**STATE OF TENNESSEE**
**DEPARTMENT OF TRANSPORTATION**
**DESIGN DIVISION**
**NASHVILLE, TENNESSEE 37243-0348**

**JOHN C. SCHROER**
COMMISSIONER

**BILL HASLAM**
GOVERNOR

# INSTRUCTIONAL BULLETIN NO. 14-05

## Regarding Revised Standard Drawings

**Effective for the August 29th Letting (June 18th turn-in),** the following Standard Drawings are revised and Section V of the Design Guidelines is revised for this update.

| DRAWING NUMBER | CURRENT REVISION DATE | DESCRIPTION |
|---|---|---|
| D-PB-2 | 1-29-14 | STANDARD DETAILS FOR FLEXIBLE PIPE INSTALLATION |
| D-PE-99 | 11-01-13 | PIPE GRATE & SKEWED CONNECTION DETAILS FOR 'U' ENDWALLS |
| S-PL-4 | 4-11-14 | SAFETY PLAN FOR BRIDGE PIERS IN CLEAR ZONE |
| S-PL-5 | 4-11-14 | SAFETY PLAN FOR BRIDGE ENDS IN MEDIAN |
| S-GRC-2 | 4-11-14 | GUARDRAIL CONNECTION TO BRIDGE END FOR LOW VOLUME LOCAL ROADS (ADT<400) |
| S-SSMB-7 | 12-4-13 | FOOTING DETAILS FOR OVERHEAD SIGN STRUCTURE 32" MEDIAN BARRIER WALL |
| S-SSMB-8 | 12-4-13 | FOOTING DETAILS FOR OVERHEAD SIGN STRUCTURE 51" MEDIAN BARRIER WALL |
| T-M-11 | 10-24-13 | SIGNING AND PAVEMENT MARKINGS FOR BICYCLE ROUTES ON RURAL ROADS |
| T-M-12 | 10-10-13 | SIGNING AND PAVEMENT MARKINGS FOR BICYCLE LANES ON URBAN ROADWAYS |
| T-M-16A | 4-21-14 | ASPHALT CENTER LANE RUMBLE STRIPE |

IB 14-05

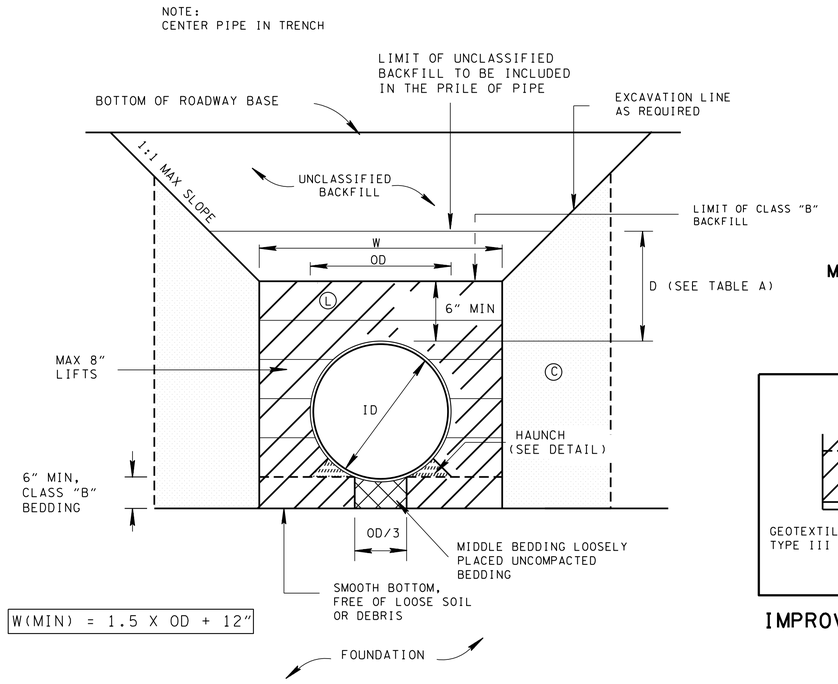
| DRAWING NUMBER | CURRENT REVISION DATE | DESCRIPTION |
|---|---|---|
| T-M-17 | 2-20-14 | PAVEMENT MARKING DETAILS FOR ROUNDABOUTS |
| T-S-18 | 2-14-14 | END OF ROADWAY, DEAD END SIGNS AND METAL BARRICADES (TYPE III) |
| T-S-22 | 9-12-13 | SIGN LAYOUT FOR HOV LANES |
| T-SG-5 | 12-4-13 | CONTROLLER CABINET DETAILS |
| T-SG-8 | 12-4-13 | STRAIN POLE DETAILS FOR SPAN MOUNTED SIGNALS |
| T-SG-9 | 12-4-13 | DETAILS OF CANTILEVER SIGNAL SUPPORT |
| T-SG-9A | 12-4-13 | MISCELLANEOUS SIGNAL DETAILS |
| T-SG-10 | 12-4-13 | MAST ARM POLE AND STRAIN POLES FOUNDATION DETAILS |
| T-WZ-32 | 10-29-13 | TRAFFIC CONTROL PLAN FOR SIGN LAYOUT FOR TRAFFIC SIGNAL AT TWO LANE BRIDGE RECONSTRUCTION SITE |
| T-L-1 | 12-4-13 | STANDARD LIGHTING FOUNDATION DETAILS |
| T-L-1SA | 9-11-13 | STANDARD LIGHTING DETAILS FOR SINGLE ARM SUPPORTS |
| T-L-2 | 12-4-13 | FOUNDATION DETAILS FOR LUMINAIRE MOUNTED ON CONCRETE MEDIAN BARRIER |
| T-RR-6 | 10-25-13 | TYPICAL SIGNING AND MARKING AT PASSIVE RAILROAD HIGHWAY GRADE CROSSINGS |

A copy of the revised standard drawings are attached.

Jennifer Lloyd

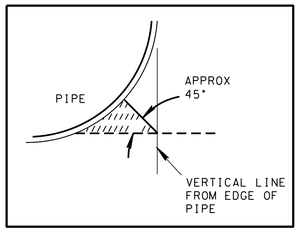
Jennifer Lloyd, PE
Civil Engineering Director
Roadway Design Division

JL:ARH:MWC
Attachments
4/22/14

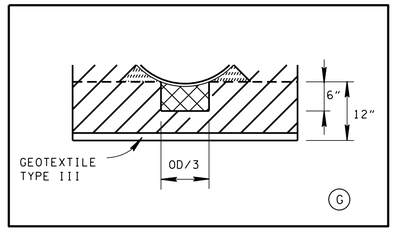



## STANDARD TRENCH INSTALLATION

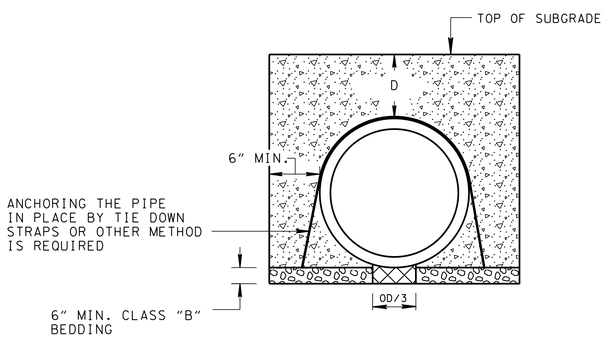
SEE GENERAL NOTE (B)




## MINIMUM HAUNCH AREA DETAIL




## IMPROVED FOUNDATION DETAIL




## ALTERNATE BACKFILL DETAIL USING EXCAVATABLE FLOWABLE FILL (EFF)

SEE GENERAL NOTE (G)

OD=OUTSIDE DIAMETER
ID=INSIDE DIAMETER

CLASS "B" STRUCTURAL BACKFILL COMPACTED TO 90% STANDARD PROCTOR DENSITY

CLASS "B" BEDDING UNCOMPACTED

FIRM INSITU SOIL OR CLASS "B" BEDDING COMPACTED TO 90% STANDARD PROCTOR DENSITY

HAUNCH AREA, SHOVEL COMPACTED

## TABLE A

| MINIMUM DEPTH (D) | |
|---|---|
| MATERIAL | D |
| HDPE ID ≤ 36" | 12" |
| HDPE ID > 36" | 21" |
| PVC | 12" |
| SRTRP | 12" |
| CMP | 12" |
| PP | 12" |

## TABLE B

| PIPE CULVERT | | CLASS "B" BEDDING MATERIAL (CY/LF) |
|---|---|---|
| PIPE DIA | PAYMENT ITEM NO | |
| 18" | 607-03.30 | 0.313 |
| 24" | 607-05.30 | 0.382 |
| 30" | 607-06.30 | 0.497 |
| 36" | 607-07.30 | 0.626 |
| 42" | 607-08.30 | 0.767 |
| 48" | 607-09.30 | 0.969 |
| 54" | 607-10.30 | 1.141 |
| 60" | 607-11.30 | 1.588 |
| 66" | 607-12.30 | 1.805 |
| 72" | 607-13.30 | 2.035 |

# GENERAL NOTES

### PIPE MATERIALS:

(A) FLEXIBLE PIPE MATERIALS ARE HDPE, PVC, CMP, SRTRP, AND PP.

ALL HIGH-DENSITY POLYETHYLENE (HDPE) PIPE USED FOR CULVERT AND STORMDRAIN APPLICATIONS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M294, TYPE S, CURRENT EDITION ALL HDPE PIPE DELIVERED AND USED SHALL BE A PARTICIPANT IN NTPEP. MAX. PIPE DIA. FOR HDPE PIPE IS 60 INCHES.

POLY VINYL CHLORIDE (PVC) PROFILE WALL DRAINAGE PIPE SHALL MEET AASHTO DESIGNATION M304. THE MAXIMUM PIPE DIAMETER FOR PVC PIPE IS 36 INCHES.

STEEL REINFORCED THERMOPLASTIC RIBBED PIPE (SRTRP) SHALL MEET AASHTO DESIGNATION MP-20. THE MAXIMUM PIPE DIAMETER FOR THE PIPE IS 36".

CORRUGATED METAL PIPE (CMP) SHALL BE ALUMINIZED COATED CORRUGATED METAL PIPE SHALL MEET AASHTO M274, MAXIMUM DIA IS 72", CMP FROM 78"-144" IN DIAMETER MAY BE USED IN SPECIAL CASES SUCH AS IF A BOX CULVERT WILL NOT WORK.

POLYPROPYLENE PIPE (PP) SHALL MEET AASHTO DESIGNATION M330, THE MAXIMUM PIPE DIAMETER IS 36".

### INSTALLATIONS REQUIREMENTS:

(B) FOR EMBANKMENT AREAS OR WHERE TRENCH CONDITIONS DO NOT EXIST, AN INDUCED TRENCH SHALL BE CONSTRUCTED SEE D-PB-3.

(C) FOR TRENCHES WITH IN SITU SOIL WALLS, ANY PORTION OF THE WALL SHALL BE AT LEAST AS FIRM AS THE MAJORITY OF THE SUBGRADE. SOIL NOT MEETING THIS REQUIREMENT SHALL BE REMOVED AND REPLACED.

(D) FOR ADDITIONAL INSTALLATION INFORMATION SEE AASHTO SECTION 30 OR ASTM D2321 ALL PIPES SHALL BE ASSEMBLED AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. PIPE SHALL BE PLACED IN THE BED STARTING AT THE DOWNSTREAM END.

(E) ONLY AS MUCH TRENCH AS CAN BE SAFELY MAINTAINED SHALL BE OPENED. ALL TRENCHES SHALL BE BACKFILLED TO THE MINIMUM COVER DEPTH "D" ABOVE THE PIPE AND COMPACTED AS SOON AS PRACTICABLE, BUT NOT LATER THAN THE END OF EACH WORKING DAY.

(F) JOINTS FOR FLEXIBLE PIPE SHALL MEET THE PERFORMANCE REQUIREMENT OF ASTM D3212. JOINTS SHALL BE INSTALLED SO THAT THE CONNECTION OF PIPE SECTION, FOR A CONTINUOUS LINE WILL BE FREE FROM IRREGULARITIES IN THE FLOW LINE. JOINTS BETWEEN PLASTIC FLEXIBLE PIPE AND STRUCTURE SHALL HAVE A GASKET MEETING ASTM F2510. FOR CMP PIPE TO STRUCTURE CONNECTIONS OR PLASTIC PIPE AT A SKEW GREATER THAN 15°, WHERE A GASKET WILL NOT WORK, NON-SHRINK GROUT APPLIED IN TWO STAGES SHALL BE USED.

(G) WHERE THE TRENCH FOUNDATION IS FOUND UNACCEPTABLE OR LOCATION WHERE THE WATER TABLE IS FOUND HIGH:

(1) IMPROVED FOUNDATION OR EFF MAY BE USED AT ENGINEER'S INSTRUCTION.

(2) MAX FILL HEIGHTS AND JOINT SPECIFICATIONS SHALL BE REVIEWED TO VERIFY CONDITIONS MEET WITH THE MANUFACTURER'S SPECIFICATIONS.

(H) ALL PIPE INSTALLATIONS REQUIRE CONCRETE ENDWALLS.

(I) MINIMUM SPACING BETWEEN MULTIPLE PIPES IS:

36" PIPES AND SMALLER: EQUAL TO THE OUTSIDE DIAMETER OF THE LARGEST PIPE.

PIPES LARGER THAN 36": EQUAL TO HALF THE OUTSIDE DIAMETER OF THE LARGEST PIPE.

(J) MAXIMUM ALLOWABLE FILL HEIGHTS ARE AS DEFINED IN THE DRAINAGE MANUAL TABLE 6A-1.

(K) FOR MINIMUM COVER DEPTHS FOR CONSTRUCTION LOADS SEE D-PB-3.

### GRANULAR COMPACTABLE BACKFILL REQUIREMENTS:

(L) THE BACKFILL SHALL BE TYPE "B" GRADING D OR E MATERIAL MEETING THE REQUIREMENTS OF SUBSECTION 903.05.

STRUCTURAL BACKFILL SHALL BE PLACED AND COMPACTED IN LAYERS NOT EXCEEDING AN 8 INCH LOOSE LIFT THICKNESS AND BROUGHT UP EVENLY AND SIMULTANEOUSLY ON BOTH SIDES OF THE PIPE TO AN ELEVATION NOT LESS THAN 6 INCHES ABOVE THE TOP OF THE PIPE.

UNCLASSIFIED BACKFILL TO THE LIMIT OF PIPE BACKFILL LINE SHALL BE COMPACTED IN ACCORDANCE TO STANDARD SPECIFICATION 204.11.

A MINIMUM COMPACTION LEVEL OF 90% STANDARD PROCTOR DENSITY PER AASHTO T99 SHALL BE ACHIEVED BY USE OF VIBRATORY PLATE. HYDROHAMMER TYPE COMPACTORS SHALL NOT BE USED OVER THE PIPE. ALL COMPACTION EQUIPMENT USED SHALL BE APPROVED BY THE ENGINEER.

### INSPECTION REQUIREMENTS:

(1) ALL PIPES SHALL UNDERGO INSPECTION DURING INSTALLATION.

(2) FINAL INSPECTIONS SHALL BE CONDUCTED NO SOONER THAN 30 DAYS AFTER COMPLETIONS OF INSTALLATION AND FINAL FILL.

(3) THE PIPE SHALL BE EVALUATED TO DETERMINE WHETHER THE INTERNAL DIAMETER OF THE BARREL HAS BEEN REDUCED MORE THAN 5% WHEN MEASURED NOT LESS THAN 30 DAYS FOLLOWING COMPLETION OF THE INSTALLATION.

(4) FOR LOCATIONS WHERE PIPE DEFLECTION EXCEEDS 5% OF THE INSIDE DIAMETER, AN EVALUATION SHALL BE CONDUCTED BY THE CONTRACTOR AND SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL CONSIDERING THE SEVERITY OF THE DEFLECTION, STRUCTURAL INTEGRITY, ENVIRONMENTAL CONDITIONS,AND THE DESIGN SERVICE LIFE OF THE PIPE. PIPE REMEDIATION OR REPLACEMENT SHALL BE REQUIRED FOR LOCATIONS WHERE THE EVALUATION FINDS THAT THE DEFLECTION COULD BE PROBLEMATIC.

(5) INSTALLED PIPE DEFLECTIONS THAT EXCEED 5% OF THE INITIAL INSIDE DIAMETER MAY INDICATE THAT THE INSTALLATION WAS SUBSTANDARD. SEE SECTION 607.09.

(6) IN ALL PIPE INSTALLATIONS, AT LEAST 10% OF THE TOTAL NUMBER OF PIPE RUNS REPRESENTING AT LEAST 10% OF THE TOTAL PROJECT FOOTAGE ON THE PROJECT SHALL BE RANDOMLY SELECTED BY THE ENGINEER AND INSPECTED FOR DEFLECTION. ALSO AS DETERMINED BY THE 100% VISUAL INSPECTION IN AASHTO SECTION 30.5.6.1, ALL AREAS IN WHICH DEFLECTION CAN BE VISUALLY DETECTED SHALL BE INSPECTED FOR DEFLECTION. (REFER TO AASHTO, SECTION 30,5.6 AS ADOPED BY THE AASHTO SUBCOMMITTEE ON BRIDGES AND STRUCTURES, JUNE 29, 2005)

### PAYMENT:

(M) EXCAVATION FOR PIPE WILL NOT BE MEASURED AND PAID FOR DIRECTLY, BUT THE COST WILL BE INCLUDED IN THE COST OF THE PROPOSED PIPE CULVERT.

PAYMENT FOR GRANULAR COMPACTABLE TYPE "B" BACKFILL, UNCLASSIFIED BACKFILL TO THE LIMIT LINE, AND/OR EXCAVATABLE FLOWABLE FILL INCLUDING BEDDING MATERIAL WILL BE INCLUDED IN THE UNIT PRICE OF THE PIPE.

GEOTEXTILE TYPE III WILL BE PAID UNDER ITEM NO. 740-10.03 IF IMPROVED FOUNDATION IS REQUIRED.

☐ REV. 7-12-07: REVISED GENERAL NOTE (J).

REV. 6-1-09: REVISED GENERAL NOTE (I) AND TITLE NAME. ADDED GENERAL NOTE (J).

REV.2-1-12: REVISED DRAWING NAME ADDED EFF DETAIL. REVISED GENERAL NOTES AND TABLE. ADDED MINIMUM COVER TABLE.

REV. 8-21-12: REVISED GENERAL NOTES. CHANGED BACKFILL MATERIAL.

REV. 1-2-13: REVISED TRENCH AND ADDED FILL DETAIL.

☐ REV. 1-29-14: ADDED PP, RELETTERED AND REVISED NOTES.

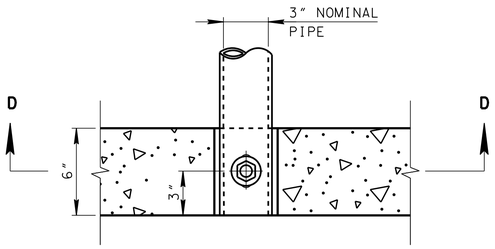
☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

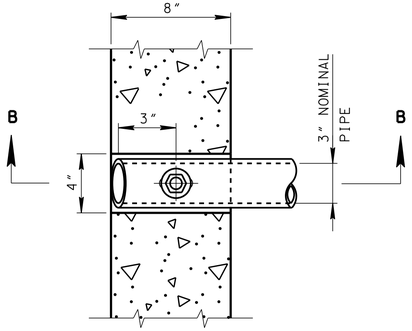
STANDARD DETAILS FOR FLEXIBLE PIPE INSTALLATION

3-15-07 | D-PB-2

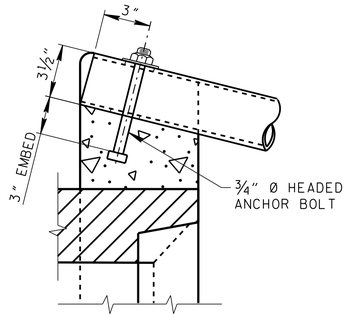
REV.11-01-13: UPDATED NOTE ④.



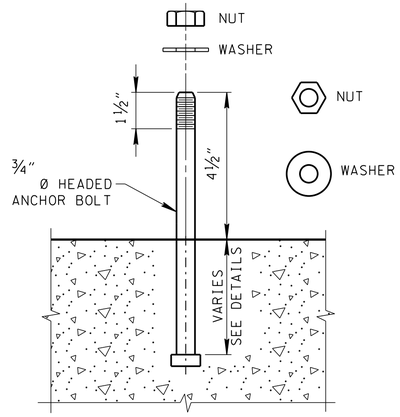

DETAIL PLAN AT WINGWALL



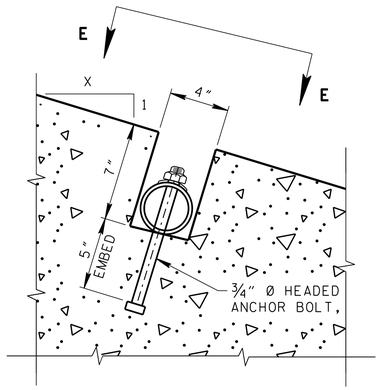

DETAIL PLAN AT HEADWALL



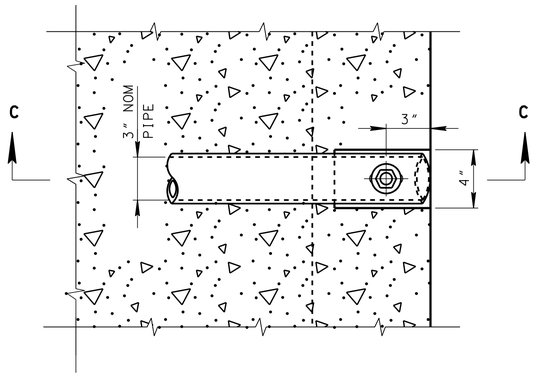

SECTION B-B THRU HEADWALL



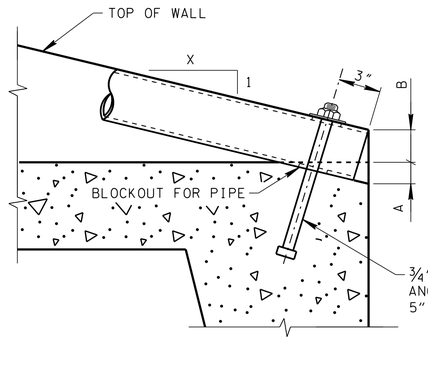

ANCHOR BOLT ASSEMBLY




SECTION D-D THRU WINGWALL

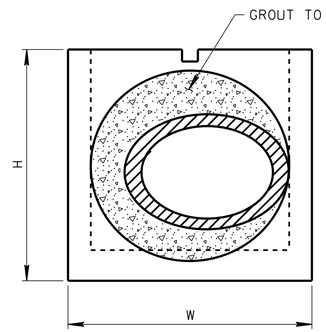



DETAIL PLAN AT TOEWALL




SECTION C-C THRU TOEWALL

| SLOPE | 3:1 | 4:1 | 6:1 |
|---|---|---|---|
| DIM. A | 2⅜" | 1⅝" | ⅞" |
| DIM. B | 1⅜" | 2" | 2⅝" |

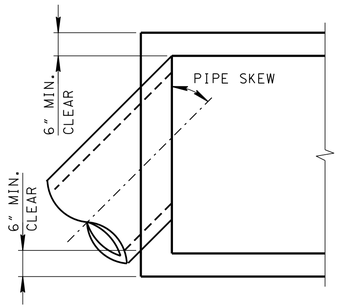



HEADWALL ELEVATION

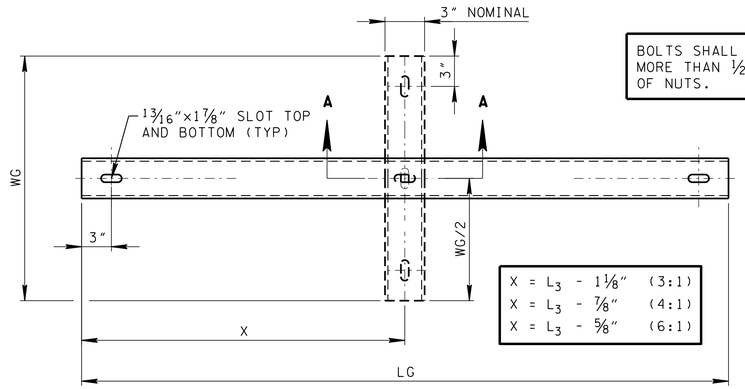
**OVERSIZED TYPE "U" CONCRETE END WALL TO BE USED TO ACCOMMODATE THE SKEWED PIPE (ASSUMES CONCRETE PIPE)**

| PIPE CULV. DIA. | PIPE SKEW | | |
|---|---|---|---|
| | 75° | 60° | 45° |
| 18" | 24" | 24" | 30" |
| 24" | 30" | 36" | 42" |
| 30" | 36" | 42" | 48" |
| 36" | 42" | 48" | * |
| 42" | 48" | * | * |
| 48" | * | * | * |

• EXCEEDS 48" TYPE "U" ENDWALL OPENING

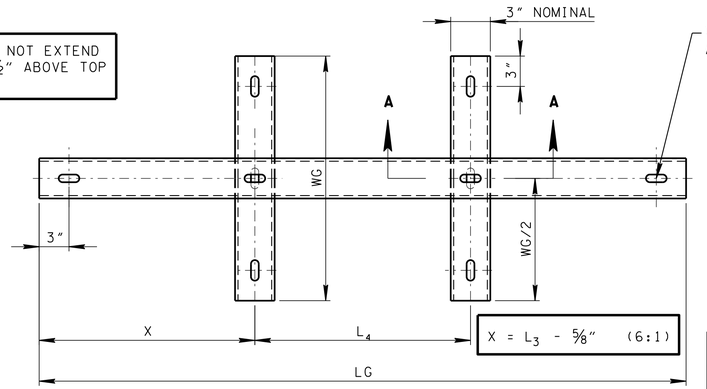



PLAN

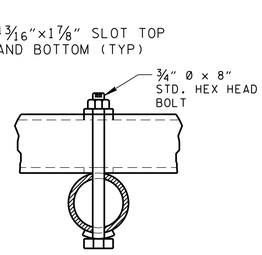



30" AND 36" PIPE (3:1, 4:1 AND 6:1 SLOPES)
42" AND 48" PIPE (3:1 AND 4:1 SLOPES)

BOLTS SHALL NOT EXTEND MORE THAN ½" ABOVE TOP OF NUTS.




42" AND 48" PIPE (6:1 SLOPE)




SECTION A-A

## SKEWED CONNECTION DETAIL

NOTE: TABLE VALUES PROVIDED ARE APPROXIMATE
ENGINEER SHALL VERIFY MINIMUM CLEARANCES

## STEEL PIPE GRATE PLANS

FOR $L_3$ AND $L_4$ DIMENSIONS SEE STD. DWGS. D-PE-30A THROUGH D-PE-48A

| PIPE CULV. DIA. | ALL SLOPES | 3:1 | 4:1 | 6:1 |
|---|---|---|---|---|
| | WG | LG | LG | LG |
| 30" | 4'-1" | 10'-10⅝" | 14'-0 ⅛" | 20'-4 ¾" |
| 36" | 4'-8" | 12'-8¾" | 16'-5" | 23'-11 ⅜" |
| 42" | 5'-3" | 14'-3¾" | 18'-5 ¾" | 26'-11 ⅞" |
| 48" | 5'-10" | 16'-1⅞" | 20'-10 ⅝" | 30'-6 ⅜" |

### ALTERNATE ANCHORS FOR STRUCTURAL STEEL GRATES

CERTIFICATION:
DRILLED-IN EPOXY ANCHORS OR CAST-IN THREADED INSERTS MAY BE UTILIZED IN LIEU OF CAST-IN HEADED ANCHOR BOLTS PROVIDED THAT THE CONTRACTOR FURNISHES CERTIFIED ANCHOR PULL OUT DATA FROM AN INDEPENDENT TESTING LABORATORY USING CLASS "A" CONCRETE AS PRESCRIBED BY TENNESSEE HIGHWAY SPECIFICATIONS. THE REQUIRED ULTIMATE LOAD FOR ¾" DIAMETER ANCHORS IS 10,000 POUNDS.

### GENERAL NOTES

① THE MATERIAL AND PAINTING FOR STRUCTURAL STEEL GRATE SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:
- Ⓐ STEEL PIPE ASTM A53, TYPE E, GRADE B, SCHEDULE 40.
- Ⓑ THE GRATE SHALL BE PAINTED BLACK, FEDERAL SPECIFICATION TT-E-489J, AFTER FABRICATION.

② THE MATERIAL AND GALVANIZING FOR BOLTS, NUTS AND WASHERS SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS:
- Ⓐ BOLTS, NUTS AND WASHERS ASTM F1554 GRADE 36
- Ⓑ GALVANIZING ASTM A153

③ THE COST OF FURNISHING BOLTS, NUTS AND WASHERS, INCLUDING ALL MATERIALS, LABOR AND INCIDENTALS NECESSARY TO COMPLETE THE INSTALLATION, SHALL BE INCLUDED IN THE PRICE BID FOR THE PIPE ENDWALL.

④ PIPE GRATE TO BE INCLUDED IN THE PRICE OF THE ENDWALL.

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

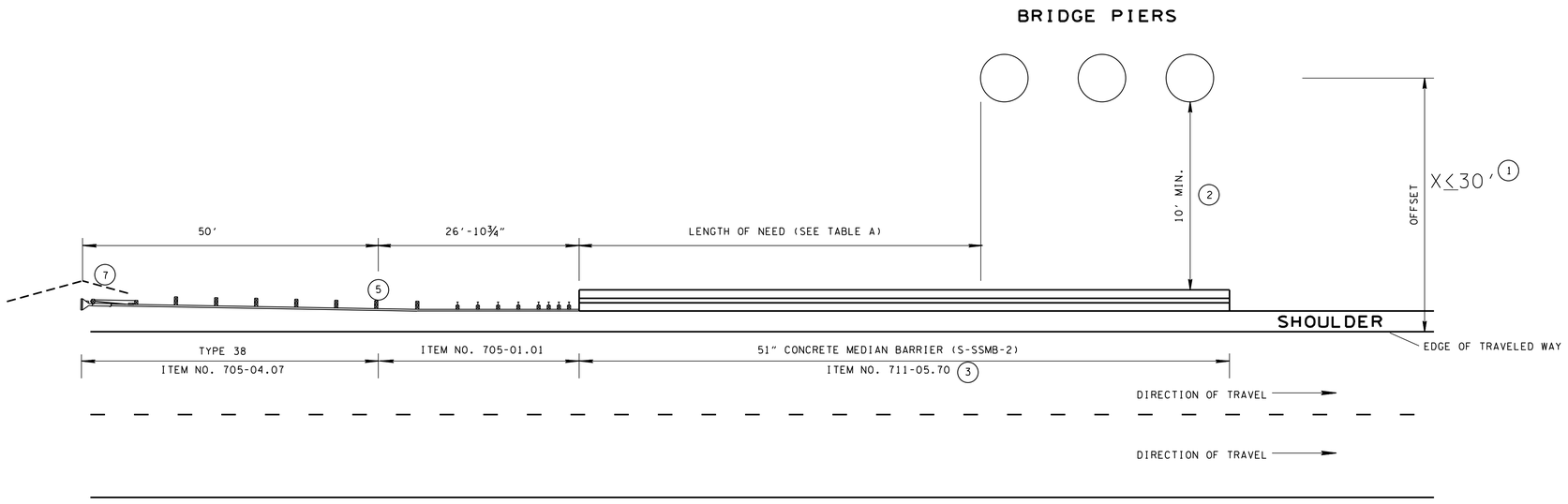
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

# PIPE GRATE & SKEWED CONNECTION DETAILS FOR "U" ENDWALLS

(FOR 3:1, 4:1 & 6:1 SLOPES)

NOT TO SCALE | 3-01-12 | D-PE-99

REV. 4-11-14: ADDED NOTE (7)




# BRIDGE PIERS IN CLEAR ZONE

| OFFSET | LENGTH OF NEED (LON) | | |
|---|---|---|---|
| X | 50 MPH | 60 MPH | 70 MPH |
| 12' | 168' | 218' | 262' |
| 18' | 181' | 236' | 283' |
| 24' | 190' | 247' | 297' |
| 30' | 196' | 255' | 306' |

TABLE A (6)
LENGTH OF NEED FOR CONCRETE MEDIAN BARRIER

## GENERAL NOTES

(1) USE THIS STANDARD ON ALL HIGH SPEED FACILITIES (45 MPH AND ABOVE) WHERE THE DISTANCE FROM EDGE OF TRAVEL WAY TO THE PIER IS LESS THAN 30'.

(2) IF THE DISTANCE FROM THE MEDAIAN BARRIER TO THE FACE OF THE PIER IS LESS THAN 10 FEET, NOTIFY STRUCTURES DIVISION THAT THE REQUIREMENTS OF AASHTO BRIDGE DESIGN SPECIFICATION 3.6.5.CANNOT BE MET WITH STANDARD DESIGN AND SPECIAL DESIGN IS REQUIRED.

(3) LENGTH OF ITEM 711-05.07 TO INCLUDE DISTANCE BETWEEN BEGIN AND END STATION OF BRIDGE PIERS PLUS LENGTH OF NEED (LON) DISTANCE FROM TABLE A.

(4) PLAN SHOWN IS FOR TREATMENT ON ONE SIDE OF MEDIAN, BUT PLAN APPLIES TO STRUCTURAL BRIDGE COMPONENTS WITHIN 30 FEET OF THE ROADWAY ON THE RIGHT SIDE ALSO.

(5) IF SPACE IS LIMITED, NON-GATING ATTENUATOR MAY BE SUBSTITUTED AND ATTACHED TO THE END OF THE CONCRETE BARRIER WALL.

(6) THE LON DIMENSION SHOWN ON THIS TABLE ARE TO BE USED FOR TANGENT OR NEAR TANGENT CONDITIONS. IN THE CASE OF CURVATURE USE STANDARD DRAWING S-PL-1 TO DETERMINE THE POINT OF NEED.

(7) FOR GRADING REQUIREMENTS AT END TERMINAL SEE S-GRT-2P OR S-GRT-2R.

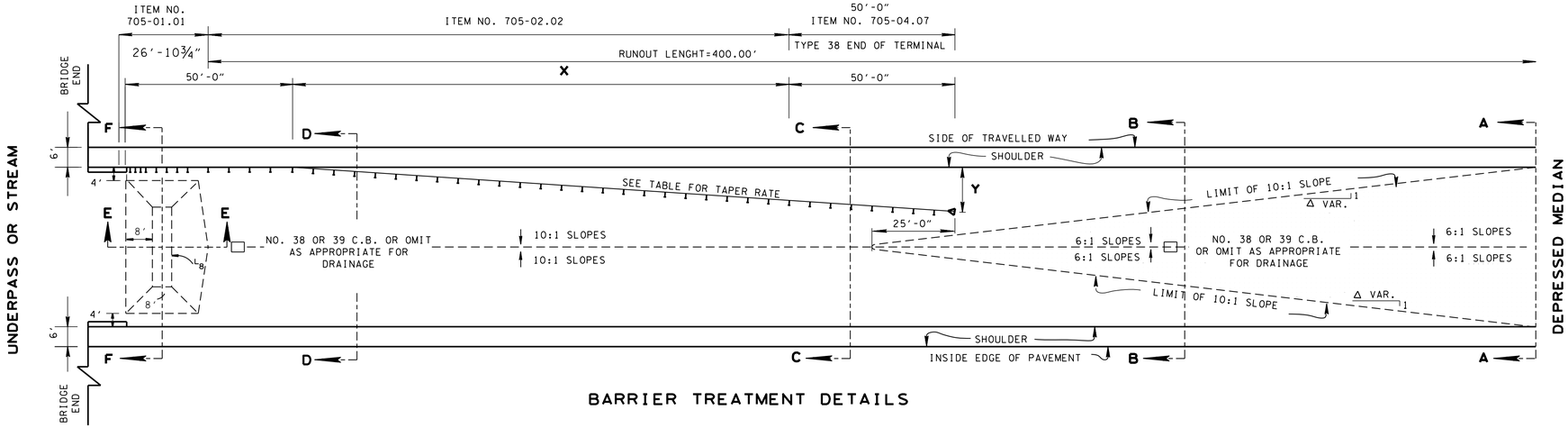
MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

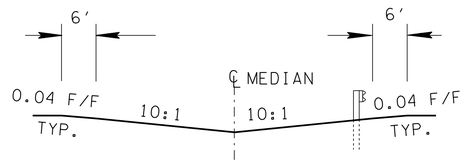
SAFETY PLAN
FOR BRIDGE PIERS
IN
CLEAR ZONE

7-11-13 | S-PL-4

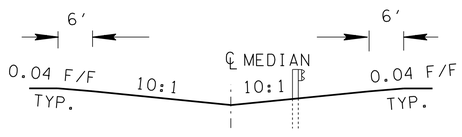
REV. 4-11-14: CORRECTED CUT SECTION LABELS.



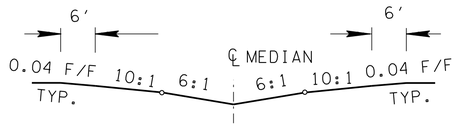

BARRIER TREATMENT DETAILS



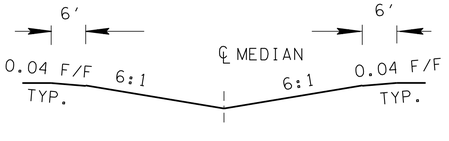

D — D




C — C




B — B

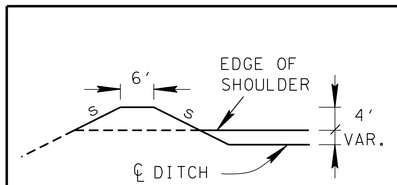



A — A

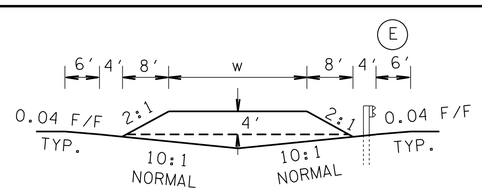
| DESIGN SPEED MPH | DIMENSIONS | | | ESTIMATED QUANTITIES (D) | | |
|---|---|---|---|---|---|---|
| | TAPER RATE | X | Y | 705-01.01 | 705-02.02 | 705-04.07 |
| 70 | 15:1 | 200′-0″ | 16′-8″ | 26′-10¾″ | 200′-0″ | 1 EACH |
| 60 | 14:1 | 137′-6″ | 13′-5″ | 26′-10¾″ | 137′-6″ | 1 EACH |
| ≤55 | 12:1 | 100′-0″ | 12′-6″ | 26′-10¾″ | 100′-0″ | 1 EACH |

GUARDRAIL DIMENSIONS AND QUANTITIES

EARTHEN BERM DETAILS




E — E




F — F

| MEDIAN WIDTH | W | ITEM NO 203-01 CY | FILL SLOPE S |
|---|---|---|---|
| 36′ | 4 | 23 | 1.5:1 |
| 40′ | 8 | 33 | 1.5:1 |
| 48′ | 12 | 49 | 2:1 |
| 60′ | 24 | 83 | 2:1 |
| 64′ | 28 | 96 | 2:1 |

EARTHEN BERM DIMENSIONS AND QUANTITIES

## GENERAL NOTES

(A) THE CONTRACTOR IS TO ELIMINATE THE 1 FOOT FLARE SHOWN ON GUARDRAIL STANDARD DRAWINGS FOR TANGENTIAL GUARDRAIL TERMINAL ANCHORS (FLARED INSTALLATIONS ONLY).

(B) ONLY ONE APPROACH SHOWN OTHER APPROACH IDENTICAL.

(C) THE DIMENSIONS SHOWN IN THIS TABLE ARE TO BE USED IN ALL TANGENT OR NEARLY TANGENT SITUATIONS WITH DESIGN SPEEDS 70 MPH OR BELOW. WHEN THE DESIGN SPEED EXCEEDS 70 MPH OR OTHER GEOMETRIC FEATURES SUCH AS CURVATURE, SKEWED BRIDGES, OR ADDITIONAL HAZARDS ARE PRESENT, THE DESIGNER SHALL USE STANDARD DRAWING S-PL-1.

(D) QUANTITIES SHOWN ARE FOR ONE APPROACH.

(E) BASED ON 6′ SHOULDER, FOR OTHER WIDTH SHOULDERS ADJUST WIDTH OF BERM AS NECESSARY. PLACEMENT OF GUARDRAIL IS NOT AFFECTED.

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

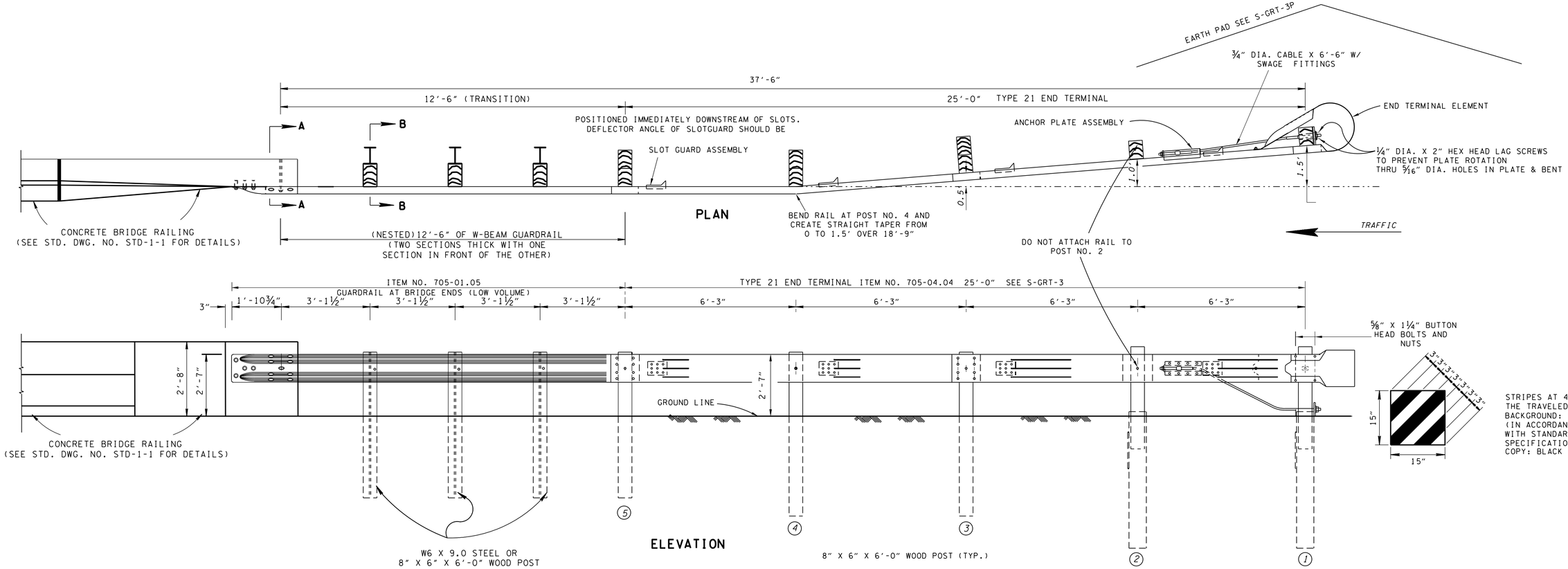
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

# SAFETY PLAN FOR BRIDGE ENDS IN MEDIANS

7-11-13 | S-PL-5

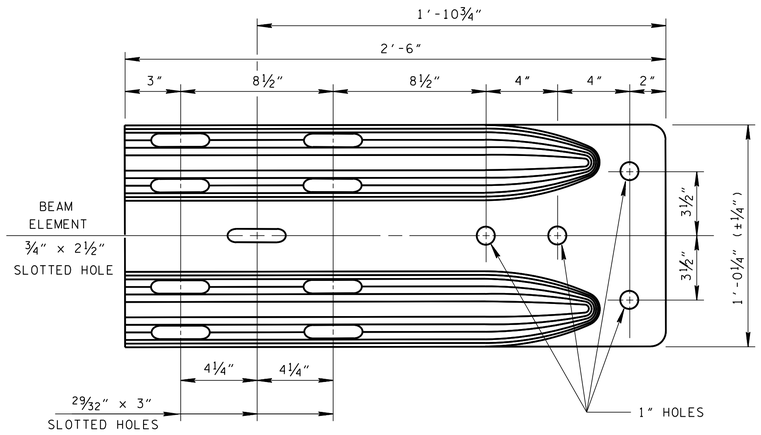
REV. 4-11-14: ADDED ITEM NUMBER FOR TRANSITION.

# THIS DRAWING IS TO BE USED FOR LOW-VOLUME LOCAL ROADS (ADT < 400) ONLY

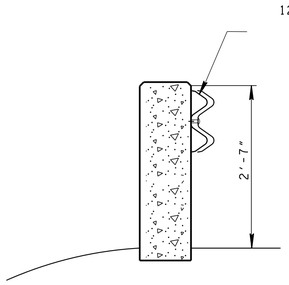



| QUANTITIES PER APPLICATION | |
|---|---|
| 705-01.05 | 1 EACH |
| 705-04.04 | 1 EACH |

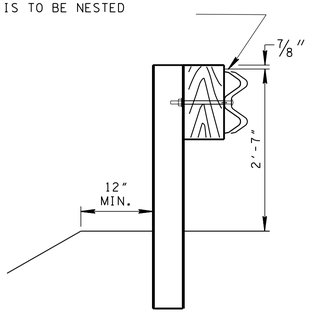
| NOTE TO DESIGNER |
|---|
| DO NOT USE WITHOUT REFERENCE S-GRT-3 AND S-GRT-3D |




ELEVATION (FRONT)




SECTION A-A




SECTION B-B

⅝" X 1¼" BUTTON HEAD BOLTS, NUTS, AND WASHERS TO BE INSTALLED THRU ENLARGED AREA OF SLOT

## GENERAL NOTES

(A) SEE STANDARD DRAWING RD01-TS-1A FOR DETAILS AND SPECIFICATIONS REGARDING DESIGN STANDARDS FOR LOW-VOLUME LOCAL ROADS.

(B) THE POST OFFSET DIMENSIONS ARE GIVEN TO THE CENTER OF THE TRAFFIC FACE OF THE BLOCKOUTS, EXCEPT AT THE FIRST TWO POSTS, WHERE THE DIMENSION IS TO THE CENTER OF THE TRAFFIC FACE OF THE POST. OFFSET POINTS ARE TO BE LOCATED BY CHORD MEASUREMENTS AT THE BACK OF THE RAIL EQUAL TO THE NOMINAL POST SPACINGS SHOWN. POSTS ARE TO BE SET APPROXIMATELY RADIAL TO THE RAILINGS AT EACH POST LOCATION.

(C) SEE S-GRT-3 FOR SLOTTED RAIL TERMINAL DETAILS (TYPE 21).

(D) SEE STRUCTURE'S BRIDGE RAIL STANDARD DRAWING FOR BOLT CONNECTION FOR MICHIGAN SHOE TO BRIDGE RAIL

(E) EARTH PAD NOT REQUIRED FOR LOW VOLUME INSTALLATION.

(F) TO BE USED ONLY FOR LOW SPEED TL-2 CONDITIONS. TRANSITION WAS EVALUATED BY TTI (REPORT 4564-1) AT TL-2.

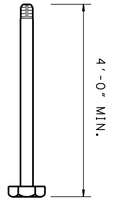
MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

**GUARDRAIL CONNECTION TO BRIDGE END FOR LOW - VOLUME LOCAL ROADS (ADT≤400)**

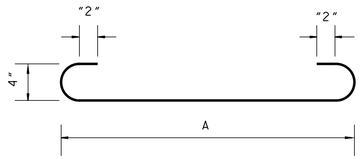
7-11-13 | S-GRC-2

REV. 12-4-13: CHANGED ANCHOR BOLTS TO THREADED.

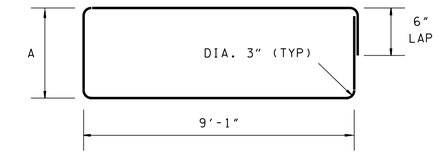



## ANCHOR BOLT DETAIL

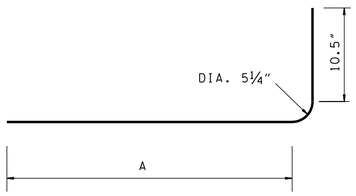
ASTM F1554 ANCHOR BOLTS
(55KSI, HEADED OR THREADED/NUTTED) TO BE DESIGNED BY SIGN STRUCTURE MANUFACTURER. SEE S-SSMB-8 FOR MIN BEARING AREA OF HEAD OR NUT



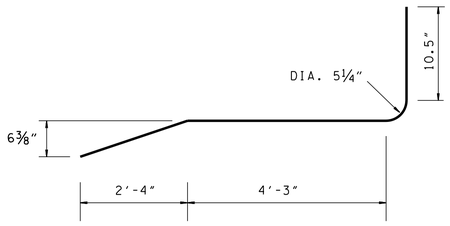

D BARS




L BARS

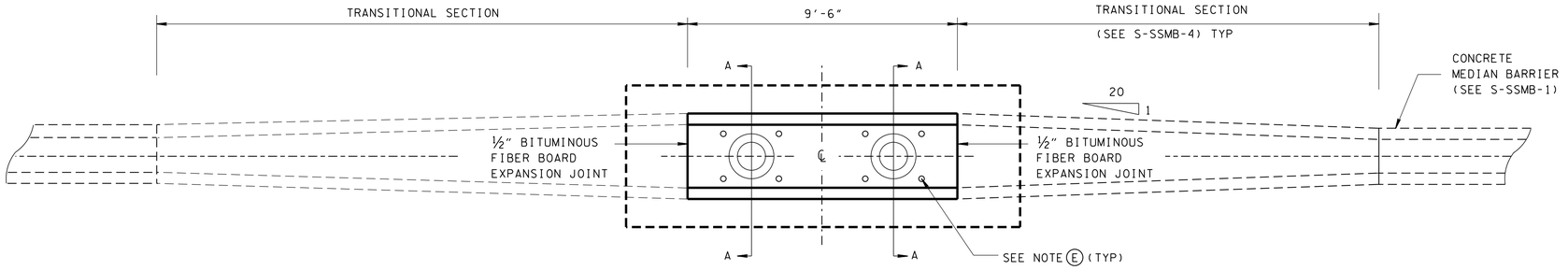



C BARS

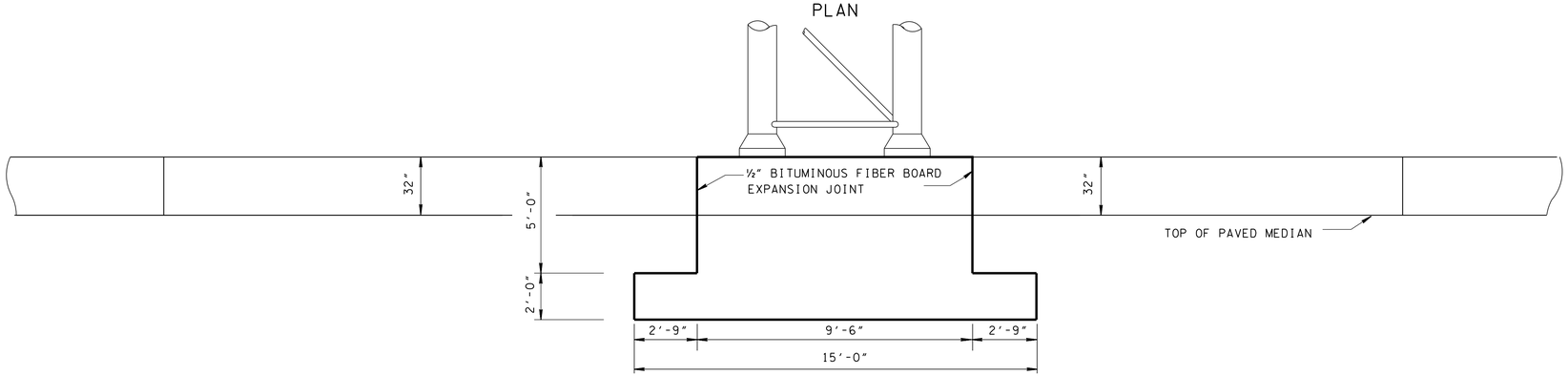



BARS CA 700

BAR DETAIL



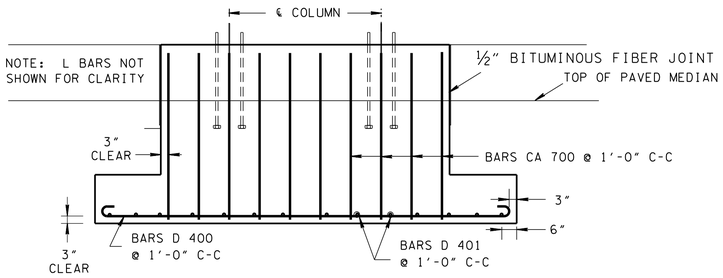

PLAN



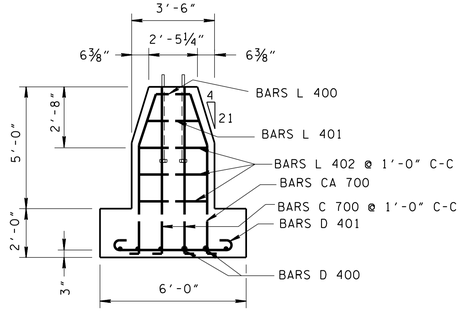

ELEVATION

| BILL OF STEEL - PER FOOTING | | | | |
|---|---|---|---|---|
| BAR | SIZE | NO. REQ'D. | DIM A | LENGTH |
| C 700 | 7 | 4 | 6'-6" | 7'-6" |
| CA 700 | 7 | 20 | | 7'-9" |
| D 400 | 4 | 6 | 14'-6" | 15'-10" |
| D 401 | 4 | 15 | 5'-6" | 6'-10" |
| L 400 | 4 | 1 | 2'-1" | 21'-10" |
| L 401 | 4 | 1 | 2'-4" | 23'-4" |
| L 402 | 4 | 3 | 3'-1" | 24'-10" |

| QUANTITIES | |
|---|---|
| CLASS "A" CONCRETE | 12.0 C.Y. |
| REINFORCING STEEL | 589 LB. |




FOOTING




SECTION "A-A"

## GENERAL NOTES

Ⓐ FINISHED CONCRETE SURFACES: CONCRETE FINISHING SHALL BE IN ACCORDANCE WITH SECTION 604.22 OF THE TENNESSEE STANDARD SPECIFICATIONS EXCEPT AS MODIFIED BY THE SPECIAL PROVISION NO. 130 REGARDING SECTION 604-CONCRETE STRUCTURES. A TEXTURED COATED FINISH SHALL BE USED IN LIEU OF A CLASS 2 FINISH. THE COLOR OF THE FINISH SHALL BE SIMILAR TO WHITE FEDERAL SPECIFICATION NO. 37778, A COLOR SAMPLE SHALL BE SUBMITTED TO THE MATERIALS AND TEST ENGINEER FOR APPROVAL.

Ⓑ EPOXY COATED DOWEL BARS WILL BE PERMITTED AS AN ALTERNATE TO PAINTED AND GREASED DOWEL BARS. THE EPOXY COATING SHALL BE AN APPROVED HIGH DENSITY POLYETHYLENE 17 MILS (± 2 MILS) BONDED TO THE BAR WITH AN APPROVED ADHESIVE 1 TO 8 MILS THICK (4 MILS NOMINAL).

Ⓒ IF A STORM DRAINAGE SYSTEM IS PLACED UNDER THE CENTER LINE OF THE MEDIAN BARRIER, THE PIPE SHALL BE SHIFTED HORIZONTALLY AROUND THE FOOTING.

Ⓓ OVERHEAD SIGN FOOTING COST IS TO BE INCLUDED IN THE COST OF THE OVERHEAD SIGN STRUCTURE.

Ⓔ LOCATION OF ANCHOR BOLTS TO BE DETERMINED IN THE FIELD BY THE ENGINEER TO MATCH SIGN STRUCTURE MANUFACTURERS SHOP DRAWING.

Ⓕ ANCHOR BOLTS, NUTS AND WASHERS ARE TO BE GALVANIZED STEEL.

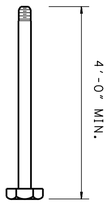
Ⓖ CONCRETE: $F_c$ = 4000 POUNDS PER SQUARE INCH AT 28 DAYS.
REINFORCING STEEL: ASTM A615, $F_y$ = 60,000 POUNDS PER SQUARE INCH
ALL REINFORCEMENT IS TO BE INSTALLED AS DETAILED ON THIS DRAWING .

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

# FOOTING DETAILS FOR OVERHEAD SIGN STRUCTURE 32" MEDIAN BARRIER WALL

2-29-12 | S-SSMB-7

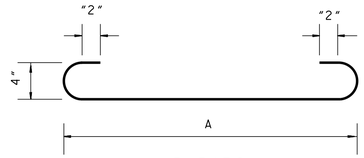
REV. 12-4-13: CHANGED ANCHOR BOLTS TO THREADED. ADDED BEARING AREA TABLE.



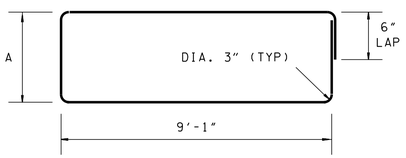

| REQUIRED BEARING AREA FOR ANCHOR BOLT | |
|---|---|
| ANCHOR BOLT DIA(IN) | HEAD OR NUT AREA (SQ IN) |
| 1" | 1.800 |
| 1¼" | 2.812 |
| 1½" | 4.050 |
| 1¾" | 5.512 |
| 2" | 7.199 |
| 2¼" | 9.122 |
| 2½" | 11.249 |

## ANCHOR BOLT DETAIL

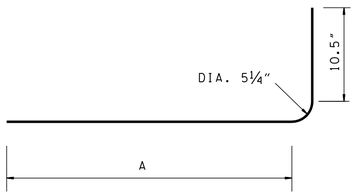
ASTM F1554 ANCHOR BOLTS
(55KSI, HEADED OR THREADED/NUTTED) TO BE DESIGNED
BY SIGN STRUCTURE MANUFACTURER



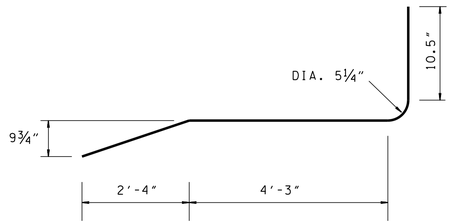

D BARS




L BARS

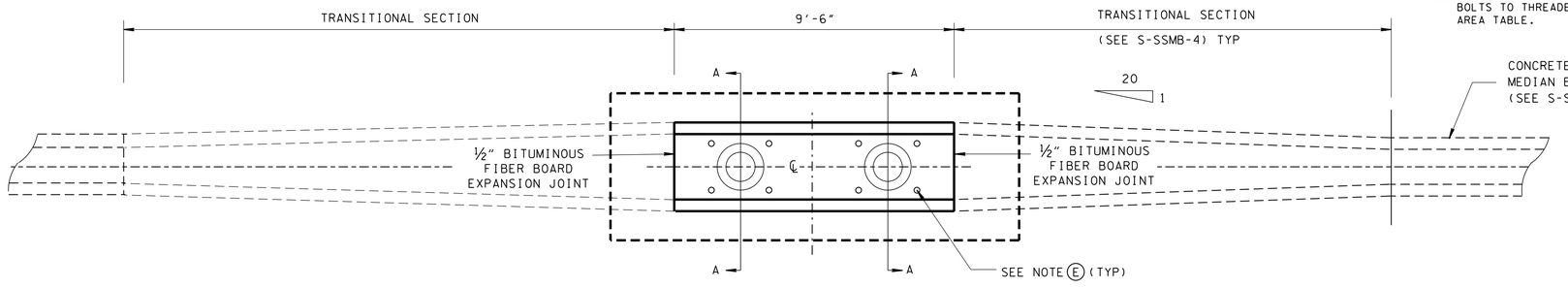



C BARS

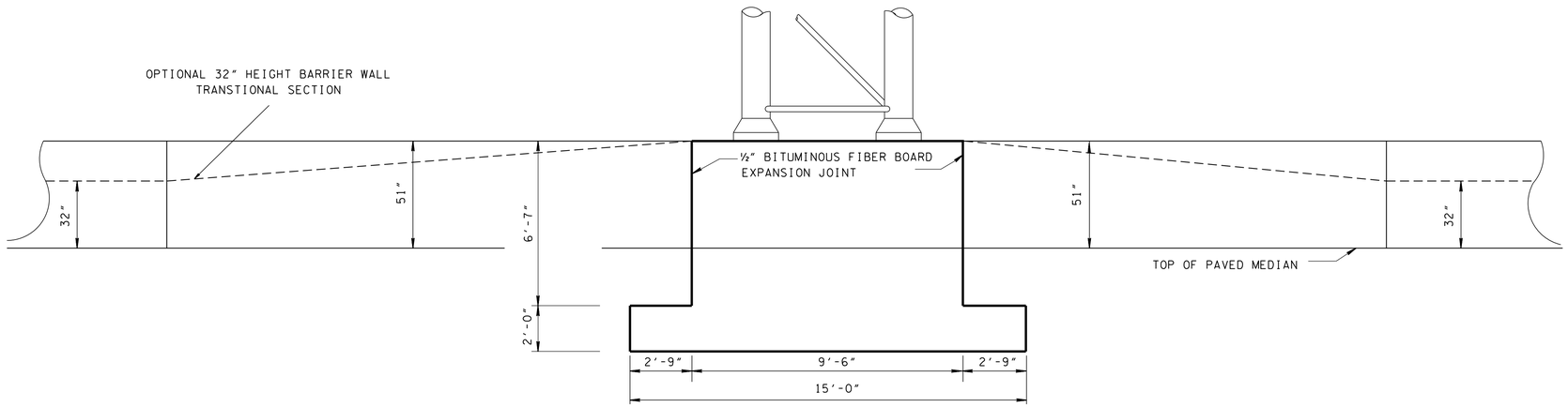



BARS CA 700

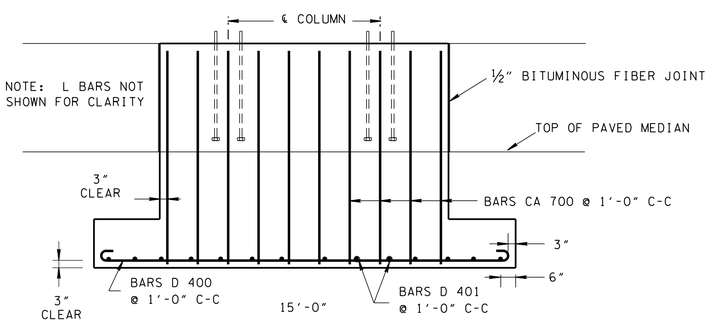
BAR DETAIL



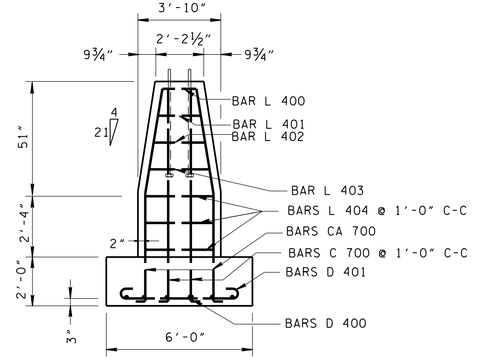

PLAN




ELEVATION




FOOTING




SECTION "A-A"

| BILL OF STEEL - PER FOOTING | | | | |
|---|---|---|---|---|
| BAR | SIZE | NO. REQ'D. | DIM "S" | LENGTH |
| C 700 | 7 | 4 | 8'-2" | 9'-3" |
| CA 700 | 7 | 20 | | 9'-1" |
| D 400 | 4 | 6 | 14'-6" | 15'-6" |
| D 401 | 4 | 15 | 5'-6" | 6'-6" |
| L 400 | 4 | 3 | 2'-1" | 22'-2" |
| L 401 | 4 | 1 | 2'-2" | 23'-0" |
| L 402 | 4 | 1 | 2'-8" | 24'-0" |
| L 403 | 4 | 1 | 3'-1" | 25'-10" |
| L 404 | 4 | 3 | 3'-7" | 25'-10" |

| QUANTITIES | |
|---|---|
| CLASS "A" CONCRETE | 13.3 C.Y. |
| REINFORCING STEEL | 658 LB. |

## GENERAL NOTES

Ⓐ FINISHED CONCRETE SURFACES: CONCRETE FINISHING SHALL BE IN ACCORDANCE WITH SECTION 604.22 OF THE TENNESSEE STANDARD SPECIFICATIONS EXCEPT AS MODIFIED BY THE SPECIAL PROVISION NO. 130 REGARDING SECTION 604-CONCRETE STRUCTURES. A TEXTURED COATED FINISH SHALL BE USED IN LIEU OF A CLASS 2 FINISH. THE COLOR OF THE FINISH SHALL BE SIMILAR TO WHITE FEDERAL SPECIFICATION NO. 37778, A COLOR SAMPLE SHALL BE SUBMITTED TO THE MATERIALS AND TEST ENGINEER FOR APPROVAL.

Ⓑ EPOXY COATED DOWEL BARS WILL BE PERMITTED AS AN ALTERNATE TO PAINTED AND GREASED DOWEL BARS. THE EPOXY COATING SHALL BE AN APPROVED HIGH DENSITY POLYETHYLENE 17 MILS (± 2 MILS) BONDED TO THE BAR WITH AN APPROVED ADHESIVE 1 TO 8 MILS THICK (4 MILS NOMINAL).

Ⓒ IF A STORM DRAINAGE SYSTEM IS PLACED UNDER THE CENTER LINE OF THE MEDIAN BARRIER, THE PIPE SHALL BE SHIFTED HORIZONTALLY AROUND THE FOOTING.

Ⓓ OVERHEAD SIGN FOOTING COST IS TO BE INCLUDED IN THE COST OF THE OVERHEAD SIGN STRUCTURE.

Ⓔ LOCATION OF ANCHOR BOLTS TO BE DETERMINED IN THE FIELD BY THE ENGINEER TO MATCH SIGN STRUCTURE MANUFACTURERS SHOP DRAWING.

Ⓕ ANCHOR BOLTS, NUTS AND WASHERS ARE TO BE GALVANIZED STEEL.

Ⓖ CONCRETE: $F_c$ = 4000 POUNDS PER SQUARE INCH AT 28 DAYS.
REINFORCING STEEL: ASTM A615, $F_y$ = 60,000 POUNDS PER SQUARE INCH
ALL REINFORCEMENT IS TO BE INSTALLED AS DETAILED ON THIS DRAWING .

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

# FOOTING DETAILS FOR OVERHEAD SIGN STRUCTURE 51" MEDIAN BARRIER WALL

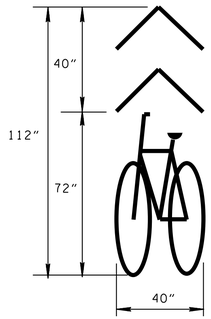
2-29-12 | S-SSMB-8

REV. 12-1-09: REMOVED RUMBLE DETAILS TO T-M-15 AND 15A.

REV. 11-1-11: REVISED GENERAL NOTE (B). ADDED GENERAL NOTE E AND (F). UPDATED PLAN VIEW, AND ADDED BIKE SYMBOL/ARROW SHARED LANE MARKING DETAIL.

REV. 6-15-12: ADDED NOTE (G).

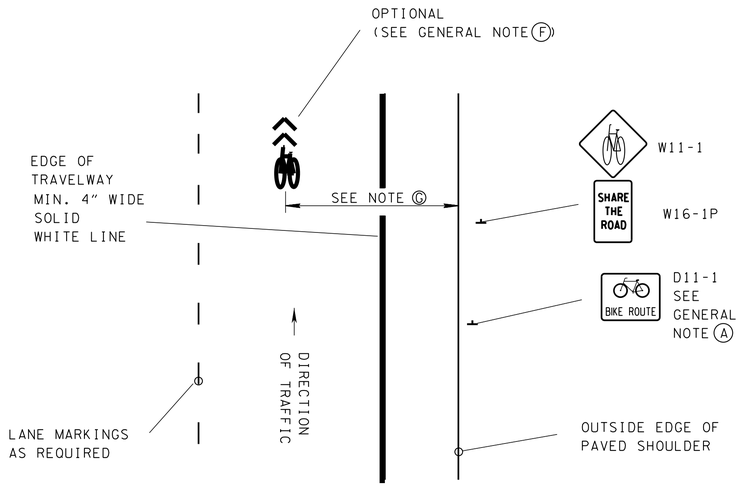
REV. 10-24-13: ADDED NOTE (H).




**BIKE SYMBOL/ARROW SHARED LANE MARKING**

(ITEM NO. 716-04.15)

NOTE: TO BE PLACED IMMEDIATELY AFTER AN INTERSECTION AND SPACED AT INTERVALS NOT GREATER THAN 250 FEET.




**SHARED- LANE MARKING DETAIL**

## GENERAL NOTES

(A) SIGNS SHOULD BE PLACED APPROXIMATELY EVERY 0.25 MILES, AT EVERY TURN, AND AT ALL SIGNALIZED INTERSECTIONS. SIGN SPACING SHOULD NOT EXCEED A MILE ON RURAL ROADS.

(B) SEE STD. DWG. T-M-15A IF RUMBLE STRIP OR RUMBLE STRIPE IS PROPOSED IN CONJUNCTION WITH BIKE ROUTE.

(C) BIKE LANES AND BIKE ROUTES ARE NOT PERMITED ON ACCESS CONTROLLED FACILITIES.

(D) IF BIKE LANE IS PROPOSED ON PAVED SHOULDER, RUMBLE STRIPS SHOULD NOT BE USED WHEN THEIR INSTALLATION WOULD LEAVE A CLEAR SHOULDER PATHWAY LESS THAN 4 FEET WIDE (OR LESS THAN 5 FEET WIDE IF THERE IS AN OBSTRUCTION SUCH AS A CURB OR GUARDRAIL) TO THE RIGHT OF THE RUMBLE STRIP FOR BICYCLE USE SEE T-M-15 FOR FURTHER INFORMATION.

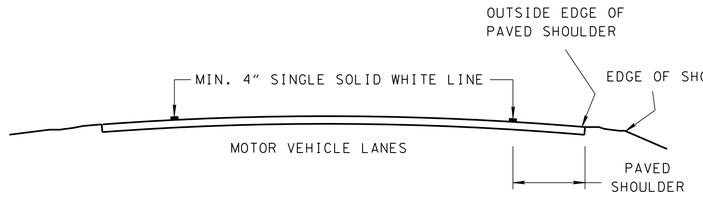
(E) SEE SECTIONS 9B.06, 9B.18, 9B.19, 9B.20, 9C.04, AND 9C.07 FOR ADDITIONAL SIGNING AND PAVEMENT MARKING INFORMATION IN THE MUTCD.

(F) OPTIONAL, SHARED BIKE LANE MARKINGS SHOULD NOT BE PLACED ON ROADWAYS THAT HAVE A SPEED LIMIT ABOVE 35 MPH.

(G) STREETS WHERE PARKING IS PERMITTED: 11 FEET MIN.
STREETS WHERE PARKING PROHIBITED: 4 FEET MIN.

(H) TO BE PAID UNDER ITEM 716-04.15 PLASTIC PAVEMENT (MARKING BIKE SYMBOL/ARROW SHARED) PER EACH.

## TYPICAL BIKE ROUTE CROSS SECTION FOR NON-ACCESS CONTROLLED RURAL ROUTES




MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

# SIGNING AND PAVEMENT MARKINGS FOR BICYCLE ROUTES ON RURAL ROADS

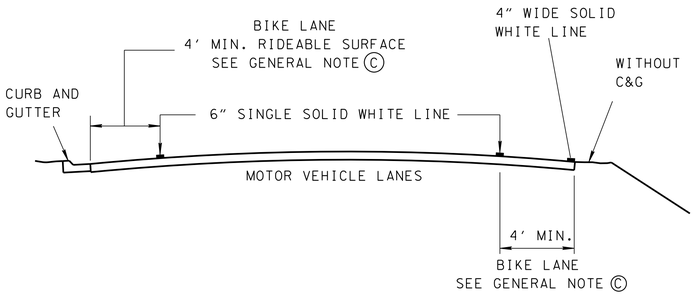
5-1-07

T-M-11

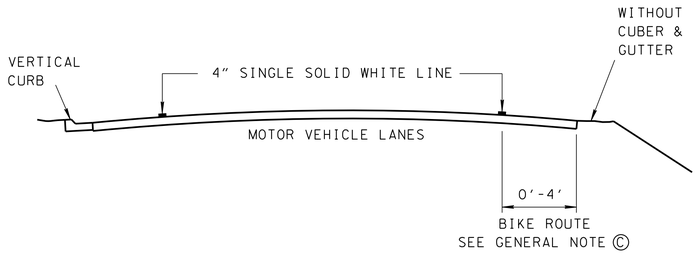
- REV. 12-1-09: ADDED SIGN NO.W5-4a AND CHANGED GENERAL NOTE (D) REARRANGED.
- REV. 11-1-11: ADDED BARRIER POST STRIPING DETAIL AND REVISED GENERAL NOTE (E).
- REV. 10-10-13: ADDED NOTE (G) AND (H).

# TYPICAL BIKE LANE CROSS SECTIONS FOR URBAN COLLECTORS AND STREETS

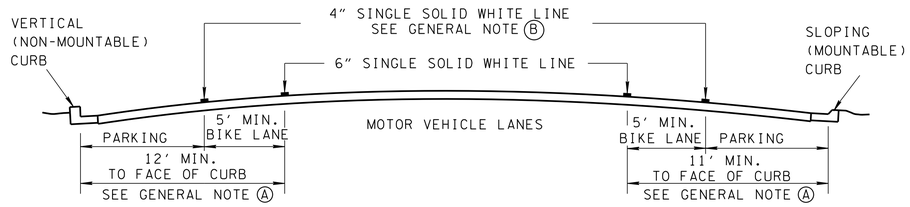
## URBAN COLLECTORS AND STREETS WITH BIKE LANE MIN. PAVED SHOULDER WIDTH 4' - 8'



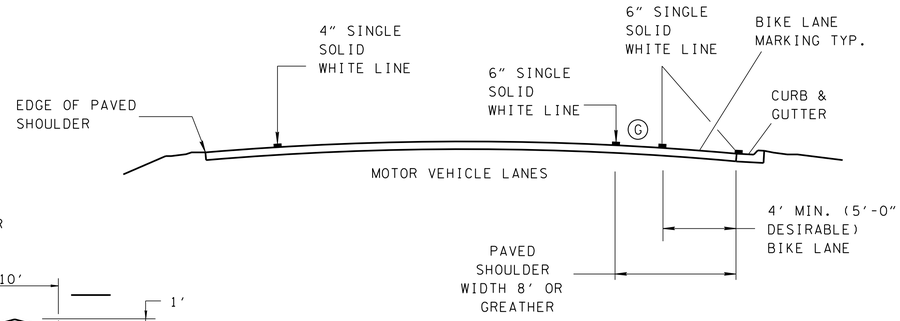

## URBAN COLLECTORS AND STREETS WITH BIKE ROUTE MIN. PAVED SHOULDER WIDTH LESS THAN 4'



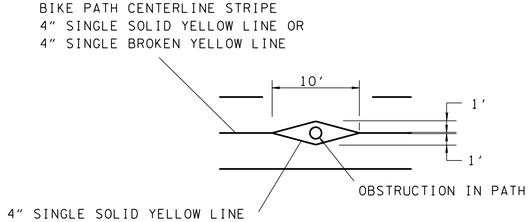

## 4-5 LANE URBAN COLLECTORS AND STREETS (CURB AND GUTTER) WITH BIKE LANE MIN. PAVED SHOULDER WIDTH 8' OR GREATER



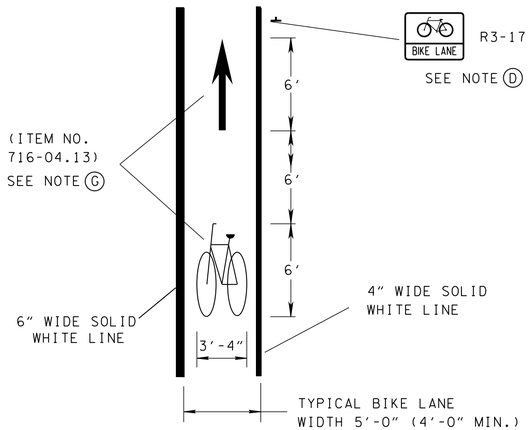

### PARKING IS PERMITTED



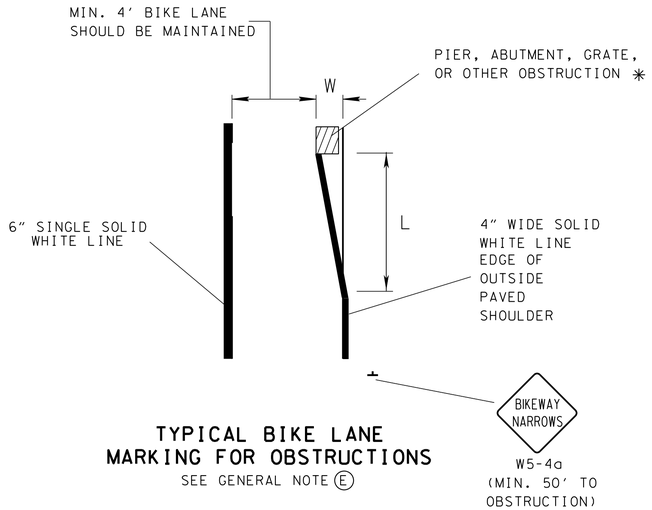

### PARKING IS PROHIBITED




### BARRIER POST STRIPING




### TYPICAL PAVEMENT MARKING FOR BICYCLE LANES (MIN. 1000' INTERVALS)




### TYPICAL BIKE LANE MARKING FOR OBSTRUCTIONS

SEE GENERAL NOTE (E)

NOTE:
WHERE THE ROADWAY DESIGN SPEEDS IS MORE THAN 40 mph SHARED USE BIKE ROUTES ARE NOT RECOMMENDED.

## GENERAL NOTES

(A) 13' IS RECOMMENDED WHERE THERE IS SUBSTANTIAL PARKING OR TURNOVER OF PARKED CARS IS HIGH (E.G. COMMERCIAL AREAS).

(B) THE OPTIONAL SOLID WHITE LINE MAY BE ADVISABLE WHERE PARKING STALLS ARE UNNECESSARY (BECAUSE PARKING IS LIGHT) BUT THERE IS CONCERN THAT MOTORISTS MAY MISCONSTRUE THE BIKE LANE TO BE A TRAFFIC LANE.

(C) AREAS WHERE MIN. OF 4' BIKE LANE CAN NOT BE PROVIDED " SHARE THE ROAD" (W16-1) SIGN SHOULD BE PLACED TO WARN THE MOTOREST FOR SHARED ROADWAY USE SEE T-M-11 FOR BIKE ROUTE PAVEMENT MARKINGS AND SIGNING REQUIREMENTS.

(D) SIGNS SHOULD BE PLACED APPROXIMATELY EVERY 0.25 MILES AND AT ALL MAJOR INTERSECTIONS.

(E) WHEN PIER, BRIDGE ABUTMENT, GRATE, OR OTHER ROADWAY OBSTRUCTION INTRUDES IN THE BIKE PATH, THE BIKE LANE SHOULD BE MARKED AS SHOWN; L=WS, WHERE W IS WIDTH OF THE OBSTRUCTION IN FEET IN BIKE LANE AND S IS BICYCLE AVERAGE APPROACH SPEED 20 MPH. * PROVIDE AN ADDITIONAL FOOT OF OFFSET FOR A RAISED OBSTRUCTION AND USE THE FORMULA L=(W+1) S FOR THE TAPER LENGTH. SEE SECTION 9C.06 OF THE MUTCD FOR ADDITIONAL INFORMATION.

(F) FOR BIKE ROUTE SIGNING REQUIREMENTS SEE T-M-11.

(G) IF THE SPACE BETWEEN LANE LINE AND THE BIKE LANE LINE IS LAGER THAN 4', PLACE CHEVRONS (6" THICK) AT 100' SPACING.

(H) ITEM NO. 716-04.13 PLASTIC PAVEMENT MARKING (BIKE LANE SYMBOL AND ARROW) PER EACH TO INCLUDE BIKE SYMBOL AND ARROW AS ONE QUANTITY.

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

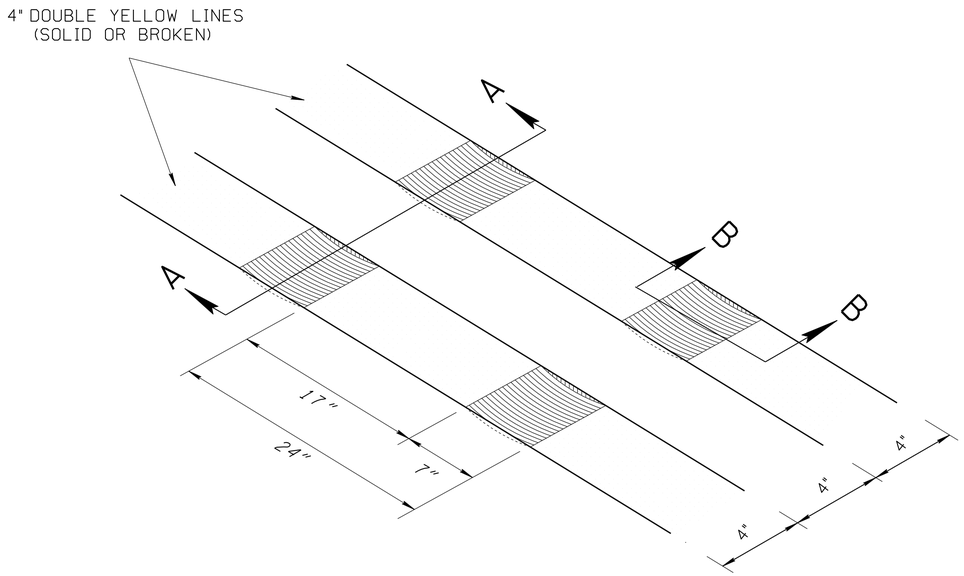
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SIGNING AND PAVEMENT MARKINGS FOR BICYCLE LANES ON URBAN ROADWAYS

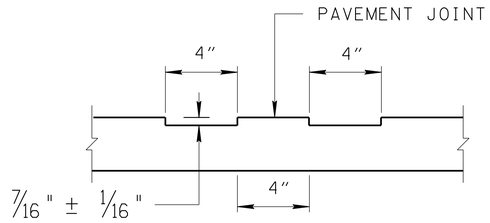
5-1-07 | T-M-12

REV. 4-21-14: REMOVED TWO WAY PASSING ZONE OPTION MODIFIED NOTES (A) AND (B).

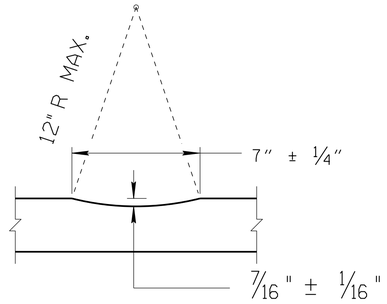
## FOR NO PASSING ZONES OR ONE WAY PASSING ZONES




ISOMETRIC VIEW




SECTION A-A




SECTION B-B

## DESIGN NOTES

(A) FOR IMPROVEMENTS OR RECONSTRUCTION OF EXISTING ROADS RUMBLE STRIPES MAY BE USED AS NEED DUE TO ACCIDENT HISTORY. FOR NEW CONSTRUCTION CENTERLINE RUMBLE STRIPES MAY BE SPECIFIED IF THE FOLLOWING CONDITIONS EXIST:

1) DESIGN SPEED GREATER THAN 45 MPH
2) ADT OF 1500 OR MORE
3) LANE WIDTH 12' MINIMUM.
4) ROAD SEGMENT IS A TWO OR FOUR LANE UNDIVIDED SECTION.
5) ROAD SEGMENT IS A NO PASSING OR ONE WAY PASSING ZONE.

(B) WHEN RUMBLE STRIPES ARE SPECIFIED, ONLY SPRAY THERMOPLASTIC (60 MIL) 4 IN LINE (716-13.01) SHALL BE USED.

(C) CENTERLINE RUMBLE STRIPES SHALL NOT BE USED ON BRIDGES.

(D) THE PAVEMENT JOINT SHALL NOT BE MILLED.

(E) RUMBLE STRIPE SHALL BE DISCONTINUED WHENEVER THE CENTERLINE MARKING IS ALSO DISCONTINUED.

(F) RUMBLE STRIPE SHOULD NOT BE USED IN RESIDENTIAL OR COMMERCIAL AREAS.

(G) SCORING FOR RUMBLE STRIPES TO PAID FOR UNDER ITEM NO. 411-12.05 (INCLUDES BOTH LEFT AND RIGHT SIDE PER LINEAR MILE).

(H) FOR RPM SPACING SEE T-M-1. IN LOCATIONS WHERE RPMS ARE PRESENT STAGGER RUMBLES SUCH THAT RPMS ARE CENTERED BETWEEN RUMBLES.

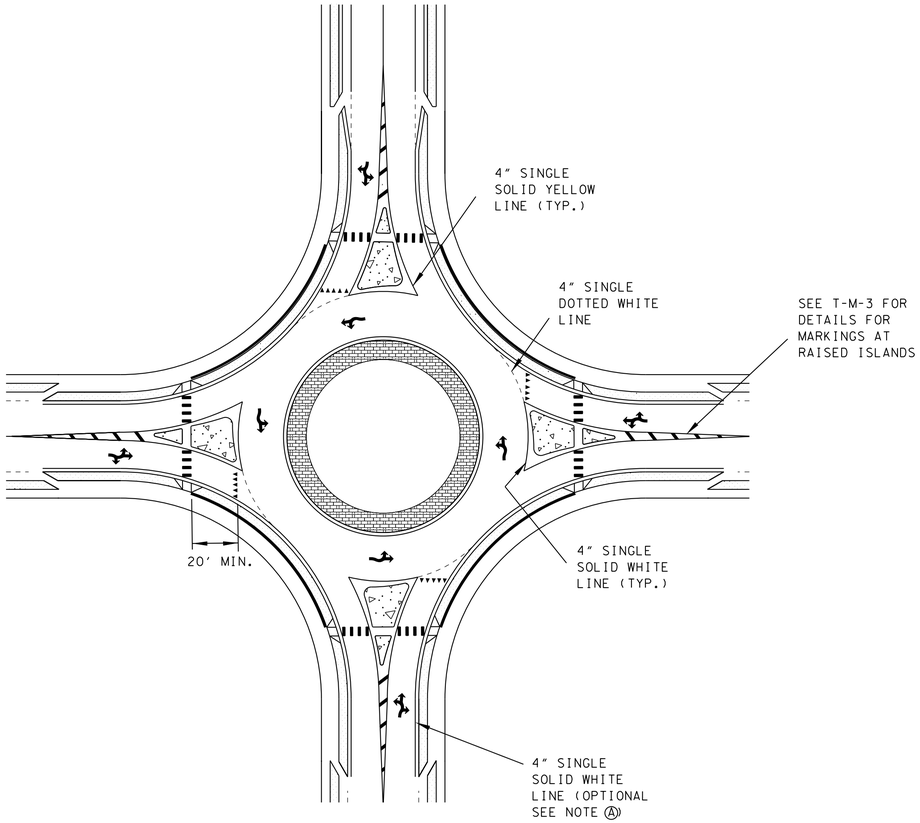
MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

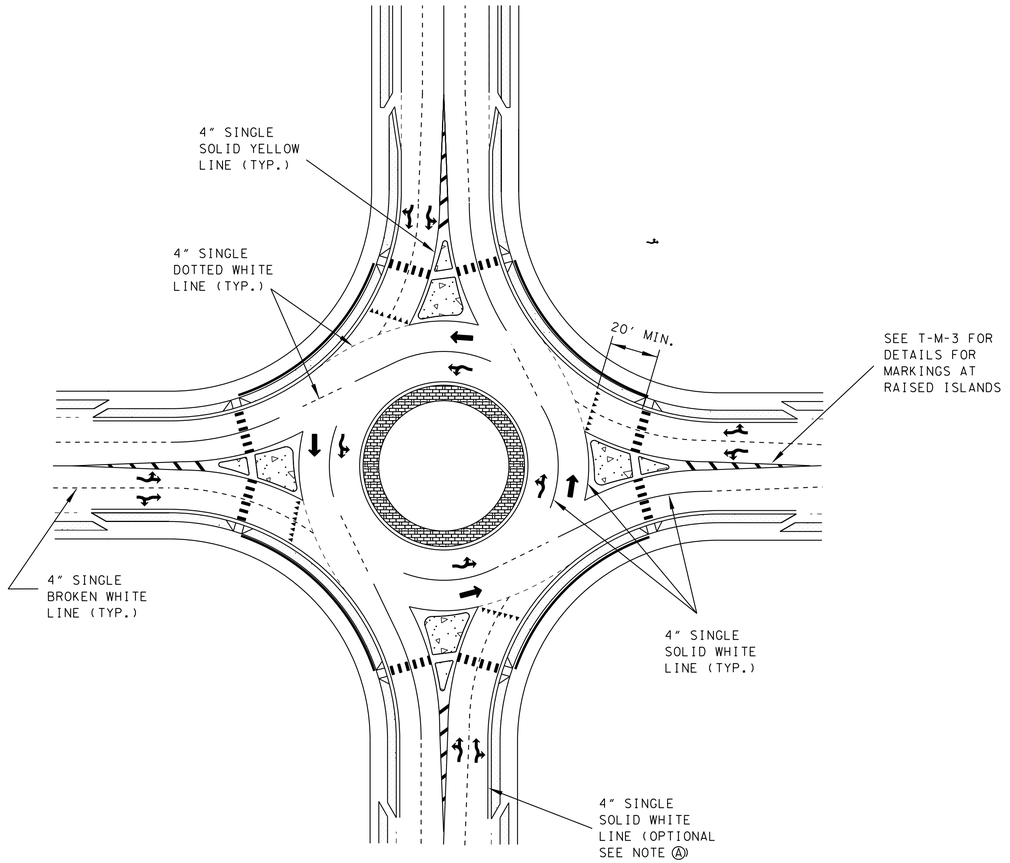
# ASPHALT CENTER LINE RUMBLE STRIPE

1-3-13 | T-M-16A

REV. 2-20-14: CORRECTED LANE MARKING ARROW FOR OUTSIDE LANES.




TYPICAL MARKINGS FOR SINGLE LANE ROUNDABOUT




TYPICAL MARKINGS FOR MULTI-LANE ROUNDABOUT

## GENERAL NOTES

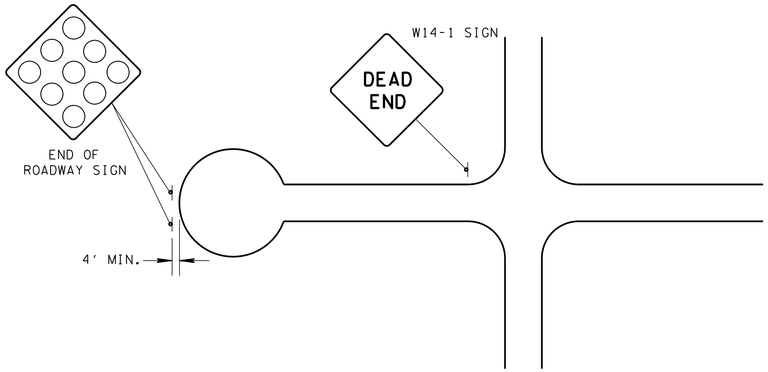
Ⓐ EDGE LINES ARE REQUIRED IF THE APPROACHING ROADWAY HAS EDGE LINES.

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

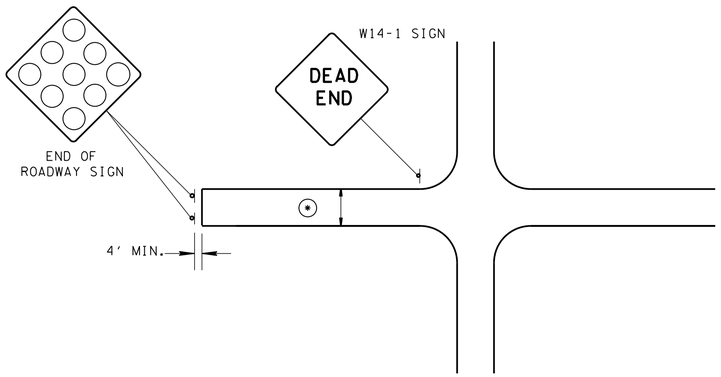
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

# PAVEMENT MARKING DETAILS FOR ROUNDABOUTS

7-2-12 | T-M-17

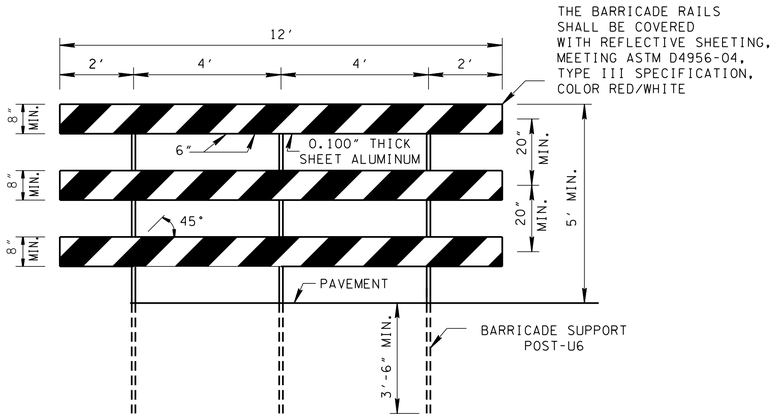



LOCATION OF SIGNS ON CUL-DE-SAC DETAIL




LOCATION OF SIGNS ON END OF ROADWAY DETAIL

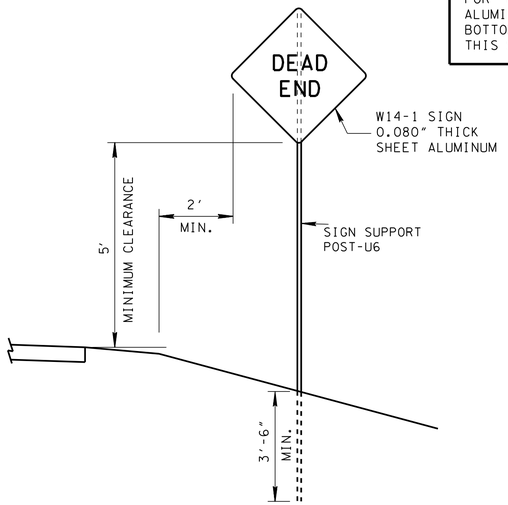
Ⓜ FOR LESS THAN 18 FEET USE ONLY ONE (1) END OF ROADWAY SIGN




METAL BARRICADE (TYPE III)

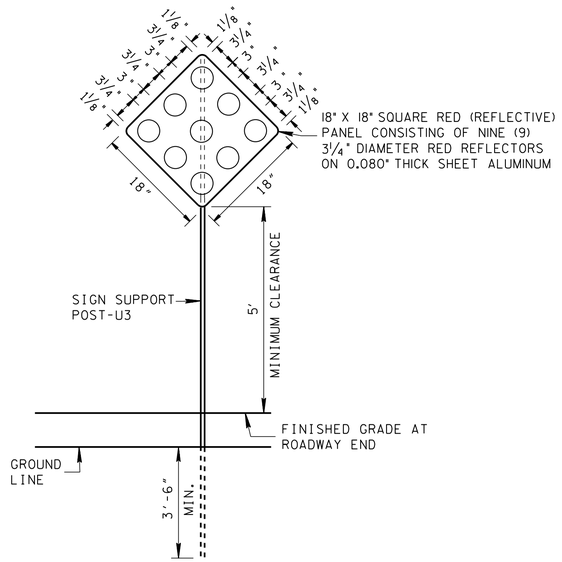
PERMANENT INSTALLATION DETAIL

FOR CONNECTION DETAIL FOR "U"-POST TO SHEET ALUMINUM SIGN FACE SEE BOTTOM LEFT CORNER OF THIS SHEET.



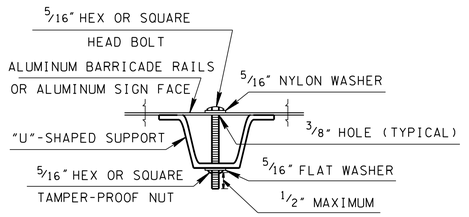

TYPICAL DEAD END SIGN AND SUPPORT DETAIL

NOTE: DEAD END SIGN AND SUPPORT, ITEM 713-16.06 WILL BE MEASURED FOR PAYMENT BY THE UNIT (EACH) COMPLETE IN PLACE. THIS PAY ITEM SHALL INCLUDE THE FURNISHING AND INSTALLING OF THE SIGNS, SUPPORT, AND HARDWARE




TYPICAL END OF ROADWAY SIGN AND SUPPORT DETAIL

NOTE: END OF ROADWAY SIGN AND SUPPORT, ITEM 713-16.07 WILL BE MEASURED FOR PAYMENT BY THE UNIT (EACH) COMPLETE IN PLACE. THIS PAY ITEM SHALL INCLUDE THE FURNISHING AND INSTALLING OF THE SIGNS, REFLECTORS, SUPPORT, AND HARDWARE.




CONNECTION DETAIL FOR "U" POST

NOTE: NUTS TO BE TIGHTENED TO A SNUG FIT ONLY.

## METAL BARRICADE (TYPE III) GENERAL NOTES

Ⓜ1 METAL BARRICADE (TYPE III), ITEM NO. 713-15.35, WILL BE MEASURED FOR PAYMENT BY THE UNIT (EACH) COMPLETE IN PLACE. THE PAY ITEM SHALL INCLUDE THE FURNISHING AND INSTALLING OF THE BARRICADE RAILS, VERTICAL "U6" POST SUPPORTS (MINIMUM LENGTH 8'-6") AND HARDWARE.

Ⓜ2 THE "ROAD CLOSED" SIGN (R11-2) SHALL BE MOUNTED ON THE BARRICADE AS DIRECTED BY THE ENGINEER. THE COST OF FURNISHING AND INSTALLING THE VERTICAL "U6" POST SUPPORT AND MOUNTING THE SIGN AND HARDWARE NECESSARY TO ATTACH IT IS TO BE INCLUDED IN THE PRICE BID FOR ITEM NO. 713-15.35, METAL BARRICADE (TYPE III). THE SIGN FACE WILL BE PAID FOR UNDER ITEM NO. 713-13.03, FLAT SHEET ALUMINUM SIGNS (0.100" THICK).

Ⓜ3 IN THE EVENT THAT MORE THAN ONE (1) BARRICADE IS REQUIRED AT A LOCATION, ONLY ONE (1) "ROAD CLOSED" SIGN SHALL BE INSTALLED. IT SHOULD BE LOCATED APPROXIMATELY AT THE CENTER LINE OF THE ROADWAY TO BE CLOSED.

REV. 1-11-82: METAL BARRICADES DETAIL ADDED.

REV. 12-12-83: CONNECTION DETAIL STEEL "U"-POST CHANGED.

REV. 4-16-84: ADDED WORK ZONE SPEED ADVISORY SIGN DETAILS AND NOTES.

REV. 10-15-90: REDREW SHEET. CHANGED MINIMUM DEPTH OF "U"-POST IN GROUND FROM 3'-0" TO 3'-6". ELIMINATED REFERENCE TO PERFORATED SQUAR TUBE POST ALTERNATE.

REV. 11-11-96: IN DETAIL FOR METAL BARRICADE (TYPE III) CHANGED TYPE OF SHEETING FROM TYPE 2 TO TYPE 3.

☐ REV. 5-27-99: CHANGED REFERENCE TO REFLECTIVE SHEETING MATERIAL USED ON TYPE III BARRICADES.

☐ REV. 5-27-01: CHANGED DECRIPTION IN ITEM NO. 713-16.07.

☐ REV. 2-14-14: REMOVED WORK ZONE SPEED LIMIT.

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

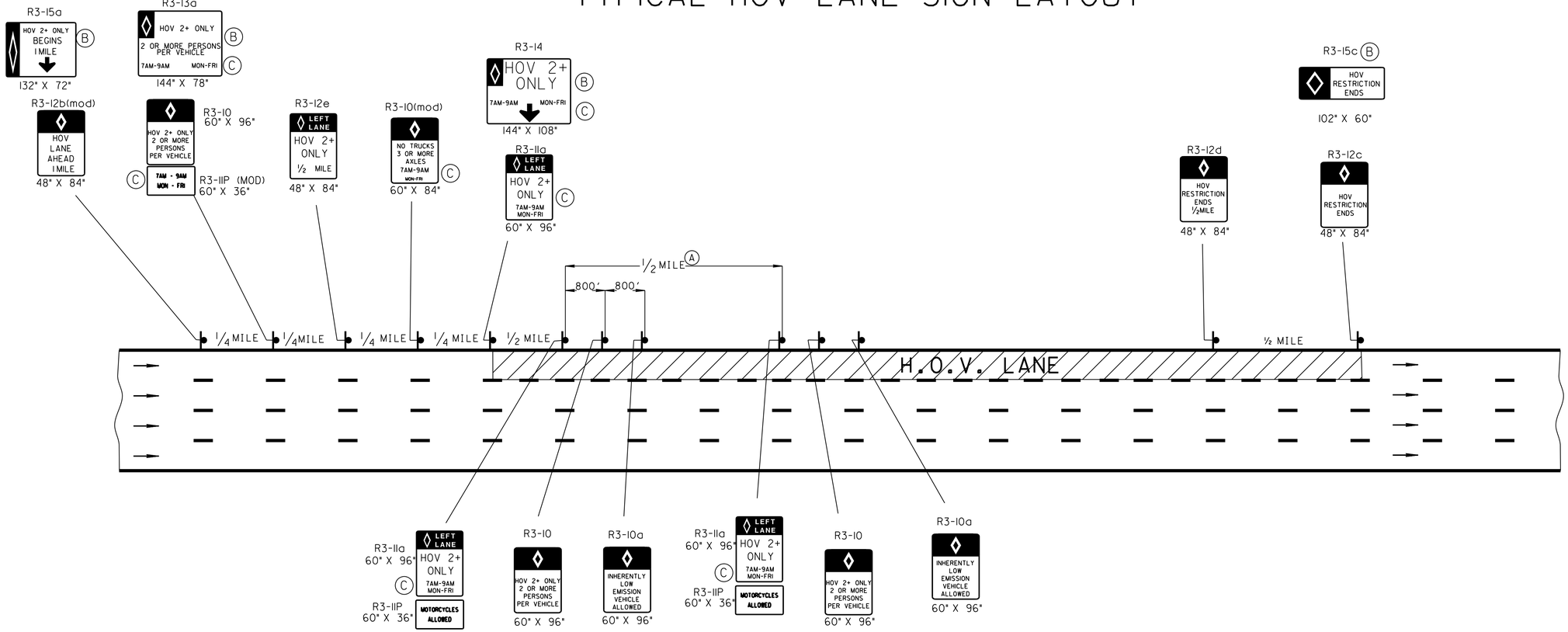
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

# END OF ROADWAY, DEAD END SIGNS, AND METAL BARRICADES (TYPE III)

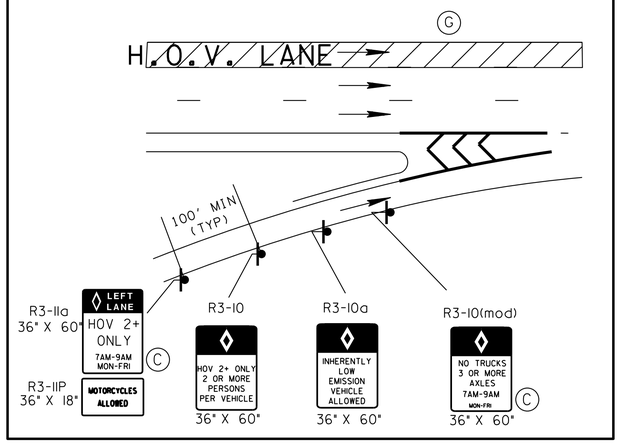
T-S-18

REV. 9-12-13: UPDATED SIGN R3-15 AND STRIPING.

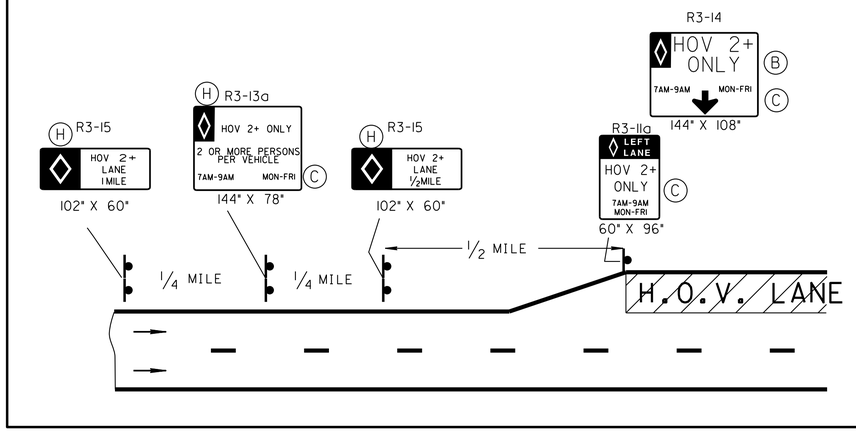
# TYPICAL HOV LANE SIGN LAYOUT




## TYPICAL ENTRANCE RAMP APPLICATION




## ADVANCED SIGNING FOR HOV LANE ADDITION




## GENERAL NOTES

(A) SIGNS R3-11a, R3-10 AND R3-10a TO BE INSTALLED IN SEQUENCE EVERY HALF MILE

(B) ALTERNATE OVERHEAD SIGNS MAY BE USED IF OVERHEAD SIGN STRUCTURE IS AVAILABLE

(C) SPECIFIC TIME RESTRICTIONS TO BE DETERMINED BY THE STATE TRAFFIC ENGINEER

(D) SEE T-M-5 FOR HOV LANE PAVEMENT MARKINGS

(E) SEE T-S-21 FOR SIGN MOUNTING TO BARRIER WALL DETAILS

(F) SEE T-S-10 FOR SIGN STIFFENER REQUIREMENTS FOR LARGE SIGNS

(G) TO BE USED ON ALL ENTRANCE RAMPS INSIDE THE HOV RESTRICTED AREA.

(H) WHERE THE MEDIAN IS INSUFFICENT, USE TYPICAL HOV SIGN LAYOUT.

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

SIGN LAYOUT FOR HOV LANES

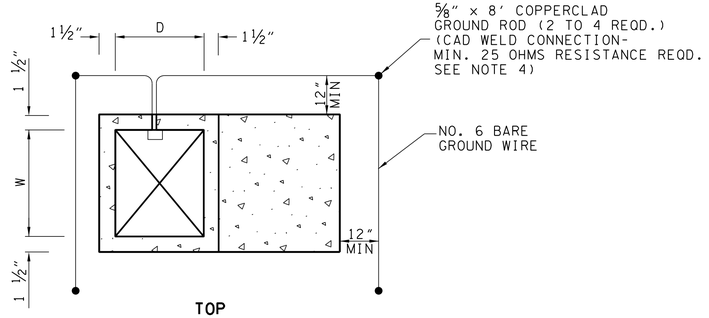
8-15-12

T-S-22

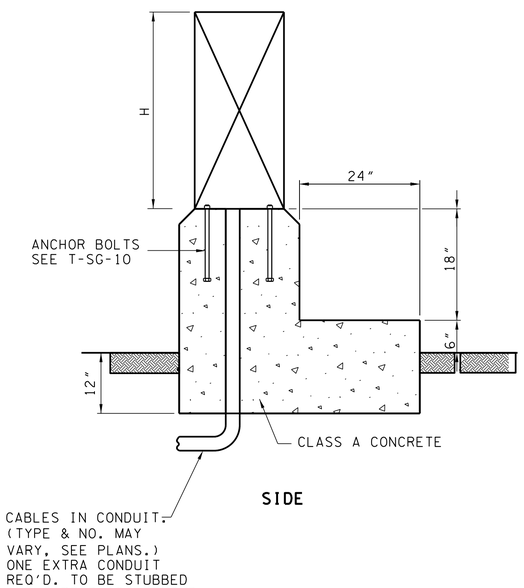
## APPROXIMATE MINIMUM DIMENSIONS FOR CONTROLLER EQUIPMENT CABINET *

| TYPE | HEIGHT(H) | WIDTH(W) | DEPTH(D) | USE |
|---|---|---|---|---|
| 4 PHASE POLE MOUNTED | 49″ | 30″ | 17″ | 8 PHASE CONTROLLER-4 PHASE OPERATION |
| 4 PHASE BASE MOUNTED | 55″ | 38″ | 26″ | 8 PHASE CONTROLLER-4 PHASE OPERATION |
| 8 PHASE BASE MOUNTED (OR 4 PHASE WITH MASTER) | 55″ | 44″ | 26″ | 8 PHASE CONTROLLER-8 PHASE OPERATION OR 4 PHASE OPERATION W/MASTER |

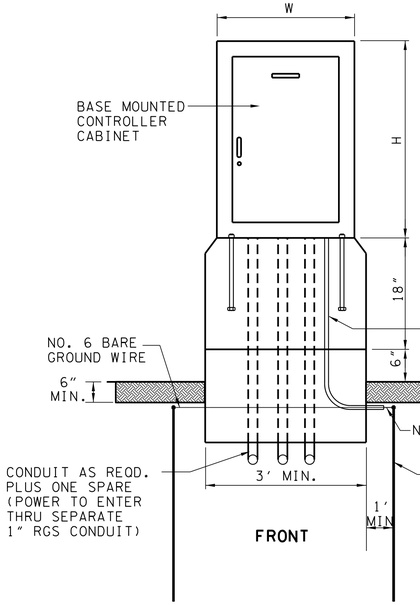
* LARGER SIZES MAY BE REQUIRED FOR LOCATIONS WITH ADDITIONAL EQUIPMENT.




TOP




SIDE

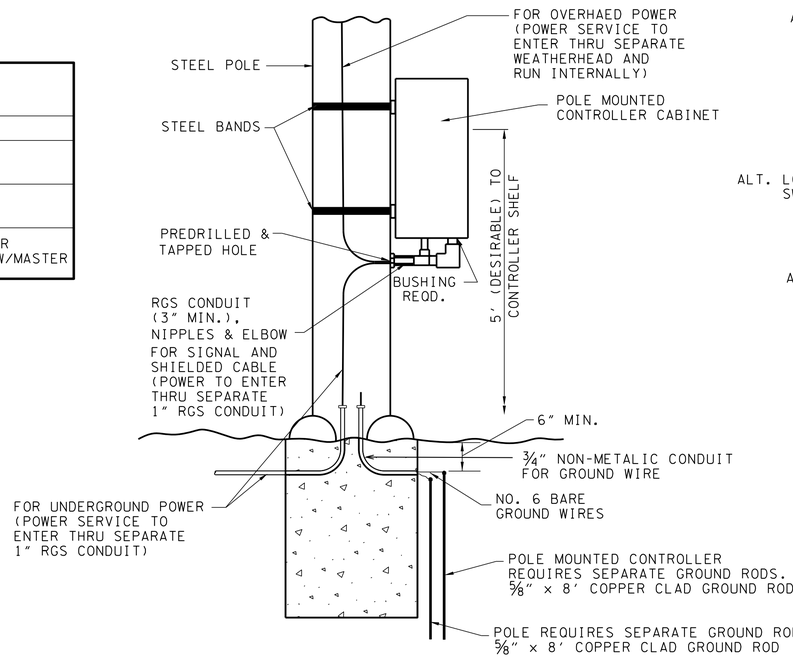



FRONT

## TYPICAL DETAIL OF BASE FOR CONTROLLER CABINET

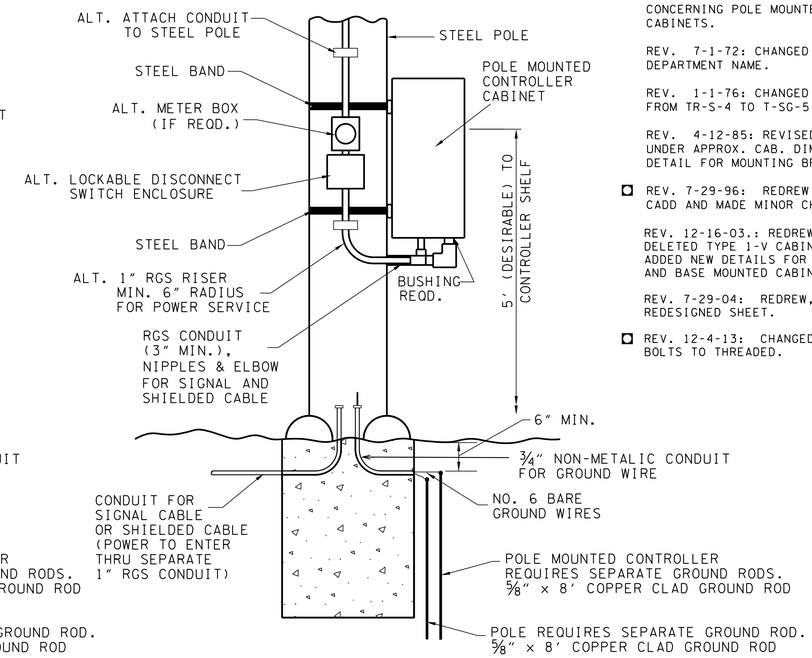
BASE MOUNTED CABINET NOTES:

1. THE BASE MOUNTED CABINET IS TO BE SITUATED IN THE OPTIMUM POSITION FOR VIEWING THE CONTROLLER OPERATION AND THE ON STREET SIGNAL DISPLAYS SIMULTANEOUSLY.
2. ALL CONDUIT TO UTILIZE LARGE SWEEP RADII (MINIMUM 6″ RADIUS).
3. FOUNDATIONS TO HAVE ONE SPARE 2″ CONDUIT. SPARE CONDUIT TO EXTEND 24″ BEYOND FOUNDATION AND BE CAPPED.
4. UP TO 4 GROUND RODS MAY BE REQUIRED. CONTRACTOR TO INSTALL NUMBER OF GROUND RODS REQUIRED TO ACHIEVE MINIMUM 25 OHMS RESISTANCE A MINIMUM OF 2 GROUND RODS ARE REQUIRED.




## TYPICAL DETAIL FOR STEEL STRAIN POLE MOUNTED CONTROLLER CABINET (OVERHEAD OR UNDERGROUND POWER SERVICE ENTRANCE)

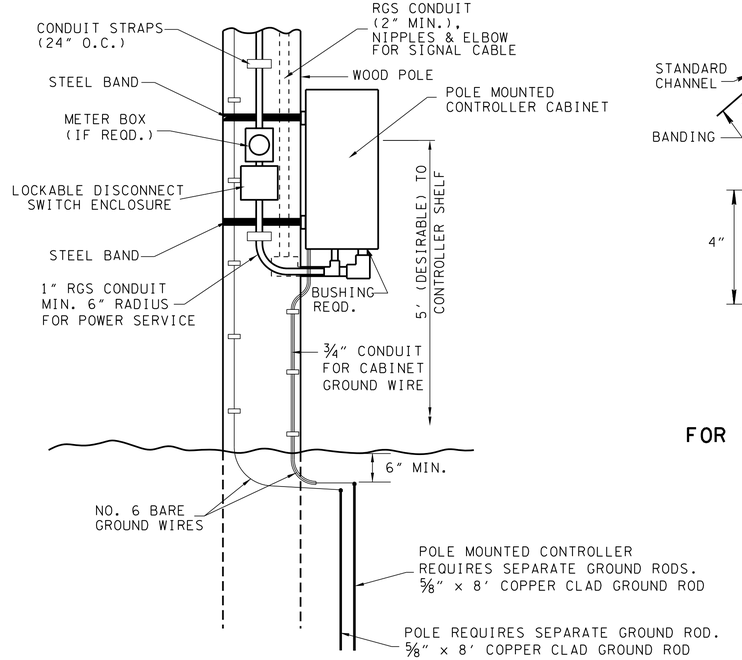
(SEE SHEET T-SG-10 FOR FOUNDATION DETAILS)



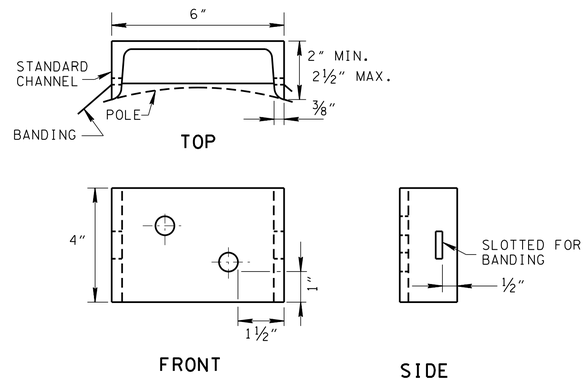

## ALTERNATE TYPICAL DETAIL FOR STEEL STRAIN POLE MOUNTED CONTROLLER CABNET (OVERHEAD POWER SERVICE ENTRANCE)*

(SEE SHEET T-SG-10 FOR FOUNDATION DETAILS)

* TYPICAL POWER SERVICE TO BE RUN INTERNALLY DOWN POLE FROM WEATHERHEAD AT TOP OF POLE.




## TYPICAL DETAIL FOR WOOD POLE MOUNTED CONTROLLER CABINET




TOP

FRONT

SIDE

## MOUNTING BRACKET FOR POLE MOUNTED CONTROLLER CABINET

(TWO PER CABINET)

REV. 6-7-72: ADDED NOTE CONCERNING POLE MOUNTED CABINETS.

REV. 7-1-72: CHANGED DEPARTMENT NAME.

REV. 1-1-76: CHANGED DWG. NO. FROM TR-S-4 TO T-SG-5.

REV. 4-12-85: REVISED NOTE UNDER APPROX. CAB. DIM. ADDED DETAIL FOR MOUNTING BRACKET.

☐ REV. 7-29-96: REDREW SHEET ON CADD AND MADE MINOR CHANGES.

REV. 12-16-03.: REDREW SHEET. DELETED TYPE 1-V CABINET AND ADDED NEW DETAILS FOR POLE AND BASE MOUNTED CABINETS.

REV. 7-29-04: REDREW, AND REDESIGNED SHEET.

☐ REV. 12-4-13: CHANGED ANCHOR BOLTS TO THREADED.

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

# CONTROLLER CABINET DETAILS

JAN 1970 | T-SG-5

REV. 9-18-89: ADDED NOTES FOR CLAMPS AND SHAFT LENGTHS. CHANGED MAX. SAG TO 5 PERCENT ADDED DETAILS FOR CONNECTORS AND CABLE CLAMPS.

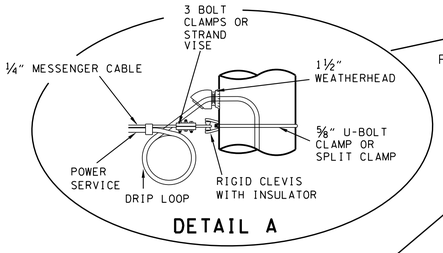
☐ REV. 7-29-96: REDREW SHEET ON CADD AND MADE MINOR CHANGES.

REV. 12-16-03: REDREW SHEET REMOVED PEDESTAL POLE DETAILS, REDREW TYPICAL SPAN WIRE LAYOUT, ADDED QUICK DISCONNECT DETAIL AND ADDED SIGNAL MOUNTING DETAIL. ADDED HAND HOLE DETAIL.

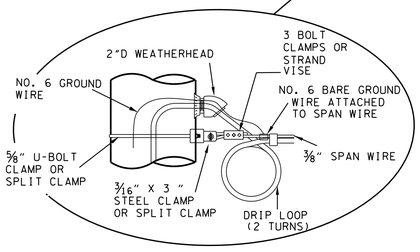
REV. 7-29-04: REDREW AND REDESIGNED SHEET.

REV. 11-1-11: REVISED R10-12 SIGN TO BE USED AS AN OPTIONAL SIGN. REVISED GENERAL NOTE G.

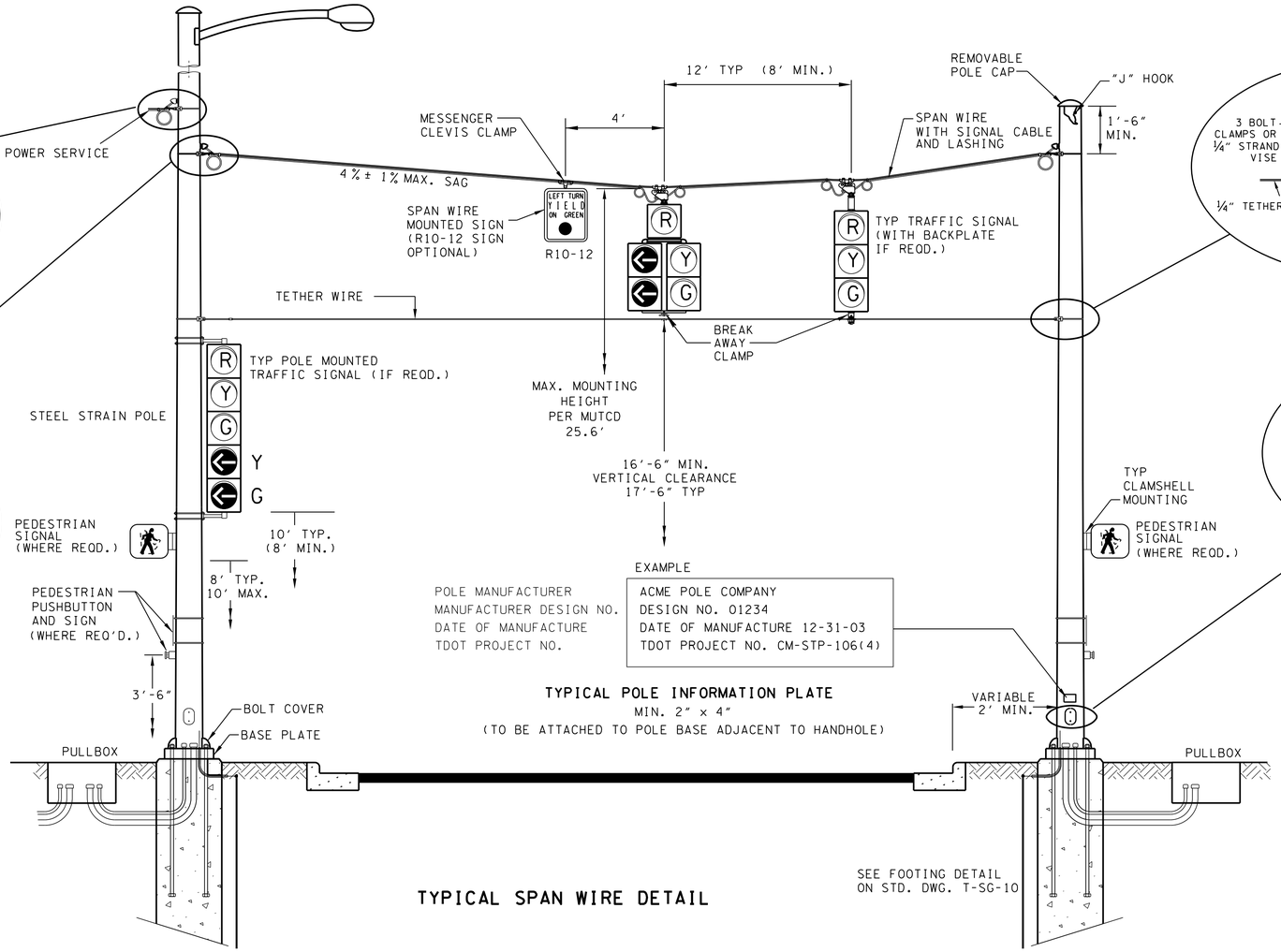
☐ REV. 12-4-13: CHANGED ANCHOR BOLTS TO THREADED.




DETAIL A




DETAIL B




TYPICAL SPAN WIRE DETAIL

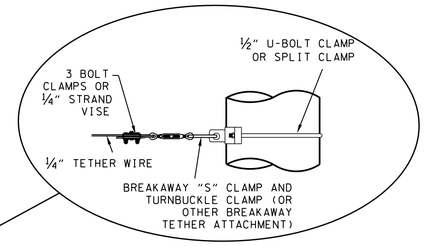
EXAMPLE

| | |
|---|---|
| POLE MANUFACTURER | ACME POLE COMPANY |
| MANUFACTURER DESIGN NO. | DESIGN NO. 01234 |
| DATE OF MANUFACTURE | DATE OF MANUFACTURE 12-31-03 |
| TDOT PROJECT NO. | TDOT PROJECT NO. CM-STP-106(4) |

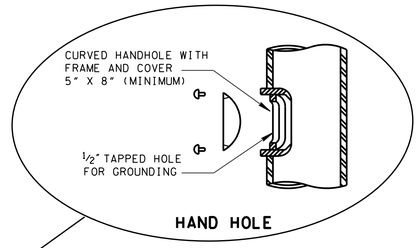
**TYPICAL POLE INFORMATION PLATE**

MIN. 2" x 4"

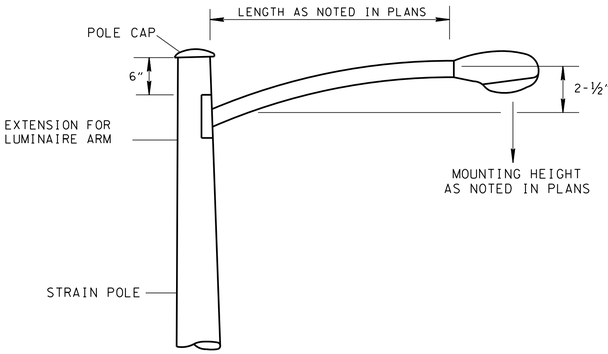
(TO BE ATTACHED TO POLE BASE ADJACENT TO HANDHOLE)

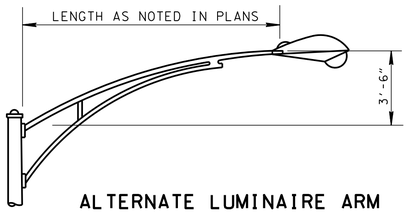



DETAIL C




DETAIL D




ALTERNATE LUMINAIRE ARM

DETAIL FOR LUMINAIRE EXTENSION AS REQUIRED BY PLANS

## STRAIN POLE GENERAL NOTES

Ⓐ LOCATIONS OF SIGNAL POLES SHOWN ON PLANS ARE APPROXIMATE AND CAN BE ADJUSTED UP TO 5' TO AVOID UTILITIES. ADJUSTMENTS GREATER THAN 5' MUST BE REVIEWED AND APPROVED BY ENGINEER.

Ⓑ ALL STRAIN POLES AT AN INTERSECTION SHALL BE SAME DIAMETER AND BOLT CIRCLE.

Ⓒ TYPICAL AERIAL POWER SERVICE ENTRANCE IS THRU WEATHER HEAD AND DOWN POLE INTERNALLY. IF CABINET IS POLE MOUNTED, AS AN ALTERNATE POWER SERVICE CABLE MAY BE RUN DOWN OUTSIDE OF STEEL STRAIN POLE IN 1" RGS RISER. UNDERGROUND POWER SERVICE SHALL BE RUN THROUGH SEPARATE 1" RGS CONDUIT THROUGH POLE FOUNDATION (SEE STD. DWG. T-SG-5).

Ⓓ POWER SERVICE CABLE SHALL BE RUN ON SEPARATE MESSENGER CABLE(2' ABOVE SPAN WIRE WITH SIGNAL OR DETECTOR CABLES).

Ⓔ ADDITIONAL WEATHER HEADS MAY BE INSTALLED FOR EASE OF CABLE ENTRANCE IF NECESSARY (TO BE FIELD DRILLED AND TAPPED).

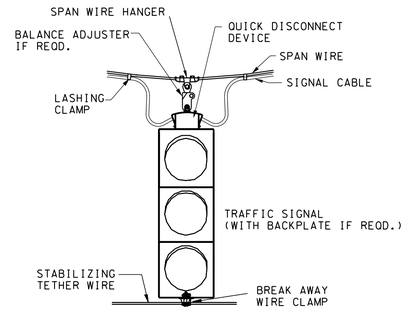
Ⓕ ENTRANCES FOR POLE MOUNTED SIGNAL HEADS SHALL BE FIELD DRILLED TO ENSURE PROPER PLACEMENT.

Ⓖ SIGNALS TO BE MOUNTED WITH 17' 6" TYPICAL VERTICAL CLEARANCE (16' 6" MIN.). MAXIMUM MOUNTING HEIGHT SHALL BE CHECKED PER MUTCD AND HEIGHT ADJUSTED IF NECESSARY. SEE SECTIONS 4D.12, 4D.13, 4D.15 AND 4D.16 OF THE CURRENT EDITION OF THE MUTCD FOR ADDITIONAL INFORMATION.

Ⓗ RED INDICATIONS TO BE APPROXIMATELY SAME HEIGHT. HANGER CONNECTOR EXTENDER OR TETHER EXTENDER MAY BE REQUIRED.

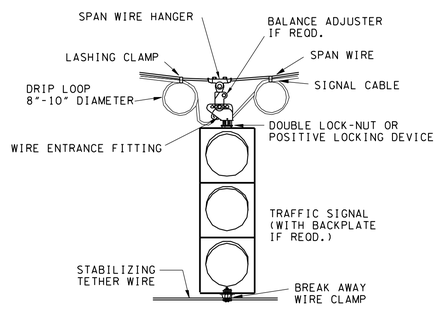
Ⓙ PEDESTRIAN SIGNAL HEADS TO BE CLAMSHELL MOUNTED UNLESS OTHERWISE SHOWN ON PLANS.

Ⓚ SEE STD. DWG. T-SG-4 FOR ADDITIONAL DETAILS.




ALTERNATE QUICK DISCONNECT MOUNTING HARDWARE DETAIL

(IF REQD.)




TYPICAL SIGNAL MOUNTING HARDWARE DETAIL

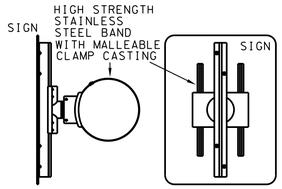
☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

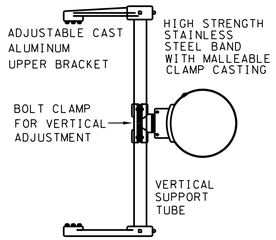
# STRAIN POLE DETAILS FOR SPAN MOUNTED SIGNALS

T-SG-8

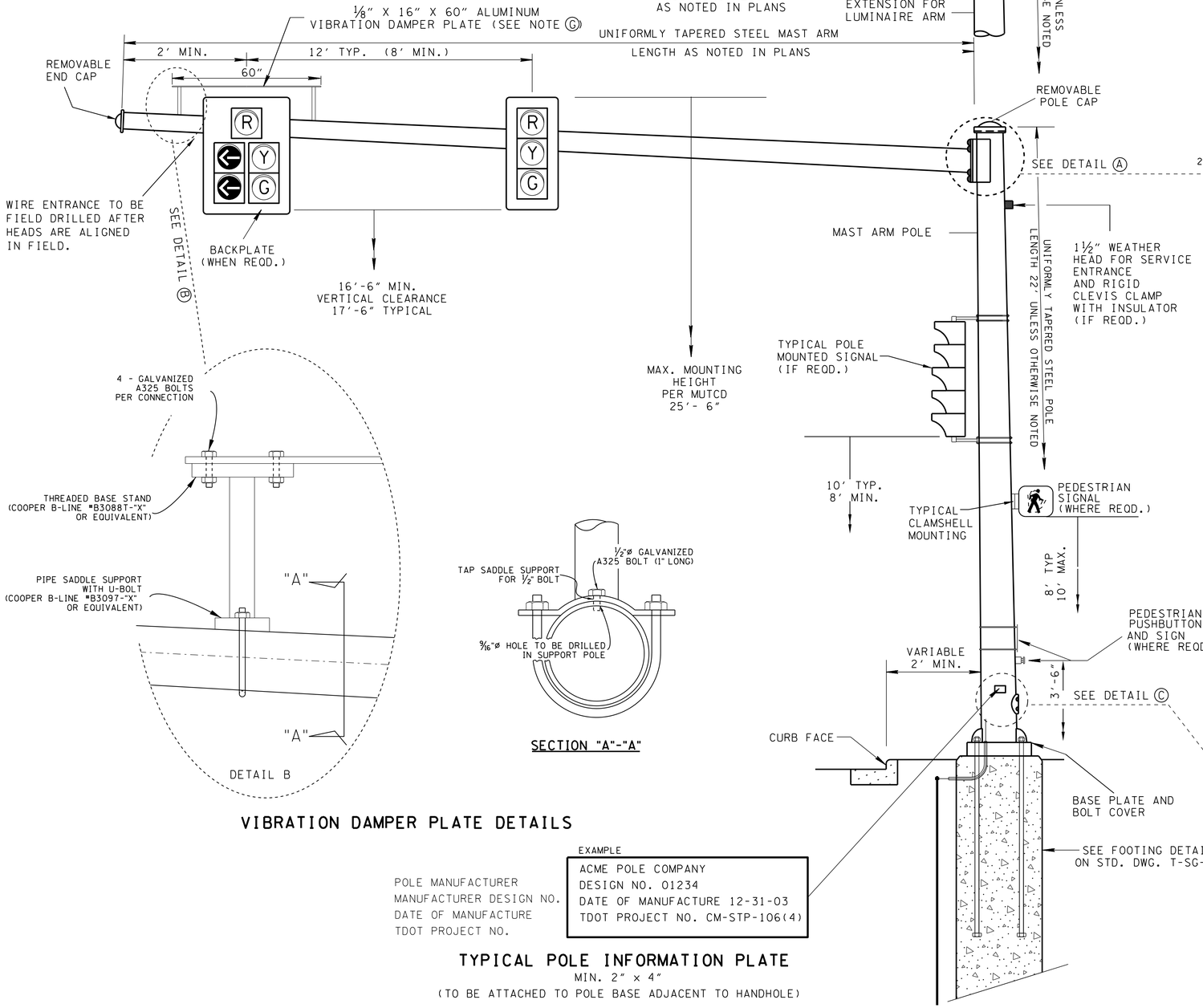
# DETAIL FOR LUMINAIRE EXTENSION AS REQUIRED BY PLANS




MAST ARM SIGN BRACKET (TYPICAL)




SIGNAL MOUNTING BRACKET (TYPICAL)










SECTION "A"-"A"

## VIBRATION DAMPER PLATE DETAILS

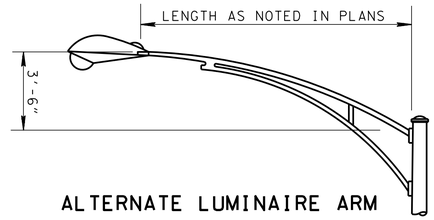
EXAMPLE

| | |
|---|---|
| POLE MANUFACTURER | ACME POLE COMPANY |
| MANUFACTURER DESIGN NO. | DESIGN NO. 01234 |
| DATE OF MANUFACTURE | DATE OF MANUFACTURE 12-31-03 |
| TDOT PROJECT NO. | TDOT PROJECT NO. CM-STP-106(4) |

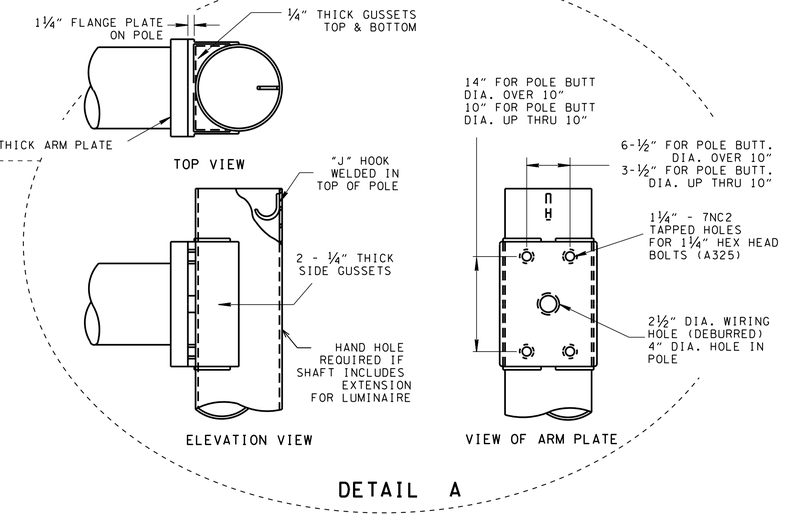
## TYPICAL POLE INFORMATION PLATE

MIN. 2" x 4"

(TO BE ATTACHED TO POLE BASE ADJACENT TO HANDHOLE)




ALTERNATE LUMINAIRE ARM




DETAIL A

## MAST ARM GENERAL NOTES

Ⓐ ADJUSTMENT OF MAST ARM POLE FOUNDATIONS MAY BE ADJUSTED UP TO 2'. ADJUSTMENTS GREATER THAN 2' MUST BE REVIEWED AND APPROVED BY ENGINEER.

Ⓑ IF CABINET IS POLE MOUNTED, POWER SERVICE CABLE MAY BE RUN DOWN OUTSIDE OF STEEL STRAIN POLE IN 1" RGS RISER AS ALTERNATE TO INTERNAL RUN. UNDERGROUND POWER SERVICE SHALL BE RUN THROUGH SEPARATE 1" RGS CONDUIT THROUGH POLE FOUNDATION (SEE STD. DWG. T-SG).

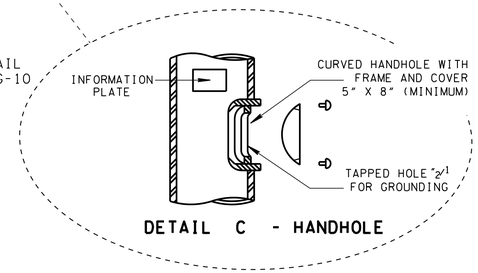
Ⓒ ENTRANCES FOR MAST ARM AND POLE MOUNTED SIGNAL HEADS SHALL BE FIELD DRILLED TO ENSURE PROPER PLACEMENT.

Ⓓ THE BOTTOM OF ALL SIGNAL HEADS ON EACH APPROACH TO BE APPROX. SAME HEIGHT.

Ⓔ SIGNALS TO BE MOUNTED WITH 17' 6" TYPICAL VERTICAL CLEARANCE (16' 6" MIN.). MAXIMUM MOUNTING HEIGHT SHALL BE CHECKED PER MUTCD AND HEIGHT ADJUSTED IF NECESSARY.

Ⓕ PEDESTRIAN SIGNAL HEADS TO BE CLAMSHELL MOUNTED UNLESS OTHERWISE SHOWN ON PLANS.

Ⓖ VIBRATION DAMPER PLATE SHOULD BE INSTALLED ON ALL MAST ARMS 50' OR LONGER AND ALWAYS BE INSTALLED AT OUTSIDE TIP.




DETAIL C - HANDHOLE

- REV. 7-29-92: DELETED CLAMP AND CLEVIS MOUNT FOR SIGNAL HEADS.
- REV. 7-29-96: REDREW SHEET ON CADD AND MADE MINOR CHANGES.

  REV. 12-16-03.: REDREW SHEET. REV. SIGNAL MOUNTING BRACKET, ADDED SIGN MOUNTING BRACKET DETAIL AND REDREW POLE DETAIL. ADDED MAX. MOUNTING HEIGHT FOR SIGNAL HEADS AND ADDED HAND HOLE DETAIL.

  REV. 7-29-04: REDREW AND REDESIGNED SHEET.

  REV. 11-16-07.: ADDED VIBRATION DAMPER PLATE DETAILS.
- REV. 12-4-13: CHANGED ANCHOR BOLTS TO THREADED.

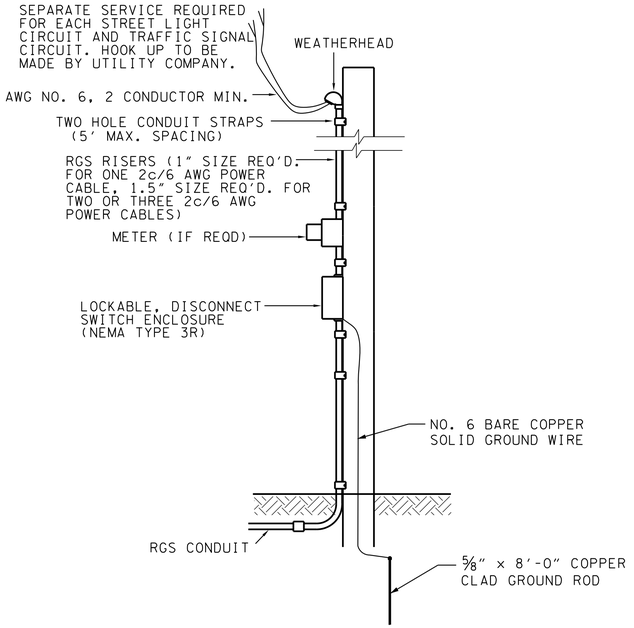
☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

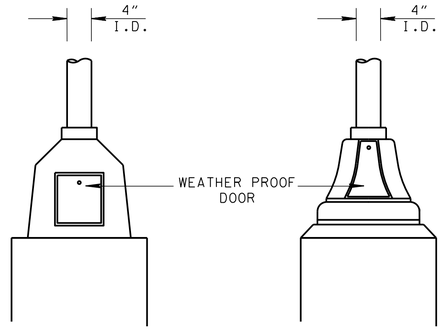
DETAILS OF CANTILEVER SIGNAL SUPPORT

T-SG-9

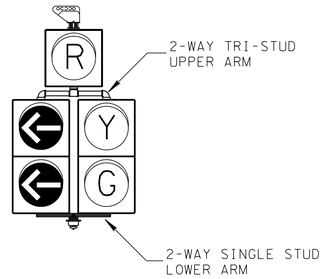
☐ REV. 12-4-13: CHANGED ANCHOR BOLTS TO THREADED.



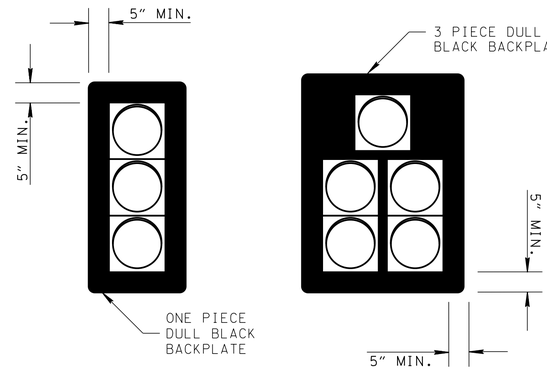

POWER SERVICE DETAIL



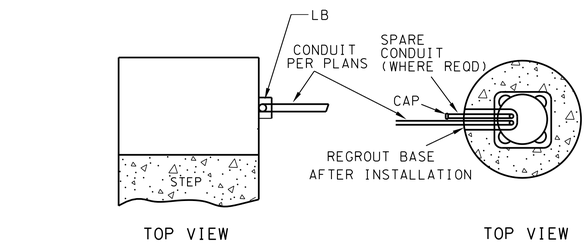

CAST PEDESTAL BASE ALTERNATES



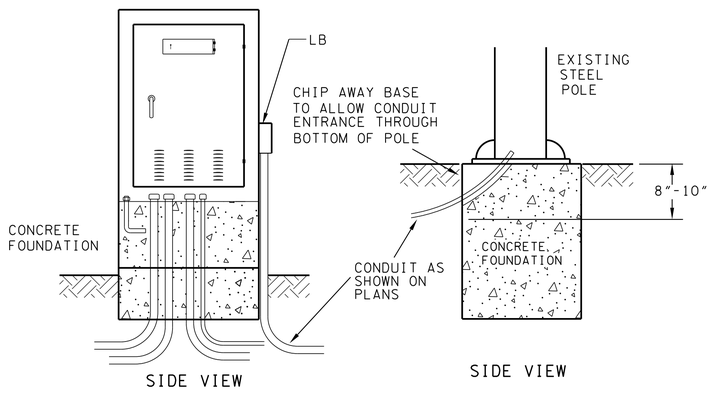

5-SECTION SIGNAL HEAD



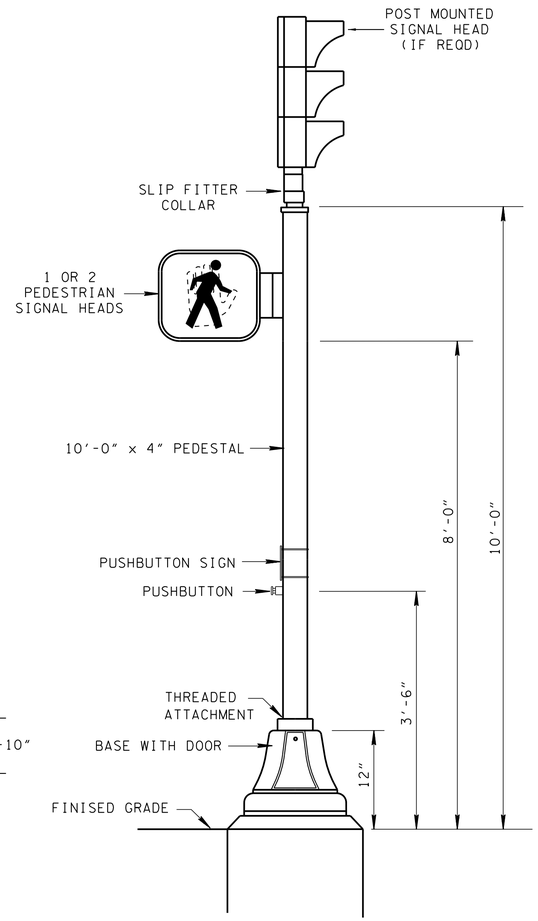

TRAFFIC SIGNAL BACKPLATE DETAIL




TOP VIEW TOP VIEW

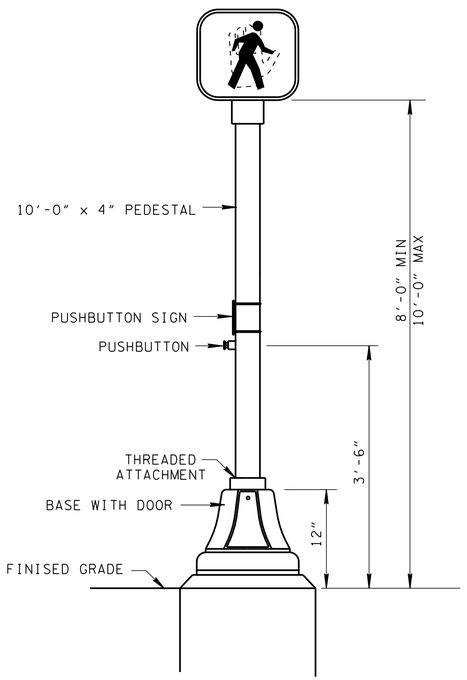



CONDUIT ENTRANCE DETAIL
(EXISTING CABINET OR POLE)




PEDESTAL MOUNTING

SEE STD.DWG. NO. T-SG-10 FOR FOUNDATION DETAILS & NOTES




PEDESTAL MOUNTING




PEDESTRIAN PUSHBUTTON POST



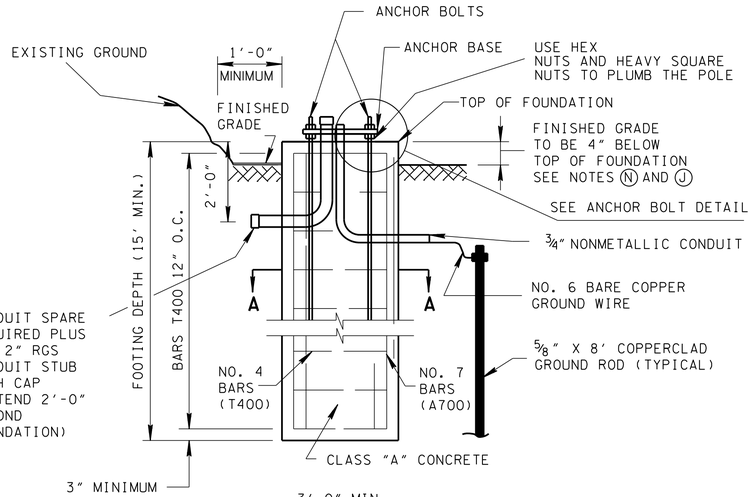

FOUNDATION DETAIL
PEDESTRIAN PUSHBUTTON POST

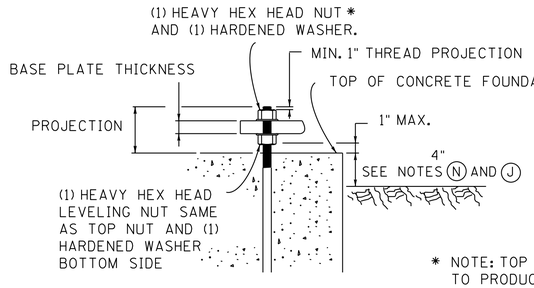
☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

MISCELLANEOUS SIGNAL DETAILS

7-29-04 T-SG-9A

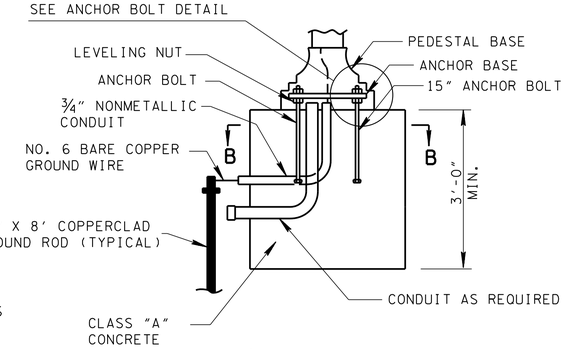


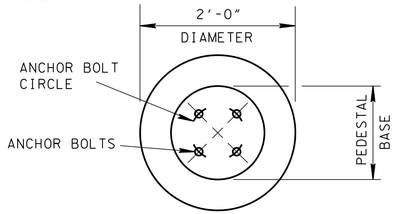




## ANCHOR BOLT DETAIL

UNDER NO CONDITIONS WILL DRILLED AND GROUTED ANCHOR BOLTS BE ALLOWED)
(CANTILEVER AND BUTTERFLY SIGN BASES SHALL REQUIRE A MINIMUM OF 8 ANCHOR BOLTS 1 1/2" IN DIAMETER)

* NOTE: TOP NUT TO BE TORQUED TO PRODUCE 60% YIELD STRESS OF ANCHOR BOLT.
NOTE: DO NOT GROUT BETWEEN BOTTOM OF BASE PLATE AND TOP OF CONCRETE FOUNDATION.

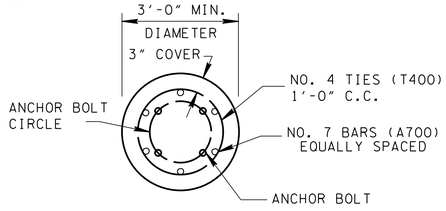



SECTION B-B

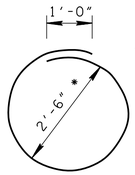
## FOOTING DETAIL FOR STEEL PEDESTAL POLE

| REQUIRED BEARING AREA FOR ANCHOR BOLT | |
|---|---|
| ANCHOR BOLT DIA(IN) | HEAD OR NUT AREA (SQ IN) |
| 1" | 1.800 |
| 1 1/4" | 2.812 |
| 1 1/2" | 4.050 |
| 1 3/4" | 5.512 |
| 2" | 7.199 |
| 2 1/4" | 9.122 |
| 2 1/2" | 11.249 |



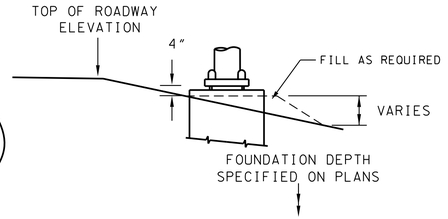

SECTION A-A

## FOUNDATION DETAIL FOR STRAIN OR MAST ARM POLE




T400 BARS SHALL LAP 1'-0"

* FOR 3'-0" DIAMETER FOOTING. USE 3'-6" FOR 4'-0" DIAMETER FOOTING.




## LOW SHOULDER FOUNDATION DETAIL

## ESTIMATED FOUNDATION QUANTITIES

| FOOTING DIAMETER | FOOTING DEPTH | T400 REINFORCING BARS | | | A700 REINFORCING BARS | | | CONCRETE (CUBIC YARDS) | MAXIMUM DESIGN MOMENT (FT-KIP) SERVICE LOAD |
|---|---|---|---|---|---|---|---|---|---|
| | | NUMBER OF BARS | LENGTH OF EACH BAR | TOTAL WEIGHT IN POUNDS | NUMBER OF BARS | LENGTH OF EACH BAR | TOTAL WEIGHT IN POUNDS | | |
| 3'-0" | 15'-0" | 15 | 8'-10" | 89 | 8 | 14'-6" | 237 | 3.9 | 134 |
| 3'-0" | 16'-0" | 16 | 8'-10" | 95 | 8 | 15'-6" | 253 | 4.2 | 150 |
| 3'-0" | 17'-0" | 17 | 8'-10" | 101 | 10 | 16'-6" | 337 | 4.5 | 167 |
| 3'-0" | 18'-0" | 18 | 8'-10" | 107 | 10 | 17'-6" | 358 | 4.7 | 184 |
| 3'-0" | 19'-0" | 19 | 8'-10" | 113 | 10 | 18'-6" | 378 | 5.0 | 202 |
| 3'-0" | 20'-0" | 20 | 8'-10" | 119 | 12 | 19'-6" | 478 | 5.2 | 221 |
| 3'-0" | 21'-0" | 21 | 8'-10" | 125 | 12 | 20'-6" | 503 | 5.5 | 240 |
| 3'-0" | 22'-0" | 22 | 8'-10" | 130 | 12 | 21'-6" | 527 | 5.8 | 260 |
| 3'-0" | 23'-0" | 23 | 8'-10" | 136 | 12 | 22'-6" | 552 | 6.0 | 280 |
| 3'-0" | 24'-0" | 24 | 8'-10" | 142 | 14 | 23'-6" | 672 | 6.3 | 300 |
| | | | | | | | | | |
| 4'-0" | 15'-0" | 15 | 12'-0" | 121 | 10 | 14'-6" | 296 | 7.0 | 179 |
| 4'-0" | 16'-0" | 16 | 12'-0" | 128 | 10 | 15'-6" | 317 | 7.4 | 200 |
| 4'-0" | 17'-0" | 17 | 12'-0" | 136 | 12 | 16'-6" | 405 | 7.9 | 223 |
| 4'-0" | 18'-0" | 18 | 12'-0" | 145 | 12 | 17'-6" | 429 | 8.4 | 246 |
| 4'-0" | 19'-0" | 19 | 12'-0" | 153 | 12 | 18'-6" | 454 | 8.8 | 270 |
| 4'-0" | 20'-0" | 20 | 12'-0" | 161 | 14 | 19'-6" | 558 | 9.3 | 295 |
| 4'-0" | 21'-0" | 21 | 12'-0" | 169 | 14 | 20'-6" | 587 | 9.8 | 320 |
| 4'-0" | 22'-0" | 22 | 12'-0" | 177 | 14 | 21'-6" | 615 | 10.2 | 346 |
| 4'-0" | 23'-0" | 23 | 12'-0" | 185 | 16 | 22'-6" | 736 | 10.7 | 373 |
| 4'-0" | 24'-0" | 24 | 12'-0" | 193 | 16 | 23'-6" | 769 | 11.2 | 401 |
| 4'-0" | 25'-0" | 25 | 12'-0" | 201 | 16 | 24'-6" | 801 | 11.7 | 429 |
| 4'-0" | 26'-0" | 26 | 12'-0" | 209 | 18 | 25'-6" | 938 | 12.1 | 458 |
| 4'-0" | 27'-0" | 27 | 12'-0" | 217 | 18 | 26'-6" | 975 | 12.6 | 487 |
| 4'-0" | 28'-0" | 28 | 12'-0" | 224 | 18 | 27'-6" | 1012 | 13.0 | 517 |
| 4'-0" | 29'-0" | 29 | 12'-0" | 233 | 20 | 28'-6" | 1165 | 13.5 | 547 |
| 4'-0" | 30'-0" | 30 | 12'-0" | 241 | 20 | 29'-6" | 1206 | 14.0 | 578 |
| 4'-0" | 31'-0" | 31 | 12'-0" | 248 | 20 | 30'-6" | 1247 | 14.4 | 609 |
| 4'-0" | 32'-0" | 32 | 12'-0" | 257 | 22 | 31'-6" | 1416 | 14.9 | 641 |

## GENERAL NOTES

(A) ALL STEEL STRAIN POLES SHALL CONFORM TO "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" OF THE TENNESSEE DEPARTMENT OF TRANSPORTATION, SECTION 730 - TRAFFIC SIGNALS.

(B) STRAIN POLES SHALL BE DESIGNED ACCORDING TO AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS (CURRENT EDITION).

(C) THE CONTRACTOR SHALL FURNISH POLES DESIGNED FOR A WIND VELOCITY ACCORDING TO THE CURRENT STANDARDS AS SPECIFIED IN AASHTO "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS".

(D) ANCHOR BOLTS SHALL BE DESIGNED BY THE POLE FABRICATOR. THEY SHALL BE CAPABLE OF RESISTING THE FULL BENDING MOMENT OF THE SHAFT AT ITS YIELD STRENGTH STRESS.

MATERIAL SPECIFICATI NS - BOLTS:

1.) ANCHOR BOLTS SHALL BE ASTM F1554 GRADE 55 ksi WITH THREADS CONFORMING TO THE REQUIREMENTS OF ASTM A563.

2.) NUTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A563.

3.) ALL HARDWARE, EXCEPT STAINLESS STEEL, SHALL BE HOT DIPPED GALVANIZED ACCORDING TO ASTM A153 OR MECHANICALLY GALVANIZED ACCORDING TO ASTM B695.

(E) THE COST OF ALL FOOTING MATERIALS AND INSTALLATION SHALL BE INCLUDED IN THE PRICE BID FOR STEEL POLES

(F) THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND NOTES TO THE ENGINEER OF STRUCTURES FOR APPROVAL PRIOR TO FABRICATION.

(G) THE MOMENT CAPACITY OF THE STRAIN POLES AND THE FOOTING DEPTHS FOR BOTH STRAIN POLE AND MAST ARM POLE SHALL BE AS SPECIFIED IN THE PLANS.

(H) CANTILEVER SIGNAL SUPPORTS SHALL BE DESIGNED BY THE POLE FABRICATOR.

(I) TOP OF FOOTING SHALL BE FLUSH IN SIDEWALK OR PAVED ISLANDS. TOP OF FOOTING SHALL NOT EXTEND MORE THAN 4" ABOVE THE GROUND LINE IN OTHER AREAS.

(J) IF ROCK IS ENCOUNTERED WHILE DRILLING FOR FOOTING, AND CORE AND THE DRILLING INDICATES ROCK IS SOLID, THE CONTRACTOR SHALL PROCEED BY ONE OF TWO METHODS. METHOD1: PROVIDE A ROCK SOCKET TWO TIMES THE DIAMETER OF THE POLE FOUNDATION. METHOD 2: DRILL SIX 1 1/8" DIAMETER HOLES IN TO ROCK A MIMIMUM DISTANCE OF THREE FEET. FILL HOLES WITH A-B EPOXY MIX AND ROTATE THE A700 BARS UNTIL FULLDEPTH IS ACHIEVED. THE A-B EPOXY MIX SHALL BE APPROVED BY TENNESSE DEPARTMENT OF TRANSPORTATION, MATERIALS AND TEST DIVISION. GROUND ROD MAY BE PLACED HORIZONTALLY, AS DEEP AS ROCK ALLOWS, WITH A 3" MINIMUM SEPARATION FROM ANY CONDUIT. THE CONTRACTOR SHALL CONTACT THE DIVISION OF STRUCTURES TO DETERMINE WHICH METHOD IS APPLICABLE OR WHETHER A SPECIAL SPREAD FOOTING DESIGN MUST BE FURNISHED BT THE DIVISION OF STRUCTURES.

(K) ALL STRAIN POLES AND MAST ARM POLES TO HAVE SPARE 2" RGS CONDUIT STUB EXTENDING 24" BEYOND POLE FOUNDATION.

(L) ALL CONDUIT BENDS IN POLE FOUNDATION TO BE 6" RADIUS.

(M) BASE OF POLE SHALL REMAIN OPEN TO PERMIT DRAINAGE AND AIR CIRCULATION. FINISHED GROUND PROFILE SHOULD DRAIN WATER AWAY FROM FOUNDATION.

- REV. 9-18-89: ADDED NOTE (J) AND GRADE DETAILS TO FOOTING DETAIL.
- REV. 1-18-91: REDREW AND REORGANIZED SHEET. ADDED GENERAL NOTE (K) REGARDING FOOTINGS IN ROCK.
- REV. 1-19-96: CHANGED GENERAL NOTE (A).
- REV. 2-14-99: REVISED GENERAL NOTE (K).

REV. 12-16-03: REVISED SHEET TITLE. DELETED ESTIMATED QUANTITY FOR FOUNDATIONS LESS THAN 10', ADDED SPARE CONDUIT TO STRAIN OR MAST ARM FOUNDATION DETAIL, ADDED LOW SHOULDER FOUNDATION DETAIL, DELETED NOTE G, RE LETTERED REMAINING NOTES AND ADDED NOTES (L) TO (N).

REV. 7-29-04: MODIFIED ESTIMATED FOOTING QUANTITIES FOR STRAIN POLE TABLE. ADDED LOWER SHOULDER FOUNDATION DETAIL.

- REV. 02-15-07: ADDED ANCHOR BOLT DETAIL. REVISED GENERAL NOTES (D),(G) & (N) AND CHANGED TITLE
- REV. 1-5-10: MODIFIED ESTIMATED FOUNDATION QUANTITIES TABLE.

REV. 5-6-13: MODIFIED ESTIMATED FOUNDATION QUANTITIES, T400 BARS, GENERAL NOTES AND FOUNDATION DETAILS.

- REV. 12-4-13: CHANGED ANCHOR BOLTS TO THREADED. ADDED BEARING AREA TABLE.

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

MAST ARM POLE AND STRAIN POLES FOUNDATION DETAILS

T-SG-10

- REV. 9-1-05: REMOVED TYPE "C" WARNING LIGHTS FROM FLEXIBLE DRUMS IN TAPER.
- REV. 3-3-06: REPLACED VERTICAL PANEL WITH BARRIER RAIL DELINEATORS. ADDED GENERAL NOTES (F).
- REV. 10-29-13: CHANGED PAY ITEM FOR BARRIER RAIL DELINEATORS.

REV. 9-17-82: CLARIFIED WORK ZONE. ADDED DETAIL "A". REMOVED SIGNS AT RIGHT END.

REV. 10-7-82: ADDED 1" CONDUIT & 7/16 " DIAMETER GUY.

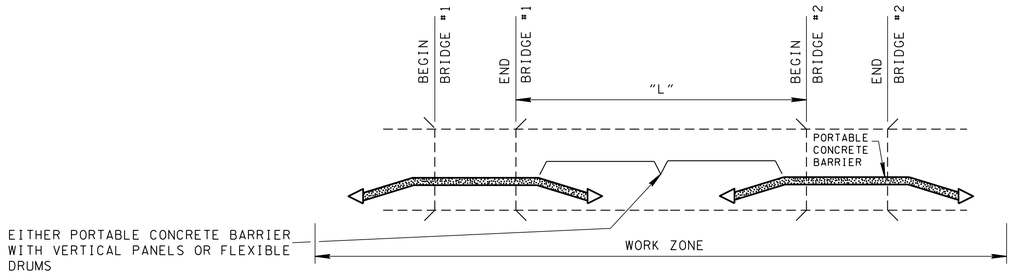
REV. 3-22-85: GENERAL REVISIONS.

REV. 10-24-86: GENERAL REVISIONS.

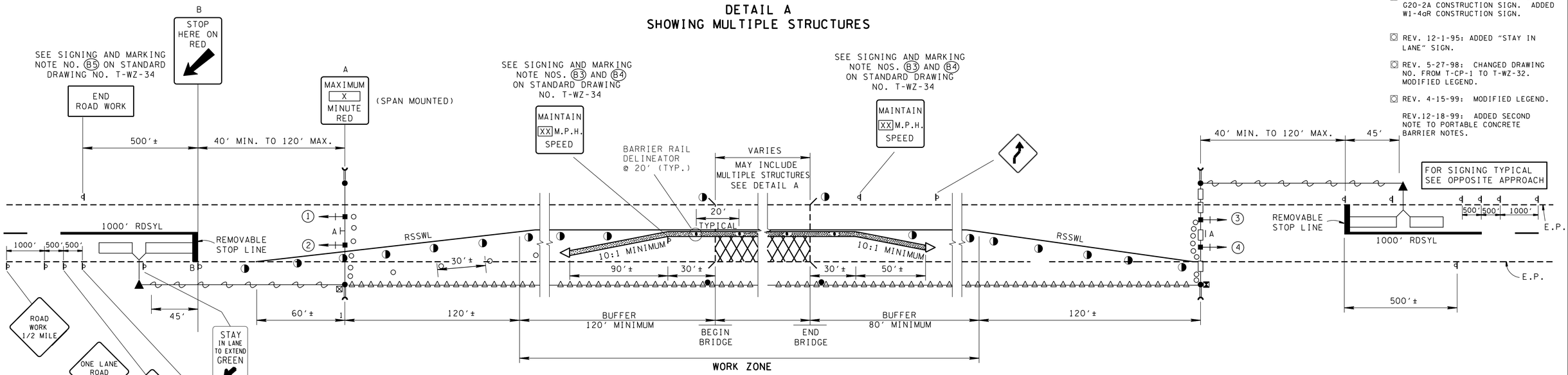
REV. 5-27-91: REDREW SHEET AND REORGANIZED SHEET.

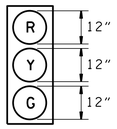
- REV. 1-19-92: GENERAL REVISION.
- REV. 4-1-92: CHANGED SECOND NOTE ON DETAIL A DELETING USE OF TYPE C WARNING LIGHTS.
- REV. 5-16-94: CHANGED CONSTRUCTION SIGNS TO CONFORM TO REVISED PART VI, M.U.T.C.D., DATED 9-3-93.
- REV. 9-5-94: CHANGED G20-2 TO G20-2A CONSTRUCTION SIGN. ADDED W1-4aR CONSTRUCTION SIGN.
- REV. 12-1-95: ADDED "STAY IN LANE" SIGN.
- REV. 5-27-98: CHANGED DRAWING NO. FROM T-CP-1 TO T-WZ-32. MODIFIED LEGEND.
- REV. 4-15-99: MODIFIED LEGEND.

REV.12-18-99: ADDED SECOND NOTE TO PORTABLE CONCRETE BARRIER NOTES.



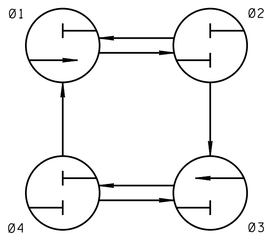

## DETAIL A
## SHOWING MULTIPLE STRUCTURES




### SIGNAL HEAD DETAIL

ALL SIGNAL HEADS SHALL HAVE BACKPLATES AND TETHER WIRES.




### PHASING DIAGRAM DETAIL

PLACEMENT OF SIGNAL HEADS SHALL BE IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (CURRENT EDITION).

### SIGNAL SEQUENCE CHART

| PHASE | INTERVAL | | SIGNAL HEAD NO. & DISPLAY 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|
| | | | R Y G | R Y G | R Y G | R Y G |
| | | | SIGNAL HEAD NO. & SEQUENCE 1 | 2 | 3 | 4 |
| 1 | R/W | | G | G | R | R |
| | CLEAR TO | 2 | Y | Y | R | R |
| | | 3 | DIRECT CLEARANCE PROHIBITED | | | |
| | | 4 | DIRECT CLEARANCE PROHIBITED | | | |
| 2 | R/W | | R | R | R | R |
| | CLEAR TO | 3 | R | R | R | R |
| | | 4 | DIRECT CLEARANCE PROHIBITED | | | |
| | | 1 | R | R | R | R |
| 3 | R/W | | R | R | G | G |
| | CLEAR TO | 4 | R | R | Y | Y |
| | | 1 | DIRECT CLEARANCE PROHIBITED | | | |
| | | 2 | DIRECT CLEARANCE PROHIBITED | | | |
| 4 | R/W | | R | R | R | R |
| | CLEAR TO | 1 | R | R | R | R |
| | | 2 | DIRECT CLEARANCE PROHIBITED | | | |
| | | 3 | R | R | R | R |
| **FLASH | | | R | R | R | R |

** SEE SIGNAL OPERATION NOTES ON STANDARD DRAWING NO. T-WZ-34 FOR TIMES WHEN YELLOW FLASH IS USED.

### GENERAL NOTES

(A) IF DISTANCE "L" IS 250' OR LESS, PORTABLE CONCRETE BARRIER SHALL BE CONTINUOUS.

(B) FOR DISTANCES GREATER THAN 250' THE CONTRACTOR MAY USE CONTINUOUS PORTABLE CONCRETE BARRIER IN LIEU OF THE INTERIOR ATTENUATORS SHOWN IN THIS DETAIL.

(C) IF "L" IS GREATER THAN 250', FLEXIBLE DRUMS OR VERTICAL PANELS SHALL BE USED TO MAINTAIN ONE LANE OF TRAFFIC.

(D) SEE TABLE VI-1 OF PART VI OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) FOR BUFFER LENGTHS.

(E) 7 OR 12 CONDUCTOR SIGNAL CABLE FROM DETECTOR CABINET TO CONTROLLER MAY BE RUN OVERHEAD (USING WOOD POLES AND MESSENGER WIRE), UNDERGROUND (DIRECT BURIED) OR ANY METHOD APPROVED BY THE ENGINEER.

(F) BARRIER RAIL DELINEATORS (ITEM NO.712-04.50) SHALL BE USED ON PORTABLE BARRIER RAIL. REFER TO THE QUALIFIED PRODUCT LIST FOR APPROVED BARRIER RAIL DELINEATORS. DIFFERENT TYPES OF BARRIER RAIL DELINEATORS SHOULD NOT BE MIXED IN THE SAME LINE.

### LEGEND

- FOUR OR EIGHT PHASE POLE MOUNTED CONTROLLER
- 6' X 45' LOOP WITH LEAD-IN
- 12 INCH SIGNAL HEAD WITH BACKPLATE ON SPANWIRE
- GUYING DEVICE VERTICAL ANCHOR (7/16" DIAMETER)
- SHIELDED DETECTOR CABLE ON SPAN WIRE
- WOOD POLE
- 7 CONDUCTOR (FOUR PHASE) OR 12 CONDUCTOR (EIGHT PHASE) FOR LOOPS & SIGNALS
- 5 CONDUCTOR SIGNAL CABLE
- FLEXIBLE DRUMS
- BARRIER RAIL DELINEATOR (ITEM NO. 712-04.50, PER EACH)
- PORTABLE CONCRETE BARRIER
- RSSWL REMOVABLE PAVEMENT MARKING (SINGLE SOLID WHITE LINE)
- RDSYL REMOVABLE PAVEMENT MARKING (DOUBLE SOLID YELLOW LINE)
- E.P. EDGE OF PAVEMENT
- DETECTOR AMPLIFIER CABINET
- WATERPROOF SPLICE
- SHIELDED DETECTOR CABLE (DIRECT BURIED)
- L DISTANCE
- ATTENUATOR (SEE STANDARD DRAWINGS)

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

CROSS REFERENCE DRAWINGS FOR THIS SHEET: T-WZ-33, T-WZ-34 AND T-WZ-35.

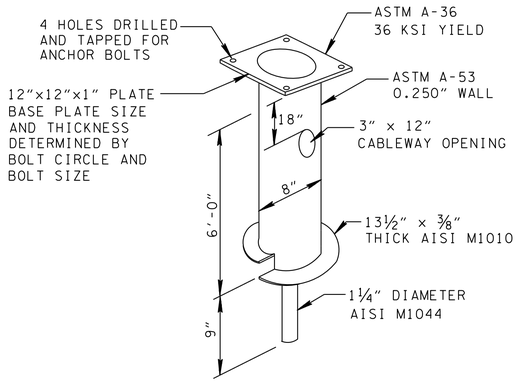
SHEET NOT TO SCALE

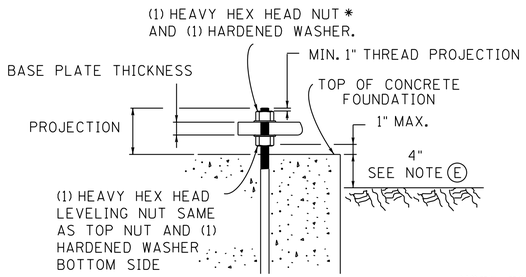
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL PLAN
SIGNAL LAYOUT FOR
TRAFFIC SIGNAL AT TWO
LANE BRIDGE
RECONSTRUCTION SITE

5-27-98 | T-WZ-32

# 30'-50' STANDARD LIGHTING ALTERNATE METAL FOUNDATION DETAIL



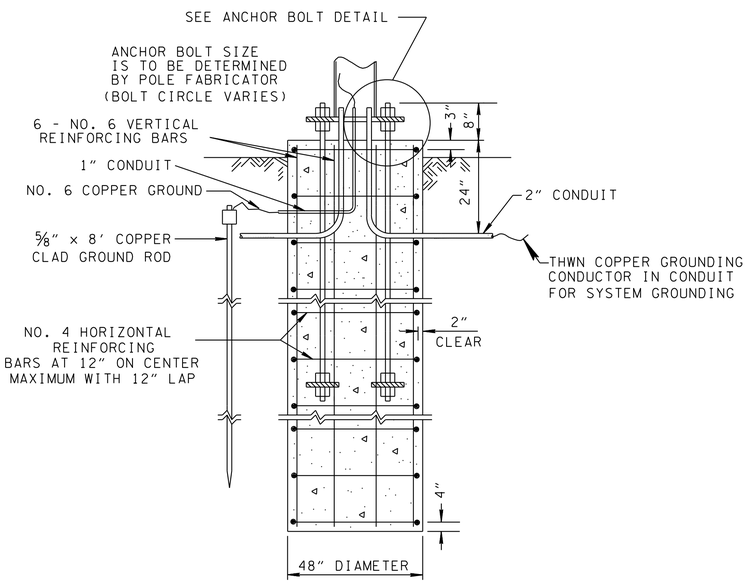

| REQUIRED BEARING AREA FOR ANCHOR BOLT | |
|---|---|
| ANCHOR BOLT DIA(IN) | HEAD OR NUT AREA (SQ IN) |
| 1" | 1.800 |
| 1¼" | 2.812 |
| 1½" | 4.050 |
| 1¾" | 5.512 |
| 2" | 7.199 |
| 2¼" | 9.122 |
| 2½" | 11.249 |

* NOTE: TOP NUT TO BE TORQUED TO PRODUCE 60% YIELD STRESS OF ANCHOR BOLT.

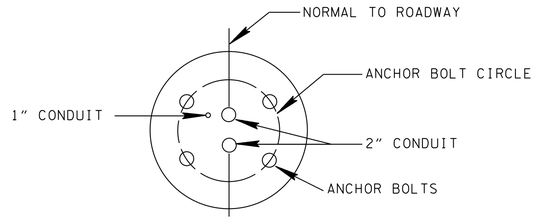
NOTE: DO NOT GROUT BETWEEN BOTTOM OF BASE PLATE AND TOP OF CONCRETE FOUNDATION.

## ANCHOR BOLT DETAIL

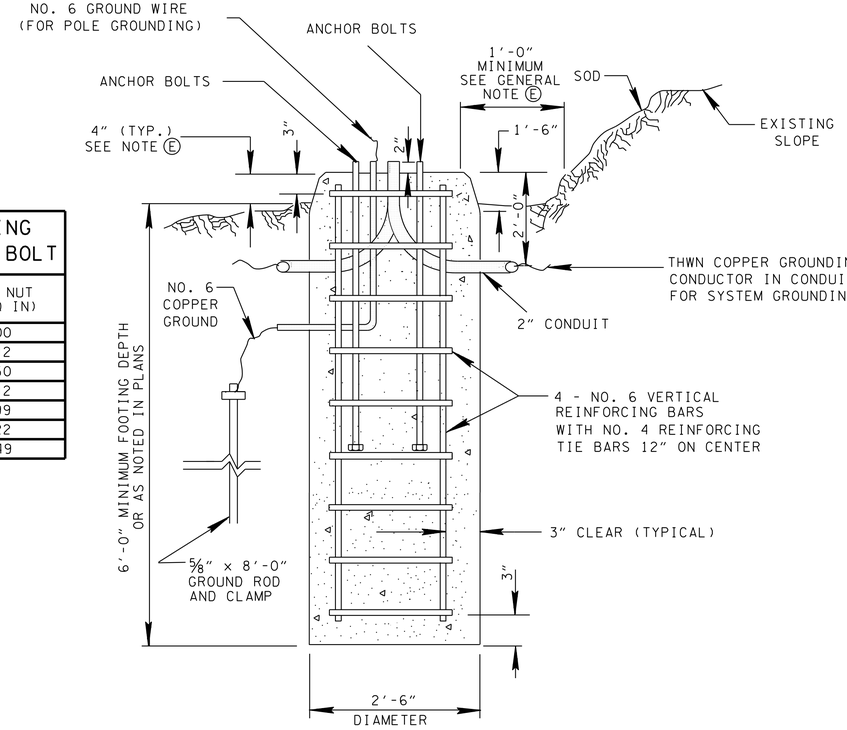
UNDER NO CONDITIONS WILL DRILLED AND GROUTED ANCHOR BOLTS BE ALLOWED)



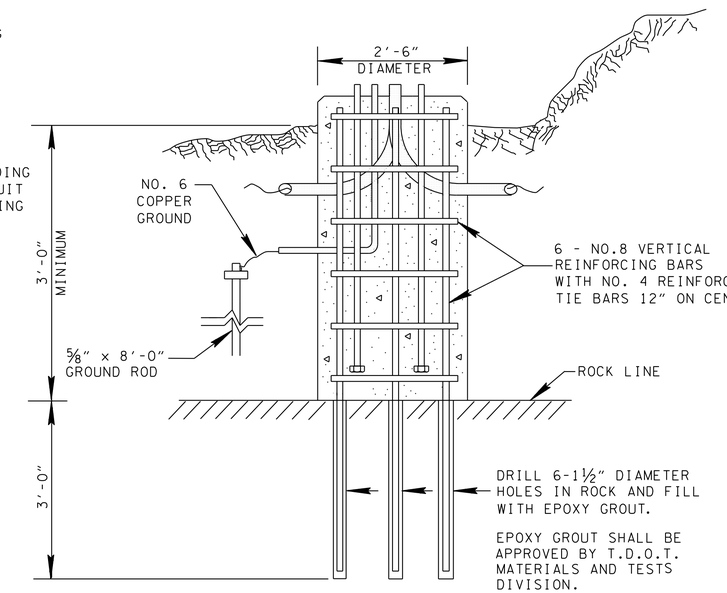

## HIGH MAST FOUNDATION DETAIL




## PLAN




## 30'-50' STANDARD LIGHT FOUNDATION DETAIL




## 30'-50' STANDARD LIGHT FOUNDATION DETAIL IN ROCK

| MINIMUM HIGH MAST FOOTING DEPTHS FOR ESTIMATING PORPOSES | |
|---|---|
| TOWER HEIGHT | MINIMUM FOOTING DEPTH |
| 100' | 14'- 0" |
| 101'- 120' | 18'- 0" |
| 121'- 140' | 22'- 0" |
| 141'- 150' | 26'- 0" |

## GENERAL NOTES

(A) ANCHOR BOLT CIRCLE DIAMETER SHALL COMPLY WITH POLE MANUFACTURER'S ANCHOR BOLT PATTERN FOR THE SPECIFIC POLE AND BREAKAWAY BASE.

(B) THE TOP 1'-0" OF THE FOUNDATION MAY BE FORMED SQUARE.

(C) WHEN NECESSARY DUE TO ROCK, THE GROUND ROD MAY BE PLACED HORIZONTALLY IN THE CONDUIT TRENCH, A 3 INCH MINIMUM SEPARATION FROM CONDUIT SHALL BE MAINTAINED.

(D) FOUNDATION SHALL BE PLACED AGAINST UNDISTURBED SOIL. IF ROCK OR WATER IS ENCOUNTERED DURING EXCAVATION FOR FOUNDATION, THE CONTRACTOR MAY PROPOSE MODIFICATIONS TO THE FOUNDATION DESIGN, SUBJECT TO THE REVIEW AND APPROVAL OF THE ENGINEER.

(E) GROUND PROFILE SHOULD DRAIN WATER AWAY FROM FOUNDATION.

(F) SEE STRUCTURES STD. DWG. STD-8-4 FOR ADDITIONAL DESIGN AND MATERIAL SPECIFICATIONS.

☒ REV. 11-12-93: NEW SHEET TRANSFERRED INFORMATION FROM T-L-1. ADDED METAL FOUNDATION DETAIL ALTERNATE.

☒ REV. 5-27-94: ADDED TABLE FOR HIGH MAST FOOTING AND GROUNDING CONDUCTOR SIZE.

☒ REV. 10-26-95: MODIFIED DESCRIPTION OF REINFORCING STEEL. CHANGED SIZE OF GROUND ROD ON HIGH MAST FOUNDATION DETAIL.

REV. 12-16-03: DELETED GROUNDING CONDUCTOR CHART. ADDED NOTE E.

☒ REV. 7-29-04: CHANGED DRAWING NO. FROM T-L-1A TO T-L-1. ADDED GENERAL NOTE (E). DELTED GROUNDING CONDOCTOR SIZE TABLE.

☒ REV. 02-15-07: ADDED ANCHOR BOLT DETAIL. NOTES AND NOTE (E) AND (F) ADDED.

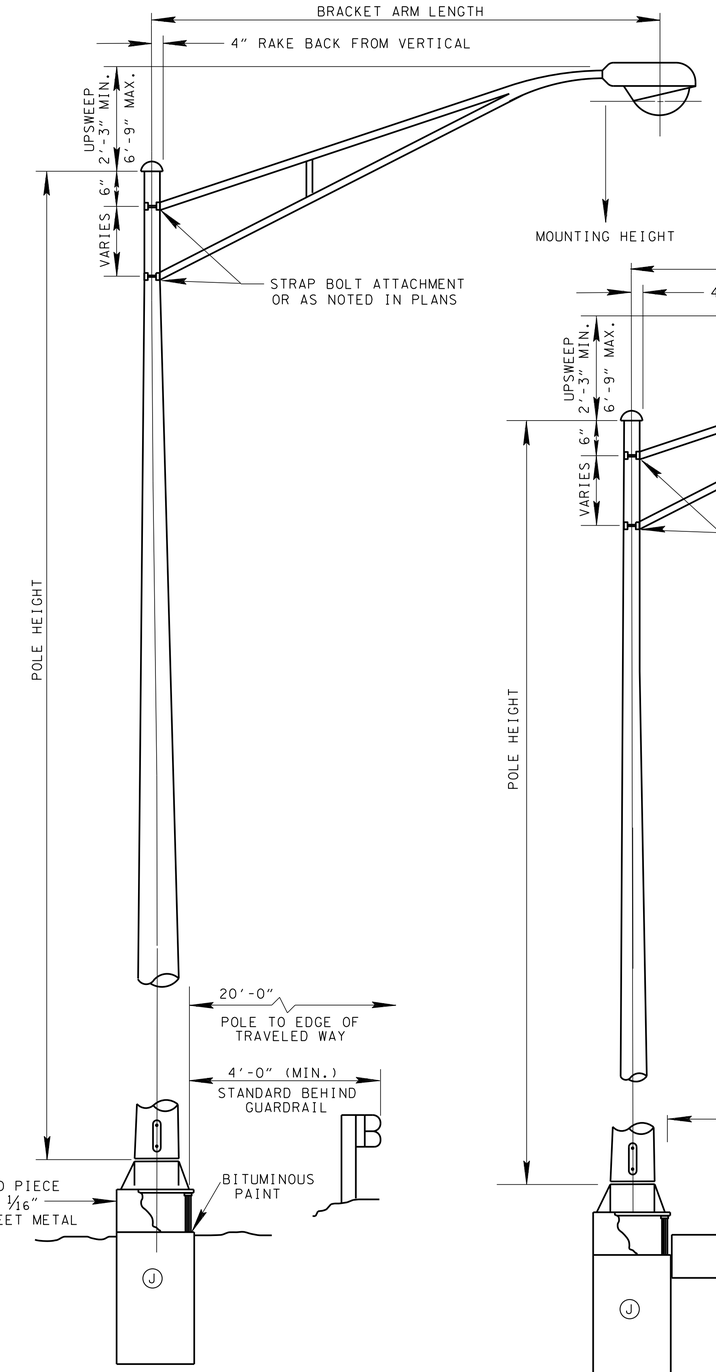
☐ REV. 12-4-13: CHANGED ANCHOR BOLTS TO THREADED. ADDED BEARING AREA TABLE.

☒ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

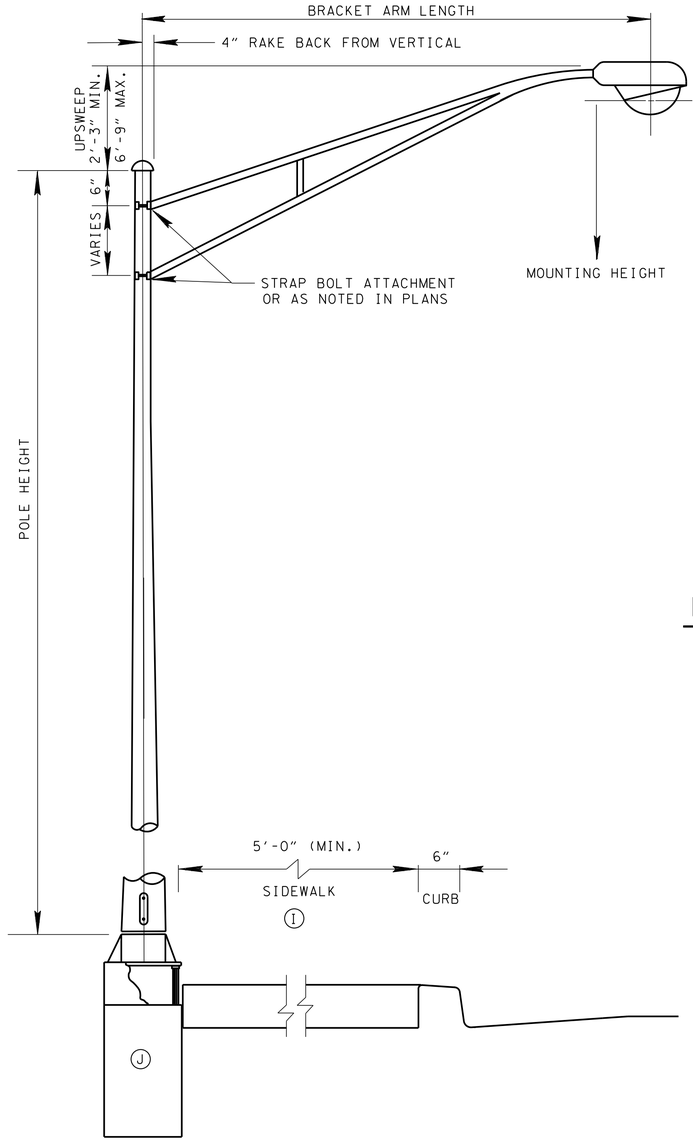
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

STANDARD LIGHTING FOUNDATION DETAILS

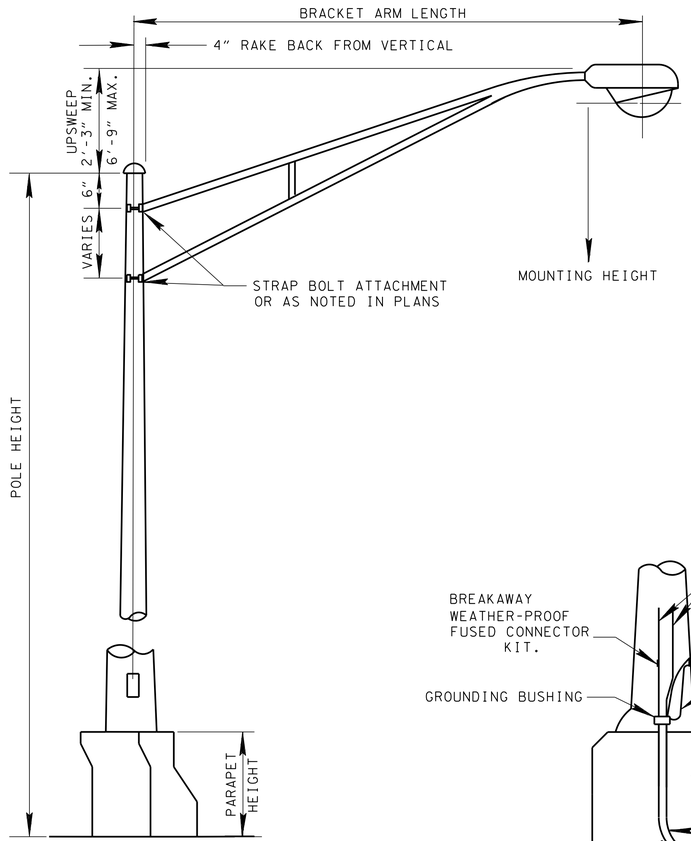
11-12-93 | T-L-1



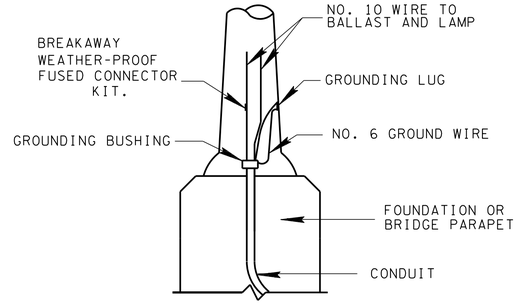

## LIGHT STANDARD DETAIL
### GROUND MOUNTED




## LIGHT STANDARD DETAIL
### CURB AND GUTTER




## LIGHT STANDARD DETAIL
### BRIDGE MOUNTED




## CONNECTION DETAIL

REV. 7-14-89: FOUNDATION DETAILS.

REV. 4-24-91: ADDED TO NOTE FOR BREAKAWAY BASE.

REV. 7-29-92: ADDED NOTE FOR SINGLE ARM BRACKET.

REV. 10-26-92: ADDED VIBRATION DAMPER NOTE. CHANGED #6 BARE GROUND TO #6 THW IN CONDUIT.

☐ REV. 11-12-93: REDREW AND REORGANIZED SHEET. TRANSFERRED FOOTING DETAILS TO NEW STANDARD DRAWING T-L-1A.

REV. 12-16-03: CHANGED DRAWING NAME AND NUMBER.

☐ REV. 7-29-04: CHANGED DRAWING NAME AND DRAWING NO. FROM T-L-1 TO T-L-1SA.

REV. 9-11-13: ADDED LIGHT STANDARD DETAIL (CURB AND GUTTER). ADDED NOTES (I) AND (J).

## GENERAL NOTES

(A) LIGHT STANDARD BASES SHALL MEET THE LATEST EDITION OF AASHTO. STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS. THE CONTRACTOR SHALL SUBMIT CERTIFICATION OF THE BREAKAWAY QUALITIES OF THE BASE TO THE TENNESSEE DEPARTMENT OF TRANSPORTATION, DIVISION OF STRUCTURES, PRIOR TO ERECTION.

(B) SLIP BASES AND SLEEVE BASES ARE NOT ACCEPTABLE.

(C) POLE HEIGHT SHALL INCLUDE ADJUSTMENT FOR SLOPE CONDITIONS, UPSWEEP OF THE BRACKET ARM, AND THE BREAKAWAY BASE.

(D) POLE HEIGHT ON BRIDGES SHALL INCLUDE ADJUSTMENT FOR THE HEIGHT OF THE PARAPET WALL AND THE UPSWEEP OF THE BRACKET ARM.

(E) BRACKET ARM DESIGN AND UPSWEEP SHALL BE UNIFORM FOR ALL LIGHT STANDARDS SUPPLIED ON A PROJECT. THE BRACKET ARM MAY BE SINGLE ARM OR TRUSS TYPE.

(F) UNLESS OTHERWISE NOTED IN THE PLANS, POLES MAY BE STEEL OR ALUMINUM.

(G) ALL LIGHT STANDARDS MOUNTED ON BRIDGES SHALL BE EQUIPPED WITH VIBRATION DAMPERS AS RECOMMENDED BY THE POLE MANUFACTURER.

(H) A 1 INCH THICK NEOPRENE RUBBER GASKET SHALL BE PROVIDED AND INSTALLED BETWEEN THE POLE BASE AND PARAPET SUPPORT. SIZE OF THE SQUARE GASKET AND BOLT CIRCLE DIAMETER SHALL BE AS REQUIRED FOR THE POLE SUPPLIED.

(I) IF THERE IS NO EXISTING OR PROPOSED SIDEWALK, LOCATE POLE BASED ON CLEAR ZONE REQUIREMENTS.

(J) SEE T-L-1 FOR FOUNDATION DETAILS.

NOT TO SCALE

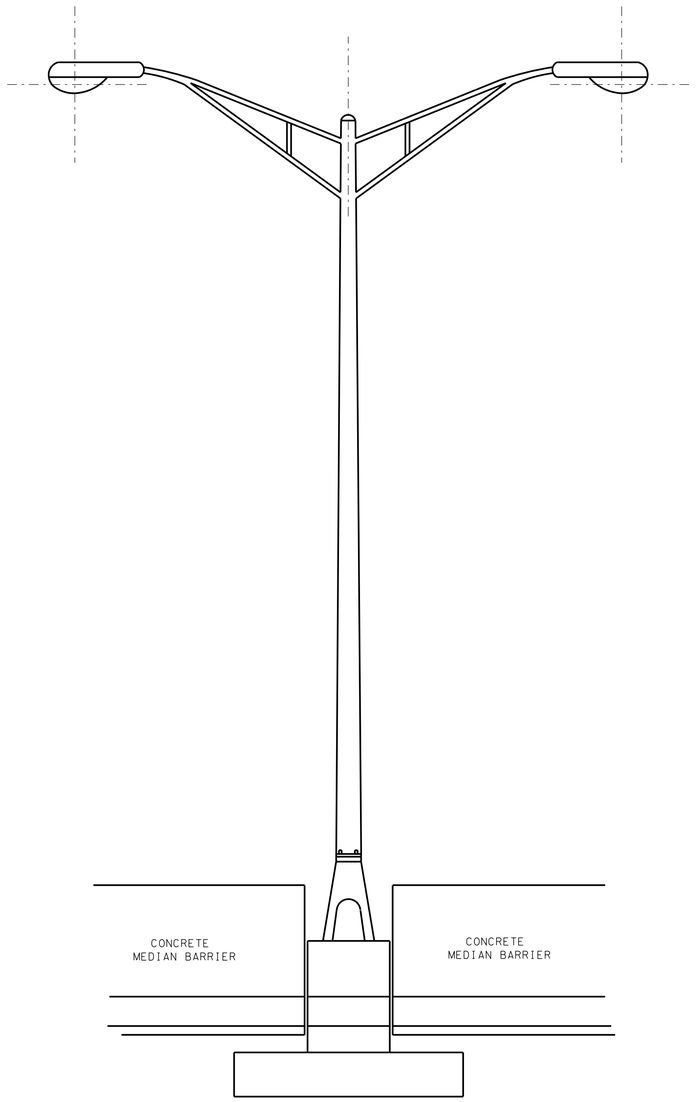
☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

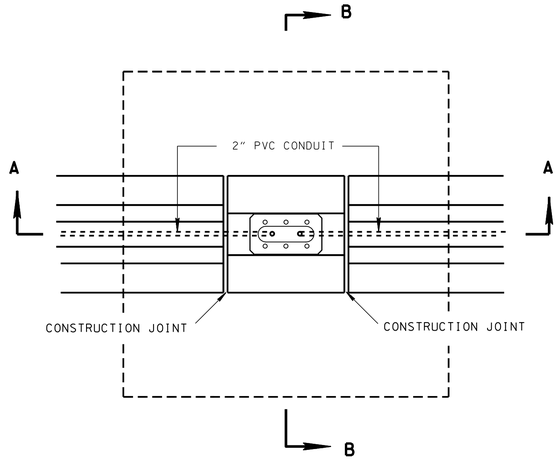
# STANDARD LIGHTING DETAILS FOR SINGLE ARM SUPPORTS

11-12-93 | T-L-1SA

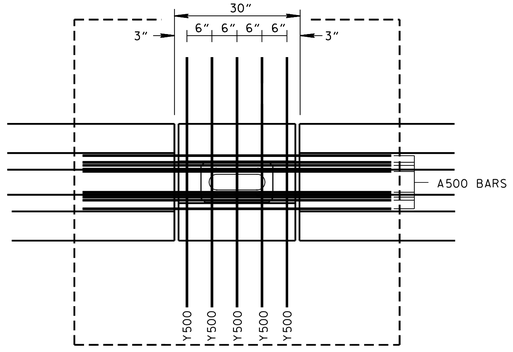
- REV. 11-1-95: CHANGED TO METRIC.
- REV. 5-27-01: CHANGED ITEM NOS. 303-15.01 TO 303-10.01 AND 714-08 TO 714-08.08.
- REV. 9-11-03: REDRAW AND REDESIGNED SHEET.
- REV. 12-4-13: CHANGED ANCHOR BOLTS TO THREADED.



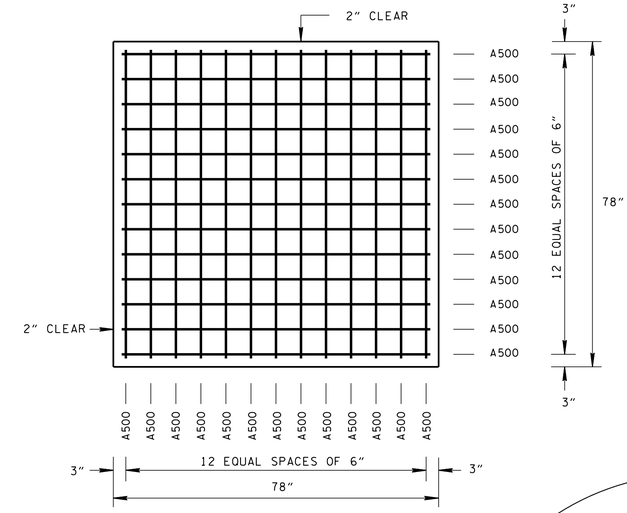

ELEVATION VIEW




PLAN VIEW

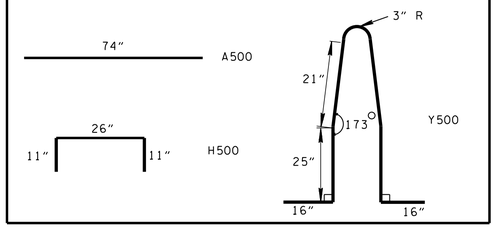


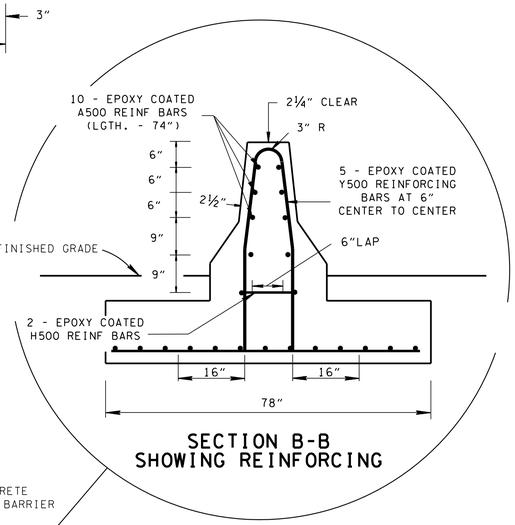

PLAN VIEW
SHOWING REINFORCING




SECTION C-C

## REINFORCING STEEL LEGEND




SECTION B-B
SHOWING REINFORCING

## GENERAL NOTES

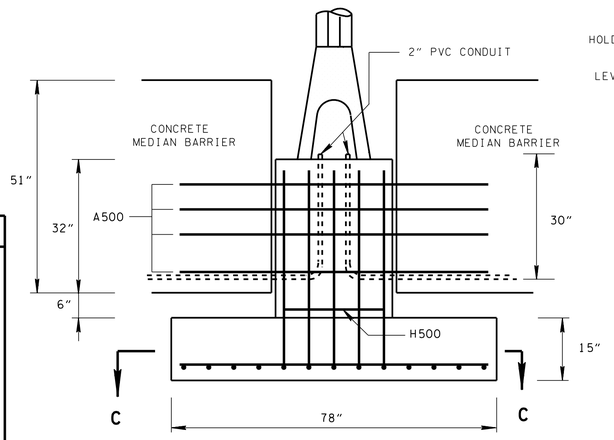
(A) MATERIALS IN CONCRETE MEDIAN BARRIER WALL AND FOOTINGS ARE TO MEET THE FOLLOWING SPECIFICATIONS:

CONCRETE: $F_c$ = 4,000 POUNDS PER SQUARE INCH AT 28 DAYS
REINFORCING STEEL: ASTM A615, $F_y$ = 60,000 POUNDS PER SQUARE INCH
ALL REINFORCING STEEL IS TO BE EPOXY COATED AND INSTALLED AS DETAILED ON THIS DRAWING.

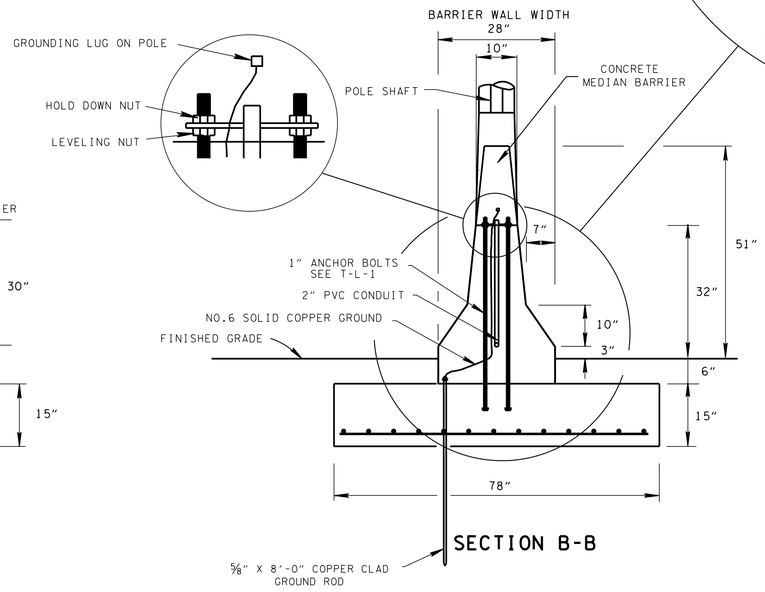
(B) ESTIMATED QUANTITIES :

CLASS "A" CONCRETE= 2.40 CUBIC YARD
NO. 5 STEEL REINFORCING BARS= 298 POUNDS

(C) UNIT PRICE ITEM NO. 714-08.26, FOUNDATION FOR LIGHT STANDARDS (MEDIAN BARRIER) PER EACH SHALL INCLUDE ALL COSTS OF FURNISHING AND INSTALLING ALL MATERIALS AND LABOR NECESSARY TO CONSTRUCT THE PORTION OF THE MEDIAN BARRIER AND THE FOOTINGS SUPPORTING THE LIGHT STANDARDS.




SECTION A-A




SECTION B-B

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

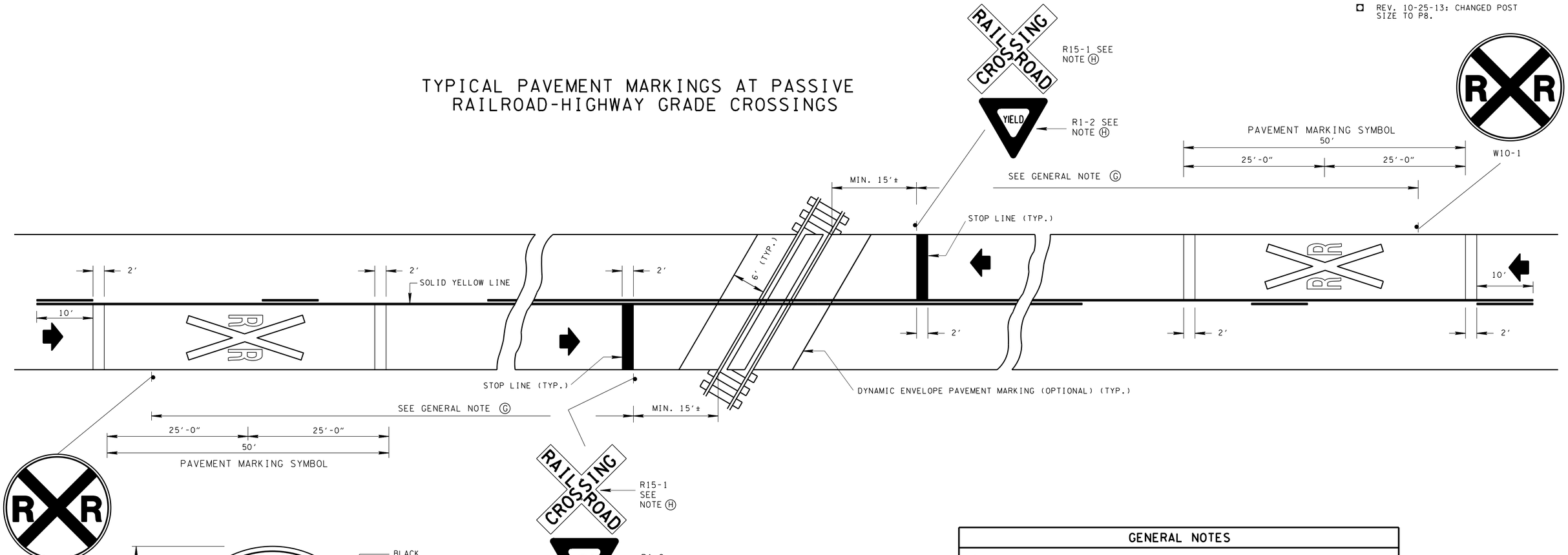
STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

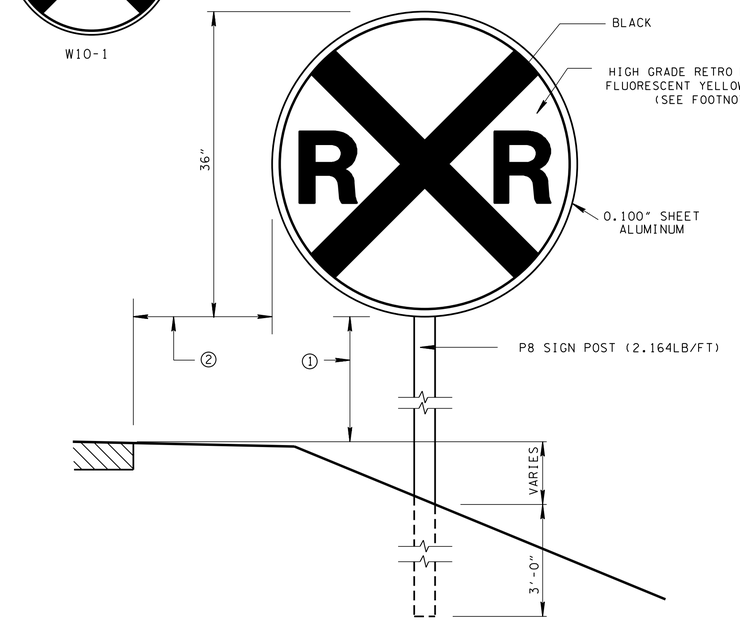
# FOUNDATION DETAIL FOR LUMINAIRE MOUNTED ON CONCRETE MEDIAN BARRIER

9-11-03 | T-L-2

REV. 10-25-13: CHANGED POST SIZE TO P8.

# TYPICAL PAVEMENT MARKINGS AT PASSIVE RAILROAD-HIGHWAY GRADE CROSSINGS



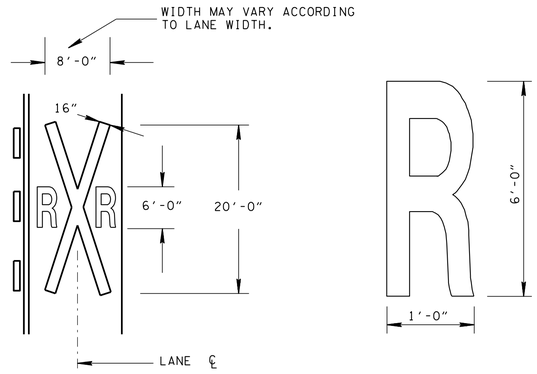




## W10-1

TO BE PAID FOR UNDER ITEM 713-16.09 RAILROAD ADVANCE WARNING SIGN AND SUPPORT.

(36 INCH DIAMETER SIGN)

## RAILROAD ADVANCE WARNING SIGN







## GENERAL NOTES

(A) A PORTION OF PAVEMENT MARKING SYMBOL SHOULD BE DIRECTLY OPPOSITE THE ADVANCE WARNING SIGN (W10-1).

(B) A THREE LANE ROADWAY SHOULD BE MARKED WITH A CENTERLINE FOR TWO LANE APPROACH OPERATION ON THE APPROACH TO A CROSSING.

(C) ON MULTI-LANE ROADS THE TRANSVERSE BANDS SHOULD EXTEND ACROSS ALL APPROACH LANES, AND INDIVIDUAL "RxR" SYMBOLS SHOULD BE USED IN EACH APPROACH LANE.

(D) PAVEMENT MARKINGS MATERIAL CAN BE EITHER PAINT OR PLASTIC AS SHOWN ON THE PLANS OR DIRECTED BY THE ENGINEER.

(E) REFER TO STANDARD ALPHABET FOR HIGHWAY SIGNS AND MARKINGS FOR RxR SYMBOLS DETAILS.

(F) THE COST OF ALL TRANSVERSE BANDS SHALL BE IN THE PRICE BID FOR THE "RxR" SYMBOLS AT EACH RAILROAD CROSSING.

(G) PLACEMENT OF THE RAILROAD ADVANCE WARNING SIGN SHALL GENERALLY BE IN ACCORDANCE WITH SECTION 2C-3 TABLE 2C-4 CONDITION B OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES

(H) RAILROAD CROSS-BUCK SIGN AND SUPPORT SHALL BE INSTALLED IN ACCORDANCE WITH T-S-16. REFER TO T-S-16A AT PASSIVE RAILROAD GRADE CROSSINGS FOR STOP SIGN OR YIELD SIGN INSTLLATION.

## FOOTNOTES

(1) SIGNS ERECTED AT THE SIDE OF THE ROAD IN RURAL DISTRICTS SHALL BE MOUNTED AT A HEIGHT OF AT LEAST 5 FEET, MEASURED FROM THE BOTTOM OF THE SIGN TO THE NEAR EDGE OF THE PAVEMENT. IN BUSINESS, COMMERCIAL AND RESIDENTIAL DISTRICTS WHERE PARKING AND/OR PEDESTRIAN MOVEMENT IS LIKELY TO OCCUR OR WHERE THERE ARE OTHER OBSTRUCTIONS TO VIEW, THE CLEARANCE TO THE BOTTOM OF THE SIGN SHALL BE AT LEAST 7 FEET.

(2) NORMALLY, SIGNS SHOULD NOT BE CLOSER THAN 6 FEET FROM THE EDGE OF THE SHOULDER, OR IF NONE, 12 FEET FROM THE EDGE OF THE TRAVELED WAY. IN URBAN AREAS A LESSER CLEARANCE MAY BE USED WHERE NECESSARY. ALTHOUGH 2 FEET IS RECOMMENDED AS A WORKING URBAN MINIMUM, A CLEARANCE OF 1 FOOT FROM THE CURB FACE IS PERMISSABLE WHERE SIDEWALK WIDTH IS LIMITED OR WHERE EXISTING POLES ARE CLOSE TO THE CURB.

(3) SEE TDOT SPECIAL PROVISION 713A REGARDING SPECIFICATIONS FOR HIGH GRADE REFLECTIVE SHEETING.

☐ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION

TYPICAL SIGNING AND MARKING AT PASSIVE RAILROAD HIGHWAY GRADE CROSSINGS

10-23-06 | T-RR-6