

**** WARNING ** WARNING ** WARNING ** WARNING ****
This document is intended for informational purposes only.

Users are cautioned that Caltrans does not assume any liability or responsibility based on these electronic files or for any defective or incomplete copying, excerpting, scanning, faxing or downloading of the contract documents. As always, for the official paper versions of the bidders and non-bidder packages, write to the California Department of Transportation, Plans and Bid Documents, Room 0200, P.O. Box 942874, Sacramento, CA 94272-0001, telephone (916) 654-4490 or fax (916) 654-7028. Office hours are 7:30 a.m. to 4:15 p.m. When ordering bidder or non-bidder packages it is important that you include a telephone and fax number, P.O. Box and street address so that you can receive addenda.

Note: Addenda information is NOT included with the electronic documents available via electronic file transfer. Only bidder or non-bidder package holders listed with the Caltrans Plans and Bid Documents section as described above will receive addenda information.



STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

NOTICE TO CONTRACTORS
AND
SPECIAL PROVISIONS

FOR CONSTRUCTION ON STATE HIGHWAY IN

**SAN DIEGO COUNTY IN SAN DIEGO, LA MESA, EL CAJON AND SANTEE FROM 0.3 MILE NORTH OF
AMAYA DRIVE OVERCROSSING TO 0.7 MILE SOUTH OF PROSPECT AVENUE UNDERCROSSING**

DISTRICT 11, ROUTE 125

**For Use in Connection with Standard Specifications Dated JULY 1992 and Labor Surcharge and Equipment Rental
Rates.**

CONTRACT NO. 11-010734

11-SD-125-19.0/21.3

Bids Open: July 20, 2000
Dated: May 22, 2000

OSD

IMPORTANT SPECIAL NOTICES

The bidder's attention is directed to Section 5, containing specifications for "Disputes Review Board," of the Special Provisions, regarding establishing a Disputes Review Board (DRB) for the project.

Caltrans is conducting a pilot program in cooperation with Surety 2000, to test electronic bond verification systems. The purpose of the pilot program is to test the use of Surety 2000 for verifying a bidder's bond electronically.

Surety 2000 is an Internet-based surety verification and security system, developed in conjunction with the surety industry. Surety agents may contact Surety 2000 at 1-800-660-3263.

Bidders are encouraged to participate in the pilot program. To participate, the bidder is asked to provide the "Authorization Code" provided by Surety 2000, on a separate sheet, together with the standard bidder's bond required by the specifications. The bidder's surety agent may obtain the "Authorization Code" from Surety 2000.

The Department will use the "Authorization Code" to access the Surety 2000 database, and independently verify the actual bidder's bond and document the functioning of the Surety 2000 system.

"Authorization Codes" will be used only to verify bidder's bonds, and only as part of the pilot program. The use of "Authorization Codes" will not be accepted in lieu of the bidder's bond or other bidder's security required in the specifications during the pilot study.

The function of the Surety 2000 system is to provide an easier way for Contractors to protect their bid security, and to discourage fraud. This system is available to all California admitted sureties and surety agents.

The results of the pilot study will be tabulated, and at some time in the future, the Department may consider accepting electronic bidder's bond verification in lieu of the bidder's bond specified.

SPECIAL NOTICE

Caltrans is conducting a pilot program in cooperation with Surety 2000, to test electronic bond verification systems. The purpose of the pilot program is to test the use of Surety 2000 for verifying a bidder's bond electronically.

Surety 2000 is an Internet-based surety verification and security system, developed by the surety industry. Surety agents may contact Surety 2000 at 1-800-660-3263.

Bidders are encouraged to participate in the pilot program. To participate, the bidder is asked to provide the "Authorization Code" provided by Surety 2000, on a separate sheet, together with the standard bidder's bond required by the specifications. The bidder's surety agent may obtain the "Authorization Code" from Surety 2000.

The Department will use the "Authorization Code" to access the Surety 2000 database, and independently verify the actual bidder's bond and document the functioning of the Surety 2000 system.

"Authorization Codes" will be used only to verify bidder's bonds, and only as part of the pilot program. The use of "Authorization Codes" will not be accepted in lieu of the bidder's bond or other bidder's security required in the specifications during the pilot study.

The function of the Surety 2000 system is to provide an easier way for Contractors to protect their bid security, and to discourage fraud. This system is available to all California admitted sureties and surety agents.

The results of the pilot study will be tabulated, and at some time in the future, the Department may consider accepting electronic bidder's bond verification in lieu of the bidder's bond specified.

The Caltrans District 11 Office is located at 2829 Juan Street, San Diego, CA. 92110. The mailing address is P.O. Box 85406, San Diego, CA. 92186-5406, E-mail address of the Duty Senior is: Duty_Senior_Const_District11@dot.ca.gov, or by fax at (619) 688-6988. The District 11 Duty Senior telephone number is (619) 688-6635.

The Website address for posting of questions and responses is: www.dot.ca.gov/dist11/construc/

TABLE OF CONTENTS

NOTICE TO CONTRACTORS.....	1
COPY OF ENGINEER'S ESTIMATE	3
SPECIAL PROVISIONS	12
SECTION 1. SPECIFICATIONS AND PLANS	12
SECTION 2. PROPOSAL REQUIREMENTS AND CONDITIONS.....	12
2-1.01 GENERAL.....	12
2-1.02 DISABLED VETERAN BUSINESS ENTERPRISE (DVBE).....	12
2-1.03 DVBE GOAL FOR THIS PROJECT	13
2-1.04 SUBMISSION OF DVBE INFORMATION	13
2-1.05 SMALL BUSINESS PREFERENCE.....	14
2-1.06 CALIFORNIA COMPANY PREFERENCE.....	15
SECTION 3. AWARD AND EXECUTION OF CONTRACT.....	15
SECTION 4. BEGINNING OF WORK, TIME OF COMPLETION AND LIQUIDATED DAMAGES	16
SECTION 5. GENERAL	16
SECTION 5-1. MISCELLANEOUS	16
5-1.00 PLANS AND WORKING DRAWINGS	16
5-1.002 LABORATORY	16
5-1.005 CONTRACT BONDS	16
5-1.01 LABOR NONDISCRIMINATION.....	17
5-1.02 LABOR CODE REQUIREMENTS	17
5-1.03 CONTRACTOR'S LICENSING LAWS	19
5-1.035 INDEMNIFICATION AND INSURANCE.....	20
5-1.04 ARBITRATION	22
5-1.05 NOTICE OF POTENTIAL CLAIM.....	22
5-1.06 PARTIAL PAYMENTS	23
5-1.07 PAYMENT OF WITHHELD FUNDS.....	23
5-1.08 FINAL PAYMENT AND CLAIMS.....	23
5-1.09 INTEREST ON PAYMENTS	25
5-1.10 PUBLIC SAFETY	25
5-1.11 SURFACE MINING AND RECLAMATION ACT.....	26
5-1.12 REMOVAL OF ASBESTOS AND HAZARDOUS SUBSTANCES.....	26
5-1.13 FINAL PAY QUANTITIES.....	27
5-1.14 YEAR 2000 COMPLIANCE.....	27
5-1.15 SUBCONTRACTOR AND DVBE RECORDS.....	27
5-1.155 PERFORMANCE OF DVBE SUBCONTRACTORS AND SUPPLIERS	27
5-1.16 SUBCONTRACTING.....	28
5-1.162 PROMPT PROGRESS PAYMENT TO SUBCONTRACTORS	28
5-1.17 PARTNERING	29
5-1.18 DISPUTES REVIEW BOARD	29
5-1.19 PALEONTOLOGY	38
5-1.20 PRE-CONSTRUCTION SURVEY	39
5-1.21 CLAIMS SUBMITTAL	40
5-1.22 COMPENSATION ADJUSTMENTS FOR PRICE INDEX FLUCTUATIONS.....	41
5-1.23 AREAS FOR CONTRACTOR'S USE.....	42
5-1.24 PAYMENTS.....	42
5-1.25 SOUND CONTROL REQUIREMENTS.....	43
5-1.26 TEMPORARY FIRE PROTECTION	43
SECTION 6. (BLANK).....	43
SECTION 7. (BLANK).....	43
SECTION 8. MATERIALS	43
SECTION 8-1. MISCELLANEOUS	43
8-1.01 PREQUALIFIED AND TESTED SIGNING AND DELINEATION MATERIALS	43
8-1.02 STATE-FURNISHED MATERIALS	49
8-1.03 SLAG AGGREGATE.....	49

8-1.04 MEASUREMENT OF QUANTITIES	50
8-1.05 ENGINEERING FABRICS	51
SECTION 8-2. CONCRETE.....	51
8-2.01 PORTLAND CEMENT CONCRETE.....	51
8-2.02 CEMENT AND WATER CONTENT	61
SECTION 8-3. WELDING	61
8-3.01 WELDING ELECTRODES	61
8-3.02 WELDING QUALITY CONTROL	61
SECTION 9. DESCRIPTION OF BRIDGE WORK.....	65
SECTION 10. CONSTRUCTION DETAILS.....	66
SECTION 10-1. GENERAL	66
10-1.00 CONSTRUCTION PROJECT INFORMATION SIGNS	66
10-1.01 ORDER OF WORK.....	66
10-1.02 WATER POLLUTION CONTROL.....	67
10-1.03 TEMPORARY EROSION CONTROL.....	72
10-1.04 TEMPORARY CULVERTS	72
10-1.05 TEMPORARY INLET	73
10-1.06 TEMPORARY FIBER ROLL	73
10-1.07 TEMPORARY SILT FENCE.....	74
10-1.08 TEMPORARY FENCES (TYPE CL-6, SLATTED).....	75
10-1.09 PRESERVATION OF PROPERTY	76
10-1.10 TEMPORARY STRAW BALE BARRIER.....	76
10-1.11 TEMPORARY GRAVEL BAG.....	77
10-1.12 TEMPORARY CONCRETE WASHOUT.....	77
10-1.13 TEMPORARY CONSTRUCTION ENTRANCE.....	78
10-1.14 DAMAGE REPAIR.....	78
10-1.15 RELIEF FROM MAINTENANCE AND RESPONSIBILITY.....	79
10-1.16 COOPERATION	79
10-1.17 PROGRESS SCHEDULE (CRITICAL PATH).....	79
10-1.18 OBSTRUCTIONS	86
10-1.19 MOBILIZATION	88
10-1.20 CONSTRUCTION AREA SIGNS	88
10-1.21 MAINTAINING TRAFFIC.....	89
10-1.22 CLOSURE REQUIREMENTS AND CONDITIONS	99
10-1.23 TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE.....	100
10-1.24 TEMPORARY PAVEMENT DELINEATION	102
10-1.25 BARRICADES	105
10-1.26 PORTABLE CHANGEABLE MESSAGE SIGN.....	105
10-1.27 TEMPORARY RAILING	105
10-1.28 TRAFFIC PLASTIC DRUMS.....	106
10-1.29 CHANNELIZERS	106
10-1.30 TEMPORARY CRASH CUSHION MODULE.....	107
10-1.31 EXISTING HIGHWAY FACILITIES	108
10-1.31A ABANDON CULVERTS AND PIPE LINES	108
10-1.31B ABANDON INLETS.....	109
10-1.31C REMOVE GUARD RAILING	109
10-1.31D REMOVE PAVEMENT MARKERS	109
10-1.31E REMOVE TRAFFIC STRIPES AND PAVEMENT MARKINGS	109
10-1.31F REMOVE CHANNELIZERS	109
10-1.31G REMOVE ROADSIDE SIGNS.....	110
10-1.31H REMOVE ROADSIDE SIGN PANEL.....	110
10-1.31I RESET ROADSIDE SIGNS.....	110
10-1.31J RELOCATE ROADSIDE SIGNS	110
10-1.31K REMOVE BASE AND SURFACING.....	110
10-1.31L COLD PLANE ASPHALT CONCRETE PAVEMENT	110
10-1.31M REMOVE CONCRETE BARRIER (TYPE K).....	111
10-1.31N REMOVE CRASH CUSHION (SAND FILLED).....	111
10-1.31O ADJUST FRAMES AND COVERS AND FRAMES AND GRATES TO GRADE.....	111
10-1.31P REMOVE CONCRETE.....	111

10-1-32	JACK SUPERSTRUCTURE	111
10-1.33	CLEARING AND GRUBBING.....	112
10-1.34	WATERING.....	112
10-1.35	EARTHWORK.....	112
10-1.36	CONTROLLED LOW STRENGTH MATERIAL	113
10-1.37	NATIVE TOPSOIL	114
10-1.38	IRRIGATION CROSSOVERS	115
10-1.39	MODIFY IRRIGATION CROSSOVERS.....	115
10-1.40	WATER SUPPLY LINE (BRIDGE).....	116
10-1.41	4 INCH CONDUIT.....	118
10-1.42	FINISHING ROADWAY.....	118
10-1.43	AGGREGATE BASE.....	118
10-1.44	TREATED PERMEABLE BASE	119
10-1.45	ASPHALT CONCRETE	119
10-1.46	CONCRETE PAVEMENT.....	123
10-1.47	PILING	125
10-1.48	PRESTRESSING CONCRETE.....	128
10-1.49	CONCRETE STRUCTURES.....	129
10-1.50	STRUCTURE APPROACH SLABS (TYPE N) AND (TYPE EQ)	133
10-1.51	SOUND WALL	135
10-1.52	SEALING JOINTS	137
10-1.53	ARCHITECTURAL SURFACE (TEXTURED CONCRETE)	138
10-1.54	REINFORCEMENT.....	139
10-1.55	STRAY CURRENT PROTECTION.....	144
10-1.56	SIGN STRUCTURES.....	145
10-1.57	ROADSIDE SIGNS.....	150
10-1.58	INSTALL ROADSIDE SIGN PANELS ON EXISTING POSTS	150
10-1.59	INSTALL SIGN PANELS ON EXISTING FRAMES	151
10-1.60	INSTALL SIGN OVERLAY	151
10-1.61	ALTERNATIVE PIPE	151
10-1.62	CORRUGATED METAL PIPE	151
10-1.63	EDGE DRAINS.....	152
10-1.64	OVERSIDE DRAINS.....	152
10-1.65	MISCELLANEOUS FACILITIES.....	152
10-1.66	SLOPE PROTECTION	152
10-1.67	SLOPE PAVING - (CONCRETE).....	153
10-1.68	SLOPE PAVING (MASONRY BLOCK).....	153
10-1.69	MISCELLANEOUS CONCRETE CONSTRUCTION	155
10-1.70	MISCELLANEOUS IRON AND STEEL.....	156
10-1.71	MISCELLANEOUS METAL (BRIDGE).....	156
10-1.72	CHAIN LINK FENCE.....	158
10-1.73	DELINEATORS.....	159
10-1.74	METAL BEAM GUARD RAILING	159
10-1.75	CHAIN LINK RAILING.....	160
10-1.76	TUBULAR HANDRAILING RAILING	160
10-1.77	CABLE RAILING	160
10-1.78	CONCRETE BARRIER.....	160
10-1.79	THERMOPLASTIC TRAFFIC STRIPES AND PAVEMENT MARKINGS.....	160
10-1.80	PAINT TRAFFIC STRIPES AND PAVEMENT MARKINGS	161
10-1.81	PAVEMENT MARKERS	161
SECTION 10-2.	HIGHWAY PLANTING AND IRRIGATION SYSTEMS	162
10-2.01	GENERAL.....	162
10-2.01A	COST BREAK-DOWN.....	162
10-2.02	EXISTING HIGHWAY PLANTING.....	166
10-2.02A	MAINTAIN EXISTING PLANTS.....	166
10-2.03	EXISTING HIGHWAY IRRIGATION FACILITIES.....	166
10-2.03A	CHECK AND TEST EXISTING IRRIGATION FACILITIES	166
10-2.04	HIGHWAY PLANTING.....	166
10-2.04A	HIGHWAY PLANTING MATERIALS	167

10-2.04B	ROADSIDE CLEARING	167
10-2.04C	PESTICIDES	168
10-2.04D	PREPARING PLANTING AREAS	168
10-2.04E	PLANTING	169
10-2.04F	HYDROSEEDING	169
10-2.04G	PLANT ESTABLISHMENT WORK	170
10-2.05	IRRIGATION SYSTEMS	171
10-2.05A	ELECTRIC AUTOMATIC IRRIGATION COMPONENTS	171
10-2.05B	IRRIGATION SYSTEMS FUNCTIONAL TEST	175
10-2.05C	IRRIGATION SYSTEMS FUNCTIONAL TEST	175
10-2.05D	PIPE	175
10-2.05E	BACKFLOW PREVENTER ASSEMBLIES	176
10-2.05F	SPRINKLERS	177
10-2.05G	FINAL IRRIGATION SYSTEM CHECK	177
SECTION 10-3.	SIGNALS, LIGHTING AND ELECTRICAL SYSTEMS	178
10-3.01	DESCRIPTION	178
10-3.02	COST BREAK-DOWN	178
10-3.03	MAINTAINING EXISTING AND TEMPORARY ELECTRICAL SYSTEMS	179
10-3.04	EXCAVATING AND BACKFILLING	179
10-3.05	FOUNDATIONS	179
10-3.06	STANDARDS, STEEL PEDESTALS AND POSTS	180
10-3.07	CONDUIT	181
10-3.08	MULTIDUCT CONDUIT SYSTEM	182
10-3.09	PULL BOXES	182
10-3.09A	TRAFFIC PULL BOXES	182
10-3.10	CONDUCTORS AND WIRING	183
10-3.11	SERVICE	183
10-3.12	ELECTRIC SERVICE (IRRIGATION)	184
10-3.13	NUMBERING ELECTRICAL EQUIPMENT	184
10-3.14	STATE-FURNISHED CONTROLLER ASSEMBLIES	184
10-3.15	TELEPHONE DEMARCATION CABINET	184
10-3.16	IRRIGATION CONTROLLER ENCLOSURE CABINET	185
10-3.17	VEHICLE SIGNAL FACES AND SIGNAL HEADS	185
10-3.18	LIGHT EMITTING DIODE SIGNAL MODULES	185
10-3.19	LIGHT EMITTING DIODE PEDESTRIAN SIGNAL FACE "UPRAISED HAND" MODULE	189
10-3.20	PEDESTRIAN SIGNALS	191
10-3.21	FLASHING BEACONS	191
10-3.22	DETECTORS	191
10-3.23	PEDESTRIAN PUSH BUTTONS	192
10-3.24	LOW PRESSURE SODIUM LUMINAIRES	192
10-3.25	SOFFIT AND WALL LUMINAIRES	194
10-3.26	PHOTOELECTRIC CONTROLS	194
10-3.27	REMOVING, REINSTALLING OR SALVAGING ELECTRICAL EQUIPMENT	194
10-3.28	PAYMENT	194
SECTION 10-4.	RELOCATION OF UTILITY FACILITIES	194
10-4.01	GENERAL DESCRIPTION	194
10-4.02	WATER SYSTEM RELOCATION	200
10-4.03	CATHODIC PROTECTION TEST STATION	217
10-4.04	WATER PIPE RELOCATION MEASUREMENT AND PAYMENT	226

DEPARTMENT OF TRANSPORTATION

NOTICE TO CONTRACTORS

CONTRACT NO. 11-010734

11-SD-125-19.0/21.3

Sealed proposals for the work shown on the plans entitled:

STATE OF CALIFORNIA; DEPARTMENT OF TRANSPORTATION; PROJECT PLANS FOR CONSTRUCTION ON STATE HIGHWAY IN SAN DIEGO COUNTY IN SAN DIEGO, LA MESA, EL CAJON AND SANTEE FROM 0.3 MILE NORTH OF AMAYA DRIVE OVERCROSSING TO 0.7 MILE SOUTH OF PROSPECT AVENUE UNDERCROSSING

will be received at the Department of Transportation, 3347 Michelson Drive, Suite 100, Irvine, CA 92612-1692, until 2 o'clock p.m. on July 20, 2000, at which time they will be publicly opened and read in Room C - 1116 at the same address.

Proposal forms for this work are included in a separate book entitled:

STATE OF CALIFORNIA; DEPARTMENT OF TRANSPORTATION; PROPOSAL AND CONTRACT FOR CONSTRUCTION ON STATE HIGHWAY IN SAN DIEGO COUNTY IN SAN DIEGO, LA MESA, EL CAJON AND SANTEE FROM 0.3 MILE NORTH OF AMAYA DRIVE OVERCROSSING TO 0.7 MILE SOUTH OF PROSPECT AVENUE UNDERCROSSING

General work description: New multilane highway and bridges to be constructed.

This project has a goal of 3 percent disabled veteran business enterprise (DVBE) participation.

No prebid meeting is scheduled for this project.

Bids are required for the entire work described herein.

At the time this contract is awarded, the Contractor shall possess either a Class A license or a combination of any of the following Class C licenses which constitutes a majority of the work: C-8, C-12.

The Contractor must also be properly licensed at the time the bid is submitted, except that on a joint venture bid a joint venture license may be obtained by a combination of licenses after bid opening but before award in conformance with Business and Professions Code, Section 7029.1.

This contract is subject to state contract nondiscrimination and compliance requirements pursuant to Government Code, Section 12990.

Preference will be granted to bidders properly certified as a "Small Business" as determined by the Department of General Services, Office of Small Business Certification and Resources at the time of bid opening in conformance with the provisions in Section 2-1.05, "Small Business Preference," of the special provisions, and Section 1896 et seq, Title 2, California Code of Regulations. A form for requesting a "Small Business" preference is included with the bid documents. Applications for status as a "Small Business" must be submitted to the Department of General Services, Office of Small Business Certification and Resources, 1531 "I" Street, Second Floor, Sacramento, CA 95814, Telephone No. (916) 322-5060.

A reciprocal preference will be granted to "California company" bidders in conformance with Section 6107 of the Public Contract Code. (See Sections 2 and 3 of the special provisions.) A form for indicating whether bidders are or are not a "California company" is included in the bid documents and is to be filled in and signed by all bidders.

Project plans, special provisions, and proposal forms for bidding this project can only be obtained at the Department of Transportation, Plans and Bid Documents, Room 0200, MS #26, Transportation Building, 1120 N Street, Sacramento, California 95814, FAX No. (916) 654-7028, Telephone No. (916) 654-4490. Use FAX orders to expedite orders for project plans, special provisions and proposal forms. FAX orders must include credit card charge number, card expiration date and authorizing signature. Project plans, special provisions, and proposal forms may be seen at the above Department of Transportation office and at the offices of the District Directors of Transportation at Irvine, Oakland, and the district in which the work is situated. Standard Specifications are available through the State of California, Department of Transportation, Publications Unit, 1900 Royal Oaks Drive, Sacramento, CA 95815, Telephone No. (916) 445-3520.

Cross sections for this project are available at the office of the District Director of Transportation of the district in which the work is situated in paper copy format.

The successful bidder shall furnish a payment bond and a performance bond.

Pursuant to Section 1773 of the Labor Code, the general prevailing wage rates in the county, or counties, in which the work is to be done have been determined by the Director of the California Department of Industrial Relations. These wages are set forth in the General Prevailing Wage Rates for this project, available at the Labor Compliance Office at the offices of the District Director of Transportation for the district in which the work is situated, and available from the California Department of Industrial Relations' Internet Web Site at: <http://www.dir.ca.gov>. Future effective general prevailing wage rates which have been predetermined and are on file with the Department of Industrial Relations are referenced but not printed in the general prevailing wage rates.

DEPARTMENT OF TRANSPORTATION

Deputy Director Transportation Engineering

Dated May 22, 2000

DJC

**COPY OF ENGINEER'S ESTIMATE
(NOT TO BE USED FOR BIDDING PURPOSES)**

11-010734

Item	Item Code	Item	Unit of Measure	Estimated Quantity
1	018401	PRECONSTRUCTION SURVEY	LS	LUMP SUM
2	070010	PROGRESS SCHEDULE (CRITICAL PATH)	LS	LUMP SUM
3	018402	TEMPORARY FIRE PROTECTION	LS	LUMP SUM
4 (S)	018403	TEMPORARY FENCE (TYPE CL-6, SLATTED)	LF	2300
5 (S)	073000	TEMPORARY CULVERT	LF	490
6 (S)	018404	TEMPORARY INLET	EA	3
7	074019	PREPARE STORM WATER POLLUTION PREVENTION PLAN	LS	LUMP SUM
8	074020	WATER POLLUTION CONTROL	LS	LUMP SUM
9 (S)	074023	TEMPORARY EROSION CONTROL	ACRE	29
10	074028	TEMPORARY FIBER ROLL	LF	13 400
11	074029	TEMPORARY SILT FENCE	LF	20 300
12	018405	TEMPORARY STRAW BALE BARRIER	EA	380
13	018406	TEMPORARY GRAVEL BAG	EA	6600
14	018407	TEMPORARY CONCRETE WASHOUT	EA	2
15	018408	TEMPORARY CONSTRUCTION ENTRANCE	EA	2
16 (S)	120090	CONSTRUCTION AREA SIGNS	LS	LUMP SUM
17 (S)	120100	TRAFFIC CONTROL SYSTEM	LS	LUMP SUM
18 (S)	120116	TYPE II BARRICADE	EA	11
19 (S)	120120	TYPE III BARRICADE	EA	32
20 (S)	120149	TEMPORARY PAVEMENT MARKING (PAINT)	SQFT	1690

Item	Item Code	Item	Unit of Measure	Estimated Quantity
21 (S)	120159	TEMPORARY TRAFFIC STRIPE (PAINT)	LF	30 860
22 (S)	120165	CHANNELIZER (SURFACE MOUNTED)	EA	81
23 (S)	018409	TRAFFIC PLASTIC DRUM	EA	140
24 (S)	120300	TEMPORARY PAVEMENT MARKER	EA	2160
25 (S)	128650	PORTABLE CHANGEABLE MESSAGE SIGN	EA	6
26 (S)	129000	TEMPORARY RAILING (TYPE K)	LF	25 900
27 (S)	129100	TEMPORARY CRASH CUSHION MODULE	EA	120
28	150206	ABANDON CULVERT	EA	4
29	150221	ABANDON INLET	EA	2
30	150227	ABANDON PIPELINE	EA	2
31	150662	REMOVE METAL BEAM GUARD RAILING	LF	65
32	150717	REMOVE TRAFFIC STRIPE AND PAVEMENT MARKING	SQFT	29 800
33	150730	REMOVE CHANNELIZERS	EA	72
34	150742	REMOVE ROADSIDE SIGN	EA	43
35	152390	RELOCATE ROADSIDE SIGN	EA	6
36 (S)	153112	COLD PLANE ASPHALT CONCRETE PAVEMENT (.15' MAXIMUM)	SQYD	720
37	153210	REMOVE CONCRETE	CY	55
38	153229	REMOVE CONCRETE BARRIER (TYPE K)	LF	5760
39	156590	REMOVE CRASH CUSHION (SAND FILLED)	EA	24
40	048234	JACK SUPERSTRUCTURE	LS	LUMP SUM

Item	Item Code	Item	Unit of Measure	Estimated Quantity
41	160101	CLEARING AND GRUBBING	LS	LUMP SUM
42	170101	DEVELOP WATER SUPPLY	LS	LUMP SUM
43	190101	ROADWAY EXCAVATION	CY	957 000
44 (F)	192003	STRUCTURE EXCAVATION (BRIDGE)	CY	4475
45 (F)	192037	STRUCTURE EXCAVATION (RETAINING WALL)	CY	7652
46 (F)	193003	STRUCTURE BACKFILL (BRIDGE)	CY	5365
47 (F)	193013	STRUCTURE BACKFILL (RETAINING WALL)	CY	6072
48	193031	PERVIOUS BACKFILL MATERIAL (RETAINING WALL)	CY	470
49	193114	SAND BACKFILL	CY	61
50 (S)	200001	HIGHWAY PLANTING	LS	LUMP SUM
51 (S)	018410	NATIVE TOPSOIL	SQYD	34 400
52 (S)	204099	PLANT ESTABLISHMENT WORK	LS	LUMP SUM
53 (S)	208000	IRRIGATION SYSTEM	LS	LUMP SUM
54	208029	4" SUPPLY LINE (BRIDGE)	LF	606
55 (S)	208706	4" CONDUIT	LF	520
56 (S)	208738	8" CORRUGATED HIGH DENSITY POLYETHYLENE PIPE CONDUIT	LF	3130
57 (S)	018411	MODIFY IRRIGATION CROSSOVER	LS	LUMP SUM
58	220101	FINISHING ROADWAY	LS	LUMP SUM
59	260201	CLASS 2 AGGREGATE BASE	CY	72 100
60	290201	ASPHALT TREATED PERMEABLE BASE	CY	4700

Item	Item Code	Item	Unit of Measure	Estimated Quantity
61	390155	ASPHALT CONCRETE (TYPE A)	TON	22 200
62	390171	ASPHALT CONCRETE BASE (TYPE A)	TON	16 400
63	394001	PLACE ASPHALT CONCRETE DIKE	LF	29 300
64	394002	PLACE ASPHALT CONCRETE (MISCELLANEOUS AREA)	SQYD	3080
65	397007	ASPHALTIC EMULSION (FOG SEAL COAT AND PAINT BINDER)	TON	14
66	401000	CONCRETE PAVEMENT	CY	14 000
67	404092	SEAL PAVEMENT JOINT	LF	71 600
68 (S)	500001	PRESTRESSING CAST-IN-PLACE CONCRETE	LS	LUMP SUM
69 (F)	510051	STRUCTURAL CONCRETE, BRIDGE FOOTING	CY	1305
70 (F)	510053	STRUCTURAL CONCRETE, BRIDGE	CY	5435
71 (F)	510085	STRUCTURAL CONCRETE, APPROACH SLAB (TYPE EQ)	CY	51
72 (F)	510086	STRUCTURAL CONCRETE, APPROACH SLAB (TYPE N)	CY	320
73 (F)	510108	CLASS A CONCRETE (RETAINING WALL)	CY	2164
74 (F)	510502	MINOR CONCRETE (MINOR STRUCTURE)	CY	228
75 (F)	018412	RIBBED TEXTURE	SQFT	8360
76 (F)	511064	FRACTURED RIB TEXTURE	SQFT	15 650
77 (S-F)	518002	SOUND WALL (MASONRY BLOCK)	SQFT	18 300
78 (S)	519085	JOINT SEAL (TYPE B-MR 1")	LF	290
79 (S)	519087	JOINT SEAL (TYPE B-MR 2")	LF	180
80 (S-F)	520102	BAR REINFORCING STEEL (BRIDGE)	LB	1 322 000

Item	Item Code	Item	Unit of Measure	Estimated Quantity
81 (S-F)	520103	BAR REINFORCING STEEL (RETAINING WALL)	LB	206 621
82 (F)	560213	FURNISH SIGN STRUCTURE (LIGHTWEIGHT)	LB	18 700
83 (S-F)	560214	INSTALL SIGN STRUCTURE (LIGHTWEIGHT)	LB	18 700
84 (S-F)	560218	FURNISH SIGN STRUCTURE (TRUSS)	LB	101 380
85 (S-F)	560219	INSTALL SIGN STRUCTURE (TRUSS)	LB	101 380
86 (F)	560223	FURNISH SIGN STRUCTURE (BRIDGE MOUNTED WITHOUT WALKWAY)	LB	870
87 (S-F)	560224	INSTALL SIGN STRUCTURE (BRIDGE MOUNTED WITHOUT WALKWAY)	LB	870
88 (S)	561004	30" CAST-IN-DRILLED-HOLE CONCRETE PILE (SIGN FOUNDATION)	LF	110
89 (S)	561005	36" CAST-IN-DRILLED-HOLE CONCRETE PILE (SIGN FOUNDATION)	LF	170
90	566011	ROADSIDE SIGN - ONE POST	EA	88
91	566012	ROADSIDE SIGN - TWO POST	EA	19
92	568007	INSTALL SIGN OVERLAY	SQFT	180
93	568016	INSTALL SIGN PANEL ON EXISTING FRAME	SQFT	310
94	568017	INSTALL ROADSIDE SIGN PANEL ON EXISTING POST	EA	3
95	568023	INSTALL ROADSIDE SIGN (LAMINATED WOOD BOX POST)	EA	2
96	620100	18" ALTERNATIVE PIPE CULVERT	LF	17
97	620140	24" ALTERNATIVE PIPE CULVERT	LF	5740
98	620220	36" ALTERNATIVE PIPE CULVERT	LF	3480
99	665817	18" BITUMINOUS COATED SLOTTED CORRUGATED STEEL PIPE (079" THICK)	LF	240
100	681103	3" PLASTIC PIPE (EDGE DRAIN)	LF	12 900

Item	Item Code	Item	Unit of Measure	Estimated Quantity
101	681107	3" PLASTIC PIPE (EDGE DRAIN OUTLET)	LF	1130
102	690224	24" BITUMINOUS COATED CORRUGATED STEEL PIPE DOWNDRAIN (.109" THICK)	LF	230
103	705930	10" GATE VALVE	EA	2
104	707417	36" PRECAST CONCRETE PIPE RISER	LF	25
105	018413	10" CEMENT MORTAR LINED AND EPOXY COATED STEEL PIPE	LF	370
106	018414	16" CEMENT MORTAR LINED AND EPOXY COATED STEEL PIPE	LF	370
107	018415	10" POLYVINYL CHLORIDE PIPE C900, CLASS 150	LF	820
108	018416	16" POLYVINYL CHLORIDE PIPE C905, PR235	LF	1380
109	018417	CATHODIC PROTECTION TEST STATION	EA	4
110	018418	1" AUTOMATIC AIR VACUUM COMBINATION VALVE ASSEMBLY	EA	2
111	018419	2" AUTOMATIC AIR VACCUM COMBINATION VALVE ASSEMBLY	EA	1
112	018420	18" PIPE CASING	LF	40
113	018421	30" PIPE CASING	LF	40
114	018422	2" BLOW OFF ASSEMBLY	EA	1
115	018423	16" BUTTERFLY VALVE (FLG)	EA	2
116	018424	16" BUTTERFLY VALVE (TEMPORARY)(FLG)	EA	2
117 (F)	721810	SLOPE PAVING (CONCRETE)	CY	64
118 (F)	721811	SLOPE PAVING (MASONRY BLOCK)	SQFT	4070
119	727902	MINOR CONCRETE (SLOPE PROTECTION)	CY	1750
120	731502	MINOR CONCRETE (MISCELLANEOUS CONSTRUCTION)	CY	410

Item	Item Code	Item	Unit of Measure	Estimated Quantity
121	731517	MINOR CONCRETE (GUTTER)	CY	33
122	018425	MINOR CONCRETE (COLORED)	CY	2000
123	018426	MINOR CONCRETE (GROOVED)	SQFT	730
124 (S-F)	750001	MISCELLANEOUS IRON AND STEEL	LB	29 940
125 (S-F)	750501	MISCELLANEOUS METAL (BRIDGE)	LB	1330
126 (S)	800361	CHAIN LINK FENCE (TYPE CL-6, VINYL-CLAD)	LF	2520
127 (S)	800365	CHAIN LINK FENCE (TYPE CL-6, SLATTED)	LF	680
128	820107	DELINEATOR (CLASS 1)	EA	190
129 (S)	832001	METAL BEAM GUARD RAILING	LF	1510
130 (S-F)	833032	CHAIN LINK RAILING (TYPE 7)	LF	777
131 (S)	833088	TUBULAR HANDRAILING	LF	590
132 (F)	833125	CONCRETE BARRIER (TYPE 25)	LF	1255
133	833127	CONCRETE BARRIER (TYPE 25B)	LF	760
134	833129	CONCRETE BARRIER (TYPE 25A MODIFIED)	LF	280
135 (F)	833142	CONCRETE BARRIER (TYPE 26 MODIFIED)	LF	388
136	833143	CONCRETE BARRIER (TYPE 26A MODIFIED)	LF	590
137 (S-F)	839521	CABLE RAILING	LF	950
138 (S)	839530	CABLE ANCHOR ASSEMBLY	EA	8
139 (S)	839532	CABLE ANCHOR ASSEMBLY (BREAKAWAY, TYPE B)	EA	5
140 (S)	839551	TERMINAL SECTION (TYPE B)	EA	3

Item	Item Code	Item	Unit of Measure	Estimated Quantity
141 (S)	839565	TERMINAL SYSTEM (TYPE SRT)	EA	8
142 (S)	839570	RETURN SECTION	EA	8
143 (S)	840505	6" THERMOPLASTIC TRAFFIC STRIPE	LF	720
144 (S)	840506	8" THERMOPLASTIC TRAFFIC STRIPE	LF	10 300
145 (S)	840508	8" THERMOPLASTIC TRAFFIC STRIPE (BROKEN 12-3)	LF	4400
146 (S)	840515	THERMOPLASTIC PAVEMENT MARKING	SQFT	4030
147 (S)	840521	4" THERMOPLASTIC TRAFFIC STRIPE (BROKEN 6-1)	LF	780
148 (S)	840526	4" THERMOPLASTIC TRAFFIC STRIPE (BROKEN 17-7)	LF	1200
149 (S)	840656	PAINT TRAFFIC STRIPE (2-COAT)	LF	125 200
150 (S)	850101	PAVEMENT MARKER (NON-REFLECTIVE)	EA	4200
151 (S)	850102	PAVEMENT MARKER (REFLECTIVE)	EA	3100
152 (S)	860251	SIGNAL AND LIGHTING (LOCATION 1)	LS	LUMP SUM
153 (S)	860252	SIGNAL AND LIGHTING (LOCATION 2)	LS	LUMP SUM
154 (S)	860253	SIGNAL AND LIGHTING (LOCATION 3)	LS	LUMP SUM
155 (S)	860254	SIGNAL AND LIGHTING (LOCATION 4)	LS	LUMP SUM
156 (S)	018427	SIGNAL AND LIGHTING (LOCATION 3, STAGE 2)	LS	LUMP SUM
157 (S)	018428	SIGNAL AND LIGHTING (LOCATION 3, STAGE 4)	LS	LUMP SUM
158 (S)	018429	SIGNAL AND LIGHTING (LOCATION 3, STAGE 5)	LS	LUMP SUM
159 (S)	018430	LIGHTING (BIKE PATH)	LS	LUMP SUM
160 (S)	860460	LIGHTING AND SIGN ILLUMINATION	LS	LUMP SUM

Item	Item Code	Item	Unit of Measure	Estimated Quantity
161 (S)	860640	IRRIGATION CONTROLLER ENCLOSURE CABINET	EA	4
162 (S)	860792	COMMUNICATION CONDUIT (BRIDGE)	LF	460
163 (S)	860796	SPRINKLER CONTROL CONDUIT (BRIDGE)	LF	840
164 (S)	860797	ELECTRIC SERVICE (IRRIGATION)	LS	LUMP SUM
165 (S)	861100	RAMP METERING SYSTEM	LS	LUMP SUM
166	999990	MOBILIZATION	LS	LUMP SUM

**STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION**

SPECIAL PROVISIONS

Annexed to Contract No. 11-010734

SECTION 1. SPECIFICATIONS AND PLANS

The work embraced herein shall conform to the provisions in the Standard Specifications dated July 1992, and these special provisions.

Amendments to the Standard Specifications set forth in these special provisions shall be considered as part of the Standard Specifications for the purposes set forth in Section 5-1.04, "Coordination and Interpretation of Plans, Standard Specifications and Special Provisions," of the Standard Specifications. Whenever either the term "Standard Specifications is amended" or the term "Standard Specifications are amended" is used in the special provisions, the indented text following said term shall be considered an amendment to the Standard Specifications. In case of conflict between such amendments and the Standard Specifications, the amendments shall take precedence over and be used in lieu of the conflicting portions.

In case of conflict between the Standard Specifications and these special provisions, the special provisions shall take precedence over and be used in lieu of the conflicting portions.

SECTION 2. PROPOSAL REQUIREMENTS AND CONDITIONS

2-1.01 GENERAL

The bidder's attention is directed to the provisions in Section 2, "Proposal Requirements and Conditions," of the Standard Specifications and these special provisions for the requirements and conditions which the bidder must observe in the preparation of the proposal form and the submission of the bid.

In addition to the subcontractors required to be listed in conformance with Section 2-1.054, "Required Listing of Proposed Subcontractors," of the Standard Specifications, each proposal shall have listed therein the name and address of each DVBE subcontractor to be used for credit in meeting the goal, and to whom the bidder proposes to directly subcontract portions of the work. The list of subcontractors shall also set forth the portion of work that will be performed by each subcontractor listed. A sheet for listing the subcontractors is included in the Proposal.

The Bidder's Bond form mentioned in the last paragraph in Section 2-1.07, "Proposal Guaranty," of the Standard Specifications will be found following the signature page of the Proposal.

In conformance with Public Contract Code Section 7106, a Noncollusion Affidavit is included in the Proposal. Signing the Proposal shall also constitute signature of the Noncollusion Affidavit.

Submit request for substitution of an "or equal" item, and the data substantiating the request to the Department of Transportation, District 11, Construction Duty Senior MS 73, P.O. Box 85406, San Diego, CA. 92186-5400, so that the request is received by the Department by close of business on the fourth day, not including Saturdays, Sundays and legal holidays, following bid opening.

2-1.02 DISABLED VETERAN BUSINESS ENTERPRISE (DVBE)

Section 10115 of the Public Contract Code requires the Department to implement provisions to establish a goal for Disabled Veterans Business Enterprise (DVBE) in contracts.

It is the policy of the Department that Disabled Veteran Business Enterprise (DVBE) shall have the maximum opportunity to participate in the performance of contracts financed solely with state funds. The Contractor shall ensure that DVBEs have the maximum opportunity to participate in the performance of this contract and shall take all necessary and reasonable steps for this assurance. The Contractor shall not discriminate on the basis of race, color, national origin, or sex in the award and performance of subcontracts. Failure to carry out the requirements of this paragraph shall constitute a breach of contract and may result in termination of this contract or other remedy the Department may deem appropriate.

Bidder's attention is directed to the following:

- A. "Disabled Veteran Business Enterprise" (DVBE) means a business concern certified as a DVBE by the Office of Small Business Certification and Resources, Department of General Services.
- B. A DVBE may participate as a prime contractor, subcontractor, joint venture partner with a prime or subcontractor, or vendor of material or supplies.
- C. Credit for DVBE prime contractors will be 100 percent.

- D. A DVBE joint venture partner must be responsible for specific contract items of work, or portions thereof. Responsibility means actually performing, managing and supervising the work with its own forces. The DVBE joint venture partner must share in the ownership, control, management responsibilities, risks and profits of the joint venture. The DVBE joint venturer must submit the joint venture agreement with the Caltrans Bidder DVBE Information form required in Section 2-1.04, "Submission of DVBE Information," elsewhere in these special provisions.
- E. A DVBE must perform a commercially useful function, i.e., must be responsible for the execution of a distinct element of the work and must carry out its responsibility by actually performing, managing and supervising the work.
- F. Credit for DVBE vendors of materials or supplies is limited to 60 percent of the amount to be paid to the vendor for the material unless the vendor manufactures or substantially alters the goods.
- G. Credit for trucking by DVBEs will be as follows:
 - 1. One hundred percent of the amount to be paid when a DVBE trucker will perform the trucking with his/her own trucks, tractors and employees.
 - 2. Twenty percent of the amount to be paid to DVBE trucking brokers who do not have a "certified roster."
 - 3. One hundred percent of the amount to be paid to DVBE trucking brokers who have signed agreements that all trucking will be performed by DVBE truckers if credit is toward the DVBE goal, a "certified roster" showing that all trucks are owned by DVBEs, and a signed statement on the "certified roster" that indicates that 100 percent of revenue paid by the broker will be paid to the DVBEs listed on the "certified roster."
 - 4. Twenty percent of the amount to be paid to trucking brokers who are not a DVBE but who have signed agreements with DVBE truckers assuring that at least 20 percent of the trucking will be performed by DVBE truckers if credit is toward the DVBE goal, a "certified roster" showing that at least 20 percent of the number of trucks are owned by DVBE truckers, and a signed statement on the "certified roster" that indicates that at least 20 percent of the revenue paid by the broker will be paid to the DVBEs listed on the "certified roster."

The "certified roster" referred to herein shall conform to the requirements in Section 2-1.04, "Submission Of DVBE Information," elsewhere in these special provisions.

- H. DVBEs and DVBE joint venture partners must be certified DVBEs as determined by the Department of General Services, Office of Small Business Certification and Resources, 1531 "I" Street, Second Floor, Sacramento, CA 95814, on the date bids for the project are opened before credit may be allowed toward the DVBE goal. It is the Contractor's responsibility to verify that DVBEs are certified.
- I. Noncompliance by the Contractor with these requirements constitutes a breach of this contract and may result in termination of the contract or other appropriate remedy for a breach of this contract.

2-1.03 DVBE GOAL FOR THIS PROJECT

The Department has established the following goal for Disabled Veteran Business Enterprise (DVBE) participation for this project:

Disabled Veteran Business Enterprise (DVBE): 3 percent.

It is the bidder's responsibility to make a sufficient portion of the work available to subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DVBE subcontractors and suppliers, so as to assure meeting the goal for DVBE participation.

The Office of Small Business Certification and Resources, Department of General Services, may be contacted at (916) 322-5060 or visit their internet web site at <http://www.osmb.dgs.ca.gov/> for program information and certification status. The Department's Business Enterprise Program may also be contacted at (916) 227-9599 or the internet web site at <http://www.dot.ca.gov/hq/bep/>.

2-1.04 SUBMISSION OF DVBE INFORMATION

The required DVBE information shall be submitted on the "CALTRANS BIDDER - DVBE INFORMATION\" form included in the Proposal. If this information is not submitted with the bid, the DVBE information forms shall be removed from the documents prior to submitting the bid.

It is the bidder's responsibility to make enough work available to DVBEs and to select those portions of the work or material needs consistent with the available DVBEs to meet the goal for DVBE participation or to provide information to establish that, prior to bidding, the bidder made adequate good faith efforts to do so.

If the DVBE information is not submitted with the bid, the apparent successful bidder (low bidder), the second low bidder and the third low bidder shall submit the DVBE information to the Department of Transportation, 1120 N Street,

Room 0200, MS #26, Sacramento, California 95814 so the information is received by the Department no later than 4:00 p.m. on the fourth day, not including Saturdays, Sundays and legal holidays, following bid opening. DVBE information sent by U.S. Postal Service certified mail with return receipt and certificate of mailing and mailed on or before the third day, not including Saturdays, Sundays and legal holidays, following bid opening will be accepted even if it is received after the fourth day following bid opening. Failure to submit the required DVBE information by the time specified will be grounds for finding the bid or proposal nonresponsive. Other bidders need not submit DVBE information unless requested to do so by the Department.

The bidder's DVBE information shall establish that good faith efforts to meet the DVBE goal have been made. To establish good faith efforts, the bidder shall demonstrate that the goal will be met or that, prior to bidding, adequate good faith efforts to meet the goal were made.

Bidders are cautioned that even though their submittal indicates they will meet the stated DVBE goal, their submittal should also include their adequate good faith efforts information along with their DVBE goal information to protect their eligibility for award of the contract in the event the Department, in its review, finds that the goal has not been met.

The bidder's DVBE information shall include the names of DVBE firms that will participate, with a complete description of work or supplies to be provided by each, the dollar value of each DVBE transaction, and a written confirmation from the DVBE that it is participating in the contract. A copy of the DVBE's quote will serve as written confirmation that the DVBE is participating in the contract. When 100 percent of a contract item of work is not to be performed or furnished by a DVBE, a description of the exact portion of that work to be performed or furnished by that DVBE shall be included in the DVBE information, including the planned location of that work. The work that a DVBE prime contractor has committed to performing with its own forces as well as the work that it has committed to be performed by DVBE subcontractors, suppliers and trucking companies will count toward the goal.

If credit for trucking by a DVBE trucking broker is shown on the bidder's information as 100 percent of the revenue to be paid by the broker is to be paid to DVBE truckers, a \"certified roster\" of the broker's trucks to be used must be included. The \"certified roster\" must indicate that all the trucks are owned by certified DVBEs and must show the DVBE truck numbers, owner's name, Public Utilities Commission Cal-T numbers, and the DVBE certification numbers. The roster must indicate that all revenue paid by the broker will be paid to DVBEs listed on the \"certified roster\".

If credit for trucking by a trucking broker who is not a DVBE is shown in the bidder's information, a \"certified roster\" of the broker's trucks to be used must be included. The \"certified roster\" must indicate that at least 20 percent of the broker's trucks are owned by certified DVBEs and must show the DVBE truck numbers, owner's name, Public Utilities Commission Cal-T numbers, and the DVBE certification number. The roster must indicate that at least 20 percent of the revenue paid by the broker will be paid to DVBEs listed on the \"certified roster\".

A bidder shall be deemed to have made good faith efforts upon submittal, within time limits specified by the Department, of documentary evidence that all of the following actions were taken:

- A. Contact was made with the Office of Small Business Certification and Resources (OSBCR), Department of General Services or their web site at <http://www.osmb.dgs.ca.gov/> to identify Disabled Veteran Business Enterprises.
- B. Advertising was published in trade media and media focusing on Disabled Veteran Business Enterprises, unless time limits imposed by the Department do not permit that advertising.
- C. Invitations to bid were submitted to potential Disabled Veteran Business Enterprise contractors.
- D. Available Disabled Veteran Business Enterprises were considered.

2-1.05 SMALL BUSINESS PREFERENCE

Attention is directed to "Award and Execution of Contract" of these special provisions.

Attention is also directed to the Small Business Procurement and Contract Act, Government Code Section 14835, et seq and Title 2, California Code of Regulations, Section 1896, et seq.

Bidders who wish to be classified as a Small Business under the provisions of those laws and regulations, shall be certified as Small Business by the Department of General Services, Office of Small Business Certification and Resources, 1531 "I" Street, Second Floor, Sacramento, CA 95814.

To request Small Business Preference, bidders shall fill out and sign the Request for Small Business Preference form in the Proposal and shall attach a copy of their Office of Small Business Certification and Resources (OSBCR) small business certification letter to the form. The bidder's signature on the Request for Small Business Preference certifies, under penalty of perjury, that the bidder is certified as Small Business at the time of bid opening and further certifies, under penalty of perjury, that under the following conditions, at least 50 percent of the subcontractors to be utilized on the project are either certified Small Business or have applied for Small Business certification by bid opening date and are subsequently granted Small Business certification.

The conditions requiring the aforementioned 50 percent level of subcontracting by Small Business subcontractors apply if:

- A. The lowest responsible bid for the project exceeds \$100,000; and
- B. The project work to be performed requires a Class A or a Class B contractor's license; and
- C. Two or more subcontractors will be used.

If the above conditions apply and Small Business Preference is granted in the award of the contract, the 50 percent Small Business subcontractor utilization level shall be maintained throughout the life of the contract.

2-1.06 CALIFORNIA COMPANY PREFERENCE

Attention is directed to "Award and Execution of Contract" of these special provisions.

In conformance with the requirements of Section 6107 of the Public Contract Code, a "California company" will be granted a reciprocal preference for bid comparison purposes as against a nonresident contractor from any state that gives or requires a preference to be given contractors from that state on its public entity construction contracts.

A "California company" means a sole proprietorship, partnership, joint venture, corporation, or other business entity that was a licensed California contractor on the date when bids for the public contract were opened and meets one of the following:

- A. Has its principal place of business in California.
- B. Has its principal place of business in a state in which there is no local contractor preference on construction contracts.
- C. Has its principal place of business in a state in which there is a local contractor construction preference and the contractor has paid not less than \$5000 in sales or use taxes to California for construction related activity for each of the five years immediately preceding the submission of the bid.

To carry out the "California company" reciprocal preference requirements of Section 6107 of the Public Contract Code, all bidders shall fill out and sign the California Company Preference form in the Proposal. The bidder's signature on the California Company Preference form certifies, under penalty of perjury, that the bidder is or is not a "California company" and if not, the amount of the preference applied by the state of the nonresident Contractor.

A nonresident Contractor shall disclose any and all bid preferences provided to the nonresident Contractor by the state or country in which the nonresident Contractor has its principal place of business.

Proposals without the California Company Preference form filled out and signed may be rejected.

SECTION 3. AWARD AND EXECUTION OF CONTRACT

The bidder's attention is directed to the provisions in Section 3, "Award and Execution of Contract," of the Standard Specifications and these special provisions for the requirements and conditions concerning award and execution of contract.

Section 3-1.01, "Award of Contract," of the Standard Specifications is amended to read:

3-1.01 Award of Contract—The right is reserved to reject any and all proposals.

The award of the contract, if it be awarded, will be to the lowest responsible bidder whose proposal complies with all the requirements prescribed. Such award, if made, will be made within 30 days after the opening of the proposals. This period will be subject to extension for such further period as may be agreed upon in writing between the Department and the bidder concerned.

All bids will be compared on the basis of the Engineer's Estimate of the quantities of work to be done.

The award of the contract, if it be awarded, will be to the lowest responsible bidder whose proposal complies with all the requirements prescribed and who has met the goal for DVBE participation or has demonstrated, to the satisfaction of the Department, adequate good faith efforts to do so. Meeting the goal for DVBE participation or demonstrating, to the satisfaction of the Department, adequate good faith efforts to do so is a condition for being eligible for award of contract.

A "Payee Data Record" form will be included in the contract documents to be executed by the successful bidder. The purpose of the form is to facilitate the collection of taxpayer identification data. The form shall be completed and returned to the Department by the successful bidder with the executed contract and contract bonds. For the purposes of the form, vendor shall be deemed to mean the successful bidder. The form is not to be completed for subcontractors or suppliers. Failure to complete and return the "Payee Data Record" form to the Department as provided herein will result in the retention of 20 percent of payments due the contractor and penalties of up to \$20,000. This retention of payments for failure to complete the "Payee Data Record" form is in addition to any other retention of payments due the Contractor.

Attention is also directed to "Small Business Preference" of these special provisions. Any bidder who is certified as a Small Business by the Department of General Services, Office of Small Business Certification and Resources will be allowed a preference in the award of this contract, if it be awarded, under the following conditions:

- A. The apparent low bidder is not certified as a Small Business, or has not filled out and signed the Request for Small Business Preference included with the bid documents and attached a copy of their Office of Small Business Certification and Resources (OSBCR) small business certification letter to the form; and
- B. The bidder filled out and signed the Request for Small Business Preference form included with the bid documents and attached a copy of their Office of Small Business Certification and Resources (OSBCR) small business certification letter to the form.

The small business preference will be a reduction in the bid submitted by the small business contractor, for bid comparison purposes, by an amount equal to 5 percent of the amount bid by the apparent low bidder, the amount not to exceed \$50,000. If this reduction results in the small business contractor becoming the low bidder, then the contract will be awarded to the small business contractor on the basis of the actual bid of the small business contractor notwithstanding the reduced bid price used for bid comparison purposes.

Attention is also directed to "California Company Preference" of these special provisions.

The amount of the California company reciprocal preference shall be equal to the amount of the preference applied by the state of the nonresident contractor with the lowest responsive bid, except where the "California company" is eligible for a California Small Business Preference, in which case the preference applied shall be the greater of the two, but not both.

If the bidder submitting the lowest responsive bid is not a "California company" and with the benefit of the reciprocal preference, a "California company's" responsive bid is equal to or less than the original lowest responsive bid, the "California company" will be awarded the contract at its submitted bid price except as provided below.

Small business bidders shall have precedence over nonsmall business bidders in that the application of the "California company" preference for which nonsmall business bidders may be eligible shall not result in the denial of the award to a small business bidder.

SECTION 4. BEGINNING OF WORK, TIME OF COMPLETION AND LIQUIDATED DAMAGES

Attention is directed to the provisions in Sections 8-1.03, "Beginning of Work," 8-1.06, "Time of Completion," 8-1.07, "Liquidated Damages," and 20-4.08, "Plant Establishment Work," of the Standard Specifications and these special provisions.

The Contractor shall begin work within 15 calendar days after the contract has been approved by the Attorney General or the attorney appointed and authorized to represent the Department of Transportation.

The work (except plant establishment work) shall be diligently prosecuted to completion before the expiration of **650 WORKING DAYS** beginning on the fifteenth calendar day after approval of the contract.

The Contractor shall pay to the State of California the sum of \$ 1,300.00 per day, for each and every calendar day's delay in finishing the work (except plant establishment work) in excess of the number of working days prescribed above.

The Contractor shall diligently prosecute all work (including plant establishment) to completion before the expiration of **900 WORKING DAYS** beginning on the fifteenth calendar day after approval of the contract.

The Contractor shall pay to the State of California the sum of \$250 per day, for each and every calendar day's delay in completing the work in excess of the number of working days prescribed above.

In no case will liquidated damages of more than \$ 1,300.00 per day be assessed.

SECTION 5. GENERAL

SECTION 5-1. MISCELLANEOUS

5-1.00 PLANS AND WORKING DRAWINGS

When the specifications require working drawings to be submitted to the Division of Structure Design, the drawings shall be submitted to: Division of Structure Design, Documents Unit, Mail Station 9, 1801 30th Street, Sacramento, CA 95816, Telephone (916) 227-8252.

5-1.002 LABORATORY

When a reference is made in the specifications to the "Laboratory," the reference shall mean the Division of Materials Engineering and Testing Services and the Division of Structural Foundations of the Department of Transportation, or established laboratories of the various Districts of the Department, or other laboratories authorized by the Department to test materials and work involved in the contract. When a reference is made in the specifications to the "Transportation Laboratory," the reference shall mean the Division of Materials Engineering and Testing Services and the Division of Structural Foundations, located at 5900 Folsom Boulevard, Sacramento, CA 95819, Telephone (916) 227-7000.

5-1.005 CONTRACT BONDS

Attention is directed to Section 3-1.02, "Contract Bonds," of the Standard Specifications and these special provisions.

The payment bond shall be in a sum not less than the following:

1. One hundred percent of the total amount payable by the terms of the contract when the total amount payable does not equal or exceed five million dollars (\$5,000,000).
2. Fifty percent of the total amount payable by the terms of the contract when the total amount payable is not less than five million dollars (\$5,000,000) and does not exceed ten million dollars (\$10,000,000).
3. Twenty-five percent of the total amount payable by the terms of the contract when the total amount payable exceeds ten million dollars (\$10,000,000).

5-1.01 LABOR NONDISCRIMINATION

Attention is directed to the following Notice that is required by Chapter 5 of Division 4 of Title 2, California Code of Regulations.

NOTICE OF REQUIREMENT FOR NONDISCRIMINATION PROGRAM (GOV. CODE, SECTION 12990)

Your attention is called to the "Nondiscrimination Clause", set forth in Section 7-1.01A(4), "Labor Nondiscrimination," of the Standard Specifications, which is applicable to all nonexempt state contracts and subcontracts, and to the "Standard California Nondiscrimination Construction Contract Specifications" set forth therein. The Specifications are applicable to all nonexempt state construction contracts and subcontracts of \$5,000 or more.

5-1.02 LABOR CODE REQUIREMENTS

Section 7-1.01A(1), "Hours of Labor," of the Standard Specifications is amended to read:

7-1.01A(1) Hours of Labor.— Eight hours labor constitutes a legal day's work. The Contractor or any subcontractor under the Contractor shall forfeit, as a penalty to the State of California, \$25 for each worker employed in the execution of the contract by the respective Contractor or subcontractor for each calendar day during which that worker is required or permitted to work more than 8 hours in any one calendar day and 40 hours in any one calendar week in violation of the provisions of the Labor Code, and in particular, Section 1810 to Section 1815, thereof, inclusive, except that work performed by employees of Contractors in excess of 8 hours per day, and 40 hours during any one week, shall be permitted upon compensation for all hours worked in excess of 8 hours per day at not less than one and one-half times the basic rate of pay, as provided in Section 1815 thereof.

Section 7-1.01A(2), "Prevailing Wage," of the Standard Specifications is amended to read:

7-1.01A(2) Prevailing Wage.— The Contractor and any subcontractor under the Contractor shall comply with Labor Code Sections 1774 and 1775. Pursuant to Section 1775, the Contractor and any subcontractor under the Contractor shall forfeit to the State or political subdivision on whose behalf the contract is made or awarded a penalty of not more than fifty dollars (\$50) for each calendar day, or portion thereof, for each worker paid less than the prevailing rates as determined by the Director of Industrial Relations for the work or craft in which the worker is employed for any public work done under the contract by the Contractor or by any subcontractor under the Contractor in violation of the provisions of the Labor Code and in particular, Labor Code Sections 1770 to 1780, inclusive. The amount of this forfeiture shall be determined by the Labor Commissioner and shall be based on consideration of the mistake, inadvertence, or neglect of the Contractor or subcontractor in failing to pay the correct rate of prevailing wages, or the previous record of the Contractor or subcontractor in meeting their respective prevailing wage obligations, or the willful failure by the Contractor or subcontractor to pay the correct rates of prevailing wages. A mistake, inadvertence, or neglect in failing to pay the correct rate of prevailing wages is not excusable if the Contractor or subcontractor had knowledge of the obligations under the Labor Code. In addition to the penalty and pursuant to Labor Code Section 1775, the difference between the prevailing wage rates and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the prevailing wage rate shall be paid to each worker by the Contractor or subcontractor. If a worker employed by a subcontractor on a public works project is not paid the general prevailing per diem wages by the subcontractor, the prime contractor of the project is not liable for the penalties described above unless the prime contractor had knowledge of that failure of the subcontractor to pay the specified prevailing rate of wages to those workers or unless the prime contractor fails to comply with all of the following requirements:

1. The contract executed between the contractor and the subcontractor for the performance of work on the public works project shall include a copy of the provisions of Sections 1771, 1775, 1776, 1777.5, 1813, and 1815 of the Labor Code.

2. The contractor shall monitor the payment of the specified general prevailing rate of per diem wages by the subcontractor to the employees, by periodic review of the certified payroll records of the subcontractor.
3. Upon becoming aware of the subcontractor's failure to pay the specified prevailing rate of wages to the subcontractor's workers, the contractor shall diligently take corrective action to halt or rectify the failure, including, but not limited to, retaining sufficient funds due the subcontractor for work performed on the public works project.
4. Prior to making final payment to the subcontractor for work performed on the public works project, the contractor shall obtain an affidavit signed under penalty of perjury from the subcontractor that the subcontractor has paid the specified general prevailing rate of per diem wages to the subcontractor's employees on the public works project and any amounts due pursuant to Section 1813 of the Labor Code.

Pursuant to Section 1775 of the Labor Code, the Division of Labor Standards Enforcement shall notify the Contractor on a public works project within 15 days of the receipt by the Division of Labor Standards Enforcement of a complaint of the failure of a subcontractor on that public works project to pay workers the general prevailing rate of per diem wages. If the Division of Labor Standards Enforcement determines that employees of a subcontractor were not paid the general prevailing rate of per diem wages and if the Department did not retain sufficient money under the contract to pay those employees the balance of wages owed under the general prevailing rate of per diem wages, the contractor shall withhold an amount of moneys due the subcontractor sufficient to pay those employees the general prevailing rate of per diem wages if requested by the Division of Labor Standards Enforcement. The Contractor shall pay any money retained from and owed to a subcontractor upon receipt of notification by the Division of Labor Standards Enforcement that the wage complaint has been resolved. If notice of the resolution of the wage complaint has not been received by the Contractor within 180 days of the filing of a valid notice of completion or acceptance of the public works project, whichever occurs later, the Contractor shall pay all moneys retained from the subcontractor to the Department. These moneys shall be retained by the Department pending the final decision of an enforcement action.

Pursuant to the provisions of Section 1773 of the Labor Code, the Department has obtained the general prevailing rate of wages (which rate includes employer payments for health and welfare, pension, vacation, travel time, and subsistence pay as provided for in Section 1773.8 of the Labor Code, apprenticeship or other training programs authorized by Section 3093 of the Labor Code, and similar purposes) applicable to the work to be done, for straight time, overtime, Saturday, Sunday and holiday work. The holiday wage rate listed shall be applicable to all holidays recognized in the collective bargaining agreement of the particular craft, classification or type of workmen concerned. The general prevailing wage rates and any applicable changes to these wage rates are available at the Labor Compliance Office at the offices of the District Director of Transportation for the district in which the work is situated. For work situated in District 9, the wage rates are available at the Labor Compliance Office at the offices of the District Director of Transportation for District 6, located at Fresno. General prevailing wage rates are also available from the California Department of Industrial Relations' Internet Web Site at: <http://www.dir.ca.gov>.

The wage rates determined by the Director of Industrial Relations for the project refer to expiration dates. Prevailing wage determinations with a single asterisk after the expiration date are in effect on the date of advertisement for bids and are good for the life of the contract. Prevailing wage determinations with double asterisks after the expiration date indicate that the wage rate to be paid for work performed after this date has been determined. If work is to extend past this date, the new rate shall be paid and incorporated in the contract. The Contractor shall contact the Department of Industrial Relations as indicated in the wage rate determinations to obtain predetermined wage changes.

Pursuant to Section 1773.2 of the Labor Code, general prevailing wage rates shall be posted by the Contractor at a prominent place at the site of the work.

Changes in general prevailing wage determinations which conform to Labor Code Section 1773.6 and Title 8 California Code of Regulations Section 16204 shall apply to the project when issued by the Director of Industrial Relations at least 10 days prior to the date of the Notice to Contractors for the project.

The State will not recognize any claim for additional compensation because of the payment by the Contractor of any wage rate in excess of the prevailing wage rate set forth in the contract. The possibility of wage increases is one of the elements to be considered by the Contractor in determining the bid, and will not under any circumstances be considered as the basis of a claim against the State on the contract.

7-1.01A(2)(a) Travel and Subsistence Payments.— Attention is directed to the requirements of Section 1773.8 of the Labor Code. The Contractor shall make travel and subsistence payments to each workman, needed to execute the work, in accordance with the requirements in Labor Code Section 1773.8.

The first and second paragraphs of Section 7-1.01A(3), "Payroll Records," of the Standard Specifications are amended to read:

7-1.01A(3) Payroll Records.— Attention is directed to the provisions of Labor Code Section 1776, a portion of which is quoted below. Regulations implementing Labor Code Section 1776 are located in Sections 16016 through 16019 and Sections 16207.10 through 16207.19 of Title 8, California Code of Regulations.

"1776. (a) Each contractor and subcontractor shall keep accurate payroll records, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by him or her in connection with the public work. Each payroll record shall contain or be verified by a written declaration that it is made under penalty of perjury, stating both of the following:

(1) The information contained in the payroll record is true and correct.

(2) The employer has complied with the requirements of Sections 1771, 1811, and 1815 for any work performed by his or her employees on the public works project.

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

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

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

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

"(c) The certified payroll records shall be on forms provided by the Division of Labor Standards Enforcement or shall contain the same information as the forms provided by the division.

"(d) A contractor or subcontractor shall file a certified copy of the records enumerated in subdivision (a) with the entity that requested the records within 10 days after receipt of a written request.

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

"(f) The contractor shall inform the body awarding the contract of the location of the records enumerated under subdivision (a), including the street address, city and county, and shall, within five working days, provide a notice of a change of location and address.

"(g) The contractor or subcontractor shall have 10 days in which to comply subsequent to receipt of a written notice requesting the records enumerated in subdivision (a). In the event that the contractor or subcontractor fails to comply within the 10-day period, he or she shall, as a penalty to the state or political subdivision on whose behalf the contract is made or awarded, forfeit twenty-five dollars (\$25) for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement, these penalties shall be withheld from progress payments then due. A contractor is not subject to a penalty assessment pursuant to this section due to the failure of a subcontractor to comply with this section."

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

5-1.03 CONTRACTOR'S LICENSING LAWS

The third paragraph of Section 7-1.01C, "Contractor's Licensing Laws," of the Standard Specifications is amended to read:

Attention is also directed to the requirements in Public Contract Code Section 10164. In all projects where Federal funds are involved, the Contractor shall be properly licensed at the time the contract is awarded.

5-1.035 INDEMNIFICATION AND INSURANCE

Section 7-1.12, "Responsibility for Damage," of the Standard Specifications is deleted.

The Standard Specifications is amended by adding the following Section 7-1.121, "Indemnification," and Section 7-1.122, "Insurance," before Section 7-1.125, "Legal Action Against the Department."

7-1.121 Indemnification.—With the exception that this section shall in no event be construed to require indemnification by the Contractor to a greater extent than permitted by law, the Contractor shall defend, indemnify and save harmless the State, including its officers, directors, agents (excluding agents who are design professionals), and employees, and each of them (Indemnitees), from any and all claims, demands, causes of action, damages, costs, expenses, actual attorneys' fees, losses or liabilities, in law or in equity, of every kind and nature whatsoever (Claims), arising out of or in connection with the Contractor's performance of this contract for:

- A. Bodily injury including, but not limited to, bodily injury, sickness or disease, emotional injury or death to persons, including, but not limited to, the public, any employees or agents of the Contractor, State, Department, or any other contractor and;
- B. Damage to property of anyone including loss of use thereof;

caused or alleged to be caused in whole or in part by any negligent or otherwise legally actionable act or omission of the Contractor or anyone directly or indirectly employed by the Contractor or anyone for whose acts the Contractor may be liable.

Except as otherwise provided by law, the indemnification provisions above shall apply regardless of the existence or degree of fault of Indemnitees. The Contractor, however, shall not be obligated to indemnify Indemnitees for Claims arising from conduct delineated in Civil Code section 2782. Further, the Contractor's indemnity obligation shall not extend to Claims to the extent they arise from any defective or substandard condition of the roadway which existed at or prior to the time the Contractor commenced work, unless this condition has been changed by the work or the scope of the work requires the Contractor to maintain existing Roadway facilities and the claim arises from the Contractor's failure to maintain. The Contractor's indemnity obligation shall extend to Claims arising after the work is completed and accepted only if these Claims are directly related to alleged acts or omissions of the Contractor which occurred during the course of the work. No inspection by the Department, its employees or agents shall be deemed a waiver by the Department of full compliance with the requirements of this section.

The Contractor's obligation to defend and indemnify shall not be excused because of the Contractor's inability to evaluate liability or because the Contractor evaluates liability and determines that the Contractor is not liable to the claimant. The Contractor will respond within 30 days to the tender of any claim for defense and indemnity by the State, unless this time has been extended by the State. If the Contractor fails to accept or reject a tender of defense and indemnity within 30 days, in addition to any other remedy authorized by law, so much of the money due the Contractor under and by virtue of the contract as shall reasonably be considered necessary by the Department, may be retained by the State until disposition has been made of the claim or suit for damages, or until the Contractor accepts or rejects the tender of defense, whichever occurs first.

With respect to third party claims against the Contractor, the Contractor waives any and all rights of any type to express or implied indemnity against the State, its directors, officers, employees, or agents (excluding agents who are design professionals).

7-1.122 Insurance.—Insurance shall conform to the following requirements:

7-1.122A Casualty Insurance.—The Contractor shall, at the Contractor's expense, procure and maintain insurance on all of its operations with companies acceptable to the Department as follows. All insurance shall be kept in full force and effect from the beginning of the work through final acceptance by the State. In addition, the Contractor shall maintain completed operations coverage with a carrier acceptable to the Department through the expiration of the patent deficiency in construction statute of repose set forth in Section 337.1 of the Code of Civil Procedure.

7-1.122A(1) Workers' Compensation and Employer's Liability Insurance.—Workers' Compensation insurance shall be provided as specified in Section 7-1.01A(6), "Workers' Compensation." Employer's Liability Insurance shall be provided in amounts not less than:

- (a) \$1,000,000 for each accident for bodily injury by accident.
- (b) \$1,000,000 policy limit for bodily injury by disease.
- (c) \$1,000,000 for each employee for bodily injury by disease.

If there is an exposure of injury to the Contractors' employees under the U.S. Longshoremen's and Harbor Workers' Compensation Act, the Jones Act or under laws, regulations or statutes applicable to maritime employees, coverage shall be included for such injuries or claims.

7-1.122A(2) Liability Insurance.—The Contractor shall carry General Liability and Umbrella or Excess Liability Insurance covering all operations by or on behalf of the Contractor providing insurance for bodily injury liability, and property damage liability for the limits of liability indicated below and including coverage for:

- (a) premises, operations and mobile equipment
- (b) products and completed operations
- (c) broad form property damage (including completed operations)
- (d) explosion, collapse and underground hazards
- (e) personal injury
- (f) contractual liability

7-1.122A(3) Liability Limits/Additional Insureds.—The limits of liability shall be at least:

- (a) \$1,000,000 for each occurrence (combined single limit for bodily injury and property damage).
- (b) \$2,000,000 aggregate for products-completed operations.
- (c) \$2,000,000 general aggregate. This general aggregate limit shall apply separately to the Contractor's work under this Agreement.
- (d) \$5,000,000 umbrella or excess liability. For projects over \$25,000,000 only, an additional \$10,000,000 umbrella or excess liability (for a total of \$15,000,000). Umbrella or excess policy shall include products liability completed operations coverage and may be subject to \$5,000,000 or \$15,000,000 aggregate limits. Further, the umbrella or excess policy shall contain a clause stating that it takes effect (drops down) in the event the primary limits are impaired or exhausted.

The State and the Department, including their officers, directors, agents (excluding agents who are design professionals), and State employees, shall be named as additional insureds under the General Liability and Umbrella Liability Policies with respect to liability arising out of or connected with work or operations performed by or on behalf of the Contractor under this contract. Coverage for such additional insureds shall not extend to liability:

- (1) arising from any defective or substandard condition of the Roadway which existed at or prior to the time the Contractor commenced work, unless such condition has been changed by the work or the scope of the work requires the Contractor to maintain existing Roadway facilities and the claim arises from the Contractor's failure to maintain; or
- (2) for claims occurring after the work is completed and accepted unless these claims are directly related to alleged acts or omissions of the Contractor which occurred during the course of the work; or
- (3) to the extent prohibited by Section 11580.04 of the Insurance Code.

The policy shall stipulate that the insurance afforded the additional insureds shall apply as primary insurance. Any other insurance or self insurance maintained by the Department or State will be excess only and shall not be called upon to contribute with this insurance. Such additional insured coverage shall be provided by a policy provision or by an endorsement providing coverage at least as broad as Additional Insured (Form B) endorsement form CG 2010, as published by the Insurance Services Office (ISO).

7-1.122B Automobile Liability Insurance.—The Contractor shall carry automobile liability insurance, including coverage for all owned, hired and non-owned automobiles. The primary limits of liability shall be not less than \$1,000,000 combined single limit each accident for bodily injury and property damage. The umbrella or excess liability coverage required under Section 7-1.122A(3), "Liability Limits/Additional Insureds," shall also apply to automobile liability.

7-1.122C Policy Forms, Endorsements and Certificates.—The Contractor's General Liability Insurance shall be provided under Commercial General Liability policy form no. CG0001 as published by the Insurance Services Office (ISO) or under a policy form at least as broad as policy form no. CG0001.

Evidence of insurance in a form acceptable to the Department, including the required "additional insured" endorsements, shall be furnished by the Contractor to the Department at or prior to the pre-construction conference. The evidence of insurance shall provide that there will be no cancellation, lapse, or reduction of coverage without thirty (30) days' prior written notice to the Department. Certificates of Insurance, as evidence of required insurance, for the General Liability, Auto Liability and Umbrella-Excess Liability policies shall set forth deductible amounts applicable to each policy and all exclusions which are added by endorsement to each policy. The Department may expressly allow deductible clauses, which it does not consider excessive, overly broad, or harmful to the interests of the State. Standard ISO form CG 0001 or similar exclusions will be allowed provided they are not inconsistent with the requirements of this section. Allowance of any additional exclusions is at the discretion of the Department. Regardless of the allowance of exclusions or deductions by the Department, the Contractor shall be responsible for any deductible amount and shall warrant that the coverage provided to the Department is consistent with the requirements of this section.

7-1.122D Enforcement.—The Department may take any steps as are necessary to assure Contractor's compliance with its obligations. Should any insurance policy lapse or be canceled during the contract period the Contractor shall, within thirty (30) days prior to the effective expiration or cancellation date, furnish the Department with evidence of renewal or replacement of the policy. Failure to continuously maintain insurance coverage as herein provided is a material breach of contract. In the event the Contractor fails to maintain any insurance coverage required, the Department may, but is not required to, maintain this coverage and charge the expense to the Contractor or terminate this Agreement. The required insurance shall be subject to the approval of Department, but any acceptance of insurance certificates by the Department shall in no way limit or relieve the Contractor of the Contractor's duties and responsibilities under the Contract to indemnify, defend and hold harmless the State, its officers, agents, and employees. Insurance coverage in the minimum amounts set forth herein shall not be construed to relieve the Contractor for liability in excess of such coverage, nor shall it preclude the State from taking other actions as is available to it under any other provision of the contract or law. Failure of the Department to enforce in a timely manner any of the provisions of this section shall not act as a waiver to enforcement of any of these provisions at a later date.

7-1.122E Self-Insurance.—Self-insurance programs and self-insured retentions in insurance policies are subject to separate annual review and approval by the State of evidence of the Contractor's financial capacity to respond. Additionally, self-insurance programs or retentions must provide the State with at least the same protection from liability and defense of suits as would be afforded by first-dollar insurance.

7-1.122F Miscellaneous.—Nothing contained in the Contract is intended to make the public or any member thereof a third party beneficiary of the Insurance or Indemnity provisions of these Standard Specifications, nor is any term, condition or other provision of the Contract intended to establish a standard of care owed to the public or any member thereof.

5-1.04 ARBITRATION

The last paragraph in Section 9-1.10, "Arbitration," of the Standard Specifications is amended to read:

Arbitration shall be initiated by a Complaint in Arbitration made in compliance with the requirements of those regulations. A Complaint in Arbitration by the Contractor shall be made not later than 90 days after the date of service in person or by mail on the Contractor of the final written decision by the Department on the claim.

5-1.05 NOTICE OF POTENTIAL CLAIM

Section 9-1.04, "Notice of Potential Claim," of the Standard Specifications is amended to read:

9-1.04 Notice of Potential Claim.—The Contractor shall not be entitled to the payment of any additional compensation for any act, or failure to act, by the Engineer, including failure or refusal to issue a change order, or for the happening of any event, thing, occurrence, or other cause, unless he shall have given the Engineer due written notice of potential claim as hereinafter specified. Compliance with this Section 9-1.04 shall not be a prerequisite as to matters within the scope of the protest provisions in Section 4-1.03, "Changes," or Section 8-1.06, "Time of Completion," or the notice provisions in Section 5-1.116, "Differing Site Conditions," or Section 8-1.07, "Liquidated Damages," or Section 8-1.10, "Utility and Non-Highway Facilities," nor to any claim which is based on differences in measurements or errors of computation as to contract quantities.

The written notice of potential claim shall be submitted to the Engineer prior to the time that the Contractor performs the work giving rise to the potential claim for additional compensation, if based on an act or failure to act by the Engineer, or in all other cases within 15 days after the happening of the event, thing, occurrence, or other cause, giving rise to the potential claim.

The written notice of potential claim shall be submitted on Form CEM-6201 furnished by the Department and shall be certified with reference to the California False Claims Act, Government Code Sections 12650 - 12655. The notice shall set forth the reasons for which the Contractor believes additional compensation will or may be due and the nature of the costs involved. Unless the amount of the potential claim has been stated in the written notice, the Contractor shall, within 15 days of submitting said notice, furnish an estimate of the cost of the affected work and impacts, if any, on project completion. Said estimate of costs may be changed or updated by the Contractor when conditions have changed. When the affected work is completed, the Contractor shall submit substantiation of his actual costs. Failure to do so shall be sufficient cause for denial of any claim subsequently filed on the basis of said notice of potential claim.

It is the intention of this Section 9-1.04 that differences between the parties arising under and by virtue of the contract be brought to the attention of the Engineer at the earliest possible time in order that such matters may be settled, if possible, or other appropriate action promptly taken. The Contractor hereby agrees that he shall have no right to additional compensation for any claim that may be based on any such act, failure to act, event, thing or occurrence for which no written notice of potential claim as herein required was filed.

Should the Contractor, in connection with or subsequent to the assertion of a potential claim, request inspection and copying of documents or records in the possession of the Department that pertain to the potential claim, Contractor shall make its records of the project, as deemed by the Department to be pertinent to the potential claim, available to the Department for inspection and copying.

5-1.06 PARTIAL PAYMENTS

The last paragraph of Section 9-1.06, "Partial Payments," of the Standard Specifications is amended to read:

Attention is directed to the prohibitions and penalties pertaining to unlicensed contractors as provided in Business and Professions Code Sections 7028.15(a) and 7031.

5-1.07 PAYMENT OF WITHHELD FUNDS

Section 9-1.065, "Payment of Withheld Funds," of the Standard Specifications, is amended by adding the following after the third paragraph:

Alternatively, and subject to the approval of the Department, the payment of retentions earned may be deposited directly with a person licensed under Division 6 (commencing with Section 17000) of the Financial Code as the escrow agent. Upon written request of an escrow agent that has not been approved by the Department under subdivision (c) of Section 10263 of the Public Contract Code, the Department will provide written notice to that escrow agent within 10 business days of receipt of the request indicating the reason or reasons for not approving that escrow agent. The payments will be deposited in a trust account with a Federally chartered bank or savings association within 24 hours of receipt by the escrow agent. The Contractor shall not place any retentions with the escrow agent in excess of the coverage provided to that escrow agent pursuant to subdivision (b) of Section 17314 of the Financial Code. In all respects not inconsistent with subdivision (c) of Section 10263 of the Public Contract Code, the remaining provisions of Section 10263 of the Public Contract Code shall apply to escrow agents acting pursuant to subdivision (c) of Section 10263 of the Public Contract Code.

5-1.08 FINAL PAYMENT AND CLAIMS

Section 9-1.07B, "Final Payment and Claims," of the Standard Specifications is amended to read:

9-1.07B Final Payment and Claims.--After acceptance by the Director, the Engineer will make a proposed final estimate in writing of the total amount payable to the Contractor, including therein an itemization of said amount, segregated as to contract item quantities, extra work and any other basis for payment, and shall also show therein all deductions made or to be made for prior payments and amounts to be kept or retained under the provisions of the contract. All prior estimates and payments shall be subject to correction in the proposed final estimate. The Contractor shall submit written approval of the proposed final estimate or a written statement of all claims arising under or by virtue of the contract so that the Engineer receives such written approval or statement of claims no later than close of business of the thirtieth day after receiving the proposed final estimate. If the thirtieth day falls on a Saturday, Sunday or legal holiday, then receipt of such written approval or statement of claims by the Engineer shall not be later than close of business of the next business day. No claim will be considered that was not included in the written statement of claims, nor will any claim be allowed as to which a notice or protest is required under the provisions in Sections 4-1.03,

"Changes," 8-1.06, "Time of Completion," 8-1.07, "Liquidated Damages," 5-1.116, "Differing Site Conditions," 8-1.10, "Utility and Non-Highway Facilities," and 9-1.04, "Notice of Potential Claim," unless the Contractor has complied with the notice or protest requirements in said sections.

On the Contractor's approval, or if he files no claim within said period of 30 days, the Engineer will issue a final estimate in writing in accordance with the proposed final estimate submitted to the Contractor and within 30 days thereafter the State will pay the entire sum so found to be due. Such final estimate and payment thereon shall be conclusive and binding against both parties to the contract on all questions relating to the amount of work done and the compensation payable therefor, except as otherwise provided in Sections 9-1.03C, "Records," and 9-1.09, "Clerical Errors."

If the Contractor within said period of 30 days files claims, the Engineer will issue a semifinal estimate in accordance with the proposed final estimate submitted to the Contractor and within 30 days thereafter the State will pay the sum so found to be due. Such semifinal estimate and payment thereon shall be conclusive and binding against both parties to the contract on all questions relating to the amount of work done and the compensation payable therefor, except insofar as affected by the claims filed within the time and in the manner required hereunder and except as otherwise provided in Sections 9-1.03C, "Records," and 9-1.09, "Clerical Errors."

Claims filed by the Contractor shall be in sufficient detail to enable the Engineer to ascertain the basis and amount of said claims. If additional information or details are required by the Engineer to determine the basis and amount of said claims, the Contractor shall furnish such further information or details so that the information or details are received by the Engineer no later than the fifteenth day after receipt of the written request from the Engineer. If the fifteenth day falls on a Saturday, Sunday or legal holiday, then receipt of such information or details by the Engineer shall not be later than close of business of the next business day. Failure to submit such information and details to the Engineer within the time specified will be sufficient cause for denying the claim.

The Contractor shall keep full and complete records of the costs and additional time incurred for any work for which a claim for additional compensation is made. The Engineer or any designated claim investigator or auditor shall have access to those records and any other records as may be required by the Engineer to determine the facts or contentions involved in the claims. Failure to permit access to such records shall be sufficient cause for denying the claims.

Claims submitted by the Contractor shall be accompanied by a notarized certificate containing the following language:

Under the penalty of law for perjury or falsification and with specific reference to the California False Claims Act, Government Code Section 12650 et. seq., the undersigned,

(name) _____ of

(title)

(company)

hereby certifies that the claim for the additional compensation and time, if any, made herein for the work on this contract is a true statement of the actual costs incurred and time sought, and is fully documented and supported under the contract between parties.

Dated _____

/s/ _____

Subscribed and sworn before me this _____ day

of _____

Notary Public
My Commission Expires _____

Failure to submit the notarized certificate will be sufficient cause for denying the claim.

Any claim for overhead type expenses or costs, in addition to being certified as stated above, shall be supported by an audit report of an independent Certified Public Accountant. Any such overhead claim shall also be subject to audit by the State at its discretion.

Any costs or expenses incurred by the State in reviewing or auditing any claims that are not supported by the Contractor's cost accounting or other records shall be deemed to be damages incurred by the State within the meaning of the California False Claims Act.

The District Director of the District which administers the contract will make the final determination of any claims which remain in dispute after completion of claim review by the Engineer. A board or person designated by said District Director will review such claims and make a written recommendation thereon to the District Director. The Contractor may meet with the review board or person to make a presentation in support of such claims.

Upon final determination of the claims, the Engineer will then make and issue his final estimate in writing and within 30 days thereafter the State will pay the entire sum, if any, found due thereon. Such final estimate shall be conclusive and binding against both parties to the contract on all questions relating to the amount of work done and the compensation payable therefor, except as otherwise provided in Sections 9-1.03C, "Records," and 9-1.09, "Clerical Errors."

5-1.09 INTEREST ON PAYMENTS

Interest shall be payable on progress payments, payments after acceptance, final payments, extra work payments and claim payments as follows:

1. Unpaid progress payments, payment after acceptance and final payments shall begin to accrue interest 30 days after the Engineer prepares the payment estimate.
2. Unpaid extra work bills shall begin to accrue interest 30 days after preparation of the first pay estimate following the receipt of a properly submitted and undisputed extra work bill. To be properly submitted, the bill must be submitted within 7 days of the performance of the extra work and in accordance with the requirements of Section 9-1.03C, "Records," and Section 9-1.06, "Partial Payments," of the Standard Specifications. An undisputed extra work bill not submitted within 7 days of performance of the extra work will begin to accrue interest 30 days after the preparation of the second pay estimate following submittal of the bill.
3. The rate of interest payable for unpaid progress payments, payments after acceptance, final payments and extra work payments shall be 10 percent per annum.
4. The rate of interest payable on a claim, protest or dispute ultimately allowed under this contract shall be 6 percent per annum. Interest shall begin to accrue 61 days after the Contractor submits to the Engineer information in sufficient detail to enable the Engineer to ascertain the basis and amount of said claim, protest or dispute.

The rate of interest payable on any award in arbitration shall be 6 percent per annum if allowed under the provisions of Civil Code Section 3289.

5-1.10 PUBLIC SAFETY

The Contractor shall provide for the safety of traffic and the public in accordance with the provisions in Section 7-1.09, "Public Safety," of the Standard Specifications and these special provisions.

The Contractor shall install temporary railing (Type K) between any lane carrying public traffic and any excavation, obstacle, or storage area when the following conditions exist:

- (1) Excavations.--Any excavation, the near edge of which is 12 feet or less from the edge of the lane, except:
 - (a) Excavations covered with sheet steel or concrete covers of adequate thickness to prevent accidental entry by traffic or the public.
 - (b) Excavations less than one foot deep.
 - (c) Trenches less than one foot wide for irrigation pipe or electrical conduit, or excavations less than one foot in diameter.
 - (d) Excavations parallel to the lane for the purpose of pavement widening or reconstruction.
 - (e) Excavations in side slopes, where the slope is steeper than 4:1.
 - (f) Excavations protected by existing barrier or railing.

(2) Temporarily Unprotected Permanent Obstacles.--Whenever the work includes the installation of a fixed obstacle together with a protective system, such as a sign structure together with protective railing, and the Contractor elects to install the obstacle prior to installing the protective system; or whenever the Contractor, for his convenience and with permission of the Engineer, removes a portion of an existing protective railing at an obstacle and does not replace such railing complete in place during the same day.

(3) Storage Areas.--Whenever material or equipment is stored within 12 feet of the lane and such storage is not otherwise prohibited by the specifications.

The approach end of temporary railing (Type K), installed in accordance with the requirements in this section "Public Safety" and in Section 7-1.09, "Public Safety," of the Standard Specifications shall be offset a minimum of 15 feet from the edge of the traffic lane open to public traffic. The temporary railing shall be installed on a skew toward the edge of the traffic lane of not more than one foot transversely to 10 feet longitudinally with respect to the edge of the traffic lane. If the 15-foot minimum offset cannot be achieved, the temporary railing shall be installed on the 10 to 1 skew to obtain the maximum available offset between the approach end of the railing and the edge of the traffic lane, and an array of temporary crash cushion modules shall be installed at the approach end of the temporary railing.

Temporary railing (Type K) shall conform to the provisions in Section 12-3.08, "Temporary Railing (Type K)," of the Standard Specifications. Temporary railing (Type K), conforming to the details shown on 1995 Standard Plan T3 or 1997 Standard Plan T3, may be used. Temporary railing (Type K) fabricated prior to January 1, 1993, and conforming to 1988 Standard Plan B11-30 may be used, provided the fabrication date is printed on the required Certificate of Compliance.

The fourteenth paragraph of Section 12-3.08, "Temporary Railing (Type K)," of the Standard Specifications is amended to read:

Each rail unit placed within 10 feet of a traffic lane shall have a reflector installed on top of the rail as directed by the Engineer. A Type P marker panel shall also be installed at each end of railing installed adjacent to a two-lane, two-way highway and at the end facing traffic of railing installed adjacent to a one-way roadbed. If the railing is placed on a skew, the marker shall be installed at the end of the skew nearest the traveled way. Type P marker panels shall conform to the provisions in Section 82, "Markers and Delineators," except that the Contractor shall furnish the marker panels.

Reflectors on temporary railing (Type K) shall conform to the provisions in "Prequalified and Tested Signing and Delineation Materials," of these special provisions.

Temporary crash cushion modules shall conform to the provisions in "Temporary Crash Cushion Module" elsewhere in these special provisions.

Except for installing, maintaining and removing traffic control devices, whenever work is performed or equipment is operated in the following work areas the Contractor shall close the adjacent traffic lane unless otherwise provided in the specifications:

Approach speed of public traffic (Posted Limit) (Miles Per Hour)	Work Areas
Over 45	Within 6 feet of a traffic lane but not on a traffic lane.
35 to 45	Within 3 feet of a traffic lane but not on a traffic lane.

The lane closure provisions of this section shall not apply if the work area is protected by permanent or temporary railing or barrier.

When traffic cones or delineators are used to delineate a temporary edge of traffic lane, the line of cones or delineators shall be considered to be the edge of traffic lane, however, the Contractor shall not reduce the width of an existing lane to less than 10 feet without written approval from the Engineer.

When work is not in progress on a trench or other excavation that required closure of an adjacent lane, the traffic cones or portable delineators used for the lane closure shall be placed off of and adjacent to the edge of the traveled way. The spacing of the cones or delineators shall be not more than the spacing used for the lane closure.

Suspended loads or equipment shall not be moved nor positioned over public traffic or pedestrians.

Full compensation for conforming to the requirements in this section "Public Safety," including furnishing and installing temporary railing (Type K) and temporary crash cushion modules, shall be considered as included in the contract prices paid for the various items of work involved and no additional compensation will be allowed therefor.

5-1.11 SURFACE MINING AND RECLAMATION ACT

Attention is directed to the Surface Mining and Reclamation Act of 1975, commencing in Public Resources Code, Mining and Geology, Section 2710, which establishes regulations pertinent to surface mining operations.

Material from mining operations furnished for this project shall only come from permitted sites in compliance with the Surface Mining and Reclamation Act of 1975.

The requirements of this section shall apply to all materials furnished for the project, except for acquisition of materials in conformance with Section 4-1.05, "Use of Materials Found on the Work," of the Standard Specifications.

5-1.12 REMOVAL OF ASBESTOS AND HAZARDOUS SUBSTANCES

When the presence of asbestos or hazardous substances are not shown on the plans or indicated in the specifications and the Contractor encounters materials which the Contractor reasonably believes to be asbestos or a hazardous substance as

defined in Section 25914.1 of the Health and Safety Code, and the asbestos or hazardous substance has not been rendered harmless, the Contractor may continue work in unaffected areas reasonably believed to be safe, and shall immediately cease work in the affected area and report the condition to the Engineer in writing.

In accordance with Section 25914.1 of the Health and Safety Code, all such removal of asbestos or hazardous substances including any exploratory work to identify and determine the extent of the asbestos or hazardous substance will be performed by separate contract.

If delay of work in the area delays the current controlling operation, the delay will be considered a right of way delay and the Contractor will be compensated for the delay as provided in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

5-1.13 FINAL PAY QUANTITIES

Section 9-1.015, "Final Pay Quantities," of the Standard Specifications is amended to read:

9-1.015 Final Pay Items.—When an item of work is designated as (F) or (S-F) in the Engineer's Estimate, the estimated quantity for that item of work shall be the final pay quantity, unless the dimensions of any portion of that item are revised by the Engineer, or the item or any portion of the item is eliminated. If the dimensions of any portion of the item are revised, and the revisions result in an increase or decrease in the estimated quantity of that item of work, the final pay quantity for the item will be revised in the amount represented by the changes in the dimensions, except as otherwise provided for minor structures in Section 51-1.22, "Measurement." If a final pay item is eliminated, the estimated quantity for the item will be eliminated. If a portion of a final pay item is eliminated, the final pay quantity will be revised in the amount represented by the eliminated portion of the item of work.

The estimated quantity for each item of work designated as (F) or (S-F) in the Engineer's Estimate shall be considered as approximate only, and no guarantee is made that the quantity which can be determined by computations, based on the details and dimensions shown on the plans, will equal the estimated quantity. No allowance will be made in the event that the quantity based on computations does not equal the estimated quantity.

In case of discrepancy between the quantity shown in the Engineer's Estimate for a final pay item and the quantity or summation of quantities for the same item shown on the plans, payment will be based on the quantity shown in the Engineer's Estimate.

5-1.14 YEAR 2000 COMPLIANCE

This contract is subject to Year 2000 Compliance for automated devices in the State of California. Year 2000 compliance is defined as follows:

Year 2000 compliance for automated devices in the State of California is achieved when embedded functions have or create no logical or mathematical inconsistencies when dealing with dates prior to and beyond 1999. The year 2000 is recognized and processed as a leap year. The product must also operate accurately in the manner in which it was intended for date operation without requiring manual intervention.

The Contractor shall provide the Engineer a Certificate of Compliance from the manufacturer in accordance with the provisions of Section 6-1.07, "Certificates of Compliance," of the Standard Specifications for all automated devices furnished for the project.

5-1.15 SUBCONTRACTOR AND DVBE RECORDS

The Contractor shall maintain records of all subcontracts entered into with certified DVBE subcontractors and records of materials purchased from certified DVBE suppliers. The records shall show the name and business address of each DVBE subcontractor or vendor and the total dollar amount actually paid each DVBE subcontractor or vendor.

Upon completion of the contract, a summary of these records shall be prepared on Form CEM-2402 (S) and certified correct by the Contractor or the Contractor's authorized representative, and shall be furnished to the Engineer.

5-1.155 PERFORMANCE OF DVBE SUBCONTRACTORS AND SUPPLIERS

The DVBEs listed by the Contractor in response to the provisions in Section 2-1.04, "Submission of DVBE Information," and Section 3, "Award and Execution of Contract," of these special provisions, which are determined by the Department to be certified DVBEs, shall perform the work and supply the materials for which they are listed, unless the Contractor has received prior written authorization to perform the work with other forces or to obtain the materials from other sources.

Authorization to utilize other forces or sources of materials may be requested for the following reasons:

- A. The listed DVBE, after having had a reasonable opportunity to do so, fails or refuses to execute a written contract, when the written contract, based upon the general terms, conditions, plans and specifications for the project, or on the terms of the subcontractor's or supplier's written bid, is presented by the Contractor.
- B. The listed DVBE becomes bankrupt or insolvent.
- C. The listed DVBE fails or refuses to perform the subcontract or furnish the listed materials.
- D. The Contractor stipulated that a bond was a condition of executing a subcontract and the listed DVBE subcontractor fails or refuses to meet the bond requirements of the Contractor.
- E. The work performed by the listed subcontractor is substantially unsatisfactory and is not in substantial conformance with the plans and specifications, or the subcontractor is substantially delaying or disrupting the progress of the work.
- F. The listed DVBE subcontractor is not licensed pursuant to the Contractor's License Law.
- G. It would be in the best interest of the State.

The Contractor shall not be entitled to payment for the work or material unless it is performed or supplied by the listed DVBE or by other forces (including those of the Contractor) pursuant to prior written authorization of the Engineer.

5-1.16 SUBCONTRACTING

Attention is directed to the provisions in Section 8-1.01, "Subcontracting," of the Standard Specifications, Section 2, "Proposal Requirements and Conditions," Section 2-1.04, "Submission of DVBE Information," and Section 3, "Award and Execution of Contract," of these special provisions and these special provisions.

The second sentence in the third paragraph of said Section 8-1.01 is amended to read:

When items of work in the Engineer's Estimate are preceded by the letters (S) or (S-F), said items are designated as "Specialty Items."

Section 8-1.01 of the Standard Specifications is amended by adding the following before the sixth paragraph:

Pursuant to the provisions of Section 6109 of the Public Contract Code, the Contractor shall not perform work on a public works project with a subcontractor who is ineligible to perform work on the public works project pursuant to Section 1777.1 or 1777.7 of the Labor Code.

Pursuant to the provisions in Section 1777.1 of the Labor Code, the Labor Commissioner publishes and distributes a list of contractors ineligible to perform work as a subcontractor on a public works project. This list of debarred contractors is available from the Department of Industrial Relations web site at:

<http://www.dir.ca.gov/DLSE/Debar.html>.

The DVBE information furnished under Section 2-1.04, "Submission of DVBE Information," of these special provisions is in addition to the subcontractor information required to be furnished in Section 8-1.01, "Subcontracting," and Section 2-1.054, "Required Listing of Proposed Subcontractors," of the Standard Specifications.

Section 10115 of the Public Contract Code requires the Department to implement provisions to establish a goal for Disabled Veteran Business Enterprise (DVBE) participation in highway contracts that are State funded. As a part of this requirement:

1. No substitution of a DVBE subcontractor shall be made at any time without the written consent of the Department, and
2. If a DVBE subcontractor is unable to perform successfully and is to be replaced, the Contractor shall make good faith efforts to replace the original DVBE subcontractor with another DVBE subcontractor.

The provisions in Section 2-1.02, "Disabled Veteran Business Enterprise (DVBE)," of these special provisions that DVBEs shall be certified on the date bids are opened does not apply to DVBE substitutions after award of the contract.

5-1.162 PROMPT PROGRESS PAYMENT TO SUBCONTRACTORS

Attention is directed to the provisions in Sections 10262 and 10262.5 of the Public Contract Code and Section 7108.5 of the Business and Professions Code concerning prompt payment to subcontractors.

5-1.17 PARTNERING

The State will promote the formation of a "Partnering" relationship with the Contractor in order to effectively complete the contract to the benefit of both parties. The purpose of this relationship will be to maintain cooperative communication and mutually resolve conflicts at the lowest possible management level.

The Contractor may request the formation of such a "Partnering" relationship by submitting a request in writing to the Engineer after approval of the contract. If the Contractor's request for "Partnering" is approved by the Engineer, scheduling of a "Partnering" workshop, selecting the "Partnering" facilitator and workshop site, and other administrative details shall be as agreed to by both parties.

The costs involved in providing a facilitator and a workshop site will be borne equally by the State and the Contractor. The Contractor shall pay all compensation for the wages and expenses of the facilitator, and of the expenses for obtaining the workshop site. The State's share of such costs will be reimbursed to the Contractor in a change order written by the Engineer. Markups will not be added. All other costs associated with the "Partnering" relationship will be borne separately by the party incurring the costs.

The establishment of a "Partnering" relationship will not change or modify the terms and conditions of the contract and will not relieve either party of the legal requirements of the contract.

5-1.18 DISPUTES REVIEW BOARD

To assist in the resolution of disputes or potential claims arising out of the work of this project, a Disputes Review Board, hereinafter referred to as the "DRB", shall be established by the Engineer and Contractor cooperatively upon approval of the contract. The DRB is intended to assist the contract administrative claims resolution process as set forth in the provisions of Section 9-1.04, "Notice of Potential Claim," and Section 9-1.07B, "Final Payment and Claims," of the Standard Specifications. The DRB shall not be considered to serve as a substitute for any requirements in the specifications in regard to filing of potential claims. The requirements and procedures established in this special provision shall be considered as an essential prerequisite to filing a claim, for arbitration or for litigation prior or subsequent to project completion.

The DRB shall be utilized when dispute or potential claim resolution at the job level is unsuccessful. The DRB shall function until the day of acceptance of the contract, at which time the work of the DRB will cease except for completion of unfinished dispute hearings and reports. After acceptance of the contract any disputes or potential claims that the Contractor wants to pursue that have not been settled, shall be stated or restated, by the Contractor, in response to the Proposed Final Estimate within the time limits provided in Section 9-1.07B, "Final Payment and Claims," of the Standard Specifications. The State will review those claims in accordance with Section 9-1.07B, of the Standard Specifications. Following the completion of the State's administrative claims procedure, the Contractor may resort to arbitration as provided in Section 9-1.10, "Arbitration," of the Standard Specifications.

Disputes, as used in this section, shall include all differences of opinion, properly noticed as provided hereinafter, between the State and Contractor on matters related to the work and other subjects considered by the State or Contractor, or by both, to be of concern to the DRB on this project, except matters relating to Contractor, subcontractor or supplier claims not actionable against the State as specified in these special provisions. Whenever the term "dispute" or "disputes" is used herein, it shall be deemed to include potential claims as well as disputes.

The DRB shall serve as an advisory body to assist in the resolution of disputes between the State and the Contractor, hereinafter referred to as the "parties". The DRB shall consider disputes referred to it, and furnish written reports containing findings and recommendations pertaining to those disputes, to the parties to aid in resolution of the differences between them. DRB findings and recommendations are not binding on the parties.

The DRB shall consist of one member selected by the State, one member selected by the Contractor, and a third member selected by the first two members and approved by both the State and the Contractor. The third member shall act as DRB Chairperson.

The first two DRB members shall select a third DRB member subject to the mutual approval of the parties, or may mutually concur on a list of potentially acceptable third DRB members and submit the list to the parties for final selection and approval of the third member. The goal in selection of the third member is to complement the professional experience of the first two members, and to provide leadership for the DRB's activities.

No DRB member shall have prior direct involvement in this contract, and no member shall have a financial interest in this contract or the parties thereto, within a period of 6 months prior to award of this contract, or during the contract, except as follows:

1. Compensation for services on this DRB.
2. Ownership interest in a party or parties, documented by the prospective DRB member, that has been reviewed and determined in writing by the State to be sufficiently insignificant to render the prospective member acceptable to the State.
3. Service as a member of other Disputes Review Boards on other contracts.

4. Retirement payments or pensions received from a party that are not tied to, dependent on or affected by the net worth of the party.
5. The above provisions apply to any party having a financial interest in this contract; including but not limited to contractors, subcontractors, suppliers, consultants, and legal and business services.

DRB members shall be especially knowledgeable in the type of construction and contract documents potentially anticipated by the contract, and shall discharge their responsibilities impartially and as an independent body considering the facts and circumstances related to the matters under consideration, applicable laws and regulations, and the pertinent provisions of the contract.

The State and the Contractor shall select their respective DRB members, in accordance with the terms and conditions of the Disputes Review Board Agreement and these provisions, within 45 days of the approval of the contract. Each party shall provide written notification to the other of the name of their selected DRB member along with the prospective member's written disclosure statement.

Before their appointments are final, the first two prospective DRB members shall submit complete disclosure statements to both the State and the Contractor. The statement shall include a resume of the prospective member's experience, together with a declaration describing all past, present and anticipated or planned future relationships, including indirect relationships through the prospective member's primary or full-time employer, to this project and with all parties involved in this construction contract; including, but not limited to, any relevant subcontractors or suppliers to the parties, the parties' principals or the parties' counsel. The DRB members shall also include a full disclosure of close professional or personal relationships with all key members of all parties to the contract. Either the Contractor or the State may object to the others nominee and that person will not be selected for the DRB. No reason need be given for the first objection. Objections to subsequent nominees must be based on a specific breach or violation of nominee responsibilities under this specification. A different person shall then be nominated within 14 Days. The third DRB member shall supply a full disclosure statement to the first two DRB members and to the parties prior to appointment. Either party may reject any of the three prospective DRB members who fail to fully comply with all required employment and financial disclosure conditions of DRB membership as described in the Disputes Review Board Agreement and elsewhere herein. A copy of the Disputes Review Board Agreement is included in this special provision.

The first duty of the State and Contractor selected members of the DRB is to select and recommend prospective third member(s) to the parties for final selection and approval. The first two DRB members shall proceed with the selection of the third DRB member immediately upon receiving written notification from the State of their selection, and shall provide their recommendation simultaneously to the parties within 21 days of the notification.

An impasse shall be considered to have been reached if the parties are unable to approve a third member within 14 days of receipt of the recommendation of the first two DRB members, or if the first two members are unable to agree upon a recommendation within the 14 day time limit allowed in the preceding paragraph. In the event of an impasse in selection of the third DRB member, the State and the Contractor shall each propose three candidates for the third position. The parties shall select all candidates proposed under this paragraph from the current list of arbitrators certified by the Public Works Contract Arbitration Committee created by Article 7.2 (commencing with Section 10245) of the State Contract Act. The first two DRB members shall then select one of the 6 proposed candidates in a blind draw.

The Contractor, the State, and all three members of the DRB shall complete and adhere to the Disputes Review Board Agreement in administration of this DRB within 14 days of the parties' concurrence in the selection of the third member. The State authorizes the Engineer to execute and administer the terms of the Agreement. The person(s) designated by the Contractor as authorized to execute Contract Change Orders shall be authorized to execute and administer the terms of this agreement, or to delegate the authority in writing. The operation of the DRB shall be in conformance with the terms of the Disputes Review Board Agreement.

The State and the Contractor shall bear the costs and expenses of the DRB equally. Each DRB board member shall be compensated at an agreed rate of \$1,000.00 per day if time spent per meeting, including all on-site time plus one hour of travel time, is greater than four hours. Each DRB board member shall be compensated at an agreed rate of \$600.00 per day if time spent per meeting, including all on-site time plus one hour of travel time, is less than or equal to four hours. The agreed rates shall be considered full compensation for on-site time, travel expenses, transportation, lodging, time for travel and incidentals for each day, or portion thereof, that the DRB member is at an authorized DRB meeting. No additional compensation will be made for time spent by DRB members in review and research activities outside the official DRB meetings unless that time, (such as time spent evaluating and preparing recommendations on specific issues presented to the DRB), has been specifically agreed to in advance by the State and Contractor. Time away from the project, that has been specifically agreed to in advance by the parties, will be compensated at an agreed rate of \$100.00 per hour. The agreed amount of \$100.00 per hour shall include all incidentals including any expenses for telephone, fax and computer services. Members serving on more than one DRB, regardless of the number of meetings per day, shall not be paid more than the all inclusive rate per day or rate per hour for an individual project. The State will provide, at no cost to the Contractor, administrative services such as conference facilities and secretarial services to the DRB. These special provisions and the Disputes Review Board Agreement state provisions for compensation and expenses of the DRB. All DRB members shall be

compensated at the same daily and hourly rate. The Contractor shall make direct payments to each DRB member for their participation in authorized meetings and approved hourly rate charges from invoices submitted by each DRB member. The State will reimburse the Contractor for its share of the costs. There will be no markups applied to any expenses connected with the DRB, either by the DRB members or by the Contractor when requesting payment of the State's share of DRB expenses.

Service of a DRB member may be terminated at any time with not less than 14 days notice as follows:

1. The State may terminate service of the State appointed member.
2. The Contractor may terminate service of the Contractor appointed member.
3. Upon the written recommendation of the State and Contractor members for the removal of the third member.
4. Upon resignation of a member.

When a member of the DRB is replaced, the replacement member shall be appointed in the same manner as the replaced member was appointed. The appointment of a replacement DRB member will begin promptly upon determination of the need for replacement and shall be completed within 14 days. Changes in either of the DRB members chosen by the two parties will not require re-selection of the third member, unless both parties agree to such re-selection in writing. The Disputes Review Board Agreement shall be amended to reflect the change of a DRB member.

The following procedure shall be used for dispute resolution:

1. If the Contractor objects to any decision, act or order of the Engineer, the Contractor shall give written notice of potential claim as specified in Section 9-1.04, "Notice of Potential Claim," of the Standard Specifications, including provision of applicable cost documentation; or file written protests or notices pursuant to Sections 4-1.03A, "Procedure and Protest", 8-1.06, "Time of Completion", 8-1.07, "Liquidated Damages", or 8-1.10, "Utility and Non-Highway Facilities" of the Standard Specifications.
2. The Engineer will respond, in writing, to the Contractor's written protest or notice within 14 days of receipt of the written protest or notice.
3. Within 14 days after receipt of the Engineer's written response, the Contractor shall, if the Contractor still objects, file a written reply with the Engineer, stating clearly and in detail the basis of the objection.
4. Following the Contractor's objection to the Engineer's decision, the Contractor shall refer the dispute to the DRB if the Contractor wishes to further pursue the objection to the Engineer's decision. The Contractor shall make the referral in writing to the DRB, simultaneously copied to the State, within 21 days after receipt of the written reply from the Engineer. The written dispute referral shall describe the disputed matter in individual discrete segments so that it will be clear to both parties and the DRB what discrete elements of the dispute have been resolved, and which remain unresolved.
5. The Contractor, by failing to submit the written notice of referral of the matter to the DRB within 21 days after receipt of the State's written reply, waives any future claims on the matter in contention.
6. The Contractor and the State shall each be afforded an opportunity to be present and to be heard by the DRB, and to offer evidence. Either party furnishing any written evidence or documentation to the DRB must furnish copies of such information to the other party a minimum of 14 days prior to the date the DRB is scheduled to convene the hearing for the dispute. Either party shall produce such additional evidence as the DRB may deem necessary to reach an understanding and determination of the dispute. The party furnishing additional evidence shall furnish copies of such additional evidence to the other party at the same time the evidence is provided to the DRB. The DRB will not consider any evidence not furnished in accordance with the terms specified herein.
7. The DRB shall furnish a report, containing findings and recommendations as described in the Disputes Review Board Agreement, in writing to both the State and the Contractor. The DRB shall complete its reports, including minority opinion if any, and submit them to the parties within 30 days of the DRB hearing, except that time extensions may be granted at the request of the DRB with the written concurrence of both parties. The report shall include the facts and circumstances related to the matters under consideration, applicable laws and regulations, the pertinent provisions of the Contract and the actual costs and time incurred as shown on the Contractor's cost accounting records.
8. Within 30 days after receiving the DRB's report, both the State and the Contractor shall respond to the DRB in writing signifying that the dispute is either resolved or remains unresolved. Failure to provide the written response within the time specified, or a written rejection of the DRB's recommendation presented in the report by either party, shall conclusively indicate that the party(s) failing to respond accepts the DRB recommendation. Immediately after responses have been received by both parties, the DRB will provide copies of both responses to the parties simultaneously. Either party may request clarification of elements of the DRB's report from the DRB prior to responding to the report. The DRB will consider any clarification request only if submitted within 10 days of receipt of the DRB's report, and if submitted simultaneously in writing to both the DRB and the other party. Each

party may submit only one request for clarification for any individual DRB report. The DRB shall respond, in writing, to requests for clarification within 10 days of receipt of such requests.

9. The DRB's recommendations, stated in the DRB's reports, are not binding on either party. Either party may seek a reconsideration of a recommendation of the DRB. The DRB shall only grant a reconsideration based upon submission of new evidence and if the request is submitted within the 30 day time limit specified for response to the DRB's written report. Each party may submit only one request for reconsideration regarding any individual DRB recommendation.
10. If the State and the Contractor are able to resolve their dispute with the aid of the DRB's report, the State and Contractor shall promptly accept and implement the recommendations of the DRB.
11. The State or the Contractor shall not call members who served on the DRB for this contract as witnesses in arbitration proceedings which may arise from this contract, and all documents created by the DRB shall be inadmissible as evidence in subsequent arbitration proceedings, except the DRB's final written reports on each issue brought before it.
12. The State and Contractor shall jointly indemnify and hold harmless the DRB members from and against all claims, damages, losses, and expenses, including but not limited to attorney's fees, arising out of and resulting from the findings and recommendations of the DRB.
13. The DRB members shall have no claim against the State or the Contractor, or both, from any claimed harm arising out of the parties' evaluations of the DRB's report.

Disputes Involving Subcontractor Claims.—For purposes of this section, a "subcontractor claim" shall include any claim by a subcontractor (including also any pass through claims by a lower tier subcontractor or supplier) against the Contractor that is actionable by the Contractor against the Department which arises from the work, services, or materials provided or to be provided in connection with the contract. If the Contractor determines to pursue a dispute against the Department that includes a subcontractor claim, the dispute shall be processed and resolved in accordance with these special provisions and in accordance with the following:

1. The Contractor shall identify clearly in all submissions pursuant to this section, that portion of the dispute that involves a subcontractor claim or claims.
2. The Contractor shall include, as part of its submission pursuant to Step 4 above, a certification (False Claims Act Certification) by the subcontractor's or supplier's officer, partner, or authorized representative with authority to bind the subcontractor and with direct knowledge of the facts underlying the subcontractor claim. The Contractor also shall submit a certification that the subcontractor claim is acknowledged and forwarded by the Contractor. The form for these certifications are available from the Engineer.
3. At any DRB meeting on a dispute that includes one or more subcontractor claims, the Contractor shall require that each subcontractor that is involved in the dispute have present an authorized representative with actual knowledge of the facts underlying the subcontractor claim to assist in presenting the subcontractor claim and to answer questions raised by the DRB members or the Department's representatives.
4. Failure by the Contractor to declare a subcontractor claim on behalf of its subcontractor (including lower tier subcontractors' and suppliers' pass through claims) at the time of submission of the Contractor's claims, as provided hereunder, shall constitute a release of the Department by the Contractor on account of such subcontractor claim.
5. The Contractor shall include in all subcontracts under this contract that subcontractors and suppliers of any tier (a) agree to submit subcontractor claims to the Contractor in a proper form and in sufficient time to allow processing by the Contractor in accordance with the Dispute Review Board resolution specifications; (b) agree to be bound by the terms of the Dispute Review Board provisions to the extent applicable to subcontractor claims; (c) agree that, to the extent a subcontractor claim is involved, completion of all steps required under these Dispute Review Board special provisions shall be a condition precedent to pursuit by the subcontractor of any other remedies permitted by law, including without limitation of a lawsuit against the Contractor; and (d) agree that the existence of a dispute resolution process for disputes involving subcontractor claims shall not be deemed to create any claim, right, or cause of action by any subcontractor or supplier against the Department.

Notwithstanding the foregoing, this Dispute Review Board special provision shall not apply to, and the DRB shall not have the authority to consider, any subcontractor claim between the subcontractor(s) or supplier(s) and the Contractor that is not actionable by the Contractor against the Department.

A copy of the "Disputes Review Board Agreement" to be executed by the Contractor, State and the three DRB members after approval of the contract follows:

DISPUTES REVIEW BOARD AGREEMENT

(Contract Identification)

Contract No. _____

THIS DISPUTES REVIEW BOARD AGREEMENT, hereinafter called "AGREEMENT", made and entered into this _____ day of _____, _____, between the State of California, acting through the California Department of Transportation and the Director of Transportation, hereinafter called the "STATE"; _____ hereinafter called the "CONTRACTOR"; and the Disputes Review Board, hereinafter called the "DRB" consisting of the following members:

(Contractor Appointee) ,

(State Appointee) ,

and _____
(Third Person)

WITNESSETH, that

WHEREAS, the STATE and the CONTRACTOR, hereinafter called the "parties", are now engaged in the construction on the State Highway project referenced above; and

WHEREAS the special provisions for the above referenced contract provides for the establishment and operation of the DRB to assist in resolving disputes; and

WHEREAS, the DRB is composed of three members, one selected by the STATE, one selected by the CONTRACTOR, and the third member selected by the other two members and approved by the parties;

NOW THEREFORE, in consideration of the terms, conditions, covenants, and performance contained herein, or attached and incorporated and made a part hereof, the STATE, the CONTRACTOR, and the DRB members hereto agree as follows:

**I
DESCRIPTION OF WORK**

To assist in the resolution of disputes between the parties, the contract provides for the establishment and the operation of the DRB. The intent of the DRB is to fairly and impartially consider disputes placed before it and provide written recommendations for resolution of these disputes to both parties. The members of this DRB shall perform the services necessary to participate in the DRB's actions as designated in Section II, Scope of Work.

**II
SCOPE OF WORK**

The scope of work of the DRB includes, but is not limited to, the following:

A. Objective

The principal objective of the DRB is to assist in the timely resolution of disputes between the parties arising from performance of this contract. It is not intended for either party to default on their normal responsibility to amicably and fairly settle their differences by indiscriminately assigning them to the DRB. It is intended that the mere existence of the DRB will encourage the parties to resolve disputes without resorting to this review procedure. But when a dispute which is serious enough to warrant the DRB's review does develop, the process for prompt and efficient action will be in place.

B. Procedures

The DRB shall render written reports on disputes between the parties arising from the construction contract. Prior to consideration of a dispute, the DRB shall establish rules and regulations that will govern the conduct of its business and reporting procedures in accordance with the requirements of the contract and the terms of this AGREEMENT. DRB recommendations, resulting from its consideration of a dispute, shall be furnished in writing to both parties. The recommendations shall be based on the pertinent contract provisions, and the facts and circumstances involved in the dispute. The recommendations shall find one responsible party in a dispute; shared or "jury" determinations shall not be rendered.

The DRB shall refrain from officially giving any advice or consulting services to anyone involved in the contract. The individual members shall act in a completely independent manner and while serving as members of the DRB shall have no consulting business connections with either party or its principals or attorneys or any other affiliates (subcontractors, suppliers, etc.) who have a beneficial interest in the contract.

During scheduled meetings of the DRB as well as during dispute hearings, DRB members shall refrain from expressing opinions on the merits of statements on matters under dispute or potential dispute. Opinions of DRB members expressed in private sessions shall be kept strictly confidential. Individual DRB members shall not meet with, or discuss contract issues with individual parties, except as directed by the DRB Chairperson. Any such discussions or meetings shall be disclosed to both parties. Any other discussions regarding the project between the DRB members and the parties shall be in the presence of all three members and both parties. Individual DRB members shall not undertake independent investigations of any kind pertaining to disputes or potential disputes, except with the knowledge of both parties and as expressly directed by the DRB Chairperson.

C. Construction Site Visits, Progress Meetings and Field Inspections

The DRB members shall visit the project site and meet with representatives of the parties to keep abreast of construction activities and to develop familiarity with the work in progress. All scheduled progress meetings shall be held at or near the job site. The DRB shall meet at least once at the start of the project, and at least once every six months thereafter. The frequency, exact time, and duration of additional site visits and progress meetings shall be as recommended by the DRB and approved by the parties consistent with the construction activities or matters under consideration and dispute. Each meeting shall consist of a round table discussion and a field inspection of the work being performed on the contract, if necessary. Each meeting shall be attended by representatives of both parties. The agenda shall generally be as follows:

1. Meeting opened by the DRB Chairperson.
2. Remarks by the STATE's representative.
3. A description by the CONTRACTOR's representative of work accomplished since the last meeting; the current schedule status of the work; and a forecast for the coming period.
4. An outline by the CONTRACTOR's representative of potential problems and a description of proposed solutions.
5. An outline by the STATE's representative of the status of the work as the STATE views it.
6. A brief description by the CONTRACTOR's or STATE's representative of potential claims or disputes which have surfaced since the last meeting.
7. A summary by the STATE's representative, the CONTRACTOR's representative, or the DRB of the status of past disputes and claims.

The STATE's representative will prepare minutes of all regular meetings and circulate them for revision and approval by all concerned.

The field inspection shall cover all active segments of the work, the DRB being accompanied by both parties' representatives. The field inspection may be waived upon mutual agreement of the parties.

D. DRB Consideration and Handling of Disputes

Upon receipt by the DRB of a written referral of a dispute, the DRB shall convene to review and consider the dispute. The DRB shall determine the time and location of DRB hearings, with due consideration for the needs and preferences of the parties while recognizing the paramount importance of speedy resolution of issues. If the matter is not urgent, it may be scheduled for the time of the next scheduled DRB visit to the project. For an urgent matter, and upon the request of either party, the DRB shall meet at its earliest convenience.

Normally, hearings shall be conducted at or near the project site. However, any location which would be more convenient and still provide all required facilities and access to necessary documentation shall be satisfactory.

Both parties shall be given the opportunity to present their evidence at these hearings. It is expressly understood that the DRB members are to act impartially and independently in the consideration of the contract provisions, and the facts and

conditions surrounding any dispute presented by either party, and that the recommendations concerning any such dispute are advisory and nonbinding on the parties.

The DRB may request that written documentation and arguments from both parties be sent to each DRB member, through the DRB Chairperson, for review before the hearing begins. A party furnishing any written documentation to the DRB shall furnish copies of such information to the other party at the same time that such information is supplied to the DRB.

DRB hearings shall be informal. There shall be no testimony under oath or cross-examination. There shall be no reporting of the procedures by a shorthand reporter or by any electronic means. Documents and verbal statements shall be received by the DRB in accordance with acceptance standards established by the DRB. Said standards need not comply with prescribed legal laws of evidence.

The third DRB member shall act as Chairperson for dispute hearings and all other DRB activities. The parties shall have a representative at all hearings. Failure to attend a duly noticed meeting by either of the parties shall be conclusively considered by the DRB as indication that the non-attending party considers any written submittals as their entire and complete argument. The claimant shall discuss the dispute, followed by the other party. Each party shall then be allowed one or more rebuttals until all aspects of the dispute are thoroughly covered. DRB members may ask questions, seek clarification, or request further data from either of the parties. The DRB may request from either party documents or information that would assist the DRB in making its findings and recommendations including, but not limited to, documents used by the CONTRACTOR in preparing the bid for the project. A refusal by a party to provide information requested by the DRB may be considered by the DRB as an indication that the requested material would tend to disprove that party's position. Claims shall not necessarily be computed by merely subtracting bid price from the total cost of the affected work. However, if any claims are based on the "total cost method", then, to be considered by the DRB, they shall be supported by evidence furnished by the CONTRACTOR that (1) the nature of the dispute(s) makes it impossible or impracticable to determine cost impacts with a reasonable degree of accuracy, (2) the CONTRACTOR's bid estimate was realistic, (3) the CONTRACTOR's actual costs were reasonable, and (4) the CONTRACTOR was not responsible for the added expenses. As to any claims based on the CONTRACTOR's field or home office accounting records, those claims shall be supported by an audit report of an independent Certified Public Accountant unless the contract includes special provisions that provide for an alternative method to calculate unabsorbed home office overhead. Any of those claims shall also be subject to audit by the DRB with the concurrence of the parties. In large or complex cases, additional hearings may be necessary in order to consider all the evidence presented by both parties. All involved parties shall maintain the confidentiality of all documents and information, as provided in this AGREEMENT.

During dispute hearings, no DRB member shall express an opinion concerning the merit of any facet of the case. All DRB deliberations shall be conducted in private, with all interim individual views kept strictly confidential.

After hearings are concluded, the DRB shall meet in private and reach a conclusion supported by two or more members. Private sessions of the DRB may be held at a location other than the job site or by electronic conferencing as deemed appropriate, in order to expedite the process.

The DRB's findings and recommendations, along with discussion of reasons therefor, shall then be submitted as a written report to both parties. Recommendations shall be based on the pertinent contract provisions, applicable laws and regulations, and facts and circumstances related to the dispute. The report shall be thorough in discussing the facts considered, the contract language, law or regulation viewed by the DRB as pertinent to the issues, and the DRB's interpretation and philosophy in arriving at its conclusions and recommendations. The DRB's report shall stand on its own, without attachments or appendices. The DRB chairman shall complete and furnish a summary report to the DRB Program Manager, Construction Program, M.S. 44, P.O. Box 942874, Sacramento, CA 94274.

With prior written approval of both parties, the DRB may obtain technical services necessary to adequately review the disputes presented; including audit, geotechnical, schedule analysis and other services. The parties' technical staff may supply those services as appropriate. The cost of any technical services, as agreed to by the parties, shall be borne equally by the two parties as specified in an approved contract change order. The CONTRACTOR will not be entitled to markups for the payments made for these services.

The DRB shall resist submittal of incremental portions of information by either party, in the interest of making a fully-informed decision and recommendation.

The DRB shall make every effort to reach a unanimous decision. If this proves impossible, the dissenting member shall prepare a minority opinion, which shall be included in the DRB's report.

Although both parties should place weight upon the DRB's recommendations, they are not binding. Either party may appeal a recommendation to the DRB for reconsideration. However, reconsideration shall only be allowed when there is new evidence to present, and the DRB shall accept only one appeal from each party pertaining to any individual DRB recommendation. The DRB shall hear appeals in accordance with the terms described in the Section entitled "Disputes Review Board" in the special provisions.

E. DRB Member Replacement

Should the need arise to appoint a replacement DRB member, the replacement DRB member shall be appointed in the same manner as the original DRB members were appointed. The selection of a replacement DRB member shall begin promptly upon notification of the necessity for a replacement and shall be completed within 14 days. This AGREEMENT will be amended to indicate change in DRB membership.

III CONTRACTOR RESPONSIBILITIES

The CONTRACTOR shall furnish to each DRB member one copy of all pertinent documents which are or may become necessary for the DRB to perform their function. Pertinent documents are any drawings or sketches, calculations, procedures, schedules, estimates, or other documents which are used in the performance of the work or in justifying or substantiating the CONTRACTOR's position. The CONTRACTOR shall also furnish a copy of such pertinent documents to the STATE, in accordance with the terms outlined in the special provisions.

IV STATE RESPONSIBILITIES

The STATE will furnish the following services and items:

A. Contract Related Documents

The STATE will furnish to each DRB member one copy of Notice to Contractors and Special Provisions, Proposal and Contract, Plans, Standard Specifications, and Standard Plans, change orders, written instructions issued by the STATE to the CONTRACTOR, or other documents pertinent to any dispute that has been referred to the DRB and necessary for the DRB to perform its function.

B. Coordination and Services

The STATE, through the Engineer, will, in cooperation with the CONTRACTOR, coordinate the operations of the DRB. The Engineer will arrange or provide conference facilities at or near the project site and provide secretarial and copying services to the DRB without charge to the CONTRACTOR.

V TIME FOR BEGINNING AND COMPLETION

Once established, the DRB shall be in operation until the day of acceptance of the contract. The DRB members shall not begin any work under the terms of this AGREEMENT until authorized in writing by the STATE.

VI PAYMENT

A. All Inclusive Rate Payment

The STATE and the CONTRACTOR shall bear the costs and expenses of the DRB equally. Each DRB board member shall be compensated at an agreed rate of \$1,000.00 per day if time spent per meeting, including all on-site time plus one hour of travel time, is greater than four hours. Each DRB board member shall be compensated at an agreed rate of \$600.00 per day if time spent per meeting, including all on-site time plus one hour of travel time, is less than or equal to four hours. The agreed rates shall be considered full compensation for on-site time, travel expenses, transportation, lodging, time for travel and incidentals for each day, or portion thereof, that the DRB member is at an authorized DRB meeting. No additional compensation will be made for time spent by DRB members in review and research activities outside the official DRB meetings unless that time has been specifically agreed to in advance by the STATE and CONTRACTOR. Time away from the project, that has been specifically agreed to in advance by the parties, will be compensated at an agreed rate of \$100.00 per hour. The agreed amount of \$100.00 per hour shall include all incidentals including any expenses for telephone, fax and computer services. Members serving on more than one DRB, regardless of the number of meetings per day, shall not be paid more than the all inclusive rate per day or rate per hour for an individual project. The STATE will provide, at no cost to the CONTRACTOR, administrative services such as conference facilities and secretarial services to the DRB.

B. Payments

All DRB members shall be compensated at the same rate. The CONTRACTOR shall make direct payments to each DRB member for their participation in authorized meetings and approved hourly rate charges from invoices submitted by each DRB member. The STATE will reimburse the CONTRACTOR for its share of the costs of the DRB.

The DRB members may submit invoices to the CONTRACTOR for partial payment for work performed and services rendered for their participation in authorized meetings not more often than once per month during the progress of the work. The invoices shall be in a format approved by the parties and accompanied by a general description of activities performed during that billing period. Payment for any hourly fees, at the agreed rate, shall not be paid to a DRB member until the amount and extent of those fees are approved by the STATE and CONTRACTOR.

Invoices shall be accompanied by original supporting documents, which the CONTRACTOR shall include with the extra work billing when submitting for reimbursement of the STATE's share of cost from the STATE. The CONTRACTOR will be reimbursed for one-half of approved costs of the DRB. No markups will be added to the CONTRACTOR's payment.

C. Inspection of Costs Records

The DRB members and the CONTRACTOR shall keep available for inspection by representatives of the STATE and the United States, for a period of three years after final payment, the cost records and accounts pertaining to this AGREEMENT. If any litigation, claim, or audit arising out of, in connection with, or related to this contract is initiated before the expiration of the three-year period, the cost records and accounts shall be retained until such litigation, claim, or audit involving the records is completed.

VII ASSIGNMENT OF TASKS OF WORK

The DRB members shall not assign any of the work of this AGREEMENT.

VIII TERMINATION OF AGREEMENT, THE DRB, AND DRB MEMBERS

DRB members may resign from the DRB by providing not less than 14 days written notice of the resignation to the STATE and CONTRACTOR. DRB members may be terminated by their original appointing power, in accordance with the terms of the contract.

IX LEGAL RELATIONS

The parties hereto mutually understand and agree that the DRB member in the performance of duties on the DRB, is acting in the capacity of an independent agent and not as an employee of either party.

No party to this AGREEMENT shall bear a greater responsibility for damages or personal injury than is normally provided by Federal or State of California Law.

Notwithstanding the provisions of this contract that require the CONTRACTOR to indemnify and hold harmless the STATE, the parties shall jointly indemnify and hold harmless the DRB members from and against all claims, damages, losses, and expenses, including but not limited to attorney's fees, arising out of and resulting from the findings and recommendations of the DRB.

X CONFIDENTIALITY

The parties hereto mutually understand and agree that all documents and records provided by the parties in reference to issues brought before the DRB, which documents and records are marked "Confidential - for use by the DRB only", shall be kept in confidence and used only for the purpose of resolution of subject disputes, and for assisting in development of DRB findings and recommendations; that such documents and records will not be utilized or revealed to others, except to officials of the parties who are authorized to act on the subject disputes, for any purposes, during the life of the DRB. Upon termination of this AGREEMENT, said confidential documents and records, and all copies thereof, shall be returned to the parties who furnished them to the DRB. However, the parties understand that such documents shall be subsequently discoverable and admissible in court or arbitration proceedings unless a protective order has been obtained by the party seeking further confidentiality.

**XI
DISPUTES**

Any dispute between the parties hereto, including disputes between the DRB members and either party or both parties, arising out of the work or other terms of this AGREEMENT, which cannot be resolved by negotiation and mutual concurrence between the parties, or through the administrative process provided in the contract, shall be resolved by arbitration as provided in Section 9-1.10, "Arbitration," of the Standard Specifications.

**XII
VENUE, APPLICABLE LAW, AND PERSONAL JURISDICTION**

In the event that any party, including an individual member of the DRB, deems it necessary to institute arbitration proceedings to enforce any right or obligation under this AGREEMENT, the parties hereto agree that any such action shall be initiated in the Office of Administrative Hearings of the State of California. The parties hereto agree that all questions shall be resolved by arbitration by application of California law and that the parties to such arbitration shall have the right of appeal from such decisions to the Superior Court in accordance with the laws of the State of California. Venue for the arbitration shall be Sacramento or any other location as agreed to by the parties.

**XIII
FEDERAL REVIEW AND REQUIREMENTS**

On Federal-Aid contracts, the Federal Highway Administration shall have the right to review the work of the DRB in progress, except for any private meetings or deliberations of the DRB.
All other Federal requirements in this agreement shall only apply to Federal-Aid contracts.

**XIV
CERTIFICATION OF THE CONTRACTOR,
THE DRB MEMBERS, AND THE STATE**

IN WITNESS WHEREOF, the parties hereto have executed this AGREEMENT as of the day and year first above written.

DRB MEMBER

DRB MEMBER

By: _____

By: _____

Title: _____

Title : _____

DRB MEMBER

By : _____

Title : _____

CONTRACTOR

CALIFORNIA STATE DEPARTMENT
OF TRANSPORTATION

By: _____

By: _____

Title: _____

Title: _____

5-1.19 PALEONTOLOGY

Paleontologist will be provided by the State for this contract. The Contractor, shall notify the Engineer 5 days in advance of any excavation. If fossils are discovered, excavation shall be suspended until the Engineer authorizes it to be resumed. If such suspension delays the current controlling operation, the Contractor will be granted an extension of time as provided in Section 8-1.07, "Liquidated Damages," of the Standard Specifications.

If such suspension delays the current controlling operation more than 2 working days, the delay will be considered a right of way delay and the Contractor will be compensated for such delay as provided in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

The Department reserves the right to use other forces for exploratory work to identify and determine the extent of the area requiring fossil recovery and for removing fossils from such area.

5-1.20 PRE-CONSTRUCTION SURVEY

Project survey shall conform to Sections 7-1.11. "Preservation of Property", and 7-1.12, "Responsibility for Damage," of the Standard Specifications, and to the following:

1) The Contractor shall make and document a pre-construction survey of properties and improvements in the area left of stations 200+00 through 214+00 "A" line and as directed by the Engineer. The property locations and type of survey are shown in the table below. Pre-construction surveys shall be made no more than 45 days in advance of the planned commencement of construction.

PRE-CONSTRUCTION SURVEY LOCATIONS		
Property Address	Exterior/Manometer *1)	Interior/Manometer *2)
8980 Ferguson	Yes	
8940 Ferguson	Yes	
8920 Ferguson	Yes	
6821 Mewall Dr.	Yes	
6845 Mewall Dr.		Yes
6853 Mewall Dr.		Yes
6862 Mewall Dr.		Yes
6871 Mewall Dr.	Yes	Yes *3)
6881 Mewall Dr.		Yes
6891 Mewall Dr.		Yes
6903 Mewall Dr.		Yes
6913 Mewall Dr.		Yes
6923 Mewall Dr.	Yes	Yes *3)
6933 Mewall Dr.		Yes
6941 Mewall Dr.	Yes	Yes *3)
6947 Mewall Dr.		Yes
6953 Mewall Dr.		Yes
6959 Mewall Dr.		Yes
*NOTES: 1) The exterior manometer floor level survey shall include the swimming pool, pool deck, planter walls, concrete slabs and other improvements within 30 feet from the slope hinge point. Items d), e) and f) below are not required. 2) The interior manometer floor level survey shall include interior floor surfaces. 3) Special grading requirements adjacent to parcel. Attention is directed to "Earthwork" elsewhere in these special provisions.		

The pre-construction surveys shall contain the following:

- a) The names of the property owner and occupants, the address of the property, the date and time of the inspection.
- b) The name of the person making the inspection.
- c) A complete description of the structure(s) or other improvement(s).
- d) A detailed interior inspection with each interior room (including attic and basement spaces) designated and described. All existing conditions of the walls, ceilings and floors such as cracks, holes and separations shall be noted.
- e) A detailed exterior inspection fully describing the existing conditions of all foundations, walls, roofs, doors and windows, and porches.
- f) A detailed listing, inspection and documentation of existing conditions of garages, outbuildings, sidewalks and driveways.

- g) A survey of any wells or other private water supplies including total depth and existing water surface levels.
- h) A floor level manometer survey shall be performed and documented in the interior or exterior or both as indicated in the above table.

2) Upon completion of construction, the Contractor shall resurvey and document the pre-construction survey within 45 days.

A resurvey of all locations will be required whenever construction operations are either terminated or suspended for a period in excess of 45 calendar days.

The documentation shall consist of a written report, and a video tape with voice narration. The video tape, must include the date and time displayed on the image.

Copies of the pre-construction inspection reports and video tape documentation shall be given to the Engineer prior to the time construction begins.

3) No construction operation shall start until the Engineer has reviewed and approved this pre-construction survey in accordance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications. The Contractor shall allow not less than 2 days for the Engineer to complete the review of the survey. In the event that additional data is required, the Contractor shall provide at least 2 days for the review of each additional survey. Should the Engineer fail to complete his review within the time allowance and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of this delay in pre-construction survey review, the delay will be considered a right of way delay as specified in Section 8-1.09, "Right of Way Delays", of the Standard Specifications.

Damage complaints shall be accurately recorded by the Contractor as to complainant, address, date, time, nature of the complainant, name of person receiving the complaint, the complaint investigation conducted and the disposition of the complaint. Complaint records shall be available to the Engineer at all times.

The contract lump sum price paid for pre-construction survey shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in preparing and documenting existing conditions before and after completion of the project, (including any resurvey required because of termination or suspension of construction operations of more than 45 days), including video tapes and records kept, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

5-1.21 CLAIMS SUBMITTAL

Claims submittal may be made on work completed, except for plant establishment work, upon receiving relief from maintenance and responsibility for the completed work in lieu of acceptance by the Director as specified in Section 9-1.07B, "Final Payment and Claims," of the Standard Specifications. Claims submitted upon granting of relief from maintenance and responsibility will be processed in accordance with Section 9-1.07B of the Standard Specifications and these special provisions.

Upon the request of the Contractor, relief from maintenance and responsibility for work completed in accordance with the requirements of the contract and to the satisfaction of the Engineer may be granted as specified in Section 7-1.15, "Relief From Maintenance and Responsibility," of the Standard Specifications. Within 90 days of granting relief from maintenance and responsibility, the Engineer will issue to the Contractor, in writing, a progress pay estimate finalizing the completed items of work. Within 30 days after receiving the progress pay estimate, the Contractor may submit to the Engineer a written statement of the claims arising under the contract exclusive of plant establishment work. No claim arising from work which relief of maintenance and responsibility were granted will be considered that was not included in the written statement of claims.

The proposed final estimate for the contract will be submitted to the Contractor after acceptance of the work, including plant establishment. After submittal of the proposed final estimate, no claim will be considered except for those arising from plant establishment work or additional work ordered by the Engineer during the plant establishment period of the contract.

The process for resolution of the contract claims, including plant establishment work, by arbitration shall not begin until acceptance of the work by the Engineer and shall be in accordance with Section 9-1.10, "Arbitration," of the Standard Specifications.

5-1.22 COMPENSATION ADJUSTMENTS FOR PRICE INDEX FLUCTUATIONS

The provisions of this section shall apply only to the following contract items:

ITEM CODE	ITEM
390171	ASPHALT CONCRETE BASE (TYPE A)
390155	ASPHALT CONCRETE (TYPE A)

The compensation payable for said asphalt concrete and asphalt concrete base will be subject to being increased or decreased in accordance with the provisions of this section for paving asphalt price fluctuations exceeding 5 percent (Iu/Ib is greater than 1.05 or less than 0.95) which occur during performance of the work.

The adjustment in compensation will be determined in accordance with the following formulae when the item of asphalt concrete or asphalt concrete base (or both) is included in a monthly estimate:

Total monthly adjustment = AQ

For an increase in paving asphalt price index exceeding 5 percent

A = 0.90 (Iu/Ib - 1.05) Ib

For a decrease in paving asphalt price index exceeding 5 percent

A = 0.90 (Iu/Ib - 0.95) Ib

Where A = Adjustment in dollars per ton of paving asphalt used to produce asphalt concrete and asphalt concrete base rounded to the nearest \$0.01.

Iu = The California Statewide Paving Asphalt Price Index which is in effect on the first business day of the month within the pay period in which the quantity subject to adjustment was included in the estimate.

Ib = The California Statewide Paving Asphalt Price Index for the month in which the bid opening for the project occurred.

Q = Quantity in tons of paving asphalt that was used in producing the quantity of asphalt concrete and asphalt concrete base shown under "This Estimate" on the monthly estimate using the amount of asphalt determined by the Engineer.

The adjustment in compensation will also be subject to the following:

1. The compensation adjustments provided herein, will be shown separately on payment estimates. The Contractor shall be liable to the State for decreased compensation adjustments and the Department may deduct the amount thereof from any moneys due or that may become due the Contractor.

2. Compensation adjustments made under this section will be taken into account in making adjustments under Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications.
3. The total price adjustment for price index increases of paving asphalt on this project shall not exceed \$195,000.
4. In the event of an overrun of contract time, adjustment in compensation for paving asphalt included in estimates during the overrun period will be determined using the California Statewide Paving Asphalt Price Index in effect on the first business day of the month within the pay period in which the overrun began.

The California Statewide Paving Asphalt Price Index is determined each month on the first business day of the month by the Department using the median of posted prices in effect as posted by Chevron, Mobil and Unocal for the Buena Vista, Huntington Beach, Kern River, Long Beach, Midway Sunset and Wilmington fields.

In the event that any of the companies discontinue posting their prices for any field, the Department will determine an index from the remaining posted prices. The Department reserves the right to include in the index determination the posted prices of additional fields.

5-1.23 AREAS FOR CONTRACTOR'S USE

Attention is directed to the requirements specified in Section 7-1.19, "Rights in Land and Improvements," of the Standard Specifications and these special provisions.

The highway right of way shall be used only for purposes that are necessary to perform the required work. The Contractor shall not occupy the right of way, or allow others to occupy the right of way, for purposes which are not necessary to perform the required work.

There are no State-owned parcels adjacent to the right of way for the exclusive use of the Contractor within the contract limits. The Contractor shall secure at his own expense any area required for plant sites, storage of equipment or materials, or for other purposes.

No area is available within the contract limits for the exclusive use of the Contractor. However, temporary storage of equipment and materials on State property may be arranged with the Engineer, subject to the prior demands of State maintenance forces and to all other contract requirements. Use of the Contractor's work areas and other State-owned property shall be at the Contractor's own risk, and the State shall not be held liable for any damage to or loss of materials or equipment located within such areas.

5-1.24 PAYMENTS

Attention is directed to Sections 9-1.06, "Partial Payments," and 9-1.07, "Payment After Acceptance," of the Standard Specifications and these special provisions.

For the purpose of making partial payments pursuant to Section 9-1.06, "Partial Payments," of the Standard Specifications, the amount set forth for the contract items of work hereinafter listed shall be deemed to be the maximum value of the contract item of work which will be recognized for progress payment purposes:

Clearing and Grubbing	\$ 80,000
Develop Water Supply	\$ 50,000

After acceptance of the contract pursuant to Section 7-1.17, "Acceptance of Contract," of the Standard Specifications, the amount, if any, payable for a contract item of work in excess of the maximum value for progress payment purposes hereinabove listed for the item, will be included for payment in the first estimate made after acceptance of the contract.

In determining the partial payments to be made to the Contractor, only the following listed materials will be considered for inclusion in the payment as materials furnished but not incorporated in the work:

- Bar Reinforcing Steel
- Cable Railing
- Chain Link Railing (Type 7)
- Miscellaneous Metal (Bridge)
- Prestressing Ducts and Anchorages
- Prestressing Steel (sealed packages only)
- Joint Seals
- Irrigation Controllers
- Pipe (Irrigation Systems)
- Valves
- Sprinklers
- Sound Wall (Masonry Block)
- Overhead Sign Structures

Culvert Pipe
Edge Drain Pipe
Water Pipes and appurtenances
Miscellaneous Iron and Steel
Fence
Railings
Pavement Markers
Signal and Lighting Standards
Signal Heads and Mounting Brackets
Luminaires
Lighting Fixtures
Type III Service Equipment Enclosures
Irrigation Controller Enclosures
Telephone Demarcation Cabinets

5-1.25 SOUND CONTROL REQUIREMENTS

Sound control shall conform to the provisions in Section 7-1.01I, "Sound Control Requirements," of the Standard Specifications and these special provisions.

The noise level from the Contractor's operations, between the hours of 7:00 p.m. and 7:00 a.m., shall not exceed 86 dBA at a distance of 50 feet. This requirement in no way relieves the Contractor from responsibility for complying with local ordinances regulating noise level outside the limits of the State right of way.

Said noise level requirement shall apply to all equipment on the job or related to the job, including but not limited to trucks, transit mixers or transient equipment that may or may not be owned by the Contractor. The use of loud sound signals shall be avoided in favor of light warnings except those required by safety laws for the protection of personnel.

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

5-1.26 TEMPORARY FIRE PROTECTION

Temporary fire protection shall be furnished, maintained and later removed as specified in these special provisions and as directed by the Engineer.

Temporary fire protection shall be provided at all times during water supply shutdowns to Grossmont College.

Temporary fire protection shall consist of four 4,000 gallon water trucks and truck drivers provided on the campus of Grossmont College as water supply for fire fighting. The water trucks shall be inspected for suitability by the Fire Marshal for the City of El Cajon prior to placement. Water trucks shall be completely filled with water and in place prior to water supply shutdown.

The exact location for placement of the water trucks will be determined by the Engineer.

The water trucks shall be capable of pumping water through a fire hose into the top of fire engine water tanks. The water trucks shall be clearly marked "For Fire Fighting Purposes Only", visible for a distance of 100 feet.

The Contractor shall provide two security personnel to be on-site during the entire water supply shutdown period whose sole purpose shall be to provide a continuous fire-watch for all campus buildings and structures.

When temporary fire protection is no longer required for the work, as determined by the Engineer, the temporary fire protection shall be removed from the site of the work within 72 hours.

The contract lump sum price paid for temporary fire protection shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in temporary fire protection, complete in place, including water, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

SECTION 6. (BLANK)

SECTION 7. (BLANK)

SECTION 8. MATERIALS

SECTION 8-1. MISCELLANEOUS

8-1.01 PREQUALIFIED AND TESTED SIGNING AND DELINEATION MATERIALS

The Department maintains a list of approved prequalified and tested signing and delineation materials and products. The Engineer shall not be precluded from sampling and testing products on the List of Approved Traffic Products.

The manufacturer of products on the List of Approved Traffic Products shall furnish the Engineer a Certificate of Compliance in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications for each type of traffic product supplied.

The following is the List of Approved Traffic Products:

PAVEMENT MARKERS, PERMANENT TYPE

RETROREFLECTIVE

Apex, Model 921 (4"x4")
Ray-O-Lite, Models SS (4"x4"), RS (4"x4") and AA (4"x4")
Stimsonite, Models 88 (4"x4"), 911 (4"x4"), 953 (2.75"x4.5")
3M Series 290 (3.5"x4")

RETROREFLECTIVE WITH ABRASION RESISTANT SURFACE (ARS)

Ray-O-Lite "AA" ARS (4"x4")
Stimsonite, Models 911 (4"x4"), 953 (2.75"x4.5")
3M Series 290 (3.5"x4")

RETROREFLECTIVE WITH ABRASION RESISTANT SURFACE (ARS)

(Used for recessed applications)

Stimsonite, Model 948 (2.3"x4.7")
Ray-O-Lite, Model 2002 (2.3"x4.7")
Stimsonite, Model 944SB (2"x4")*
Ray-O-Lite, Model 2004 ARS (2"x4")*

*For use only in 4.5-inch wide (older) recessed slots

NON-REFLECTIVE FOR USE WITH EPOXY ADHESIVE, 4-inch Round

Apex Universal (Ceramic)
Highway Ceramics, Inc. (Ceramic)

NON-REFLECTIVE FOR USE WITH BITUMEN ADHESIVE, 4-inch Round

Apex Universal (Ceramic)
Apex Universal, Model 929 (ABS)
Elgin Molded Plastics, "Empco-Lite" Model 900 (ABS)
Highway Ceramics, Inc. (Ceramic)
Hi-Way Safety, Inc., Models P20-2000W and 2001Y (ABS)
Interstate Sales, "Diamond Back" (ABS) and (Polypropylene)
Alpine Products, D-Dot (ABS)
Road Creations, Model RCB4NR (Acrylic)

PAVEMENT MARKERS, TEMPORARY TYPE

TEMPORARY MARKERS FOR LONG TERM DAY/NIGHT USE (6 months or less)

Apex Universal, Model 924 (4"x4")
Davidson Plastics Corp., Model 3.0 (4"x4")
Elgin Molded Plastics, "Empco-Lite" Model 901 (4"x4")
Road Creations, Model R41C (4"x4")
Vega Molded Products "Temporary Road Marker" (3"x4")

TEMPORARY MARKERS FOR SHORT TERM DAY/NIGHT USE (14 days or less)
(For seal coat or chip seal applications, clear protective covers are required)

Apex Universal, Model 932
Davidson Plastics, Models T.O.M., T.R.P.M., and "HH" (High Heat)
Hi-Way Safety, Inc., Model 1280/1281

STRIPING AND PAVEMENT MARKING MATERIALS

PERMANENT TRAFFIC STRIPING AND PAVEMENT MARKING TAPE

Advanced Traffic Marking, Series 300 and 400
Brite-Line, Series 1000
Swarco Industries, "Director 35" (For transverse application only)
Swarco Industries, "Director 60"
3M, "Stamark" Series 380 and 5730
3M, "Stamark" Series A320 Bisymmetric (For use on low-volume roadways only)
3M, "Stamark" Series A420, A440, N420, and N440 (For transverse application only)

TEMPORARY (REMOVABLE) STRIPING AND PAVEMENT MARKING TAPE (6 months or less)

Brite-Line, Series 100
P.B. Laminations, Aztec, Grade 102
Swarco Industries, "Director-2"
3M, "Stamark," Series A620
3M Series A145 Removable Black Line Mask
(Black Tape: For use only on Asphalt Concrete Surfaces)
Advanced Traffic Marking Black "Hide-A-Line"
(Black Tape: For use only on Asphalt Concrete Surfaces)

PREFORMED THERMOPLASTIC (Heated in place)

Flint Trading, "Premark" and "Premark 20/20 Flex"
Pavemark, "Hotape"

REMOVABLE TRAFFIC PAINT

Belpro, Series 250/252 and No. 93 Remover

CLASS 1 DELINEATORS

ONE-PIECE DRIVEABLE FLEXIBLE TYPE, 66"

Carsonite, Curve-Flex CFRM-400
Carsonite, Roadmarker CRM-375
Davidson Plastics, "Flexi-Guide Models 400 and 566"
FlexStake, Model 654TM
GreenLine Models HWD1-66 and CGD1-66
J. Miller Industries, Model JMI-375 (with soil anchor)

SPECIAL USE FLEXIBLE TYPE, 66"

Carsonite, "Survivor" with 18" U-Channel base
FlexStake, Model 604
GreenLine Models HWD and CGD (with 18" U-Channel base)
Safe-Hit with 8" pavement anchor (SH248-GP1)
Safe-Hit with 15" soil anchor (SH248-GP2) and with 18" soil anchor (SH248-GP3)

SURFACE MOUNT FLEXIBLE TYPE, 48"

Bent Manufacturing Company, "Masterflex" Model MF-180EX-48
Carsonite, "Super Duck II"
FlexStake, Surface Mount, Models 704 and 754TM

CHANNELIZERS

SURFACE MOUNT TYPE, 36"

Bent Manufacturing Company, "Masterflex" Models MF-360-36 (Round) and MF-180-36 (Flat)
Carsonite, "Super Duck" (Flat SDF-436, Round SDR-336)
Carsonite, Super Duck II Model SDCF203601MB "The Channelizer"
Davidson Plastics, Flex-Guide Models FG300LD and FG300UR
FlexStake, Surface Mount, Models 703 and 753TM
GreenLine, Model SMD-36
The Line Connection, "Dura-Post" Model DP36-3 (Permanent)
The Line Connection, "Dura-Post" Model DP36-3C (Temporary)
Repo, Models 300 and 400
Safe-Hit, Guide Post, Model SH236SMA

CONICAL DELINEATORS, 42"

(For 28"Traffic Cones, see Standard Specifications)

Bent Manufacturing Company "T-Top"
Plastic Safety Systems "Navigator-42"
Roadmaker Company "Stacker"
TraFFix Devices "Grabber"

OBJECT MARKERS

TYPE "K", 18"

Carsonite, Model SMD-615
FlexStake, Model 701KM
Repo, Models 300 and 400
Safe-Hit, Model SH718SMA
The Line Connection, Model DP21-4K

TYPE "K-4", 18-24"

(Shown as Type "Q" in the Traffic Manual)

Carsonite, Super Duck II
FlexStake, Model 701KM
Repo, Models 300 and 400
Safe-Hit, Models SH8 24SMA_WA and SH8 24GP3_WA
The Line Connection, Model DP21-4Q

TEMPORARY RAILING (TYPE K) REFLECTORS AND CONCRETE BARRIER MARKERS

IMPACTABLE TYPE

ARTUK, "FB"
Davidson Plastics, Model PCBM-12
Duraflex Corp., "Flexx 2020" and "Electriflexx"

NON-IMPACTABLE TYPE

ARTUK, JD Series
Stimsonite, Model 967 (with 3 1/4" Acrylic cube corner reflector)
Stimsonite, Model 967LS
Vega Molded Products, Models GBM and JD

THREE BEAM BARRIER MARKERS

(For use to the left of traffic)

Duraflex Corp., "Railrider"
Davidson Plastics, "Mini" (3"x10")

CONCRETE BARRIER DELINEATORS, 16"

(For use to the right of traffic. When mounted on top of barrier, places top of reflective element at 48")

Davidson Plastics, Model PCBM T-16
Safe-Hit, Model SH216RBM

CONCRETE BARRIER-MOUNTED MINI-DRUM

(10" x 14" x 22")

Stinson Equipment Company "SaddleMarker"

SOUND WALL DELINEATOR

(Applied to a vertical surface. Top of reflective element at 48")

Davidson Plastics, PCBM S-36

GUARD RAILING DELINEATOR

(Top of reflective element at 48" above plane of roadway)

WOOD POST TYPE, 27"

Carsonite, Model 427
Davidson Plastics FG 427 and FG 527
FlexStake, Model 102 GR
GreenLine GRD 27
J.Miller Model JMI-375G
Safe-Hit, Model SH227GRD

STEEL POST TYPE

Carsonite, Model CFGR-327 with CFGRBK300 Mounting Bracket

RETROREFLECTIVE SHEETING FOR:

CHANNELIZERS, BARRIER MARKERS, AND DELINEATORS

3M, High Intensity
Reflexite, PC-1000 Metalized Polycarbonate
Reflexite, AC-1000 Acrylic
Reflexite, AP-1000 Metalized Polyester
Reflexite, AR-1000 Abrasion Resistant Coating
Stimsonite, Series 6200 (For rigid substrate devices only)

TRAFFIC CONES, 13" Sleeves

Reflexite SB (Polyester), Vinyl or "TR" (Semi-transparent)

TRAFFIC CONES, 4" and 6" Sleeves

3M Series 3840

Reflexite Vinyl, "TR" (Semi-transparent) or "Conformalite"

BARRELS AND DRUMS

Reflexite, "Super High Intensity" or "High Impact Drum Sheeting"

3M Series 3810

BARRICADES: Type I, Engineering Grade

American Decal, Adcolite

Avery Dennison, 1500 and 1600

3M, Scotchlite, Series CW

BARICADES: Type II, Super Engineering Grade

Avery Dennison, "Fasign" 2500 Series

Kiwalite Type II

Nikkalite 1800 Series

SIGNS: Type II, Super Engineering Grade

Avery Dennison, "Fasign" 2500 Series

Kiwalite, Type II

Nikkalite 1800 Series

SIGNS: Type III, High-Intensity Grade

3M Series 3800

Nippon Carbide, Nikkalite Brand Ultralite Grade II

SIGNS: Type IV, High-Intensity Prismatic Grade

Stimsonite Series 6200

SIGNS: Type VII, High-Intensity Prismatic Grade

3M Series 3900

SIGNS: Type VI, Roll-Up Signs

Reflexite, Vinyl (Orange), Reflexite "SuperBright" (Fluorescent orange)

3M Series RS34 (Orange) and RS20 (Fluorescent orange)

SIGN SUBSTRATE FOR CONSTRUCTION AREA SIGNS

ALUMINUM

FIBERGLASS REINFORCED PLASTIC (FRP)

Sequentia, "Polyplate"

Fiber-Brite

8-1.02 STATE-FURNISHED MATERIALS

Attention is directed to Section 6-1.02, "State-Furnished Materials," of the Standard Specifications and these special provisions.

In addition to the requirements of Section 6-1.02, "State-Furnished Materials," of the Standard Specifications, the Contractor shall notify the Engineer and the Caltrans Electrical Supervisor, telephone (858) 467-4010 not less than 2 working days before completely wired controller cabinet is to be picked up.

The following materials will be furnished to the Contractor:

Sign panels for roadside signs and overhead sign structures.
Laminated wood box posts with metal caps for roadside signs.
Hardware for mounting sign panels as follows:

1. Blind rivets for mounting overlapping legend at sign panel joints.
2. Closure inserts.
3. Aluminum bolts and nuts and steel beveled washers for mounting laminated sign panels on overhead sign structures.

Marker panels, including reflectors, for Type N, Type P and Type R object markers.
Lamps for vehicular traffic signal units and for Type A pedestrian signal units.
Incandescent lamps for flashing beacons and sign lighting fixtures.
Traffic signal, traffic monitoring station, and ramp meter controller assemblies (including wired cabinet, controller unit and loop detector sensor units).
Self-adhesive numbers for numbering electrical equipment.
Padlocks.

Completely wired controller cabinets (with auxiliary equipment but without controller unit) will be furnished to the Contractor at the District 11 Signal Laboratory, 7181 Opportunity Road, San Diego, California 92111, telephone No. (858) 467-4010.

Sign panels for roadside signs, will be available at the District Maintenance warehouse, 7181 Opportunity Road, San Diego, California.

The Contractor, shall submit a written request to the Engineer for the delivery of State-furnished sign panels for overhead sign structures and roadside signs at least 120 days in advance of their intended installation.

At the option of the Contractor, sign panels for overhead sign structures will be furnished at the site of the project or at the Department of Transportation's Warehouse, 2001 Evergreen Street, Sacramento, California 95815. In addition to the written request 120 days in advance of the intended installation, the Contractor shall, within 30 days of receiving notice that the contract has been approved, notify the Engineer in writing at which location such panels are to be delivered.

8-1.03 SLAG AGGREGATE

Air-cooled iron blast furnace slag shall not be used to produce aggregate for:

1. Structure backfill material.
2. Pervious backfill material.
3. Permeable material.
4. Any reinforced or prestressed portland cement concrete component or structure.
5. Any nonreinforced portland cement concrete component or structure for which a Class 1 Surface Finish is required by the provisions in Section 51-1.18B, "Class 1 Surface Finish," of the Standard Specifications.

Aggregate produced from slag resulting from any steel-making process shall not be used for any highway construction except for the following items:

1. Class 2 Aggregate Base
2. Asphalt Concrete

Steel slag to be used to produce aggregate for and Class 2 aggregate base shall be crushed so that 100 percent of the material will pass a 3/4 inch sieve and then shall be control aged for a period of at least 3 months under conditions that will maintain all portions of the stockpiled material at a moisture content in excess of 6 percent of the dry weight of the aggregate.

Any supplier of steel slag aggregate shall provide separate stockpiles for controlled aging of the slag. An individual stockpile shall contain not less than 10,000 nor more than 50,000 tons of said slag. The material in each individual stockpile

shall be assigned a unique lot number and each stockpile shall be identified with a permanent system of signs. The supplier shall maintain a permanent record of the dates on which stockpiles are completed and controlled aging begun, of the dates when controlled aging was completed, and of the dates tests were made and the results of said tests. Moisture tests shall be made at least once per week. No credit for aging will be given for the time period covered by any tests which show a moisture content of 6 percent or less. Such stockpiles and records shall be available to the Engineer during normal working hours for inspection, check testing and review.

The supplier shall notify the Transportation Laboratory, 5900 Folsom Boulevard, Sacramento, California 95819, when each stockpile is completed and controlled aging begun. No more aggregate shall be added to the stockpile unless a new aging period is initiated. A further notification shall be sent when controlled aging is completed.

The supplier shall provide a Certificate of Compliance in conformance with the requirements in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications. Each stockpile or portion of a stockpile that is used in the work will be considered a lot. Said Certificates of Compliance shall state that the steel slag aggregate has been aged in a stockpile for at least 3 months at a moisture content in excess of 6 percent of the dry weight of the aggregate.

Each delivery of aggregate containing steel slag for use as Class 2 aggregate base shall be accompanied by a delivery tag for each load which will identify the lot of material by stockpile number, where the slag was aged, and the date that the stockpile was completed and controlled aging begun.

Air-cooled iron blast furnace slag or natural aggregate may be blended in proper combinations with steel slag aggregate to produce the specified gradings, for those items for which steel slag aggregate is permitted, unless otherwise provided.

Aggregate containing slag shall meet all of the applicable quality requirements for the items in which the aggregate is used.

The combined slag aggregate shall conform to the specified grading for the item in which it is used. The grading will be determined by California Test 202, modified by California Test 105 when there is a difference in specific gravity of 0.2 or more between the coarse and fine portion of the aggregate or between blends of different aggregates.

No aggregate produced from slag shall be placed within one foot, measured in any direction, of any non-cathodically protected pipe or structure unless the aggregate is incorporated in portland cement concrete pavement, in asphalt concrete, or in treated base.

When slag is used as aggregate in asphalt concrete, the K_c factor requirements, as determined by California Test 303, will not apply.

Slag aggregate used for embankment construction shall not be placed within 18 inches of finished slope lines, measured normal to the plane of the slope.

If steel slag aggregates are used to make asphalt concrete, there shall be no other aggregates used in the mixture, except that up to 50 percent of the material passing the No. 4 sieve may consist of iron blast furnace slag aggregates or natural aggregates, or a combination thereof. If iron blast furnace aggregates or natural aggregates or a combination thereof are used in the mix, each type of aggregate shall be fed to the drier at a uniform rate. The rate of feed of each type of aggregate shall be maintained within 10 percent of the amount set. Adequate means shall be provided for controlling and checking the accuracy of the feeder.

In addition to the requirements of Section 39-3.01, "Storage," of the Standard Specifications, steel slag aggregate shall be stored separately from iron blast furnace slag aggregate and each type of slag aggregate shall also be stored separately from natural aggregate.

Asphalt concrete produced from more than one of the following shall not be placed in the same layer: steel slag aggregates; iron blast furnace slag aggregates; natural aggregates; or any combination thereof. Once a type of aggregate or aggregates is selected, it shall not be changed without prior approval by the Engineer.

If steel slag aggregates are used to produce asphalt concrete, and if the specific gravity of a compacted stabilometer test specimen is in excess of 2.40, the quantity of asphalt concrete to be paid for will be reduced. The stabilometer test specimen will be fabricated in accordance with the procedures in California Test 304 and the specific gravity of the specimen will be determined in accordance with Method C of California Test 308. The pay quantity of asphalt concrete will be determined by multiplying the quantity of asphalt concrete placed in the work by 2.40 and dividing the result by the specific gravity of the compacted stabilometer test specimen. Such reduction in quantity will be determined and applied as often as is necessary to insure accurate results as determined by the Engineer.

8-1.04 MEASUREMENT OF QUANTITIES

Attention is directed to the provisions in Section 9-1.01, "Measurement of Quantities," of the Standard Specifications and these special provisions.

The following is added after the third paragraph in Section 9-1.01, "Measurement of Quantities," of the Standard Specifications:

All elements of the material plant controller which affect the accuracy or delivery of data shall be made available for the application of security seals. These devices will be inspected and all adjusting elements sealed prior to the first

production of materials for the contract. The security seals will be furnished by the Engineer. Material production shall cease when alteration, disconnection, or otherwise manipulation of the security seals occur and production shall not resume until the device is inspected and resealed by the Engineer.

Within the limits of the project or at the plant site, the Contractor shall provide a vehicle platform scale of sufficient weighing capacity to check full production sized batches from all proportioning scales to be used in producing materials for the project. Such vehicle platform scale shall conform to the provisions in Section 9-1.01, "Measurement of Quantities," of the Standard Specifications.

Full compensation for furnishing and operating the vehicle platform scale required to check proportioning scales shall be considered to be included in the contract prices paid for the various contract items of work requiring the proportioning scales and no separate payment will be made therefor.

8-1.05 ENGINEERING FABRICS

Engineering fabrics shall conform to the requirements in Section 88, "Engineering Fabrics," of the Standard Specifications and these special provisions.

Filter fabric for this project shall be ultraviolet ray (UV) protected.

SECTION 8-2. CONCRETE

8-2.01 PORTLAND CEMENT CONCRETE

Portland cement concrete shall conform to the provisions in Section 90, "Portland Cement Concrete," of the Standard Specifications and these special provisions.

Unless the use of mineral admixture is prohibited, whenever the word "cement" is found in the Standard Specifications or the special provisions, it shall be understood to mean "cementitious material" when both of the following conditions are met:

- A. The cement content of portland cement concrete is specified, and
- B. Section 90, "Portland Cement Concrete," of the Standard Specifications is referenced.

Portland cement concrete that is produced using equipment where the cement and mineral admixture are proportioned in the same weigh hopper shall be sampled and tested by the Contractor, in the presence of the Engineer, for mix uniformity in conformance with the requirements of ASTM Designation: C 94 Section 11, 4 "Mixing and Delivery," and "Annex A1." The testing shall be performed on concrete produced using an approved project mix design and may be done at the project concrete placement site.

The batch plant producing the portland cement concrete for the project shall have met the requirements of California Test 109 within one year prior to producing concrete for the project.

Sampling for mix uniformity tests shall be performed the first time portland cement concrete, of sufficient volume to perform these tests, is placed on the project. All test results shall be presented to the Engineer no later than 10 days after completion of sampling.

Test results from mixer uniformity testing will not be used for contract compliance, acceptance, or payment.

Prior to placing any concrete on the project, the Contractor shall supply a list of all portland cement concrete mixers to be used. When truck mixers are to be used, the list shall contain the truck identification number, mixer brand, mixer age and mixer condition.

When truck mixers are used, the mix uniformity testing shall be performed on 5 truck mixers per project. The truck mixers selected for testing shall be representative of the different mixer brands, ages, and conditions of the mixers on the list and approved by the Engineer. Mixer selection shall be completed before mix uniformity testing is started. Sampling for the mix uniformity tests from each of the 5 mixers shall be completed within the same work shift, unless otherwise approved in writing by the Engineer. The Contractor shall notify the Engineer, in writing, a minimum of 24 hours prior to performing the sampling for these tests. The letter of notification shall include 1) the truck mixer information, 2) the specific gravity of the coarse aggregate in the mix to be tested, and 3) a copy of the current ACI "Concrete Field Testing Technician, Grade 1" certification for each tester who will perform testing for the Contractor. The Contractor shall provide an adequate number of testers to successfully perform the testing with a minimum amount of impact to the Contractor's operations.

When concrete is completely mixed in stationary mixers, each mixer used for the project shall be tested one time.

Full compensation for the testing of mix uniformity as specified herein will be considered as included in the contract price paid for the concrete work involved and no additional compensation will be allowed therefor.

Section 90-1.01, "Description," of the Standard Specifications is amended to read:

90-1.01 Description.—Portland cement concrete shall be composed of cementitious material, fine aggregate, coarse aggregate, admixtures if used, and water, proportioned and mixed as specified in these specifications.

Unless otherwise specified, cementitious material to be used in portland cement concrete shall conform to the requirements for cement and mineral admixtures in Section 90-2, "Materials" and shall be either: 1) "Type IP (MS Modified)" cement; or 2) a combination of "Type II Modified" portland cement and mineral admixture.

Concrete for each portion of the work shall comply with the requirements for the Class, cementitious material content in pounds per cubic yard, 28-day compressive strength, minor concrete, or commercial quality concrete, as shown on the plans or specified in these specifications or the special provisions.

Class B concrete shall contain not less than 470 pounds of cementitious material per cubic yard.

Class C concrete shall contain not less than 376 pounds of cementitious material per cubic yard.

Class D concrete shall contain not less than 658 pounds of cementitious material per cubic yard.

Minor concrete shall contain not less than 564 pounds of cementitious material per cubic yard unless otherwise specified in these specifications or the special provisions.

Unless otherwise designated on the plans or specified in these specifications or the special provisions, the amount of cementitious material used per cubic yard of concrete in structures or portions of structures shall conform to the following:

Use	Cementitious Material Content in pounds
Concrete which is designated by compressive strength:	
Deck slabs and slab spans of bridges	658 min., 800 max.
Roof sections of exposed top box culverts	658 min., 800 max.
Other portions of structures	564 min., 800-max.
Concrete not designated by compressive strength:	
Deck slabs and slab spans of bridges	658 min.
Roof sections of exposed top box culverts	658 min.
Prestressed members	658 min.
Seal courses	658 min.
Other portions of structures	564 min.
Concrete for precast members	564 min., 940 max.

Whenever the 28-day compressive strength shown on the plans is greater than 3,500 pounds per square inch, the concrete shall be considered to be designated by compressive strength. If the plans show a 28-day compressive strength which is 4,500 pounds per square inch or greater, an additional 7 days will be allowed to obtain the specified strength. The 28-day compressive strengths shown on the plans which are 3,500 pounds per square inch or less, are shown for design information only and are not to be considered a requirement for acceptance of the concrete.

Concrete designated by compressive strength shall be proportioned such that the concrete will conform to the strength shown on the plans or specified in the special provisions.

The Contractor shall determine the mix proportions for all concrete except pavement concrete. The Engineer will determine the mix proportions for pavement concrete.

Before using concrete for which the mix proportions have been determined by the Contractor, or in advance of revising those mix proportions, the Contractor shall submit in writing to the Engineer a copy of the mix design.

Compliance with cementitious material content requirements will be verified in conformance with procedures described in California Test 518 for cement content. For testing purposes, mineral admixture shall be considered to be cement. Batch proportions shall be adjusted as necessary to produce concrete having the specified cementitious material content.

If any concrete used in the work has a cementitious material content, consisting of cement, mineral admixture, or cement plus mineral admixture, which is less than the minimum required for the work, the concrete shall be removed. However, if the Engineer determines that the concrete is structurally adequate, the concrete may remain in place and the Contractor shall pay to the State \$0.25 for each pound of cement, mineral admixture, or cement plus mineral admixture which is less than the minimum required for the work. The Department may deduct the amount from any monies due, or that may become due, the Contractor under the contract. The deductions will not be made unless the difference between the contents required and those actually provided exceeds the batching tolerances permitted by Section 90-5, "Proportioning." No deductions for cementitious material content will be made based on the results of California Test 518.

The requirements of the preceding paragraph shall not apply to minor concrete nor commercial quality concrete.

All concrete for which the mix proportions are determined either by the Contractor or the Engineer shall conform to the requirements of this Section 90.

The first paragraph in Section 90-2.01, "Portland Cement," of the Standard Specifications is amended to read:

90-2.01 Portland Cement.—Unless otherwise specified, portland cement shall be either "Type IP (MS) Modified" cement or "Type II Modified" portland cement.

"Type IP (MS) Modified" cement shall conform to the specifications for Type IP (MS) cement in ASTM Designation: C 595, and shall be comprised of an intimate mixture of Type II cement and not more than 25 percent of a mineral admixture. The type and minimum amount of mineral admixture used in the manufacture of "Type IP (MS) Modified" cement shall be in conformance with the provisions of Section 90-4.08, "Required Use of Mineral Admixtures."

"Type II Modified" portland cement shall conform to the specifications for Type II portland cement in ASTM Designation: C 150.

In addition, "Type IP (MS) Modified" cement and "Type II Modified" portland cement shall conform to the following requirements:

- A. The cement shall not contain more than 0.60 percent by weight of alkalis, calculated as the percentage of Na₂O plus 0.658 times the percentage of K₂O, when determined by either direct intensity flame photometry or by the atomic absorption method. The instrument and procedure used shall be qualified as to precision and accuracy in conformance with the requirements of ASTM Designation: C 114.
- B. The autoclave expansion shall not exceed 0.50 percent.
- C. Mortar, containing the cement to be used and Ottawa sand, when tested in conformance with California Test 527, shall not expand in water more than 0.010 percent and shall not contract in air more than 0.048 percent except that when cement is to be used for precast prestressed concrete piling, precast prestressed concrete members or steam cured concrete products, the mortar shall not contract in air more than 0.053 percent.

The second paragraph in Section 90-2.01, "Portland Cement," of the Standard Specifications is amended to read:

Type III and Type V portland cements shall conform to the specifications in ASTM Designation: C 150, and the additional requirements listed above for Type II Modified portland cement, except that when tested in conformance with California Test 527, mortar containing Type III portland cement shall not contract in air more than 0.075 percent.

The third paragraph in Section 90-2.01, "Portland Cement," of the Standard Specifications is deleted.

The twelfth paragraph in Section 90-2.02, "Aggregates," of the Standard Specifications is deleted.

The first paragraph in Section 90-2.03, "Water," of the Standard Specifications is amended to read:

90-2.03 Water.—In conventionally reinforced concrete work, the water for curing, for washing aggregates, and for mixing shall be free from oil and shall not contain more than 1,000 parts per million of chlorides as Cl, nor more than 1,300 parts per million of sulfates as SO₄. In prestressed concrete work, the water for curing, for washing aggregates, and for mixing shall be free from oil and shall not contain more than 650 parts per million of chlorides as Cl, nor more than 1,300 parts per million of sulfates as SO₄. In no case shall the water contain an amount of impurities that will cause either: 1) a change in the setting time of cement of more than 25 percent when tested in conformance with ASTM Designation: C 191 or ASTM Designation: C 266; or 2) a reduction in the compressive strength of mortar at 14 days of more than 5 percent, when tested in conformance with ASTM Designation: C 109, when compared to the results obtained with distilled water or deionized water, tested in conformance with ASTM Designation: C 109.

The following section is added to Section 90-2, "Materials," of the Standard Specifications:

90-2.04 Admixture Materials.—Admixture materials shall conform to the requirements of the ASTM Designations shown below:

Chemical Admixtures—ASTM Designation: C 494.

Air-entraining Admixtures—ASTM Designation: C 260.

Calcium Chloride—ASTM Designation: D 98.

Mineral Admixtures—Coal fly ash, raw or calcined natural pozzolan as specified in ASTM Designation: C 618, except that the loss on ignition shall not exceed 4 percent, or, silica fume as specified in ASTM Designation:

C 1240, with reduction of mortar expansion of 80 percent, minimum, using the cement from the proposed mix design.

Mineral admixtures shall be used in conformance with the provisions in Section 90-4.08, "Required Use of Mineral Admixtures."

Section 90-4.02, "Materials," of the Standard Specifications is amended to read:

90-4.02 Materials.—Admixture materials shall be as specified in Section 90-2.04, "Admixture Materials."

Section 90-4.05, "Optional Use of Chemical Admixtures," of the Standard Specifications is amended to read:

90-4.05 Optional Use of Chemical Admixtures.—The Contractor will be permitted to use Type A or F, water-reducing; Type B, retarding; or Type D or G, water-reducing and retarding admixtures as described in ASTM Designation: C 494 to conserve cementitious material or to facilitate any concrete construction application subject to the following conditions:

When a water-reducing admixture or a water-reducing and retarding admixture is used, the cementitious material content specified or ordered may be reduced by a maximum of 5 percent by weight except that the resultant cementitious material content shall be not less than 470 pounds per cubic yard.

When a reduction in cementitious material content is made, the dosage of admixture used shall be the dosage used in determining approval of the admixture.

Section 90-4.07, "Optional Use of Air-entraining Admixtures," of the Standard Specifications is amended to read:

90-4.07 Optional Use of Air-entraining Admixtures.—When air-entrainment has not been specified or ordered by the Engineer, the Contractor will be permitted to use an air-entraining admixture to facilitate the use of any construction procedure or equipment provided that the average air content, as determined by California Test 504, of 3 successive tests does not exceed 4 percent and no single test value exceeds 5.5 percent. If the Contractor elects to use an air-entraining admixture in concrete for pavement, the Contractor shall so indicate at the time the Contractor designates the source of aggregate as provided in Section 40-1.015, "Cement Content."

Section 90-4.08, "Required Use of Mineral Admixtures," of the Standard Specifications is amended to read:

90-4.08 Required Use of Mineral Admixtures.—Unless otherwise specified, mineral admixture shall be combined with cement to make cementitious material for use in portland cement concrete.

The calcium oxide content of mineral admixtures shall not exceed 10 percent and the available alkali, as sodium oxide equivalent, shall not exceed 1.5 percent when measured in conformance with the requirements of ASTM Designation: C 618.

The amounts of cement and mineral admixture used in cementitious material for portland cement concrete shall be sufficient to satisfy the minimum cementitious material content requirements specified in Section 90-1.01, "Description," or Section 90-4.05, "Optional Use of Chemical Admixtures," and shall conform to the following:

The minimum amount of cement shall not be less than 75 percent by weight of the specified minimum cementitious material content.

The minimum amount of mineral admixture to be combined with cement shall be determined using one of the following criteria:

- A. When the calcium oxide content of a mineral admixture, measured in conformance with the requirements of ASTM Designation: C 618 and Section 90-2.04, "Admixture Materials," is equal to or less than 2 percent by weight, the amount of mineral admixture shall not be less than 15 percent by weight of the total amount of cementitious material to be used in the mix.
- B. When the calcium oxide content of a mineral admixture, measured in conformance with the requirements of ASTM Designation: C 618 and Section 90-2.04, "Admixture Materials," is greater than 2 percent, the amount of mineral admixture shall not be less than 25 percent by weight of the total amount of cementitious material to be used in the mix.

- C. When a mineral admixture is used, which conforms to the requirements for silica fume in Section 90-2.04, "Admixture Materials," is used, the amount of mineral admixture shall not be less than 10 percent by weight of the total amount of cementitious material to be used in the mix.

If more than the required amount of cementitious material is used, the additional cementitious material in the mix may be either cement, any mineral admixture conforming to the requirements of Section 90-4.02, "Admixture Materials," or a combination of both; however, the maximum total amount of mineral admixture shall not exceed 35 percent by weight of the total amount of cementitious material to be used in the mix. Where Section 90-1.01, "Description," specifies a maximum cementitious content in pounds per cubic yard, the total weight of cement and mineral admixture per cubic yard shall not exceed the specified maximum cementitious material content.

Section 90-4.09, "Optional Use of Mineral Admixture," of the Standard Specifications is deleted.

Section 90-4.11, "Storage, Proportioning, and Dispensing of Mineral Admixtures," of the Standard Specifications is amended to read:

90-4.11 Storage, Proportioning, and Dispensing of Mineral Admixtures.—Mineral admixtures shall be protected from exposure to moisture until used. Sacked material shall be piled to permit access for tally, inspection and identification for each shipment.

Adequate facilities shall be provided to assure that mineral admixtures meeting the specified requirements are kept separate from other mineral admixtures in order to prevent any but the specified mineral admixtures from entering the work. Safe and suitable facilities for sampling mineral admixtures shall be provided at the weigh hopper or in the feed line immediately in advance of the hopper.

Mineral admixtures shall be incorporated into concrete using equipment conforming to the requirements for cement weigh hoppers, and charging and discharging mechanisms in ASTM Designation: C 94, in Section 90-5.03, "Proportioning," and in this Section 90-4.11.

When interlocks are required for cement and mineral admixture charging mechanisms by Section 90-5.03A, "Proportioning for Pavement," and cement and mineral admixtures are weighed cumulatively, their charging mechanisms shall be interlocked to prevent the introduction of mineral admixture until the weight of cement in the cement weigh hopper is within the tolerances specified in Section 90-5.02, "Proportioning Devices."

Mineral admixture used in concrete for exposed surfaces of like elements of a structure shall be from the same source and of the same percentage.

Section 90-5.02, "Proportioning Devices," of the Standard Specifications is amended to read:

90-5.02 Proportioning Devices.—All weighing, measuring or metering devices used for proportioning materials shall conform to the requirements in Section 9-1.01, "Measurement of Quantities," and this Section 90-5.02. In addition, any automatic weighing systems used shall comply with the requirements for automatic proportioning devices in Section 90-5.03A, "Proportioning for Pavement." These automatic devices shall be automatic to the extent that the only manual operation required for proportioning the aggregates, cement, and mineral admixture for one batch of concrete is a single operation of a switch or starter.

Proportioning devices shall be tested at the expense of the Contractor as frequently as the Engineer may deem necessary to insure their accuracy.

Weighing equipment shall be insulated against vibration or movement of other operating equipment in the plant. When the plant is in operation, the weight of each batch of material shall not vary from the weight designated by the Engineer by more than the tolerances specified herein.

Equipment for cumulative weighing of aggregate shall have a zero tolerance of ± 0.5 percent of the designated total batch weight of the aggregate. For systems with individual weigh hoppers for the various sizes of aggregate, the zero tolerance shall be ± 0.5 percent of the individual batch weight designated for each size of aggregate. Equipment for cumulative weighing of cement and mineral admixtures shall have a zero tolerance of ± 0.5 percent of the designated total batch weight of the cement and mineral admixture. Equipment for weighing cement or mineral admixture separately shall have a zero tolerance of ± 0.5 percent of their designated individual batch weights. Equipment for measuring water shall have a zero tolerance of ± 0.5 percent of its designated weight or volume.

The weight indicated for any batch of material shall not vary from the preselected scale setting by more than the following:

- A. Aggregate weighed cumulatively shall be within 1.0 percent of the designated total batch weight of the aggregate. Aggregates weighed individually shall be within 1.5 percent of their respective designated batch weights.

- B. Cement shall be within 1.0 percent of its designated batch weight. When weighed individually, mineral admixture shall be within 1.0 percent of its designated batch weight. When mineral admixture and cement are permitted to be weighed cumulatively, cement shall be weighed first to within 1.0 percent of its designated batch weight, and the total for cement and mineral admixture shall be within 1.0 percent of the sum of their designated batch weights.
- C. Water shall be within 1.5 percent of its designated weight or volume.

Each scale graduation shall be approximately 0.001 of the total capacity of the scale. The capacity of scales for weighing cement, mineral admixture, or cement plus mineral admixture and aggregates shall not exceed that of commercially available scales having single graduations indicating a weight not exceeding the maximum permissible weight variation above, except that no scale shall be required having a capacity of less than 1,000 pounds, with one-pound graduations.

Section 90-5.03, "Proportioning," excluding Section 90-5.03A, "Proportioning for Pavement," of the Standard Specifications is amended to read:

90-5.03 Proportioning.—Proportioning shall consist of dividing the aggregates into the specified sizes, each stored in a separate bin, and combining them with cement, mineral admixture and water as provided in these specifications. Aggregates shall be proportioned by weight.

At the time of batching, all aggregates shall have been dried or drained sufficiently to result in a stable moisture content such that no visible separation of water from aggregate will take place during transportation from the proportioning plant to the point of mixing. In no event shall the free moisture content of the fine aggregate at the time of batching exceed 8 percent of its saturated, surface-dry weight.

Should separate supplies of aggregate material of the same size group, but of different moisture content or specific gravity or surface characteristics affecting workability, be available at the proportioning plant, withdrawals shall be made from one supply exclusively and the materials therein completely exhausted before starting upon another.

Bulk "Type IP (MS) Modified" cement, that conforms to the requirements in Section 90-2.01, "Portland Cement," shall be weighed in an individual hopper and shall be kept separate from the aggregates until the ingredients are released for discharge into the mixer.

Bulk cement to be blended with mineral admixture for use in portland cement concrete for pavement and structures may be weighed in separate, individual weigh hoppers or may be weighed in the same weigh hopper with mineral admixture and shall be kept separate from the aggregates until the ingredients are released for discharge into the mixer. If the cement and mineral admixture are weighed cumulatively, the cement shall be weighed first.

When cement and mineral admixtures are weighed in separate weigh hoppers, the weigh systems for the proportioning of the aggregate, the cement, and the mineral admixture shall be individual and distinct from all other weigh systems. Each weigh system shall be equipped with a hopper, a lever system, and an indicator to constitute an individual and independent material weighing device. The cement and the mineral admixture shall be discharged into the mixer simultaneously with the aggregate.

The scale and weigh hopper for bulk weighing cement, mineral admixture, and cement plus mineral admixture shall be separate and distinct from the aggregate weighing equipment.

When the source of any aggregate is changed for concrete structures, the Contractor shall adjust the mix proportions and submit in writing to the Engineer a copy of the mix design before using such aggregates. When the source of any aggregate is changed for other concrete, the Engineer shall be allowed sufficient time to adjust the mix and such aggregates shall not be used until necessary adjustments are made.

For all batches with a volume of one cubic yard or more, the batching equipment shall conform to one of the following combinations:

- A. Separate boxes and separate scale and indicator for weighing each size of aggregate.
- B. Single box and scale indicator for all aggregates.
- C. Single box or separate boxes and automatic weighing mechanism for all aggregates.

In order to check the accuracy of batch weights, the gross weight and tare weight of batch trucks, truck mixers, truck agitators, and non-agitating hauling equipment shall be determined when ordered by the Engineer. The equipment shall be weighed at the Contractor's expense on scales designated by the Engineer.

Section 90-5.03A, "Proportioning for Pavement," of the Standard Specifications is amended to read:

90-5.03A Proportioning for Pavement.—Aggregates and bulk cement, mineral admixture, and cement plus mineral admixture for use in pavement shall be proportioned by weight by means of automatic proportioning devices of approved type conforming to the requirements specified in this Section 90-5.03A.

The Contractor shall install and maintain in operating condition an electrically actuated moisture meter that will indicate, on a readily visible scale, changes in the moisture content of the fine aggregate as it is batched within a sensitivity of 0.5 percent by weight of the fine aggregate.

The batching of cement, mineral admixture, or cement plus mineral admixture and aggregate shall be interlocked so that a new batch cannot be started until all weigh hoppers are empty, the proportioning devices are within zero tolerance, and the discharge gates are closed. The interlock shall permit no part of the batch to be discharged until all aggregate hoppers and the cement and mineral admixture hoppers or the cement plus mineral admixture hopper are charged with weights which are within the tolerances specified in Section 90-5.02, "Proportioning Devices."

The discharge gate on the cement and mineral admixture hoppers or the cement plus mineral admixture hopper shall be designed to permit regulating the flow of cement, mineral admixture, or cement plus mineral admixture into the aggregate as directed by the Engineer.

When separate weigh boxes are used for each size of aggregate, the discharge gates shall permit regulating the flow of each size of aggregate as directed by the Engineer.

Material discharged from the several bins shall be controlled by gates or by mechanical conveyors. The means of withdrawal from the several bins, and of discharge from the weigh box, shall be interlocked so that not more than one bin can discharge at a time, and that the weigh box cannot be tripped until the required quantity from each of the several bins has been deposited therein. Should a separate weigh box be used for each size of aggregate, all may be operated and discharged simultaneously.

When the discharge from the several bins is controlled by gates, each gate shall be actuated automatically so that the required weight is discharged into the weigh box, after which the gate shall automatically close and lock.

The automatic weighing system shall be designed so that all proportions required may be set on the weighing controller at the same time.

The third paragraph in Section 90-6.01, "General," of the Standard Specifications is amended to read:

All concrete shall be homogeneous and thoroughly mixed, and there shall be no lumps or evidence of undispersed cement, mineral admixture, or cement plus mineral admixture.

The third and fourth paragraphs in Section 90-6.02, "Machine Mixing," of the Standard Specifications are amended to read:

The batch shall be so charged into the mixer that some water will enter in advance of cementitious materials and aggregates. All water shall be in the drum by the end of the first one-fourth of the specified mixing time.

Cementitious materials shall be batched and charged into the mixer by means that will not result either in loss of cementitious materials due to the effect of wind, or in accumulation of cementitious materials on surfaces of conveyors or hoppers, or in other conditions which reduce or vary the required quantity of cementitious material in the concrete mixture.

The sixth paragraph in Section 90-6.02, "Machine Mixing," of the Standard Specifications is amended to read:

The total elapsed time between the intermingling of damp aggregates and all cementitious materials and the start of mixing shall not exceed 30 minutes.

The seventh through tenth paragraphs in Section 90-6.03, "Transporting Mixed Concrete," of the Standard Specifications are amended to read:

When a truck mixer or agitator is used for transporting concrete to the delivery point, discharge shall be completed within 1.5 hours, or before 250 revolutions of the drum or blades, whichever comes first, after the introduction of the cement to the aggregates. Under conditions contributing to quick stiffening of the concrete, or when the temperature of the concrete is 85° F., or above, a time less than 1.5 hours may be required.

When non-agitating hauling equipment is used for transporting concrete to the delivery point, discharge shall be completed within one hour after the addition of the cement to the aggregates. Under conditions contributing to quick stiffening of the concrete, or when the temperature of the concrete is 85° F., or above, the time between the introduction of cement to the aggregates and discharge shall not exceed 45 minutes.

Each load of concrete delivered at the jobsite shall be accompanied by a weight certificate showing the mix identification number, non-repeating load number, date and time at which the materials were batched, the total amount of water(gallons) added to the load and for transit-mixed concrete, the reading of the revolution counter at the time the truck

mixer is charged with cement. This weight certificate shall also show the actual scale weights (pounds) for the ingredients batched. Theoretical or target batch weights shall not be used as a substitute for actual scale weights.

Weight certificates shall be provided in printed form, or if approved by the Engineer, the data may be submitted in electronic media. Electronic media shall be presented in a tab-delimited format on 90 mm diskette with a capacity of at least 1.4 megabytes. Captured data, for the ingredients represented by each batch shall be LFCR (one line, separate record) with allowances for sufficient fields to satisfy the amount of data required by these specifications.

The Contractor may furnish a weight certificate that is accompanied by a separate certificate which lists the actual batch masses or measurements for a load of concrete provided that both certificates are 1) imprinted with the same non-repeating load number that is unique to the contract and 2) delivered to the jobsite with the load.

All weight certificates furnished by the Contractor shall conform to the requirements of Section 9-1.01, "Measurement of Quantities."

Section 90-6.05, "Hand-Mixing," of the Standard Specifications is amended to read:

90-6.05 Hand-Mixing.—Hand-mixed concrete shall be made in batches not more than one-third cubic yard and shall be mixed on a watertight, level platform. The proper amount of coarse aggregate shall be measured in measuring boxes and spread on the platform and the fine aggregate shall be spread on this layer, the 2 layers being not more than one foot in total depth. On this mixture shall be spread the dry cement and mineral admixture and the whole mass turned no fewer than 2 times dry; then sufficient clean water shall be added, evenly distributed, and the whole mass again turned no fewer than 3 times, not including placing in the carriers or forms.

The first paragraph in Section 90-6.06, "Amount of Water and Penetration," of the Standard Specifications is amended to read:

Type of Work	Nominal Penetration (inch)	Maximum Penetration (inch)
Concrete pavement	0-1	1 5/8
Non-reinforced concrete facilities	0-1 3/8	2
Reinforced concrete structures:		
Sections over one foot thick	0-1 3/8	2 1/2
Sections one foot thick or less	0-2	3
Concrete placed under water	3-4	4 1/2
Cast-in-place concrete piles	2 1/2 - 3 1/2	4

The first paragraph following the table of penetration ranges in Section 90-6.06, "Amount of Water and Penetration," of the Standard Specifications is amended to read:

The amount of free water used in concrete shall not exceed 312 pounds per cubic yard, plus 20 pounds for each required 100 pounds of cementitious material in excess of 564 pounds per cubic yard.

The fourth paragraph in Section 90-6.06, "Amount of Water and Penetration," of the Standard Specifications is amended to read:

Where there are adverse or difficult conditions which affect the placing of concrete, the above specified penetration and free water content limitations may be exceeded providing the Contractor is granted permission by the Engineer in writing to increase the cementitious material content per cubic yard of concrete. The increase in water and cementitious material shall be at a ratio not to exceed 30 pounds of water per added 100 pounds of cementitious material per cubic yard. The cost of additional cementitious material and water added under these conditions shall be at the Contractor's expense and no additional compensation will be allowed therefor.

Section 90-9.01, "General," of the Standard Specifications is amended to read:

90-9.01 General.—Concrete compressive strength requirements consist of a minimum strength which must be attained before various loads or stresses are applied to the concrete and, for concrete designated by strength, a minimum strength at the age of 28 days or at the age otherwise allowed in Section 90-1.01, "Description." The various strengths required are specified elsewhere or are shown on the plans.

The compressive strength of concrete will be determined from test cylinders which have been fabricated from concrete sampled in conformance with California Test 539. Test cylinders will be molded and initial field cured in

conformance with California Test 540. Test cylinders will be cured and tested after receipt at the testing laboratory in conformance with California Test 521. A strength test shall consist of the average strength of 2 cylinders fabricated from material taken from a single load of concrete, except that, if any cylinder should show evidence of improper sampling, molding, or testing, that cylinder shall be discarded and the strength test shall consist of the strength of the remaining cylinder.

When concrete compressive strength is specified as a prerequisite to applying loads or stresses to a concrete structure or member, test cylinders for other than steam cured concrete will be cured in conformance with Method 1 of California Test 540. The compressive strength of concrete determined for these purposes will be evaluated on the basis of individual tests.

When concrete is designated by 28-day compressive strength rather than by cementitious material content, the concrete strength to be used as a basis for acceptance of other than steam cured concrete will be determined from cylinders cured in conformance with Method 1 of California Test 540. If the result of a single compressive strength test at the maximum age specified or allowed is below the specified strength but is 95 percent or more of the specified strength, the Contractor shall, at the Contractor's expense, make corrective changes, subject to approval of the Engineer, in the mix proportions or in the concrete fabrication procedures, before placing additional concrete, and shall pay to the State \$10.00 for each in-place cubic yard of concrete represented by the deficient test. If the result of a single compressive strength test at the maximum age specified or allowed is below 95 percent of the specified strength, but is 85 percent or more of the specified strength, the Contractor shall make the corrective changes specified above, and shall pay to the State \$15.00 for each in place cubic yard of concrete represented by the deficient test. In addition, such corrective changes shall be made when the compressive strength of concrete tested at 7 days indicates, in the judgment of the Engineer, that the concrete will not attain the required compressive strength at the maximum age specified or allowed. All concrete represented by a single test which indicates a compressive strength of less than 85 percent of the specified 28-day compressive strength will be rejected in conformance with the provisions in Section 6-1.04, "Defective Materials."

If the test result indicates that the compressive strength at the maximum curing age specified or allowed is below the specified strength, but 85 percent or more of the specified strength, payments to the State as required above shall be made, unless the Contractor, at the Contractor's expense, obtains and submits evidence acceptable to the Engineer that the strength of the concrete placed in the work meets or exceeds the specified 28-day compressive strength. If the test result indicates a compressive strength at the maximum curing age specified or allowed below 85 percent, the concrete represented by that test will be rejected, unless the Contractor, at the Contractor's expense, obtains and submits evidence acceptable to the Engineer that the strength and quality of the concrete placed in the work are acceptable. If the evidence consists of tests made on cores taken from the work, the cores shall be obtained and tested in conformance with the specifications of ASTM Designation: C 42.

No single compressive strength test shall represent more than 300 cubic yards.

When a precast concrete member is steam cured, the compressive strength of the concrete will be determined from test cylinders which have been handled and stored in conformance with Method 3 of California Test 540. The compressive strength of steam cured concrete will be evaluated on the basis of individual tests representing specific portions of production. When the concrete is designated by 28-day compressive strength rather than by cementitious material content, the concrete shall be considered to be acceptable whenever its compressive strength reaches the specified 28-day compressive strength provided that strength is reached in not more than the maximum number of days specified or allowed after the member is cast.

When concrete is specified by compressive strength, prequalification of materials, mix proportions, mixing equipment, and procedures proposed for use, will be required prior to placement of the concrete. Prequalification shall be accomplished by the submission of acceptable certified test data or trial batch reports by the Contractor. Prequalification data shall be based on the use of materials, mix proportions, mixing equipment, procedures, and size of batch proposed for use in the work.

Certified test data, in order to be acceptable, must indicate that not less than 90 percent of at least 20 consecutive tests exceed the specified strength at the maximum number of cure days specified or allowed, and none of those tests are less than 95 percent of specified strength. Strength tests included in the data shall be the most recent tests made on concrete of the proposed mix design and all shall have been made within one year of the proposed use of the concrete.

Trial batch test reports, in order to be acceptable, must indicate that the average compressive strength of 5 consecutive concrete cylinders, taken from a single batch, at not more than 28 days (or the maximum age allowed) after molding shall be at least 600 pounds per square inch greater than the specified 28-day compressive strength, and no individual cylinder shall have a strength less than the specified strength at the maximum age specified or allowed. Data contained in the report shall be from trial batches which were produced within one year of the proposed use of specified strength concrete in the project. Whenever air-entrainment is required, the air content of trial batches shall be equal to or greater than the air content specified for the concrete without reduction due to tolerances.

All tests shall be performed in conformance with either the appropriate California Test methods or the comparable ASTM test methods. All equipment employed in testing shall be in good condition and shall be properly calibrated. If

the tests are performed during the life of the contract, the Engineer shall be notified sufficiently in advance of performing the tests in order to witness the test procedures.

The certified test data and trial batch test reports shall include the following information:

- A. Date of mixing.
- B. Mixing equipment and procedures used.
- C. The size of batch in cubic yards and the weight, type and source of all ingredients used.
- D. Penetration of the concrete.
- E. The air content of the concrete if an air-entraining admixture is used.
- F. The age at time of testing and strength of all concrete cylinders tested.

All certified test data and trial batch test reports shall be signed by an official of the firm which performed the tests.

When approved by the Engineer, concrete from trial batches may be used in the work at locations where concrete of a lower quality is required and the concrete will be paid for as the type or class of concrete required at that location.

After materials, mix proportions, mixing equipment, and procedures for concrete have been prequalified for use, additional prequalification by testing of trial batches will be required prior to making any changes which, in the judgment of the Engineer, could result in a lowering of the strength of the concrete below that specified.

The Contractor's attention is directed to the time required to test trial batches and the Contractor shall be responsible for production of trial batches at a sufficiently early date so that the progress of the work is not delayed.

When precast concrete members are manufactured at the plant of an established manufacturer of precast concrete members, the mix proportions of the concrete shall be determined by the Contractor, and a trial batch and prequalification of the materials, mix proportions, mixing equipment, and procedures will not be required.

Section 90-10.02A, "Portland Cement," of the Standard Specifications is renamed "Cementitious Material" and is amended to read:

90-10.02A Cementitious Material.—Cementitious material shall conform to the provisions in Section 90-1.01, "Description." Compressive strength requirements consist of a minimum strength which must be attained before various loads or stresses are applied to the concrete and, for concrete designated by strength, a minimum strength at the age of 28 days or at the age otherwise allowed in Section 90-1.01, "Description." The various strengths required are specified elsewhere or are shown on the plans.

The fifth paragraph in Section 90-10.02B, "Aggregate," of the Standard Specifications is deleted.
Section 90-10.03, "Production," of the Standard Specifications is amended to read:

90-10.03 Production.—Cementitious material, water, aggregate, and admixtures shall be stored, proportioned, mixed, transported, and discharged in conformance with recognized standards of good practice, which will result in concrete that is thoroughly and uniformly mixed, that is suitable for the use intended, and which conforms to requirements specified herein. "Recognized standards of good practice" are outlined in various industry publications such as are issued by American Concrete Institute, AASHTO, or California Department of Transportation.

The cementitious material content of minor concrete shall conform to the provisions in Section 90-1.01, "Description."

The amount of water used shall result in a consistency of concrete conforming to the provisions in Section 90-6.06, "Amount of Water and Penetration." Additional mixing water shall not be incorporated into the concrete during hauling or after arrival at the delivery point, unless authorized by the Engineer.

Discharge of ready-mixed concrete from the transporting vehicle shall be made while the concrete is still plastic and before any stiffening occurs. An elapsed time of 1.5 hours (one hour in non-agitating hauling equipment), or more than 250 revolutions of the drum or blades, after the introduction of the cementitious material to the aggregates, or a temperature of concrete of more than 90° F. will be considered as conditions contributing to the quick stiffening of concrete. The Contractor shall take whatever action is necessary to eliminate quick stiffening, except that the addition of water will not be permitted.

The required mixing time in stationary mixers shall be not less than 50 seconds nor more than 5 minutes.

The minimum required revolutions at mixing speed for transit-mixed concrete shall be not less than that recommended by the mixer manufacturer, and shall be increased, if necessary, to produce thoroughly and uniformly mixed concrete.

Each load of ready-mixed concrete shall be accompanied by a weight certificate which shall be delivered to the Engineer at the discharge location of the concrete, unless otherwise directed by the Engineer. The weight certificate shall be clearly marked with the date and time of day when the load left the batching plant and, if hauled in truck mixers or agitators, the time the mixing cycle started.

A Certificate of Compliance in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," shall be furnished to the Engineer, prior to placing minor concrete from a source not previously used on the contract, stating that minor concrete to be furnished meets all contract requirements, including minimum cementitious material content specified.

The third and fourth paragraphs in Section 90-11.02, "Payment," of the Standard Specifications are amended to read:

Should the Engineer order the Contractor to incorporate any admixtures in the concrete when their use is not required by these specifications or the special provisions, furnishing the admixtures and adding them to the concrete will be paid for as extra work as provided in Section 4-1.03D.

Should the Contractor use admixtures as permitted under Sections 90-4.05, "Optional Use of Chemical Admixtures;" or 90-4.07, "Optional Use of Air-entraining Admixtures;" or should the Contractor request and obtain permission to use other admixtures for the Contractor's benefit, the Contractor shall furnish those admixtures and incorporate them in the concrete at the Contractor's expense and no additional compensation will be allowed therefor.

8-2.02 CEMENT AND WATER CONTENT

Except for concrete listed below, all concrete which is designated as Class A and all concrete for use in structures shall contain not less than 615 pounds of cement per cubic yard and shall be air-entrained as provided in Section 90-4, "Admixtures," of the Standard Specifications. The air content at time of mixing and prior to placing shall be 3 percent \pm one percent.

1. Paving concrete.
2. Concrete designated by 28-day compressive strength.
3. Concrete designated as Class D or by a cement content which exceeds 615 pounds per cubic yard.
4. Seal course concrete.
5. Concrete for deck slabs of bridges and structure approach slabs.
6. Concrete for piling.

Except for concrete for deck slabs of bridges and structure approach slabs, the amount of free water used in concrete shall not exceed 340 pounds per cubic yard, plus 20 pounds for each required 100 pounds of cement in excess of 615 pounds per cubic yard.

The amount of free water used in concrete for deck slabs of bridges and structure approach slabs shall not exceed 335 pounds per cubic yard, plus 20 pounds for each required 100 pounds of cement in excess of 658 pounds per cubic yard.

SECTION 8-3. WELDING

8-3.01 WELDING ELECTRODES

Flux core welding electrodes conforming to the requirements of AWS A5.20 E6XT-4 or E7XT-4 shall not be used to perform any type of welding for this project.

8-3.02 WELDING QUALITY CONTROL

Welding quality control shall conform to the requirements in the AWS welding codes, the Standard Specifications and these special provisions.

Welding quality control shall apply when any work is welded in conformance with the provisions in Section 49, "Piling," Section 52, "Reinforcement," Section 55, "Steel Structures," Section 56-1, "Overhead Sign Structures," Section 75-1.035, "Bridge Joint Restrainer Units," or Section 86-2.04, "Standards, Steel Pedestals and Posts," of the Standard Specifications.

Wherever reference is made to the following AWS welding codes in the Standard Specifications, on the plans or in these special provisions, the year of adoption for these codes shall be as listed:

AWS Code	Year of Adoption
D1.1	1998
D1.4	1992
D1.5	1995
D1.5 (metric only)	1996

All requirements of the AWS welding codes shall apply unless specified otherwise in the Standard Specifications, on the plans or in these special provisions. Wherever the abbreviation AWS is used, it shall be equivalent to the abbreviations ANSI/AWS or ANSI/AASHTO/AWS.

The welding of all fracture critical members (FCMs) shall conform to the provisions specified in the Fracture Control Plan (FCP) and herein.

The Contractor shall designate in writing a welding Quality Control Manager (QCM). The QCM shall be responsible directly to the Contractor for the quality of welding, including materials and workmanship, performed by the Contractor and all subcontractors.

The QCM shall be the sole individual responsible to the Contractor for submitting, receiving, and approving all correspondence, required submittals, and reports to and from the Engineer.

The QCM shall not be employed or compensated by any subcontractor, or by other persons or entities hired by subcontractors, who will provide other services or materials for the project. The QCM may be an employee of the Contractor.

Welding inspection personnel or nondestructive testing (NDT) firms to be used in the work shall not be employed or compensated by any subcontractor, or by other persons or entities hired by subcontractors, who will provide other services or materials for the project, except for the following conditions:

1. The welding is performed at a permanent fabrication facility which is certified under the AISC Quality Certification Program, Category Cbr, Major Steel Bridges.
2. The welding is performed at a permanent fabrication facility which is certified under the AISC Quality Certification Program, Category Sbd, Conventional Steel Building Structures. This condition shall apply only for work welded in conformance with the provisions in Section 56-1, "Overhead Sign Structures" or Section 86-2.04, "Standards, Steel Pedestals and Posts," of the Standard Specifications.

For welding performed at such certified facilities, the inspection personnel or NDT firms may be employed or compensated by the fabrication facility performing the welding.

Prior to submitting the Welding Quality Control Plan (WQCP) required herein, a pre-welding meeting between the Engineer, Contractor and any welding subcontractors or entities hired by these subcontractors to be used in the work, shall be held to discuss the requirements for the WQCP.

Prior to performing any welding, the Contractor shall submit to the Engineer, in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications, 3 copies of a separate WQCP for each item of work for which welding is to be performed. As a minimum, each WQCP shall include the following:

1. The name of the welding firm and the NDT firm to be used;
2. A manual prepared by the NDT firm that shall include equipment, testing procedures, code of safe practices, the Written Practice of the NDT firm, and the names, qualifications and documentation of certifications for all personnel to be used;
3. The name of the QCM and the names, qualifications and documentation of certifications for all Quality Control (QC) Inspectors and Assistant Quality Control Inspectors to be used;
4. An organizational chart showing all QC personnel and their assigned QC responsibilities;
5. The methods and frequencies for performing all required quality control procedures, including QC inspection forms to be used, as required by the specifications including:
 - (a) all visual inspections;
 - (b) all NDT including radiographic geometry, penetrometer and shim selection, film quality, film processing, radiograph identification and marking system, and film interpretation and reports; and
 - (c) calibration procedures and calibration frequency for all NDT equipment;
6. A system for the identification and tracking of all welds, NDT and any required repairs, and a procedure for the reinspection of any repaired welds. The system shall have provisions for 1) permanently identifying each weld and the person who performed the weld, 2) placing all identification and tracking information on each radiograph and 3) a method of reporting nonconforming welds to the Engineer;

7. Standard procedures for performing noncritical repair welds. Noncritical repair welds are defined as welds to deposit additional weld beads or layers to compensate for insufficient weld size and to fill limited excavations that were performed to remove unacceptable edge or surface discontinuities, rollover or undercut. The depth of these excavations shall not exceed 65 percent of the specified weld size;
8. The welding procedure specification (WPS), including documentation of all supporting Procedure Qualification Record (PQR) tests performed, and the name of the testing laboratory who performed the tests, to verify the acceptability of the WPS. The submitted WPS shall be within the allowable period of effectiveness;
9. Documentation of all certifications for welders for each weld process and position that will be used. Certifications shall list the electrodes used, test position, base metal and thickness, tests performed, and the witnessing authority. All certifications shall be within the allowable period of effectiveness; and
10. One copy each of all AWS welding codes and the FCP which are applicable to the welding to be performed. These codes and the FCP shall become the permanent property of the Department.
11. Example forms to be used for Certificates of Compliance, daily production logs, and daily reports.

The Engineer shall have 10 working days to review the WQCP submittal after a complete plan has been received. No welding shall be performed until the WQCP is approved in writing by the Engineer. Should the Engineer fail to complete the review within this time allowance and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in reviewing the WQCP, the delay will be considered a right of way delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

An amended WQCP or addendum shall be submitted to, and approved in writing by the Engineer, for any proposed revisions to the approved WQCP. An amended WQCP or addendum will be required for any revisions to the WQCP, including but not limited to a revised WPS, additional welders, changes in NDT firms or procedures, QC or NDT personnel, or updated systems for tracking and identifying welds. The Engineer shall have 3 working days to complete the review of the amended WQCP or addendum. Work that is affected by any of the proposed revisions shall not be performed until the amended WQCP or addendum has been approved. Should the Engineer fail to complete the review within this time allowance and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in reviewing the amended WQCP or addendum, the delay will be considered a right of way delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

After final approval of the WQCP, amended WQCP or addendum, the Contractor shall submit to the Engineer 7 copies each of these approved documents.

It is expressly understood that the Engineer's approval of the Contractor's WQCP shall not relieve the Contractor of any responsibility under the contract for the successful completion of the work in conformity with the requirements of the plans and specifications. The Engineer's approval shall not constitute a waiver of any of the requirements of the plans and specifications nor relieve the Contractor of any obligation thereunder, and defective work, materials and equipment may be rejected notwithstanding approval of the WQCP.

A daily production log for welding shall be kept by the QCM for each day that welding is performed. The log shall clearly indicate the locations of all welding, and shall include the welders' names, amount of welding performed, any problems or deficiencies discovered, and any testing or repair work performed, at each location. The daily report from each Quality Control Inspector shall also be included in the log.

The following items shall be included in a Welding Report that is to be submitted to the Engineer within 7 days following the performance of any welding:

1. Reports of all visual weld inspections and NDT;
2. Radiographs and radiographic reports, and other required NDT reports;
3. Documentation that the Contractor has evaluated all radiographs and other nondestructive tests, corrected all rejectable deficiencies, and all repaired welds have been reexamined by the required NDT and found acceptable; and
4. Daily production log.

All radiographic envelopes shall have clearly written on the outside of the envelope the following information: name of the QCM, name of the nondestructive testing firm, name of the radiographer, date, contract number, complete part description, and all included weld numbers or a report number, as detailed in the WQCP. In addition, all innerleaves shall have clearly written on them the part description and all included weld numbers, as detailed in the WQCP.

All reports regarding NDT, including radiographs, shall be signed by both the NDT technician and the person that performed the review, and then submitted directly to the QCM for review and signature prior to submittal to the Engineer. Corresponding names shall be clearly printed or typewritten next to all signatures.

The Engineer will review the Welding Report to determine if the Contractor is in conformance with the WQCP. Except for steel piling, the Engineer shall be allowed 7 days to review the report and respond in writing after a complete Welding Report has been received. The review time for steel piling shall be as specified in "Piling" of these special provisions. Prior to receiving notification from the Engineer of the Contractor's conformance with the WQCP, the Contractor may encase in

concrete or cover any welds for which a Welding Report has been submitted. However, should the Contractor elect to encase or cover those welds prior to receiving notification from the Engineer, it is expressly understood that the Contractor shall not be relieved of the responsibility for incorporating material in the work that conforms to the requirements of the plans and specifications. Any material not conforming to these requirements will be subject to rejection. Should the Contractor elect to wait to encase or cover any welds pending notification by the Engineer, and should the Engineer fail to complete the review and provide notification within this time allowance, and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in notification, the delay will be considered a right of way delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

Sections 6.1.2 through 6.1.4.3 of AWS D 1.1, Sections 7.1.1 and 7.1.2 of AWS D 1.4, and Sections 6.1.1.1 through 6.1.3.3 of AWS D 1.5 are replaced with the following:

Quality Control (QC) shall be the responsibility of the Contractor. As a minimum, the Contractor shall perform inspection and testing prior to welding, during welding and after welding as specified in this section and additionally as necessary to ensure that materials and workmanship conform to the requirements of the contract documents.

The Quality Control (QC) Inspector shall be the duly designated person who performs inspection, testing, and quality matters for all welding.

Quality Assurance (QA) is the prerogative of the Engineer. The QA Inspector is the duly designated person who acts for and on behalf of the Engineer.

All QC Inspectors shall be responsible for quality control acceptance or rejection of materials and workmanship, and shall be currently certified as AWS Certified Welding Inspectors (CWI) in conformance with the requirements in AWS QC1, "Standard and Guide for Qualification of Welding Inspectors."

The QC Inspector may be assisted by an Assistant QC Inspector provided that this individual is currently certified as an AWS Certified Associate Welding Inspector (CAWI) in conformance with the requirements in AWS QC1, "Standard and Guide for Qualification of Welding Inspectors," or has equivalent qualifications. The QC Inspector shall monitor the Assistant QC Inspector's work, and shall be responsible for signing all reports.

When the term "Inspector" is used without further qualification, it shall refer to the QC Inspector.

Section 6.14.6, "Personnel Qualification," of AWS D 1.1, Section 7.7.6, "Personnel Qualification," of AWS D 1.4 and Section 6.1.3.4, "Personnel Qualification," of AWS D 1.5 are amended to read:

Personnel performing NDT shall be qualified in conformance with the requirements in the current edition of the American Society for Nondestructive Testing (ASNT) Recommended Practice No. SNT-TC-1A and the Written Practice of the NDT firm. The Written Practice of the NDT firm shall meet or exceed the requirements of the current edition of the ASNT Recommended Practice No. SNT-TC-1A. Only individuals who are 1) qualified for NDT Level II, or 2) Level III technicians who have been directly certified by the ASNT and are authorized to perform the work of Level II technicians, shall perform NDT, review the results, and prepare the written reports.

Section 6.5.4, "Scope of Examination," of AWS D 1.1 and Section 7.5.4 of AWS D 1.4 are amended to read:

The QC Inspector shall inspect and approve the joint preparation, assembly practice, welding techniques, and performance of each welder, welding operator, and tack welder to make certain that the applicable requirements of this code and the approved WPS are met.

Section 6.5.4 of AWS D 1.5 is amended to read:

The QC Inspector shall inspect and approve the joint preparation, assembly practice, welding techniques, and performance of each welder, welding operator, and tack welder to make certain that the applicable requirements of this code and the approved WPS are met. The QC Inspector shall examine the work to make certain that it meets the requirements of section 3 and 9.21. The size and contour of welds shall be measured using suitable gages. Visual inspection for cracks in welds and base metal, and for other discontinuities should be aided by strong light magnifiers, or such other devices as may be helpful. Acceptance criteria different from those specified in this code may be used when approved by the Engineer.

The Engineer shall have the authority to verify the qualifications or certifications of any welder, Quality Control Inspector, or NDT personnel to specified levels by retests or other means.

A sufficient number of QC Inspectors shall be provided to ensure continuous inspection when any welding is being performed. Continuous inspection, as a minimum, shall include (1) having QC Inspectors continually present on all shifts when any welding is being performed, or (2) having a QC Inspector within such close proximity of all welding operations

that inspections by the QC Inspector of each operation, at each welding location, shall not lapse for a period exceeding 30 minutes.

Inspection and approval of the joint preparation, assembly practice, welding techniques, and performance of each welder, welding operator, and tack welder shall be documented by the QC Inspector on a daily basis for each day that welding is performed.

The QC Inspector shall provide reports to the QCM on a daily basis for each day that welding is performed.

Except for noncritical weld repairs, base metal repairs, or any other type of repairs not submitted in the WQCP, the Engineer shall be notified immediately in writing when any welding problems or deficiencies are discovered and also of the proposed repair procedures to correct them. The Engineer shall have 5 working days to review these procedures. No remedial work shall begin until the repair procedures are approved in writing by the Engineer. Should the Engineer fail to complete the review within this time allowance and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in reviewing the proposed repair procedures, the delay will be considered a right of way delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

When joint details that are not prequalified by the applicable AWS codes are proposed for use in the work, all welders using these details shall perform a qualification test plate using the approved WPS variables and the joint detail to be used in production. The test plate shall be the maximum thickness to be used in production. The test plate shall be mechanically or radiographically tested as directed by the Engineer. Mechanical and radiographic testing and acceptance criteria shall be as specified in the applicable AWS codes.

The period of effectiveness for a welder's or welding operator's qualification shall be a maximum of 3 years for the same weld process, welding position, and weld type. A valid qualification at the beginning of work on a contract will be acceptable for the entire period of the contract, as long as the welder's work remains satisfactory.

All qualification tests for welders, welding operators, and WPSs used in welding operations will be witnessed by the Engineer.

Section 6.6.5, "Nonspecified Nondestructive Testing Other Than Visual," of AWS D 1.1, Section 6.6.5 of AWS D 1.4 and Section 6.6.5 of AWS D 1.5 shall not apply.

For any welding, the Engineer may direct the Contractor to perform NDT that is in addition to the visual inspection or NDT specified in the AWS welding codes, in the Standard Specifications or in these special provisions. Additional NDT required by the Engineer, will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications. Should any welding deficiencies be discovered by this additional NDT, the cost of the testing will not be paid for as extra work, and shall be at the Contractor's expense.

All required repair work to correct welding deficiencies, whether discovered by the required visual inspection or NDT, or by additional NDT directed by the Engineer, and any associated delays or expenses caused to the Contractor by performing these repairs, shall be at the Contractor's expense.

At the completion of all welding, the QCM shall sign and furnish to the Engineer, a certificate of compliance in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications for each item of work for which welding was performed. The certificate shall state that all of the materials and workmanship incorporated in the work, and all required tests and inspections of this work, have been performed in conformance with the details shown on the plans and the provisions of the Standard Specifications and these special provisions.

Full compensation for conforming to all of the requirements of this section, Welding Quality Control, shall be considered as included in the contract prices paid for the various contract items of work involved and no additional compensation will be allowed therefor.

SECTION 9. DESCRIPTION OF BRIDGE WORK

The bridge work to be done consists, in general, of constructing 3 new concrete bridges briefly described as follows:

NAVAJO ROAD UNDERCROSSING (Bridge No. 57-1050R/L)

Two single span, cast-in-place prestressed concrete box girder superstructures, each approximately 155 feet long and 71 feet wide cast above final grades and lowered onto their reinforced concrete abutments on spread footings.

GROSSMONT COLLEGE DRIVE OVERCROSSING (Bridge No. 57-1051)

A 2-span, cast-in-place prestressed concrete box girder superstructure approximately 347 feet long and 91 feet wide with reinforced concrete abutments and bent supported on spread footings.

SECTION 10. CONSTRUCTION DETAILS

SECTION 10-1. GENERAL

10-1.00 CONSTRUCTION PROJECT INFORMATION SIGNS

Before any major physical construction work readily visible to highway users is started on this contract, the Contractor shall furnish and erect two Type 2 Construction Project Information signs at the locations designated by the Engineer.

The signs and overlays shall be of a type and material consistent with the estimated time of completion of the project and shall conform to the details shown on the plans.

The sign letters, border and Caltrans construction logos shall conform to the colors (non-reflective) and details shown on the plans, and shall be on a white background (non-reflective). The colors blue and orange shall conform to PR Color Number 3 and Number 6, respectively, as specified in the Federal Highway Administration's Color Tolerance Chart.

The sign message to be used for fund types shall consist of the following, in the order shown:

STATE HIGHWAY FUNDS TRANSNET

The sign message to be used for type of work shall consist of the following:

HIGHWAY CONSTRUCTION

The sign message to be used for the Year of Completion of Project Construction will be furnished by the Engineer. The Contractor shall furnish and install the "Year" sign overlay within 10 working days of notification of the year date to be used.

The letter sizes to be used shall be as shown on the plans. The information shown on the signs shall be limited to that shown on the plans.

The signs shall be kept clean and in good repair by the Contractor.

Upon completion of the work, the signs shall be removed and disposed of outside the highway right of way in accordance with the provisions in Section 7-1.13 of the Standard Specifications.

Full compensation for furnishing, erecting, maintaining, and removing and disposing of the construction project information signs shall be considered as included in the contract lump sum price paid for construction area signs and no additional compensation will be allowed therefor.

10-1.01 ORDER OF WORK

Order of work shall conform to the provisions in Section 5-1.05, "Order of Work," of the Standard Specifications and these special provisions.

The uppermost layer of new pavement shall not be placed until all underlying conduits and loop detectors have been installed.

Prior to commencement of the traffic signal functional test at any location, all items of work related to signal control shall be completed and roadside signs and all pavement delineation and pavement markings shall be in place at that location.

Attention is directed to "Obstructions", "Maintaining Traffic" and "Temporary Pavement Delineation" of these special provisions and to the stage construction sheets of the plans.

Utility relocation coordination will be required per "Obstructions".

Attention is directed to "Temporary Fire Protection" elsewhere in these special provisions.

The Contractor shall notify the Engineer 10 days prior to taking the 16 inch waterline in Grossmont College Drive out of service.

The existing earthen sound berm shall remain until Soundwall "S207" is constructed, except for removal required for access to the work area. Once construction of the soundwall has commenced, work shall progress diligently until completion of the soundwall. Nonconflicting work may proceed concurrently with the construction of the soundwall provided progress is maintained adequately to assure completion without delays. In the event that progress is not maintained, the Engineer may order suspension of such nonconflicting work.

Attention is directed to "Earthwork" elsewhere in these special provisions.

The Contractor shall notify the Engineer 10 days prior to performing grading operations in the vicinity between stations 200+00 and 214+00 "A" Line, west of Fanita Drive.

Attention is directed to "Preconstruction Survey" elsewhere in these special provisions. Prior to the commencement of work along the "A" Line between stations 200+00 and 214+00 a preconstruction survey shall be completed.

Attention is directed to "Progress Schedule (Critical Path)" of these special provisions regarding the submittal of a general time-scaled logic diagram within 10 days after approval of the contract. The diagram shall be submitted prior to performing any work that may be affected by any proposed deviations to the construction staging of the project.

Contract No. <Dist>-<Contract_No>

The work shall be performed in conformance with the stages of construction shown on the plans. Nonconflicting work in subsequent stages may proceed concurrently with work in preceding stages, provided satisfactory progress is maintained in the preceding stages of construction.

In each stage, after completion of the preceding stage, the first order of work shall be the removal of existing pavement delineation as directed by the Engineer. Pavement delineation removal shall be coordinated with new delineation so that lane lines are provided at all times on traveled ways open to public traffic.

Before obliterating any pavement delineation that is to be replaced on the same alignment and location, as determined by the Engineer, the pavement delineation shall be referenced by the Contractor, with a sufficient number of control points to reestablish the alignment and location of the new pavement delineation. The references shall also include the limits or changes in striping pattern, including one- and 2-way barrier lines, limit lines, crosswalks and other pavement markings. Full compensation for referencing pavement delineation shall be considered as included in the contract prices paid for new pavement delineation and no additional compensation will be allowed therefor.

When traffic is moved from an established path to a new path and pavement delineation changes are required, all material and equipment needed for new delineation shall be at the site of the work before any shift of traffic is undertaken. The equipment shall be in good working condition.

The Contractor shall place temporary railing (Type K), traffic plastic drums and temporary crash cushion modules, as shown on the plans, before beginning any work shown to be performed behind temporary railing (Type K) and temporary crash cushion modules.

At locations exposed to public traffic where guard railings are to be constructed, or removed, the Contractor shall schedule his operations so that at the end of each working day there shall be no post holes open nor shall there be any railing posts installed without the blocks and rail elements assembled and mounted thereon.

The Contractor shall furnish the Engineer with a statement from the vendor that the order for the plants required for this contract, including inspection plants, has been received and accepted by the vendor. The statement shall be furnished not less than 60 days prior to planting the plants. The statement from the vendor shall also include the names, sizes, and quantities of plants ordered and the anticipated date of delivery.

The Contractor shall place orders for replacement plants at the appropriate time with the vendor so that roots of the replacement plants are not in a root-bound condition.

The Contractor shall furnish the Engineer with a statement from the vendor that the order for the seed required for this contract has been received and accepted by the vendor. The statement shall be furnished not less than 60 days prior to applying seeds. The statement from the vendor shall also include the names and quantity of seed ordered and the anticipated date of delivery.

Attention is directed to the requirements specified under "Irrigation Systems Functional Test" elsewhere in these special provisions, regarding restrictions for planting operations.

Unless otherwise shown on the plans or specified in these special provisions, conduits to be jacked or drilled or installed by open trench for water line crossovers and sprinkler control crossovers shall be installed prior to the installation of other pipe supply lines.

Clearing, grubbing and earthwork operations shall not be performed in areas where existing irrigation facilities are to remain, until existing irrigation facilities have been checked for proper operation as specified under "Highway Planting and Irrigation Systems" elsewhere in these special provisions.

Existing conduits to be modified shall be located as specified under "Modify Irrigation Crossovers" elsewhere in these special provisions prior to the start of other work in these areas.

Attention is directed to the requirements specified in Section 20-5.027B, "Wiring Plans and Diagrams," of the Standard Specifications, regarding submittal of working drawings.

Concrete barriers on Navajo Road Undercrossing, Bridge No. 57-1050R/L, shall be constructed after lowering the bridge superstructure onto substructure.

10-1.02 WATER POLLUTION CONTROL

Water pollution control work shall conform to the requirements in Section 7-1.01G, "Water Pollution," of the Standard Specifications and these special provisions.

This project shall conform to the requirements of General Construction Activity Storm Water Permit No. CAS000002 issued by the State Water Resources Control Board. This General Permit, hereafter referred to as the "Permit," regulates storm water discharges associated with construction activities.

Water pollution control work shall conform to the requirements in the Construction Contractor's Guide and Specifications of the Caltrans Storm Water Quality Handbooks, dated April 1997, and addenda thereto issued up to, and including, the date of advertisement of the project, hereafter referred to as the "Handbook". Copies of the Handbook and the General Permit may be obtained from the Department of Transportation, Material Operations Branch, Publication Distribution Unit, 1900 Royal Oaks Drive, Sacramento, California 95815, Telephone: (916) 445-3520.

Copies of the Handbook and the Permit are also available for review at Caltrans District Office, District Construction Liaison Office, 2829 Juan Street, San Diego, California 92110, Telephone (619) 688-6635.

The Contractor shall become fully informed of and comply with the applicable provisions of the Handbook, Permit and Federal, State and local regulations that govern the Contractor's operations and storm water discharges from both the project site and areas of disturbance outside the project limits during construction. The Contractor shall maintain a copy of the Permit at the project site and shall make the Permit available during construction activities.

Unless arrangements for disturbance of areas outside the project limits are made by the Department and made part of the contract, it is expressly agreed that the Department assumes no responsibility to the Contractor or property owner whatsoever with respect to any arrangements made between the Contractor and property owner to allow disturbance of areas outside the project limits.

The Contractor shall be responsible for the costs and for any liability imposed by law as a result of the Contractor's failure to comply with the requirements set forth in this section "Water Pollution Control", including but not limited to, compliance with the applicable provisions of the Handbook, Permit and Federal, State and local regulations. For the purposes of this paragraph, costs and liabilities include, but are not limited to, fines, penalties and damages whether assessed against the State or the Contractor, including those levied under the Federal Clean Water Act and the State Porter Cologne Water Quality Act.

In addition to any remedy authorized by law, so much of the money due the Contractor under the contract that shall be considered necessary by the Department may be retained by the State of California until disposition has been made of the costs and liabilities.

The retention of money due the Contractor shall be subject to the following:

1. The Department will give the Contractor 30 days notice of its intention to retain funds from any partial payment which may become due to the Contractor prior to acceptance of the contract. Retention of funds from any payment made after acceptance of the contract may be made without prior notice to the Contractor.
2. No retention of additional amounts out of partial payments will be made if the amount to be retained does not exceed the amount being withheld from partial payments pursuant to Section 9-1.06, "Partial Payments," of the Standard Specifications.
3. If the Department has retained funds and it is subsequently determined that the State is not subject to the costs and liabilities in connection with the matter for which the retention was made, the Department shall be liable for interest on the amount retained at the legal rate of interest for the period of the retention.

Conformance with the requirements of this section "Water Pollution Control" shall not relieve the Contractor from the Contractor's responsibilities, as provided in Sections 7-1.11, "Preservation of Property," 7-1.121, "Indemnification," and 7-1.122, "Insurance," of the Standard Specifications.

The Contractor shall, at reasonable times, allow authorized agents of the California Regional Water Quality Control Board, State Water Resources Control Board, U. S. Environmental Protection Agency and local storm water management agency, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the construction site and the Contractor's facilities pertinent to the work;
2. Have access to and copy any records that must be kept as specified in the Permit;
3. Inspect the construction site and related soil stabilization practices and sediment control measures; and
4. Sample or monitor for the purpose of ensuring compliance with the Permit.

The Contractor shall notify the Engineer immediately upon request from regulatory agencies to enter, inspect, sample, monitor or otherwise access the project site or the Contractor's records.

STORM WATER POLLUTION PREVENTION PLAN PREPARATION, APPROVAL AND UPDATES

As part of the water pollution control work, a Storm Water Pollution Prevention Plan, hereafter referred to as the "SWPPP," is required for this contract. The SWPPP shall conform to the requirements in Section 7-1.01G, "Water Pollution," of the Standard Specifications, the requirements in the Handbook, the requirements of the Permit and these special provisions. Upon the Engineer's approval of the SWPPP, the SWPPP shall be deemed to fulfill the requirements of Section 7-1.01G, "Water Pollution," of the Standard Specifications for development and submittal of a Water Pollution Control Program.

No work having potential to cause water pollution, as determined by the Engineer, shall be performed until the SWPPP has been approved by the Engineer.

Within 30 days after the approval of the contract, the Contractor shall submit 5 copies of the SWPPP to the Engineer. The Contractor shall allow 15 days for the Engineer to review the SWPPP. If revisions are required, as determined by the Engineer, the Contractor shall revise and resubmit the SWPPP within 15 days of receipt of the Engineer's comments and shall allow 15 days for the Engineer to review the revisions. Upon the Engineer's approval of the SWPPP, 3 additional

copies of the SWPPP, incorporating the required changes, shall be submitted to the Engineer. In order to allow construction activities to proceed, the Engineer may conditionally approve the SWPPP while minor revisions are being completed.

The objectives of the SWPPP shall be to identify pollution sources that may adversely affect the quality of storm water discharges associated with the project and to identify, construct, implement and maintain water pollution control measures, hereafter referred to as control measures, to reduce to the extent feasible pollutants in storm water discharges from the construction site both during and after construction is completed under this contract.

The SWPPP shall incorporate control measures in the following categories:

1. Soil stabilization practices;
2. Sediment control practices;
3. Sediment tracking control practices;
4. Wind erosion control practices; and
5. Non-storm water management and waste management and disposal control practices.

Specific objectives and minimum requirements for each category of control measures are contained in the Handbook.

The Contractor shall consider the objectives and minimum requirements presented in the Handbook for each of the above categories. When minimum requirements are listed for any category, the Contractor shall incorporate into the SWPPP and implement on the project, one or more of the listed minimum controls required in order to meet the pollution control objectives for the category. In addition, the Contractor shall consider other control measures presented in the Handbook and shall incorporate into the SWPPP and implement on the project the control measures necessary to meet the objectives of the SWPPP. The Contractor shall document the selection process in accordance with the procedure specified in the Handbook.

The following contract items of work, as shown on the project plans, shall be incorporated into the SWPPP as critical temporary control measures: temporary erosion control, temporary silt fence, temporary straw bale, temporary gravel bag, temporary construction entrance and temporary concrete washout. The Contractor shall consider other control measures to supplement the critical temporary control measures when necessary to meet the pollution control objectives of the SWPPP.

The SWPPP shall include, but not be limited to, the following items as described in the Handbook and Permit:

1. Source Identification;
2. Erosion and Sediment Controls;
3. Non-Storm Water Management;
4. Waste Management and Disposal;
5. Maintenance, Inspection and Repair;
6. Training;
7. List of Contractors and Subcontractors;
8. Post-Construction Storm Water Management;
9. Preparer;
10. A copy of the Notice of New Construction (NONC) submitted by the Department for this project;
11. Copy of the General Permit;
12. BMP Consideration Checklist;
13. SWPPP Checklist;
14. Schedule of Values; and
15. Water Pollution Control Drawings.

The Contractor shall amend the SWPPP, graphically and in narrative form, whenever there is a change in construction activities or operations which may affect the discharge of significant quantities of pollutants to surface waters, ground waters, municipal storm drain systems, or when deemed necessary by the Engineer. The SWPPP shall also be amended if it is in violation of any condition of the Permit, or has not effectively achieved the objective of reducing pollutants in storm water discharges. Amendments shall show additional control measures or revised operations, including those in areas not shown in the initially approved SWPPP, which are required on the project to control water pollution effectively. Amendments to the SWPPP shall be submitted for review and approval by the Engineer in the same manner specified for the initially approved SWPPP. Approved amendments shall be dated and logged in the SWPPP. Upon approval of the amendment, the Contractor shall implement the additional control measures or revised operations.

The Contractor shall keep a copy of the SWPPP and approved amendments at the project site. The SWPPP shall be made available upon request of a representative of the Regional Water Quality Control Board, State Water Resources Control Board, U.S. Environmental Protection Agency or local storm water management agency. Requests by the public shall be directed to the Engineer.

By June 15 of each year, the Contractor shall submit an annual certification to the Engineer stating compliance with the requirements governing the Permit. If the project is in non-compliance at any time, the Contractor shall make a written report to the Engineer within 15 days of identification of non-compliance.

SCHEDULE OF VALUES

The Contractor shall submit with the SWPPP, for approval by the Engineer, a schedule of values detailing the cost breakdown of the contract lump sum item for water pollution control. The schedule of values shall reflect the items of work, quantities and costs for control measures shown in the SWPPP, except for critical temporary controls and permanent control measures which are shown on the project plans and for which there is a contract item of work. Adjustments in the items of work and quantities listed in the schedule of values shall be made when required to address approved amendments to the SWPPP.

The sum of the amounts for the units of work listed in the schedule of values shall be equal to the contract lump sum price for water pollution control.

If approved in writing by the Engineer, the schedule of values will be used to determine progress payments for water pollution control during the progress of the work, and as the basis for calculating any adjustment in compensation for the contract item for water pollution control due to changes in the work ordered by the Engineer.

SWPPP IMPLEMENTATION

Upon approval of the SWPPP, the Contractor shall be responsible throughout the duration of the project for installing, constructing, inspecting and maintaining the control measures included in the SWPPP and any amendments thereto and for removing and disposing of temporary control measures. Unless otherwise directed by the Engineer or specified in these special provisions, the Contractor's responsibility for SWPPP implementation shall continue throughout any temporary suspension of work ordered in accordance with Section 8-1.05, "Temporary Suspension of Work," of the Standard Specifications. Requirements for installation, construction, inspection, maintenance, removal and disposal of control measures are specified in the Handbook and these special provisions.

Soil stabilization practices and sediment control measures, including minimum requirements, shall be provided throughout the winter season, defined as between November 1 and March 30.

Implementation of soil stabilization practices and sediment control measures for soil-disturbed areas of the project site shall be completed, except as provided for below, no later than 20 days prior to the beginning of the winter season or upon start of applicable construction activities for projects which begin either during or within 20 days of the winter season.

Throughout the winter season, the active, soil-disturbed area of the project site shall be no more than 10 acres. The Engineer may approve, on a case-by-case basis, expansions of the active, soil-disturbed area limit. The Contractor shall demonstrate the ability and preparedness to fully deploy soil stabilization practices and sediment control measures to protect soil-disturbed areas of the project site before the onset of precipitation. The Contractor shall maintain a quantity of soil stabilization and sediment control materials on site equal to 125 percent of that sufficient to protect unprotected, soil-disturbed areas on the project site and shall maintain a detailed plan for the mobilization of sufficient labor and equipment to fully deploy control measures required to protect unprotected, soil-disturbed areas on the project site prior to the onset of precipitation. The Contractor shall include a current inventory of control measure materials and the detailed mobilization plan as part of the SWPPP.

Throughout the winter season, soil-disturbed areas of the project site shall be considered to be nonactive whenever soil disturbing activities are expected to be discontinued for a period of 20 or more days and the areas are fully protected. Areas that will become nonactive either during the winter season or within 20 days thereof shall be fully protected with soil stabilization practices and sediment control measures within 10 days of the discontinuance of soil disturbing activities or prior to the onset of precipitation, whichever is first to occur.

Throughout the winter season, active soil-disturbed areas of the project site shall be fully protected at the end of each day with soil stabilization practices and sediment control measures unless fair weather is predicted through the following work day. The weather forecast shall be monitored by the Contractor on a daily basis. The National Weather Service forecast shall be used, or an alternative weather forecast proposed by the Contractor may be used if approved by the Engineer. If precipitation is predicted prior to the end of the following work day, construction scheduling shall be modified, as required, and the Contractor shall deploy functioning control measures prior to the onset of the precipitation.

The Contractor shall implement, year-round and throughout the duration of the project, control measures included in the SWPPP for sediment tracking, wind erosion, non-storm water management and waste management and disposal.

The Engineer may order the suspension of construction operations which create water pollution if the Contractor fails to conform to the requirements of this section "Water Pollution Control" as determined by the Engineer.

MAINTENANCE

To ensure the proper implementation and functioning of control measures, the Contractor shall regularly inspect and maintain the construction site for the control measures identified in the SWPPP. The Contractor shall identify corrective actions and time frames to address any damaged measures or reinitiate any measures that have been discontinued.

The construction site inspection checklist provided in the Handbook shall be used to ensure that the necessary measures are being properly implemented, and to ensure that the control measures are functioning adequately. The Contractor shall submit one copy of each site inspection record to the Engineer.

During the winter season, inspections of the construction site shall be conducted by the Contractor to identify deficient measures, as follows:

1. Prior to a forecast storm;
2. After any precipitation which causes runoff capable of carrying sediment from the construction site;
3. At 24 hour intervals during extended precipitation events; and
4. Routinely, at a minimum of once every 2 weeks.

If the Contractor or the Engineer identifies a deficiency in the deployment or functioning of an identified control measure, the deficiency shall be corrected by the Contractor immediately, or by a later date and time if requested by the Contractor and approved by the Engineer in writing, but not later than the onset of subsequent precipitation events. The correction of deficiencies shall be at no additional cost to the State.

WATER POLLUTION CONTROL TRAINING

The Contractor's management and supervisory personnel along with workers involved with the placement and maintenance of storm water pollution prevention "Best Management Practices" shall be trained on general storm water pollution control requirements consistent with the "Caltrans Storm Water Quality Handbook, Construction Contractor's Guide and Specifications". The training is to be provided by the Contractor. The amount of training provided should be commensurate with the job performed by the employee.

Full compensation for water pollution control training shall be considered as included in the contract lump sum price paid for prepare storm water pollution prevention plan, and no additional compensation will be allowed therefor.

PAYMENT

The contract lump sum price paid for prepare storm water pollution prevention plan shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals for doing all the work involved in developing, preparing, obtaining approval of, revising and amending the SWPPP as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Attention is directed to Sections 9-1.06, "Partial Payments," and 9-1.07, "Payment After Acceptance," of the Standard Specifications. Payments for prepare storm water pollution prevention plan will be made as follows:

1. After the SWPPP has been approved by the Engineer, 75 percent of the contract item price for prepare storm water pollution prevention plan will be included in the monthly partial payment estimate; and
2. After acceptance of the contract pursuant to Section 7-1.17, "Acceptance of Contract," the remaining 25 percent of the contract item price for prepare storm water pollution prevention plan will be made in accordance with Section 9-1.07.

The contract lump sum price paid for water pollution control shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in installing, constructing, maintaining, removing and disposing of control measures, except those shown on the project plans and for which there is a contract item of work, and excluding developing, preparing, obtaining approval of, revising and amending the SWPPP, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Changes in control measures required by an approved amendment to the SWPPP, except changes to those control measures shown on the project plans and for which there is a contract item of work, will be considered extra work, in accordance with Section 4-1.03D of the Standard Specifications and the following:

If the control measure is listed in the approved SWPPP schedule of values, an adjustment in compensation for the contract item for water pollution control will be made by applying the increase or decrease in quantities to the approved schedule of values. No adjustment of compensation will be made to the unit price listed for any item in the schedule of values due to any increase or decrease in the quantities, regardless of the reason for the increase or decrease. The provisions in Section 4-1.03B, "Increased or Decreased Quantities," shall not apply to items listed in the schedule of values.

If the control measure is not listed in the approved SWPPP schedule of values, payment will be made by force account.

Those control measures which are shown on the project plans and for which there is a contract item of work will be measured and paid for as that item of work.

The Engineer will retain an amount equal to 25 percent of the estimated value of the contract work performed during estimate periods in which the Contractor fails to conform to the requirements of this section "Water Pollution Control" as determined by the Engineer.

Retentions for failure to conform to the requirements of this section "Water Pollution Control" shall be in addition to the other retentions provided for in the contract. The amounts retained for failure of the Contractor to conform to the requirements of this section will be released for payment on the next monthly estimate for partial payment following the date that an approved SWPPP has been implemented and maintained, and water pollution is adequately controlled, as determined by the Engineer.

10-1.03 TEMPORARY EROSION CONTROL

Temporary erosion control shall conform to the provisions for erosion control in Section 20-3, "Erosion Control," of the Standard Specifications and these special provisions.

Attention is directed to "Water Pollution Control" elsewhere in these special provisions.

Temporary erosion control work shall consist of applying erosion control materials to embankment slopes, excavation slopes and other areas designated on the plans. Temporary erosion control work shall be completed in the designated areas during the period starting November 1 and ending March 30, or within 5 days after an area becomes inactive during this period as defined in "Water Pollution Control" elsewhere in these special provisions.

MATERIALS.—Materials shall conform to Section 20-2, "Materials," of the Standard Specifications and the following:

STABILIZING EMULSION.—Stabilizing emulsion shall conform to the provisions in Section 20-2.11, "Stabilizing Emulsion," of the Standard Specifications and these special provisions.

The requirement of an effective life of at least one year for stabilizing emulsion shall not apply.

Stabilizing emulsion shall be in a dry powder form, may be reemulsifiable, and shall be a processed organic adhesive.

APPLICATION.—Temporary erosion control materials shall be applied in a single application. The following mixture in the proportions indicated shall be applied with hydro-seeding equipment:

Material	Pounds per acre (Slope measurement)
Fiber	1000
Stabilizing emulsion (solids)	250

The ratio of total water to total stabilizing emulsion in the mixture shall be as recommended by the manufacturer.

MEASUREMENT AND PAYMENT.—Temporary erosion control will be measured and paid for by the acre in the same manner specified for erosion control in Sections 20-3.06 and 20-3.07 of the Standard Specifications.

Temporary erosion control placed at locations other than as shown on the project plans or directed by the Engineer, in accordance with the Contractor's Storm Water Pollution Prevention Plan, will not be measured and will be paid for as specified in "Water Pollution Control" elsewhere in these special provisions.

No adjustment of compensation will be made for any increase or decrease in the quantities of temporary erosion control required, regardless of the reason for the increase or decrease. The provisions in Section 4-1.03B, "Increased or Decreased Quantities," shall not apply to temporary erosion control.

10-1.04 TEMPORARY CULVERTS

Temporary culverts shall be furnished and installed, maintained and later removed as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

The size and type of temporary culvert to be installed at each location shall be at the option of the Contractor; however, the culvert shall be capable of sustaining the intended load and of discharging a quantity of water equivalent to the type and size of culvert shown on the plans. Adequacy as to equivalent strength and capacity shall be subject to approval, in writing, by the Engineer.

Flared end sections, where shown on the plans, shall be constructed and shall conform to the provisions of Section 70 "Miscellaneous Facilities" of the Standard Specifications.

Used materials may be used providing such used materials are good, sound, and are suitable for the purpose intended.

Excavation and backfill for temporary culverts shall be performed in a manner that will provide adequate support for the culvert and a firm, nonsettling foundation for any roadbed constructed over the culverts.

Temporary culverts that are damaged from any cause during the progress of the work shall be repaired or replaced by the Contractor at his expense.

When no longer required for the work as determined by the Engineer, temporary culverts shall be removed. Removed facilities shall become the property of the Contractor and shall be removed from the site of the work, except as otherwise provided in this section.

Removed temporary culverts that are not damaged may be reused in the permanent work providing such culverts conform to all of the requirements specified for the permanent work and such culverts are new when used as temporary culverts.

Trenches and pits caused by the removal of temporary culverts shall be backfilled in accordance with the provisions in the second paragraph of Section 15-1.02, "Preservation of Property," of the Standard Specifications.

Regardless of the sizes or kinds of temporary culverts installed, temporary culverts will be measured and paid for by the linear foot for temporary culvert in the same manner specified for corrugated metal pipe in Sections 66-4.01, "Measurement," and 66-4.02, "Payment," of the Standard Specifications.

Full compensation for flared end sections shall be considered as included in the contract price paid for temporary culvert and no additional compensation will be allowed therefor.

Full compensation for maintaining, removing, and disposing of temporary culvert and flared end sections shall be considered as included in the contract prices paid for temporary culvert and no additional compensation will be allowed therefor.

10-1.05 TEMPORARY INLET

Temporary inlets shall be constructed, maintained and later removed as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

Asphalt concrete aprons shall be constructed at the inlet locations as shown on the plans.

Asphalt concrete shall be produced at an established commercial mixing plant. The aggregate and asphalt binder shall be heated and mixed thoroughly.

The maximum size aggregate shall be 1/2 inch.

Prior to spreading asphalt concrete, a paint binder of asphaltic emulsion or of paving asphalt shall be furnished and applied uniformly to a pavement to be surfaced and to contact surfaces of all cold pavement joints, curbs, gutters and to other surfaces designated by the Engineer. If paving asphalt is furnished it shall be applied at a temperature of not less than 285° F. nor more than 350° F.

Asphalt concrete shall be spread and compacted by methods that will produce an asphalt concrete surfacing true to grade and cross section, of uniform smoothness and texture, compacted firmly and free from depressions, humps or irregularities.

Asphalt concrete may be spread in one layer to the required line, grade and cross section and shall be compacted firmly.

When no longer required for the work as determined by the Engineer, temporary inlets and aprons shall be removed. Removed facilities shall become the property of the Contractor and shall be removed from the site of the work.

Trenches and pits caused by the removal of temporary inlets and aprons shall be backfilled in accordance with the provisions in the second paragraph of Section 15-1.02, "Preservation of Property," of the Standard Specifications.

Regardless of the sizes or kinds of temporary inlets constructed, temporary inlets will be measured and paid for as temporary inlet.

Full compensation for asphalt concrete aprons shall be considered as included in the contract price paid for temporary inlet and no additional compensation will be allowed therefor.

The contract unit price paid for temporary inlet shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in temporary inlet, complete in place, including aprons, frames and grates and maintaining, removing, and disposing of temporary inlets, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.06 TEMPORARY FIBER ROLL

Temporary fiber rolls shall conform to the details shown on the plans, the provisions in Section 20-3, "Erosion Control," of the Standard Specifications and these special provisions.

Temporary fiber rolls shall be furnished, installed, maintained and removed at the locations shown on the plans.

Attention is directed to "Water Pollution Control" elsewhere in these special provisions.

MATERIALS.—Materials shall conform to Section 20-2, "Materials," of the Standard Specifications and the following:

Temporary fiber roll shall consist of prefabricated wheat or rice straw in rolls with a minimum diameter of 8 inches. The rolls shall be bound with an ultraviolet (UV) degradable plastic netting and weigh no less than 1.3 pounds per linear foot.

Stakes shall be fir or pine, and shall have a cross-sectional area of at least 0.5 square inch and a minimum length of 2 feet.

INSTALLATION.—Temporary fiber roll shall be installed as shown on the plans and in accordance with Detail Sheet 1 in Appendix C, CD43(2) in the Construction Contractors Guide and Specifications of the Caltrans Storm Water Quality Handbooks and the manufacturer's recommendations.

Temporary fiber roll shall be maintained to provide for the dispersal of concentrated water runoff and reduce runoff velocities. When no longer required for the intended purpose, as determined by the Engineer, temporary fiber roll shall be removed from the site of the work.

MEASUREMENT AND PAYMENT.—The quantity of temporary fiber roll to be paid for will be determined by the linear foot measured from one end to the other end along the surface of the roll.

The contract price paid per linear foot for temporary fiber roll shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing temporary fiber roll, complete in place, including maintenance and removal of materials, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Temporary fiber roll placed at locations other than as shown on the project plans or directed by the Engineer, in accordance with the Contractor's Storm Water Pollution Prevention Plan, will not be measured and will be paid for as specified in "Water Pollution Control" elsewhere in these special provisions.

No adjustment of unit prices will be made for any increase or decrease in the quantities of temporary fiber roll required, regardless of the reason for the increase or decrease. The provisions in Section 4-1.03B, "Increased or Decreased Quantities," shall not apply to temporary fiber roll.

10-1.07 TEMPORARY SILT FENCE

Temporary silt fence shall conform to the details shown on the plans and these special provisions.

Temporary silt fence shall be furnished, installed, maintained and removed at the locations shown on the plans.

Preparation shall conform to the requirements in Section 20-3.02, "Preparation," of the Standard Specifications.

Attention is directed to "Water Pollution Control" elsewhere in these special provisions.

MATERIALS.—Materials shall conform to Section 20-2, "Materials," of the Standard Specifications and the following:

Temporary silt fence shall be a prefabricated silt fence with a minimum woven polypropylene fabric width of 36 inches and a minimum tensile strength of 100 pounds, conforming to ASTM Designation: D 4632 and having an integral reinforcement layer. The reinforcement layer shall be a polypropylene or equivalent net provided by the manufacturer.

INSTALLATION.—Temporary silt fence shall be installed as shown on the plans and in accordance with Detail Sheets 1 and 2 in Appendix C, CD36(2) in the Construction Contractors Guide and Specifications of the Caltrans Storm Water Quality Handbooks and as follows:

When joints are necessary, the temporary silt fence shall overlap a minimum of 6 inches with both posts tied together.

Temporary silt fences shall be maintained to provide for adequate sediment holding capacity. Sediment deposits shall be removed when the sediment deposit reaches approximately one-third of the fence height. Removed sediment shall be deposited within the project in such a way that it is not subject to erosion by wind or water, or as directed by the Engineer.

When no longer required for the intended purpose, as determined by the Engineer, temporary silt fence shall be removed from the site of the work.

Holes, depressions or any other ground disturbance caused by the removal of the temporary silt fence shall be backfilled and repaired in accordance with the provisions in the second paragraph of Section 15-1.02, "Preservation of Property," of the Standard Specifications.

MEASUREMENT AND PAYMENT.—The quantity of temporary silt fence to be paid for will be determined by the linear foot from actual measurements, the measurements to be made parallel with the ground slope along the line of the completed temporary silt fence, deducting the widths of openings.

The contract price paid per linear foot for temporary silt fence shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing temporary silt fence, complete in place, including trench excavation and backfill, and maintenance and removal of temporary silt fence, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Temporary silt fence placed at location other than as shown on the project plans or directed by the Engineer, in accordance with the Contractor's "Storm Water Pollution Prevention Plan", will not be measured and will be paid for as specified in "Water Pollution Control" elsewhere in these special provisions.

No adjustment of compensation will be made for any increase or decrease in the quantities of temporary silt fence required, regardless of the reason for the increase or decrease. The provisions in Section 4-1.03B, "Increased or Decreased Quantities," shall not apply to temporary silt fence.

10-1.08 TEMPORARY FENCES (TYPE CL-6, SLATTED)

Temporary fences (Type CL-6 slatted) with wood or plastic slats inserted vertically in the chain link fabric shall be furnished and constructed, maintained, and later removed as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

Temporary fences shall be constructed along all temporary construction easements where fencing will be removed to perform contract work.

Except as otherwise specified in this section, temporary fences shall conform to the plan details and the specifications for permanent fences of similar character as provided in Section 80, "Fences," of the Standard Specifications.

Wood slats shall consist of clear redwood or light to medium weight wood produced by the species Shorea (Meranti). Wood slats shall not be less than 1/4 inch thick and approximately 2- 5/16 inches wide with a length sufficient to fill the vertical opening of the fabric and shall be inserted vertically in the mesh openings, so as to fit snugly, and fastened in a manner to prevent easy removal or displacement.

Plastic slats shall be manufactured from a high density virgin polyethylene with ultraviolet inhibitors, shall be green in color and shall conform to the following:

Dimensions:

Flat tubular cross section with a wall thickness of approximately 0.03-inch; depth of approximately 0.325-inch; width of approximately 2.38 inches; length equal to designated fence height.

Materials Specifications

Property	Value	ASTM Designation
Melt Index	0.24	D 1238
Density	0.951	D 1505
Low Temperature		
Brittleness	-76° F.	D 746
Tensile Strength	3700 psi	D 638

Used materials may be used providing such used materials are good, sound, and are suitable for the purpose intended.

Materials may be commercial quality providing the dimensions and sizes of said materials are equal to, or greater than, the dimensions and sizes shown on the plans or specified by the specifications.

Posts shall be either metal or wood at the Contractor's option.

Galvanizing and painting of steel items will not be required.

Treating wood with wood preservatives will not be required.

Concrete footings for metal posts will not be required.

Temporary fences that are damaged from any cause during the progress of the work shall be repaired or replaced by the Contractor at his expense.

When no longer required for the work as determined by the Engineer, temporary fences shall be removed. Removed facilities shall become the property of the Contractor and shall be removed from the site of the work, except as otherwise provided in this section.

Removed temporary fence materials that are not damaged may be reused in the permanent work providing such materials conform to all of the requirements specified for the permanent work and such materials are new when used for the temporary fences.

Holes caused by the removal of temporary fences shall be backfilled in accordance with the provisions in the second paragraph of Section 15-1.02, "Preservation of Property," of the Standard Specifications.

Temporary fences will be measured and paid for in the same manner specified for permanent fences of similar character as provided in Section 80, "Fences," of the Standard Specifications.

Full compensation for maintaining, removing, and disposing of temporary fences shall be considered as included in price paid for temporary fence (type CL-6 slatted) and no additional compensation will be allowed therefor.

10-1.09 PRESERVATION OF PROPERTY

Attention is directed to the provisions in Section 7-1.11, "Preservation of Property," of the Standard Specifications and these special provisions.

Existing trees, shrubs and other plants, that are not to be removed as shown on the plans or specified elsewhere in these special provisions, and are injured or damaged by reason of the Contractor's operations, shall be replaced by the Contractor. The minimum size of tree replacement shall be 24 inch box and the minimum size of shrub replacement shall be 15-gallon. Replacement ground cover plants shall be from flats and shall be planted 12 inches on center. Replacement of Carpobrotus ground cover plants shall be from cuttings and shall be planted 12 inches on center. Replacement planting shall conform to the requirements in Section 20-4.07, "Replacement," of the Standard Specifications.

Damaged or injured plants shall be removed and disposed of outside the highway right of way in accordance with the provisions in Section 7-1.13 of the Standard Specifications. At the option of the Contractor, removed trees and shrubs may be reduced to chips. The chipped material shall be spread within the highway right of way at locations designated by the Engineer.

Replacement planting of injured or damaged trees, shrubs and other plants shall be completed prior to the start of the plant establishment period and shall conform to the provisions in Section 20-4.05, "Planting," of the Standard Specifications.

10-1.10 TEMPORARY STRAW BALE BARRIER

Temporary straw bale barrier shall conform to the details shown on the plans, and these special provisions.

Temporary straw bale barrier work shall consist of furnishing, installing, constructing, anchoring, staking, maintaining and removing bales at the locations shown on the plans.

Preparation shall conform to the requirements in Section 20-3.02, "Preparation," of the Standard Specifications.

Attention is directed to "Water Pollution Control" elsewhere in these special provisions.

MATERIALS.—Materials shall conform to the provisions in Section 20-2.06, "Straw," of the Standard Specifications and the following:

Each straw bale shall be a minimum of 14 inches wide, 18 inches in height, 36 inches in length and 50 pounds in weight. The straw bale shall be composed entirely of vegetative matter, except for binding material.

Stakes shall be 2 inches x 2 inches wood posts. Each stake shall have a minimum length of 3 feet.

Bales shall be bound by either wire, nylon or polypropylene string. Jute and cotton binding shall not be used. Wire shall be a minimum of 16-gage baling wire. Nylon or polypropylene string shall be approximately 0.08-inch in diameter with 80 pounds of breaking strength.

INSTALLATION.—Temporary straw bale barriers shall be installed as shown on the plans and in accordance with Detail Sheet 1 in Appendix C, CD37(2) in the Construction Contractors Guide and Specifications of the Caltrans Storm Water Quality Handbooks and the following:

Bales shall be placed so that the binding wire or string is not in contact with the ground. Bales shall be securely anchored in place by 2 stakes driven through the bales. The first stake in each bale shall be driven toward the previously laid bale to force the bales together.

Temporary straw bale barriers shall be maintained to provide for adequate sediment holding capacity. Sediment deposits shall be removed when the sediment deposit reaches one-third of the straw bale barrier height. Removed sediment shall be deposited within the project in such a way that it is not subject to erosion by wind or water, or as directed by the Engineer. Installed bales shall be removed and replaced as required to adapt to changing conditions.

When no longer required for the intended purpose, as determined by the Engineer, temporary straw bale barrier shall be removed from the site of the work.

Holes, depressions or any other ground disturbance caused by the removal of the temporary straw bale barrier shall be backfilled and repaired in accordance with the provisions in the second paragraph of Section 15-1.02, "Preservation of Property," of the Standard Specifications.

MEASUREMENT AND PAYMENT.—Temporary straw bale barrier will be measured and paid for by the unit of temporary straw bale from actual count in place.

The contract unit price paid for temporary straw bale shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing temporary straw bale barriers complete in place, including maintenance and removal of materials, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Temporary straw bale barriers placed at locations other than as shown on the project plans or directed by the Engineer, in accordance with the Contractor's "Storm Water Pollution Prevention Plan", will not be measured and will be paid for as specified in "Water Pollution Control" elsewhere in these special provisions.

No adjustment of compensation will be made for any increase or decrease in the quantities of temporary straw bale required, regardless of the reason for the increase or decrease. The provisions in Section 4-1.03B, "Increased or Decreased Quantities," shall not apply to temporary straw bale.

10-1.11 TEMPORARY GRAVEL BAG

Temporary gravel bag shall conform to the details shown on the plans and these special provisions.

Temporary gravel bag shall be furnished, installed, maintained and removed at the locations shown on the plans.

Preparation shall conform to the requirements in Section 20-3.02, "Preparation," of the Standard Specifications.

Attention is directed to "Water Pollution Control" elsewhere in these special provisions.

MATERIALS.—Materials shall conform to Section 20-2, "Materials," of the Standard Specifications and the following:

Gravel bag fabric shall be woven polypropylene, polyethylene or Polyamide with a minimum unit weight of 0.25 pound per square yard. The fabric shall have a mullen burst strength of at least 300 psi, conforming to ASTM Designation: D 3786 and an ultraviolet (UV) stability exceeding 70 percent.

Filled gravel bags shall have a length of 24 inches to 32 inches, width of 16 inches to 18 inches, thickness of 6 inches to 8 inches, and weight of 90 pounds to 120 pounds.

Gravel bag fill material shall be non-cohesive, gravel, free from deleterious material.

INSTALLATION.—Temporary gravel bag barriers consisting of gravel bags placed in multiple layers shall be installed as shown on the plans and in accordance with Detail Sheet 1 in Appendix C, CD38(2) in the Construction Contractors Guide and Specifications of the Caltrans Storm Water Quality Handbooks.

Temporary gravel bag barriers consisting of gravel bags placed in a single layer shall be installed along contours with ends abutting. The last 6.5 feet of the gravel bag row shall be turned up the slope.

Temporary gravel bag barriers shall be maintained to provide for adequate sediment holding capacity. Sediment deposits shall be removed when the deposit reaches one-third of the temporary gravel bag barrier height. Removed sediment shall be deposited within the project in such a way that it is not subject to erosion by wind or water, or as directed by the Engineer.

When no longer required for the intended purpose, as determined by the Engineer, temporary gravel bag barriers shall be removed from the site of the work.

Holes, depressions or any other ground disturbance caused by the removal of the temporary gravel bag barriers shall be backfilled and repaired in accordance with the provisions in the second paragraph of Section 15-1.02, "Preservation of Property," of the Standard Specifications.

MEASUREMENT AND PAYMENT.—Temporary gravel bag will be measured and paid for by the unit of temporary gravel bag from actual count in place.

The contract unit price paid for temporary gravel bag shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing temporary gravel bags complete in place, including maintenance and removal of materials, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Temporary gravel bag barriers placed at locations other than as shown on the project plans or directed by the Engineer, in accordance with the Contractor's Storm Water Pollution Prevention Plan, will not be measured and will be paid for as specified in "Water Pollution Control" elsewhere in these special provisions.

No adjustment of compensation will be made for any increase or decrease in the quantities of temporary gravel bag required, regardless of the reason for the increase or decrease. The provisions in Section 4-1.03B, "Increased or Decreased Quantities," shall not apply to temporary gravel bag.

10-1.12 TEMPORARY CONCRETE WASHOUT

Temporary concrete washout shall be constructed, maintained, and later removed as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

Attention is directed to "Water Pollution Control" elsewhere in these special provisions.

Temporary concrete washout shall be located a minimum of 50 feet from downstream storm drain inlets, open drainage facilities, and watercourses. Each facility shall be located away from construction traffic or access areas to prevent disturbance or tracking. The exact location of the temporary concrete washout will be determined by the Engineer.

A sign shall be erected as shown on the plans. The concrete washout sign shall be installed within 25 feet of the temporary concrete washout. The perimeter of the concrete washout shall be delineated by lath and flagging to prevent accidental access.

Plastic lining shall have a minimum thickness of 12 mils, and shall be firmly held in place with gravel bags placed no more than 10 feet apart. Plastic lining shall be installed and maintained in accordance with the manufacturers instructions.

Gravel bags shall conform with the provisions for "Temporary Gravel Bag" elsewhere in these special provisions.

Maintaining temporary concrete washout shall include removing and disposing of hardened concrete. Concrete waste materials shall be removed and disposed of in conformance with the provisions in Section 15-3.02, "Removal Methods," of the Standard Specifications.

When temporary concrete washout is no longer required for the work, as determined by the Engineer, the concrete waste shall be removed and disposed of in conformance with the provisions in Section 15-3.02, "Removal Methods," of the Standard Specifications. Materials for temporary concrete washout shall become the property of the Contractor and shall be removed from the site of the work and disposed of outside of the highway right of way in accordance with section 7-1.13, "Disposal of Material Outside the Highway Right of Way" of the Standard Specifications.

Trenches, depressions and pits caused by the removal of temporary concrete washout shall be backfilled in accordance with the provisions in the second paragraph of Section 15-1.02, "Preservation of Property," of the Standard Specifications.

Temporary concrete washout will be measured by the unit, as shown on the plans.

The contract price paid for temporary concrete washout shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing temporary concrete washout, complete in place, including excavation, backfill and plastic lining, maintaining, removing and disposing of concrete waste and temporary concrete washout as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.13 TEMPORARY CONSTRUCTION ENTRANCE

Temporary construction entrance shall be constructed, maintained, and later removed as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

The exact location of the temporary construction entrance will be determined by the Engineer.

Attention is directed to "Water Pollution Control" elsewhere in these special provisions.

Filter fabric shall conform to the requirements in Section 68-1, "Underdrains" of the Standard Specifications.

The aggregate shall conform to 1 1/2" x 3/4" grading and the requirements in Section 90-3.02, "Coarse Aggregate Grading" of the Standard Specifications.

Aggregate shall be clean and free from vegetable matter and other deleterious substances.

Steel plate shall conform to the requirements in Section 75-1.02 "Miscellaneous Iron and Steel" of the Standard Specifications.

When no longer required for the work, as determined by the Engineer, temporary construction entrance shall be removed by the Contractor and disposed of outside of the highway right of way in accordance with section 7-1.13, "Disposal of Material Outside the Highway Right of Way" of the Standard Specifications.

Trenches, depressions and pits caused by the removal of temporary concrete washout shall be backfilled in accordance with the provisions in the second paragraph of Section 15-1.02, "Preservation of Property," of the Standard Specifications.

Temporary construction entrance will be paid by the unit, as shown on the plans.

The contract price paid temporary construction entrance shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing temporary construction entrance, complete in place, including excavation, steel plate, aggregate and filter fabric, maintaining, removing, backfilling and disposing of temporary construction entrance as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.14 DAMAGE REPAIR

Attention is directed to the provisions in Sections 7-1.16, "Contractor's Responsibility for the Work and Materials," and 7-1.165, "Damage by Storm, Flood, Tidal Wave or Earthquake," of the Standard Specifications and these special provisions.

When, as a result of drought conditions (as defined herein) during the plant establishment period, plants have died or, in the opinion of the Engineer, have deteriorated to a point beyond which they will not mature as typical examples of their species, the Engineer may direct replacement of the affected plants. The total cost of ordered plant replacements, after water has been restricted or stopped, will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications. Any restriction or shutoff of available water shall not relieve the Contractor from performing other contract work. A drought

condition occurs when the Department, or its supplier, restricts or stops delivery of water to the Contractor to the degree that plants have died or deteriorated as described above.

When the provisions in Section 7-1.165, "Damage by Storm, Flood, Tidal Wave or Earthquake," of the Standard Specifications, are applicable, the provisions above for payment of costs for repair of damage due to drought shall not apply.

10-1.15 RELIEF FROM MAINTENANCE AND RESPONSIBILITY

The Contractor may be relieved of the duty of maintenance and protection for those items not directly connected with plant establishment work, except highway planting and irrigation systems in accordance with the provisions in Section 7-1.15, "Relief From Maintenance and Responsibility," of the Standard Specifications.

10-1.16 COOPERATION

Attention is directed to Sections 7-1.14, "Cooperation," and 8-1.10, "Utility and Non-Highway Facilities," of the Standard Specifications and these special provisions.

It is anticipated that work by other contractors in connection with the revision of Route 125 (Contract Number 11-010744) adjacent to and within the limits of this project, will be underway during the progress of the work on this contract. Consecutive on-ramp or off-ramps in the same direction of travel shall not be closed simultaneously unless otherwise provided in these special provisions or permitted by the Engineer.

In the event of a loss caused to the Contractor due to unnecessary delays or failure to finish the work within the time specified for completion caused by another contractor under contract with the Department performing work for the State, the State will reimburse the delayed contractor in conformance with the provisions in Section 8-1.09 "Right of Way Delays," of the Standard Specifications. Deductions will be made from any moneys due or that may become due the contractor causing the loss or delay.

10-1.17 PROGRESS SCHEDULE (CRITICAL PATH)

Progress schedules will be required for this contract and shall conform to the requirements of these special provisions. Progress schedules shall utilize the Critical Path Method (CPM). Contractor's attention is directed to "Cooperation" and "Obstructions" elsewhere in these special provisions. Nothing in these special provisions shall be construed as relieving the Contractor from the responsibilities specified in Section 7, "Legal Relations and Responsibility," of the Standard Specifications.

Definitions.—The following definitions shall apply to these special provisions:

Activity.—Any task or item of work that shall be performed in order to complete a project.

Baseline Schedule.—The initial CPM progress schedule as accepted by the Engineer representing the Contractor's original work plan.

Concurrent Delay.—Two or more delays on the critical path that occur at the same time.

Contract Completion Date.—The date the Contractor is contractually obligated to complete the project, including any authorized adjustments, as specified in Section 8-1.06, "Time of Completion," of the Standard Specifications.

Contractor Delay.—A delay that extends the time required to complete a controlling operation caused by and within the control of the Contractor, his subcontractor at any tier or suppliers.

Controlling Operation.—A feature of work or activity on the critical path.

Critical Path.—In a project network, the sequence of activities yielding the longest path in a CPM analysis necessary to complete the project.

Critical Path Method (CPM).—A mathematical calculation method using the sequence of activities and their interrelationships, interdependencies, resources and durations to determine the critical path that shows the expected time to complete a project.

Data Date.—The day after the date through which progress updates have been calculated; everything occurring earlier than the data date is "As-Built," and everything on or after the data date is "Planned."

Early Completion Time.—The difference in time between the contract completion date and the current State-accepted scheduled completion date.

Excusable Delay.—A delay as defined in Section 8-1.07, "Liquidated Damages," of the Standard Specifications where the Contractor may be granted an extension of time commensurate with the provisions in Section 8-1.06, "Time of Completion," of the Standard Specifications with no entitlement for adjustment in compensation.

Float.—The amount of time between the early start date and the late start date or the early finish date and the late finish date of any activity or group of activities in the network.

Free Float.—The amount of time an activity can be delayed before delaying a subsequent activity.

Fragnet.—A section or fragment of the network diagram comprised of a group of activities.

Milestone.—A marker in a network which is typically used to mark a point in time or denote the beginning or end of a sequence of activities. A milestone has zero duration and zero resources, but will otherwise function in the network as if the milestone were an activity.

Narrative Report.—A report that identifies potential problem areas, current and anticipated delaying factors and their impact, actions taken or proposed, proposed changes in schedule logic, extension or contraction of activities, proposed addition or deletion of activities, explanation for changes in the critical path, explanation for changes in scheduled completion date, out of sequence work, and any other topics related to job progress or scheduling.

Near Critical Path.—A path having 10 working days or less of total float.

Punch List.—A list of details needing attention to complete task or work for both contract item and extra work.

Schedule Revision.—A change in the future portion of the schedule that modifies logic; alters construction sequences such as performing sequential activities concurrently or concurrent activities sequentially; adds or deletes activities or significantly alters activity durations, as determined or accepted by the Engineer.

Scheduled Completion Date.—The Contractor's scheduled completion date as shown on the accepted baseline schedule as modified by subsequent accepted schedule updates and revisions.

State Delay.—A delay that is attributable solely to the State, is beyond the control of the Contractor, and extends the time required to complete a controlling operation.

State Owned Float Activity.—The activity documenting time saved on the critical path by contract changes or other actions of the State, except contract change orders that result from significant Contractor development and investment.

Time Impact Analysis.—An analysis demonstrating the estimated time impact of a contract change order, delay or other event on the scheduled completion date.

Total Float.—The amount of time that an activity may be delayed without delaying the scheduled completion date.

Update.—The routine modification of the CPM progress schedule through a regular monthly review to incorporate actual past progress to date by activity, projected completion dates, and approved time adjustments.

Materials (Computer System).—The Contractor shall provide a computer system for the State's exclusive possession and use for CPM progress schedules. The minimum computer system to be furnished shall be complete with keyboard, mouse, monitor, printer and plotter. The system shall be from those identified by the Gartner Group as Tier 1 and shall also conform to the following requirements:

1. Latest industry-available Intel Pentium processor, Motorola RISC processor or equivalent.
2. Latest computer operating system software compatible with the selected processor, either Windows or MACINTOSH.
3. Minimum of 128 megabytes of random access memory (RAM).
4. Internal drives, including: one 4-gigabyte minimum hard disk drive, one 1.44 megabyte 3.5-inch floppy disk drive, one Iomega Jaz drive with two 1-gigabyte minimum cartridges, and one 32x speed CD-ROM drive.
5. Internal fax/modem, latest speed and software version of U.S. Robotics, 3COM or equivalent.
6. A 17-inch minimum, color monitor capable of at least 1,024 x 768 pixels.
7. A color-ink-jet-type, E-size plotter with a minimum 8 megabytes RAM, capable of 300 dots per inch color, 600 dots per inch monochrome, or equivalent, compatible with the selected system capable of plotting, in color, fully legible time-scaled logic diagrams, network diagrams, and bar charts. The plotter shall have the capability of being connected to or networked with a minimum of 5 computers.
8. A color-ink-jet-type, B-size plotter compatible with the selected system capable of printing fully legible, time-scaled charts, network diagrams and reports.
9. A manual parallel cable switching device, with connecting cables, allowing the user to alternate printing between the plotters.
10. CPM software shall be compatible with the hardware provided, shall be the latest version of Primavera Project Planner for Windows, SureTrak for Windows, or equal, and shall be able to create files that can easily be imported into the latest version of Primavera.
11. General software shall be latest versions of Microsoft Office Professional and McAfee VirusScan virus protection. The general software shall be compatible with the hardware provided.
12. Upgrades to the CPM and general software shall be provided, as the upgrades become available.

The computer hardware and software furnished by the Contractor shall be compatible with that used for the production of the CPM progress schedule required by these special provisions, including original instruction manuals and other documentation normally provided with the CPM and general software. Before delivery and setup of the computer system, the Contractor shall submit to the Engineer for approval a detailed list of the computer hardware and software the Contractor proposes to furnish, including an itemized schedule of costs for the system.

The Contractor shall furnish, install, set up, maintain and repair the computer system ready-for-use, and provide plotter supplies as necessary during the course of the project at a location determined by the Engineer. The first submittal of the

baseline schedule will not be considered complete until the hardware and software are installed and ready for use with the submitted baseline schedule. The Contractor shall instruct and assist the Engineer in the use of the hardware and software. When requested by the Engineer, the Contractor shall provide one 8-hour session of outside commercial training in the use of the CPM software for a maximum of 2 project staff at a location acceptable to the Engineer. Hardware repairs shall be made within 48 hours of notification by the Engineer, or replacement equipment shall be furnished and installed by the Contractor until repairs have been completed.

Computer hardware and software furnished shall remain the property of the Contractor and shall be removed by the Contractor upon acceptance of the contract if no claims involving contract progress are pending. If contract claims involving contract progress are pending, computer hardware or software shall not be removed until the final estimate has been submitted to the Contractor.

General.—Early completion time shall be considered a resource for the exclusive use of the Contractor. The Contractor may increase early completion time by increasing production or reallocating resources to be more efficient, or by proposing, and the State accepting, contract change orders that are the result of significant Contractor development and investment or from an appropriate share of an accepted Cost Reduction Incentive Proposal.

State owned float shall be considered a resource for the exclusive use of the State. The Engineer may either accrue State owned float to mitigate past or anticipated future State delays, or reduce contract working days. The State may reduce contract working days if the action is the result of a contract change order other than those that result from significant Contractor development and investment. The Engineer will document State owned float by directing the Contractor in writing to update the State owned float activity and the activity relative to the State action that created the float. The Contractor shall conduct a time impact analysis to determine the effect of the change in the same manner described in "Schedule Time Adjustment", specified herein and shall include the impacts acceptable to the Engineer in the next update or revision. The Contractor shall include a log of the action in the State owned float activity, and include a discussion of the action in the narrative report of the next schedule update.

Contractor delays that are concurrent with State delays may be excusable, but are not compensable. Other Contractor delays are not excusable. Changes or delays that do not affect the controlling operation or operations on the critical path will not be considered as the basis for a time adjustment.

The State will be responsible for the impacts of: State delays; State's action or lack of action; utility companies who perform work on the project or impact the project schedule as set forth in Section 8-1.10, "Utility and Non-Highway Facilities," of the Standard Specifications; and other contractors working directly for the State who impact the project or project schedule as specified in "Cooperation" of these special provisions. The Contractor shall mitigate these delays and impacts, and shall minimize the costs of these delays and impacts. If an unanticipated State delay or project impact results in an increased cost to the Contractor, the Contractor will be entitled to an adjustment in compensation in conformance with the provisions in Section 8-1.09, "Right of Way Delays" of the Standard Specifications.

The Contractor shall be responsible for assuring that the work sequences are logical and the network shows a coordinated plan for complete performance of the work. Failure of the Contractor to include in the schedule any element of work required for the performance of the contract shall not relieve the Contractor from completing the work within the time limit specified in the contract. If the Contractor or the Engineer discovers an undefined element of work, activity or logic, it shall be corrected by the Contractor in a schedule revision, as specified in these special provisions. If a planned activity requires greater-than-normal daily resources to accomplish, relative submittals shall include a narrative describing the activity, and the amount and use of the extraordinary resources.

The Baseline Schedule or Schedule Update submitted for acceptance shall not show variances from the requirements of these special provisions unless approved by the Engineer. The Contractor shall make specific mention of the variations in the letter of transmittal, and shall make the associated adjustments to the project schedule. The Contractor will not be relieved of the responsibility for executing the work in strict conformance with the provisions in the requirements of these special provisions. In the event of a conflict between the requirements of these special provisions and the information provided or shown on an accepted schedule, the requirements of these special provisions shall take precedence.

Each schedule submitted to the Engineer shall comply with the limits imposed by these special provisions, with the specified intermediate milestones and completion dates, and with the constraints, restraints or sequences included in these special provisions, except that after the Engineer accepts the baseline schedule, the Contractor may show a late scheduled completion date on subsequent updates or revisions. The degree of detail shall include factors to the satisfaction of the Engineer, including, but not limited to:

1. Physical breakdown of the project;
2. Contract milestones and completion dates, substantial completion dates, constraints, restraints, sequences of work shown in these special provisions, the planned substantial completion date, and the final completion date;
3. Type of work to be performed, the sequences, and the activities to be performed by subcontractors;
4. Procurement, submittal, submittal review, manufacture, test, delivery, and installation of major materials and equipment that require approval;

5. Preparation, submittal, and approval of shop or working drawings and material samples showing time, as specified in these special provisions, for the Engineer's review;
6. Identification of interfaces and dependencies with preceding, concurrent and follow-on contractors, railroads, and utilities as indicated in these special provisions;
7. Identification of each utility relocation or interface as a separate activity;
8. Batch plant erection and plant certification;
9. Erection and removal of falsework or shoring;
10. Submission and approval of reports or results for major tests, such as that for pile loading or traffic controllers;
11. Indicate long-term ramp and connector closing and opening events, traffic switches, and opening and closing of pavements to traffic as separate one day activities;
12. Punch-list and final clean-up.
13. State owned float as the last activity in the schedule, at the end of which is the Scheduled Completion Date.
14. Activity coding conventions shall include the following:

	Code	Value	Description
(1) Responsibility	RESP	CT	Caltrans
		UTIL	Utility Company
		RAIL	Railroad
		xxxx	Contractor
		xxxx	Subcontractor
		xxxx	others, as needed
(2) Stage	STGE	1	Stage 1
		2	Stage 2
		other designations	other descriptions, as needed
(3) Phase	PHAS	1	Phase 1
		2	Phase 2
		other phases	other phases, as needed
(4) Utilities	UTIL	PGE	Pacific Gas & Electric
		BELL	Pacific Bell
		GTE	GTE
		SCE	Southern California Edison
		other utilities	other utilities, as needed
The Contractor may include additional coding conventions, such as Ramps (RAMP), Facilities (FAC), and Events (EVNT).			

The work shall be executed in the sequence indicated in the accepted baseline schedule and subsequent accepted updates and revisions. Once the Engineer accepts a CPM schedule, the Contractor shall neither artificially improve the progress nor artificially change the quantity of float in any part of the schedule by artificially adding or deleting activities, revising schedule logic restraints, or changing planned activity durations. Schedule changes of planned work shall be documented in a properly submitted revision. The Contractor may improve the progress by performing sequential activities concurrently or by performing activities more quickly than planned. In the case of multiple critical paths, float generated by early completion of one or a sequence of activities will be considered in determining if that sequence of activities remains on the critical path.

The schedule shall be modified to reflect actual events and conditions, including non-work days, as these events and conditions occur for historical purposes and for use in time impact analysis. Submittals and Engineer review time shall be shown in the progress schedule, including CPM schedule updates and revisions. The duration of the Engineer review activity shall be 15 days unless specified otherwise in these special provisions.

The Contractor will be allowed to show an early or late scheduled completion date on schedule updates and revisions. The Engineer shall use the most current, accepted schedule update and revision, and Contractor-provided cause, time-impact and schedule-delay analysis that is acceptable to the Engineer to determine apparent impacts.

The Engineer shall be allowed 20 days to review and accept or reject the baseline schedule. The Engineer shall be allowed 15 days to review and accept or reject any updated or revised schedule. Rejected schedules shall be resubmitted to the Engineer within 5 days, at which time a new review period of 5 days will begin. After the baseline schedule is accepted, schedules that are not accepted or rejected within the required review period will be deemed to have been accepted by the Engineer. Acceptance of any schedule does not relieve the Contractor from the responsibility of submitting complete and accurate information.

Pre-Construction Scheduling Conference.—The Contractor shall schedule, and the Engineer will conduct a Pre-Construction Scheduling Conference with the Contractor's Project Manager and Construction Scheduler within 10 days after approval of the contract. At this meeting, the Engineer will review the requirements of this section of the special provisions with the Contractor. The Contractor shall submit a general time-scaled logic diagram displaying the major activities and sequence of planned operations and shall be prepared to discuss the proposed work plan and schedule methodology that complies with the requirements in these special provisions. If the Contractor proposes deviations to the construction staging of the project, the Contractor shall submit a general time-scaled logic diagram displaying the deviations and resulting time impacts, and shall be prepared to discuss the proposal. At this meeting, the Contractor shall additionally submit the alpha-numeric coding structure and the activity identification system for labeling the work activities. To easily identify relationships, each activity description shall indicate its associated scope or location of work by including such terms as quantity of material, type of work, Bridge Number, Station to Station location, side of highway (such as left, right, northbound, southbound), lane number, shoulder, ramp name, ramp line descriptor or mainline. The Engineer will review and comment on the logic diagram, the coding structure and activity identification system within 15 days after submission by the Contractor. The Contractor shall make all modifications to the time-scaled logic diagram, the coding structure, and activity identification system that the Engineer requests and shall employ that coding structure and identification system. The Contractor shall include the Engineer-requested modifications in the baseline schedule.

Network Diagram and Project Schedule Reports—Schedules submitted to the Engineer, including the baseline schedule, shall include originally-plotted time-scaled network diagram(s). Network diagrams shall be based on early start and early finish dates of activities shown. The network diagrams submitted to the Engineer shall also be accompanied by the CPM software-generated tabular reports for each activity included in the project schedule. Three different report sorts shall be provided: Early Start, Total Float, and Activity Number which shall show the predecessors and successors for each activity. Tabular reports (8 1/2" x 11" size) shall be submitted to the Engineer and shall include at a minimum, the following:

1. Data date;
2. Predecessor and successor activity numbers and descriptions;
3. Activity number and description;
4. Activity code(s);
5. Scheduled, or actual and remaining durations for each activity;
6. Earliest start date (by calendar date);
7. Earliest finish date (by calendar date);
8. Actual start date (by calendar date);
9. Actual finish date (by calendar date);
10. Latest start date (by calendar date);
11. Latest finish date (by calendar date);
12. Free Float, in work days;
13. Total Float, in work days;
14. Percentage of activity complete and remaining duration for incomplete activities;
15. Lag(s); and
16. Imposed constraints.

The networks shall be drafted time-scaled to show a continuous flow of information from left to right. The primary path(s) of criticality shall be clearly and graphically identified on the network(s). The network diagram shall be prepared on E-size sheets (34" x 44"), and shall have a title block in the lower right-hand corner and a timeline on each page. Exceptions to the size of the network sheets and the use of computer graphics to generate the networks shall be subject to the Engineer's approval.

The narrative report shall be organized as follows:

1. Contractor's Transmittal Letter
2. Work completed during the period
3. Identification of any unusual resources: manpower, material, or equipment restrictions or use, including multiple shifts, six day weeks, specified overtime, or work at times other than regular days or hours
4. Description of the current critical path
5. Changes to the critical path since the last schedule submittal
6. Description of problem areas

7. Current and anticipated delays
 - a. Cause of the delay
 - b. Impact of the delay on other activities, milestones, and completion dates
 - c. Corrective action and schedule adjustments to correct the delay

8. Pending items and status thereof
 - a. Permits
 - b. Change Orders
 - c. Time Adjustments
 - d. Non-Compliance Notices

9. Contract completion date(s) status
 - a. Ahead of schedule and number of days
 - b. Behind schedule and number of days
 - c. If date changes, explain the cause

10 Attached Updated Network Diagram and Reports

Schedule network diagrams, tabular reports and the narrative reports shall be submitted to the Engineer for acceptance in the following quantities:

1. Two sets of originally-plotted, time-scaled network diagram(s);
2. Two copies of each of the three sorts of the CPM software-generated tabular reports (8 1/2" x 11" size);
3. One 1.44-megabyte 3.5 inch floppy diskette containing the schedule data.
4. Two copies of the narrative report.

Baseline Schedule Requirements.—Within 30 days after approval of the contract, the Contractor shall submit a baseline schedule to the Engineer. The baseline project schedule shall have a data date of the first working day of the contract and shall not include any completed work to-date. The baseline schedule shall be practicable; include the entire scope of work; meet interim target dates, milestones, stage construction requirements, and internal time constraints; show logical sequence of activities; and shall not extend beyond the number of working days originally provided in these special provisions. An early completion schedule will be acceptable provided that the schedule meets the requirements of these special provisions and the Standard Specifications.

The baseline CPM progress schedule submitted by the Contractor shall have a sufficient number of activities to assure adequate planning of the project, and to permit monitoring and evaluation of progress, and the analysis of time impacts. The baseline schedule shall depict how the Contractor plans to complete the whole work involved, and shall show the activities that define the critical path. Multiple critical paths and near-critical paths shall be kept to a minimum, as determined by the Engineer. A total of not more than 50 percent of the baseline schedule activities shall be critical or near-critical, unless otherwise approved by the Engineer.

Activities shall have a duration of not less than one working day nor more than 20 working days, unless otherwise approved by the Engineer. The activities in the baseline schedule, with the exception of the first and last activities, shall have a minimum of one predecessor and a minimum of one successor. The baseline schedule shall not attribute negative float or negative lag to any activity.

Monthly Schedule Updates.—On or before the first calendar day of each month, the Contractor shall meet with the Engineer to review contract progress. At the monthly progress meeting the Contractor shall submit to the Engineer an update of the network diagram and project schedule reports as defined above. Update schedules shall have a data date of the twenty-first calendar day of the month, or other date as established by the Engineer, and shall include the information available up to that date. Durations for work that has been completed will be shown on the schedule as the work actually occurred, including Engineer submittal review and Contractor resubmittal times.

Schedule Revisions.—When the Contractor proposes a revision to an accepted schedule, the Contractor shall state in writing the reasons for the change, as well as the specifics, such as, but not limited to, revisions to activities, logic, durations, and other matters pertinent to the proposed revisions. If the Engineer considers a schedule revision to be of a major nature, the Engineer may require the Contractor to revise and submit for acceptance the affected portion(s) of the project schedule and an analysis to show the effect on the entire project. In addition to the revision submittal, the Contractor shall submit a

schedule update with the same data date as the revision which is to reflect the project condition just prior to implementing the revision. The Contractor shall discuss contemplated revisions with the Engineer prior to the submittal.

Within 15 days, the Contractor shall submit a revised CPM network for approval when requested by the Engineer, or when any of the following occurs:

1. There is a significant change in the Contractor's operations that affects the critical or near critical path(s).
2. The scheduled completion date of the current submitted updated CPM schedule indicates that the contract progress is 20 days or more behind the current accepted schedule or revision.
3. The Contractor or the Engineer considers that an approved or anticipated change will impact the critical or near critical path or contract progress.

Schedule Time Adjustment.—When the Contractor requests a time adjustment due to contract change orders or delays, or if the Contractor or the Engineer considers that an approved or anticipated change will impact the critical path or contract progress, the Contractor shall submit a written time impact analysis to the Engineer illustrating the impacts of each change or delay on the current scheduled completion date or milestone completion date. The analysis shall use the currently accepted schedule that has a data date closest to and prior to the event. If the Engineer determines that the currently accepted schedule does not appropriately represent the conditions prior to the event, the schedule shall be updated to the day before the event being analyzed. An additional analysis shall be performed after the completion of said event. If the event is on the critical path at the time of its completion, then the difference between the scheduled completion dates of these 2 analyses shall be equal to the adjustment in time. The time impact analysis shall include one or more fragnet(s) demonstrating how the Contractor proposes to incorporate the event(s) into the schedule, including logic and duration of the proposed activities. Until such time that the Contractor provides the analysis, the Engineer may, at his option, construct and utilize the project as-built schedule or other recognized method to determine delay impacts.

Time impact analyses shall be submitted in duplicate within 15 days of a delay, and shall be used in determining contract change order days. Approval or rejection of each time impact analysis by the Engineer will be made within 15 days after receipt of the time impact analysis. In the event the Contractor does not agree with the decision of the Engineer regarding the impact of a change or delay, notice shall be given in conformance with the provisions in Section 9-1.04, "Notice of Potential Claim," of the Standard Specifications.

Final Schedule Update.—Within 30 days after acceptance of the contract by the Director, the Contractor shall submit a final update of the schedule (as-built schedule) with actual start and actual finish dates for the activities. The Contractor shall submit a written certificate with this submittal signed by the Contractor's Project Manager and an officer of the company stating "To the best of my knowledge, the enclosed final update of the project schedule reflects the actual start and completion dates of the actual activities for the project contained herein." An officer of the company may delegate in writing the authority to sign the certificate to a responsible manager. Submittal of the final schedule update and the certification shall be a condition precedent to the release of any retained funds under the contract.

Payment.—Progress schedule (critical path) will be paid for at a lump sum price. The contract lump sum price paid for progress schedule (critical path) shall include full compensation for furnishing all labor, material (including computer hardware and software), tools, equipment, and incidentals; and for doing all the work involved in preparing, furnishing, updating, and revising progress schedules; maintaining and repairing the computer hardware; and instructing and assisting the Engineer in the use of the computer hardware and software, as specified in the Standard Specifications and in these special provisions, and as directed by the Engineer. Payments for the progress schedule (critical path) contract item will be made as follows:

1. A total of 50 percent of the progress schedule (critical path) contract item amount will be made upon achieving all of the following: 5 percent of all work completed, accepted baseline, all accepted required schedule updates and revisions, and required CPM training.
2. A total of 60 percent of the progress schedule (critical path) contract item amount will be made upon achieving all of the following: 25 percent of all work completed, accepted baseline, and all accepted required schedule updates and revisions.
3. A total of 75 percent of the progress schedule (critical path) contract item amount will be made when 50 percent of all work completed, accepted baseline, and all accepted required schedule updates and revisions.
4. A total of 100 percent of the progress schedule (critical path) contract item amount will be made when 100 percent of all work completed, accepted baseline, all accepted required schedule updates and revisions, and a completed and certified Final Schedule Update.

The adjustment provisions in Section 4-1.03, "Changes," of the Standard Specifications, shall not apply to the item of progress schedule (critical path). Adjustments in compensation for progress schedule (critical path) will not be made for any increased or decreased work ordered by the Engineer in furnishing progress schedules.

Retention.—The Department will retain an amount equal to 25 percent of the estimated value of the work performed during each estimate period in which the Contractor fails to submit pre-construction scheduling documents, an acceptable baseline, acceptable updated schedule, or acceptable revised progress schedule (critical path) conforming to the requirements of these special provisions as determined by the Engineer. Retentions for failure to submit acceptable CPM progress schedules shall be in addition to other retentions provided for in the contract. Retentions for failure to submit progress schedules (critical path) will be released for payment on the next monthly estimate for partial payment following the date that pre-construction scheduling documents and acceptable progress schedules (critical path) are submitted to the Engineer, and no interest will be due the Contractor.

10-1.18 OBSTRUCTIONS

Attention is directed to Sections 8-1.10, "Utility and Non-Highway Facilities," and 15, "Existing Highway Facilities," of the Standard Specifications and these special provisions.

The Contractor's attention is directed to the existence of certain underground facilities that may require special precautions be taken by the Contractor to protect the health, safety and welfare of workers and of the public. Facilities requiring special precautions include, but are not limited to: conductors of petroleum products, oxygen, chlorine, and toxic or flammable gases; natural gas in pipelines greater than 6 inches in diameter or pipelines operating at pressures greater than 60 psi; underground electric supply system conductors or cables, with potential to ground of more than 300 Volts, either directly buried or in duct or conduit which do not have concentric grounded or other effectively grounded metal shields or sheaths.

The Contractor shall notify the Engineer and the appropriate regional notification center for operators of subsurface installations at least 2 working days, but not more than 14 calendar days, prior to performing any excavation or other work close to any underground pipeline, conduit, duct, wire or other structure. Regional notification centers include but are not limited to the following:

Notification Center	Telephone Number
Underground Service Alert-Northern California (USA)	1-800-642-2444 1-800-227-2600
Underground Service Alert-Southern California (USA)	1-800-422-4133 1-800-227-2600

The following utility facilities are shown on the plans and require special handling. This does not relieve the Contractor of his responsibility for other utility facilities on the project.

Utility	Location	Note
4" GAS	NAVAJO RD	A
UG ELEC	NAVAJO RD	A

(A) -- A representative of the utility owner shall be present whenever excavation is performed within 4 feet of the utility. The utility company must be notified by the Contractor 2 days before excavation.

Excavation in areas requiring regional notification center investigation shall not be commenced until all utilities in these areas have been located and identified.

Power equipment may be used for excavating construction area sign postholes if it is determined that there are no utility facilities within 4 feet of the proposed post holes.

It is anticipated that the following utility facilities will be relocated prior to the dates shown:

Utility	Location	Date
OH ELEC	GROSSMONT COLLEGE DR	8/15/00
UG TELE	GROSSMONT COLLEGE DR	10/1/00
UG CABLE	GROSSMONT COLLEGE DR	11/1/00
UG TELE	FANITA DR	6/30/00
UG ELEC	COCO'S	6/30/00

The Utility Working Days shall not begin until both the notification and site preparation requirements have been met.

Utility Owner and type of facility	Location	Utility N & W Days	Site Prep by Contractor	Utility Co. Work
SDG&E UG ELEC	"GR3" Line Sta 22+50 to 26+50 Lt	20 & 20	(A)	(A)
SDG&E UG ELEC	East approach Grossmont College Dr OC	20 & 10	(B)	(B)
SDG&E UG ELEC	West approach Grossmont College Dr OC	20 & 10	(C)	(C)
SDG&E UG ELEC	Grossmont College Dr OC	20 & 5	(D)	(E)
SDG&E UG ELEC	Grossmont College Dr OC	20 & 20	NONE	(D)
PAC BELL UG TELE	"GR3" Line Sta 22+50 to 26+50 Lt	20 & 20	(A)	(A)
PAC BELL UG TELE	East approach Grossmont College Dr OC	20 & 10	(B)	(B)
PAC BELL UG TELE	West approach Grossmont College Dr OC	20 & 10	(C)	(C)
PAC BELL UG TELE	Grossmont College Dr OC	20 & 5	(D)	(E)
PAC BELL UG TELE	Grossmont College Dr OC	20 & 20	NONE	(G)
COX CABLE UG CABLE	"GR3" Line Sta 22+50 to 26+50 Lt	20 & 20	(A)	(A)
COX CABLE UG CABLE	East approach Grossmont College Dr OC	20 & 10	(B)	(B)
COX CABLE UG CABLE	West approach Grossmont College Dr OC	20 & 10	(C)	(C)
COX CABLE UG CABLE	Grossmont College Dr OC	20 & 30	(D)	(F)

Refer to the Utility N /W Days column:

N = The minimum number of working days from the date the Engineer receives written notification that a site will be ready for utility work to the date the site is actually ready for utility work

W = The number of working days needed by the utility company to complete the listed Utility Co. Work.

Site Prep. by Contractor The work described in "Site Prep. by Contractor" must be completed by the Contractor before the associated utility relocation work described in "Utility Co. Work" can be performed by the utility company.

Site Prep by contractor	Site Preparation Work
(A)	Grade "GR3" Line And Sta 22+50 to 26+50 "G" Line Left to subgrade and stake curb and sidewalk
(B)	Grade to subgrade east approach
(C)	Grade to subgrade west approach
(D)	Pour Soffit

Utility Company Work. The work described in "Relocation Work" will be performed by the utility company after the associated site preparation work has been completed by the Contractor. The work listed in "Work to be performed by the Utility Company" is the minimum anticipated work. The actual work may vary from that listed.

Utility Co. Work	Relocation Work
(A)	Place conduit, slab, vault, and handhold
(B)	Place conduit in subbase and abutment at east approach
(C)	Place conduit in subbase and abutment at west approach
(D)	Run cable thru completed conduit, energize, and wreck out existing OH Elec
(E)	Place conduit and blocks in bridge,
(F)	Place conduit in bridge, run cable thru completed conduit, energize, and wreck out existing OH Cable
(G)	Run cable thru completed conduit, energize, and wreck out existing OH Tele

10-1.19 MOBILIZATION

Mobilization shall conform to the provisions in Section 11, "Mobilization," of the Standard Specifications.

10-1.20 CONSTRUCTION AREA SIGNS

Construction area signs shall be furnished, installed, maintained, and removed when no longer required in conformance with the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

Attention is directed to "Obstructions" elsewhere in these special provisions.

Excavations required to install construction area signs shall be performed by hand methods without the use of power equipment, except that power equipment may be used if it is determined there are no utility facilities in the area of the proposed post holes.

The second sentence of the third paragraph in Section 12-3.02, "Barricades," of the Standard Specifications is amended to read:

The entire area of orange and white stripes shall be Type I, engineering grade, or Type II, super engineering grade, retroreflective sheeting conforming to the requirements of ASTM Designation: D 4956-95.

The third paragraph in Section 12-3.06A, "Stationary Mounted Signs," of the Standard Specifications is amended to read:

Sign panels for stationary mounted signs shall consist of Type III or Type IV reflective sheeting applied to an aluminum substrate conforming to the requirements in the Department's "Specifications for Reflective Sheeting Aluminum Signs." The type of reflective sheeting, Type III or Type IV, shall be at the Contractor's option and sign substrates fabricated from materials other than aluminum may be used when specified in the special provisions.

Legend and border may be applied by a screening process or by use of pressure sensitive cut-out sheeting. Size and spacing of letters and symbols shall be as depicted on the sign specification sheets published by the Department.

Rectangular signs over 54 inches measured along the horizontal axis, and diamond-shaped signs 60 inches and larger shall be framed unless otherwise specified. Frames shall be constructed in conformance with the requirements of the Department's "Framing Details for Sheet Aluminum Signs," Sheets 1 through 4 and Table 1 on Sheet 5.

Copies of the Department's "Specifications for Reflective Sheeting Aluminum Signs," "Framing Details for Sheet Aluminum Signs," and sign specification sheets may be obtained from the Department's Office of Business Management, Materiel Operations Branch, 1900 Royal Oaks Drive, Sacramento, CA 95815.

The second paragraph in Section 12-3.06B, "Portable Signs," of the Standard Specifications is amended to read:

Sign panels for portable signs shall conform to the provisions of sign panels for stationary mounted signs in Section 12-3.06A, "Stationary Mounted Signs," or shall be Type VI reflective sheeting as specified in the special provisions, or shall be cotton drill fabric, flexible industrial nylon fabric, or other approved fabric. Fabric signs shall not be used during the hours of darkness. Size, color, and legend requirements for portable signs shall be as described for stationary mounted sign panels in Section 12-3.06A. The height to the bottom of the sign panel above the edge of traveled way shall be at least 12 inches.

The third paragraph in Section 12-3.06B, "Portable Signs," of the Standard Specifications is deleted.

Sign substrates for stationary mounted construction area signs may be fabricated from fiberglass reinforced plastic as specified under "Prequalified and Tested Signing and Delineation Materials" of these special provisions.

Type VI reflective sheeting for sign panels for portable construction area signs shall conform to the provisions in "Prequalified and Tested Signing and Delineation Materials" of these special provisions.

10-1.21 MAINTAINING TRAFFIC

Attention is directed to Sections 7-1.08, "Public Convenience," 7-1.09, "Public Safety," and 12, "Construction Area Traffic Control Devices," of the Standard Specifications and to the Section entitled "Public Safety" elsewhere in these special provisions, and these special provisions. Nothing in these special provisions shall be construed as relieving the Contractor from the responsibilities specified in Section 7-1.09.

Attention is directed to "Traffic Plastic Drums," elsewhere in these special provisions regarding the use of plastic drums in place of portable delineators, cones or Type I or II barricades.

The minimum size specified for Type II flashing arrow signs in the table following the second paragraph of Section 12-3.03, "Flashing Arrow Signs," of the Standard Specifications is amended to read "36 inches by 72 inches".

In the Standard Plans, Note 10 on Standard Plan T10, Note 9 on Standard Plan T10A, Note 5 on Standard Plan T11, Note 6 on Standard Plan T12, Note 5 on Standard Plan T13, and Note 4 on Standard Plan T14 are revised to read:

All cones used for night lane closures shall be fitted with reflective sleeves as specified in the specifications.

The second and third paragraphs of Section 12-3.10, "Traffic Cones," of the Standard Specifications are amended to read:

During the hours of darkness traffic cones shall be affixed with reflective cone sleeves. The reflective sheeting of sleeves on the traffic cones shall be visible at 1,000 feet at night under illumination of legal high beam headlights, by persons with vision of or corrected to 20/20.

Reflective cone sleeves shall conform to the following:

1. Removable flexible reflective cone sleeves shall be fabricated from the reflective sheeting specified in the special provisions, have a minimum height of 13 inches and shall be placed a maximum of 3 inches from the top of the cone. The sleeves shall not be in place during daylight hours.
2. Permanently affixed semitransparent reflective cone sleeves shall be fabricated from the semitransparent reflective sheeting specified in the special provisions, have a minimum height of 13 inches, and shall be placed a maximum of 3 inches from the top of the cone. Traffic cones with semitransparent reflective cone sleeves may be used during daylight hours, or
3. Permanently affixed double band reflective cone sleeves shall have 2 white reflective bands. The top band shall be 6 inches in height, placed a maximum of 4 inches from the top of the cone. The lower band shall be 4 inches in height, placed 2 inches below the bottom of the top band. Traffic cones with double band reflective cone sleeves may be used during daylight hours.

The type of reflective cone sleeve used shall be at the option of the Contractor. Only one type of reflective cone sleeve shall be used on the project.

The C16 and C17 designations of the signs shown on the detail "Entrance Ramp Without Turning Pockets" of Standard Plan T14 are amended to designate the signs as R16 and R17, respectively.

Lane closures shall conform to the provisions in the section of these special provisions entitled "Traffic Control System for Lane Closure."

When performing work on overhead sign structures over pavement, the Contractor shall close the traffic lane and shoulder directly below the work, except when working on overhead sign structures equipped with walkways. When work is to be performed on sign structures equipped with walkways over traffic lanes, the Contractor shall either:

1. Close the traffic lanes and shoulders directly below the work as provided in this Section, "Maintaining Traffic," or,
2. Perform the following safety measures:

All safety railings shall be in place.

All personnel shall be secured to the sign structure.

All tools shall be secured to the structure or to personnel by means of leashes not more than three feet in length.

Install close mesh netting on and below the sign structure that will catch any material that may be dropped.

When new ramps are constructed, the respective ramp metering systems shall be complete and operational when the ramp is open to public traffic.

The Contractor shall notify the Engineer not less than 14 calendar days prior to opening ramps to be controlled by ramp metering systems.

At all locations where falsework pavement lighting or pedestrian openings through falsework are designated, falsework lighting shall be installed in conformance with the provisions in Section 86-6.11, "Falsework Lighting," of the Standard Specifications.

Openings shall be provided through bridge falsework for the use of public traffic at each location where falsework is constructed over the streets or routes listed in the following table. The type, minimum width, height and number of openings at each location, and the location and maximum spacing of falsework lighting if required, for each opening, shall conform to the requirements in the table. The width of vehicular openings shall be the clear width between temporary railings or other protective work. The spacing shown for falsework pavement lighting is the maximum distance center to center in feet between fixtures.

NAVAJO ROAD UNDERCROSSING

Bridge No. 57-1050R/L,

Existing Navajo Road

	Number	Width	Height
Vehicle Openings	2	53 ft	15 ft
Pedestrian Openings	2	5 ft	10 ft

Location and Spacing of
Falsework Pavement Lighting
R and L 22.5 with C 22.5 staggered 1/2 space

(Width and Height in feet.)

(R=right side of traffic. L=left side of traffic)

(C=Centered overhead.)

The exact location of openings will be determined by the Engineer.

Personal vehicles of the Contractor's employees shall not be parked on the traveled way or shoulders, including any section closed to public traffic.

Whenever vehicles or equipment are parked on the shoulder within 6 feet of a traffic lane, the shoulder area shall be closed as shown on the plans.

Lanes shall be closed only during the hours shown on the charts included in this section "Maintaining Traffic." Except work required under said Sections 7-1.08 and 7-1.09, work that interferes with public traffic shall be performed only during the hours shown for lane closures.

The full width of the traveled way shall be open for use by public traffic when construction operations are not actively in progress.

Designated legal holidays are: January 1st, the third Monday in February, the last Monday in May, July 4th, the first Monday in September, November 11th, Thanksgiving Day, and December 25th. When a designated legal holiday falls on a Sunday, the following Monday shall be a designated legal holiday. When November 11th falls on a Saturday, the preceding Friday shall be a designated legal holiday.

Minor deviations from the requirements of this section concerning hours of work which do not significantly change the cost of the work may be permitted upon the written request of the Contractor if in the opinion of the Engineer public traffic will be better served and the work expedited. Such deviations shall not be adopted by the Contractor until the Engineer has approved them in writing. All other modifications will be made by contract change order.

Consecutive on-ramps or off-ramps in the same direction of travel shall not be closed simultaneously unless otherwise provided in these special provisions or permitted by the Engineer.

Chart No. 1																										
Multilane Lane Requirements																										
Direction: Eastbound "Navajo Rd."												Location: Lake Murray Blvd. to Fletcher Parkway														
FROM HOUR TO HOUR	a.m.												p.m.													
	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	
Mondays through Thursdays	1	1	1	1	1	1																	2	2	2	1
Fridays	1	1	1	1	1	1																				
Saturdays				1	1	1	1	2	2																	
Sundays				1	1	1	1	1	2	2	2	2	2	2	2	2	2					2	1	1	1	
Day before designated legal holiday	1	1	1	1	1	1																				
Designated legal holidays																										
Legend:																										
1 One lane open in direction of travel																										
2 Two adjacent lanes open in direction of travel																										
No lane closure allowed																										
REMARKS:																										
Advanced closure notice to Grossmont Hospital is required.																										

Chart No. 2																																						
Multilane Lane Requirements																																						
Direction: Westbound "Navajo Rd."												Location: Fletcher Parkway to Lake Murray Blvd.																										
												a.m.						p.m.																				
FROM HOUR TO HOUR												12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12		
Mondays through Thursdays												1	1	1	1	1	1				2	2	2	2	2	2								2	2	2	1	
Fridays												1	1	1	1	1	1				2	2	2	2	2	2												
Saturdays															1	1	1	1	1	2	2	2	2	2	2	2	2	2										
Sundays															1	1	1	1	1	1	2	2	2	2	2	2	2	2					2	1	1	1		
Day before designated legal holiday												1	1	1	1	1	1				2	2	2	2	2	2												
Designated legal holidays																																						
Legend:																																						
1		One lane open in direction of travel																																				
2		Two adjacent lanes open in direction of travel																																				
		No lane closure allowed																																				
REMARKS:																																						
Advanced closure notice to Grossmont Hospital is required.																																						

Chart No. 3																																						
Multilane Lane Requirements																																						
Direction: Eastbound and Westbound "Navajo Rd."												Location: Lake Murray Blvd. to Fletcher Parkway																										
												a.m.						p.m.																				
FROM HOUR TO HOUR												12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12		
Mondays through Thursdays												1	1	1	1	1																				1	1	
Fridays												1	1	1	1	1																						
Saturdays																																						
Sundays																																				1	1	
Day before designated legal holiday												1	1	1	1	1																						
Designated legal holidays																																						
Legend:																																						
1		One lane open in direction of travel																																				
		No lane closure allowed																																				
REMARKS:																																						
This chart is valid for falsework erection/ removal only. For work on EB "Navajo Rd.", provide one lane on WB "Navajo Rd." for EB traffic. For work on WB "Navajo Rd.", provide one lane on EB "Navajo Rd." for WB traffic. Advanced closure notice to Grossmont Hospital is required.																																						

Chart No. 4																													
Multilane Lane Requirements																													
Direction: Eastbound and Westbound "Navajo Rd."												Location: At RTE 125																	
												a.m.						p.m.											
FROM HOUR TO HOUR	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12				
Mondays through Thursdays	x	x	x	x	x																			x	x				
Fridays	x	x	x	x	x																								
Saturdays																													
Sundays																								x	x				
Day before designated legal holiday	x	x	x	x	x																								
Designated legal holidays																													
Legend:																													
<input checked="" type="checkbox"/> Road may be closed.																													
<input type="checkbox"/> No lane closure allowed																													
REMARKS:																													
This chart is valid for super structure jacking work only.																													
Advanced closure notice to Grossmont Hospital is required.																													

Chart No. 5																													
Multilane Lane Requirements																													
Direction: Eastbound and Westbound "Grossmont College Dr."												Location: Griffin Dr. to E. of Nugent Ct.																	
												a.m.						p.m.											
FROM HOUR TO HOUR	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12				
Mondays through Thursdays	1	1	1	1	1	1																	1	1	1				
Fridays	1	1	1	1	1	1																							
Saturdays																													
Sundays																							1	1	1				
Day before designated legal holiday	1	1	1	1	1	1																							
Designated legal holidays																													
Legend:																													
<input checked="" type="checkbox"/> One lane open in direction of travel																													
<input type="checkbox"/> No lane closure allowed																													
REMARKS:																													
The hours on this chart may be used for work on the following detours: D-1 and D-1B.																													
Advanced closure notice to Grossmont Hospital is required.																													

Chart No. 8																													
Multilane Lane Requirements																													
Direction: Southbound SD-125												Location: North of Grossmont College Dr. to South of Navajo Rd.																	
												a.m.						p.m.											
FROM HOUR TO HOUR	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12				
Mondays through Thursdays	1	1	1	1	1	1																			1	1	1	1	
Fridays	1	1	1	1	1	1																							
Saturdays				1	1	1	1	1	1	1	1																		
Sundays				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1							1	1	1	1	
Day before designated legal holiday	1	1	1	1	1	1																							
Designated legal holidays																													
Legend:																													
<input type="checkbox"/> 1 One lane open in direction of travel <input type="checkbox"/> No lane closure allowed																													
REMARKS:																													
The hours on this chart may be used for works on the following detours: D-3, D-9A, and D-9B. Advanced closure notice to Grossmont Hospital is required.																													

Chart No. 9																													
Multilane Lane Requirements																													
Direction: Northbound "Fanita Dr."												Location: Navajo Rd. to Grossmont College Dr.																	
												a.m.						p.m.											
FROM HOUR TO HOUR	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12				
Mondays through Thursdays	1	1	1	1	1	1																							
Fridays	1	1	1	1	1	1																							
Saturdays				1	1	1	1	1	1	1	1	1	1	1	1	1	1												
Sundays				1	1	1	1	1	1	1	1	1	1	1	1	1	1								1	1	1	1	
Day before designated legal holiday	1	1	1	1	1	1																							
Designated legal holidays																													
Legend:																													
<input type="checkbox"/> 1 One lane open in direction of travel <input type="checkbox"/> No lane closure allowed																													
REMARKS:																													
The hours on this chart may be used for works on the following detours: D-2, D-6, and D-11. Advanced closure notice to Grossmont Hospital is required.																													

**Chart No. 10
Multilane Lane Requirements**

Direction: Southbound "Fanita Dr."						Location: Grossmont College Dr. to Navajo Rd.																						
	a.m.						p.m.																					
FROM HOUR TO HOUR	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12			
Mondays through Thursdays	1	1	1	1	1	1																			1	1	1	1
Fridays	1	1	1	1	1	1																						
Saturdays				1	1	1	1	1	1	1	1																	
Sundays				1	1	1	1	1	1	1	1	1	1	1	1	1	1							1	1	1	1	
Day before designated legal holiday	1	1	1	1	1	1																						
Designated legal holidays																												

Legend:
 1 One lane open in direction of travel
 No lane closure allowed

REMARKS:
 The hours on this chart may be used for works on the following detours: D-2, D-6, and D-11.
 Advanced closure notice to Grossmont Hospital is required.

**Chart No. 11
Ramp Lane Requirements**

Direction: Southbound SD-125	Location: - SB On-ramp from Grossmont College Dr. - SB Off-ramp to Navajo Rd.																									
	a.m.												p.m.													
FROM HOUR TO HOUR	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	
Mondays through Thursdays	x	x	x	x	x																					
Fridays																									x	x
Saturdays	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Sundays	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Day before designated legal holiday																										
Designated legal holidays																										
Legend:																										
<input checked="" type="checkbox"/> Ramp may be closed																										
<input type="checkbox"/> No work that interferes with public traffic will be allowed																										
REMARKS:																										
This chart is valid for one time use only. Closure date shall be coordinated with the Resident Engineer. Advanced closure notices to Grossmont Hospital and Grossmont College are required. Access for emergency vehicles shall be maintained through work area.																										
NOTE: When an Off-ramp is allowed to be closed, place a PCMS (Portable Changeable Message Sign) in the direction of travel allowing the traffic the option to use the preceding Off-ramp and warning them of the ramp closure ahead.																										

Chart No. 12 Ramp Lane Requirements																										
Direction:		Location:												KP:												
Northbound SD-125		- NB On-ramp from Amaya Dr. - NB Off-ramp to Navajo Rd. - NB On-ramp from Navajo Rd. - NB Off-ramp to Grossmont College Dr. - NB On-ramp from Grossmont College Dr.																								
Southbound SD-125		- SB On-ramp from Navajo Rd. - SB Off-ramp to Navajo Rd. - SB On-ramp from Grossmont College Dr. - SB Off-ramp to Grossmont College Dr.																								
FROM HOUR TO HOUR		a.m.												p.m.												
		12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Mondays through Thursdays		x	x	x	x	x																			x	x
Fridays		x	x	x	x	x																				
Saturdays																										
Sundays																									x	x
Day before designated legal holiday		x	x	x	x	x																				
Designated legal holidays																										
Legend: <input checked="" type="checkbox"/> Ramp may be closed <input type="checkbox"/> No work that interferes with public traffic will be allowed																										
REMARKS: This Chart to be used when NB and SB RTE 125 traffic is travelling over Navajo Rd UC and under Grossmont College Dr. OC No two consecutive Off-ramps or On-ramps shall be closed at the same time. Advanced closure notice to Grossmont Hospital is required. NOTE: When an Off-ramp is allowed to be closed, place a PCMS (Portable Changeable Message Sign) in the direction of travel allowing the traffic the option to use the preceding Off-ramp and warning them of the ramp closure ahead.																										

Pedestrian access facilities shall be provided through construction areas within the right of way as shown on the plans and as specified herein. Pedestrian walkways shall be provided with surfacing of asphalt concrete, portland cement concrete or timber. Surface shall be skid resistant and free of irregularities. Hand railings shall be provided on each side of pedestrian walkways as necessary to protect pedestrian traffic from hazards due to construction operations or adjacent vehicular traffic. Protective overhead covering shall be provided as necessary to insure protection from falling objects and drip from overhead structures.

In addition to the required openings through falsework, the Contractor shall provide pedestrian facilities during pile driving, footing, wall, and other bridge construction operations. At least one walkway shall be available at all times. If the Contractor's operations require the closure of one walkway, then another walkway shall be provided nearby, off the traveled roadway.

Railings shall be constructed of wood, S4S, and shall be painted white. Railings and walkways shall be maintained in good condition by the Contractor. Walkways shall be kept clear of obstructions.

Full compensation for providing said pedestrian facilities shall be considered as included in the prices paid for the various contract items of work involved and no additional compensation will be allowed therefor.

Erection and removal of falsework at Navajo Road Undercrossing shall be undertaken at one location at a time. During falsework erection and removal or structure lowering operation, public traffic in the lanes over which falsework is being erected or removed, or structure lowered shall be routed around the work area on adjacent streets or where 2 falsework openings are called for at one location, the public traffic may be routed through the work and through the opening for the opposing lanes of traffic by means of a local detour. Removal shall include lowering falsework, blowing sand from sand jacks, turning screws on screw jacks and removing wedges.

Local detours shall be not less than 12 feet in width, adjacent to the median side of the opposing traffic lanes, and shall at no place encroach on the lanes.

Stopping of traffic during erection or removal of falsework shall be undertaken only during hours permitted elsewhere in these special provisions for the period necessary for erecting or removing the falsework.

Regardless of the construction procedure, methods and equipment selected, the Contractor shall have all necessary materials and equipment on the site to erect or remove the falsework or over any one opening prior to stopping public traffic, and shall erect or remove the falsework in an expeditious manner in order that inconvenience to public traffic will be a minimum.

The Contractor may occupy one 10-foot lane while placing or removing forms for the superstructure of bridge over Navajo Road which are to remain open. Occupation of a traffic lane because of form work at any location will be permitted only during such times as construction operations are actually in progress and only during hours permitted elsewhere in these special provisions.

10-1.22 CLOSURE REQUIREMENTS AND CONDITIONS

Lane closures shall conform to the provisions in "Maintaining Traffic" of these special provisions and these special provisions.

The term closure, as used herein, is defined as the closure of a traffic lane or lanes, including ramp or connector lanes, within a single traffic control system.

The Contractor shall furnish a sufficient number of special portable freeway detour signs as shown on the plans to be used on the detour routes as directed by the Engineer.

CLOSURE SCHEDULE

By Noon Monday, the Contractor shall submit a written schedule of planned closures for the next week period, defined as Friday Noon through the following Friday Noon.

The Closure Schedule shall show the locations and times when the proposed closures are to be in effect. The Contractor shall use closure schedule request forms furnished by the Engineer for this purpose. Closure schedules submitted with incomplete, unintelligible or inaccurate information will be returned for correction. The Contractor will be notified of disapproved closures or closures that will require coordination with other parties as a condition of approval.

Amendments to the Closure Schedule, including additional closures, shall be submitted to the Engineer, in writing, at least 3 working days in advance of any planned closure. Approval of amendments to the Closure Schedule will be at the discretion of the Engineer.

The Contractor shall confirm, in writing, all scheduled closures by no later than 8:00 a.m. 3 working days prior to the date on which the closure is to be made. Approval or denial of scheduled closures will be made by no later than 4:00 p.m. 2 working days prior to the date on which the closure is to be made. Closures not confirmed or approved will not be allowed.

City streets and ramps may be closed only if signed for closing 3 days in advance. The Contractor shall notify the Engineer not less than 5 calendar days prior to signing the city street or ramp. If the city street or ramp is not closed on the posted day, the closure shall be changed to allow 3 days advance notice before closure.

Confirmed closures that are cancelled due to unsuitable weather may be rescheduled at the discretion of the Engineer for the next working day.

CONTINGENCY PLAN

The Contractor shall prepare a contingency plan for reopening closures to public traffic. The Contractor shall submit the contingency plan for a given operation to the Engineer within one working day of the Engineer's request.

LATE REOPENING OF CLOSURES

If a closure is not reopened to public traffic by the specified time, work shall be suspended in conformance with the provisions in Section 8-1.05, "Temporary Suspension of Work," of the Standard Specifications. The Contractor shall not make any further closures until the Engineer has accepted a work plan, submitted by the Contractor, that will insure that future closures will be reopened to public traffic at the specified time. The Engineer will have 2 working days to accept or

reject the Contractor's proposed work plan. The Contractor will not be entitled to any compensation for the suspension of work resulting from the late reopening of closures.

COMPENSATION

The Contractor shall notify the Engineer of any delay in the Contractor's operations due to the following conditions, and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of those conditions, and the Contractor's loss due to that delay could not have been avoided by rescheduling the affected closure or by judicious handling of forces, equipment and plant, the delay will be considered a right of way delay within the meaning of Section 8-1.09, "Right of Way Delays," and compensation for the delay will be determined in conformance with the provisions in Section 8-1.09:

- A. The Contractor's proposed Closure Schedule is denied and his planned closures are within the time frame allowed for closures in "Maintaining Traffic" of these special provisions, except that the Contractor will not be entitled to any compensation for amendments to the Closure Schedule that are not approved.
- B. The Contractor is denied a confirmed closure.

Should the Engineer direct the Contractor to remove a closure prior to the time designated in the approved Closure Schedule, any delay to the Contractor's schedule due to removal of the closure will be considered a right of way delay within the meaning of Section 8-1.09, "Right of Way Delays," and compensation for the delay will be determined in conformance with the provisions in Section 8-1.09.

Furnishing, posting, maintaining, and removing special detour signs shall be considered as included in the contract lump sum price paid for traffic control system and no additional compensation will be allowed therefor.

10-1.23 TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE

A traffic control system shall consist of closing traffic lanes and ramps in accordance with the details shown on the plans, the provisions of Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications, the provisions under "Maintaining Traffic" and "Construction Area Signs" elsewhere in these special provisions and these special provisions.

The provisions in this section will not relieve the Contractor from the responsibility to provide such additional devices or take such measures as may be necessary to comply with the provisions in Section 7-1.09, "Public Safety," of the Standard Specifications.

During traffic stripe operations and pavement marker placement operations using bituminous adhesive, traffic shall be controlled, at the option of the Contractor, with either stationary or moving type lane closures. During all other operations traffic shall be controlled with stationary type lane closures. The Contractor's attention is directed to the provisions in Section 84-1.04, "Protection From Damage," and Section 85-1.06, "Placement," of the Standard Specifications.

If any component in the traffic control system is displaced, or ceases to operate or function as specified, from any cause, during the progress of the work, the Contractor shall immediately repair the component to its original condition or replace the component and shall restore the component to its original location.

STATIONARY TYPE LANE CLOSURE.--When lane and ramp closures are made for work periods only, at the end of each work period, all components of the traffic control system, except portable delineators placed along open trenches or excavation adjacent to the traveled way, shall be removed from the traveled way and shoulder. If the Contractor so elects, the components may be stored at selected central locations, approved by the Engineer, within the limits of the highway right of way.

Each vehicle used to place, maintain and remove components of a traffic control system on multilane highways shall be equipped with a Type II flashing arrow sign which shall be in operation when the vehicle is being used for placing, maintaining, or removing the components. Vehicles equipped with Type II flashing arrow sign not involved in placing, maintaining, or removing the components when operated within a stationary type lane closure shall only display the caution display mode. The sign shall be controllable by the operator of the vehicle while the vehicle is in motion. The flashing arrow sign shown on the plans shall not be used on the vehicles which are doing the placing, maintaining and removing of components of a traffic control system, and shall be in place before a lane closure requiring its use is completed.

MOVING TYPE LANE CLOSURE.--Flashing arrow signs used in moving lane closures shall be truck-mounted. Changeable message signs used in moving lane closure operations shall conform to Section 12-3.12, "Portable Changeable Message Signs," of the Standard Specifications, except the signs shall be truck-mounted and the full operation height of the bottom of the sign may be less than 7 feet above the ground, but should be as high as practicable.

Truck-mounted crash cushions (TMCC) for use in moving lane closures shall be any of the following approved models, or equal:

(1)

Hexfoam TMA Series 3000 and
Alpha 1000 TMA Series 1000 and
Alpha 2001 TMA Series 2001

Manufacturer:	Distributor(Northern):
Energy Absorption Systems, Inc. One East Wacker Drive Chicago, IL 60601-2076 Telephone (312) 467-6750	Traffic Control Service, Inc. 8585 Thys Court Sacramento, CA 95828 Telephone (800) 884-8274 FAX (916) 387-9734
	Distributor(Southern):
	Traffic Control Service, Inc. 1881 Betmor Lane Anaheim, CA 92805 Telephone (800) 222-8274

(2)

Cal T-001 Model 2 or Model 3

Manufacturer:	Distributor:
Hexcel Corporation 11711 Dublin Blvd. P.O. Box 2312 Dublin, CA 94568 Telephone (510) 828-4200	Hexcel Corporation 11711 Dublin Blvd. P.O. Box 2312 Dublin, CA 94568 Telephone (510) 828-4200

(3)

Renco Rengard Model Nos.
CAM 8-815 and RAM 8-815

Manufacturer:	Distributor:
Renco Inc. 1582 Pflugerville Loop Road P.O. Box 730 Pflugerville, TX 78660-0730 Telephone (800) 654-8182	Renco Inc. 1582 Pflugerville Loop Road P.O. Box 730 Pflugerville, TX 78660-0730 Telephone (800) 654-8182

Each TMCC shall be individually identified with the manufacturer's name, address, TMCC model number, and a specific serial number. The names and numbers shall each be a minimum 1/2 inch high, and located on the left (street) side at the lower front corner. The TMCC shall have a message next to the name and model number in 1/2 inch high letters which states, "The bottom of this TMCC shall be _____ inches \pm _____ inches above the ground at all points for proper impact performance." Any TMCC which is damaged or appears to be in poor condition shall not be used unless recertified by the manufacturer. The Engineer shall be the sole judge as to whether used TMCCs supplied under this contract need recertification. Each unit shall be certified by the manufacturer to meet the requirements for TMCCs in accordance with the standards established by the Transportation Laboratory Structures Research Section.

Approvals for new TMCC designs proposed as equal to the above approved models shall be in accordance with the procedures (including crash testing) established by the Transportation Laboratory Structures Research Section. For information regarding submittal of new designs for evaluation contact:

Transportation Laboratory
Structures Research Section
P.O. Box 19128
5900 Folsom Boulevard
Sacramento, CA 95819

New TMCCs proposed as equal to approved TMCCs or approved TMCCs determined by the Engineer to need recertification shall not be used until approved or recertified by the Transportation Laboratory Structures Research Section.

PAYMENT.--The contract lump sum price paid for traffic control system shall include full compensation for furnishing all labor, materials (including signs), tools, equipment and incidentals, and for doing all the work involved in placing, removing, storing, maintaining, moving to new locations, replacing and disposing of the components of the traffic control system as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer. Flagging costs will be paid for as provided in Section 12-2.02, "Flagging Costs," of the Standard Specifications.

The adjustment provisions in Section 4-1.03, "Changes," of the Standard Specifications, shall not apply to the item of traffic control system. Adjustments in compensation for traffic control system will be made only for increased or decreased traffic control system required by changes ordered by the Engineer and will be made on the basis of the cost of the increased or decreased traffic control necessary. Such adjustment will be made on a force account basis as provided in Section 9-1.03, "Force Account Payment," of the Standard Specifications for increased work, and estimated on the same basis in the case of decreased work.

Traffic control system required by work which is classed as extra work, as provided in Section 4-1.03D of the Standard Specifications, will be paid for as a part of the extra work.

10-1.24 TEMPORARY PAVEMENT DELINEATION

Temporary pavement delineation shall be furnished, placed, maintained, and removed in conformance with the provisions in Section 12-3.01, "General," of the Standard Specifications and these special provisions. Nothing in these special provisions shall be construed as reducing the minimum standards specified in the Manual of Traffic Controls published by the Department or as relieving the Contractor from the responsibilities specified in Section 7-1.09, "Public Safety," of the Standard Specifications.

Attention is directed to "Traffic Plastic Drums," elsewhere in these special provisions regarding the use of traffic plastic drums in place of portable delineators or cones.

GENERAL

Whenever the work causes obliteration of pavement delineation, temporary or permanent pavement delineation shall be in place prior to opening the traveled way to public traffic. Laneline or centerline pavement delineation shall be provided at all times for traveled ways open to public traffic. On multilane roadways (freeways and expressways) edgeline delineation shall be provided at all times for traveled ways open to public traffic.

The Contractor shall perform the work necessary to establish the alignment of temporary pavement delineation, including required lines or marks. Surfaces to receive temporary pavement delineation shall be dry and free of dirt and loose material. Temporary pavement delineation shall not be applied over existing pavement delineation or other temporary pavement delineation. Temporary pavement delineation shall be maintained until superseded or replaced with a new pattern of temporary pavement delineation or permanent pavement delineation.

Temporary pavement markers, including underlying adhesive, and removable traffic tape which is applied to the final layer of surfacing or existing pavement to remain in place or which conflicts with a subsequent or new traffic pattern for the area shall be removed when no longer required for the direction of public traffic, as determined by the Engineer.

TEMPORARY LANELINE AND CENTERLINE DELINEATION

Whenever lanelines or centerlines are obliterated and temporary pavement delineation to replace the lines is not shown on the plans, the minimum laneline and centerline delineation to be provided for that area shall be temporary reflective pavement markers placed at longitudinal intervals of not more than 24 feet. The temporary reflective pavement markers shall be the same color as the laneline or centerline the pavement markers replace. Temporary reflective pavement markers shall be, at the option of the Contractor, one of the temporary pavement markers listed for short term day/night use (14 days or less) or long term day/night use (6 months or less) in "Prequalified and Tested Signing and Delineation Materials" of these special provisions.

Temporary reflective pavement markers shall be placed in conformance with the manufacturer's instructions and shall be cemented to the surfacing with the adhesive recommended by the manufacturer, except epoxy adhesive shall not be used to place pavement markers in areas where removal of the pavement markers will be required.

Temporary laneline or centerline delineation consisting entirely of temporary reflective pavement markers placed on longitudinal intervals of not more than 24 feet shall be used on lanes opened to public traffic for a maximum of 14 days. Prior to the end of the 14 days the permanent pavement delineation shall be placed. If the permanent pavement delineation is not placed within the 14 days, the Contractor shall provide additional temporary pavement delineation and shall bear the cost thereof. The additional temporary pavement delineation to be provided shall be equivalent to the pattern specified for the permanent pavement delineation for the area, as determined by the Engineer.

Full compensation for furnishing, placing, maintaining and removing the temporary reflective pavement markers (including underlying adhesive, layout (dribble) lines to establish alignment of temporary reflective pavement markers or used for temporary laneline and centerline delineation) for those areas where temporary laneline and centerline delineation is not shown on the plans and for providing equivalent patterns of permanent traffic lines for those areas when required, shall be considered as included in the contract prices paid for the items of work that obliterated the laneline and centerline pavement delineation and no separate payment will be made therefor.

TEMPORARY EDGELINE DELINEATION

On multilane roadways (freeways and expressways) whenever edgelines are obliterated and temporary pavement delineation to replace those edgelines is not shown on the plans, the edgeline delineation to be provided for those areas adjacent to lanes open to public traffic shall be as follows:

Temporary pavement delineation for right edgelines shall, at the option of the Contractor, consist of either a solid 4-inch wide traffic stripe of the same color as the stripe the temporary edgeline delineation replaces, or traffic cones, portable delineators or channelizers placed at longitudinal intervals not to exceed 100 feet.

Temporary pavement delineation for left edgelines shall, at the option of the Contractor, consist of either solid 4-inch wide traffic stripe of the same color as the stripe the temporary edgeline delineation replaces, or traffic cones, portable delineators or channelizers placed at longitudinal intervals not to exceed 100 feet; or temporary reflective pavement markers placed at longitudinal intervals of not more than 6 feet. Temporary pavement markers used for temporary left edgeline delineation shall be one of the types of temporary pavement markers listed for short term day/night use (14 days or less) or long term day/night use (6 months or less) in "Prequalified and Tested Signing and Delineation Materials" of these special provisions.

Four inch wide traffic stripe placed for temporary edgeline delineation which will require removal shall conform to the provisions of "Temporary Traffic Stripe (Tape)" of these special provisions. Where removal of the 4-inch wide traffic stripe will not be required, painted traffic stripe conforming to the provisions of "Temporary Traffic Stripe (Paint)" of these special provisions may be used. The quantity of temporary traffic stripe (tape) or temporary traffic stripe (paint) used for this temporary edgeline delineation will not be included in the quantities of tape or paint to be paid for.

The lateral offset for traffic cones, portable delineators or channelizers used for temporary edgeline delineation shall be as determined by the Engineer. If traffic cones or portable delineators are used as temporary pavement delineation for edgelines, the Contractor shall provide personnel to remain at the job site to maintain the cones or delineators during the hours of the day that the portable delineators are in use.

Channelizers used for temporary edgeline delineation shall be the surface mounted type and be orange in color. Channelizer bases shall be cemented to the pavement in the same manner provided for cementing pavement markers to pavement in the section of these special provisions entitled "Pavement Markers," except epoxy adhesive shall not be used to place channelizers on the top layer of pavement. Channelizers shall be, at the Contractor's option, one of the surface mount types 36 inch) listed in "Prequalified and Tested Signing and Delineation Materials" of these special provisions.

Temporary edgeline delineation shall be removed when no longer required for the direction of public traffic as determined by the Engineer.

The quantity of channelizers used as temporary edgeline delineation will not be included in the quantity of channelizers to be paid for. Full compensation for furnishing, placing, maintaining and removing temporary edgeline delineation for those areas where temporary edgeline delineation is not shown on the plans shall be considered as included in the contract prices paid for the items of work that obliterated the edgeline pavement delineation and no separate payment will be made therefor.

TEMPORARY TRAFFIC STRIPE (PAINT)

Temporary traffic stripe consisting of painted traffic stripe shall be applied and maintained at the locations shown on the plans. The painted temporary traffic stripe shall be complete in place at the location shown, prior to opening the traveled way to public traffic. Removal of painted temporary traffic stripe will not be required.

Temporary painted traffic stripe shall conform to "Paint Traffic Stripes and Pavement Markings" of these special provisions, except for payment and the number of coats shall be, at the option of the Contractor, either one or 2 coats regardless of whether on new or existing pavement.

At the Contractor's option, temporary removable striping tape listed in "Prequalified and Tested Signing and Delineation Materials" of these special provisions may be used instead of painted temporary traffic stripes. When traffic stripe tape is used in place of painted temporary traffic stripes, the tape will be measured and paid for as temporary traffic stripe (paint).

When painted traffic stripe is specified for temporary left edgeline delineation, temporary reflective pavement markers placed at longitudinal intervals of not more than 6 feet may be used in place of the temporary painted traffic stripe. Temporary reflective pavement markers shall be one of the types of temporary pavement markers listed for long term day/night use (6 months or less) in "Prequalified and Tested Signing and Delineation Materials" of these special provisions. When temporary reflective pavement markers are used in place of temporary painted traffic stripe, payment for those temporary pavement markers will be made on the basis of the theoretical quantity of temporary traffic stripe (paint), required for the left edgeline the temporary pavement markers replace.

TEMPORARY PAVEMENT MARKING (PAINT)

Temporary pavement marking consisting of painted pavement marking shall be applied and maintained at the locations shown on the plans. The painted temporary pavement marking shall be complete in place at the location shown, prior to opening the traveled way to public traffic. Removal of painted temporary pavement marking will not be required.

Temporary painted pavement marking shall conform to "Paint Traffic Stripes and Pavement Markings" of these special provisions, except for payment and the number of coats shall be, at the option of the Contractor, either one or two coats regardless whether on new or existing pavement.

At the Contractor's option, temporary removable pavement marking tape or permanent pavement marking tape listed in "Prequalified and Tested Signing and Delineation Materials" of these special provisions may be used instead of painted temporary pavement markings. When pavement marking tape is used, regardless of which type of tape is placed, the tape will be measured and paid for as temporary pavement marking (paint).

TEMPORARY PAVEMENT MARKERS

Temporary pavement markers shall be applied at the locations shown on the plans. The pavement markers shall be applied complete in place at the location shown, prior to opening the traveled way to public traffic.

Temporary pavement markers shown on the plans shall be, at the option of the Contractor, one of the temporary reflective pavement markers for long term day/night use (6 months or less) listed in "Prequalified and Tested Signing and Delineation Materials" of these special provisions.

Temporary pavement markers shall be placed in conformance with the manufacturer's instructions and shall be cemented to the surfacing with the adhesive recommended by the manufacturer, except epoxy adhesive shall not be used in areas where removal of the pavement markers will be required.

Where the temporary pavement delineation shown on the plans for lanelines or centerlines consists entirely of a pattern of broken traffic stripe and pavement markers, the Contractor may use groups of the temporary reflective pavement markers for long term day/night use (6 months or less) listed in "Prequalified and Tested Signing and Delineation Materials" of these special provisions, in place of the temporary traffic stripe tape or painted temporary traffic stripe. The groups of pavement markers shall be spaced as shown on the plans for a similar pattern of permanent traffic line, except pavement markers shown to be placed in the gap between the broken traffic stripe shall be placed as part of the group to delineate the pattern of broken temporary traffic stripe. The kind of laneline and centerline delineation selected by the Contractor shall be continuous within a given location. Payment for temporary pavement markers used in place of temporary traffic stripe will be made on the basis of the theoretical quantities of temporary traffic stripe (tape), temporary traffic stripe (paint) and temporary pavement markers required for the pattern the pavement markers replace.

Reflective pavement markers conforming to the provisions of "Pavement Markers" of these special provisions may be used in place of temporary reflective pavement markers for long term day/night use (6 months or less) except to simulate patterns of broken traffic stripe. Placement of the reflective pavement markers used for temporary pavement markers shall conform to "Pavement Markers" of these special provisions except the waiting period provisions before placing the pavement markers on new asphalt concrete surfacing as specified in Section 85-1.06, "Placement," of the Standard Specifications shall not apply and epoxy adhesive shall not be used to place pavement markers on asphalt concrete surfacing in areas where removal of the pavement markers will be required.

MEASUREMENT AND PAYMENT

Temporary traffic stripe (paint) and temporary pavement marking (paint) will be measured and paid for in the same manner as specified for paint traffic stripe (1-coat) and paint pavement marking (1-coat) specified in Section 84-3.06, "Measurement," and Section 84-3.07, "Payment," of the Standard Specifications.

Temporary pavement markers, shown on the plans, will be measured and paid for as units in the same manner specified for reflective pavement markers as provided in Section 85-1.08, "Measurement," and Section 85-1.09, "Payment," of the

Standard Specifications. Temporary pavement markers, used for temporary laneline and centerline delineation for areas which are not shown on the plans will not be included in the quantities of temporary pavement markers to be paid for. Full compensation for removing temporary pavement markers, when no longer required, shall be considered as included in the contract unit price paid for temporary pavement marker and no separate payment will be made therefor.

Temporary pavement markers, shall conform to the section entitled "Pavement Markers," elsewhere in these special provisions except; The 14-day waiting period before placing the pavement markers on new asphalt concrete surfacing as specified in Section 85-1.06 "Placement," of the Standard Specifications shall not apply: Bituminous adhesive shall not be used to place markers on PCC pavement.

10-1.25 BARRICADES

Barricades shall be furnished, placed, and maintained at the locations designated by the Engineer, shown on the plans, or specified and shall conform to the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

Type II reflective sheeting for stripes on barricade rail faces shall conform to the requirements specified under "Prequalified and Tested Signing and Delineation Materials," elsewhere in these special provisions.

Construction area sign and marker panels conforming to the requirements in Section 12-3.06, "Construction Area Signs," of the Standard Specifications shall be installed on barricades as directed by the Engineer at the locations shown on the plans.

Sign panels for construction area signs and marker panels installed on barricades shall conform to the requirements of Section 12-3.06A, "Stationary Mounted Signs," of the Standard Specifications.

Full compensation for furnishing, installing, maintaining, and removing construction area signs and markers on barricades shall be considered as included in the contract unit price or prices paid for the type or types of barricade and no separate payment will be made therefor.

Barricades shown on the plans as part of a traffic control system will be paid for as provided in "Traffic Control System for Lane Closure," elsewhere in these special provisions, and will not be included in counts for payment for barricades.

10-1.26 PORTABLE CHANGEABLE MESSAGE SIGN

Portable changeable message signs shall be furnished, placed, operated, and maintained at locations directed by the Engineer and shall conform to the provisions of Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

The Contractor shall have 6 portable changeable message signs on the project at all times.

10-1.27 TEMPORARY RAILING

Temporary railing (Type K) shall be placed at the locations shown on the plans, specified in these special provisions or in the Standard Specifications or ordered by the Engineer, and shall conform to the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

Reflectors and adhesive shall be furnished by the Contractor.

The fourth paragraph of Section 12-4.01, "Measurement and Payment," of the Standard Specifications is amended to read:

When the Engineer's Estimate includes a contract item for temporary railing (Type K), the temporary railing (Type K) will be measured by the linear foot along the top of the railing, at each location shown on the plans, specified, or ordered by the Engineer. If the Engineer orders a lateral move of the temporary railing (Type K), and the repositioning is not shown on the plans, moving the temporary railing will be paid for as extra work as provided in Section 4-1.03D and the temporary railing will not be measured in the new position. Temporary railing (Type K) placed in excess of the length shown, specified, or ordered will not be paid for. The contract price paid per linear foot for temporary railing (Type K) shall include full compensation for furnishing all labor, materials (including reinforcement and Type P marker panels), tools, equipment and incidentals, and for doing all the work involved in furnishing, placing, maintaining, repairing, replacing, and removing the temporary railing, including excavation and backfill, drilling holes and bonding threaded rods or dowels when required, removing threaded rods or dowels and filling the drilled holes with mortar, furnishing and installing reflectors, and moving and replacing removable panels as required, complete in place, as shown on the plans, as specified in these specifications and the special provisions, and as directed by the Engineer.

Reflectors on temporary railing (Type K) shall conform to the provisions in "Prequalified and Tested Signing and Delineation Materials," of these special provisions.

Temporary railing (Type K), conforming to the details shown on 1995 Standard Plan T3 or 1997 Standard Plan T3, may be used. Temporary railing (Type K) fabricated prior to January 1, 1993, and conforming to 1988 Standard Plan B11-30 may be used, provided the fabrication date is printed on the required Certificate of Compliance.

The Contractor's attention is directed to the provisions in "Public Safety" and "Order of Work" elsewhere in these special provisions.

Temporary railing (Type K) placed in accordance with the provisions in "Public Safety" elsewhere in these special provisions will not be measured nor paid for.

10-1.28 TRAFFIC PLASTIC DRUMS

Traffic plastic drums shall conform to the requirements for traffic control devices in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

Traffic plastic drums shall be constructed of low-density polyethylene material and shall be flexible or collapsible upon impact by a vehicle. The traffic plastic drum shall have a weighted base that will separate from the drum. The base shall be of such shape as to preclude rolling upon impact by a vehicle. The base shall be of sufficient weight to maintain the drum in position and upright. The base or external ballast rings shall not exceed 4 inches in height, and drum rings shall not exceed 38 inches maximum in diameter. The base or external rings placed over and around the drum, resting on the pavement or ground shall contain the ballast for the drums. Ballast for drums shall be sand or water, except sand shall be used in areas susceptible to freezing. The base shall have drain holes to prevent the accumulation of water. Sand bags shall not be used as ballast for drums.

The body of the traffic plastic drum shall be of a fluorescent orange or predominately orange color. Drums shall be a minimum of 36 inches in height above the traveled way, and have at least an 18 inch minimum width, regardless of orientation.

The markings on drums shall be horizontal, circumferential, alternating orange and white reflective bands 4 to 6 inches wide. Each drum shall have a minimum of 2 orange and 2 white bands. The top of the uppermost reflective band shall be no lower than 6 inches from the top of the drum. Any non-reflective spaces between the bands shall not exceed 2 inches in width. The reflective sheeting shall conform to the provisions in "Prequalified and Tested Signing and Delineation Materials," elsewhere in these special provisions.

Only one type of traffic plastic drum shall be used on the project. The type of traffic plastic drum proposed for use on the project shall be submitted to the Engineer for approval, prior to placement on the project.

In curvilinear alignment traffic plastic drums shall be used only on one side of the traveled way. Traffic plastic drums shall be placed on the alignment and location shown on the plans, or directed by the Engineer. Traffic plastic drums shall be placed uniformly, straight on tangent alignment and on a true arc on curved alignment. All layout work necessary to place the traffic plastic drums to the proper alignment shall be performed by the Contractor.

If traffic plastic drums are displaced or are not in an upright position, from any cause, the traffic plastic drums shall immediately be replaced or restored to their original location, in an upright position, by the Contractor.

At the option of the Contractor, where portable delineators, cones or Type I or II barricades are specified in the specifications or shown on the plans, traffic plastic drums may be used in place of those portable delineators, cones or Type I or II barricades.

At the completion of the project, traffic plastic drums shall become the property of the Contractor and removed from the site of the work.

Traffic plastic drums shall be installed as shown on the plans.

Traffic plastic drums will be measured as units from actual count of the number of traffic plastic drum designated on the plans or ordered by the Engineer. After initial placement of traffic plastic drums, and if ordered by the Engineer, the traffic plastic drums shall be moved from location to location and the cost thereof will be paid for as extra work as provided in Section 4-1.03D. Traffic plastic drums which are used as part of traffic control system in place of cones, delineators or barricades or which are used in place of those portable delineators, cones or Type I or II barricades specified in "Public Safety" elsewhere in these special provisions or which are placed in excess of the number specified or shown will not be included in the count of traffic plastic drums to be paid for.

10-1.29 CHANNELIZERS

Channelizers shall be surface mounted type and shall be furnished, placed and maintained at the locations shown on the plans and shall conform to the provisions in Sections 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

Channelizers shall conform to the provisions in "Prequalified and Tested Signing and Delineation Materials," elsewhere in these special provisions.

Channelizer posts shall be orange in color.

At the option of the Contractor, channelizer bases may be cemented to the pavement using hot melt bitumen adhesive and in the same manner provided for cementing pavement markers to pavement in the section of these special provisions entitled "Pavement Markers."

10-1.30 TEMPORARY CRASH CUSHION MODULE

This work shall consist of furnishing, installing and maintaining sand filled temporary crash cushion modules in groupings or arrays at each location shown on the plans, specified in the special provisions or directed by the Engineer. The grouping or array of sand filled modules shall form a complete sand filled temporary crash cushion in accordance with the details shown on the plans and these special provisions.

Attention is directed to "Public Safety" of these special provisions.

GENERAL

Whenever the work or the Contractor's operations establishes a fixed obstacle, the exposed fixed obstacle shall be protected with a sand filled temporary crash cushion. The sand filled temporary crash cushion shall be in place prior to opening the lanes adjacent to the fixed obstacle to public traffic.

Sand filled temporary crash cushions shall be maintained in place at each location, including times when work is not actively in progress. Sand filled temporary crash cushions may be removed during a work period for access to the work provided that the exposed fixed obstacle is 15 feet or more from a lane carrying public traffic and the temporary crash cushion is reset to protect the obstacle prior to the end of the work period in which the fixed obstacle was exposed. When no longer required, as determined by the Engineer, sand filled temporary crash cushions shall be removed from the site of the work.

MATERIALS

At the Contractor's option, the modules for use in sand filled temporary crash cushions shall be either Energite III Inertial Modules, Fitch Inertial Modules manufactured after March 31, 1997, or equal:

Energite III Inertial Modules manufactured by Energy Absorption Systems, Inc., One East Wacker Drive, Chicago, IL 60601-2076, Telephone 1-312-467-6750, FAX 1-800-770-6755.

Distributor (Northern): Traffic Control Service, Inc., 8585 Thys Court, Sacramento, CA 95828, Telephone 1-800-884-8274, FAX 1-916-387-9734

Distributor (Southern): Traffic Control Service, Inc., 1881 Betmor Lane, Anaheim, CA 92805, Telephone 1-800-222-8274, FAX 1-714-937-1070.

Fitch Inertial Modules, national distributor; Roadway Safety Service, Inc., 1050 North Rand Road, Wauconda, IL 60084, Telephone 1-800-426-0839, FAX 1-847-487-9820.

Distributor: Singletree Sales Company, 1533 Berger Drive, San Jose, CA 95112, Telephone 1-800-822-7735, FAX 1-408-287-1929.

Modules contained in each temporary crash cushion shall be of the same type at each location. The color of the modules shall be the standard yellow color as furnished by the vendor, with black lids. The modules shall exhibit good workmanship free from structural flaws and objectionable surface defects. The modules need not be new. Good used undamaged modules conforming to color and quality of the types specified above may be utilized. If used Fitch modules requiring a seal are furnished, the top edge of the seal shall be securely fastened to the wall of the module by a continuous strip of heavy duty tape.

Modules shall be filled with sand in accordance with the manufacturer's directions, and to the sand capacity in pounds for each module as shown on the plans. Sand for filling the modules shall be clean washed concrete sand of commercial quality. At the time of placing in the modules, the sand shall contain not more than 7 percent water, as determined by California Test 226.

Modules damaged due to the Contractor's operations shall be repaired immediately by the Contractor at the Contractor's expense. Modules damaged beyond repair, as determined by the Engineer, due to the Contractor's operations shall be removed and replaced by the Contractor at the Contractor's expense.

INSTALLATION

Temporary crash cushion modules shall be placed on movable pallets or frames conforming to the dimensions shown on the plans. The pallets or frames shall provide a full bearing base beneath the modules. The modules and supporting pallets or frames shall not be moved by sliding or skidding along the pavement or bridge deck.

A Type R or P marker panel shall be attached to the front of the crash cushion as shown on the plans, when the closest point of crash cushion array is within 12 feet of the traveled way. The marker panel, when required, shall be firmly fastened to the crash cushion with commercial quality hardware or by other methods approved by the Engineer.

At the completion of the project, temporary crash cushion modules, sand filling, pallets or frames, and marker panels shall become the property of the Contractor and shall be removed from the site of the work. Temporary crash cushion modules shall not be installed in permanent work.

MEASUREMENT AND PAYMENT

Temporary crash cushion modules will be measured by the unit determined from the actual count of modules used in the work or ordered by the Engineer at each location. Temporary crash cushion modules placed in accordance with the provisions in "Public Safety" elsewhere in these special provisions and modules placed in excess of the number specified or shown will not be measured nor paid for.

Repairing modules damaged by public traffic will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications. Modules damaged beyond repair by public traffic, when ordered by the Engineer, shall be removed and replaced immediately by the Contractor. Modules replaced due to damage by public traffic will be measured and paid for as temporary crash cushion module.

If the Engineer orders a lateral move of sand filled temporary crash cushions and the repositioning is not shown on the plans, moving the sand filled temporary crash cushion will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications and these temporary crash cushion modules will not be counted for payment in the new position.

The contract unit price paid for temporary crash cushion module shall include full compensation for furnishing all labor, materials (including sand, pallets or frames and marker panels), tools, equipment and incidentals, and for doing all work involved in furnishing, installing, maintaining, moving and resetting during a work period for access to the work, and removing from the site of the work when no longer required (including those damaged by public traffic) the sand filled temporary crash cushion modules, complete in place, as shown on the plans, as specified in these special provisions and as directed by the Engineer.

10-1.31 EXISTING HIGHWAY FACILITIES

The work performed in connection with various existing highway facilities shall conform to the provisions in Section 15, "Existing Highway Facilities," of the Standard Specifications and these special provisions.

10-1.31A ABANDON CULVERTS AND PIPE LINES

Existing culverts and utility pipe lines, where shown on the plans to be abandoned, shall be abandoned in place or at the option of the Contractor, the culverts and pipe lines shall be removed and disposed of. All resulting openings into existing structures, that are to remain in place, shall be plugged with commercial quality concrete containing not less than 470 pounds of cement per cubic yard.

Abandoning culverts and pipe lines in place shall conform to the following:

Culverts and pipe lines, that intersect the side slopes, shall be removed to a depth of not less than 3 feet, measured normal to the plane of the finished side slope, before being abandoned.

Culverts and pipe lines, 24 inches in diameter and larger, shall be backfilled with sand by any method, acceptable to the Engineer, which completely fills the pipe. Sand backfill material shall be clean, free draining, and free from roots and other deleterious substances.

The ends of culverts and pipe lines shall be securely closed by a 0.5-foot thick tight fitting plug or wall of commercial quality concrete.

Culverts and pipe lines shall not be abandoned until their use is no longer required. The Contractor shall notify the Engineer in advance of any intended culvert or pipe abandonment.

If the Contractor elects to remove and dispose of any culvert or pipe line which is specified to be abandoned, as provided herein, any sand backfill specified for such pipe will be measured and paid for in the same manner as if the culvert or pipe line has been abandoned in place.

Sand backfill will be measured by the cubic yard determined from the dimensions of the culverts and pipe lines to be abandoned.

The contract price paid per cubic yard for sand backfill shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in backfilling pipes with sand, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Full compensation for plugs, pipe removal, structure excavation, and backfill, shall be considered as included in the contract unit price paid for abandon culvert and pipe line, and no additional compensation will be allowed therefor.

10-1.31B ABANDON INLETS

Existing pipe and drainage inlets where shown on the plans to be abandoned, shall be abandoned.

Removed frames and grates shall be disposed of.

10-1.31C REMOVE GUARD RAILING

Existing guard railing, where shown on the plans to be removed, shall be removed and disposed of.

Existing concrete anchors shall be removed to a depth of not less than one foot below subgrade or one foot below finished grade, whichever is greater in depth. Full compensation for removing concrete anchors shall be considered as included in the contract price paid per linear foot for remove metal beam guard railing and no separate payment will be made therefor.

Full compensation for removing cable anchor assemblies shall be considered as included in the contract price paid per linear foot for remove metal beam guard railing and no separate payment will be made therefor.

10-1.31D REMOVE PAVEMENT MARKERS

Existing pavement markers, when no longer required for traffic lane delineation as directed by the Engineer, shall be removed and disposed of.

Full compensation for removing and disposing of pavement markers shall be considered as included in the contract price paid per ton for asphalt concrete (Type A) and no separate payment will be made therefor.

10-1.31E REMOVE TRAFFIC STRIPES AND PAVEMENT MARKINGS

Traffic stripes and pavement markings to be removed shall be removed at the locations shown on the plans and at the locations designated by the Engineer.

Removal of temporary traffic stripe (paint) and temporary pavement markings (paint) shown on the stage construction sheets of the plans will be measured and paid for as remove traffic stripe and pavement marking.

The first paragraph of Section 15-2.02B, "Traffic Stripes and Pavement Markings," of the Standard Specifications is amended to read:

15-2.02B Traffic Stripes and Pavement Markings.— Traffic stripes and pavement markings shall be removed by any method that does not materially damage the existing pavement. Pavement marking images shall be removed in such a manner that the old message cannot be identified. Where grinding is used, the pavement marking image shall be removed by grinding a rectangular area. The minimum dimensions of the rectangle shall be the height and width of the pavement marking. Residue resulting from removal operations shall be removed from pavement surfaces by sweeping or vacuuming before the residue is blown by the action of traffic or wind, migrates across lanes or shoulders, or enters into drainage facilities.

Section 15-2.07, "Payment," of the Standard Specifications is amended by adding the following paragraph:

Full compensation for any additional grinding outside the limits of the existing pavement marking image to obtain a rectangular area shall be considered as included in the contract price paid for the item of work involved and no additional compensation will be allowed therefor.

Nothing in these special provisions shall relieve the Contractor from the Contractor's responsibilities as provided in Section 7-1.09, "Public Safety," of the Standard Specifications.

Existing traffic stripe and markings may be paint, pavement tape or thermoplastic.

10-1.31F REMOVE CHANNELIZERS

Channelizers shall be removed as shown on the plans or as designated by the Engineer.

Where blast cleaning is used for the removal of glue or for removal of objectionable material, and such removal operation is being performed within 10 feet of a lane occupied by public traffic, the residue including dust shall be removed immediately after contact between the sand and the surface being treated. Such removal shall be by a vacuum attachment operating concurrently with the blast cleaning operation.

Nothing in these special provisions shall relieve the Contractor from his responsibilities as provided in Section 7-1.09, "Public Safety," of the Standard Specifications.

10-1.31G REMOVE ROADSIDE SIGNS

Existing roadside signs, at locations shown on the plans to be removed, shall be removed and disposed of.

Existing roadside signs shall not be removed until replacement signs have been installed or until the existing signs are no longer required for the direction of public traffic, unless otherwise directed by the Engineer.

Attention is directed to "Remove Roadside Sign Panel" elsewhere in these special provisions.

10-1.31H REMOVE ROADSIDE SIGN PANEL

Existing roadside sign panel, at locations shown on the plans to be removed, shall be removed and disposed of.

Existing roadside sign panel shall not be removed until replacement signs have been installed or until the existing signs are no longer required for the direction of public traffic, unless otherwise directed by the Engineer.

Remove roadside sign panel will be measured and paid for as remove roadside sign.

10-1.31I RESET ROADSIDE SIGNS

Existing roadside signs shall be removed and reset as shown on the plans.

Each roadside sign shall be reset on the same day said sign is removed.

Two holes shall be drilled in each existing post as required to provide a breakaway feature as shown on the plans.

Reset roadside sign (one post) will be measured and paid for as relocate roadside sign.

10-1.31J RELOCATE ROADSIDE SIGNS

Existing roadside signs shall be removed and relocated at new locations shown on the plans.

Each roadside sign shall be installed at the new location on the same day said sign is removed from its original location.

Two holes shall be drilled in each existing post as required to provide a breakaway feature as shown on the plans.

Attention is directed to reset roadside signs elsewhere in these special provisions.

10-1.31K REMOVE BASE AND SURFACING

Existing base and bituminous surfacing shown on the plans to be removed, shall be removed to a depth of at least 0.5-foot below the grade of the existing surfacing. Resulting holes and depressions shall be backfilled with earthy material selected from excavation to the lines and grade established by the Engineer.

Removing base and surfacing will be measured and paid for as roadway excavation.

10-1.31L COLD PLANE ASPHALT CONCRETE PAVEMENT

Existing asphalt concrete pavement shall be cold planed at the locations and to the dimensions shown on the plans.

Planing asphalt concrete pavement shall be performed by the cold planing method. Planing of the asphalt concrete pavement shall not be done by the heater planing method.

Cold planing machines shall be equipped with a cutter head not less than 30 inches in width and shall be operated so as not to produce fumes or smoke. The cold planing machine shall be capable of planing the pavement without requiring the use of a heating device to soften the pavement during or prior to the planing operation.

The depth, width and shape of the cut shall be as indicated on the typical cross sections or as directed by the Engineer. The final cut shall result in a uniform surface conforming to the typical cross sections. The outside lines of the planed area shall be neat and uniform. Planing asphalt concrete pavement operations shall be performed without damage to the surfacing to remain in place.

Planed widths of pavement shall be continuous except for intersections at cross streets where the planing shall be carried around the corners and through the conform lines. Following planing operations, a drop-off of more than 0.15-foot will not be allowed at any time between adjacent lanes open to public traffic.

Where transverse joints are planed in the pavement at conform lines no drop-off shall remain between the existing pavement and the planed area when the pavement is opened to public traffic. If asphalt concrete has not been placed to the level of existing pavement before the pavement is to be opened to public traffic a temporary asphalt concrete taper shall be constructed. Asphalt concrete for temporary tapers shall be placed to the level of the existing pavement and tapered on a slope of 30:1 or flatter to the level of the planed area.

Asphalt concrete for temporary tapers shall be commercial quality and may be spread and compacted by any method that will produce a smooth riding surface. Temporary asphalt concrete tapers shall be completely removed, including the removal of all loose material from the underlying surface, before placing the permanent surfacing. Such removed material shall be disposed of outside the highway right of way in accordance with the provisions in Section 7-1.13 of the Standard Specifications.

Operations shall be scheduled such that not more than 7 days shall elapse between the time when transverse joints are planed in the pavement at the conform lines and the permanent surfacing is placed at such conform lines.

The material planed from the roadway surface, including material deposited in existing gutters or on the adjacent traveled way, shall be removed and disposed of outside the highway right of way in accordance with the provisions in Section 7-1.13 of the Standard Specifications. Removal operations of cold planed material shall be concurrent with planing operations and follow within 50 feet of the planer, unless otherwise directed by the Engineer.

Cold plane asphalt concrete pavement will be measured by the square yard. The quantity to be paid for will be the actual area of surface cold planed irrespective of the number of passes required to obtain the depth shown on the plans.

The contract price paid per square yard for cold plane asphalt concrete pavement shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all work involved in cold planing asphalt concrete surfacing and disposing of planed material, including furnishing the asphalt concrete for and constructing, maintaining, removing, and disposing of temporary asphalt concrete tapers, as specified in these special provisions and as directed by the Engineer.

10-1.31M REMOVE CONCRETE BARRIER (TYPE K)

Existing concrete barrier (Type K), where shown on the plans to be removed, shall be removed and disposed of. Remove concrete barrier (Type K) will be measured by the linear foot along the top of the barrier.

10-1.31N REMOVE CRASH CUSHION (SAND FILLED)

Existing crash cushion, where shown on the plans to be removed, shall be removed and disposed of.

Crash cushion modules, sand filling, pallets or frames, and marker panels shall be removed from the site of the work. Removed crash cushion modules shall not be installed in permanent work.

Remove crash cushion (sand filled) will be measured by the unit. Each module will be counted as a unit.

10-1.31O ADJUST FRAMES AND COVERS AND FRAMES AND GRATES TO GRADE

Frames and covers and frames and grates of existing manholes, inlets, or other facilities shall be adjusted to grade in accordance with the provisions in Section 15-2.05, "Reconstruction," of the Standard Specifications.

Full compensation for ADJUST FRAMES AND COVERS AND FRAMES AND GRATES TO GRADE shall be considered as included in the contract unit price paid per TON for ASPHALT CONCRETE (TYPE A) and no separate payment will be made therefor.

10-1.31P REMOVE CONCRETE

Concrete, designated on the plans to be removed, shall be removed.

Concrete removed at the following locations will be measured and paid for by the cubic yard, measured before and during removal operations:

Locations listed in quantity table under heading "Remove Concrete" as shown on the plans.

Ditch excavation will be measured and paid for as remove concrete.

Other concrete to be removed will not be measured nor paid for as remove concrete. Attention is directed to Sections 16, "Clearing and Grubbing," and 19-1.04, "Removal and Disposal of Buried Man-Made Objects," of the Standard Specifications.

Where no joint exists between concrete to be removed and concrete to remain in place, the concrete shall be cut in a neat line to a minimum depth of 0.17-foot with a power driven saw before concrete is removed.

Where concrete has been removed outside the roadway prism, the backfilled areas shall be graded to drain and blend in with the surrounding terrain.

Concrete to be removed which has portions of the same structure both above and below ground will be considered as concrete above ground for compensation.

10-1-32 JACK SUPERSTRUCTURE

Jack superstructure shall consist of lowering the superstructure of NAVAJO ROAD UNDERCROSSING (Bridge No. 57-1050R/L) to the requirements and grades as shown on the plans and in accordance with the requirements in these special provisions.

GENERAL.- -Attention is directed to "Order of Work" and "Maintaining Traffic," elsewhere in these special provisions.

The Contractor shall design the temporary supports for the superstructure and determine the methods and equipment for lowering the superstructure.

At least 5 weeks before starting the work the Contractor shall submit to the Engineer complete calculations, details and working drawings of the temporary supports, methods and equipment he proposes to use in accordance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications. Working drawings and calculations shall be signed by an engineer who is registered as a Civil Engineer in the State of California.

LOWERING OPERATIONS.- -The supports and jacking equipment shall accommodate the structure dead load shown on the plans and any additional loads due to the Contractor's operations. The lowering system shall provide total stability of the structure throughout the lowering operations.

Systems involving modifications to the bridge that impair the structural integrity, intended serviceability or design capacity of the bridge shall not be used.

A redundant system of supports for back-up should the primary lowering system fail shall be provided. Such redundant system shall include stacks of steel plates that will be removed one by one as the superstructure is lowered. Steel plates shall be maintained to within 3/4 inch of the superstructure soffit during the entire lowering process.

Monitoring and control devices to assure proper load distribution and lowering shall be provided. The superstructure shall be lowered uniformly without distortion that would cause damage to the structure.

The superstructure shall be lowered to the position shown on the plans so that the load is distributed uniformly across each abutment. Galvanized shims shall be placed, as approved by the Engineer, when they are required to provide uniform loading at bearing pads.

Damage to the structure as a result of the Contractor's operations shall be repaired or replaced by the Contractor at his expense in accordance with the requirements for new work of similar character.

After lowering the superstructure, all members installed on the bridge for jacking the superstructure shall be removed and the bridge surfaces shall be finished.

PAYMENT.- Jack superstructure will be paid for on the basis of a lump sum price. The contract lump sum price paid for jack superstructure shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in jacking the superstructure (including shimming at bearing pads), complete in place as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.33 CLEARING AND GRUBBING

Clearing and grubbing shall conform to the provisions in Section 16, "Clearing and Grubbing," of the Standard Specifications and these special provisions.

Clearing and grubbing shall include removing existing fence within the temporary construction easements and removing the existing shed shown on the plans.

Vegetation shall be cleared and grubbed only within the excavation and embankment slope lines.

At locations where there is no grading adjacent to a bridge or other structure, clearing and grubbing of vegetation shall be limited to 5 feet outside the physical limits of the bridge or structure.

Existing vegetation, outside the areas to be cleared and grubbed, shall be protected from injury or damage resulting from the Contractor's operations.

Activities controlled by the Contractor, except cleanup or other required work, shall be confined within the graded areas of the roadway.

Nothing herein shall be construed as relieving the Contractor of Contractor's responsibility for final cleanup of the highway as provided in Section 4-1.02, "Final Cleaning Up," of the Standard Specifications.

10-1.34 WATERING

Watering shall conform to the provisions in Section 17, "Watering," of the Standard Specifications and these special provisions.

Attention is directed to the optional source or sources of water for use on the project specified in "Materials Information" available to contractors.

Attention is directed to "Beginning of Work, Time of Completion and Liquidated Damages," elsewhere in these special provisions, regarding availability of water.

10-1.35 EARTHWORK

Earthwork shall conform to the provisions in Section 19, "Earthwork," of the Standard Specifications and these special provisions.

Attention is directed to "Order of Work" elsewhere in these special provisions.

Areas shown on the plans as "Removal of Unconsolidated Fill" shall be excavated to the elevations shown on the plans or as directed by the Engineer. The material shall then be compacted in accordance with the provisions in Section 19 "Earthwork" of the Standard Specifications and these special provisions.

Stepped slope excavation shall be performed in accordance with the provisions in Section 19, "Earthwork", of the Standard Specifications and these special provisions.

Stepped slopes, as shown on the plans or designated by the Engineer, shall be excavated to conform with the typical cross section as shown on the plans. The approximate midpoint of the horizontal tread shall be constructed on the staked slope line, so when completed the theoretical planned slope shall intersect the horizontal and vertical planes of the steps at their midpoints.

The steps shall be constructed to within a ± 20 percent tolerance of the horizontal and vertical dimensions shown on the plans.

The first step shall begin at the upper interface of rippable rock line and continue to the bottom of the slope. The top of the slope shall be rounded as shown on the plans.

Where slopes transition from stepped slope to unstepped slope, or to a stepped slope of a different slope angle, the steps shall be blended by maintaining a constant vertical spacing and varying the tread width to achieve the transition. Where blasting or heavy ripping is required by the nature of the material being excavated, stepped slopes and slope rounding will not be required if approved in writing by the Engineer.

The steps shall be constructed as shown on the plans, either parallel to the grade or level along the contour of the slope. The steps shall carry through the slope rounding at the ends of the excavation and blend into the ends of the slope rounding by varying the tread width.

Scaling shall not be performed on the stepped slopes except for the removal of material or rock fragments which cover more than one-half the shelf width.

When directed by the Engineer, the outer edge of the step shall be beveled during construction to reduce the sharp geometric lines on the slope and provide loose material to support growth.

Where localized outcroppings of sound rock are encountered, the stepped slope excavation shall be performed in accordance with the provisions in Section 19, "Earthwork", of the Standard Specifications.

Full compensation for construction of stepped slopes shall be considered as included in the contract price paid per cubic yard for roadway excavation and no additional compensation will be allowed therefore.

Between stations 210+60 and 211+30 "A" Line (left), 213+50 and 214+10 "A" Line (left), 214+50 and 215+20 "A" Line (left), special grading requirements shall apply as follows:

- 1) The portion of embankment placed within a horizontal distance of 20 feet from the existing slope face shall have a Resistance (R-Value) of not less than 10 and a Sand Equivalent (SE) not less than 12 and shall conform to the following gradation requirements:

Gradation	
Sieve Size	% Passing
1"	100
No. 4	35-100
No. 200	0-20

- 2) Compaction shall be performed using light motor driven compaction equipment.
- 3) The provisions of paragraph 4 of Section 19.601 "Placing" shall not apply to embankment construction.

Surplus excavated material shall become the property of the Contractor and shall be disposed of outside the highway right of way in accordance with the provisions in Section 7-1.13 of the Standard Specifications.

Where a portion of existing surfacing is to be removed, the outline of the area to be removed shall be cut on a neat line with a power-driven saw to full depth before removing the surfacing. Full compensation for cutting existing surfacing shall be considered as included in the contract price paid per cubic yard for roadway excavation and no additional compensation will be allowed therefor.

10-1.36 CONTROLLED LOW STRENGTH MATERIAL

Controlled low strength material shall consist of a workable mixture of aggregate, cementitious materials and water, and shall conform to the provisions in Section 19-3, "Structure Excavation and Backfill," of the Standard Specifications and these special provisions.

At the option of the Contractor, controlled low strength material may be used as structure backfill for pipe culverts, except that controlled low strength material shall not be used as structure backfill for culverts having a span greater than 20 feet.

When controlled low strength material is used for structure backfill, the width of the excavation shown on the plans may be reduced so that the clear distance between the outside of the pipe and the side of the excavation, on each side of the pipe, is a minimum of 12 inches. This minimum may be reduced to 6 inches when, either the height of cover is less than or equal to 20 feet or the pipe diameter or span is less than 42 inches.

Controlled low strength material in new construction shall not be permanently placed higher than the basement soil. For trenches in existing pavements, permanent placement shall be no higher than the bottom of any existing pavement permeable drainage layer. If a drainage layer does not exist, permanent placement in existing pavements shall be no higher than 1 inch below the bottom of the existing asphalt concrete, or no higher than the top of base below the existing Portland cement concrete pavements. The minimum height that controlled low strength material shall be placed, relative to the pipe invert, is 0.5D (D=Diameter) for rigid pipe and 0.7D for flexible pipe.

When controlled low strength material is proposed for use, the Contractor shall submit a mix design and test data to the Engineer for approval prior to excavating the trench for which controlled low strength material is proposed for use. The test data shall demonstrate that the mix design provides:

- a) For pipe culverts having a height of cover of 20 feet or less, a 28-day compressive strength between 50 and 100 psi is required; for height of cover greater than 20 feet, a minimum 28-day compressive strength of 100 psi is required. Compressive strength shall be determined by ASTM Designation: D 4832, "Preparation and Testing of Soil-Cement Slurry Test Cylinders."
- b) When controlled low strength material is used as structure backfill for pipe culverts, the sections of pipe culvert in contact with the controlled low strength material shall meet the requirements of Chapter 850 of the Highway Design Manual using the minimum resistivity, pH, chloride content, and sulfate content of the hardened controlled low strength material. Minimum resistivity and pH shall be determined by California Test 643, the chloride content shall be determined by California Test 422 and the sulfate content shall be determined by California Test 417.
- c) Cement shall be any type of Portland cement conforming to the provisions of ASTM Designation: C 150; or any type of blended hydraulic cement conforming to either ASTM Designation: C 595M or the physical requirements of ASTM Designation: C 1157M. Testing of cement will not be required.
- d) Admixtures may be used in conformance with Section 90-4, "Admixtures," of the Standard Specifications. Chemical admixtures containing chlorides as Cl in excess of one percent by mass of admixture, as determined by California Test 415, shall not be used.

Materials for controlled low strength material shall be thoroughly machine-mixed in a pugmill, rotary drum, or other approved mixer. Mixing shall continue until the cementitious material and water are thoroughly dispersed throughout the material. Controlled low strength material shall be placed in the work within 3 hours after introduction of the cement to the aggregates.

Controlled low strength material shall be placed in a uniform manner that will prevent voids in, or segregation of, the backfill, and will not float or shift the culvert. Foreign material which falls into the trench prior to or during placing of the controlled low strength material shall be immediately removed.

When controlled low strength material is to be placed within the traveled way or otherwise to be covered by paving or embankment materials, the material shall achieve a maximum indentation diameter of 3 inches prior to covering and opening to traffic. Penetration resistance shall be as measured by ASTM Designation: C 6024, "Standard Test Method for Ball Drop on Controlled Low Strength Material to Determine Suitability for Load Application."

Controlled low strength material used as structure backfill for pipe culverts will be considered structure backfill for compensation purposes.

If structure excavation or structure backfill involved in bridges is not otherwise designated by type, and payment for the structure excavation or structure backfill has not otherwise been provided for in the Standard Specifications or these special provisions, the structure excavation or structure backfill will be paid for at the contract price per cubic yard for structure excavation (bridge) or structure backfill (bridge).

10-1.37 NATIVE TOPSOIL

This work shall consist of excavating, stockpiling, removing from stockpiles, spreading, and compacting native topsoil in accordance with these special provisions.

Immediately prior to excavating native topsoil, trash and debris shall be removed, and vegetation shall be mowed to within one inch of the existing ground. Mowed material and trash and debris shall be removed and disposed of outside the highway right of way in accordance with the provisions in Section 7-1.13 of the Standard Specifications.

Native topsoil shall be obtained by excavating the top one-foot of existing material from proposed excavation and embankment areas and other areas designated on the plans. Native topsoil shall be stockpiled along the top of proposed excavation slopes and along the toe of proposed embankment slopes. When native topsoil cannot be stockpiled outside the slope lines as specified herein, excavated native topsoil material may be stockpiled at other locations when approved in writing by the Engineer.

Upon completion of the grading operations for the excavation and embankment slopes and other areas to receive native topsoil, the native topsoil shall be spread on stepped cut slopes to receive ground cover. Native topsoil shall be placed to a uniform depth of not less than 0.5 foot and shall be compacted or stabilized in such a manner as to retain the material in place on the slopes. Native topsoil shall not be compacted or stabilized to the degree that the native topsoil is not maintained as a viable growing medium.

Native topsoil shall be placed on designated excavation slopes prior to planting.

Native topsoil placed on the finished slopes will be measured and paid for by the square yard. The areas of native topsoil will be calculated on the basis of actual or computed slope measurements.

The contract price paid per square yard for native topsoil shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in excavating, stockpiling, removing native topsoil from stockpiles, spreading and compacting or stabilizing native topsoil complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.38 IRRIGATION CROSSOVERS

Irrigation crossovers shall conform to the provisions in Section 20-5, "Irrigation Systems," of the Standard Specifications and these special provisions.

Irrigation crossovers shall include conduits, water line crossovers, sprinkler control crossovers and appurtenances. Sizes of the conduits, water line crossovers and sprinkler control crossovers shall be as shown in the table for "Irrigation Crossovers" in the plans.

Conduits shall be placed in open trenches in accordance with the provisions in Section 20-5.03B, "Conduit for Water Line Crossovers and Sprinkler Control Crossovers," of the Standard Specifications.

Conduits shall be corrugated high density polyethylene (HDPE) pipe. Corrugated high density polyethylene pipe shall conform to ASTM Designation: F 405 or F 667, or AASHTO Designation: M 252 or M or M 294 and shall be Type S. Couplings and fittings shall be as recommended by the pipe manufacturer.

Water line crossovers shall conform to the provisions in Section 20-5.03C, "Water Line Crossovers," of the Standard Specifications, and shall be polyvinyl chloride (PVC) plastic pipe, 1120 or 1220. PVC plastic pipe water line crossovers shall have a minimum pressure rating (PR) of 315 psi unless otherwise shown on the plans.

Sprinkler control crossovers shall conform to the provisions in Section 20-5.027D, "Sprinkler Control Crossovers," of the Standard Specifications.

Installation of pull boxes shall conform to the provisions in Section 20-5.027I, "Conductors, Electrical Conduit and Pull Boxes," of the Standard Specifications. When no conductors are installed in electrical conduits, pull boxes for irrigation crossovers shall be installed on a foundation of compacted soil.

Full compensation for sprinkler control crossovers, water line crossovers, pavement markers, and appurtenances, and for pressure testing water line crossover in the conduit shall be considered as included in the contract price paid per linear foot for 8-inch corrugated high density polyethylene pipe conduit and no additional compensation will be allowed therefor.

10-1.39 MODIFY IRRIGATION CROSSOVERS

Modify existing irrigation crossovers shall conform to the provisions in Section 20-5, "Irrigation Systems," of the Standard Specifications and these special provisions.

Modify irrigation crossovers shall consist of locating existing irrigation crossover, removing portions of the conduit, water line crossover, and sprinkler control crossover and pressure testing existing water line crossovers. The length of conduit, water line crossover and sprinkler control crossover to be removed shall be as shown on the plans.

Before any work is started in an area where existing irrigation crossover conduit is to be modified, the existing conduit shall be located by the Contractor. When exploratory holes are used to locate the existing conduit, the exploratory holes shall be excavated in accordance with the provisions in Section 20-5.03B, "Conduit for Water Line Crossovers and Sprinkler Control Crossovers," of the Standard Specifications.

If debris is encountered in the ends of conduits, the debris shall be removed. Removal of debris within the first 3 feet in the conduits shall be at the Contractor's expense. If debris is encountered in the conduit more than 3 feet from the ends of the conduits, the additional debris shall be removed as directed by the Engineer. When directed by the Engineer, removal of debris more than 3 feet from the ends in the conduits will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

After water line crossover has been shortened, water line crossovers shall be retested for leakage in accordance with the provisions in Section 20-5.03H, "Pressure Testing," of the Standard Specifications. Leaks that develop shall be repaired at the Contractor's expense, and the water line crossovers shall be retested until a satisfactory pressure test is achieved.

The contract lump sum price paid for modify irrigation crossover shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in modify irrigation crossover, complete in place, pressure testing existing water line crossovers, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.40 WATER SUPPLY LINE (BRIDGE)

Water supply lines identified on the plans as supply line (bridge) shall be of the size shown and shall conform to the details shown on the plans, the provisions in Section 20-5, "Irrigation Systems," of the Standard Specifications and these special provisions.

Unless otherwise shown on the project plans, casings shall be installed at each abutment, and casings shall be extended to the greater of: (1) 5 feet beyond the approach slab, (2) 5 feet beyond the end of the adjacent wingwall or (3) 20 feet beyond the abutment.

Working Drawings.--The Contractor shall submit complete working drawings for temporary support of the casing at the abutments to the Office of Structure Design (OSD), in accordance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications.

The working drawings shall be supplemented by manufacturer's descriptive data, performance data and installation instructions for the following:

Seismic expansion assembly

The data for the expansion assembly for supply lines 4-inch diameter or greater shall include the preset dimension for each expansion assembly installation.

For initial review, 5 sets of drawings shall be submitted. After review, between 6 and 12 sets, as requested by the Engineer, shall be submitted to OSD for final approval and use during construction.

MATERIALS:--

Pipe and Fittings for Supply Line 4-inch Diameter or Greater.--Pipes and fittings for supply lines of 4-inch diameter or greater shall be ductile iron.

Ductile iron pipe shall be restrained push-on joint pipe conforming to ANSI/AWWA C151/A21.51. At expansion joint connection, ductile iron pipe shall have a factory installed flange on one end compatible to the expansion joint connection, and the other end shall be compatible to the restrained push-on joint pipe or flange for a continuous connection. Ductile iron pipe shall be furnished in full 18-foot lengths.

Restrained push-on joints for ductile iron pipe shall conform to ANSI/AWWA C111/A21.11. The joints shall be boltless, non-compression, non-threaded with synthetic rubber gasket seals and have a positive locking device to keep the connection from separating. The joints shall be designed for a working pressure of 350 psi and be capable of deflecting after assembly.

Fittings and flanges for ductile iron pipe shall conform to ANSI/AWWA C110/A21.10 except for the manufacturer's proprietary design dimensions for restrained push-on joint pipe.

Ductile iron pipe and fittings shall have cement mortar lining and seal coating conforming to ANSI/AWWA C104/A21.4. Pipe shall have a bituminous outside coating conforming to ANSI/AWWA C151/A21.51, and fittings shall have a bituminous outside coating conforming to ANSI/AWWA C110/A21.10.

Air Release Valve Assembly for Supply Line 4-inch Diameter or Greater.--Air release valve assembly for supply lines of 4-inch diameter or greater shall consist of a double-strap pipe saddle rated 150 psi minimum, one-inch ball valve, automatic air release valve, and tank vent. Air release valve shall have cast iron body with stainless steel trim, stainless steel float, one-inch inlet pipe connection and 3/16 inch orifice. Tank vent shall be the size of air release valve outlet and have a double opening facing down with screen cover.

Casing Insulators for Supply Line 4-inch Diameter or Greater.--Casing insulators for supply lines of 4-inch diameter or greater shall be designed for the size of casing and supply line shown on the plans. Casing insulators shall be 8-inch wide unit consisting of 14-gage thick, painted or galvanized, steel band and a minimum of four 2-inch wide glass reinforced runners. The casing insulators shall have a non-conductive inner liner. Insulators 6-inch diameter or larger shall also be coated with .010-inch thick coating of heat fused polyvinyl chloride. Casing insulators shall be factory constructed to ensure the supply line is centered in the casing to avoid any pipe to pipe contact and shall have at least 2 runners seated on the bottom of the casing.

Dirt Stops for Supply Line 4-inch Diameter or Greater.--Dirt stops for supply lines of 4-inch diameter or greater shall consist of a redwood cover and foam filling the end void between the supply line and the end of the casing. The redwood cover shall be made with 2-inch thick construction grade redwood and cut to fit the supply line. The foam shall be commercially available polyurethane foam spray.

Seismic Expansion Assembly for Supply Line 4-inch Diameter or Greater.--Seismic expansion assembly for supply lines of 4-inch diameter or greater shall consist of a sleeve type expansion joint and an integral ball joint at each end with insulated flange connections to supply line. Seismic expansion joint shall be manufactured of ductile iron and conform to the requirements of ANSI/AWWA C153/A21.53. Expansion joint for pipe sizes 24 inches and smaller shall be pressure rated to a minimum of 350 psi, and seismic expansion assembly for pipe sizes greater than 24 inches shall be rated at a minimum of

250 psi. Seismic expansion assembly shall be capable of deflecting and expanding simultaneously to an amount of not less than a 15 degree deflection at each end of the unit and a total of 8-inch axial movement.

Seal gasket for sleeve expansion shall be retained in the grooved outer casing with a leak proof design for 350 psi working pressure. The expansion sleeve shall have a limiting stop collar to keep it from separating. The ball joints for the seismic expansion assembly shall be contained in flanged retainers with seal gaskets that shall conform to the specification.

Expansion joint shall be lined with a minimum of 15 mils of fusion bonded epoxy conforming to the requirements of ANSI/AWWA C213 and shall be holiday tested with a 1500 volt spark test conforming to the requirements of ANSI/AWWA C213.

Insulated Flange Connection.--Insulated flange connection shall consist of dielectric flange gasket, insulating washers and sleeves held in place with steel bolts and nuts. Gasket shall have dielectric rating of 500 volts/mil, minimum.

Casing.--Casing shall be welded steel pipe conforming to Section 70-1.02B, "Welded Steel Pipe," of the Standard Specifications, except that the pipe shall be treated in accordance with the following requirements, prior to shipping. Exterior surfaces of welded steel pipe shall be cleaned and coated in accordance with specifications of ANSI/AWWA C213 or at the option of the Contractor cleaned, primed and coated in accordance with specifications of ANSI/AWWA C214.

Pipe Wrapping Tape.--Wrapping tape for pipe in contact with the earth shall be a pressure sensitive polyvinyl chloride or polyethylene tape with a minimum thickness of 50 mils.

Concrete Pipe Supports.--Concrete pipe supports shall consist of either a precast or cast-in-place concrete pipe cradle, galvanized steel pipe clamp, 2 anchor bolts and where shown on the plans, a stainless steel pipe protection shield.

Concrete pipe supports and pipe stops shall conform to the dimensions shown on the plans and shall be constructed of commercial quality concrete with a cement content not less than 564 pounds of portland cement per cubic yard, and commercial quality wire mesh. The concrete for pipe supports and pipe stops shall be moist cured for not less than 3 days.

Steel anchor bolts, nuts, pipe clamps and other fittings shall be suitable for the type and size of the supply lines or casing and shall conform to the provisions in Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications.

Epoxy Adhesive.--Epoxy adhesive shall conform to the provisions in Section 95-1, "General," of the Standard Specifications and at the option of the Contractor, shall conform to the provisions in Section 95-2.03, "Epoxy Resin Adhesive for Bonding New Concrete to Old Concrete," or in Section 95-2.04, "Rapid Set Epoxy Adhesive for Pavement Markers," or in Section 95-2.05, "Standard Set Epoxy Adhesive for Pavement Markers," of the Standard Specifications.

INSTALLATION:--

Water supply lines in bridge structures shall be supported as shown on the plans and in conformance with these special provisions.

If a blockout is provided in the bridge abutment wall for casing, the space between the casing and bridge abutment wall shall be filled with portland cement mortar conforming to the provisions in Section 51-1.135, "Mortar," of the Standard Specifications.

When the bridge superstructure is to be prestressed, the space around supply lines through abutments shall not be filled until the prestressing has been completed.

Openings for supply lines through bridge superstructure concrete shall either be formed or shall consist of pipe sleeves.

Ductile iron pipe for supply line 4-inch diameter or greater shall be connected and fully extended (pulled out) at the joint before the next connection is made.

Expansion joint for supply line 4-inch diameter or greater shall be factory adjusted and set at half the expansion capacity and approved by Engineer in advance. Expansion joint shall be connected to the supply line with insulated flange connections.

Cleaning and Closing of Pipe.--The interior of the pipe shall be cleaned before installation. Openings shall be capped or plugged as soon as the pipe is installed to prevent the entrance of any materials. The caps or plugs shall remain in place until their removal is necessary for completion of the installation.

Wrapping and Coating Pipe.--Damaged coating on supply line pipe in contact with the earth shall be wrapped with tape as follows:

1. Pipe to be wrapped shall be thoroughly cleaned and primed as recommended by the tape manufacturer.
2. Tapes shall be tightly applied with one-half uniform lap, free from wrinkles and voids to provide not less than 100 mils thickness.

3. Field joints and fittings for wrapped pipe shall be covered by double wrapping 50 mil thick tape. Wrapping at joints shall extend a minimum of 6 inches over adjacent pipe coverings. Width of tape for wrapping fittings shall not exceed 2 inches. Adequate tension shall be applied so tape will conform closely to contours of joint.

Where a casing passes through the abutment wall, the casing shall be wrapped with an additional 2 layers of asphalt-felt building paper conforming to the requirements of ASTM Designation: D 226, Type I, securely taped or wired in place.

TESTING.--

Water supply lines of 4-inch diameter or greater shall be tested in accordance with the provisions in Section 20-5.03H(1), "Method A," of the Standard Specifications, except that the testing pressure shall be 200 psi of water pressure and the testing period shall be 4 hours minimum with no leakage or pressure drop. The air relief valve shall not be subjected to water pressure due to testing.

The Contractor shall furnish pipe anchorages to resist thrust forces occurring during testing. Leaks shall be repaired and defective materials shall be replaced by the Contractor at the Contractor's expense.

Pressure testing and necessary repairing of water lines shall be completed prior to backfilling, placing deck slabs over supply lines in box girder cells, or otherwise covering the supply lines.

Each end of water line shall be capped prior to and after the testing.

The supply line shall be tested as one unit. The limits of the unit shall be 5 feet beyond the casing at each end of the bridge.

MEASUREMENT AND PAYMENT.--

Measurement and payment for supply line (bridge) for each size listed in the Engineer's Estimate shall be made in the same manner as galvanized steel pipe and plastic pipe supply lines in Sections 20-5.04, "Measurement," and 20-5.05, "Payment," of the Standard Specifications.

Full compensation for furnishing and installing air release valves, steel brackets, and other fittings, casing and casing insulators, dirt stops, concrete supports, testing and checking, concrete thrust blocks, pipe wrapping tape, epoxy adhesives and seismic expansion assemblies, shall be considered as included in the contract prices paid per linear foot for the sizes of supply line (bridge) involved and no additional compensation will be allowed therefor.

10-1.41 4 INCH CONDUIT

Irrigation conduit shall be polyvinyl chloride (PVC) plastic pipe, class 1120 or 1220, with a minimum pressure rating (PR) of 315, and shall conform to Sections 20-2.15B(1), "Plastic Pipe Supply Line," and 20-5.03B "Conduit for Water Line Crossovers and Sprinkler Control Crossovers," of the Standard Specifications and these special provisions.

Conduit shall be installed 12 inches below finished grade and shall extend 6 inches beyond edge of paved surface.

Conduit shall be installed at location shown on the plans.

The contract unit price paid per linear foot for 4 inch conduit shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in 4 inch conduit complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.42 FINISHING ROADWAY

Finishing roadway shall conform to the provisions in Section 22, "Finishing Roadway," of the Standard Specifications.

10-1.43 AGGREGATE BASE

Aggregate base shall be Class 2 and shall conform to the provisions in Section 26, "Aggregate Bases," of the Standard Specifications and these special provisions.

The first paragraph of Section 26-1.02A, "Class 2 Aggregate Base," of the Standard Specifications is amended by adding the following sentences:

Aggregate may include or consist of material processed from reclaimed asphalt concrete, portland cement concrete, lean concrete base, cement treated base, glass or a combination of any of these materials. Aggregate base incorporating reclaimed glass shall not be placed at locations where surfacing will not be placed over the aggregate base.

The fourth paragraph in said Section 26-1.02A, is amended by adding the following sentence:

Untreated reclaimed asphalt concrete and portland cement concrete will not be considered to be treated with lime, cement or other chemical material for purposes of performing the Durability Index test.

10-1.44 TREATED PERMEABLE BASE

Treated permeable base shall be asphalt treated and shall conform to the provisions in Section 29, "Treated Permeable Bases," of the Standard Specifications.

10-1.45 ASPHALT CONCRETE

Asphalt concrete and asphalt concrete base shall be Type A and shall conform to the provisions in Section 39, "Asphalt Concrete," of the Standard Specifications and these special provisions.

The last sentence of the first paragraph in Section 39-2.01, "Asphalts," of the Standard Specifications and the fifth, sixth, seventh and eighth paragraphs of Section 39-3.03, "Proportioning," of the Standard Specifications shall not apply.

The second paragraph in Section 39-3.05, "Asphalt Concrete and Asphalt Concrete Base Storage," of the Standard Specifications is amended to read:

Storage silos shall be equipped with a surge-batcher sized to hold a minimum of 4,000 pounds of material. A surge-batcher consists of equipment placed at the top of the storage silo which catches the continuous delivery of the completed mix and changes it to individual batch delivery and prevents the segregation of product ingredients as the completed mix is placed into storage. The surge-batcher shall be center loading and shall be thermally insulated or heated or thermally insulated and heated to prevent material buildup. Rotary chutes shall not be used as surge-batchers.

The surge-batcher shall be independent and distinct from conveyors or chutes used to collect or direct the completed mixture being discharged into storage silos and shall be the last device to handle the material before it enters the silo. Multiple storage silos shall be served by an individual surge-batcher for each silo. Material handling shall be free of oblique movement between the highest elevation (conveyor outfall) and subsequent placement in the silo. Discharge gates on surge-batchers shall be automatic in operation and shall discharge only after a minimum of 4,000 pounds of material has been collected and shall close before the last collected material leaves the device. Discharge gate design shall prevent the deflection of material during the opening and closing operation.

The amount of asphalt binder to be mixed with the aggregate for asphalt concrete and asphalt concrete base will be determined by the Engineer in accordance with California Test 367 using the samples of aggregates furnished by the Contractor in conformance with Section 39-3.03, "Proportioning," of the Standard Specifications.

Asphalt concrete used to change the cross slope or profile of surfacing shall not be considered to be asphalt concrete leveling for payment purposes, and shall be constructed as specified for asphalt concrete pavement.

Planned roads and connections used as detours shall be paved, except that the top layer of asphalt concrete shall be deferred until temporary striping is no longer needed.

The amount of asphalt binder used in asphalt concrete placed in dikes, gutters and overside drains shall be increased one percent by weight of the aggregate over the amount of asphalt binder determined for use in asphalt concrete placed on the traveled way.

Asphalt concrete and asphalt concrete base placed in layers less than 0.15-foot in compacted thickness or widths of less than 5 feet shall be spread and compacted with the equipment and by the methods specified in said Section 39. All other asphalt concrete and asphalt concrete base shall be compacted and finished in conformance with said Section 39, amended as follows:

Section 39-5.02, "Compacting Equipment," of the Standard Specifications is amended to read:

39-5.02 Compacting Equipment.--The Contractor shall furnish a sufficient number of rollers to obtain the specified compaction and surface finish required by these specifications.

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

The second paragraph of Section 39-6.01, "General Requirements," of the Standard Specifications is amended to read:

Asphalt concrete and asphalt concrete base shall be compacted by any means to obtain the specified relative compaction before the temperature of the mixture drops below 150° F. Additional rolling to achieve the specified relative compaction will not be permitted after the temperature of the mixture drops below 150° F. or once the pavement is opened to public traffic. When vibratory rollers are used as finish rollers the vibratory unit shall be turned off.

Section 39-6.03, "Compacting," of the Standard Specifications is amended by deleting the fifth, and seventh through tenth paragraphs and adding the following before the eleventh paragraph:

Asphalt concrete and asphalt concrete base shall be compacted to a relative compaction of not less than 95 percent and shall be finished to the lines, grades and cross section shown on the plans. In-place density of asphalt concrete and asphalt concrete base will be determined prior to opening the pavement to public traffic.

Relative compaction will be determined by California Test 375. Laboratory specimens will be compacted in conformance with California Test 304. Lots will be established for asphalt concrete and asphalt concrete base areas to be tested, as specified in California Test 375.

If the test results for any lot of asphalt concrete or asphalt concrete base indicate that the relative compaction is below 95.0 percent, but above 92.9 percent, the Contractor will be advised that he is not attaining the required relative compaction and that his materials or his procedures, or both, need adjustment. Asphalt concrete or asphalt concrete base spreading operations shall not continue until the Contractor has notified the Engineer of the adjustment that will be made in order to meet the required compaction.

If the test results for any lot of asphalt concrete or asphalt concrete base indicate that the relative compaction is less than 93.0 percent, the asphalt concrete or asphalt concrete base represented by that lot shall be removed, except as otherwise provided below. Asphalt concrete and asphalt concrete base spreading operations shall not continue until the Contractor makes significant adjustments to his materials or procedures or both in order to meet the required compaction. The adjustments shall be as agreed to by the Engineer. However, if requested by the Contractor and approved by the Engineer, asphalt concrete or asphalt concrete base with a relative compaction of 90.0 percent or greater may remain in place and the Contractor shall pay to the State an amount of reduced compensation for such lot with low compaction. The Department may deduct the amount of reduced compensation from any monies due, or that may become due, the Contractor under the contract. The amount of reduced compensation the Contractor shall pay to the State will be calculated using the total tons represented in the lot with low compaction times the contract price per ton for the contract item of asphalt concrete or asphalt concrete base involved times the following reduced compensation factors:

Relative Com- paction (Percent)	Reduced Compensation Factor	Relative Com- paction (Percent)	Reduced Compensation Factor
93.0	0.000	91.4	0.062
92.9	0.002	91.3	0.068
92.8	0.004	91.2	0.075
92.7	0.006	91.1	0.082
92.6	0.009	91.0	0.090
92.5	0.012	90.9	0.098
92.4	0.015	90.8	0.108
92.3	0.018	90.7	0.118
92.2	0.022	90.6	0.129
92.1	0.026	90.5	0.142
92.0	0.030	90.4	0.157
91.9	0.034	90.3	0.175
91.8	0.039	90.2	0.196
91.7	0.044	90.1	0.225
91.6	0.050	90.0	0.300
91.5	0.056		

The miscellaneous areas to be paid for at the contract price per square yard for place asphalt concrete (miscellaneous area) in addition to the prices paid for the materials involved shall be limited to the areas listed on the plans.

Aggregate for asphalt concrete dikes and miscellaneous areas shall conform to the 3/8 inch maximum grading as specified in Section 39-2.02, "Aggregate," of the Standard Specifications.

If the Contractor selects the batch mixing method, asphalt concrete shall be produced by the automatic batch mixing method as provided in Section 39-3.03A(2), "Automatic Proportioning," of the Standard Specifications.

In addition to the requirements in Section 39-5.01, "Spreading Equipment," of the Standard Specifications, asphalt paving equipment shall be equipped with automatic screed controls and a sensing device or devices.

When placing asphalt concrete to lines and grades established by the Engineer, the automatic controls shall control the longitudinal grade and transverse slope of the screed. Grade and slope references shall be furnished, installed and maintained by the Contractor. Should the Contractor elect to use a ski device, the minimum length of the ski device shall be 30 feet. The ski device shall be a rigid one piece unit and the entire length shall be utilized in activating the sensor.

When placing the initial mat of asphalt concrete on existing pavement, the end of the screed nearest the centerline shall be controlled by a sensor activated by a ski device not less than 30 feet long. The end of the screed farthest from centerline

shall be controlled by a sensor activated by a similar ski device or by an automatic transverse slope device set to reproduce the cross slope designated by the Engineer.

When paving contiguously with previously placed mats, the end of the screed adjacent to the previously placed mat shall be controlled by a sensor that responds to the grade of the previously placed mat and will reproduce the grade in the new mat within a 0.01-foot tolerance. The end of the screed farthest from the previously placed mat shall be controlled in the same manner as when placing the initial mat.

Should the methods and equipment furnished by the Contractor fail to produce a layer of asphalt concrete conforming to the requirements, including straightedge tolerance, of Section 39-6.03, "Compacting," of the Standard Specifications, the paving operations shall be discontinued and the Contractor shall modify his equipment or furnish substitute equipment.

Should the automatic screed controls fail to operate properly during any day's work, the Contractor may use manual control of the spreading equipment for the remainder of that day, however, the equipment shall be corrected or replaced with alternative automatically controlled equipment conforming to the requirements in this section before starting another day's work.

In addition to the straightedge requirements in Section 39-6.03, "Compacting," of the Standard Specifications asphalt concrete pavement shall conform to the surface tolerances specified herein.

The top surface of the uppermost layer of asphalt concrete surfacing (other than open graded asphalt concrete) shall be profiled, by the Contractor in the presence of the Engineer, using a California Profilograph or equivalent in accordance with California Test 526 and as specified in these special provisions. Prior to beginning profiles, the profilograph shall be calibrated in the presence of the Engineer. Profiles shall be made on the traveled way 3 feet from and parallel to each edge of traveled way and at the approximate location of the planned lane lines.

Pavement so profiled shall conform to the following profile requirements:

Pavement shall not have individual deviations in excess of 0.3-inch, as determined by California Test 526. The station location of the profiles for determining deviations shall be designated by the Engineer.

Checking the following areas of pavement surface with the California Profilograph or equivalent will not be required:

1. Pavement on horizontal curves having a centerline radius curve of less than 1,000 feet and pavement within the superelevation transition of such curves.
2. Pavement with a total thickness of 0.20-foot or less, or pavement with extensive grade correction which does not receive advance leveling operations as specified in Section 39-6.02, "Spreading," of the Standard Specifications.
3. Pavement for ramps and connectors with grades 8 percent or steeper and superelevation rates greater than 10 percent and short sections of city or county streets and roads.
4. Pavement within 50 feet of a transverse joint that separates the pavement from an existing pavement not constructed under the contract.
5. All shoulders and miscellaneous areas.

The top surface of the uppermost layer of asphalt concrete surfacing that does not meet all specified surface tolerances shall be brought within tolerance by abrasive grinding. Areas which have been abrasive ground shall receive a fog seal coat. Deviations in excess of 0.3-inch which cannot be brought into specified surface tolerances by abrasive grinding shall be corrected by either (1) removal and replacement or, (2) placing an overlay of asphalt concrete. The corrective method for each area shall be selected by the Contractor and shall be as approved by the Engineer prior to beginning the corrective work. Any replacement or overlay pavement not meeting specified tolerances shall be corrected by the methods specified above. All corrective work shall be at the Contractor's expense except that flagging costs will be paid for as provided in Section 12-2, "Flagging," of the Standard Specifications.

After abrasive grinding has been completed to reduce individual deviations in excess of 0.3-inch, additional grinding or corrections to the surface as specified above shall be performed as necessary to reduce the profile of the pavement to the specified profile value required for the area. The Contractor shall run profilograms of such areas that have received abrasive grinding or corrective work until the final profilograms indicate the profile of the area is within the specified tolerance.

When abrasive grinding is used to bring the top surface of the uppermost layer of asphalt concrete surfacing within specified surface tolerances, additional abrasive grinding shall be performed as necessary to extend the area ground in each lateral direction so that the lateral limits of grinding are at a constant offset from, and parallel to the nearest lane line or pavement edge, and in each longitudinal direction so that the grinding begins and ends at lines normal to the pavement centerline, within any ground area. All ground areas shall be neat rectangular areas of uniform surface appearance.

Abrasive grinding shall conform to the requirements in the first paragraph and the last 4 paragraphs in Section 42-2.02, "Construction," of the Standard Specifications, except that the grinding residue shall be disposed of outside the highway right of way.

The original of final profilograms that indicate the pavement surface is within the profile specified shall become the property of the State and shall be delivered to the Engineer prior to acceptance of the contract.

Full compensation for performing all profile checks for profile and furnishing final profilograms to the Engineer, for performing all corrective work to the pavement surface including abrasive grinding, removing and replacing asphalt concrete or placing asphalt concrete overlay to bring the surface within the tolerance specified shall be considered as included in the contract price paid per ton for asphalt concrete and no separate payment will be made therefor.

The area to which paint binder has been applied shall be closed to public traffic. Care shall be taken to avoid tracking binder material onto existing pavement surfaces beyond the limits of construction.

A drop-off of more than 0.15-foot will not be allowed at any time between adjacent lanes open to public traffic.

Where the existing pavement is to be widened by constructing a new structural section adjacent to the existing pavement, the new structural section shall be completed to match the elevation of the edge of the existing pavement at each location prior to spreading and compacting asphalt concrete over the adjacent existing pavement.

Shoulders or median borders adjacent to a lane being paved shall be surfaced prior to opening the lane to traffic.

The aggregate from each separate bin used for asphalt concrete and asphalt concrete base, Type A, except for the bin containing the fine material, shall have a Cleanness Value of 57 minimum for "contract compliance" and a 65 minimum for "operating range" as determined by California Test 227, modified as follows:

Tests will be performed on the material retained on the No. 8 sieve from each bin and will not be a combined or averaged result.

Each test specimen will be prepared by hand shaking for 30 seconds, a single loading of the entire sample on a 12-inch diameter, No. 4 sieve, nested on top of a 12-inch diameter, No. 8 sieve.

Where a coarse aggregate bin contains material which will pass the maximum size specified and be retained on a 3/8 inch sieve, the test specimen weight and volume of wash water specified for 1" x No. 4 aggregate size will be used.

Samples will be obtained from the weigh box area during or immediately after discharge from each bin of the batching plant or immediately prior to mixing with asphalt in the case of continuous mixers.

The Cleanness Value of the test sample from each of the bins will be separately computed and reported.

At drier-drum and continuous plants with cold feed control, Cleanness Value test samples will be obtained from the discharge of each coarse aggregate storage. An aggregate sampling device shall be provided which will provide a 50-pound sample of each coarse aggregate.

If the results of the Cleanness Value tests do not meet the requirements specified for "operating range" but meet the "contract compliance" requirements, placement of the material may be continued for the remainder of that day. However, another day's work may not be started until tests, or other information, indicate to the satisfaction of the Engineer that the next material to be used in the work will comply with the requirements specified for "operating range."

If the results of the Cleanness Value tests do not meet the requirements specified for "contract compliance," the material which is represented by these tests shall be removed. However, if requested by the Contractor and approved by the Engineer, said material having a Cleanness Value of 48 or greater may remain in place and accepted on the basis of a reduced payment for all such material left in place.

Asphalt concrete or asphalt concrete base that is accepted on the basis of reduced payment will be paid for at the contract prices for the items of asphalt concrete involved multiplied by the following factors:

Test Value	Pay Factor
56	0.90
55	0.85
54	0.80
53	0.75
52	0.70
51	0.65
50	0.60
49	0.55
48	0.50

If asphalt concrete or asphalt concrete base is accepted on the basis of reduced payment due to a Cleanness Value of 48 to 56 and also accepted on the basis of aggregate grading or Sand Equivalent tests not meeting the "contract compliance" requirements, the reduced payment for Cleanness Value shall apply and payment by the Contractor to the State for asphalt concrete or asphalt concrete base not meeting the "contract compliance" requirements for aggregate grading or Sand Equivalent shall not apply.

10-1.46 CONCRETE PAVEMENT

Portland cement concrete pavement shall conform to the provisions in Section 40, "Portland Cement Concrete Pavement," of the Standard Specifications and these special provisions.

The concrete for pavement shall contain a minimum of 564 pounds of portland cement per cubic yard.

Tie bars shall be installed at longitudinal joints and transverse contact joints, as shown on the plans, except that when there are more than 2 longitudinal joints in the total width of pavement, tie bar installation shall be arranged, as determined by the Engineer, so that tie bars are not installed in more than 2 of 3 adjacent longitudinal joints. Tie bars shall be deformed reinforcing steel bars conforming to the specifications of ASTM Designation: A 615, Grade 40 or 60, ASTM Designation: A 616, Grade 50 or 60, or ASTM Designation: A 706 and shall be epoxy coated as specified in Section 52-1.02B, "Epoxy-coated Bar Reinforcement," of the Standard Specifications.

The joint detail for transverse and longitudinal joints, as shown on the plans, shall apply only to all weakened plane joints. All weakened plane joints shall be constructed by the sawing method. In addition to sawing weakened plane joints, secondary saw cuts shall be made along the transverse and longitudinal weakened plane joints to the width and depth shown on the plans to accommodate joint seal. The secondary saw cuts shall be made when the portland cement concrete pavement has cured a minimum of 3 days and the concrete has hardened sufficiently to prevent spalling and raveling during sawing operations and after any grinding of pavement surface in the area of the joint has been completed. Should grinding or grooving be required over or adjacent to any joint after silicone joint sealant has been placed, the joint materials shall be completely removed and replaced at the Contractor's expense.

In not less than 7 days after the placement of concrete pavement and not more than 4 hours before placing backer rods and joint sealant materials, the top one inch of the joint walls shall be cleaned by the dry sand blast method and other means as necessary to completely remove from the joint all objectionable material such as soil, asphalt, curing compound, paint and rust. After cleaning the joint, all traces of sand, dust and loose material shall be removed from and near the joint by the use of a vacuum device. Surface moisture shall be removed at the joints by means of compressed air or moderate hot compressed air or other means, approved by the Engineer. Drying procedures that leave a residue or film on the joint wall shall not be used.

Backer rod shall be installed as shown on the plans and shall be an expanded, closed-cell polyethylene foam that is compatible with the joint sealant so that no bond or adverse reaction occurs between the rod and sealant. Backer rod shall be installed when the temperature of the portland concrete pavement is above the dew point of the air and when the air temperature is 40° F. or above. Backer rod shall be installed when the joints to be sealed have been properly patched, cleaned and dried, as determined by the Engineer. Methods of placing backer rod which leave a residue or film on the joint walls shall not be used.

Immediately after placement of the backer rod, low modulus silicone joint sealant shall be placed in the clean, dry, prepared joints as shown on the plans. The silicone sealant shall be applied by a mechanical device with a nozzle shaped to fit inside the joint to introduce the sealant from inside the joint. Adequate pressure shall be applied to the sealant to ensure that the sealant material is extruded evenly and that full continuous contact is made with the joint walls. After application of the sealant the surface of the sealant shall be recessed as shown on the plans.

Any failure of the joint material in either adhesion or cohesion of the material will be cause for rejection of the joint. The finished surface of silicone joint sealant shall conform to the dimensions and allowable tolerances shown on the plans. Rejected joint materials or joint material whose finished surface do not conform to the dimensions shown on the plans, as determined by the Engineer, shall be repaired or replaced, at the Contractor's expense, with joint material that conforms to the requirements.

Low modulus silicone joint sealant shall be furnished in a one part silicone formulation. Acid cure sealants shall not be used. The compound shall be compatible with the surface to which it is applied and shall conform to the following requirements:

Specification	Test Method	Requirement
Tensile stress, 150% elongation, 7-day cure at 77° ± 3° F. and 45% to 55% R.H. ^e	ASTM D 412 (Die C)	45 psi max.
Flow at 77° ± 3° F.	ASTM C 639a	shall not flow from channel
Extrusion Rate at 77° ± 3° F.	ASTM C 603b	75-250 gms/min.
Specific Gravity	ASTM D 792 Method A	1.01 to 1.51
Durometer Hardness, at 0° F., Shore A, cured 7 days at 77° ± 3° F.	ASTM C 661	10 to 25
Ozone and Ultraviolet Resistance, after 5,000 hrs.	ASTM C 793	No chalking, cracking or bond loss
Tack free at 77° ± 3° F. and 45% to 55% R.H. ^e	ASTM C 679	less than 75 minutes
Elongation, 7 day cure at 77° ± 3° F. and 45% to 55% R.H. ^e	ASTM D 412 (Die C)	500 percent min.
Set to touch, at 77° ± 3° F. and 45% to 55% R.H. ^e	ASTM D 1640	less than 75 minutes
Shelf Life, from date of shipment	—	6 months min.
Bond, to concrete mortar-concrete briquets, air cured 7 days at 77° ± 3° F.	AASHTO T 132 ^c	50 psi min.
Movement capability and adhesion. 100 percent extension at 0° F. after, air cured 7 days at 77° ± 3° F., and followed by 7 days in water at 77° ± 3° F.	ASTM C 719d	No adhesive or cohesive failure after 5 cycles

Notes:

- a ASTM C 639 Modified (15 percent slope channel A).
- b ASTM C 603, through 1/8 inch opening at 50 psi.
- c Mold briquets in accordance with AASHTO Designation: T 132, sawed in half and bonded with a 1/16 inch maximum thickness of sealant and tested in accordance with AASHTO Designation: T 132. Briquets shall be dried to constant weight at $100 \pm 5^\circ$ C.
- d Movement Capability and Adhesion: Prepare 1' x 1" x 3" concrete blocks in accordance with ASTM Designation: C 719. A sawed face shall be used for bond surface. Seal 2 inches of block leaving 1/2 inch on each end of specimen unsealed. The depth of sealant shall be 3/8 inch and the width 1/2 inch.
- e R.H. equals relative humidity.

The silicone joint sealant shall be formulated to cure rapidly enough to prevent flow after application on grades of up to 15 percent.

A Certificate of Compliance shall be furnished to the Engineer in accordance with the provisions of Section 6-1.07, "Certificates of Compliance," of the Standard Specifications. Said certificate shall also be accompanied with a certified test report of the results of the required tests performed on the sealant material within the previous 12 months prior to proposed use. Said certificate and accompanying test report shall be provided for each lot of silicone joint sealant prior to use on the project.

After each joint is sealed, all surplus joint sealer on the pavement surface shall be removed. Traffic will not be permitted over the sealed joints until the sealant is track free and set sufficiently to prevent embedment of roadway debris into the sealant.

Sealing longitudinal and transverse weaken plane joints in portland cement concrete pavement will be measured by the linear foot.

The contract price paid per linear foot for seal pavement joint shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in sealing pavement joints complete in place, including sawing and preparing the joints in the concrete pavement, furnishing and installing backer rod, repairing and patching spalled or raveled sawed joints, and replacing or repairing rejected joints, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Full compensation for furnishing and placing epoxy-coated tie bars in portland cement concrete pavement shall be considered as included in the contract price paid per cubic yard for concrete pavement and no separate payment will be made therefor.

10-1.47 PILING

Piling shall conform to the provisions in Section 49, "Piling," of the Standard Specifications, and these special provisions.

Foundation recommendations are included in the "Information Handout" available to the Contractor as provided for in Section 2-1.03, "Examination of Plans, Specifications, Contract, and Site of Work," of the Standard Specifications.

Attention is directed to "Welding Quality Control" of these special provisions.

Attention is directed to "Public Safety," of these special provisions. Before performing any pile handling or pile installation operation at any location that is closer than the length of the pile being handled or installed to the edge of any area open to public traffic or public use, the Contractor shall submit to the Engineer, as provided in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications, a detail plan of the measures that will be employed to provide for the safety of traffic and the public.

The second paragraph in Section 49-1.03, "Determination of Length," of the Standard Specifications is amended to read:

At the Contractor's option, the Contractor may conduct additional foundation investigation, including installing and axial load testing additional non-production indicator piling. The Engineer shall approve locations of additional foundation testing. The Contractor shall notify the Engineer at least 5 working days prior to beginning additional foundation investigation.

Additional foundation investigation shall be completed prior to requesting revised specified pile tip elevations or modification to the installation methods specified herein. Revisions to specified tip elevations and modifications to the specified installation methods will be subject to the provisions of Section 5-1.14, "Cost Reduction Incentive."

Modification to the specified installation methods and specified pile tip elevation will not be considered at locations where lateral load demands control design pile tip elevations or when the plans state that specified pile tip elevation shall not be revised.

The pile structural capacity design is based on the nominal strength as defined in Caltrans Bridge Design Specifications (Article 8.1.3) or the nominal resistance as defined in the LRFD Bridge Design Specifications (Article 1.3.2.1). The nominal resistance of the pile, as shown on the plans, is the design capacity required to resist the factored axial load demands.

Indicator compression pile load testing shall conform to the requirements of ASTM Designation: D 1143. The acceptance criteria for compression pile load testing shall be as follows:

The pile shall sustain the first compression test load applied which is equal to the nominal compression resistance, as shown on the plans, with no more than 0.5 inch total vertical movement at the top of the pile measured relative to the top of the pile prior to the start of compression load testing.

Indicator tension pile load testing shall conform to the requirements of ASTM Designation: D 3689. The loading apparatus described as "Load Applied to Pile by Hydraulic Jack(s) Acting at One End of Test Beam(s) Anchored to the Pile" shall not be used. The acceptance criteria for tension pile load testing shall be as follows:

The pile shall sustain the first tension test load applied which is equal to the nominal tension resistance, as shown on the plans, with no more than 0.5 inch total vertical movement at the top of the pile measured relative to the top of the pile prior to the start of tension load testing.

Indicator piling shall be removed in conformance with the requirements in Section 15-4.02, "Removal Methods," and the remaining holes shall be backfilled with earth or other suitable material approved by the Engineer.

For driven piling, the Contractor shall furnish piling of sufficient length to obtain both the specified tip elevation and design load shown on the plans or specified in the special provisions. For cast-in-drilled-hole concrete piling, the Contractor shall construct piling of such length to develop the compression nominal resistance and to obtain the specified tip elevation shown on the plans or specified in the special provisions.

The fifth paragraph in Section 49-1.04, "Load Test Piles," of the Standard Specifications is amended to read:

Load test anchorages in piles used as anchor piles shall conform to the following requirements:

High strength threaded steel rods shall conform to the provisions for bars in Section 50-1.05, "Prestressing Steel," except Type II bars shall be used.

High strength steel plates shall conform to the requirements in ASTM Designation: A 709, Grade 50.

Anchor nuts shall conform to the provisions in the second paragraph in Section 50-1.06, "Anchorages and Distribution."

The eighth, ninth and tenth paragraphs in Section 49-1.04, "Load Test Piles," of the Standard Specifications are amended to read:

Should the Engineer fail to complete the load tests within the time specified in the special provisions and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in load testing of piles, the delay will be considered a right of way delay as specified in Section 8-1.09, "Right of Way Delays."

The Contractor shall furnish labor, materials, tools, equipment, and incidentals as required to assist the Engineer in the installation, operation and removal of State-furnished steel load test beams, State-furnished jacks, bearing plates, drills, and other test equipment. This work will be paid for as extra work as provided in Section 4-1.03D.

The first and second paragraphs in Section 49-1.05, "Driving Equipment," of the Standard Specifications are amended to read:

49-1.05 Driving Equipment.—Driven piles shall be installed with impact hammers that are approved in writing by the Engineer. Impact hammers shall be steam, hydraulic, air, or diesel hammers. Impact hammers shall develop sufficient energy to drive the piles at a penetration rate of not less than 1/8 inch per blow at the specified bearing value.

Vibratory hammers shall not be used for installation of piles, unless otherwise shown on the plans or specified in the special provisions.

Hammers with an external combustion engine that are not single action, shall have a transducer that records ram velocity.

Double acting diesel hammers with internal combustion engines shall have a transducer that records bounce chamber pressure.

For hammers with no visual way of observing the ram stroke, a printed readout showing hammer energy during driving operation shall be provided to the Engineer by the Contractor.

The fifth paragraph in Section 49-1.05, "Driving Equipment," of the Standard Specifications is deleted.

Concrete for cast-in-drilled-hole concrete piles shall conform to the provisions in Section 90-10, "Minor Concrete," of the Standard Specifications. Reinforcing bars shall conform to the requirements in ASTM Designation: A 706/A706M and these special provisions.

The third paragraph in Section 49-4.04, "Steel Shells," of the Standard Specifications is amended to read:

Steel shells shall conform to the provisions for steel pipe piles specified in Section 49-5, "Steel Piles."

Section 49-5.01, "Description," of the Standard Specifications is amended to read:

49-5.01 Description.—Steel piles shall include structural shape piles and pipe piles. Structural shape steel piles shall be of the rolled section shown on the plans or of the section specified in the special provisions and shall be structural steel conforming to the specifications of ASTM Designation: A 36/A 36M, or at the option of the Contractor, structural steel conforming to the specifications of ASTM Designation: A 572/A 572M.

Steel pipe piling shall conform to the following requirements:

1. Piles shall be of the nominal diameter and the nominal wall thickness as the pipe piles shown on the plans unless otherwise specified in the special provisions.
2. The carbon equivalency (CE) as defined in AWS D 1.1, Section XI5.1, shall not exceed 0.45.
3. The sulfur content shall not exceed 0.05 percent.
4. Piles shall conform to any additional requirements in the special provisions, including but not limited to, tolerances for diameter, edge alignment, end match marking, roundness, and straightness, that are required in order to conform with steel pile splice welding and welding inspection provisions.
5. Steel pipe pile seams shall be complete penetration welds and shall conform to the requirements of AWS D1.1 and any additional amendments to AWS D1.1 listed herein and in the special provisions. Incomplete penetration welds and defective welds of steel pipe piles shall be repaired or restored to achieve complete joint penetration groove work.
6. Steel pipe piles that are less than 14 inches in diameter shall conform to the specifications of ASTM Designation: A 252, Grade 2 or 3, and steel pipe piles that are 14 inches and greater in diameter shall conform to the specifications of ASTM Designation: A 252, Grade 3, as amended by the above requirements.

Steel piles shall not be joined by welded lap splicing.

The manufacturer or fabricator of steel piling shall furnish a Certificate of Compliance stating that the piling being supplied conforms to these specifications and to the special provisions. The Certificate of Compliance shall include test reports for tensile, chemical, and any specified nondestructive tests. Samples for testing shall be taken from the base metal, steel, coil or from the manufactured or fabricated piling.

Section 49-5.02, "Splicing," of the Standard Specifications is amended to read:

49-5.02 Splicing.—Steel pile splices shall conform to the requirements of AWS D 1.1 and the special provisions. Structural shape steel piling splices shall be complete joint penetration groove welds. Steel pipe pile splices that are made at a permanent manufacture or fabrication facility, and that are made prior to furnishing the Certificate of Compliance shall be complete penetration welds. Steel pipe pile splices that are made in the field shall be complete joint penetration groove welds.

Ends of steel pipe piling to be spliced that have been damaged during driving shall be removed to a sound and uniform section conforming to the tolerances for diameter, edge alignment and roundness required to meet the steel pile splice welding requirements. Pipe ends shall be field cut using automated guided cutting equipment. Manual flame cutting shall not be used.

10-1.48 PRESTRESSING CONCRETE

Prestressing concrete shall conform to the provisions in Section 50, "Prestressing Concrete," of the Standard Specifications and these special provisions.

The Contractor shall submit to the Office of Structure Design (OSD) for approval in accordance with the provisions in Section 5-1.02, "Plans and Working Drawings," working drawings of the prestressing system proposed for use. For initial review, 8 sets of the drawings shall be submitted for bridges and 6 sets shall be submitted for other structures. After review, between 6 and 12 sets, as requested by the Engineer, shall be submitted to OSD for final approval and for use during construction.

The sixth paragraph in Section 50-1.02, "Drawings," of the Standard Specifications is amended to read:

At the completion of each structure on the contract, one set of reduced prints on 60 pound (minimum) bond paper, 11 inches by 17 inches in size, of the corrected original tracings of all working drawings for each structure shall be furnished to the Engineer. Reduced prints of drawings which are common to more than one structure shall be submitted for each structure. An index prepared specifically for the drawings for each structure containing sheet numbers and titles shall be included on the first reduced print in the set for each structure. Reduced prints for each structure shall be arranged in the order of drawing numbers shown in the index.

The seventh paragraph in Section 50-1.02, "Drawings," of the Standard Specifications is amended to read:

The edge of the corrected original tracing image shall be clearly visible and visually parallel with the edges of the page. A clear, legible symbol shall be provided as near to the upper left side of each page as is feasible within the original print to show the amount of reduction and a horizontal and vertical scale shall be provided on each reduced print to facilitate enlargement to original scale.

The eighth paragraph in Section 50-1.02, "Drawings," of the Standard Specifications is amended to read:

For bridges, in addition to the reduced prints of the working drawings, the Contractor shall furnish to the Engineer one set of working drawings consisting of either ink tracings on cloth, ink tracings on polyester base drafting film, silver sensitized cloth duplicate tracings, or silver sensitized polyester based reproduction films with matte surface on both sides.

The second paragraph in Section 50-1.08, "Prestressing," of the Standard Specifications is amended to read:

The maximum temporary tensile stress (jacking stress) in prestressing steel shall not exceed 75 percent of the specified minimum ultimate tensile strength of the prestressing steel. Pretensioned prestressing steel shall be anchored at stresses that will result in the ultimate retention of working forces at not less than those shown on the plans, but in no case shall the stress at anchorages after seating exceed 70 percent for normal relaxation strand, or 75 percent for low relaxation strand, of the specified minimum ultimate tensile strength of the prestressing steel.

The seventh paragraph in Section 50-1.08, "Prestressing," of the Standard Specifications is amended to read:

Each jack used to stress tendons shall be equipped, with either: (1) two pressure gages or (2) one pressure gage and a load cell, at the option of the Contractor. The jack body shall be permanently marked with the ram area. Each pressure gage shall be fully functional and have an accurately reading dial at least 6 inches in diameter. The jack and each gage shall be calibrated as a unit with the cylinder extension in the approximate position that it will be at final jacking force. The load cell, if used, shall be calibrated and shall be provided with an indicator which may be used to determine the prestressing force in the tendon. The range of the load cell shall be such that the lower 10 percent of the manufacturer's rated capacity will not be used in determining the jacking stress. The jacking equipment calibration procedure shall be as follows:

Each jack used to stress tendons, which are permanently anchored at 25 percent or more of the specified minimum ultimate tensile strength of the prestressing steel, shall be calibrated by the Transportation Laboratory within one year prior to use and after each repair, unless otherwise directed. The Contractor shall be responsible for:

- 1) scheduling of calibration of the jacking equipment with the Transportation Laboratory, telephone (916) 227-7251;
- 2) verifying that the jack and supporting systems are complete, with proper components, and are in good operating conditions;

- 3) mechanically calibrating the gages with a dead weight tester or other approved means prior to calibration of the jacking equipment by the Transportation Laboratory,
- 4) providing sufficient labor, equipment, and material to install and support the jacking -and calibration equipment -and to remove the equipment after the calibration is complete, and;
- 5) plotting the calibration results.

Each jack used to stress tendons permanently anchored at less than 25 percent of the specified minimum ultimate tensile strength of the prestressing steel, shall be calibrated by a private laboratory approved by the Transportation Laboratory within 6 months prior to use and after each repair, unless otherwise directed.

The fourth paragraph in Section 50-1.11 "Payment," of the Standard Specifications is amended to read:

Full compensation for furnishing and placing additional concrete and deformed bar reinforcing steel required by the particular system used, ducts, anchoring devices, distribution plates or assemblies and incidental parts, for furnishing samples for testing, for calibration of jacking equipment done by a private laboratory, and for pressure grouting ducts shall be considered as included in the contract lump sum price paid for prestressing cast-in-place concrete or in the contract price for furnish precast members, and no additional compensation will be allowed therefor.

The details shown on the plans for cast-in-place prestressed box girder bridges are based on a bonded full length draped tendon prestressing system. For these bridges the Contractor may, in accordance with the provisions of Section 5-1.14, "Cost Reduction Incentive," of the Standard Specifications, propose an alternative prestressing system utilizing bonded partial length tendons providing the proposed system and associated details meet the following requirements:

The proposed system and details must provide moment and shear resistances at least equal to those used for the design of the structure shown on the plans.

The concrete strength shall not be less than that shown on the plans.

Not less than 35 percent of the total prestressing force at any section shall be provided by full length draped tendons.

Anchorage blocks for partial length tendons shall be located so that they will not interfere with the placement of any utility facilities shown on the plans or of any future utilities to be placed through openings shown on the plans.

Temporary prestressing tendons, if used, shall be detensioned and any temporary ducts shall be filled with grout before completion of the work. Temporary tendons shall be either removed or fully encased in grout before completion of the work.

All details of the proposed system, including supporting checked calculations, shall be included in the drawings submitted in accordance with Section 50-1.02, "Drawings," of the Standard Specifications.

Moments and shears for loads used in the design shown on the plans will be made available to the Contractor upon written request to the Engineer.

10-1.49 CONCRETE STRUCTURES

Portland cement concrete structures shall conform to the provisions in Section 51, "Concrete Structures," of the Standard Specifications and these special provisions.

Shotcrete shall not be used as an alternative construction method for reinforced concrete members unless otherwise specified.

The first sentence of the tenth paragraph in Section 51-1.05, "Forms," of the Standard Specifications is amended to read:

Form panels for exposed surfaces shall be plywood conforming to or exceeding the requirements of U.S. Product Standard PS 1 for Exterior B-B (Concrete Form) Class I Plywood or any material which will produce a smooth uniform concrete surface substantially equal to that which would result from the use of that plywood.

The second paragraph in Section 51-1.22, "Measurement," of the Standards Specifications is amended to read:

The estimated quantity of concrete for minor structures designated as final pay in the Engineer's Estimate will not be revised as specified in Section 9-1.015, "Final Pay Items," of the Standard Specifications, when the constructed height of said minor structure, including revisions by the Engineer, is within 0.5-foot of the vertical dimension shown on the plans.

The third paragraph in Section 51-1.15, "Drains in Walls, of the Standard Specifications is amended to read:

In addition to the drain holes and weep holes specified in the preceding paragraph, holes approximately 3 inches in diameter for relief of hydrostatic pressure shall be provided at the bottom of walls, immediately above the footing, at approximately 15 feet centers.

When a roughened concrete surface is shown on the plans, the existing concrete surface shall be roughened to a full amplitude of approximately 1/4-inch by abrasive blasting, water blasting or mechanical equipment.

Neoprene strip shall be furnished and installed at abutment backwall joint protection in accordance with the details shown on the plans, the provisions in the Standard Specifications, and these special provisions.

Furnishing and installation of neoprene strip shall conform to the requirements for strip waterstops as provided in Section 51-1.145, "Strip Waterstops," of the Standard Specifications, except that protective board will not be required.

Materials for access opening covers in soffits of new cast-in-place concrete box girder bridges shall conform to the provisions for materials in Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications.

Plastic pipe located at vertical drains used behind retaining walls including horizontal or sloping drains down slopes shall be polyvinyl chloride (PVC) plastic pipe, Schedule 80, conforming to the provisions for pipe for edge drains and edge drain outlets in Section 68-3.02, "Materials," of the Standard Specifications. The vertical drain pipe shall be rigidly supported in place during backfilling operations.

Vertical, horizontal, radial or normal dimensions shown on the Typical Section in the plans, are for zero percent cross-slope. At the Contractor's option, the Typical Section of superelevated concrete box girder structures with (1) sloping exterior girders, (2) a straight uninterrupted cross slope between edges of deck, and (3) a single profile grade line, may be rotated around the profile grade line in superelevation areas. The horizontal distances between the profile grade line and the edges of deck shall remain unchanged. The planned girder widths and slab thicknesses shall remain unchanged, and the interior girder stems shall remain vertical at the planned locations.

FALSEWORK.--Falsework shall be designed and constructed in conformance with the requirements in Section 51-1.06, "Falsework," of the Standard Specifications and these special provisions.

Section 51-1.06A, "Falsework Design and Drawings," of the Standard Specifications is amended by adding the following after the first paragraph:

The falsework drawings shall include details of the falsework removal operations showing the methods and sequences of removal and equipment to be used.

The seventeenth paragraph of Section 51-1.06A is amended to read:

Temporary bracing shall be provided, as necessary, to withstand all imposed loads during erection, construction and removal of any falsework. The falsework drawings shall show provisions for such temporary bracing or methods to be used to conform to this requirement during each phase of erection and removal. Wind loads shall be included in the design of such bracing or methods.

The fifth paragraph of Section 51-1.06A(1), "Design Loads," of the Standard Specifications is amended to read:

The minimum horizontal load to be allowed for wind on heavy-duty steel shoring or steel pipe column falsework having a vertical load carrying capacity exceeding 30 kips per leg or column shall be the sum of the products of the wind impact area, shape factor, and the applicable wind pressure value for each height zone. The wind impact area is the total projected area of all the elements in the tower face or falsework bent normal to the direction of the applied wind. The shape factor shall be taken as 2.2 for heavy-duty shoring and 1.0 for pipe column falsework. Wind pressure values shall be determined from the following table:

Height Zone (Feet above ground)	Wind Pressure Value	
	Shores or Columns Adjacent to Traffic	At Other Locations
0 to 30	20 psf	15 psf
30 to 50	25 psf	20 psf
50 to 100	30 psf	25 psf
Over 100	35 psf	30 psf

The first 2 sentences of the sixth paragraph of Section 51-1.06A(1), "Design Loads," of the Standard Specifications are amended to read:

The minimum horizontal load to be allowed for wind on all other types of falsework, including falsework supported on heavy-duty shoring or pipe column falsework, shall be the sum of the products of the wind impact area and the applicable wind pressure value for each height zone. The wind impact area is the gross projected area of the falsework and any unrestrained portion of the permanent structure, excluding the areas between falsework bents or towers where diagonal bracing is not used.

The second entry under "Timber" in the second paragraph of Section 51-1.06A(2), "Design Stresses, Loadings, and Deflections," of the Standard Specifications is amended to read:

Compression parallel to the grain $\frac{480,000}{(L/d)^2}$ psi, but not to exceed 1,600 psi.

The last paragraph under "Timber" in the second paragraph of Section 51-1.06A(2), "Design Stresses, Loadings, and Deflections," of the Standard Specifications is amended to read:

Timber connections shall be designed in conformance with the procedures, stresses and loads permitted in the Falsework Manual as published by the Department of Transportation, Division of Structures, Office of Structure Construction.

The third paragraph of Section 51-1.06B "Falsework Construction" of the Standard Specifications is amended to read:

When falsework is supported on piles, the piles shall be driven and the actual bearing value assessed as specified in Section 49, "Piling."

For falsework piles with a calculated loading capacity greater than 100 tons, the contractor shall conduct dynamic monitoring of pile driving and conduct penetration and bearing analyses based on a wave equation analysis. Said analysis shall be signed by an Engineer who is registered as a Civil Engineer in the State of California and submitted to the Engineer prior to completion of falsework erection.

The first paragraph of Section 51-1.06C, "Removing Falsework," of the Standard Specifications is amended to read:

Falsework supporting any span of a simple span bridge shall not be released before 10 days after the last concrete, excluding concrete above the bridge deck, has been placed. Unless otherwise permitted by the Engineer, falsework supporting any span of a continuous or rigid frame bridge shall not be released before 10 days after the last concrete, excluding concrete above the bridge deck, has been placed in that span and in the adjacent portions of each adjoining span for a length equal to at least 1/2 the length of the span where falsework is to be released.

Section 51-1.06C, "Removing Falsework," of the Standard Specifications is amended by adding the following after the seventh paragraph:

Unless otherwise specified, removing falsework supporting any span of structural members subject to bending, shall conform to the requirements for removing falsework supporting any span of a simple span bridge.

SLIDING BEARINGS.--Sliding bearings consisting of elastomeric bearing pads lubricated with grease and covered with sheet metal shall conform to the following requirements:

Grease shall conform to the requirements of Military Specification: MIL-S-8660. A uniform film of grease shall be applied to the upper surface of the pads prior to placing the sheet metal.

Sheet metal shall be commercial quality galvanized sheet steel. The sheet metal shall be smooth and free of kinks, bends, or burrs.

Construction methods and procedures shall prevent grout or concrete seepage into the sliding bearing assembly.

ELASTOMERIC BEARING PADS.--Elastomeric bearing pads shall conform to the provisions in Section 51-1.12H, "Elastomeric Bearing Pads," of the Standard Specifications and these special provisions.

The fifth paragraph of Section 51-1.12H(1), "Plain and Fabric Reinforced Elastomeric Bearings," of the Standard Specifications is amended to read:

The peel strength test will be performed after immersing the sample in water for a minimum of 10 days. The bond between elastomer and fabric shall be such that when a sample is tested for separation, it shall have a minimum peel strength of 30 pounds per inch when tested in accordance with California Test 663.

The last 2 sentences of the tenth paragraph of Section 51-1.12H(1), "Plain and Fabric Reinforced Elastomeric Bearings," of the Standard Specifications are amended to read:

Pads shall be available for sampling at least 4 weeks in advance of intended use. All sample pads for testing shall be furnished by the Contractor at his expense.

The fifth subparagraph of the first paragraph of Section 51-1.12H(2), "Steel Reinforced Elastomeric Bearings," of the Standard Specifications is amended to read:

One sample bearing shall be furnished to the Engineer from each lot of bearings to be furnished for the contract. Samples shall be available at least 3 weeks in advance of intended use. The sample bearing shall be one of the following:

Bearing pad thickness as shown on the plans	Sample bearing
2 inches or less	Smallest complete bearing shown on the plans.
Greater than 2 inches	* 2.25±0.125 inch thick sample not less than 8 inches by 12 inches in plan and cut by the manufacturer from the center of one of the thickest complete bearings.

* The sample bearing plus remnant parts of the complete bearing shall be furnished to the Engineer.

MEASUREMENT AND PAYMENT.--Measurement and payment for concrete in structures shall conform to the provisions in Sections 51-1.22, "Measurement," and 51-1.23, "Payment," of the Standard Specifications and these special provisions.

Full compensation for roughening existing concrete surfaces to a full amplitude of approximately 1/4-inch, where shown on the plans, shall be considered as included in the contract price paid per cubic yard for structural concrete, bridge and no separate payment will be made therefor.

The seventh paragraph of Section 51-1.22, "Measurement," of the Standard Specifications is deleted.

The thirteenth paragraph of Section 51-1.23, "Payment," of the Standard Specifications is amended to read:

Full compensation for waterstops, strip waterstops, and neoprene strip shall be considered as included in the contract price paid per cubic yard for the various items of concrete work involved and no separate payment will be made therefor.

Full compensation for furnishing and installing access opening covers in soffits of new cast-in-place box girder bridges shall be considered as included in the contract price paid per cubic yard for structural concrete, bridge and no separate payment will be made therefor.

Full compensation for furnishing and installing plastic pipe located at vertical drains used behind retaining walls including horizontal or sloping drains down slopes, including excavation and backfill involved in placing the plastic pipe, shall be considered as included in the contract price paid per cubic yard for the various items of concrete work and no separate payment will be made therefor.

10-1.50 STRUCTURE APPROACH SLABS (Type N) and (Type EQ)

This work shall consist of constructing reinforced concrete approach slabs, structure approach drainage system and treated permeable base at structure approaches in accordance with the details shown on the plans, the provisions in Section 51, "Concrete Structures," of the Standard Specifications and these special provisions.

GENERAL.--Attention is directed to the section, "Engineering Fabrics," of these special provisions.

STRUCTURE APPROACH DRAINAGE SYSTEM.--The structure approach drainage system shall consist of the following:

GEOCOMPOSITE DRAIN.--Geocomposite drain shall consist of a manufactured core not less than 0.25-inch thick nor more than 2 inches thick with one or both sides covered with a layer of filter fabric that will provide a drainage void. The drain shall produce a flow rate, through the drainage void, of at least 2.0 gallons per minute per foot width at a hydraulic gradient of 1.0 and a minimum externally applied pressure of 3,500 pounds per square foot.

A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications shall be furnished for the geocomposite drain certifying that the drain produces the required flow rate and complies with these special provisions. The Certificate of Compliance shall be accompanied by a flow capability graph for the geocomposite drain showing flow rates and the externally applied pressures and hydraulic gradients. The flow capability graph shall be stamped with the verification of an independent testing laboratory.

Filter fabric for the geocomposite drain shall conform to the provisions for fabric for underdrains in Section 88, "Engineering Fabrics," of the Standard Specifications.

The manufactured core shall be either a preformed grid of embossed plastic, a mat of random shapes of plastic fibers, a drainage net consisting of a uniform pattern of polymeric strands forming 2 sets of continuous flow channels, or a system of plastic pillars and interconnections forming a semirigid mat.

The core material and filter fabric shall be capable of maintaining the drainage void for the entire height of geocomposite drain. Filter fabric shall be integrally bonded to the side of the core material with the drainage void. Core material manufactured from impermeable plastic sheeting having nonconnecting corrugations shall be placed with the corrugations approximately perpendicular to the drainage collection system.

The geocomposite drain shall be installed with the drainage void and the filter fabric facing the embankment. The fabric facing the embankment side shall overlap a minimum of 3 inches at all joints and wrap around the exterior edges a minimum of 3 inches beyond the exterior edge. If additional fabric is needed to provide overlap at joints and wrap-around at edges, the added fabric shall overlap the fabric on the geocomposite drain at least 6 inches and be attached thereto.

Should the fabric on the geocomposite drain be torn or punctured, the damaged section shall be replaced completely or repaired by placing a piece of fabric that is large enough to cover the damaged area and provide a 6-inch overlap.

PLASTIC PIPE.--Plastic pipe shall conform to the provisions for pipe for edge drains and edge drain outlets in Section 68-3, "Edge Drains," of the Standard Specifications.

DRAINAGE PADS.--Concrete for use in drainage pads shall conform to the provisions in Section 90-10, "Minor Concrete," of the Standard Specifications, except the concrete shall contain not less than 470 pounds of cement per cubic yard.

TREATED PERMEABLE BASE AT BOTTOM OF GEOCOMPOSITE DRAINS.--Treated permeable base to be placed around slotted plastic pipe at the bottom of geocomposite drains shall conform to the provisions in "Treated Permeable Base Under Approach Slabs." If asphalt treated permeable base is used, it shall be placed at a temperature of not less than 180° F. nor more than 230° F.

The filter fabric to be placed over the treated permeable base at the bottom of geocomposite drains shall conform to the provisions for filter fabric for edge drains in Section 88, "Engineering Fabrics," of the Standard Specifications.

ENGINEERING FABRICS.--Filter fabric to be placed between the structure approach embankment material and the treated permeable base shall conform to the provisions for filter fabric for edge drains in Section 88, "Engineering Fabrics," of the Standard Specifications and the following special provisions:

The subgrade to receive the filter fabric, immediately prior to placing, shall conform to the compaction and elevation tolerance specified for the material involved.

Filter fabric shall be aligned, handled and placed in a wrinkle-free manner in accordance with the manufacturer's recommendations.

Adjacent borders of the filter fabric shall be overlapped from 12 to 18 inches or stitched. The preceding roll shall overlap the following roll in the direction the material is being spread or shall be stitched. When the fabric is joined by stitching, it shall be stitched with yarn of a contrasting color. The size and composition of the yarn shall be as recommended by the fabric manufacturer. The stitches shall number 5 to 7 per inch of seam.

Equipment or vehicles shall not be operated or driven directly on the filter fabric.

TREATED PERMEABLE BASE UNDER APPROACH SLAB.--Treated permeable base under structure approach slabs shall consist of constructing either an asphalt treated permeable base or a cement treated permeable base in accordance with Section 29, "Treated Permeable Bases," of the Standard Specifications and the following special provisions:

The type of treatment, asphalt or cement, to be used shall be at the option of the Contractor.

Not less than 30 days prior to the start of placing treated permeable base the Contractor shall notify the Engineer, in writing, which type of treated permeable base will be furnished. Once the Contractor has notified the Engineer of his selection the Contractor will not be allowed to change the type to be furnished without a prior written request to do so and approval thereof in writing by the Engineer.

Asphalt treated permeable base shall be placed at a temperature of not less than 200° F. nor more than 250° F. Material stored in excess of 2 hours shall not be used in the work.

Asphalt treated permeable base material may be spread in one layer. It shall be compacted with a vibrating shoe type compactor or rolled with a roller weighing not less than 1 1/2 tons nor more than 5 tons. Rolling shall begin as soon as the mixture has cooled sufficiently to support the weight of the rolling equipment without undue displacement.

Cement treated permeable material may be spread in one layer. The material shall be compacted with either a vibrating shoe type compactor or with a steel-drum roller weighing not less than 1 1/2 tons nor more than 5-tons. Compaction shall follow within one-half hour after the spreading operation and shall consist of 2-complete coverages of the treated material.

APPROACH SLABS:

Concrete for use in approach slabs shall contain not less than 658 pounds of cement per cubic yard.

Miscellaneous steel parts shall conform to the provisions in Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications. Structure approach slabs shall be cured for not less than 5 days prior to opening to traffic, unless, at the option of the Contractor, the structure approach slabs are constructed using concrete with a non-chloride Type C chemical admixture conforming to these special provisions.

Portland cement for use in concrete using a non-chloride Type C chemical admixture shall be Type II Modified, Type II Prestress, or Type III. Type II Modified and Type III cement shall conform to the provisions in Section 90-2.01, "Portland Cement," of the Standard Specifications. Type II Prestress cement shall conform to the requirements of Type II Modified cement, except the mortar containing the portland cement to be used and Ottawa sand, when tested in accordance with California Test 527, shall not contract in air more than 0.053 percent.

The non-chloride Type C chemical admixture, approved by the Engineer, shall conform to the requirements of ASTM Designation: C 494 and Section 90-4, "Admixtures," of the Standard Specifications.

The concrete with non-chloride Type C chemical admixture shall be prequalified prior to placement in accordance with the provisions for prequalification of concrete specified by compressive strength in Section 90-9.01, "General," of the Standard Specifications and the following:

Immediately after fabrication of the 5 test cylinders, the cylinders shall be stored in a temperature medium of 70 ± 3 degrees F until the cylinders are tested.

The 6-hour average strength of the 5 test cylinders shall not be less than 850 psi. No more than 2 test cylinders shall have a strength of less than 800 psi.

Building paper shall be commercial quality No. 30 asphalt felt.

Polyvinyl chloride (PVC) conduit used to encase the abutment tie rod shall be of commercial quality.

The top surface of approach slabs shall be finished in conformance with the provisions in Section 51-1.17, "Finishing Bridge Decks," of the Standard Specifications. Edges of slabs shall be edger finished.

Approach slabs shall be cured with pigmented curing compound (1) in accordance with the provisions for curing structures in Section 90-7.01B, "Curing Compound Method," of the Standard Specifications.

Structure approach slabs constructed using concrete with a non-chloride Type C chemical admixture shall be cured for not less than 6 hours prior to opening to traffic. The curing period shall be considered to begin at the start of discharge of the last truck load of concrete to be used in the slab.

If the ambient temperature is below 65° F during the curing period for approach slabs using concrete with a non-chloride Type C chemical admixture, an insulating layer or blanket shall cover the surface. The insulation layer or blanket shall have an R-value rating given in the table below. At the Contractor's option, a heating tent may be used in lieu of or in combination with the insulating layer or blanket.

Temperature range during curing period	R-value, minimum
55° F. through 64° F.	1
45° F. through 54° F.	2
40° F. through 44° F.	3

JOINTS.--Hardboard and expanded polystyrene shall conform to the provisions in Section 51-1.12D, "Sheet Packing, Preformed Pads and Board Fillers," of the Standard Specifications.

Type AL joint seals shall conform to the provisions in Section 51-1.12F, "Sealed Joints" of the Standard Specifications. The sealant may be mixed by hand-held power-driven agitators and placed by hand methods.

The pourable seal between the steel angle and concrete barrier shall conform to the requirements for Type A and AL seals in Section 51-1.12F(3), "Materials and Installation," of the Standard Specifications. The sealant may be mixed by hand-held power-driven agitators and placed by hand methods. Immediately prior to placing the seal, the joint shall be thoroughly cleaned, including abrasive blast cleaning of the concrete surfaces, so that all foreign material and concrete spillage are removed from all joint surfaces. Joint surfaces shall be dry at the time the seal is placed.

MEASUREMENT AND PAYMENT.--Structural concrete, approach slab (Type N) and structural concrete, approach slab (Type EQ) will be measured and paid for in accordance with the provisions in Sections 51-1.22, "Measurement," and 51-1.23, "Payment," of the Standard Specifications and these special provisions.

Full compensation for the structure approach drainage system including geocomposite drain, plastic pipe, and drainage pads, treated permeable base, filter fabric, miscellaneous metal, and pourable seals, shall be considered as included in the contract price paid per cubic yard for structural concrete, approach slab of the type shown in the Engineer's Estimate and no additional compensation will be allowed therefor.

10-1.51 SOUND WALL

DESCRIPTION.--This work shall consist of constructing sound walls of masonry block. Sound walls shall be supported on piles, pile caps or footings as shown on the plans.

SOUND WALL (MASONRY BLOCK).--Sound wall (masonry block), consisting of a reinforced hollow unit masonry block stem, shall conform to the provisions in Sections 19, "Earthwork," 52, "Reinforcement," and 90, "Portland Cement Concrete," of the Standard Specifications and these special provisions.

Sound wall masonry unit stems shall be constructed with joints of portland cement mortar. Wall stems shall be constructed with hand laid block. Wall stems shall not be constructed with preassembled panels.

All loose material existing at the bottom of the hole after drilling operations have been completed shall be removed to the depth of pile shown on the plans before placing concrete in the hole.

Concrete for sound wall footings, pile caps and grade beams, if needed, shall conform to the provisions in Section 90-10, "Minor Concrete," of the Standard Specifications.

Reinforcing bars shall conform to ASTM Designation: A 706.

Concrete masonry units shall be hollow, load bearing, conforming to ASTM Designation: C 90, lightweight or medium weight classification, Type II. Standard or open end units may be used. Open end units, if used, shall not reduce the spacing of the bar reinforcement as shown on the plans.

Concrete cells in the 10" block shall be the same as the core cells in the 8" x 8" X 16" block.

The masonry units shall be nominal size and texture and of uniform color. The color shall be tan, color of the referee sample available for inspection by bidders at the District 11, Construction Liason Office (Duty Senior) 2829 Juan Street, San Diego, California Telephone (619) 688-6635.

When high strength concrete masonry units with $f_m=2500$ pounds per square inch are shown on the plans, the high strength masonry units shall have a minimum compressive strength of 3750 pounds per square inch based on net area. Each high strength concrete masonry unit shall be identified with a groove embedded in an interior corner. The groove shall extend from a mortar surface for a length of about 2 inches and shall have a depth of about 3/16 inch.

Expansion joint filler shall conform to ASTM Designation: D 1751 or ASTM Designation: D 2000 2AA-805.

Portland cement mortar shall be colored to match the units. Coloring shall be chemically inert, fade resistant mineral oxide or synthetic type.

Portland cement for wall stems shall conform to Section 90-2.01, "Portland Cement," of the Standard Specifications.

Hydrated lime shall conform to ASTM Designation: C 207, Type S.

Mortar sand shall be commercial quality.

Mortar for laying masonry units shall consist, by volume, of one part portland cement, 0 to 1/2 parts of hydrated lime, and 2 1/4 to 3 parts of mortar sand. Sufficient water shall be added to make a workable mortar. Each batch of mortar shall be accurately measured and thoroughly mixed. Mortar shall be freshly mixed as required. Mortar shall not be retempered more than one hour after mixing.

Prepackaged mortar materials and mortar containing admixtures may be used when approved in writing by the Engineer, provided the mortar shall not contain more than 0.05 percent soluble chlorides in accordance with California Test 422 or 0.25 percent soluble sulfates, as SO_4 , in accordance with California Test 417.

Prior to laying masonry units using prepackaged mortar materials or mortar containing admixtures, the Contractor shall submit to the Engineer his proposed sources of the materials together with test data from an independent testing laboratory for mortar tested in accordance with California Test 551. The test data shall be from specimens having a moist cure, except, the sample will not be immersed in lime water. The average 28-day compressive strength of the mortar shall be not less than 2,500 psi.

Aggregate for grout used to fill masonry units shall consist of fine aggregate and coarse aggregate conforming to the provisions in Section 90-2.02, "Aggregates," of the Standard Specifications. At least 20 percent of the aggregate shall be coarse aggregate. The Contractor shall determine the grading except that 100 percent of the combined grading shall pass the 1/2 inch sieve.

At the option of the Contractor, grout for filling masonry units may be proportioned either by volume or weight. Grout shall contain only enough water to cause it to flow and fill the voids without segregation. The maximum amount of free water shall not exceed 0.7 times the weight of the cement for regular strength masonry. The maximum amount of free water shall not exceed 0.6 times the weight of the cement for high strength masonry.

Grout proportioned by volume for regular strength masonry shall consist of at least one part portland cement and 4.5 parts aggregate. Grout proportioned by volume for high strength masonry shall consist of at least one part portland cement and 3.5 parts aggregate. Aggregate volumes shall be based on a loose, air-dry condition.

Grout proportioned by weight for regular strength masonry shall contain at least 564 pounds of portland cement per cubic yard. Grout proportioned by weight for high strength masonry shall contain at least 658 pounds of portland cement per cubic yard.

Construction of reinforced concrete masonry unit wall stems with portland cement mortar joints shall conform to the following:

Concrete masonry unit construction shall be true and plumb in the lateral direction and shall conform to the grade shown on the plans in the longitudinal direction. Bond beam units or recesses for horizontal reinforcement shall be provided.

Cells to be filled with grout shall be provided with cleanout openings at the bottoms of each grout lift that exceeds 5 feet in height. After cell inspection, the cleanouts shall be sealed before filling with grout.

Mortar joints shall be approximately 3/8 inch wide. Walls and cross webs forming cells to be filled with grout shall be full bedded in mortar to prevent leakage of grout. All head and bed joints shall be solidly filled with mortar for a distance in from the face of the wall or unit not less than the thickness of the longitudinal face shells. Head joints shall be shoved tight.

Mortared joints around cells to be filled shall be placed so as to preserve the unobstructed vertical continuity of the grout filling. Any overhanging mortar or other obstruction or debris shall be removed from the inside of such cells.

Reinforcement shall be securely held in position at top and bottom with either wire ties or spacing devices and at intervals not exceeding 192 bar diameters. Wire shall be 16-gage or heavier. Wooden, aluminum, or plastic spacing devices shall not be used.

Splices in vertical reinforcement will be allowed only where shown on the plans.

Only those cells containing reinforcement shall be filled solidly with grout. All grout in the cells shall be consolidated at the time of placement by vibrating and re-consolidated after excess moisture has been absorbed but before plasticity is lost. Slicing with a trowel is not acceptable.

If the total height of grout to be placed exceeds 6 feet the grout shall be placed in 4-foot maximum height lifts. The grout placement shall proceed in lifts until the full height of the section is placed. A minimum waiting period between placing of lifts shall be limited to the time required to obtain initial consolidation of grout, but shall be not less than 30 minutes.

A construction joint is required at the top of the top course to permit placement of the mortar cap. The mix design for the mortar cap shall be as approved by the Engineer.

Construction joints shall be made in grout when the placing of grout in grout filled cells is stopped for more than one hour. The construction joint shall be 1/2 inch below the top of the last course filled with grout.

Bond beams shall be continuous. The top of unfilled cells under horizontal bond beams shall be covered with metal or plastic lath.

When fresh masonry joins masonry that is partially or totally set, the contact surface shall be cleaned, roughened and lightly wetted.

Surface of the concrete on which the masonry walls are to be placed shall be roughened and cleaned, exposing the stone aggregate, and shall be flushed with water and allowed to dry to a surface dry condition immediately prior to laying the masonry units.

Where masonry unit cutting is necessary, all cuts shall be made with a masonry saw to neat and true lines. Masonry units with excessive cracking or chipping of the finished exposed surfaces will not be acceptable.

Masonry shall be protected as provided for concrete structures in Section 90-8, "Protecting Concrete," of the Standard Specifications and these special provisions.

During erection, all cells shall be kept dry in inclement weather by covering partially completed walls. The covering shall be waterproof fabric, plastic or paper sheeting, or other approved material. Wooden boards and planks are not acceptable as covering materials. The covering shall extend down each side of masonry walls approximately 2 feet.

Splashes, stains or spots on the exposed faces of the wall shall be removed.

Private yard drains consisting of 4 inch PVC pipe and 12 inch catch basins shall be constructed as shown on the plans in accordance with the provisions of Section 68-1 "Underdrains" of the Standard Specifications.

Full compensation for private yard drains shall be considered as included in the contract price paid per square foot for sound wall (masonry block) and no separate payment will be made therefore.

MEASUREMENT AND PAYMENT.--Sound wall (Masonry Block), will be measured by the square foot of the area of wall projected on a vertical plane between the elevation lines shown on the plans and length of wall).

The contract price paid per square foot for sound wall (masonry block), shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the sound wall, complete in place, including all supports, anchorages, private yard drains, excavation, backfill, reinforcement, and grade beams, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.52 SEALING JOINTS

Joints in concrete bridge decks and joints between concrete structures and concrete approach slabs shall be sealed in conformance with the details shown on the plans, the provisions in Section 51, "Concrete Structures," of the Standard Specifications and these special provisions.

When ordered by the Engineer, a joint seal larger than called for by the Movement Rating shown on the plans shall be furnished and installed. Payment to the Contractor for furnishing the larger seal and for saw cutting the increment of additional depth of groove required will be determined as provided in Section 4-1.03, "Changes," of the Standard Specifications.

Where polyurethane seals are shown on the plans, silicone sealant conforming to these specifications may be used.

The first and second paragraphs of Section 51-1.12F(3), "Materials and Installation," of the Standard Specifications are amended to read:

(a) Type A and AL Seal.— The sealant shall consist of a 2 component polyurethane sealant, which will withstand up to ± 25 percent movement, or a 2 component silicone sealant, which will withstand up to ± 50 percent movement.

Polyurethane and silicone sealants shall be tested in accordance with California Test 435. The sealants shall conform to State Specification 8030-61J-01 and the following requirements:

SPECIFICATION	REQUIREMENT
Modulus at 150 percent elongation	5-75 psi
Width of sealant after 7 days extension and one hour recovery	21/32 inch max.
Condition 24 hours after notching	Notched or loss of bond 1/4 inch, max.
Condition of water immersed specimen at 7 days	Notched or loss of bond 1/4 inch, max.
Condition of specimen when tested in accordance with ASTM Designation: G 53 using FS 40 UV-B bulbs for a minimum of 25 cycles. The cycle shall be 4 hours UV exposure at 140 degrees F and 4 hours condensate exposure at 104 degrees F	No more than slight checking or cracking.
Grease cone penetration	4.5 - 12.0 mm.

State Specifications for polyurethane and silicone sealants may be obtained from the Transportation Laboratory.

Section 51-1.12F(3)(a), "Type A and AL Seal," of the Standard Specifications is amended by adding the following paragraphs after the eighth paragraph:

A Certificate of Compliance, accompanied by a certified test report, shall be furnished for each batch of polyurethane and silicone sealant in conformance with the provisions in Section 6-1.07, "Certificates of Compliance."

Samples of the two components, not less than one quart each, from each batch of sealant shall be submitted to the Transportation Laboratory. In addition, samples of manufacturer required primers, not less than one quart each, shall be submitted. The samples shall be furnished for testing, with the Certificate of Compliance, 30 days in advance of proposed use.

10-1.53 ARCHITECTURAL SURFACE (TEXTURED CONCRETE)

Architectural texture for concrete surfaces shall conform to the details shown on the plans and the provisions in Section 51, "Concrete Structures," of the Standard Specifications and these special provisions.

Architectural textures listed below are required at concrete surfaces shown on the plans:

- Fractured rib texture
- Ribbed texture

The fractured rib texture shall be an architectural texture simulating the appearance of straight ribs of concrete with a fractured concrete texture imparted to the raised surface between the ribs. Grooves between ribs shall be continuous with no apparent curves or discontinuities. Variation of the groove from straightness shall not exceed 1/4 inch for each 10 feet of groove. The architectural texture shall have random shadow patterns. Broken concrete at adjoining ribs and groups of ribs shall have a random pattern. The architectural texture shall not have secondary patterns imparted by shadows or repetitive fractured surfaces.

The ribbed texture shall be an architectural texture simulating the appearance of ribs and shapes constructed to the dimensions shown on the plans.

TEST PANEL.--A test panel at least 4' x 4' in size shall be successfully completed at a location approved by the Engineer before beginning work on architectural textures. The test panel shall be constructed and finished with the materials, tools, equipment and methods to be used in constructing the architectural texture. If ordered by the Engineer, additional test panels shall be constructed and finished until the specified finish, texture and color are obtained, as determined by the Engineer.

The test panel approved by the Engineer shall be used as the standard of comparison in determining acceptability of architectural texture for concrete surfaces.

FORM LINERS.--Form liners shall be used for textured concrete surfaces and shall be installed in conformance with the manufacturer's recommendations, unless other methods of forming textured concrete surfaces are approved by the Engineer. Form liners shall be manufactured from an elastomeric material or a semi-elastomeric polyurethane material by a manufacturer of commercially available concrete form liners. No substitution of other types of formliner material will be allowed. Form liners shall leave crisp, sharp definition of the architectural surface. Recurring textural configurations exhibited by repeating, recognizable shadow patterns shall be prevented by proper casting of form liner patterns. Textured

concrete surfaces with such recurring textural configurations shall be reworked to remove such patterns as approved by the Engineer or the concrete shall be replaced.

Form liners shall have the following properties:

Description	ASTM Designation:	Range
Elastomeric material		
Shore A hardness	D 2240	20 to 65
Tensile strength (psi)	D 412	130 to 900
Semi-elastomeric polyurethane		
Shore D hardness	D 2240	55 to 65
Tensile strength (psi)	D 2370	2600 minimum

Cuts and tears in form liners shall be sealed and repaired in conformance with the manufacturer's recommendations. Form liners that are delaminated from the form shall not be used. Form liners with deformations to the manufactured surface caused by improper storage practices or any other reason shall not be used.

Form liners shall extend the full length of texturing with transverse joints at 8 foot minimum spacing. Small pieces of form liners shall not be used. Grooves shall be aligned straight and true. Grooves shall match at joints between form liners. Joints in the direction of grooves in grooved patterns shall be located only in the depressed portion of the textured concrete. Adjoining liners shall be butted together without distortion, open cracks or offsets at the joints. Joints between liners shall be cleaned before each use to remove any mortar in the joint.

Adhesives shall be compatible with the form liner material and with concrete. Adhesives shall be approved by the liner manufacturer. Adhesives shall not cause swelling of the liner material.

RELEASING FORM LINERS.--Products and application procedures for form release agents shall be approved by the form liner manufacturer. Release agents shall not cause swelling of the liner material or delamination from the forms. Release agents shall not stain the concrete or react with the liner material. For reliefs simulating fractured concrete or wood grain surfaces the application method shall include the scrubbing method using a natural bristle scrub brush in the direction of grooves or grain. The release agent shall coat the liner with a thin film. Following application of form release agent, the liner surfaces shall be cleaned of excess amounts of agent using compressed air. Buildup of form release agent caused by the reuse of a liner shall be removed at least every 5 uses.

Form liners shall release without leaving particles or pieces of liner material on the concrete and without pulling or breaking concrete from the textured surface. The concrete surfaces exposed by removing forms shall be protected from damage.

CURING.--Concrete surfaces with architectural texture shall be cured only by the forms-in-place or water methods. Seals and curing compounds shall not be used.

MEASUREMENT AND PAYMENT.--Architectural texture will be measured and paid for by the square foot.

The contract price paid per square foot for architectural texture of the types listed in the Engineer's Estimate shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in architectural texture, complete in place, including test panels, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.54 REINFORCEMENT

Reinforcement shall conform to the provisions in Section 52, "Reinforcement," of the Standard Specifications and these special provisions.

The first paragraph of Section 52-1.02A, "Bar Reinforcement," of the Standard Specifications is amended to read:

52-1.02A Bar Reinforcement.—Reinforcing bars shall be low-alloy steel deformed bars conforming to the requirements in ASTM Designation: A 706/A 706M, except that deformed or plain billet-steel bars conforming to the requirements in ASTM Designation: A 615/A 615M, Grade 40 or 60, may be used as reinforcement in the following 5 categories:

1. Slope and channel paving;
2. Minor structures;
3. Sign and signal foundations (pile and spread footing types);
4. Roadside rest facilities; and
5. Concrete barrier Type 50 and Type 60 series and temporary railing.

Deformations specified in ASTM Designation: A 706/A 706M will not be required on bars used as spiral or hoop reinforcement in structures and concrete piles.

Welded wire fabric shall be either plain or deformed conforming to the requirements in ASTM Designation: A185 or ASTM Designation: A497, respectively.

Section 52-1.02D, "Reinforcing Wires and Plain Bars," of the Standard Specifications is amended to read:

52-1.02D Reinforcing Wire.—Wire used as reinforcement in structures and concrete piles, as shown on the plans, shall be cold drawn steel wire conforming to the specifications of ASTM Designation: A 82.

The last paragraph of Section 52-1.07, "Placing," of the Standard Specifications is amended to read:

Whenever a portion of an assemblage of bar reinforcing steel that is not encased in concrete exceeds 20 feet in height, the Contractor shall submit to the Engineer for approval, in accordance with the provisions in Section 5-1.02, "Plans and Working Drawings," working drawings and design calculations for the temporary support system to be used. The working drawings and design calculations shall be signed by an engineer who is registered as a Civil Engineer in the State of California. The temporary support system shall be designed to resist all expected loads and shall be adequate to prevent collapse or overturning of the assemblage. If the installation of forms or other work requires revisions to or temporary release of any portion of the temporary support system, the working drawings shall show the support system to be used during each phase of construction. The minimum horizontal wind load to be applied to the bar reinforcing steel assemblage, or to a combined assemblage of reinforcing steel and forms, shall be not less than 20 pounds per square foot on the gross projected area of the assemblage.

The sixth paragraph of Section 52-1.08, "Splicing," of the Standard Specifications is amended to read:

Except when otherwise specified, mechanical lap splicing shall conform to the details shown on the plans, the requirements for mechanical butt splices as specified in this Section 52-1.08, and Sections 52-1.08C, "Mechanical Butt Splices," 52-1.08D, "Qualification of Welding and Mechanical Splicing," and 52-1.08E, "Job Control Tests," and the following:

The mechanical lap splice shall be a unit consisting of a sleeve, in which the reinforcing bars are positioned, and a wedge driven through holes in the sleeve and between the reinforcing bars. The mechanical lap splice shall only be used for splicing non-epoxy-coated deformed reinforcing bars Nos. 4, 5 and 6.

The eighth and ninth paragraphs of Section 52-1.08, "Splicing," of the Standard Specifications are amended to read:

Unless otherwise shown on the plans or approved by the Engineer, splices in adjacent reinforcing bars at any particular section shall be staggered. The minimum distance between staggered lap splices or mechanical lap splices shall be the same length required for a lapped splice in the largest bar. The minimum distance between staggered butt splices shall be 2 feet. Distances shall be measured between the midpoints of the splices along a line which is centered between the axes of the adjacent bars.

Completed butt splices shall develop a minimum tensile strength, based on the nominal bar area, of 63,000 psi for ASTM Designation: A 615/A 615M Grade 40 bars, and of 80,000 psi for ASTM Designation: A 615/A 615M Grade 60 and ASTM Designation: A 706/A 706M bars. If butt splices are made between 2 bars of dissimilar strengths, the minimum required tensile strength for the splice shall be that required for the weaker bar.

The second sentence of the eleventh paragraph of Section 52-1.08, "Splicing," of the Standard Specifications is amended to read:

Job control tests shall be made on sample splices representing each lot of mechanical butt splices as provided in Section 52-1.08E, "Job Control Tests."

Section 52-1.08B, "Butt Welded Splices," of the Standard Specifications is amended to read:

52-1.08B Butt Welded Splices.—Butt welded splices in reinforcing bars shall be complete joint penetration butt welds conforming to the requirements in AWS D1.4, and the requirements of these specifications and the special provisions. At the option of the Contractor, shop produced resistance butt welds, that are produced by a fabricator who is approved by the Transportation Laboratory may be used.

Only the joint details and dimensions as shown in Figure 3.2, "Direct Butt Joints," of AWS D 1.4-92, shall be used for making complete joint penetration butt welds of bar reinforcement. Split pipe backing shall not be used.

Material used as backing for complete joint penetration butt welds of bar reinforcement shall be a flat plate conforming to the requirements of ASTM Designation: A 709, Grade 36. The flat plate shall be 0.25-inch thick with a width, as measured perpendicular to the axis of the bar, equal to the nominal diameter of the bar, and a length which does not exceed twice the nominal diameter of the bar. The flat plate backing shall be fitted tightly to the bar with the root of the weld centered on the plate. Any bar deformation or obstruction preventing a tight fit shall be ground smooth and flush with the adjacent surface. Tack welds used to fit backing plates shall be within the weld root area so that they are completely consumed by the finished weld. Backing plates shall not be removed.

Butt welds shall be made with multiple weld passes using a stringer bead without an appreciable weaving motion. The maximum stringer bead width shall be 2.5 times the diameter of the electrode and slagging shall be performed between each weld pass. Weld reinforcement shall not exceed 1/8-inch in convexity.

Before any electrodes or flux-electrode combinations are used, the Contractor, at the Contractor's expense, shall furnish certified copies of test reports for all the pertinent tests specified in AWS A5.1, AWS A5.5, AWS A5.18 or AWS A5.20, whichever is applicable, made on electrodes or flux-electrode combinations of the same class, brand and nearest specified size as the electrodes to be used. The tests may have been made for process qualification or quality control, and shall have been made within one year prior to manufacture of the electrodes and fluxes to be used. The report shall include the manufacturer's certification that the process and material requirements were the same for manufacturing the tested electrodes and the electrodes to be used. The forms and certificates shall be as directed by the Engineer.

Electrodes for manual shielded metal arc welding of ASTM Designation: A 615/A 615M, Grade 60 bars shall conform to the requirements of AWS A5.5 for E9018-M or E10018-M electrodes.

Electrodes for manual shielded metal arc welding of A 706/A 706M bars shall conform to the requirements of AWS A5.5 for E8016-C3 or E8018-C3 electrodes.

Solid and composite electrodes for semiautomatic gas metal-arc and flux-cored arc welding of Grade 40 reinforcing bars shall conform to the requirements of AWS A5.18 for ER70S-2, ER70S-3, ER70S-6 or ER70S-7 electrodes; or AWS A5.20 for E70T-1, E70T-5, E70T-6 or E70T-8 electrodes.

Electrodes for semiautomatic welding of ASTM Designation: A 615/A 615M, Grade 60 and ASTM Designation: A 706/A 706M bars shall produce a weld metal deposit with properties conforming to the requirements of Section 5.3.4 of AWS D1.1-96 for ER80S-Ni1, ER80S-Ni2, ER80S-Ni3, ER80S-D2, E90T1-K2 and E91T1-K2 electrodes.

Reinforcing bars shall be preheated for a distance of not less than 6 inches on each side of the joint prior to welding.

For all welding of ASTM Designation: A 615/A 615M, Grade 40 or Grade 60 bars, the requirements of Table 5.2, "Minimum Preheat and Interpass Temperatures," of AWS D1.4-92 are superseded by the following:

The minimum preheat and interpass temperatures shall be 400° F. for Grade 40 bars and 600° F. for Grade 60 bars. Immediately after completing the welding, at least 6 inches of the bar on each side of the splice shall be covered by an insulated wrapping to control the rate of cooling. The insulated wrapping shall remain in place until the bar has cooled below 200° F.

When welding different grades of reinforcing bars, the electrode shall conform to Grade 40 bar requirements and the preheat shall conform to the Grade 60 bar requirements.

In the event that any of the specified preheat, interpass and post weld cooling temperatures are not met, all weld and heat affected zone metal shall be removed and the splice rewelded.

Welding shall be protected from air currents, drafts, and precipitation to prevent loss of heat or loss of arc shielding. The method of protecting the welding area from loss of heat or loss of arc shielding shall be subject to approval by the Engineer.

Reinforcing bars shall not be direct butt spliced by thermite welding.

The first paragraph of Section 52-1.08C, "Mechanical Butt Splices," of the Standard Specifications is amended to read:

52-1.08C Mechanical Butt Splices.—Mechanical butt splices shall be the sleeve-filler metal type, the sleeve-threaded type, the sleeve-swaged type, the sleeve-filler grout type, the sleeve-lockshear bolt type, the two-part sleeve-forged bar type, or the two-part sleeve-friction bar type, at the option of the Contractor.

The following is added after the third paragraph of Section 52-1.08C, "Mechanical Butt Splices," of the Standard Specifications:

Slip requirements shall not apply to mechanical lap splices.

The following is added after Section 52-1.08C(3), "Sleeve-Swaged Mechanical Butt Splices," of the Standard Specifications:

52-1.08C(4) Sleeve-Filler Grout Mechanical Butt Splices.—The sleeve-filler grout type of mechanical butt splices shall consist of a steel splice sleeve that fits closely over the reinforcing bars with a non-shrink grout filler in the annular space between the reinforcing bars and the sleeve and between the ends of the reinforcing bars.

No vibration or movement of the reinforcing steel or sleeve at the splice shall be allowed while the splice is developing sufficient strength to support the reinforcing bars. The Contractor shall submit complete details of the bracing and clamping system to eliminate all vibration or movement at the splice during setup of the filler in accordance with the provisions in Section 5-1.02, "Plans and Working Drawings."

52-1.08C(5) Sleeve-lockshear Bolt Mechanical Butt Splices.—The sleeve-lockshear bolt type of mechanical butt splices shall consist of a seamless steel sleeve, 2 serrated steel strips welded to the inside of the sleeve, center hole with centering pin, and bolts that are tightened until the bolt heads shear off and the bolt ends are embedded in the reinforcing bars.

52-1.08C(6) Two-Part Sleeve-Forged Bar Mechanical Butt Splices.— The two-part sleeve-forged bar type of mechanical butt splices shall consist of a shop machined two-part threaded steel sleeve that interlocks two hot-forged reinforcing bars ends. The forged bar ends may be either shop produced or field produced.

52-1.08C(7) Two-Part Sleeve-Friction Bar Mechanical Butt Splices.— The two-part sleeve-friction bar type of mechanical butt splices shall consist of a shop machined two-part threaded steel sleeve whose ends are friction welded, in the shop, to the reinforcing bars ends.

The third paragraph of Section 52-1.08D, "Qualification of Welding and Mechanical Splicing," of the Standard Specifications is amended to read:

Resistance butt welds shall be produced by a fabricator approved by the Transportation Laboratory.

Each operator qualification test for mechanical splices shall consist of 2 sample splices. Each mechanical splice procedure test shall consist of 2 sample splices.

For sleeve-filler, sleeve-threaded, sleeve-lockshear bolt and two-part sleeve friction bar mechanical butt splices, all sample splices shall be made on the largest reinforcing bar size to be spliced by the procedure or operator being tested except that No. 14 bars may be substituted for No. 18 bars.

For sleeve-swaged and two-part sleeve-forged mechanical butt splices, and mechanical lap splices, all sample splices shall be made on the largest reinforcing bar size of each deformation pattern to be spliced by the procedure or operator being tested. When joining new reinforcing bars to existing reinforcement, the qualification test sample bars shall be made using only the deformation patterns of the new reinforcement to be joined.

Section 52-1.08E, "Job Control Tests," of the Standard Specifications is amended to read:

52-1.08E Job Control Tests.— When mechanical butt splices, shop produced complete joint penetration butt welded splices, or shop produced resistance butt welded splices are used, the Contractor shall furnish job control tests from a local qualified testing laboratory. A job control test shall consist of the fabrication, under conditions used to produce the splice, and the physical testing of 3 sample splices for each lot of 150 splices.

A lot of mechanical butt splices is defined as 150, or fraction thereof, of the same type of mechanical butt splices used for each combination of bar size and bar deformation pattern that is used in the work.

A lot of shop produced complete joint penetration butt welded splices, or shop produced resistance butt welded splices, is defined as 150, or fraction thereof, of the same type of welds used for each combination of bar size and bar deformation pattern that is used in the work.

When joining new reinforcing bars to existing reinforcement, the job control test shall be made using only the deformation patterns of the new reinforcement to be joined.

A sample splice shall consist of a splice made at the job site to connect two 30-inch, or longer, bars using the same splice materials, position, location, and equipment, and following the same procedures as are being used to make splices in the work. Shorter sample splice bars may be used if approved by the Engineer.

Sample splices shall be made and tested in the presence of the Engineer or the Engineer's authorized representative.

Sample splices shall be suitably identified with weatherproof markings prior to shipment to the testing laboratory.

For sleeve-threaded mechanical butt splices, the reinforcing bars to be used for job control tests shall be fabricated on a random basis during the cutting of threads on the reinforcing bars of each lot and shipped to the job site with the material they represent.

For shop produced complete joint penetration butt welds, shop produced resistance butt welded splices and all types of mechanical butt splices, except the sleeve-threaded type, the Engineer will designate when samples for job control tests are to be fabricated, and will determine the limits of the lot represented by each job control test.

Should the average of the results of tests made on the 3 sample splices or should more than one sample splice in any job control test fail to meet the requirements for splices, all splices represented by that test will be rejected in accordance with the provisions in Section 6-1.04, "Defective Materials," of the Standard Specifications. This rejection shall prevail unless the Contractor, at the Contractor's expense, obtains and submits evidence, of a type acceptable to the Engineer, that the strength and quality of the splices in the work are acceptable.

Section 52-1.08F, "Nondestructive Splice Tests," of the Standard Specifications is amended to read:

52-1.08F Nondestructive Splice Tests.—All required radiographic examinations of complete joint penetration butt welded splices shall be performed by the Contractor in accordance with the requirements of AWS D 1.4 and these specifications.

Prior to radiographic examination, welds shall meet the requirements of Section 4.4, "Quality of Welds," of AWS D1.4-92.

Radiographic examinations shall be performed on 25 percent of all complete joint penetration butt welded splices from a production lot. The size of a production lot will be a maximum of 100 splices. The Engineer will select the splices which will compose the production lot and also the splices within each production lot to be radiographically examined.

Should more than 12 percent of the splices which have been radiographically examined in any production lot be defective, an additional 25 percent of the splices, selected by the Engineer from the same production lot, shall be radiographically examined. Should more than 12 percent of the cumulative total of splices tested from the same production lot be defective, all remaining splices in the lot shall be radiographically examined.

Additional radiographic examinations performed due to the identification of defective splices shall be at the Contractor's expense.

All defects shall be repaired in accordance with the requirements of AWS D1.4.

Radiographic examinations will not be required for either shop produced complete joint penetration butt welds or shop produced resistance butt welded splices of No. 8 or smaller bars used as spiral or hoop reinforcement.

In addition to radiographic examinations performed by the Contractor, any mechanical or welded splice may be subject to inspection or nondestructive testing by the Engineer. The Contractor shall provide sufficient access facilities in the shop and at the jobsite to permit the Engineer or his agent to perform the inspection or testing.

The Contractor shall notify the Engineer in writing 48 hours prior to performing any radiographic examinations.

The radiographic procedure used shall conform to the requirements of ASME Boiler and Pressure Vessels Code, Section V, Article 2 and the following:

Two exposures shall be made for each complete joint penetration butt welded splice. For each of the two exposures, the radiation source shall be centered on each bar to be radiographed. The first exposure shall be made with the radiation source placed at zero degrees from the top of the weld and perpendicular to the weld root and identified with a station mark of "0." When obstructions prevent a zero degree placement of the radiation source for the first exposure, and when approved in writing by the Engineer, the source may be rotated, around the centerline of the reinforcing bar, a maximum of 25 degrees. The second exposure shall be at 90 degrees to the "0" station mark and shall be identified with a station mark of "90."

For field produced complete joint penetration butt welds, no more than one weld shall be radiographed during one exposure. For shop produced complete joint penetration butt welds, if more than one weld is to be radiographed during one exposure, the angle between the root line of each weld and the direction to the radiation source shall be not less than 65 degrees.

Radiographs shall be made by either X-ray or gamma ray. Radiographs made by X-ray or gamma rays shall have densities of not less than 2.3 nor more than 3.5 in the area of interest. A tolerance of 0.05 in density is allowed for densitometer variations. Gamma rays shall be from the iridium 192 isotope and the emitting specimen shall not exceed 0.175-inch in the greatest diagonal dimension.

The radiographic film shall be placed perpendicular to the radiation source at all times; parallel to the root line of the weld unless source placement determines that the film must be turned; and as close to the root of the weld as possible.

The minimum source to film distance shall be maintained so as to insure that all radiographs maintain a maximum geometric unsharpness of 0.020 at all times, regardless of the size of the reinforcing bars.

Penetrameters shall be placed on the source side of the bar and perpendicular to the radiation source at all times. One penetrometer shall be placed in the center of each bar to be radiographed, perpendicular to the weld root, and adjacent to the weld. Penetrometer images shall not appear in the weld area.

When radiography of more than one weld is being performed per exposure, each exposure shall have a minimum of one penetrometer per bar, or 3 penetrameters per exposure. When 3 penetrameters per exposure are used, one penetrometer shall be placed on each of the 2 outermost bars of the exposure, and the remaining penetrometer shall be placed on a centrally located bar.

An allowable weld buildup of 1/8 inch may be added to the total material thickness when determining the proper penetrometer selection. No image quality indicator equivalency will be accepted. Wire penetrameters or penetrometer blocks shall not be used.

Penetrameters shall be sufficiently shimmed using a radiographically identical material. Penetrometer image densities shall be a minimum of 2.0 and a maximum of 3.6.

All radiographic film shall be Class 1, regardless of the size of reinforcing bars.

Radiographs shall be free of film artifacts and processing defects, including, but not limited to, streaks, scratches, pressure marks, or marks made for the purpose of identifying film or welding indications.

Each splice shall be clearly identified on each radiograph and the radiograph identification and marking system shall be established between the Contractor and the Engineer before radiographic inspection begins. Film shall be identified by lead numbers only; etching, flashing, or writing in identifications of any type will not be permitted. Each piece of film identification information shall be legible and shall include, as a minimum, the following information: Contractor's name, date, name of nondestructive testing firm, initials of radiographer, contract number, part number, and weld number. The letter "R" and repair number shall be placed directly after the weld number to designate a radiograph of a repaired weld.

Radiographic film shall be developed within a time range of one minute less to one minute more than the film manufacturer's recommended maximum development time. Sight development will not be allowed.

Processing chemistry shall be done with a consistent mixture and quality, and processing rinses and tanks shall be clean to ensure proper results. Records of all developing processes and any chemical changes to the developing processes shall be kept and furnished to the Engineer upon request. The Engineer may request, at any time, that a sheet of unexposed film be processed in the presence of the Engineer to verify processing chemical and rinse quality.

All radiographs shall be interpreted and graded by a Level II or Level III technician who is qualified in accordance with the American Society for Nondestructive Testing's Recommended Practice No. SNT-TC-1A. The results of these interpretations shall be recorded on a signed certification and a copy kept with the film packet.

Technique sheets prepared in accordance with ASME Boiler and Pressure Vessels Code, Section V, Article 2 Section T-291 shall also contain the developer temperature, developing time, fixing duration and all rinse times.

All radiographic envelopes shall have clearly written on the outside of the envelope the following information: name of the Contractor's Quality Control Manager (QCM), name of the nondestructive testing firm, name of the radiographer, date, contract number, complete part description, and all included weld numbers or a report number, as detailed in the Contractor's Quality Control Plan (QCP). In addition, all innerleaves shall have clearly written on them the part description and all included weld numbers, as detailed in the Contractor's QCP.

10-1.55 STRAY CURRENT PROTECTION

This work shall consist of connecting copper cable to bar reinforcing steel at Grossmont College Drive Overcrossing, Bridge No. 57-1051. The work shall be in accordance with the details shown on the plans and as specified in these special provisions.

COPPER CABLE TO BAR REINFORCING STEEL CONNECTION.--The copper cable shall be fusion welded to the bar reinforcing steel by an exothermic type welding process as shown on the plans. Materials used shall be in accordance with the manufacturer's recommendations regarding the mold size and shape, and the charge size and alloy mixture for the powder.

The copper cable shall conform to the requirements in Section 86-2.08B, "Multiple Circuit Conductors," of the Standard Specifications.

Rubber splicing compound, commercially available, shall be applied to the welded connection.

Apply two layers of tape, each half lapped. The tape shall be commercially available vinyl electrical tape with minimum thickness of 20 mils.

The test box cover and anchorage devices shall conform to the provisions in Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications. The gasket shall be of commercially available neoprene.

PAYMENT.--Except as otherwise provided, full compensation for connecting copper cable to bar reinforcing steel shall be considered as included in the contract prices paid per pound for bar reinforcing steel (bridge) and no additional compensation will be allowed therefor.

10-1.56 SIGN STRUCTURES

Sign structures and foundations for overhead signs shall conform to the provisions in Section 56-1, "Overhead Sign Structures," of the Standard Specifications and these special provisions.

Paragraph 3 in Section 56-1.01, "Description," of the Standard Specifications is amended to read:

Before commencing fabrication of sign structures, the Contractor shall submit 2 sets of working drawings to the Engineer in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings." The working drawings shall include sign panel dimensions, span lengths, post heights, anchorage layouts, proposed splice locations, a snugging and tensioning pattern for anchor bolts and high strength bolted connections, and details for permanent steel anchor bolt templates. The drawings shall be supplemented by a written quality control program listing methods, equipment, and personnel necessary to satisfy the requirements specified herein and in the special provisions.

Working drawings shall be 22 inches x 34 inches or 11 inches x 17 inches in size and each drawing and calculation sheet shall include the sign structure type and reference as shown on the contract plans, District-County-Route, and contract number.

The Engineer shall have 20 working days to review the sign structure working drawings after a complete submittal has been received. No fabrication or installation of sign structures shall be performed until the working drawings are approved in writing by the Engineer.

Should the Engineer fail to complete the review within the time allowance and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in reviewing the sign structure working drawings, the delay will be considered a right of way delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays."

The first paragraph, including the material table, in Section 55-2.01, "Description," of the Standard Specifications is amended to read:

55-2.01 Description.—The various materials shall conform to the specifications of ASTM as listed in the following tabulation with certain modifications and additions as specified:

MATERIAL	SPECIFICATION
Structural steel	ASTM Designation: A 709/A 709M, Grade 36 [250] or {A 36/A 36M} ^(a)
High strength low alloy columbium vanadium steel	ASTM Designation: A 709/A 709M, Grade 50 [345] or {A 572/A 572M, Grade 50 [345]} ^(a)
High strength low alloy structural steel	ASTM Designation: A 709/A 709M, Grade 50W [345 W] or {A 588/A 588M} ^(a)
High-yield strength, quenched and tempered alloy steel plate suitable for welding	ASTM Designation: A 709/A 709M, Grade 100 [690] and Grade 100W [690W] or {A 514/A 514M} ^(a)
Steel fastener components for general applications:	
Bolts and studs	ASTM Designation: A 307
Headed anchor bolts	ASTM Designation: A 307, Grade B, including S1 supplementary requirements
Nonheaded anchor bolts	ASTM Designation: A 307, Grade C, including S1 supplementary requirements and S1.6 of AASHTO Designation: M 314 supplementary requirements or AASHTO Designation: M 314, Grade 36 or 55, including S1 supplementary requirements
High-strength bolts and studs which include threaded rods and high-strength nonheaded anchor bolts	ASTM Designation: A 449, Type 1 ASTM Designation: A 563, including Appendix X1 ^(b)
Nuts	ASTM Designation: F 844
Washers	
Components of high-strength steel fastener assemblies for use in structural steel joints:	
Bolts	ASTM Designation: A 325, Type 1
Tension control bolts	ASTM Designation: F 1852, Type 1
Nuts	ASTM Designation: A 563, including Appendix X1 ^(b)
Hardened washers	ASTM Designation: F 436, Type 1, Circular, including S1 supplementary requirements
Direct tension indicators	ASTM Designation: F 959, Type 325, zinc-coated
Carbon steel for forgings, pins and rollers	ASTM Designation: A 668/A 668M, Class D
Alloy steel for forgings	ASTM Designation: A 668/A 668M, Class G
Pin nuts	ASTM Designation: A 36/A 36M
Carbon-steel castings	ASTM Designation: A 27/A 27M, Grade 65-35 [450-240], Class 1
Malleable iron castings	ASTM Designation: A 47, Grade 32510 or A 47M, Grade 22010
Gray iron castings	ASTM Designation: A 48, Class 30B
Carbon steel structural tubing	ASTM Designation: A 500, Grade B or A 501
Steel pipe (Hydrostatic testing will not apply)	ASTM Designation: A 53, Type E or S, Grade B; A 106, Grade B; or A 139, Grade B
Stud connectors	ASTM Designation: A 108 and ANSI/AASHTO/AWS D1.5
(a) Grades that may be substituted for the equivalent ASTM Designation: A 709 steel, at the Contractor's option, subject to the modifications and additions specified and to the requirements of A 709.	
(b) Zinc-coated nuts that will be tightened beyond snug or wrench tight shall be furnished with a dry lubricant conforming to Supplementary Requirement S2 in ASTM Designation: A 563.	

Paragraphs 1 through 5, excluding Section 55-3.14A, of Section 55-3.14, "Bolted Connections," of the Standard Specifications are amended to read:

55-3.14 Bolted Connections.—Bolted connections in structural steel joints, unless otherwise shown on the plans or specified in the special provisions, shall be made with high-strength steel fastener assemblies. These fastener assemblies shall consist of either 1) a high-strength steel bolt, nut and hardened washer or 2) a tension control bolt, nut and hardened washer. A direct tension indicator (DTI) may be used with the high-strength bolt, nut and hardened washer assembly.

Bolted connections using fastener assemblies shall conform to the requirements in "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" (RCSC Specification) approved by the Research Council on Structural Connections of the Engineering Foundation, and these specifications.

When reference is made to the RCSC Specification, the "Allowable Stress Design" version shall be used when allowable stress design is shown on the plans and the "Load and Resistance Factor Design" version shall be used when load factor design or load and resistance factor design is shown on the plans.

All connections made with fastener assemblies shall be tensioned as a slip critical connection, whether classified as a slip critical or bearing type connection, unless otherwise designated on the plans.

The hardened washer shall be installed under the nut or bolt head, whichever is the element turned in tightening. Nuts shall be located, wherever practicable, on the side of the member that will not be visible from the traveled way. Nuts for bolts that will be partially embedded in concrete shall be located on the side of the member that will be encased in concrete.

When the bolt head is used as the turned element, all tension testing and tension verification, including determining job inspecting torque, shall be performed by turning the bolt head.

Each length and diameter of fastener assemblies used in any one joint of a high-strength bolted connection shall be from the same rotational capacity lot. The Contractor shall keep a record of which rotational capacity lots are used in each joint.

The Contractor shall provide, calibrate and maintain the equipment and tools necessary for the preliminary testing, installation and inspection of all fasteners.

Bolt tension measuring devices and calibrated wrenches shall be calibrated within one year prior to first being used on the job, and a minimum of once each year thereafter. This calibration shall be done by a qualified independent laboratory or authorized warranty repair and calibration center recognized by the tool manufacturer. Bolt tension measuring devices shall be calibrated, to within one percent of the actual tension value, with a minimum of 4 verification readings evenly spaced over a range of 20 to 80 percent of full scale. Calibrated wrenches shall be calibrated to within 2 percent of the actual torque value, with a minimum of 4 verification readings evenly spaced over a range of 20 to 100 percent of full scale. Test equipment used for certification and calibration standards shall be traceable to the National Institute of Standards and Technology.

If a torque multiplier is used in conjunction with a calibrated wrench as a method for tightening fastener assemblies to the required tension, both the multiplier and the wrench shall be calibrated together as a system. The same length input and output sockets and extensions that will be used in the work shall also be included in the calibration of the system. The manufacturer's torque multiplication ratio shall be adjusted during calibration of the system, such that when this adjusted ratio is multiplied by the actual input calibrated wrench reading, the product is a calculated output torque that is within 2 percent of the true output torque. When this system is used in the work to perform any installation tension testing, rotational capacity testing, fastener tightening, or tension verification, it shall be used, intact as calibrated.

Prior to the use of bolt tension measuring devices or calibrated wrenches, the Contractor shall furnish to the Engineer certificates of calibration with plots of verification readings for each device or wrench.

In addition to the submittals required in Section 55-1.03, "Inspection," the Contractor shall furnish certified test reports of tests on fastener components and fastener assemblies performed prior to shipment to the job-site. Certified test reports for fastener components and fastener assemblies shall be furnished to the Engineer prior to use of the fastener assembly. The certified test reports shall include the rotational capacity lot numbers for fastener assemblies supplied and all test reports specified in the "Certification," "Report," "Number of Tests and Retests," and "Certification and Test Report" sections in the appropriate ASTM specifications for the fastener components. For ASTM Designation A307, Grade B or Grade C anchor bolts, the chemical composition and calculated carbon equivalent of each heat of steel shall be furnished.

All bolted connection surfaces shall be prepared before assembly in conformance with the requirements in the special provisions.

Section 55-3.14, "Bolted Connections," of the Standard Specifications is amended by adding the following paragraphs:

55-3.14B Installation.—If any components of fastener assemblies are furnished with water soluble lubricants, fastener installation will not be permitted when surface moisture is present at a high-strength bolted connection. If

fastener assemblies are furnished with other than water soluble lubricants, the Engineer may require the Contractor to perform additional fastener testing if any fastener work or testing is performed when surface moisture is present.

Manual torque wrenches shall have either a dial gage or digital read out. Any electric, pneumatic or hydraulic calibrated wrench used to tension fasteners shall have an adjustable control unit that can be set to positively shut off at the desired torque.

Wrenches used for snugging tension control bolts in a connection prior to final tensioning shall not apply torsion to the splined end of the bolt.

The threaded ends of fastener assemblies projecting past the outer face of the nut (thread stickout), where first full formed threads are present, shall be at least flush with, but not extend more than 1/4 inch beyond, the outer face of the nut. A maximum of one hardened washer, in addition to the single washer required under the turned element, may be installed under the non-turning element of the fastener assembly. The thread stickout of studs, rods and anchor bolts, shall be at least 1/8 inch, and there shall be a minimum of 3 full threads located within the grip of the connection. In addition, a minimum of 3 full threads shall be located between the bearing surfaces of the bolt head and nut. The total stickout shall not be excessive.

Larger bolts, having diameters up to 1/4 inch greater than the diameter of the bolt shown on the plans, may be used if approved by the Engineer provided that spacing and edge distance requirements for the larger bolt are met and the net section is adequate.

When DTIs are used, one DTI shall be installed under each bolt head with the DTI protrusions contacting the bearing surface of the bolt head. To tension the bolt, the bolt head shall be held stationary and the nut turned. Unless otherwise specified, manufacturer's installation procedures shall be followed. Each bolt shall be tensioned in at least 2 tightening stages until at least 50 percent of the gaps on each DTI are greater than zero and less than 1/8 inch. Complete crushing of all DTI protrusions (0 gaps) on any given DTI will be cause for rejection.

The same head orientation shall be used within any one high-strength bolted connection.

55-3.14C Rotational Capacity Testing Prior to Shipment to Job Site.—Rotational capacity tests on fastener assemblies shall be performed as specified in the special provisions.

55-3.14D Installation Tension Testing and Rotational Capacity Testing After Arrival to Job Site.—Installation tension tests and rotational capacity tests on fastener assemblies shall be performed as specified in the special provisions.

55-3.14E Tension Verification of Fastener Assemblies.—Minimum fastener tension in all completed high-strength bolted connections shall be verified.

For each type of fastener assembly, at least 10 percent, but no fewer than 2 assemblies used in each high-strength bolted connection shall be checked for minimum tension, by the Contractor, in conformance with the procedure described in Section 9(b), "Arbitration Inspection," of the RCSC Specification. For determining the job inspecting torque for short bolts, the procedure described in steps 1 through 9 of the "Arbitration of Disputes, Inspection Torque Method-Short Bolts," section of the "Structural Bolting Handbook," published by the Steel Structures Technology Center, Incorporated shall replace Section 9(b)(2) of the RCSC Specification. A separate inspecting torque shall be determined and used for each different rotational capacity lot of fasteners.

The verification for minimum tension shall be performed 1) no longer than 48 hours after all fasteners in the connection have been tensioned, 2) on fastener assemblies selected by the Engineer, 3) in the presence of the Engineer, and 4) in such a manner that the Engineer can read the torque wrench gage or access the DTI gaps during inspection.

Section 56-1.02C, "Bolts, Nuts and Washers," of the Standard Specifications is amended to read:

56-1.02C Bolts, Nuts, and Washers.—Bolts, nuts, and washers for use in sign structures shall conform to the provisions in Section 55-2, "Materials."

A permanent steel template shall be used to maintain the proper anchor bolt.

One top nut, one leveling nut, and two washers shall be provided for the upper threaded portion of each anchor bolt.

Paragraph 1 in Section 56-1.03, "Fabrication," of the Standard Specifications, with the exception of the title, is deleted.

Paragraph 3 in Section 56-1.03, "Fabrication," of the Standard Specifications is amended by adding the following:

Surfaces of base plates which are to come in contact with concrete, grout, or washers and leveling nuts shall be flat to within 1/8 inch tolerance in 12 inches, and to within 3/16 inch tolerance overall. Faying surfaces of plates in high-strength bolted connections including flange surfaces of field splices, chord joints, and frame junctures, and contact surfaces of plates used for breakaway slip base assemblies shall be flat to within 1/16 inch tolerance in 12 inches, and within 1/8 inch tolerance overall.

Thermally cut holes made in tubular members of sign supports, other than holes in base and flange plates, shall initially be made a minimum of 1/16 inch undersized, and then be mechanically enlarged by reaming or grinding to the final required size and shape. All edges shall have a surface roughness of not greater than 0.25 mil. Round holes may be drilled to the exact final diameter. No holes shall be made in members unless the holes are shown on the plans or are approved in writing by the Engineer.

Paragraphs 6 through 13 in Section 56-1.03, "Fabrication," of the Standard Specifications are amended to read:

High-strength bolted connections, where shown on the plans, shall conform to the provisions in Section 55-3.14, "Bolted Connections," except that only fastener assemblies consisting of a high-strength bolt, nut, hardened washer and direct tension indicator shall be used.

High-strength fastener assemblies, and any other bolts, nuts, and washers attached to sign structures shall be zinc-coated by the mechanical deposition process.

An alternating snugging and tensioning pattern for anchor bolts and high-strength bolted splices shall be used. Once tensioned, high-strength fastener components and DTT's shall not be reused.

For bolt diameters less than 3/8 inch, the diameter of the bolt hole shall be not more than 0.3 inches larger than the nominal bolt diameter. For bolt diameters greater than or equal to 3/8 inch, the diameter of the bolt hole shall be not more than 1/32 inch larger than the nominal bolt diameter.

Sign structures shall be fabricated into the largest practical sections prior to galvanizing.

Ribbed sheet metal panels for box beam closed truss sign structures shall be fastened to the truss members by cap screws or bolts as shown on the plans, or by 3/16 inch stainless steel blind rivets conforming to Industrial Fasteners Institute, Standard IFI-114, Grade 51. The outside diameter of the large flange rivet head shall be not less than 5/8 inch in diameter. Web splices in ribbed sheet metal panels may be made with similar type blind rivets of a size suitable for the thickness of material being connected.

Any spalling or chipping of concrete structures shall be repaired by the Contractor at the Contractor's expense.

Overhead sign supports shall have an aluminum identification plate permanently attached near the base, adjacent to the traffic side on one of the vertical posts, using either stainless steel rivets or stainless steel screws. As a minimum, the information on the plate shall include the name of the manufacturer, the date of manufacture and the contract number.

Section 56-1.04, "Welding," of the Standard Specifications is amended to read:

56-1.04 Welding.— Welding, nondestructive testing (NDT) of welds, and acceptance and repair criteria for NDT of steel overhead sign structure members shall conform to the requirements of AWS D1.1 and the special provisions. Steel members used for overhead sign structures shall receive NDT in conformance with AWS D1.1 and the following:

Weld Location	Weld Type	Minimum Required NDT
Welds for butt joint welds in tubular sections, nontubular sections, and posts	CJP groove weld with backing ring	100% UT or RT
Longitudinal seam welds*	PJP groove weld	25% MT
	CJP groove weld	100% UT or RT
Welds for base plate, flange plate, or end cap to post or mast arm	CJP groove weld	25% UT or RT
	Fillet weld	25% MT
* Longitudinal seam welds shall have 60% minimum penetration, except that within 6 inches of any circumferential weld, longitudinal seam welds shall be CJP groove welds.		

A written procedure approved by the engineer shall be used when performing UT on material less than 5/16 inch thick. Contoured shoes shall be used when performing UT on round tubular sections under 50 inch in diameter.

When less than 100 percent of a weld is specified for NDT, and if defects are found during this inspection, additional NDT shall be performed. This additional NDT shall be performed on 25percent of the total weld for all similar welds, as determined by the Engineer, produced for sign structures in the project. If any portion of the additional weld inspected is found defective, 100percent of all similar welds produced for sign structures in the project, as determined by the Engineer, shall be tested. Circumferential welds and base plate to post welds may be repaired only one time without written permission from the Engineer.

Where cast-in-drilled-hole concrete pile sign foundations are to be constructed in slag aggregate embankments, the diameter of the pile shall be increased to provide at least 3 inches of concrete cover over the reinforcing steel. Cast-in-drilled-hole concrete piles constructed with the additional dimension specified herein will be measured and paid for at the contract price per linear foot for the size of cast-in-drilled-hole concrete pile (sign foundation) shown on the plans for that location.

Full compensation for additional cost of constructing cast-in-drilled-hole concrete pile sign foundations in slag aggregate embankments, including the increased quantity of portland cement concrete, and any increased drilling cost, shall be considered as included in the contract price paid per linear foot for the size of cast-in-drilled-hole concrete pile (sign foundation) shown on the plans and no additional compensation will be allowed therefor.

PAYMENT

Full compensation for furnishing anchor bolt templates and for testing of welds, shall be considered as included in the contract lump sum price paid per pound for furnish sign structure and no additional compensation will be allowed therefor.

10-1.57 ROADSIDE SIGNS

Roadside signs shall be installed at the locations shown on the plans or where directed by the Engineer, and shall conform to the provisions in Section 56-2, "Roadside Signs," of the Standard Specifications and these special provisions.

Type N, Type P, and Type R marker panels mounted on a post with a roadside sign shall be considered to be sign panels and will not be paid for as markers.

The first three paragraphs of Section 56-2.02B, "Wood Posts," of the Standard Specifications are amended to read:

The grades and species allowed for wood posts, 4" x 4" in size, are select heart redwood; No. 1 heart structural redwood (1050f); No. 2 heart structural redwood (900f); No. 1 structural light framing Douglas fir, free of heart center; No. 1 structural light framing Hem-Fir, free of heart center; or No. 1 structural light framing Southern yellow pine, free of heart center. The grades and species allowed for wood posts, 4" x 6" in size, are select heart grade redwood; select heart structural grade redwood (1100f); No. 1 heart structural redwood (950f); No. 2 structural joists and planks, Douglas fir, free of heart center; No. 1 structural joists and planks Hem-Fir, free of heart center; or No. 2 structural joists and planks Southern yellow pine. The grades and species allowed for wood posts larger than 4" x 6" in size are select heart redwood; No. 1 heart structural redwood (950f); No. 1 posts and timbers (also known as No. 1 structural) Douglas fir, free of heart center; select structural posts and timbers Hem-Fir, free of heart center; or No. 1 timbers Southern yellow pine, free of heart center.

Posts shall be graded in conformance with the provisions in Section 57-2, "Structural Timber." Sweep shall not exceed 0.08-foot in 10 feet.

Before preservative treatment, the moisture content of Douglas fir, Hem-Fir, and Southern yellow pine posts shall be not more than 25 percent as measured at the midpoint of the post in the outer inch, using an approved type of moisture meter, in conformance with the requirements of ASTM Designation: D 4444.

Install sign (strap and saddle bracket method) will be measured and paid for as install roadside sign panel on existing post.

10-1.58 INSTALL ROADSIDE SIGN PANELS ON EXISTING POSTS

Roadside sign panels shall be installed on existing posts at the locations shown on the plans or where directed by the Engineer and in conformance with the provisions in Section 56-2.04, "Sign Panel Installation," of the Standard Specifications and these special provisions.

Attention is directed to "Roadside Signs" elsewhere in these special provisions.

The cutting of the ends of wood posts in the field and field application of wood preservatives shall conform to the provisions in the sixth paragraph of Section 56-2.02B, "Wood Posts," of the Standard Specifications.

Two holes shall be drilled in each existing post as required to provide a breakaway feature as shown on the plans.

Existing sign panels, as shown on the plans, shall be removed and disposed of as provided in Section 15, "Existing Highway Facilities," of the Standard Specifications.

Installing roadside sign panels on existing posts will be paid for as units determined from actual count in place.

The contract unit price paid for install roadside sign panel on existing post shall include full compensation for furnishing all labor, materials (except State-furnished sign panels), tools, equipment, and incidentals, and for doing all the work involved in installing roadside sign panels on existing posts (including removing and disposing of existing sign panels, and drilling holes in existing posts to provide a breakaway feature), complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.59 INSTALL SIGN PANELS ON EXISTING FRAMES

Sign panels shall be installed on existing frames at the locations shown on the plans or where directed by the Engineer and in conformance with the provisions in Section 56-1.06, "Sign Panels and Fastening Hardware," of the Standard Specifications and these special provisions.

Existing sign panels, as shown on the plans, shall be removed and disposed of as provided in Section 15, "Existing Highway Facilities," of the Standard Specifications.

Installing sign panels on existing frames will be measured by the square foot, and the quantity to be paid for will be the total area, in square feet, of sign panels installed in place.

The contract price paid per square foot for install sign panel on existing frame shall include full compensation for furnishing all labor, materials (except State-furnished sign panels and mounting bolts), tools, equipment, and incidentals, and for doing all the work involved in installing sign panels on existing frames, complete in place (including removing and disposing of existing sign panels), as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.60 INSTALL SIGN OVERLAY

Sign overlays shall be installed on existing signs, as shown on the plans, and in conformance with these special provisions.

Sign overlay panels will be furnished by the State as provided under "State Furnished Materials" of these special provisions.

Self plugging blind rivets for installing sign overlays shall have a 3/16" x 5/8" shank. A number 10 drill shall be used for drilling the rivet holes. If the overlay is not pre-punched, maximum rivet spacing shall be 16 inches.

Install sign overlay will be measured by the square foot.

The contract price paid per square foot for install sign overlay shall include full compensation for furnishing all labor, materials (except sign overlays), tools, equipment, and incidentals, and for doing all the work involved in installing sign overlay panels on existing signs (including fastening hardware), as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.61 ALTERNATIVE PIPE

Alternative pipe culverts shall conform to the provisions in Section 62, "Alternative Culverts," of the Standard Specifications and these special provisions.

Except as otherwise designated by classification on the plans or in the specifications, joints for culvert and drainage pipes shall conform to the plans or specifications for standard joints.

REINFORCED CONCRETE PIPE:

Concrete for reinforced concrete pipe used as alternative pipe shall conform to the following:

Alternative pipe culvert

Concrete shall contain a minimum of 8 sacks of Type II modified cement per cubic yard. Total mix water shall not exceed 15% by volume. Concrete cover over bar reinforcing steel shall be a minimum of 2 inches on both sides.

10-1.62 CORRUGATED METAL PIPE

Corrugated steel culverts shall conform to the provisions in Section 66, "Corrugated Metal Pipe," of the Standard Specifications and these special provisions.

Asphaltic mastic coating or polymeric coating substituted for bituminous coating shall be placed on the outside and inside surfaces of the pipe.

Corrugated steel pipe shall be fabricated from zinc-coated steel sheet.

The first paragraph in Section 66-1.03, "Protective Coatings, Linings and Pavings," of the Standard Specifications is amended to read:

66-1.03 Protective Coatings, Linings and Pavings.—When required by the special provisions or designated in the Engineer's Estimate, pipes shall be protected with bituminous coating, bituminous lining or have the invert paved with bituminous material or coated with polymerized asphalt. All moisture, dirt, oil, unbonded or incompatible paint, grease, alkalis, or other foreign matter shall be removed from the surface to be coated before the coating material is applied.

Section 66-1.03, "Protective Coatings, Linings and Pavings," of the Standard Specifications is amended by adding the following paragraphs after the eighth paragraph:

Polymerized asphalt invert coating shall be applied in conformance with the requirements in ASTM Designation: A 849 for "Invert Paved Type with Polymer Material (Class P)," except that polymerized asphalt coatings shall be applied by immersion to a minimum thickness of 0.05 inch above the crests and troughs of the corrugations of the interior and exterior invert including pipe ends. Polymerized asphalt material shall conform to the "Requirements for Polymer Coating" contained in ASTM Designation: A 742/A 742M, and the following:

Polymerized asphalt shall be hot-applied thermoplastic material containing a minimum of 7.0 percent styrene-butadiene-styrene block copolymer.

There shall be not more than 0.25 inch undercutting or delamination from the scribe when a minimum 12 inches by 12 inches coupon cut from the coated pipe is exposed for 1000 hours in accordance with the requirements in ASTM Designation: B 117. Cut edges shall be sealed by dipping in a sample of the polymerized asphalt coating heated to the manufacturer's recommended application temperature. There shall be no corrosion or delamination from the sealed edges following exposure as specified.

The last paragraph in Section 66-1.03, "Protective Coatings, Linings and Pavings," is amended to read:

Damaged protective coatings, linings and invert paving shall be repaired by the Contractor at the Contractor's expense. Bituminous material conforming to the requirements in AASHTO Designation: M 190 or other materials approved by the Engineer shall be used to repair damaged bituminous coatings; asphalt mastic material conforming to the requirements in AASHTO Designation: M 243 shall be used to repair damaged asphalt mastic coatings; and tar base material conforming to the provisions of AASHTO Designation: M 243 shall be used to repair damaged polymeric coatings. The repair of damaged polymerized asphalt coatings shall conform to the requirements in ASTM Designation: A 762, Section 11, "Repair of Damaged Coatings."

Section 66-3.06, "Damaged Aluminum Coatings," of the Standard Specifications is amended to read:

66-3.06 Damaged Aluminum Coatings.— In lieu of the requirements in AASHTO Designation: M 36/M 36M, damaged aluminum coatings shall be repaired as provided for damaged galvanizing in Section 75-1.05, "Galvanizing," or Section 66-3.05, "Damaged Galvanizing."

Universal coupling bands constructed with dimples, as shown on the Standard Plans, shall not be used in the work, except as otherwise provided herein.

When any corrugated steel pipe has been cut in the field, the connections shall be made with a coupling band and a portland cement concrete collar. The coupling band shall be the universal type constructed with dimples or the helical type.

10-1.63 EDGE DRAINS

Edge drains shall conform to the requirements in Section 68-3, "Edge Drains," of the Standard Specifications.

10-1.64 OVERSIDE DRAINS

Corrugated steel pipe downdrains shall conform to the provisions in Section 69, "Overside Drains," of the Standard Specifications and these special provisions.

Attention is directed to "Corrugated Metal Pipe elsewhere in these special provisions.

Corrugated steel pipe downdrains shall be fabricated from zinc-coated steel sheet.

10-1.65 MISCELLANEOUS FACILITIES

Precast concrete pipe risers shall conform to the provisions in Section 70, "Miscellaneous Facilities," of the Standard Specifications.

10-1.66 SLOPE PROTECTION

Slope protection shall conform to the provisions in Section 72, "Slope Protection," of the Standard Specifications and these special provisions.

The minor concrete (slope protection), where shown on the plans, shall be colored in accordance with the provisions in Section 72-6.03, "Materials," of the Standard Specifications. The color shall be tan conforming closely to Davis San Diego Buff color No. 5237 or Scofield Adobe Tan color No. C-21.

Full compensation for color additive shall be considered as included in the contract price paid for minor concrete (slope protection) and no separate compensation will be allowed therefor.

10-1.67 SLOPE PAVING - (CONCRETE)

Slopes under the bridge ends where shown on the plans shall be paved in conformance with the provisions in Section 72-6, "Slope Paving," of the Standard Specifications and these special provisions.

The first paragraph of Section 72-6.06, "Payment," of the Standard Specifications is amended to read:

The contract price paid per cubic yard for slope paving (concrete) shall include full compensation for furnishing all labor, materials (including bar reinforcing steel, reinforcing steel anchors, galvanized nails and timber spacers), tools, equipment and incidentals, and for doing all the work involved in constructing slope paving, complete in place (including excavation, backfill and installing timber spacers), as shown on the plans, as specified in the special provisions and these specifications, and as directed by the Engineer.

The slope paving shall be colored in accordance with the provisions in Section 72-6.03, "Materials," of the Standard Specifications.

The color of the completed slope paving after curing and when dry shall be tan conforming closely to Davis San Diego Buff color No. 5237 or Scofield Adobe Tan color No. C-21.

10-1.68 SLOPE PAVING (MASONRY BLOCK)

Slopes under the bridge ends at Navajo Road Undercrossing where shown on the plans shall be paved in accordance with the provisions in Section 72-6, "Slope Paving," of the Standard Specifications and these special provisions.

Air blown mortar shall not be used.

Masonry block for slope paving at Navajo Road Undercrossing shall be concrete pavers conforming to ASTM Designation: C 90, Type-II. The surface exposed to view shall have split face texture. Each split faced block veneer shall have a minimum of 5 scores of at least 5/8 inch deep. The color of veneer blocks shall be tan and shall match the referee sample available at District 11 Construction Liaison (Duty Senior), California Department of Transportation, 2829 Juan Street, San Diego, CA.

The nominal size of concrete pavers shall be 8" x 2" x 16". Head and bed mortar joints shall be butt joints.

Portland cement shall conform to the requirements in Section 90-2.01, "Portland Cement," of the Standard Specifications.

Hydrated lime shall conform to ASTM Designation: C 207, Type S.

Mortar sand shall be commercially produced for masonry work and free of organic impurities and lumps of clay and shale.

Mortar for laying concrete pavers shall consist, by volume, of one part portland cement, 0 to 1/2 parts of hydrated lime, and 2 1/4 to 3 parts of mortar sand. Sufficient water shall be added to make a workable mortar. Each batch of mortar shall be accurately measured and thoroughly mixed. Mortar shall be freshly mixed as required. Mortar shall not be retempered more than one hour after mixing. The amount of lime shall be reduced as necessary to prevent leaching and efflorescence on finished surfaces.

A proprietary, premixed packaged blend of cement, lime, and sand, without color, that requires only water to prepare for use as brick mortar or grout may be furnished for mortar. Packages of premix shall bear the manufacturer's name, brand, weight, and color identification. The manufacturer's recommended mixing proportions and procedures shall be furnished to the Engineer.

Surfaces of concrete against which concrete pavers are to be placed shall be roughened and cleaned, exposing the stone aggregate, and shall be flushed with water and allowed to dry to a surface dry condition immediately prior to laying the paver units.

Concrete pavers shall be installed on a bond coat over a cement mortar bedding.

Concrete surface to receive mortar setting bed shall be prepared as specified for horizontal construction joints in Section 51-1.13, "Bonding," of the Standard Specifications.

The setting bed of mortar shall have a thickness of not less than one inch and shall be finished parallel to the finished brick surface. The setting bed of mortar shall be cured for at least 24 hours before placing the bond coat. The surfaces of the cured setting bed shall be roughened and cleaned free from laitance, coatings, oil, sand, dust, and loose particles.

The bond coat shall be either dry set mortar or latex-portland cement mortar. Organic adhesive shall not be used for bond coat. The bond coat shall be mixed according to the manufacturer's recommendations. The consistency of the mixture shall be such that ridges formed with the recommended notched trowel shall not flow or slump. Reworking will be allowed provided no water or materials are added. The cured setting bed shall be dampened before placing the bond coat but the setting bed shall not be soaked.

The bond coat shall be floated onto the cured setting bed surface with sufficient pressure to cover the surface evenly with no bare spots. The surface area to be covered with bond coat shall be no greater than the area that can be covered with concrete pavers while the bond coat is still plastic. Bond coat mortar shall be combed with a notched trowel within 10 minutes before installing concrete pavers. Concrete pavers shall not be installed on a skinned over mortar bond coat.

The concrete pavers shall be back buttered immediately before installing the units. The concrete pavers shall be firmly pressed into the freshly notched bond coat. Concrete pavers shall be tamped to a true surface and to obtain 100 percent coverage by bond coat on the back of each unit.

Joints shall be straight and of uniform and equal width.

Spacers, strings, ropes, pegs, glue, paper and face mounting material shall be removed before grouting the concrete pavers. Grouting shall not begin until at least 48 hours after installing concrete pavers.

Grout shall be suitable for grouting quarry tile and shall conform to ANSI Standard: A 108.5 and shall consist, by volume, of one part portland cement, up to 1/5 part lime, 2 parts sand, and an amount of water to provide a grout with a consistency that can be forcibly compressed into joints. As an alternative, a proprietary portland cement grout suitable for grouting quarry tile may be used.

A maximum amount of grout shall be forced into the joints between and surrounding concrete paver units. The grout shall be tooled to a slightly concave cross section to a depth not more than 1/8 inch below the finished surface.

The finished grout shall have a uniform color and shall be smooth without voids, pinholes or low spots.

The concrete pavers shall be kept continuously damp for at least 72 hours after grouting. Curing materials shall not stain the concrete pavers, grouted joints, or surrounding concrete surfaces.

Surfaces of completed masonry, concrete, and other such materials exposed to view shall be protected from spillage, splatters and other deposits of cementitious materials from masonry construction. All such deposits shall be removed without damage to the materials or exposed surfaces. Stains, efflorescence, laitance, splashes or spots on the faces of masonry exposed to view shall be removed. Cleaning agents shall conform to the concrete paver manufacturers recommendations. Cleaning agents shall be applied to a sample area acceptable to the Engineer, and their performance and the cleaning methods approved by the Engineer before proceeding with cleaning beyond the sample area.

Areas of slope paving shown on the plans to have an exposed aggregate finish shall be constructed and finished in accordance with the following requirements.

1. Coarse aggregate shall conform to the requirements for 1" x No. 4 primary size coarse aggregate in Section 90-3.02, "Coarse Aggregate Grading," of the Standard Specifications.
2. Shotcrete shall not be used for the construction of exposed aggregate concrete.
3. Coarse aggregates shall be exposed to a depth of approximately 3/16 to 3/8 inch. Exposed aggregate surfaces shall be uniform in appearance.
4. At the option of the Contractor, a concrete set retarder may be applied to the surface of the concrete after placing, consolidating, and finishing of the concrete has been completed. The concrete set retarder shall be commercial quality, manufactured specifically for use on the top surface of concrete and shall be applied in accordance with the manufacturer's recommendations. The retarder shall effectively retard the setting time of the cement and fine aggregate matrix deep enough and long enough to permit exposing the aggregates.
5. Care shall be taken in placing and consolidating the concrete such that the coarse aggregate remains uniformly distributed throughout the concrete.
6. When the mass of the concrete has set sufficiently to permit removing the matrix of cement and fine aggregate, the coarse aggregate shall be exposed with a water spray, coarse brooming, abrasive blasting, or a combination of these procedures. Removal methods shall not dislodge or loosen the coarse aggregate from embedment in the cement mortar.
7. Immediately after the cement mortar has hardened sufficiently to resist further removal, all cement film and other loose material shall be cleaned from the exposed aggregate and all other surfaces with stiff brooms and water.
8. Except when operations for exposing the aggregate are underway, concrete shall be cured by the water method or with Type (6) curing compound in accordance with Section 90-7.01B, "Curing Compound Method," of the Standard Specifications. Areas of concrete where curing compounds are removed during the cure period shall be kept continuously wet until the end of the cure period or until the curing compound is replaced.

Slope paving (masonry block) will be measured by the square foot. The area to be paid for will be calculated from the lengths and widths placed of masonry block and the exposed aggregate finish shown on the plans.

The contract price paid per square foot for slope paving (masonry block) shall include full compensation for furnishing all labor, materials (including concrete pavers, steel anchors and reinforcement), tools, equipment, and incidentals and for doing all the work involved in slope paving, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Full compensation for exposed aggregate finish shall be considered as included in the contract price paid per square foot for slope paving (masonry block) and no separate payment will be made therefor.

10-1.69 MISCELLANEOUS CONCRETE CONSTRUCTION

Minor concrete (miscellaneous construction), minor concrete (gutter), minor concrete (colored) and minor concrete (grooved) shall conform to the provisions in Section 73, "Concrete Curbs and Sidewalks," of the Standard Specifications and these special provisions.

The gutter behind the retaining wall shall conform to the provisions in Section 73, "Concrete Curbs and Sidewalks," of the Standard Specifications and these special provisions.

Curb ramp detectable warning surface shall conform to the details shown on the plans and shall not be constructed or installed on curb ramps with a slope that exceeds 6.67 percent. The finished surfaces of the detectable warning surface shall be free from blemishes.

Curb ramp detectable warning surface shall consist of raised truncated domes constructed or installed on curb ramps. Detectable warning surface, at the option of the Contractor, shall be either cast-in-place or stamped into the surface of the curb ramp, or shall be a prefabricated surface installed on the curb ramp. The color of detectable warning surface shall be yellow conforming to Federal Color Number 33538 of Standard Number 595B. Detectable warning surface either cast-in-place or stamped into the surface of the curb ramp shall be painted yellow in conformance with the provisions of Section 59-6, "Painting Concrete," of the Standard Specifications.

Prior to constructing curb ramps with cast-in-place or stamped detectable warning surface, the Contractor shall construct a test panel on the job site of a size not less than 2 feet by 2 feet. The test panel shall be constructed, finished and cured with the same materials, tools, equipment and methods to be used in constructing the proposed permanent work. Additional test panels shall be constructed as necessary until a panel is produced which demonstrates, to the satisfaction of the Engineer, the ability of the selected procedure to produce a detectable warning surface that meets all of the specified requirements.

Full compensation for constructing or installing curb ramp detectable warning surface shall be considered as included in the contract price paid per cubic yard for minor concrete (miscellaneous construction) and no separate payment will be made therefor.

Minor concrete (colored), except minor concrete (grooved), shall be tan conforming closely to Davis manufacturer San Diego Buff color No. 5237 or Scofield manufacturer Sombrero Buff color No. C-25. Minor concrete (grooved) shall be brown, closely conforming to Davis manufacturer Flagstone Brown color No. 644 or Scofield manufacturer Adobe Tan color No. C-21. Coloring shall be integral, chemically inert, fade resistant mineral oxide or synthetic type.

The surface, except minor concrete (grooved), shall receive a heavy broom finish.

Prior to placing the permanent colored concrete, the Contractor shall construct a test panel at least 3 feet by 3 feet at the site for approval by the Engineer. The test panel shall be constructed of the same materials proposed for the permanent work and shall be colored, finished, including scoring and cured as specified for the permanent work. Additional test panels shall be constructed as necessary until a panel is produced which conforms to the requirements herein, before constructing other colored concrete.

Aggregate for minor concrete (grooved) shall conform to the grading specified for fine aggregate in Section 90-3.03, "Fine Aggregate Grading," of the Standard Specifications.

Welded wire fabric, of the size and type shown on the plans, conforming to the provisions in Section 52, "Reinforcement," of the Standard Specifications, shall be placed in the textured paving areas shown on the plans.

Aggregate base shall be Class 2 and shall conform to the provisions in Section 26, "Aggregate Bases," of the Standard Specifications and these special provisions.

The respective pattern types and colors of concrete for textured paving shall be placed at the locations shown on the plans, struck off and compacted until a layer of mortar is brought to the surface. The concrete shall be screeded to the required grade and cross section and floated to a uniform surface.

Minor concrete (grooved) concrete release agent shall have a color conforming to Davis manufacturer Kahlua color No. 667

The forming tools for the textured paving shall be applied to form the patterned surfaces while the concrete is still in the plastic stage of set.

Grooved concrete areas shall be cured by the curing compound method. The curing compound shall be curing compound (6) as specified in Section 90-7.01B, "Curing Compound Method," of the Standard Specifications.

Curing seal and other deleterious substances shall be removed from the impressions in the textured areas, to receive the grout, before the grout is placed. Cleaning and removal methods shall not stain or discolor those portions of the textured paving to remain exposed after grouting. Methods of cleaning the impressions in textured areas to be grouted shall be approved by the Engineer.

For payment purposes, the area in square feet of minor concrete (grooved) will be determined from horizontal measurements of the finished textured paving.

The contract price paid per square foot for minor concrete (grooved) shall include full compensation for furnishing all labor, materials tools, equipment, and incidentals, and for doing all the work involved in constructing minor concrete (grooved) concrete complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.70 MISCELLANEOUS IRON AND STEEL

Miscellaneous iron and steel shall conform to the provisions in Section 75, "Miscellaneous Metal," of the Standard Specifications and these special provisions.

The second paragraph in Section 75-1.06, "Measurement," of the Standards Specifications is amended to read:

Scale weights will not be required when miscellaneous iron and steel, miscellaneous bridge metal, miscellaneous metal (restrainer), or pumping plant metal work are designated as final pay items in the Engineer's Estimate.

10-1.71 MISCELLANEOUS METAL (BRIDGE)

Miscellaneous metal (bridge) shall conform to the provisions for miscellaneous bridge metal in Section 75, "Miscellaneous Metal," of the Standard Specifications and these special provisions.

Attention is directed to "Welding Quality Control" of these special provisions.

The second paragraph of Section 75-1.02, "Miscellaneous Iron and Steel" of the Standard Specifications is amended to read:

Unless otherwise specified, materials shall conform to the following specifications:

MATERIAL	SPECIFICATION
Steel bars, plates and shapes	ASTM Designation: A 36/A 36M or A 575, A 576 (AISI or M Grades 1016 through 1030 except Grade 1017)
Other parts for general applications	Commercial quality
Steel fastener components for general applications:	
Bolts and studs	ASTM Designation: A 307
Headed anchor bolts	ASTM Designation: A 307, Grade B, including S1 supplementary requirements
Nonheaded anchor bolts	ASTM Designation: A 307, Grade C, including S1 supplementary requirements and S1.6 of AASHTO Designation: M 314 supplementary requirements or AASHTO Designation: M 314, Grade 36 or 55, including S1 supplementary requirements
High-strength bolts and studs which include threaded rods and high-strength nonheaded anchor bolts	ASTM Designation: A 449, Type 1
Nuts	ASTM Designation: A 563, including Appendix X1 ^(a)
Washers	ASTM Designation: F 844
Components of high-strength steel fastener assemblies for use in structural steel joints:	
Bolts	ASTM Designation: A 325, Type 1
Tension control bolts	ASTM Designation: F 1852, Type 1
Nuts	ASTM Designation: A 563, including Appendix X1 ^(a)
Hardened washers	ASTM Designation: F 436, Type 1, Circular, including S1 supplementary requirements
Direct tension indicators	ASTM Designation: F 959, Type 325, zinc-coated
Stainless steel fasteners for general applications:	Alloys 304 or 316
Bolts, screws, nuts and studs which include threaded rods and nonheaded anchor bolts	ASTM Designation: F 593 or F 738M ASTM Designation: A 240 and ANSI B 18.22M
Washers	
Carbon-steel castings	ASTM Designation: A 27/A 27M, Grade 65-35 [450-240], Class 1
Malleable iron castings	ASTM Designation: A 47, Grade 32510 or A 47M, Grade 22010
Gray iron castings	ASTM Designation: A 48, Class 30B
Ductile iron castings	ASTM Designation: A 536, Grade 65-45-12
Cast iron pipe	Commercial quality standard soil
Steel pipe	Commercial quality welded
(a) Zinc-coated nuts that will be tightened beyond snug or wrench tight shall be furnished with a dry lubricant conforming to Supplementary Requirement S2 in ASTM Designation: A 563.	

Miscellaneous metal (bridge) shall consist of the miscellaneous bridge metal items listed in Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications, and the following:

Soffit opening grates

Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications is amended by adding the following paragraph after paragraph 3:

High-strength bolted connections shall conform to the provisions for high-strength steel fasteners and for bolted connections in Section 55, "Steel Structures."

An approved thread locking system, consisting of a cleaner, primer and anaerobic adhesive, shall be applied where shown on the plans. Lubricants and foreign materials shall be removed from the threaded areas of both parts using the cleaner and small wire brush. The primer shall be applied to cover the threaded areas of both parts. The anaerobic adhesive shall be applied to fill the male threads in the area of the final position of the nut. The nut shall be installed at the location or to the torque shown on the plans, and an additional fillet of anaerobic adhesive shall be applied completely around the exposed junctions of the nut and male part. Full compensation for furnishing and applying the thread locking system shall be considered as included in the contract price paid for the item of work requiring the system and no separate payment will be made therefor.

The third subparagraph of the second paragraph of Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications is amended to read:

3. Manhole frames and covers, frames and grates, ladder rungs, guard posts, and access door assemblies.

The third subparagraph of the eleventh paragraph of Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications is amended to read:

Cast-in-place inserts shall be ferrule loop or cast iron type.

All metal parts of anchorage devices shall be fabricated from steel, except iron castings for cast-in-place inserts shall be malleable iron or ductile iron.

All metal parts of anchorage devices, except mechanical expansion anchors and iron castings for cast-in-place inserts, shall be hot-dip or mechanically galvanized. Mechanical expansion anchors may be hot-dip or mechanically galvanized, made from stainless steel, or coated with electrodeposited zinc conforming to the requirements of ASTM Designation: B 633. Iron castings shall be mechanically galvanized.

The second paragraph in Section 75-1.06, "Measurement," of the Standards Specifications is amended to read:

Scale weights will not be required when miscellaneous iron and steel, miscellaneous bridge metal, miscellaneous metal (restrainer), or pumping plant metal work are designated as final pay items in the Engineer's Estimate.

10-1.72 CHAIN LINK FENCE

Chain link fence shall be (Type CL-6, vinyl-clad) or (Type CL-6, slatted) as shown on the plans and shall conform to the provisions in Section 80, "Fences," of the Standard Specification and these special provisions.

Chain link fabric, for Type CL-6 chain link fence shall be vinyl coated and shall be black in color.

Chain link fence (Type CL-6, slatted) shall have wood or plastic slats at the option of the Contractor, but shall be consistent throughout the project.

Wood slats shall consist of clear redwood or light to medium weight wood produced by the species Shorea (Meranti). Wood slats shall not be less than 1/4 inch thick and approximately 2 5/16 inches wide with a length sufficient to fill the vertical opening of the fabric and shall be inserted vertically in the mesh openings, so as to fit snugly, and fastened in a manner to prevent easy removal or displacement.

Plastic slats shall be manufactured from a high density virgin polyethylene with ultraviolet inhibitors, shall be green in color and shall conform to the following:

Dimensions:

Flat tubular cross section with a wall thickness of approximately 0.03-inch; depth of approximately 0.325 inch; width of approximately 2.38 inches; length equal to designated fence height.

Materials Specifications

Property	Value	ASTM Designation
Melt Index	0.24	D 1238
Density	0.951	D 1505
Low Temperature		
Brittleness	-76° F.	D 746
Tensile Strength	3700 psi	D 638

10-1.73 DELINEATORS

Delineators shall conform to the provisions in Section 82, "Markers and Delineators," of the Standard Specifications and these special provisions.

Delineators on flexible posts shall be as specified in "Prequalified and Tested Signing and Delineation Materials," elsewhere in these special provisions. Flexible posts shall be made from a flexible white plastic which shall be resistant to impact, ultraviolet light, ozone and hydrocarbons. Flexible posts shall resist stiffening with age and shall be free of burns, discoloration, contamination, and other objectionable marks or defects which affect appearance or serviceability.

Reflective sheeting for metal and flexible target plates shall be the reflective sheeting designated for channelizers, markers, and delineators specified in "Prequalified and Tested Signing and Delineation Materials," elsewhere in these special provisions.

10-1.74 METAL BEAM GUARD RAILING

Metal beam guard railing shall conform to the provisions in Section 83-1, "Railings," of the Standard Specifications and these special provisions.

Attention is directed to "Order of Work" of these special provisions.

Line posts and blocks shall be wood.

The ninth, eleventh and twelfth paragraphs in Section 83-1.02B, "Metal Beam Guard Railing," of the Standard Specifications are amended to read:

The grades and species of wood posts and blocks shall be No. 1 timbers (also known as No. 1 structural) Douglas fir or No. 1 timbers Southern yellow pine. Wood posts and blocks shall be graded in conformance with the provisions in Section 57-2, "Structural Timber," except allowances for shrinkage after mill cutting shall in no case exceed 5 percent of the American Lumber Standards minimum sizes, at the time of installation.

Wood posts and blocks shall be pressure treated after fabrication as provided in Section 58, "Preservative Treatment of Lumber, Timber and Piling," with creosote, creosote coal tar solution, creosote-petroleum solution (50-50), pentachlorophenol in hydrocarbon solvent, copper naphthenate, ammoniacal copper arsenate, or ammoniacal copper zinc arsenate. In addition to the preservatives listed above, Southern yellow pine may also be pressure treated with chromated copper arsenate. When other than one of the creosote processes is used, blocks shall have a minimum retention of 0.40-pound per cubic foot, and need not be incised.

If copper naphthenate, ammoniacal copper arsenate, chromated copper arsenate, or ammoniacal copper zinc arsenate is used to treat the wood posts and blocks, the bolt holes shall be treated as follows:

Before the bolts are inserted, bolt holes shall be filled with a grease, recommended by the manufacturer for corrosion protection, which will not melt or run at a temperature of 150° F.

TERMINAL SYSTEM (TYPE SRT).—Terminal system (Type SRT) shall be furnished and installed as shown on the plans, and as specified in these special provisions.

Terminal system (Type SRT) shall be a SRT-350 Slotted Rail Terminal as manufactured by Syro, Inc., a Trinity Industries Company, and shall include all the items detailed for terminal system (Type SRT) shown on the plans.

Arrangements have been made to insure that any successful bidder can obtain the SRT-350 Slotted Rail Terminal from the manufacturer, Syro, Inc., a Trinity Industries Company, P.O. Box 99, 950 West 400S, Centerville, UT 84014, Telephone (800) 772-7976. The price quoted by the manufacturer for the SRT-350 Slotted Rail Terminal, FOB Centerville, Utah is \$865.00, not including sales tax.

The above price will be firm for orders placed on or before June 30, 2000 provided delivery is accepted within 90 days after the order is placed.

The Contractor shall provide the Engineer with a Certificate of Compliance from the manufacturer in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications. The Certificate of Compliance shall certify that terminal systems (Type SRT) conform to the contract plans and specifications, conform to the prequalified design and material requirements and were manufactured in conformance with the approved quality control program.

The terminal system (Type SRT) shall be installed in conformance with the manufacturer's installation instructions and these requirements. At the Contractor's option, steel foundation tubes with soil plates attached, shall be either driven, with or without pilot holes, or placed in drilled holes. Any space around the steel foundation tubes shall be backfilled with selected earth, free of rock, placed in layers approximately 4 inches thick and each layer shall be moistened and thoroughly compacted. Wood terminal posts shall be inserted into the steel foundation tubes by hand. Before the wood terminal posts are inserted, the inside surfaces of the steel foundation tubes to receive the wood posts shall be coated with a grease which will not melt or run at a temperature of 150° F or less. The edges of the wood terminal posts may be slightly rounded to facilitate insertion of the post into the steel foundation tubes.

Surplus excavated material remaining after the terminal system (Type SRT) has been constructed shall be disposed of in a uniform manner along the adjacent roadway as directed by the Engineer.

The quantity of terminal systems (Type SRT) will be measured as units determined from actual count in place in the completed work.

The contract unit price paid for terminal system (Type SRT) shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all work involved in furnishing and installing terminal system (Type SRT), complete in place, including excavation, backfill and disposal of surplus material and connecting the terminal system to new or existing metal beam guard railing, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.75 CHAIN LINK RAILING

Chain link railing shall conform to the provisions in Section 83-1, "Railings," of the Standard Specifications.

10-1.76 TUBULAR HANDRAILING RAILING

Tubular handrailing shall conform to the provisions in Section 83-1, "Railings," of the Standard Specifications.

10-1.77 CABLE RAILING

Cable railing shall conform to the provisions in Section 83-1, "Railings," of the Standard Specifications.

10-1.78 CONCRETE BARRIER

Concrete barriers shall conform to the provisions in Section 83-2, "Barriers," of the Standard Specifications and these special provisions.

Type 25 modified concrete barrier located at the bridge approaches, as shown on the plans, will be measured and paid for as concrete barrier (Type 25).

Type 26A modified concrete barrier located at the bridge approaches at Grossmont College Drive Overcrossing, as shown on the plans, will be measured and paid for as concrete barrier (Type 26 modified). For locations other than Grossmont College Drive Overcrossing, Type 26A modified concrete barrier will be measured and paid for as concrete barrier (Type 26A modified).

The last subparagraph of the seventh paragraph of Section 83-2.02D(2), "Materials," of the Standard Specifications is amended to read:

Grease shall conform to the requirements of Military Specification: MIL-S-8660.

10-1.79 THERMOPLASTIC TRAFFIC STRIPES AND PAVEMENT MARKINGS

Thermoplastic traffic stripes (traffic lines) and pavement markings shall conform to the provisions in Section 84, "Traffic Stripes and Pavement Markings," of the Standard Specifications and these special provisions.

The second and third sentences of Section 84-2.02, "Materials," of the Standard Specifications are amended to read:

Glass beads to be applied to the surface of the molten thermoplastic material shall conform to the requirements of State Specification 8010-004 (Type II).

State Specifications for thermoplastic material and glass beads may be obtained from the Transportation Laboratory, 5900 Folsom Boulevard, Sacramento, CA 95819-4612, Telephone 916-227-7289.

At the option of the Contractor, permanent striping tape as specified in "Prequalified and Tested Signing and Delineation Materials" of these special provisions, may be placed instead of the thermoplastic traffic stripes and pavement markings specified herein, except that 3M, "Stamark" Series A320 Bisymmetric Grade, manufactured by the 3M Company, shall not be used. Pavement tape, if used, shall be installed in conformance with the manufacturer's specifications. If pavement tape is placed instead of thermoplastic traffic stripes and pavement markings, the pavement tape will be measured and paid for as thermoplastic traffic stripe and thermoplastic pavement marking.

10-1.80 PAINT TRAFFIC STRIPES AND PAVEMENT MARKINGS

Painting traffic stripes (traffic lines) and pavement markings, including temporary traffic stripes and pavement markings shown on the stage construction sheets of the plans, shall conform to the provisions in Section 84, "Traffic Stripes and Pavement Markings," of the Standard Specifications and these special provisions.

Attention is directed to "Remove Traffic Stripes and Pavement Markings" elsewhere in these special provisions regarding removal of temporary painted traffic stripes and pavement markings shown on the stage construction sheets of the plans.

The subparagraphs of the first paragraph in Section 84-3.02, "Materials," of the Standard Specifications are amended to read:

	State Specification No.
Solvent Borne, Acrylic Copolymer Traffic Line.—White, Yellow and Black	PT-170-A
Water Borne, Traffic Line.—White, Yellow and Black	8010-20A

The second and third paragraphs in Section 84-3.02, "Materials," of the Standard Specifications are amended to read:

Glass beads shall conform to State Specification 8010-004 (Type II).

State Specifications for traffic paint and glass beads may be obtained from the Transportation Laboratory, 5900 Folsom Boulevard, Sacramento, CA 95819-4612, Telephone 916-227-7289.

At the option of the Contractor, permanent striping tape as specified in "Prequalified and Tested Signing and Delineation Materials" of these special provisions, may be placed instead of the painted traffic stripes and pavement markings specified herein, except that 3M, "Stamark" Series A320 Bisymmetric Grade, manufactured by the 3M Company, shall not be used. Pavement tape, if used, shall be installed in conformance with the manufacturer's specifications. If pavement tape is placed instead of painted traffic stripes and pavement markings, the pavement tape will be measured and paid for as paint traffic stripe and paint pavement marking of the number of coats designated in the Engineer's Estimate.

Where striping is shown on the plans to join existing striping the Contractor shall begin and end transition from the existing striping pattern into or from the new striping pattern a sufficient distance to ensure continuity of the striping pattern.

Temporary traffic stripes shall be removed when no longer required for the direction of public traffic, as determined by the Engineer.

Temporary painted traffic stripes shown on the stage construction sheets of the plans will be measured and paid for as paint traffic stripe (-2-coat).

Temporary pavement markings shown on the stage construction sheets of the plans will be measured and paid for as paint pavement marking (1-coat).

10-1.81 PAVEMENT MARKERS

Pavement markers, including temporary pavement markers shown on the stage construction sheets of the plans, shall conform to the provisions in Section 85, "Pavement Markers," of the Standard Specifications and these special provisions.

Attention is directed to "Remove Pavement Markers" elsewhere in these special provisions regarding removal of temporary pavement markers shown on the stage construction sheets of the plans.

The sixth paragraph of Section 85-1.06 shall not apply to the temporary pavement markers shown on the plans.

Epoxy adhesive shall not be used to place temporary pavement markers in areas where removal of the markers will be required.

Temporary pavement markers shall be removed when no longer required for the direction of public traffic, as determined by the Engineer.

The second paragraph in Section 85-1.02, "Type of Markers," of the Standard Specifications shall not apply.

Certificates of compliance shall be furnished for pavement markers as specified in "Prequalified and Tested Signing and Delineation Materials" elsewhere in these special provisions.

Attention is directed to "Traffic Control System For Lane Closure" elsewhere in these special provisions regarding the use of moving lane closures during placement of pavement markers with bituminous adhesive.

Temporary pavement markers shown on the stage construction sheets of the plans will be measured and paid for as pavement marker (non-reflective) and pavement marker (reflective).

SECTION 10-2. HIGHWAY PLANTING AND IRRIGATION SYSTEMS

10-2.01 GENERAL

The work performed in connection with highway planting and irrigation systems shall conform to the provisions in Section 20, "Erosion Control and Highway Planting," of the Standard Specifications and these special provisions.

The Contractor shall notify the Engineer not less than 72 hours prior to requiring initial access to the existing irrigation controllers. When the Engineer determines that access to the controllers is required at other times, arrangements will be made to provide this access.

10-2.01A COST BREAK-DOWN

The Contractor shall furnish to the Engineer a cost break-down for the contract lump sum items of highway planting and irrigation system.

Cost break-downs shall be completed and furnished in the format shown in the samples of the cost break-downs included in this section. Unit descriptions of work shown in the samples are the minimum to be submitted. Additional unit descriptions of work may be designated by the Contractor. If the Contractor elects to designate additional unit descriptions of work, the quantity, value and amount for those units shall be completed in the same manner as for the unit descriptions shown in the samples. The units and quantities given in the samples are to show the manner of preparing the cost break-downs to be furnished by the Contractor.

The Contractor shall determine the quantities required to complete the work shown on the plans. The quantities and their values shall be included in the cost break-downs submitted to the Engineer for approval. The Contractor shall be responsible for the accuracy of the quantities and values used in the cost break-downs submitted for approval.

No adjustment in compensation will be made in the contract lump sum prices paid for highway planting and irrigation system due to any differences between the quantities shown in the cost break-downs furnished by the Contractor and the quantities required to complete the work as shown on the plans and as specified in these special provisions.

The sum of the amounts for the units of work listed in each cost break-down for highway planting and irrigation system work shall be equal to the contract lump sum price bid for the work. Overhead and profit shall be included in each individual unit listed in each cost break-down. Cost break-downs shall be submitted to the Engineer for approval within 15 working days after the contract has been approved. Cost break-downs shall be approved, in writing, by the Engineer before any partial payment for the items of highway planting and irrigation system will be made.

Approved cost break-downs will be used to determine partial payments during the progress of the work and as the basis of calculating the adjustment in compensation for the items of highway planting and irrigation system due to changes ordered by the Engineer. When an ordered change increases or decreases the quantities of an approved cost break-down, the adjustment in compensation will be determined in the same manner specified for increases and decreases in the quantity of a contract item of work in accordance with Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications.

IRRIGATION SYSTEM COST BREAK-DOWN

Contract No. 11-010734

UNIT DESCRIPTION	UNIT	APPROXIMATE QUANTITY	VALUE	AMOUNT
CHECK AND TEST EXISTING IRRIGATION FACILITIES	LS	LUMP SUM		
CONTROL AND NEUTRAL CONDUCTORS	LS	LUMP SUM		
1" ELECTRIC REMOTE CONTROL VALVE	EA	25		
1-1/2" ELECTRIC REMOTE CONTROL VALVE	EA	174		
2" ELECTRIC REMOTE CONTROL VALVE	EA	2		
2" ELECTRIC REMOTE CONTROL VALVE (MASTER) (WITH FLOW METER)	EA	2		
40 STATION SATELLITE CONTROLLER	EA	1		
32 STATION SATELLITE CONTROLLER	EA	4		
16 STATION SATELLITE CONTROLLER (SCORPIO)	EA	1		
HAND HELD REMOTE CONTROL, TRC TRANSMITTER AND RECEIVER	EA	2		
MAXICOM TRAINING (16 HOURS) AND PC ANYWHERE SOFTWARE	LS	LUMP SUM		
1" PLASTIC PIPE (PR 200) (SUPPLY LINE)	LF	65,970		
1-1/4" PLASTIC PIPE (PR 200) (SUPPLY LINE)	LF	15,560		
1-1/2" PLASTIC PIPE (PR 200) (SUPPLY LINE)	LF	8,790		
2" PLASTIC PIPE (PR 200) (SUPPLY LINE)	LF	21,790		
3" PLASTIC PIPE (PR 200) (SUPPLY LINE)	LF	15,160		
2" BACKFLOW PREVENTER ASSEMBLY	EA	2		
BACKFLOW PREVENTER ASSEMBLY ENCLOSURE	EA	2		
SPRINKLER (TYPE A-5)	EA	145		
SPRINKLER (TYPE A-6)	EA	290		
SPRINKLER (TYPE A-7)	EA	468		
SPRINKLER (TYPE A-8)	EA	314		
SPRINKLER (TYPE A-11)	EA	7		
SPRINKLER (TYPE A-12)	EA	43		

10-2.02 EXISTING HIGHWAY PLANTING

In addition to the provisions in Section 20 of the Standard Specifications, work performed in connection with existing highway planting shall be in accordance with the provisions in Section 15, "Existing Highway Facilities," of the Standard Specifications and these special provisions.

Replacement planting shall conform to the requirements specified under "Preservation of Property" elsewhere in these special provisions.

10-2.02A MAINTAIN EXISTING PLANTS

Existing plants shall be maintained as directed by the Engineer. Maintain existing plants will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

10-2.03 EXISTING HIGHWAY IRRIGATION FACILITIES

In addition to the provisions in Section 20, "Erosion Control and Highway Planting," of the Standard Specifications, the work performed in connection with the various existing highway irrigation system facilities shall conform to the provisions in Section 15, "Existing Highway Facilities," of the Standard Specifications and these special provisions.

Existing irrigation facilities shown on the plans or specified in these special provisions to be removed shall remain in place until their use, as determined by the Engineer, is no longer required.

Existing irrigation facilities that are to remain, or are to be maintained, as part of this contract, shall be protected from damage. If the Contractor's operations damage the existing irrigation facilities, the Contractor shall, at the Contractor's expense, repair or replace the damaged facilities as follows:

Repair or replacement of damaged facilities shall be completed within 10 working days of the damage.

Replaced irrigation facilities shall be new, and of equal or better quality than the damaged facility. Replacement irrigation facilities shall be compatible with the irrigation systems to remain.

After repair or replacement of the facilities is complete, the Contractor shall demonstrate to the Engineer that the repaired or replaced facilities operate properly. When remote control valves are repaired or replaced, the valves shall be tested with the irrigation controller in the automatic mode.

10-2.03A CHECK AND TEST EXISTING IRRIGATION FACILITIES

Existing irrigation facilities that are to remain and that are within areas where clearing and grubbing or earthwork operations are to be performed, shall be checked for missing or damaged components and proper operation prior to performing the operations. Existing irrigation facilities outside of work areas that are affected by the construction work shall also be checked for proper operation.

The Contractor shall submit a written list of existing irrigation system deficiencies to the Engineer within 5 working days after checking the existing facilities.

Deficiencies found during checking existing facilities shall be corrected by the Contractor as directed by the Engineer. Corrective work ordered by the Engineer will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

Existing backflow preventers shall be tested in accordance with the requirements specified under "Irrigation Systems" elsewhere in these special provisions.

Length of watering cycles for use of potable water from water meters for checking or testing existing irrigation facilities shall be as determined by the Engineer.

Repairs to the existing irrigation facilities ordered by the Engineer after checking and testing the facilities, and any further repairs required thereafter as ordered by the Engineer, except as otherwise provided under "Existing Highway Irrigation Facilities" elsewhere in these special provisions, will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

Full compensation for checking and testing existing irrigation facilities, including testing existing backflow preventers, shall be considered as included in the contract lump sum price paid for irrigation system and no additional compensation will be allowed therefor.

10-2.04 HIGHWAY PLANTING

The work performed in connection with highway planting shall conform to the provisions in Section 20-4, "Highway Planting," of the Standard Specifications and these special provisions.

10-2.04A HIGHWAY PLANTING MATERIALS

PLANTS.--Plants that are found to be in a root bound condition or have an underdeveloped root ball as determined by the Engineer will not be accepted.

GREEN WASTE COMPOST.—Green waste compost shall be woody material. Woody materials shall consist of chipped, shredded or ground green materials such as shrubs, tree trimmings or clean processed wood products. Green waste compost shall be obtained from suppliers permitted by the California Integrated Waste Management Board.

Deleterious materials such as rocks, glass, plastics, metals, clods, weeds, weed seeds, coarse objects, sticks larger than the specified particle size, salts, paint, petroleum products, pesticides or other chemical residues that would be harmful to plant or animal life shall not exceed 0.1 percent of the compost volume. Chipping shall include shredding, grinding or any other method used to reduce compost materials to the specified size. At least 85 percent of the compost, by volume, shall conform to the particle size specified.

Materials shall be composted and have reached an internal temperature of 133° F. for a minimum of 20 consecutive days. During the composting process the compost shall have been turned a minimum of 5 times, and shall have been cured for 90 days after the composting process is completed.

Green waste compost shall be a maximum screening size of 5/8 inch minus.

MULCH.--Mulch shall be wood chips.

COMMERCIAL FERTILIZER.--Commercial fertilizer (slow release) shall be a pelleted or granular form, shall be a slow release type and shall have the following guaranteed chemical analysis:

Ingredient	Percentage
Nitrogen	19
Phosphoric Acid	6
Water Soluble Potash	12

Commercial fertilizer (tablet) shall be a slow release type and shall be in tablet form. Each tablet, as shown on the Plant List on the plans, shall have a mass of 21 ± 1 grams, and shall have the following guaranteed chemical analysis:

Ingredient	Percentage
Nitrogen	20
Phosphoric Acid	10
Water Soluble Potash	5

10-2.04B ROADSIDE CLEARING

Prior to preparing planting areas and hydroseeding areas, or commencing irrigation trenching operations for planting areas, trash and debris shall be removed from proposed planting areas and within the areas extending beyond the outer limits of the proposed planting areas to the adjacent edges of existing planting to remain or to be maintained, shoulders, dikes, curbs, sidewalks, fences and walls.

In addition to removing trash and debris, the project area shall be cleared as specified herein:

Weeds shall be killed and removed within proposed ground cover, and weeds shall be killed and removed within the area extending beyond the outer limits of the proposed ground cover areas to the adjacent edges of shoulders, dikes, curbs, sidewalks, walls, existing planting and fences. At locations where proposed ground cover areas are 12 feet or more from the adjacent edges of shoulders, dikes, curbs, sidewalks, walls and fences, the clearing limit shall be 6 feet beyond the outer limits of the proposed ground cover areas.

Weeds shall be killed and removed within proposed planting areas where plants are to be planted in groups or rows 15 feet or less apart, and from within an area extending 6 feet beyond the outer limits of the groups or rows of plants.

Weeds shall be killed and removed within an area 6 feet in diameter centered at each proposed plant location where the plants are to be planted more than 15 feet apart and are located outside of proposed ground cover areas.

Roadside clearing for hydroseeding areas shall consist of mowing weeds and removing trash and debris in the areas to be seeded until the start of the hydroseeding operation.

Disposal of weeds killed during the initial roadside clearing will be required, unless otherwise directed by the Engineer.

After the initial roadside clearing is complete, additional roadside clearing work shall be performed as often as necessary to maintain the areas, as specified above, in a neat appearance until the start of the plant establishment period. This work shall include the following:

Trash and debris shall be removed.

Rodents shall be controlled.

Weed growth shall be killed and removed before the weeds reach the seed stage of growth or exceed 6 inches in length.

Weeds in plant basins, including basin walls, shall be removed by hand pulling, after the plants have been planted.

WEED CONTROL.--Weed control shall also conform to the following:

Stolon type weeds shall be killed with glyphosate.

Tumbleweeds shall be removed by hand pulling before the tumbleweeds reach a height of 6 inches.

Removed weeds shall be disposed of outside the highway right of way in accordance with the provisions in Section 7-1.13 of the Standard Specifications.

Areas to be mowed shall be mowed when weed height exceeds 12 inches. Weeds shall be mowed to a height of 2 inches to 6 inches.

Disposal of mowed material and killed weeds after initial roadside clearing will be required, unless otherwise directed by the Engineer.

Roadside clearing work shall not include any work required to be performed as clearing and grubbing as specified in Section 16, "Clearing and Grubbing," of the Standard Specifications.

10-2.04C PESTICIDES

Pesticides used to control weeds shall conform to the provisions in Section 20-4.026, "Pesticides," of the Standard Specifications. Except as otherwise provided in these special provisions, pesticide use shall be limited to the following materials:

Diquat

Glyphosate

Oxadiazon - 50 percent WP (Preemergent)

Oryzalin (Preemergent)

Trifluralin (Preemergent)

Ammonium Sulfate

If the Contractor elects to request the use of other pesticides on this project, the request shall be submitted in writing to the Engineer not less than 10 working days prior to the intended use of the other pesticides. Except for the pesticides listed in the preceding paragraph, no pesticides shall be used or applied without prior written approval from the Engineer.

Prior to placing mulch one application of preemergent shall be applied to green waste compost area.

Glyphosate shall be used to kill stolon type weeds.

Oxadiazon shall be of the emulsifiable concentration or wettable powder type.

Ground cover plants shall be planted a minimum of 5 days and shall be watered prior to the application of preemergents.

A minimum of 100 days shall elapse between applications of preemergents.

Except for ground cover plants, preemergents shall not be applied within 18 inches of plants.

Ammonium sulfate shall be used only in areas planted to *Carpobrotus* or *Delosperma*. Ammonium sulfate shall not be applied in such a manner as to allow the pesticides to come in contact with trees or shrubs.

No pesticides shall be applied within the limits of plant basins. Pesticides shall not be applied in such a manner as to allow the pesticides to come in contact with the foliage and woody parts of plants.

10-2.04D PREPARING PLANTING AREAS

Plants adjacent to drainage ditches shall be located so that after construction of the basins, no portion of the basin walls shall be less than the minimum distance shown on the plans for each plant involved.

WEED GERMINATION.--Weed germination shall be performed within the areas to be planted with ground cover.

After the irrigation systems have been installed and the plant holes have been excavated and backfilled, no further planting work shall be done for a period of 20 days, except the soil shall be kept sufficiently moist to germinate the weeds and weeds that germinate shall be killed.

PREPARE HOLES.—Holes for plants shall be excavated to the minimum dimensions shown on the plans.

Backfill material for plant holes shall be a mixture of native soil and soil amendment (nitrolized fir shaving) as shown on the plans. Backfill material shall be thoroughly mixed and uniformly distributed throughout the entire depth of the plant hole without clods and lumps.

10-2.04E PLANTING

Commercial fertilizer and iron sulfate shall be applied or placed at the time of planting and at the rates shown on the plans.

Commercial fertilizer (slow release) shall be applied to ground cover plants immediately after planting and watered into the soil.

Commercial fertilizer (tablet) shall be placed evenly around and approximately half the depth of the root ball for Plant (Group A, B, K and Z) plants.

Mulch placed in areas outside of plant basins shall be spread to a depth of not less than 4 inches.

Mulch for plant basins shall be placed so that the mulch does not come in contact with the plant stem.

Mulch placed adjacent to earthen drainage ditches shall not be placed within 10 feet of the edge of the ditches. Mulch placed adjacent to paved drainage ditches shall not be placed within 10 feet of its edge.

Green waste compost shall be placed on surface of ground cover areas a maximum of 5 working days prior to planting ground cover. Material shall be spread a rate of 2 yards of compost per 1000 square feet.

Attention is directed to the requirements specified under "Irrigation Systems Functional Test" elsewhere in these special provisions regarding functional tests of irrigation systems. Planting shall not be performed in an area until the functional test has been completed on the irrigation system serving that area.

10-2.04F HYDROSEEDING

Hydroseeding shall conform to the provisions in Section 20-3, "Erosion Control," of the Standard Specifications and these special provisions.

Hydroseeding work shall consist of mowing weeds and hydroseeding seed and commercial fertilizer to areas designated on the plans as "Hydroseed."

Hydroseeding materials shall not be applied prior to November 1, nor after January 31. If hydroseeding work cannot be performed prior to the start of plant establishment and within the above specified time limit, then the work shall be performed during the plant establishment period when directed by the Engineer.

Pesticides shall not be used on hydroseeding areas after the seed has been applied.

SITE PREPARATION.--Immediately prior to hydroseeding areas, trash and debris shall be removed, and weeds shall be mowed as close to the ground as possible. Removal of mowed material will not be required.

Removed trash and debris shall be disposed of outside the highway right of way in accordance with the provisions in Section 7-1.13 of the Standard Specifications.

MATERIALS.--Materials shall conform to the provisions in Section 20-2, "Materials," of the Standard Specifications and the following:

SEED.--Seed shall conform to the provisions in Section 20-2.10, "Seed," of the Standard Specifications. Individual seed species shall be measured and mixed in the presence of the Engineer.

Seed not required to be labeled under the California Food and Agricultural Code shall be tested for purity and germination by a seed laboratory certified by the Association of Official Seed Analysts, or a seed technologist certified by the Society of Commercial Seed Technologists.

Seed shall have been tested for purity and germination not more than one year prior to application of seed.

Results from testing seed for purity and germination shall be furnished to the Engineer prior to applying seed.

NON-LEGUME SEED.--Non-legume seed shall consist of the following:

NON-LEGUME SEED		
Botanical Name (Common Name)	Percent (Minimum) Germination	Pounds pure live seed per acre (Slope measurement)
Dimorphotheca sinuata (African Daisy)	85	6

Seed shall be delivered to the job site in unopened separate containers with the seed tag attached. Containers without a seed tag will not be accepted.

A sample of approximately one ounce of seed will be taken from each seed container by the Engineer.

COMMERCIAL FERTILIZER.--Commercial fertilizer shall conform to the provisions in Section 20-2.02, "Commercial Fertilizer," of the Standard Specifications and shall have a guaranteed chemical analysis of 16 percent nitrogen, 20 percent phosphoric acid and 0 percent water soluble potash.

APPLICATION.--Hydroseed shall be applied at the rate of 6 pounds per acre (slope measurement). Commercial fertilizer shall be applied at the rate of 150 pounds per acre (slope measurement).

10-2.04G PLANT ESTABLISHMENT WORK

The plant establishment period shall be Type 2 and shall be not less than 250 working days.

If hydroseeding cannot be performed within the time limits specified under "Hydroseeding" elsewhere in these special provisions, and the Engineer determines that the work except hydroseeding and plant establishment work has been completed, the Engineer will notify the Contractor in writing of the start of the plant establishment period.

Hydroseeding not performed prior to the start of the plant establishment period shall be performed during the plant establishment period. The work involved in preparing areas to receive hydroseeding and applying seed shall be in accordance with the requirements specified under "Hydroseeding" elsewhere in these special provisions.

Attention is directed to "Relief From Maintenance and Responsibility" elsewhere in these special provisions regarding relief of maintenance and protection.

Three applications of commercial fertilizer (slow release) shall be applied to trees, shrubs, vines and ground cover areas when directed by the Engineer. Commercial fertilizer shall be applied at the rates shown on the plans and shall be spread with a mechanical spreader wherever possible.

The center to center spacing of replacement plants for unsuitable ground cover plants shall be determined by the number of completed plant establishment working days at the time of replacement and the original spacing in accordance with the following:

ORIGINAL SPACING (Inches)	SPACING OF REPLACEMENT GROUND COVER PLANTS (Inches)		
	Number of Completed Plant Establishment Working Days		
	1-125	126-190	191-250
9"	9"	6"	6"

During the plant establishment period, the Contractor shall water the plants utilizing the Remote Irrigation Control System (RICS) software program. The Contractor shall submit a watering schedule to the Engineer for use during the plant establishment period.

Weeds within plant basins, including basin walls and ground cover, shall be controlled by hand pulling.

Weeds within mulched areas, but outside of plant basins, shall be controlled by killing.

Vines shall be trained onto fences and walls.

At the option of the Contractor, plants of a larger container size than those originally specified may be used for replacement plants during the first 125 working days of the plant establishment period. The use of plants of a larger container size than those originally specified for replacement plants shall be at the Contractor's expense.

After 125 working days of the plant establishment period have been completed, replacement of plants, except for ground cover plants, shall be one gallon size for seedlings, pot and liner size plants; 5-gallon size for one gallon size

plants; 15-gallon size for 5-gallon size plants; 24-inch box size for 15-gallon size plants; and 36-inch box size for 24-inch box size.

When ordered by the Engineer, one application of a preemergent pesticide conforming to the requirements specified under "Pesticides" elsewhere in these special provisions, shall be applied between 40 and 50 working days prior to completion of the plant establishment period.

When the Engineer determines that the plant stakes are inadequate to support the plants during the plant establishment period, the Contractor, at his cost, shall replace the plant stakes with a larger diameter stake adequate to support the plant. Plant stakes shall be removed at any time during the plant establishment period when ordered by the Engineer. Plant stakes shall be completely removed within 15 working days prior to completion of the plant establishment period.

The Contractor shall submit a watering schedule program, for each irrigation controller, to the Engineer for approval not less than 40 working days prior to the completion of the plant establishment period. If the Engineer determines the submitted watering schedule is unacceptable, the Contractor shall submit a revised watering schedule to the Engineer for approval within 5 working days after receiving notice that the previously submitted schedule is unacceptable.

Written instructions shall be given to the Engineer during the plant establishment period on the use and adjustment of the installed irrigation controllers. The approved watering schedule program shall be implemented by the Contractor not less than 10 working days prior to the completion of the plant establishment period. The programming shall not relieve the Contractor of the responsibility to apply sufficient water as conditions may require to keep the plants in a healthy condition.

The final inspection, as specified in Section 5-1.13 of the Standard Specifications, shall be completed a minimum of 20 working days before the estimated completion of the contract.

10-2.05 IRRIGATION SYSTEMS

Irrigation systems shall be furnished and installed in accordance with the provisions in Section 20-5, "Irrigation Systems," of the Standard Specifications, except materials containing asbestos fibers shall not be used.

Materials for irrigation systems, unless otherwise specified, shall be commercial quality.

Primers and paints for application on metal and wood surfaces shall be the best quality grade of the type specified elsewhere in these special provisions and shall be manufactured by a recognized paint manufacturer. Thinners and coloring tints shall conform to the paint manufacturer's recommendations. Coatings shall not be thinned except as recommended by the paint manufacturer for application. Each application of paint shall be compatible with the previous application and shall be from paint made by the same manufacturer. Testing of primers and paints will not be required.

Gate valves, 3 inches and larger in size, shall be furnished with a square lug and shall be operated by use of long shank keys. Prior to acceptance of the contract, one long shank keys shall be delivered to the Engineer.

Gate valves 3 inches in size shall be flanged type gate valves and shall have a solid brass wedge.

Pipe flanges used to connect plastic or metal pipe to gate valves shall be metal. Plastic flanges will not be allowed.

VALVE BOXES.--Valve boxes shall conform to the requirements in Section 20-2.24, "Valve Boxes," of the Standard Specifications, except as otherwise provided herein.

Valve boxes shall be, fiberglass reinforced plastic and shall be purple in color for use with reclaimed water.

Covers for plastic valve boxes shall be glass fiber reinforced plastic and shall be purple in color for use with reclaimed water. Valve boxes shall be identified on the top surface of the covers by hot branding the appropriate abbreviations for the irrigation facilities contained in the valve boxes as shown on the plans. Valve boxes that contain remote control valves shall be identified by the appropriate letters and numbers (controller and station numbers). The letters and numbers shall be 2 inches in height.

10-2.05A ELECTRIC AUTOMATIC IRRIGATION COMPONENTS

IRRIGATION CONTROLLERS.--Irrigation controllers shall be solar automatic irrigation controllers, Rain Bird Maxicom and Motorola controllers. The Rain Bird Maxicom irrigation controllers shall communicate by cellular interface. Motorola irrigation controllers shall be Scorpio auxiliary controllers with UHF radios.

Arrangements have been made to insure that any successful bidder can obtain the specified equipment listed below from Pacific Technical Services, 23372 South Pointe Drive, Laguna Hills, California, 92653, telephone (949) 837-4737.

The quoted prices and equipment are as follows:

RAINBIRD EQUIPMENT DESCRIPTION	QUOTED PRICE	SALES TAX	EXTENDED PRICE	QUANTITY AT THIS PRICE
RB2-40 ESP 40 Station Satellite Controller with Radio, Modem Dome Antenna Assembly, Master Valve Relays TRC Connector and Cable Kit.	\$3,949.00	\$306.00	\$4,255.00	1
RB2-32 ESP 32 Station Satellite Assembly, Cluster Adapter Module, Master Valve Relays TRC Connector and Cable Kit.	\$2,029.00	\$157.00	\$2,343.00	2
RB2-32 ESP 32 Station Satellite Controller with Radio, Modem Dome Antenna assembly, Master Valve Relays TRC Connector and Cable Kit.	\$3,226.00	\$250.00	\$3,476.00	2
RB2-16 ESP 16 Station Satellite Assembly, Cluster Adapter Module, Master Valve Relays TRC Connector and Cable Kit.	\$1,657.00	\$128.00	\$1,785.00	1
TRC-XREC-K Hand Held Remote Control, TRC Transmitter and Receiver.	\$2,045	\$158.50	\$2,203.50	2
SOFTWARE CPC Anywhere software and 16 Hours of Maxicom Training	\$1,960.00	\$152.00	\$2,112.00	1

Prices are guaranteed by Pacific Technical Services for one year from the date of the quote, December 17, 1999.

Arrangements have been made to insure that any successful bidder can obtain the specified equipment listed below from Crest Automation & Classic Contracting, 2913 El Camino Real, Suite 119, Tustin, California, 92782, telephone (949) 552-6552.

The quoted prices and equipment are as follows:

MOTOROLA EQUIPMENT DESCRIPTION	QUANTITY	QUOTED PRICE	SALES TAX	EXTENDED PRICE
F2805A 16 Station Controller (Scorpio)	1	\$2,340.00	\$181.35	\$2,521.35
16 Station Terminal Strip Kit	1	\$175.50	\$13.60	\$189.10
RRA-4738 UHF Dome Antenna.	1	\$166.50	\$12.90	179.40

Prices are guaranteed by Crest Automation & Classic Contracting for one year from the date of the quote, November 18, 1999.

Solar automatic irrigation controller shall conform to the following:

1. Photovoltaic 4-station irrigation controller, photovoltaic power system, computer with lockable, waterproof, vandal resistant case, shall be manufactured as one complete unit.
2. All power will be provided by an internal photovoltaic system. Power shall be available for continuous 24-hour operation under the minimum light equivalent to 25% of ambient light at 55 degrees latitude.
3. The computer liquid-crystal display will be powered by a 9-volt battery key mechanism.
4. The irrigation controller shall have an output digital control pulse at 3.5-volts which will operate a valve solenoid actuator within 1000 feet distance.
5. Irrigation controller shall be fully automatic and capable of operating a complete 1 day to 90 day cycle, scheduling up to 32 totally independent programs, each having its own start time, day cycle, assigned stations, duration, and program time. Each station shall be capable of 1 minute to 24 hours in 1 minute increments with separate setting for hours and minutes.
6. Irrigation controller shall have an emergency program backup system with a user-defined fail-safe program and system parameters which are stored in non-erasable memory.
7. Irrigation controller shall be installed on a vertical mounting tube, mounted as shown on the plans.
8. Low voltage control and neutral conductors and splice connectors shall be manufactured by the same company.
9. The watering time of each station shall be displayed on the face of the control panel.

Attention is directed to the requirements specified in Section 10-3, "Signals, Lighting and Electrical Systems," elsewhere in these special provisions, regarding electrical power for irrigation controllers and irrigation controller enclosure cabinets.

ELECTRIC REMOTE CONTROL VALVES.--Electric remote control valves shall conform to the following:

1. Valves shall be of glass filled nylon construction.
2. Valves shall be normally closed.
3. Valves shall be completely serviceable from the top without removing the valve body from the system.
4. Valves shall be equipped with a device that will regulate and adjust the flow of water and shall be provided with a manual shutoff. The manual shutoff for valves large than 3/4 inch shall be operated by a cross handle.
5. Valves for each irrigation controller shall be the same model series and shall be compatible with the model series of the irrigation controller.
6. Valve solenoids shall operate on the low voltage AC current supplied from the irrigation controller.
7. Valves shall be angle pattern (bottom inlet) or straight pattern (side inlet) as shown on the plans.
8. Valves shall be provided with manual bleeding devices.
9. Valves shall be equipped with internal diaphragms installed in the valve body casting.
10. Valve inlets and outlets shall have threaded fittings.
11. Valves shall have an operating pressure range of 20 to 200 psi.

12. Valves shall be internal self-cleaning, with no external tubing.
13. Valves shall be manufactured for use with non-potable water.

REMOTE CONTROL VALVE (MASTER) WITH FLOW METER.--The master remote control valve with flow meter shall be a globe type valve, consisting of diaphragm actuated hydraulic control valve with 0.3 amp, 3-way solenoid control and built-in impeller type flow meter. Remote control valves (master) shall normally be closed.

The valves shall conform to the following:

1. Valves shall be pressure rated to 150 psi and shall be equipped with 8-volt, cast iron, flange type end connections which conform to ANSI Standard: B16.1, Class 125.
2. Impeller driven flow meters shall be accurate to plus or minus 2 percent of the actual flow.
3. Flow meters shall be equipped with an electric pulse transmitter for remote monitoring, factory preset to provide a pulse signal every 10 gallons. Flow meter 2 inches in size shall have a flow range between 10 to 90 gallons per minute.
4. Valves shall operate on the 24-volt AC voltage supplied from the irrigation controller or controllers.
5. Main valve bodies and covers shall be of cast iron construction with internal and external epoxy coatings.

Flow sensor cable shall be installed in conduit between each master remote control valve with flow meter and irrigation controller as shown on the plans. Flow sensor cable shall conform the requirements elsewhere in these special provisions.

PULL BOXES.--Pull box installations shall conform to the provisions in Section 20-5.027I, "Conductors, Electrical Conduits and Pull Boxes," of the Standard Specifications.

CONDUCTORS.--Low voltage as used in this subsection "Conductors" shall mean 36 volts or less.

Low voltage control and neutral conductors in pull boxes and valve boxes, at irrigation controller terminals, and at splices shall be marked with adhesive cloth wrap-around markers.

Markers for the control conductors shall be identified with the appropriate number or letter designations of irrigation controllers and station numbers. Markers for neutral conductors shall be identified with the appropriate number or letter designations of the irrigation controllers.

The color of low voltage neutral and control conductor insulation, except for the striped portions, shall be homogeneous throughout the entire thickness of the insulation.

At the option of the Contractor, other types of splice sealing materials and methods may be used provided other materials and methods have been approved in writing by the Engineer prior to installation of the connectors.

FLOW SENSOR CABLE

Flow sensor cable shall be UL listed as Type TC and meet the requirements of ICEA/NEMA, 600-V control cable, 90°C, and the following:

1. The cable shall consist of two No. 16, minimum, stranded copper conductors. Each conductor shall be insulated with 0.48-mm, minimum nominal thickness, color coded, polypropylene or polyethylene material. Color coding shall distinguish each conductor.
2. The shield shall be either tinned copper braid or aluminized polyester film with a nominal 20 percent overlap. Where the film is used, a No. 18 or larger, stranded, tinned, copper drain wire shall be placed between the insulated conductors and the shield and in contact with the conductive surface of the shield.
3. The jacket shall be black polyvinyl chloride with minimum ratings of 600 V and 90°C and a minimum nominal thickness of 1.25 mm. The cable jacket shall be marked with the manufacturer's name or trademark, insulation type designation, number of conductors and conductor size, and voltage and temperature ratings.
4. The finished outside diameter of the cable shall not exceed 8.9 mm.
5. The capacitance, as measured between any conductor and the other conductors and the shield, shall not exceed 88 pf per meter at 1000 Hz.
6. The cable run between each valve and the irrigation controller shall be continuous without splices.

Prior to granting relief from maintenance and responsibility, as provided elsewhere in these special provisions, the functional test, as specified in Section 20-5.027J, "Testing," of the Standard Specifications, shall be satisfactorily completed, and instruction shall be given to the Engineer on the use and adjustment of the installed irrigation controllers.

10-2.05B IRRIGATION SYSTEMS FUNCTIONAL TEST

Functional tests for solar irrigation controllers (not a part of Remote Irrigation Controller System) and associated automatic irrigation systems shall conform to the provisions in Section 20-5.027J, "Testing," of the Standard Specifications and these special provisions.

Tests shall consist of demonstrating to the Engineer, through one complete cycle of the irrigation controllers in the automatic mode, that the associated automatic components of the irrigation systems operate properly. If automatic components of the irrigation systems fail a functional test, these components shall be repaired at the Contractor's expense and the testing repeated until satisfactory operation is obtained.

Associated automatic components shall include, but not be limited to, remote control valve actuator systems, remote control valves and rain sensors.

Upon completion of work on an irrigation system, including correction of deficiencies and satisfactory functional tests for the systems involved, the plants to be planted in the area watered by the irrigation system may be planted, provided the planting areas have been prepared as specified elsewhere in these special provisions.

10-2.05C IRRIGATION SYSTEMS FUNCTIONAL TEST

Functional tests for remote irrigation controller system (RICS) and associated automatic irrigation systems shall conform to the provisions in Section 20-5.027J, "Testing," of the Standard Specifications and these special provisions.

Two functional tests shall be performed, one without and one with connection to the RICS base station. Both tests shall consist of demonstrating to the Engineer, through one complete cycle of the irrigation controllers in the automatic mode, that the associated automatic components of the irrigation systems operate properly.

The Contractor shall notify the Engineer not less than 2 weeks prior to starting the functional tests for the remote irrigation controller system.

The existing RICS base station is located at the Kearny Mesa Water Manager's Office at 7181 Opportunity Road, Room 8, San Diego, California, 92111. Access to the RICS base station shall be by way of the Santee Maintenance Station, located at 8502 Railroad Avenue, Santee, CA 92071.

Associated automatic components for both tests shall include, but not be limited to, new and existing remote control valve actuator systems, irrigation controllers, remote control valves, conductors, flow sensors, and rain sensors. Associated automatic components for the second test shall include, but not be limited to, new and existing irrigation software programs, existing trunked radio transmission systems and flow alarms for high, low, zero and maximum mainline flows.

The first test shall be done prior to planting the plants and consist of testing the irrigation controllers and associated automatic irrigation systems without connection to the RICS base station. Upon completion of a satisfactory functional test, and correction of any deficiencies, the plants to be planted in the areas watered by the irrigation system may be planted, provided the planting areas have been prepared as specified elsewhere in these special provisions.

The second test shall be done prior to the start of plant establishment and consist of testing the irrigation controllers (field units) and associated automatic irrigation systems with connection to the RICS base station. As part of the second test the Contractor shall submit a RICS watering schedule for each irrigation controller (field unit) to the Engineer. The Engineer will enter the watering schedule into the irrigation software program, and a computer printout will be made available to the Contractor for verification. If the Engineer determines the submitted watering schedule is unacceptable, the Contractor shall submit a revised watering schedule to the Engineer for approval within 5 working days. Also as part of the second test the Contractor shall demonstrate to the Engineer that the RICS base station detects and reports the high, low, zero and maximum mainline flow alarms. Upon completion of a satisfactory test, including correction of deficiencies, the plant establishment period may begin, provided planting work as specified elsewhere in these special provisions has been completed except for plant establishment work.

If new automatic components of the irrigation systems, including RICS base station components, fail a functional test, the components shall be repaired at the Contractor's expense and the testing shall be repeated until satisfactory operation is obtained.

Repair or replacement of existing irrigation facilities due to unsatisfactory performance shall conform to the provisions in "Existing Highway Irrigation Facilities" elsewhere in these special provisions.

10-2.05D PIPE

COPPER PIPE.--Copper pipe shall be seamless, Type K hard drawn tubing.

Copper pipe supply lines installed between water meters and backflow preventer assemblies shall be installed not less than 18 inches below finished grade, measured to the top of the pipe.

Copper pipe buried in the ground shall be wrapped with a purple colored tape bearing the continuous wording "CAUTION RECLAIMED WATER." Tape shall be tightly applied with 1/2 inch minimum uniform overlap, free from wrinkles and voids. Pipe shall be wrapped a minimum of two wrappings.

PLASTIC PIPE.--Plastic pipe supply lines shall be purple colored PVC supply lines used for reclaimed water. Purple colored PVC supply lines shall conform to the following:

1. Pipe shall be made of polyvinyl chloride (PVC) 1120 with the minimum pressure ratings (PR) as shown on the plans.
2. Pipe shall conform to the following Standards: ASTM Designation: D 1785, ASTM Designation: D 3139 and ASTM Designation: D 2241, or ASTM Designation: D 2672.
3. Pipe shall have permanent wording "CAUTION RECLAIMED WATER" in 2 rows, approximately 180 degrees apart, in the longitudinal direction of the pipe. The warning message shall be repeated every 2 feet continuously along the pipe.

Plastic pipe supply lines and fittings that are 2 inches or larger in diameter on the supply side of control valves shall be the rubber ring gasket type, except when PR 315 plastic pipe supply line is required.

Plastic pipe supply lines less than 2 inches in diameter shall have solvent cemented type joints. Primers shall be used on the solvent cemented type joints.

Plastic pipe supply lines installed in conduit shall have a minimum pressure rating (PR) of 315 psi.

Solvent cement for plastic pipe supply lines shall conform to the requirements of the local Air Quality Management District.

10-2.05E BACKFLOW PREVENTER ASSEMBLIES

Backflow preventers shall be one of the approved reduced pressure principle devices listed by the California Department of Health Services, Division of Drinking Water and Environmental Management, 601 North 7th Street, MS 92, P O Box 942732, Sacramento, CA 94234-7320.

Pressure loss through the backflow preventers shall not exceed the following:

BACKFLOW PREVENTER SIZE (inches)	FLOW RATE (GPM)	PRESSURE LOSS (psi)
2	90	7.5

Backflow preventer assemblies shall be painted with a minimum of 2 applications of a commercial quality enamel paint. The color of the paint shall be light brown.

BACKFLOW PREVENTER ASSEMBLY ENCLOSURES.--Enclosures shall be fabricated of structural steel angles and flattened expanded metal and shall be installed over backflow preventer assemblies on a portland cement concrete pad in accordance with the details shown on the plans. There shall be a 2 inches minimum clearance between the backflow preventer assembly and the backflow preventer assembly enclosure. The concrete pad shall extend a minimum of 2 inches beyond the outer limits of the backflow preventer assembly enclosure, unless otherwise shown on the plans and these special provisions.

Expanded metal for sides, ends, and top panels shall be fabricated from 0.074-inch (14-gage), minimum thickness, sheet steel. The flattened expanded metal openings shall be approximately 3/4 inch by 1 3/4 inches in size.

Expanded metal panels shall be attached to the steel frames by a series of welds, not less than 1/4 inch in length and spaced not more than 4 inches on centers, along the edges of the enclosures.

Enclosure door handles shall have provisions for padlocking in the latched position. Padlocks will be State-furnished as provided under "State-furnished Materials" elsewhere in these special provisions.

Enclosures shall be galvanized, after fabrication, in accordance with the requirements specified in Section 75-1.05, "Galvanizing," of the Standard Specifications.

Hold down bolt assemblies shall be galvanized and shall be installed when the portland cement concrete pad is still plastic. Nuts shall be hexagonal and washers shall be the lock type.

Enclosures shall be painted with one application of a commercial quality pre-treatment, vinyl wash primer and a minimum of one application of a commercial quality, exterior enamel for metal. The finish color shall be light brown.

TESTING BACKFLOW PREVENTERS.--New backflow preventers installed by the Contractor and existing backflow preventers to remain in place shall be tested for proper operation by a certified Backflow Preventer Tester.

The backflow preventer tester shall hold a valid certification as a Backflow Preventer Tester from the county in which the device to be tested is located, or if the county does not have a certification program for Backflow Preventer Testers, the tester shall have a certificate from one of the following:

1. The American Water Works Association.
2. A county which has a certification program for Backflow Preventer Testers.

Testing for proper operation shall conform to the provisions of the county in which the testing is being performed or, if these procedures are not available, the tests shall conform to the provisions in the latest edition of the Guidance Manual for Cross-Connection Control Program, which is available from the California Department of Health Services, Division of Drinking Water and Environmental Management, 601 North 7th Street, MS 92, P.O. Box 942732, Sacramento, CA 94234-7320, Telephone: (916) 327-4097 or (916) 323-6111.

Tests for new backflow preventers shall be satisfactorily completed after installation of the backflow preventer assembly and before operation of the irrigation systems. Existing backflow preventers shall be tested, and repaired if required, when existing irrigation facilities are checked.

Repair of existing backflow preventers will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications when ordered by the Engineer, except damage caused by the Contractor's operations.

The Contractor shall notify the Engineer at least 5 days prior to testing backflow preventers.

One copy of the test results for each backflow preventer and a valid certification from the backflow preventer tester shall be furnished to the Engineer. New backflow preventers failing required tests shall be repaired or replaced at the Contractor's expense.

New and existing backflow preventers shall be retested one year after the satisfactory completion of the first tests or 10 days prior to completion of the plant establishment period, whichever occurs first.

Testing existing backflow preventers will be paid for as provided under "Checking and Testing Existing Irrigation Facilities" elsewhere in these special provisions.

Full compensation for retesting the backflow preventers shall be considered as included in the contract lump sum price paid for plant establishment work and no additional compensation will be allowed therefor.

10-2.05F SPRINKLERS

Sprinklers shall be the type, pattern and material and shall have the operating characteristics listed in the "Sprinkler Schedule" shown on the plans.

Drain pipe for (Type C-2 modified) sprinklers shall be commercially available rigid perforated polyvinyl chloride (PVC) pipe with the holes spaced not more than 6 inches on center on one side of the pipe.

The drain pipe shall be installed around the sprinkler riser within the plant basin as shown on the plans with the holes facing the plant root ball.

Pea gravel for backfilling the drain pipe shall be naturally rounded aggregate, clean, washed, dry, and free from clay or organic material. The pea gravel shall conform to the following grading:

Sieve or Screen Size	Percentage Passing
3/4"	100
1/2"	90-100
3/8"	40-70
No. 4	0-15
No. 8	0-3

10-2.05G FINAL IRRIGATION SYSTEM CHECK

A final check of the existing and new irrigation facilities shall be done not more than 20 working days prior to the acceptance of the contract.

Length of watering cycles for use of potable water from water meters for the final check of irrigation facilities will be determined by the Engineer.

Remote control valves connected to existing and new irrigation controllers shall be checked for automatic performance when controllers are in the automatic mode.

Unsatisfactory performance of irrigation facilities installed by the Contractor shall be repaired and rechecked at the Contractor's expense until satisfactory performance is obtained, as determined by the Engineer.

Repair or replacement of unsatisfactory performance of existing irrigation facilities shall conform to the provisions of "Existing Highway Irrigation Facilities" elsewhere in these special provisions.

Nothing in this section, "Final Irrigation System Check," shall be construed as relieving the Contractor of full responsibility to make good or repair the defective work or materials found at any time before the formal written acceptance of the entire contract by the Director.

Full compensation for checking the irrigation systems prior to the acceptance of the contract shall be considered as included in the contract lump sum price paid for plant establishment work and no additional compensation will be allowed therefor.

SECTION 10-3. SIGNALS, LIGHTING AND ELECTRICAL SYSTEMS

10-3.01 DESCRIPTION

Traffic signals and lighting, Irrigation controller enclosure cabinet, electric service(irrigation), lighting(bike path), flashing beacons, lighting and sign illumination, ramp metering systems, communication conduit and sprinkler control conduit shall conform to the provisions in Section 86, "Signals, Lighting and Electrical Systems," of the Standard Specifications and these special provisions.

Lighting equipment is included in the following structures:

Grossmont College Drive Overcrossing, Bridge No. 57-1051
Navajo Road Undercrossing, Bridge No. 57-1050 R/L

Communication conduit is included in the following structures:

Navajo Road Undercrossing, Bridge No. 57-1050 R

Sprinkler control conduit is included in the following structures:

Grossmont College Drive Overcrossing, Bridge No. 57-1051
Navajo Road Undercrossing, Bridge No. 57-1050 R/L

Traffic signal work is to be performed at the following locations:

Route 125 Southbound Ramps at Navajo Road
Route 125 Northbound Ramps at Navajo Road
Route 125 Southbound Ramps at Grossmont College Drive
Route 125 Northbound Ramps at Grossmont College Drive

10-3.02 COST BREAK-DOWN

The Contractor shall furnish to the Engineer a cost break-down for each contract lump sum item of work described in this Section 10-3.

The Contractor shall determine the quantities required to complete the work shown on the plans. The quantities and values shall be included in the cost break-down submitted to the Engineer for approval. The Contractor shall be responsible for the accuracy of the quantities and values used in the cost break-down submitted for approval.

No adjustment in compensation will be made in the contract lump sum prices paid for the various electrical work items due to any differences between the quantities shown in the cost break-down furnished by the Contractor and the quantities required to complete the work as shown on the plans and as specified in these special provisions.

The sum of the amounts for the units of work listed in the cost break-down for electrical work shall be equal to the contract lump sum price bid for the work. Overhead and profit shall be included in each individual unit listed in the cost break-down, however, costs for traffic control system shall not be included. Bond premium, temporary construction facilities, plant and other items will not be paid for under the various electrical work items and shall be included in the mobilization bid item for the entire project.

The cost break-down shall be submitted to the Engineer for approval within 15 days after the contract has been approved. The cost break-down shall be approved, in writing, by the Engineer before any partial payment for the items of electrical work will be made.

At the Engineer's discretion the approved cost break-down may be used to determine partial payments during the progress of the work and as the basis of calculating the adjustment in compensation for the item or items of electrical work due to changes ordered by the Engineer. When an ordered change increases or decreases the quantities of an approved cost break-down, the adjustment in compensation may be determined at the Engineer's discretion in the same manner specified for increases and decreases in the quantity of a contract item of work in accordance with Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications.

The cost breakdown shall, as a minimum, include the following items:

- foundations - each type
- standards and poles - list by each type
- conduit - list by each size and installation method
- pull boxes - each type
- conductors - each size and type
- service equipment enclosures
- telephone demarcation box
- signal heads and hardware - each type
- pedestrian signal heads and hardware - each type
- pedestrian push buttons
- loop detectors - each type
- luminaires - each type

10-3.03 MAINTAINING EXISTING AND TEMPORARY ELECTRICAL SYSTEMS

Traffic signal system shutdowns shall be limited to periods allowed for lane closures listed or described under "Maintaining Traffic," elsewhere in these special provisions.

10-3.04 EXCAVATING AND BACKFILLING

The third paragraph in Section 86-2.01, "Excavating and Backfilling," of the Standard Specifications is amended to read:

The excavations shall be backfilled in conformance with the provisions in Section 19-3, "Structure Excavation and Backfill." Backfill placed in conduit trenches to be outside of slope lines and not under pavement shall be compacted to a relative compaction of not less than 90 percent.

Backfill on slopes and in areas where pavement is to be constructed shall be compacted to a relative compaction of not less than 95 percent.

10-3.05 FOUNDATIONS

Placement of concrete for foundations shall conform to the provisions of Section 51, "Concrete Structures," of the Standard Specifications.

The first sentence of the eighth paragraph in Section 86-2.03, "Foundations," of the Standard Specifications is amended to read:

Anchor bars or studs and nuts, except for Type 30 and Type 31 lighting standards, shall conform to ASTM Designation: A 307. Headed anchor bolts for foundations shall conform to the specifications of ASTM Designation: A 307, Grade B with S1 supplementary requirements. At the option of the Contractor, nonheaded anchor bolts for foundations shall conform either to the specifications of ASTM Designation: A 307, Grade C or to the provisions in AASHTO Designation: M 314, Grade 36 or 55 with S1 supplementary requirements. When nonheaded anchor bolts conforming to the specifications of ASTM Designation: A 307, Grade C are furnished, the end of each fabricated anchor bolt shall be either coded by end stamping as required in ASTM Designation: A 307 or the end that projects from the concrete shall be permanently coded with a green color by the manufacturer.

High strength anchor bolts, bars, or studs for Type 30 and Type 31 lighting standards shall conform to ASTM Designation: A 325, A 325M or A 449 and shall comply with the mechanical requirements of ASTM Designation: A 325 or A 325M after galvanizing. Nuts and washers for high strength anchor bolts shall conform to ASTM Designations: A 563 or A 563M, and F 476 or F 476M, respectively. In addition to the requirements of ASTM Designation: A 449, studs shall be marked on either end as required for bolt heads.

Where cast-in-drilled-hole concrete pile foundations are to be constructed in slag aggregate embankments, the diameter of the pile shall be increased to provide a minimum of 3 inches of concrete cover over the reinforcing steel.

Full compensation for the increased diameter of cast-in-drilled-hole concrete pile foundations in slag aggregate embankments, including additional portland cement concrete, and any increased drilling and placement cost, shall be considered as included in the contract lump sum price paid for the item requiring the cast-in-drilled-hole concrete pile foundation and no additional compensation will be allowed therefor.

10-3.06 STANDARDS, STEEL PEDESTALS AND POSTS

The sign mounting hardware, as shown on Detail U of Standard Plan ES-6T, shall be installed at the locations shown on the plans.

The sign panels will be State-furnished as provided under "Materials" of these special provisions.

Existing mast arms to receive low pressure sodium (LPS) luminaires shall be provided with 15-inch minimum and 18-inch maximum tenon extensions as shown on the plans.

Type 30 and 31 standards shall have slip bases, unless otherwise shown on the plans.

The length of the 2 3/8-inch diameter or 2-inch standard pipe tenon on the end of new mast arms receiving low pressure sodium (LPS) luminaires shall not be less than 15 inches nor greater than 18 inches.

On Standard Plan ES-6B, in the Luminaire Arm Data table, the "P" Mounting Height data listed under the No Barrier column shall apply to Type 22 lighting standards and the data listed under the 2'-8" Barrier column shall apply to Type 21 lighting standards.

On Standard Plan ES-6E, the title of the expanded detail of the installation of a slip base is revised to read "SLIP BASE DETAIL".

On Standard Plan ES-6L, in the Signal Arm Data table, dimension "L" for 40'-0" and 45'-0" mast arms is revised to read 1 3/4 inches.

On Standard Plan ES-6TA, in the Alternative Poles table, Standard Description, 17B-2-70-20', is revised to read, 17-2-70-20'.

At the option of the Contractor, poles with base diameter and respective wall thickness shown for each pole type in the table below may be substituted for those shown on the Standard Plans. Sheet steel shall have a minimum yield of 48,000 psi.

Pole Type	Base Diameter x Wall Thickness (in.)
17A-1-70	9 x 0.1793
17-2-70	9 x 0.1793
18-1-70	9 x 0.1793
19-1-70	9 x 0.1793
18-2-70	9 x 0.1793
18-1-80	9 x 0.1793
16-2-80	9 x 0.1793
19-3-70	11 x 0.1793
19A-3-70	11 x 0.1793
19A-2-80	11 x 0.1793
23-3-70	11 x 0.1793
23-4-70	12 x 0.1793
23-3-80	11 x 0.2391
26-3-80	12.75 x 0.2391
26A-3-80	12.75 x 0.2391
27-3-80	12.75 x 0.2391
27-4-80	12.75 x 0.2391

At the option of the Contractor, signal mast arms with base diameter and respective wall thickness shown in the table below may be substituted for those shown on the Standard Plans. Sheet steel shall have a minimum yield of 48,000 psi.

Arm Type	Base Diameter x Wall Thickness (in.)
XX-1-70-20	6 x 0.1196
XX-2-70-20	6 x 0.1196
XX-3-70-20	6 x 0.1793
XX-2-80-20	7 x 0.1196
XX-3-80-20	7 x 0.1793
XX-1-70-25	7 x 0.1196
XX-2-70-25	7 x 0.1196
XX-3-70-25	7 x 0.1793
XX-4-70-25	7.5 x 0.1793
XX-1-80-25	7 x 0.1196
XX-2-80-25	7 x 0.1793
XX-3-80-25	8 x 0.1793
XX-1-70-30	7.5 x 0.1196
XX-1-80-30	7.5 x 0.1196
XX-3-80-30	9 x 0.1793
XX-4-80-30	9 x 0.1793
XX-3-70-35	8.5 x 0.1793
XX-3-80-35	9.5 x 0.1793
XX-4-80-35	10 x 0.1793
XX-3-70-40	10 x 0.1793
XX-4-70-40	10 x 0.1793
XX-0-80-40	10 x 0.1793
XX-3-70-45	10 x 0.1793
XX-4-70-45	10 x 0.1793
XX-3-80-45	10 x 0.2391
XX-4-80-45	10 x 0.2391
XX-5-70-55	50 ft. = 12 x 0.1793 plus 5 ft. @ 0.1196

Note: Pole type in the Arm Type column in the table has been designated XX, as pole type is not relevant to the dimensions shown.

Handholes for signal standards shall be located 90° clockwise from the traffic signal mast arm.

Type 1 standards shall be assembled and set with the handhole on the downstream side of the pole in relation to traffic, or as shown on the plans.

10-3.07 CONDUIT

Conduit to be installed underground shall be the rigid non-metallic type unless otherwise specified.

The conduit in a foundation and between a foundation and the nearest pull box shall be the rigid non-metallic type.

When rigid non-metallic conduit is installed in a trench (not in pavement or under portland cement concrete sidewalk), after the bedding material is placed and conduit installed, the trench shall be backfilled with commercial quality concrete, containing not less than 376 pounds of portland cement per cubic yard, to not less than 4 inches above the conduit before additional backfill material is placed.

Conduit runs shown on the plans to be located behind curbs may be installed in the street, within 3 feet of and parallel to the face of the curb, by the "Trenching in Pavement Method" described in Section 86-2.05C, "Installation," of the Standard Specifications. Pull boxes shall be located behind the curb or at the locations shown on the plans.

After conductors have been installed, the ends of conduits terminating in pull boxes, service equipment enclosures, telephone demarcation cabinet and controller cabinets shall be sealed with an approved type of sealing compound.

At locations where conduit is required to be installed under pavement and existing underground facilities require special precautions, as described in "Obstructions" of these special provisions, conduit shall be placed by the "Trenching in Pavement Method" as specified in Section 86-2.05C, "Installation," of the Standard Specifications.

At other locations where conduit is required to be installed under pavement and if delay to any vehicle will not exceed 5 minutes, conduit may be installed by the "Trenching in Pavement Method."

Pull ropes for use when installing cables in rigid non-metallic conduit shall consist of a flat, woven, lubricated, soft-fiber polyester tape with a minimum tensile strength of 1,800 pounds and shall have printed sequential measurement markings at least every 3 feet.

At the option of the Contractor, the final 2 feet of conduit entering a pull box in a reinforced concrete structure may be the liquidtight flexible metal type.

New conduit runs terminating in existing controller cabinets may enter using Type LB conduit fittings. The locations of holes to be made through the sides of the controller cabinet will be determined by the Engineer.

10-3.08 MULTIDUCT CONDUIT SYSTEM

Where multiduct conduit system (MDCS) is shown on the plans a factory assembled conduit system shall be used. The system shall be:

A four-inch conduit with four 1-inch conduits contained therein. Joints shall be keyed to mate the enclosed conduits.

Conduit to be installed underground shall be Type 3. Conduit on bridge structures shall be fiberglass.

One-inch conduits shall be either all individually factory color coded or all orange, except that fiberglass conduits shall be gray. Straight segments of multiduct conduit shall be nominal 20-foot lengths.

Joints shall be solvent welded or sealed with a gasket as recommended by the manufacturer. Joints shall lock together or be provided with a seating mark to verify proper assembly.

Bends shall be rigid factory assembled sections designed to fit the system.

The minimum conduit bend radius shall not be less than 4 feet.

10-3.09 PULL BOXES

Grout shall not be placed in bottom of pull boxes.

Where the sump of an existing pull box is disturbed by the Contractor's operation, the sump shall be reconstructed as shown on Standard Plan ES-8.

10-3.09A TRAFFIC PULL BOXES

Traffic pull boxes and covers shall have a vertical proof-load strength of 25,000 pounds. The 25,000 pound load shall be distributed through a 9" x 9" x 2" steel plate according to Federal Specification RR-F-621e. This load shall be placed anywhere on the box and cover for a period of one minute without causing any cracks or permanent deformations.

The No. 3 1/2(T) and No. 5(T) pull boxes shall be reinforced with a galvanized Z-bar welded frame and cover similar to that shown on the plans for No. 6(T) pull boxes. Frames shall be anchored to the boxes by means of 1/4 inch x 2 1/4-inch long concrete anchors. Four concrete anchors shall be provided for the No. 3 1/2(T) pull box, one placed in each corner. Six concrete anchors shall be provided for each No. 5(T) and No. 6(T) pull box, one placed in each corner and one placed near the middle of each of the longer sides.

Hold down screws shall be 3/8 inch hex flange cap screws of Type 316 stainless steel. The nut shall be zinc plated carbon steel and shall be made vibration resistant with a wedge ramp at the root of the thread. The nut shall be spot welded to the underside of, or fabricated with, the galvanized Z-bar pull box frame.

Steel covers shall be countersunk approximately 1/4 inch to accommodate the bolt head. The bolt head shall not extend more than 1/8 inch above the top of the cover when tightened down. A 1/4 inch tapped hole and brass bonding screw shall be provided.

The opening of traffic pull boxes shall have the following dimensions.

Pull Box Type	Width (±1 inch)	Length (±1 inch)
No. 3 1/2(T)	10 1/2"	17"
No. 5(T)	13"	24"
No. 6(T)	17"	30"

Concrete placed around and under traffic pull boxes as shown on the plans shall contain a minimum of 564 pounds of cement per cubic yard.

After the installation of traffic pull boxes, the steel covers shall be installed and kept bolted down during periods when work is not actively in progress at the pull box. When placing the steel cover for the final time, the cover and the Z-bar frame shall be cleaned of all debris and securely tightened down.

10-3.10 CONDUCTORS AND WIRING

At any point, the minimum thickness of Type USE, RHH, or RHW insulation shall be 0.039 inches for conductor sizes No. 14 to No. 10, inclusive, and 0.051 inches for No. 8 to No. 2, inclusive.

At any point, the minimum thickness of Type THW and TW insulation shall be 0.027 inches for conductor sizes No. 14 to No. 10, inclusive, 0.04 inches for No. 8, and 0.054 inches for No. 6 to No. 2, inclusive.

Splices of conductors shall be insulated with heat-shrink tubing of the appropriate size after thoroughly painting the spliced conductors with electrical insulating coating.

Heat-shrink material shall be heated as recommended by the manufacturer.

The Contractor shall provide the Engineer a Certificate of Compliance from the manufacturer in accordance with the provisions of Section 6-1.07, "Certificates of Compliance," of the Standard Specifications for all the conductors and cables furnished for the project.

The third paragraph of Section 86-2.08B, "Multiple Circuit Conductors," of the Standard Specifications is amended to read:

Conductors for wiring wall and soffit luminaires shall be stranded copper, with insulation rated for use at temperatures up to 125°C.

In addition to the requirements for splices in detector circuits, the open end of cable jackets or tubing shall be sealed in a manner similar to the splicing requirements to prevent the entrance of water.

Section 86-2.09D, "Splicing," of the Standard Specifications is amended by retitling as "Splicing and Terminations," and the last paragraph is amended to read:

All splices and terminal lugs for conductor sizes No. 8 and smaller shall be soldered by the hot iron, pouring or dipping method. Open flame soldering will not be permitted.

SIGNAL CABLE.--The color code for the conductors in the nine-conductor cable shall be as noted on the plans.

Signal cables shall be installed continuously, without splices, from the terminal block at the controller cabinet to a terminal block on the standard.

EMERGENCY VEHICLE PRE-EMPTOR DETECTOR LEAD-IN CABLE.--Emergency vehicle pre-emptor detector lead-in cable (EV-DLC) shall consist of a 3-conductor shielded cable.

Conductors shall be No. 20-7x28 stranded copper and strands shall be tinned. Conductor insulation shall be a low density polyethylene, high-density polyethylene, or polypropylene material having a minimum average thickness of 25 mils. Conductors shall be color coded: 1-yellow, 1-blue, and 1-orange.

The shield shall be tinned copper braid or aluminum polyester tape with a nominal 20% overlap. Where the tape is used, a No. 20-7x28 stranded, tinned, bare drain wire shall be placed between the insulated conductors and the shield and in contact with the conductive surface of the shield.

The capacitance measured between any conductor and the other two conductors and the shield shall not exceed 48 pico-farads per foot when tested at 1000 hertz.

The cable jacket shall be a black PVC material or black high-density polyethylene, rated for 300 volts minimum, and 140 degrees F. minimum. It shall have an average minimum wall thickness of 40 mils. The cable jacket shall be marked with the manufacturers name, insulation type, designation number, number of conductors, conductor size, voltage and temperature ratings.

The finished outside diameter of the cable shall be 0.30-inch (nominal).

The cable run between each detector and the controller cabinet shall be continuous without splices or shall be spliced only as directed by the emergency vehicle pre-emptor detector manufacturer.

SIGNAL INTERCONNECT CABLE.--Signal Interconnect Cable (SIC) shall be the twelve-conductor type.

The ends of signal interconnect cable terminating at controller and telephone demarcation cabinets shall have crimped and soldered spade type terminals.

10-3.11 SERVICE

Continuous welding of exterior seams in service equipment enclosures is not required.

Type III service equipment enclosures shall be the aluminum type.

Service equipment enclosures shall not be painted.

Overlapping exterior seams and doors shall meet the requirements for Type 3R enclosures specified in the NEMA Enclosure Standards.

Multiple pole circuit breakers shall be the internal trip type.

Dead front panel or panels, and corresponding exterior door, shall be hinged on one side and shall be openable without the use of tools.

A barrier type terminal block rated for 50 amperes, minimum, shall be provided in each service equipment enclosure. The terminal block shall have a minimum of 12 positions with terminals rated at Size No. 8 or larger, to accept the field wires indicated on the plans. Field wires shall be terminated using crimped, insulated loop connectors.

Circuit breakers used as service disconnect equipment shall have a minimum interrupting capacity of 42,000 amperes, rms, for 120/240-volt services.

Circuit breakers shall be the cable-in/cable-out type, mounted on non-energized clips. All circuit breakers shall be mounted vertically with the up position of the handle being the "ON" position.

10-3.12 ELECTRIC SERVICE (IRRIGATION)

Electric service (irrigation) shall be from the service points to the irrigation controllers (IC) and to the spaces provided in the irrigation controller enclosure cabinets (CEC) for irrigation controllers, as shown on the plans.

The inscription on nameplates shall be the identifying letter designation used on the plans and in these special provisions, or shall be as directed by the Engineer.

Electric service (irrigation) will be paid on a lump sum basis.

The contract lump sum price paid for electric service (irrigation) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing electric service (irrigation) for irrigation controllers, complete in place, including conductors, conduit and pull boxes to the pull box adjacent to irrigation controller enclosure cabinets and irrigation controllers, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-3.13 NUMBERING ELECTRICAL EQUIPMENT

Self-adhesive numbers (on reflective sheeting) will be furnished by the State as provided under "State-Furnished Materials" of these special provisions.

The Contractor shall place the numbers on the equipment as directed by the Engineer.

Numbers shall be applied to a clean surface.

Where shown on the plans, equipment numbers shall be placed for all electroliers, soffit lighting, sign lighting and service equipment enclosures. On service equipment enclosures, the numbers shall be placed on the front door. On electroliers and sign structure posts, the numbers shall be placed as shown on Standard Plan ES-6A, except that the numbers shall be placed on the side nearest the roadway facing approaching traffic at a height up to 8 feet above the base plate.

Where new numbers are to be placed on existing or relocated equipment, the existing numbers shall be removed.

Numbers for illuminated signs mounted on overcrossings or for soffit luminaires shall be placed on the nearest adjacent bent or abutment at approximately the same station as the sign or soffit luminaire. Where no bent or abutment exists near the sign or soffit luminaire, the number shall be placed on the underside of the structure adjacent to the sign or soffit luminaire. Arrangement of numbers shall be the same as those used for electroliers.

Numbers for sign bridges shall be placed on both posts.

10-3.14 STATE-FURNISHED CONTROLLER ASSEMBLIES

The Model 170 controller assemblies, including controller unit, completely wired controller cabinet and inductive loop detector sensor units, but without anchor bolts, will be State-furnished as provided under "Materials" of these special provisions.

The Contractor shall construct each controller cabinet foundation as shown on Standard Plan ES-4B for Model 332 and 334 cabinets (including furnishing and installing anchor bolts), shall install the controller cabinet on said foundation, and shall make all field wiring connections to the terminal blocks in the controller cabinet.

A listing of field conductor terminations, in each State-furnished controller cabinet, will be furnished free of charge to the Contractor at the site of the work.

State forces will maintain all controller assemblies. The Contractor's responsibility shall be limited to that provided for in Section 6-1.02, "State-Furnished Materials," of the Standard Specifications.

10-3.15 TELEPHONE DEMARCATION CABINET

Telephone demarcation cabinets shall be fabricated from aluminum. Fabrication of telephone demarcation cabinets shall conform to the requirements of Section 86-3.07A, "Cabinet Construction". Telephone demarcation cabinets shall not be painted.

The Contractor shall construct each telephone demarcation cabinet foundation as shown on Standard Plan ES-4B and the project plans for Type G cabinets (including furnishing and installing anchor bolts), shall install the telephone demarcation cabinet on said foundation, and shall make all field wiring connections to the terminal blocks in the telephone demarcation

cabinet. Terminal blocks shall conform to the provisions in Section 86-3.09M, "Terminal Blocks," of the Standard Specifications. Light duty terminal blocks may be used.

Duplex convenience receptacles shall have ground-fault circuit interruption as defined by the Code. Circuit interruption shall occur on 6 mA of ground-fault current and shall not occur on less than 4 mA.

A listing of field conductor terminations, in each telephone demarcation cabinet, will be furnished free of charge to the Contractor at the site of the work.

10-3.16 IRRIGATION CONTROLLER ENCLOSURE CABINET

Irrigation controller enclosure cabinets (CEC) shall be constructed and the equipment within the cabinets shall be installed in accordance with the details shown on the project plans, Standard Specifications, and these special provisions.

Irrigation controller enclosure cabinets shall be fabricated in accordance with the provisions in Section 86-3.04A, "Cabinet Construction," of the Standard Specifications

Irrigation controller enclosure cabinets shall be fabricated of stainless steel.

Irrigation controller enclosure cabinet doors shall not be provided with integral door locks. Irrigation controller enclosure cabinet door handles shall have provisions for padlocking in the latched position. Padlocks will be State-furnished as provided under "State-Furnished Materials" elsewhere in these special provisions.

Inside of the doors shall have provisions for storage of irrigation plans.

Duplex convenience receptacles shall have ground-fault circuit interruption as defined by the Code. Circuit interruption shall occur on 6 milliamperes of ground-fault current and shall not occur on less than 4 milliamperes. Receptacles shall be installed in a weatherproof housing with rainproof lift covers.

Irrigation controller enclosure cabinets will be measured by the unit as determined from actual count in place.

The contract unit price paid for irrigation controller enclosure cabinet shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in fabricating and installing irrigation controller enclosure cabinets, complete in place (including constructing foundations and pads, conduits to pull box adjacent to cabinets, and installing equipment, within the cabinets, except controllers), as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-3.17 VEHICLE SIGNAL FACES AND SIGNAL HEADS

Lamps for traffic signal units (except programmed visibility type) will be State-furnished as provided under "Materials" of these special provisions.

Section 86-4.01A, "Optical Units," of the Standard Specifications is amended by adding the following paragraph:

At the Contractor's option, a single piece formed metal reflector-ring holder may be used.

Reflectors shall be the silvered glass type.

Type SV-1-T mountings with 5 sections and SV-2-TD mountings shall be bolted to the standard through the upper pipe fitting in a manner similar to the terminal compartment.

The first paragraph of Section 86-4.06, "Signal Mounting Assemblies," of the Standard Specifications is amended to read:

86-4.06 Signal Mounting Assemblies.— Signal mounting assemblies shall consist of 1½ inch standard steel pipe or galvanized conduit, necessary fittings, slip-fitters and terminal compartments. Pipe fittings shall be ductile iron, galvanized steel, aluminum alloy Type AC-84B No. 380, or bronze. Mast arm slip-fitters, post top slip-fitters and terminal compartments shall be cast bronze or hot-dip galvanized ductile iron. After installation any exposed threads of galvanized conduit brackets and areas of the brackets damaged by wrench or vise jaws shall be cleaned with a wire brush and painted with 2 applications of approved unthinned zinc-rich primer (organic vehicle type) conforming to the requirements in Section 91, "Paint." Aerosol cans shall not be used.

Pipe fittings shall not be the aluminum type.

10-3.18 LIGHT EMITTING DIODE SIGNAL MODULES

GENERAL

For traffic signal faces, the 12-inch red sections and the red arrow sections shall utilize light emitting diode (LED) signal modules.

Each LED signal module shall consist of an assembly that utilizes light emitting diodes as the light source.

Each Type 1 LED signal module shall be designed to be installed in the door frame of a standard traffic signal housing.

LED signal modules shall be from the same manufacturer and each size shall be the same model.

Type 1 LED signal modules shall be sealed units with 2 conductors for connecting to power, a printed circuit board, a power supply, a red lens and gasket, and shall be weatherproof after installation and connection. The circuit board and power supply shall be contained inside the Type 1 LED signal module. Circuit boards shall conform to Chapter 1, Section 6, of the "Transportation Electrical Equipment Specifications" published by the State of California, Department of Transportation.

Conductors for Type 1 LED signal modules shall be 3 feet in length, with terminals attached, and shall conform to Section 86-4.01C, "Electrical Components," of the Standard Specifications.

Connections shall be to the terminal block in the signal face or shall utilize an adapter that screws into the medium base lamp socket. Contacts shall be brass. Splices will not be allowed.

The lens of the Type 1 LED signal module shall be integral to the unit, shall be convex with a smooth outer surface, and shall be made of ultraviolet stabilized plastic or glass. The lens shall be capable of withstanding ultraviolet (UV) (direct sunlight) exposure for a minimum period of 48 months without exhibiting evidence of deterioration.

The Type 1 LED signal module shall be sealed in the door frame with a one-piece ethylene propylene rubber (EPDM) gasket.

The LEDs shall utilize AlInGaP technology and shall be the ultra bright type or equivalent rated for 100,000 hours of continuous operation from -40°F to +165°F.

The individual LEDs shall be wired such that physical damage or the failure of one LED will result in the loss of not more than 5 percent of the LED signal module light output.

Maximum power consumption requirements for LED signal modules shall be as follows:

	77°F	165°F
12 inch Circular	25.0 W	30.0 W
12 inch Arrow	15.0 W	18.0 W

LED signal modules shall be rated for a minimum useful life of 48 months.

PHYSICAL AND MECHANICAL REQUIREMENTS

Type 1 LED signal modules shall be designed as retrofit replacements for existing optical units of traffic signal sections and shall not require special tools for installation. Type 1 LED signal modules shall fit into existing traffic signal section housings built to the specifications of "Vehicle Traffic Control Signal Heads (VTCSH)" without modification to the housing.

Installation of Type 1 LED signal modules shall not require the removal of material in the traffic signal section except the optical unit components, that is, lens, gaskets, lamp, lamp socket, and reflector. Installed LED signal modules shall fit securely in the door frame and shall be weathertight.

LED signal modules shall have a maximum mass of 4.4 pounds.

The lens may be tinted or may use transparent film or materials with similar characteristics to enhance "ON/OFF" contrasts. The use of tinting or other materials to enhance "ON/OFF" contrasts shall not affect chromaticity and shall be uniform across the face of the lens.

If a polymeric lens is used, a surface coating or chemical surface treatment shall be used to provide front surface abrasion resistance.

LED signal modules shall be rated for use in the operating temperature range of -40°F to +165°F.

Type 1 LED signal modules shall be protected against dust and moisture intrusion according to the specifications of NEMA Standard 250-1991 for Type 4 enclosures to protect the internal components.

LED signal modules shall be single, self-contained devices, not requiring on-site assembly for installation into existing traffic signal housing. The power supply for the LED signal module shall be integral to the unit.

The LED signal module assembly shall be manufactured to withstand mechanical shock and vibration from high winds and other sources.

Enclosures containing either the power supply or electronic components of LED signal modules shall be made of UL94VO flame retardant materials. The lens of the LED signal module is excluded from this specification.

Each LED signal module shall have the manufacturer's name, trademark, model number, serial number, lot number, and the month and year of manufacture permanently marked on the back of the LED signal module.

The following operating characteristics shall be identified: rated voltage, power consumption and volt-ampere (VA).

Each Type 1 LED signal module shall have prominent and permanent vertical marking(s) for correct indexing and orientation within a signal housing. The markings shall consist of an "UP" arrow, or the word "UP" or "TOP".

PHOTOMETRIC REQUIREMENTS

The minimum initial luminous intensity values for LED signal modules shall be as specified in Section 11.04 of the ITE publication ST-008B, "Vehicle Traffic Control Signal Heads (VTCSH)" at 77°F.

LED signal modules shall meet or exceed 85 percent of the standard light output values specified in the VTCSH, after 48 months of continuous use over the temperature range of -40°F to +165°F in a traffic signal operation.

The measured chromaticity coordinates of LED signal modules shall conform to the chromaticity specifications of Section 8.04 and Figure 1 of the VTCSH over the temperature range of -40°F to +165°F.

In addition to the specifications for circular LED signal modules, LED red arrow signal modules shall conform to the following:

The LED red arrow signal module indication shall meet existing specifications stated in Section 9.01 of the VTCSH for arrow lenses. The LEDs shall be spread evenly across the illuminated portion of the arrow area. Each LED signal section indication shall provide an average luminous intensity of 1605 foot-lamberts. Measurements shall be performed at rated operating voltage of 120 VAC.

ELECTRICAL

LED signal modules shall operate from a 60 Hz \pm 3 Hz AC line over a voltage range from 95 V to 135 V. The LED circuitry shall prevent perceptible flicker over the specified voltage range. The fluctuations of line voltage shall have no visible effect on the luminous intensity of the indications. Rated voltage for the measurements shall be 120 V.

Wiring and terminal blocks shall meet the specifications of Section 13.02 of the VTCSH. Two secured, color coded, 600 V, 20 AWG minimum, jacketed wires, conforming to the National Electric Code, rated for service at or greater than 221°F, are to be provided for electrical connection for each Type 1 LED signal module.

The LED signal module on-board circuitry shall include voltage surge protection to withstand high-repetition noise transients as specified in Section 2.1.6 of NEMA Standard TS2-1992.

LED signal modules shall be operationally compatible with currently used controller assemblies (solid state load switches, flashers and conflict monitors).

LED signal modules and associated on-board circuitry shall meet Federal Communications Commission (FCC) Title 47, SubPart B, Section 15 regulations concerning the emission of electronic noise.

LED signal modules shall provide a power factor of 0.90 or greater while operating throughout the temperature range of -40°F to +165°F.

Total harmonic distortion (current and voltage) induced into an AC power line by a LED signal module shall not exceed 20 percent while operating throughout the temperature range of -40°F to +165°F.

TESTING

The LED signal modules tested or submitted for testing shall be representative of typical average production units. Circular LED signal modules shall be tested in conformance with the requirements in California Test 604. Optical testing shall be performed with the LED signal module mounted in a standard traffic signal section but without a visor or hood attached to the signal section.

Design Qualification Testing

Design Qualification Testing shall be performed by the manufacturer on new LED signal module designs, and on an existing design when a major design change has been implemented.

A quantity of 2 units for each design shall be submitted for Design Qualification Testing. Test units shall be submitted to the Department of Transportation, Transportation Laboratory, Office of Materials Engineering and Testing Services (METS), 5900 Folsom Boulevard, Sacramento, CA 95819, after manufacturer's testing is complete.

Manufacturer's test data shall be submitted with test units for METS verification of Design Qualification Testing data.

The sample LED signal modules shall be energized for a minimum of 24 hours, at 100 percent on-time duty cycle, at or greater than 165°F before performing Design Qualification Testing. For Design Qualification Testing, specifications measured shall include but not be limited to:

The luminous intensity measurements shall be taken over the temperature range of -40°F to +165°F.

Color requirements shall be measured while operating throughout the temperature range of -40°F to +165°F.

Specified parameters shall be measured and used for quality comparison of Production Quality Assurance current measurement on production LED signal modules.

LED signal modules shall be tested for compatibility with the controller unit, conflict monitor and load switch. Each LED signal module shall be connected to the output of a standard load switch connected to an AC voltage supply between the values of 95 VAC and 135 VAC with the input to the load switch in the "OFF" position. The AC voltage developed across each LED signal module so connected shall not exceed 10 V rms as the input AC voltage is varied from 95 V rms to 135 V rms.

Mechanical vibration testing shall be according to MIL-STD-883, Test Method 2007, using 3 four minute cycles along each x, y, and z axis, at a force of 2.5 Gs, with a frequency sweep from 2 Hz to 120 Hz. The loosening of the lens, of internal components, or other physical damage shall be cause for rejection.

Temperature cycling shall be performed according to MIL-STD-883, Test Method 1010. The temperature range shall be according to "Environmental Requirements." A minimum of 20 cycles shall be performed with a 30 minute

transfer time between temperature extremes and a 30 minute dwell time at each temperature. LED signal modules shall be tested under operating conditions. Failure of an LED signal module to function properly or evidence of cracking of the LED signal module lens or housing after temperature cycling shall be cause for rejection.

Moisture resistance testing shall be performed on LED signal modules according to NEMA Standard 250-1991 for Type 4 enclosures. Evidence of internal moisture after testing shall be cause for rejection.

Production Quality Control Testing

The following Production Quality Control tests shall be performed on each new LED signal module prior to shipment:

A single point measurement with a correlation to the intensity requirements of Section 1.04 of the VTCSH may be used.

The ambient temperature for this measurement shall be greater than 77°F.

Each LED signal module not meeting minimum luminous intensity requirements according to Table 1 of VTCSH for circular indications, or 1605 foot-lamberts for arrow indications shall be cause for rejection. The manufacturer shall retain test results for 7 years.

For the burn-in period, each LED signal module shall be energized at rated voltage for a 30 minute stabilization period before the measurement is made.

Each LED signal module shall be tested for rated initial intensity after burn-in.

Each LED signal module shall be tested for required power factor after burn-in.

Each LED signal module shall be measured for current flow in amperes after burn-in. The measured current values shall be compared against rated values resulting from design qualification measurements under "Design Qualification Testing." The current flow shall not exceed the rated value. The measured ampere values with rated voltage shall be recorded as volt-ampere (VA) on the product labels.

Each LED signal module shall be visually inspected for exterior physical damage or assembly anomalies. Careful attention shall be paid to the surface of the lens to ensure that no scratches (abrasions), cracks, chips, discoloration or other defects are apparent. Defects shall be cause for rejection.

Production Quality Assurance Testing

Production Quality Assurance Tests may be performed on each new LED signal module. The LED signal modules tested or submitted for testing shall be representative of typical average production units.

Circular LED signal modules shall be tested in conformance with the requirements in California Test 604 and as specified in these special provisions.

Optical testing shall be performed with the LED signal module mounted in a standard traffic signal section but without a visor or hood attached to the signal section.

The number of units tested (sample size) shall be determined by the quantity of each model in the shipment. The sample size shall conform to the requirements of American National Standard Institute/Acceptance Sampling in Quality Control, ANSI/ASQC Z1.4.

The State will determine the sampling parameters to be used for the random sample testing.

Specified parameters may be tested on the sample.

Acceptance or rejection of the shipment shall conform to the requirements of ANSI/ASQC Z1.4 for shipments which are sampled randomly.

Upon rejection of the shipment, the vendor shall arrange for pick-up of the shipment at no cost to the State.

Certificate of Compliance

The Contractor shall provide the Engineer with a Certificate of Compliance from the manufacturer in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications. The certificate shall certify that the LED signal modules comply with the requirements of these specifications. The certificate shall also include a copy of applicable test reports on the LED signal modules.

WARRANTY

The manufacturer shall provide a written warranty against defects in materials and workmanship for the LED signal modules for a period of 36 months after date of acceptance. Replacement LED signal modules shall be provided within 30 days after receipt of LED signal modules that have failed at no cost to the State including the cost of shipping the failed LED signal modules. The written warranty shall be given to the Engineer prior to installation.

10-3.19 LIGHT EMITTING DIODE PEDESTRIAN SIGNAL FACE "UPRAISED HAND" MODULE

GENERAL

For Type A pedestrian signal faces on this project, the pedestrian signal face "Upraised Hand" section shall utilize a light emitting diode (LED) module.

Each LED pedestrian signal module shall consist of an assembly that utilizes light emitting diodes as the light source for pedestrian signal faces in lieu of an incandescent lamp.

LED pedestrian signal modules shall be designed to mount in the standard lamp socket of an existing Type A pedestrian signal housing. The installation of a LED pedestrian signal module shall not require modification to the standard lamp socket or reflector.

LED pedestrian signal modules shall be from the same manufacturer.

The circuit board and power supply shall be integral to the unit. Printed circuit boards shall conform to Chapter 1, Section 6 of the "Transportation Electrical Equipment Specifications" published by the State of California, Department of Transportation.

LED pedestrian signal modules shall not require a specific mounting orientation or have a variance in light output, pattern or visibility for any mounting orientation.

The LEDs shall utilize AlInGaP technology and shall be the ultra bright type or equivalent rated for 100,000 hours of continuous operation from -40°F to +165°F.

The individual LEDs shall be wired such that physical damage or the failure of one LED will result in the loss of not more than 5 percent of the pedestrian signal modules light output.

Maximum power consumption requirements for LED pedestrian signal modules shall be 15.0 W at 77°F and 18.0 W at 165°F.

The luminance of the UPRAISED HAND symbol shall be 1095 foot-lamberts minimum. The color of UPRAISED HAND shall be Portland orange conforming to the requirements of the Institute of Transportation Engineers Standards: "Pedestrian Traffic Control Signal Indications" and the "Manual on Uniform Traffic Control Devices." The height of each symbol shall be not less than 10 inches and the width of each symbol shall be not less than 6 1/2 inches.

The uniformity ratio of an illuminated symbol shall not exceed 4 to 1 between the highest luminance area and the lowest luminance area.

LED pedestrian signal modules shall be rated for a minimum useful life of 48 months.

PHYSICAL AND MECHANICAL REQUIREMENTS

LED pedestrian signal modules shall be designed as retrofit replacements for existing optical units and shall not require special tools for installation. LED pedestrian signal modules shall fit into existing pedestrian signal face housings built according to the specifications of "Vehicle Traffic Control Signal Heads (VTCSH)" without modification to the housing.

Installation of LED pedestrian signal modules shall only require removal of the lamp.

LED pedestrian signal modules shall be rated for use in the operating temperature range of -40°F to +165°F.

LED pedestrian signal modules shall be single, self-contained devices, not requiring on-site assembly for installation into an existing Type A Housing. The power supply for LED pedestrian signal modules shall be integral to the unit.

LED pedestrian signal modules shall be manufactured to withstand mechanical shock and vibration from high winds and other sources.

Enclosures containing either the power supply or electronic components of LED pedestrian signal modules shall be made of UL94VO flame retardant materials.

Each LED pedestrian signal module shall have the manufacturer's name, trademark, model number, serial number, lot number, and the month and year of manufacture permanently marked on the back of the module.

The following operating characteristics shall be identified: rated voltage, power consumption and volt-ampere (VA).

PHOTOMETRIC REQUIREMENTS

The minimum initial luminous intensity values for LED pedestrian signal modules shall be 1095 foot-lamberts.

LED pedestrian signal modules shall meet or exceed 85 percent of 1095 foot-lamberts after 48 months of continuous use over the temperature range of -40°F to +165°F in a traffic signal operation.

The measured chromaticity coordinates of LED pedestrian signal modules shall conform to the chromaticity requirements of Section 5.3.2.1 and Figure C of the VTCSH while operating throughout the temperature range of -40°F to +165°F.

ELECTRICAL

LED pedestrian signal modules shall operate from a 60 Hz \pm 3 Hz AC line over a voltage ranging from 95 V to 135 V. The circuitry of LED pedestrian signal modules shall prevent perceptible flicker over the voltage range specified above. The

fluctuations of line voltage shall have no visible effect on the luminous intensity of the indications. Rated voltage for the measurements shall be 120 V.

On-board circuitry of the LED pedestrian signal modules shall include voltage surge protection to withstand high-repetition noise transients as stated in Section 2.1.6 of NEMA Standard TS2-1992.

LED pedestrian signal modules shall be operationally compatible with currently used controller assemblies (solid state load switches, flashers and conflict monitors).

LED pedestrian signal modules and associated on-board circuitry shall meet Federal Communications Commission (FCC) Title 47, SubPart B, Section 15 regulations concerning the emission of electronic noise.

LED pedestrian signal modules shall provide a power factor of 0.90 or greater while operating throughout the temperature range of -40°F to +165°F.

Total harmonic distortion (current and voltage) induced into an AC power line by LED pedestrian signal modules shall not exceed 20 percent while operating throughout the temperature range of -40°F to +165°F.

TESTING

The LED pedestrian signal modules tested or submitted for testing shall be representative of typical average production units. Modules shall be tested in conformance with the requirements in California Test 606. Optical testing shall be performed with the module mounted in a Type A Housing but without a visor or hood attached to the housing.

Design Qualification Testing

Design Qualification Testing shall be performed by the manufacturer on new LED pedestrian signal module designs, and on an existing design when a major design change has been implemented.

A quantity of 2 units for each design shall be submitted for Design Qualification Testing. Test units shall be submitted to the Department of Transportation, Transportation Laboratory, Office of Materials Engineering and Testing Services (METS), 5900 Folsom Boulevard, Sacramento, CA 95819, after manufacturer's testing is complete.

Manufacturer's test data shall be submitted with test units for METS verification of Design Qualification Testing data.

The sample LED pedestrian signal modules shall be energized for a minimum of 24 hours, at 100 percent on-time duty cycle, at or greater than 165°F before performing Design Qualification Testing. For Design Qualification Testing, specifications measured shall include but not be limited to:

The luminous intensity measurements shall be taken over the temperature range of -40°F to +165°F.

Color requirements shall be measured while operating throughout the temperature range of -40°F to +165°F.

Specified parameters shall be measured and used for quality comparison of Production Quality Assurance current measurement on production modules.

Modules shall be tested for compatibility with the controller unit, conflict monitor and load switch. Each module shall be connected to the output of a standard load switch connected to an AC voltage supply between the values of 95 VAC and 135 VAC. The AC voltage developed across each module so connected shall not exceed 10 V rms as the input AC voltage is varied from 95 V rms to 135 V rms.

Mechanical vibration testing shall be according to MIL-STD-883, Test Method 2007, using 3 four minute cycles along each x, y, and z axis, at a force of 2.5 Gs, with a frequency sweep from 2 Hz to 120 Hz. The loosening of the lens or of internal components, or other physical damage shall be cause for rejection.

Temperature cycling shall be performed according to MIL-STD-883, Test Method 1010. The temperature range shall be according to "Environmental Requirements." A minimum of 20 cycles shall be performed with a 30 minute transfer time between temperature extremes and a 30 minute dwell time at each temperature. Modules under test shall be tested under operating conditions. Failure of a module to function properly or evidence of cracking of the module lens or housing after temperature cycling shall be cause for rejection.

Moisture resistance testing shall be performed on modules mounted in a standard pedestrian signal housing according to NEMA Standard 250-1991 for Type 4 enclosures. Evidence of internal moisture after testing shall be cause for rejection.

Production Quality Control Testing

The following Production Quality Control tests shall be performed on each new LED pedestrian signal module prior to shipment:

The ambient temperature for this measurement shall be greater than 77°F.

Each module not meeting minimum luminous intensity of 1095 foot-lamberts shall be cause for rejection.

The LED pedestrian signal modules tested or submitted for testing shall be representative of typical average production units. The manufacturer shall retain test results for 7 years.

For the burn-in period, each LED pedestrian signal module shall be energized at rated voltage for a 30 minute stabilization period before the measurement is made.

After burn-in each LED pedestrian signal module shall be tested for rated initial intensity and for required power factor.

Each LED pedestrian signal module shall be measured for current flow in amperes after burn-in. The measured current values shall be compared against rated values resulting from design qualification measurements under "Design Qualification Testing." The current flow shall not exceed the rated value. The measured ampere values with rated voltage shall be recorded as volt-ampere (VA) on the product labels.

Each LED pedestrian signal module shall be visually inspected for exterior physical damage or assembly anomalies. Defects shall be cause for rejection.

Production Quality Assurance Testing

Production quality assurance testing may be performed on each new LED pedestrian signal module.

LED pedestrian signal modules shall be tested in conformance with the requirements in California Test 606 and as specified in these special provisions.

Optical testing shall be performed with the LED pedestrian signal module mounted in a standard Type "A" Pedestrian Housing, but without a visor or hood attached to the housing.

The number of units tested (sample size) shall be determined by the quantity of each model in the shipment. The sample size shall conform to the specifications of American National Standard Institute/Acceptance Sampling in Quality Control, ANSI/ASQC Z1.4.

The State will determine the sampling parameters to be used for the random sample testing.

Specified parameters may be tested on the sample.

Acceptance or rejection of the shipment shall conform to the requirements of ANSI/ASQC Z1.4 for shipments which are sampled randomly.

Upon rejection of the shipment, the vendor shall arrange for pick-up of the shipment at no cost to the State.

Certificate of Compliance

The Contractor shall provide the Engineer with a Certificate of Compliance from the manufacturer in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications. The certificate shall certify that the LED pedestrian signal modules comply with the requirements of these specifications. The certificate shall also include a copy of applicable test reports on the modules.

WARRANTY

The manufacturer shall provide a written warranty against defects in materials and workmanship for the LED pedestrian signal modules for a period of 36 months after date of acceptance. Replacement modules shall be provided within 30 days after receipt of modules that have failed at no cost to the State including the cost of shipping the failed modules. The written warranty shall be given to the Engineer prior to installation.

10-3.20 PEDESTRIAN SIGNALS

Lamps for Type A pedestrian signals will be State-furnished as provided under "Materials" of these special provisions.

Type SP-1-T pedestrian signal mountings shall have an upper and lower mounting bracket attached to the pedestrian signal housing in the same manner as that shown on the plans for Type SP-2-T mounting.

10-3.21 FLASHING BEACONS

All incandescent lamps for flashing beacon units will be State-furnished as provided under "Materials" of these special provisions.

10-3.22 DETECTORS

Loop detector sensor units will be State-furnished as provided under "Materials" of these special provisions.

Loop wire shall be Type 2.

Like-numbered detector loops, when shown on the plans, shall be connected to the same detector lead-in cable.

Loop detector lead-in cable shall be Type B.

The third paragraph of Section 86-5.01A(5), "Installation Details," of the Standard Specifications is amended to read:

Slots cut in the pavement shall be washed clean, blown out and thoroughly dried before installing conductors. Residue resulting from slot cutting operations shall not be permitted to flow across shoulders or lanes occupied by public traffic and shall be removed from the pavement surface before any such material flows off of the pavement surface. Residue from slot cutting operations shall be disposed of outside the highway right of way in accordance with Section 7-1.13.

Slots shall be filled with elastomeric sealant or hot-melt rubberized asphalt sealant.

At the Contractor's option, where a Type A or a Type B loop is indicated on the plans, a Type E loop may be substituted.

All loop detectors, excluding preformed loop detectors, on any leg of the intersection shall be of the same type. Preformed loop detectors shall conform to the requirements described in "Preformed Inductive Loops," elsewhere in these special provisions.

The depth of loop sealant above the top of the uppermost loop wire in the sawed slots shall be 2 inches, minimum.

The diameter and spacing of the Type E detector loops, shown on Standard Plan ES-5B, is changed to 6 feet and 10 feet, respectively. The sides of the slot shall be vertical and the minimum radius of the slot entering and leaving the circular part of the loop shall be 1 1/2 inches. Slot width shall be a maximum of 3/4 inch. Loop wire for circular loops shall be Type 2. Slots of circular loops shall be filled with elastomeric sealant or hot melt rubberized asphalt sealant.

The ends of loop detector lead-in cables terminating at a controller cabinet with double row barrier terminal blocks shall have crimped and soldered ring terminals, otherwise the ends shall have approximately 3/4 inch of insulation removed and the exposed wire soldered.

PREFORMED INDUCTIVE LOOPS.--Preformed inductive loops shall be the type shown on the plans.

The loop shall be 6-foot square unless otherwise shown. The loop shall consist of four turns of No. 16, or larger, wire with Type THWN or TFFN insulation.

The loop wires shall be encased in 3/8 inch, minimum size, Schedule 40 or Schedule 80 PVC or polypropylene conduit. The conduit shall be sealed to prevent the entrance of water and the movement of wires within the conduit.

The loop wires from the preformed loop to the adjacent pull box shall be twisted together into a pair (at least 2 turns per foot) and encased in Schedule 40 or Schedule 80 PVC or polypropylene conduit between the preformed loop and the adjacent pull box or detector handhole. The lead-in conduit shall be sealed to prevent the entrance of water at the pull box or handhole end.

In new reinforced concrete structure decks the preformed loops shall be secured to the top of the uppermost layer of reinforcing steel using nylon wire ties. The loop shall be held parallel to the structure deck by using PVC or polypropylene spacers where necessary. Conduit for lead-in conductors shall be placed between the uppermost two layers of reinforcing steel.

10-3.23 PEDESTRIAN PUSH BUTTONS

Pedestrian push button housing shall be mounted with the actuator button at 39 inches above the adjacent finished grade.

Section 86-5.02, "Pedestrian Push Buttons," of the Standard Specifications is amended by adding the following subparagraph to the third paragraph:

The face of the actuator shall have a minimum circular diameter of 2 inches.

10-3.24 LOW PRESSURE SODIUM LUMINAIRES

Low pressure sodium luminaires shall be completely assembled, furnished with a lamp and ballast and shall comply with the following requirements:

Low pressure sodium luminaires shall be enclosed type with a horizontal burning lamp. Luminaires shall be the cutoff type.

Luminaires shall be manufactured by a manufacturer who is now regularly engaged in the manufacture of street lighting luminaires.

Each luminaire shall consist of a housing, a reflector, a refractor or a lens, a lamp socket, an integral ballast, a removable ballast tray, a lamp support, a terminal strip, a capacitor and a slip fitter. The reflector may be an integral part of the housing.

The luminaire housing shall be of corrosion resistant die cast aluminum, of 0.0625-inch minimum thickness, corrosion resistant aluminum sheet and plate with concealed continuous welds, or of acrylonitrile-butadiene-styrene sheet material (3/32 inch minimum nominal wall thickness), on a cast aluminum frame that provides mounting for all electrical components and the slipfitter. The housing shall be divided into optical and power compartments that are individually accessible for service and maintenance. Positioning and clamping of the luminaire to the pipe tenon shall be accomplished by tightening mounting bolts.

Painted exterior surfaces of the luminaire shall be finished with a fused coating of electrostatically applied polyester powder paint or other ultraviolet inhibiting film. Color shall be aluminum gray.

A high temperature neoprene, or equal, sealing ring shall be installed in the pipe tenon opening to prevent entry of water and insects into the power and optical compartments.

Access to the power unit assembly shall be through a weathertight hinged cover secured, with spring type latches or captive screws, to the luminaire housing.

Hardware shall be stainless steel or cadmium plated. Machine screws or bolts shall be used to secure removable components. Sheet metal screws shall not be used.

Cutoff luminaires shall be provided with a flat lens.

Refractors shall be one piece injection molded polycarbonate of 3/32 inch minimum thickness, or one piece injection molded acrylic of 1/8 inch minimum thickness. Flat lens shall be one piece polycarbonate of 3/32 inch minimum thickness. The refractor assembly and flat lens assembly shall be constructed to rigidly maintain its shape. The refractor assembly and the flat lens assembly shall be hinged and secured with spring type latches to the luminaire housing. The flat lens shall be mounted to a metal frame. Alternate methods of manufacturing the refractor may be approved provided minimum specified thicknesses are maintained. A sample refractor for testing will be required for alternate methods of manufacturing.

The lamp socket shall be of high temperature, flame retardant thermoset material with self-wiping contacts or may be of other equally durable material. The socket shall be rated for 660 watts and 1,000 volts.

Position of the lamp socket and the lamp support shall maintain the lamp in correct relationship with reflector and refractor for designed distribution pattern.

Candlepower distribution shall be ANSI Type III, short or Type IV, medium distribution, for cutoff luminaires.

With a 34-foot mounting height, each type of luminaire shall maintain a minimum of 0.2 foot-candle at least 90 feet each side, along the longitudinal roadway line below the luminaire, and a minimum of 0.35 foot-candle at a transverse roadway distance from the luminaire location equal to 1.5 times the luminaire mounting height.

Certified luminaire performance data shall be furnished as part of the Equipment List and Drawings as specified in Section 86-1.03 of the Standard Specifications. This data shall include complete photometric test data in the form of isolux charts at a scale of one inch equals 20 feet, for the luminaire and lamp sizes indicated on the plans.

Alternate data may be in the form of horizontal foot-candle values recorded on a 15' x 15' grid extending 90 feet longitudinally each side of the light source, and 15 feet behind and 90 feet in front of the light source, for the luminaire and lamp sizes and the mounting height indicated on the plans. The horizontal footcandle levels in the data submitted shall equal or exceed the levels specified in these special provisions. Failure to meet the referenced values will be justification for disapproval of the luminaires.

The photometric test shall be performed and certified by an independent and recognized testing laboratory. Subsequent to the Contractors installation of any luminaires, field checks may be performed at random by the Engineer and calculated according to the Illuminating Engineering Society "Guide for Photometric Measurement of Roadway Lighting Installation (LM-50)" approved in July, 1974. Failure to meet or exceed the referenced values during field checks will be justification for replacement by the Contractor.

Low pressure sodium lamps shall conform to the following:

The lamps shall be 180-watt, single ended, bayonet base, tubular gas discharge lamps suitable for street lighting use.

Low pressure sodium lamps shall have a minimum of 93 percent maintenance of initial lumens during rated life and shall comply with the following minimum performance requirements:

Lamp Designation	ANSI Code: L74-RF-180
Nominal Watts	180
Initial Lumens	33,000
Rated Ave. Life (@ 10 Hrs/Start)	18,000
Operating Position	Horizontal $\pm 20^\circ$

Low pressure sodium lamps shall reach 80 percent of light output within 10 minutes and shall restrike within one minute after an outage due to power interruption or voltage drop at the lamp socket.

The base of the lamp shall have a device that will allow the installer to indicate the month and year of installation.

Ballasts for low pressure sodium luminaires shall be the autotransformer or high reactance type and, when operated with the lamp, shall have the following characteristics and maintain the following lamp operation:

1. The power factor shall be not less than 90 percent when the ballast is operated at nominal line voltage.
2. Lamp wattage regulation spread, at any lamp voltage from nominal through life, shall not vary by more than ± 6 percent for ± 10 percent input voltage variation.
3. The lamp current crest factor shall not exceed 1.8 at nominal line voltage.
4. Ballast losses shall not exceed 24 percent for 180-watt ballasts at nominal line voltage.

A single multi-circuit connector shall be provided for quick disconnection of ballast tray.

10-3.25 SOFFIT AND WALL LUMINAIRES

A No. 7 pull box shall be installed adjacent to each soffit luminaire as shown on the plans.

10-3.26 PHOTOELECTRIC CONTROLS

Contactors shall be the mechanical armature type.

Photoelectric units for illuminated signs shall have a "turn-on" level of between 20 and 30 footcandles. (Turn-on level specified above corresponds to a switching level of approximately 40 to 60 footcandles measured in the horizontal plane.) "Turn-off" level shall not exceed 3 times "turn-on" level.

10-3.27 REMOVING, REINSTALLING OR SALVAGING ELECTRICAL EQUIPMENT

Salvaged electrical materials shall be hauled to the District Recycle Yard, located near the south end of the Route 15 High Occupancy Vehicle Lanes (HOV) in the City of San Diego, San Diego County and stockpiled.

The Contractor shall provide equipment, as necessary, to safely unload and stockpile the material. A minimum of two working days notice shall be given to the Engineer and the District Electrical Recycle Coordinator, telephone (619) 688-6842, prior to delivery.

10-3.28 PAYMENT

The contract lump sum price or prices paid for signal and lighting shall include highway lighting at intersections in connection with signals only.

All other roadway lighting on the project shall be considered as included in the contract lump sum price paid for lighting and sign illumination.

Full compensation for lighting(bike path) shall be considered as included in the contract lump sum price paid for lighting(bike path) and no additional compensation will be allowed therefor.

Full compensation for hauling and stockpiling electrical materials shall be considered as included in the contract price paid for the item requiring the material to be salvaged, and no additional compensation will be allowed therefor.

SECTION 10-4. RELOCATION OF UTILITY FACILITIES

10-4.01 GENERAL DESCRIPTION

Relocating the utility facilities shall consist of modifying the existing utility facilities and constructing or installing new utility facilities in accordance with the provisions of the of the State Standard Specifications; the details shown on the plans; and these special provisions.

If parking is to be restricted during construction, the Contractor shall post "tow-away/no parking" signs 24 hours in advance after receiving approval from the Engineer. The sign shall contain "days/hours" information and be posted so as to be reasonably seen by the public.

The Contractor shall notify the Engineer 3 working days in advance of any lane, street or alley closures or implementing any construction detour

The Contractor shall keep the streets in and adjacent to the construction area clean at all times. Streets shall be swept before washing. The Contractor shall not allow sewage to be discharged onto the ground or into any stream, creek or storm drain.

EXCAVATION.-- Excavation shall conform to the provisions in Section 19.3, "Structure Excavation and Backfill", of the State Standard Specifications and to the lines and grades shown on the plans and as directed by the Engineer.

TRENCH EXCAVATION.--Trench excavation shall conform to the provisions in Sections 5-1.02A, "Trench Excavation Safety Plans," and 19-1.02 "Preservation of Property," of the State Standard Specifications, the contract plans, and these special provisions.

The narrowest practicable trench width at top of pipe which will allow proper densification of pipe zone bedding and backfill materials shall be maintained regardless of the type of soil or the method of densification. The width of trench at bottom of pipe shall be determined by the space required for proper and effective use of tamping equipment, but not less than pipe OD plus 24 inches.

Safe and suitable ladders which project 2 feet above the top of the trench shall be provided for all trenches over 4 feet in depth. One ladder shall be provided for each 50 feet of open trench, or fraction thereof, and be so located that workers in the trench need not move more than 25 feet to a ladder.

Shoring is considered to be adequate sheeting, shoring, bracing, or equivalent method for (1) protection of life and limb which shall conform to applicable safety orders; (2) protection of existing underground and above-ground private and public improvements; and (3) the remedy of any and all conditions encountered, regardless of depth, (including, but not limited to trench sloughing, pavement separation, etc.) during the construction of the project.

Should a bracing system utilize steel H-beams or piles or other similar vertical supports, driving of said vertical supports will not be permitted except for the last 4 feet above the bottom of pile, except where this procedure is impracticable. The vertical support may then be driven to the required depth, not to exceed 4 feet. During the drilling and driving operations the Contractor shall take care to avoid damage to utilities.

At locations where the drilling of such holes is impracticable because of the existence of rocks, running sand, or other similar conditions, and provided said impracticability is demonstrated to the satisfaction of the Engineer by actual drilling operations by the Contractor, the Engineer may, upon request of the Contractor, approve the use of means other than drilling for the purpose of placing the vertical support. Such other means, however, must be of a nature which will accomplish, as nearly as possible, the purpose of the drilling, namely, the prevention of damage to existing surface or subsurface improvements, both public and private.

WATER IN TRENCH.-- The Contractor shall keep the excavation free from water during construction. Where groundwater is encountered, the static water level shall be drawn down a minimum of 12 inches below the bottom of the excavation to maintain the undisturbed state of the native soils to prevent softening of the bottom of the excavation, and to allow the placement of any fill to the specified density. Disposal of the water shall not damage property or create a public nuisance. The Contractor shall have on hand pumping equipment and machinery in good working condition for emergencies. Dewatering systems shall operate continuously until the backfill has been completed to 12 inches above the normal static groundwater level. Water may be discharged into an existing storm drain, channel, or street gutter only with the approval of the Engineer.

Dewatering systems shall not remove natural soils.

Release of the groundwater to its static level shall be controlled to prevent the disturbance of the natural foundation soils or compacted fill and to prevent flotation or movement of structures or pipes.

In no case shall the sewers be used as drains for water without the approval of the Engineer.

Crushed rock shall be used for drainage when required by the Engineer. When crushed rock is used, filter fabric shall be installed between the rock and backfill material. Crushed rock shall be the one-inch crushed rock gradation as specified in the State Standard Specifications.

When crushed rock for drainage is so ordered by the Engineer, crushed rock will be paid for as extra work as provided in Section 4-1.03D of the State Standard Specifications.

Full compensation for dewatering, shall be considered as included in the contract prices paid for the various items of work, and no additional compensation shall be allowed therefor.

EXCESS TRENCH EXCAVATION.-- Wherever the Contractor over-excavates the bottom of a trench, the bottom of the trench for water mains shall be backfilled with "Bedding For Water Pipes" listed elsewhere in these Special Provisions.

Over excavation and associated bedding not ordered by the Engineer shall be at the Contractor's expense.

ADDITIONAL BEDDING.-- When so ordered by the Engineer, additional bedding required below subgrade to replace soft or unstable material will be paid for as extra work as provided in Section 4-1.03D of the State Standard Specifications.

Material for additional bedding shall be the one-inch crushed rock gradation as specified in the State Standard Specifications.

IMPORTED BACKFILL.-- The densification method for imported backfill material shall be the same as the method for non-imported backfill.

A minimum relative compaction of 90 percent shall be achieved

Separate payment for imported backfill will be made only when the excavation is done in heavy clay, highly expansive or other deleterious material, and the imported backfill is ordered by the Engineer. The Engineer will be responsible for

Contract No. «Dist»-«Contract_No»

decisions whether or not the excavated material is suitable for backfill and when separate payment is made for imported backfill.

TRENCH RESURFACING.-- Trench resurfacing where required shall consist of asphalt concrete or portland cement concrete as per Section 39, "Asphalt Concrete" or Section 90, "Portland Cement Concrete", of the State Standard Specifications and these special provisions, as shown on the plans, and as directed by the Engineer.

Whenever excavation is made through pavement, sidewalk, driveway or drainage ditch, temporary bituminous resurfacing 2 inch thick shall be placed and maintained according to the State Standard Specifications unless permanent pavement is placed within 24 hours after backfill of trench.

COORDINATION.-- The Contractor shall notify the Engineer at least 10 working days in advance of his intent to begin work on the polyvinyl chloride and steel water pipe.

The Contractor shall provide for a safe 4 feet wide pedestrian walkway to all places of business, and for all residences during construction.

The Contractor shall not allow sewage to be discharged onto the ground or into any stream, creek or storm drain.

The Contractor shall distribute printed notices of proposed utility work to all occupants along streets where construction work is to be performed at least one week before starting such work.

The Contractor shall notify the owner or occupant (if not owner occupied) of the closure of the driveways to be closed more than one 8-hour day at least 3 working days prior to the closure. The Contractor shall minimize the inconvenience and minimize the time period that the driveways will be closed. The Contractor shall fully explain to the owner/occupant how long the work will take and when closure is to start.

The Contractor shall perform his work in such a manner that existing private and/or public utilities will not be disturbed for a period of time in excess of 4 hours. Utilities service shall not be interrupted prior to 8:00 a.m. nor after 4:00 p.m. unless otherwise approved in writing by the Engineer.

The Contractor shall cooperate with the utility owner's personnel in order to facilitate their inspection work and shall allow them access to the site of the work.

Approvals and instructions from the utility owner's personnel will be transmitted to the Contractor through the Engineer.

EXISTING UTILITIES.-- Where a possible at-grade conflict with existing underground utilities appears on the plans, unless prior pothole information is shown, the Contractor shall determine its location a minimum of 500 feet ahead of the work prior to trenching. Grade and alignment changes shall be made only if approved by the Engineer.

The horizontal and vertical locations shown for the existing underground utilities are approximate. It will be the responsibility of the Contractor to locate all utility lines in the construction area prior to excavation. Any damage to existing utility, structure, or service, whether or not indicated on the drawings shall be repaired at the Contractor's expense in a manner approved by the Engineer.

Attention is directed to "Obstructions" elsewhere in these special provisions.

All existing services to remain in service during construction. Contractor to provide and install all high -lines as needed to provide constant service.

Any potholing required will be paid for as extra work as provided in Section 4-1.03D of the State Standard Specifications.

Where a water distribution main is shown on the plans, it shall be assumed that every property is served by that water main.

Where existing underground utilities are undercut, particular care shall be exercised in selecting, placing, and compacting the backfill material under and around such utility to assure firm support. For at least 12 inches all around the undercut utility, the backfill material shall have a sand equivalent of 50 and a relative compaction of 95 percent.

Where, in the opinion of the Engineer, the native soil is unsuitable for supporting the undercut utility, the material shall be removed. The resulting depression shall be backfilled with suitable backfill material. Such excavation and backfill below the planned elevation of the bottom of the trench will be paid for as extra work as provided in Section 4-1.03D of the State Standard Specifications.

Where a one-inch or smaller water service is damaged during trenching operation, a minimum 4 foot section of such service shall be removed and replaced with two 45-degree ells and new copper tubing bent to a 12 inch minimum radius.

The Contractor's attention is directed to Section 7-1.11, "Preservation of Property". of the State Standard Specifications. The Contractor shall be careful to avoid damage to water services, sewer laterals, water and sewer mains during his trenching operation. In the event damage is done requiring new service connections and water main repairs, the Contractor shall pay for work required to be done by the utility owner. If requested by the Contractor and approved by the Engineer, the Contractor may perform said repairs.

The Contractor shall alter, relocate or reconstruct portions of existing utility service connections, such as water, which may or may not have been shown on the plans, or not accurately shown on the plans, but which are found to interfere with the work. Such work will be paid for at the unit prices for the various contract items of work involved; except for the following:

- A. The service connection is not shown on the plans or marked in the field.
- B. The service connection will conflict with the plan elevation of the new main.

Upon discovery of service connection not shown on the plans or marked in the field that conflict with the plan elevation of the new main the Contractor shall immediately notify the Engineer. When so ordered by the Engineer, protection or relocation of the items listed above will be paid for as extra work as provided in Section 4-1.03D of the State Standard Specifications.

WATER FOR CONSTRUCTION PURPOSES.-- The Contractor shall furnish all water required for construction, including water for flushing. A meter shall be installed whenever water is required by the Contractor. The water and meter shall be paid for by the Contractor in accordance with the water district's, city's, or county's rates and rules.

Only the 2-1/2 inch port shall be used for water available from fire hydrants along the job site. The 4 inch port shall be free for use in the event of a fire.

No compensation shall be paid the Contractor for water for the initial filling or refilling, for testing or retesting, and for refushing the pipeline.

The size and location of temporary meters shall be as determined by the Contractor.

COST OF WATER WITHIN PADRE DAM MUNICIPAL WATER DISTRICT;-- All water obtained from the Padre Dam Municipal Water District shall be paid for by the Contractor in accordance with the Padre Dam Municipal Water District's rates and rules.

HIGH-LINE.--All high-line, fittings and service connections shall be furnished, installed and connections made by the Contractor.

The Contractor shall be responsible for disinfecting all high-line, connections, flushing and assisting the Padre Dam Municipal Water District in taking water samples for bacteriological tests. Refer to disinfection and bacteriological test procedures listed elsewhere in these special provisions.

Following disinfection and acceptance of the high -line as a potable water system, the Contractor shall maintain continuous service through the high -line piping to all consumers normally served, both directly and indirectly, by the pipeline. Upon completion of the work, the high-line piping shall be removed or abandoned by the Contractor.

The high-line shall be installed in such a manner that it will not present a hazard to traffic and will not interfere with access to homes and driveways along its route.

All pipe, valves, fittings, hose and connections furnished by the Contractor shall be of good quality, suitable for conveying potable water. Only hot dipped galvanized pipe and fittings or Schedule 80 polyvinyl chloride (PVC) pipe shall be used for high-line piping. All polyvinyl chloride piping must be labeled "N.S.F." tested for a potable water system.

BURIED WATER LINE WARNING AND IDENTIFICATION TAPE.-- Polyethylene plastic tape shall be inert plastic film (non-metallic), acid and alkali-resistant. Polyethylene plastic warning tape shall be manufactured specifically for warning and identification of buried utility lines. Tape shall be puncture resistant and have an elongation of two times its original length before parting.

Provide tape color coded with a warning and identification imprinted in bold black letters continuously over the entire tape length.

Message	Color
Caution: Waterline Buried Below	Blue
Caution: Reclaimed Waterline Buried Below	Purple
Caution: Cathodic Protection Cable Buried Below	Red
Caution: Electric Line Buried Below	Red

Ink used to print messages shall be permanent and cannot be removed by normal handling and burial. Ink shall be black in color with the message "CAUTION, BURIED WATER LINE BELOW" or other message shown above printed at 30 inch intervals.

Tape shall be 4 mils thick and 6 inches wide.

Warning and identification tape shall be placed on the compacted and graded pipe zone backfill 1 foot above and centered over the water mains and cathodic protection prior to backfilling the trench. Tape shall run continually along the entire length of the utility intended for identification. Tape shall be installed on the main piping and all appurtenant laterals,

including blowoffs, air vacuum assemblies, fire hydrants, and services. Tape splices to overlap a minimum of 2 feet for continuous coverage.

BURIED RECLAIMED WATER LINE WARNING AND IDENTIFICATION.—Reclaimed water mains and appurtenances not available in a purple color shall be identified in the field by means of utility identification tape applied to the surface of the items. Valves, ductile iron fittings and similar items shall receive a band of tape applied circumferentially at the ends of the fittings adjacent to connections to the adjoining piping sections, and to the operator portions of gate and butterfly valves. The identification tape shall also be used to secure the polyethylene wrap specified for the various piping materials and appurtenances. Copper tubing and the appurtenant bronze fittings shall be identified by means of utility tape applied continuously along the upper surface of the entire length of the line.

Accessible items that are not available from the manufacturer in the purple color such as those located at grade, above ground and within meter boxes and vaults shall be identified in the field by means of paint coating in the purple color. Meters, meter box lids, blowoff piping and blowoff box covers or blowoff manhole covers, valve box lids, air valves and enclosures, piping valves, and all other items either accessible or exposed to view shall be identified by means of the purple coating. Coating shall be in accordance with the "Approved Materials Lists" shown elsewhere in these special provisions.

Below ground identification tape shall be pressure sensitive adhesive backed plastic tape. Tape shall be a minimum of 4 mils thick and 2 inches wide, colored purple bearing the designation "RECLAIMED WATER" for the purpose of direct application to the buried pipe and appurtenances. Tape shall meet all other requirements of Warning and Identification Tape

Above ground identification shall be vinyl with self-adhesive backing bearing the warning "RECLAIMED WATER – DO NOT DRINK" in English and Spanish along with the international "DO NOT DRINK" symbol. Warning labels and signs shall have a purple background with contrasting lettering and markings

POLYETHYLENE WRAP.— Polyethylene wrap material shall be installed per methods A or C as described AWWA C105. Odd shaped appurtenances shall be wrapped in accordance with the specific AWWA C105 subsection.

The polyethylene material shall completely encase and cover all metal surfaces. Valves shall have only the stem exposed and film shall be attached so that valve operation will not disturb the wrapping or break the seal

The polyethylene material shall be secured with a plastic adhesive tape or plastic tie straps in a manner that will hold without displacement during backfill.

TRACER WIRE.— Tracer wire shall be installed with all non-metallic water and reclaimed water mains and appurtenances prior to the placement of any backfill. The wire shall be placed on the top centerline of the pipe and continually along the entire length of the pipe. The wire shall be secured to the pipe at 6 foot intervals with plastic adhesive tape, duct tape or plastic ties. The wire shall form a mechanically and electrically continuous line throughout the pipe including casings.

Tracer wire shall be #14 solid copper UF type with cross linked polyethylene insulation. The insulation shall be white or yellow in color.

Wire splices at pipe tees, crosses, laterals, etc. shall be accomplished using a copper split bolt connector. The split bolt wire splice connector shall be completely wrapped with 3 layers of rubber splice tape followed by an additional layer of electric tape. The tape shall lap the wire insulation a minimum of 3 inches in each direction to form a water proof splice. Self-adhering rubber tape and electrical tape shall be used on all split bolt connections.

The wire shall terminate at meter boxes, blow off boxes or air valve enclosures at 1,000 foot intervals maximum. The wire shall extend into the box enclosure and terminate with a 24 inch coil of wire.

The wire shall be tested for electric continuity by the Contractor in the presence of the Engineer. Testing shall be accomplished using Progressive Electronics 77M tone generator or assemblies device and a testing telephone handset. In areas to be paved the tracer wire shall be tested prior to the placement of the asphalt.

CURB IDENTIFICATION.—The Contractor shall mark the location of each potable water lateral at the curb by stamping a letter "W" on the face of the curb in 2 inch high letters and reclaimed water laterals with a letter "RW" on the face of the curb in 2inch high letters.

DISPOSAL OF NON-FRIABLE ASBESTOS.-- Disposal of non-friable asbestos-containing materials shall be in accordance with the County of San Diego Guidelines. Guidelines may be obtained at the Solid Waste Division, County of San Diego, Public Works Division, Building 2, 5555 Overland Avenue, San Diego, CA 92123. Payment for the disposal of non-friable asbestos-containing materials shall be included in the price paid per linear foot for "Abandon Pipeline" and no separate payment will be allowed therefor.

DISPOSAL OF FRIABLE ASBESTOS; --All friable asbestos containing materials (materials that can be crumbled, pulverized, or reduced to powder in hand) are regulated as a hazardous waste and shall be transported by a licensed hazardous waste hauler and disposed of in an appropriate landfill.

Payment for the disposal of friable asbestos-containing materials shall be included in the price bid for "Abandon Pipeline" or "Remove Water Main" and no separate payment will be allowed therefor.

CONCRETE FOR ANCHOR, VALVE, AND THRUST BLOCKS.--Concrete thrust and anchor blocks shall be used, at all unrestrained fittings or required for hydrostatic testing, and shall conform to Section 90-10, "Minor Concrete," of the State Standard Specifications. Blocks shall be poured against undisturbed earth. The undisturbed earth which is to receive the resultant thrust shall be a plane surface located at right angles to the force to be resisted. Unless otherwise directed, blocking shall be placed so that joints of pipe and fitting will be accessible for repair. Refer to the project plans for the sizes of the various anchor and thrust blocks. Additional concrete required for thrust blocks, due to soil conditions, will be paid for as extra work as provided in Section 4-1.03D of the State Standard Specifications.

DEWATERING;--The Padre Dam Municipal Water District inspector shall be present for all dewatering.

HYDROSTATIC TESTING OF MAINS GENERAL.— The Contractor shall notify the Engineer at least three working days in advance of performing any pressure test. No pressure test shall be made on Saturdays, Sundays or designated legal holidays as per Section "Maintaining Traffic" elsewhere in these special provisions unless approved in writing by the Engineer.

The pipeline shall be hydrostatically tested by the Contractor in the presence of the Engineer after all pipe and appurtenances have been installed as shown on the staging plans. All permanent thrust blocks and anchors shall be in place and shall have set the required period of time prior to testing. Testing shall not begin until the pipe trench has been backfilled and compacted a minimum of 2-1/2 feet above the top of pipe and the anchor, thrust, and supporting concrete has attained a compressive strength of 2,000 psi.

Steel pipelines shall not be tested before the mortar lining and coating on all of the pipe lengths in the line have attained an age of 14 days. Cement mortar lined pipe shall not be filled with water until a minimum of eight hours has elapsed after the last joint has been mortared.

Hydrostatic testing may be performed concurrently with the disinfection operation. In the event repairs are necessary as indicated by the hydrostatic test, additional disinfection may be required by the Engineer.

Potable water shall be used for hydrostatic testing when such testing is performed separately from disinfection operations. Make up water for testing shall also be potable water. Chlorinated water shall be used to charge the line and for make up water when hydrostatic testing and disinfection operations are combined.

Temporary blocking during the tests will be permitted only at temporary plugs, caps or where directed by the Engineer.

All valves and appurtenances shall be operated during the test period. The test shall be conducted with the valves in the open position.

All valves, air vacuum assemblies, blowoffs, and services shall be monitored during the test for possible leakage and repairs made if necessary before the test proceeds.

For pipe lines with a porous lining such as cement mortar the pipe shall be filled with water and placed under a 5 psi pressure for a minimum of 48 hours prior to the actual hydrostatic test.

Before applying the specified test pressure, care shall be taken to release all air within the pipe and appurtenances to be tested. Air shall be released through services, fire hydrants, air release valves, or other approved methods.

The Contractor shall furnish all materials including water, equipment, bracing, connections, labor and expense required for testing of pipeline. He shall be responsible for the result of any failure under test which is attributable to defective material and/or workmanship furnished by him or to his negligence or improper conduct of the test.

A two hour hydrostatic test shall be performed. The hydrostatic test pressure shall be at least the pressure indicated below at the lowest point in the section being tested and shall be at least equal to the design class of the pipe at the highest point.

Steel pipe test pressure shall be (1.2 x Pipe Class)

PVC C900 and C905 and ductile Iron Pipe shall be (1.5 x Pipe Class)

The test pressure shall be maintained continuously by pumping for a period of at least one hour. The minimum allowable during the pumping time shall be 95 percent of the test pressure. At the end of the first hour, the pressure shall meet the requirements stated above, pumping shall then be discontinued for one hour and the drop in pressure recorded. The initial test pressure shall then be restored by pumping, and the quantity of water pumped into the line shall be accurately measured. This measured quantity shall not exceed that which would result from leakage at the following rates:

PVC and steel and ductile iron pipe with rubber joints

(2 gal) x (nominal diameter of pipe in inches) x (length of pipe in feet)
126,720

Allowable leakage for steel (flanged or welded) and ductile iron (flanged) pipe shall be zero.

In the event that the rate of loss of water during the test is greater than that stated above, the Contractor shall locate the leaks and perform the required repairs. If necessary, additional tests shall be performed until a satisfactory test has been completed. Regardless of the test results, all detectable leaks shall be repaired by the Contractor.

10-4.02 WATER SYSTEM RELOCATION

GENERAL REQUIREMENTS

WORK INVOLVED.-- Work consists of the relocation of and reconnection of water mains belonging to the Padre Dam Municipal Water District.

DRAWINGS AND DATA REQUIRED.--Attention is directed to Section 5-1.02, "Plans and Working Drawings", of the State Standard Specifications.

Where pipe is fabricated for this project, the Contractor shall submit complete erection and fabrication drawings to the Engineer for approval as follows:

1. The following items shall be submitted and approved prior to the fabrication of steel pipe and specials.
 - A. An affidavit of compliance with AWWA C200, C203, C205, or C214 as applicable.
 - B. A tabulated schedule including:
 1. Order of installation and closures.
 2. Pipe station and bottom of pipe elevation at each change of grade and alignment
 3. Elements of curves and bends, both in horizontal and vertical alignment
 4. Pipe internal diameter, wall thickness, and internal design pressure.
 5. Locations of bulkheads for field hydrostatic testing. (Testing against valves will not be permitted).
 6. Locations of closures, including cut-to-fit allowances, for length adjustments and for construction convenience.
 7. Locations of valves, flanges and other mechanical equipment.
 - C. Typical details of all specials and fittings, joints, and linings and coating, and butt straps.
 - D. Calculations supporting the sizing of reinforcing collars, wrapper plates or crotch plates.
 - E. Calculations supporting selected wall thickness of the pipe and specials.
 - F. Calculations supporting welded joint design.
 - G. Current shop welder certification.
 - H. Mill test reports on each heat from which steel is rolled.
 - I. Certification of dye-penetration shop weld testing.
 - J. Details and description of exterior pipe coatings including repair and testing procedures.
 - K. Materials, General:
 1. Manufacturer's catalog data including model or figure number and dimensions for each type of coupling for each type of pipe material for which the couplings are used. Include bolting and gasket data.
 2. Manufacturer's recommended installation or instructions.
 3. Materials of construction by ASTM reference grade.
 4. Shop coating data including surface preparation, coating material, number of coats, and dry film thickness applied shall be described.
2. A layout schedule shall include the station, elevation and piece identification of each pipe special, fitting and appurtenance, and the station and elevation of each pipe joint.
3. Before preparing the schedule and fabrication drawings, the Contractor shall determine the precise locations and alignment of the new pipe relative to the alignment of the new pipe as shown on the drawings. The Contractor shall furnish the Engineer with tracings or transparencies of the approved schedule and drawings, from which the Engineer can obtain the required prints.

WORK TO BE PERFORMED BY THE PADRE DAM MUNICIPAL WATER DISTRICT FORCES.- The Padre Dam municipal Water District forces will perform the following work:

1. Operate all existing valves.
2. Take samples for testing. The Contractor shall notify the Engineer a minimum of 3 days prior to testing.
3. Set tapping gate valves on existing mains where required.
4. Cut-in new valves in existing pipes.

CONNECTIONS TO WATER MAIN.- All connections shall be made by the Contractor unless otherwise shown on the plans or specified herein. Connections shall not be made to the existing water mains until all hydrostatic and bacteriological testing has been successfully completed and accepted by the Engineer and approval has been given by the Engineer to proceed.

All connections to be made to the existing system shall be correlated with the time requirements of the Padre Dam Municipal Water District. The Engineer will schedule all tie-ins to the existing mains. Only the utility owner's personnel shall operate the existing valves.

The Contractor shall give the Engineer a minimum of 48 hours notice prior to the time of any proposed shutdown of existing mains or services. Connections shall be made only in the presence of the Engineer and no connection work shall proceed until the Padre Dam Municipal Water District has given notice to proceed. The Padre Dam Municipal Water District Inspector is to be notified in writing at least twenty-four hours in advance of any connection to any main.

The Contractor shall have on hand all materials, adequate labor forces, and equipment necessary to make the connections, all required excavation, backfill, pavement replacement, lights and barricades, and may be required to include a water truck, high line hose and fittings as part of the equipment for making the connections. In addition, the Contractor shall assist the Padre Dam Municipal Water District in alleviating any hardship incurred during the shutdown for connections.

The Padre Dam Municipal Water District shall supply all tapping sleeves and tapping gate valves. The Padre Dam Municipal Water District will excavate for the tap and install tapping sleeves and valves on the existing water mains. To facilitate the future connection the Contractor shall leave a 20 foot space between the new pipe and the tapping valve connection point. After all testing is complete and the new pipe approved by the Engineer the Contractor shall connect the new pipe to the existing tapping valve and complete all backfill operations.

Where connections are made to existing valves, the Contractor shall furnish and install all temporary blocking, steel clamps and shackles and anchors as required by the Engineer and shall replace the gate box materials, well, and cover and adjust the well to the proper grade in accordance with these special provisions. No pipeline hydrostatic test shall be done against any existing valve.

The Engineer may postpone or re-schedule 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. If progress is inadequate during the connection operations to complete the connection in the time specified, the Engineer will order necessary corrective measures and all costs for same shall be paid by the Contractor.

The Contractor shall be responsible for determining in advance the grade of all existing pipelines to which connections are to be made. Connections shall be made with as little change as possible in the grade of the new main. If the grade of the existing pipe is below that of the new pipeline, a sufficient length of the new line shall be deepened so as to prevent the creation of any high spot or abrupt changes in grade of the new line. Where the grade of the existing pipe is above that of the new pipeline, the new line shall be laid at specified depth, except for the first joint adjacent to the connection, which shall be deflected as necessary to meet the grade of the existing pipe. If sufficient change in direction cannot be obtained by the limited deflection of the first joint, a fitting of the proper angle shall be installed. Where the connection creates a high or low spot in the line, a standard air release or blowoff assembly shall be installed as directed by the Engineer.

SHUTDOWN TIME TABLE FOR WATER MAINS.--The Contractor shall notify the Engineer 5 working days in advance of any planned shutdown.

Connections shall be made between Tuesday and Friday with a maximum shutdown period of 6 hours during the normal workday unless directed otherwise by the Engineer.

When, in the opinion of the Engineer, conditions are such that a 6 hour shutdown is insufficient time to accomplish the work, then the connections shall be made at night.

ABANDON WATER PIPE.--Existing water mains where shown on the plans to be abandoned shall be abandoned in place or, at the option of the Contractor, lines shall be removed and disposed of. All resulting openings into existing structures, that are to remain in place, shall be plugged with minor concrete.

The existing pipe shall be cut and plugged with concrete at 50 to 250 foot intervals.

Valves shall be turned to the closed position and service lines shall have corporate stops closed and capped and the meter boxes removed.

Salvaged material shall not be allowed to accumulate along the line of work, but shall be removed from the area at the earliest practical time.

Fire hydrant bodies, and blowoff assemblies, shall be salvaged and returned to the Engineer.

BEDDING FOR WATER PIPE.--Bedding to the spring line shall be placed at approximately the same elevation on each side of the pipe to prevent unequal loading and displacement of the pipe. Bedding shall be a minimum of 6 inches below the bottom of the water pipe.

Bedding material shall be the same as "Backfill", Pipe Zone (Adjacent to Pipe) listed elsewhere in these special provisions.

BACKFILL.--The trench backfill shall be placed and mechanically compacted. Compaction shall conform to the of the State Standard Specifications, as shown on the plans and these special provisions.

1) Imported Granular Material, Pipe Zone.

Imported granular material shall be free of organic material. The coefficient of uniformity shall be 3 or greater. The material shall be quarry waste or sand. Material shall have a sand equivalent of not less than 30 per ASTM D 2419 and shall conform to the following gradation:

U.S. Standard Sieve Size	Percent passing by weight
1/2"	100
3/8"	90-100
No. 4	50-100
No. 8	10-60
No. 30	25-60
No. 100	5-20
No. 200	0-12

Pipe Zone material shall be placed along the length of the pipe to 12 inches above the top of pipe. The Contractor shall use mechanical vibration of the bedding to obtain densification of 90 % relative density.

2) Backfill, Trench Zone

The trench backfill shall not contain more than 15 percent by volume of clay or adobe. A maximum of 15 percent shall pass a No. 200 sieve. The material shall be at optimum moisture content and shall be compacted in maximum 6 inch deep uniform layers on each side of the pipe. Backfill shall be complete prior to hydrostatic tests on the water mains and casings unless otherwise specified or permitted by the Engineer.

Trench backfill shall be compacted to obtain 90 percent relative compaction. For areas within roadways, the top one foot shall be compacted to 95 percent relative compaction.

Water consolidation shall not be used.

The use of a backhoe mounted compaction wheel is prohibited within the pipe zone.

Should evidence of pipe settlement be observed during any stage of backfilling by mechanical means, such operations shall be immediately discontinued and the remainder of backfilling in the affected portions of the trench shall be backfilled by methods as approved by the Engineer.

PIPE LAYING-GENERAL.--Pipe laying shall conform to State Standard Specifications and these special provisions. The pipe shall be laid in accordance with the manufacturer's recommendations, and shall be laid to the lines and grades shown on the plans except as amended and supplemented by the manufacturer's tabulated layout schedule and approved by the Engineer. Internal bracing installed at fabrication shall be maintained until pipe zone compaction is complete.

Necessary facilities, including slings, shall be provided by the Contractor for lowering and properly placing the pipe sections and fittings in the trench without damage.

Trenches shall be in a reasonable dry condition when pipe is laid. The Contractor shall take all necessary precautions to prevent the pipe from floating due to water entering the trench from any source, and he shall assume full responsibility for any damage due to this cause.

When the exterior joint weld is less than a complete circumferential weld extreme caution shall be exercised to assure that there is no damage to the rubber gasket in the pipe joint. The Engineer reserves the right to limit the size of welding rod and the thickness of pass as well as control of amperage used for making the welds. Where joints on the existing pipe are to be field welded, the mortar on the entire joint shall be removed, cleaned and refilled with mortar after welding is completed.

Bedding shall provide uniform and adequate longitudinal support under the full length of pipe. Bell holes at each joint shall be provided to permit the joint to be assembled properly while maintaining uniform pipe support.

All connecting parts of the pipe, rings, couplings, and fittings shall be cleaned before assembly, shall be tightly fitted together and care taken to secure true alignment and grade.

The rubber gasket joint shall be made by properly lubricating the rubber gasket with a suitable vegetable compound soap before it is placed in the groove at the spigot end. The gasket shall be stretched over the spigot end of the pipe and carefully seated in the groove, with care taken to equalize the stress in the gasket around the circumference of the joint. The gasket shall not be twisted, rolled, cut, crimped, or otherwise injured or forced out of position during the closure of the joint. A "feeler" gage shall be used to check the position of the rubber gasket after the joint has been telescoped.

The Contractor shall keep the pipe and appurtenances clean during the progress of the work. Dirt, rocks, or other foreign materials shall be removed from the interior of the pipe before and during installation. All openings in the pipeline shall be closed at the end of each day's operations or whenever the workmen are to be absent from the work area. This may require the use of a plywood or steel bulkhead. All surface or ground water shall be prevented from entering the pipe and shall be removed from the trench.

Each section of pipe shall be carefully lowered into the trench using slings in such a way that the coating and lining are not damaged by flexure or abrasion. The spigot shall be entered into the bell or collar and forced home. The joint shall be made carefully to avoid undue stressing of, or impact damage to, the pipe and gasket, and stabbing as a method of installation will not be permitted. Unless otherwise detailed on the plans, pipe shall not be set on blocks of any kind (including wood) in the trench bottom. If blocking becomes necessary, bags filled with sand may be placed under the pipe. These bags shall be broken after the haunches are packed.

The pipe shall not be dragged along the bottom of the trench, but shall be securely supported by the slings until the joint is assembled. Each spigot shall be inserted into the bell or collar the distance shown on the approved fabrication drawings so as to avoid cumulative gain or loss of laying length.

Suitable excavations shall be provided in the bedding material for removal of the slings, without damaging the coating, after assembly of the joint. These sling removal holes shall be filled, the pipe length securely blocked in its proper alignment, and the pipe barrel partially backfilled.

Unless the sheeting of shoring is to be cut off and left in place, densification of bedding for pipe shall be accomplished after the sheeting or shoring has been removed from the bedding zone. Alternate methods of pipe bedding which are recommended by the pipe manufacturer may be used if approved by the Engineer.

All joints shall be cleaned with a wire brush and welded before coating repair. All jetting locations shall be sufficient to thoroughly saturate the bedding material around the pipe.

DELIVERY, STORAGE, AND HANDLING OF CEMENT MORTAR LINED AND EPOXY COATED STEEL PIPE AND SPECIALS.—Temporary internal bracing shall be installed in all pipe 16 inches and larger prior to shipment to the job site. Temporary bracing shall be 4 inch x 4inch wooden struts installed in both the horizontal and vertical directions. Each set of struts shall be nailed together as a unit. Wooden wedges may be used to maintain the proper fit of the struts. The bracing shall be located 12 inches in from each end of the pipe section.

Pipe shall be transported to the job site on padded bunks with nylon tie-down straps or padded bonding to protect the pipe.

Pipes and specials shall only be handled with appropriate spreader bars and wide nylon straps. Chains and wire slings shall not be used. Pipe and specials shall not be dragged along the ground. All pipe over 20 feet in length shall be lifted at the quarter points from each end.

Pipes shall be stored on earth berms or timber cradles adjacent to the trench in the numerical order of installation. Pipe shall be supported at the quarter points.

Plastic end caps shall be maintained in good condition until the pipe is ready for installation. Periodically open the plastic end caps and spray potable water inside the pipe for moisture control.

Maintain internal bracing installed at fabrication until pipe zone compaction is complete.

DELIVERY, STORAGE AND HANDLING OF POLYVINYL CHLORIDE (PVC) WATER PIPE.-- PVC pipe shall be stored in the field by supporting the pipe uniformly as specified in AWWA Manual M23. Do not stack pipe higher than 4 feet or stack the pipe with weight on the bell ends. Cover stored PVC pipe to protect it from the sun's ultraviolet radiation.

Overly faded pipe, which is determined by the Engineer to be of suspect quality shall not be used and shall be removed from the project site immediately. PVC pipe which has been gouged shall not be used. PVC pipe which has received minor scratches during handling may be used solely at the discretion of the Engineer. Pipe which has been contaminated with any petroleum products (inside or outside) shall not be installed.

PVC pipe that has been dropped, dragged or handled in a manner that will cause bruises, cracks or other damage shall not be used.

Overly faded pipe, which is determined by the Engineer to be of suspect quality shall not be used and shall be removed from the project site immediately.

DELIVERY, STORAGE AND HANDLING OF VALVES.—Valves shall be delivered and stored in accordance with AWWA C550. The port openings shall be covered with plastic, cardboard, or wood while in transit and during storage in the field. These shall remain in place until the valve is ready to be installed. Valves shall not be stored in contact with the ground. Valves shall not be stacked.

INSTALLATION OF POLYVINYL CHLORIDE (PVC) WATER PIPE.-- At all times when the work of installing pipe is not in progress, all openings into the pipe and the ends of the pipe in the trenches shall be kept tightly closed. The Contractor shall maintain the interior of the pipe clean, sanitary, and free from foreign materials.

Where pipe sections less than the standard 20 foot pipe lengths are required, the pipe sections shall be installed in accordance with the manufacturer's installation guide. The minimum pipe length permitted is 5 feet except at fittings and valves where the minimum is 18 inches.

Pipe which has been contaminated with any petroleum products (inside or outside) shall not be installed.

PVC pipe which has been gouged shall not be used. PVC pipe which has received minor scratches during handling may be used solely at the discretion of the Engineer.

The pipe shall not be dropped, dragged, or handled in a manner that will cause bruises, cracks, or other damage. Any material damaged in the course of installation shall be identified and removed from the jobsite.

Installation tolerances for the pipe shall not vary more than 0.15 feet horizontally or 0.30 feet vertically from the alignment and elevations shown on the approved plans. In no case shall the pipe be bent between the couplings, nor shall deflection be made at a joint without the use of a deflection coupling. Lay pipe uphill should the grade exceed 10 percent

PVC pipe shall be installed in the trench using bell holes at each joint to prevent the pipe from being supported by the bell end or coupling.

All connecting parts of pipe, rings, coupling and castings shall be clean before assembly. Assembly of the couplings and rings shall be in accordance with the manufacturer's recommendations. Lubricant and rubber rings shall be supplied by the pipe manufacturer. The use of excessive lubricant will not be permitted.

After the spigot end has been inserted into the bell or coupling to the proper insertion mark the elastomeric ring shall be checked for grooving or improper assembly by passing a feeler gauge around the completed joint. Come-a-longs or pipe jacks may be used to drive the spigot end into the bell. Stabbing shall not be permitted.

Concrete cradles shall be installed at all fittings and valves.

Cutting and milling shall be accomplished with tools intended for such use to create a machined end equal in workmanship to the milled ends of the pipe as furnished by the manufacturer. Milling shall not result in undercutting the wall thickness and must be approved by the Engineer prior to installation.

INSTALLATION OF STEEL PIPE.-- At all times when the work of installing pipe is not in progress, all openings into the pipe and the ends of the pipe in the trenches shall be kept tightly closed. The Contractor shall maintain the interior of the pipe clean, sanitary, and free from foreign materials.

Lay pipe uphill should the grade exceed 10 percent.

Specials shall be supported independently of the pipe sections.

After the spigot end has been inserted into the bell or coupling a come-a-longs or pipe jacks may be used to drive the spigot end into the bell. Stabbing shall not be permitted.

INSTALLATION OF VALVES.—Valves shall be installed with the bolt holes straddling the centerline of the pipe and the operating nut in the vertical position. Joints shall be cleaned as listed elsewhere in these special provisions. Valves shall be installed in accordance with the manufacturers recommendations and in accordance with applicable specifications for the pipe material and joint type being used for the valve and water mains.

REPAIRS TO POLYVINYL CHLORIDE WATER PIPE.-- Repairs shall be made using PVC couplings with two elastomeric gaskets which are designed to connect plain ends of straight pipe. These couplings shall not be used to obtain deflection of the pipe joint. Use of couplings shall only be permitted upon the approval of the Engineer.

DUCTILE IRON SPOOLS.—Spools shall be ductile iron and shall be installed between the cross and the valves and as shown on the plans. The spools shall be a minimum of 18 inches long for pipes 8 inches through 12 inches and 24 inches long for pipes 16 inches and greater unless otherwise shown on the plans.

DOUBLE BALL JOINTS;--Double ball joints shall consist of a sleeve type expansion joint and a ball joint at each end with flange connections to carrier pipe. At each end of the expansion joint connection there shall be an insulated flange connection. Expansion joint shall be manufactured of ductile iron and conform to the requirements of ANSI A 21.53 and

AWWA C153. Expansion joint shall be pressure rated and tested against its own restraint to a minimum of 350 psi. Expansion joint shall be capable of deflecting and expanding simultaneously to an amount of not less than a 15 degree deflection at each end of the unit and a total of 8 inch axial movement.

The Contractor shall furnish three sets of manufacturer's complete product specifications, installation instructions and data including the expansion joint's neutral face-to-face dimension and proposed pre-compressed dimension for each installation to the Engineer for approval before the installation of any expansion joint and pipe.

An aluminum tag for the expansion joint shall be factory attached to the unit with epoxy or wire and installed so that it is readily visible by the Engineer. The model number, serial number, pressure rating, neutral dimension, extension, and compression shall be stamped or embossed on the tag.

The expansion joint shall be installed according to manufacturer's recommendations in the presence of the Engineer.

Seal gasket for sleeve expansion shall be retained in the grooved outer casing with a leak-proof design for up to a 350 psi of pressure. The expansion sleeve shall have a limiting stop collar to keep it from separating. The ball joint shall be contained in a flanged retainer with seal gasket which shall conform to the requirements of ANSI A21.11 and AWWA C111.

All water containing parts shall be lined with a minimum of 15 mils of fusion bonded epoxy conforming to the requirements of ANSI/AWWA C213 and shall be holiday tested with a 1500 volt spark test conforming to said specification.

Expansion joints shall be protected with restrainer units at bridge abutments as shown on the plans. All metal, welding and galvanizing shall conform to the provisions of Section 75, "Miscellaneous Metal," of the State Standard Specifications. The opening between the pipe collar and the outside diameter of the pipe shall be filled with caulking or spray foam.

INSULATED PIPE FLANGE KIT.-- All of the insulating kits shall be suitable for appropriate service at the operating temperatures and pressures of the water pipeline and shall be installed at the locations shown on the plans and in accordance with the manufacturer's recommendations. Installation shall conform with the National Association of Corrosion Engineer's Recommended Practice RP02-86 "Electrical Isolation of Cathodically Protected pipelines". Particular attention shall be paid to properly aligning the pipe flanges prior to inserting the bolts with insulating sleeves to prevent cutting of the sleeves and creating an electrical path when the bolts are tightened. Care shall be taken to prevent any moisture, soil, or other foreign matter from contacting any portion of the two mating pipe flanges or gaskets prior to or during installation. If any foreign matter contacts any portion of the insulated flange, the entire pipe joint shall be disassembled, cleaned with a solvent and dried prior to reassembly. Conductive grease shall not be used on the flange bolts or any other flange components.

In addition to the cement mortar lining, the interior of the pipe at the insulated flanges shall be coated with a two component smooth white liquid epoxy consisting of 100 percent solids for a distance of two pipe diameters in each direction away from the insulated flange.

The surface of the pipe shall be wire brushed to remove all rust, scale, and other foreign materials.

The two part epoxy paint shall be mixed per the manufacturer's recommendations and shall be thoroughly remixed for two minutes by hand or with a mechanical mixer immediately prior to application

The insulating sleeves shall be full length phenolic, The insulating washers shall be phenolic,

Nuts, bolts and washers shall be as listed in "NUTS, BOLTS AND WASHERS" in these special provisions.

The tape coating for all above-grade insulated pipe flanges shall be a minimum 14 mil thick general utility pipeline tape.

Each insulated pipe flange shall be tested for effective electric insulation of the two mating pipe flanges. The insulated pipe flange shall be tested in accordance with NACE RP02-86, Section 7, "Field Testing and Maintenance". The Contractor shall replace or repair any insulated pipe flange assembly until electrical discontinuity is accomplished.

TEMPORARY BLOWOFFS.-- The Contractor shall install temporary caps, plugs, thrust blocks, and temporary blowoffs for testing water mains. Caps and plugs installed by the Contractor to temporarily close the ends of new mains adjacent to points of connections shall contain two-inch outlets with corporation stops. Corporation stops shall protrude free from thrust blocks and be available for use in relieving pressure in the mains prior to connecting. Caps and outlets will be the property of the Contractor and may be claimed after connections are made.

After testing, the Contractor shall supply and install the connections and equipment necessary to convey the discharge water to a storm drain adequate for the discharge volume.

If the new water main is to be installed and tested in sections, caps and plugs installed by the Contractor to temporarily close the ends of each section of new water main shall contain 2 inch outlets with gate valves. Valves shall protrude free from thrust blocks and be used for testing and relieving pressure. Valves, outlets and thrust blocks used for the temporary blowoff shall remain the property of the Contractor and be entirely removed before connecting the pipeline to an adjacent section.

COPPER BRASS AND BRONZE TUBES AND FITTINGS.— Copper tube for services as shown on the plans shall conform to the requirements of ASTM B-88 Type K or t ASTM B-88 M Type A seamless copper water tube. Copper tubing 1 inch in diameter shall be soft, 1-1/2 inch to 2 inch shall be rigid.

Components shall be selected from the "Approved Materials List" listed elsewhere in these special provisions.

Threaded nipples, brass pipe and fittings shall conform to ASTM B 43, regular wall thickness. Threads shall conform to ANSI B1.20.1 Copper fittings shall be compression type.

Bronze stops, curb stops, meter and angle meter stops, meter flange adapters, and bronze-bodied service saddles shall conform to ASTM B 62 and be selected from the "Approved Materials List" listed elsewhere in these special provisions. Bronze fittings shall be compression type.

Service saddles shall be the double strap type except for C905 PVC applications where the wide strap type shall be used in accordance with the "Approved Materials List". Service saddles shall be used on all services and appurtenances connections on PVC pipe. For piping materials other than PVC, service and appurtenance connections shall be as shown on the plans.

Tubing shall be cut square and bends in soft copper tubing shall be "long sweep" without flattening, buckling, or thinning the tubing wall.

Flange bolts shall straddle the horizontal and vertical centerlines of the pipe. Bolts, nuts, and flange faces shall be thoroughly cleaned with a wire brush prior to assembly and bolts and nuts lubricated with anti-seize compound. Nuts shall be evenly tightened in an alternating or "star" pattern.

Service saddles shall be located a minimum of 2 feet from any pipe joint or fitting. Service saddles for 1 inch connections shall be located a minimum of 2 feet from other connections. Additionally, multiple service saddles for 1 inch connections that are installed on the same side of a single pipe length shall be alternately staggered between 10 and 30 degrees to prevent a weakened plane. Service saddles 1-1/2 inches and greater shall be spaced a minimum of 36 inches apart. Nuts shall be evenly tightened in an alternating or "star" pattern.

TAPPING FOR COPPER BRASS AND BRONZE TUBES AND FITTINGS.— Tapping into the pipe shall be made in accordance with the pipe manufacturer's recommendations. Tapping tools and shell cutters with internal teeth or double slots which retain the coupon shall be used.

GASKETS.—Gasket configuration and materials shall comply with AWWA C200 and C205 according to the applicable joint type and pressure rating of the pipe system.

Flange gaskets shall be full face, neoprene, 1/8 inch thick for all pipe sizes.

Gaskets for meter flanged end fittings shall be made of synthetic rubber and shall be full face 1/8" thick.

Blind flange gaskets shall cover the entire surface of the blind flange.

DISINFECTION;--All newly installed water mains and appurtenances and temporary high-lines shall be chlorine disinfected and field tested by the Contractor in accordance with AWWA Standard Specifications B300, B301, and C-651 and the following requirements prior to connection to the existing system.

Chlorine may be applied by a liquid chlorine, gas-water mixture or if approved by the Engineer calcium hypochlorite tablets and water solution.

The Contractor shall give the Engineer 48 hours notice in writing prior to the time requested for filling the pipeline. Disinfection of the pipelines shall not proceed until all appurtenances and any necessary sample ports have been installed and authorization to proceed has been given by the Engineer.

All components incorporated into the tie ins or connections to the existing system shall be disinfected prior to installation using the sodium hypochlorite solution.

Only vacuum operated equipment shall be used to inject the liquid chlorine gas. Direct feed chlorinators which operate solely from gas pressure in the chlorine cylinder shall not be permitted. The equipment shall incorporate a backfill preventing device at the point of connection to the potable water source used to fill the line being tested.

The chlorinating agent shall be applied at the beginning of the system to be chlorinated and shall be injected through a corporation stop, a hydrant, or other approved connection to ensure treatment of the entire system.

Only a certified, licensed chlorination and testing Contractor shall perform the chlorination work.

Sodium hypochlorite solution shall only be used for cleaning a swabbing contaminated piping and appurtenances immediately prior to installation and for disinfecting all components of a tie-in connection to the existing pipe system. Sodium hypochlorite solution may also be used, when approved by the Engineer, to increase the total chlorine residual if the concentration from the initial filling and chlorination of the system is found to be low. The solution shall be added to the system in appropriate amounts at sufficient locations to insure that the disinfecting solution is present at a concentration within the specified range throughout the system. The pump equipment used for this injection of sodium hypochlorite solution shall incorporate a back-flow prevention device at the point of connection to the potable water source used to fill the line being tested. The sodium hypochlorite solution shall not be used as a substitute for liquid chlorine (gas) chlorination.

Materials used in disinfection shall be as follows:

Liquid Chlorine (gas): Liquid chlorine gas shall contain 100 percent available chlorine and be packaged in steel cylinders in net weights of 150 lb. or 1 ton. Liquid chlorine shall be used with the appropriate gas flow chlorinators, heaters, and injectors to provide a controlled, high concentration solution into the water.

Sodium Hypochlorite (Liquid): Sodium Hypochlorite (Liquid) solution shall contain 5 percent to 15 percent available chlorine.

Calcium Hypochlorite Tablets: Calcium Hypochlorite Tablets shall be 0.2-oz. and contain approximately 65 percent chlorine by weight. Tablets shall be placed in the pipe per the following table and using the methods as detailed in AWWA C651.

Diameter of Pipe (Inches)	No. of Hypochlorite Tablets Per 20 Linear Feet of Pipe
6	5
8	6
10	8
12	9

The quantities above shall not be exceeded by more than 10 percent. Disinfecting the waterlines shall be in accordance with the following procedure:

Water shall be fed into the pipeline at a rate not to exceed 300GPM or a velocity of one foot per second whichever is less. Disinfection shall result in a initial chlorine concentration of not less than 50 ppm nor more than 100 ppm in all sections of the pipeline and appurtenances.

All valves shall be operated with the disinfection solution present in the pipeline. All appurtenances such as air vacuum valves and blowoffs shall be flushed with treated water a sufficient length of time to insure a chlorine concentration within the specified range in all components of each appurtenance.

The Padre Dam Municipal Water District will verify the presence of the disinfection solution throughout the system by sampling and testing for an acceptable chlorine concentration at the various appurtenances and/or at the test points provided by the Contractor. Areas of the system that are found below the specified chlorine concentration level shall receive additional flushing and/or additional disinfection solution as necessary to meet the specified concentrations. Additional disinfection solution after the initial charging of the line shall be by either the liquid chlorine (gas) method or the sodium hypochlorite method as directed by the Engineer.

Treated water shall be retained in the system for a minimum period of 24 hours and shall produce at the end of the retention period not less than 35 ppm in all sections being disinfected.

Following the period of retention, the chlorinated water shall be flushed from the main using potable water from a source designated by the Padre Dam Municipal Water District. Flushing shall continue until the replacement water in the new system is equal in chlorine residual to the potable water source of supply as verified by the Padre Dam Municipal Water District.

Indiscriminate disposal of the chlorinated water, or discharge to storm drains, drainage courses or surface waters shall be prohibited.

Any indication that the discharge of the chlorinated water may cause damage to the environment shall require the neutralizing of the chlorine residual by means of a reducing agent in accordance with AWWA C651 and the requirements of these special provisions.

In the event chlorinated water is to be discharged into a natural stream, river, or body of water containing wildlife, precautions such as dilution or dechlorination must be taken. The Contractor shall be responsible for notification to the Regional Water Quality Board and the California Department of Fish and Game.

Total Residual Chlorine Effluent Limitations: The total residual chlorine limits for the discharge of water from the testing of pipelines to surface waters of the San Diego Region is as follows:

Total Residual Chlorine Effluent Limitations	
30-Day Average	.002 mg/l
Daily Maximum	.008 mg/l
Instantaneous Maximum	.02 mg/l

Prior to acceptance for service, the Padre Dam Municipal Water District will perform bacteriological testing on all lines. The testing methodology employed is as set forth in "AWWA Standard Methods for the Examination of Water and Waste Water". Testing requirements are as set forth in the "California Domestic Water Quality and Monitoring Regulations" and commensurate with current requirements for surface water testing.

The Padre Dam Municipal Water District will analyze the samples for the presence of coliform bacteria and heterotrophic type bacteria (heterotrophic plate count). The evaluation criteria for a passing test is as follows:

Coliform bacteria: no positive sample

Heterotrophic plate count (HPC): less than 500 colony forming units/ml.

If the initial disinfection fails to produce satisfactory bacteriological results, the pipeline shall be refreshed and resampled. If the second set of samples do not produce satisfactory results, the pipeline shall be rechlorinated by the liquid chlorine (gas) method, flushed, and resampled. The chlorination, flushing, and sampling shall continue until satisfactory results are obtained.

The cost of correcting the problems causing test failure and any costs for retesting shall be considered to be included in the price paid for the various size pipes and no additional compensation will be provided.

The Padre Dam Municipal Water District will take samples for analysis on Monday, through Thursday of each week only. A minimum of 48 hours will be required to complete the bacteriological analysis after the sample has been received at the laboratory.

DISINFECTION FOR CONNECTIONS TO EXISTING MAINS.--The Contractor shall disinfect all fittings and short sections of pipe as they are being installed with a liquid chlorine solution in accordance with AWWA C651. Alternate methods may be used with prior approval of the Engineer.

Pipe and specials, valves, fittings, and appurtenances which become contaminated during installation shall be cleaned, rinsed with potable water and then sprayed and swabbed with a 5 percent sodium hydrochloride disinfecting solution prior to installation.

All disinfection shall be performed in the presence of the Engineer.

INTERIOR JOINT FINISH FOR PIPES LESS THAN 24 INCHES IN DIAMETER.-- Interior mortar joints shall be smooth and all gaps filled with cement mortar. All excess mortar shall be removed from the pipe interior. The pipe shall not be moved after the interior joint finish has been applied.

FIELD PAINTING AND COATING--The Contractor shall provide notice 3 working days in advance of field operations involving surface preparation and coating application.

The Engineer will determine compliance of the preparation of the shop and field prepared surface.

In addition to touch up painting and coating, all metallic appurtenances of the elements not protected from corrosion by another system shall be painted with a two part coating. The Engineer will inspect application of all touch up, primer, intermediate and finish coatings to determine the integrity of the coating and compliance with the required dry film thickness. Each coating application will be checked and deficiencies marked. Items exhibiting an improper finish or color, or insufficient surface preparation or dry film thickness, shall be prepared as necessary and corrected, utilizing the specified paint materials to obtain compliance.

Under no circumstances shall the specified paint materials be used where they may come in contact with the public water supply.

The publication listed below forms a part of this specification to the extent referenced and are referred to in the text by the basic designation only.

AWWA C 210 - Liquid Epoxy Coating Systems For Interior And Exterior Of Steel Water Pipes

AWWA C 218 - Coating the Exterior of above ground steel Water Pipelines and Fittings

SSPC - Steel Structure Painting Council

The following items or materials are not to be field painted unless specifically required elsewhere in the special provisions:

Buried mortar-coated pipe and fittings

Stainless steel-

Interior surfaces of valves, fittings and pipe

Nameplates

Grease fittings

Brass, copper or bronze, except as required for reclaimed water system identification.

Buried pipe and appurtenances, except as required in the piping specifications.

Coating systems shall be as follows:

Painting:

Paint, coatings and color selections shall be in accordance with the plans and these special provisions. All paint products shall be delivered to the job site in the original, unopened containers. All materials of a specified painting system, including primer, intermediate and finish coats, shall be produced by the same manufacturer and additives shall be used only as recommended by the paint manufacturer and as permitted by Engineer.

Silicone-Alkyd Coating System

The primer shall be suitable for the various substrate materials scheduled to receive the silicone-alkyd finish coats as indicated in the "Approved Materials List" listed elsewhere in these special provisions.

The silicone-alkyd coating system shall consist of a prime coat, an intermediate coat and sufficient finish coats to provide a total minimum dry film thickness of 6 mils.

The silicone-alkyd finish coating shall be a high gloss industrial type, Lead free alkyd base coating, containing a minimum of 47 percent solids by volume. The finish coat shall be intended for use on interior and exterior metal surfaces as a general protective coating.

Minimum and maximum recoat times as specified by the manufacturer shall apply. If these times are exceeded the surface shall be prepared as recommended by the manufacturer and as directed by the Engineer prior to receiving additional coats.

Epoxy Coating System: General

This coating system is used to provide the critical color code identification of items that do not normally require a protective coating and are located in areas exposed to abrasion and weathering. This coating is to provide a lasting identification mark only and is not intended to provide protection against rust and corrosion. Epoxy shall be two part capable of being applied under water and positively bond to the substrate.

Observe minimum and maximum recoat times as specified by the manufacturer. If these times are exceeded, the surface shall be prepared as recommended by the manufacturer and as directed by the engineer prior to receiving additional coats.

Epoxy Coating System, Steel Pipe

All exterior surfaces of pipes and fittings shall be coated with a three coat epoxy system conforming to AWWA C 210. The overall system coverage shall have a minimum dry film thickness of 12 mils. Coverage rates shall be as follows:

Primer: Primer coatings shall be applied at the dry film thickness rate of 2.5 to 3.5 mils.

Intermediate and Top Coat: Intermediate and top coat shall be applied at the dry film rate of 4 to 6 mils each.

If any of the following minimum conditions are present, the application of coatings shall be delayed or postponed until conditions are favorable.

During rain, fog, or mist, or when the relative humidity exceeds 80 percent.

When the surface to be coated is wet, moist, or contaminated with any foreign matter.

When the surrounding air temperature or the temperature of the surface to be coated is below 40 ° F.

When the temperature of the surface to be coated is more than 5° F below the air temperature or when the surface temperature is 120° F or above.

When the surface temperature is less than 5° F above the dew point or is expected to be within four hours after application of coating.

If a change in weather conditions results in damage to a newly-applied coating, restore the affected coatings shall be restored to their specified condition as directed by the Engineer.

Refer to "Epoxy Coating" listed elsewhere in these special provisions.

Surfaces not to be painted shall be protected as follows:

Remove, mask, or otherwise protect hardware, switch plates, aluminum surfaces, machined surfaces, couplings, shafts, nameplates and other surfaces not intended to be painted. Provide drop cloths to prevent paint materials from falling on or marring adjacent surfaces. Protect working parts of mechanical and electrical equipment from damage during surface preparation and the painting process.

Prior to field touch up of shop applied prime coat, prepare the surface per manufacturer's recommendations and as directed by the Engineer. Reapply primer as required to cover all scratched, abraded, or deficient areas.

Do not prepare more surface area than can be coated in the same work day. Surface preparation shall conform with the SSPC specifications as follows:

Item	Specification
Solvent Cleaning	SP 1
Hand Tool Cleaning	SP 2
Power Tool Cleaning	SP 3
White Metal Blast Cleaning	SP 5
Commercial Blast Cleaning	SP 6
Brush-Off Blast Cleaning	SP 7
Picking	SP 8
Near-White Blast Cleaning	SP 10

Wherever the words "solvent cleaning", "hand tool cleaning", "wire brushing", or "blast cleaning" or similar words are used in these special provisions or in paint manufacturer's specifications, they shall be understood to refer to the applicable SSPC Surface Preparation Specifications listed above.

Surface preparation shall be as recommended by the product manufacturer or as directed by the Engineer in the field. In general, surface preparation shall be either SSPC-SP1, SP.2 or SP3. Water blasting or sandblasting may be utilized as required by field conditions or as directed by the Engineer.

Unless otherwise directed by the Engineer, do not sandblast items that have previously been factory primed or painted. Application shall be as follows:

Work shall conform to the requirements of SSPC-PA 1, Shop, Field, and Maintenance Painting, unless the recommendations of the coating manufacturer are more restrictive, including the selection of spray equipment, brushes, rollers, mixing, drying time, temperature and humidity limitations during application, and safety precautions. Procedures for the application of coatings will be reviewed by the Engineer.

Stir, strain, and keep coating materials at a uniform consistency during application. Where thinning is permitted by the Engineer, do not reduce the coating material more than is necessary to obtain the proper application characteristics and to obtain the specified dry film thickness. Do not exceed the maximum rate allowed by the manufacturer. Do not flood the coating material surface with thinner prior to mixing. stir coating materials at all times when adding thinner.

Apply each coating evenly, free of brush marks, sags, runs, bridges, shiners, laps or other Imperfections and evidence of poor workmanship. Visible areas of chipped, peeled, or abraded paint shall be hand or power sanded, feathering the edges. The areas shall then be primed and finish coated in accordance with the specifications. Finished surfaces shall be free from defects and blemishes prior to final acceptance.

The following items shall be field painted using a silicone-alkyd system and shall be color coded in accord with the specifications utilizing appropriate pigments added to the coating by the manufacturer:

- Potable water ferrous metal piping and appurtenances located above ground, exposed or in vaults, and as directed by the Engineer.

- All reclaimed water piping and appurtenances, including meters, blowoff piping, outlets, and all devices associated with the reclaimed system, where located above ground, exposed, or in vaults, boxes or enclosures.

- Fire hydrants.

- Exterior surface of air-vacuum relief valve assemblies and enclosures.

- Protector posts.

The following items shall be field painted using an acrylic-epoxy coating to provide critical color code identification of items not normally requiring protective coating:

- Valve box lids.

- Meter box lids for all reclaimed water services.

- Blowoff box lids.

CEMENT MORTAR LINING.--Cement mortar lining shall conform to AWWA C205, except as noted below,
Lining Thickness

Nominal Pipe Size	Lining Thickness	Tolerance
4" to 10"	5/16"	-1/32" + 1/32"
12" to 16"	1/2"	-1/16" + 1/8"

Cement used in mortar lining shall be Portland Cement per ASTM C150, and Type II or Type V for lining.

Cement mortar for field joints shall consist of a mixture of 1-1/2 to 2 parts sand to one part Type II or Type V Portland Cement with enough water to permit packing and troweling without crumbling. The sand shall be washed, well graded sand such that all will pass a No. 8 sieve. Water shall be clean potable water. The quantity of water to be used in preparation of grout shall be the minimum required to produce a mixture sufficiently workable for the purpose intended. Grout shall attain a minimum compressive strength of 1,800 psi at 28 days.

Acceleration admixtures may be added if permitted by the Engineer. Calcium chloride shall not be used in the mix.

FIELD-WELDED JOINTS.-- Field welders shall be certified under Section IX, Part A of the ASME Boiler and Pressure Vessel Code or in accordance with AWWA C206, Section 3. Welders shall present a copy of their certification to the Engineer prior to performing any field welding.

Field welding of pipe joint shall conform to the requirements of AWWA Standard C206. Such joints shall be inspected and approved by the Engineer before any protective coating is placed around the outside of the joint.

Both the bell and spigot ends shall be cleaned of foreign matter prior to welding. For pipe less than 24" in diameter only the exterior of the pipe shall be welded. All welds shall remain exposed until they have been inspected and approved. Welding electrodes shall be as recommended by the pipe manufacturer. Maximum throat thickness shall be 1/8 inch.

Weld material shall be deposited in successive layers. Complete and clean each layer around the pipe circumference before commencing the next layer. The minimum number of passes for cylinder thickness less than 1/4 inch shall be two.

The Engineer reserves the right to limit the size of welding rod and the thickness of pass as well as control of amperage used for making the welds.

One joint per each 400 linear feet of pipe shall be left unwelded until all joints on both sides of it have been welded. This joint shall be welded at the coolest time during the working day.

WATER MAIN.-- All water pipe and fittings installed as water main shall be Polyvinyl Chloride Pipe (PVC) Water Pipe or Steel Pipe.

All steel pipe shall be cement mortar lined and epoxy coated.

POLYVINYL CHLORIDE (PVC) WATER PIPE.-- The pipe shall conform to the latest revision of AWWA Standard Specification C-900, Class 150 (DR18) and Class 200 (DR14), for Polyvinyl Chloride (PVC) Pressure Pipe 4 inches through 12 inches and C-905 pressure rating 165 (DR25) and 235 (DR18), for 16 inch and larger pipe for water.

PVC pipe shall have common profiles for interchange ability between rough-barrel dimensions, couplings, ends, and elastomeric gaskets so as to facilitate future repairs. When assembled, the pipe shall have only one gasket per bell and spigot end, and/or two gaskets per coupling.

PVC pipe shall be provided in standard 20 foot lengths, unless otherwise specified, detailed, required for curve alignment, or required on the approved plans. In the case where deep trenches or shoring restrict the use of standard length sections, the use of 10 foot lengths will be allowed. Random lengths shall not exceed 15 percent of the total length provided.

Pipe and fittings of 14" size shall not be used.

In areas where it is required to lay the pipe along a curve, the use of deflection couplings will be used to form the arc. The pipe shall not be placed to form an arc, nor shall the pipe be deflected within the integral bell or ductile fitting. Deflection couplings may be used. The PVC pipe shall be laid at a radius no less than the minimum shown below:

Pipe Length Used	Minimum Radius with 5 degree joint Deflection Without Bending Pipe
20 feet	229 feet
10 feet	115 feet
Combination	76 feet

Combination listed above: Lengths allowed are limited to 20 feet, 10 feet, and 5, feet. No more than two 5 foot lengths may be used in succession without being separated by a 20 foot or 10 foot length. In no case shall the radius be allowed to be less than the 76 feet without incorporating a ductile iron deflection fitting.

Pipe shall carry a current certification of the National Sanitation Foundation as acceptable for use in the transport of potable water and each pipe section shall bear indelible identification markings as required in AWWA C900 and/or AWWA C905.

The manufacturer of the pipe shall supply to the Engineer a statement certifying that each lot of pipe has been tested and found to meet the requirements of AWWA C900 and/or AWWA C905.

Provide pipe with cast iron equivalent outside diameter and integral wall-thickened bell and spigot ends, one elastomeric gasket for each bell end.

All pipe shall have a home mark on the spigot end to indicate proper penetration when the joint is made.

PVC pipe which has been subjected to excessive ultraviolet radiation from the sun shall not be used. The Engineer shall determine the acceptability of PVC pipe faded by the sun's radiation.

Solvent cement joints shall not be used.

Any length of pipe, coupling, or elastomeric gasket found to be defective in workmanship or materials, or so damaged as to make repairs and use questionable, shall be rejected.

Pipe for reclaimed water shall be purple and marked "RECLAIMED WATER" in addition to the standard labels required by AWWA.

PIPE CASING.—Steel pipe casing shall be butt welded sheets conforming to ASTM A36/A 36M, ASTM A 283/A 283M, Grade D or ASTM A 570/A570M, Grade 33. Pipe casing shall not be spiral welded.

The thickness of the pipe casing shall be as specified on the contract plans.

Pipe casing shall be lined and coated with hot applied coal tar enamel per AWWA C203, Type II. Coating and lining thickness shall be 90 mils minimum.

Casing spacers and end seals shall be used.

The annular space between the carrier pipe and casing shall not be filled with any material unless otherwise noted on the plans.

EPOXY COATING GENERAL.—Epoxy coating shall be acrylic epoxy and shall be a fast drying coating resistant to weather and abrasion containing a minimum of 39 percent solids by volume. Refer to the approved materials list elsewhere in these special provisions.

The acrylic epoxy coating shall consist of a prime coat as required for the substrate and two finish coats. Coating shall be applied in accordance with the manufacturer's recommendations.

The primer shall be suitable for the various substrate materials scheduled to receive the acrylic epoxy finish coats.

EPOXY COATING, STEEL PIPE .—Coat the exterior surfaces of all pipe and appurtenances as described below:

Color of finish coat shall be selected by the Engineer

Primer: Primer shall be TNEMEC 90-97 Organic Zinc Primer, Carboline 858 Organic Zinc Primer, or an equal approved by the Engineer

Intermediate and Top Coats: Intermediate and top coat shall be TNEMEC Series 66 Hi-Build Epoxy, Carboline 890 High Build Epoxy, or an equal approved by the Engineer.

Primer, intermediate, and top coat materials shall be from the same manufacturer. Coating materials shall be applied, cured, and inspected in accordance with the manufacturer's latest published instructions.

EXTERIOR JOINT FINISH-WELDED JOINTS.—The epoxy finish at all field welded joints shall be repaired as follows:

All welds shall be smooth followed by surface preparations per SSPC, SP-3 Power Tool Cleaning.
Epoxy coating shall be applied in a three coat system.

PIPE CASING SPACERS AND END SEALS.—Steel pipe casing spacers shall be stainless steel, centered position type with PVC liner and non metallic anti friction runners. Spacers shall be installed in accordance with the manufacturers recommendations with a minimum of three equally spaced spacers per pipe section.

Casing end seals shall be heat shrinkable casing seal consisting of a thick wall sleeve internally coated with a controlled thickness of a specifically formulated thixotropic adhesive sealant. End seals shall be installed per manufacturer's recommendations.

End seals shall not be installed until after the pipe has passed the hydrostatic test.

DEFLECTION COUPLING-C900 PVC PIPE ONLY.—PVC deflection couplings shall be extruded from heavy wall stock, with machined gasket grooves for two elastomeric gaskets which are designed to allow a maximum of 5 degrees total deflection.

DUCTILE IRON FITTINGS FOR PVC PIPE.—Fittings shall be mechanical type or push-on type joints manufactured specifically for PVC. Refer to Fittings for PVC pipe listed elsewhere in these special provisions.

STEEL PIPE--CEMENT MORTAR LINED AND EPOXY COATED.-- Cement mortar lined and epoxy coated steel pipe shall conform to AWWA C200 and C205, C210 and AWWA M11 and have lap welded joints.

Steel for pipe and specials shall conform to ASTM A 36/A 36M, ASTM A 283/A 283M, Grade D or ASTM a 570/A 570/M Grade 33 or 36.

All steel used for pipe and specials shall have a 33,000 psi minimum yield point.

The term "diameter of pipe" as used in the special provisions or as shown on the plans shall mean the net inside diameter of the lining.

Circumferential stress in steel cylinders shall not exceed 50 percent of the specified minimum yield strength of the steel used, but not more than 16,500 psi. The internal operating pressure used for design shall be as called for on the approved drawings but not less than 150 psi. If no specific surge analysis has been performed, the internal operating pressure used in the circumferential stress calculations shall include as least a 10 percent increase for surge conditions. No allowance shall be used for the tensile strength of the cement mortar lining or coating.

Special sections shall be designed per AWWA M11 and as a minimum shall conform to the pressure rating, grade of steel and cylinder thickness of the adjoining standard pipe sections. Fitting dimensions shall conform to AWWA C208. Reinforcing collar, wrappers, crotch plates, anchor rings shall conform to AWWA M11.

Outlets may be built into the wall of the pipe or may be fabricated as steel plate specials. Outlets to be installed on the straight pipe lengths shall be welded to the steel cylinder of the pipe prior to application of mortar coating to the cylinder. Outlets of size 2 inch and smaller in piping 4 inch and larger shall be of the threadolet type, per AWWA M11. Outlets shall be 3000 lb. forged steel per ASTM A 105 or ASTM A 216, Grade WCB. Threads shall comply with ABSI B1.20.1 Outlets larger than 2 inch shall use a tee or nozzle with a flanged outlet. All outlets larger than 2 inch in diameter shall be provided with steel reinforcing collars, wrapper plates, or crotch plates per AWWA M11, section 13. At the option of the manufacturer, wrappers may be used in the place of collars, and crotch plates may be used in place of collars and wrappers.

On 2 inch and smaller outlets and where galvanic isolation is required, the outlet shall be increase in size to accept a nylon isolation bushing.

Bends shall have a minimum radius of not less than 2 and 1/2 times the pipe diameter or 10 feet whichever is less. The maximum deflection at mitered girth seams shall be 22.5 degrees. At the option of the Contractor, a bend may be welded to the adjacent pipe section.

The minimum cylinder thickness shall be:

pipes to 18 inches in diameter	.1345 inches or 10 gage
specials to 18 inches in diameter	.250 inches

The wall thickness tolerances for steel pipe 12 inches in diameter and greater shall be governed by the requirements of the ASTM specifications to which the plates or sheets are ordered, but in no case shall the thickness be less than that necessary to meet internal pressure and surge requirements.

Pipe sections shall not be less than 20 feet or more than 40 feet in length except where shorter lengths are required to fit horizontal and vertical requirements.

The exterior surfaces of areas of pipe that are not mortar coated shall be sandblasted per SSPC-SP 10 Near White and epoxy coated per the requirements listed elsewhere in these special provisions.

Shop hydrostatic testing shall be performed on pipe cylinders per AWWA C200. In addition, all welds of specials and attachments shall be tested by a dye penetrant process. Certification of such testing shall be submitted to the engineer.

Use plain end pipe for flexible pipe couplings per AWWA C200. Provide joint harnesses per AWWA M11 where indicated on the plans.

Each length of the straight pipe and each special at the bell shall be plainly marked to properly identify the location of the pipe by item in reference to the layout schedule.

STEEL PIPE FLANGES.-- Steel pipe flanges shall be AWWA C207. Class D flanges (matching ANSI/ASME B16.1, Class 125 flanges for bolt sizes and drilling) for pressures up to 150 psi and AWWAC207, Class E flanges (matching ANSI/ASME B16.1, Class 125 flanges for bolt sizes and drilling) for pressures between 150 psi and 250 psi.

Flanges shall be flat faced. Segmented flanges shall not be used.

Bolt hole shall straddle the horizontal and vertical center lines.

Slip on type flanges intended for field fit-up and welding shall be welded inside and outside per AWWA C207.

NUTS, BOLTS AND WASHERS.-- All nuts and bolts shall be new and unused.

Zinc plated bolts and nuts for installation on pipelines up to 20 inches in diameter shall be carbon steel conforming to ASTM A 307 Grade A, unless otherwise indicated on the plans. Bolts shall be standard ANSI B1.1, Class 2A coarse threads. Nuts shall be standard ANSI B1.1 Class 2B coarse threads.

All nuts and bolts shall be hexagonal, except where special shapes are required. Bolts shall be of such length that not less than 1/4 inch nor more than 1/2 inch shall project past the nut in the tightened position.

Washers shall be made from the same material as the nuts.

The bolts, nuts, and flange faces shall be thoroughly cleaned by wire brush prior to assembly. Bolts and nuts shall be lubricated with a anti-seize compound approved by the Engineer. Nuts shall be tightened in a "Star" pattern to the manufacturer's recommended torque.

A washer shall be used under each nut only. Nuts shall be uniformly and progressively tightened.

Unless otherwise called for, buried nuts and bolts shall receive a heavy coat of NO-OX-ID or equal protective grease coating prior to being wrapped with polyethylene.

DUCTILE IRON PIPE AND DUCTILE IRON FITTINGS FOR AC, PVC, AND IRON PIPE.--Ductile iron pipe and ductile iron fittings for AC pipe, PVC pipe and Ductile Iron pipe shall conform to the requirements of AWWA C110, C111, C115, C151 and C153. Fittings shall have the type of joint in which the water tightness depends solely on a ring type rubber gasket, mechanical joint, or flanged fittings. Fittings shall have class 125 flanges per ANSI B16.1 depending upon the flange on the mating appurtenances.

Bolts and nuts for all flanged connections shall be hexagonal and shall conform to AWWA C110, Table 10.14 for length and diameter. Bolts and nuts for all mechanical joint connections shall be tee-head bolt and hexagonal nut style and shall conform to AWWA C111.

All threads shall be coarse thread series conforming to the requirements of the American Standard for screw threads.

All bolts and nuts on buried fittings and joints shall be corrosion resistant.

All Ductile or Cast Iron pipe and fittings shall be coated and lined as specified herein. Linings shall be cement mortar conforming to AWWA C104 (ANSI A21.4). The exterior surface shall have the factory coat of a corrosion resistant coal-tar pitch. The coating shall be smooth, tough, and tenacious when cold, not tacky and not brittle. Lining or exterior coating that does not bond firmly or shows voids or holidays shall be rejected.

The pipe and fittings shall be inspected for defects. Materials found to be defective or damaged shall be rejected and removed from the work. Any damage to the exterior protective coating of the pipe or fittings shall be painted with coal-tar pitch varnish. In case of damage to the interior protective cement lining of any pipe or fittings, said pipe or fitting shall be relined with cement mortar. Where a portion of a length of pipe is damaged, the damaged part shall be cut off in an approved manner and discarded and the remaining sound portion may be used. The Contractor shall be responsible for any and all damage to material and he shall stand the expense of repairing or replacing same.

An approved type of cutter shall be used in making any cuts in iron pipe. Damage to lining or coating during cutting shall be repaired by the Contractor to the satisfaction of the Engineer.

All connecting parts of the pipe, rubber rings, and fittings shall be assembled in a workmanlike manner in accordance with the manufacturer's recommendations and as provided in these special provisions. Rubber rings and lubricants for rubber ring joints shall be provided by the pipe manufacturer or shall be an approved equal. The use of excessive lubricant will not be permitted. Rubber rings shall be stored out of the sun and protected from deterioration.

Flanged and mechanical joints shall be carefully assembled and bolts and nuts shall be tightened gradually and uniformly around the flanges. Flanged joints that are exposed or above ground shall be cleaned and painted either with coal tar primer and enamel, or with an epoxy primer and finish paint as directed by the Engineer. Gaskets for flanged joints shall be made of 1/8 inch rubber gasket.

Every open end of pipeline shall be plugged water tight with standard cast iron test plugs or expandable type sewer plugs, before leaving the work at night. No burlap, wood or other similar temporary plugs shall be allowed.

Steel shackles shall be installed where shown on the drawings or directed by Engineer and where necessary to anchor pipe fittings and appurtenances. Shackles shall be made from flat steel plate accurately formed as detailed and shall be hot dip galvanized after fabrication. After installation, shackles shall be thoroughly and completely coated with an approved type coal tar enamel or epoxy paint.

Flexible pipe couplings shall be as listed elsewhere in these special provisions.

Flanged coupling adapters shall be of the type for connecting ductile iron or asbestos cement pipe to flanged outlets. Flanges shall be cast iron, AWWA C115 (ANSI A21.15) and followers shall be ductile iron ASTM A536. Gaskets and bolts shall be as specified above.

All buried couplings shall be coated with an approved type coal tar enamel or epoxy and wrapped with polyethylene after installation.

Polyethylene encasement for the protection of Ductile and Cast Iron piping shall meet the requirements of AWWA C105 (ANSI A21.5) and as specified as follows:

All Ductile and Cast Iron pipe, fittings, valves, and appurtenances, buried in the ground shall be protected with an 8 mil thickness polyethylene sleeve or sheet. The polyethylene material shall be secured with a plastic adhesive tape minimum 2 inches wide in a manner that will hold without displacement during backfill and will positively bond to metal, PVC, and asbestos cement pipe surfaces and polyethylene material. The polyethylene material shall completely encase and cover all metal surfaces. Laps shall be at least 12 inches wide. Valves shall have only the stem exposed and film shall be attached so that valve operation will not disturb the wrapping or break the seal. Flanged connections shall conform to the following:

Bolt holes of flanges shall straddle the vertical and horizontal centerlines of the pipe run.

Flanges shall be cleaned by wire brushing before installing gaskets.

Flange bolts and nuts shall be cleaned by wire brushing, threads lubricated with oil and graphite, and nuts tightened uniformly and progressively.

If flanges leak under pressure testing, the nuts and bolts shall be loosened or removed, the gasket reseated or replaced, the bolts and nuts reinstalled or retightened, and the joints retested. Joints shall be watertight.

Flanged pipe and fittings shall be shop fabricated, not field fabricated. Threaded flanges shall comply with AWWA C115 and shall be individually fitted and machine tightened in the shop.

BLOWOFF ASSEMBLIES.--All blowoff assemblies shall be installed in accordance with the plans at locations noted on the plans and at such additional locations as required by the Engineer for the removal of water or sediment from the pipeline.

Blowoff assemblies for reclaimed water shall be identified with purple color coating identification labels or signs in accordance with the requirements listed elsewhere in these special provisions.

All materials shall conform to the applicable requirements of "Approved Materials List" specified elsewhere in these special provisions.

Blowoff assemblies shall be installed within a section of the pipe no closer than 18 inches to a bell, coupling, joint, or lining. Blowoff assemblies shall be installed at the end of all pipe lines, regardless of the length, and at low points of the pipe line as shown in the contract plans.

Blowoff assemblies shall be disinfected, hydrostatically tested and coated in accordance with requirements listed elsewhere in these special provisions.

VALVE BOX AND EXTENSION STEMS.—Valve box shall be 6 inch in diameter for valves 2 inch and smaller and 8 inches in diameter for valves larger than 2 inch. Valve boxes shall be PVC pipe conforming to AWWA Specification C-900. Materials shall be selected from the Approved Materials List listed elsewhere in these special provisions.

Valve box lids shall be cast iron, circular and come with a skirt for a close fit inside the upper portion of the valve box. Lids shall be marked "WATER" for use on potable water systems and "RECLAIMED" for use on reclaimed water systems.

Valve box lids shall be 6 inch with a 4 inch skirt for 6 inch diameter PVC valve boxes and 8 inch with a 6 inch skirt for 8 inch diameter PVC valve boxes.

When top of valve nut is 5 feet or more below finished grade, a valve stem extension shall be furnished in accordance with the details shown on the plans.

Steel extension stems may be round or square hot dipped galvanized steel tubing of a solid design with couplings. No pinned couplings shall be permitted.

Fiberglass extension stems shall be square fiberglass tubing with a maximum length of 8 feet.

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

VALVE LID COLOR CHART.— Valve lids shall be painted in the following color code.

Valve Box Lids	Color
Blow off and normally closed valves	Red
Reclaimed water valves	Purple
Potable water valves	Yellow
Fire hydrant and fire service valves	White

GATE VALVES-RESILIENT WEDGE;-- All Resilient Wedge Gate Valves shall be of the non-rising stem type which open by turning the stem counter-clockwise. Each valve shall be the same size as the mains in which they are to be installed. Valves 4 inches through 12 inches shall conform to the requirements of AWWA C509.

Valve end types shall be compatible with the piping system in which they are installed or called for on the plans.

Valves for buried applications shall be provided with a 2 inch square AWWA operating nut and valves located above ground or in structures shall be equipped with a handwheel per AWWA C509.

Low friction torque reduction thrust bearings shall be located both above and below the stem collar.

Stem seats shall be the o-ring type with a minimum of two rings.

The wedge gate shall be encapsulated with a bonded-in-place Nitrile elastomer covering. Minimum thickness of the rubber seating area shall be 1/4 inch.

Interior and exterior surfaces, except encapsulated disc, shall be coated with epoxy lining and coatings in accordance with AWWA C550. The minimum dry thickness for epoxy linings and coatings shall be 8 mils. Liquid epoxy lining and coating shall be applied in 2 coats in accordance with AWWA C210. Powder epoxy lining and coating shall be applied in accordance with AWWA C213.

Epoxy lining and coating in the field shall be prohibited.

The valves shall be hydro tested as specified elsewhere in these special provisions. During the test the valves shall be operated. Hydro testing against closed valves shall not be permitted.

Field wrapping of the valves shall be as listed elsewhere in these special provisions.

BUTTERFLY VALVES;-- Butterfly valves shall conform to the AWWA C504, subject to the requirements of this section., shall incorporate a body mounted rubber seat and shall open by turning in a counterclockwise direction.

Actuators for valves 16 inches through 24 inches may be the manual traveling nut type. Traveling nut actuators shall not be used on valves requiring motor drive actuators or where worm drive gears are specified.

Manual valve actuators for valves located above ground or in vaults and structures shall have hand-wheels. Minimum handwheel diameter shall be 12 inches. The actuator shall be equipped with a dial indicator which shows the position of the valve disc.

Manual valve actuators designed for buried or submerged locations shall be fully gasketed, sealed, and factory packed with grease, and shall be provided with a 2 inch square operating nut.

Actuators shall have travel stops and shall be sized for opening and closing the valve's full rated working pressure and at minimum flow velocity of 16 feet per second. Actuators shall be of the same manufacturer as the valve and shall be installed and adjusted at the manufacturer's factory.

Actuators shall receive an epoxy coating on the exterior surface.

Valves and actuators shall be epoxy lined and coated in accordance with AWWA C550.

The minimum dry film thickness for epoxy lining and coating shall be 8 mils. The liquid epoxy lining and coating shall be applied in two coats in accordance with AWWA C210. Powder epoxy lining and coating shall be applied in accordance with AWWA C213.

Epoxy lining and coating of the valve in the field is prohibited.

Field wrapping of the valves shall be as listed elsewhere in these special provisions.

The valves shall be hydro tested as specified elsewhere in these special provisions. During the test the valves shall be operated. Hydro testing against closed valves shall not be permitted. Hydro testing of individual valves on site may be required by the Engineer and shall be in accordance with AWWA C504. The Padre Dam Municipal Water shall provide the hardware to adapt the valve and the Contractor shall furnish all labor, test pump, pressure gauges, and miscellaneous fittings to perform the test.

DEWATERING PIPE AND FITTINGS;--Unless otherwise called for on the plans, all dewatering piping material shall be cement lined ductile iron Class 53 conforming to AWWA C151 and AWWA C111 and these special provisions.

The interior surfaces of pipe and fittings shall be cement mortar lined and sealed in accordance with these special provisions.

Unless otherwise specified on the drawing, ends shall be mechanical joint, flanged, or flange threaded to suit the conditions specified and shall conform to these special provisions. Flanged or mechanical joint fittings shall be ductile iron or cast iron as specified on the plans. All fittings shall be Class 250 minimum conforming to AWWA C110 and AWWA C111.

Flanges shall be ductile iron, screwed on, faced and drilled according to AWWA C110.

Valves shall be of the size, type, as shown on the plans.

Inspection and certification of ductile iron piping shall conform to these special provisions. Certification shall show that each length of the pipe has been tested physically for ductility and has satisfactorily passed such tests.

METER BOXES.--Boxes shall be polymer type box and lid in accordance with the "Approved Materials List" shown elsewhere in these special provisions. Meter boxes used in conjunction with reclaimed water installations shall be manufactured purple in color.

AIR VACUUM AND COMBINATION VALVE ASSEMBLIES;—Air vacuum and combination valves shall meet the requirements of AWWA C550 and AWWA C512.

Combination air valves shall be the single body type incorporating stainless steel trim components and inlet and outlet configurations compatible with the pipe system in which they are installed.

Air release valves and air and vacuum valves shall incorporate a cast iron body stainless steel trim components and inlet and outlet configurations compatible with the pipe system in which they are installed.

Valves shall not be connected closer than 18 inches from bells, couplings, joints, or fittings on the water main.

During the hydrostatic testing the line valves and air valves shall be operated. Valves assemblies shall be disinfected and hydrostatically tested as specified elsewhere in these special provisions.

AIR VACUUM AND COMBINATION VALVE ENCLOSURES;—Valve enclosures shall be constructed of 10 gage steel with two rows of 1/2 inch diameter vent holes, 4-L clips with 5/8” holes welded to the inside of the cylinder, 1-1/2 inch lifting eyes, 180 degree door with two hinges and locking hasp, and one coat shop primed to accept the finish coat.

10-4.03 CATHODIC PROTECTION TEST STATION

CATHODIC PROTECTION, GENERAL.--The work includes corrosion control installations such as Cathodic Protection (CP) Test Stations and other related items.

The following publications form a part of this specification to the extent indicated by reference thereto. The publications are referred to in the text by the basic designation only.

American Society for Testing and Materials (ASTM):

D-1248	Polyethylene Plastics, Molding and Extrusion Materials
B-418	Standard Specification for Cast and Wrought Galvanic Zinc

American Water Works Association (AWA):

AWA C217	Cold-Applied Petrolatum Tape and petroleum wax tape coatings for the exterior of special sections, connections, and fittings for buried steel water pipelines
----------	---

National Association of Corrosion Engineers (NAACO):

RP0375	Application and Handling of Wax type Protective Coatings and Wrapper Systems for Underground Pipelines.
RP0286	Electrical Insulation Of Cathodically Protected Pipelines

The following information shall be submitted for approval of the Engineer. This information shall be submitted with clear references to the applicable specification paragraphs. The title shall clearly give the project name, identify the system specification number, and the Contractor's name and address.

Catalog Data:

- Wire and cable
- Copper/Copper Sulfate Permanent Reference Cell
- At-grade CP Test Box
- Conduit
- Welded Wire Connections
- Insulated Pipe Flange Kit
- Internal Lining For All Insulated Pipe Flanges

Wax-tape System
Tape Coating For Above-grade Insulated Pipe Flanges
Plastic Warning Tape
Vinyl Plastic Electrical Tape
Weld Coating

As-built drawings for the cathodic protection system shall be maintained by the Contractor during installation and construction of the cathodic protection systems. Design drawings shall be revised to show exact locations of all anodes, anode test boxes, and CP test stations and shall properly identify all items of equipment and material.

All materials and equipment to be used in construction shall be stored in such a manner to be protected from detrimental effects from the elements. If actual storage cannot be affected, materials and equipment shall be stacked well above ground level and protected from the elements as appropriate.

TEST STATIONS.--All test stations shall be installed behind the curb to allow for safe access of test personnel.

Two wire test stations shall be installed at the locations shown on the plans. The two wires welded to the pipe shall terminate in the concrete box with a minimum of 18 inches of slack in each wire.

Four wire test stations shall be installed at the locations shown on the plans. All wires shall terminate in the concrete box with a minimum of 18 inches of slack in each wire.

PIPE BONDING WIRE.--Electrical continuity bonding wires shall be welded across all buried metallic inline valves, flexible couplings, grooved couplings, pipe joints that are circumferentially welded, and bolted flanges, except those containing an insulation gasket kit.

BURIED WARNING AND IDENTIFICATION TAPE.--All cathodic protection test wires and cables shall include warning and identification tape as listed elsewhere in these special provisions and as shown in the plans.

BRASS IDENTIFICATION TAGS.--All wires terminating in the anode test boxes or CP test boxes shall be identified with brass tags securely attached to the wire with nylon ties. Each brass tag shall be approximately one inch in diameter and shall be manufactured from 18-gauge brass with die stamped identifying letters and/or numerals 3/16 inches high. Copper sulfate reference electrode tags at cathodic test boxes shall be stamped CuSO₄.

TEST BOX.--The anode test box shall be a circular shaped precast concrete roadway box with a cast iron cover. The cover shall be cast with the legend "C.P. Test" using letters not less than one inch high. The body of the box shall weigh not less than 54 lb. and the cover shall weigh not less than 12 lb.

HIGH POTENTIAL MAGNESIUM ANODES.--The materials and equipment furnished under this section of the special provisions shall be standard products of manufacturers regularly engaged in the manufacture of such products and shall be the manufacturer's latest standard design that complies with the specification requirements.

Magnesium Anodes: Each magnesium anode shall be a magnesium ingot with a No. 10 anode lead wire attached and prepackaged in a permeable cloth bag with backfill.

A) Chemical Composition: The "high potential" magnesium anodes shall be of the following chemical composition:

Aluminum	0.01% Max
Manganese	0.05%-1.30 %
Copper	0.02% Max.
Nickel	0.001% Max.
Iron	0.03% Max.
Other	0.05% each---0.3% Max. Total
Magnesium	Remainder

B) Anode Size and Weight:

The ingot weight of the prepackaged magnesium anode shall be 32 pounds. The size of the ingot shall be approximately 8 inch x 8 inch x 30 inch.

COPPER SULFATE REFERENCE ELECTRODE.--The reference electrode shall be constructed with an iron trap to prevent contamination from the surrounding soil. The reference electrode shall have a design life of a minimum of 15 years and a stability of plus or minus 5 millivolts under a 3.0 microampere load.

The reference electrode shall have a minimum No. 14 WAG HWY/PE insulated lead wire. Wire length shall be long enough to extend to the monitoring test box plus 18 inches of slack without splices.

Each reference electrode shall be prepackaged in a permeable cloth bag with low resistively backfill mixture to protect against the "drying out" type of failure. The backfill shall be of the following composition:

Gypsum	50%
Powdered Bentonite	50%

WIRE--All wire shall be stranded copper wire rated at 600 volts. Wires with cut or damaged insulation are not acceptable and replacement of the entire lead would be required. Wire length shall be long enough to extend from the point of connection to the monitoring test box without splices. The pipe lead wires shall have 18 inches of slack in the test box.

All lead wire and joint bond wire shall have a 7/64 inch thick high molecular weight polyethylene (HMW/PE) insulation specifically designed for cathodic protection service and suitable for direct burial in corrosive soil or water, conforming to ASTM D-1248, Type 1, Class C, Category 5 (HMW/PE Type CP) grade E-5 or J-1. The wire size shall be as shown on the plan sheets for the specific pipe size.

WELDED WIRE CONNECTIONS--All wire to pipe connections shall be made by the exothermic welding process. Welding charges and molds shall be provided by a manufacturer regularly engaged in the production of such materials and shall be for the various surface configurations and materials.

The wire shall be cut to prevent deforming the wire ends.

3 inch by 3 inch area of the outer coating shall be removed and the pipe surface ground or filed to a bright, shiny, clean and dry surface before welding the wire to the pipe.

Mastic or other coatings shall be applied to the area where the exterior coating has been removed as specified elsewhere in these special provisions.

Only one wire shall be attached with each weld. Welds shall be a minimum of 6 inches apart. All welds shall be slag free. Welds that allow the wire to loosen by pulling on the wire shall be replaced.

WELD COATING--All buried exothermic welds for the pipe lead wire connections shall be coated with a cold-applied fast-drying mastic consisting of 80 percent solids by volume and formulated from refined tar resins, synthetic resins, and solvent coatings.

INSTALLATION OF COPPER SULFATE REFERENCE CELL--Copper sulfate reference electrodes shall be kept in dry storage, above freezing, until installation. Cover the reference electrode with 12 inches of native soil and pour a total of 5 gallons of water over it to saturate it and improve its electrical conductivity to earth.

BACKFILLING WIRE--All buried wiring shall be installed at a minimum depth of 24 inches. Metallic warning tape shall be installed over all pipe lead wires and anode lead wires at a depth of 8 inches. Trenches shall be compacted in accordance with trench requirements listed elsewhere in these special provisions. Care shall be taken when installing wire and backfilling trench so that insulation is not broken, cut or bruised. If any wire insulation is damaged, it shall be replaced completely at the Contractor's expense.

FIELD TESTING--Cathodic protection installations shall be tested by a firm knowledgeable in cathodic protection. Testing shall be performed in the presence of the Engineer and a representative of the Padre Dam Municipal Water District.

The Contractor shall notify the Engineer 5 day prior to performing any field tests.

Pipeline electrical continuity testing may be performed prior to backfilling as an unofficial test. Official testing shall be at the completion of all work on the pipe line.

Electrical continuity tests shall be performed on all sections of pipe to be monitored between each pair of adjacent corrosion monitoring test stations or between the ends of the pipe sections less than 500 feet in length. Each pipe section shall be considered electrically continuous when the measured longitudinal resistance of each pipe section is no greater than 20 percent higher than the theoretical resistance of that section of pipe. If testing indicated inadequate electrical continuity the Contractor shall locate the improperly bonded pipe joints and make the necessary repairs. Until the electric continuity has the testing procedures.

The entire metallic piping system shall be tested to establish the base CP potential measurement reading. The base data will be used for future monitoring and comparative purposes. The baseline data shall include voltage measurements to +/- 1mV between any permanent copper sulfate reference electrodes (+ voltmeter correction) and a reliable portable copper sulfate reference electrode (- voltmeter correction) placed directly in the CP test box.

At the completion of the testing a report shall be given the Engineer showing the results of the field testing listed above.

**PADRE DAM MUNICIPAL WATER DISTRICT
WATER AND RECLAIMED WATER
PRE-APPROVED MATERIAL LIST**

Subject	Spec Reference	Manufacturer (Brand Name)	Notes
Actuator		Auma SG series EIM Rotork Flo-Loc, FloPac	Electric valve actuators used for valve control on motor operated valves
Adapter, Kamlock		OPW Kamlock 600-F-SS	316 stainless steel adapter MIP x male Kamlock 2", 4", and 6"
Adapter, Flange		Dresser 127 JCM 301 Powerseal 3521, 3528 Romac FCA501, FC400 Smith-Blair 912, 913 Ford Style FFCA	Six inch and larger Mechanical x flange. Steel or ductile iron construction within anchor pins, Epoxy coated, 304 stainless steel bolts and nuts
Backflow Preventer			Reduced Pressure Principal Type Assemblies as approved by the State of California, Department of Health Services
Bushing, Insulating		Calpico F.H.Mahoney	Nylon 1-1/4" x 1", 1-1/2" x 1", 2-1/2" x 2"
Cap, Locking Dust		OPW Kamlock 600 Ytype DC-SS	316 Stainless steel 2", 4", and 6"
Casing End Seal Heat Shrinkable		Advanced Products and Systems Cascade Calpico Pipeline Seal & Insulator Powerseal Raychem	Heat shrinkable seal to provide water proof seal between casing and carrier pipe.
Casing Spacer		Advanced Products and Systems Cascade Calpico Pipeline Seal & Insulator Powerseal Raychem	Stainless steel Casing Spacer Center Restrained Position Type with PVC Line and Non-Metalic Anti-friction Runners.
Cathodic Test Box		Brooks 1-Rt Series Farwest Type 1-Rt J&R No. 10-R	For cathodic protection test stations and anode ground beds
Cathodic Welding		Cadweld	For welding cathodic bond wires
Clamp, Repair		Adams 220 APAC 402, 422 or 432 Cascade CR-2, CRT-2 Ford F2 or FS2 JCM 102 Mueller 510 Powerseal 3122, 3111, 3132 Romac SS2, CL2 Smith Blair 227	Stainless Steel Double Lug AC, CI, PVC, and DI pipe 4" through 20"
Coating, Corrosion		Sto CR 246	
Coating, Epoxy		Carbine Super Hi-grad 891	Touch up paint for metal surfaces
Coating, Internal		Aquatapoxy CCI Hydro - pox	Internal coating for insulated flange
Coating, Mastic		Kop-Coat Bitumastic #50 Polyken #938	Protecting Underground Metal Surfaces
Coating Heat Shrinkable		Raychem WPC	

Subject	Spec Reference	Manufacturer (Brand Name)	Notes
Coating, Tape		Denso Mastic Trenton #1	Protecting Mechanical Joints, Flanges, Fittings, and Valves
Coating, Waterproof		Sto CR241	Water-tight coat waterproofing membrane, Trowel Grade Fiber, Reinforced Flexible
Connector, Tracer Wire		3M DBR-6 King 4,5,6	Direct bury silicone filled capsule tube with standard wire nut or silicone filled wire nut connectors for tracer wires
Corporation Stop, Super Grip		A.Y. McDonald 4704BT Jones J-1935SG, J-1957SG Ford FB1100-Q seriesG Mueller B 25028	Bronze compression x MIP Threaded Ball Valve (T-Headed Only) 3/4", 3/4" x 1", 1-1/2", and 2" full opening.
Coupling Compression Super Grip		Ford C44-Q Series Jones 2609SG McDonald 4758T Mueller H - 15403	Three part compression coupling for copper pipes 3/4", 1", 1-1/2", and 2"
Coupling, Repair or Closure for C900 PVC		Certainteed V. I. HD	PVC, 4" - 12" Solid PVC 5degree max. deflection
Coupling Deflection for C900 PVC		Certainteed V. I. HD	PVC, 4" - 12" Solid PVC
Coupling, Closure, Deflection, or Repair for C905 PVC		IPEX Nyloplast America Septer	16" through 36" Solid PPPVC
Coupling, Dielectric		Calpico F.H.Mahoney	Galvanized A120 merchant steel coupling with Mycarta Threaded Liner
Coupling Straight Flexible		APAC 301 Ford FC1 Powerseal 3501, 3538 Romac 501 Smith-Blair 411	Four inch or larger steel or ductile iron construction, slip x slip, epoxy coated with 304 or 316 stainless steel bolts and nuts. For use on AC, PVC, DI, or Steel pipe
Coupling Grooved		Grinnell #7001 Tyler 500 Victaulic 44, 77	ID, and Steel pipe 4" & larger
Coupling Transition, flexible		APAC 311, 313 Baker Ford Style FC2A Powerseal 3501, 3538 Romac 501 Smith-Blair 413	Four inch or larger steel or ductile iron construction, slip x slip, epoxy coated with 304 or 316 stainless steel bolts and nuts. For use on AC, PVC, DI, or Steel pipe
Ell, Bury Ductile Iron		Clow South Bay Foundry	Long Radius. Short radius used only with Engineer's approval
Ell, Super Grip Type		Ford L44-Q Series Jones J-2611SG Mueller H-15526	3/4" and 2" compression to compression for copper pipe
Enclosure, Test Station		Pipeline Products WTS-900	12 gage steel 8" x 36" Polyester coated. Color chocolate brown
Expansion Joint		APAC 703 Dresser 63 Power seal 3563 Smith-Blair 611, 612	For Water Main Bridge Crossings
Expansion Joint Rubber		General Rubber 1050, 1075 Holz CSM, CR, C11R Mercer 500 -700 Metraflex Metra -Sphere	Expansion joints at reservoir and pump station inlet/outlet to allow lateral movement and isolate vibration.
Fitting, Ductile Iron	AWWA C-110, C111 AWWA C-153	Bachman Nappco/Sigma Star Tyler	Flanged, mechanical joint or push on Tees, bends, crosses, reducers, and other appurtenances for water lines 4" and larger SSB fittings will not be allowed.

Subject	Spec Reference	Manufacturer (Brand Name)	Notes
Fitting Grooved		Grinnell Tyler G-B Victaulic	Ductile iron fittings (4" through 24")
Gasket		Calpico Garlock Johns-Manville	1/16"; full-face, Aramid Fiber or Ring
Gasket		Calpico Garlock Johns-Manville	1/16" thick cloth inserted rubber; full-face or ring
Gasket Rubber Ring		Calpico Johns-Mansville U.S.Pipe	1/8" thick; Rubber 4" Through 36" 250 PSI Max., Ring Type
Gasket Rubber Gasoline Resistant		Newby	Gasoline resistant pipe gaskets for water mains
Gate Well cap and Assembly		South Bay Foundry 1208N	Ductile iron, machine frame and lid used for valve access, Used in areas where speeds exceed 35 mph.
Gate Well cap and Assembly		South Bay Foundry B50	Ductile iron lid for air/vacuum ball valve access 4" nominal diameter with 6" skirt
Gate Well cap and Assembly		South Bay Foundry B52	Ductile iron lid for 8 inch nominal diameter with 6 inch skirt. for areas where speed limit is less than 35 mph.
Gate Well Cap 8 inches		South BAY Foundry SBF 1200	Ductile iron heavy lid used for valves 8" nominal diameter with 6 inch skirt. Minimum weight 40 pounds. For areas with traffic speed of more than 35 mph.
Grease		Sanchem No-Ox-Id Dearborn Chemical	For bolt corrosion protection
Grout		STO epoxy binder CR633 STO epoxy gel CR 635 STO N-S Grout CR732	Non-shrink cement-based construction grout
Insulating Blanket		McMaster-Carr	Insulating Blanket for Corrosion Interference Mitigation. Neoprene or Butyl Rubber Sheeting
Insulating Coupling		ROMAC IC400, IC501	Insulating Couplings for Corrosion (4" through 24") Protection of Pipelines
Insulating Gasket Kit		Calpico PSI - Gasketseal PSI - Linebacker Farwest	Insulating gasket kits for corrosion protection of pipelines
Meter Box		Amorcast A6001640PC-12/#A6000483DQ Cover & #A6000487 Read Lid	(10" x 20") Polymer meter box and 2 piece lid 1" meters; cover color gray for water and purple for reclaimed water
Meter Box		Amorcast A6000486SAW/#A6000164 3DZ Cover & #A6000482 Read Lid	(17" x 30") Polymer meter box and 2 piece lid, 1-1/2" and 2" meters and 2" blow-off assembly or 5/8", 3/4", and 1" meters with pressure regulators; or. Cover color gray for water and purple for reclaimed water
Meter Flange		Ford 6F series Jones J129 A.Y. McDonald 610F	1-1/2", 2" meters
Meter Stop Angle Super Grip		Ford BA43-334WQ, BA43-444WQ Jones J-1963WSG Mueller B-24258 A.Y.McDonald 4602BT	3/4" through 1" lock wing, inlet compression x outlet Swivel meter nut, ball Valve

Subject	Spec Reference	Manufacturer (Brand Name)	Notes
Meter Stop Super Grip		Ford BFA43-666WQ, BFA43-777WQ Jones J-1975WSG A.Y.McDonald 4602BT	1-1/2" and 2 " lock wing, inlet compression x outlet flange, ball valve
Meter Stop Customer Side 100 Psi		Mcdonald 6101Mw/6120 Ford B13-332Ww/HT34, B13-444Ww/HT34 Jones J-1908	Bronze, 3/4" and 1" inlet swivel meter nut, outlet FIP thread, lever handle ball valve
Meter Stop Customer Side 250 Psi		Mcdonald 6101M Mueller B-24337 Ford BF13-666W, BF13-777W Jones J-1913W	Bronze, 3/4" and 1" inlet swivel meter nut, outlet FIP thread , lever handle ball valve
Paint, Marking	Federal Specification TTP-1052D, Type II		
Pipe, Copper Tubing		Cerro Halstead Lee-Cambridge Mueller Phillips- Dodge	3/4" & 1" Type K Soft Seamless Rolled Tubing 1-1/2" & 2" Type K Soft Seamless Straight Lengths 1-1/2" & 2" Type K Rigid Seamless Straight Lengths
Pipe, Ductile Iron 4" and larger	AWWA C-111, 115, 150, 151	American Pipe Pacific States U.S. Pipe	Double Cement Mortar Lined
Pipe, PVC 900	AWWA C-900, Class 150 And Class 200	Certainteed Diamond Plastics Extrusion Technologies IPEX J-M Pipe Pacific Western Pipe Vinyltech	4" through 12", pipes.
Pipe, PVC 905r	AWWA C-905, DR 25 AND DR 18	Certainteed Extrusion Technologies IPEX J-M Pipe Pacific Western Pipe Vinyltech	16" through 24" pipes
Polyethylene Encasement	AWWA C-105		8 mils thick. For DIP
Primer, Wax Tape		Carboline Denso Paste Trenton Tem-Coat	
Polyethylene Wrap			8-mil thick polyethylene wrap for DI fittings
Saddle, Service For PVC 900		Ford 202BS Jones J-969 McDonald 3846 MuellerBR2S Series Romac 202B Smith-Blair 393	Bronze or Brass Saddle with Stainless Steel four bolt straps. IP Thread outlet. Sizes 3/4"to 2" for pipes 4" through 12"
Saddle, Service For Pvc C-905		Ford 202BS Romac 202N Jones J-696	Bronze or Brass Saddle with Stainless Steel four bolt straps. IP Thread outlet. Sizes 3/4"to 2" for pipes 16" and larger (Romac saddle requires nylon bushing)
Sealant		3M Scotch Seal	Chemical grout for joint sealing
Seismic Coupling		EBAA Iron Flex-Tend Star Pipe Starflex 5000	Flexible expansion joints for pipelines

Subject	Spec Reference	Manufacturer (Brand Name)	Notes
Tape, Warning/identification		Calpico Type 1 Ine-Tec Type B T. Christy Ent Type 1 Terra Tape Sta. 250 Thor, Elast Tec Northtown	For buried pipeline identification
Tape Outer Wrap		Polyken 960 Trenton Polyply	Adhesive plastic outerwrap for wax tape
Tape Utility		3 M 50, 51 Scotchwrap Calpico Polyken 900	General Utility Pipeline Tape for Corrosion Protection of Above and Below Ground Pipes and Fittings
Valve, Air Release 150 Psi		Apco 50, 200, 200A Crispin P110, P120, P30, P42 Val-Matic VM-38, VM-45	1" through 3" N.P.T. Inlet 4" flanged inlet
Valve, Air Release 300 Psi		Apco 50, 200, 200A Crispin P110, P120, P30, P41 Val-Matic VM-38, VM-45	1" through 3" N.P.T. Inlet 4" flanged inlet
Valve Ball		Ford B44-444-Q, BB44- 777-Q Jones J-1949SG McDonald 6100T Mueller B-25209, B-25146	1" through 2" Bronze straight, compression x compression
Valve Ball 150 Psi		Apollo 70-100 Series Milwaukee BA-1005 Nibco 560 Series Stockham S-214	1/4" through 2" FIP threads with handle
Valve Ball 150 Psi	AWWA C-507	Pratt	4" and larger, thermosetting or fusion bonded epoxy coated, rubber seat
Valve, Butterfly 150 Psi 4" through 12"	AWWA C-504	Dezurik AWWA Keystone 504 M & H 4500 Pratt Ground Hog	Thermosetting or fusion bonded epoxy coated and lined
Valve, Butterfly 250 Psi 4" through 12"	AWWA C-504	Dezurik AWWA Keystone 507 Pratt Triton HP-250	Thermosetting or fusion bonded epoxy coated and lined
Valve, Butterfly 150 Psi 16" and larger	AWWA C-504	Dezurik AWWA M & H 1450, 4500 Mosser 810, 830 Muller/Pratt Groundhog	Thermosetting or fusion bonded epoxy coated and lined, Class B Flange x Flange
Valve, Butterfly 250 Psi 16" and larger		Dezurik BAW 250 M & H 1450, 4500 Mosser 810, 830 Muller/Pratt Triton 250	Thermosetting or fusion bonded epoxy coated and lined, Class B Flange x Flange
Valve Butterfly Wafer 150 Psi 16" and Larger,	AWWA C-504	Pratt MKII	Thermosetting or fusion bonded epoxy coated and lined
Valve, Combination Air Release & Air & Vacuum 300 Psi 1" through 3"	AWWA C512	APCO 143C.2, 145C.2, 147C.2 Cal-Val 361-CAV564.3, CAV332.3, 363-CAV332.3 Crispin UL 10, UL 20, UL 30 Val-Matic 201C.2, 202C.2, 203C.2	Single cast body with stainless steel internal parts, BUNA-N seats, and epoxy coated interior. N.P.T. threaded inlet and outlet.
Valve, Check 150 psi and 300 psi		APCO Series 800 Val-Matic Series 9000	Slanting Disc Check Valve 4" and larger

Subject	Spec Reference	Manufacturer (Brand Name)	Notes
Valve, Combination Air Release & Air & Vacuum 300 Psi 4"and larger	AWWA C512	Apco 152.1/200A.3 152.2/200A.3 153.1/200A.3 153.2/200A.3 154.1/200A.3 152.2/200A.3 Cal-Val MTP364/34.332 MTP364/34.116.3 MTP366/34.332 MTP366/34.116.3 MTP368/34.332 MTP368/34.116.3 Crispin AL41/PL10 AL42/PL10 AL41/PL10 AL61/PL10 AL81/PL10 AL82/PL10 Val-Matic 104/38, 153/38.5, 106/38, 156/38.5, 108/38, 158/38.5	Duel body style. Stainless steel internal parts, BUNA-N seats, protection hood and epoxy coated interior. Flanged 125# or 250# inlet.
Valve, Gate Resilient Seat/Wedge 250 Psi	AWWA C-509	American-FC Series 500 AVK 25 Clow 6000 Series Kennedy Valve, Ken-Seal II Mueller A-2360 U.S. Pipe Metroseal 250	4" through 12" Non Rising Stem, Epoxy Coated Interior, Rubber Encapsulated Wedge
Valve, Pressure Reducing		Cla-Val 90G-01	For Water Mains, 4" through 16"
Valve, Pressure Regulating 150-249 Psi		Cash Acme EB24UHPSD	3/4" through 2" service
Valve, Pressure Regulating 250-400 Psi		Cash Acme E55	3/4" through 2" service
Valve, Pressure Relief		Cash Acme FWC	For Service Connections, 3/4"
Valve, Pressure Relief and Sustaining		Cla-Val 50-01, 650-01	For Water Mains, 4" through 16"
Vault Access Door		Bilco Type AD-JL	Aluminum Vault access doors, dual door configuration, spring loaded and counter balanced with inset for padlock. All vaults shall have H-10 for parkways and H-20 rated traffic doors
Vault Joint Sealant		A-Lok Butyl Lok Associated Concrete Products Quick Seal	None
Vault, Ladder		Bilco Ladder Up Pipeline products VL-100	Vault ladder extension, retractable 48 inch extension
Vault, Precast Concrete		Associated Concrete Brooks Products J & R Concrete Products San Diego Precast	None
Valve Stem Extension		Pipeline Products FPU-210, FPT-200, FPL-220	Extension or Three part Fiberglass Valve Extension
Wire, Tracer			#14 AWGSolid Copper UF Type wire with cross linked Polyethylene insulation. White or yellow

10-4.04 WATER PIPE RELOCATION MEASUREMENT AND PAYMENT

MEASUREMENT.— Water system work performed under these special provisions will be designated in the contract item by size, type, thickness, quality, or whatever information is necessary for identification.

The lengths of the various sizes and types of water pipe and casing to be paid for will be determined by the linear foot from actual measurements along the centerline of the pipe in place in the completed work. Pipe placed in excess of the length designated by the Engineer will not be paid for. When pipes are cut to fit a structure, the quantity to be paid for will be the length of pipe placed before cutting, measured in one foot increments.

Fittings, which increase the length of the water main and for which no separate contract item is provided, will be measured by the foot for the size of water main involved. Fittings will be measured along centerlines to the point of intersections.

Quantities of the various sizes and types of valves, valve assemblies (including enclosure), water and copper services, cathodic protection test station to be paid for will be determined as units from actual count in the completed work.

PAYMENT.—Items of work measured as provided in these special provisions will be paid for at the contract prices per linear foot for the various sizes and types of water pipe and casing at the contract prices per unit the various sizes and types of valves, valve assemblies (including enclosure), water and copper services, cathodic protection test station.

Full compensation for reconnect new mains to existing mains, temporary blow-off assemblies, disinfect water mains and water pressure test, remove water mains for installation of new water pipe, and salvage materials involved in constructing the water main shall be considered as included in the contract prices paid for the various sizes and types of water pipe and no separate payment will be made therefor.

Abandon water pipe, abandon water services will be measured and paid for as abandon pipeline.

Full compensation for remove water main, slurry backfill, the various sizes and types of blocks, services, flexible joints and ball joints, and disposal of friable and non-friable material involved in constructing the water mains shall be considered as included in the contract prices paid for the various items of water mains and no separate payment will be made therefor.

When imported backfill is ordered by the Engineer, it will be paid for as extra work as specified in Section 4-1.03D of the State Standard Specifications.

Full compensation for furnishing all labor, materials (including metallic tape locator for non-metallic water pipe), tools, equipment, and incidentals, and for doing all the work involved in relocating the water system, complete and in place shall be considered as included in the prices paid for the various contract items of water systems relocation involved, and to additional compensation will be allowed therefor.

Full compensation for protective work operations required to accommodate or safeguard public traffic or existing facilities (including fencing) and for all trenching and shoring, control of water in and outside the excavations and trenches, and all highline systems shall be considered as included in the prices paid for the various contract items of water systems relocation involved, and no additional compensation will be allowed therefor.