NOTES:

1. All materials and construction shall conform to the requirements of the Specifications. However, these T.S. Drawing requirements supercede any conflicting requirement specified in the original 2008 version of the Specifications or any subsequent version (stored or standard) which has not been revised to include advancements specified in these drawings.

2. All new signals, except the programmed visibility and pedestrian signals, installed at any one intersection or interchange shall be of the same manufacturer. Vehicle traffic signal face assemblies shall be bagged in an approved fashion if installed prior to turn-on or if they are left off (dormant) for any length of time.

3. Only those signal sections and LED traffic signal modules that have been approved shall be used. All signals (ball, arrows, bi-modal arrows, program visibility and pedestrian) shall be fully tested prior to installation.

4. All signals shall meet or exceed the applicable requirements of MUTCD and ITE Equipment and Material Standards. The ball indications shall conform to the 2005 ITE "Vehicle Traffic Control Signal Heads - Light Emitting Diode Circular Signal Supplement" (VTCSH-LED). The arrow indications shall conform to the 2008 ITE "Vehicle Traffic Control Signal Heads - Light Emitting Diode Vehicle Arrow Traffic Signal Supplement." See T.S. 8-7, sheet 1 of 3 for additional pedestrian signal requirements. Additionally the LED ball, arrow and pedestrian modules (or units) shall be certified or listed and permanent labeled on the back of each module as meeting the applicable ITE specification per a third party verification program (e.g. Intertek ETL or equal).

5. Due to Arizona hot desert climate it is desirable to have signal indication module units certified per the upper ITE specification limit of 81 degrees C (or 178 degree F) temperature, instead of the standard 74 degree C (165 degrees F); however, this is not required it is at the opinion of the manufacturer. All units shall also be certified or tested for load switch and conflict monitor compatibility (per ITE specification technical note No. 3). A list of incompatible load switches or conflict monitors, if and as applicable, shall be supplied if requested. Both the balls, arrows and pedestrian signals shall have transient suppression capabilities which exceed the ITE arrow specification requirements.

6. All red and green LED traffic signal units shall conform to the applicable requirements of the Energy Policy Act of 2005 (EPACT of 2005), specific electrical energy usage requirements as defined per the table shown on this sheet. All units shall be ENERGY STAR qualified and the manufacturer shall adhere to the applicable ENERGY STAR partnership agreement requirements for traffic signals.

Electrical Energy Efficient Criteria of EPACT of 2005 (See Note 13)		
Traffic Signal Face Module Type	Maximum Wattage at 74 degrees C / 165 degree F	Maximum Wattage at 25 degrees C / 77 degree F
8" Red Ball	13	8
8" Yellow Ball	N/A	16 - N/A *
8" Green Ball	12	12
12" Red Ball	17	11
12" Yellow Ball	N/A	22 - N/A *
12" Green Ball	15	15
12" Red Arrow	12	9
12" Yellow Arrow	N/A	16 - N/A *
12" Green Arrow	11	11

N/A - No requirements for yellow have been issued yet.
* - Maximum wattages are an ADOT requirement.

7. All plastics shall be UV Stabilized and shall be rated for a minimum 5-year outdoor service life. They shall not embrittle, crack, cloud, glaze and yellow within that time frame. Lenses shall be hard coated for enhanced durability.

8. All LED modules shall include a continuous neoprene type gasket which shall assure a weather and dust proof seal between the unit and the section door.

9. The units shall be designed to reduce the chance of sun phantom. This includes having a lens design (for pixilated units) or an optical assembly design (incandescent look or non-pixilated illumination units) that is specifically configured and tested to prevent or minimize the occurrence of sun phantom.

10. All arrow icons shall be omni-directional. A label on the back of the signal module shall state that.

11. All signal (ball, arrow and program visibility) indications shall also be physically and optically suitable for span wire applications, as required by T.S. 15 series.

12. The units shall be rated to operate at 120 VAC. The minimum wire size for the unit connection conductors shall be #18 AWG with an approved insulation. The units shall be connected to the section's terminal block with a insulated clip and spade type of connector kit.

13. The traffic signal housing, visor and backplate shall have at least a one-year warranty against defects in materials and workmanship. The LED traffic signal units shall have a minimum of 3-year warranty. Both warranties shall be full replacement. Upon project completion all warranties shall be assigned to the Department or the municipality (as applicable). The long term warranty shall be based on the manufactured date which shall be labeled or stamped on the unit. All units shall have a unique serial number that is expressed on a permanent label in writing and bar code on the back of the unit. A complete listing of all serial numbers shall be provided in written and electronic formats.

14. All backplates shall be louvered. Size, number, location and configuration of those louvers can vary. The backplates shall be fabricated from 16 gauge aluminum as a minimum, all backplates shall be one piece aluminum except for the type Q-2 which shall have no more than three sections total. The width of the backplate frame around 12 inch signals shall be five inches with eight inches for 8 inch signals. The backplates shall be powder coated or painted a minimum of two coats of dull black paint. The finish achieved shall have a minimum outdoor weathering rating of 12 or more years. The standard dull black color is Federal Standard (FS) 595A b 37038. Any field damage of the backplate shall be repainted with a matching color.

15. All dimensions shown are nominal. See remaining drawings within T.S. 8 Series for additional requirements and details. These notes and requirements, as applicable, apply to T.S. 8-1, 8-2, 8-3, 8-5, 8-6 and 8-7.

16. See drawings T.S. 8-6 for requirements for LED lamp for programmed visibility signals made by 3M and McCain. If programmed visibility signals are used they shall be installed, aimed and masked (if applicable) in accordance to the manufacturer's requirements and instructions. A night and day visibility test shall be conducted prior to final acceptance. Masking and aiming shall be adjusted as directed by the Engineer.

NOT TO SCALE

DESIGN APPROVED ARCHIVED APPROVED FOR DISTRIBUTION	ARIZONA DEPARTMENT OF TRANSPORTATION INTERMODAL TRANSPORTATION DIVISION TRAFFIC SIGNALS AND LIGHTING STANDARD DRAWINGS	REVISION 01/12 DRAWING NO. T.S. 8-0
	TRAFFIC SIGNAL REQUIREMENTS AND DETAILS	SHEET NO. 1 OF 1

NO	DESCRIPTION OF REVISIONS	MADE BY	DATE
1	2010 EDITION	C. COLE	03/10
2	2012 - REVISED NOTES	C. COLE	01/12