

SECTION 5

DRAFTING STANDARDS AND SHEET LAYOUT

5.1 SCOPE

This section defines drafting requirements for various drawings. It is important that plans be neat, orderly, legible, and easy to follow. Also, all plans approved by the City will be microfilmed. Therefore, certain drafting standards are necessary to produce quality plans that can be legibly microfilmed.

5.2 ASSESSMENT DIAGRAMS

The size of each sheet of an assessment diagram shall be 18" x 26". A marginal line shall be drawn completely around each sheet, leaving an entirely blank margin of one inch (1").

The particular number of the sheet and the total number of sheets composing the map shall be stated on each sheet and its relation to each adjoining sheet shall be clearly shown.

The district boundary shall be shown in a heavy dashed line. This map shall conform to the detail shown on Plate No. 5-1 in Appendix 1 to Section 5.

5.3 IMPROVEMENT PLANS

All improvement plans shall be prepared on City of Sacramento standard title block mylar sheets. (See Plates Nos. 5-2A and 5-2B in Appendix 1 to Section 5). Drawing size shall be D size, 22" x 34". The use of other drawing sizes shall be approved by the Engineer prior to initiating the drawing. Lettering and numerals shall be 1/8" minimum. Typing or machine prepared characters are acceptable. Only ink on mylar is acceptable for final drawings. (See Section 5.5 - "Water Plans Standards" and Section 5.6 - "Traffic and Street Lighting Plans" for specific drafting requirements for water and electrical facilities).

5.3.1 Cover Sheet

A cover sheet is required on projects exceeding 3 sheets in the set and shall include:

1. **Project Location** - shows general location in the City.
2. **Sheet Index.**

3. **Legend** - see Plate No. 5-3A, 5-3B, and 5-3C in Appendix 1 to Section 5.
4. **Bench Marks** - Plans will not be approved unless a City bench mark is used. Contact the City Construction Section for location and elevation of the nearest official bench mark.
5. **Signature Block** - Design Engineer/Consultanting Engineer shall coordinate with divisions of the Department of Public Works for required signatures.
6. **General Notes** - Design Engineer/Consultanting Engineer shall coordinate current notes with operating divisions of the Department of Public Works.
7. **Site Map** - shows entire subdivision, project, or assessment district. When applicable show city limits, street names, section lines, and existing/proposed sanitary sewers and drainage lines. Water lines are shown on separate plans.

5.3.2 Plan and Profile Sheet

5.3.2.1 Topography

All pertinent topographic features shall be shown, such as elevations, underground utilities, poles, ditches, edge of pavement, curb and gutter, sidewalk, structure, trees and other features of the area which may affect design. All existing features should be shown in dashed lines. (See legend Plate No. 5-3A, 5-3B, 5-3C in Appendix 1 to Section 5).

5.3.2.2 Proposed Improvements

All proposed improvements shall be shown in solid heavy lines. (See legend Plate No. 5-3A, 5-3B, 5-3C in Appendix 1 to Section 5).

5.3.2.3 Scale

A scale of 1" = 40' horizontal and 1" = 4' vertically is recommended for most projects. For alleys, small improvements, or when a large amount of detail is required,

a scale of 1" = 20' horizontal and 1" = 2' vertically is recommended.

5.3.2.4 Right-of-way

All right-of-way lines, easements, section lines and temporary construction easements both existing and proposed shall be shown on the plans. All right-of-way and easement lines shall be properly dimensioned.

5.3.2.5 Street dimensions

All proposed streets shall be dimensioned from centerline to lip of gutter, face of curb, back of sidewalk, and to right-of-way. On curb and gutter No. 13 (rolled), the face is considered to be 6" from the back of curb. On curb and gutter No. 4 (vertical), the face is considered 8" from back of curb. Dimension radius on round corners shall be shown.

5.3.2.6 Stationing

The stationing is typically placed on the street centerline and reads from north to south and from west to east insofar as possible.

5.3.2.7 Profile

Profile area shall include the following information:

1. Existing centerline and proposed centerline with % of grade labeled.
2. Existing and proposed gutter flow lines.
3. Existing improvements and proposed improvements - provide stationing of manholes, label pipe sizes, and pipe length.
4. A station should be shown for all intersections, curve returns, beginning of curve (BC), point of compound curve (PCC), point of reverse curve (PRC) and end of curve (EC).

5.3.3 Grading Plan

All existing pertinent topographic features shall be shown. The proposed elevations, pad elevations and on site drainage shall be shown (required for all subdivisions).

5.3.4 Detail Sheet

5.3.4.1 Typical Section

A typical section for each type of street within the improvements is required. See Section 15 page 15-1 for street width standards.

5.3.4.2 Details

A detail is required for any item that is not shown in the City of Sacramento Standard Specifications, Latest Edition.

5.3.4.3 Cross Sections

Include as necessary.

5.4 PLAT MAPS

Refer to Section 8 - "Right-of-Way Engineering and Acquisition".

5.5 WATER PLAN STANDARDS

5.5.1 Example Water Plans

Copies of example water plans are available from the engineering section of the Water Division, from the Development Services Division, and the Engineering Division of the Department of Public Works.

5.5.2 Tracing Material

All water distribution system improvement plans shall be drawn in ink on Mylar type film. The drawings shall be made on City standard 22 inch by 34 inch, "D" size, sheets with the Water Division title block. Blank sheets are available from the Development Services Division and the Engineering Division of the Department of Public Works.

5.5.3 Scale of Drawings

A scale of one inch equals 100 feet is the preferred scale of water distribution system improvement plans. For small improvement projects

such as replacement of water mains in alleys or short length main extensions or for projects where a large amount of detail is required, scales of one inch equals 20 feet, one inch equals 40 feet, or one inch equals 50 feet are acceptable.

5.5.4 Plan Orientation

The layout of the water system water plan sheet should be arranged to indicate the North arrow is directed towards the top of the sheet or to the left or right edge of the sheet.

5.5.5 Plan and Profile

Construction plans for water distribution systems should indicate in plan view the layout of existing and proposed water mains as well as the location of all gate valves, fire hydrants, blow-offs, water services, etc, and any special details. Stationing along the centerlines of streets and at street intersections should appear on all water plans. The location of in-line gate valves, fire hydrants, water services, and blow-offs at the terminus of dead end water mains shall be indicated by engineer's station or by dimensions from property lines.

Plans for water distribution systems shall include the geometric alignment and right-of-way width of all dedicated streets, existing and proposed curbs, gutters, sidewalks, and existing above ground and underground utilities. In addition, water plans shall show all existing and proposed obstructions that will interfere with the placement of water main pipe such as bridges, culverts, open channels, traffic islands, underground vaults, etc.

A profile is normally not required to be shown for water plans of distribution mains. However, a profile may be required for the segments of water distribution main crossing beneath railroads or major drainage channels. Other situations, such as limited clearances to existing or proposed utilities may also require a profile of a segment of the distribution main to be shown on the water plans.

A profile is required, however, for projects involving the construction of water transmission mains (16" diameter and larger).

5.5.6 Required Details

Applicable details obtained from Water Division "Technical Drawings" shall be shown on water plans or shall be included in the special provisions for the project. The "Technical Drawing" details most commonly used include the following:

1. TDW - 2 FIRE HYDRANT PROTECTION DETAIL
2. TDW - 18 WATER SERVICE TRANSFER DETAIL
3. TDW - 23 INSTALLATION OF METERED WATER SERVICES
4. TDW - 26 REDUCED PRESSURE PRINCIPLE (RP) AND DOUBLE CHECK VALVE ABOVE GROUND INSTALLATION
5. TDW - 27 BACKFLOW PREVENTION ASSEMBLIES FOR BUILDING/BASEMENT INSTALLATIONS
6. TDW - 28 INSTALLATION OF FUTURE WATER SERVICES

Copies of the above technical drawings are included in the Appendix to Section 13 - "Water Distribution System Design Standards".

5.5.7 Water Drafting Notes

Descriptive drafting notes are to be used on water distribution system improvement plans to convey specific information relating to the "tie-in" connections, installation of water services, appurtenances such as fittings and gate valves, and the installation of fire hydrants. A copy of these descriptive notes is included in the Appendix 2 to Section 5. Under certain conditions supplemental notes may be required by the design engineer.

5.5.8 Water Standard Notes and Special Notes

Standard general notes and certain special notes are to be used on all water plans to convey specific information common to all water distribution system projects. Often these general and special notes serve as the special provisions for water plans. A copy of these general and special notes is included in Appendix 2 to Section 5 of this Design Standard under "Standard General Notes - Water".

5.6 TRAFFIC SIGNAL AND STREET LIGHTING PLANS

All traffic signal and street lighting plans shall be prepared on City of Sacramento standard title block mylar sheets as shown in Appendix 1 to Section 5. Drawing size shall be "D" size, 22" x 34". The use of other drawing sizes shall be approved by the Engineer prior to initiating the drawing. Lettering and numerals shall be 1/8" minimum. Typing or machine prepared characters

are acceptable. Only ink on mylar is acceptable for final drawings. Final drawings submitted for approval shall have no adhesive-back reproduction film ("sticky backs").

5.6.1 Traffic Signal Cover Sheet

Traffic Signal Cover Sheets shall comply with Section 5.3.1 of this manual.

5.6.2 Traffic Signal Plan Sheets

Each set of traffic signal plans shall include, but is not limited to, the following sheets:

	<u>Scale</u>
1. Traffic Signal Intersection Sheet (110 feet $\pm$ from stopbar in each direction)	1" = 20'
2. Traffic Signal Intersection Sheet (325 feet $\pm$ from stopbar in each direction for loops, lighting)	1" = 40'
3. Signing and Striping Sheet	1" = 40'
4. Underground Utilities Sheet	1" = 40'
5. Interconnect Sheet (if applicable)	1" = 100'
6. Street Improvements (if applicable)	as required

5.6.3 Traffic Signal Intersection Sheets

The Traffic Signal Intersection Sheets shall show the following information:

1. **Topography** - All pertinent topographic features in the immediate vicinity of the project shall be shown - edge of pavement, back of sidewalk, back of curb, existing topography such as fences, street lights, signal poles, planters, pullboxes, fire alarm pedestals, service pedestals, controller cabinets, power poles, striping, median islands and other geometric features, obstructions, or traffic control features that may affect the proposed intersection design. Existing striping shall be properly dimensioned.
2. **Proposed Improvements** - Proposed improvements shall be shown in solid heavy lines as shown in Appendix 1 to Section 5.

Proposed improvement information from the 1"=20' plan shall be copied to the 1"=40' plan and shall include the proposed signal poles, signal and pedestrians heads, controller, service, phasing of signal heads, controller, conduit and proposed loops, see Typical Plan Set in Appendix 3 to Section 5.

3. **Right-of-Way** - All right-of-way lines, easements, section lines and temporary construction easements both existing and proposed shall be properly dimensioned.
4. **Special Details** - A detail is required if an area of the plan needs to be enlarged for clarity, or if any item is not shown in the most current issue of the City of Sacramento Standard Specifications or CalTrans Standard Plans.

5.6.4 Plan Sheet Format

Shall generally conform to the following:

1. **Construction Notes** - A set of construction notes shall appear on each sheet applicable to the work on that sheet only. General notes that are applicable to all sheets may be on the first sheet on which the notes apply and then be referred to on the remaining sheets. Construction notes shall be placed in consecutive order in the upper right hand quadrant of the plan sheet. Construction notes shall have a line drawn to the appropriate area to which the note applies.

Caltrans abbreviated notes shall not be used with City projects but may be used when required by the State for joint City/State projects. If Caltrans abbreviations are used, a legend describing each abbreviation shall be shown on the Plans. Plan sheets shall be checked for consistency and continuity between notes and symbols on different sheets.

2. **Conductor Schedule** - Conductor schedule shall be in the upper left hand quadrant of the plan sheet. See Typical Plan Set in Appendix 3 to Section 5.
3. **Pole Schedule** - Pole and equipment schedule shall be in the lower left hand quadrant of the plan sheet. See Typical Plans Set in Appendix 3 to Section 5.
4. **Luminaire Schedules** - Luminaire schedules, if required, shall be shown in tabular form and should indicate, but not be limited to, the amount and type of luminaires on each new or existing service, the service location and voltage, the number of lights

removed or added from an existing service, and any other pertinent information affecting the service load. See Typical Plans Set in Appendix 3 to Section 5.

5.6.5 Signing and Striping Plan Sheet

Shall include the following information:

1. Existing striping and proposed striping.
2. Existing signing and proposed signing.
3. "FOR INFORMATION ONLY" (Not a part of this contract). City Signing and Striping crews shall perform the signing and striping for traffic signal projects unless otherwise noted.
4. Signature block for signature of supervising engineer, Transportation Division as shown in the Typical Plans Set in Appendix 3 to Section 5.

5.6.6 Interconnect Sheets

Shall include the following information:

1. Existing street lighting electroliers and conduit, pullboxes, intersection conduit, controller cabinets, and service pedestals along the arterial to be interconnected.
2. All intersections to be interconnected, using match lines where necessary.

5.6.7 Standard Plan Sheets

Standard Plan Sheets E-2, E-3, and E-4 shall be included with every traffic signal project plan set. See Typical Plans Set in Appendix 3 to Section 5. These plan sheets are available from the Electrical Design Section of the Engineering Division.

5.6.8 Street Lighting Plan Sheets

1. **Scale:** A scale of 1" = 100' horizontal is recommended for most street lighting plan sheets.
2. **Existing Topography:** Existing topography shall include existing service points, existing street lighting in the immediate vicinity of the project, and conduit runs.

3. **Proposed Improvements:** Proposed street lights to be installed shall be shown in solid heavy lines.
4. **Right-of-Way:** All right-of-way lines, easements, section lines and temporary construction easements, both existing and proposed, shall be properly dimensioned. Any public utility easements shall be noted.
5. **Subdivision and Lot Details:** Subdivision plans shall show lot numbers and frontage measurements, intersection property lines of adjacent properties, and names and plans numbers of adjacent subdivisions. Service details shall be shown as applicable.
6. **Luminaire Schedules:** Luminaire schedules shall be shown in tabular form and should indicate, but not be limited to, the amount and type of luminaires on each new or existing service, the service location and voltage, the number of lights removed or added from an existing service, and any other pertinent information affecting the service load.

APPENDIX 1 TO SECTION 5

CIVIL

<u>PLATE NO.</u>	<u>DESCRIPTION</u>	<u>Page No.</u>
PLATE 5-1	TYPICAL ASSESSMENT DISTRICT DIAGRAM	5-12
PLATE 5-2A	STANDARD PLAN SHEET	5-13
PLATE 5-2B	STANDARD PLAN/PROFILE SHEET	5-14
PLATE 5-3A	STANDARD SYMBOLS	5-15
PLATE 5-3B	STANDARD SYMBOLS	5-16
PLATE 5-3C	STANDARD SYMBOLS	5-17

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STANDARD PLAN SHEET

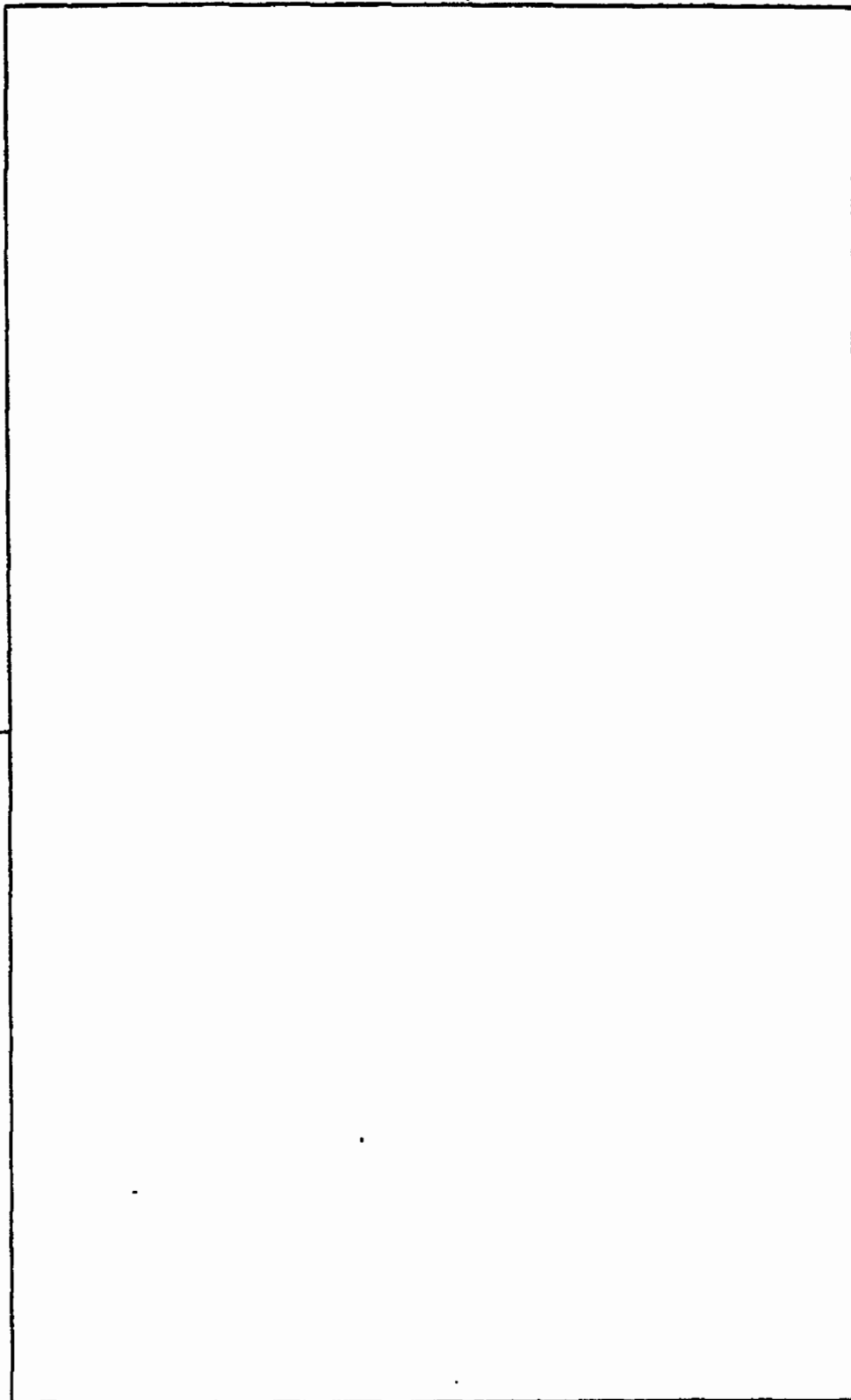
		SHEET NO.	
		OF	
CITY OF SACRAMENTO DEPARTMENT OF PUBLIC WORKS		PROJECT NO. DATE	
DESIGNER CHECKED BY		REVIEWED BY DATE	
DRAWN BY DATE		SCALE DATE	

PLATE 5-2A

STANDARD PLAN/PROFILE SHEET

		SHEET NO. 1 OF 1	
		CITY OF SACRAMENTO DEPARTMENT OF PUBLIC WORKS	
REVISIONS NO. 1 DATE 10/1/90		DESIGNED BY CHECKED BY DATE 10/1/90	DRAWN BY DATE 10/1/90

PLATE 5-2B

STANDARD SYMBOLS

CITY OF SACRAMENTO STANDARD SYMBOLS

NAME	PEN #	EXISTING	PEN #	PROPOSED
DROP INLET		□		■
MANHOLE		○		●
SEWER CLEANOUT		◦		•
STORM DRAIN	1		3	
SANITARY SEWER	1		3	
WATER MAIN	0		3	
GATE VALVE	0		3	
WATER METER	0		2	
STANDARD FIRE HYDRANT	0		2	
DOUBLE PUMPER FIRE HYD.	0		2	
WHARF HYDRANT	0			
AIR RELEASE	0		3	
BUTTERFLY VALVE	0		3	
CHECK VALVE	0		3	
BLOW-OFF	0		3	
POWER POLE		PP ○		
POWER POLE W/GUY		PP ○ →		
JOINT POLE		○ ^{JP}		
STREET LIGHT		□		
PULL BOX		□ ^{PB}		
SIGNAL POLE		—		
SMUD (UNDERGROUND)	00	— SMUD —		

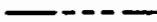
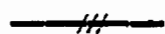
PLATE 5-3A

STANDARD SYMBOLS

NAME	PEN #	EXISTING	PEN #	PROPOSED
ELECTRICAL	00	— E —		
GAS VALVE		•		
GAS MAIN	00	— G —		
TELEPHONE	00	— T —		
CABLE TELEVISION	00	— CTV —		
FIRE ALARM		△ F.A.		
STREET SIGN		— T —		— T —
FENCE	00	— X — X — X —	1	— X — X —
MAIL BOX		□ M.B.		■ M.B.
RETAINING WALL	00	=====		=====
FLOW LINE	0	— — — — —	1	— — — — —
CONTOUR	00	— 20 —	1	— 20 —
EDGE OF PAVEMENT	0	— — — — —	1	— — — — —
CURB, GUTTER & SDWK.	00	=====	0	=====
RIGHT OF WAY	1	— — — — — R/W	2	R/W — — — — —
CENTER LINE	00	— C —	00	— C —
PROPERTY LINE	0	— — — — —	1	— — — — —
SLOPE BANK	00	Y' Y' Y' Y' Y'	1	Y' Y' Y' Y' Y'
ELEVATION		x 23.10 Ex.		x 23.10 Ex.
BENCH MARK		4021 X B.M.		
TEMPORARY BENCHMARK		△ TBM		
HEDGE		— — — — —		— — — — — TO BE REMOVED
TREE		— — — — —		— — — — —
BUILDING	00	=====	1	=====

PLATE 5-3B

STANDARD SYMBOLS

NAME	PEN#	EXISTING	PEN#	PROPOSED
ELECTROLIER FOR POST TOP LUMINAIRE	00		1	
ELECTROLIER WITH MAST ARM FOR MAST ARM MOUNTED LUMINAIRE	00		1	
OVERHEAD CONDUCTOR	0		2	
CONDUIT (HASH MARKS INDICATE NO. OF WIRES ST. LT. PLANS ONLY)	1		4	
PULL BOX (5 UNLESS OTHERWISE NOTED)	00		0	
SERVICE PEDESTAL	00		1	
SMUD SERVICE POLE	00		0	
SMUD SERVICE SIDEWALK BOX	00		1	
TYPICAL I.E.S. LIGHT PATTERN OF LUMINAIRE	00		1	TYPE III
INDICATES CONSTRUCTION NOTE NO. 1	00		0	
INDICATES ELECTROLIER LOCATION (DETAIL A)	00		0	
FIRE ALARM PEDESTAL	00		1	
CONTROLLER CABINET	00		1	
CONDUIT RUN (TRAFFIC SIGNAL PLANS)	00		0	
DETECTOR HANDHOLE	00		1	

NOTE:
REFER TO CALTRANS STANDARD SYMBOL SHEET ES-1B FOR ANY SYMBOLS NOT SHOWN HERE.

PLATE 5-3C

APPENDIX 2 TO SECTION 5

WATER DRAFTING NOTES

The following "Drafting Notes" are to be used in the preparation of water distribution system improvement plans.

1. Tie-In Connections to Existing Water Mains

- a. After disinfection City crews will "tap" / or "cut-in" existing water main and install _____" G. V. for a fee in the amount of \$ _____. Contractor shall provide all excavation, backfill, and pavement restoration.
- b. After disinfection Contractor shall install _____" diameter tapping sleeve with _____" G. V. on existing water main.

OR

After disinfection Contractor shall "cut-in" tee on existing water main and provide _____" diameter G. V.

2. Extension of Existing Water Distribution Mains

- a. Remove blow-off from end of existing main. Connect mains after disinfection.
- b. Remove plug from existing tee / cross fitting and install _____" diameter G. V. Connect mains after disinfection.

3. Installation of Water Services

- a. City crews will install _____" tap for a fee in the amount of \$ _____. Contractor to perform all required excavation, backfill, and pavement restoration.
- b. City crews will tap existing main and install _____" water service and _____" meter for a fee in the amount of \$ _____.
- c. Contractor shall tap existing main and install _____" water service with _____" G. V. and 2" blow-off.
- d. City crews will tap existing main and install _____" G. V. for a fee in the amount of \$ _____. Contractor to provide all required excavation, backfill, and pavement restoration. Connect mains after disinfection.

4. Gate Valves, Fittings, and Other Appurtenances

- a. Place _____ " tee / cross with _____ " G. V.'s. Plug north / south / east / west end of tee / cross.
- b. Place _____ " x _____ " reducer.
- c. Place _____ " 90 / 45 / 22 1/2 degree elbow.
- d. Place _____ " G. V.
- e. Place _____ " blow-off.
- f. Place _____ " C. I. plug.

5. Fire Hydrants

- a. Place standard / double pumper fire hydrant
OR
Place Std. F. H. / D. P. F. H.
- b. Place _____ " x 6" tee with standard F. H.
- c. Place _____ " x 8" tee with D. P. F. H.
- d. Relocate existing fire hydrant.
- e. Remove existing hydrant and place Std F. H. / D.P.F.H.

GENERAL NOTES - WATER

- 1.(General) Water mains, fittings, gate valves, fire hydrants, and water services shall conform to and be installed in accordance with the City of Sacramento Standard Specifications dated June 1989.
- 2.(General) The Contractor shall contact the Construction Section of the City of Sacramento Engineering Division at 449-5282 at least two working days in advance of beginning work for construction surveys and the scheduling of construction inspection.
- 3.(General) Prior to beginning any excavation and to avoid conflicts, the Contractor shall determine the location of all existing underground utilities in the area of the proposed work. Such existing utilities shall include, but not be limited to, electrical or telephone conduits and cables, gas lines, water mains, sewer and drain lines, cable TV, etc.

Notify Under Ground Service Alert (USA) a minimum of 48 hours in advance of beginning work. Call 1-(800) 642-2444.

- 4.(General) Standard Drawing SD-1 in Section 38 of the Standard Specifications shall be amended by deleting the dimensions 2" Minimum and 2-1/2" Maximum as the distance between the concrete collar at the base of the hydrant and the breakable flange and coupling.

Fire hydrants shall be set to meet the bury depth requirements of the fire hydrant manufacturer.

- 5.(General) A solid No 10 bare copper locating wire shall be placed with all pipes for water distribution mains regardless of type of pipe material.

- 1.(Special) Section 10-30(6L) and Section 10-31(3) of the Standard Specifications shall be amended to read, "Fire hydrants and valves shall turn to the left (counter-clockwise) to open.

- 2.(Special) Since this subdivision is not contiguous to existing development, the property owner or developer of this subdivision shall be responsible for the construction of any required off-site water main extensions as determined by the City Development Services Division, provided construction of improvements for the adjacent subdivision are not provided for at the time of construction of this subdivision.

- 3.(Special) All existing fire hydrants to be relocated by the Contractor shall be inspected by City Water Division personnel prior the relocation of the hydrant.

The Water Division has the option of furnishing, at no cost to the Contractor, a new or replacement fire hydrant as a substitute for the existing hydrant and to take the existing fire hydrant as salvage. The Contractor shall install the replacement fire hydrant.

- 4.(Special) Existing gate valves, risers or standpipes, and valve boxes shall be abandoned in place where indicated on the Plans. The gate valves shall be left in a closed position, the riser or standpipe removed, and the void filled with crushed rock or Class 2 aggregate base.

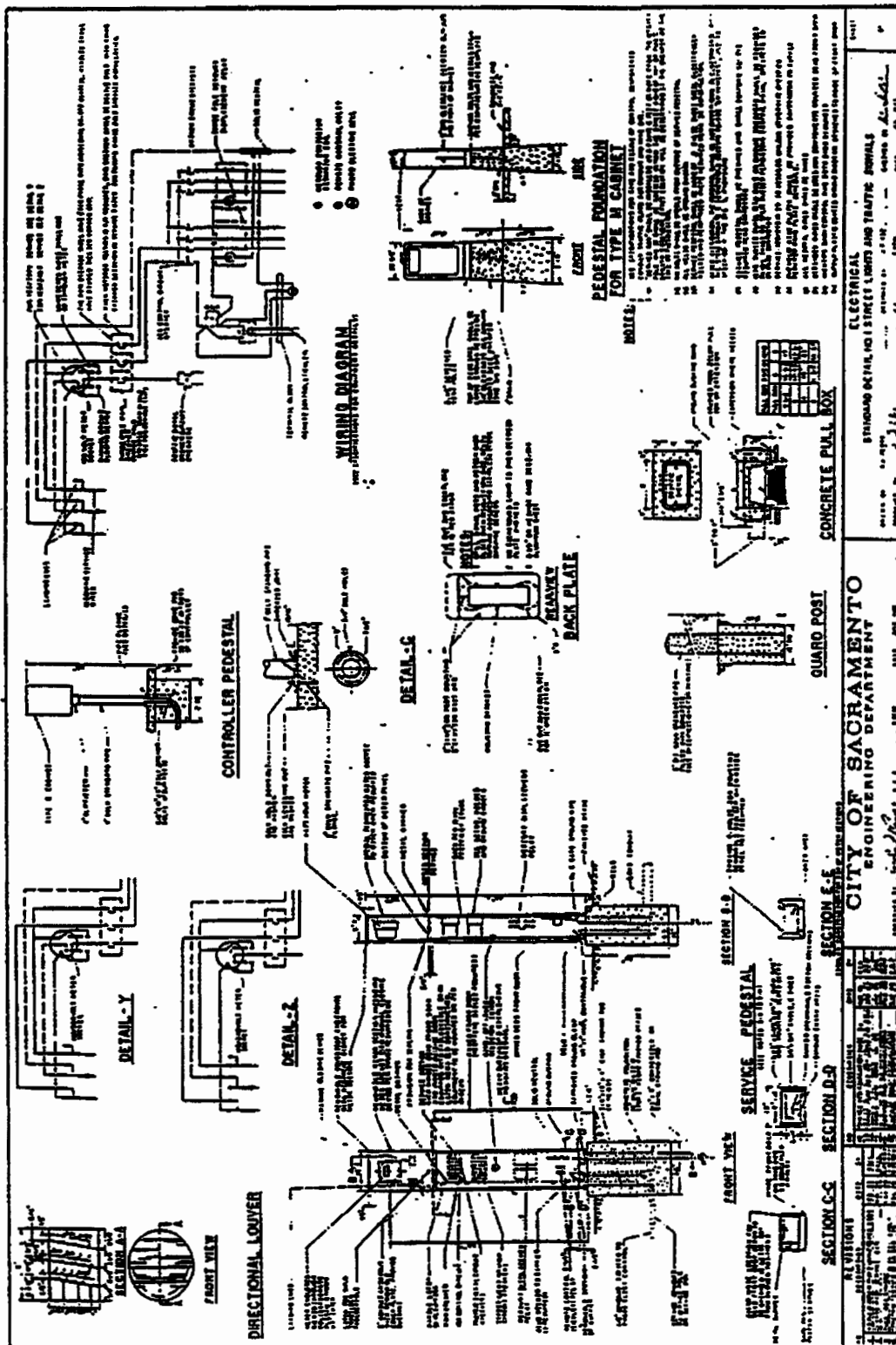
Existing valve boxes with bottom flanges (Sacramento and Napa type) may be reused by the Contractor with the approval of the Engineer. Sacramento or Napa type valve boxes not reused by the Contractor shall be returned to the City Corporation Yard. Other types of valve boxes become of the property of and shall be disposed by the Contractor.

- 5.(Special) All water service taps to existing water mains to be installed by the Contractor shall be made while keeping the existing water main in service and under pressure. Shutdown of the existing water main to facilitate the installation of water service taps shall not be permitted.

APPENDIX 3 TO SECTION 5

ELECTRICAL

<u>PLATE NO.</u>	<u>DESCRIPTION</u>	<u>PAGE NO.</u>
PLATE 5-4A	TRAFFIC SIGNAL STANDARD PLAN SHEET 1	5-23
PLATE 5-4B	TRAFFIC SIGNAL STANDARD PLAN SHEET 2	5-24
PLATE 5-4C	TRAFFIC SIGNAL STANDARD PLAN SHEET 3	5-25
PLATE 5-5A	TRAFFIC SIGNAL PLAN, 1" = 20'	5-26
PLATE 5-5B	TRAFFIC SIGNAL PLAN, 1" = 40'	5-27
PLATE 5-6	STRIPING PLAN	5-28
PLATE 5-7	UTILITY PLAN	5-29



TRAFFIC SIGNAL STANDARD PLAN SHEET 2

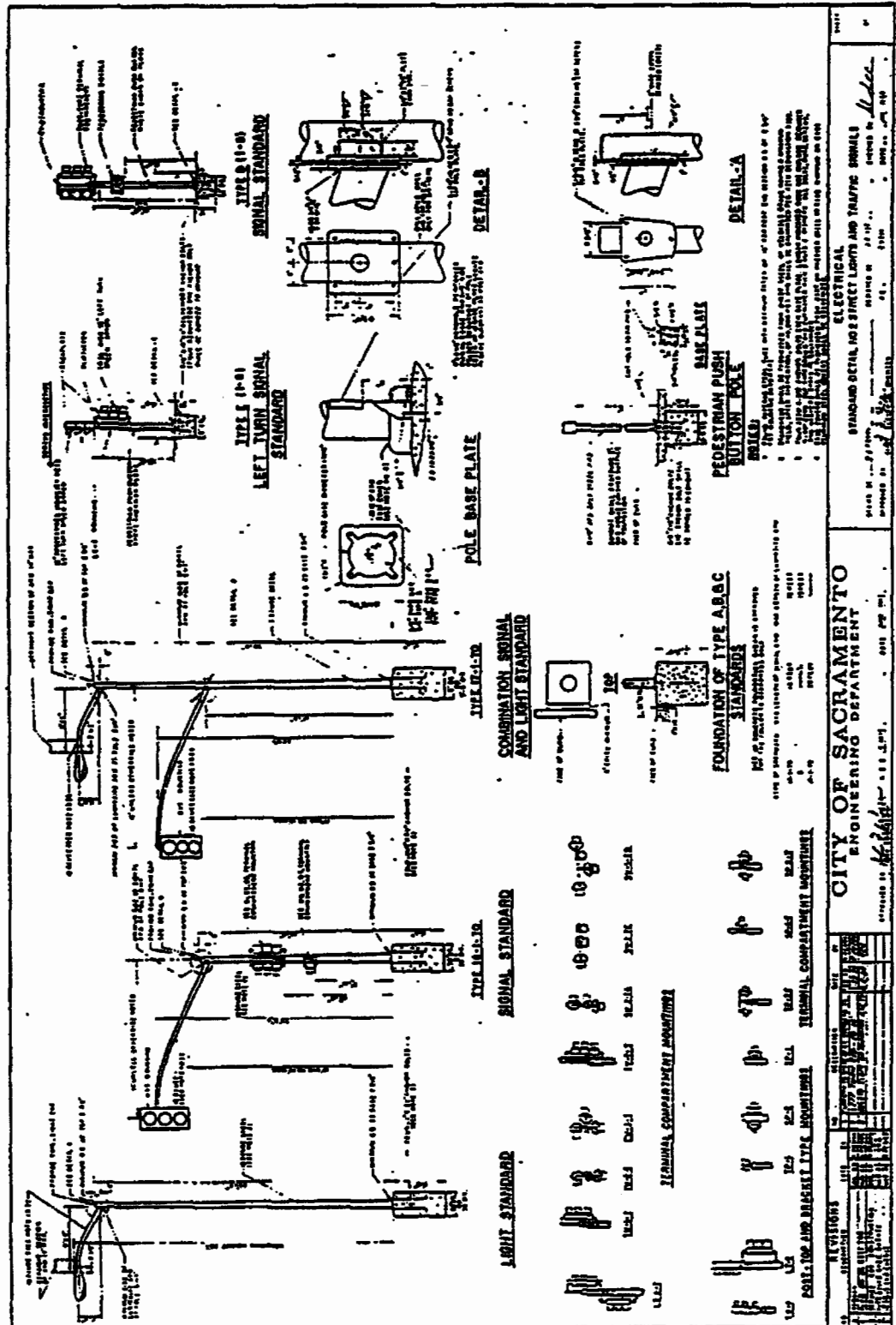


PLATE 5-4B

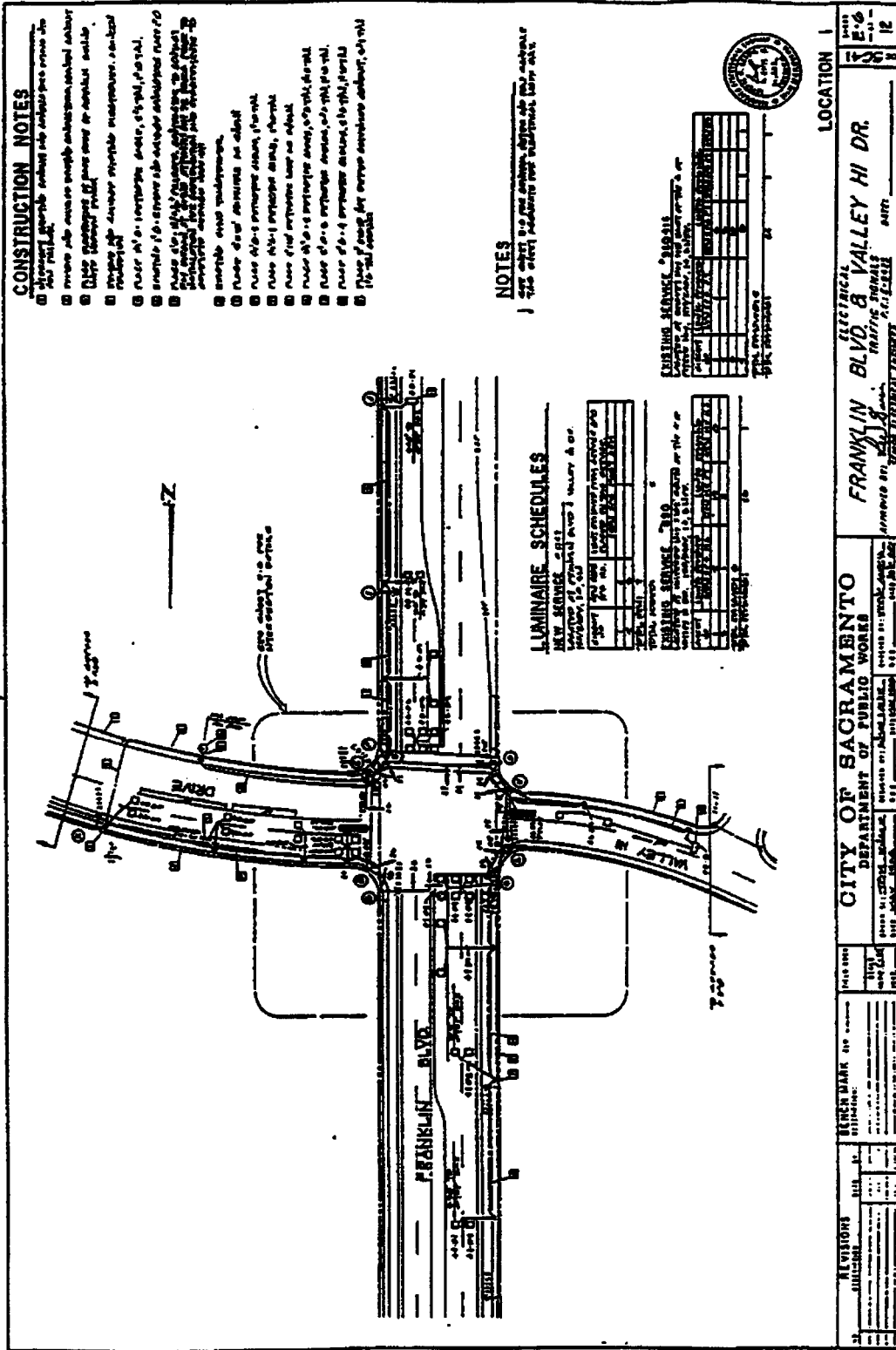
September 1, 1990



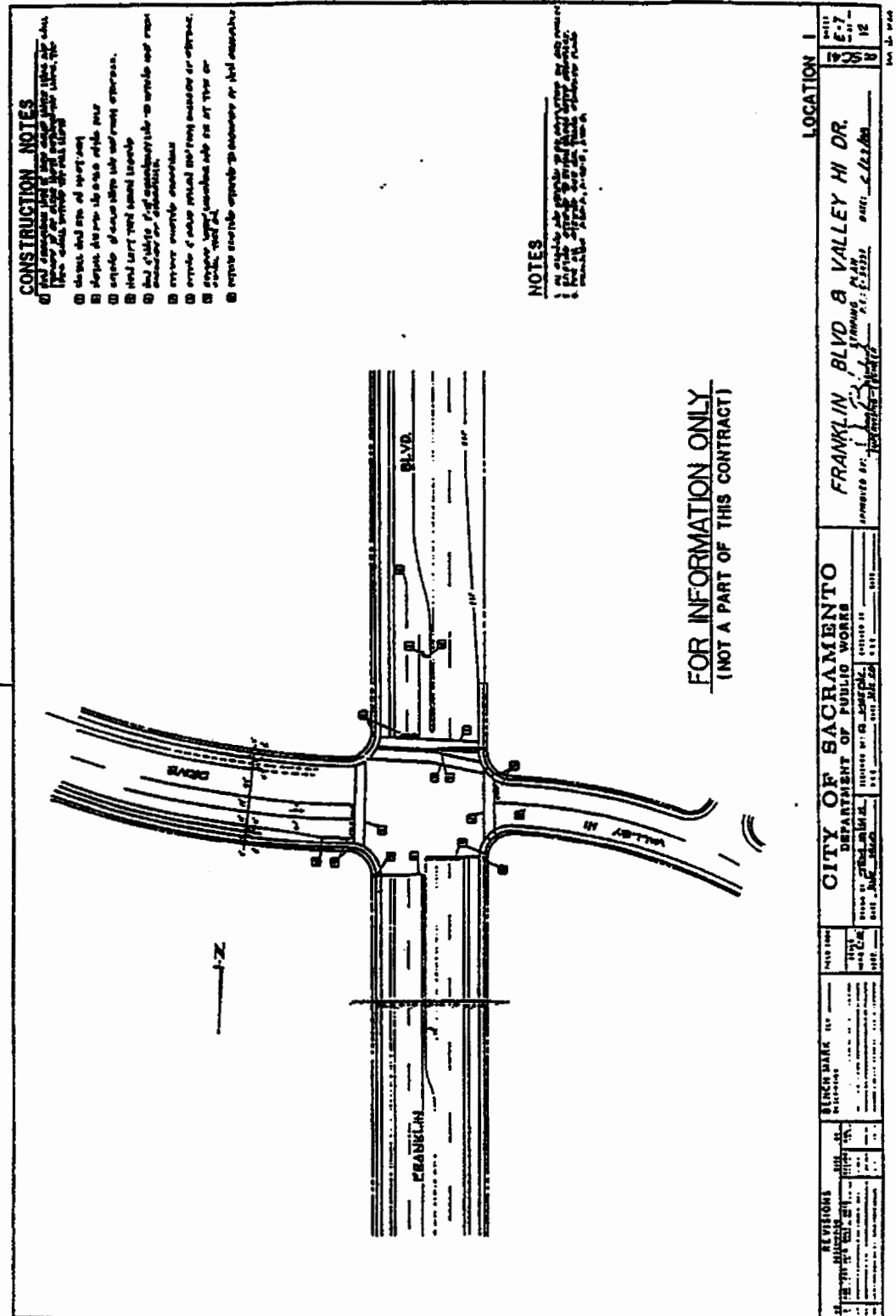
September 1, 1990



TRAFFIC SIGNAL PLAN, 1" = 40'



STRIPING PLAN



UTILITY PLAN

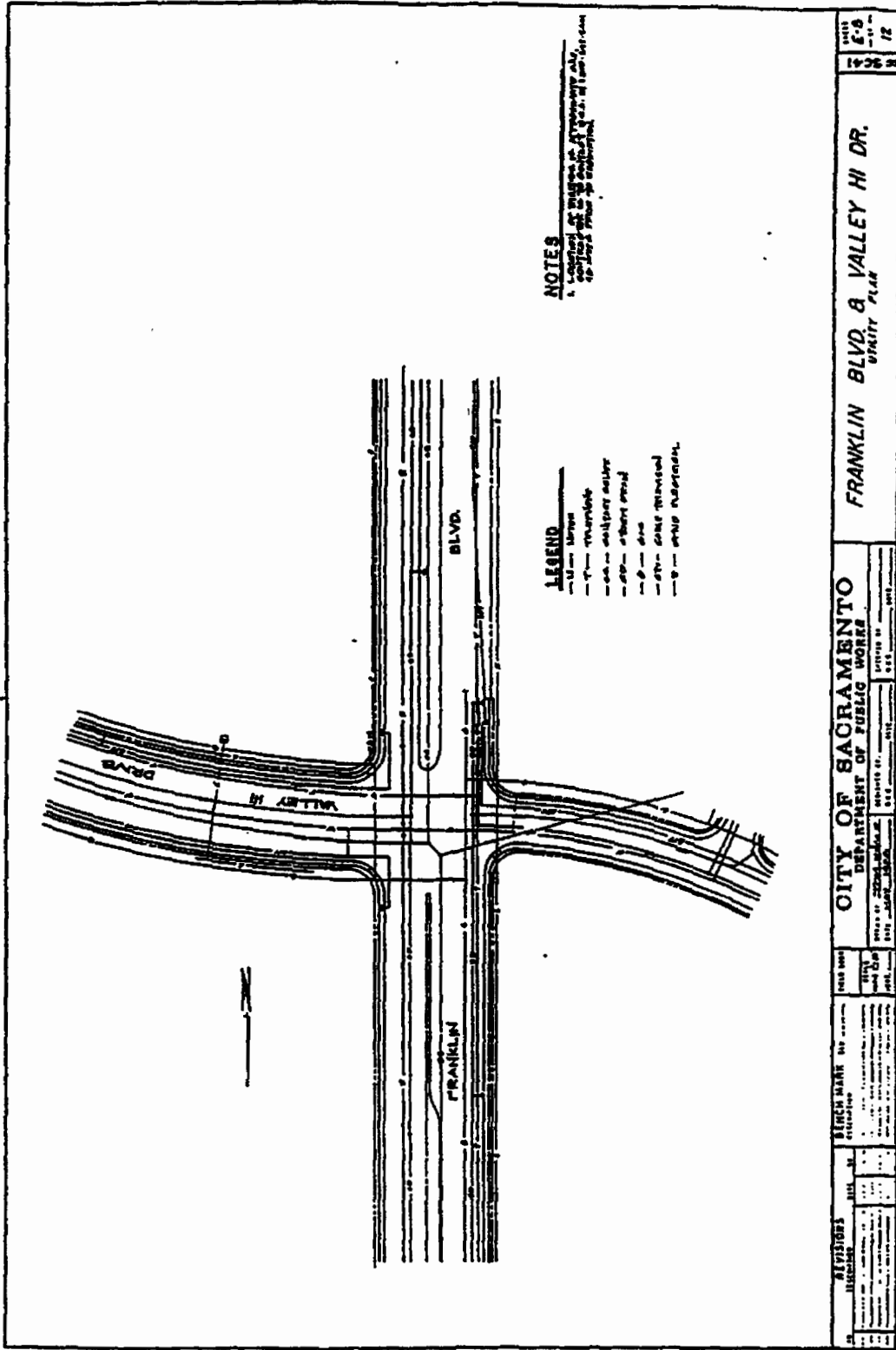


PLATE 5-7