Section 104

(February 2016)

Traffic Signals

This section establishes the uniform policies and procedures for the preparation of traffic signal plans, signal equipment, and construction requirements in the City of Irvine.

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

Please refer to the latest posted amendment for any updates or modifications to the standards herein.

Revision:	Date:	Descriptions:
Rev #1	8/7/19	Update to TS-8A – Traffic Signal Loop Detection Details
Rev #2	5/4/20	Update to Table 700-6(A) Pre-Qualified Materials and Equipment

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Section 104
Traffic Signals

104.1 GENERAL.

1. The Design Engineer preparing plans and specifications for traffic signals shall:

   a) Comply with the requirements of the latest revision of the State of California Standard Plans and Specifications, except as modified herein, for the installation and/or modification of traffic signals, highway safety lighting, and internally illuminated street name signs (IISNS). Sign(s) installation shall comply with State of California Standard Specifications, Section 56. Traffic stripes and pavement markings shall comply with State of California Standard Specifications, Section 84, except that thermoplastic material shall not be allowed. All pavement-marking stencils shall match City of Irvine stencils (Hawkins). Pavement markers shall comply with State of California Standard Specifications, Section 85.

   b) Use the latest edition of the California Manual on Uniform Traffic Control Devices (MUTCD) available on the Caltrans web site at: http://www.dot.ca.gov/hq/traffops/engineering/mutcd

   c) Use the latest Standard City Title Sheet (Attachment 1), Sample Traffic Signal Plan Sheet (Attachment 2) and other attachments for reference on completing plans.

   d) Include the following:

      (1) Title sheet with general notes. Title sheet shall also include a note identifying the approval date of the City of Irvine Standards and Design Manual Section 104 -Traffic Signals, and all other relevant standards documents, used in designing of the project.

      (2) Reference sheet(s) with applicable detail plans from the attachments herein. Reference sheets shall include up to eight detail plan sheets tiled two vertically and 4 horizontally on each 24-inch x 36-inch sheet.

      (3) Civil Engineering plans for any right of way (ROW) and/or traffic signal maintenance easement.

(4) Traffic signal plans shall include new and existing curb and gutter, right of way, maintenance easements showing all existing utilities, all traffic signal interconnect cable, and City boundary lines on both civil and traffic signal plans. All widths shall be clearly labeled and dimensioned to the centerline.

(5) Signing and striping plans, if applicable.

(6) Traffic control plan for vehicles, bicycles and pedestrians, if applicable.

2. During the design phase of the project, the Design Engineer shall be responsible for potholing proposed traffic signal pole locations (Type 1A and pedestrian poles excluded) to foundation depth and width, prior to completion of the plans in order to identify potential conflicts with existing substructures. A log of the work performed showing depth, width, location, and unusual obstructions in the potholes shall be provided with the plans after potholing.

104.2 PLAN PREPARATION.

1. General

a) The first plan-check submittal shall be at least 80% complete. Plans not conforming to the standards herein will be returned to the design engineer for correction without further review.

b) The City of Irvine requires the title sheet of “stand-alone” traffic signal plans to be prepared on 24-inch x 36-inch Mylar sheets with a ½ inch margin on all sides except the left side, which shall be 1½ inches. Deviations from these Specifications shall be requested from the Engineer prior to commencement of work.

c) All traffic signal plans shall be prepared using the latest version of AutoCAD. Prior versions of AutoCAD, released within four years of the plan submittal date, will be allowed. Provide files of completed plans in both AutoCAD and Adobe PDF format on CD-ROM disks to the Engineer upon completion of design.

2. Plan Preparation

Plan preparation shall use AutoCAD layer descriptions (Attachment 3) and conform to the following requirements:

a) Signal plans shall be drawn at a 1" = 20' scale.

b) All lettering shall be 1/10-inch minimum in height when plotted or printed at full scale. The lettering size shall conform to the highest standards in order to issue legible reduced size prints

c) Streets shall always be oriented horizontally and vertically and the north arrow positioned near the upper left-hand corner of the plan. Refer to Standard Traffic Signal Plan Sheet sample (Attachment 2.)

d) When preparing plans for crossing arterials, the major arterial shall be Phases 2 and 6: Phase 2 for eastbound direction on an east-west arterial and northbound direction on a north-south arterial. If the streets are apparently of equal importance, the designer shall request a determination from the Engineer.

e) Squares shall be used to designate construction notes.

f) Triangles and clouding shall be used to indicate plan revisions.

g) All existing conditions shall be screened to appear lighter than the rest of the drawing.

h) Include standard traffic signal notes. Refer to 104.5 of this manual.

i) Signal pole schedule. Refer to 104.5 of this manual.

j) Detector/sensor schedule. Refer to 104.5 of this manual.

k) Conductor schedule. Refer to 104.5 of this manual.

l) The preferred location for cabinet placement shall be per Plan TS-9B, on the far-side corner of the main arterial, in the direction of the primary flow of traffic. A minimum of 48 inches of concrete pad shall be provided at the front and rear of the signal cabinet and electrical service/BBS. The police panel side of the signal cabinet may abut the ROW providing there are no physical barriers preventing access to the panel. Where sufficient ROW exists, up to 24 inches of clearance shall be provided on the police panel side of the signal cabinet. Clearances shall be unobstructed by any above ground facilities. A retaining wall shall be installed where required. The Engineer must approve any variance from the preferred location.

m) Front side of traffic signal controller cabinet should open toward the intersection where possible. Electrical meter shall be facing the street.

n) Nearest practical Southern California Edison service vault and service handhole shall be shown on plan.

o) Utilize N.E.M.A. phasing conforming to the California MUTCD.

p) Symbols shown shall conform to State of California Standard Plans ES-1A and ES-1B.

q) Pole identification numbering shall increase clockwise around the intersection, with the No. 1 being the first pole away from the controller corner. Refer to the Sample Traffic Signal Plan Sheet (Attachment 2).

r) All traffic signal plans shall indicate required traffic signal pole locations as referenced from BCR, ECR, and curb face.

s) Conduit run identification numbering shall start at the conduit crossing farthest from the controller corner and increase sequentially toward the home run pull box on the controller corner. The final home run conduits shall have the highest identification numbers. Refer to 104.5 of this manual.

t) Signing and striping, where applicable, shall be provided on separate plan sheets, drawn at a scale of 1”=40’. Traffic striping shall be in accordance to the latest editions of the State of California Standard Plans and California MUTCD.

u) Unless otherwise physically required, an exclusive/split phase shall not be used in the phase sequence.

v) Traffic signal modifications requiring the installation of video detection cabling shall require all conductors to be removed from the conduit before pulling new cable. “Slipping” is not allowed.

w) Traffic signal modifications requiring the installation of ADA compliant Push Button Assembly cabling will require all conductors to be removed from the conduit before pulling new cable. “Slipping” is not allowed.

x) Traffic signal modifications shall match installed equipment by make and model. If the system cannot be matched, the entire system shall be replaced.

y) Maximum allowable conduit fill is 26% for new installation and 40% for existing/ modified installations.

z) Intersections approaches with a minimum of three through lanes or a distance greater than 36-feet from the lane line between the through and the left turn lanes to the far right most curb and gutter in the direction of travel will require two video detection cameras unless one camera is sufficient as determined by the Engineer. If two cameras are

installed, one camera will be mounted on the Luminaire arm as shown in TS-9F, the second camera will be mounted on the mast arm as shown in TS-9F.

aa) Advance detection shall be provided on streets where the approach speeds are 25 mph or greater. Separate loops shall be placed in each through lane. Advance loop setback requirements from intersections, based on approach speeds, are shown below.

Advance Detector Loop Setback
MUTCD Table 4D-101

Approach Speed (mph)	Setback (feet from limit line)
25	105’
30	140’
35	185’
40	230’
45	285’
50	345’
55	405’
60	475’

3. Deviations

The Engineer shall approve any deviation from the Sample Traffic Signal Plan Sheet or any of the specifications included in this document.

104.3 CONSTRUCTION SPECIAL PROVISIONS.

A. THESE ADDITIONS, DELETIONS, AND AMENDMENTS MODIFY THE SPECIFICATIONS IN THE “STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION”, 2015 EDITION AND ANY SUPPLEMENTS.

B. THESE ADDITIONS, DELETIONS, AND AMENDMENTS SHALL TAKE PRECEDENCE IN THE EVENT OF A CONFLICT WITH ANY STANDARD SPECIFICATIONS.

C. AS A CONVENIENCE, THESE ADDITIONS, DELETIONS, AND AMENDMENTS HAVE BEEN ARRANGED IN A FORMAT THAT PARALLELS THE “STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION”, 2015 EDITION AND ANY SUPPLEMENTS.

PART 1 GENERAL PROVISIONS

SECTION 1 - TERMS, DEFINITIONS, ABBREVIATIONS, UNITS OF MEASURE AND SYMBOLS

1-1 TERMS.

1-2 DEFINITIONS.

Agency/Board/City – The City of Irvine, a municipal corporation.

Agency Representative – The person or engineering/architectural firm authorized by the Agency to represent it during the performance of the Work by the Contractor and until Final Acceptance. The Agency Representative means the Agency Representative or his assistants.

Calendar Day – The 24-hour day as denoted on the calendar.

Calendar Month – The period including the first through the last day of a month.

City – See Agency.

Engineer – The City Engineer acting either directly or through the Agency Representative.

Laboratory – The laboratory authorized by the Agency or the Agency Representative to test material and work involved in the project.

State Standard Specifications – Standard Specifications issued by the State of California, Department of Transportation, Current Edition.

1-3. ABBREVIATIONS.

1-3.2 Common Usage.

Abbreviation	Word or Words
ADA	Americans with Disabilities Act
BCR	Beginning of Curb Return
DBE	Disadvantaged Business Enterprise
DLC	Digital Loop Cable
ECR	End of Curb Return
ESA	Environmentally Sensitive Area
NPDES	National Pollutant Discharge Elimination System
NOI	Notice of Intent
SWMP	Storm Water Management Plan
SWRCB	State of California Water Resources Control Board
WATCH	Work Area Traffic Control Handbook

WPCP	Water Pollution Control Plan
WDID	Waste Discharge Identification Number
PEC	Photo Electric Control
SQPL	State of California Qualified Products List, Current Edition
TEES	State of California Transportation Equipment Electrical Specifications, Current Edition

DELETE the abbreviation of MUTCD and SUBSTITUTE with the following:

MUTCD	California Manual on Uniform Traffic Control Devices

1-3.3 Institutions.

Abbreviation	**Word or Words**
ACI	American Concrete Institute
AI	The Asphalt Institute
AIA	American Institute of Architects
APWA	American Public Works Association
AREMA	American Railway Engineering and Maintenance of Way Association
ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
CRSI	Concrete Reinforcing Steel Institute
NFPA	National Fire Protection Association
PCA	Portland Cement Association
SSPC	Steel Structures Painting Council
SWRCB	State of California Water Resources Control Board
UBC	Uniform Building Code, Pacific Coast Building Officials Conference of the International Conference of Building Officials

PART 7 STREET LIGHTING AND TRAFFIC SIGNAL SYSTEMS

SECTION 700 – MATERIALS

REVISE as follows:

700-1 GENERAL. *MODIFY to ADD the following:*
The City maintains a Traffic Signal Qualified Product List (QPL) included Section 700-6 of the Special Provisions. The Engineer shall not be precluded from sampling and testing products on this list. The manufacturer of the product on the QPL shall furnish the Engineer a Certificate of Compliance in accordance with subsection 4-1.5 "Certificate of Compliance" of the Special Provisions for each type of material supplied.

Requests for substitutions shall be in accordance with subsection 4-1.6 "Trade Names or Equals" of the Standard Specifications and the Special Provisions.

700-3.5 Conduits.

700-3.5.4 Rigid Non-Metallic Conduit. *DELETE in its entirety and SUBSTITUTE with the following:*
Rigid non-Metallic conduit shall conform to the requirements of the UL Standard for Rigid Non-Metallic Conduit, Publication UL651 and UL 651B, and the State Standard Specifications Section 86-2.05A "Type-3". Rigid non-metallic conduit connections shall be of the solvent weld type. Unless otherwise indicated, the minimum trade size and type of conduit shall be as indicated in the table below:

Size	Schedule	Usage
4"	80*	Signal wiring, interconnect*
4"	40	Signal wiring, interconnect
3"	80*	Service wiring, primary pole entry, interconnect between intersections*
3"	40	Service wiring, primary pole entry, interconnect between intersections
2 ½"	80*	DLC cables*
2 ½"	40	DLC cables
2"	40	Type 1 pole entry, pedestrian push button poles

* Schedule 80 conduit shall be used for all conduit installed beneath roadways, driveways and when installed in foundations.

700-3.7 Pull Boxes. *DELETE 3rd, 4th, and 5th paragraphs and SUBSTITUTE with the following:*
See *City of Irvine Standard Plan* TS-2 for installation.

Traffic signal wiring and interconnect boxes shall be 18-inch deep, No. 6 size (17 ½-inch x 30 ½-inch lid), per the State Standard Plans plan ES-8A, with a lightweight polymer lid and "TRAFFIC SIGNAL" marking, unless otherwise noted on the plans.

Electrical service boxes shall be No. 5 size (13 ¾-inch x 23 ¼-inch lid), per the State Standard Plans plan ES-8A, with a lightweight polymer lid and "EDISON" marking.

Communications electrical boxes and primary signal wiring boxes, for storage of wire and cable adjacent to traffic signal cabinets, shall be B40 size (23 7/8-inch x 35 ½–inch lid) with a lightweight polymer lid and "TRAFFIC SIGNAL" marking.

The Contractor shall coordinate with Southern California Edison for location of service handholes and install per their requirements.

700-3.10 Services. *DELETE the last paragraph and SUBSTITUTE with the following:*
Services enclosures shall conform to the Irvine Traffic Signal Standard Plan TS-7A, shall be from a manufacturer listed on the QPL.

a) Color: The service enclosure shall be powder coated beige: color number FS20475, Federal Standard 595C with a gloss level of 60 or higher.

b) Circuits: The service shall provide for the following circuits using independent breakers:

    1) Main breaker capacity: 100-amp

    2) Metered circuits shall be provided for IP-CCTV (15-amp), Communications equipment (15-amp), LED luminaire (15-amp), as well as one spare breaker (15-amp).

    3) Six outlet power strip to be mounted on plywood board to allow for equipment power.

ADD:

700-3.10.1 Battery Backup System (BBS). Service enclosure assemblies shall include an Agency approved BBS. The system shall consist of bypass switch, Power Transfer Relay, BBS inverter, and batteries as shown in the City of Irvine Traffic Signal Standards Plan TS-7. Approved batteries and required cabling shall be provided with the BBS system. BBS components shall be from a model approved on the Irvine Traffic Signal QPL.

700-4.4 High Pressure Sodium Luminaires. *DELETE in its entirety and SUBSTITUTE with the following:*
High pressure sodium luminaires are not permitted for new or modified installations. Only LED luminaires are permitted, see the QPL for LED luminaires.

700-4.7.2 Photoelectric Control Units. *DELETE e) and SUBSTITUTE with the following:*

e) *Housed in the service enclosure.*

700-4.7.3 Contactor. *DELETE in its entirety and SUBSTITUTE with the following.* The contactor shall have contacts rated to switch the specified lighting load. The contact configuration shall be "normally open" unless otherwise specified in the Special Provisions. The contactor shall be the solid state type. No mercury type contactors will be allowed. The contactor shall have a minimum rating of 30A, per contact, inductive load.

700-5.3 Conductors and Cable.

700-5.3.1 General. *DELETE Sign Lighting and Grounded and Common in TABLE 700-5.3.1 and SUBSTITUTE with the following:*

Circuit	Signal Phase Or Function	Identification			Size
		Insulation Colors		Band Symbols	
		Base	Stripe		
Sign Lighting	Ungrounded Line	Orange	White	NBR	14
Grounded and Common	Sign Lighting	White	Orange	NBR	14

700-5.3.4 Fiber Optic Cable.

700-5.3.4.1 General. *MODIFY to ADD the following:*
Optical fiber shall be manufactured by Corning per Agency supplied QPL:

700-5.3.4.3 Construction. *DELETE in its entirety and SUBSTITUTE with the following:*
The fiber optic cables shall be constructed as shown on the Irvine Traffic Signal Standards Plan TS-3

700-5.3.4.5 Identification. *MODIFY to ADD the following:*
Fiber optic cables must have "Corning Optical Cable" or "Corning Optical Fiber" on the labeling to identify the cable or optical fiber manufacturer.

700-5.4 Controllers.

ADD:

700-5.4.1.1 Signal Control Cabinet Assembly. The signal control cabinet assembly shall include the following components:

a) Traffic signal controllers as defined in subsection 700-5.4.4.6 of these Specifications

b) Detection and isolation subsystem as defined in subsection 700-5.4.4.7 of these Specifications

c) Load control subsystem as defined in subsection 700-5.4.4.8 of these Specifications

d) Power distribution subsystem as defined in subsection 700-5.4.4.9 of these Specifications

e) Signal monitor unit as defined in subsection 700-5.4.4.10 of these Specifications

f) Fiber Interconnect Unit (FIU) as defined in subsection 700-5.4.4.11 of these Specifications

g) Fiber Optic Splice Canister as defined in subsection 700-5.4.4.11 of these Specifications

h) Communications data network as defined in subsection 700-5.4.4.12 of these Specifications

i) Retractable document storage tray below the controller

j) Call input test panel as defined in subsection 700-5.4.4.13 of these Specifications

k) Removable manual control pushbutton with coiled cable

l) Front and rear door florescent lighting (downward reflectorized) with door-actuated switches

700-5.4.3.4 Aluminum Cabinets. *MODIFY to ADD the following:*
The traffic signal controller assembly shall be an Irvine ATMS 332L as defined herein and in accordance with the Irvine Traffic Signal Standards Plan TS-9C.

Interior and exterior cabinet surfaces shall be powder coat finished in beige: color, color number FS20475, Federal Standard 595C with a gloss level of 60 or higher.

ADD:

700-5.4.4.5 Contactor. The power distribution assembly shall utilize a solid state type contactor. No mercury type contactors will be allowed. The contactor shall have a minimum rating of 50A, per contact, inductive load.

ADD:

700-5.4.4.6 Controller Unit. The Irvine traffic signal controller unit shall be as specified in the plans or model 2070E controller as defined in the 2009 TEES. The controller unit shall be from a manufacturer approved on the QPL. The 2070E controller shall include 2070-1C CPU, 2070-3B (8-line) display, 2070-4A power supply, 2070-2A I/O

Firmware: The 2070E 1C module shall be delivered pre-loaded with Econolite ASC3 firmware (current version), unless otherwise specified in the project specifications. A client site license certificate shall be provided with each controller.

All installations shall include a factory produced category 5e network 3-foot cable to interface the traffic signal controller to the communications network switch.

ADD:

700-5.4.4.7 Detection and Isolation Subsystem.
Input Files: Irvine ATMS 332L signal control cabinets shall include two input file assemblies. Each input file shall be a TEES 332L standard, 14-channel unit with PC backplane, from a manufacturer approved on the QPL under the "Model 332L Cabinets" section. The input file slots shall be allocated and labeled as shown on the Irvine Traffic Signal Standards Plan TS-9C.

Detectors and Isolators: Inductive loop detectors shall be Model 222, two channel units. DC isolators shall be Model 242, two channel units. AC isolators shall be Model 252, two channel units. Detectors and isolators shall be from a manufacturer approved on the most recent SQPL under the respective sections or as amended by the QPL.

ADD:

700-5.4.4.8 Load Control Subsystem. Output and auxiliary files: Irvine ATMS signal control cabinets shall include one TEES 332L standard, 12-position output file and one 6-position auxiliary file. The load control subsystem shall be fully populated with sixteen (16) Model 200 Switch Packs and all relays. Switch Packs shall be compatible for use with a model 2010 SMU with plus features activated (PDC SSS-86-3 or equivalent). All load control subsystem components shall be from a manufacturer approved on the QPL. The output and auxiliary file slots shall be labeled for phase and function.

ADD:

700-5.4.4.9 Power Distribution Subsystem. The main power distribution assembly shall be a TEES 332L standard PDA No. 2L unit. The PDA No. 2L shall be populated with two Model 204 flashers and a high efficiency (>80% at ½ load) Model 206L or 206G power supply. All power distribution subsystem components shall be from a manufacturer approved on the most recent SQPL under the "Model 206L Power Supply Module" sections or as amended by the QPL.

ADD:

700-5.4.4.10 Signal Monitor Unit. Agency approved models are listed on the QPL.

ADD:

700-5.4.4.11 Fiber Optic Interconnect Unit. Cabinet assemblies shall include a Fiber Optic Interconnect Unit (FIU) to provide for termination of fiber optic cable. The FIU shall be assembled from components listed on the QPL, unless otherwise specified in the project plans. The exact quantities of components required shall be defined by the

fiber charts provided by the Agency before signal turn-on. The FIU shall interface with the Fiber splice canister via a drop cable.

The splice canister shall be assembled from components listed on the QPL, unless otherwise specified in the project plans. The exact quantities of components required shall be defined by the fiber charts provided by the Agency before signal turn on.

ADD:

700-5.4.4.12 Communication Data Network. Agency approved models are listed on the QPL herein.

ADD:

700-5.4.4.13 Call Input Test Panel. A call input test panel shall be installed at the uppermost position of the signal control cabinet rack, above the controller, facing the front. The panel shall include 12 tactile push button switches with ¼ inch minimum diameter head, one for each vehicle and pedestrian input phase. The panel shall be labeled to indicate the phase and function of each button. The push buttons shall be wired to the appropriate output terminals on the back of the input files, actuating the primary vehicle and pedestrian call inputs for each phase. An in-line Molex connector shall be installed in the cabinet wiring harness within 12 inches of the panel to allow removal without cutting conductors.

700-5.5 Traffic Signal Faces and Fittings. *MODIFY to ADD the following:*
Traffic signal faces and fittings shall conform to:

a) State Standard ES-4D

b) State Standard Plan RSP ES-4E

700-5.5.11 Circular Light Emitting Diode (LED) Signal Modules. *MODIFY to ADD the following:*
Agency approved models are listed on the QPL.

700-5.6.2.5 Housing. *DELETE in its entirety and SUBSTITUTE with the following:*
Housing shall conform to:

a) State Standard Plan ES-4B

b) Pedestrian heads shall be clamshell side-mount Types SP-1-T, SP-2-T or top-mount TP-1-T

700-5.6.6 Pedestrian Signal Sections. *DELETE in its entirety and SUBSTITUTE with the following:*
Agency approved models are listed on the QPL.

700-5.8 Detectors.

700-5.8.2 Inductive Loop Detectors. *MODIFY to ADD the following:*

Inductive loop detection shall be utilized only for advance detection on all new traffic signals. Modifications involving replacement of less than 50% of existing presence (limit line) detection loops may retain inductive loop detectors unless otherwise shown on the plans.

700-5.8.2.2 Sensor Units. *MODIFY to ADD the following:*

a) ATMS cabinet applications shall use TEES standard Model 222 sensor units.

b) Type-P cabinet applications shall use Model 262-FC sensor units.

700-5.8.2.3 Conductors. *MODIFY to ADD the following:*
Irvine Inductive loop installations shall use only Type 2 loop wire and Type B lead-in cable (DLC).

ADD:

700-5.8.4 Video Detectors.

700-5.8.4.1 General. The term “video detection system” shall be defined as a complete installation consisting of one or more video cameras, one or more video processors, extension modules and Input/ Output (I/O) modules, a remote communications module, LCD display monitor, configuration device, mounting hardware, cabling, and any required interfacing equipment, providing the detection of vehicles and bicycles solely from visual image information.

Where temporary detection is required due to road construction activity or extended overhead wiring, video detection shall be installed before construction commences to ensure continuous operation of the presence detection. After construction, any temporary camera systems shall be removed or the entire intersection presence detection shall be converted to permanent video detection per the above specifications. Partial video detections will not be accepted unless approved by the Engineer. All temporary wired/wireless hardware shall become property of the Agency after wired conversion is completed.

700-5.8.4.2 System Components. Agency approved models are listed on the QPL .

700-5.9 Pedestrian Push Button Assemblies. *MODIFY to ADD the following:*
Note: Traffic signal modifications shall match installed equipment by make and model. If the system cannot be matched, the entire system shall be replaced.

All signalized intersections shall have ADA compliant pedestrian and bicycle push buttons as specified below:

a) PPB: New or modified Pedestrian Push Buttons (PPB) shall be ADA compliant Accessible Pedestrian Signals (APS). The sign plates shall be per California MUTCD sign specifications.

b) BPB: New or modified Bicycle Push Buttons (BPB) shall be ADA compliant, non-vibratory, Type B. The sign plates shall be with directional arrow and per California MUTCD sign specifications.

c) Special: When applicable, provide special height push buttons for equestrian trail street crossings.

d) ADA requirements: The pedestrian push button assembly shall be mounted such that the center of the PPB cap is located per ADA regulations or one meter (40") from the ground. Bicycle push buttons, and any other non-vibratory buttons, shall have a 2-inch diameter, stainless steel, ADA compliant push button caps.

e) The pushbutton must be within accessible reach range of a level landing for use from a wheelchair.

Agency approved models are listed on the QPL.

ADD:

700-5.10 Closed Circuit Television (CCTV). Video/ power circuit cable shall be POE utilizing 24AWG, shielded, solid core, Category 5e cable. Data connection installation between POE and communications switch shall include factory produced category 5e network cable to interface the IP-CCTV to the communications network switch. Existing CCTV cables may not be CAT5E.

Agency approved IP-CCTV equipment is listed on the QPL.

ADD:

700-5.11 Internally Illuminated Street Name Signs (IISNS). Internally illuminated street name sign (IISNS) fixtures shall be 18-inch height and 72-inch or 96-inch length. Sign construction shall conform to State Standard Specifications Section 86-6.09 and State Standard Plan ES-7P for Type A signs, except as noted below. Agency approved manufacturers are listed on the QPL.

Fixtures shall have two street name panels with 3M™ Scotchlite™ Series 4090 Diamond Grade DG³ reflective sheeting. Lettering background overlay shall be 3M™ ElectroCut™ Film Series 1179 (Brown). Panels shall be covered with a UV protective, clear acrylic plastic film. Panels shall have aluminum frames compatible with approved fixtures. Design specifications for the IISNS panels are shown on the City of Irvine Traffic Signal Standards Plan TS-5.

Text font shall be "Highway Gothic, Series E," (8" upper case and 6" lower case). Letter spacing (kerning) shall be 100%. Each panel shall have only one street name in a single line of text, unless otherwise approved by the Engineer.

When opposing approaches have different street names, unique street name panels shall be used for each side of the intersection. The unique street name panel shall contain an arrow for the associated street.

Street names placed on signs shall be approved through the City Planning Department before panels are ordered and installed.

Type IV photoelectric control shall be provided on each IISNS fixture.

The IISNS shall be illuminated by a solid-state high flux/high output ultra-high brightness white LED light engine panel.

Agency approved models are listed on the QPL.

ADD:

700-5.12 Emergency Vehicle Preemption (EVP).

700-5.12.1 General. Emergency Vehicle Preemption (EVP) shall include encoded phase selectors, optical detectors, optical detector cable, card racks, and any wiring harnesses required to interface the phase selectors to the traffic signal cabinet to actuate the controller and monitor phase green status.

700-5.12.2 Components. Agency approved models are listed on the QPL.

700-5.12.3 Warranty. At time of installation, the manufacturer shall warrant the system has been properly installed and is ready for operation. All component parts of the system shall be warranted to be free from workmanship and/or material defects during the first five (5) years from the date of shipment from the manufacturer. The system shall include an additional five-year maintenance coverage plan, providing repair or replacement at a fixed deductible charge to the Agency, for a total of ten (10) years of product coverage.

ADD:

700-5.13 Lighted Crosswalks. Agency approved models are listed on the QPL.

All signs and In-Roadway Warning Light (IRWL) units shall comply with current MUTCD requirements.

Lighted crosswalk systems shall provide an audible message when the crosswalk system is activated.

The system shall use ADA compliant push buttons, installed as defined in 700-5.9 “Push Button Assemblies” of these Specifications.

Conduits and pull boxes shall conform to 700-3.5 “Conduit” and 700-3.7 “Pull Boxes” of the Special Provisions.

ADD:

700-6 IRVINE TRAFFIC SIGNAL QUALIFIED PRODUCTS LIST.

700-6.1 General. Specific models listed on this Qualified Products List (QPL) are approved by the Agency. Equivalency requests for substitute products shall require submittal of specifications and/or samples, as deemed necessary by the Agency, to determine interchangeability, interoperability, and/or compatibility with existing hardware and equipment. Submittals shall be required before use or installation of any material not specifically listed or defined in the Special Provisions. Materials not specifically listed in the QPL or Special Provisions by make and/or model shall comply with the characteristics defined in the Special Provisions or referenced base specifications.

Equipment equivalency submittals shall be coordinated with the City of Irvine Signal Operations and Maintenance lab**.** Such submittals will be reviewed for actual equivalency within 30 days of receipt and approved or declined by the Engineer. Submittal for equivalency shall not guarantee acceptance. Only accepted equipment, as specified herein, shall be allowable for field installation. Approval of equivalency shall be conveyed to the submitter through the Agency Representative in a written memo from the Engineer modifying the specifications herein.

700-6.2 Reference Specifications. Except as modified herein and on the Plans, Specifications, and Special Provisions all components shall conform, where applicable, to the following:

a) State of California Department of Transportation, Qualified Products Lists (SQPL)

b) State of California Department of Transportation, Transportation Electrical Equipment Specifications (TEES)

c) The MUTCD

700-6.3 Pre-Qualified Materials and Equipment. Materials and equipment listed in Table 700-6(A) have been pre-qualified for use in the City of Irvine. Where no specific make is specified, or to determine the standards for equivalency, refer to the Irvine Special Provisions sections listed in the reference column.

Table 700-6(A) Pre-Qualified Materials and Equipment

Material Type	Make	Model	Reference
Standards and Arms:			700-3.3
Conduit:			700-3.5
Pull Boxes:			700-3.7
#5 Box	Oldcastle/Christy	N30 Electrical Box	
	BES	C30 Electrical Box	
#5 Lid	Oldcastle/Christy	FL 30T	
	BES	PL30T	
#6 Box	Oldcastle/Christy	N36 Electrical Box	
	BES	C36 Electrical Box	
#6 Lid	Oldcastle/Christy	FL36T	
	BES	PL36T	
B40/C40 Box	Oldcastle/Christy	N40 Electrical Box	
	BES	C40 Electrical Box	
B40/C40 Lid	Oldcastle/Christy	SYN2436T	
	BES	PL40T	
Electrical Service for ATMS 332L Cabinet:			700-3.10
	Myers Power Products	B.M. No. 518636E	
Electrical Service for Type-P Cabinet:			700-3.10
Left Utility Entrance	Myers Power Products	B.M. No. 518606E	
Right Utility Entrance	Myers Power Products	B.M. No. 518642E	
Side Mount BBS Cabinet:			700-3.10.2
	Myers Power Products	B.M. No. 527341	

Material Type	Make	Model	Reference
Communications/CCTV Cabinet:			700-3.10.2.4
	Myers Power Products	B.M. No. 5051595 Irvine	
Battery Backup System:			700-3.10.2
	Myers	MP2000E	
Luminaires:			700-4.4
	Leotek	EC3-10M-MV-NW-3-GY-700-WL	
Conductors and Wiring:			700-5.3
Interconnect Cable:			700-5.3.3
60-Fiber Hybrid	Corning	060XU4-CP013D20	
12-Fiber SMF	Corning	012EU4-64701D20	
Traffic Signal Cabinet Assembly:			700-5.4
	SQPL Approved	332L (With Irvine Modifications)	
Controller Unit and Firmware:			700-5.4.4.6
2070E	Siemens/Eagle		
2070E	Safetran		
ASC3	Econolite firmware	Version (latest)	
Input Files and Detector Units: SQPL			700-5.4.4.7
Output Files: SQPL			700-5.4.4.8
Load Switch Pack:			700-5.4.4.8
	PDC	SSS-86-3	

Material Type	Make	Model	Reference
Signal Monitor Unit:			700-5.4.4.10
	EDI	2010ECLip	
Fiber Optic Splice Canister:			700-5.4.4.4.11
Splice Canister	Corning	SCF-6C22-01	
Splice Tray		SCF-ST-099	
Fiber Optic Interconnect Unit:			700-5.4.4.11
Term Housing	Corning	CCH-02U	
MM Coupler Panel		CCH-CP12-15T	
SM Coupler Panel		CCH-CP12-19T	
Fan-Out Kit		FAN-BT25-06	
MM ST Connector		95-000-51	
SM ST Connector		95-200-51	
Communication Data Network:			700-5.4.4.12
Ethernet Switch	Cisco	IE-3000-8TC	
FX Port Module		IEM-3000-8FM=	
Power Supply		PWR-IE3000-AC=	
Rack Mount		STK-RACKMNT-2955	
Vehicle and Pedestrian Signal Faces:			700-5.5
12”Red Ball	GE Lighting	DR6-RTFB-VLA	
	Dialight	433-1210-003XL	

Material Type	Make	Model	Reference
	Leotek	TSL-12R-LX-IL6-A1	
12”Amber Ball	GE Lighting	DR6-YTFB-17A-VLA	
	Dialight	433-3230-901XL	
	Leotek	TSL-12Y-LX-IL6-A1	
12”Green Ball	GE Lighting	DR6-GTFB-VLA	
	Dialight	433-2220-001XL	
	Leotek	TSL-12G-LX-IL6-A1	
12”Red Arrow	GE Lighting	DR6-RTAAN-17A	
	Dialight	432-1314-001XOD	
	Leotek	TSL-12RA-IL6-A1	
12”Amber Arrow	GE Lighting	DR6-YTAAN-17A-YX	
	Dialight	431-3334-901XOD	
	Leotek	TSL-12YA-IL6-A1	
12”Green Arrow	GE Lighting	DR6-GTAAN-17A	
	Dialight	432-2324-001XOD	
	Leotek	TSL-12GA-IL6-A1	
PED Module	GE Lighting	PS7-CFF1-26A	
	Dialight	430-6479-001X	
	~~Leotek~~	~~TSL-PED-16-CIL-9~~	
Detection Systems:			700-5.8
Video Detection Processor	Iteris	4ch Vantage Edge 2 with Smart Cycle.	

Material Type	Make	Model	Reference
Video Detection Camera	Iteris	RZ-4 Advanced Wide Dynamic Range Camera	
Video Detection Communication Module	Iteris	Edge Connect	
Video Detection Extension Module	Iteris	Extension Module	
Push Buttons:			700-5.9
Accessible Pedestrian Station Approved by Agency for Special Locations	Polara	Navigator Push Button Station, 4-wire	
(New Construction)	Polara	Navigator Push Button Station, 2-wire	
Closed Circuit Television (CCTV) System:			700-5.10
Camera	Axis	Q6045-E MkII	
Arm	Axis	T91A67 Pole Bracket T91B61 Wall mount	
Internally Illuminated Street Name Signs (IISNS):			700-5.11
Sign and Enclosure	Nu-Art		
	McCain		

Material Type	Make	Model	Reference
	National		
LED Light Engine	Illumecon	1072FGF for 6’ 1096FGF for 8’	
Emergency Vehicle Preempt (EVP) System:			700-5.12
Phase Selector	GTT Opticom	764	
2ch, 2 way	GTT Opticom	722	
2ch, 1 way	GTT Opticom	721	
1ch, 1 way	GTT Opticom	711	
Lighted Crosswalk System:			700-5.13
	Silicon Constellations		

SECTION 701 – CONSTRUCTION

REVISE as follows:

701-1 GENERAL. *MODIFY to ADD the following:*
The work shall conform to the following codes and standards:

a) California Administrative Code, Title 8, Chapter 4, subchapter 5

b) NEC

c) The State Standard Specifications and State Standard Plans, current editions

d) The MUTCD

ADD:

701.1.1 Equipment List and Drawings. Agency approved models are listed on the QPL.

701-4 DAMAGE TO EXISTING SYSTEMS.

ADD:

701-4.1.1 Traffic Detectors. Existing detection shall be maintained at all times during construction. In the event of unexpected damage by the Contractor or any of their subcontractors as determined by the City Representative, the Contractor shall commence repairs immediately. The Contractor shall replace and restore to operation any damaged detector (inductive loop or other) within ten days after damage occurs. If at any time damage to existing presence vehicle loop detection exceeds 50%, video detection shall be installed for the entire intersection in accordance with the Special Provisions, unless otherwise approved by the Engineer.

The City shall have the option to complete necessary repairs and charge the responsible Contractor for any associated repair costs, pursuant to Title 6-3-317 of the City Municipal Code.

701-11 PULL BOXES.

701-11.1 General. *MODIFY to ADD the following:*

a) Pull boxes shall not be installed in paved shoulder, roadway, in or within 1’ of handicap ramps.

b) Pull boxes shall be installed in the sidewalk.

c) A grounding rod and lug shall be installed in each pull box per State Standard Specifications Section 86-2.10, providing connection for the #10 solid wire from the nearest pole.

d) Pull box covers shall not be bolted down.

e) The B-40 communications electrical box shall include a fiber optic cable splice canister to provide for splicing of fiber optic cable. The splice canister shall be the consolidation point for all fiber optic cables and the source of the drop cable for the traffic signal cabinet fiber interconnect unit (FIU).

701-12 CONDUIT.

701-12.1 General. *MODIFY to ADD the following:*
Conduit types and sizes for each application shall be as specified in 700-3.5 "Conduit" of the Standard Specifications and these Special Provisions.

Unless otherwise indicated, the depth of the conduit shall be as indicated in the table below:

Location	Depth Requirement
Beneath Streets and Driveways	42 inches below finished surface or 6 inches below the deepest structural section
Back of Curb and Gutter	30 inches below top of curb

If conduits cannot be installed at required depths: Conduits shall be installed at the maximum allowable depth and encased with a minimum of 3" of concrete, unless otherwise specified by the Engineer. Conduits shall not be installed deeper than 66".

701-13 WIRES, CONDUCTORS AND CABLES.

701-13.1 General. *MODIFY to ADD the following:*
The service feed from the service pull box to the electrical service shall have a tag at both ends identifying them as "City of Irvine Service Conductors".

All individual conductors shall be labeled in the cabinet per NEMA numeric format. Conductor insulation colors and wire sizes shall be in accordance with the State Standard Specifications Section 86.2.08A, "Conductor Identifications," except as required herein.

The conditions of this subsection shall apply to all new traffic signal installations and modifications where entire signal conductor legs are re-pulled.

New traffic signal field conductors shall be multi-conductor signal cable and individual wires as specified herein and in accordance with the State Standard Specifications Sections 86-2.08D, "Signal Cable," and 86-2.08B, "Multiple Circuit Conductors."

New traffic signal field conductors used for phase indications and buttons shall be State standard 12CSC, 5CSC, and 3CSC multi-conductor signal cable. IMSA cable shall not be utilized. Each signal cable shall be one continuous cable from the signal cabinet to the terminal block on the signal standard it services. No splicing of signal cable shall be permitted. The signal cables shall be labeled in each pull box, per the

State Standard Specifications Section 86-2.08D, and at the signal cabinet, indicating the signal standard to which it is connected.

Primary and secondary signal standards shall receive one 12CSC cable for vehicle and pedestrian indications and one 3CSC cable for each button circuit. An additional 5CSC cable shall be furnish and installed for each additional vehicle phase serviced by the pole. All 12 CSC cable conductors shall terminate on the terminal block. The 3CSC cables shall service the buttons directly. The 12CSC conductor utilization shall be in accordance with the State Standard Specifications Section 86-2.08D, with the black conductors reserved as spares. The 3CSC conductor utilization shall be: blue/black stripe for pedestrian buttons, blue/orange stripe for bike buttons, and white/black stripe for common.

Pedestrian signal standards shall receive one 5CSC and one 3CSC cable. The 5CSC cable shall service the pedestrian indication and the 3CSC cable shall service button circuits.

Conductors and cables shall be as defined in the State Standard Specifications Section 86-2.08 “CONDUCTORS AND CABLES” and the Special Provisions.

a) When new conductors are added to or existing conductors removed from an existing conduit, all conductors shall be removed. The conduit is to be cleaned and blown out to ensure it is free of obstructions and debris. All copper cables shall have 3’ -5’ coiled in each pull box to allow for servicing.

b) Each multi-conductor cable shall be one continuous cable from the signal cabinet to the terminal block on the signal standard it services. No splicing of multi-conductor cable shall be permitted.

c) All cables and conductors shall be neatly arranged and wire tied as necessary to give a neat finished appearance in all pull boxes, cabinets and termination points.

d) All cables are to be pulled by hand. Winches or power activated pulling equipment shall not be used in accordance with State Standard Specifications 86-2.05C.

e) All cables and conductors shall be pulled in the conduit as one unit per State Standard Specifications 86-2.09B.

701-13.2 Splices. *MODIFY to ADD the following:*
Splicing and termination of traffic signal conductors shall be pursuant to the State Standard Specifications Section 86-2.09D, “Splicing and Terminations*.” Line item 5 of the State Standard Specifications Section 86-2.09D shall not apply*.

Conductors for internally illuminated street name sign (IISNS) and Safety Lighting circuits may be spliced to branch the circuits as they progress around the intersection.

701-14 SERVICES.

701-14.3 Service in Vaults. *MODIFY to ADD the following:*
The copper service feed wires from the service pull box to the electrical service shall have an Agency furnished tag at both ends identifying them as “City of Irvine Service Conductors” to power company officials.

701-16 STREET LIGHTING CONSTRUCTION. *MODIFY to ADD the following:*

701-16.8 Luminaries. *ADD the following after the subsection title:*
Luminaires mounted to traffic signal standards shall have an in-line 5-amp fuse in a fuse holder (Tron HEB AA) within the pull box closest to the corresponding traffic signal pole foundation per the State Standard Specifications Section 86-2.09F, “Fused Splice Connectors.”

Luminaires shall have a shorting cap unless shown otherwise on the plans.

701-17 TRAFFIC SIGNAL CONSTRUCTION

701-17.1 General. *MODIFY to ADD the following:*
Per the State Standard Specifications Section 86-1.07 “Scheduling of work”, the initial turn on shall be made between the hours of 9:00 a.m. and 2:00 p.m. Turn on shall occur on any working day except Friday or the day preceding a legal holiday. Prior to turn-on, all equipment as shown on the plans shall be installed and operable including pedestrian signals, pedestrian push buttons, vehicle detectors, communications to the ITRAC center, lighting, signs and pavement delineation. All louvers, visors and signal faces shall be directed to provide maximum visibility.

The Engineer shall be notified at least three working days prior to the intended traffic signal turn-on. The Contractor shall not proceed with the turn-on without the presence of the Engineer or his representative. The Contractor shall arrange to have a signal technician, qualified to work on the controller and employed by the traffic signal controller cabinet manufacturer or his representative, present at the time of turn-on to verify operation of the equipment.

Pre-installation configuration and testing: Traffic signal cabinet assemblies, conflict monitor, controller, EVP, Edge connect cards, network communications switches, and IPCCTV system shall be delivered to the Agency lab as one complete shipment at least five (5) working days before installation for configuration and testing by Agency Representatives. The Agency lab is located at 6427 Oak Canyon Road, Building 3, Irvine, CA 92618. Delivery and pick-up of equipment for pre-installation testing can be coordinated through the Agency Representative.

The City of Irvine will provide the following support for new or modified intersection construction.

One (1) – Pre turn-on inspection:
All equipment must be present, wired and operational with the exception of EVP. EVP equipment will be installed and tested as operational during the turn on process by the manufacture or representative.

One (1) – Turn-on inspection:
Inspection shall be day of the turn on scheduled with the inspection team following guidelines set forth in State Standard Specifications Section 86-1.07

Any subsequent inspections will be charged by the hour at the contractors' expense.

701-17.3 Conduit. *DELETE in its entirety and SUBSTITUTE with the following:*

a) Conduits terminating within the pull box either from the bottom or side shall terminate no less than 1" above and no more than 2" above the slurry base within.

b) All new intersections shall include separate conduits for Signal Interconnect Cable (SIC) and signal wiring Detector Lead in Cable (DLC).

c) Sharing of the DLC and IP-CCTV wiring in the same conduits with SIC is allowed on intersection modifications where conduit fill is less than and will not exceed 40% upon completion.

d) The ends of all conduits shall have Carlon, or approved equal bell fittings with conduit sealing compound to prevent dirt and rock from entering conduit.

e) Existing underground conduit to be utilized for a new or modified system shall be cleaned with a mandrel or cylindrical wire brush and blown out with compressed air to ensure structural integrity and cleanliness.

f) All interconnect conduits shall contain a No. 10 green insulated solid copper trace wire. All other conduits shall contain a bare, No. 8 solid copper bonding wire, which shall be soldered and crimped in each pull box per the State Standard Specifications Section 86-2.09D, and connected to the ground bar in the traffic signal cabinet.

g) All empty conduits for future conductors shall contain "mule tape" pull tape per the State Standard Specifications Section 86-2.05C.

h) All "Pot-holing" within the street to determine subsurface utility locations shall be back-filled and patched to the specifications on Irvine Standard Plan No. 223, "Utility Trench Repair."

701-17.4 Wiring, Conductors, and Cables.

701-17.4.1 General. *MODIFY to ADD the following:*
The copper service feed wires from the service pull box to the electrical service shall have a tag at both ends identifying them as "City of Irvine Service Conductors" to power company officials.

When new conductors are added to or existing conductors removed from an existing conduit, all conductors shall be removed. The conduit is to be cleaned and blown out to ensure it is free of obstructions and debris. All copper cables shall have 3' -5' coiled in each pull box to allow for servicing.

Each multi-conductor cable shall be one continuous cable from the signal cabinet to the terminal block on the signal standard it services. No splicing of multi-conductor cable shall be permitted.

All cables and conductors will be neatly arranged and wire tied as necessary to give a neat finished appearance in all pull boxes, cabinets and termination points.

All cables are to be pulled by hand. Winches or power activated pulling equipment is not allowed per State Standard Specifications 86-2.05C.

All cables and conductors shall be pulled in the conduit as 1 unit per State Standard Specifications 86-2.09B.

Whenever conductors or cables are installed or replaced in a conduit, the ends of the conduit shall have sealing compound applied to inhibit dirt and rock intrusion.

701-17.4.2 Conductor Splicing and Termination. *DELETE in its entirety and SUBSTITUTE with the following:*
Splicing and termination of traffic signal conductors shall be pursuant to the State Standard Specifications Section 86-2.09D, "Splicing and Terminations." Line item 5 of the State Standard Specifications Section 86-2.09D shall not apply.

All individual conductors shall be labeled in the cabinet per NEMA numeric format. Conductor insulation colors and wire sizes shall be in accordance with the State Standard Specifications Section 86.2.08B, "Conductor Identifications," except as required herein.

The conditions of this subsection shall apply to all new traffic signal installations and modifications where entire signal conductor legs are re-pulled.
New traffic signal field conductors shall be multi-conductor signal cable and individual wires as specified herein and in accordance with the State Standard Specifications Sections 86-2.08D, "Signal Cable," and 86-2.08C "Circuit Conductors."

New traffic signal field conductors used for phase indications and buttons shall be State standard 12CSC, 5CSC, and 3CSC multi-conductor signal cable. IMSA cable shall not be utilized. Each signal cable shall be one continuous cable from the signal cabinet to the terminal block on the signal standard it services. No splicing of signal cable shall be permitted. The signal cables shall be labeled in each pull box, per the State Standard Specifications Section 86-2.08D, and at the signal cabinet, indicating the signal standard to which it is connected.

Primary and secondary signal standards shall receive one 12CSC cable for vehicle and pedestrian indications and one 3CSC cable for each button circuit. An additional

5CSC cable shall be furnish and installed for each additional vehicle phase serviced by the pole. All 12 CSC cable conductors shall terminate on the terminal block. The 3CSC cables shall service the buttons directly. The 12CSC conductor utilization shall be in accordance with the State Standard Specifications Section 86-2.08D, with the black conductors reserved as spares. The 3CSC conductor utilization shall be: blue/black stripe for pedestrian buttons, blue/orange stripe for bike buttons, and white/black stripe for common.

Pedestrian signal standards shall receive one 5CSC and one 3CSC cable. The 5CSC cable shall service the pedestrian indication and the 3CSC cable shall service button circuits.

Conductors and cables shall be as defined in the State Standard Specifications Section 86-2.08 “CONDUCTORS AND CABLE.” Conductors for internally illuminated street name sign (IISNS) and Safety Lighting circuits may be spliced to branch the circuits as they progress around the intersection.

Additional conductors must be installed for audible pedestrian button systems, IP-CCTV, and emergency vehicle preemption systems. Please refer to subsections 700-5.9, 700-5.10 and 700-5.12 of these Special Provisions for additional conductor requirements of these systems.

When new conductors are added or existing conductors are removed from existing conduits, all existing conductors shall be removed per the State Standard Specifications Section 86-2.09B, “Installation.” The conduit shall be cleaned as provided in the State Standard Specifications Section 86-2.05C, “Installation.” Both old and new conductors, as shown on the plans, shall be pulled into the conduit as a unit, unless otherwise approved by the Engineer.

701-17.4.5 Fiber Optic Cable.

701-17.4.5.1 General. *MODIFY to ADD the following:*
Each multi-conductor cable shall be labeled in each pull box and at the signal cabinet per the State Standard Specifications Section 86-2.08D, indicating the signal standard to which it is connected.

Fiber optic cables must have “Corning Optical Cable” or “Corning Optical Fiber” on the labeling to identify the cable or optical fiber manufacturer. The color codes and order for tubes and fiber strands shall be as shown on the Irvine Traffic Signal Standards Plan TS-3.

Signal Interconnect Cable (SIC) shall be continuous and no splices will be allowed between cabinets.

SIC Pull Boxes: SIC conduit shall be installed in pull boxes using 45-degree, UL approved elbows. These elbows shall be placed as far apart in the pull box as possible, oriented in the direction of the cable, and offset to one side to facilitate cable pulling and coiling. Approximately 10 feet of SIC shall be coiled inside of each pull box.

Slack and Termination: A minimum of 50 feet of SIC slack shall be coiled and stored in the communications electrical boxes (B40BOX or No. 6 pull box) adjacent to the cabinet foundations at each end of a run. SIC shall be terminated in the traffic signal cabinet and splice canister in the B40 Box per the City of Irvine Traffic Signal Standards Plans TS-10A and TS-10B. When re-terminating existing SIC, sufficient cable slack shall be pulled from adjacent pull boxes to allow for terminations. If necessary, the slack will be obtained from as many pull boxes in the run required to re-terminate the cable to specifications.

Cleaning: Prior to any termination or splicing of fiber optic cables, buffer tubes, fibers, etc. shall be cleaned with an acceptable industry cleaning agent to remove any gel or flooding materials used in the cable structure. Cabinet and surrounding area shall be cleaned of any debris and or gel flooding once termination procedure is completed.

Installation and Testing: Fiber optic SIC shall be installed, spliced, terminated, and tested in accordance with NECA/FOA 301-2009 standards. These standards are available for purchase from the National Electrical Contractors Association Web site at: https://www.necanet.org/store/search-results/?keyword=NECA/FOA 301-2009 standards. This includes pre-installation and post installation testing of the cable.

a) Pre-installation testing shall be performed on all fibers using an Optical Time-Domain Reflectometer (OTDR) to confirm no existing damage to the existing cable. The Contractor shall perform such testing on-site prior to completing termination in the communication cabinet.

b) Post-installation testing of all terminated fibers shall be performed using launch cables at both ends as specified in NECA/FOA 301-2009 Annex B.3. The Contractor shall perform such testing on-site after all termination and splicing work is completed.

Test Results: Test results, in the form of pre-installation test data and post--installation OTDR traces, shall be provided to the Agency Representative in a bound hard copy format along with the electronic file and appropriate viewing software, for review and approval after installation and splicing/termination work are completed. The pre-installation test results shall be in the form of a spreadsheet detailing the length and loss/kft for each fiber as well as the parameters used for testing. The post-installation OTDR traces shall clearly show each continuous fiber, the connectors on each end, and the loss for each event. An Agency representative shall approve the test results before final acceptance.

The B-40 communications electrical box shall include a fiber optic cable splice canister to provide for splicing of fiber optic cable. The splice canister shall be the consolidation point for all fiber optic cables and the source of the drop cable for the traffic signal cabinet fiber interconnect unit (FIU). The splice canister shall be assembled from components listed on the Irvine Traffic Signal QPL, unless otherwise specified in the project plans. The exact quantities of components required shall be defined by the fiber charts provided by the Agency before signal turn on.

Existing communication systems shall be maintained at all times during construction. In the event of damage by the Contractor or any of his subcontractors as determined by the Engineer, the Contractor shall commence repairs immediately. Repairs to damaged signal interconnect cable (SIC) shall be completed within 10 working days. The City shall have the option to complete necessary repairs and charge the responsible Contractor for any associated repair costs, pursuant to Sec. 6-3-317 of the City Municipal Code.

701-17.5 Signal Heads.

701-17.5.1 General. *MODIFY to ADD the following:*
All 1A pole mounted traffic signal heads shall be Type TV-1-T or TV-2-T, and pedestrian heads shall be clamshell side-mount Type SP-1-CS or top-mount TP-1-T. Vehicle and pedestrian heads shall be visible from all normal operational directions, without obstructions.

701-17.6 Detectors.

701-17.6.1 General. *MODIFY to ADD the following:*
Side Street Detection: Where a single phase is used on a side street approach, and both through (right turn) and left turn lanes are present, the left turn lane shall use phase 3 and/or 7 detection channels to facilitate future independent left turn phasing. Left turn lane detection shall output to the associated through phase.

Side Street Right Lane Presence: To facilitate right turn delay functionality in the 2070 controller, the 5 phase 4 and 5 phase 8 channels shall be exclusively used to serve the right-most stop bar detection loops on side street approaches. These detection channels shall not be combined with any other presence channels.

Single Lane/No Advance: Where a side street has only one lane of traffic, and no advance detection is installed, the loop configuration will consist of four Type-E loops or video detection zones. The front pair, closest to the stop bar, shall use channels 5 phase 4 or 5 phase 8 and be configured for delay capability as noted above. The back pair, farthest from the stop bar, shall use channels 4 phase 4 or 4 phase 8, configured as standard presence detection.

701-17.6.3. Inductive Loop Detectors.

701-17.6.3.1 General. *DELETE in its entirety and SUBSTITUTE with the following:*
Inductive loop detection shall be utilized only for advance detection on all new traffic signals. Modifications involving replacement of less than 50% of existing presence (limit line) detection loops may retain inductive loop detectors unless otherwise specified in project plans or at the direction of the Engineer.

All detection loops shall be 6-foot diameter Type E installed per the State Standard Plans ES-5A and ES-5B using Type 2 loop wire, unless otherwise approved by the Engineer. Elongated, oval shaped, loops may be installed to accommodate lanes over 12 feet in width.

Detector loops shall be installed in a saw-cut slot with a minimum of 3 inches depth below the finished pavement surface, and minimum 2 inches of sealant covering the loop wires (Irvine Traffic Signal Standards Plan TS-8A). All detection loops shall be sealed with hot melt adhesive.

Where two or more loops are to be on one channel of detection, or to a single DLC, the loops shall be connected in series.

ADD:

701-17.6.3.1.1 Presence Loops. Presence Loops (less than 50% replacement): There shall be a maximum of two through loops for each presence detection channel. (Irvine Traffic Signal Standards Plans TS-8A, TS-8D, and TS-8E). For each through lane up to 12 feet in width, there shall be two 6-foot diameter loops placed ten feet apart, in the direction of travel. The Engineer shall approve all other loop sizes. Each presence loop shall have three turns.

Presence Loop Placement (less than 50% replacement): All presence loops shall be installed with the leading edge positioned one foot before the limit line, or the stop bar, in the direction of travel. All presence loop home run detection wires shall be located ahead of the loops, within the crosswalk. The left turn lanes shall have four loops, with the front two loops and the back two loops on separate DLC's (Irvine Traffic Signal Standards Plan TS-8A).

ADD:

701-17.6.3.3.2 Advance Loops. Advance detection loops shall be a single loop per lane with one DLC per loop. Each advanced loop shall be assigned to a separate detection channel. Each advance loop shall have four turns where the total length of the DLC is less than 500 feet; otherwise, five turns are required.

ADD:

701-17.6.3.3.4 Conductors. Conductor and cables shall be identifiable per State Standard 86-2.08B and labeled per State Standard 86-2.08D

ADD:

701-17.6.4 Video Detectors. The term "video detection system" shall be defined as a complete installation consisting of one or more video cameras, one or more video processors, extension modules and Input/ Output (I/O) modules, a remote communications module, LCD display monitor, configuration device, mounting hardware, cabling, and any required interfacing equipment, providing the detection of vehicles and bicycles solely from visual image information.

701-17.6.4.1 Temporary Video Detection. Where temporary detection is required due to road construction activity or extended overhead wiring, video detection shall be installed before construction commences to ensure continuous operation of the presence detection. After construction, any temporary camera systems shall be removed and the entire intersection presence detection shall be converted to

permanent video detection per the above specifications. All temporary wired/wireless hardware shall become property of the Agency after wired conversion is completed.

ADD:

701-17.8 Closed Circuit Television (CCTV) System.

701-17.8.1 Approved Traffic Signal Location. All new traffic signal installations on any roadway shall include, as part of the standard safety systems, the installation of CCTV camera equipment, MPEG CCTV transmission equipment, and any additional wiring or hardware required to support an operational CCTV system. This requirement shall apply unless otherwise specified by the Engineer. The approved location for new CCTV camera installations at traffic signals shall be the primary pole farthest from the traffic signal cabinet corner, unless otherwise specified by the Engineer.

701-17.8.1.1 Installation. The IP-CCTV system shall be installed per details on Irvine Traffic Signal Standards Plan TS-6, "IP-CCTV System Mounting and Placement." All new or modified IP-CCTV systems shall be installed per Irvine Traffic Signal Standards Plan TS-11A (ATMS cabinets) or TS-11B (Type P cabinets). Service connections shall be provided inside the camera arm access cover. The service connections shall have sufficient slack to be removed from the cover for usage, inspection, and repair.

All new traffic roundabout or traffic circle installations on any roadway shall include, as part of the standard safety systems, the installation of IP-CCTV camera equipment, IP-CCTV and any additional wiring or hardware required to support an operational IP-CCTV system. The approved location for the IPIP-CCTV camera installation shall be on a Type 15TS pole and be on the outer perimeter of the roundabout or traffic circle, unless otherwise specified by the Engineer.

701-17.8.1.2 Power. Power is provided by manufacture supplied POE injector.

701-17.8.2 Approved Roundabout Location. All new traffic roundabout or traffic circle installations on any roadway shall include, as part of the standard safety systems, the installation of IP-CCTV camera equipment, and any additional wiring or hardware required to support an operational IP-CCTV system. The approved location for the IP-CCTV camera installation shall be on a Type 15TS pole and be on the outer perimeter of the roundabout or traffic circle, unless otherwise specified by the Engineer.

701-17.8.2.1 IP-CCTV Installation. IP-CCTV systems shall be installed per Section 700-5.10 Closed Circuit Television (IP-CCTV) and per details on Irvine Traffic Signal Standards Plan TS-7A "IP-CCTV Communications / Service Meter Cabinet".

701-17.8.2.2 Communication Cabinet. Communication cabinet shall be with TBS terminal block, AC neutral ground bus and an equipment ground bus.

a) Communication cabinet components shall include, but not limited to:

1) Fiber Interconnect Unit (FIU) wall mounted

2) Communications data network

3) Manufacture supplied POE power supply

701-17.8.2.3 Communication Cabinet Foundation. Communication cabinet shall be installed as shown in the Irvine Signal Standard Plan TS-7A.

701-17.8.2.4 Electrical Service. Services enclosures shall conform to the Irvine Traffic Signal Standard Plan TS-7A, shall be from a manufacturer listed on the Irvine Traffic Signal QPL, and shall have the following characteristics:

a) Service conduit shall conform to the requirements of the serving utility and shall not be less than 3 inches in diameter.

b) Rating: NEMA 3X enclosure and UL listed assembly

c) Construction: Aluminum

d) Type: Myers B.M. # 5051595Irvine

e) Color: The service enclosure shall be powder coated beige: color number FS20475, Federal Standard 595C with a gloss level of 60 or higher.

f) Circuits: The service shall provide for the following circuits using independent breakers:

1) Main breaker capacity: 100-amp

2) Metered circuits shall be provided for IP-CCTV (15-amp), Communications equipment (15-amp), Street light (15-amp), as well as one spare breaker (15-amp)

3) Six outlet power strip to be mounted on plywood board to allow for equipment power

701-17.8.2.5 Communication Equipment. Communication equipment shall be provided per provisions of Section 700-5.4.4.11 Fiber Optic Interconnect Unit and Section 700-5.4.4.12 Communication Data Network.

701-17.8.2.6 Transmission Equipment. The transmission equipment shall be installed and tested for operation by the Contractor to the satisfaction of the Agency Representative before acceptance of the system. Irvine Traffic Signal Standards Plans TS-11A depict typical communication systems installations, including the MPEG encoder unit. MPEG units shall be delivered to the Agency lab at least five (5) Working Days before installation for testing and programming by City personnel as described in 701-17.1 of the Special Provisions.

ADD:

701-17.9 Emergency Vehicle Preemption (EVP) System. The encoded phase selector shall be a Global Traffic Technologies (GTT) model 764 with a model 768 auxiliary interface panel wired for green inputs.

The optical detectors shall consist of the following models.

a) GTT 722 Opticom™ Detector: Receives Optical signals from two directions and outputs two discrete electrical signals.

b) GTT 721 Opticom™ Detector: Receives Optical signals from two directions and outputs a single electrical signal.

c) GTT 711 Opticom™ Detector: Receives Optical signal from a single direction and outputs a single electrical signal.

When installing an EVP system in a Type P cabinet, the Contractor shall furnish and install a GTT model 760 card rack and all necessary electronics, wiring and devices required to interface with the traffic signal controller and the detector units in the controller cabinet. The Contractor shall also install an additional, city furnished, shelf in the Type P cabinet to accommodate the GTT model 760 card rack, where the existing detection shelf does not have sufficient space.

The EVP shall be installed in accordance with manufacturer supplied documentation. The encoded phase selector shall be installed in the input file slots J-11 (A, B) and J-12 (C, D) for ATMS applications.

EVP Channel	Vehicle Phase	Controller Channel
Channel A	Phases 2,5	3
Channel B	Phases 6,1	4
Channel C	Phases 4,7	5
Channel D	Phases 3,8	6

The circuits from the optical detectors to the phase selectors shall use GTT model 138 optical detector cable. These circuits shall carry power to the optical detector from the phase selector and carry the optical detector signal to the phase selector.

104.4 REVISION PROCESS

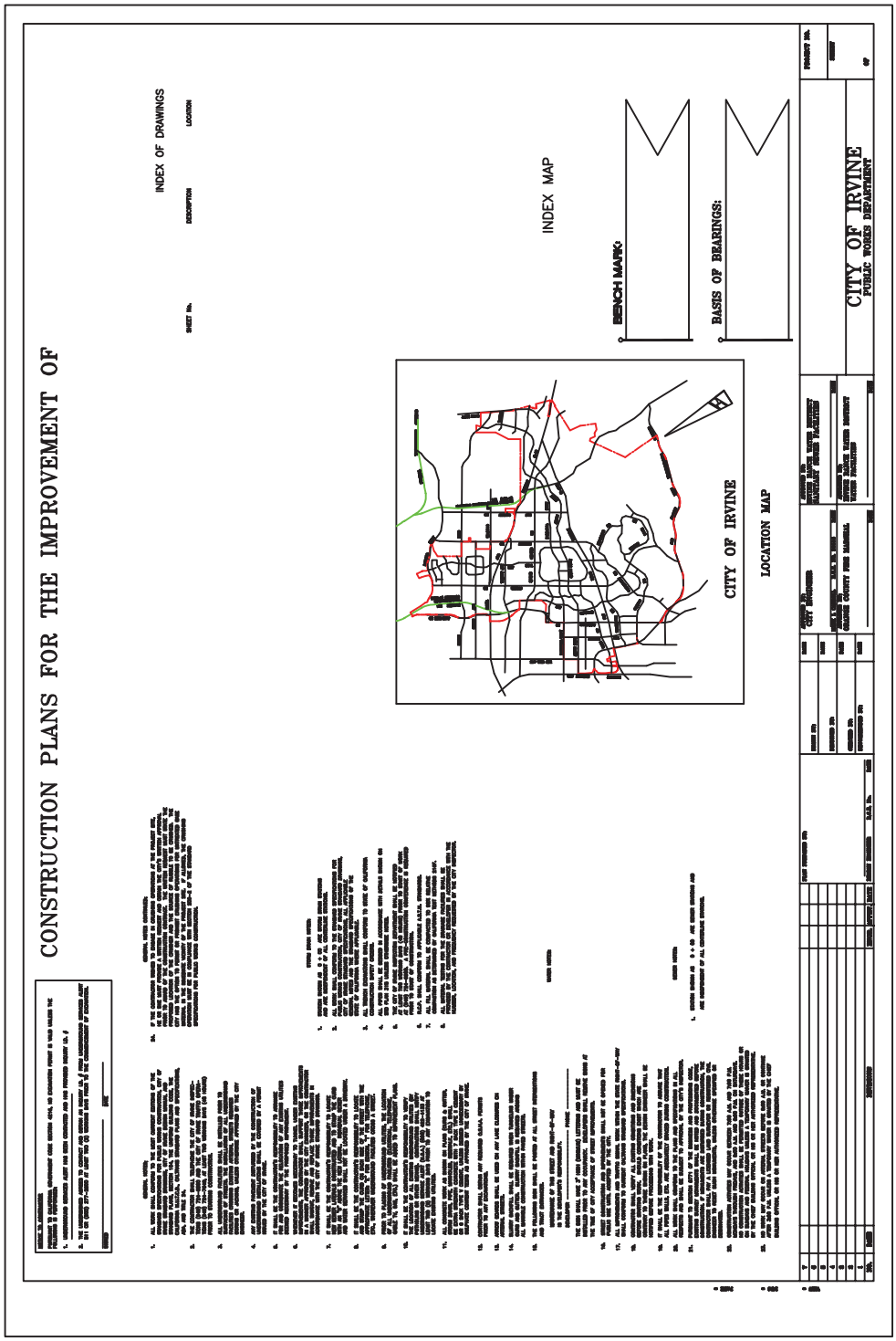
A. All users are encouraged to suggest revisions to this document. Suggestions should be submitted in writing to the City of Irvine, Signal Operations and Maintenance, for consideration. Each suggestion will be reviewed and responded to. Suggestions meeting the approval of the Engineer will be incorporated in the next revision of this manual.

B. Equipment equivalency submittals shall be coordinated with the City of Irvine maintenance and testing lab. Such submittals will be reviewed for actual equivalency within 30 days of receipt and approved or declined by the Engineer. Submittal for equivalency shall not guarantee acceptance. Only accepted equipment, as specified herein, shall be allowable for field installation. Approval of equivalency shall be conveyed to the submitter, and the City inspection department, in a written memo from the Engineer modifying the specifications herein. December 31st is the cutoff date to have submittals approved for the next revision of these standards.

104.5 ATTACHMENTS AND TRAFFIC SIGNAL PLANS

CITY OF IRVINE

PUBLIC WORKS



STANDARD CITY TITLE SHEET

MARK CARROLL, R.C.E. 31515
CITY OF IRVINE - CITY ENGINEER

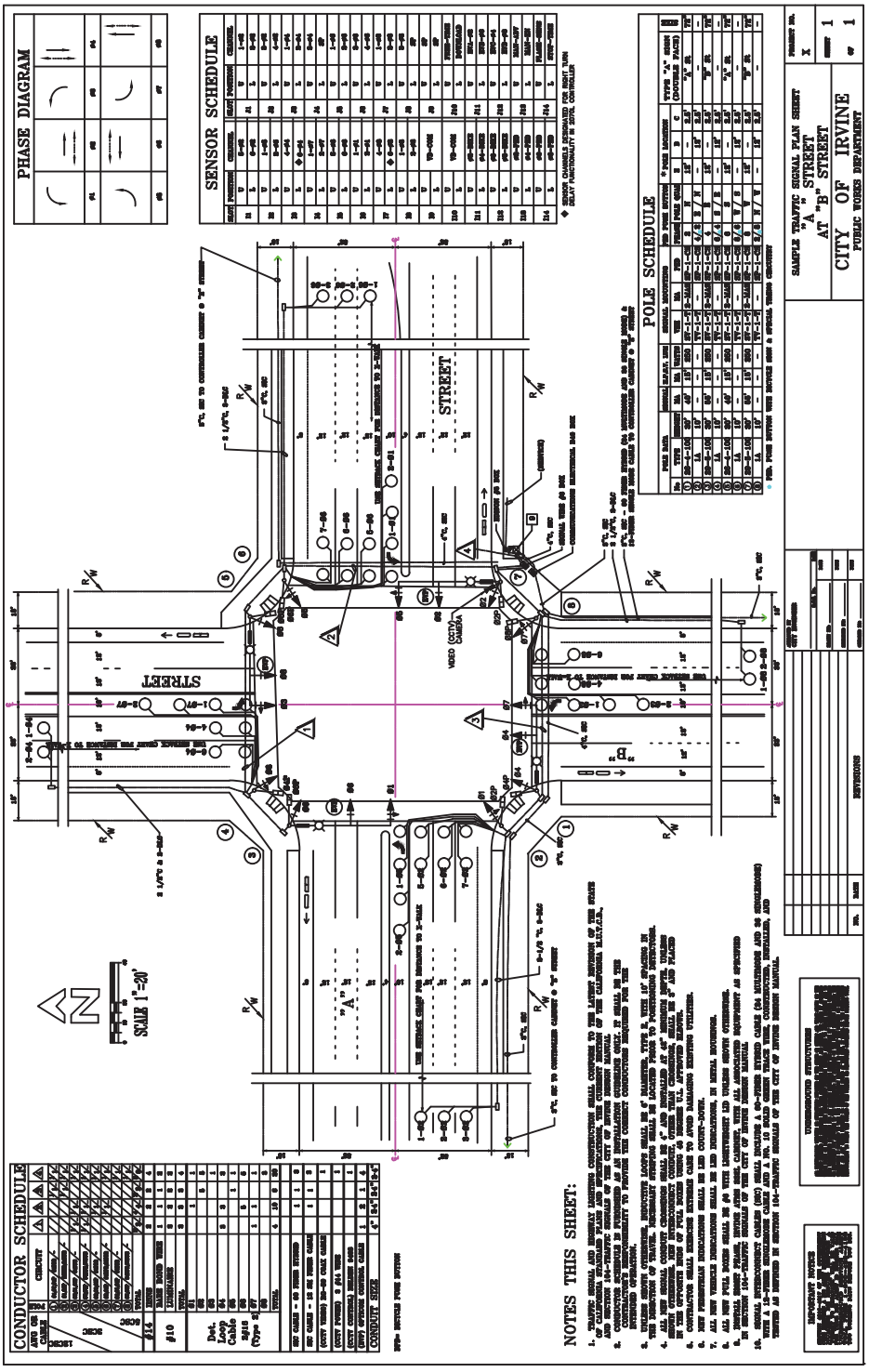
AUGUST 2013
DATE

ATTACHMENT 1

SHEET 1 OF 1

CITY OF IRVINE

PUBLIC WORKS



SAMPLE TRAFFIC SIGNAL PLAN

MARK CARROLL, R.C.E. 31515
CITY OF IRVINE - CITY ENGINEER

AUGUST 2013
DATE

ATTACHMENT 2

SHEET 1 OF 1

CITY OF IRVINE
PUBLIC WORKS

AutoCAD - Layers

LAYER NAME	LINE WIDTH	COLOR	PATTERN	LINE TYPE	USE
0	1.20	WHITE		CONTINUOUS	
CL	0.25	MAGENTA		CL	Centerlines, Stationing, Station Numbers, "CL" text
CURB	0.60	GREEN		CONTINUOUS	Curbs (curbs to be removed can be show n on a different layer)
CUTLINE	0.20	140		CONTINUOUS	Sheet Cutline
DEFPOINTS	0.00	WHITE		CONTINUOUS	
DIMS	0.30	CYAN			Dimensions
EX-CO	0.30	8		CONDUIT	Existing Conduit
EX-EQ	0.25	MAGENTA		EXISTING	Existing Equipment, Controller Boxes, Loops, Pullboxes, Signal Equipment, Signs, Ped. Ramps
EX-ST	0.25	MAGENTA		EXISTING	Existing Striping, Pavement Legends
HATCH	0.25	40		CONTINUOUS	All Hatchw ork
PROP-CO	1.00	WHITE		CONDUIT	Proposed or New Conduit
PROP-EQ	0.70	BLUE		CONTINUOUS	Proposed or New Equipment, Controller Boxes, Loops, Pullboxes, Signal Equipment, Signs, Ped. Ramps
PROP-ST	0.30	CYAN		CONTINUOUS	Proposed or New Striping, Pavement Legends
RW	0.35	RED		RW	Street Right-of-Way Lines
SW	0.25	11	253	CONTINUOUS	Sidew alks, Ped. Ramps, Drivew ays
TABLE-1	0.30	CYAN		CONTINUOUS	Schedules, Diagrams, Border
TABLE-2	0.50	YELLOW		CONTINUOUS	Schedules, Diagrams, Border
TABLE-3	1.00	WHITE		CONTINUOUS	Schedules, Diagrams, Border, and Street Names
TEXT	0.50	YELLOW		CONTINUOUS	General Notes, Construction Notes
UTIL-1	0.20	9	254	DASHED	Utilities (Single Line)
UTIL-2	0.20	9	254	EXISTING	Utilities (Catch Basin, Storm Drain, etc.)

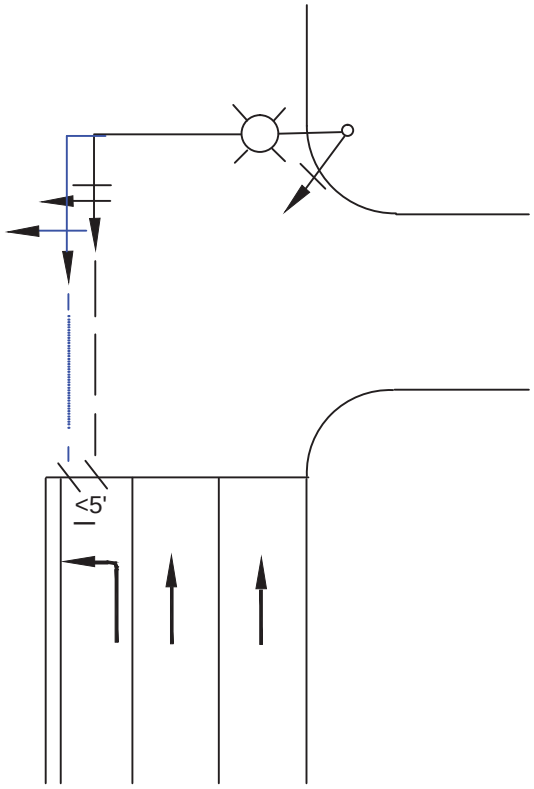
TRAFFIC SIGNAL - AUTOCAD LAYERS

MARK CARROLL, R.C.E. 31515
CITY OF IRVINE - CITY ENGINEER

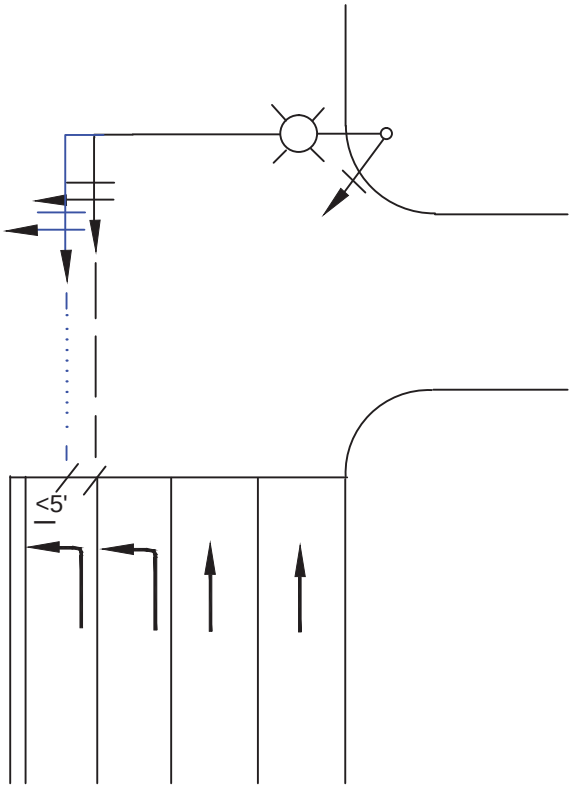
AUGUST 2013
DATE

ATTACHMENT 3

CITY OF IRVINE
PUBLIC WORKS



SINGLE LEFT TURN

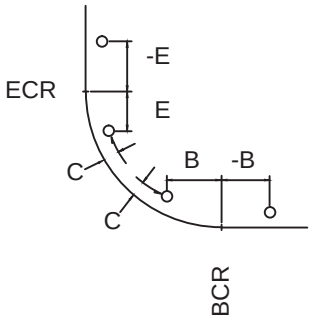


DUAL LEFT TURN

LEGEND

PREFERRED PLACEMENT

MAXIMUM DEVIATION LEFT OF DIVIDING LINE



POLE PLACEMENT

NOTE :
1. THE LEFT-TURN TRAFFIC SIGNAL HEAD SHALL BE CENTERED ON THE LEFT-TURN MOVEMENT OR AT A MAXIMUM OF 5 FEET LEFT FROM THE LEFT-TURN MOVEMENT.
2. POLE PLACEMENT DIMENSION C SHALL BE 2.5 FEET FROM FACE OF CURB TO CENTERLINE OF POLE. DIMENSIONS B AND E SHALL BE PER POLE SCHEDULE, OR AS DIRECTED BY THE ENGINEER.

MAST ARM & SIGNAL POLE PLACEMENT

TS-1

SHEET 1 OF 1

MARK CARROLL, R.C.E. 31515
CITY OF IRVINE - CITY ENGINEER

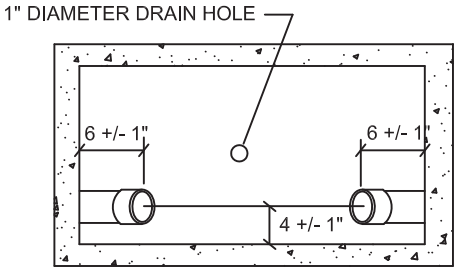
AUGUST 2013
DATE

CITY OF IRVINE

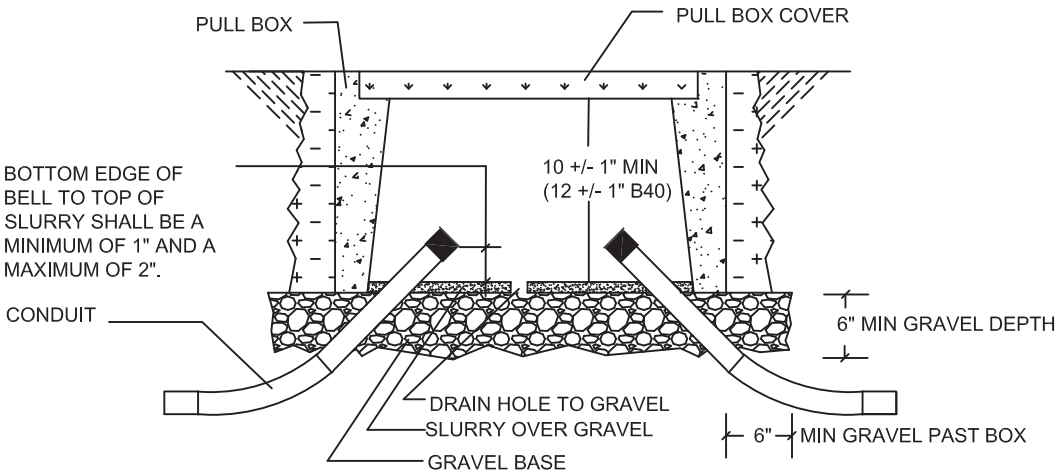
PUBLIC WORKS

MODIFIES CALTRANS STANDARD PLAN ES-8A

TOP VIEW



SIDE VIEW



1. INTERCONNECT PULL BOXES ARE TO BE NO. 6, EXCEPT FOR THE C40 ELECTRICAL BOX ADJACENT TO THE COMMUNICATION CABINET, PLACED NO GREATER THAN 400 FOOT INTERVALS, AND HAVE 45 DEGREE CONDUIT ELBOWS.
2. NO. 6 PULL BOXES SHALL HAVE FIBRELYTE COVERS. C40 PULL BOXES SHALL HAVE "LIGHTWEIGHT" POLYMER CONCRETE LID.
3. ALL PULL BOXES ARE TO BE MARKED "TRAFFIC SIGNAL" EXCEPT THE EDISON PULL BOX.
4. THERE SHALL BE A MINIMUM OF 10 INCHES (±1) OF VOID FROM TOP OF SLURRY TO THE BOTTOM OF THE COVER, IN A SINGLE STACK PULL BOX. B40 BOXES SHALL HAVE AN ADDITIONAL 2" SUMP.
5. GRAVEL BED SHALL BE 6" DEEP, BELOW PULL BOX AND EXTENDING 6" PAST THE OUTER EDGES IN ALL DIRECTIONS.
6. PULL BOX FLOOR SHALL HAVE CEMENT GROUT (MINIMAL SLOPE TO CENTER) COVERING BASE MATERIAL.
7. DRAIN HOLE SHALL ALLOW WATER TO DRAIN THROUGH GROUT TO GRAVEL BASE MATERIAL.
8. PULL BOXES SHALL BE INSPECTED FOR PROPER CONSTRUCTION PRIOR TO WIRE INSTALLATION.

TRAFFIC SIGNAL PULL BOXES

TS-2

SHEET 1 OF 1

MARK CARROLL, R.C.E. 31515
CITY OF IRVINE - CITY ENGINEER

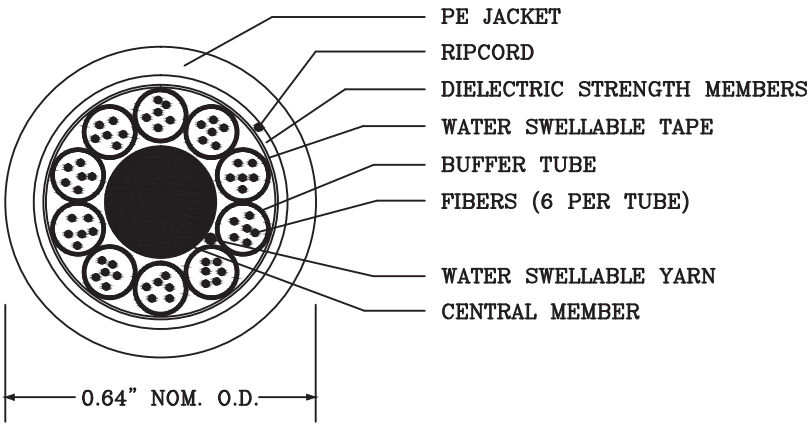
DECEMBER 2015
DATE

CITY OF IRVINE

PUBLIC WORKS

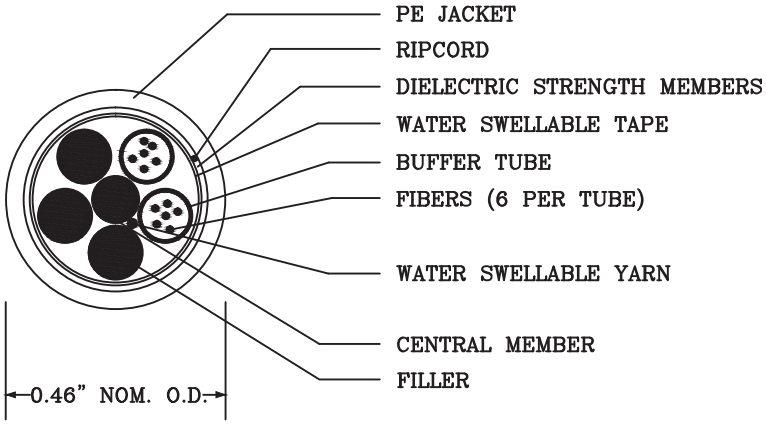
60 FIBER HYBRID CABLE
(CORNING ALTOS 060XU4-CP013D20)

TUBE COLOR	FIBER TYPE
BLUE	62.5/125 MMF
ORANGE	62.5/125 MMF
GREEN	62.5/125 MMF
BROWN	62.5/125 MMF
SLATE	8.3/125 SMF
WHITE	8.3/125 SMF
RED	8.3/125 SMF
BLACK	8.3/125 SMF
YELLOW	8.3/125 SMF
VIOLET	8.3/125 SMF



12 FIBER SINGLEMODE CABLE
(CORNING ALTOS 012EU4-64701D20)

TUBE COLOR	FIBER TYPE
BLUE	8.3/125 SMF
ORANGE	8.3/125 SMF



SIGNAL INTERCONNECT CABLES

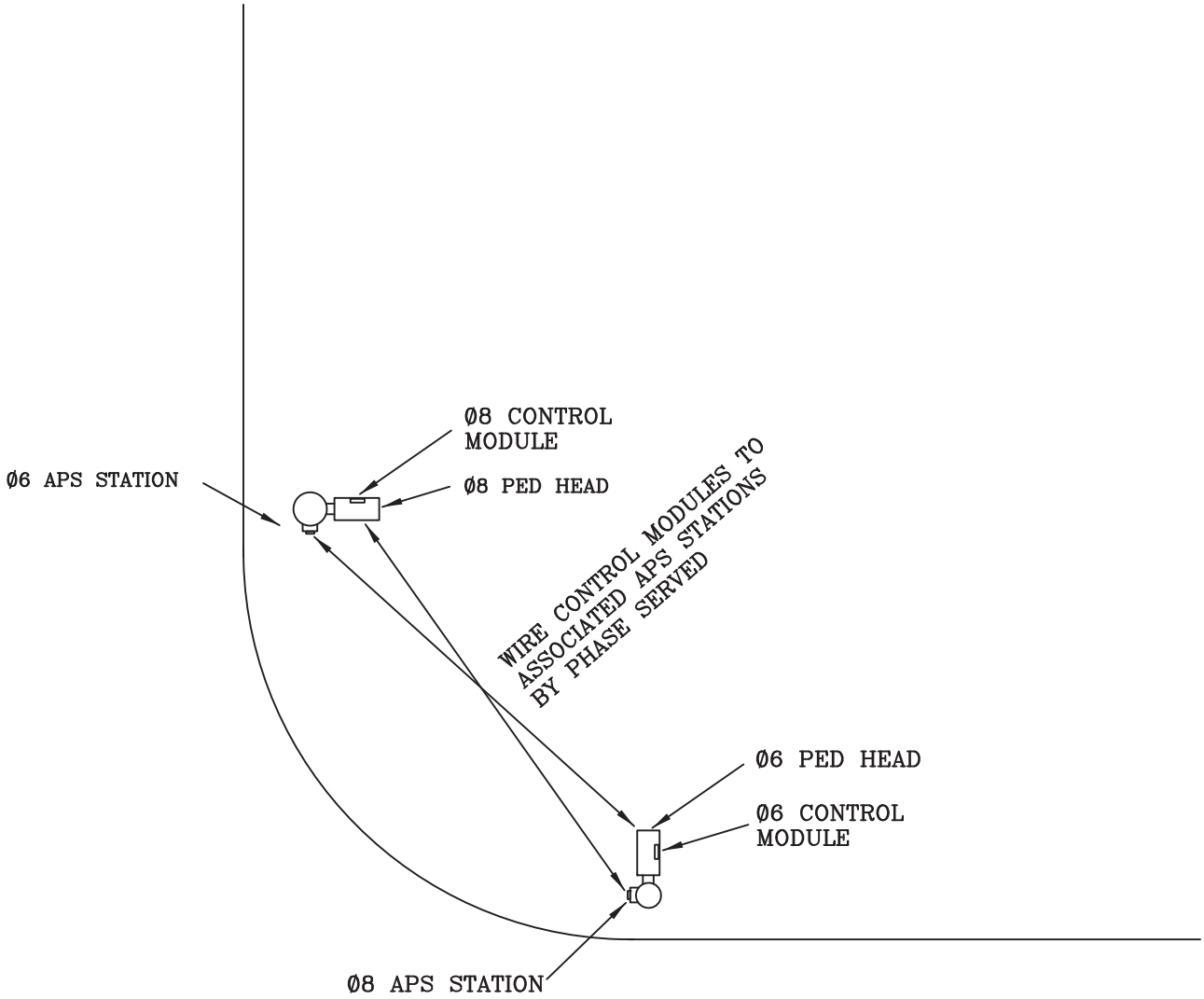
TS-3

SHEET 1 OF 1

MARK CARROLL, R.C.E. 31515
CITY OF IRVINE - CITY ENGINEER

AUGUST 2013
DATE

CITY OF IRVINE
PUBLIC WORKS



NOTES:

1. ACCESSIBLE PEDESTRIAN SYSTEM (APS) SHALL BE FIELD WIRED MODELS UTILIZING PEDESTRIAN HEAD MOUNTED CONTROL MODULES.
2. SYSTEMS SHALL BE FROM THOSE APPROVED IN THE IRVINE TRAFFIC SIGNAL QPL.
3. A PROGRAMMER UNIT SHALL BE PROVIDED TO THE CITY WHEN REQUIRED FOR INSTALLATION.
4. APS SIGNS SHALL BE MUTCD COMPLIANT 9"X12".
5. NEW 2 WIRE SYSTEMS SHALL BE INSTALLED PER MANUFACTURERS GUIDLINES.

ACCESSIBLE PEDESTRIAN SYSTEM INSTALLATION

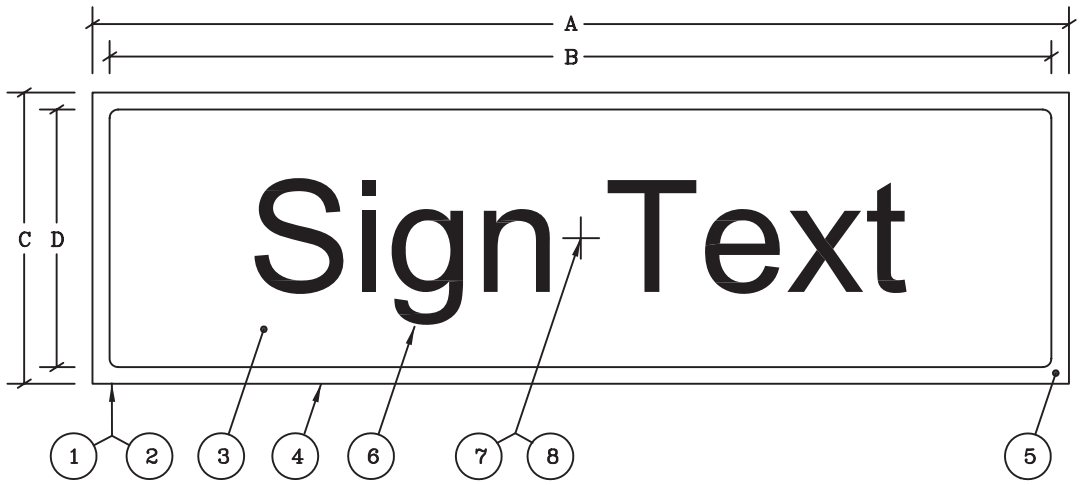
TS-4

SHEET 1 OF 1

MARK CARROLL, R.C.E. 31515
CITY OF IRVINE - CITY ENGINEER

FEBRUARY 2016
DATE

CITY OF IRVINE
PUBLIC WORKS



	FIXTURE SIZE	
DIMENSION	6 FOOT	8 FOOT
A	72”	96”
B	69”	93”
C	18”	18”
D	15”	15”

* PANELS DIMENSIONS WITHOUT FRAME

1. PANELS SHALL BE CONSTRUCTED WITH 3M DG REFLECTIVE SHEETING, SERIES 4090.
2. PANELS AND FRAMING SHALL BE DESIGNED TO FIT THE ISNS FIXTURE DEFINED IN 700-5.11.
3. LETTERING BACKGROUND OVERLAY SHALL BE 3M ELECTROCUT FILM, 1179 (BROWN).
4. PANELS SHALL BE COVERED WITH A UV PROTECTIVE, CLEAR ACRYLIC FILM.
5. WHITE BORDER SHALL BE 1 INCH AROUND ALL EDGES OF PANEL.
6. TEXT SHALL BE HIGHWAY GOTHIC, SERIES E, WITH 8" UPPER CASE AND 6" LOWER CASE WITH 100% KERNING.
7. TEXT SHALL BE CENTERED VERTICALLY ON THE PANEL, RELATIVE TO THE UPPER CASE LETTERS.
8. TEXT SHALL BE CENTERED HORIZONTALLY ON THE PANEL.
9. SIGN PANELS SHALL HAVE ONLY ONE STREET NAME IN A SINGLE LINE OF TEXT.

ILLUMINATED STREET NAME SIGN PANELS

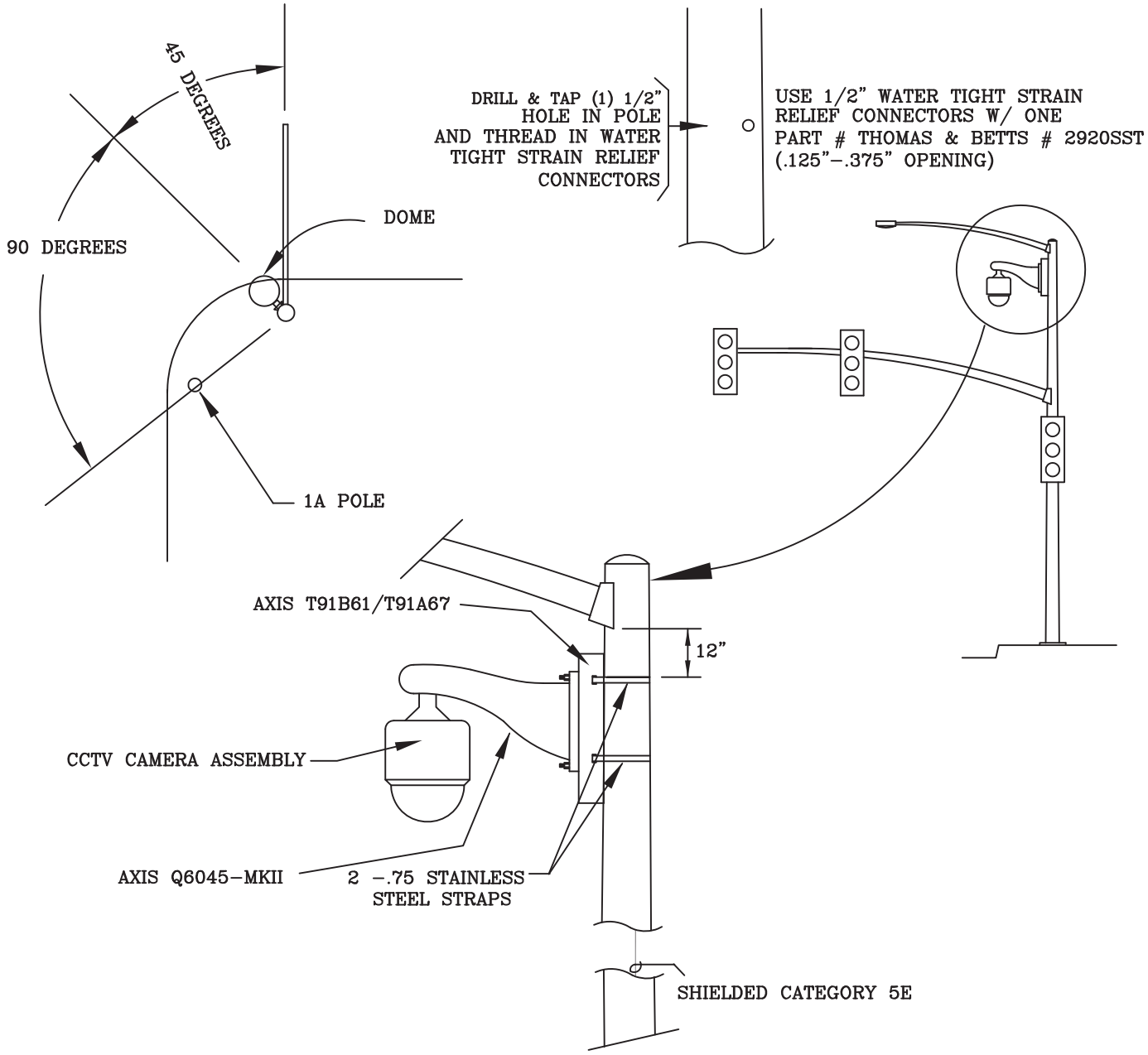
TS-5

SHEET 1 OF 1

MARK CARROLL, R.C.E. 31515
CITY OF IRVINE - CITY ENGINEER

FEBRUARY 2016
DATE

CITY OF IRVINE
PUBLIC WORKS



NOTES:
1. POWER OVER ETHERNET (POE) INJECTOR WILL BE SELF MOUNTED WITHIN THE CONTROLLER CABINET.

CCTV SYSTEM MOUNTING AND PLACEMENT

TS-6

SHEET 1 OF 1

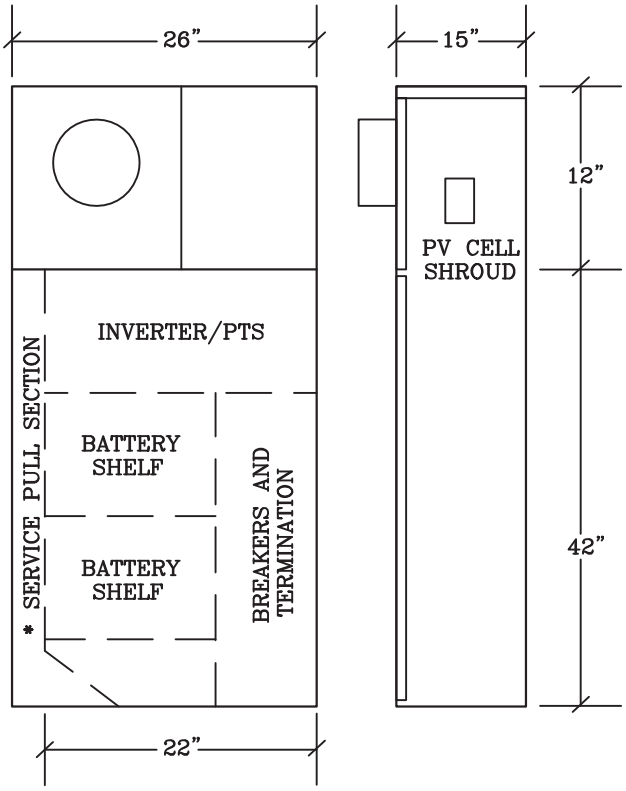
MARK CARROLL, R.C.E. 31515
CITY OF IRVINE - CITY ENGINEER

FEBRUARY 2016
DATE

CITY OF IRVINE
PUBLIC WORKS

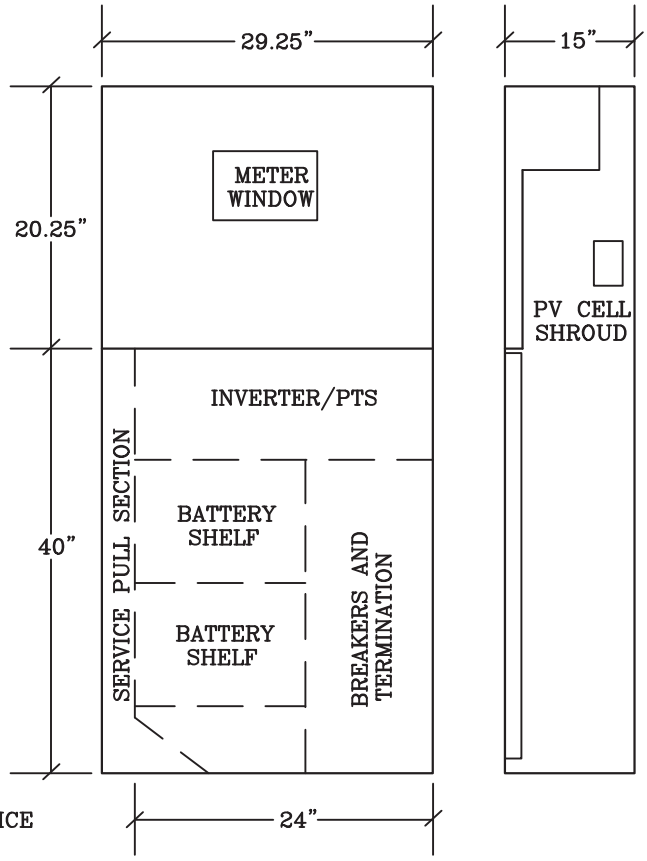
TYPE P CABINET
SERVICE/BBS ENCLOSURE

EXTERNAL SERVICE METER



ATMS 332L CABINET
SERVICE/BBS ENCLOSURE

INTERNAL SERVICE METER



* SOME TYPE-P RETROFIT LOCATIONS REQUIRE SERVICE PULL SECTION ON THE RIGHT SIDE.

1. SERVICE/BBS ENCLOSURE AND COMPONENTS MUST CONFORM TO 700-3.10 SPECIFICATIONS.
2. SERVICE/BBS ASSEMBLIES MUST BE UL LISTED.
3. A PULL SECTION ACCESS DOOR SHALL BE PROVIDED ON THE LEFT SIDE OF THE SERVICE.
4. SEPARATE METERED AND UNMETERED BREAKER BUSSES SHALL BE PROVIDED.
5. METERED CIRCUITS SHALL INCLUDE SIGNAL (40A), IISNS (15A), CCTV (15A), AND SPARE (15A).
6. UNMETERED CIRCUITS SHALL INCLUDE LIGHTING (30A) AND CONTROL (15A).
7. DETAILED SPECIFICATIONS MAY BE OBTAINED FROM SIGNAL OPERATIONS & MAINTENANCE: 949-724-7649
8. BREAKER/BBS SECTION DOOR SHALL HAVE A 3-POINT LATCHING SYSTEM WITH CORBIN #2 LOCK AND PADLOCK HASP.

TYPE IIB SERVICE/BBS DETAILS

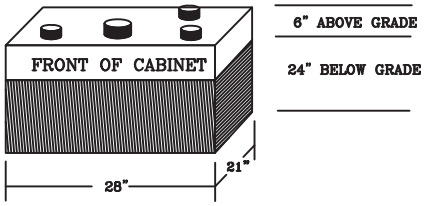
TS-7

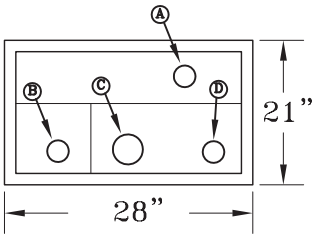
SHEET 1 OF 1

MARK CARROLL, R.C.E. 31515
CITY OF IRVINE - CITY ENGINEER

FEBRUARY 2016
DATE

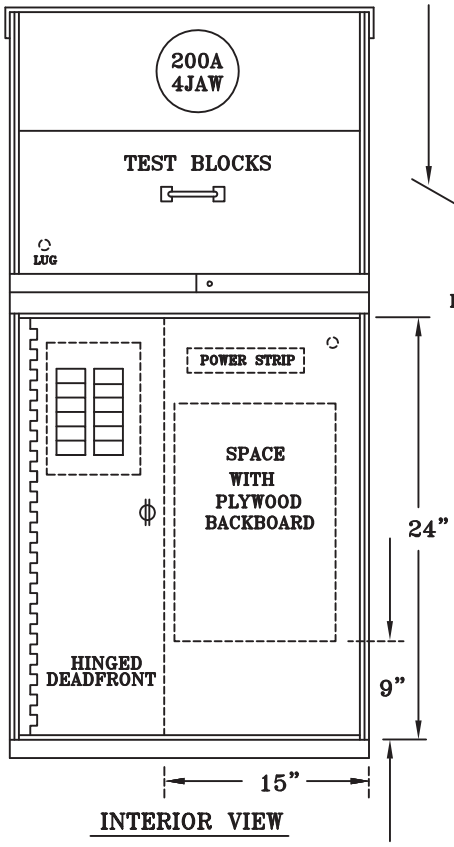
CITY OF IRVINE
PUBLIC WORKS



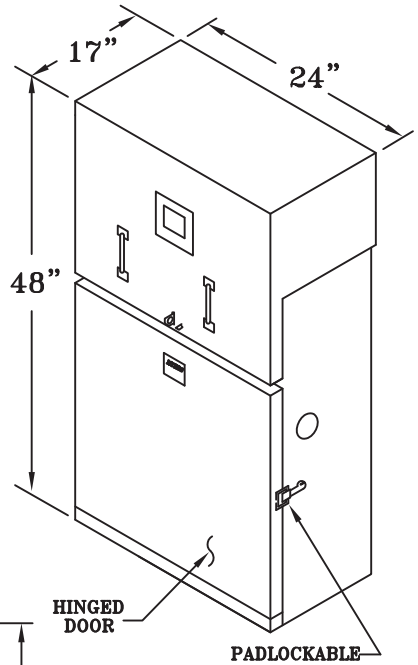


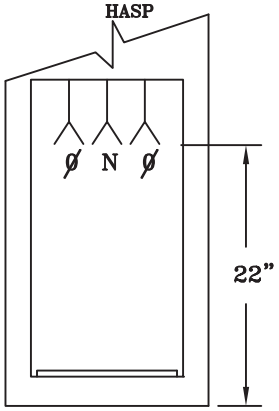
Ⓐ SCE SERVICE IN
Ⓑ LUMINAIRE
Ⓒ SIC FIBER
Ⓓ CCTV TO CAMERA

FOUNDATION



INTERIOR VIEW





REAR LANDING DETAIL
COVER REMOVED

FOR BASE DETAIL SEE MYERS CATALOG.

CCTV COMMUNICATIONS/SERVICE METER CABINET

TS-7A

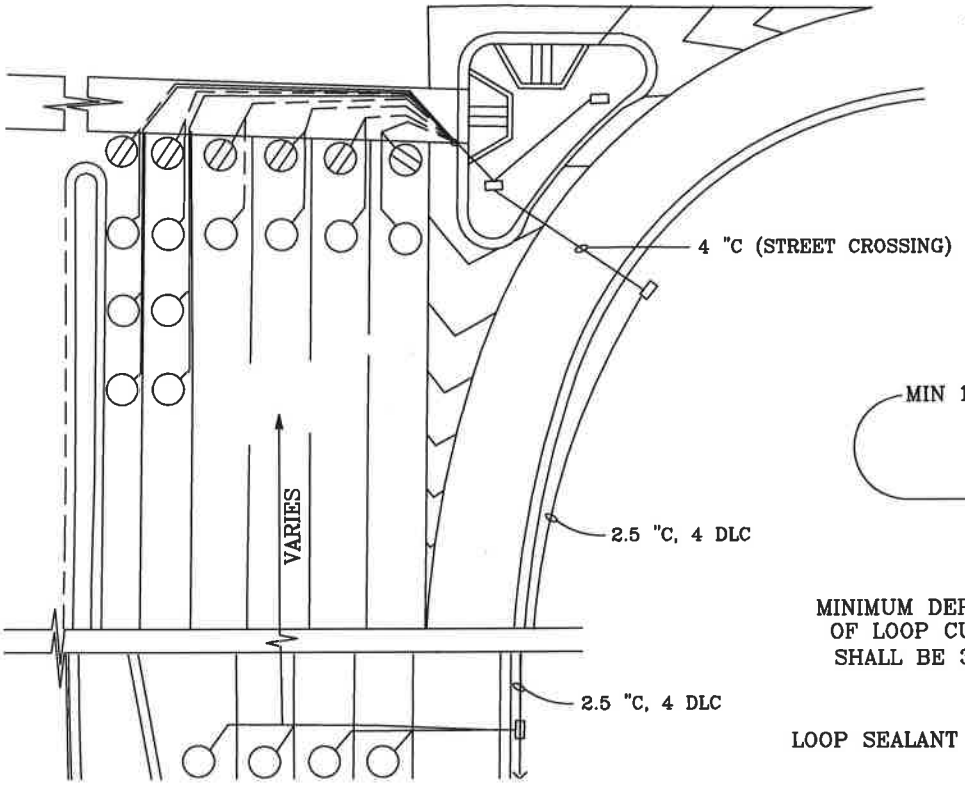
SHEET 1 OF 1

MARK CARROLL, R.C.E. 31515
CITY OF IRVINE - CITY ENGINEER

FEBRUARY 2016
DATE

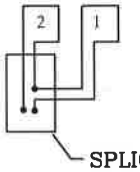
CITY OF IRVINE
PUBLIC WORKS

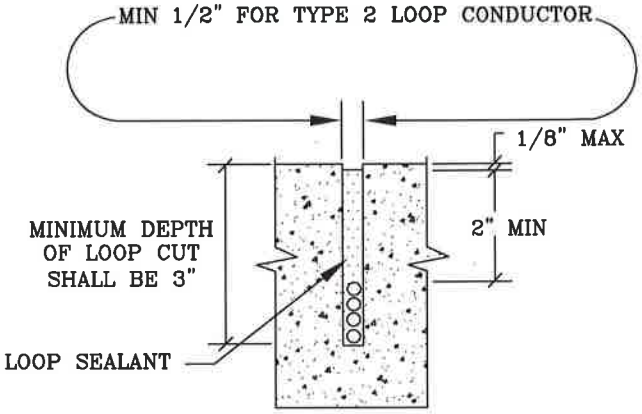
(MODIFIES CALTRANS STANDARD PLAN ES-5A AND ES-5B)



STANDARD LOOP CONNECTIONS

NUMBER 1 LOOP CLOSEST TO THE CROSSWALK

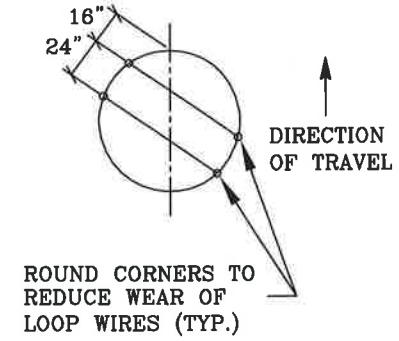




NOTES:

1. TRAFFIC SIGNAL LOOPS SHALL BE TYPE E, EXCEPT FRONTMOST PRESENCE LOOPS SHALL BE TYPE E (MODIFIED). SEE DETAIL HEREON.
2. LOOP CONDUCTORS SHALL BE TYPE 2.
3. LOOPS SHALL HAVE A MINIMUM OF 3-TURNS FOR PRESENCE AND 4-TURNS FOR FRONTMOST PRESENCE AND ADVANCE.
4. LOOPS SHALL BE SEALED WITH HOT MELT ADHESIVE.
5. LOOPS SHALL BE SPLICED IN SERIES, AND BY LANE.
6. PRESENCE LOOPS SHALL BE INSTALLED ONE FOOT BEHIND THE LIMIT LINE.
7. ADVANCE LOOPS SHALL BE INSTALLED PER SET BACK REQUIREMENTS (104.3.V.10).
8. TYPE E AND TYPE E (MODIFIED) LOOPS SHALL BE 6' IN DIAMETER WITH A 10' GAP BETWEEN LOOPS. TYPE D (MODIFIED) SHALL BE 3' X 3' WHEN INSTALLED IN AN EXCLUSIVE BIKE LANE.

TYPE E (MODIFIED) DETAIL



TRAFFIC SIGNAL LOOP DETECTION DETAILS

TS-8A

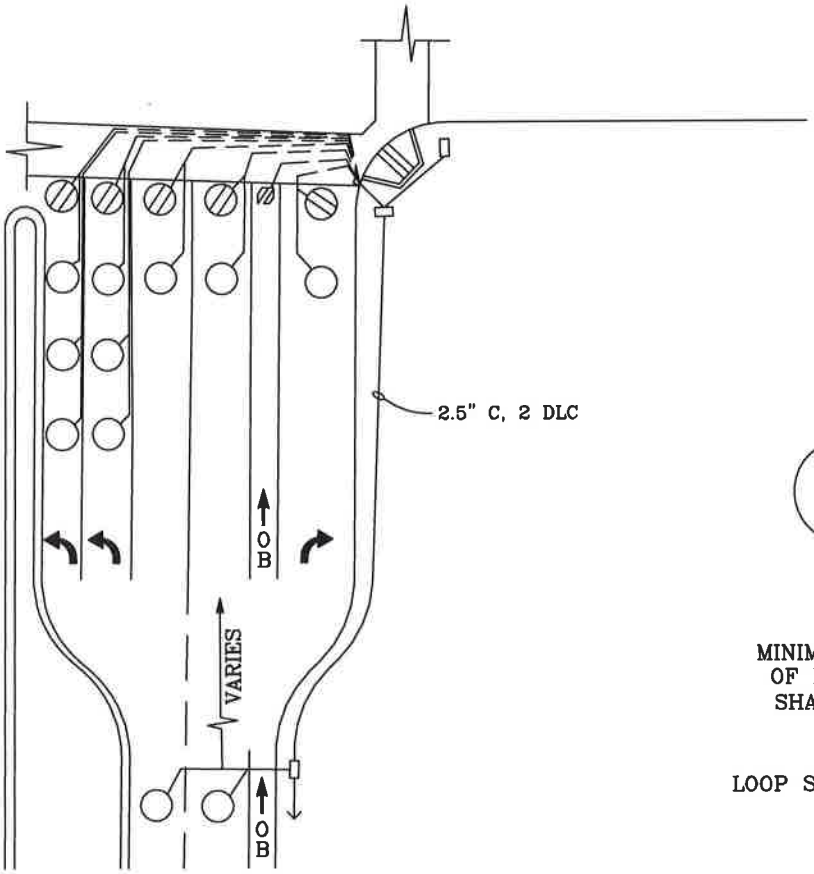
SHEET 1 OF 2

STEVE SHERWOOD, R.C.E. 42950
CITY OF IRVINE - ACTING CITY ENGINEER

8-7-19
DATE

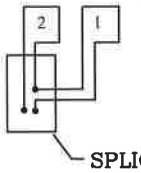
CITY OF IRVINE
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(MODIFIES CALTRANS STANDARD PLAN ES-5A AND ES-5B)

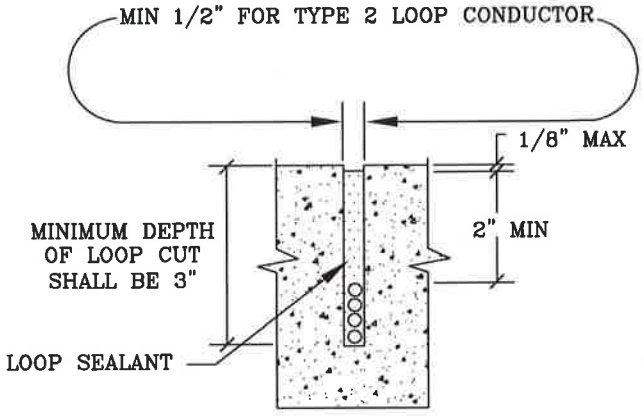


STANDARD LOOP CONNECTIONS

NUMBER 1 LOOP CLOSEST TO THE CROSSWALK



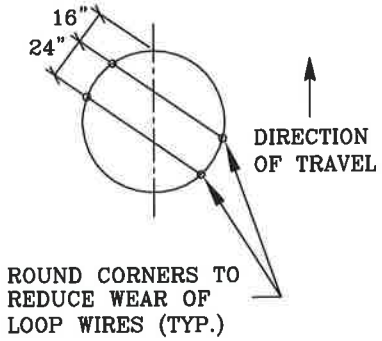
SPLICE IN PULL BOX



NOTES:

1. TRAFFIC SIGNAL LOOPS SHALL BE TYPE E, EXCEPT FRONTMOST PRESENCE LOOPS SHALL BE TYPE E (MODIFIED) AND BIKE LANE SHALL BE TYPE D (MODIFIED). SEE DETAIL HEREON.
2. LOOP CONDUCTORS SHALL BE TYPE 2.
3. LOOPS SHALL HAVE A MINIMUM OF 3-TURNS FOR PRESENCE AND 4-TURNS FOR FRONTMOST PRESENCE AND ADVANCE.
4. LOOPS SHALL BE SEALED WITH HOT MELT ADHESIVE.
5. LOOPS SHALL BE SPLICED IN SERIES, AND BY LANE.
6. PRESENCE LOOPS SHALL BE INSTALLED ONE FOOT BEHIND THE LIMIT LINE.
7. ADVANCE LOOPS SHALL BE INSTALLED PER SET BACK REQUIREMENTS (104.3.V.10).
8. TYPE E AND TYPE E (MODIFIED) LOOPS SHALL BE 6' IN DIAMETER WITH A 10' GAP BETWEEN LOOPS. TYPE D (MODIFIED) SHALL BE 3' X 3' WHEN INSTALLED IN AN EXCLUSIVE BIKE LANE.

TYPE E (MODIFIED) DETAIL



TRAFFIC SIGNAL LOOP DETECTION DETAILS

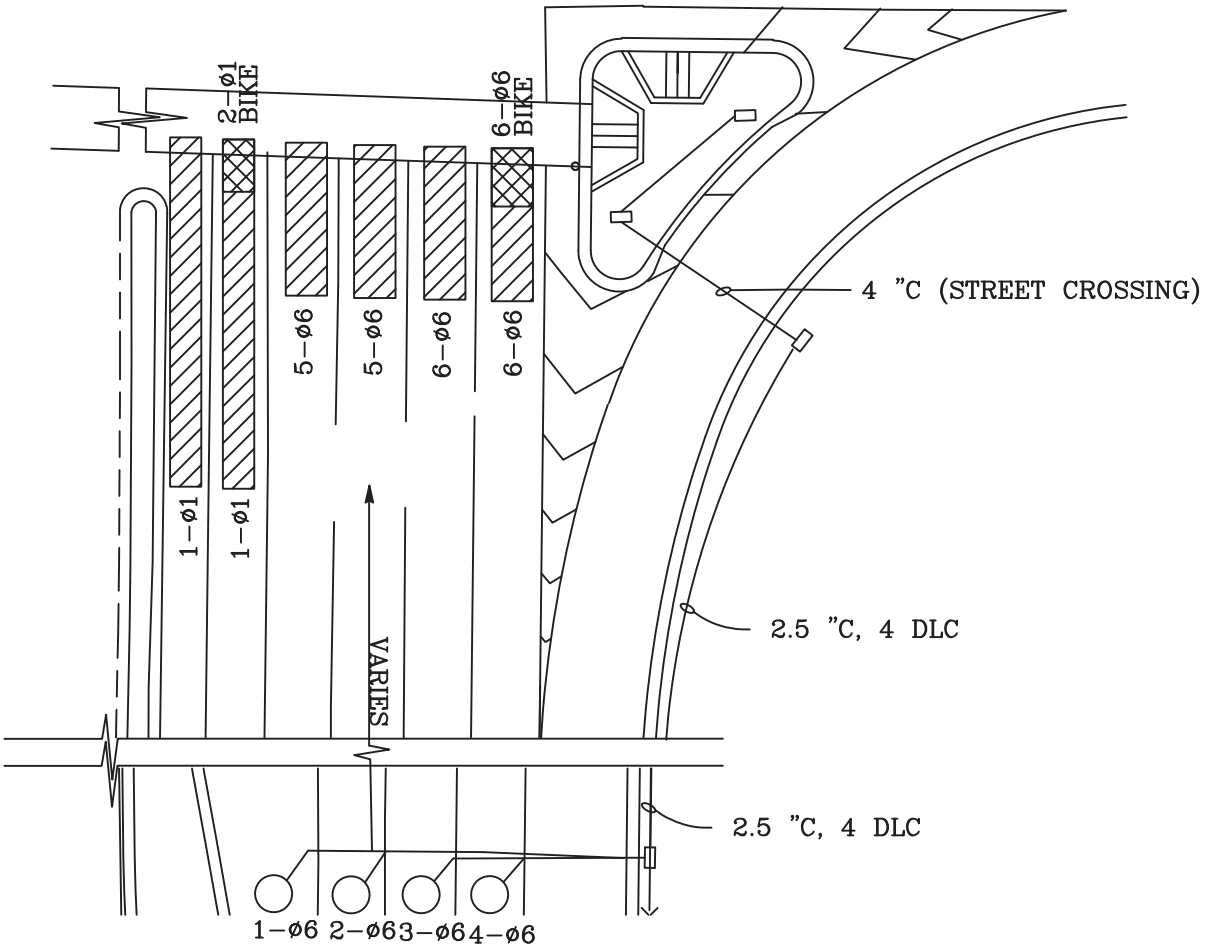
TS-8A

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NOTES :

1. ADVANCE DETECTION LOOPS SHALL BE TYPE E CONFORMING TO PLAN TS-8A SPECIFICATIONS.
2. PRESENCE SHALL BE VIDEO DETECTION CONFORMING TO 700-5.8.4 AND 701-17.6.4 SPECIFICATIONS.
3. PRESENCE DETECTION ZONES SHALL BE CONSISTENT WITH PLANS TS-8C, TS-8D, OR TS-8E.
4. BICYCLE DETECTION ZONES SHALL BE PLACED AT THE FRONT OF ALL STOP BAR ZONES.
5. ONE OR TWO VIDEO DETECTION CAMERAS MAY BE USED FOR EACH APPROACH.
6. PREFERRED PLACEMENT FOR VIDEO DETECTION CAMERAS IS ON THE LUMNAIRE ARM.

TRAFFIC SIGNAL VIDEO DETECTION DETAILS

TS-8B

SHEET 1 OF 1

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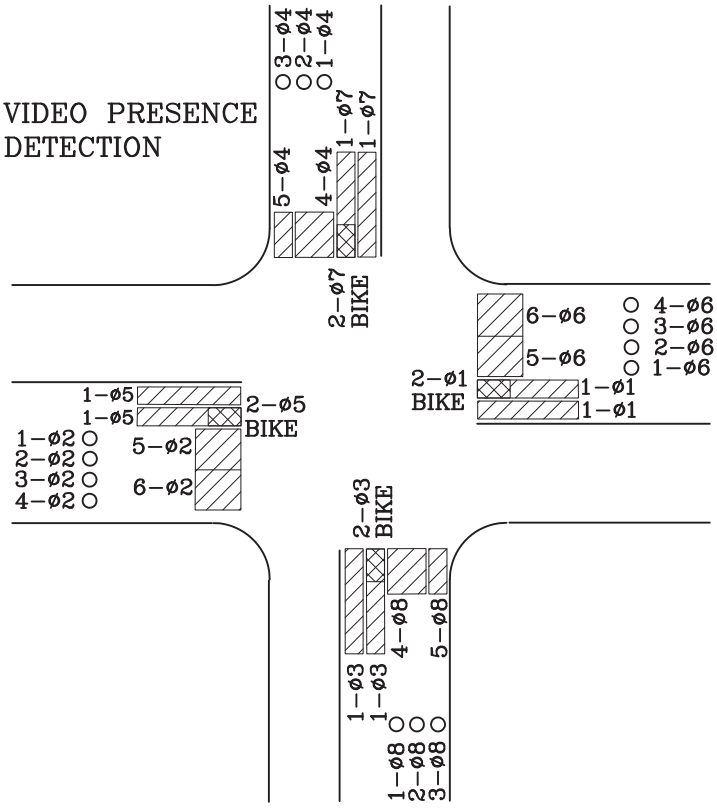
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SENSOR SCHEDULE

SLOT	POSITION	CHANNEL	SLOT	POSITION	CHANNEL
I1	U	5–ø2	J1	U	1–ø2
	L	6–ø2		L	2–ø2
I2	U	1–ø5	J2	U	3–ø2
	L	2–ø5B		L	4–ø2
I3	U	4–ø4	J3	U	1–ø4
	L	◆5–ø4		L	2–ø4
I4	U	1–ø7	J4	U	3–ø4
	L	2–ø7B		L	SP
I5	U	5–ø6	J5	U	1–ø6
	L	6–ø6		L	2–ø6
I6	U	1–ø1	J6	U	3–ø6
	L	2–ø1B		L	4–ø6
I7	U	4–ø8	J7	U	1–ø8
	L	◆5–ø8		L	2–ø8
I8	U	1–ø3	J8	U	3–ø8
	L	2–ø3B		L	SP
I9	U	VD COM	J9	U	SP
	L			L	SP
I10	U	VD COM	J10	U	FREE
	L			L	DL
I11	U	ø2 BIKE	J11	U	EVA–ø2
	L	ø4 BIKE		L	EVB–ø6
I12	U	ø6 BIKE	J12	U	EVC–ø4
	L	ø8 BIKE		L	EVD–ø8
I13	U	ø2 PED	J13	U	MAN ADV
	L	ø4 PED		L	MAN EN
I14	U	ø6 PED	J14	U	FLASH SEN
	L	ø8 PED		L	STOP TIME

◆ SENSOR CHANNELS DESIGNATED FOR RIGHT TURN DELAY FUNCTIONALITY IN CONTROLLER

VIDEO PRESENCE DETECTION



NOTES:
1. THIS DETECTION SCHEDULE IS APPLICABLE ONLY TO ATMS 332L CABINET INSTALLATIONS AND MODIFICATIONS.
2. VIDEO DETECTION PROCESSORS SHALL BE INSTALLED IN SLOTS I1-2, I3-4, I5-6, AND I7-8.
3. DETECTION CHANNELS 6-Ø4 AND 6-Ø8 SHALL ALWAYS BE UTILIZED FOR THE RIGHT-MOST LANE PRESENCE LOOPS ON SIDE-STREETS TO ACCOMODATE DELAY FUNCTIONALITY.

ATMS 332L DETECTOR SCHEDULE

TS-8C

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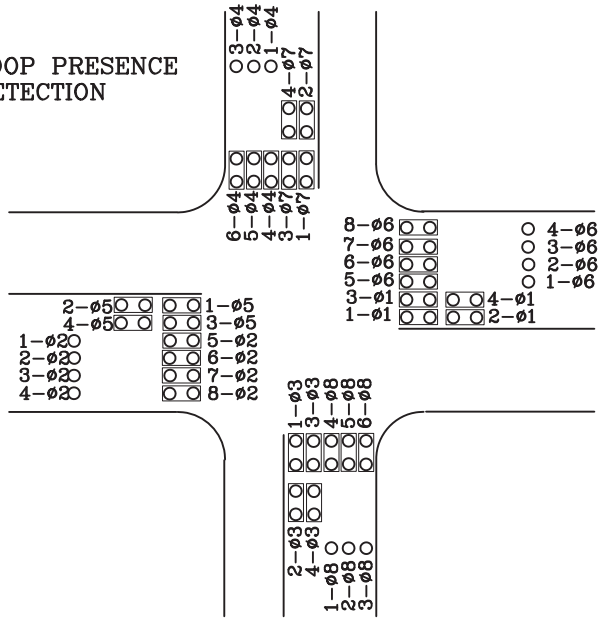
SENSOR SCHEDULE

UNIT	CHANNEL	DETECTOR	UNIT	CHANNEL	DETECTOR
I1	1	1-ø1	J8	1	◆6-ø8
	2	2-ø1		2	FUT
I2	1	3-ø1	J9	1	FUT
	2	4-ø1		2	FUT
I3	1	5-ø2	K1	1	1-ø2
	2	6-ø2		2	FUT
I4	1	7-ø2	K2	1	2-ø2
	2	8-ø2		2	FUT
I5	1	1-ø3	K3	1	3-ø2
	2	2-ø3		2	FUT
I6	1	3-ø3	K4	1	4-ø2
	2	4-ø3		2	FUT
I7	1	4-ø4	K5	1	1-ø4
	2	5-ø4		2	FUT
I8	1	◆6-ø4	K6	1	2-ø4
	2	FUT		2	FUT
I9	1	FUT	K7	1	3-ø4
	2	FUT		2	FUT
J1	1	1-ø5	K8	1	1-ø6
	2	2-ø5		2	FUT
J2	1	3-ø5	K9	1	2-ø6
	2	4-ø5		2	FUT
J3	1	5-ø6	K10	1	3-ø6
	2	6-ø6		2	FUT
J4	1	7-ø6	K11	1	4-ø6
	2	8-ø6		2	FUT
J5	1	1-ø7	K12	1	1-ø8
	2	2-ø7		2	FUT
J6	1	3-ø7	K13	1	2-ø8
	2	4-ø7		2	FUT
J7	1	4-ø8	K14	1	3-ø8
	2	5-ø8		2	FUT

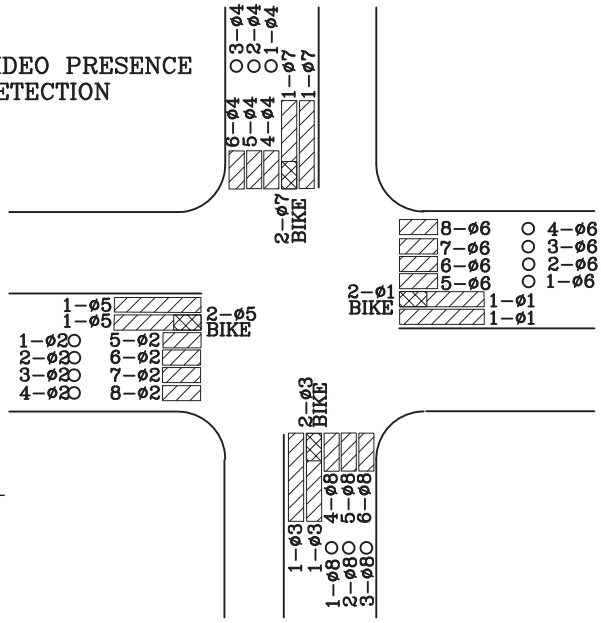
■ SENSOR UNITS SHALL BE RACK MOUNT WITH WITH TWO CHANNELS PER DETECTOR UNIT

◆ SENSOR CHANNELS DESIGNATED FOR RIGHT TURN DELAY FUNCTIONALITY IN CONTROLLER

LOOP PRESENCE DETECTION



VIDEO PRESENCE DETECTION



NOTES:

1. THIS DETECTION SCHEDULE IS APPLICABLE ONLY TO ATMS DUAL 332 CABINET INSTALLATIONS AND MODIFICATIONS.
2. WHEN UTILIZED, VIDEO DETECTION PROCESSORS SHALL BE INSTALLED IN SLOTS I3-4, I7-8, J3-4, AND J7-8. EXTENSION MODULES SHALL BE INSTALLED IN SLOTS I1, I5, J1, AND J5
3. DETECTION CHANNELS 6-Ø4 AND 6-Ø8 SHALL ALWAYS BE UTILIZED FOR THE RIGHT-MOST LANE PRESENCE LOOPS ON SIDE-STREETS TO ACCOMODATE DELAY FUNCTIONALITY.

ATMS DUAL 332 DETECTOR SCHEDULE

(FOR MODIFICATION REFERENCE USE ONLY)

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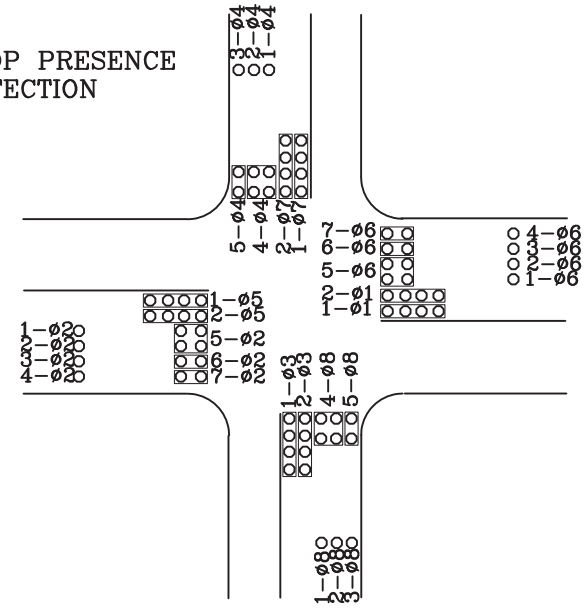
TS-8D

SHEET 1 OF 1

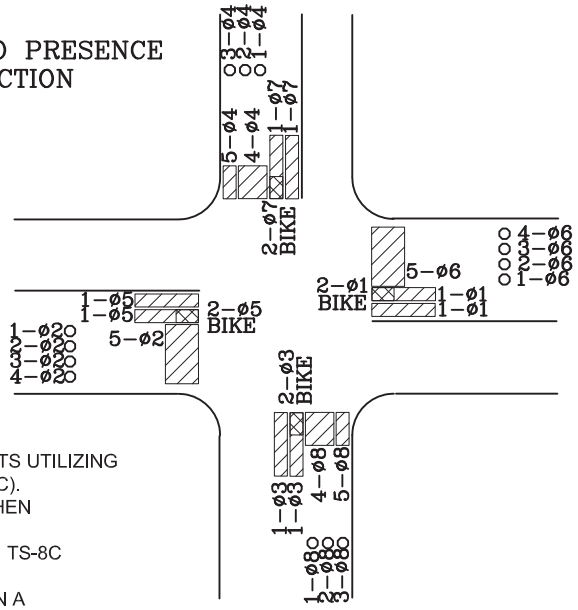
CITY OF IRVINE
PUBLIC WORKS

SENSOR SCHEDULE			
SENSOR UNIT	CHANNEL	ULTIMATE	EXISTING
1	1	5-ø2	
	2	6-ø2	
2	1	1-ø5	
	2	2-ø5B	
3	1	4-ø4	
	2	5-ø4	
4	1	1-ø7	
	2	2-ø7B	
5	1	5-ø6	
	2	6-ø6	
6	1	1-ø1	
	2	2-ø1B	
7	1	4-ø8	
	2	5-ø8	
8	1	1-ø3	
	2	2-ø3B	
9	1	1-ø2	
	2	2-ø2	
10	1	3-ø2	
	2	4-ø2	
11	1	1-ø4	
	2	2-ø4	
12	1	3-ø4	
	2	1-ø6	
13	1	2-ø6	
	2	3-ø6	
14	1	4-ø6	
	2	1-ø8	
15	1	2-ø8	
	2	3-ø8	
16	1	7-ø2	
	2	7-ø6	

LOOP PRESENCE DETECTION



VIDEO PRESENCE DETECTION



NOTES:
1. THIS DETECTION SCHEDULE IS APPLICABLE ONLY TO TYPE-P CABINETS UTILIZING 2-CHANNEL DETECTOR UNITS WITH TIMING FUNCTIONS (MODEL 262FC).
2. THIS SCHEDULE IS FOR REFERENCE USE AND SHALL ONLY APPLY WHEN MODIFYING EXISTING TYPE-P CABINET INSTALLATIONS. ALL NEW INSTALLATIONS OR CABINET REPLACEMENTS SHALL REFER TO PLAN TS-8C "ATMS 332L DETECTOR SCHEDULE".
3. WHEN UTILIZED, VIDEO DETECTION MODULES SHALL BE INSTALLED IN A STAND-ALONE RACK AND WIRED TO THE CONTROLLER INTERFACE PANEL.

TYPE P DETECTOR SCHEDULE

(FOR MODIFICATION REFERENCE USE ONLY)

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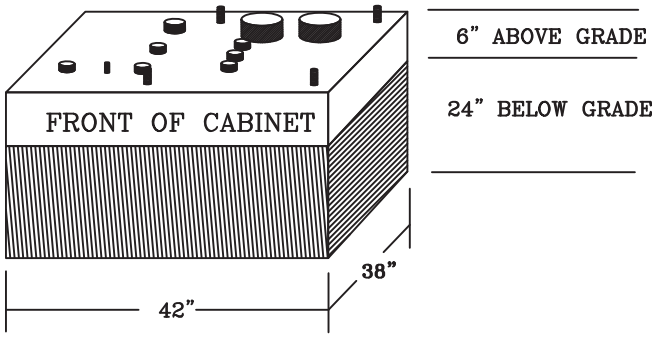
FEBRUARY 2016
DATE

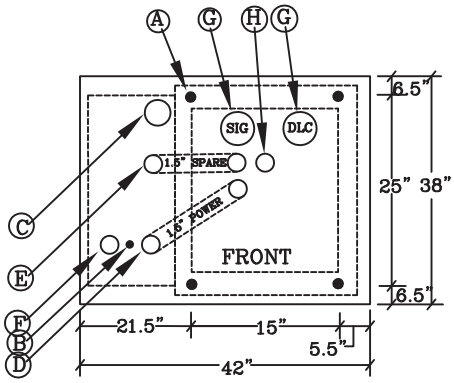
TS-8E

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PUBLIC WORKS

ATMS 332L





Ⓐ ANCHOR BOLT
Ⓑ 5/8–INCH GROUNDING ROD
Ⓒ 3–INCH EDISON SERVICE CONDUIT
Ⓓ 1.5–INCH POWER CONDUIT
Ⓔ 1.5–INCH SPARE CONDUIT
Ⓕ 1.5–INCH FIELD CIRCUITS CONDUIT
Ⓖ 4–INCH ENTRY CONDUIT
Ⓗ 1.5–INCH SIC PIGTAIL CONDUIT

NOTES :
1. CABINET LOCATION SHALL BE APPROVED BY A CITY REPRESENTATIVE PRIOR TO INSTALLATION OF THE CABINET BASE FORMS.
2. CONDUIT LOCATIONS ARE PROVIDED AS A GENERAL REFERENCE. FINAL CONDUIT PLACEMENT SHALL BE INSPECTED AND APPROVED PRIOR TO POURING THE CONCRETE FOUNDATION.

ATMS CABINET FOUNDATIONS

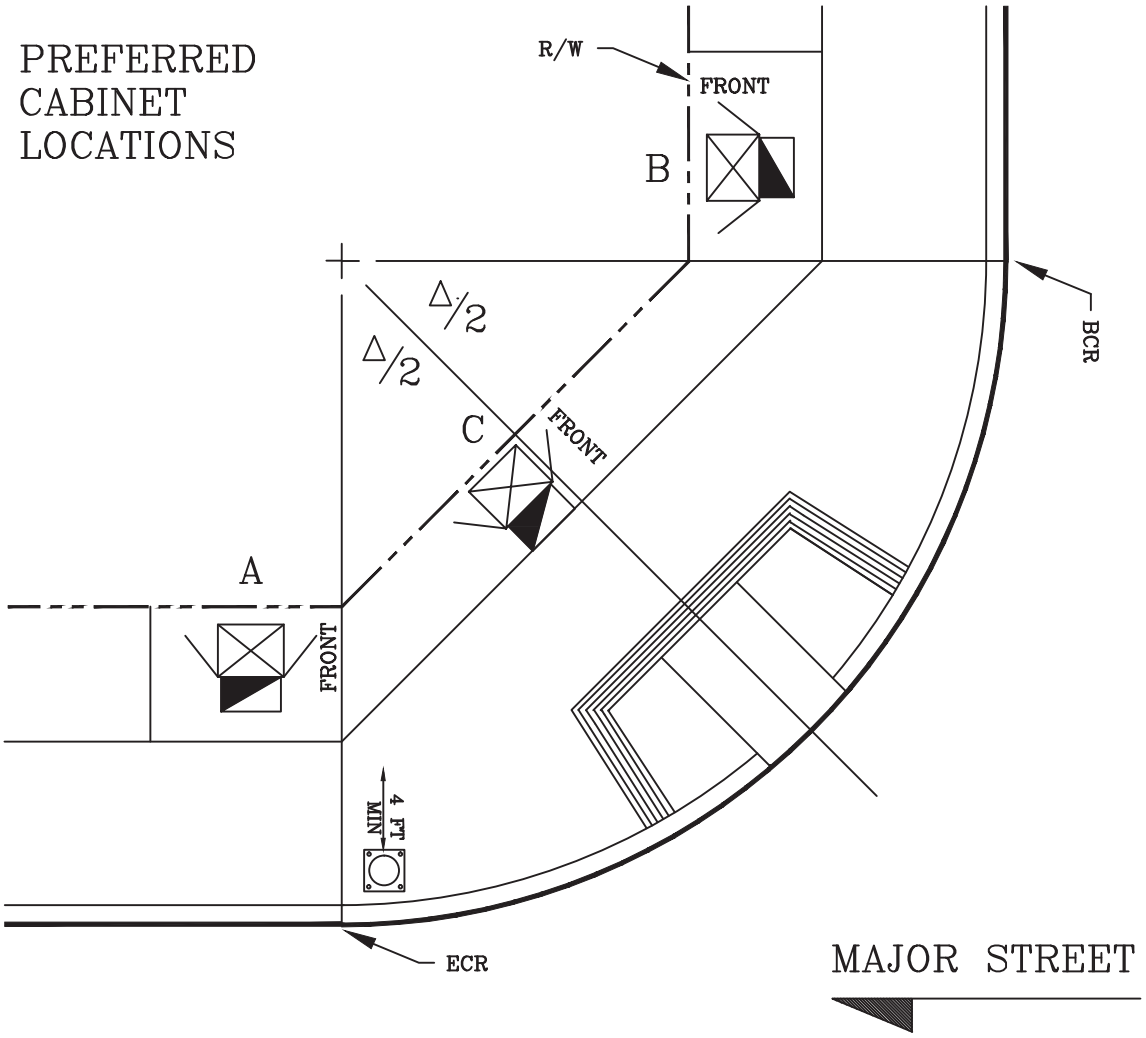
TS-9A

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NOTES :

1. THIS DETAIL SHOWS OPTIONAL ATMS 332L CABINET LOCATIONS IN ORDER OF PREFERENCE A TO C. DEVIATIONS FROM THESE PREFERRED LOCATIONS MUST BE APPROVED BY THE CITY TRAFFIC ENGINEER.
2. THE CABINET FRONT SHALL BE MINIMUM OF 36-INCHES FROM THE ECR OR BCR FOR PREFERRED LOCATIONS A OR B WITH THE FRONT DOOR FACING THE INTERSECTION.
3. HALF DELTA PREFERRED LOCATION C IS DIRECTLY IN LINE WITH THE PEDESTRIAN RAMP.
4. THERE SHALL BE A MINIMUM OF 48-INCHES OF CONCRETE FRONTING BOTH CABINET DOORS AND THE ELECTRICAL SERVICE. THE BACK SIDE OF THE CABINET MAY ABUT THE RIGHT-OF WAY LINE.
5. TO MITIGATE FOR SLOPED CONDITIONS BEHIND THE CABINET, INSTALLATION OF RETAINING WALL/CURB MAY BE REQUIRED TO MAINTAIN CLEAR ACCESS TO CONCRETE PAD AROUND CABINET. WHEN RETAINING WALL/CURB IS REQUIRED, THE TOP OF THE RETAINING WALL/CURB SHALL HAVE FEATURES TO PREVENT SKATEBOARDING.

ATMS 332L CABINET PLACEMENT

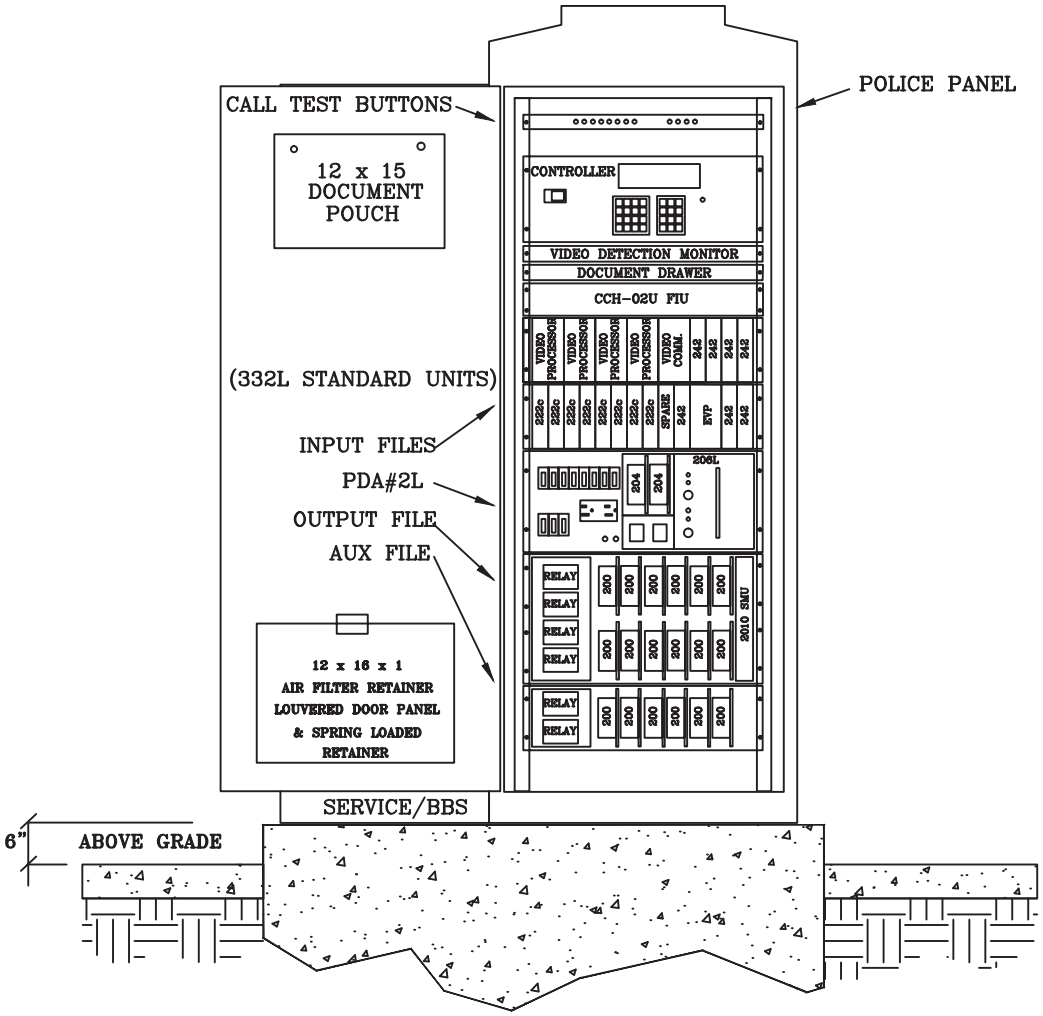
TS-9B

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INPUT FILE SLOT ALLOCATION

I	5-2	1-5	4-4	1-7	5-6	1-1	4-8	1-3	VD COM	VD COM	2 BIKE	6 BIKE	2 PED	6 PED
	6-2	2-5	5-4	2-7	6-6	2-1	5-8	2-3			4 BIKE	8 BIKE	4 PED	8 PED
J	1-2	3-2	1-4	3-4	1-6	3-6	1-8	3-8	SP	FREE	EVA 2	EVC 4	MAN ADV	FLSH SENS
	2-2	4-2	2-4	SP	2-6	4-6	2-8	SP	SP	DL	EVB 6	EVD 8	MAN EN	STOP TIME

1. ATMS 332L CABINETS ARE BASED UPON THE CALTRANS TEES STANDARDS.
2. COMPONENTS SHALL BE MOUNTED IN THE RACK IN THE APPROXIMATE POSITIONS SHOWN.
3. INPUT FILE SLOT ALLOCATIONS SHALL BE AS SHOWN.
4. COMMUNICATIONS NETWORK SWITCHES SHALL BE RACK MOUNTED TO THE BACK OF THE RACK, BEHIND THE CONTROLLER.
5. THE EXTERNAL SWITCH PANEL (PD PANEL) SHALL INCLUDE SWITCHES FOR FLASH, ON/OFF, AND MANUAL CONTROL.

ATMS 332L CABINET LAYOUT

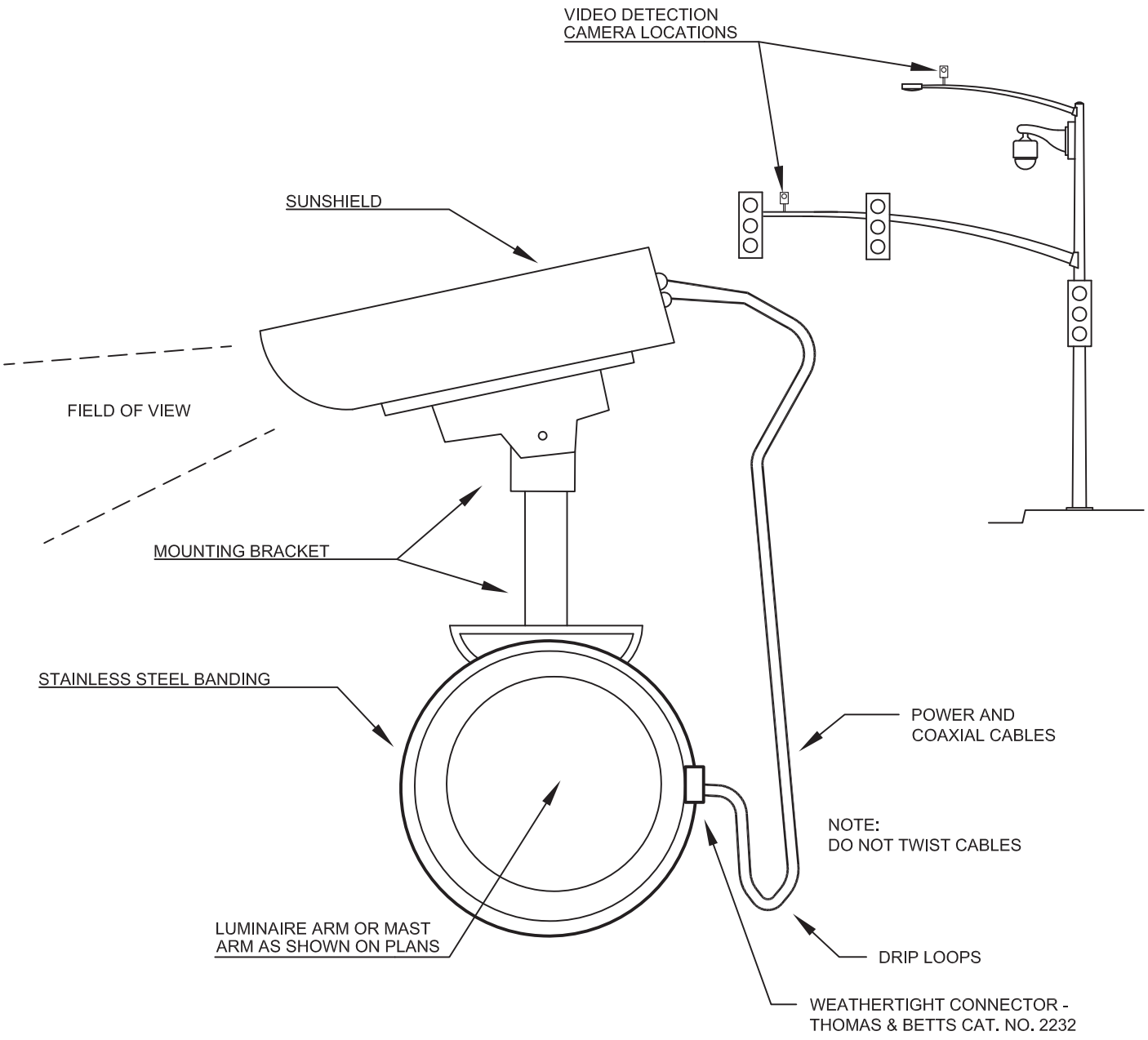
TS-9C

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VIDEO DETECTION CAMERA MOUNTING

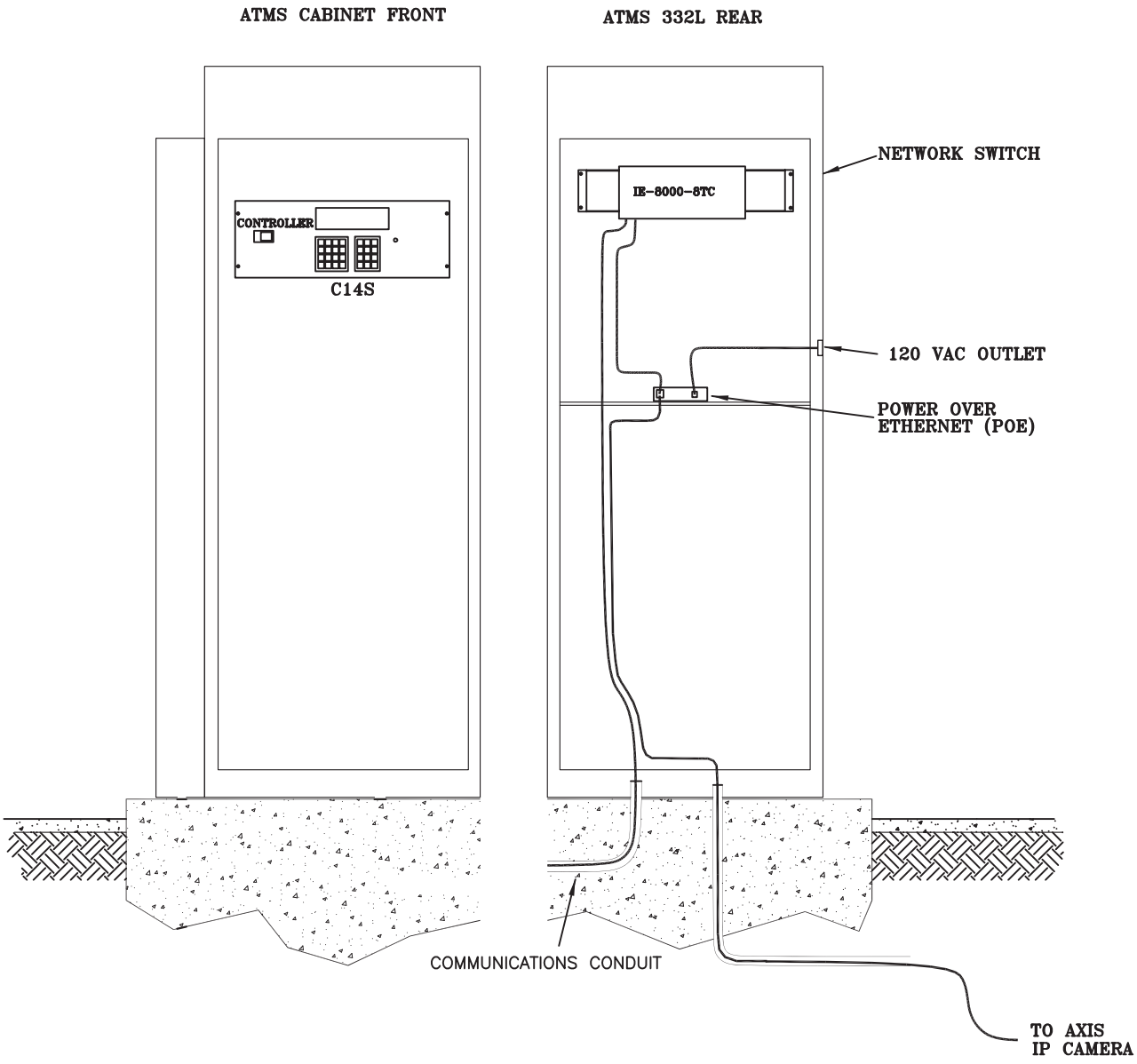
TS-9F

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1. DELIVER CONTROLLER WITH ALL PLUG-INS, SWITCH AND AXIS IP CAMERA TO CITY FOR CONFIGURATION AT LEAST 5-DAYS PRIOR TO TURN-ON. COORDINATE WITH SIGNAL OPERATIONS & MAINTENANCE: 949-724-7649
2. OBTAIN FIBER CHART FOR SIGNAL INTERCONNECT TERMINATION FROM CITY: 949-724-7649
3. CONTROLLER ETHERNET COMMUNICATIONS (C14S) CONNECTS TO SWITCH PORT 1
4. AXIS CCTV SWITCH PORT 9
5. OPERATIONAL TESTING: VERIFY CCTV CAMERA, AND CONTROLLER COMMUNICATIONS OPERATIONAL ON-SITE.
6. VERIFY OPERATION OF ALL EQUIPMENT ON NETWORK WITH SYSTEMS SUPPORT STAFF: 949-724-7649

ATMS CABINET COMMUNICATION

TS-11A

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