



## TRAFFIC SIGNAL DESIGN: ENGINEERING CONCEPTS (TE-02)

### COURSE OUTLINE

#### Day One

8:00 - 8:15 AM Introductions, Outline, and Overview (JJP)

8:15 - 10:00 AM Module 1: Overview of Traffic Signal Design Process (JJP)

- Justification, warrants, and alternatives analysis
- Consideration of context (street design, land use, and future use)
- Ownership, operation, and maintenance responsibilities
- Applicable design references
- *Interactive Engagement Exercise:* Go over an example of intersection/street improvement plan, with traffic volumes, then examine and discuss options.

10:00 AM - 12:00 NN Module 2: Signal Phasing, Operation, and Detection (JJP)

- Relationship between signal phasing and operations
- Relationship between signal phasing and intersection design
- Detection – purpose and alternatives
- Detection – technology alternatives and selection process
- *Interactive Engagement Exercise:* Give trainees example(s) of turn templates and lane geometry, and have them determine signal phasing.

12:00 NN - 1:00 PM Lunch (on your own)

1:00 - 3:00 PM Module 3: Controllers and Cabinets (BS)

- Relationship between signal phasing and controller
- Relationship between controller and cabinet
- Controller hardware and software
- Cabinet hardware
- *Interactive Engagement Exercise:* Give trainees example(s) of signal phasing diagram (s), and have them determine conflict monitor breakout(s) and cabinet output files.

3:00 - 5:00 PM Module 4: Signal Heads and Poles (BS)

- Signal heads - where do they go? Visibility cones and use of PV heads, louvers, and visors. Also relationship to signal cabinet circuit breakers
- Poles - where do they go? Considerations for pole placement – ADA, utilities, maintenance, and lighting considerations
- Mast arms- height, length, wind-load

- Signage installations on mast arms and signal poles - considerations
- *Interactive Engagement Exercise:* Give trainees an example of geometric striping plan, and have them select appropriate mast arms, signal poles, and pole foundations.

## Day Two

### 8:00 - 10:00 AM Module 5: Conduit and Wiring (BS)

- Conduit and pull boxes – why, where, size, type, conduit fill
- Wire/Cable terminations
- Conductor Schedule
- *Interactive Engagement Exercise:* Given a basic signal design, ask trainees to complete a conductor schedule.

### 10:00 AM - 12:00 NN Module 6: Intersection Highway Safety Lighting (JJP)

- Purpose
- Lighting measurements, standards and guidance
- Typical Light contours and pole placement
- Wiring, circuiting and service cabinets.
- *Interactive Engagement Exercise:* Go over lighting of an intersection, give assumptions, and have trainees determine light locations and wiring.

### 12:00 NN - 1:00 PM Lunch (on your own)

### 1:00 - 3:00 PM Module 7: Specifications and Estimates (BS)

- Purpose - what is included?
- Key points – materials, execution, and payment
- Format – Caltrans, APWA, CSI, agency, etc.
- Cost estimate – relationship to specifications, format, examples.
- Project delivery - design/bid/build, design-build, DBOM, etc.
- *Interactive Engagement Exercise:* Use the trainees' drawings in Module 7, determine an engineer's cost estimate based on unit-price cost structure.

### 3:15 - 4:30 PM Module 8: Drawing A Signal Design Plan (JJP)

- *Interactive Engagement Exercise:* Hands-on, this module is all-interactive. Take information from past modules and design the traffic signals for an intersection. We will deliver blank sheets, then walk trainees through the design of a signal based on information given in previous modules.

### 4:30 - 5:00 PM Wrap-Up, Course Evaluation, and Certificates (BS)