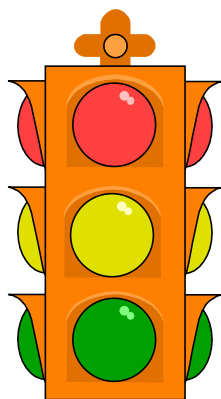




# **CITY OF OCEANSIDE**

## **PUBLIC WORKS DEPARTMENT**

### **TRANSPORTATION DIVISION**



### **TRAFFIC SIGNAL DESIGN**

### **POLICY MANUAL**

## **FOR NEW SIGNAL INSTALLATIONS**

**MARCH 2001**

## **FORWARD**

This manual establishes uniform policies and procedures for the preparation of traffic signal plans in the City of Oceanside.

It is not intended as a textbook, or a substitute for engineering knowledge, experience, or judgement, but rather as a guideline to uniformity and to provide the designer with sufficient information to prepare the desired plans with a minimum of uncertainty.

Traffic signals installed in the City's redevelopment area and in the Rancho Del Oro area may have special design specifications. Engineer should check with the Public Works Department, Transportation Division before starting project.

## **I. GENERAL REQUIREMENTS**

The Engineer preparing traffic signals shall:

- A. Utilize latest Caltrans Standard Specification (Section 86). \*July 1999 (Non Metric Std)
- B. Utilize latest Caltrans Standard Special Provisions.
- C. Include Oceanside special requirements, as defined in this manual.
- D. Utilize latest Caltrans Traffic Manual and MUTCD recommended design practices, where applicable.
- E. Pothole locations of the proposed mastarm poles prior to completion of the plans (if conflicts are foreseen).
- F. Utilize City of Oceanside standard plan sheets and title sheets.
- G. Meet with City Transportation Division to review design concepts. Engineer shall prepare a redlined concept drawing for discussion.
- H. Coordinate with the serving utility for service points and conflicts.
- I. Send plans to all utility companies for their information.
- J. Provide three sets of check prints at each submittal.
- K. Plans shall be signed by a registered Civil Engineer in California.

## **II. PLAN FORMAT AND DRAFTING REQUIREMENTS**

The City requires all traffic signal plans be prepared on City mylars which are obtainable from the City's Engineering Division. The quality of drafting and lettering size shall conform to the highest standards, in order to insure legible reduced prints. Plans shall be produced in AUTO CAD: Version 14 or latest standard. A copy of the electronic file of the signed drawings will be submitted to the City.

Plan preparation shall conform to and/or include the following requirements:

- A. Utilize NEMA phasing conforming to Caltrans Traffic Manual
  - 1.  $\phi 2 + \phi 6 = \text{Arterial}$ 
    - $\phi 2 = \text{Eastbound on E-W Arterial}$
    - $\phi 2 = \text{Northbound on N-S Arterial}$

2. When preparing plans for crossing arterials, the major arterial shall be Phase 2 and 6. If the arterials are apparently of equal importance, the City Transportation Division shall designate the major arterial.
- B. North shall always be oriented up or to the right on all plans. The major arterial shall always be horizontal on the plan.
- C. Signal plans shall be drawn at a 1" - 20' scale.
- D. Generally, signing and striping modifications shall be provided on separate plan sheets, and refer to California Standard Plans for Traffic Signing and Striping.
- E. Pole identification numbering shall always increase clockwise around the intersection with the highest number of poles being always on the controller corner.
- F. Conduit run identification numbering shall start at the farthest conduit crossover from the controller corner and increase always toward the home run pullbox on the controller corner. The final home run conduits (2-3") shall have the highest identification numbers.
- G. Pedestrian ramps shall be paved out on all four corners.
- H. The traffic signal plan shall contain the following: Conductor schedule, pole schedule, phase diagram and construction notes.

Any deviation from the various formats shown on the typical plan shall be approved by the City prior to implementation.

### **III. SPECIAL DESIGN REQUIREMENTS**

The following items provide further information about special requirements of the City of Oceanside. Traffic signals installed in the City's redevelopment area and in the Rancho Del Oro area may have special design specifications. Engineer should check with the Public Works Department, Engineering Division before starting project.

#### **A. CONTROLLER AND CABINET**

1. Shall be Type 170E, with Model 222 Loop Detector Sensor Units (Detector Systems or Equal), Type 400 Modem Module.
2. Shall have Bi Tran Systems Local Controller Program #200CA, with a Bi Tran 412C Prom Module.
3. Shall be fully equipped to operate an eight phase intersection.
4. Shall include emergency vehicle pre-emption (OPTICOM) equipment. 754 discriminators or the latest version. 711, 721, or 722 detectors or the latest version.

3M Representative shall be present at time of turn on.

5. Type 332 cabinet (anodized aluminum) with drawer.
6. Shall be equipped with Clary battery back up or equal
7. Testing of complete control equipment and cabinet wiring shall be accomplished by the City of Oceanside. Allow three weeks for testing. Contractor to deliver and pick up at the City Operations Center, 4925 Oceanside Boulevard.
8. Manufacturer of controller shall submit testing certification for the controller.

**B. SIGNAL AND LIGHTING STANDARDS**

1. Use Case 4 arm loading and wind velocity of 80 mph.
2. All poles shall be five feet behind curb unless shown otherwise.
3. Luminaires shall be 120 V, have integral ballasts and photo-electric switches (Type IV), and be 250 watt high pressure sodium.
4. Provide single faced reflectorized (Diamond Grade VIP) street name signs (letters and background) on signal mast arms (with Astro bracket mount or equal). Per Caltrans Standards.
5. Use MAS mounting for all overhead signals except for overhead left turns shall be MAT mounting.

**C. CONDUIT AND CONDUCTORS**

1. All conduits should be rigid nonmetallic (refer to Caltrans Standard Specifications).
2. All conduits crossing streets shall be three inches minimum unless shown otherwise.
3. Install spare two inch conduit between the controller and adjacent pullbox.
4. Loop detector lead-in cable shall be Type B.
5. Loop detector wire shall be Type 2.
6. Fused splice connectors shall be installed in the pole handhole for each luminaire.
7. Twelve conductor and three conductor signal cable or sixteen conductor signal cable shall be installed from the traffic signal controller to each signal standard.
8. Signal interconnect cable (SIC) shall consist of twelve: No. 19 copper conductor (PE-89).
9. SIC shall be installed in two inch conduit, for the entire length of project on arterials .

**D. DETECTORS**

1. Roadways with advance detection shall have call detectors at the limit line.
2. Advance loops shall have individual DLC for each lane.
3. Right turn lanes shall utilize call delay features.

4. Inductive loops shall be Type E with ten foot spacing in the direction of travel and centered in the lane as shown.
5. The conductors shall be shielded cable (refer to Caltrans Standard Specifications).
6. After conductors are installed in the slots cut in the pavement, the slots shall be filled with hot seal. The sealant shall be at least one inch thick above the top conductor in the saw cut.
7. Use Caltrans Traffic Manual for detector setbacks from limit line (Table 9-1).

**E. SIGNAL AND PEDESTRIAN HEADS**

1. All signal lenses shall be twelve inch glass.
2. All signal faces shall have back plates.
3. Left turn indications shall be all arrows.
4. Pedestrian signal faces shall be Type A (MTS Model 7090).
5. Programmed visibility heads shall only be used when unusual conditions exist.
6. Signal visors shall be tunnel.
7. All red indications shall be LED Dialight. Red Arrow 432-1314-801, Red Ball 432-1210-801 and Ped Hand 432-5401-001. All green and yellow indications shall be LED Synchronex.

**F. GENERAL NOTES**

1. Pole and detector locations are approximate and will be field located by the engineer.
2. Pullboxes shall be #5 unless shown otherwise.
3. Signing and striping shall be the responsibility of the contractor. Removal of existing striping in conflict with new shall be the responsibility of the contractor. All stop bars and legends and arrows shall be thermoplastic installed by contractor.
4. Install E.V.P.E. detector on signal mast arm for each direction (with mini astro bracket).
5. Install Type IIIB service cabinet (anodized aluminum).
6. Service point shall be within 100' from the meter per San Diego Gas and Electric requirements.
  - a. Service cabinet shall be a minimum of ten feet from controller cabinet.
  - b. Service cabinet shall meet San Diego Gas and Electric standards.

**IV. BID DOCUMENT REQUIREMENTS**

- A. City Standards, Caltrans Standard Specifications, and Caltrans Standard Plans shall be referred to as part of the contract requirements. Caltrans current Standard Special Provisions shall be utilized as the base for contract preparation.
- B. In addition to the required, applicable, Caltrans special provisions, the following City special provisions shall be included, where applicable:
1. Maintaining existing and temporary electrical systems - Traffic signal system shutdowns shall be limited to periods between the hours of 8:00 a.m. to 3:00 p.m.
  2. The contractor shall notify the City of Oceanside's Public Works Department, Transportation Division and the Public Services Division Signal Technician, through the City Inspector, a minimum of forty-eight hours before any traffic signal system shutdown.
  3. Planned power outages scheduled by construction projects require fourteen day advance notice to the City of Oceanside's Police Department to review for manpower needs and costs.
  4. Contractor will install temporary stop signs. Night work will be scheduled if feasible.
  5. Contractor will be required to pay costs of overtime or extra personnel for controlling traffic at dark intersections.
  6. The Police Department contact for planned outages will be the Watch Commander at 435-4980 or Dispatch at 435-4911.
  7. The contractor shall place "Stop Ahead" and "Stop" signs to direct vehicle and pedestrian traffic through the intersection during traffic signal system shutdown. Temporary "Stop Ahead" and "Stop" signs shall be either covered or removed when the system is turned on.
  8. The contractor shall have a representative from the controller manufacturer at the signal turn-on.
  9. The initial turn-on shall be between 9:00 am and 2:00 pm unless specified otherwise in writing by Transportation Engineer.
  10. Two complete sets of "Record Drawings" shall be delivered to the Transportation Division upon completion of work.
  11. All material lists, manufacturers warranties, guarantees, brochures and manuals shall be submitted in a bound binder prior to acceptance of project.

## **SINGLE FACE REFLECTORIZED STREET NAME SIGNS**

## **1. FABRICATION**

Sign panels shall be fabricated from a single sheet of 0.080 thickness 6061-H12 aluminum. Panels shall be minimum seventeen inches high and either six foot or eight foot in length as required. Sign panels over six foot in length shall be furnished with a one inch 6063 T6 U channel attached across the longest span of the rear face of the panel.

The front face of the sign shall be laminated with a white reflectorized vinyl sheet background, and overlaid with a green vinyl sheet. The green layer shall be appropriately cut with a mechanical plotter to form borders, letters, numbers, symbols or characters as specified in special provisions or contract plans.

Exposed mounting hardware (boltheads, rivets, etc.) on the face of the sign shall be painted to closely matched the color of the area in which they are placed. Nylon washers shall be used beneath bolt caps at vinyl surfaces of the sign face.

White vinyl sheeting for borders, letters, numbers, symbols or characters shall be 3M reflective sheet Diamond Grade Vip #3990 or approved equal. Vinyl overlay shall be 3M Scotchlite Electronic Cuttable Transparent Film Green #1177 or approved equal. Letters shall be white reflectorized, six inches uppercase and four and one half inches lowercase, with style and spacing established by Caltrans. Sign faces shall include a one inch minimum white reflectorized border. When required sign faces shall include white reflectorized block numbers, minimum two inches in height, placed below the street name.

## **2. MOUNTING**

Reflectorized street name signs shall be furnished with a sign mounting assembly. The sign mounting assembly shall consist of a minimum four foot long, two inches diameter aluminum tube with ends formed to mount flush with the rear of the sign surface, and a cast aluminum sign mounting bracket with stainless steel bands to attach the aluminum tube to the signal mast arm. The sign mounting assembly shall be universally adjustable and suitable for mast arm mounting.

The formed tube shall be extruded from 6063-T5 aluminum. The sign mounting bracket shall be cast from aluminum alloy 713. Each sign mounting assembly shall be complete with all necessary hardware, and not require use of special tools to install or adjust.