

ALL GENERAL NOTES SHOWN BELOW SHALL APPLY TO ALL OF THE STANDARD DRAWINGS IN TCS SERIES

| DESCRIPTION    | REVISIONS | DATE      |
|----------------|-----------|-----------|
| MODIFIED NOTES |           | 3/15/2011 |

**CONTRACTOR**

ON CONSTRUCTION PROJECTS IT WILL BE THE CONTRACTORS RESPONSIBILITY TO INSTALL THE NECESSARY TRAFFIC CONTROL BEFORE CONSTRUCTION BEGINS.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL DEVICES TO ASSURE A HIGH DEGREE OF BOTH DAY AND NIGHT VISIBILITY, WHICH WILL INCLUDE ANY WASHING, REPLACEMENT AND/OR REPOSITIONING WHERE DEEMED NECESSARY BY THE ENGINEER.

THE CONTRACTOR SHALL REPAIR OR REPLACE ANY NEW OR EXISTING PERMANENT STATE OWNED SIGNS WHICH ARE DAMAGED DUE TO HIS NEGLIGENCE OR CARELESS HANDLING DURING THE CONSTRUCTION OF THIS PROJECT. THIS SHALL BE DONE AT THE CONTRACTORS EXPENSE.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING TEMPORARY TRAFFIC CONTROL WORK ZONE AND EXISTING PAVEMENT MARKINGS ON ALL ROADWAYS OPEN TO TRAFFIC WITHIN THE PROJECT. SUFFICIENT QUANTITIES HAVE BEEN PROVIDED FOR MAINTAINING PAVEMENT MARKINGS FOR PRESCRIBED DETOUR ROUTES WHEN DEEMED NECESSARY BY THE ENGINEER.

**SIGN MATERIALS**

ALL SIGN BLANK MATERIALS SHALL BE THE OPTION OF THE CONTRACTOR BUT SHALL BE OF SUCH MATERIAL THAT WILL RETAIN A SATISFACTORY APPEARANCE THROUGHOUT THE LIFE OF THE PROJECT.

ALL SIGNS, LIGHTS, FLAGS, ETC. SHALL CONFORM IN SIZE, SHAPE, COLOR, LEGENDS AND APPLICATIONS TO THE STANDARDS SET FORTH IN THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES AND/OR OKLAHOMA STATE STANDARD DRAWINGS FOR SIGNS. STANDARD DRAWINGS ARE AVAILABLE FROM THE DEPARTMENT OF TRANSPORTATION. INTERPRETATIONS THAT MAY BE NECESSARY SHALL BE REFERRED TO THE ENGINEER.

**SIGN SHEETING**

REFLECTORIZATION OF TRAFFIC CONTROL DEVICES SHALL BE BY MEANS OF WIDE ANGLE, FLAT TOP REFLECTIVE SHEETING MEETING THE REQUIREMENTS OF 2009, OKLAHOMA STANDARD SPECIFICATIONS.

**SIGN INSTALLATION**

ALL SIGNS SHALL BE SECURELY PLACED OR WEIGHTED TO PREVENT BLOWING OVER. ROCKS, BROKEN CONCRETE OR OTHER SUCH OBJECTS SHALL NOT BE CONSIDERED AN ACCEPTABLE SUBSTITUTE FOR SAND BAGS WHEN USED TO OBTAIN ADDED STABILITY FOR MOVABLE SIGNS AND BARRICADES.

SPACING OF SIGNING, ON THE PLANS OR TCS STANDARDS, SHOULD BE NO LESS THAN THE DISTANCES SHOWN. THE DISTANCE BETWEEN SIGNS SHOULD BE INCREASED ON HIGH SPEED OR MORE HEAVILY TRAVELED HIGHWAYS, OR WHERE SIGHT DISTANCE IS RESTRICTED.

IN ALL CONSTRUCTION ZONES, THE 48 INCH X 48 INCH WARNING SIGNS SHALL HAVE ATTACHED THERETO FLORESCENT FLAGS AND TYPE "A" WARNING LIGHTS. THIS SHALL ALSO APPLY WHEN SIGNS ARE USED ON BOTH SIDES OF THE ROADWAY. ADDITIONAL FLASHING LIGHTS MAY BE REQUIRED WHEN SO DESIRED BY THE ENGINEER.

ALL DIAMOND SHAPED CONSTRUCTION WARNING SIGNS ON EXPRESSWAYS OR FREEWAYS SHALL BE 48 INCH X 48 INCH, WITH THE APPROPRIATE ADVISORY SIGN WHERE REQUIRED UNLESS OTHERWISE NOTED IN THE PLANS.

DUE TO THE TEMPORARY NATURE OF CONSTRUCTION, SIGNS WHICH ARE 33 S.F. AND OVER WILL HAVE NO REINFORCING STEEL IN THEIR FOOTINGS.

ALL SIGNS AND SIGN ASSEMBLIES WITH A TOTAL SURFACE AREA OF 10 S.F. OR MORE SHALL BE INSTALLED ON TWO (2) POSTS. THE EXCEPTION BEING SINGLE ROUTE MARKER ASSEMBLIES.

SIGNS MOUNTED ON BARRICADES SHALL BE MOUNTED AS HIGH AS NECESSARY TO BE VISIBLE.

**BARRICADES**

ONE (1) WING BARRICADE SHALL BE SET ON EACH SIDE OF THE ROADWAY IN ADVANCE OF THE FIRST ADVANCE WARNING SIGN. THE EXCEPTIONS ARE MINOR CROSS STREETS AND SECTION LINE ROADS WHICH INTERSECT THE WORK AREA.

WING BARRICADES SHALL BE INSTALLED ON TWO (2) BREAKAWAY POSTS.

**WORK DURATION**

THE FIVE CATEGORIES OF WORK DURATION AND THEIR TIME AT A LOCATION SHALL BE:  
 A) LONG-TERM STATIONARY IS WORK THAT OCCUPIES A LOCATION MORE THAN 3 DAYS.  
 B) INTERMEDIATE-TERM STATIONARY IS WORK THAT OCCUPIES A LOCATION MORE THAN ONE DAYLIGHT PERIOD UP TO 3 DAYS, OR NIGHTTIME WORKLASTING MORE THAN 1 HOUR.  
 C) SHORT-TERM STATIONARY IS DAYTIME WORK THAT OCCUPIES A LOCATION FOR MORE THAN 1 HOUR WITHIN A SINGLE DAYLIGHT PERIOD.  
 D) SHORT DURATION IS WORK THAT OCCUPIES A LOCATION UP TO 1 HOUR.  
 E) MOBILE IS WORK THAT MOVES INTERMITTENTLY OR CONTINUOUSLY.

**LIGHTING**

TYPE "A" WARNING LIGHTS SHALL BE USED ON BARRICADES (AS REQUIRED) AND WARNING SIGNS.

TYPE "C" WARNING LIGHTS MAY BE USED ON VERTICAL PANELS (OPTIONAL).

**CONSTRUCTION NOTES**

SHOULD THE REQUIRED WORK ON ANY PROJECT, INCLUDING ANY TRAFFIC CONTROL, OVERLAP OR OTHERWISE INTERFERE WITH THE ON-GOING WORK OR TRAFFIC CONTROL OF ANOTHER PROJECT, IT SHALL BE THE RESPONSIBILITY OF THE RESPECTIVE CONTRACTORS TO COORDINATE THEIR WORK ACTIVITIES TO FACILITATE THE SAFE MOVEMENT OF TRAFFIC THROUGHOUT OR AROUND THEIR COLLECTIVE WORK AREAS. ANY SUCH RECOMMENDED CHANGES SHALL BE SUBMITTED IN WRITING TO EACH PROJECT RESIDENT ENGINEER FOR REVIEW AND APPROVAL.

ALL TRAFFIC CONTROL DEVICES NOT REQUIRED FOR THE SAFE CONDUCT OF TRAFFIC THROUGH THE TEMPORARY TRAFFIC CONTROL ZONE SHALL BE PROMPTLY REMOVED, COMPLETELY COVERED, TURNED AWAY FROM TRAFFIC OR OTHERWISE TAKEN OUT OF SERVICE. DEVICES SHALL NOT BE STORED ALONG THE ROADWAY WITHIN 15 FEET (15') OF AN OPEN DRIVING LANE, EITHER BEFORE OR AFTER THEY ARE TO BE USED UNLESS PROTECTED BY GUARDRAIL, BRIDGE RAIL, AND/OR BARRIERS INSTALLED FOR OTHER PURPOSES. THESE DEVICES SHALL BE REMOVED FROM THE TEMPORARY TRAFFIC CONTROL ZONE WHEN THE ENGINEER DETERMINES THEY ARE NO LONGER NEEDED. WHERE THERE IS INSUFFICIENT RIGHT-OF-WAY TO PROVIDE FOR THIS 15 FEET (15') SETBACK, THE CONTRACTOR SHALL DETERMINE ALTERNATE LOCATIONS AND REQUEST THE ENGINEERS APPROVAL TO USE THEM.

TRAFFIC CONTROL DEVICES, WARNING DEVICES, AND BARRIERS SHALL BE KEPT IN CORRECT POSITION, PROPERLY DIRECTED, CLEARLY VISIBLE AND CLEAN AT ALL TIMES. DAMAGED, DEFACED OR DIRTY DEVICES OR BARRICADES SHALL IMMEDIATELY BE REPAIRED, REPLACED OR CLEANED BY THE CONTRACTOR AND APPROVED FOR USE BY THE ENGINEER.

NO EQUIPMENT OR VEHICLES BELONGING TO THE CONTRACTOR, HIS SUB-CONTRACTORS OR EMPLOYEES SHALL BE PARKED OR STOPPED WITHIN 30 FEET (30') OF A LANE CARRYING TRAFFIC, AT ANY TIME, UNLESS REQUIRED BY ONGOING WORK OPERATIONS.

ALL DETOURS AND DIVERSIONS SHOULD BE IN PLACE, WITH SIGNING, STRIPING AND CHANNELIZING DEVICES, AS SHOWN IN THE PLANS OR STANDARD DRAWINGS, BEFORE THEY ARE OPENED TO TRAFFIC.

WHEN IT BECOMES NECESSARY TO CLOSE THE ROAD TO THROUGH TRAFFIC, NO LESS THAN SEVEN DAYS PRIOR TO THE CLOSURE, THE CONTRACTOR SHALL NOTIFY THE FOLLOWING INDIVIDUALS OR AGENCIES DESCRIBING THE AFFECTED ROAD AND THE APPROXIMATE DURATION OF THE CLOSURE. THOSE TO BE NOTIFIED INCLUDE BUT ARE NOT LIMITED TO 1) LOCAL LAW ENFORCEMENT OFFICIALS, 2) LOCAL FIRE OFFICIALS, 3) AMBULANCE SERVICES, 4) LOCAL SCHOOL SUPERINTENDENT, 5) UNITED STATES POSTAL SERVICE, AND 6) CITY OR COUNTY ROAD SUPERINTENDENT.

ALL TEMPORARY TRAFFIC CONTROL DEVICES, AND THEIR CONDITIONS THROUGHOUT THE LIFE OF THE CONSTRUCTION PROJECT, SHALL MEET O.D.O.T.'S LATEST "QUALITY STANDARDS FOR TEMPORARY TRAFFIC CONTROL DEVICES". THE O.D.O.T. RESIDENT ENGINEER WILL MAKE FINAL DECISION OF ALL TEMPORARY TRAFFIC CONTROL DEVICES BASED ON THE O.D.O.T. GUIDELINES.

NO GENDER BIAS SIGNS ARE ALLOWED.

**ARROW DISPLAY**

USE OF AN ARROW DISPLAY, IN THE ARROW OR CHEVRON MODE, SHALL BE LIMITED TO STATIONARY OR MOVING LANE CLOSURES.

AN ARROW DISPLAY, IN THE CAUTION MODE, SHALL BE USED ONLY FOR SHOULDER WORK, BLOCKING THE SHOULDER, ROADSIDE WORK NEAR THE SHOULDER, OR FOR MOBILE OPERATIONS (I.E. STRIPING).

AN ARROW DISPLAY IN THE ARROW OR CHEVRON MODE, SHALL NOT BE USED ON A TWO-LANE, TWO-WAY ROADWAY FOR TEMPORARY ONE-LANE OPERATION.

AN ARROW DISPLAY SHALL NOT BE USED ON A MULTI-LANE ROADWAY TO LATERALLY SHIFT TRAFFIC.

**CHANNELIZING DEVICES**

IN THOSE AREAS WHERE DRIVERS ARE ASKED TO MAKE A DECISION OR MUST BE GUIDED THROUGH A PRECISE MOVEMENT, BY USE OF CHANNELIZING DEVICES, IT IS ESPECIALLY IMPORTANT TO PROVIDE A CLEARLY DEFINED PATH. EXAMPLES OF THIS COULD BE IN DELINEATING A TEMPORARY GORE OR TURNING RADIUS. IN SUCH AREAS THE SPACING OF CHANNELIZING DEVICES MAY BE REDUCED TO 10 FEET FOR SPEEDS OF 40 M.P.H. OR LESS, AND 20 FEET FOR SPEEDS GREATER THAN 40 M.P.H.

WHEN CHANNELIZING DEVICES ARE USED TO DIRECT TRAFFIC ACROSS EXISTING LANE LINES OR EDGE LINES, THE SPACING BETWEEN CHANNELIZING DEVICES SHALL BE REDUCED 50%. SPACING SHOULD ALSO BE REDUCED WHEN CHANNELIZING DEVICES ARE PLACED ON CURVES, HILLS, OR NEXT TO POTENTIAL HAZARDS.

ALL TRAFFIC CONTROL CHANNELIZING DEVICES SHALL MEET MUTCD COLOR REQUIREMENTS.

**FLAGGERS**

FLAGGERS MUST BE CLEARLY VISIBLE TO APPROACHING TRAFFIC FOR A DISTANCE SUFFICIENT TO PERMIT PROPER RESPONSE BY MOTORISTS TO THE FLAGGING INSTRUCTIONS, AND TO PERMIT TRAFFIC TO REDUCE SPEED OR STOP BEFORE ENTERING THE TEMPORARY TRAFFIC CONTROL ZONE. FLAGGERS SHALL BE POSITIONED TO MAINTAIN MAXIMUM COLOR CONTRAST BETWEEN THE FLAGGER'S REFLECTIVE CLOTHING AND EQUIPMENT AND THE WORK AREA BACKGROUND.

DURING HOURS OF DARKNESS, FLAGGER STATIONS SHALL BE ILLUMINATED SUCH THAT THE FLAGGER WILL BE CLEARLY VISIBLE TO APPROACHING TRAFFIC. LIGHTS TO BE USED FOR ILLUMINATING THE STATION SHALL BE APPROVED BY THE ENGINEER. REFLECTORIZED PADDLES AND REFLECTORIZED VESTS, SHIRTS OR JACKETS SHALL BE USED FOR NIGHTTIME FLAGGING.

UNLESS OTHERWISE SPECIFIED IN THE PLANS, THE COST OF FLAGGING OPERATIONS SHALL BE INCLUDED IN OTHER ITEMS OF WORK.

**MINIMUM STANDARDS FOR TRAFFIC CONTROL DEVICES**

- (1) WARNING LIGHTS (TYPE A FLASHERS AND TYPE C STEADY BURN)
  - (A) NOT LESS THAN NINETY (90) PERCENT OF THE TOTAL NUMBER OF LIGHTS BEING USED AT ANY ONE TIME SHALL BE FULLY OPERATIONAL
  - (B) NOT MORE THAN THREE (3) LIGHTS ADJACENT TO ONE ANOTHER SHALL BE FAILING.
- (2) ARROW DISPLAY
  - (A) WHEN IN ARROW MODE, NO MORE THAN TWO (2) LAMPS IN THE STEM AND ZERO (0) LAMPS IN THE HEAD SHALL BE FAILING. THE DIMMING FUNCTION SHALL BE OPERATING PROPERLY.
  - (B) WHEN IN CAUTION MODE (CORNERS), A MINIMUM OF FOUR (4) LAMPS SHALL BE OPERATIONAL. THE DIMMING FUNCTION SHALL BE OPERATING PROPERLY.
  - (C) ANY LAMP WHICH IS LIGHTED BUT IMPROPERLY ALIGNED SHALL NOT BE CONSIDERED OPERATIONAL.
- (3) CHANGEABLE MESSAGE SIGNS
  - (A) NOT LESS THAN NINETY (90) PERCENT OF THE PIXELS SHALL BE FUNCTIONAL IN EACH CHARACTER MODULE.
  - (B) NO SANDBAG BALLASTING OVER 3 FEET IN HEIGHT.
- (4) PAVEMENT MARKING TAPE
  - (A) NOT MORE THAN TEN (10) PERCENT OF ALL TAPE, PAINT, MESSAGE OR SYMBOL SHALL BE MISSING
  - (B) NOT MORE THAN TWO (2) CONSECUTIVE DASHED LINES SHALL BE MISSING.
  - (C) NOT MORE THAN FIFTY (50) CONTINUOUS FEET OF A SOLID LINE SHALL BE MISSING.
- (5) CONSTRUCTION ZONE PAVEMENT MARKERS
  - (A) NOT MORE THAN TEN (10) PERCENT OF THE TOTAL NUMBER OF MARKERS SHALL BE MISSING.
  - (B) NOT MORE THAN THREE (3) CONSECUTIVE MARKERS SHALL BE MISSING.

**STRIPING**

WHENEVER THE WORK CAUSES THE OBLITERATION OF PAVEMENT MARKINGS, EITHER TEMPORARY OR PERMANENT MARKINGS SHALL BE IN PLACE PRIOR TO OPENING THE ROADWAY TO TRAFFIC. CENTERLINE PAVEMENT MARKINGS SHALL BE PROVIDED AT ALL TIMES FOR ROADWAYS OPEN TO TRAFFIC.

THE APPLICATION SURFACES FOR PAVEMENT MARKINGS SHALL BE FREE OF DUST, DIRT, MOISTURE OR OTHER FOREIGN MATTER WHICH WOULD INTERFERE WITH ADHESION. INSTALLATION OF ALL PAVEMENT MARKINGS SHALL BE IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.

ALL TEMPORARY PAVEMENT MARKINGS SHALL BE REMOVED IMMEDIATELY AHEAD OF THE PERMANENT STRIPING OPERATIONS OR RE-STRIPING FOR FOLLOWING CONSTRUCTION PHASES.

WHEN REMOVABLE PAVEMENT MARKINGS TAPE IS TO BE INSTALLED ON NEW CONCRETE PAVEMENT, THE CURING COMPOUND SHALL BE REMOVED PRIOR TO INSTALLATION.

IF REMOVABLE PAVEMENT MARKING TAPE IS INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATIONS AND FAILS DURING THE FIRST SIX MONTHS OF SERVICE, IT SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE. REPLACEMENT SHALL BE ACCOMPLISHED IN A TIMELY MANNER UPON BEING NOTIFIED, BY THE ENGINEER, OF SUCH FAILURE.

**PILOT CAR**

WHEN LANE CLOSURES ARE REQUIRED ON TWO-LANE /TWO-WAY ROADWAYS, THE CONTRACTOR MAY, AT HIS OPTION, UTILIZE A PILOT CAR. IF THE CONTRACTOR ELECTS TO USE A PILOT CAR, CHANNELIZING DEVICES ALONG THE CENTERLINE WILL NOT BE REQUIRED. THE PILOT CAR OPERATOR SHALL BE IN RADIO CONTACT WITH PERSONNEL IN THE TEMPORARY TRAFFIC CONTROL ZONE. MAXIMUM SPEED OF THE PILOT CAR THROUGH THE WORK AREA SHALL BE 25 M.P.H. FULL COMPENSATION FOR FURNISHING AND OPERATING THE PILOT CAR, (INCLUDING DRIVER, RADIOS, AND ANY OTHER EQUIPMENT OR LABOR REQUIRED) SHALL BE CONSIDERED AS INCLUDED IN THE COST OF OTHER ITEMS OF WORK.

**MISCELLANEOUS**

TRAFFIC CONDITIONS MAY NECESSITATE CHANGES IN THE USE AND/OR QUANTITIES OF THE TRAFFIC CONTROL DEVICES AS SHOWN IN THE PLANS OR IN THE STANDARDS. ANY SUCH CHANGES ARE SUBJECT TO APPROVAL BY THE ENGINEER.

ALL CHANNELIZING DEVICES PROVIDED ON THIS PROJECT SHALL BE IN GOOD CONDITION AND SHALL BE APPROVED FOR USE ON THIS PROJECT BY THE ENGINEER.

THE REGULATORY SPEED LIMITS THROUGH THE WORK ZONE MAY BE ADJUSTED AT THE DISCRETION OF THE ENGINEER WITH THE DOCUMENTED APPROVAL OF THE DIVISION ENGINEER IN ACCORDANCE WITH TITLE 47 OF THE OKLAHOMA MOTOR VEHICLE LAWS.

THE TERMINATION AREA EXTENDS FROM THE DOWNSTREAM END OF THE WORK AREA TO THE TEMPORARY TRAFFIC CONTROL DEVICE SUCH AS "END ROAD WORK" SIGNS. IF POSTED, A SPEED SIGN, OR OTHER SIGNS MAY BE USED TO INFORM ROAD USERS THAT THEY CAN RESUME NORMAL OPERATIONS.

THE CONSTRUCTION SIGNING AND BARRICADE CONTRACTOR SHOULD AFFIX THEIR COMPANY NAME AND/OR LOGO INCONSPICUOUSLY ON EACH TRAFFIC CONTROL DEVICE.



APPROVED BY TRAFFIC ENGINEER: *Sheld Gandy* DATE: 3/21/11

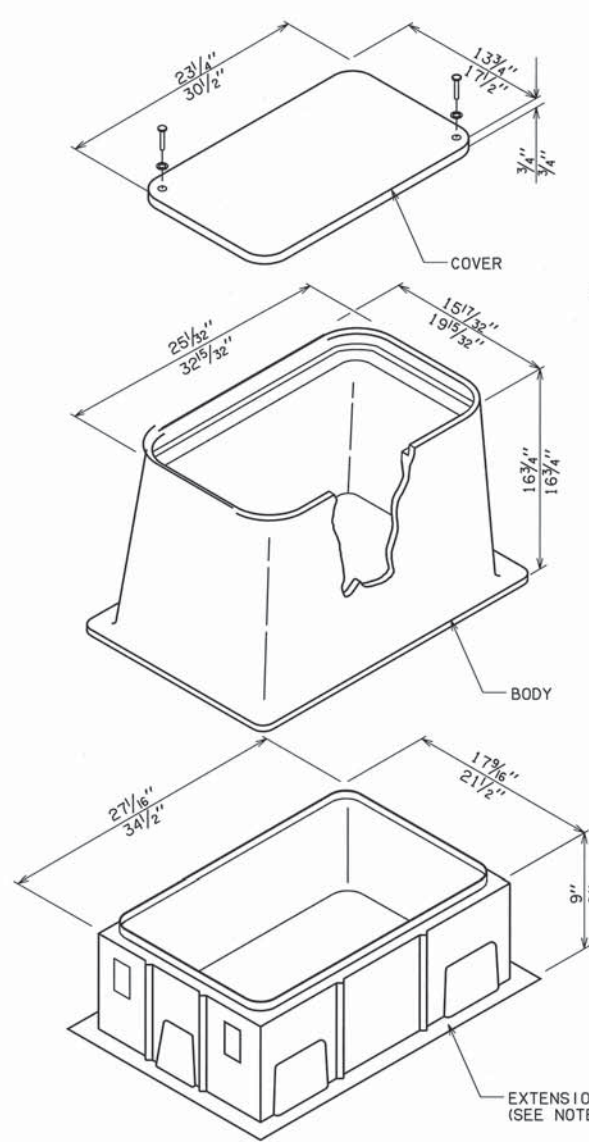
TRAFFIC STANDARD  
 TRAFFIC CONTROL STANDARD  
 TRAFFIC CONTROL CONSTRUCTION NOTES

2009 SPECIFICATIONS

|        |    |
|--------|----|
| TCS1-1 | 01 |
| T-501  |    |

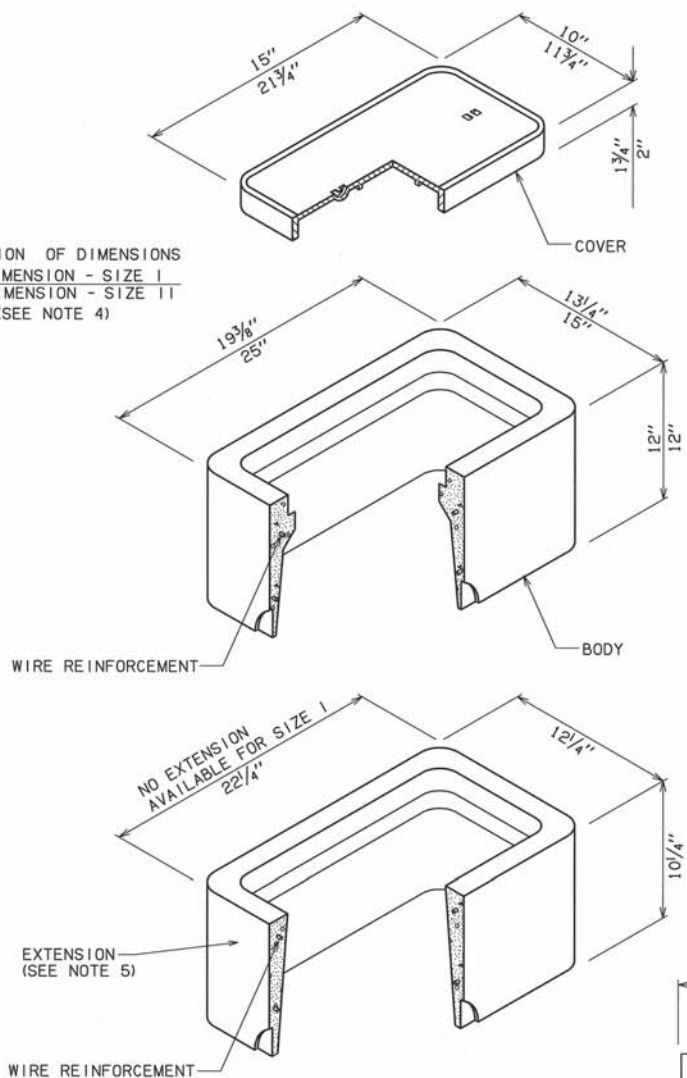
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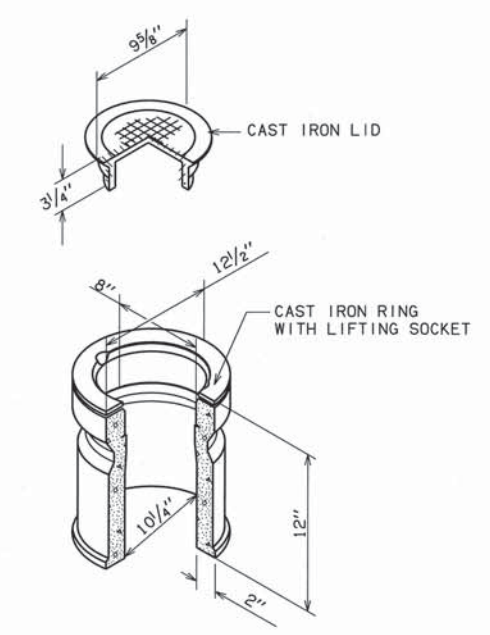


**PLASTIC PULL BOX  
SIZE I & II**

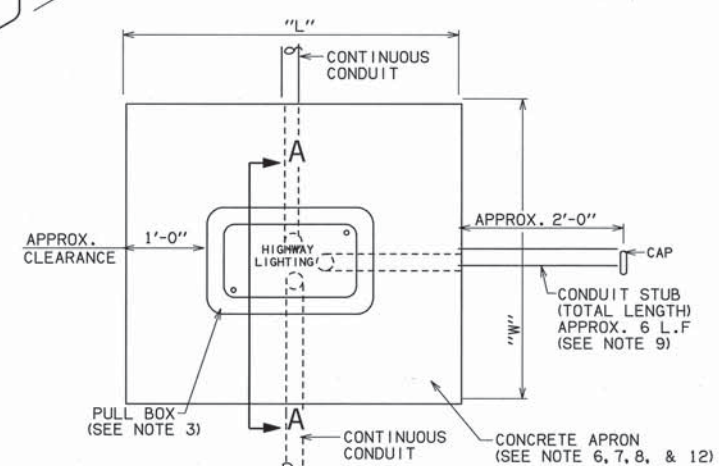
EXPLANATION OF DIMENSIONS  
TOP DIMENSION - SIZE I  
BOTTOM DIMENSION - SIZE II  
(SEE NOTE 4)



**CONCRETE PULL BOX  
SIZE I & II**



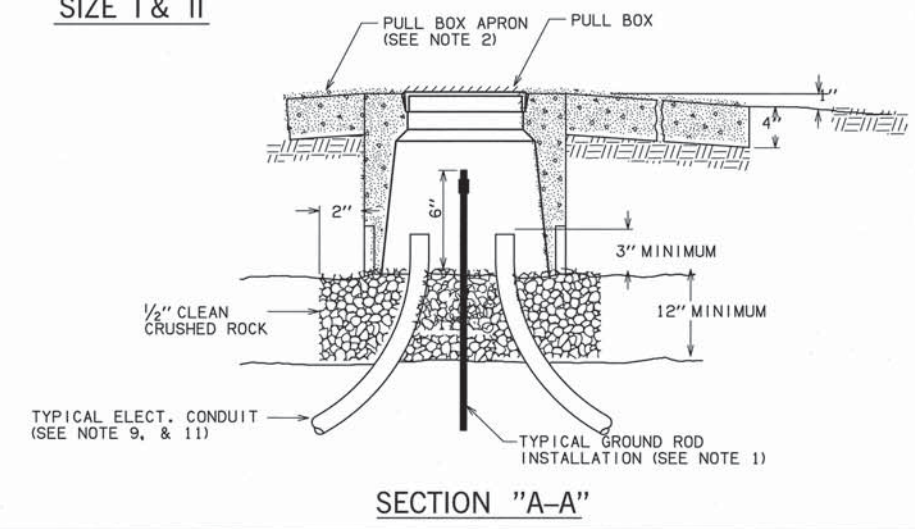
**CONCRETE PULL BOX  
SIZE III**



| PULL BOX SIZE | "L"   | "W"   | CLASS "A" CONCRETE C.Y. ** |
|---------------|-------|-------|----------------------------|
| I             | 3'-6" | 3'-6" | .13                        |
| II            | 4'-0" | 4'-0" | .17                        |
| III           | 3'-0" | 3'-0" | .11                        |

**PULL BOX APRON AND CONDUIT STUB DETAIL**

\*\*FOR INFORMATION ONLY



**SECTION "A-A"**

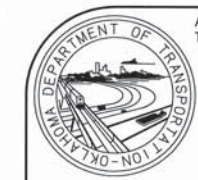
**MATERIAL SPECIFICATIONS**

- THE PRE-CAST CONCRETE BODY AND THE PRE-CAST REINFORCED PLASTIC PULL BOX BODY AND COVER SHALL CONFORM TO THE 2009 STANDARD SPECIFICATIONS OR SPECIAL PROVISIONS.
- THE GRAY IRON CAST COVER & ELECTRICAL CONDUITS SHALL CONFORM TO THE 2009 STANDARD SPECIFICATIONS.
- THE CONCRETE APRON SHALL BE CLASS "A" CONCRETE.
- THE GRAVEL OR CRUSHED ROCK BASE SHALL BE CLEAN, TOUGH, DURABLE, PRACTICALLY FREE FROM CLAY OR OTHER FOREIGN SUBSTANCES AND SHALL PASS A 5/8" SIEVE 100%.
- THE WIRE REINFORCEMENT SHALL BE 9 GAUGE WELDED WIRE FABRIC.

**GENERAL NOTES**

- IF SPECIFIED IN THE PLANS, A GROUND ROD SHALL BE INSTALLED AND ALL COSTS SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE "PULL BOX".
- THE PULL BOX SHALL BE BUILT TO FIT THE EXISTING FIELD CONDITION AND BE PRESENTED WITH A NEAT WORKMAN LIKE APPEARANCE. EACH PULL BOX SHALL BE INSTALLED WITH THE APPROPRIATE SIZED CONCRETE APRON. IF THE PULL BOX IS TO BE INSTALLED IN A SIDEWALK OR OTHER PAVED AREA, NO APRON WILL BE REQUIRED UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
- THE PULL BOX COVER SHALL HAVE THE APPROPRIATE LEGEND. WHEN A PULL BOX IS INSTALLED BY THE GRADING OR SURFACING CONTRACTOR THE LEGEND FOR THE COVER SHALL READ "TRAFFIC SIGNALS", UNLESS OTHERWISE SPECIFIED IN THE PLANS. OTHER APPROPRIATE LEGENDS ARE: "HIGHWAY LIGHTING", "STREET LIGHTING", "DANGER", ETC... NO ADVERTISING OTHER THAN THE MANUFACTURERS LOGO WILL BE ALLOWED ON THE PULL BOX COVER.
- THE DIMENSIONS FOR THE PULL BOXES ARE NOMINAL AND MAY VARY SLIGHTLY BY THE MANUFACTURER'S DESIGN.
- PULL BOX BODY EXTENSIONS SHALL BE INSTALLED BELOW THE PULL BOX BODY AT THE LOCATION SHOWN IN THE PLANS.
- THE COST OF THE CONCRETE APRON AND GRAVEL SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE PULL BOX UNLESS OTHERWISE SPECIFIED.
- A CIRCULAR CONCRETE APRON MAY BE USED IN LIEU OF THE SQUARE APRON SHOWN PROVIDING THE 1'-0" MINIMUM CLEARANCE IS MAINTAINED.
- THE CONCRETE APRON THICKNESS AND SIZE MAY BE ALTERED AT THE DIRECTION OF THE ENGINEER. IF ALTERED, THE ADDITIONAL CONCRETE WILL BE PAID FOR AS "STRUCTURAL CONC." C.Y.
- THE NUMBER, SIZE, TYPE AND LOCATION OF THE CONDUIT STUBS FOR FUTURE CONDUIT RUNS SHALL BE AS SHOWN ON THE PLANS, SEE STANDARD CCD1-1 (LATEST REVISION).
- CONDUCTORS HAVING UNLIKE VOLTAGES SHALL HAVE SEPARATE CONDUITS AND PULL BOXES.
- FOR BENDING RADIUS OF CONDUIT, SEE STANDARD CCD1-1 (LATEST REVISION).
- A CONCRETE APRON SHALL BE INSTALLED AROUND ANY RESET PULLBOX OR EXISTING PULLBOX THAT DOES NOT HAVE AN APRON OR IS NOT INSTALLED IN A PAVED AREA. THE CONCRETE AND THE INSTALLATION OF THE APRON SHALL BE PAID FOR IN OTHER ITEMS OF WORK.

| BASIS OF PAYMENT |          |      |
|------------------|----------|------|
| ITEM NO.         | ITEM     | UNIT |
| 803(A)           | PULL BOX | EA   |



APPROVED BY TRAFFIC ENGINEER: *David G. Gandy* DATE: 8/31/2010  
TRAFFIC STANDARD

**TYPICAL PULL BOX DETAILS**

2009 SPECIFICATIONS

**General Specifications For Luminaires:**

**Description**

The luminaire shall be a horizontal or vertical burning as applicable, high intensity discharge, outdoor luminaire complete with housing, appropriate mounting, built in ballast, Mogul socket, lamp, gasketed, reflector and glass refractor, unless otherwise specified.

**Materials:**

**Lamp:**

- The high-intensity discharge lamp shall be of the size and type specified in the plans.
- The lamp base shall be nickel plated brass with a date coding feature.
- The lamp shall be capable of starting 90% of the time at -29 C.

**Mounting:**

- Luminaires for mast arm mounting shall be equipped with a Slip fitter designed to accept 1-1/4" to 2" schedule 40 pipe and provide a method of leveling the luminaire and vertical adjustments ± 5 degrees using externally accessible bolts. The Slipfitter shall be equipped with a pipe stop.
- Luminaires for post top mounting shall be equipped with a Slipfitter designed to accept a 2-3/8" to 3" O.D. pole or Tenon and shall be equipped with leveling screws.

**Gaskets:**

- The gaskets shall be made of heat resistant nonmoisture absorbing polyester, silicon rubber or dacron felt. The gasket shall be continuous or one piece and installed with no butt ends or gaps.

**Lamp Socket:**

- The lamp socket shall be a completely porcelain enclosed nickel plated brass mogul type shell with internal lamp grips to assure electrical contact under conditions of normal vibration and resist the removal of the lamp. The socket shall have welded internal connections, and be in compliance with the latest revision of EEI publication no. TDJ-147.

**Socket Support:**

- The socket support shall contain identifying marks so the socket may be easily adjusted, both horizontally and vertically to provide the specified IES light distribution.

**Ballast:**

- Ballasts shall be bobbin wound and have a high power factor (90% or better), be capable of operating the high intensity discharge lamp specified from a single phase, grounded, 480 volt nominal, multiple system, unless otherwise specified. The ballast, capacitor and starting aid, if required, shall be rewired to the lamp socket and terminal board and be modular constructed and designed for easy removal and installation by using quick disconnect features. The ballast shall be designed to start the lamp at -29 C (mercury) or at -35 C (high pressure sodium). For luminaires used in conjunction with traffic signals, the ballast shall be designed for 120/240 volt operation.
- High pressure sodium ballast shall be a constant wattage or magnetic regulator type capable of operating the lamp within the limits defined by ANSI standards with ± 10% line voltage variation. arc tube voltage shall be 100 volt design.

**Terminal Board:**

- The terminal board shall be of phenolic resin, molded plastic or porcelain with protective barriers between terminals. The screw terminals shall be captive type, compatible with aluminum or copper conductors and capable of accepting up to a No. 6 AWG conductor.

**Electrical:**

- All electrical components shall be insulated to a minimum of 10 KV BIL.
- Termination connectors shall meet or exceed twice the rated current value for EEI-TDJ162 Class A Heat Cycle Test.
- All wire shall be UL approved and the insulation capable of withstanding the designed operating temperatures of the luminaire.

**Hardware:**

- All nuts bolts, screws, clips, washers, springs and attaching hardware shall be fabricated from non-corrosive alloys. Cadmium plating will not be considered adequate weather proofing. All threaded surfaces used in aluminum housing shall be lubricated with silicone grease.

**Finish:**

- Unless otherwise specified, the luminaire shall have a light grey baked-on enamel finish, similar to the Munsell #SBG-ASA#70.

**Photo Cell and Receptacle:**

If specified, the luminaire shall be equipped with the following:

- The photoelectric control shall be a hermetically sealed cadmium sulfide photocell, detachable type, 105-285 volt, 50/60 hertz ac, outdoor control complete, in accordance with EEI-NEMA standards, relay load contracts rated 1000 watts or 1800 volt-ampere reactive, single-pole, single-throw contact, normally closed for "fail safe" operation, enclosed positive lightning and surge protection, housed in a high impact acrylic housing which has a base plate gasket and 3-pole polarized twist-lock plug. Turn-on shall occur at one foot candle and turn-off at 5 foot-candles approximately.
- The three pole locking receptacle shall be in accordance with the latest EEI and NEMA standards and be prewired to the terminal board.

**Miscellaneous:**

- Each luminaire shall be supplied with a permanently attached name plate inside the housing and/or on the ballast. This label shall indicate the manufacturer, catalog no., lamp type, wattage, line voltage rating and connection diagram.
- Each luminaire may be marked in accordance with EEI-NEMA standards for "Field Identification of High-Intensity Discharge Lamps in Luminaires used in Roadway Lighting Equipment" EEI Pub. No. TDJ-150 and NEMA Pub. No. OD150.
- Following the installation of the high mast and post top (offset design) luminaires, aiming shall be under the direction of the highway lighting engineer.

**Photometric Data:**

- The luminaire manufacturer shall furnish photometric data for alternative fixture or light levels not contained on the standard for approval.
- The photometric data shall be in accordance with the uniform computer input format specified in the latest edition of the "IES Approved Method for Photometric Testing of Roadway Luminaires."

**Testing:**

- If requested, a sample luminaire and lamp of each type and size shall be supplied for testing purposes.

**Certification:**

- The luminaire and/or lamp manufacturer shall provide a Type "D" certification in accordance with Subsection 106.4C of the "2009 Standard Specifications for Highway Construction."

**Additional Individual Luminaire Specifications For High- Intensity Discharge Luminaires**

**Description:**

Luminaires shall comply with the general specifications for high intensity discharge luminaires on STD. HLD1-1 (Latest Revision), and the following specifications:

**Roadway Luminaires (General):**

- Housing:**  
The housing shall be precision die-cast aluminum and be of adequate size to contain the ballast components, reflector lamp and socket, terminal board, Slipfitter and allow all the electrical components to operate within their designed temperature range. The housing shall be designed to accommodate at least a 400 watt high pressure sodium lamp.
- Reflector:**  
The reflector shall be of specular finished, hydro-formed, anodic coated aluminum with a minimum coat thickness of 0.00015 inches and weighing 7.5 milligrams per square inch to provide a minimum reflectivity of 82%, the reflector shall have a reverse flange and mounted within the housing to assure a firm surface for proper gasket sealing when the refractor door is closed.
- Refractor:**  
The refractor shall be pressed , heat resistant, crystal clear borosilicate glass, annealed, homogenous and free from imperfections and striations. Refracting prisms shall be incorporated in the refractor to assure maximum utilization of the light generated and provide the required photometric distribution.
- Door:**  
The refractor door shall be precision die-cast aluminum with clips for proper positioning of the refractor. The door shall be easily detached from the housing by operating the spring loaded latch or latches and separating the hinge halves while wearing linemen's gloves.
- Cut-off visor:**  
If specified on the plans, each luminaire shall be equipped with a cut-off visor. Cut-off shall occur full circumference of the luminaire at approximately 75 degrees from the vertical axis. The visor shall be similar in color to the luminaire.
- Ballast:**  
The ballast shall be door mounted on all luminaires 400 watt or less.

**Roadway Luminaire (Cutoff Design)**

- Refractor:**  
The refractor shall be flat stripped heat and impact resistant glass.
- Distribution control:**  
Distribution control shall be cutoff.

**Additional Individual Luminaire Specifications For Light Emitting Diode Luminaires**

**Description:**

Luminaires shall comply with Specification Section 809 for Light Emitting Diode Luminaires (Latest Revision) and the following specification requirements.

**LED Luminaires (General Requirements)**

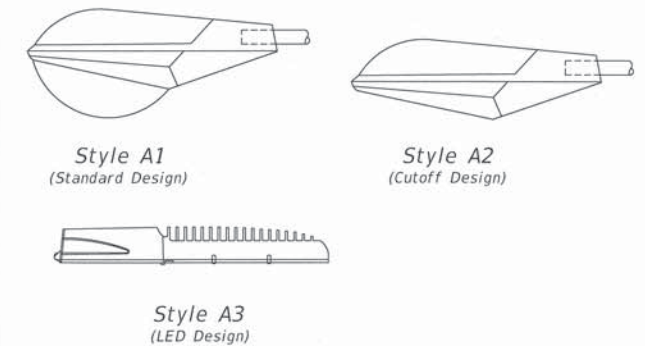
- Provide LED luminaires listed to UL1598 and suitable for use in wet locations. Ensure that optical compartment meets IEC STD. 60529-IP66. Supply NRTL certification to verify listing. Do not place fuses in pole-mounted luminaires. Provide wall- or underpass-mounted luminaires with internal 10-amp, time delay fuses and fuse holders.
- Housing reflector, refractor, and door shall be constructed from 96% copper free diecast aluminum. Provide for luminaire mounting to a 1 1/4 in. pipe arm, capable of adjustments 0 - 45 degrees from level. Meet ANSI 136.31, 3.0 G vibration requirements. Equip luminaire with a three-prong ANSI 136.10 rotatable and shorting cap. Ensure weight of the luminaire is less than 60 LB. and the effective projected area is less than 2.1 SQ. FT.
- Mounting: Attach a level indicator to the fixture housing. Ensure that indicator is sensitive to 1 degree changes in position at any point within 5 degrees of the level position. Ensure that indicator is clearly visible from the ground up to a 40-ft. mounting height. Ensure that indication of level corresponds to a level of fixture housing.
- LED drivers. Provide luminaire with replaceable LED driver that will operate at 120 v, 240 v, or 480 v line voltages as shown in the plans. Provide LED drivers meeting the performance specifications described in Specification Section 809 for Light Emitting Diode Luminaires.
- LED optical assembly: Provide LED optical assembly with nominal color temperature of 4000K. For verification testing, CCT within the range of 3700K to 4300K is allowable. Provide LED optical assembly with a minimum CRI (Color Rendering Index) of 70. Provide a passive thermal management system. Do not use fans or other mechanical cooling systems.
- Finish: Paint luminaires light gray with initial gloss of 30-60% (semi-gloss) when installing on galvanized poles. For all other poles, paint luminaires to match the color of the pole as directed. Use a thermoset powder-coat paint system. Provide ASTM testing documentation that meets the painting performance requirements set forth in Specification Section 809 for Light Emitting Diode Luminaires.

| Typical Lamp Schedule |                                     |                |                       |                      |                |                       |
|-----------------------|-------------------------------------|----------------|-----------------------|----------------------|----------------|-----------------------|
| Nominal Lamp Wattage  | High-Intensity Discharge Lamp Types |                |                       | LED Type             |                |                       |
|                       | High Pressure Sodium                |                |                       | Light Emitting Diode |                |                       |
|                       | Color                               | Nominal Lumens | Rated Avg. Life, Hrs. | Color                | Nominal Lumens | Rated Avg. Life, Hrs. |
| 100                   | CL                                  | 9,500          | 20,000                | 4000k                | 6,000          | 70,000                |
|                       | Coated                              | 8,800          | 20,000                | 4000k                | 6,000          | 70,000                |
| 200                   | CL                                  | 22,000         | 24,000                | 4000k                | 10,000         | 70,000                |
| 250                   | CL                                  | 27,500         | 24,000                | 4000k                | 14,000         | 70,000                |
|                       | Coated                              | 26,000         | 24,000                | 4000k                | 14,000         | 70,000                |
| 310                   | CL                                  | 37,000         | 24,000                | 4000k                | 17,000         | 70,000                |
| 400                   | CL                                  | 50,000         | 24,000                | 4000k                | 22,000         | 70,000                |
|                       | Coated                              | 47,500         | 24,000                | 4000k                | 22,000         | 70,000                |
| 1000                  | CL                                  | 140,000        | 24,000                | -                    | -              | -                     |

Typical Lamp Schedule

| Legend For "Luminaires"   |            |   |             |               |               |
|---------------------------|------------|---|-------------|---------------|---------------|
| Lamp Type                 | Lamp Color | Lumens  | Vert. Dist. | Lateral Dist. | Control Style |
| Lamp Watt                 |            | 100, 250, 310, 400, 1000, Etc...                              |             |               |               |
| Lamp Type                 |            | HPS = High Pressure Sodium<br>LED = Light Emitting Diode      |             |               |               |
| Lamp Color                |            | CL = Clear<br>CI = Color Improved                             |             |               |               |
| Nominal Lamp Lumen Rating |            | 9,500/22,000/27,500/37,000/50,000/<br>140,000/Etc...          |             |               |               |
| Vertical Distribution     |            | S = Short<br>M = Medium<br>L = Long                           |             |               |               |
| Lateral Distribution      |            | Type 1, 2, 3, 4, 5  |             |               |               |
| Distribution Control      |            | C = Cutoff<br>S = Semicutoff<br>N = Noncutoff                 |             |               |               |
| Style                     |            | A1 = Standard Design<br>A2 = Cutoff Design<br>A3 = LED Design |             |               |               |

Legend For Luminaires



Legend For Luminaires

Approved By  
Bridge Engineer: *[Signature]* Date: 3-21-16

Approved By  
Traffic Engineer: *[Signature]* Date: 3/19/2016

Traffic Standard

Typical Highway Luminaire Details

| DESCRIPTION | REVISIONS | DATE |
|-------------|-----------|------|
|             |           |      |



ROAD WORK SIGN

W20-1 48 x 48 16.00 SF  
 COLOR:  
 LEGEND AND BORDER:  
 BLACK (NON-REFLECTORIZED)  
 BACKGROUND:  
 FLUORESCENT ORANGE (REFLECTORIZED)



DETOUR SIGN

W20-2 48 x 48 16.00 SF  
 COLOR:  
 LEGEND AND BORDER:  
 BLACK (NON-REFLECTORIZED)  
 BACKGROUND:  
 FLUORESCENT ORANGE (REFLECTORIZED)



ROAD CLOSED SIGN

W20-3 48 x 48 16.00 SF  
 COLOR:  
 LEGEND AND BORDER:  
 BLACK (NON-REFLECTORIZED)  
 BACKGROUND:  
 FLUORESCENT ORANGE (REFLECTORIZED)



STREET CLOSED SIGN

W20-3A 48 x 48 16.00 SF  
 COLOR:  
 LEGEND AND BORDER:  
 BLACK (NON-REFLECTORIZED)  
 BACKGROUND:  
 FLUORESCENT ORANGE (REFLECTORIZED)



ONE LANE ROAD SIGN

W20-4 48 x 48 16.00 SF  
 COLOR:  
 LEGEND AND BORDER:  
 BLACK (NON-REFLECTORIZED)  
 BACKGROUND:  
 FLUORESCENT ORANGE (REFLECTORIZED)



LEFT LANE CLOSED SIGN

W20-5(L) 48 x 48 16.00 SF  
 COLOR:  
 LEGEND AND BORDER:  
 BLACK (NON-REFLECTORIZED)  
 BACKGROUND:  
 FLUORESCENT ORANGE (REFLECTORIZED)



RIGHT LANE CLOSED SIGN

W20-5(R) 48 x 48 16.00 SF  
 COLOR:  
 LEGEND AND BORDER:  
 BLACK (NON-REFLECTORIZED)  
 BACKGROUND:  
 FLUORESCENT ORANGE (REFLECTORIZED)



FLAGGER SIGN

W20-7 48 x 48 16.00 SF  
 COLOR:  
 LEGEND AND BORDER:  
 BLACK (NON-REFLECTORIZED)  
 BACKGROUND:  
 FLUORESCENT ORANGE (REFLECTORIZED)



FLAGGER SIGN

W20-7a 48 x 48 16.00 SF  
 COLOR:  
 LEGEND AND BORDER:  
 BLACK (NON-REFLECTORIZED)  
 BACKGROUND:  
 FLUORESCENT ORANGE (REFLECTORIZED)



WORKERS SIGN

W21-1 48 x 48 16.00 SF  
 COLOR:  
 LEGEND AND BORDER:  
 BLACK (NON-REFLECTORIZED)  
 BACKGROUND:  
 FLUORESCENT ORANGE (REFLECTORIZED)



FRESH OIL SIGN

W21-2 48 x 48 16.00 SF  
 COLOR:  
 LEGEND AND BORDER:  
 BLACK (NON-REFLECTORIZED)  
 BACKGROUND:  
 FLUORESCENT ORANGE (REFLECTORIZED)



ROAD MACHINERY AHEAD SIGN

W21-3 48 x 48 16.00 SF  
 COLOR:  
 LEGEND AND BORDER:  
 BLACK (NON-REFLECTORIZED)  
 BACKGROUND:  
 FLUORESCENT ORANGE (REFLECTORIZED)

NOTES:  
 WORD SIGNS MAY BE USED IF SYMBOL SIGNS ARE NOT AVAILABLE EITHER IN "STANDARD HIGHWAY SIGNS MANUAL" OR IN THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) (CURRENT EDITION).

ALL DIAMOND SHAPE CONSTRUCTION WARNING SIGNS SHALL BE 48 INCHES X 48 INCHES UNLESS OTHERWISE NOTED IN THE PLANS.

\* SUPPLEMENTAL SIGNS SHALL ONLY BE USED IN CONJUNCTION WITH DIAMOND SHAPE CONSTRUCTION WARNING SIGNS. THE SIZE OF SUPPLEMENTAL SIGNS SHALL BE APPROPRIATE FOR USE WITH A 48 INCH X 48 INCH WARNING SIGN UNLESS OTHERWISE NOTED IN THE PLANS.

TRFPC36 MA\2009\_Standard\TC\1514.dgn 8:37:49 AM 6/23/2010 R:\TRAF\_PLOT\Veroy\pen\_R\TRAF\_PLOT\dw.ctb

| BASIS OF PAYMENT |                    |      |
|------------------|--------------------|------|
| ITEM NO.         | ITEM               | UNIT |
| 880(B)           | CONSTRUCTION SIGNS | SD   |



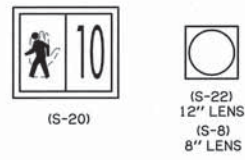
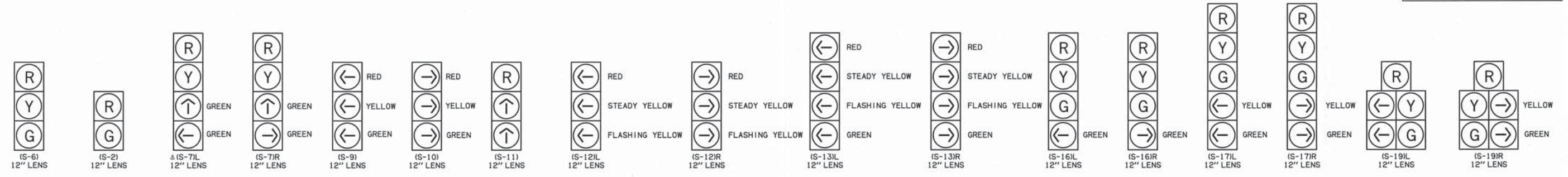
APPROVED BY  
 TRAFFIC ENGINEER: *David Smith* DATE: 6/23/10

TRAFFIC STANDARD  
 TRAFFIC CONTROL STANDARD  
 CONSTRUCTION SIGNS

2009 SPECIFICATIONS

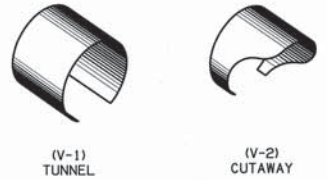
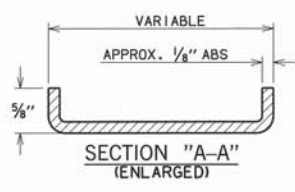
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| T-514   |    |

| DESCRIPTION                              | REVISIONS | DATE      |
|--|-----------|-----------|
| ADDED SIGNALS                            |           | 7/08/2011 |
| UPDATED SYMBOLS                          |           |           |
| ADDED RETRO-REFLECTIVE TAPE TO BACKPLATE |           | 4/2/2013  |

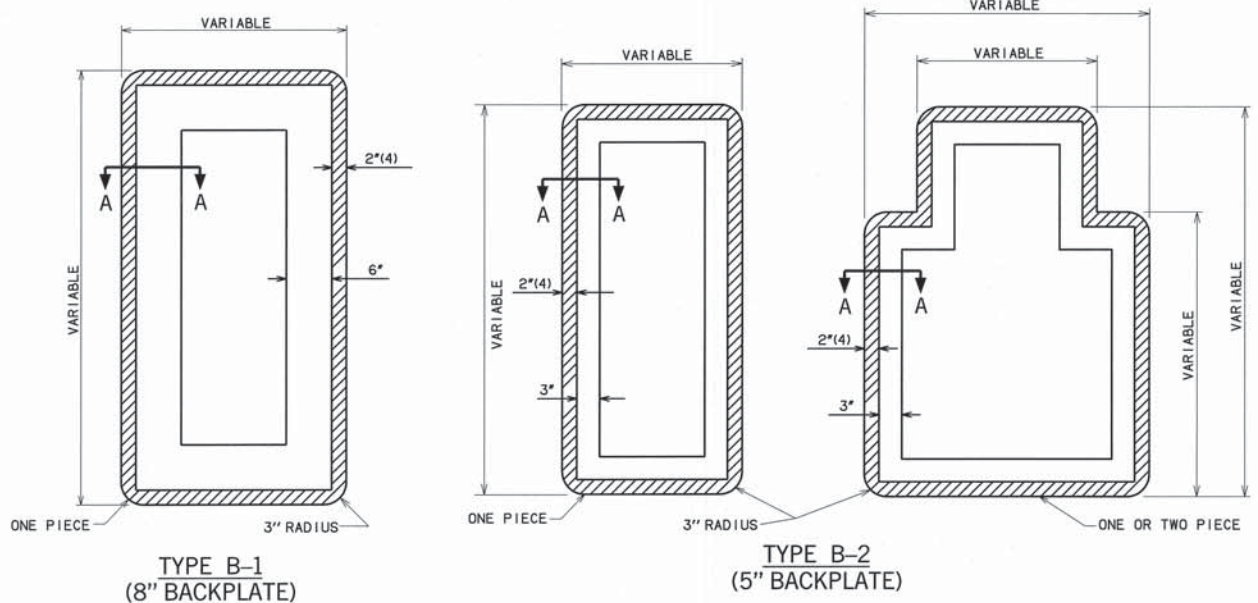


**SIGNAL FACE TYPES**

R = RED  
Y = YELLOW  
G = GREEN



**VISOR TYPES**



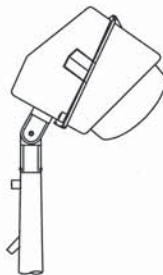
**GENERAL NOTES**

1. ALL TRAFFIC SIGNAL AND PEDESTRIAN SIGNAL HEADS SHALL BE FURNISHED WITH GLASS LENSES, UNLESS OTHERWISE SPECIFIED. THE LENSES SHALL CONFORM TO THE LATEST STANDARD OF THE INSTITUTE OF TRANSPORTATION ENGINEERS.
2. BACKPLATES SHALL BE INSTALLED WITH TWO RIVETS AND/OR SCREWS PER SECTION, A MINIMUM OF SIX PER SIGNAL, OR AS RECOMMENDED BY THE MANUFACTURER.
3. VACUUM FORMED BACKPLATES SHALL BE USED ON ALL STANDARD TRAFFIC SIGNAL HEADS. UNLESS NOTED ON PLANS, BACKPLATES ARE TO BE BLACK.
4. BACKPLATES SHALL HAVE A 2" FLUORESCENT YELLOW TAPE APPLIED TO THE BACKPLATE. THE TAPE SHALL EITHER BE TYPE 1X OR TYPE X1.

| BASIS OF PAYMENT |           |      |
|------------------|-----------|------|
| ITEM NO.         | ITEM      | UNIT |
| 833              | BACKPLATE | EA   |

APPROVED BY  
TRAFFIC ENGINEER: *David Smith* DATE: 4/18/2013  
TRAFFIC STANDARD  
TRAFFIC SIGNALS AND ACCESSORIES

| DESCRIPTION | REVISIONS | DATE |
|-------------|-----------|------|
|-------------|-----------|------|



**VECTOR SERIES**  
OFFSET DESIGN



**RSL SERIES**  
DECORATIVE DESIGN

**TYPICAL POST TOP LUMINAIRES**

**ADDITIONAL INDIVIDUAL LUMINAIRE SPECIFICATIONS FOR HIGH-INTENSITY DISCHARGE LUMINAIRES**

**DESCRIPTION:**

LUMINAIRES SHALL COMPLY WITH THE GENERAL SPECIFICATIONS FOR HIGH-INTENSITY DISCHARGE LUMINAIRES ON STD. HLD1-1- (LATEST REVISION) AND THE FOLLOWING SPECIFICATIONS.

**2.0 POST TOP LUMINAIRE (GENERAL)**

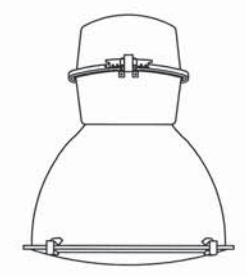
A. BALLAST:  
A DOOR MOUNTED BALLAST IS NOT REQUIRED.

**2.1 POST TOP LUMINAIRE (OFFSET DESIGN):**

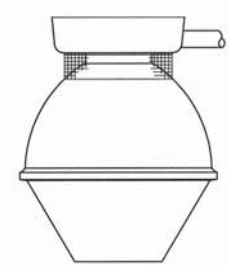
- A. HOUSING REFLECTOR, REFRACTOR AND DOOR SHALL CONFORM TO THE SPECIFICATIONS FOR "ROADWAY LUMINAIRES 1.0" ON STD. HLD1-1- (LATEST REVISION).
- B. MOUNTING:  
THE CAST ALUMINUM TENON MOUNTING BRACKET SHALL PERMIT EXTERNAL LATERAL ORIENTATION, LEVELING AND VERTICAL AIMING.
- C. LAMP SOCKET:  
THE LAMP SOCKET SHALL BE ATTACHED TO THE REFLECTOR AND ASSURE CORRECT LAMP POSITIONING.

**2.2 POST TOP LUMINAIRE (DECORATIVE DESIGN):**

- A. HOUSING, REFRACTOR AND TOP COVER:  
THE HOUSING BASE SHALL BE DIE CAST ALUMINUM. REFRACTOR HOLDER AND TOP COVER MAY BE EITHER DIE CAST ALUMINUM OR HEAVY DUTY FORMED ALUMINUM.  
  
REFRACTOR SHALL CONFORM TO THE 'REFRACTOR SPECIFICATIONS FOR ROADWAY LUMINAIRES 1.0' OR SHALL BE OF PRISMATIC ACRYLIC PLASTIC HAVING LASTING LIGHT TRANSMISSION PROPERTIES.  
  
THE TOP COVER SHALL BE HINGED, LATCHED AND EQUIPPED WITH A SAFETY CHAIN ATTACHED TO THE HOUSING.
- B. BALLAST:  
  
THE BALLAST SHALL BE DESIGNED FOR SINGLE PHASE, GROUNDED, 120/240 VOLT OPERATION IN A MULTIPLE SYSTEM.
- C. FINISH:  
  
THE LUMINAIRE SHALL HAVE A BAKED ON ACRYLIC FINISH OF EITHER BLACK, GREY OR A COLOR TO MATCH THE POLE. SEE PLANS FOR COLOR REQUIRED.



ENCLOSED DESIGN



OPEN DESIGN

**HMST SERIES**

**TYPICAL HIGH MAST LUMINAIRES**

**ADDITIONAL INDIVIDUAL LUMINAIRE SPECIFICATIONS FOR HIGH-INTENSITY DISCHARGE LUMINAIRES**

**DESCRIPTION:**

LUMINAIRES SHALL COMPLY WITH THE GENERAL SPECIFICATIONS FOR HIGH-INTENSITY DISCHARGE LUMINAIRES ON STD. HLD1-1- (LATEST REVISION) AND THE FOLLOWING SPECIFICATIONS.

**3.0 HIGH MAST LUMINAIRES: (GENERAL)**

- A. MOUNTING HOUSING:  
HIGH MAST LUMINAIRES SHALL BE FOR 2" DIAMETER MAST ARM MOUNTING AND SHALL PERMIT LEVELING ±3° VERTICAL. A PIPE CLAMP SHALL PREVENT THE LUMINAIRE FROM TWISTING ON THE ARM. THE HOUSING SHALL BE DIE CAST ALUMINUM.
- B. BALLAST ENCLOSURE:  
THE BALLAST SHALL BE ENCLOSED IN A CAST ALUMINUM MODULE ON THE TOP OF THE MOUNTING HOUSING AND SHALL BE EASILY DETACHED WITHOUT REMOVING THE LUMINAIRE.
- C. CUT-OFF VISOR:  
IF REQUIRED, CUT-OFF VISORS WILL BE INSTALLED IN THE LUMINAIRES TO SHIELD THE EMITTED LIGHT FROM THE LUMINAIRE. THE CUTOFF VISORS MAY BE REQUIRED TO SHIELD A PORTION OR ALL 360° OF THE LUMINAIRE REFRACTOR.

SHOULD CUT-OFF VISORS BE REQUIRED, THE DEPARTMENT WILL NEGOTIATE WITH THE CONTRACTOR FOR THE ADDITIONAL MATERIALS AND LABOR TO DO THE MODIFICATIONS.

D. INSTALLATION:  
LUMINAIRES SHALL BE INSTALLED ON THE HIGH MAST LOWERING DEVICE LUMINAIRE RING AFTER ERECTION OF THE POLE AND THE LOWERING DEVICE. CARE SHALL BE TAKEN NOT TO DAMAGE LUMINAIRE ASSEMBLY OR LAMPS DURING INSTALLATION.

E. SIZE:  
THE LUMINAIRE SHALL BE DESIGNED FOR 100 M.P.H. WIND LOADING, WEIGHING NO MORE THAN 75 LBS. AND HAVING AN EFFECTIVE PROJECTED AREA NO GREATER THAN 2.2 SQUARE FEET.

**3.1 HIGH MAST LUMINAIRE (OPEN DESIGN):**

A. OPTICAL ASSEMBLY:  
THE REFLECTOR AND REFRACTOR SHALL BE PRISMED, PRESSED, HEAT RESISTANT, CRYSTAL CLEAR, BOROSILICATE GLASS, ANNEALED, HOMOGENOUS AND FREE FROM IMPERFECTIONS AND STRIATIONS.

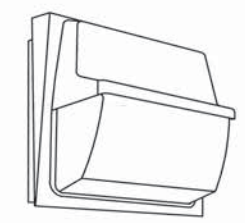
THE REFLECTOR SHALL BE CONTAINED IN A SPUN AND CAST ALUMINUM HOUSING. THE OPTICAL ASSEMBLY SHALL BE OPEN AND VENTILATED AND MUST BE EASILY REMOVED FROM ITS MOUNTING.

**3.2 HIGH MAST LUMINAIRE (ENCLOSED DESIGN)**

A. OPTICAL ASSEMBLY:  
THE REFLECTOR SHALL BE OF SPUN ALUMINUM, FACETTED TO REDIRECT REFLECTED LIGHT AWAY FROM THE LAMP ARC. TUBE AND FINISHED WITH THE ALGLAS PROCESS.

THE REFRACTOR SHALL BE CURVED CLEAR TEMPERED GLASS CONNECTED TO THE REFLECTOR ASSEMBLY WITH STAINLESS STEEL CLAMP BAND, LATCH AND HINGE.

THE OPTICAL ASSEMBLY SHALL BE GASKETED AND ALL AIR ENTERING THE OPTICAL CAVITY SHALL BE FILTERED THROUGH AN ACTIVATED CHARCOAL FILTER.



**WL2K SERIES**

**TYPICAL UNDERPASS LUMINAIRES**

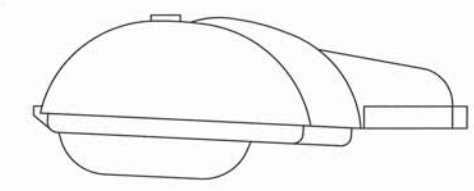
**ADDITIONAL INDIVIDUAL LUMINAIRE SPECIFICATIONS FOR HIGH-INTENSITY DISCHARGE LUMINAIRES**

**DESCRIPTION:**

LUMINAIRES SHALL COMPLY WITH THE GENERAL SPECIFICATIONS FOR HIGH-INTENSITY DISCHARGE LUMINAIRES ON STD. HLD1-1- (LATEST REVISION), AND THE FOLLOWING SPECIFICATIONS.

**4.0 UNDERPASS LUMINAIRES:**

- A. MOUNTING:  
THE CAST ALUMINUM HOUSING SHALL BE DESIGNED FOR BACK MOUNTING ON A FLAT SURFACE WITH AT LEAST 3 MOUNTING HOLES.
- B. HOUSING, REFLECTOR, REFRACTOR AND DOOR:  
THE HOUSING, REFLECTOR, REFRACTOR AND DOOR SHALL CONFORM TO THE SPECIFICATIONS FOR "ROADWAY LUMINAIRES 1.0" ON STANDARD HLD1-1- (LATEST REVISION).  
  
THE DOOR SHALL BE HINGED TO THE HOUSING AND PROTECTED WITH A SAFETY CHAIN.
- C. REFRACTOR GUARD:  
  
IF SPECIFIED, THE LUMINAIRE SHALL BE EQUIPPED WITH AN EXTERNALLY MOUNTED POLYCARBONATE GRID GUARD TO PROTECT THE REFRACTOR.



**MONGOOSE**

**SEE STANDARDS HLD1-1, HLD3-1 (LATEST REVISION) FOR ADDITIONAL LUMINAIRE SPECIFICATIONS**

**LEGEND FOR "LUMINAIRES"**

| LAMP TYPE                 | LAMP COLOR | LUMENS   | VERT. DIST. | LATERAL DIST. | CONTROL STYLE |
|---------------------------|------------|--|-------------|---------------|---------------|
| LAMP WATT                 |            | 100, 250, 310, 400, 1000, ETC...                       |             |               |               |
| LAMP TYPE                 |            | MH = METAL HALIDE<br>HPS = HIGH PRESSURE SODIUM        |             |               |               |
| LAMP COLOR                |            | CL = CLEAR<br>CI = COLOR IMPROVED                      |             |               |               |
| NOMINAL LAMP LUMEN RATING |            | 9,500, 22,000, 27,500, 37,000, 50,000, 140,000, ETC... |             |               |               |
| VERTICAL DISTRIBUTION     |            | S = SHORT<br>M = MEDIUM<br>L = LONG                    |             |               |               |
| LATERAL DISTRIBUTION      |            | TYPE 1, 2, 3, 4, 5                                     |             |               |               |
| DISTRIBUTION CONTROL      |            | C = CUTOFF<br>S = SEMI CUTOFF<br>N = NONCUTOFF         |             |               |               |
| STYLE                     |            | A1 = STANDARD DESIGN<br>A2 = CUTOFF DESIGN             |             |               |               |

| BASIS OF PAYMENT |                     |      |
|------------------|---------------------|------|
| ITEM NO.         | ITEM                | UNIT |
| 809(B)           | UNDERPASS LUMINAIRE | EA   |
| 809(C)           | POST TOP LUMINAIRE  | EA   |
| 809(E)           | HIGH MAST LUMINAIRE | EA   |

APPROVED BY  
TRAFFIC ENGINEER: *[Signature]* DATE: 8/31/2010

TRAFFIC STANDARD  
TYPICAL HIGHWAY LUMINAIRE DETAILS