

**City of Ontario, California
Engineering Department
Traffic and Transportation Division**

Traffic and Transportation Guidelines



August 2013

TABLE OF CONTENTS

1.0	IMPROVEMENT PLAN DESIGN CRITERIA	1
1.1	General Drafting Standards	1
1.2	Signing and Striping Plans	2
	1.2.1 Street Name Sign Requirements and Installation Guidelines	5
	1.2.2 Advanced Street Name Signs	5
1.3	Traffic Signal Plans	6
1.4	Street Light Plans	14
2.0	ACCESS GUIDELINES	18
2.1	Traffic Signal Spacing	18
2.2	Cross Street Spacing (3 or 4 leg intersections with full access)	18
2.3	Median Breaks	18
2.4	Right Turn Lanes (Deceleration Lanes) at Driveways	19
2.5	Driveway Spacing	19
2.6	Opposing Side Driveway Spacing on Streets w/o Restrictive Medians	20
2.7	Corner Clearance Standards at Intersections	20
3.0	ROUNABOUT DESIGN	21
3.1	Roundabout Layout Features	21
3.2	Roundabout Landscape Features	21
4.0	CHOKER PLACEMENT	23
5.0	MONUMENT PLACEMENT	24
	APPENDIX A – FIGURES	25
	Figure 1: Roundabout Layout Detail	26
	Figure 2: Roundabout Landscape Detail	27
	Figure 3: Choker Placement Guidelines	28
	Figure 4: Monument Placement Case 1	29
	Figure 5: Monument Placement Case 2	30
	Figure 6: Monument Placement Case 3	31
	Figure 7: Monument Placement Case 4	32
	Figure 8: Monument Placement Special Cases	33
	Figure 9: Street Name Sign Locations	34
	APPENDIX B – DESIGN REVIEW CHECKLISTS	35
	Signing and Striping Plans	36
	Traffic Signal Plans	37
	Street Light Plans	38

CITY OF ONTARIO

STREET LIGHT

DESIGN SUBMITTAL CHECK LIST

1.0 IMPROVEMENT PLAN DESIGN CRITERIA

Engineered drawings, otherwise known as plans, submitted by private design engineers (the "Engineer") to the City of Ontario for plan check shall adhere to these Traffic and Transportation Guidelines whenever the plans involve Signing and Striping, Street Lights, Traffic Signals, or Temporary Traffic Control.

The submitted plans will be checked by the City for conformance with the City's standards and policies, and for overall acceptability of the proposed design. The following guiding documents are to be used by the Engineer in preparing the plans: the California Manual on Uniform Traffic Control Devices (CAMUTCD); the Highway Design Manual; the AASHTO Policy on Geometric Design of Highways and Streets; the Caltrans Standard Plans and Standard Specifications; the City's Standard Drawings; and the City's Special Provisions. Other pertinent documents may include Specific Plans, Master Plans, and the Conditions of Approval for the project.

Appendix A of this document contains a "Design Submittal Checklist" that must be fully filled out by the Engineer and included with the submitted plans as part of the submittal package. Street improvement plans, when part of the project, will also be provided with the plans submitted for review.

It is the responsibility of the Engineer to be knowledgeable in traffic engineering principles required for the design of traffic and transportation projects, and to complete a thorough quality assurance/quality control (QA/QC) review of the plans for errors BEFORE submitting them to the City for plan check. Plans submitted with numerous design and/or drafting errors, or drafted with poor quality workmanship, are subject to being rejected and returned without being reviewed.

Plans being re-submitted for a second or subsequent check shall include a new set of plans, the previous set of plans containing the City's red lines and comments, the appropriate design submittal checklist and any other items that document any comments that have been exchanged between the Engineer and the City.

Any and all submittals that do not contain all of the required components as identified in these guidelines are subject to rejection, and may be returned for correction without being reviewed. The Engineer should contact the Traffic Engineering Section at (909) 395-2025 to determine whether there are any special requirements for a project.

1.1 General Drafting Standards

All plan sheets submitted shall be 24 inches by 36 inches with the standard City title block. **Unless requested, title sheets are not required.** No sticky backs or paste-ons will be accepted. At the time of final submittal, copies of the drawings created using CAD drawing programs shall be provided to the City on a CD or DVD, or other acceptable digital storage media used at that time. All drawings submitted should utilize

CITY OF ONTARIO

STREET LIGHT

DESIGN SUBMITTAL CHECK LIST

the “e-transmit” feature and include any reference drawings, plot files and text files as necessary. Drawings created using programs other than Autodesk “AutoCAD” shall be submitted as DXF files. Signatures must be “wet-originals” on the final submittal.

Projects shall have a complete, master set of General Notes, Construction Notes, and/or Legend of Special Symbols for the whole project on the first sheet of the set. Subsequent project sheets shall require only those Construction Notes, and/or Legend of Special Symbols applicable to that sheet. In no case should a Construction Note or Symbol be defined differently on separate sheets of the same project. Abbreviations, Standard Notes or Symbols shown on the Caltrans Standard Plans shall not be redefined on a project. Undefined, nonstandard symbols, shall not be used.

Reference to other drawings shall be made using the City assigned drawing number only. If a drawing number has not yet been assigned, leave a blank space. Drawing numbers will not be assigned until the City asks for originals.

Show surface features such as meter boxes, power poles, sidewalk, drive approaches, existing signs, striping and markings, catch basins, gutters, etc. and both existing and proposed signal poles and street lights. Show and label the types and limits of any pavement whenever the pavement type is other than asphalt concrete.

Where a project spans multiple jurisdictions, a signature block for each affected agency shall be included on the title page, and on each page where there is shared jurisdiction on the project. Show all jurisdictional boundary lines on the plans.

Show a north arrow above the plan scale in the lower right hand corner of the drawing, oriented toward either the top or the right side of the drawing. North arrows shall be consistent with the type being used as a City standard at said time.

Use short dashed lines to indicate equipment and improvements which are existing or are to be installed by another plan sheet. Solid lines, even though drawn narrower, can be erroneously construed as requiring installation of items that may exist.

All submitted plans shall be produced by ink-plotting, or by other permanent print methods. Sepia mylars are not acceptable.

1.2 Signing and Striping Plans

The following standards shall apply to all Signing and Striping Plans:

- The drawing scale shall be 1 inch equals 40 feet.
- Street names, not stationing, shall be used to describe the limits of the drawing or project in the title block. Stationing may be shown for reference only.
- Details of signs or striping should only be shown when they differ from the Caltrans details.
- Signing and striping plans are identified by “T-..” drawing numbers.
- Existing signing and striping to be removed by construction, such as street widening, does not need to be shown.
- Dimension all street and lane widths.

CITY OF ONTARIO

STREET LIGHT

DESIGN SUBMITTAL CHECK LIST

- Taper length dimensions, transitions and longitudinal dimensions shall be shown as needed to insure constructability.
- Provide lane width dimensions on either end of any transitions of lane width.
- Provide dimensions from the beginning and end of a transition to a physical feature that can be measured to in the field (BCR, ECR, street light, fire hydrant, limit line, etc.)
- In order to relate the proposed striping to the existing striping, show the existing striping with dimensions on cross streets, and at either end of the project's boundaries, even if separated by an intersection.

Construction notes for striping should indicate the type of work to be performed (install, paint, remove), a description of the installation (solid-double yellow, 4-inch white lane line, etc.), and if not a removal, the Caltrans detail number. Example: (1) – *Paint solid double yellow centerline per Caltrans Detail 21.*

(2) – *Install thermoplastic 4-inch white lane line per Caltrans Detail 9.*

- Signing and striping, including legends and markings, installed at their ultimate location shall be thermoplastic, with the exception of speed limit marking that shall be in paint.
- Standard white lane lines shall include solid 50-foot long "Leader" lines at intersections.
- Lane use arrows in dedicated turn lanes shall be as follows:
 - In turn lanes less than 100 feet in length
 - place one Type IV arrow at the beginning (back) of the lane.
 - In turn lanes 100 feet in length or more
 - place one Type IV arrow at the beginning (back) of the lane and an additional arrow near the front of the lane.
- Lane use arrows shall be used whenever allowable movements from a particular lane may not be clear to the driver.
- Minimum lane widths are:
 - Single left turn lane – 10 feet
 - Dual left turn lanes – 12 feet inside (#1 lane), 10 feet outside (#2 lane)
 - Through lane against raised median with gutter – 14 feet
 - Through lane against raised median without gutter – 13 feet
 - Through lane against outer curb and gutter – 14 feet
 - Middle through lane – 12 feet
 - Right turn lane – 13 feet
 - Trap right turn lane – 14 feet
- A trap lane shall be provided whenever a travel lane is forced to turn left or right, and shall be consistent with Figure 3B-12 (CA) of the CAMUTCD. The channelizing line (8-inch white) shall be preceded by a minimum of 300 feet of 8-

CITY OF ONTARIO

STREET LIGHT

DESIGN SUBMITTAL CHECK LIST

inch skip white (Caltrans Detail 37B). A Type IV arrow shall be placed at the beginning of the 8-inch skip white.

- Left turn lanes:
 - The 8-inch white channelizing line shall be a minimum of 50 feet in length and shall be increased in increments of 25 feet.
 - The width of the bay taper shall be 75% of the width of the turn lane(s).
 - The approach transition shall be at least 100 feet in length.
 - The reverse curve should become tangent with the left edge of the turn pocket 25 feet before the beginning of the 8-inch white channelizing line. The length of the reverse curve bay taper shall be at least 60 feet for a single left turn lane, and 120 feet for a dual left turn lane.
 - The reverse curve is omitted in a two-way-left-turn-lane. Use a 50-foot gap between the end of the yellow line and the beginning of the 8-inch white line for a single left turn lane, or a 100-foot gap for a dual left turn lane.
- Intersections without crosswalks shall have the striping for the intersection end at a point 10 feet behind half-delta.
- Crosswalks shall be designed per City Standard Drawing 1307. Ladder and Diagonal stripes are not acceptable crosswalk markings. At locations with two wheelchair ramps, as per Caltrans Standard A88A, the crosswalks should be centered on the ramps.
- The Engineer should be realistic about trying to reuse/relocate existing signs within the area of construction.
- Signs should be installed on street light poles as much as possible.
- Where the sidewalk is adjacent to the curb, signs not on street light poles shall be installed on separate poles behind the sidewalk and away from any tree canopy areas.
- Existing signs not within the removal area shall be provided with a note/remark as to the type of sign and whether it is to be removed/relocated or protect-in-place.
- Refer to the CAMUTCD Table 2C-4 to determine the minimum distance for placement of advance warning signs
- There is a legal definition for, and a difference between parking and stopping:
 - Outside travel lane is equal to, or greater than 18 feet wide.
 - Use R26 (CA) signs (No Parking Anytime) to restrict parking.
 - Outside travel lane is less than 18 feet wide.
 - Use R26(S) (CA) signs (No Stopping Anytime)
 - Do not install R26(S) (CA) signs on the same post as a stop sign.

CITY OF ONTARIO

STREET LIGHT

DESIGN SUBMITTAL CHECK LIST

When the limits of the restricted areas need to be clearly defined, or they transition from No Parking to No Stopping, use the appropriate R28 (CA) Series signs; *i.e. an R28(S)(Lt)(CA) sign (No Stopping Anytime with an Arrow pointing left) or an R28(Rt)(CA) sign (No Parking Anytime with an Arrow pointing right.)*

- Divided roadways with raised medians:
 - Install “Divided Highway” (W6-1) and “Divided Highway Ends” (W6-2) signs prior to the beginning and end of the divided roadway sections. Omit the W6-1 and W6-2 signs at signalized intersections. Install Type H reflective markers per Caltrans Detail 26 adjacent to the raised medians
 - Install “Keep Right” (R4-7) signs in the island nose at the beginning of the raised median section and at major intersections. On island noses without R4-7s install Type “K” markers.
 - The entire curb face of an island nose separating directions of travel shall be painted yellow. White shall be used when the island divides traffic traveling in the same direction.
 - Install “One Way” (R6-1 Series) signs on all island noses and in the median across from major driveways.
 - Install Type V “Wrong Way Arrows” (per Caltrans Standard Plans) 100 feet apart in each approach lane at intersections with collector or arterial streets, and at minor “T” intersections without a median break. At other minor intersections install one Type V “Wrong Way Arrow” in each approach lane.
 - On divided highways with three or more through lanes in one direction, install supplemental signing in the median. Lane drop, and merge warning signs in the median shall only be required if they apply to the lane adjacent to the median.
 - At signalized intersections with pedestrian push button poles in the median, install signs a minimum of 3 feet behind the PPB post.

1.2.1 Street Name Sign Requirements and Installation Guidelines

Street name signs are required on all development projects. The sign placement should be shown on the Signing and Striping Plans, or on the Street Improvement Plans if no separate Signing and Striping Plans are prepared for said project. The placement of street name signs should conform to applicable City Standard Drawings and the following guidelines: (See also Figure 9 Herein)

- Street name signs shall be placed at the near right-hand approach side on the higher classification roadway at its intersection with a lower classification roadway, or on the roadway with a higher traffic volume if both intersecting roadways are of the same classification.
- Street name signs shall be placed at the top of a tee intersection, as well as on the right-hand approach side of the through roadway.

CITY OF ONTARIO

STREET LIGHT

DESIGN SUBMITTAL CHECK LIST

- Street name signs shall be placed at the top of a tee intersection with a named public alley.
- Street name signs may be placed on either traffic sign posts or on street light standards if they are located within 8 feet of their intended location.

1.2.2 Advanced Street Name Sign Requirements

Advanced street name signs as per the California MUTCD (G7-1(CA)) shall be installed on all minor and principal arterial roadways in advance of their intersection with all roadways.

1.3 Traffic Signal Plans

The following standards shall apply to all Traffic Signal Plans:

- The scale of the plan shall be 1 inch equal 20 feet. One sheet per intersection is desired, schedules and notes will be accepted on a separate sheet when necessary.
- Traffic signals are usually constructed at the intersection of a named public roadway, and the intersection of another roadway or pathway, that may be a named public roadway, private roadway, driveway, pedestrian crossing or bikeway crossing. The two crossing ways must be named accordingly, and said names must comply with the naming convention established by the City's Development Code. As such, the drawing title shall describe the intersection by listing the north/south name of the intersection first, followed by the east/west name.
- Traffic signal and interconnect plans are identified by "G-.." drawing numbers.
- Installation of traffic signal interconnect conduit extending beyond the limits of any signal drawings for the same project may be accomplished by the use of a note describing the installation.
- Show all underground and overhead utilities on all drawings.
- If applicable, indicate possible conflict with irrigation systems and corrective action by Contractor should damage occur.
- Label the assigned phase adjacent to all symbols shown on the plan for vehicular and pedestrian indications.
- Dimension all street and lane widths, and utility locations. Provide dimension between centerline and curb.
- In areas without sidewalk, provide for the installation of such within the curb return area to the back side of the pole caps, and across the front of the controller and service cabinets.
- See Section 1.2 Signing and Striping Plans for new or modified striping.

CITY OF ONTARIO

STREET LIGHT

DESIGN SUBMITTAL CHECK LIST

- Where signing and striping work is substantial, and causes confusion when placed on the traffic signal plan, a separate signing and striping plan shall be provided using a scale of 1 inch equal to 40 feet.
- On projects with separate striping plans, the signal plan shall reflect the signing and striping as it will be at the end of the project.
- All traffic signal installation or modification plans shall have the following schedules/tables provided for each location:
 - Pole schedule
 - Phase Diagram
 - Conductor schedule with the conduit percent fill shown

Controller Unit Specifications

- The proposed controller unit shall be compatible with any existing or future signal system designated for that area by the City. The controller unit shall be an Econolite ASC/3-2100.
- The controller cabinet shall be a Type "P" with the top of foundation 18 inches above finished grade.
- Controller cabinets shall be placed on the same corner as the service.
- The controller cabinet should be located as close as practicable to provide the following:
 - Located on an approach leg to the intersection.
 - Traffic movements at the intersection are visible and unobstructed by physical features.
 - Possible to park a maintenance truck close to the cabinet.
 - Sidewalks, wheelchair ramps, store entrances, etc., are not obstructed.
 - It should not obstruct pedestrian or driver visibility standards.
 - The precise location of the controller cabinet shall be indicated on the plans by indicating a lateral distance from the closest BCR/ECR, and dimension from the curb face to the front of cabinet. The designer is to take all measures, including potholing if necessary, to ensure there are no conflicting utilities at proposed cabinet location. Final location to be approved by City staff in the field prior to construction.

Traffic Signal Standards

- Median installations of traffic signal standards other than pedestrian push button posts should be avoided.
- Where a standard must be located in a median, the median should be at least 5 feet wide. The standard should include a pedestrian push button and should be set 3 feet behind the nose or the pedestrian aperture on the median.

CITY OF ONTARIO

STREET LIGHT

DESIGN SUBMITTAL CHECK LIST

- 1-A poles for use with five section signal heads shall have a height of 15 feet.
- Signal poles adjacent to a divided arterial street shall have a 35-foot shaft and a 15-foot luminaire arm. All other poles, other than 1-A poles, shall have a 30-foot shaft with a 12-foot luminaire arm. Main signal poles shall have a davit arm above the mast arm to accommodate a horizontally mounted street name sign.
- Signal poles, mast arms and equipment shall be designed for maximum case arm loading and 100 mph wind velocity.
- When installing a pole on a foundation for a future pole with a different bolt pattern, use a standard pole with an adaptor plate rather than a pole with a modified base plate.
- On divided arterials safety lights shall be installed on signal poles at the BCR and the ECR to backlight the intersections.

Traffic Signal Conductors

- Where new conductors are to be added to existing conduit, any existing conductors with THHN or THWN insulation should be replaced. Existing conductors with types of insulation other than THHN or THWN should be examined to see whether they should be replaced.
- Signal cable shall be used on all new installations and for modifications where all the control conductors to a pole shall be replaced.
- Signal cables shall not be spliced or looped. Signal cables shall be provided to each pole in the following manner; one 3-conductor cable for the pedestrian push button; one 5-conductor cable for the pedestrian indications; and either one 12-conductor cable for vehicle indications with overlaps, or a 9-conductor cable for all others.
- The conductor schedule for signal modifications shall be based upon the actual conductors existing at the time of the design and not upon the conductor schedule of the plan used for the construction.
- Safety lighting and internally illuminated street name sign conductors (where applicable) shall not be looped through the controller cabinet and shall use a cable with a minimum #10 AWG conductors for safety lighting and signal commons, and #12 AWG conductors for illuminated street names (when applicable).
- Signal Interconnect Cable (SIC) shall be Fiber Optic Cable.

Traffic Signal Conduit

- There shall be at least two 3-inch conduits entering a controller cabinet.
- The maximum allowable conduit fill is 28% for new conduits, and 35% for existing conduits, and shall be shown on the plans on the conductor schedule.
- For modification projects, all existing conduits should be examined to see if they need replacement.

CITY OF ONTARIO

STREET LIGHT

DESIGN SUBMITTAL CHECK LIST

- The possible location of bore pits should be considered when planning the location of conduit runs.
- Minimum new conduit sizes shall be 2-inch for advance detectors, 3-inch for all other applications, and 4-inch for signal interconnect runs.
- Interconnect conduit is to be run adjacent to signal conduits so as to share the same trench, and shall enter a separate #6E pull box adjacent to the controller cabinet prior to entering the cabinet.

Conductor and Conduit Schedule

- A conductor and conduit schedule shall be provided for all signal plans, preferably on the same sheet as the signal plan. Use numbers inside triangles to designate conductor runs.
- In the conductor schedule, number the conduit runs from the end of one leg to the end of the other leg so that the conduit runs into the controller cabinet are in the middle of the schedule. Each 3-inch conduit entering the cabinet should be considered a separate run. Do not number conduit runs between signal poles and adjacent pull box.

Traffic Signal Pull Boxes

- Pull boxes for signal interconnect runs shall be a minimum #6E. All other pull boxes shall be #5 minimum.
- Pull boxes to be installed in unimproved areas, including unimproved areas behind a curb, shall be traffic rated and shall have a pull box marker installed adjacent to the pull box.
- A #6 pull box should be used:
 - At the end of EACH signal conduit exiting the controller cabinet;
 - When four or more conduits enter the pull box; and
 - Adjacent to mast arm poles.
- Pull boxes should not be placed:
 - In painted medians (except where a raised median is planned);
 - In paved shoulder;
 - In the traveled way; and
 - In the boundaries of a wheel chair ramp.

Vehicle Detection

- Vehicle detection for all new traffic signal installations shall be accomplished through the use of inductive loops. Modifications to existing traffic signals that are utilizing machine vision(video detection) may be required to convert to inductive loops at the discretion of the Engineer.

CITY OF ONTARIO

STREET LIGHT

DESIGN SUBMITTAL CHECK LIST

- Presence detection shall include lane-by-lane detection capable of discriminating between vehicles and bicycles; shall provide extension/hold for detected bicycles; shall contain a pre-formed parallelogram loop wired continuously from the loop to the cabinet; shall be installed across the entire width of each travel lane plus 12 inches of overhang; and shall be installed at a 45 degree angle to approaching traffic.
- Provide two 6-foot diameter loops in each left turn lane behind the presence loops.
 - Place the first loop 15 feet behind the presence loop, measured along the center of the lane, from edge-of-loop to edge-of-loop.
 - Where approach speeds are less than or equal to 40 mph, separate the two circular loops by 45 feet from edge to edge.
 - Where approach speeds are greater than 40 mph, separate the two circular loops by 55 feet from edge to edge.
- Badly damaged pavement shall be identified to be replaced before installing loop detectors.
- Assign the detector loop sets, or areas of video detection, to controller detector inputs as follows:

Detection Area	Label on Plan	Input Channel
Southbound L/T No. 1 Bike/Veh	1B-N-Ø1	1
Southbound L/T No. 2 Bike/Veh	2B-N-Ø1	2
Southbound L/T Count	1C-N-Ø1	3
Southbound L/T Advance	1A-N-Ø1	4
Southbound Thru No. 1 Bike/Veh	1B-N-Ø6	5
Southbound Thru No. 2 Bike/Veh	2B-N-Ø6	6
Southbound Thru No. 3 Bike/Veh	3B-N-Ø6	7
Southbound Thru Count	1C-N-Ø6	8
Southbound Thru Advance	1A-N-Ø6	9
Southbound Striped Bike Lane	4B-N-Ø6	10
Westbound L/T No. 1 Bike/Veh	1B-E-Ø3	11
Westbound L/T No. 2 Bike/Veh	2B-E-Ø3	12
Westbound L/T Count	1C-E-Ø3	13

CITY OF ONTARIO

STREET LIGHT

DESIGN SUBMITTAL CHECK LIST

Westbound L/T Advance	1A-E-Ø3	14
Westbound Thru No. 1 Bike/Veh	1B-E-Ø8	15
Westbound Thru No. 2 Bike/Veh	2B-E-Ø8	16
Westbound Thru No. 3 Bike/Veh	3B-E-Ø8	17
Westbound Thru Count	1C-E-Ø8	18
Westbound Thru Advance	1A-E-Ø8	19
Westbound Striped Bike Lane	4B-E-Ø8	20
Northbound L/T No. 1 Bike/Veh	1B-S-Ø5	21
Northbound L/T No. 2 Bike/Veh	2B-S-Ø5	22
Northbound L/T Count	1C-S-Ø5	23
Northbound L/T Advance	1A-S-Ø5	24
Northbound Thru No. 1 Bike/Veh	1B-S-Ø2	25
Northbound Thru No. 2 Bike/Veh	2B-S-Ø2	26
Northbound Thru No. 3 Bike/Veh	3B-S-Ø2	27
Northbound Thru Count	1C-S-Ø2	28
Northbound Thru Advance	1A-S-Ø2	29
Northbound Striped Bike Lane	4B-S-Ø2	30
Eastbound L/T No. 1 Bike/Veh	1B-W-Ø7	31
Eastbound L/T No. 2 Bike/Veh	2B-W-Ø7	32
Eastbound L/T Count	1C-W-Ø7	33
Eastbound L/T Advance	1A-W-Ø7	34
Eastbound Thru No. 1 Bike/Veh	1B-W-Ø4	35
Eastbound Thru No. 2 Bike/Veh	2B-W-Ø4	36
Eastbound Thru No. 3 Bike/Veh	3B-W-Ø4	37
Eastbound Thru Count	1C-W-Ø4	38
Eastbound Thru Advance	1A-W-Ø4	39
Eastbound Striped Bike Lane	4B-W-Ø4	40

- Replace bike/vehicle presence detection with conventional 6-foot diameter loop detection from the through lanes when there is a corresponding striped bike lane in the same direction of travel.

CITY OF ONTARIO

STREET LIGHT

DESIGN SUBMITTAL CHECK LIST

- Approach speed is the posted speed limit or the current 85th percentile speed of the approaching traffic, whichever is greater. For new intersections use the design speed.
- Advanced detection should be provided on all approaches to an intersection and should be located in accordance with the CA MUTCD Table 4D-101 (for speeds between the values shown, use the next highest value)

Emergency Vehicle Preemption

- Install Opticom Model 722 optical detectors and model 138 detector cables in all new and modified traffic signals. Install one optical detector for each approach at all signalized intersections. The placement of the optical detectors shall take into consideration horizontal and vertical curves in the roadway, and other obstructions to ensure proper communications with the approaching emergency vehicle.
- Discriminator modules shall be Opticom Model 752 and fully compatible with NEMA TS-1 and TS-2.

Street Name Signs

- The traffic signal shall include a street name sign mounted horizontally on a davit arm above the mast arm on the main signal pole. Unless specifically required to be illuminated, street name signs shall be reflective, as per city standards.

Utility Clearance

- It is the design engineer's responsibility to ascertain and provide for the minimum clearance requirements between the signal and/or lighting equipment and overhead utility lines, utility poles, and railroad tracks.

Traffic Signal Electrical Service

- The electric service (SCE) point of connection shall be determined and shown on the plan at the time of first plan submittal.
- The service enclosure shall be precisely located on the plans with corresponding dimensioning a minimum of 10 feet from the controller cabinet, shall be Type III-CF, and placed such that a street crossing between the Edison service point and the enclosure is not required. The placement of the enclosure shall take into consideration the possible impacts to intersection visibility.
- A modification of the existing service shall be required when adding circuits (even if future) for luminaires and IISNS (if applicable).
- The design shall provide separate lighting circuits, 30-amp circuit breaker for each 1200 watts or portion thereof, and the correct number of conductors in the service run for each circuit in the service.

Vehicle Signal Heads

- All vehicle signal faces shall have 12-inch LED indications and have back plates.

CITY OF ONTARIO

STREET LIGHT

DESIGN SUBMITTAL CHECK LIST

- All side mounted heads (vehicular and pedestrian) shall have terminal compartments.
- All mast arm mounted indications shall use MAS mountings.
- Left turn signal faces shall consist of conventional 12-inch red arrow, yellow arrow, and green arrow sections. Older existing configurations with mixed indications of green arrow, and circular yellow and red lenses shall be replaced with an all-arrow configuration as part of any modification project.
- Provide a near, right side indication whenever the distance from the limit line to the indications controlling that movement exceeds 150 feet.
- The distance from the limit line to mast arm mounted signal faces shall be at least 70 feet.
- Provide two mast arm mounted through signal faces whenever the number of through lanes exceeds two, located as close as practicable such that:
 - One face is in line with the lane stripe between the first and second through lanes, and one face is in line with the lane stripe between the second and third through lanes of a three-lane approach.
 - One face is in line with the lane stripe between the first and second through lanes, and one face is in line with the lane stripe between the third and fourth through lanes of a four-lane approach.
- Mast arm mounted left turn signal faces are normally located as close as practicable to the following:
 - One face in line with, but no further out than, the center of a one-lane left turn approach.
 - One face in line with the stripe between the two lanes of a two-lane left turn approach.

Pedestrian Signal Heads

- Pedestrian signal heads shall be GT1 LED Countdown type, 16 inch by 18 inch, with a full hand and man symbol. They shall be located such that there is minimum visibility interference from vehicles stopped at the crosswalk or limit line.

Phase Diagram

- A phase diagram shall be provided.

Pole and Equipment Schedule

- A pole and equipment schedule shall be provided for all signal plans, preferably on the same sheet as the signal plan. Use letters inside circles to designate poles.
- The precise location of poles shall be shown on the schedule by indicating lateral dimensions to either side of the BCR or ECR, as the case may be, and shall

CITY OF ONTARIO

STREET LIGHT

DESIGN SUBMITTAL CHECK LIST

show the dimension from the curb face to the center of the pole. The minimum allowable setback shall be 5 feet from curb face to center of pole. The designer is to take all measures, including potholing if necessary, to ensure there are no conflicting utilities at proposed pole locations. The final location of all poles to be approved by City staff in the field prior to construction.

Railroad Pre-Emption

- A twelve-conductor signal cable shall be provided between the traffic signal controller cabinet and the railroad crossing cabinet. All other Railroad Pre-Emption design elements will be determined at the time of design in consultation with City, Railroad, and California Public Utilities Commission (PUC) staff.

Pedestrian Push Buttons and Posts

Pedestrian Push Button (PPB) posts shall be avoided to the extent possible by considering striping changes to the plans, or alternative pole locations. When needed, PPBs shall be shown on the plans using the correct Caltrans symbol. Install R9-3a signs, and corresponding pedestrian barricades at locations where marked crosswalks are not provided and pedestrian crossings are not allowed.

- At corners:

PPBs that are to be mounted on a signal standard should be within 5 feet of the crosswalk (or where a marked crosswalk will be if it has not yet been installed). If the signal standard cannot be located in this area, a separate PPB post should be installed.

In medians:

PPBs that are placed within a raised median shall be 2 feet behind the nose of the median, or 2 feet behind the farthest prolongation of the pedestrian opening through the median. There shall be no traffic signs mounted on any PPB post, and no PPBs are to be installed in raised medians narrower than 4 feet.

Traffic Signal Modifications

- On modification plans, show design or model numbers for all existing special poles, especially concrete, where such information exists on City drawings or can be obtained in the field.
- Modify or replace existing pedestrian indications and PPB signs to comply with Special Provisions (i.e. convert to Caltrans Type A with International Symbols.)
- Call for installation of backplates where none exist. In some cases this will require modification of existing signal mounting hardware.
- In pole schedules on modification plans, provide notes/remarks indicating: (E) existing to remain, (N) new equipment or pole, (R) relocate equipment to new pole or pole to new location, (M) modify existing. If appropriate, note if all are existing or new.

CITY OF ONTARIO

STREET LIGHT

DESIGN SUBMITTAL CHECK LIST

- Where installing additional or new indications on existing poles, call for either new installation, replacement, or modification of signal mounting hardware; not two or more choices. The designer should make the choice based on present condition of equipment and/or ease of, or cost of, modifications.

Intersection Safety Lighting

- Safety lighting circuits(120-volt), internally illuminated street name sign circuits(120-volt)(when applicable), and street lighting circuits(240-volt) shall be independent of each other.
- Intersection safety lights shall be of the LED type, 157-watt GE Luminaire Order No. ERMCMC-0-C3-43-2-Gray.

1.4 Street Light Plans

The following standards shall be applied to all Street Light Plans:

- The scale of the plan shall be 1 inch equals 40 feet, or 1 inch equals 20 feet.
- The drawing title shall list the name of the street upon which the lights are located on and a corresponding cross street name.
- Street Light plans are identified by “L-..” drawing numbers.
- Show all utilities.
 - If applicable, indicate possible conflicts with irrigation systems, and identify corrective action to be taken by Contractor should damage occur.
- Where Street Light improvements exist, or are proposed on private property (behind ROW line), indicate existence of, or need for, encroachment and maintenance easements. Appropriate easements must be provided prior to approval of plans for private developments. On City projects, coordinate acquisition with City personnel.
- Dimension all street and lane widths and utility locations. Provide dimension between centerline and curb.
- In areas without sidewalk, provide for the installation of such within the curb return area to the back side of the pole caps and across the front of the service cabinets.
- Street light standards, mast arms and equipment shall be designed for maximum case arm loading of 100 mph wind velocity.
- It is the design engineer’s responsibility to ascertain and provide for the minimum clearance requirements between the lighting equipment and overhead utility lines, utility poles, and railroad tracks. The design engineer shall obtain approval from Edison for overhead clearance per CAL/OSHA Electrical Safety Order 2946 with a minimum clearance of 10 feet from overhead high voltage lines and street lights.

CITY OF ONTARIO

STREET LIGHT

DESIGN SUBMITTAL CHECK LIST

- Provide separate lighting circuit and 30-amp, 240-volt breakers for each direction or portion thereof from the service with a minimum of 4 circuits.
- Provide correct number of conductors in service runs for each circuit in the service with a #5 pull box in front of the service per the City Standard Drawings 5105 and 5106.
- The owner shall be responsible for all costs associated with the operation and maintenance of the street lighting/traffic signal facilities and appurtenances. A signed Consent and Waiver annexation form to the appropriate Landscape and Lighting Districts shall be filed with the City Engineer's office. This form and applicable fee can be obtained from the Engineering Department's Assessment and Consulting Services section by contacting General Services at (909) 395-2016.
- This form shall be fully executed, notarized by all the record owner(s) of the property, and recorded with the San Bernardino County Recorder's office. This original recorded document and a copy shall be submitted to the City Engineer's office, Engineering Services/Land Development Section, prior to the issuance of a building permit or final approval of the subdivision map, whichever occurs first, along with the payment of the applicable fee for annexing the property to the appropriate District.

Location of Street Lights

- Intersections:
 - Two minimum on local residential and industrial intersections;
 - Four, one each on opposite corners, where one of the streets has a curb separation of 64 feet or greater.
- Between intersections with staggered spacing as follows:
 - Local residential curb separation 40 feet or less, 130 feet \pm 15 feet;
 - Local industrial curb separation 48 feet or less, 180 feet \pm 15 feet;
 - Collector street curb separation 64 feet or less, 160 feet \pm 15 feet;
 - Standard arterial curb separation 76 feet or less, 122 feet \pm 15 feet;
 - Divided arterial curb separation 94 feet or less, 170 feet \pm 15 feet opposed;
 - Divided arterial curb separation 128 feet or less, 120 feet \pm 15 feet opposed.
- Attempt to place near lot lines, but allow clear sight distances for survey ties.
- Sharp curves, steep hills and other street conditions as deemed necessary by the City Engineer.
- Alleys, where warranted by extreme situations resulting in severe problems.

CITY OF ONTARIO

STREET LIGHT

DESIGN SUBMITTAL CHECK LIST

Installation Required of Developers

- Mandatory for all subdivisions and developments requiring a building permit in accordance with Sections A & B, except:
 - Remodels and additions less than 25% of the existing structures, where no street improvements are required but shall pay an in-lieu fee for a portion of a street light.
 - Existing Edison lights shall be replaced with City standard lights.

See the next page for additional Street Light information:

CITY OF ONTARIO

STREET LIGHT

DESIGN SUBMITTAL CHECK LIST

<i>Roadway Section</i>	<i>Lamp Group</i>	<i>Pole Spacing</i>	<i>Configuration</i>	<i>Old Lamp</i>	<i>Lamp Type</i>	<i>Std. Dwg. Pole Type</i>	<i>Watts</i>	<i>Mfg</i>	<i>Luminaire Order No.</i>
36/40-Foot Local Street Section	I	130'±15'	Staggered	70 HPS	LED	5101-Type B	55	BetaLED	STR-LWY-2M-HT-03-D-UL-SV-525-43K-R-UTL
							49	GE	ERM-C-0-A7-43-2-GRAY
							46	Leotek	GCA1-40E-MV-NW-2M-GY-350-WL
48-Foot Local Industrial Street Section	II	180'±15'	Staggered	100 HPS	LED	5101-Type A	70	BetaLED	STR-LWY-2M-HT-04-D-UL-SV-525-43K-R-UTL
							80	GE	ERM-C-0-A4-43-2-GRAY
							71	Leotek	GCA1-40E-MV-NW-2M-GY-350-WL
64-Foot Arterial/Collector Street Section	III	160'±15'	Staggered	150 HPS	LED	5101-Type C	104	BetaLED	STR-LWY-3M-HT-06-D-UL-SV-525-43K
							115	GE	ERM-C-0-A5-43-2-GRAY
							105.8	Leotek	GCA1-60E-MV-NW-3M-GY-350-WL
76-Foot Arterial/Collector Street Section	IV	122'±15'	Staggered	250 HPS	LED	5101-Type C	104	BetaLED	STR-LWY-3M-HT-06-D-UL-525-43K
							127	GE	ERM-C-0-A6-43-2-GRAY
							105.8	Leotek	GCA1-60E-MV-NW-3M-GY-350-WL
82-Foot Arterial/Collector Street Section	VI	162'±15'	Opposed	250 HPS	LED	5101-Type C	188	BetaLED	STR-LWY-3M-HT-11-D-UL-525-43K
							157	GE	ERM-C-0-C3-43-2-GRAY
							159	Leotek	GCA1-90E-MV-NW-3M-GY-350-WL
84-Foot Arterial/Collector Street Section	V	130'±15'	Staggered	250 HPS	LED	5108	119	BetaLED	STR-LWY-3M-HT-07-D-UL-525-43K
							127	GE	ERM-C-0-A6-43-2-GRAY
							132.7	Leotek	GCA1-80E-MV-NW-3M-GY-350-WL
94-Foot Principal Arterial Street Section	VII	148'±15'	Opposed	250 HPS	LED	5101-Type C	188	BetaLED	STR-LWY-3M-HT-11-D-UL-525-43K
							157	GE	ERM-C-0-C3-43-2-GRAY
							150	Leotek	GCA1-120E-MV-NW-3M-GY-350-WL
72-Foot Principal Arterial Street Sections	VIII	175'±15'	Opposed	250 HPS	LED	5108	188	BetaLED	STR-LWY-3M-HT-11-D-UL-525-43K
							157	GE	ERM-C-0-C3-43-2-GRAY
							159	Leotek	GCA1-90E-MV-NW-3M-GY-350-WL
84-Foot Principal Arterial Street Sections	IX	160'±15'	Opposed	250 HPS	LED	5108	202	BetaLED	STR-LWY-3M-HT-12-D-UL-525-43K
							157	GE	ERM-C-0-C3-43-2-GRAY
							159	Leotek	GCA1-90E-MV-NW-3M-GY-350-WL
96-Foot Principal Arterial Street Sections	X	147'±15'	Opposed	250 HPS	LED	5108	202	BetaLED	STR-LWY-3M-HT-12-D-UL-525-43K
							157	GE	ERM-C-0-C3-43-2-GRAY
							159	Leotek	GCA1-90E-MV-NW-3M-GY-350-WL
108-Foot Principal Arterial Street Sections	XI	140'±15'	Opposed	250 HPS	LED	5108	202	BetaLED	STR-LWY-3M-HT-12-D-UL-525-43K
							157	GE	ERM-C-0-C3-43-2-GRAY
							176.8	Leotek	GCA1-100E-MV-NW-3M-GY-350-WL
130-Foot Principal Arterial Street Section	XII	118'±15'	Opposed	250 HPS	LED	5108	188	BetaLED	STR-LWY-3M-HT-11-D-UL-525-43K
							157	GE	ERM-C-0-C3-43-2-GRAY
							159	Leotek	GCA1-90E-MV-NW-3M-GY-350-WL