SPECIAL PROVISIONS AND
STANDARD DRAWINGS FOR
THE INSTALLATION AND MODIFICATION OF
TRAFFIC SIGNALS

“RED BOOK”

July 2008

Rita L. Robinson, General Manager
## REVISION LOG

<table>
<thead>
<tr>
<th>DATE</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jul-09</td>
<td>Revised Section A7 &quot;Contractor Requirements&quot;</td>
</tr>
<tr>
<td></td>
<td>Revised page 1 of &quot;No Left &amp; No Right Turn Electric Sign&quot; (S-58.13)</td>
</tr>
<tr>
<td>Aug-09</td>
<td>Increased F-1/F-8 foundation depth to 36&quot; (S-52.1)</td>
</tr>
</tbody>
</table>
# TABLE OF CONTENTS

| INTRODUCTION | ................................................................. | 1 |
| PART I | SPECIAL PROVISIONS |
| A. GENERAL |
| 1. Definitions | .............................................................................................................. | 2 |
| 2. LADOT District Field Operations Yards | .............................................................................................................. | 2 |
| 3. Purchase of This Document | .............................................................................................................. | 2 |
| 4. Material | .............................................................................................................. | 2 |
| 5. Notification | .............................................................................................................. | 3 |
| 6. Worksite Traffic Control | .............................................................................................................. | 3 |
| 7. Contractor Requirements | .............................................................................................................. | 4 |
| 8. Traffic Control Signing | .............................................................................................................. | 4 |
| 9. LADOT Supplied Material | .............................................................................................................. | 4 |
| 10. Controller Testing | .............................................................................................................. | 4-5 |
| 11. Salvage Equipment | .............................................................................................................. | 5 |
| B. CONSTRUCTION PRACTICES |
| 1. Pullboxes | .............................................................................................................. | 6 |
| 2. Conduit |
| a. Material | .............................................................................................................. | 6-7 |
| b. Trenching | .............................................................................................................. | 7 |
| c. Installation in Roadways | .............................................................................................................. | 7-8 |
| d. Backfill | .............................................................................................................. | 8 |
| e. Installation in Parkways | .............................................................................................................. | 8 |
| f. Size | .............................................................................................................. | 8 |
| 3. Backfilling | .............................................................................................................. | 9-11 |
| a. Schedule | .............................................................................................................. | 9 |
| b. Foundation Holes | .............................................................................................................. | 9 |
| c. Trenches | .............................................................................................................. | 9 |
| Table I (Backfilling, Restoration of Excavations and Removal of Equipment and Material) | .............................................................................................................. | 10 |
| 4. Conductors and Cable |
| a. Material | .............................................................................................................. | 11 |
| b. Identification | .............................................................................................................. | 12 |
| c. Interconnect |
| 1) Direct Wire | .............................................................................................................. | 12 |
| 2) Multi-Pair Interconnect Cable | .............................................................................................................. | 12 |
3) Telephone and Fire Alarm ................................................................. 12

d. Inductive Loop Detectors ................................................................. 12-13
1) Wire Splicing .................................................................................... 13
2) Loop Detector Wire Routing System ................................................. 13
3) Sealant ................................................................................................. 13
4) Transit Bus or Photo Red-Light Detector Wire ................................. 13

e. Conductor Splicing and Termination .................................................. 13-14
1) Connectors .......................................................................................... 13
2) Multi-Conductor Signal Cables in the Controller Pullbox ................. 13

f. Inductive Loop Detector Lead-in Cable ............................................... 14

g. Transit Bus or Photo Red-Light Detector Lead-in Cable ....................... 14

h. Conductors Attached to Controller Field Terminals .............................. 14

i. Field Testing .......................................................................................... 14
1) Continuity .......................................................................................... 14
2) Ground ................................................................................................. 14
3) Insulation Resistance ........................................................................... 14

5. Fiber Optic Cable

a. General
1) Description ....................................................................................... 15
2) Performance ........................................................................................ 15
3) Construction ........................................................................................ 15
4) Jacket ................................................................................................. 15
5) End Termination Cable ....................................................................... 15
6) Identification ........................................................................................ 15
7) Reels ................................................................................................. 15
8) Installation .......................................................................................... 15-16

b. Splicing of Fiber Optic Cable .............................................................. 16

6. Controller ............................................................................................................... 16

7. Ground Rods ........................................................................................ 16

8. Service ..................................................................................................... 17

9. Signal Heads

a. Vehicle and Pedestrian Signal Head Covers ...................................... 17
b. Vehicle Heads ...................................................................................... 17
c. Pedestrian Heads .................................................................................. 17
d. Traffic Signal Visors ............................................................................ 17
e. Light Emitting Diodes (LED) Signal Modules ................................... 17

10. Detectors ................................................................................................. 18

11. Lines and Grades .................................................................................. 18

12. Anchor Bolt Height ............................................................................... 18

C. TABLES

28-Conductor Cable Color Code Identification .................................... 19
## PART II
### STANDARD DRAWINGS

<table>
<thead>
<tr>
<th>TITLE</th>
<th>DRAWING NUMBER</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic Signal Symbols</td>
<td>S-50.1</td>
<td>20-23</td>
</tr>
<tr>
<td><strong>Standards</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type 1, Typical Mounting</td>
<td>S-51.1.2A</td>
<td>24</td>
</tr>
<tr>
<td>Types 1, 1A, 8 &amp; 9</td>
<td>S-51.1.3A</td>
<td>25</td>
</tr>
<tr>
<td>Type 7</td>
<td>S-51.7</td>
<td>26</td>
</tr>
<tr>
<td>Type 8 (337 Post-Top Mounted Cabinet)</td>
<td>S-51.8</td>
<td>27</td>
</tr>
<tr>
<td>Type 9</td>
<td>S-51.9A</td>
<td>28</td>
</tr>
<tr>
<td>Type 16</td>
<td>S-51.9.5</td>
<td>29</td>
</tr>
<tr>
<td>CD 954</td>
<td>S-51.9.6</td>
<td>30</td>
</tr>
<tr>
<td>100 MPH Poles</td>
<td>S-52.1.6</td>
<td>31</td>
</tr>
<tr>
<td>Camera Poles</td>
<td>S-52.1.4B</td>
<td>32-33</td>
</tr>
<tr>
<td><strong>Temporary Standards</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>For Type 1 Standard</td>
<td>S-57.2B</td>
<td>34</td>
</tr>
<tr>
<td>For Type CD 954 Standard</td>
<td>S-57.2C</td>
<td>35</td>
</tr>
<tr>
<td>(Without Luminaire Arm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>For Type CD 954 Standard</td>
<td>S-57.2D</td>
<td>36</td>
</tr>
<tr>
<td>(With Luminaire Arm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Controller Cabinet (337), for Type 8 Standard</td>
<td>S-57.3</td>
<td>37</td>
</tr>
<tr>
<td><strong>Fittings</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typical Post-Top Mounting</td>
<td>S-61.1</td>
<td>38</td>
</tr>
<tr>
<td>Typical Clamp Mounting</td>
<td>S-62.1</td>
<td>39</td>
</tr>
<tr>
<td>Typical Terminal Compartment &amp; Pole Plate Mounting</td>
<td>S-63.1</td>
<td>40</td>
</tr>
<tr>
<td>Special Mast Arm Mountings</td>
<td>S-63.1.4</td>
<td>41-42</td>
</tr>
<tr>
<td>Mast Arm Mounting</td>
<td>S-67.1</td>
<td>43</td>
</tr>
<tr>
<td>Removable Lifting Plate For Controller Cabinets</td>
<td>S-68.1</td>
<td>44</td>
</tr>
<tr>
<td><strong>Visors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8&quot; Diameter Beveled</td>
<td>S-76.3</td>
<td>45</td>
</tr>
<tr>
<td>12&quot; Diameter Beveled</td>
<td>S-76.6</td>
<td>46</td>
</tr>
<tr>
<td>Long Visor, 8&quot; &amp; 12&quot; Diameter Full Circle</td>
<td>S-76.7</td>
<td>47</td>
</tr>
<tr>
<td>Pigeon Visor, Tunnel</td>
<td>S-76.8</td>
<td>48</td>
</tr>
<tr>
<td><strong>Push Buttons</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pushbutton, Installation</td>
<td>S-72.0A</td>
<td>49</td>
</tr>
<tr>
<td>Pushbutton</td>
<td>S-72.1.1</td>
<td>50</td>
</tr>
<tr>
<td>Bicycle Pushbutton Sign</td>
<td>S-72.2</td>
<td>51</td>
</tr>
<tr>
<td>Pedestrian Pushbutton Sign</td>
<td>S-73.0</td>
<td>52</td>
</tr>
<tr>
<td>Countdown Pedestrian Pushbutton Sign</td>
<td>S-73.1</td>
<td>53</td>
</tr>
</tbody>
</table>
### Loops
- Inductive Loop Installation .......................................................... S-70.1A .............................. 54-55
- Bicycle Detector .......................................................................... S-70.1D .................................... 56
- Preformed Loop Installation ........................................................ S-70.1E ..................................... 57
- Transit Priority Loop ................................................................... S-70.1F ..................................... 58
- System Detector Loop Lead-in Cable (2, 3, 4 pair) ..................... S-70.2 ....................................... 59
- Multi-Pair Loop Lead-in Cable .................................................... S-70.3 ....................................... 60
- Light Rail Train (LRT) Track Area Detector Loop .................... S-70.4A .............................. 61-62

### Cabinets
- 337 Cabinet, Post-Top Mounted.................................................. S-75.9A .................................... 63
- Cabinet, Controller, Type M ........................................................ S-75.5.3 .................................... 64
- Type II Communication Cabinet & Foundation ......................... S-75.0C .................................... 65

### Pullboxes
- Pullbox, Types PB-2 & PB-3 ....................................................... S-78.5.1 .................................... 66
- Metal Cover Traffic Pull Box ...................................................... S-78.5.2 .................................... 67
- Special Cover for Pullbox ............................................................ S-78.8 ....................................... 68
- Fiber Optic Splice Box I .............................................................. S-79.02A .................................. 69
- Fiber Optic Splice Box II ............................................................. S-79.02B .................................. 70

### Foundations
- Foundation, Types F-1 & F-8 ...................................................... S-52.1 ....................................... 71
- Foundation, Type F-2 ................................................................ S-52.2 ....................................... 72
- Foundation, CIDH Type F-2 ........................................................ S-52.2.2 .................................... 73
- Foundation, Type F-7 ................................................................ S-52.7 ....................................... 74
- Adapter Base Plate (For F-1 to F-7 Foundation) ......................... S-52.7.1 .................................... 75
- Adapter Plate (For F-2 to F-1 Foundation) ................................. S-52.7.4 .................................... 76
- Base Casting (For Types 1, 1A, 8 & 9 Standards) ................. S-52.7.2 .................................... 77
- Foundation, Type F-12A .............................................................. S-52.1.2B ................................. 78
- Foundation, Type F-332 .............................................................. S-52.1.3 .................................... 79

### Service
- Overhead Service, DWP .............................................................. S-79.8 ....................................... 80
- Underground Service, DWP ...................................................... S-79.9 ....................................... 81
- Type II Service Distribution Cabinet ........................................... S-79.9A .................................... 82
- Service, Telephone, ATSAC 332 Cabinet ................................ S-79.3A .................................... 83

### Overhead Signs
- Sign Cantilever, 12 foot Arm..................................................... S-98.0 ....................................... 84
- Sign Cantilever, 22 foot Arm..................................................... S-92.3 ....................................... 85
- Sign Cantilever, 34 foot Arm..................................................... S-92.2 ....................................... 86-87
- Laminated Overhead Sign Mounting System ......................... S-45.0 ....................................... 88
- 14’ Cantilever Changeable Message Sign ................................ S-92.4 ....................................... 89-90
- Trailblazer Sign ........................................................................ S-58.16 ...................................... 91-92
Miscellaneous
Backplates ................................................................. S-77.8A ........................................... 93
Mast Arm Mounted Street Name Sign .......................... S-486.0 ........................................ 94-95
Mast Arm Street Name Sign Bracket Type 1 .............. S-457.0 ............................................ 96
No Left and No Right Turn Electric Sign ............... S-58.13 ............................................... 97-98
Use Tunnel, Electric Sign ..................................... S-58.14 ........................................... 99
R3-5 Electric Sign .................................................. S-58.17 ........................................ 100
Lane Usage Control Electric Sign .......................... S-58.18 ........................................... 101
R3-9a Electric Sign ............................................... S-58.19 ........................................ 102
Sign Enclosure ...................................................... S-58.21 ........................................ 103
Electric Train & Bus Warning Sign ...................... S-58.23 ........................................... 104
Transit Priority Unit Cabinet Detail ....................... S-70.3A .................................... 105-110
Pedestrian Barricade .............................................. S-454.2 ........................................ 111
INTRODUCTION

This document, Special Provisions and Standard Drawings for the Installation and Modification of Traffic Signals, governs the contractual construction activities related to traffic signals in the City of Los Angeles. Where no contract is applicable, but reference is made to “contractor”, said provisions apply to the City of Los Angeles Department of Transportation field forces. This edition supersedes all previous editions. This document supplements the Standard Specifications for Public Works Construction, or “Green book”, as adopted by the City of Los Angeles Board of Public Works and as modified by the corresponding issue of the “Brown Book.” Together, all of these documents govern all contractual construction activities.

All materials used in the installation and/or modification of traffic signal systems shall conform to the latest Material Specification of the City of Los Angeles Department of Transportation. The LADOT Material Specifications may be obtained from the Material Services Division, Department of Transportation, 100 South Main Street, 10th Floor, Los Angeles, California, 90012, telephone number (213) 928-9636.
PART I

SPECIAL PROVISIONS

A. GENERAL

1. DEFINITIONS

LABPW: City of Los Angeles Board of Public Works.
LADOT: City of Los Angeles Department of Transportation
MUTCD: Manual of Uniform Traffic Control Devices (California Supplement)
WATCH: Work Area Traffic Control Handbook

2. LADOT DISTRICT FIELD OPERATIONS YARD

The address and telephone numbers of the LADOT Field Operations Yards are listed below:

- Valley Yard: 14832 Raymer Street, Van Nuys; (818) 756-7845
- Central Yard: 1831 Pasadena Ave, Los Angeles; (213) 485-7689
- Western Yard: 2801 Exposition Blvd, Los Angeles; (213) 485-6818

3. PURCHASE OF THIS DOCUMENT

This document, Special Provisions and Standard Drawings for the Installation and Modification of Traffic Signals, may be purchased from the LADOT Records Section, 100 South Main Street, 10th Floor, Los Angeles, California, 90012, telephone number (213) 972-5060. This document can also be downloaded in PDF format from the LADOT web site at: http://www.ladot.lacity.org/tf_Development_Review.htm

The LADOT Signal Design Section maintains a list of the names of all users and individuals who previously purchased a copy of this manual for the purpose of notifying them of revisions. However, LADOT does not assume any responsibility for this notification.

4. MATERIAL

All materials used in the installation and/or modification of non-temporary signal systems shall be new and unused, unless otherwise specified on the plan and shall conform to the latest LADOT Material Specifications. Temporary signal standards and signal heads installed on these standards may be used, but shall be undamaged.
5. NOTIFICATION

The contractor shall notify LADOT Traffic Signal Inspector at Central Yard, (213) 485-1071, Valley Yard, (818) 756-7852, or Western Yard, (213) 485-6834, depending on the project location, three (3) working days prior to start of construction on any project involving work on traffic signals or signal systems. In case of emergency, the LADOT Traffic Signal Inspector may authorize requests for change orders. The signal inspector shall be notified for inspection approval of all underground substructures, including foundations, 24 hours prior to covering the work or pouring foundations.

Any work that will affect a major ATSAC communication facility (i.e. fiber optic cable, main communication trunk cable, communication hub site, etc.) as determined by the LADOT Traffic Signal Inspector, shall be prohibited between the hours of 6:00 A.M. to 9:00 A.M. and 3:00 P.M. to 7:00 P.M. on weekdays, except national holidays. If such work requires that ATSAC communication system be off line for five (5) or more working days during the hours permitted, the contractor shall provide temporary facilities in order to maintain operation of the ATSAC system. These temporary facilities may include, but are not limited to, overhead spans of fiber optic or communication cable, and any related equipment. Any work required to install and remove these temporary facilities shall be done at the contractor’s expense. Once said temporary facilities are in place, the contractor shall have thirty (30) working days in which to complete construction and to fully restore the ATSAC communication system.

Failure to notify the LADOT Traffic Signal Inspector prior to start of work will result in suspension of work. Delays in the complete restoration of the signal system may require the contractor to pay liquidated damages as specified in the contract or may require LADOT forces to complete the work which will be charged to the contractor and/or permittee.

Traffic control shall be in accordance with the LADOT Standard Plan S-488.0, the latest edition of the WATCH manual, MUTCD (California Supplement), associated worksite traffic control plans or any additional requirements called for on the plan or in the special provisions.

6. WORKSITE TRAFFIC CONTROL

The contractor shall install and maintain overhead cable or wires to maintain existing signal operation when installing new conduit runs across the street, replacing cable runs across the street, or installing or replacing signal standards, foundations or heads.

Regular traffic signal control (including interconnect) shall be maintained from 6:00 A.M. to 9:00 A.M. and 3:00 P.M. to 7:00 P.M. on weekdays, except national holidays. National holidays are New Year’s Day, President’s Day, Memorial Day, Independence Day, Labor Day, Veteran’s Day, Thanksgiving, and Christmas. Flashing, activation and deactivation of signals and interconnect may occur only between 9:00 A.M. and 3:00 P.M. and between 7:00 P.M. and 6:00 A.M. on weekdays, except national holidays, and shall be accomplished only by an LADOT traffic signal electrician. The LADOT traffic signal electrician may reschedule or cancel a scheduled signal deactivation in the event of unsafe working or weather conditions.

Arrangements to deactivate signals (signal shutdown) shall be made at least 24 hours in advance, Monday-Thursday at (213) 485-9161 before 9:00 A.M. on non-holiday weekdays. The LADOT project number as shown on the traffic signal plan must be given at this time. The contractor may be charged for electrical and traffic control work provided by LADOT.
7. CONTRACTOR REQUIREMENTS

All traffic signal and/or related electrical work shall be performed and inspected under the conditions of the most current, amended Board of Public Works “Enhanced Electrical Safety Policy”. The “Enhanced Electrical Safety Policy” is applicable for all work on traffic signals and/or related electrical work performed for LADOT regardless of contract cost.

The Contractor shall certify that all personnel employed in traffic signal and/or related work fully comply with the requirements of the “Enhanced Electrical Safety Policy”.

Failure to fully comply with the requirements of the “Enhanced Electrical Safety Policy” may result in a suspension of work and/or sanctions against the Contractor.

THE CONTRACTOR SHALL NOT WORK ON TRAFFIC SIGNAL CIRCUITS WHILE THEY ARE ENERGIZED

When a signal shutdown is approved by LADOT, it shall be two (2) hours maximum, unless approved for a longer period, and may occur only between the hours of 9A.M. to 3P.M. Monday-Thursday on non-holiday weekdays. The Traffic Signal Inspector may authorize work necessitating longer periods of time. Preliminary work associated with the signal shutdown shall be done prior to the actual shutdown in order to minimize the amount of time necessary for the completion of the work. Sufficient staffing and equipment shall be employed by the contractor to minimize the shutdown period. Once a shutdown is affected, all work shall be diligently pursued without interruption until the signals are back in normal operation.

8. TRAFFIC CONTROL SIGNING

Any traffic control signing damaged or lost by the contractor shall be replaced at the contractor's expense. Arrangements for obtaining replacement signing (with subsequent billing) shall be made with the LADOT Bureau of Accounting, General Accounting Division, at (213) 972-5908. Prior to the completion of construction, the contractor shall permanently mount all traffic control signing per LADOT standards.

Five (5) working days prior to any traffic signal pole removal, the appropriate yard Superintendent shall be notified for the removal and reinstallation of pole and mast arm mounted street name signs. The address and phone numbers of the LADOT Field Operations Yards are shown in Section 2.

9. LADOT SUPPLIED MATERIAL

Arrangements for obtaining materials, except traffic signal controller assemblies, to be supplied by LADOT as indicated on traffic signal design plans, shall be made ten (10) working days in advance by contacting the LADOT Field Operations Division at (213) 928-9620.

10. CONTROLLER TESTING

All traffic signal controller assemblies being furnished and installed by the contractor must be tested by LADOT. The completely assembled controller with cabinet and auxiliary equipment shall be delivered to the LADOT Traffic Signal Shop at Piper Technical Center, 555 Ramirez
Street, Los Angeles, California, 90012, telephone number (213) 847-2944, at least thirty (30) working days prior to desired pick-up date. The traffic signal program for the Model 2070 controller will be supplied and installed by LADOT. Upon successful completion of the testing, the contractor shall pick up the traffic signal controller assemblies within fifteen (15) working days after notification for installation at the job site.

11. SALVAGE EQUIPMENT

All arrangements for traffic signal equipment specified to be returned to LADOT shall be made five (5) working days prior to the desired delivery date. Return materials to the following locations:

a. Traffic Signal Heads  
   LADOT Western Yard  
   2801 Exposition Blvd, Los Angeles, California, 90018  
   Telephone: (213) 485-6818

b. Mast Arms, Standards and other large poles  
   LADOT Valley Yard  
   14832 Raymer St, Van Nuys, California, 91405  
   Telephone: (818) 756-7845

c. Controller Cabinets  
   LADOT Equipment Repair Shop  
   447 Ducommun St, Los Angeles, California, 90012  
   Telephone: (213) 847-2944

Controller cabinets shall become the property of the contractor, unless indicated otherwise on the project plans or by the LADOT Traffic Signal Inspector. The model 170 or 2070 controller units and model 210 or 2010 conflict monitor remain the property of LADOT, and will be removed from the controller cabinet by the LADOT Traffic Signal Inspector.

The contractor shall exercise due care in the removal of traffic signal equipment, including signs and sign posts, that have been specified to be reused or salvaged, so that the equipment will remain in the same condition as that prior to removal. The contractor will be required to replace any traffic signal equipment that was damaged or destroyed while in the contractor's care. The contractor shall be responsible for cleaning traffic signal equipment prior to delivery.
B. CONSTRUCTION PRACTICES

1. PULLBOXES

The tops of pullboxes installed in the sidewalk areas shall be flush with the surrounding grade or the top of the adjacent curb. Where practical, pullboxes adjacent to standards shall be placed with a clearance of three (3) feet from the side of foundations. Pullboxes shall not be placed in curb ramp areas or driveways. Pullboxes shall be located beyond the door opening paths of traffic signal controllers. Unless physically impractical, pullboxes shall be installed at least six (6) inches from any substructure or back of curb. This is to allow for rock under and cement around the pullbox.

Type PB-3 pullboxes shall be used for all:
   a. Interconnect runs (telephone and/or fiber optic cables)
   b. Power service conduits
   c. Controllers
   d. Junctions with four or more conduits
   e. Junctions with three conduits, two of which are three-inch in diameter
   f. All street crossings

Type PB-2 pullboxes shall be installed at all other locations, unless otherwise noted on the plans.

The service pullbox shall be separated from the intersection wiring whenever possible.

For fiber optic runs, the spacing between the pullboxes shall be at intervals not to exceed 600 feet. For all other runs, pullboxes shall be spaced at intervals not to exceed 300 feet.

Existing pullboxes are considered to be an integral part of the surrounding concrete sidewalk. Where the surrounding sidewalk surface is composed of a special material, pullboxes with covers of compatible material shall be used to obtain a homogeneous appearance of the sidewalk area. The contractor shall be required to replace the pullboxes when modifying or replacing the surrounding concrete. Replacement of pullboxes shall be made per LADOT Standard Drawing S-78.5.1 or S-78.8. Under no circumstances is any pullbox to be reused or modified for reuse.

2. CONDUIT

   a. Material

Rigid non-metallic conduits conforming to the requirements in UL Publication 651 for Rigid Non-metallic Conduit (PVC Schedule 80) shall be used, except where galvanized rigid steel conduit is required or permitted.

Galvanized rigid steel conduit shall be used where specified in this manual, where shown on the plans, or where jacking is required.

Galvanized rigid steel conduit is permitted where exposed above ground as a permanent installation or where authorized by the LADOT Traffic Signal Inspector. A separate #8 ground wire and a Kevlar High Strength Conduit Measuring Tape, Greenlee catalog number 39243, 39244, 39245 (or equivalent), shall be included within the PVC conduits at the time of installation. For the galvanized steel conduit a
¼-inch diameter polyethylene pull rope shall be included. All the ground wires shall be spliced together and connected to the ground rod.

b. **Trenching**

PVC conduit shall be installed in open soil trenches and in pavement trenches whose edges have been saw cut, except in the vicinity of pullboxes where it may be bored in pre-drilled, augured or air-blown holes. Generally, trenches should be four inches wide. Where trenching occurs within Portland Cement Concrete, a 24-inch wide section of roadbed whose edges have been saw cut shall be removed.

Trenching is not permitted through Portland Cement Concrete structures, such as bus pads, spandrels and cross gutters. Where these are encountered, jacking with galvanized rigid steel conduit, or boring with PVC conduit is required.

Traffic signal conduits shall be separated from street lighting conduits. New conduit runs shall be of the same size and material throughout the run. Empty PVC conduit (conduit only) shall include a #8 green ground wire and a Kevlar High Strength Conduit Measuring Tape, Greenlee catalog number 39243, 39244, 39245 (or equivalent). Empty galvanized rigid steel conduit (conduit only) shall include a ¼-inch diameter polyethylene pull rope. Existing underground conduit being incorporated into a new system shall be cleaned with a mandrel or cylindrical wire brush and blown out with compressed air.

c. **Installation in Roadways**

Interconnect, fiber optic, system and bus detector loop conduits shall be installed at a consistent depth throughout a block with minimum cover of 18 inches (below the established edge of the gutters) on Major and Secondary highways, and 15 inches on all other streets or alleys, unless otherwise specified on the Plans.

Conduits containing traffic signal load wires (115 volts) shall be installed at a consistent depth, with the minimum and maximum depths as per Section 307-2.5 of the Standard Specifications for Public Works Construction. All street crossings shall be installed at 30-inch depth.

Conduit trenches approximately four (4) inches wide may be excavated at locations shown on the Plans using earth saw methods. The preferred alignment is along the outer edge of an existing gutter.

Where there is no gutter, the trench shall be at a distance of 36 inches from the existing or future curb face (which will accommodate the construction of a 24-inch wide gutter in the future), or as shown on the Plans. Removal and replacement of all pavement between the trench and the edge of the existing pavement shall be done at the discretion of the Engineer.

On Major or Secondary highways, the asphalt concrete pavement resurfacing shall conform to the Standard Specifications for Public Works Construction.
On all other asphalt concrete streets or alleys, the upper three inches of trench shall be completed with material matching the existing pavement. Major and Secondary Highways are shown on the Streets and Highways Designation map.

Portland Cement Concrete (PCC) roadway resurfacing shall be a minimum of six (6) inches thick and twenty-four (24) inches wide for all classifications of roadway.

Concrete pavement serving as bus pads, spandrels, cross gutters or local depressions shall not be cut. In addition, concrete curbs and gutters (regardless of gutter width) shall not be cut. At these locations, the conduit shall be bored or jacked.

It is desirable to maintain a straight alignment. Routing of a conduit at a bus pad or at any other protrusions beyond the gutter edge must be approved by the Engineer. It should be noted that some installations might require locations in back of the curb. Locations where conduits are within one foot vertically and two feet horizontally from, or otherwise in conflict with, existing utilities will not be permitted.

d. Backfill

Backfill may be Portland Cement Concrete (PCC) when required by the Engineer, or a one-sack sand-Portland Cement slurry mix. Portland Cement Concrete backfill shall be a 520-C-2500 mix with a 4-inch maximum slump. For PCC, calcium chloride must be added up to the maximum amount allowed by Section 201-1.2.4 of the Standard Specifications.

e. Installation in Parkways

All conduit installations in parkways shall have a minimum cover of 16 inches below surface (LAMC Sec. 62.04). If directional bore is permitted by the Engineer, conduit depth shall have a minimum cover of 22 inches below surface.

All existing improvements in parkways, including landscaping and sprinklers, shall be protected from damage or restored to pre-construction condition.

f. Size

All cross street conduit runs and all interconnect conduit runs between intersections, except for fiber optic interconnect runs, shall be three-inch in diameter. All fiber optic interconnect runs shall be two-inch in diameter. Three-inch conduit shall be used between an F-8 foundation and the adjacent PB-3 pullbox. Two three-inch conduits are required between an F-332 foundation and the adjacent PB-3 pullbox. One-inch conduit shall be used between an F-7 foundation and the adjacent pullbox. All other new conduit runs shall be two-inch in diameter, unless otherwise specified on the plan.

When existing conduit runs are to be modified or extended, the material and size of the new conduit shall be the same as the existing conduit.
3. BACKFILLING

a. **Schedule**

All excavations for the installation of foundations, conduits and pullboxes, and removal of old systems, shall be backfilled, compacted and restored to match adjacent areas and excess material removed from the job site within the calendar days prescribed in the following Table I. The number of days allowed commences with the start of excavation unless otherwise permitted by the Engineer. All trenching activity, commenced each day, shall be fully backfilled to the finished surface grade at the end of the day; final resurfacing shall be completed within five (5) working days. All streets and all trenches shall be maintained in safe condition until final resurfacing.

b. **Foundation Holes**

A one-sack slurry mix shall be used to backfill foundation holes created as a result of removing the existing foundations. If the area excavated for a new foundation is deemed to have unstable soil as determined by the Engineer, then the area excavated shall be backfilled with one sack slurry mix, 24 hrs prior to re-excavation for the new foundation. Where the new foundation is within three (3) feet of the existing foundation, the removal and backfill of the existing foundation shall occur prior to the installation of the new foundation.

c. **Trenches** - See Section B.2, Conduit
### TABLE I

**BACKFILLING, RESTORATION OF EXCAVATIONS AND REMOVAL OF EQUIPMENT AND MATERIAL**

<table>
<thead>
<tr>
<th></th>
<th>Backfilled &amp; Compacted or covered</th>
<th>Excess Equipment &amp;/or Material removed from job site</th>
<th>Permanent Resurfacing</th>
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<td>1. Parkway: Pilot Holes and Jacking Pits (1) (2)</td>
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<td>3 days</td>
<td>7 days</td>
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<td>2. Roadway Excavations (1)(2)(3)</td>
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<tr>
<td>3. Existing Foundation and Pullbox Removals</td>
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<td>4. Existing Standard (poles) and misc. equipment</td>
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<tr>
<td>5. New Foundation Installations</td>
<td>Daily</td>
<td>Daily</td>
<td>7 days</td>
</tr>
<tr>
<td>6. New Pullboxes: Excavation and Placement</td>
<td>3 days</td>
<td>5 days</td>
<td>7 days</td>
</tr>
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</table>

(1) Excavation for jacking pits and excavations within roadways shall be backfilled and compacted in accordance with Subsection 301-1.3 of the Standard Specifications for Public Works Construction.

(2) Approved protective plates/covers shall be placed immediately at the end of each day until excavations are no longer needed.

(3) Temporary asphalt concrete (cold mix) shall be placed immediately after the backfill is compacted in accordance with subsection 306-1.5.1 of the Standard Specifications for Public Works Construction.
The previous requirements do not relieve the Contractor of his/her obligation to properly place warning signs and barricades as well as maintain the job site in accordance with Subsections 7-9 and 7-10 of the Standard Specifications for Public Works Construction and the Work Area Traffic Control Handbook (WATCH) manual.

If the times specified in Table I are exceeded, the Contractor (as directed by the Engineer) shall stop all other work until the restoration work is brought into compliance. Contact time will continue to be charged during such periods.

Where field conditions are such that these Special Provision are conflicting, the Engineer shall be notified immediately.

Where excavations occur in the sidewalks or other pedestrian ways, the Contractor shall provide a safe and orderly pedestrian passage around the excavation area. The pedestrian passage shall not subject pedestrians to hazards from traffic or construction operations, or cause pedestrians to walk upon unsuitable or hazardous surfaces.

4. CONDUCTORS AND CABLE

a. Material

All permanent conductors shall be run inside conduits or standards. Multi-conductor cable shall be used for all circuits in lieu of individual conductors. The multi-conductor cable shall conform to the latest revision of the following LADOT Specifications:

- 92-089-01 (28 conductor cable)
- 92-091-01 (13 conductor cable)
- 92-090-01 (9 conductor cable)
- 92-094-01 (5 conductor cable)

Conductors shall be solid copper wire of the gauge shown on the plans, unless otherwise specified.

Whenever new conductors are to be installed in a conduit with existing individual conductors (service wires excepted), all individual conductors shall be removed and replaced with multi-conductor cable. 28-conductor cable shall be installed in all new street crossings unless otherwise specified on the plans.

All temporary overhead circuit runs shall be multi-conductor cable. Where exposed over the roadway, they shall be at least 20 feet above ground. Over the sidewalk and roadside areas not open to vehicular traffic, they shall be at least 12 feet above ground.

Service conductors shall have black and white insulation.
b. Identification

Each communication cable shall be identified in all communication cabinets and splice vaults by a plastic tag 1-inch by 4-inch in size, with the cable run identification characters in ½-inch letters and secured to the cable with two nylon tie-wrap devices.

Each cable shall be identified in all controller cabinets by a plastic tag ½-inch by 2-inch in size, stamped with the cable run identification characters in ¼-inch letters and secured to the cable with two nylon tie-wrap devices.

Each conductor shall have clear, distinctive and permanent bands for identification. These identification bands shall be used even though the conductors have clear markings within their insulation. Bands shall conform to the latest edition of Standard Specifications for Public Works Construction. These permanent identification bands shall be marked as specified. All conductors shall be labeled within each affected pullbox.

c. Interconnect

1) **Direct Wire:** Interconnect cable with 7 - #14 wires per LADOT Specification 92-039-03 (latest revision) shall be continuous from controller to controller, unless splices are specifically authorized by the LADOT Traffic Signal Inspector. Where splices are authorized by the LADOT Traffic Signal Inspector, they shall be soldered and shall be secured using vinyl, water-tight, spring tensioned, silicone filled, direct burial wire connectors, as described in LADOT Specification 56-002-03 (latest revision).

2) **Multi-Pair Interconnect Cable:** Filled telephone type cable shall consist of paired #22 AWG solid annealed copper conductors. The cable shall be polyethylene insulated and aluminum shielded, conforming to the construction requirements and environmental, mechanical, and electrical tests of LADOT Specification 92-069-01 (latest revision) for filled telephone cable. The cable sizes shall be 6, 12, 25, 50, and 75 pair. Cable splices shall only be made at a communication cabinet, splice vault or controller. Punch down the “IN” cable on the left side of the T-66 block and the “OUT” cable(s) on the right side of the T-66 block.

3) **Telephone and Fire Alarm:** Interconnect cable using telephone lines or former fire alarm lines shall be #14 AWG stranded twisted pair copper wire having 600-volt insulation and overall shield and jacket.

d. Inductive Loops Detector

Inductive loop detectors shall be installed as per LADOT Standard Drawing S-70.1A or as otherwise approved by LADOT. To the greatest extent practical, loops should be installed in one continuous medium. Loop wire shall conform to LADOT Specification 92-093-01 (latest revision). All detector lead-in cable connections and terminations shall be soldered.
1) **Wire Splicing:** Where circuits are to be spliced, each splice shall be crimped and soldered with rosin core (no acid core or acid paste shall be used) then sealed with vinyl, watertight, spring tensioned, silicone filled, direct burial wire connector per LADOT Specification 56-002-03 (latest revision).

2) **Loop Detector Wire Routing System:** Unless otherwise specified, all detector loops shall be wound in a clockwise direction. The input (or start) wire shall be tagged with an odd number, the output (or finish) wire with the next higher number. A plastic tag ½-inch by 2-inch shall be tie wrapped around each loop pair to identify each pair by phase and numbers of individual conductors.

3) **Sealant:** The loop wires shall be covered and sealed using Caltrans approved “Hot-Melt Rubberized Asphalt Sealant” for loop installation. Note: “Hot-Melt Crack Sealant” shall not be used in place of the above.

4) **Transit Bus or Photo Red-Light Detector Wire:** All Transit Bus or Photo Red-Light loop wire shall conform to IMSA Specification 51-7.

e. **Conductor Splicing and Termination**

1) **Connectors**
   All spliced solid field conductors shall be twisted together and secured using vinyl, water-tight, spring tensioned, silicone filled, direct burial wire connectors, as described in LADOT Specification 56-002-03 (latest revision). At least 36 inches of surplus signal cable shall be neatly coiled in a clockwise direction within each pullbox. Of these 36 inches of cable, only 24 inches of outer jacket shall be removed. The remaining 12 inches of cable shall remain enclosed within the outer jacket for future emergency repair needs. Care shall be used in removing the outer cable jacket to ensure that the individual conductor insulation is not cut or nicked. Failure to protect the individual conductor insulation shall result in the replacement of the damaged cable at contractor’s expense.

2) **Multi-Conductor Signal Cables in the Controller Pullbox**
   The installation of new multi-conductor cable(s) into and through the controller pullbox shall be spliced together as referenced in paragraph 1) and not looped through, except for:
   a) Service wires
   b) Communication cables
   c) Loop detector lead-in cables
   d) Railroad preemption cables or wires
   e) Telephone interconnect cables
   f) Video cables or conductors

3) All stranded wires shall be terminated with an LADOT approved terminal connector and properly compressed for minimum resistance at the attachment.
4) Where optimum operation of circuits requires minimum resistance, as determined by the LADOT Traffic Signal Inspector, the connections and terminals shall be soldered.

f. Inductive Loop Detector Lead-in Cable

All inductive loop detector lead-in cable from the pullbox to the controller cabinet shall have two-, three- or four-pair conductors and shall conform to Standard Drawing S-70.2 and LADOT Specification 92-082-03 (latest revision). A maximum of 12” of outer jacket shall be removed.

g. Transit Bus or Photo Red-Light Detector Lead-in Cable

All Transit Bus or Photo Red-Light detector lead-in cable from the pullbox to the controller cabinet shall be one pair cable and conform to IMSA Specification 50-2.

h. Conductors Attached to Controller Field Terminals

Each controller field terminal shall have a maximum of one wire connected. If the intersection wiring plan requires more than the single wire to accomplish the correct operation, splicing the conductors in the controller pullbox shall be used.

1) Compression terminal connectors shall not be used when connecting solid wires to controller terminals.
2) Compression terminal connectors shall be used when connecting stranded wires to controller terminals, and shall be soldered.

i. Field Testing

Prior to start of functional testing, the Contractor shall perform the following tests on all circuits, in the presence of the DOT Inspector and/or Engineer.

1) **Continuity:** Each circuit shall be tested for continuity. When 120V AC is used to conduct a “dynamic, non-destructive” test of the circuit(s), then suitable circuit protection shall be used. Suitable circuit protection shall be in the form of a low amperage fuse or circuit breaker with a design curve that reacts fast enough to trip and protect the circuit under test without interrupting any of the cabinet circuit breakers.

2) **Ground:** Each circuit shall be tested for grounds.

3) **Insulation Resistance:** An insulation resistance test at 500 Volts DC shall be made on each circuit between the circuit and a ground. The insulation resistance shall not be less than 10 Megohms on all circuits, except for inductive loop detector circuits, which shall have an insulation resistance value of not less than 100 Megohms.
5. FIBER OPTIC CABLE

a. General

1) **Description:** Fiber Optic Trunk Cable shall be of loose-tube construction. The optical fibers shall be single mode optical glass or as specified by the Engineer. The fiber optic cable shall conform to ICEA S-87-640.

2) **Performance:** The optical performance of each single-mode fiber measured at wave lengths of both 1310 nanometers and 1550 nanometers shall have maximum attenuation of 0.4 decibels per kilometer at 1310 nanometers and 0.3 decibels per kilometer at 1550 nanometers and shall conform to TIA/EIA 49Z C4AA.

3) **Construction:** The cable shall be constructed using five or six gel-filled, color-coded buffer tubes stranded (reverse oscillation) around a dielectric central member. The color-coded fibers shall be contained in the buffer tubes and the remaining fillers shall be natural or white in color. A layer of aramid yarn (e.g. Kevlar) shall hold the tubes in position around the central member and provide tensile strength. The color code for the fibers shall be blue, orange, green brown, slate and white. Water blocking shall be of the dry-tape type within the interstitial spaces, and gel within the buffer tubes.

4) **Jacket:** The filled cable core shall be covered with a black, medium density polyethylene jacket. This outer jacket shall be abrasion and crack resistant, non-nutrient to fungus, electronically non-conductive and compatible with all cable components to which it may come in contact. The jacket shall be free from holes, splits, blisters or other imperfections.

5) **End Termination Cable:** Shall be of the tight-buffered type and shall contain two single-mode fibers protected by a yellow jacket and aramid yarn (e.g. Kevlar) strength member. The length of a typical end termination cable shall not exceed 100 feet. Connectors for end termination cables shall be ST unless otherwise specified by the Engineer.

6) **Identification:** Each length of cable shall be permanently identified by specifying the manufacturer and type of cable at intervals not greater than six feet along the outside of the outer jacket. Each length of cable shall be permanently marked with foot (or meter) markings at intervals not greater than three feet (or one meter).

7) **Reels:** The cable shall be wound on standard reels in a manner which provides access to both ends of the cable for testing while the cable is still on the reel.

8) **Installation:** Cable installation and handling procedures shall be in accordance with accepted industry standards and/or manufacturer’s recommendations and shall be performed by adequately trained and certified
personnel. In all type 3 pullboxes, there shall be 10 feet minimum of extra looped cable for each cable entering or leaving the box.

b. **Splicing of Fiber Optic Cable**

Splicing of the Fiber Optic Cable shall be done by the fusion technique. All cables shall be carefully prepared and spliced in accordance with the cable manufacturer’s recommendations. Either heat shrinkable tubing shall protect the finished splices, metal protective sleeves or by some other method approved by the Engineer. All splices must be tested and documented after encasement. No splice shall exceed a 0.05 decibel loss.

The completed splices shall be enclosed in re-enterable splice enclosures that seal to form moisture resistant protection. The splice case or enclosure shall contain a removable splice organizer or crib that shall secure the individual fibers and protect the splices. The splice organizer shall be attached to the strength members in the fiber optic cable. There shall be adequate space inside the enclosure to hold at least three feet of buffer tubes from each cable. There shall be no splices except as authorized by the LADOT Traffic Signal Inspector. Splice enclosures shall be Corning 6C22-02 (or equivalent) unless otherwise authorized by the LADOT Traffic Signal Inspector. Fiber optic interconnect cables may only be spliced at special fiber optics splice boxes as shown on the plans. Video fiber optic cable shall be spliced in double-deep, type 3 pullboxes.

6. **CONTROLLER**

The contractor-supplied controllers shall conform to the latest LADOT material specification and addendum for the Model 2070 controller assembly, with either Type 332 or 337 cabinet as shown on the traffic signal plan, and all auxiliary equipment required to provide a complete functioning controller per LADOT Specifications 054-053-07 (latest revision).

7. **GROUND RODS**

Copper ground rods shall be installed in all controller foundations and all service pullboxes. For a post-top mounted controller cabinet on existing or new F-8 foundation, an 8-foot by ½-inch diameter ground rod shall be installed in the controller pullbox. For a Type 332 cabinet on F-332 foundation, an 8-foot by ½-inch diameter ground rod shall be installed in the foundation. For a Type M communication cabinet on F-12A foundation, an 8-foot by ½-inch diameter ground rod shall be installed in the foundation. A green #8 AWG copper wire shall be connected from the cabinet chassis ground terminal to the ground rod in the foundation or controller pullbox.
8. SERVICE

a. Service conductors shall be continuous without splices from the service pullbox to the controller service connection.

b. A voltage measurement shall be made between the service hot and neutral terminals before the main circuit breaker in the controller assembly.

   **IF THE VOLTAGE IS LESS THAN 110 VOLTS AC NOTIFY THE LADOT TRAFFIC SIGNAL INSPECTOR.**

c. A resistance measurement shall be made between the service neutral terminal and the chassis ground terminal.

   **IF THE RESISTANCE IS MORE THAN 4.0 OHMS NOTIFY THE LADOT TRAFFIC SIGNAL INSPECTOR.**

9. SIGNAL HEADS

a. **Vehicle and Pedestrian Signal Heads Covers**
   Shall conform to LADOT Specification 92-086-03 (latest revision).

b. **Vehicle Heads**
   1) Each signal section housing shall conform to LADOT Specification 92-061-06 (latest revision) for Vehicle Signal Heads, 8-inch and 12-inch glass filled polycarbonate.
   2) A minimum of two vehicle heads for each and every phase shall be in operation while work is being performed at the intersection. Non-functioning vehicle heads shall be covered or turned away from the intersection.

c. **Pedestrian Heads**
   1) Each pedestrian signal housing shall conform to LADOT Specification 92-064-06 (latest revision) for Pedestrian Signal Heads, glass filled polycarbonate.
   2) One visible operating pedestrian head shall be provided at all times for each direction of each signalized crosswalk while work is being performed at the intersection. Non-functioning pedestrian heads at a signalized crosswalk shall be covered or turned away from the intersection.

d. **Traffic Signal Visors** – All vehicle signal indications shall be provided with removable visors per LADOT Specification 92-061-06 (latest revision). If beveled or long visors are specified on the traffic signal plans, they shall conform to Standard Drawings S-76.3, S-76.6 or S-76.7.

e. **Light Emitting Diode (LED) Signal Modules** – All new traffic signal modules shall be LED, and shall conform to LADOT Specification 92-088-06 (latest revision).
10. DETECTORS

The contractor shall replace and restore operation of any damaged detectors (inductive loop, video or other type) within two (2) working days after the completion of construction on the portion of the roadway where the detectors were damaged.

Devices other than those identified in the LADOT Specification 54-055-01 (latest revision), must be submitted for test, evaluation, and approval to the LADOT Traffic Signal Lab Research and Development Section, at least 90 days prior to expected date of activation. Contact the Signal Repair Section Supervisor at (213) 847-2943 for specifications applicable to the device being submitted.

11. LINES AND GRADES

a) All new or relocated traffic signal work shall be located as per the design plans and engineering specifications.

b) Any reference to curb line on the plans or in the engineering specifications shall be made once the permanent curb and gutter is installed, prior to excavating any new foundations that are called for on the plans.

c) Contractor shall assume all responsibility for accuracy of foundation installation, including removal of foundations installed at unacceptable elevations and restoration of the soil prior to reinstallation of proposed foundation, at their own expense.

12. ANCHOR BOLT HEIGHT

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<tr>
<td></td>
<td>OLD Green</td>
<td>Brown</td>
<td>Purple / Purple</td>
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<tr>
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<td>Signal Common</td>
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28-Conductor Cable Color Code Identification
Traffic Signal Symbols

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<th>EXISTING</th>
<th>EXISTING TO BE REMOVED</th>
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<tbody>
<tr>
<td>8&quot;</td>
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<td>SIGNAL HEAD, THREE 8&quot; (200 MM) SECTION HEADS (Footnote A)</td>
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<tr>
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<td>SIGNAL HEAD, THREE 12&quot; (300 MM) SECTIONS (Footnote A)</td>
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<td>SIGNAL HEAD WITH BEVELED VISOR (LEFT BEVEL SHOWN) (Footnote A)</td>
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<td>SIGNAL STANDARD</td>
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<td>SIGNAL HEAD, THREE 8&quot; (200 MM) SECTIONS WITH LONG VISOR (Footnote A)</td>
</tr>
<tr>
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<td>SIGNAL HEAD, FOUR SECTIONS - THREE 8&quot; SECTIONS (R, Y, G) + 12&quot; GREEN ARROW (Footnotes A &amp; B)</td>
</tr>
<tr>
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<td>SIGNAL HEAD, FOUR SECTIONS - THREE 12&quot; SECTIONS (R, Y, G) + 12&quot; GREEN ARROW (Footnotes A &amp; B)</td>
</tr>
<tr>
<td></td>
<td>8&quot;</td>
<td>SIGNAL HEAD, THREE SECTIONS - TWO 8&quot; SECTIONS (R, Y) + 12&quot; GREEN UP ARROW (Footnote A)</td>
</tr>
<tr>
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<td>SIGNAL HEAD, THREE SECTIONS - ONE 12&quot; SECTION (R) + 12&quot; YELLOW AND GREEN ARROWS (Footnotes A &amp; B)</td>
</tr>
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<td>SIGNAL HEAD, THREE SECTIONS - 12&quot; RED, YELLOW AND GREEN ARROWS (Footnotes A &amp; B)</td>
</tr>
<tr>
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<td>SIGNAL HEAD, FIVE SECTIONS - THREE 8&quot; SECTIONS (R, Y, G) + 12&quot; YELLOW &amp; GREEN ARROWS (Footnotes A &amp; B)</td>
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<td>SIGNAL HEAD, FIVE SECTIONS - THREE 12&quot; SECTIONS (R, Y, G) + 12&quot; YELLOW AND GREEN ARROWS - CLUSTER HEAD IF ON MAST ARM FOR LEFT TURN PHASE (Footnotes A &amp; B)</td>
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<tr>
<td>PV</td>
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<td>SIGNAL HEAD, THREE 12&quot; PROGRAMMED VISIBILITY SECTIONS (R, Y, G) (Footnote A)</td>
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<td>LOUVERED SIGNAL INDICATIONS (8&quot; OR 12&quot;), (FOOTNOTES A,F)</td>
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**Traffic Signal Symbols**

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION

Approved: 6-28-08
Drawing No.: S-50.1

for Rita L. Robinson, General Manager
PROPOSED

EXISTING

EXISTING TO BE REMOVED

SIGNAL HEAD, THREE 8" SECTIONS—STEADY RED, FOLLOWED BY FLASHING RED, FOLLOWED BY STEADY YELLOW (Footnote A)

LIGHT RAIL SIGNAL, PER PLAN DETAILS

STANDARD WITH MAST ARM AND WITHOUT LUMINAIRE (Footnotes A & C)

STANDARD WITH MAST ARM AND LUMINAIRE (Footnotes A & C)

CD954 STANDARD WITH MAST ARM AND WITHOUT LUMINAIRE; PLATFORM MOUNTED (TEMPORARY SIGNAL) (Footnotes A & C)

CD954 STANDARD WITH MAST ARM AND LUMINAIRE; PLATFORM MOUNTED (TEMPORARY SIGNAL) (Footnotes A & C)

TYPE 1 STANDARD, PLATFORM MOUNTED (TEMPORARY SIGNAL)

ELECTROLIER, PENDANT TYPE

ELECTROLIER, UPRIGHT TYPE

OVERHEAD CABLE

FIBER OPTIC CABLE

SIGNAL CONDUCTORS

FIBER SPLICE VAULT

PEDESTRIAN SIGNAL

PEDESTRIAN PUSHBUTTON

EQUESTRIAN PUSHBUTTON (MOUNTING HEIGHT PER PLAN)

BICYCLIST PUSHBUTTON

APS — INDICATES DEVICE WITH ACCESSIBLE PEDESTRIAN SIGNAL FEATURES
### FOOTNOTES:

A. WITH BACKPLATES
B. SYMBOL SHALL DESIGNATE EITHER RIGHT OR LEFT ARROW(S)
C. MAST ARM LENGTH SHALL BE 15', UNLESS OTHERWISE NOTED
D. ALL SIGNAL HEADS SHOWN WITH SIGNAL STANDARD.
E. PEDESTRIAN SIGNAL AND PUSH BUTTONS SHOWN WITH STANDARD.
F. FOR SPECIAL APPLICATIONS ONLY.

### PROPOSED

<table>
<thead>
<tr>
<th>C.B.</th>
<th>c.b.</th>
<th>c.b.</th>
<th>CATCH BASIN</th>
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<tr>
<td>M</td>
<td>☢</td>
<td>☢</td>
<td>MANHOLE</td>
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<tr>
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<td>☑</td>
<td>☑</td>
<td>FLASHING BEACON</td>
</tr>
<tr>
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<td>INDUCTIVE LOOP DETECTOR -6-FOOT DIAMETER</td>
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<td>BICYCLE LOOP DETECTOR PER LADOT STD. DWG. NO. S-70.1D</td>
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<td>INDUCTIVE LOOP DETECTOR (SIZE NOTED PER PLAN)</td>
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<td>MR</td>
<td>MR</td>
<td>MR</td>
<td>OVERHEAD DETECTOR</td>
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<tr>
<td>V.</td>
<td>V.</td>
<td>V.</td>
<td>MICROWAVE/RADAR (MR), VIDEO (V.), OPTICAL (O.)</td>
</tr>
<tr>
<td>O.</td>
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<td>INFRARED (I)</td>
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<td>☑</td>
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<td>☑</td>
<td>VIDEO CAMERA</td>
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<td>PHOTO ENFORCEMENT CAMERA</td>
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<td>SPREAD SPECTRUM RADIO UNIT</td>
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<td>IN ROADWAY LIGHTING</td>
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### EXISTING

### EXISTING TO BE REMOVED
Typical 1-Way Head Mounting

Typical Street Name Sign Installation

Typical Pedestrian Head mounting

 Shaft—Type 1

Base

Foundation Type-1

1"x25"x4"—Anchor Bolts, 4 Required

14" Min.

TYPICAL MOUNTING OF TYPE 1 STANDARD

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
Donald R. Howery, General Manager

Title

Drawn By FD 12-18-81
Checked By RO 12-29-81
Supervised By JF 12-29-81
Reviewed By JAC 12-30-81

Updated RO JF JAC 09-15-82

Approved Jan. 25, 1982

Donald R. Howery
General Manager

DRAWING NO. S-51.1.2A
NOTES:

1. MATERIAL: NEW 4" SCHEDULE 40 STEEL PIPE PER ASTM SPEC. A-120.

2. FINISH: HOT DIP GALVANIZE PER ASTM SPEC. A-120.

3. BOTH ENDS OF SHAFT MUST BE REAMED TO REMOVE ALL BURRS.

4. THREADS SHALL BE CLEAN AND WILL PERMIT HAND-TIGHT ENGAGEMENT OF A STANDARD PIPE FITTING OF 8 THREADS.

5. THREADS SHALL BE COATED WITH A GALVANIZER PAINT AND FURNISHED WITH DISPOSABLE PROTECTORS.
Notes:
2. Finish: Hot dip galvanize after fabrication per ASTM spec. A-120

Base Detail

Section A-A

No. 7 Drill, 1/4-20 Tap, 2 Holes

1 1/8" Drill

Hole Detail

4 3/4" X 3/4"

Foundation, Type F-7

Notes:
2. Finish: Hot dip galvanize after fabrication per ASTM spec. A-120

4 1/2" Bolt Circle

Cut hole to fit post

3/8" Drill, 4 Holes

1/2" R

Anchor Bolts 1/2" X 10 1/2" X 1 1/2" (4 required)
Door openings on Type 337 PTM cabinet

Typical cabinet installation (Type 337 post-top mounted cabinet)

Note: Type 337 PTM cabinet to be mounted with doors perpendicular to curb and doors swing towards curb. See detail upper left.

Curb Face

Detail

Typical cabinet installation (Type 337 post-top mounted cabinet)

Note: Type 337 PTM cabinet to be mounted with doors perpendicular to curb and doors swing towards curb. See detail upper left.

Curb Face

Detail

Typical cabinet installation (Type 337 post-top mounted cabinet)

Note: Type 337 PTM cabinet to be mounted with doors perpendicular to curb and doors swing towards curb. See detail upper left.

Curb Face

Detail

Typical cabinet installation (Type 337 post-top mounted cabinet)

Note: Type 337 PTM cabinet to be mounted with doors perpendicular to curb and doors swing towards curb. See detail upper left.

Curb Face

Detail

Typical cabinet installation (Type 337 post-top mounted cabinet)

Note: Type 337 PTM cabinet to be mounted with doors perpendicular to curb and doors swing towards curb. See detail upper left.

Curb Face

Detail

Typical cabinet installation (Type 337 post-top mounted cabinet)

Note: Type 337 PTM cabinet to be mounted with doors perpendicular to curb and doors swing towards curb. See detail upper left.

Curb Face

Detail

Typical cabinet installation (Type 337 post-top mounted cabinet)

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Typical cabinet installation (Type 337 post-top mounted cabinet)

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Detail

Typical cabinet installation (Type 337 post-top mounted cabinet)

Note: Type 337 PTM cabinet to be mounted with doors perpendicular to curb and doors swing towards curb. See detail upper left.

Curb Face

Detail

Typical cabinet installation (Type 337 post-top mounted cabinet)

Note: Type 337 PTM cabinet to be mounted with doors perpendicular to curb and doors swing towards curb. See detail upper left.

Curb Face

Detail

Typical cabinet installation (Type 337 post-top mounted cabinet)

Note: Type 337 PTM cabinet to be mounted with doors perpendicular to curb and doors swing towards curb. See detail upper left.
Typical pedestrian head installation

Shaft - Type 9

Base

Foundation, Type F-1

1" X 25" X 4" - Anchor Bolts, 4 required

36"

14" Min.

MOUNTING OF
TYPE 9 STANDARD

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
Frances T. Banerjee, General Manager

Approved Nov. 13, 1998

DRAWING NO. S-51.9A
Note:
Standard must conform to Bureau of Street Lighting Plan L-103-0

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<td>20'</td>
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<tr>
<td>TYPE</td>
<td>Standard Height</td>
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<td>18.5&quot;</td>
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<tr>
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<tr>
<td>18-4-100</td>
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<tr>
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<td>17&quot;</td>
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<td>24-4-100</td>
<td>30'</td>
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<tr>
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<td>61-5-100</td>
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NOTES:
1. Fabrication of the standards shall conform to the State of California Department of Transportation Standard Plans latest revision.
2. Hand hole to be located as shown.
3. Base plate to be as shown.
4. Luminare Arm Length per Street Lighting Sheet.
* Fabricate and install with 18" bolt circle.

Approved: July 24, 2007, for Gloria J. Jeff, General Manager

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION

100 MPH Poles

S-52.1.6

Drawing No.
Camera Poles

(CASE 4 MAST ARM LOADING - 100 MPH WIND SPEED)

DEPARTMENT OF TRANSPORTATION

Title
Camera Poles

City of Los Angeles

Department of Transportation

Approved by:
Shailesh Patel, S. E.
Division Engineer
Structural Engineering Division
Bureau of Engineering

Date
11-19-07

DWN
MT
11-15-07
Title

Camera Poles

(CASE 4 MAST ARM LOADING - 100 MPH WIND SPEED)

Approved by:
Shailesh Patel, S. E.
Division Engineer
Structural Engineering Division
Bureau of Engineering

Date
11-19-07

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION

March 18, 2008

Drawing No.
S-52.1.4B

Page 32
MID-POINT GRIPS TO THE TOP CABLE HOOK.

3" SCHEDULE 40 PIPE (HOT-DIP GALVANIZED PER ASTM A-153)

UPPER HANDHOLE & COUPLING FOUNDATION DETAIL

Clamp & Side Mounted Camera Arm Detail

3" SCHEDULE 40 PIPE (HOT-DIP GALVANIZED PER ASTM A-153)

6½ DIA. X ⅜ THK. PLATE (ASTM A-36)

3½ DIA. X ⅜ THK. CLAMP PLATE (ASTM A-36)

4-⅝" DIA. STEEL STUDS, EQUALLY SPACED ON 4⅛" DIA. B.C.

2" COUPLING

3" X 5" HANDHOLE RIM (¼ PL. X 2" WIDE) AND COVER

* EACH CABLE SHALL BE SUPPORTED INSIDE THE POLE BY KELLIMS GRIPS (OR EQUIVALENT) ONE AT THE TOP AND A SECOND AT THE MID-POINT. TWO ⅜" DIA. GALVANIZED STEEL WIRES SHALL SECURE MID-POINT GRIPS TO THE TOP CABLE HOOK.

UPPER HANDHOLE & COUPLING DETAIL

Clamp & Side Mounted Camera Arm Detail

3" SCHEDULE 40 PIPE (HOT-DIP GALVANIZED PER ASTM A-153)

6½ DIA. X ⅜ THK. PLATE (ASTM A-36)

4-⅝" DIA. STEEL STUDS, EQUALLY SPACED ON 4⅛" DIA. B.C.

2" COUPLING

3" X 5" HANDHOLE RIM (¼ PL. X 2" WIDE) AND COVER

* EACH CABLE SHALL BE SUPPORTED INSIDE THE POLE BY KELLIMS GRIPS (OR EQUIVALENT) ONE AT THE TOP AND A SECOND AT THE MID-POINT. TWO ⅜" DIA. GALVANIZED STEEL WIRES SHALL SECURE MID-POINT GRIPS TO THE TOP CABLE HOOK.

UPPER HANDHOLE & COUPLING DETAIL

Clamp & Side Mounted Camera Arm Detail

3" SCHEDULE 40 PIPE (HOT-DIP GALVANIZED PER ASTM A-153)

6½ DIA. X ⅜ THK. PLATE (ASTM A-36)

4-⅝" DIA. STEEL STUDS, EQUALLY SPACED ON 4⅛" DIA. B.C.

2" COUPLING

3" X 5" HANDHOLE RIM (¼ PL. X 2" WIDE) AND COVER

* EACH CABLE SHALL BE SUPPORTED INSIDE THE POLE BY KELLIMS GRIPS (OR EQUIVALENT) ONE AT THE TOP AND A SECOND AT THE MID-POINT. TWO ⅜" DIA. GALVANIZED STEEL WIRES SHALL SECURE MID-POINT GRIPS TO THE TOP CABLE HOOK.

UPPER HANDHOLE & COUPLING DETAIL

Clamp & Side Mounted Camera Arm Detail

3" SCHEDULE 40 PIPE (HOT-DIP GALVANIZED PER ASTM A-153)

6½ DIA. X ⅜ THK. PLATE (ASTM A-36)

4-⅝" DIA. STEEL STUDS, EQUALLY SPACED ON 4⅛" DIA. B.C.

2" COUPLING

3" X 5" HANDHOLE RIM (¼ PL. X 2" WIDE) AND COVER

* EACH CABLE SHALL BE SUPPORTED INSIDE THE POLE BY KELLIMS GRIPS (OR EQUIVALENT) ONE AT THE TOP AND A SECOND AT THE MID-POINT. TWO ⅜" DIA. GALVANIZED STEEL WIRES SHALL SECURE MID-POINT GRIPS TO THE TOP CABLE HOOK.

UPPER HANDHOLE & COUPLING DETAIL

Clamp & Side Mounted Camera Arm Detail

3" SCHEDULE 40 PIPE (HOT-DIP GALVANIZED PER ASTM A-153)

6½ DIA. X ⅜ THK. PLATE (ASTM A-36)

4-⅝" DIA. STEEL STUDS, EQUALLY SPACED ON 4⅛" DIA. B.C.

2" COUPLING

3" X 5" HANDHOLE RIM (¼ PL. X 2" WIDE) AND COVER

* EACH CABLE SHALL BE SUPPORTED INSIDE THE POLE BY KELLIMS GRIPS (OR EQUIVALENT) ONE AT THE TOP AND A SECOND AT THE MID-POINT. TWO ⅜" DIA. GALVANIZED STEEL WIRES SHALL SECURE MID-POINT GRIPS TO THE TOP CABLE HOOK.
LADOT

14"

GRADING OR WOOD SHIMS

BE SET LEVEL THROUGH THE USE OF

PER FOOT, TEMPORARY STANDARD TO

FOR SLOPES GREATER THAN 1/2" RISE

S. E. ROWE, General Manager

DEPARTMENT OF TRANSPORTATION

CITY OF LOS ANGELES

DRAWING NO.

General Manager

Title

Revisions

Approved

S. E. Rowe

General Manager

USE 8" OR 12" HEADS CORRESPONDING TO PERMANENT HEADS BEING REPLACED

36" SQ. x 1/4" THK. STEEL PLATFORM, HOT DIP GALVANIZED PER ASTM 123

TYPE 1 BASE W/ 4 3/4" DIA. x 3-1/2" BOLTS & NUTS W/ 2 WASHERS FOR EACH BOLT

3/8" DIA. STEEL COIL CHAIN TIED TO EACH 5 GAL. BLOCK AND LOCKED AROUND THE TYPE 1 STANDARD

5 GAL. CAN FILLED W/ CONCRETE. FOUR CANS ARE REQUIRED, SPACED AS SHOWN

2" HIGH x 1/4" THK. PERIMETER LIP RESTING ON GROUND

1-3/4" x 1-3/4" x 1/4" STEEL ANGLE BRACKETS WELDED TO PLATE

4 HOLES @ 7/8" DIA.

9-1/2" DIA. BOLT CIRCLE

1" x 1" NOTCHES FOR CABLE

5 GAL. CAN FILLED WITH CONCRETE

"LADOT" OR CONTRACTOR NAME EMBOSSED OR WELDED ON AT LEAST TWO SIDES

1/2" DIA. STEEL ROD EMBEDDED 9" DEEP

5 GAL. CAN FILLED WITH CONCRETE MIN. WEIGHT: 90 LBS.

3/8" DIA. STEEL COIL CHAIN TIED TO EACH 5 GAL. BLOCK AND LOCKED AROUND THE TYPE 1 STANDARD

1" x 1" NOTCH FOR CABLE

BASE ASSEMBLY

LIP

TYPE 1 STANDARD

NOT TO SCALE

FOR SLOPES GREATER THAN 1/2" RISE PER FOOT, TEMPORARY STANDARD TO BE SET LEVEL THROUGH THE USE OF GRADING OR WOOD SHIMS

STREET NAME SIGN

TEMPORARY SIGNAL

FOR TYPE I STANDARD

CITY OF LOS ANGELES

DEPARTMENT OF TRANSPORTATION

S. E. ROWE, General Manager

Drawn By

RMO 04-07-92

Title

Checked By

CW 04-08-92

Supervised By

AAM 04-09-92

Reviewed By

GH 04-09-92

JEF 4-10-92

Revisions

Approved 4-15-92

DRAWING NO.

S-57.2B
NOTES:
1. THE CD954 STANDARD (WITHOUT LUMINAIRE ARM) SHALL CONFORM TO DEPT. OF TRANSPORTATION, CITY OF LOS ANGELES STANDARD DWG. # S-51.9.6 (FOUNDATION EXCLUDED).
2. THE MAST ARM LENGTH SHALL NOT EXCEED 15'-0".
3. THERE SHALL BE A MAXIMUM OF 2 - 5 SECTION SIGNAL HEADS & 2 - PED. HEADS MOUNTED TO THE SHAFT AND ONE 5-SECTION SIGNAL HEAD MOUNTED AT THE END OF MAST ARM.

SECTION A-A

SIGNAL, TEMPORARY
FOR TYPE CD954 STD.
(WITHOUT LUMINAIRE ARM)
NOTES:
1. THE CD954 STANDARD SHALL CONFORM TO DEPT. OF TRANSPORTATION, CITY OF LOS ANGELES, STANDARD DRAWING # S-51.9.6 (FOUNDATION EXCLUDED).
2. THE MAST ARM LENGTH SHALL NOT EXCEED 15'-0".
3. THERE SHALL BE A MAXIMUM OF 2 - 5 SECTION SIGNAL HEADS & 2 - PED. HEADS MOUNTED TO THE SHAFT AND ONE 3-SECTION SIGNAL HEAD MOUNTED AT THE END OF MAST ARM. ALL SIGNAL HEADS TO BE POLYCARBONATE TYPE.

SECTION A-A

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<th>CHECKED BY</th>
<th>DATE</th>
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STRUCTURAL ENGINEERING DIVISION
CHECKED FOR STRUCTURAL DESIGN
DIV. ENGR. C. W. Robins
DATE 8-29-96

TYPE CD 954 STD.

PLATE WASHER (4 REQ.)
1-1/8" TYP.
4" X 4" X 1/2"
PLATE WASHER (4 REQ.)
A.C. OR P.C.C. SURFACE
60" X 60" X 3/4" STL. PLATE
COAT PLATE ASSEMBLY WITH PRIMER AND TRAFFIC SIGNAL YELLOW PAINT.

LEVEL
1/4" TYP.
4" X 4" X 1/2"
PLATE WASHER (4 REQ.)
2" HOLE
WELD ANGLES TO PLATE
5" X 3" X 1/2" TYP

3/8" CABLE, EMBED 12" DEEP
(8 REQ.)

TYPE CD954 STD.

1-1/8" X 4" HEX. HD.
BOLT, HEX. NUT, FLAT WASHER (4 REQ.)
WELD BOLTS & 4" X 4" X 1/2" PLATE WASHERS TO 3/4" PLATE
MORTAR LEVELING BED, WEDGE EDGES UNTIL MORTAR SETS.
(MORTAR IS NOT REQUIRED ON C.A.B., DIRT OR WHEN SLOPE IS LESS THAN 1/4" PER FOOT.)

SIGNAL HEADS
SEE NOTE 3

STREET NAME SIGN

2 PEDESTRIAN HEADS
SEE PLAN & SECTION A-A

ROADWAY

TEMPORARY O.H. SIGNAL CABLE
(MAXIMUM SPAN 100 FEET)

15' - 0" MAX.
ALL 12" SECTIONS

12" X 12" X 1/2"
PLATE WASHER (4 REQ.)

1-1/8" BOLT SIZE AND 11-1/2" BOLT CIRCLE
DRILL 1-1/2" DIAMETER HOLES (4 REQ.) FOR
1-1/8" BOLT SIZE AND 11-1/2" BOLT CIRCLE
LADOT

14"

GRADING OR WOOD SHIMS
BE SET LEVEL THROUGH THE USE OF
PER FOOT, TEMPORARY STANDARD TO
FOR SLOPES GREATER THAN 1/2" RISE

ASTM 123

THOMAS K. CONNER, General Manager

DEPARTMENT OF TRANSPORTATION
CITY OF LOS ANGELES

DRAWING NO.

General Manager
Approved

Title

REV.

Drawn By
7-24-97
MT

Temporary Controller
For Type 8 Standard

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
THOMAS K. CONNER, General Manager

Approved FEB. 2 1998

DRAWING NO.
S–57.3
Note:

Note:
Note:
NOTES:

1. ITEM "A" IS THE BASIC MOUNTING DESIGN FOR MOST MAST ARM SIGNAL INSTALLATIONS WHEN STANDARD TENON LOCATION ON THE MAST ARM CANNOT BE UTILIZED. IT USES A 6" TENON LENGTH WITH 2 3/8" OUTSIDE DIAMETER FOR PLUMBIZER MOUNTING.

2. ITEM "B" IS USED FOR INSTALLATION OF TRAFFIC SIGNAL HEADS, EXCEPT PROGRAMMED VISIBILITY (P.V.) HEADS, WHEN IT IS DESIRED TO MOUNT THEM HORIZONTALLY OR TO ADJUST THE HEIGHT VERTICALLY BY MOVEMENT OF ITEM "E".

3. ITEM "C" IS USED FOR INSTALLATION OF HORIZONTAL OR VERTICAL PROGRAMMED VISIBILITY (P.V.) HEADS. IT IS EQUIPPED WITH 14" ARMS WHICH ALLOW FOR REPLACEMENT OF SIGNAL LAMPS LOCATED IN THE REAR OF THE SIGNAL HEAD.

4. ITEM "D" IS USED FOR INSTALLATION OF ELECTRIC SIGNS.

5. ITEM "E" IS A STANDARD CLAMP KIT DESIGNED TO BE USED FOR FASTENING ITEMS "B", "C", AND "D" TO MAST ARMS OR POLES IN A VERTICAL OR HORIZONTAL POSITION.

6. THE BOTTOM ARMS IN ITEMS "B", "C", AND "D" ARE STATIONARY AND ARE HELD IN PLACE WITH PIPE THREADS AND SET SCREWS. THE UPPER ARMS SLIDE ALONG THE SHAFT AND ARE HELD IN PLACE WITH SET SCREWS.

7. THE STANDARD 29" BAND FOR ITEM "A" AND "E" FITS A 4" TO 8.6" DIAMETER. BAND LENGTHS UP TO 56" CAN BE USED FOR LARGER DIAMETER INSTALLATIONS.

8. ITEMS "A" THROUGH "E" ARE AVAILABLE FROM PELCO PRODUCTS INC. OR EQUIVALENT.

9. THE 1 1/2"X 1 1/2" ALUMINUM LOCK NUT SHOWN WITH ITEM "D" IS COMMONLY USED FOR SIGNAL HEAD & PEDESTRIAN HEAD INSTALLATIONS.

10. THE 4 1/2"X 4 1/2"X 1/4" ALUMINUM PLATE IS USED FOR SIGN BOX REINFORCEMENT AT BRACKET INSTALLATION LOCATION AND MUST BE SPECIALLY FABRICATED.

DETAIL "A"

4 1/2" X 4 1/2" X 3/4"
ALUMINUM PLATE
NOT TO SCALE
Note:
Notes:

Drill four (4) $\frac{3}{16}''$ holes to match removable lifting plate.

$\frac{3}{8}''$ X $1\frac{1}{4}''$ N.C. Hex. Head Bolt and nut, Cad. plated (2 Req.)

Controller Cabinet Wall (Ref.)

Notes:
Notes
1. Bevel opposite side for Right Beveled Visor.
2. Ears and joints may be riveted or welded.
3. Material: Aluminum 3003-H14 0.040" thickness
4. Finish: Painting of Visors (Outside & Inside) shall conform to "Standard Specifications" (latest edition)
   Dept. of Transportation, State of California.
Notes
1. Bevel opposite side for Right Beveled Visor.
2. Ears and joints may be riveted or welded.
3. Material:
   Aluminum 3003-H14 0.040" thickness
4. Finish:
   Painting of Visors (Outside & Inside)
   shall conform to "Standard Specifications" (latest edition)
   Dept. of Transportation, State of California.
NOTES:

1. EARS AND JOINTS MAY BE RIVETED OR WELDED.

2. MATERIAL: ALUMINUM 3003-H14 0.040 INCH THICKNESS

3. FINISH: PAINTING OF VISORS (OUTSIDE & INSIDE) SHALL CONFORM TO "STANDARD SPECIFICATIONS (LATEST EDITION), DEPT. OF TRANSPORTATION, STATE OF CALIFORNIA".

LONG VISOR, 8” x 18” FULL CIRCLE
Not To Scale

LONG VISOR, 12” x 27” FULL CIRCLE
Not To Scale
NOTES:
1. EARS AND JOINTS MAY BE RIVETED OR WELDED.
2. MATERIAL: ALUMINUM 3003-H14 0.040 INCH THICKNESS
3. FINISH: PAINTING OF VISORS (OUTSIDE & INSIDE) SHALL CONFORM TO "STANDARD SPECIFICATIONS (LATEST EDITION), DEPT. OF TRANSPORTATION, STATE OF CALIFORNIA".

See Ear Detail On Std. Dwg. No. S-76.3

See Ear Detail On Std. Dwg. No. S-76.6
STEEL STANDARDS

1 ⅜" drill

No. 7 drill, ¼"-20 N.C. tap
2 holes

6"
9 ⅛"

Typical arrangement

Curb

Parallel to crosswalk
for which intended

CONCRETE STANDARDS

Standard inserts for concrete standards, tapped ¼"-20 N.C.

5/8" hole

3' 6" Typical

2 holes
1 ¼"-20 N.C.

9 ⅛"
6"

Typical arrangement

Pushbutton

JAC 12-22-82

11/72

PUSHBUTTON, INSTALLATION
**SIGN**

1. Pedestrian pushbuttons – see Standard Drawings S–73.0 and S–73.1.
   Bicycle pushbuttons – see Standard Drawings S–72.2.

2. Mounting hardware consists of four(4) 8–32 x 3/4" long.

**HOUSING**

Construction, materials and finish painting shall conform to LADOT material specification 92–052–02 or latest version.

**ASSEMBLY**

Construction, materials and finish painting shall conform to LADOT material specification 92–053–02 or latest version. Pushbuttons shall be 2" in diameter.

---

**POST–TOP MOUNTING**

(See S–51.7 for installation)

---

**SIDE MOUNTING**

(See S–72.0A for installation)
Note: Sign shall be powder coated aluminum with black legend on white background as shown.
Material: .063 Aluminum
* Use left, right or double arrow as necessary.
Note: Sign shall be powder coated aluminum with black legend on white background as shown.
Material: .063 Aluminum
* Use left, right or double arrow as necessary.
Notes:
1. Sign shall be .063 aluminum.
2. Powder coated with black legend on white background and orange hand and timer symbols.
   * Use left, right or double arrow as necessary
NOTES:
1. INSTALL 3 CLOCKWISE TURNS OF LOOP WIRE FOR EACH DETECTOR, UNLESS OTHERWISE SHOWN ON SIGNAL PLAN.
2. SEE LADOT MATERIAL SPECIFICATION NO. 92-081-05 OR LATEST REVISION.
3. ANY NON-ROUND SHAPED LOOPS MUST CONFORM TO ALL OTHER SPECIFICATIONS SHOWN ON THIS STANDARD DRAWING.

FILL SLOT WITH LOOP SEALANT TO WITHIN 1/16" OF TOP. (DO NOT OVERFILL)

* DEPTH OF SLOT NOT TO EXCEED DEPTH OF PAVEMENT, FOR P.C.C. (CONCRETE) SURFACES, THE MINIMUM COVER ABOVE LOOP WIRE SHALL BE 2.5" MINIMUM.

INDUCTIVE LOOP INSTALLATION
CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION

July 9, 2008
Drawing No. S-70.1A

for Rita L. Robinson, General Manager
Perform Loop installation in the following order:

1. OPEN THE PAVEMENT AT LEAST 42" FROM CURB FACE AND AT LEAST 18" FROM EDGE OF GUTTER USING A STAR DRILL OR A JACK HAMMER (ASPHALT CONCRETE ONLY). OPEN NO MORE THAN A 12" X16" AREA. IN CASES WHERE THERE IS A CONCRETE BUS PAD ADJACENT TO THE GUTTER, INSTALL THE STUBOUT BEYOND THE EDGE OF THE BUS PAD.

2. INSTALL 2" PVC (SC80) OR PVC FLEX (SC40) FROM THE PULLBOX PIT WITH A 45 DEGREE ELBOW AT THE STUB-OUT AS SHOWN. DEPTH OF THE CONDUIT SHALL BE AT LEAST 18" BELOW THE STREET GRADE.

3. PATCH STREET USING HOT PATCH ASPHALT CONCRETE AND SAND AS SHOWN.

4. INSTALL DUCT SEAL WHERE WIRES ENTER 2" PVC OR 2" PVC FLEX.

5. FILL SAWCUT SLOT WITH CALTRANS APPROVED HOT-MELT RUBBERIZED ASPHALT SEALANT.

* NO MORE THAN 8 LOOPS OR 16 WIRES PER STUB-OUT.
NOTES:
1. INSTALL FOUR (4) COMPLETE ALTERNATING
    TURNS OF LOOP CONDUCTORS,
    UNLESS OTHERWISE SPECIFIED.
2. FOR STUB-OUT AND CONDUIT DETAILS
    REFER TO PAGE (2) OF S-70.1A
3. SEE LADOT MATERIAL SPECIFICATION
    NO. 92-081-05 OR LATEST REVISION.
4. USE CASE I LOOPS FOR BIKE LANE
    INSTALLATIONS. USE CASE II LOOPS
    WHEN VEHICULAR LOOPS ARE INTENDED
    TO DETECT BICYCLES.
5. AN OCTAGONAL SHAPED LOOP OR OTHER
    NON-ROUND SHAPED LOOP MAY BE USED
    INSTEAD OF THE ROUND-LOOP WITH
    PRIOR LADOT APPROVAL.
6. SAME WINDING PATTERN TO BE USED
    IN BOTH LOOPS WITH (1) PAIR FROM
    EACH LOOP LEADING TO THE PULLBOX.
7. LOOPS INSTALLED IN BIKE LANES WITH PARKING SHALL BE PLACED WITH THE
    NEAR EDGE OF THE LOOP (1)-FOOT TO THE RIGHT OF THE BIKE LANE
    DELINEATION LINE, UNLESS OTHERWISE NOTED BY LADOT.
8. LOOPS INSTALLED IN BIKE LANES ADJACENT TO THE ROADSIDE WITHOUT PARKING
    SHALL BE CENTERED IN THE BIKE LANE, OR BETWEEN THE GUTTER AND THE
    BIKE LANE DELINEATION LINE, UNLESS OTHERWISE NOTED BY LADOT.
9. ANY LADOT APPROVED NON-ROUND SHAPED LOOPS MUST CONFORM TO ALL
    OTHER SPECIFICATIONS SHOWN ON THIS STANDARD DRAWING.
NOTES:
1. PRE-FORMED LOOP SHALL BE CONSTRUCTED FROM 1/2” I.D. POLYPROPOLENE, WITH AN O.D. OF 3/4” INCH.
2. LOOP IS TO HAVE ONE CONTINUOUS #16 TFFN WIRE THROUGH THE LOOP HEAD AND LEAD-IN TO PREVENT LOOP MALFUNCTION DUE TO SPlicing. LOOP SHALL HAVE FOUR (4) TURNS OF WIRE.
3. THE CONDUIT SHALL BE COMPLETELY FILLED WITH HOT, RUBERIZED ASPHALT WHICH WILL ALLOW THE LOOP TO RETAIN FLEXIBILITY ONCE COOLED, PREVENT INCURSION OF MOISTURE AND SET THE WIRE TURNS FIRMLY IN PLACE.
4. EACH LOOP HEAD SHALL BE PROVIDED WITH A 5” CONTRACTION/EXPANSION JOINT TO ALLOW FOR MOVEMENT OF PAVEMENT AND TO PREVENT BREAKAGE OF THE WIRE AND/OR CONDUIT. THE JOINT IS TO HAVE A 9” LONG BY 3/4” SCHEDULE 80 PVC COVER SLIDE TO BE PLACED OVER THE JOINT FOR PROTECTION FROM THE ELEMENTS.
5. ENCASE LEAD-IN WRES IN A NON-CONDUCTIVE 250 PSI FLEX HOSE SEAMLESS FIBER BRAID REINFORCEMENT AND A NON-CONDUCTIVE SEAMLESS EXTRUDED URETHANE NON-PERFORATED JACKET. FILL LEAD-IN HOSE COMPLETELY WITH HOT RUBERIZED ASPHALT. TWIST WIRES AT LEAST TWO TIMES PER FOOT FOR ENTIRE RUN. ATTACH LEAD-IN TO LOOP HEAD WITH A SCHEDULE 80 CVPC TEE AND A CVPC ADAPTER BUSHING.
6. ANY VARIATION TO THE INSTALLATION AS DESCRIBED ABOVE SHALL BE APPROVED BY THE DESIGN ENGINEER PRIOR TO INSTALLATION.
7. THE 3/8” O.D. LEAD-IN HOSE SHALL BE INSTALLED IN 2” PVC CONDUIT BETWEEN PULLBOX AND ENTRY TO PAVEMENT SLAB. LOOP SHALL BE ATTACHED TO TOP OF REINFORCING BARS WHEN USED IN THE PAVEMENT SLAB.
### Table

<table>
<thead>
<tr>
<th>Length of Loop</th>
<th>Number of Turns</th>
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<tbody>
<tr>
<td>&lt; 40'</td>
<td>2</td>
</tr>
<tr>
<td>≥ 40'</td>
<td>1</td>
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### Diagram

**Winding Detail**
- **2 Turns**
- **1 Turn**

**Transit Priority Loop**

- **City of Los Angeles**
- **Department of Transportation**

**Title:**
- **Saw Slot Detail**
- **Length as Specified on Plan**

- **Symbol:**

---

**Table of Approvals**

<table>
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<tr>
<th>Drawing No.</th>
<th>Date</th>
<th>Approval</th>
<th>Title</th>
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<tr>
<td>S-70.1F</td>
<td>4-5-2001</td>
<td>Frances Bannerjee, General Manager</td>
<td>Transit Priority Loop</td>
</tr>
</tbody>
</table>
DO NOT CONNECT UNUSED PAIR

TO EARTH GROUND AT

DRAIN WIRE CONNECTED

BLUE/WHITE (PAIR 1)

ORANGE/WHITE (PAIR 2)

ONE-LOOP HOOKUP
2 PAIR CABLE

TWO-LOOP HOOKUP
2 PAIR CABLE

ORANGE/WHITE (PAIR 2)

DRAIN WIRE CONNECTED
TO EARTH GROUND AT
CONTROLLER CABINET

GREEN/WHITE (PAIR 3)

THREE-LOOP HOOKUP
3 PAIR CABLE

ORANGE/WHITE (PAIR 2)

DRAIN WIRE CONNECTED
TO EARTH GROUND AT
CONTROLLER CABINET

BROWN/WHITE (PAIR 4)

FOUR-LOOP HOOKUP
4 PAIR CABLE

DRAIN WIRE CONNECTED
TO EARTH GROUND AT
CONTROLLER CABINET

NOTES:
1. THIS STANDARD DRAWING DESCRIBES A TWO, THREE OR FOUR PAIR LOOP DETECTOR LEAD-IN CABLE, INDIVIDUALLY SHIELDED AND JACKETED AND SUITABLE FOR INSTALLATION IN A PAVEMENT SAWCUT, CONDUIT, OR DIRECT BURIAL.
2. THE DETECTOR LEAD-IN CABLE CAN BE WIRED IN EITHER A SINGLE, DOUBLE, TRIPLE OR QUADRUPLE CHANNEL CONFIGURATION.
3. ELECTRICAL CONNECTIONS SHALL BE CAREFULLY SOLDERED AND WATERPROOFED.
4. SEE LADOT MATERIAL SPECIFICATION NO. 92–082–03 OR LATEST REVISION.
5. LOOP NUMBERS SHOWN ARE TYPICAL.
6. SYSTEM LOOPS USE A SINGLE PAIR FOR EACH LOOP.

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION

Approved February 25, 2005
for Wayne K. Tanda, General Manager
Actuation/ Phase Loops

NOTES:
1. CONNECT TWO TO FOUR LOOPS IN SERIES TO EACH PAIR, DO NOT USE PARALLEL CONNECTIONS.
2. DO NOT CONNECT ANY UNUSED CABLE PAIRS.
3. TYPICAL INSTALLATION SHOWN. TWO OR THREE PAIR CABLE MAY BE USED WHEN SHOWN ON SIGNAL PLAN.

DRAIN WIRE CONNECTED TO EARTH GROUND AT CONTROLLER CABINET

NOTES:
1. CONNECT TWO TO FOUR LOOPS IN SERIES TO EACH PAIR, DO NOT USE PARALLEL CONNECTIONS.
2. DO NOT CONNECT ANY UNUSED CABLE PAIRS.
3. TYPICAL INSTALLATION SHOWN. TWO OR THREE PAIR CABLE MAY BE USED WHEN SHOWN ON SIGNAL PLAN.
LRT DETECTOR FOR EMBEDDED TRACK

1. PREFORM LOOP TO BE USED FOR ALL NEW CONSTRUCTION.
2. SEE CURRENT LADOT MATERIAL SPECIFICATION FOR TRAFFIC LOOP.
3. SEE LADOT STD DWG S-70.1.A FOR INDUCTIVE LOOP INSTALLATION DETAILS NOT SHOWN HEREON.

NOTES:

1. TO BE USED FOR EXISTING INSTALLATIONS ONLY.
2. SEE LADOT STD DWG S-70.1.A FOR INDUCTIVE LOOP INSTALLATION DETAILS NOT SHOWN HEREON.
NOTES:

1. PRE-FORMED LOOP SHALL BE CONSTRUCTED FROM 1/2" I.D. POLYPROPOLENE, WITH AN O.D. OF 3/4" INCH.

2. LOOP IS TO HAVE ONE CONTINUOUS #16 TFFN WIRE THROUGH THE LOOP HEAD AND LEAD-IN TO PREVENT LOOP MALFUNCTION DUE TO SPLICING. LOOP SHALL HAVE FOUR (4) TURNS OF WIRE.

3. THE CONDUIT SHALL BE COMPLETELY FILLED WITH HOT, RUBERIZED ASPHALT WHICH WILL ALLOW THE LOOP TO RETAIN FLEXIBILITY ONCE COOLED, PREVENT INCURSION OF MOISTURE AND SET THE WIRE TurnerS FIRMLY IN PLACE.

4. EACH LOOP HEAD SHALL BE PROVIDED WITH A 5" CONTRACTION/EXPANSION JOINT TO ALLOW FOR MOVEMENT OF PAVEMENT AND TO PREVENT BREAKAGE OF THE WIRE AND/OR CONDUIT. THE JOINT IS TO HAVE A 9" LONG BY 3/4" SCHEDULE 80 PVC SLIDE TO BE PLACED OVER THE JOINT FOR PROTECTION FROM THE ELEMENTS.

5. ENCASE LEAD-IN WIRES IN A NON-CONDUCTIVE 250 PSI FLEX HOSE, SEAMLESS, WITH FIBER BRAID REINFORCEMENT AND A NON-CONDUCTIVE SEAMLESS EXTENDED URETHANE NON-PERFORATED JACKET. FILL LEAD-IN HOSE COMPLETELY WITH HOT RUBERIZED ASPHALT. TWIST WIRES AT LEAST TWO TIMES PER FOOT FOR ENTIRE RUN. ATTACH LEAD-IN TO LOOP HEAD WITH A SCHEDULE 80 CVPC TEE AND A CVPC ADAPTER BUSHING.

6. ANY VARIATION TO THE INSTALLATION AS DESCRIBED ABOVE SHALL BE APPROVED BY THE DESIGN ENGINEER PRIOR TO INSTALLATION.

---

NOTE:

1. SPLICES SHALL BE MADE IN THE HANDHOLE, AND SHALL BE SOLDERED AND WATERPROOFED.
Identification (Required on front door)

Rear door

Fan Vent

Removable lifting plates per S-68.1

Police door with shroud to provide access to switches and indicators only. (Required on front door)

Front door

Louvered vents with 20 in² min. flow area. (Required in front door)

Cabinet doors shall be secured by a 3-point latch mechanism. Latch handle shall be equipped with hasp for addition of pad lock (Required on front & rear doors.)

Notes:
1. Cabinet construction, ventilation requirements and other necessary accessories shall conform to the latest specification for "Cabinet Assembly – Type 337 post – top mounted", Dept. of Transportation, City of Los Angeles.
2. Cabinet shall be equipped with rails for mounting equipment. Rails shall be of standard 19" rack configuration.

<table>
<thead>
<tr>
<th>Type</th>
<th>Foundation</th>
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<tbody>
<tr>
<td>Type 337 (Post – top mounted)</td>
<td>F-8</td>
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</tbody>
</table>

Cabinet Details
Dimension Tolerance ±0.125 inch
Note:

1. When this cabinet is used as an ATSAC type I communication cabinet, a one-inch (1”) screened drain pipe shall be provided through the foundation. A 19” X 33” or larger 3/4-inch thick plywood mounting panel shall be installed on the inside of the rear wall. Machine screws and bolts shall not protrude beyond the outside wall of the cabinet.

<table>
<thead>
<tr>
<th>Type</th>
<th>Foundation</th>
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<tbody>
<tr>
<td>M</td>
<td>F-12A</td>
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Specification No. 92-044-04 or latest revision

Title: Cabinet, Controller Type M

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
Donald R. Howery, General Manager

Approved August 2, 1982
DRAWING NO. S-75.5.3

Donald R. Howery
General Manager 9/87
### CITY OF LOS ANGELES

**DEPARTMENT OF TRANSPORTATION**

**DRAWING NO. S-75.0C**

**GENERAL MANAGER**

**R E V I S I O N S**

- **Reviewed By**
- **Supervised By**
- **Checked By**

**Drawn By**

**RMO 12-20-90**

**SPEC. NO. 92-067-02**

**NOTES:**

- **MATERIAL:** .125" THK. AL 5052 H32
- **FINISH:** ANODIZED PER MIL-A-8625C SPEC.

**CONTINUOUS HINGE STAINLESS STEEL**

**VENTING LOUVERS WITH PROTECTIVE SCREENS**

**ADJUSTABLE PANEL MOUNTING STUDS**

**CABINET OPENING**

**3/4" PLYWOOD PANEL**

**VENTING LOUVERS WITH PROTECTIVE SCREENS**

**ADJUSTABLE PANEL MOUNTING STUDS**

**CABINET**

**OPENING**

**FRONT VIEW**

**REAR VIEW**

**SIDE VIEW**

**PLAN VIEW**

**TYPE II COMMUNICATION CABINET & FOUNDATION**

**CITY OF LOS ANGELES**

**DEPARTMENT OF TRANSPORTATION**

**S. E. ROWE, General Manager**

**DRAWING NO. S-75.0C**

**SUPERcedes S-75.0B**

**Show frnd. 2" above surface**

**ERA 1-10-91**

**JEM 1-14-91**

**ERA 2-12-91**

**JEM 2-27-91**

**ERA 2-22-91**

**Approved**

**S. E. Rowe**

**General Manager**
NOTES:

1. Pullbox details not shown on this plan shall conform to Dept. of Public Works Standard Drawing # L-201-0.

2. Outside Dimension: Type PB2- 15"X25", Type PB3- 22"X34"

3. Galvanized conduits must be bonded with copper ground strap around the neck of each conduit. PVC conduits must have their ground wires spliced together.

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<td>Pr. T. E.</td>
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CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION

Approved: February 25, 2005

for Wayne K. Tanda, General Manager

Drawing No. S-78.5.1
NOTES:
1. Traffic pullboxes in driveways, alleys and locations with vehicular traffic shall be metal covered per this standard.
2. Pullbox details not shown on this plan shall conform to Caltrans Standard Plan ES–8.
3. Traffic pullbox shall be provided with steel cover and special concrete footing. Steel cover shall have embossed non–skid pattern.
4. Galvanized conduits must be bonded with copper ground strap around the neck of each conduit. PVC conduits must have their ground wires spliced together.
5. Top of pull boxes shall be flush with surrounding grade or top of adjacent curb, except that in unpaved areas where pull box is not immediately adjacent to and protected by a concrete foundation, pole or other protective construction, the box shall be placed with its top 1 1/4" above surrounding grade. Where practicable, pull boxes shown in the vicinity of curbs shall be placed adjacent to the back of curb, and pull boxes shown adjacent to standards shall be placed on side of foundation facing away from traffic, unless otherwise noted. When pull box is installed in sidewalk area, the depth of the pull box shall be adjusted so that the top of the pull box is flush with the sidewalk.
6. Pull box cover shall be marked as "TRAFFIC SIGNAL".
7. Bonding jumper for metal covers shall be 3" long, minimum.
8. Hold–down bolt shall be 5/8" and coarse threaded.
2-\(\frac{3}{4}\)" Brass lift plug

"A" Cover outside

"B" Frame inside

"C" Frame

"D" Inside Dim.

1" Stamped letters

"E" Cover

1\(\frac{1}{8}\)" Typ.

"G" Frame inside

Steel sleeve internal thread \(\frac{3}{8}"-10\) UNC

full length to match brass lift plug

Notes:

1. All metal surfaces for special frame and cover shall have a galvanized finish.

2. All welding, machining and drilling shall be done before galvanizing.

3. Plug threads must be greased thoroughly prior to installation.

<table>
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<tr>
<th></th>
<th>&quot;A&quot;</th>
<th>&quot;B&quot;</th>
<th>&quot;C&quot;</th>
<th>&quot;D&quot;</th>
<th>&quot;E&quot;</th>
<th>&quot;F&quot;</th>
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<td>For Type 2 Pullbox</td>
<td>18(\frac{3}{4})&quot;</td>
<td>19&quot;</td>
<td>29&quot;</td>
<td>9(\frac{1}{2})&quot;</td>
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<td>For Type 3 Pullbox</td>
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<td>13&quot;</td>
<td>37(\frac{3}{4})&quot;</td>
<td>37(\frac{3}{4})&quot;</td>
<td>36(\frac{3}{4})&quot;</td>
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NOTES:

1. LIFTING RINGS AND BOLTS SHALL BE PROVIDED.

2. PARKWAY COVER SHALL BE 3/16" SAFETY PLATE, 5/16" SAFETY PLATE FOR TRAFFIC COVER.

3. ALL METAL SURFACES FOR SPECIAL FRAME AND COVER SHALL HAVE A GALVANIZED FINISH.

4. ALL WELDING, MACHINING AND DRILLING SHALL BE DONE BEFORE GALVANIZING.

5. PLUG THREADS MUST BE GREASED THOROUGHLY PRIOR TO INSTALLATION.
NOTES:

1. TWO 1" DIA. GROUNDING ROD KNOCKOUTS SHALL BE PROVIDED.

2. LIFTING RINGS AND BOLTS SHALL BE PROVIDED.

3. PARKWAY COVER SHALL BE 3/16" SAFETY PLATE, 5/16" SAFETY PLATE FOR TRAFFIC COVER.

4. ALL METAL SURFACES FOR SPECIAL FRAME AND COVER SHALL HAVE A GALVANIZED FINISH.

5. ALL WELDING, MACHINING AND DRILLING SHALL BE DONE BEFORE GALVANIZING.

6. PLUG THREADS MUST BE GREASED THOROUGHLY PRIOR TO INSTALLATION.
NOTES:
1. TYPE F-1 — 2" NOMINAL SIZE CONDUIT, UNLESS OTHERWISE SPECIFIED
   TYPE F-8 — 3" NOMINAL SIZE CONDUIT, UNLESS OTHERWISE SPECIFIED
2. TOPPING SHALL BE CONSIDERED A PART OF THE FOUNDATION.
3. UNLESS OTHERWISE SPECIFIED, IN UNPAVED AREAS A 36"X24"X4" SLAB SHALL BE PROVIDED FOR EACH DOOR OPENING IN THE CASE OF A MODEL 337 CABINET.
4. ON TYPE F-8, GROUND ROD SHALL BE INSTALLED ON CONTROLLER PULLBOX.
Notes:
1. Use 1" galvanized conduit for street lighting and 2" schedule 80 PVC conduit for traffic signal unless otherwise specified.
2. Conduit stubs from foundation shall be in the direction of the nearest corresponding pullbox unless otherwise specified.
3. Topping shall be considered as a part of the foundation.
Notes:
1. Use 1" galvanized conduit for street lighting and 2" schedule 80 PVC conduit for traffic signal unless otherwise specified.
2. Conduit stubs from foundation shall be in the direction of the nearest corresponding pullbox unless otherwise specified.
NOTES:
1. Conduit shall be 1” nominal size unless otherwise specified.
2. Topping shall be considered a part of the foundation.
PPB Post

Two washers each anchor bolt

Adapter plate

Conduit

Foundation

\( \frac{5}{8}" \times 1\frac{3}{4}" \) sq. or hex head galv. bolts

\( \frac{3}{8}" \) steel plate

\( \frac{1}{8}" \) Fillet weld at least two opposite flats of each bolt

Note
Base plate shall be hot dipped galvanized after machining in accordance with the latest edition of ASTM designation A-123

SPEC. NO. 92-056-01

<table>
<thead>
<tr>
<th>Revisions</th>
<th>Title</th>
<th>Date</th>
<th>Approver</th>
<th>Drawing No.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ADAPTER BASE PLATE (For F-1 to F-7 Foundation)</td>
<td>May 27, 1971</td>
<td>B. Fredrickson</td>
<td>S-52.7.1</td>
</tr>
</tbody>
</table>

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
Donald R. howery, General Manager

Approved: B. Fredrickson
For General Manager

75
NOTES:
1. THIS ADAPTER PLATE SHALL BE USED ONLY FOR TYPE 1, 1A AND 9 STANDARD.
2. STEEL PLATE AND OTHER COMPONENTS SHALL CONFORM TO ASTM SPECS. A-36.
3. HOT DIP GALVANIZED AFTER FABRICATION PER ASTM SPECS. A-123.
4. SEE L.A.D.O.T. STANDARD DRAWING NO.S-52.1 AND S-52.2 FOR F-1 AND F-2 FOUNDATION DETAILS.
5. SEE L.A.D.O.T. STD. DWG. NO.S-52.7.2 FOR BASE CASTING.
NOTES:
1. Base material: Carbon steel casting ASTM A27 grade 65–35
2. Finish: Hot dip galvanize after machining per ASTM specification A–123
NOTES:

1. Conduit consists of (2) 3" nominal size unless otherwise specified.
NOTE:
1. NO PULLBOX TO BE LOCATED WITHIN THE FRONT OR REAR 24"X36" CONCRETE SLAB.
Notes:
1. Department of Water & Power to install 3 #2 stranded aluminum wires from service pole to pullbox. At the terminus of each #2 aluminum wire the Dept. of Water & Power to splice 2 #6 stranded copper wires, (12" long) using compression type connectors. The exposed ends of each copper wire shall be taped when not in use.
2. Install continuous #8 green ground conductor to controller cabinet.
3. See Standard Specifications for Public Works Construction, Sec. 307-2.8
1. Department of Water & Power to install 3 #2 stranded aluminum wires from service vault to pullbox. At the terminus of each #2 aluminum wire the Dept. of Water & Power to splice 2 #6 stranded copper wires, (12" long) using compression type connectors. The exposed ends of each copper wire shall be taped when not in use.

2. Install continuous #8 green ground conductor to controller cabinet.

3. See Standard Specifications for Public Works Construction, Sec. 307-2.8
NOTES:

1. FOR CABINET AND FOUNDATION DETAIL SEE CITY OF LOS ANGELES DEPARTMENT OF TRANSPORTATION STANDARD DRAWING NO.S-75.0C.

2. SERVICE DISTRIBUTION CABINET SHALL HAVE INSTALLED ON ITS BACK PANEL A 100-AMPS LOADCENTER EQUIVALENT TO SQUARE D CAT. NO.Q06-12L100.

3. CIRCUIT BREAKERS SHALL BE PROVIDED AND INSTALLED AS FOLLOWS:

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Type</th>
<th>Amps</th>
</tr>
</thead>
<tbody>
<tr>
<td>2EA</td>
<td>2 POLE</td>
<td>50A</td>
</tr>
<tr>
<td>1EA</td>
<td>1 POLE</td>
<td>50A</td>
</tr>
<tr>
<td>1EA</td>
<td>1 POLE</td>
<td>30A</td>
</tr>
<tr>
<td>2EA</td>
<td>1 POLE</td>
<td>20A</td>
</tr>
</tbody>
</table>
Notes:

1. Raintight box with three knockouts in bottom for \(\frac{3}{4}\), 1, 1\(\frac{1}{4}\) or 1\(\frac{1}{2}\) inch conduit, U.L. approved; 10"W X 12"H X 4"D. Box to be galvanized ASTM Spec. A-525; Similar to circle A-W catalog number 10124 RTSC.

2. Install one nipple with two \(\frac{3}{4}\)" bushings for each 1" Galvanized conduit installed as shown on plans.

3. Raintight box shall be drilled or otherwise configured to accept a padlock.
Sign, Cantilever, 12' Arm

Special Detail "B"

Title

Drawing No.

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION

S-98.0

General Notes:

1. All metal parts shall be galvanized after fabrication.

2. All pipes shall conform to ASTM A53 Grade B specification.


4. Tapered tube of equivalent size & capacity may be substituted for pipe post subject to the approval of the Engineer.

5. Sign arms shall be made level by raking the standard with the leveling nuts or other method approved by the Engineer to compensate for dead load deflection.

6. All structural steel shall conform to ASTM designation A7 or A36.

7. See S-45.0 for sign dimensions, positioning and mounting.

Design:

Design loading:

Wind loading 20 psf

Design Stresses:

Concrete: n=10

fc = 1,200 psi

Reinforcing Steel

fs = 20,000 psi

Structural steel

fb = 18,000 psi

Soil Bearing Pressure

- 3,000 psf

Specification

Wind loading 20 psf

Design Stresses:

Concrete: n=10

fc = 1,200 psi

Reinforcing Steel

fs = 20,000 psi

Structural steel

fb = 18,000 psi

Soil Bearing Pressure

- 3,000 psf

Frances Banerjee, General Manager

Revisions

Date Init.

Caisson Concrete shall be 560-C-3250

3" cl. to spiral

4"Ø x 54" (includes a 6" right angle bend), thrd. 8", galv. top 12", 2 hex. nuts & 2 std. washers each.

Four anchor bolts 5/8" x 54" long, equally spaced

3"Ø Hand hole with frame and removable cover. 1"Radius corners in hand hole.

General Notes:

1. All metal parts shall be galvanized after fabrication.

2. All pipes shall conform to ASTM A53 Grade B specification.


4. Tapered tube of equivalent size & capacity may be substituted for pipe post subject to the approval of the Engineer.

5. Sign arms shall be made level by raking the standard with the leveling nuts or other method approved by the Engineer to compensate for dead load deflection.

6. All structural steel shall conform to ASTM designation A7 or A36.

7. See S-45.0 for sign dimensions, positioning and mounting.

Frances Banerjee

Original Approved 1-24-1978

by Philip H. Skarin

Revised 11-15-99

Drawing No. S-98.0
General Notes:
1. All metal parts shall be galvanized after fabrication.
2. All pipes shall conform to ASTM A53 Grade B specification.
4. Tapered tube of equivalent size & capacity may be substituted for pipe post subject to the approval of the Engineer.
5. Sign arms shall be made level by raking the standard with the leveling nuts or other method approved by the Engineer to compensate for dead load deflection.
6. All structural steel shall conform to ASTM designation A36, except as shown on plan.
7. See S-45.0 for sign dimensions, positioning and mounting.

Notes:
1. Total sign area shall not exceed 90 sq. ft.
2. Length "F" shall not exceed 15.5 feet with maximum sign area.

Specification
Design:
Loading: Wind, Normal to sign face: 23.3 psf. Transverse to Face: 0.2 of normal force
Unit Stresses:
Structural steel
Reinforcing Steel
Concrete: n=10
Soil Bearing Pressure
fc = 3000 psi
fs = 24,000 psi
fb = 23,000 psi
c = 3,000 psf
fc = 1200 psi
f6 = 3000 psi
Concrete: n=10
fc = 3,000 psi

General Notes:
1. All metal parts shall be galvanized after fabrication.
2. All pipes shall conform to ASTM A53 Grade B specification.
4. Tapered tube of equivalent size & capacity may be substituted for pipe post subject to the approval of the Engineer.
5. Sign arms shall be made level by raking the standard with the leveling nuts or other method approved by the Engineer to compensate for dead load deflection.
6. All structural steel shall conform to ASTM designation A36, except as shown on plan.
7. See S-45.0 for sign dimensions, positioning and mounting.

Revisions
Date Init.  Title
Original Approved 12-29-70
by Philip H. Skarin

85
**Specification**

**Design:**

**Loading:**
- Wind, Normal to sign face: 23.3 psf
- Transverse to face: 0.2 of normal force

**Unit Stresses:**
- Concrete: n=10  
  \( f_c = 3000 \text{ psi} \)
- Reinforcing Steel  
  \( f_s = 24,000 \text{ psi} \)
- Structural steel  
  \( f_b = 23,000 \text{ psi} \)
- Soil Bearing Pressure  
  \( = 23,000 \text{ psf} \)

---

**Monotube Overhead Sign Supports**

Not to Scale

- Bar 7\(\frac{3}{4}\)\"x\(\frac{3}{8}\)\"x14\(\frac{3}{8}\)\" long, 2 req'd. Cut to fit flush with pipe
- See "Weld Detail"
- Post
- 4 1\(\frac{1}{4}\)" ASTM A-325 bolt with hex. nut & washer
- 2-Pl 1\(\frac{1}{4}\"x14"x22" long
- 2\" Hole in plates & pipe finished smooth

---

**Detail "A"**
Not to Scale

- Removable top Pl. \(\frac{3}{16}\"x15\"\)
- Bar 2\"x\(\frac{7}{8}\)" Bend to circular shape with 12\(\frac{1}{2}\)" O.D.
- Post

---

**Detail "B"**
Not to Scale

- 3\(\frac{1}{2}\)" Dia. C.I.D.H. foundation (PF-34)
- See Section A-A for reinforcement
- Bar 7\(\frac{3}{4}\)\"x\(\frac{3}{8}\)\"x14\(\frac{3}{8}\)" long, 2 req'd. Cut to fit flush with pipe
- See "Weld Detail"
- Post
- 4 1\(\frac{1}{4}\)" ASTM A-325 bolt with hex. nut & washer
- 2-Pl 1\(\frac{1}{4}\"x14"x22" long
- 2\" Hole in plates & pipe finished smooth

---

**Detail "C"**
Not to Scale

- Bar 7\(\frac{3}{8}\)\"x\(\frac{3}{8}\)\"x14" long, 2 req'd
- See "Weld Detail"
- Post
- 4 1\(\frac{1}{4}\)" ASTM A-325 bolt with hex. nut & washer
- 2-Pl 1\(\frac{1}{4}\"x14"x22" long
- 2\" Hole in plates & pipe finished smooth

---

**Robert R. Yates**  
General Manager  
5-26-96

**34' CANTILEVER SIGN**  
**STANDARD AND FOUNDATION DETAILS**  
1/2

---

**CITY OF LOS ANGELES**  
**DEPARTMENT OF TRANSPORTATION**
Robert R. Yates, General Manager

---

OKO: TJ  
SR. T.E.: JEF  
OWN: EC  
T.E.: KF  
JEF: S-92.2
General Notes:

1. Total sign area shall not exceed 180 sq. ft.
2. Length "B" shall not exceed 22' with maximum sign area.
3. See plan for positioning of panel.
4. All metal parts shall be galvanized after fabrication.
5. All pipes shall conform to ASTM A53 Grade B specification.
7. Tapered tube of equivalent size & capacity may be substituted for pipe post subject to the approval of the Engineer.
8. Sign arms shall be made level by raking the standard with the leveling nuts or other method approved by the Engineer to compensate for dead load deflection.
9. All structural steel shall conform to ASTM designation A36, except where otherwise shown.
SECTION A–A
Not To Scale

SECTION B–B
Not To Scale

SECTION C–C
Not To Scale

MOUNTING HARDWARE
Not To Scale

<table>
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<tr>
<th>NO.</th>
<th>DESCRIPTION</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TYPE &quot;A&quot; LAMINATED SIGN PANEL PER LADOT SPECIFICATION 82–052–01</td>
<td>–</td>
</tr>
<tr>
<td>2</td>
<td>I–BEAM 6&quot; x 3.33&quot;, 4.3 Lbs/Linear Ft, 6061–T6 ALUMINUM ALLOY</td>
<td>1 PER PANEL</td>
</tr>
<tr>
<td>3</td>
<td>MAST ARM PER LADOT STD. DWG. NOS. S–92.2, S–92.3 OR S–98.0</td>
<td>–</td>
</tr>
<tr>
<td>4</td>
<td>1/2&quot;–13 UNC–2A, STAINLESS STEEL OR HOT–DIPPED GALVANIZED U–BOLT (4&quot; THREAD) WITH HEX NUT AND TAPERED WASHER (ASTM A307)</td>
<td>2 PER I–BEAM</td>
</tr>
<tr>
<td>5</td>
<td>1/4&quot; x 2&quot; x 6&quot; ALUMINUM STRAPS FOR EACH PANEL CLOSURE PER LADOT SPECIFICATION 82–052–01</td>
<td>4 PER CLOSURE</td>
</tr>
<tr>
<td>6</td>
<td>ALUMINUM MOUNTING CLAMP</td>
<td>4 PER I–BEAM</td>
</tr>
<tr>
<td>7</td>
<td>3/8&quot; x 1.750&quot; (18–8) STAINLESS STEEL POST CLEVIS BOLT (16 THREADS) WITH HEX HEAD NYLON INSERT STUD NUT AND FLAT WASHER</td>
<td>4 PER I–BEAM</td>
</tr>
</tbody>
</table>

GENERAL NOTES:
1. OVERHEAD SIGN PANELS SHALL BE TYPE "A" LAMINATED SIGN PANEL PER LADOT SPEC. 82–052–01.
2. SEE LADOT STD. DWG. NOS. S–92.2, S–92.3, OR S–98.0 FOR DIMENSIONS, SPACINGS, QUANTITIES, AND OTHER REQUIREMENTS DEPENDENT ON MAST ARM SPECIFICATIONS.
4. GUIDE SIGNS SHALL HAVE A WHITE LEGEND AND BORDER MADE OF FP92 TYPE II (HIGH INTENSITY) REFLECTIVE MATERIAL ON A GREEN BACKGROUND MADE OF FP92 TYPE IV (VIP GRADE) REFLECTIVE MATERIAL.
5. REGULATORY SIGNS SHALL HAVE A BLACK (SCOTCH–CAL) LEGEND AND BORDER, ON A WHITE BACKGROUND MADE OF FP92 TYPE IV (VIP GRADE) REFLECTIVE MATERIAL.
### Specifications

**Design:**

**Wind Velocity:**
85 MPH

### General Notes

1. All pipes shall conform to ASTM A53 Grade B Specifications.
2. Bar reinforcements shall conform to ASTM A615, Grade 60.
3. All structural steel shall conform to ASTM designation A36, except as shown on the plan.
4. Welding design and fabrication shall be in accordance with the latest edition of the AWS Structural Welding Code D1.1–Steel.
5. All metal parts shall be galvanized after fabrication.
6. Sign Arm shall be made level by raking the standard with the leveling nuts or other method approved by the Engineer to compensate for dead load deflection.
7. Mounting Brackets shall be per Caltrans Standard Drawing No. S40R.
TRAILBLAZER SIGN

REAR VIEW
(Not To Scale)

FRONT VIEW
(Not To Scale)

* WIDTH CAN BE INCREASED BY 12 INCHES TO ACCOMMODATE "NORTH" OR "SOUTH" LEGEND.

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION

Robert R. Yates 8-19-96
Approved

General Manager

Drawn By
Checked By
Supervised By
Reviewed By

6-20-96
6-20-96
6-20-96
6-15-96

Title

Unistrut Installation (Detail "A")
1. Trailblazer signs to be used in conjunction with static freeway overhead guide signs.
2. Use one or two arrows on the trailblazer sign as appropriate.
3. Sign shall utilize Light Emitting Diodes (LED) for message illumination. The individual LED’s shall equal or exceed in quality as those manufactured by Hewlett-Packard, high power ALInGAP amber type, catalog #HLM-A-DLOO.
4. Sign text shall be 10” U.C. with 1” spacing between each letter and a minimum of one letter width spacing between words.
5. The overall sign size shall be 60” in height x 60” in width and 8” in depth.
6. The weight of the sign (enclosure + all components) shall not exceed 115 lbs.
7. The sign shall be constructed so that the front face panel shall be contained within an extruded 0.90 aluminum frame having full welded seams and powder coat painted with high gloss black finish meeting the color standards of Fed. Spec. 595b, 17038.
8. The transparent Lexan front face panel shall be hinged at the top allowing front access to the interior of the sign. Support shall be provided to hold the Lexan panel open during maintenance.
9. A honeycomb formed block anodized screen shall be provided between the LED’s lamp clusters and the front face panel to enhance resistance to “sun phantom” effect.
10. The sign shall use a closed cell neoprene gasket making the sign watertight.
11. Sign enclosure hardware materials shall be stainless steel AISI303, for corrosion resistance.
12. An opening shall be made on the bottom side of the sign so that all conductors, enclosed in flexible conduit, may exit from the sign into the cantilever arm.
13. The sign shall be vented in the bottom portion on the opposite end from the conductor opening.
14. The LED elements shall be comprised of individual removable modules. Each LED module shall be composed of 1” pixels (clusters) having 8 each LED’s per pixel. One module shall be used for each letter of the message.
15. Each pixel shall be removable or replaceable on the module without the use of any tools other than a screwdriver.
16. The sign shall be equipped with a photoelectric cell mounted on the enclosure to measure ambient light intensity and automatically compensate for ambient light conditions.
17. The LED sign shall be mountable using unistrut mounting system.
18. Sign shall be equipped with a terminal block to provide separate power inputs to each of the text and arrow modules. The sign shall be powered with 120V AC.
19. A full set of proposed sign specifications and drawings shall be supplied to the City prior to manufacturing.

Title
TRAILBLAZER SIGN

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION

Approved
Robert R. Yates, General Manager

DRAWING NO.
S-58.16
NOTES:

1. THE WIDTH DIMENSION, "A" SHALL BE 5-1/2" AND THE CORNER RADIUS DIMENSION, "R", SHALL BE 2". THE BACKPLATE SHALL HAVE A NOMINAL THICKNESS OF 1/8".

ALL OUTSIDE AND INSIDE EDGES SHALL BE FORMED WITH A 1/2" TO 5/8" FLANGE (INSIDE DIMENSION), TURNED AWAY FROM THE FRONT SURFACE.

2. FOR ALL MANUFACTURED SIGNAL HEADS, BACKPLATES SHALL BE DESIGNED SO AS TO SHOW NO BACKGROUND LIGHT BETWEEN THE BACKPLATE AND THE HEAD. THE FABRICATION SHALL BE VACUUM FORMED AS ONE PIECE WITH A BLACK LUSTERLESS, HAIRCELL FINISH ON THE FRONT SIDE. ALL SURFACES SHALL BE FLAT AND STRAIGHT WITHOUT BLISTERS, BUCKLING OR WARPING. FLANGES SHALL BE STRAIGHT, UNIFORM AND HAVE A CONSISTENT FLANGE DIMENSION THROUGHOUT.

3. THE BACKPLATE MATERIAL SHALL BE COMPOUNDED FROM VIRGIN ABS CONTAINING 60% STYRENE, 20% RUBBER AND 20% ACRYLIC. IT SHALL CONTAIN ULTRA VIOLET INHIBITORS AND STABILIZERS FOR PROTECTION AGAINST ULTRA VIOLET DEGRADATION. THE BACKPLATE MUST MEET A FALLING DART IMPACT TEST OF 16 FT/LB.

4. THE INTERNAL SHAPES AND DIMENSIONS SHALL MATCH VARIOUS MANUFACTURED SIGNAL HEADS.
A. STREET NAME SIGNS

NOTES
1. LEGEND SIZE: 8" UPPER CASE, 6" LOWER CASE, SERIES "E" LETTERS; 11-1/4" X 12-3/4" ONE-LINE ARROW
2. COLOR: WHITE LEGEND, BLUE BACKGROUND
3. REFLECTIVITY: HIGH INTENSITY LETTERS ON SUPER ENGINEER GRADE BACKGROUND OR REVERSE SCREENING ON HIGH INTENSITY SHEETING
4. WHERE THE LENGTH OF THE SIGN BLADE WOULD EXCEED 96" (GENERALLY 16 LETTERS AND SPACES) THE STREET NAME TITLES, "ST", "AVE", "BL", "PL", "DR", "RD", ETC. MAY BE DELETED

B. FREEWAY RAMP SIGNS

NOTES
1. LEGEND SIZE: 8" AND 6" SERIES D CAPITAL LETTERS; 11-1/4" X 12-3/4" ONE-LINE ARROW; 18" HIGH US, CALIFORNIA OR INTERSTATE SHIELD, AS APPROPRIATE WITH PROPORTIONAL NUMBERS
2. COLOR: WHITE LEGEND, WARBOYS GREEN (L.A. NO.1) BACKGROUND; BLACK ON WHITE US SHIELD; WHITE ON GREEN CALIFORNIA SHIELD; WHITE ON BLUE AND RED INTERSTATE SHIELD
3. REFLECTIVITY: HIGH INTENSITY LETTERS ON SUPER ENGINEER GRADE OR REVERSE SCREENING ON HIGH INTENSITY SHEETING

APPROVED March 4, 2005

John E. Reeder
for Wayne K. Tanda, General Manager

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION

MAST ARM MOUNTED STREET NAME SIGNS

OWN: MT: T.E.: S-486.0
NOTES:
1. FOR INSTALLATION DETAILS SEE STD. PLAN S-457.0
2. FOR SIGNFIX ALUMINUM CHANNEL FRAMING SYSTEM DETAILS SEE STANDARD PLAN S-476.0
M10J-OCB250AL
ADJUSTABLE LENGTH
SWING SIGN BRACKET
All Aluminum 6061T6 Alloy
and Stainless Steel Components

M10J-OCB250FL
FIXED LENGTH NON-ADJUSTABLE
SWING SIGN BRACKET
All Aluminum 6061T6 Alloy
and Stainless Steel Components

1. Bracket available from:
   Hawkins Traffic Safety Supply
   1255 Eastshore Highway
   Berkeley, CA 94710 (415)525-4040

2. If another sign is installed on the mast arm next to the
   signal head, the street name sign shall be installed with
   12" clearance to the edge of that sign.

3. Sign bracket shall be attached to mast arm with 3/4" wide
   type 201 stainless steel sign banding secured with a banding
   buckle. Banding shall be 0.020" thick double banded or 0.030"
   thick single banded.

NOTES:

M10J-OCB250FL
Bracket

M10J-OCB250AL
Bracket

Main St

L/4  L  L/4

12-1-88
S. E. Rowe

S-457.0
Notes:
1. Sign shall be capable of displaying the following messages:
   R3-1 (No Right Turn symbol), R3-2 (No Left Turn symbol)
   Message Colors:
   Red – Circle & Diagonal. Width of Circle and Diagonal – 1.5 ” stroke – 3 pixel
   Lunar White – Left Arrow or Right Arrow. Width of Arrow – 2” stroke – 4 Pixels
2. The "NO LEFT TURN" and "NO RIGHT TURN" symbols shall be formed by rows of fiber optic bundles
   spaced 0.50 inch (center to center).
3. Fiber optic bundles shall alternate between two or more lamp sources so that in the event
   of a lamp failure the sign shall continue to display a discernible and readable message.
4. Refer to LADOT STD. DWG. No. S–63.1.4 for mounting assembly.
5. Sign shall conform to LADOT Specification No. 82–049–03.
6. For housing description, see LADOT STD. DWG. S–58.21
7. 24” X 24” electric sign shall include a visor enclosure as shown.
8. Lamps shall be solid state, 7W maximum.
SIGN FACE
Not To Scale

(Pedestrian Head Sign)

VISOR ENCLOSURE
Not To Scale
REGULAR PEDESTRIAN SIGNAL HEADS

NOTES:
1. THE "USE TUNNEL" SIGN SHALL BE INTERNALLY ILLUMINATED BY SUPER LED DIODES. THE DIODES SHALL Emitted RED COLORED LIGHT. THE SIGN BACKGROUND SHALL BE BLACK.
2. THE SIGN MESSAGE "USE TUNNEL" SHALL BE 4" IN HEIGHT WITH BRUSH STROKE WIDTH OF 1/2". THE ARROW SHALL BE 6-1/2" LONG WITH BRUSH STROKE WIDTH OF 1".
3. THE SIGN HOUSING SHALL CONSIST OF TWO (2) STANDARD PEDESTRIAN SIGNAL ENCLOSURES CONNECTED TO ONE ANOTHER IN A VERTICAL MANNER.
4. MINIMUM SPACE SHALL BE PROVIDED TO ALLOW FREE MOVEMENT OF DOOR OPENINGS.
5. THE "USE TUNNEL" ELECTRIC SIGN SHALL BE DISPLAYED ONLY WITH THE HAND SYMBOL OF THE PEDESTRIAN SIGNAL HEAD.

* MEETING LADOT SPECIFICATIONS

<table>
<thead>
<tr>
<th>Drawn By</th>
<th>Checked By</th>
<th>Supervised By</th>
<th>Reviewed By</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAR</td>
<td>KHC</td>
<td>ERA</td>
<td>JEF</td>
<td>03-05-92</td>
</tr>
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</table>

"USE TUNNEL" ELECTRIC SIGN

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
S. E. ROWE, General Manager

<table>
<thead>
<tr>
<th>Title</th>
<th>Approved</th>
<th>DRAWING NO.</th>
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<td>&quot;USE TUNNEL&quot; ELECTRIC SIGN</td>
<td>3-18-92</td>
<td>S-58.14</td>
</tr>
</tbody>
</table>

S. E. Rowe
General Manager

99
NOTES:

1. SIGN SHALL BE CAPABLE OF DISPLAYING THE FOLLOWING MESSAGES:
   A: LUNAR WHITE – R3-5L (LEFT ARROW W/ONLY). WIDTH OF ARROW – 1.5” STROKE
   B: LUNAR WHITE – R3-5R (RIGHT ARROW W/ONLY). LETTERS ARE SERIES "C", 1” STROKE

2. MESSAGES SHALL BE FORMED WITH ROWS OF FIBER OPTIC BUNDLES.
   SPACED 0.50 INCH (CENTER TO CENTER).

3. FIBER OPTIC BUNDLES SHALL ALTERNATE BETWEEN TWO OR MORE LAMP SOURCES SO THAT IN THE EVENT OF A LAMP FAILURE THE SIGN SHALL CONTINUE TO DISPLAY A DISCERNABLE AND READABLE MESSAGE.

4. SIGN SHALL COMPLETELY BLANK OUT WHEN NOT ENERGIZED.

5. DOOR FRAME, FACE PLATE, AND INTERIOR OF HOUSING AND VISOR SHALL BE PAINTED FLAT BLACK NON-REFLECTIVE FINISH.

6. VISOR ENCLOSURE SHALL BE FASTENED SECURELY TO THE FRONT FRAME OF THE SIGN.

7. REFER TO LADOT STD. DWG. NO. S-63.1.4 FOR MOUNTING ASSEMBLY.

8. SIGN SHALL CONFORM TO LADOT SPECIFICATION NO. 82-049-03.

NOTES:
1. SIGN SHALL BE CAPABLE OF DISPLAYING THE FOLLOWING MESSAGES:
   A: RED – "X"    WIDTH OF "X" – 1.5" STROKE
   B: GREEN ARROW (\downarrow) WIDTH OF ARROW – 1.5" STROKE
2. THE RED "X" SHALL BE FORMED WITH ROWS OF FIBER OPTIC BUNDLES SPACED 0.50 INCH (CENTER TO CENTER).
   THE GREEN DOWN ARROW SHALL BE FORMED WITH ROWS OF FIBER OPTIC BUNDLES, SPACED 0.50 INCH (CENTER TO CENTER).
3. FIBER OPTIC BUNDLES SHALL Alternate BETWEEN TWO OR MORE LAMP SOURCES SO THAT IN THE EVENT OF A LAMP FAILURE THE SIGN SHALL CONTINUE TO DISPLAY A DISCERNABLE AND READABLE MESSAGE.
4. SIGN SHALL COMPLETELY BLANK OUT WHEN NOT ENERGIZED.
5. DOOR FRAME, FACE PLATE, AND INTERIOR OF HOUSING AND VISOR SHALL BE PAINTED FLAT BLACK NON-REFLECTIVE FINISH.
6. VISOR ENCLOSURE SHALL BE FASTENED SECURELY TO THE FRONT FRAME OF THE SIGN.
7. REFER TO LADOT STD. DWG. NO. S–63.1.4 FOR MOUNTING ASSEMBLY.
8. SIGN SHALL CONFORM TO LADOT SPECIFICATION NO. 82–049–03.
NOTES:

1. SIGN SHALL BE CAPABLE OF DISPLAYING THE FOLLOWING MESSAGES:
   A: LUNAR WHITE – R3-9a (LEFT ARROWS) WIDTH OF ARROWS – 1.5" STROKE
2. MESSAGES SHALL BE FORMED WITH ROWS OF FIBER OPTIC BUNDLES, SPACED 0.50 INCH (CENTER TO CENTER).
3. FIBER OPTIC BUNDLES SHALL ALTERNATE BETWEEN TWO OR MORE LAMP SOURCES SO THAT IN THE EVENT OF A LAMP FAILURE THE SIGN SHALL CONTINUE TO DISPLAY A DISCERNABLE AND READABLE MESSAGE.
4. SIGN SHALL COMPLETELY BLANK OUT WHEN NOT ENERGIZED.
5. DOOR FRAME, FACE PLATE, AND INTERIOR OF HOUSING AND VISOR SHALL BE PAINTED FLAT BLACK NON-REFLECTIVE FINISH.
6. VISOR ENCLOSURE SHALL BE FASTENED SECURELY TO THE FRONT FRAME OF THE SIGN.
7. REFER TO LADOT STD. DWG. NO. S-63.1.4 FOR MOUNTING ASSEMBLY.
8. SIGN SHALL CONFORM TO LADOT SPECIFICATION NO. 82-049-03.
**SECTION A-A**

- **Heli-arc** weld one side of corner post to door frame, both ends.

- **Heli-arc** weld all seams of housing, 4 corners.

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**ITEM**

1. HOUSING, .125" EXTRUDED ALUMINUM
2. DOOR FRAME, .125" EXTRUDED ALUMINUM
3. FACE PLATE, .08" ALUMINUM
4. MATTE/CLEAR POLYCARBONATE LENS, 125" THICK
5. VISOR, .063" ALUMINUM
6. BACK PLATE, .063" ALUMINUM
7. OPTICS ENCLOSURE, .02" ALUMINUM
8. TRANSFORMER SHELF, .063" ALUMINUM
9. LAMPS, SOLID STATE 7W MAX.
10. TRANSFORMERS, 120 VAC PRI., 12 VAC 25 VA SEC.
11. COMMON ENDS (LIGHT INPUT), ALUMINUM
12. END TIPS (LIGHT OUTPUTS), NYLON
13. FIBER OPTIC GLASS BUNDLES, DIA. VARIES
14. CONTINUOUS HINGE, 1-1/4" (OPEN) X .040" STAINLESS STEEL
15. 1/4-TURN LINK LOCKS, STAINLESS STEEL
16. DOOR GASKET, 1" X 3/16" NEOPRENE (ALL SIDES CONTINUOUS)
17. TERMINAL BLOCK (3 PT.)
18. CORNER POSTS, ALUMINUM
19. #8 X 5/16" SLOTTED PAN HEAD SCREWS, STAINLESS STEEL
20. 4 1/2" X 4 1/2" X 1/4" REINFORCEMENT ALUMINUM PLATE (SEE DETAIL "A")
21. #8 X 3/4" SLOTTED ROUND HEAD MACHINE SCREW, HEX NUTS & LOCK WASHERS (STAINLESS STEEL)
22. LENS STIFFENER BLOCKS, ACRYLIC
23. 5/16" X 1-1/4" HEX HEAD MACHINE SCREW BOLT & HEX NUT VISOR SCREWS (STAINLESS STEEL)
24. 5/16" X 1" HEX HEAD MACHINE SCREW BOLT & HEX NUT & LOCK WASHERS (STAINLESS STEEL)
25. MOUNTING BRACKET
26. 1/2" WIRE ENTRY BUSHING

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**SIGN ENCLOSURE**

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION

Approved
June 26, 2008

S - 58.21
MESSAGES SHALL BE FORMED BY ROWS OF FIBER OPTIC GLASS BUNDLES.

2. DUAL ROWS OF FIBER OPTIC BUNDLES SHALL BE USED TO FORM THE WORD "TRAIN". LETTERS IN THE BUS WARNING SIGN MESSAGE SHALL HAVE A BRUSH STROKE OF 1-INCH. BUS SYMBOL AND LETTERS SHALL ALSO CONFORM TO THE LATEST EDITION OF THE FHWA STANDARD HIGHWAY SIGNS BOOK.

3. THE FRONT VIEW OF THE TRAIN OR BUS SHALL BE SOLID FORMED BY ROWS OF FIBER OPTIC GLASS BUNDLES.

4. THE COLOR OF THE MESSAGES SHALL BE YELLOW. THE SIGN BACKGROUND SHALL BE BLACK.

5. FIBER OPTIC GLASS BUNDLES SHALL ALTERNATE BETWEEN TWO OR MORE LAMP SOURCES. IN THE EVENT OF A LAMP FAILURE, THE SIGN SHALL CONTINUE TO DISPLAY A READABLE AND DISCERNABLE MESSAGE.

6. SIGN HOUSING SHALL BE EQUIPPED WITH FOUR (4) 3/16" DRAIN HOLES AT THE BOTTOM.

7. THE VISOR ENCLOSURE SHALL BE FASTENED SECURELY TO THE FRONT FRAME OF THE SIGN.

8. HOUSING SHALL CONTAIN 4 1/2" X 4 1/2" REINFORCEMENT PLATE LOCATED ON THE TOP AND BOTTOM FOR USE WITH THE PELCO ASTRO SIGN-BRAC INSTALLATION.

9. REFER TO STD. DWG. NO. S-63.1.4 FOR THE MOUNTING ASSEMBLY (T=46", L=29").

10. SIGN SHALL CONFORM TO LADOT SPECIFICATION NO. 82-049-03.

11. FOR HOUSING DESCRIPTION SEE LADOT STD. DWG. NO. S-58.21
CONNECT SENSOR CABLE ENDS (B1/B2, B3/B4) TO THE SENSOR J1 SERIAL PORTS.
ROUTE SERIAL COMMUNICATIONS CABLE BEHIND CABINET CHASIS.
CONNECT 2070 CABLE END TO THE 2070 C21S PORT.

1. THIS DRAWING DEPICTS A TWO SENSOR CONFIGURATION. EACH SENSOR CAN ACCOMODATE UP TO TWO LOOPS.
2. INSTALL 283LA TRANSIT SENSORS IN SLOTS 10 OF THE I & J INPUT FILES. CONNECT SENSOR CABLE ENDS (B1/B2, B3/B4) TO THE SENSOR J1 SERIAL PORTS.
3. ROUTE SERIAL COMMUNICATIONS CABLE BEHIND CABINET CHASIS. CONNECT 2070 CABLE END TO THE 2070 C21S PORT. SECURE CABLE TO CABINET CHASIS WITH WIRE TIES.
NOTE:
1. INSTALL C20 HARNES AND PANEL ON RACK ABOVE C2 PANEL.
NOTES:

1. CONNECT 2070 CABLE END TO THE 2070 C21S PORT.
2. INSTALL INPUT FILE HARNESS FROM TBO TO INPUT FILE BACKPLANE.
3. CONNECT C20 HARNESS TO THE C20S PORT.
NOTE:
1. ALL CONNECTIONS SHALL BE SOLDERED.
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C20 CONNECTOR

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NOTES:
1. PROVIDE TWO (2) 1/4" MOUNTING HOLES CENTERED 0.325" FROM TOP AND BOTTOM EDGES.
2. ALL CONNECTIONS SHALL BE SOLDERED.
Notes:
1. Pipe post to be set 1'–6" back from face of curb unless otherwise specified.
2. For minimum pipe diameters and wall thickness refer to ASTM A6M.
3. Use left, right or double arrow on sign as needed.