

MODESTO CITY STANDARD SPECIFICATIONS

Design Sections

- 00 Design Index
- 01 Design General
- 02 Design Maps & Improvements
- 03 Design Streets
- 04 Design Storm Drainage
- 05 Design Sanitary Sewer
- 06 Design Water
- 07 Design Street Light
- 08 Design Non-city Utility
- 08A Fiber Optic Design
- 09 Design Survey
- 10 Design Driveway Access
- 11 Design Grading
- 14 Design Demo
- 15 Design Estimates
- 16 NPDES
- 20 Design Walls
- 21 Development Processes

Design Appendices

- APP A-Design CAD Standards
- APP B-Construction Notes
- APP C-Bonding
- APP D-Review Checklist
- APP Dc-Commercial Review Checklist
- APP F-SS design procedure
- APP G-SD Design Example
- APP H-Private Developments
- APP I-Private Fire Water
- APP J-Village Sewer
- APP K-Easement Deeds
- APP L-Water Outside City
- APP M-Water_Sewer Separation
- APP N-NPDES
- APP O-Fiber Optics Permit
- APP O-Fiber Optics questionnaire
- APP P-Outdoor_Washing_Facilities
- APP Q_Digital_File_Req
- APP R-Outside Service Agreements

Standards Section

- 00 Standards Index
- 01 Standards Safety
- 02 Permitting
- 03 Standards Street
- 04 Standards Storm
- 05 Standards Sanitary
- 06 Standards Water
- 07 Standards Lighting
- 08 Utilities
- 11 Standards Earthwork
- 12 Standards Landscaping
- 13 Standards Irrigation
- 17 Standards Adj of MH
- 18 Standards Traffic Signals
- 19 Standards Emergency Vehicle

Standard Details

- 0000 Standard Details Index
- 0100 Safety
- 0200 Cad Standards
- 0300 Streets /Traffic
- 0400 Storm Drain
- 0500 Sewer
- 0600 Water
- 0700 Lighting
- 0800 Utilities
- 0900 Survey
- 1000 Driveways/Access
- 1100 Earthwork
- 1200 Landscaping

General Provisions

- 00 Index
- 01 Definittins and Terms
- 02 Award and Execution of Contract
- 03 Nature of Contract/Changes in Work
- 04 Control of Work
- 05 Control of Materials
- 06 Utilities
- 07 Legal Relations and Responsibilities to the Public
- 08 Prosecution and Progress
- 09 Measurement and Payment

INDEX

ENGINEER DESIGN STANDARDS

<u>SECTION</u>		<u>PAGE</u>
<u>1</u>	<u>GENERAL</u>	
<u>1.01</u>	Purpose and Intent	1-1
<u>1.02</u>	Scope	1-1
<u>1.03</u>	Design.....	1-1
<u>1.04</u>	Final Authority	1-1
<u>1.05</u>	Definitions	1-1
<u>2</u>	<u>MAPS AND IMPROVEMENT PLANS</u>	
<u>2.01</u>	General	2-1
<u>2.02</u>	Preparation	2-1
	A. Dimensions.....	2-1
	B. Drafting Specifications	2-1
	C. Improvement Plan Format	2-1
	D. Final Maps	2-6
	E. Checklist (Appendix D).....	2-7
<u>2.03</u>	Submittal	2-7
	A. Improvement Plans.....	2-7
	B. Final Map Package	2-8
	C. Submittal For Grading Permit	2-9
	D. Subsequent Plan Submittals	2-9
<u>2.04</u>	Record Drawings.....	2-10
<u>2.05</u>	As-built Drawings	2-10
<u>3</u>	<u>STREET DESIGN</u>	
<u>3.01</u>	General	3-1
<u>3.02</u>	Pavement Design.....	3-2
<u>3.03</u>	Streets Rights-of-way/Easements.....	3-3
<u>3.04</u>	Subdivision Boundaries.....	3-3
<u>3.05</u>	Horizontal Alignment.....	3-3
<u>3.06</u>	Vertical Alignment.....	3-4
<u>3.07</u>	Sidewalks, Curbs and Gutters	3-5
<u>3.08</u>	Median Curbs	3-6
<u>3.09</u>	Bus Turnout.....	3-7
<u>3.10</u>	Driveway Standards	3-7

SECTION

PAGE

3. STREET DESIGN (continued)

3.11	Alleys.....	3-8
3.12	Intersections.....	3-8
3.13	Survey Monuments.....	3-8
3.14	Design Speed.....	3-9
3.15	Street Striping.....	3-9
3.16	Signing and Barricades.....	3-9
3.17	Undergrounding of Utilities	3-10
3.18	Standard Locations of Utilities.....	3-10
3.19	Relocating Existing Irrigation Lines	3-10
3.20	Fire Department Standards for Private Streets.....	3-11

4. STORM DRAIN DESIGN

4.01	General	4-1
4.02	Submittal of Drainage Calculations	4-2
4.03	Hydrology Calculations.....	4-3
4.04	Pipe Materials.....	4-3
4.05	Cover Requirements.....	4-4
4.06	Horizontal Alignment.....	4-4
4.07	Drainage Structures	4-5
4.08	Easements.....	4-5
4.09	Miscellaneous Items	4-6
4.10	Detention Basins	4-6

5. SANITARY SEWER DESIGN

5.01	General	5-1
	A. Submittal Map & Calcs	5-1
	B. Line Size and Service Policy.....	5-1
	C. Right-of-way Policy	5-2
	D. Service Policy.....	5-2
	E. Septic Tank Policy.....	5-2
	F. Fly Line Policy	5-2
5.02	Flow	5-3
5.03	Velocity	5-6
5.04	Vertical Alignment.....	5-6
5.05	Horizontal Alignment.....	5-7
5.06	Pipe Materials.....	5-8
5.07	Sewer Laterals	5-8

SECTION

PAGE

5. SANITARY SEWER DESIGN (continued)

<u>5.08</u>	Manholes	5-9
<u>5.09</u>	Pump Systems	5-10
<u>5.10</u>	Village One PVC Standard Specifications.....	5-10

6. WATER SYSTEM DESIGN

<u>6.01</u>	General	6-1
<u>6.02</u>	Layout of Mains	6-1
<u>6.03</u>	Vertical Alignment.....	6-1
<u>6.04</u>	Horizontal Alignment.....	6-2
<u>6.05</u>	Pipe Size and Material.....	6-2
<u>6.06</u>	Water Service	6-3
<u>6.07</u>	Fire Hydrants	6-3
<u>6.08</u>	Valves 6-4	
<u>6.09</u>	Blow-Offs.....	6-4
<u>6.10</u>	Thrust Blocks	6-4
<u>6.11</u>	Easement Requirements	6-5
<u>6.12</u>	Private Water System Design for Fire Protection	6-5

7. STREET LIGHT DESIGN

<u>7.01</u>	General	7-1
<u>7.02</u>	Spacing, Intensity and Mounting Heights	7-1
<u>7.03</u>	Pole Height and Arm Length.....	7-2
<u>7.04</u>	Location of Street Lights	7-2
<u>7.05</u>	Pull Boxes	7-3

8. NON-CITY UTILITY DESIGN

<u>8.01</u>	General	8-1
<u>8.02</u>	Layout of Utility or Joint Trench.....	8-1
<u>8.03</u>	Vertical Alignment.....	8-1
<u>8.04</u>	Horizontal Alignment.....	8-1
<u>8.05</u>	Overhead Utility Lines	8-1

9. SURVEY STANDARDS

<u>9.01</u>	Parcel Maps	9-1
<u>9.02</u>	Subdivision Maps.....	9-2

SECTION

PAGE

9. SURVEY STANDARDS (continued)

9.03	Specifications for Surveys on the California Coordinate System 1983 Based on the NAD 83 Datum	9-3
9.04	Vertical Datum	9-3
9.05	Street Monuments	9-3
9.06	Boundary Monuments	9-4
9.07	Block Corner Monuments	9-4
9.08	Lot Corner Monuments	9-4

10. DRIVEWAY ACCESS AND DESIGN

10.01	General	10-1
10.02	Design Standards.....	10-3
10.03	Design Criteria	10-4

11. GRADING DESIGN STANDARDS

11.01	General	11-1
11.02	Soils Report.....	11-1
11.03	Grading at Property Lines	11-1
11.04	Lot Grading	11-2

12. LANDSCAPING (w/ Construction Standards Section 12)

13. IRRIGATION (w/ Construction Standards Section 13)

14. DEMOLITION AND ABANDONMENT PLAN

14.01	General	14-1
14.02	Content	14-1
14.03	Scale	14-1

15. ESTIMATES FOR BONDING

15.01	General	15-1
15.02	Costs	15-1
15.03	Form	15-1
15.04	Grading.....	15-1
15.05	Construction of Existing Streets.....	15-1
15.06	Groundwater.....	15-2

SECTION

PAGE

16. WALL DESIGN

<u>16.01</u>	General	16-1
<u>16.02</u>	Design Standards	16-1
<u>16.03</u>	Finish Treatments	16-2
<u>16.04</u>	Color	16-2
<u>16.05</u>	Panel Supports	16-2
<u>16.06</u>	Inspections	16-2
<u>16.07</u>	Wall Caps	16-2
<u>16.08</u>	Location	16-2

APPENDIX A CITY CAD STANDARDS

Chapter 1	General Drawing Requirements	A-1
Chapter 2	Layers	A-3
Chapter 3	Fonts	A-9
Chapter 4	Pen Assignments	A-12
Chapter 5	Symbols & Abbreviations	A-19
Chapter 6	Title Block	A-24
Chapter 7	Deviations	A-25
Chapter 8	Standards Modifications	A-26

APPENDIX B CONSTRUCTION NOTES

<u>1.01</u>	General	B-1
<u>1.02</u>	Water	B-2
<u>1.03</u>	Storm Drain	B-3
<u>1.04</u>	Sanitary Sewer	B-4

APPENDIX C BONDING

<u>1.01</u>	General	C-1
<u>1.02</u>	Bond Estimate Costs	C-2
	<u>A.</u> Earthwork and Paving	C-2
	<u>B.</u> Concrete Work	C-3
	<u>C.</u> Water System	C-4
	<u>D.</u> Sewer System	C-4
	<u>E.</u> Storm Drain System	C-5
	<u>F.</u> Electrical	C-6
	<u>G.</u> Miscellaneous	C-6

<u>SECTION</u>	<u>PAGE</u>
<u>APPENDIX D</u>	IMPROVEMENT PLAN REVIEW CHECKLIST
<u>1.01</u>	General D-1
<u>1.02</u>	Title Sheet D-1
<u>1.03</u>	Sheet Two (and Three if required) D-2
<u>1.04</u>	Demolition and Abandonment Plan D-2
<u>1.05</u>	Grading Plans D-2
<u>1.06</u>	Utility Plans D-3
<u>1.07</u>	Streets D-3
	A. Plan Views.....D-3
	B. Profiles D-4
<u>1.08</u>	Sanitary Sewers D-5
<u>1.09</u>	Drainage D-6
	A. Hydrology - Hydraulics D-6
	B. Easements.....D-6
	C. Structures.....D-6
	D. Pipe.....D-7
	E. Channels.....D-7
	F. Temporary Storm Drain Retention Basins D-7
<u>1.10</u>	Waterlines.....D-8
<u>1.11</u>	Street Lighting.....D-8
<u>1.12</u>	Landscape and Irrigation D-9
<u>1.13</u>	Engineers Cost Estimate.....D-9
<u>APPENDIX E</u>	MINIMUM SUBMITTAL PACKAGE E-1
<u>APPENDIX F</u>	SANITARY SEWER DESIGN PROCEDURE F-1
<u>APPENDIX G</u>	STORM DRAIN DESIGN EXAMPLE.....G-1
<u>APPENDIX H</u>	FIRE DEPARTMENT STANDARDS FOR PRIVATE STREETS & DEVELOPMENTS
<u>1.01</u>	General H-1
<u>1.02</u>	Automatic Fire Protection H-1
<u>1.03</u>	Access to Site H-1
<u>1.04</u>	Access to Buildings.....H-1
<u>1.05</u>	Access Roadways.....H-2
<u>1.06</u>	Street Widths H-2
<u>1.07</u>	Fire Lane and Fire Hydrant Marking.....H-3

<u>SECTION</u>		<u>PAGE</u>

**APPENDIX H FIRE DEPARTMENT STANDARDS FOR
PRIVATE STREETS & DEVELOPMENTS**

<u>1.08</u>	Electronically Controlled Vehicle Access Gate	H-3
<u>1.09</u>	Buildings Under Construction.....	H-4
<u>1.10</u>	Sidewalks	H-4

[APPENDIX I](#) **PRIVATE WATER SYSTEM DESIGN FOR
FIRE PROTECTION**

<u>1.01</u>	General	I-1
<u>1.02</u>	Pipe Size and Material.....	I-1
<u>1.03</u>	Fire Main Restraints	I-1
<u>1.04</u>	Depth of Bury	I-2
<u>1.05</u>	Control Valves.....	I-2
<u>1.06</u>	Check Valves.....	I-2
<u>1.07</u>	Fire Hydrants	I-2
<u>1.08</u>	Fire Department Connections.....	I-3
<u>1.09</u>	Approval Procedure.....	I-3
<u>1.10</u>	Inspection and Test Procedures	I-4

[APPENDIX J](#) **VILLAGE ONE PVC SEWER STANDARDS**

<u>1.01</u>	General	J-1
<u>1.02</u>	Design	J-1
<u>1.03</u>	Manholes	J-1
<u>1.04</u>	PVC Pipe Material	J-1
<u>1.05</u>	Excavation	J-3
<u>1.06</u>	Sewer Service Materials.....	J-3
<u>1.07</u>	Bedding	J-3
<u>1.08</u>	Backfill	J-4
<u>1.09</u>	Air Pressure Test	J-4
<u>1.10</u>	Deflection Testing	J-6
<u>1.11</u>	Inspection	J-7
<u>1.12</u>	Special Notes and Details Required on Design Plans	J-7

[APPENDIX K](#) **PREPARING EASEMENTS AND DEEDS**

<u>1.01</u>	General	K-1
<u>1.02</u>	Signatures	K-2

APPENDIX K PREPARING EASEMENTS AND DEEDS (continued)

Easement Deeds -

Example A	K-2
Example B	K-3
Example C	K-4

[APPENDIX L](#) MODESTO WATER OUTSIDE CITY LIMITS

1.01 General	L-1
1.02 Design	L-1
1.03 Fees	L-2
1.04 Process.....	L-2

TABLES AND FIGURES

TABLE 3.1 Street Design Standards	3-1
TABLE 4.1 Design Storm Methods.....	4-3
TABLE 4.2 Basic Runoff Coefficients	4-8
TABLE 4.3 Composite Runoff Coefficients & Minimum Overland Travel Times for Various Land Uses	4-8
TABLE 4.4 Manning Coefficient	4-9
FIGURE 4.1 Standard Form - Runoff Calculations	4-10
FIGURE 4.2 Rain Intensity Frequency Curve	4-11
TABLE 5.1 Acreage Flows Estimates	5-4
FIGURE 5.1 Ratio of Peak to Average Flow of Sanitary Sewer.....	5-5
TABLE 7.1 Spacing, Intensity and Mounting Heights	7-2
TABLE 8.1 Non-city Utility Horizontal Alignment	8-2
TABLE 10.1 Driveway Design Standards	10-5
FIGURE H.1 Fire Department Approved Turnarounds	H-5
FIGURE H.2 Fire Department No Parking Signs	H-6
TABLE H.1 Guidelines for Installing Sidewalks	H-7
TABLE I.1 Flow Rate to Produce Velocity of 10ft/sec.....	I-4
TABLE J.1 Air Pressure Testing Chart	J-5
TABLE J.2 Description of Material Classification (ASTM D 2321).....	J-8

SECTION 1

GENERAL

1.01 PURPOSE AND INTENT

The purpose and intent of these Design Standards is to provide certain minimum standards for the design, construction, repair and alterations for streets, roadways, alleys, drainage, sewerage, water supply facilities, utility location, landscaping & irrigation, lighting, and all appurtenances thereunto, within the City of Modesto.

1.02 SCOPE

The primary scope of these Design Standards is intended to be those improvements to be turned over to the City of Modesto for operations and/or maintenance. The City recognizes, however, that it has a responsibility to assure that certain other owned improvements (private streets, public and private utilities, etc.) meet a minimum standard as well. City Design Standards may be applied to privately owned and maintained improvements which affect public health and safety.

1.03 DESIGN

The design of each development is in itself a special case and these Design Standards shall not be construed to be a maximum required design on all or any separate phase of the construction. Under certain conditions, any or all phases of the development may be required to exceed these Standards. It is also recognized that there may be developments where it is impossible to meet these Design Standards. It is suggested that these cases be reviewed with the City Engineer early in the design process to minimize reworking plans where deviation is not permitted.

1.04 FINAL AUTHORITY

The City Engineer shall be the final authority on all questions which may arise as to the interpretation of these Standards. The City Engineer's decision shall be final and he/she shall have authority to enforce and make effective such decisions. Appeals of the City Engineer's decisions may be made to the City Council.

1.05 DEFINITIONS

In these Standards, the intent and meaning of the terms that are used shall be as defined in Section 1 of the City General Provisions except as herein below specifically noted, revised, or added.

- A. CITY - Shall mean the City of Modesto, a municipal corporation.
- B. CITY ENGINEER - Shall mean the Director of Engineering, Public Works and Transportation, City of Modesto, or his designated representative.
- C. CONSULTING ENGINEER - Any person or persons, firm, partnership or corporation legally authorized to practice Civil Engineering in the State of California who prepares or submits improvement plans and specifications to the Department of Community Development for the City of Modesto for approval.
- D. COUNTY - Stanislaus County
- E. DESIGN - Shall mean, including but not limited to, street alignment, grade, geometric section, structural section; sanitary sewer alignment, grade, size; water system alignment, size, valving, fire hydrant location; storm drain alignment, grade, size and miscellaneous improvements as required by the City Engineer.
- F. DEVELOPER - Shall mean any person, firm, corporation, partnership or association engaged in the development of property in part or in whole by the placing of any improvements thereon, whether the property was previously developed in whole, in part, or at all.
- G. EASEMENT - Shall mean an easement dedicated to the City or Public Utility which shall be continuing and irrevocable unless formally abandoned.
- H. IMPROVEMENTS - Refers to street work, sidewalk, curb, gutter, driveways, water mains, sanitary sewer, storm drainage, public utilities, landscaping, and fences to be installed by the developer on land to be used for public right of way.
- I. MANUAL OF WARNING SIGNS - Shall mean the Manual of Warning Signs, Lights, and Devices for Use in Performance of Work Upon Highways of the State of California, Department of Transportation - Current Edition.
- J. SOILS REPORT - Shall mean a report as prepared by any person or persons, firm, partnership, or corporation legally licensed to prepare Soils Reports in the State of California.
- K. STANDARD DETAIL AND SPECIFICATIONS - Shall mean the Standard Details and Specifications of the City of Modesto.

- L. STATE HIGHWAY DESIGN MANUAL - Shall mean the State of California Department of Transportation Highway Design Manual, latest edition, unless otherwise stated.
- M. STATE MATERIAL MANUAL - Shall mean the Materials Manual of Testing and Control Procedures of the State of California, Public Transportation Laboratory Manual of Tests, Department of Transportation, latest edition, unless otherwise stated.
- N. STATE PLANNING MANUAL - Shall mean the Planning Manual of Instructions of the State of California, Department of Public Works, Department of Transportation, latest edition, unless otherwise stated.
- O. STATE SPECIFICATIONS - Shall mean the Standard Specifications of the State of California Department of Transportation, latest edition, unless otherwise stated.
- P. STANDARD PLANS - Shall mean the Standard Plans of the State of California Department of Transportation, latest edition, unless otherwise stated.
- Q. SUBDIVISION ORDINANCE - Shall mean the Subdivision Ordinance of the City of Modesto.
- R. UBC - Shall mean the edition, as approved by City Council, of the Uniform Building Code of the International Conference of Building Code of the International Conference of Building Officials.
- S. UPC - Shall mean the edition, as approved by City Council, of the Uniform Plumbing Code.
- T. ZONING ORDINANCE - Shall mean the zoning ordinance of the City of Modesto.

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SECTION 2

MAPS & IMPROVEMENT PLANS

2.01 GENERAL

Complete plans and specifications for all proposed improvements including any necessary dedications and easements shall be submitted to Development Services for approval and must receive the required approval prior to the commencement of construction of any such improvements. This shall apply where it is the intent that any portion of such improvement will be turned over to the City of Modesto. Such plans shall be prepared and signed by a Registered Civil Engineer in accordance with the provisions of Professional Engineer's Act Chapter 7 - Division 3 of the Business and Professional Code, relating to the practice of Civil Engineering.

2.02 PREPARATION

Improvement plans and specifications shall be prepared in accordance with the following requirements:

- A. Dimensions - Improvement plans shall be clearly and legibly drawn in ink on engineering vellum paper 24 by 36 inches with a 1 inch minimum clear margin on the left edge and inch minimum margins on all other edges.
- B. Drafting Specifications - Standard drafting symbols are shown in Appendix A of these Design Guidelines. Consulting Engineers under city contract shall use these symbols and standards or close facsimiles on all improvement plans. Deviations must be approved prior to submittal of any plans to the City. Consulting engineers on private development are requested to use these symbols and standards or close facsimiles. At this time, the City will not enforce these standards on private development. **(Appendix A only recommended)**
- C. Improvement Plan Format
 - 1. Title Sheet (Sheet 1 and/or sheet 2)
 - a. Name of Subdivision or project
 - b. Vicinity Map with North Arrow
 - c. Index of sheets.
 - d. City Engineer's Signature Block
 - e. Consulting Engineer's Signature Block

- f. General and special notes relating to construction methods. Standard notes for plans prepared in the City of Modesto are shown in Appendix B of these Design Standards (May place on sheet 2 instead of cover sheet).
 - g. List of applicable city standards, with latest revision date.
 - h. Temporary and permanent bench marks and horizontal control points including their description (NAV88 Datum).
 - I. Planning Commission, City Council or Board of Zoning Adjustment Resolution No. that approves the project.
 - j. Plan view showing the limits of each sheet and sheet number within the plan set.
 - k. Typical Street Sections. Show storm drain open channels where applicable in these sections.
 - l. Pavement Design Chart showing street name (and station if section changes), TI, R-value, AC, AB and ASB thicknesses.
- 2. Utility Plan (Sheet 2 or 3)
 - a. Plan view showing the entire street right-of-way layout, proposed water and sewer mains, storm drainage system, fire hydrant, street light locations, lot numbers and other miscellaneous improvements to be installed.
 - b. Complete Legend using the standard symbols as shown in Appendix A of these Design Standards. (**Appendix A - only recommended**)
- 3. Demolition and Abandonment Plan (If needed)
 - a. Plan view showing existing topography at a scale large enough to clearly show existing improvements.
 - b. Show all existing surface and subsurface improvements, especially buildings, wells, septic tanks and leach fields.
- 4. Grading Plan
 - a. Plan view at 1" = 40' or 50' showing existing and proposed topography on site and a minimum 50' of the immediately adjacent areas.
 - b. Top of curb elevations at all property line extensions and grade breaks.
 - c. Street slopes at centerline.
 - d. Lot elevations.

- e. Lot numbers.
- f. Location of proposed and existing storm drain structures.
- g. Retaining walls and sound walls.
- h. Typical lot grading details showing plans and section.
- i. Elevations at rear of all lots.

5. Street Plan and Profiles

- a. Plan views at a scale of 1" = 40' for all new streets, widening of existing streets, etc. including existing improvements, proposed improvements, and future improvements if known.
- b. Proposed improvements shall include sidewalk, curb, gutter, driveways, sewer mains and laterals, water mains and services, storm drains, manholes, drainage inlets, valves, fire hydrants, barricades, street lights, survey monuments and other data required by the City Engineer.
- c. Centerline stationing shall be shown with grades indicated in plan view for street intersections, drainage structure (include dimensions or station offsets from centerline), beginning and endings of curb returns or other curves.
- d. Street plans shall include right-of-way lines and widths, street widths and names, and easement widths.
- e. Profile view of each street shall be shown on the same sheet as plan view and at a vertical scale of 1" = 2' or 4' or approved alternate.
- f. Profiles shall show existing grade at centerline of street, proposed top of curb, sanitary sewer mains, water mains, storm drains, utility crossings, and any other features of interest.
- g. Elevations shall be shown in profile of top of curb at grade breakpoints, manhole and drainage inlet inverts, high points and low points of water mains. Vertical curves shall show station and elevation of beginning points, points of intersections, low points and ending points.
- h. Street, storm drain and sewer main slopes shall be shown.

- i. Centerline curve data shall be shown in plan view or by tabulation for street centerline; curb data for curb returns shall also be shown. If a utility is non-concentric with the street centerline, utility curb data shall be annotated on the pipe in plan view.
6. Signing and Striping Plan (combined with the electrical street lighting plan)
 - a. Provide a plan at a scale sufficient to clearly indicate all street striping and signing. Plan must include existing striping to include across the street with the new striping plan. Any tapering needs to show the striping at least 300' past the tapering.
 - b. Striping plan shall conform to CALTRANS standards.
7. Street Lighting Plan (incl. signing and striping information)
 - a. Plans shall be 1" = 40', 50' or 100' scale.
 - b. The consulting engineer shall show the street light locations and wattage with his or her initial submittal of improvement plans. The final as-built set of improvement plans shall show the service points, conduit runs, pull box locations and wire size. As-builts shall be provided before final acceptance of the subdivision.
 - c. Street light locations & wattage shall be shown on plans and approved by the City of Modesto. Any street lights attaching to existing or new MID poles shall be approved by the Modesto Irrigation District with a signature block for MID provided on the base sheet.
 - d. Service Pedestal shall be located out of sight distance triangle area, 25 feet or more from corner property line.
 - e. Plans shall be stamped by a registered Professional Engineer.
 - f. The following notes shall be placed on the Street Lighting Plan Sheet of the improvement plans:

GENERAL NOTES FOR STREET LIGHTS

1. When pole location conflicts with an existing or proposed facility, place as directed by the City Engineer. In no circumstances shall a pole be moved more than 20' without an approved revision of the plan sheets.

2. Developer to supply all materials when served from an underground source. MID to supply and install conduit on overhead connections.
 3. Contractor shall provide a pull box at the service point, each side of the street crossing, and at 200' maximum spacing. Pull box may be set adjacent or behind pole in R.O.W.. Any conduit run over 100' will require a pull box at the pole.
 4. Conduit shall be a minimum depth of 18" below sidewalk grade in park strips and 30" below top of curb grade in streets, alleys and easements not adjacent to curb or sidewalk. Depth shall not exceed 48".
 5. Where sidewalk is against property line, the conduit shall be placed 6" behind curb.
 6. Where walk is separated from curb and gutter or a 10' sidewalk is installed in back of curb and gutter, place pole 18" from back of curb. All other zones shall be 18" from back of sidewalk.
 7. Pole foundations shall be 72" deep by 30" diameter or 60" deep by 36" square and placed against undisturbed earth.
 8. When spotting the distance for placement of pull boxes, a bull box shall be placed at the light pole and then space from there.
8. Traffic Signal Plan (when required by City - Special Circumstances)
- a. Plans shall be 1" = 20' scale in AutoCAD version 12 or higher Windows format.
 - b. Plans shall have a cover sheet showing project location, map, CalTrans standards used, general notes, project name, index of sheets, City & consulting engineer signing block.
 - c. Plans shall have equipment and wiring schedules.
 - d. Plans shall have detector loop layout, service and phasing diagrams.
 - e. Detector loop assignments shall be called out.
 - f. Detector loop hand holes are required.

- g. Plans shall show existing or proposed lane widths. A striping plan will be required for any new street widths.
 - h. Plans shall show all existing utilities and accommodate for them. Overhead line heights at pole locations will be required with plans.
 - i. Conductors shall be THW.
 - j. Emergency Vehicle pre-emption shall be installed.
 - k. Phase 2 & 5 shall be for eastbound traffic.
 - l. Plans shall have overhead street name signs with block numbers.
 - m. Service locations shall be shown on plans and approved by Modesto Irrigation District.
 - n. Controller Cabinet and Service Pedestal shall be located out of Sight Distance Triangle area, 25 feet or more from corner property line.
 - o. Plans shall be stamped by a registered Professional Engineer.
9. Detail Sheets or Off-site Improvements (If required)
- a. Additional drawings may be required to show special project improvements or structures.
 - b. Plan and profiles of streets, storm drain lines, sanitary sewers or water lines built off-site.
10. Landscape & Irrigation Drawings
- a. Submit when improvement plans are submitted.
 - b. Scale shall be 1" = 20'.
 - c. Irrigation schematic to be shown separate from planting details.

D. Final Maps

- 1. All maps shall be prepared in conformance to the current version of the State of California Subdivision Map Act.

E. Checklist (Appendix D)

A detailed checklist has been provided in Appendix D for use by the Consulting Engineer in the preparation of construction plans for projects in the City. Specific design requirements are listed in the checklist that are not being defined in these Design Standards. The Consulting Engineer is hereby cautioned to review this checklist carefully prior to the preparation of any construction plans to minimize the need for revisions. This checklist will be used by City staff to review submittal of all construction plans.

2.03 **SUBMITTAL**

All plans submitted for review shall be final and complete as defined in this section. Incomplete plans or partial submittal will not be reviewed. Delays may be incurred when incomplete plans or partial packages are submitted for review.

A developer may seek an Grading Permit for Grading prior to the approval of the Improvement Plans. Checklist A defines a complete submittal for a review of Improvement Plans. Checklist B is for a submittal seeking a Grading Permit only. Special conditions may require additional items. Plan checking shall not normally be started until all items on the checklist are submitted.

A. Improvement Plans (Initial Check)

1. Improvement Plans - 2 Sets (Initial & subsequent submittals until signed for construction)

Prepared as prescribed in Section 2.02 of these Design Standards. Striping Plans are required for each subdivision and Demolition Plans are required when existing structures will be or have recently been removed or there is possibility of wells, septic tanks or retention basins on-site. Supporting calculations for pavement sections, retaining walls, etc. are required.

The checklist in Appendix D of these Design Standards will assist the Consulting Engineer with the preparation of plans for submittal to the city.

2. Storm Drain Package - 2 Sets

Drainage calculations are required for any new subdivision or development and shall be done on standard form Figure 4.1 (page Design 4-10). Submittal of drainage calculations shall include the following items:

- a. Hydrology calculations for 5 year and 100 year storms, together with assumptions, charts, tables, references and methods used.

- b. A plan, preferably at 1" = 100' scale, showing proposed street system, existing and proposed drainage system, tributary sub-areas (including offsite drainage), and peak flow in all pipes.
 - c. The hydraulic calculations shall show as a minimum the hydraulic grade line (HGL), the proposed storm drain, including slopes and sizes, the flow in the pipes, velocities in pipes, structure losses, tailwater assumptions and top of curb elevations (or freeboard at structures).
 - d. Calculations for any temporary storm drain retention basins.
3. Sanitary Sewer Package - 2 Sets (if required)

Engineering calculations shall be submitted to the City Engineer for the design of all proposed sanitary sewer systems. The calculations shall include the following items:

- a. A plan, preferably at 1"= 100' scale, showing the proposed street system, tributary sub-areas, existing and future tributary sub-areas, existing and future tributary areas outside the project limits, zoning, projected land use, and any features affecting the system design.
 - b. Design flows at major junction points including flows coming from outside the project limits.
 - c. Size, length, slope, and invert elevations of all proposed lines and location of manholes.
4. Soils Report or supplemental R-value test data & street design - 2 Copies.

B. Final Map Package

- 1. 2 Copies of the Map, 1 Copy of remaining items:
 - a. Copy of the complete Final Map.
 - b. Preliminary Title report less than 3 months old.
 - c. Copies of all deeds and easements referenced to the Final Map.
 - d. Lot, parcel and boundary closure calculations.
 - e. Survey monument letter (memo).
- 2. Development Conditions - 1 Copy (Resolution approving subdivision)

3. Engineer's Estimate (at the final corrected improvement plans) - 1 Set -The estimate shall utilize the City's standard costs and other requirements as defined in Section 10 of these Design Standards.

C. Submittal for Grading Permit (Checklist B)

1. Grading Plans - 3 Sets

Prepared as required by Section 2.02-C-4 and Section 11 of these Design Standards. The checklist in Appendix D provides the Consulting Engineer with additional guidance for the preparation of these plans.

2. Storm Drain Package - 2 Sets

Drainage calculations are required for any new subdivision or development and shall be done on standard form Figure 4.1. Submittal of drainage calculations shall include the following items:

- a. Hydrology calculations for 5 year and 100 year storms, together with assumptions, charts, tables, references and methods used.
 - b. A plan, preferably at 1" = 40' or 50' scale, showing proposed street system, existing and proposed drainage system, tributary sub-areas (including offsite drainage), and peak flow in all pipes. If drainage is not installed and silt will not enter the City system or a stream or river, then no storm drain information is required.
 - c. The hydraulic calculations shall show as a minimum the hydraulic grade line (HGL), the proposed storm drain, including slopes and sizes, the flow in the pipes, velocities in pipes, structure losses, tailwater assumptions and top of curb elevations (or freeboard at structures).
 - d. Calculations for any temporary storm drain retention basins.
3. Soils Report - 2 Copies (If available)
 4. Grading Permit Fees

Grading permits required only if any of the fills exceed 18".

D. Subsequent Plan Submittals

1. Improvement Plans - 2 Sets

If the Consultant or Engineer feels there are issues remaining after re-working the initial set of plans returned from the City, the Consultant may submit 2 sets of Improvement plans with the revised Design.

2. Storm & Sewer Packages - not required unless changes in pipe lengths change substantially.

2.04 **RECORD DRAWINGS** (For Construction Purposes)

After final approval and signatures on the vellums by the City Engineer and all agencies, the consulting engineer shall submit the following:

- A. One set of vellum and 5 sets of blueline prints for the Improvement Plans.
- B. One CAD file of the Utility Plan Sheet with layers for the various utilities and property lines.

2.05 **AS-BUILT DRAWINGS** (Required for final acceptance of the subdivision)

The consulting engineer is responsible for completing the as-built plans. The consulting engineer shall submit the following prior to final acceptance of the subdivision improvements by the City:

- A. One set of vellums of the Improvement Plans.
- B. A CAD computer file of the Improvement Plans. If no CAD drawing, then scanned images of the Improvement Plans in TIFF format.

As-built drawings will not require re-survey of the subdivision improvements. As-builts shall indicate horizontal movement and additions of any appurtenances such as catch basins, manholes, cleanouts, street lights, pull boxes and monuments. Only horizontal movements exceeding 10' shall be shown. Other data required in the as-builts is schematics of the street light conduit and additions of elbows in the water line to cross specific unknown obstructions and other unknown obstructions discovered in the course of construction.

SECTION 3

STREET DESIGN

3.01 GENERAL

All new street improvements will require that underground utilities be extended to the limit of improvements and services be extended to the property line. If half-street construction is approved, utility services must extend a minimum of 5' from outside the edge of new pavement.

For purposes of geometric and structural design, streets shall be classified according to the following. Any deviation from the following standard shall require the approval of the City Engineer. If there is insufficient soils data, specifically R-values, then streets shall be designed using an assumed R-value of 5. The table on Standard Detail #301 lists street structural sections for R values of 5 through 60.

TABLE 3.1 STREET DESIGN STANDARDS

Class	Right of Way (Feet)	Width Between Curbs (Feet)	Design Speeds	*Traffic Index	Street Section Requirement	Min. Pavement Section AC/AB	Minimum Centerline Radius for Horizontal Curve (ft.)
State Hwy 219	135	115	55	11	Std Detail #301	.55/.35	800*
Expressway 4 lane	100	90	55	11		.55/.345	800*
Expressway 6 lane	135	115	55	11		.55/.35	800*
Principal Arterial	114	94	45	11		.55/.35	1000
Minor Arterial/Major	100	80	40	10		.50/.35	750
Major Collector	84 96 w/bike lanes	64 76	35	10		.40/.35	525
Minor Collector	60 72 w/bike lanes	40 52	25	8		.40/.35	250
Residential	50	36	25	6		.20/.35	250*
Cul-de-sac	50	34	25	4.5		.20/.35	250*
Industrial	60	40	40	9		.45/.35	600*

* Smaller radii may be acceptable. City Engineer shall judge the suitability of the curve based on design. In all circumstances except cul de sacs, the curves must meet CALTRANS geometric guidance. Superelevation will be accepted on expressways only. Expressway minimums based on superelevation.

* May be raised at the discretion of the City Engineer if traffic warrants a higher value.

The minimum street section shall be determined from R-values obtained from material gathered from the level of the proposed subgrade using the design method described in the Highway Design Manual. In no case shall the minimum street section be less than 0.20 ft. of asphalt concrete and 0.35 ft. of aggregate base. Aggregate base section may be comprised of an equivalent section of aggregate base and aggregate subbase, but in no case shall aggregate base be less than 0.35 ft..

3.02 PAVEMENT DESIGN (See Table on Standard Detail #301)

- A. Structural street sections posted in Standard Detail #301 shall be used for all pavement designs in the City (based on R-value design).
- B. Intersections for a Major street connecting to a Major street shall use a TI of 11 for design and Industrial connecting to Industrial shall use a T.I. of 10 for design.
- C. R-Value Testing

The developer shall be responsible for obtaining soil R-value tests, specifically supervised by a licensed registered civil engineer in sufficient quantity to establish the quality of the soil and to provide a basis for the design of the structural section.

The following R-value tests will be required at the street subgrade elevation:

- 1) A minimum of one R-value test shall be taken for all developments with additional R-value tests specified by the City Engineer. The City Engineer may require as many as one test per 10 lots along a residential street.
- 2) On major and collector streets where the frontage is less than 500 feet, one R-value test shall be made. On major or collector streets, where the frontage exceeds 500 feet, a minimum of one R-value test shall be taken at each 500 foot interval.

Exact locations of the R-value tests shall be as approved by the City Engineer. The developer shall stake the field test locations and shall provide an existing ground and finish grade elevation for each test location. The developer shall determine the depth of the R-value test.

The Developer shall provide results of the R-value tests to the City Engineer. The results provided to the City shall include the following:

- 1) Locations and a summary table shown in the soils report or the supplement.
- 2) Self certification that the stabilimeter is properly calibrated per California Test 102.
- 3) Completed California Test 301 Forms T.C. - 361.

3.03 STREETS RIGHTS-OF-WAY/EASEMENTS

The right-of-way widths and typical sections for the various class streets shall conform to the City of Modesto Standard Details and the established Specific Plans on file in the Public Works & Transportation Department.

Public service, drainage, tree planting, and fence easements shall be located as required by the Utility companies and the City.

Public Utility easements (PUE's) on private property shall be a minimum of 10 feet in width and provide for the express purposes of placement of underground utilities. Where the City Engineer finds that sufficient public right-of-way exists, underground utilities shall be placed within said public right-of-way in the location deemed appropriate by the City Engineer. PUE's through cul-de-sac bulbs are discouraged. If a utility is cross connected through a cul-de-sac to an adjacent street, the City Engineer will require dedication of the property and line of sight vision where possible (See detail 507).

3.04 SUBDIVISION BOUNDARIES

Subdivision boundary lines should follow lot lines where possible and should cross streets perpendicular to street centerline. Streets shall be fully improved within tract boundaries.

3.05 HORIZONTAL ALIGNMENT

- A. Intersections - Streets shall intersect at as near right angles as practical. In no case shall the angle of intersection be less than 70 degrees.
- B. Opposing Streets - All streets entering upon opposite sides of any given street shall have their centerline directly opposite each other or separated by at least 100 feet.
- C. Curb line radii shall be shown on the improvement plans.

- D. Street Curvature - Curve design shall be based on the State of California Department of Transportation Highway Design Manual.
- E. Cul-de-sac - The maximum length of a cul-de-sac street, from center of intersecting street to center of turn-around, shall be 500 feet.
- F. Curb Return Radii -

Downtown District (See Standard Detail #352) - the minimum radius shall be 15 feet.

Residential - Minimum radius shall be 20 feet.

Commercial and Industrial - Minimum radius for new construction shall be 50 feet.
- G. Minor Streets - Minor streets shall be laid out so that their use by through traffic will be discouraged.
- H. Block Lengths - Block lengths shall not exceed 1,100 feet.
- I. The minimum stopping sight distance over any segment of the roadway shall conform to the Highway Design Manual.
- J. When an existing City street tree(s) is within 15 feet of a proposed improvement project, a Tree Evaluation Report must be obtained from the Parks and Recreation Department and submitted to the City Engineer prior to commencement of work.

3.06 VERTICAL ALIGNMENT

- A. Top of Curb Grades - Grades shall not be less than 0.20% and not greater than 6%. With the approval of the City Engineer, in problem areas, the gutter slope may be 0.15% for residential and 0.10% for commercial.
- B. Grades on opposite sides of the street shall be the same wherever practical.
- C. Curb Returns - The minimum fall around returns shall be as follows:
 - 0.20 feet for 15' to 20' radius
 - 0.35 feet for 30' to 40' radius
 - 0.40 feet for a radius greater than 40'.
- D. Cross Slope - The standard cross slope of the street shall be 2 percent. Where necessary when matching existing facilities, the cross slope may vary between 1.5 percent and 4 percent.

- E. Vertical Curves - Where the algebraic difference in slope exceeds 1 percent, a vertical curve shall be used. The minimum length of vertical curve shall be 50' minimum or as required by the Highway Design Manual, whichever is larger.
- F. Low points - Whenever possible, streets shall be designed to collect storm water at intersections (3' past the curb return ER's) and property lines. Low points shall not be designed in driveways or on the curb return.
- G. High points - High points shall be successively lower than the last high point for at least 2 high points. The purpose for this is to allow plugged up drains to overflow within the street right-of-way before releasing to the next inlet. Successive high points with a relative flat grade shall not differ more than .3' (ponding at inlet limited to .8').

3.07 SIDEWALKS, CURBS AND GUTTERS

- A. Curb, gutter and sidewalk shall be installed in conformance with the City of Modesto Construction Specifications and Standard Details.

Vertical curb and gutter (6") and 4' wide sidewalk to be installed in P-O Zones and on residential connector or collector streets. Sidewalk in C-1, C-2, C-M and C-3 Zones shall be extended to within 1" of property line (width may be determined by use or by existing conditions, if specifically approved in writing by the City Engineer - See Details 306 - 309).

Drive-over curb (4 1/2") and 4' sidewalk shall be installed on residential street widths in newly developed R-1, R-2, and R-3 zones.

Vertical curb (6") and 4' sidewalk shall be installed in existing in-fill R-1, R-2, and R-3 zones where previous work is vertical curb.

Replacement and Repair - Where existing curb, gutter and sidewalk do not meet the current City Standards and are in need of repairs, it shall be the developer's responsibility to remove and replace necessary curb, gutter and sidewalk. Removal shall be removed to the nearest expansion, weakened plane or construction joint or sawed at the nearest score line.

Sidewalks in private gated communities shall follow the ITE guidance set forth in Design Appendix H, Table H-1.

- B. Private gated communities shall be required to install sidewalks in accordance with ITE standards set forth in Appendix K.

- C. Downtown Exposed Aggregate Sidewalk - These Standards shall be mandatory within the area as shown in Standard Detail #352, except that exposed aggregate sidewalks shall not be required on the streets bordering the area.

Any proposed changes to this pattern or substitution of materials shall be considered on a case by case basis. The Downtown Improvement District Board of Directors (D.I.D.) will provide the initial review and recommendation to the City Council. The City Engineer will also make a recommendation for D.I.D. and City Council consideration. The City Council will then approve or deny the proposed change with appropriate modifications.

Minor modifications required by special conditions may be made with approval of the City Engineer.

New, full-width, exposed aggregate sidewalk shall be constructed and shall replace existing sidewalk when the existing sidewalk is less than 50% of the total sidewalk area.

For existing developments in areas requiring full-width sidewalk, "fill-in" sidewalk, added to provide the full-width, shall be exposed aggregate when the existing sidewalk is less than 50% of the total sidewalk area.

See Modesto Municipal Code, Section 7-1.502, for required locations of full-width sidewalk. Where existing sidewalk is more than 50% exposed aggregate finish is optional.

The sidewalk area shall be defined as the entire area required to have sidewalk including tree and tree blockout areas, but not including curb ramps or drive approaches.

Corner lot frontages shall have each street considered separately.

- D. Handicap Ramps - Handicap ramps shall be installed at all street crossings and curb returns. Ramps shall conform to Standard Details (#345 to #349) according to type of street.

3.08 CURBED MEDIANS (Standard Detail #328)

On existing major streets of 70 feet or wider, from curb to curb, an 8 inch high curbed median shall be installed at the intersection of a major street at Developer's expense as shown in details #315 - 322, and 328 or as directed by the City Engineer. The median shall extend a minimum of 350 feet from the intersection centerline. The minimum width of a median shall be 4 feet without landscaping or 8 feet with landscaping.

On new major streets or where part of a street is widened from two lanes to four or more lanes, a curbed median shall be installed for the full length of the new street or street widening at Developer's expense and shall conform to one of the following:

- A. A 4 foot wide curbed median without landscaping, surfaced with concrete, "Bomanite" finish, or approved equal. Median shall be mounded with 12:1 slope or 1" per 1' (2" mound on 4' median). Landscaped median islands shall not be mounded to allow irrigation water to drain over the pavement.
- B. A curbed median ranging in width from 8 feet to 16 feet 6 inches with landscaping. A water barrier shall be installed 6 inches beneath the street structural section.

Breaks in curbed medians shall be at all major and collector streets, with a minimum of 600 feet between breaks. Additional breaks shall be as approved by the City Engineer.

Traffic lanes adjacent to curbed medians shall be 12 feet 6 inches in width. Specific design of medians and traffic lanes shall be as directed by the City Engineer.

3.09 BUS TURNOUT (Standard Details #325 - 328)

Prior to filing of a tentative parcel or subdivision map or prior to property development, the location of bus turnouts shall be approved by the City Engineer. Bus turnouts may be required on major and collector streets where there is a curbside travel lane or the probability of replacing curbside parking with travel lanes. Bus turnouts may be placed approximately 1,000 feet apart, or as directed by the City Engineer. Turnouts may be required at all four corners at major/major and major/collector street intersections where there is no parking lane or where the parking lane will be eliminated, as directed by the City Engineer.

Bus turnouts may be placed on the far side of the intersection in the travel direction. Other locations shall be as determined by the City Engineer. Location of mid-block turnouts shall be as approved by the City Engineer and shall only be approved if there is no intersection available to accommodate a turnout within 1000 feet.

Bus turnouts shall be constructed as shown in Standard Details #325-328. The slope of the bus turnout parallel to the roadway shall match the slope of the roadway. A maximum cross slope of 2% is allowed perpendicular to the roadway in the passenger loading area.

3.10 DRIVEWAY STANDARDS

See Design Section 10

3.11 ALLEYS

- A. Commercial Alleys shall be 20' or 30' wide with 5' valley gutter. Sectional thickness design of the aggregate base shall be based on a minimum traffic index (TI) of 4 and a minimum of a .2' asphaltic cap. A commercial alley approach shall be constructed as detailed in the Standard Details. Concrete alleys are encouraged in commercial areas but not required over asphalt alleys.
- B. New residential alleys shall be designed with a TI of 4 and a minimum of .2' AC.
- C. Existing residential alleys may be surfaced with a 2" AC over existing base.
- D. Existing alleys contiguous to new development shall be improved to a minimum width of 14 feet.

3.12 INTERSECTIONS

- A. Street intersections shall be designed so that the larger street or through street maintains its cross-slope through the intersection. The plans shall clearly indicate which street cross-slope is to be maintained.
- B. Sufficient elevations shall be shown on the plan or profile to clearly indicate how it is to be constructed. As a minimum, the elevation at the centerline intersection point and at grade breaks on the centerline of side streets shall be shown.
- C. Intersections shall be designed to drain all water to drainage inlets without ponding or draining water across intersections. Valley gutters are not to be utilized in positive storm drain areas to obtain drainage across intersections except in cul-de-sacs and unusual circumstances approved by the City Engineer. Valley gutters are discouraged from use in in-fill projects. The City Engineer may require detailed design submittal for problem intersections.

3.13 STREET SURVEY MONUMENTS

- A. Street survey monuments and boxes shall be installed as follows:
 - 1. At all 1/4 Section corners, section corners and intersections with streets with ROW greater than 71 feet.
 - 2. At BC's, EC's, PCC's and angle PT's on streets with a ROW greater than 71 feet.
 - 3. At all locations as required by the City Engineer.

4. A minimum of 1 monument tied into the California coordinates shall be referenced to the subdivision. This one monument shall be constructed per detail 900. All other monuments shall consist of durable new material. They shall be 1 inch O.D. x 24 inch long galvanized iron pipe or approved equal. The center of the top shall be the exact point monumented. The monument shall be tagged as required by the State of California Land Surveyor's Act. All other referenced monuments shall be boxed with a 3/4" pin.
- B. All monument boxes set shall be shown on the Standard Details and shall clearly show the registration number of the licensed Civil Engineer or Land Surveyor who prepared the final or parcel map.
 - C. Developers will be required to install a box around existing monuments fitting the criteria outlined in 3.13A above.
 - D. The location and detail of monument pins and boxes in the ROW shall be shown on the improvement plans, Street Lighting/Striping Plan Sheets and on Final Maps or recorded maps.

3.14 DESIGN SPEED

Street speeds shall be designed as listed in Table 3-1 or as approved by the City Engineer.

3.15 STREET STRIPING

A striping plan shall be prepared and placed on the Street Lighting Plan sheet at a scale sufficient to clearly indicate all street striping, including centerline, stop street markings, crosswalks, etc.. Street signs shall be shown on the same drawing. Plan sheet shall include any and all mergers and tapers beyond property limits and on both sides of the street.

3.16 SIGNING AND BARRICADES

- A. Street names shall be approved by the City Staff.
- B. Street name and stop signs shall be paid for by the developer. City shall supply and install street name and stop signs.
- C. Other regulatory and warning signs to control traffic, such as speed zone signs, will be furnished and installed by the City of Modesto.
- D. Permanent barricades shall be installed where improvements cover only a portion of the ultimate development or as directed by the City Engineer. The barricade shall be constructed, erected, painted and signed in accordance with the Standard Details.

3.17 UNDERGROUNDING OF UTILITIES

All subdivisions and major developments, in accordance with City policy, shall underground all new services and existing fronting overhead utilities in accordance with respective utility company policies in either public utility easements or within the public right-of-way. Any installation of utilities outside a PUE and in a public ROW shall be specifically approved by the City Engineer for location. Installation of said underground utilities shall be in accordance with the specifications of the respective utilities. Where corner properties are undergrounding existing fronting overhead facilities and those facilities continue across the fronting streets, the developer shall be responsible for undergrounding to the street right-of-way line opposite the development.

Undergrounding of electrical utilities shall include lines up to 12 KVA. Utilities over 12 KVA may remain pole mounted. A 12 KVA line may remain on poles when installed on a 69 KVA line.

Design Section 8, "Non-City Utilities," gives some additional guidance to undergrounding utilities.

3.18 STANDARD LOCATIONS OF UTILITIES

Utilities in a common trench shall be located as shown in the Standard Details #804, 805 and 806. Revisions to these locations or separate utilities in an existing right of way should be noted on the plan submitted with the encroachment permit request.

3.19 RELOCATING EXISTING IRRIGATION LINES

Existing cast-in-place irrigation lines in street right of way shall be replaced with rubber-gasketed, reinforced concrete pipe conforming to Sections 65-1.02A and 65-1.06B of the State Standards.

The pipe shall be Class III except where the cover to finish grade is less than 3 feet, the pipe shall be Class IV.

Irrigation lines to be abandoned shall be removed, and not crushed and left in place.

Irrigation lines within a subdivision shall be removed, protected or relocated as required by the Irrigation District and the City Engineer. Appropriate easements for irrigation lines to remain shall be dedicated as necessary. If required, a release of irrigation rights shall be executed by the Property Owner.

3.20 FIRE DEPARTMENT STANDARDS FOR PRIVATE STREETS AND DEVELOPMENTS.

Design Appendix H provides design requirements in use by the Modesto Fire Code and Modesto Municipal Code.

The City Engineer will be the final authority for Public Works and Transportation on allowing gated communities with public sewer, water, and storm drain facilities. Policy decisions to accept the utilities as public facilities are based on the size of the development and conformance to the minimum Modesto Standards. These design standards include meeting the requirements for street width and structural section, installation of Curb, Gutter & Sidewalk and installation of sewer, water and storm drain.

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SECTION 4

STORM DRAINAGE DESIGN

4.01 GENERAL

All drainage facilities shall be designed in accordance with accepted engineering principles, and shall conform to these Design Standards.

The Storm Drainage Master Plan being written establishes a multiple criteria policy for all future drainage system design within the City. The criteria are as follows:

- A. The 100-year storm is to be contained within .8' of the low point flow line grade (provided pads or lots are a minimum 1.0' above top of curb).
- B. The 5-year storm will not surcharge any conduit unless written approval is granted by the City Engineer.

All proposed storm drainage facilities shall include provisions for future upstream development and no development shall discharge at a rate which exceeds the capacity of any portion of the existing downstream system. Calculations for storm drainage design within a development as well as calculations for runoff generated by upstream areas within the contributing watershed shall be submitted to the City Engineer for approval.

These adopted criteria are intended primarily for new construction and make use of the surface capacity of the new streets as a part of the detention/discharge system. Small in-fill projects shall utilize rock wells and all on-site drainage shall be stored and disposed of on-site.

In areas of Stanislaus County under the City's sphere of influence exceptions may be made to substitute galvanized pipe french drains (small development - less than 1.5 acre) for drainage of the ROW. The City's preference will be rock wells or on site detention basins for drainage of the ROW.

The diversion of natural drainage will be allowed only within the limits of a proposed improvement. All natural drainage must leave the improved area at its original horizontal and vertical alignment unless a special agreement, approved by the City Engineer, has been executed with adjoining property owners.

All proposed improvements shall be designed such that, for the 5 year design storm, there is no surcharging in any conduit unless written approval is granted by the City Engineer. In those special cases where surcharging is permitted, the minimum hydraulic freeboard shall be

18 inches as measured from the top of curb or when applicable, as required by the Federal Emergency Management Agency (FEMA) and the Department of Water Resources (DWR) Division of Safety of Dams, whichever is greater.

Containment of flood waters within .8' of the low point (adjacent property 1' above TC). Flood water shall be confined to streets or other approved right-of-ways by grading, levees or alternative means acceptable to the City Engineer. In no instance shall an improvement be designed such that flood waters can reach a depth of 0.80 feet, as measured from the top-of-curb, before overland release occurs.

The design of all bridges, box culverts, levees, detention basins, spillways, and other applicable structures shall comply with the latest FEMA and DWR Division of Safety of Dams regulations.

At intersection of pipes, the downstream pipe shall have a crown elevation which is less than or equal to the crowns of all upstream connecting pipes. Pipe diameters shall not decrease in the downstream direction.

4.02 SUBMITTAL OF DRAINAGE CALCULATIONS

Drainage calculations are required for any new subdivision or development and shall be done on standard form Figure 4.1, or a spreadsheet reproducing this information. Submittal of drainage calculations shall include the following items:

- A. Topographic map showing the relationship between the proposed development and the remainder of the watershed, including acreage of all sub-areas.
- B. Hydrology calculations for 5 year and 100 year storms, together with assumptions, charts, tables, references and methods used.
- C. A plan, preferably at 1" = 100' scale, showing proposed street system, existing and proposed drainage system, tributary sub-areas (including offsite drainage), the magnitude and direction (indicated by arrows) of flow in each pipe and flow to each structure contributed by its tributary area. All flow rates shall be in cubic feet per second (cfs).
- D. The hydraulic calculations shall show as a minimum the hydraulic grade line (HGL), the proposed storm drain, including slopes and sizes, the flow in the pipes, velocities in pipes, elevation of pipe inverts at structures, top of structure elevation at each structure and top of curb elevations (or freeboard at structures).

4.03 HYDROLOGY CALCULATIONS

Design storm methods shall be according to the following guidelines:

TABLE 4.1 DESIGN STORM METHODS

Design Area or Item	Design Method	Design Return	Comments
Less than 400 acres	Rational Method	5 yr	Refer to these specifications and details
Greater than 400 acres	Unit Hydrograph	100 yr 24 hr	Rainfall depths shall be taken from NOAA Atlas 2, Volume XI, or Rainfall Intensity Curves (Standard Detail 400).
Detention Basin	Unit Hydrograph	100 yr 24 hr	Peak discharge from a detention basin shall not exceed 90% of the undeveloped peak flow from the 24 hr., 100 year event.

- A. Rational Method - Storm runoff for areas smaller than 400 acres shall be computed using the Rational Method according to the formula:

Where: $Q = CIA$
 Q = design runoff, in cubic feet per second (cfs)
 C = Coefficient of runoff based on ultimate development of the drainage area, as defined in Table 4.2
 I = Rainfall intensity from Standard Detail 400 (in/hr)
 A = Area of drainage basin in acres

- B. Unit Hydrography - Detention basin capacity and storm runoff for areas larger than 400 acres shall be computed using the Unit Hydrograph Method as defined by the Stanislaus County Hydrology and Drainage Procedure Manual and as modified herein.

4.04 PIPE MATERIALS

The minimum allowable inside diameter of any storm drain pipe shall be 12 inches and designed to flow with a minimum velocity of 2 feet per second when flowing full. The pipe materials which may be used for storm drainage improvements within the City right-of-way are specified in section 10 of the Standards.

4.05 COVER REQUIREMENTS

All storm drain pipe alignments shall be designed to allow a minimum of 2 feet of cover as measured from top of curb to the inside top of pipe. If, for sound engineering reasons, 2 feet of cover cannot be obtained, the pipe shall either be encased in concrete or provided with a concrete cover as specified by the City Engineer.

- A. Reinforced Concrete Pipe (RCP) - The following chart lists the minimum allowable classes of RCP. For use in this chart, cover is defined as the distance from the inside top of pipe to either the top of curb or finished grade, whichever is applicable.

<u>Cover in Feet</u>	<u>Minimum Class, RCP</u>
Less than 2.5	Class IV (2000 D)
2.5 to 7.9	Class III (1350 D)
8.0 - 11.9	Class IV (2000 D)
12.0 - 17.0	Class V (3000 D)

Any storm drain pipe which lies wholly or in part within the structural section of a street shall be Class V.

- B. Cast-In-Place Concrete Pipe (CIPP) - CIPP shall have a minimum cover in conformance with the following:

1. CIPP shall not be used if the paving surface is less than 18 inches above the top of pipe or a distance less than of the outside pipe diameter, whichever is greater.
2. If the paving surface is 18 inches or more above the top of pipe, backfill shall be placed in accordance with the City of Modesto standard backfill requirements for utility trenches.
3. The City Engineer may seasonally or permanently deny the use of CIPP if, in his/her judgement, local conditions make the use of said pipe undesirable.
4. CIPP stubs which will need to be tied onto in the future with additional pipe shall have a connection piece of CL IV RCP installed as a stub. Design Engineers shall indicate any pieces of RCP needed for connection with the CIP on the improvement plan profile.

4.06 HORIZONTAL ALIGNMENT

Storm drainage pipe shall be parallel with the centerline of the street and centered under face of curb. Unnecessary meandering and angular changes shall be avoided. Pipe curvature shall

not exceed manufacturer's recommendations. When appropriate, pipe shall be deflected before each curb inlet such that it enters in the center of the inlet.

4.07 DRAINAGE STRUCTURES

1. Manholes and Junction Boxes shall conform to the City Standard Details. They shall be located at changes in grade or conduit size, at junction points, on curved pipe at the EC or BC or the curve, and at 300 foot intervals along the curve.
2. Catch Basins shall conform to the City Standard Details. Catch Basins shall be designed and spaced such that they intercept and fully contain the 5-year storm. Under no circumstances shall the spacing of Catch Basins exceed 1,000 feet. Catch basins which are connected to positive drainage and do not first contribute to a settling pond or separator or are connected to a rock well, shall be a CalTrans G5 with a minimum of one Type 18 bicycle proof grate. Catch Basins which are connected to a positive drainage and settling basin or separator shall be curb inlets (Santa Rosa 3AC or equal) with cast iron lids stamped with "City of Modesto".
3. Box Culverts shall be required when specified by the City Engineer and designed on an individual basis.
4. Headwalls, Wingwalls, Endwalls, etc. shall be considered on an individual basis and, in general, designed in accordance with section 51 of the State Specifications.
5. Drainage Pump Stations may be permitted on an individual basis with the written approval of the City Engineer.
6. Temporary Inlets and Outlets shall conform to good engineering practice and shall be specifically designed and detailed on the plans.
7. Storm water runoff in gutters shall be conveyed in underground structures when any one of the following criteria is met:
 - a. Gutter runoff exceeds 3.0 cfs
 - b. Length of gutter exceeds 1,000 feet

4.08 EASEMENTS

Publicly owned drainage conduits and channels will not be allowed on private property unless they lie within a dedicated public easement. Where minor improvement of a drainage channel falls on adjacent property, such as daylighting a ditch profile, written permission from the adjacent property owner(s) for such construction shall be required. A copy of the document

which grants said approval shall be submitted to the City Engineer prior to the approval of the improvement plans.

Easements for closed conduits shall meet both of the following width criteria:

1. Minimum width of any easement for a closed conduit shall be 15 feet.
2. All easements for closed conduits shall have a minimum width in feet equal to the required trench width according to the standard detail for trench backfill plus 2 additional feet of width for every foot of depth of the pipe as measured from the bottom of the pipe to finished grade. All conduits shall be centered within their easements.

Drainage easements for open channels shall have sufficient width to contain the open channel and a 17-foot wide service road. The toe of a bank shall not be within 5 feet of an easement boundary. Easement boundary lines shall, at changes of alignment, have a radius sufficient enough to provide turning room for vehicles operating on the service road.

4.09 MISCELLANEOUS ITEMS

- A. Fencing—All basins and open channels shall be enclosed by a chain link fence complying with the City Standard Details and Specifications. The fence shall be located a minimum of 6 inches within the required easement boundary. Vertical Lats inserted in the fence shall be used to screen the detention site.
- B. Service Road—A service road shall be provided within the boundary of all open channels. It shall be a minimum of 17 feet wide, graded for vehicular traffic and clear of trees, shrubbery, and other obstructions for its full width. Fourteen feet of the road's width shall be paved or graveled (surface type to be determined by the City Engineer for each case) with a minimum unpaved shoulder width of 1 foot on each side of the roadway. Service roads may be required on both sides of the channel as determined by the City Engineer.

4.10 DETENTION BASINS

All basins, temporary or permanent, shall meet the following conditions and conform to the standard details.

- A. Volume – The volume of the basin shall be large enough to entrap a total of 2 inches of water over the commercial area developed and 1.0 inches over the residential area

developed. For residential areas, the capacity may be reduced, upon approval of the City Engineer.

- B. Depth – The maximum water depth shall be 10 feet and the bottom shall be shaped to concentrate the water at the rock wells.
- C. High Water Elevation – the high water elevation of the basin shall be 6 inches below the lowest gutter elevation.
- D. Side Slopes – Side slopes shall be at 4:1 for permanent basins and a minimum of 2:1 for temporary basins. Temporary basins will be defined as basins planned for less than 10 years of service.
- E. Access – A 15' wide access road shall be constructed to bottom of the detention basin. Road surface shall be constructed with 2" of $\frac{3}{4}$ " crushed over 6" CL II aggregate base over road stabilization fabric. A 2" AC over 6" AB road shall be constructed from street driveway to the access gate to the ponds. Access road grade shall not exceed a 10:1 with 3:1 side slopes.
- F. Rock Wells – A minimum of 3 rock wells within each basin. Any basin exceeding 200,000 cubic feet of capacity shall install as additional rock well for each 50,000 cubic feet over 200,000 cubic feet.
- G. Inlet Structure – Temporary basins shall use either a concrete flared end section (FES) or a small head wall. A 2' deep x 12" wide concrete cutoff wall shall be constructed at the outlet to prevent scouring. Grouted rock (3" or larger) or engineer rock (20 lb+) w/ engineer fabric under rock to prevent erosion and cat tails and weed growth under the rock.
- H. Fencing – All basins shall be enclosed by a chain link fence complying with the City Standard Details and Specifications. The fence shall be located a minimum of 6 inches within the required easement boundary. Vertical Lats inserted in the fence shall be used to screen the detention site.

TABLE 4.2**BASIC RUNOFF COEFFICIENTS**

<u>SURFACE</u>	<u>COEFFICIENTS</u>
Pavement	0.95
Roofs	0.80
Compacted earth without paving	0.75
Lawns & Open Lands	0.1 – 0.2

TABLE 4.3**COMPOSITE RUNOFF COEFFICIENTS & MINIMUM OVERLAND TRAVEL TIMES FOR VARIOUS LAND USES (1)**

	RUNOFF COEFFICIENT (C)	MINIMUM OVERLAND TRAVEL TIME (Min.)
Residential Areas		
Suburban Density (0.5 to 1.0 Acre Lots)	.25	30
Low Density (Single Family)	.30	20
Medium Density (Multi-Family)	.50	20
Business & Commercial	.90	10
Industrial (1)		
Restrictive Light	.80	10
General	.90	10

- (1) In lieu of using this table, composite coefficients may be determined for land uses within a development by using the basic coefficients shown in Table 1.

TABLE 4.4**MANNING COEFFICIENT****CONDUIT MATERIAL****MANNING COEFFICIENT****Closed conduits ***

Asbestos cement	0.013
Cast iron pipe	0.013
Concrete pipe	0.013
Corrugated metal pipe	
Plain	0.024
Pave invert	0.020
Fully paved	0.013
Vitrified clay	0.013

Open channels

Lined channels	
Asphalt	0.015
Concrete	0.015
Rubble or riprap	0.030
Vegetal	0.040
Excavated or dredged	
Earth, straight & uniform	0.030
Earth, winding, fairly uniform	0.040
Unmaintained	0.100

(Adapted from Table XIV, ASCE Manual No. 37, 1970)

JOB TITLE: _____
DES. BY: _____ DATE: _____
CHK. BY: _____ DATE: _____
RUNOFF COEFFICIENTS:

City of Modesto
Public Works and Transportation
Storm Sewer Design

RAINFALL CURVES

PIPE:

Type:

Source: _____
M.A.P.: _____

Friction Coefficient $n =$ _____
Minimum Velocity at _____

Design Flow: $V =$ _____, fps

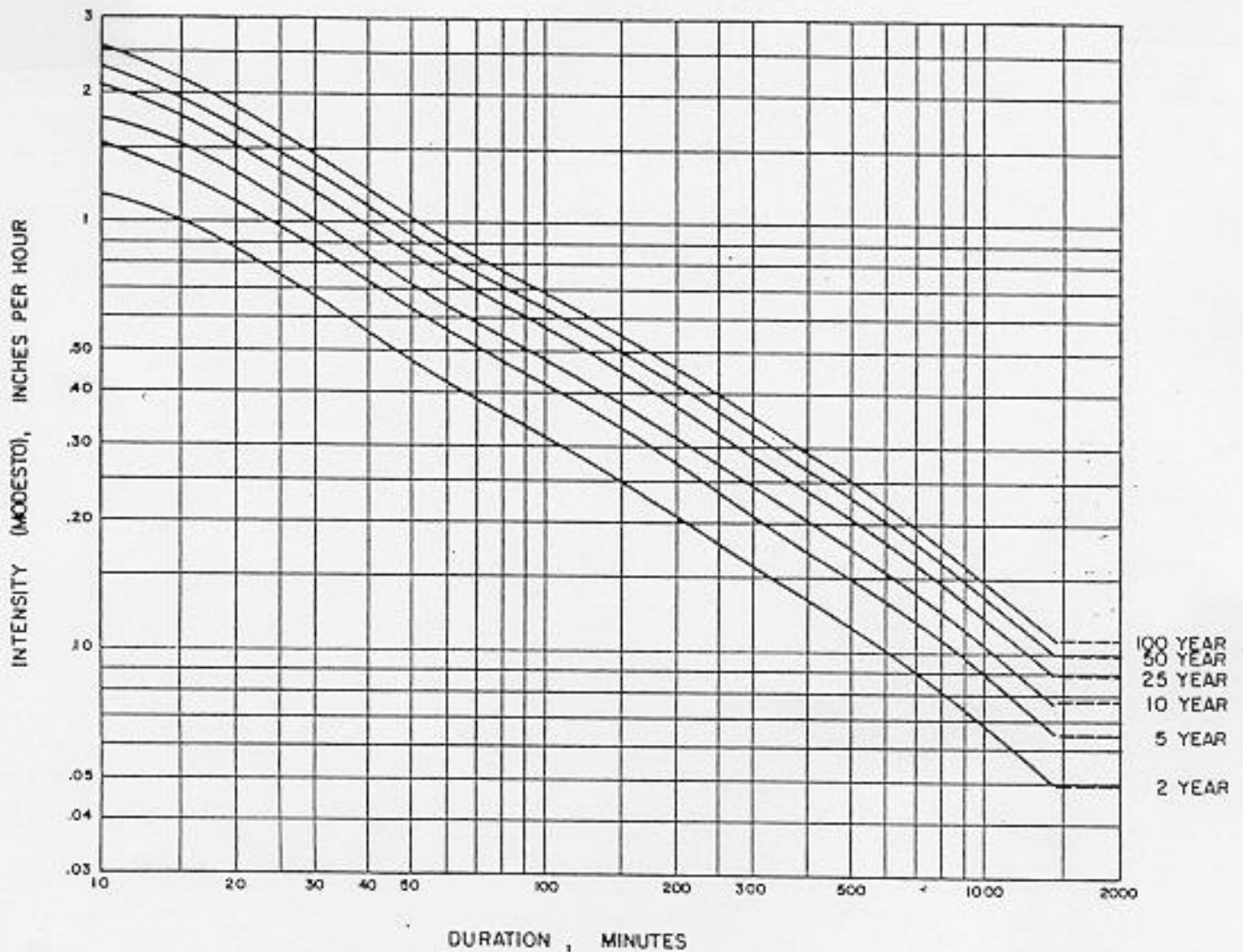
TIME OF CONCENTRATION

Initial: _____ Min

Land Use: _____
Weighted Coefficient: _____

FIGURE 4-2

RAIN INTENSITY FREQUENCY CURVE



THESE CURVES ARE BASED ON CALIFORNIA DEPARTMENT OF WATER RESOURCES DATA FROM THE MODESTO RAINFALL GAGING STATION.(MEAN ANNUAL PRECIPITATION = 10.9 INCHES)

TO OBTAIN INTENSITIES FOR LOCATIONS OTHER THAN MODESTO, MULTIPLY INTENSITY ON THIS CHART BY MEAN ANNUAL PRECIPITATION AT THE POINT IN QUESTION DIVIDED BY 10.90.

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SECTION 5

SANITARY SEWER DESIGN

5.01 GENERAL

A. Submittal Map & Calcs

Sanitary sewer system design within a developing area must include provisions for size and capacity to adequately convey all domestic and industrial waste that can be reasonably anticipated under conditions of full ultimate development. Engineering calculations to support the sewer system design shall be submitted to the City Engineer for approval. The calculations shall include:

1. Map indicating service area within the sewer system including any future contributing development with projected land use, zoning, and any physical features contributing to the sewer system design.
2. Sanitary sewer waste volumes, either existing or proposed, within the service area of the system.
3. Size and slope of each pipe between appurtenant structures.
4. Invert/RIM elevations of each pipe and appurtenant structure.

B. Line Size and Service Policy

1. The line size and service policy requires that the minimum size of any new public sewer main shall be 6 inches in diameter.
2. All side sewers (laterals) 8" and larger shall be connected by or at a manhole.
3. The minimum lateral size is 4 inches where grade requirements can be met and the lateral's intended use is to serve single family residences. Six-inch or larger laterals shall be installed where intended use is industrial, commercial or greater than single family residential flows. Joint use of laterals will not be permitted except in multi-family residential uses.
4. Laterals connecting structures having a finished floor elevation 12 inches or less above the highest elevation of the nearest upstream structure shall require installation of a backflow prevention device next to the cleanout.

5. No direct connections are permitted on 12 inch or larger sewer mains.

C. Right of Way Policy

The right of way policy requires that all public sewers be in dedicated rights of way for sewers and/or public use. Sewer services are not permitted in dedicated right-of-way outside the roadway without prior written approval by the City Engineer. This approval will be given only when insufficient grade makes it impossible to serve the property directly from a sewer main in the right-of-way.

Dedicated right-of-way outside the roadway for sanitary sewers shall meet both of the following width criteria:

1. Minimum width of any dedication shall be 15 feet.
2. All dedications shall have a minimum width in feet equal to the required trench width according to the standard detail for trench backfill plus 2 additional feet of width for every foot of depth of the pipe as measured from the bottom of the pipe to finished grade. All sewer pipes shall be centered within the dedications.
3. In a residential cul-de-sac where the sewer is extended through the cul-de-sac to another street, a dedicated right-of-way shall be paved with a 10' wide drive (6" concrete) and landscaped on both sides of the drive. One removable bollard shall be installed at each end of the dedicated right-of-way. Curbs shall not be modified to accommodate the access driveway.

D. Service Policy

The service policy of the Modesto Municipal Sewer District #1 requires that all properties served must annex into the District.

A property already inside the district may extend sewer mains and laterals to connect to the system. If the extension requires use of force mains, the property owner must prove to the City Engineer its requirement and design the facility to the City Engineer's satisfaction.

As a minimum, sewer mains shall be extended across frontage, unless otherwise approved by the City Engineer.

E. Septic Tank Policy

No new septic tanks are allowed within the municipal sewer district's boundaries. In older areas, in which a sewer service is installed after the homes have been on septic

tanks, property owners have a five year grace period to connect to the new sewer main. If no service is available, then septic tanks will remain the norm until such time the municipality makes sewer service available.

F. Fly Line Policy

Fly lines, a parallel sewer line constructed adjacent to a main trunk and/or a deep line, may be constructed in most circumstances when approved by the City Engineer. The standards of construction are outlined in Detail 508.

5.02 **FLOW**

A. The design sanitary sewer flow shall be computed using the following formula:

$$Q_D = Q_P + I$$

Where: Q_D = Design Flow (gal per day)
 Q_P = Peak Flow
 I = Infiltration

The peak flow (Q_P) for residential service areas is defined as 2 1/2 times or as shown in Figure 5.1, the average flow, with the average flow for the service area being computed from two basic assumptions:

1. 2.50 persons per single family dwelling
2. 100 gallons per person per day

Acresage flows estimates for master planning and sizing mains when the exact number of residential services are not specified by are as follows:

TABLE 5.1 ACREAGE FLOWS ESTIMATES

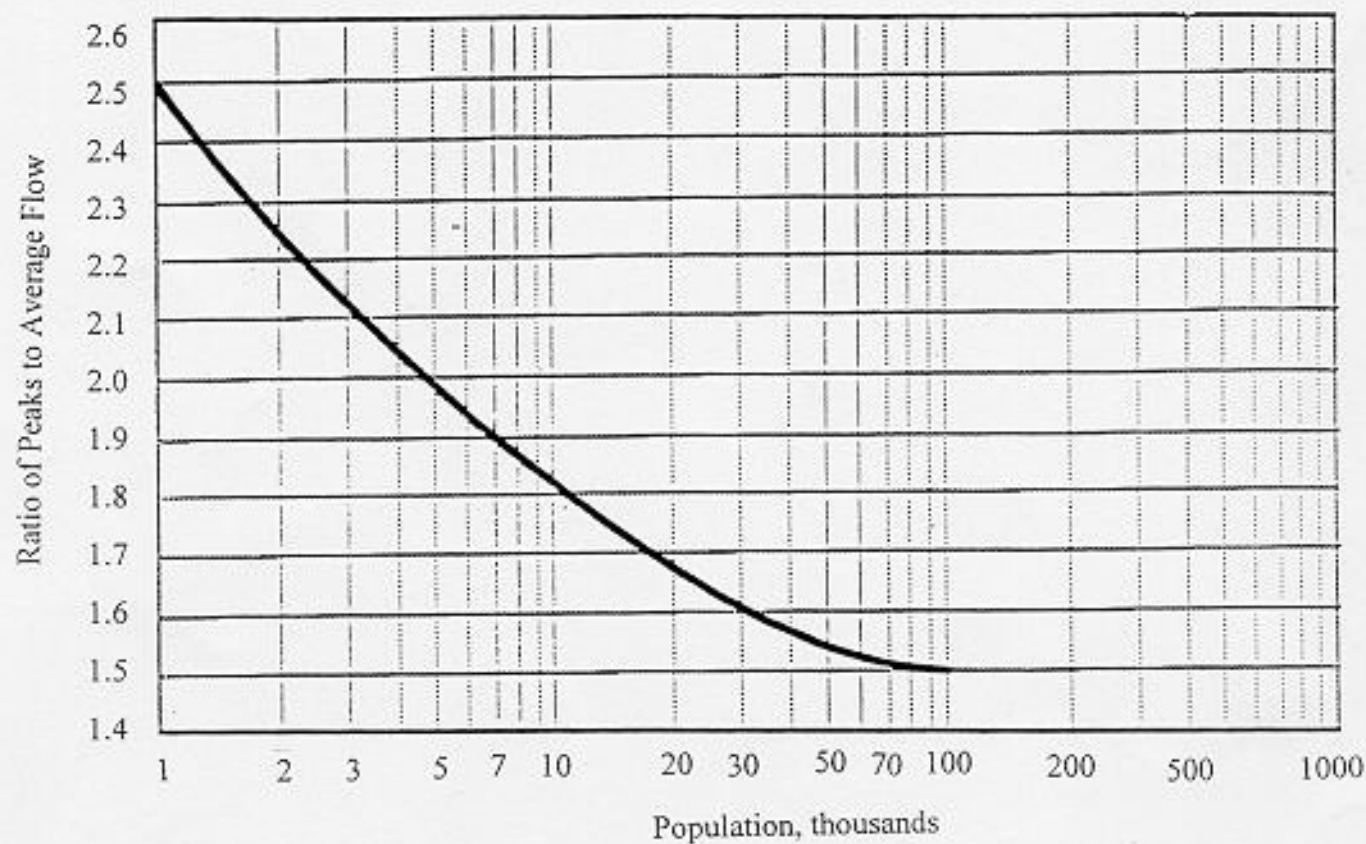
Land Use	Density Units/Acre	Persons Dwelling/Unit	Average Flow (Gal/Ac/Day)	Peak Flow (Gal/Ac/Day)
Very Low Density Residential	2	2.50	500	1650
Low Density Residential	5	2.50	1250	4125
Medium Density	8	2.50	2000	5280
High Density Residential	10	2.50	2500	6600
Multi-Family	22	1.90	4180	10450
Commercial				7500
Office				7500
Light Industrial				3000
Heavy Industrial				*Note 1
Schools			20 GPCD	*Calculate*

*Note 1 - Sewage flow rate shall be considered on a case by case basis and may require special design.

- B. Infiltration and inflow (I & I) shall be computed by using 500 gallons per inch diameter mile per day for sewer mains and laterals or 1000 gal/acre/day. Residential laterals shall be assumed to be a minimum of 75 feet in length.

FIGURE 5.1

RATIO OF PEAK TO AVERAGE FLOW OF SANITARY SEWAGE



Reference: Modesto Sewerage Survey, 1966

C. Pipe Capacity

1. Manning's Formula, $Q = A (1.49/n) R^{2/3} S^{1/2}$, shall be used to determine pipe capacity. The "n" value shall be 0.013 or the pipe manufacturer's recommendation, whichever is greater.
2. All main sewers shall be sized to carry the design flows at 70% of pipe capacity.
3. Design capacities for trunk sewers 12 inches and larger shall require approval by the Deputy Director of Utilities.

5.03 VELOCITY

Sewer velocity shall be equal to or greater than 2 feet per second for all sewers when flowing full. Where design velocities for main sewers exceed 10 feet per second, polyethylene lined ductile iron pipe conforming to Section 12 of the Specific Provisions shall be used. The ductile iron pipe shall be wrapped with a 40-mil polyethylene blanket.

The following are minimum slopes required for sewer lines:

PIPE SIZE	MIN. SLOPE
6 inch	0.50%
8 inch	0.35%
10 inch	0.25%
12 inch	0.20%

5.04 VERTICAL ALIGNMENT

- A. Minimum pipe cover and clearance shall be maintained in the design of sanitary sewers. If certain conditions exist which make it impractical to meet the minimum cover and clearance requirements, the conditions and locations shall be specifically noted above the sewer profile on the plans. Each location not meeting the minimum cover and clearance requirements will require special pipe, bedding and/or backfill and shall be approved by the City Engineer.

Under no conditions or circumstances shall other utilities be allowed to be installed directly over and parallel to any sanitary sewer installation.

- B. Main and trunk sewers shall have a minimum depth of 42 inches from the top of pipe to the finished grade and a minimum of 2 feet to bottom of street subgrade. Mains installed with less cover shall use ductile iron pipe or other engineered alternatives and shall require the approval of the City Engineer.

- C. Sewer laterals shall have a minimum depth of 3 feet from the top of the pipe to the finished grade at the right-of-way. Maximum depth of 5 feet at right-of-way for residential subdivisions. Commercial, industrial, apartment and multi-family shall have a minimum of 5 feet at right-of-way and shall be increased by one foot for every 250' of lot depth.
- D. Pipe shall be laid with a minimum of 12 inches vertical clearance from all improvements and utilities, unless otherwise approved by the City Engineer.
- E. At points of convergence of pipes of various sizes, the soffits of the pipe elevations shall match.
- F. A change of direction requires a 0.10 foot minimum drop from the incoming pipe flowline to the outgoing pipe flowline in the structure.
- G. Sewer lines shall be installed on a straight grade between manholes.

5.05 HORIZONTAL ALIGNMENT

- A. Sanitary sewers shall be placed within street rights of way unless placement in an easement is specifically approved by the City Engineer.
- B. Alignment shall be parallel to the street centerline wherever possible. In new developments, the horizontal alignment of sewer mains shall be 6 feet north or 6 feet west of the street centerline. When looping the system around the new subdivision, the utility lines may become reversed - 6 feet south or 6 feet east of the street centerline.
- C. Sanitary sewer mains shall be on a straight line between manholes. Whenever it is essential that a curved alignment be used, a minimum radius of 200 feet shall be required, but shall be greater whenever possible. The radius and delta of all curves shall be indicated on the plans adjacent to the curve. If the sewer line parallels the road centerline, then only the street centerline data on radius and delta needs to be indicated on the plans.
- D. The deflection in the joint between any two successive pipe sections shall not exceed eighty percent (80%) of the maximum deflection as recommended in writing by the pipe manufacturer. Minimum 2-foot pipe lengths may be used to install short radius curves providing the requirements specified herein are met.
- E. Sewers within 100 feet of domestic wells shall be cast iron or ductile iron.

5.06 PIPE MATERIALS

Sewer pipe shall be Vitrified Clay Pipe, Cast Iron Pipe, or Ductile Iron Pipe. Vitrified Clay Pipe shall be clay bell and spigot end compression joint pipe and shall conform to the current standard specifications of the A.S.T.M. C700-71T for Extra Strength Clay pipe, except that no glazed pipe will be permitted. Village One may use 8"- PVC SDR 35 pipe with approved backfill requirements. See Specifications in Appendix J.

5.07 SEWER LATERALS

Sewer laterals are those portions of the sewer system between the main sewer and the sewer maintained by property owners. Property owners shall be responsible for the entire lateral from the sewer main in the street to the house. In all cases City maintained sewer lines will lie in a street right-of-way or dedicated public easement. In all new subdivision work, the house lateral lines and risers from the sewer to the property line shall be installed at the time the sewer is constructed. Wherever a sanitary sewer is installed which will serve existing houses or other buildings, a house lateral line shall be constructed for each existing house or building. Each house lateral line shall be referenced to the plan stationing. Each individual building parcel shall be connected by a separate sewer lateral.

Exceptions to separate sewer and water laterals may be granted by the City Engineer in commercial centers with associations or management agencies and appropriate private easements. The Public ownership will, in all cases, stop at the right-of-way line of the street. No dedicated public easement will be accepted.

The following are requirements for sewer laterals:

- A. All sewer laterals, from property line or edge of easement to the point of connection with the main line or a manhole shall have an alignment that provides an angle of intersection with the downstream section of the main sewer of no more than 90°.
- B. The maximum deflection at any one point in a lateral including fittings at saddle or wye connection to main sewer or at angle points having clean outs, shall be 22-1/2° (1/16 bend) and any two consecutive deflection (bends) shall not be less than 2 feet apart.
- C. Building drains (i.e. floor drains, roof leaders, etc.) shall not be connected to the sanitary sewer system.
- D. All wash racks and car washes must be connected through an oil/water separator before connection to the sanitary sewer. Also, overhead cover must be installed to prevent rain-water infiltration.

- E. A sewer cleanout shall be provided on the sewer lateral within the City right-of-way at the back of sidewalk as shown in the Standard Details.
- F. Cleanouts shall be constructed in all sewer laterals at the following locations:
 - 1. At the City right-of-way as shown on the Standard Details.
 - 2. At any single turn greater than 45°.
 - 3. At intervals not to exceed 100 feet along the side sewer lateral.
- G. Cleanouts shall be constructed in conformance with the City Standard Details.
- H. Backflow prevention devices may be required as specified in Section 5.01 B.4.
- I. When connecting a sewer lateral directly from an existing manhole to the right-of-way line, ductile iron pipe (DIP) shall be inserted into the manhole and brought to the right-of-way line. Vitrified Clay Pipe (VCP) may be used with an adjustable repair coupling connecting to the DIP at least 4 feet from the outside face of the existing manhole.

5.08 MANHOLES

- A. Manholes shall be placed at the intersections of all sanitary sewers, at all locations where there is a change in size, grade or direction and at the ends of all permanent lines.
- B. Manhole spacing shall not exceed 400 feet.
- C. Manholes installed in areas outside of the street shall have bolted manhole covers. Rim elevations shall be a minimum of one (1) foot above ground.
- D. Manholes shall be constructed at all service lateral connections where the main line is not at least 1-1/2 times the size of the service lateral.
- E. Where the location of two manholes is determined by intersecting lines, the distances between intervening manholes shall be approximately equal.
- F. Whenever a change in the size of pipe, or an angle of 20° or more in alignment occurs at manholes, the flow line of the incoming pipe shall be a minimum of 0.10 feet above the flow line of the outgoing pipe, or an amount necessary to match pipe soffits. The improvement plans shall show invert in and invert out of the manhole.
- G. A maximum drop of 2 feet shall be allowed in a standard manhole. Drop manholes shall be used for larger drops.

- H. Manholes shall be used at the termination of cul-de-sac sewer mains. Side sewers shall be connected to this manhole for services to adjacent properties.
- I. Cleanouts may be installed at the upstream end of mains which are proposed to be extended in the future and do not exceed 250' and/or 3 services. Future extensions exceeding 250' and/or 3 services shall use a manhole with a five-foot stub and plug for future extension.

5.09 PUMP SYSTEMS

Special design of sewer force mains or other unusual features or structures require individual study and approval by the City Engineer.

- A. All sewage pump systems, including residential sewage pumps, when proposed, shall be submitted to the City Engineer.
- B. Pump stations shall have 50 percent standby and a minimum of 2 pumps. Standby power shall be provided.

5.10 VILLAGE ONE PVC STANDARDS

The installation of Polyvinyl Chloride (PVC) pipe sewers is allowed in Village One only. It is being allowed as an experiment to evaluate the use of this type of pipe, the field installation, and the long-term stability of the pipe. The special specifications in Appendix J are a supplement to the current Modesto Standard Specifications.

SECTION 6

WATER SYSTEM DESIGN

6.01 GENERAL

All improvements, including extensions, replacements and repairs, shall conform to the requirements of the National Board of Fire Underwriters, American Water Works Association Standards, the Modesto Municipal Code, and these Standard Specifications and Details of the City of Modesto.

All installations shall conform to regulations prescribed by the California State Department of Public Health.

In all cases, water mains shall be of sufficient size to meet fire-flow requirements set forth in the Modesto Fire Code.

6.02 LAYOUT OF MAINS

The distribution system, whenever possible, shall employ the “Gridiron System” of water circulation so as to allow pressure equalization. All water pipelines designed for the transmission or distribution of domestic water supply shall be constructed and installed within the right-of-way of public streets or roads, unless such construction or installation is determined to be impractical by the City Engineer.

The Consulting Engineer shall show, on the profile of improvement plans, inverts of pipe at all changes in grade and in all areas where conflicts with other utilities might arise, he/she shall also show the top of pipe. A detail shall be drawn of such conflicts with sufficient information shown that the City Engineer can make a determination as to the adequacy of the solution shown.

6.03 VERTICAL ALIGNMENT

Water mains and services shall be installed at a depth which will provide a minimum of 42 inches from the top of the pipe to finished grade or a minimum of 24 inches from the top of pipe to the street subgrade, whichever is greater.

Where a water line crosses a sewer line, the water line shall be designed according to “Criteria for the Separation of Water Mains and Sanitary Sewers”, Department of Health Services, State of California.

When crossing a sanitary sewer, it is desirable that the water main be installed above the sanitary sewer with a clearance of 12 inches. Construction shall conform to the Standard Details.

When lines are realigned in such a way that an 18" high point is required, an air release valve shall be required. Air vacuum valves shall be located within 3' of lot lines within the ROW. Fire hydrants may be used in lieu of an air release valve.

6.04 HORIZONTAL ALIGNMENT

Alignment shall be parallel to the street centerline wherever possible. In new developments, the horizontal alignment of water mains shall be 6 feet south or 6 feet east of the street centerline. When looping the system around the new subdivision, the utility lines may become reversed - 6 feet north or 6 feet west of the street centerline. In existing streets and non-residential streets, the alignment may vary from the Standard Specifications with approval of the City Engineer, but in no case shall there be less than 10 feet horizontal clearance to a sanitary sewer, or 10 feet horizontal clearance to a storm drain or industrial site.

Curved water mains are allowed in curved streets when curvature does not exceed 80% of the manufacturer's recommendations.

6.05 PIPE SIZE AND MATERIAL

The minimum size pipe used for water mains shall have a nominal diameter of 8 inches. Water mains serving a cul-de-sac beyond a fire hydrant may use a 6-inch diameter line. Larger sizes will be required as designated by the City Engineer from the City of Modesto Master Plan. Industrial and commercial areas may require installation of 12-inch mains.

For single family residential areas, all water mains shall be sized to provide 1000 gallons per minute fire flow from each of 2 adjacent fire hydrants flowing simultaneously with 20 pounds per square inch residual pressure.

For multi-family, commercial, and industrial areas, all water mains shall be sized to provide fire flow as specified in the Modesto Fire Code, Table A-III-A-1, but shall provide not less than 1500 gallons per minute from each of 2 adjacent fire hydrants flowing simultaneously with 20 pounds per square inch residual pressure.

The fire flow can generally be obtained using the following design standards:

- 1/2 mile looped grid - 12 inch mains or larger
- 1/4 mile looped grid - 8 inch mains
- Distribution system, looped - 8 inch mains

Pipe materials may be ductile iron pipe (D.I.P.) or polyvinyl chloride pipe (P.V.C.). All allowable materials are specified in Section 12 of the Standard Specifications.

6.06 WATER SERVICE

The minimum size service is 1 inch and shall be installed in conformance with Standard Detail 612. For properties other than single family residential, and for non-typical single family residential, the design engineer shall determine the water service size.

All water services shall be metered, except dedicated fire services.

Each individual property shall have a separate water service complete from the water main to the property. Water services are not permitted in easements without prior approval of the City Engineer.

All meter boxes shall be located in the public right-of-way. Meter boxes shall not be located in vehicular traffic areas.

6.07 FIRE HYDRANTS

Fire hydrants shall be supplied from the largest available main except transmission mains.

Fire hydrants shall be fed from two directions unless specifically approved by the City Engineer and Fire Marshall or unless located in a cul-de-sac.

Fire hydrant spacing and distribution shall be determined as follows:

- A. R-1 & R-2 Residential Zones - 500 feet, All other zones - 300 feet
- B. In addition, hydrants shall be placed on both sides of a major street and shall be spaced on each side according to the maximum distance allowed. On major streets where buildings and streets are separated by a 6-foot restrictive wall, hydrants shall be placed at all street intersections with a maximum distance of 1000 feet between hydrants. If the distance exceeds 1000 feet, intermediate hydrants shall be placed at even intervals between intersections.
- C. On divided streets, planned divided streets or state highways, the above spacing shall apply to both sides of the street.
- D. A fire hydrant shall be located at the end of all cul-de-sacs in lieu of a blow-off. The Contractor shall install fire hydrants per the Standard Specifications. The fire hydrant, bury, 6" GV and breakoff riser shall be provided free of charge by the City of Modesto. Pickup shall be coordinated with the City Water Division. The Design

consultant shall not count this fire hydrant in satisfying the Fire Marshall's spacing requirements. This hydrant is for health reasons.

Fire hydrant shall be installed in conformance with Standard Details #605 and #606.

Fire hydrants shall be located at ends of curb returns or at lot lines. The preferred fire hydrant location is at curb returns.

6.08 VALVES

The distribution system shall be equipped with a sufficient number of valves so that no single shutdown will result in shutting down a main, or necessitate the removal from service a length of pipe greater than 550 feet. Transmission mains greater than 12" in diameter shall have valves at 1000 feet on center. Additionally, in no case shall more than two fire hydrants be removed from service. The valves should be so located that any section of main can be shut down without going to more than three valves. One of the valves for a tee or cross at a cul-de-sac must be in the direction of the cul-de-sac. Valves, incorporating a blow off device, shall be installed at the boundary of development. A valve shall be installed on each side of services to all hospitals, schools and major industrial sites as directed by the City Engineer.

Valves installed on all ten-inch (10") and smaller lines shall be gate valves. Mains twelve inches (12") and larger shall utilize butterfly valves. When butterfly valves are used, butterfly operator shall be toward nearest property lines.

Valves shall be installed in conformance with Standard Details.

6.09 BLOW-OFFS

Blow-offs shall be constructed at the end of all temporary DEAD END runs. Blow-offs for future extensions shall be installed at mains to be extended at a later date. Install in conformance with Standard Detail # 610.

Permanent dead ends must have a fire hydrant installed at the end of the line in lieu of a blow-off. See criteria in 6.07d above.

6.10 THRUST BLOCKS

Thrust blocks shall be installed in conformance with Standard Detail #609. Joint restraints are an acceptable alternative but must be approved by the City Engineer.

6.11 WATER LINE EASEMENT

Dedicated water mains outside the public right-of-way are discouraged and will be scrutinized. The design engineer should strive for a design to put them within the public right-of-way.

6.12 PRIVATE WATER SYSTEM DESIGN FOR FIRE PROTECTION

Appendix Design I provides design requirements in use by the Modesto Fire Code and Modesto Municipal Code.

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SECTION 7

STREET LIGHTING

7.01 GENERAL

These specifications shall cover the design and installation of street lights and park trail lights. The design and installation shall conform to these specifications, the City of Modesto, Standard Specifications and Plans, and Section 86 of the State Specifications.

The Consulting Engineer shall show the proposed street lighting system or park trail lighting system on the project improvement plans.

The plans shall include the following items:

1. Location of electroliers.
2. Intensity of luminaries
3. Location of service points (As-builts).
4. Location of pull boxes (As-builts).
5. Location of conduit runs (As-builts).

* As-built - Consulting engineer to submit as-builts after improvements are installed. The consulting engineer shall provide the as-builts prior to final acceptance of the construction improvements.

The Consulting Engineer shall submit three (3) copies of the street light plans to the City for preliminary review in the initial submittal. The consulting engineer shall then obtain service locations and identification numbers from Modesto Irrigation District (M.I.D.).

After the Consulting Engineer receives the service locations, he/she shall determine the wire size and length of each conduit run. These items may be shown in tabular form or denoted next to each conduit run on the plans. The circuit lengths and conductors shall be sized such that the maximum voltage drop between the source and any street light does not exceed 5 percent of the nominal circuit voltage. Conductors shall be THW No. 10 copper or larger.

The cost for all M.I.D. services shall be paid for by the developer or contractor. This shall include the M.I.D. connection charge for energizing street lights.

7.02 SPACING, INTENSITY AND MOUNTING HEIGHTS

- A. Street lights shall have the following spacing, intensity and mounting heights according to the type of street they are to be installed on.

TABLE 7.1 SPACING, INTENSITY AND MOUNTING HEIGHTS

Type of Street	Spacing (feet)	Luminaire Wattage	Mounting Height
Residential & Collector	330'	100W - mid block 150W - intersections	25' H w/ 15' arm
Major	165' staggered to each side	200W	28' H w/ 15' arm

- B. Streetlights shall be placed at street intersections and curves. Additional lights may be added as required.

7.03 POLE HEIGHT AND ARM LENGTH

All poles shall have a single arm.

Pole height and arm length shall be as shown in the Standard Plans.

7.04 LOCATION OF STREET LIGHTS

- A. If possible, streetlights shall be located within 3' of a property line.
- B. On streets with separated sidewalks, street lights shall be located at the front of sidewalk. The edge of the pole foundation shall meet the front of sidewalk.
- C. On streets with monolithic curb, gutter, and sidewalk, street lights shall be located at the back of sidewalk. The edge of the pole foundation shall meet the back of sidewalk.
- D. Where there is only curb and gutter, the center of the street light foundation shall be located four (4) feet from the back of curb.
- E. T intersections - A street light shall be located on the through street around the projected centerline of the intersecting street.
- F. Cul-de-sac - A street light shall be located within the bulb.
- G. Four way intersection/major streets - Street lights shall be located at all curb returns.
- H. Four way intersection/major and minor street - Street lights shall be located at the far right curb returns of the major street in the direction of travel.

- I. Four way intersection/minor streets - A street light shall be located at one of the returns.
- J. Electroliers will normally be staggered on opposite sides of the street. Electroliers shall be placed on the outer edge of curves.
- K. Electroliers are required at each knuckle. The electrolier shall be located on the outside of the knuckle.

7.05 PULL BOXES

- A. Pull boxes shall be spaced at a maximum of 200 feet.
- B. Where conduit runs exceed 100 feet, one pull box shall be located next to each electrolier.
- C. One pull box shall be located at each side of all street crossings, at or near the curb return.
- D. Pull boxes shall be placed immediately behind the sidewalk in sidewalk areas or 4 feet behind the back of the curb in non-sidewalk areas.
- E. Where a utility company transformer is designated as the service point, a pull box shall be installed adjacent to the transformer.

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SECTION 8

NON-CITY UTILITY DESIGN

8.01 GENERAL

These specifications shall cover some of the design and installation procedures for gas, cable, telephone and electric facilities within the City of Modesto. Any cost incurred in conforming to these standards will not be reimbursed by the City.

8.02 LAYOUT OF UTILITY OR JOINT TRENCH

The distribution system, whenever possible, shall be undergrounded in the dedicated public utility easement (P.U.E.). All new electrical service shall become part of the joint trench where practical and the facility undergrounding is consistent with California Public Utilities Commission Rule 20. Where it is necessary to construct underground facilities in, on, over, under, along, through or across any portion of a surfaced street, the same, where practicable and economically reasonable shall be done by a tunnel or bore so as not to disturb the surfaced street; and in the event that the same cannot be so done, such street work shall be done under an excavation permit to be granted by the City Engineer.

8.03 VERTICAL ALIGNMENT

Conduits shall be installed a minimum of 36" under the existing ground as well as the final grade in the P.U.E. When installing conduits for crossings through existing streets, a minimum of 42" of cover is required. Conduits installed in undeveloped areas of future streets shall be installed at a depth which will provide a minimum of 42 inches from the top of the conduit to finished grade or a minimum of 24 inches from the top of conduit to the street subgrade, whichever is greater.

8.04 HORIZONTAL ALIGNMENT

Alignments shall be parallel to the street centerline wherever possible. In new developments, the horizontal alignment of joint trench shall be parallel to the centerline within the P.U.E. Where a P.U.E. is not available or in existing urbanized and built-up areas Table 15.1 gives guidance.

8.05 OVERHEAD UTILITY LINES

Utility overhead lines are discouraged. Wherever reasonable, utility companies forced to relocate lines by street dedication or widening shall underground the facility. In the case where a pole facility cannot be economically undergrounded, other facilities may remain on the pole during and after relocation i.e. a 69 KVA line is not economically feasible to underground, therefore, a 12 KVA line on the same set of poles will not be forced to underground. The utility lines must be

consolidated as much as possible. A 69 KVA on one side of the street and a 12 KVA on the other side will be combined onto one set of poles.

Where utility poles are permitted, poles shall be located behind sidewalk wherever possible. Where a separated sidewalk is proposed or existing, the pole shall be placed a minimum of 18 inches behind curb. Where the entire area behind curb is concrete, the pole shall be a minimum of 4.5' behind curb.

TABLE 8.1 NON-CITY UTILITY HORIZONTAL ALIGNMENT

Condition	Alignment
Extending or repairing an existing service through urbanized areas.	Trench and install conduit at either behind walk, under walk or within 3 feet of existing lip of gutter but in no case shall installation be closer than 36" to an existing sewer, water or storm drain line (outside wall to outside wall of conduits - see Detail 810 - Case E).
Extending new service through a new area with a minimum of 10' of sidewalk and/or landscaping.	Install conduit behind curb, gutter and sidewalk. (Detail 809 & 810 - Cases A thru D).
Extending new service through rural areas with only 40' of right-of-way.	Install conduit 1' +/- off the existing right of way. All junction boxes shall be installed in easements outside the ROW. Utilities must negotiate the construction and permanent easement (Detail 808).
Extending new service through right-of-way less than 40' and congested areas with 45' of right of way or less.	City Engineer shall engineer a location based on the master plan of utilities. In most cases with less than 40' of ROW, developer or utility will acquire easement (Detail 808).

SECTION 9

SURVEY STANDARDS

9.01 PARCEL MAPS

- A. The City Surveyor has established coordinated positions in the City of Modesto by tying the section corners or other appropriate corners or road centerlines on an approximate 1-mile grid convenient for proper coordinate tie-in of such map boundaries to the existing monuments of and, where possible, intervisible with the local control network, and by calculating and adjusting coordinates for these corners using the California Coordinate System based on the North American Datum of 1983, 1992 Adjustment or current adjustment.
- B. All data pertaining to these control monuments has been or will be filed in accordance with the requirements of the Land Surveyor's Act and these records shall be indexed and made readily available to the general public.
- C. The City shall require the surveyor or engineer to show, on the Parcel Map, those ties made by the surveyor or engineer to such control monuments in accordance with Division 8, Chapter 1, Section 8813 of the Public Resources Code; and that coordinates published by the City for these control monuments be shown on the map.
- D. The surveyor or engineer shall be permitted to show, on any Record of Survey submitted for filing, the information prescribed above when the normal course of survey activities includes ties made to points for which coordinates have been provided or accepted into the control network by the City and when such information may be shown pursuant to the requirements of the California Public Resources Code.
- E. The City shall require the surveyor or engineer preparing the Parcel Map to tie the boundary of said map into the California Coordinate System (NAD 83) in at least two locations, preferably on opposite sides of the boundary or as mutually agreed to by the surveyor or engineer and the City Surveyor.
- F. The Basis of Bearings of the Parcel Map shall be the California Coordinate System (NAD 83), 1992 Adjustment or current adjustment as directed by the City Surveyor as established by the use of existing monuments, Global Positioning System surveys (GPS), or by astronomic observation.
- G. If the boundary of the Parcel Map being submitted is a parcel or lot of a map already tied to the California Coordinate System, NAD 83, 1992 Adjustment or current adjustment as directed by the City Surveyor, the requirements in Paragraph E (above) shall be waived.

9.02 SUBDIVISION MAPS

- A. The City Surveyor has established coordinated positions in the City of Modesto by tying the section corners or other appropriate corners or road centerlines on an approximate 1-mile grid convenient for proper coordinate tie-in of such map boundaries to the existing monuments of and, where possible, intervisible with the local control network, and by calculating and adjusting coordinates for these corners using the California Coordinate System based on the North American Datum of 1983, 1992 Adjustment or current adjustment.
- B. All data pertaining to these control monuments has been or will be filed in accordance with the requirements of the Land Surveyor's Act and these records shall be indexed and made readily available to the general public.
- C. The City shall require the surveyor or engineer to show, on the Parcel Map, those ties made by the surveyor or engineer to such control monuments in accordance with Division 8, Chapter 1, Section 8813 of the Public Resources Code; and that coordinates published by the City for these control monuments be shown on the map.
- D. The surveyor or engineer shall be permitted to show, on any Record of Survey submitted for filing, the information prescribed above when the normal course of survey activities includes ties made to points for which coordinates have been provided or accepted into the control network by the City and when such information may be shown pursuant to the requirements of the California Public Resources Code.
- E. The City shall require the surveyor or engineer preparing the Parcel Map to tie the boundary of said map into the California Coordinate System (NAD 83) in at least two locations, preferably on opposite sides of the boundary or as mutually agreed to by the surveyor or engineer and the City Surveyor.
- F. The Basis of Bearings of the Parcel Map shall be the California Coordinate System (NAD 83), 1992 Adjustment or current adjustment as directed by the City Surveyor as established by the use of existing monuments, Global Positioning System surveys (GPS), or by astronomic observation.
- G. If the boundary of the Parcel Map being submitted is a parcel or lot of a map already tied to the California Coordinate System, NAD 83, 1992 Adjustment or current adjustment as directed by the City Surveyor, the requirements in Paragraph E (above) shall be waived.

9.03 SPECIFICATIONS FOR SURVEYS ON THE CALIFORNIA COORDINATE SYSTEM 1983 BASED ON THE NAD 83 DATUM

The following specifications apply to surveys on the California Coordinate System of 1983 based on the NAD 83 Datum.

- A. All points coincident with City Geodetic Control Points will have the exact published coordinate values in U.S. feet. If a survey is initiated prior to publication of a readjustment, the previously adjusted values will be accepted for a period of up to 90 days from the date of current publication.
- B. The whole number for the coordinate will be shown, i.e. no constants will be applied.
- C. One point on the external boundary will have a grid coordinate value. All other points on or internal to the boundary will have coordinates based on computations from the grid boundary point using ground distances. The boundary point assigned grid coordinate values should be on the major control line where applicable. The boundary point assigned a grid value will be annotated with the grid coordinates.
- D. A tie to the geodetic control network will be made to the boundary point showing the California Coordinate System Values. Additional ties as previously required will also be provided.
- E. A combination factor and coordinate system information, including the date of adjustment, will appear on the recorded map.
- F. The difference between computed tie distances and annotated tie distance multiplied by the combination factor will not exceed 0.02 feet.

9.04 VERTICAL DATUM

- A. The official vertical datum for the City of Modesto is the North American Vertical Datum of 1988 (NAVD 88).
- B. Elevations shown on plans shall be based upon the official City Datum, NAVD 88.

9.05 STREET MONUMENTS (see Street Design - Design Section 3.13)

9.06 BOUNDARY MONUMENTS

Boundary monuments shall be placed on the exterior boundary of the subdivision at the following locations:

- A. Changes in direction
- B. Beginning and end of curves
- C. Other points deemed necessary by the City Engineer.

Boundary monuments shall be placed in the same manner and of the same material as street monuments except that in unpaved areas the top shall be at least 1 foot below finished grade.

9.07 BLOCK CORNER MONUMENTS

Corner monuments shall be placed at all block corners and alley corners.

Block corner monuments shall be placed in the same manner and of the same material as street monuments except the top shall be at least 1 foot below the surface.

9.08 LOT CORNER MONUMENT

Lot corner monuments shall be placed in the same manner and of the same material as street monuments except that they may be 3/4 inch O.D. and, in unpaved areas, the top shall be at least 1 foot below the finished grade.

Lot corner monuments shall be located where required by the City Engineer. The basic criteria for the locations shall be as follows:

- A. Lots shall have a monument at each corner except as otherwise provided by this section.
- B. Lots that are crated with zero back or side yards may have lot corners under building foundations deleted except those corners that are Block or alley corners.
- C. Lots that are created as part of a townhouse condominium development where realty is to be owned in fee by the individual lot owner shall be monumented using a minimum of 4 monuments for each contiguous group of lots. Contiguous groups of lots containing more than 10 lots shall have additional monuments as required by the City Engineer. Monuments shall not be located under footing or structure.

- D. Condominium airspace developments where realty is not to be owned in fee by the individual lot owner shall have the exterior boundary monumented as required by Section 9.06 of these Standards.

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SECTION 10

DRIVEWAY ACCESS AND DESIGN

10.01 GENERAL

- A. The purpose of this design section is to insure standards are met to protect the public health, safety and welfare. The standards are meant to apply to new developments which are not constrained by already existing improvements or severe topography. To the extent deemed reasonably possible by the City Engineer, in-fill developments will be required to match these standards. The City Engineer may approve modifications of these standards only when necessary to allow private and public construction which is compatible with surrounding in-place improvements and conditions.
- B. For the purposes of this driveway design, the following definitions apply:
1. Auxiliary Lane - A separate right turn lane, left turn lane, deceleration lane or acceleration lane.
 2. Commercial Property - Property regardless of zoning district upon which any structure is either wholly or partially used for offices or the wholesale or retail sale of goods or services. In addition, for purposes of this design section, all properties other than residential, apartment or industrial shall be considered a commercial property.
 3. Continuous Deceleration Lane - A deceleration lane that serves two (2) or more driveways, public streets or combination thereof.
 4. Deceleration Lane - A lane, including tapered areas, in advance of a driveway or public street used to allow turning vehicles to exit the through traffic lane and slow before making the turn.
 5. Peak Hour - The one (1) hour period between 4:00 p.m. and 6:00 p.m. of a typical weekday with the highest volume of traffic on the roadway.
 6. Driveway - Any approach or access that connects private property to the public right-of-way but may be considered to extend onto private property when necessary to ensure safe operation of the driveway/street intersection.
 7. Driveway Throat Width - The shortest distance between the parallel edges of a driveway.

8. Drop approach driveway - Driveway approach requiring a curb return radius, no vertical lip, handicap ramps and concrete apron extending a minimum to the public right-of-way and a gradual slope to at least 15' back from curb line. See Standard Detail 1010.
 9. Flared driveway - Driveway access requiring the curb to depress to street level and 3' flared aprons transition the sidewalk into the driveway. Driveway ends at the property line or at back of sidewalk. See Standard Details 1011 & 1012.
 10. Industrial Property - Property, regardless of zoning district, upon which all the structure or structures is used for warehousing or manufacturing.
 11. Internal Driveway - A private road or access way on private property that connects buildings or abutting ground to the driveway.
 12. Major Street Facility - Any of the following: (1) freeway frontage road, (2) principal or minor arterial street, (3) major collector street.
 13. Median Type Driveway - A driveway having ingress and egress drives divided by a raised median of ten feet (10') width or less.
 14. Residential Property - Property that contains three (3) or less dwelling units.
 15. Shared Driveway - A driveway constructed on or near a common property line between two (2) or more properties and providing access to all such properties.
 16. Street Class - The functional classification of a street as defined in the Circulation Element of the General Plan or as defined by the City Engineer for those streets not shown in the General Plan.
- C. For commercial, industrial or apartment driveways on a major street facility, the City Engineer may require an applicant to submit a driveway volume and capacity analysis of the proposed driveway as part of the driveway permit application and review process. Traffic studies shall be submitted in accordance with the City's Traffic Study Procedures. This requirement may be waived if the City Engineer determines that the driveway has been adequately analyzed in a previous traffic study.
- D. A joint private access easement may be required between adjacent lots fronting on arterial and major collector streets in order to minimize the total number of access points along those streets and to facilitate traffic flow between lots. Lots with sufficient frontage to safely meet the design requirements of Section 10.03 shall be permitted their own driveways. The owner or developer of property required to use shared driveways shall be responsible for obtaining easements on adjacent property as necessary. The City may, but shall not be required to,

assist in the acquisition of offsite easements if the owner is unable to acquire them. With a request for assistance, the owner shall provide the evidence of a reasonable offer made to the adjacent property owner. Upon such a written request for assistance, the City may attempt to acquire these easements through negotiations. If the negotiations are unsuccessful, the request may be submitted to Council for consideration of acquisition through condemnation. In either case, the total cost of the acquisition and the cost of the easements shall be paid by the owner (developer). In the event the City elects not to acquire the property through condemnation, alternate driveway locations and designs in conformance with this standard shall be required.

- E. When an application for building permit or change in property use results in changes in the type of driveway operation, and the driveway is not in conformance with this standard, the reconstruction, relocation or conformance of the access to these standards may be required. The City Engineer may not require driveway revisions unless one or both of the following access change conditions has occurred:

1. The existing use of the driveway is projected in the opinion of the City Engineer using generally accepted transportation engineering standards to increase in actual or proposed daily vehicular volume on the driveway by twenty percent (20%) or more.
2. The change in the use of the property or modifications to the property restricts the flow of vehicles entering the property in a manner which is anticipated to disrupt normal traffic flow on the public street, thereby creating a hazard.

“Change in property use” may include but is not necessarily limited to: change in type of business; expansion in existing business; change in zoning; and subdivision which creates new parcels. It does not include modifications in advertising, landscaping, remodeling, general maintenance or aesthetics that do not affect internal or external traffic flow or safety.

- F. Driveways shall not be constructed at such locations or in such manner that water is diverted from the street onto private property, unless requested in writing and specifically approved in writing by the City Engineer. Likewise, the driveway may not be used as a drainage channel for the onsite runoff. Driveways located in areas utilizing rock wells will be scrutinized much closer due to the capacities and cost of City rockwells.

10.02 DESIGN STANDARDS

The values in Table 13.1 represent minimum and /or maximum standards to be applied in designing and locating driveways on streets in the City of Modesto. For each driveway, the City Engineer may require a specific combination of dimensions within these ranges based on the anticipated traffic flow and safety characteristics of the driveway and public street. New

subdivisions will use drive over curb. Flared driveways are required where some or all the following conditions exist: (1) on-street parking creates extra width to maneuver, (2) the street facility is residential, minor collector or major collector and (3) traffic volume over the driveway is less than one thousand (1,000) vehicles per day. Drop approaches are required where some or all the following conditions exist: (1) traffic conditions are at a level of service “D” or “E”, (2) the street facility is rated major or above and (3) traffic volume over the driveway is one thousand (1,000) or more vehicles per day.

10.03 DESIGN CRITERIA

A. All Driveway Types (Flared, Drop Approach, Drive-over curb)

1. The use of shared driveways shall require the dedication of a joint-use private access easement on each affected property and the filing of a private maintenance agreement with the City. Said dedication shall be provided on the final plat of the subject properties or be filed by separate instrument with Stanislaus County and the City. When the center of the easement is offset from the common lot line, the easement must extend past the lot line in a minimum distance of one foot (1'). The combined size of the access easement must be minimum of ten feet (10') wide and fifteen feet (15') deep for residential property , and a minimum of twenty-four feet (24') wide and forty-eight feet (48') deep (as measured from the right-of-way line) for all other land uses. As a minimum, the easement width shall encompass the entire width of the future planned driveway.
2. No portion of any driveway shall be located within four feet (4') of any fire hydrant, electrical pole or any other surface public utility. At the applicant's expense, applicant may have the surface utility moved if the public utility agency involved determines that the move will not detrimentally affect the service.

Table 10.1 Driveway Design Standards

Requirements	Street Class	Residential Driveway	Apartment-Commercial Driveway	Industrial Driveway
Driveway Throat Width ¹	Local Minor Collector Major Collector Arterial & Larger	10' - 28' 10' - 28' 12' - 28' 12' - 28'	24' - 36' 24' - 36' 24' - 36' 30' - 36'	24' - 45' 30' - 45' 35' - 45' 40' - 45'
Driveway Curb Radius (Drop Approach Type Only)	Local Minor Collector Major Collector Arterial & Larger	N/A ² N/A ² 10' - 15' 15'	N/A ² 15' - 20' 15' - 20' 20' - 30'	10' - 20' 15' - 20' 20' - 25' 20' - 30'
Minimum Centerline Driveway ³ Spacing Along Roadway	Local Minor Collector Major Collector Arterial & Larger	28' 28' 100' 100'	100' 150' 200' 250' ⁴	100' 150' 200' 250' ⁴
Driveway Angle ⁵	All	70° - 90°	90°	90°
Minimum Distance ⁶ From Driveway to Intersection Along:	Local Minor Collector Major Collector Arterial & Larger	30' 50' 150' ⁷ 300' ⁸	75' 150' 150' ⁷ 300' ⁸	75' 100' 150' ⁷ 300' ⁸
Maximum Approach Grade ⁹ (Drop Approach Only)	Local & Minor Col. All Others	+9% +6%	+6% +3%	+6% +3%
Minimum Distance to Property Line ¹⁰	All	2' ¹⁰	2'	2'
Minimum Approach Length ¹¹ (Drop Approach Only)	Local & Minor Col. All Others	6' 9'	9' 17'	9' 17'

NOTES:

1. The requirements for Driveway Throat is standard for undivided two-way operation and may be varied by the City Engineer if, in that person's discretion, traffic volumes, truck usage, shared driveways, and other factors warrant the variance. Not more than 50% of the frontage of any parcel shall be devoted to driveways. Lots fronting on a cul-de-sac are exempt from this requirement.
2. Driveways may only be flared or drive over curb in these areas.
3. The minimum distance between driveways serving the same parcel shall not be less than 20 feet as measured between the ends of the driveway flare or curb return.
4. Driveways on major collectors and larger served by deceleration lanes may be spaced at two hundred foot (200') minimum intervals.

5. Measured as intersection of the tangent centerline of driveway with the tangent portion of the public street curb line, extending a minimum of twenty feet (20') from the future curb line.
 6. Distance measured from the intersection as measured from the intersection ROW line to the driveway centerline (see Standard Details 1002, 1004 & 1005).
 7. If the driveway has to be located less than 150' from an intersection with a major street facility ROW line, the approach shall be placed at or near the farthest property line from the intersection and a one hundred and fifty foot (150') long raised median from the stop bar at the intersection shall be installed by the Developer at Developer's expense.
 8. If the driveway has to be located less than 300' from an intersection with a major street facility ROW line, the approach shall be placed at or near the farthest property line from the intersection and a three hundred foot (300') long raised median from the stop bar at the intersection shall be installed by the Developer at Developer's expense.
 9. The percent of slope measured along the centerline of the driveway from the flow line of the future curb line.
 10. The minimum distance over which the maximum approach grade must be maintained measured from the flow line of the present curb or a known future curb, as determined by the City Engineer, or his designee.
 11. Driveway locations for single family property shall not be permitted within 2 feet of a property line unless a property fronts on a cul-de-sac bulb in which case a driveway may be constructed up to the property line. Shared driveways or unusual situations may be approved by the City Engineer.
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3. The driveway curb return (drop approach type) at the point of tangency with the street curb or driveway flare (ramp approach type) shall not be located within (a) four feet (4') of the downstream edge, or eight feet (8') of the upstream edge of a straight curb inlet or inlet extension; nor (b) within ten feet (10') of a recessed inlet without prior written permission of the City Engineer.
4. All vehicle maneuvering on apartment, commercial and industrial properties into a parking space or up to a loading dock or into any other area shall be accomplished by off-street maneuvering areas and internal driveways. No back-in or back-out vehicle maneuvering from a driveway shall be allowed to occur on any public street or right-of-way with the exception of residential drives on local and minor collector streets.
5. Driveways may be prohibited where adequate sight distance is not available for the established speed limit or the design speed of a future street improvement, if higher. Sight distances shall be calculated in accordance with the latest edition of the State Standards for Geometric Highway Design. If an inspection by the City Engineer indicates that driveway sight distance may be insufficient, the applicant will be required to submit vertical and horizontal information to the City that verifies adequate sight distance is available for the proposed driveway location. The City Engineer may deny access or a specific driveway location to any abutting public street if said access cannot be provided in a reasonable and safe manner.

6. Temporary driveways shall only be permitted when a contractual agreement is executed between the property owner and the City. Said agreement shall require annual reviews of driveway use, and the City may require removal of driveway at no cost to the City. The City Engineer may require an escrow fee be provided to the City for a maximum ten (10) year period for the removal of the driveway and related expenses.
7. The City Engineer may authorize variance from the design criteria contained herein whenever the City Engineer determines such variances are necessary to preserve the safe and efficient movement of traffic.
8. Any abandoned driveway shall be completely removed and replaced with standard sidewalk, curb, and gutter.
9. Parking lot driveways shall be designed in such a manner as to preclude the use of the abutting public street for vehicular circulation solely related to the parking lot.
10. Roll over curb is the standard for new subdivision construction.

B. Drop Approach Driveways

1. When a drop-type driveway approach is required for an apartment, commercial or industrial property because of its connection to a major street facility, the driveway shall extend onto private property a minimum distance of fifteen feet (15') from the right-of-way line before intersecting any internal driveway.
2. For any drop approach type driveway, the point of radius return tangency with the street curb shall not extend beyond the property line (projected perpendicular to the street centerline), except as provided in shared driveway agreements and as approved by the City Engineer. See Section 3.17 for further detail.
3. Unless contained on the building permit site plan, a drop approach type driveway shall have a site plan showing all existing right-of-way, easements, curbs, storm drain inlets, flumes, underground and overhead utilities, trees and sidewalks shall be required for each non-residential driveway permit application. The proposed driveway grade profile shall also be shown for a minimum distance of fifteen feet (15') past the right-of-way line. All driveways and median openings within one hundred fifty feet (150') of the subject property on both sides of each abutting street shall be shown on the site plan. If an adjacent street contains a raised median, showing driveway(s) on the opposite side of the street shall not be required unless a median opening is present or proposed.

4. Handicap ramps not exceeding 12:1 slope shall be required on all driveway drop approaches.
5. Any driveway drop approach shall have an initial positive approach grade not to exceed the values shown in Table 13.1. The initial approach grade shall have a length equal to or greater than the appropriate minimum approach length value shown in Table 13.1, as measured from the present curb or any known future curb line, as determined by the City Engineer. The initial approach shall extend onto private property if necessary, but driveways shall not be constructed at locations or in such manner that water is diverted from the street onto private property. Any sidewalk affected by driveway approach construction shall be adequately transitioned with the driveway using a maximum eight percent (8%) grade.

C. Residential Standards

1. A circular residential driveway may be allowed on any street type provided that the minimum distance between driveways shall not be less than 50 feet as measured from the centerline of the driveways.
2. A residential driveway shared by two (2) or more properties shall have a minimum throat width of twelve feet (12'). A joint-use private access easement shall also be required.
3. Driveway access to a residential lot from any major street facility or minor collector shall not be permitted unless that lot has no other public access. If such a driveway is approved on a major street facility or a minor collector, an off-street maneuvering area approved by the City Engineer shall be provided to ensure that vehicles will not back into the public street. Driveway access to a residential lot from a minor collector street or major street facility may be denied if: (a) the lot has access to a local street and/or (b) the proposed access would create a traffic flow or safety problem.
4. Shared residential driveways may be required for adjoining residential lots on major street facilities to reduce the number of access points on those roadways.5. To provide adequate vehicle storage and maneuvering area, a minimum twenty foot (20') driveway space shall be required between the street right-of-way and all garages or other structures served by the driveway. For side-yard driveways to local streets, a fifteen-foot (15') driveway space will be allowed. A minimum twenty-four foot (24') maneuvering space shall be required for all rear-entry garages which may extend into an adjacent access easement or alley.

D. Auxiliary Lanes

1. The City Engineer may require the applicant to provide a deceleration lane for any driveway located on an arterial street if the right-turn ingress volume exceeds fifty (50) vehicles in the peak hour of the street. If the existing or future speed limit on the street facility exceeds 40 m.p.h., a deceleration lane may be required if forty (40) right-turn ingress vehicles occur in the peak hour. Such calculation shall be made by the City Engineer unless a traffic study is provided by the applicant. The design of such a deceleration lane shall conform to the dimensions shown in Standard Detail 1008, unless authorized by the City Engineer.
2. When a driveway is approved within the separate right-turn lane of a public street intersection, the lane shall be extended a minimum of fifty feet (50') in advance of the driveway. No driveway shall be permitted within the transition area of any separate right-turn or deceleration lane.
3. A continuous deceleration lane may be required as a condition of driveway permit when two (2) or more deceleration lanes are planned, and their proximity necessitates that they be combined for proper traffic flow and safety. The transition taper for a continuous deceleration lane shall not extend into or beyond a public street intersection.
4. On undivided arterial and collector roadways, a left-turn lane and taper may be required as a condition of the driveway permit when the projected product of the left-turn ingress volume (fifty (50) minimum) and the opposing volume per lane exceeds 25,000 in any peak hour. In such cases, the City Engineer will analyze the present and future traffic volumes to verify that the left-turn lane is necessary to maintain minimum levels of traffic flow and safety.
5. The City Engineer may require a temporary auxiliary lane to be constructed on existing arterial roadways that are planned for future improvement.
6. In the event an applicant chooses to locate a driveway that requires an auxiliary lane to extend wholly or partially across one (1) or more adjacent properties, the City Engineer may require the applicant to attempt to obtain any necessary right-of-way for such lane.
7. In the event the applicant is allowed to locate a driveway with deceleration lane within one hundred feet (100') of an arterial intersection, he/she may be required to extend the deceleration lane to such intersection. The one hundred feet (100') shall be measured from the center of the driveway to the intersection of the extended right-of-way lines of the arterial intersection.

8. The applicant shall be responsible for the design, right-of-way, adjustment of utilities and construction costs of any auxiliary lane and street widening required as a condition of the driveway permit.

E. Signalized Driveways

1. As a condition of a driveway permit on a major street facility, the City Engineer may require the applicant to submit driveway volume and capacity information when signalization is requested or expected at the driveway intersection. When signal warrants are met and an overall public benefit is shown, the City Engineer may require as a condition of the permit that the applicant pay for the traffic signal installation costs necessary to serve the subject driveway. The applicant may also be required to construct onsite and offsite improvements necessary to provide proper alignment, adequate signal capacity, smooth traffic flow and safety for the public street/driveway intersection.
2. If a driveway is installed at an existing or proposed signalized intersection, the applicant must provide a traffic signal access easement (minimum twenty feet (20') wide by sixty feet (60') deep must be provided to allow the City to install and/or maintain the signal detectors placed in the driveway.
3. If a driveway is permitted and installed at an existing signalized intersection, the applicant shall pay any costs necessary to modify the existing signal and intersection to accommodate the new driveway.

F. Special Driveway Designs

1. The Director may require internal driveway improvements, turning movement prohibitions, auxiliary lanes and traffic control devices to address safety and/or capacity problems within the property which will have a detrimental effect on the adjacent public street system.
2. All driveways on undivided arterial roadways having a projected exiting left-turn volume that will operate at a level of service E or worse may be required to be constructed with a left-turn egress control median. Likewise, any driveway having a projected ingress left-turn volume that will have a level of service E or worse may be required to have a left-turn ingress control median. If both conditions exist, a right-in/right-out driveway design may be required by the City Engineer.
3. Driveways having a projected design volume of five thousand (5,000) or more vehicles per day shall have a minimum of one hundred foot (100') continuous approach length without adjacent parking stalls or vehicular cross flow.

SECTION 11

GRADING DESIGN STANDARDS

11.01 GENERAL

All grading shall be designed in accordance with the soils report and Chapter 70 of the latest Uniform Building Code.

11.02 SOILS REPORT

A comprehensive soils report shall be prepared for each project in the City. The report must be prepared by a licensed Geotechnical experienced in soil work or Geotechnical Engineer. It shall include R-values (if greater than 5) taken at the site with a map showing the locations and depths of the test samples. Additionally, it shall include ground water elevations, stripping and grading recommendations, determination if expansive soil is present, etc.

11.03 GRADING AT PROPERTY LINES

- A. The property line of any proposed or existing site or parcel located within the grading project shall be setback a minimum 1.5' from the top of the slope.
- B. Excavation and fill slopes shall be set back a minimum of two feet from the project boundary line except as provided below.
- C. Pad excavations may cross a phasing line of a project as long as a method has been provided to allow construction on the newly created parcel which will protect the rights of any future owners of either phase of the project. The pad extension shall extend a minimum two (2) feet across the phasing boundary line of the project.
- D. Cut or fill slopes may be allowed on adjacent existing parcels with a recorded slope easement from the current owners of the existing parcel.
- E. A twelve inch (12") maximum wood wall (2" x 12" rowd) may be installed along project boundaries to preclude grading on adjacent property.
- F. Walls higher than twelve inches (12") shall be masonry or reinforced concrete. Calculations shall be provided with submittal of improvement plans or the design engineer may refer to Modesto City Standard Details #338 & 339.

11.04 LOT GRADING

- A. Lots shall be graded or swaled to slope a minimum of 1% toward a public street from the low point in the rear of the lot to the back of fronting sidewalks or top of curb grades. Pad elevations for buildings shall be at least 0.1' above the high point as determined above. Alternative lot grading may be approved by the City Engineer if special conditions exist as long as disposal of all site drainage can be provided in a safe manner.

SECTION 14

DEMOLITION AND ABANDONMENT PLAN

14.01 GENERAL

A Demolition and Abandonment plan shall be prepared when the development site has existing improvements upon it. The City's primary purpose for preparing this plan is to identify those sites which may have wells, septic tanks, retention basins, etc. that require special treatments for abandonment or significant costs to prepare the site for construction.

14.02 CONTENT

The plan, when required, shall show all houses or other structures wells, existing trees, septic tanks, septic tank leach fields, pipelines, storm drain retention or detention basins, street trees, irrigation facilities, utilities, streets or roads, bridges or other concrete structures that currently exist at the site of the planned development. The Consulting Engineer is encouraged to contact the City staff as early as possible during the design process to determine if this plan is required, what scale will be acceptable and which existing improvements are required to be shown.

14.03 SCALE

The drawings shall be prepared at a scale sufficient to clearly show all existing improvements, as described above.

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SECTION 15

ENGINEER'S ESTIMATE FOR BONDING

15.01 GENERAL

An Engineer's Estimate shall be prepared to allow bonding all improvements to be constructed in the subdivision and to establish City fees. Bonds and/or equivalent securities shall be provided to the City by the developer prior to the recording of any Final Map.

15.02 COSTS (Recommended but not required)

- A. The City has established minimum unit costs for the most common items constructed. Copies are available from the City Engineer and are periodically updated. In Appendix C of these Design Guidelines is a copy that should be verified to assure that it is the latest version.
- B. Unit costs have been used which reflect, as much as possible, the costs the City may incur in constructing the improvements. It is not the intent to estimate the costs private developers may incur.
- C. A ten percent (10%) contingency fee shall be included to protect the City from inflation of costs and unforeseen conditions.

15.03 FORM

The Engineer's Estimate shall be in the form of a table listing items, units used, unit costs, quantity of each item and the total cost of the improvement. See example in Appendix C.

15.04 GRADING

Estimates for grading shall indicate cubic yards to be moved onsite and cubic yards of import or export required, if any. Grading of temporary drainage basins shall be shown as a separate item. Estimates for grading shall include the costs of any grading performed under a grading permit.

15.05 CONSTRUCTION OF EXISTING STREETS

When new facilities are to be installed in existing streets, unit prices for underground improvements shall be increased. To simplify the estimation of these costs the City will require a fifty percent (50%) increase in unit prices.

15.06 GROUNDWATER

If the soil report or other historical evidence or records indicates that groundwater will be encountered during construction, unit costs for all pipelines installed within 2 feet of the groundwater shall be increased by \$10 per lineal foot.

SECTION 16

WALL DESIGN STANDARDS

16.01 GENERAL

Walls shall be designed by a licensed Civil or Structural Engineer in accordance with accepted engineering principles and shall conform to these Design Standards.

The design code to be utilized to design walls within the City of Modesto shall be the currently adopted version of the Uniform Building Code, except as modified in Section 9.02 of these standards. Specific design parameters and references are listed for the designer's convenience in Section 9.02 of these standards.

16.02 DESIGN STANDARDS

A. Wind Load

For walls less than twelve (12) feet in height, ten (10) pounds per square foot of exposed face shall be used. When the wall is twelve (12) feet high or higher, fifteen (15) pounds per square foot of exposed face shall be used.

B. Seismic Load

A load equal to 0.2 times the dead load shall be used for fences over six (6) feet in height.

C. Earth Loads

In the absence of a soils report giving site-specific data, a minimum active pressure of forty (40) pounds per cubic foot and a maximum passive pressure of one-hundred (100) pounds per cubic foot shall be used.

D. Pier Depth

Pier depth shall be calculated per Section 2906 of the UBC.

E. Cover for Reinforcing

The minimum allowable cover for structural steel reinforcement shall be a minimum of one-and-one half (1.5) inches.

F. Minimum Reinforcement (Temperature)

For temperature refer to Section 2607 of the UBC.

16.03 FINISH TREATMENTS

Finish treatments shall be as specified by the City.

16.04 COLOR

All color shall be integral to the wall. Painted walls shall not be allowed.

16.05 PANEL SUPPORTS

- A. For clarity in this section of these Design Standards, piers are defined as those portions of the panel support, especially for pre-cast walls, which are below ground and carry the weight of the panels vertically. Posts are defined for this section as those above ground portions of the panel supports that serve chiefly to provide horizontal stability.
- B. When piers and posts are separate members connected by a method requiring plate connections, all support shall be continuous. No shimming shall be allowed.
- C. Piers shall be designed to a size to provide sufficient support to prevent crushing, cracking and deformation of the panels being supported.

16.06 INSPECTIONS

The City may require coring of prefabricated wall sections to assure conformance with these Standards. Walls found in nonconformance will be required to be removed and replaced with conforming walls at the developer's expense. The City Engineer may require inspections at the fabrication facility to assure compliance. The City will require reimbursement by the developer for these expenses.

16.07 WALL CAPS

Where specified by the City, walls shall be provided with rolled caps to prevent moisture penetration to walls.

16.08 LOCATION

In areas where a community facilities district (CFD) is established to pay for annual maintenance of landscaping in front of the wall, the wall shall be located within the public

right-of-way and become a part of the CFD. If there is no CFD mechanism to pay for the cost of repair, the wall shall be located 6" behind ROW on private property. Hence, the owner of the property is responsible for maintenance.

A standard detail shall be provided on the wall drawings indicating the placement of the wall in relationship to the property line and public ROW. This detail will also be shown in the improvement plans.

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APPENDIX B

CONSTRUCTION NOTES

The following notes shall be placed on all plan cover sheets by the Engineer (may be placed on Sheet 2 instead of Cover Sheet).

1.01 GENERAL

1. All material and work shall conform to City of Modesto Specifications and Plans. The improvements are subject to the inspection and approval of the Public Works Department. Contact Public Works Construction Administration Office at 577-5452 two working days (48 hours) prior to the start of any work to arrange for inspection.
2. Prior to excavating near any underground utilities, call U.S.A. at least forty-eight (48) hours in advance at phone (800) 642-2444.
3. These plans have been checked by the City of Modesto and/or its authorized representative, but such checking and/or approval does not relieve the developer from his/her responsibility to correct errors, omissions or make changes required by conditions discovered in the field during the course of construction.
4. Refer to the Final Map of this tract for property line data.
5. Contractor shall control dust at all times during construction as required by the City of Modesto.
6. Relocation of designed utility systems more than 25' must be reviewed by the Public Works Department prior to construction and shall be accurately shown on revised plans stamped and signed by City staff prior to the installation of the improvements.
7. All construction staking for curb, gutter, and sidewalk, sanitary sewers, storm drains, water lines, fire hydrants, electroliers, etc. shall be done under the direction of a registered civil engineer or licensed land surveyor.
8. All existing utilities may **not** be shown. The contractor shall take precautionary measures to protect these utilities. The contractor shall do no excavation until all utility agencies and the City of Modesto have been notified and have been given the opportunity to mark their facilities in the field.
9. House services, fire hydrant laterals, gas and telephone lines, and all other underground utilities shall be installed prior to curb, gutter, and sidewalk construction and street paving.

10. All lines abandoned during construction shall be removed.
11. Testing:
 - a) All independent laboratory inspection called for by the City Engineer will be paid for by the developer or contractor.
 - b) Tests for R-values are required prior to the installation of base rock.
12. Street striping shall include stop bars, centerline striping or markers, crosswalks and all other markings required by the City Engineer. Striping shall be done with thermoplastic and reflective markers.
13. All trenches shall be backfilled in accordance with City standards.
14. When widening the pavement on an existing road, the existing pavement shall be cut to a neat line and removed back to an existing adequate structural section, or to the original road section. An exploratory trench, or pot-holing, may be required to determine the limits of pavement removal.
15. Existing curb and sidewalk within the project limits that are damaged or displaced, even though they were not to be removed, shall be repaired or replaced per City Standard Details even if damage or displacement occurred prior to any work performed by the contractor.
16. Asbestos Cement Pipe (ACP) or fittings shall not be used within the City of Modesto.
17. Prior to trenching for any sewer, water, or storm drain pipe, the contractor shall verify, in the field, the size and location of the existing pipe at the point of connection. Any deviation from the plans shall be resolved by the design engineer prior to trenching.
18. Manholes, valves, cleanouts, etc. shall be brought to finish grade by the underground contractor after the final paving course is placed.
19. For pipes greater than 24", 60" inside diameter, manholes shall be used.

1.02 WATER

1. All water lines shall be pressure-tested, disinfected, flushed, and tested for bacteria in conformance with the City of Modesto specifications prior to final acceptance by the City.
2. All water services shall be 1" minimum installed per City Standards. Water service shall be connected to water mains with two-strap bronze saddles. City shall make all taps on existing water mains only. 1" water service shall include a Brooks 1017 or Christy #B12 box.

3. All valves, tees and crosses to be flanged to their respective fittings. Water valves to be resilient seat only.
4. Water mains at the end of future streets shall have two half-lengths of pipe between gate valve and blow-off. Deflection of water lines shall not exceed 80% of manufacturer's specifications.
5. Water mains shall be as per city standards and fire hydrants shall be Jones J-4040, Long Beach 425, Clow 850, Mueller A-481 or approved equal and shall conform to the latest AWWA Specifications, C-503, for wet-barrel fire hydrants. All hydrants shall be painted with "Caterpillar Yellow" Polyurethane high duty industrial enamel.
6. All valve stems must be brought to a minimum of four feet (4') below finish grade with stem extension units.
7. Thrust blocks shall be provided at all required locations on water line in accordance with the City of Modesto Specifications and Details.

1.03 STORM DRAIN

1. Storm drain pipe sizes shall not be changed without the approval of the City Engineer.
2. Storm drain pipe alternatives:
 - a) Reinforced concrete pipe class III (unless otherwise noted).
 - b) Cast-in-place concrete pipe, City of Modesto Standard (36" or larger).
3. Catch basins to be constructed per City Standard Details.
4. For all construction projects, Contractor shall file a Notice of Intention (NOI) to the State Water Quality Board. This is part of the NPDES permit process. Contractor shall also be in compliance with Chapter 10 of Title V of the Modesto Municipal Code. The Contractor may file for a notice of exemption with the State Water Quality Board.
5. All construction site activities shall conform to the State Water Resources Control Board, National Pollution Discharge Elimination System (NPDES), Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Construction Activity.

1.04 SANITARY SEWER

1. Sanitary sewer pipe shall be V.C.P. extra strength (ASTM C-700).
2. All sanitary sewer mains shall be television inspected, flushed with an approved sewer ball and pass a leakage test in conformance with City of Modesto Standard Specifications prior to acceptance by the City. All testing shall be performed after the compaction for street base rock and prior to paving.
3. One 4" V.C.P. sanitary sewer lateral shall be installed to each lot at location shown on the plan. A cleanout shall be placed at right-of-way line per standard plan #509. Cover on lateral at property line to be 3' minimum to 5' maximum except as noted on plans.

APPENDIX C

BONDING

1.01 GENERAL

Developers required to bond improvements within the City will be screened utilizing the proceeding cost schedule wherever possible. This schedule will be updated every few years based on numerous bids.

The bond estimate shall contain the following information: Name of development, Developer(s) Company, Today's date, Preparer's Company, address and phone number. The example below shows all the pertinent information.

#6000
pg 1 of 1
Aug 3, 1995

**Bond Estimate
Valley Oak Subdivision
by Reicher Development**

Prepared by: XYZ Engineers
2300 McHenry Ave
Modesto, CA 98768
Ph. (209) 578-1111

A. GRADING AND STREET WORK

Item	Quantity	Unit	Description	Unit Price	Total
1	23,000	CY	Excavation	3.00	69,000
2	5,500	CY	Import Fill (incl. spreading)	6.00	33,000
3	72	EA	Lot Grading	180.00	12,960
4	105,000	SF	Subgrade	0.20	21,000
			TOTAL GRADING AND STREET WORK		\$135,960

B. CONCRETE

Item	Quantity	Unit	Description	Unit Price	Total
1	4,520	LF	Curb and gutter	8.00	36,160
2	18,200	SF	Sidewalks	1.90	34,580
3	8	EA	Catch Basin	1450.00	11,600
			TOTAL GRADING AND STREET WORK		\$82,340

Contingency 10%

1.02 **BOND ESTIMATE COSTS**

A. EARTHWORK & PAVING

	<u>DESCRIPTION</u>	<u>UNIT COST</u>
1.	Disc site	\$120/acre
2.	Clear, grub & mobilization	If total costs \$100K to \$200K then 15% If total costs \$200K to \$600K then 8% If total costs exceed \$600K then 4%
3.	Roadway excavation	0 to 5000 cy - \$3.50/cy 5000 cy and above - \$2.30/cy
4.	General excavation	0 to 5000 cy - \$2.50/cy
5.	Subgrade (paving)	\$0.20/sf
6.	Subgrade (concrete)	\$0.30/sf
7.	Import (incl. spread)	\$6.00/cy
8.	Export	\$3.00/cy
9.	Lot Grading	\$200/lot
10.	Grade landscape	0 to 20,000sf - \$0.30/sf 20K & up - \$0.10/sf
11.	Channel Excavation	\$10/cy (incl. trimming banks)
12.	Engineer Rock	\$55/cy
13.	Cobbles	\$50/cy or \$3.50/sf
14.	Grouted Cobbles	\$65/cy or \$4.50/sf
15.	Bridge/structure excavation	\$35/cy
16.	3/4" AB or ASB	\$13/tn or \$.08 per inch/sf
17.	1/2" AC	\$35/tn or \$.22 per inch/sf

A. EARTHWORK & PAVING (continued)

	<u>DESCRIPTION</u>	<u>UNIT COST</u>
18.	Prime Coat	\$450/tn or \$1.30/gal or \$.03/sf ((?sf x .25)/(240x9))=? tn
19.	Seal coat (park top or =)	\$0.12/sf
20.	Crushed Rock	\$16/tn or \$32/cy
21.	Geotextile Fabric (subgrade)	\$.08/sf
22.	Petromat (overlays)	\$.95/sy
23.	AC Overlay (1.5")	\$.45/sf (w/Tack Coat)
24.	12" Lime Treated Base	\$.70/sf (thru final trim)

B. CONCRETE WORK

	<u>DESCRIPTION</u>	<u>UNIT COST</u>
1.	Vertical Curb	\$12/lf
2.	Curb & Gutter	\$9/lf
3.	Extruded Curb (6" epoxied)	\$6/lf
4.	Monolithic C, G & SW	\$12/lf
5.	Sidewalk	\$2/sf
6.	Structural Concrete (Exclude exc & backfill)	1 to 50 cy - \$800/cy 50 cy & above - \$300/cy
7.	Rockwell	\$3200/ea
8.	Catch Basin	\$1200/ea
9.	Junction Box	\$1400/ea
10.	Concrete Flatwork	6" conc/4" AB - \$6/sf
11.	Bomanite	\$7/sf
12.	Paving Stones	\$5/sf
13.	Concrete Cap (on utilities)	\$5/lf
14.	Seeded Concrete Flatwork	Add \$.70/sf to unit cost
15.	Colored Concrete	Add \$.50/sf to unit cost
16.	Concrete Lining (Guniting)	\$3/sf
17.	Concrete Lining (w/mesh)	\$3.50/sf
18.	Rebar in Lining	\$0.75/lb
19.	Valley Gutter	\$15/lf

C. WATER SYSTEM

	<u>DESCRIPTION</u>	<u>UNIT COST</u>
1.	4" Water Main	\$14/lf
2.	6" Water Main	\$16/lf
3.	8" Water Main	\$20/lf
4.	10" Water Main	\$25/lf
5.	12" Water Main	\$30/lf
6.	15" Water Main	\$40/lf
7.	18" Water Main	\$50/lf
8.	24" Water Main	\$60/lf
9.	4" Gate Valve	\$350/ea
10.	6" Gate Valve	\$450/ea
11.	8" Gate Valve	\$550/ea
12.	10" Gate Valve	\$750/ea
13.	12" B.V.	\$900/ea
14.	15" B.V.	\$2,100/ea
15.	18" B.V.	\$3,000/ea
16.	24" B.V.	\$5,000/ea
17.	Air Release Valve (ARV)	\$500/ea
18.	Blowoff Valve	\$500/ea
19.	1 1/2" Irrigation Service	\$350/ea
20.	Residential Water Service	\$300/ea
21.	2 1/2" dia PVC & smaller	\$12/lf
22.	Water Quality Sampler	\$2000/ea
23.	Bore & Jack	\$10/lf per diameter inch
24.	Fire Hydrant	\$1800/ea

D. SEWER SYSTEM

	<u>DESCRIPTION</u>	<u>UNIT COST</u>
1.	4" SS	\$16/lf
2.	6" SS	\$20/lf
3.	8" SS	\$25/lf
4.	10" SS	\$32/lf
5.	12" SS	\$38/lf
6.	15" SS	\$45/lf
7.	18" SS	\$70/lf
8.	21" SS	\$105/lf
9.	24" SS	\$110/lf

D. SEWER SYSTEM (continued)

	<u>DESCRIPTION</u>	<u>UNIT COST</u>
10.	SS Lateral	\$450/ea
11.	Cleanout in street	\$450/ea
12.	48" SSMH	\$1500/ea
13.	60" SSMH	\$2400/ea
14.	Street Tie In	\$3000/ea
15.	Adjust Manhole to Grade	\$350/ea
16.	Bore & Jack	\$10/lf per dia inch

E. STORM DRAIN SYSTEM

	<u>DESCRIPTION</u>	<u>UNIT COST</u>
1.	4"& 6" Perforated Drain System	\$24/lf
2.	10" CP	\$18/lf
3.	12" R.C.P.	\$20/lf
4.	15" R.C.P.	\$22/lf
5.	18" R.C.P.	\$24/lf
6.	21" R.C.P.	\$26/lf
7.	24" R.C.P.	\$28/lf
8.	30" R.C.P.	\$45/lf
9.	36" R.C.P.	\$65/lf
10.	36" CIPP	\$40/lf
11.	36" RG R.C.P. (Cent Spun)	\$70/lf
12.	48" R.C.P.	\$85/lf
13.	48" CIPP	\$55/lf
14.	48" RG R.C.P. (Cent Spun)	\$90/lf
15.	54" R.C.P.	\$100/lf
16.	54" CIPP	\$65/lf
17.	54" RG R.C.P. (Cent Spun)	\$105/lf
18.	60" R.C.P.	\$125/lf
19.	60" CIPP	\$75/lf
20.	60" RG R.C.P. (cent Spun)	\$130/lf
21.	72" R.C.P.	\$180/f
22.	72" CIPP	\$95/lf
23.	72" RG R.C.P. (Cent Spun)	\$185/lf
24.	84" R.C.P.	\$230/lf
25.	84" CIPP	\$130/lf
26.	96" R.C.P.	\$300/lf
27.	96" CIPP	\$160/lf

E. STORM DRAIN SYSTEM (continued)

	<u>DESCRIPTION</u>	<u>UNIT COST</u>
28.	48" Manhole	\$1,300/ea
29.	60" Manhole	\$1,700/ea
30.	Rip Rap/Engr Rock	\$55/cy
31.	12" to 18" Corrugated Pipe Stub	\$30/lf
32.	12" to 18" FES (Corrugated)	\$300/ea
33.	Bore & Jack	\$10 per dia inch per lf

F. ELECTRICAL

	<u>DESCRIPTION</u>	<u>UNIT COST</u>
1.	Conduit and cable/trench	\$18/lf
2.	70W Electrolier	\$1,600/ea
3.	100W Electrolier	\$1,800/ea
4.	200W Electrolier	\$2,000/ea
5.	Pull Box	\$170/ea
6.	Traffic Signal New Rd. w/o Turn Lt	\$70,000/ea
7.	w/ Turn Lt	\$85,000/ea
8.	Joint Trench	\$15/lf

G. MISCELLANEOUS

	<u>DESCRIPTION</u>	<u>UNIT COST</u>
1.	AC Patching	\$6/sf
2.	Conc. Patching (SW gaps)	\$400/ea
3.	Hydroseeding	\$0.03/sf
4.	Landscape	\$3.00/sf
5.	Street Sign w/stop sign attached	\$300/ea
6.	Signs	\$170/ea
7.	FH Markers	\$12/ea
8.	Striping (not thermoplastic)	\$1.50/lf
9.	Monuments	\$150/ea
10.	Barricades	\$40/lf
11.	6' Chain Link Fence	\$12/lf
12.	3 Strand Barbed Wire Fence	\$6/lf
13.	6' Masonry Sound Wall	\$45/lf
14.	Chain Link Gates	\$45/lf

APPENDIX D

REVIEW CHECK LIST

DEVELOPMENT OR SUBDIVISION NAME _____

Engineering Firm _____

Contact Person _____

Telephone Number _____

Assessors's Parcel No. _____

Tentative Map Expiration Date _____

() First Check () Recheck # _____

- ___ Sets of Plans
- ___ Sets of Hydrology Map and Calcs
- ___ Copies of Engineer's Estimate
- ___ Copies of Soil Report
- ___ Sets of Sewer Map and Calcs
- ___ Copies of Tentative Map
- ___ Copies of Final Conditions of Approval (Resolutions)
- ___ Sets of Final Map Package (S 2.03 D)

1.01 GENERAL

- ___ 1. Plans follow standard detail 202.
- ___ 2. North arrow and scale on each sheet. North up and/or left or right.
- ___ 3. Titles and numbers on all sheets and match index.
- ___ 4. Conformance to Tentative Map and Conditions of Approval, especially street and R/W Widths, grading, drainage, sewerage, water lines, number and size of lots, etc.

1.02 TITLE SHEET

- ___ 1. Name of Tract or project.
- ___ 2. Tract Number.

- ___ 3. Vicinity Map with north arrow (north up and/or left or right).
- ___ 4. Sheet Index.
- ___ 5. City Engineer's Signature Block.
- ___ 6. Consultant Signature Block.
- ___ 7. General Notes per Appendix "B" of the Design Standards (may be on sheet 2).
- ___ 8. Resolution No. approving project.

1.03 SHEET ONE (TITLE SHEET AND/OR SHEET TWO, IF REQUIRED)

- ___ 1. Map showing all streets, utilities, structures, etc. and show improvement plan sheet layout.
- ___ 2. Drafting symbol legend.
- ___ 3. Street sections shown.
- ___ 4. Structural sections shown and agree with City Std Detail No. 301 (TI, R-value, AB, AC)
- ___ 5. Curb shown.
- ___ 6. Right-of-way and street widths shown.
- ___ 7. Cross-slope shown - note relative difference of and T/C.
- ___ 8. Sidewalk shown.
- ___ 9. Pedestrian paths shown.
- ___ 10. Drainage ways shown.
- ___ 11. Temporary and permanent bench marks and descriptions.
- ___ 12. List of Abbreviations.

1.04 DEMOLITION AND ABANDONMENT PLAN (If required)

- ___ 1. Show existing buildings and structures.
- ___ 2. Existing septic tanks and leach fields shown.
- ___ 3. Existing wells shown.

1.05 GRADING PLANS

- ___ 1. Existing elevations or contours shown (may be separate sheet).
- ___ 2. Proposed lot grades.
- ___ 3. TC elevations at property line extensions.
- ___ 4. TC at grade breaks and curb returns shown.
- ___ 5. TC at storm drain inlets shown.
- ___ 6. Street slopes at centerline shown. (0.2 % minimum)

- ___ 7. Lot numbers shown.
- ___ 9. Retaining walls and sound walls shown.
- ___ 10. Plan view of typical lot drainage. Minimum swale slope of lots 1%.
- ___ 11. Section of typical lot to show property line/slope relations.
- ___ 12. Show grading required for off-site drainage.
- ___ 13. Grading shown between back-of-curb or sidewalk and original ground at right-of-way line.
- ___ 14. Grading conforms to adjacent properties shown correctly and no adverse effect on future development.
- ___ 15. Check on drainage across lot lines and lots to drain to streets.
- ___ 16. Maximum slopes 2:1 or per Soils Report.
- ___ 17. All pads above high water if storm drains plug. (Surface flows)
- ___ 18. Elevations at rear of lots shown.

1.06 UTILITY PLANS (1 or 2 sheets)

- ___ 1. Station number on sanitary sewer laterals (in cul-de-sacs - dimension off lot lines at ROW).
- ___ 2. Water service dimensioned off sanitary sewer or standard detail describing offset.
- ___ 3. Water, sewer and storm drain mains with line size and direction of flow indicated.
- ___ 4. Appurtenances (Fire hydrants, manholes, blow-offs, air release valves, catch basins, street lights, irrigation sleeves, MID irrigation lines).
- ___ 5. Gate valves.
- ___ 6. Off-site utility work (may be a different scale).
- ___ 7. Scale 1" = 40' up to 1" = 100', north arrow.
- ___ 8. Irrigation service points for landscaping in the public right-of-way.
- ___ 9. Street names.
- ___ 10. Boundaries of subdivision.

1.07 STREETS (Plan & Profile)

A. Plan Views

- ___ 1. Wheelchair ramps shown per Standard Details.
- ___ 2. Radius of curvature, central angle, and length shown on all street curves.
- ___ 3. Curb curve data given; central angle, length, and radius (30' on residential streets and 50' on industrial streets).
- ___ 4. Scale 1" = 40'.

- ___ 5. Cul-de-sac radius per Standard Detail No. 311.
- ___ 6. R/W and street width dimensions shown.
- ___ 7. Centerline stationing at 100' and at BC and EC of curves.
- ___ 8. Lot/parcel lines and numbers/letters shown.
- ___ 9. Cul-de-sac cross slopes from high point to gutter lip minimum 2% and maximum 5%.
- ___ 10. Valley gutters (in-fill projects only) - show flow lines at center of street.
- ___ 11. Stationing on all drainage structures shown.
- ___ 12. T/C elevation given at all drain structures.
- ___ 13. Drainage easements shown and dimensioned.
- ___ 14. Location of underground pipes and utilities shown.
- ___ 15. Location of fire hydrants per Tentative Map.
- ___ 16. Street monuments shown.
- ___ 17. Pedestrian Paths shown. Basic grades shown.
- ___ 18. Street names shown.
- ___ 19. Stations and elevations street intersections shown.
- ___ 20. All notes and symbols standard and conforming to legend.
- ___ 21. All existing utility poles, manholes, valves, signs, mail, boxes, trees, etc. shown.
Indicate those to be removed, relocated or adjusted to grade.
- ___ 22. Continuations and cross streets properly referenced.
- ___ 23. Project limits and City limits shown.
- ___ 24. Standard knuckle used (Standard Detail No. 312).
- ___ 25. Barricades shown in proper locations.
- ___ 26. Handicap ramps shown.
- ___ 27. Driveway locations and widths shown. Minimum 2' from property line unless a shared driveway or cul-de-sac lot.

B. Profiles

- ___ 1. Vertical curves designed for proper speeds per Highway Design Manual.
- ___ 2. Minimum vertical curve lengths observed (50').
- ___ 3. Vertical scale 1" = 2' or 4'.
- ___ 4. Vertical curve, used for grade breaks greater than 1%.
- ___ 5. In cul-de-sacs, show profiles @ centerline from end of TC profile through the radius point to top of curb at end of cul-de-sac (dashed line).
- ___ 6. 2% maximum grade observed across intersections.
- ___ 7. 0.20% minimum grade observed on all streets at curb.

- ___ 8. 0.35' minimum fall around curb returns on all streets.
- ___ 9. All underground pipes and utilities shown; storm drain, water and sewers.
- ___ 10. Existing ground on centerline shown.
- ___ 11. Finished grade profile for top of curb shown.
- ___ 12. Centerline profiles of intersecting streets shown on to their point of intersection.
- ___ 13. Off-tract profile to catch point shown where road is constructed to subdivision boundary.
- ___ 14. Centerline stations and elevations shown @ all BVC, EVC, PIVC, grade breaks, low points and high points.
- ___ 15. All slopes in profile shown.
- ___ 16. Show all utility crossings with clearances indicated when closer than 15".
- ___ 17. Manhole and drop inlet invert and flowline elevations shown.

1.08 SANITARY SEWERS

- ___ 1. System in agreement with tentative map and master plan.
- ___ 2. Design conforms to City standards.
- ___ 3. Size of line shown.
- ___ 4. Adequate cover; 42" min. to finished grade - 2' min. to subgrade, Ductile Iron Pipe or engineered alternatives if shallower.
- ___ 5. Clearance with water main.
- ___ 6. Size, slope, length between structures, and type of pipe.
- ___ 7. Connection to existing facilities.
- ___ 8. Extension lines to subdivision boundary.
- ___ 9. Sewer line to be located per Standard Detail Nos. 804 & 805.
- ___ 10. Curves allowed within 80% of recommendations of pipe manufacturer. Show curve data or offsets if concentric with centerline.
- ___ 11. On all curves where short pipe lengths are used, indicate clearly on plans.
- ___ 12. Rim elevations on manhole shown.
- ___ 13. Stations given for manholes.
- ___ 14. Sizes of existing lines shown.
- ___ 15. Pipe types allowed - VCP only. (D.I.P. if cover requires it - PVC SDR35 in Village One -
- ___ 16. 400' maximum distance manhole to manhole.
- ___ 17. Minimum 2 fps velocity.
- ___ 18. .10' drop around corner through manhole.

- ___ 19. Bolted manhole covers for any off street manholes.
- ___ 20. In unimproved areas, manholes extended 1' above ground.
- ___ 21. Check sanitary calculations.
- ___ 22. Laterals shown in plan and 11' center to center from water services and 3' below water if crossing. (Follow health department diagram.)
- ___ 23. Special approval areas shall be noted in profile (less than minimum cover and clearances.)
- ___ 24. Cleanout on main where temporary phasing exists and run does not exceed 250' and 3 services. Manhole and stub when temporary stop exceeds 250' or more than 3 services are going to be installed.

1.09 DRAINAGE

A. Hydrology - Hydraulics

- ___ 1. Calculations per City Standards and based on 5-year storm with minimum velocity of 2 fps.
- ___ 2. Calculations shall include the following: HGL, FL EL, Q, A, S, V, freeboard at structures, structure losses, and tailwater assumptions (5 yr & 100 yr).
- ___ 3. Adequacy of in-tract and off-tract drainage system verified.
- ___ 4. All starting water surface calculations adequately verified.
- ___ 5. Drainage map showing street system, existing and proposed drainage system, slope arrows, tributary sub-areas, peak flow in all pipes (1" = 100' preferred).
- ___ 6. All pipe in tributary areas labeled to correspond with calculations.

B. Easements

- ___ 1. Off-tract drainage improvements (plan and profile) and accompanying easements shown. Off-tract offers of dedication for drainage easement submitted for review.
- ___ 2. Off-tract work to be done but no easement requirements. Right of entry submitted for review.
- ___ 3. Easement widths indicated.
- ___ 4. Easements across lots not permitted.

C. Structures

- ___ 1. Max. Diameter pipes through drainage structures observed.
Standard D.I. - 30"
Manhole Base - >30"

- ___ 2. 1.00' Minimum HGL to TC.
- ___ 3. Special structure calculations provided.

D. Pipe

- ___ 1. Size, slope, length between structures, type and class or thickness of pipe shown in profiles. (12" minimum).
- ___ 2. Reinforced concrete or cast in place pipe only (CIPP on 36" dia or larger).
- ___ 3. Trunk lines 1.25' behind top face of curb. Transition to enter catch basin in the center.
- ___ 4. Outlet protection provided.
- ___ 5. 3' minimum cover over pipe to finished grade unless special design and calcs submitted.
- ___ 6. Curve radii allowed to within 80% of pipe manufacturer's recommendations.
- ___ 7. All curve data at centerline of pipe shown unless concentric with street then offsets allowed.
- ___ 8. Elevations, slopes and distances all mathematically correct.
- ___ 9. Match hydraulic/hydrology calculations.

E. Channels

- ___ 1. Maximum velocity in earth channel verified by soils report.
- ___ 2. Channel side slopes as specified by soils report.
- ___ 3. Channel design per City of Modesto Specific Plan.

F. Temporary Storm Drain Retention Basins

- ___ 1. Runoff and volume calculations per City Design Guidelines.
- ___ 2. Groundwater level shown on basin section.
- ___ 3. Basin bottom 5' above water table unless statement from soils engineer indicates range of depths then 2' allowed.
- ___ 4. Outfall protection using rip-rap required.
- ___ 5. Chain link fence with slats around basin required.
- ___ 6. Ramp at 10% maximum required.
- ___ 7. Off-tract basins require an access road around the basin.
- ___ 8. Easements are required.

1.10 WATER LINES

- ___ 1. System in agreement with Tentative Map.
- ___ 2. Design conforms to City standards.
- ___ 3. Size - 8" min., except cul-de-sacs without hydrants where 6" is allowed.
- ___ 4. Valves.
- ___ 5. Hydrants - locations as shown on approved Tentative Map.
- ___ 6. Cover - 42" min. to finished grade.
- ___ 7. Proper separation from sewer lines & storm drain (10' min.).
- ___ 8. Location - per City Standard Detail No. 805.
- ___ 9. Lines kept in streets - easements discouraged.
- ___ 10. Crossings with sewer mains or laterals meet health standards (Standard Detail No.600).
- ___ 11. Length & size of pipe shown in profile (indicate all changes in class of pipe exceeding CL 150).
- ___ 12. Length shown as distance between crosses or tees.
- ___ 13. Invert elevations shown at grade breaks.
- ___ 14. Sizes of all existing lines shown.
- ___ 15. Top of curb at hydrant locations.
- ___ 16. Curves allowed to within 80% of pipe manufacturer's recommendations. Curve data shown unless concentric with street improvements where slowing offsets is acceptable.
- ___ 17. Air Valves and Blow-offs behind walks.
- ___ 18. Fire hydrants at back of cul-de-sacs for terminating water lines (in lieu of a blow-off).
- ___ 19. Connection to existing facilities.
- ___ 20. At points of future extension install temporary BLOWOFF with valve.
- ___ 21. Lines extended to tract boundaries and along frontage.
- ___ 22. House services shown in plan.
- ___ 23. Fire hydrants maximum spacing - 500' residential and 300' other. Hose lay lengths 250' residential and 150' other. Cul-de-sacs within 200' of radius point.

1.11 STREET LIGHTING

- ___ 1. Shown at 1" = 40', 50' or 100' plan scale.
- ___ 2. Cul-de-sacs, 100 watt at end of 100 foot deep or deeper.

- ___ 3. Residential streets - evenly spaced at 330 feet maximum. 100 watt on 25'-6" poles with 15 foot arms.
- ___ 4. Collector Streets - evenly spaced at 330 feet maximum. 150 watt on 28' - 6" poles with 15 foot arms.
- ___ 5. Arterial Streets - evenly spaced at 330 feet maximum. 200 watt on 28' - 6" poles with 15 foot arms.
- ___ 6. Wattage and pole heights indicated on plans.
- ___ 7. Point of connection (MID transformer)
- ___ 8. Conduit location.
- ___ 9. Striping and barricades.

1.12 LANDSCAPE & IRRIGATION

- ___ 1. Shown on 20-scale plan.
- ___ 2. Electrical connection point for Irrigation System.
- ___ 3. Water connection point for Irrigation System.
- ___ 4. Property/Right of Way lines and Planting Easements.
- ___ 5. Drainage.

1.13 ENGINEERS COST ESTIMATE

- ___ 1. Verify that unit costs compare with City Standard Costs.
- ___ 2. Verify quantities of all items.
- ___ 3. Review with plans to determine if there are missing items.
- ___ 4. 10% contingency required.
- ___ 5. Grading quantities shown - lump sum not acceptable.
- ___ 6. Driveways included as separate item.
- ___ 7. Sidewalk on square foot and not included in curb and gutter item.
- ___ 8. Increase costs of facilities installed in existing streets by 50%.
- ___ 9. Check groundwater depth. If pipes installed below water table, increase costs by \$10 per lineal foot.
- ___ 10. For each 20 electroliers, 1 extra is required.
- ___ 11. When resubmitted, verify that all changes in plans are reflected in the estimate.

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APPENDIX E

MINIMUM SUBMITTAL PACKAGE

- A. Improvement Plans with Supporting Calculations - 2 sets
- B. Storm Drain Package - 2 sets
- C. Engineers Estimate - 1 sets
- D. Final Map Package - 2 sets
- E. Approved Tentative Map - 1 maps
- F. Final Conditions of Approval - 1 sets
- G. Soils Report - 2 sets (if available - minimum requirement of R-value testing and pavement design recommendation with testing locations.)
- H. Sewer Design Calculations - 2 sets (if required-normally at tentative map).
- I. Copy of Notice of Intention (part of NPDES permitting process).

A detailed description of the items listed above is included in Section 2.03 of the City of Modesto, Engineering Design Standards.

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APPENDIX F

SANITARY SEWER DESIGN PROCEDURE

The following procedure is used in determining design Q's for City of Modesto projects. See Design Section 5 for further explanation. Calcs required if no master plan exists or master plan is being modified by the design submitted.

PROCEDURE:

1. A plan, preferably 1" - 100' scale, showing the proposed street system, tributary sub-areas, existing and future tributary areas outside the project limits, zoning, projected land use, and any features affecting the system design.
2. Determine and show the tributary sub-areas to the nearest 0.1 acre.
3. Considering all criteria (available slope, cover and design standards), establish pipe size and slope, then determine velocity and pipe capacity

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APPENDIX G

STORM DRAIN DESIGN EXAMPLE

The following procedure, based on the Rational Formula $Q = CIA$ in conjunction with the City of Modesto Design Standards, is used in determining design Q 's for City of Modesto project. See Design Section 4 for further explanation. Calcs required for all subdivisions.

PROCEDURE:

1. On a plan, preferably 1" - 100' scale, show proposed street system, existing and proposed drainage systems and delineate tributary sub-areas.
2. Assume initial time of concentration (T), roof to gutter runoff time, normally 20 minutes.
3. Calculate travel time (T) to the first inlet. Assume average velocity in curb and gutter to be 1.0 feet per second (at slope of .002).
4. The time of concentration (T) to the inlet is then the sum of the initial time of concentration and the travel time. $T_c = T_i + T_t$.
5. Determine " I ", rainfall intensity in inches per hour, for a time equal to the time of concentration (T_c) from the Rainfall Intensity Curve, Figure 4-2 of these Design Standards.
6. Determine " c ", coefficient of runoff using C values given in City of Modesto Design Standards, Design Section 4, Table 4.2.
7. Determine " A ", the area of the tributary sub-areas to the nearest 0.1 acres.
8. Compute $Q = CIA$, where Q equals the peak flow in cubic feet per second.
9. Considering all criteria (available slope, cover, hydraulic grade line, etc.), establish pipe size and slope, then determine pipe velocity and travel time (T) required to carry above Q to the next M.H. inlet of M.H. confluence. Use Manning's " n " equals 0.013 for all pipes.

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APPENDIX H
FIRE DEPARTMENT STANDARDS for PRIVATE STREETS
and DEVELOPMENTS

1.01 GENERAL

All commercial, industrial, multi-family and private residential properties shall comply with the following minimum standards. These standards have been developed in accordance with the currently adopted 1994 Uniform Fire Code, current department standards, current city standards and nationally recognized recommended standards.

1.02 AUTOMATIC FIRE PROTECTION

With the exception of one and two family dwellings (R3 occupancy) and private garages (U1 occupancy), any new building or structure with a floor area under one roof that exceeds five thousand (5,000) square feet shall be equipped with an approved automatic fire sprinkler system designed and installed in accordance with the current adopted edition of NFPA 13 (or 13R when applicable). MMC 3-1.102 originally adopted in 1982.

1.03 ACCESS TO SITE

Commercial, industrial, and institutional complexes shall have two access ways, one from each of two public streets, preferably from one North-South and one East-West street.

Multi-family housing complexes and private residential subdivisions with 25 or more dwelling units shall have two access ways from a single public street.

Multi-family housing complexes and private residential subdivisions with 24 or fewer dwelling units may have a single access from a single public street.

1.04 ACCESS TO BUILDINGS

Every building shall be located in such a manner that the farthest point of the building, from a public or private fire access road, does not exceed one hundred fifty (150) feet. This distance shall be measured around the outside perimeter of the building and shall take into consideration any natural or man-made barriers that may impede rescue and firefighting efforts.

This distance may be increased to 200 feet when an automatic fire sprinkler system is installed throughout a building or buildings.

1.05 ACCESS ROADWAYS

Access roads shall be designed, constructed and maintained to support the 30 ton (60,000 pound) imposed load of the fire apparatus. These roads shall have a smooth hard surface of asphalt or concrete to provide all-weather driving capability.

Engineered alternative surfaces that incorporate turf with pavers may be permitted on emergency-only access roads and shall be designed to support the same apparatus loads

An unobstructed vertical clearance of 13 feet 6 inches shall be maintained.

All curves and changes in direction shall afford a minimum inside turning radius of 25 feet and outside radius of 45 feet.

Dead-end roads that exceed 150 feet in length shall be constructed with approved turnarounds. See Standard Details #314 & 315.

Cul-de-sac streets shall be designed and installed in accordance with public street standards. See Standard Detail #311.

1.06 STREET WIDTHS

Parallel parking of vehicles is assumed when determining minimum widths.

Private one & two family residential and multi-family developments:

- 34 feet when parking is unrestricted
- 34 feet in cul-de-sacs and streets when parking is restricted to passenger vehicles only
- 28 feet when parking is restricted to one side only
- 20 feet when parking is prohibited on either side

Mobile homes parks (regulated by Title 25, CCR):

- 40 feet when parking is unrestricted
- 30 feet when parking is restricted to one side only
- 20 feet when parking is prohibited on either side

Commercial and Industrial developments:

- 40 feet when parking is unrestricted
- 30 feet when parking is restricted to one side
- 20 feet when parking is prohibited on either side

Upon approval of the chief, street width reduction may be considered when an automatic fire sprinkler system is installed throughout buildings or complexes. These reductions will be evaluated on a case-by-case basis and in no case shall the width be reduced to less than 20 feet.

Parking restrictions shall be posted in an approved manner.

1.07 FIRE LANE and FIRE HYDRANT MARKING

When parking is prohibited or restricted, approved signs or other approved notices shall be provided and maintained using one of the following methods:

Curb or road surface shall be painted bright red; the words "NO PARKING-FIRE LANE" shall be painted in white letters, 6 inches in height with a 1 inch stroke or

A sign shall be posted immediately adjacent to, and visible from, the designated place with the words "NO PARKING-FIRE LANE"; the letters shall be 3 inches in height with a 1/2 inch stroke. Signs shall be posted not less than four (4) feet and no more than eight (8) feet above finish grade. See Standard Detail #715.

Spacing for signage or curb marking shall be every 25 feet or as necessary to properly identify the designated area. A combination of red striping and signage may be used.

1.08 ELECTRONICALLY CONTROLLED VEHICLE ACCESS GATES

Plans shall be submitted to and approved by Fire Marshal prior to installation.

Plans shall be submitted to and approved by the Development Services Department to insure pedestrian and vehicular safety and compliance with established fence setback standards.

A building permit is required for ANY electrical installation, and for structural consideration if gates or fence exceeds 6 feet in height.

Recommended gate setback from property line is 35 feet but this distance may be modified when approved by both the Fire Marshal and Development Services Manager.

Entrance/exits 1) with one-way, physically divided, traffic lanes shall provide 15 feet of driving surface, 2) with undivided two-way traffic lanes shall provide 20 feet of driving surface. Additional width will be required for parking or turnout areas.

Gates serving the one-way traffic lanes shall be capable of opening to a clear and unobstructed width of 12 feet; gates serving the two-way traffic lanes shall be capable of opening to a clear and unobstructed width of 16 feet.

Required gates shall be equipped with a Modesto Fire Department accessible, electrically operated KNOX key switch.

Required gates shall also be operable by remote telephone access. The telephone number which activates the gate shall be provided to the Fire Department for entry into the emergency dispatch file.

Other forms of remote gate activation will be considered and may be approved on a case-by-case basis.

All electrically operated controls shall unlock upon power failure.

1.09 BUILDINGS UNDER CONSTRUCTION

Access roads shall be constructed to within 150 feet of all buildings under construction.

Required access roads shall be constructed and approved prior to the start of any building construction.

Temporary dead-ends created during project phasing shall be limited to 150 feet or less or approved temporary turnarounds shall be constructed.

Fire hydrants shall be installed and approved prior to the start of building construction. See Sec. 6.07 and Standard Detail #605 and 606.

1.10 SIDEWALKS

Private gated communities within the City limits shall conform to the guidelines set forth in Table H-3 - Guidelines for Installing Sidewalks.

FIGURE H.1
FIRE DEPARTMENT APPROVED TURN-AROUNDS

*NOTE: Measurements are to edge of pavement - no parking

Scale: 1" = 30' (One inch equals thirty feet)

FIGURE H.2
FIRE DEPARTMENT NO PARKING SIGNS

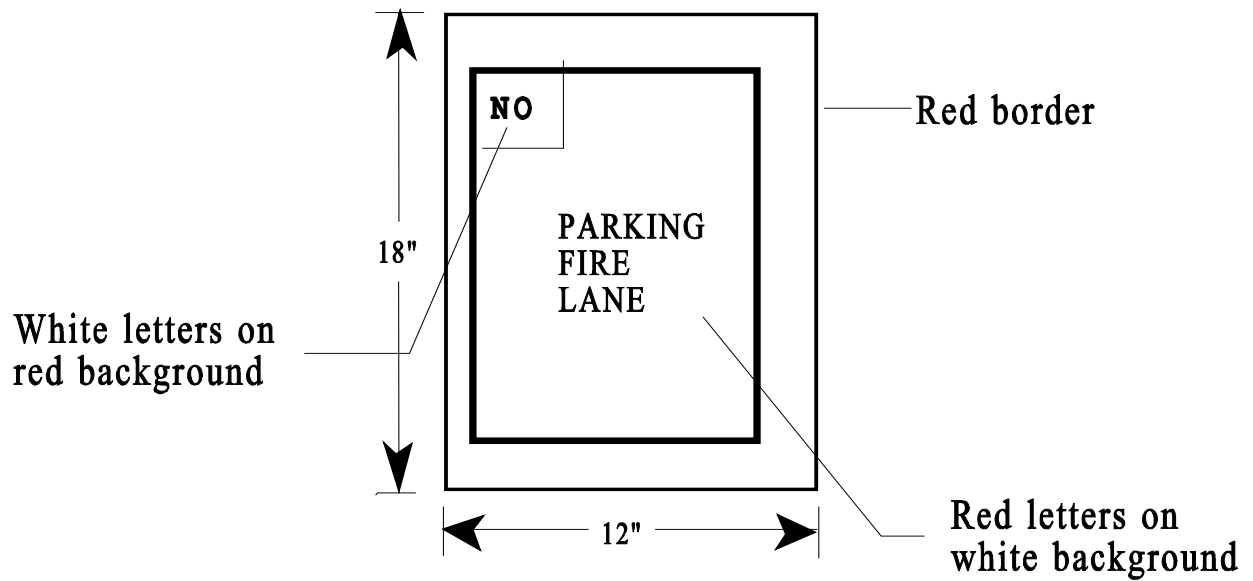


**TABLE H.1
GUIDELINES FOR INSTALLING SIDEWALKS.**

Land-Use/Roadway Functional Classification/ and Dwelling Unit	New Urban and Suburban Streets	Existing Urban and Suburban Streets
Commercial & Industrial (All Streets)	Both sides.	Both Sides. Every effort should be made to add sidewalks where they do not exist and complete missing links.
Residential/(Major Arterials)	Both sides.	Both sides.
Residential/(Collectors)	Both sides.	Multi-family - both sides. Single family dwellings - prefer both sides; require at least one side.
Residential/(Local Streets) More than 4 Units Per Acre	Both sides.	Prefer both sides; require at least one side.
1 to 4 Units per Acre	Prefer both sides; require at least one side.	One side preferred, at least 4 ft; shoulder on both sides required.
Less than 1 Unit per Acre	One side preferred, shoulder on both sides required.	At least 4-ft shoulder on both sides required.

Notes:

- 1) Any local street within two blocks of a school site that would be on a walking route to school - sidewalk and curb and gutter required.
- 2) Sidewalks may be omitted on one side of a new street where that side clearly cannot be developed and where there are no existing or anticipated uses that would generate pedestrian trips on that side.
- 3) Where there are service roads, the sidewalk adjacent to the main road may be eliminated and replaced by a sidewalk adjacent to the service road on the side away from the main road.
- 4) For rural roads not likely to serve development, a shoulder at least 4 ft in width, preferably 8 ft on primary highways should be provided. Surface material should be provide a stable, mud-free walking surface.

Taken from INSTITUTE OF TRANSPORTATION ENGINEERS, Sidewalks , by Fred N. Ranck, pg 17.

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APPENDIX I

PRIVATE WATER SYSTEM DESIGN FOR FIRE PROTECTION

1.01 GENERAL

All on-site improvements shall conform to the requirements of the American Water Works Association, the Modesto Municipal Code, the Modesto Fire Code, these Standard Specifications and Details, NFPA 13, *Standard for Installation of Fire Automatic Sprinkler Systems*, NFPA 24, *Standard for Private Fire Service Mains* and NFPA 1141, *Standard for Fire Protection in Planned Building Groups*.

1.02 PIPE SIZE AND MATERIAL

The minimum pipe size used to supply only a fire sprinkler system may have a nominal diameter of 4 inches if hydraulic calculations show that the main will supply the total demand, including hose allowances at the available design pressure, and the main size is at least as large as the riser.

The minimum pipe size used for a dead-end main, not exceeding 300 feet in length, supplying only one fire hydrant, shall have a minimum nominal diameter of 6 inches.

The minimum pipe size used for a dead-end main up to 600 feet in length, supplying one or more hydrants or a combination of fire hydrant and fire sprinkler system, shall have a nominal diameter of 8 inches.

The minimum pipe size used for a dead-end main exceeding 600 feet in length shall have a nominal diameter of 10 inches.

The minimum pipe size used for looped mains supplying fire hydrants and fire sprinkler systems shall have a nominal diameter of 6 inches.

Larger pipe sizes may be required when minimum fire flow, set forth in Section 6.05, can not be attained or when hydraulic calculations dictate otherwise.

Pipe materials shall be listed for fire protection service, comply with AWWA Standards, and be designed to withstand a minimum working pressure of 150 psi.

1.03 FIRE MAIN RESTRAINTS

All changes of direction, caps, bends and hydrant branches shall be restrained against movement. Type of pipe, soil conditions and available space will determine the method.

Thrust blocking shall be installed in conformance with Standard Detail #609. Other joint restraints shall be installed in conformance with NFPA 24.

1.04 DEPTH OF BURY

Water mains shall be buried a minimum of 36 inches under driveways and 48 inches under railroad tracks. When vehicular traffic is not a concern, the piping may be buried a minimum of 30 inches to prevent mechanical and damage.

Depth of covering shall be measured from the top of pipe to finished grade.

1.05 CONTROL VALVES

At least one control valve shall be installed in each source of water supply except for fire department connections. The City gate valve may be used as the system control valve for mains supplying only fire hydrants.

At least one control valve shall be installed on each sprinkler system. Sprinkler system control valves shall be listed indicating type; outside stem and yoke (O S & Y) used in connection with a double check valve assembly or post indicator valves (PIV) are acceptable.

Post indicator valves shall be set so that the top of the post will be 36 inches above final grade, and should be located not less than 40 feet from buildings. When a PIV cannot be placed at this distance, the alternate location shall be approved by the Fire Marshal.

Sectional valves may be required on large systems; see Section 6.08. Locations and type shall be approved by the Fire Marshal.

1.06 CHECK VALVES

All private fire systems shall have installed at least one listed check valve. When there is more than one source of water supply, a check valve shall be installed in each connection.

When installed underground, the required fire sprinkler system check valve, shall be in vault large enough to allow for State mandated inspection, maintenance, and repair of the valve.

Class 1 and 2 private fire systems (direct connection from public water mains, with or without a booster pump) will have a single check valve installed by the City at the connection to the public water system. This valve is not to be considered the required sprinkler system check valve. See Standard Detail #620

Private fire systems with domestic water connections and Class 3, 4, 5, and 6 private fire systems (cross-connected to fire pumps, unapproved water sources, or having materials or conditions that could contaminate the potable water) shall have an approved back-flow prevention device as required by AWWA M-14. When FEBCO Models 806 or 825 with OS & Y gates, or equal, is used on a fire sprinkler service, no additional system check valve is required.

1.07 FIRE HYDRANTS

See Section 6.05, and Standard Details 605 & 606.

1.08 FIRE DEPARTMENT CONNECTIONS

Except for residential systems with 20 or fewer heads, every sprinkler system shall have installed an approved fire department connection (FDC), with internal National Standard (NST) treaded swivel fittings. Listed caps shall be provided. All fire department connections shall be easily accessible, without interference from buildings, fences or other objects.

A listed check valve shall be installed in each FDC.

An FDC shall be installed on the system side of the system check and control valves, and on each side of a sectional valve.

The FDC shall not be connected to the suction side of a fire pump.

Parking shall be prohibited in front of and within 20 feet of the hose connections. FDC's shall be located within 18 and 48 inches of adjacent grade or access level; and when possible shall be located within 90 feet of a fire hydrant.

Two 2 inch hose connections shall be supplied by a 4 inch pipe when the riser is 4 inches or larger; a single 2 inch hose connection supplied by a 3 inch pipe may be used when the riser is 3 inches or smaller.

1.09 APPROVAL PROCEDURE

Underground fire services for fire hydrants and/or automatic fire protection systems shall be included in civil drawings or on site plan at time of submittal for building permit. Plans shall include piping from street connection to termination at building or at hydrant, or both. Locations of existing (or proposed new) off-site fire hydrants, FDC, and approved shut-off valve shall also be included. If required fire protection system check valve will be underground, it shall also be included.

Aboveground automatic fire sprinkler and standpipe system plans may be submitted separately to Fire Department after building permit for the structure is issued. A separate permit is not required unless the fire sprinkler installation is the only work being done.

All fire sprinkler systems shall be designed and installed in accordance with NFPA Standard 13; all standpipe systems shall be designed and installed in accordance with NFPA Standard 14.

A minimum of three sets of complete plans shall be submitted.

Plans shall be approved by Fire Department prior to start of construction.

1.10 INSPECTION AND TEST PROCEDURES

All required inspections and tests shall be witnessed by Fire Department personnel. It is the installing contractors responsibility to schedule and be present during all inspections and tests. Contact the Fire Prevention Bureau 24 hours prior to desired inspection or test to schedule an appointment.

One set of APPROVED plans shall be kept on the job site during construction.

All private fire system trenches, piping , joints, valves and pipe restraints (thrust blocks or other approved method) shall be inspected prior to covering.

All private fire main piping, supplying only fire hydrants, shall be hydrostatically tested at 150 psi for 1 hour; all fire main piping supplying a sprinkler system shall be hydrostatically tested at 200 psi for 2 hours. This test will be against a blind flange (skillet). It is recommended that the pipe only be backfilled between joints during this test so that leaks can be easily detected. The hot tap to the City main will not be made until this test has been completed.

**TABLE I.1
FLOW RATE TO PRODUCE VELOCITY OF 10FT/SEC**

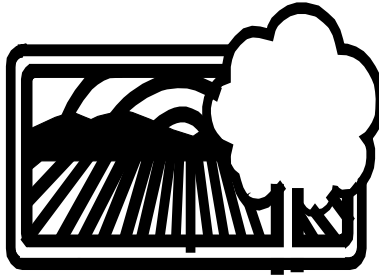
Pipe Size (in.)	Flow Rate (gpm)
4	390
6	880
8	1560
10	2440
12	3520

The main shall be thoroughly flushed to remove foreign materials. The minimum flow rate shall be the water demand rate of the system or the necessary flow rate to provide a velocity of 10 feet per second, whichever is greater.

All fire hydrants shall be installed and tested prior to building construction. Furthermore, the fire hydrant must have unobstructed access and be maintained operational at all times.

Appendix J

City of Modesto



Village One PVC Sewer Standards

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PVC Sewers - Village One

TABLE OF CONTENTS

SECTION	TEXT PAGE
1.01. General	J-1
1.02. Design	J-1
1.03 Manholes	J-1
1.04 PVC Pipe Material	J-1
1.05 Excavation.	J-3
1.06 Sewer Service Materials	J-3
1.07 Bedding	J-3
1.08 Backfill	J-4
1.09 Air Pressure Test	J-4
1.10 Deflection Testing	J-6
1.11 Inspection	J-7
1.12 Special Notes and Details Required on Design Plans	J-7

TABLES:

J.1 Air Pressure Testing Chart	J-5
J.2 Description of Material Classification (ASTM D 2321)	J-8

DETAILS:

811V PVC Sewer Trench Backfill in Undeveloped Streets	Detail No. 811V
812V PVC Sewer Trench Backfill in Existing Streets	Detail No. 812V

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APPENDIX J

SPECIFICATIONS FOR THE DESIGN AND CONSTRUCTION OF POLYVINYL CHLORIDE PIPE FOR SANITARY SEWERS WITHIN VILLAGE ONE

1.01 GENERAL

The installation of Polyvinyl Chloride (PVC) pipe sewers is allowed in Village One only. It is being allowed as an experiment to evaluate the use of this type of pipe, the field installation, and the long term stability of the pipe. PVC pipe sewers shall be installed by a Contractor holding the appropriate license for such work under the provisions of the State of California Business and Professions Code. **These special specifications are a supplement to the current Modesto Standard Specifications.** Where there is a conflict of specifications, these specifications shall take precedence.

1.02 DESIGN

PVC pipe sewers shall not be used for sewers that exceed the nominal diameter of 8-inches. PVC pipe sewers shall be sized to carry the quantity of sewage which will be discharged from their service area with a minimum design flow of 0.007 cfs/acre. When using PVC, sewer mains shall be no smaller than 8-inch diameter. Eight inch dia. sewers shall have a grade of not less than 0.35% (n coefficient = .013).

All sewers shall have a minimum cover of 3-feet 6 inches from the top of the pipe to finished grade and a minimum of 2 feet to bottom of street subgrade. Sewers with less than minimum cover shall be ductile iron pipe.

1.03 MANHOLES

Connections of PVC pipe and fittings to a manhole shall be water tight. The use of manhole water stops per manufacturer's requirements shall be approved by the City Engineer prior to the installation of any pipe or fitting.

1.04 PVC Pipe Material

PVC pipe and fittings 4 inch through 8 inch shall conform to the current ASTM Specifications D-3034 SDR 35 with an initial pipe stiffness of 46 lbs./in./in. Additives and fillers including but not limited to stabilizers, antioxidants, lubricants, colorants, etc., shall not exceed 10 parts by weight per 100 parts of PVC resin in the compound per ash test results conducted in accordance with ASTM D817.

All pipe, fittings, and couplings shall be clearly marked at intervals not to exceed 5 feet as follows:

- 1) Nominal pipe diameter.
- 2) Date of Manufacture.
- 3) Manufacturer's name or logo.
- 4) ASTM and SDR designation..

For fittings and couplings, the Pipe Stiffness is not required.

All pipe and fittings shall be suitable for use as a gravity sewer conduit, with provisions for expansion and contraction at each joint. All joints shall be made with flexible elastomeric seals meeting the requirements of ASTM D3212, and shall be capable of passing all tests specified in said standard and within these specifications. A factory-applied reference mark shall be provided on the spigot end to ensure proper positioning in the adjoining bell. The pipe shall be uniform in color, opacity, density, and other physical properties.

Wyes for house service connections shall be complete molded fittings. Solvent type saddle and wye are not allowed at any time.

Any wye found to have been solvent welded will require the complete removal of both pipe and joint and replaced with a complete fitting and repair couplings. The cost of repairs shall be borne by the Contractor.

Written certification (compliance), by the manufacturer, shall be submitted showing that all pipe and fittings meet the requirements herein.

When testing is required by the City Engineer because of suspect quality or because the date of manufacture to installation exceeds 13 months, one test pipe shall be selected at random by the City Engineer from each 1,000 feet or fraction thereof of each size of pipe delivered to the work site. But no less than one test pipe per lot. The length of specimen for each selected pipe shall be a minimum of 8 feet. The cost of such tests shall be borne by the Contractor.

The standards for testing set forth in the specifications will need to be 95% or better of ASTM's recommended initial values for Tensile Strength, Modulus of Tensile Elasticity, Pipe Flattening and Stiffness. Impact strength will meet 90% of the recommended ASTM value for pipe manufacturers.

Flexible Pipe not installed within 120 days of the latest test shall not be used without prior written approval from the City Engineer.

Care shall be taken during transporting of the pipe to insure that the binding and tie down methods do not cut the pipe in any manner. Pipe bowed, deformed or otherwise damaged during shipping or storage shall be rejected.

Pipe stored on the job site for an excessive duration, over 8 months, shall be covered with canvas or other opaque material to protect it from the sun's rays. Air circulation shall be provided under the covering.

Pipe shall be made of PVC plastic having a cell classification of 12454-B or C as defined in ASTM D 1784. The fittings shall be made of PVC plastic having a cell classification of 12454-C. PVC compounds of other cell classifications shall be approved by the City Engineer.

1.05 EXCAVATION

Trench width shall be a minimum width not less than the greater of either the pipe outside diameter plus 16in. (400mm) or the pipe outside diameter times 1.25 plus 12 in. (300 mm).

PVC sewer pipes shall be over excavated a minimum of 4 inches below the pipe or bell, which ever is lower in elevation.

1.06 SEWER SERVICE MATERIALS

PVC pipe shall be used for all sewer services from 4 inches to 8 inches. PVC pipe shall not be used for any sewer services on VCP or Ductile Iron Sewer Mains. PVC pipe shall not be used for any sewer services over 8 inch in diameter.

Connections to PVC Pipe sewer mains shall utilize a "wye" fitting. "Tee" connections to PVC Pipe will not be allowed. Solvent type fittings are not allowed.

When cutting in a wye, 3/4 inch crushed stone shall be placed under the main line and the sewer service lateral within the right of way line.

1.07 BEDDING

PVC pipe and fittings shall be bedded in conformance with these specifications.

Bedding shall be defined as that material supporting, surrounding, and extending a minimum of 4 inches under the pipe or projecting bell which ever is lowest to 1 foot above the top of the pipe or projecting bell which ever is highest. Where it becomes necessary to remove boulders or other interfering objects at subgrade for bedding, any void below such subgrade shall be filled with the bedding material.

If soft, spongy, unstable, or other similar material is encountered upon which the bedding material is to be placed, this unsuitable material shall be removed to a depth ordered by the City Engineer and replaced with bedding material of suitable density.

Bedding Material shall first be placed on a firm and unyielding subgrade so that the pipe is supported for the full length of the barrel. There shall be a minimum of 4 inches of bedding below the pipe barrel or projecting bell which ever is lowest. Haunching of the Class II bedding around pipe shall be done by hand to provide the maximum performance. Bedding material shall be placed, and densified by mechanical means in lifts not exceeding 6 inches to an elevation of 1 foot over the top of the pipe. Bedding material shall be compacted to 90 percent relative compaction. Jetting of the bedding material will not be allowed. Unless the sheeting and 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, and prior to the placement of backfill.

Remaining backfill shall be in accordance with the Modesto Standard Specifications unless noted on the improvement plans.

Except where otherwise specified, bedding material shall consist of clean sand & gravels, Class II material (ASTM designation D 2321-72) or manufactured granular angular material, Class IB (ASTM designation D 2321-72). The description of the material may also be found in Table 10.8 of the Uni-Bell Handbook of PVC Pipe.

Written certification, by a certified geotechnical laboratory, shall be submitted showing that the bedding material meets the requirements herein prior to the placement. If the sand bedding material changes, the Contractor shall resubmit written certification that the new bedding material meets the requirements herein.

1.08 BACKFILL

PVC pipe shall be bedded in accordance with these Standards. Above this bedding, all clods of any kind shall be removed which are larger than 3 inches in diameter. Ponding or jetting may not be allowed.

In existing paved streets, Class 1 aggregate sub-base conforming to Section 25-1.02A of the State Standards shall be used as the backfill material where a sewer wye is installed on an existing main. Ponding or jetting will not be allowed in existing paved streets, either paved or undeveloped.

Compaction tests shall be performed by a soils technician under the supervision of a registered Geotechnical Engineer retained at the Contractor's expense.

1.09 AIR PRESSURE TEST

The Contractor shall furnish all materials, equipment, and labor for making an air test. Air test equipment shall be approved by the City Engineer unless otherwise provided on the Plans or in the Specifications.

The Contractor may conduct an initial air test of the sewer mainline after densification of the backfill, but prior to installation of the house connection sewers. Such tests will be considered to be for the Contractor's convenience and need not be performed in the presence of the City Engineer.

Each section of sewer shall be tested between successive manholes by plugging and bracing all openings in the sewer mainline and the upper ends of all house connection sewers. Prior to any air pressure testing, all pipe plugs shall be checked with a soap solution to detect any air leakage. If any leaks are found, the air pressure shall be released, the leaks eliminated, and the test procedure started over again. The Contractor has the option of wetting the interior of the pipe prior to the test.

The final leakage test of the sewer mainline and branching house connection sewers, shall be conducted in the presence of the City Engineer in the following manner:

Air shall be introduced into the pipeline until 3.0 psi gage pressure has been reached, at which time the flow of air shall be reduced and the internal air pressure shall be maintained between 2.5 and 3.5 psi gage pressure for at least 2 minutes to allow the air temperature to come to equilibrium with the temperature of the pipe walls. Pressure in the pipeline shall be constantly monitored by a gage and hose arrangement separate from hose used to introduce air into the line. Pressure in the pipeline shall not be allowed to exceed 5 psi gage pressure.

**TABLE J.1
AIR PRESSURE TEST**

<i>Main Line</i>		<i>4" House Connection</i>				
<i>Diameter (Inches)</i>	<i>Length (Feet)</i>	<i>House Connection Length</i>				
		<i>0 ft.</i>	<i>100 ft.</i>	<i>200 ft.</i>	<i>300 ft.</i>	<i>400 ft.</i>
8	0	0	20	40	50	70
	50	40	50	70	90	80
	100	70	90	100	100	90
	150	110	120	110	100	100
	200	140	120	110	110	100
	300	140	130	120	110	110
	400	140	130	120	120	110
<i>Main Line</i>		<i>6" House Connection</i>				
<i>Diameter (Inches)</i>	<i>Length (feet)</i>	<i>House Connection Length</i>				
		<i>0 ft.</i>	<i>100 ft.</i>	<i>200 ft.</i>	<i>300 ft.</i>	<i>400 ft.</i>
8	0	0	40	80	100	100
	50	40	70	110	110	110
	100	70	110	120	110	110
	150	110	120	120	120	110
	200	140	130	120	120	120
	300	140	130	120	120	120
	400	140	130	130	120	120

Time in Seconds for Pressure to Drop from 2.5 to 1.5 psi Gage Pressure

After the temperature has stabilized and no air leaks at the plugs have been found, the air pressure shall be permitted to drop and, when the internal pressure has reached 2.5 psi gage pressure, a stopwatch or sweep-second-hand watch shall be used to determine the time lapse required for the air pressure to drop to 1.5 psi gage pressure.

If the time lapse (in seconds) required for the air pressure to decrease from 2.5 to 1.5 psi gage pressure exceeds that shown in Table No. 5.2 the pipe shall be presumed to be within acceptance limits for leakage.

If the time lapse is less than that shown in Table No. 5.2 the Contractor shall make the necessary corrections to reduce the leakage to acceptance limits.

1.10 DEFLECTION TESTING

Deflection testing shall be conducted following final compaction of the rock base in the streets but no sooner than 30 days following pipe installation. Percent allowable deflection shall follow the ASTM Standards. With the Village standard of 8" PVC sewer pipe, the maximum permissible deflection is 4%.

Following the placement and densification of backfill and prior to the placing of permanent pavement, 100 percent of all mainline PVC sewer pipe installed shall be cleaned and measured for obstructions (deflections, joint offsets, and lateral pipe intrusions). A rigid, odd numbered-leg (9 legs minimum) mandrel, with a circular cross section having a minimum diameter at any point along the full length of 7.282 inches, shall be pulled through the pipe by hand in the presence of the City Engineer. The minimum length of the circular portion of the mandrel shall be equal to the ID of the pipe. Contractor shall submit its design of the mandrel to the City Engineer for approval. Once the deflection testing has started the mandrel(s) shall stay in the possession of the City Engineer.

The initial maximum deflection shall be 5%. Vertical deflection exceeding 5% shall be cause for rejection of the pipe and all related work. Any over deflected pipe shall be uncovered and, if not damaged, reinstalled. Damaged pipe shall not be reinstalled, but shall be removed from the work site. Any pipe subjected to any method or process other than removal, which attempts, even successfully, to reduce or cure any over deflection, shall be uncovered, removed from the job site and replaced with new pipe (such as the use of a "re-rounder"). Any pipe found to be re-rounded will be replaced from structure to structure with new pipe at the expense of the contractor.

All deflection testing conducted by the Contractor shall be under the supervision and approval of the City Engineer. All reports and records of deflection testing shall be given to the City Engineer. The costs of the initial deflection test shall be borne by the contractor. Any retests for vertical deflection due to failure shall be borne by the contractor.

The maximum 11 month deflection for PVC pipe shall be 6 percent. The City will conduct deflection testing approximately one month prior to expiration of the contractor's one year warranty period. Any pipe failing the 7% deflection test within the one-year warranty period will be subject to replacement by the Contractor at his/her expense.

Any pipe which has been replaced will be re-tested by the contractor at his/her expense.

1.11 INSPECTION

Defects such as high and low spots, joint separations, offset joints, chipped ends, cracked or damaged pipe, infiltration points, and debris in lines shall be corrected by the contractor at his/her expense. For joint separations, low spots, and chipped ends, the following maximum acceptable limits will apply for eight and ten inch pipes:

Joint separations - 1/2 inch

Low spots -	6"	-	1/2"	(.04')	Depth tolerance of trapped water
	8"	-	3/4"	(.06')	
	10"	-	1"	(.08')	
	12" & larger				depth tolerance = 10% of pipe area

Chipped ends - 1/4 inch

For pipe larger than 10 inches, specific maximum limits will be specified by the City for each project.

1.12 SPECIAL DETAILS REQUIRED ON DESIGN PLANS

Design Engineers specifying the use of 8" PVC sewer line shall place the standard trench backfill detail within the set of improvement plans and a note detailing the mandrel and air test requirements.

TABLE J.2
DESCRIPTION OF MATERIAL CLASSIFICATION
As Defined in ASTM D 2321

Class	Type	Soil Group Symbol	Description ASTM D 2487	<u>Percentage Passing Sieve Sizes</u>			<u>Atterberg Limits</u>		<u>Coefficients</u>	
				1.5 in (40mm)	No. 4 (4.75mm)	No. 200 (0.075) (mm)	LL	PI	Uni- formity C _U	Curva- ture C _C
IA	Manufactured Aggregates: open- graded class	None	Angular, crushed stone or rock, crushed gravel, broken coral, crushed slag, cinders or shells; large void content, contain little or no fines	100%	≤10%	<5%	Non Plastic			
IB	Manufactured, Processed Aggregates: dense-graded, clean	None	Angular, crushed stone (or other Class IA materials) and stone/sand mixtures with gradations selected to minimize migration of adjacent soils; contain little or no fines	100%	≤50%	<5%	Non Plastic			
II	Coarse-Grained Soils, clean	GW	Well-graded gravels and gravel-sand mixtures; little or no fines	100%	<50% of Coarse Fraction	<5%	Non Plastic		>4	1 to 3
		GP	Poorly-graded gravels and gravel-sand mixtures; little or no fines						<4	<1 or >3
		SW	Well-graded sands and gravelly sands; little or no fines						>6	1 to 3
		SP	Poorly-graded sands and gravelly sands; little or no fines						<6	<1 or >3
	Coarse-Grained Soils, borderline clean w/fines	eg. GW- GC, SP-SM	Sands and gravels which are border-line between clean and with fines	100%	Vanes	5% to 12%	Non Plastic		Same as for GW, GP, SW and SP	

APPENDIX K

EASEMENT DEEDS

1.01 GENERAL

The City of Modesto may require dedication of public right of way associated with development or utility operations or maintaining city trees. To expedite the dedication, the consulting engineer shall prepare the dedication for the City Engineer's signature using the format and signature block as shown in this appendix. Any questions about the format may be directed to the City Engineer.

Any offers of dedication will be sent through Development Services, Community Development Department. Offers will be forwarded from Community Development to Public Works and Transportation. Within Public Works and Transportation, the City's surveyor will check the description and Encroachment Permits will check for form and record the dedication at the Stanislaus Records Office.

The consulting engineer or individual offering dedication will provide all documentation referenced in the dedication map. In other words, a preliminary title report and all referenced maps, surveys, and deeds referenced in the dedication. The title report shall have been prepared within the past sixty (60) days. All offerings of dedications shall have a platt.

1.02 SIGNATURES

A. Individual

Individuals or married couples by legal definition.

B. Partnership

A partnership only requires the signature of one partner to be legal. The signing partner must have documentation to prove he/she is a partner and the partnership by-laws allow just one signature. Usually the name of the partnership is printed above the signatures. The name and title of the partner(s) should be printed below the signature lines.

C. Corporations

A corporation requires the signatures of two authorized corporate officers or one signature and the corporate seal. The signing parties must have documentation to their corporate status and the corporate by-laws establishing their signature as legal. Usually the name of the corporation is printed above the signatures. The name and title of corporate officers should be printed below the signature lines.

EXAMPLE A

3337 Coffee Road

EASEMENT FOR PUBLIC RIGHT OF WAY

Lot Por Block 12419

APN 013-8263

Recording Requested by

City of Modesto

When Recorded Mail To:

City of Modesto

City Clerk

P. O. Box 642

Modesto, California 95353

EASEMENT DEED

Individual

JOHN H. DOE and MARY K. DOE, trustees of the J & M DOE Living Trust as to an undivided 1/2 interest as tenants in common, and JOE G. DOE and LAURA K. DOE, husband and wife as joint tenants as to an undivided 1/2 interest,

GRANTS and dedicates to the CITY OF MODESTO, a municipal corporation, an easement for public right of way purposes, including but not limited to the right to construct, operate, maintain, replace, remove and renew a public street, sidewalk, utilities, street trees and appurtenances thereto, over, under, upon and across the following described real property in the State of California, County of Stanislaus, City of Modesto.

description

Containing xxx Sq. Ft., more or less.

Dated:

JOHN H. DOE, TRUSTEE

JOE G. DOE

Dated:

MARY K. DOE, TRUSTEE

LAURA K. DOE

This is to certify that the interest in real property conveyed by this deed is hereby accepted by order of the Modesto Municipal Code Section 7-1.701(d), adopted April 13, 1993, and the grantee consents to recordation thereof.

Date:

By:

VAN W. SWITZER, City Engineer
City of Modesto

EXAMPLE B

1008 Petaluma Drive
PLANTING EASEMENT
Lot 16 Block 5306
APN 029-4081

Recording Requested by
City of Modesto

When Recorded Mail To:
City of Modesto
City Clerk
P. O. Box 642
Modesto, California 95353

EASEMENT DEED
Individual

JOHN DOE and JANE DOE, husband and wife, as joint tenants,

GRANTS to the CITY OF MODESTO, a municipal corporation, an easement for the planting, maintenance, and removal of existing and new street trees, together with the right of ingress and egress therefrom, over, across, and under the real property in the State of California, County of Stanislaus, City of Modesto, described as follows:

description

Dated:

JOHN DOE

JANE DOE

This is to certify that the interest in real property conveyed by this deed is hereby accepted by order of the Modesto City Council Resolution No. 96-331, adopted June 11, 1996, and the grantee consents to recordation thereof.

Date:

By:

VAN W. SWITZER, City Engineer
City of Modesto

EXAMPLE C

FLOYD AVENUE
EASEMENT FOR PUBLIC UTILITIES
Portion Block 11371
APN 052-2312

Recording Requested by:

City of Modesto

When Recorded Mail To:

City of Modesto
City Clerk
P. O. Box 642
Modesto, CA 95353

EASEMENT DEED

Corporation

XYZ VENTURE, a joint venture composed of ABC CORPORATION, a California Corporation, and JACKS, Inc., a California Corporation,

GRANTS to the CITY OF MODESTO, a municipal corporation, an easement for public utilities to construct, operate, maintain, replace, remove and renew the facilities and appurtenances together with the right of ingress thereto and egress therefrom over, under and across the following described real property in the State of California, County of Stanislaus, City of Modesto:

description

ABC CORPORATION,
A California corporation

JACKS,
A California Corporation

By _____ Date _____ By _____ Date _____

(Typed Name) (Office) (Typed Name) (Office) _____

By _____ Date _____ By _____ Date _____

(Typed Name) (Office) (Typed Name) (Office) _____

This is to certify that the interest in real property conveyed by this deed is hereby accepted by order of the Modesto City Council Resolution No. 96-331, adopted June 11, 1996, and grantee consents to recordation thereof.

Date: _____

By: _____

VAN W. SWITZER, City Engineer
City of Modesto

APPENDIX L

MODESTO WATER OUTSIDE CITY LIMITS

1.01 GENERAL

With the City of Modesto's acquisition of the Del Este Water System, the City of Modesto has accepted the responsibility to provide water to customers outside the city limits. To help provide quality service and direction for the development community, the following specifications were developed. These specifications give only an outline of the design, fees, and processing requirements for water service outside the city limits. Please refer specific questions to our utilities division, ph (209) 571-5102 or city building permits at ph (209) 577-5232.

1.02 DESIGN

The design requirements are identical to the City Modesto Standard Specifications except for horizontal location. These locations are dictated by the local agency in charge of public right-of-way. A signature block shall be provided on the cover sheet of development plans for the City of Modesto Utilities Division.

All improvement plans shall contain at least the following water notes on the cover or second sheet of the improvement plans:

WATER NOTES:

1. Water line materials and construction shall be in accordance with the city of Modesto standard specifications.
2. Water line crossings shall meet state health standards.
3. All water lines shall be tested and disinfected in conformance with the city of Modesto standards prior to final acceptance.
4. Contractor shall stamp a "w" at the face of sidewalk directly over the service lateral.
5. All connections to the existing water facilities shall be made by the city of Modesto's water service crews.
6. Fire hydrant assemblies to meet the local fire department standards. (*design consultant shall note the type of assembly*). Testing of fire hydrants shall conform to the local fire department's and/or agency's standards.

7. Contractor shall obtain a city of Modesto encroachment permit prior to the start of waterline construction. Contractor should verify the city of Modesto has received its sets of improvement plans before coming to city hall for an encroachment permit (ph (209) 577-5264). Contractor may obtain an encroachment permit by phone/fax.
8. All waterline construction must be inspected by the city of Modesto construction inspection - ph (209) 577-5452.

1.03 FEES

The following fees apply:

- A. Systems Fee (based on net sf - may or may not apply depending on area) - Pays for development of wells and transmission mains (12" or larger main).
- B. Connection Charge (mandatory charge) - City crews will perform the tap into main.
- C. Meter Charge (mandatory charge) - Charge for future meter installation.
- D. Plan Check - Pays for city utility engineer to review plans and sign the improvement plans. Paid on a time and materials basis. Paid with the city inspection fee.
- E. City Inspection Fee - Pays for city inspectors to inspect the construction of the pipeline, certify the testing and chlorination of the water line, and provide the governing agency a letter of acceptance after all tests are completed and the city inspection and plan check bill has been paid.
- F. Lateral Fee (may or may not apply depending on area and type of connection) - Fee to connect to an existing line based on the lot frontage. Most subdividers install their own lateral and do not pay this fee.
- G. Reimbursement Agreement - A written agreement between the city and the developer to secure reimbursement for a line extended by the developer to serve his/her subdivision at his/her cost which may benefit other developers in the future. This agreement has a 10-year life. Any developer connecting up to this line will pay a fee which will be transferred to original developer. No interest or cost index may be attached to the construction costs.

1.04 PROCESS

The following process is involved for the water utility's approval. This process is in addition to the governing agency's due process.

- A. Developer secures agreement from the utility or water board to serve water in this area. This may or may not be an issue.
- B. Submit plans to the City of Modesto Utilities Division for approval. A signature block for the utility must be provided on the cover sheet of the improvement plans.
- C. After approval of the plans, develop pulls permits from City of Modesto Building Department for payment of the various fees except inspection. Building Department will notify the water department when fees are paid. Contractor must schedule the water crews to make any connection to an existing water line.
- D. In addition to any local jurisdiction's encroachment permit, the developer or contractor shall pull a City of Modesto encroachment permit to construct the water line. Contractor shall notify City of Modesto inspection before start of waterline construction. City of Modesto reserves the right to reject pipeline construction done without inspection.
- E. After contractor receives a final inspection of the waterline, the developer will be billed for the inspection and plan check. Developer must pay the invoice before a letter of acceptance is provided to the developer and governing agency.

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**CITY OF MODESTO
INDEX**

STANDARDS

<u>SECTION</u>	<u>PAGE</u>
 1. SAFETY	
1.01 General	1-1
1.02 Traffic Control.....	1-1
1.03 Signs	1-1
1.04 Barricades.....	1-2
1.05 Flasher Supports.....	1-2
1.06 Delineators	1-2
1.07 Flagmen	1-2
1.08 Warning Lights.....	1-2
1.09 Street Closures.....	1-3
1.10 Rules and Regulations	1-3
1.11 Underground Service Alert	1-4
 2. SECTION REMOVED AND/OR RELOCATED	
 3. STREET CONSTRUCTION	
3.01 Engineering Fabrics.....	3 - 1
3.02 Aggregate Subbase	3 - 3
3.03 Aggregate Base.....	3 - 3
3.04 Asphalt Concrete	3 - 4
3.05 Concrete Curb, Gutter, Sidewalk & Driveways	3 - 6
3.06 Striping and Pavement Markings	3 - 9
3.07 Header Board.....	3 - 10
 4. STORM DRAINAGE	
4.01 Description	4 - 1
4.02 Materials.....	4 - 1
4.03 Testing.....	4 - 4
4.04 Measurement and Payment	4 - 5

SECTION

PAGE

5. SANITARY SEWERS

5.01	Description	5 - 1
5.02	Materials.....	5 - 1
5.03	Installation.....	5 - 5
5.04	Measurement and Payment	5 - 14

6. WATER DISTRIBUTION

6.01	Description	6 - 1
6.02	Materials.....	6 - 1
6.03	Installation.....	6 - 5
6.04	Measurement and Payment	6 - 11

7. STREET LIGHTING ELECTRICAL WORK

7.01	Descriptions.....	7 - 1
7.02	Materials.....	7 - 1
7.03	Installation.....	7 - 3
7.04	Acceptance	7 - 6
7.05	Measurement and Payment	7 - 7

8. UTILITY TRENCHING AND BACKFILL

8.01	Description	8 - 1
8.02	Maximum Length of Open Trench.....	8 - 1
8.03	Maximum and Minimum Width of Trench.....	8 - 1
8.04	Bracing Excavations.....	8 - 2
8.05	Bedding	8 - 2
8.06	Backfill.....	8 - 3
8.07	Densification Methods: Mechanically Compacted Backfill....	8 - 4
8.08	Backfill Placement Requirements	8 - 5
8.09	Backfill Materials.....	8 - 5
8.10	Restoring Surface	8 - 7
8.11	Measurement and Payment	8 - 7

9. SECTION REMOVED AND/OR RELOCATED

10. SECTION REMOVED AND/OR RELOCATED

SECTION**PAGE****11. EARTHWORK**

11.01	Description	11 - 1
11.02	Grade Tolerance	11 - 1
11.03	Relative Compaction	11 - 1
11.04	Stripping Original Ground	11 - 1
11.05	Subgrade Stability/Deflection Test	11 - 1
11.06	Disposal of Excess Material	11 - 1
11.07	Slopes	11 - 2
11.08	Import Borrow	11 - 2
11.09	Tree Obstructions	11 - 2

12. LANDSCAPE PLANTING

12.01	Description	12 - 1
12.02	General	12 - 1
12.03	Materials	12 - 3
12.04	Agronomic Soils Test	12 - 9
12.05	Planting	12 - 9
12.06	Cleaning Up	12 - 13
12.07	Watering	12 - 13
12.08	Inspection	12 - 13
12.09	Preliminary Inspection to the Maintenance Period	12 - 14
12.10	Landscape Maintenance Period	12 - 14
12.11	Final Inspection and Acceptance	12 - 16
12.12	Guarantee	12 - 17
12.13	Measurement and Payment	12 - 17

13. IRRIGATION

13.01	Description	13 - 1
13.02	Rules and Regulations	13 - 1
13.03	Materials	13 - 2
13.04	Installation	13 - 4
13.05	Testing	13 - 8
13.06	Guarantee	13 - 9
13.07	As-Built Drawings	13 - 9
13.08	Measurement	13 - 10
13.09	Payment	13 - 10

SECTION**PAGE****14 SECTION REMOVED AND/OR RELOCATED****15 SECTION REMOVED AND/OR RELOCATED****16 SECTION REMOVED AND/OR RELOCATED****17. ADJUSTMENT OF MANHOLES AND WATER VALVES**

17.01	Description	17-1
17.02	Adjustment	17-1
17.03	Measurement and Payment	17-1

18. TRAFFIC SIGNALS

18.01	Description	18-1
18.02	Order of Work	18-1
18.03	Progress Schedule	18-1
18.04	Obstructions	18-2
18.05	Signals, Lighting and Electrical Systems	18-2
18.06	Construction Area Signs.....	18-14
18.07	Traffic Controls	18-15

19. EMERGENCY VEHICLE DETECTOR SYSTEM

19.01	Matched System Components	19-1
19.02	System Operation	19-1
19.03	System Component Specifications.....	19-2
19.04	Reliability	19-26
19.05	Qualifications	19-26
19.06	Responsibilities	19-27
19.07	Guaranteed Warranty.....	19-27
19.08	Certificate of Insurance	19-28
19.09	Certification.....	19-28

TABLES AND FIGURES

Table 5.1	Air Pressure Test	5-12
Table 6.1	Calcium Hydrochlorite Granules	6 - 9
Table 6.2	Calcium Hydrochlorite Tablets	6 - 10

CITY OF MODESTO SECTION 1

SAFETY

1.01 GENERAL

This Safety Section is intended to establish general principles of traffic control, worker protection and public safety measures to be taken in the performance of all work covered by the Standards.

No specification contained herein shall be deemed to create a legal standard of conduct or duty toward the public nor shall it limit the City in the exercise of powers conferred by law in modifying these specifications under special conditions.

The requirements of the current edition of the State of California, Department of Transportation, "Manual of Traffic Controls For Construction and Maintenance Work Zones", herein referred to as the State Traffic Manual, shall take precedence over the requirements of this Safety Section.

1.02 TRAFFIC CONTROL

The safe movement of traffic through construction areas depends upon communicating concise and proper information to the public by signs, barricades, delineators, flagmen and warning lights. All such devices necessary shall be furnished by the Developer or City Contractor.

The size, shape and color of such devices as shown herein shall be as required by the State of California, Department of Transportation. **Prior to any lane closure on a collector or major street, a traffic control plan shall be prepared by the Developer or City Contractor and approved by the Engineer.**

1.03 SIGNS

The types of signs shown in Drawing No. 2-B are typical under normal conditions.

Warning signs used for night time conditions shall be reflectorized or illuminated. The use of orange flags in conjunction with signs is permitted if they do not, at any time, interfere with a clear view of the sign face.

Reflectorized signs fastened to barricades of similar supports shall have the face of the sign vertical and normal to the direction of traffic for effective visibility.

Signs are to be used only as long as necessary and then removed. During periods when the signs are temporarily unnecessary, they shall be removed or have their message covered.

1.04 BARRICADES

Barricades are intended to impose an obstacle in or close off the normal flow of travel. Approved barricades are shown on Drawing No. 2-D.

Barricades shall not be used unless they are needed to separate the motorist from objects of greater hazard than the barricades themselves. Barricades should never be used primarily for delineation. The use of nonstandard types of barricades, such as drums, buckets, sandbags, etc., can be hazardous and their use is prohibited.

1.05 FLASHER SUPPORTS

Portable flasher supports shall be as required by the State Traffic Manual.

1.06 DELINEATORS

The function of delineators is to channelize traffic. They shall consist of post and paddle type markers of cylindrical or cone shaped objects 18 to 48 inches in height as shown in Drawing 2-F.

Delineators should be uniformly positioned laterally and longitudinally relative to the line of traffic and they must be maintained in an erect position.

Delineators for night time use shall be reflectorized or illuminated to be visible from 500 feet under normal atmospheric conditions.

When placed in proximity to the edge of a traffic lane, delineators should be made of a material that will withstand impact without damage to them or the striking vehicle. Consideration must also be given to the necessity for stability against knockdown from wind or the wash of passing traffic.

1.07 FLAGMEN

Flagmen shall be required as necessary for safe conduct of the traffic through the construction area or as directed by the City Engineer. Flagmen shall not be used as a substitute for other warning signs and devices. Standard hand signals shall be used as shown in the State Traffic Manual.

1.08 WARNING LIGHTS

Warning lights shall be electric lanterns, electric markers or flashers provided to indicate an obstruction or restriction during periods of low visibility. Warning lights shall be placed to mark the location of obstructions. Motion may be imparted to warning lights.

Flashing lights for delineating the path traffic is to follow shall be uniformly spaced as approved by the City Engineer.

Warning lights may be fastened to signs, barricades and portable flasher supports in a manner satisfactory to the City Engineer.

1.09 STREET CLOSURES

For any temporary street closure on all or part of a residential street, the street closure shall be made as shown in the State Traffic Manual. Prior to any street closure on a collector or major street, a traffic control plan shall be prepared by the Developer or Contractor and approved by the City Engineer. In addition, a copy of the approved traffic control plan shall be on the site at all times. One lane for each direction of through traffic must be maintained except where flagmen are provided to control traffic; then one lane may serve both directions. When trenching is necessary across intersecting streets, the work shall be done in such a manner as to maintain two-way traffic on cross streets at all times.

Where the trench line crosses an entrance to private property, access to the property shall be maintained at all times by means of a suitable bridge, until the trench may be backfilled. Such bridges shall be properly guarded and illuminated at night. Where any crosswalk is cut by the trench, suitable bridging shall be constructed. Such bridging shall be at least 4 feet in width, have suitable hand railing, be properly guarded and be illuminated at night.

The complete closure of a street is allowed only when authorized in writing by the City Engineer, as provided by Section 7-2.14 of the Modesto Municipal Code. Such closure shall be accomplished only through the use of Type III barricades as shown on Drawings no. 2-D and the State Traffic Manual.

Permanent closures and temporary closures in new developments at dead end streets and where pavement narrows at the edge of the development shall be made as shown in Drawing Nos. 2-P and 2-Q.

1.10 RULES AND REGULATIONS

All work performed and all materials used by the Developer or City Contractor shall comply with the State Labor Code, the California Administrative Code, Construction Safety Order, Title 8, Subchapter 4, and all other applicable Federal, State and Local laws and regulations.

Specifically, the Developer or Contractor shall furnish, install and maintain all shoring, bracing and sheeting. Any damage resulting from a lack of adequate shoring, bracing or sheeting shall be repaired at the Developer's or City Contractor's expense.

Additional requirements may be imposed by the City Engineer in the interest of public safety.

1.11 UNDERGROUND SERVICE ALERT - USA

USA is a “One Call Notification Center” used for identifying any underground facilities prior to digging. The Developer or City Contractor shall call USA at 800-642-2444 at least 48 hours prior to the start of any excavation within the City limits. All participating members, including the City of Modesto, will be informed by USA of the location, date, time and description of the proposed excavation.

Any existing underground facilities will then be located and marked in the field by the appropriate USA member organization(s). Requests for field meetings shall be included in the initial call to USA. For further information, contact the City of Modesto at 577-5307.

All excavation shall be in compliance with Section 1540(a)(1) of the Construction Safety Orders (Title 8, California Administrative Code Section 1540) which states:

“Prior to opening an excavation, effort shall be made to determine whether underground installation; i.e., sewer, water, fuel, electric lines, etc., will be encountered and, if so, where such underground installations are located. When the excavation approaches the approximate location of such an installation, the exact location shall be determined by careful probing or hand digging; and, when it is uncovered, adequate protection shall be provided for the existing installation. All known owners of underground facilities in the area concerned shall be advised of proposed work at least 48 hours prior to the start of actual excavation.”

The Developer or Contractor shall be responsible for the preservation of, and any damage to, both private and public property in accordance with the current State Standards - Section 7-1.11.

SECTION 3

STREET CONSTRUCTION

3.01 ENGINEERING FABRICS

A. Description

This work shall include furnishing all the labor, materials, tools and equipment necessary to place the engineering fabrics in accordance with the approved plans and these specifications.

Engineering fabrics shall include pavement reinforcing fabric and light duty road stabilization fabrics. A Certificate of Compliance from the product manufacturer for each type of engineering fabric used shall be furnished to the Engineer. Engineering fabrics shall be furnished in protective covers to shield against ultraviolet rays, abrasion, and water.

B. Pavement Reinforcing Fabric

1. Materials

Pavement reinforcing fabric shall be manufactured from polyester, polypropylene, or polypropylene-nylon material. The fabric shall be non-woven heat bonded on the top side, and shall conform to the following:

<u>Property</u>	<u>Minimum Requirements</u>	<u>Test Method</u>
Grab Strength (lbs.)	80	ASTM D4632
Elongation at break (%)	50	ASTM D4632
Asphalt Retention (gal/sy)	0.2	TF25 #8
Melting Point (F)	300	ASTM D276

2. Installation

Pavement reinforcing fabric shall be installed in accordance with Section 39-4.03 of the State Specifications.

C. Road Stabilization Fabric

1. Materials

Road stabilization fabric shall be for light duty applications and shall be manufactured from polyester, nylon, or polypropylene material, or any combination thereof. The fabric shall be non-woven, permeable, and shall conform to the following:

<u>Property</u>	<u>Minimum Requirements</u>	<u>Test Method</u>
Grab Strength (lbs.)	90	ASTM D4632
Puncture Strength (psi)	30	ASTM D751-69
Trapezoidal Tear (lbs)	30	ASTM D4533
Burst Strength (psi)	145	ASTM D751-68 IST 180, 5-84

2. Installation

The subgrade to receive the geotextile fabric, immediately prior to placing, shall conform to the compaction and grade requirements as specified in the Specific Provisions and as shown on the Plans.

Geotextile fabric shall be handled and placed in accordance with manufacturer's recommendations.

The fabric shall be aligned and placed in a wrinkle-free manner.

Adjacent borders of the fabric shall be overlapped a minimum of 12 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 the seam.

Within 24 hours after the fabric has been placed, it shall be covered with aggregate base material as shown on the plans.

During spreading and compaction of the aggregate base material minimum of 6 inches of such material shall be maintained between the fabric and the Contractor's equipment. Equipment or vehicles shall not be operated or driven directly on the fabric.

C. Measurement and Payment

Engineering fabric will be measured by the square yard of area covered, excluding additional fabric required for overlap.

Payment for engineering fabric shall be based on the contract unit price and quantity installed as described above. The contract unit price shall include furnishing all labor, materials, tools, equipment, and incidentals and for performing all the work involved in installing the engineering fabric, as specified in these specifications and as directed by the City Engineer.

3.02 AGGREGATE SUBBASE

A. Description

Aggregate subbase shall conform with Section 25 of the State Specifications and shall be Class 2 ASB. Thickness shown on the plans shall be the minimum section allowed.

B. Measurement and Payment

Aggregate subbase shall be measured by the ton as placed on the street, driveways, and other areas designated by the City Engineer.

Payment shall be made at the contract price per ton and shall include full compensation for furnishing all labor, materials, tools, equipment, incidentals and for doing all the work complete in place as shown on the plans, as specified in these specifications and as directed by the City Engineer.

3.03 AGGREGATE BASE

A. Description

Aggregate base shall conform with Section 26 of the State Specifications and shall be Class 2, 3/4 inch maximum AB. Thickness shown on the plans shall be the minimum section allowed.

B. Measurement and Payment

Aggregate base shall be measured by the ton as placed on the street, driveways, and other areas designated by the City Engineer.

Payment shall be made at the contract price per ton and shall include full compensation for furnishing all labor, materials, tools, equipment, incidentals and for doing all the work

in placing asphalt concrete, prime coat and tack coat, complete in place as shown on the plans, as specified in these specifications and as directed by the City Engineer.

3.04 ASPHALT CONCRETE

A. Description

Asphalt Concrete shall conform with Section 39 of the State Specifications and shall be Type B Asphalt Concrete using AR4000 paving asphalt. Aggregate used in all but the final course shall be 3/4 inch maximum, medium grading.

Aggregate used in the final course shall be as follows:

Major, Collector and Industrial Streets - 3/4 inch maximum, medium grading

Residential Streets - 1/2 inch maximum, medium grading

Asphalt for 1 inch overlays shall be as specified in the Special Provisions for each project.

Asphalt concrete shall be spread according to the following:

<u>SECTION</u>	<u>LIFT</u>	<u>GRADING</u>
0.10'-0.20'	One Lift	1/2" Max. Medium
0.25'	Two equal lifts	1/2" Max. Medium

B. Paving Spread

The following rules are to be used in paving public streets:

1. The final course shall be paved starting from the curb and paving toward the center line.
2. When paving the final surfacing course, there shall be a minimum of two rakers and one screed man per paving machine.
3. Vibratory rollers may be used as approved by the City Engineer.
4. The surface course shall be laid with a paving machine except when permitted otherwise by the City Engineer.

5. Paving machines shall have automatic joint control.

6. Extensions or wings shall not be permitted except as approved by the City Engineer.

C. Penetration Treatment, Seal, Prime and Tack Coats

<u>TYPE</u>	<u>ASPHALT GRADE</u>	<u>RATE gals./yd.</u>
Prime	SC-250	0.25
Tack	CSS-1 (slow setting)	0.02 to 0.10
Fog Seal	SS-1	0.05 to 0.10

Prime coat shall be required prior to paving. Tack coat shall be required between asphalt concrete lifts when traffic has utilized the paving surface.

D. Adjustment of Iron

Manholes, cleanouts, blow-offs and water valve boxes shall be brought to finish grade after the final pavement lift has been installed. All iron shall be lowered prior to any pavement planing.

E. Stage Construction

Asphalt concrete and asphalt concrete base shall be spread and compacted in layers. The top layer of asphalt concrete shall not exceed 0.20-foot in compacted thickness. The next lower layer shall not exceed 0.25-foot in compacted thickness, and any lower layers shall not exceed 0.40-foot in compacted thickness. Each layer of asphalt concrete base shall not exceed 0.40-foot in compacted thickness. No layer shall be placed over a layer which exceeds 0.25-foot in compacted thickness until the temperature at mid depth, of the layer which exceeds 0.25-foot in compacted thickness, is not more than 160° F.

Refer to Section 2 of these specifications for pavement reinforcing fabrics required for asphalt concrete overlays.

F. Mix Design

Contractor shall insure the asphalt concrete suppliers have a current (calendar year) mix design on file with the City of Modesto prior to any paving.

G. Spreading and Compacting Equipment

Spreading and compacting equipment shall be as specified in Section 39-5 of the State Specifications. The State Specifications are amended to allow use of a motorized latent box for projects involving less than 50 tons of asphalt concrete.

H. Measurement and Payment

Asphaltic concrete shall be measured by the ton as placed on the street, driveways, and other areas designated by the City Engineer.

Payment shall be made at the contract price per ton and shall include full compensation for furnishing all labor, materials, tools, equipment, incidentals and for doing all the work in placing asphalt concrete, prime coat and tack coat, complete in place as shown on the plans, as specified in these specifications and as directed by the City Engineer.

3.05 CONCRETE CURB, GUTTER, SIDEWALK & DRIVEWAYS

A. Description

Work shall conform with Section 73 and Section 90 of the State Specifications with the following additions. All curb, gutter and sidewalk shall be placed monolithically and shall be constructed of 3000 psi portland cement concrete. Materials - Type 1 or Type 2, 4" maximum slump, 1" maximum size Aggregate.

Traffic, parking and street name signs on city streets which require relocation because of the work will be relocated by the City but two working days advance notice is required. Traffic signs on state highways and stop signs on streets entering state highways must be relocated by Cal Trans. Utility poles which require relocation because of the work shall be relocated by the utility company owning the poles.

B. Installation

1. Subgrade Preparation

The finished subgrade immediately prior to placement of aggregate base shall be compacted for a depth of 0.5 feet.

2. Cushion (if specified)

Shall be mechanically compacted Class 2 Aggregate Base.

3. Forms

Lumber used for forms must be surfaced on the side placed next to the concrete and shall not be less than 1-1/2 inches thick after being surfaced. Warped forms and forms not having a smooth, straight upper edge shall not be used. Benders or thin planks, rigidly placed, may be used on curves, grade changes, or the curb returns.

All forms shall be clean and coated with a light oil to prevent the concrete from adhering to them. All forms must be carefully set to proper alignment and grade and shall be rigidly held in place by the use of steel or wooden stakes. Clamps, spreaders and braces shall be used where required to insure rigidity in the forms.

Forms shall not vary from vertical grade by more than 0.02 foot and from horizontal alignment by more than 0.05 foot within the distance not to exceed 25 feet. All forms shall have smooth even lines in both the horizontal and vertical plane. A windrow of earth placed against the forms prior to placing concrete may be required to prevent them from bulging.

Except for vertical curb forms, all forms shall remain in place for at least 12 hours after the concrete is placed.

4. Extruded Sidewalk, Curb and Gutter

Use of an extrusion machine is allowed. A test pour may be required by the City Engineer prior to approval.

5. Placing and Finishing

No concrete shall be placed or finished in the rain. It shall be the Contractor's responsibility to schedule his operations such that concrete will not be placed or finished in the rain.

At the end of each day's pour, when work is terminated, or when a delay of more than 30 minutes occurs, the joint shall be made vertical and square ended. In no case shall the end of a day's pour terminate in a driveway.

a) Curb & Gutter

Expansion joints shall be constructed in conformance with Section 303 5.4.2 "Expansion Joints" of the Standard Specifications for Public Works Construction (SSPWC), at the end of each curb return and at intervals not to exceed two hundred (200) feet. Where the existing sidewalk and curb is cut to install new

driveways and approaches, expansion joints shall be constructed on each side of the driveway or approach.

Weakened plane joints shall be constructed in conformance with Section 303-5.4.3 "Weakened Plane Joints" of SSPWC at either (8) foot intervals and at each end of the driveway approaches.

When curb, gutter and sidewalk are poured monolithically, scoring lines in conformance with Section 303-5.5.3 "Walk" of the SSPWC shall be placed along the back of the curb.

When matching 6 inch vertical curb sections, the return curb section is optional. The asphalt shall be cut a minimum of 6 inches from the lip of the curb.

b) Sidewalk

Expansion joints for new construction shall be located opposite the expansion joints as placed for curbs and gutters.

Expansion joints placed in sidewalks where curbs and gutters exist shall be placed to match the expansion joints in existing curbs and gutters.

Sidewalk score lines shall conform to score lines of existing sidewalks when new construction is placed contiguous and in line with existing sidewalk or as indicated on the contract plans or standard plans for sidewalk. Sidewalk score lines for new construction shall be as indicated on the Standard Details.

c) Driveways/Approaches

When back of approach is poured against existing concrete a 1/4" premolded expansion joint filler shall be placed against the existing concrete.

Score lines shall correspond with the score lines of adjacent sidewalk.

d) Exposed Aggregate Sidewalk

Exposed aggregate sidewalk shall conform to sidewalks of these Standards for concrete sidewalk except for the surface finish.

Exposed aggregate sidewalk may be seeded with ½ inch maximum aggregate embedded in the surface of the concrete by tapping or rolling or standard mix with 60% Min. - 70 % Max. Aggregate content and ½ inch Min. - 1 inch Max.

Aggregate screening may be used. The aggregate shall be exposed by washing away the surface mortar with water.

The finished surface shall contain 40 to 60 percent exposed, rounded aggregate.

e) Services and Lot Lines

Contractor shall clearly mark a "W" for water service, a "S" for sewer service and a "+" for lot line extensions in the wet concrete at the location of perpendicular crossings.

6. Testing

The finished concrete shall be in conformance with the tolerances for forms as stated above in Section 9.02c and attain a minimum 28-day compressive strength of 3000 psi. Core testing of substandard concrete will not be permitted.

After construction, gutters shall be checked by flowing water. The Engineer or his/her representative must be present during the flow test. Any high spots or depressions revealed by the flow test (which exceed 0.02 foot) shall be repaired by removing that section of concrete and replacing it to the correct grade.

Finished face of curb shall not vary by more than an aggregate total of 0.05 foot from the design alignment within a distance not to exceed 25 feet.

C. Measurement and Payment

Quantities of concrete in curbs, gutters, sidewalks, and driveways shall be measured and payment made at the bid price per unit as shown on the bid sheet. Curbs shall be measured continuous through driveways (approaches). Approaches shall be measured to the "back of curb line" when payment is made by the square foot. Payment shall include full compensation for the furnishing, placing and curing of the concrete together with the excavation, cushion material and all incidentals.

3.06 STRIPING AND PAVEMENT MARKINGS

A. Description

Traffic striping work shall conform to the provisions in Sections 15, 84, and 85 "Existing Highway Facilities," "Traffic Stripes and Pavement Markings," and "Pavement Markers" of the California Standard Specifications, dated July 1992, applicable sheets of the California Standard Plans, dated July 1992, the details and notes as shown on the Plans, and these special provisions.

B. Thermoplastic Traffic Stripes and Pavement Markings

This work shall consist of applying thermoplastic traffic stripes (traffic lines) and pavement markings, including applying glass spheres, at the locations shown on the plans in conformance with Section 84-1 "General," and 84-2 "Thermoplastic Traffic Stripes and Pavement Markings," of the State Standard Specifications and these special provisions.

C. Pavement Markers

This work shall consist of furnishing and placing raised pavement markers at the locations shown on the plans in conformance with Section 85 "Pavement Markers," of the State Standard Specifications and these special provisions.

D. Painted Traffic Stripes and Pavement Markings

Painted traffic stripes and pavement markings shall only be used where the roadway is to be resurfaced within one year. This work shall consist of applying painted traffic stripes (traffic lines) and pavement markings, including glass spheres, at locations shown on the plans in conformance with Section 84-1 "General" and 84-2 "Thermoplastic Traffic Stripes and Pavement Markings" of the Standard Specifications and these special provisions.

E. Removal of Traffic Stripes and Pavement Markings

This work shall consist of removing existing traffic stripes (traffic lines) and pavement markings at the locations shown on the plans in conformance with Sections 15-1 "General," and 15-2 "Miscellaneous Highway Facilities" of the State Standard Specifications and these special provisions.

3.07 HEADER BOARD

A. Description

Header Boards shall be constructed to protect the edges of the asphalt concrete where streets are partially completed.

B. Materials

All header boards shall be either redwood or Douglas fir with an American Wood Preservers Bureau stamp indicating its use for ground contact and application of LP22 waterborne preservative or approved equal.

The boards shall be 2 inch x 6 inch dimensioned of appropriate material.

C. Backfill

Backfill shall be native material, mechanically compacted.

D. Measurement and Payment

Full compensation for conforming to the requirements of this section shall be considered as included in the unit price bid for the header board.

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SECTION 4

STORM DRAINAGE

4.01 DESCRIPTION

This work shall include the furnishing of all labor, materials, tools and equipment to construct and complete, in an efficient and workmanlike manner, the installation of the storm drainage system in accordance with the approved plans, these specifications and the City Standard Details.

These Standards cover storm drainage facilities to be constructed in the public right of way. The drainage system may be rock wells or be a positive collection system discharged into a natural waterway (positive drainage) or detention basin.

4.02 MATERIALS

A. Pipe

1. Reinforced Concrete Pipe shall conform to the specifications of A.S.T.M. Designation C76 and shall be Class III, unless otherwise specified on the plans. Reinforcing shall be the minimum requirements for circular reinforcing wire mesh cages as specified in A.S.T.M. Designation C76. Portland Cement used in the manufacture of reinforced concrete pipe shall conform to the requirements of the specifications for Type II Portland Cement, A.S.T.M. Designation C150.

Test on reinforced concrete pipe shall be required to determine conformance with “D” load and reinforcing requirements of these specifications.

Pipe samples for testing shall be furnished, without charge, by the Contractor one week in advance of construction. The cost of testing the pipe shall be borne by the Contractor. One section of pipe from each lot to be used shall be tested in accordance with the procedures outlined in A.S.T.M. C76. Lots tested shall be marked with the date made as well as by lot number for shipment to the specific project for which that lot has been tested. Any pipe arriving on the job without the appropriate markings shall be rejected and sent back to the supplier until such lot or lots can be tested and accepted for use.

In lieu of the above testing of reinforced concrete pipe, the Contractor may submit to the City Engineer the manufacturer’s “Certificate of Compliance” guaranteeing the requirements of A.S.T.M. C76.

2. Cast-In-Place Concrete Pipe shall require prior approval of the City Engineer and shall conform to the requirements of Section 63 of the State Specifications except that the concrete shall be placed around the full circumference in one operation. Concrete shall be a minimum of 4000 psi.
3. Non-Reinforced Concrete Pipe shall not be allowed.
4. Asbestos Cement Storm Drain Pipe shall not be allowed.

B. Laying Pipe

The pipe shall be laid in conformity with the prescribed lines and grades, which shall be obtained by means of a laser beam or by measuring from a tightly stretched line parallel with the grade and supported on at least 3 points over the center line of the pipe. The Developer or Contractor shall field verify the depth and alignment of any existing storm drain line prior to construction. If the existing storm drain line is not exactly as shown on the improvement plans, the Developer or Contractor shall obtain the approval of the City Engineer before proceeding. All adjustments of pipe to line and grade shall be made by scraping away or filling in and tamping under the body of the pipe and not by blocking or wedging. All pipe shall be laid with bell end upstream and shall be laid upstream from structure to structure.

C. Manhole and Junction Boxes

For storm drains of less than 48 inches in diameter, precast reinforced concrete manholes shall be used. Manhole shall conform to the specifications of sanitary sewer manholes.

In easement areas, the casting grade shall conform to the surrounding surface unless special elevations are required.

For storm drains of 48 inches and greater diameter, junction boxes shall be cast-in-place conforming to the Standard Detail. Concrete shall be furnished, mixed, placed, and cured in accordance with the provisions of Section 90 of the State Specifications and shall be 4000 psi with 1½ inch maximum aggregate size. The inside dimension of manholes and junction boxes shall be such as to provide a minimum of 3 inches clearance on the outside diameter of the outfall pipe and the minimum wall thickness shall be 6 inches.

D. Catch Basins

1. Storm drain catch basins shall be cast-in-place conforming to the Standard Details. Concrete shall be 3000 psi with 1½ inch maximum aggregate size.
2. Curb inlet shall be constructed as shown on Standard Detail #413.

3. The structural channel iron shall be galvanized to conform to the requirements of Section 75-1.05 of the State Standards. Damaged galvanizing shall conform to Section 66-3.05 of the State Standards.

E. Headwalls, Wingwalls, Endwalls, and Railings

All headwalls, wingwalls, and endwalls shall be of 3000 psi reinforced Portland Cement Concrete constructed in accordance with the plans and Section 51 of the State Specifications. Temporary bank protection may be provided by sack concrete rip-rap in accordance with Section 72 of the State Specifications.

F. Drainage Pump Stations

Drainage pump stations shall be allowed on an individual basis with the specific approval of the City Engineer.

G. Rockwells

Standard rock wells shall conform to Standard Detail #407 or the Turlock Well. The depth of rock well shall extend to a level where it penetrates at least a 10 feet continuous coarse sand stratum that is 25 feet or more below the surface of the street. The rock well shall extend to 50 feet deep if a coarse sand stratum is not reached between 25 and 50 feet. Turlock wells shall extend from 50 to 70 feet.

The driller or Developer shall submit to the City Engineer a well drilling log as soon as possible after drilling is completed and prior to acceptance of the improvements by the City Engineer. Rock shall conform to the gradation of State Standards Section 90-3.02, 1.5 inch X 3/4 inch.

The pipe may be either corrugated aluminum pipe, corrugated galvanized steel pipe or SDR 35. The galvanized pipe shall conform to the requirements of Section 66-1.02 of the State Standards.

The catch basin pipe shall be identical to the positive storm drain system inlet as shown on Standard Detail #413.

Temporary rock wells shall be constructed by the Developer or City Contractor where required to provide temporary drainage for his/her work. The temporary rock well shall be constructed as shown on Standard Detail #411.

H. Service Connections

Private on-site development shall not drain into the public right of way unless the right of way has positive storm drain pipes with sufficient capacity to handle additional runoff. Under no circumstances can development tie into an existing rock well.

Service connections include lines from drain inlets in the public right of way, private lines from drain inlets on private property, and private lines from roof drains of private buildings.

Service lines from drain inlets and roof drains on private property shall be constructed to an on-site catch basin or junction structure before entering the R.O.W. Tie-ins are restricted to catch basins, junction boxes or manholes.

4.03 TESTING

A. Rockwells

Testing shall consist of flooding with water until a static head is obtained at the well inlet. Rock wells shall absorb this static water within 24 hours. If the maximum practical input flow has been applied continuously for 1 hour without obtaining a static head, the rock well will be approved. Testing shall be done under the direction of the City Engineer and at Developer or Contractor's expense.

B. Storm Drain Pipes

The City Engineer will inspect all new lines with closed circuit television or by visual inspection made when crawling through the lines. If the closed circuit television is used, the Developer or City Contractor shall give the City Engineer at least 2 working days notice prior to performing the work.

The Developer or City Contractor shall clean all lines of dirt and other debris, clean manholes, remove pipe crowns, compact trench, raise manhole rims to grade, and correct all visible infiltration, leaks, and deficiencies prior to inspection. Areas adjacent to manholes shall be leveled and made accessible to the television trailer. All inspection and equipment time will be charged to the Developer on subdivision projects.

All defects and deficiencies discovered in this inspection shall be corrected by the Contractor to the satisfaction of the City Engineer and at the Contractor's expense.

Measuring devices and depth tolerances for trapped water shall be:

Device	Depth Tolerance
6"	.08'
8"	.11'
10"	.13'
12"	.16'
15"	.20'
18"	depth tolerance = 10% of pipe area

If the City suspects any damage or break in the line, the televised inspection may be repeated within the one year warranty period. All defects discovered in this inspection as well as the cost of the televised inspection shall be corrected by the Contractor at his/her expense.

4.04 MEASUREMENT AND PAYMENT

A. Pipe

Payment for storm drain pipe complete in place shall be per lineal foot measured from center of manhole to center of manhole or catch basin, or from center of manhole to wall of outlet structure as the case may be. Measurement shall be along a line parallel to the grade of the storm drain.

Payment shall include the furnishing of all labor, materials, water, tools, and equipment required to construct and complete, in an efficient and workmanlike manner, the installation of storm drain pipe in accordance with the plans and these specifications.

Full compensation for all incidentals arising from this work shall be considered as included in the price paid per lineal foot measure and no further compensation shall be allowed.

B. Structures, Manholes and Catch Basins

The unit of measure for payment shall be per each unit. Payment shall be made at the bid price per item for each structure complete in place and shall include the cost of excavation, backfill, frames, covers, plates or reinforcing steel where required.

Full compensation for all incidentals, arising from this work shall be considered as included in the price paid per each unit and no further compensation shall be allowed.

SECTION 5

SANITARY SEWERS

5.01 DESCRIPTION

This work shall include the furnishing of all the labor, materials, tools and equipment to construct and complete, in an efficient and workmanlike manner, the installation of the sanitary sewer mains and laterals in accordance with the approved plans, standard details and these specifications. All work shall be done in an orderly and workmanlike manner and under the direction and to the satisfaction of the City Engineer.

5.02 MATERIALS

A. General

The source and supply of materials shall be approved by the City Engineer. Compression joints shall be used for all pipe and shall conform to the current standard specifications of the A.S.T.M. C42-91.

B. Gravity Sewer Pipe

1. Vitrified Clay Pipe shall be extra strength, bell and spigot end compression joint pipe, conforming to A.S.T.M. Designation C700-91T as it applies to unglazed vitrified clay pipe.
2. Cast Iron Pipe shall conform to the current standard specifications of the American National Standards Institute (ANSI) A21.6, and shall be Class 150, with bell and spigot joints. Cast Iron fittings shall conform to ANSI/AWWA C110-77. In areas of minimum cover, (typically 2 to 3 feet), No-Hub Cast Iron Pipe and fittings conforming to CISPI 301 and 310 may be used. However, all No-Hub Cast Iron Pipe and fittings, including services, shall be hydrostatically tested in accordance with Section 11.03 of these standards. The hydrostatic test shall be performed after the pipe and fittings have passed the television inspection.
3. Ductile Iron Pipe shall be Class 50 and shall conform to the current standard specifications of the ANSI/AWWA C151/A21.51 and shall have a minimum 35 mil polyethylene lining in conformance with A.S.T.M. Designation D1248. All fittings shall conform to ANSI/AWWA C110/A21.10.

C. Pressure Sewer Pipe

Whenever the design of a sanitary sewer system includes the necessity of a sewage lift station and pressure mains, types of pipe shall be approved by the City Engineer for each specific case.

D. Joints and Couplings

1. Vitrified Clay Joints shall be resilient material conforming to the requirements of A.S.T.M. Designation C425.
2. Banded Rubber Couplings shall conform to the requirements of A.S.T.M. Designation C425.

E. Fittings

All fitting shall be manufactured of the same materials as the pipe and installed in accordance with City Standard Details.

F. Laterals

1. Pipe shall be of the same type and class as that used for the main.
2. Joints and Couplings for laterals shall be the same type and specifications as those used for the main.

G. Connections

1. Vitrified Clay Pipe (V.C.P.)

For 6 inch VCP mains, a cut-in clay wye or tee shall be used with plain ends along the “run” of the pipe, and a bell branch end may be used.

A synthetic, rubber, wedged, insert tee, “Tap-Tite”, may be substituted for the clay wye or tee.

For 8 inch or 10 inch VCP mains, a tap-in clay wye saddle with a collar or tee saddle with a collar shall be used having a bell branch end.

A synthetic, rubber, wedged, insert tee, “Tap-Tite”, may be substituted for the clay wye saddle or tee saddle.

When cutting in a wye or tee, well graded, crushed stone or crushed gravel, meeting the requirements of ASTM Designation C33, Gradation 67 (3/4 to No. 4) shall be placed under the main line and the sewer service lateral within the right of way line.

When joining the cut ends of the existing main to the wye or tee, a “BAND SEAL” type sewer repair coupling, or approved equal, shall be used. Calder couplings will not be permitted on the “run” of the pipe.

When joining the wye saddle or the tee saddle to the existing main, “WYN-STIK ES-20-A” epoxy resin compound, or approved equal, shall be used.

When connecting a sewer lateral directly from the manhole to the right of way line, Vitrified Clay Pipe shall be used from the manhole out to 1 foot from the manhole housing. The VCP shall then be cut, and joined to the remaining sections of the service lateral with a clay caulder coupling with shear bands, or approved equal.

2. Cast Iron Pipe (C.I.P.)

Only Cast Iron wyes and tees shall be used for connection to Cast Iron sewer mains, and shall conform to the current standard specifications of the American National Standards Institute (ANSI) C110-77. No-Hub Cast Iron wyes and tees shall be used for connections to No-Hub Cast Iron wyes and tees shall be used for connections to No-Hub Cast Iron sewer mains.

Only Class 50 Cast Iron straight pipe, elbows and fittings shall be used from the sewer main to the right of way line. Cast Iron Pipe shall be furnished with “Tyton Joints”, “Ty-Seal Joints”, or approved equal. Cast Iron transition couplings shall be installed in accordance with the manufacturer’s specifications for pipe size.

When connecting a sewer lateral directly from the manhole to the right of way line, Cast Iron Pipe shall be inserted into the manhole and brought to the right of way line.

3. Ductile Iron Pipe (DIP)

Connections to Ductile Iron Pipe sewer mains shall be at manholes only.

Only Cast Iron straight pipe, elbows and fittings shall be used from the sewer main to the right of way line. Cast Iron Pipe shall be furnished with “Tyton Joints”, “Ty-Seal Joints”, or approved equal. Cast Iron transition couplings shall be installed in accordance with the manufacturer’s specification for each pipe size.

When connecting a sewer lateral directly from the manhole to the right of way line, Cast Iron Pipe shall be inserted into the manhole and brought to the right of way line.

H. Manholes

Sanitary sewer manholes shall be of precast reinforced concrete conforming to A.S.T.M. Designation C478 except that the Portland Cement shall be Type II modified cement. The manhole base, riser and cone shall have a minimum compressive strength of 4,000 psi at 28 days. Manholes shall be constructed in accordance with the Standard Details.

Iron castings for manhole covers and frames shall conform to A.S.T.M. Designation A48, Class 25 and be of the dimension shown on the Standard Details.

All castings shall be sound and free from shrinkage cracks, blow holes, and other defects. All fins and burnt sand must be removed. Excessive porosity and spongy surfaces will constitute causes for rejection. The City Engineer shall be the judge as to whether the defects are sufficient to cause rejection.

The manhole cover shall seat evenly and firmly in the frame. Cast iron frames and covers shall be dipped or painted with asphalt, which will form a tough, tenacious, non-scaling coating which does not have a tendency to become brittle when cold or sticky when hot.

I. Cleanouts

Back of sidewalk cleanouts shall be constructed in accordance with the Standard Details.

J. Conductor Pipe

Pipe used as a conductor pipe under a highway or railroad shall be welded steel pipe. The protective lining and coating if any, shall be as shown on the plans or specified in the Special Provisions.

Welded steel pipe shall be manufactured of steel meeting the requirements of A.S.T.M. Designation A245, Commercial Grade. The method by which the pipe is manufactured shall comply with one or more of A.S.T.M. Specifications: A-134, A-135, A-139, or A-211. The pipe shall be welded by either the electric-resistance or electric-fusion process, with either spiral seam welded joint or straight seam welded joint. All joints shall be butt-welded.

When the conductor pipe is to be installed by boring and jacking, the wall thickness shall be 1/4 inch for sizes up to and including 24 inches in diameter, and 5/16 inch for sizes 27 inches to 36 inches in diameter, unless otherwise specified.

5.03 INSTALLATION

- A. Sanitary Sewer Installation - All sanitary sewer pipe installations shall be accomplished as specified herein except where modified by the requirements specific to the various types of pipeline materials specified under Section 10.02.

All sewer pipe shall be laid with a minimum of 12 inches vertical clearance from water and 6 inches clearance from all other improvements and utilities, unless otherwise approved by the City Engineer. Refer to the pipe cover requirements in Section 5.04 of the Design Standards for minimum cover requirements. All pipe shall be laid to conform to the prescribed line and grade as shown on the plans and each pipe length checked to the grade line which the Contractor establishes from the grade stakes.

The grade line shall be established before any pipe is laid in the trench. For pipes with slopes greater than 1%, the string line set for trenching purposes may be used as the grade line. For pipes with slopes less than 1%, either (1) a grade line shall be established in the bottom of the trench such that the top of each bell will touch the line when the pipe has been properly positioned, or (2) a grade line shall be established above the trench on firmly secured batter boards from which the grade of each pipe can be checked by using a grade pole.

Alternate use of commercial LASER grade setting systems in lieu of string lines specified herein are acceptable when the following requirements and conditions are met:

1. The Contractor shall have the responsibility of providing an instrument operator who is qualified and trained in the operation of the LASER and said operator must adhere to the provisions of the State of California Construction Safety Orders issued by the Division of Industrial Safety. Attention is particularly directed to Sections 1516, 1800, and 1801 of said Orders for applicable requirements.
2. All LASER control points shall be established bench marks or construction off-set stakes identified on cut sheets and set in the field for the work. LASER set up points shall be these control points or points set directly from them by instrument.

Each length of pipe shall be laid on compacted, approved bedding material as specified and shall have full bearing for its entire length between bell holes excavated in said bedding material to allow for unobstructed assembly of all bell and spigot joints. "Stabbing", "Swinging In", or "Popping On" spigot ends of pipe into bell ends will not be permitted. After jointing is accomplished, all annular spaces between pipe and bell holes shall be packed with bedding material, taking care not to damage, move or lift the pipe from its bedding support.

Adjustments of pipe to line and grade shall be made by scraping away or filling in and tamping approved material under the body of the pipe. No wedging or blocking to support the pipe will be permitted.

A sewer line, unless otherwise approved by the City Engineer, shall be laid, without break, upgrade from point of connection to existing sewer and with the bell end forward or upgrade. Pipe shall not be laid when the City Engineer determines that the condition of the trench or the weather is unsuitable. When pipe-laying is not in progress, the forward end of the pipe shall be kept effectively closed with an approved temporary plug or cap.

Sewer pipes, branches, stubs, or other open ends which are not to be immediately connected, shall be plugged or capped with a standard watertight plug or cap, as approved by the City Engineer for use in the particular installation. The plug or cap shall be placed on a standard end.

Pipe entering or leaving manholes or other structures shall have joints within 2½ feet of the manhole base.

In all cases, flexibility of joints in or at the manhole base shall be preserved to prevent damage to the pipe by differential settlement.

All sewer line connections to manholes, trunk sewers, main sewers, or side sewers shall be left uncovered until after the inspection has been made. After approval of the connection, the trench shall be backfilled as specified. The City Engineer may, at his/her discretion, require special pipe to be laid in areas that are potentially unstable or subject to settlement.

If the sewer is to be laid in an area that is to be filled, and the cover prior to filling is less than 5 feet, the pipe shall not be laid until the area has been filled to a level 5 feet above the proposed pipe and compacted to 90% relative compaction, unless otherwise authorized by the City Engineer.

When a new sewer is extended from other than an existing manhole and the first new manhole upstream of the connection establishes conditions prescribed in Section 5.02 of the Design Standards, the Contractor installing such new facilities shall also be responsible for installing backwater prevention devices in conformance with said section on existing side sewers so affected.

B. Laterals

Attention is directed to the Standard Details for additional details and requirements pertinent to lateral installations.

Wye or tee: (for 6 inch VCP main and all Cast Iron or Ductile mains)

1. Excavate sewer main to a point 6 inches below required depth.
2. Make three (3) initial cuts in the main, 2 to 6 inches apart, and remove the rings. Cut the main to the required length to insert wye or tee.
3. Place 6 inches of crushed stone or crushed gravel as per Section 8.10 of these Standards at bottom of sewer main trench.
4. Install wye or tee as per Standard Plans. Tee shall be used if main is 5 feet or deeper.

Wye Saddle or Tee Saddle: (for 8 inch or 10 inch VCP mains)

Whenever lateral lines are to be installed as part of the Contract for the construction of the sewer main, the use of saddles will not be permitted.

That portion of any lateral line to be placed under an existing curb and gutter and/or sidewalk shall be done by boring or cutting and replacing the existing curb and gutter and/or sidewalk.

The lateral line shall have a clean-out at back edge of sidewalk as shown on the Standard Details. A cover box shall be installed as noted on detail. Said cleanout shall consist of a combination wye and eighth bend. Laterals and cleanouts shall not be located in the driveway.

The wye branches, unless otherwise specified, shall be inclined at any angle not greater than 45 degrees from the horizontal.

The end of the lateral service shall extend a maximum of 48 inches and a minimum of 24 inches beyond the rear edge of the sidewalk in streets having sidewalks adjacent to the curb and shall extend a maximum of 12 inches and a minimum of 6 inches beyond the back edge of the curb for sidewalks that are separated from the curb by a planter strip and in commercial sidewalks.

The location of every sewer service shall be marked with an "S" directly above the service on the top of curb, the "S" to be 1½ inches in height and 1/4 inch in depth.

When a backwater prevention device is required under Section 5 of the Engineering Design Standards, such installations shall be made after final grading around the building has been completed and at a location where sewage can overflow without serious property damage on adjacent areas. It shall be the responsibility of the Contractor installing backwater prevention devices to see that informational notices, for present and

future owners, regarding the importance of such devices are conspicuously posted upon the device and on the structure by said device.

C. Manholes

Precast Manhole Construction - All precast manholes shall be excavated and backfilled in conformance with the requirements of Section 19-3 of the State Specifications and installed as specified herein. All embedment materials under, around and at least 3 inches over all pipelines located within five feet of structure bases shall be compacted without jetting prior to barrel section placements. All precast manholes shall be constructed to subgrade prior to setting adjoining sewer pipeline trench and/or structure backfill where such method of compaction is permitted and used.

All joint surfaces of precast sections and face of manhole base shall be thoroughly clean prior to setting precast sections. These various sections shall be set in preformed plastic sealing gaskets of material conforming to the requirements of FEDERAL SPECIFICATION SS-S-00210.

1. Installation of gaskets - Apply one coat of primer to clean, dry joint surface (both tongue and groove) and of the two-piece wrapper on the gasket. The outside paper will protect the gasket and assure against stretching. Before setting the manhole section in the trench, attach the plastic gasket strips end-to-end to the tongue or groove of each joint, forming a continuous gasket around the entire circumference of the manhole joint.
2. Handling of barrel sections after the plastic gasket has been affixed shall be carefully controlled to avoid bumping the gasket and thus displacing it or contaminating it with dirt or other foreign material. Any gaskets so disturbed shall be removed and replaced if damaged and repositioned if displaced.
3. Care shall be taken to properly align the manhole section with the previously set section before it is lowered into position.
4. During cold or wet weather, pass direct heat over the concrete joint surface lightly until ice, frost and moisture are removed and surface to be primed is dry and warm immediately before application of primer. Direct heat shall also be passed over plastic gasket strips immediately prior to attaching them to joint surfaces and immediately prior to insertion of tongue into groove.

The cast-in-place base shall be 4,000 psi, 28 day concrete with 1½ inch maximum size aggregate. It shall rest on firm, undisturbed soil, and shall be of the dimensions shown on the Standard Details.

Where sewer lines pass through manholes, the pipe shall be laid continuously as a whole pipe. After the manhole base and precast sections have been placed and sufficient time has elapsed to allow all concrete and grout to set, the top half of pipe within the manhole shall be carefully cut off and the sides mortared. All channels so formed shall be checked with a template and shall form a smooth flowing channel at all flow depths.

Temporary covers of 3/8 inch steel plate of sufficient size to adequately cover the opening shall be placed on the cone until the base is complete and the manhole casting shall then be installed. Suitably located ribs shall be welded to the underside of the cover to hold it in place during any grading operations.

The throat of the manhole shall be made of precast concrete rings of the proper inside diameter. The minimum depth of throat permitted shall be one 3 inch ring between the cone and the frame. The maximum depth permitted shall be 12 inches of rings between the cone and frame.

When adjusting the manhole frame and cover to grade, the frame shall be wired to a 2" x 4" of sufficient length to span the excavation and the throat completed to the right level. Whenever the space between the bottom of the frame and the top of a ring is less than three inches, the void may be filled with concrete, poured against a suitable form on the inside of the structure.

When adjusting an existing manhole to grade and the total depth of the throat from the top of the frame to the bottom of the throat exceeds 24 inches, the upper portion of the manhole shall be removed to the first full-size manhole section. The upper portion shall then be reconstructed as outlined above.

Connections to existing manholes shall be made by carefully breaking out an opening in the wall of the manhole, inserting the end of the pipe through the opening, and packing the opening around the pipe with a stiff mix of cement mortar thoroughly compacted. The mortar shall be composed of one part Type II Portland Cement and three parts clean sand. Connections shall be watertight.

Before any work is started on adjusting or repairing a manhole, the channels in the base shall be covered with strips of wood, and the entire base covered with a heavy piece of canvas. This cover shall be kept in place during all work. Upon completion of the work the wood strips and the canvas shall be removed from the manhole, allowing no debris to fall or remain in the manhole.

D. Inspection

The City Engineer shall at all times have access to the work during its construction, and the Contractor shall provide proper and safe facilities for such access and inspection.

City Engineer shall be furnished with every reasonable facility for ascertaining that the materials and the workmanship are in accordance with the requirements and intentions of these specifications. All work done and all materials furnished shall be subject to his/her inspection and approval.

The work shall be done under the supervision and to the complete satisfaction of the City and in accordance with the laws of the State of California.

The inspection of the work shall not relieve the Contractor of any of his/her obligations to fulfill his/her contract as prescribed, and defective work shall be made good and unsuitable materials may be rejected, notwithstanding that such defective work and materials have been previously overlooked by the City Engineer and accepted or estimated for payment. See Section 3-1.06 of the General Provisions.

The Contractor shall, at any time when requested, submit to the City Engineer properly authenticated documents or other satisfactory proof as to his/her compliance with the requirements of these Specifications.

E. Testing of Sewer Lines

All leakage tests shall be completed and approved after backfilling and prior to placing of permanent resurfacing.

1. Cleaning and Flushing

Prior to performing a leakage test, the pipe installation shall be thoroughly cleaned. Cleaning shall be performed by the Contractor by means of an inflatable rubber ball. The ball shall be of a size that will fit snugly into the pipe to be flushed. The ball shall be placed in the last cleanout or manhole on the pipe to be cleaned, and water introduced behind it. The ball shall pass through the pipe with only the pressure of the water impelling it. All debris flushed out ahead of the ball shall be removed at the first manhole where its presence is noted. If any wedged debris or damaged pipe shall stop the ball, the Contractor shall remove the obstruction. When a new sewer is connected to an existing line, cleaning and flushing shall be carried out to the first existing manhole downstream from the point of connection.

2. Low-Pressure Air Test

After completing backfill of a section of sewer line, the Contractor shall at his/her expense, conduct a Line Acceptance Test using low pressure air. The test shall be performed using the equipment listed below, according to stated procedures and under the supervision of the City Engineer.

PROCEDURE: The section of pipe to be tested shall be isolated by completely blocking all outlets in the section under test. Careful attention must be given to the bracing of all plugs, as the line will be under pressure. One of the plugs used at the manhole must be equipped for an air inlet to fill the line from the air compressor. The air compressor which feeds air into the pipe section must be equipped to control the air entry rate and to prevent the pressure from exceeding 5 psig. The air compressor shall be fitted with a blow-off valve to operate at 5.0 psig to prevent an increase in pressure which could be hazardous to the pipeline.

After the pipe has been wetted, the air shall be allowed to slowly fill the pipe line until a constant pressure of 4.0 psig is maintained. At this point, the air compressor shall be controlled so that the internal pressure in the line is maintained between 4.0 and 3.5 psig for at least two minutes to permit the temperature of the entering air to equalize with the temperature of the pipe wall. If it is necessary to bleed off the air to repair a faulty plug, a new two-minute interval must be allowed when the line has been refilled.

When the temperature of the air has reached equilibrium with that of the pipe wall, the air source shall be disconnected. Before disconnecting the air supply, the pressure shall be at 4.0 psig. The gauge is then watched until the air pressure reaches 3.5 psig. When the pressure has reached 3.5 psig a stop watch will be started and stopped when the pressure has reached 2.5 psig. The time required, as shown on the watch, for the loss of 1.0 psig drop shall be in accordance with ASTM C 828 or NCPI Low Pressure Air Tables for Sanitary Sewer. The portion of line being tested shall be termed "Acceptable" if the time required in minutes for the pressure to decrease from 3.5 to 2.5 psig is not less than the time shown for the given diameters in the following table:

TABLE 5.1
AIR PRESSURE TEST

Main Line		4" House Connection				
Diameter (inches)	Length (feet)	House Connection Length				
		0 ft.	100 ft.	200 ft.	300 ft.	400 ft.
8	0	0	20	40	50	70
	50	40	50	70	90	80
	100	70	90	100	100	90
	150	110	120	110	100	100
	200	140	120	110	110	100
	300	140	130	120	110	110
	400	140	130	120	120	110
Main Line		6" House Connection				
Diameter (inches)	Length (feet)	House Connection Length				
		0 ft.	100 ft.	200 ft.	300 ft.	400 ft.
8	0	0	40	80	100	100
	50	40	70	110	110	110
	100	70	110	120	110	110
	150	110	120	120	120	110
	200	140	130	120	120	120
	300	140	130	120	120	120
	400	140	130	130	120	120

Time in Seconds for Pressure to Drop from 2.5 to 1.5 psi Gage Pressure

The air test shall be performed after the completion of backfill and compaction and prior to final paving and pouring of the curbs, gutters and sidewalks.

The Contractor shall furnish all equipment needed to complete this test.

If the installation fails to meet this requirement, the Contractor shall, at his/her own expense, determine the source of leakage. He/she shall then repair or replace all defective materials and/or workmanship and perform the air test as many times as necessary to achieve an acceptable test.

3. Televised Inspection

The City Engineer will inspect all new lines with closed circuit television. The Contractor shall give the City Engineer at least 2 working days notice prior to performing the work.

The Contractor shall clean all lines of dirt and other debris, clean manholes, remove broken pipe, compact trench, raise manhole rims to grade, and pass the air test prior to television inspection. Areas adjacent to manholes shall be leveled and made accessible to the television trailer.

Defects such as high and low spots, joint separations, offset joints, chipped ends, cracked or damaged pipe, infiltration pints and debris in lines shall be corrected by the contractor at his/her expense. For joint separations, low spots and chipped ends, the following maximum acceptable limits will apply for eight and ten inch pipes:

Joint separations - ½ inch

Low spots - 6"	-	1/2" (.04')	Depth tolerance of trapped water
8"	-	3/4" (.06')	
10"	-	1" (.08')	
12" & larger		depth tolerance = 10% of pipe area	

Chipped ends - 1/4 inch

For pipe larger than 10 inches, specific maximum limits will be specified by the City for each Project.

F. Cleanouts

Back of sidewalk cleanouts shall be constructed in accordance with the Standard Details.

Concrete shall be Grade B conforming to Section 201-1.3.2 "Combined Aggregate Gradings" of SSPWC and have a 28-day compressive strength of 2500 psi.

Cleanout frames and covers shall be manufactured, tested and otherwise furnished in accordance with the Standard Specification of Fray Iron Castings A.S.T.M. serial designation A48.48 , Class 30. The contact surfaces of frames and cover shall be machine surfaced to eliminate rattling and other movement under traffic. Castings shall be equal in materials and construction to cleanout assemblies Christy F14, or approved equal.

G. Grease Traps

Grease traps and interceptors shall be constructed by the Developer on private property on the sewer service lateral for any facility whose operation will result in oil, grease, sand or other solids being discharged into the City's sanitary sewer system.

The traps or interceptor shall conform to Section 708 and 711 of the current Uniform Plumbing Code adopted by the City and it shall be constructed where it can be easily inspected for proper operation by the City Engineer.

For additional information regarding specific requirements for grease traps contact the Chief Building Official.

5.04 MEASUREMENT AND PAYMENT

A. Pipe

Payment for sanitary sewer pipe complete in place shall be per lineal foot measured from center of manhole to center of manhole following a line parallel to the grade of the sewer. Payment shall include the furnishing of all labor, materials, water, tools, and equipment required to construct and complete in an efficient and workmanlike manner the installation of the sewer pipe in accordance with the plans and these specifications.

Full compensation for all incidentals arising from this work shall be considered as included in the price paid per unit of measure and no further compensation shall be allowed.

B. Structures & Manholes

The unit of measure for payment shall be per each unit. Payment shall be made at the bid price per item for each structure complete in place and shall include the cost of excavation, backfill, frames, covers, plates, or reinforcing steel where required.

Full compensation for all incidentals arising from this work shall be considered as included in the price paid per unit of measure and no further compensation shall be allowed.

SECTION 6

WATER DISTRIBUTION

6.01 DESCRIPTION

This work shall include the furnishing of all the labor, materials tools and equipment to construct and complete in an efficient and workmanlike manner the installation of the water lines in accordance with the approved plans, these specifications and the Standard Details.

6.02 MATERIALS

Materials to be Furnished and Installed by Developer:

The Developer or Contractor shall furnish all labor, material, equipment and appliances required to complete the water mains and services specified, with exception to those items listed in these Standards. In new single family subdivisions, the Developer or Contractor shall furnish and install the meter boxes.

Materials to be Furnished and Installed by City:

All connections to existing "live" lines, including service taps, shall be made by city crews.

Tapping sleeves and valves

1½ inch or larger water service

Meters, single check valves and meter boxes, unless otherwise listed in a previous section of these standards.

A temporary tie-in for the extension of a water main into a subdivision will be installed by the City at the developer's expense. Only one temporary tie-in, including water meter, will be allowed for each subdivision during construction. Any remaining tie-ins will be installed by the City upon acceptance of the waterlines. Developer or Contractor shall provide at least 4 working days notice prior to installation of the temporary tie-in.

A. Pipe

1. Ductile Iron Pipe (DIP)

Ductile iron pipe Class 350 Pressure may be substituted for Polyvinyl Chloride Pipe (P.V.C.) through 12". Ductile iron pipe shall conform to the A.W.W.A. C151. Water pipe materials with diameters over 12" shall be specified by the City Engineer.

Ductile iron pipe shall have "Tyton Joints", "Ty-Seal Joints", or approved equal and shall be cement lined in conformance with latest A.W.W.A. Specification C-104. All ductile iron pipe shall be protected by a polyethylene encasement in conformance with A.W.W.A. C105.

2. Polyvinyl Chloride Pipe (P.V.C.)

Polyvinyl chloride pressure pipe shall be Class 150 DR 18, and shall conform to AWWA C-900. Polyvinyl chloride pipe shall be Pacific Western, John Mansville, Certainteed or approved equal. All polyvinyl chloride pipe shall be twenty (20) foot laying lengths and shall have cast iron outside diameters (C.I.O.D.'s).

Joints of Polyvinyl Chloride pipe shall have elastomeric-gasket bell ends or couplings. The bell ends shall be integral thickened bell end or integral sleeve-reinforced bell end. The bell end joints shall have a minimum wall thickness of the bell or sleeve-reinforced bell, equal at all points to the Standard Dimension Ratio (S.D.R.) requirements for the pipe. The minimum wall thickness in the ring groove and bell-entry sections shall be equal to or exceed the minimum wall thickness of the pipe barrel.

If belled pipe is not used, one Polyvinyl Chloride coupling, manufactured of the same material and by the same manufacturer as the pipe, shall be furnished with each length of pipe together with 2 rubber rings.

Butterfly valves may be installed on Class 150 Polyvinyl Chloride Pipe main runs but shall not be used on Class 200 or greater.

B. Fitting and Thrust Blocking

Bends, tees and other fittings shall be Ductile Iron, Class 150, for use with Cast Iron Pipe and Ductile Iron Pipe (Flange Fittings -A.W.W.A. 110, Mechanical Fittings - A.W.W.A. 111). All fittings for Polyvinyl Chloride Pipe shall be mechanical joints except fittings with valves shall be mechanical joints by flange.

Fittings shall be handled and jointed as specified for pipe installation herein before. Reaction or thrust blocking shall be constructed at bends, tees, dead ends and where changes in pipe diameter occur. Blocking shall be made of 3,000 psi concrete, and shall be placed between undisturbed ground and the fitting to be anchored. The area of bearing on the pipe and on the ground shall be that required by City Standard Details. The blocking shall be placed so that the joints of the pipe and fittings will be accessible for repair.

C. Valves and Valve Boxes

All valves shall be Mueller resilient seat gate valve, American Darling compression resilient seat valve, M & H 3067 AWWA resilient seat gate valve, Kennedy resilient seat gate valve, AVK resilient seat gate valve, Clow resilient seat gate valve or approved equal, and shall be the rubber-seated, tight-closing type conforming to the current AWWA Specifications C-509. Valves shall open left and be equipped with a 2 inch AWWA operating nut. Dresser "450" butterfly valve conforming to the current AWWA Specifications C-504, or approved equal, may be installed on main runs, only.

Valve boxes shall be Christy G5 with Christy Cast Iron cover or approved equals. The following materials may be used for extensions: concrete, 8 inch Poly-Vinyl Chloride Pipe, with a minimum 50 foot head, or approved equal. All valve boxes shall be installed to finished grade as per the City Standard Detail.

D. Water Service Materials

Plastic Pipe shall be used for all 1 inch water services.

Polyvinyl Chloride Pipe Schedule 40 shall be used for all water services larger than 1 inch and smaller than 4 inches.

Polyvinyl Chloride Pipe C-900 shall be used for all 4 inch or larger water services.

(1) 1 Inch Water Service With Meter Box

All 1 inch water services, including meter boxes, shall be installed in accordance with the Standard Detail. The following materials shall be used:

Plastic Pipe: All Plastic Pipe shall be ultra-high molecular weight polyethylene flexible pipe; Class 160 psi; PE 3408 for potable water; 1 inch iron pipe size (I.P.S.); outside diameter from 1.310 inches to 1.370 inches per latest A.W.W.A. Specification C901.

Manufacturer shall be: YARDLEY - 02223; DRISCOPIPE - 5100 or WESFLEX - PE 3408

Curb Stop, Meter Box, and Related Materials: The curb stop shall be a 1 inch ball valve Ford BA13-444W-LA86-44 or Jones J-1971W.

Meter adaptor: 1 inch Meter coupling, Ford SP3 or approved equal

Meter idler: Schedule 80 PVC 10-3/4 inch x 1-1/4 inch threaded

Meter box: Christy #B12, 12 inch x 20 inch with G20 cover/cast iron hinged lid or Brooks 1017 with hinged cast iron lid in pedestrian areas, only.

For drive approaches and vehicular traffic areas, a Christy cover shall be provided as follows:

Residential: Cast-iron traffic cover

Commercial or Industrial: Steel checker plate

(2) Water Main Taps

Service taps on lines not yet accepted by the City shall be made by the Developer or Contractor, after approval by the City Engineer.

The Polyvinyl Chloride water mains shall be tapped with a hole saw. Saddles shall be bronze full body Mueller, Jones, Ford or Clow. Corporation stops shall be Ford FB1101 (1") or FB1100 (1½" and 2") or Jones J3402 (1") or J1397 (1½" and 2").

(3) Backflow Prevention Device:

An approved backflow prevention device shall be installed at all connections to the City water main at Developer's or Contractor's expense. The approved backflow prevention device shall be approved by the City Engineer prior to installation.

All backflow prevention devices shall be of the type approved by the Foundation for Cross-Connection Control and Hydraulic Research, University of Southern California.

All backflow prevention devices shall be installed according to manufacturers' specifications, unless otherwise approved by the City Engineer.

(4) Pipe Locating Wire for Non-Conductive Water Mains:

Tracer wire shall be solid #10 AWG copper wire, soft drawn.

(5) Air Release Valve

Air release valves shall be APCO or equal and conform to the Standard Details.

6.03 INSTALLATION

A. Handling of Pipe and Accessories

Proper implements, tools, equipment and facilities satisfactory to the City Engineer shall be provided and used by the Developer or Contractor for the safe and efficient execution of the work. All pipe, fittings, valves, hydrants and accessories shall be lowered into the trench in such a manner as to prevent damage to pipe fittings. Under no circumstance shall pipe or accessories be dropped or dumped into the trench. Special care shall be exercised so that the coating on pipe, valves and fittings will not be damaged. If such damage should occur, the coating shall be repaired to the satisfaction of the City Engineer. Chain slings will not be permitted. Pipe loaded on trucks or stacked one upon another shall be supported on wooden blocking. Pipe handled sideways shall not be skidded or rolled against pipe already on the ground. All foreign matter or dirt shall be removed from the interior of pipe before lowering into position in the trench. Pipe shall be kept clean by means approved by the City Engineer during and after laying. All pipe and accessories shall be inspected for defects prior to lowering into trench. Any defective, damaged or unsound pipe or accessory shall be repaired or replaced at the Developer's or Contractor's expense

B. Laying Pipe

The Developer or Contractor shall field verify the depth and alignment of any existing water line prior to construction. If the existing water line is not exactly as shown on the improvement plans, the Developer or Contractor shall obtain approval of the City Engineer before proceeding.

When waterlines are being installed in new subdivision, mainline pipe and the fire hydrant runs shall be installed prior to the installation of curb, gutter, and sidewalk. The services shall be installed after the curb, gutter, and sidewalk. Pipe shall be installed in accordance with manufacturer's recommendations. Uniform bearing shall be developed under the full length of the barrel of the pipe. Bell holes shall be provided at each joint, but shall be no larger than necessary for joint assembly.

All pipe for water mains and laterals shall be laid to line and grade as shown on the approved plans and at such depths as to provide 42 inches minimum cover from the top of the pipe to ultimate finish street grade. The Developer or Contractor shall be responsible for verifying ultimate finish grade by requesting this information from the City Engineer.

When curved alignment is shown on the plans the maximum deflection at any joint shall not exceed the manufacturer's recommendation for the type of pipe and joint being used.

Thrust blocks of 3,000 psi concrete shall be cast-in-place at all bends, reducers, behind each tee, or each cross which is valved in such a manner that it can act as a tee, and at the back of fire hydrants. The thrust block shall extend from the fitting to undisturbed soil, shall be kept clear of the joints, and shall be of such bearing area as to assure adequate resistance to the force to be encountered. In lieu of the above, movement may be prevented by the use of pipe collars and stainless steel rods and other joint restraint devices approved by the City Engineer. When straps are used to secure thrust blocks, they shall be stainless steel.

Whenever pipe laying is discontinued for short periods, or when work is stopped at the end of the day, the open ends of all mains shall be closed with water-tight plugs or bulkheads. The plug or bulkhead shall not be removed unless or until the trench is dry.

Valves shall be set plumb and properly fitted to the adjacent sections of the main. A valve box shall be installed over each valve.

Tracer (locating) wire shall be laid on top of the P.V.C. pipe and connected at valves per the Standard Details. Tracer tape will not be accepted.

C. Installation of Service Lines

Installation of the services shall consist of the following basic steps:

- (a) Excavation of the entire service trench.
- (b) Thoroughly clean the water main.
- (c) Place and make tap as shown on the Standard Drawing.
- (d) Open tap valve immediately after making tap to flush material from the main line.
- (e) Insert stainless steel sleeves in the plastic pipe and tighten service line connections as per manufacturer's recommendation.
- (f) Place the service line at right angles to the water main.
- (g) Use boring or pushing methods, but not washing methods, to place pipe under curb and sidewalk.
- (h) Backfill and compact the dirt above the service line.

- (i) Service location to be marked by chiseling a "X" on curb face.
- (j) Curb stop, stainless steel insert, meter idler, meter adaptor, service plug for SP3 unit, meter box with a brick at each corner, and lid to be placed at correct depth and distance from sidewalk.

Plastic service pipe shall not be heat-flared. Because of the variation in the outside diameter of the pipe, a saddle tap in lieu of the Quiktap may be required.

Special care shall be exercised to insure proper compaction is made under curb stop so it is vertical and the meter idler is level. Compaction shall be made under and around the meter box so it remains level and at the finished sidewalk grade.

D. Fire Hydrants (See Standard Detail #606)

Fire hydrants shall be Jones J-4040, Long Beach Model 425, Clow Model 850, Mueller A-481 or approved equal and shall conform to the latest AWWA Specifications, C-503, for wet-barrel fire hydrants. All hydrants shall be painted with "Caterpillar Yellow" Polyurethane High Duty Industrial Enamel.

E. Temporary Blow-Offs (See Standard Detail #610)

The final length of pipe, prior to the blow-off, shall be 18 to 39 inches. All salvaged temporary blow-offs shall become the property of the Developer or Contractor and shall be removed from the job site before completion.

F. Connections with Existing Waterlines

THE CITY WILL MAKE ALL CONNECTIONS TO THE EXISTING WATERLINES UNLESS SPECIFICALLY APPROVED OTHERWISE BY THE CITY ENGINEER.

When work is done by the Developer or Contractor, the Developer or Contractor shall make all excavations and furnish, install and maintain such shoring, bracing and sheeting necessary for these connections. The Developer or Contractor shall install the water line within 6 inches vertically and with a 10 foot separation from the tie-in to the existing system.

Connections shall be made at such times as designated by the City Engineer and in such a manner as to insure the least inconvenience to water users. No connection shall be made until the new work has been tested and disinfected as specified hereinafter. The Developer or Contractor shall be responsible for safeguarding the existing system from

all damage and possible contamination in the performance of the work. The City shall furnish the pipe and materials necessary to make the tie-in with the existing system.

G. Testing of Water Mains

After the pipe has been backfilled to 12 inches over the top, each section of the pipe to be tested shall be slowly filled with water and all air shall be expelled from the pipe. The release of the air can be accomplished by opening hydrants and service line cocks at the high points of the system and the blow-offs at the dead ends. The valves controlling the admission of water into the section of pipe to be tested should be opened wide before shutting the hydrants or blow-offs. After the system has been filled and pressurized to the service pressure of 50 pounds with water and all air expelled, all valves controlling the section to be tested shall be closed and the line be allowed to set pressurized for a period of not less than 24 hours.

The pipe shall then be refilled, if necessary, and subjected to a pressure of not less than 150 pounds per square inch or the service pressure plus 50 pounds, whichever is greater, for a period of not less than 1 hour. Curb stops, idler fittings and SP3 units shall also be included in the hydrostatic test. Pipe installation will not be accepted if leakage exceeds the following:

Allowable Leakage per 100 Couplings

<u>Pipe Diameter in Inches</u>	<u>Maximum Gallons per Hour</u>
6	1.84
8	2.45
10	3.07
12	3.68
14	4.28
16	4.89
18	5.52
20	6.12
24	7.34

The Developer or Contractor shall perform the test prior to connecting to the existing system. The Developer or Contractor shall furnish and install temporary caps, plugs for SP3 units, thrust blocks and other necessary materials needed to hold pressures on sections of line being tested.

Water for testing may be taken from the nearest blow-off, fire hydrant or other approved source. All pipe, fittings, valves, couplings, and other materials needed to fill the test lines with water shall be supplied and installed by the Developer or Contractor. Care shall be taken not to contaminate the existing system.

The pump, gauge, pipe connection, and all necessary apparatus and equipment needed for the test shall be supplied by the Developer or Contractor.

The Developer or Contractor shall permanently stop all leaks. All pipe or joints which prove defective shall be replaced and the lines on which such defect or defects occur shall be tested again to determine final acceptability of the installation.

H. Disinfecting Water Mains:

Water mains shall be disinfected using one of the following methods: the Tablet Method, the Continuous Feed Method or the Slug Method. The Continuous Feed and Slug Methods shall be performed in conformance with AWWA Standard C651-86, Section 5. The Tablet Method consists of placing calcium hypochlorite granules and tablets in the water main as it is being installed and filling the water main with potable water when the installation is completed. This method may be used only if the pipes and appurtenances are kept clean and dry during construction. This method can not be used on solvent-welded plastic or on screwed-joint steel pipe because of the danger of fire or explosion from the reaction of the joint compounds with the calcium hypochlorite.

The Tablet Method shall be performed as follows:

Placing of calcium hypochlorite granules: During construction, calcium hypochlorite granules shall be placed at the upstream end of the first section of pipe, at the upstream end of each branch main and at 500 foot intervals along the pipe length. The quantity of granules shall be as shown in Table 1.

TABLE 6.1

Calcium Hydrochlorite Granules

Ounces (oz.) of Calcium Hypochlorite Granules to be Placed at Beginning of Main and at each 500 foot interval.

<u>Pipe Diameter</u> <u>(in.)</u>	<u>Calcium Hypochlorite</u> <u>Granules (oz.)</u>
4	0.5
6	1.0
8	2.0
12	4.0
16 and larger	8.0

Placing of calcium hypochlorite tablets: During construction, 5 gram (g) calcium hypochlorite tablets shall be placed in each section of pipe and also one such tablet shall be placed in each hydrant, hydrant branch and other appurtenances. The number of 5 gram (g) tablets required for

each pipe section shall be calculated based on the formula $0.0012 d^2 L$, where d is the inside pipe diameter, in inches, and L is the length of the pipe section, in feet. The result shall be rounded to the next higher integer. Table 2 shows the number of tablets required for commonly used sizes of pipe.

TABLE 6.2

Calcium Hypochlorite Tablets

Number of 5 gram (g) Calcium Hypochlorite Tablets
Required for Dose of 25 Milligrams per Liter (mg/L)*

Pipe Diameter (in.)	<u>Length of Pipe Section (ft)</u>				
	13 or less	18	20	30	40
Number of 5 g Calcium Hypochlorite Tablets					
4	1	1	1	1	1
6	1	1	1	2	2
8	1	2	2	3	4
10	2	3	3	4	5
12	3	4	4	6	7
16	4	6	7	10	13

* Note: Number of tablets is based on 3.25 grams available chlorine per tablet and any portion of a tablet is rounded to the next higher whole number.

The tablets shall be attached by a food-grade adhesive "Permatex Form-A-Gasket No. 2" or "Permatex Clear RTV Silicone Adhesive Sealant". There shall be no adhesive on the tablet except on the broad side attached to the surface of the pipe. All tablets shall be attached inside and at the top of the main, with approximately equal numbers of tablets at each end of a given pipe length. If the tablets are attached before the pipe section is placed in the trench, their position shall be marked on the section so it can be readily determined that the pipe is installed with the tablets on top.

When installation is completed, the main shall be filled with water at a rate such that water within the main will flow at a velocity no greater than 1 foot per second. Precautions shall be taken to assure that air pockets are eliminated. This water shall remain in the pipe for at least 24 hours. If the water temperature is less than 41 degrees Fahrenheit (5 degrees Centigrade), the water shall remain in the pipe for at least 48 hours. Valves shall be positioned so that the strong chlorine solution in the treated main will not flow into water mains in active service.

Valves and hydrants shall be opened and closed while the system is being disinfected. Treated water shall be retained at least 24 hours after which time it shall be tested for residual chlorine. If less than 5 parts per million is indicated, additional chlorine in solution shall be added until disinfection satisfactory to the City Engineer is obtained. When disinfection has been completed and approved by the City Engineer, the system shall be flushed and filled with clear water. The clear water shall then be flushed into a sewer manhole, using an approved backflow prevention device or approved technique, until all foreign material has been removed from the lines.

The City Engineer shall test the water after refilling the line and, if not found to be of safe bacteriological quality, he shall require the Developer or City Contractor to re-chlorinate the line until the quality of the water is proven to be satisfactory.

I. Sample Stations

In accordance with the Coliform Rule as mandated by the State of California, sampling stations shall be installed by the Developer or City Contractor at Developer or City Contractor's expense, where located by the City Engineer, approximately 1 sampling station for every 1/4 square mile.

Sampling stations shall be served by a 1 inch service installed as shown in the Standard Details, except that a meter idler assembly is not required. The testing nozzle shall be threadless and shall be between 36 - 48 inches in height.

All sampling stations shall be installed as shown in the Standard Details. The piping from the curb stop to the nozzle shall be of brass, copper or Schedule 40 Polyvinyl Chloride Pipe. All piping that is above grade shall be insulated with foam pipe insulation. All station housings shall be "Kupferle Foundry - Mainguard 91", "Koraleen Enterprises - Station Guard", "Max Fusion", or approved equal.

6.04 MEASUREMENT AND PAYMENT

Water main shall be measured horizontally by the linear foot through valves and fittings. Valves greater than 12" shall each be measured as one completed installed unit in operable condition including valve, anchor block, valve box and riser. Valves 12" and smaller shall be considered in the unit price per lineal foot of pipe. Fire hydrants shall each be measured as one complete installed unit in operable condition including hydrant, break-off riser, bury thrust block, 6 inch valve, and piping from main to bury. Air relief and blow-off assemblies shall each be measured as one complete unit in operable condition including valve, valve box, curb stop, corporation stop, service clamp and any other necessary fittings. Fittings, anchors, and thrust blocks shall not be measured for payment.

The contract price for water main and appurtenances shall constitute full compensation for all labor, materials, and tests necessary to furnish and install the main and appurtenances in accordance with the drawings and specification.

SECTION 7

STREET LIGHTING ELECTRICAL WORK

7.01 DESCRIPTION

This work shall include the furnishing of all labor, materials, tools and equipment to construct and complete in an efficient and workmanlike manner the installation of the traffic signal system in accordance with the approved plans, these specifications, the City Standard Details, and the State Specifications and Standard Plans.

Electrical equipment shall conform to the requirements of the National Electrical Manufacturers Association and material and work shall conform to the requirements of the National Electrical Code, the Electrical Safety Orders of the Division of Industrial Safety, Department of Industrial Relations of the State of California; Rules for Overhead Line Construction G.O. 95, State of California, Public Utilities Commission, the Standards of the American Society for Testing Materials and the American National Standards Institute.

7.02 MATERIALS

A. Poles and Arms - All street light poles and arms shall be hot-dip galvanized steel. Poles shall be foundation mounted and shall not be painted. Twenty-eight (28') foot poles with 15 foot arms shall be Ameron Catalog No. N-2815-2 or an approved equal. Twenty-five (25') foot poles with 15 foot arms shall be Ameron Catalog No. N-2515-2 or an approved equal. Pole tops and base covers shall be furnished and installed with each pole. Where the pole is not located at the back of the sidewalk, the length of the luminaire arm shall be as directed by the City Engineer. Poles shall have hand-holes near their bases.

B. Luminaires - The luminaires shall be as follows or an approved equal:

200 watt I.E.S. Type III	I.T.T. 113-62J3 G.E. M2RR20S1A2GMS2 Hubbell RM GT 15 S31 071 0 3 4 0
150 watt I.E.S. Type II or Type III	I.T.T. 113-56262 G.E. M2RR15S1M2GMS2 Hubbell RM GT 15 S31 061 0 3 4 0
100 watt I.E.S. Type II or Type III	I.T.T. 113-56262 G.E. M2RR10S1M2GMS2 Hubbell RM GT 10 S31 061 0 3 4 0

Luminaires shall have high pressure sodium vapor lamps, glass refractors, built-in receptacles for photoelectric cells, and regulator or auto-regulator type ballasts with a power factor of not less than 92%.

- C. Foundations - Street light foundations shall be constructed of concrete. The concrete shall have a minimum 28 day compressive strength of 3000 psi.
- D. Conductors - Conductors shall be No. 8 AWG copper or larger, THW single conductor, Underwriters Laboratory approved.
- E. Conduit - Conduit and fittings shall be rigid metal or intermediate metal in locations where approved by National Code, 1 inch minimum diameter, as shown on Drawing No. 4-F. All fittings installed in concrete shall be of the concrete tight type.

Conduit shall be zinc-coated by the sheradizing, hot-dip or electro-plating process. Each length shall bear the label of the Underwriters Laboratory, Inc.

- F. I.D. Number - All street lights and park trail lights shall have an identification number on the pole. The identification number shall be installed per the Standard Details.
- G. Wood Pole Mount - Where use of existing wood poles is approved by the Engineer, brackets for street lights mounted on wooden utility poles shall be Ameron Catalog No. 961-15N2 or approved equal. Brackets shall be 15 feet in length.
- H. Pull Boxes - All pull boxes shall be Christy N-30 concrete, Brooks Series 38 or approved equal. All pull box lids shall identify the circuit as Street Lights, Traffic Signal, etc.. Traffic lids shall be used when pull boxes are placed in areas traveled by vehicles. The traffic lids shall be 1/4 inch galvanized steel plate with 1/2 inch diameter light hole and bolt holes to match standard stud bolts.
- I. Ballast - All street lights shall have regulator ballasts and shall be 120 volt operational.
- J. Trenching - Trenching for street lights may be in the joint utility trench or in a separate trench. Depth of trenching shall be per Standard Details.
- K. Photo Electrical Control - Photoelectric cells shall be adjustable, compatible with related equipment and adequate for the load. They shall be General Electric No. C402G660, Fisher Pierce No. 6690B or an approved equal.
- L. Fused Splice Connectors - Fused splice connectors shall be installed in pull boxes adjacent to electroliers. For electroliers without adjacent pull boxes, the fused splice connector shall be located in a pull box, fusing only the hot leg with an in-line connector. Fixtures mounted

on timber poles shall be fused in an adjacent pull box. All splices shall be made with wire connections, ITT No. 10-604, 10-606 or 10-6010 or approved equal.

- M. Fuses - Luminaires with up to 200 watt lamps shall have a five (5) amp fuse installed. Luminaires with 250 watt or greater wattage shall have a ten (10) amp fuse. Fuse shall be the slow blowing type.
- N. Anchor Bolts - Anchor bolts shall be 1 inch in diameter, 40 inches long with a 4 inch "L" bend at the bottom end. Anchor bolts shall conform to ASTM Designation A 307.
- O. Service Connections - Materials needed to connect street lighting circuits to Modesto Irrigation District power shall be supplied by Modesto Irrigation District. These materials will be from the power source on the pole to the fuse holder in the pull box.

7.03 INSTALLATION

A. Foundations

Foundations shall be constructed of Portland cement concrete per State Specifications and shall be located per the Standard Details. Foundations shall rest on firm ground. The area around each foundation shall be backfilled and compacted per Standard Details.

Foundations shall be placed monolithically to within 4 inches of sidewalk grade. After pole is installed, a 36 inch square cap shall be placed to bring the foundation to sidewalk grade.

In areas of reconstruction, all work on foundations must conform to Section 15-2.05, 86-2.02 and 86-2.03 of the State Standards. Sidewalk grade may be lowered a maximum of 2 inches. In no case shall the base of the standard be permitted to be more than 2 inches above grade. Where the new grade will be higher than the original established grade, the standards may be raised as permitted by unused threads on the anchor bolts. In all cases, a full nut of threads must be maintained. Welding shall not be performed on the body of high strength anchor bolts. Base of standards may never be left below grade. Where these Standards can not be met, a new pole foundation must be installed.

Where steel poles are to be served by an aerial drop from an overhead source, the foundations shall include a concrete-encased grounding electrode complying with Article 250-81(c) of the National Electrical Code.

B. Conduit

All conductors shall be run in conduit. Conduit to be installed underground shall be rigid metal type conforming to article 346 of the Electrical Code and Section 4.3, "Conduit," of

the City Standards, or concrete encased Schedule 40 PVC. Schedule 80 PVC plastic conduit shall be used on wood poles.

Conduit terminating in each standard or pull box shall be electrically connected to each other with a copper ground strip equivalent in area to No. 8 AWG copper wiring using insulating bushings with the facilities to connect ground wire.

Metallic conduit shall be installed at all street crossings and planting strips. Conduit shall be jacked or trenched with an earth saw. Conduit depth shall be 30 inches minimum.

Metallic conduit may be jacked through the ground from one excavation to another with not more than one length being driven by impact blows or hammering.

An alternate method of placing conduit, as approved by the Director of Engineering and Transportation, pertaining to straight line runs of Schedule 40 PVC conduit may be in street area only as follows:

Conduit shall be placed under existing pavement in a trench approximately 2 inches wider than the outside diameter of the conduit to be installed. Trench width shall not exceed 6 inches. The top of the installed conduit shall be a minimum of 15 inches below finish grade.

Install conduit 24" back of curb or as directed by the City Engineer.

The outline of all areas of pavement to be removed shall be cut to a minimum depth of 3 inches with an abrasive type saw or with a rock cutting excavator specifically designed for this purpose. Cuts shall be neat and true with no shatter outside the removal area.

The conduit shall be placed in the bottom of the trench and the trench shall be backfilled with commercial quality concrete, containing not less than 564 pounds of cement per cubic yard, to not less than 0.20-foot below the pavement surface for asphalt surfaced roadways and 0.50-foot below the pavement surface for portland cement concrete surfaces. The top 0.20-foot of asphalt surfaced roadways shall be backfilled with asphalt concrete produced from commercial quality paving asphalt and aggregates, and the top 0.50-foot of portland cement concrete surfaced roadways shall be backfilled with commercial quality concrete containing not less than 705 pounds of cement per cubic yard and accelerating admixtures or other provisions for high early strength. Calcium chloride shall not be used in concrete which will be in contact with metal conduit. Conduit installed under street crossings, sidewalks, into pull boxes and foundations shall be Rigid Metal. Connections to PVC conduit shall be by approved fittings.

Exposed Conduit Installation. Run exposed conduits at right angles or parallel to structural members. Conduits shall be securely fastened in place. Conduits one (1) inch

and smaller may be secured with one hole malleable iron straps. Conduits 1-1/4 inches and larger shall be secured with conduit hangers or two hole galvanized straps. All straps shall be stand-off type. Plumbers tape shall not be used to secure conduits. Provide junction or pull boxes where required for pulling conductors due to excessive numbers of bends or length of conduit runs. All unused conduit openings shall be plugged or capped. Caulking compound or wooden plugs shall not be used.

Where factory bends are not used, conduit shall be bent without crimping or flattening using the longest radius practicable. In no case shall the bend radius be less than six times the inside diameter of the conduit.

C. Conductors

Conductors for 120 volt lighting shall be No.8 AWG THW copper, THWN copper wire, or as shown on the plans. The neutral conductor shall be identified. A U.L. listed lubricant shall be used in placing conductors in conduit.

Conductors shall be identified with street light pole number in the service box. Identification shall be by direct labeling, tags, or bands and shall be weatherproof.

No conductors shall be drawn into the conduit until the conduit run is complete and the conduit is free of debris. If the conduit is installed in a pole foundation, the conductors shall not be drawn into the conduit for at least 3 days after placement of the foundation concrete.

Conductors shall not be spliced except in pole bases (or in pull boxes when approved by the City Engineer). The splices shall be made as follows:

1. In pole bases, all splices shall be made with wire connections, ITT No. 10-604, 10-606 or 10-6010 or approved equal.
2. Where specifically approved by the City Engineer, splices in pull boxes shall be made using Ilson IK8 10 STP - 8 STP split bolt or approved equal to connect wire ends. Split bolt shall be wrapped first with Plymouth Bishop 122 Rubber Tape (splicing compound) #2002 or approved equal and then with 3M"33+" electrical tape or approved equal. The entire splice shall be coated with 3M "Scotchkote" electrical coating or approved equal.

D. Poles

Poles shall not be installed until the foundation has set at least 5 days. Poles shall be plumbed by adjusting the leveling nuts; leveling shims shall not be used. The poles shall be grounded to conform to the provisions of the National Electrical Code.

E. Connection to Electrical Distribution System

Where lighting circuit and energy source meet, the circuit shall terminate in Modesto Irrigation District's service box or pull box, as shown in the Standard Plans. The circuit shall terminate with a Bussman TRON fuse-holder, with 30 Amp cartridge fuse, type HEB-AB or approved equal. The fuse shall be taped to the cable and there shall be 4 feet of slack conductor coiled in service box.

The Modesto Irrigation District shall make service connections for light standard in pull box. Where service is from an overhead source, the Modesto Irrigation District shall supply and install conduit and cable on utility pole and make connections in pull box located at base of pole as per Drawing No. 4-F. Where service is from an Modesto Irrigation District transformer, and no service or pull box exists, Developer shall furnish and install a pull box at transformer location, as shown on the Standard Plans. Developer shall furnish and install conduit and conductors from pull box into Modesto Irrigation District transformer. Entrance into Modesto Irrigation District transformer shall be coordinated with, and supervised by the Modesto Irrigation District.

The connection to either an overhead or underground energy source will be made by the Modesto Irrigation District, upon receipt of request for service by City. All necessary wiring, conduit, etc. to an existing and available power source shall be installed prior to acceptance by the City. Request for service is made upon completion of work by Developer or City Contractor or upon development of adjacent property.

Unless otherwise requested by the City Engineer, the Developer shall deliver to the City refractors, lamps and photoelectric cells in lieu of installing them in the electroliers. Advance arrangements shall be made to schedule delivery.

When light is to be mounted on a wooden utility pole, Developer shall furnish all materials as specified herein, including all conduit, conductors, thru bolts, lag bolts, etc. for installation by City or Modesto Irrigation District. The cost for installation shall be included in the cost for inspection of improvements.

7.04 ACCEPTANCE

Acceptance test - Upon completion of the installation of a circuit, the contractor shall notify the City Engineer, who will make the necessary insulation and ground tests. The system will be further tested by 2 weeks of operation prior to the acceptance of the contract. The street light system from the service point to the electroliers shall be tested for the following items:

- A. Identification of light distribution patterns.
- B. Acceptability of the ballasts, fixtures, and lamps for electrical and noise standards.

- C. Verification that all connections are electrically and mechanically sufficient.
- D. Conductors shall move, with minimal effort, within the conduit.

7.05 MEASUREMENT AND PAYMENT

- A. Street Lights - Street lights shall each be measured and paid for as one complete installed unit in operable condition including concrete foundation, pole with mast arm(s), luminaire complete with ballast and lamp, photoelectric control, conductors in the pole and grounding.
- B. Conduit - Conduit shall be paid for by the linear foot as measured horizontally through all phases of the electrical underground street lighting system.
- C. Pull Boxes - Pull boxes shall be measured and paid for as one complete installed unit, including the base and lid.
- D. Conductors - Conductors shall be paid for by the linear foot, as measured horizontally, for the wires through pull boxes.

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SECTION 8

UTILITY TRENCHING AND BACKFILL

8.01 DESCRIPTION

A trench is defined as an excavation in which the depth is greater than the width of the bottom of the excavation.

Excavation for appurtenant structures such as but not limited to, manholes, transition structures, junction structures, vaults, valve boxes, catch basins, thrust blocks, and boring pits shall be deemed to be in the category of trench excavation.

All utilities shall obtain an encroachment permit prior to commencement of work. The request shall be accompanied by a plan showing location and sizes of all underground work in existing right of way and easements including new subdivisions and parcel splits. The encroachment permit must be obtained from the City Engineer prior to commencement of work.

Excavation for the installation of conduit shall be by open trench unless otherwise specified or shown on the drawings. However, should the contractor elect to tunnel or bore and jack any portion not so specified, he/she shall first obtain written approval from the City Engineer.

8.02 MAXIMUM LENGTH OF OPEN TRENCH

The maximum length of open trench where prefabricated pipe is to be laid shall be the distance necessary to accommodate that amount of pipe which can be installed in a single day. The distance is the collective length at any location, including open excavation, pipe laying and appurtenant construction and backfill which has not been temporarily resurfaced. Use of steel plates as open trench covers shall be allowed only with prior approval of the City Engineer.

8.03 MAXIMUM AND MINIMUM WIDTH OF TRENCH

The maximum clear width of the trench at the top of the pipe shall not be more than the outside diameter of the pipe at any point plus 2 feet. Greater width of trench at the top of the pipe shall be permitted only on written approval by the City Engineer. In no case shall the free working space on each side of the pipe be less than 6 inches.

If the maximum trench width is exceeded, the contractor shall provide additional bedding, another type of bedding, or a higher strength of pipe, as shown on the plans or as approved by the City Engineer, at no additional cost to the City.

8.04 BRACING EXCAVATIONS

The manner of bracing excavations shall be as set forth in the rules, orders, and regulations of the Division of Industrial Safety of the State of California.

After the pipeline has been installed and sufficiently backfilled to protect the pipe, all shoring, bracing and sheeting shall be removed. All voids left by the removal of such bracing shall be carefully filled with suitable material compacted in place.

8.05 BEDDING

Bedding shall be defined as that material supporting, surrounding and extending to one foot above the top of pipe, but not exceeding an overall depth of 40 inches.

In soft, spongy, unstable, or similar other material is encountered upon which the bedding material or pipe is to be placed, this unsuitable material shall be removed to a depth ordered by the City Engineer and replaced with bedding material suitably densified. Additional bedding so ordered, over the amount required by the plans or specifications, shall be paid for as provided in the Proposal or the Special Provisions. If the necessity for such additional bedding material has been caused by an act or failure to act on the part of the contractor, or is required for the control of ground water, the contractor shall bear the expense of the additional excavation and bedding.

Bedding material shall first be placed so that the pipe is supported for the full length of the barrel with full bearing on the bottom segment of the pipe equal to a minimum of 0.4 of the outside diameter of the barrel except for PVC pipe which requires bedding to the top of the pipe. The remainder of the bedding shall be carefully placed to the proper depth.

Bedding material shall be compacted to a relative density of 90%. Bedding material shall meet the specifications listed under Section 1.10-09, "Backfill Materials."

Where pipe is to be installed in new embankment, the embankment shall first be constructed to a height of 12 inches above the top of pipe and for a distance on each side of the pipe location of not less than 5 times the diameter of the pipe, after which the trench shall be excavated with sides nearly vertical and the pipe installed.

When water is encountered, the trench shall be kept dry until laying and jointing of the pipe and placing of the bedding material has been completed, inspected, and approved. The contractor shall place a minimum of 6 inches of pervious material or de-water the trench in a manner which has received prior approval of the City Engineer.

When installing water line pipe, the open pipe ends of the pipe shall be closed by approved means to prevent entrance of water or dirt into the line. Whenever water is excluded from the pipe, adequate backfill shall be deposited on the pipe to prevent floating. Any pipe which has floated shall be removed from the trench and relaid as directed by the City Engineer.

All existing gas pipes, water pipes, conduits, sewers, drains, fire hydrants and other structures shall be carefully supported and protected from damage which may be a result of dewatering by the Contractor, and in case of damage, they shall be restored by him/her, without additional compensation, to their original condition.

8.06 BACKFILL

Backfill shall be defined as that material which lies above the pipe bedding or conduit bedding.

Backfill, for cast-in-place structures such as, but not limited to, manholes, transition structures, junction structures, vaults, valve boxes and reinforced concrete box conduits shall start at the surface upon which the base of the structure rests.

Whenever it is necessary to cross an existing irrigation pipe, the backfill shall be made by use of a pneumatic tamper. The entire area under the irrigation pipe, 2 feet on either side and 6 inches on top of the pipe shall be tamped to 95% compaction.

In areas of previously undeveloped land (new construction), backfill shall be “native material” provided all organic material, rubbish, debris, large rocks, clay chunks, and other objectionable materials are first removed. When satisfactory compaction of the native material cannot be obtained, “select backfill” shall be required.

Except where the pipe must remain exposed for force main leakage tests and subject to the provisions herein, the contractor shall proceed as soon as possible with backfilling operations. Care shall be exercised so that the conduit will not be damaged or displaced.

The Contractor shall not place backfill against or over the top of any cast-in-place pipe or structures for a period of ten days. Following the expiration of the ten day period, backfill shall not be placed unless and until the concrete has attained a compressive strength equal to or greater than 85% of the specified design strength.

Where it becomes necessary to excavate beyond the limits of normal excavation lines in order to remove boulders or other interfering objects, the voids remaining after the removal of the boulders shall be backfilled as specified herein, or as otherwise approved by the City Engineer.

- A. Where the void is below the subgrade for bedding conduits or structures, backfill shall be thoroughly densified bedding material.
- B. Where the void is in the side of the trench, it shall be backfilled with suitable material and densified as approved by the City Engineer.

It shall be understood that the removal of all boulders or other interfering objects and the backfilling of voids left by such removals shall be at the expense of the contractor and no direct

payment for the cost of such work will be made. The cost of such work shall be included in the prices bid for the various items of work.

After the placing of backfill has been started, the contractor shall proceed as soon as practicable with densification.

8.07 DENSIFICATION METHODS: MECHANICALLY COMPACTED BACKFILL

- A. Backfill shall be mechanically compacted by means of tamping rollers, sheepfoot roller, pneumatic rollers, vibrating rollers, or other mechanical tampers. All such equipment shall be of a size and type approved by the City Engineer.

Permission to use specific compaction equipment shall not be construed as guaranteeing or implying that the use of such equipment will not result in damage to adjacent ground, existing improvements, or improvements installed under the contract. The contractor shall make his/her own determination in this regard.

Tests for compaction shall be made in accordance with N-Cal-Test Method 216 or 231. Backfill material in undeveloped streets shall be free of objectionable matter, such as vegetation, large clods and asphaltic paving material.

Material for mechanical compacted backfill shall be placed in lifts which, prior to compaction, shall not exceed the depths specified below for the various types of equipment:

- (1) Impact, free-fall, or "stomping" equipment - maximum lift depth of 3 feet.
- (2) Vibratory equipment, vibratory smooth-wheel rollers, and vibratory pneumatic-tired rollers - maximum lift depth 2 feet.
- (3) Rolling equipment, including sheepfoot (both vibratory and non-vibratory), grid, smooth-wheel (not vibratory), pneumatic tired (non-vibratory), and segmented wheels - maximum lift depth of 1 foot.
- (4) Hand-directed mechanical tampers, including vibratory plates - maximum lift depth of 8 inches.

Mechanically compacted backfill shall be placed in horizontal layers of such depths (not exceeding those specified above) compatible to the material being placed and the type of equipment being used. Each layer shall be evenly spread, moistened (or dried, if necessary), and then tamped or rolled until the specified relative compaction has been attained.

B. Jetting

Ponding or jetting will not be permitted in the public right-of-way.

8.08 BACKFILL PLACEMENT REQUIREMENTS

A. Method “A”:

Method “A” is to be used in existing streets (Detail No. 800). Backfill shall be “select backfill” as specified in these specifications. The area above the pipe zone (bedding) may be native trench spoils. The last two feet from proposed finish pavement grade shall contain Class II aggregate base mechanically compacted to a minimum relative compaction of 95% and a temporary layer (2 inch minimum) of asphalt cutback and placed to grade. This temporary cutback shall be maintained by the contractor until permanent paving is installed. Permanent asphalt paving shall be 1 inch greater in thickness than the existing pavement, with a minimum thickness of 3 inches.

B. Method “B”:

Method “B” is to be used within the public right-of-way in previously undeveloped land (new construction). Backfill shall be as specified in “BACKFILL”, Section 8.06.

When native material is used as backfill, the area of the trench between the bedding zone and 18 inches below the bottom of the street section shall be mechanically compacted to a minimum relative compaction of 90%. The minimum relative compaction shall be 95% in the top 18 inches.

C. Method “C”:

Method “C” is to be used in unimproved or non-street right-of-way areas. The area of the trench between the bedding zone and the top of trench shall be backfilled with native material. Compaction shall be done mechanically in uniform lifts not exceeding 6 feet so as to attain a minimum relative compaction of 90%.

8.09 BACKFILL MATERIALS

* See class I, II and III materials*

Bedding

<u>Sieve Size</u>	<u>Polyvinyl Chloride Pipe % Passing</u>	<u>All Other Pipe % Passing</u>
3/4"	100	100
3/8"	-	100
#4	35 – 55	70 – 100
#30	-	20 – 100
#200	3 – 9	0 - 15
Sand Equivalent	30 min	30 min
Minimum Dry Density	-	80 lb/cu ft
R - Value	78 min	-

<u>Select Backfill</u>	<u>Sieve Size</u>	<u>% Passing</u>
	3"	100
	#4	35 – 100
	#30	20 – 100

Sand Equivalent to be 20 Min.
Minimum Dry Density 110 lb./cu. ft.

<u>Pervious Material</u>	<u>Sieve Size</u>	<u>% Passing</u>
	#2	100
	#50	0 - 100
	#100	0 – 8
	#200	0 – 4

Drain Rock Washed coarse aggregate conforming to one of the following gradings:

<u>1 1/2" x 3/4"</u>		<u>3/4" x #4</u>	
<u>Sieve Size</u>	<u>% Passing</u>	<u>Sieve Size</u>	<u>% Passing</u>
2"	100%	1"	100%
1 1/2"	90 – 100%	3/4"	90 – 100%
1"	20 – 55%	1/2"	60 – 85%
3/4"	0 – 15%	3/8"	20 – 55%
3/8"	0 – 5%	#4	0 – 15%
		#8	0 – 5%

Backfill Native material as specified in "BACKFILL" Section 9.06.

The percentage composition by weight in place shall conform to the gradings previously mentioned as determined by Test Method No. California 202. Materials as delivered shall be of uniform mixture and shall be free of vegetable matter and refuse.

8.10 RESTORING SURFACE

The surface of all trenches shall be filled and compacted so that the surfaces will conform to the condition of the surrounding ground. The repaving requirements of the plans shall be met regardless of type of existing surfacing.

Existing pavement shall be cut in neat parallel lines as shown in the Standard Details.

Aggregate base shall be Class II compacted to 95% relative compaction. Aggregate base shall have 3/4 inch maximum combined grading.

Asphalt concrete shall be Type B, AR 4000 with 1/2 inch maximum aggregate, medium grading. A paint binder of asphaltic emulsion shall be applied to all surfaces in conformance with Section 39-4 of the State Standards

8.11 MEASUREMENT AND PAYMENT

Payment for Utility trenching and backfill shall be included in the contract price for the utility being installed and no additional payment shall be made for excavation, bracing and shoring, dewatering, backfilling or compaction.

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SECTION 11

EARTHWORK

11.01 DESCRIPTION

Work shall conform with Section 19 of the State Standard Specifications except as noted herein.

11.02 GRADE TOLERANCE

Immediately prior to placing subsequent layers of material, the grading plane of the basement material shall not vary more than 0.05 foot above or below the design grade.

11.03 RELATIVE COMPACTION

In all excavated areas, except in industrial areas or where a Traffic Index (T.I.) of 10 or greater is required, the top 0.5 foot of undisturbed material shall be compacted to 95% relative compaction in accordance with Test Methods No. California 216 or 231, a nuclear density-moisture gauge. Industrial and roads where T.I.'s of 10 and greater are required the relative compaction shall not be less than 95% for 2.5 feet below the finished pavement.

11.04 STRIPPING ORIGINAL GROUND

The Contractor will be required to strip and compact only the top 6 inches of original ground, except where design T.I. is 10 or more.

11.05 SUBGRADE STABILITY/DEFLECTION TEST

The Contractor shall be required to furnish loaded trucks for the purpose of testing the load bearing capacity of the finished basement material or ditch backfill. Total gross load per rear axle shall be 16,000 pounds. Tire pressure must be over 65 pounds. If the tested surface shows a visible deflection extending more than 6 inches from the wheel track at the time of loading, or a visible crack remains after loading, the Contractor shall take corrective measures.

The Contractor may use a test roller of size and weight to meet the City Engineer's approval to pass over the finished subgrade to ensure that there are no soft or spongy areas.

11.06 DISPOSAL OF EXCESS MATERIALS

The Contractor shall obtain a disposal site for all excess material not used on the job site in accordance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway

Right-of-Way,” of the State Standards. A letter showing permission and conditions for use of the disposal site shall be filed. The Contractor shall control dust at the disposal site and keep any streets used for disposal haul free of excess material.

11.07 SLOPES

Park strips and fill areas shall be shaped and cut slopes shall be rounded. No slopes shall exceed 3:1 without prior approval from the City Engineer.

11.08 IMPORT BORROW

All import borrow shall be non-expansive engineered fill having a maximum percentage passing the #200 sieve of 40, a maximum plasticity index of 98 and a minimum “R” value of 55 unless otherwise specified in the Special Provisions . Tests for “R” value shall be made in accordance with Test Method No. California 301.

11.09 TREE OBSTRUCTIONS

When an existing City street tree(s) is within 15 feet of a proposed improvement project, a Tree Evaluation Report must be obtained from the Parks and Recreation Department and submitted to the City Engineer prior to commencement of work.

SECTION 12

LANDSCAPE PLANTING

12.01 DESCRIPTION

Landscaping shall be installed to conform to these Standards by Developer or Contractor holding an appropriate license for such work under the provisions of the State of California Business and Professional Code.

Furnish all labor, materials, supplies, tools and transportation and perform all operations in connection with and incidental to the complete installation of all plantings as shown on the Drawings. The work shall include, but shall not necessarily be limited to the following:

- A. Finish grading (fine).
- B. Soil preparation.
- C. Tree supports.
- D. Furnishing plants and planting.
- E. Fertilizer, iron sulfate and soil amendment.
- F. Watering.
- G. Landscape Maintenance Period: 30 calendar days
- H. Landscape Maintenance Period: 60 calendar days
- I. Cleanup, inspection and approval.

Work Not Included in This Section:

- A. Rough grading.
- B. Finish grading.
- C. Irrigation system.

12.02 GENERAL

A. Samples, if required

The Contractor shall submit to the City Engineer, fourteen (14) days prior to installation, samples of materials for approval. For standard products, the manufacturer's analysis will be acceptable.

B. Verification of Material

The Contractor shall, upon demand, produce records to verify the ordering and delivery of specified quantities and types of material for this job.

C. Personnel

Planting and seeding shall be performed by personnel familiar with planting procedures and under the supervision of a qualified planting foreman. The planting foreman shall be on the job site whenever planting is in progress.

D. Weather

No planting shall occur during weather conditions which will adversely affect materials or when soil is in a muddy condition.

E. Abbreviations

o.c. - on center
g.c. - gallon can

F. Approvals

All irrigation work, except for placement of polyethylene lines, shall be inspected and approved before starting any work of this section.

All landscape planting shall be installed and approved prior to the commencement of the plant establishment period.

G. Preservation of Property

The planting operations shall be conducted in such a manner that no damage shall result to existing site improvements and plantings. The Contractor shall be responsible for any damage resulting from his/her operations, and shall repair or replace such damage at his/her own expense. Vehicles of any kind shall not be allowed to pass over curbs, sidewalk, planting areas, etc., unless proper protection is provided.

H. Landscape Establishment and Landscape Maintenance

Landscape Establishment is the establishment of all landscape elements, such as trees, shrubs, groundcover and turf. The landscape establishment period will be considered complete when all new plantings are in good health and have been in the ground for a minimum of 30 calendar days, all turf areas have achieved an even, close stand of grass,

and all areas have been reviewed and approved by the City Engineer. This work is to be completed within the stated contract period.

Landscape Maintenance will consist of a period of 60 calendar days which will begin after completion of the Landscape Establishment period and notification by the City Engineer.

12.03 MATERIALS

A. Imported Topsoil

Topsoil shall be an imported fertile, friable soil of loamy character containing a normal amount of organic matter. It shall be obtained from well-drained stable land and shall be free from refuse, roots, heavy or stiff clay and stones larger than 1 inch in size. Soil shall, by particle examination, contain the following percentages: sand - between 45 and 52; Silt - between 26 and 50; Clay between 6 and 26. Sands shall range from 2 to 0.05 millimeters in diameter; silt from 0.05 to 0.002 millimeter; and clay less than 0.002 millimeters.

B. Soil Amendment

Soil amendment shall be an organic material composted from wood and plant material under optimum conditions to destroy viable weed seeds and pathogens (i.e. 4-8 weeks at temperature of 130-150 degrees Fahrenheit with moisture levels of 35-50%, and turned with a commercial compost turner to thoroughly mix and incorporate all the product to ideal temperature and moisture conditions). Final product shall be screened to ½ inch and cured to stabilize.

Soil amendment shall be dark brown, fine texture, and shall have a minimum of 1% available nitrogen content (% dry weight). Submit complete analysis of the proposed soil amendment to the City Engineer for approval. Prior to amending soil, the landscape contractor shall review the results of the soils test and report recommendations to the City Engineer. The soils report recommendations shall take precedence over the minimum amendment and fertilizer application rates specified on the plans only when they exceed the specified minimums.

C. Fertilizer

1. Planting Tablets

Tightly compressed, long-lasting, slow-release fertilizer tablets weighing 21 grams, with a potential acidity of not more than 5 percent by weight and having an analysis of 20-10-5 derived from the sources listed in the following guaranteed analysis:

Guaranteed Analysis

Total Nitrogen (N).....	20%
Derived from urea-formaldehyde	
7.0% water soluble Nitrogen, 13.0% water insoluble Nitrogen	
Available Phosphoric Acid (P ₂ O ₅).....	10%
Derived from calcium phosphate	
Soluble Potash (K ₂ O).....	5%
Combined Calcium (Ca).....	2.60%
Derived from calcium phosphates	
Combined Sulfur (S)	1.60%
Derived from ferrous and potassium sulfates	
Iron (expressed as elemental Fe).....	35%
Derived from ferrous sulfate	
Potential Acidity: 5% or 100 lbs.	
Calcium Carbonate Equivalent per ton	

2. Fertilizer 16-7-12

Fertilizer shall be a long lasting, slow-release fertilizer compound having an N-P-K ratio of 16-7-12 (+ Iron), and shall be derived from the sources listed in the following analysis and be a blend of coated prills (which supply controlled release nitrogen, phosphorus, and potassium) and uncoated, rapidly soluble prills containing nitrogen and phosphorus.

Guaranteed Analysis

Total Nitrogen (N).....	16%
8.5% Ammoniacal Nitrogen	
Derived from Ammonium Nitrate, Ammonium Phosphates, and Ammonium Sulfate	
Available Phosphoric Acid (P ₂ O ₅).....	7%
Derived from Ammonium and Calcium Phosphates	
Soluble Potash (K ₂ O).....	12%
Derived from Potassium Sulfate and Potassium Nitrate	

Combined Sulfur (S) 5%
Derived from Potassium Sulfate and Iron Sulfates

Iron (Fe) expressed as Elemental 2.5%
Derived from Iron Sulfates

Potential Acidity: 5% or 100 lbs
800 Calcium Carbonate Equivalent per ton

3. Fertilizer 12-12-12

Fertilizer shall be rapidly soluble prills containing equal amounts of nitrogen, phosphorous, and potash plus sulfur and calcium and derived from the following sources:

Guaranteed Analysis

Total Nitrogen (N).....12%
As Ammoniacal derived from Ammonium Sulfate and
Ammonium Phosphate

Available Phosphoric Acid (P_2O_5).....12%
Derived from Ammonium Phosphate

Soluble Potash (K_2O) 12%
Derived from sulfate of potash

Sulfur (S) expressed as elemental 15%
Derived Sulfate

Calcium (Ca) 2.10%
Derived from Gypsum

D. Ammonium Sulfate: Conforming to the requirements of the Agricultural Code of the State of California.

E. Iron Sulfate: Ferric sulfate or ferrous sulfate in pellet or granular form containing not less than 18.5% iron expressed as metallic iron, and shall be registered as an agricultural mineral with the State Department of Agriculture in compliance with Article 2, "Fertilizing Materials," Section -1030 of the Agricultural Code.

F. Rock Cobbles: Rock shall be a rounded cobble with the following percentage larger than:

10 lb = 0 - 5%
5 lb = 25 - 75%
1 lb = 90 - 100%

G. Metal Edging: All metal edging shall be 1/4" thick - Reyerson, or approved equal.
(Reyerson phone number: 510 653-2933)

H. Top Dress: Grover WonderGrow or approved equal: Top dress shall be wood chips and/or plant material ground and composted for at least one month at moisture levels of 30-50% and temperatures of 130--150 degrees F. The product shall be dark brown throughout, screened at a maximum of 1" to remove all contaminants, such as plastic of other debris, and with a minimum of 1% nitrogen to prevent nitrogen deficiency in plant material. Material to be applied at a minimum layer of 3 inches.

I. Trees and Shrubs:

1. Quality and size. Plants shall be vigorous and of normal habit of growth and shall be free of girdling roots, sun scald, abrasions, disease, insects, insect eggs and larvae. Plants shall equal or exceed the standards as outlined by the American Standards for Nursery Stock and to applicable California Agricultural Codes.
2. Nursery grown. Plants shall be nursery grown under climatic conditions similar to those in the locality of the project for a period of one (1) year prior to planting on site.
3. Substitutions are not desired. When substitutions are allowed, all requirements of the plant shall be met, and in no case shall substitutions be made without the written approval of the City Engineer or his qualified representative.
4. Boxed trees shall be well-established in boxes before delivery to job.
5. Trees shall have straight trunks with the leader and side limbs intact, unless otherwise specified. All abrasions and cuts shall be completely calloused over.
6. Plants not approved are to be removed from site immediately and replaced with suitable plants.
7. Inspection and approval of specimens required before delivery to site; all others on delivery. City may reject entire lot of plants represented by defective samples. Random samples will be inspected for root condition.

8. Staking material:

Stakes for trees shall be round, of Lodge Pole pine, made from the entire bole of the tree with bark removed and completely treated in a solution of pentachlorophenol. They shall be at least 2" or 2-1/2" in diameter, conically pointed at one end, 10" long tapered point and chamfered at the other end.

Tree ties shall be as noted on drawings.

9. No plants shall be transported to the planting area that are not thoroughly wet throughout the ball of earth surrounding the roots. Plants should not be allowed to dry out, nor shall any roots be exposed to the air except during the act of Placement. Any plants that, in the opinion of the City Engineer, are dry or in a wilted condition when delivered or thereafter, whether in place or not, will not be accepted and shall be replaced at the Contractor's expense.
10. Plant material for back-up lot landscaping shall be low-maintenance, require minimal use of irrigation water once established, and shall be appropriate for the landscape situation:
1. Evergreen shrubs, 3 - 4 feet high in 3' X 10" planters with vines planted so as to cover the wall.
 2. Plant material must be appropriate to full sun, part sun, or shade locations.
 3. Street tree varieties shall be selected by the City arborist.

J. Herbicide

Submit written chemical weed control program prepared by a licensed pest control advisor for approval by the City Engineer.

K. Seed

Seed mixture shall be 98 percent pure, and noxious weed free, with a minimum of 88 percent Germination. Seed variety or mix shall be as specified on the plans or in the special provisions. All seed shall be re-cleaned Grade A "new crop" seed, delivered in the original unopened containers, and shall bear a guaranteed analysis and dealer's label. The dealer may mix the seed provided a guaranteed statement of composition of mixture and percentages of purity and germination of each variety is attached to the sealed container. The seed shall be pre-treated with a pre-emergence fungus preventative such as "Thiram" or approved equal in accordance with manufacturer specifications. The seed containers shall be stored immediately in a dry, weather and damp proof structure. Any

transit or storage will not be acceptable. Supplier shall be approved by the City Engineer prior to delivery.

L. Hydromulch Seed

1. Seed - as specified, on the plans or in the special provisions.
2. Fertilizer - use 16-7-12, 870 lbs. per acre.
3. Cellulose: The mulch shall be a green colored, fibrous, wood cellulose mulch containing no growth or germination inhibiting factors. It shall be manufactured in such a manner that, after addition and agitation in slurry tanks with fertilizer, seed, water, and other approved additives, the fibers in the material will become uniformly suspended to form a homogeneous slurry, and that when hydraulically sprayed on the ground, the material will form a blotter-like ground cover impregnated uniformly with seed and, which after application, will allow the absorption of moisture and allow the rainfall to percolate to the underlying soil. Cellulose shall be certified to indicate that laboratory and field testing of the product has been accomplished and that it meets all of the foregoing requirements. Weight specification of this material from suppliers and for all applications shall refer only to air dry weight of the fiber material. Each package of the cellulose fiber shall be marked by the manufacturer to show the air dry weight content, 1800 lbs. per acre.
4. Water: Water for hydromulching shall be clean, potable and added to the slurry mixture in sufficient amount to spread uniformly the required quantity of hydromulch solids (approximately 3,000 gallons per acre).
5. Equipment: Hydromulching equipment used for the application of the seed, fertilizer and slurry of prepared wood pulp shall be of the type as approved by the City Engineer. This equipment shall have a built-in agitation system and operating capacity sufficient to agitate, suspend and homogeneously mix a slurry containing up to 40 pounds of fiber plus combined total of 70 pounds fertilizer solids and seed for each 100 gallons of water. The slurry distribution lines shall be large enough to prevent stoppage. This discharge line shall be equipped with a set of hydraulic spray nozzles which will provide a continuous non-fluctuating discharge and delivery of the slurry in the prescribed quantities uniformly, without misses, waste, or erosion. The slurry tank shall have a minimum capacity of 1,000 gallons and shall be mounted on a traveling unit which may be either self-propelled or drawn. The City Engineer may authorize equipment with smaller tank capacity provided that the equipment has the necessary agitation system and sufficient capacity to spray the slurry in a uniform coat.

M. Mulch

Mulch shall be a fibrous, woody bark mixture called "Walk-on-bark" as distributed by Sun-up Forest Products, Inc. or approved equal.

12.04 AGRONOMIC SOILS TESTS

Prior to soil preparation, the Contractor shall obtain agronomic soils tests for all planting areas. Tests shall be performed by an approved agronomic soils testing laboratory and shall include a fertility and suitability analysis with written recommendations for soil amendment, fertilizer, and chemical conditioner application rates for soil preparation, planting backfill mix, auger hole requirements, and post-maintenance fertilization program.

Soil found to be unsuitable for sustaining healthy plant growth, i.e. soil contaminated with sterilants, excessive construction materials, etc., shall be removed and replaced with suitable topsoil as directed by the City Engineer.

12.05 PLANTING

A. Soil Preparation and Fine Grading

Before any planting operations start in any area, all trash and deleterious materials on the surface of the ground shall be removed and disposed of. After completion of fine grading and prior to soil preparation, the Contractor shall review Agronomic Soils Test and Report recommendations as required. The soils report recommendations shall take precedence over the minimum amendment and fertilizer application rates specified on the plans only when they exceed the specified minimums.

All weed growth within the areas to receive planting shall be removed. Areas containing common Bermuda grass shall be fumigated with materials approved by the City Engineer.

All planting areas shall be cultivated until the soil is brought to a loose friable condition to a depth of 12 inches. Remove all debris and rocks which are greater than one inch in any dimension. Evenly distribute soil amendment and fertilizer over all areas at the following rates:

1. Soil Amendment - 6 cubic yards per 1,000 square feet
2. Fertilizer - 20 pounds per 1,000 square feet of 12-12-12 or approved equal.

After approval of amendment and fertilizer applications by the City Engineer, incorporate into top 12 inches of soil by repeated rotary-hoe cultivation.

When rough grading and soil conditioning have been completed, all areas to receive planting shall be finish graded. Grading shall be done when soil is at optimum moisture content for working. The finish grade shall be smooth, uniform, and free of abrupt grade changes and depressions to ensure surface drainage.

The finish grade below adjacent paving, curbs or headers shall be 4 inches in shrub or ground cover areas prior to placing a 3-inch layer of top dress.

Finished grades shown on plans are given in feet and decimals of feet. Slope uniformly between given spot elevations. Planting areas, including lawns, shall be true to grade within one inch when tested in any direction with a 10 foot straightedge.

Grades not otherwise indicated shall be uniform levels or slopes between points where elevations are given, or between points established by walks, pavings, curbs, or catch basins. Finish grades shall be smooth, even and on a uniform plane with no abrupt change of surface. Minor adjustments of finish grades shall be made at the direction of the City Engineer if required.

All grades shall provide for natural runoff of water without low spots or pockets. Flow line grades shall be accurate and shall not be less than 2 percent gradient wherever possible unless otherwise indicated.

Finished grade of all shrub, annual, and ground cover areas shall be 1 inch below top of adjacent pavement, headers, curbs or walls unless otherwise indicated on the drawings. Finished grade of lawn areas shall be 3/4 inch below top of adjacent pavement, curbs, and headers.

Tops and toes of all slopes shall be rounded to produce a gradual and natural-appearing transition between relatively level areas and slopes.

Tree Supports: All trees shall be supported at time of planting as called for on planting plan.

B. Planting

All trees and shrubs shall be planted, staked and tied as noted:

1. Rock and/or other underground obstructions shall be removed to a depth necessary to permit proper planting, if possible. Note drainage requirements for plant pits. Plant locations which interfere with underground construction or where obstruction cannot be removed shall be adjusted and the new location approved by the City Engineer.

2. Tree and shrub locations as shown on planting plan are relative, and the City Engineer reserves the right to make adjustments in the location of trees and shrubs in order to achieve the intended results. No planting shall be done without prior approval of location by City Engineer. The Contractor shall locate trees no closer than 10 feet to sidewalks and 15 feet to mow strips and curbing.
3. Tree holes shall at all times be in accordance with standard tree planting specifications of City of Modesto.
4. Place backfill in bottom of plant hole after making sure base of hole is loose enough for good drainage. Place approximately one cup of bone meal in bottom of planting hole and mix to a depth of 6 inches prior to placing of tree.
5. Soil excavated from holes may be reused for planting operations.
6. Proper drainage of tree and shrub pits is necessary. Any subsoil conditions causing the retention of water in plant holes for more than 24 hours shall be brought to the attention of the City Engineer with proposals for correction before the planting proceeds. When extensive hard pan conditions are encountered, a 6' x 6' tapered pit must be provided for tree plantings.
7. Glazed sides of augured holes shall be scarified.
8. Trees and shrubs shall be carefully removed from containers. All tin containers, other than knockout cans, shall be cut on two sides to facilitate removal of plants with as little disturbance as possible to the root ball. Cans shall be cut with an approved type of can cutter or similar equipment. In no case shall cans be broken open with an axe, mattock, or similar article.
9. Trees and shrubs shall be set true and plumb with the top of the plant ball, as grown in the nursery can container, set approximately one inch above the finish grade of the planting area. The Contractor shall be responsible for any settling and shall raise and replant any tree whose crown settles below the finish grade.
10. Form a "berm" or ridge of soil at drip line of plant in a neat circle to facilitate watering and hold top mulch.
11. Pruning of 10 percent of trees and shrubs to be done in field as directed by City Engineer. No pruning to be done without inspection and approval of City Engineer.

12. Install planting tablets as follows:

1 gallon plant	1 tablet
5 gallon plants	3 tablets
15 gallon plants	5 tablets

Specimen Plants: Use one tablet for each ½ inch of tree trunk diameter or for each one foot of height. Sink tablets 6 to 8 inches deep evenly spaced around the drip line.

Position the plant in the hole and backfill no higher than halfway up the root ball. Place the recommended number of tablets evenly around the perimeter of, and immediately adjacent to, the root ball at a depth which is between the middle and bottom of the root ball. Complete the backfilling, tamp and water.

13. After thoroughly watering in all plant material, apply a 3-inch layer of top dress to all planter areas having new plant material. Keep mulch away from root ball of plant.

C. Hydromulch Seeding

Preparation: The slurry preparation shall take place on the site. The slurry preparation shall begin by adding water to the tank when the engine is at half throttle. When the water level has reached the height of the agitator shaft, good recirculation shall be established; and at this time, the seed shall be added. Fertilizer shall then be added, followed by wood pulp. The wood pulp shall only be added to the mixture after the seed.

The engine throttle shall be opened to full speed when the tank is half filled with water. All the wood pulp shall be added the time the tank is two-thirds to three-fourths full. Spraying shall commence immediately when the tank is full.

Application: All areas to receive hydromulch shall be sprayed with a uniform, visible coat by using the green color of the wood pulp as a guide. The slurry shall be applied in a sweeping motion, in an arched stream, so as to fall like rain on each other until a good coat is achieved, and the material is spread at 1,800 pounds wood fiber per acre plus seed and fertilizer. Hydromulch shall not be allowed to fall on the ground cover and shrub areas.

Time Limit: Any slurry mixture which has not been applied to the slopes within four hours after mixing will be rejected by the City Engineer and shall be removed from the project at the Contractor's expense.

D. Sod Planting

Care should be given to prevent heel or foot prints in the grade as the sod is planted. Unroll the sod fitting each strip tightly to the preceding strip. Do not stretch the sod. Force each strip together as tightly as possible. Stagger the strips of sod as a brick layer places bricks to prevent the seams from matching.

As soon as sod is placed, roll it with a light roller, making certain that no air space is left under the sod. After the first rolling moisten the sod lightly and then allow the grass to dry off before the second rolling. The second rolling should be at a cross angle from the first rolling.

Upon completion of the rolling, apply sufficient water to wet the sod and soil to a depth of 6 inches. Sod shall be kept moist for the next ten days. At the end of the ten day period, mow to a height of not less than 2 inches. Care should be taken to leave no foot prints in the sod.

12.06 CLEANING UP

The Contractor shall at all times keep the premises from accumulations of waste material or rubbish caused by his/her employees or work, or the employees or work of any subcontractor and at the completion of the work he/she shall remove all rubbish from and about the site and all his/her and his/her subcontractor's tools, scaffolding, and surplus materials.

12.07 WATERING

Apply water to all plants during operations and thereafter, until acceptance of work.

Plants which cannot be watered efficiently with the existing irrigation system shall be watered by means of a hose.

Immediately after planting, apply water to each tree and shrub. Apply water in a moderate stream in the planting hole until the material about the roots is completely saturated from the bottom of the hole to the top of the ground.

Apply water in sufficient quantities and as often as seasonal conditions require to keep the planted areas wet at all times, well below the root system of plants.

12.08 INSPECTION

- A. The Contractor shall schedule his work so that the City Engineer's inspection can be accomplished in one trip to the site.

- B. No planting shall be done until all materials have been approved for quality and placement by the City Engineer.
- C. A daily log of maintenance at the park site shall be kept by the landscape contractor. Entries to log shall commence with plant establishment and end upon final acceptance of project. Log shall be legible and include man hours at job site, equipment and materials used. A copy of this log shall be given to the City Engineer prior to final acceptance of project
- D. Certificates of Inspection to accompany shipments of plant material shall be furnished as may be required by the City (such as Pinto Tag). Written certifications required which are to be submitted to the City Engineer upon delivery to the job site include:
 - Quantity of commercial fertilizer used.
 - Quantity of soil amendments.
 - Quantity of iron sulfate.
 - Quantity of soil sulfur.
 - Quantity of seed.
 - Quantity of hydromulch materials.

12.09 PRELIMINARY INSPECTION TO THE MAINTENANCE PERIOD

A written notice requesting an inspection should be submitted to the Agency Representative at least ten (10) days prior to the anticipated date. Prior to this inspection, the site must be thoroughly cleaned up and all excess material and debris removed.

Prior to the start of the 90-calendar day plant establishment and project maintenance period, the Contractor will be required to have a complete inspection and approval of all landscape construction items.

The following inspections are required:

- At 30th calendar day.
- At 60th calendar day.
- At completion of the maintenance period.

12.10 LANDSCAPE MAINTENANCE PERIOD

The Landscape Maintenance Period shall begin after the 30-day Plant Establishment Period, and shall last a total of 60 calendar days. The contractor must notify the inspector, in writing,

seven (7) days prior to the anticipated date of inspection to establish the end of the Plant Establishment Period.

During the Landscape Maintenance Period, the site shall be kept free of all weeds, debris and trash. During this period, plants found to be missing or unhealthy by the City Engineer must be replaced by the contractor within five (5) working days. The five-day period will begin when the inspector notifies the contractor of the existing condition in writing. If for any reason replacement is not made, the Landscape Maintenance Period will be considered void and will start over again when all plant material is in healthy condition.

Landscape maintenance work shall consist of applying water (except initial watering of plants), weeding, caring for plants, sweeping walks, litter pickup, and performing all general project maintenance.

During the Landscape Maintenance Period, all plants and planted areas shall be kept well watered and kept weed free at all times. Weeds, Dallas and Johnson grass, and Bermuda grass shall be removed and disposed of.

The Contractor shall keep project site reasonably free of rodents as required to maintain healthy plant material.

In order to carry out the project maintenance work, the Contractor shall maintain a sufficient number of men and adequate equipment to perform the work herein specified from the time any planting is done until the end of the Landscape Maintenance Period or until the final approval.

The Contractor may be relieved from maintenance work required in these special provisions when the project maintenance work has been satisfactorily completed and accepted in writing by the Agency.

Lawn shall be mowed as specified herein. Clippings and debris shall be removed from the site. Lawn shall be trimmed at the edges of curbs, paving, drains, and headers. Lawn areas which fail to germinate shall be reseeded at maximum 10-day intervals until a vigorous, even stand of turf is established. Lawn areas shall be kept free of weeds by hand pulling, or may be sprayed with the approved selective chemical herbicide before they exceed 2 inches in height. Lawn shall be mowed for the first time after establishment of a vigorous, uniform stand of turf has reached a height of 3 inches. Lawn shall be mowed a second time when it again reaches a 3 inch height, except that the second cutting shall be performed no sooner than 10 days after the first. Mowing shall take place thereafter at maximum one-week intervals until final acceptance.

After second mowing of grass, apply second application of fertilizer. Apply fertilizer (12-12-12) at a rate of 6 lbs. per 1000 square feet uniformly over turf area. Apply again at the same rate just prior to final inspection.

Plants installed shall be properly maintained by regular watering, cultivating, weeding, re-mulching, repair of stakes, pruning, and treatment of insects and pests. During the maintenance period, any plants which are vandalized, diseased, dead, or in an unhealthy condition shall be replaced by the Contractor at his/her expense within five (5) days after notification from the City Engineer. Any lawn or plants damaged by herbicide shall be replaced by the Contractor at his/her expense. Maintenance shall also include treatment for fungus, diseases, rodents, and insects, the requirements for approval being the same for herbicide.

Weed all areas at intervals of not more than ten (10) days. Rocks, clods, and debris which appear on the surface shall be removed. Heaved, settled, or eroded areas shall be restored by excavating, filling, finish grading, rolling, and re-seeding as required.

Maintenance includes all items constructed under the contract. All items shall be maintained in an optimum working condition. The site shall be kept free of debris, including emptying of trash containers, by means of a general clean-up twice a week.

12.11 FINAL INSPECTION AND ACCEPTANCE

Final inspection will be conducted at the end of the maintenance Period. Notice requesting final inspection shall be submitted by the Contractor to the City Engineer at least 7 days prior to the anticipated date.

Acceptance of the project by the City will be contingent upon proper maintenance and the establishment of a vigorous, uniform stand of turf over all areas seeded. Any portion thereof which does not show a vigorous, uniform stand shall make all lawn areas subject to continued maintenance at the Contractor's expense.

Prior to the final inspection, the Contractor shall also have performed weeding, repair or touch-up of paving, equipment, and structures, and the thorough cleaning of the site.

Just prior to the final inspection, 16-6-8 granular form commercial fertilizer shall be applied as follows:

Specimen	1 pint
15 g.c. plants	1 cup
5 g.c. plants	½ cup
1 g.c. plants	1/4 cup
Ground cover	10 lbs./1000 square feet
Lawn Areas	6 lbs./1000 square feet

Fertilizer shall be spread around plant base and thoroughly watered.

At the final inspection, the City Engineer will determine the condition of improvements, planting, and lawn. Plants which are missing, vandalized, dead, or unhealthy shall be replaced by the Contractor at his expense with the same species and sizes originally specified. The Contractor shall make replacements within two weeks after final inspection, and maintain plants for an additional 30 days.

If project improvements, corrective work, and maintenance have not been performed as specified and to the satisfaction of the City Engineer, maintenance shall continue at the Contractor's expense until such time as work has been successfully completed. Should work have been performed as specified and to the City Engineer's satisfaction, the City will assume maintenance responsibilities following the final inspection.

12.12 GUARANTEE

All grass areas are to be guaranteed against any defects for one hundred twenty (120) calendar days, 15-gallon trees for one (1) year, shrubs for one (1) year and groundcover for one hundred twenty (120) calendar days after completion of the landscape maintenance period.

Any trees or other plant materials that die back and lose the form and size originally specified shall be replaced, even though they have taken root and are growing after the die-back.

Within 15 days of written notification by the City, remove and replace all guaranteed plant materials which, for any reason, fail to meet requirements of guaranty. Replacements shall be made to same specifications as required for original materials and shall carry the same guaranty from the time they are replaced.

12.13 MEASUREMENT AND PAYMENT

The landscaping shall be measured and payment made at the contract lump sum or unit price and shall include full compensation for furnishing all labor, materials, tools, equipment, incidentals and for doing all work in landscaping and planting areas and tree areas including

staking as shown on the plans and as specified in these specifications and as directed by the City Engineer.

SECTION 13

IRRIGATION

13.01 DESCRIPTION

Irrigation System shall be installed to conform to these Standards by Developer or Contractor holding an appropriate license for such work under the provisions of the State of California Business and Professional Code and Shall conform to Section 20-5.03A of the State Standards.

Furnish all labor, materials, supplies, tools, and transportation and perform all operations in connection with and incidental to the complete installation of the irrigation system in accordance with the approved plans and these specifications. The work shall include, but shall not necessarily be limited to the following:

- A. Ordering materials to complete the irrigation system.
- B. Trenching, stockpiling excavation materials and refilling and compacting trenches.
- C. Furnishing materials and installation for complete system including piping, valves, fittings, sprinklers, bubblers, emitters, backflow prevention assemblies, controllers, and final adjustment of valves and pressure regulators to ensure proper operation of irrigation system.
- D. Replacement of unsatisfactory materials.
- E. Tests.
- F. As-built drawings.
- G. Cleanup, inspection and approval.
- H. All work of every description mentioned in the specification and/or addenda thereto, and all other labor and materials incidental to the satisfactory completion of the work, including cleanup of the site as directed by the City Engineer.

13.02 RULES AND REGULATIONS

All work and materials shall be in full accordance with the latest rules and regulations of the Uniform Plumbing Code, published by the Western Plumbing Officials Association, and other applicable State or local laws or regulations. Nothing in these Drawings or Specifications is to be considered to permit work not conforming to these Codes.

- A. When the specifications call for materials or construction of a better quality or larger size than required by the above-mentioned rules and regulations, the provision of the Specifications shall take precedence over the requirements of the said rules and regulations.
- B. The Contractor shall furnish without any extra charge any additional material and labor when required by the compliance with these rules and regulations,

though the work be not mentioned in these particular Specifications as shown on the Drawings.

- C. The Contractor shall erect and maintain barricades, guards, warning signs, and lights as necessary or required by OSHA regulation for the protection of the public or workers.
- D. Any existing buildings, equipment, domestic water piping, pipe covering, sewers, storm drains, electrical wiring, sidewalks, landscaping, etc., damaged by the Contractor during the course of his work shall be replaced or repaired by the Contractor in a manner satisfactory to the City Engineer and at the Contractor's own expense, and before final payment is made. The Contractor shall be responsible for damage caused by leaks in the piping systems, being installed or having been installed by him. He/she shall repair, at his/her expense, all damage so caused, in a manner satisfactory to the City Engineer.

Supervision and Workmanship: The Contractor, personally or through an authorized and competent representative, shall supervise the work constantly, and shall as far as possible, keep the same foreman and workers on the job from commencement to completion. The workmanship of the entire job must in every way be first class, and only experienced and competent workers will be allowed on the job.

Layout of Work: The Contractor shall stake out the irrigation system as shown on the Drawings, using a different color flagging for: heads, valves, tie-in point and trench. These areas shall be checked by Contractor and City Engineer before construction is started. Any changes, deletions, or additions shall be determined at this check. Trenching shall be started only after layout has been checked by the City Engineer. The Contractor shall be responsible to provide uniform and complete coverage of the entire landscaped area.

13.03 MATERIALS

General

Certain numbers on the Drawings and in the Specifications are taken from the catalogs of the manufacturer named. Equipment equal in quality and utility will be accepted, upon approval by the City Engineer in writing.

Materials

- A. Main line (from point of connection to RCVs) shall be PVC 1120 Schedule 40. Use schedule 40 PVC couplings.
- B. Lateral lines (non-pressure) shall be 1120-200 psi PVC plastic pipe with Schedule 40 Type 1, Grade 1, PVC solvent weld fittings. Lateral lines under sidewalk shall be PVC 1120 Schedule 40.

- C. Connections between main lines and RCVs shall be of Schedule 80 PVC nipples and fittings.
- E. Riser stock shall be as follows:
 - 1. Risers connecting PVC lateral line to drip branch line. Shall be Dura FMM007 Flex Hose (MIPT x MIPT) or approved equal.
 - 2. Risers shall in no case be of smaller nominal diameter than the IPS size of joint provided on the sprinkler or QCV to be installed.
- F. Control wire shall be copper with UL-approved for direct burial in ground. Common ground wire shall have white insulating jacket; control wires shall have jacket of color other than white. Common ground and control wire shall be #12-1 AWG-UF and control wire shall be #14-1 AWG-UF. Splices shall be made with Rainbird Pentite connector or with 3M-DBY connectors.
- G. Emitters shall be of the types listed on the Drawings or approved equal.
- H. Controllers shall conform to the Standard Details. Controller shall not be mounted on access control wall. Electrical service and meter shall be mounted in a pedestal-type cabinet. With the approval of the City Engineer, the controller and the meter may be mounted in a single pedestal type cabinet. Controller must be 120 Volt automatic and have a moisture sensing capability. The controller must have the potential of 8-hour continuous irrigation and be installed in a vandal- resistant case. Controller to be Rainbird ISC-SAT-B+, Rainbird ESP-MC or equivalent, suitable for future connection to MaxiCom system. A flow sensor, master valve, cluster control unit and related equipment may be required, at the request of the City Engineer.
- I. Remote Control Valves (RCV) shall be globe glass filled nylon body and bonnet pattern with brass flow stem and manual bleed petcock. Sizes of remote control valves shall be as listed on the Drawings.
- J. Rain sensor shall be Rain Guard WCS with vandal-resistant bracket No. RGVR-S. Mount to side of irrigation controller as per manufacturer's instructions and as shown on Drawings.
- L. Gate valves 2-1/2" and smaller shall be bronze construction with operating wheel and screwed connections. Three-inch and larger shall be cast iron and operating nut (2" square) and "O" ring connections for PVC plastic pipe. Install in 8" diameter concrete valve box with cast iron lid marked "IRRIGATION" as detailed, Brooks 1R or approved equal.

- M. Backflow prevention device shall be the reduced pressure type with gate valves, check valves, test cocks reduced pressure chamber and air vent. It shall be U.S.C. approved and conform to the Standard Details. It shall consist of 2 check valves, an automatic operated differential relief valve located between the 2 check valves, a tightly closing shut-off valve on each side of the check valve assembly, and equipped with necessary test costs for testing. Components of the device shall be factory matched. Remote control valves shall be sized as required by flow of irrigation circuit. They shall be brass and have a flow range of 5 to 50 gallons per minute, and pressure regulation from 15 to 70 pounds per square inch as shown in Drawing No. 910. Install 12" above finish grade.
- N. Filter strainer shall have a plastic housing, 1" Female (NPT) with removable screen. Rainbird No. RBY-100-150 with 150 mesh stainless steel screen or approved equal.
- O. Pressure reducing valve shall have a plastic housing, with a preset outlet pressure of 25 psi, Rainbird NO. PSI-HMB-25 or approved equal.
- P. Boxes for RC valve/filter/strainer/PRV assembly in area subject to vehicle traffic shall be concrete 17" x 30" with concrete body, bolt down steel traffic cover marked "IRRIGATION" and 6" extension, Brooks 66 series or approved equal. Boxes for the above assemblies in non-traffic situations shall be fiberglass with a locking lid-spanner head or similar, Carson model no. 1730 or approved equal.
- Q. Miscellaneous installation materials:
 - 1. Solvent cement and primer for solvent weld joints shall be of marked and type approved by the manufacturer(s) of pipe.
 - 2. Lubricant for assembling rubber rings and seal joints shall be of make and type recommended by manufacturer(s) of pipe.
 - 3. Pipe joint compound shall be non-hardening, non-toxic materials designed specifically for use on threaded connections in water carrying pipe. Performance shall be same as Teflon, or approved equal.

13.04 INSTALLATION

- A. Preparation: Schedule and coordinate placement of materials and equipment in a manner to effect earliest completion of work in conformance with construction and progress schedule.
- B. Handling and Storage:
 - 1. Protect work and materials from damage during construction and storage.

2. Plastic pipe. Handle carefully; protect from prolonged exposure to sunlight.

C. Layout:

1. Lay out work as correctly as possible in accordance with diagrammatic drawings.
2. Where site conditions do not permit locating piping, valves and heads where shown, notify the City Engineer immediately and determine relocation in joint conference.
3. Run pipelines and automatic control wiring in common trenches wherever practical.

D. Excavating and trenching:

1. Excavation shall be in all cases ample in size to permit the pipes to be laid at the elevations intended and to permit ample space for joining.
2. Make trenches for pipelines deep enough to provide minimum cover from finish grade as follows:
 - a. 24" minimum cover over main lines to control valves and quick coupling valves.
 - b. 24" minimum cover over control wires from controller to valves.
 - c. 18" minimum cover over RCV-controlled lines (lateral) to sprinkler heads and emitter branches.

E. Assembling pipelines:

1. All pipe shall be assembled free from dirt and pipe scale. Field cut ends shall be reamed only to full pipe diameter with rough edges and burrs removed.
2. Solvent weld joint:
 - a. Prepare joint by first making sure the pipe end is square, then deburring the pipe end and cleaning pipe and fittings of dirt, dust, and moisture.
 - b. Dry-insert pipe into fitting to check for mis-sizing. Pipe should enter fitting 1/3 to 2/3 depth of socket.
 - c. Coat the inside socket surface of the fitting and the external surface of the male end of the pipe with primer. Then, without delay, apply solvent cement lightly to the inside of the socket. At this time, apply a second coat of cement to the pipe end.

- d. Insert pipe immediately into fitting and turn 1/4 turn to distribute cement and remove air bubbles. The pipe must seat to the bottom of the socket and fitting. Check alignment of the fitting. Pipe and fitting shall be aligned properly without strain to either.
 - e. Hold joint still for approximately thirty (30) seconds and then wipe the excess cement from the pipe and fitting.
 - f. Cure joint a minimum of thirty (30) minutes before handling and at least six (6) hours before allowing water in the pipe.
3. Threaded joints:
- a. Field-threading of plastic pipe or fittings is not permitted. Factory-formed threads only will be permitted.
 - b. All threaded joints shall be made up with pipe joint compound. Apply compound to male threads only.
 - c. Where assembling to threaded plastic fitting, take up joint no more than one full turn beyond hand tight.
 - d. Where assembling threaded plastic fittings, use strap-type friction wrench only; do not use metal jawed wrench.
4. Cap or plug openings as pipeline is assembled to prevent entrance of dirt or obstruction. Remove caps or plugs only when necessary to continue assembly.
5. Where pipes or control wires pass through sleeves, provide removable non-decaying plugs at ends of sleeve to prevent entrance of earth.
6. PVC plastic main lines not having control wire running in same trench shall have 2" plastic coated metallic tape running continuously on top of pipe for future detection.

F. Remote control valves:

- 1. Install where shown and group together where practical. Limit one RCV per box (below grade valves only).
- 2. Install valves no farther than 12" from main line unless absolutely necessary.
- 3. Locate valves no closer than 12" from walk edges. Locate RCV's and QCV's outside of future construction areas.

4. Thoroughly flush main line before installing valve.
5. Provide 4" of pea gravel in bottom of valve box. No soil shall be in contact with RCV.
6. Support valve box with four (4) bricks (one at each corner). Maintain a minimum of 2" clearance between PVC pipe and valve box (below grade valves only).
7. Label control line wire at each RCV with a 2 1/4" x 2 3/4" Polyurethane I.D. Tag, indicating identification number of valve (controller and station number). Attach label to control wire and place next to solenoid.

G. Automatic control wiring:

1. Connections shall be made with brass connectors and sealing with Pentite or 3M-DBY connectors.
2. If splicing is required between controller and remote control valve, splices shall be located in valve box and so noted on as-built drawings.

H. Backfilling:

1. Backfill only after piping has been inspected and approved.
2. Backfill material shall be the earth excavated from trenches, free from rock, concrete chunks, and other foreign or coarse materials. If additional backfill material is needed, it shall be import material to match existing soil. Carefully select backfill that is to be placed next to plastic pipe to avoid any sharp objects which may damage pipe.
3. Place backfill materials in 6" layers and compact by tamping to a minimum compaction of 90% of original soil.
4. Dress off areas to obtain finish grades and remove excess soil, rocks, or debris remaining after backfill is completed.
5. If settlement occurs along trenches and adjustments in pipes, valves, sprinkler heads, soil, sod or paving are necessary to bring the system, soil, sod or paving to the proper level of the permanent grade, the Contractor, as part of the work under this Contract, shall make all adjustments without extra cost to the City.
6. Install a 2 inch wide continuous flexible metal or direct burial irrigation wire. Detection tape or wire shall be used on all main lines that do not have control wire sharing a common trench.

I. Emitters:

1. Thoroughly flush lines before installing emitters.
2. Locate emitters as shown in plan and detail.

J. Sprinkler Heads

1. Thoroughly flush lines before installing heads.
2. Locate heads as shown in plan and detail.
3. Adjust sprinkler heads for proper distribution and trim.

K. Testing:

Perform tests as specified. Remake any faulty joints with all new materials. Use of cement or caulking to seal leaks is absolutely prohibited.

13.05 TESTING

After the entire sprinkling system has been completely installed, complete test of the entire installation shall be made by the Contractor in the presence of a representative of the City Engineer before final acceptance of the system by the City. The Contractor shall perform testing at his/her own expense.

- A. Testing of Service Lines and Irrigation Main - Service lines and irrigation main shall be tested in accordance with applicable provisions of the Water Distribution Specifications.
- B. Testing Plastic Pipe - After all new sprinkler piping and risers are in place and connected, and all necessary division work has been completed and prior to the installation of sprinkler heads, control valves shall be opened and a full head of water used to flush out the system. After the system is thoroughly flushed, risers shall be capped off and the system pressure tested.

Request the presence of the City Engineer in writing at least 72 hours in advance of Testing. All Testing shall be in the presence of the City Engineer or his/her representative. Center load piping with small amount of backfill to prevent arching or slipping under pressure. No fitting shall be covered. Apply a continuous static water pressure when welded plastic joints have cured at least 24 hours and with the risers capped as follows:

1. Test main lines and submains at 125 psi for 4 hours.
2. Test lateral lines at line pressure for 4 hours.
3. Repair leaks resulting from tests. Pressure testing shall continue until no leakage or loss of pressure is shown over the entire prescribed test period. At the conclusion of the

pressure test, the heads shall be installed and tested for operation in accordance with design requirements under normal operating pressure.

C. Testing of Electrical System

Prior to acceptance of the work the Contractor shall cause the following tests to be made:

1. For continuity of each circuit.
2. For grounds in each circuit.
3. A megger test on each circuit.
4. A functional test in which it is demonstrated that each and every part of the system functions as specified or intended herein.

13.06 GUARANTEE

It shall be the responsibility of the irrigation contractor to fill and repair all depressions and replace all ground cover and planting lost due to the settlement of irrigation trenches for one (1) year following completion and acceptance of the job. The Contractor shall also guarantee all materials, equipment and workmanship and shall agree to replace at his/her expense, at any time within one (1) year after installation is accepted, and all defective parts that may be found.

13.07 AS-BUILT DRAWINGS

- A. The Contractor shall maintain in good order in the field office one complete set of black line prints of all sprinkler Drawings which form a part of this Contract, showing all water lines, sprinklers, valves, controllers, and stub-outs. In the event any work is not installed as indicated on the Drawings, such work shall be corrected and dimensioned accurately from sidewalks, fence posts or other permanent park elements on these as-built drawings.
- B. All underground stub-outs for future connections, gate valves and remote control valves shall be located and dimensioned accurately from sprinkler heads, walks, on all as-built drawings.
- C. As-built plans must be accurate and up-to-date with the approval of the City Inspector before each progress payment will be made.
- D. Upon completion of the work, obtain reproducible mylars from the City of Modesto and neatly correct the mylars to show the as-built conditions. This must be completed and approved prior to final payment by Director of Parks & Recreation.

13.08 MEASUREMENT

The work performed under these specifications will be measured by the unit or lump sum as designated in the contract item for constructing an irrigation system.

If measured by unit, quantities of sprinkler heads, quick coupling valves, backflow preventers, etc. will be determined from actual count of the items in place in the completed work.

Quantities of conduit and the various sizes of pipe will be measured by the lineal foot in place in the completed work.

13.09 PAYMENT

Payment will be made at the lump sum or unit price for sprinklers, sprinkler heads, bubbler heads, quick coupling valves, backflow preventers, control valves, control assemblies, or turning unions and the contract prices per linear foot for the various sizes and types of pipe. Full compensation for furnishing and installing swing joints and pipe used for risers shall be considered as included in the price paid for the contract item requiring the riser or swing joint and riser and no separate payment will be made therefore.

When there are no separate contract items for spray nozzles, valve protectors, valve boxes or any other materials necessary to complete the irrigation system, such materials shall be furnished and installed. Full compensation for this work and materials shall be considered as included in the prices paid for the various contract items of the irrigation system and no separate payment will be made therefore.

The above prices and payments shall include full compensation for furnishing all labor, materials tools, equipment, and incidentals, and for doing all the work involved in installing the irrigation systems, complete in place, as shown on the plans, and specified in these specifications and the special provisions, and as directed by the City Engineer, including any structure excavation, structure backfill and water involved.

SECTION 17

ADJUSTMENT OF MANHOLES AND WATER VALVES

17.01 DESCRIPTION

This work shall consist of adjusting manholes and water valve boxes to conform with the new elevation of the street and in conformance with the Standard Specifications and Details.

17.02 ADJUSTMENT

Manholes, cleanouts, blow-offs and water valve boxes shall be brought to finish grade after the final pavement lift has been installed. The manhole openings shall be temporarily covered by suitable means. For street reconstructions or asphalt repairs on existing streets, manholes and valves shall be raised and asphalt concrete placed within 10 working days after permanent pavement wearing course has been placed. The necessary portions of the subgrade, base and pavement shall be neatly cut away, the manhole built up, and the frames set to a grade flush with the surface of the adjacent pavement. The surrounding area from which the pavement, base or subgrade has been removed shall be back-filled to within 2 inches of the surface with Portland Cement Concrete. Per detail, the remaining 2 inches shall be backfilled with ½ inch maximum asphalt concrete and compacted. The work shall be performed so as to present a neat and thoroughly workmanlike appearance upon completion.

17.03 MEASUREMENT AND PAYMENT

Unless specifically shown as an item of work on the proposal form, the adjustment of manholes, cleanouts, blow-offs, and water valves shall be considered included in other items of work and no additional compensation will be made for labor, materials or equipment needed in adjusting utility appurtenances.

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SECTION 18

TRAFFIC SIGNALS

18.01 DESCRIPTION

This work shall include the furnishing of all labor, materials, tools and equipment to construct and complete in an efficient and workmanlike manner the installation of the traffic signal system in accordance with the approved plans, these specifications, the City Standard Details, and the State Standard Specifications and Standard Plans.

18.02 ORDER OF WORK

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

The first order of work shall be to place the order for the traffic signal equipment. The Contractor shall furnish the City Engineer with a statement from the vendor that the order for said equipment has been received and accepted by said vendor.

Prior to the commencement of work and within 10 days following the signing of the Contract by the City of Modesto and the Contractor, the Contractor shall submit 5 copies of a complete list of equipment and materials to be furnished with a copy of the section of the specification pertaining to the each item submitted. Partial or incomplete material lists will not be considered. See Section 15-3.02 for more information.

18.03 PROGRESS SCHEDULE

Progress schedules will be required for this contract and shall conform to the provisions in Section 8-1.04, "Progress Schedule," of the State Standard Specifications and these special provisions.

The Contractor shall provide the City Engineer with a typewritten project schedule at the preconstruction meeting.

No signal standard shall be delivered on-site until Contractor has all signal materials at hand.

Signal heads shall not be installed before traffic signal controller is installed and wired.

18.04 OBSTRUCTIONS

Attention is directed to Sections 8-1.10, "Utility and Non-Highway Facilities," and 15, "Existing Highway Facilities," of the State 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 (gage); 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 conductors or other effectively grounded metal shields or sheaths.

The Contractor shall notify the City 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:

<u>Notification Center</u>	<u>Telephone</u>
Underground Service Alert (USA) - No. California	1-800-642-2444
Underground Service Alert (USA) - So. California	1-800-422-4133
South Shore Utility Coordinating Council (DIGS)	1-800-541-3447
Western Utilities Underground Alert, Inc.	1-800-424-3447

18.05 SIGNALS, LIGHTING AND ELECTRICAL SYSTEMS

- A. Description: Modifying traffic signals and lighting shall conform to provisions in Section 86, "Signals and Lighting," of the State Standard Specifications and these special provisions.

Traffic signal modification work is to be performed at the following location:

STREET NAME and STREET NAME

The Contractor shall furnish all labor, materials and equipment necessary to complete the work as shown on the Plans, as specified in these Special Provisions of the Specifications, and in strict accordance with the conditions of the Contract. All incidental work not shown on the Plans or specified herein which is necessary to complete the work necessary to provide the system described, or shown, shall be furnished and installed as part of this contract at no additional cost to the City. The work

shall be complete and ready for service as shown on the Plans and/or specified to the satisfaction of the City Engineer.

The Contractor is advised to inspect the site to observe actual working conditions.

- B. Equipment List and Drawings: Prior to the commencement of work, and within 10 days following the signing of the Contract by the City of Modesto and the Contractor, the Contractor shall submit 5 copies of a complete list of equipment and materials to be furnished, including all substitutions proposed to the City Engineer for approval. Partial or incomplete material lists will not be considered. No substitutions will be considered thereafter. Only one request for substitution will be considered on each item of material or equipment. If the Contractor desires to make a substitution, he shall submit complete product information to document the equipment or material being offered as being equal to that specified. No substitutions will be allowed until requested and approved in writing. Only equipment and/or materials approved by the City Engineer may be substituted. The City Engineer reserves the right to require the originally specified equipment and/or materials.

Installation of an approved substitution shall be the Contractor's responsibility, and any revisions necessary for the installation of approved substituted materials and/or equipment shall be made without additional expense to the City of Modesto.

Shop drawings shall be submitted in a complete package. partial submittal will not be considered.

The controller cabinet schematic wiring diagram and intersection sketch shall be combined into one drawing, so that, when the cabinet door is fully open, the drawing is oriented with the intersection.

The Contractor shall furnish a maintenance manual for all controller units, auxiliary equipment, and vehicle detector sensor units, control units and amplifiers. The maintenance manual and operation manual may be combined into one manual. The maintenance manual or combined maintenance and operation manual shall be submitted at the time the controllers are delivered for testing or, if ordered by the City Engineer, previous to purchase. The maintenance manual shall include, but need not be limited to, the following items:

- (a) Specifications
- (b) Design characteristics
- (c) General operation theory
- (d) Function of all controls
- (e) Trouble shooting procedure (diagnostic routine)
- (f) Block circuit diagram
- (g) Geographical layout of components

- (h) Schematic diagrams
 - (i) List of replaceable component parts with stock numbers
- C. Warranties, Guarantees, and Instruction Sheets: Warranties, guarantees, and instruction sheets shall conform to the provisions in Section 86-1.04, "Warranties, Guarantees, and Instruction Sheets," of the State Standard Specifications and these special provisions.

The Contractor shall be responsible for all work and materials and/or equipment installed under these Plans and Specifications.

The Contractor shall repair or replace at his expense, any defective work, material, or equipment which may become evident within one year of the date of filing of the Notice of Completion. The Contractor shall be responsible for all damage to other materials, equipment, structures, etc., caused by defects for a one-year period if the defect is due to defective material, equipment or workmanship.

If any part (or parts) is found to be defective in materials or workmanship within the one-year period, and it is determined by the City Engineer or by an authorized manufacturer's representative that said part (or parts) cannot be repaired on the site, the manufacturer shall provide a replacement part (or parts) of equal kind and/or type during the repair period, and shall be responsible for the removal, handling, repair or replacement, and reinstallation of the part (or parts) until such time as the traffic signal equipment is functioning as specified and as intended herein, the repair period shall in no event exceed 72 hours, including acquisition of parts.

The one-year guarantee on the repaired or replaced parts shall again commence with the date of reassembly of the system.

- D. Interruption of Existing Utilities: The Contractor shall bear the cost of any utility interruption, temporary relocation, modification, or other modifications as needed to install or remove any traffic signal equipment.
- E. Maintaining Existing and Temporary Electrical Systems: Existing traffic signal system shutdowns shall be limited to periods between the hours of 9:00 a.m. and 3:00 p.m.

The Contractor shall place "Stop Ahead" and "Stop" signs to direct vehicle and pedestrian traffic through the intersection during traffic signal system shutdown. All signal faces shall be covered if the system must be shut down for a 24-hour period. Contractor must request in writing the City Engineer's approval 48 hours prior to a 24-hour signal system shutdown. The Contractor shall wait for the City Engineer's approval, in writing, prior to any 24-hour signal system shutdown. If written approval is not received by the Contractor within 48 hours of request, Contractor will assume the request has been denied. Temporary "Stop Ahead" and "Stop" signs shall be either covered or removed when the system is turned on.

One "STOP AHEAD" sign and one "STOP" sign shall be placed for each direction of traffic. For two-lane approaches, two "STOP" signs shall be placed. Location of the signs shall be as directed by the Engineer.

"Stop Ahead" and "Stop" signs shall be furnished by the Contractor and shall conform to the provisions in Section 12-3.06, "Construction Area Signs," of the State Standard Specifications except that the base material for the signs shall not be plywood.

Full compensation for furnishing, installing, maintaining and removing temporary "Stop Ahead" and "Stop" signs and for covering signs not in use shall be considered as included in the contract lump sum price for the signal item involved and no additional compensation will be allowed therefor.

- F. Signal System Shutdown Penalty: It is agreed by the parties to the contract that in case signal system shutdowns occur during hours other than the hours between 9:00 a.m. and 3:00 p.m., damage will be sustained by the City of Modesto, and that is and will be impracticable to determine the actual damage which the City of Modesto will sustain, in the event of any, by reason of such signal system shutdowns that occur before 9:00 a.m. or after 3:00 p.m. and it is therefore agreed that the Contractor will pay to the City of Modesto the sum of One Hundred and no/100ths Dollars (\$100.00) per every hour (60 minutes), or part thereof, of signal system shutdown before 9:00 a.m. or after 3:00 p.m. The Contractor agrees to pay such liquidated damages as herein provided, and in case the same are not paid, agrees that the City of Modesto may deduct the amount thereof from any money due the Contractor under the contract.

The Signal System Shutdown Penalty as provided for herein may be waived by the City of Modesto if the Contractor installs a temporary traffic signal system for signal system shutdowns which occur during hours other than the hours between 9:00 a.m. and 3:00 p.m.

The installation of a temporary traffic signal system by the Contractor as provided for herein shall require prior written authorization by the City Engineer. Prior to installation, the Contractor shall submit a supplemental Equipment List and Drawings to the City Engineer for approval of each such temporary traffic signal system and any modification thereto, including, but not limited to, equipment and location.

Full compensation for furnishing, installation, maintaining and removing temporary traffic signal equipment shall be considered as included in the contract lump sum price for the signal item involved and no additional compensation will be allowed therefor.

- G. Regulations and Code: All work and materials shall conform with the latest codes, rules and regulations of the following:

1. State codes and ordinances
2. Local City and/or County ordinances
3. National Electrical Code
4. Uniform Building Code

Nothing in these Specifications is to be construed to permit work not conforming to the above; expense for compliance with the above shall be paid for by the Contractor. Whenever the Plans and Specifications require higher standards or larger sizes than those required by the Ordinances and Statutes, the Plans and Specifications shall take priority.

The Contractor shall have Special Dispensation from the California Occupational Safety and Health Administration to conduct operations no closer than 6 feet, but within 10 feet, of a high voltage line prior to erecting signal standards.

- H. Encroachment Permits: Contractor shall be responsible for paying all encroachment permit fees required on this contract by other agencies.
- I. Removing, Reinstalling or Salvaging Electrical Equipment: Salvaged electrical materials shall be hauled to City of Modesto Electrical Division, 501 N. Jefferson Street, Modesto, California, and stockpiled.

Full compensation for hauling and stockpiling electrical materials shall be considered as included in the lump sum contract price or prices paid for traffic signal and lighting work, and no additional compensation will be allowed therefor.

- J. Standards, Steel Pedestals and Posts: Paragraph four of Section 86-2.04, "Standards, Steel Pedestals and Posts," of the State Standard Specifications is amended by adding the following after the second subparagraph:

Standards with an outside diameter of 12 inches or less shall be round. Standards with an outside diameter of greater than 12 inches shall be round or multi-sided. Multi-sided standards shall have a minimum of 10 sides which shall be convex and shall have a minimum bend radius of 4 inches.

Section 86-2.04, "Standards, Steel Pedestals and Post," of the State Standard Specifications is amended by adding the following after paragraph eleven:

All galvanized nuts, used on assemblies with a specified pre-load or torque, shall be lubricated in accordance with the requirements specified for galvanized Grade DH nuts in ASTM Designation: A 563.

The twelfth paragraph in said Section 86-2.04 of the State Standard Specifications is amended to read:

The sign mounting hardware, as shown on Detail U of Standard Plan ES-6T, shall be installed at the locations shown on the plans.

Where the plans refer to the side tenon detail at the end of the signal mast arm, the applicable tip tenon detail may be substituted.

Standards, steel pedestals and posts shall have ornamental base covers.

Standards, steel pedestals and posts shall be galvanized.

- K. Solid-state Traffic Actuated Controller: The Contractor shall furnish one Model 170E controller assembly consisting of Model 170E controller unit, one wired Model 332 cabinet and all auxiliary equipment required to control the signal indications as shown on the Plans, and as specified in these Special Provisions. The controller shall be furnished complete with all equipment conforming to the requirements in the "Traffic Signal Control Equipment Specifications," issued by the State of California. Controllers, cabinets, equipment, and all modifications thereto shall be type approved by the State of California Testing Laboratory, and shall have California State Quality Product listing.

The controller unit shall be supplied with BI Tran System Program #200SA. One diagnostic PROM module with C1 and C2 wraparound plugs compatible with and of the same manufacture as the controller units shall also be provided. The diagnostic PROM modules and intersection programs shall be accompanied by an operation/instruction manual.

The controller cabinet layout and component locations shall conform to the requirements for Model 332 cabinet in said "Traffic Signal Control Equipment Specifications," and addendum thereto.

The controller shall have four ACIA capability. Four ACIA's shall be integral to the controller unit.

The controller memory modules shall be model 412C as described in the Caltrans specification and provide for 32K EPROM (27256), 16K RAM, and 8K zero power RAM (memory method 2, memory select 4).

All compression connectors that terminate inside controller cabinet for low voltage circuits shall be soldered.

The controller shall be supplied with a Model 400 modem module complete with terminal block and cable to connect to controllers ACIA port. The Contractor shall install terminal block and all cabinet wiring except incoming communication lines.

The cabinets shall be wired and fully equipped for traffic actuation and phasing shown on the Plans.

Cabinet shall be aluminum. Cabinet shall have the additional following items installed:

1. Fluorescent light with door switches
2. Auto/manual control with police panel cord.
3. Pull-out drawer/shelf assembly
4. Communications panels

The Contractor shall arrange to have a signal technician, qualified to work on the controller units and employed by the controller unit manufacturer or his representative, present at the time the equipment is turned on.

The convenience receptacle 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 of ground-fault current.

Model 332 cabinets shall be furnished with a Corbin lock, keyed "State #2."

Contractor shall deliver all signal equipment to be installed within controller cabinet including cabinet to City Electrical shop thirty (30) days before installation for testing. Contractor shall deliver equipment from City Electrical shop to job site. If any component fails, the 30-day testing time will restart after the replacement part is received at the City Electrical shop.

- L. Vehicle Signal Faces and Signal Heads: Signal housings shall be polycarbonate manufactured from virgin material using lexan polycarbonate.

Backplates shall be polycarbonate material.

Reflectors shall be mounted with mechanical fasteners; adhesive mounting shall not be used.

Glass lenses shall be used.

All signals shall have tunnel visors and backplates. All sections of all signals shall be 12".

All lamps for traffic signal units will be Contractor-furnished, 130-volt 1950 lumen 25TS 8000 HR lamps.

Top openings of signal heads shall be sealed with neoprene gaskets.

- M. Pedestrian Signals: Pedestrian signals shall be Type A. International symbol indications shall be provided.

The following type of screen shall be provided:

A 1 1/2-inch deep eggcrate-type screen either of 0.020-inch maximum thickness 3003 H14 aluminum alloy or of 0.030-inch nominal thickness polycarbonate. The assembly shall be mounted in a frame constructed of 0.040-inch minimum thickness aluminum alloy or polycarbonate.

The eggcrate-type screen shall be installed parallel to the face of the message plate and shall be held in place by the use of stainless steel screws.

The hood described in Section 86-4.05C, "Visors," of the State Standard Specifications is not required.

The screen and frame shall be anodized flat black or may be finished with flat black enamel as specified in Section 91-4.01, "Enamel: Traffic Signal Lusterless Black," of the Standard Specifications. Said enamel shall be applied in the shop at the Contractor's expense.

Alternate methods may be substituted for the above screening providing the results are equal to or superior to those obtained with the above specified screen as determined by the City Engineer.

- N. Luminaires: Glare shields are not required.

Luminaires shall be 200 watt, with high pressure sodium, General Electric C265N579, ITT 133-62J3, Hubbel RM GT 20 S31 071 0340.

- O. Photoelectric Controls: Photoelectric controls shall be Type IV.

- P. Emergency Vehicle Detector System: The Contractor shall provide and install a 3M Emergency Vehicle Detector System per the plans and these Special Provisions with two phase selectors inside the controller cabinet compatible with optically activated receiver units and Model 170E controller. The Contractor shall provide and install optically activated receiver units with optical detector cable as shown on the plans. The phase selectors, optical emitter, optically activated receiver units, and optical detector cable shall meet specifications in Attachment 1.

The Contractor shall be responsible for making the optical Emergency Vehicle Detector System operational, as per supplier's requirements.

Q. Terminal Compartment: Slip-fitters and terminal compartments shall be cast bronze.

R. Detectors: Loop wire shall be Type 1.

Detector loops shall be six feet by six feet in size unless otherwise noted on the Plans.

Unless shown otherwise, each loop shall consist of three turns of loop conductor.

Conductor of each loop shall be run continuous, without splice, to the termination pull box where splice to detector lead-in cable is made. Conductors from loop to termination pull box shall be twisted together three turns per foot, before inserting in the saw cut slot and conduit.

Each loop shall be installed with the conductor wound in a clockwise rotation. Each individual conductor shall be banded "Start" and "End" in the termination pull box.

Each pair of loop conductors shall be identified and banded together in pairs, by lane, in the termination pull box.

All banding shall be of the permanent, waterproof type.

Upon completion of the loop, and prior to connecting the loop to the lead-in cable, each loop shall be megohm tested and tested for continuity in the presence of the City Engineer. The insulation resistance of the loop conductors, lead-in cable, and splices shall not be less than 100 megohms.

Final loop connections shall be made such that each loop section is wound in the opposite rotation to an adjacent loop, whether such loop is in the same lane or in the adjacent lane.

The loops shall be joined in combination of series-parallel so that optimum sensitivity is obtained at the detector sensor unit, and shall be in accordance with the detector unit manufacturer's recommendation regarding series-parallel combinations.

Final splices between loops and lead-in cable shall not be made until the operation of the loops under actual traffic conditions is approved by the City Engineer.

Loop detector lead-in cable shall be Type B. Splices to lead-in cable shall be soldered, insulated and installed in a 3M slick buried service wire splice encapsulation kit, or approved equal.

Each loop detector lead-in cable shall be identified and banded in each pull box and in the controller cabinet.

Detectors shall be Indicator Controls Corporation Series 3DLD with built-in loop diagnostics, transmission programs and serial port interface, or approved equal. Detectors shall have automatic reset capability and shall not require manual resetting upon opening and closing of loop circuit.

The sealant for filling slots shall be an **ELASTOMERIC SEALANT**, and shall conform to State Standard Specification 86-5.01A(5), 3M detector sealant, black 5000.

- S. Conductors and Wiring: Subparagraphs 2, 4, and 5 of the first paragraph of Section 86-2.09D, "Splicing," of the State Standard Specifications is deleted.

Splices shall be insulated by "Method B", except detector lead-in cables.

Conductors shall be cabled in bundles, by phase, and identified by phase with permanent labels in the controller cabinet and at terminal pull boxes.

Multiple lighting conductors, signal light grounded conductors, and bonding conductors only, may be spliced.

"C" shaped compression connectors, as shown on the Plans, shall be used.

Insulation shall be THW rated, and shall comply with Section 86-2.08B of the State Standard Specifications.

- T. Fused Splice Connectors: Fused splice connectors will not be required.
- U. Bonding and Grounding: Grounding jumper shall be attached by a 3/16 inch or larger brass bolt in the signal standard or controller pedestal and shall be run to the conduit, ground rod or bonding wire in adjacent pull box.

Grounding jumper shall be visible after cap has been poured on foundation.

Equipment grounding conductors will not be required in conduit containing loop lead-in cables only.

Green Wire #6 (cabinet ground) shall have a separate ground rod in pull box nearest to cabinet, with no other wire attached.

- V. Conduit: Conduit shall be rigid galvanized metal.

When a standard coupling cannot be used for coupling metal-type conduit, a UL listed threaded union coupling, as specified in the third paragraph in Section 86-2.05C, "Installation," of the State Standard Specifications, or a concrete-tight split coupling or concrete-tight set screw coupling shall be used.

Insulated bonding bushings will be required on metal conduit. All conduit shall be grounded together in all pull boxes and cabinets by means of a grounding jumper.

Conduit to be installed under pavement shall be installed by bore and jacking, directional drilling, or other approved methods which do not damage pavement.

After conductors have been installed, the ends of conduits terminating in pull boxes, and in service and controller cabinets shall be sealed with an approved type of sealing compound.

W. Pull Boxes: Pull boxes shall be precast reinforced concrete.

The bottoms of pull boxes shall be grouted. Contractor's attention is directed to Section 86-2.06C of the State Standard Specifications.

Recesses for suspension of ballasts will not be required.

Pull boxes shall be State #5 minimum. Larger sizes shall be installed where required by the National Electrical Code or where shown on the Plans.

X. Foundations: Portland cement concrete shall conform to Section 90-10, "Minor Concrete," of the State Standard Specifications and shall contain no less than 470 pounds of cement per cubic yard, except concrete for reinforced pile foundations shall contain not less than 564 pounds of cement per cubic yard.

Y. Signs: Signs shall be furnished and installed by the Contractor as shown on the Plans and as specified in the State of California Traffic Manual, issued March 1987.

The G7 street name signs shall be on a diamond grade reflective sheeting.

Street name text shall be white, 10-inch upper case, D font, on a green background. Block numbers and arrows shall be white, four inches high, on a green background. Block numbers and arrow shall be located on the right hand side of the sign. Arrows shall be orientated toward the highest block number. The block shall be located above the arrow, see detail on the plans. Messages shall be on both sides of the signs unless otherwise indicated on the plans. G7 signs shall be provided as follows:

STREET NAME (Two G7 Signs)
BLOCK NUMBERS with arrow pointing as indicated on the plans.

The Contractor shall provide and install signs as called for on the plans.

Two wraps of stainless steel Band-It-Band strapping 3/4" thick shall be used to hang all overhead signs. Band-It-Band buckles type 201 stainless steel shall be used with strapping.

- Z. Testing: The Contractor shall make the signals fully operational including entering timing settings provided by the Public Works and Transportation Department in the controller and peripheral equipment.

The Contractor shall have present, a qualified field technician, who shall be qualified to perform testing and servicing on all systems of the installation.

Prior to scheduled turn on, the field technician shall perform all testing assignments. This testing shall include measurement of each loop installation utilizing a field loop tester/analyzer. Based on the measurement of each loop, the final loop configuration shall be established in such manner as to generate a unique frequency for each adjacent loop system, (detector channel). This unique frequency shall be set such that in the natural state and in the detect state, the frequency does not enter the frequency range of any adjacent loop system. In addition to the frequency setting and adjustments, the loop configuration shall be such that peak tuning characteristics shall be maximized; i.e., the detect state shall be a minimum of a 3.0 reference value based on natural state reference. For loops rated less than a 3.5 reference value, the loops shall be configured to maximize the sensitivity of the loop closest to the stop bar.

The Contractor shall provide the City Engineer with the detector test report. This report shall include each detector as labeled on the drawing, and shall show the final loop configuration, the natural state frequency, the detect frequency, and the calculated reference value of each loop system.

- Aa. Signal Energizing: The Contractor, after fully testing the new traffic signal equipment, will contact the City Inspector to schedule signal energizing. Signals will only be allowed to be put into operation on Tuesdays, Wednesdays or Thursdays. The Contractor will have the signal fully tested at least 24 hours before the signal is energized.
- Bb. Functional Testing: The first paragraph in Section 86-2.14B, "Field Testing," of the State Standard Specifications is amended to read:

Prior to start of functional testing, the Contractor shall perform the following tests on all circuits, in the presence of the Engineer.

The functional test for each lighting system shall consist of not less than 14 days. If unsatisfactory performance of the system develops, the conditions shall be corrected and the test shall be repeated until the 14 days of continuous, satisfactory operation is obtained.

18.06 CONSTRUCTION AREA SIGNS:

Construction area signs shall be furnished, installed, maintained, and removed when no longer required in accordance with the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these Special Provisions.

The Contractor shall notify the appropriate regional notification center for operators of subsurface installations at least 2 working days, but not more than 14 calendar days, prior to commencing any excavation for construction area sign posts. The regional notification centers include but are not limited to the following:

<u>Notification Center</u>	<u>Telephone</u>
Underground Service Alert (USA) - No. California	1-800-642-2444
Underground Service Alert (USA) - So. California	1-800-422-4133
South Shore Utility Coordinating Council (DIGS)	1-800-541-3447
Western Utilities Underground Alert, Inc.	1-800-424-3447

All 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 first sentence of the first paragraph in Section 12-3.06A, "Stationary Mounted Signs," of the State Standard Specifications is amended to read:

Stationary mounted signs shall be installed on wood posts in the same manner shown on the plans for installation of roadside signs, except as follows:

1. Back braces and blocks for sign panels will not be required.
2. The height to the bottom of the sign panel above the edge of travelled way shall be 5 feet, except when the sign is located in the path of pedestrians or bicycles that height to the bottom of the sign panel above the edge of the travelled way shall be 7 feet.
3. Construction area sign posts may be installed on above-ground temporary platform sign supports as approved by the City Engineer, or the signs may be installed on existing lighting standards or other supports as approved by the Engineer. When construction area signs are installed on existing lighting standards, holes shall not be made in the standards to support the sign.

4. The post embedment shall be 2.5 feet if post holes are backfilled around the posts with portland cement concrete produced from commercial quality aggregates and cement with not less than 282 pounds of cement per cubic yard.

18.07 TRAFFIC CONTROLS

- A. Maintaining Traffic: Attention is directed to Sections 7-1.08, "Public Convenience," 7-1.09, "Public Safety," and Section 12, "Construction Area Traffic Control Devices," of the State 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 his responsibility as provided in said Section 7-1.09.

The table following the subparagraph of the fifth paragraph of Section 12-3.04, "Portable Delineators," is amended to read:

Divergence Angle (degrees)	Incidence Angle (degrees)	Dry Reflectance Value
0.2	0.4	250
0.2	30	95
0.5	0.4	95
0.5	30	65

Illuminated traffic cones when used during the hours of darkness shall be affixed or covered with reflective cone sleeves as specified in Section 12-3.10, "Traffic Cones," of the Standard Specifications, except the sleeves shall be 7 inches long.

Lane closures shall conform to the provisions in the section of these special provisions entitled "Traffic Control System for Lane Closure."

Personal vehicles of the Contractor's employees shall not be parked on the traveled way or shoulders, including any section closed to public traffic.

The Contractor shall notify local authorities of his intent to begin work at least five days before work is begun. The Contractor shall cooperate with local authorities relative to handling traffic through the area and shall make his own arrangements relative to keeping the working area clear of parked vehicles.

Whenever vehicles or equipment are parked on the shoulder within six feet of a traffic lane, the shoulder area shall be closed with fluorescent traffic cones or portable delineators placed on a taper in advance of the parked vehicles or equipment and along

the edge of the pavement at 25-foot intervals to a point not less than 25 feet past the last vehicle or piece of equipment. A minimum of 9 cones or portable delineators shall be used for the taper. A C23 (Road Work Ahead) or C24 (Shoulder Work Ahead) sign shall be mounted on a telescoping flag tree with flags. The flag tree shall be placed where directed by the Engineer.

A minimum of one paved traffic lane, not less than 12 feet wide, shall be open for use by public traffic in each direction of travel.

The full width of the traveled way shall be open for use by public traffic on Saturdays, Sundays and designated legal holidays, after 3:00 p.m. on Fridays and the day preceding designated legal holidays, and 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 25. 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 City Engineer public traffic will be better served and the work expedited. Such deviations shall not be adopted until the Engineer has indicated his written approval. All other modifications will be made by contract change order.

- B. Traffic Control System For Lane Closure: A traffic control system shall consist of closing traffic lanes in accordance with the provisions of Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications, the provisions under "Maintaining Traffic" elsewhere in these special provisions, and these special provisions.

The provisions in this section will not relieve the Contractor from his 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 the hours of darkness, as defined in Division 1, Section 280, of the Vehicle Code, portable signs shown on the plans to be illuminated shall be, at the option of the Contractor, either; illuminated signs in conformance with the provisions in Section 12-3.06B, "Portable Signs," of the State Standard Specifications; or Reflexite vinyl microprism reflective sheeting signs; or 3M high intensity reflectorized sheeting on aluminum substrate signs; or Seibulite Brand Ultralite Grade Series, encapsulated lens retroreflective sheeting signs; or equal.

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 said component to its original condition or replace said component and shall restore the component to its original location.

When lane 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, said components may be stored at selected central locations, approved by the City Engineer, within the limits of the highway right-of-way.

Traffic control system required by work which is classed as extra work, as provided in Section 4-1.03D of the State Standard Specifications, will be paid for as a part of said extra work.

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 City Engineer.

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 City 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.

- C. 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 State Standard Specifications and these special provisions.
- D. Dust Control: Dust control shall conform to the provisions in Section 10, "Dust Control," of the State Standard Specifications and these special provisions.
- E. Traffic Controls - Qualified Individual: Traffic controls through the construction zone shall be designed and maintained by a designated individual qualified in this responsibility. Evidence of qualification may be a Certificate of Completion of a course titled "Safety Through Maintenance and Construction Zones," issued by ITE. The full

cost of providing this service shall be considered as included in the contract lump sum price paid for the traffic control system and no separate payment will be made therefor.

- F. Traffic Control for Ingress and Egress: Delineators shall be furnished and installed as directed by the City Engineer at each driveway or other point of ingress or egress. They shall be maintained, and removed when no longer required in accordance with the provisions in Section 12, "Construction Area Traffic Control Devices," of the State Standard Specifications and these special provisions.

Full compensation for furnishing, placing, maintaining, and removing the delineators shall be considered as included in the contract lump sum price paid for the traffic control system and no separate payment will be made therefor.

- G. Traffic Control for Traffic Striping: During traffic stripe operations and pavement marker placement operations using bituminous adhesive, traffic shall be controlled with lane closures, as provided for under "Traffic Control System For Lane Closure" of these special provisions, or by use of an alternate traffic control plan proposed by the Contractor. The Contractor shall not start traffic striping operations using an alternate plan until he has submitted his plan to the City Engineer and has received written approval of said plan. Alternate traffic control plans for striping operations shall conform to the provisions in Section 7-108, "Public Convenience," 7-109, "Public Safety," and 12, "Construction Area Traffic Control Devices," of the State Standard Specifications and these special provisions.

The alternate plan shall include the use of not less than two "shadow" vehicles equipped with Type II flashing arrow signs. The "shadow" vehicles and the application vehicle shall be equipped with two-way radios and the vehicle operators shall maintain communication during the striping operation. The trailing "shadow" vehicle shall weigh between 11,000 and 18,000 pounds and shall be equipped with a truck-mounted crash cushion (TMCC).

The alternate plan shall also include the proposed spacing of the "shadow" vehicles and their operation for the various road conditions to be encountered on the project, (e.g., when placing centerline stripe on a two-lane highway, one "shadow" vehicle shall precede the striping vehicle to warn oncoming traffic and the other "shadow" vehicle shall follow the striping vehicle to warn traffic overtaking the striping operations.)

Flashing arrow signs shall be in the caution display mode when used on two-lane highways.

The Contractor's attention is directed to the provisions in Section 84-1.04, "Protection from Damage," of the State Standard Specifications.

The TMCC shall be designed, constructed, and tested to protect the truck from errant vehicles striking it from the rear and to protect the occupants of the errant vehicle. The TMCC, which includes the collapsing cartridge (attenuator), mounting hardware, and

other accessories, shall meet the following requirements when tested in accordance with National Cooperative Highway Research Program (NCHRP) Report 230 except as noted herein.

When mounted on a truck, weighing between 11,000 and 13,000 pounds, equipped with a manual transmission, and with the emergency brakes engaged and truck transmission in second gear; the TMCC assembly shall absorb the energy of passenger vehicles weighing 2,250 pounds and 4,500 pounds traveling at a minimum speed of 45 mph, impacting straight and centered into the rear of the TMCC.

Either criterion A or B shall be met during each test.

- A. During impact (from time of initial impact to time of complete rest of both the truck and crash test vehicles) the highest 50 millisecond average value of longitudinal acceleration for either crash test passenger vehicle shall not exceed -12 gs.
- B. The Occupant Impact Velocity of the impacting passenger vehicles must not exceed 40 feet per second any time during the impact. The Occupant Ridedown Acceleration shall be less than 20 gs.

Other criteria to be met from NCHRP Report 230 are the Safety Evaluation Criteria in Table 6 including Items C, D, E and H. If Item F is used, the values of F1, F2, F3 and F4 may be 1.0.

All TMCCs shall be a minimum of 94 inches wide. The attenuator box shall be designed and constructed so that, when impacted, its components are retained and will not be obstacles to nearby traffic.

The entire TMCC unit and accessories shall conform to the provisions of the California Vehicle Code, the Safety Orders of the Division of Occupational Safety and Health, and all Federal and State regulations.

The rear face of the attenuator assembly shall have a 12-inch reflectorized strip centered across the entire width of the attenuator. The strip shall consist of 4- or 6-inch orange stripes alternating with 4- or 6-inch white stripes at 45 degrees from lower left to upper right. Different size stripes shall not be used in the same strip.

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." Each unit shall be certified by the manufacturer to meet the requirements of these special provisions. Any TMCC which is damaged or appears to be in poor condition must be recertified by the manufacturer. The

Engineer shall be the sole judge as to whether used TMCCs supplied under this contract need recertification.

The following TMCC designs have been approved for use as meeting the above requirements:

Hexfoam TMA Series 3000 and
Alpha 1000 TMA Series 1000 and
Alpha 2001 TMA Series 2001

Manufacturer:

Energy Absorption
Systems, Inc.
3617 Cincinnati Avenue
Rocklin, CA 95677
Telephone (916) 645-8181

Distributor:

Traffic Products Company
P. O. Box 1030
Rocklin, CA 95677-1030
Telephone (800) 232-7623

Cal T-001 Model 2 or Model 3

Manufacturer

Hexcel Corporation
11711 Dublin Blvd.
P O. Box 2312
Dublin, CA 94568
Telephone (510) 828-4200

Distributor:

Hexcel Corporation
11711 Dublin Blvd.
P. O. Box 2312
Dublin, CA 94568

Reno Rengard Model Nos. CAM 8-815 and RAM 8-815

Manufacturer

Renco Inc.
1582 Pflugerville Loop Road
P. O. Box 730
Pflugerville, TX 78660-0730
Telephone (800) 654-8182

Distributor:

Renco Inc.
1582 Pflugerville Loop Road
P. O. Box 730
Pflugerville, TX 78660-0730
Telephone (800) 654-8182

Approval for new TMCC designs shall be obtained by submitting a short but complete report of the crash tests as described on pages 12, 14, and 35 of NCHRP Report 230; films of the crash tests showing ground targets, car and truck targets, and a timing device for obtaining the speed of the car and truck during initial impact and thereafter; complete dimensioned scale drawings of the entire TMCC assembly; specifications for all materials that affect the impact performance of the TMCC; and a brief description of any quality control program the manufacturer will use to assure uniformity of the critical

materials and/or components of the TMCC. This information shall be submitted for evaluation and approval to:

Structures Research Section
Transportation Laboratory
P. O. Box 19128
5900 Folsom Boulevard
Sacramento, CA 95819

Upon approval of a TMCC design, 4 sets of plans and specifications shall be submitted to the Transportation Laboratory. Any modification to an approved TMCC design shall be submitted to the Transportation Laboratory. Upon approval, the modified TMCC shall be assigned a new model number and 4 sets of plan and specifications shall be submitted to the Transportation Laboratory.

Full compensation for providing traffic control for applying traffic stripes and pavement markers with bituminous adhesive shall be considered as included in the contract lump sum price paid for traffic control system contract prices paid for the various items involved and no separate payment will be made therefor.

H. Temporary Pavement Delineation: Temporary pavement delineation shall be furnished, placed, maintained and removed in accordance with the provisions in Section 12-3.01, "General," of the State Standard Specifications and these special provisions. Nothing in these special provisions shall be construed as to reduce the minimum standards specified in the Manual of Traffic Controls published by the Department or as relieving the Contractor from his responsibility as provided in Section 7-1.09, "Public Safety," of the State Standard Specifications.

1. 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.

All work necessary, including any required lines or marks, to establish the alignment of temporary pavement delineation shall be performed by the Contractor. 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 and removable traffic-type tape which conflicts with a new traffic pattern or which is applied to the final layer of surfacing or existing pavement to remain in place shall be removed when no longer required for the direction of public traffic, as determined by the Engineer.

2. TEMPORARY LANELINE AND CENTERLINE DELINEATION - Whenever lanelines and centerlines are obliterated, the minimum laneline and centerline delineation to be provided shall be temporary reflective raised pavement markers placed at longitudinal intervals of not more than 24 feet. The temporary reflective raised pavement markers shall be the same color as the laneline or centerline the markers replace. Temporary reflective raised 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" elsewhere in these special provisions.

Temporary reflective raised pavement markers shall be placed in accordance 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 markers will be required.

Temporary laneline or centerline delineation consisting entirely of temporary reflective raised 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, at his expense, additional temporary pavement delineation. 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 raised pavement markers, used for temporary laneline and centerline delineation for those areas where temporary laneline and centerline delineation and for providing equivalent patterns of permanent traffic lines for such 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.

3. TEMPORARY EDGELINE DELINEATION - Whenever edgelines are obliterated, the edgeline delineation to be provided for that area adjacent to lanes open to public traffic shall consist of, at the option of the Contractor, either solid 4-inch wide traffic stripe of the same color as the stripe the temporary edgeline delineation replaces, or shall consist of traffic cones, portable delineators or channelizers placed at longitudinal intervals not to exceed 50 feet.

Four-inch wide traffic stripe placed for temporary edgeline delineation, which will require removal, shall consist of temporary removable construction grade striping and pavement marking tape listed in "Prequalified and Tested Signing and Delineation Materials" elsewhere in these special provisions. Temporary removable construction grade striping and pavement marking tape when used shall be applied in accordance with the manufacturer's recommendations. Where removal of 4-inch wide traffic stripe will not be required, painted traffic stripe used for temporary edgeline delineations 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. The quantity of painted traffic stripe used for temporary edgeline delineation will not be included in the quantities of paint traffic stripe 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 maintain the cones or delineators while they are in use.

Channelizers used for temporary edgeline delineation shall be surface mounted type and shall 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 (365") listed in "Prequalified and Tested Signing and Delineation Materials" elsewhere in these special provisions.

Temporary edgeline delineation shall be removed when no longer required for the direction of public traffic, as determined by the Engineer.

Full compensation for furnishing, placing, maintaining, and removing temporary edgeline delineation 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.

- I. 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.

1. 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.

2. MATERIALS - At the Contractor's option, the modules for use in sand filled temporary crash cushions shall be either of the following types or equal:

Energite Inertial Modules

Manufacturers

Energy Absorption
Systems, Inc.
One East Walker Drive
Chicago, IL 60601

Distributor

Traffic Products Company
P. O. Box 1030
Rocklin, CA 95677-1030
Telephone (916) 624-9717

or Fitch Inertial Modules

National Distributor

Roadway Safety Service, Inc.
700-3 Union Parkway
Ronkonkoma, NY 11779

Distributor (Northern)

Singletree Sales Company
1533 Berger Drive
San Jose, CA 95112
Telephone (408) 287-1943

Distributor (Southern)

Roadway Safety Service, Inc.
700-3 Union Parkway
Ronkonkoma N7 11779

Traffic Control Service, Inc.
1881 Betmor Lane
Anaheim, CA 92805
Telephone (714) 937-0422

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 no 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 his 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 his expense.

3. **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 P or Type R marker panel, as shown on the plans, shall be attached to the front of the leading module of each temporary crash cushion. The marker panel shall be firmly fastened to the module 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.

4. **MEASUREMENT AND PAYMENT** - Temporary crash cushion modules placed in accordance with the provisions in "Public Safety" elsewhere in these special provisions will not be measured nor paid for.

- J. **Watering:** Watering shall conform to the provision in Section 17, "Watering," of the State Standard Specifications and these special provisions.

If the Contractor uses nonpotable water on the project, the sources and discharge of nonpotable water shall meet the California Department of Health Services water reclamation criteria and the Regional Water Quality Control Board requirements. The

Contractor shall obtain either a waste water discharge permit or a waiver from the Regional Water Quality Control Board. Copies of permits or waivers from the Regional Water Quality Control Board shall be delivered to the Engineer before using nonpotable water on the project.

Nonpotable water, if used, shall not be conveyed in tanks or drain pipes which will be used to convey potable water. There shall be no connection between nonpotable watersupplies and potable water supplies. Nonpotable water supply, tanks, pipes, and any other conveyances of nonpotable water shall be labeled:

NONPOTABLE WATER
DO NOT DRINK

Flushing streets as an alternative to sweeping will not be permitted.

SECTION 19

EMERGENCY VEHICLE DETECTOR SYSTEM

19.01 MATCHED SYSTEM COMPONENTS

- A. To assure desired performance, the system shall provide the synergy of four principle components, matched and proven through integrated testing and extensive functional experience. The matched component system shall offer compatibility with all types of traffic signal controllers, i.e., electro-mechanical, solid-state. Matched components provide future system compatibility of all priority control elements.

19.02 SYSTEM OPERATION

- A. Phase selection shall be activated by an optically transmitted signal of 14.0359 or 9.63855 from a single light source or upon the actuation of a test switch or remote call signal to the phase selector.
- B. The system shall cause the traffic controller to select from normally available green phases by activation of a combination of its inputs such as, STOP TIME, MANUAL, FORCE OFF, MANUAL CONTROL ENABLE, INTERVAL ADVANCE, PHASE OMIT, and VEHICLE DETECTOR.
- C. The system shall not require modification or replacement of the existing traffic controller unit beyond adding the necessary system hardware.
- D. The system shall provide adjustable timing capability to ensure adequate minimum traffic signal displays when priority control is active. The Traffic Engineer shall be able to establish the following with the limitations of the traffic controller unit and the timings stated in Section III.C. of this specification.
 - 1) Minimum green times on non-desired greens.
 - 2) Minimum display times of pedestrian WALK and DON'T WALK.
- E. The system shall provide for up to 3 optical detectors to be connected to each channel to accomplish the following:
 - 1) To provide adequate optical emitter detection range to allow sufficient time to deliver the desired traffic signal display in accordance with the minimum times required to terminate non-desired traffic signal displays.

- 2) To provide continuous line-of-sight contact between the optical emitter and the optical detector units.
- F. Abnormal sequence of traffic signal displays will not occur.
- G. Transitions from green to red without an appropriate yellow change interval will not occur.
- H. The system shall allow the traffic signal controller to resume normal timing operation after the desired signal display is obtained and optical signals have ceased for an appropriate period.

19.03 SYSTEM COMPONENT SPECIFICATIONS

A. Optical Detector

- 1) The optical detector shall be a lightweight, weatherproof device capable of sensing and transforming pulsed optical energy into electrical signals usable by the phase selection equipment.
- 2) The unit shall be high-impact polycarbonate construction with non-corrosive hardware.
- 3) The unit shall be designed for simple mounting at or near an intersection on mast arm, pedestal, pipe, or span wire.
- 4) The unit shall be available in three optical input and electrical output configurations to accept:
 - a. Optical signals from two directions and output to two discrete electrical signals (two eye, two channel)
 - b. Optical signals from two directions and output to a single electrical signal (two eye, one channel)
 - c. Optical signal from a single direction and output to a single electrical signal (one eye, one channel)
- 5) The unit shall include a design feature to allow aiming of the two optical sensing inputs for skewed approaches or slight curves.
- 6) The unit shall have a built-in terminal strip to simplify wiring connections.

- 7) The unit shall receive power from the phase selector and be operational from 16 to 40 unregulated DC volts.
- 8) The unit shall be responsive to the optical emitter at a distance of at least 2,500 feet.
- 9) The unit shall be capable of providing the necessary electrical signal to the phase selector through up to 1,000 feet of optical detector cable.
- 10) The unit shall employ a replaceable circuit board assembly and photocells to facilitate repair.
- 11) The unit shall operate over an ambient temperature range of -30 C to + 60 C.

B. Optical Detector Cable

- 1) Optical system cable shall be tested and certified by the manufacturer of the priority system components that the cable meets or exceeds matched component system performance.
- 2) The cable must guarantee delivery of the necessary quality signal from the optical detector to the phase selector over a non-spliced distance of 1,000 feet.
- 3) The cable must guarantee sufficient power to the optical detector over a non-spliced distance of 1,000 feet.
- 4) The cable must be of durable construction to satisfy the following installation methods:
 - Direct burial
 - Conduit and mast arm pull
 - Exposed overhead (supported by messenger wire)
- 5) The weight must not exceed .04 lbs/ft.
- 6) The outside diameter shall not exceed 0.3 inches.
- 7) The insulation rating must be 600 volts minimum.
- 8) The temperature rating must be 80 C minimum.

- 9) The cable shall have 3 conductors of AWG20 (7x28) stranded, individually tinned, copper color coded as follows:
 - Orange for delivery of optical detector power (+)
 - Blue for optical detector power return (-)
 - Yellow for optical detector signal
 - Bare for optical detector power return (-)
- 10) The conductors will be shielded with aluminized polyester and have an AWG20 (7x28) stranded and individually tinned drain wire to provide signal integrity and transient protection.
- 11) The shield wrapping shall have a 20% overlap to ensure shield integrity following conduit and mast arm pulls.

C. Phase Selection Equipment

- 1) The priority control system manufacturer shall offer devices to assure interface with Type 170 controllers.
- 2) The encoded phase selector shall be a two channel device.
 - a) Only one priority control output is allowed to be active at a time.
 - b) High priority optical signals override low priority optical signals in the same channel or from channel to channel.
- 3) The encoded phase selector shall be capable of three levels of discrimination of optical signals.
 - a) The first level of discrimination shall be determination of the presence of the base optical signal. The base optical signal is a constant frequency optical pulse signal. There are two possible frequency rates, one for high priority and one for low priority. The high priority rate is approximately 14Hz. and the low priority rate is approximately 10Hz. The phase selector must be able to determine if either of these flash rates are present in the signal from an optical detector.
 - b) The second level of discrimination shall be the identification of the optical coding pulses.
 - c) The third level of discrimination shall be to determine when the vehicle is within the predetermined range.

- 4) The encoded phase selector shall log information about encoded optical signals received.
- 5) The log shall be stored in non-volatile memory that is maintained when power is removed.
- 6) The following information shall be stored in the activity log for each valid optical signal received:
 - a) Vehicle Class
 - b) Vehicle I.D. Number
 - c) Priority
 - d) Direction
 - e) Call Duration
 - f) Final Greens at End of Call
 - g) Duration of Final Greens
 - h) Time Call Ended in Real Time
 - i) Near of Far Vehicle Verification
- 7) A communication port shall be provided for transfer of information to and from the encoded phase selector.
- 8) The port shall be an RS232 interface.
- 9) This port shall allow remote communication with the phase selector by means of a modem.
- 10) Communication on this port shall be of a polled nature. The communications port shall only respond to commands that it is sent, it shall not send information without a request.
- 11) The communications port shall be configured so that multiple phase selectors can communicate on the same port. It must be possible to connect the RxD and TxD and GND wires from up to three (3) phase selectors together onto the same port and still communicate with each unit separately.
- 12) One priority control output shall be provided per channel. An output is activated whenever a valid optical signal is found. If more than one channel is active at the

same time, the only first channel active or the highest priority channel is allowed to have an active output.

- 13) Only one priority control output shall be active at a time.
- 14) Several control timers shall be integrated into the phase selector. These control timers shall limit or modify the duration of a priority control condition.
- 15) These timers shall be configurable through the communications port and there shall be one set of timers per channel.
- 16) The control timers shall control:
 - a) Max. Call Time -- Default is 65535 seconds
 - b) Call Extension Time -- Default is 6 seconds
 - c) Call Delay Time -- Default is 0 seconds
- 17) The encoded phase selector shall be equipped with appropriate inputs and outputs to interface to other equipment.
 - a) Detector Inputs
 - 1) One primary detector input per channel (two total), shall be located on the card edge connector. Each primary detector input is intended to serve a single optical detector. The detection range is independently settable for each primary input.
 - 2) Two auxiliary detector inputs per channel (four total), shall be located on the front panel. Each auxiliary detector input is intended to serve a single optical detector. The detection range is settable by channel for the auxiliary detectors (I.E. both auxiliary detectors on a channel will have the same range).
 - b) Green Monitoring Inputs
 - 1) Eight inputs and a common shall be provided to monitor green lights at the intersection. These inputs are located on a connector on the front panel and are optically isolated. They are designed to sense AC+ load switch outputs.

c) AC Power Inputs

- 1) The phase selector is powered by 115 VAC power. The power connections AC+, AC-, and Chassis Ground shall be located on the edge connector.

d) Optical Detector Power Outputs

- 1) The optical detector power outputs for the optical detectors shall be located on the edge connector. The power connections are 24 VDC and Ground.

e) Priority Control Outputs

- 1) One priority control output shall be provided per channel (two total).
- 2) Each output shall be optically isolated to provide isolation between the phase selector and the controller equipment.
- 3) These outputs shall be located on the edge connector.
- 4) Each output shall consist of two connections, the collector and the emitter of the opto-isolator output transistor.

18) The encoded phase selector shall be equipped with a communications port.

- a) An RS232 serial interface port shall provide communication between the phase selector and other computers.
- b) The communications port shall operate on three wires;
 - 1) transmit
 - 2) receive
 - 3) ground.
- c) The communications port shall be available through a separate three pin connector on the front panel of the phase selector.
- d) The communications port shall be odd parity, 7 data bits, 1 stop bit, and 1200 baud (bits per second).

- 19) The encoded phase selector shall be equipped with a test switch for each channel.
 - a) The test switches shall be located on the front panel of the phase selector.
 - b) The test switches shall be toggle switches with center off and momentary positions on either side of center.
 - c) The test switches shall generate priority control signals in the following manner:
 - 1) Pushing a test switch up shall cause a high priority call for that channel.
 - 2) Pushing a test switch down shall cause a low priority call for that channel.
 - 3) With the unit not power up pushing the channel A test switch down and simultaneously pushing the channel B test switch up while turning on the power shall cause the encoded phase selector to be initialized and set to the default configuration.
- 20) The encoded phase selector shall be equipped with an on/off power switch to turn the phase selector on or off while in the card rack.
 - a) The power switch shall be a toggle switch located on the front panel of the phase selector.
 - b) The up position shall be "on".
- 21) The encoded phase selector shall be equipped with a pilot light.
 - a) When power is provided to the phase selector and the unit is on, the pilot light shall be lighted.
 - b) The pilot light shall be a red LED located on the front panel of the unit and it shall be daylight readable.
 - c) The pilot light shall flash to indicate failure of the unit's microprocessor.
- 22) The encoded phase selector shall be equipped with call status lights.
 - a) There shall be two call status lights per channel.
 - b) The call status lights shall be red LED's and they shall be daylight readable.
 - c) The call status lights are located on the front panel of the phase selector.

- d) The upper LED per channel shall indicate high priority calls and the lower LED per channel shall indicate low priority calls.
 - e) The call status lights shall also provide a failure code indication when the 562 fails due to its internal diagnostic checks.
 - f) The failure code shall be shown on the call status lights prior to flashing the pilot light to indicate the failure.
- 23) The encoded phase selector shall be equipped with 15 pin male D-shell located on the front panel, known as JP1, to provide green light monitoring and auxiliary detector input connections as shown below:

<u>Pin</u>	<u>Function</u>
1	Phase 1 green input
2	Phase 2 green input
3	Phase 3 green input
4	Phase 4 green input
5	Phase 5 green input
6	Phase 6 green input
7	Phase 7 green input
8	Phase 8 green input
9	Channel A auxiliary detector input
10	Channel A auxiliary detector input
11	Channel B auxiliary detector input
12	Channel B auxiliary detector input
13	no connections
14	no connections
15	Common for green sense (AC-)

- 24) The encoded phase selector shall be equipped with a 44 pin STD card edge connector on the main PCB, known as JP3, to provide primary detector input, detector power output, AC power input, and priority control output connections as shown below:

<u>Pin</u>	<u>Function</u>
D	Channel A primary optical detector input
E	Optical detector DC power output (24 + VDC)
F	Channel A priority control output, collector (+)
H	Channel A priority control output, emitter (-)
J	Channel B primary optical detector input
K	Optical detector DC ground
L	Chassis ground
M	AC- IN

N	AC+ IN (115 VAC)
W	Channel B priority control output, collector (+)
X	Channel B priority control output, emitter (-)

25) The encoded phase selector shall include valid reception frequency ranges of:

High priority -

valid periods within:	valid between the frequencies:
71.250+/-0.090mS	14.082Hz to 13.986Hz

invalid periods outside:	invalid outside the frequencies:
71.250+/-0.400mS	14.1143 Hz to 13.9567 Hz

Low priority -

valid periods within:	valid between the frequencies:
103.75+/-0.090mS	9.663Hz to 9.616Hz

invalid periods outside:	invalid outside the frequencies:
103.75+/-0.400mS	9.686Hz to 9.593Hz

26) The encoded phase selector shall be capable of identifying the entire range of encoded optical energy as transmitted by the encoded emitter to allow the identification of specific vehicles using the system.

27) The range of vehicle class and identification numbers included shall be separated into ten classes with each class containing 1000 codes as shown below:

<u>Vehicle Class</u>	<u>Vehicle ID #'s</u>
0	000 to 999
1	000 to 999
2	000 to 999
3	000 to 999
4	000 to 999
5	000 to 999
6	000 to 999
7	000 to 999
8	000 to 999
9	000 to 999

28) The encoded phase selector shall also be capable of identifying the range setting code as transmitted by the encoded emitter to allow the range to be set by a specially configured encoded emitter.

29) The encoded phase selector shall include priority control output timing and controls to notify the traffic controller of the priority control demand.

- 30) There shall be two priority control output states as shown below:
- 1) A steady, low impedance state to indicate a high priority control output.
 - 2) An alternating low and high impedance, 6.25 $\pm$ 0.1 Hz square wave, indicating a low priority control output.
- 31) Only one of the priority control outputs shall be active at a time.
- 32) Calls of the same priority shall be valid on both channels, the first call to be recognized shall be held until it is completed (a second call will not interrupt a first call of the same priority).
- 33) High priority calls shall always override low priority calls.
- 34) The encoded phase selector's control timers shall only be configured by means of the communications port.
- 35) The encoded phase selector's MAX. CALL timer shall set the maximum time a channel is allowed to be active. It is settable from a minimum of 10 seconds to 65535 seconds in 1 second intervals. The accuracy of this timer shall be $\pm 2/0$ seconds.
- 36) The encoded phase selector's CALL EXTENSION timer shall set the time a call is held on a channel after the Optical signal is no longer being received. It is settable from 1 second to 255 seconds in 1 second intervals. The accuracy of this timer shall be $\pm 2/0$ seconds.
- 37) The encoded phase selector's CALL DELAY timer shall set the time a call must be recognized before activation of the corresponding output. It is settable from 0 second to 255 seconds in 1 second intervals. The accuracy of this timer shall be $\pm 2/0$ seconds.
- 38) The encoded phase selector's DESIRED GREEN TIME and CLEARANCE TIME timers shall be used only during low priority control. They shall allow control to be returned to the controller during the priority control so movements, other than the Desired Greens can be serviced. The phase selector monitors the green lights through the green sense inputs to perform this function.
- 39) The encoded phase selector's DESIRED GREENS shall be set using the structure of an eight bit number as the framework to define the desired greens.

- 40) The least significant bit shall represent phase one, the second least significant bit shall represent phase two, and so on, up to eight phases.
- 41) Setting a Desired Green bit shall indicate that a green light is expected during priority control.
- 42) Clearing all eight Desired Green bits shall disable this function for that channel.
- 43) The MAX. GREEN TIMER shall set the maximum time which the Desired Greens are allowed to be displayed. When this time has expired, the priority control output is discontinued and control is passed to the Max. Non-Green Timer.
- 44) The greens shall be continuously monitored and compared to the value in the MAX. GREEN timer to determine the appropriate action.
- 45) The Max. Green Timer shall be settable from 120 seconds to at least 240 seconds in 1 second intervals with an accuracy of $\pm 2/0$ seconds.
- 46) The MAX. NON-GREEN TIMER shall set the minimum time which the Desired Greens are not displayed between priority control. When this timer is active, the priority control output is not active. This timer will not time out until the greens have been in a non-Desired Green state for at least Max. Non-Green Time (the indications may stay in the desired state after the priority control has ended). When Max. Non-Green Time has expired, the priority control output is discontinued and control is passed again to the Max. Green Timer. This sequence of priority control for Max. Green Time and non-priority control for Max. Non-Green Time is continued until a high priority call overrides the call, the Max. Call Timer has expired, or the call ends.
- 47) The Max. Non-Green Timer shall be settable from 1 second to at least 240 seconds in 1 second intervals with an accuracy of $\pm 2/0$ seconds.
- 48) The encoded phase selector shall include a data log to store the history of valid optical calls that have been received.
- 49) The data log must provide a history of up to 100 of most recent optical priority control calls. When the log is full, oldest entry shall be dropped to make space for a new entry.
- 50) Data storage shall be non-volatile so that the log is not lost during power interruptions.

51) Each log entry shall include nine points of information about the call as shown below:

Class -	type of vehicle
Code -	ID of vehicle
Priority -	high or low
Direction -	channel A or B
Call Duration -	in seconds
Final Greens at End of Call -	eight greens
Duration of Final Greens -	in seconds
Time Call Ended in Real Time -	second, minute, hours, day, month, year
Intersection Near or Far -	amplitude exceeded 400 - Near

52) The encoded phase selector shall be initialized to the default configuration by any of several different means. Initialization shall be caused by either:

- a) command through the communications port, or
- b) holding the channel A test switch at low priority and the channel B test switch at high priority during power up.

53) Initialization to the default state shall cause the encoded phase selector to be configured as shown below:

- Clear log
- Primary detector range (both channels) set at max.
- Auxiliary detector range (both channels) set at max.
- All high priority codes set valid
- All low priority codes set valid
- Max. Call Time (both channels) set at max.
- Call Extension Time (both channels) set at 6 seconds
- Call Delay Time (both channels) set at 0 seconds
- Desired Greens (both channels) cleared
- Max. Green Time (both channels) cleared
- Max. Non-Green Time (both channels) cleared
- Intersection Name is cleared

54) The encoded phase selector shall at power up:

- check all of RAM with a write/read test to make sure that all memory locations are operable. If an error is found, operations must be aborted

and the watch dog timer must be allowed to time-out so that the pilot light flashes thereby indicating failure.

- check all of ROM against a checksum. If an error is found, operations must be aborted and the watch dog timer must be allowed to time-out so that the pilot light flashes thereby indicating failure.
- initialize the micro-processor.
- check configuration section of EEPROM against a checksum. If an error is found, operations must be aborted.
- check for the channel A test switch set for low priority and the channel B test switch set for high priority, if they are, the EEPROM must be initialized to the default state.

55) The encoded phase selector shall include the following error diagnostic capabilities:

- a) The pilot light and the call status lights on the front panel of the phase selector shall act together to display diagnostics error indications to the user.
- b) An error shall be shown by displaying a code on the call status lights and then causing the pilot light to blink.
- c) The error codes shall be patterns of the call status lights where two or more of the lights are on and with the lowest light (the channel B, low priority light) as one of them.
- d) There shall be six error code indications.
- e) In addition to the six diagnostic codes, there shall be two other error states that may occur:
 - 1) no pilot light, and
 - 2) flashing pilot light with no error code or an error code that is not defined.

56) The encoded phase selector error codes shall be as described in the table below:

<u>Code</u>				<u>Meaning of Code</u>
<u>Ch. AH</u>	<u>Ch.AL</u>	<u>Ch. BH</u>	<u>Ch. BL</u>	
	ON	ON	ON	EEPROM Checksum Error (Re-initialize to default to clear)
ON		ON	ON	EEPROM Failure
ON	ON		ON	Main Processor RAM Failure
	ON		ON	Main Processor ROM Failure
ON			ON	Channel A Discriminator Processor Failed
		ON	ON	Channel B Discriminator Processor Failed

*If there is not a valid error code and the pilot light flashes, this indicates that the main micro-processor has failed.

*If the power is on and power is available to the phase selector and the pilot light does not light, the power supplies or the watch dog circuit has failed.

57) The encoded phase selector shall operate on AC power from 95 to 135 volts at 60 Hz. at 0.2 amps AC max.

58) The encoded phase selector's communication port shall operate as an RS232 Tx/D voltage:

Mark -4.2 volts min.

Space +4.2 volts min.

59) The encoded phase selector's Opto-isolator isolation shall be: 100M ohm at 500V DC

60) The encoded phase selector's Priority control outputs shall operate with the following characteristics:

-current capacity: 50 mA. max.

-voltage drop: 2 VDC max. at 50 MA. load

-high impedance state: 250K ohm min.

61) The encoded phase selector's Optical Detector power shall be:

-voltage: 24 +/- 2 volts DC

-current: 50 MA. min.

62) The encoded phase selector's logic power shall be:

- "+5VDC Supply" +5v: 5v +/- 10%
- "-5VDC Supply" -5v: -5v +/- 10%

63) The encoded phase selectors Green light sense inputs shall operate with the following characteristics:

- 15 VAC or less = OFF
- 65 VAC or more = ON

64) The encoded phase selector shall operate over a temperature range of: -30 F (-34 C) to + 165 F (+74 C).

65) The encoded phase selector shall operate over a humidity range of: 5% to 95%.

66) The encoded phase selector shall not exceed the following physical dimensions:

- Length: 6.90 inches (175.3 mm)
- Height: 4.5 inches (114.3 mm)
- Width: 1.12 inches (28.5 mm)
- Handle: 1.2 inch length (30.5 mm) (from face plate),
0.25 inch diameter (6.4 mm)

67) The encoded phase selector shall meet or exceed the following:

- NEMA AC Power Surge test specifications, Section 2 NEMA TS-1 (1983).
- NEMA AC Power Interruption test specifications, Section 2 NEMA TS-1 (1983).
- NEMA Input/Output Transient test specifications, Section 2 NEMA TS-1 (1983).
- NEMA Temperature and Humidity test specifications, Section 2 NEMA TS-1 (1983).
- NEMA Vibration test specifications, Section 2 NEMA TS-1 (1983).
- NEMA Shock test specifications, Section 2 NEMA TS-1 (1983).
- NEMA = NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION

D. Optical Emitter (Not Part of the Contract)

1. The emitter generates the optical signal which serves as the trigger to the rest of the Opticom system. The optical signal generated by the encoded emitter is a series of intense flashes from a single light source. The flash signal consists of two parts; a fixed frequency base signal and a coded overlay signal that allows for transmittal of information. Encoded emitters will be used in priority vehicle control applications.

- a) The Encoded emitter shall consist of two major sub-components; a power supply and a flash head.
- b) The power supply shall contain all the electronics necessary to generate high voltage pulses for flashing the Xenon tube along with control circuitry to produce flashes in the proper sequence.
- c) The flash head shall contain a single reflector, a trigger transformer, and a single Xenon flash tube.
- d) Both the power supply and the flash head shall be resistant to water entry, but only the flash head is intended to be installed outside the vehicle.
- e) The emitter shall be able to be mounted in two configurations; horizontal and bulkhead. In the horizontal configuration, the flash head is mounted on the surface of the vehicle. In the bulkhead configuration the emitter is recessed into a hole in a vertical surface to give it a minimal appearance.
- f) The flash head shall be small enough to fit into most lightbars.
- g) The emitter shall be powered by DC voltage supplied from the vehicle's battery.
- h) A weatherproof fuse holder shall be provided.
- i) The flash sequence generated by the emitter shall carry two types of information. The first information type is the base frequency of the flashes.
- j) The base frequency shall be the same as the basic Opticom (either 10Hz or 14Hz approximately), it provides compatibility with earlier Opticom systems.
- k) The base flash frequency shall carry the priority information in the optical signal. 14Hz is high priority and 10Hz is low priority.
- l) Selection of high or low priority shall be done through a priority selection input wire.
- m) A second type of information sent by the emitter shall be a vehicle identification code which is interleaved into the base frequency flashes.
- n) Setting the code shall be done through four, 10 position rotary switches provided in the power supply. The power supply must be opened to set the code into the dip switches.

- o) A special code shall be reserved for setting intersection detection range.
- p) Self diagnostics shall check for missing pulses and shall indicate such occurrences by flashing the indicator light at a rate of 2Hz.
- q) Two cables shall be provided to install and operate the encoded emitter. The emitter cable connects the flash head to the power supply. The installation cable connects the power supply to DC power and control switches.
- r) The emitter cable shall be pre-assembled with connectors at both ends and available in two lengths; four feet and fifteen feet.
- s) The installation cable shall be pre-assembled with a connector at the power supply end and no connector at the battery/interface end. The cable length must be twenty-five feet.
- t) A switch shall be provided with the encoded emitter.
- u) A water resistant, minimum 5 ampere rated, in-line fuse-holder shall be provided with the encoded emitter.
- v) A disable input shall be provided.
- w) The disable input shall provide a latching disable function for the emitter. The disable input is active when it is applied to ground and is available in the power supply cable. It will disable the emitter under the following conditions:
 - the emitter has been powered up
 - the disable input has been inactive for at least 0.2 seconds (this will keep the emitter from being disabled if the disable is applied when the emitter is powered up)
 - the disable input is active (grounded) for at least 0.2 seconds
 - once the emitter is disabled, it will remain disabled until power is removed, it will not flash when disabled
- x) The indicator light output shall provide a continuous ground signal when the emitter is powered up and not disabled and not in a failed state. The purpose of this output is to provide the use with a lighted indication that the emitter is operating when it has been turned on. When the emitter has been disabled (by use of the disable input), the indicator light output will flash at a 0.5Hz rate with a

50% duty cycle. When the emitter has failed the indicator light will flash at a 4Hz rate with a 50% duty cycle.

- y) The encoded emitter shall be able to set the operating ranges of an encoded phase selector.
- z) The encoded emitter shall send a specific code reserved for setting range.
- aa) This range setting code shall be generated for either high or low priority operation.
- bb) The range setting code feature shall be activated by selecting the enabling wire from the installation cable and connecting it to the positive DC supply voltage.
- cc) The encoded emitter shall be able to generate either the high priority or low priority flash rate frequency.
- dd) The encoded emitter flash rate selection shall be controlled by selecting an enabling wire from the installation cable and connecting it to the positive DC supply voltage to cause the emitter to operate at the low priority flash rate. The enabling wire not connected shall cause the emitter to operate at the high priority flash rate.
- ee) The encoded emitter shall be capable of sending an embedded code intended to identify the vehicle class and vehicle identification number of the vehicle detected by the system.
- ff) One of the switches shall provide for 10 possible vehicle classes and three switches shall provide for 1000 possible identification numbers per class.
- gg) The encoded emitter shall be capable of sending the codes during high or low priority operation.
- hh) The vehicle identification number code shall be disabled while the range code is sent.
- ii) The encoded emitter flash rate for high priority shall be $14.0359 \pm 0.00300\text{Hz}$
- jj) The encoded emitter flash rate for low priority shall be $9.63855 \pm 0.00140\text{Hz}$
- kk) The encoded emitter shall have sufficient optical energy output to be detected by a system connected to a system phase selector at a range of up to at least 2500 feet (762 m) under clear atmospheric conditions.

- ll) The encoded emitter shall operate at 10 to 16 volts DC.
- mm) The encoded emitter shall operate over an ambient temperature range of -30 F (-34 .C) to + 140 F (+60 C).
- nn) The encoded emitter shall operate over a range of relative humidity range from 5% to 95%.
- oo) The encoded emitter assembly dimensions shall be as described below:

Power Supply -

Length: 9.75 inches (max.) (247.7 mm)
Height: 2.80 inches (max.) (71.1 mm)
Width: 3.50 inches (max.) (88.9 mm)

Flash Head (with Bracket) -

Depth: 3.75 inches (max.) (95.3 mm)
Height: 4.00 inches (max.) (101.6 mm)
Width: 5.00 inches (max.) (127.0 mm)

Switch Box -

Depth: 4.00 inches (max.) (101.6 mm)
Height: 1.10 inches (max.) (27.9 mm)
Width: 4.45 inches (max.) (113.0 mm)

- pp) The encoded emitter assembly shall meet or exceed the test specifications below:

Moisture (for the flash head only):

Per SAE J575 Section 4.2 (water resistant, weep holes provided for moisture run-off due to condensation)

Vibration:

Per SAE J575 Section 4.1

Dust:

Per SAE J575 Section 4.3

Corrosion:

Per SAE J575 Section 4.4

Supply Transients:

Per SAE J1113 Section 4, test pulses 1-7

Static Discharges:
Per SAE J1113 Section 5

Shock:
20 G's (1mS Duration)

E. Card Rack

- 1) The card rack shall be designed to accept two shelf-mount- configuration phase selectors and an interface card.
- 2) The card rack shall provide all interface connections for the phase selectors and interface card.
- 3) Internal wiring shall interconnect up to two phase selectors and the interface cards.
- 4) The phase selectors and interface card shall mate with 22 pin edge connectors in the rack.
- 5) A 16 pin circular connect on the front panel, together with the mating harness, shall provide interface connections from the card rack to the traffic controller.
- 6) Two terminal strips shall be provided on the front panel for connection of the optical detector field wire to the card rack.
- 7) A power on/off switch shall be provided on the front panel.
- 8) The card rack shall be designed to be powered by AC mains.
- 9) The card rack shall be designed to be installed within a weatherproof enclosure.
- 10) The card rack shall not exceed the following dimensions:
 - Length - Approximately 7.5 inches
 - Width - Approximately 7.5 inches
 - Height - Approximately 4.75 inches

F. Interface Card

- 1) The interface card shall be designed to provide electrical and logic interface between phase selectors and a NEMA type traffic controller
- 2) The inputs to the interface card shall be connected to the outputs of the phase selector.
- 3) The outputs of the interface card shall be connected to the "Ped Omit", "Manual Control Enable", "Interval Advance", and "Phase Omit" inputs of the NEMA type controller.

- 4) The interface card shall decode the outputs of the phase selector(s) and advance the controller to the phase that is set for that channel.
- 5) The interface card shall accomplish this with a micro controller to monitor the outputs from the phase selectors and bring the controller to the proper phase for that channel.
- 6) The micro controller shall read the inputs from the phase selectors and make a determination if there are any calls, and whether they are of high or low priority and the micro controller shall implement appropriate measures to manipulate the controller to the desired green.
- 7) The interface card shall provide 4 inputs that are connected to the phase selector(s).
- 8) The interface card shall provide one input to disable and reset the interface card.
- 9) The interface card shall provide the following outputs:
 - a) Manual Control Enable - this output allows manual operation of the controller.
 - b) Interval Advance - this output advances the controller to its next stage of operation.
 - c) Ped Omits - These 4 outputs prevent any of the pedestrian walk signals from coming on when a call is in progress.
 - d) Phase Omits - These 8 outputs determine the phase of the intersection.
- 10) The interface card shall, when multiple inputs of the same priority are present, service them on a first come first serve basis.
- 11) The interface card shall, when both high and low priority signals are present at the inputs, service the high priority call.
- 12) The interface card shall, if a low priority call is being serviced and a high priority input is received, drop the low priority call and service the high priority call.
- 13) The interface card shall provide the following inputs:
 - a) Call monitor Inputs - four inputs from the phase selectors, one per channel.
 - b) Disable input - Connecting this input to a low impedance source will disable the outputs and reset the interface card.

- 14) The interface card shall provide the following switches:
- a) Channel 1 Phase - 8 position dip switch, sets the phase to output to the controller during a call on channel 1.
 - b) Channel 2 Phase - 8 position dip switch, sets the phase to output to the controller during a call on channel 2.
 - c) Channel 3 Phase - 8 position dip switch, sets the phase to output to the controller during a call on channel 3.
 - d) Channel 4 Phase - 8 position dip switch, sets the phase to output to the controller during a call on channel 4.
 - e) Interval Advance Delay - 10 position rotary switch, controls timing between interval advance pulses.
- 15) The interface card shall provide the following outputs:
- a) Ped Omits
 - b) Phase Omits
 - c) Manual Control Enable
 - d) Interval Advance
- 16) The interface card power supply shall convert 120 VAC to 5 VDC.
- 17) The interface card shall provide a watchdog circuit to monitor the operation of the micro controller to ensure that it is operating properly.
- 18) The interface card shall include an error indicating light.
- 19) The error indicating shall indicate the status of the interface card.
- 20) The error indicating light shall be on steady if the interface card is operating properly.
- 21) The error indicating light shall be off if the unit is not receiving power.
- 22) The error indicating light shall flash when the unit is either not operating properly or there is an invalid switch setting. An invalid switch setting would be if there were more than 2 phases selected for a channel.

23) The interface card shall be in accordance with NEMA Traffic Control Systems Standard No., TS 1-1983.

24) The interface card input specifications shall be:

- a) Isolation voltage of 5000 V pk.
- b) Inputs will have pull-up resistors so that the unused inputs will default to their off state.
- c) Input impedance, 1.2K ohms.
- d) Maximum input on voltage 135 VAC.
- e) Minimum input off voltage 40 VAC.

25) The interface card output specifications shall be:

- a) Isolation voltage of 5000 V pk.
- b) Maximum output current 100 ma.

26) The interface card shall be tested and meet all NEMA transient and power interruption standards as are outlined in NEMA Traffic Control Systems Standards No., TS 1-1983.

27) The interface card shall be tested to meet the following NEMA operating temperature standards:

- a) Minimum operating temperature - -34 F (-30 C)
- b) Maximum operating temperature - +165 F (+74 C)
- c) Maximum operating humidity - 95% from 39 F (+4 C)
to +109 F (+43.3 C)

28) The interface card shall consume less than 5 watts.

29) The interface card shall provide connector pin assignments as shown below:

Pin Description

- A Phase 1 Omit
- B Phase 2 Omit
- C Channel 3 High/Low priority Input
- D Channel 1 High/Low priority Input
- E Unregulated +24 VDC Output

Pin Description

F	Phase 3 Omit
H	Phase 4 Omit
J	Channel 2 High/Low priority Input
K	DC Common
L	Disable
M	AC-
N	AC+
P	Ped Omit 1
11	Ped Omit 2
14	Ped Omit 3
15	Ped Omit 4
R	Manual Control Enable
S	Interval Advance
T	Phase 5 Omit
U	Phase 6 Omit
V	Channel 4 High/Low priority Input
W	Phase 7 Omit
X	Phase 8 Omit
Y	Output Common
Z	Output Common

30) The interface card shall be a 4.5 inch by 6.5 inch printed circuit card.

G. Interface Software

Priority control software shall be provided on 3.5" 1.44MB diskettes to interface with Phase Selectors. It shall run on most IBM compatible computers with at least 512 Kilo Bytes of RAM, DOS 4.0 or higher and; monochrome, CGA, EGA, monochrome VGA, or color VGA display capability. The software shall aid in the setup and presentation of user settable system parameters, viewing and changing setting, viewing activity screens, displaying and/or downloading records of previous activity showing class, code, priority, direction, call duration, final greens at end of call, duration of final greens, time call ended in real time plus vehicle location indication (vehicle near indicated).

1. The software shall be operated using a mouse, or directly from the computer keyboard keys, or in combination.
2. The software shall be a WindowsTM version.
3. The software shall provide menu displays to allow setting of valid vehicle I.D. classes and codes, establishing signal intensity thresholds (detection

ranges), modem initialization, intersection name, timing parameters, setting of desired green signal indications during priority control operation and upload and download capability to view, reset and/or retrieve logged data and priority vehicle activity.

19.04 RELIABILITY

- A. All equipment supplied as part of the optical priority remote traffic control system intended for use in the controller cabinet shall meet the electrical and environmental specifications spelled out in the NEMA standards publication TS1-1983 part 2:
- 1) Line voltage variations per NEMA TS1 - 2.1.2
 - 2) Power source frequency per NEMA TS1 - 2.1.3
 - 3) Primary power interruptions per NEMA TS1 - 2.1.04.A.1
 - 4) Power source noise transients per NEMA TS1 - 2.1.6.1
 - 5) Power source high energy transients per NEMA TS1 - 2.1.6.2
 - 6) Nondestruct transient immunity per NEMA TS1- 2.1.8
 - 7) Input-Output noise immunity per NEMA TS1 - 2.1.7
 - 8) Temperature range per NEMA TS1 - 2.1.5.1
 - 9) Humidity per NEMA TS1 - 2.1.5.2
 - 10) Shock test per NEMA TS1 - 2.1.13
 - 11) Vibration per NEMA TS1 - 2.1.12
- B. All equipment supplied as part of the priority control system intended for use in or on emergency vehicles shall operate properly under any combination of the following environmental conditions.
- 1) Temperature range: -30 C to +60 C
 - 2) Relative Humidity: 0 to 95%
 - 3) Vehicle battery voltage: 10 to 15 volts

19.05 QUALIFICATIONS

- A. The manufacturer shall verify the proven, safe operation of the system's optical communication technology. A list of twenty (20) user agencies having two (2) years or more experience interfacing priority control equipment with electro-mechanical, solid-state, and programmable controller types must be provided upon request.

- B. The manufacturer must also demonstrate the ability to finance on-going technical support, product warranties, and responsibility for product failure. A copy of the manufacturer's last full year and four previous year's corporate financial statements must be provided upon request.
- C. The manufacturer shall have an independent quality department that has complete authority to control product integrity and is answerable only to the senior officer of the organization.
- D. The manufacturer shall operate according to documented quality systems that have been inspected and approved by a regulatory agency of the U.S. Government.

19.06 RESPONSIBILITIES

- A. The manufacturer and/or the manufacturer's representative shall provide quality service before, during, and after installation of the priority control system. The manufacturer and/or the manufacturer's representative, as consultants to the installer, must provide certified trained technicians having traffic systems industry experience and operational knowledge of priority control systems.
- B. After an award, the manufacturer or its authorized representative shall be responsible for system documentation including the following:
 - 1) Acquire all relevant controller information.
 - 2) Determine the number of vehicle phases (greens).
 - 3) Determine the desired greens for priority approaches.
 - 4) Determine ring configuration of each controller.
 - 5) Establish pedestrian phase timing requirements.
 - 6) Establish minimum green times for non-priority phases.
 - 7) Establish the manipulation method of each controller type.
 - 8) Supply interface information to installer.
 - 9) Assist in system checkout prior to purchaser's acceptance by:
 - Verifying proper installation per recommended interfaces
 - Verifying that optical ranges are properly set
 - Verifying that phase selector timings or controller software timings are properly set.
 - 10) Instruct maintenance personnel in routine maintenance of the system.

19.07 GUARANTEED WARRANTY

- A. Manufacturer shall warrant that, provided the priority control system has been properly installed, operated and maintained, component parts of a matched component system (see Section II) that prove to be defective in workmanship and/or material during the first ten (10) years from date of shipment from manufacturer shall be covered in a documented system protection plan.
- B. The protection plan shall warrant that component parts, of a matched component system, that prove to be defective in workmanship and/or material during the first five (5) years from date of shipment from manufacturer will be repaired at no charge and that extended coverage with a fixed repair deductible will be available for an additional five (5) years.
- C. In total, the warranty coverage must assure ten year operational reliability and interface compatibility with future components designed for the system.

19.08 CERTIFICATE OF INSURANCE

The manufacturer shall provide a certificate of insurance protection for \$5,000,000. This certificate assures the priority control user that the manufacturer is insured against civil damages if proven to be at fault for an accident due to equipment failure within the system of matched priority control components. This certificate, however, need not, and is not meant to, provide liability insurance protection to the priority control system user.

19.09 CERTIFICATION

The manufacturer of the priority control system shall certify that component products are designed, manufactured, and tested as a system matched components and will meet or exceed the requirements of this specification.

CITY OF MODESTO

INDEX

DETAILS

<u>SECTION</u>	<u>DETAIL NO.</u>
<u>100 - Traffic Safety:</u>	
Construction Barricades	100
Traffic Cones and Lane Closure Tapers.....	101
Construction Signs (Appearance).....	102
Construction Signs (Description).....	103
Traffic Controls Multi-Lane Conventional Highway:	
Typical Lane Closure	104
Lane Closure - Half Roadway	105
Lane Closure with Reversible Control	106
<u>200 - Engineering:</u>	
Typical Layout for Improvement Plans (Diagram)	200
Typical Layout for Improvement Plans (Legend)	201
Typical Title Strip for All Sheet	202
Design Revisions Format	203
Drafting Standards (Lettering)	204
Drafting Standards (Symbols)	205
<u>300 - Streets:</u>	
Street Sections	300
Structural Section Requirements.....	301
Collector/Collector Street Intersection.....	302
Major/Collector/Industrial Street Intersection.....	303

SECTIONDETAIL NO.**300 - Streets (continued):**

Collector/Major Street Intersection	304
Major/Major Street Intersection	305
Major Street Section.....	306
Minor Collector/Industrial Street Section	307
Expressway (Except Briggsmore Avenue).....	308
Residential Street Section.....	309
Cul-De-Sac Street Section - Curb/Easement.....	310
Cul-De-Sac Street Section - Design Layout/Types	311
Alignment for 90 Street Intersection Knuckle.....	312
Village Traffic Circle	313
100' Major Street with Continuous Median	314
Standard Pavement on Existing Street Section	322
Part-Width Street Section.....	324
Mid Block Bus Turnout.....	325
Far-side Bus Turnout.....	326
Nearside Bus Turnout.....	327
Median Detail.....	328
Thru Drain Detail for Medians.....	329
Curb Sections	330
Curb Modification for Existing Tree.....	331
Curb Drain Under Sidewalk.....	332
Sidewalk Modification for Tree at Property Line	334
Sidewalk Modification for Tree at Curb	335
Sidewalk Widening for Obstructions	336
Tree Block Out.....	337
Concrete And Aggregate Sidewalk	342

SECTIONDETAIL NO.**300 - Streets (continued):**

Curb Ramp - Case B and Case E.....	345
Curb Ramp - Case C.....	346
Curb Ramp - Case A and Case D.....	347
Curb Ramp - Notes and Details.....	348
Curb & Sidewalk Returns w/Transitions	349
Valley Gutter	351
Downtown Exposed Aggregate Sidewalk.....	352

400 - Storm Drain:

Rain Intensity - Frequency Curves	400
Drainage Basin	401
Drainage Basin Outlet	402
Temporary Rockwell & Typical Locations	403
Rockwell Assembly w/ Type I Catch Basin.....	405
Grate Detail	406
Rockwell for Vehicular Traffic Areas.....	407
Rockwell Frame & Cover and Screen Cover	408
Type II Catch Basin w / 3AC Top or Equal	409
Type II Catch Basin.....	410
Drive-Over Curb Transition for Curb Inlet	411
Junction Box.....	412
Lateral Manhole	413
Precast Trunk Manhole	414
Cast-In-Place-Trunk Manhole.....	415
Manhole Cover and Frame.....	416

SECTION

DETAIL NO.

500 - Sanitary Sewer:

California Health Department Requirements	500
Lateral, Subtrunk or Small Trunk Manhole	501
Sanitary Sewer Drop in New Manhole.....	503
Sanitary Sewer Drop in Existing Manhole.....	504
Terminal Manhole	505
Manhole Cover and Frame	506
Temporary Lamphole	507
Sewer Fly-Line Construction	508
Sewer Service	509
Service Riser	511
Cut-In Service.....	512
Saddle Installation	513
Existing House Lateral Relocation.....	514
Sand & Grease Interceptor	515

600 - Water:

California Health Department Requirements	600
Fire Hydrant Location	605
Fire Hydrant Installation.....	606
Valve Box Installation.....	608
Thrust Blocking.....	609
Blow-Off	610
Sample Station	611
1" Water Service with Meter Box	612
Schedule of Metered Services	613
Air & Vacuum Release Valve	614

SECTION

DETAIL NO.

600 - Water (continued):

Layout for 3" or Larger Meter By-Pass Installation	617
Backflow Prevention Device.....	618
Typical Fire Sprinkler Line with Post Indicator Valve	620
Fire Protection System Standards.....	621
Pipe Locating Wire for Non-Conductive Water Mains.....	622
Standard Water Service Taps 1" - 2" & Tap Excavation Requirements	623

700 - Lighting & Traffic:

Locations of 25' Poles	700
Locations of 28' Poles	701
Installation Layout.....	702
Pull Box	703
Pole Foundation.....	704
Trench Section.....	705
Sign Posts	706
Street Name Sign.....	707
Street Sign Location	708
Typical Overhead Street Name Signs.....	709
Curb Numbers	710
Clear Vision Triangle	711
Dead End Street Barricade	712
Street Width Transition Barricade.....	713
Information on Dead End Barricade.....	714
Pavement Markers & Traffic Lines Typical Details:	
Standard Plan A20A.....	716
Standard Plan A20B	717
Standard Plan A20C	718

SECTION

DETAIL NO.

700 - Lighting & Traffic:

Standard Plan A20D.....	719
Pavement Markings - Arrows:	
Standard Plan A24A.....	720
Standard Plan A24B.....	721
Pavement Markings - Symbols and Numerals	722
Pavement Markings - Words.....	723
Pavement Markings - Words and Crosswalks.....	724

800 - Utilities, SD, SS, W:

Trench Backfill - Existing Streets	800
Trench Backfill - Undeveloped Streets	801
Trenching and Resurfacing (page 1 of 2).....	802
Trenching and Resurfacing (page 2 of 2).....	803
Standard Locations for Residential	804
Street Crossing for Residential.....	805
Trenching in the Street	806
Adjusting Street Facilities to Grade	807
Utility Location w/o Ultimate ROW	808
Joint Trench Locations - Cases A-C.....	809
Joint Trench Locations - Cases D-E.....	810
PVC Sewer Trench Backfill - Undeveloped Streets	811V
PVC Sewer Trench Backfill - Existing Streets	812V

900 - Survey:

Survey Monument	900

SECTION

DETAIL NO.

1000 - Driveways:

Driveway Design Standards	1000
Driveway Design Standards	1001
Residential Driveways.....	1002
Non-Residential Driveways	1003
Apartment / Commercial Driveways.....	1004
Industrial Driveways	1005
Access Design	1006
Median Design	1007
Deceleration Lanes for Driveways	1008
Driveway Details, Utilities	1009
Construction Details for Alley Flared Driveways	1010
Construction Details for Commercial Flared Driveways	1011
Construction Details for Residential Flared Driveways.....	1012
Construction Details for Drop Approach Driveways	1013

1200 - Landscaping:

Typical Tree Staking	1200
Planter Detail.....	1201
Solenoid Valve Detail	1202
Gate Valve Assembly.....	1203
Irrigation Controller	1204
Typical Wire Connection	1205
Street Tree Block Out - Typical Bubbler Detail.....	1206
Bubbler Detail	1207
Irrigation Layout - Typical Back-Up Lot Planting	1208

SECTION

DETAIL NO.

1200 - Landscaping:

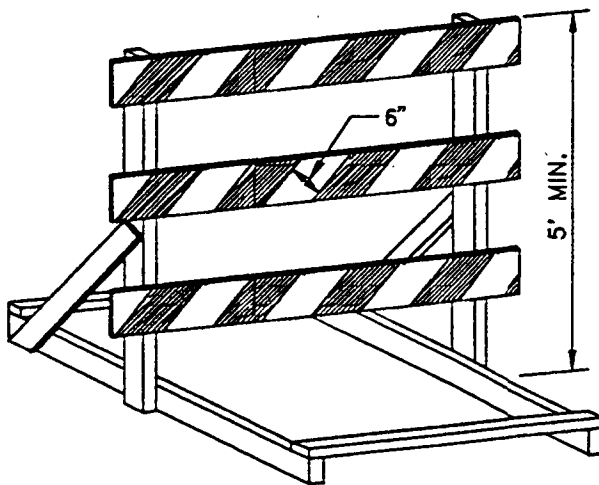
Reduced Pressure Principle Backflow Prevention	
Assembly for 3" & Larger.....	1209
Reduced Pressure Principle Backflow Prevention	
Assembly 1" to 2 Size.....	1210
Typical Concrete Thrust Block	1211
Typical Trenching	1212
Access Control Wall.....	1213
7 Foot Access Control Wall	1214
Chain Link Fence & Gate.....	1215
Fence Standards (Building Department)	1216

BARRICADE CHARACTERISTICS

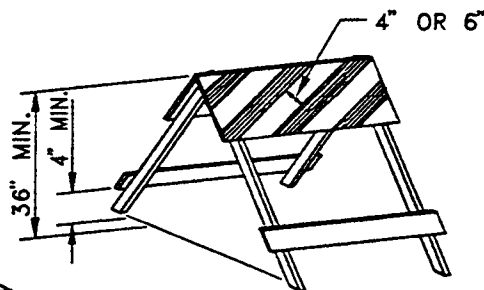
TYPE *	I	II	III
WIDTH OF RAIL	8" MIN. - 12" MAX.	8" MIN. - 12" MAX.	8" MIN. - 12" MAX.
LENGTH OF RAIL	2' MIN.	2' MIN.	4' MIN.
WIDTH OF STRIPES **	6"	6"	6"
HEIGHT	3' MIN.	3' MIN.	5' MIN.
NUMBER OF REFLECTORIZED RAIL FACES	2 (ONE EACH DIRECTION)	4 (ONE EACH DIRECTION)	3-IF FACING TRAFFIC IN ONE DIRECTION. 6-IF FACING TRAFFIC IN TWO DIRECTIONS.

- (*) FOR WOODEN BARRICADES NOMINAL LUMBER DIMENSIONS WILL BE SATISFACTORY.
 (**) FOR RAILS LESS THAN 3 FEET LONG, 4 INCH WIDE STRIPES SHALL BE USED.

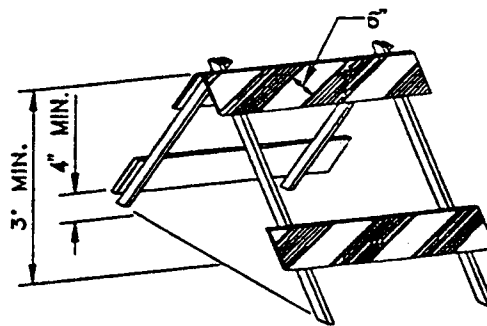
Note: Flashing Lights are required



TYPE III



TYPE I



TYPE II

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97
REVISED BY: r.a.c. DATE: 09-92
REVISED BY: DATE:
DRAWN BY: HAH DATE: 08-74

TRAFFIC SAFETY

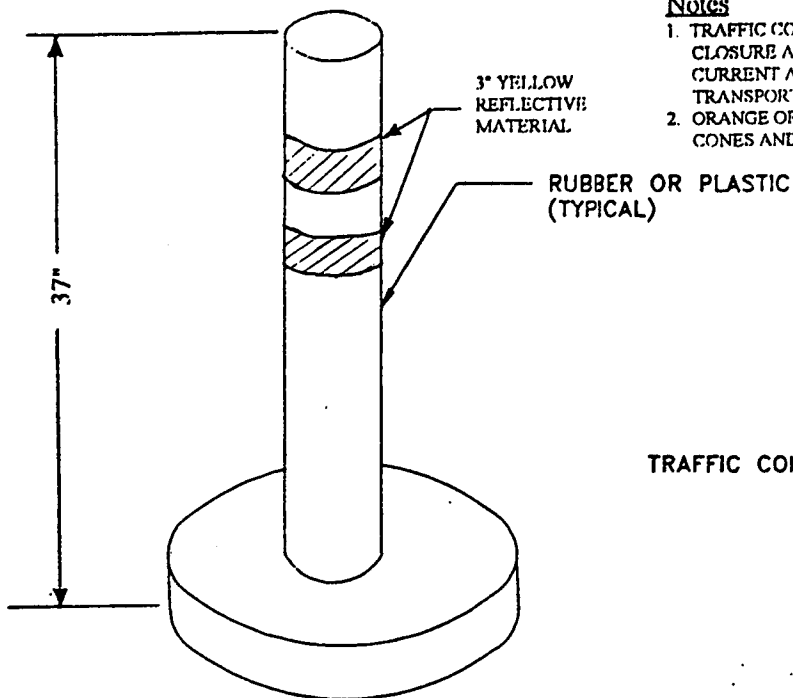
CONSTRUCTION
BARRICADES

DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

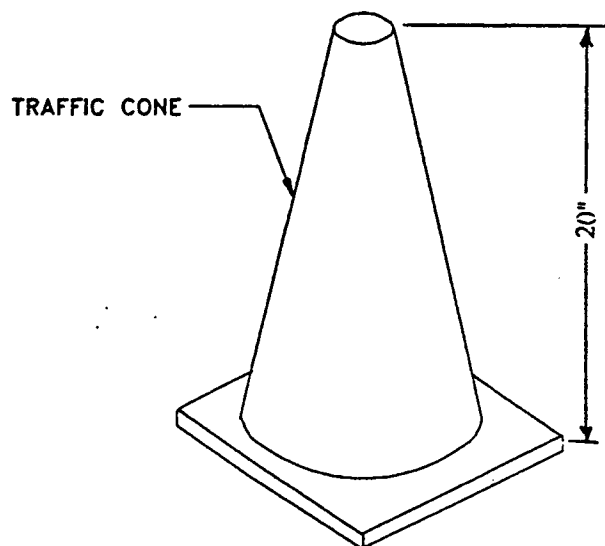
DRAWING NO.
100



DELINEATOR

Notes

1. TRAFFIC CONES AND TRANSITONS SHALL CONFORM TO THE CLOSURE AND TRANSITONS SHALL CONFORM TO THE CURRENT APPLICABLE CALIFORNIA DEPARTMENT OF TRANSPORTATION STANDARDS AND THESE SPECIFICATIONS.
2. ORANGE OR RED SHALL BE THE PREDOMINATE COLOR OF CONES AND DELINEATORS.



CONE

TRANSITION TAPER LENGTH FORMULA

L = TRANSITION TAPER LENGTH

S = POSTED SPEED LIMIT

W = LATERAL TRANSITION

$L = S \times W$ FOR $S \geq 45$ MPH

$L = WS^2/60$ FOR $S \leq 40$ MPH

TRANSITION TAPER LENGTH

POSTED SPEED MPH	TAPER LENGTH FEET FOR 12 FOOT LATERAL TRANSITION
25 (40 KmPH)	125'
30 (48 KmPH)	180'
36 (56 KmPH)	245'
40 (64 KmPH)	320'
45 (72 KmPH)	440'
50 (80 KmPH)	600'
55 (89 KmPH)	680'

CONE SPACING CHART

POSTED SPEED MPH	MAXIMUM SPACING FEET
25-35 (40-56 KmPH)	20'
40-45 (64-72 KmPH)	35'
50-55 (80-89 KmPH)	40'

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: NOVAK DATE: 08-08-83

REVISED BY: DATE:

DRAWN BY: RS

DATE: 08-74

TRAFFIC SAFETY

**TRAFFIC CONES AND
LANE CLOSURE TAPERS**

**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

DRAWING NO.

101

ROAD
CLOSED

C2
48" X30"

DETOUR
AHEAD

ONE LANE
ROAD
AHEAD

C1
48" X48"

FLAGMAN
AHEAD

ROAD
CONSTRUCTION
AHEAD

C16
48" X48"

ROAD
CLOSED
AHEAD

C9
48" X48"

OPEN
TRENCH

C18
48" X48"

FRESH
OIL

C19
48" X48"

C27
24" X24"

C4
24" X24"



END
CONSTRUCTION

25
MPH

C13
60" X24"

W6
24" X24"

STOP

C28A 24" dia.

SLOW

C28A



C5
48" X18"

END
DETOUR

C7
30" X18"

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SIGNED BY: VAN SWITZER

R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: YIA THAO DATE: 06-88

REVISED BY: DATE:

DRAWN BY: HAH

DATE:

TRAFFIC SAFETY
CONSTRUCTION
SIGNS

DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DRAWING NO.
102

CONSTRUCTION SIGNS

CODE	LEGEND	COLOR		SIZE
C1	DETOUR AHEAD	B ON W	48" X 48"	(91.4 cm X 91.4 cm)
C2	ROAD CLOSED	B ON W	48" X 30"	(121.7 cm X 76.2 cm)
C3A	ROAD CLOSED TO THRU TRAFFIC	B ON W	60" X 30"	(152.4 cm X 76.2 cm)
C4	FRESH OIL	B ON O	24" X 24"	(60.9 cm X 60.9 cm)
C5	DETOUR (AVAILABLE LEFT OR RIGHT)	B ON O	48" X 18"	(121.7 cm X 45.7 cm)
C6	LOOSE GRAVEL	B ON O	30" X 30"	(76.2 cm X 76.2 cm)
C7	END DETOUR	B ON O	30" X 18"	(76.2 cm X 45.7 cm)
C9	FLAGMAN AHEAD	B ON O	48" X 48"	(121.7 cm X 121.7 cm)
C9A	FLAGMAN AHEAD (SYMBOLIC)	B ON O	48" X 48"	(121.7 cm X 121.7 cm)
C13	END CONSTRUCTION	B ON O	60" X 24"	(152.4 cm X 60.9 cm)
C14	END ROAD WORK	B ON O	42" X 18"	(106.7 cm X 45.7 cm)
W15	ROAD NARROWS	B ON O	36" X 36"	(91.4 cm X 91.4 cm)
C16	ONE LANE ROAD AHEAD	B ON O	48" X 48"	(121.7 cm X 121.7 cm)
C18	ROAD CONSTRUCTION AHEAD	B ON O	48" X 48"	(121.7 cm X 121.7 cm)
C19	ROAD CLOSED AHEAD	B ON O	48" X 48"	(121.7 cm X 121.7 cm)
W19	PAVEMENT ENDS	B ON O	42" X 42"	(106.7 cm X 106.7 cm)
C22	MEN WORKING	B ON O	30" X 30"	(76.2 cm X 76.2 cm)
C22B	MEN WORKING (SYMBOLIC)	B ON O	36" X 36"	(91.4 cm X 91.4 cm)
C23	ROAD WORK AHEAD	B ON O	30" X 30"	(76.2 cm X 76.2 cm)
C24	SHOULDER WORK AHEAD	B ON O	30" X 30"	(76.2 cm X 76.2 cm)
C27	OPEN TRENCH	B ON O	36" X 36"	(91.4 cm X 91.4 cm)
C28A-B	FLAGMAN HAND PADDLE	W ON R B ON O	18" X 18"	(45.7 cm X 45.7 cm)
W35	SLOW	B ON O	30" X 30"	(76.2 cm X 76.2 cm)
W33	ROUGH ROAD	B ON O	30" X 30"	(76.2 cm X 76.2 cm)
TYPE N	9 AMBER REFLECTORS	Y	18" X 18"	(45.7 cm X 45.7 cm)

COLOR B-BLACK, R-RED, W-WHITE, Y-YELLOW, O-ORANGE

NOTES

1. CONSTRUCTION SIGN BACKING MATERIAL SHALL BE ALUMINUM OR MARINE GRADE PLYWOOD FOR ALL SIGNS.
2. SIGN FACE MATERIAL SHALL BE REFLECTIVE SHEETING WITH A SEALED SURFACE.
3. ALL CONSTRUCTION SIGNS SHALL CONFORM TO THE CURRENT STANDARDS AND SPECIFICATIONS OF CALIFORNIA DEPARTMENT OF TRANSPORTATION.
4. SPECIAL SIGNS SHALL BE APPROVED BY THE CITY ENGINEER AND PROVIDED BY THE CONTRACTOR.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: KJB

DATE: 5-15-96

TRAFFIC SAFETY

CONSTRUCTION
SIGNS

DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DRAWING NO.

103

Figure 5-9
TYPICAL LANE CLOSURE
(TRAFFIC CONTROL SYSTEM FOR MULTILANE CONVENTIONAL HIGHWAYS)

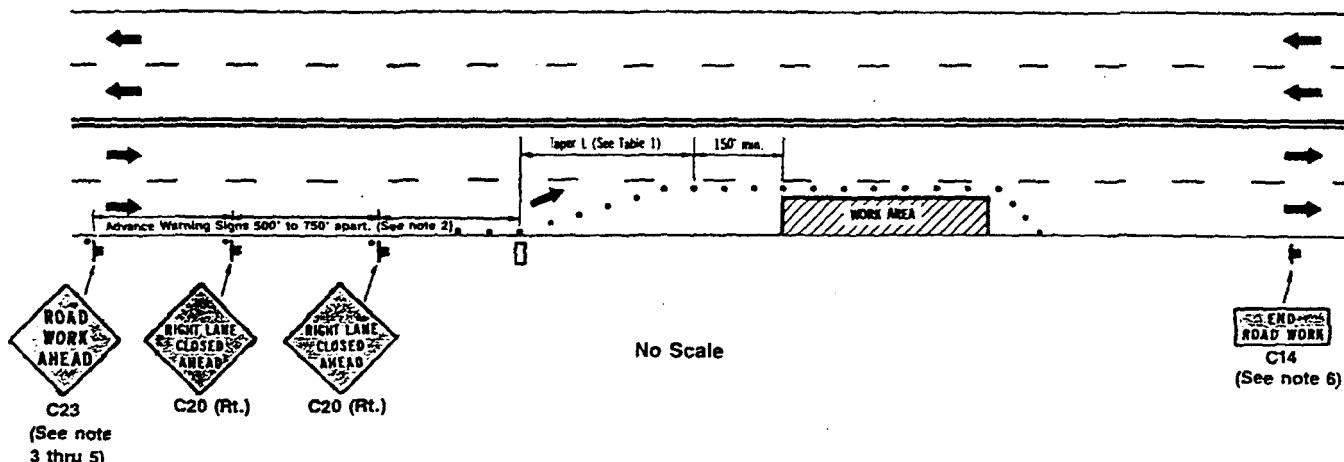


TABLE 1

APPROACH SPEED (MPH)	TAPER LENGTH (L) *	NUMBER OF CONES FOR TAPER *	SPACING OF CONES ALONG TAPER (Feet) ±
25	125	6	25
30	180	7	30
35	245	8	35
40	320	9	40
45	540	13	45
50	600	13	50
50 +	1000	21	50

(*) Based on 12-foot wide lane. This column is also appropriate for lane widths less than 12 feet.

Legend:

- Sign
- Cone or Portable Delineator
- Direction of Traffic
- Flashing Arrow Sign (Optional)

NOTES:

Taper formula:

$$L \approx S \times W \text{ for speeds of 45 or more.}$$

$$L = \frac{WS^2}{60} \text{ for speeds of 40 or less.}$$

Where:

- L = Minimum length of taper.
- S = Numerical value of posted speed limit prior to work or 85 percentile speed.
- W = Width of offset.

SPECIAL NOTE: Field conditions could require deviations from these plans and accompanying notes.

NOTES:

- This plan does not apply where there are emergency conditions. Under emergency conditions, equipment and personnel which are available should be utilized to implement a closure even though such closure does not meet the standards contained in this plan. As equipment or personnel become available an immediate effort should then be made to implement the standards shown on this plan.
- Where approach speeds are low, signs may be placed at 300 feet spacings, and even closer in urban areas.
- All advance warning signs shall be 48" x 48" minimum on highways with approach speeds of 45 mph or more. When speeds are less than 45 mph the C23 sign shall be 30" x 30" minimum; other advance warning signs shall be 36" x 36" minimum. (See Note 5)
- All warning signs for night closures shall be either illuminated or reflectorized.
- A C18 "ROAD CONSTRUCTION AHEAD" sign may be used in lieu of the C23. (See Note 3)
- A C13 "END CONSTRUCTION" sign, as appropriate, may be used in lieu of the C14. The sign is optional if the end of work zone is obvious or falls within a larger project limit.
- Warning (W) series signs used in work zones shall be black on orange. Existing yellow warning signs already in place within these areas may remain in use.
- Pavement markings for closures shall conform to Section 5-05 of this manual.
- All cones shall be internally illuminated or fitted with reflective white sleeves for night closures (See Section 5-03.3).
- The maximum spacing between channelizing devices in a taper should be approximately equal in feet to the speed limit. (See Table 1)

Figure 5-10
TYPICAL CLOSING OF HALF ROADWAY
(TRAFFIC CONTROL SYSTEM FOR MULTILANE CONVENTIONAL HIGHWAYS)

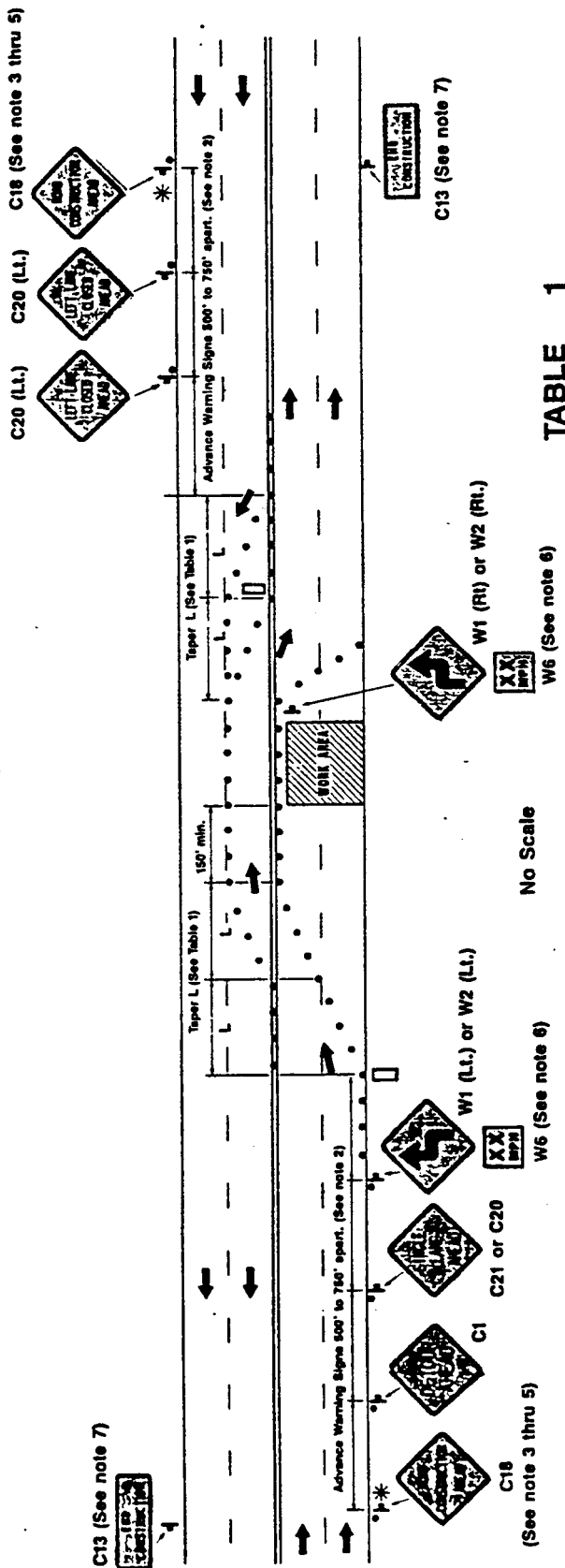


TABLE 1

APPROACH SPEED (MPH)	TAPER LENGTH (L) *	NUMBER OF CONES FOR TAPER *	SPACING OF CONES ALONG TAPER (feet) ‡
25	125	6	25
30	180	7	30
35	245	8	35
40	320	9	40
45	540	13	45
50	600	13	50
50 +	1000	21	50

(★) Based on 12-foot wide lane. This column is also appropriate for lane widths less than 12 feet.

NOTES:

Taper formula:

L = S x W for speeds of 45 or more.

- WS² for speeds of 40 or less.

09

Where: $L =$ Minimum length of taper.

S = Numerical value of posted speed limit prior to work or 85 percentile speed.

W = Width of offset.

SPECIAL NOTE:

Field conditions could require deviations from these plans and accompanying notes.

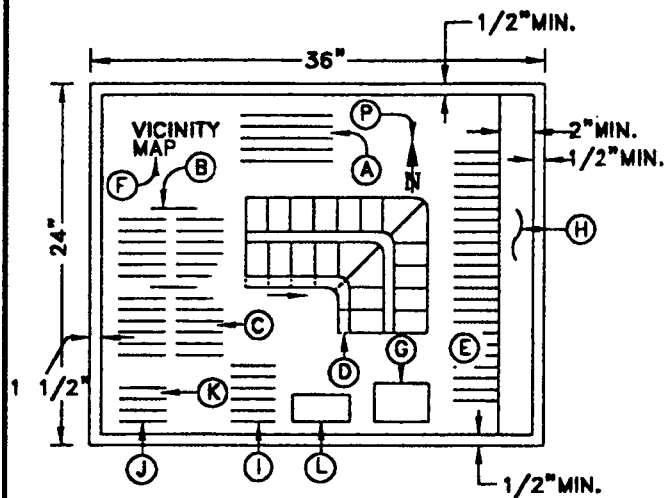
NOTES:

1. This plan does not apply where there are emergency conditions. Under emergency conditions, equipment and personnel which are available should be utilized to implement a closure even though such closure does not meet the standards contained in this plan. As equipment or personnel become available an immediate effort should then be made to implement the standards shown on this plan.
2. Where approach speeds are low, signs may be placed at 300 feet spacings, and even closer in urban areas.
3. All advance warning signs shall be 48" x 48" minimum on highways with approach speeds of 45 mph or more. When speeds are less than 45 mph the C23 sign shall be 30" x 30" minimum; other advance warning signs shall be 36" x 36" minimum. (See Note 5)
4. All warning signs for night closures shall be either illuminated or reflectorized.
5. A C23 "ROAD WORK AHEAD" sign may be used in lieu of the C18. (See Note 3)
6. Determine advisory speed at site; should not be posted if in excess of speed limit.
7. A C14 "END ROAD WORK" sign, as appropriate, may be used in lieu of the C13. This sign is optional if the end of work zone is obvious, or falls within a larger project limit.
8. Warning (W) series signs used in work zones shall be black on orange. Existing yellow warning signs already in place within these areas may remain in use.
9. Pavement markings for closures shall conform to section 5-05 of this manual.
10. All cones shall be internally illuminated or fitted with reflective white sleeves (See Section 5-03.3).
11. The maximum spacing between channelizing devices in a taper should be approximately equal in feet to the speed limit. (See Table 1)

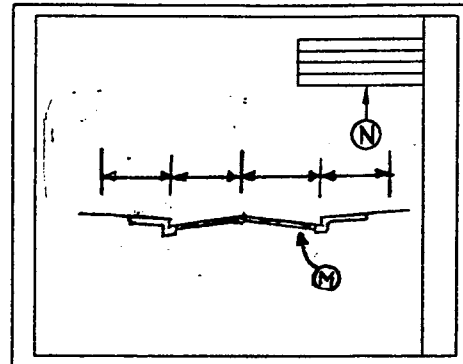
[illegible]

Field conditions could require deviations from these plans and accompanying notes.

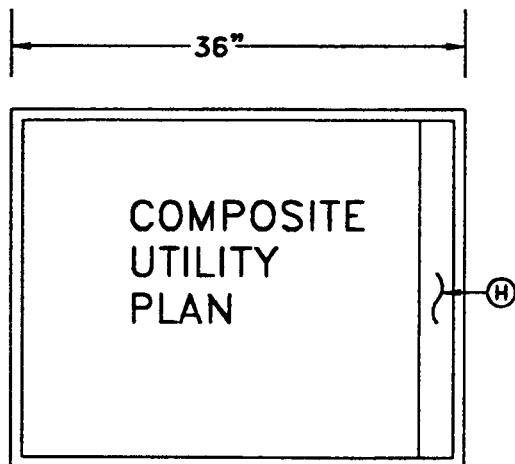
1. This plan does not apply where there are emergency conditions. Under emergency conditions, equipment and personnel which are available should be utilized to implement a closure even though such closure does not meet the standards contained in this plan. As equipment or personnel become available an immediate effort should then be made to implement the standards shown on this plan.
2. Where approach speeds are low, signs may be placed at 300 feet spacings and even closer in urban areas.
3. All advance warning signs shall be 48" x 48" minimum on highways with approach speeds of 45 mph or more. When speeds are less than 45 mph the C23 sign shall be 30" x 30" minimum; other advance warning signs shall be 36" x 36" minimum.
4. All warning signs for night closures shall be illuminated or reflectorized.
5. A C18 "ROAD CONSTRUCTION AHEAD" or C16 "ONE LANE ROAD AHEAD" sign may be used in lieu of the C23. (See Note 3)
6. A C13 "END CONSTRUCTION" sign, as appropriate, may be used in lieu of the C14. The sign is optional if the end of work zone is obvious, or falls within a larger project limit.
7. Warning (W) series signs used in work zones shall be black on orange. Existing yellow warning signs already in place within these areas may remain in use.
8. All cones shall be internally illuminated or fitted with reflective white sleeves for night closures.
9. The spacing between cones along centerline should be approximately 100 feet throughout the length of the work zone. Centerline cones may be eliminated if a pilot car operation is used.
10. When a pilot car is used a "TRAFFIC CONTROL WAIT FOR PILOT CAR" sign (C37) should be posted at intersecting driveways and roads. Flaggers may be used in lieu of C37 signs.
11. An additional advance flagger should be considered upstream on high volume highways, to warn traffic where queues may develop. Flaggers' stations for work at night shall be illuminated as noted in Section 5-07.
12. Place C30 "LANE CLOSED" sign (30" x 30" minimum) at 500' -1000' intervals throughout extended work zones. They are optional if the work area is visible from the flagger station.



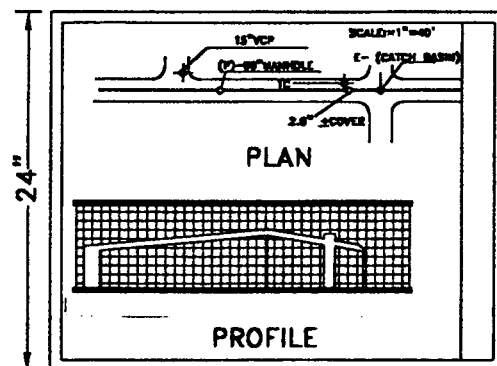
SHEET NO. 1



SHEET NO. 2



SHEET NO. 3



SHEET NO. 4

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: K.B.

DATE: 5-96

ENGINEERING

TYPICAL LAYOUT FOR IMPROVMENT PLANS

DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.
200

COMPOSITE UTILITY PLAN SHALL INCLUDE SEWER, WATER AND STORM DRAIN PIPE LENGTH AND SIZE. MAINTENANCE HOLES SHALL BE NUMBERED TO CORRESPOND WITH MAINTENANCE HOLE NUMBERS ON MASTER PLANS AND PLAN AND PROFILE.

SHEETS 1 THROUGH 3 MAY BE COMBINED ON 1 OR 2 SHEETS DEPENDING ON THE SIZE OF THE PROJECT. THE COMPOSITE UTILITY PLAN MUST BE AT 1"=100' SCALE. SUBSEQUENT SHEETS SHALL BE AT: HORIZONTAL 1"=40' OR 1"=20' AND VERTICAL 1"=4' OR 1"=2'.

LEGEND

- A PROJECT TITLE
- B SYMBOLS LEGEND
- C ABBREVIATIONS
- D ENTIRE PROJECT INCLUDING OFFSITE
- E STD. CONSTRUCTION NOTES
- F VICINITY MAP
- G CONCURRENCE BY OTHER DEPARTMENTS
- H TITLE STRIP
- I INDEX OF SHEETS
- J RESOLUTION NO. / APPROVING CONDITIONS REFERENCE
- K BENCH MARK
- L SOILS ENGINEER
- M TYPICAL CROSS SECTIONS
- N PAVEMENT THICKNESS TABLE FOR ALL STREETS WITHIN PROJECT
- P NORTH ARROW AND SCALE

NOTES:

1. DETAILS MAY BE PLACED ON ANY SHEET AND REFERENCED IN THE PLAN AND PROFILE SHEET.
2. SUBDIVISIONS SHALL INCLUDE A GRADING PLAN. HORIZONTAL SCALE MAY BE 1"=10' TO 1"=50'.
3. TRAFFIC DRAWINGS, IF REQUIRED, SHALL BE LOCATED AT THE END OF THE IMPROVEMENT PLANS.
4. ALL PLANS FOR WORK IN THE PUBLIC RIGHT OF WAY SHALL INCLUDE THE CITY'S STANDARD NOTES AS FOUND IN THE DESIGN SECTION, APPENDIX B OF THE MODESTO CITY STANDARD SPECIFICATIONS.
5. ALL PLAN SHEETS SHALL HAVE A TITLE STRIP AS DEFINED IN THE CITY STANDARD SPECIFICATIONS.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: K.B.

DATE: 5-96

ENGINEERING

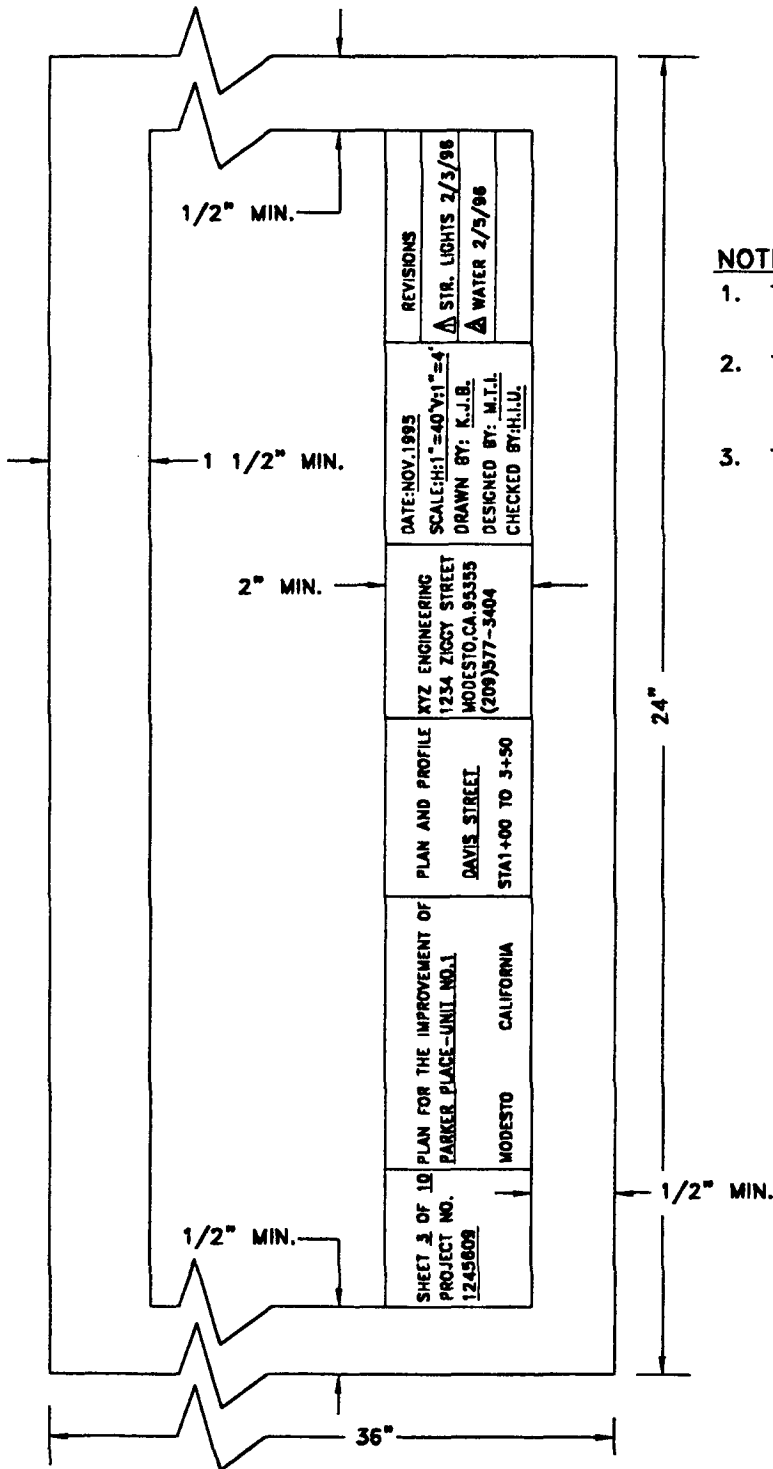
TYPICAL LAYOUT FOR IMPROVEMENT PLANS

DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.
201



NOTES:

1. TITLE STRIPS SHALL BE USED ON ALL PAGES OF THE PLAN SET.
2. THE TITLE STRIP TEST IN THE BLOCKS MAY BE HORIZONTAL OR VERTICAL TO THE PAGE.
3. THE MINIMUM CONTENTS ON THE TITLE STRIP ARE SHOWN IN THE EXAMPLE. THEY ARE AS FOLLOWS:
 - A. SHEET NUMBER AND PROJECT NUMBER.
 - B. TITLE OF PROJECT
 - C. CITY AND STATE OF PROJECT
 - D. TYPE OF SHEET I.E. TITLE, DETAIL, PLAN AND PROFILE (IF MORE THAN ONE SHEET IS NEEDED TO COVER THE STREET THAN STATION NUMBERS SHALL ALSO BE ANNOTATED.)
 - E. DESIGN COMPANY OR AGENCY NAME, ADDRESS AND PHONE NUMBER.
 - F. DATE OF DRAWING, SCALE AND INITIALS OF THE DRAFTER, DESIGNER AND SUPERVISOR CHECKING THE DRAWINGS.
 - G. REVISION BLOCK WITH NUMBER, DESCRIPTION AND DATE OF REVISIONS.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: H.R.

DATE: 5-96

ENGINEERING

TYPICAL TITLE STRIP FOR ALL SHEETS

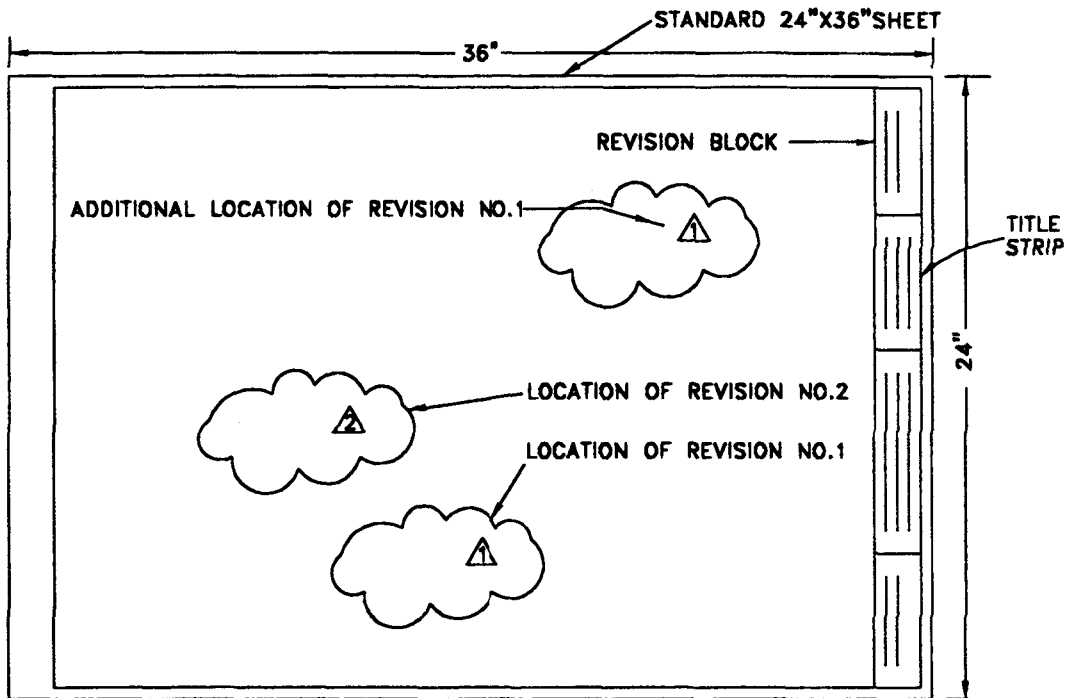
DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.

202



NOTES:

1. EACH DESIGN SHALL BE NUMBERED CONSECUTIVELY WITH THE NUMBER PLACED IN A TRIANGLE THUS:  AND DESCRIBED IN THE REVISION BLOCK.
2. FOR LOCATION OF THE RELATED REVISION", I.E.  SHALL BE PLACED AROUND THE ITEMS) TO BE REVISED. A REVISION TRIANGLE (NOTE 1). SHALL BE PLACED WITHIN THE CLOUD TO IDENTIFY THE REVISION NUMBER. I.E.  (SEE SAMPLES ABOVE)
3. IF MASSIVE REVISIONS OCCUR THAT COULD RENDER THE DRAWING UNREADABLE AN ADDITIONAL SHEET MAY BE USED AS APPROVED BY THE CITY ENGINEER.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97
REVISED BY: K.B. DATE: 5-96
REVISED BY: R.A.C. DATE: 2-94
DRAWN BY: H.R. DATE: 11-85

**ENGINEERING
DESIGN
REVISIONS FORMAT**

**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

DETAIL NO.
203

DRAFTING STANDARDS

ALL SUBDIVISION PLANS, CONSTRUCTION DRAWINGS, +PROPERTY PLATS SUBMITTED TO THE CITY ENGINEER FOR CONSIDERATION SHALL CONFORM TO AND BE PREPARED IN ACCORDANCE WITH THE FOLLOWING STANDARDS:

- 1.- ALL LETTERING, OTHER THAN THAT HEREIN SPECIFIED OR SHOWN BELOW, SHALL BE A MINIMUM OF 0.100 INCH IN HEIGHT USING A NO.0 RAPIDOGRAPH PEN, OR EQUAL. VERTICAL OR SLANTED LETTERING MAY BE USED.

2.- SUBDIVISION PLANS

SUBDIVISION OUTLINE	=====	NO. 3 RAPIDOGRAPH
BLOCK OUTLINE	=====	NO. 2 RAPIDOGRAPH
LOT LINES	=====	NO. 1 RAPIDOGRAPH
EASEMENT LINES	-----	NO. 0 RAPIDOGRAPH
STREET CENTER LINES	-----	NO. 0 RAPIDOGRAPH
RADIAL BEARING LINES	-----	NO. 00 RAPIDOGRAPH
MONUMENTS SET	○	
MONUMENTS SET IN MONUMENT BOX.....	◎	
MONUMENTS FOUND	●	
MONUMENTS FOUND IN MONUMENT BOX..	◎	

STREET NAMES..... NAME LETTERS 0.175" HIGH
NO. 2 RAPIDOGRAPH

LOT NUMBERS 36 LETTERS 0.175"
NO. 2 RAPIDOGRAPH

BEARING, DISTANCES, CURVE DATA LETTERS 0.175" HIGH
COORDINATES, ECT. NO. 1 RAPIDOGRAPH

ADJACENT SUBDIVISIONS LETTERS 0.100" HIGH
NO. 0 RAPIDOGRAPH
SHADOW LETTERING

ADJACENT LOT NUMBERS LETTERS 0.175" HIGH
NO. 0 RAPIDOGRAPH
DOTTED LETTERING

TITLE BLOCK AND OTHER RELATED LETTERING SHALL BE IN ACCORDANCE WITH STANDARD ACCEPTED ENGINEERING PRACTICE, BUT IN NO CASE SHALL THE LETTERING BE LESS THAN 0.100" IN HEIGHT AND USING A NO. 0 RAPIDOGRAPH PEN.

3.- IMPROVEMENT PLANS

DESCRIPTION	PROPOSED	EXISTING
SANITARY SEWER	— 6"S —	— 6"S —
STORM SEWER	— 8"D —	— 8"D —
GAS LINE	— 4"G —	— 4"G —
WATER LINE	— 8"W —	— 8"W —
TELEPHONE.....	— T —	— T —
CABLE TELEVISION.....	— TV —	— TV —
GAS VALVE	— G —	— G —
WATER VALVE	— W —	— W —
ELECTRICAL CONDUIT.....	— E —	— E —
MATCH LINE	STA. 5+00	

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: H.R.

DATE: 5-96

ENGINEERING

DRAFTING
STANDARDS

DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION

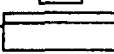
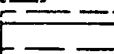
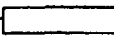
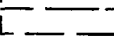
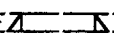
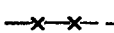
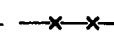
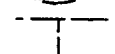
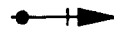
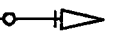


CITY of MODESTO

DETAIL NO.

204

IMPROVEMENT PLANS (CONTINUED)

DESCRIPTION	TO BE CONSTRUCTED	EXISTING
MAINTENANCE HOLE		
CATCH BASIN		
GAS METER		
WATER METER		
CURB AND GUTTER		
SIDEWALK		
DRIVEWAY		
PAVEMENT BUTT JOINT OR REMOVAL		
FIRE HYDRANT		
SIGN		
SANITARY SEWER CLEAN OUT		
UTILITY POLE		
GUARD RAIL		
BARRICADE		
FENCE		
RAILROAD		
WHEELCHAIR RAMP		
SANITARY SEWER SERVICE		
LAMP POLE		
TRAFFIC SIGNAL		

THE FOREGOING SYMBOLS SHALL BE USED IN CONNECTION WITH ALL IMPROVEMENTS AND CONTRACT PLANS.

ANY ABBREVIATIONS USED SHALL CONFORM TO THE STANDARD ABBREVIATIONS AS SET FORTH IN SECTION 1-1.03 OF THE CITY OF STOCKTON STANDARD SPECIFICATIONS.

ALL LETTERING SHALL CONFORM TO ACCEPTED ENGINEERING PRACTICE. BUT IN NO CASE SHALL THE LETTERING BE LESS THAN 0.100" IN HEIGHT AND USING A NO. 0 RAPIDOGRAPH PEN.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: H.R.

DATE: 5-96

ENGINEERING

DRAFTING
STANDARDS

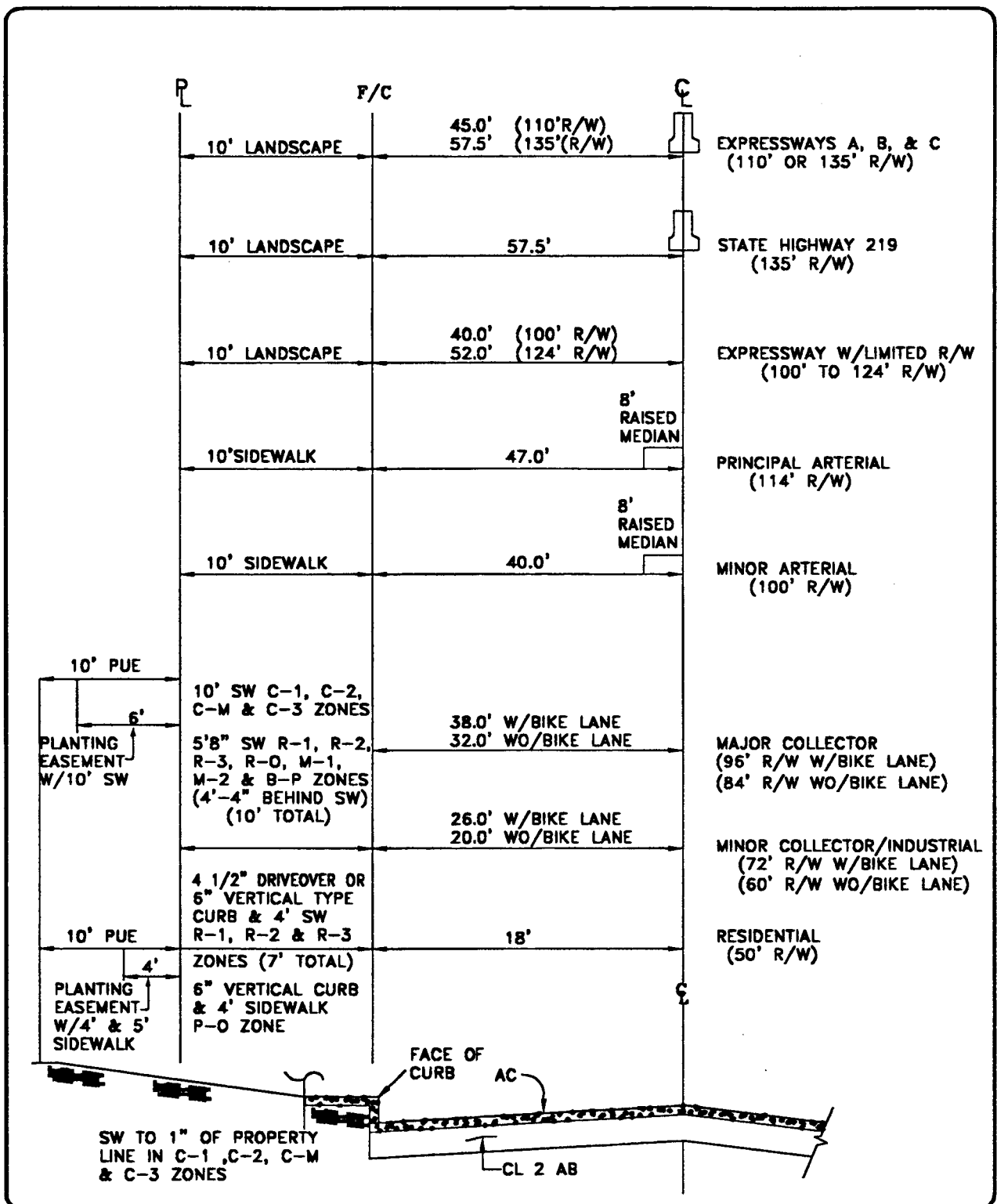
DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.

205



ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: K.B. DATE: 5-96

REVISED BY: R.A.C. DATE: 2-94

DRAWN BY: H.R. DATE: 1-75

STREETS

STREET SECTIONS

DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.
300

STRUCTURAL SECTION REQUIREMENTS

T.I.	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0		4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	
R-Value	Required AC Thickness (Feet)										Required AB Thickness (Feet)									
5	0.20	0.20	0.20	0.25	0.40	0.45	0.50	0.55	0.60		0.60	0.95	1.25	1.45	1.50	1.70	1.95	2.20	2.40	
10	0.20	0.20	0.20	0.25	0.40	0.45	0.50	0.55	0.60		0.55	0.85	1.15	1.35	1.35	1.60	1.80	2.00	2.20	
15	0.20	0.20	0.20	0.25	0.40	0.45	0.50	0.55	0.60		0.50	0.80	1.05	1.25	1.25	1.45	1.65	1.85	2.05	
20	0.20	0.20	0.20	0.25	0.40	0.45	0.50	0.55	0.60		0.40	0.70	1.00	1.15	1.15	1.30	1.50	1.70	1.85	
25	0.20	0.20	0.20	0.25	0.40	0.45	0.50	0.55	0.60		0.35	0.65	0.90	1.05	1.00	1.20	1.35	1.55	1.70	
30	0.20	0.20	0.20	0.25	0.40	0.45	0.50	0.55	0.60		0.35	0.55	0.80	0.95	0.90	1.05	1.20	1.40	1.50	
35	0.20	0.20	0.20	0.25	0.40	0.45	0.50	0.55	0.60		0.35	0.50	0.70	0.85	0.80	0.95	1.10	1.20	1.35	
40	0.20	0.20	0.20	0.25	0.40	0.45	0.50	0.55	0.60		0.35	0.40	0.65	0.75	0.65	0.80	0.95	1.05	1.15	
45	0.20	0.20	0.20	0.25	0.40	0.45	0.50	0.55	0.60		0.35	0.35	0.55	0.65	0.55	0.65	0.80	0.90	1.00	
50	0.20	0.20	0.20	0.25	0.40	0.45	0.50	0.55	0.60		0.35	0.35	0.45	0.55	0.45	0.55	0.65	0.75	0.80	
55	0.20	0.20	0.20	0.25	0.40	0.45	0.50	0.55	0.60		0.35	0.35	0.35	0.45	0.35	0.40	0.50	0.60	0.65	
60	0.20	0.20	0.20	0.25	0.40	0.45	0.50	0.55	0.60		0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.40	0.45	

Note 1: The minimum T.I. used to determine the structural section for a Major-Major intersection shall be T.I. 11 and Industrial intersection shall be a T.I. 10

Note 2: The following conditions applied to formulating the above structural designs:

- The chart utilized the R-value design method used by the California Department of Transportation as Highway Design Manual" and the "Flexible Pavement Structural Section Design Guide for California Counties, Third Edition (January 1979)
- The following conditions applied to the design guidelines:
 - Used a safety factor for Traffic Index (T.I.) of 8.0 or greater
 - Adjusted resulting AB thickness to conform to the City's acceptable minimum AB thickness of .35'
 - Maximum acceptable R-value used in calculating street pavement was "60".
 - AB thickness rounded off to the nearest .05'.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: H.R.

DATE: 5-96

STREETS

STRUCTURAL SECTION REQUIREMENTS

DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



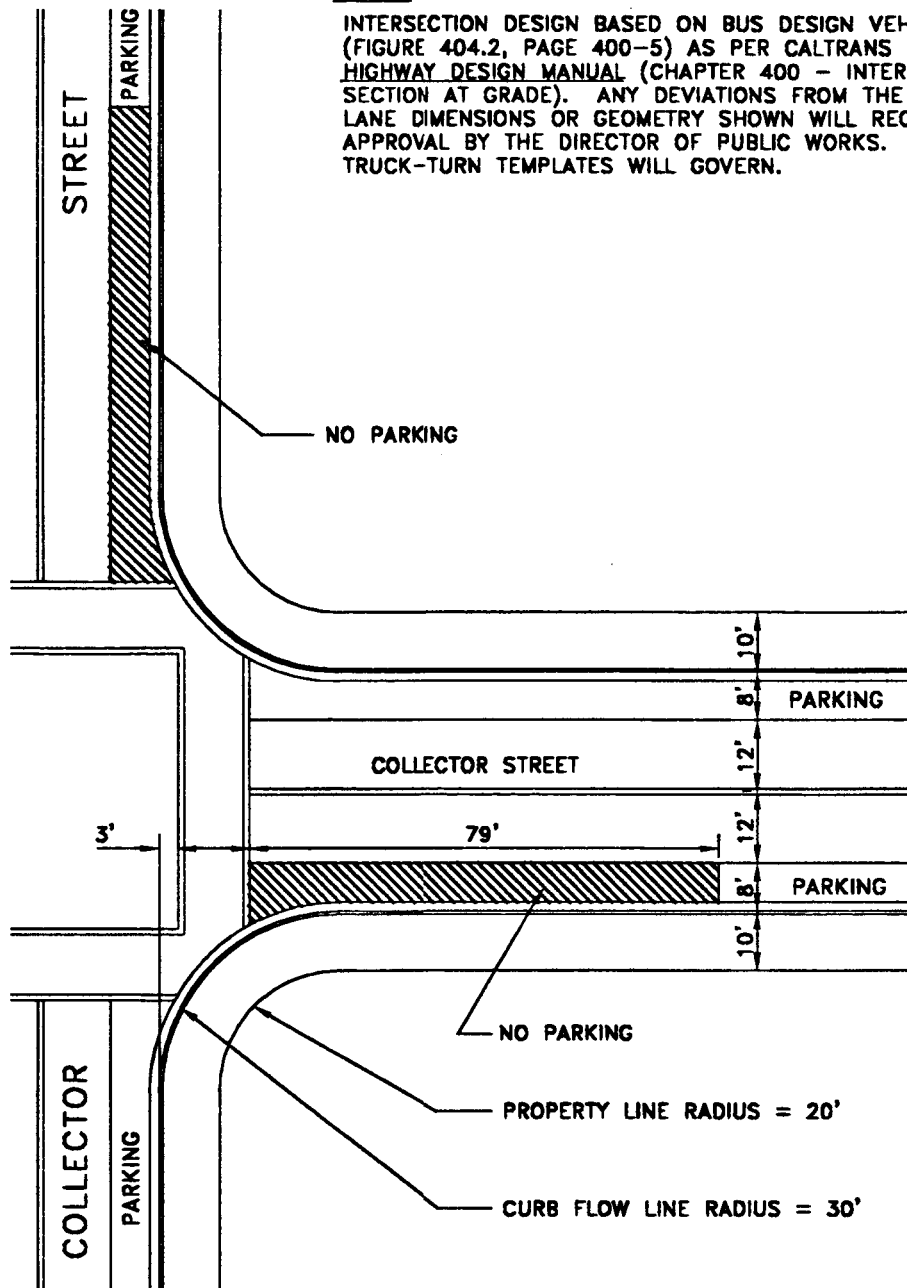
CITY of MODESTO

DETAIL NO.

301

NOTE:

INTERSECTION DESIGN BASED ON BUS DESIGN VEHICLE
(FIGURE 404.2, PAGE 400-5) AS PER CALTRANS
HIGHWAY DESIGN MANUAL (CHAPTER 400 - INTER-
SECTION AT GRADE). ANY DEVIATIONS FROM THE TYPICAL
LANE DIMENSIONS OR GEOMETRY SHOWN WILL REQUIRE
APPROVAL BY THE DIRECTOR OF PUBLIC WORKS.
TRUCK-TURN TEMPLATES WILL GOVERN.



ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97
REVISED BY: K.B. DATE: 5-96
REVISED BY: r.a.c. DATE: 2-94
DRAWN BY: EMB DATE: 1-24-91

STREETS

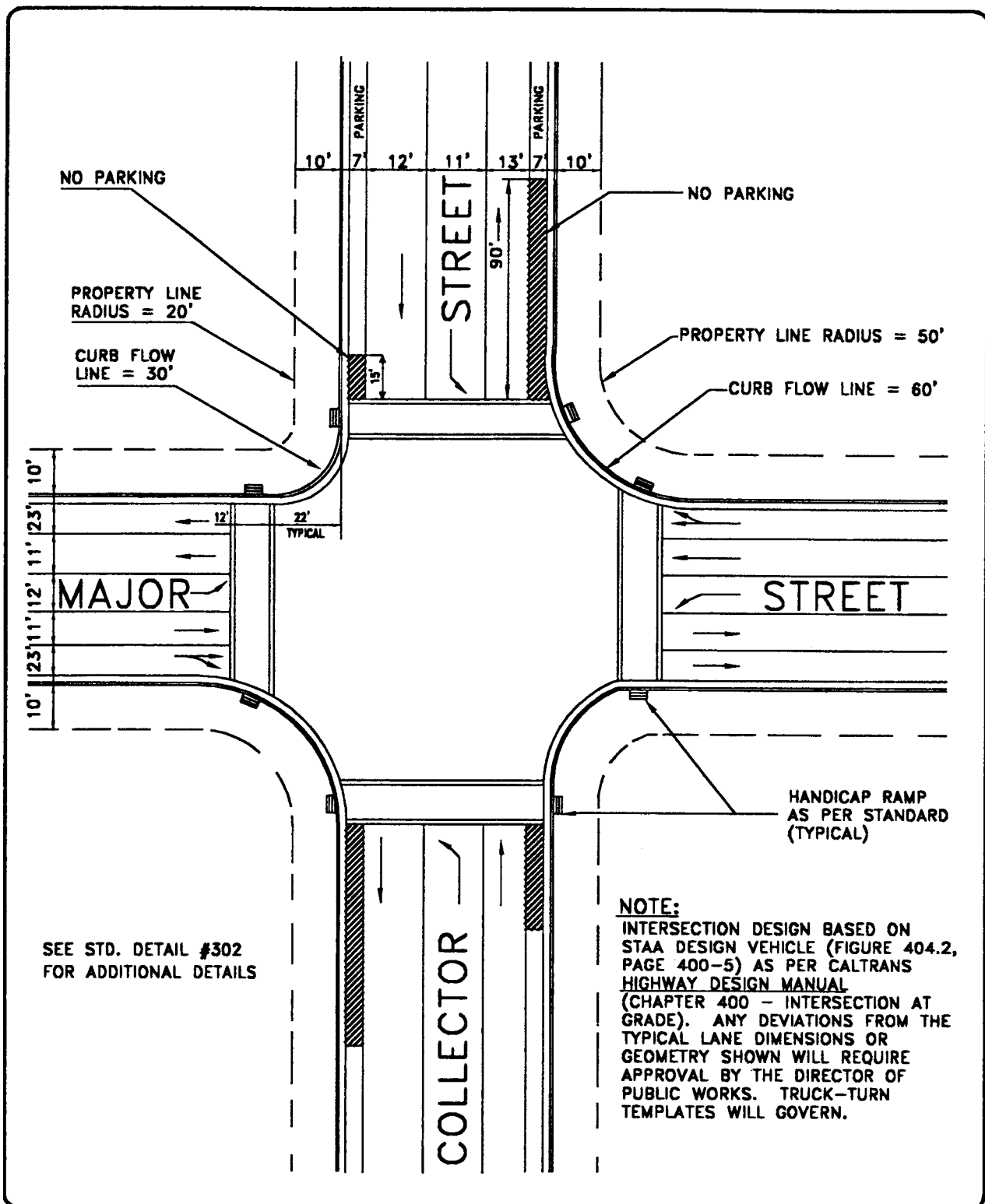
**COLLECTOR/COLLECTOR
STREET INTERSECTION**

**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

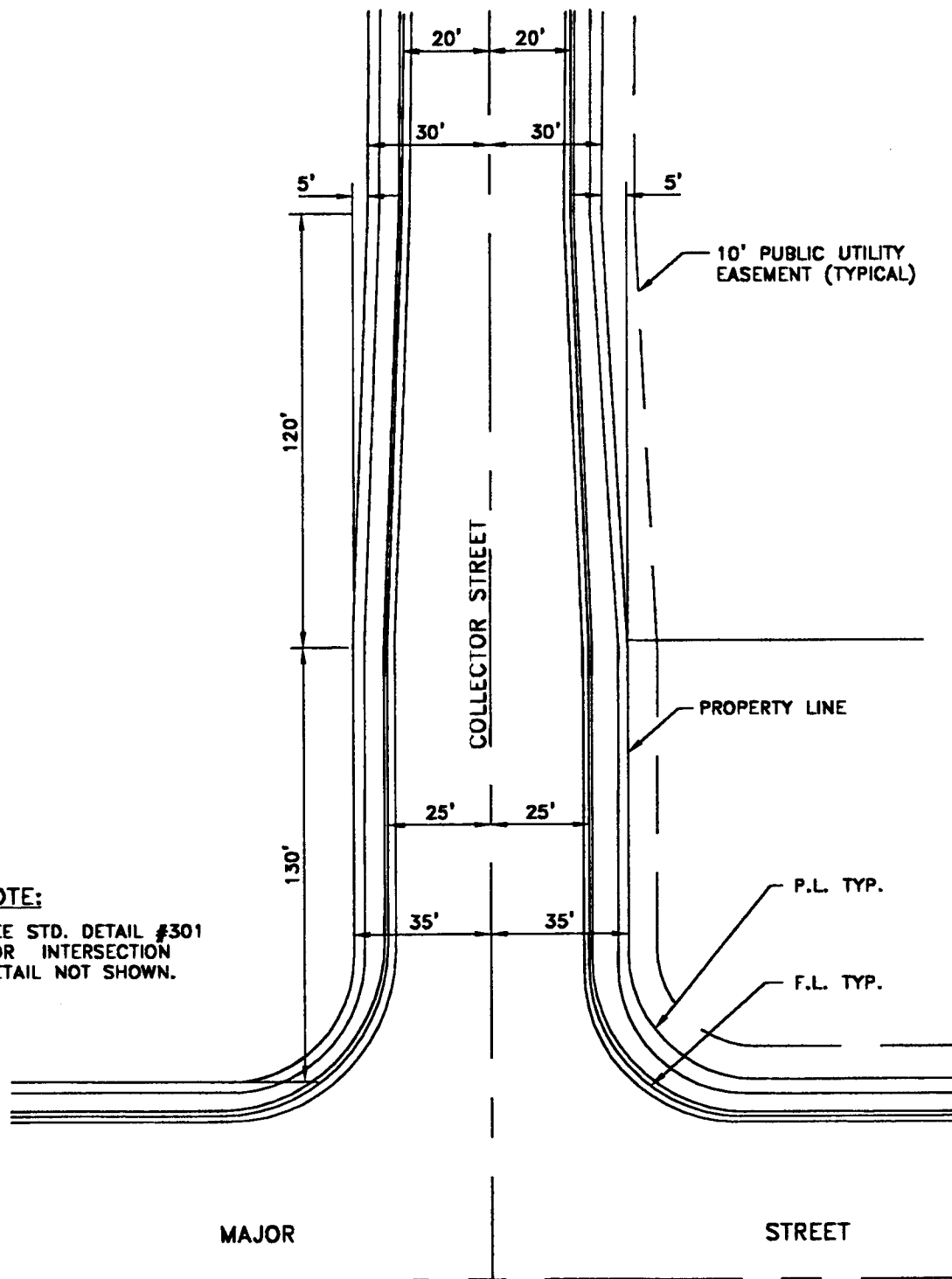
DETAIL NO.
302



ORIGINAL STAMPED AND SIGNED BY: VAN SWITZER		STREETS		
R.E. 22055 EXP. DATE: 9-30-00				
APPROVED BY CITY COUNCIL: 9-9-97		MAJOR/COLLECTOR/INDUSTRIAL STREET INTERSECTION		CITY of MODESTO
REVISED BY: K.B. DATE: 5-96				
REVISED BY: r.a.c. DATE: 2-94		DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION		DETAIL NO. 303
DRAWN BY: H.R. DATE: 1-95				

NOTE:

SEE STD. DETAIL #301
FOR INTERSECTION
DETAIL NOT SHOWN.



ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: K.B. DATE: 5-96

REVISED BY: r.a.c. DATE: 9-92

DRAWN BY: JEW

DATE: 8-77

STREETS

**COLLECTOR STREET-
MAJOR STREET
INTERSECTION**

**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**

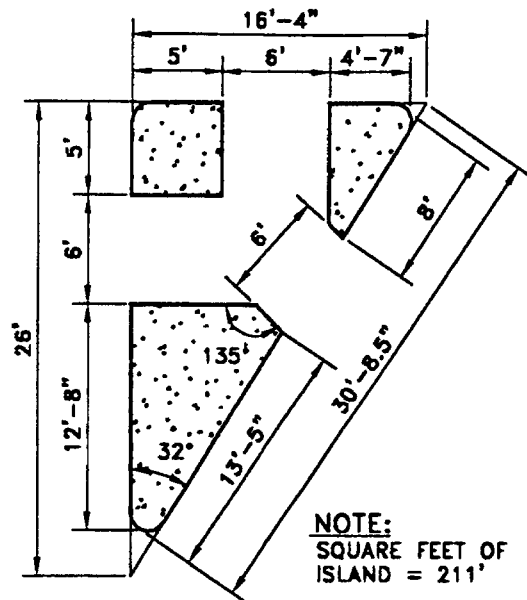


CITY of MODESTO

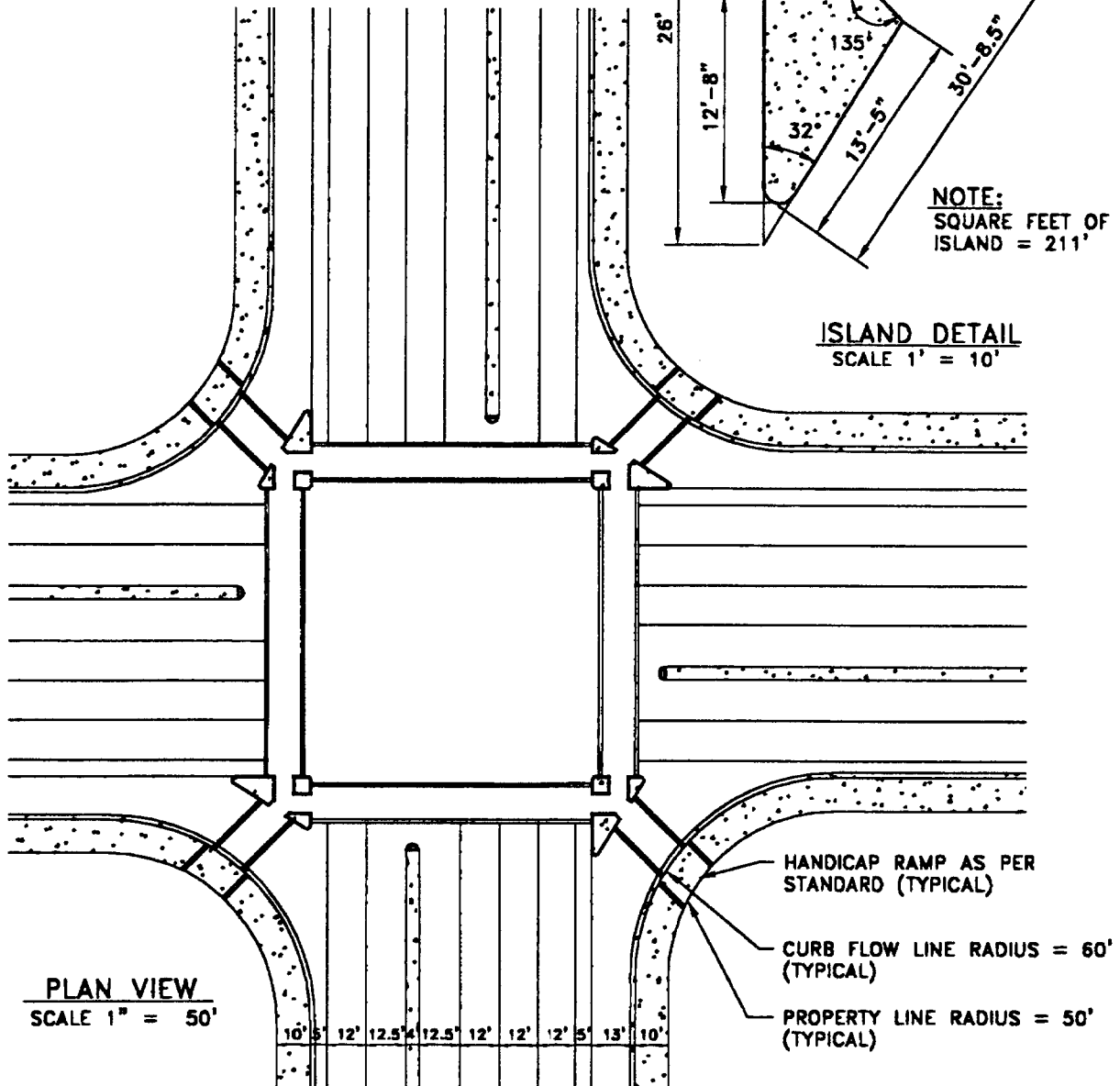
DETAIL NO.
304

NOTE:

INTERSECTION DESIGN BASED OF STAA DESIGN
VEHICLE (FIGURE 404.2, PAGE 400-5) AS PER
CALTRANS HIGHWAY DESIGN MANUAL (CHAPTER
400-INTERSECTIONS AT GRADE) ANY DEVIATIONS
FROM THE TYPICAL LANE DIMENSIONS OR GEOMETRY
SHOWN WILL REQUIRE APPROVAL BY THE DRIECTOR
OF PUBLIC WORKS.
TRUCK TURN TEMPLATES WILL GOVERN.



ISLAND DETAIL
SCALE 1' = 10'



PLAN VIEW
SCALE 1" = 50'

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97
REVISED BY: K.B. DATE: 5-96
REVISED BY: r.o.c. DATE: 2-94
DRAWN BY: EMB DATE: 1-91

STREETS

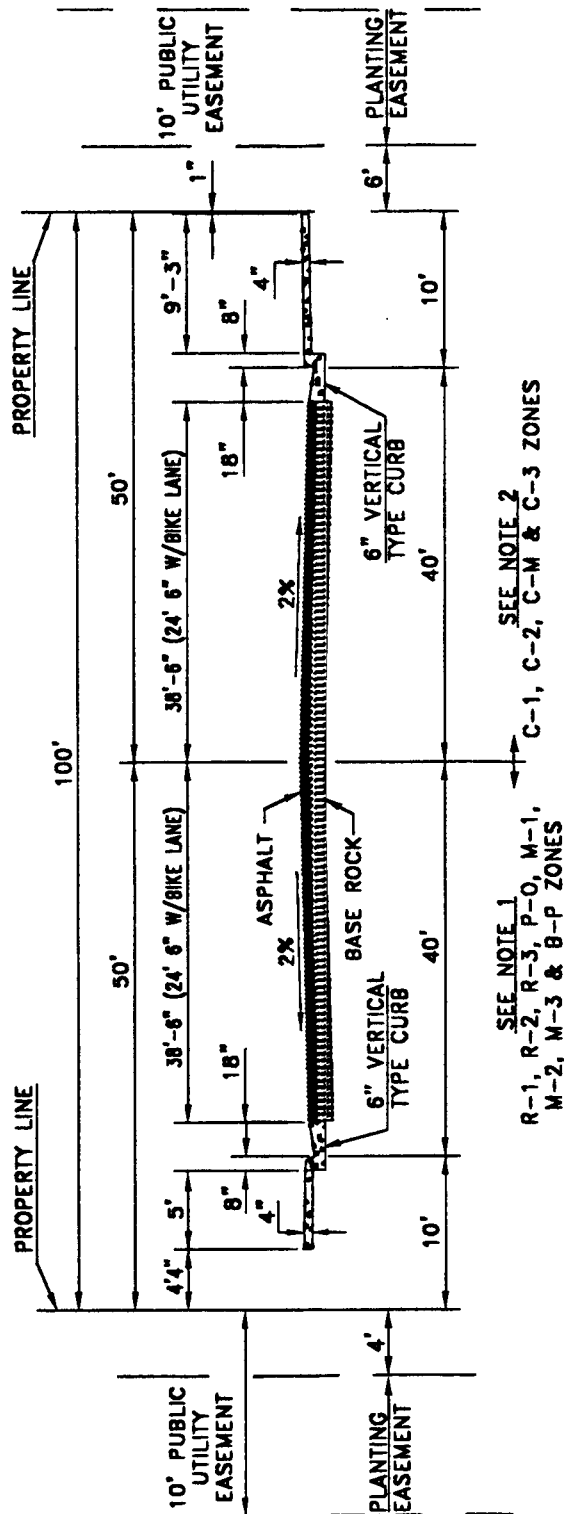
**MAJOR/MAJOR
STREET INTERSECTION**

**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

DETAIL NO.
305



NOTE 1:

6" VERTICAL TYPE CURB AND 5' WIDE SIDEWALK TO BE INSTALLED IN R-1, R-2, R-3, P-O, M-1, M-2, M-3 AND B-P ZONES.

A 16.5' MEDIAN WITH LANDSCAPING MAY BE REQUIRED.

NOTE 2:

6" VERTICAL TYPE CURB AND SIDEWALK INSTALLED IN C-1, C-2, C-M AND C-3 ZONES TO BE EXTENDED TO WITHIN 1" OF THE PROPERTY LINE. (WIDTH MAY BE DETERMINED BY USE OR BY EXISTING CONDITIONS. IF SPECIFICALLY APPROVED IN WRITING BY THE CITY ENGINEER.) SEE STANDARD DETAIL #316 FOR STREET BLOCK OUT ON FULL WIDTH STREET.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: K.B. DATE: 5-96

REVISED BY: r.a.c. DATE: 2-94

DRAWN BY: H.R. DATE: 1-96

STREETS

**MAJOR STREET
SECTION**

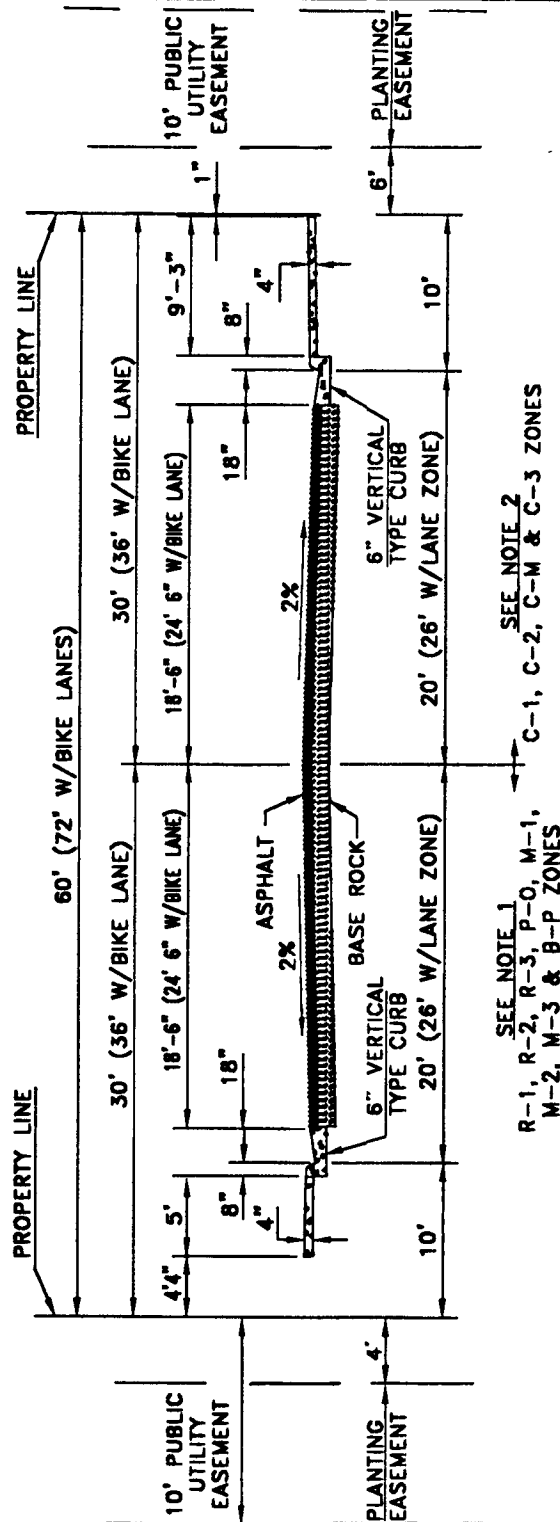
**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

DETAIL NO.

306



NOTE 1:

6" VERTICAL TYPE CURB AND 5' WIDE SIDEWALK TO BE INSTALLED IN R-1, R-2, R-3, P-O, M-1, M-2, M-3 AND B-P ZONES.

NOTE 2:

6" VERTICAL TYPE CURB AND SIDEWALK INSTALLED IN C-1, C-2, C-M AND C-3 ZONES TO BE EXTENDED TO WITHIN 1" OF THE PROPERTY LINE. (WIDTH MAY BE DETERMINED BY USE OR BY EXISTING CONDITIONS. IF SPECIFICALLY APPROVED IN WRITING BY THE CITY ENGINEER.) SEE STANDARD DETAIL #316 FOR STREET BLOCK OUT ON FULL WIDTH STREET.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: H.R.

DATE: 1-96

STREETS

MINOR COLLECTOR/ INDUSTRIAL STREET SECTION

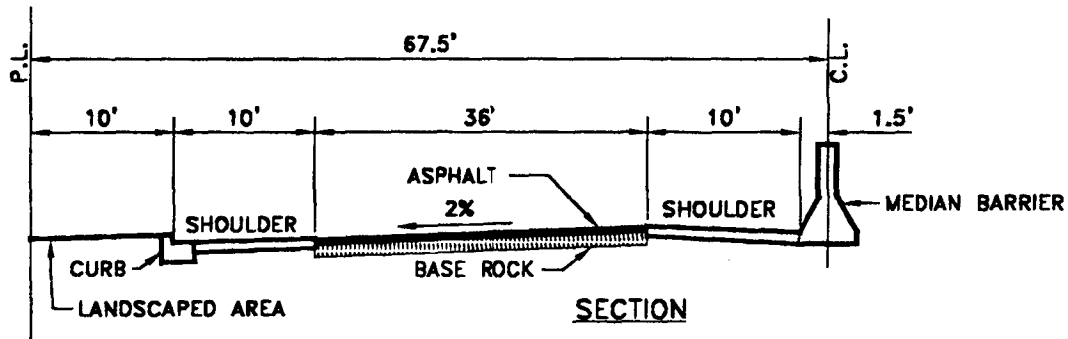
DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.

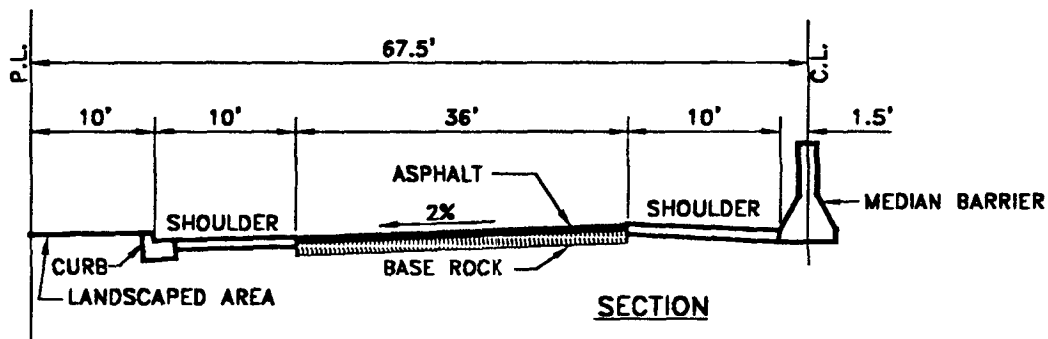
307



NOTE:

LANDSCAPING AND IRRIGATION SHALL BE AS
APPROVED BY THE LANDSCAPE DESIGNER.

135' RIGHT OF WAY EXCEPT STATE HIGHWAY 219



NOTE:

LANDSCAPING AND IRRIGATION SHALL BE AS
APPROVED BY THE LANDSCAPE DESIGNER.

135' RIGHT OF WAY FOR STATE HIGHWAY 219

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: K.B. DATE: 5-96

REVISED BY: VINCE YAH DATE: 1-91

DRAWN BY: JOE WELLS DATE: 3-88

STREETS

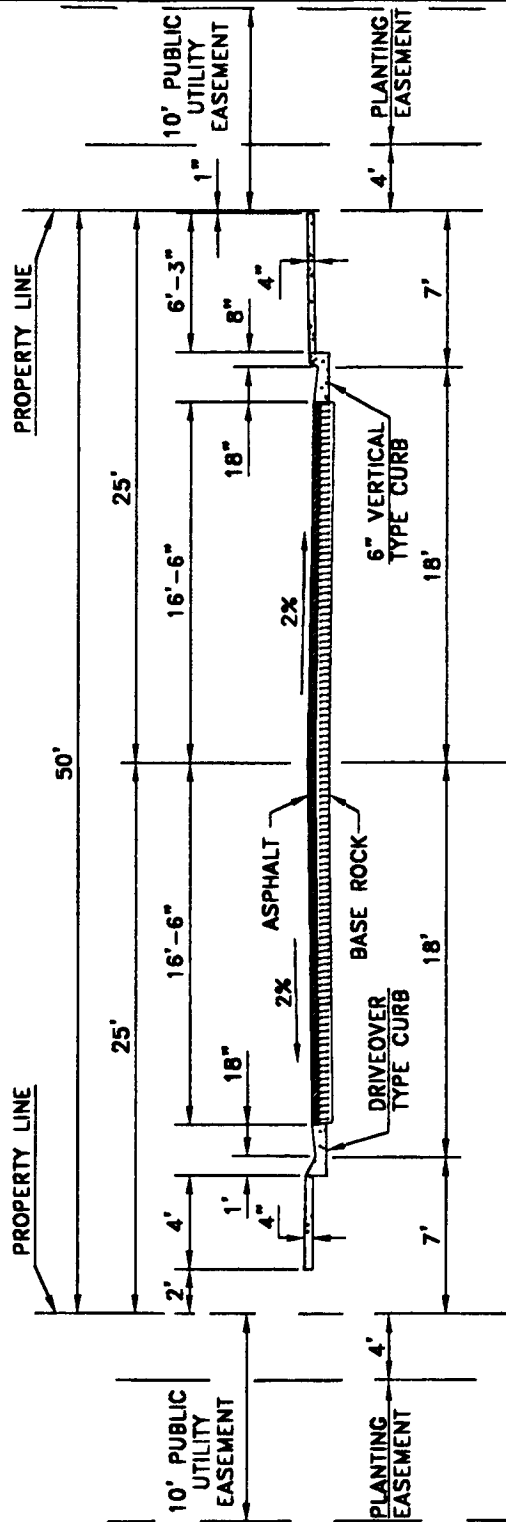
**EXPRESSWAY EXCEPT
BRIGGSMORE AVENUE**

**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

DETAIL NO.
308



SEE NOTE 1 SEE NOTE 2

NOTE 2:

1. 6" VERTICAL TYPE CURB AND 4' WIDE SIDEWALK TO BE INSTALLED IN P-O ZONES.
2. SIDEWALK IN C-1, C-2, C-M AND C-3 ZONES TO BE EXTENDED TO WITHIN 1" OF PROPERTY LINE, (WIDTH MAY BE DETERMINED BY USE OR BY EXISTING CONDITIONS, IF SPECIFICALLY APPROVED IN WRITING BY THE ENGINEER,

NOTE 1:

1. 4-1/2" DRIVEOVER OR 6" VERTICAL TYPE CURB AND 4' WIDE SIDEWALK TO BE INSTALLED IN R-1, R-2, AND R-3 ZONES.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97
REVISED BY: K.B. DATE: 5-96
REVISED BY: HOVIK DATE: 11-89
DRAWN BY: JLA DATE: 12-85

STREETS

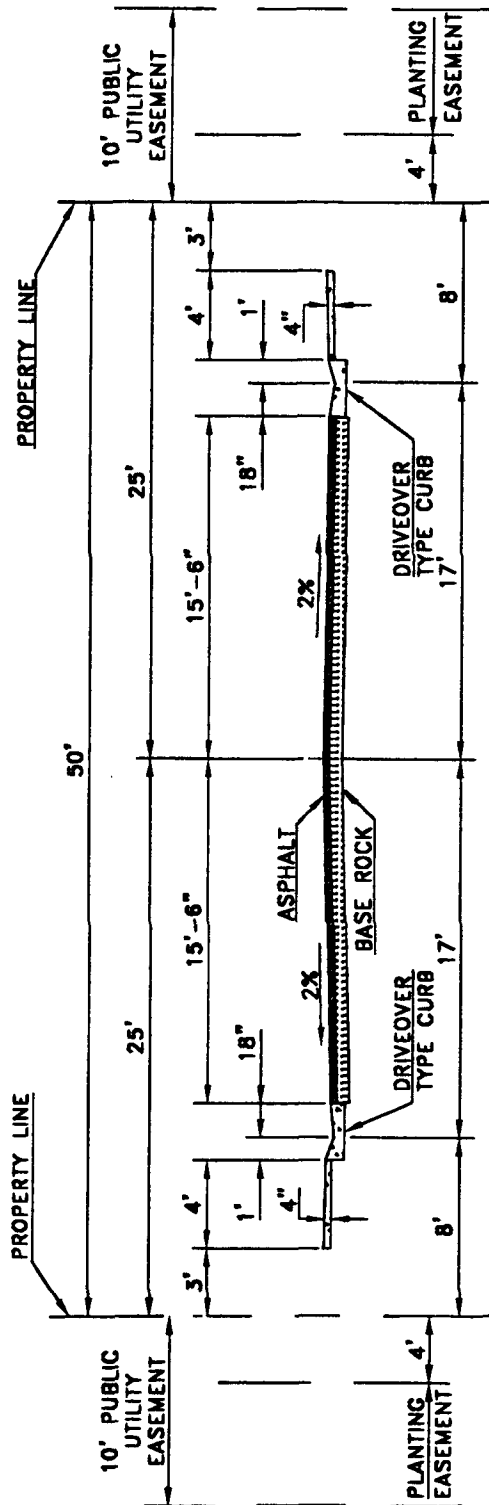
**RESIDENTIAL
STREET SECTION**

**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

DETAIL NO.
309



ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: K.B. DATE: 5-96

REVISED BY: DATE:

DRAWN BY: LCB

DATE: 3-80

STREETS

CUL-DE-SAC STREET SECTION

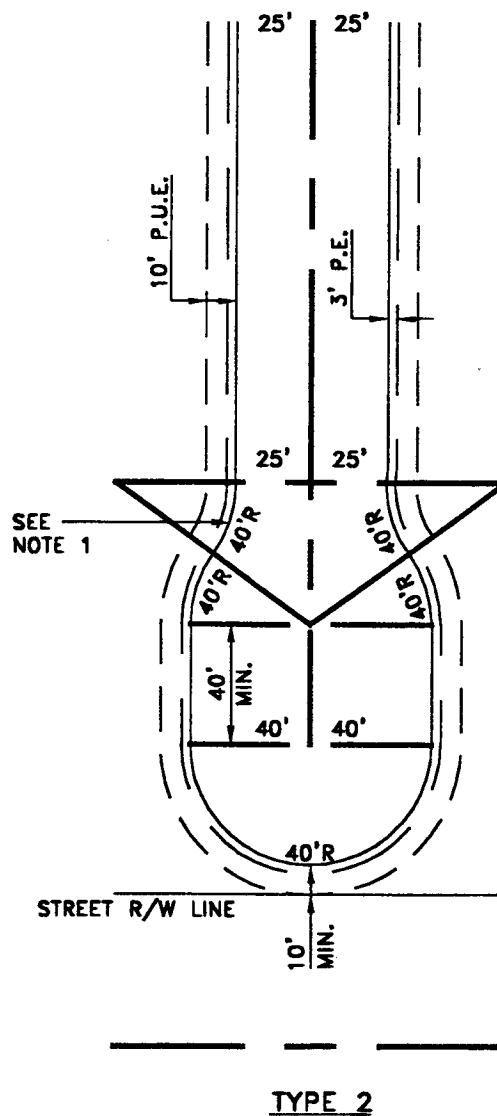
DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.

310



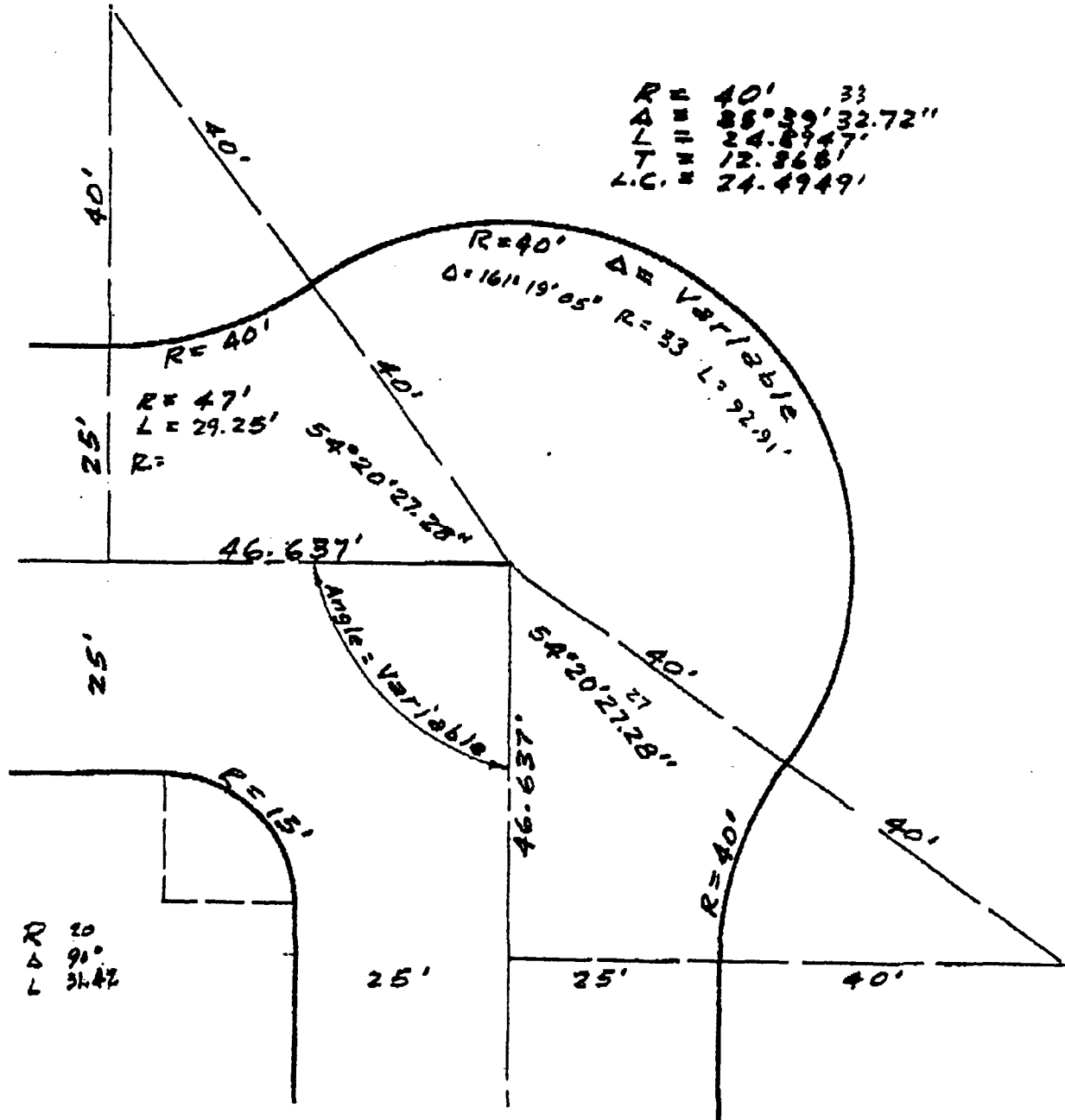
NOTE:

RADII OTHER THAN 40 FEET
SHALL BE AS APPROVED BY
THE CITY ENGINEER.

ORIGINAL STAMPED AND SIGNED BY: VAN SWITZER R.E. 22055 EXP. DATE: 9-30-00	STREETS CUL-DE-SAC STREET SECTION	 CITY of MODESTO
APPROVED BY CITY COUNCIL: 9-9-97		
REVISED BY: K.B. DATE: 5-96		
REVISED BY: HOVIK DATE: 12-89		
DRAWN BY: LCB DATE: 3-80	DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION	DETAIL NO. 311

STANDARD 40' RAD. CIRCLE

SCALE - 1" = 20'
50' STREETS



R = 40'
A = 88°39'32.72"
L = 24.8947'
T = 12.868'
L.C. = 24.4949'

R = 20
A = 90°
L = 31.42

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97
REVISED BY: DATE:
REVISED BY: DATE:
DRAWN BY: K.B. DATE: 5-96

STREETS

ALIGNMENT FOR 90 STREET
INTERSECTION KNUCKLE

DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION

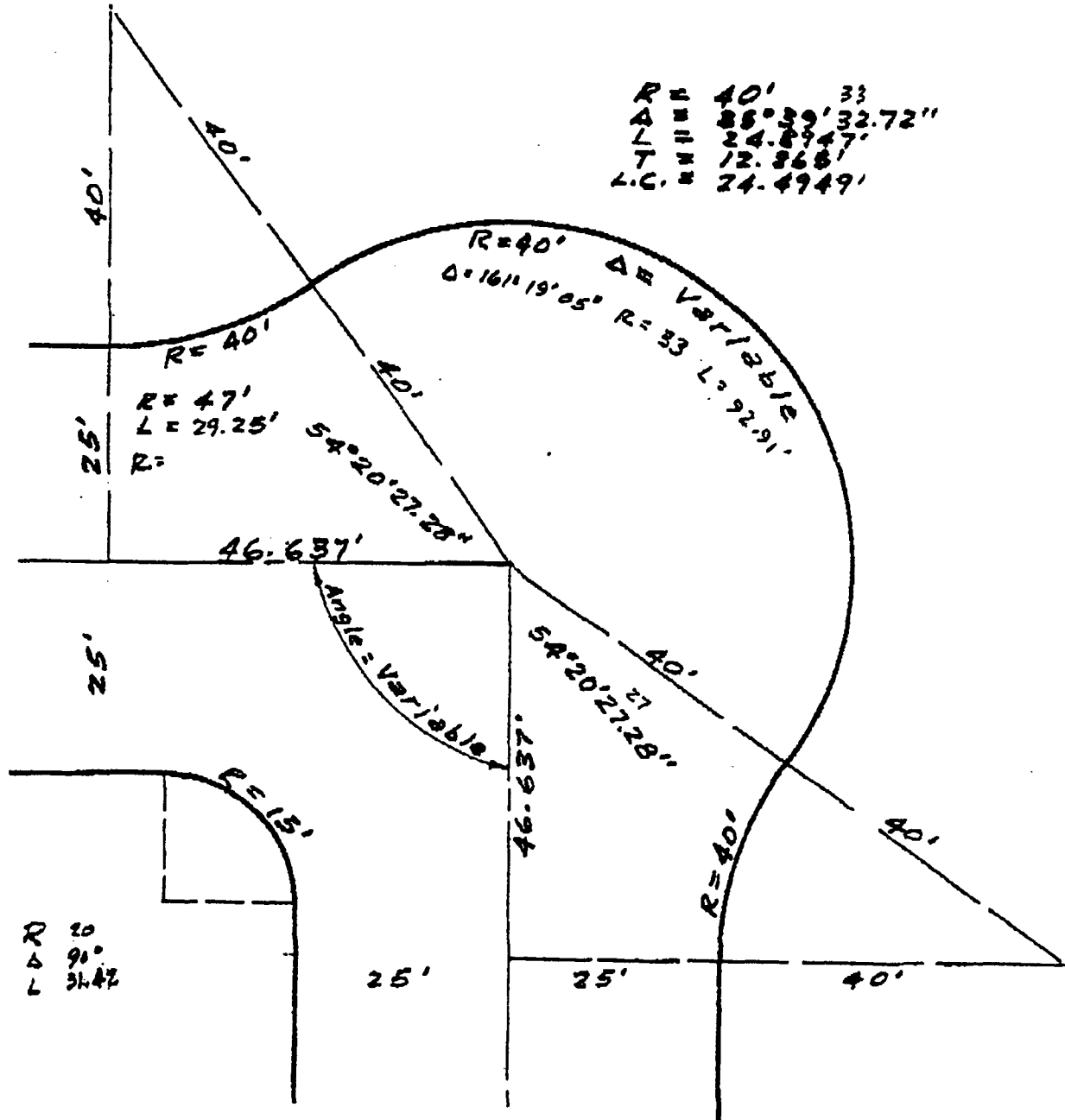


CITY of MODESTO

DRAWING NO.
312

STANDARD 40' RAD. CIRCLE

SCALE - 1" = 20'
50' STREETS



R = 40'
A = 88°39'32.72"
L = 24.4947'
T = 12.868'
L.C. = 24.4949'

R = 20
A = 90°
L = 31.42

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97
REVISED BY: DATE:
REVISED BY: DATE:
DRAWN BY: K.B. DATE: 5-96

STREETS

ALIGNMENT FOR 90 STREET
INTERSECTION KNUCKLE

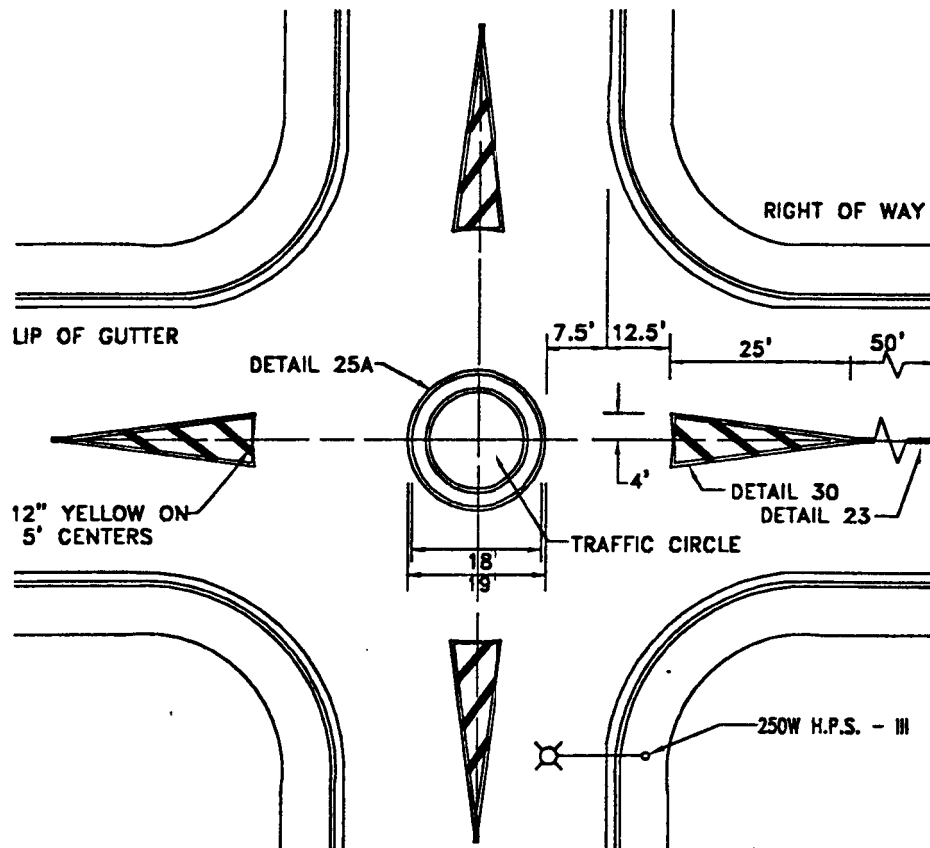
DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DRAWING NO.
312

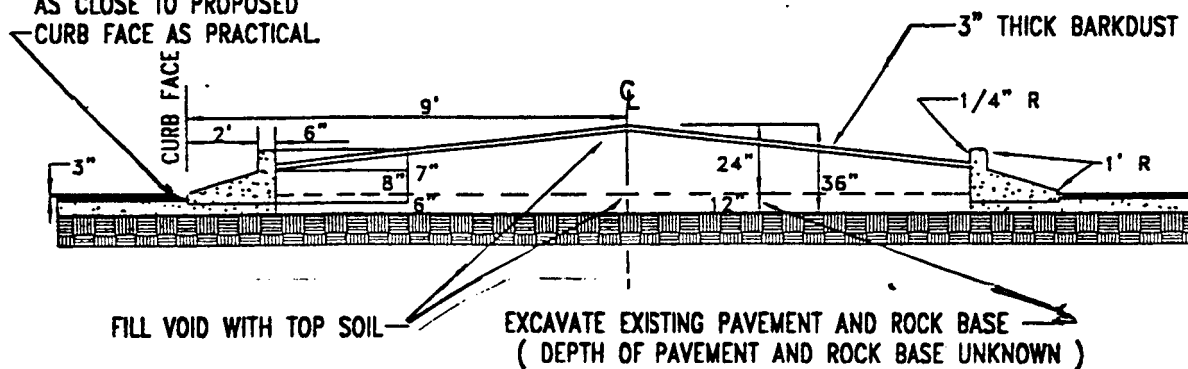
TYPICAL CIRCLE DETAIL



NOTE: SEE DETAILS NO. 716 THRU 718 FOR STRIPING DETAILS.

TYPICAL ISLAND SECTION

SAW CUT EXISTING A.C.
AS CLOSE TO PROPOSED
CURB FACE AS PRACTICAL



FILL VOID WITH TOP SOIL

EXCAVATE EXISTING PAVEMENT AND ROCK BASE
(DEPTH OF PAVEMENT AND ROCK BASE UNKNOWN)

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: H.R.

DATE: 6-96

STREETS

**VILLAGE TRAFFIC
CIRCLE**

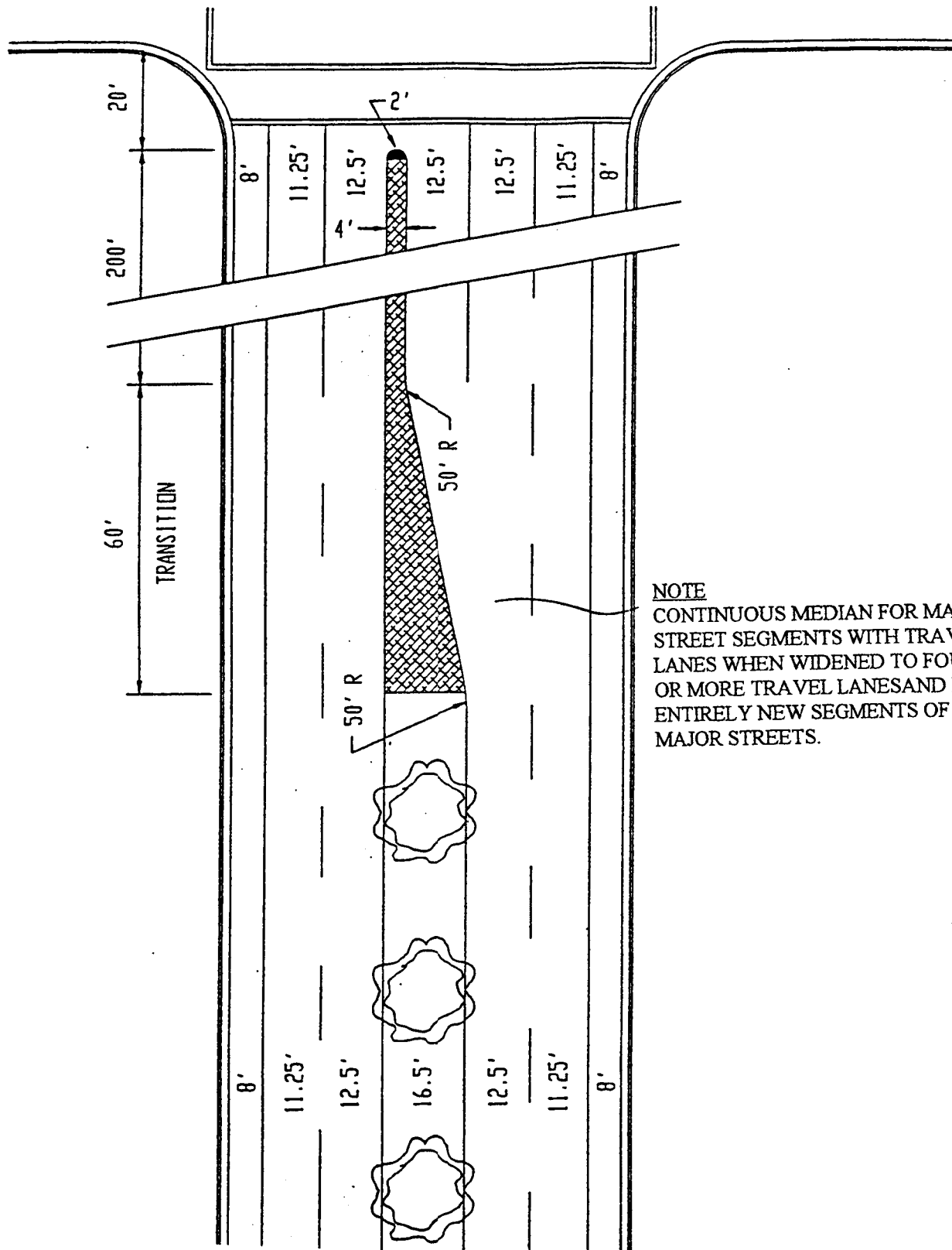
**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

DETAIL NO.

313



NOTE
 CONTINUOUS MEDIAN FOR MAJOR STREET SEGMENTS WITH TRAVEL LANES WHEN WIDENED TO FOUR OR MORE TRAVEL LANES AND FOR ENTIRELY NEW SEGMENTS OF MAJOR STREETS.

ORIGINAL STAMPED AND
 SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-97

APPROVED BY
 CITY COUNCIL: 05-10-94

REVISED BY: HOVIK

DATE: 11-89

REVISED BY: r.a.c.

DATE: 02/94

DRAWN BY: FRE

DATE: 1-75

STREETS

**100' MAJOR STREET
 WITH CONTINUOUS MEDIAN**

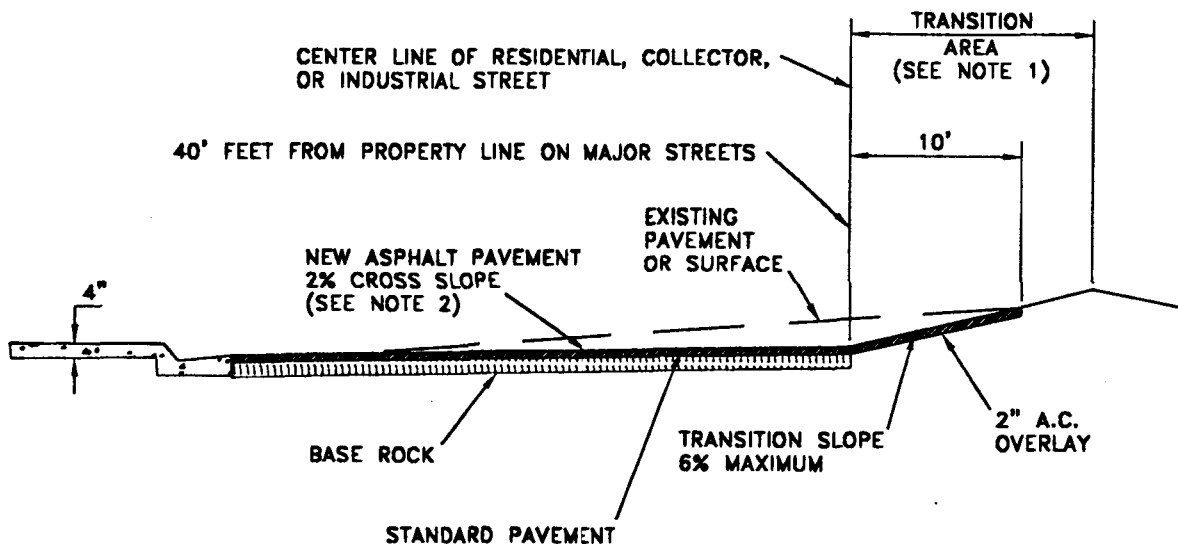
**DEPARTMENT OF PUBLIC WORKS
 AND TRANSPORTATION**



CITY of MODESTO

DRAWING NO.

314



NOTES:

1. TRANSITIONS REQUIRING WORK BEYOND THE CENTER LINE SHALL BE DONE BY THE DEVELOPER.
2. WITH WRITTEN PERMISSION FROM THE CITY ENGINEER, A MAXIMUM CROSS SLOPE OF 4% MAY BE PERMITTED.
3. WHERE EXISTING GRADES CANNOT BE MET, THE CITY ENGINEER MAY APPROVE ALTERNATE PROPOSALS SUCH AS DEVELOPER POSTING A CASH BOND FOR THAT PORTION OF THE STREET ADJACENT TO PROJECT.
4. THE MAXIMUM WIDTH OF STANDARD IMPROVEMENTS REQUIRED SHALL BE 40 FEET. THE MAXIMUM WIDTH OF TRANSITION PAVEMENT SHALL BE 10' (FEET) FOR SLOPES BETWEEN 4% & 6%.
5. NOT APPLICABLE TO SINGLE FAMILY, DUPLEX, TRIPLEX, AND FOURPLEX LOTS CREATED BY PARCEL MAPS IN EXISTING DEVELOPED AREAS.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: K.B. DATE: 5-96

REVISED BY: r.a.c. DATE: 2-94

DRAWN BY: JLA

DATE: 12-85

STREETS

STANDARD PAVEMENT ON EXISTING STREET SECTION

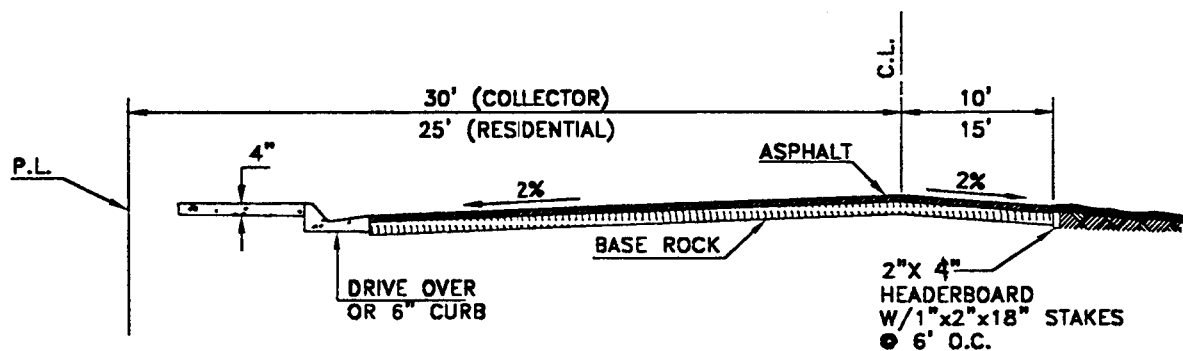
DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.

322



SECTION

NOTE:

1. THE PART-WIDTH STREET IS ONLY PERMITTED ON A FRONTAGE WHERE THE DEVELOPER DOES NOT HAVE OWNERSHIP OR CONTROL OF THE RIGHT OF WAY FOR A FULL WIDTH STREET IMPROVEMENT.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97
REVISED BY: K.B. DATE: 5-96

REVISED BY: VINCE YAH DATE: 1-91

DRAWN BY: JLA DATE: 12-85

STREETS

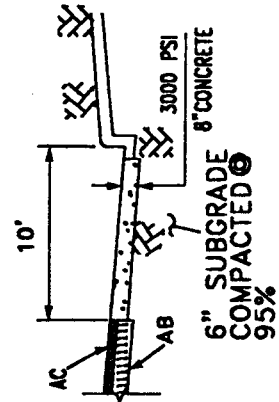
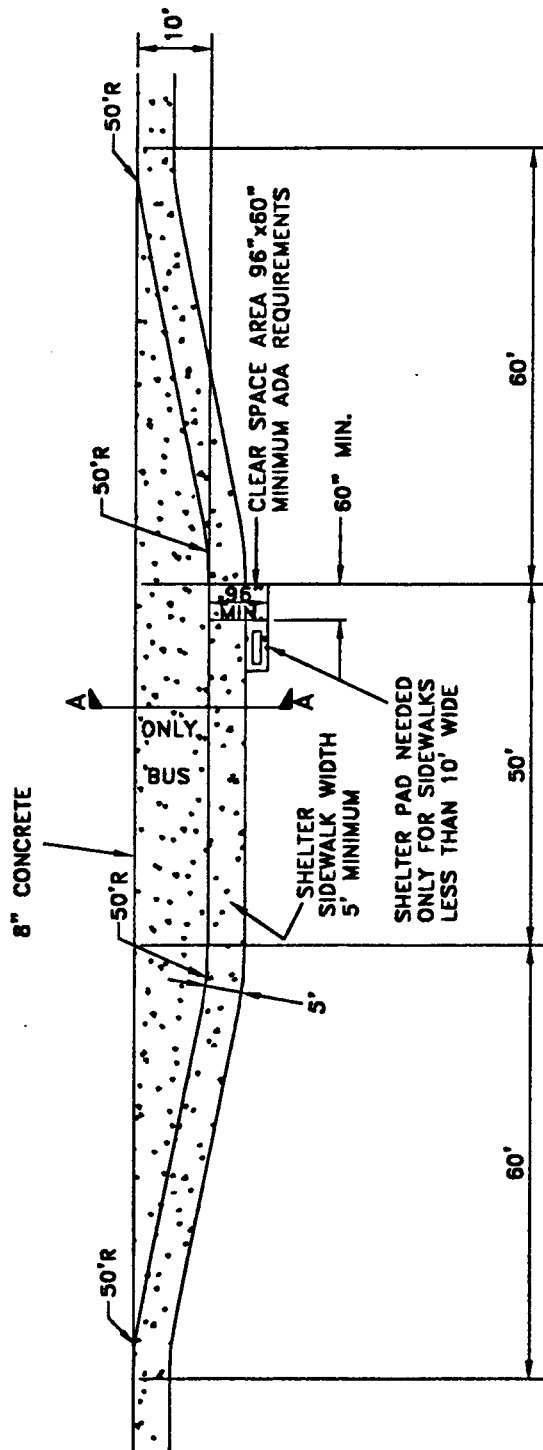
PART-WIDTH STREET SECTION

DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.
324



SECTION A-A
NTS

NOTES:

1. NO EXTRA SHELTER PAD NEEDED FOR SIDEWALKS WIDER THAN 10'.
2. SHELTER PAD & SHELTERS MUST BE WIDE ENOUGH TO MEET ADA REQUIREMENTS 40"x30" CLEAR FLOOR AREA WITHIN SHELTER PERIMETER.

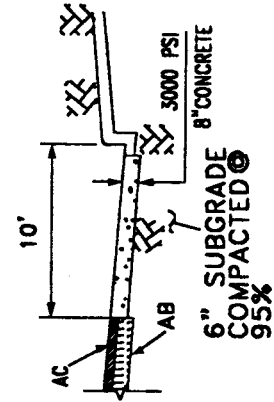
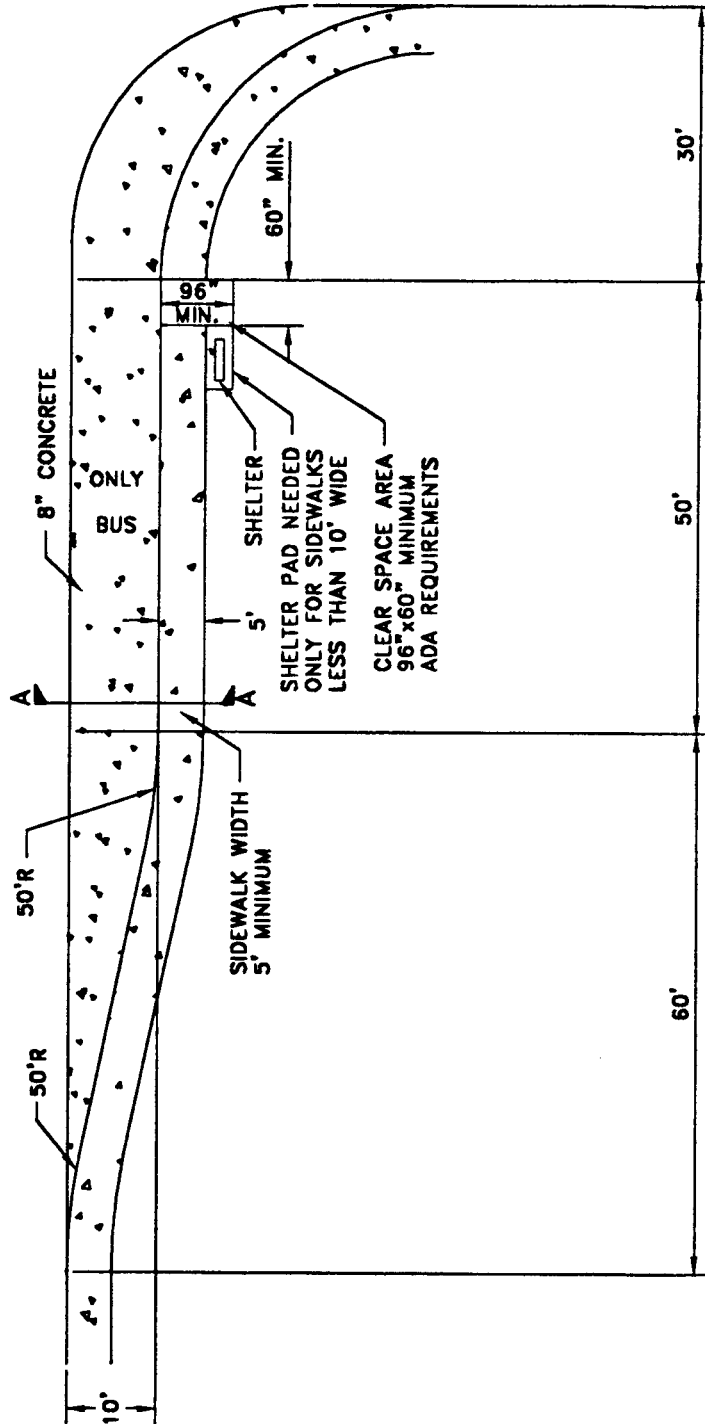
ORIGINAL STAMPED AND SIGNED BY: VAN SWITZER	
R.E. 22055	EXP. DATE: 9-30-00
APPROVED BY CITY COUNCIL: 9-9-97	
REVISED BY: K.B.	DATE: 5-96
REVISED BY: r.o.c.	DATE: 2-94
DRAWN BY: r.o.c.	DATE: 9-92

STREETS
MID BLOCK BUS
TURNOUT

DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION


CITY of MODESTO

DETAIL NO.
325



SECTION A-A
NTS

NOTES:

1. NO EXTRA SHELTER PAD NEEDED FOR SIDEWALKS WIDER THAN 10'.
2. SHELTER PAD & SHELTERS MUST BE WIDE ENOUGH TO MEET ADA REQUIREMENTS 40"x50" CLEAR FLOOR AREA WITHIN SHELTER PERIMETER.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: K.B.

DATE: 5-96

REVISED BY: r.a.c.

DATE: 2-94

DRAWN BY: r.a.c.

DATE: 9-92

STREETS

**NEARSIDE BUS
TURNOUT**

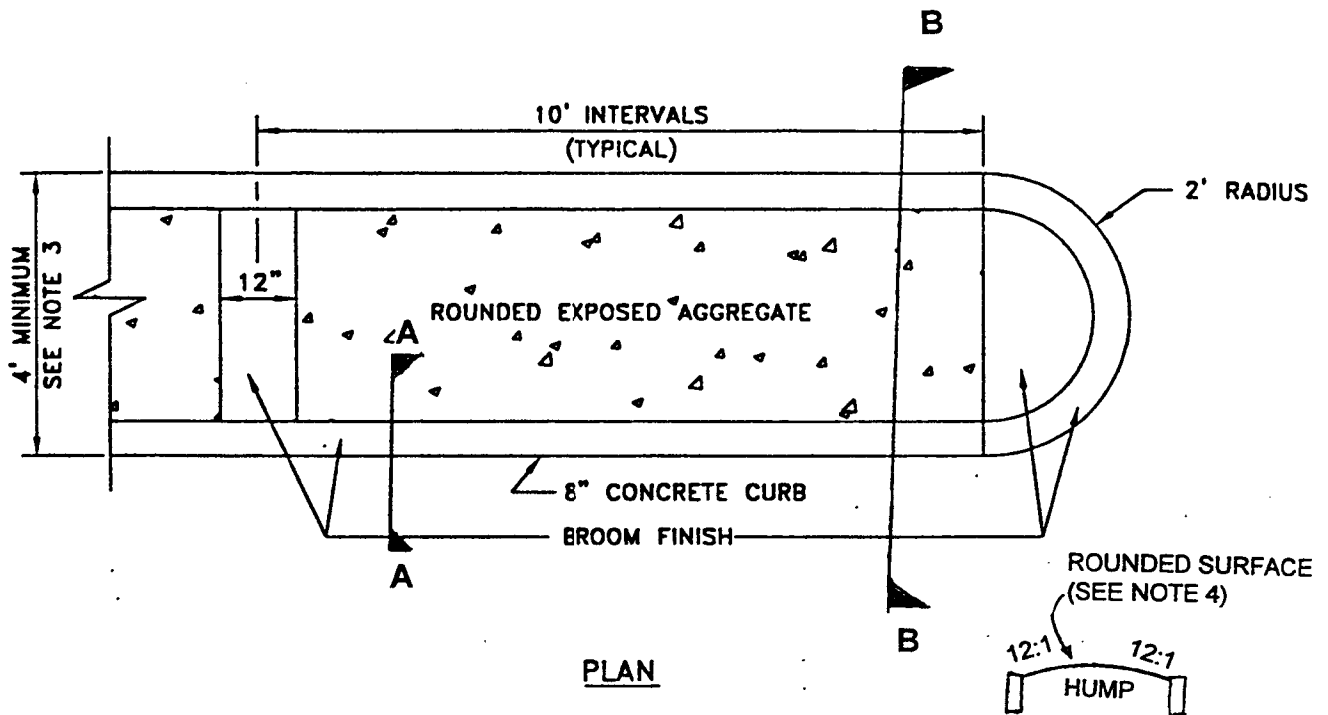
**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

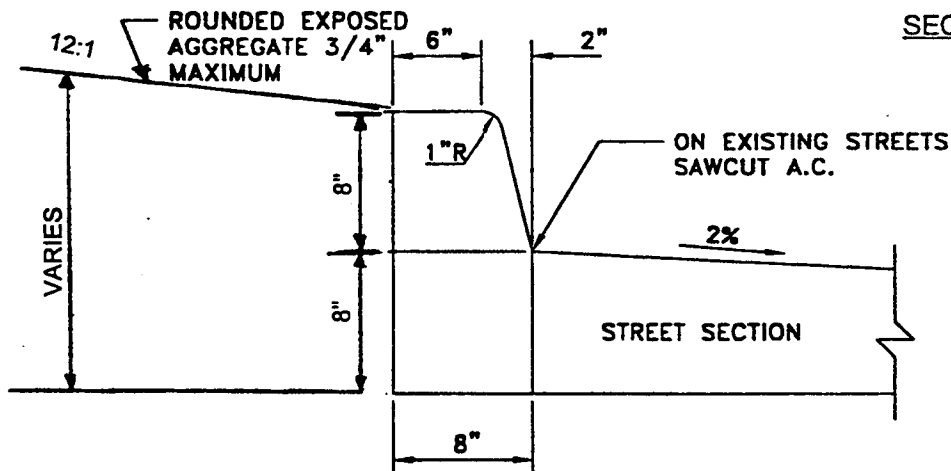
DETAIL NO.

327



PLAN

SECTION B - B



NOTES:

SECTION A-A

1. ON LANDSCAPED MEDIANS CURB SHALL EXTEND TO BOTTOM OF AGGREGATE BASE.
2. PROVIDE WEAKENED PLANE JOINTS IN ACCORDANCE WITH CONSTRUCTION STANDARDS AND AT END OF RETURNS.
3. LANDSCAPED MEDIANS SHALL BE A MINIMUM OF 8' WIDE.
4. ROUND SURFACE OF MEDIAN TO GIVE A 2" CENTER HUMPS IN THE CENTER ON A 4' MEDIAN, 4" CENTER HUMPS IN A 8' MEDIAN AND 8" CENTER HUMPS IN 16' MEDIAN.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: r.a.c. DATE: 02-94

REVISED BY: DATE:

DRAWN BY: r.a.c.

DATE: 09-11-92

STREETS

MEDIAN
DETAIL

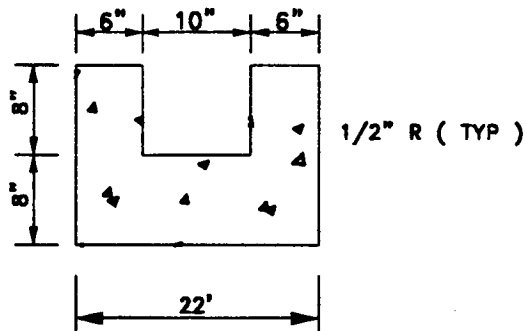
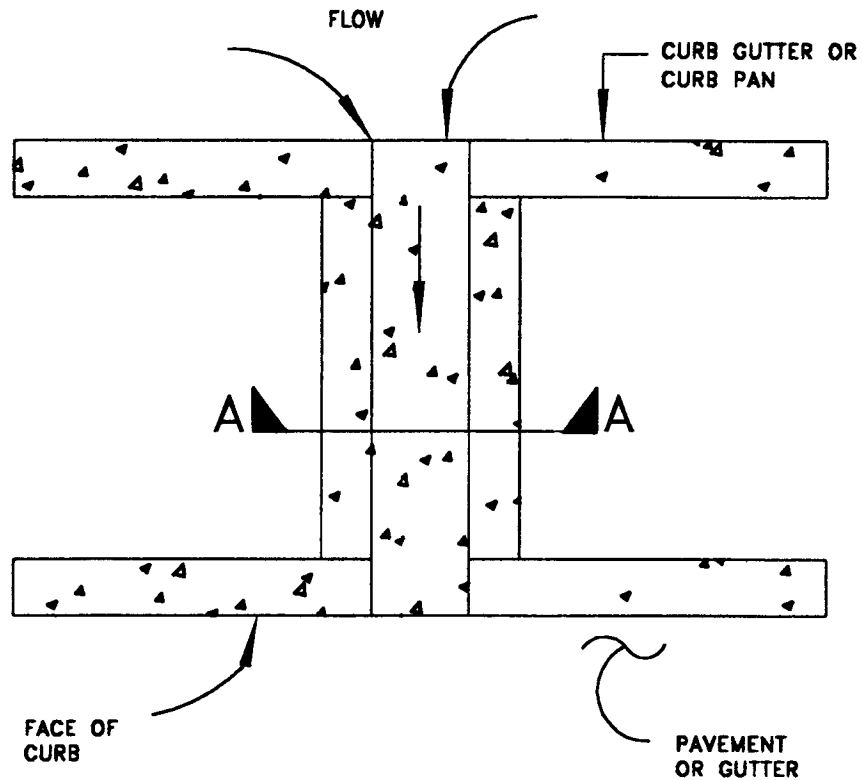
DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.

328



SECTION A-A
NTS

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: K.B.

DATE: 5-96

STREETS

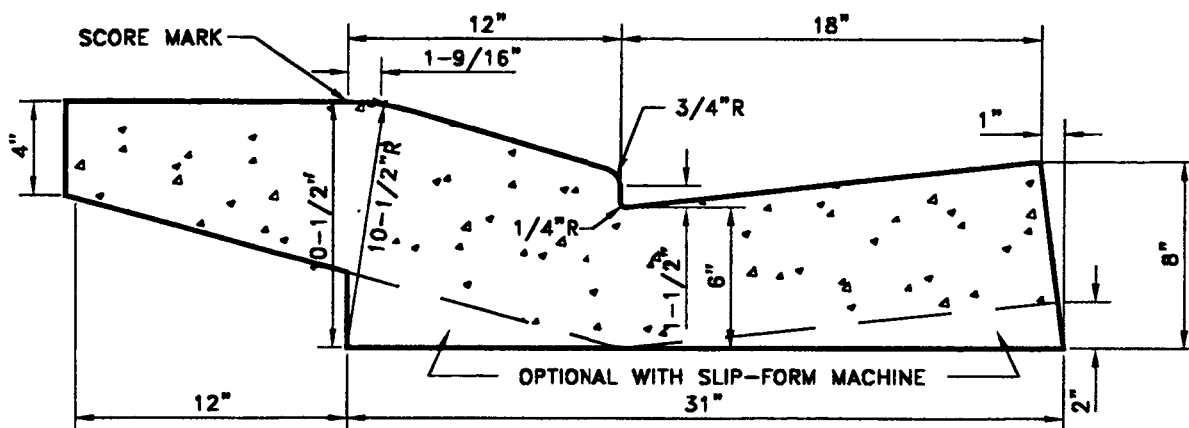
THRU DRAIN DETAIL FOR MEDIANS

DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION

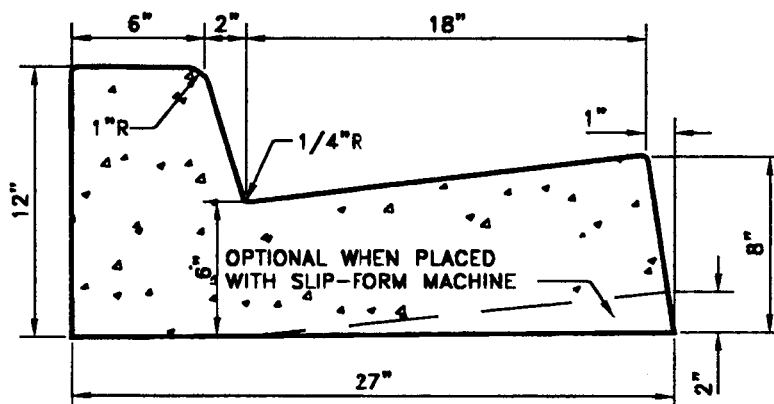


CITY of MODESTO

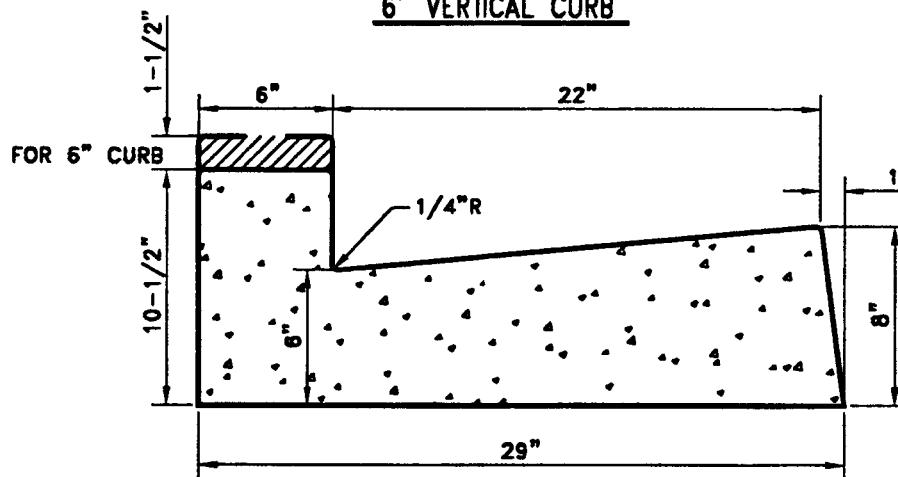
DETAIL NO.
329



4-1/2" DRIVE OVER CURB



6" VERTICAL CURB



RETURN CURB

(OPTIONAL WITH 6" VERTICAL CURB)

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: K.B. DATE: 5-96

REVISED BY: DATE:

DRAWN BY: JLA

DATE: 12-85

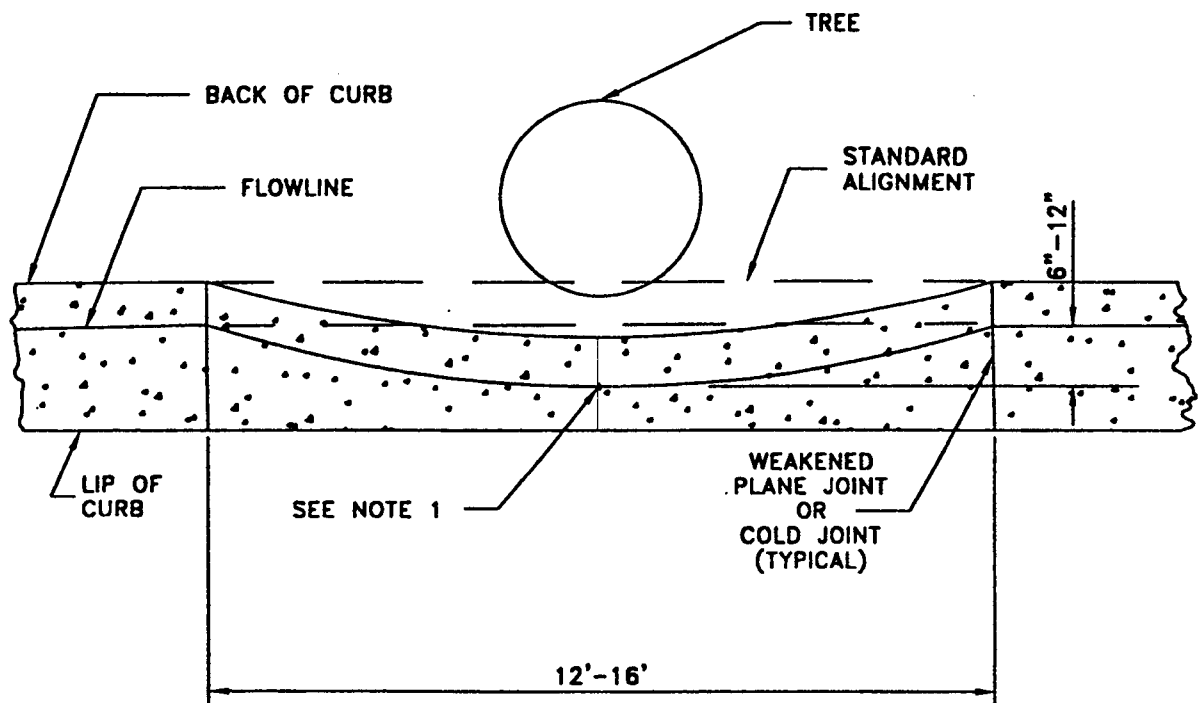
STREETS CURB SECTIONS

DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.
330



NOTES:

1. CURB ALIGNMENT SHALL BE MODIFIED WITH FLOWLINE GRADE MAINTAINED.
2. TREE ROOTS ARE TO BE CUT AT EDGE OF WALK TO 12" BELOW FINISH GRADE, AS DETERMINED BY THE CITY ENGINEER.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: r.a.c. DATE: 02-94

REVISED BY: DATE:

DRAWN BY: JLA

DATE: 12-85

STREETS

**CURB MODIFICATION
FOR EXISTING TREE**

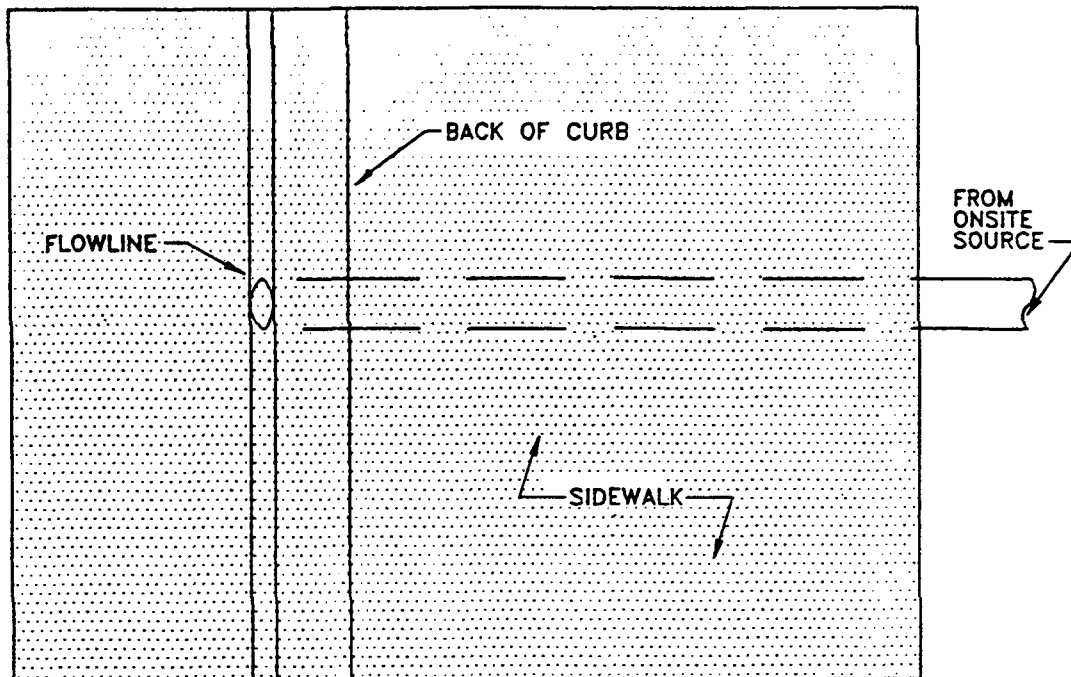
**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

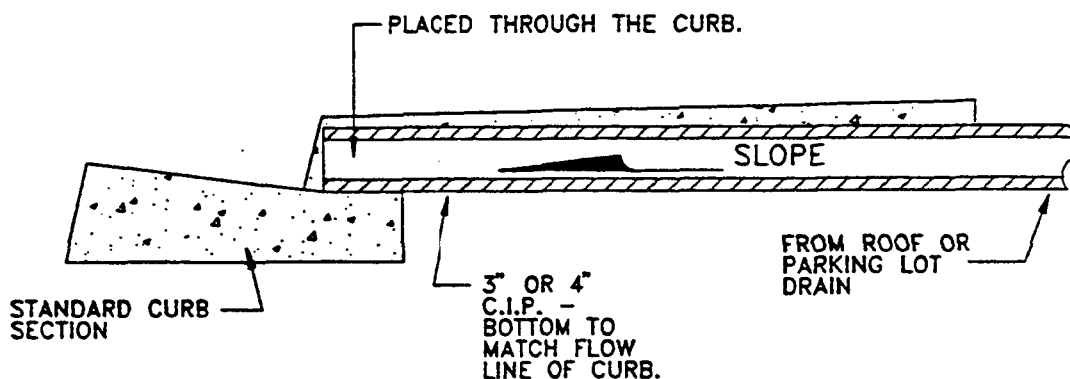
DETAIL NO.

331



PLAN

FIBERMESH OR WIRE MESH
TO BE ADDED TO THE CONCRETE



SECTION

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: SNELL

DATE: 08-74

STREETS

CURB DRAIN
UNDER SIDEWALK

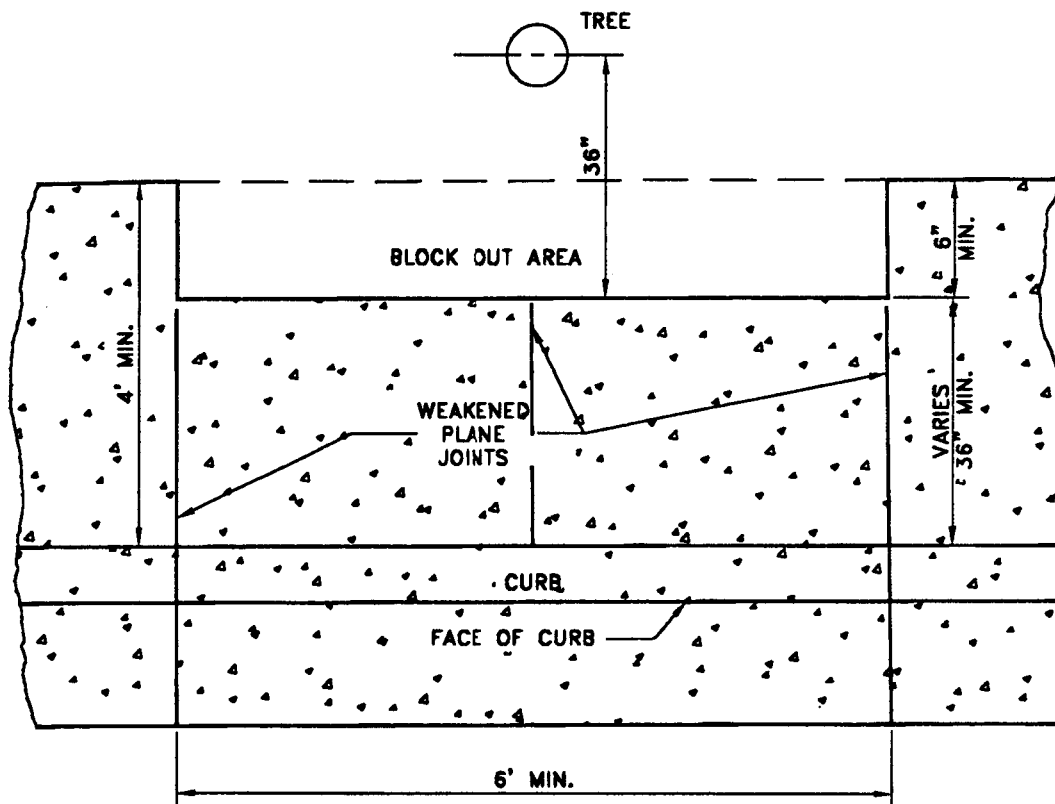
DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DRAWING NO.

332



NOTES:

1. TREE ROOTS ARE TO BE CUT AT EDGE OF WALK TO 10" BELOW FINISH GRADE, AS DETERMINED BY THE ENGINEER.
2. IF TREE IS 6" OR LESS IN DIAMETER (20" GIRTH) AN IT'S CENTER IS 12" - 36" FROM BACK EDGE OF FULL WALK, PLACE CONCRETE IN BLOCK-OUT AREA, WITH COLD JOINTS OR REDWOOD STRIPS AT THE EDGES (SEE DETAIL #337).

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: K.B. DATE: 5-96

REVISED BY: r.a.c. DATE: 2-94

DRAWN BY: JLA

DATE: 12-85

STREETS

**SIDEWALK MODIFICATION
FOR TREE AT
PROPERTY LINE**

**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**

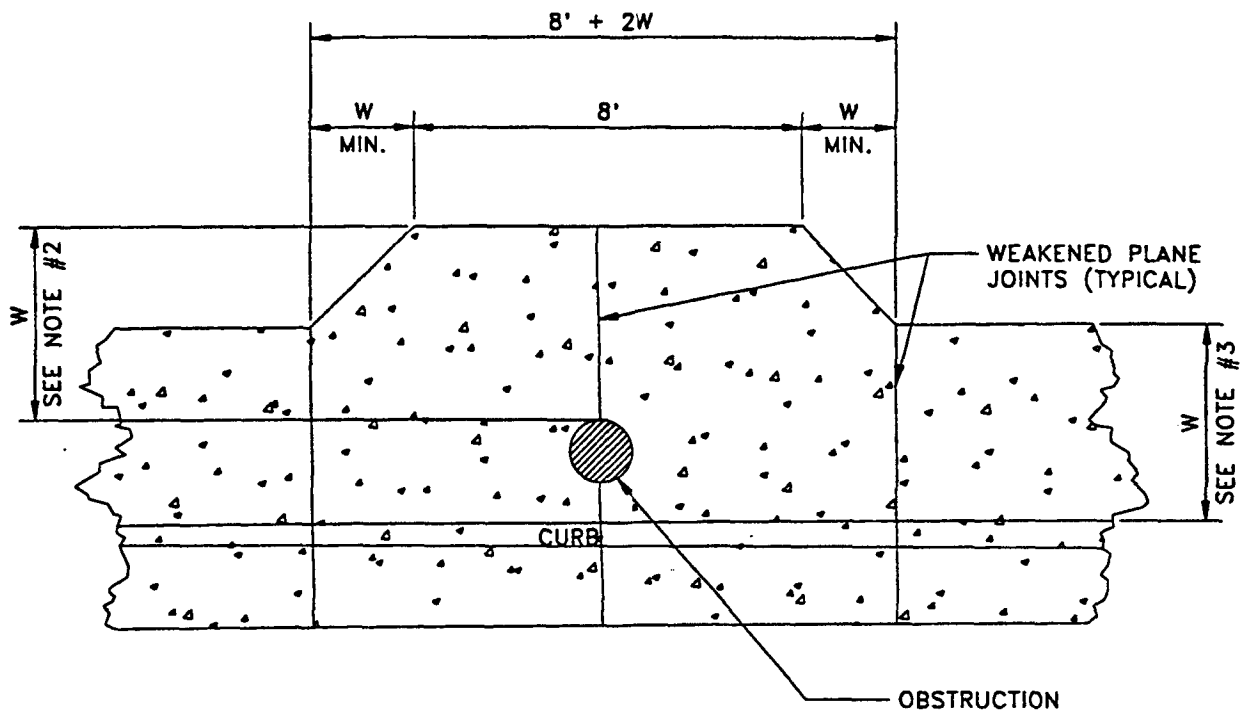


CITY of MODESTO

DETAIL NO.

334

335



NOTES:

1. NO WIDENING IS NEEDED WHEN SPACE BETWEEN BACK OF CURB AND FACE OF OBSTRUCTION IS 36" OR MORE.
2. BACK OF WIDENED SIDEWALK SHALL REMAIN WITHIN THE STREET RIGHT OF WAY.
3. W = PROPOSED OR EXISTING SIDEWALK WIDTH.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: LCB DATE: 06-05-84

REVISED BY: r.a.c. DATE: 02-94

DRAWN BY: JLA

DATE: 11-85

STREETS

SIDEWALK WIDENING FOR OBSTRUCTIONS

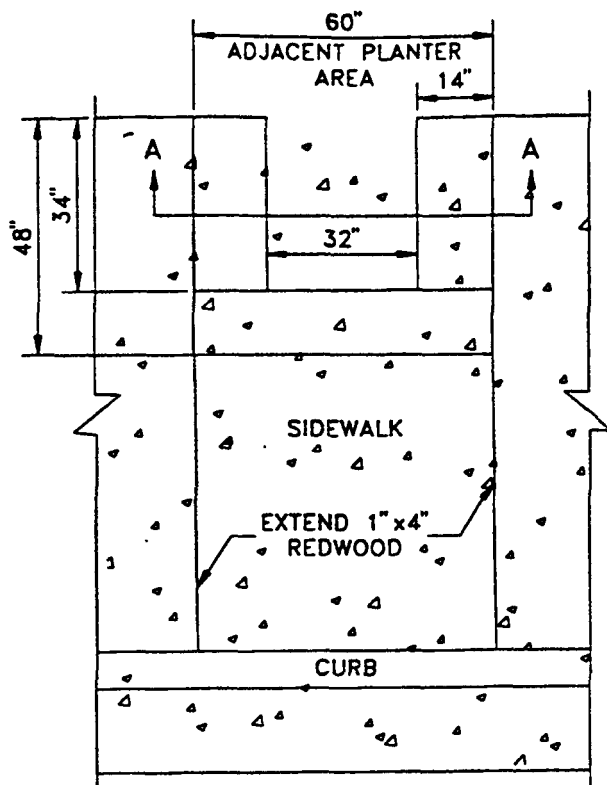
DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



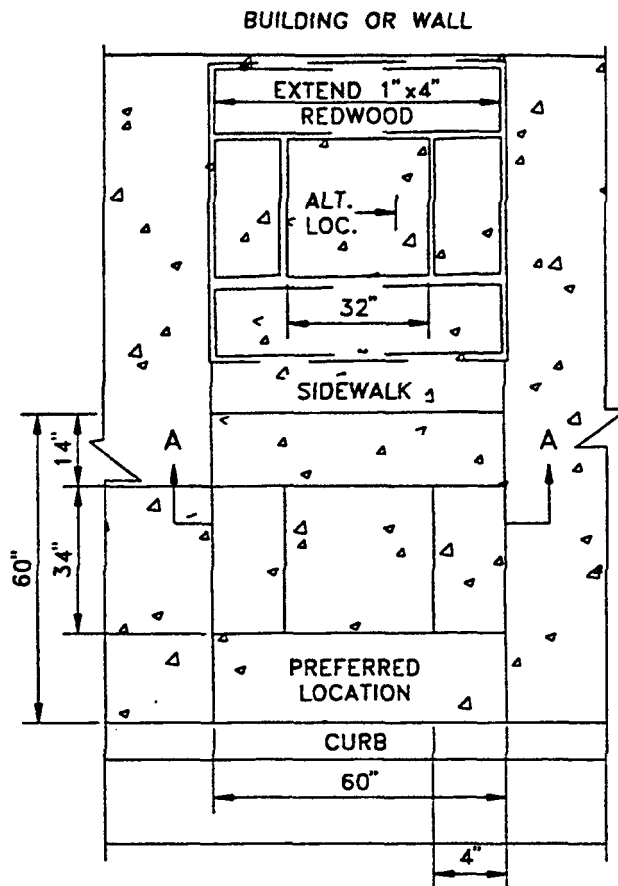
CITY of MODESTO

DETAIL NO.

336



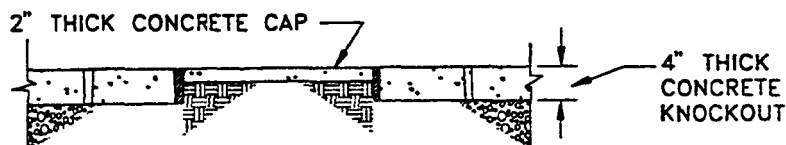
SIDEWALK WITH ADJACENT LANDSCAPING



SIDEWALK WITH ADJACENT
ACCESS WALLS OR BUILDINGS

PLAN

PLAN



SECTION A-A

NOTES:

1. BLOCK-OUTS SHALL BE SPACED AT 40' INTERVALS (APPROXIMATELY).
2. THE LANDSCAPE DESIGNER SHALL DETERMINE THE FINAL PLACEMENT OF STREET TREE BLOCK-OUTS AND MUST BE CONTACTED AT 577-5344 AT LEAST 24 HOURS PRIOR TO PLACEMENT OF CONCRETE WALKWAYS OR DRIVEWAYS.
3. USE 1" X 4" REDWOOD OR CEDAR FORMS.
4. THOSE AREAS THAT HAVE EXISTING STREET IMPROVEMENTS AND EXISTING STREET TREES ON ADJACENT PARCELS SHALL BE EVALUATED ON AN INDIVIDUAL BASIS BY THE LANDSCAPE DESIGNER PRIOR TO INSTALLATION OF THE TREE BLOCK-OUT.
5. IN COMMERCIAL AREAS, TREES MAY BE REQUIRED TO BE LOCATED AT THE BACK OF SIDEWALK AS DIRECTED BY THE ENGINEER, ON A CASE BY CASE BASIS. IN SUCH CASES, A PLANTING EASEMENT CAN BE REQUIRED AT THE BACK OF SIDEWALK.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: HM DATE: 12-89

REVISED BY: r.o.c. DATE: 09-92

DRAWN BY: HAH

DATE: 08-74

STREETS

TREE
BLOCK OUT

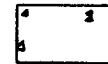
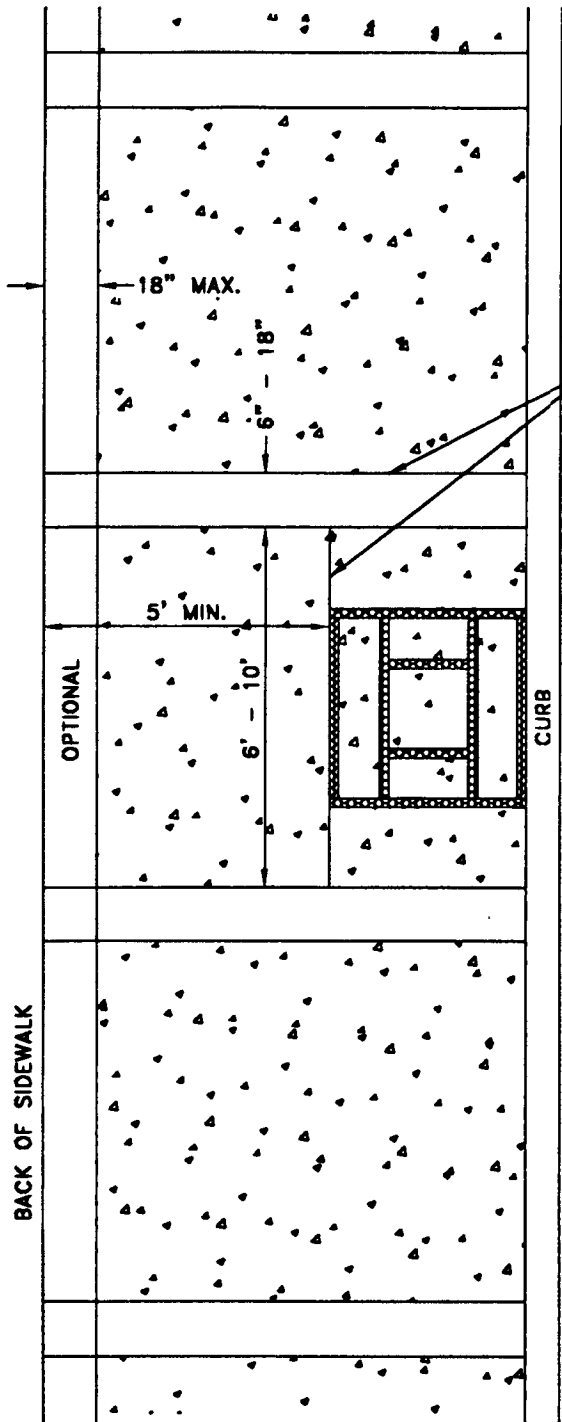
DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



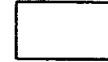
CITY of MODESTO

DETAIL NO.

337



EXPOSED AGGREGATE
FINISH



STANDARD CONCRETE
FINISH

WEAKENED PLANE
OR COLD JOINT
(TYPICAL)

NOTES:

1. FOR FULL WALK EXPANSION,
MATERIAL SHALL BE PLACED
ADJACENT TO STRUCTURE.
2. FOR ALTERNATE LOCATION OF
BLOCK OUT, SEE DETAIL
NO. 337.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: K.B.

DATE: 5-96

REVISED BY: r.o.c.

DATE: 2-94

DRAWN BY: JLA

DATE: 12-85

STREETS

**CONCRETE AND
AGGREGATE SIDEWALK**

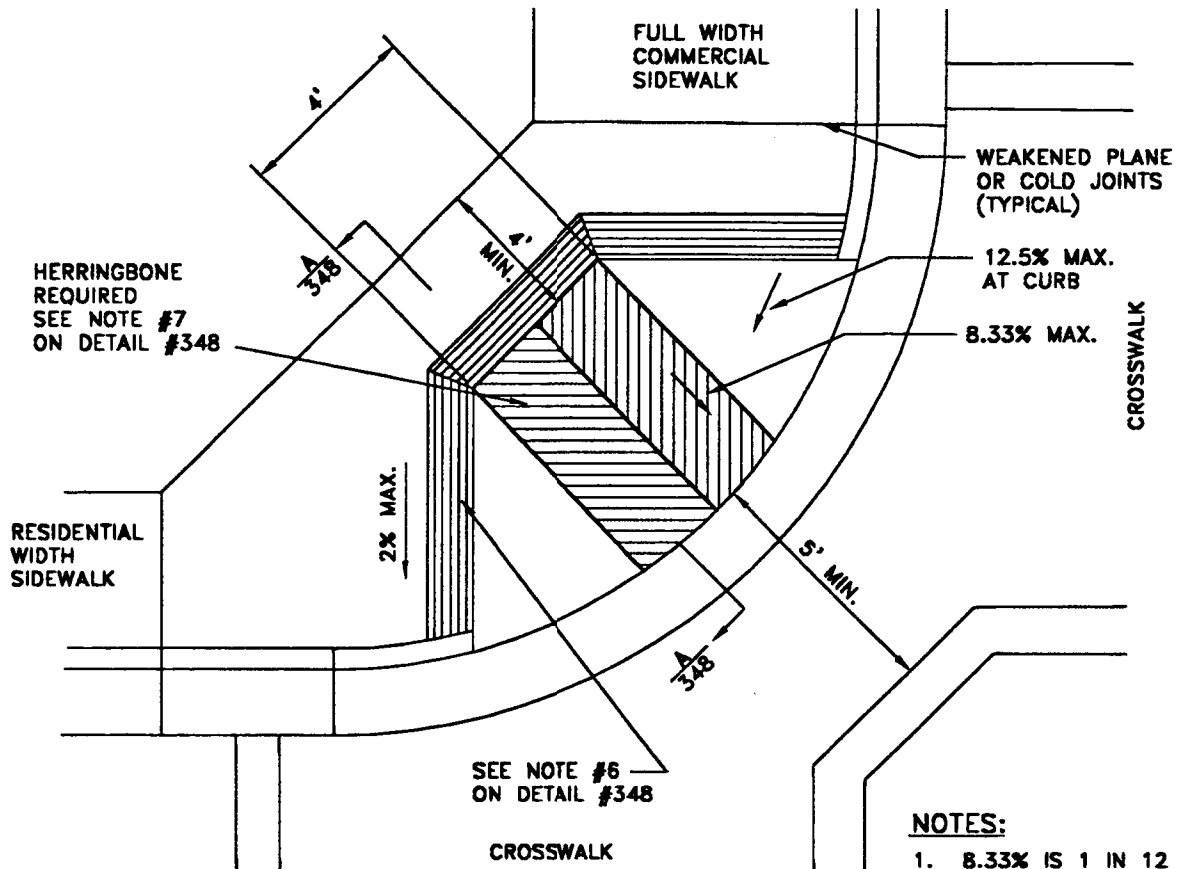
**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

DETAIL NO.

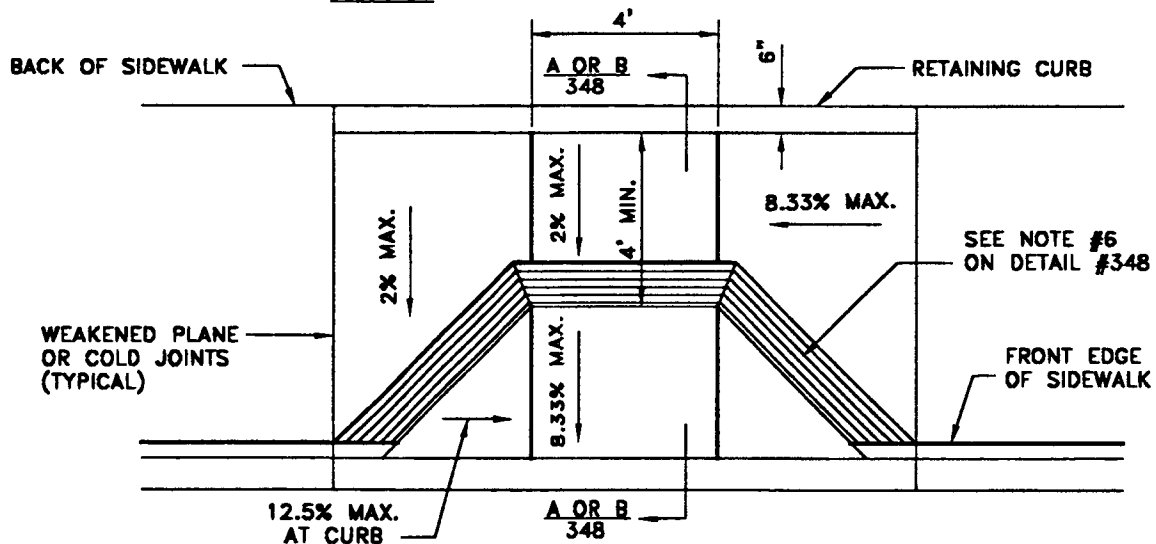
342



NOTES:

1. 8.33% IS 1 IN 12
2. 12.5% IS 1 IN 8

CASE E



CASE B

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: K.B. DATE: 5-96

REVISED BY: r.a.c. DATE: 2-94

DRAWN BY: RAF DATE: 1-83

STREETS

**CURB RAMP
CASE B & CASE E**

**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**

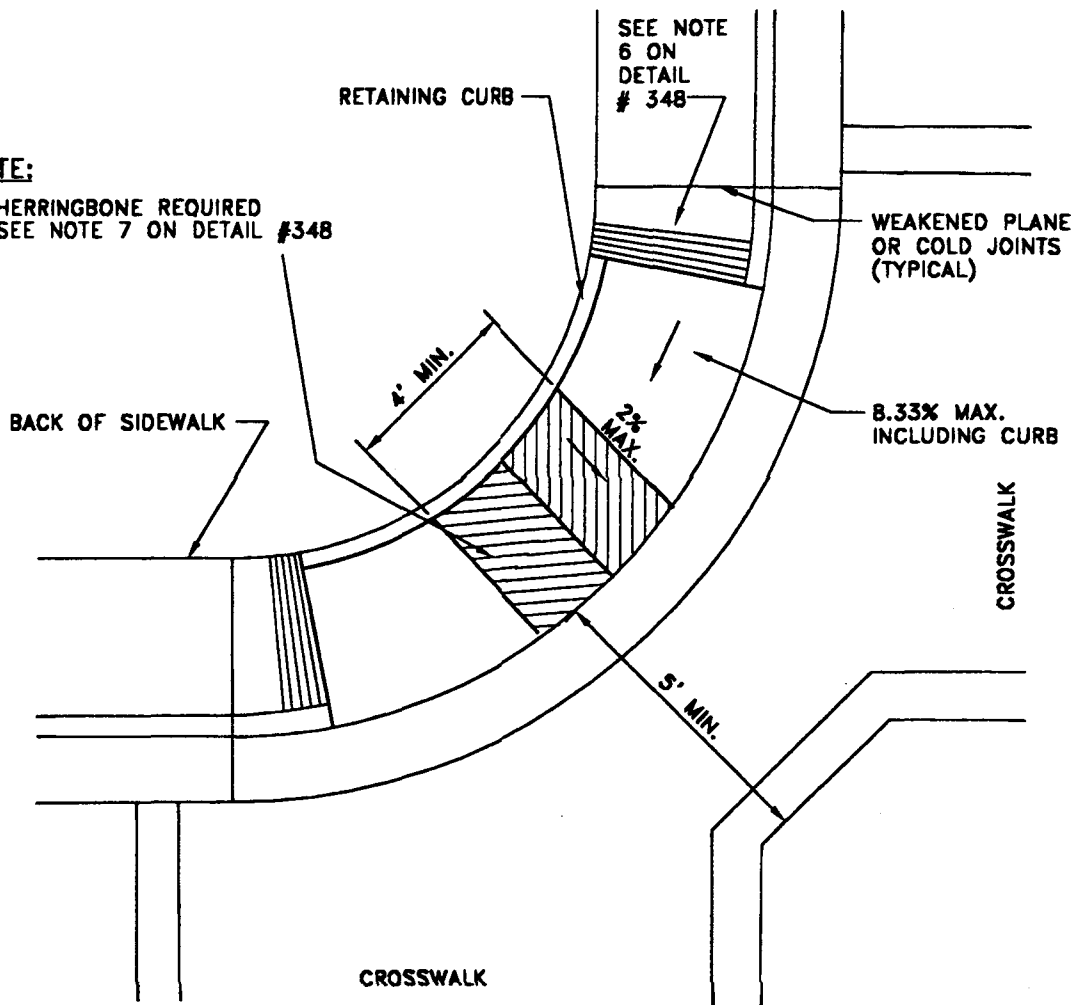


CITY of MODESTO

DETAIL NO.
345

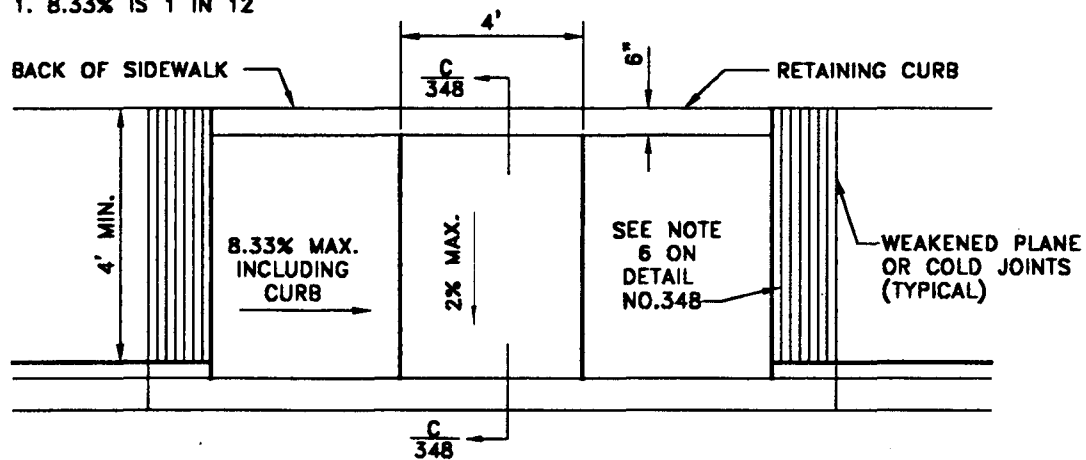
NOTE:

1. HERRINGBONE REQUIRED
SEE NOTE 7 ON DETAIL #348



NOTE:

1. 8.33% IS 1 IN 12



ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: K.B. DATE: 5-96

REVISED BY: r.a.c. DATE: 2-94

DRAWN BY: RAF

DATE: 1-83

STREETS

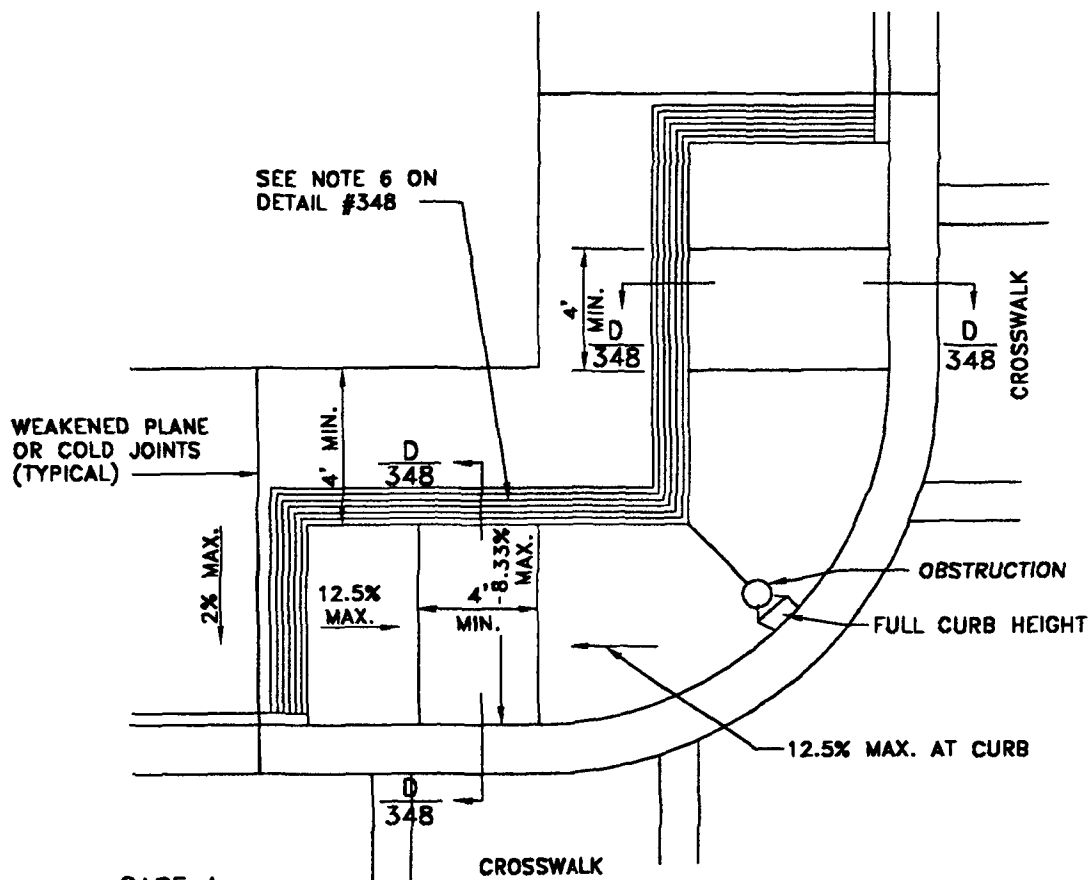
**CURB RAMP
CASE C**

**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



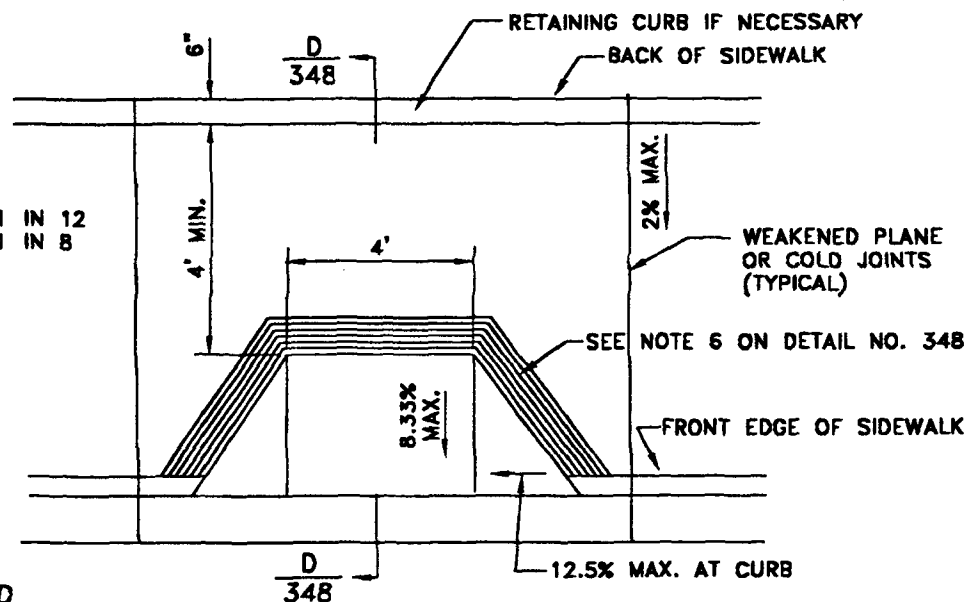
CITY of MODESTO

DETAIL NO.
346



NOTES:

1. 8.33% IS 1 IN 12
2. 12.5% IS 1 IN 8



ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97
REVISED BY: K.B. DATE: 5-96
REVISED BY: r.d.c. DATE: 2-94
DRAWN BY: JLA DATE: 11-85

STREETS

**CURB RAMP
CASE A AND CASE D**

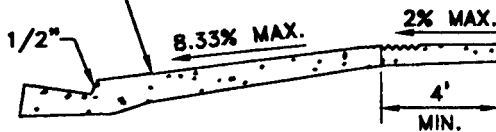
**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



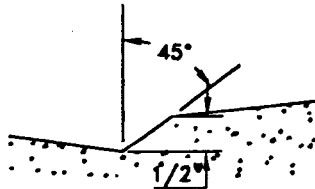
CITY of MODESTO

DETAIL NO.
347

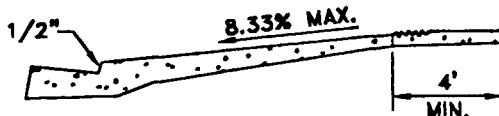
USE HERRINGBONE GROOVES ON SLOPING PORTION OF RAMP WHEN LOCATED IN CENTER OF CURB RETURN.



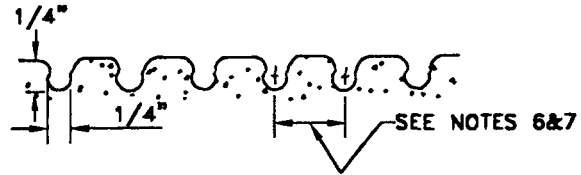
SECTION A-A



LIP DETAIL
(TYPICAL)



SECTION D-D

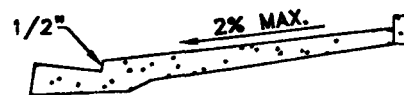


GROOVING DETAIL



SECTION B-B

6" WIDE RETAINING CURB, IF NECESSARY



SECTION C-C

NOTE: 8.33% IS 1 IN 12.

NOTES:

1. THE LOWER END OF EACH CURB RAMP SHALL HAVE A 1/2" (12.7 MM) LIP BEVELED AT 45°
2. IF DISTANCE FROM CURB TO BACK OF SIDEWALK IS TOO SHORT TO ACCOMMODATE RAMP AND 4' PLATFORM AS IN CASE, THE SIDEWALK MAY BE DEPRESSED LONGITUDINALLY AS IN CASE B OR C OR MAY BE WIDENED AS IN CASE D.
3. IF SIDEWALK IS LESS THAN 5' WIDE, THE FULL WIDTH OF THE SIDEWALK SHALL BE DEPRESSED AS SHOWN IN CASE C.
4. WHEN RAMP IS LOCATED IN CENTER OF CURB RETURN, CROSSWALK CONFIGURATION MUST BE SIMILAR TO THAT SHOWN ON THE PLAN TO ACCOMMODATE WHEELCHAIRS.
5. IF LOCATED ON A CURVE, THE SIDES OF THE RAMP NEED NOT BE PARALLEL, BUT THE MINIMUM WIDTH OF THE RAMP SHALL BE 4'.
6. THE RAMP SHALL HAVE A 12" WIDE BORDER WITH 1/4" GROOVES APPROXIMATELY 3/4" O.C. (SEE GROOVING DETAIL). THE SURFACE OF THE RAMP SHALL HAVE A TRANSVERSE BROOMED SURFACE TEXTURE ROUGHER THAN THE SURROUNDING SIDEWALK EXCEPT WHEN LOCATED IN THE CENTER OF CURB RETURN.
7. WHEN RAMP IS LOCATED IN CENTER THE CENTER OF CURB RETURN, IT SHALL BE GROOVED IN A HERRINGBONE PATTERN WITH 1/4" GROOVES APPROXIMATELY 1-1/2" O.C. (SEE GROOVING DETAIL). GROOVES SHOULD BE ALIGNED PARALLEL TO CROSSWALK TO DIRECT BLIND PEDESTRIANS INTO APPROPRIATE CROSSWALK.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: K.B. DATE: 5-96

REVISED BY: r.a.c. DATE: 9-92

DRAWN BY: JLA DATE: 11-85

STREETS

**CURB RAMP
NOTES AND DETAILS**

**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**

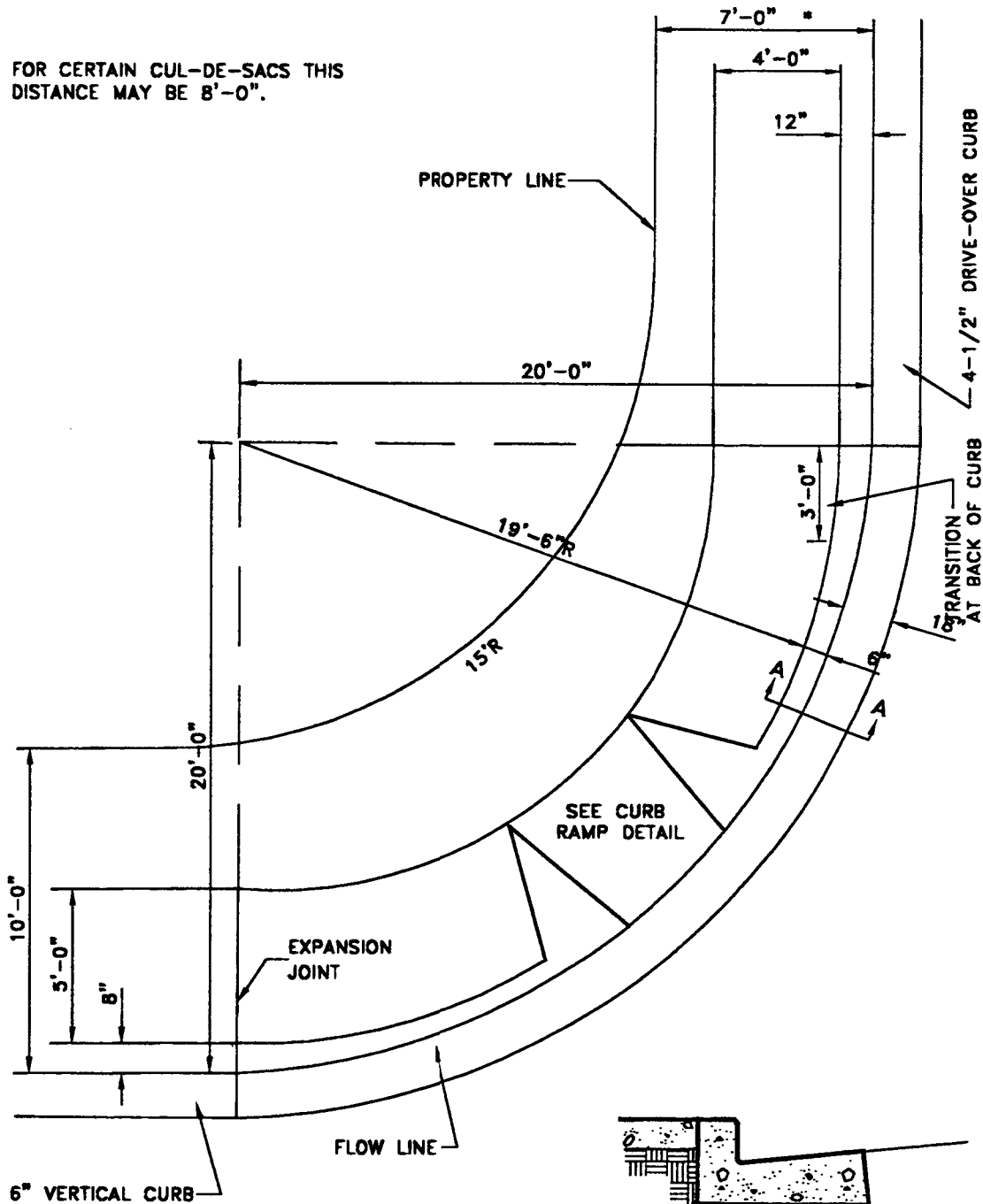


CITY of MODESTO

DETAIL NO.

348

* FOR CERTAIN CUL-DE-SACS THIS DISTANCE MAY BE 8'-0".



6" VERTICAL CURB

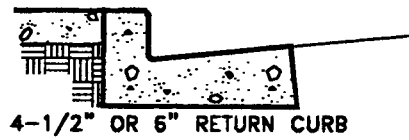
FLOW LINE

SEE CURB RAMP DETAIL

EXPANSION JOINT

TRANSITION AT BACK OF CURB

4-1/2" DRIVE-OVER CURB



SECTION A-A

NOTE:
DRIVE APPROACHES SHALL NOT ENCROACH IN RETURNS.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: K.B. DATE: 5-96

REVISED BY: r.a.c. DATE: 2-94

DRAWN BY: JLA DATE: 11-85

STREETS

**CURB & SIDEWALK
RETURNS
WITH TRANSITIONS**

**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

DETAIL NO.
349



1. **ADDITIONAL WEAKENED PLANE JOINTS IN ACCORDANCE WITH THE CONSTRUCTION STANDARDS (SEC. 8.01 E).**
2. **IF APPROVED BY THE CITY ENGINEER, VALLEY GUTTER MAY BE USED IN IN-FILL AREAS.**
3. **VALLEY GUTTERS WILL NOT BE APPROVED ACROSS STREETS IN NEWLY DEVELOPED AREAS, EXCEPT CUL-DE-SACS.**

DRAWN BY: JLA DATE: 11-85

**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



THESE STANDARDS SHALL BE MANDATORY WITHIN THE AREA AS SHOWN IN FIGURE 1, EXCEPT THAT EXPOSED AGGREGATE SIDEWALKS SHALL NOT BE REQUIRED ON THE STREETS BORDERING THE AREA.

EXPOSED AGGREGATE SIDEWALK AREA BOUNDARY

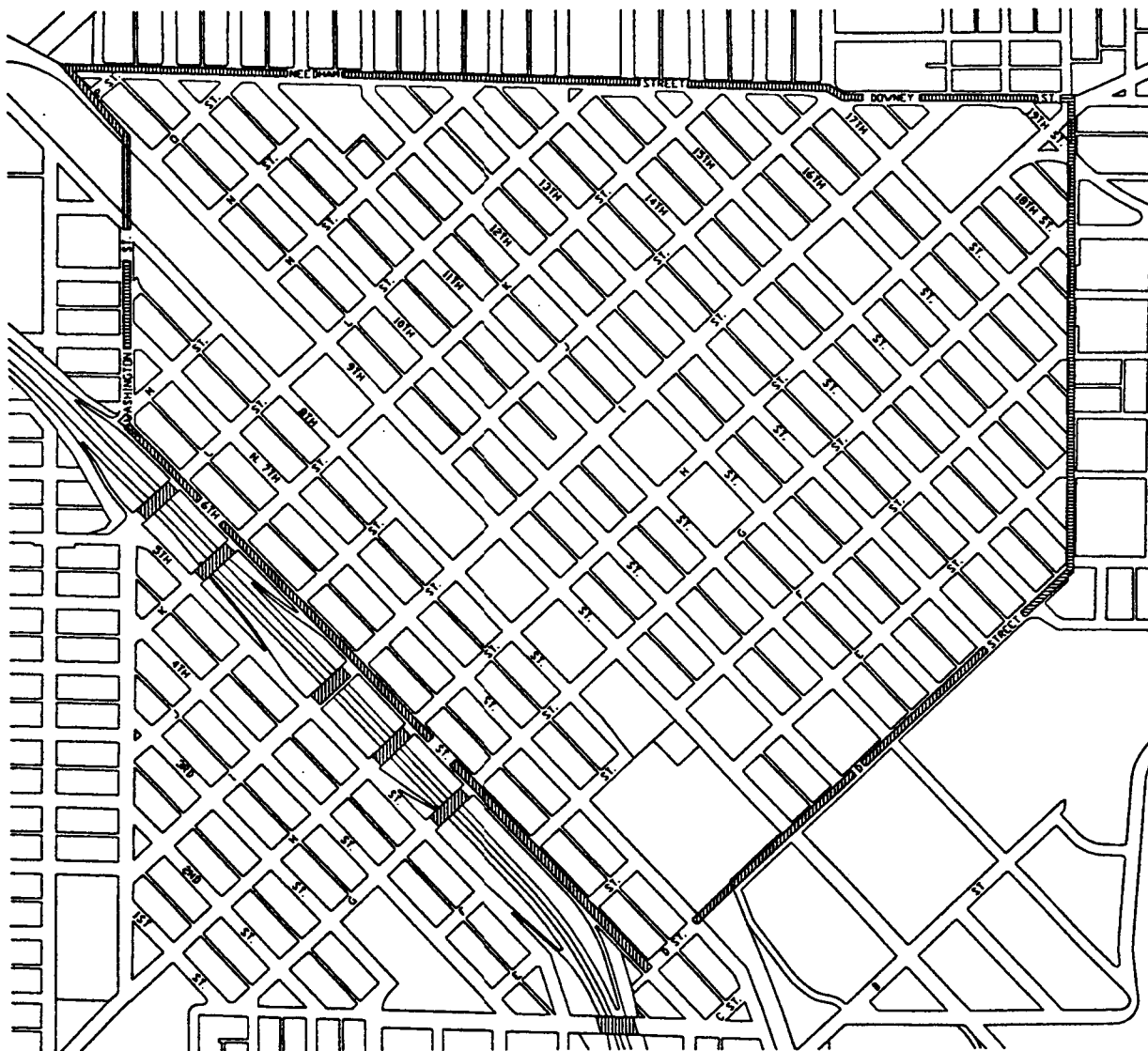


FIGURE 1

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: H.R.

DATE: 1-25-96

STREETS

DOWNTOWN EXPOSED
AGGREGATE SIDEWALK

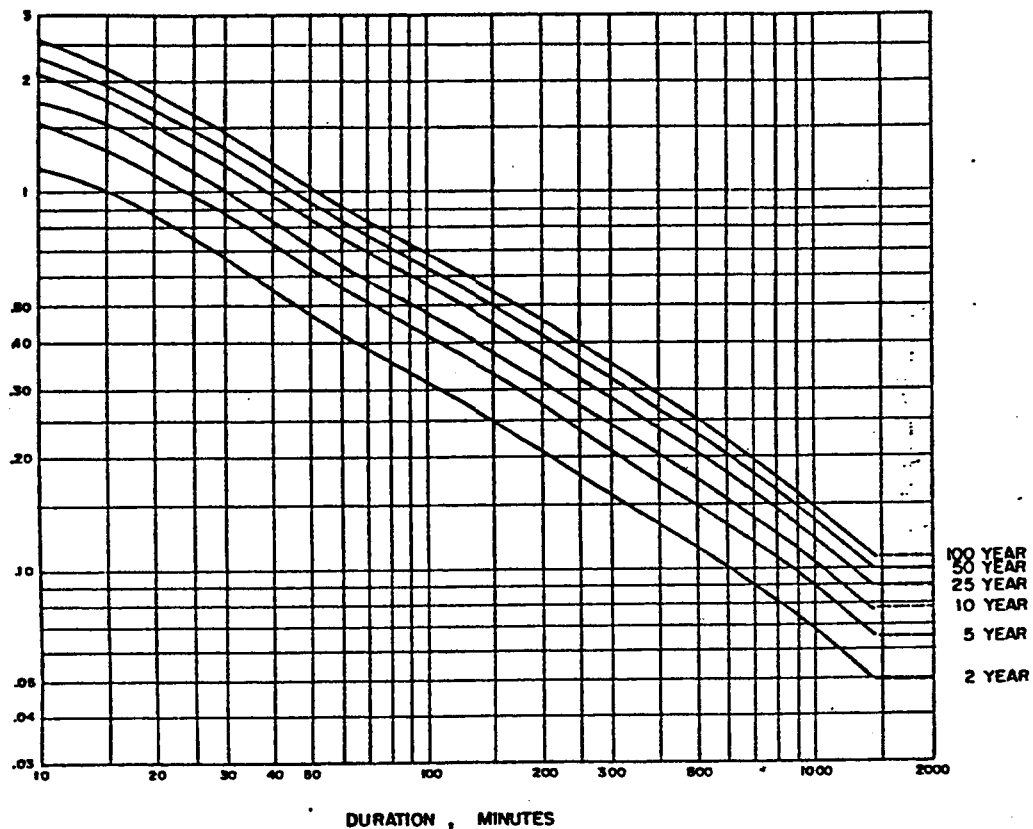
DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.

352



THESE CURVES ARE BASED ON CALIFORNIA
 DEPARTMENT OF WATER RESOURCES DATA
 FROM THE MODESTO RAINFALL GAGING
 STATION.(MEAN ANNUAL PRECIPITATION = 10.9
 INCHES)

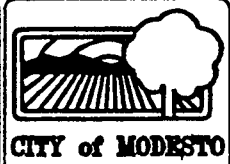
TO OBTAIN INTENSITIES FOR LOCATIONS
 OTHER THAN MODESTO, MULTIPLY INTEN-
 SITY ON THIS CHART BY MEAN ANNUAL
 PRECIPITATION AT THE POINT IN QUESTION
 DIVIDED BY 10.90.

ORIGINAL STAMPED AND
 SIGNED BY: VAN SWITZER
 R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
 CITY COUNCIL: 9-9-97
 REVISED BY: DATE:
 REVISED BY: DATE:
 DRAWN BY: K.B. DATE: 5-96

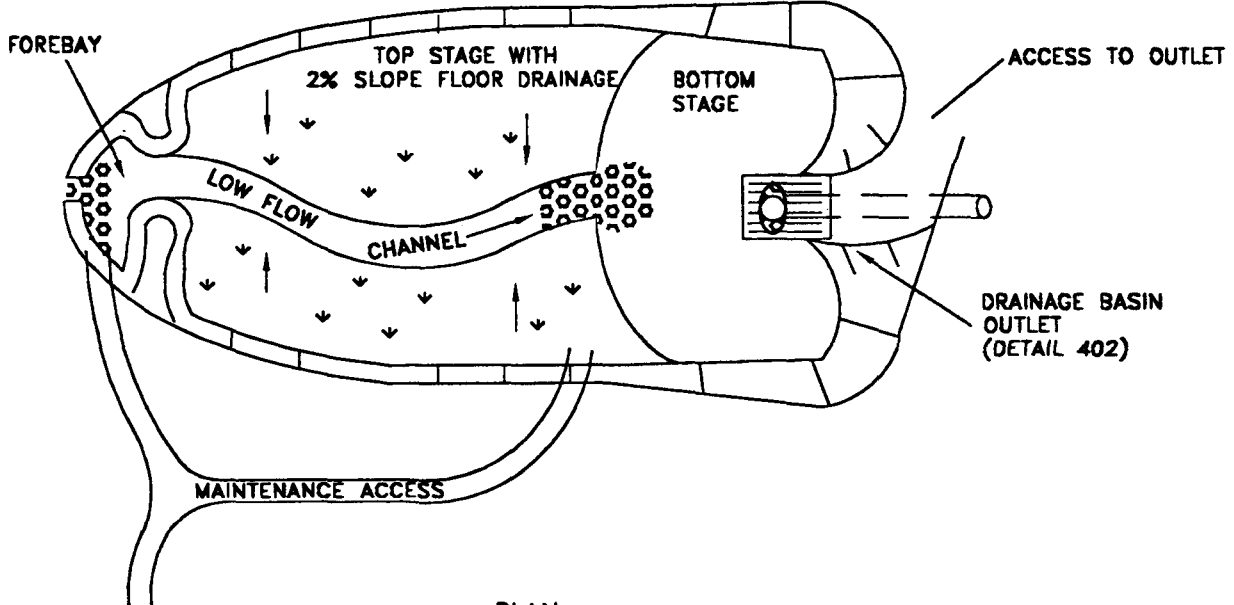
STORM DRAINS RAIN INTENSITY FREQUENCY CURVES

DEPARTMENT OF PUBLIC WORKS
 AND TRANSPORTATION

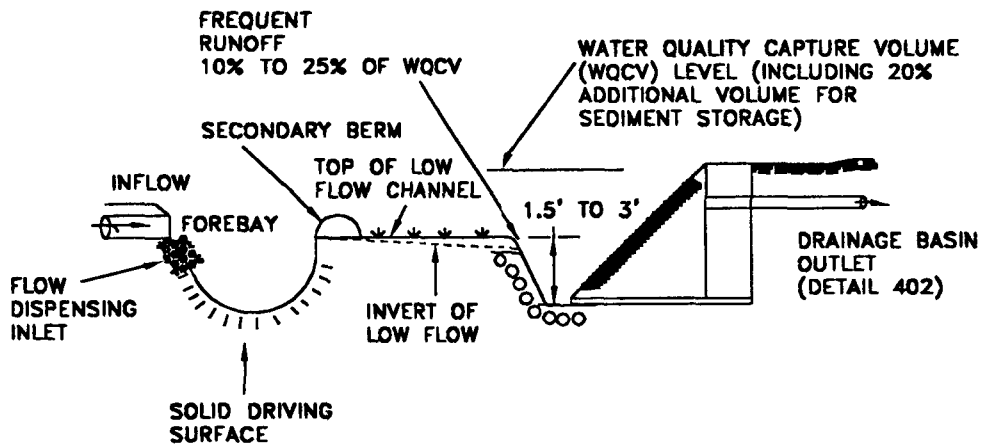


DETAIL NO.
 400

SLIDE SLOPES NO STEEPER THAN 4:1



PLAN
NOT TO SCALE



SECTION
NOT TO SCALE

LOW FLOW CHANNELS AND GUIDANCE TO DESIGNING BASINS SHOULD FOLLOW GUIDELINES ESTABLISHED IN THE BMP'S (BEST MANAGEMENT PRACTICES) FOUND IN FIGURE 5A. PLAN AND SECTION OF AN EXTENDED DETENTION BASIN.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: K.B. DATE: 5-96

STORM DRAINS

DRAINAGE BASIN

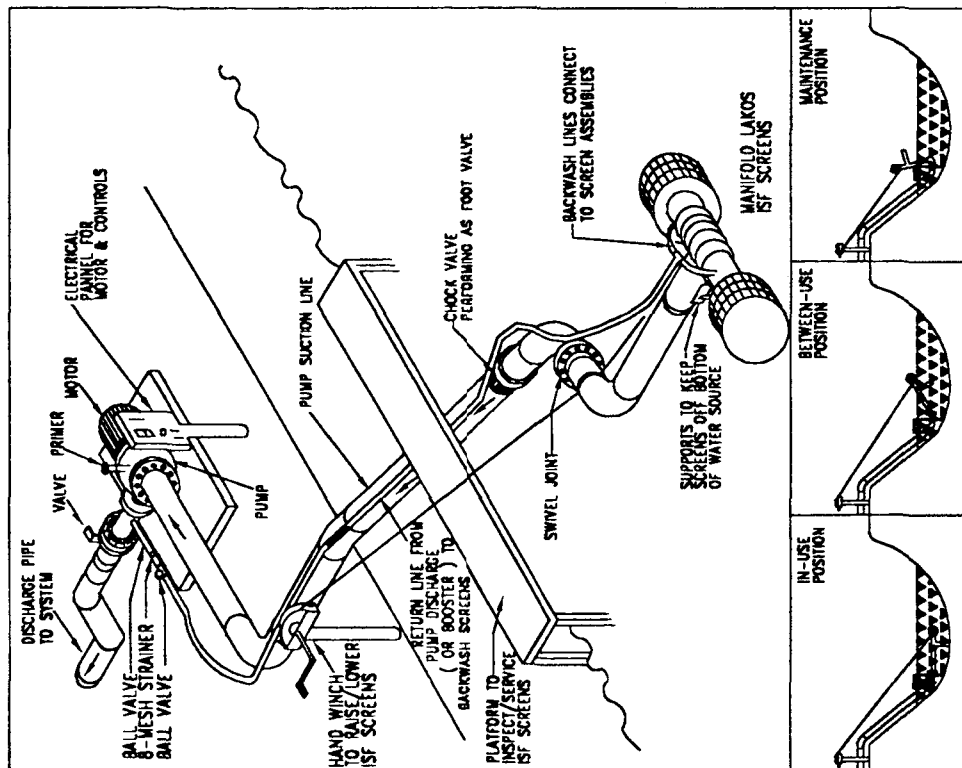
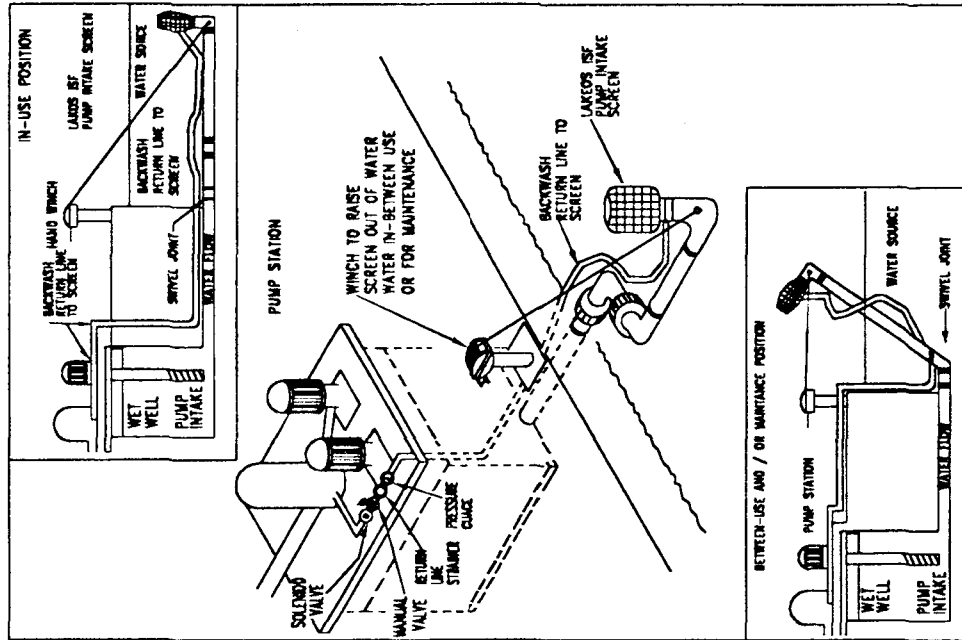
DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.
401

SAMPLE INSTALLATIONS



PROFILE

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: H.R. DATE: 2-2-96

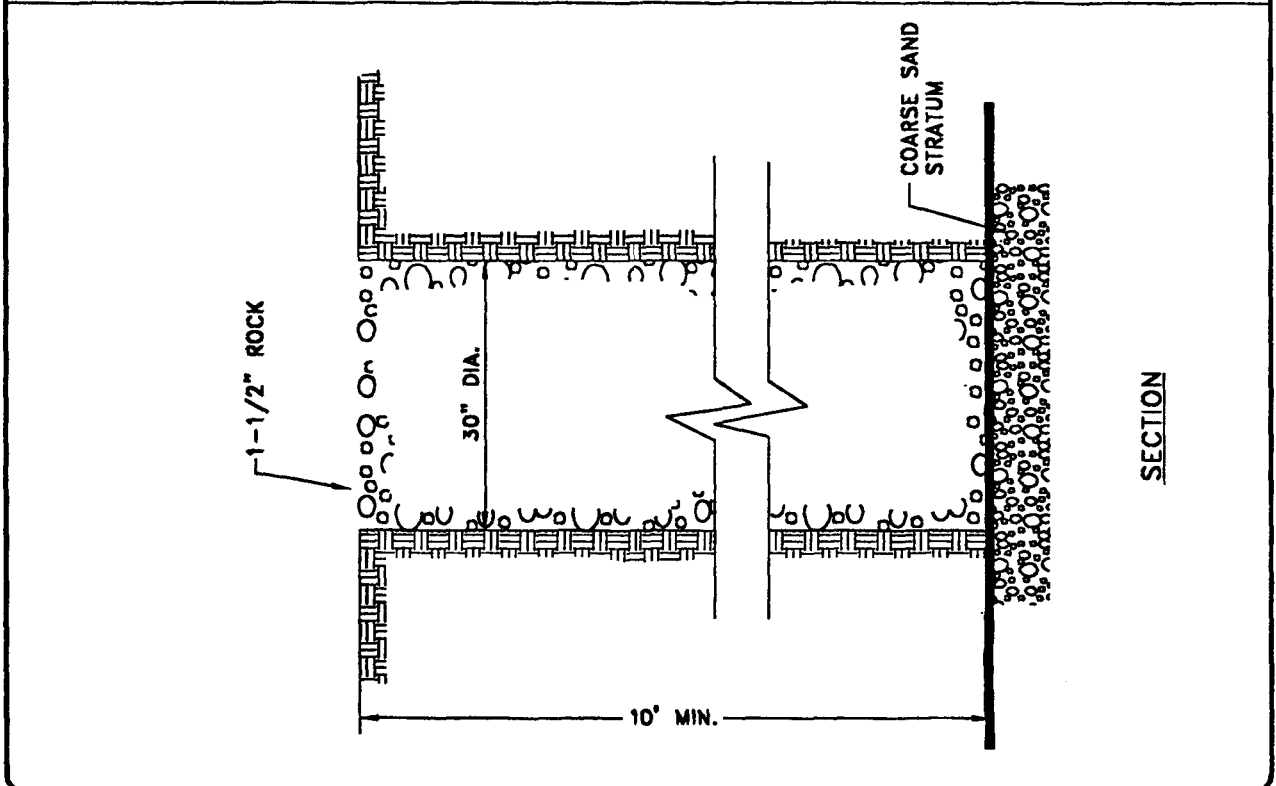
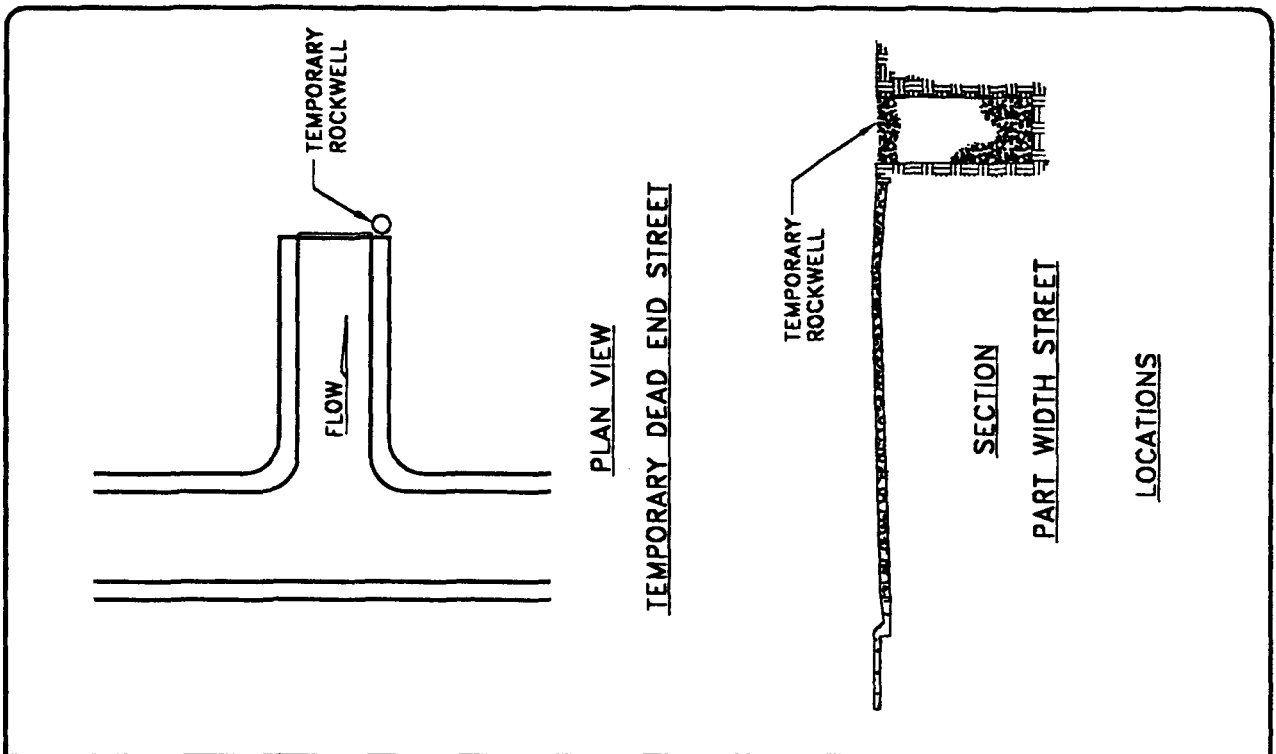
STORM DRAINS DRAINAGE BASIN OUTLET

DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.
402



ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97
REVISED BY: K.B. DATE: 5-96
REVISED BY: VINCE YAH DATE: 2-91
DRAWN BY: FRE DATE: 3-75

STORM DRAINS

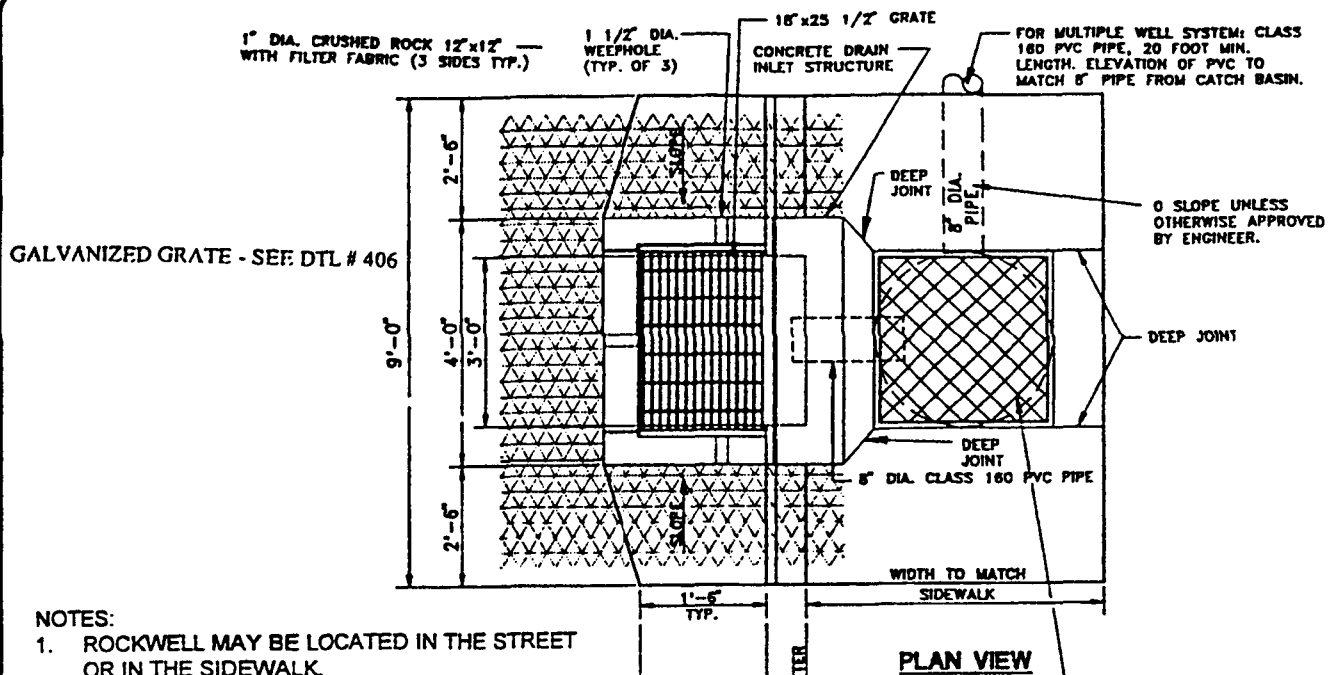
TEMPORARY ROCKWELL & TYPICAL LOCATIONS

DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



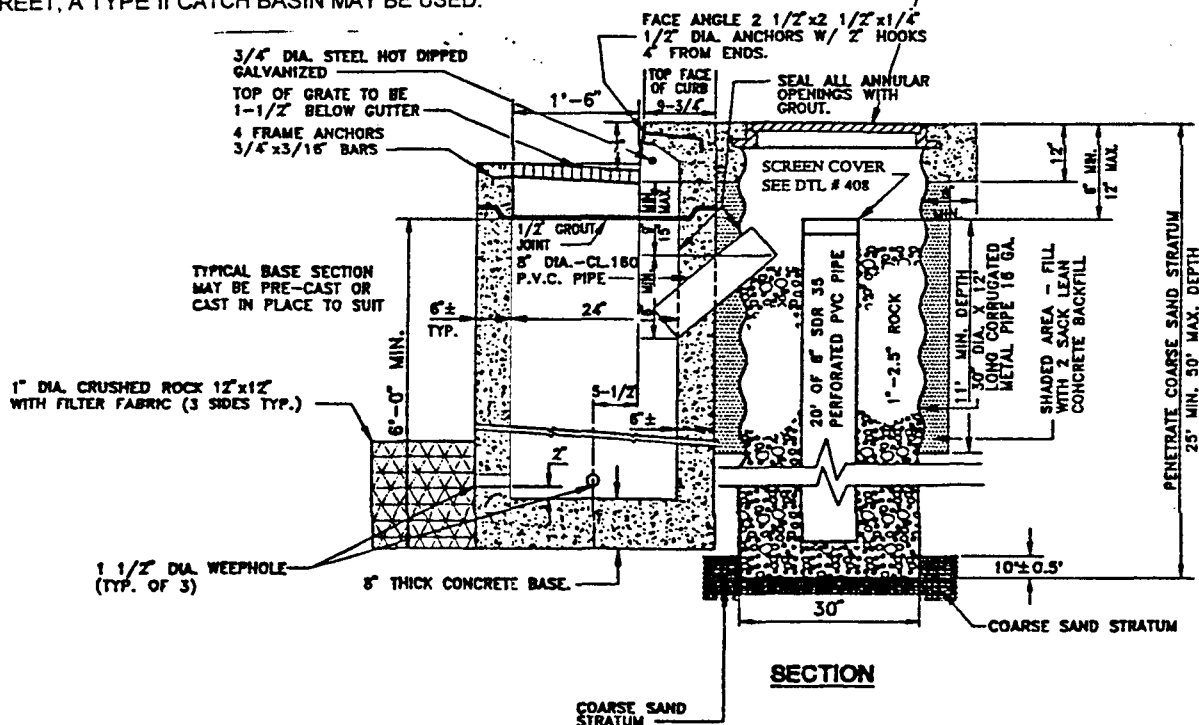
CITY of MODESTO

DETAIL NO.
403



NOTES:

1. ROCKWELL MAY BE LOCATED IN THE STREET OR IN THE SIDEWALK.
2. MULTIPLE ROCKWELLS MAY BE ESTABLISHED BY CONNECTING ADDITIONAL PIPE TO ROCKWELLS AND DRILLING A MINIMUM OF 20' FROM AN EXISTING ROCKWELL.
3. INLET TOP MUST HAVE A TRASH BAR.
4. GRATING MUST BE BICYCLE PROOF. SEE DETAIL 406.
5. IN CASES WHERE UTILITIES ARE IN CONFLICT WITH A PROPOSED CATCH BASIN IN THE STREET, A TYPE II CATCH BASIN MAY BE USED.



ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: L. CORONA DATE: 11-95

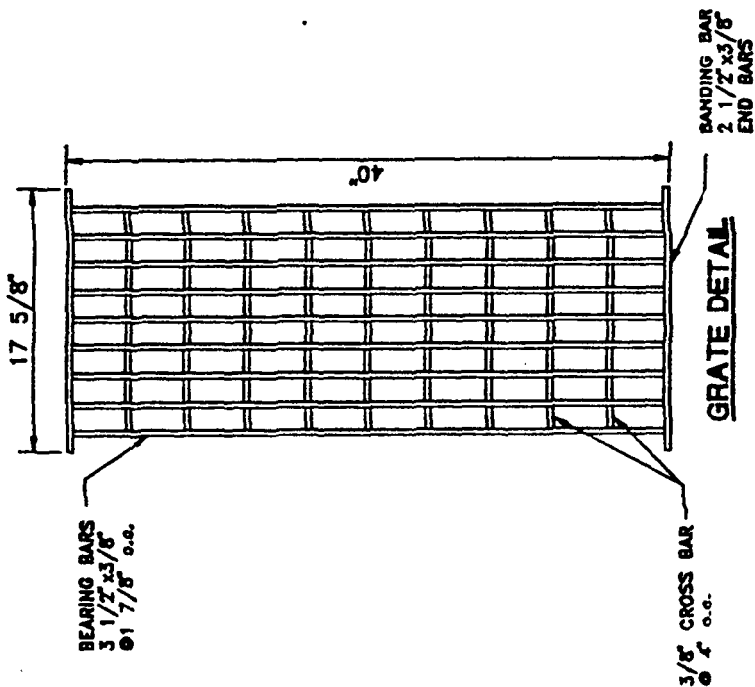
STORM DRAINS ROCKWELL ASSEMBLY WITH TYPE I - CATCH BASIN

DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



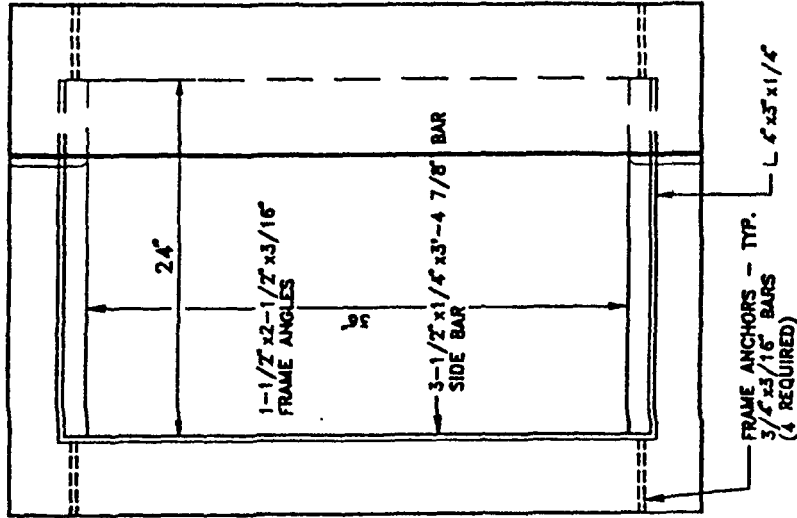
CITY of MODESTO

DETAIL NO.
405



NOTES:

1. GRATE SHALL BE RATED FOR H-20 LOADING.
2. GRATE SHALL BE HOT DIPPED GALVANIZED.
3. GRATE SHALL BE BICYCLE PROOF.



CONCRETE CATCH BASIN

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: L. CORONA

DATE: 11-95

STORM DRAINS

GRATE DETAIL

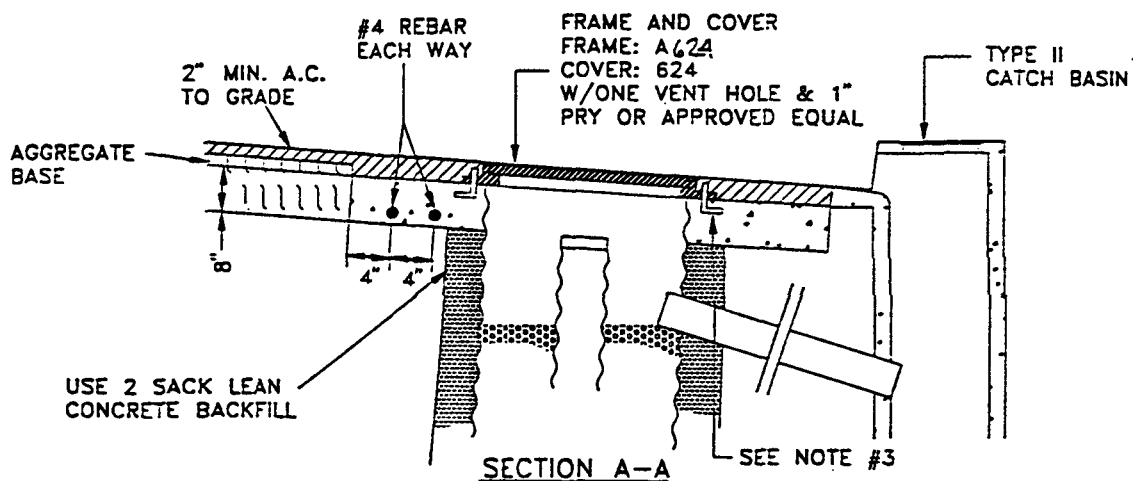
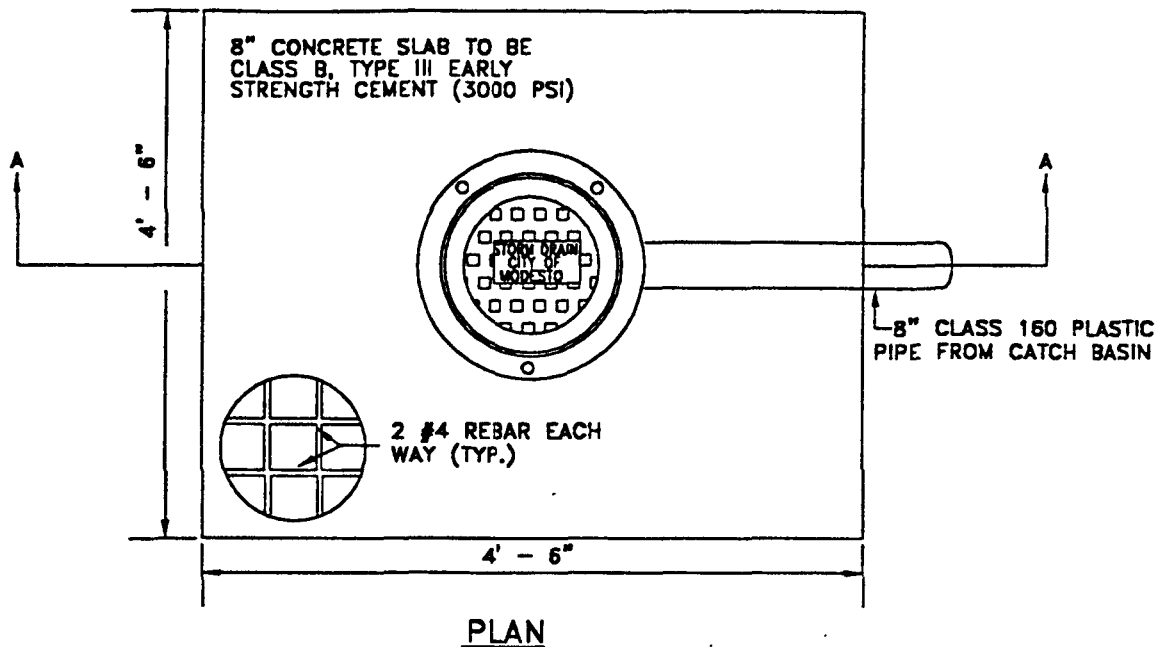
DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.

406



NOTES:

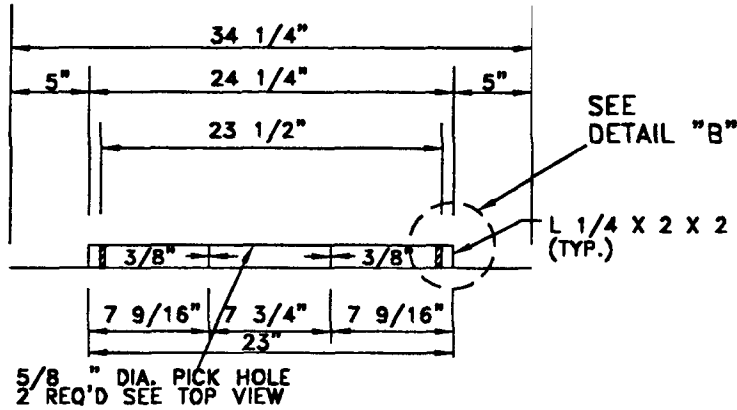
1. AS A LAST RESORT AND WITH APPROVAL BY THE CITY ENGINEER, ROCKWELLS MAY BE PLACED IN VEHICULAR TRAFFIC AREAS. THE PREFERRED PLACEMENT IS WITHIN THE SIDEWALK, LEFT OR RIGHT OF THE CATCH BASIN.
2. A MANHOLE CONE WITH A SBF 624 FRAME AND COVER MAY BE SUBSTITUTED WITH THE APPROVAL OF THE CITY ENGINEER.
3. USE 1/2" DIA. ANCHOR BOLTS W/NUTS & WASHERS FOR ANCHORS TO SECURE FRAME TO SLAB OR CAST FRAME TO TOP OF SLAB. SET FRAME, COVER & CONCRETE TO FINAL GRADE AFTER PAVING.
4. COVER TO BE MARKED "STORM DRAIN".

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

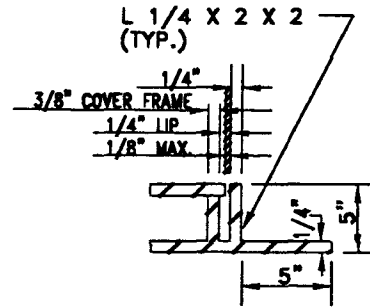
APPROVED BY
CITY COUNCIL: 9-9-97
REVISED BY: K.B. DATE: 5-96
REVISED BY: VINCE YAH DATE: 2-91
DRAWN BY: H.R. DATE: 3-75

STORM DRAINS
**ROCKWELL FOR VEHICULAR
TRAFFIC AREAS**
**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**

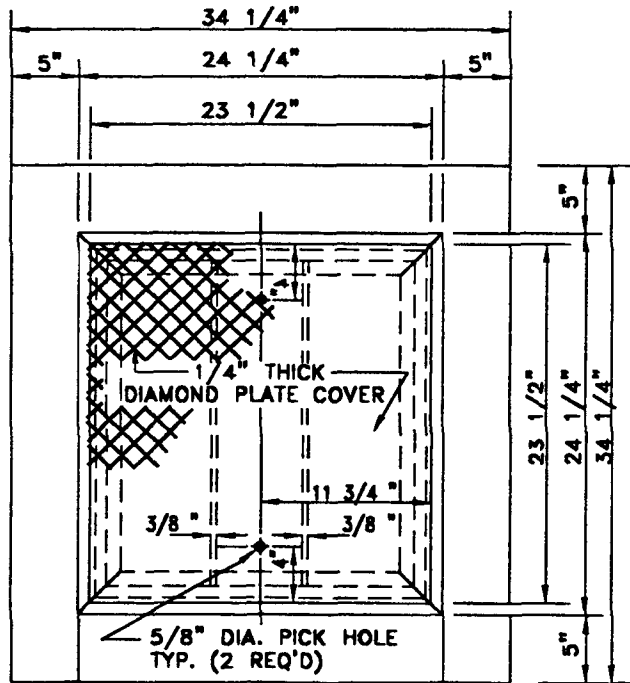

CITY of MODESTO
DETAIL NO.
407



SECTION A-A



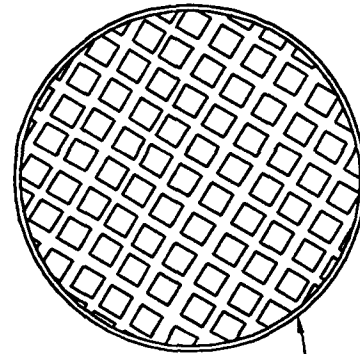
DETAIL "B"



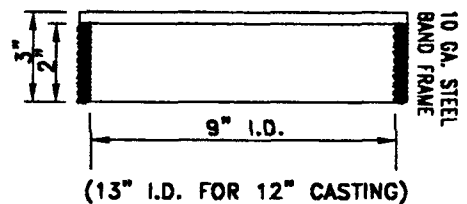
TOP VIEW

NOTE:

FRAME AND COVER TO BE HOT DIPPED GALVANIZED AFTER MANUFACTURED.



SCREEN COVER
3/4" - 9 - 11
FLATTENED
EXPANDED
METAL WELDED
TO FRAME



NOTE:

UNIT TO BE HOT DIPPED GALVANIZED AFTER MANUFACTURED.

SCREEN COVER DETAIL

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: K.B.

DATE: 5-96

STORM DRAINS

**ROCKWELL FRAME
AND COVER AND
SCREEN COVER**

**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

DETAIL NO.

408

CAST IRON LID W/ "STORM
CITY OF MODESTO"
STAMPED

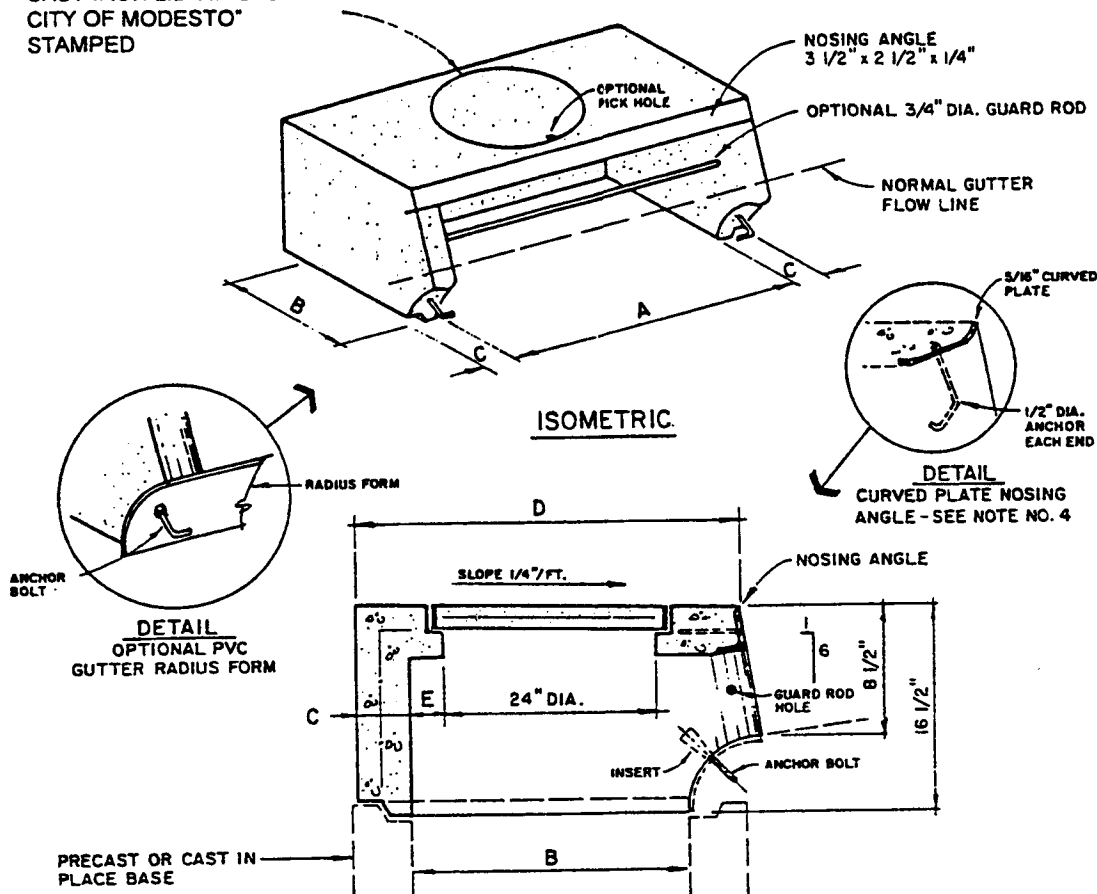


TABLE OF DIMENSIONS

MODEL	A	B	C	D	E
3AC	36	36	6	48	3

DIMENSIONS ARE IN INCHES

NOTES:

1. TYPE II CATCH BASIN TO BE USED WITH POSITIVE STORM DRAIN SYSTEM WITH SETTLING PONDS OR OIL/WATER/DEBRIS SEPARATOR (NOT A DIRECT DISCHARGE TO A RIVER OR STREAM).
2. CAST IRON LID STAMPED WITH "STORM - CITY OF MODESTO" IN 1" TO 3" LETTERS.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: L. CORONA DATE: 11-95

STORM DRAINS

**TYPE II CATCH BASIN
W/3AC TOP OR EQUAL**

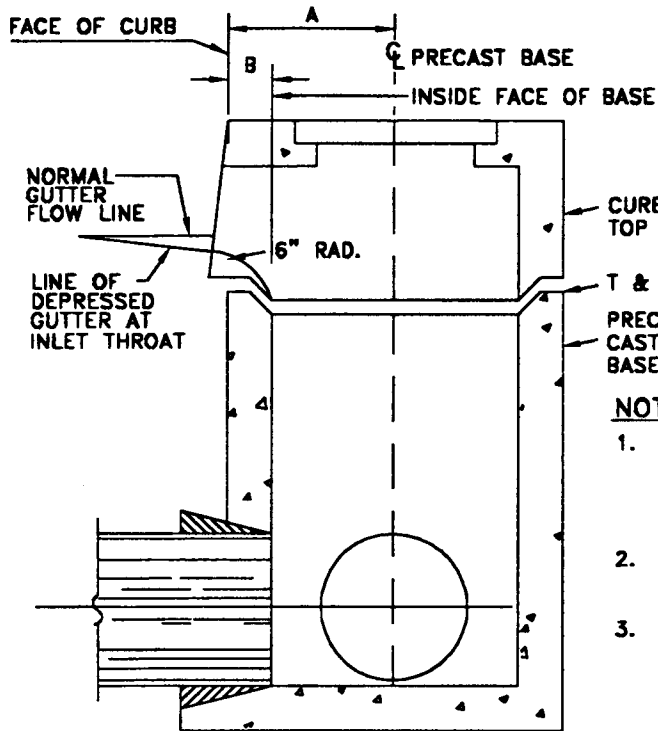
**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

DETAIL NO.

409



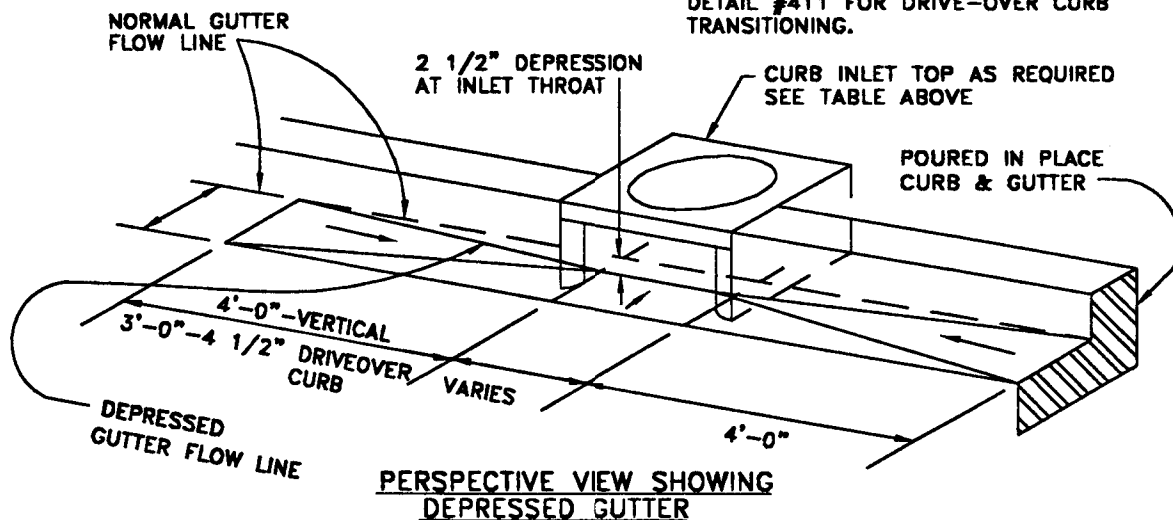
TYPICAL SECTION

CURB INLET OFFSET TABLE

CURB INLET MODEL NO.	A	B	PRECAST BASE MODEL
3AC	24"	6"	1M

NOTES:

1. TYPE II CATCH BASIN TO BE USED WITH POSITIVE STORM DRAIN SYSTEM WITH SETTLING PONDS OR SEPARATOR (I.E.— NOT CONTRIBUTING DIRECTLY TO A RIVER OR STREAM).
2. THIS DETAIL INDICATES REQUIRED TRANSITION LENGTHS FOR DRIVE-OVER CURB TO THE VERTICAL INLET FACE OF 8 1/2".
3. STORM DRAINAGE LINES RUN PARALLEL WITH THE CENTERLINE OF THE STREET, WITH THE CENTERLINE OF THE PIPE DIRECTLY UNDER THE FACE OF THE CURB. ALTHOUGH DEFLECTION INTO AND OUT OF TYPE II CATCH BASIN WILL BE NECESSARY, UNNECESSARY MEANDERING AND ANGULAR CHANGES SHALL BE AVOIDED. PIPE CURVATURE SHALL NOT EXCEED MANUFACTURER'S RECOMMENDATIONS.
4. CAST IRON LID STAMPED WITH "STORM DRAIN" AND "CITY OF MODESTO" IN 1" TO 2" LETTERING.
5. FOR VERTICAL CURB TRANSITIONING, SEE DETAIL #411 FOR DRIVE-OVER CURB TRANSITIONING.



**PERSPECTIVE VIEW SHOWING
DEPRESSED GUTTER**

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: K.B. DATE: 5-96

REVISED BY: r.a.c. DATE: 2-94

DRAWN BY: H.R. DATE: 4-96

STORM DRAINS

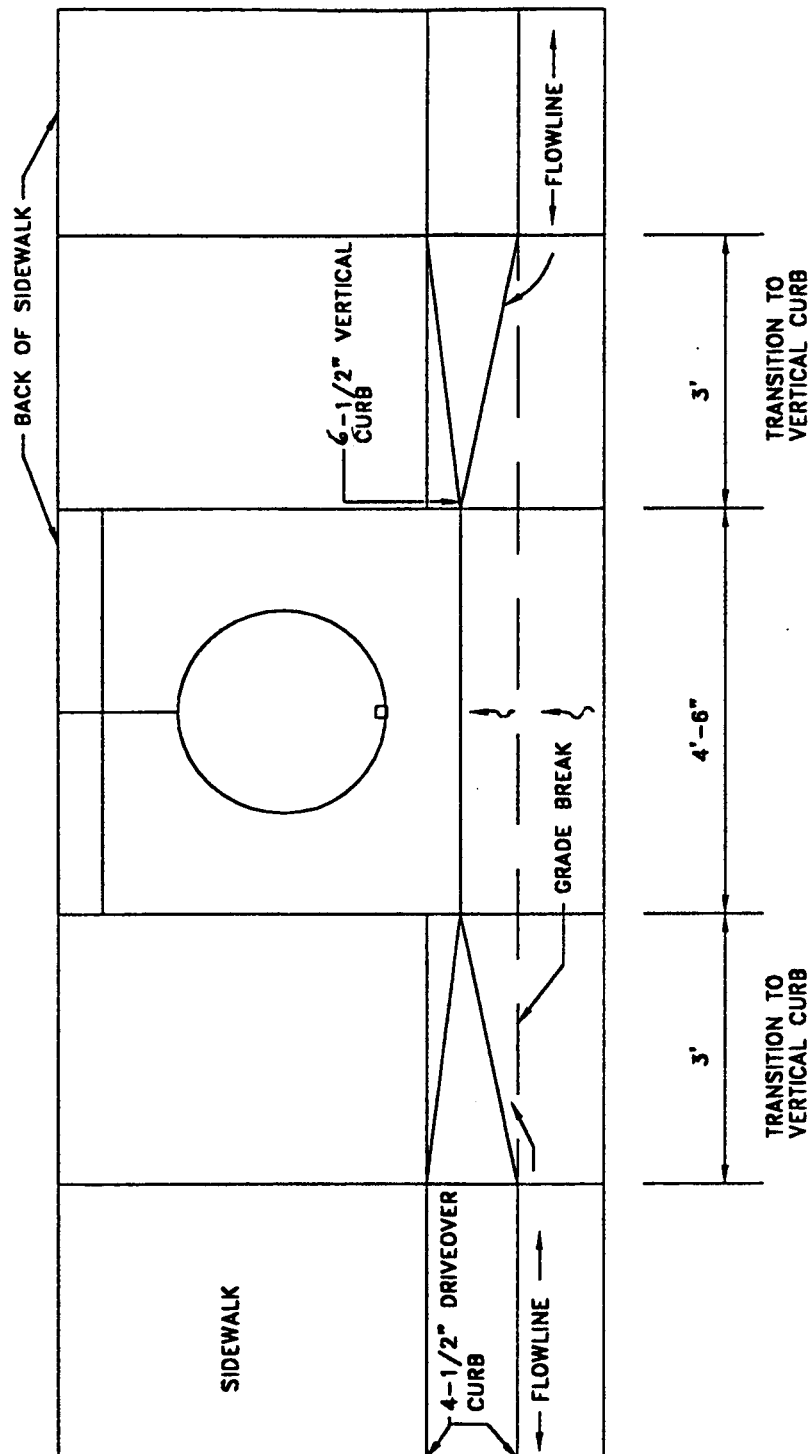
TYPE II CATCH BASIN

**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

DETAIL NO.
410



NOTE:

1. THIS TYPE OF CATCH BASIN MAY BE USED ONLY IN POSITIVE STORM DRAIN AREAS WHERE A SETTLING BASIN OR SEPARATOR IS USED TO PREVENT LEAVES FROM ENTERING OUR STREAMS OR RIVERS.
2. STORM DRAINAGE LINES RUN PARALLEL WITH THE CENTERLINE OF THE STREET, WITH THE CENTERLINE OF THE PIPE DIRECTLY UNDER THE FACE OF THE VERTICAL CURB AND CENTERED UNDER DRIVE-OVER CURB. ALTHOUGH DEFLECTION INTO AND OUT OF TYPE II CATCH BASINS WILL BE NECESSARY, UNNECESSARY MEANDERING AND ANGULAR CHANGES SHALL BE AVOIDED. PIPE CURVATURE SHALL NOT EXCEED MANUFACTURER'S RECOMMENDATIONS.
3. INSTALL A SANTA ROSA 3AC TOP WITH TRASH BAR OR APPROVED EQUAL.
4. LID SHALL BE CAST IRON STAMPED WITH "STORM DRAIN" AND "CITY OF MODESTO" IN 1" TO 2" LETTERING.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: K.B. DATE: 5-96

REVISED BY: r.o.c. DATE: 2-94

DRAWN BY: JLA DATE: 11-85

STORM DRAINS
DRIVE-OVER CURB
TRANSITION
FOR CURB INLET

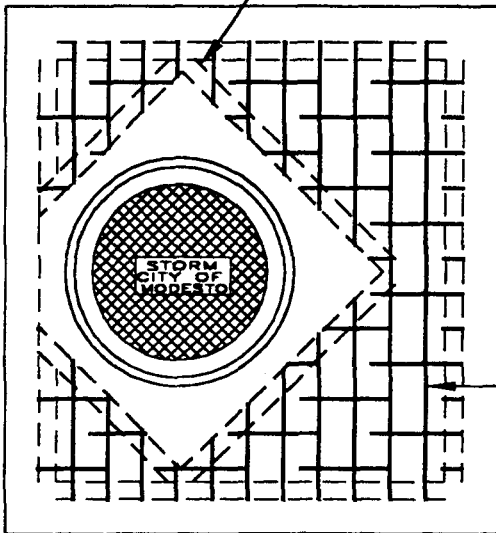
DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.
411

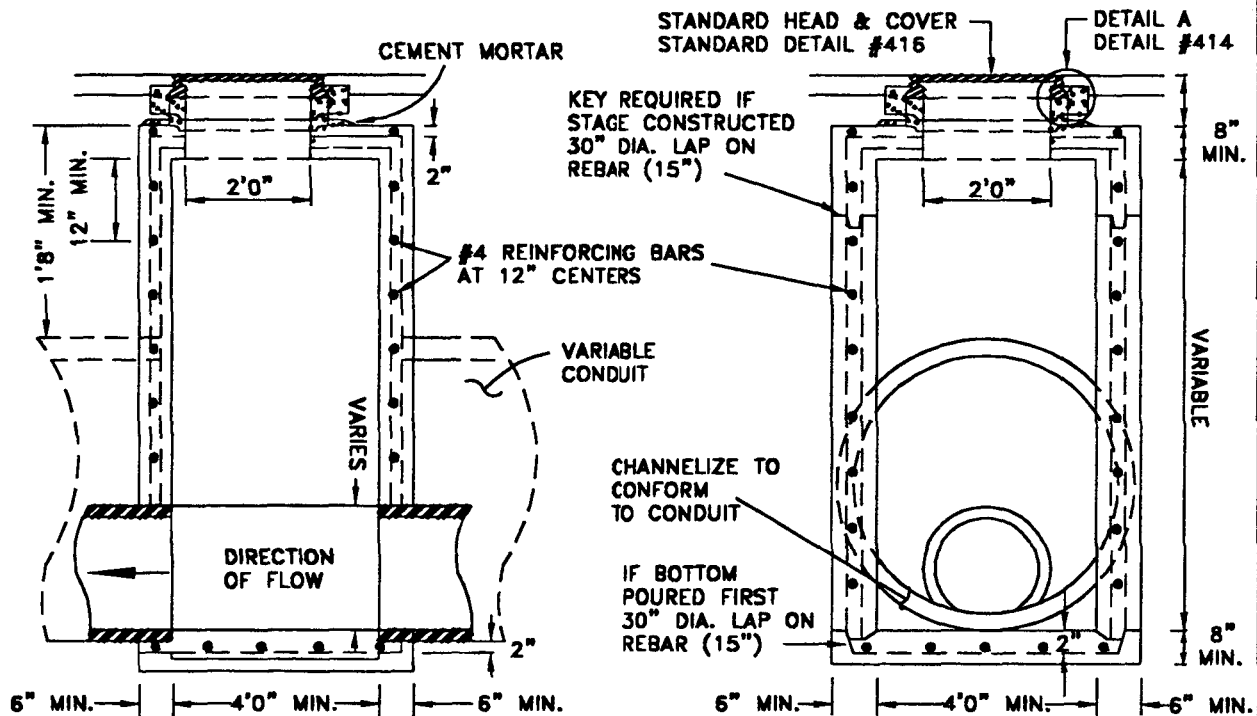
#4 REBAR AT 45 DEGREES
CENTERED IN SLAB



#4 REINFORCING BARS
AT 12" CENTERS, TOP
AND BOTTOM OF SLAB.

NOTES:

1. THIS INSTALLATION SHALL BE USED ON EXISTING MANHOLES ONLY WHERE THE DIFFERENCE IN ELEVATION BETWEEN THE TOP OF THE OUTLET PIPE AND THE INVERT OF THE FEEDER OR COLLECTOR SEWER EXCEEDS 24".
2. 12" MAX. FOR 8" PIPE, 24" MAX. FOR PIPES LESS THAN 8".
3. FLEXIBLE JOINT - BALL AND SPIGOT OR COULDER COUPLING. SOLVENT WELDED JOINT NOT PERMITTED.
4. ADJUST FRAME TO GRADE AFTER PAVING.
5. ALL PRECAST CONCRETE SHALL BE DESIGNED TO WITHSTAND H2O LOADING.
6. IN TRAFFIC AREAS CONCRETE SHALL BE MADE WITH 3000 PSI PCC HIGH-EARLY STRENGTH. BARRICADES SHALL BE REMOVED IN 24 HOURS.



ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: K.B.

DATE: 6-96

STORM DRAINS

JUNCTION BOX

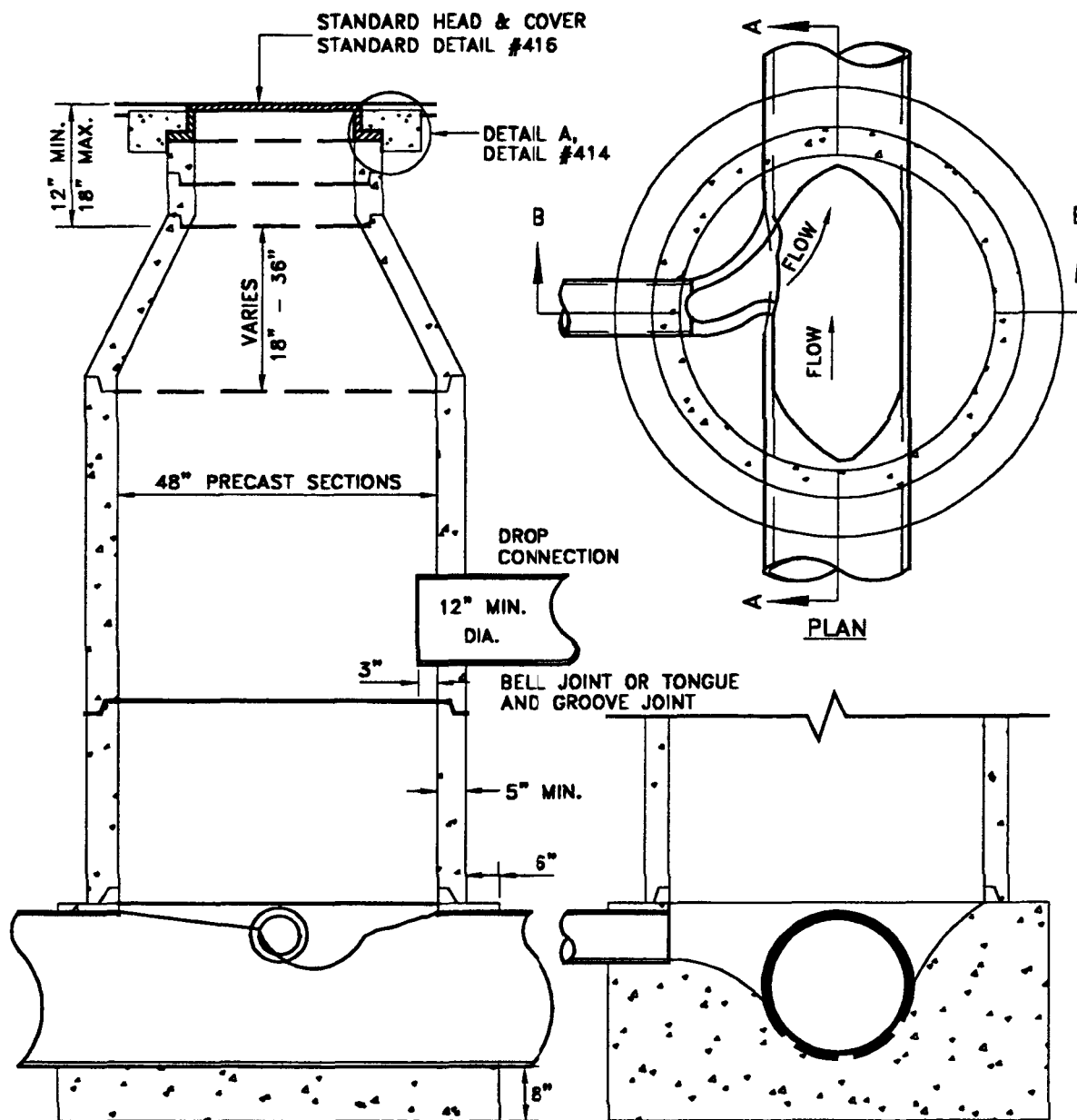
DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.

412



SECTION A-A

SECTION B-B

NOTES:

1. PIPE TO BE LAID THROUGH MANHOLE AND TOP PORTION REMOVED AFTER CONCRETE HAS SET.
2. MORTAR ALL JOINTS.
3. INCOMING SMALLER PIPES SHALL MATCH CROWNS OF THE LARGER PIPE.
4. ADJUST FRAME TO GRADE AFTER PAVING.
5. ALL PRECAST CONCRETE SHALL BE DESIGNED TO WITHSTAND H2O LOADING.
6. IN TRAFFIC AREAS CONCRETE COLLAR SHALL BE MADE WITH 3000 PSI PCC, HIGH-EARLY STRENGTH. BARRICADES TO BE REMOVED IN 24 HOURS.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: K.B. DATE: 6-96

REVISED BY: YAH DATE: 2-91

DRAWN BY: H.R. DATE: 3-75

STORM DRAINS

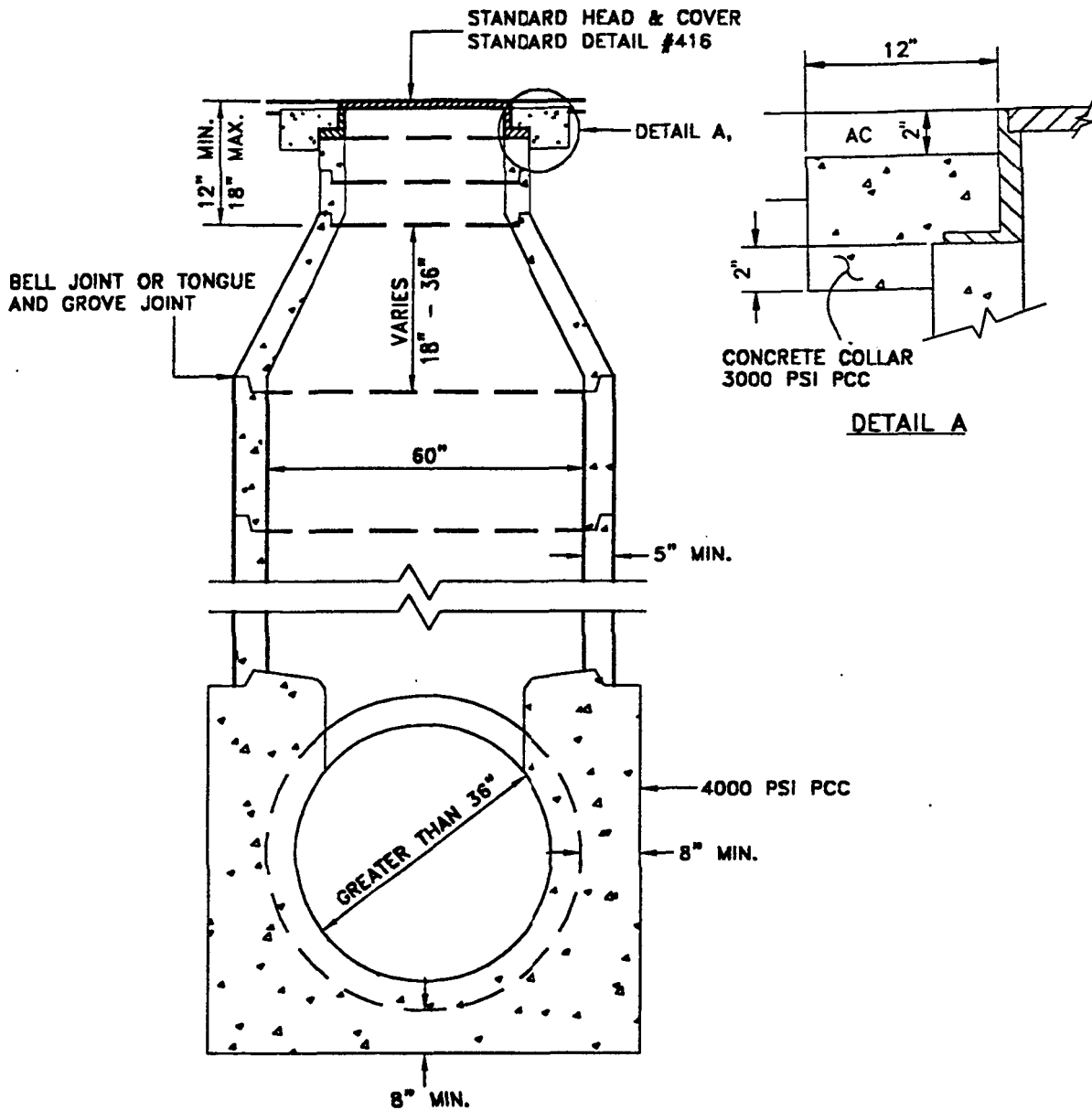
**LATERAL
MANHOLE**

**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

DETAIL NO.
413



NOTES:

1. PIPE TO BE LAID THROUGH MANHOLE AND TOP PORTION REMOVED AFTER CONCRETE HAS SET.
2. MORTAR ALL JOINTS.
3. INCOMING SMALLER PIPES SHALL MATCH CROWNS OF THE LARGER PIPE.
4. ADJUST FRAME TO GRADE AFTER PAVING.
5. ALL PRECAST CONCRETE SHALL BE DESIGNED TO WITHSTAND H₂O LOADING.
6. IN TRAFFIC AREAS, CONCRETE COLLAR SHALL BE MADE WITH 3000 P.S.I. PCC, HIGH-
EARLY STRENGTH. BARRICADES SHALL BE REMOVED IN 24 HOURS.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97
REVISED BY: K.B. DATE: 6-96

REVISED BY: VINCE YAH DATE: 1-91

DRAWN BY: FRE DATE: 3-75

STORM DRAINS

**"PRECAST TRUNK"
MANHOLE**

**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**

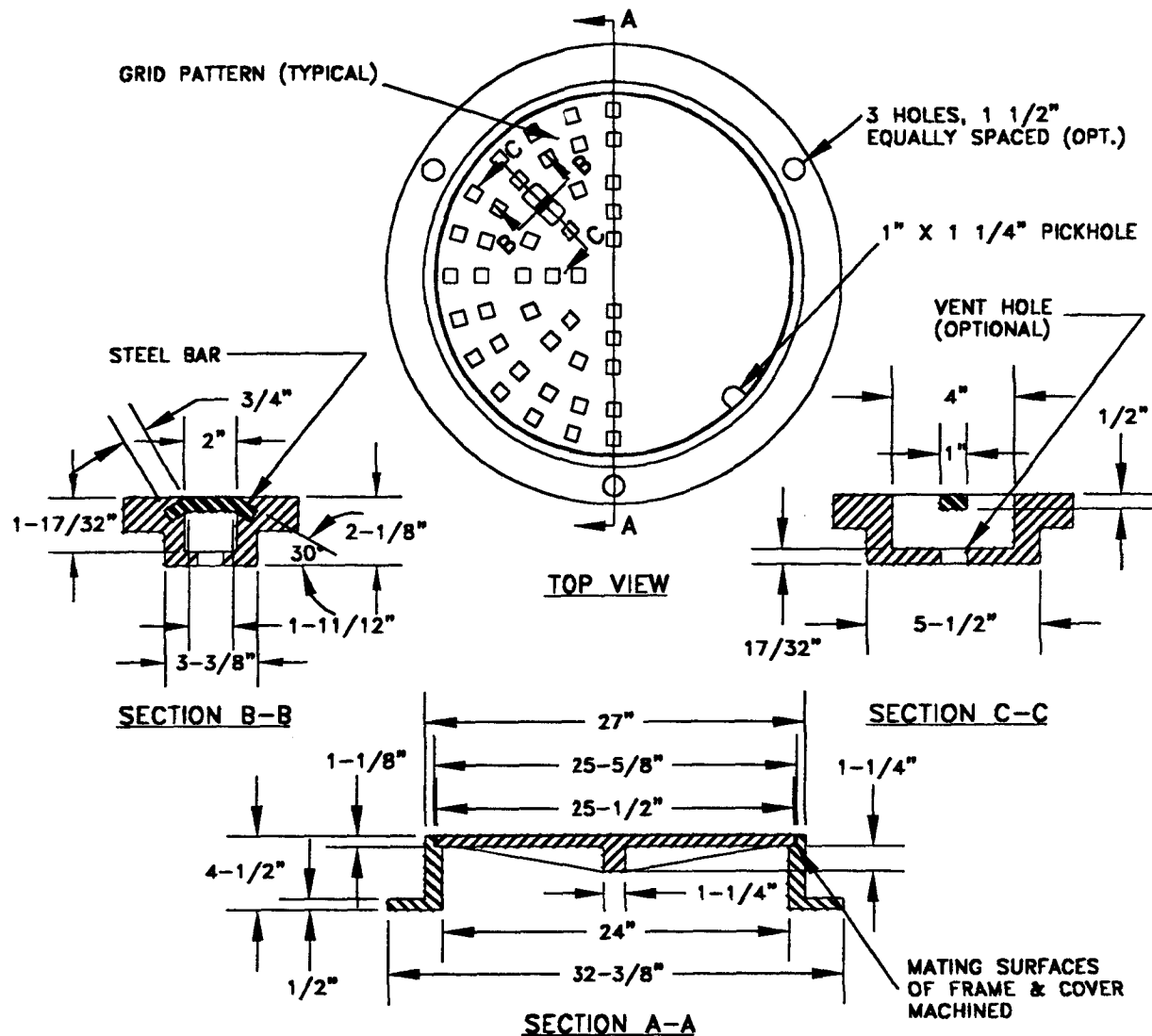


CITY of MODESTO

DETAIL NO.

414

ORIGINAL STAMPED AND SIGNED BY: VAN SWITZER R.E. 22055 EXP. DATE: 9-30-00	STORM DRAINS CAST-IN-PLACE TRUNK MANHOLE	 CITY of MODESTO
APPROVED BY CITY COUNCIL: 9-9-97	DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION	DETAIL NO. 415
REVISED BY: K.B. DATE: 6-96		
REVISED BY: VINCE YAH DATE: 1-91		
DRAWN BY: FRE DATE: 3-75		



NOTES:

1. DIMENSIONS FOR FRAME AND COVER SHALL MATCH. MATING SURFACES OF FRAME AND COVER SHALL BE MACHINED TO INSURE NO-ROCK FIT.
2. COVER SHALL HAVE VERTICAL SIDES. NO TAPERED COVERS SHALL BE INSTALLED.
3. WEIGHT OF COVER SHALL BE NO LESS THAN 130 POUNDS. WEIGHT OF FRAME SHALL BE NO LESS THAN 140 POUNDS.
4. SOUTH BAY FOUNDRY SBF A-624 W/624 COVER OR APPROVED EQUAL.
5. EACH MANHOLE COVER SHALL BE STAMPED "STORM DRAIN" AND "CITY OF MODESTO" WITH 1" TO 2" LETTERING.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: K.B. DATE: 6-96

REVISED BY: HOVIK DATE: 1-89

DRAWN BY: H.R. DATE: 2-96

STORM DRAINS

**MANHOLE COVER
AND FRAME**

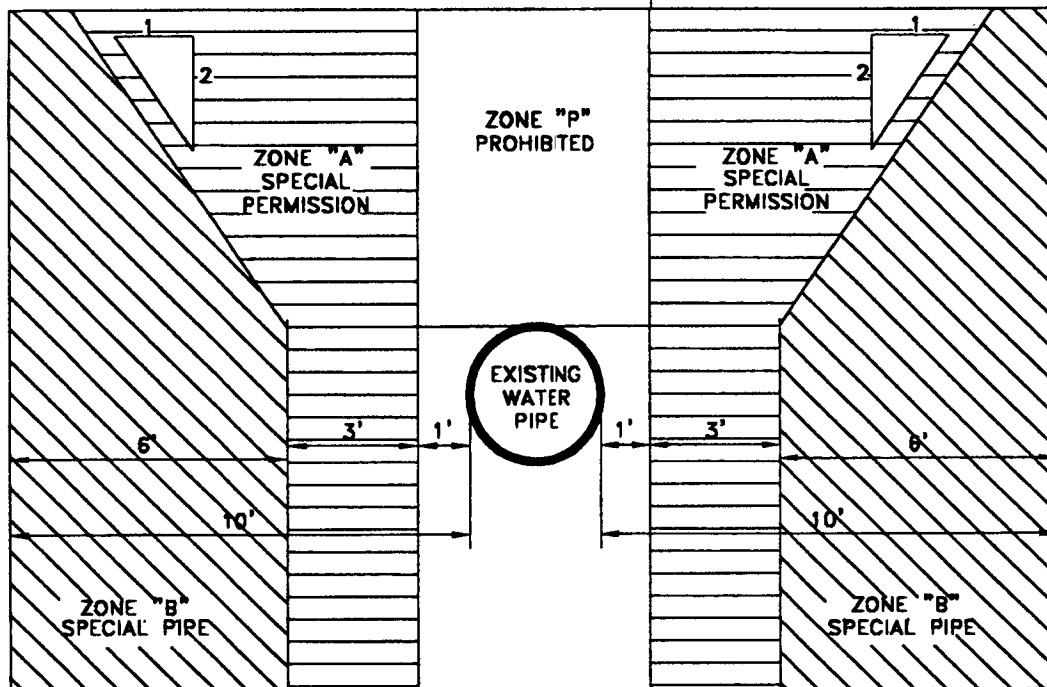
**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



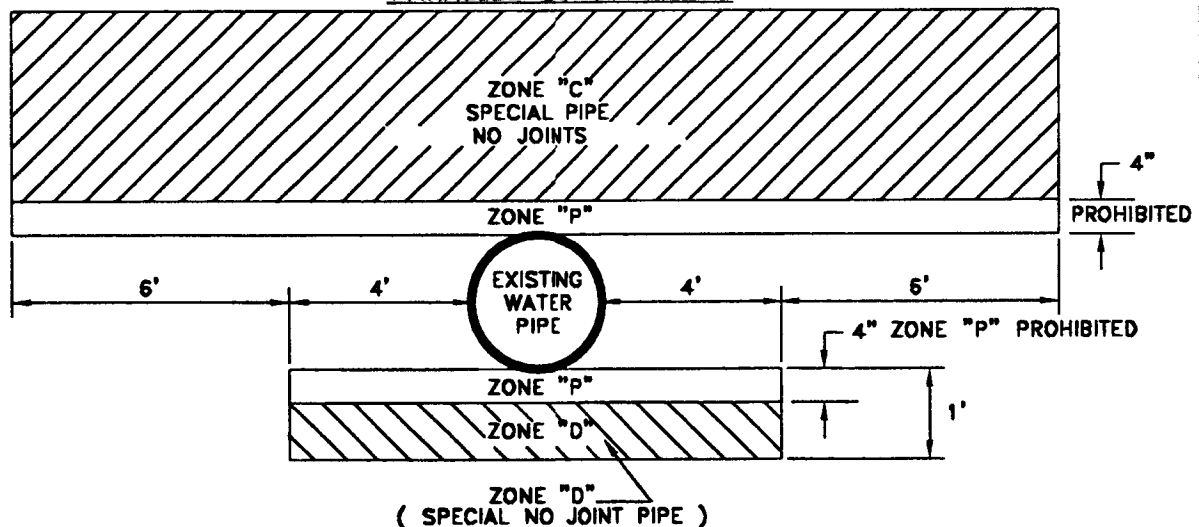
CITY of MODESTO

DETAIL NO.
416

SPECIAL CONSTRUCTION REQUIREMENTS
(TO BE USED ONLY WHERE REQUIRED SEPARATION CANNOT BE OBTAINED)
CASE 2-NEW WATER LINE BEING INSTALLED



PARALLEL CONSTRUCTION



PERPENDICULAR CONSTRUCTION

NOTES:

1. ZONE "P" IS PROHIBITED CONSTRUCTION ZONE.
2. ZONE "C", SPECIAL PIPE, SHALL BE PVC CLASS 200 PER AWWA C900 OR APPROVED EQUAL.

ORIGINAL STAMPED AND
 SIGNED BY: VAN SWITZER
 R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
 CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: K.B. DATE: 6-96

SEWERS

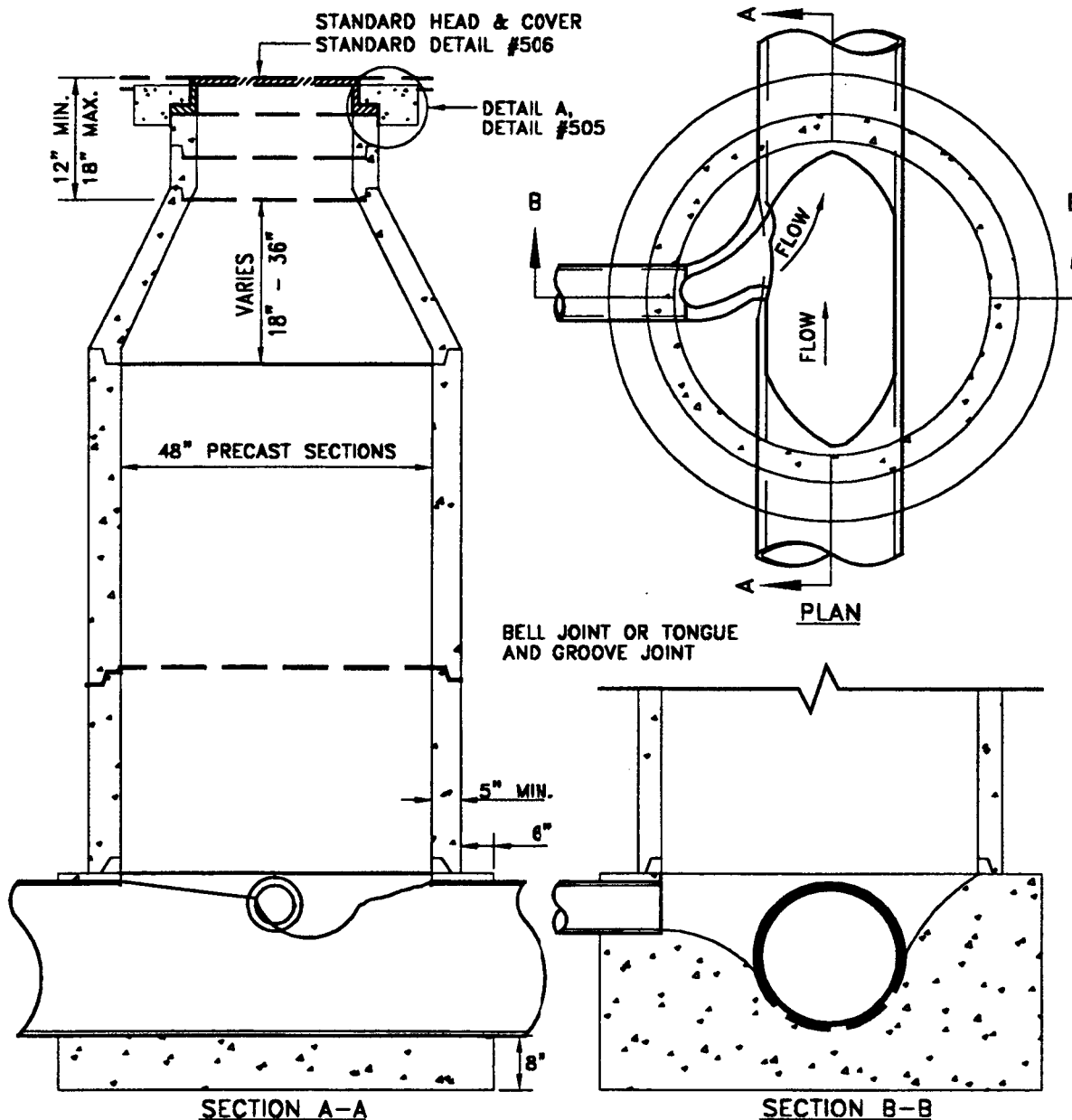
**CALIFORNIA HEALTH
 DEPARTMENT REQUIREMENTS**

**DEPARTMENT OF PUBLIC WORKS
 AND TRANSPORTATION**



CITY of MODESTO

DETAIL NO.
500



NOTES:

1. PIPE TO BE LAID THROUGH MANHOLE AND TOP PORTION REMOVED AFTER CONCRETE HAS SET.
2. MORTAR ALL JOINTS.
3. INCOMING SMALLER PIPES SHALL MATCH CROWNS OF THE LARGER PIPE.
4. A CHANGE IN DIRECTION OF FLOW IN A MANHOLE REQUIRES A .10' FALL (MIN.).
5. ADJUST FRAME TO GRADE AFTER PAVING.
6. ALL PRECAST CONCRETE SHALL BE DESIGNED TO WITHSTAND H2O LOADING.
7. IN TRAFFIC AREAS CONCRETE COLLAR SHALL BE MADE WITH 3000 PSI PCC, HIGH EARLY STRENGTH. BARRICADES SHALL BE REMOVED IN 24 HOURS.
8. MORE THAN A 2' DROP FOR AN INCOMING PIPE SHALL REQUIRE A DROP CONNECTION.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: K.B. DATE: 6-96

REVISED BY: DATE:

DRAWN BY: FRE

DATE: 01-75

SEWERS

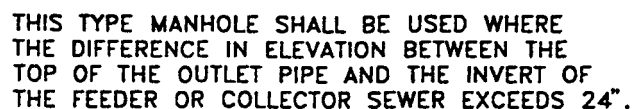
LATERAL, SUB TRUNK OR
SMALL TRUNK MANHOLE

DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.
501



PLAN



SECTION A-A

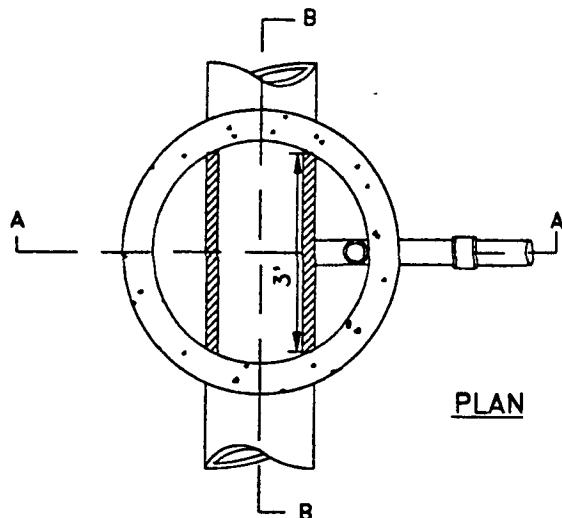
SECTION B-B

1. PIPE TO BE LAID THROUGH MANHOLE AND TOP PORTION REMOVED AFTER CONCRETE HAS SET.
2. MORTAR ALL JOINTS.
3. INCOMING SMALLER PIPES SHALL MATCH CROWNS FO THE LARGER PIPE.
4. A CHANGE IN DIRECTION OF FLOW IN A MANHOLE REQUIRES A .10' FALL (MIN.).
5. ADJUST FRAME TO GRADE AFTER PAVING.
6. ALL PRECAST CONCRETE SHALL BE DESIGNED TO WITHSTAND H2O LOADING.
7. IN TRAFFIC AREAS CONCRETE COLLAR SHALL BE MADE WITH 3000 PSI PCC, HIGH EARLY STRENGTH. BARRICADES SHALL BE REMOVED IN 24 HOURS.
8. MORE THAN A 2' DROP FOR AN INCOMING PIPE SHALL REQUIRE A DROP CONNECTION.
9. FLEXIBLE JOINT-BELL & SPIGOT OR ADJUSTABLE REPAIR COUPLING (ARC). SOLVENT WELDED NOT PERMITTED.
10. 12" MAX. FOR 8" OR LARGER PIPE. 24" MAX. FOR PIPES LESS THAN 8".

DATE:

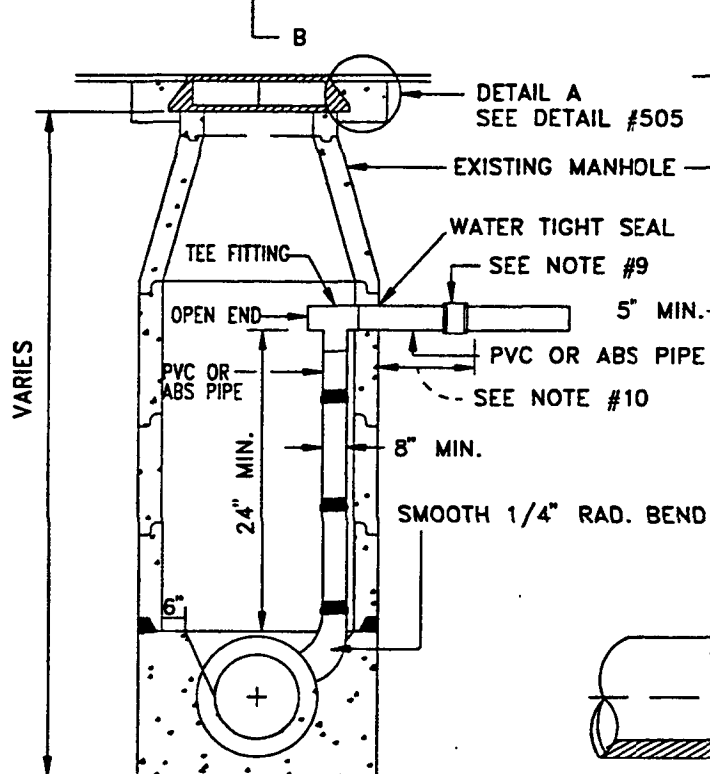
DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



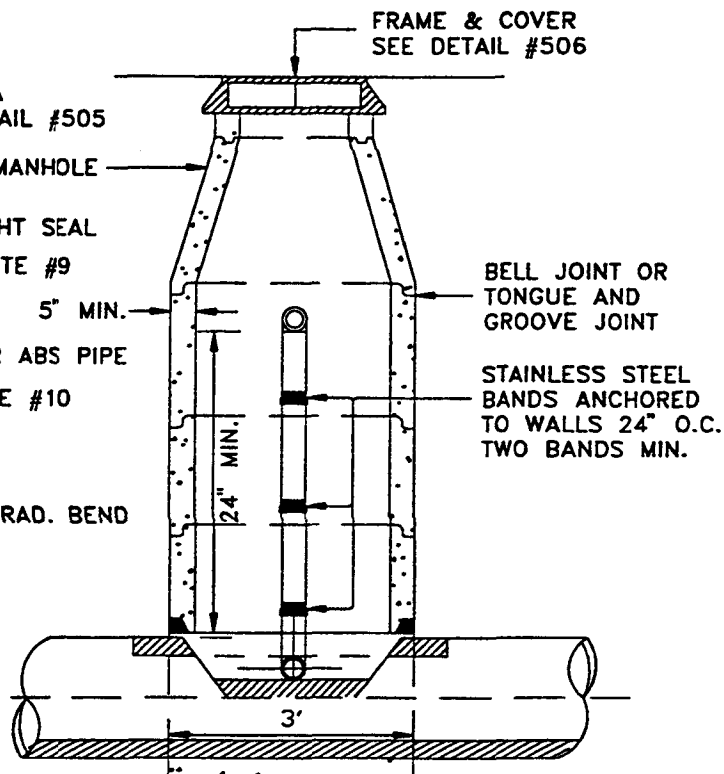


PLAN

THIS TYPE MANHOLE SHALL BE USED WHERE THE DIFFERENCE IN ELEVATION BETWEEN THE TOP OF THE OUTLET PIPE AND THE INVERT OF THE FEEDER OR COLLECTOR SEWER EXCEEDS 24".



SECTION A-A



SECTION B-B

NOTES:

1. PIPE TO BE LAID THROUGH MANHOLE AND TOP PORTION REMOVED AFTER CONCRETE HAS SET.
2. MORTAR ALL JOINTS.
3. INCOMING SMALLER PIPES SHALL MATCH CROWNS TO THE LARGER PIPE.
4. A CHANGE IN DIRECTION OF FLOW IN A MANHOLE REQUIRES A .10' FALL (MIN.).
5. ADJUST FRAME TO GRADE AFTER PAVING.
6. ALL PRECAST CONCRETE SHALL BE DESIGNED TO WITHSTAND H2O LOADING.
7. IN TRAFFIC AREAS CONCRETE COLLAR SHALL BE MADE WITH 3000 PSI PCC, HIGH EARLY STRENGTH. BARRICADES SHALL BE REMOVED IN 24 HOURS.
8. MORE THAN A 2' DROP FOR AN INCOMING PIPE SHALL REQUIRE A DROP CONNECTION.
9. FLEXIBLE JOINT-BELL & SPIGOT OR ADJUSTABLE REPAIR COUPLING (ARC). SOLVENT WELDED NOT PERMITTED.
10. 12" MAX. FOR 8" OR LARGER PIPE. 24" MAX. FOR PIPES LESS THAN 8".

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: H.R.

DATE:

SEWERS

SANITARY SEWER DROP
IN EXISTING MANHOLE

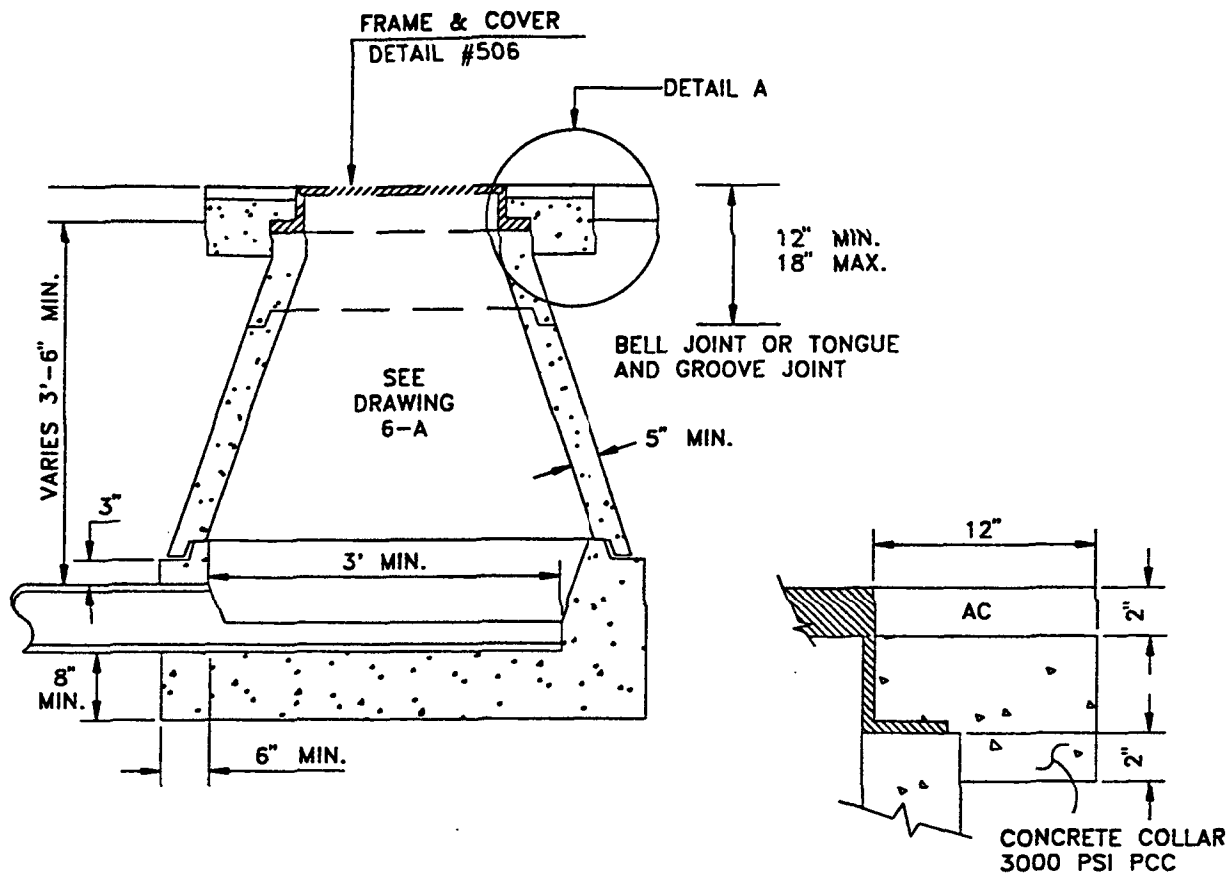
DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.

504



DETAIL A

NOTES:

1. PIPE TO LAID THROUGH MANHOLE AND TOP PORTION REMOVED AFTER CONCRETE HAS SET.
2. MORTAR ALL JOINTS.
3. INCOMING SMALLER PIPES SHALL MATCH CROWNS OF THE LARGER PIPE.
4. A CHANGE IN DIRECTION OF FLOW IN A MANHOLE REQUIRES A .10' FALL (MIN.).
5. ADJUST FRAME TO GRADE AFTER PAVING.
6. ALL PRECAST CONCRETE SHALL BE DESIGNED TO WITHSTAND H2O LOADING.
7. IN TRAFFIC AREAS CONCRETE COLLAR SHALL BE MADE WITH 3000 PSI PCC, HIGH EARLY STRENGTH. BARRICADES SHALL BE REMOVED IN 24 HOURS.
8. MORE THAN A 2' DROP FOR AN INCOMING PIPE SHALL REQUIRE A DROP CONNECTION.
9. FLEXIBLE JOINT-BELL & SPIGOT OR ADJUSTABLE REPAIR COUPLING. SOLVENT WELDED JOINT NOT PERMITTED.
10. 12" MAX. FOR 8" OR LARGER PIPE. 24" MAX. FOR PIPES LESS THAN 8".

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: YIA THAO DATE: 10-88

DRAWN BY: H.R.

DATE: 2-96

SEWERS

TERMINAL
MANHOLE

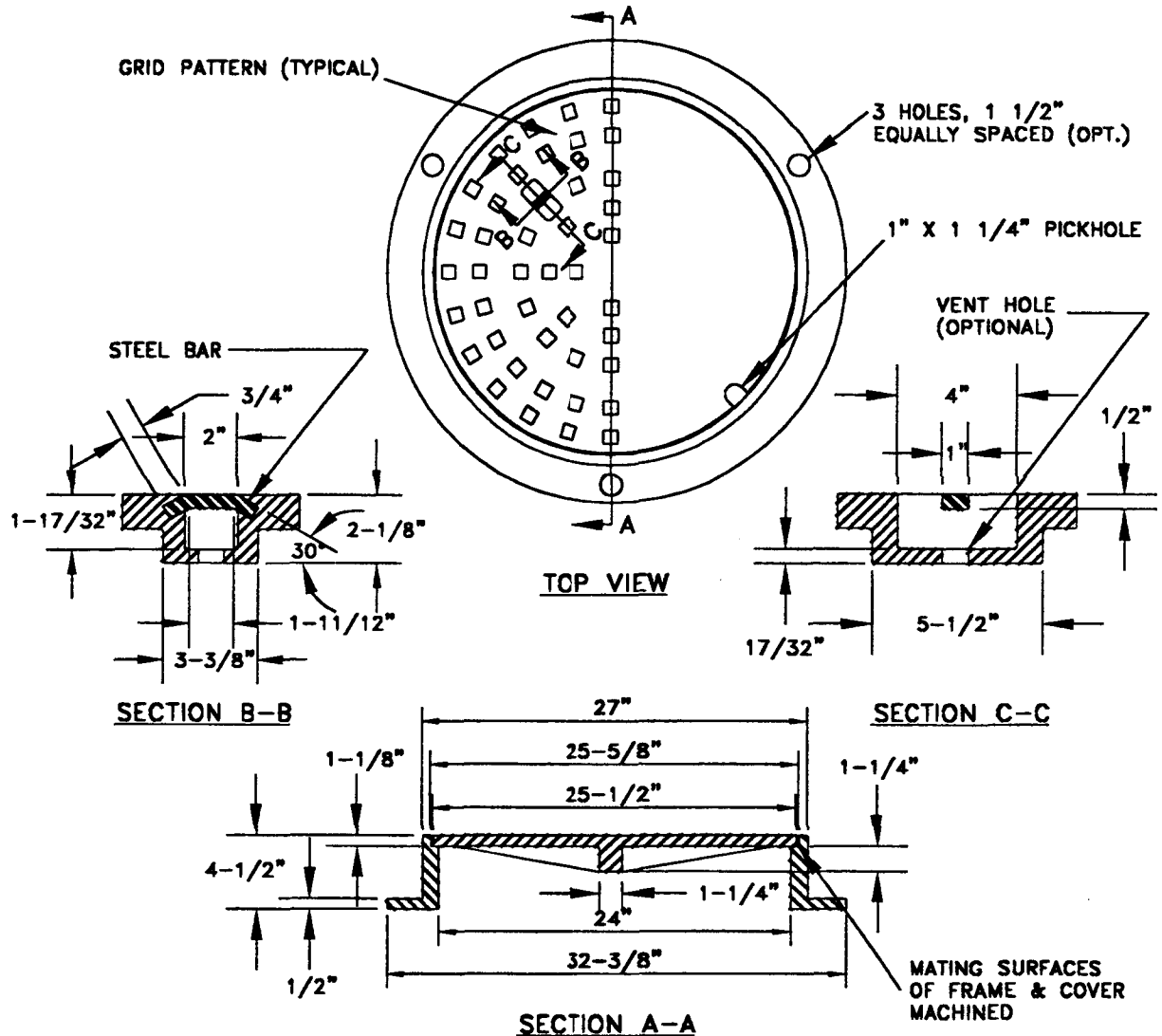
DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.

505



NOTES:

1. DIMENSIONS FOR FRAME AND COVER SHALL MATCH. MATING SURFACES OF FRAME AND COVER SHALL BE MACHINED TO INSURE NO-ROCK FIT.
2. COVER SHALL HAVE VERTICAL SIDES. NO TAPERED COVERS SHALL BE INSTALLED.
3. WEIGHT OF COVER SHALL BE NO LESS THAN 130 POUNDS. WEIGHT OF FRAME SHALL BE NO LESS THAN 140 POUNDS.
4. SOUTH BAY FOUNDRY SBF A-624 W/624 COVER OR APPROVED EQUAL.
5. EACH MANHOLE COVER SHALL BE STAMPED "SEWER" AND "CITY OF MODESTO" WITH 1" TO 2" LETTERING.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: K.B. DATE: 9-96

REVISED BY: DATE:

DRAWN BY: JOE WELLS DATE: 4-88

SEWERS

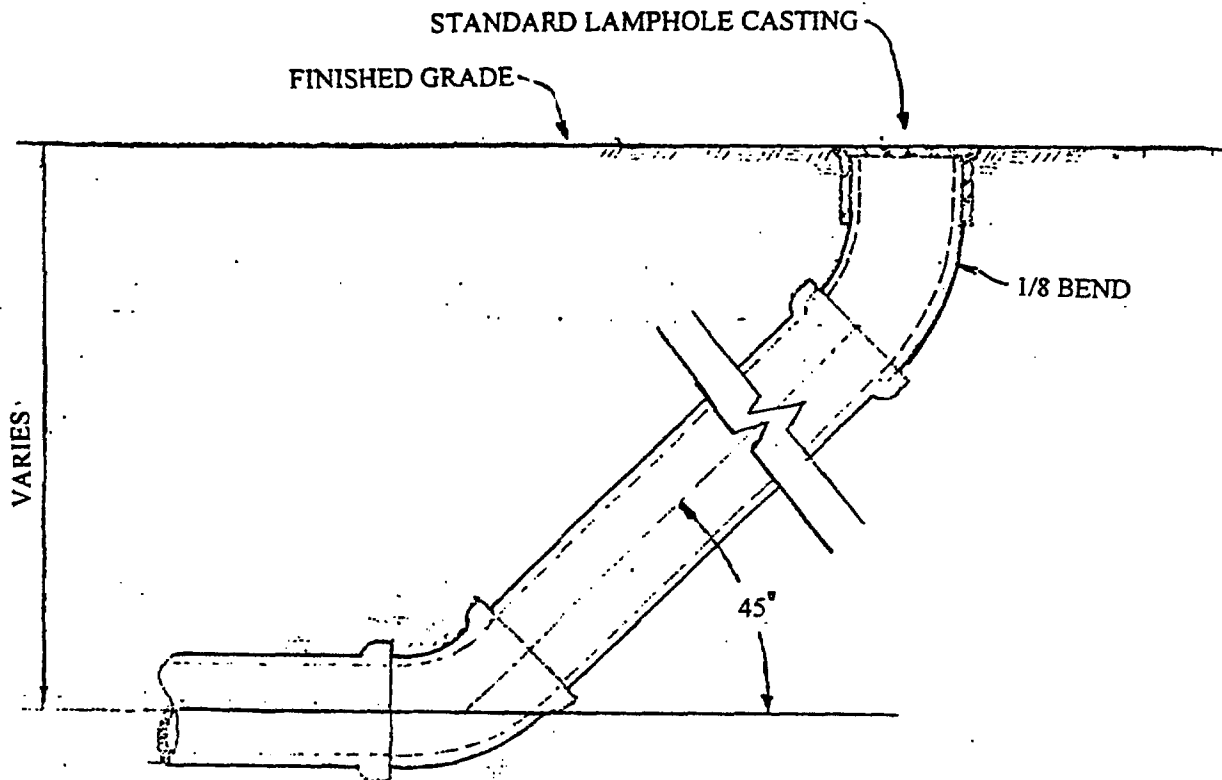
**MANHOLE COVER
AND FRAME**

**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

DETAIL NO.
506



STANDARD LAMPHOLE

NOTE:

1. USE OF A LAMPHOLE IS RESTRICTED TO PHASED DEVELOPMENT WHERE A MAXIMUM OF ONLY 200' AND/OR A MAXIMUM OF 3 SERVICES ARE ON THE LINE EXTENDING FROM THE LAST MANHOLE TO THE LAMPHOLE. WYES WILL NOT BE ACCEPTED.
2. LAMPHOLE CASTING SHALL BE CAST IRON.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: VINCE YAH DATE: 01-91

REVISED BY: r.o.c. DATE: 02-94

DRAWN BY: RS

DATE: 08-74

SEWERS

TEMPORARY
LAMPHOLE

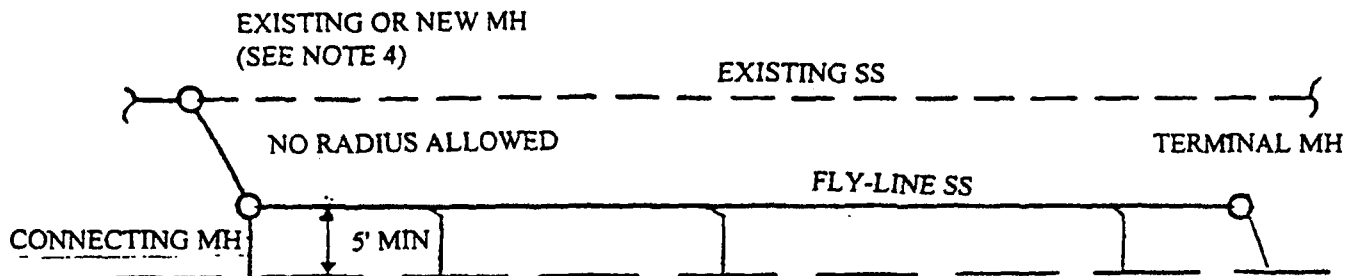
DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.

507



PLAN VIEW

NOTES:

1. Fly-line pipe radii shall be no smaller than 250'.
2. Fly-lines to be constructed parallel to centerline of a road or parallel to the existing trunk line.
3. Contractor shall construct a minimum of two manholes per fly-line, terminal manhole and connecting manhole adjacent to the existing line. No radius may be installed between the connecting manhole and existing manhole.
4. No cleanouts or lamp holes will be accepted on a fly-line in a public ROW or easement.
5. Contractor shall construct a drop connection when the fly-lines inletting sewage exceeds a 2' drop. See Detail 504.
6. Fly-line to be constructed in the ROW no closer than 5' from the lip of gutter.
7. Fly-line to have a minimum separation of 5', measured outside bell to outside bell, from any other parallel utility line except water. A 10' separation between parallel sewer and water lines is required.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: DATE:

SEWERS

**SEWER FLY-LINE
CONSTRUCTION**

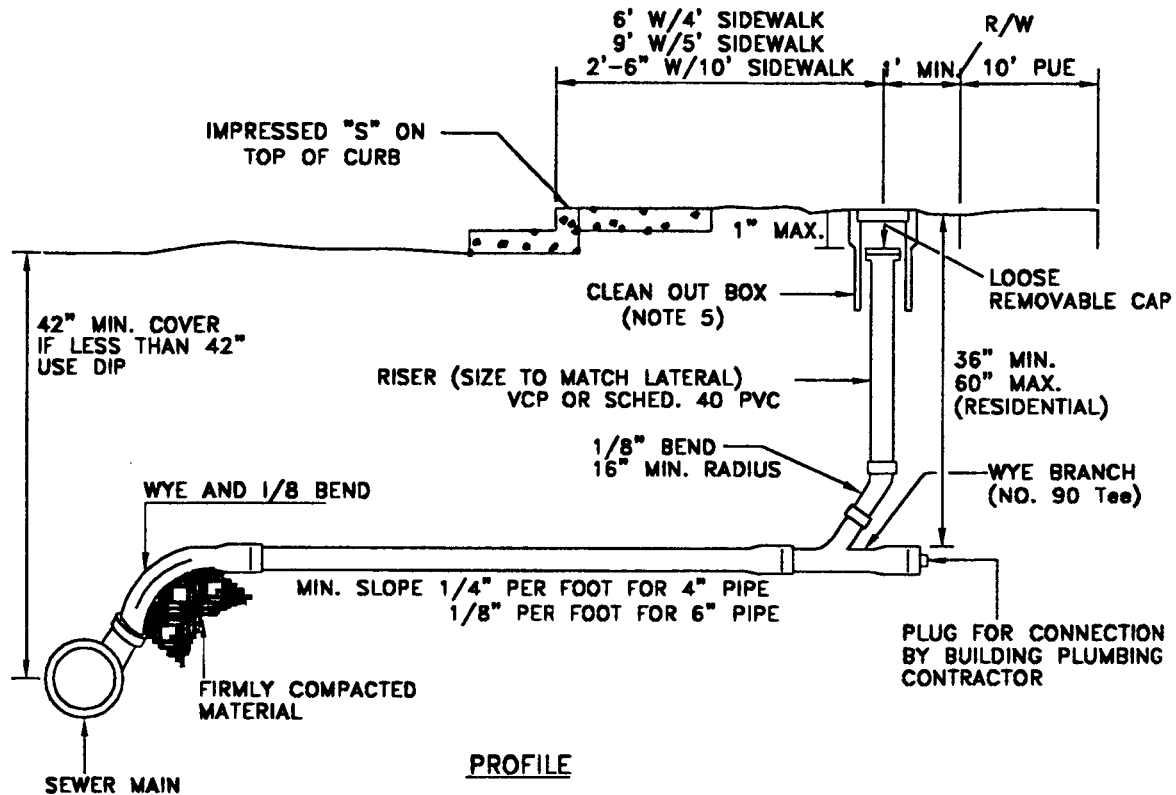
**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

DRAWING NO.

508



PROFILE

NOTES:

1. NO CLEANOUTS SHALL BE LOCATED IN DRIVEWAYS.
2. IF THE SIDEWALK IS SEPARATE FROM THE CURB, THE CLEANOUT RISER SHALL BE INSTALLED IN THE APPROXIMATE CENTER OF THE PLANTING STRIP.
3. HOUSE CONNECTION SHALL BE MADE UNDER THE SUPERVISION OF THE CITY INSPECTOR.
4. SEWER LATERAL SHALL BE CONSTRUCTED WITH A STRAIGHT GRADE AND ALIGNMENT FROM THE MAIN TO THE PROPERTY LINE UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER.
5. CLEANOUT BOX SHALL BE A CHRISTY FB, OR APPROVED EQUAL, WITH CAST IRON COVER MARKED "C.O."
6. PIPE SLOPE MAY BE INCREASED TO ACCOMMODATE DEEP SEWERS AND PROVIDE A MINIMUM 36" COVER AT RIGHT OF WAY.
7. SEWER LATERAL SHALL BE EXTRA STRENGTH VCP WITH COMPRESSION JOINTS.
8. PROPERTY OWNER WILL BE RESPONSIBLE FOR MAINTAINING THE LATERAL FROM THE CONNECTION AT THE MAIN TO THE HOUSE.
9. LATERAL SHALL BE INSPECTED BY CITY TV; INSPECTION REQUEST WITH 24 HOUR NOTICE.
10. THE HOUSE LATERAL MAY BE PLACED UNDER EXISTING CURB AND SIDEWALK BY DRILLING 8" (MAX. DIA.) TUNNEL AND PLACING PIPE WITH NEOPRENE BANDED JOINTS.
11. TO MARK THE SERVICE LOCATION TO A PROPERTY, AN IMPRESSED "S" SHALL BE STAMPED IN WET CONCRETE OR CHISELED IN EXISTING CONCRETE.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: K.B.

DATE: 6-96

SEWERS

**SEWER
SERVICE**

**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

DETAIL NO.
509

BUILDING SERVICE

SEWER LATERAL
OR SUB TRUNK

PLAN

PLUG

BUILDING SERVICE

BACK FILL &
COMPACT AS SHOWN
ON DETAILS
#800 TO #803

SEWER LATERAL
OR SUB TRUNK

SECTION

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: K.B. DATE: 6-96

REVISED BY: DATE:

DRAWN BY: RS

DATE: 8-74

SEWERS

**SERVICE
RISER**

**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**

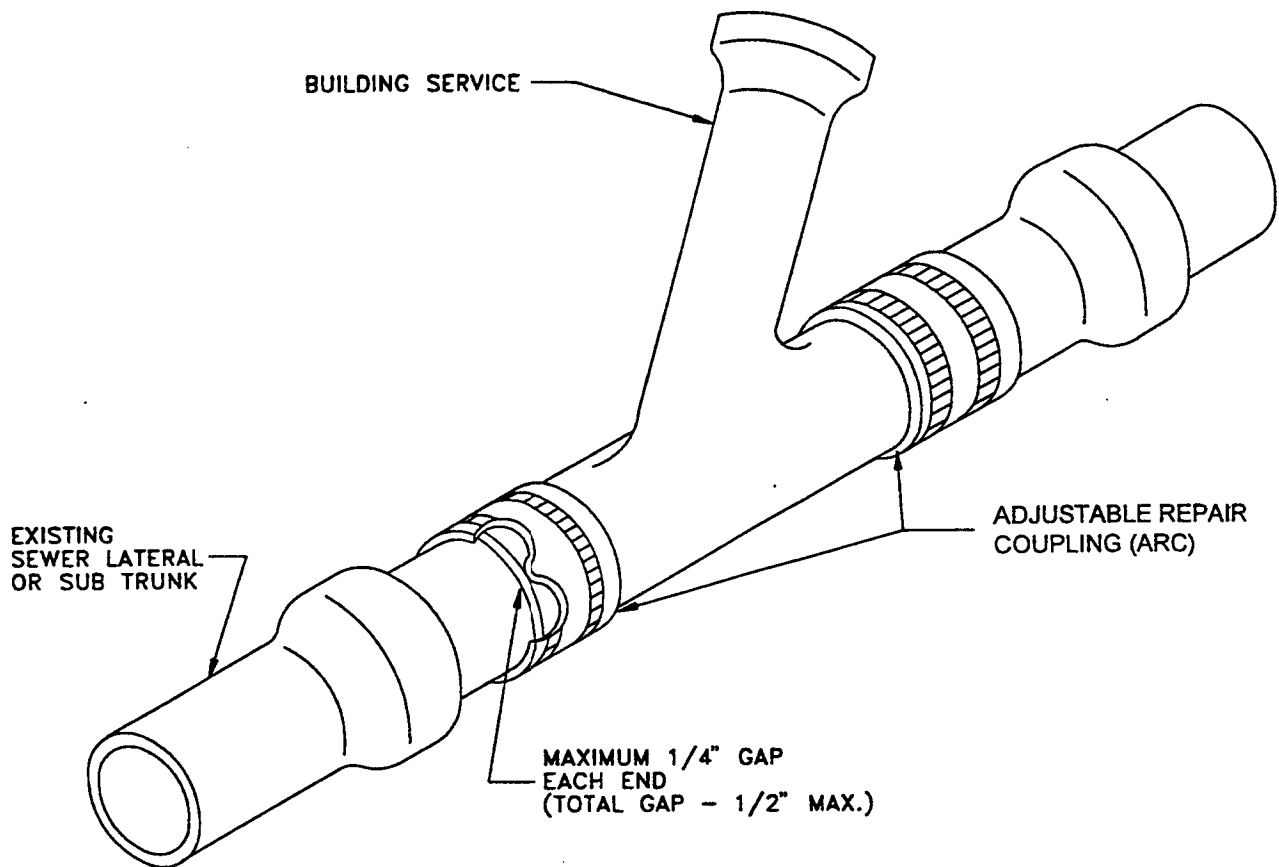


CITY of MODESTO

DETAIL NO.

511

NOTE: TEES AND WYES INSTALLED IN MAINS UNDER CONSTRUCTION SHALL BE INSTALLED CONCURRENTLY WITH THE MAIN. ALL FITTINGS, INCLUDING THE JOINTS, SHALL BE OF THE SAME TYPE AND MATERIAL AS THE MAIN. CUT-IN TEES AND WYES WILL NOT BE PERMITTED ON A MAIN UNDER CONSTRUCTION.



NOTES:

1. CUTS ARE TO BE MADE WITH A PIPE CUTTING TOOL.
2. THERE SHALL BE NO MORE THAN TWO BANDS IN FIVE FEET OF LATERAL OR SUB TRUNK RUN.
3. SHEAR RINGS OF A TYPE APPROVED BY THE ENGINEER SHALL BE INSTALLED ON ALL JOINTS.
4. CUT-IN TEE SHALL BE USED FOR SEWER MAINS 5' OR DEEPER .

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: VINCE YAH DATE: 01-91

REVISED BY: r.a.c. DATE: 02-94

DRAWN BY: RS

DATE: 08-74

SEWERS

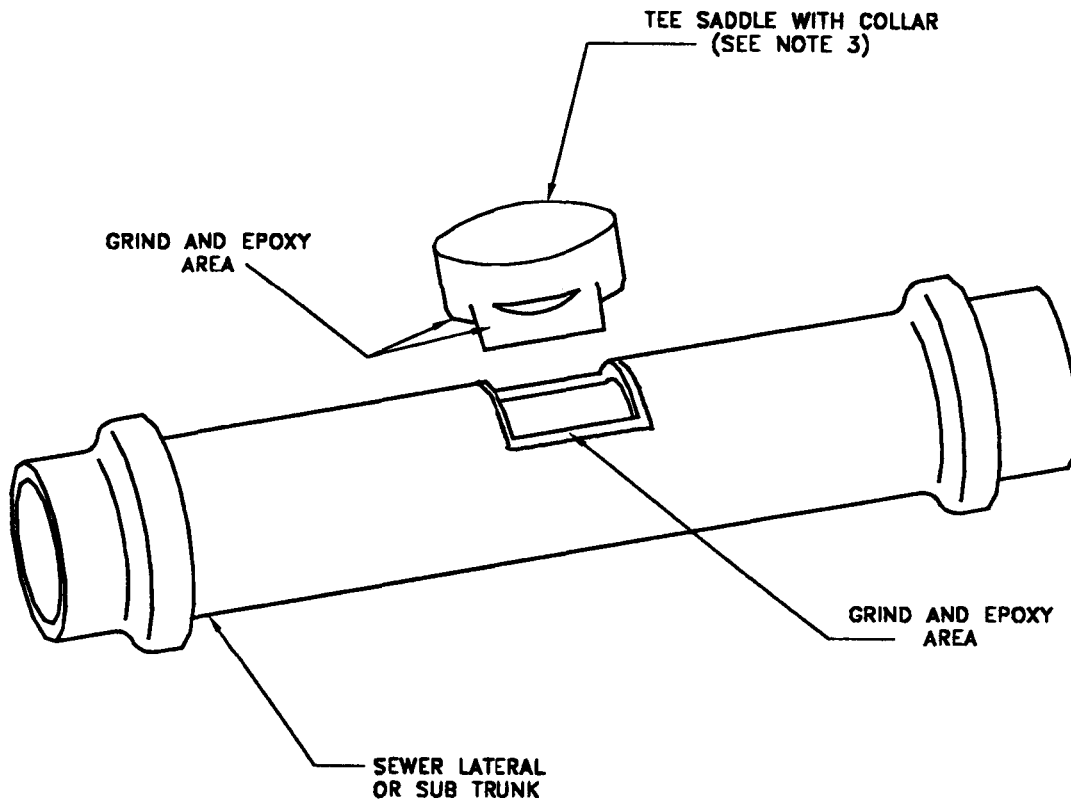
CUT-IN
SERVICE

DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.
512



NOTES:

1. THE ENGINEER SHALL BE PRESENT DURING INSTALLATION.
2. PIPE SHALL BE CUT IN SUCH A WAY AS TO ELIMINATE DAMAGE TO THE EXISTING MAIN.
3. WYE SADDLE WITH COLLAR MAY BE USED ON SEWER MAINS LESS THAN 5' DEEP.
4. A SYNTHETIC RUBBER WEDGED INSERTED TEE, "TAP-TITE", MAY BE SUBSTITUTED FOR THE ABOVE PROCEDURE.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: K.B. DATE: 6-96

REVISED BY: r.o.c. DATE: 2-94

DRAWN BY: LCB

DATE: 2-80

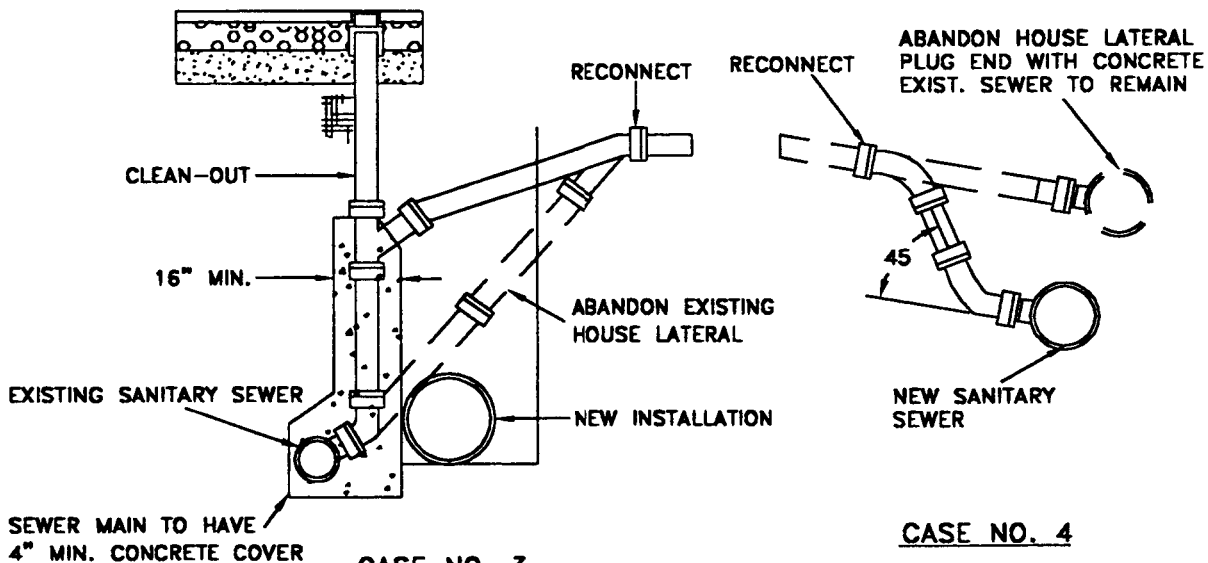
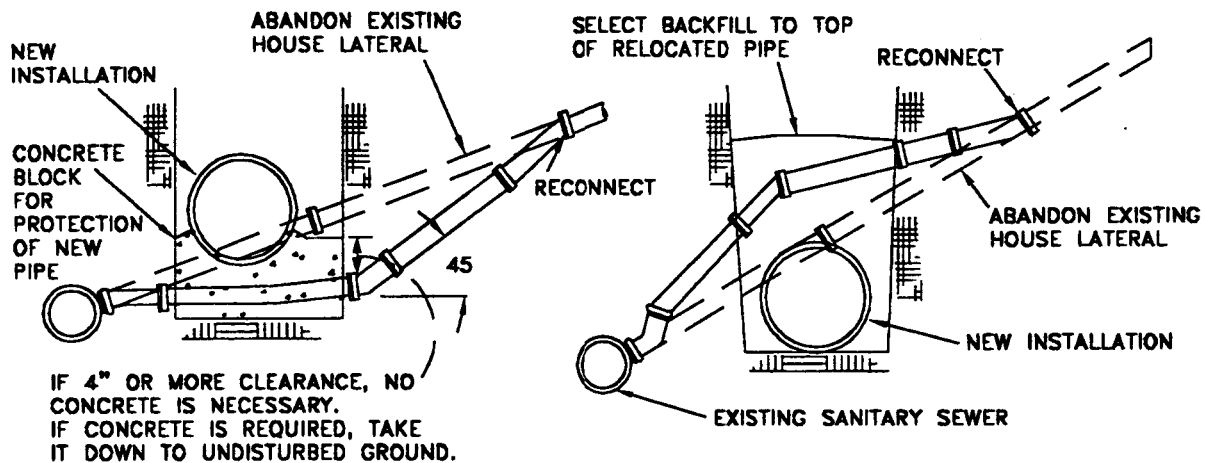
SEWERS
SADDLE
INSTALLATION

**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

DETAIL NO.
513



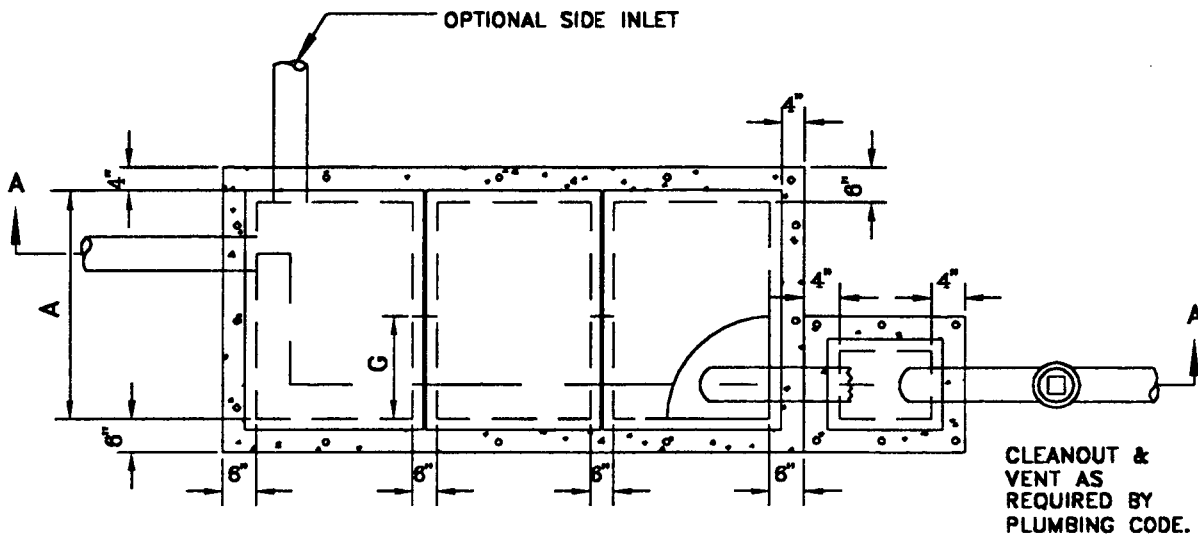
NOTES:

1. ALL HOUSE LATERALS SHALL BE THICKNESS CLASS 22 CAST IRON PIPE WITH FLEXIBLE WATERTIGHT JOINTS.
2. THE MINIMUM SLOPE FOR HOUSE LATERALS SHALL BE 1/4" PER FOOT.
3. A 6" SADDLE MAY BE USED WHERE NECESSARY AND SHALL BE CONNECTED TO THE PIPE CONSTITUTING THE EXISTING "Y" OR "T" OR TO THE NEXT LOWER PIPE LENGTH.
4. Y'S MAY BE LAID "FLAT" UPON SPECIAL APPROVAL FROM THE CITY ENGINEER. CASE NO. 3 SHALL BE USED ONLY WHEN CASE NO. 1 HAS LESS THAN REQUIRED SLOPE.
5. ALL MATERIALS SHALL BE AS DESIGNATED OR APPROVED EQUAL.

ORIGINAL STAMPED AND SIGNED BY: VAN SWITZER	
R.E. 22055	EXP. DATE: 9-30-00
APPROVED BY CITY COUNCIL: 9-9-97	
REVISED BY:	DATE:
REVISED BY:	DATE:
DRAWN BY: H.R.	DATE: 2-96

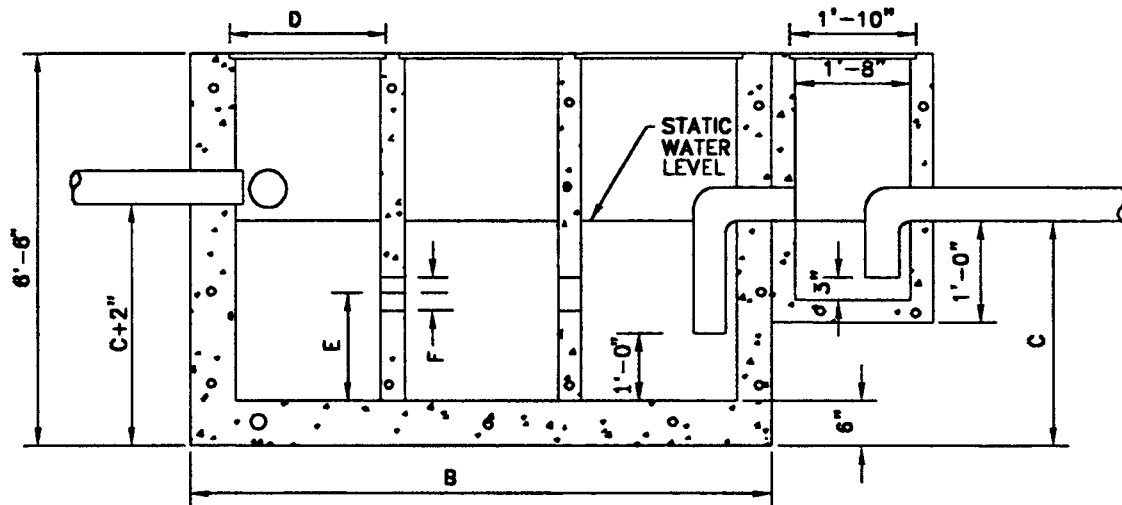
SEWERS
EXISTING HOUSE LATERAL RELOCATION
DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION


CITY of MODESTO
DETAIL NO. 514



PLAN

TRAFFIC LIDS TO BE INSTALLED
IN TRAFFIC AREAS



SECTION A-A

CAPACITY GALLONS	DIMENSIONS							COVER SIZE	METAL COVERS	PIPE SIZE
	A	B	C	D	E	F	G			
510	3'-0"	9'-6"	3'-0"	2'-6"	1'-6"	4 1/2"	1'-6"	2'-10"X3'-4"	1/4" STEEL PLATE	4"
866	3'-5"	10'-3"	4'-0"	2'-5"	2'-0"	0'-6"	1'-9"	3'-10"X3'-10"	3/8" ALUMINUM PLATE	4"
1260	4'-0"	12'-6"	4'-0"	3'-6"	2'-0"	0'-6"	2'-0"	3'-10"X4'-4"	3/8" ALUMINUM PLATE	4"

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: H.R.

DATE: 3-96

SEWERS

SAND & GREASE INTERCEPTOR

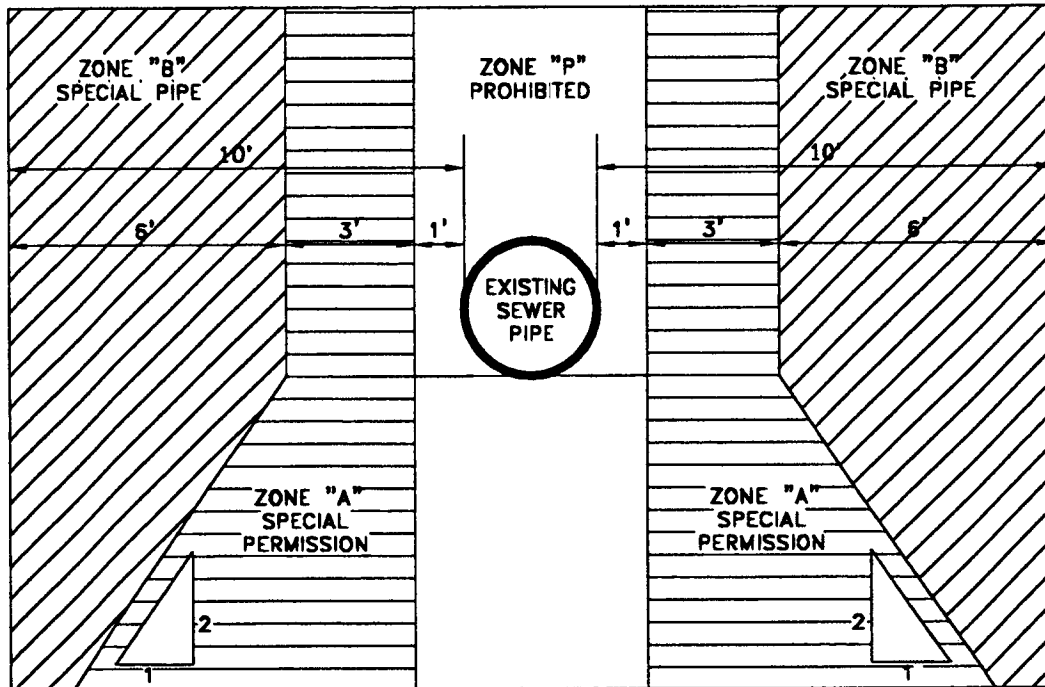
DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



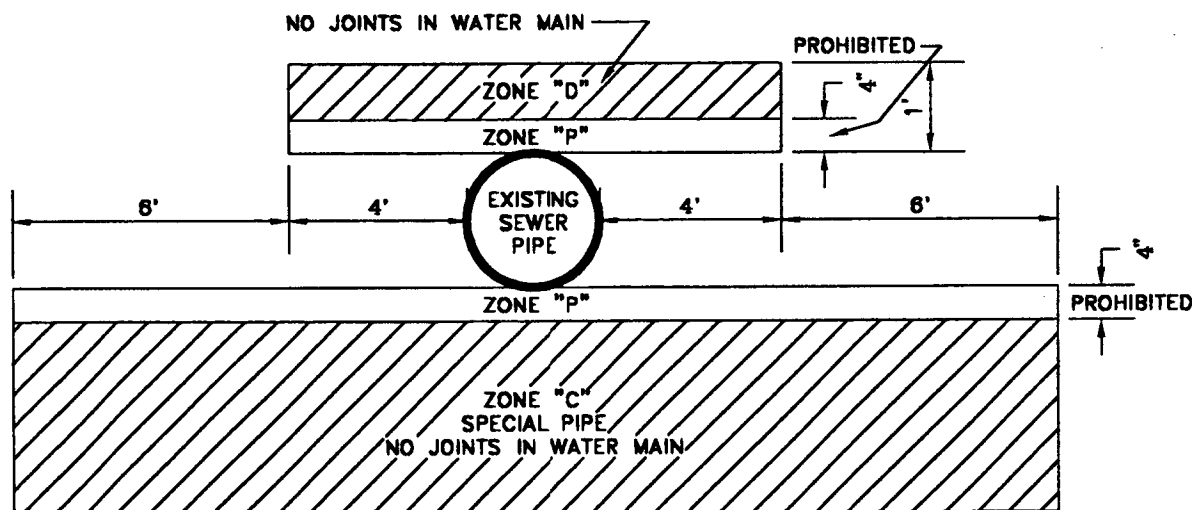
CITY of MODESTO

DETAIL NO.
515

SPECIAL CONSTRUCTION REQUIREMENTS
(TO BE USED ONLY WHERE REQUIRED SEPARATION CANNOT BE OBTAINED)
CASE 2-NEW WATER LINE BEING INSTALLED



PARALLEL CONSTRUCTION



PERPENDICULAR CONSTRUCTION

NOTES:

1. ZONE "P" IS PROHIBITED CONSTRUCTION ZONE.
2. ZONE "C", SPECIAL PIPE, SHALL BE PVC CLASS 200 PER AWWA C900 OR APPROVED EQUAL.

ORIGINAL STAMPED AND
 SIGNED BY: VAN SWITZER
 R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
 CITY COUNCIL: 9-9-97

REVISED BY: K.B. DATE: 6-96

REVISED BY: DATE:

DRAWN BY: L. CORONA DATE: 9-95

WATER

**CALIFORNIA HEALTH
 DEPARTMENT REQUIREMENTS**

**DEPARTMENT OF PUBLIC WORKS
 AND TRANSPORTATION**



CITY of MODESTO

DETAIL NO.
600

NOTE:

FIRE HYDRANT LOCATION ADJUSTED
TO DRIVEWAYS SHALL BE 10'
OUTSIDE OF RIGHT-OF-WAY.

2 1/2" HOSE CONNECTION

4 1/2" STEAMER CONNECTION

45°±5°

RUN OF STREET

PROPERTY LINE

1'

SIDEWALK - ADJACENT TO CURB

CURB

STREET

PROPERTY LINE

2'

SIDEWALK - FULL WIDTH
OR ADJACENT TO
PROPERTY LINE.

CURB

STREET

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: K.B. DATE: 6-96

REVISED BY: HOVIK DATE: 11-89

DRAWN BY: BS

DATE: 2-75

WATER

**FIRE HYDRANT
LOCATION**

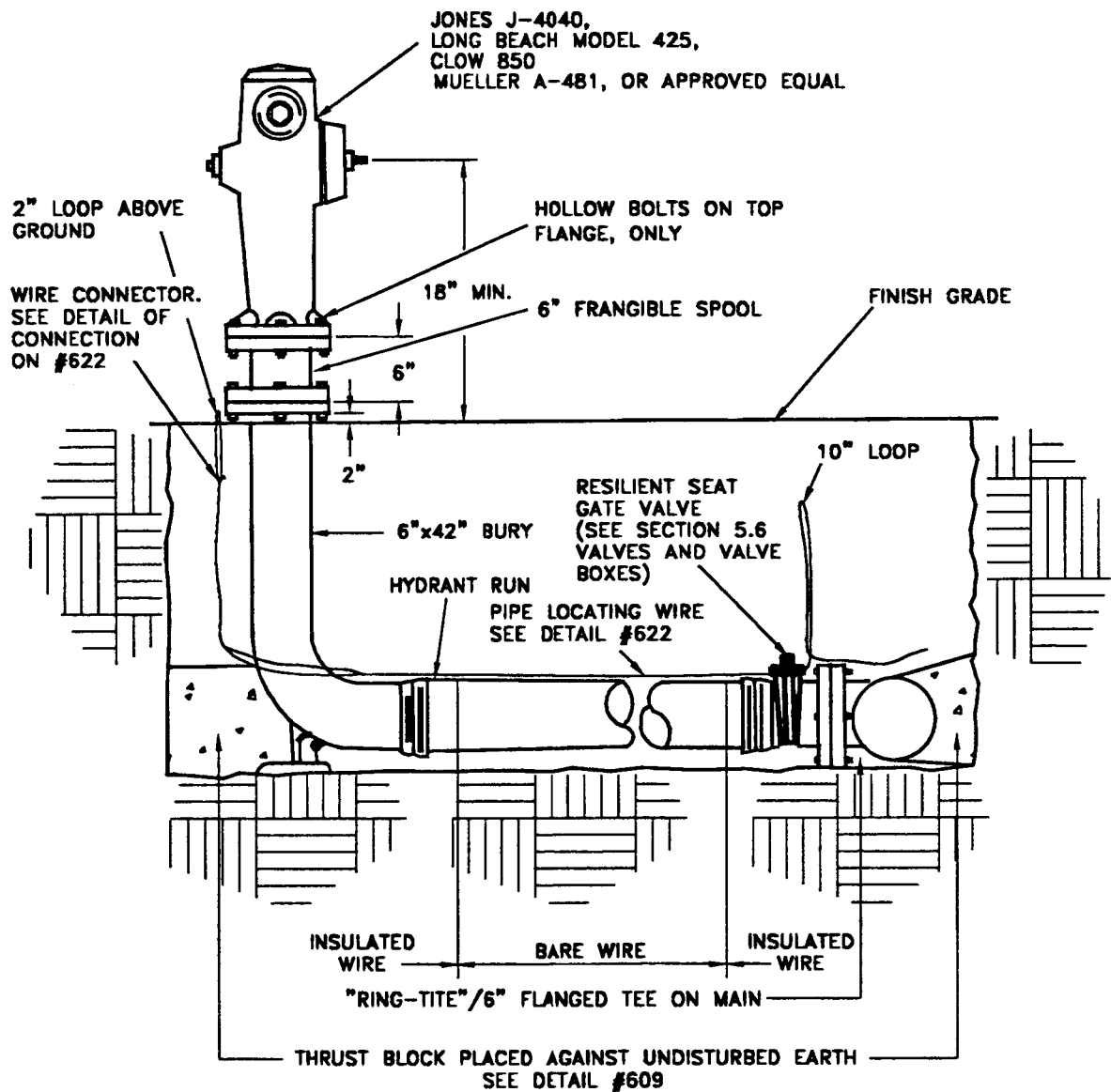
**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

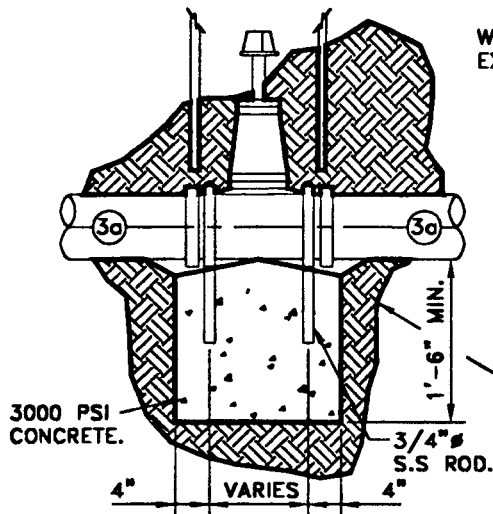
DETAIL NO.

605

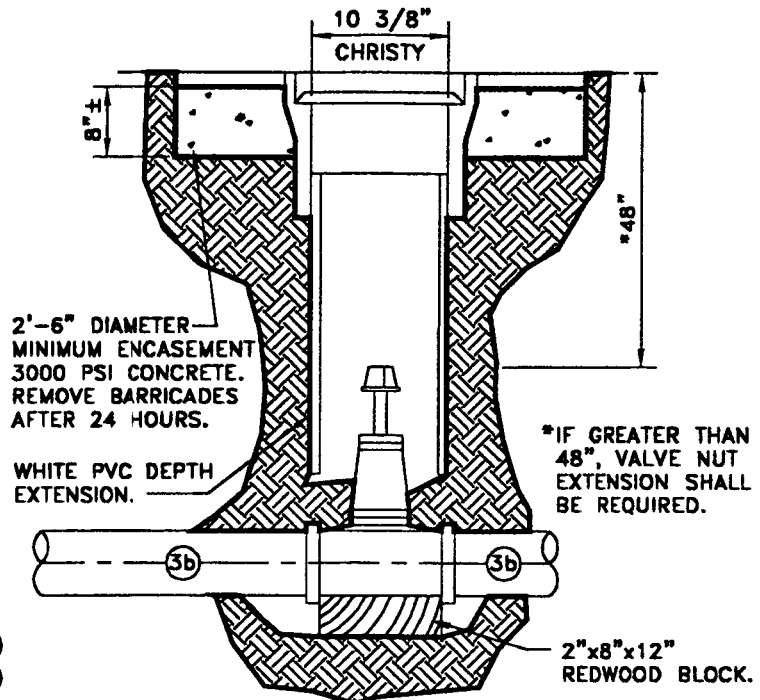


SECTION

ORIGINAL STAMPED AND SIGNED BY: VAN SWITZER R.E. 22055 EXP. DATE: 9-30-00		WATER FIRE HYDRANT INSTALLATION	 CITY of MODESTO
APPROVED BY CITY COUNCIL: 9-9-97			
REVISED BY: K.B. DATE: 6-96			
REVISED BY: VANCE YAH DATE: 1-91			
DRAWN BY: LCB	DATE: 3-80	DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION	DETAIL NO. 606



TYPICAL SECTION GREATER THAN 12" VALVE



TYPICAL SECTION 12" VALVE AND SMALLER

AREA BEARING AGAINST UNDISTURBED EARTH SHALL BE A MIN. OF 9' SQUARE.

NOTES:

1. VALVE BOX AND COVER SHALL BE CHRISTY CONCRETE PRODUCTS NO. G-5 OR EQUAL WITH DEPTH EXTENSIONS AS REQUIRED.
2. ALL VALVES SHALL HAVE FLANGED CONNECTIONS AT ALL TEES AND CROSSES.
3. ALL VALVES SHALL BE SEPARATED FROM COLLARS AS NOTED:
 - A. 6'6" (1/2 SECTION)
 - B. 3'3" (1/4 SECTION)
4. VALVE SHALL BE RESILIENT SEAT GATE (12" OR LESS) OR BUTTERFLY (GREATER THAN 12") PER CITY SPECIFICATION.
5. CLEAN INSIDE OF EXTENSIONS SO STEM IS CLEAN OF DIRT.
6. SET VALVE BOX TO FINISH GRADE.
7. COMPACT EARTH AROUND BASE WITH MECHANICAL TAMPER TO 95% RELATIVE COMPACTION AND ENCASE IN 8" OF CONCRETE.
8. AFTER CONCRETE SETS, PATCH WITH 2" AC.
9. VALVE BOXES IN DIRT OR UNDEVELOPED AREAS SHALL HAVE CONCRETE ENCASEMENT POURED TO GRADE (NO 2" AC).

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: K.B. DATE: 6-96

REVISED BY: r.a.c. DATE: 2-94

DRAWN BY: SM

DATE: 2-75

WATER

**VALVE BOX
INSTALLATION**

**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

DETAIL NO.
608

**MINIMUM THRUST BLOCK AREAS
(IN SQUARE FEET)**

PIPE SIZE	TEE	90° BEND	45° BEND	22 1/2° BEND	DEAD END
4"	1.5	2	1.5	1	1.5
6"	3	4.5	2.5	1.5	3
8"	5	7	4	2	5
10"	8.5	11.5	6.5	3.5	8.5
12"	11.5	16.5	9	4.5	11.5

NOTES:

1. AREAS ARE FOR 150 POUNDS PER SQUARE INCH WATER PRESSURE AND SANDY SOIL. AREAS SHALL BE DOUBLED FOR CLAYEY SOIL.
2. BLOCKING SHALL BE MADE OF CLASS B CONCRETE AND SHALL BE PLACED BETWEEN UNDISTURBED GROUND AND THE FITTING TO BE ANCHORED. THE BLOCKING SHALL BE PLACED SO THAT THE JOINTS OF THE PIPE AND FITTINGS WILL BE ACCESSIBLE FOR REPAIR.
3. THRUST BLOCKS SHALL BE CONSTRUCTED AT PIPE DIAMETER CHANGES AND AT OTHER FITTINGS NOT LISTED, AND SHALL BE PLACED AS DIRECTED BY THE ENGINEER.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055 EXP. DATE: 9-30-93

APPROVED BY
CITY COUNCIL: 12-22-92

REVISED BY: HM DATE: 01-90

REVISED BY: r.a.c. DATE: 09-92

DRAWN BY: RGR DATE: 08-75

WATER

THRUST BLOCKING

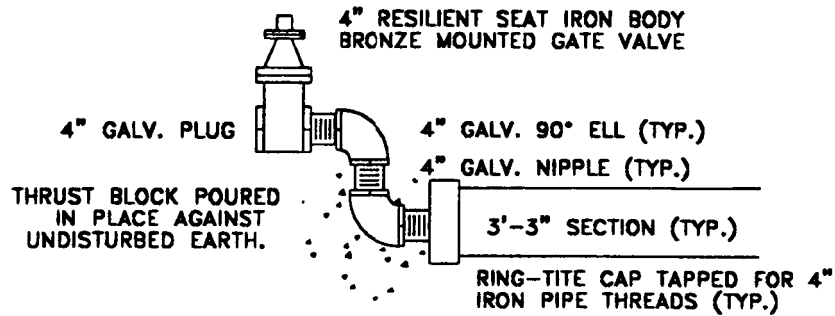
**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



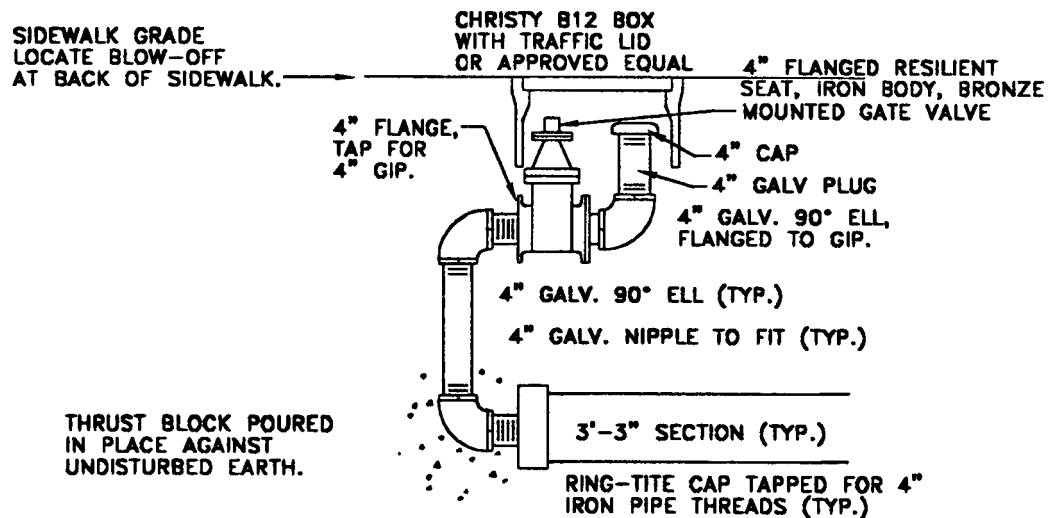
CITY of MODESTO

DETAIL NO.

609



TEMPORARY BLOW-OFF



PERMANENT BLOW-OFF

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: JOE WELLS DATE: 2-88

WATER

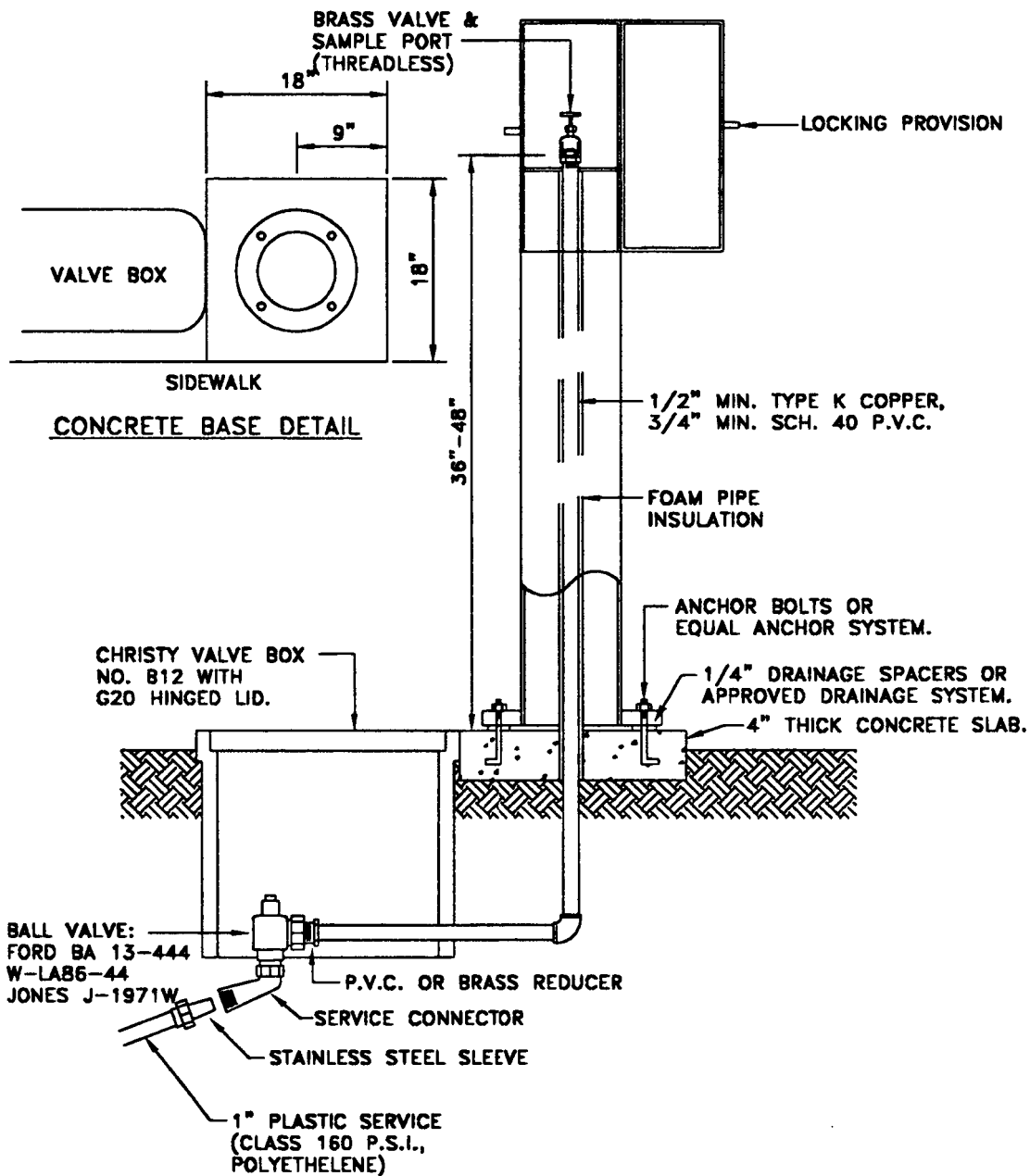
BLOW-OFF

**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

DETAIL NO.
610



ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: r.o.c. DATE: 9-92

REVISED BY: DATE:

DRAWN BY: DRM

DATE: 7-92

WATER

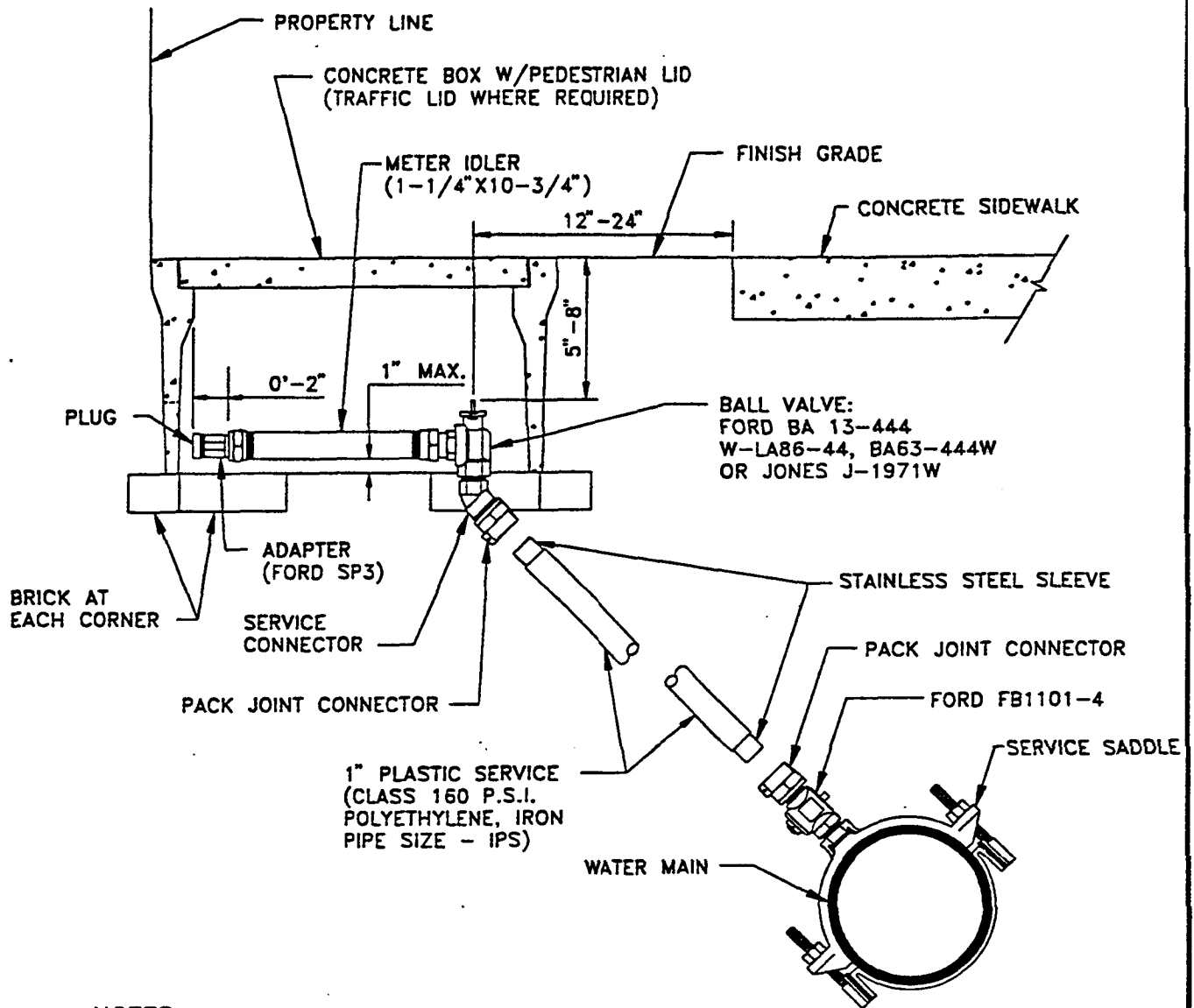
SAMPLE STATION

**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

DETAIL NO.
611



NOTES:

1. CITY CREWS SHALL FURNISH AND INSTALL ALL WATER SERVICES GREATER THAN 1" IN DIAMETER.
2. IF THE SERVICE TRENCH IS IN EXISTING PAVING, THE PAVEMENT SHALL BE REPLACED AS PER MAIN LINE TRENCH.
3. SERVICE SHALL BE A MINIMUM OF 24" BELOW BOTTOM OF CURB.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGE TO CURB, GUTTER AND SIDEWALK INCLUDING DAMAGE FROM SETTLING OF THE TRENCH.
5. CURB, GUTTER AND SIDEWALK TO BE INSTALLED BEFORE WATER SERVICE INSTALLATION UNLESS OTHERWISE NOTED.
6. DOUBLE STRAP BRONZE SADDLE FOR ASBESTOS CEMENT PIPE IS AN ACCEPTABLE ALTERNATIVE TO THE QUICK TAP WITH SADDLE. SADDLE SHALL BE BRONZE FULL BODY MUELLER, FORD OR JONES.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: r.d.c. DATE: 09-92

REVISED BY: L. CORONA DATE: 09-95

DRAWN BY: E.H.

DATE: 02-75

WATER

**1" WATER SERVICE
WITH METER BOX**

**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

DETAIL NO.

612

USE (A) FLOW MAX GPM*	DOMESTIC ONLY (B)		FIRE ONLY	FIRE & DOMESTIC	
	DESCRIPTION (C)	APPLICATION DWELLING UNITS	SIZE	DESCRIPTION	APPLICATION
50	1"	1-2			APARTMENTS, OFFICE BUILDINGS MOBILE HOME PARKS, ETC.
100	1 1/2"	3-10			
160	2"	10-20			
500	4" WITH SCREENS	20-100			
1000	6" WITH SCREENS	100-200	6"	6" FULL FLOW (E)	FIRE FLOWS WILL NORMALLY DETERMINE SIZE OF SERVICE REQUIRED.
1600	8" WITH SCREENS	200 +	8" OR 6" (D)	8" OR 6" (D) FULL FLOW (E)	
1600*	10" WITH SCREENS		10" OR 8" (D)	10" OR 8" FULL FLOW (E)	

NOTES:

(A) COMMERCIAL OR INDUSTRIAL USERS SHALL SUBMIT FLOW DATA WHEN REQUIRED.

(B) OFFICE BUILDING AND SIMILAR TYPE USES TO BE CALCULATED ON THE BASIS OF TWO CLOSETS OR URINALS EQUAL ON DWELLING UNIT.

(C) CITY SERVICE AND METER SIZE. CUSTOMER MAY CHANGE SIZE BEYOND METER AS PERMITTED BY BUILDING CODE.

(D) WHERE SYSTEM CAN BE LOOPED, (I.E. TWO CONNECTIONS TO CITY SYSTEM.

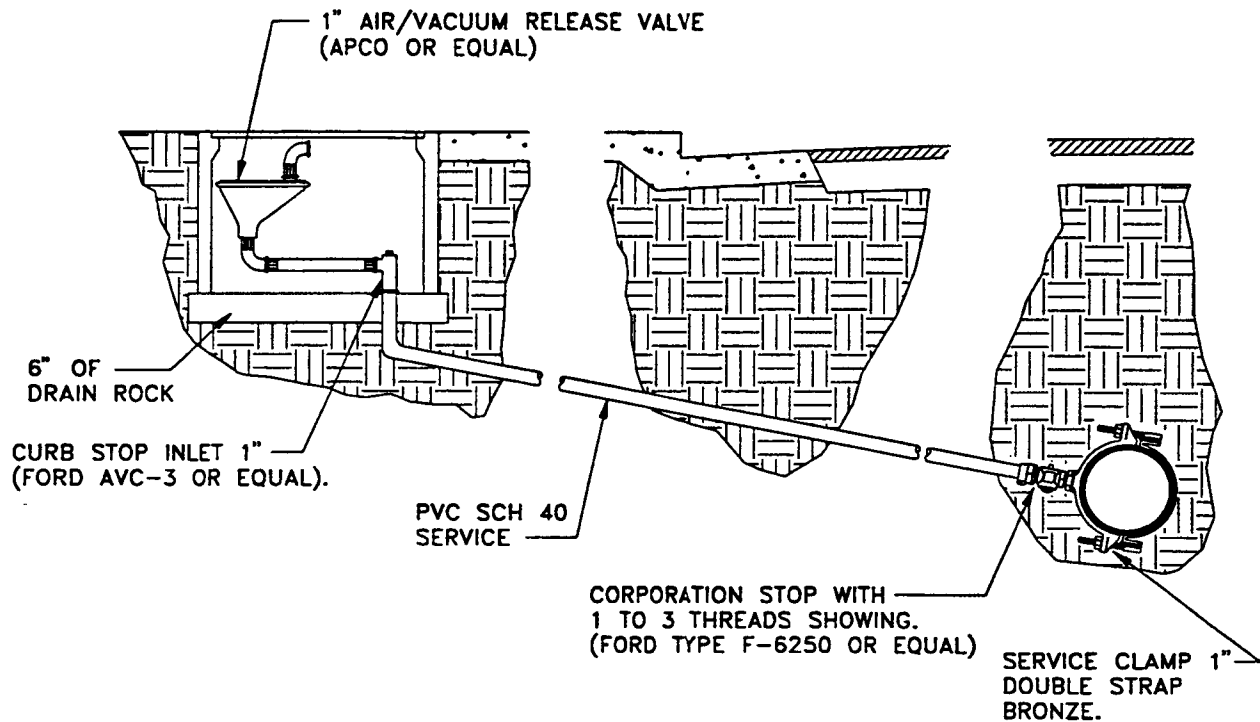
(E) A BACKFLOW PREVENTION DEVICE MAY BE REQUIRED.

(F) STRAINERS FOR 3" AND ABOVE.

(G) MUST MEET ALL AWWA STANDARDS FOR METERED SERVICE.

* MAX. GPM FOR SHORT PERIODS ONLY (NORMAL USE).

ORIGINAL STAMPED AND SIGNED BY: VAN SWITZER R.E. 22055 EXP. DATE: 9-30-00	WATER SCHEDULE OF METERED SERVICES DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION	 CITY of MODESTO
APPROVED BY CITY COUNCIL: 9-9-97	REVISOR: DATE:	
REVISOR: DATE:	REVISOR: DATE:	
DRAWN BY: K.B.	DATE: 6-96	
DETAIL NO. 613		



AIR & VACUUM RELEASE VALVE

NOTES:

1. AIR RELEASE VALVE SHALL HAVE CHRISTY B-36 METER BOX AND CHRISTY E-70 LID.
2. PLACE 6 INCHES OF DRAIN ROCK UNDER BOX.
3. ALL FITTINGS AND NIPPLES TO BE BRASS OR COPPER.
4. 1" ARV FOR 6" THROUGH 16" PIPE. 2" ARV FOR 18" AND GREATER.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055 EXP. DATE: 9-30-97

APPROVED BY
CITY COUNCIL: 00-00-00

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: L. CORONA DATE: 09-95

WATER

AIR & VACUUM
RELEASE VALVE

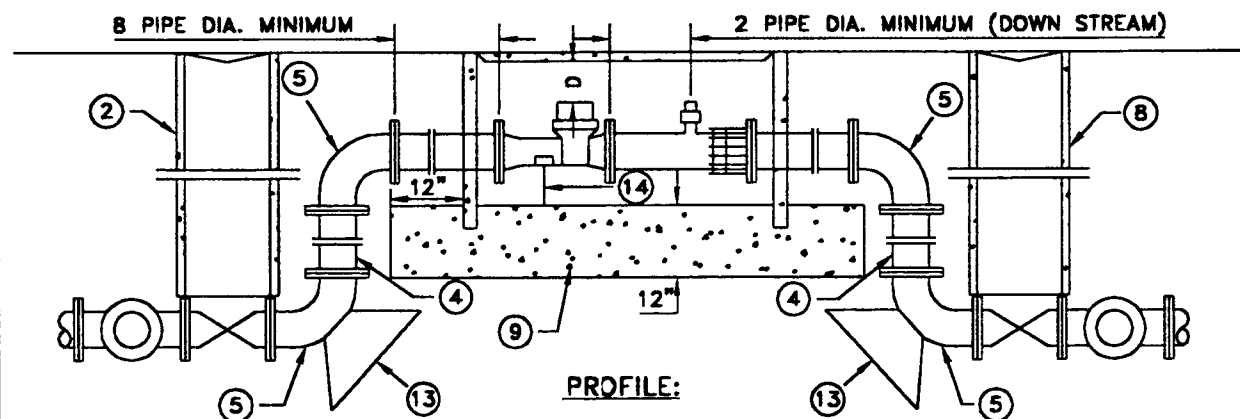
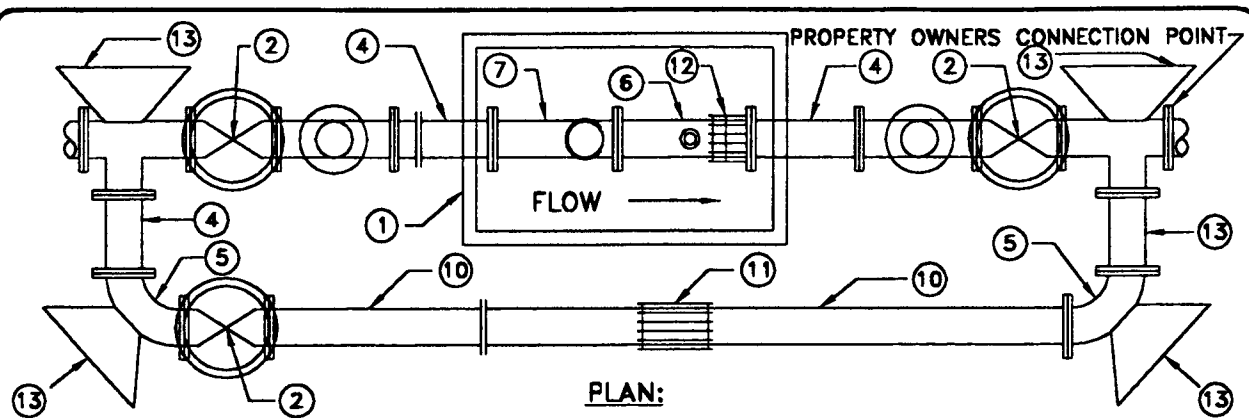
DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.

614



COMPONENTS FOR 3" OR LARGER METER METER INSTALLATIONS:

1. SIZE OF METER VAULT SHALL BE DETERMINED BY METER SIZE. VAULT COVERS SHALL BE 2 OR 3 PIECE METAL WITH READING LID CUT-IN POSITIONED OVER REGISTER.
2. VALVE - SEE STANDARD SPECIFICATION 76-1,02D.
3. CLASS 125 CAST IRON TEE.
4. CLASS 125 CAST IRON SPOOL.
5. CLASS 125 CAST IRON 90° LONG RADIUS ELBOW.
6. CAST IRON TAPPED SPOOL OR TEE, FLANGE BY PLAIN END, WITH 2" BLIND FLANGED ACCESS.
7. METER AS SPECIFIED BY CITY WATER DIVISION.
8. CHRISTY G-5 VALVE BOX OR BROOKS NO. 1-RT VALVE BOX. BOTH WITH CAST IRON COVERS. SEE STANDARD DRAWING NO. 99.
9. 5 SACK CONCRETE FOOTING, 3000 P.S.I.
10. FLANGED BY PLAIN END CAST IRON PIPE.
11. FLEX COUPLING - ROCKWELL 411 STEEL COUPLING OR EQUAL.
12. FLANGED COUPLING ADAPTER - ROCKWELL 912 OR EQUAL.
13. THRUST BLOCKS - SEE DETAIL #609.
14. METER AND PIPE SUPPORTS AS REQUIRED.

NOTES:

- A. DETAILED DESIGN WILL BE REQUIRED AND SHALL BE APPROVED BY THE CITY ENGINEER PRIOR TO INSTALLATION.
- B. BY-PASS REQUIREMENTS WILL BE DETERMINED BY THE WATER/SEWER SUPERINTENDENT OR THE CITY ENGINEER.
- C. "D" DIMENSION SHALL BE 12"-24" MAXIMUM.
- D. DIMENSION WILL VARY WITH METER AND SERVICE SIZE.
- E. USE MATERIALS LISTED ABOVE AND/OR APPROVED EQUAL.
- F. ALL METERED SERVICES AND TAPS SHALL BE INSTALLED BY CITY CREWS.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: K.B.

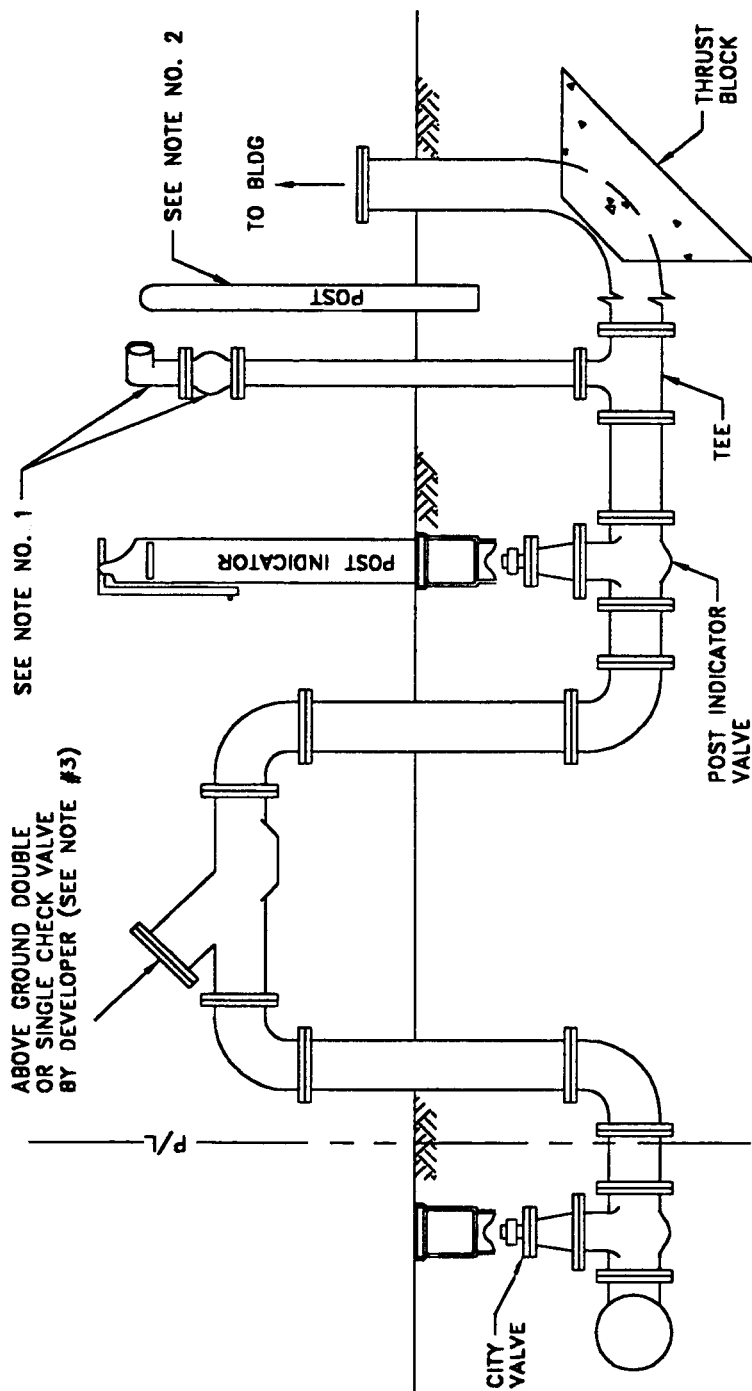
DATE: 9-96

WATER
LAYOUT FOR 3" OR
LARGER METER
BY-PASS INSTALLATION
DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.
617



NOTES:

1. LISTED AND APPROVED FIRE DEPT. CONNECTION WITH CHECK VALVE PER CITY OF MODESTO FIRE DEPT. REQUIREMENTS.
2. GUARD POSTS AS REQUIRED.
3. DOUBLE OR SINGLE CHECK VALVE DETERMINED BY FIRE SPRINKLER DESIGNER WITH APPROVAL BY THE CITY CROSS CONNECTION SPECIALIST. A MINIMUM OF A SINGLE CHECK VALVE REQUIRED FOR FIRE HYDRANTS ON PRIVATE PROPERTY.
4. CLASS 3-6 FIRE SPRINKLER SYSTEMS MAY REQUIRE DOUBLE CHECK VALVE ASSEMBLY OR REDUCED PRESSURE DEVICE. PLANS SHALL BE APPROVED BY THE CROSS CONNECTION SPECIALIST.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: K.B.

DATE: 6-96

WATER
TYPICAL FIRE
SPRINKLER WITH POST
INDICATOR VALVE

DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.
620

GENERAL:

1. ALL PRIVATE FIRE SYSTEMS CROSS-CONNECTED TO UNAPPROVED WATER SOURCES AND CONNECTED TO DOMESTIC WATER MAINS SHALL HAVE BACKFLOW PREVENTION AS REQUIRED BY AWWA M-14 FOR CLASSES III, IV, V AND VI FIRE SYSTEMS. PLANS SHALL BE SUBMITTED TO AND APPROVED BY THE FIRE DEPARTMENT AND CITY OF MODESTO WATER DIVISION CROSS-CONNECTION SPECIALISTS PRIOR TO CONSTRUCTION. "AS BUILT" DRAWINGS SHALL BE PROVIDED PRIOR TO CONNECTION TO THE PUBLIC WATER SYSTEM.
2. ALL FIRE PROTECTION SYSTEMS SHALL BE DISINFECTED PRIOR TO CONNECTION TO PUBLIC WATER SYSTEM IN ACCORDANCE WITH THE CITY OF MODESTO STANDARD SPECIFICATIONS.
3. WITHIN THE CITY WATER SERVICE AREA ALL ON-SITE FIRE HYDRANT SYSTEMS SHALL HAVE A DETECTOR CHECK WITH CHECK VALVE LOCATED AT THE PROPERTY LINE IMMEDIATELY DOWN-STREAM OF THE MAIN SHUT OFF VALVE. PLANS AND SPECIFICATIONS SHALL BE SUBMITTED FOR APPROVAL BY THE MUNICIPAL UTILITIES DEPARTMENT.

INSTALLATION REQUIREMENTS:

1. FIRE HYDRANTS, ON-STREET AND/OR ON-SITE, SHALL BE INSTALLED IN ACCORDANCE WITH CITY OF MODESTO STANDARD SPECIFICATIONS. INSPECTION APPROVAL BY THE FIRE MARSHALL IS REQUIRED PRIOR TO ANY BACKFILL. WITNESSED PRESSURE TEST, 150 P.S.I. FOR 2 HOURS, IS REQUIRED FOR ALL ON-SITE SYSTEMS. FIRE DEPARTMENT PLAN LOCATION APPROVAL REQUIRED PRIOR TO CONSTRUCTION. COMBINED SYSTEMS--SPRINKLER AND HYDRANT--SHALL BE TESTED AT 200 POUNDS FOR TWO HOURS.
2. AUTOMATIC SPRINKLER SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH NFPA #13 STANDARD. PRIOR TO CONSTRUCTION, DETAILED PLANS SHALL BE SUBMITTED FOR FIRE DEPARTMENT APPROVAL. PRESSURE AND FLOW TESTING OF BOTH ABOVE GROUND AND UNDERGROUND SYSTEMS SHALL BE AT 200 POUNDS FOR TWO HOURS AND OBSERVED BY THE FIRE DEPARTMENT. A FINAL INSPECTION OF THE COMPLETED SYSTEM SHALL BE CONDUCTED BY THE FIRE DEPARTMENT TO INSURE THAT THE EQUIPMENT AND INSTALLATION CONFORMS TO THE APPROVED PLANS.
3. ALL STANDPIPE SYSTEMS (WET OR DRY) SHALL BE INSTALLED ACCORDING TO NFPA #14 STANDARDS. PRIOR TO CONSTRUCTION DETAILED PLANS SHALL BE SUBMITTED FOR FIRE DEPARTMENT APPROVAL. TESTING AND INSPECTION SHALL CONFORM TO SPRINKLER SYSTEM INSTALLATIONS.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: K.B.

DATE: 9-96

WATER

**FIRE PROTECTION
SYSTEM STANDARDS**

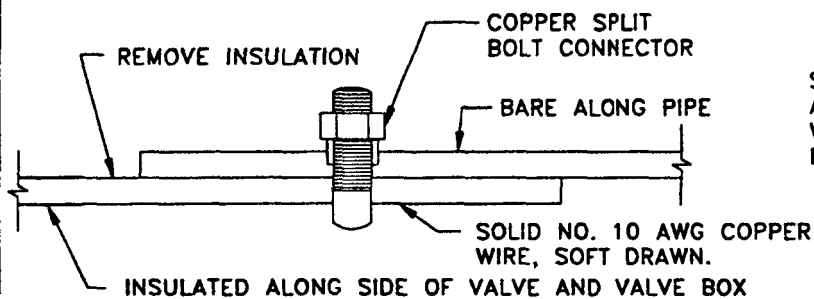
**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

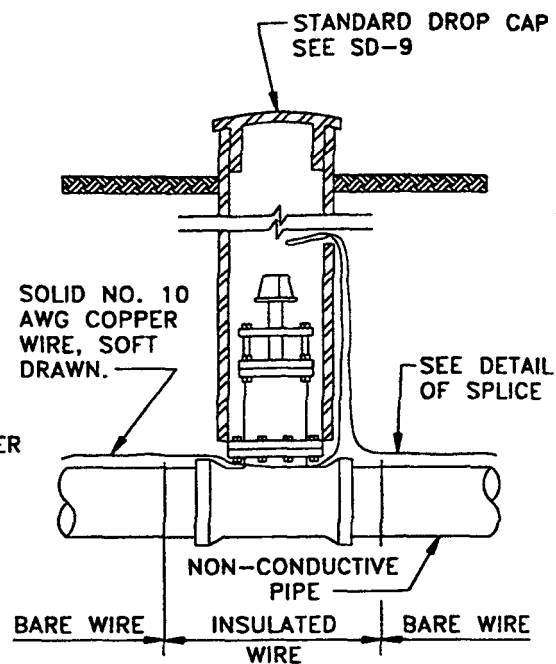
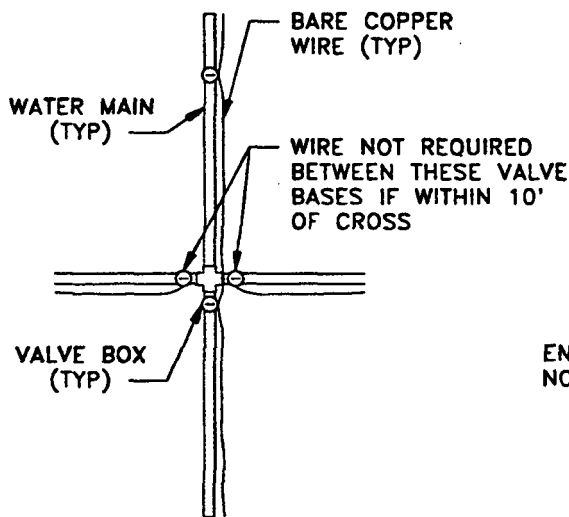
DETAIL NO.

621

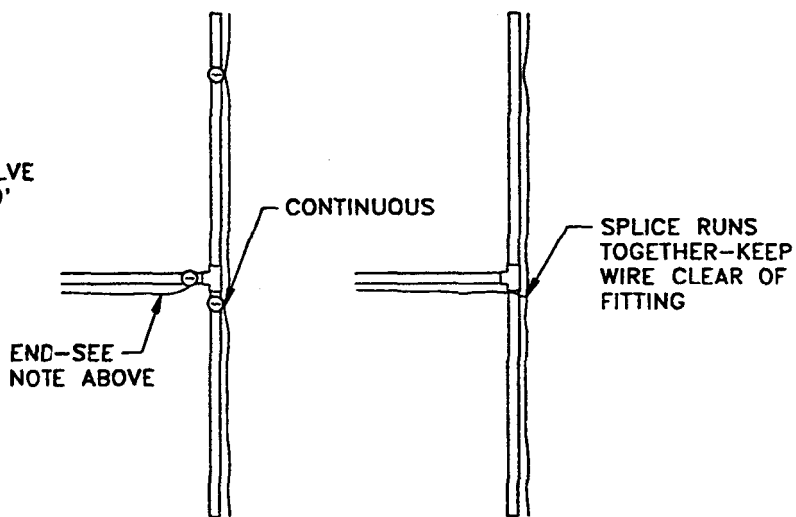


NOTE: IF WIRE ENDS AT VALVE BOX, RUN SINGLE INSULATED LEAD UP TO 10' BELOW GROUND.

DETAIL OF CONNECTION



INSTALLATION AT VALVE BOX



TYPICAL PLACING AT MAIN INTERSECTIONS

NOTES:

1. WIRE TO BE CONTINUOUS BETWEEN VALVE BOXES, EXCEPT WHERE BOXES ARE WITHIN TEN (10') FEET OF PIPE INTERSECTION.
2. BARE WIRE NOT TO TOUCH VALVE OR FITTINGS. (COATED WIRE ONLY)
3. LOCATING WIRE TO BE LAID AT TOP OF PIPE.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: L. CORONA DATE: 10-95

WATER

**PIPE LOCATION WIRE FOR
NON-CONDUCTIVE WATER MAINS**

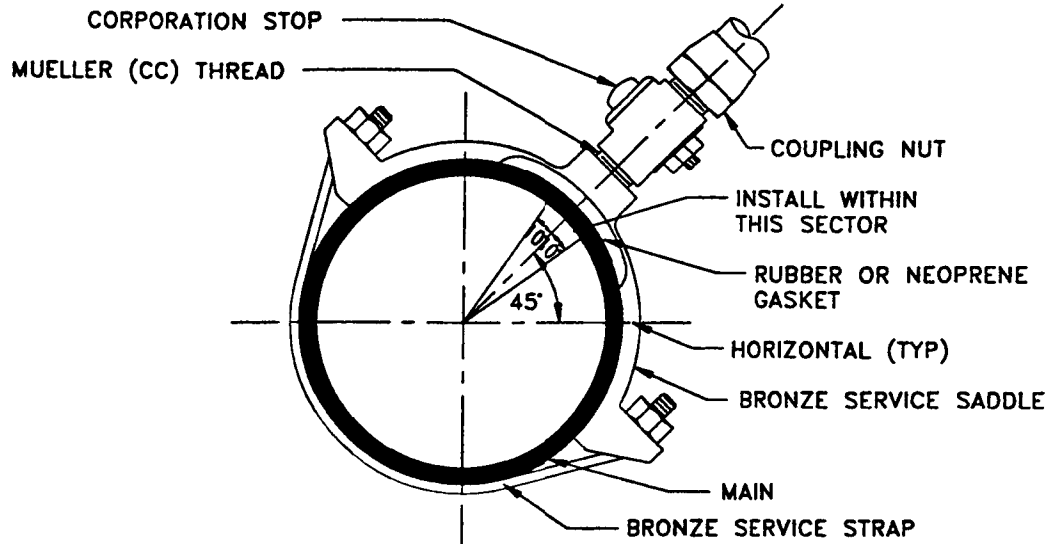
**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



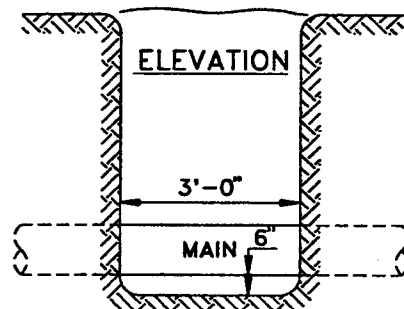
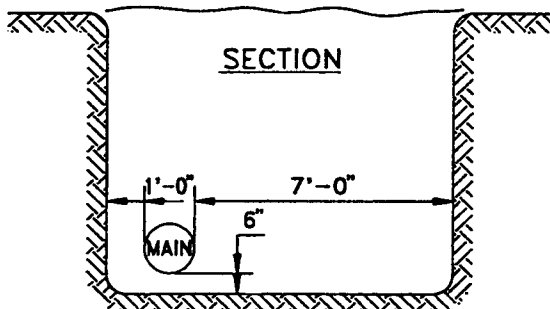
CITY of MODESTO

DETAIL NO.

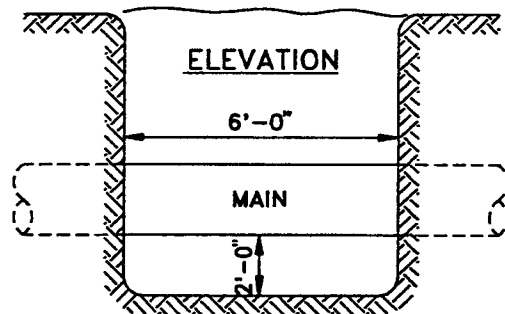
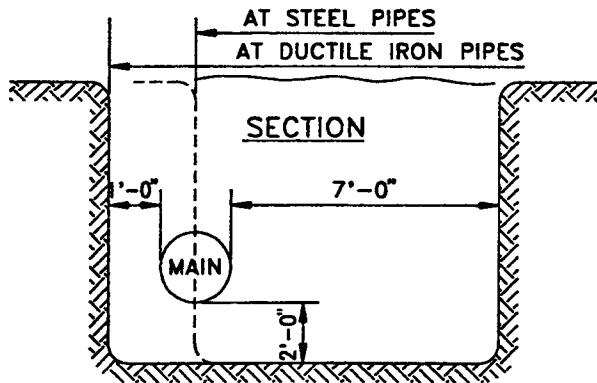
622



TYPICAL TAP WITH REQUIRED SERVICE SADDLE



TAP EXCAVATION REQUIREMENTS FOR EXISTING MAINS 4" THRU 12"



TAP EXCAVATION REQUIREMENTS FOR EXISTING MAINS OVER 12"

NOTES:

1. ALL CORPORATION STOPS TO HAVE A.W.W.A. STANDARD CORPORATION STOP THREAD (MUELLER CC) ON INLET END. OUTLET TO BE USED WITH FLARED OR COMPRESSION FITTING.
2. CONTACT ENGINEER FOR APPROVAL LIST OF WATER SERVICE CONNECTION MATERIALS.
3. A BRONZE DOUBLE STRAP SERVICE SADDLE IS REQUIRED ON ALL WATER SERVICE TAPS 1" THRU 2" EXCEPT C-900.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: L. CORONA DATE: 10-95

WATER

**STANDARD WATER SERVICE
TAPS 1" THRU 2" AND TAP
EXCAVATION REQUIREMENTS**

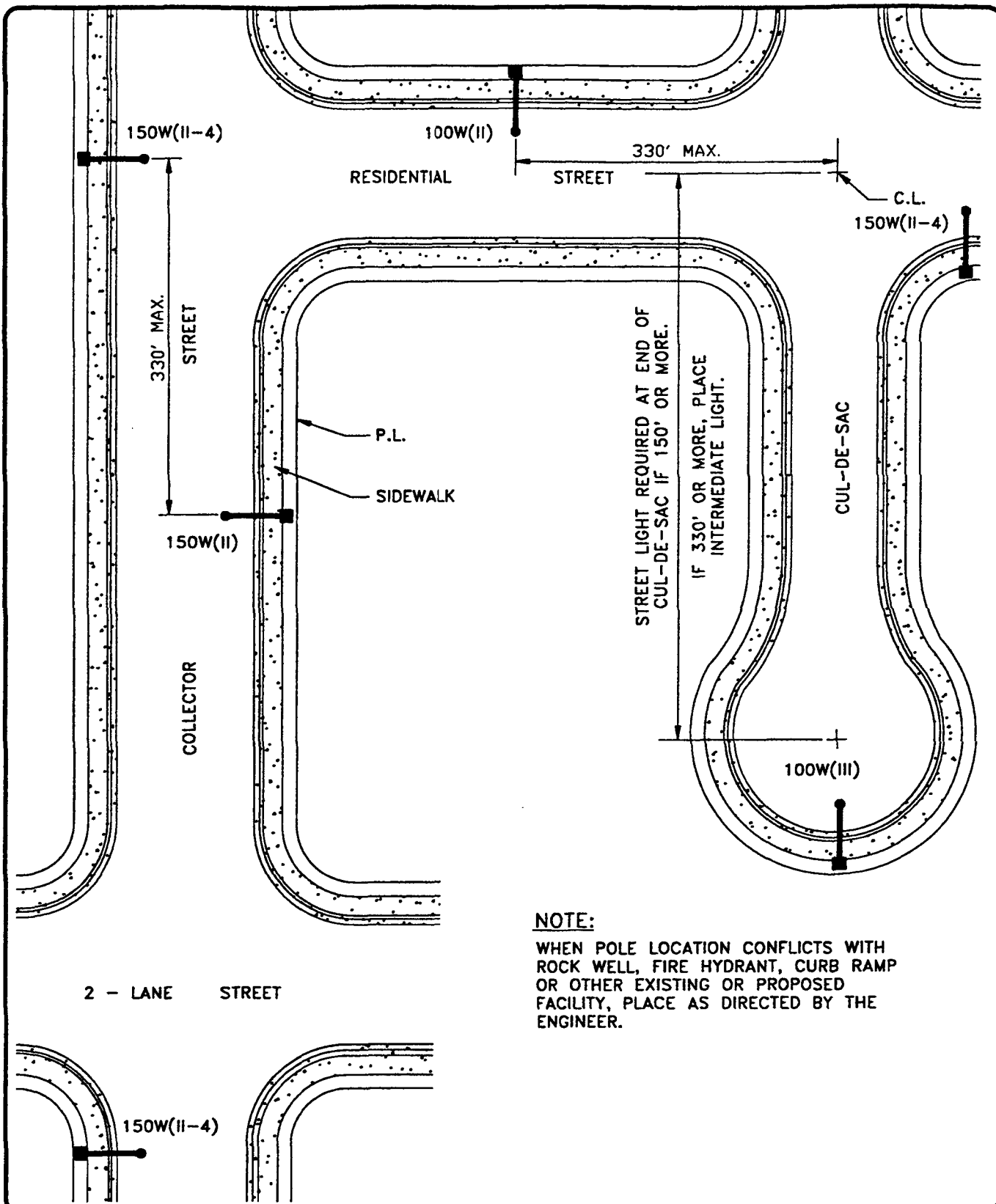
**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

DETAIL NO.

623



NOTE:

WHEN POLE LOCATION CONFLICTS WITH ROCK WELL, FIRE HYDRANT, CURB RAMP OR OTHER EXISTING OR PROPOSED FACILITY, PLACE AS DIRECTED BY THE ENGINEER.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: r.a.c. DATE: 02-94

REVISED BY: HOVIK DATE: 01-90

DRAWN BY: FE

DATE: 08-74

LIGHTING & TRAFFIC

**LOCATIONS
OF 25' POLES**

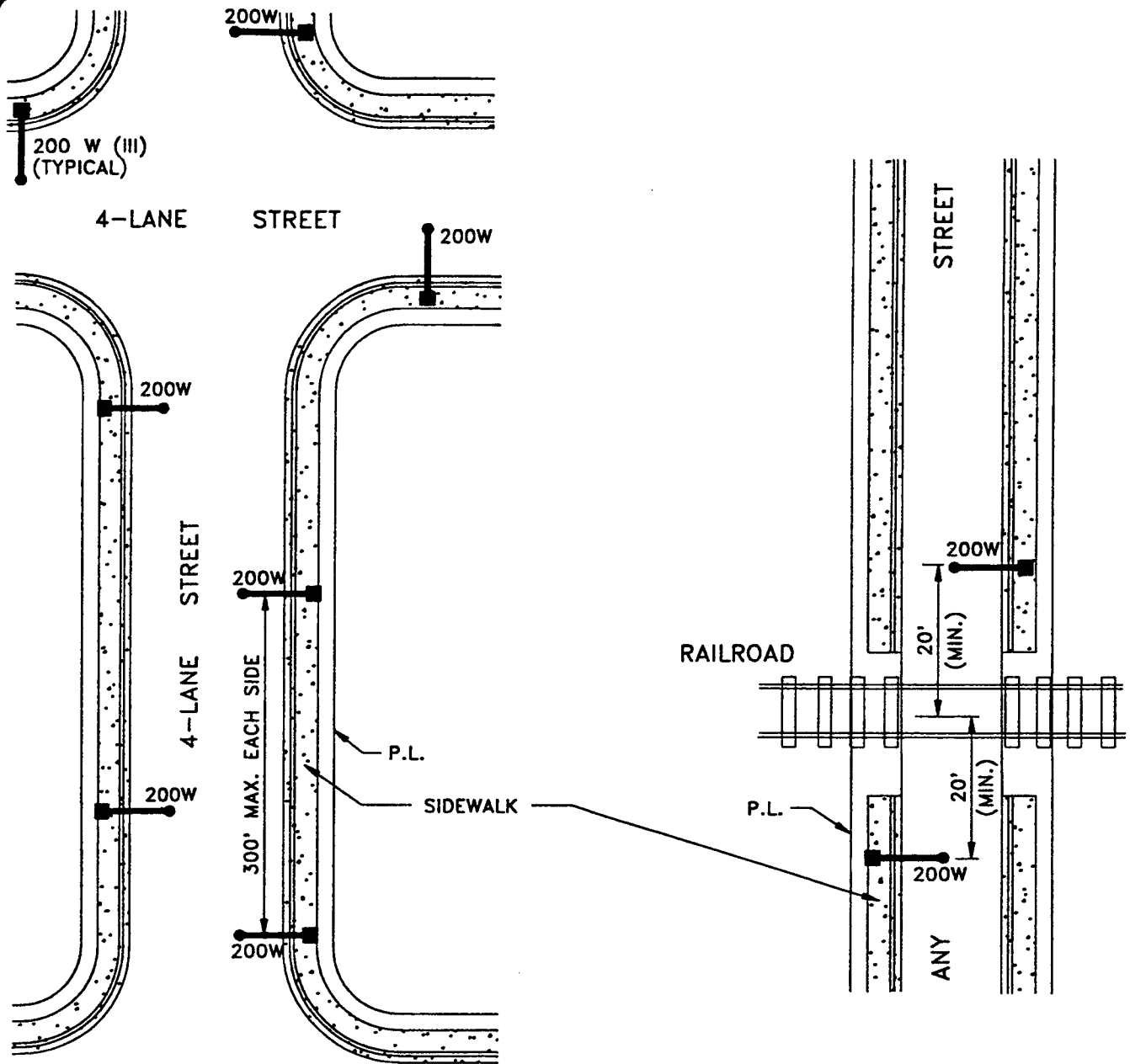
**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

DETAIL NO.

700



NOTE:

WHEN POLE LOCATION CONFLICTS WITH ROCK WELL, FIRE HYDRANT, DRIVEWAY OR OTHER EXISTING OR PROPOSED FACILITY, PLACE AS DIRECTED BY THE ENGINEER.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: VINCE YAH DATE: 01-91

REVISED BY: HOVIK DATE: 01-90

DRAWN BY: BS

DATE: 08-74

LIGHTING & TRAFFIC

**LOCATION
OF 28' POLES**

**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



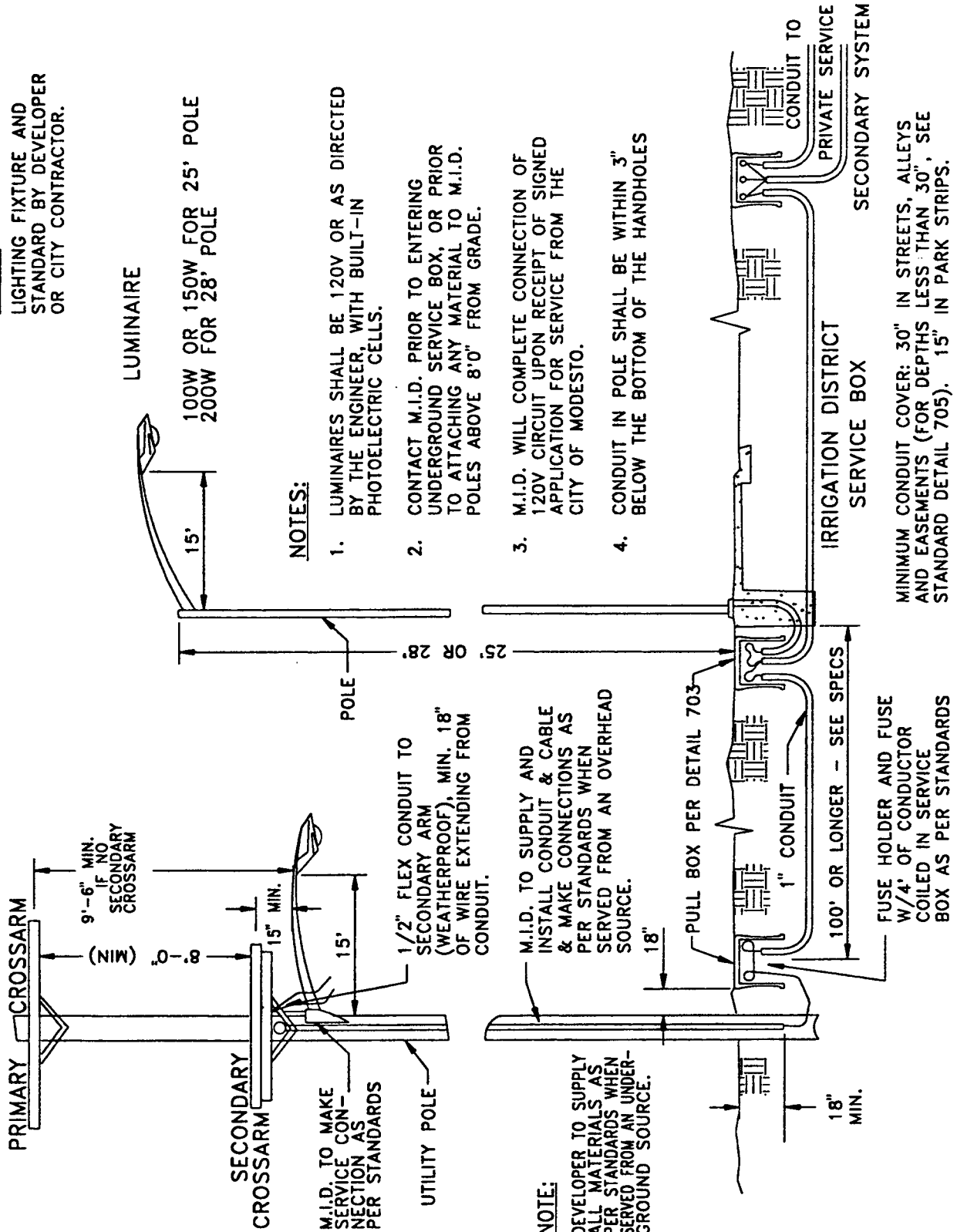
CITY of MODESTO

DETAIL NO.

701

NOTE:

LIGHTING FIXTURE AND STANDARD BY DEVELOPER OR CITY CONTRACTOR.



NOTES:

1. LUMINAIRES SHALL BE 120V OR AS DIRECTED BY THE ENGINEER, WITH BUILT-IN PHOTOELECTRIC CELLS.
2. CONTACT M.I.D. PRIOR TO ENTERING UNDERGROUND SERVICE BOX, OR PRIOR TO ATTACHING ANY MATERIAL TO M.I.D. POLES ABOVE 8'0" FROM GRADE.
3. M.I.D. WILL COMPLETE CONNECTION OF 120V CIRCUIT UPON RECEIPT OF SIGNED APPLICATION FOR SERVICE FROM THE CITY OF MODESTO.
4. CONDUIT IN POLE SHALL BE WITHIN 3" BELOW THE BOTTOM OF THE HANDHOLES

NOTE:

DEVELOPER TO SUPPLY ALL MATERIALS AS PER STANDARDS WHEN SERVED FROM AN UNDERGROUND SOURCE.

M.I.D. TO SUPPLY AND INSTALL CONDUIT & CABLE & MAKE CONNECTIONS AS PER STANDARDS WHEN SERVED FROM AN OVERHEAD SOURCE.

MINIMUM CONDUIT COVER: 30" IN STREETS, ALLEYS AND EASEMENTS (FOR DEPTHS LESS THAN 30", SEE STANDARD DETAIL 705). 15" IN PARK STRIPS.

ORIGINAL STAMPED AND SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY CITY COUNCIL: 9-9-97

REVISED BY: RF

DATE: 01-21-93

REVISED BY: r.a.c.

DATE: 02-94

DRAWN BY: BS

DATE: 08-74

LIGHTING & TRAFFIC

INSTALLATION LAYOUT

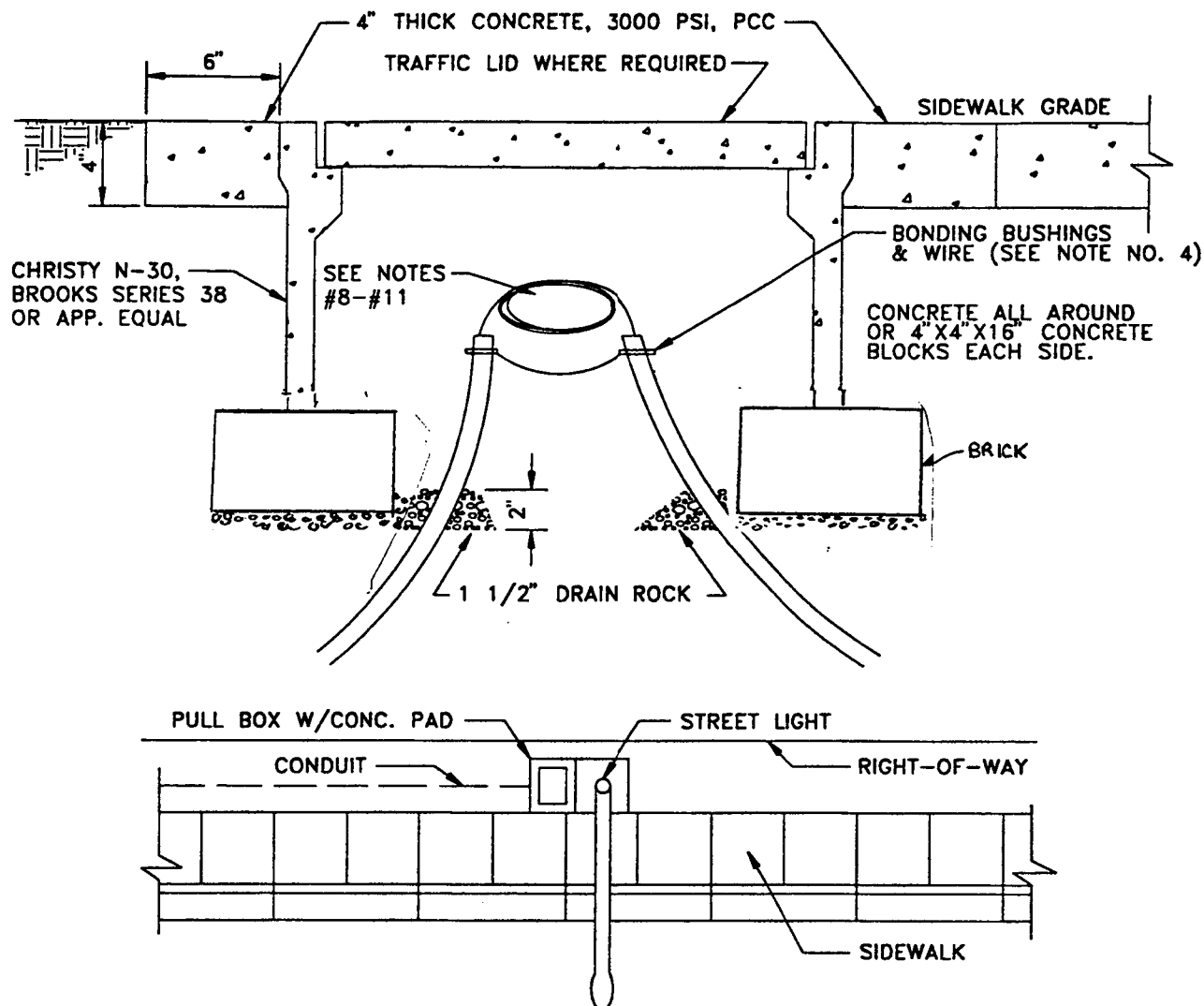
DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.

702



NOTES:

1. CONDUIT SHALL BE A MINIMUM DEPTH OF 15" BELOW SIDEWALK GRADE IN PARK STRIPS, AND 30" BELOW TOP OF CURB GRADE IN STREETS, ALLEYS AND EASEMENTS NOT ADJACENT TO CURB OR SIDEWALK. DEPTH SHALL NOT EXCEED 48".
2. CONDUIT MAY BE INSTALLED AT DEPTHS LESS THAN 30" IN STREETS, ALLEYS AND EASEMENTS WITH PRIOR WRITTEN APPROVAL OF THE CITY ENGINEER. SUCH APPROVAL MAY BE GRANTED ONLY UPON SPECIFIC REQUEST FROM THE DEVELOPER OR CITY CONTRACTOR. CONCRETE-ENCASED PVC CONDUIT MAY ALSO BE APPROVED UPON SPECIAL REQUEST.
3. WHERE SIDEWALK IS AGAINST PROPERTY LINE, THE CONDUIT SHALL BE PLACED 6" BEHIND CURB.
4. FOR BACKFILL & COMPACTION REQUIREMENTS, SEE STANDARD DETAILS #800 TO #803.
5. TURLOCK IRRIGATION DISTRICT (TID) CONDUIT TO BE PLACED AT A DEPTH OF 24".
6. REPLACE SOD IN LAWN AREA.
7. PULL BOX MAY BE SET ADJACENT OR BEHIND POLE IN THE RIGHT-OF-WAY.
8. IF PULL BOX IS MID-CIRCUIT, LEAVE 4' OF SLACK CONDUCTOR IN BOX.
9. IF PULL BOX IS A CIRCUIT TERMINUS AT POWER SOURCE, INSTALL FUSE HOLDER (PER SPEC.) WITH 4' OF SLACK CONDUCTOR. TAPE FUSE TO CONDUCTOR IN BOX.
10. CONDUIT ENTERING IRRIGATION DISTRICT SERVICE BOX SHALL CONFORM TO DISTRICT SPECIFICATIONS. (SEE DRAWING 4-F)
11. THE BONDING WIRE SHALL BE AT LEAST THE SAME GAUGE AS THE LARGEST CIRCUIT CONDUCTOR. (MIN. OF NO. 8 AWG COPPER WIRE)

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: r.a.c. DATE: 02-94

REVISED BY: DATE:

DRAWN BY: SNELL

DATE: 08-74

LIGHTING & TRAFFIC

PULL BOX

DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.

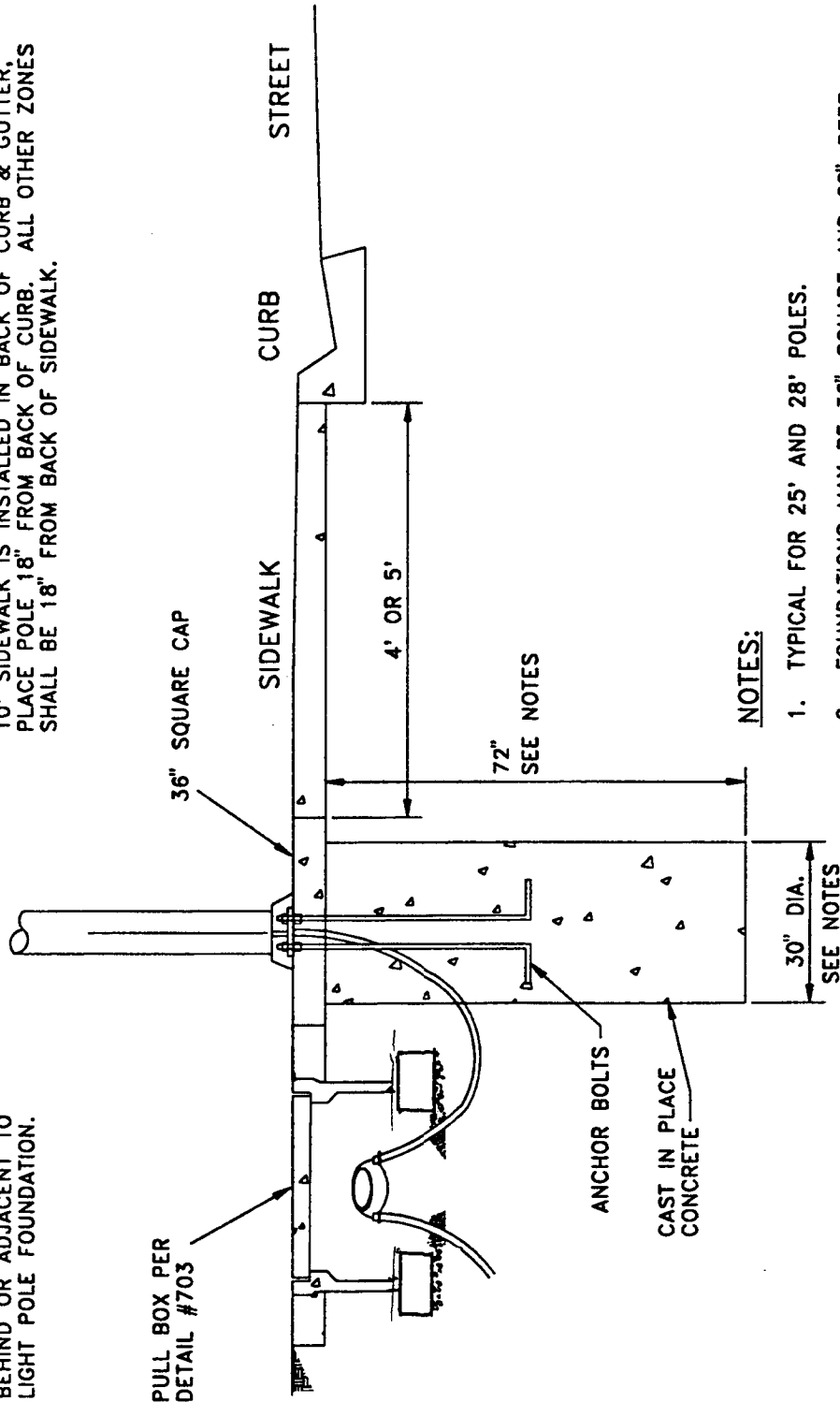
703

NOTE:

PULL BOX MAY BE LOCATED BEHIND OR ADJACENT TO LIGHT POLE FOUNDATION.

NOTE:

WHERE WALK IS SEPARATED FROM CURB & GUTTER OR A 10' SIDEWALK IS INSTALLED IN BACK OF CURB & GUTTER, PLACE POLE 18" FROM BACK OF CURB. ALL OTHER ZONES SHALL BE 18" FROM BACK OF SIDEWALK.



NOTES:

1. TYPICAL FOR 25' AND 28' POLES.
2. FOUNDATIONS MAY BE 36" SQUARE AND 60" DEEP.
3. CONCRETE TO BE PLACED AGAINST UNDISTURBED EARTH.
4. EACH LIGHT POLE MUST HAVE A PULL BOX.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: HOVIK DATE: 09-88

REVISED BY: r.a.c. DATE: 02-94

DRAWN BY: SM

DATE: 08-74

LIGHTING & TRAFFIC

POLE FOUNDATION

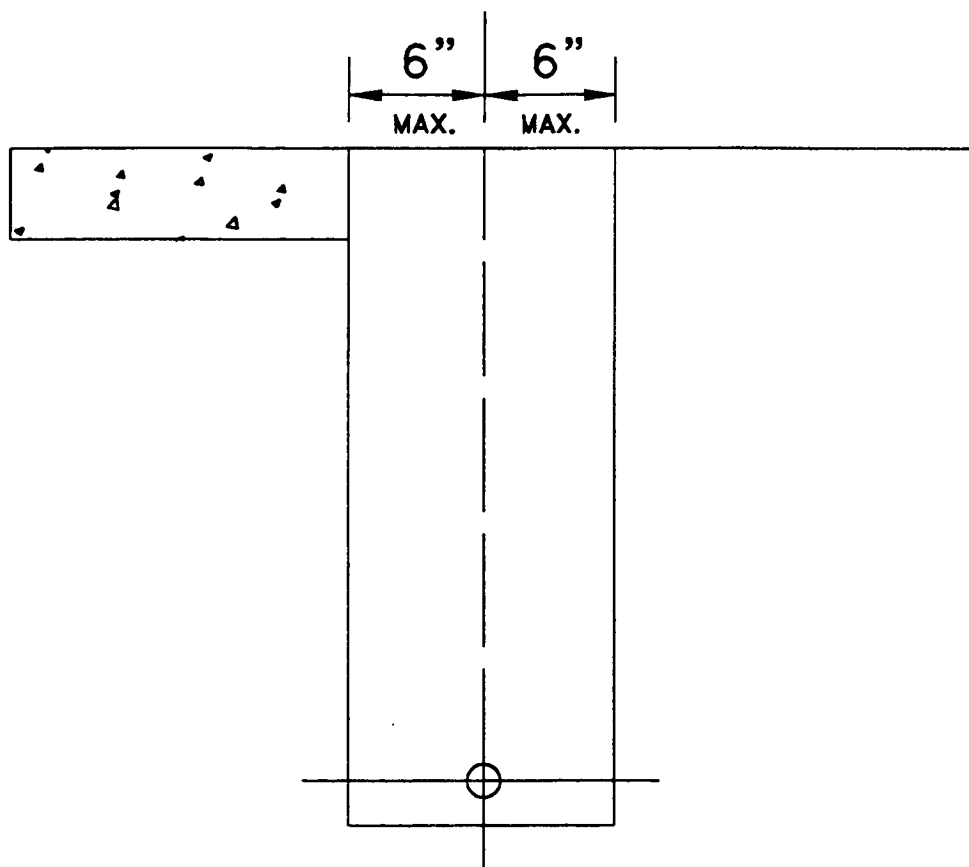
DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.

704



NOTES:

1. CONDUIT SHALL BE A MINIMUM OF 24" BELOW SIDEWALK GRADE IN PARK STRIPS, AND 30" BELOW TOP OF CURB GRADE IN STREETS, ALLEYS AND EASEMENTS NOT ADJACENT TO CURB OR SIDEWALK. DEPTH SHALL NOT EXCEED 48".
2. CONDUIT MAY BE INSTALLED AT DEPTHS LESS THAN 30" IN STREETS, ALLEYS AND EASEMENTS WITH PRIOR WRITTEN APPROVAL OF THE CITY ENGINEER. SUCH APPROVAL MAY BE GRANTED ONLY UPON SPECIFIC REQUEST FROM THE DEVELOPER OR CITY CONTRACTOR. CONCRETE-ENCASED PVC CONDUIT MAY ALSO BE APPROVED UPON SPECIAL REQUEST.
3. WHERE SIDEWALK IS AGAINST PROPERTY LINE, THE CONDUIT SHALL BE PLACED 6" BEHIND CURB.
4. FOR BACKFILL & COMPACTION REQUIREMENTS SEE STANDARD DETAILS #800 TO #803.
5. TURLOCK IRRIGATION DISTRICT (TID) CONDUIT TO BE PLACE AT A DEPTH OF 24".
6. REPLACE SOD IN LAWN AREA.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: K.B. DATE: 6-96

REVISED BY: r.a.c. DATE: 2-94

DRAWN BY: FRE DATE: 1-75

LIGHTING & TRAFFIC

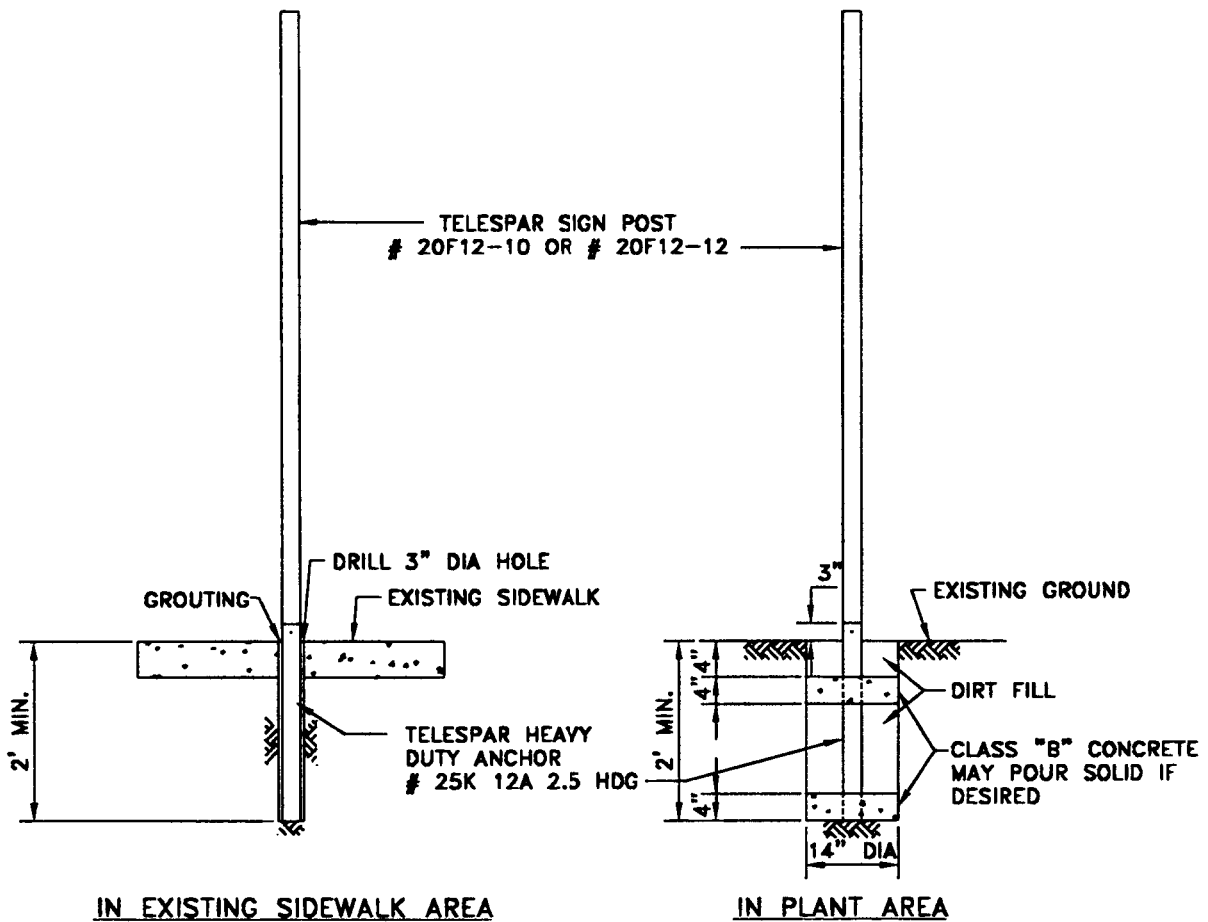
TRENCH SECTION

**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

DETAIL NO.
705



NOTE:

ANCHOR TO BE DRIVEN OR PLACED WITH 3" MAXIMUM ABOVE GROUND LEVEL.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: K.B.

DATE: 6-96

LIGHTING & TRAFFIC

**SIGN
POST**

**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**

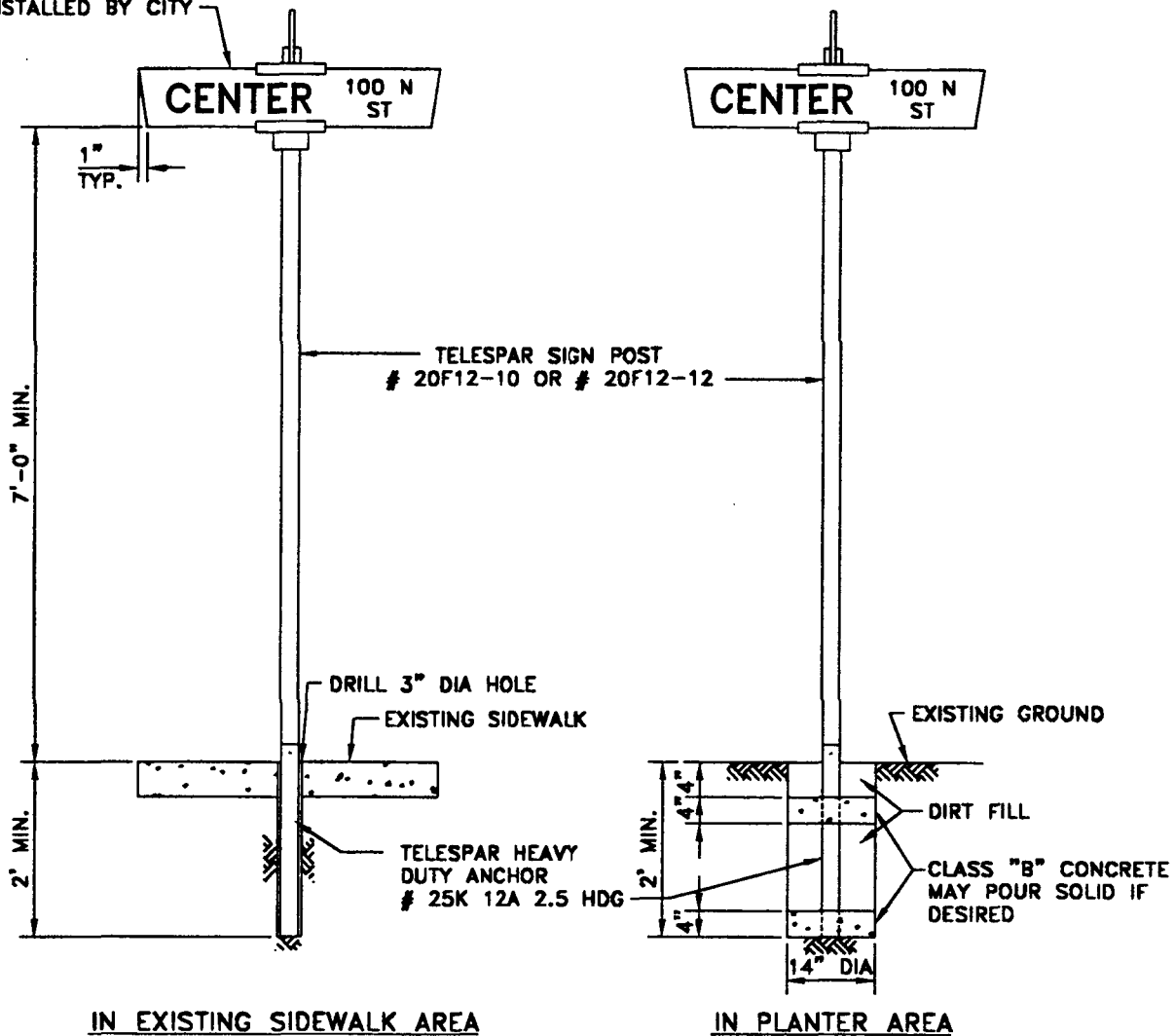


CITY of MODESTO

DETAIL NO.

706

STREET NAME SIGNS TO BE
INSTALLED BY CITY



NOTES:

1. SEE DRAWING OF STANDARDS FOR LOCATION OF STREET NAME SIGNS.
2. ANCHOR OT BE DRIVEN OR PLACED WITH 3" MAXIMUM ABOVE GROUND LEVEL.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: K.B.

DATE: 6-96

LIGHTING & TRAFFIC

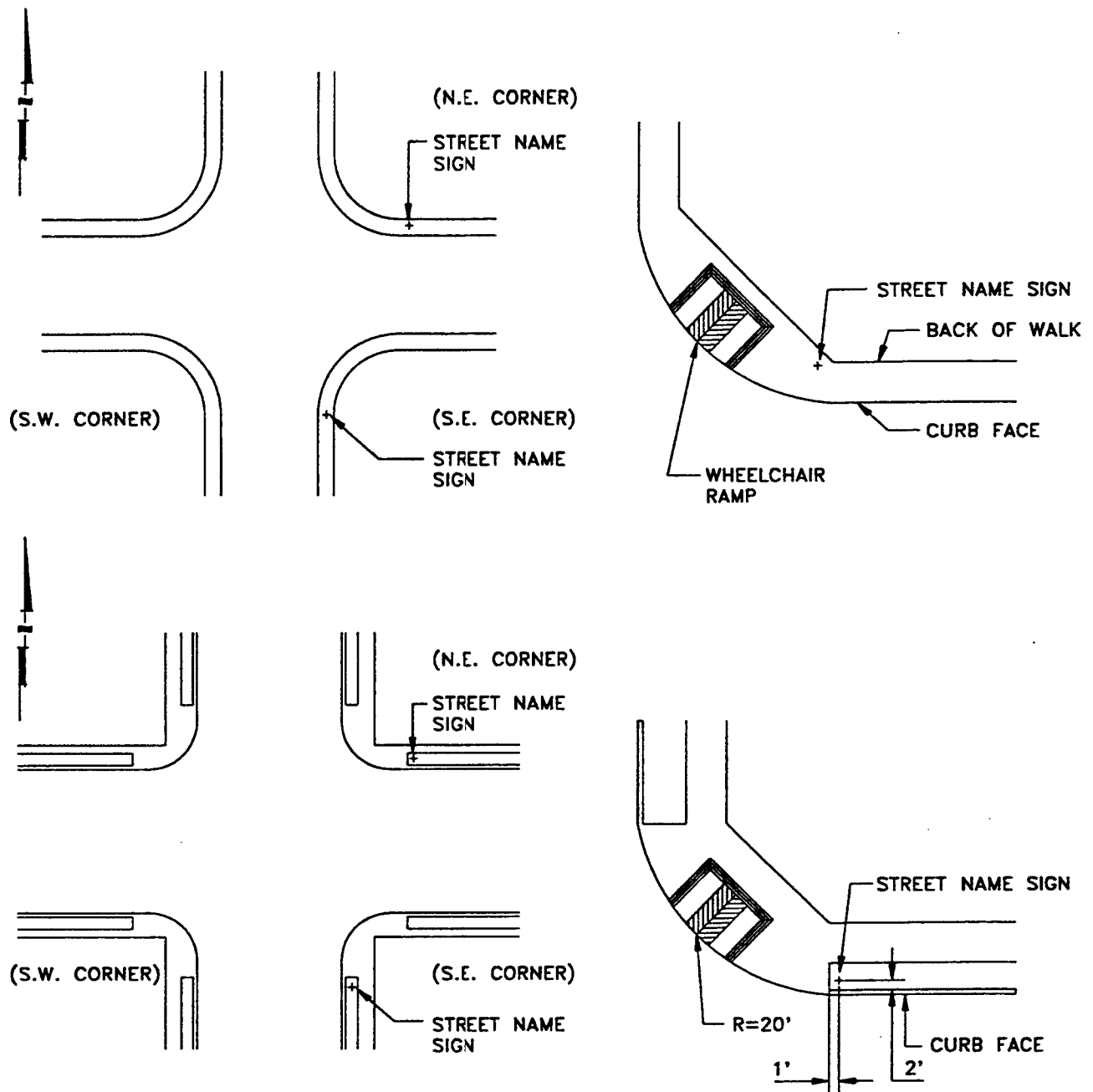
**STREET NAME
SIGN**

**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

DETAIL NO.
707



NOTES:

1. DRILL 3" DIA. HOLE IN CONCRETE IF SIGN INSTALLED AFTER SIDEWALK HAS BEEN CONSTRUCTED.
2. SIGN LOCATION SHALL BE AS FOLLOWS:
ON RESIDENTIAL STREETS: N.E. OR S.E. CORNER.
ON MAJOR ARTERIALS: ON BOTH SIDES OF THE STREET.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: L. CORONA DATE: 11-95

LIGHTING & TRAFFIC

**STREET SIGN
LOCATION**

**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

DETAIL NO.

708

TYPICAL OVERHEAD STREET NAME SIGNS

FRONT VIEW



BACK VIEW



NOTES:

1. ALL LETTERS SHALL BE 10" CAPS FOR STREET NAME.
2. ALL BLOCK NUMBERS SHALL BE 4" NUMBERS.
3. ALL ARROWS SHALL BE 4" WIDE.
4. ALL TEXT SHALL BE SERIES "D".
5. SIGNS SHALL BE WHITE ON A GREEN BACKGROUND.
6. SIGNS SHALL BE DIAMOND GRADE SHEETING.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: L. CORONA

DATE: 11-95

LIGHTING & TRAFFIC

TYPICAL OVERHEAD
STREET NAME SIGNS

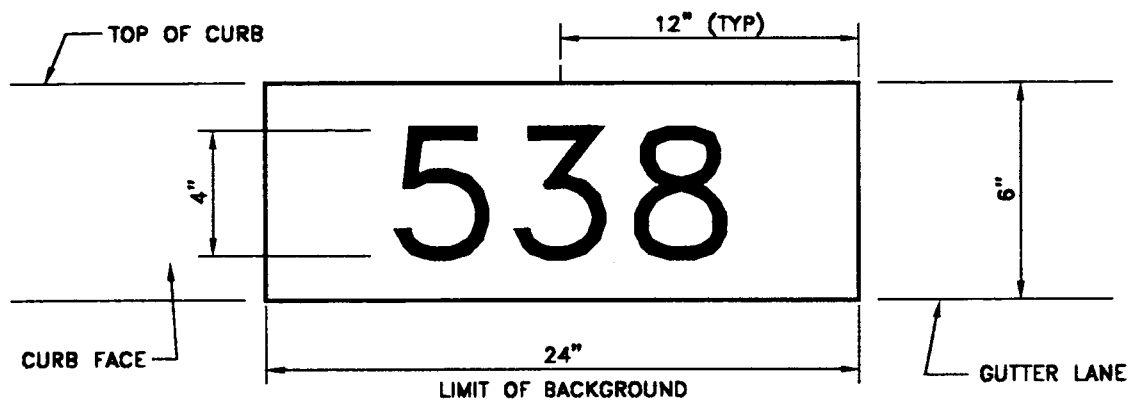
DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.

709



CURB PAINTING STANDARD

NOTES:

1. BUILDING NUMBERS MAY BE PAINTED ON CURB SURFACES IN ACCORDANCE WITH CITY COUNCIL POLICY AND THIS STANDARD DRAWING.
2. NUMBERS SHALL BE PAINTED WITH BLACK 4" BLOCK LETTERS HAVING A 1/2" STROKE ON A WHITE REFLECTORIZED BACKGROUND.
3. NUMBERS SHALL BE PAINTED WITHIN 2 FT. OF THE DRIVEWAY TO THE PROPERTY.
4. AN APPROVED ENCROACHMENT PERMIT FROM THE OFFICE OF THE CITY ENGINEER SHALL BE OBTAINED BEFORE CURBS MAY BE PAINTED.
5. PAINT MUST BE APPROVED BY THE CITY ENGINEER.
6. PAINTING CONTRACTOR MUST HAVE A VALID BUSINESS LICENSE IN THE CITY OF MODESTO.
7. A SPECIFIED FEE SHALL BE CHARGED FOR WORK PERFORMED (NO DONATIONS).
8. APPROVAL IN WRITING OF THE PROPERTY OWNER PRIOR TO PAINTING SHALL BE SUBMITTED TO THE CITY ENGINEER.
9. NUMBER SHALL BE CENTERED ON 24" BACKGROUND.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: K.B.

DATE: 6-96

LIGHTING & TRAFFIC

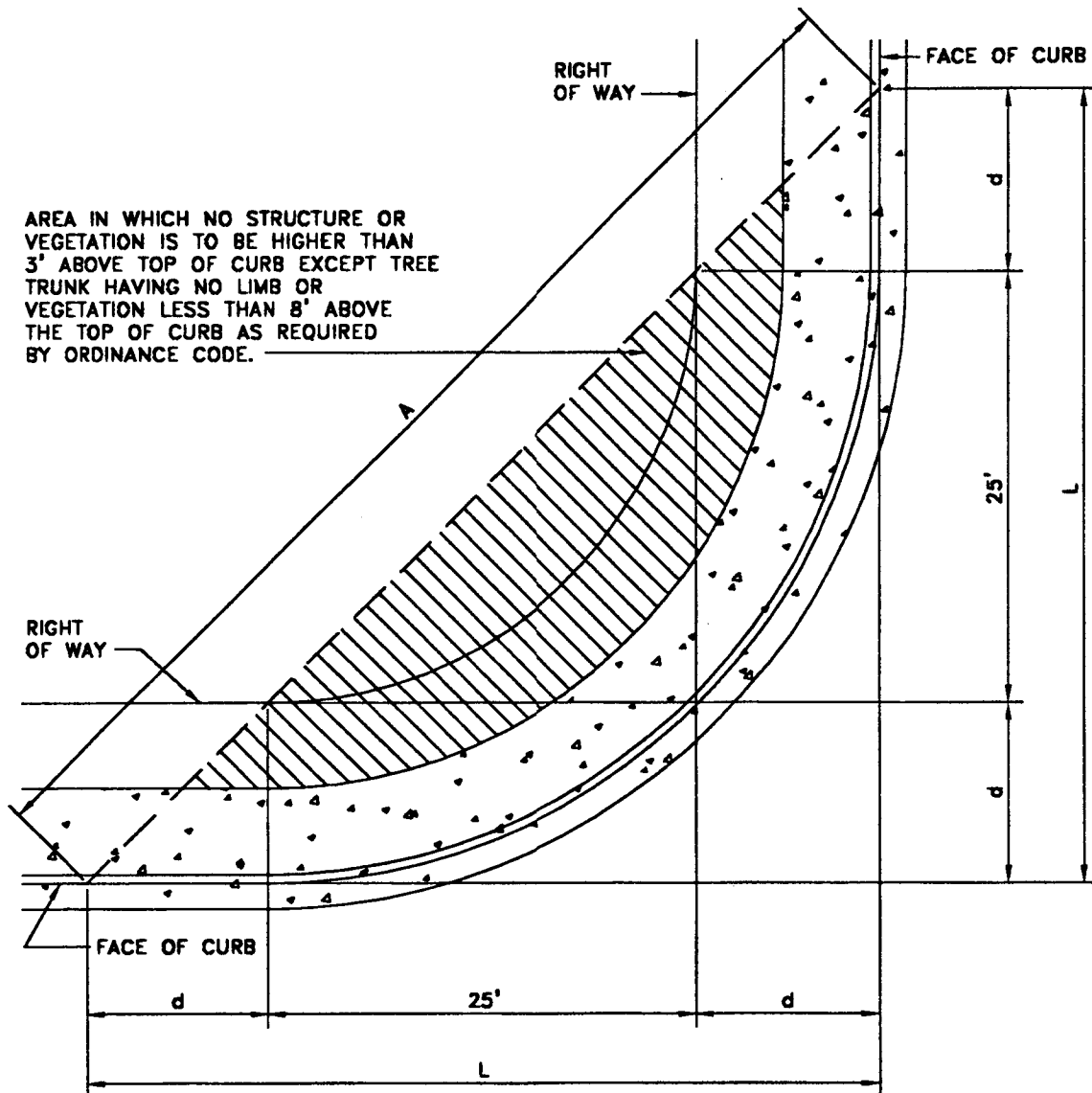
**CURB
NUMBERS**

**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

DETAIL NO.
710



TOTAL DISTANCE (L) = 25 + 2d

EXAMPLE: $L = 25' + 2(10') = 45'$
 $A = 1.412 \times L$
 $A = 1.412 \times 45' = 63.5'$

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: K.B.

DATE: 6-96

LIGHTING & TRAFFIC

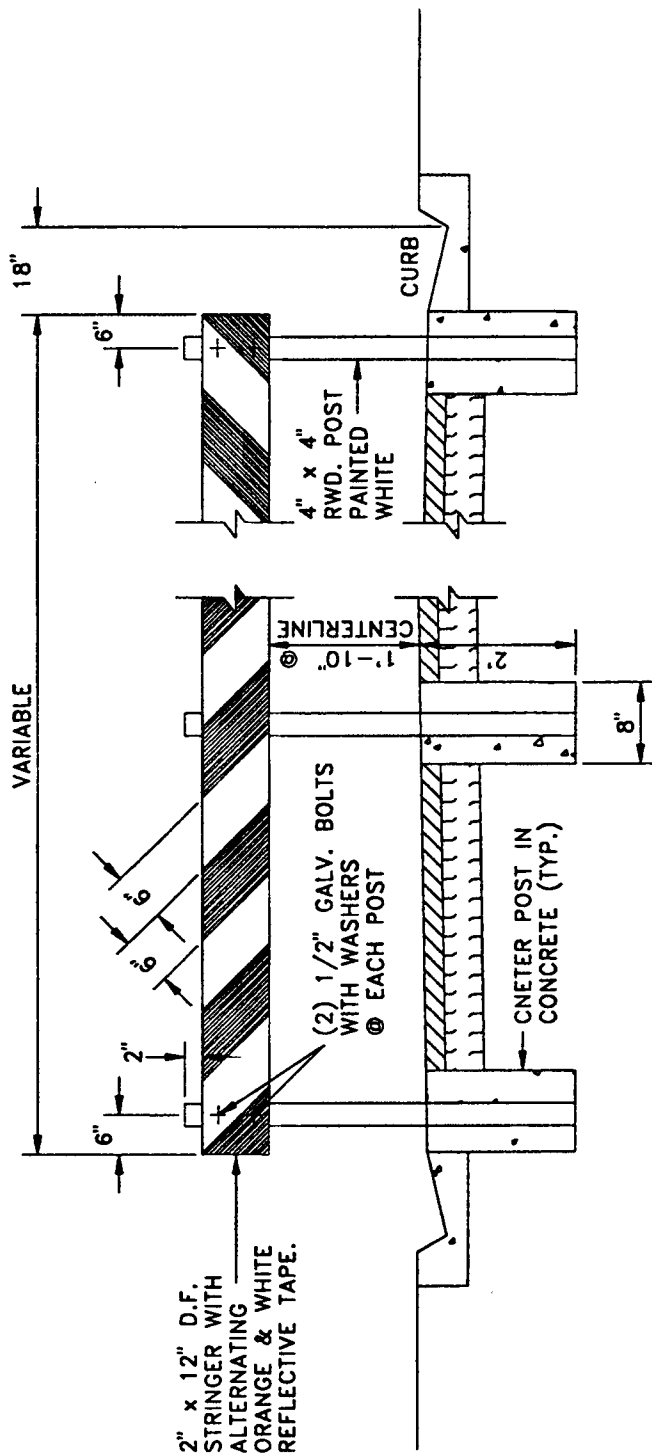
CLEAR VISION TRIANGLE AREA

DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.
711

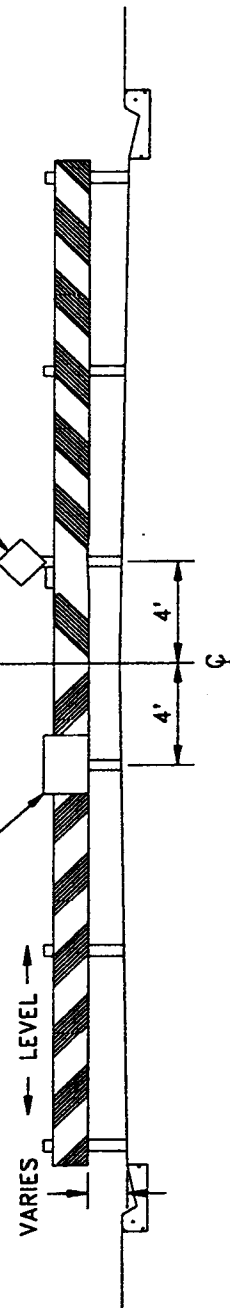


SECTION

30" x 30" YELLOW W31 "SCOTCHLITE" OR APPROVED EQUAL ON ALUMINUM WARNING SIGN.

18" x 18" RED TYPE N "SCOTCHLITE" WITH RED REFLECTIVE BACKGROUND, OR APPROVED EQUAL, ON ALUMINUM WARNING SIGN.

SEE DETAIL #714 FOR INFORMATION SIGN



ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: HOVIK

DATE: 07-19-88

REVISED BY: VINCE YAH

DATE: 01-91

DRAWN BY: RS

DATE:

LIGHTING & TRAFFIC

DEAD END STREET
BARRICADE

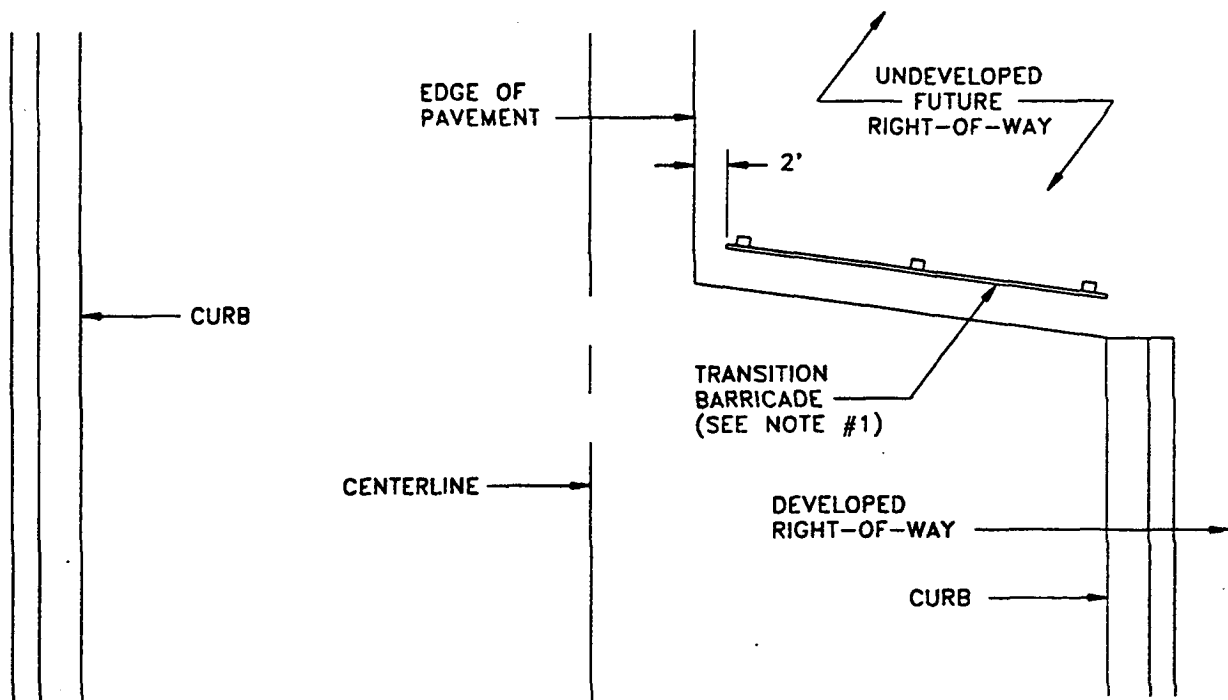
DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.

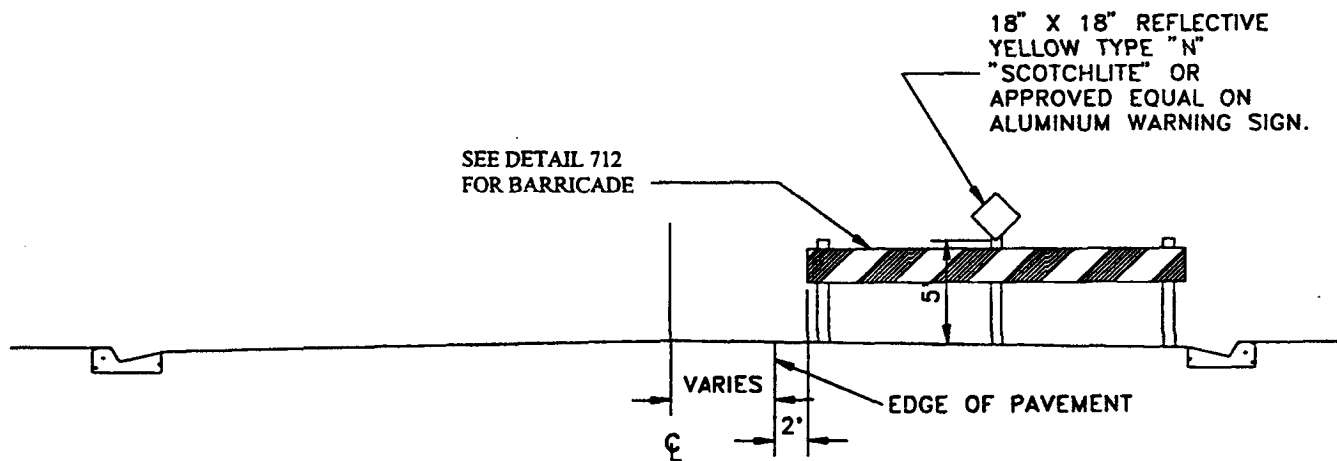
712



PLAN

NOTE:

1. ALTERNATE LOCATION SHALL BE AS APPROVED BY THE ENGINEER.



PROFILE

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: HOVIK DATE: 07-15-88

REVISED BY: DATE:

DRAWN BY: LCB

DATE: 04-88

LIGHTING & TRAFFIC

STREET WIDTH
TRANSITION BARRICADE

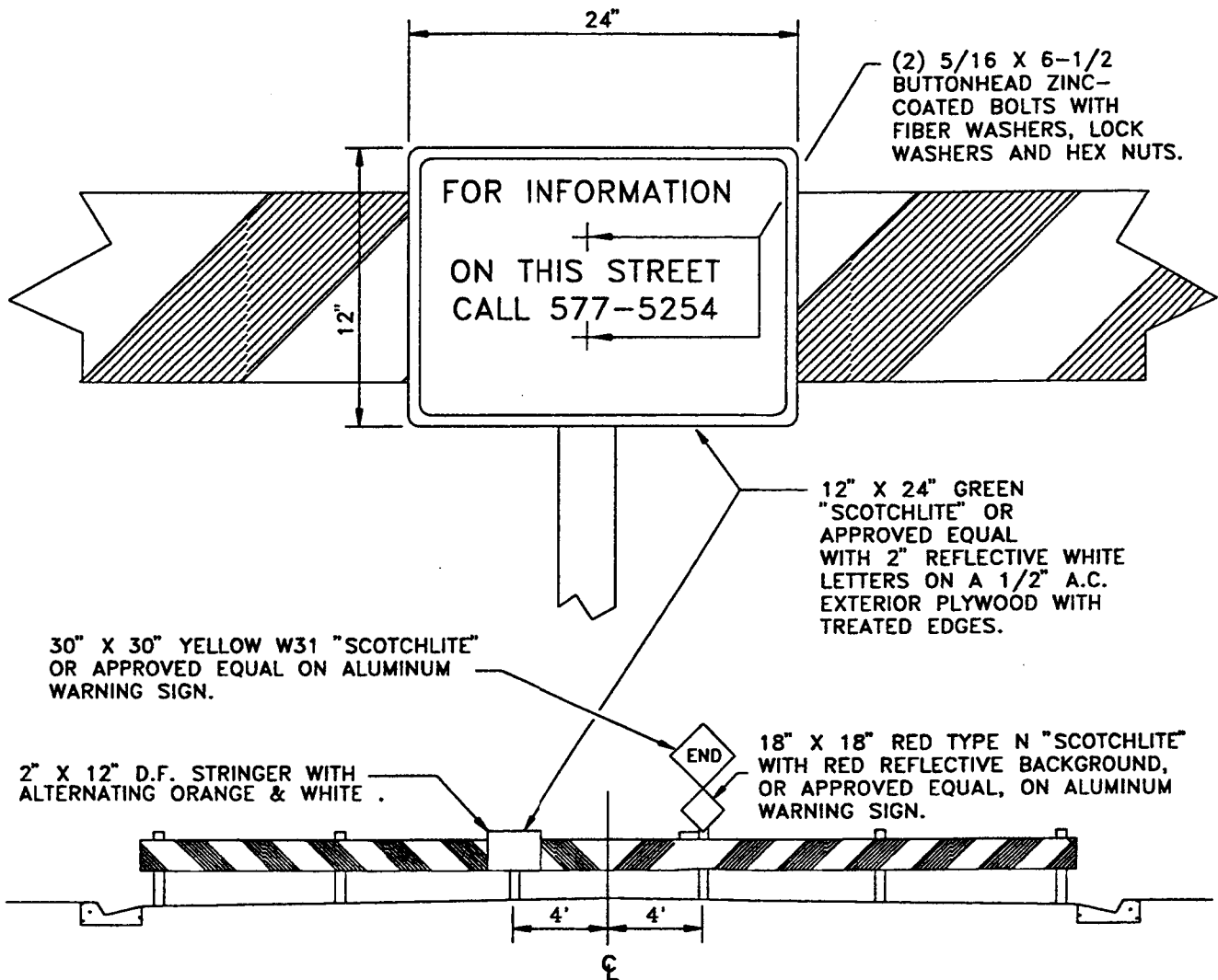
DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.

713



ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: HOVIK DATE: 11-89

REVISED BY: r.a.c. DATE: 02-94

DRAWN BY: FRE

DATE: 1-75

LIGHTING & TRAFFIC INFORMATION ON DEAD END BARRICADE

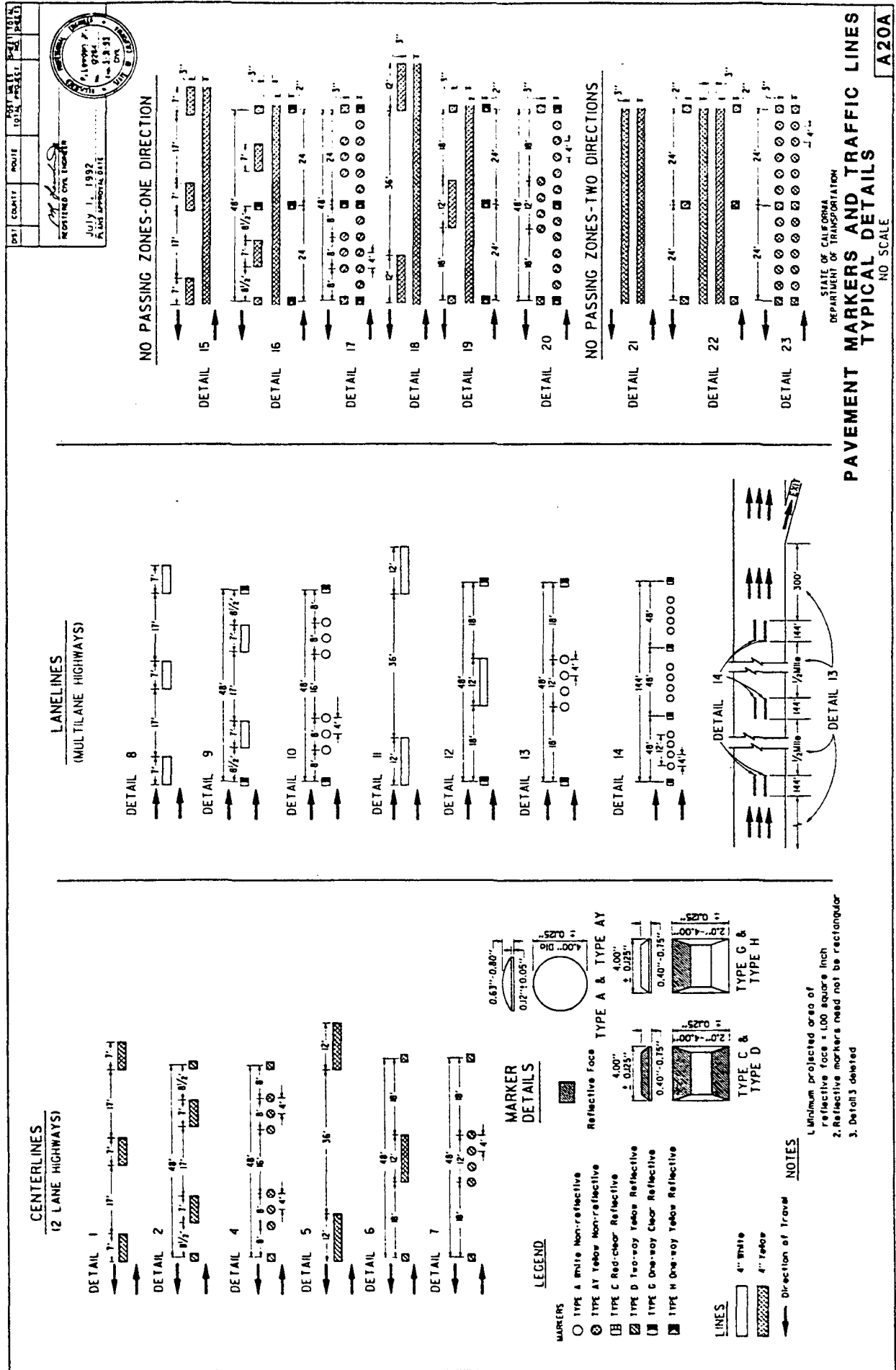
DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.

714



POST OFFICE	ROUTE	TOTAL MILES	DATE

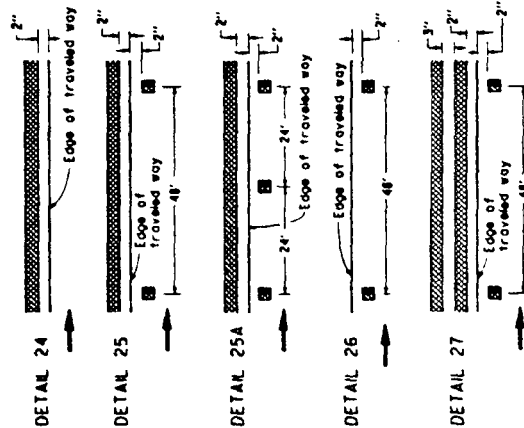
REGISTERED ONE LOCATION

JULY 1, 1992

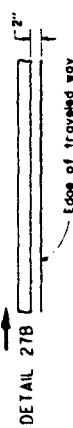
PLANS APPROVAL DATE

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

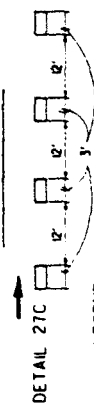
LEFT EDGELINES
(DIVIDED HIGHWAYS)



RIGHT EDGELINE



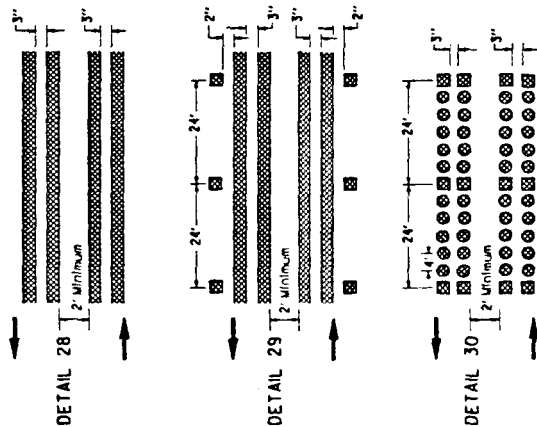
RIGHT EDGELINE EXTENSION THROUGH INTERSECTIONS



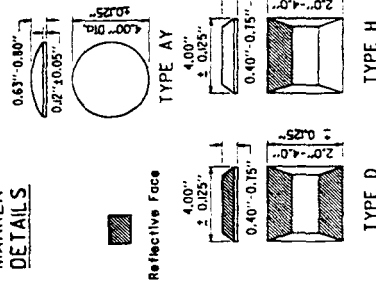
LEGEND

- MARKERS
- TYPE D Two-way Yellow Reflective
 - TYPE AT Yellow Non-reflective
 - TYPE H One-way Yellow Reflective
- LINES
- 4" WHITE
 - 4" YELLOW
 - Direction of Travel

MEDIAN ISLANDS



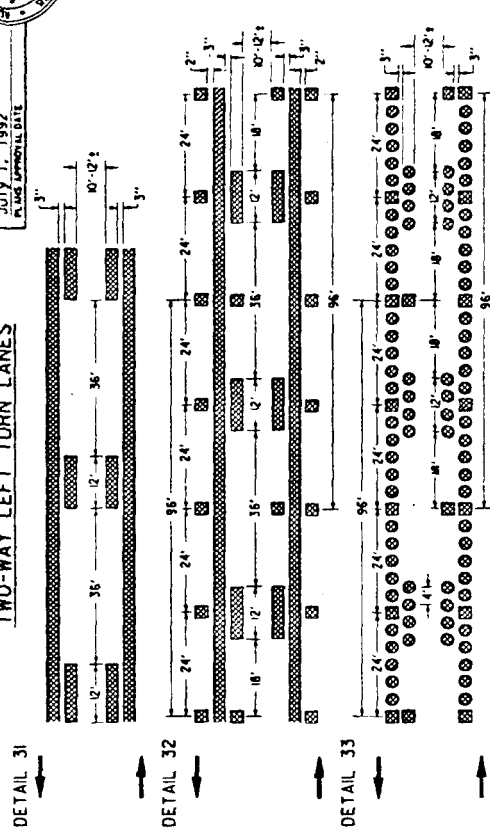
MARKER DETAILS



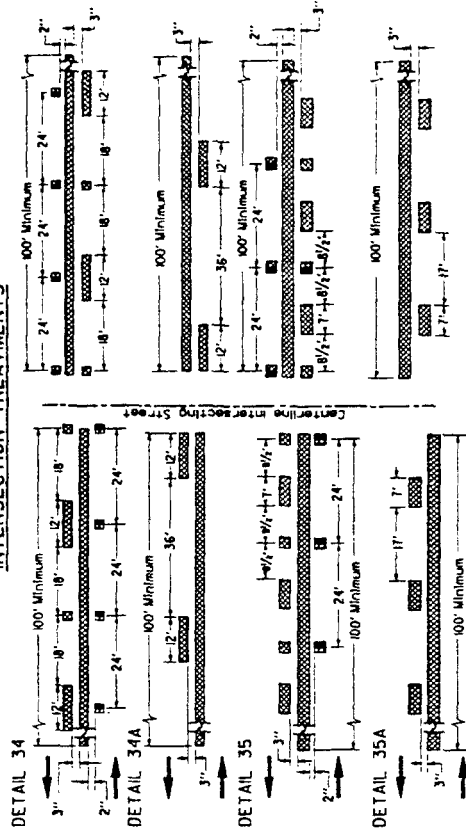
NOTES

- Minimum projected area of reflective face ± 4.00 square inch
- Reflective marker need not be rectangular
- Detail 27A deleted

TWO-WAY LEFT TURN LANES



INTERSECTION TREATMENTS



PAVEMENT MARKERS AND TRAFFIC LINES TYPICAL DETAILS

A20B

NO SCALE

STATE OF CALIFORNIA

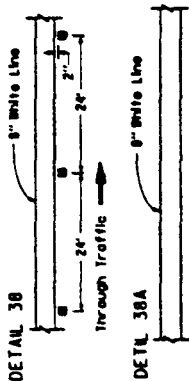
DEPARTMENT OF TRANSPORTATION

PAVEMENT MARKERS AND TRAFFIC LINES TYPICAL DETAILS

Direction of Travel

DATE	ROUTE	PROJECT
JULY 1, 1992	107	107
JULY 1, 1992 PLANNING DIVISION PLANNING DIVISION		

CHANNELIZING LINE



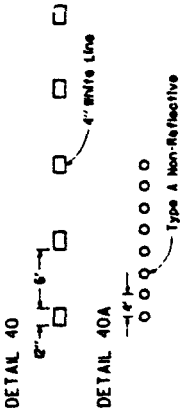
BIKE LANE LINE



BIKE LANE



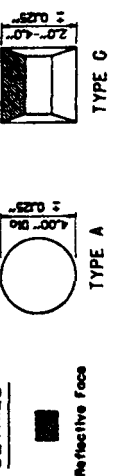
LANE LINE EXTENSIONS THROUGH INTERSECTIONS



LEGEND

- TYPE A White Non-reflective
- ◻ TYPE G One-way Clear Reflective
- Direction of Travel

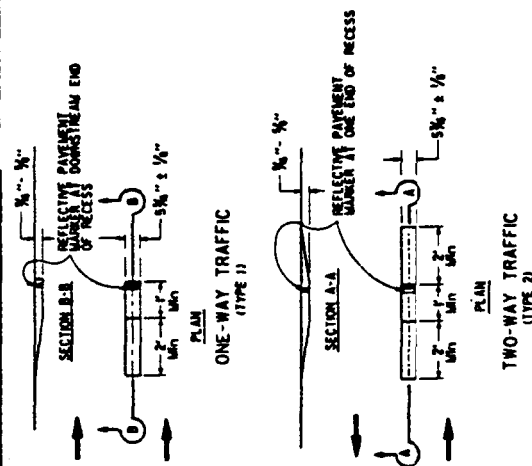
MARKER DETAILS



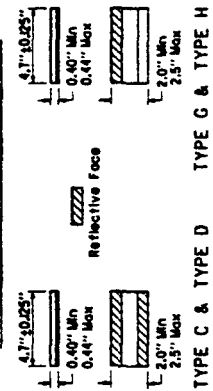
NOTES

1. Minimum projected area of reflective face = 100 square inch
2. Reflective markers need not be rectangular
3. See typical traffic line details for marker patterns to be used with recessed pavement markers.
- Detail H requires a Type 2 recess.

RECESS DETAIL FOR REFLECTIVE PAVEMENT MARKER



REFLECTIVE PAVEMENT MARKER FOR RECESSED INSTALLATION



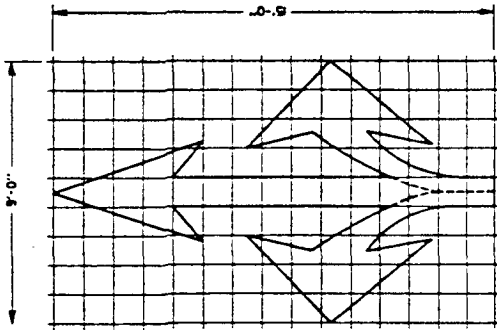
See Note 3

DATE	COUNTY	ROUTE	POST MILE	SECTION

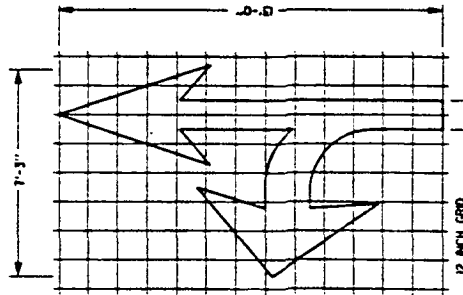
REGISTERED CIVIL ENGINEER

July 1, 1992

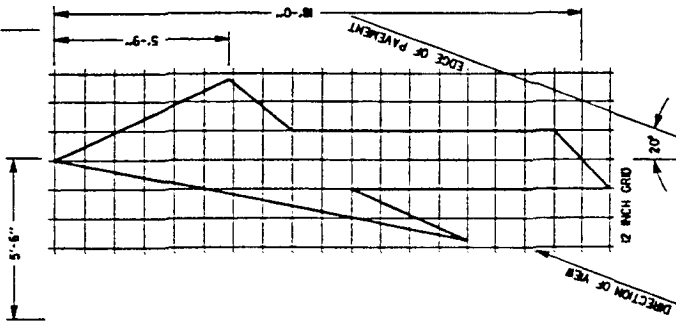
PLANS APPROVAL DATE



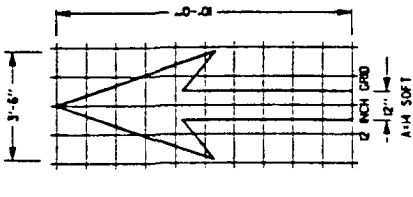
TYPE VIII ARROW



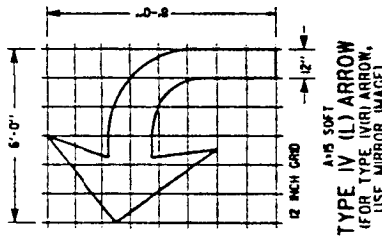
TYPE VII(L) ARROW
(FOR TYPE VII(R) ARROW,
USE MIRROR IMAGE)



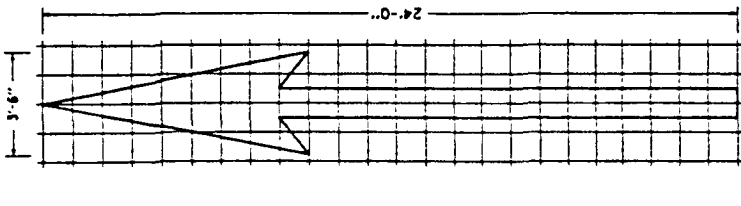
TYPE VI ARROW
RIGHT LANE DROP ARROW
(FOR LEFT LANE,
USE MIRROR IMAGE)



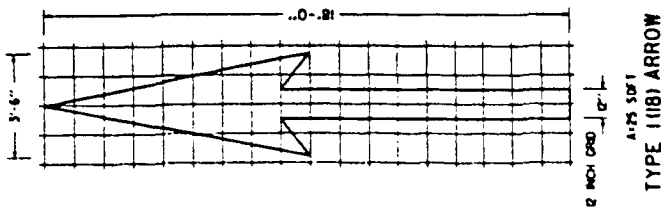
TYPE I(II) ARROW



TYPE IV (L) ARROW
(FOR TYPE IV(R) ARROW,
USE MIRROR IMAGE)

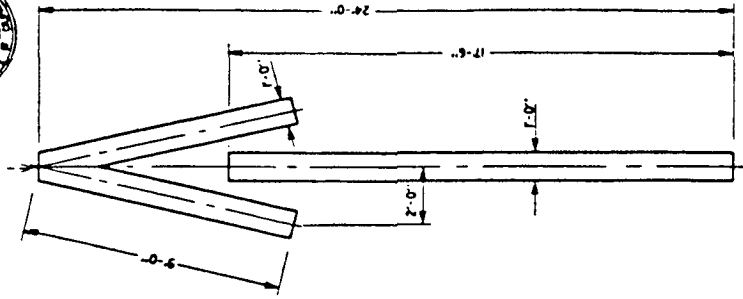


TYPE 11(24) ARROW



TYPE 11(8) ARROW

TYPE V ARROW



NOTES:

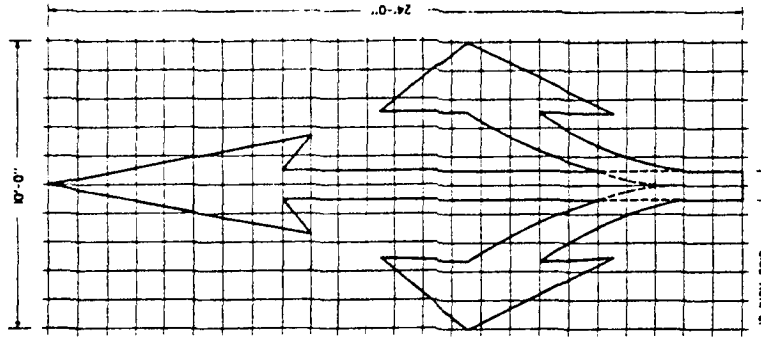
MINOR VARIATIONS IN DIMENSIONS
MAY BE ACCEPTED BY THE ENGINEER.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
PAVEMENT MARKINGS
ARROWS
NO SCALE

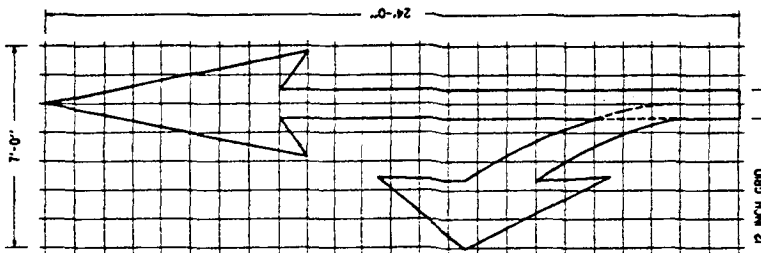
A24A

POST COUNTY	ROUTE	POST MILE	POST MILE

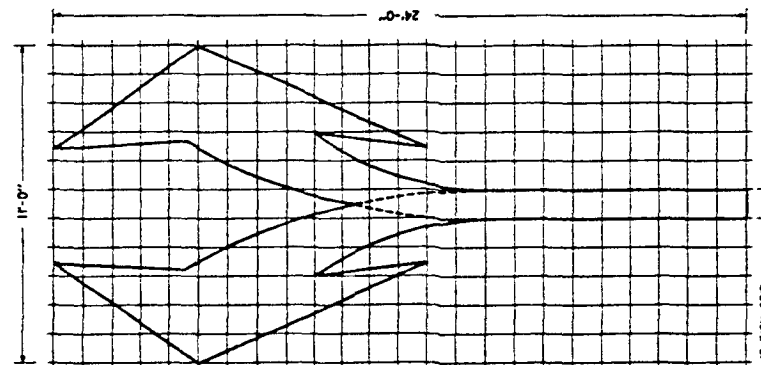
JULY 1, 1992
 REVISIONS ON DRAWING
 DATE APPROVAL DATE
 1-2-93



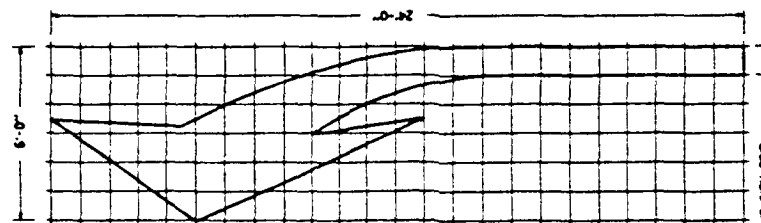
TYPE II(B) ARROW



TYPE II(L) ARROW
(FOR TYPE II(R) USE MIRROR IMAGE)



TYPE III(B) ARROW



TYPE III(L) ARROW
(FOR TYPE III(R) USE MIRROR IMAGE)

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

STATE OF CALIFORNIA
 DEPARTMENT OF TRANSPORTATION
 PAVEMENT MARKINGS

ARROWS
 NO SCALE

A24B

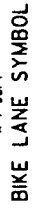
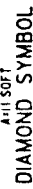
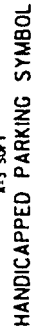
**MINOR VARIATIONS IN DIMENSIONS
MAY BE ACCEPTED BY THE ENGINEER.**

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

**PAVEMENT MARKINGS
SYMBOLS AND NUMERALS**

NO SCALE

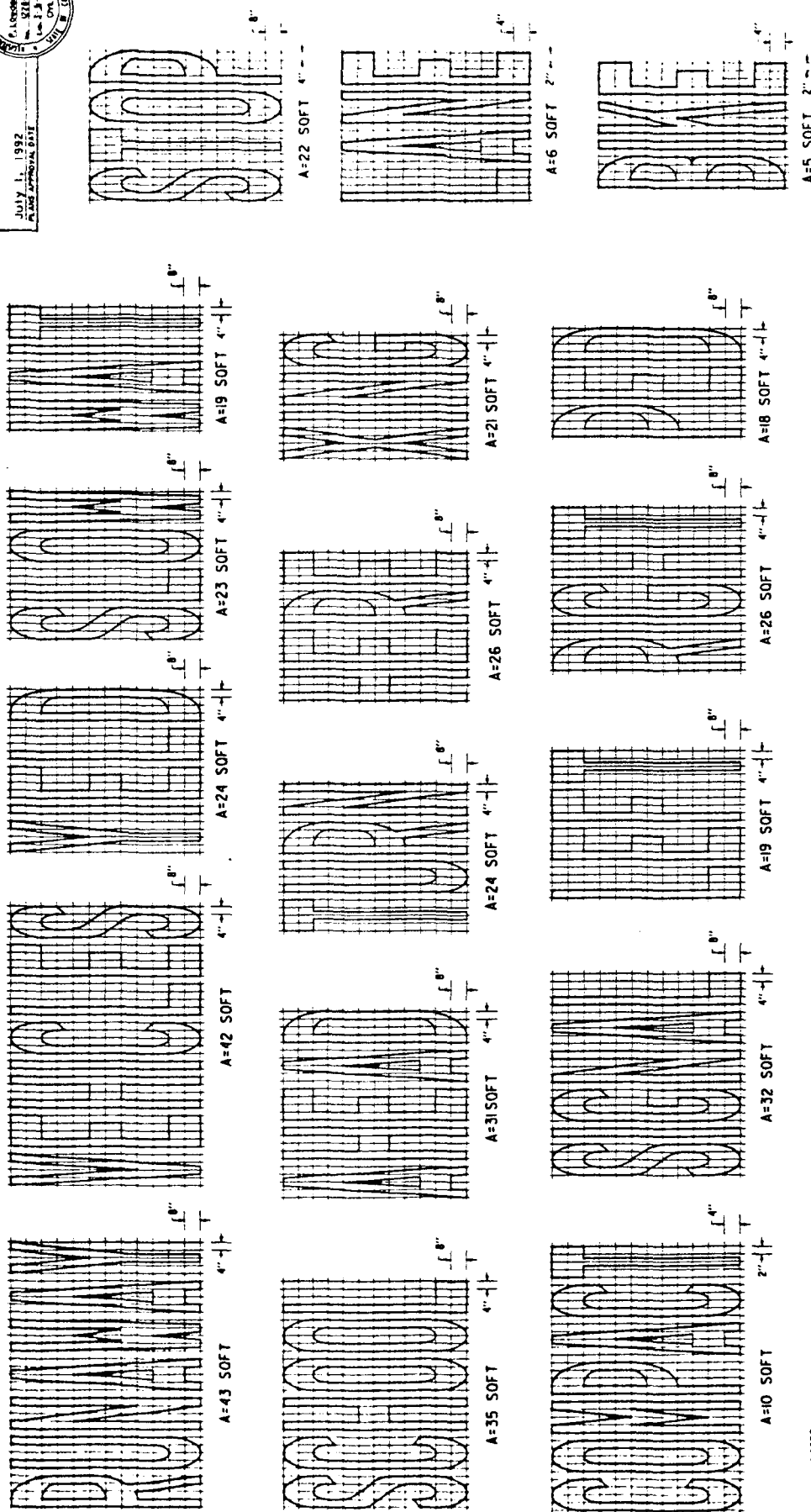
A24C



RAILROAD CROSSING SYMBOL
TO SOFT DOES NOT INCLUDE THE 2' X 10" VARIABLE
BOTH TRANSVERSE LINES.

POST COUNTY	ROUTE	POST MILE	POST TOTAL

	
REGISTERED CIVIL ENGINEER JULY 1, 1992 PLANS APPROVAL DATE	



NOTES.

- (1) If a message consists of more than one word, it should read "UP", i.e., the first word should be nearest the driver.
- (2) The space between words should be at least four times the height of the characters for low speed roads, but not more than ten times the height of the characters. The space may be reduced appropriately where there is limited space because of local conditions.
- (3) Minor variations in dimensions may be accepted by the Engineer.
- (4) Portions of a letter, number or symbol may be separated by connecting segments not to exceed 2" in width.

WORD MARKINGS											
ITEM	SOFT	ITEM	SOFT	ITEM	SOFT	ITEM	SOFT	ITEM	SOFT	ITEM	SOFT
XING	21	YIELD	24	BKE	5	PEB	18				
AHEAD	31	SCHOOL	35	SLOW	23	COMPACT	10				
WAIT	19	SIGNAL	32	STOP	22	RAILWAY	43				
LANE	6	TURN	24	LEFT	19	VEHICLES	42				
RIGHT	26	HERE	26								

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
PAVEMENT MARKINGS
WORDS
NO SCALE

A 24D

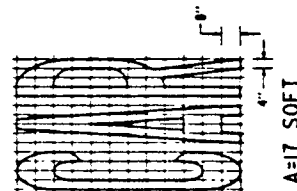
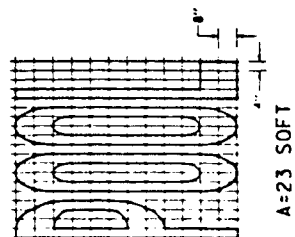
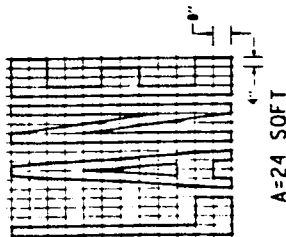
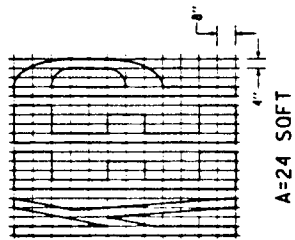
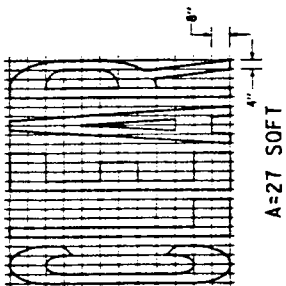
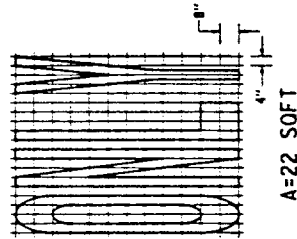
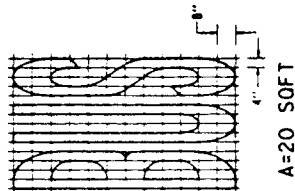
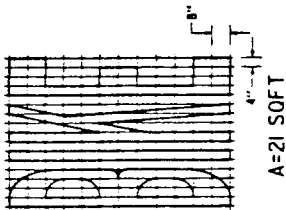
DS1	CDR11	ROUTE	POST MILE	POST MILE	POST MILE
					
REGISTERED CIVIL ENGINEER JULY 1, 1992 EXPIRATION DATE JULY 1, 1995					

CROSSWALK AND LIMIT LINE

See Note 5
12" White Line



WORD MARKINGS			
ITEM	SOFT	ITEM	SOFT
LINE	24	NO	5
POOL	23	BRE	21
CAR	17	BUS	20
CLEAR	27	ONLY	22
KEEP	24		



NOTES

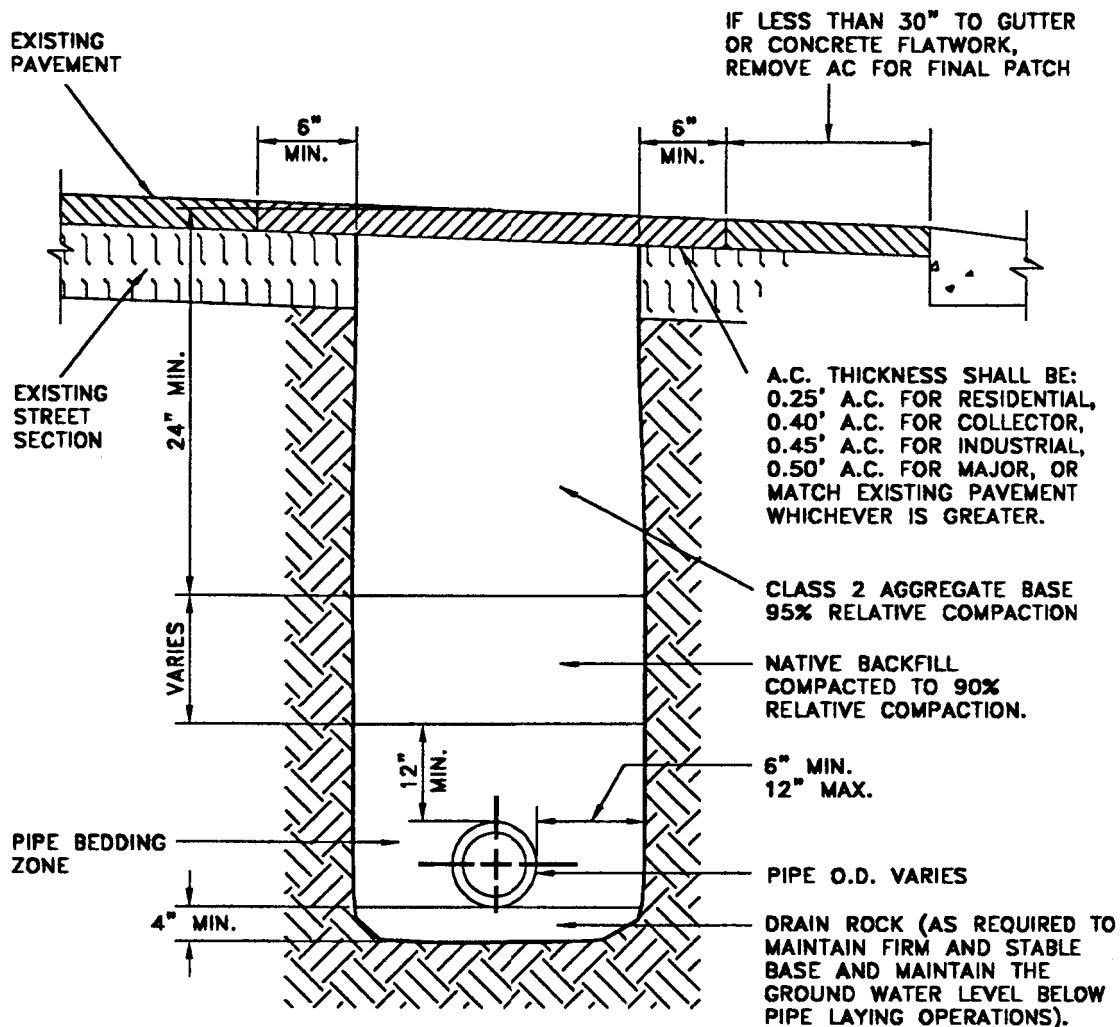
- (1) If a message consists of more than one word, it should read "p", i.e., the first word should be nearest the driver.
- (2) The space between words should be at least four times the height of the characters for low speed roads, but not more than ten times the height of the characters. The space may be reduced appropriately where there is limited space because of local conditions.
- (3) Minor variations in dimensions may be accepted by the Engineer.
- (4) Portions of a letter, number or symbol may be separated by connecting segments not to exceed 2" in width.
- (5) Crosswalks contiguous to school grounds are to be 12" yellow lines in place of 12" white shown.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

**PAVEMENT MARKINGS
WORDS AND CROSSWALKS**

NO SCALE

A24E



SECTION

NOTES:

1. TRENCH SECTION SHALL BE BACKFILLED AND MECHANICALLY COMPACTED TO GRADE.
2. IN EXISTING PAVEMENT, CONTRACTOR SHALL FURNISH 2" TEMPORARY PAVEMENT, TO BE INSTALLED AND COMPACTED AS DIRECTED BY THE CITY ENGINEER.
3. ON INDUSTRIAL STREETS OR WHERE T.I. IS 10 OR ABOVE, THE DEPTH OF RELATIVE COMPACTION SHALL BE DETERMINED BY THE CITY ENGINEER.
4. IF TRENCH IS WITHIN 3' OF EXISTING GUTTER OR CONCRETE FLATWORK, CONTRACTOR SHALL REMOVE AC AND PAVE TRENCH AND ADJACENT PIECE.
5. PRIME COAT REQUIRED ABOVE AGGREGATE BASE.
6. BACKFILL MATERIAL FOR THE PIPE BEDDING ZONE SHALL BE SAND, CLASS 2 AGGREGATE BASE OR A CONTROLLED DENSITY BACKFILL (SLURRY MIX). SEE SECTION 9 OF THE CONSTRUCTION STANDARDS.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: K.B. DATE: 6-96

REVISED BY: DATE:

DRAWN BY: r.a.c.

DATE: 9-92

UTILITIES

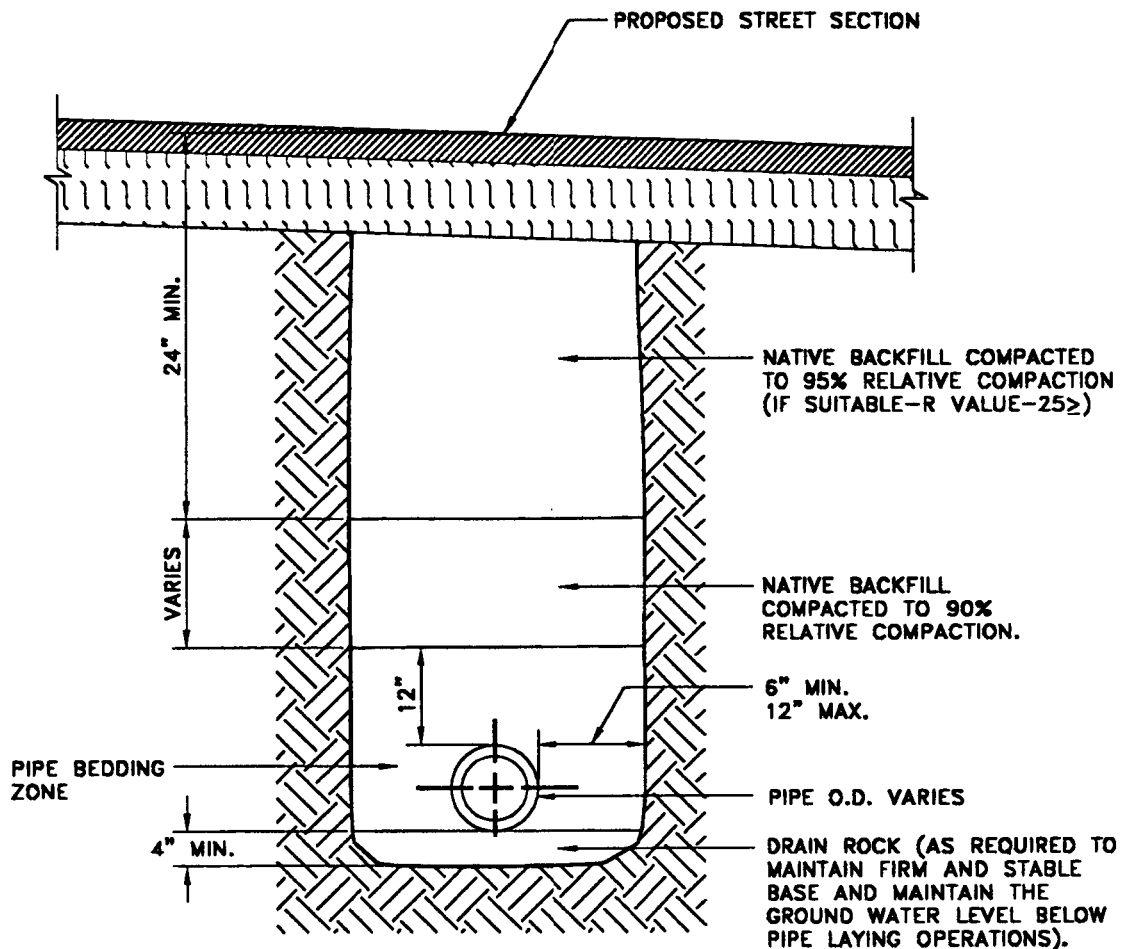
TRENCH BACKFILL EXISTING STREETS

DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.
800



SECTION

NOTES:

1. TRENCH SECTION SHALL BE BACKFILLED AND MECHANICALLY COMPACTED TO GRADE.
2. THE CLEAR WIDTH OF THE TRENCH SHALL BE A MAXIMUM OF THE PIPE O.D. PLUS 2 FEET. IF THE MAXIMUM TRENCH WIDTH MUST BE EXCEEDED OR IF THE PIPE IS INSTALLED IN A COMPACTED EMBANKMENT, THEN EMBEDMENT SHALL BE COMPACTED TO A POINT OF AT LEAST 2 1/2 PIPE DIAMETERS FROM THE PIPE ON BOTH SIDES OF THE PIPE OR TO THE TRENCH WALLS, WHICHEVER IS LESS.
3. IN LANDSCAPED AREAS, THE NATIVE BACKFILL SHALL BE COMPACTED TO 85% RELATIVE COMPACTION.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: K.B. DATE: 6-96

REVISED BY: DATE:

DRAWN BY: r.a.c.

DATE: 9-92

UTILITY

TRENCH BACKFILL UNDEVELOPED STREETS

DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.

801

NOTES:

1. UNSTABLE SUBGRADE MATERIAL SHALL BE EXCAVATED AND STABILIZED WITH #3 ROCK (PER ASTM 33 OR APPROVED EQUAL) OR WITH CEMENT SLURRY/CONCRETE AS APPROVED BY THE CITY ENGINEER.
2. ALL TRENCHES SHALL BE SHORED OR PROTECTED IN ACCORDANCE WITH OSHA AND OTHER STATE AND FEDERAL SAFETY CODES, REGULATIONS AND ORDINANCES.
3. FOR EXISTING STREETS, BACKFILL MATERIAL SHALL BE AGGREGATE BASE (95% RELATIVE COMPACTION 2'-0" BELOW THE PAVEMENT SURFACE) AND NATIVE BACKFILL (90% RELATIVE COMPACTION FOR THE REMAINING DEPTH TO THE PIPE BEDDING).
4. PLACEMENT OF AGGREGATE BASE SHALL BE IN 12" LIFTS EVENLY PLACED AND MECHANICALLY COMPACTED TO RELATIVE DENSITY AS SPECIFIED. COMPACTION TESTS SHALL BE REQUIRED AT THE DISCRETION OF THE CITY ENGINEER. ALL COSTS RELATED TO THESE TESTS SHALL BE BORNE BY THE OWNER/CONTRACTOR/UTILITY COMPANY WHEN SUCH TESTS ARE REQUIRED. IF RESULTS OF THESE TESTS DO NOT MEET SPECIFIED REQUIREMENTS, BACKFILL SHALL BE EXCAVATED, REPLACED, COMPACTED AND RETESTED. IN CASE OF ONE SACK SLURRY MIX OR CONTROLLED DENSITY FILL, NO COMPACTION TEST WILL BE REQUIRED.
5. DROP HAMMER SHALL NOT BE USED TO CUT PAVEMENT.
6. ALL TRENCHES SHALL BE BACKFILLED AND TEMPORARILY PAVED AT THE END OF EACH WORKING DAY. THE USE OF STEEL PLATES MUST BE APPROVED BY THE CITY ENGINEER AT LEAST 48 HOURS IN ADVANCE.
7. MINIMUM 24 HOUR NOTICE SHALL BE REQUIRED FOR ALL CITY INSPECTIONS. CALL CITY OF MODESTO CONSTRUCTION ADMINISTRATION OFFICE AT 577-5316.
8. INITIAL CUT IN STREET PAVEMENT SHALL BE EQUAL TO THE WIDTH OF THE TRENCH WITH THE OPTION OF BEING JACK HAMMERED OR SAW CUT.
9. FINAL CUT IN STREET PAVEMENT SHALL BE 12" WIDER THAN THE TRENCH WIDTH AS SHOWN IN THE DETAIL AND SHALL BE MADE BY SAW CUTTING ONLY.
10. TEMPORARY BITUMINOUS SURFACING (CUT BACK) SHALL BE PLACED AND COMPACTED IMMEDIATELY ABOVE THE TRENCH FOLLOWING COMPACTION AND APPROVED BY THE CITY ENGINEER. MINIMUM DEPTH OF CUT BACK SHALL BE 2" OR AS SPECIFIED BY THE CITY ENGINEER. CUT BACK SHALL BE MAINTAINED IN A CONDITION SATISFACTORY TO THE CITY ENGINEER UP TO THE TIME THE FINAL PAVING IS PLACED ON TRENCH IN ACCORDANCE WITH NOTE #11.
11. FINAL PAVING ABOVE THE TRENCH SECTION SHALL BE PLACED WITHIN 14 DAYS OF ITS BACKFILL AND COMPACTION. EXTENSION MAY BE GRANTED BY THE CITY ENGINEER DUE TO WEATHER CONDITIONS. IN THE EVENT PERMANENT PAVING IS NOT DONE WITHIN 14 DAYS, THE CITY WILL CONSIDER THIS AS INCOMPLETE WORK AND WILL TAKE NECESSARY ACTION IN ACCORDANCE WITH PREVAILING CITY ORDINANCES AND POLICIES.
12. TEMPORARY CUT BACK SHALL BE REMOVED BEFORE PLACEMENT OF FINAL PAVING. FINAL PAVING SHALL BE PLACED ON UNDISTURBED PREVIOUSLY INSPECTED AND COMPACTED AGGREGATE BASE OR ONE SACK SLURRY MIX/CONTROLLED DENSITY FILL. RECOMPACTION SHALL BE REQUIRED FOR ANY DISTURBED BASE OR SURFACE.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: K.B.

DATE: 6-98

UTILITIES

**TRENCHING &
RESURFACING**

**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

DETAIL NO.

802

NOTES:(CONT.)

13. FOR A PARALLEL TRENCH LONGER THAN ONE HALF LENGTH OF THE BLOCK, A SLURRY SEAL SHALL BE REQUIRED ON THE ENTIRE HALF WIDTH OF THE STREET ON THE TRENCH SIDE AS DIRECTED BY THE CITY ENGINEER.
14. PROPER TRAFFIC CONTROLS AND COVERING OF TRENCHES SHALL BE MAINTAINED IN ACCORDANCE WITH THE CITY OF MODESTO STANDARD SPECIFICATIONS.
15. NO TRENCH SHALL BE OPENED IN ANY STREET FOR THE PURPOSE OF LAYING PIPES OR CONDUITS MORE THAN SIX HUNDRED (600) FEET AT A TIME.
16. ASPHALT CONCRETE SHALL BE IN ACCORDANCE WITH THE CITY OF MODESTO STANDARD SPECIFICATIONS.
17. TRENCHING SHALL NOT BE ALLOWED ON ANY STREET WHICH HAS BEEN RECONSTRUCTED OR REPAVED WITHIN THE PAST 3 YEARS NOR ON SLURRY SEALED STREETS FOR A PERIOD OF EIGHTEEN (18) MONTHS.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: K.B.

DATE: 6-98

UTILITIES

**TRENCHING &
RESURFACING**

**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**

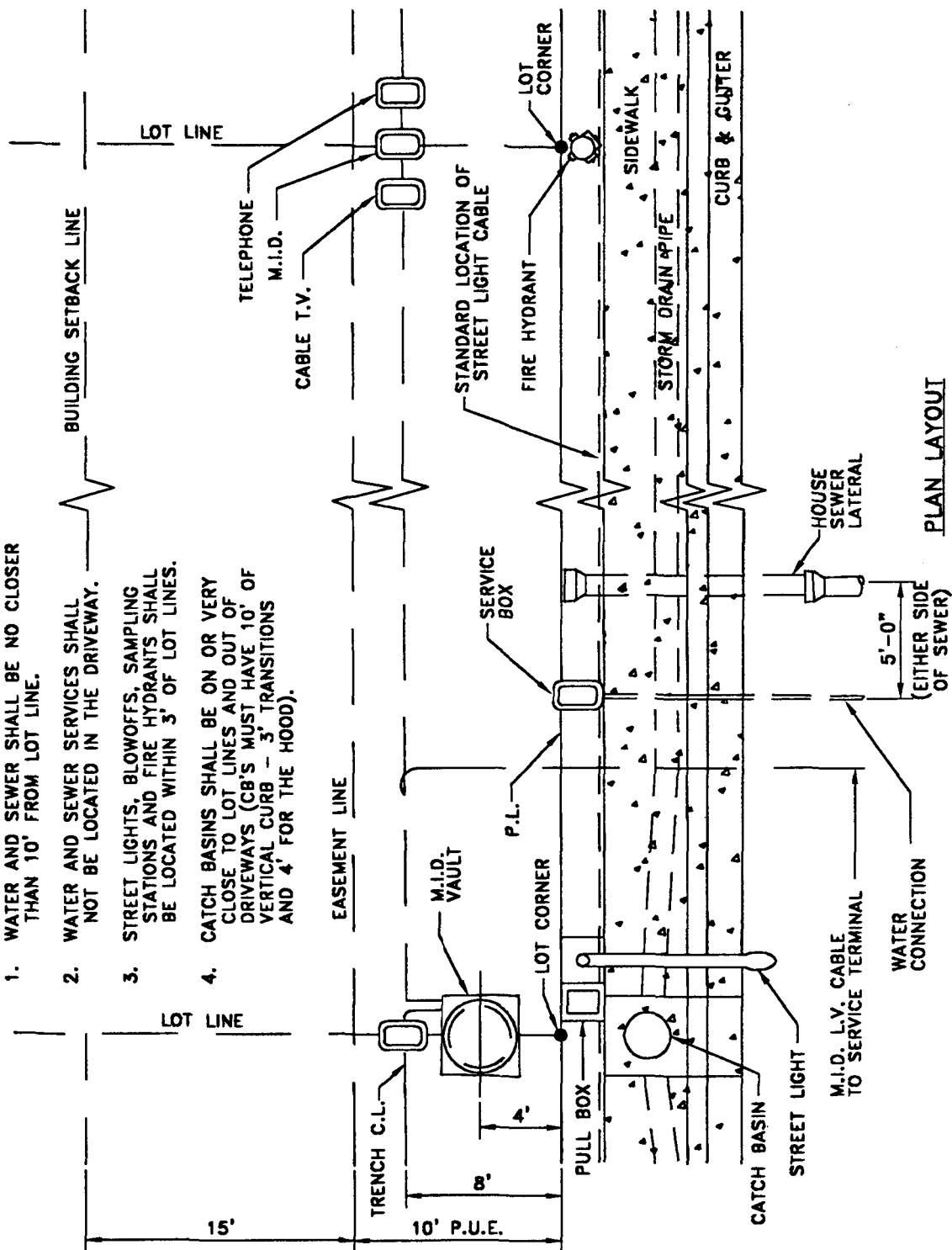


CITY of MODESTO

DETAIL NO.
803

NOTES:

1. WATER AND SEWER SHALL BE NO CLOSER THAN 10' FROM LOT LINE.
2. WATER AND SEWER SERVICES SHALL NOT BE LOCATED IN THE DRIVEWAY.
3. STREET LIGHTS, BLOWOFFS, SAMPLING STATIONS AND FIRE HYDRANTS SHALL BE LOCATED WITHIN 3' OF LOT LINES.
4. CATCH BASINS SHALL BE ON OR VERY CLOSE TO LOT LINES AND OUT OF DRIVEWAYS (CB'S MUST HAVE 10' OF VERTICAL CURB - 3' TRANSITIONS AND 4' FOR THE HOOD).



ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: K.B. DATE: 6-96

REVISED BY: YIA THAO DATE: 1-90

DRAWN BY: RS

DATE: 8-74

UTILITIES

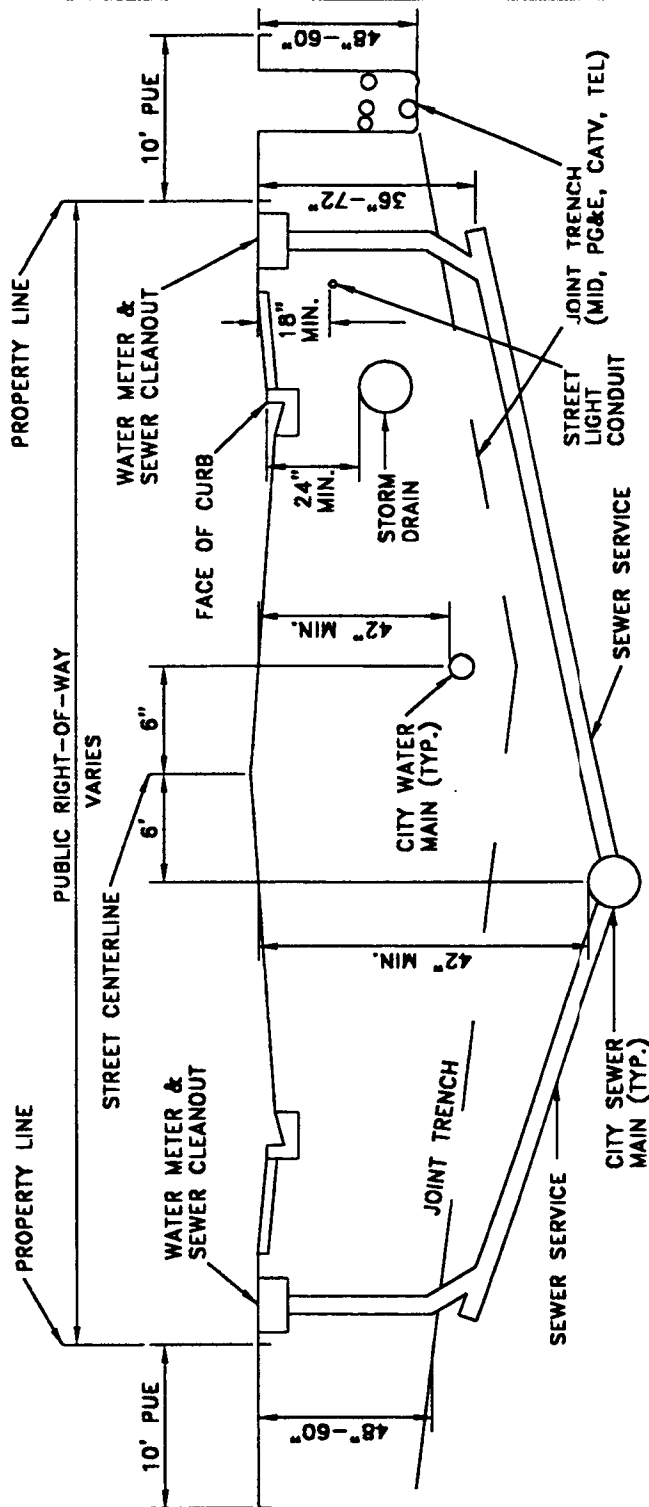
**STANDARD LOCATIONS
FOR RESIDENTIAL**

**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

DETAIL NO.
804



TYPICAL SECTION

NOTES:

1. FOR INDUSTRIAL SECTIONS, DEPTH OF SERVICES AT PROPERTY LINE SHALL BE DETERMINED BY INDIVIDUAL SEWER AND STORM DRAIN DESIGN.
2. STORM DRAIN PIPE MAY BE ON EITHER SIDE OF THE STREET UNDER FACE OF CURB TO 1.25' BEHIND CURB AND GUTTER. STORM DRAIN WILL TRANSITION INTO CURB INLETS.
3. PREVIOUS INSTALLATIONS REQUIRED SEWER TO BE ON CENTERLINE AND WATER TO BE 10' NORTH OR EAST OF CENTERLINE. IN FILL AREAS WITH NO POSITIVE STORM DRAIN, PIPE SHOULD FOLLOW THE OLD STANDARD LOCATION.
4. JOINT TRENCH MAY BE ON EITHER SIDE OF THE STREET AT APPROXIMATELY 8' BEHIND PROPERTY LINE.
5. REPAIR SPLICES AND NEW CABLE FRANCHISES PLACED IN EXISTING ROADWAYS ARE 18" OUT FROM THE LIP OF GUTTER.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY:

DATE:

REVISED BY:

DATE:

DRAWN BY: K.B.

DATE: 6-96

UTILITIES

**STREET CROSSING
FOR RESIDENTIAL**

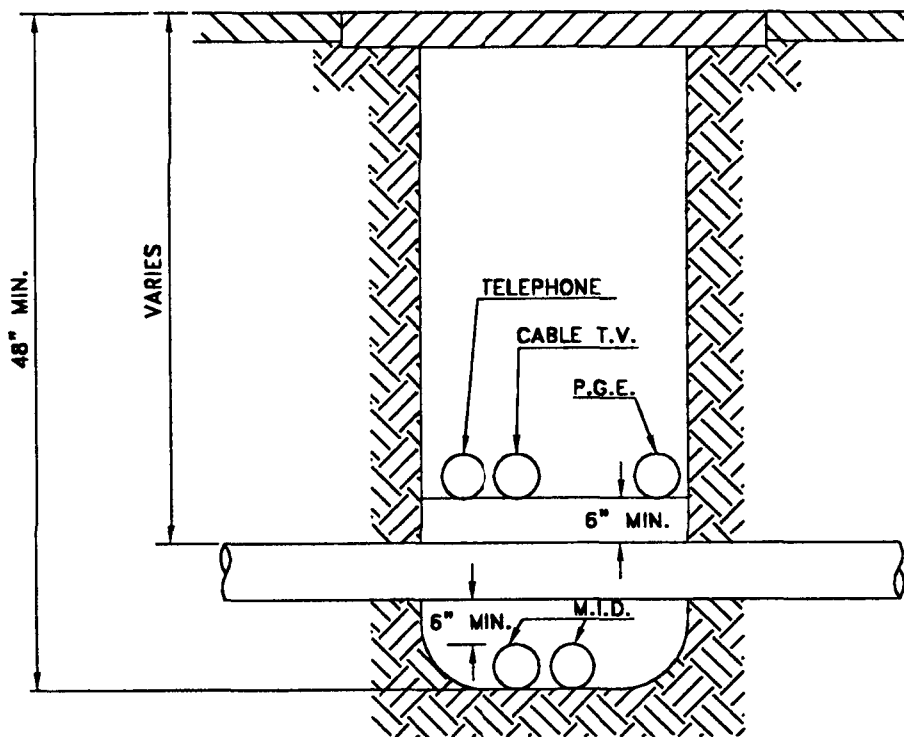
**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

DETAIL NO.

805



SECTION

NOTES:

1. A SINGLE UTILITY MAY BE PLACED IN A 4" MINIMUM WIDTH TRENCH. SINGLE UTILITY TRENCH PARALLEL TO THE STREET SHALL BE NEXT TO THE LIP OF GUTTER, UNLESS APPROVED OTHERWISE.
2. FOR BACKFILL AND COMPACTION REQUIREMENTS SEE DETAILS #800-#803.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: K.B. DATE: 6-96

REVISED BY: r.a.c. DATE: 2-94

DRAWN BY: FRE

DATE: 1-75

UTILITIES

**TRENCHING
IN THE STREET**

**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**

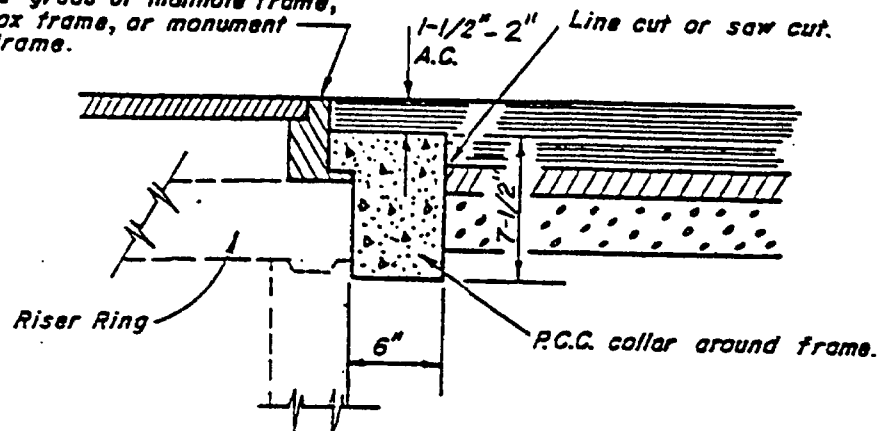


CITY of MODESTO

DETAIL NO.

806

*Proposed grade of manhole frame,
valve box frame, or monument
cover frame.*



ADJUSTING EXISTING FRAMES

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: HOVIK DATE: 11-89

REVISED BY: r.a.c. DATE: 02/94

DRAWN BY: FRE

DATE: 1-75

UTILITIES

ADJUSTING STREET FACILITIES TO GRADE

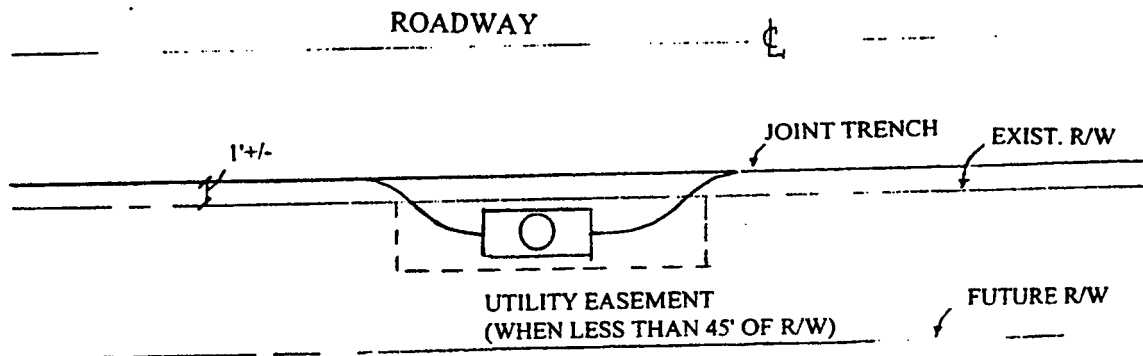
DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DRAWING NO.

807



UTILITY LOCATIONS WHEN NO DEDICATED P.U.E EXISTS

Existing
Right of Way (R/W)

Utility Location

Less than 40' R/W

Utility must obtain its own easement

40' - 45' R/W without

In non-urbanized conditions, utility placed 1' +/- from existing R/W. Utility must obtain construction easement as well as its own easement for any junction boxes. In urbanized areas, City Engineer shall engineer a location based on existing and proposed utilities.

45' or more

Utility located as far over as possible toward the edge of the R/W. Everything located within current R/W.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: HOVIK

DATE: 11-89

REVISED BY: r.a.c.

DATE: 02/94

DRAWN BY: FRE

DATE: 1-75

UTILITIES

UTILITY LOCATION
W/O ULTIMATE R.O.W.

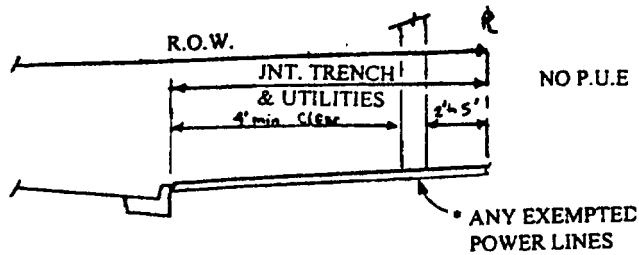
DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

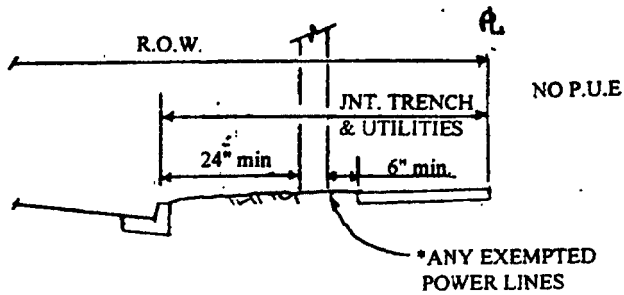
DRAWING NO.

808



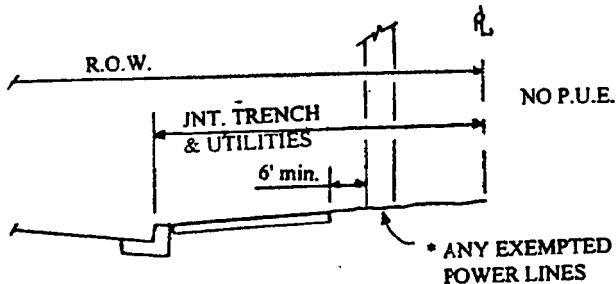
* DETERMINED BY CITY ENGINEER APPLYING
P.U.C. RULE 20 AND ECONOMIC FEASIBILITY.

CASE A



* DETERMINED BY CITY ENGINEER APPLYING
P.U.C. RULE 20 AND ECONOMIC FEASIBILITY.

CASE B



* DETERMINED BY CITY ENGINEER APPLYING
P.U.C. RULE 20 AND ECONOMIC FEASIBILITY.

CASE C

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R.E. 22055

EXP. DATE: 9-30-00

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CITY COUNCIL: 9-9-97

REVISED BY: HOVIK DATE: 11-89

REVISED BY: r.a.c. DATE: 02/94

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DATE: 1-75

UTILITIES

UTILITY LOCATIONS

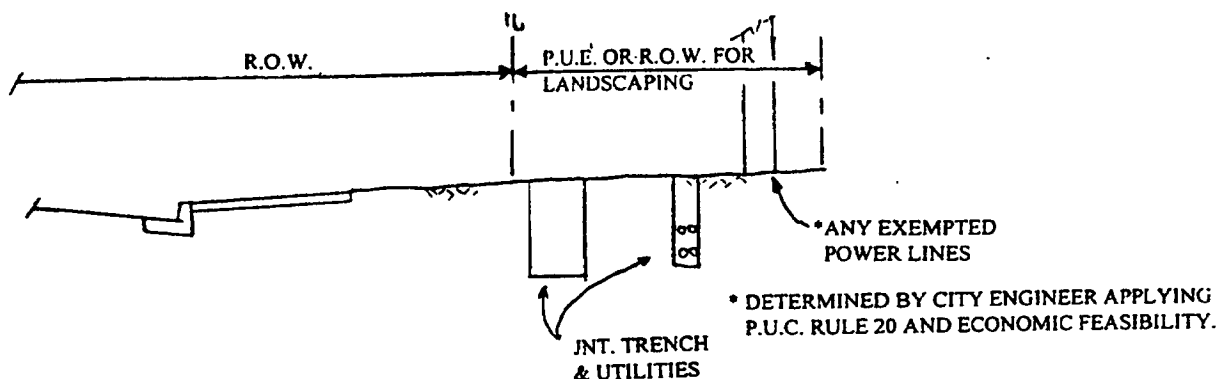
DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



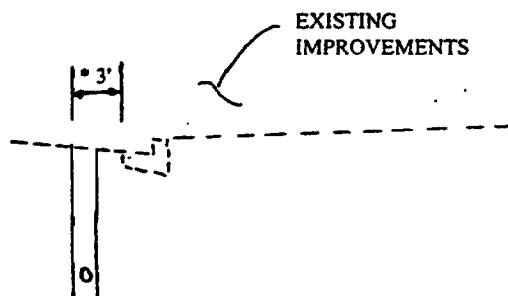
CITY of MODESTO

DRAWING NO.

809



CASE D



CASE E

GENERAL NOTES

1. A MINIMUM OF 3' SEPARATION REQUIRED BETWEEN ANY EXISTING SEWER, WATER OR STORM DRAIN AND A NEW UTILITY SERVICE (OUTSIDE WALL OR CONDUIT TO OUTSIDE WALL OF CONDUIT).
2. NO POLE RELOCATION MAY BE PLACED INTO AN EXISTING SIDEWALK UNLESS THERE IS NO P.U.E. AND THE SIDEWALK COVERS THE R.O.W. BEHIND THE CURB. IN THIS CASE, THE POLE SHALL BE PLACED BETWEEN 2' AND 5' FROM THE EDGE OF THE EXISTING R.O.W.
3. WHEN INSTALLING ANY UTILITY TRENCH PARALLEL TO THE EXISTING LIP OF GUTTER IN THE EXISTING PAVEMENT ALL PAVEMENT SLIVERS LESS THAN 3' FROM TRENCH TO LIP OF GUTTER SHALL BE REMOVED AND PATCHED WITH THE TRENCH PATCHING.

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SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-00

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CITY COUNCIL: 9-9-97

REVISED BY: HOVIK

DATE: 11-89

REVISED BY: r.a.c.

DATE: 02/94

DRAWN BY: FRE

DATE: 1-75

UTILITIES

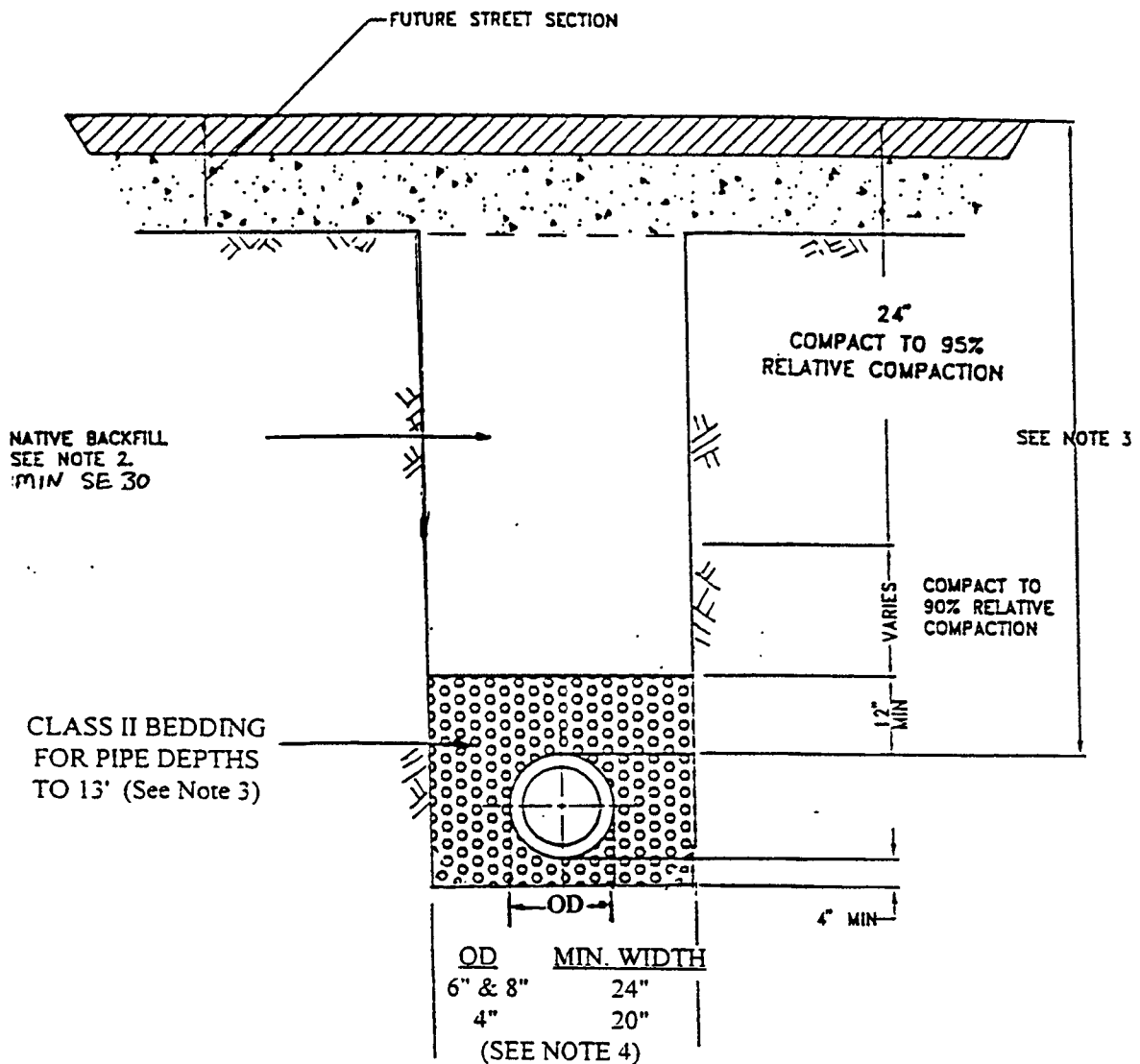
UTILITY LOCATIONS

DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DRAWING NO.
810



SECTION

Notes

1. Trench section shall be backfilled and mechanically compacted to grade (No Jutting).
2. In landscape areas the native backfill shall be compacted to 85% relative compaction.
3. Maximum cover with Class II bedding is 13 feet. Maximum cover with Class IB bedding is 16 feet.
4. Trench width shall be a minimum width not less than the greater of either the pipe outside diameter plus 16 in. (400mm) or the pipe outside diameter times 1.25 plus 12 in. (300mm).

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SIGNED BY: VAN SWITZER

R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: VINCE YAH DATE: 01-91

REVISED BY: r.a.c. DATE: 02-94

DRAWN BY: RS

DATE: 08-74

SEWERS

P.V.C SEWER TRENCH BACKFILL UNDEVELOPED STREETS

DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION

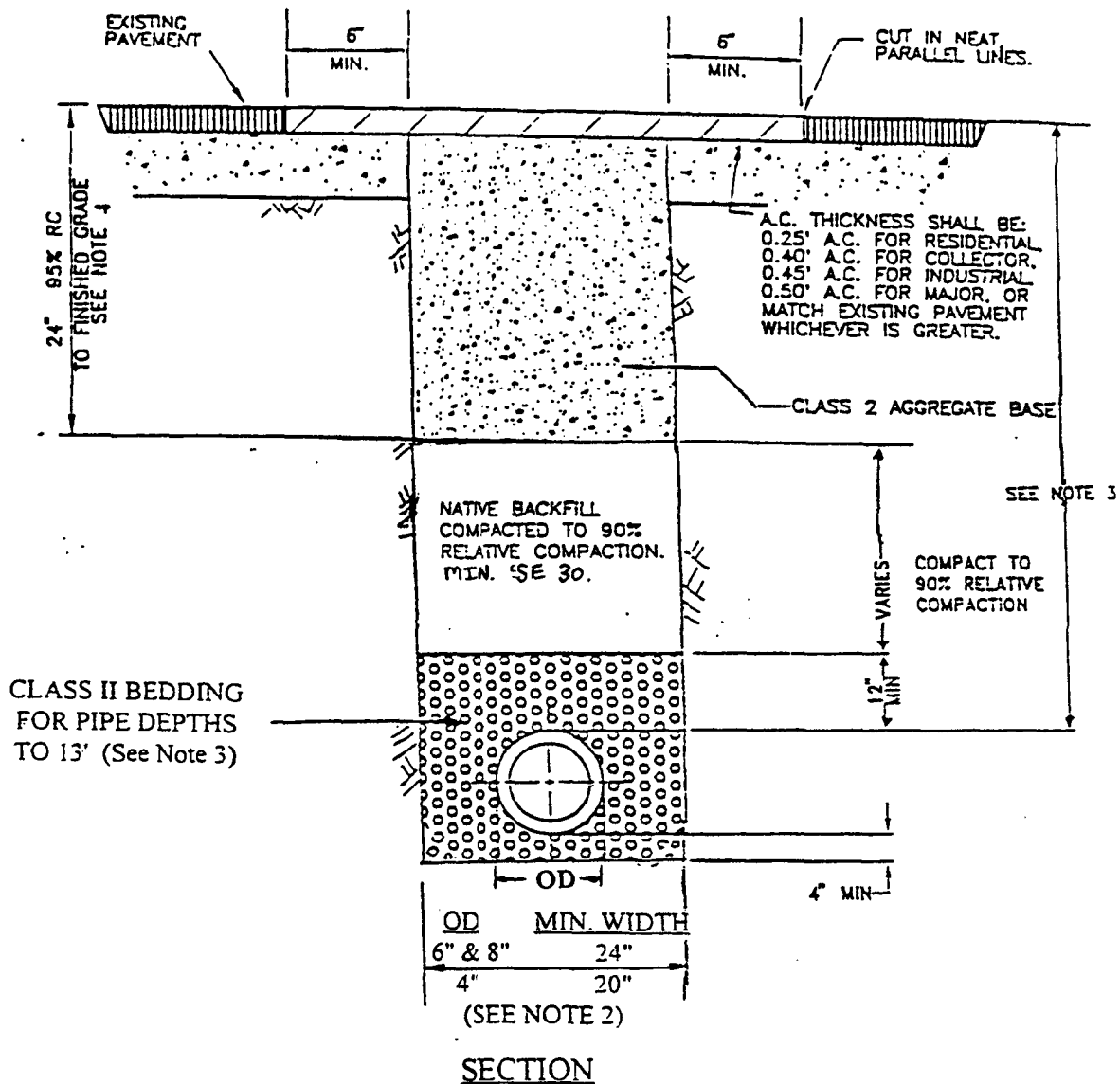


CITY of MODESTO

DETAIL NO.

811V

VILLAGE ONE ONLY



Notes

1. Trench section shall be backfilled and mechanically compacted to grade (No Jetting).
2. Trench width shall be a minimum width not less than the greater of either the pipe outside diameter plus 16 in. (400mm) or the pipe outside diameter times 1.25 plus 12 in. (300mm).
3. Maximum cover with Class II bedding is 13 feet. Maximum cover with Class IB bedding is 16 feet.
4. On industrial streets or where the TI is 10 or above, the depth of relative compaction shall be determined by the City Engineer.
5. In existing pavement, contractor shall furnish 2" temporary pavement.
6. Excavations that leave 3 feet or less of existing surface shall have the remaining surfacing removed and repaved with the same material as the trench section.

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 SIGNED BY: VAN SWITZER

R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
 CITY COUNCIL: 9-9-97

REVISED BY: VINCE YAH DATE: 01-91

REVISED BY: r.o.c. DATE: 02-94

DRAWN BY: RS

DATE: 08-74

SEWERS

P.V.C SEWER TRENCH BACKFILL EXISTING STREETS

DEPARTMENT OF PUBLIC WORKS
 AND TRANSPORTATION

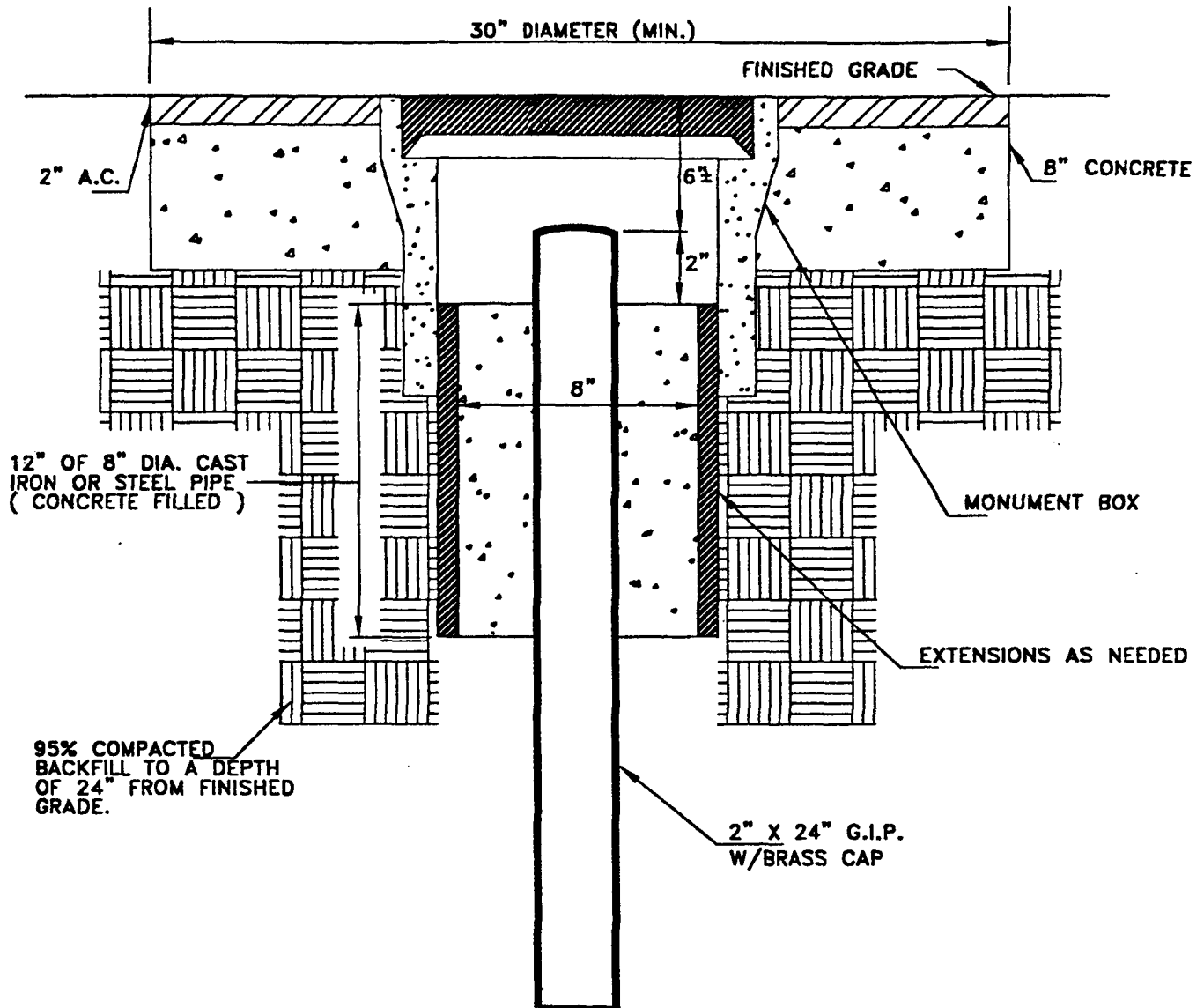


CITY of MODESTO

DETAIL NO.

812V

VILLAGE ONE ONLY



NOTES:

1. MONUMENT BOXES SHALL BE CHRISTY G5 WITH CHRISTY IRON COVER OR APPROVED EQUALS.
2. SET MONUMENT BOX TO FINISH GRADE.
3. COMPACT EARTH AROUND BASE WITH MECHANICAL TAMPER TO 95% RELATIVE COMPACTION AND ENCASE IN 8" OF CONCRETE.
4. AFTER CONCRETE SETS, PATCH WITH 2" A.C.
5. IN TRAFFIC AREAS, CONCRETE SHALL BE MADE WITH TYPE III HIGH EARLY STRENGTH CEMENT. BARRICADES SHALL BE REMOVED IN 24 HOURS.

NOT TO SCALE

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R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: H.R.

DATE: 04-96

STREETS

**SURVEY
MONUMENT**

**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

DETAIL NO.

900

TABLE 13.1 DRIVEWAY DESIGN STANDARDS

REQUIREMENTS	STREET CLASS	RESIDENTIAL DRIVEWAY	APARTMENT-COMMERCIAL DRIVEWAY	INDUSTRIAL DRIVEWAY
DRIVEWAY THROAT WIDTH ¹	LOCAL MINOR COLLECTOR MAJOR COLLECTOR MAJOR & LARGER	10'-28' 10'-28' 12'-28' 12'-28'	24'-36' 24'-36' 24'-36' 30'-36'	24'-45' 30'-45' 35'-45' 40'-45'
DRIVEWAY CURB RADIUS (DROP APPROACH TYPE ONLY)	LOCAL MINOR COLLECTOR MAJOR COLLECTOR MAJOR & LARGER	N/A ² N/A ² 10'-15' 15'	N/A ² 15'-20' 15'-20' 20'-30'	10'-20' 15'-20' 20'-25' 20'-30'
MINIMUM CENTERLINE DRIVEWAY ³ SPACING ALONG ROADWAY	LOCAL MINOR COLLECTOR MAJOR COLLECTOR MAJOR & LARGER	15' 15' 100' 100'	100' 150' 200' 250' ⁴	100' 150' 200' 250' ⁴
DRIVEWAY ANGLE ⁵	ALL	70° - 90°	90°	90°
MINIMUM DISTANCE ⁶ FROM DRIVEWAY TO INTERSECTION ALONG:	LOCAL MINOR COLLECTOR MAJOR COLLECTOR MAJOR & LARGER	30' 50' 100' ⁷ 150' ⁸	75' 150' 250' ⁷ 350' ⁸	75' 150' 250' ⁷ 350' ⁸
MAX. APPROACH GRADE ⁹ (DROP APPROACH ONLY)	LOCAL & MINOR COL. ALL OTHERS	+9% +6%	+6% +3%	+6% +3%
MINIMUM DISTANCE TO PROPERTY LINE ¹⁰	ALL	2' ¹⁰	2'	2'
MINIMUM APPROACH LENGTH ¹¹ (DROP APPROACH ONLY)	LOCAL & MINOR COL. ALL OTHERS	6' 9'	9' 17'	9' 17'

SEE NOTES ON STANDARD DETAIL #1001

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R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

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DRAWN BY: H.R.

DATE: 04-96

DRIVEWAYS

DRIVEWAY DESIGN
STANDARDSDEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION

CITY of MODESTO

DETAIL NO.

1000

NOTES:

1. THE REQUIREMENTS FOR DRIVEWAY THROAT IS STANDARD FOR UNDIVIDED TWO-WAY OPERATION AND MAY BE VARIED BY THE CITY ENGINEER IF, IN THAT PERSON'S DISCRETION, TRAFFIC VOLUMES, TRUCK USAGE, SHARED DRIVEWAYS AND OTHER FACTORS WARRANT THE VARIANCE. NOT MORE THAN 50% OF THE FRONTAGE OF ANY PARCEL SHALL BE DEVOTED TO DRIVEWAYS. LOTS FRONTING ON A CUL-DE-SAC ARE EXEMPT FROM THIS REQUIREMENT.
2. DRIVEWAYS MAY ONLY BE FLARED OR DRIVE OVER CURB IN THESE AREAS.
3. THE MINIMUM DISTANCE BETWEEN DRIVEWAYS SERVING THE SAME PARCEL SHALL NOT BE LESS THAN 20 FEET AS MEASURED BETWEEN THE ENDS OF THE DRIVEWAY FLARE OR CURB RETURN.
4. DRIVEWAYS ON MAJOR COLLECTORS AND LARGER, SERVED BY DECELERATION LANES MAY BE SPACED AT TWO HUNDRED FOOT (200') MINIMUM INTERVALS.
5. MEASURED AS INTERSECTION OF THE TANGENT CENTERLINE OF DRIVEWAY WITH THE TANGENT PORTION OF THE PUBLIC STREET CURB LINE, EXTENDING A MINIMUM OF TWENTY FEET (20') FROM THE FUTURE CURB LINE.
6. DISTANCE MEASURED FROM THE INTERSECTION AS MEASURED FROM THE INTERSECTION R.O.W. LINE TO THE DRIVEWAY CENTERLINE. (SEE STANDARD DETAILS #1002, #1004 & #1005)
7. IF THE DRIVEWAY HAS TO BE LOCATED LESS THAN 150' FROM AN INTERSECTION WITH A MAJOR STREET FACILITY R.O.W. LINE, THE APPROACH SHALL BE PLACED AT OR NEAR THE FARTHEST PROPERTY LINE FROM THE INTERSECTION AND A ONE HUNDRED AND FIFTY FOOT (150') LONG RAISED MEDIAN FROM THE STOP BAR AT THE INTERSECTION SHALL BE INSTALLED BY THE DEVELOPER AT THE DEVELOPER'S EXPENSE.
8. IF THE DRIVEWAY HAS TO BE LOCATED LESS THAN 300' FROM AN INTERSECTION WITH A MAJOR STREET FACILITY R.O.W. LINE, THE APPROACH SHALL BE PLACED AT OR NEAR THE FARTHEST PROPERTY LINE FROM THE INTERSECTION AND A THREE HUNDRED FOOT (300') LONG RAISED MEDIAN FROM THE STOP BAR AT THE INTERSECTION SHALL BE INSTALLED BY THE DEVELOPER AT THE DEVELOPER'S EXPENSE.
9. THE PERCENT OF SLOPE MEASURED ALONG THE CENTERLINE OF THE DRIVEWAY FROM THE FLOW LINE OF THE FUTURE CURB LINE.
10. THE MINIMUM DISTANCE OVER WHICH THE MAXIMUM APPROACH GRADE MUST BE MAINTAINED MEASURED FROM THE FLOW LINE OF THE PRESENT CURB OR A KNOWN FUTURE CURB, AS DETERMINED BY THE CITY ENGINEER, OR HIS DESIGNEE.
11. DRIVEWAY LOCATIONS FOR A SINGLE FAMILY PROPERTY SHALL NOT BE PERMITTED WITHIN TWO FEET OF A PROPERTY LINE UNLESS A PROPERTY FRONTS ON A CUL-DE-SAC BULB IN WHICH CASE A DRIVEWAY MAY BE CONSTRUCTED UP TO THE PROPERTY LINE. SHARED DRIVEWAYS OR UNUSUAL SITUATIONS MAY BE APPROVED BY THE CITY ENGINEER.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

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REVISED BY: DATE:

DRAWN BY: K.B.

DATE: 6-96

DRIVEWAYS

**DRIVEWAY DESIGN
STANDARDS**

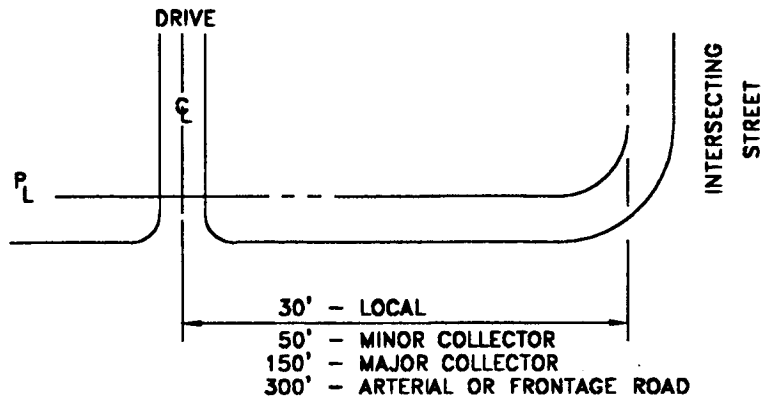
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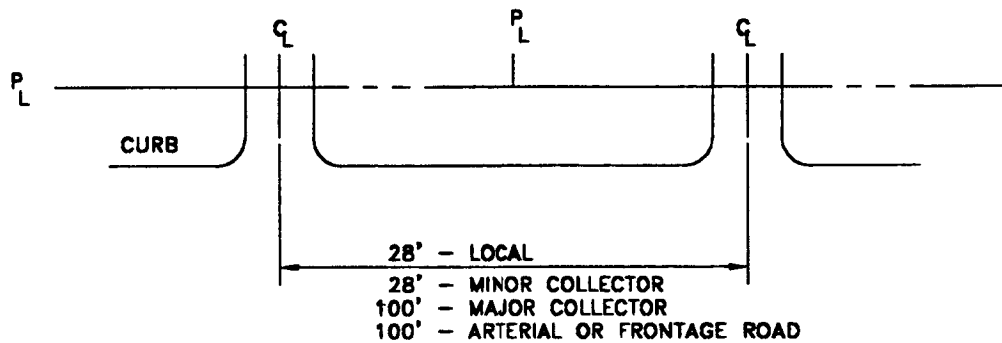
CITY of MODESTO

DETAIL NO.

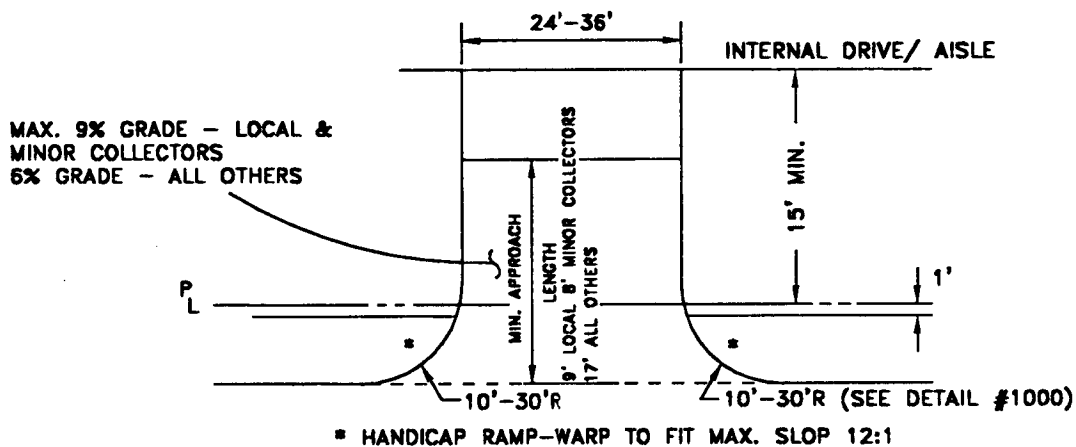
1001



MINIMUM DISTANCE FROM INTERSECTION



MINIMUM SPACING



TYPICAL DESIGN

NOTE:

TYPICAL RESIDENTIAL DRIVEWAY SHALL BE DRIVEOVER CURB. RESIDENTIAL PROPERTIES FACING ON COLLECTORS SHALL BE DRIVEOVER CURB OR FLARED DRIVEWAYS. RESIDENTS ON MAJOR STREET FACILITIES SHALL BE DROP APPROACH OR FLARED DRIVEWAYS.

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DRAWN BY: K.B.

DATE: 6-96

DRIVEWAYS

RESIDENTIAL DRIVEWAYS

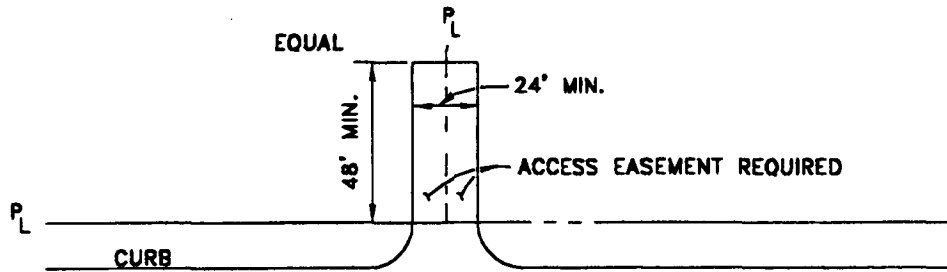
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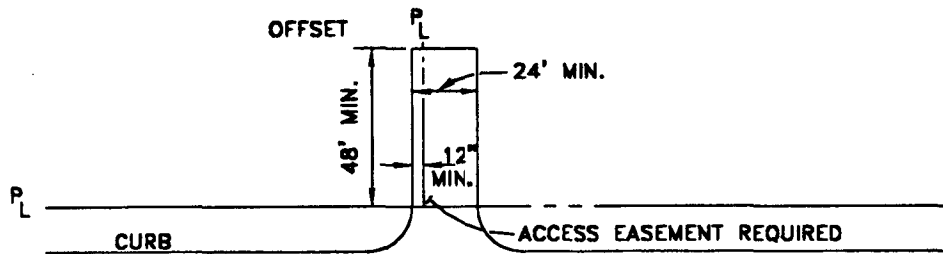
CITY of MODESTO

DETAIL NO.

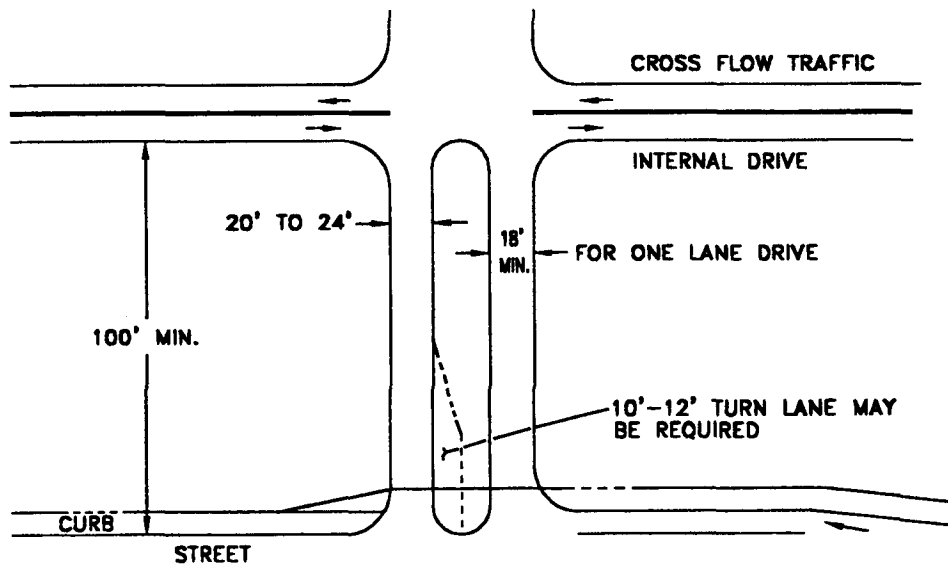
1002



DROP APPROACH OR FLARED DRIVEWAY



SHARED DRIVEWAYS



DROP APPROACH ONLY FOR LARGE VOLUME DRIVEWAYS
(OVER 5,000 VEHICLES/DAY)

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DATE: 6-96

DRIVEWAYS

NON-RESIDENTIAL DRIVEWAYS

DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.

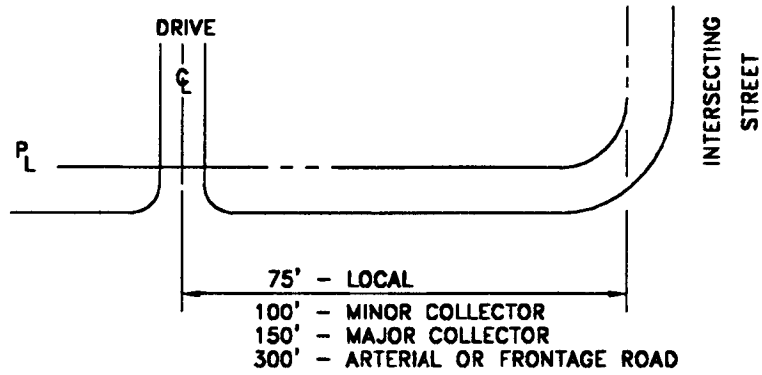
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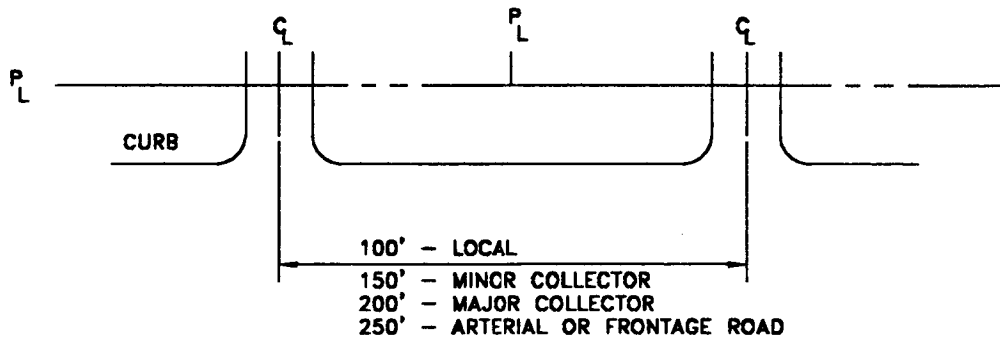
TYPICAL DESIGN

TYPICAL DESIGN MAY BE DROP APPROACH OF FLARED DRIVEWAY DEPENDING ON DRIVEWAY COUNTS AND LEVEL OF SERVICE ON THE ROAD WHERE THE DRIVEWAY CONNECTS.

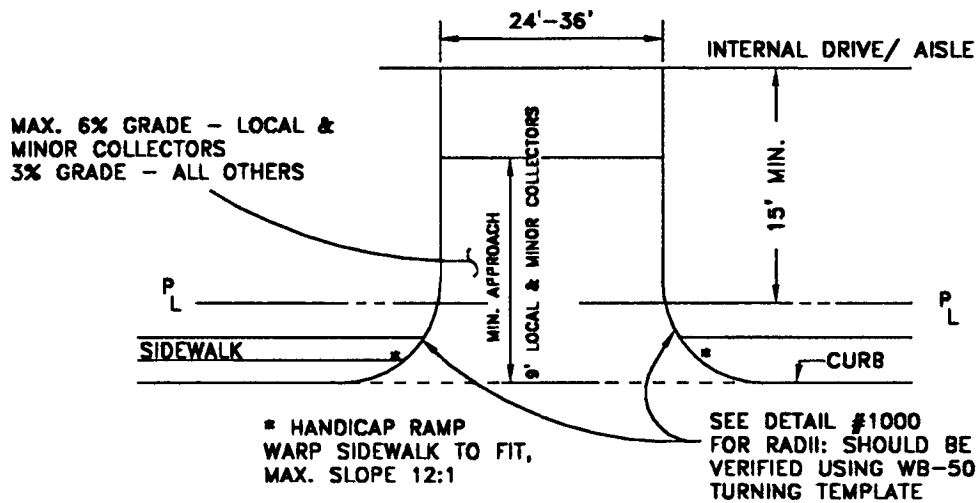
ORIGINAL STAMPED AND SIGNED BY: VAN SWITZER R.E. 22055 EXP. DATE: 9-30-00	DRIVEWAYS APARTMENT/ COMMERCIAL DRIVEWAYS	 CITY of MODESTO
APPROVED BY CITY COUNCIL: 9-9-97	DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION	DETAIL NO. 1004
REVISED BY: DATE:		
REVISED BY: DATE:		
DRAWN BY: K.B. DATE: 6-96		



MINIMUM DISTANCE FROM INTERSECTION



MINIMUM SPACING



DROP APPROACH TYPICAL DESIGN

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DRIVEWAYS

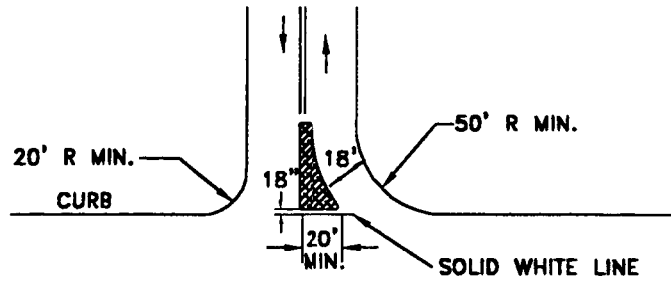
INDUSTRIAL DRIVEWAYS

DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION

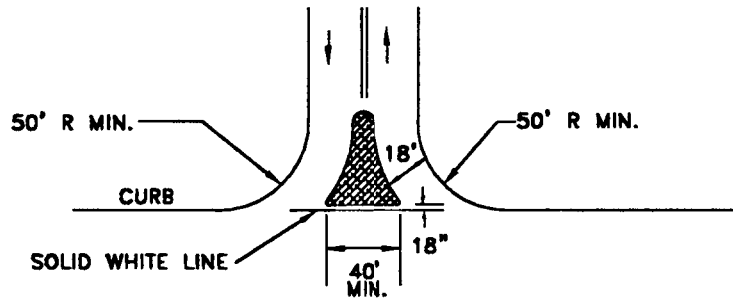


CITY of MODESTO

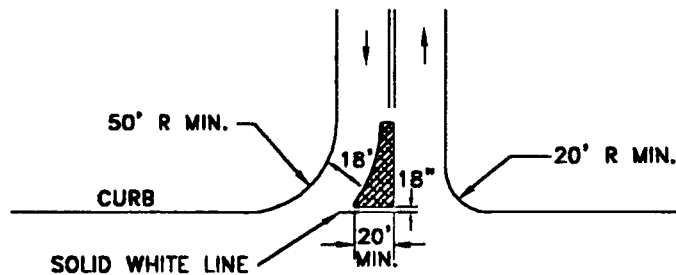
DETAIL NO.
1005



RIGHT-IN, RIGHT-OUT, LEFT-OUT
ACCESS DESIGN



RIGHT-IN, RIGHT-OUT
ACCESS DESIGN



RIGHT-IN, RIGHT-OUT, LEFT-IN
ACCESS DESIGN

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R.E. 22055 EXP. DATE: 9-30-00

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CITY COUNCIL: 9-9-97

REVISED BY: DATE:

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DRAWN BY: K.B.

DATE: 6-96

DRIVEWAYS

ACCESS DESIGN

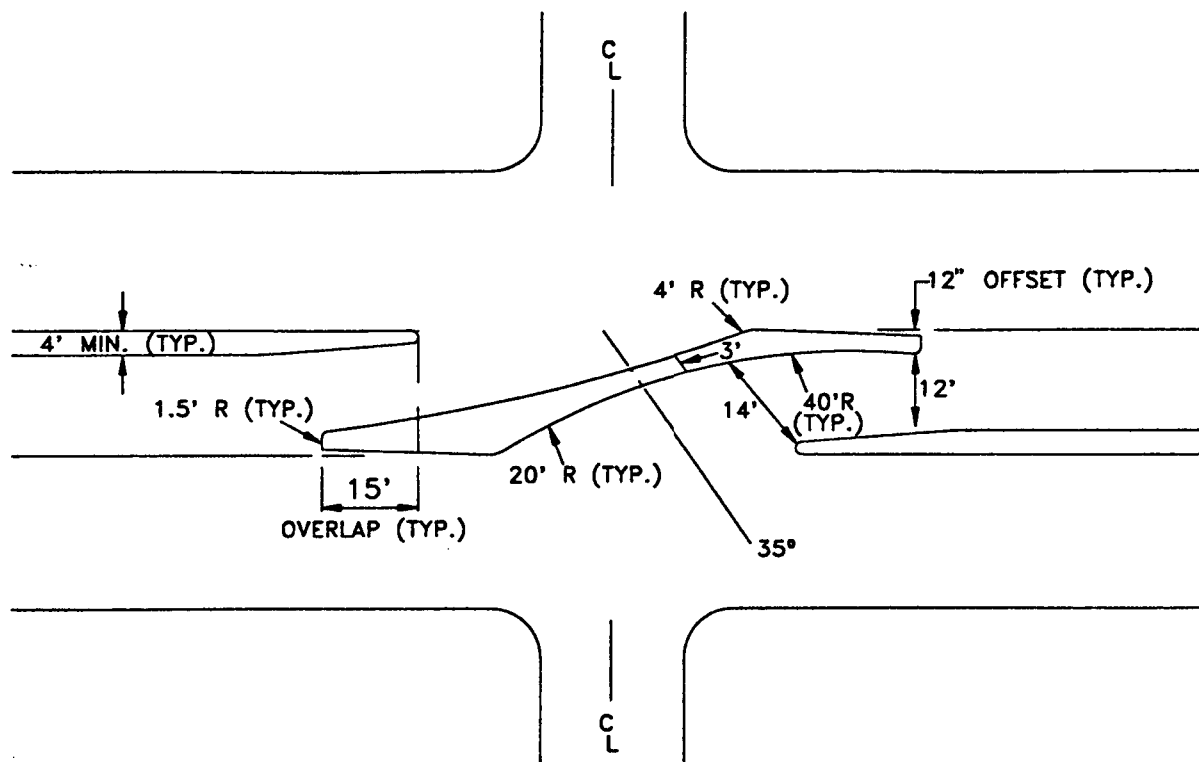
DEPARTMENT OF PUBLIC WORKS
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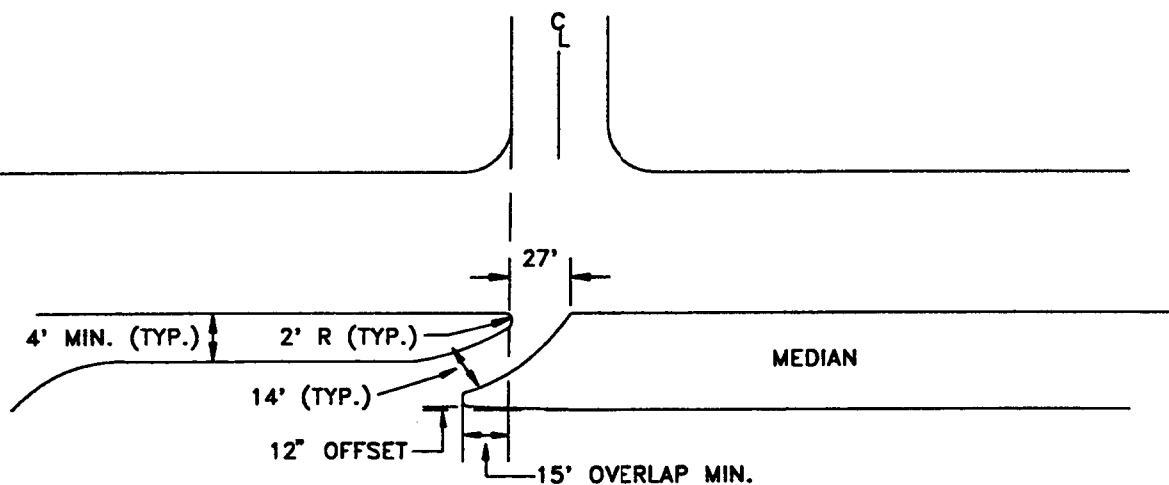
CITY of MODESTO

DETAIL NO.

1006



LEFT-IN ONLY MEDIAN DESIGN



MEDIAN DESIGN TO RESTRICT EXITING LEFT TURNS

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

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CITY COUNCIL: 9-9-97
REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: H.R. DATE: 04-96

DRIVEWAYS

MEDIAN DESIGN

DEPARTMENT OF PUBLIC WORKS
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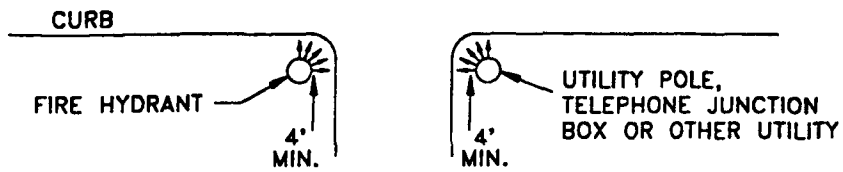
CITY of MODESTO

DETAIL NO.
1007

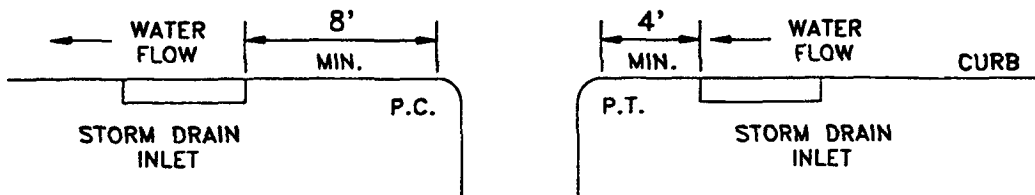


A MAXIMUM OF THREE DRIVEWAYS CAN BE CONNECTED WITH A CONTINUOUS DECELERATION LANE, UNLESS THE LANE IS AN EXTENSION OF A RIGHT TURN LANE AT AN INTERSECTION. THE MAXIMUM LENGTH OF A COMBINATION DECELERATION-RIGHT TURN LANE IS 1,320 FEET. DRIVEWAY SPACING SHALL BE AS SHOWN IN DETAIL #1000.

1008



ABOVE GROUND UTILITIES



STRAIGHT CURB INLET

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: H.R.

DATE: 05-96

DRIVEWAYS

DRIVEWAY DETAILS, UTILITIES

DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION

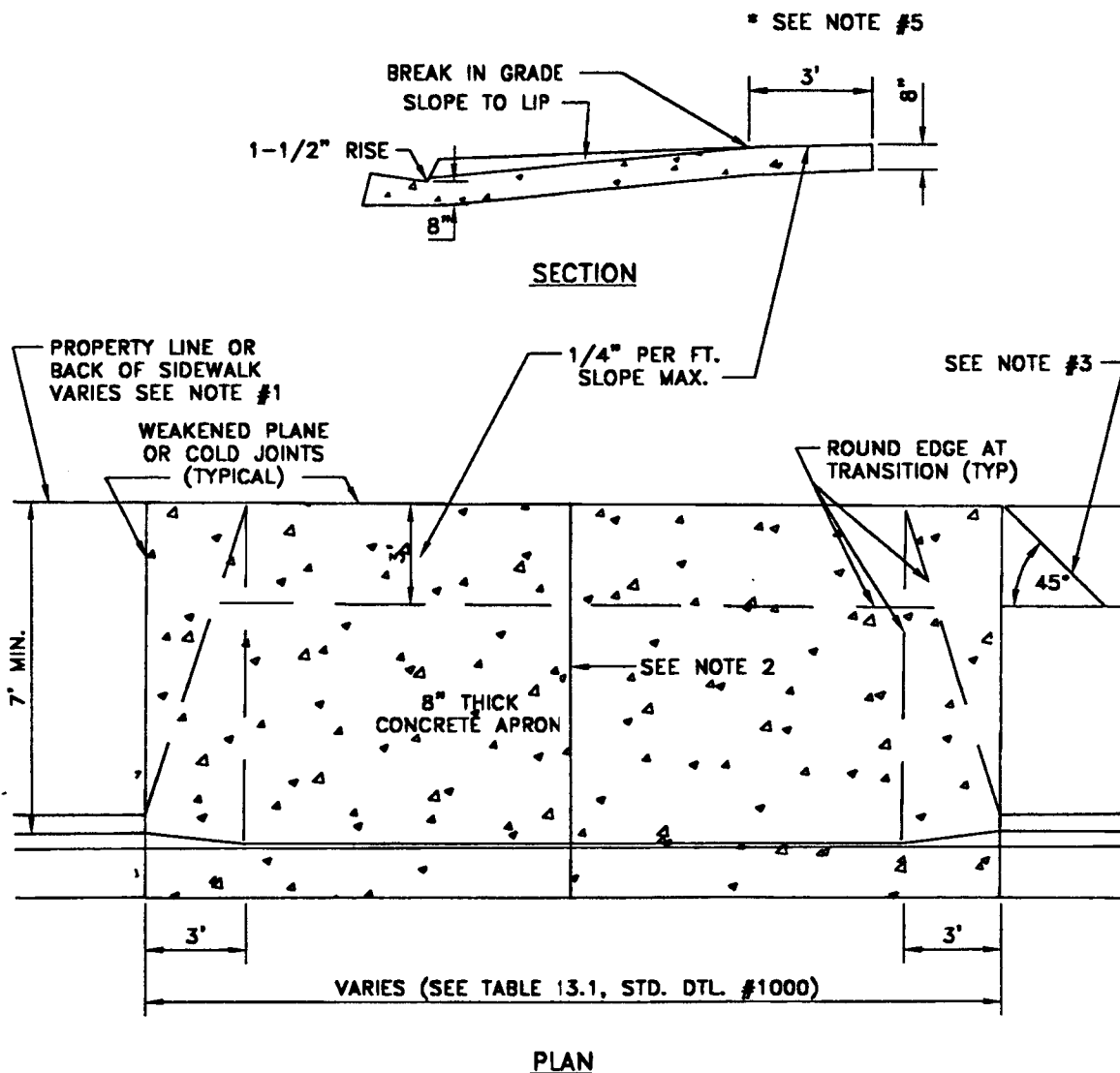


CITY of MODESTO

DETAIL NO.

1009

1010



NOTES:

1. REFER TO TYPICAL STREET SECTIONS OR CALL PUBLIC WORKS AT 577-5264 FOR PROPERTY LINE LOCATION.
2. INTERMEDIATE WEAKENED PLANE JOINT IN ACCORDANCE WITH CONSTRUCTION STANDARDS.
3. PROVIDE TRANSITION FOR SIDEWALKS THAT ARE LESS THAN FULL WIDTH.
4. IN RETROFIT AREAS, ASPHALT SHALL BE CUT A MINIMUM OF 6" FROM LIP OF CURB.
5. OPTIONAL IN P-O AND M ZONES.

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SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: K.B. DATE: 6-96

REVISED BY: r.a.c. DATE: 2-94

DRAWN BY: JLA DATE: 11-85

DRIVEWAYS

**CONSTRUCTION DETAILS
FOR COMMERCIAL
FLARED CRIVEWAYS**

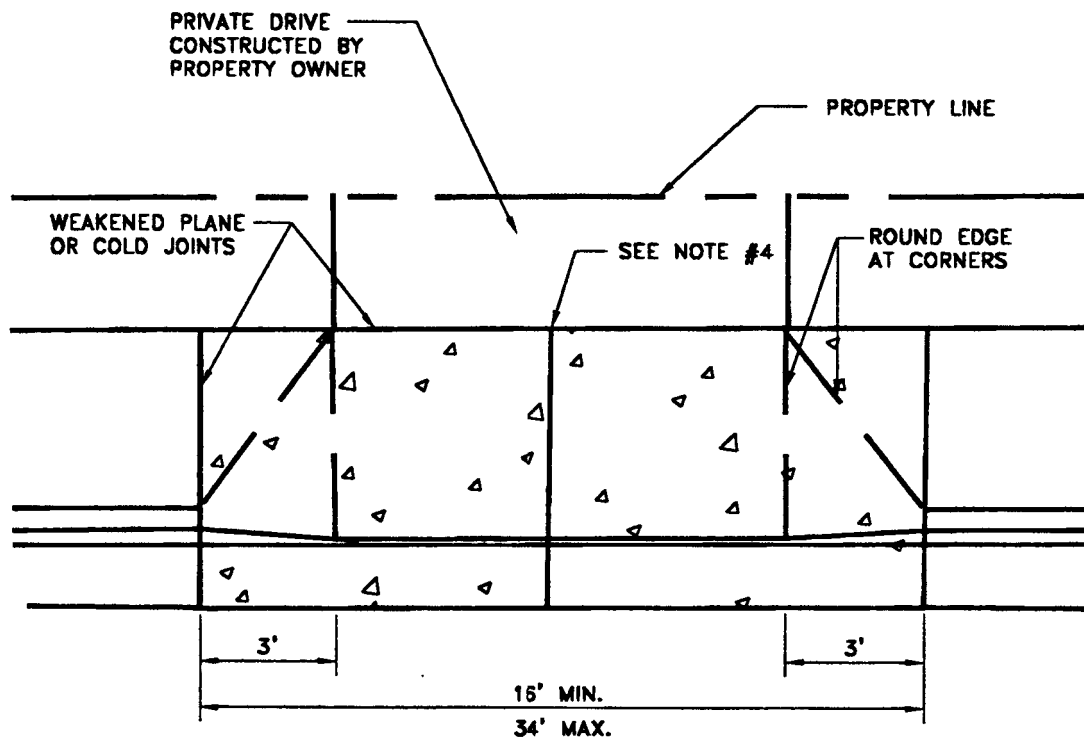
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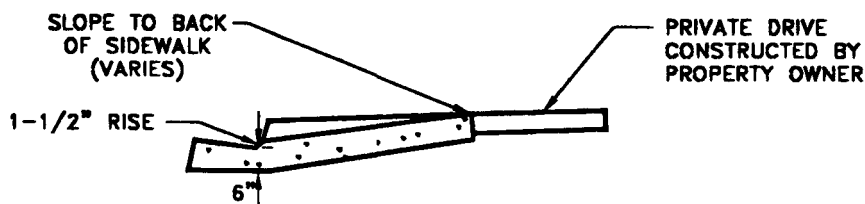
CITY of MODESTO

DETAIL NO.

1011



PLAN



SECTION

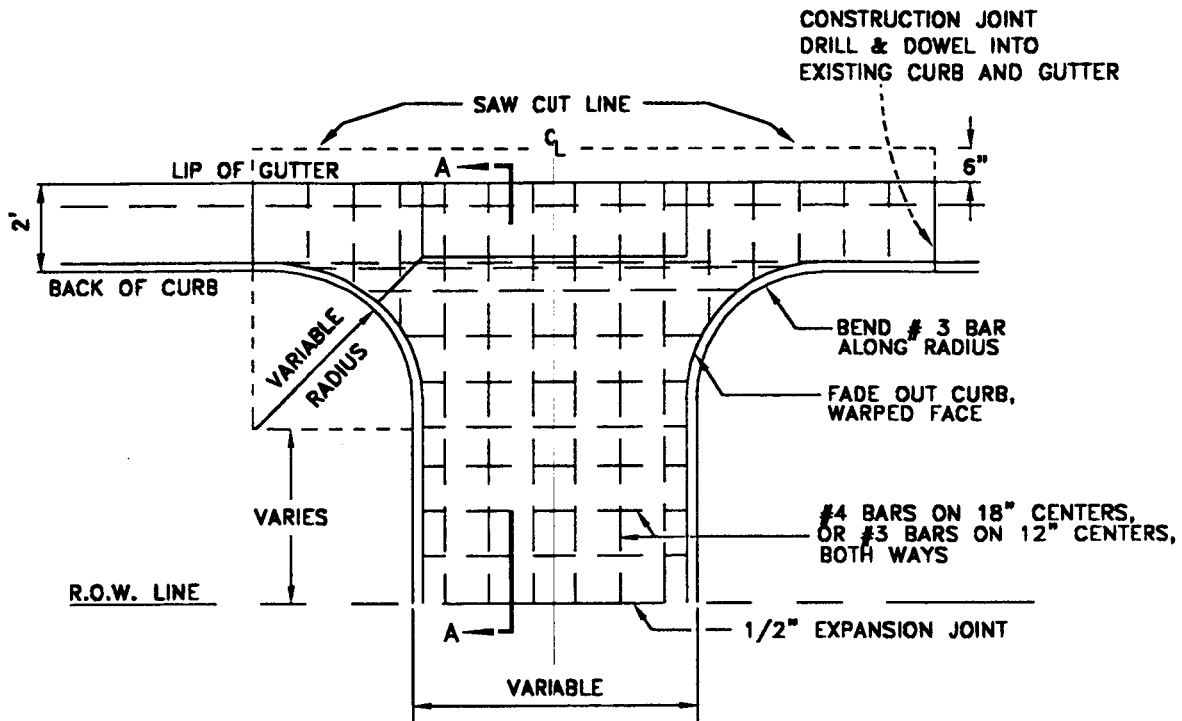
NOTES:

1. UNSUITABLE SOIL SHALL BE REMOVED AND REPLACED WITH SAND.
2. NON-MONOLITHIC DRIVEWAY APPROACHES MAY BE CONSTRUCTED WHERE DEPRESSED CURB EXISTS OR WHERE CURB IS PLACED WITH A SLIP FORM MACHINE.
3. IN RETROFIT AREAS, THE WIDTH OF THE STREET PATCH SHALL BE A MINIMUM OF 6".
4. INTERMEDIATE WEAKENED PLANE JOINTS IN ACCORDANCE WITH THE CONSTRUCTION STANDARDS.

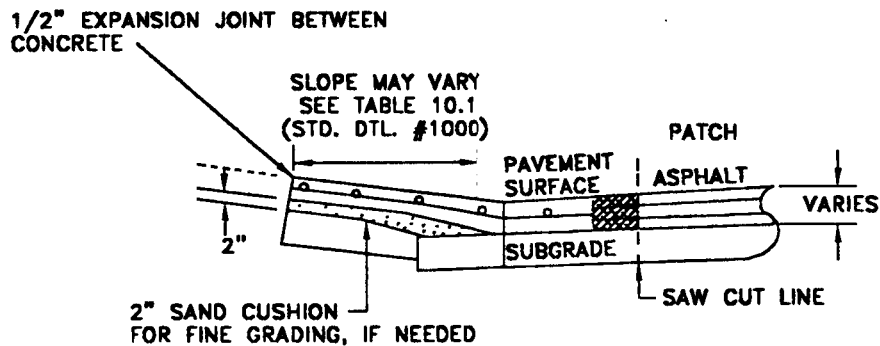
ORIGINAL STAMPED AND SIGNED BY: VAN SWITZER	
R.E. 22055	EXP. DATE: 9-30-00
APPROVED BY CITY COUNCIL: 9-9-97	
REVISED BY: r.a.c.	DATE: 2-94
REVISED BY: K.B.	DATE: 6-96
DRAWN BY: JLA	DATE: 11-85

DRIVEWAYS
CONSTRUCTION DETAILS FOR RESIDENTIAL FLARED DRIVEWAYS
DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION

 CITY of MODESTO
DETAIL NO. 1012



SEE TABLE 13.1 (STD DTL #1000)



SECTION A-A

DESIGN CRITERIA

DRIVEWAY TYPE

SLAB THICKNESS

STEEL

RESIDENTIAL

6"

NONE

ALL OTHERS

6"

#4 BAR ON 18" CENTERS OR
#3 BAR ON 12" CENTERS, BOTH WAYS
OR 8" PCC W/NO STEEL

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: K.B.

DATE: 6-96

DRIVEWAYS

**CONSTRUCTION DETAILS
FOR DROP APPROACH
DRIVEWAYS**

**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

DETAIL NO.

1013

- * PAINT ALL CUTS OVER 1" DIA.
- * PLANT SO THAT TOP OF ROOT BALL IS EVEN WITH THE FINISHED GRADE

2 STRAND TWISTED 12 GAUGE GALV. WIRE ENCASED IN 1" DIA. RUBBER HOSE OR 2" WIDE ELASTIC WEBBING ATTACHED TO ANCHOR STAKES WITH GALV. SCREWS.

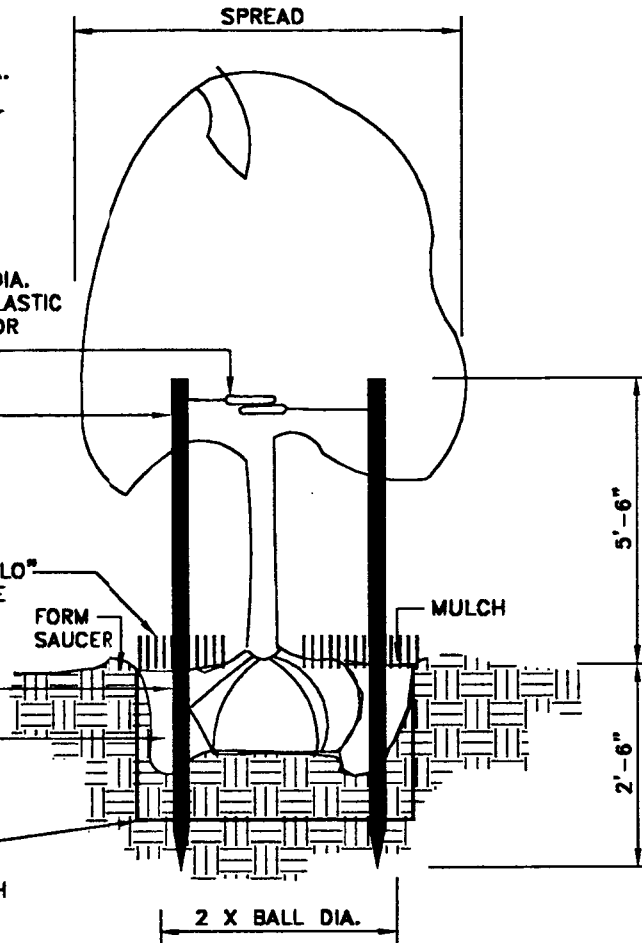
TREATED LODGEPOLE
1-3 STAKES 2" X 2"
DRIVEN (MIN. 18") FIRMLY
INTO SUBGRADE PRIOR
TO BACKFILLING

1" DEPTH "VITA BARK OR "TILO"
MULCH - 1" MAX. SIEVE SIZE

DO NOT TOUCH ROOTBALL
WITH STAKE

SPECIFIED PLANTING MIX
WATER & TAMP TO
REMOVE AIR POCKETS

DEEP ROOT BARRIER IN
KNOCK-OUT OR NEXT TO
SIDEWALK-MINIMUM 24" DEPTH



NOTES:

1. TOP SUPPORT OF TREES SHOULD BE AS LOW ON THE TRUNK AS POSSIBLE BUT HIGH ENOUGH THAT THE TREE WILL RETURN TO UPRIGHT AFTER DEFLECTION. TO FIND THE PROPER HEIGHT, HOLD THE TRUNK IN ONE HAND, PULL THE TOP TO ONE SIDE AND RELEASE. THE HEIGHT AT WHICH THE TRUNK WILL JUST RETURN TO UPRIGHT WHEN THE TOP IS RELEASED IS THE HEIGHT AT WHICH TO ATTACH THE TIES.
2. A LINE DRAWN BETWEEN THE ANCHOR STAKES SHOULD BE AT TIGHT ANGLES TO THE WIND DIRECTION.
3. TOP-MOST LOOP IS TIED FIRST TO HOLD THE TRUNK IN THE DESIRED POSITION. THE LOWER TIE IS THEN SECURED TO MAINTAIN THE TRUNK FIRMLY IN THE UPPER LOOP.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: r.a.c.

DATE: 2-94

REVISED BY: K.B.

DATE: 6-96

DRAWN BY: B.F.

DATE: 12-90

LANDSCAPING

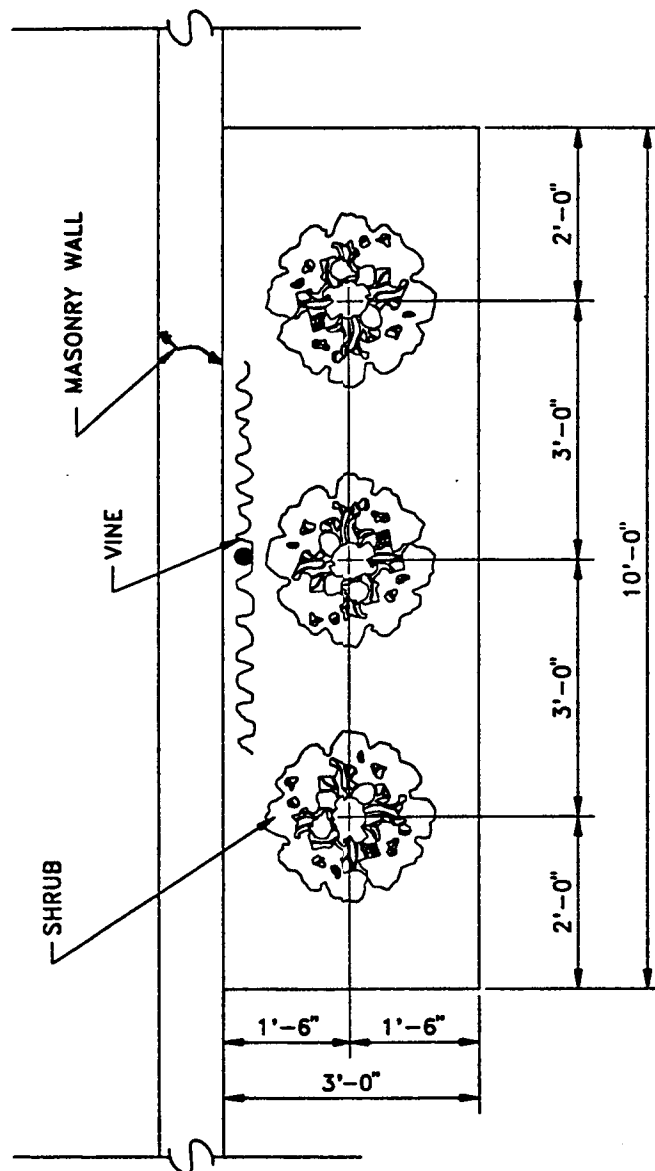
TYPICAL TREE STAKING

DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DRAWING NO.
1200



ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: DCJ

DATE: 1-75

LANDSCAPING

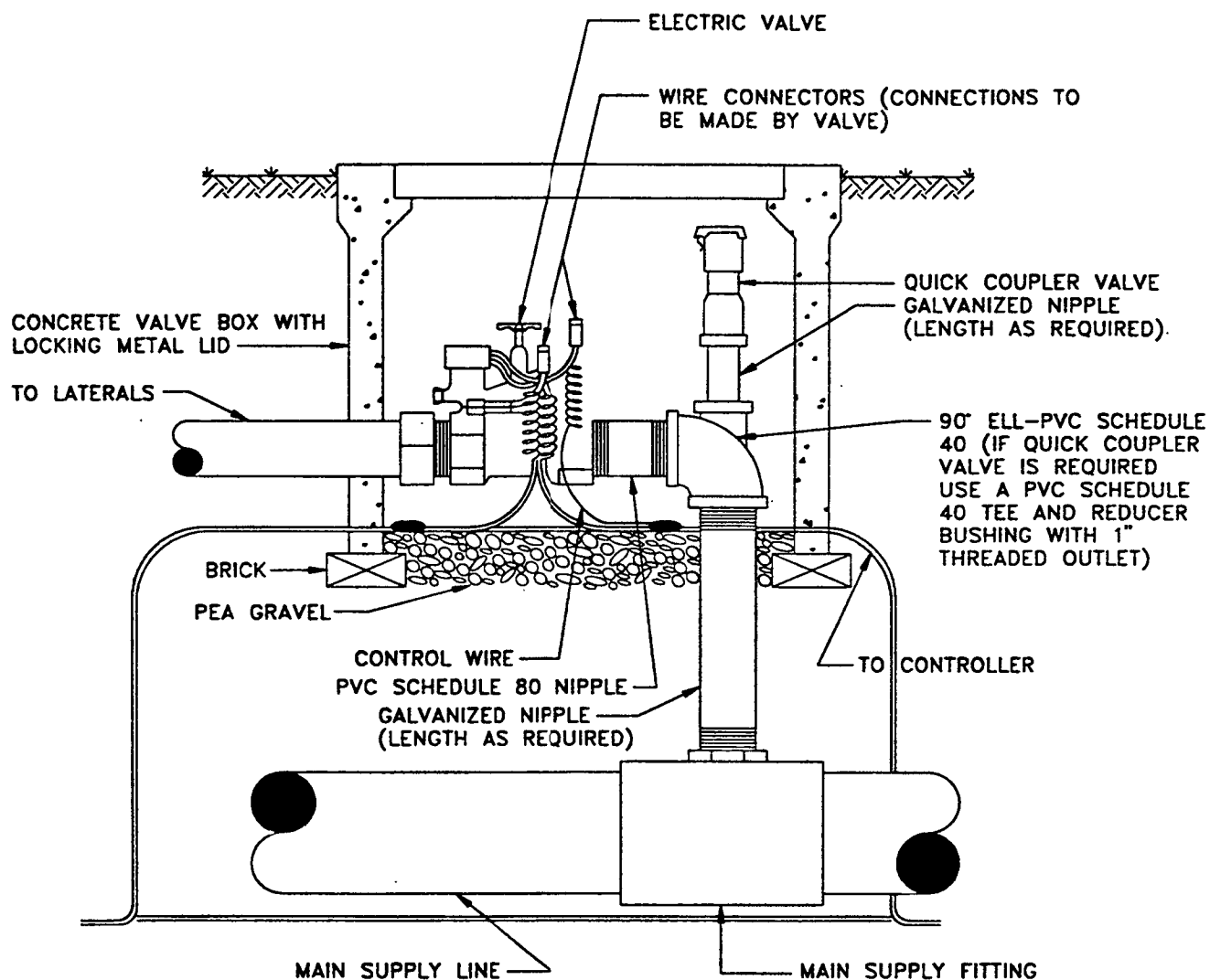
PLANTER
DETAIL

DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.
1201



NOTES:

1. ALL WIRE TO BE INSTALLED AS PER LOCAL CODE.
2. TAPE AND BUNDLE WIRE EVERY TEN FEET.
3. PROVIDE EXPANSION COILS AT EACH WIRE CONNECTION IN VALVE BOX.
(WRAP AROUND 1/2" PIPE 15 TIMES)
4. COMPACT SOIL AROUND VALVE BOX TO SAME DENSITY AS UNDISTURBED ADJACENT SOIL.
5. ALL THREADED CONNECTIONS TO BE COATED WITH "RECTORSEAL NO. 5."

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: LCC DATE: 03-94

REVISED BY: DATE:

DRAWN BY: KLS

DATE: 08-14-81

LANDSCAPING

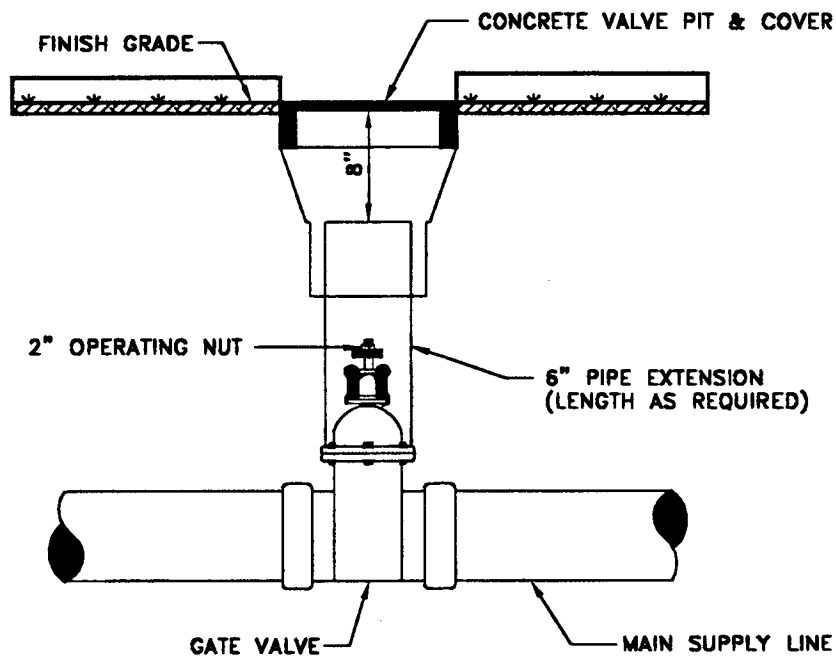
SOLENOID
VALVE DETAIL

PARKS AND RECREATION
DEPARTMENT



CITY of MODESTO

DETAIL NO.
1202



NOTE:

COMPACT SOIL AROUND CONTROL VALVE PIT ASSEMBLY
TO SAME DENSITY AS UNDISTURBED ADJACENT SOIL.

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SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: LCC DATE: 2-94

REVISED BY: DATE:

DRAWN BY: KLS

DATE: 8-14-81

LANDSCAPING

**GATE VALVE
ASSEMBLY**

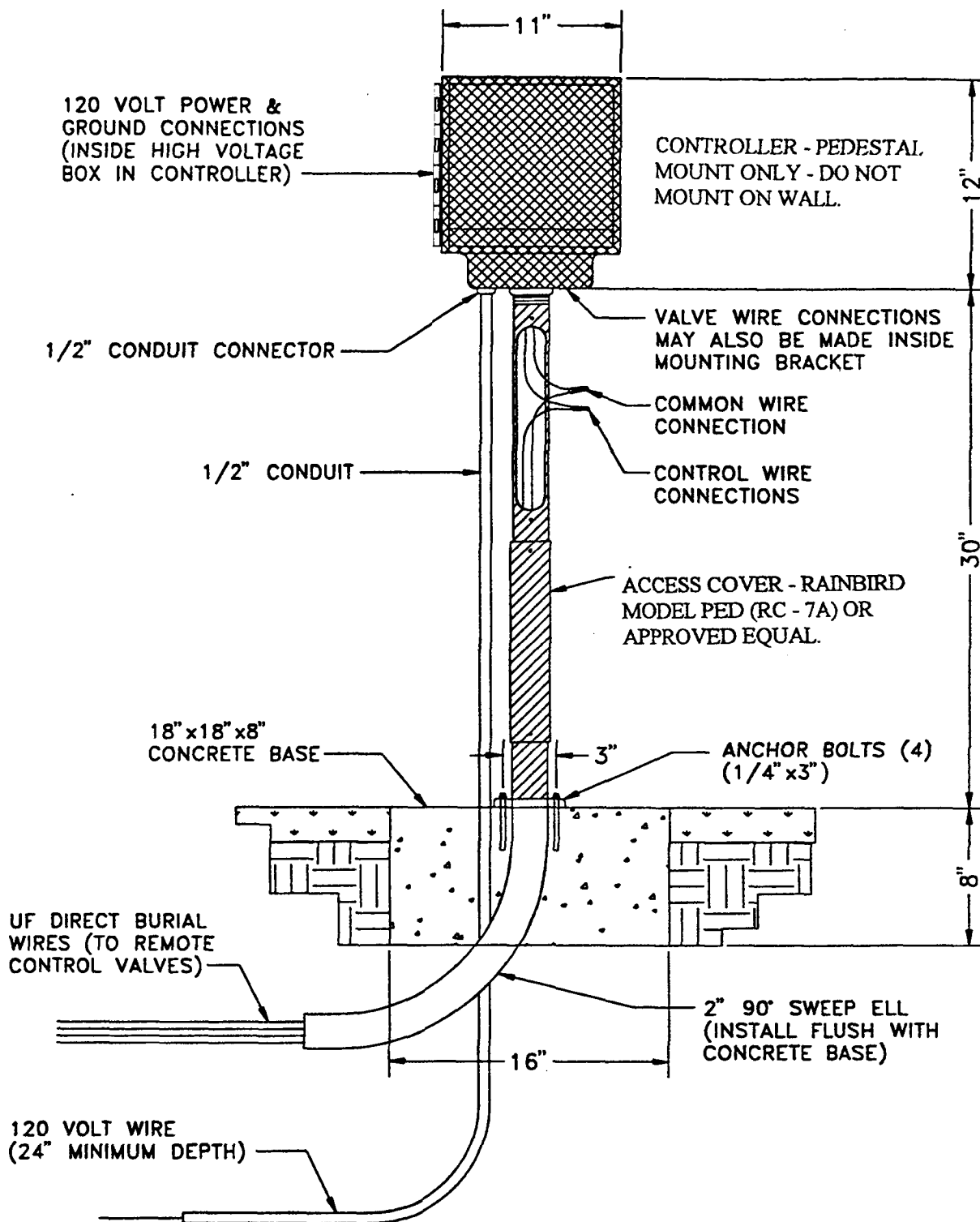
**PARKS AND RECREATION
DEPARTMENT**



CITY of MODESTO

DETAIL NO.

1203



NOTE:

ALL WIRING TO BE INSTALLED AS PER LOCAL CODE.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: LCB DATE: 06-87

REVISED BY: r.o.c. DATE: 09-92

DRAWN BY: FDA

DATE: 02-85

LANDSCAPING

IRRIGATION
CONTROLLER

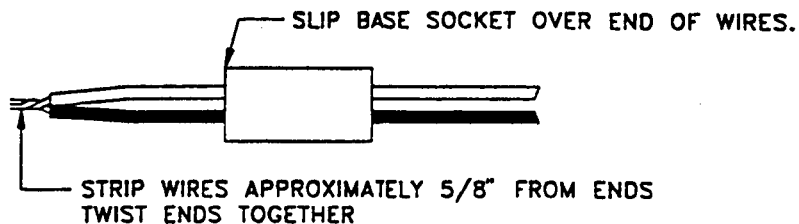
DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



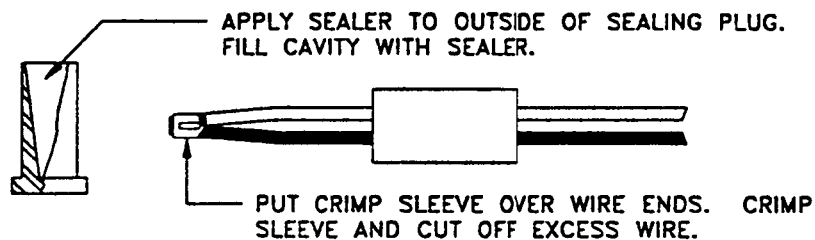
CITY of MODESTO

DETAIL NO.

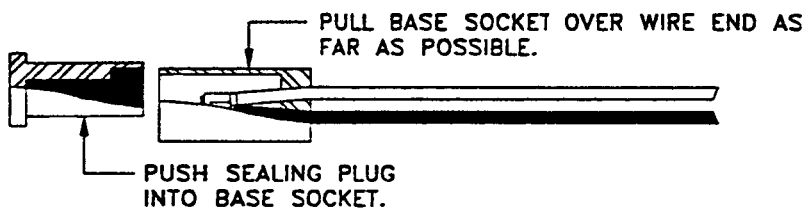
1204



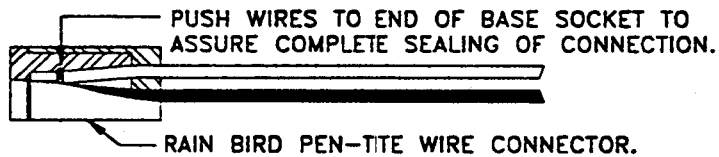
STEP 1



STEP 2



STEP 3



STEP 4

NOTES:

1. FOR WIRE SIZES NO. 14, NO. 12 AND NO. 10.
2. WIRING SHALL BE DIRECT BURIAL WIRE

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: LCC DATE: 02-94

REVISED BY: DATE:

DATE: 08-14-81

LANDSCAPING

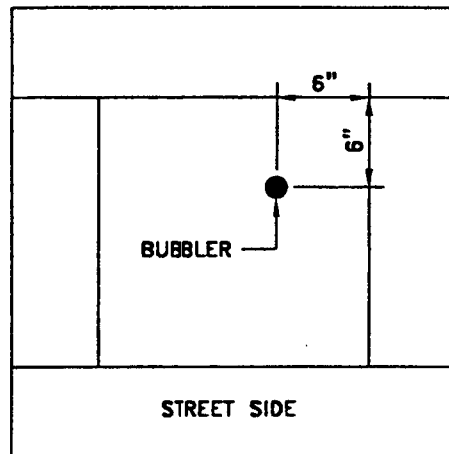
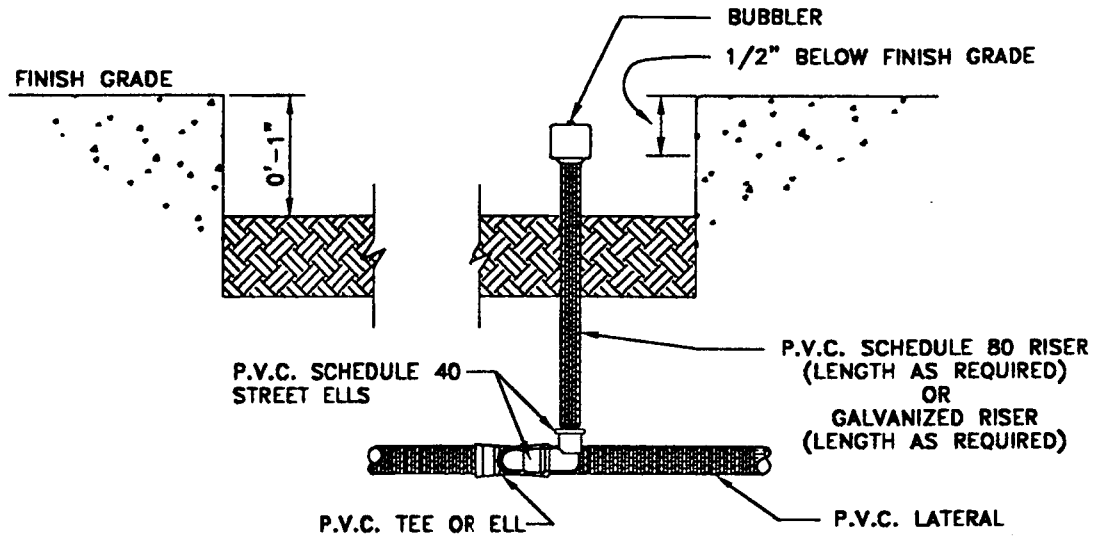
TYPICAL WIRE
CONNECTION

PARKS AND RECREATION
DEPARTMENT



CITY of MODESTO

DETAIL NO.
1205



STREET TREE KNOCKOUT DETAIL
PLAN VIEW
N.T.S.

NOTES:

1. USE RAINBIRD 1402 PRESSURE COMPENSATING FULL CIRCLE BUBBLERS.
2. USE "TEFLON TAPE" ON ALL GALVANIZED PIPE CONNECTIONS.
3. P.V.C. THREADED CONNECTIONS TO BE COATED WITH "RECTORSEAL NO. 5."
4. REFER TO STD. DETAIL 337 FOR KNOCKOUT DETAIL.
5. BUBBLER TO BE REMOVED AND REPLACED WITH CAP IF CITY STREET TREE IS NOT PLANTED.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97
REVISED BY: LCC DATE: 2-94
REVISED BY: K.B. DATE: 6-96
DRAWN BY: DCJ DATE: 5-4-82

LANDSCAPING

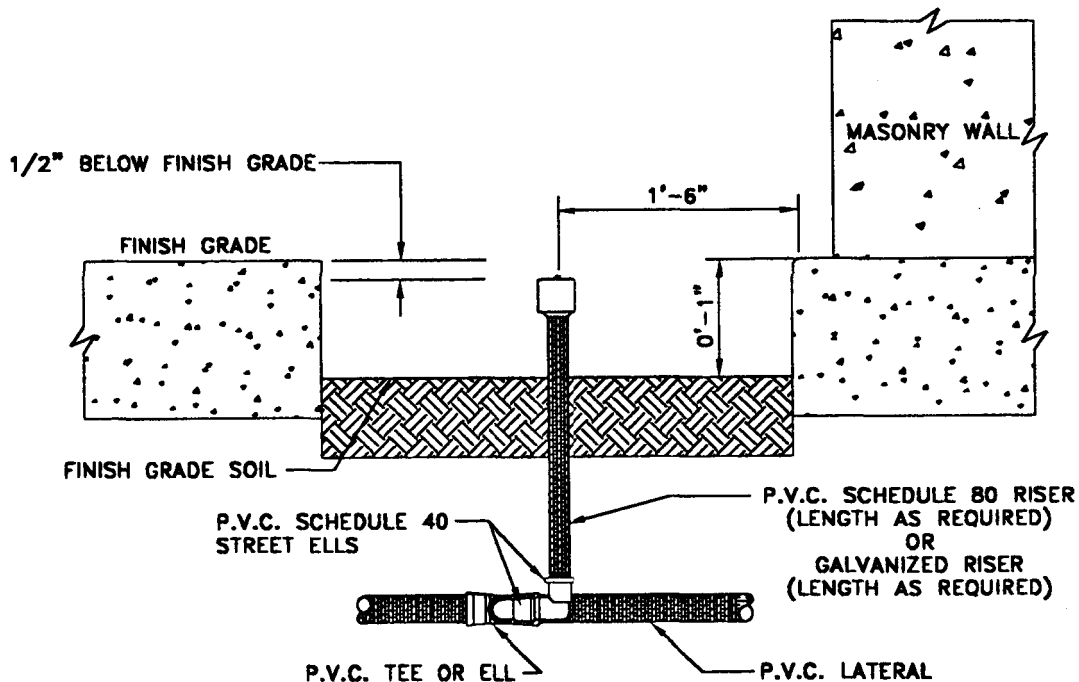
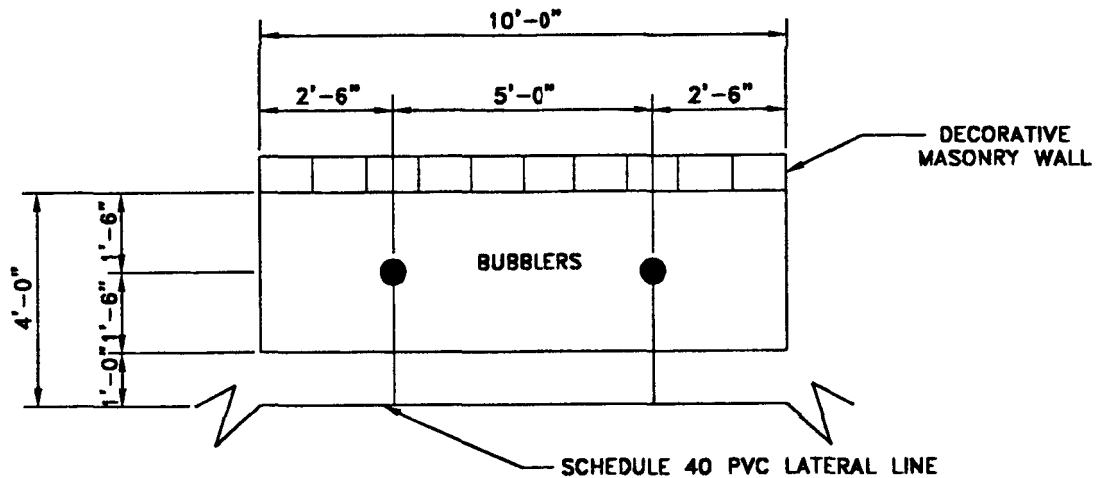
**STREET TREE BLOCK OUT
TYPICAL BUBBLER DETAIL**

**PARKS AND RECREATION
DEPARTMENT**



CITY of MODESTO

DETAIL NO.
1206



NOTES:

1. USE RAINBIRD 1402 PRESSURE COMPENSATING FULL CIRCLE BUBBLERS.
2. USE "TEFLON TAPE" ON ALL GALVANIZED PIPE CONNECTIONS.
3. P.V.C. THREADED CONNECTIONS TO BE COATED WITH "RECTORSEAL NO. 5."

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DCJ DATE: 7-5-89

REVISED BY: LCC DATE: 2-94

DRAWN BY: DCJ DATE: 5-24-88

LANDSCAPING

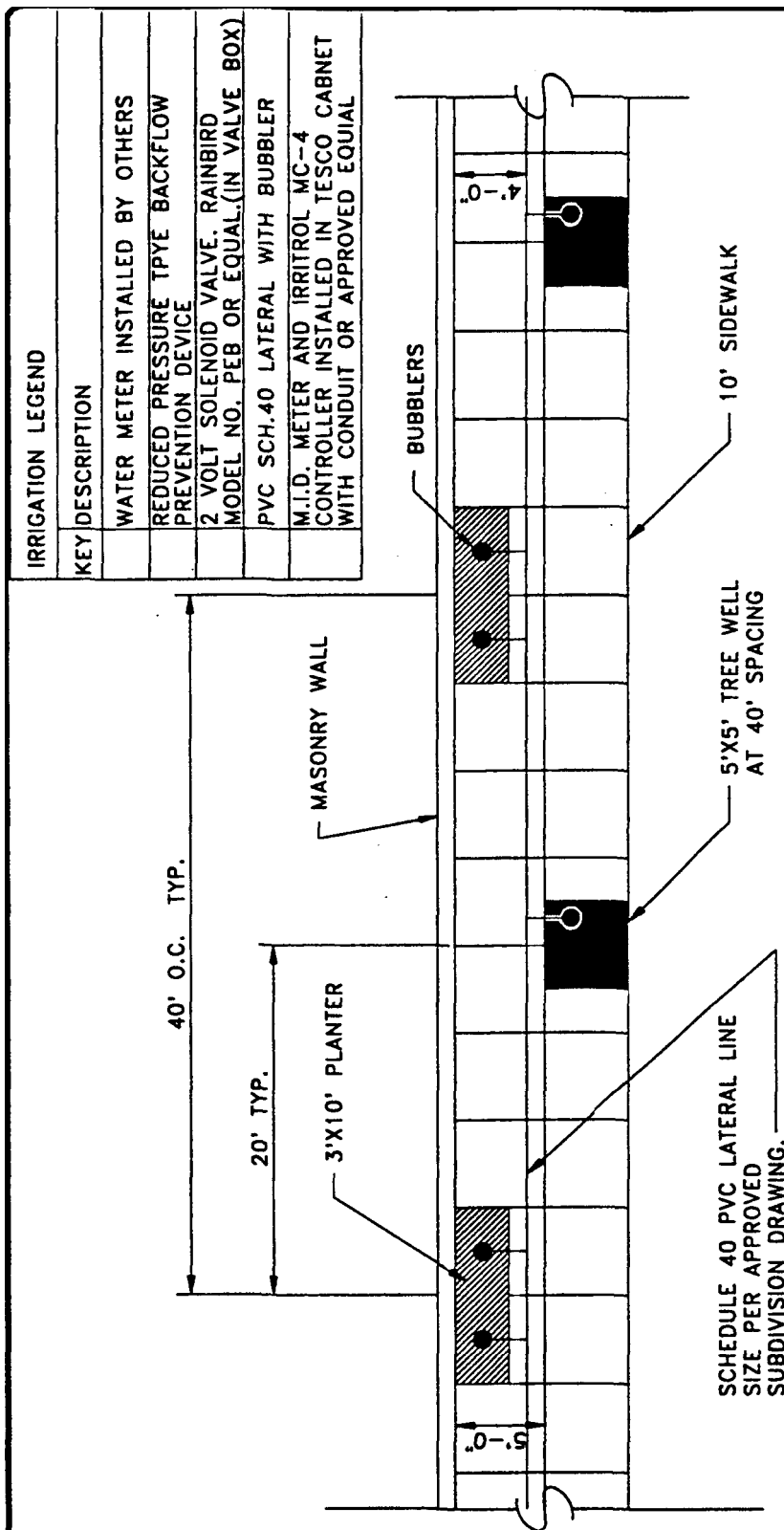
BUBBLER DETAIL

PARKS AND RECREATION
DEPARTMENT



CITY of MODESTO

DETAIL NO.
1207



NOTES:

1. THE ENGINEER OR ARCHITECT SHALL USE THIS PLAN AS A GENERAL GUIDELINE FOR IRRIGATION REQUIREMENTS AS RELATING TO STREET FRONTAGE IMPROVEMENTS WHERE TREE WELLS SHALL BE INSTALLED.
2. THE PRIMARY INTENT OF THIS PLAN IS TO DEMONSTRATE THE MINIMUM IRRIGATION DESIGN CALL-OUT TO BE INSTALLED.
3. THE DIAGRAMMATIC IRRIGATION PLAN AS SHOWN ABOVE IS AN EXAMPLE OF MINIMUM. REQUIRED INFORMATION FOR CONSTRUCTION PURPOSES THE IRRIGATION PLAN SUBMITTAL SHALL SHOW ALL POINTS OF INSTALLATION AND CONNECTION AND GIVE DETAILS AS TO HOW INSTALLATION AND CONNECTION SHALL BE MADE. PIPES, VALVES, BACKFLOW PREVENTION, WIRING, ETC. SHALL BE PROPERLY SIZED AND INDICATED ON THE SUBMITTED PLANS.
4. PLANS SHALL SHOW ENTIRE PROJECT AREA WITH PROPOSED IRRIGATION SYSTEM.
5. DETAILS GIVEN ARE DIAGRAMMATIC AND SHALL BE DIRECTLY COPIED ONTO WORKING DRAWINGS. THESE DETAILS SHOW MATERIAL REQUIREMENTS BY THE CITY AND SERVE AS EXAMPLES OF REQUIRED INFORMATION FOR INFORMATION BY A LICENSED LANDSCAPE CONTRACTOR.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-97

APPROVED BY
CITY COUNCIL: 05-10-94

REVISED BY: r.a.c.

DATE: 02-94

REVISED BY:

DATE:

DRAWN BY: DCJ

DATE: 07-11-89

LANDSCAPING

IRRIGATION LAYOUT TYPICAL BACK-UP LOT PLANTING

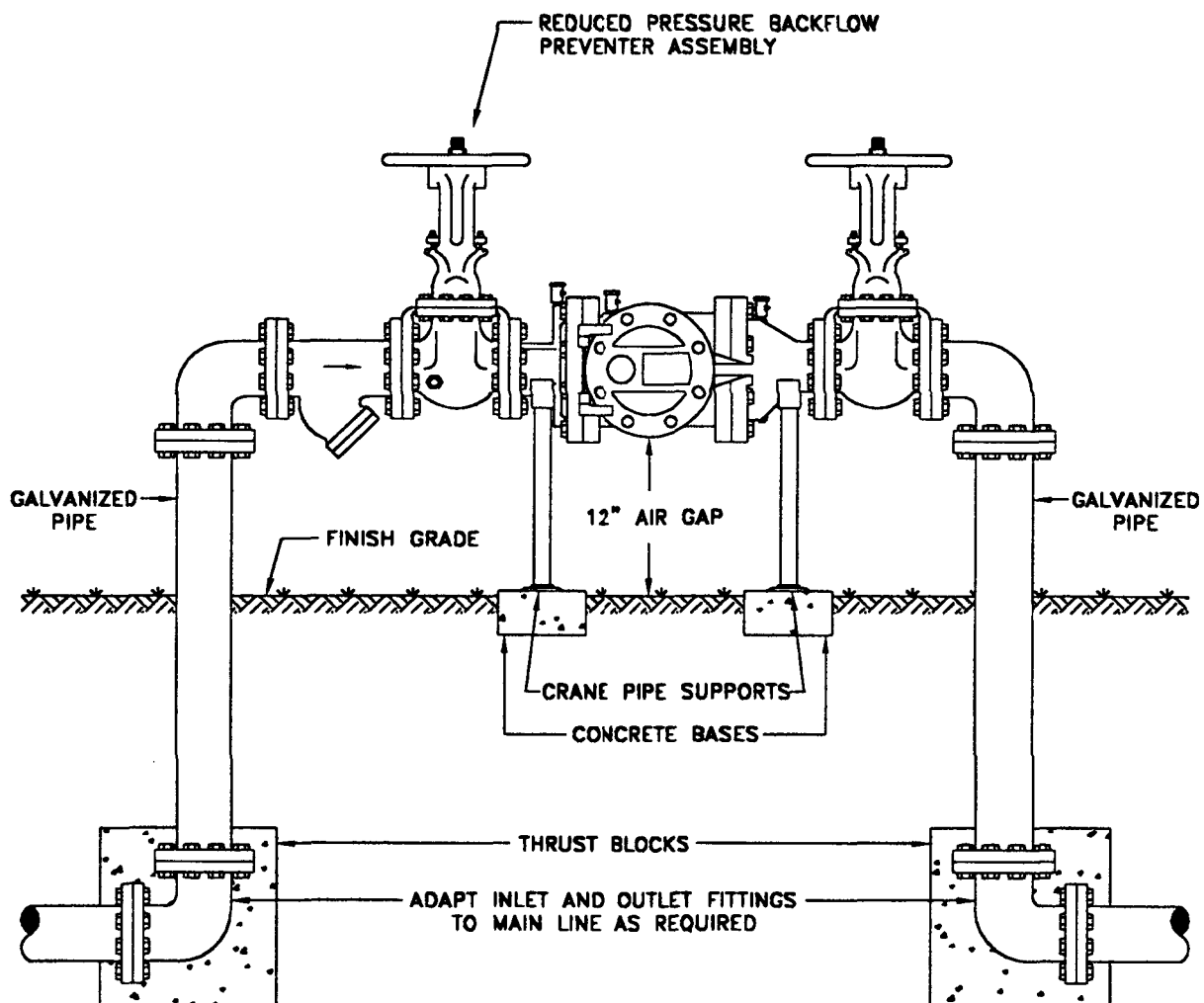
DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.

1208



NOTES:

1. INSTALL 12" AIR GAP MINIMUM (CONSULT LOCAL CODE)
2. ALL CONNECTIONS ON ASSEMBLY TO FLANGED.

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SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: K.B.

DATE: 6-96

LANDSCAPING

**REDUCED PRESSURE PRINCIPLE
BACKFLOW PREVENTION
ASSEMBLY FOR 3" & LARGER**

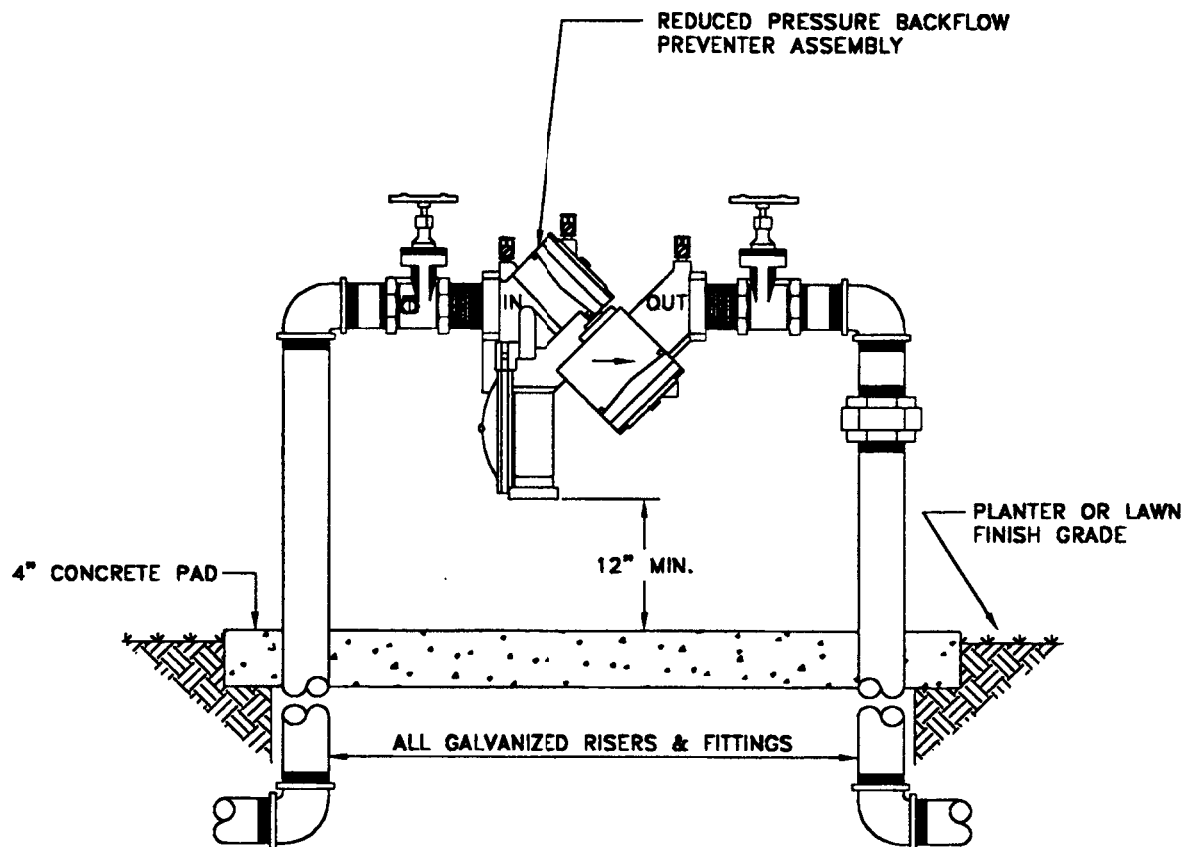
**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

DETAIL NO.

1209



ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: LCC DATE: 2-94

REVISED BY: DATE:

DRAWN BY: B.F.

DATE: N/A

LANDSCAPING

REDUCED PRESSURE PRINCIPLE
BACKFLOW PREVENTION ASSEMBLY
1" TO 2-1/2" SIZE

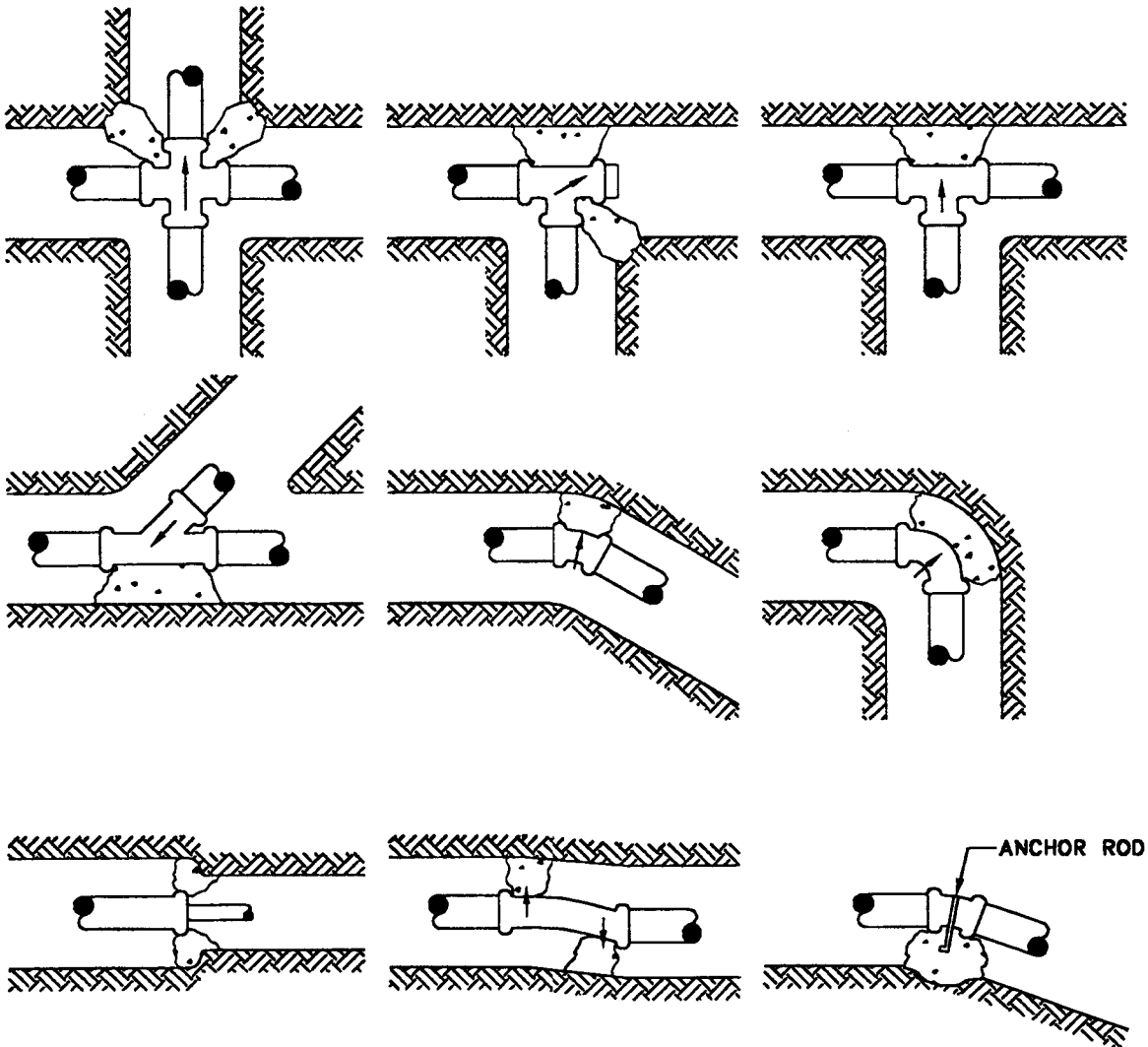
PARKS AND RECREATION
DEPARTMENT



CITY of MODESTO

DETAIL NO.

1210



NOTES:

1. CONTRACTOR SHALL ARRANGE FOR SERVICES OF MFR'S QUALIFIED INSTRUCTOR.
2. SIZES OF ANCHOR AND THRUST BLOCKS SHALL BE AS RECOMMENDED BY PIPE MFR.
3. ANCHOR AND THRUST BLOCKS SHALL BEAR AGAINST UNDISTURBED SOIL.
4. CONCRETE SHALL ATTAIN 2000 PSI COMPRESSIVE STRENGTH.
5. ANCHOR RODS SHALL BE 1/2" DIA. REINFORCING STEEL, ENCASED IN CONCRETE.
6. KEEP CONCRETE CLEAR OF ALL PIPE OPENINGS.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: LCC DATE: 2-94

REVISED BY: DATE:

DRAWN BY: FDA

DATE: 8-14-81

LANDSCAPING

**TYPICAL CONCRETE
THRUST BLOCK**

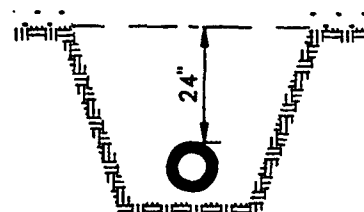
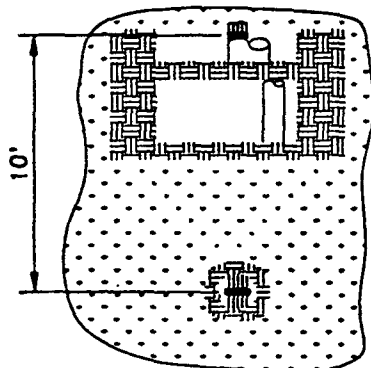
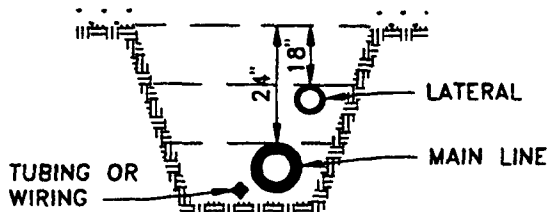
**PARKS AND RECREATION
DEPARTMENT**



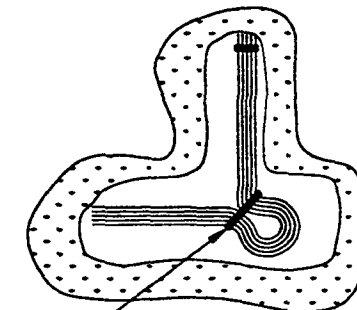
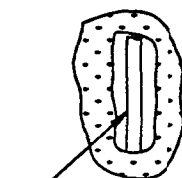
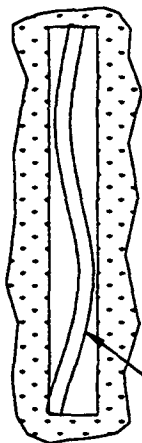
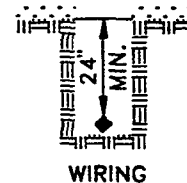
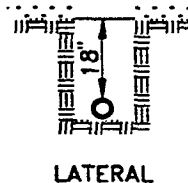
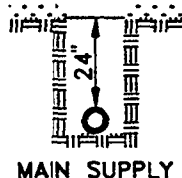
CITY of MODESTO

DETAIL NO.

1211



ALL MAIN SUPPLY LINES TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION SPECIFICATIONS



NOTE:

IN LANDSCAPED AREAS COMPACT BACKFILL TO 85% RELATIVE COMPACTION

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055

EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: r.a.c. DATE: 09-92

REVISED BY: DATE:

DRAWN BY: KLS

DATE: 08-15-81

LANDSCAPING

TYPICAL
TRENCHING

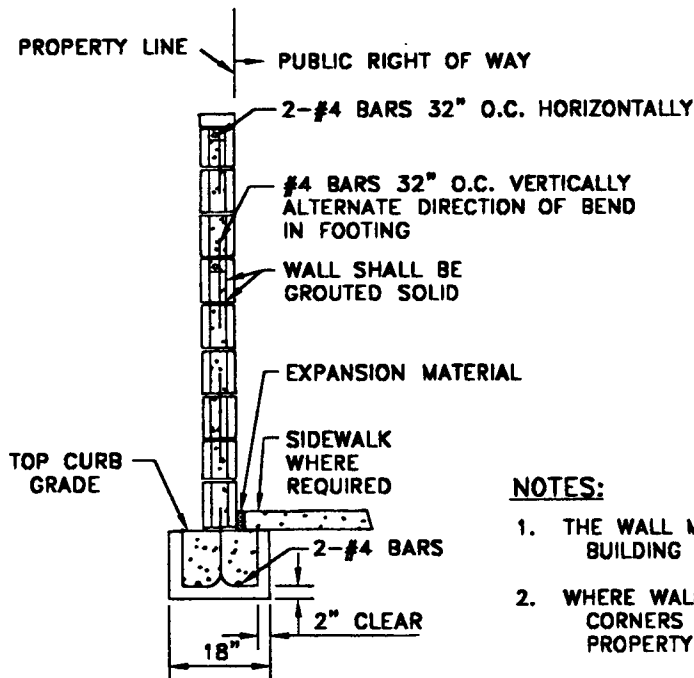
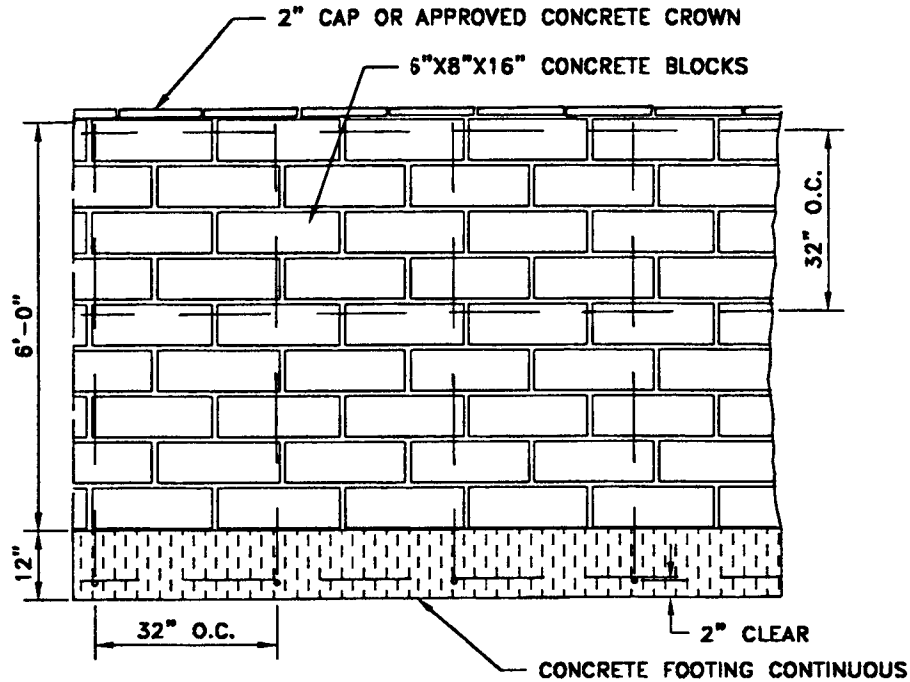
DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.

1212



SECTION

NOTES:

1. THE WALL MUST BE APPROVED BY THE CHIEF BUILDING OFFICIAL.
2. WHERE WALLS ARE CONSTRUCTED, WITNESS CORNERS MAY BE PLACED 3 FEET INSIDE PROPERTY IN LIEU OF PROPERTY CORNER.
3. DECORATIVE FEATURES SHALL BE AS REQUIRED BY THE CHIEF BUILDING OFFICIAL.

ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER
R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: K.B. DATE: 6-96

REVISED BY: r.a.c. DATE: 9-92

DRAWN BY: JLA DATE: 11-85

LANDSCAPING

**ACCESS CONTROL
WALL**

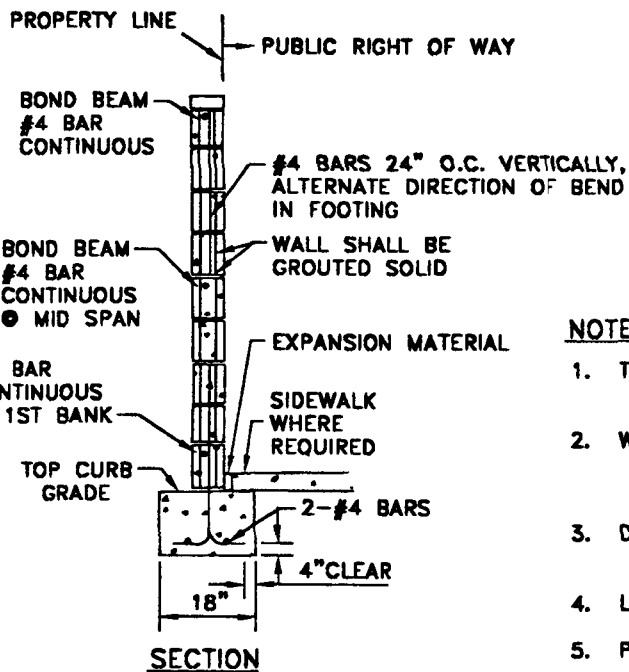
**DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION**



CITY of MODESTO

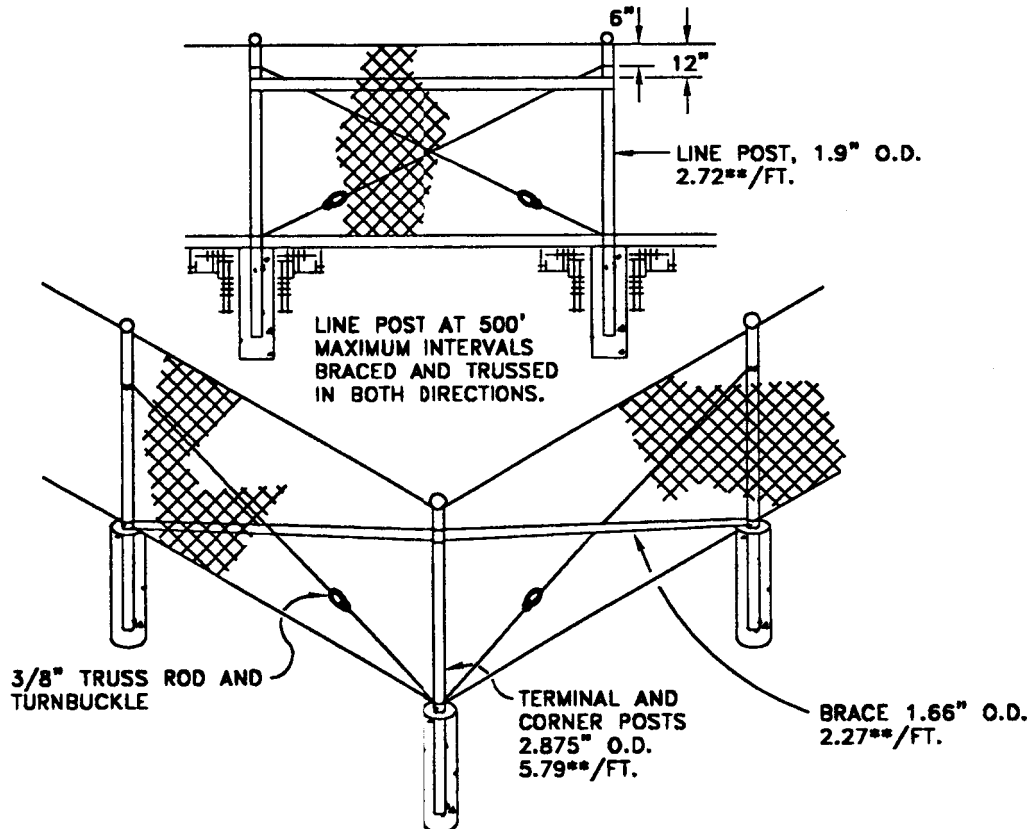
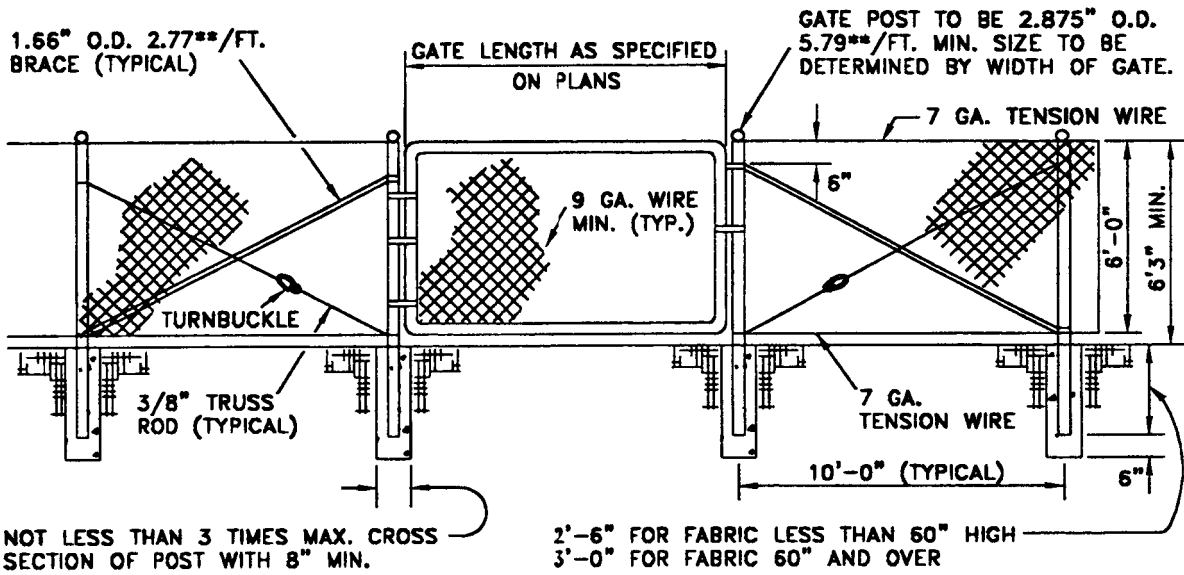
DETAIL NO.

1213



1. THE WALL MUST BE APPROVED BY THE CHIEF BUILDING OFFICIAL.
2. WHERE WALLS ARE CONSTRUCTED, WITNESS CORNERS MAY BE PLACED IN LIEU OF PROPERTY CORNER.
3. DECORATIVE FEATURES SHALL BE AS REQUIRED BY THE CHIEF BUILDING OFFICIAL.
4. LAP ALL STEEL SPLICES 12" MINIMUM.
5. PILASTER ENCROACHES INTO SIDEWALK.
6. ALTERNATIVE WALL CONSTRUCTION SHALL BE APPROVED IN WRITING BY THE ENGINEER.

1214



ORIGINAL STAMPED AND
SIGNED BY: VAN SWITZER

R.E. 22055 EXP. DATE: 9-30-00

APPROVED BY
CITY COUNCIL: 9-9-97

REVISED BY: DATE:

REVISED BY: DATE:

DRAWN BY: K.B.

DATE: 6-96

LANDSCAPING

CHAIN LINK FENCE & GATE

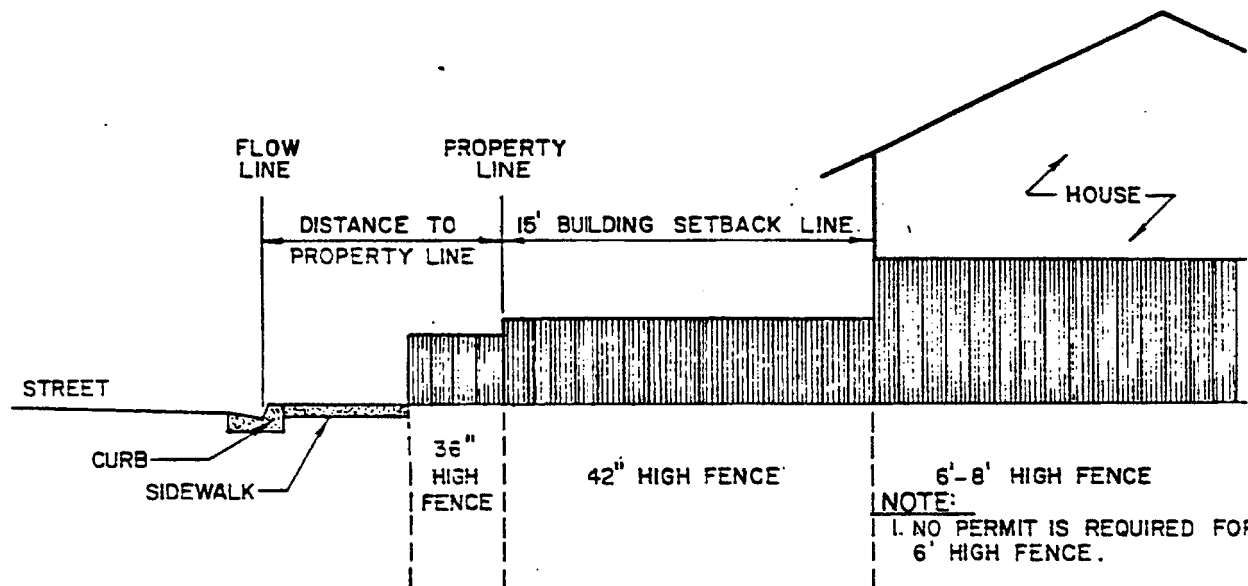
DEPARTMENT OF PUBLIC WORKS
AND TRANSPORTATION



CITY of MODESTO

DETAIL NO.

1215



NOTE:

1. NO PERMIT IS REQUIRED FOR 6' HIGH FENCE.
2. ENGINEERING BY A LICENSED ENGINEER AND A PERMIT IS REQUIRED FOR FENCES EXCEEDING 6' IN HEIGHT BUT NOT TO EXCEED 8' IN HEIGHT.

ELEVATION

REF. CODE	FENCE STANDARDS	DRAWN BY: HEINTZ
<i>Daryl C Willey</i>		DATE: JULY 1986
CHIEF BUILDING OFFICIAL	CITY OF MODESTO BUILDING INSPECTION DEPT.	PAGE:

CITY OF MODESTO

INDEX

GENERAL PROVISIONS

<u>SECTION</u>	<u>PAGE</u>
1. DEFINITIONS AND TERMS.....	1-1
2. AWARD AND EXECUTION OF CONTRACT	
2.01 General Terms	2-1
2.02 Award of Contract	2-1
2.03 Contract Bonds.....	2-2
2.04 Execution of Contract.....	2-3
2.05 Subcontractors	2-3
3. NATURE OF CONTRACT/CHANGES IN WORK	
3.01 Alterations	3-1
3.02 Limited City Power	3-1
3.03 Extra Work.....	3-1
3.04 Changes in Work	3-2
3.05 Unit Price Bid Items.....	3-2
3.06 Guarantee	3-3
3.07 Disputed Work	3-3
4. CONTROL OF WORK	
4.01 Authority of the Public Works and Transportation Director.....	4-1
4.02 Plans and Specifications.....	4-1
4.03 Plans	4-2
4.04 Conformity with Plans and Allowable Deviations.....	4-2
4.05 Coordination of Plans, Specifications and Special Provisions...	4-2
4.06 Interpretation of Plans and Specifications.....	4-3
4.07 Superintendence	4-3
4.08 Surveying.....	4-3
4.09 Inspection	4-4
4.10 Compaction Tests.....	4-4
4.11 Authority of Inspectors	4-4

SECTION

PAGE

4. CONTROL OF WORK (continued)

4.12	Removal of Defective or Unauthorized Work	4-5
4.13	Beneficial Use	4-5
4.14	Final Inspection	4-6
4.15	Additional and Emergency Protection.....	4-6
4.16	Conferences	4-6
4.17	Subsurface Data.....	4-7
4.18	Differing Site Conditions	4-7
4.19	Hours of Work.....	4-8
4.20	Construction Schedule.....	4-8

5. CONTROL OF MATERIALS

5.01	Samples and Tests	5-1
5.02	Submittal	5-2
5.03	Protection of Work and Materials	5-3
5.04	Defective Materials	5-3
5.05	Certificates of Compliance	5-3
5.06	Disposal of Excess Material	5-4
5.07	Substitutions	5-4
5.08	As-Built Plans	5-4

6. UTILITIES

6.01	Location.....	6-1
6.02	Protection	6-1
6.03	Notification.....	6-2
6.04	Removal	6-2
6.05	Relocation.....	6-2
6.06	Delays.....	6-2
6.07	Cooperation	6-3
6.08	Existing Utilities.....	6-3
6.09	Utility Companies	6-4

7. LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC

7.01	Laws to be Observed	7-1
7.02	Employment	7-1
7.03	Hours of Labor	7-2

SECTION

PAGE

7. LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC (continued)

7.04	Prevailing Wages (When required by Special Provisions).....	7-2
7.05	Permits and Licenses	7-4
7.06	Patent Fees and Royalties.....	7-4
7.07	Cooperation and Collateral Work	7-4
7.08	Use of Premise	7-5
7.09	Project Site Maintenance.....	7-5
7.10	Temporary Light, Power, and Water	7-7
7.11	Protection and Restoration of Existing Improvements.....	7-7
7.12	Public Convenience and Safety.....	7-8
7.13	Hold Harmless Agreement	7-9
7.14	Insurance Requirements	7-10
7.15	Verification of Coverage.....	7-11
7.16	Subcontractors	7-11
7.17	Contractor s Responsibility for Work	7-11
7.18	Advertising	7-12
7.19	Risk of Loss.....	7-12
7.20	Hazardous Materials.....	7-12
7.21	Control of Fugitive Dust	7-13
7.22	Control of Storm Water.....	7-13

8. PROSECUTION AND PROGRESS

8.01	Subletting and Assignment.....	8-1
8.02	Progress of the Work.....	8-2
8.03	Character of Workers	8-3
8.04	Temporary Suspension of Work.....	8-3
8.05	Time of Completion and Liquidated Damages	8-4
8.06	Suspension of Contract.....	8-6
8.07	Rights-of-Way	8-7
8.08	Delays by the City of Modesto	8-7

9. MEASUREMENT AND PAYMENT

9.01	Measurement	9-1
9.02	Scope of Payment.....	9-1
9.03	Extra and Force Account Work.....	9-2
9.04	Progress Payments.....	9-3
9.05	Final Payment.....	9-4
9.06	Increased or Decreased Contract Quantities.....	9-4

SECTION

PAGE

9. MEASUREMENT AND PAYMENT (continued)

9.07	Substitution of Securities for Withheld Payments	9-4
9.08	Rights to Withhold Amounts	9-5
9.09	Dispute Resolution	9-6

**CITY OF MODESTO
GENERAL PROVISIONS**

SECTION 1

DEFINITIONS AND TERMS

Whenever in these specifications, or in any documents or instruments where these specifications govern, the following terms or pronouns in place of them are used, the intent and meaning will be interpreted as follows:

AGREEMENT - See Contract.

ASTM - American Society for Testing and Materials.

AWWA - American Water Works Association.

ADDENDA - Written or graphic instruments issued prior to the opening of bids which clarify, correct or change the bidding documents or the contract documents.

BID - The offer of a proposal of the bidder submitted on the prescribed form setting forth the prices for the work to be performed.

BIDDER - Any individual, firm or corporation submitting a proposal for the work contemplated, acting directly or through a duly authorized representative.

BIDDER S GUARANTY - The cash or certified check or cashiers check or bidders bond accompanying the proposal submitted by the bidder as a guaranty that the bidder will enter into a contract with the City of Modesto for the construction of the work if awarded to him or her.

BONDS - Bid, performance and payment bonds and other instruments of security.

CHANGE ORDER - A document which is signed by the Contractor and City and authorizes an addition, deletion or revision in the work, with possible adjustment in the contract price or the contract time, issued on or after the effective date of the Contract.

CITY - City of Modesto, California

CITY ENGINEER - Deputy Director of Public Works and Transportation, Engineering, City of Modesto, acting either directly or through properly authorized agents, such agents acting within the scope of the particular duties entrusted to them.

CITY STANDARDS - The Standard Specifications of the City of Modesto, Department of Public Works and Transportation, copies of which are available at the office of the Public Works and Transportation Director.

CONTRACT - The written agreement covering the performance of the work and the furnishing of labor and materials in the construction of the work.

CONTRACTOR - The person or persons, partnership or corporation, private or municipal, who have entered into a contract with the City of Modesto or their legal representatives.

COUNCIL - The City Council of the City of Modesto.

DAYS - Days shall mean calendar days unless otherwise specified.

DEFECTIVE - An adjective which when modifying the word Work refers to work that is unsatisfactory, faulty or deficient, or does not conform to the contract plan and specifications, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the contract plans and specifications, or has been damaged prior to the Engineers' recommendations of final payment.

DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION - Department of Public Works and Transportation of the City of Modesto.

DIRECTOR OF PUBLIC WORKS AND TRANSPORTATION - The Director of Public Works and Transportation of the City of Modesto acting either directly or through properly authorized agents, such agents acting within the scope of the particular duties entrusted to them.

EASEMENTS - A recorded document in which the land owner gives the City permanent rights to construct and maintain water mains, sanitary sewers, storm drains and/or facilities across private property.

ENGINEER - See City Engineer

HOLD HARMLESS - Agreement by one party to indemnify and defend a second party when the second party is sued by a third party as a result of the first party's actions or inactions.

LIQUIDATED DAMAGES - The amount of dollars assessed for each and every calendar day required to complete the contract in excess of the contract time.

PLANS - The official plans, typical cross-sections, general cross-sections, working drawings and supplemental drawings, or reproductions thereof, which show the location, character, dimensions and details of the work to be done, and which are to be considered as a part of the contract supplementary to these specifications.

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

PROPOSAL FORM - The approved form on which the City of Modesto requires formal bids be prepared and submitted for the work.

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

SHOP DRAWINGS - All drawings, diagrams, illustrations, schedules and other data which are specifically prepared by or for the Contractor to illustrate some portion of the Work and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams and other information prepared by a supplier and submitted by the Contractor to illustrate material or equipment for some portion of the Work.

SPECIAL PROVISIONS - The Special Provisions are specific clauses of the Specifications setting forth conditions or requirements peculiar to the particular work called for by the plans and specifications.

SPECIFICATIONS - The textual directions, provisions and requirements contained herein.

STANDARD DETAILS - Details of City standard construction of the various items of work indicated and/or referred to on the plans, specifications of special provisions.

STANDARD SPECIFICATIONS - City of Modesto Standard Specifications.

STATE - State of California

STATE STANDARDS - The Standard Specifications of the State of California, Department of Transportation, a current copy of which is on file in the office of the Public Works and Transportation Director.

SUPERINTENDENT - The executive representative of the Contractor present on the project at all times during progress, authorized to receive and fulfill instructions from the Public Works and Transportation Director.

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

SURVEYOR - A land surveyor licensed in the State of California.

TESTING AGENCY - The commercial laboratory designated by the Engineer to test materials involved in the contract.

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SECTION 2

AWARD AND EXECUTION OF CONTRACT

2.01 GENERAL TERMS

It is the intent of the Contract to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any work, materials or equipment that may reasonably be inferred from the Contract Documents as being required to produce the intended result will be supplied whether or not specifically called for. When words which have a well-known technical or trade meaning are used to describe the work, materials or equipment, such words shall be interpreted in accordance with that meaning. Reference to standard specifications, manuals or codes of any technical society, organization or association, or to the Laws or Regulations of any governmental authority, whether such reference is specific or implied, shall mean the latest standard specification, manual, code or Laws or Regulations in effect at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated. However, no provisions of any referenced standard specifications, manual or code (whether or not specifically incorporated by reference in the Contract Documents) shall be effective to change the duties and responsibilities of City, Contractor or Engineer, or any of their consultants, agents or employees any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority of supervising or directing the furnishing or performance of the Work or any duty or authority of undertaking responsibility for the Contractor. Clarifications and interpretations of the Contract Documents shall be issued by Engineer.

2.02 AWARD OF CONTRACT

A. Notice of Award.

The City reserves the right to reject any and all proposals. The award of the contract, if it is awarded, will be to the lowest responsible bidder whose proposal complies with all the requirements prescribed. The award, if made, will be made within sixty (60) days after the opening of the proposals.

All bids will be compared on the basis of the Engineers estimate of the quantities of work to be done.

B. Delivery of Signed Contract, Project Bonds, Insurance.

Within ten (10) working days of the date of receipt of the Notice of Award, the Contractor shall obtain and deliver the required project bonds and insurance, acceptable to the City, and return two copies of signed Contract to the City.

C. Notice to Proceed.

A preconstruction conference must be held prior to starting any work on the project. The City will contact the Contractor no later than five (5) working days from the date the contract is signed by the City Manager to set up the preconstruction conference, which shall be held no later than ten (10) working days from the contract signing date. The Notice to Proceed shall be issued at the preconstruction conference.

D. Commencement of Work.

Work shall commence as soon as possible from the date of the Notice to Proceed and shall be diligently prosecuted to completion within the time provided in the Special Provisions.

No work shall commence before contract bonds and insurance certificates have been filed with the City and the contract has been signed by the City Manager.

E. Return of Bidders Guaranty.

The proposals of the two (2) lowest bidders will be considered in awarding the contract. All other proposal guarantees will be returned promptly by the City Clerk after tabulation of bids has been made. The proposal guarantees retained will be returned after the successful bidder has executed the contract and the bonds accompanying the same are approved and filed.

2.03 CONTRACT BONDS

The Contractor shall furnish two (2) good and sufficient bonds. These bonds shall be in the amount and for the purpose specified below. They shall be surety bonds issued by corporations duly and legally licensed to transact business in the State of California. All bonds shall be issued only by companies listed in the latest edition of the publication titled "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds" published by the U.S. Department of the Treasury. They shall be issued at the expense of the Contractor, and shall be maintained by him or her at his or her expense during the entire life of the contract. All surety companies shall be approved by the City.

One bond shall be in the amount of one hundred percent (100%) of the contract price and shall guarantee faithful performance of the contract and insure the City during the life of the contract.

One bond shall be in the amount of one hundred percent (100%) of the contract price and shall secure the obligations set forth in Section 3248 of the Civil Code of the State of California.

2.04 EXECUTION OF CONTRACT

The contract shall be signed by the successful bidder and returned, together with the contract bonds and insurance certificates as required under Section 7.14 of these specifications within ten (10) working days after the bidder has received notice that the contract has been awarded. No proposal shall be considered binding upon the City of Modesto until the execution and return to the City of the contract and the filing of the contract bonds and insurance certificates with the City.

Failure to execute and return a contract and file acceptable bonds and insurance as provided herein within ten (10) working days after the bidder has received notice that the contract has been awarded shall be just cause for the annulment of the award and the forfeiture of the proposal guaranty to the City of Modesto.

Upon the failure or refusal of the successful bidder to execute and return the contract and file acceptable bonds and insurance, the award may be made to the second lowest responsible bidder and should he or she fail or refuse to execute and return the contract and file acceptable bonds and insurance, the award may be made to the third lowest responsible bidder. On the failure or refusal of the second or third lowest responsible bidders to whom the contract is awarded to execute and file the contract and file acceptable bonds and insurance, their bidders' guarantees shall be likewise forfeited to the City of Modesto.

2.05 SUBCONTRACTORS

In accordance with the Subletting and Subcontracting Fair Practices Act, commencing with Section 4100 of the Public Contract Code, each bidder for the work specified shall set forth in his or her bid:

- (a) The name and the location of the place of business of each subcontractor who will perform work or labor or render service to the prime contractor in or about the construction of the work or improvement, or a subcontractor licensed by the State of California who, under a subcontract to the prime contractor, specially fabricates and installs a portion of the work or improvement according to detailed drawings contained in the plans and specifications, in an amount in excess of one-half of one percent (0.5%) of the prime contractor's total bid.
- (b) The portion of the work which will be done by each such subcontractor. The prime contractor shall list only one subcontractor for each such portion as is defined by the prime Contractor in his or her bid.

If a prime contractor fails to specify a subcontractor or if a prime contractor specifies more than one subcontractor for the same portion of work to be performed under the contract in excess of one-half of one percent (0.5%) of the prime contractor's total bid or, in the case of bids or offers

for the construction of streets or highways, including bridges, in excess of one-half of 1 percent of the prime contractor's total bid or ten thousand dollars (\$10,000), whichever is greater, he or she agrees that he or she is fully qualified to perform that portion himself or herself, and that he or she shall perform that portion himself. If his or her bid is accepted, he or she shall not be permitted to subcontract any portion of the work which he or she is required to perform himself or herself, to substitute any person as subcontractor in place of the subcontractor listed in the original bid, or to permit any such subcontract to be voluntarily assigned or transferred or allow it to be performed by anyone other than the original subcontractor listed in the original bid, except under the conditions set forth in the Subletting and Subcontracting Fair Practices Act.

Should the prime contractor violate any of these provisions, his or her so doing will be deemed a violation of his or her contract and the City may exercise the option, in its own discretion, of (1) canceling his or her contract or (2) assessing the prime contractor a penalty in an amount of not more than ten percent (10%) of the amount of the subcontract involved. The funds recovered through the application of this penalty shall be deposited in the fund out of which the prime contract is awarded.

The Contractor agrees that he or she is as fully responsible to the City for the acts and omissions of his or her subcontractors and of persons either directly or indirectly employed by them, as he or she is for the acts and omissions of persons directly employed by him. The City will deal directly with, and make all payments to the Contractor only.

The Contractor shall be responsible for the coordination of all trades, subcontractors, and suppliers engaged upon the work. Neither the City nor the Engineer will undertake to settle any differences between the Contractor and his/her subcontractors or between subcontractors.

When the subcontracted work is not being prosecuted in a manner satisfactory to the Engineer, the Contractor shall be notified to take corrective action within a specified time. If timely correction is not made, on receipt by the Contractor of written instructions from the Engineer the subcontractor shall be removed immediately from the work. He/she shall not be re-employed on the work.

Nothing contained in the contract documents shall create any contractual relation between any subcontractor and the City.

SECTION 3

NATURE OF CONTRACT/CHANGES IN WORK

3.01 ALTERATIONS

By mutual consent in writing of the parties signatory to the contract, alterations or deviations, increases or decreases, additions or omissions in the plans and specifications may be made and the same shall in no way affect or make void the contract.

3.02 LIMITED CITY POWER

The Contractor recognizes that the City is a public agency and that it can act only through its duly authorized agents, and in this regard agrees that only written change orders, executed as specifically authorized by the governing body of the City either directly or through properly authorized agents, shall be valid. The Consulting Engineer shall have no authority to issue a change order unless so specifically authorized, and no person shall have authority to issue any oral change order. Unless a valid change order is issued therefor, all changes in the work performed by the Contractor shall be at his own risk, and he/she shall not be entitled to any additional compensation on account thereof, and he/she may be required to make the work conform to the Specifications. No act or series of acts by the City during the course of the contract shall be deemed to constitute a waiver of the right of the City to rely upon the provisions of this subparagraph.

3.03 EXTRA WORK

New and unforeseen work will be classed as extra work when such work cannot be covered by any of the various items, or combination of items for which there is a bid price. If extra work orders are given, such work shall be considered a part hereof and subject to each and all of its terms and requirements.

The Contractor shall do no extra work except upon written order from the Public Works and Transportation Director. For such extra work the Contractor shall receive payment as previously agreed upon in writing, or he or she shall be paid on force account.

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

3.04 CHANGES IN WORK

A. Changes in Accordance with Specifications.

Each change ordered shall be performed in accordance with the Specifications insofar as they may be applied without conflict with the conditions set forth in the change order.

B. Changes Requested by the Contractor.

Changes in the plans and specifications, requested in writing by the Contractor, which do not materially affect the work and which are not detrimental to the work or to the interests of the City, may be granted to facilitate the work, when approved in writing by the Engineer.

If such changes are granted, they shall be made at a reduction in cost or at no additional cost to the City. Nothing herein shall be construed as granting a right to the Contractor to demand acceptance of such changes.

C. Changes Initiated By the City.

At any time during the progress of the work, and without in any way rendering void the contract, the City may order alterations in, additions to, or deductions from the work, and when so ordered in writing, the Contractor shall proceed with the changes directed in such order.

The Contractor shall not be entitled to any extension of time for the completion of the work by virtue of any change order unless, with respect to a change order executed by the Contractor, the change order specifically provides therefore, or, with respect to a change order not so executed, the Contractor, within five days after receipt of the order, files a written claim therefore with the Engineer, in which event he/she shall be entitled to a reasonable extension of time as determined by the Engineer.

The Contractor and the City may agree upon unit prices or lump sums which shall be used to increase or decrease the contract price on account of any change ordered. In the absence of any such agreement, the contract price shall be adjusted as hereinafter provided.

3.05 UNIT PRICE BID ITEMS

Unit prices for individual bid items are used by the City when the exact quantity of an item to be constructed cannot be determined. The Engineer will provide an estimated quantity for purposes of evaluating the bid. Payment for each item will be based upon the actual work completed.

Whenever an item of work or materials is specified in the contract by unit prices and is changed, but by not more than twenty-five percent of the Engineers' estimate of that bid item quantity as

specified in the Bid Form, then the contract price shall be increased or decreased by the application of the unit prices so specified.

Whenever said contract item increases or decreases in quantity by more than twenty-five percent, the addition or subtraction from the contract price shall be established in accordance with Section 4-1.03 of the State Standard Specifications.

3.06 GUARANTEE

Except as otherwise expressly provided in the Specifications, and excepting only items of routine maintenance, ordinary wear and tear and unusual abuse or neglect, Contractor guarantees all work executed by him and all supplies, materials and devices of whatsoever nature incorporated in, or attached to the work, or otherwise delivered to City as a part of the work pursuant to the Contract, to be absolutely free of all defects of workmanship and materials for a period of one year after final acceptance of the entire work by the City Council. Contractor shall repair or replace any or all such work or material, together with all or any other work or material which may be displaced or damaged in so doing, that may prove defective in workmanship or material within said one year guarantee period without expense or charge of any nature whatsoever to City. If subsequent repairs are required, the repaired items will be guaranteed free of defects for an additional year from the date of repair.

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

3.07 DISPUTED WORK

If the Contractor and the Engineer are unable to reach agreement on disputed work, the Public Works and Transportation Director may direct the Contractor to proceed with the work. Payment shall be as later determined by Section 9.03.

Although not to be construed as proceeding under extra work provisions, the Contractor shall keep and furnish records of disputed work in accordance with Section 9.03.

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SECTION 4

CONTROL OF WORK

4.01 AUTHORITY OF THE PUBLIC WORKS AND TRANSPORTATION DIRECTOR

The Public Works and Transportation Director shall decide any and all questions which may arise as to the quality or acceptability of materials furnished and work performed and as to the manner of performance and rate of progress of the work; all questions which arise as to the interpretation of the plans and specifications; all questions as to the acceptable fulfillment of the contract on the part of the Contractor; and all questions as to claims and compensations.

Any decision of the Public Works and Transportation Director shall be final and he or she shall have executive authority to enforce and make effective such decisions and orders as the Contractor fails to carry out promptly.

4.02 PLANS AND SPECIFICATIONS

The Contractor shall keep at the worksite a copy of the plans and specifications, to which the Engineer shall have access at all times.

The plans, specifications and other contract documents will govern the work. Standard Specifications and plans which are referenced in the drawings or specifications are a part of the contract documents.

While the City has endeavored to accurately represent the physical conditions which may affect the cost of the proposed work shown on the plans or indicated in the specifications, the City does not warrant the completeness or accuracy of such information. It is the Contractor's responsibility to ascertain the existence of any such conditions affecting the cost of the work which would have been disclosed by reasonable examination to the site.

No test, investigation, statement or estimate of a factual situation not incorporated in the contract shall be relied on by the Contractor. Any test, investigation, statement or estimate of fact incorporated in the contract shall be considered by the Contractor to be a suggestion only, and he/she may request equal access to the underlying or background informative material or source and shall arrive at his own opinion thereon, including his/her determination of how reliable might be any conclusion appearing in (or inferred from) the contract.

The Contractor may not rely on "drawings of record" or similarly final or accepted drawings or maps of facilities constructed on public or private property for or under inspection by the City. Such information may be used for reference only. Actual locations and depths shall be determined by field investigations by the Contractor.

The General and Special Provisions apply with equal force to all the work, including extra work authorized.

For convenience, these Specifications are arranged in the several sections indicated, but such separation shall not be considered as the limits of the work required of any separate trade. The terms and conditions of such limitations are wholly between the Contractor and his/her subcontractors.

In general, the drawings will indicate dimensions, position and kind of construction, and the written Specifications will indicate qualities and methods. Work not particularly detailed, marked or specified, shall be as similar parts that are detailed, marked or specified.

4.03 PLANS

All work shall conform to the approved plans.

It is mutually agreed, however, that approval by the Public Works and Transportation Director of the Contractor's working plans does not relieve the Contractor of any responsibility for accuracy of dimensions and details and that the Contractor shall be responsible for agreement and conformity of his or her working plans with the approved plans and specifications.

4.04 CONFORMITY WITH PLANS AND ALLOWABLE DEVIATIONS

Finished surfaces in all cases shall conform to the dimensions shown on the approved plans. Deviations from the approved plans as may be required by the exigencies of construction will be determined in all cases by the Public Works and Transportation Director and authorized in writing.

4.05 COORDINATION OF PLANS, SPECIFICATIONS AND SPECIAL PROVISIONS

During the review of the contract plans, special provisions, or standard specifications, the Contractor and each of his/her subcontractors shall make a written report to the Engineer describing any conflicts, deficiencies, errors or omissions detected, which may create construction problems. The report will enable the Engineer to resolve the items in the report prior to the start of construction.

During the progress of construction, if any further errors, omissions, conflicts or discrepancies are detected, it shall be the Contractor's duty to immediately report them to the Engineer and obtain written instructions resolving deficiencies prior to proceeding with affected work.

Should the Contractor deliberately proceed with any portion or phase of construction which is obviously incorrectly indicated in the contract plans or documents, he/she shall be responsible for any corrective measures required to make adequate repairs or adjustments.

These specifications, the plans, special provisions, and all supplementary documents are essential parts of the contract and a requirement occurring in one is as binding as though occurring in all. They are intended to be cooperative, to describe and to provide for a complete work.

4.06 INTERPRETATION OF PLANS AND SPECIFICATIONS

In case of conflicts between Plans and Specifications, the Specifications control quality, materials and installation requirements; the Plans control size, location and quantity. Should it appear that the work to be done, or any matter relative thereto is not sufficiently detailed or explained in these specifications, plans and the special provisions, the Contractor shall apply to the Public Works and Transportation Director for such further explanations as may be necessary and shall conform to such explanation or interpretation as part of the contract, so far as may be consistent with the intent of the original specification.

In the event of any discrepancy between any drawing and the figures written thereon, the figures shall be taken as correct.

4.07 SUPERINTENDENCE

The Contractor shall personally supervise the work under the contract or shall designate in writing to the Public Works and Transportation Director the name of his or her representative who shall at all times be present at the site of the work. The authorized representative shall have full authority to direct the work and shall receive and obey orders from the Public Works and Transportation Director. Contractor shall provide the Director one week's written notice of change to authorized representative.

4.08 SURVEYING

The Engineer will lay out the work and stake the necessary control points for the Contractor's operations. The Contractor shall give at least forty-eight (48) hours' notice in advance of the time he or she will require staking of any portion of work and he or she shall furnish such facilities and labor necessary for marking and maintaining points set by the Engineer.

The Contractor shall preserve all stakes and points set for lines, grades, or measurements of the work in their proper places until authorized to remove them by the Engineer. All expenses incurred in replacing stakes that have been removed without proper authority shall be paid by the Contractor. This charge will be deducted from monies due or to become due the Contractor.

A. Permanent Survey Markers

The contractor shall notify the Engineer at least 7 days before starting work. This allows the Engineer to take necessary measures to ensure the preservation of survey monuments and bench marks. The contractor shall not disturb permanent survey monuments or bench marks

without the consent of the Engineer. The contractor also shall bear the expense of replacing any that may be disturbed without permission. **Replacement shall be done only by the Engineer.**

When a change is made in the finished elevation of the pavement of any roadway in which a permanent survey monument is located, the contractor shall adjust the monument cover to the new grade unless otherwise specified.

4.09 INSPECTION

The Public Works and Transportation Director shall at all times have access to the work during construction and shall be furnished with every reasonable facility for ascertaining that the materials used and employed and the workmanship are in accordance with the requirements and intentions of these specifications. All work done and all materials furnished shall be subject to inspection. Work covered without the favorable review of the Director shall, if required by the Director, be uncovered for inspection at the Contractor's expense.

Whenever the Contractor varies the period during which work is carried on each day, he or she shall give due notice to the Public Works and Transportation Director so that proper inspection may be provided. Any work done without proper inspection will be subject to rejection.

The inspection of the work shall not relieve the Contractor of any of his or her obligations to fulfill the contract as prescribed.

If work is to be completed after normal business hours, Contractor shall call the inspector 48 hours in advance to schedule an inspection to be made after normal business hours. Work shall not be covered without inspection.

4.10 COMPACTION TESTS

All compaction tests required by the Engineer shall be by the testing agency currently under contract to the City of Modesto to provide such services. The City shall pay for only the tests which were successfully passed. Any failed test shall be paid for by the Contractor. City shall require retesting until all required tests are successfully passed.

The testing program, including the numbers and location of tests, shall be under the direction of the Engineer. All compaction test sites deeper than five (5') feet below grade shall be properly shored by the Contractor to protect the testing personnel.

4.11 AUTHORITY OF INSPECTORS

Properly authorized inspectors shall be considered to be the representatives of the City, limited to the duties and powers entrusted to them. It will be their duty to inspect materials and

workmanship of those portions of the work to which they are assigned, either individually or collectively under instructions from the Public Works and Transportation Director and to report any and all deviations from the drawings, specifications, and other contract provisions which may come to their notice. Any inspector may be considered to have the right to order the work subject to his or her inspection stopped, if in his or her opinion such action becomes necessary, until the Public Works and Transportation Director is notified and has determined and ordered that the work may proceed in due fulfillment of all contract requirements.

4.12 REMOVAL OF DEFECTIVE OR UNAUTHORIZED WORK

All work which is defective in its construction, or deficient in any of the requirements of these specifications, shall be remedied or removed and replaced by the Contractor in an acceptable manner, and no compensation will be allowed for such correction.

Any work done beyond the lines and grades shown on the plans, or established by the Public Works and Transportation Director, or any extra work done without written authority, will be considered as unauthorized and will not be paid for.

Upon failure on the part of the Contractor to comply forthwith with any order of the Public Works and Transportation Director made under the provisions of this article, the Public Works and Transportation Director shall have the authority to cause defective work to be remedied or removed and replaced, and unauthorized work to be removed and to deduct the costs thereof from any monies due or to become due to the Contractor.

4.13 BENEFICIAL USE

As a condition to partial payments made hereunder, the City shall have the right to make beneficial use of completed portions of the work. The Contractor shall provide proper access to the work for this purpose, but such use and operation shall not constitute an acceptance of the work until the entire work under this contract is finally accepted by the City Council. The City shall perform normal maintenance on approved portions of work placed in service. Nothing in this section shall be construed as relieving the Contractor from full responsibility for correcting defective work or materials.

Such action by the City will not relieve the Contractor of responsibility for injury or damage to said completed portions of the improvement resulting from use by public traffic or from the action of the elements or from any other cause, injury or damage resulting from the Contractor's operations or negligence. The Contractor will be required to re-clean such portions of the improvement before field acceptance.

4.14 FINAL INSPECTION

Before final inspection of the work, the Contractor shall clean the project site and all ground occupied by him in connection with the work of all rubbish, excess materials, false work, temporary structures and equipment. All parts of the work shall be left in a neat and presentable condition. Full compensation for final cleaning up will be considered as included in the prices paid for the various contract items of work and no separate payment will be made therefor.

Upon completion of the final inspection, when the work is found to be in compliance with these specifications, the Public Works and Transportation Director will recommend to the City Council acceptance of the completed work. The work is not complete until accepted by the City Council.

4.15 ADDITIONAL AND EMERGENCY PROTECTION

Whenever, in the opinion of the Public Works and Transportation Director, the Contractor has not taken sufficient precautions for the safety of the public or the protection of the works to be constructed under this contract, or of adjacent structures on property which may be injured by processes of construction on account of such neglect, and whenever, in the opinion of the Public Works and Transportation Director, an emergency shall arise and immediate action shall be considered necessary in order to protect public or private, personal or property interests, then and in that event, the Public Works and Transportation Director, with or without notice to the Contractor, may provide suitable protection to the said interests by causing such work to be done and such material to be furnished as shall provide such protection as the Public Works and Transportation Director may consider necessary and adequate.

The cost and expense of such work and material so furnished shall be borne by the Contractor and if the same shall not be paid on presentation of the bills therefor, then such costs shall be deducted from any amounts due or to become due the Contractor. The cost shall be determined in accordance with a schedule of fees approved by the City Council for encroachment permits.

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

4.16 CONFERENCES

A preconstruction conference will be held prior to commencing work. The City shall designate a date and time for a preconstruction conference. The Contractor shall, at the preconstruction conference or within five calendar days after Notice To Proceed, whichever occurs first, present a project construction schedule and traffic control plan.

Prior to commencing work and at any time during the progress of the work, the Public Works and Transportation Director shall have authority to call meetings with the Contractor and any of his employees or subcontractors on this project as deemed necessary to discuss details of construction or interpretation of contract documents. No additional compensation for attendance at such meetings shall be allowed.

The Engineers' approval will be given only if he/she is satisfied that the Contractor's construction schedule is sufficiently detailed to show clearly the work to be completed during each month and, if adhered to, will be adequate to assure the completion of the work within the time for completion set forth in the Special Provisions.

4.17 SUBSURFACE DATA

All soil and test soil data, water table elevations, and soil analyses included or referred to in the Contract Documents apply only at the location of the test holes and to the depths indicated. Soil test reports for test holes which have been drilled are available for inspection at the office of the Engineer. Any additional subsurface exploration shall be done by bidders or the Contractor at their own expense.

The indicated elevation of the water table is that existing at the date the test hole data was determined. It is the Contractor's responsibility to determine and allow for the elevation of ground water at the date of project construction. A difference in elevation between ground water shown in soil boring logs and ground water actually encountered during construction will not be considered as a basis of extra work.

4.18 DIFFERING SITE CONDITIONS

During the progress of the work, if subsurface or latent physical conditions are encountered at the site differing materially from those indicated in the contract or if unknown physical conditions of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the work provided for in the contract, are encountered at the site, the party discovering such conditions shall promptly notify the other party in writing of the specific differing conditions before they are disturbed and before the affected work is performed.

Upon written notification, the Engineer will investigate the conditions, and if the Engineer determines that the conditions materially differ and cause an increase or decrease in the cost or time required for the performance of any work under the contract, an adjustment, excluding loss of anticipated profits, will be made and the contract modified in writing accordingly. The Engineer will notify the Contractor of his determination whether or not an adjustment of the contract is warranted.

Pursuant to Section 25914.2 of the California Health and Safety Code, in the event the contractor encounters on the site materials he or she reasonably believes to be asbestos or a hazardous substance, and the asbestos or hazardous substance has not been rendered harmless, the contractor may continue work in unaffected areas reasonably believed safe and shall immediately cease work

on the area affected and report the condition to the Engineer in writing. If the Engineer determines that asbestos or hazardous substances which were not disclosed in the bid are present on the site, all work regarding the removal of those substances will be performed pursuant to a separate contract.

No contract adjustment which results in a benefit to the Contractor will be allowed unless the Contractor has provided the required written notice.

No contract adjustment will be allowed under the provisions specified in this section for any effects caused on unchanged work.

Any contract adjustments warranted due to differing site conditions will be made in accordance with Section 9.03 or Section 9.06

4.19 HOURS OF WORK

Work areas will be available for performance of the contract between 7:00 am and 5:00 pm, excluding Saturday, Sunday and Holidays. Work performed during hours and /or on days other than specified above shall be the subject of a written request to the City. If permission is granted, the Contractor shall bear all additional expenses of City's personnel and inspection services created by change to extraordinary work hours.

4.20 CONSTRUCTION SCHEDULE

Prior to the start of any work, the Contractor shall submit a proposed construction schedule to the Engineer. The construction schedule shall be in the form of a tabulation, chart, or graph and shall be in sufficient detail to show chronological relationship of all activities of the project. These include, but are not limited to, estimated starting and completion dates of various activities, submittal of shop drawings, procurement of materials, and scheduling of equipment. The construction schedule shall be consistent in all respects with the time and order of work requirements of the contract.

SECTION 5

CONTROL OF MATERIALS

5.01 SAMPLES AND TESTS

At the option of the Public Works and Transportation Director, the source of supply of all materials furnished by the Contractor shall be approved by the Public Works and Transportation Director before delivery is started and before such material is used in the work. Representative preliminary samples of the character and quality prescribed shall be submitted by the Contractor or producer of all materials to be used in the work for testing or examination as desired by the Public Works and Transportation Director.

All tests of materials furnished by the Contractor shall be made in accordance with commonly recognized industry standards and such special methods and tests as are prescribed in these specifications.

The Contractor shall furnish without charge such samples of materials as are required by the Public Works and Transportation Director. No material shall be used until it has been approved by the Public Works and Transportation Director. Samples will be secured and tested whenever necessary to determine the quality of the materials.

The Contractor shall be responsible for, and shall pay for, all source quality control and all offsite tests of materials required, except laboratory work for soil relative compaction testing and concrete strength testing during construction. The City Engineer shall have the right to witness all offsite tests and the Contractor shall furnish adequate notice of when tests will be made.

The City shall furnish and pay for all initial onsite testing services required by the Contract Documents. When initial tests indicate non-compliance with the Contract Documents, all subsequent retesting occasioned by the non-compliance shall be performed by the same testing laboratory and the cost thereof will be deducted from the Contract Sum.

Inspection or testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor. Functional testing of mechanical and electrical equipment shall be the sole responsibility of the Contractor.

When, in the opinion of the City Engineer, additional tests or inspections are required because of the manner in which the Contractor executes his work, such tests and inspections shall be paid for by the City, but will be deducted from the Contract Sum. Examples of such tests and inspections are tests of materials substituted for previously accepted materials or substituted for specified materials, retests made necessary by failure of materials to comply with the requirements of the Specifications, load tests made necessary because of portions of the structure not fully meeting Specifications or plan requirements, etc.

5.02 SUBMITTAL

Contractor shall submit shop drawings, product literature, etc., as required in the specifications, for review by the City Engineer. Provide seven copies, unless otherwise noted in the individual specifications. Shop drawings shall be submitted at least 21 calendar days before approved drawings will be required for the work. Submitted materials may not be used in the work until favorably reviewed by the City Engineer. Shop drawings shall be of a size and scale to clearly show all necessary details. Submittals will be marked as follows:

A. No Exceptions Taken:	Accepted subject to its compatibility with future submissions and additional partial submissions for portions of the work not covered in this submission. Does not constitute approval or deletion of specified or required items not shown in the partial submission.
B. Make Corrections Noted: (No Resubmittal Required)	Same as "A", except that minor corrections as noted shall be made by the Contractor.
C. Amend and Resubmit:	Rejected because of major inconsistencies or errors which shall be resolved or corrected by the Contractor prior to subsequent review by the Engineer.
D. Rejected - Resubmit:	Submitted material does not conform to plans and specifications in major respect, i.e.: wrong size, model, capacity or material.

Items "A" and "B" above (no resubmittal required) are considered "favorable review" of a submittal. Items "C" and "D" above (correction and resubmittal required) are considered "unfavorable review."

Favorable review by the City Engineer will not constitute acceptance by the City Engineer of any responsibility for the accuracy, coordination and completeness of the shop drawings or the items of equipment represented on the drawings. Accuracy, coordination, and completeness of shop drawings shall be the sole responsibility of the Contractor, including responsibility to back-check comments, corrections, and modifications from the City Engineers' review before fabrications.

Preparation of resubmittal of unfavorably reviewed submittals will not be reason for additional compensation.

5.03 PROTECTION OF WORK AND MATERIALS

The Contractor shall provide and maintain storage facilities and employ such measures as will preserve the specified quality and fitness of materials to be used in the work. Stored materials shall be reasonably accessible for inspection. The Contractor shall also adequately protect new and existing work and all items of equipment for the duration of his/her contract.

The Contractor shall not, without the City's consent, assign, sell, mortgage, hypothecate, or remove equipment or materials which have been installed or delivered and which may be necessary for the completion of the contract.

5.04 DEFECTIVE MATERIALS

All materials not conforming to the requirements of these specifications shall be considered as defective, and all such materials, whether in place or not, shall be rejected and shall be removed immediately from the site of the work unless otherwise permitted or directed by the Public Works and Transportation Director. No rejected materials, the defects of which have been subsequently corrected, shall be used until approved in writing by the Public Works and Transportation Director.

Upon failure on the part of the Contractor to comply with any order of the Public Works and Transportation Director made under the provisions of this article, the Public Works and Transportation Director shall have authority to remove and replace defective material and to deduct the cost of removal and replacement from any monies due or to become due to the Contractor.

5.05 CERTIFICATES OF COMPLIANCE

A Certificate of Compliance shall be furnished prior to the use of any materials for which these specifications require that such a certificate be furnished. In addition, when so authorized in these specifications, the City Engineer may permit the use of certain materials or assemblies prior to sampling and testing if accompanied by a Certificate of Compliance. The certificate shall be signed by the manufacturer of the material or the manufacturer of assembled materials and shall state that the materials involved comply in all respects with the requirements of the specifications.

A Certificate of Compliance shall be furnished with each lot of material delivered to the work and the lot so certified shall be clearly identified in the certificate.

All materials used on the basis of a Certificate of Compliance may be sampled and tested at any time. The fact that material is used on the basis of a Certificate of Compliance shall not relieve the Contractor of responsibility for incorporating material in the work which conforms to the requirements of the plans and specifications and any such material not conforming to such requirements will be subject to rejection whether in place or not.

5.06 DISPOSAL OF EXCESS MATERIAL

Excess material shall be disposed of in a legal manner. Disposal on private property will be done only with the prior written consent of the property owner.

5.07 SUBSTITUTIONS

If the Contractor desires to make a substitution, he shall submit complete product information to document the equipment or material being offered as being equal to that specified. No substitutions will be allowed until requested and approved in writing. Only equipment and/or materials approved by the City Engineer may be substituted. The City Engineer reserves the right to require the originally specified equipment and/or materials.

Shop drawings shall be submitted in a complete package. Partial or incomplete submittals will not be considered.

The specified contract completion time shall not be affected by any circumstance developing from the provisions of this subsection.

Installation of an approved substitution shall be the Contractor's responsibility, and any revisions necessary for the installation of approved substituted materials and/or equipment shall be made without additional expense to the City of Modesto.

5.08 AS-BUILT PLANS

The Contractor shall maintain one set of full size prints and mark thereon any deviations from plan dimensions, elevations, or orientations, and shall submit same in good condition to the City Engineer upon completion of the job as a condition of acceptance of the project. Marked prints shall be updated at least once each week and shall be available to the City Engineer for review as to currency prior to developing partial payment estimates.

SECTION 6

UTILITIES

6.01 LOCATION

The City will search known records and indicate on the plans those utilities, except service connections, which may affect the work. Any available information regarding removal, relocation, or disconnection of utilities, or installation of new utilities, will be furnished to prospective bidders before the receipt of bids. The Contractor shall immediately report to the City Engineer those utilities omitted from the plans or found substantially at variance with the location shown.

At least two (2) working days prior to commencing work, the Contractor shall request utility owners to mark or otherwise indicate the location of their substructures. The location of utilities as shown on the plans are approximate and are not to be construed as certainty. It shall be the Contractor's responsibility to determine the true location and depth of all utilities and service connections affecting or conflicting with the work, prior to the performance of the work. He/she shall also familiarize himself/herself with the type, material, age and condition of any utility which may be affected by the work.

6.02 PROTECTION

The Contractor shall not interrupt the service function or disturb the supporting base of any utility, without authority from the utility owner or order from the City Engineer.

Where protection is required to insure support of utilities located substantially as shown on the plans or in accordance with other information furnished bidders prior to receipt of bids, or for underground service connections, the Contractor shall, unless otherwise provided, furnish and place the necessary protection at his/her expense.

Upon learning of the existence and location of any utility omitted from or shown incorrectly on the plans, the Contractor shall notify the owner and be fully responsible for protecting such utility.

The Contractor shall immediately notify the City Engineer and the utility owner if he disturbs, disconnects or damages any utility. If the utility is located substantially as indicated on the plans or as marked in the field, the Contractor shall bear the costs of repair or replacement.

When placing concrete around or contiguous to any utility, the Contractor shall at his expense, furnish and install a cushion of expansion joint material, clear opening, or sleeve, or by other suitable means shall prevent embedment in or bonding with the concrete.

6.03 NOTIFICATION

The Contractor shall give written 48 hour advance notice to all customers who will be affected during an outage of any utility.

6.04 REMOVAL

Unless otherwise specified, the Contractor shall remove all portions of interfering utilities shown on the plans as abandoned or to be abandoned in place. Before starting removal operations, the Contractor shall ascertain from the utility owner whether abandonment is complete. The costs involved in the removal and disposal shall be absorbed in the Contractor's bid.

6.05 RELOCATION

When feasible, the owners of utilities within the area affected by the work will complete their necessary installations, relocations, repairs, or replacements before commencement of work by the Contractor. When the Special Provisions or plans indicate that a utility is to be relocated, altered or constructed by others, the City will conduct all negotiations with the owners and the work will be done at no cost to the Contractor.

Utilities, found by the Engineer to interfere with the permanent project work after award of the contract, will be relocated, altered, or reconstructed by the utility owners, or the Engineer may order changes in the work to avoid interference. Such changes will be paid for in accordance with Section 3.

When the plans or specifications provide for the Contractor to alter, relocate, or reconstruct a utility, all costs for such work shall be absorbed in the Contractor's bid. Temporary or permanent relocation or alteration of utilities desired by the Contractor for his own convenience shall be his/her responsibility, and he/she shall make all arrangements and bear all cost. The Contractor may, for his/her own convenience or to expedite the work, agree with the owner of any utility to disconnect and reconnect interfering service connections. The City shall not be involved in any such agreement.

6.06 DELAYS

The Contractor is responsible for notifying utility owners in time to prevent delays attributable to utility relocations or alterations as called for in the Contract Documents. The Contractor shall not be entitled to damages or additional payment if such delay does occur. The Engineer will determine the extent of the delay on the project as a whole, and any commensurate extension of time.

6.07 COOPERATION

When necessary, the Contractor shall so conduct his/her operations as to permit access to the worksite and provide time for utility work to be accomplished during the progress of the contract work.

6.08 EXISTING UTILITIES

In case it shall be solely convenient for the Contractor to remove any telephone, telegraph or electric power transmission poles, gas pipes, water pipes, electrical conduits, or underground structures of any character, or any portion thereof, the owner thereof or their agents or superintendents, upon proper application of the Contractor shall be notified by the Public Works and Transportation Director to remove same within a specified time, and the Contractor shall not interfere with said structures until the time specified in the said notice shall have expired.

Any charges levied for such removal by the utility shall be at the sole expense of the Contractor.

The right is reserved to municipal corporations, county authorities, and to water, gas, telephone, telegraph and electric power transmission utilities, to enter upon any public highway, road or right of way, for the purpose of making repairs and changes that have become necessary by reason of the improvement thereof.

It shall be the sole responsibility of the Contractor to maintain in operating condition any ditches, canals, pipes, conduits, wires, diversion boxes, and other appurtenances therefor during such times as the same may be in use for irrigation or conveying and distributing irrigation water. Contractor shall make any necessary arrangements with the distributors of such irrigation water to coordinate his or her construction under these specifications with said irrigation so as to cause no interruption thereof.

Any such irrigation works damaged or removed by the Contractor shall be repaired or replaced by him at his or her sole expense and to the satisfaction of the Public Works and Transportation Director.

The Contractor is responsible for determining the exact location of all existing utilities and for the protection of and repair of damage to them. Contact Underground Service Alert, 1-800-642-2444, 48 hours before work is to begin.

6.09 UTILITY COMPANIES

The following utilities may be effected during construction and it shall be the Contractor's responsibility to contact each, prior to commencement of the work and at such other times that it becomes necessary during construction:

1. City of Modesto
2. Pacific Telephone
3. Modesto Irrigation District
4. Pacific Gas and Electric
5. Post Newsweek Cable

The Contractor shall locate, preserve and protect from damage all surface and underground utilities within the area of construction. Call Underground Service Alert (USA), 1-800-642-2444, forty-eight (48) hours prior to start of construction for locating lines of member utilities.

SECTION 7

LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC

7.01 LAWS TO BE OBSERVED

The Contractor shall comply with:

- (a) all state and federal laws and regulations including but not limited to Occupational Safety and Health Acts,
- (b) all municipal ordinances and regulations of the City of Modesto,
- (c) all orders and decrees of bodies or tribunals having any jurisdiction or authority,
- (d) Section 504 of the Rehabilitation Act of 1983 as incorporated in the Revenue Sharing Act. Each bidder shall submit with his or her bid, certification that he or she is in compliance with this Act as specified in Section 51.55 of the General Sharing Regulations, summarized in the City of Modesto policy statement on nondiscrimination of the handicapped, which laws, ordinances, regulations, orders or decrees in any manner affect those engaged or employed in the work or material used in the work, or which in any way affect the conduct of the work.

7.02 EMPLOYMENT

Nondiscrimination -

In connection with the performance of work under this contract, the Contractor agrees that neither he or she nor any subcontractor who performs any work or labor or renders any service pursuant hereto shall discriminate against any employee or applicant for employment because of race, sex, creed, color, national origin or handicapped status.

Affirmative Action Program Certification -

Each bidder shall submit with his or her bid, certification that he or she is in compliance with the Civil Rights Act of 1964, Executive Order No. 11246, the California Fair Employment Practices Act, and any other applicable federal and state laws and regulations relating to equal opportunity employment.

The Contractor shall submit a statement each month while the project is in progress certifying that he or she is in compliance with the above laws and regulations. The certification shall be on a form approved by the City. The project is considered as being in

progress upon issuance of the Notice to Proceed and until the project is accepted by the City Council.

If, on or before the 25th of any month, the Contractor has not submitted the required certificate for the current month, the City will retain from the monthly estimate an amount equal to two percent (2%) of the estimated value of the work performed during the month, except that such retention shall not exceed Two Thousand Dollars (\$2,000.00) nor be less than Five Hundred Dollars (\$500.00). Retentions for failure to submit a certificate shall be in addition to all other retentions provided for in this contract. After the required certificate is received, the retention for that certificate will then be released with the next monthly partial payment which is made.

Apprentices -

The Contractor and all subcontractors shall comply with the provisions of Section 1777.5 et seq of the California Labor Code. The responsibility for compliance with these provisions is fixed with the prime contractor for all apprenticeable occupations.

If the prime contract involves less than Thirty Thousand Dollars (\$30,000.00) or twenty (20) days, Labor Code Section 1777.5 shall not apply.

7.03 HOURS OF LABOR

The Contractor shall forfeit as penalty to the City of Modesto, Twenty-five Dollars (\$25.00) for each worker employed in the execution of the contract by him or her or by any subcontractor, for each calendar day during which any worker is required or permitted to labor more than eight (8) hours in violation of the provisions of the Labor Code, and in particular, Sections 1810 to Section 1815. However, work performed by any worker in excess of 8 hours per day shall be permitted upon compensation for all hours worked in excess of eight hours a day at not less than one and one-half times the basic rate of pay as provided in the Labor Code.

7.04 PREVAILING WAGES (WHEN REQUIRED BY SPECIAL PROVISIONS)

Bidders are hereby notified that pursuant to Section 1770 et seq. of the Labor Code of the State of California, the Director of the Department of Industrial Relations of the State of California has ascertained the general prevailing rate of hourly wages and rates for overtime, Saturday, Sunday and holiday work in the locality where this work is to be performed for each craft or type of worker or mechanic needed to execute the contract which will be awarded the successful bidder. Refer to "GENERAL WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773, and 1773.1" which is on file in the office of the City Clerk, City Hall, 801 Eleventh Street, Modesto, California, and is available to any

interested party on request. The Contractor shall post a copy of the prevailing wage rates at each job site.

The Contractor and all subcontractors shall comply with the provisions of Section 1776 of the California Labor Code, regarding payroll records. Compliance with said Section 1776 shall be the Contractor's responsibility.

The Contractor shall comply with the provisions of Labor Code Section 1775. In accordance with said Section 1775, the Contractor shall forfeit, as a penalty to the City of Modesto, Twenty-five Dollars (\$25.00) for each calendar day, or portion thereof, for each worker paid less than the stipulated prevailing rates for such work or craft in which such worker is employed for any public work done under the contract by him or by any subcontractor under him. In addition to said penalty, the Contractor shall pay to each worker the difference between the stipulated prevailing wage rate and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the stipulated prevailing wage rate.

The Contractor may pay compensation to workers in excess of the prevailing wage rate as determined above; however, such payments shall not be the basis for any claim for additional compensation to the Contractor by the City. The possibility of wage increases is one of the elements to be considered by the Contractor in determining his or her bid, and will not under any circumstances be considered as the basis for any claim for additional compensation by the City to the Contractor.

The Public Works and Transportation Director will require submittal of Certified Payrolls from the Contractor when in his or her opinion they are needed to verify that the Contractor is in compliance with the State Labor Code or when needed to confirm the cost of work being done or the cost of proposed changes on the project. The payrolls shall be on a form and at a frequency as required by the Public Works and Transportation Director.

If certified payrolls are requested and if, on or before the 20th of the month the Contractor has not submitted satisfactory certified payrolls for all work performed during the monthly period ending on or before the 6th of that month, the City will deduct an amount equal to 10 percent (10%) of the estimated value of the work performed during the month from the next monthly estimate, except that such deduction shall not exceed \$10,000 nor be less than \$1,000 for each month. Deductions for failure to submit satisfactory certified payrolls shall be in addition to all other deductions/retentions provided for in this contract or by State/Federal law. The deduction for failure to submit certified payrolls for each monthly period will be released for payment on the monthly estimate for partial payments next following the date that all the satisfactory certified payrolls for which the deduction was made are submitted. The total of all deductions being held for certified payroll record submittal can be more than the aforementioned limits, since each month's deduction stands on its own, and consequently, can accumulate beyond the \$10,000 limit.

7.05 PERMITS AND LICENSES

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

7.06 PATENT FEES AND ROYALTIES

The Contractor shall absorb in his/her bid, the patent fees or royalties on any patented article or process which may be furnished or used in the work. The Contractor shall indemnify and hold the City harmless from any legal action that may be brought for infringement of patents

7.07 COOPERATION AND COLLATERAL WORK

The Contractor shall be responsible for ascertaining the nature and extent of any simultaneous, collateral and essential work by others. The City, its workmen and contractors, and others, shall have the right to operate within or adjacent to the worksite to perform such work.

The City reserves the right to award other contracts in connection with the total project, the work under which may proceed simultaneously with the work to be done under this contract. The Contractor shall coordinate his/her operations with those of other contractors. Cooperation will be required in the arrangement for the storage of materials, and in the detailed execution of the work. The Contractor, including his/her subcontractors, if any, shall keep himself/herself informed of the progress and the detail work of other contractors and shall notify the Engineer immediately of lack of progress or defective workmanship on the part of other contractors, where such delay or such defective workmanship will interfere with his/her operations. Failure of the Contractor to keep informed of the work progressing on the site and failure to give notice of lack of progress or defective workmanship by others shall be construed as acceptance by him/her of the status of the work as being satisfactory for proper coordination with his/her own work. The Contractor and each other contractor shall adjust, correct and coordinate his/her work with the work of others, so that no discrepancies shall result in the whole work.

If the Contractor or any of his subcontractors or employees cause loss or damage to any separate contractor on the work, the Contractor, by agreement or arbitration, if he/she deems it necessary, will settle any claim for such loss or damage. If such separate contractor shall sue the Owner, on account of any loss so sustained, the Owner shall notify the Contractor, who shall indemnify and save harmless the Owner against any loss or damage arising therefrom, including the cost and expense of defending any such suit.

The City, the Contractor, and each of such workmen, contractors, and others, shall coordinate their operations and cooperate to minimize interference.

The Contractor shall absorb in his/her bid all costs involved in his/her part as a result of coordinating his/her work with others. The Contractor will not be entitled to additional

compensation from the City for damages resulting from such simultaneous, collateral and essential work. If necessary to avoid or minimize such damage, or delay, the Contractor shall redeploy his/her work force to other parts of the work.

Where work of one trade joins or is on other work, there shall be no discrepancy when same is completed. In engaging one kind of work with another, marring or damaging same will not be permitted. Should improper work of any trade be covered by another which results in damage or defects, the whole work affected shall be made good by the Contractor without expense to the City.

7.08 USE OF PREMISES

Contractor shall confine construction equipment, the storage of materials and equipment and the operations of workers to the Project site and land and areas identified in and permitted by the Contract Documents and other land and areas permitted by Laws and Regulations, right-of-way, permits and easements, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereto or of any land or areas contiguous thereof, resulting from the performance of the Work. Should any claim be made against the City by any such owner or occupant because of the performance of the Work, Contractor shall promptly attempt to settle with such other party by agreement or otherwise resolve the claim by arbitration or at law. Contractor shall, to the fullest extent permitted by *Laws and Regulations, indemnify and hold City harmless from and against all claims, damages, losses and expenses (including, but not limited to, fees of engineers, architect, attorneys and other professional and court and arbitration costs) arising directly or consequentially out of any action, legal or equitable, brought by any such other party against City to the extent based on claim arising out to Contractor's performance of the Work.

7.09 PROJECT SITE MAINTENANCE

Cleanup and Dust Control. Throughout all phases of construction, including suspension of work, and until final acceptance of the project, the Contractor shall keep the work site clean and free from rubbish and debris. The Contractor shall also abate dust nuisance by cleaning, sweeping, and sprinkling with water, or other means as necessary. The use of water resulting in mud on public streets will not be permitted as a substitute for sweeping or other methods.

The Contractor shall be required to apply water for dust control at all times. This includes Saturdays, Sundays and holidays. If dust control is not adequate in the opinion of the Engineer, the Engineer will have this work done by others and will deduct such cost from the local contract price.

When construction operations cause dirt to be deposited on public streets, the Contractor shall furnish and operate a self-loading motor sweeper with spray nozzles at least once each working day to keep paved areas clean whenever construction, including restoration, is incomplete.

Materials and equipment shall be removed from the site as soon as they are no longer necessary. Upon completion of the work and before final inspection the entire worksite shall be cleared of equipment, unused materials, and rubbish so as to present a satisfactory clean and neat appearance. All cleanup costs shall be absorbed in the Contractor's bid. All traffic signs and street signs within the limit of work necessarily removed during the various phases of operations shall be temporarily re-set by the Contractor at or near the original location upon completion of each phase of construction operations. Prior to removal of all traffic, street and traffic control signs, the Contractor shall take photographs of the site which show the existing location of these signs, so that upon completion the photographs will aid in resetting the signs at or near their original location. Traffic control signs and street signs will be replaced upon completion of the work and the cost of removal and replacement will be included in various bid items no separate payment will be made as such. Rural type mail boxes shall be maintained by the Contractor in a manner satisfactory to the property owner and postal service, and the Contractor shall relocate same as soon as possible to a permanent location in accordance with postal regulations and in a location acceptable to the property owner.

Care shall be taken to prevent spillage on haul routes. Any such spillage shall be removed immediately and the area cleaned.

Excess excavated material from catch basins or similar structures shall be removed from the site immediately. Sufficient material may remain for use as backfill if permitted by the specifications. Forms and form lumber shall be removed from the site as soon as practicable after stripping.

Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

Earth dams will not be permitted at catch basin openings, local depressions, or elsewhere, except in time of emergency. Temporary dams of sand bags, asphaltic concrete or other acceptable material may be permitted when necessary to protect the work, provided their use does not create a hazard or nuisance to the public. Such dams shall be removed from the site as soon as their use is no longer necessary.

Failure of the Contractor to comply with the Engineers' cleanup orders may result in an order to suspend work until the condition is corrected. No additional compensation will be allowed as a result of such suspension.

Vermin Control - At the time of acceptance, structures entirely constructed under the contract shall be free of rodents, insects, vermin and pests. Necessary extermination work shall be

arranged and paid for by the Contractor as part of the contract work within the contract time and shall be performed by a licensed agency in accordance with requirements of governing authorities. The Contractor shall be liable for injury to persons or property and responsible for the elimination of offensive odors resulting from extermination operations.

Sanitation - The Contractor shall provide and maintain enclosed toilets for the use of employees engaged in the work. These accommodations shall be maintained in a neat and sanitary condition. They shall also comply with all applicable laws, ordinances and regulations pertaining to the public health and sanitation of dwelling and camps.

Sewage flows shall not be interrupted. Should the Contractor disrupt existing sewer facilities, sewage shall be conveyed in closed conduits and disposed of in a sanitary sewer system. Sewage shall not be permitted to flow in trenches or be covered by backfill.

7.10 TEMPORARY LIGHT, POWER, AND WATER

The Contractor shall at his or her own expense, furnish, install, maintain, and remove all temporary light, power, and water, including piping, wiring, lamps, and other equipment, necessary for the work. The Contractor shall not draw water from any fire hydrant, except to extinguish a fire, without first obtaining the necessary permits and metering devices. Contractor shall make prompt payment for use of temporary utilities.

7.11 PROTECTION AND RESTORATION OF EXISTING IMPROVEMENTS

The Contractor shall be responsible for the protection of public and private property adjacent to the work and shall exercise due caution to avoid damage to such property.

Unless otherwise provided, the Contractor shall repair or replace all existing improvements (e.g., curbs, sidewalks, driveways, fences, signs, utilities, street surfaces, structures, etc.) damaged or removed as a result of his/her operations. Repairs and replacements shall be at least equal to existing improvements, and shall match them in finish and dimension.

Trees, lawns, and shrubbery not designated for removal shall be protected from damage or injury. If damaged or removed because of the Contractor's operations, they shall be restored or replaced in as nearly the original condition and location as is reasonably possible. Lawns shall be reseeded and covered with suitable mulch.

All costs to the Contractor for protecting, removing, and restoring existing improvements shall be absorbed in his/her bid.

7.12 PUBLIC CONVENIENCE AND SAFETY

- A. The Contractor shall so conduct his or her operations as to cause the least possible inconvenience to the general public and residents of the vicinity. Public convenience and safety shall conform to Section 7-1.08 "Public Convenience" and Section 7-1.09, "Public Safety of the State Standards," and the Cal Trans Manual of Traffic Control. Where lane or street closures are required for the prosecution of the work, the Contractor shall submit a traffic control plan to the Engineer for approval 72 hours before closure.

The Contractor shall furnish, erect, and maintain such fences, barriers, lights and signs as are necessary to give adequate warning to the public at all times that the work is in progress and of any dangerous conditions to be encountered as a result thereof, and he or she shall also erect and maintain such warning signs as may be required by the City of Modesto. Temporary traffic controls and markings shall be removed when no longer needed.

- B. Before excavating any trench 5 feet or more in depth, the Contractor shall submit a detailed plan to the City Engineer showing the design of shoring, bracing, sloping, or other provisions to be made for the workers' protection from the hazard of caving ground during the excavation of such trench. If the plan varies from the shoring system standards, the plan shall be prepared by a registered Civil Engineer. No excavation shall start until the City Engineer has accepted the plan and the Contractor has obtained a permit from the State Division of Industrial Safety. A copy of the permit shall be submitted to the City Engineer.
- C. Notice to Agencies - The Contractor shall notify in writing all agencies having jurisdiction at least forty-eight (48) hours, excluding holidays and weekends, prior to instituting any lane closure or detour. At the end of each day's work, the Contractor shall inform the ambulance services, police and fire departments of the status of all detours and/or lanes or road closures. The Contractor shall cooperate with the U.S. Postal Service as well as the various parties involved in collection and removal of trash and garbage and the Bus Services to maintain existing schedules for these services.
- D. Emergency Vehicle Access Through Detours - During all detours and/or street closures the Contractor shall provide for movement of emergency vehicles through the work area. It is essential that the Contractor's work and equipment does not impede egress from any fire or police station to other areas of their service area.
- E. Access to Private Property - The Contractor shall schedule operations to minimize disruption of access to private property. Prior to blocking access to any private driveway or parking lot entrance, the Contractor shall notify the resident or business owner or tenant of pending closure and allow residents to remove vehicles. During non-working hours no driveway, house or parking lot shall be denied access to a public roadway.

- F. Night Detours - The Contractor shall not be permitted to maintain any lane closure or road closure during non-working hours without first obtaining written approval of the Engineer. During non-working hours the Contractor shall restore travel lanes to their original alignment and configuration by means of backfilling and temporary pavement or bridging. The Contractor shall place "ROUGH ROAD" signs conforming to the Manual of Traffic Control at uneven temporary pavement or bridging.
- G. Parking Restrictions - The Contractor shall post approved "No Parking" signs at all locations necessary to establish work areas and detour traffic. Signs shall read: "NO PARKING - CONSTRUCTION TOW-AWAY ZONE", show hours of parking restriction and indicate telephone number of police agency having jurisdiction. Signs shall be placed at least 24 hours in advance of restriction.
- H. Bridging Over Trenches and Excavations - Bridging shall be placed across all trenches and excavations of existing streets and at driveways when work is not in progress. Bridging for vehicular traffic shall be of sufficient width to accommodate the required number of travel lanes. Bridging shall be designed to support H-20 vehicular traffic. All bridging shall be set flush with travel surface or a satisfactory transition from travel surface to top of bridging shall be provided.

A satisfactory transition shall mean a change in elevation between the levels of not less than twelve (12) inches horizontal to one (1) inch vertical.

Transition may be accomplished by means of temporary pavement.

- I. Temporary Traffic Lanes - Temporary traffic lanes shall be at least 10 feet wide. Provide an additional two (2) feet of clearance from curbs. The length of temporary lanes should be limited to the area under construction and the distance necessary to divert traffic.
- J. The Contractor will provide his/her own staging areas.

7.13 HOLD HARMLESS AGREEMENT

The Contractor shall hold the CITY, its agents, officers, employees, and volunteers, harmless from and save, defend and indemnify them against any and all claims, losses, liabilities and damages from every cause, including but not limited to injury to person or property or wrongful death, with the indemnity to include reasonable attorney's fees, and all costs and expenses, arising directly or indirectly out of any act or omission of Contractor relating to or during the performance of its obligations under this Agreement.

7.14 INSURANCE REQUIREMENTS

Insurance requirements for Contractors - Bidders' attention is directed to the insurance requirements below. **It is strongly recommended that bidders confer with their respective insurance carriers and/or brokers to determine in advance of bid submission the availability of insurance certificates and endorsements as prescribed and provided herein.** If an apparent low bidder fails to comply strictly with the insurance requirements, that bidder may be disqualified from award of the contract. These insurance requirements are considered a material element of any contract to be made and failure to effect, maintain, renew, or provide proper proof of coverages may be treated as a material breach of any such contract. The City reserves the right to alter, amend, or otherwise modify these requirements as the City may deem necessary.

The Contractor shall provide at its own expense and maintain at all times the following insurance with insurance companies licensed in the State of California and shall provide evidence of such insurance to the CITY as may be required by the Risk Manager of the CITY. The policies or certificates thereof shall provide that, thirty (30) days prior to cancellation or material change in the policy, notices of same shall be given to the Risk Manager of the CITY by registered mail, return receipt requested, for all of the following stated insurance policies.

- A. Workers' Compensation - in compliance with the statutes of the State of California, plus employer's liability with a minimum limit of liability of \$500,000.
- B. General Liability insurance with a minimum limit of liability per occurrence of \$1,000,000 for bodily injury and \$100,000 for property damage or \$1,000,000 combined single limit. This insurance shall indicate on the certificate of insurance the following coverages and indicate the policy aggregate limit applying to: premises and operations; broad form contractual; independent contractors and subcontractors; products and completed operations.
- C. Automobile Liability insurance with a minimum limit of liability per occurrence of \$1,000,000 for bodily injury and \$100,000 for property damage or \$1,000,000 combined single limit. This insurance shall cover any automobile for bodily injury and property damage.
- D. Course of Construction insurance with a minimum limit of the complete project, if required by the Special Provisions.

If at any time any of said policies shall be unsatisfactory to the CITY, as to form or substance or if a company issuing such policy shall be unsatisfactory to the CITY, the Contractor shall promptly obtain a new policy, submit the same to the Risk Manager for approval and submit a certificate thereof as hereinabove provided. Upon failure of the Contractor to furnish, deliver or maintain such insurance and certificates as above provided, this Agreement, at the election of the CITY, may be forthwith declared suspended, or terminated. Failure of the Contractor to obtain

and/or maintain any required insurance shall not relieve the Contractor from any liability under this Agreement, nor shall the insurance requirements be construed to conflict with or otherwise limit the obligations of the Contractor concerning indemnification. The CITY, its agents, officers, employees, and volunteers shall be named as an additional insured on all insurance policies required herein, except Workers' Compensation. The Workers' Compensation insurer shall agree to waive all rights of subrogation against the CITY, its agents, officers, employees, and volunteers for losses arising from work performed by Contractor for the CITY. The Contractor's insurance policy(ies) shall include a provision that the coverage is primary as respects the CITY; shall include no special limitations to coverage provided to additional insured; and, shall be placed with insurer(s) with acceptable Best's rating of A:VII or with approval of the Risk Manager.

7.15 VERIFICATION OF COVERAGE

Contractor shall furnish the City with Certificates of Insurance and with original endorsements effecting coverages required. The certificates and endorsements are to be signed by a person authorized by the insurer to bind coverage. The certificates and endorsements are to be on forms approved by the City. All certificates and endorsements are to be received and approved by the City prior to the commencement of any work. The City reserves the right to require complete, certified copies of all required insurance policies at any time.

7.16 SUBCONTRACTORS

Contractor shall include all subcontractors as insureds under its policies or shall furnish separate certificates and endorsements for each subcontractor evidencing coverages for each subcontractor in form and amount meeting all the requirements herein.

7.17 CONTRACTOR S RESPONSIBILITY FOR WORK

Until the formal acceptance of the work by the City Council, the Contractor shall be responsible for and have care, custody, and control of the work and of the materials to be used therein, including materials delivered to the work site, materials for which partial payment has been received, and materials which have been furnished by the City; and the Contractor shall bear full risk of loss, injury or damage to any part of the work and materials by action of the elements, or from any other cause, whether arising from the execution or non-execution of the work. The Contractor shall rebuild, repair, restore and make whole all loss or damage to any portion of the work or materials before final acceptance and shall bear the expense thereof, except for such loss or damage occasioned by acts of the Federal Government or the public enemy, or by an act of God as defined in Section 4150 of the California Government Code.

Suspension of the work for any cause whatever shall not relieve the Contractor of his or her responsibility for the work and materials as herein specified.

The Contractor shall be responsible for and must make good any defects arising through faulty, improper or inferior workmanship or materials arising or discovered in any part of the work during one (1) year after the completion and acceptance of the same.

The Contractor shall be responsible for any damage his activities cause to adjacent public or private improvements. The Contractor shall take all measures necessary to protect adjacent natural areas from runoff, sedimentation, debris, or other damage resultant from the project activities. On projects over five (5) acres in area, the Contractor shall comply with all provisions of the Storm Water Pollution Prevention Plan prepared for the project. A copy of this document is available for review at City, 801 - 11th Street, Modesto, 2nd Floor, Public Works and Transportation Department, Engineering Division.

7.18 ADVERTISING

The names of contractors, subcontractors, architects, or engineers, with their addresses and designation of their particular specialties, may be displayed on removable signs. The size and location of such signs shall be subject to the Engineers' approval.

Commercial advertising matter shall not be attached to or painted on the surfaces of buildings, fences, canopies, or barricades.

7.19 RISK OF LOSS

Until the completion and formal acceptance of the completed work by the City Council, the Contractor shall have the charge and care thereof and shall bear all risks of injury or damage to or destruction of, the work or any part or parts thereof, or any materials or equipment delivered to the site thereof, by fire, earthquake, windstorm or other action of the elements, vandalism, or from any other cause, including loss by theft, from the date of commencement of construction to the date of such formal acceptance. The Contractor shall rebuild, repair, restore and make good all injuries or damage to any portion of the work, and shall bear the entire expense thereof, except such injuries or damages as are caused by riot, insurrection, or acts of the Federal or State Government or a public enemy in time of war.

7.20 HAZARDOUS MATERIALS

If the Contractor encounters conditions or materials which he has reason to believe may be hazardous, as defined in Section 25117 of the Health and Safety Code, he shall immediately so notify the Engineer both verbally and in writing. Work on the immediate area of the suspected hazardous material shall be suspended until the Engineer authorizes it to be resumed. If such suspension delays the current controlling operation, the Contractor may be granted a time extension as provided in Section 8.08.

The City reserves the right to use other forces for exploratory work to identify and determine the extent of such material, and for removing hazardous material from such area.

The Contractor shall be held responsible for the proper handling, use, storage, and disposal of hazardous materials used in the construction of the project.

7.21 CONTROL OF FUGITIVE DUST

The Contractor shall comply with all applicable provisions of Regulation VIII of the San Joaquin Valley Unified Pollution Control District. The regulation is scheduled to become effective December 10, 1993. The Contractor is hereby alerted to the fact that this regulation imposes specific restrictions and requirements on the Contractor related to the construction activities at the site. The Contractor assumes full responsibility for conforming to the requirements of this regulation.

In the event the regulatory agency levies any fine or charge against the City as a result of the Contractor's failure to comply with this regulation, the Contractor shall reimburse the City upon demand the full amount of said fine or charge. The City shall have the right to deduct funds from monies due the Contractor should the Contractor fail to reimburse the City as stated above.

Copies of Regulation VIII may be obtained by contacting:

San Joaquin Valley Unified Air Pollution Control District
4230 Kiernan Avenue, Suite #130
Modesto, CA 95356
(209) 545-7000

7.22 CONTROL OF STORM WATER

The Contractor shall comply with all applicable federal, state, and municipal regulation for the control of storm water pollution from construction activities. The Contractor is hereby alerted to the fact that these regulations impose specific restrictions and requirements on the Contractor related to the construction activities at the site. The Contractor assumes full responsibility for conforming to the requirements of these regulations.

In the event the regulatory agency levies any fine or charge against the City as a result of the Contractor's failure to comply with this regulation, the Contractor shall reimburse the City upon demand the full amount of said fine or charge. The City shall have the right to deduct funds from monies due the Contractor should the Contractor fail to reimburse the City as stated above.

The Contractor's attention is directed to the Construction Best Management Practices (BMPs) Handbook for specific guidance on selecting best management practices for reducing pollutants in storm water discharges from construction activities.

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SECTION 8

PROSECUTION AND PROGRESS

8.01 SUBLETTING AND ASSIGNMENT

The Contractor shall give his or her personal attention to the fulfillment of the contract and shall keep the work under his or her control, including the work of all subcontractors.

The Contractor shall perform, with its own organization, contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the City. In order to meet the 30 percent requirement, contractor may propose to contract for direct payment by its own organization for any element or combination of elements of the original contract price, including, but not limited to, materials, manufactured products, labor, equipment rental, tools and incidentals, but excluding "specialty items" defined in (B) below, totaling not less than 30 percent of the original price. Specialty items may be performed by subcontract and the amount of any such specialty items so performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization.

- A. "Its own organization" shall be construed to include only workers employed and paid directly by the prime contractor and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of subcontractor, assignee, or agent of the prime contractor.
- B. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid on the contract as a whole and in general are to be limited to minor components of the overall contract. Only those items of work specifically designated as "Specialty Items" on the contract proposal form shall be considered as such.

The contract amount upon which the requirement set forth above is computed includes the cost of materials and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the Engineer determines is necessary to assure the performance of the contract.

No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the Engineer and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the Engineer has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

Where a portion of the work sublet by the Contractor is not being prosecuted in a manner satisfactory to the Public Works and Transportation Director, the subcontractor shall be removed immediately on the request of the Public Works and Transportation Director and shall not again be employed on the work.

8.02 PROGRESS OF THE WORK

The Contractor shall begin work as soon as possible after receiving the Notice to Proceed from the City and shall diligently prosecute the same to completion as hereinbefore specified. No work shall commence before contract bonds and insurance certificates have been filed with the City and the contract has been signed.

A preconstruction conference must be held prior to starting any work on the project. The City will contact the Contractor no later than five (5) working days from the date the contract is signed by the City Manager to set up the preconstruction conference which shall be held no later than ten (10) working days from the contract signing date. The Notice to Proceed shall be issued at the preconstruction conference.

The contractor shall submit a construction schedule in accordance with Section 4.20.

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

At any time during the project when, in the opinion of the Engineer, the project falls more than 20 working days behind the current schedule, the Engineer may request a revised schedule. The Contractor shall comply with this request at no additional cost to the City.

The Engineer shall review the proposed schedule for completeness and reasonableness. If in the opinion of the Engineer the proposed schedule is incomplete or unreasonable, the schedule shall be revised at no additional cost to the City.

Failure to comply with the above provisions shall entitle the City to withhold an additional ten percent (10%) of the amount due on progress payments until the contractor complies with these provisions.

8.03 CHARACTER OF WORKERS

If any person employed by the Contractor shall fail or refuse to carry out the direction of the Public Works and Transportation Director, or shall appear to the Public Works and Transportation Director to be incompetent or to act in a disorderly or improper manner, that person shall be discharged immediately on the request of the Public Works and Transportation Director, and such person shall not again be employed on the work.

8.04 TEMPORARY SUSPENSION OF WORK

The Public Works and Transportation Director shall have the authority to suspend the work wholly or in part for such period as he or she may deem necessary due to unsuitable weather, or to such other conditions as are considered unfavorable for the suitable prosecution of the work, or for such time as he or she may deem necessary, due to the failure on the part of the Contractor to carry out orders given, or to perform any provisions of the work. The Contractor shall immediately obey such order of the Public Works and Transportation Director and shall not resume the work until ordered to do so in writing by the Public Works and Transportation Director.

In the event that a suspension of work is ordered as provided above, and should such suspension be ordered by reason of the failure of the Contractor to carry out orders or to perform any provision of the contract, or by reason of weather conditions being unsuitable for performing any item or items of work, which work, in the sole opinion of the Engineer, could have been performed prior to the occurrence of such unsuitable weather conditions had the Contractor diligently prosecuted the work when weather conditions were suitable, the Contractor, at his expense, shall do all the work necessary to provide a safe, smooth, and unobstructed passageway through construction for use by public traffic during the period of such suspension as provided in Sections 7-1.08, "Public Convenience," and 7-1.09, "Public Safety," of the State Standards and as specified in the special provisions for the work. In the event that the Contractor fails to perform the work above specified, the City will perform such work and the cost thereof will be deducted from monies due or to become due the Contractor.

If the Engineer orders a suspension of all of the work or a portion of the work which is the current controlling operation or operations, due to unsuitable weather or to such other conditions as are considered unfavorable to the suitable prosecution of the work, the days on which the suspension is in effect shall not be considered working days as defined in Section 8.05, "Time of Completion." If a portion of work at the time of such suspension is not a current controlling operation or operations, but subsequently does become the current controlling operation or operations, the determination of working days will be made on the basis of the then current controlling operation or operations.

If a suspension of work is ordered by the Engineer due to the failure on the part of the Contractor to carry out orders given or to perform any provision of the contract, the days on which the

suspension order is in effect shall be considered working days if such days are working days within the meaning of the definition set forth in Section 8.05, "Completion Time."

In the event of a suspension of work under any of the conditions set forth in this Section 8.04, such suspension of work shall not relieve the Contractor of his responsibilities as set forth in Section 7, "Legal Relations and Responsibility."

8.05 TIME OF COMPLETION AND LIQUIDATED DAMAGES

It is agreed by the parties to the contract that in case all the work called for under the contract is not completed before or upon the expiration of the time limit as set forth in these specifications, damage will be sustained by the City of Modesto, and that it is and will be impracticable to determine the actual damage which the City of Modesto will sustain, in the event of any, by reason of such delay, and it is therefore agreed that the Contractor, his or her heirs, assigns, and sureties, will pay to the City of Modesto the sum of Three Hundred Fifty Dollars (\$350.00) per day for each and every calendar day's delay beyond the time prescribed to complete the work; and the Contractor agrees to pay such liquidated damages as herein provided, and in case the same are not paid, agrees that the City of Modesto may deduct the amount thereof from any money due or that may become due the Contractor under the contract.

It is further agreed that in case the work called for under the contract is not finished and completed in all parts and requirements within the time specified, the Public Works and Transportation Director shall have the right to extend the time for completion or not, as may seem best to serve the interest of the City of Modesto; and if he or she decides to extend the time limit for the completion of the contract, he or she shall further have the right to charge the Contractor, his or her heirs, assignees, or sureties, and to deduct from final payment for the work, all or any part, as he or she may deem proper, of the actual cost of engineering, inspection, superintendence, and other overhead expenses which are directly chargeable to the contract, and which accrue during the period of such extension except that the cost of final surveys and preparation of final estimate shall not be included in such charges.

Liquidated damages shall not be assessed, nor shall the cost of engineering and inspection during any delay in the completion of the work caused by Acts of God or of the public enemy, acts of the Federal Government, City, fire, floods, epidemics, severe weather, or delays of subcontractors due to such causes; provided, that the Contractor shall within ten (10) days from the beginning of such delay notify the Public Works and Transportation Director in writing of the causes of delay, who shall ascertain the fact and extent of the delay, and his or her finding of the facts thereon shall be final and conclusive.

No extension of time will be granted for a delay caused by a shortage of materials unless the Contractor furnishes to the Engineer documentary proof that he has made every effort to obtain such materials from all known sources within reasonable reach of the work in a diligent and timely manner, and further proof in the form of supplementary progress schedules, as required

in Section 8.02 "Progress of the Work," that the inability to obtain such materials when originally planned, did in fact cause a delay in final completion of the entire work which could not be compensated for by revising the sequence of the Contractor's operations. The term "Shortage of materials," as used in this section, shall apply only to materials, articles, parts or equipment which are standard items and are to be incorporated in the work. The term "shortage of materials" shall not apply to materials, parts, articles or equipment which are processed, made, constructed, fabricated or manufactured to meet the specific requirements of the contract. Only the physical shortage of material will be considered under these provisions as a cause for extension of time. Delays in obtaining materials due to priority in filling orders will not constitute a shortage of materials.

It is the intention of the above provisions that the Contractor shall not be relieved of liability for liquidated damages or engineering and inspection charges for any period of delay in completion of the work in excess of that expressly provided for in this Section 8.05.

The Contractor shall complete the work within the number of calendar days or working days set forth in the Special Provisions.

A working day is defined as any day, except Saturdays, Sundays and legal holidays and days on which the Contractor is specifically required by the special provisions to suspend construction operations and except days on which the Contractor is prevented by inclement weather or conditions resulting immediately therefrom adverse to the current controlling operation or operations for at least 60 percent of the total daily time being currently spent on the controlling operation or operations.

Legal holidays are as follows: New Years' Day, Martin Luther King Jr. Day, Presidents' Day, Memorial Day, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day, the day after Thanksgiving, and Christmas Day.

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

Determination that a day is a non-working day by reason of inclement weather or conditions resulting immediately therefrom, shall be made by the City Engineer. The Contractor will be allowed 15 days from issuance of the Weekly Statement of Working Days in which to file a written protest, setting forth in what respects he/she differs from the City Engineer. Otherwise the decision of the City Engineer shall be deemed to have been accepted by the Contractor as correct. The City Engineer will furnish the Contractor a weekly statement showing the number of working days charged to the contract for the preceding week, the number of working days of time extensions being considered or approved, the number of working days originally specified for the completion of the contract and the number of working days remaining to complete the

contract and the extended date for completion thereof, except when working days are not being charged in accordance with the provisions in Section 8.04, "Temporary Suspension of Work."

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

8.06 SUSPENSION OF CONTRACT

If at any time, in the opinion of the City Manager, the Contractor has failed to supply an adequate working force or material of proper quality, or has failed in any other respect to prosecute the work with the diligence and force specified and intended in and by the terms of the contract, notice thereof in writing will be served upon him, and should he or she neglect or refuse to provide means for a satisfactory compliance with the contract, as directed by the Public Works and Transportation Director, within the time specified in such notice, the City Manager in any such case shall have the power to suspend the operation of the contract. Upon receiving notice of such suspension, the Contractor shall discontinue said work, or such parts of it as the City Manager may designate.

Upon such suspension, the Contractor's control shall terminate and thereupon the City Manager or his or her duly authorized representative may take possession of all or any part of the Contractor's materials, tools, equipment, and appliances upon the premises, and use the same for the purpose of completing said contract and hire such force and buy or rent such additional machinery, tools, appliances, equipment and supplies at the Contractor's expense as may be necessary for the proper conduct of the work and for the completion thereof, or may employ other parties to carry the contract to completion, employ the necessary workmen, substitute other machinery or materials and purchase the materials contracted for in such manner as the City Manager shall deem proper or the City Manager may annul and cancel the contract and re-let the work or any part thereof. Any excess cost arising therefrom over and above the contract price will be charged against the contractor and his or her sureties, who will be liable therefore. In the event of such suspension, all monies due the Contractor or retained under the terms of the contract shall be forfeited to the City of Modesto, but such a forfeiture will not release the Contractor or his or her sureties from liability or failure to fulfill the contract. The Contractor and his or her sureties will be credited with the amount of money so forfeited toward any excess cost over and above the contract price arising from the suspension of the operations of the contract and the completion of the work by the City of Modesto as above provided and the Contractor will be so credited with any surplus remaining after all just claims for such completion have been paid.

In the determination of the question whether there has been any such noncompliance with the contract as to warrant the suspension or annulment thereof, the decision of the City Manager shall be binding on all parties to the contract.

8.07 RIGHTS OF WAY

Rights of way or easements for work to be constructed will be provided by the City of Modesto. The Contractor shall make his or her own arrangements and pay all expenses for additional area required by him outside of the limits of rights of way or easements unless otherwise especially provided. In the event of delay on the part of the City of Modesto, its officers, agents or employees in obtaining any such rights of way or easements for the work to be constructed, then the Contractor shall have time for the completion of his or her contract for the period or periods caused by such delay or delays, but shall have no damages against the City of Modesto, its officers, agents or employees.

8.08 DELAYS BY THE CITY OF MODESTO

Any act or omission of anything required to be done by the City of Modesto, its officers, agents or employees, which shall cause the Contractor delay in the completion of the work shall be grounds for extension of time on the part of the Contractor to complete the work, but shall give the Contractor no damages for such delay.

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SECTION 9

MEASUREMENT AND PAYMENT

9.01 MEASUREMENT

All work to be paid for at a contract price per unit of measurement shall be measured by the Public Works and Transportation Director in accordance with the United States Standard Measurements. A ton shall consist of two thousand (2,000) pounds avoirdupois. Material paid for by the ton shall be weighed on platform scales furnished by and at the expense of the Contractor, or on public scales. If weighed on scales furnished by the Contractor, said scales shall be satisfactory to the Public Works and Transportation Director and shall be sealed by a representative of the State Division of Weights and Measures, at the expense of the Contractor, as often as the Public Works and Transportation Director may deem necessary to insure their accuracy. If weighed on public scales, the Contractor shall furnish Weighmaster's Certificates to the Public Works and Transportation Director. (If material is shipped by rail, car weight will be accepted provided that actual weight of material only will be paid for.) Trucks used to haul material to be paid for by weight shall be weighed empty daily at such times as the Public Works and Transportation Director directs, and each truck shall bear a plainly legible identification mark.

Where payment is to be made on the basis of lump sum amounts bid for the various items shown on the proposal form and included in the contract as awarded, no measurement will be made of included items for payment. Measurement to check compliance with the plans will be made.

9.02 SCOPE OF PAYMENT

The Contractor shall accept the compensation as herein provided, as full payment for furnishing all materials, labor, tools, and equipment necessary to complete the work and for performing all work contemplated and embraced under the contract; also, for loss or damage arising from the nature of the work, or from the action of the elements, except as hereinbefore provided, or from any unforeseen difficulties which may be encountered during the prosecution of the work until the final acceptance by the City Council and for all risks of every description connected with the prosecution of the work; also, for all expenses incurred in consequence of the suspension or discontinuance of the work as herein specified; and for completing the work according to the plans and specifications. Neither the payment of any estimate, nor of any retained percentage, shall relieve the Contractor of responsibility for faulty workmanship or materials and unless otherwise specified, he or she shall remedy any defects due thereto and pay for any damage to other work resulting therefrom, which shall appear within a period of one (1) year from the date of the Notice of Completion and acceptance by the City Council. The City shall give notice of defects with reasonable promptness. All questions arising under this section shall be decided by the Public Works and Transportation Director.

9.03 EXTRA AND FORCE ACCOUNT WORK

Extra work as described in Section 3.03, when ordered and accepted, shall be paid for under a written change order in accordance with the terms therein provided. Payment for extra work will be made at the unit price or lump sum previously agreed upon by the Contractor and the Public Works and Transportation Director or by force account.

If the work is done on force account, the Contractor shall receive the actual cost of the materials furnished by him or her as shown by his or her paid vouchers, plus fifteen percent (15%) less all available cash, trade, and other discounts. However, the City of Modesto reserves the right to furnish such materials as it deems expedient, and the Contractor shall have no claim for profit on the cost of such material. For all labor, and equipment that is necessary, Contractor shall receive the current prices in the locality, which shall have been previously determined and agreed to in writing by the Public Works and Transportation Director and by the Contractor, plus a twenty percent (20%) markup for labor and a fifteen percent (15%) markup for equipment. Equipment or tools having a replacement value of \$50.00 or less, whether or not consumed by use, shall be considered small tools and no payment will be made therefor. The actual cost of rental for use of such items of equipment must have an individual value in excess of fifty (\$50.00) dollars, preauthorized by the City in writing and shall not exceed rental rates established by the current State of California (Cal Trans) Labor Surcharge and Equipment Rental Rates Manual. When extra work to be paid for on a force account basis is performed by a subcontractor, an additional markup of 5 percent will be added to the total cost of said extra work including all markups specified in this section. Said additional 5 percent markup shall reimburse the Contractor for additional administrative costs, and no other additional payment will be made by reason of performance of the extra work by a subcontractor.

The cost of labor, whether the employer is the Contractor, subcontractor, or other forces, will be the sum of the following:

- A. Actual Wages - The actual wages paid including the pro-rata cost of foremen continuously employed on the work, but not the salary, or any part thereof, of the Contractor's superintendent. Wages shall include any employer payments to or on behalf of the workers for health and welfare, pension, vacation, and similar purposes.
- B. Labor Surcharge - To the actual wages, will be added a labor surcharge which shall constitute full compensation for all payments imposed by State and Federal laws and for all other payments made to, or on behalf of, the workers; other than actual wages and subsistence and travel allowance. The labor surcharge will be as set forth in the California Department of Transportation publication entitled "Equipment Rental Rates and General Prevailing Wage Rates".
- C. Subsistence and Travel Allowance - The actual subsistence and travel allowance paid to such workers.

All extra work done on force account shall be recorded daily on report sheets made available by the Public Works and Transportation Director and signed by the Contractor. Daily reports shall thereafter be considered the true record of the extra work done. In the event of a dispute or failure of the Contractor to sign the daily reports, the Contractor shall have seven (7) calendar days to make a claim to the Public Works and Transportation Director in writing or said daily reports shall be the basis for payment.

When extra work is performed by subcontractors, the Contractor shall reach agreement with them as to the distribution of the payments made by the City, including the above percentages. No additional payment therefor will be made by the City by reason of the performance of the work by a subcontractor or other forces.

The above markups shall constitute full compensation for all overhead costs which shall be deemed to include all items of expense not specifically designated as a direct cost. The total payment made as provided above shall be deemed to be the actual cost of such work and shall constitute full compensation therefor.

9.04 PROGRESS PAYMENTS

Between the 20th and the 25th day of each month, the Public Works and Transportation Director will make an approximate estimate of the value of the work done under the specifications during the month. Whenever the said estimate or estimates of work done since the last previous estimate exceeds Three Hundred Dollars (\$300.00) in amount, ninety percent (90%) of such estimated sum will be paid the Contractor on or before the 10th day of the month next following.

The estimated value of work done may include seventy-five percent (75%) of the net invoice value of acceptable nonperishable material delivered to the work. The Contractor shall furnish to the Public Works and Transportation Director such detailed information as he or she may request to aid him as a guide in the preparation of the estimate.

The City shall retain ten percent (10%) of estimate value of the work done and nonperishable material delineated to the work, as part security for the fulfillment of the contract by the Contractor.

It is understood that the estimates from month to month will be approximate only and all monthly estimates and payments will be subject to correction in subsequent estimates, and the making of progressive payments shall not in any respect be taken as an admission of the City of the amount of work done or of its quality or sufficiency, nor as an acceptance of the work or release of the Contractor of any of his or her responsibility under the contract.

The Contractor will be allowed fifteen (15) days in which to protest in writing the correctness of the statement; otherwise the statement shall be deemed to have been accepted by the Contractor as correct.

No such estimate or payment shall be required to be made when, in the judgment of the Public Works and Transportation Director, the work is not proceeding in accordance with the provisions of the contract, or when in his or her judgment the total value of the work done since the last estimate amounts to less than Three Hundred Dollars (\$300.00).

When the contract is a lump sum contract, the Contractor shall submit a cost breakdown for the Engineers' approval before the first progress payment will be prepared.

9.05 FINAL PAYMENT

The Public Works and Transportation Director shall, after completion of the contract, make a final estimate of the amount of work done thereunder and the value of such work. The City of Modesto shall pay ninety percent (90%) of such value after deducting therefrom all previous payments and all amounts to be retained under the contract. The payment of the retained amount shall be due and payable thirty-five (35) days after recording the notice of completion.

The final estimate shall be conclusive and binding against both parties to the contract on all questions relating to the performance of the contract and the amount of work done thereunder and compensation therefor, except in the case of gross error.

The Contractor agrees that the payment of the final amount due under the contract and the adjustment and payment of any work done in accordance with any alternation of the same, shall release the City of Modesto and its employees or agents, from any and all claims or liability on account of work performed under the contract or any alteration thereof.

9.06 INCREASED OR DECREASED CONTRACT QUANTITIES

Whenever an item of work or materials is specified in the contract by unit prices and is changed, but by not more than twenty-five percent of the Engineers' estimate of that bid item quantity as specified in the Bid Form, then the contract price shall be increased or decreased by the application of the unit prices so specified.

Whenever said contract item increases or decreases in quantity by more than twenty-five percent, the addition or subtraction from the contract price shall be established in accordance with Section 4-1.03 of that State Standard Specifications.

9.07 SUBSTITUTION OF SECURITIES FOR WITHHELD PAYMENTS

Except as otherwise prohibited by law, the Contractor may elect to receive all payments due under the contract pursuant to Sections 9.04 and 9.05 without any retention. As provided in Section 22300 of the California Public Contract Code, at the request and expense of the Contractor, securities equivalent to the amount withheld shall be deposited with the City, or with a State or federally chartered bank as the escrow agent. Alternatively, the contractor may request

and the City shall make payment of retentions earned directly to an escrow agent in accordance with the provisions of Section 22300 of the California Public Contracts Code. Upon satisfactory completion of the contract, the securities shall be returned to the Contractor. The term “satisfactory completion of the contract” shall include the filing of a notice of completion and the retention of the securities for a period of thirty (30) days thereafter.

Any of the following securities which shall be approved by the City's Director of Finance are eligible for investment under Section 22300 of the California Public Contracts Code.

- A. Securities eligible for investment under Government Code Section 16430, or
- B. Certificates of deposit issued by banks authorized to transact business in California which are members of the Federal Deposit Insurance Corporation, or by Savings and Loan Associations authorized to transact business in California which are members of the Federal Savings and Loan Insurance Corporation, or
- C. Interest bearing demand deposit accounts, or
- D. Standby letters of credit.

9.08 RIGHT TO WITHHOLD AMOUNTS

In addition to the amount which the City may otherwise retain under the Contract, the City may withhold a sufficient amount or amounts of any payment or payments otherwise due the Contractor, as in its judgment may be necessary to cover:

- A. Payments which may be past due and payable for just claims against the Contractor or any subcontractor for labor or materials furnished for the performance of this Contract.
- B. For defective work not remedied.
- C. For failure of the Contractor to make proper payments for the use of temporary utilities.
- D. Failure of the Contractor to make proper submissions, as herein specified.
- E. Failure to submit certified payrolls, when requested.
- F. Failure to submit, revise, resubmit or otherwise conform to the requirements herein for work scheduling.

When the above reasons for withholding amounts are removed, payment will be made to the Contractor for amounts withheld because of them on the next regularly scheduled progress payments.

The City in its discretion may apply any withheld amount or amounts to the payment of valid claims. In so doing, the City shall be deemed the agent of the Contractor for these purposes only, and any payment so made by the City shall be considered as a payment made under the contract by the City to the Contractor, and the City shall not be liable to the Contractor for such payment made in good faith. Such payments may be made without prior judicial determination of the claim or claims. The City will render to the Contractor a proper accounting of such funds disbursed on behalf of the Contractor.

9.09 DISPUTE RESOLUTION

All claims, controversies, or disputes not settled by the Director of Public Works and Transportation pursuant to Section 4.01, arising out of, or relating to the contract, or the breach, termination, enforcement, interpretation, or validity of the contract, including the determination of the scope or applicability of this specification shall be determined by binding arbitration in Modesto, California by one arbitrator. The American Arbitration association shall administer the arbitration under its' Construction Industry Arbitration Rules then in effect, subject to the modifications of those rules contained in this specification. This agreement to arbitrate shall be specifically enforceable under the prevailing law of any court having jurisdiction, and the award rendered by the arbitrator may be entered in any court having jurisdiction. The appropriate venue for any arbitration under this specification shall be in Stanislaus County, California.

This specification is not intended to and does not waive the claim filing requirements found in California Government Code Section 900 et seq. In the event that a timely and legally sufficient, arbitrable claim is filed by Contractor with City, and the claim is rejected in whole or in part by City, this specification shall result in the conclusive, final, and binding resolution of all the issues presented in the claim so long as any issues presented by the claim are arbitrable. Claims rejected by City or by operation of law, shall be submitted by Contractor to arbitration pursuant to the Construction Industry Arbitration Rules of the American Arbitration Association within ninety (90) days after mailing of the written rejection by City to Contractor. Otherwise, the claim or claims shall be deemed waived in their entirety. Contractor may submit to arbitration by advising the City Clerk in writing of its' desire to arbitrate within the 90 day period, and thereafter following Association rules in good faith.

The "fast track" rules of the American Arbitration Association shall apply to any claim or counterclaim less than ONE HUNDRED FIFTY THOUSAND AND 00/100 (\$150,000.00) DOLLARS. In arbitration not proceeding under the "fast track" rules, the arbitrator shall have the power to order that depositions be taken and other discovery be made. Both City and Contractor shall have the right, upon written notice, to take no more than three (3) depositions of the other as a matter of right in an arbitration not proceeding under the "fast track" rules.

Whether or not City and Contractor may be engaged in interstate commerce, any controversy or dispute mentioned above shall be determined by, and the parties shall be bound by, the

substantive law of the State of California, and not the Federal Arbitration Act at 9 USC Section 1 et seq.

The arbitrator may grant any remedy or relief deemed by the arbitrator just and equitable under the circumstances, whether or not such relief could be awarded in a court of law. The arbitrator shall be empowered to award monetary sanctions against a party. The arbitrator shall, in the written award, allocate all the costs of the arbitration, including the fees of the arbitrator and the reasonable attorney fees of the prevailing party, against the party who did not prevail. The prevailing party shall be the party in whose favor the majority of the central issues in the case are resolved.

Notwithstanding anything in this specification to the contrary, the arbitrator shall have no power to award punitive damages or other damages not measured by the party's actual damages (excluding litigation costs and fees) against any party. This limitation of the arbitrators' powers under this Agreement shall not operate as an exclusion of the issue of punitive damages from this Agreement to Arbitrate sufficient to vest jurisdiction in a court with respect to that issue.

Contractor shall include in all subcontracts a specification whereby the subcontractor consents to being joined in an arbitration between Owner and Contractor involving the work of the subcontractor to be joined. Contractor's failure to do so shall be a breach of the Public Works and Transportation contract.

The parties to any contract of which this specification is made a part by reference or otherwise shall, and hereby do, waive any rights provided by Title 9.2 of the California Code of Civil Procedure, Section 1296. The arbitrators' award shall be deemed final, conclusive and binding to the fullest extent allowed by California law.

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