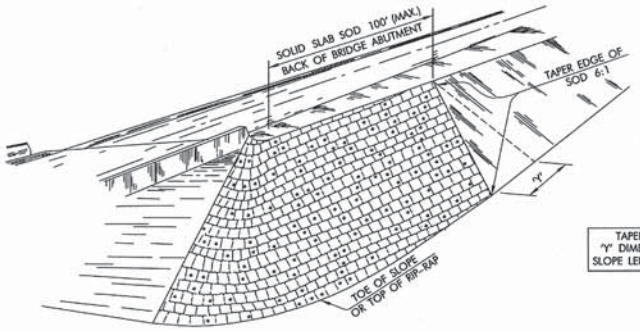
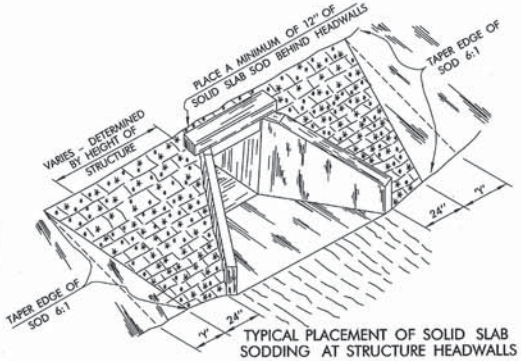
REVISIONS	
DESCRIPTION	DATE

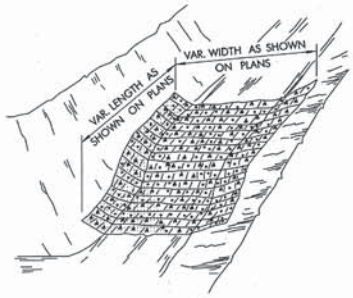


TYPICAL PLACEMENT OF SOLID SLAB SODDING
ON FILL SLOPES, APPROACHES TO OVERPASSES AND BRIDGES.

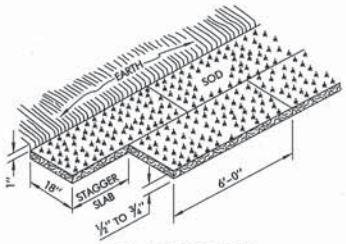
TAPER NOTE
"Y" DIMENSION =
SLOPE LENGTH x 0.17



TYPICAL PLACEMENT OF SOLID SLAB
SODDING AT STRUCTURE HEADWALLS



TYPICAL PLACEMENT OF
SOLID SLAB SODDING IN DITCHES



SOLID SLAB SODDING
(MARCH 1 THRU AUGUST 31)

THE PLACEMENT OF SOLID SLAB SOD SHALL BE RESTRICTED TO THE PERIOD FROM MARCH 1 THRU AUGUST 31, UNLESS OTHERWISE APPROVED BY THE ENGINEER.

GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
2. SOLID SLAB SOD SHALL BE PLACED IN HORIZONTAL ROWS WITH THE LONGEST SIDE OF EACH SLAB RUNNING PARALLEL TO THE ROADWAY, AND THE SLABS IN ALTERNATE ROWS STAGGERED HALF THE LENGTH OF EACH INDIVIDUAL SLAB. ENSURE THE ROWS RUN PARALLEL TO THE ROADWAY.
3. SLABS SHALL BE CUT AND HARVESTED WITH A COMMERCIAL SOD CUTTER TO THE DIMENSIONS SHOWN, THEN LOADED, TRANSPORTED AND HANDLED ON PALLETS.
4. AFTER PLACEMENT OF SOLID SLAB SOD, EARTH AT THE OUTER EDGES OF THE PLACEMENT SHALL BE BACKFILLED AND LOOSELY COMPACTED TO AT LEAST 1" ABOVE THE TOP OF THE SOLID SLAB SODDING.
5. STAKE SOD ON ALL SLOPES 1:2 OR STEEPER, AND ON ANY AREAS THAT ARE IN SUCH CONDITION THAT THERE IS DANGER OF SOD SLIPPING. PERFORM STAKING CONCURRENTLY WITH SOD PLACEMENT AND PRIOR TO TAMPING WITH SOUND WOODEN STAKES APPROXIMATELY 1 INCH SQUARE OR 1 INCH IN DIAMETER AND NOT LESS THAN 12 INCHES IN LENGTH, OR USE METAL STAPLES IN PLACE OF WOODEN STAKES. PLACE, STAKE AND STAPLE THE SOD WHERE NECESSARY, AND AS DETERMINED BY THE ENGINEER.

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
230(A)	SOLID SLAB SODDING	S.Y.

APPROVED BY ROADWAY ENGINEER: Timothy A. Bigler DATE: 12/2/09

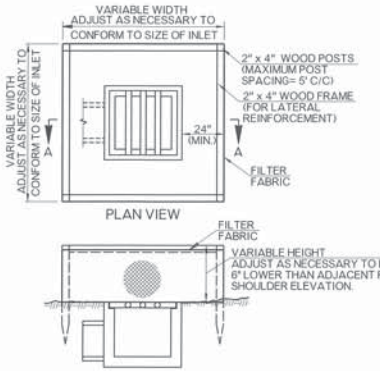
ROADWAY STANDARD

SOLID SLAB SODDING

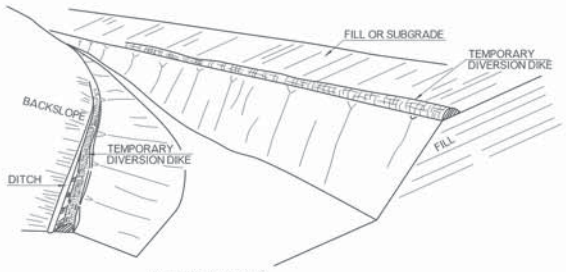
2009 SPECIFICATIONS

SSS-1	0
	R-3

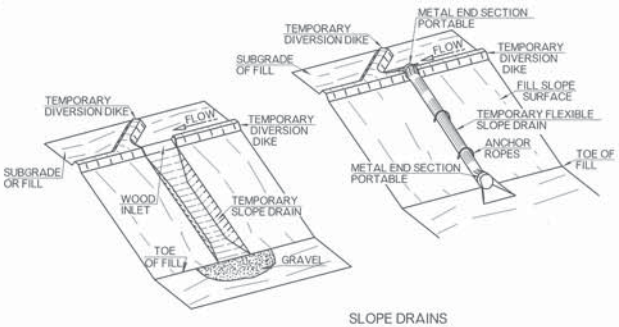
OKLAHOMA DEPARTMENT OF TRANSPORTATION	
STANDARD REVISIONS	
DESCRIPTION	DATE



SECTION A - A
SEDIMENT FILTER

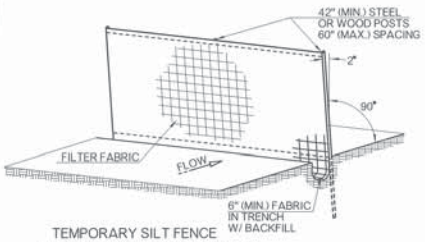


DIVERSION DIKES

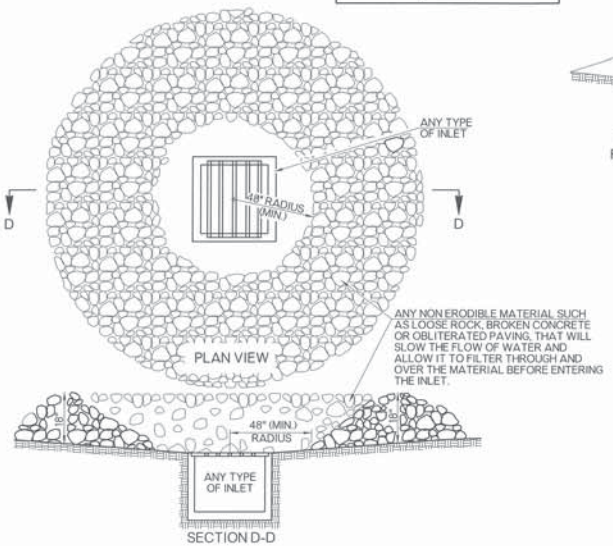


SLOPE DRAINS

TEMPORARY SEDIMENT FILTER
SYMBOLOGY
SYMBOL TO BE USED TO DENOTE
DEVICE ON PLANS
TSF
#



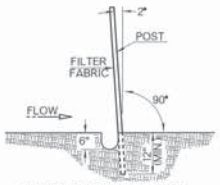
TEMPORARY SILT FENCE
RECOMMENDED TOE-IN METHOD



SECTION D-D

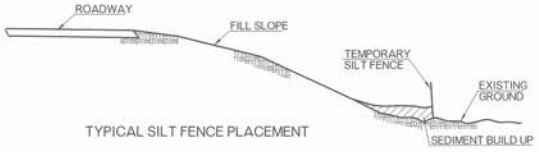
SEDIMENT FILTER
(TYPE II)

TEMPORARY SILT FENCE
SYMBOLOGY
SYMBOL TO BE USED TO DENOTE
DEVICE ON PLANS



TEMPORARY SILT FENCE
SECTION

TEMPORARY SLOPE DRAIN
SYMBOLOGY
SYMBOL TO BE USED TO DENOTE
DEVICE ON PLANS



TYPICAL SILT FENCE PLACEMENT

GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
2. COST OF TEMPORARY DIVERSION DIKES TO BE INCLUDED IN PRICE BID FOR OTHER ITEMS OF WORK.

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
221 (A)	TEMPORARY SLOPE DRAINS	LF
221 (C)	TEMPORARY SILT FENCE	LF
221 (D)	TEMPORARY SEDIMENT FILTER	EA

APPROVED BY
ROADWAY ENGINEER: Caleb F. A DATE: 04/16/15

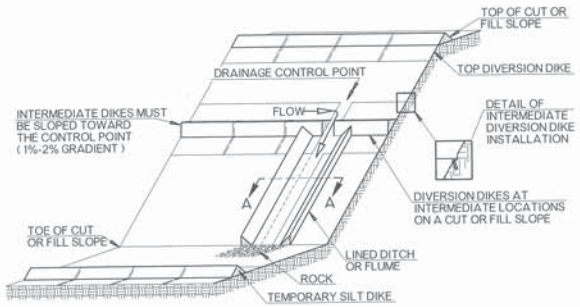
ROADWAY DESIGN DIVISION STANDARD

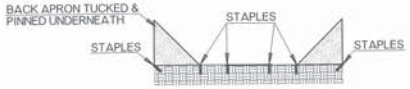
TEMPORARY SEDIMENT CONTROLS

OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

TSC2-3 | 2
R-5

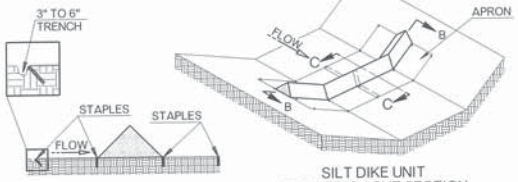
OKLAHOMA DEPARTMENT OF TRANSPORTATION	
STANDARD REVISIONS	
DESCRIPTION	DATE





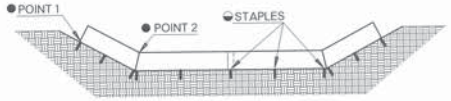
TEMPORARY DITCH LINER
SECTION A - A

TEMPORARY SILT DIKE INSTALLATION FOR DIVERSION DIKES AND / OR DITCH LINER



SECTION C - C

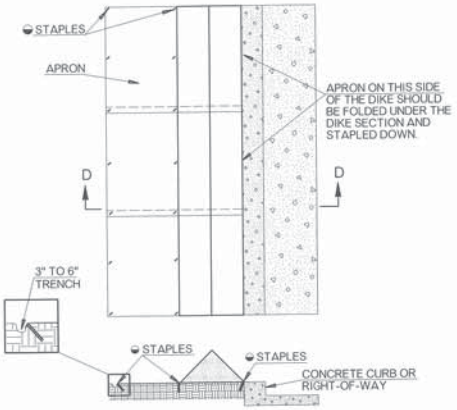
SILT DIKE UNIT
ISOMETRIC / CUT SECTION



DIKE SECTION
SECTION B - B

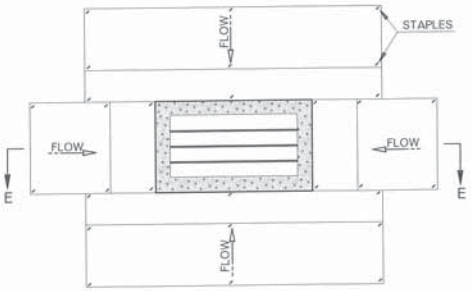
TEMPORARY SILT DIKE INSTALLATION FOR ROADWAY DITCH OR DRAINAGE DITCH

- POINT "1" MUST BE HIGHER THAN POINT "2" TO ENSURE THAT WATER FLOWS OVER THE DIKE AND NOT AROUND THE ENDS.
- STAPLES SHALL BE PLACED WHERE THE UNITS OVERLAP AND IN THE CENTER OF THE UNIT AS SHOWN ON THE DIAGRAM.

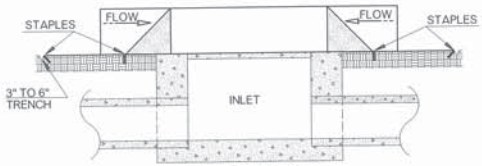


SECTION D - D

TEMPORARY SILT DIKE INSTALLATION FOR CONTINUOUS BARRIER

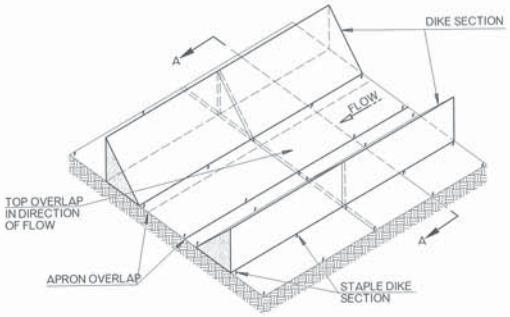


DROP INLET



SECTION E - E

TEMPORARY SILT DIKE INSTALLATION FOR DROP INLETS



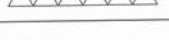
TEMPORARY SILT DIKE INSTALLATION FOR TEMPORARY DITCH LINER

GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
2. THIS WORK SHALL CONSIST OF FURNISHING, INSTALLING, AND MAINTAINING THE TEMPORARY SILT DIKE. THE DIKES SHALL BE USED AS A CONTINUOUS LINE BARRIER AT THE TOE OF SLOPE OR ACROSS THE ROADWAY DITCH TO CONTAIN SEDIMENT AND MINIMIZE EROSION, OR AS DIRECTED BY THE ENGINEER. THESE DIKES SHALL BE INSTALLED AND LOCATED AS SOON AS CONSTRUCTION WILL ALLOW OR AS DIRECTED BY THE ENGINEER.
3. TEMPORARY SILT DIKE SHALL BE TRIANGULAR SHAPED HAVING A HEIGHT OF AT LEAST 8" TO 10" IN THE CENTER WITH EQUAL SIDES AND A 16" TO 20" BASE. THE TRIANGULAR SHAPED INNER MATERIAL SHALL BE URETHANE FOAM MEETING THE REQUIREMENTS FOR ASTM D3574. THE OUTER COVER SHALL BE A WOVEN GEOTEXTILE FABRIC PLACED AROUND THE INNER MATERIAL & ALLOWED TO EXTEND BEYOND BOTH SIDES OF THE TRIANGLE 24" TO 36". THIS FABRIC SHOULD BE MILDEW RESISTANT, ROT-PROOF AND RESISTANT TO HEAT AND ULTRAVIOLET RADIATION MEETING REQUIREMENTS FOR SEDIMENT CONTROL IN AASHTO M 288. THE DIKES SHALL BE ATTACHED TO THE GROUND WITH WIRE STAPLES. THE STAPLES SHALL BE NO. 11 GAUGE WIRE AND BE AT LEAST 6" TO 8" LONG. STAPLES SHALL BE PLACED AS SHOWN ON THESE DETAILS.
4. ACCEPTED TEMPORARY SILT DIKE, MEASURED AS PROVIDED ABOVE, WILL BE PAID FOR AT THE CONTRACT UNIT PRICE BID FOR TEMPORARY SILT DIKE. PRICE BID WILL INCLUDE THE COST OF FURNISHING THE DIKES, INSTALLING, MAINTAINING AND REMOVAL WHEN DIRECTED BY THE ENGINEER.

SYMBOLOGY

SYMBOL TO BE USED TO DENOTE DEVICE ON PLANS



NOTE: SILT DIKE SHOULD ONLY BE USED FOR DROP INLETS IN SUMP LOCATIONS. FOR DROP INLETS ON GRADE, USE SEDIMENT TRAPS OR OTHER CONTROLS.

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
221 (F)	TEMPORARY SILT DIKE	LF

NOTE: SILT DIKES ARE ONLY FURNISHED IN 7' INCREMENTS.

APPROVED BY ROADWAY ENGINEER: Calvin F. H DATE 04/14/15

ROADWAY DESIGN DIVISION STANDARD

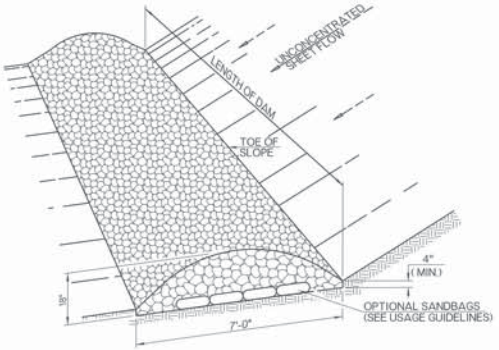
ODOT

TEMPORARY SILT DIKE

OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

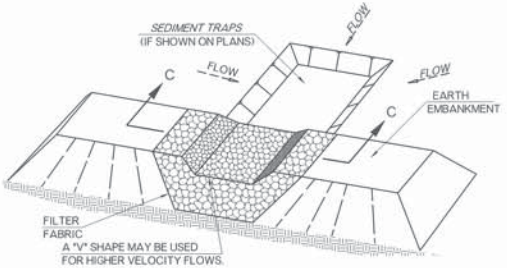
TSD-2	0
	R-6

OKLAHOMA DEPARTMENT OF TRANSPORTATION	
STANDARD REVISIONS	
DESCRIPTION	DATE



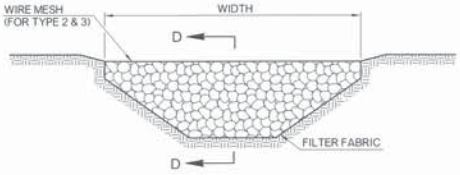
FILTER DAM AT TOE OF SLOPE

CAN BE USED WHEN TEMPORARY SILT FENCE IS NOT ADEQUATE FOR CONDITIONS. USED WITH ROCK FILTER DAM (TYPE 1) ONLY. ESTIMATED QUANTITY = 0.28 C.Y. PER FOOT OF LENGTH.



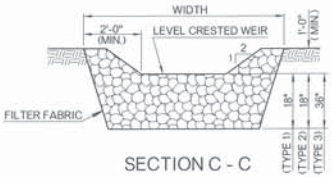
FILTER DAM AT SEDIMENT TRAP

ROCK FILTER DAM (TYPE 1, 2, OR 3)

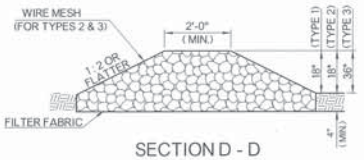


FILTER DAM AT CHANNEL SECTION

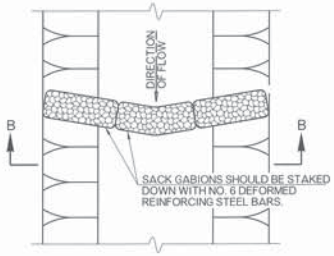
ROCK FILTER DAM (TYPE 1, 2, OR 3)



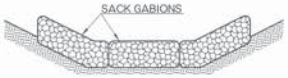
SECTION C - C



SECTION D - D



PLAN VIEW



SECTION B - B

SYMBOLOGY

SYMBOL TO BE USED TO DENOTE DEVICE ON PLANS

RFD #

ROCK FILTER DAM USAGE GUIDELINES

ROCK FILTER DAMS SHOULD BE USED WHEN SIGNIFICANT AMOUNTS OF SEDIMENT ARE ANTICIPATED, TO DISSIPATE THE ENERGY OF FLOWING WATER AND COLLECT SEDIMENT NEAR THE TOE OF SLOPES, AT UPSTREAM AND DOWNSTREAM DRAINAGE STRUCTURES, IN ROADWAY DITCHES AND IN SMALL CHANNELS, AS SHOWN IN PLANS OR AS DIRECTED BY THE ENGINEER.

TYPE 1 (18 IN. HIGH WITH NO WIRE MESH) : TYPE 1 SHOULD BE USED AT THE TOE OF SLOPES, AROUND INLETS, IN SMALL DITCHES AND AT DIKE OR SWALE OUTLETS. THIS TYPE OF DAM IS RECOMMENDED TO CONTROL EROSION FROM A DRAINAGE AREA OF 5 ACRES OR LESS. TYPE 1 SHOULD NOT BE USED IN CONCENTRATED HIGH VELOCITY FLOWS (APPROX. 7.9 FT./SEC. OR MORE) IN WHICH ROCK WASH OUT MAY OCCUR. SANDBAGS MAY BE USED AT THE EMBEDDED FOUNDATION (4 IN. DEEP (MIN.) FOR BETTER FILTERING EFFICIENCY OF LOW FLOWS.

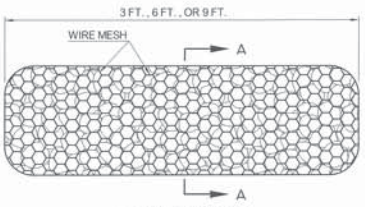
TYPE 2 (18 IN. HIGH WITH WIRE MESH) : TYPE 2 SHOULD BE USED IN DITCHES AND AT DIKES OR SWALE OUTLETS.

TYPE 3 (3 FT. HIGH WITH WIRE MESH) : TYPE 3 SHOULD BE USED IN STREAM FLOW AND SHOULD BE SECURED TO THE STREAM BED.

TYPE 4 (SACK GABIONS) : TYPE 4 SHOULD BE USED IN DITCHES AND SMALLER CHANNELS TO FORM AN EROSION CONTROL DAM.

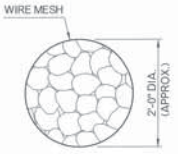
GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
2. MATERIALS SPECIFICATIONS FOR FILTER FABRIC, STONE FILL FOR GABIONS (ROCK)AND WIRE MESH, SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATION SECTIONS 712.02, 713.03 AND 732.09, RESPECTIVELY.
3. SPECIFIC DIMENSIONS OF ROCK FILTER DAMS OR SEDIMENT TRAPS SHALL BE SHOWN ON THE PLANS.
4. ROCK FILTER DAM TYPES 2 & 3 SHALL BE SECURED WITH WIRE MESH. THE ROCK SHALL BE PLACED ON THE MESH TO THE HEIGHT & SLOPES SPECIFIED. THE MESH SHALL BE FOLDED AT THE UPSTREAM SIDE OVER THE ROCK AND TIGHTLY SECURED TO ITSELF ON THE DOWNSTREAM SIDE USING WIRE TIES OR HOG RINGS. IN STREAM USE, THE MESH SHALL BE SECURED OR STAKED TO THE STREAM BED PRIOR TO ROCK PLACEMENT.
5. A MINIMUM DISTANCE OF 12 INCHES SHALL BE MAINTAINED BETWEEN TOP OF ROCK FILTER DAM WEIR AND TOP EMBANKMENT FOR FILTER DAMS AT SEDIMENTATION TRAPS. ROCK FILTER DAMS SHALL BE EMBEDDED A MINIMUM OF 4 INCHES INTO THE EXISTING GROUND.



SACK GABIONS

ROCK FILTER DAM (TYPE 4)



SECTION A - A

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
221 (G)	TEMPORARY ROCK FILTER DAM (TYPE 1)	CY
221 (G)	TEMPORARY ROCK FILTER DAM (TYPE 2)	CY
221 (G)	TEMPORARY ROCK FILTER DAM (TYPE 3)	CY
221 (G)	TEMPORARY ROCK FILTER DAM (TYPE 4)	CY

COST OF FILTER DAM (ALL TYPES) TO INCLUDE ALL MATERIAL AND LABOR REQUIRED FOR CONSTRUCTION.

APPROVED BY ROADWAY ENGINEER: _____ DATE 04/16/15

ROADWAY DESIGN DIVISION STANDARD

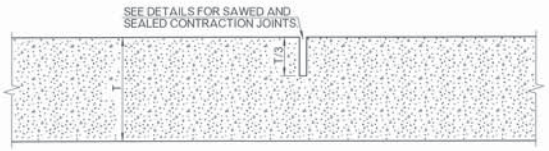
TEMPORARY ROCK FILTER DAMS

OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

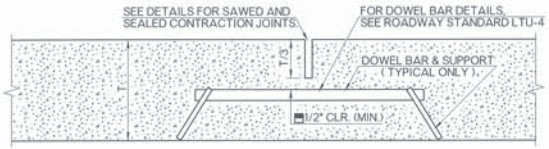
TRFD-1 | 2

R-8

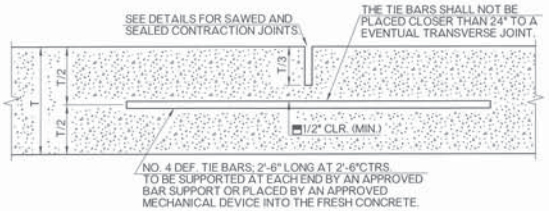
OKLAHOMA DEPARTMENT OF TRANSPORTATION	
STANDARD REVISIONS	
DESCRIPTION	DATE



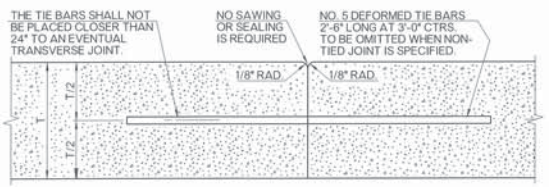
NON-DOWELED CONTRACTION JOINT



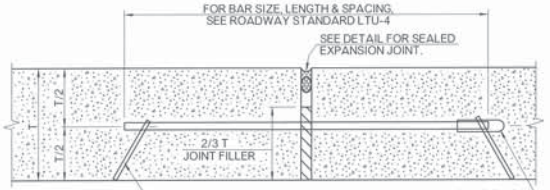
◒DOWELED CONTRACTION JOINT



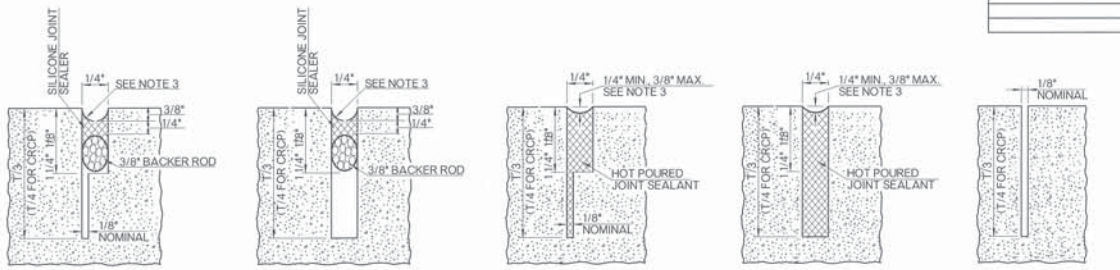
LONGITUDINAL JOINT



TIED BUTT JOINT AND
LONGITUDINAL CONSTRUCTION JOINT

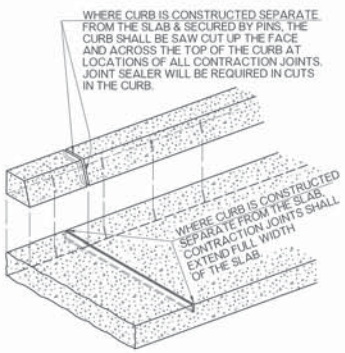


EXPANSION JOINT / ISOLATION JOINT
OMIT DOWEL BARS, CAPS & SUPPORTS FOR ISOLATION JOINTS

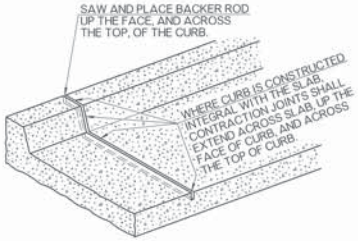


SILICONE SEALANT OPTION | SILICONE SEALANT OPTION | HOT POUR OPTION | HOT POUR OPTION | NO SEALANT OPTION

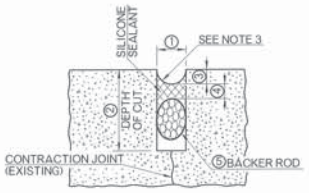
SAWED AND SEALED, CONTRACTION AND LONGITUDINAL JOINTS ALTERNATE DETAILS
UNLESS OTHERWISE SPECIFIED IN THE PLANS, ONLY THE SILICONE SEALANT OPTIONS WILL BE ALLOWED.



CONTRACTION JOINT WITH
SEPARATE CURB



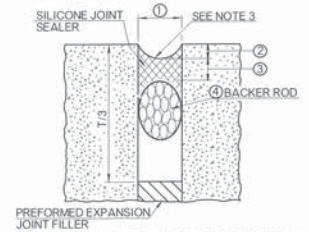
CONTRACTION JOINT WITH
INTEGRAL CURB



JOINT REHABILITATION DETAILS

JOINT REHABILITATION TREATMENT TABLE

SILICONE SEALANT				
JOINT WIDTH ①	DEPTH OF CUT ②	SEALANT RECESS DEPTH ③	SEALANT THICKNESS ④	BACKER ROD DIAMETER ⑤
3/8"	1 1/4"	3/8"	3/16"	1/2"
1/2"	1 3/4"	3/8"	1/4"	5/8"
3/4"	1 3/4"	3/8"	3/8"	7/8"
7/8"	1 3/4"	1/2"	7/16"	1"
1"	2"	1/2"	1/2"	1 1/8"
OVER 1"	OVER 2"	1/2"	1/2"	1 1/4"



EXPANSION JOINTS / ISOLATION JOINTS
HOT POURED JOINT SEALANT MAY BE USED IN LIEU OF BACKER ROD AND SILICONE SEALANT, IF APPROVED BY THE ENGINEER

EXPANSION JOINT / ISOLATION JOINT TREATMENT TABLE

JOINT WIDTH ①	SEALANT RECESS DEPTH ②	SILICONE SEALANT THICKNESS ③	BACKER ROD DIAMETER ④
1/2"	3/8"	1/4"	5/8"
3/4"	3/8"	3/8"	7/8"
1"	3/8"	1/2"	1 1/4"
1 1/2"	1/2"	3/4"	2"
2"	1/2"	3/4"	2 1/2"

EXPANSION OR ISOLATION JOINT WIDTH SHALL BE 1/2", UNLESS OTHERWISE SPECIFIED ON THE PLANS. TABLE VALUES, AS SHOWN THIS TABLE, SHALL BE USED IN THOSE SPECIFIED CASES.

GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIALS REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
2. ALL CONCRETE JOINT SEALING SHALL BE IN ACCORDANCE WITH SECTION 415 OF THE SPECIFICATIONS.
3. THE SHAPE FACTOR, COMBINED WITH THE JOINT CLEANLINESS, IS THE CRITICAL COMBINATION NECESSARY TO GUARANTEE DESIRED BONDING AND FUNCTION OF SEALED JOINTS. THE JOINT SHAPE FACTOR IS DEFINED AS THE FINAL PRESSED SHAPE OF THE SILICONE MATERIAL. THE TOOLING OPERATION WILL FIRMLY PRESS THE FRESHLY APPLIED MATERIAL INTIMATELY AGAINST THE CUT SIDES OF THE RECESS AND THE BACKER ROD SURFACES. THE ROUNDED SHAPE ON TOP AND BOTTOM OF THE SILICONE ALLOWS THE SEALANT TO PROPERLY FLEX BUT MAINTAIN ADHERENCE TO THE PAVING. SELF LEVELING SEALANTS WILL BE INSTALLED TO BE FLUSH WITH THE PAVEMENT SURFACE.
- ◒4. ON JOINTED PORTLAND CEMENT CONCRETE PAVEMENTS, DOWELLED CONTRACTION JOINTS SHALL BE USED ON DRIVING LANES ONLY. CONCRETE SHOULDERS SHALL NOT BE DOWELLED UNLESS SPECIFIED ON THE PLANS.
5. LONGITUDINAL JOINTS BETWEEN PAVEMENT AND TIED CONCRETE SHOULDERS SHALL NOT BE SAWED OR SEALED UNLESS OTHERWISE SHOWN ON THE PLANS.
- ◓6. ON ALL SAWED JOINTS, THE KERF DEPTH SHALL CLEAR DOWEL BARS, TIE BARS AND/OR REINFORCING STEEL BY A MINIMUM OF 1/2".
7. CONTRACTION JOINTS IN JOINTED P. C. PAVEMENT SHALL BE AT APPROXIMATELY 15'-0" CENTERS, UNLESS OTHERWISE SPECIFIED ON THE PLANS.
8. TRANSVERSE GROOVING SHALL BE CONSTRUCTED TO THE FOLLOWING DIMENSIONS: 1/8" TO 3/16" WIDE, 1/8" TO 3/16" DEEP, AND EQUALLY SPACED AT 1/2" TO 1" APART. GROOVES SHALL BE NEAT IN APPEARANCE, OF UNIFORM DEPTH, AND LOCATED 1" TO 3" FROM NEAREST CONTRACTION JOINTS.

APPROVED BY ROADWAY ENGINEER: Calvin E. A DATE 04/14/15
ROADWAY DESIGN DIVISION STANDARD

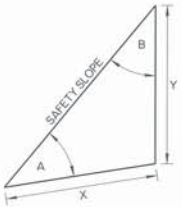
ODOT JOINTS AND SEALERS - LONGITUDINAL, EXPANSION, & CONTRACTION

OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

LECS-4	1
R-14	

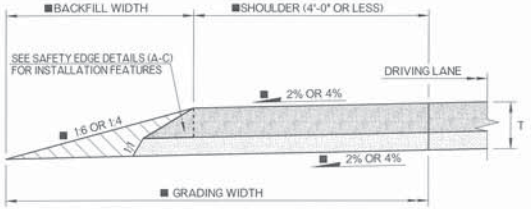
OKLAHOMA DEPARTMENT OF TRANSPORTATION	
STANDARD REVISIONS	
DESCRIPTION	DATE

X - ASPHALT PAVEMENT SAFETY EDGE WIDTH			
Y	X (2% SLOPE)		X (-4% SLOPE)
	2%	-2%	
IN	IN	IN	IN
0.50	0.86	0.88	0.89
0.75	1.28	1.31	1.33
1.00	1.71	1.75	1.77
1.50	2.57	2.63	2.66
2.00	3.42	3.50	3.54
2.50	4.28	4.38	4.43
3.00	5.14	5.26	5.31
3.50	5.99	6.13	6.20
4.00	6.85	7.01	7.08
4.50	7.70	7.88	7.97
5.00	8.56	8.76	8.85



$$X = \frac{Y \cdot SIN(B)}{SIN(A)}$$

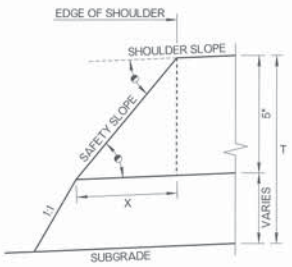
CALCULATE X USING 30° FOR ANGLE A.



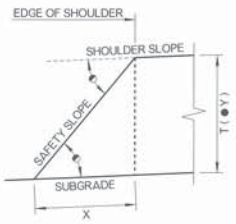
TYPICAL SECTION VIEW OF AN ASPHALT PAVEMENT SAFETY EDGE

NOTE: SAFETY EDGE SHALL BE INSTALLED ON SHOULDERS OF WIDTH 4'-0" OR LESS.
■ SEE TYPICAL SECTION FOR DIMENSIONS AND SLOPES.

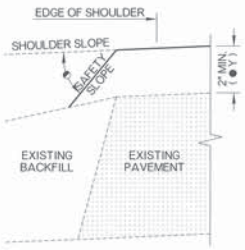
DETAIL A (T>5")



DETAIL B (T ≤ 5")



DETAIL C (OVERLAY)



SAFETY EDGE DETAILS (A-C)

● VARIES BETWEEN 2" AND 5" WITH A 5" MAXIMUM HEIGHT.
◴ 30°±5° (ANGLE IS MEASURED FROM SLOPED EDGE OF SHOULDER.)

GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
2. SAFETY EDGE SHALL BE CONSTRUCTED IN UNION WITH THE ASPHALT CONCRETE PAVEMENT.
3. THE SAFETY EDGE, AS SHOWN, CAN BE APPLIED TO NEW CONSTRUCTION AND TO OVERLAYS OF AT LEAST 2".
4. INSTALLATION OF SAFETY EDGE IS NOT REQUIRED IN CURB AND GUTTER AREAS.
5. ALL SAFETY EDGES MUST MEET THE APPROVAL OF THE ENGINEER. THE ENGINEER MAY REQUIRE PROOF THAT THE SYSTEM HAS BEEN USED ON PREVIOUS PROJECTS WITH ACCEPTABLE RESULTS OR MAY REQUIRE THAT A TEST SECTION BE CONSTRUCTED PRIOR TO THE BEGINNING OF WORK TO DEMONSTRATE THAT THE EDGE SHAPE AND COMPACTION IS TO THE SATISFACTION OF THE ENGINEER.
6. PRIOR TO PAVING SAFETY EDGE, GRADE AN AREA 10" WIDE BEGINNING AT EDGE OF PAVED SHOULDER TO PROVIDE A LEVEL SURFACE FREE OF VEGETATION.

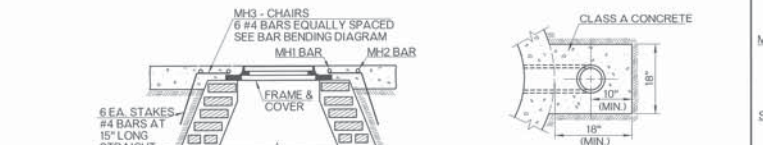
APPROVED BY ROADWAY ENGINEER: Calvin F. W DATE 01/16/15

ROADWAY DESIGN DIVISION STANDARD

PAVEMENT SAFETY EDGE

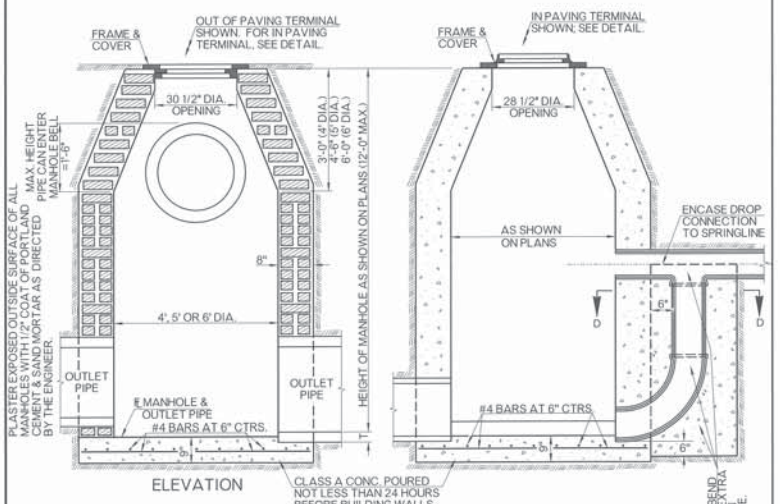
OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

PSE-1	0
R-21	



IN PAVING MANHOLE TERMINAL

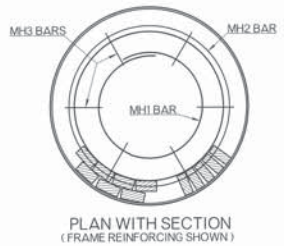
SECTION D-D



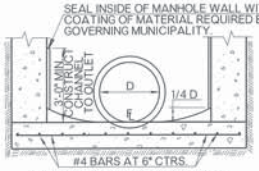
ELEVATION

DROP INLET FOR SANITARY SEWER
WHERE DIFFERENCE IN FLOW LINES IS 4' AND OVER

NOTE: ALL SANITARY SEWER MANHOLES SHALL BE CONSTRUCTED ONLY OF CLASS A CONCRETE OR PRECAST CONCRETE UNITS. TYPICAL BRICK MASONRY CONSTRUCTION MAY BE USED FOR STORM SEWER MANHOLES, CURB INLETS AND JUNCTION BOXES.



PLAN WITH SECTION
(FRAME REINFORCING SHOWN)

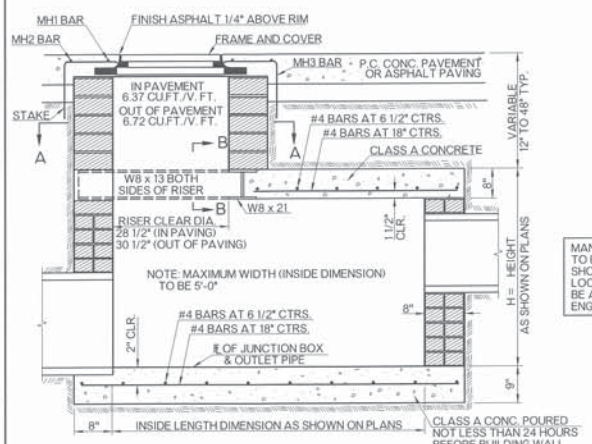


SECTION AT BOTTOM OF SANITARY SEWER MANHOLE

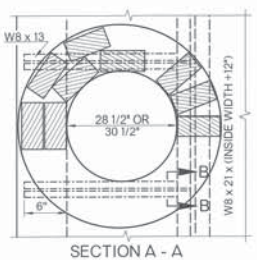
BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
611 (A)	MANHOLE (▼DIA.)	EA
611 (B)	ADDITIONAL DEPTH IN MANHOLE (▼DIA.)	VF

▼DIAMETER SHALL BE SPECIFIED (SEE PAY ITEM LIST)

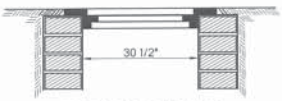
STANDARD MANHOLES



SECTION THRU JUNCTION BOX
(SHOWN IN PAVING WITH RISER)

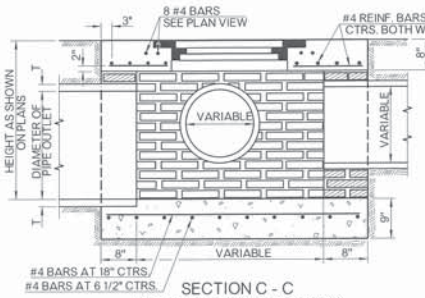


SECTION A - A



JUNCTION BOX RISER
OUT OF PAVING

SECTION B - B

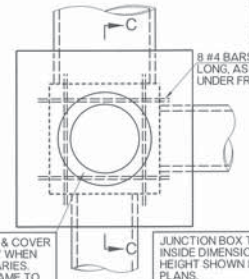


SECTION C - C
DETAIL OF JUNCTION BOX
(SHOWN OUTSIDE OF PAVING AND NO RISER)

STANDARD JUNCTION BOXES

OKLAHOMA DEPARTMENT OF TRANSPORTATION

STANDARD REVISIONS	
DESCRIPTION	DATE



PLAN

MANHOLE FRAME & COVER TO BE USED ONLY WHEN SHOWN IN SUMMARIES. LOCATION OF FRAME TO BE AS DIRECTED BY THE ENGINEER.

JUNCTION BOX TO HAVE INSIDE DIMENSIONS AND HEIGHT SHOWN IN THE PLANS.

DEDUCTIONS FOR PIPE OPENING	
PIPE DIA.	VOLUME (CU. FT.)
18"	1.92
24"	3.24
30"	4.93
36"	6.97
42"	9.36
48"	12.11
54"	15.21
60"	18.66
66"	22.47
72"	26.62
78"	31.45
84"	36.36
90"	41.63

MH1 AND MH2 #4 BAR
FOR MANHOLE & JUNCTION BOX RISERS IN PAVING.

MH3 #4 BAR (CHAIR)

GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
2. ALL MANHOLES SHALL BE 4 FOOT DIAMETER UNLESS A LARGER DIAMETER IS REQUIRED.
3. FOR DETAILS OF FRAME AND COVER, SEE ROADWAY STANDARD MFC-4.
4. CAST-IN-PLACE CONCRETE WALLS WITH THE SAME DIMENSIONS SHOWN ON THIS STANDARD, MAY BE USED IN LIEU OF THE BRICK MASONRY. CAST-IN-PLACE WALLS EXCEEDING 5 FEET IN DEPTH (GUTTERLINE TO FLOWLINE), WILL REQUIRE NO. 4 REINFORCING BARS SPACED AT 30 INCH CTRS. VERTICALLY AND 12 INCHES CTRS. HORIZONTALLY.
5. WHERE A MORTAR COAT IS REQUIRED IT SHALL BE 1/2" THICK AND SHALL BE APPLIED WHILE BRICK MASONRY IS CLEAN AND DAMP.
6. MANHOLES UP TO 5 FEET IN HEIGHT, SHALL BE PAID FOR AS 'MANHOLE' (EA.). ANY ADDITIONAL HEIGHT OF MANHOLE SHALL BE PAID FOR AS 'ADDITIONAL DEPTH IN MANHOLE' (VF).
7. JUNCTION BOX WALL CONSTRUCTION SHALL BE MEASURED BY CF OF WALL MATERIAL AND TO BE PAID FOR AS 'JUNCTION BOXES' (CF). DEDUCTIONS IN VOLUME WILL BE MADE FOR ALL PIPE OPENINGS 18 INCHES IN DIAMETER AND LARGER (SEE TABLE). COST OF FRAME & COVER SHALL BE INCLUDED IN COST OF JUNCTION BOX.
8. REINFORCING STEEL AND STRUCTURAL STEEL, WILL BE INCLUDED AS PART OF THE COST OF THE STRUCTURE COMPLETE, AND WILL NOT BE MEASURED AS A PAY ITEM.

OPTIONAL PRECAST MANHOLE & JUNCTION BOXES

9. WHEN PRECAST STORM SEWER OR JUNCTION BOX UNITS ARE SUBSTITUTED FOR BRICK MASONRY OR CAST-IN-PLACE UNITS:
   A. THE MATERIAL COMPONENTS SHALL MEET AASHTO DESIGNATION M 199, AND SHOP DRAWINGS SHALL BE SUBMITTED TO ODOT FOR APPROVAL.
   B. ALL LIFT HOLES SHALL BE SEALED WITH FIRMLY PACKED MIXTURE OF CEMENT AND SAND GROUT.

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
▲ 509 (C)	CLASS A CONCRETE, SMALL STRUCTURES	CY
611 (L)	JUNCTION BOXES	CF

▲ FOR QUANTITIES OF CLASS A CONCRETE LESS THAN 20.0 CY

APPROVED BY ROADWAY ENGINEER: Caleb E. A DATE 04/16/15

ROADWAY DESIGN DIVISION STANDARD

MANHOLES AND JUNCTION BOXES

OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

MJB-3 | 1

R-43

OKLAHOMA DEPARTMENT OF TRANSPORTATION	
STANDARD REVISIONS	
DESCRIPTION	DATE

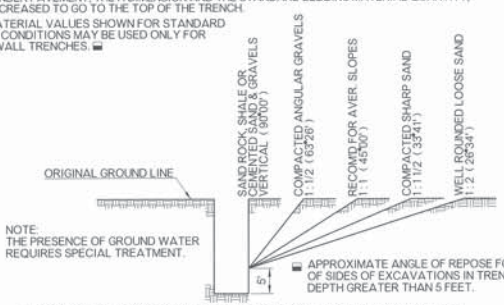
TRENCHING DIMENSIONS AND STANDARD BEDDING MATERIAL QUANTITIES

	PIPE DIAM. OR DESIGN EQUIV.	H ■	T	SINGLE PIPE STANDARD TRENCHING		DOUBLE PIPE STANDARD TRENCHING		TRIPLE PIPE STANDARD TRENCHING		SPECIAL TRENCHING SINGLE, DOUBLE & TRIPLE PIPE OPTIONS W+12"
				W	STANDARD BEDDING MATERIAL ■	W	STANDARD BEDDING MATERIAL ■	W	STANDARD BEDDING MATERIAL ■	ADDL STANDARD BEDDING MATERIAL
	IN.	FT.	FT.	FT.	CY/LF	FT.	CY/LF	FT.	CY/LF	CY/LF
ROUND PIPE	18	3.25	0.208	3.17	0.274	5.67	0.468	8.17	0.663	0.120
	24	3.83	0.25	4.00	0.386	7.00	0.629	10.00	0.873	0.142
	30	4.42	0.292	4.58	0.474	8.33	0.811	12.08	1.146	0.163
	⊞ 36	5	0.333	6.17	0.751	10.67	1.193	15.17	1.636	0.185
	⊞ 42	5.58	0.375	6.75	0.870	12.00	1.429	17.25	1.989	0.207
	⊞ 48	6.17	0.417	7.33	0.996	13.33	1.688	19.33	2.379	0.228
	⊞ 54	6.75	0.458	7.92	1.126	14.67	1.960	21.42	2.794	0.250
	⊞ 60	7.33	0.5	9.50	1.532	17.00	2.521	24.50	3.510	0.271
	⊞ 66	8.08	0.542	10.08	1.757	18.33	2.965	26.58	4.173	0.299
	⊞ 72	8.67	0.583	10.67	1.931	19.67	3.327	28.67	4.724	0.321
	⊞ 78	9.25	0.625	11.25	2.107	20.75	3.615	30.25	5.122	0.343
	⊞ 84	9.83	0.667	11.83	2.288	21.83	3.908	31.83	5.529	0.364
	⊞ 90	10.42	0.708	12.42	2.479	22.92	4.219	33.42	5.959	0.386
	⊞ 96	11	0.75	13.00	2.671	24.00	4.527	35.00	6.383	0.407
ARCH PIPE	18	2.88	0.208	3.50	0.271	6.33	0.471	9.17	0.671	0.106
	21	3.08	0.229	4.12	0.338	7.29	0.567	10.46	0.796	0.114
	24	3.33	0.250	4.38	0.374	7.75	0.624	11.13	0.874	0.123
	30	3.79	0.291	6.10	0.603	10.13	0.915	14.16	1.227	0.140
	36	4.20	0.333	6.81	0.700	11.67	1.097	16.53	1.493	0.156
	42	4.69	0.375	7.50	0.813	13.17	1.308	18.83	1.802	0.173
	⊞ 48	5.17	0.416	9.21	1.180	15.71	1.842	22.21	2.504	0.191
	⊞ 54	5.58	0.458	9.83	1.243	17.05	1.946	24.28	2.649	0.207
	⊞ 60	6.08	0.500	10.58	1.392	18.69	2.228	26.81	3.064	0.225
	⊞ 66	6.75	0.542	11.00	1.488	19.56	2.365	28.11	3.242	0.250
	⊞ 72	7.00	0.583	12.00	1.690	21.78	2.803	31.55	3.917	0.259
	⊞ 78	7.83	0.625	12.42	1.854	22.64	3.071	32.86	4.288	0.272
	⊞ 84	7.83	0.667	13.33	1.983	24.67	3.385	36.00	4.788	0.290
	⊞ 90	8.92	0.708	14.50	2.382	27.08	4.131	39.67	5.881	0.330
	⊞ 96	9.46	0.750	15.17	2.625	28.33	4.549	41.50	6.473	0.350
HORIZONTAL ELLIPTICAL PIPE	18	2.96	0.229	3.62	0.282	6.54	0.487	9.46	0.691	0.109
	24	3.46	0.27	4.54	0.387	8.04	0.640	11.54	0.893	0.128
	30	3.96	0.312	6.29	0.629	10.51	0.954	14.74	1.28	0.147
	36	4.50	0.375	7.00	0.743	12.00	1.153	17.00	1.564	0.167
	⊞ 42	5.00	0.416	7.75	0.862	13.64	1.379	19.53	1.896	0.185
	⊞ 48	5.42	0.458	9.42	1.170	16.08	1.788	22.75	2.406	0.200
	⊞ 54	5.92	0.5	10.17	1.311	17.72	2.050	25.28	2.789	0.219
	⊞ 60	6.42	0.541	10.92	1.478	19.36	2.368	27.81	3.259	0.238
	⊞ 66	6.91	0.583	11.58	1.626	20.81	2.648	30.03	3.67	0.256
	⊞ 72	7.41	0.625	12.33	1.807	22.44	3.004	32.56	4.201	0.275
	⊞ 78	7.91	0.667	13.00	1.962	23.89	3.305	34.78	4.649	0.293
	⊞ 84	8.58	0.708	13.75	2.239	25.53	3.850	37.31	5.462	0.318
	⊞ 90	9.00	0.75	14.42	2.364	26.83	4.062	39.25	5.759	0.333
	⊞ 96	9.5	0.791	15.17	2.570	28.25	4.408	41.33	6.245	0.352

NOTE: QUANTITIES FOR 66" & 78" EQUIV. DIAM. ARCH PIPE BASED ON METAL PIPE & ESTIMATED WALL THICKNESS.

■ FOR PIPES UNDER PAVEMENT, THE H DIMENSION AND THE STANDARD BEDDING MATERIAL QUANTITY, SHALL BE INCREASED TO GO TO THE TOP OF THE TRENCH.

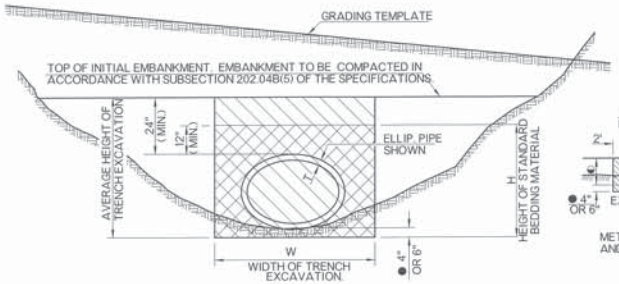
⊞ BEDDING MATERIAL VALUES SHOWN FOR STANDARD TRENCHING CONDITIONS MAY BE USED ONLY FOR VERTICAL WALL TRENCHES. ■



■ APPROXIMATE ANGLE OF REPOSE FOR SLOPING OF SIDES OF EXCAVATIONS IN TRENCHES WITH DEPTH GREATER THAN 5 FEET.

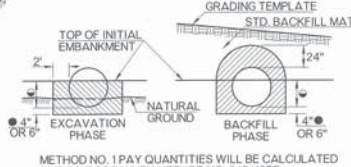
■ OPTIONAL TRENCHES WITH DEPTH GREATER THAN 5.0 FEET

EXCAVATION AND BEDDING MATERIAL WILL BE MEASURED AND PAID FOR AS IF SHEETING & SHORING WAS USED. (SPECIAL TRENCHING=STD. WIDTH TRENCH+12")



METHOD NO. 1

◒ EMBANKMENT HEIGHT PRIOR TO EXCAVATION
PIPE SIZES FROM 18" TO 42" =30"
PIPE SIZES FROM 48" TO 84" =2/3 DIAM.
PIPE SIZES LARGER THAN 84" =60"



METHOD NO. 1 PAY QUANTITIES WILL BE CALCULATED AND PAID FOR WHEN METHOD NO. 2 IS USED.

METHOD NO. 2
(OPTIONAL INSTALLATION FOR R. C. PIPE)

	CONDUIT SHAPE			DIST.
	ROUND	ARCH	ELLIPTICAL	G
FOR DIA. OR SPAN	UP TO 24"	UP TO 36"	UP TO 36"	12"
	25" TO 72"			D/2"
		37" TO 108"	37" TO 108"	D/3"
	OVER 73"	OVER 108"	OVER 108"	36"

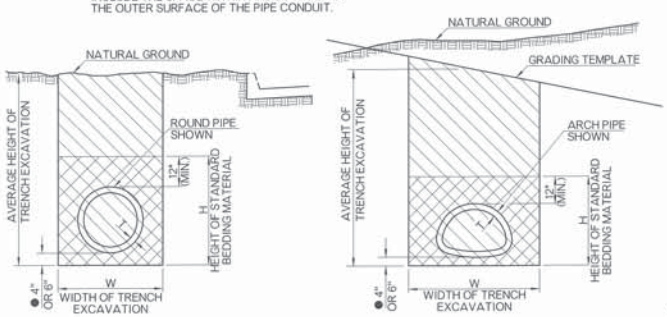
DOUBLE PIPE INSTALLATION
(USED WITH CET END TREATMENTS)

TRENCH EXCAVATION IN EMBANKMENT SECTIONS

LIMITS OF STANDARD BEDDING MATERIAL

QUANTITIES FOR BEDDING MATERIAL DO NOT INCLUDE THE SPACE WITHIN AND BOUNDED BY THE OUTER SURFACE OF THE PIPE CONDUIT.

LIMITS OF TRENCH EXCAVATION



TRENCH EXCAVATION IN CUT SECTIONS

GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
2. TRENCH EXCAVATION AND BEDDING MATERIAL WILL NOT BE REQUIRED FOR PIPE INSTALLATIONS OF SIDE DRAINS UNLESS OTHERWISE NOTED ON THE PLANS.
3. FOR PIPE UNDERDRAIN INSTALLATIONS, SEE ROADWAY STANDARD PUD-3.
4. ■ SPECIAL TRENCHING CONDITIONS ARE THOSE AS DEFINED BY O.S.H.A. REGULATIONS, TITLE 29 CFR CHAPTER XVII, PART 1926.650, 1926.651 & 1926.652, SO DEFINED WILL APPLY UNTIL THEY ARE IN CONFLICT WITH CURRENT SPECIFICATIONS. FOR TRENCH DEPTHS OVER FIVE FEET. WHERE O.S.H.A. REGULATIONS FOR SPECIAL TRENCHING ARE APPLIED, QUANTITIES AND DIMENSIONS FOR SPECIAL TRENCHING WILL BE USED FOR COMPUTING QUANTITIES. SEE TABLE OF TRENCHING DIMENSIONS AND STANDARD BEDDING MATERIAL QUANTITIES.
5. NORMAL BACKFILLING OPERATIONS SHALL FOLLOW BEDDING AND PIPE INSTALLATION AS CLOSELY AS PRACTICAL. IN NO CASE SHALL A PIPE INSTALLATION SUBJECT TO SUDDEN FLOW DEVELOPMENT BE LEFT WITHOUT SUFFICIENT BACKFILL TO RESTRAIN THE CONDUIT AND PREVENT JOINT SEPARATION AND/OR PIPING SCOUR. PHYSICALLY RESTRAINING THE CONDUIT MAY BE USED TO AUGMENT OR REPLACE THIS IMMEDIATE BACKFILL REQUIREMENT.
6. ANY EXCESS EXCAVATION NOT USED FOR BACKFILL WILL BECOME THE PROPERTY OF THE CONTRACTOR AND DISPOSED OF, BY HIM, IN A MANNER APPROVED BY THE ENGINEER.
7. ○ STANDARD BEDDING QUANTITIES FOR ROUND PIPE ARE BASED ON AASHTO DESIGNATED CLASS III (WALL B) REINFORCED CONCRETE PIPE.
8. ■ WHEN REQUIRED, THE SIDES OF THE TRENCHES SHALL BE SHEETED AND SHORED OR OTHERWISE SUPPORTED WHEN THE TRENCH IS MORE THAN 5.0 FEET IN DEPTH. IN LIEU OF SHEETING, THE SIDES OF THE TRENCH ABOVE THE 5.0 FOOT LEVEL MAY BE SLOPED TO PRECLUDE COLLAPSE, SEE OPTIONAL TRENCHES DETAIL THIS SHEET.
9. ⊠ PROPER COMPACTION OF BACKFILL REQUIRES A VERTICAL WALLED TRENCH TO 24 INCHES ABOVE TOP OF PIPE, REGARDLESS OF EXCAVATION ABOVE THAT ELEVATION.
10. ● EQUIVALENT PIPE SIZES 66 INCHES AND LARGER REQUIRE 6 INCHES OF BEDDING MATERIAL BELOW PIPE CONDUIT.
11. ◑ ELLIPTICAL PIPE DIMENSIONS CONFORM TO AASHTO M 207, AS DESIGNATED RISE BY SPAN.
12. FOR COMPUTING TRENCH EXCAVATION & STANDARD BEDDING QUANTITIES, THE LENGTH OF THE CULVERT SHALL INCLUDE END SECTION AND END TREATMENT LENGTHS.
13. MULTIPLE PIPE INSTALLATIONS WILL REQUIRE A MINIMUM OF 12" BETWEEN PIPES FOR PROPER COMPACTION.

TABLE OF EQUIVALENT PIPES

EQUIV. DIA.	REINF. CONC. ARCH PIPE	STEEL ARCH PIPE	ALUMINUM ARCH PIPE	REINF. CONC. ELLIPTICAL PIPE ◑
18"	22" x 13"	21" x 15"	21" x 15"	14" x 23"
21"		24" x 18"	24" x 18"	
24"	28" x 18"	28" x 20"	28" x 20"	19" x 30"
27"				22" x 34"
30"	36" x 22"	35" x 24"	35" x 24"	24" x 38"
36"	43" x 26"	42" x 29"	42" x 29"	29" x 45"
42"	51" x 31"	49" x 33"	49" x 33"	34" x 53"
48"	58" x 36"	57" x 38"	57" x 38"	38" x 60"
54"	65" x 40"	64" x 43"	64" x 43"	43" x 68"
60"	73" x 45"	71" x 47"	71" x 47"	48" x 76"
66"		77" x 52"	77" x 52"	53" x 83"
72"	88" x 54"	83" x 57"	83" x 57"	58" x 91"
78"		87" x 63"	92" x 65" ▲	63" x 98"
84"	102" x 62"	95" x 67"	95" x 67" ▲	68" x 106"
90"	115" x 72"	103" x 71"	103" x 71" ▲	72" x 113"
96"	122" x 77"	112" x 75"	112" x 75" ▲	77" x 121"

▲ STRUCTURAL PLATE ARCH.

BASIS OF PAYMENT

ITEM NO.	ITEM	UNIT
613 (R)	STANDARD BEDDING MATERIAL, CLASS A	CY
613 (S)	STANDARD BEDDING MATERIAL, CLASS B	CY
613 (T)	STANDARD BEDDING MATERIAL, CLASS C	CY
613 (V)	TRENCH EXCAVATION	CY

APPROVED BY ROADWAY ENGINEER: Calvin F. A DATE 04/16/15

ROADWAY DESIGN DIVISION STANDARD

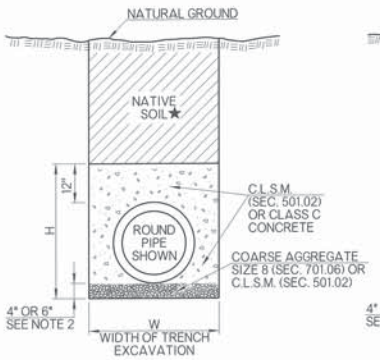
STANDARD PIPE INSTALLATION

OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

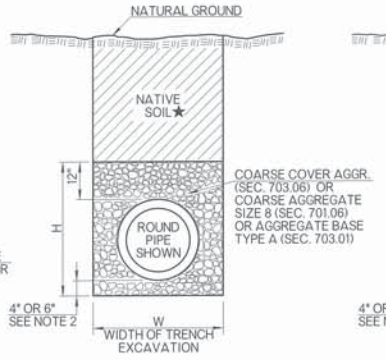
SPI-4 | 1

R-47

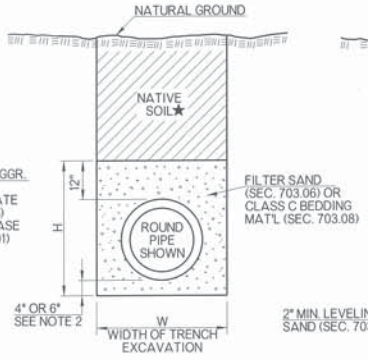
OKLAHOMA DEPARTMENT OF TRANSPORTATION	
STANDARD REVISIONS	
DESCRIPTION	DATE



CLASS A BEDDING

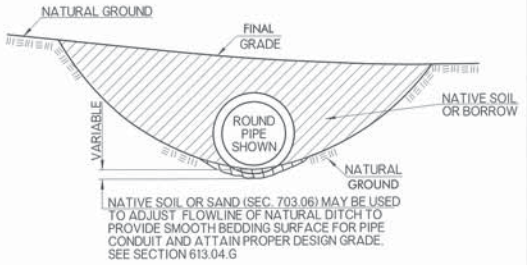


CLASS B BEDDING



CLASS C BEDDING

CLASS D BEDDING ALTERNATE 1



CLASS D BEDDING ALTERNATE 2

PIPE BEDDING CLASS/DESIGN TABLE							
	■ UNDER PAVING				OUTSIDE PAVING		
TYPE OF PIPE	CROSS DRAIN (NHS OR ADT > 6000 VPD)	CROSS DRAIN (OTHER)	STORM SEWER (NHS OR ADT > 6000 VPD)	STORM SEWER (OTHER)	CROSS DRAIN	SIDE DRAIN	STORM SEWER
REINFORCED CONCRETE PIPE	B	C	B	C	C	D	C
CORRUGATED GALV. STEEL PIPE (CGSP)	NA	B	NA	B	C	D	C
MILL PRECOATED CGSP	NA	B	NA	B	C	D	C
CORRUGATED GALV. STRUCT. PLATE	NA	B	NA	B	C	D	C
ALUMINIZED TYPE II CSP	NA	B	NA	B	C	D	C
CORRUGATED POLYETHYLENE / PVC	NA	A	NA	A	B	B	B
POLYVINYL CHLORIDE (SC 40/80 PVC)	NA	NA	NA	NA	NA	NA	NA
POLYPROPYLENE PIPE (PP) ▲	NA	B	NA	B	C	D	C

■ WHEN THERE IS ANY POSSIBILITY OF THE PAVEMENT BEING WIDENED DURING THE LIFE OF THE DRAINAGE STRUCTURE, THE BEDDING SHALL MEET THE 'UNDER PAVING SECTION' CRITERIA FOR THE FULL EXTENT OF ANY ANTICIPATED EXPANSION TO THE FACILITY.

▲ BACKFILL WITH A MINIMUM OF TWO (2) FEET OF APPROVED BACKFILL MATERIAL.

GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
2. EQUIVALENT PIPE SIZES 66 INCHES AND LARGER REQUIRE 6 INCHES OF BEDDING MATERIAL BELOW PIPE CONDUIT.
3. NATIVE SOIL FOR BACKFILL, TO BE COMPACTED IN ACCORDANCE WITH SECTION 202.04 OF THE STANDARD SPECIFICATIONS.
4. A BETTER CLASS OF BEDDING MAY BY SUBSTITUTED FOR THE NEXT LOWER CLASS. EXAMPLE: CLASS A STANDARD BEDDING CAN BE USED IN LIEU OF CLASS B STANDARD BEDDING.
5. FOR TRENCH WIDTH (W), BEDDING HEIGHT (H), PIPE DATA, MULTIPLE PIPE SPACING & BEDDING DATA, SEE ROADWAY STANDARDS SPI-4 & FPI-3.
6. DATA TABLE WILL DISPLAY 'NA' WHEN PIPE MATERIALS ARE NOT ALLOWED.
7. STANDARD BEDDING CLASS D MATERIAL(S) (ALTERNATE 1) WILL BE CONSIDERED AS INCIDENTAL AND NOT BE PAID FOR SEPARATELY. COST FOR BORROW OR FILL MATERIAL, NEEDED FOR ALTERNATE 2, WILL BE INCLUDED IN THE PRICE OF THE PIPE.
8. PIPE MATERIAL(S)/PRODUCT(S) NOT SHOWN IN THE PIPE BEDDING TABLE WILL BE EVALUATED AND APPROVED ON A CASE BY CASE BASIS.
9. ALL TEMPORARY PIPES SHALL HAVE CLASS D BEDDING UNLESS OTHERWISE SHOWN IN THE PLANS.
10. BEDDING MATERIAL TYPE B, C, AND D, SHALL BE PLACED IN 6" LAYERS AND COMPACTED TO THE SPECIFIED DENSITY USING HAND OPERATED EQUIPMENT ONLY.

★11. WHEN PIPE INSTALLATION IS UNDER PAVING, IN LIEU OF BACKFILLING WITH NATIVE SOIL, PLACE BEDDING MATERIAL ALL THE WAY TO TOP OF TRENCH.

12. THE USE OF AN ALTERNATE PIPE AND ITS CORRESPONDING BEDDING MATERIAL WILL BE ACCEPTABLE PROVIDED THE CRITERIA IN THE DESIGN TABLE IS MET
13. POLYPROPYLENE PIPE SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321.

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
613 (R)	STANDARD BEDDING MATERIAL, CLASS A	CY
613 (S)	STANDARD BEDDING MATERIAL, CLASS B	CY
613 (T)	STANDARD BEDDING MATERIAL, CLASS C	CY

APPROVED BY ROADWAY ENGINEER: Calvin F. A DATE 04/16/15

ROADWAY DESIGN DIVISION STANDARD

STANDARD PIPE BEDDING

OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

SPB-1 | 4

R-49

FULL CIRCLE STEEL PIPE CULVERT

PIPE DIAMETER FOR CORRUGATION PATTERN				MIN. COVER	MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE						
				TOP OF PIPE TO TOP OF SUBGRADE	EQUIV. STANDARD GAGE						
2 2/3" x 1/2"	3" x 1"	5" x 1"	6" x 2"		16	14	12	10	8	7	5
18"				12"	61'	67'	86'	90'	94'		
21"				12"	53'	57'	74'	77'	81'		
24"				12"	46'	50'	65'	68'	71'		
27"				12"	41'	44'	57'	60'	63'		
30"				12"	37'	40'	52'	54'	56'		
36"				12"	30'	33'	43'	45'	47'		
	36"			12"	53'	66'	77'	89'	100'		
42"				12"	34'	44'	46'	47'	49'		
	42"			12"	45'	56'	64'	71'	78'		
48"				12"		41'	44'	45'	46'		
	48"			12"	39'	49'	56'	61'	66'		
		48"		12"	49'	52'	56'	61'	66'		
54"				12"		36'	43'	44'	45'		
	54"			12"	35'	44'	51'	55'	58'		
		54"		12"	47'	48'	52'	55'	58'		
60"				12"			42'	43'	43'		
	60"			12"	31'	39'	49'	51'	53'		
		60"		12"	43'	46'	49'	51'	53'		
			60"	12"			46'	68'	90'	96'	106'
66"				12"				42'	43'		
	66"			12"	29'	36'	47'	48'	50'		
		66"		12"	39'	45'	47'	48'	50'		
			66"	12"			42'	62'	78'	82'	90'
72"				12"				42'	42'		
	72"			12"	26'	33'	45'	47'	48'		
		72"		12"	36'	44'	45'	47'	48'	73'	78'
			72"	12"			38'	57'	69'		
78"				12"					42'		
	78"			12"	24'	30'	44'	45'	46'		
		78"		12"	33'	42'	44'	45'	46'		
			78"	12"			35'	53'	63'	66'	70'
84"				12"					42'		
	84"			12"	22'	28'	42'	44'	45'		
		84"		12"	31'	39'	43'	44'	45'		
			84"	12"			33'	49'	59'	61'	64'
	90"			12"		26'	39'	44'	44'		
		90"		12"	29'	36'	43'	44'	44'		
			90"	12"			31'	45'	55'	57'	60'
	96"			12"		24'	36'	43'	44'		
		96"		12"		34'	43'	43'	44'		
			96"	12"			29'	43'	53'	54'	57'
	102"			24"			34'	41'	43'		
		102"		24"		32'	42'	43'	43'		
	108"			24"			32'	39'	43'		
		108"		24"			42'	42'	43'		
			108"	24"			25'	38'	49'	50'	52'
	114"			24"			31'	37'	41'		
		114"		24"			40'	42'	42'		
	120"			24"			29'	35'	39'		
		120"		24"			38'	42'	42'		
			120"	24"			23'	34'	45'	48'	49'

FULL CIRCLE ALUMINUM PIPE CULVERT

PIPE DIAMETER FOR CORRUGATION PATTERN			MIN. COVER	MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE				
			TOP OF PIPE TO TOP OF SUBGRADE	EQUIV. STANDARD GAGE				
2 2/3" x 1/2"	3" x 1"	6" x 1"		16	14	12	10	8
18"			12"	36'	36'	63'		
24"			12"	27'	27'	47'	50'	
27"			12"	24'	24'	42'	44'	
30"			12"	22'	21'	37'	39'	
	30"		12"	40'	50'	68'		
36"			12"		18'	32'	33'	
	36"		12"	33'	41'	57'	85'	
		36"	12"	20'				
42"			12"			54'	57'	
	42"		12"	27'	35'	48'	73'	
48"			12"			47'	49'	51'
	48"		12"	24'	30'	42'	63'	82'
54"			12"			41'	44'	45'
	54"		12"	21'	27'	37'	56'	73'
		54"	12"		29'	42'	67'	66'
60"			12"				39'	41'
	60"		12"	19'	24'	33'	24'	66'
		60"	12"		25'	37'	59'	58'
66"			12"				36'	37'
	66"		12"	14'	18'	26'	40'	51'
		66"	12"		23'	33'	53'	52'
	72"		12"		28'	27'	41'	54'
		72"	15"		19'	27'	36'	43'
	78"		15"		18'	25'	38'	50'
		78"	15"		17'	25'	32'	40'
	84"		18"		17'	23'	35'	47'
		84"	18"			23'	30'	37'
	90"		18"			21'	33'	43'
		90"	18"			21'	28'	34'
	96"		18"			20'	31'	40'
		96"	18"			19'	26'	32'
	102"		21"			18'	28'	37'
		102"	21"			18'	25'	29'
	108"		21"				27'	35'
		108"	21"			17'	23'	28'
	114"		24"				25'	34'
		114"	24"			16'	21'	26'
	120"		24"				24'	32'
		120"	24"				20'	25'

METAL PIPE ARCH - FILLS TO 10 FT. MAX.

APPROX. EQUIV. ROUND PIPE	SIZE SPAN x RISE	2 2/3" x 1/2" CORRUGATION PATTERN			
		STEEL		ALUMINUM	
		MIN. GAGE	MIN. COVER	MIN. GAGE	MIN. COVER
15"	17" x 13"	16	12"	16	12"
18"	21" x 15"	16	12"	16	12"
21"	24" x 18"	16	12"	16	12"
24"	28" x 20"	16	12"	14	12"
30"	35" x 24"	14◒	12"	14	12"
36"	42" x 29"	14	12"	12	15"
42"	49" x 33"	14	12"	12	15"
48"	57" x 38"	12	12"	10	15"
54"	64" x 43"	12	12"	10	18"
60"	71" x 47"	10	12"	8	18"
66"	77" x 52"	8	12"	8	18"
72"	83" x 57"	8	12"	8	18"
3" x 1" & 5" x 1" CORRUGATION PATTERN					
36"	40" x 31"	14	12"		
42"	46" x 36"	14	12"		
48"	53" x 41"	14	12"		
54"	60" x 46"	14	12"	14	15"
60"	66" x 51"	14	12"	14	18"
66"	73" x 55"	14	12"	14	18"
72"	81" x 59"	14	12"	12	21"
78"	87" x 63"	14	12"	12	21"
84"	95" x 67"	12	12"	12	24"
90"	103" x 71"	12	18"	10	24"
96"	112" x 75"	12	18"	10	27"
102"	117" x 79"	12	18"		
108"	128" x 83"	10	24"		
114"	137" x 87"	10	24"		
120"	142" x 91"	10	24"		

◒ WHEN INSTALLED UNDER PAVEMENT INCLUDING ALL P.C. OR A.C. SURFACING UNDER MAINLINE TRAFFIC AND MAJOR STREET RETURNS. A MINIMUM PIPE GAGE OF 16 MAY BE USED FOR INSTALLATION REQUIRING 30 INCH EQUIVALENT ROUND CONDUITS (MAX.) AND LIMITED TO LOW VOLUME COUNTY OR OFF-SYSTEM ROADS, MINOR STREET RETURNS, DRIVEWAYS OR TEMPORARY DETOURS, AS APPROVED BY THE ENGINEER.

POLY-PROPYLENE PIPE DIAMETER	MAXIMUM FILL HEIGHT OVER CULVERT (FT.) ◑			
	UNDER PAVEMENT		OUTSIDE PAVEMENT	
	95% COMPACT	90% COMPACT	Class C - 85% COMPACT	Class D - 85% COMPACT
18	25	18	16	13
24	22	16	14	12
30	23	17	13	12
36	22	16	11	11
42	22	15	11	11
48	21	15	11	10
60	23	16	11	10

◑ REFER TO ROADWAY DESIGN STANDARD SPB-1 FOR MINIMUM FILL HEIGHT AND OTHER POLYPROPYLENE INSTALLATION DETAILS.

EQUIVALENT METAL THICKNESS AND GAGE		
GAGE NUMBER	METAL THICKNESS (INCHES)	
	■ STEEL	♦ ALUMINUM
16	0.064	0.060
14	0.079	0.075
12	0.109	0.105
10	0.138	0.135
8	0.168	0.164
7	0.188	----
5	0.218	----

■ THE THICKNESS OF THE SHEET INCLUDES BOTH THE BASE STEEL AND THE COATING.

♦ THE THICKNESS SHOWN REFERS TO THE CLAD SHEET.

GENERAL NOTES

1. METAL PIPE FILL HEIGHT DESIGNS ARE BASED ON A CLASS B BEDDING, NEGATIVE PROJECTION, HS-20 LIVE LOADING AND 120 LBS/C.F. SOIL WEIGHT. POLYPROPYLENE PIPE FILL HEIGHTS ARE BASED ON AASHTO M330 FOR POLYPROPYLENE, TYPE S, PIPE WITH OUTER CORRUGATED WALL AND SMOOTH INNER WALL.
2. IN THE EVENT LOADS IN EXCESS OF HS-20 ARE TO BE OPERATED OVER OR ADJACENT TO THE PIPE INSTALLATION DURING THE CONSTRUCTION PHASE, THE CONTRACTOR SHALL PROVIDE AND MAINTAIN A MINIMUM OF FOUR FEET OF COVER OVER THE PIPE AT WHEEL OR TRACK PATHS.
3. PROPER INSTALLATION PRACTICES MUST BE ADHERED TO AS SHOWN ON ROADWAY STANDARDS SPI-4, FPI-3 AND SPB-1. POLYPROPYLENE PIPE SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321.
4. ANY PIPE DEFORMED PRIOR TO FINAL ACCEPTANCE SHALL BE REPLACED BY THE CONTRACTOR AT HIS EXPENSE. SURFACE DISTRESS MUST BE REPAIRED TO THE SATISFACTION OF THE ENGINEER OR REPLACED AT THE CONTRACTOR'S EXPENSE.
5. MAXIMUM FILL HEIGHTS ARE MEASURED TO TOP OF SUBGRADE (OR BOTTOM OF ASPHALT OR PC PAVEMENT) FOR METAL AND POLYPROPYLENE PIPES.

OKLAHOMA DEPARTMENT OF TRANSPORTATION

STANDARD REVISIONS

DESCRIPTION	DATE

APPROVED BY ROADWAY ENGINEER: Calvin F. A DATE: 04/16/15

ROADWAY DESIGN DIVISION STANDARD

FILL HEIGHT TABLES (METAL & POLYPROPYLENE PIPES)

OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

FHTMPP-1 | 0

R-50

OKLAHOMA DEPARTMENT OF TRANSPORTATION	
STANDARD REVISIONS	
DESCRIPTION	DATE

REQUIRED PIPE CLASS FOR REINFORCED CONCRETE ROUND PIPE IN CUT SECTIONS

PIPE DIAMETER	●MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE												
	1' TO 2'	2' THRU 10'	12'	14'	16'	18'	20'	25'	30'	35'	40'	45'	50'
12" 15" 18"	IV III III	II II II	II II II	II II II	II II II	II II II	III II II	III III III	III III III	III III III	III III III	III III III	III III III
24" 27" 30" 36"	III II II	II II II	II II III	III III III	III III IV	III III IV	III III IV	IV IV IV	IV IV IV	IV IV IV/V	IV IV IV/V	IV IV IV/V	IV IV IV/V
42" 48" 54" 60"	II II II	II II II	III III III	III III III	III III IV	IV IV IV	IV IV IV	IV IV IV	IV IV IV/V	IV/V IV/V IV/V	V V V	IV/V IV/V V	IV/V IV/V V
66" 72" 78" 84"	II II II	II II II	III III III	III III III	IV IV III	IV IV IV	IV IV IV	IV IV IV	IV/V IV/V IV/V	IV/V IV/V IV/V	V V V	V V V	V V V
90" 96" 102" 108"	II II II	II II II	II II II	III III III	III III III	IV IV IV	IV IV IV	IV IV IV	IV/V IV/V IV/V	IV/V IV/V IV/V	V V V	V V V	V V V

REQUIRED PIPE CLASS FOR REINFORCED CONCRETE ROUND PIPE IN FILL SECTIONS

PIPE DIAMETER	●MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE												
	1' TO 2'	2' THRU 10'	12'	14'	16'	18'	20'	25'	30'	35'	40'	45'	50'
12" 15" 18"	IV III III	II II II	III III III	III III III	IV IV IV	IV IV IV	IV IV IV	IV/V IV/V IV/V	V V V	* * *	* * *	* * *	* * *
24" 27" 30" 36"	III II II	II II II	III III III	III III III	IV IV IV	IV IV IV	IV IV IV	IV/V IV/V IV/V	V V V	* * *	* * *	* * *	* * *
42" 48" 54" 60"	II II II	II II II	III III II	III III III	IV IV III	IV IV IV	IV IV IV	IV/V IV/V IV/V	V V V	* * *	* * *	* * *	* * *
66" 72" 78" 84"	II II II	II II II	II II II	III III III	III III III	IV IV IV	IV IV IV	IV/V IV/V IV/V	V V V	V V V	* * *	* * *	* * *
90" 96" 102" 108"	II II II	II II II	II II II	III III III	III III III	IV IV IV	IV IV IV	IV/V IV/V IV/V	V V V	V V V	* * *	* * *	* * *

* SPECIAL DESIGN PIPE. DESIGN METHOD TO CONFORM TO CURRENT AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES.

● FILL HEIGHT MEASURED FROM TOP OF PIPE TO TOP OF SUBGRADE.

REINFORCED CONCRETE ARCH/ELLIPTICAL PIPE

▲ CLASS A - III ARCH
CLASS HE - III HORIZONTAL ELLIPTICAL
CLASS VE - IVVERTICAL ELLIPTICAL

APPROXIMATE EQUIVALENT ROUND PIPE	ARCH SIZE SPAN x RISE	HORIZONTAL ELLIPTICAL SIZE RISE x SPAN	VERTICAL ELLIPTICAL SIZE RISE x SPAN	MINIMUM COVER	MAXIMUM COVER
15"	18" x 11"			12"	10'
18"	22" x 13"	14" x 23"	23" x 14"	12"	10'
24"	28" x 18"	19" x 30"	30" x 19"	12"	10'
30"	36" x 22"	24" x 38"	38" x 24"	12"	10'
36"	43" x 26"	29" x 45"	45" x 29"	12"	10'
42"	51" x 31"	34" x 53"	53" x 34"	12"	10'
48"	58" x 36"	38" x 60"	60" x 38"	12"	10'
54"	65" x 40"	43" x 68"	68" x 43"	12"	10'
60"	73" x 45"	48" x 76"	76" x 48"	12"	10'
66"		53" x 83"	83" x 53"	12"	10'
72"	88" x 54"	58" x 91"	91" x 58"	12"	10'
78"		63" x 98"	98" x 63"	12"	10'
84"	102" x 62"	68" x 106"	106" x 68"	12"	10'
90"	115" x 72"	72" x 113"	113" x 72"	12"	10'
96"	122" x 77"	77" x 121"	121" x 77"	12"	10'
102"		82" x 128"	128" x 82"	12"	10'
108"	138" x 87"	87" x 136"	136" x 87"	12"	10'
114"		92" x 143"	143" x 92"	12"	10'
120"		97" x 151"	151" x 97"	12"	10'

▲ DIMENSIONS LISTED FOR ARCH PIPE IN PAY ITEMS SHOW TRUNCATED INCHES.

GENERAL NOTES

1. FILL HEIGHT DESIGNS ARE BASED ON A CLASS B BEDDING, NEGATIVE PROJECTION, HS-20 LIVE LOADING, AND 120 LBS/C.F. SOIL WEIGHT.
2. MINIMUM HEIGHT OF COVER FROM TOP OF PIPE TO TOP OF SUBGRADE FOR REINFORCED CONCRETE PIPE SHALL BE 12 INCHES.
3. IN THE EVENT LOADS IN EXCESS OF HS-20 ARE TO BE OPERATED OVER OR ADJACENT TO THE PIPE INSTALLATION DURING THE CONSTRUCTION PHASE, THE CONTRACTOR SHALL PROVIDE AND MAINTAIN A MINIMUM OF FOUR FEET OF COVER OVER THE PIPE AT WHEEL OR TRACK PATHS.
4. PROPER INSTALLATION PRACTICES MUST BE ADHERED TO AS SHOWN ON ROADWAY STANDARDS SPI-4, FPI-3 AND SPB-1.
5. ANY PIPE CRACKED PRIOR TO FINAL ACCEPTANCE SHALL BE REPLACED BY THE CONTRACTOR AT HIS EXPENSE. SURFACE DISTRESS MUST BE REPAIRED TO THE SATISFACTION OF THE ENGINEER, OR REPLACED AT THE CONTRACTOR'S EXPENSE.
6. PIPE DIMENSIONS LISTED IN TABLES CONFORM TO 2005 AASHTO DESIGNATIONS.
7. CLASS IV/V REINFORCED CONCRETE PIPE SHALL MEET STRENGTH TEST REQUIREMENTS OF A MAXIMUM 2000 POUNDS FOR CLASS IV AND 3000 POUNDS FOR CLASS V PIPE - FORCE PER LINEAR FOOT PER FOOT OF DIAMETER TO PRODUCE A 0.01 INCH CRACK, CONFORMING TO TEST PROCEDURE REFERENCES IN AASHTO M 170.

APPROVED BY ROADWAY ENGINEER: Calvin A. DATE 04/16/15

ROADWAY DESIGN DIVISION STANDARD

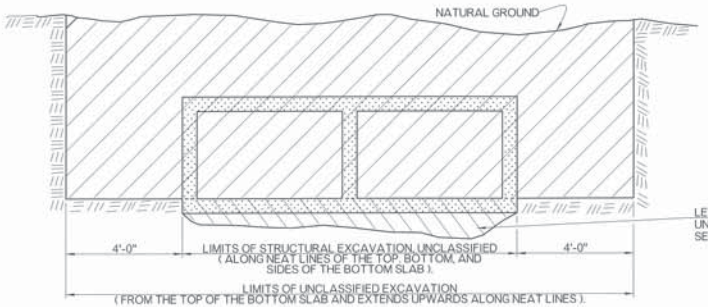
ODOT

FILL HEIGHT TABLES
(CONCRETE PIPES)

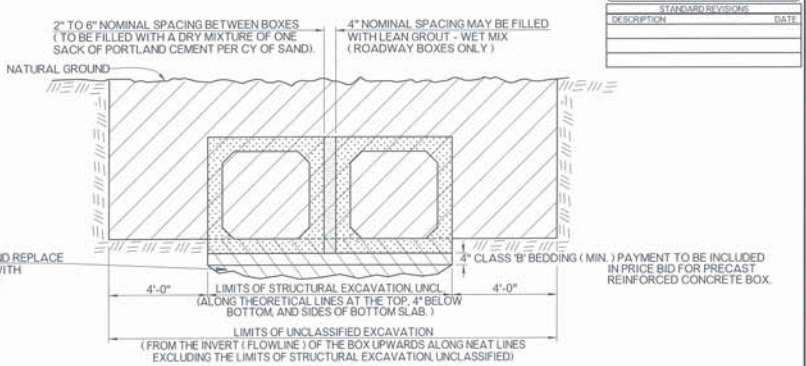
OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

FHTCP-3 | 1

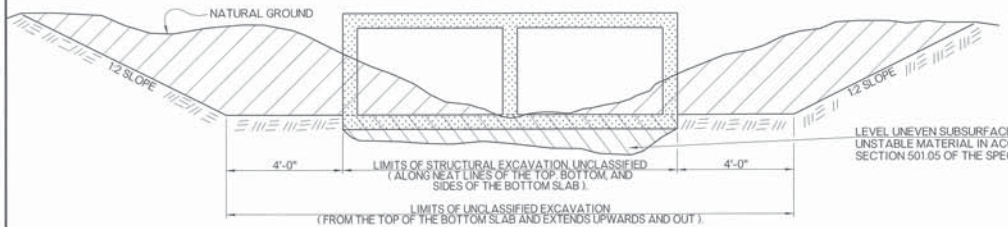
R-51



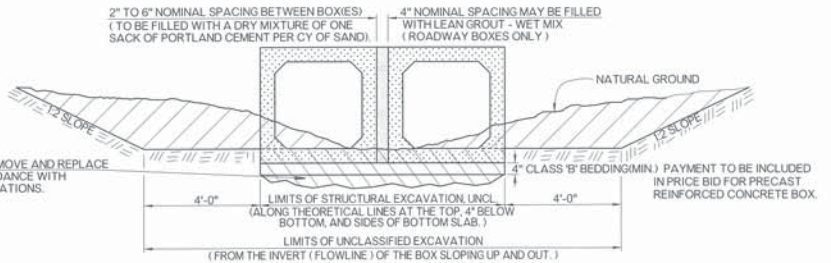
REQUIREMENTS FOR UNCLASSIFIED AND STRUCTURAL EXCAVATION OF RCB STORM SEWERS



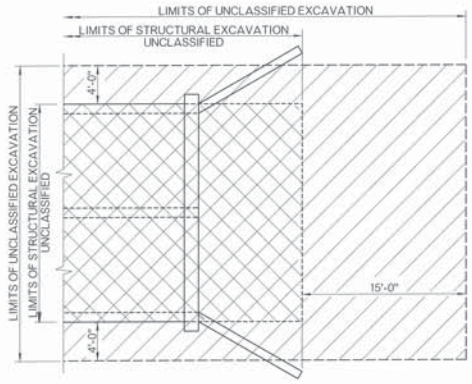
REQUIREMENTS FOR EXCAVATION OF PRECAST RCB STORM SEWERS



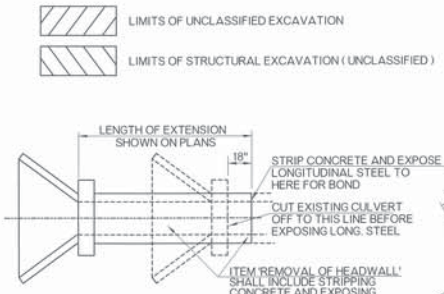
REQUIREMENTS FOR UNCLASSIFIED AND STRUCTURAL EXCAVATION OF RCB CULVERTS OF ROADWAY AND BRIDGE CLASSIFICATION



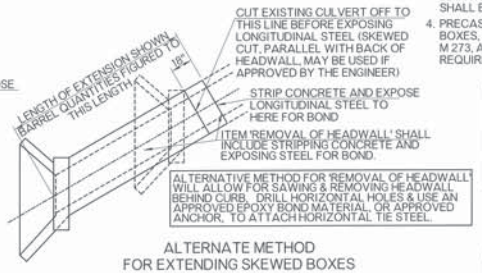
REQUIREMENTS FOR EXCAVATION OF PRECAST RCB CULVERTS OF ROADWAY AND BRIDGE CLASSIFICATION.



PLAN VIEW



ALTERNATE METHOD FOR EXTENDING 90° BOXES



ALTERNATE METHOD FOR EXTENDING SKEWED BOXES

GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
2. PAYMENT FOR CAST-IN-PLACE REINFORCED CONCRETE BOXES WILL BE IN CUBIC YARDS OF CLASS A OR CLASS AA CONCRETE AND POUNDS OF REINFORCING STEEL, IN ACCORDANCE WITH SECTION 509 AND 511 OF THE SPECIFICATIONS.
3. PAYMENT FOR PRECAST CONCRETE BOX CULVERTS WILL BE MADE BASED ON THE UNIT PRICE BID FOR ITEMS AND QUANTITIES OF A CAST-IN-PLACE BOX OF THE LENGTH REQUIRED AS DETERMINED BY FIELD MEASUREMENTS, AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH SECTION 508 OF THE SPECIFICATIONS.
4. PRECAST CONCRETE BOX SECTIONS, USED IN LIEU OF CAST-IN-PLACE CONCRETE BOXES, SHALL MEET MINIMUM DESIGN REQUIREMENTS OF AASHTO M 259 OR M 273, AND ASTM C1433 OR C1577, AND JOINT FILLER SHALL MEET THE REQUIREMENTS OF SUBSECTION 726.01.B OF THE SPECIFICATIONS.

BASIS OF PAYMENT

ITEM NO.	ITEM	UNIT
202 (A)	UNCLASSIFIED EXCAVATION	CY
501 (A)	STRUCTURAL EXCAVATION UNCLASSIFIED	CY
619 (B)	REMOVAL OF HEADWALL	EA

OKLAHOMA DEPARTMENT OF TRANSPORTATION

STANDARD REVISIONS

DESCRIPTION	DATE

APPROVED BY ROADWAY ENGINEER: Caleb F. A DATE: 04/16/15

ROADWAY DESIGN DIVISION STANDARD

STANDARD BOX INSTALLATION

OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

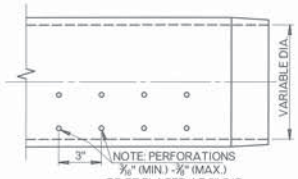
SBI-4 | 2

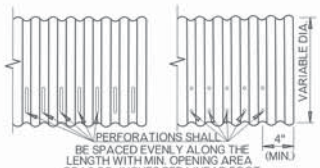
R-52

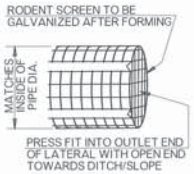
OKLAHOMA DEPARTMENT OF TRANSPORTATION	
STANDARD REVISIONS	
DESCRIPTION	DATE

TYPICAL COUPLING FOR
PVC PIPE UNDERDRAIN
1/4 SECTION REMOVED

TYPICAL CORRUGATED COUPLING
OR AN APPROVED EQUAL







TYPICAL RODENT SCREEN

POLYVINYL (PVC) PIPE UNDERDRAIN

CORRUGATED POLYETHYLENE PIPE UNDERDRAIN

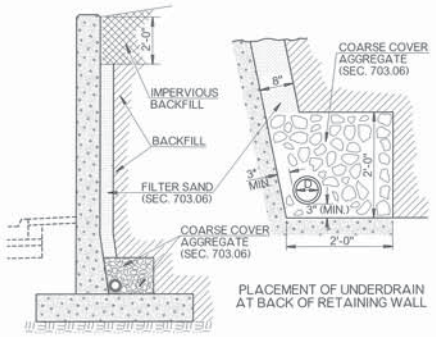
INSTALLATION TECHNIQUE: (12" DIAMETER OR SMALLER)

PERFORATED PIPE UNDERDRAIN, WHEN INSTALLED IN A TRENCH, SHALL BE BEDDED ON 4" OF COARSE COVER AGGREGATE. THE INSTALLED PIPE SHALL THEN BE CAREFULLY BACKFILLED WITH THE REMAINING COARSE COVER AGGREGATE TO 6" ABOVE THE TOP OF THE PIPE. FILTER SAND SHALL BE INSTALLED TO APPROXIMATELY 6" BELOW THE ORIGINAL NATURAL GROUND AS APPROVED BY THE ENGINEER. THE LAYER OF COARSE COVER AGGREGATE SHALL BE PAID FOR AS PIPE UNDERDRAIN COVER MATERIAL AND SHALL CONFORM TO SEC. 703.06. FILTER SAND SHALL BE PAID FOR AS CLASS C STANDARD BEDDING MATERIAL AND SHALL CONFORM TO SEC. 703.06.

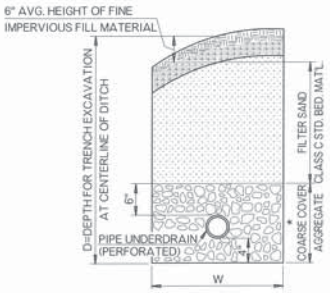
NON-PERFORATED PIPE UNDERDRAIN, WHEN INSTALLED IN A TRENCH, SHALL BE BEDDED IN A 4" LAYER CONSISTING OF COARSE AGGREGATE COVER MATERIAL OR A 50-50 MIX OF COARSE AGGREGATE COVER MATERIAL AND FILTER SAND. THIS LAYER OF COVER MATERIAL SHALL CONFORM TO SEC. 703.06, AND SHALL BE PAID FOR AS PIPE UNDERDRAIN COVER MATERIAL. THE REMAINING BACKFILL MAY BE NATIVE SOIL REMOVED IN THE TRENCHING OPERATION, FILTER SAND OR BACKFILLED ACCORDING TO THE ENGINEER. COST TO BE INCLUDED IN OTHER ITEMS OF WORK. SEE GENERAL NOTE NUMBERS 5 & 6.

GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
2. THE EXTENT, LOCATION AND DEPTH OF DRAINS MAY BE ADJUSTED BY THE ENGINEER TO SUIT CONDITIONS FOUND DURING CONSTRUCTION.
3. COST OF ALL FITTINGS TO BE INCLUDED IN THE PRICE BID PER LINEAR FOOT OF PIPE UNDERDRAIN.
4. FOR PIPE UNDERDRAIN OF UP TO 12" IN DIAMETER,
   W = 24" WITHOUT SHEETING AND SHORING.
   W = 36" WHEN SHEETING AND SHORING IS USED.
   SEE ROADWAY STANDARD SPI-4 FOR SHEETING & SHORING NOTES.
5. FOR PIPE UNDERDRAIN LARGER THAN 12" IN DIAMETER, SEE ROADWAY STANDARD SPI-4 FOR ADDITIONAL TRENCH EXCAVATION DETAILS.
6. NON-PERFORATED UNDERDRAIN PIPES, LARGER THAN 12", SHALL BE TREATED AS PIPE CONDUITS: I.E., PAY ITEMS SHALL CONSIST OF TRENCH EXCAVATION AND BEDDING MATERIAL. SEE STANDARD SPB-1.
7. MATERIALS SHOWN HERE ARE TYPICAL ONLY AND ARE NOT THE ONLY CHOICE FOR SUBSURFACE DRAINAGE PURPOSES.
8. OUTLET OPENING SHALL HAVE INSTALLED A REMOVABLE RODENT SCREEN HAVING A WIRE MESH DESIGN & 0.23" to 0.50" (NOM.) SQUARE OPENINGS. SCREEN MATERIAL MAY BE STAINLESS STEEL OR GALVANIZED WITH WIRE THICKNESS OF BETWEEN 0.023" & 0.038", AFTER SHAPING AND FABRICATION. RODENT SCREEN DESIGN SHALL BE APPROVED BY THE ENGINEER.
9. THE FINAL SECTION OF THE OUTLET LATERAL CONDUIT SHALL BE NON-PERFORATED, SCHEDULE 40 OR TYPE S HIGH DENSITY POLYETHYLENE AND A MINIMUM 20'-0" IN LENGTH, INCLUDING COUPLINGS.
10. FOR DETAILS OF OUTLET LATERAL HEADWALL, SEE ROADWAY STANDARD PED-3.

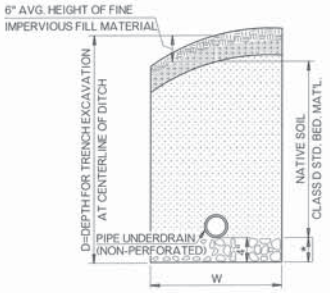


PLACEMENT OF UNDERDRAIN
AT BACK OF RETAINING WALL



DETAIL
TRENCH EXCAVATION
PERFORATED PIPE
UNDERDRAIN INSTALLATIONS

* PIPE UNDERDRAIN COVER MATERIAL



DETAIL
TRENCH EXCAVATION
NON-PERFORATED PIPE
UNDERDRAIN INSTALLATIONS

* PIPE UNDERDRAIN COVER MATERIAL

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
613 (H)	■ PERFORATED PIPE UNDERDRAIN ROUND	LF
613 (I)	■ NON-PERFORATED PIPE UNDERDRAIN RND.	LF
613 (Q)	OUTLET LATERAL HEADWALL	EA
613 (T)	STANDARD BEDDING MATERIAL, CLASS C	CY
613 (U)	PIPE UNDERDRAIN COVER MATERIAL	CY
613 (V)	TRENCH EXCAVATION	CY

■ DIMENSION TO BE SPECIFIED IN INCHES

APPROVED BY
ROADWAY ENGINEER: Calvin F. H. DATE: 04/16/15

ROADWAY DESIGN DIVISION STANDARD

PIPE UNDERDRAIN INSTALLATION

OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

PUD-3 | 2

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OKLAHOMA DEPARTMENT OF TRANSPORTATION	
STANDARD REVISIONS	
DESCRIPTION	DATE

● SPEED FACTOR MAY BE DESIGN SPEED, OBSERVED SPEED OR ASSIGNED SPEED BASED UPON PREDICTABLE GROWTH FACTORS OR PENDING IMPROVEMENTS.

THRU ROAD SPEED ● MPH	DA	
	MINIMUM	DESIRABLE
≤ 35	65'	200'
36-49	70'	233'
50-54	70'	267'
≥ 55	65'	295'

THRU ROAD SPEED ● MPH	D	
	MINIMUM	DESIRABLE
≤ 35	65'	100'
36-49	100'	133'
50-54	125'	167'
≥ 55	150'	200'

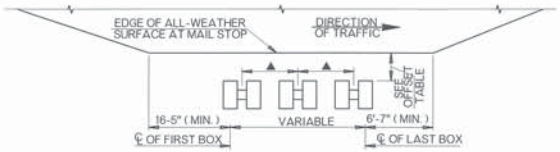
DC	
NORMAL	MINIMUM
100'	65'

DS	
NORMAL	MINIMUM
150'	100'

SUGGESTED MINIMUM CLEARANCE DISTANCES TO NEAREST MAILBOX IN MAIL STOPS AT INTERSECTIONS

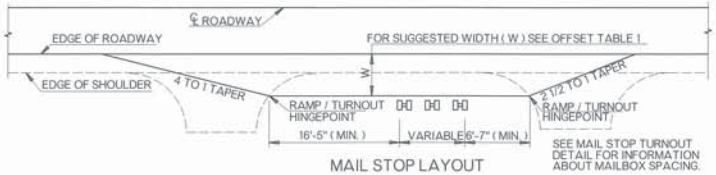
OFFSET TABLE				
HIGHWAY TYPE AND TRAFFIC CONDITIONS	WIDTH OF ALL-WEATHER SURFACE OF TURNOUT OR AVAILABLE SHOULDER AT MAILBOX		DISTANCE ROADSIDE FACE OF MAILBOX IS TO BE OFFSET BEHIND EDGE OF TURNOUT OR USABLE SHOULDER	
	PREFERRED	MINIMUM	PREFERRED	MINIMUM
RURAL HIGHWAY ADT OVER 10,000 VPD	12'	8'	8" TO 12"	0
RURAL HIGHWAY ADT 1,500 TO 10,000 VPD	12'	8'	8" TO 12"	0
RURAL HIGHWAY ADT 400 TO 1,500 VPD	10'	8'	8" TO 12"	0
RURAL ROAD ADT UNDER 400 VPD	8'	6'	8" TO 12"	10"
RURAL ROAD ADT UNDER 50 VPD SPEED 40 MPH OR LESS	6'	2'	8" TO 12"	0
RESIDENTIAL STREET WITHOUT CURB OR ALL-WEATHER SHOULDER	6'	0	8" TO 12"	10" ●
CURBED STREET	NOT APPLICABLE		8" TO 12" BEHIND FACE OF CURB	6" BEHIND FACE OF CURB

ADT-AVERAGE DAILY TRAFFIC, THROUGH ROAD ONLY
VPD-VEHICLES PER DAY
● IF TURNOUT IS PROVIDED, THIS MAY BE REDUCED TO ZERO.



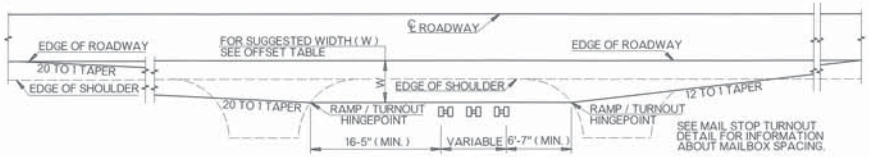
MAIL STOP TURNOUT DETAIL

▲ RECOMMENDED MINIMUM SPACING IS 3/4 OF THE DIMENSION FROM THE GROUND LINE TO THE BOTTOM OF THE MAILBOX



MAIL STOP LAYOUT

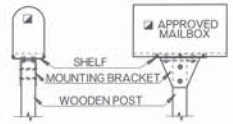
FOR ROADS CARRYING TRAFFIC AT 40 MPH OR LESS OR FOR LOCAL AND COLLECTOR ROADS



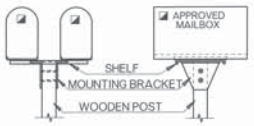
MAIL STOP LAYOUT

ROADS CARRYING TRAFFIC AT SPEED OVER 40 MPH

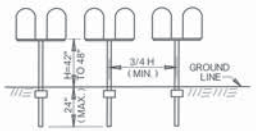
◪ MAILBOX DIMENSIONS & SIZES			
MAILBOX DESIGN TYPE	DIMENSIONS (NOM.)		
	LENGTH	WIDTH	HEIGHT
1	19"	6 1/2"	8 1/2"
1-A	21"	8"	10 1/2"
2	23 1/2"	11 1/2"	13 1/2"



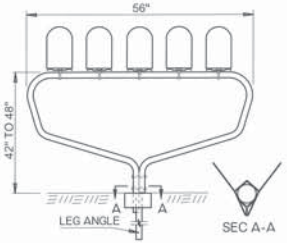
MAILBOX INSTALLATION - SINGLE WOODEN POST SUPPORT & BRACKET ASSEMBLY DETAILS



MAILBOX INSTALLATION - MULTIPLE (DOUBLE OR TWIN BOX)



POST SPACING DETAIL
MULTIPLE BOX INSTALLATION
SINGLE POST SERIES



MAILBOX INSTALLATION - MULTIPLE (MULTIPLE BOX SUPPORT DETAILS)

MAXIMUM NUMBER OF MAILBOXES = 5

GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
2. MAILBOX INSTALLATION, SINGLE OR MULTIPLE TYPE, SHALL BE OF A DESIGN AND MATERIAL THAT HAS BEEN CRASH TESTED AND APPROVED. OTHER DESIGNS OR MAILBOX TYPES SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.
3. IF MAILBOX IS INSTALLED IN AN AREA WITH GUARDRAIL, MAILBOX AND/OR POST ASSEMBLY SHOULD BE BEHIND OR FLUSH WITH FACE OF RAIL.
4. PRODUCER AND CONTRACTOR SHALL AVOID PATENT INFRINGEMENT OF THE MAILBOX SUPPORT ASSEMBLY AND SHALL SAVE THE STATE HARMLESS IN THE USE OF ANY MAILBOX SUPPORT ASSEMBLY.
5. ALTERNATE WOODEN POST SUPPORT INSTALLATIONS MAY BE USED IN LIEU OF METAL PIPE SUPPORT UNITS IF WOODEN COMPONENTS CONFORM TO CURRENT SPECIFICATIONS.
6. PRICE OF EACH MAILBOX INSTALLATION, SINGLE OR MULTIPLE, INCLUDES PAYMENT FOR INSTALLATION OF THE POST SYSTEM, SUPPORT POST, ALL ATTACHMENT HARDWARE AND MOUNTING OF THE MAILBOX. PAYMENT FOR THE MAILBOX WILL BE PAID FOR BY THE EACH AND SEPARATELY FROM THE SUPPORT SYSTEM.
7. IF MAILBOX IS INSTALLED BEHIND CURB, ANY SIDEWALKS WILL REQUIRE A MINIMUM 3'-0" OF USABLE SPACE BEHIND THE MAILBOX.

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
◪ 629 (A)	MAILBOX INSTALLATION - SINGLE	EA
◪ 629 (B)	MAILBOX INSTALLATION - MULTIPLE	EA
629 (C)	MAILBOX	EA
629 (D)	REMOVAL OF MAILBOX INSTALLATION	EA
629 (E)	REMOVE AND RESET MAILBOX	EA

◪ MAILBOX DESIGN TYPE(S) AND LOCATION(S) SHALL BE SPECIFIED IN THE PLANS.

APPROVED BY ROADWAY ENGINEER: Calvin E. A DATE: 04/16/15

ROADWAY DESIGN DIVISION STANDARD

MAILBOX INSTALLATION

OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

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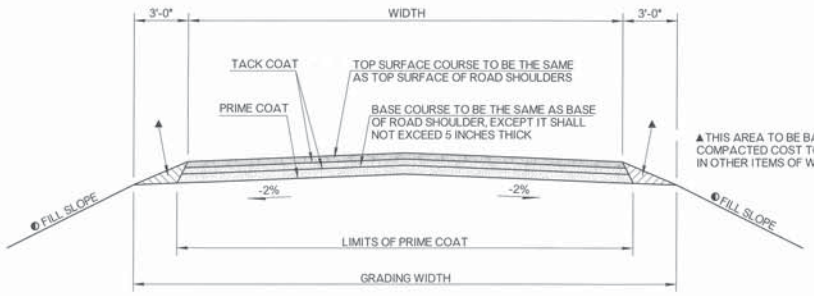
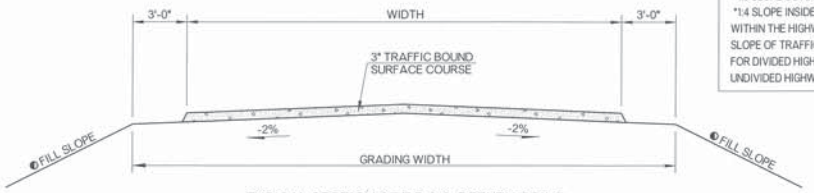
OKLAHOMA DEPARTMENT OF TRANSPORTATION	
STANDARD REVISIONS	
DESCRIPTION	DATE

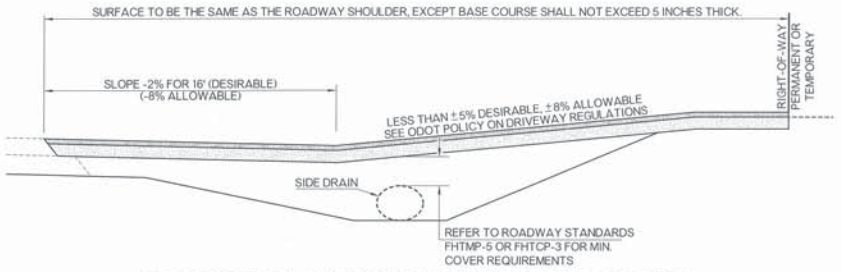


TYPICAL SECTION OF ASPHALT RETURN/DRIVE

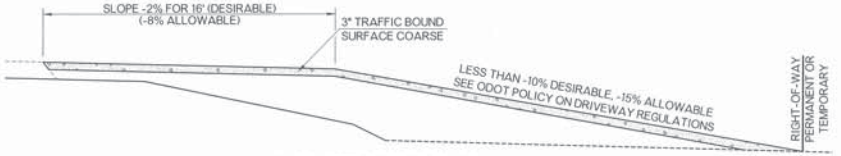


TYPICAL SECTION OF T.B.S.C. RETURN/DRIVE

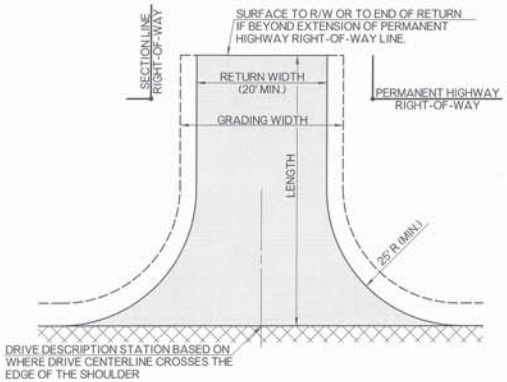
◐FILL SLOPE NOTES:
FILL SLOPE AS SHOWN IN TYPICAL SECTIONS SHALL NOT EXCEED:
*1:3 SLOPE OUTSIDE HIGHWAY CLEARZONE
*1:4 SLOPE INSIDE HIGHWAY CLEARZONE
WITHIN THE HIGHWAY CLEARZONE, ADJUST SLOPE OF TRAFFIC APPROACH END TO 1:10 FOR DIVIDED HIGHWAYS AND 1:6 FOR UNDIVIDED HIGHWAYS.



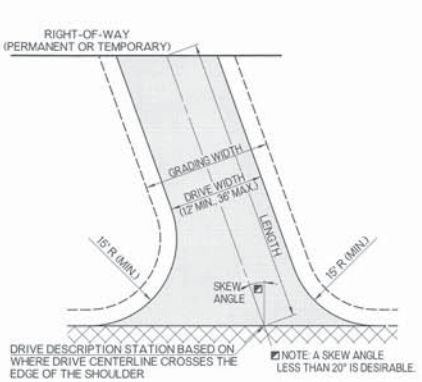
PROFILE OF TYPICAL ASPHALT RETURN/DRIVE ON ROADWAY CUT SECTION



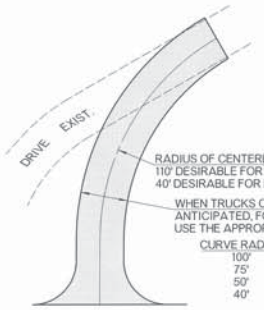
PROFILE OF TYPICAL T.B.S.C. RETURN/DRIVE ON ROADWAY FILL SECTION



PLAN TYPICAL SECTION LINE RETURN



PLAN TYPICAL DRIVE ON SKEW



CURVE RADIUS	MIN. WIDTH
100'	14'
75'	16'
50'	18'
40'	20'

SECTION LINE OR DRIVE
WITH CURVED ALIGNMENT

PROPOSED DRIVES AND RETURNS SHALL MATCH EXISTING EXCEPT WHEN SKEW ANGLE EXCEEDS 20 DEGREES; IT IS THEN DESIRED TO SHIFT THE LOCATION AND CONSTRUCT USING CURVED ALIGNMENT

USEFUL ABBREVIATIONS FOR PLAN SHEETS:

ASPH.	ASPHALT
T.B.S.C.	TRAFFIC BOUND SURFACE COARSE
CONC.	CONCRETE
SEC. RET.	SECTION LINE RETURN
FIELD ENT.	FIELD ENTRANCE
PVT. DRIVE	PRIVATE DRIVE
COMM. DRIVE	COMMERCIAL DRIVE
W/S.D.	WITH SIDE DRAIN
AS DIKE	AS DIKE ACROSS DITCH

APPROVED BY ROADWAY ENGINEER: _____ DATE: 04/16/15

ROADWAY DESIGN DIVISION STANDARD

RURAL DRIVEWAY INSTALLATION

OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

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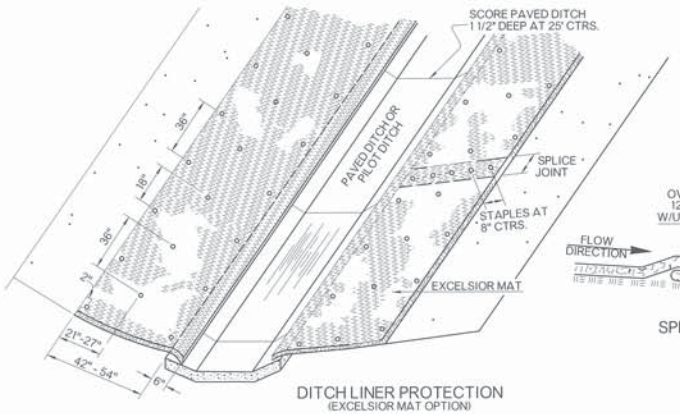
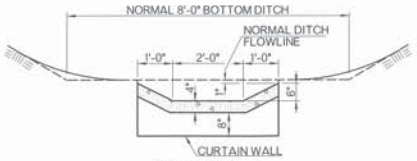
OKLAHOMA DEPARTMENT OF TRANSPORTATION	
STANDARD REVISIONS	
DESCRIPTION	DATE

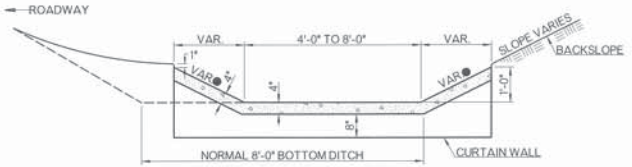


DITCH LINER PROTECTION
(EXCELSIOR MAT OPTION)

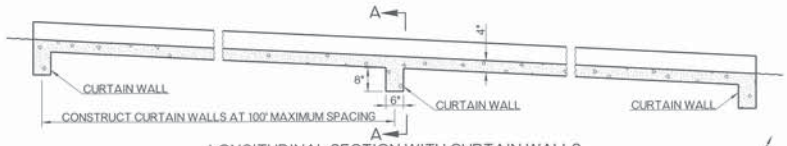
SPLICE JOINT



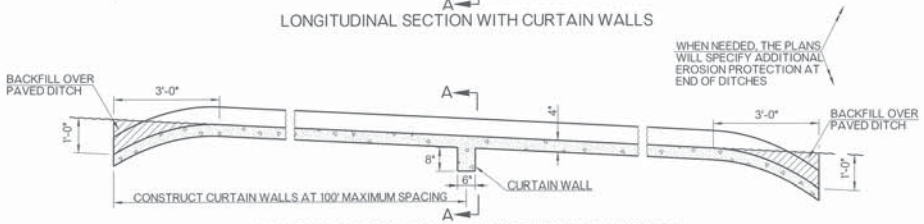
SECTION A - A
DESIGN NO. 1



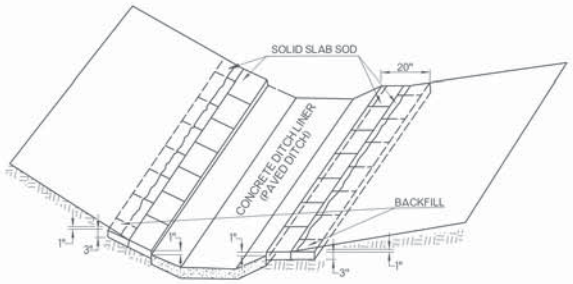
SECTION A - A
DESIGN NO. 2



LONGITUDINAL SECTION WITH CURTAIN WALLS



OPTIONAL LONGITUDINAL SECTION WITH BURIED ENDS
(BURIED ENDS SHALL NOT BE USED ADJACENT TO DRAINAGE STRUCTURES)



DITCH LINER PROTECTION
(SOLID SLAB SOD OPTION)

DESIGN NO. 1 - A PAVED PILOT DITCH TO BE PLACED 6" BELOW THE NORMAL FLOWLINE AND IN THE CENTER OF A STANDARD DITCH

DESIGN NO. 2 - A DITCH THAT IS PAVED AND HAVING THE SAME FLOWLINE AS A STANDARD UNPAVED DITCH

QUANTITIES OF CLASS C CONCRETE PER LF OF PAVED DITCH
QUANTITIES IN CUBIC YARDS

	DESIGN NO. 1					DESIGN NO. 2					
BOTTOM WIDTH	2'-0"	3'-0"	4'-0"	5'-0"	6'-0"	4'-0"	5'-0"	6'-0"	7'-0"	8'-0"	
K1	.0522	.0645	.0769	.0892	.1016	.1274	.1397	.1521	.1644	.1768	DES. 2A
K2	.0586	.0709	.0832	.0955	.1078	.1790	.1913	.2036	.2159	.2282	
● VARIABLE AS SHOWN ON PLANS DESIGN 2A = 1:3 SLOPES DESIGN 2B = 1:2 SLOPES DESIGN 2C = 1:1 SLOPES						K1	.1045	.1168	.1292	.1415	.1539	DES. 2B
						K2	.1357	.1480	.1603	.1726	.1850	
						K1	.0923	.1048	.1172	.1295	.1479	DES. 2C
						K2	.1105	.1228	.1352	.1476	.1600	

TOTAL CLASS C CONC. = (LENGTH OF PAVED DITCH) (K1) + (NO. OF CURT. WALLS) (K2)
K1=CU. YDS. OF CONCRETE PER LINEAR FOOT
K2=CU. YDS. OF CONCRETE PER CURTAIN WALL

GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
2. ALL COST OF ADDITIONAL BORROW OR EXCAVATION, REQUIRED FOR INSTALLING PAVED DITCH, SHALL BE INCLUDED IN PRICE BID FOR CLASS C CONCRETE.
3. THE DITCH SHALL BE WATERED, AND COMPACTED, BEFORE PLACING CLASS C CONCRETE.
4. DITCH LINER PROTECTION MAY BE EITHER EXCELSIOR MAT, OR SOLID SLAB SOD, AND SHALL BE MEASURED BY THE LINEAR FOOT OF DITCH (PAVED DITCH), IN PLACE.

BASIS OF PAYMENT

ITEM NO.	ITEM	UNIT
509 (D)	CLASS C CONCRETE	CY
229	DITCH LINER PROTECTION	LF

APPROVED BY ROADWAY ENGINEER: Calvert A DATE 04/10/15

ROADWAY DESIGN DIVISION STANDARD

PAVED DITCHES AND FLUMES

OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

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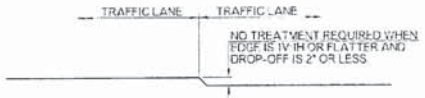
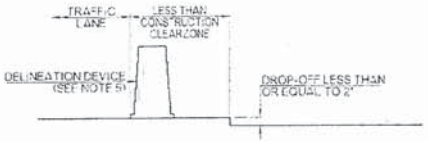
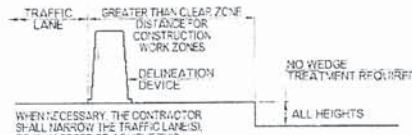
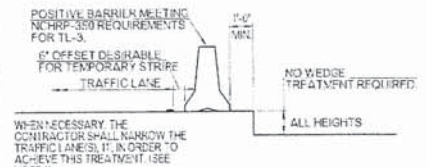
CROSS SECTION	CONDITION		DROP-OFF TREATMENT	SIGN
	DIFFERENTIAL	TIME		
 TREATMENT 1	BETWEEN TRAFFIC LANES PAVEMENT EDGE DIFFERENTIAL LESS THAN OR EQUAL TO 2"	NON-WORKING HOURS NOTE: FOR WORKING HOURS, USE DELINEATION LIKE TREATMENT 2	NO WEDGE REQUIRED FOR OVERLAYS 1" WEDGE TREATMENT FOR MILLED DROP-OFFS	 W8-11 (SEE NOTE 4)
 TREATMENT 2	INSIDE CONSTRUCTION CLEARZONE PAVEMENT EDGE DIFFERENTIAL LESS THAN OR EQUAL TO 2"	NON-WORKING AND WORKING HOURS	NO WEDGE REQUIRED	 W8-17 W8-17P (SEE NOTE 3)
 TREATMENT 3 FOR POSTED SPEEDS 45 MPH OR LESS. NOT TO BE USED ON INTERSTATES	INSIDE CONSTRUCTION CLEARZONE WITH DIFFERENTIAL GREATER THAN 2" AND LESS THAN OR EQUAL TO 18" NOTE: FOR DIFFERENTIAL GREATER THAN 18", USE TREATMENT 4 OR 5	NON-WORKING HOURS	WEDGE TREATMENT SLOPE = 1V:4H OR FLATTER	 W8-17 W8-17P (SEE NOTE 3)
		WORKING HOURS	NO WEDGE REQUIRED	
 TREATMENT 4	OUTSIDE CONSTRUCTION CLEARZONE ALL HEIGHTS OF EDGE DIFFERENTIAL	NON-WORKING AND WORKING HOURS WHERE PLANS REQUIRE ADJACENT LANE CLOSURE WITH CHANNELIZATION OR PARTIAL LANE CLOSURE WITH BARRIER	NO WEDGE REQUIRED	ONLY NORMAL CONSTRUCTION SIGNING REQUIRED
 TREATMENT 5	INSIDE CONSTRUCTION CLEARZONE POSITIVE BARRIER FOR SEPARATION ALL HEIGHTS OF EDGE DIFFERENTIAL	NON-WORKING AND WORKING HOURS WHERE PLANS REQUIRE ADJACENT LANE CLOSURE WITH CHANNELIZATION OR PARTIAL LANE CLOSURE WITH BARRIER	NO WEDGE REQUIRED	ONLY NORMAL CONSTRUCTION SIGNING REQUIRED

OKLAHOMA DEPARTMENT OF TRANSPORTATION

STANDARD REVISIONS

DESCRIPTION	DATE

RECOMMENDED CLEAR ZONE DISTANCE (FT.) FOR CONSTRUCTION WORK ZONES

DESIGN SPEED	DESIGN ADT	FILL SLOPES (V:H)			CUT SLOPES (V:H)		
		1:6 OR FLATTER	1:5 TO 1:4	1:3	1:3	1:4 TO 1:5	1:6 OR FLATTER
40 MPH OR LESS	UNDER 750	4	4	SEE PROCEDURE IN SECTION 11.2.2 OF THE ODOT ROADWAY DESIGN MANUAL	4	4	4
	750 - 1500	5	6		5	5	5
	1500 - 6000	6	7		6	6	6
	OVER 6000	7	8		7	7	7
45 - 50 MPH	UNDER 750	5	6		4	4	5
	750 - 1500	7	8		5	6	7
	1500 - 6000	8	10		6	7	8
	OVER 6000	10	12		7	9	10
55 MPH	UNDER 750	6	7		4	5	5
	750 - 1500	8	10		5	7	8
	1500 - 6000	10	12		7	8	10
	OVER 6000	11	13		9	10	11
60 MPH	UNDER 750	8	10		5	6	7
	750 - 1500	10	13		6	8	10
	1500 - 6000	13	16★		7	9	12
	OVER 6000	15	16★		10	12	13
65 - 70 MPH	UNDER 750	9	10		5	7	7
	750 - 1500	12	14		6	9	10
	1500 - 6000	14	17★		8	11	13
	OVER 6000	15	19★		11	13	14

★ THE CLEARZONE MAY BE LIMITED TO 15' FOR PRACTICALITY AND TO PROVIDE A CONSISTENT ROADWAY TEMPLATE.

ALL DISTANCES ARE MEASURED FROM THE EDGE OF THE DRIVING LANE.

FOR CLEAR ZONES, THE "DESIGN ADT" WILL BE THE TOTAL ADT ON TWO-WAY ROADWAYS AND DIRECTIONAL ADT ON ONE-WAY ROADWAYS.

V:H = VERTICAL : HORIZONTAL

GENERAL NOTES

1. EDGE DROP-OFF TREATMENTS SHOWN ON THIS STANDARD ARE INTENDED FOR TEMPORARY DROP-OFFS IN CONSTRUCTION WORK ZONES.
2. DELINEATION DEVICES, AND WARNING DEVICES WILL BE REQUIRED IN ACCORDANCE WITH M.U.T.C.D. AND APPLICABLE TRAFFIC STANDARDS.
3. EDGE DROP-OFF SIGNS TO REMAIN IN PLACE UNTIL PERMANENT SHOULDER SHAPING IS COMPLETE.
4. UNEVEN LANES SIGNS TO REMAIN IN PLACE UNTIL THIS SITE CONDITION IS NO LONGER VALID.
5. THE FOLLOWING ARE THE ONLY ACCEPTABLE DELINEATION DEVICES FOR DROP-OFF APPLICATIONS, AND SHALL BE PLACED ON TOP OF PAVEMENT SURFACE:
   A. DRUMS
   B. CONES
   C. TUBULAR MARKERS
   D. VERTICAL PANELS
6. ALL WEDGES FOR DROP-OFF TREATMENTS, SHALL BE STABLE AND COMPACTED MATERIAL CAPABLE OF SUPPORTING TRAFFIC.
7. THE CONTRACTOR MAY USE TREATMENT 5 IN LIEU OF WEDGE TREATMENT WHEN ALTERNATE CONSTRUCTION TRAFFIC CONTROL PLANS, ARE APPROVED BY THE ENGINEER.
8. DAILY INSPECTIONS SHALL BE CONDUCTED BY THE CONTRACTOR TO ASSURE THAT NO EROSION, EXCESSIVE SLOPES, RUTTING OR OTHER DEFICIENCIES EXIST. ANY DEFICIENCIES SHALL BE CORRECTED IMMEDIATELY AT THE CONTRACTOR'S EXPENSE.
9. THE SPACING OF THE DELINEATION DEVICES (FT.) SHALL BE EQUAL TO THE DESIGN SPEED OF THE DETOUR (MILES PER HOUR)
10. WORKING HOURS ARE DEFINED AS WHEN WORKERS ARE PRESENT AND WORKING ON CONSTRUCTION RELATED ITEMS AND IN AN AREA WHERE EDGE DROP OFFS NEED TO BE REDUCED OR REMOVED.
11. FOR ALL NON-INTERSTATE AND NON-DIVIDED HIGHWAYS, A TRAFFIC LANE WIDTH OF 11' IS DESIRED. HOWEVER, ON A SITE BY SITE BASIS THE CONTRACTOR CAN ADJUST THE TRAFFIC LANE AND SHOULDER (IF ANY) TO NO LESS THAN A 10' TRAFFIC LANE WIDTH.

APPROVED BY ROADWAY ENGINEER: _____ DATE: _____

ROADWAY DESIGN DIVISION STANDARD

PAVEMENT DROP-OFF TREATMENTS

OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

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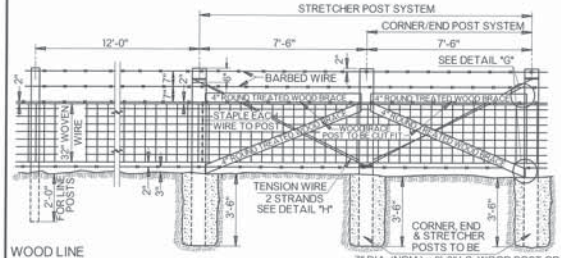
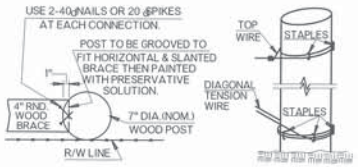


WOOD LINE POST DETAIL

END, CORNER AND STRETCHER POST DETAIL

7" DIA. (NOM.) x 8'-0" LG. WOOD POST OR 3 1/2" DIA. x 8'-0" LG. GALV. STEEL POST

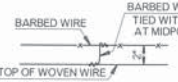
USE STRETCHER DETAILS AT ALL CORNERS, BENDS IN R/W, HILLTOPS, IN VALLEYS OR DEEP DEPRESSIONS AND AT 500'-0" MAXIMUM SPACING USE END POSTS FOR CROSS FENCE CONNECTIONS.

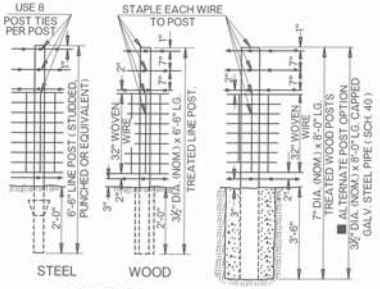


DETAIL "G"

DETAIL "H"

IF 3 1/2 " DIA. x 8'-0" LONG GALV. STEEL (SCH. 40) PIPE IS USED AS ALTERNATIVE POST (■), THEN 2" DIA. GALV. STEEL PIPES (SCH. 40) WILL BE USED AS BRACING AND ATTACHED USING STANDARD CHAIN LINK FENCE HARDWARE MEETING THE REQUIREMENTS OF AASHTO M 181 AND ASTM A53. SEE CHAINLINK DETAILS ON ROADWAY STANDARD RWF3-2.





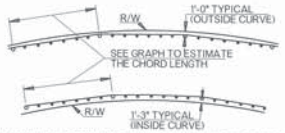
STEEL LINE POSTS

HOLES FOR WOOD LINE POSTS SHALL BE DRILLED 8" DIAMETER OR POST MAY BE DRIVEN.

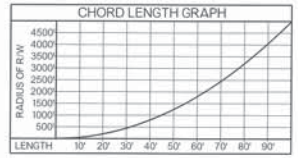
WOOD

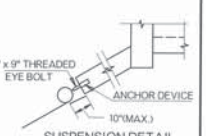
CORNER, STRETCHER, GATE, OR END POST

HOLE SHALL BE 18" DIA. (MIN.) REQUIRES CONCRETE FOOTING

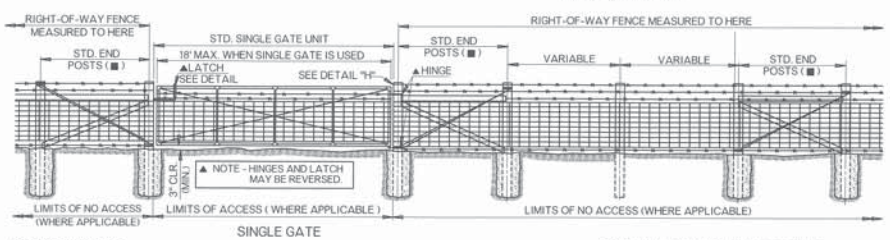


TYPICAL PLACEMENT FOR FENCE ALONG CURVES (WHEN R/W RADIUS IS LESS THAN 5000')

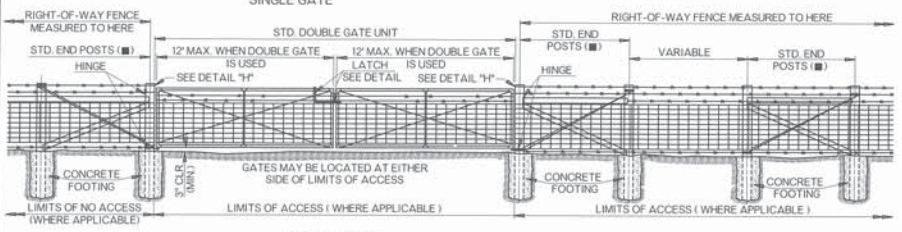




SUSPENSION DETAIL

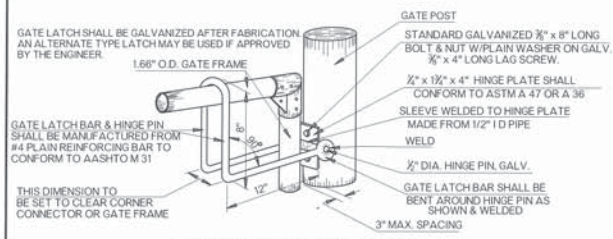


SINGLE GATE



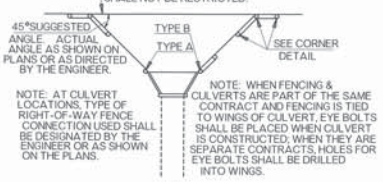
DOUBLE GATE

GATE DETAILS



TYPICAL GATE LATCH DETAIL

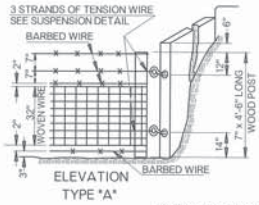
WHERE REQUIRED, PROPERTY OWNER SHALL CONSTRUCT AND MAINTAIN AT HIS OWN EXPENSE FENCING AND/OR WATER GATE BETWEEN CORNER POSTS. THE FLOW SHALL NOT BE RESTRICTED.



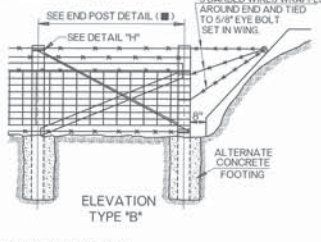
NOTE: AT CULVERT LOCATIONS, TYPE OF RIGHT-OF-WAY FENCE CONNECTION USED SHALL BE DESIGNATED BY THE ENGINEER OR AS SHOWN ON THE PLANS.

NOTE: WHEN FENCING & CULVERTS ARE PART OF THE SAME CONTRACT AND FENCING IS TIED TO WINGS OF CULVERT, EYE BOLTS SHALL BE PLACED WHEN CULVERT IS CONSTRUCTED; WHEN THEY ARE SEPARATE CONTRACTS, HOLES FOR EYE BOLTS SHALL BE DRILLED INTO WINGS.

PLAN

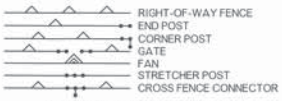


ELEVATION TYPE "A"



ELEVATION TYPE "B"

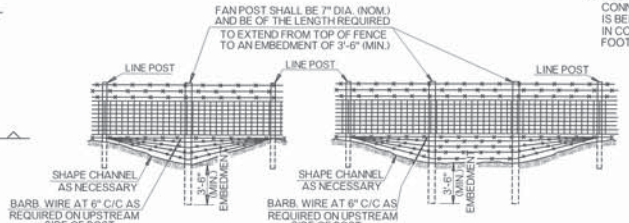
CONNECTIONS AT CULVERTS



FENCING SYMBOLS ON PLANS

SEE PLAN AND PROFILE SHEETS FOR LOCATION

PLAN



TYPICAL FAN DETAILS

FOR SMALL DRAINS AND IRREGULAR TERRAIN

GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
2. SEE PLANS FOR SIZE AND LOCATION OF GATES. USE DOUBLE GATES WHERE WIDTH IS GREATER THAN 18 FEET. ALL DOUBLE GATES SHALL BE PAID FOR AS TWO SINGLE GATES AND SHALL INCLUDE ALL HINGES, LATCHES, AND INCIDENTALS NECESSARY TO COMPLETE THE INSTALLATION.
3. FENCE, IN GENERAL, SHALL BE ON OUTSIDE OF POSTS. AWAY FROM CENTERLINE OF HIGHWAYS AND CONSTRUCTED ON THE PERMANENT RIGHT-OF-WAY LINE (EXCEPTIONS ARE ON CURVES AND CORNERS).
4. ALL WIRES SHALL MAKE TWO COMPLETE WRAPS AROUND EACH END POST, THEN AROUND THEMSELVES TWO TWISTS/TURNS. USE EXTRA STAPLES ON END POST. SEE DETAIL "H" FOR WIRE WRAPPING EXAMPLES.
5. STRETCHER POST TO BE USED IN GENERAL AT HILL TOPS AND AT BOTTOM OF VALLEYS AND AT A MAXIMUM 500 FEET APART.
6. ALL MISCELLANEOUS HARDWARE SHALL BE FURNISHED GALVANIZED OR ALUMINUM COATED. ALL ALTERNATIVE METAL PIPE POSTS SHALL BE CAPPED.
7. ALL POSTS WITH THE EXCEPTION OF LINE POSTS, FAN POSTS AND HEADWALL CONNECTION STRETCHER POSTS SHALL BE EMBEDDED IN CONCRETE WHEN FENCE IS BEING ERECTED ON EARTHEN FOUNDATIONS. OTHER POSTS MAY BE EMBEDDED IN CONCRETE IF AND AS DIRECTED BY THE ENGINEER TO SATISFY SPECIFIC FOOTING REQUIREMENTS.

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
624 (A)	FENCE-STYLE WWF	LF
624 (B)	GATES-STYLE WWF	EA

OKLAHOMA DEPARTMENT OF TRANSPORTATION

STANDARD REVISIONS	
DESCRIPTION	DATE

APPROVED BY ROADWAY ENGINEER: Caleb F. A DATE 04/16/15

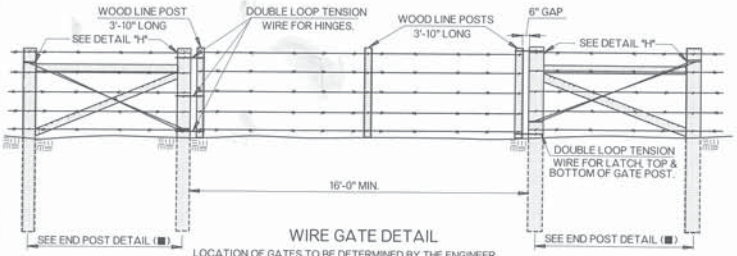
ROADWAY DESIGN DIVISION STANDARD

RIGHT-OF-WAY FENCE STYLE WWF (WOVEN WIRE FENCE)

OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

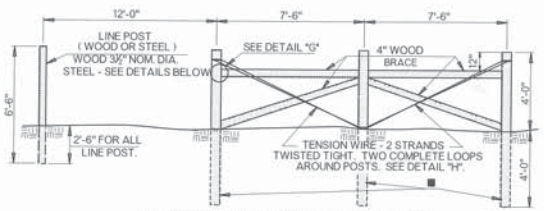
RWF1-2 | 2

R-66



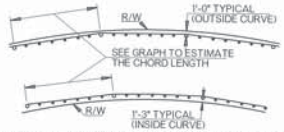
WIRE GATE DETAIL

LOCATION OF GATES TO BE DETERMINED BY THE ENGINEER. OTHER TYPES OF GATES MAY BE SUBSTITUTED FOR THE WIRE GATE, SUCH AS PREFABRICATED PIPE TUBING TYPES OR RANCH STYLE METAL PANEL TYPE. IF APPROVED BY THE ENGINEER, COST OF WIRE GATE SHALL BE INCLUDED IN THE PRICE BID FOR FENCE.

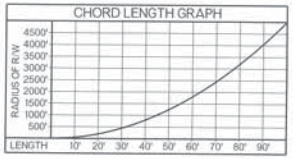


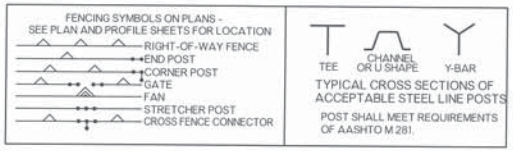
CORNER & STRETCHER POSTS DETAIL

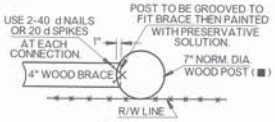
USE STRETCHER DETAILS AT ALL CORNERS, BENDS IN R/W, ON HILLTOPS, IN VALLEYS OR DEEP DEPRESSIONS, AND AT 500' MAXIMUM SPACING.



TYPICAL PLACEMENT FOR FENCE ALONG CURVES
(WHEN R/W RADIUS IS LESS THAN 5000')

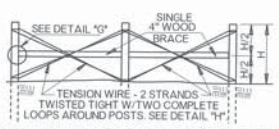




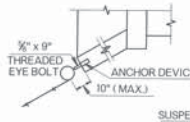


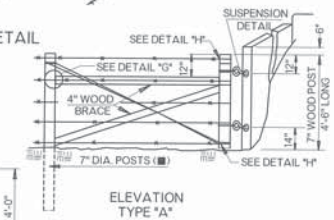
DETAIL "G"

IF 3 1/2" DIA. x 8'-0" LONG GALV. STEEL (SCH. 40) PIPE IS USED AS ALTERNATIVE POST (■), THEN 2" DIA. GALV. STEEL PIPES (SCH. 40) WILL BE USED AS BRACING AND ATTACHED USING STANDARD CHAIN LINK FENCE HARDWARE MEETING THE REQUIREMENTS OF AASHTO M 181 & ASTM A53. SEE CHAINLINK DETAILS ON ROADWAY STANDARD RWF3-2.

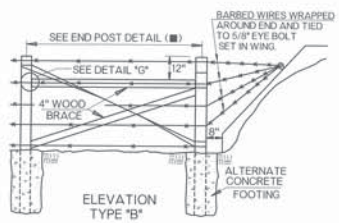


CORNER & STRETCHER POSTS DETAIL ALTERNATIVE



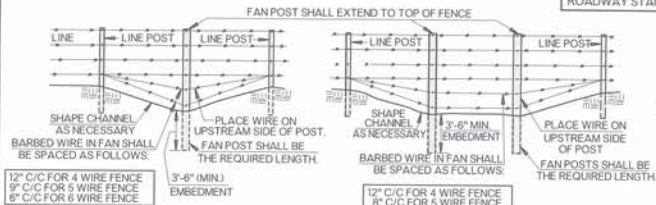


ELEVATION
TYPE "A"



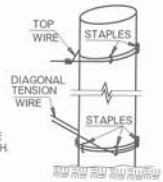
ELEVATION
TYPE "B"

CONNECTIONS AT CULVERTS

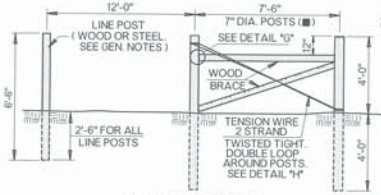


TYPICAL FAN DETAILS

(FOR SMALL DRAINS AND IRREGULAR TERRAIN)



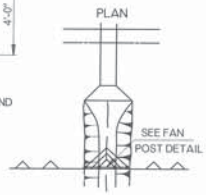
DETAIL "H"



END POST DETAIL

USE FOR CROSS FENCE CONNECTIONS.

NOTE: ALL WIRES SHALL MAKE TWO COMPLETE WRAPS AROUND END POST, THEN AROUND THEMSELVES TWO TURNS. USE EXTRA STAPLES ON END POSTS. SEE DETAIL "H".



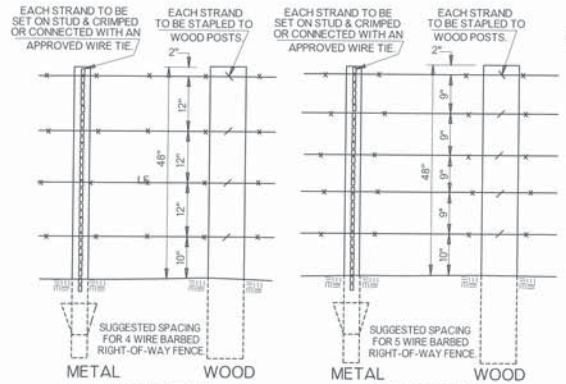
GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
2. FENCE, IN GENERAL, SHALL BE ON OUTSIDE OF POSTS AWAY FROM CENTERLINE OF HIGHWAY AND CONSTRUCTED ON THE PERMANENT RIGHT-OF-WAY (EXCEPTIONS ARE CORNERS AND CURVES).
3. HINGES AND LOOP LATCH ON WIRE GATES SHALL BE FABRICATED FROM TENSION WIRE. THE HINGES (3 PER POST) SHALL BE FORMED OF DOUBLE LOOPS ON THE GATE POST. THE LOOP HINGES AROUND THE WIRE GATE POST SHALL BE FORMED LOOSE FOR EASE OF MOVEMENT. THE TOP 2 (TOP AND BOTTOM) LOOP STRETCHER POSTS TO BE USED IN GENERAL AT HILL TOPS AND AT BOTTOM OF VALLEYS AND AT A MAXIMUM OF 500 FEET APART.
4. ALL MISCELLANEOUS HARDWARE SHALL BE FURNISHED GALVANIZED OR ALUMINUM COATED. ALL ALTERNATIVE METAL PIPE POSTS SHALL BE CAPPED.

BASIS OF PAYMENT

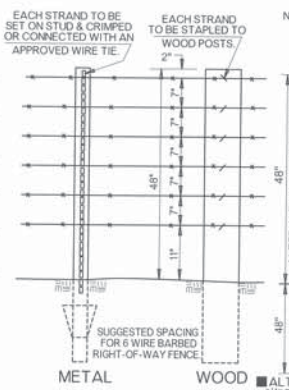
ITEM NO.	ITEM	UNIT
624 (C)	FENCE-STYLE SWF (● BARBED WIRE)	LF
624 (C)	FENCE-STYLE SWF (● SMOOTH WIRE)	LF
624 (C)	FENCE-STYLE SWF (● BARBLESS WIRE)	LF

● NUMBER OF STRANDS



4 WIRE DETAIL

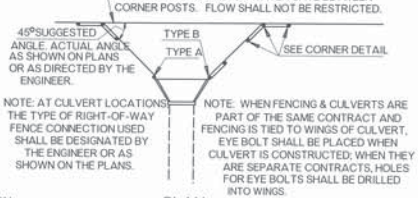
5 WIRE DETAIL



6 WIRE DETAIL

■ ALTERNATE POST OPTION
3½" DIA. X 8'-0" LG. CAPPED
GALV. SCH. 40 STEEL PIPE

IF DESIRED BY PROPERTY OWNER, THE PROPERTY OWNER OWNER SHALL CONSTRUCT AND MAINTAIN AT HIS OWN EXPENSE FENCING AND/OR WATER GATE BETWEEN CORNER POSTS. FLOW SHALL NOT BE RESTRICTED.



NOTE: AT CULVERT LOCATIONS THE TYPE OF RIGHT-OF-WAY FENCE CONNECTION USED SHALL BE DESIGNATED BY THE ENGINEER OR AS SHOWN ON THE PLANS.

NOTE: WHEN FENCING & CULVERTS ARE PART OF THE SAME CONTRACT AND FENCING IS TIED TO WINGS OF CULVERT, EYE BOLT SHALL BE PLACED WHEN CULVERT IS CONSTRUCTED; WHEN THEY ARE SEPARATE CONTRACTS, HOLES FOR EYE BOLTS SHALL BE DRILLED INTO WINGS.

PLAN

APPROVED BY
ROADWAY ENGINEER: _____ DATE 04/16/15

ROADWAY DESIGN DIVISION STANDARD

ODOT

RIGHT-OF-WAY FENCE STYLE SWF
(STRAND WIRE FENCE)

OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

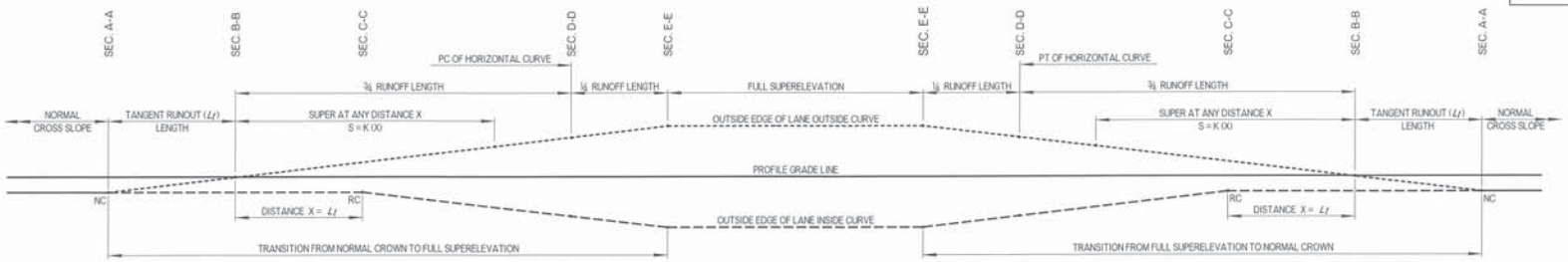
RWF2-2 | 1

R-67

OKLAHOMA DEPARTMENT OF TRANSPORTATION
STANDARD REVISIONS

DESCRIPTION	DATE

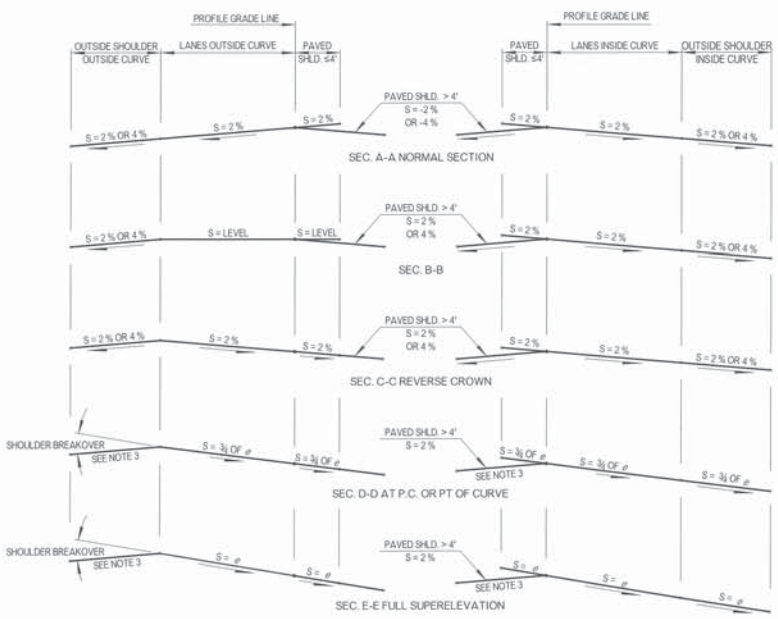
OKLAHOMA DEPARTMENT OF TRANSPORTATION	
STANDARD REVISIONS	
DESCRIPTION	DATE



PROFILE FOR UNDIVIDED (CROWN SECTION) AND DIVIDED HIGHWAYS

PROFILE GRADE IS FINISH GRADE LINE

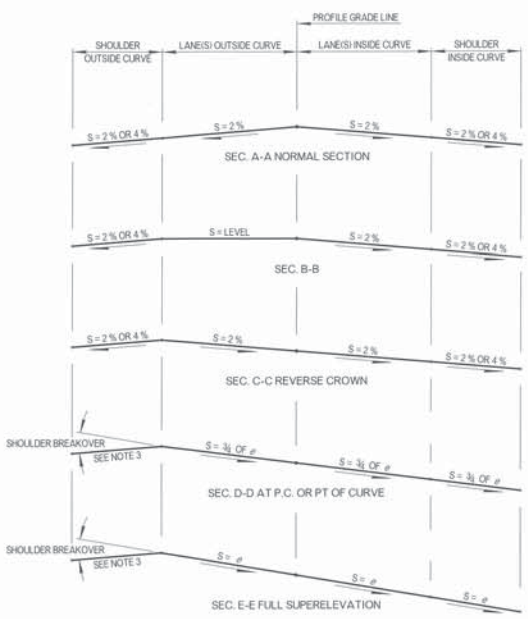
RUNOFF LENGTH ADJUSTMENTS		
NUMBER OF LANES ROTATED n_l	ADJUSTMENT FACTOR b_w	LENGTH INCREASE RELATIVE TO 1 LANE $= n_l b_w$
1.0	1.00	1.00
1.5	0.83	1.25
2.0	0.75	1.50
2.5	0.70	1.75
3.0	0.67	2.00
3.5	0.64	2.25



TYPICAL SECTIONS FOR DIVIDED HIGHWAYS

NOTE: FOR DIVIDED HIGHWAYS WITH MEDIAN WIDTH GREATER THAN 46 FEET, TREAT EACH DIRECTION AS A SEPARATE ROADWAY.

PROFILE GRADE IS FINISH GRADE LINE



TYPICAL SECTIONS FOR UNDIVIDED HIGHWAYS

PROFILE GRADE IS FINISH GRADE LINE

SUPERELEVATION NOMENCLATURE

b_w = ADJUSTMENT FACTOR FOR ROTATED LANES.
e_d = DESIGN SUPERELEVATION RATE (%)
L_r = MINIMUM LENGTH OF SUPERELEVATION RUNOFF.
L_t = MINIMUM LENGTH OF TANGENT RUNOUT.
n_l = NUMBER OF LANES ROTATED.
NC = NORMAL CROWN.
RC = REVERSE CROWN
S = CROSS SLOPE (%).
V_d = DESIGN SPEED (MILES PER HOUR)
$K = \frac{e_d(.01)}{L_r}$ (FT/FT)

GENERAL NOTES

1. THIS STANDARD DRAWING PROVIDES BASIC GUIDELINES FOR SUPERELEVATION DEVELOPMENT FOR TWO OR FOUR LANE, OPEN ROADWAY CONDITIONS ONLY. FOR OTHER SUPERELEVATION DESIGN CRITERIA, SEE THE 2011 AASHTO "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS".
2. FOR CURVES WITH SPIRALS, RUNOFF LENGTH IS EQUAL TO SPIRAL LENGTH. WITH FULL SUPERELEVATION REACHED AT S.C. or C.S. OF CURVE. CHECK RAMP GRADES AND SUPERELEVATION TRANSITIONS AT RAMP TERMINALS DURING STAKING AND MAKE ADJUSTMENTS AS REQUIRED TO OBTAIN SMOOTH PROFILES FOR BOTH EDGES OF THE RAMP PAVEMENT. CROSSOVER CROWN LINE BREAKOVER SHALL NOT EXCEED 5.0% (CALCULATED AS THE ALGEBRAIC DIFFERENCE IN CROSS SLOPES OF ADJACENT PAVEMENTS), WITHOUT THE APPROVAL OF ODOT ENGINEER.
3. IF PRACTICAL THE SHOULDER BREAKOVER SHOULD NOT EXCEED 0.07 FEET PER FOOT, CALCULATED AS THE ALGEBRAIC DIFFERENCE IN CROSS SLOPE OF PAVEMENT AND SHOULDER SURFACES. IT IS ACCEPTABLE FOR THE BREAKOVER TO BE 8%. ROTATE SHOULDER TO MAINTAIN DESIRABLE BREAKOVER. CONTINUOUS SHOULDER CROSS SLOPE SHOULD BE AT LEAST 1% TO INSURE PROPER DRAINAGE.
4. CROSS SLOPE (S) IS NORMALLY SET AT 3/4 (75%) SUPER AT THE P.C. AND PT OF A CURVE. HOWEVER THE DESIGNER MAY ADJUST THIS PERCENTAGE TO BE FROM 60% TO 90%, TO ACCOMMODATE SITE CONDITIONS.
5. THE SUPERELEVATION TABLE FOR LOW SPEED URBAN STREETS MAY BE USED WHERE THE DESIGN SPEED IS NOT GREATER THAN 45 MPH.

SUPERELEVATION RATE GUIDELINES

$e_{max.}$ = 6.0 % ELEVATED OR INTERMITTENTLY ELEVATED ROADWAYS (BRIDGES, BOXES), ROADWAYS WITH FREQUENT SLOW MOVING VEHICLES, URBAN STREETS WHERE ROADSIDE DEVELOPMENT PRECLUDES HIGHER SUPERELEVATION RATE

$e_{max.}$ = 8.0 % DEPRESSED OR GROUND-LEVEL ROADWAYS; ROADWAYS ON STEEP OR LONG DOWNGRADES, ROADWAYS WHERE DRAINAGE CONSIDERATIONS ARE PRIMARY LOW VOLUME GRAVEL-SURFACED ROADS

APPROVED BY ROADWAY ENGINEER: Calvin E. A DATE 04/14/15

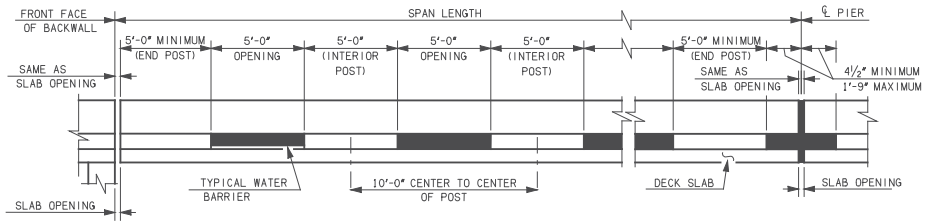
ROADWAY DESIGN DIVISION STANDARD

SUPERELEVATION

OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

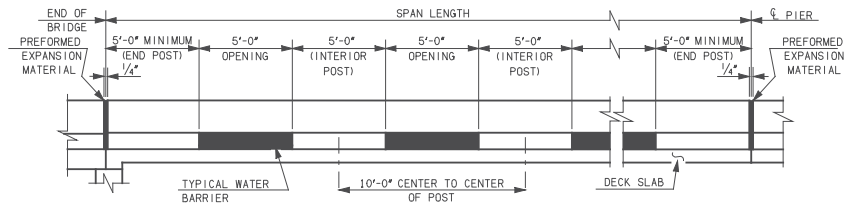
SUEL1-3 | 2

R-70



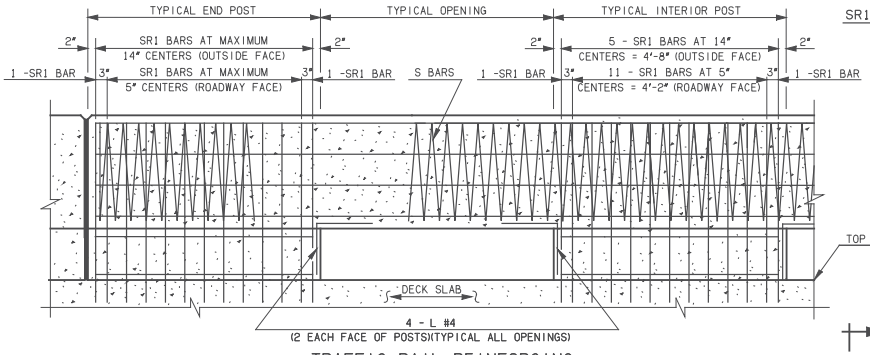
AT EXPANSION ABUTMENTS — AT EXPANSION PIERS

ELEVATION OF RAIL WITH EXPANSION JOINTS

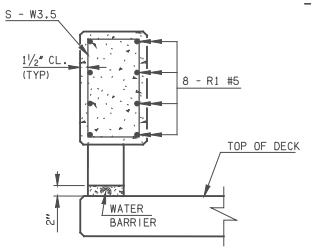


AT FIXED ABUTMENTS — AT FIXED PIERS

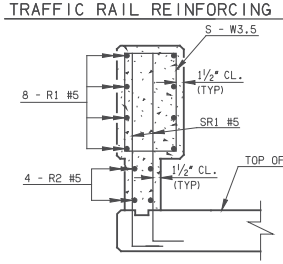
ELEVATION OF RAIL WITH FIXED JOINTS



TRAFFIC RAIL REINFORCING

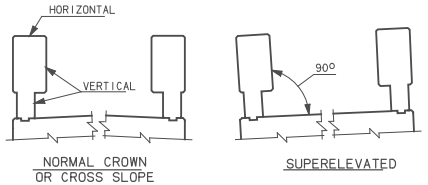


SECTION THRU POST OPENING

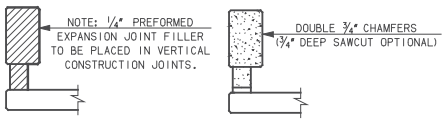


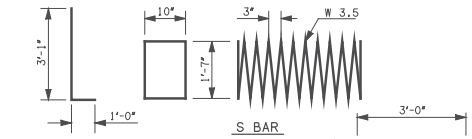
SECTION THRU POST

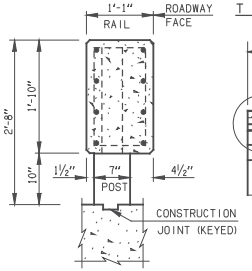
SECTION THRU RAIL AT BRIDGE DECK OR APPROACH SLAB



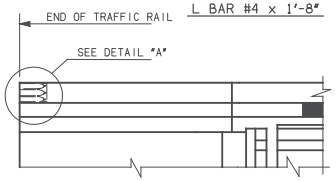
NOTE: WHERE ROADWAY SURFACE TRANSITIONS FROM NORMAL CROWN SLOPE TO FULL SUPERELEVATION, UNIFORMLY VARY THE ANGLE FORMED BY THE FACE OF THE RAILING AND THE ROADWAY BETWEEN THE LIMITS SHOWN ABOVE.



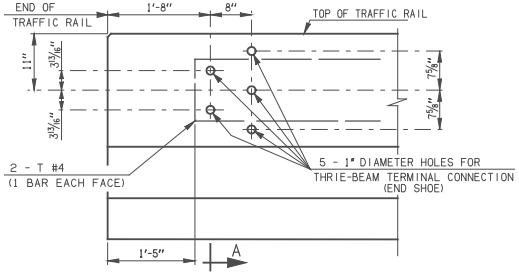




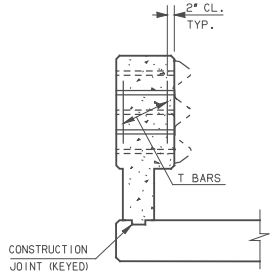
TYPICAL SECTION THRU RAIL



GUARDRAIL CONNECTION



DETAIL "A"



SECTION "A-A"

CONCRETE TRAFFIC RAIL NOTES

Construct the Concrete Traffic Rail to meet the requirements of the Standard Specification For Highway Construction (English) as well as the following requirements.

CLASS AA CONCRETE:
Use Class AA Concrete in the Concrete Traffic Rail. All costs of concrete to be included in the price bid per linear foot of "Concrete Rail (TR4)".

REINFORCING STEEL:
All reinforcing steel , except for the S-Bar , used in the Concrete Traffic Rail is to be epoxy coated. When two or more S Bars are used in a continuous rail section, butt their ends together within the center 3'-0" of a rail post. Place and tie all SR1 Bars before the concrete is placed in the deckslab and approach slabs. SR1 Bars will be measured and paid for as "EPOXY COATED REINFORCING STEEL". All other reinforcing steel will not be measured for payment.

GUARDRAIL CONNECTION:
Form or drill holes, as shown, for the connection of the Thrie-Beam Terminal Connection (End Shoe) at the locations shown in the plans or as directed by the Engineer. It is the responsibility of the bridge Contractor to provide the holes. The contractor that installs the Guardrail will be responsible for installing the Thrie-Beam Terminal Connection.

CONSTRUCTION JOINTS:
Place a construction joint at each fixed abutment and fixed pier, and at other locations shown in the plans. Place ¼" thick preformed expansion material in the construction joint such that it covers the entire area of the rail and post in accordance with the details shown.

EXPANSION JOINTS:
At expansion joints in the deckslab or approach slab, match the width of the opening between the ends of the railing with the opening of the expansion joints. Construct the opening between the end post and the joint as shown on the plans within the maximum and minimum dimensions as shown on this sheet.

CONTROL CRACK JOINTS:
When plans call for a control crack joint provide double ¾" chamfers or ¾" deep sawcut in accordance with the details shown. All bars shall be continuous through the control crack joints.

CONCRETE RAIL CONSTRUCTION:
Locate posts as shown on this sheet unless shown otherwise in the plans. Construct openings such that the face of the posts are perpendicular to the roadway profile grade.

WATER BARRIER:
Provide water barrier at rail openings that would drain onto the undercrossing roadways and sidewalks as shown in plans or as directed by the Engineer. Place the concrete for the water barrier concurrently with the placement of the concrete in the posts. Include all costs of water barriers in the price bid per linear foot of "Concrete Rail (TR4)".

BASIS OF PAYMENT		
ITEM NO.	DESCRIPTION	UNIT
504(E)	CONCRETE RAIL (TR4)	L.F.

REVISIONS		
DESCRIPTION		DATE

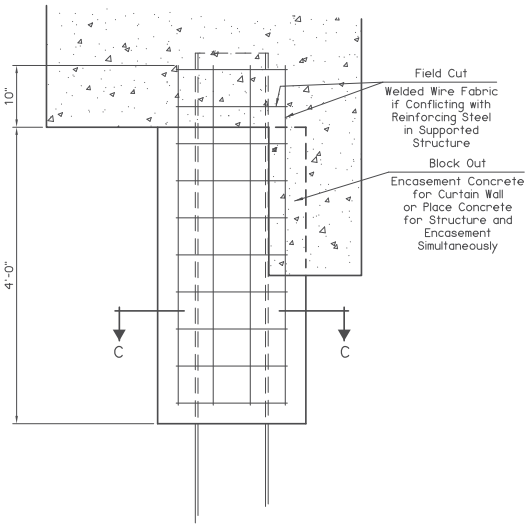
APPROVED BY BRIDGE ENGINEER : Scott K. Neels DATE 9/2/10

OKLAHOMA DEPT. OF TRANSPORTATION
BRIDGE STANDARD (ENGLISH)

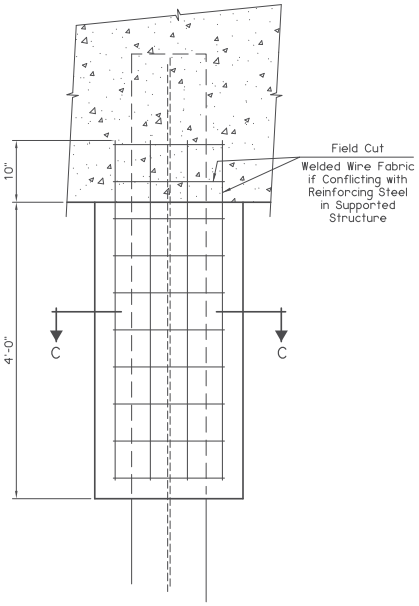
CONCRETE TRAFFIC RAIL (TR4)

2009 SPECIFICATIONS

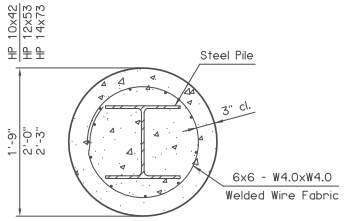
TR4-2 00E
B-03E



ELEVATION AT CURTAIN WALL



TYPICAL ELEVATION

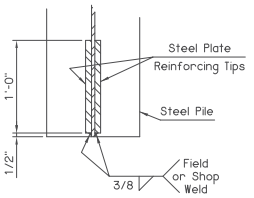


SECTION C-C

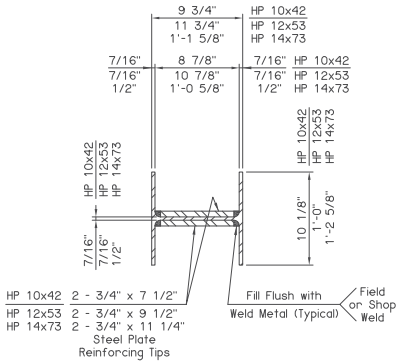
DETAIL OF STEEL PILE ENCASEMENT

NOTE:
Forms for Encasements may be omitted when soil conditions permit. The Department considers the cost of Excavation, Forms, Class A Concrete and Welded Wire Fabric Reinforcing Steel for Steel Pile Encasements to be included in the contract unit price of PILES, DRIVEN.

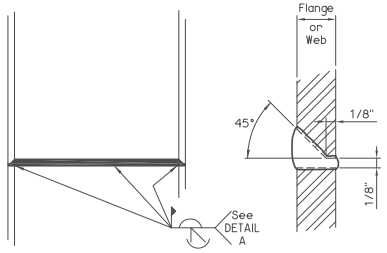
PILE ENCASEMENT QUANTITIES PER PILE				
ITEM	UNIT	HP 10x42	HP 12x53	HP 14x73
CLASS A CONCRETE	C.Y.	0.34	0.45	0.57
REINFORCING STEEL	LB.	16.2	18.3	20.3



SECTION A-A

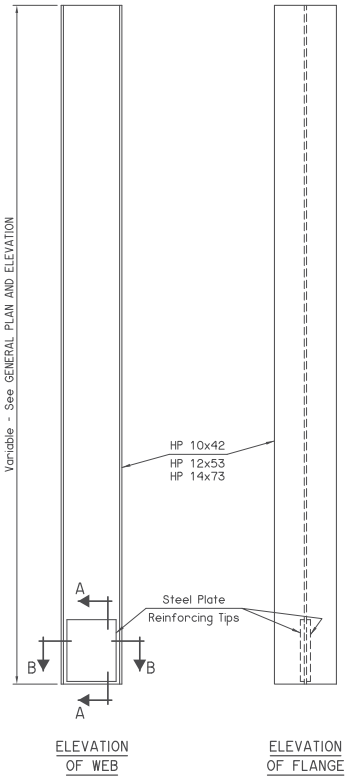


SECTION B-B



DETAIL OF WELDED SPLICE

DETAIL A



ELEVATION OF WEB

ELEVATION OF FLANGE

DETAIL OF PILING

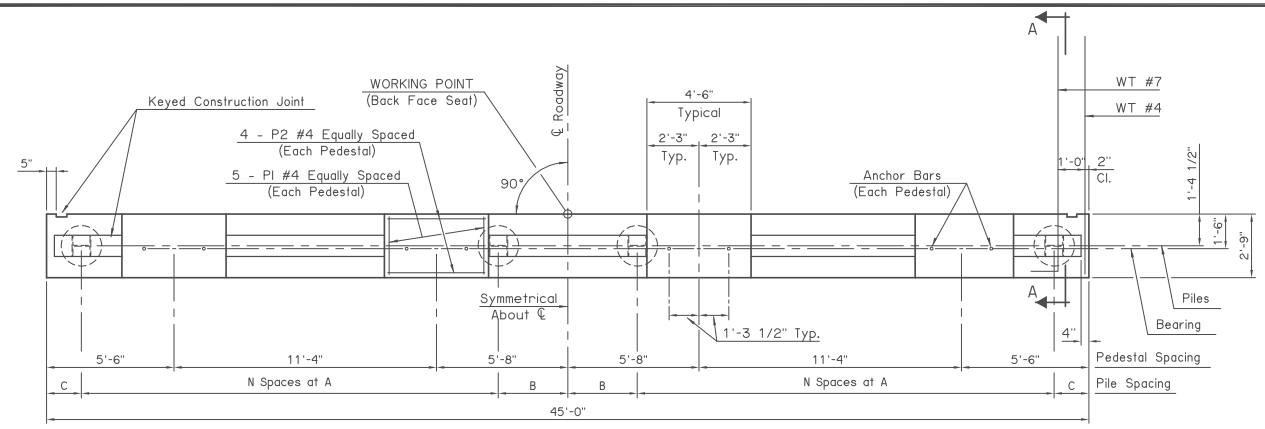
NOTE:
Provide structural steel for Piling and Steel Plate Reinforcing Tips in accordance with AASHTO M270 (ASTM A572), Grade 50. Provide Steel Plate Reinforcing Tips for all Piling unless specifically deleted by notes in the Project Plans and Specifications.
The Contractor may use Manufactured Driving Tips as an alternative to the Steel Plate Reinforcing Tips shown with approval by the Bridge Engineer. The Department considers the cost of Steel Plate Reinforcing Tips or Manufactured Driving Tips to be included in the contract unit price of PILES, FURNISHED.

APPROVED BY BRIDGE ENGINEER [signature] DATE 9/2/10

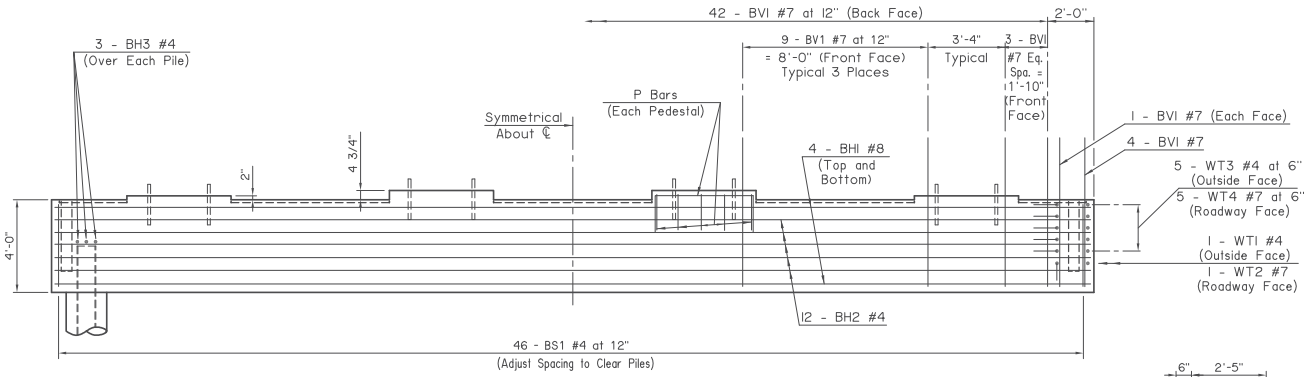
OKLAHOMA DEPT. OF TRANSPORTATION
BRIDGE STANDARD (ENGLISH)

STEEL PILING

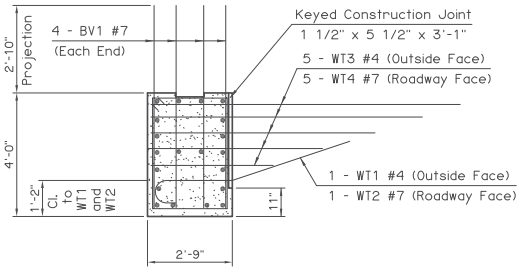
2009 SPECIFICATIONS	HP1-2	OOE
		B-11E



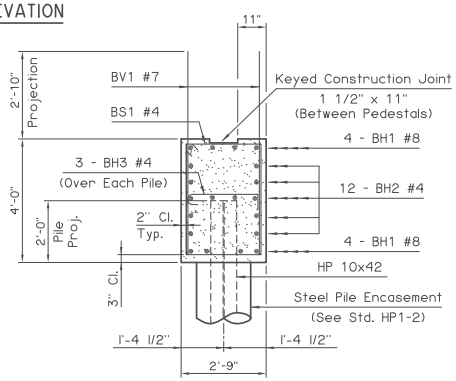
PLAN



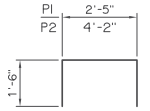
ELEVATION



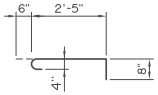
SECTION A-A



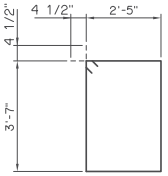
TYPICAL SECTION THRU SEAT



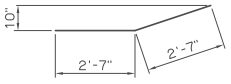
P1 #4 x 5'-5"
P2 #4 x 7'-2"



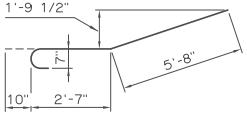
BH3 #4 x 3'-7"



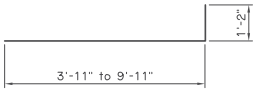
BS1 #4 x 12'-9"



WT1 #4 x 5'-2"



WT2 #7 x 9'-1"



WT4 #7 x 8'-1" Avg.

PILE SCHEDULE						
SPAN	TOTAL NUMBER OF PILES	N	A	B	C	MAXIMUM FACTORED PILE LOAD
65'	8	3	5'-8"	2'-10"	2'-8"	74.6 TON
70'	8	3	5'-8"	2'-10"	2'-8"	77.3 TON
75'	9	4	5'-0"	0"	2'-6"	71.1 TON
80'	9	4	5'-0"	0"	2'-6"	73.4 TON
85'	9	4	5'-0"	0"	2'-6"	75.7 TON
90'	9	4	5'-0"	0"	2'-6"	78.1 TON
95'	10	4	4'-6"	2'-3"	2'-3"	72.3 TON
100'	10	4	4'-6"	2'-3"	2'-3"	74.4 TON

Place all WT Wing reinforcing tied to Abutment Seat reinforcing before placing Abutment Seat concrete. Do not place Abutment Wing concrete until concrete for the Abutment Diaphragm and Deck Slab have attained a strength of 3000 p.s.i. For additional details, see ABUTMENT DIAPHRAGM DETAILS (SHEET 1 OF 2 AND SHEET 2 OF 2) and ABUTMENT WING DETAILS (SHEET 2 OF 2).

ABUTMENT SEAT BAR LIST					
MARK	SIZE	NO.	FORM	LENGTH	LENGTH VARIATION
EPOXY COATED REINFORCING					
BV1	#7	87	STR.	6'-7"	
BH1	#8	8	STR.	44'-8"	
BH2	#4	12	STR.	44'-8"	
BS1	#4	46	BNT.	12'-9"	
P1	#4	20	BNT.	5'-5"	
P2	#4	16	BNT.	7'-2"	
WT1	#4	2	BNT.	5'-2"	
WT2	#7	2	BNT.	9'-1"	
① WT3	#4	10	STR.	6'-11" AVG.	3'-11" to 9'-11"
① WT4	#7	10	BNT.	8'-1" AVG.	5'-1" to 11'-1"
8 PILE ABUTMENT					
BH3	#4	24	BNT.	3'-7"	
9 PILE ABUTMENT					
BH3	#4	27	BNT.	3'-7"	
10 PILE ABUTMENT					
BH3	#4	30	BNT.	3'-7"	

① 2 Sets of 5

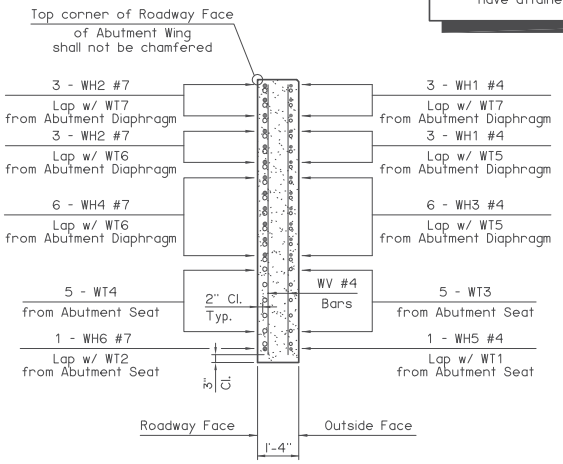
APPROVED BY BRIDGE ENGINEER [signature] DATE 4/22/10

OKLAHOMA DEPT. OF TRANSPORTATION
BRIDGE STANDARD (ENGLISH)

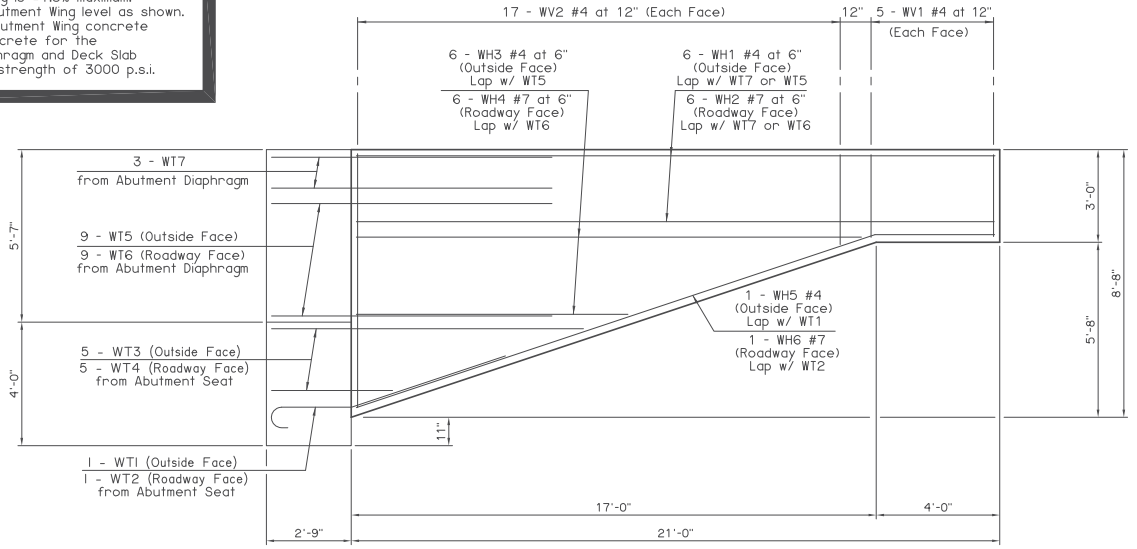
ABUTMENT DETAILS
TYPE IV P.C. BEAMS
INTEGRAL (SHEET 1 OF 2)

2009 SPECIFICATIONS	B40-I-ABUT-PC4-1	01E
		B-44E

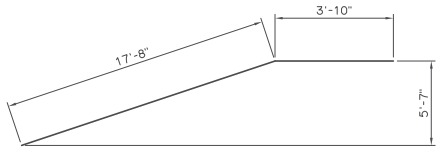
This standard may be used only if grade from Back Face of Abutment Seat to end of Wing is ±1.5% maximum. Construct top of Abutment Wing level as shown. Do not place Abutment Wing concrete until concrete for the Abutment Diaphragm and Deck Slab have attained a strength of 3000 p.s.i.



SECTION THRU WING AT BACK FACE OF ABUTMENT SEAT



WING ELEVATION



WH5 #4 x 2'-6"
WH6 #7 x 2'-6"

ABUTMENT QUANTITIES		
ITEM	UNIT	TOTAL
SUBSTRUCTURE EXCAVATION COMMON	C.Y.	45
CLSM BACKFILL	C.Y.	100
CLASS A CONCRETE	C.Y.	29.8
EPOXY COATED REINFORCING STEEL	LB.	4,830
PILES, FURNISHED (HP10x42)	L.F.	
PILES, DRIVEN (HP10x42)	L.F.	
WATER REPELLENT (VISUALLY INSPECTED)	S.Y.	11
6" PERFORATED PIPE UNDERDRAIN ROUND	L.F.	42
6" NON-PERF. PIPE UNDERDRAIN RND.	L.F.	

NOTE:
See TYPICAL CROSS SECTION for extent of Water Repellent Treatment.

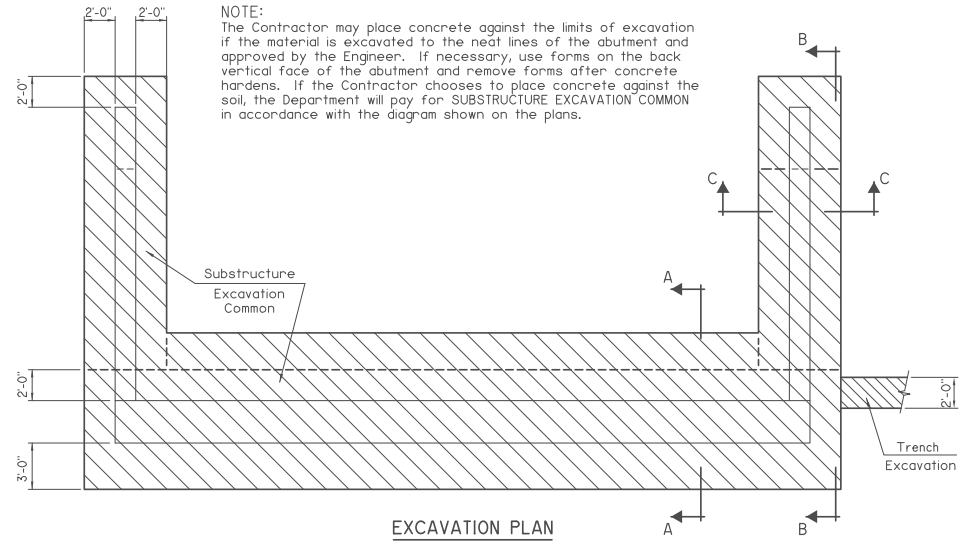
ABUTMENT WING BAR LIST ONE SHOWN, TWO REQUIRED					
MARK	SIZE	NO.	FORM	LENGTH	LENGTH VARIATION
EPOXY COATED REINFORCING					
WH1	#4	6	STR.	20'-8"	
WH2	#7	6	STR.	20'-8"	
WH3	#4	6	STR.	12'-5" AVG.	8'-8" to 16'-2"
WH4	#7	6	STR.	12'-5" AVG.	8'-8" to 16'-2"
WH5	#4	1	BNT.	21'-6"	
WH6	#7	1	BNT.	21'-6"	
WV1	#4	10	STR.	2'-7"	
① WV2	#4	34	STR.	5'-6" AVG.	2'-10" to 8'-2"

① 2 Sets of 17

APPROVED BY BRIDGE ENGINEER [signature] DATE 4/22/20

OKLAHOMA DEPT. OF TRANSPORTATION
BRIDGE STANDARD (ENGLISH)
ABUTMENT DETAILS
TYPE IV P.C. BEAMS
INTEGRAL (SHEET 2 OF 2)

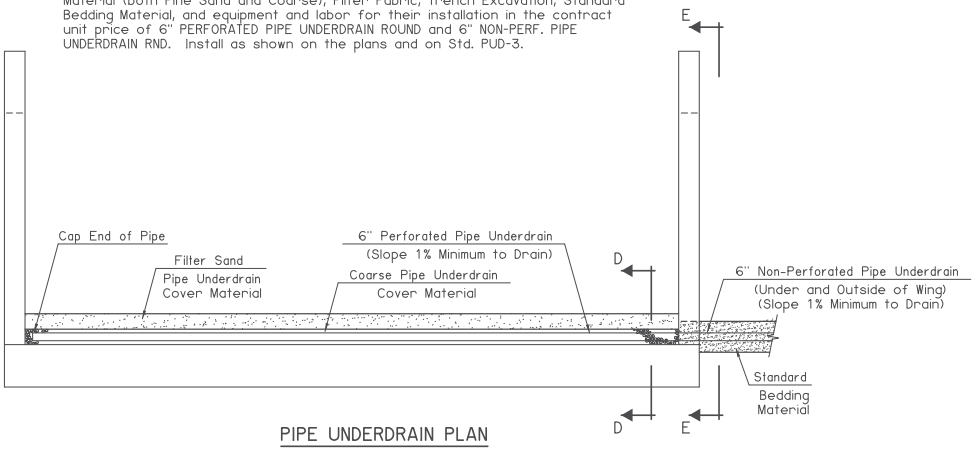
2009 SPECIFICATIONS	B40-I-ABUT-PC4-2	01E
		B-45E



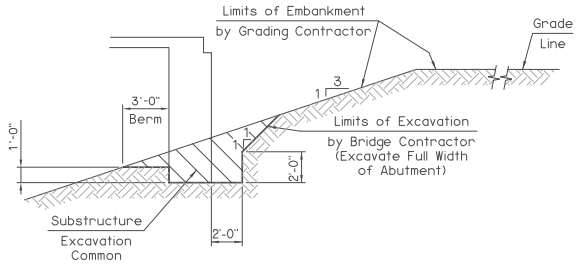
NOTE:
The Contractor may place concrete against the limits of excavation if the material is excavated to the neat lines of the abutment and approved by the Engineer. If necessary, use forms on the back vertical face of the abutment and remove forms after concrete hardens. If the Contractor chooses to place concrete against the soil, the Department will pay for SUBSTRUCTURE EXCAVATION COMMON in accordance with the diagram shown on the plans.

EXCAVATION PLAN

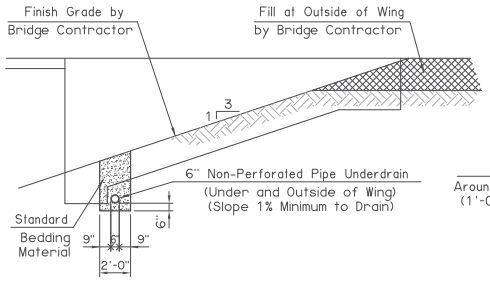
NOTE:
The Engineer may adjust the extent, location and depth of 6" Non-Perforated Pipe Underdrain during construction. Include the cost of Pipe Underdrain Cover Material (both Fine Sand and Coarse), Filter Fabric, Trench Excavation, Standard Bedding Material, and equipment and labor for their installation in the contract unit price of 6" PERFORATED PIPE UNDERDRAIN ROUND and 6" NON-PERF. PIPE UNDERDRAIN RND. Install as shown on the plans and on Std. PUD-3.



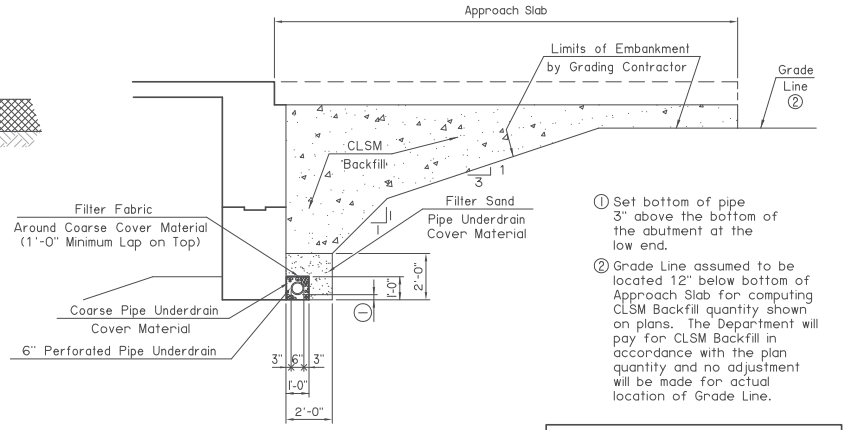
PIPE UNDERDRAIN PLAN



SECTION A-A



SECTION E-E

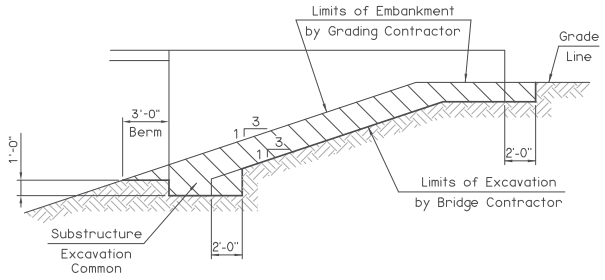


SECTION D-D

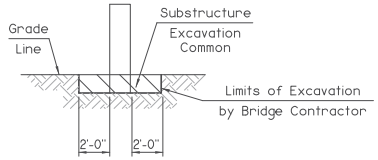
① Set bottom of pipe 3" above the bottom of the abutment at the low end.

② Grade Line assumed to be located 12" below bottom of Approach Slab for computing CLSM Backfill quantity shown on plans. The Department will pay for CLSM Backfill in accordance with the plan quantity and no adjustment will be made for actual location of Grade Line.

Do not place CLSM Backfill until Superstructure is in place and the Abutment Wing concrete has attained a strength of 3000 p.s.i.



SECTION B-B



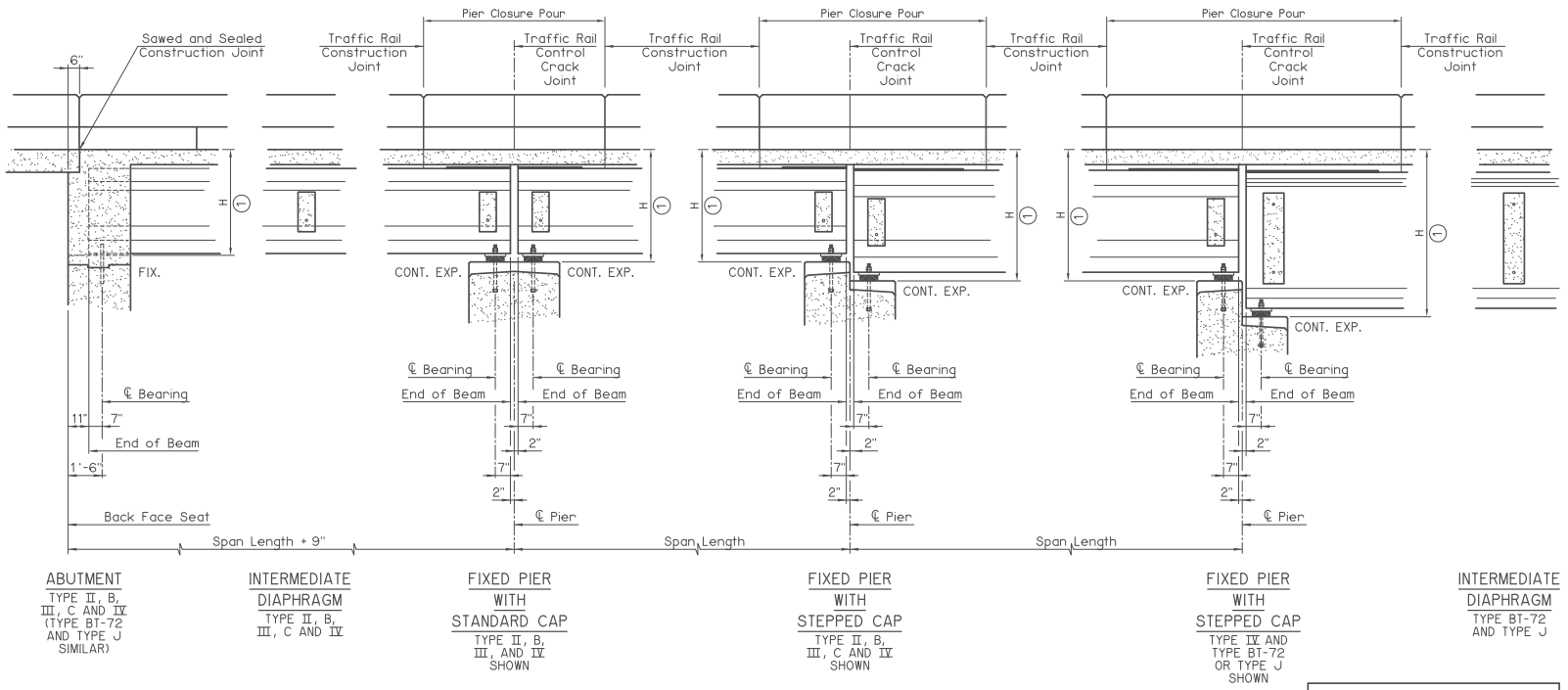
SECTION C-C

APPROVED BY BRIDGE ENGINEER _____ DATE 9/2/10

OKLAHOMA DEPT. OF TRANSPORTATION
BRIDGE STANDARD (ENGLISH)

SUBSTRUCTURE EXCAVATION AND PIPE UNDERDRAIN ASSEMBLY DETAILS INTEGRAL

2009 SPECIFICATIONS	B40-I-ABUT-MISC	01E
		B-60E



ABUTMENT
TYPE II, B, III, C AND IV (TYPE BT-72 AND TYPE J SIMILAR)

INTERMEDIATE DIAPHRAGM
TYPE II, B, III, C AND IV

FIXED PIER WITH STANDARD CAP
TYPE II, B, III, AND IV SHOWN

FIXED PIER WITH STEPPED CAP
TYPE II, B, III, C AND IV SHOWN

FIXED PIER WITH STEPPED CAP
TYPE IV AND TYPE BT-72 OR TYPE J SHOWN

INTERMEDIATE DIAPHRAGM
TYPE BT-72 AND TYPE J

LONGITUDINAL SECTION

STAY-IN-PLACE DECK FORM NOTES

The Contractor may use Stay-In-Place Steel Deck Forms if the minimum Deck Slab thickness of 8" is obtained by measuring from the top of the Deck Slab to the top portion of the steel corrugation. Preformed Corrugation Filler, composed of Polystyrene or other material, may be used if bonded to the Deck Forms. No additional concrete weight of the Deck Slab is permitted. The total additional weight of the Deck Form and Filler shall not exceed 5 p.s.f. The Department considers all costs of Stay-In-Place Steel Deck Forms to be included in the contract unit price of CLASS AA CONCRETE.

The Contractor may substitute Stay-In-Place Prestressed Concrete Deck Forms, at no additional cost to the Department, if the following conditions are met:

(1) The Bridge Engineer approves shop drawings and structural calculations for the forms submitted by the Contractor.
(2) The Bridge Engineer approves new structural design, structural calculations, and a new reinforcing schedule for the Deck Slab submitted by the Contractor.
(3) Shop drawings, new Deck Slab reinforcing schedule, structural designs, and calculations are prepared and sealed by a Professional Engineer licensed in the State of Oklahoma.

① Dimension is from top of Deck Slab to bottom of Bearing Assembly at ℄ Bearing.

NOTE:
For Deck Slab Pouring Sequence Diagram, see SUPERSTRUCTURE BAR LIST.

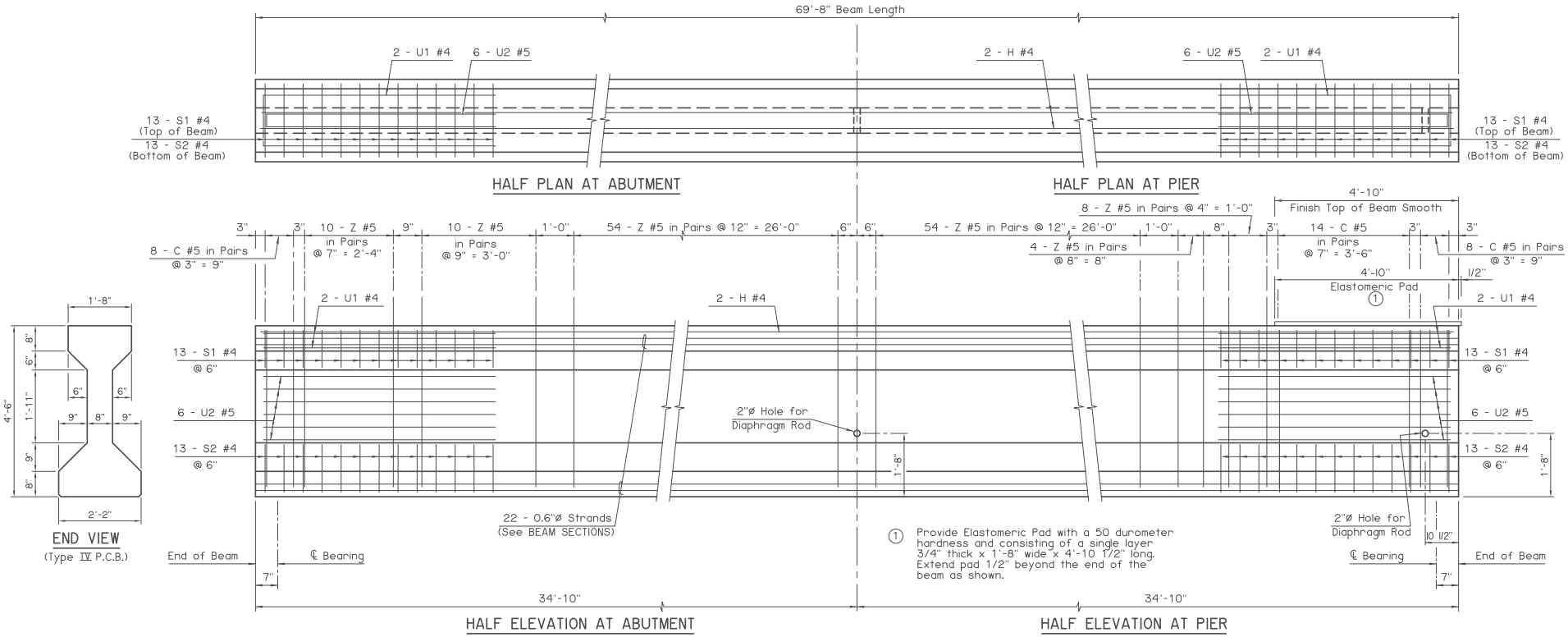
SCHEDULE FOR DIMENSION H		
P.C. BEAM	H AT ABUTMENT	H AT PIER
TYPE II	3'-10"	4'-1 5/8"
TYPE B	3'-8"	3'-11 5/8"
TYPE III	4'-8"	4'-11 5/8"
TYPE C	4'-3"	4'-6 5/8"
TYPE IV	5'-6"	5'-9 5/8"
TYPE BT-72	7'-1"	7'-5 1/8"
TYPE J	7'-1"	7'-5 5/8"

Do not place the concrete for the Deck Slab or apply other massive loads to the Beams or Diaphragms until the concrete in the Diaphragms has been in place a minimum of 10 days or at the discretion of the Engineer. The Engineer may approve shortened time if the Beam and Diaphragm concrete has attained 80% of the specified compressive strength.

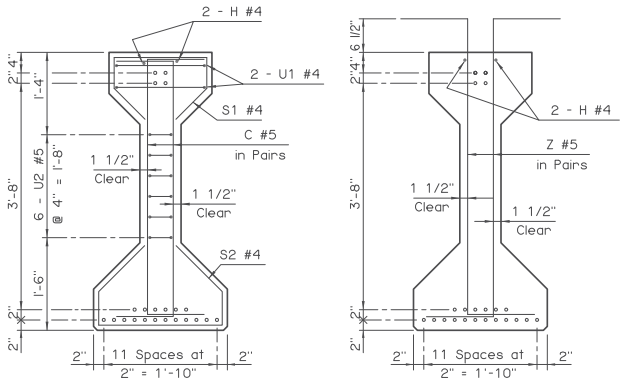
APPROVED BY BRIDGE ENGINEER [signature] DATE 9/2/10

OKLAHOMA DEPT. OF TRANSPORTATION
BRIDGE STANDARD (ENGLISH)
LONGITUDINAL SECTION
P.C. BEAMS
INTEGRAL

2009 SPECIFICATIONS	B40-I-LSECT-PCB	03E
		B-66E



① Provide Elastomeric Pad with a 50 durometer hardness and consisting of a single layer 3/4" thick x 1'-8" wide x 4'-10 1/2" long. Extend pad 1/2" beyond the end of the beam as shown.



BEAM SECTIONS
(22 - 0.6"ø STRANDS)

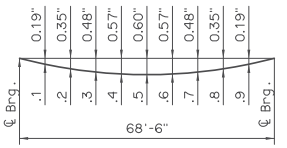
PRESTRESSED CONCRETE BEAM NOTES

COMPRESSIVE STRENGTH
Provide concrete with a compressive strength of 4,500 p.s.i. at transfer of prestress and 6,000 p.s.i. at 28 days.

STRAND TYPE
Provide low-relaxation strands having a nominal diameter of 0.6" with ultimate tensile strength of 270 k.s.i.

LFD OPERATING RATING - HS 38.3
The Operating Rating shown is based on a nominal strength using only strands that are bonded for the full length of the beam. All partially bonded strands are neglected in strength computations.

Information shown on this sheet is applicable only to the standard bridge cross-section with 40' Clear Roadway, 8" Deck Slab and 4 Beams at 11'-4" spacing. Any deviation requires custom design and details with an appropriate Dead Load Deflection Diagram.



DEAD LOAD DEFLECTION DIAGRAM

NOTE:
The Dead Load Deflection shown above at the tenth points are the initial deflections due to Deck Slab + Diaphragms + Haunch + S.I.P. Steel Deck Form Allowance + Concrete Traffic Rail. It does not include the Beam weight or Future Wearing Surface.

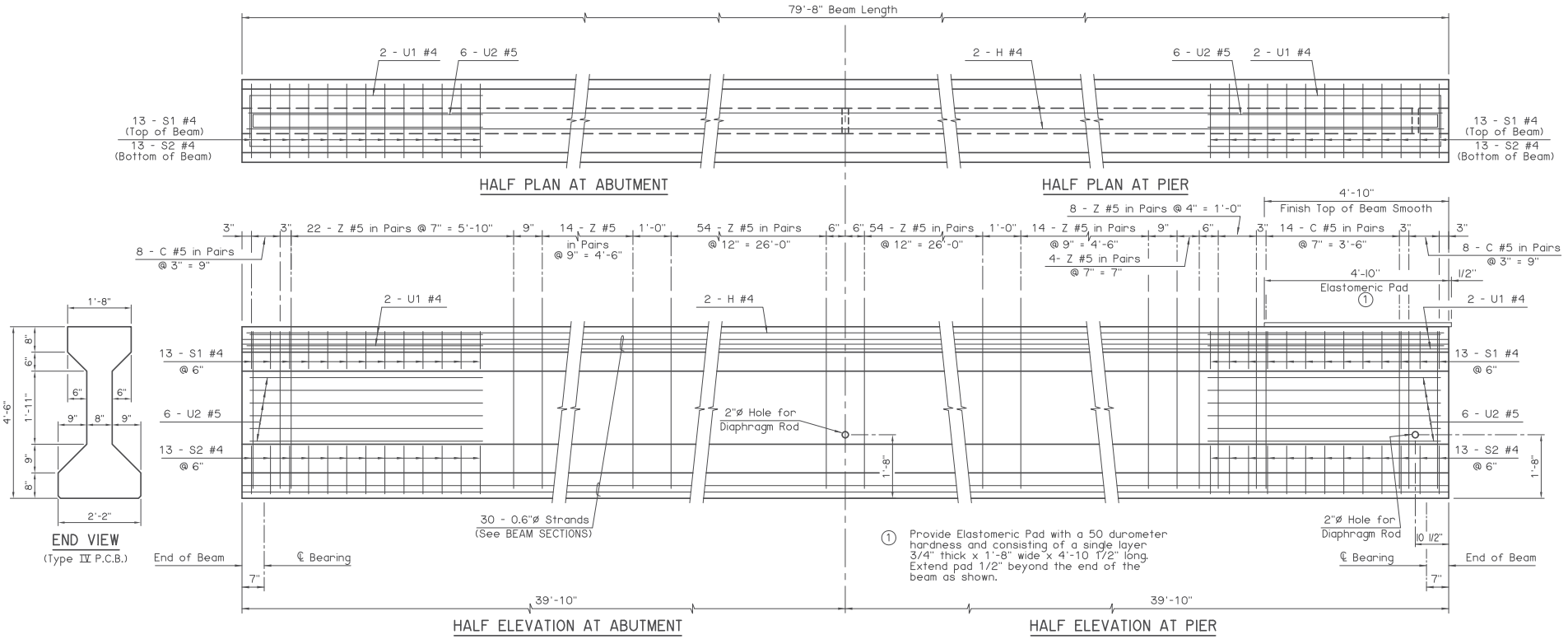
APPROVED BY BRIDGE ENGINEER _____ DATE 9/2/10

OKLAHOMA DEPT. OF TRANSPORTATION
BRIDGE STANDARD (ENGLISH)

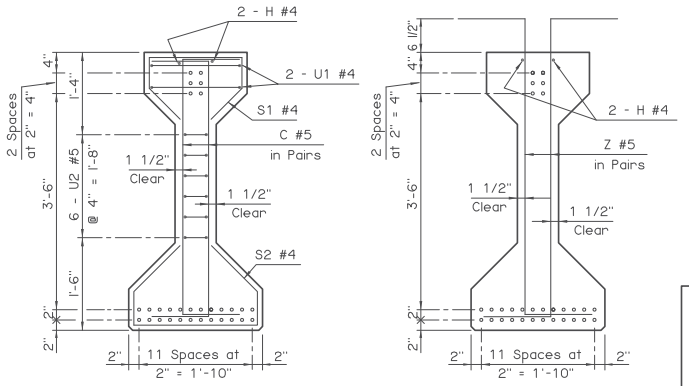
TYPE IV P.C. BEAM DETAILS 70' SPAN INTEGRAL

2009 SPECIFICATIONS	B40-I-PCB-IV-70	02E

B-105E



① Provide Elastomeric Pad with a 50 durometer hardness and consisting of a single layer 3/4" thick x 1'-8" wide x 4'-10 1/2" long. Extend pad 1/2" beyond the end of the beam as shown.



BEAM SECTIONS
(30 - 0.6"ø STRANDS)

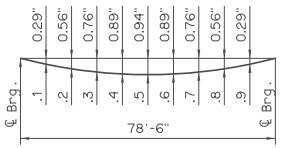
Information shown on this sheet is applicable only to the standard bridge cross-section with 40' Clear Roadway, 8" Deck Slab and 4 Beams at 11'-4" spacing. Any deviation requires custom design and details with an appropriate Dead Load Deflection Diagram.

PRESTRESSED CONCRETE BEAM NOTES

COMPRESSIVE STRENGTH
Provide concrete with a compressive strength of 5,250 p.s.i. at transfer of prestress and 7,000 p.s.i. at 28 days.

STRAND TYPE
Provide low-relaxation strands having a nominal diameter of 0.6" with ultimate tensile strength of 270 k.s.i.

LFD OPERATING RATING - HS 42.7
The Operating Rating shown is based on a nominal strength using only strands that are bonded for the full length of the beam. All partially bonded strands are neglected in strength computations.



DEAD LOAD DEFLECTION DIAGRAM

NOTE:
The Dead Load Deflection shown above at the tenth points are the initial deflections due to Deck Slab + Diaphragms + Haunch + S.I.P. Steel Deck Form Allowance + Concrete Traffic Rail. It does not include the Beam weight or Future Wearing Surface.

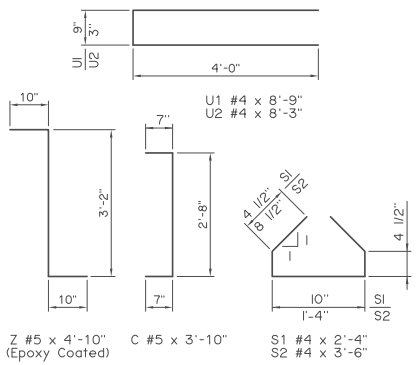
APPROVED BY BRIDGE ENGINEER [signature] DATE 9/2/10

OKLAHOMA DEPT. OF TRANSPORTATION
BRIDGE STANDARD (ENGLISH)

TYPE IV P.C. BEAM DETAILS 80' SPAN INTEGRAL

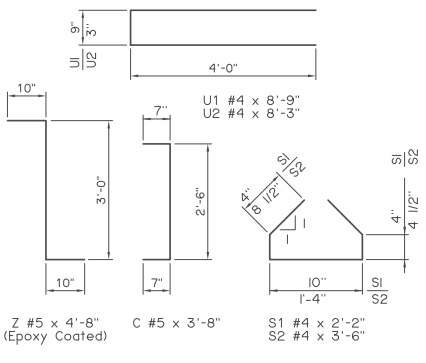
2009 SPECIFICATIONS	B40-I-PCB-IV-80	02E

B-107E



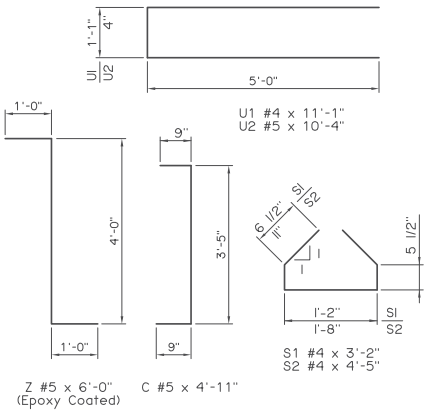
Z #5 x 4'-10" (Epoxy Coated) C #5 x 3'-10" S1 #4 x 2'-4" S2 #4 x 3'-6"

TYPE II P.C. BEAMS



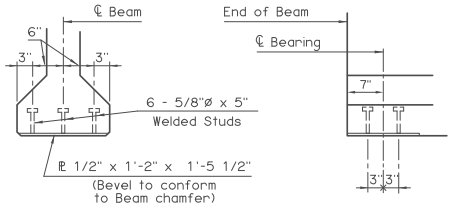
Z #5 x 4'-8" (Epoxy Coated) C #5 x 3'-8" S1 #4 x 2'-2" S2 #4 x 3'-6"

TYPE B P.C. BEAMS

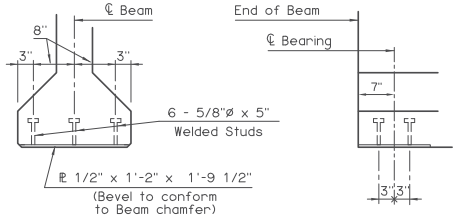


Z #5 x 6'-0" (Epoxy Coated) C #5 x 4'-11" S1 #4 x 3'-2" S2 #4 x 4'-5"

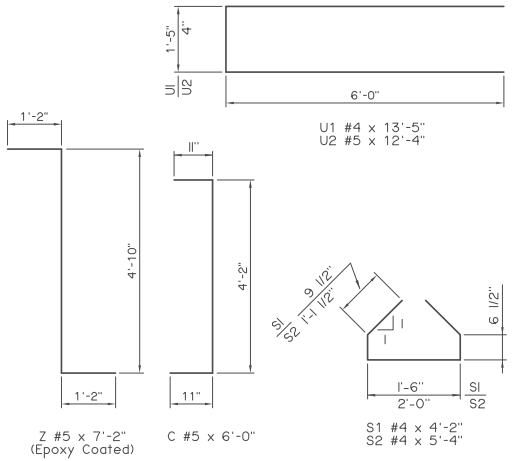
TYPE III P.C. BEAMS



TYPE II AND TYPE B P.C. BEAMS

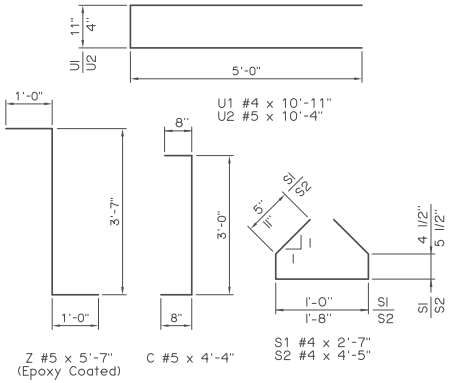


TYPE III AND TYPE C P.C. BEAMS



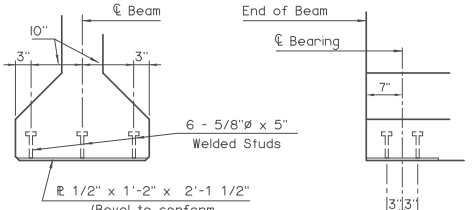
Z #5 x 7'-2" (Epoxy Coated) C #5 x 6'-0" S1 #4 x 4'-2" S2 #4 x 5'-4"

TYPE IV P.C. BEAMS



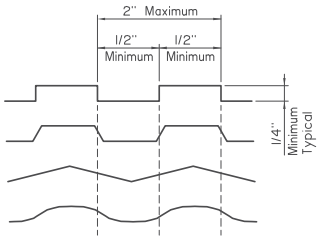
Z #5 x 5'-7" (Epoxy Coated) C #5 x 4'-4" S1 #4 x 2'-7" S2 #4 x 4'-5"

TYPE C P.C. BEAMS



TYPE IV P.C. BEAMS

P.C. BEAM BAR BEND DETAILS



INTENTIONALLY ROUGHENED SURFACE DETAILS

Intentionally roughen the entire top surface of P.C. Beam to a minimum height of 1/4" over a maximum pitch of 2" measured longitudinally along the length of the beam. Provide a crest and trough associated with the height of not less than 1/2". Produce the roughened surface by using a special trowel to form one of the surfaces shown in the details, by cleaning the concrete surface with a stiff wire brush (or blasting) to expose the aggregate to a height of 1/4", or by using another approved method. Submit the method to be used for approval by the Engineer. Repair any damage to reinforcement's epoxy coating before placement of deck concrete.

EMBEDDED SOLE PLATE DETAILS

NOTE:
Provide an Embedded Sole Plate at each end of the Beam.

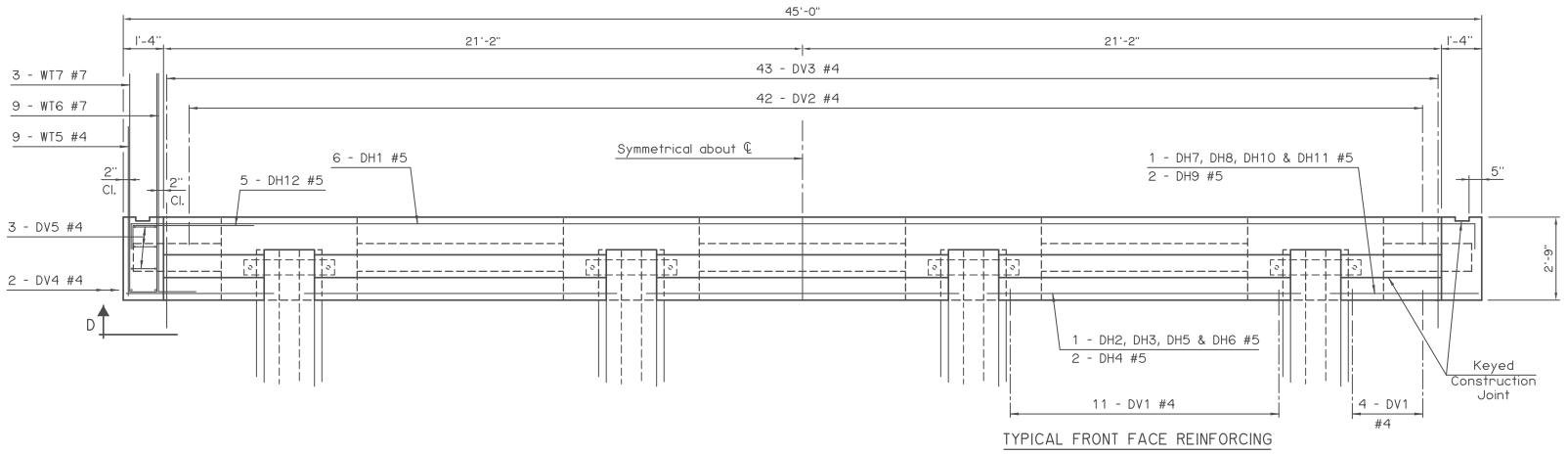
APPROVED BY BRIDGE ENGINEER Robert Lewis DATE 9/2/10

OKLAHOMA DEPT. OF TRANSPORTATION
BRIDGE STANDARD (ENGLISH)

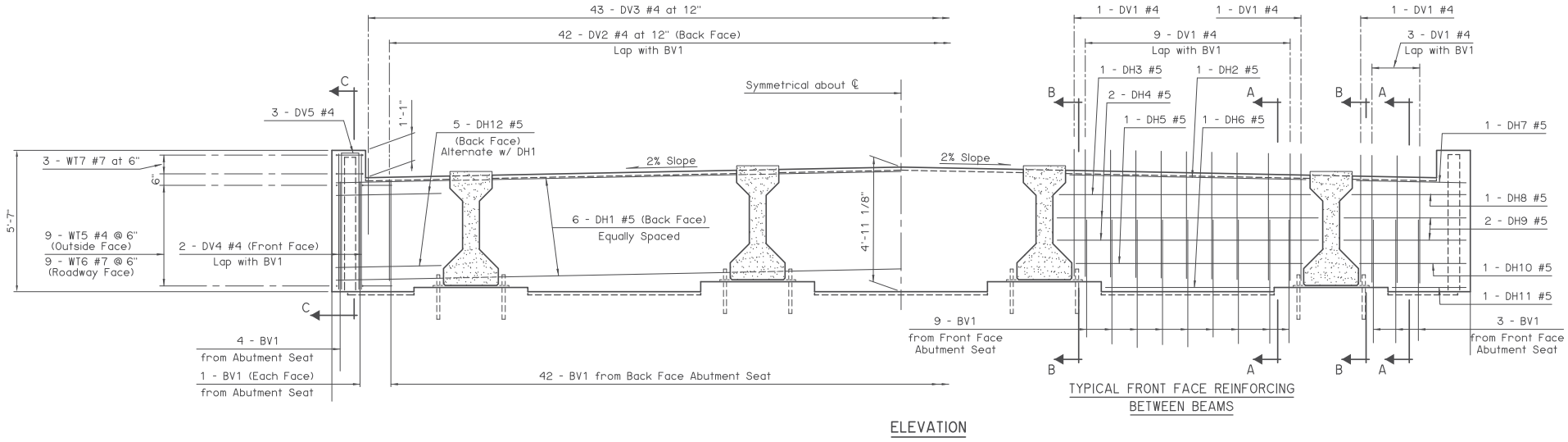
P.C. BEAM DETAILS
TYPE II, B, III, C AND IV P.C. BEAMS
INTEGRAL

2009 SPECIFICATIONS	B40-I-PCB-DTL	01E

B-113E



PLAN



ELEVATION

NOTE:
See ABUTMENT DIAPHRAGM DETAILS (SHEET 2 OF 2) for SECTION A-A, B-B, C-C and D.

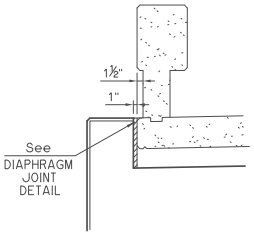
APPROVED BY BRIDGE ENGINEER _____ DATE 4/22/10

OKLAHOMA DEPT. OF TRANSPORTATION
BRIDGE STANDARD (ENGLISH)

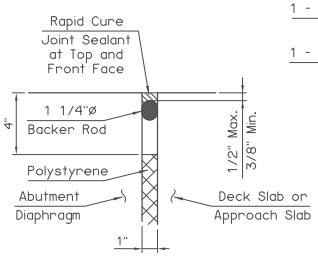
ABUTMENT DIAPHRAGM DETAILS TYPE IV P.C. BEAMS INTEGRAL (SHEET 1 OF 2)

2009 SPECIFICATIONS	B40-I-ADIA-PC4-1	02E

B-175E

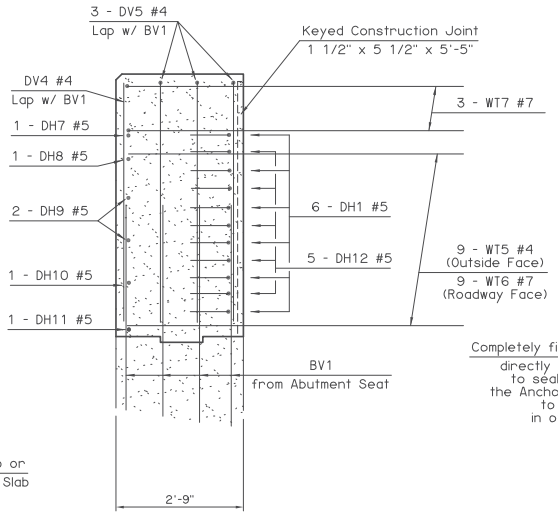


SECTION D



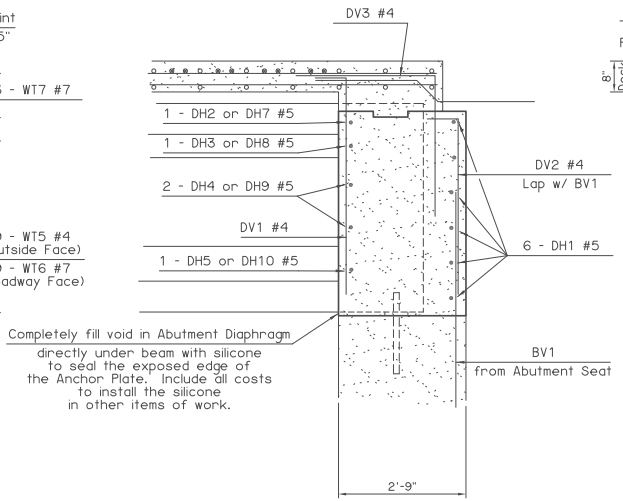
DIAPHRAGM JOINT DETAIL

NOTE:
Include all costs to install the Diaphragm Joint in other items of work.

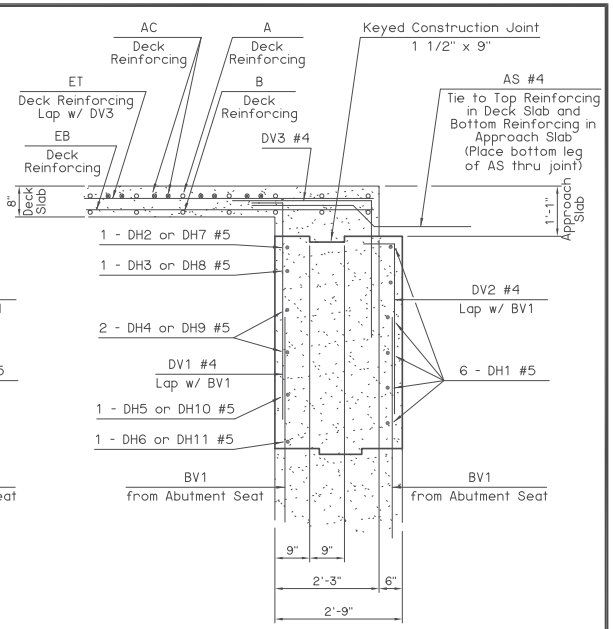


SECTION C-C

Deck Slab shown for informational purposes only. Do not place Deck Slab Concrete until the Abutment Diaphragm Concrete has attained a compressive strength of 3000 p.s.i.

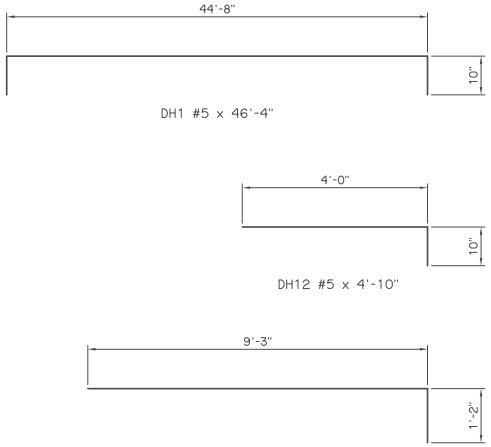


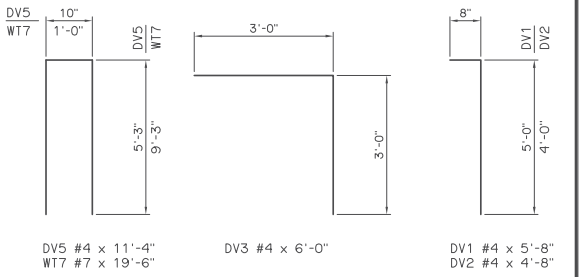
SECTION B-B



SECTION A-A

ABUTMENT DIAPHRAGM BAR LIST ONE SHOWN				
EPOXY COATED REINFORCING				
MARK	SIZE	NO.	FORM	LENGTH
DV1	#4	41	BNT.	5'-8"
DV2	#4	42	BNT.	4'-8"
DV3	#4	43	BNT.	6'-0"
DV4	#4	4	STR.	5'-3"
DV5	#4	6	BNT.	11'-4"
DH1	#5	6	BNT.	46'-4"
DH2	#5	3	STR.	9'-4"
DH3	#5	3	STR.	9'-11"
DH4	#5	6	STR.	10'-4"
DH5	#5	3	STR.	8'-10"
DH6	#5	3	STR.	6'-6"
DH7	#5	2	STR.	4'-4"
DH8	#5	2	STR.	4'-6"
DH9	#5	4	STR.	4'-10"
DH10	#5	2	STR.	4'-1"
DH11	#5	2	STR.	2'-11"
DH12	#5	10	BNT.	4'-10"
WT5	#4	18	STR.	5'-9"
WT6	#7	18	BNT.	10'-5"
WT7	#7	6	BNT.	19'-6"





DV5 #4 x 11'-4"
WT7 #7 x 19'-6"

DV3 #4 x 6'-0"

DV1 #4 x 5'-8"
DV2 #4 x 4'-8"

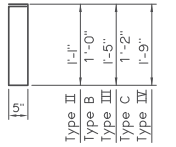
APPROVED BY BRIDGE ENGINEER _____ DATE 4/2/20

OKLAHOMA DEPT. OF TRANSPORTATION
BRIDGE STANDARD (ENGLISH)

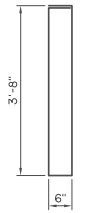
ABUTMENT DIAPHRAGM DETAILS TYPE IV P.C. BEAMS INTEGRAL (SHEET 2 OF 2)

2009 SPECIFICATIONS	B40-I-ADIA-PC4-2	02E

B-176E

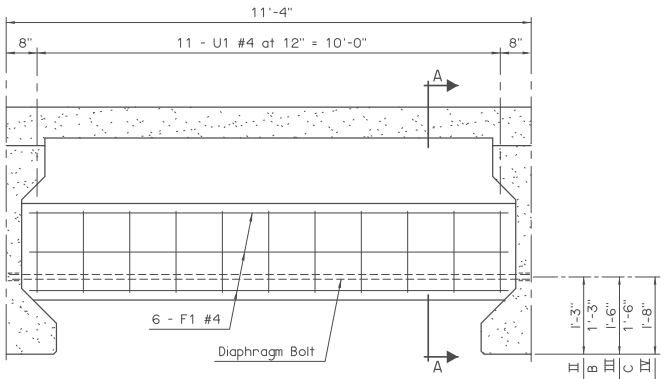


U1 #4 x 3'-5" - Type II
U1 #4 x 3'-3" - Type B
U1 #4 x 4'-1" - Type III
U1 #4 x 3'-7" - Type C
U1 #4 x 4'-9" - Type IV



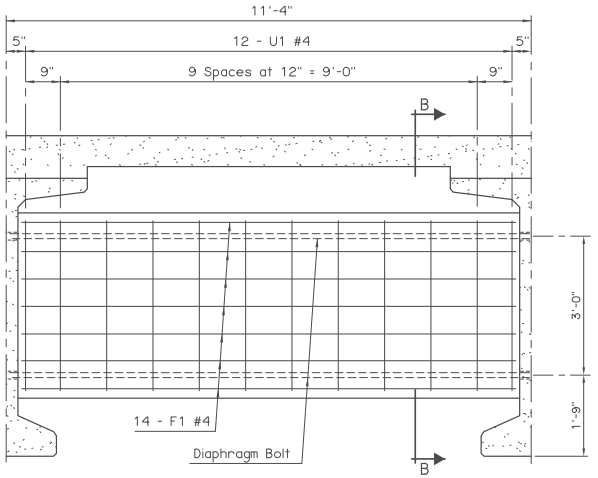
U1 #4 x 8'-10" - Type BT-72
U1 #4 x 8'-10" - Type J

INTERMEDIATE DIAPHRAGM BAR LIST ONE DIAPHRAGM SHOWN					
P.C. BEAM	MARK	SIZE	NO.	FORM	LENGTH
	EPOXY COATED REINFORCING				
TYPE II	U1	#4	33	BNT.	3'-5"
	F1	#4	18	STR.	10'-6"
TYPE B	U1	#4	33	BNT.	3'-3"
	F1	#4	18	STR.	10'-6"
TYPE III	U1	#4	33	BNT.	4'-1"
	F1	#4	18	STR.	10'-5"
TYPE C	U1	#4	33	BNT.	3'-7"
	F1	#4	18	STR.	10'-5"
TYPE IV	U1	#4	33	BNT.	4'-9"
	F1	#4	18	STR.	10'-4"
TYPE BT-72	U1	#4	36	BNT.	8'-10"
	F1	#4	42	STR.	10'-6"
TYPE J	U1	#4	36	BNT.	8'-10"
	F1	#4	42	STR.	10'-6"



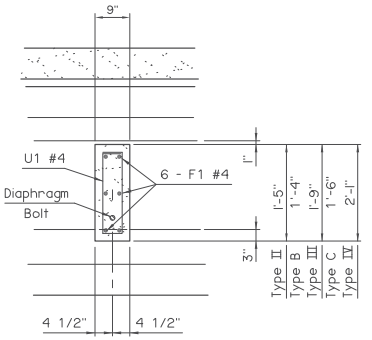
PRECAST BEAM TYPE II, B, III, C AND IV

(1 INTERMEDIATE DIAPHRAGM PER SPAN)
(1 PIER DIAPHRAGM AT EACH PIER PER SPAN)

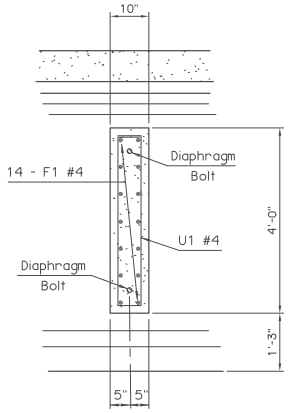


PRECAST BEAM TYPE BT-72 AND J

(2 INTERMEDIATE DIAPHRAGMS PER SPAN)
(1 PIER DIAPHRAGM AT EACH PIER PER SPAN)



SECTION A-A



SECTION B-B

DIAPHRAGM DETAILS

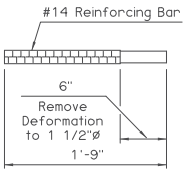
APPROVED BY BRIDGE ENGINEER _____ DATE 4/22/10

OKLAHOMA DEPT. OF TRANSPORTATION
BRIDGE STANDARD (ENGLISH)

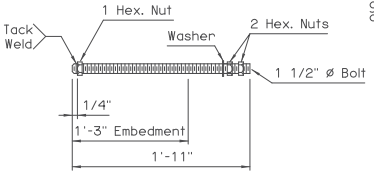
INTERMEDIATE AND PIER DIAPHRAGM DETAILS P.C. BEAMS INTEGRAL

2009 SPECIFICATIONS	B40-I-DIA-PCB	01E

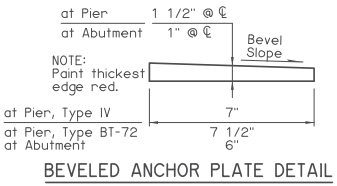
B-190E



ABUTMENT ANCHOR BAR DETAIL

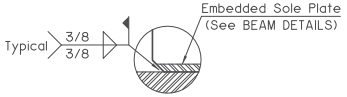


PIER ANCHOR BOLT DETAIL

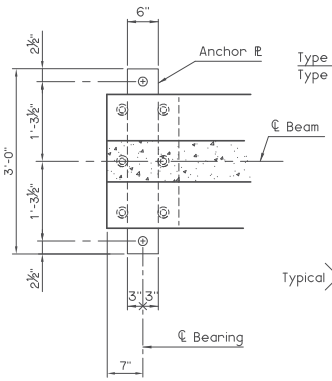


BEVELED ANCHOR PLATE DETAIL

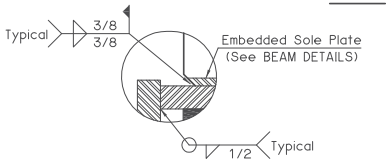
NOTE:
Beveled Anchor Plate is required when angle between beam supports due to roadway grade exceeds 1%. Bevel Slope to match angle between beam supports and horizontal.



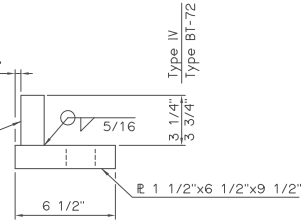
DETAIL B



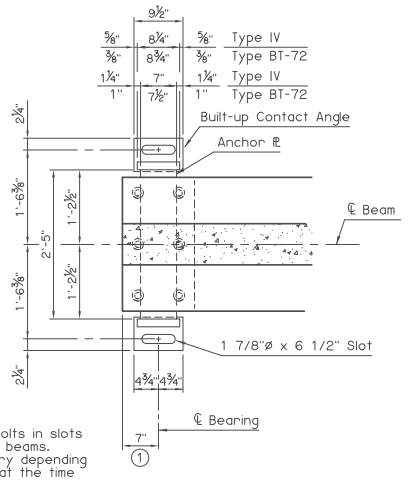
PLAN



DETAIL A

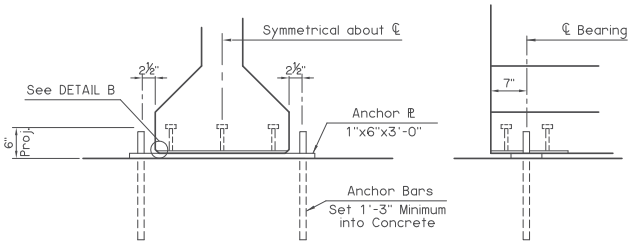


BUILT-UP CONTACT ANGLE DETAIL



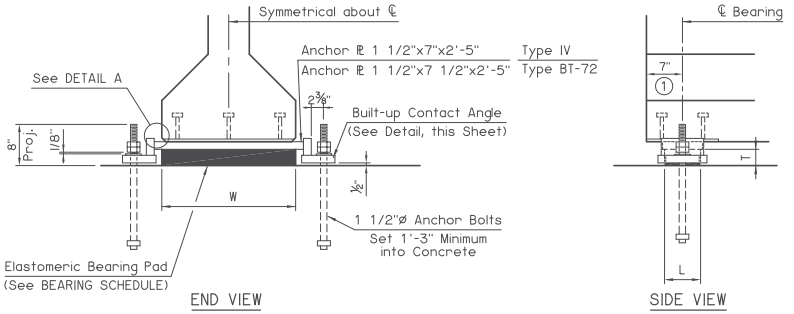
1 Center Anchor Bolts in slots during setting of beams. Dimension may vary depending on temperature at the time of beam setting.

PLAN



END VIEW SIDE VIEW

ABUTMENT FIXED BEARING DETAILS



END VIEW SIDE VIEW

PIER EXPANSION BEARING DETAILS

EXPANSION BEARING ASSEMBLY NOTES:

Provide structural steel for Anchor Plates and Built-up Contact Angles in accordance with ASTM A240 (Austenitic Stainless Steel, Type 316, Charpy V-Notch testing not required). For Anchor Bolts, provide continuously threaded bars in accordance with ASTM A320, Class 2, Grade B8M (Austenitic Stainless Steel, Type 316, Charpy V-Notch testing not required). Use austenitic stainless steel nuts and washers conforming to ASTM A194, Grade 8M and ASTM A320, respectively. Perform all welding consistent with procedures for stainless steel.

FIXED BEARING ASSEMBLY NOTES:

Provide structural steel for Anchor Plates in accordance with AASHTO M270 (ASTM A709), Grade 50W (Weathering Steel, Charpy V-Notch testing not required). For Anchor Bars, provide a reinforcing bar in accordance with AASHTO M31, Grade 60.

TYPE IV BEARING SCHEDULE

SPAN	60 DUROMETER ELASTOMERIC BEARING PAD				MAXIMUM EXPANSION LENGTH (2)
	SIZE (T x L x W)	COVER LAYER	INNER LAYER	LAMINATE PLATE	
65'	3 1/8"x6"x2'-2"	2 - 1/4"	5 - 3/8"	6 - 1/8"	205'
70'	3 1/8"x6"x2'-2"	2 - 1/4"	5 - 3/8"	6 - 1/8"	205'
75'	3 1/8"x6"x2'-2"	2 - 1/4"	5 - 3/8"	6 - 1/8"	205'
80'	3 1/8"x6"x2'-2"	2 - 1/4"	5 - 3/8"	6 - 1/8"	205'
85'	3 1/8"x6 1/2"x2'-2"	2 - 1/4"	5 - 3/8"	6 - 1/8"	205'
90'	3 1/8"x6 1/2"x2'-2"	2 - 1/4"	5 - 3/8"	6 - 1/8"	215'
95'	3 1/8"x6 1/2"x2'-2"	2 - 1/4"	5 - 3/8"	6 - 1/8"	215'
100'	3 1/8"x6 1/2"x2'-2"	2 - 1/4"	5 - 3/8"	6 - 1/8"	220'

TYPE BT-72 BEARING SCHEDULE

SPAN	60 DUROMETER ELASTOMERIC BEARING PAD				MAXIMUM EXPANSION LENGTH (2)
	SIZE (T x L x W)	COVER LAYER	INNER LAYER	LAMINATE PLATE	
95'	3 5/8"x6 1/2"x2'-2"	2 - 1/4"	6 - 3/8"	7 - 1/8"	215'
100'	3 5/8"x6 1/2"x2'-2"	2 - 1/4"	6 - 3/8"	7 - 1/8"	220'
105'	3 5/8"x6 1/2"x2'-2"	2 - 1/4"	6 - 3/8"	7 - 1/8"	230'
110'	3 5/8"x6 1/2"x2'-2"	2 - 1/4"	6 - 3/8"	7 - 1/8"	230'
115'	3 5/8"x7"x2'-2"	2 - 1/4"	6 - 3/8"	7 - 1/8"	230'

(2) Bonding to Anchor Plate not required.

APPROVED BY BRIDGE ENGINEER _____ DATE 9/2/20

OKLAHOMA DEPT. OF TRANSPORTATION
BRIDGE STANDARD (ENGLISH)

BEARING DETAILS TYPE IV AND TYPE BT-72 P.C. BEAMS INTEGRAL

2009 SPECIFICATIONS	B40-I-BRG-PC4BT	02E

B-197E

① Quantity includes provision for laps required in longitudinal reinforcing as follows:
65' thru 100' Spans - 1 lap

② Quantity includes provision for laps required in longitudinal reinforcing as follows:
65' Span = 1 lap
70' thru 100' Spans - 1 1/2 laps
Laps account for adjacent span combinations and are approximate. The Department will not pay for additional quantities of reinforcing steel in excess of the quantities shown in the plans.

③ At abutments, provide and install Fixed Bearing Assemblies of the size, shape and location as detailed in the plans. See schedule for estimated total of structural steel per span for the Fixed Bearing Assemblies. Include all costs associated with providing and installing the Anchor Plate and Anchor Bars, including all material, labor, equipment and incidentals necessary to complete the work shown in the plans in the contract unit price of FIXED BEARING ASSEMBLIES.

④ At all piers, provide and install Expansion Bearing Assemblies of the size, shape and location as detailed in the plans. See schedule for estimated total of stainless steel per span for the Expansion Bearing Assemblies. Include all costs associated with providing and installing the Elastomeric Pads, Anchor Plates, Contact Plates, Anchor Bars and Anchor Bolts, Nuts and Washers, including all material, labor, equipment and incidentals necessary to complete the work shown in the plans in the contract unit price of EXPANSION BEARING ASSEMBLIES.

⑤ Provide and install Elastomeric Pads between the top surface of the Beams and the bottom surface of the Deck Slab. The Elastomeric Pads are to be of the size and shape as detailed in the plans and located at each Beam end above the Piers. Include all costs associated with providing and installing the Elastomeric Pads above the Beams, including all material, labor, equipment, and incidentals necessary to complete the work as shown in the plans, in the contract unit price of ELASTOMERIC BEARING PADS.

SUPERSTRUCTURE QUANTITIES PER SPAN

SPAN	ABUTMENT TO ABUTMENT									
	PRESTRESSED CONCRETE BEAMS (TYPE IV) (L.F.)	SAW-CUT GROOVING (S.Y.)	CONCRETE RAIL (TR4) (L.F.)	STRUCTURAL STEEL (LB.)	CLASS AA CONCRETE (C.Y.)	EPOXY COATED REINFORCING STEEL ① (LB.)		WATER REPELLENT (VISUALLY INSPECTED) (S.Y.)		FIXED BEARING ASSEMBLY (EACH) ③
						TR4 W/ OPENINGS	TR4 W/O OPENINGS	TR4 W/ OPENINGS	TR4 W/O OPENINGS	
65'	259	291.1	131.0	150	117.3	19,400	19,990	272	267	8
70'	279	313.3	141.0	150	122.7	20,630	21,210	289	285	8
75'	299	335.6	151.0	150	128.2	21,750	22,440	307	302	8
80'	319	357.8	161.0	150	133.7	22,980	23,660	324	319	8
85'	339	380.0	171.0	150	139.2	24,090	24,890	342	337	8
90'	359	402.2	181.0	150	144.7	25,330	26,110	360	354	8
95'	379	424.4	191.0	150	150.1	26,440	27,340	378	371	8
100'	399	446.7	201.0	150	155.6	27,680	28,560	395	388	8

SUPERSTRUCTURE QUANTITIES PER SPAN

SPAN	ABUTMENT TO PIER											
	PRESTRESSED CONCRETE BEAMS (TYPE IV) (L.F.)	SAW-CUT GROOVING (S.Y.)	CONCRETE RAIL (TR4) (L.F.)	STRUCTURAL STEEL (LB.)	CLASS AA CONCRETE (C.Y.)	EPOXY COATED REINFORCING STEEL ② (LB.)		WATER REPELLENT (VISUALLY INSPECTED) (S.Y.)		FIXED BEARING ASSEMBLY (EACH) ③	EXPANSION BEARING ASSEMBLY (EACH) ④	ELASTOMERIC BEARING PADS (EACH) ⑤
						TR4 W/ OPENINGS	TR4 W/O OPENINGS	TR4 W/ OPENINGS	TR4 W/O OPENINGS			
65'	259	294.4	130.5	300	97.0	19,270	19,750	251	246	4	4	4
70'	279	316.7	140.5	300	102.5	20,580	21,050	268	264	4	4	4
75'	299	338.9	150.5	300	108.0	21,700	22,270	286	281	4	4	4
80'	319	361.1	160.5	300	113.5	22,930	23,500	303	298	4	4	4
85'	339	383.3	170.5	300	118.9	24,040	24,720	321	315	4	4	4
90'	359	405.6	180.5	300	124.4	25,280	25,950	339	333	4	4	4
95'	379	427.8	190.5	300	129.9	26,390	27,170	357	350	4	4	4
100'	399	450.0	200.5	300	135.4	27,620	28,400	374	367	4	4	4

SUPERSTRUCTURE QUANTITIES PER SPAN

SPAN	PIER TO PIER										
	PRESTRESSED CONCRETE BEAMS (TYPE IV) (L.F.)	SAW-CUT GROOVING (S.Y.)	CONCRETE RAIL (TR4) (L.F.)	STRUCTURAL STEEL (LB.)	CLASS AA CONCRETE (C.Y.)	EPOXY COATED REINFORCING STEEL ② (LB.)		WATER REPELLENT (VISUALLY INSPECTED) (S.Y.)		EXPANSION BEARING ASSEMBLY (EACH) ④	ELASTOMERIC BEARING PADS (EACH) ⑤
						TR4 W/ OPENINGS	TR4 W/O OPENINGS	TR4 W/ OPENINGS	TR4 W/O OPENINGS		
65'	259	288.9	130.0	450	76.8	19,150	19,520	229	225	8	8
70'	279	311.1	140.0	450	82.2	20,350	20,820	247	242	8	8
75'	299	333.3	150.0	450	87.7	21,580	22,050	265	260	8	8
80'	319	355.6	160.0	450	93.2	22,700	23,270	282	277	8	8
85'	339	377.8	170.0	450	98.7	23,930	24,500	300	294	8	8
90'	359	400.0	180.0	450	104.2	25,040	25,720	317	312	8	8
95'	379	422.2	190.0	450	109.6	26,280	26,950	336	329	8	8
100'	399	444.4	200.0	450	115.1	27,390	28,170	353	346	8	8

BEARING ASSEMBLY STAINLESS/STRUCTURAL STEEL QUANTITIES PER SPAN

ABUTMENT TO ABUTMENT	ABUTMENT TO PIER		PIER TO PIER
FIXED BEARING ASSEMBLIES (LB.)	FIXED BEARING ASSEMBLIES (LB.)	EXPANSION BEARING ASSEMBLIES (LB.)	EXPANSION BEARING ASSEMBLIES (LB.)
700	350	790	1,580

CONSTRUCTION JOINT SEAL QUANTITIES

ITEM	UNIT	EACH PIER
SEALER CRACK PREPARATION	L.F.	81.5
SEALER RESIN	GAL.	0.9

APPROVED BY BRIDGE ENGINEER [signature] DATE 9/2/10

OKLAHOMA DEPT. OF TRANSPORTATION
BRIDGE STANDARD (ENGLISH)

SUPERSTRUCTURE QUANTITIES TYPE IV P.C. BEAMS INTEGRAL

2009 SPECIFICATIONS	B40-I-SPR-QUAN-PCB-IV	03E

B-209E

APPROACH SLAB QUANTITIES

	ITEM	UNIT	APPROACH SLAB NO. 1	APPROACH SLAB NO. 2
	20'-0" APPROACH SLAB			
② ①	APPROACH SLAB	S.Y.	93.7	93.7
	SAW-CUT GROOVING	S.Y.	88.9	88.9
	CONCRETE RAIL (TR4)	L.F.	40.0	40.0
	WATER REPELLENT (VISUALLY INSPECTED)	S.Y.	18	18
	24'-0" APPROACH SLAB			
③ ①	APPROACH SLAB	S.Y.	112.4	112.4
	SAW-CUT GROOVING	S.Y.	106.7	106.7
	CONCRETE RAIL (TR4)	L.F.	48.0	48.0
	WATER REPELLENT (VISUALLY INSPECTED)	S.Y.	22	22
	29'-0" APPROACH SLAB			
④ ①	APPROACH SLAB	S.Y.	135.9	135.9
	SAW-CUT GROOVING	S.Y.	128.9	128.9
	CONCRETE RAIL (TR4)	L.F.	58.0	58.0
	WATER REPELLENT (VISUALLY INSPECTED)	S.Y.	27	27

① The Department considers the cost of Concrete, Reinforcing Steel (including SR1 bars), Backer Rod, Rapid Cure Joint Sealant, Polystyrene and Polyethylene Sheeting to be included in the contract unit price of APPROACH SLAB.

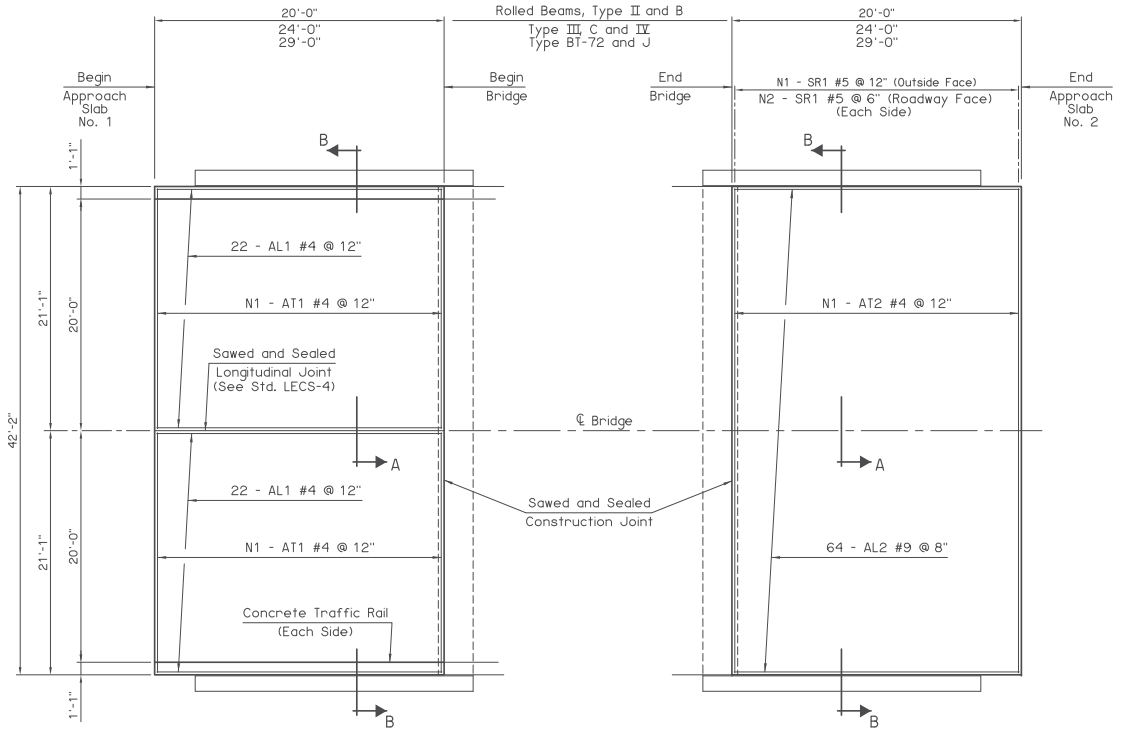
② There is an estimated 33.8 C.Y. of Class AA Concrete and an estimated 6,600 LB. of Epoxy Coated Reinforcing Steel in each Approach Slab.

③ There is an estimated 40.6 C.Y. of Class AA Concrete and an estimated 7,910 LB. of Epoxy Coated Reinforcing Steel in each Approach Slab.

④ There is an estimated 49.1 C.Y. of Class AA Concrete and an estimated 9,550 LB. of Epoxy Coated Reinforcing Steel in each Approach Slab.

APPROACH SLAB BAR LIST
(ONE SHOWN, TWO REQUIRED)

MARK	SIZE	NO.	FORM	LENGTH	N1	N2
20'-0" APPROACH SLAB						
EPOXY COATED REINFORCING						
AT1	#4	42	STR.	20'-9"	21	
AT2	#4	21	STR.	41'-10"	21	
AL1	#4	44	STR.	19'-10"		
AL2	#9	64	STR.	19'-10"		
SR1	#5	124	BNT.	4'-1"	21	41
24'-0" APPROACH SLAB						
EPOXY COATED REINFORCING						
AT1	#4	50	STR.	20'-9"	25	
AT2	#4	25	STR.	41'-10"	25	
AL1	#4	44	STR.	23'-10"		
AL2	#9	64	STR.	23'-10"		
SR1	#5	148	BNT.	4'-1"	25	49
29'-0" APPROACH SLAB						
EPOXY COATED REINFORCING						
AT1	#4	60	STR.	20'-9"	30	
AT2	#4	30	STR.	41'-10"	30	
AL1	#4	44	STR.	28'-10"		
AL2	#9	64	STR.	28'-10"		
SR1	#5	178	BNT.	4'-1"	30	59



TOP REINFORCING MAT DETAIL

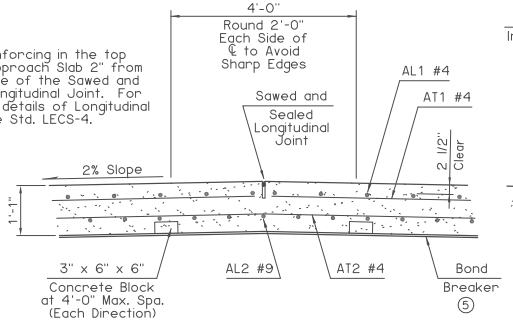
BOTTOM REINFORCING MAT DETAIL

NOTE:
For additional detail of Approach Slab at Abutment, see LONGITUDINAL SECTION and ABUTMENT DIAPHRAGM DETAILS.

APPROACH SLAB NO. 1

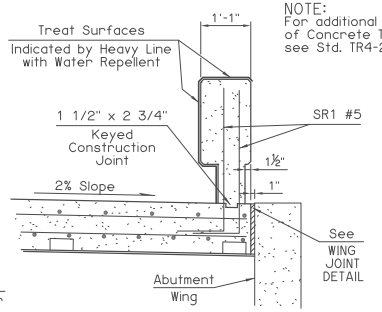
APPROACH SLAB NO. 2

NOTE:
Place Reinforcing in the top of the Approach Slab 2" from either side of the Sawed and Sealed Longitudinal Joint. For additional details of Longitudinal Joint, see Std. LECS-4.



SECTION A

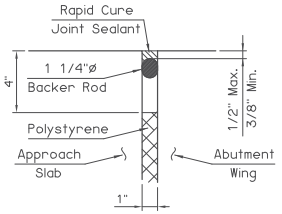
NOTE:
For SR1 bar bend, see Std. TR4-2.



SECTION B

NOTE:
For additional detail of Concrete Traffic Rail, see Std. TR4-2.

⑤ Bond Breaker shall be one 6 mil or two 4 mil Polyethylene sheets. Bond Breaker shall extend full width of Approach Slab and full length up to the back face of the Abutment Diaphragm. Bond Breaker shall not be placed in notch of the Abutment Diaphragm.



WING JOINT DETAIL

Information shown on this sheet is applicable only with Asphalt Roadway

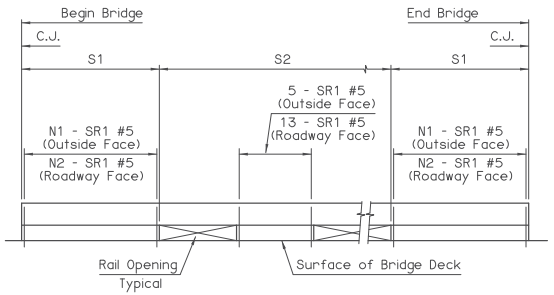
APPROVED BY BRIDGE ENGINEER _____ DATE 4/22/10

OKLAHOMA DEPT. OF TRANSPORTATION
BRIDGE STANDARD (ENGLISH)

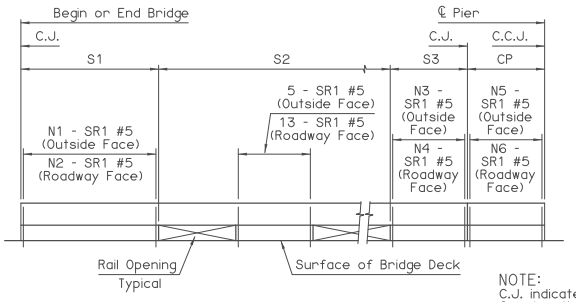
APPROACH SLAB DETAILS INTEGRAL

2009 SPECIFICATIONS	B40-I-AS	03E

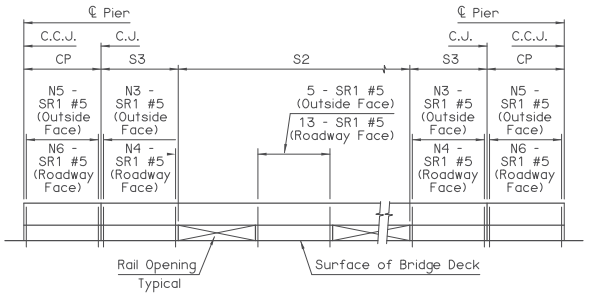
B-216E



ABUTMENT TO ABUTMENT



ABUTMENT TO PIER



PIER TO PIER

CONCRETE TRAFFIC RAIL ELEVATION

NOTE:
C.J. indicates a Construction Joint.
C.C.J. indicates a Control Crack Joint.
For additional detail of Concrete Traffic Rail, see Std. TR4-2.

TYPE IV P.C. BEAMS
CONCRETE TRAFFIC RAIL WITH OPENINGS SCHEDULE

SPAN	SPAN TYPE																	
	ABUTMENT TO ABUTMENT				ABUTMENT TO PIER										PIER TO PIER					
	S1	S2	N1	N2	S1	N1	N2	S2	S3	N3	N4	CP	N5	N6	S2	S3	N3	N4	CP	N5	N6
65'	5'-3"	11 Spa. @ 5'-0" = 55'-0"	6	14	9'-3"	9	24	9 Spa. @ 5'-0" = 45'-0"	5'-0"	5	13	6'-0"	6	15	7 Spa. @ 5'-0" = 35'-0"	9'-0"	9	23	6'-0"	6	15
70'	7'-9"	11 Spa. @ 5'-0" = 55'-0"	8	20	12'-0"	11	30	9 Spa. @ 5'-0" = 45'-0"	7'-3"	7	19	6'-0"	6	15	9 Spa. @ 5'-0" = 45'-0"	6'-6"	7	17	6'-0"	6	15
75'	5'-3"	13 Spa. @ 5'-0" = 65'-0"	6	14	9'-3"	9	24	11 Spa. @ 5'-0" = 55'-0"	5'-0"	5	13	6'-0"	6	15	9 Spa. @ 5'-0" = 45'-0"	9'-0"	9	23	6'-0"	6	15
80'	7'-9"	13 Spa. @ 5'-0" = 65'-0"	8	20	12'-0"	11	30	11 Spa. @ 5'-0" = 55'-0"	7'-3"	7	19	6'-0"	6	15	11 Spa. @ 5'-0" = 55'-0"	6'-6"	7	17	6'-0"	6	15
85'	5'-3"	15 Spa. @ 5'-0" = 75'-0"	6	14	9'-3"	9	24	13 Spa. @ 5'-0" = 65'-0"	5'-0"	5	13	6'-0"	6	15	11 Spa. @ 5'-0" = 55'-0"	9'-0"	9	23	6'-0"	6	15
90'	7'-9"	15 Spa. @ 5'-0" = 75'-0"	8	20	12'-0"	11	30	13 Spa. @ 5'-0" = 65'-0"	7'-3"	7	19	6'-0"	6	15	13 Spa. @ 5'-0" = 65'-0"	6'-6"	7	17	6'-0"	6	15
95'	5'-3"	17 Spa. @ 5'-0" = 85'-0"	6	14	9'-3"	9	24	15 Spa. @ 5'-0" = 75'-0"	5'-0"	5	13	6'-0"	6	15	13 Spa. @ 5'-0" = 65'-0"	9'-0"	9	23	6'-0"	6	15
100'	7'-9"	17 Spa. @ 5'-0" = 85'-0"	8	20	12'-0"	11	30	15 Spa. @ 5'-0" = 75'-0"	7'-3"	7	19	6'-0"	6	15	15 Spa. @ 5'-0" = 75'-0"	6'-6"	7	17	6'-0"	6	15

TYPE IV P.C. BEAMS
CONCRETE TRAFFIC RAIL WITH OPENINGS SR1 BAR LIST

SPAN	EPOXY COATED REINFORCING				SPAN TYPE		
					ABUTMENT TO ABUTMENT	ABUTMENT TO PIER	PIER TO PIER
	MARK	SIZE	FORM	LENGTH	NO.	NO.	NO.
65'	SR1	#5	BNT.	4'-1"	260	288	320
70'	SR1	#5	BNT.	4'-1"	292	320	324
75'	SR1	#5	BNT.	4'-1"	296	324	356
80'	SR1	#5	BNT.	4'-1"	328	356	360
85'	SR1	#5	BNT.	4'-1"	332	360	392
90'	SR1	#5	BNT.	4'-1"	364	392	396
95'	SR1	#5	BNT.	4'-1"	368	396	428
100'	SR1	#5	BNT.	4'-1"	400	428	432

TYPE BT-72 AND TYPE J P.C. BEAMS
CONCRETE TRAFFIC RAIL WITH OPENINGS SCHEDULE

SPAN	SPAN TYPE																				
	ABUTMENT TO ABUTMENT				ABUTMENT TO PIER										PIER TO PIER						
	S1	S2	N1	N2	S1	N1	N2	S2	S3	N3	N4	CP	N5	N6	S2	S3	N3	N4	CP	N5	N6
95'	5'-3"	17 Spa. @ 5'-0" = 85'-0"	6	14	8'-3"	8	21	15 Spa. @ 5'-0" = 75'-0"	5'-0"	5	13	7'-0"	7	17	13 Spa. @ 5'-0" = 65'-0"	8'-0"	8	21	7'-0"	7	17
100'	7'-9"	17 Spa. @ 5'-0" = 85'-0"	8	20	12'-0"	11	30	15 Spa. @ 5'-0" = 75'-0"	6'-3"	7	16	7'-0"	7	17	15 Spa. @ 5'-0" = 75'-0"	5'-6"	6	15	7'-0"	7	17
105'	5'-3"	19 Spa. @ 5'-0" = 95'-0"	6	14	8'-3"	8	21	17 Spa. @ 5'-0" = 85'-0"	5'-0"	5	13	7'-0"	7	17	15 Spa. @ 5'-0" = 75'-0"	8'-0"	8	21	7'-0"	7	17
110'	7'-9"	19 Spa. @ 5'-0" = 95'-0"	8	20	12'-0"	11	30	17 Spa. @ 5'-0" = 85'-0"	6'-3"	7	16	7'-0"	7	17	17 Spa. @ 5'-0" = 85'-0"	5'-6"	6	15	7'-0"	7	17
115'	5'-3"	21 Spa. @ 5'-0" = 105'-0"	6	14	8'-3"	8	21	19 Spa. @ 5'-0" = 95'-0"	5'-0"	5	13	7'-0"	7	17	17 Spa. @ 5'-0" = 85'-0"	8'-0"	8	21	7'-0"	7	17
120'	7'-9"	21 Spa. @ 5'-0" = 105'-0"	8	20	12'-0"	11	30	19 Spa. @ 5'-0" = 95'-0"	6'-3"	7	16	7'-0"	7	17	19 Spa. @ 5'-0" = 95'-0"	5'-6"	6	15	7'-0"	7	17
125'	5'-3"	23 Spa. @ 5'-0" = 115'-0"	6	14	8'-3"	8	21	21 Spa. @ 5'-0" = 105'-0"	5'-0"	5	13	7'-0"	7	17	19 Spa. @ 5'-0" = 95'-0"	8'-0"	8	21	7'-0"	7	17
130'	7'-9"	23 Spa. @ 5'-0" = 115'-0"	8	20	12'-0"	11	30	21 Spa. @ 5'-0" = 105'-0"	6'-3"	7	16	7'-0"	7	17	21 Spa. @ 5'-0" = 105'-0"	5'-6"	6	15	7'-0"	7	17

TYPE BT-72 AND TYPE J P.C. BEAMS
CONCRETE TRAFFIC RAIL WITH OPENINGS SR1 BAR LIST

SPAN	EPOXY COATED REINFORCING				SPAN TYPE		
					ABUTMENT TO ABUTMENT	ABUTMENT TO PIER	PIER TO PIER
	MARK	SIZE	FORM	LENGTH	NO.	NO.	NO.
95'	SR1	#5	BNT.	4'-1"	368	394	428
100'	SR1	#5	BNT.	4'-1"	400	428	432
105'	SR1	#5	BNT.	4'-1"	404	430	464
110'	SR1	#5	BNT.	4'-1"	436	464	468
115'	SR1	#5	BNT.	4'-1"	440	466	500
120'	SR1	#5	BNT.	4'-1"	472	500	504
125'	SR1	#5	BNT.	4'-1"	476	502	536
130'	SR1	#5	BNT.	4'-1"	508	536	540

NOTE:
For bar bend, see Std. TR4-2.

APPROVED BY BRIDGE ENGINEER [signature] DATE 9/2/10

OKLAHOMA DEPT. OF TRANSPORTATION
BRIDGE STANDARD (ENGLISH)

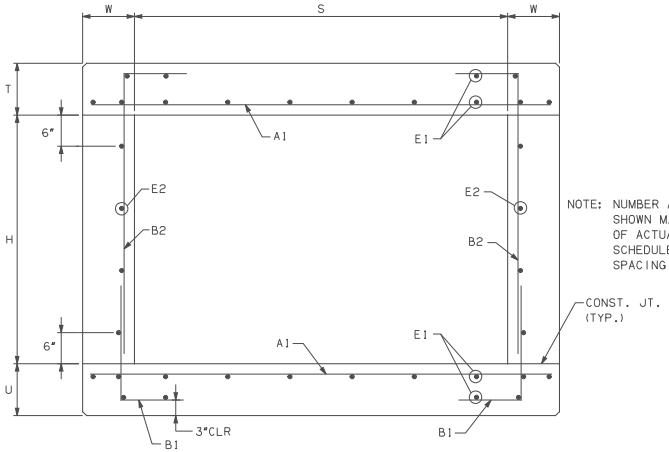
CONCRETE TRAFFIC RAIL WITH OPENINGS TYPE IV, BT-72 AND J P.C. BEAMS INTEGRAL

2009 SPECIFICATIONS	B40-I-TR4-0-PC45	02E

B-220E

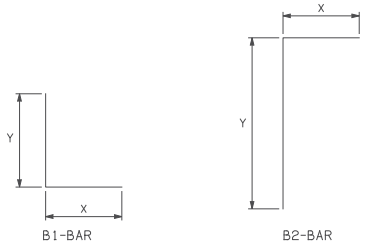
REVISIONS		
DESCRIPTION		DATE

SECTION DIMENSIONS					REINFORCING STEEL																				SECTION DIMENSIONS		QUANTITIES	
					A1-BARS				B1-BARS					B2-BARS						E1-BARS AT 12" MAX.			E2-BARS AT 12" MAX.					PER FOOT OF BARREL	
S	H	T	U	W	SIZE	SPA	LENGTH	WEIGHT PER FT.	SIZE	SPA	"X"	"Y"	LENGTH	WEIGHT PER FT.	SIZE	SPA	"X"	"Y"	LENGTH	WEIGHT PER FT.	NO.	SIZE	WEIGHT PER FT.	NO.	SIZE	WEIGHT PER FT.	S	H	CONC. (C.Y.)	REINF. (LB.)
3'	2'	7"	8"	6"	#5	6"	3'-8"	15.3	#4	12"	0'-8"	1'-9"	2'-5"	3.2	#4	12"	0'-8"	2'-5"	3'-1"	4.1	18	#4	12.0	4	#4	2.7	3'	2'	0.26	37.3
3'	3'	7"	8"	7"	#5	6"	3'-10"	16.0	#4	12"	0'-8"	1'-9"	2'-5"	3.2	#4	12"	0'-8"	3'-5"	4'-1"	5.5	18	#4	12.0	6	#4	4.0	3'	3'	0.32	40.7
4'	2'	9"	10"	7"	#5	6"	4'-10"	20.2	#4	12"	0'-8"	1'-11"	2'-7"	3.5	#4	12"	0'-8"	2'-7"	3'-3"	4.3	20	#4	13.4	4	#4	2.7	4'	2'	0.39	44.1
4'	3'	9"	10"	7"	#5	6"	4'-10"	20.2	#4	12"	0'-8"	1'-11"	2'-7"	3.5	#4	12"	0'-8"	3'-7"	4'-3"	5.7	20	#4	13.4	6	#4	4.0	4'	3'	0.43	46.8
4'	4'	9"	10"	8"	#5	6"	5'-0"	20.9	#5	12"	0'-10"	2'-3"	3'-1"	6.4	#5	12"	0'-10"	4'-7"	5'-5"	11.3	20	#4	13.4	8	#4	5.3	4'	4'	0.51	57.3
5'	2'	9"	10"	6"	#6	6"	5'-8"	34.0	#4	12"	0'-8"	1'-11"	2'-7"	3.5	#4	12"	0'-8"	2'-7"	3'-3"	4.3	22	#4	14.7	4	#4	2.7	5'	2'	0.43	59.2
5'	3'	9"	10"	6"	#6	6"	5'-8"	34.0	#5	6"	0'-10"	2'-3"	3'-1"	12.9	#5	6"	0'-10"	3'-7"	4'-5"	18.4	22	#4	14.7	6	#4	4.0	5'	3'	0.46	84.0
5'	4'	9"	10"	7"	#6	6"	5'-10"	35.0	#5	6"	0'-10"	2'-3"	3'-1"	12.9	#5	6"	0'-10"	4'-7"	5'-5"	22.6	22	#4	14.7	8	#4	5.3	5'	4'	0.53	90.5
5'	5'	9"	10"	8"	#6	6"	6'-0"	36.0	#5	6"	0'-10"	2'-3"	3'-1"	12.9	#5	6"	0'-10"	5'-7"	6'-5"	26.8	22	#4	14.7	10	#4	6.7	5'	5'	0.62	97.1
5'	7'	10"	11"	10"	#6	6"	6'-4"	38.1	#5	6"	0'-10"	2'-4"	3'-2"	13.2	#5	6"	0'-10"	7'-8"	8'-6"	35.5	22	#4	14.7	14	#4	9.4	5'	7'	0.86	110.9



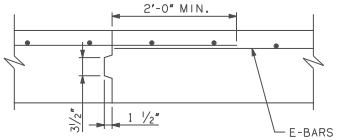
NOTE: NUMBER AND SPACING OF E-BARS SHOWN MAY NOT BE REPRESENTATIVE OF ACTUAL CULVERT SECTIONS, SEE SCHEDULE ABOVE FOR NUMBER AND SPACING OF E-BARS.

BARREL SECTION



BAR BEND DIAGRAMS

NOTE: ALL "X" DIMENSIONS ARE HORIZONTAL IN BARREL SECTION.
ALL "Y" DIMENSIONS ARE VERTICAL IN BARREL SECTION.



TRANSV. CONSTR. JOINT

DESIGN DATA:

1. DESIGNED IN ACCORDANCE WITH 2007 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND INTERIM SPECIFICATIONS FROM 2008.
2. DESIGNED FOR HL-93 LOADING AND ODOT OVERLOAD TRUCK.
3. MATERIALS:
   CONCRETE (CLASS AA) f'c = 4 KSI
   REINFORCING STEEL fy = 60 KSI

GENERAL NOTES:

1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 OKLAHOMA STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.
2. ALL CONCRETE EDGES SHALL HAVE A 1 ½" CHAMFER UNLESS OTHERWISE SHOWN OR NOTED. ALL CHAMFER STRIPS SHALL BE SIZED LUMBER.
3. ALL REINFORCING STEEL SHALL HAVE A 2" MINIMUM CLEAR COVER UNLESS OTHERWISE SHOWN.
4. THE QUANTITY FOR REINFORCING STEEL DOES NOT INCLUDE LAP SPLICES OF E1-BARS OR E2-BARS IN THE LENGTH OF THE BARREL OR AT TRANSVERSE CONSTRUCTION JOINTS. THE SPLICE LENGTH FOR E-BARS SHALL BE 24" MINIMUM. THE NUMBER OF SPLICES USED IS TO BE APPROVED BY THE ENGINEER. REINFORCING STEEL FOR SPLICES SHALL NOT BE MEASURED FOR PAYMENT, AND ALL COSTS WILL BE INCLUDED IN THE UNIT BID PRICE FOR REINFORCING STEEL.
5. TRANSVERSE CONSTRUCTION JOINTS SHALL BE PLACED IN ALL CULVERTS 100 FT. OR MORE IN LENGTH. JOINTS SHALL BE SPACED AT 60 FT. MAX.
6. REINFORCING STEEL SHALL BE CONTINUOUS THROUGH THE TRANSVERSE CONSTRUCTION JOINT AND EXTEND A MIN. OF 24" INTO ADJACENT SECTION.

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
509.06 (A)	CLASS AA CONCRETE	C.Y.
511.06 (A)	REINFORCING STEEL	LB.

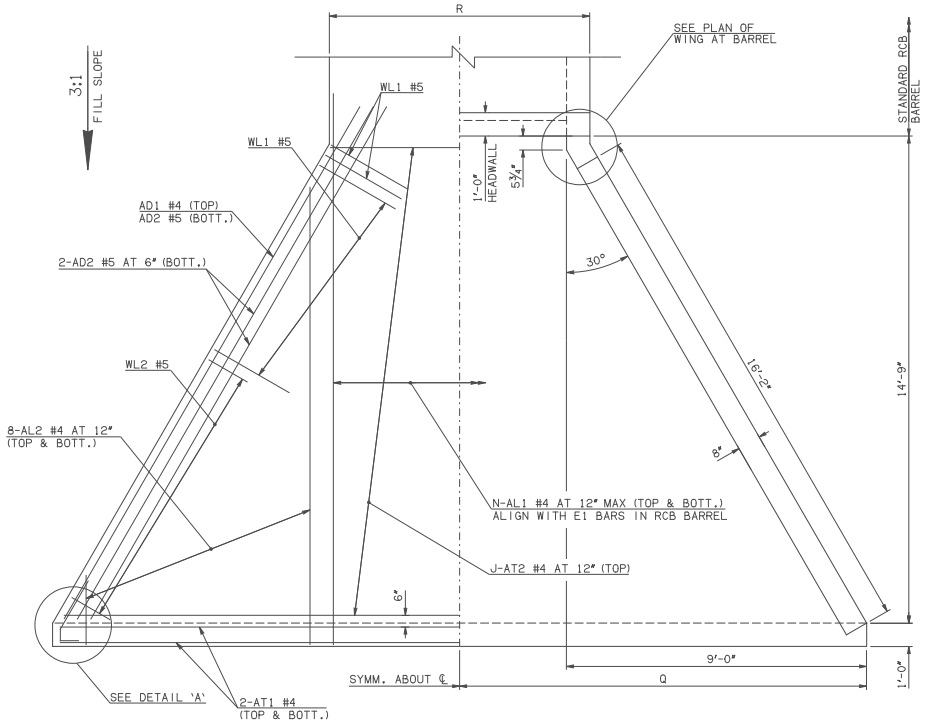
APPROVED BY BRIDGE ENGINEER [signature] DATE 4/2/10

OKLAHOMA DEPT. OF TRANSPORTATION
BRIDGE STANDARD (ENGLISH)

RCB CULVERTS - BARREL DETAILS
3'-0", 4'-0" & 5'-0" SPANS - SINGLE CELL
2 FT. TO 20 FT. FILL

2009 SPECIFICATIONS	RCB-C1-3&4&5(2-20)	01E
		B-510E

REVISIONS		
DESCRIPTION		DATE



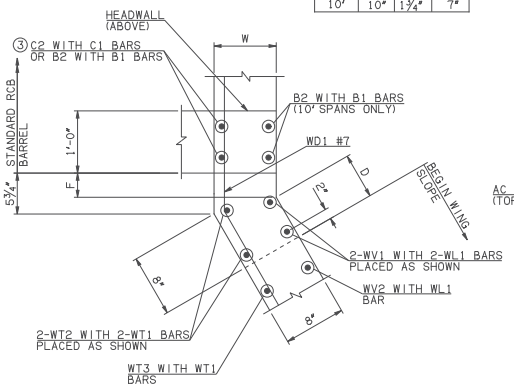
HALF APRON REINFORCING

HALF APRON PLAN

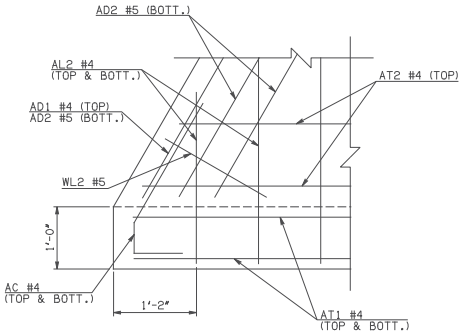
APRON DETAIL

③ SEE HEADWALL DETAIL AT EXTERIOR WALL

WINGWALL DIMENSIONS			
SPAN	W	D	F
3'	7"	7¾"	1¾"
4'	7"	7¾"	1¾"
5'	6"	9¾"	0
6'	7"	7¾"	1¾"
8'	10"	1¾"	7"
10'	10"	1¾"	7"

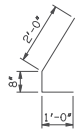


PLAN OF WING AT BARREL



DETAIL 'A'

APRON VARIABLES				
SPAN	DIM. R	DIM. Q	QTY. J	QTY. N
3'	4'-2"	10'-6"	15	5
4'	5'-2"	11'-0"	15	6
5'	6'-0"	11'-6"	15	7
6'	7'-2"	12'-0"	15	8
8'	9'-8"	13'-0"	15	10
10'	11'-8"	14'-0"	15	14



AC #4 x 3'-8"

WINGWALL BAR LIST					
ONE WINGWALL SHOWN; TWO REQUIRED					
MARK	SIZE	QTY.	FORM	LENGTH	REMARKS
WD1	#7	4	BNT	8'-4"	
WH1	#4	2	STR	16'-8"	
② WH2	#4	8	STR	8'-8½" AVG.	3'-6" TO 13'-11"
WH3	#5	2	STR	16'-7"	
WL1	#5	13	BNT	6'-1"	
WL2	#5	10	BNT	4'-2½" AVG.	2'-11" TO 5'-6"
WT1	#4	8	STR	2'-10"	
WT2	#4	2	STR	5'-0"	
WT3	#4	6	STR	4'-1½" AVG.	3'-5" TO 4'-10"
WT4	#4	10	STR	2'-2½" AVG.	11" TO 3'-6"
WV1	#5	2	STR	5'-0"	
WV2	#5	6	STR	4'-1½" AVG.	3'-5" TO 4'-10"
U1	#4	1	BNT	1'-10'	

① 4-SETS OF 8-AL2 BARS REQUIRED
② 2-SETS OF 4-WH2 BARS REQUIRED

APRON AND HEADWALL BAR LIST																				
ONE APRON AND ONE HEADWALL SHOWN																				
MARK	SIZE	FORM	3' SPAN			4' SPAN			5' SPAN			6' SPAN			8' SPAN			10' SPAN		
			QTY.	LENGTH	REMARKS	QTY.	LENGTH	REMARKS	QTY.	LENGTH	REMARKS	QTY.	LENGTH	REMARKS	QTY.	LENGTH	REMARKS	QTY.	LENGTH	REMARKS
AC	#4	BNT	4	3'-8"		4	3'-8"		4	3'-8"		4	3'-8"		4	3'-8"		4	3'-8"	
AD1	#4	STR	2	18'-8"		2	18'-8"		2	18'-8"		2	18'-8"		2	18'-8"		2	18'-8"	
AD2	#5	STR	6	18'-8"		6	18'-8"		6	18'-8"		6	18'-8"		6	18'-8"		6	18'-8"	
AL1	#4	STR	10	17'-7"		12	17'-7"		14	17'-7"		16	17'-7"		20	17'-7"		28	17'-7"	
① AL2	#4	STR	32	8'-6½" AVG.	2'-6" TO 14'-7"	32	8'-6½" AVG.	2'-6" TO 14'-7"	32	8'-6½" AVG.	2'-6" TO 14'-7"	32	8'-6½" AVG.	2'-6" TO 14'-7"	32	8'-6½" AVG.	2'-6" TO 14'-7"	32	8'-6½" AVG.	2'-6" TO 14'-7"
AT1	#4	STR	4	20'-8"		4	21'-8"		4	22'-8"		4	23'-8"		4	25'-8"		4	27'-8"	
AT2	#4	STR	15	12'-1" AVG.	4'-0" TO 20'-2"	15	13'-1" AVG.	5'-0" TO 21'-2"	15	14'-1" AVG.	6'-0" TO 22'-2"	15	15'-1" AVG.	7'-0" TO 23'-2"	15	17'-1" AVG.	9'-0" TO 25'-2"	15	19'-1" AVG.	11'-0" TO 27'-2"
CH	#4	STR	4	3'-10"		4	4'-10"		4	5'-8"		4	6'-10"		4	9'-4"		4	11'-4"	
CL1	#4	BNT	5	4'-4"		6	4'-4"		7	4'-4"		8	4'-4"		10	4'-4"		14	4'-4"	
CL2	#4	BNT	5	4'-3"		6	4'-3"		7	4'-3"		8	4'-3"		10	4'-3"		14	4'-3"	

QUANTITIES							
ITEM	UNIT	3' SPAN	4' SPAN	5' SPAN	6' SPAN	8' SPAN	10' SPAN
CLASS AA CONCRETE	CY	7.90	8.30	8.70	9.20	10.10	10.90
REINFORCING STEEL	LB	1460.00	1510.00	1560.00	1600.00	1690.00	1830.00

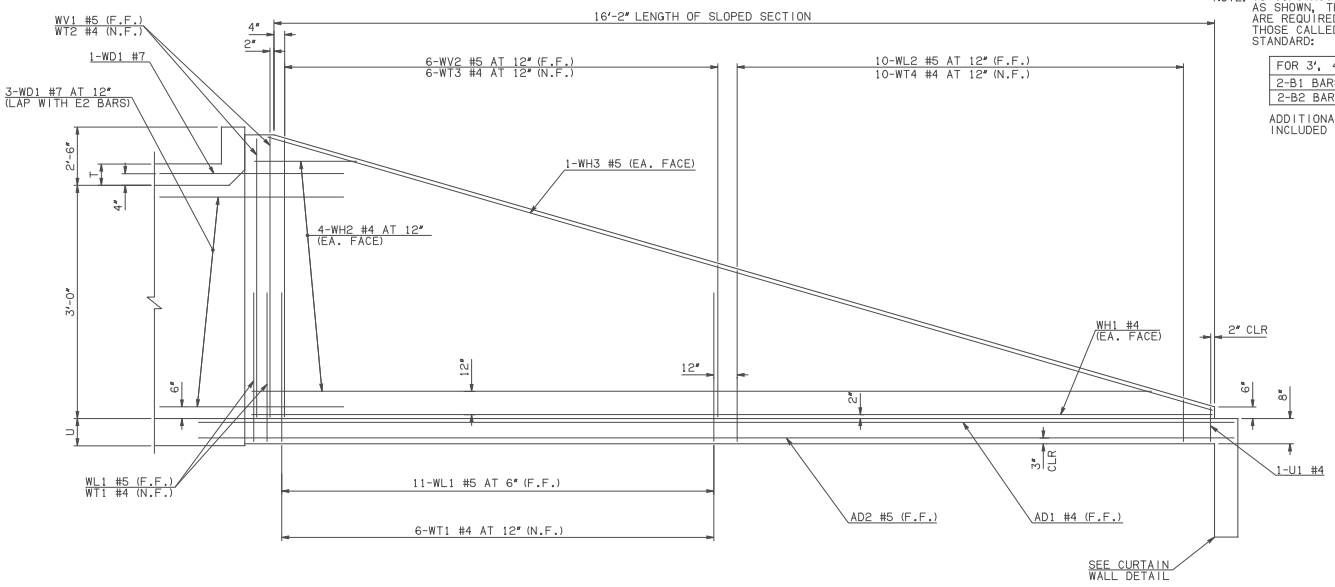
NOTE: QUANTITIES ABOVE ARE FOR ONE END SECTION, WHICH IS COMPRISED OF ONE HEADWALL, ONE APRON, AND TWO WINGWALLS. INCLUDED IN REINFORCING STEEL PAY ITEM QUANTITY IS THE WEIGHT OF ADDITIONAL RCB BARREL REINFORCING STEEL REQUIRED AS SHOWN.

APPROVED BY BRIDGE ENGINEER [signature] DATE 4/2/10

OKLAHOMA DEPT. OF TRANSPORTATION
BRIDGE STANDARD (ENGLISH)
RCB CULVERTS - END SECTION DETAILS
SINGLE CELL - 3'-0" HEIGHT - 0°
SHEET NO. 1 OF 2

2009 SPECIFICATIONS	RCB-E1-H3-0-1	01E
		B-572E

REVISIONS		
DESCRIPTION		DATE



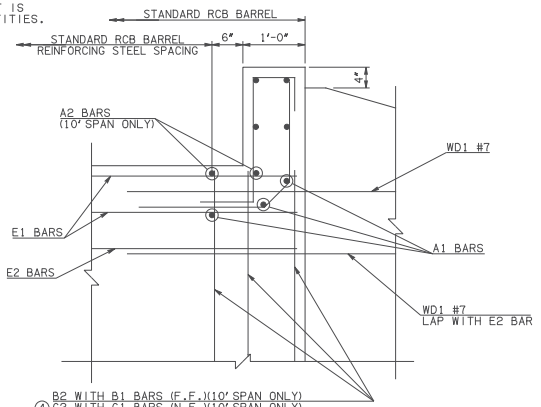
NOTE: F.F. = FAR FACE
N.F. = NEAR FACE

WING ELEVATION

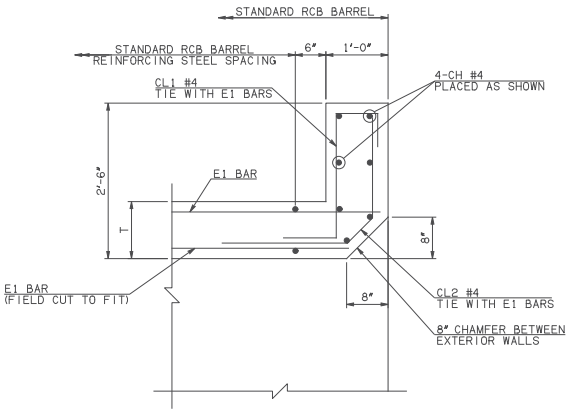
④ NOTE: TO CONSTRUCT ONE END SECTION AS SHOWN, THE FOLLOWING BARS ARE REQUIRED IN ADDITION TO THOSE CALLED IN THE RCB BARREL STANDARD:

FOR 3', 4', 5', 6', & 8' SPANS	FOR 10' SPAN
2-B1 BARS	2-C1 BARS
2-B2 BARS	2-C2 BARS

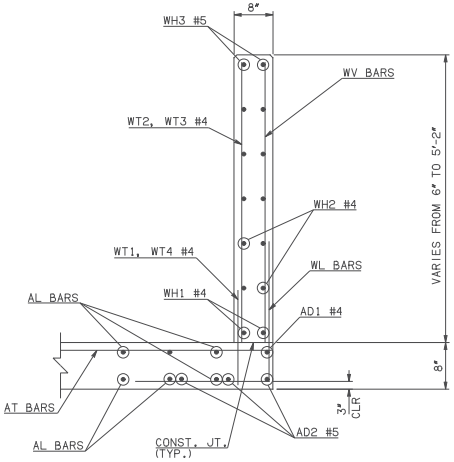
ADDITIONAL WEIGHT IS INCLUDED IN QUANTITIES.



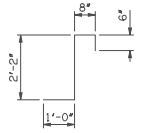
HEADWALL DETAIL AT EXTERIOR WALL



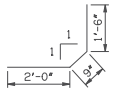
HEADWALL DETAIL AT MIDSPAN



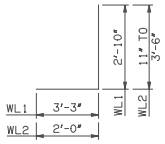
TYPICAL SECTION THRU WING



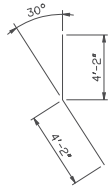
CL1 #4 x 4'-4"



CL2 #4 x 4'-3"



WL1 #5 x 6'-1"
WL2 #5 x 4'-2½" AVG.



WD1 #7 x 8'-4"

U1 #4 x 1'-10"

APPROVED BY BRIDGE ENGINEER Kenneth Kuehl DATE 4/2/10

OKLAHOMA DEPT. OF TRANSPORTATION
BRIDGE STANDARD (ENGLISH)

RCB CULVERTS - END SECTION DETAILS
SINGLE CELL - 3'-0" HEIGHT - 0°
SHEET NO. 2 OF 2

2009 SPECIFICATIONS	RCB-E1-H3-0-2	01E
		B-573E

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

REVISIONS	
DESCRIPTION	DATE
MODIFIED NOTES	3/15/2011

CONTRACTOR

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

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

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

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

SIGN MATERIALS

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

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

SIGN SHEETING

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

SIGN INSTALLATION

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

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

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

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

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

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

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

BARRICADES

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

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

WORK DURATION

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

LIGHTING

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

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

CONSTRUCTION NOTES

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

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

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

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

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

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

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

NO GENDER BIAS SIGNS ARE ALLOWED.

ARROW DISPLAY

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

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

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

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

CHANNELIZING DEVICES

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

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

ALL TRAFFIC CONTROL CHANNELIZING DEVICES SHALL MEET MUTCD COLOR REQUIREMENTS.

FLAGGERS

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

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

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

MINIMUM STANDARDS FOR TRAFFIC CONTROL DEVICES

(1) WARNING LIGHTS (TYPE A FLASHERS AND TYPE C STEADY BURN)
- (A) NOT LESS THAN NINETY (90) PERCENT OF THE TOTAL NUMBER OF LIGHTS BEING USED AT ANY ONE TIME SHALL BE FULLY OPERATIONAL.
- (B) NOT MORE THAN THREE (3) LIGHTS ADJACENT TO ONE ANOTHER SHALL BE FAILING.

(2) ARROW DISPLAY
- (A) WHEN IN ARROW MODE, NO MORE THAN TWO (2) LAMPS IN THE STEM AND ZERO (0) LAMPS IN THE HEAD SHALL BE FAILING. THE DIMMING FUNCTION SHALL BE OPERATING PROPERLY.
- (B) WHEN IN CAUTION MODE (CORNERS), A MINIMUM OF FOUR (4) LAMPS SHALL BE OPERATIONAL. THE DIMMING FUNCTION SHALL BE OPERATING PROPERLY.
- (C) ANY LAMP WHICH IS LIGHTED BUT IMPROPERLY ALIGNED SHALL NOT BE CONSIDERED OPERATIONAL.

(3) CHANGEABLE MESSAGE SIGNS
- (A) NOT LESS THAN NINETY (90) PERCENT OF THE PIXELS SHALL BE FUNCTIONAL IN EACH CHARACTER MODULE.
- (B) NO SANDBAG BALLASTING OVER 3 FEET IN HEIGHT.

(4) PAVEMENT MARKING TAPE
- (A) NOT MORE THAN TEN (10) PERCENT OF ALL TAPE, PAINT, MESSAGE OR SYMBOL SHALL BE MISSING.
- (B) NOT MORE THAN TWO (2) CONSECUTIVE DASHED LINES SHALL BE MISSING.
- (C) NOT MORE THAN FIFTY (50) CONTINUOUS FEET OF A SOLID LINE SHALL BE MISSING.

(5) CONSTRUCTION ZONE PAVEMENT MARKERS
- (A) NOT MORE THAN TEN (10) PERCENT OF THE TOTAL NUMBER OF MARKERS SHALL BE MISSING.
- (B) NOT MORE THAN THREE (3) CONSECUTIVE MARKERS SHALL BE MISSING.

STRIPING

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

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

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

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

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

PILOT CAR

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

MISCELLANEOUS

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

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

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

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

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

APPROVED BY TRAFFIC ENGINEER: _____ DATE: 3/21/11

TRAFFIC STANDARD
TRAFFIC CONTROL STANDARD
TRAFFIC CONTROL CONSTRUCTION NOTES

2009 SPECIFICATIONS

TCS1-1	01
	T-501

$$date$$

TAPER LENGTH CRITERIA FOR WORK ZONES

SPEED LIMIT M.P.H.	"L" FORMULA	"L" TAPER LENGTH (MINIMUM) (FT) 10' OFFSET	11' OFFSET	12' OFFSET	NUMBER OF CHANNELIZING DEVICES REQUIRED (MINIMUM) 10' OFFSET	11' OFFSET	12' OFFSET	SPACING CHANNELIZING DEVICES (MAXIMUM) ① THRU TAPER SECTION (FT.)	② THRU TANGENT SECTION (FT.)	MAXIMUM HORIZONTAL ALIGNMENT THRU DETOUR (DEGREE) (S = 0)	SPEED LIMIT M.P.H.
20	$L = \frac{W \times S^2}{60}$	70	75	80	5	5	5	20	40	—	20
25		105	115	125	6	6	6	25	50	—	25
30		150	165	180	6	7	7	30	60	15	30
35		205	225	245	7	8	8	35	70	11	35
40		265	295	320	8	9	9	40	80	8	40
45	L = W x S	450	495	540	11	12	13	45	90	6	45
50		500	550	600	11	12	13	50	100	5	50
55		550	605	660	12	14	15	50	100	4	55
60		600	660	720	13	15	16	50	100	3	60
65		650	715	780	14	16	17	50	100	2.5	65
70		700	770	840	15	17	18	50	100	2	70
75		750	825	900	16	18	19	50	100	1.8	75

NOTES:

① RECOMMENDED SIGNING TO BE USED THRU LANE TAPER IS (1) CW1-8 ON EVERY OTHER DRUM.

② RECOMMENDED SIGNING TO BE USED THRU TANGENT LANES IS (1) R4-7A(R) OR (1) R4-7A(L) (AS APPLIES) ON EVERY OTHER DRUM.

L = TAPER LENGTH IN FEET

W = WIDTH OF OFFSET IN FEET

S = POSTED SPEED OR OFF-PEAK 85 PERCENTILE SPEED IN MPH

TYPE OF TAPER	TAPER LENGTH
UPSTREAM TAPERS	
MERGING TAPER	L MINIMUM
SHIFTING TAPER	1/2 L MINIMUM
SHOULDER TAPER	1/3 L MINIMUM
TWO-WAY TRAFFIC TAPER	100 FEET MAXIMUM
DOWNSTREAM TAPERS (USE IS OPTIONAL)	100 FEET PER LANE

RECOMMENDED CLEAR ZONE DISTANCE (FT) (CONSTRUCTION WORK ZONES)

DESIGN SPEED	DESIGN ADT	FILL SLOPES 6:1 OR FLATTER	5:1 OR 4:1	3:1	CUT SLOPES 3:1	4:1 OR 5:1	6:1 OR FLATTER
40 MPH OR LESS	UNDER 750	4	4	SEE NOTE 3	4	4	4
	750-1500	5	6		5	5	5
	1500-6000	6	7		6	6	6
	OVER 6000	7	8		7	7	7
45-50 MPH	UNDER 750	5	6		4	4	5
	750-1500	7	8		5	6	7
	1500-6000	8	10		6	7	8
	OVER 6000	10	12		7	9	10
55 MPH	UNDER 750	6	7		4	5	5
	750-1500	8	10		5	7	8
	1500-6000	10	12		7	8	10
	OVER 6000	11	13		8	10	11
60 MPH	UNDER 750	8	10		5	6	7
	750-1500	10	13		6	8	10
	1500-6000	13	16 ★		7	9	12
	OVER 6000	15	18 ★		10	12	13
65-70 MPH	UNDER 750	9	10		5	7	7
	750-1500	12	14		6	9	10
	1500-6000	14	17 ★		8	11	13
	OVER 6000	15	19 ★		11	13	14

NOTES:

★ THE CLEAR ZONE MAY BE LIMITED TO 15 FEET FOR PRACTICALITY AND TO PROVIDE A CONSISTENT ROADWAY TEMPLATE.

(1) ALL DISTANCES ARE MEASURED FROM EDGE OF THE TRAVEL LANE.

(2) FOR CLEAR ZONES, THE "DESIGN ADT" WILL BE THE TOTAL ADT ON TWO-WAY ROADWAYS AND DIRECTIONAL ADT ON ONE-WAY ROADWAYS (E.G., RAMPS AND ONE ROADWAY OF A DIVIDED HIGHWAY).

(3) FILL SLOPES WHICH ARE 3:1 OR STEEPER ARE CRITICAL AND MAY REQUIRE A BARRIER. THEREFORE THERE IS NOT A CLEAR ZONE APPLICATION.

FLARE RATES FOR CONCRETE MEDIAN BARRIER IN TEMPORARY TRAFFIC CONTROL ZONES

SPEED ★	FLARE RATE (MINIMUM)
40 M.P.H.	9 TO 1
45 M.P.H.	10 TO 1
50 M.P.H.	11 TO 1
55 M.P.H.	12 TO 1
60 M.P.H.	13 TO 1
65 M.P.H.	14 TO 1
70 M.P.H.	15 TO 1
75 M.P.H.	16 TO 1

★ POSTED SPEED LIMIT PRIOR TO CONSTRUCTION

STOPPING SIGHT DISTANCE AS A FUNCTION OF SPEED

SPEED ★ (MPH)	LENGTH (FEET)
20 M.P.H.	115
25 M.P.H.	155
30 M.P.H.	200
35 M.P.H.	250
40 M.P.H.	305
45 M.P.H.	360
50 M.P.H.	425
55 M.P.H.	495
60 M.P.H.	570
65 M.P.H.	645
70 M.P.H.	730
75 M.P.H.	820

★ POSTED SPEED, OFF-PEAK 85th PERCENTILE SPEED PRIOR TO WORK STARTING, OR THE ANTICIPATED OPERATING SPEED.

RECOMMENDED DISTANCE BETWEEN SIGNS (MIN.) ROAD TYPE	A (FT)	B (FT)	C (FT)
URBAN (LOW SPEED)	100	100	100
URBAN (HIGH SPEED)	350	350	350
RURAL	500	500	500
EXPRESSWAY /FREEWAY	1,000	1,500	2,640

PAVEMENT MARKINGS THROUGH TEMPORARY TRAFFIC CONTROL ZONE

	DRIVING SURFACE	FLEX TAB MARKERS	TAPE (REMOVABLE)	TAPE (NON-REMOVABLE)	PAINT	CONSTRUCTION ZONE PAVEMENT MARKERS
ASPHALT	EXISTING PAVEMENT TO BE REMOVED OR OVERLAYED IN THE NEXT PHASE	X	X	X	X	X
	EXISTING PAVEMENT TO BE LEFT IN PLACE THRU THE NEXT PHASE	X	X			X
	INTERMEDIATE LIFT	X	X	X	X	X
	MILLED SURFACE	X	X	X	X	X
	FINAL LIFT	X	X			
CONCRETE	EXISTING PAVEMENT TO BE REMOVED OR OVERLAYED IN THE NEXT PHASE	X	X	X	X	X
	EXISTING PAVEMENT TO BE LEFT IN PLACE THRU THE NEXT PHASE	X	X			X
	FINAL SURFACE	X	X		X	X

NOTE:
USE OF NON-REMOVABLE TAPE (FOILBACK) SHALL BE LIMITED TO THOSE CONDITIONS SHOWN IN THE TABLE.

CROSSOVER CRITERIA FOR WORK ZONES

WIDTH OF MEDIAN (W) (FT)	LATERAL SHIFT – (P) (FT)	LENGTH OF CROSSOVER – LC ★ (FT) V.	30 M.P.H.	35 M.P.H.	40 M.P.H.	45 M.P.H.	50 M.P.H.	55 M.P.H.	60 M.P.H.	65 M.P.H.	70 M.P.H.	75 M.P.H.
		D.	15°	11°	8°	6°	5°	4°	3°	2.5°	2°	1.8°
		R.	382	521	716	955	1146	1433	1910	2292	2865	3183
20	32		219	256	301	348	382	427	493	541	605	637
30	42		250	293	344	398	437	489	565	619	692	730
40	52		277	325	382	443	485	543	628	688	770	812
50	62		301	354	417	483	529	593	685	751	841	886
60	72		324	381	448	519	570	638	738	809	905	955
70	82		344	405	478	554	608	681	787	863	966	1,018
80	92		363	428	505	586	643	720	833	914	1,023	1,078
90	102		381	450	531	616	676	758	877	962	1,076	1,135
100	112		398	470	555	644	708	793	918	1,007	1,127	1,189
110	122		414	489	578	672	738	827	958	1,050	1,176	1,240
120	132		429	508	601	698	767	860	995	1,092	1,223	1,290

★ CROSSOVER = REVERSE CURVE CONNECTION TYING TWO (2) PARALLEL ROADWAYS.

REVISIONS DESCRIPTION	DATE

APPROVED BY TRAFFIC ENGINEER: Harold Smith DATE: 6/23/10

TRAFFIC STANDARD

TRAFFIC CONTROL STANDARD

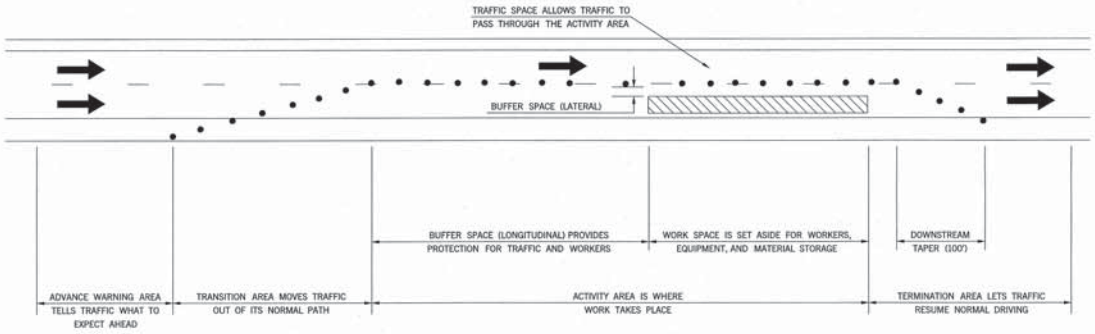
TRAFFIC CONTROL TABLES AND CHARTS

2009 SPECIFICATIONS

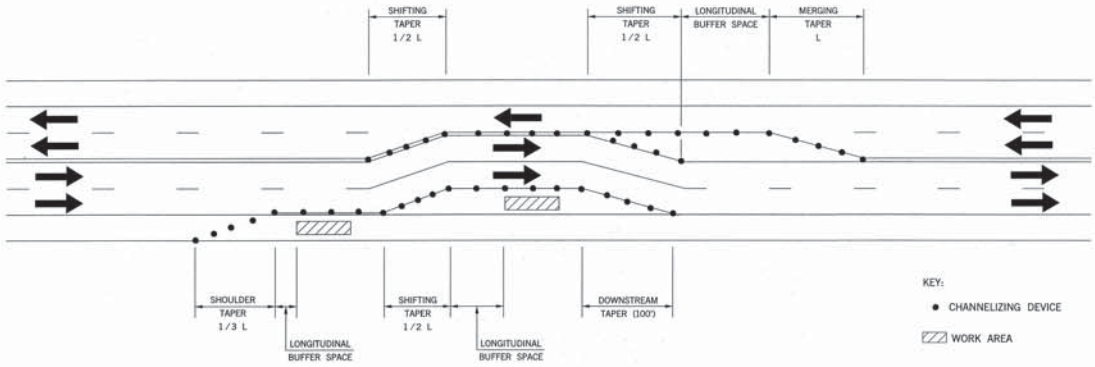
TCS2-1 00

T-502

REVISIONS		
DESCRIPTION		DATE
CHANGED TRANSITION NOTATION		5/31/2011



COMPONENT PARTS OF A TEMPORARY TRAFFIC CONTROL ZONE



TAPERS AND BUFFER SPACE

TEMPORARY TRAFFIC CONTROL ELEMENTS

APPROVED BY TRAFFIC ENGINEER: _____ DATE: 5/31/2011

TRAFFIC STANDARD

TRAFFIC CONTROL STANDARD
TEMPORARY TRAFFIC CONTROL ELEMENTS

2009 SPECIFICATIONS

TCS3-1 | 01

T-503

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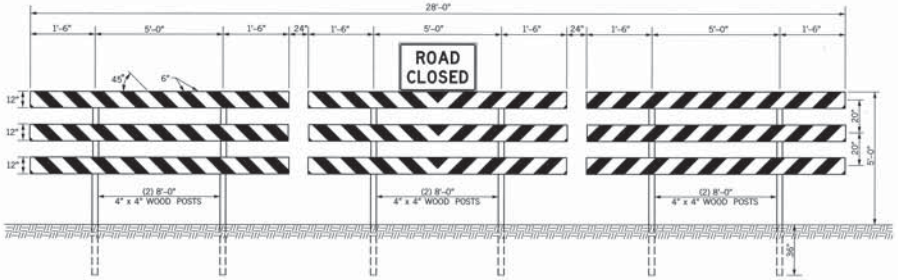
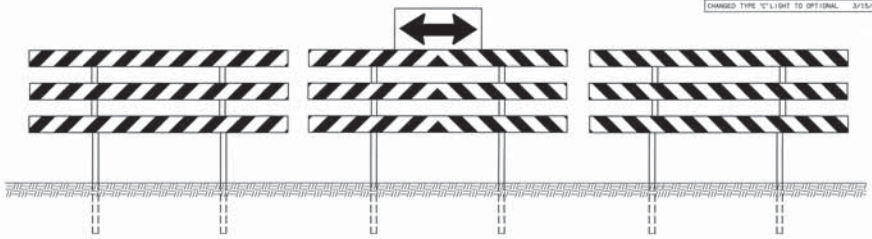
REVISIONS		
DESCRIPTION		DATE
CHANGED TYPE "C" LIGHT TO OPTIONAL		3/15/2011



WHEN ROAD ENDS



FOR T-INTERSECTIONS

PERMANENT TYPE III(A/B) BARRICADE

(DIMENSIONS ARE TYPICAL FOR BOTH BARRICADES)

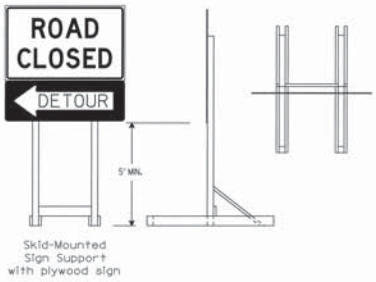
NOTES: A PERMANENT BARRICADE TYPE III(A) SHALL CONSIST OF NINE (9) PANELS AND SIX (6) POSTS.

TYPICAL INSTALLATION AS SHOWN IS FOR AN ABSOLUTE CLOSURE.

BARRICADES SHOULD NOT BE PLACED PARALLEL TO TRAFFIC IF NOT OUTSIDE OF CLEAR ZONE.

PERMANENT BARRICADE TYPE III(B) WILL BE IDENTICAL TO TYPE III(A) WITH NINE (9) ADDITIONAL RETLECTORIZED 3/4"x12" LUMBER PANELS ATTACHED TO THE BACK SIDE OF THE BARRICADE.

COLOR: BACKGROUND – WHITE (REFLECTORIZED)
DIAGONAL STRIPES – RED (REFLECTORIZED)



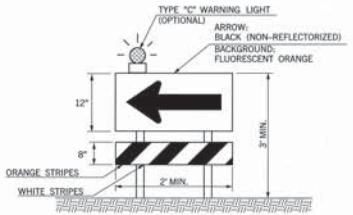
Skid-Mounted Sign Support with plywood sign

LONG/INTERMEDIATE TERM STATIONARY PORTABLE SIGN SUPPORTS

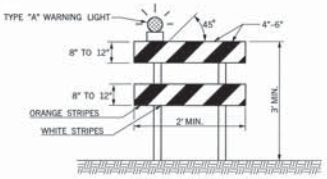
5 Foot Mounting Height

(SKID MOUNTED)

(SHALL BE PLACED BEHIND TYPE III BARRICADE)



DIRECTION INDICATOR BARRICADE



TYPE II BARRICADE

NOTES: FOR WOODEN BARRICADES NOMINAL LUMBER DIMENSIONS WILL BE SATISFACTORY.

FOR RAILS LESS THAN 3 FEET LONG, 4 INCH WIDE STRIPES SHALL BE USED.

TYPE III BARRICADES SHALL BE CONSTRUCTED USING A MINIMUM OF TWO (2) POSTS.

FOR WOODEN BARRICADES, PANEL THICKNESS SHALL NOT EXCEED ONE-HALF INCH (1/2").

BARRICADES SHOULD NOT BE PLACED PARALLEL TO TRAFFIC IF NOT OUTSIDE OF CLEAR ZONE.

PROJECTS WITH WORK LIMITS OF 2.0 MILES OR MORE IN LENGTH WILL REQUIRE THE G20-1A SIGN. THE SIGN (G20-1A) WILL BE REQUIRED ON ONE SIDE OF A 2-LANE ROADWAY AND BOTH SIDES OF A DIVIDED HIGHWAY.

ALL BARRICADE STRIPES SHALL BE RETROREFLECTIVE.
COLOR: BACKGROUND – WHITE (REFLECTORIZED)
DIAGONAL STRIPES – FLUORESCENT ORANGE (REFLECTORIZED)

IF BARRICADES ARE USED TO CHANNELIZE PEDESTRIANS, THERE SHALL BE CONTINUOUS DETECTABLE BOTTOM AND TOP RAILS WITH NO GAPS BETWEEN INDIVIDUAL BARRICADES TO BE DETECTABLE TO USERS OF LONG CANES. THE BOTTOM OF THE BOTTOM RAIL SHALL BE NO HIGHER THAN 6 INCHES ABOVE THE GROUND SURFACE. THE TOP OF THE TOP RAIL SHALL BE NO LOWER THAN 36 INCHES ABOVE THE GROUND SURFACE.

SIGNS MOUNTED ON TYPE III BARRICADES SHOULD NOT COVER MORE THAN 50 PERCENT OF THE TOP TWO RAILS OR 33 PERCENT OF THE TOTAL AREA OF THE THREE RAILS

SIGNS MOUNTED ON BARRICADES, OR OTHER PORTABLE SUPPORTS, SHALL BE NO LESS THAN 1' ABOVE THE TRAVELED WAY.

SANDBAGS MAY BE PLACED ON LOWER PARTS OF THE FRAME OR THE STAYS OF BARRICADES TO PROVIDE THE REQUIRED BALLAST.

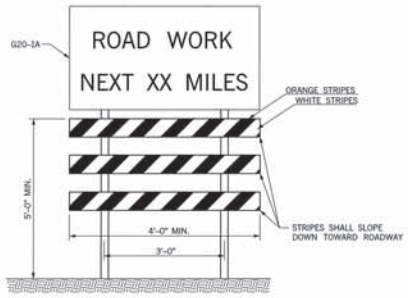
BALLAST SHALL NOT BE PLACED ON TOP OF ANY STRIPED RAIL. BARRICADES SHALL NOT BE BALLASTED BY NONDEFORMABLE OBJECTS SUCH AS ROCKS OR CHUNKS OF CONCRETE. BALLAST SHALL NOT EXTEND INTO THE ACCESSIBLE PASSAGE WIDTH OF 60".

DIRECTION INDICATOR BARRICADE SHALL CONSIST OF A ONE-DIRECTION LARGE ARROW (W1-6) SIGN MOUNTED ABOVE A DIAGONAL STRIPED, HORIZONTALLY ALIGNED, RETRO-REFLECTIVE RAIL.

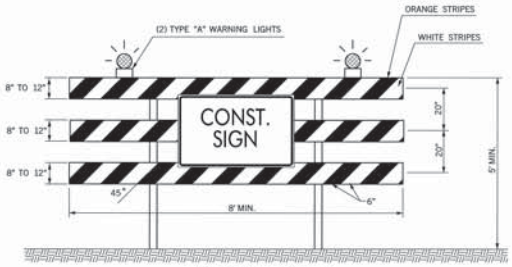
WHERE BARRICADES EXTEND ENTIRELY ACROSS A ROADWAY, THE STRIPES SHOULD SLOPE DOWNWARD IN THE DIRECTION TOWARD WHICH ROAD USERS MUST TURN.

WHERE BOTH RIGHT AND LEFT TURNS ARE PROVIDED, THE BARRICADE STRIPES SHOULD SLOPE DOWNWARD IN BOTH DIRECTIONS FROM THE CENTER OF THE BARRICADE OR BARRICADES.

WHERE NO TURNS ARE INTENDED, THE STRIPES SHOULD BE POSITIONED TO SLOPE DOWNWARD TOWARD THE CENTER OF THE BARRICADE OR BARRICADES.



WING BARRICADE



TYPE III BARRICADE

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
880(B)	CONSTRUCTION SIGNS	SD
880(C)	CONSTRUCTION BARRICADES	SD
880(E)	WARNING LIGHTS	SD

APPROVED BY TRAFFIC ENGINEER: [signature] DATE: 3/21/11

TRAFFIC STANDARD

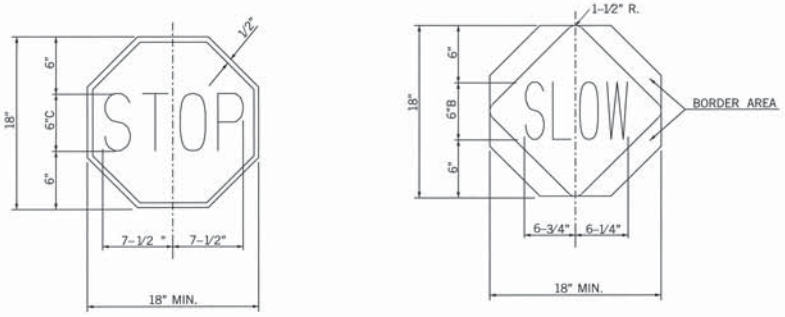
TRAFFIC CONTROL STANDARD
TRAFFIC CONTROL DEVICES

2009 SPECIFICATIONS

TCS4-1 | 01

T-504

$$dateS$$

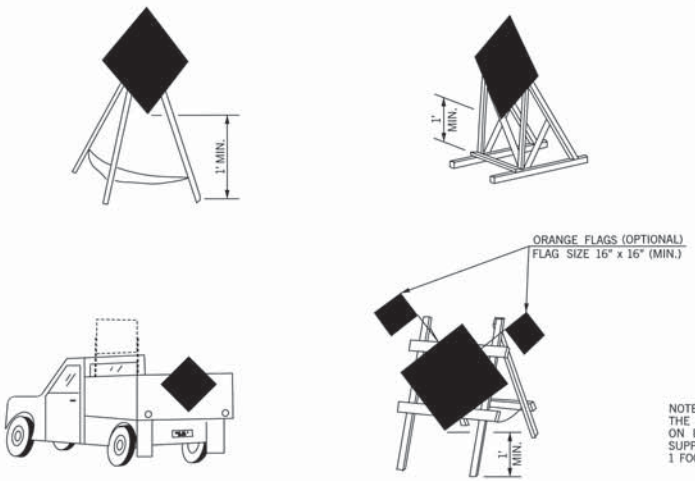


STOP:
LEGEND AND BORDER: WHITE (REFLECTORIZED)
BACKGROUND: RED (REFLECTORIZED)

SLOW:
LEGEND AND BORDER AREA: BLACK (NON-REFLECTORIZED)
BACKGROUND: ORANGE (REFLECTORIZED)

STOP–SLOW PADDLE

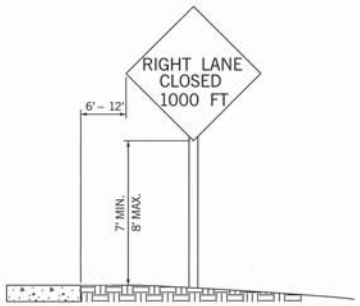
DESCRIPTION	REVISIONS	DATE



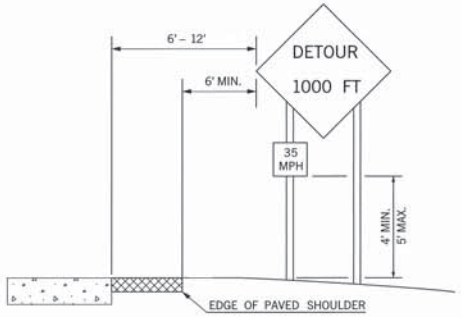
NOTE:
THE BOTTOM OF SIGNS MOUNTED ON BARRICADES OR TEMPORARY SUPPORTS SHALL NOT BE LESS THAN 1 FOOT ABOVE THE TRAVELED WAY.

PORTABLE AND TEMPORARY MOUNTINGS
METHODS OF MOUNTING SIGNS OTHER THAN ON POSTS

URBAN DISTRICT (WITH CURB)



URBAN DISTRICT (WITHOUT CURB)



RURAL DISTRICT WITH ADVISORY SPEED PLATE

RURAL DISTRICT

HEIGHT AND LATERAL LOCATIONS OF SIGNS – TYPICAL INSTALLATIONS

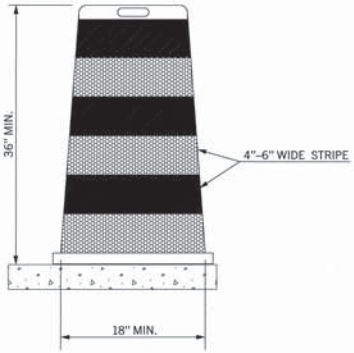
APPROVED BY TRAFFIC ENGINEER: _____ DATE: 6/23/10

TRAFFIC STANDARD

TRAFFIC CONTROL STANDARD
TYPICAL SIGN INSTALLATION

2009 SPECIFICATIONS

TCS5-1	00
T-505	



DRUM

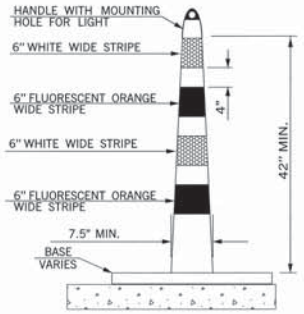
NOTES:

METAL DRUMS SHALL NOT BE USED.

EACH DRUM SHALL HAVE A MINIMUM OF TWO (2) FLUORESCENT ORANGE STRIPES ALTERNATING WITH A MINIMUM OF TWO (2) WHITE STRIPES. THESE STRIPES SHALL CONSIST OF RETROREFLECTIVE SHEETING.

BALLAST SHALL NOT BE PLACED ON TOP OF A DRUM.

DRUMS SHALL NOT BE USED TO DELINEATE AN EDGE DROP OFF IF THEY MUST BE PLACED IN THE DROP OFF AREA BELOW THE LEVEL OF THE DRIVING SURFACE.



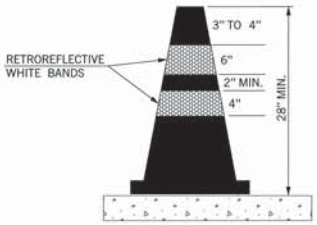
CHANNELIZER CONE

NOTES:

CHANNELIZER CONES USED ON HIGH SPEED ROADWAYS, ON ALL HIGHWAYS DURING NIGHTTIME, OR WHENEVER MORE CONSPICUOUS GUIDANCE IS NEEDED SHALL BE A MINIMUM OF 42 INCHES HIGH.

EACH CHANNELIZERS CONES SHALL HAVE A MINIMUM OF TWO (2) FLUORESCENT ORANGE STRIPES ALTERNATING WITH A MINIMUM OF TWO (2) WHITE STRIPES. THESE STRIPES SHALL CONSIST OF RETROREFLECTIVE SHEETING.

BASE SHALL WEIGH 30 LBS. OR MORE.



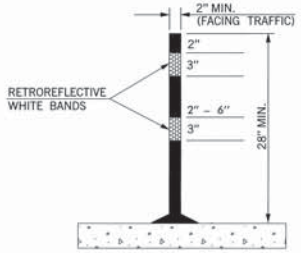
CONE

NOTES:

CONES USED ON HIGH SPEED ROADWAYS, ON ALL HIGHWAYS DURING NIGHTTIME, OR WHENEVER MORE CONSPICUOUS GUIDANCE IS NEEDED SHALL BE A MINIMUM OF 28 INCHES HIGH.

CONES SHALL BE PREDOMINANTLY ORANGE, WITH WHITE RETROREFLECTIVE SHEETING.

REVISIONS	
DESCRIPTION	DATE
ADD NOTE TO VERTICAL PANEL	07/19/10
CHANGED TYPE "C" LIGHT TO OPTIONAL	3/15/2011

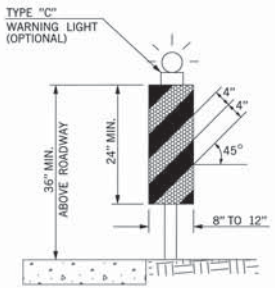


TUBE CHANNELIZER

NOTES:

TUBE CHANNELIZERS USED ON HIGH SPEED ROADWAYS, ON ALL HIGHWAYS DURING NIGHTTIME, OR WHENEVER MORE CONSPICUOUS GUIDANCE IS NEEDED SHALL BE A MINIMUM OF 28 INCHES HIGH.

TUBE CHANNELIZERS SHALL BE PREDOMINANTLY ORANGE, WITH WHITE RETROREFLECTIVE SHEETING.



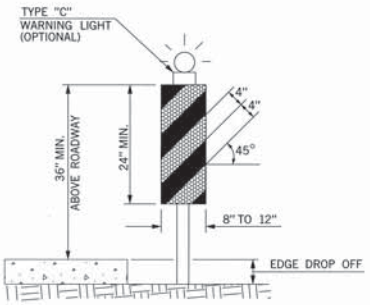
VERTICAL PANEL W/NO DROP OFF

NOTES:

PANEL STRIPE WIDTHS SHALL BE 6 INCHES EXCEPT WHERE PANELS LENGTHS ARE LESS THAN 36 INCHES, THEN 4 INCH WIDE STRIPES MAY BE USED.

MARKINGS FOR VERTICAL PANELS SHALL BE ALTERNATING FLUORESCENT ORANGE AND WHITE RETROEFLECTORIZED STRIPES (SLOPING DOWNWARD AT AN ANGLE OF 45 DEGREES IN THE DIRECTION TRAFFIC IS TO PASS).

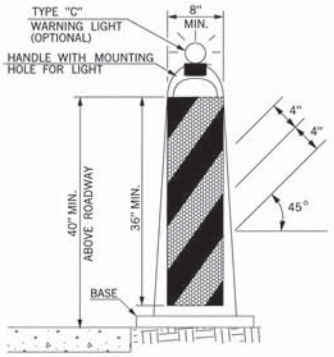
SHALL HAVE A MINIMUM OF TWO (2) FULL FLUORESCENT ORANGE STRIPES.



VERTICAL PANEL W/DROP OFF

ON UNDIVIDED HIGHWAYS, VERTICAL PANELS SHALL HAVE A MINIMUM OF 192 SQUARE INCHES OF RETROREFLECTIVE SHEETING ON EACH PANEL (FRONT AND BACK). WHEN USED ON HIGH SPEED ROADWAYS, VERTICAL PANELS SHALL HAVE MINIMUM OF 270 SQUARE INCHES OF RETROREFLECTIVE SHEETING ON EACH PANEL (FRONT AND BACK). THIS SHALL CONSTITUTE ONE (1) COMPLETE VERTICAL PANEL.

ON DIVIDED HIGHWAYS A VERTICAL PANEL MAY HAVE SHEETING ON ONLY ONE SIDE.



STACKABLE VERTICAL PANEL

NOTES:

(1) VERTICAL PANEL SIGNS SHALL BE MOUNTED BACK TO BACK WHEN USED FOR TWO-WAY TRAFFIC.

(2) BASE SHALL BE NO LARGER THAN 28" LONG BY 20" WIDE, AND 2" THICK.

(3) BASE SHALL WEIGHT 30 LBS. OR MORE.

(4) THESE DEVICES SHALL BE CONSTRUCTED OF A MATERIAL THAT CAN BE STRUCK WITHOUT DAMAGING VEHICLES ON IMPACT.

KEY:

FLUORESCENT ORANGE (REFLECTORIZED)

WHITE (REFLECTORIZED)

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
880(D)	VERTICAL PANEL	SD
880(E)	WARNING LIGHTS	SD
880(F)	DRUMS	SD
880(G)	TUBE CHANNELIZERS	SD
880(H)	CONES	SD
880(G)	CHANNELIZER CONES	SD

APPROVED BY TRAFFIC ENGINEER: _____ DATE: 3/21/12

TRAFFIC STANDARD

TRAFFIC CONTROL STANDARD
CHANNELIZING DEVICES

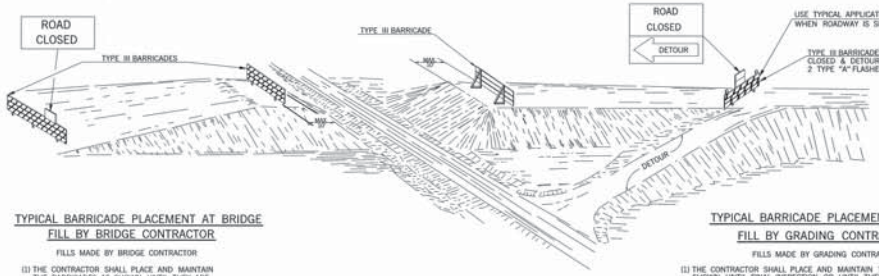
2009 SPECIFICATIONS

TCS6-1 | 02

T-506

$$date$$

REVISIONS	
DESCRIPTION	DATE
MODIFIED NOTE	3/15/2011
ADD "NO CELL PHONE" USAGE IN WORK ZONE, DISTANCE SIGN TO WARNING SIGNS	4/2/2013



TYPICAL BARRICADE PLACEMENT AT BRIDGE FILL BY BRIDGE CONTRACTOR

FILLS MADE BY BRIDGE CONTRACTOR

(1) THE CONTRACTOR SHALL PLACE AND MAINTAIN THE BARRICADES AS SHOWN UNTIL THEY ARE NO LONGER NEEDED.

(2) THE CONTRACTOR SHALL NOTIFY THE ENGINEER PRIOR TO REMOVAL OF THE BARRICADES.

(3) THE ENGINEER SHALL NOTIFY THE GRADING CONTRACTOR TO FURNISH AND ERECT HIS BARRICADES "IMMEDIATELY" AFTER THE BRIDGE CONTRACTOR REMOVES HIS BARRICADES. THE GRADING CONTRACTOR SHALL MAINTAIN HIS BARRICADES UNTIL FINAL INSPECTION OR UNTIL THEY ARE NO LONGER NEEDED.

(4) BARRICADES AT BRIDGE FILL SHALL BE IN PLACE AND MAINTAINED AT ALL TIMES UNTIL OPENED TO TRAFFIC, HOWEVER, BARRICADES MAY BE REMOVED OR ADJUSTED, AS NEEDED, TO ALLOW ACCESS TO THE WORK AREA.

TYPICAL BARRICADE PLACEMENT AT BRIDGE FILL BY GRADING CONTRACTOR

FILLS MADE BY GRADING CONTRACTOR

(1) THE CONTRACTOR SHALL PLACE AND MAINTAIN THE BARRICADES AS SHOWN UNTIL FINAL INSPECTION OR UNTIL THEY ARE NO LONGER NEEDED.

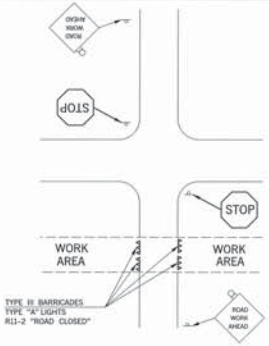
(2) THE CONTRACTOR SHALL NOTIFY THE ENGINEER PRIOR TO REMOVAL OF THE BARRICADES.

(3) IF THE BRIDGE WORK ORDER IS ISSUED PRIOR TO COMPLETION OF THE GRADING CONTRACT, THE BRIDGE CONTRACTOR SHALL MAKE ARRANGEMENTS WITH THE GRADING CONTRACTOR TO ASSUME RESPONSIBILITY FOR PROTECTION OF THE BRIDGE WORK AREA. THIS WILL INCLUDE FURNISHING, INSTALLING, AND MAINTAINING ALL BARRICADES AND SIGNS NECESSARY TO PROVIDE THAT PROTECTION UNTIL THE BRIDGE IS COMPLETED AND THE FINAL INSPECTION IS COMPLETED.

(4) IF THE BRIDGE WORK ORDER HAS NOT BEEN ISSUED PRIOR TO THE FINAL INSPECTION OF THE GRADING, THEN THE GRADING CONTRACTOR SHALL MAKE ARRANGEMENTS WITH THE OKLAHOMA DEPARTMENT OF TRANSPORTATION FOR STATE FORCES TO SUPPLY, INSTALL AND MAINTAIN ANY NECESSARY TRAFFIC CONTROL DEVICES NEEDED TO PROTECT THE WORK AREA. THESE STATE OWNED DEVICES SHALL REMAIN IN PLACE UNTIL SUCH TIME THAT THE BRIDGE WORK ORDER IS ISSUED. AT THAT TIME THE BRIDGE CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR TRAFFIC CONTROL AND REPLACE THE STATE OWNED DEVICES WITH HIS OWN.

(5) SUFFICIENT NUMBER OF TYPE II BARRICADES WITH SIGNS SHALL BE USED TO COMPLETELY CLOSE THE WORK AREA TO THROUGH TRAFFIC.

(6) BARRICADES AT BRIDGE FILL SHALL BE IN PLACE AND MAINTAINED AT ALL TIMES UNTIL OPENED TO TRAFFIC, HOWEVER, BARRICADES MAY BE REMOVED OR ADJUSTED, AS NEEDED, TO ALLOW ACCESS TO THE WORK AREA.



TYPICAL SIGN PLACEMENT FOR INTERSECTING ROADS AND STREETS

NOTES:

(1) SIGNS SHOWN FOR ONE DIRECTION OF TRAVEL ONLY.

(2) FLASHING WARNING LIGHTS SHALL BE USED TO CALL ATTENTION TO THE EARLY WARNING SIGNS.

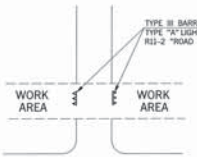
(3) WARNING LIGHTS SHOULD BE USED TO MARK CHANNELIZING DEVICES AT NIGHT AS NEEDED.

(4) PLACEMENT OF TYPE III BARRICADES SHALL BE APPROVED BY THE ENGINEER.

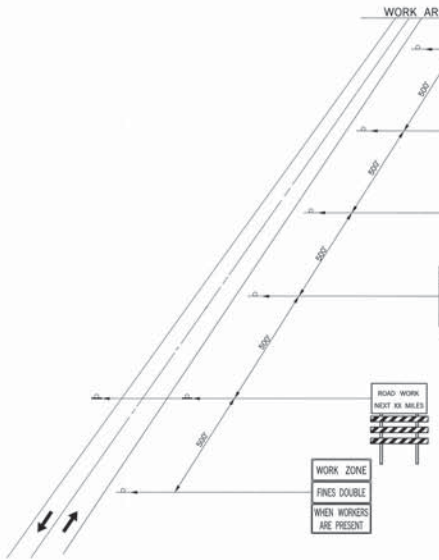
(5) TYPE II BARRICADES, DRUMS AND/OR VERTICAL PANELS MAY BE SUBSTITUTED FOR TYPE III BARRICADES TO AVOID OBSTRUCTING THE MOTORISTS VIEW.

(6) IF TWO OR MORE DRIVEWAYS ARE IN CLOSE PROXIMITY, THE BARRICADES BETWEEN THE DRIVEWAYS MAY BE OMITTED AT THE DISCRETION OF THE ENGINEER.

(7) THE "ROAD WORK AHEAD" SIGN, WHICH SERVES AS A GENERAL WARNING OF OBSTRUCTIONS OR RESTRICTIONS, SHALL BE LOCATED ON ALL INTERSECTING ROADS AND STREETS.



TYPICAL SIGN PLACEMENT FOR PRIVATE DRIVE OR RESIDENCE



TYPICAL CONSTRUCTION WARNING SIGNS WITH MESSAGES OTHER THAN DETAILED ON STANDARD DRAWINGS SHALL BE CONSTRUCTED USING THE LARGEST POSSIBLE LETTER SIZE. SIGN SIZE AND COLOR SHALL BE THE SAME AS OTHER CONSTRUCTION WARNING SIGNS USED FOR SIMILAR CONDITIONS.

FINES DOUBLE IN WORK ZONE SIGNS ARE TO BE USED ONLY ON STATE OR FEDERAL HIGHWAYS WHERE THE SPEED LIMIT IS REDUCED OR AS DIRECTED BY THE ENGINEER.

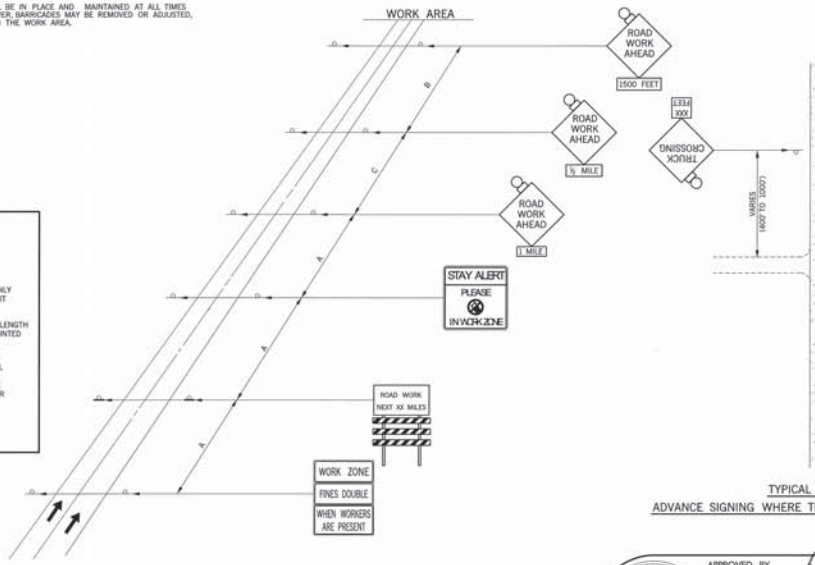
PROJECTS WITH WORK LIMITS OF 1.0 MILES OR MORE IN LENGTH WILL REQUIRE THE G20-1A SIGN. THE SIGN SHALL BE MOUNTED AS SHOWN ON TC54-1-(LATEST REVISION).

WARNING SIGNS SHOWN ARE "ADVANCE" WARNING SIGNS AND ARE REQUIRED ON ALL STATE HIGHWAYS. ADDITIONAL WARNING SIGNS MAY BE REQUIRED WITHIN THE PROJECT LIMITS TO WARN DRIVERS OF SPECIFIC HAZARDS. ADVANCE "WARNING SIGNS" MAY CHANGE AS CONDITIONS CHANGE OR AS DIRECTED BY THE ENGINEER.

PROJECT WORK OF 1.0 MILE OR MORE IN LENGTH WILL REQUIRE SIGNS CS-14 AND R2-1 TO BE PLACED EVERY 1/2 MILE THROUGH WORK ZONE.

TYPICAL APPLICATION ADVANCE WARNING SIGNS ON 2-LANE HIGHWAY

DISTANCE BETWEEN SIGNS SHALL BE A (MIN.)			
ROAD TYPE	A (FT)	B (FT)	C (FT)
URBAN (LOW SPEED)	100	100	100
URBAN (HIGH SPEED)	350	350	350
RURAL	500	500	500
EXPRESSWAY /FREEWAY	1,000	1,500	2,640



TYPICAL APPLICATION ADVANCE WARNING SIGNS ON A DIVIDED HIGHWAY

TYPICAL APPLICATION ADVANCE SIGNING WHERE TRUCKS ARE CROSSING

APPROVED BY TRAFFIC ENGINEER: [signature] DATE: 4/8/2013

TRAFFIC STANDARD

TRAFFIC CONTROL STANDARD PLACEMENT OF ADVANCE WARNING SIGNS

2009 SPECIFICATIONS

TCS7-1 | 02

T-507

$$date$$

STOP

R1-1	30 x 30	5.18 SF
R1-1E	36 x 36	7.46 SF
R1-1F	48 x 48	13.26 SF

COLOR:
LEGEND AND BORDER:
WHITE (REFLECTORIZED)
BACKGROUND:
RED (TRANSPARENT REFLECTORIZED)

YIELD

R1-2	36 x 36 x 36	3.90 SF
R1-2E	48 x 48 x 48	6.93 SF
R1-2F	60 x 60 x 60	10.83 SF

COLOR:
LEGEND AND BORDER:
RED (TRANSPARENT REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)

SPEED LIMIT

R2-1( ) (SPEED)	24 x 30	5.00 SF
R2-1E( )	36 x 48	12.00 SF
R2-1F( )	48 x 60	20.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)

NO RIGHT TURN

R3-1	24 x 24	4.00 SF
R3-1E	36 x 36	9.00 SF
R3-1F	48 x 48	16.00 SF

COLOR:
ARROW AND BORDER:
BLACK (NON-REFLECTORIZED)
CIRCLE AND DIAGONAL:
RED (TRANSPARENT REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)

NO LEFT TURN

R3-2	24 x 24	4.00 SF
R3-2E	36 x 36	9.00 SF
R3-2F	48 x 48	16.00 SF

COLOR:
ARROW AND BORDER:
BLACK (NON-REFLECTORIZED)
CIRCLE AND DIAGONAL:
RED (TRANSPARENT REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)

KEEP RIGHT SIGN

R4-7	24 x 30	5.00 SF
R4-7E	36 x 48	12.00 SF
R4-7F	48 x 60	20.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)

KEEP LEFT SIGN

R4-8	24 x 30	5.00 SF
R4-8E	36 x 48	12.00 SF
R4-8F	48 x 60	20.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)

KEEP RIGHT

R4-7a(R)	24 x 30	5.00 SF
R4-7a(R)E	36 x 48	12.00 SF
R4-7a(R)F	48 x 60	20.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)

KEEP LEFT

R4-7a(L)	24 x 30	5.00 SF
R4-7a(L)E	36 x 48	12.00 SF
R4-7a(L)F	48 x 60	20.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)

DO NOT ENTER

R5-1	30 x 30	6.25 SF
R5-1E	36 x 36	9.00 SF
R5-1F	48 x 48	16.00 SF

COLOR:
SYMBOL::
RED (TRANSPARENT REFLECTORIZED)
LEGEND AND BACKGROUND::
WHITE (REFLECTORIZED)

ONE WAY

R6-1(L)	36 x 12	3.00 SF
R6-1E(L)	54 x 18	6.75 SF
R6-1F(L)	54 x 18	6.75 SF

COLOR:
ARROW AND BORDER:
WHITE (NON-REFLECTORIZED)
LEGEND AND BACKGROUND:
BLACK (REFLECTORIZED)

ONE WAY

R6-1(R)	36 x 12	3.00 SF
R6-1E(R)	54 x 18	6.75 SF
R6-1F(R)	54 x 18	6.75 SF

COLOR:
ARROW AND BORDER:
WHITE (NON-REFLECTORIZED)
LEGEND AND BACKGROUND:
BLACK (REFLECTORIZED)

STOP HERE ON RED

R10-6	24 x 36	6.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)

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

REVISIONS

DESCRIPTION	DATE

BASIS OF PAYMENT

ITEM NO.	ITEM	UNIT
880(B)	CONSTRUCTION SIGNS	SD

APPROVED BY TRAFFIC ENGINEER: [signature] DATE: 6/23/10

TRAFFIC STANDARD

TRAFFIC CONTROL STANDARD
CONSTRUCTION SIGNS

2009 SPECIFICATIONS

TCS8-1 | 00

T-508

REVISIONS	
DESCRIPTION	DATE
CHANGED SIGN DESIGNATION	3/15/2011

ROAD CLOSED

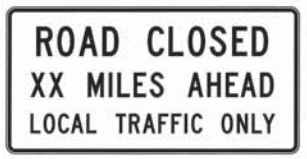
R11-2 48 x 30 10.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)

LANE CLOSED

R11-2(LANE) 48 x 30 10.00 SF

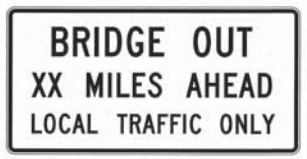
COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)



ROAD CLOSED XX MILES AHEAD

R11-3a 60 x 30 12.50 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)



BRIDGE OUT XX MILES AHEAD

R11-3b 60 x 30 12.50 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)

ROAD CLOSED TO THRU TRAFFIC

R11-4 60 x 30 12.50 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
WHITE (REFLECTORIZED)

DETOUR SIGN

M4-8 24 x 12 2.00 SF
M4-8E 30 x 15 3.13 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)

DETOUR SIGN

M4-9(R) 30 x 24 5.00 SF
M4-9(R)E 48 x 36 12.00 SF
M4-9(R)F 60 x 48 20.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)

DETOUR SIGN

M4-9(L) 30 x 24 5.00 SF
M4-9(L)E 48 x 36 12.00 SF
M4-9(L)F 60 x 48 20.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)

DETOUR SIGN

M4-9(V) 30 x 24 5.00 SF
M4-9(V)E 48 x 36 12.00 SF
M4-9(V)F 60 x 48 20.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)

DETOUR SIGN

M4-10(R) 48 x 18 6.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)

DETOUR SIGN

M4-10(L) 48 x 18 6.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)

ROAD WORK NEXT XX MILES SIGN

G20-1A 36 x 18 4.50 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)

END ROAD WORK SIGN

G20-2A 36 x 18 4.50 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)

PILOT CAR FOLLOW ME SIGN

G20-4 36 x 18 4.50 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)

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

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

APPROVED BY TRAFFIC ENGINEER: [signature] DATE: 3/21/11

TRAFFIC STANDARD

TRAFFIC CONTROL STANARD
CONSTRUCTION SIGNS

2009 SPECIFICATIONS

TCS9-1 01

T-509

$$date$$

REVISIONS		
DESCRIPTION		DATE
CHANGE DESIGN NUMBER		07/19/10

CHEVRON

W1-8	18 x 24	3.00 SF
W1-8E	30 x 36	7.50 SF
W1-8F	36 x 48	12.00 SF

COLOR:
SYMBOL AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE
(REFLECTORIZED)

STOP AHEAD

W3-1 48 x 48 16.00 SF

COLOR:
BORDER AND ARROW:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)
SYMBOL:
WHITE BORDER ON RED BACKGROUND
(REFLECTORIZED)

YIELD AHEAD

W3-2 48 x 48 16.00 SF

COLOR:
BORDER AND ARROW:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)
SYMBOL:
WHITE BORDER ON RED BACKGROUND
(REFLECTORIZED)

SIGNAL AHEAD

W3-3 48 x 48 16.00 SF

COLOR:
SYMBOL AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)
R = RED (REFLECTORIZED)
Y = YELLOW (REFLECTORIZED)
G = GREEN (REFLECTORIZED)

BE PREPARED TO STOP SIGN

W3-4 48 x 48 16.00 SF
COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

SPEED REDUCTION

W3-5 48 x 48 16.00 SF

COLOR:
BORDER AND ARROW:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)
SYMBOL:
BLACK BORDER AND TEXT ON
WHITE BACKGROUND (REFLECTORIZED)

LEFT LANE ENDS

W4-2(L) 48 x 48 16.00 SF

COLOR:
SYMBOL AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

RIGHT LANE ENDS

W4-2(R) 48 x 48 16.00 SF

COLOR:
SYMBOL AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

ROAD NARROWS

W5-1 48 x 48 16.00 SF

COLOR:
SYMBOL AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

NARROW BRIDGE

W5-2 48 x 48 16.00 SF

COLOR:
SYMBOL AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

NOTES:
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ALL DIAMOND SHAPE CONSTRUCTION WARNING SIGNS SHALLBE 48 INCHES X 48 INCHES UNLESS OTHERWISE NOTED IN THE PLANS.

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

ONE LANE BRIDGE

W5-3 48 x 48 16.00 SF

COLOR:
SYMBOL AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

DIVIDED HIGHWAY

W6-1 48 x 48 16.00 SF

COLOR:
SYMBOL AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

DIVIDED HIGHWAY

W6-2 48 x 48 16.00 SF

COLOR:
SYMBOL AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

TWO WAY TRAFFIC SIGN

W6-3 48 x 48 16.00 SF

COLOR:
SYMBOL AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

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

APPROVED BY TRAFFIC ENGINEER: [signature] DATE: 2/6/2010

TRAFFIC STANDARD

TRAFFIC CONTROL STANDARD
CONSTRUCTION SIGNS

2009 SPECIFICATIONS

TCS11-1 01

T-511

LOW SHOULDER SIGN

W8-9 48 x 48 16.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

UNEVEN LANES SIGN

W8-11 48 x 48 16.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

NO CENTER LINE SIGN

W8-12 48 x 48 16.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

GROOVED PAVEMENT SIGN

W8-15 48 x 48 16.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

MOTORCYCLE (PLAQUE) *

W8-15P 18 x 36 4.50 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

SHOULDER DROP-OFF (SYMBOL)

W8-17 48 x 48 16.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

SHOULDER DROP-OFF (PLAQUE) *

W8-17P 18 x 36 4.50 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

LANE ENDS MERGE LEFT SIGN

W9-2(L) 48 x 48 16.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

LANE ENDS MERGE RIGHT SIGN

W9-2(R) 48 x 48 16.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

TRUCK CROSSING SIGN

W11-10 48 x 48 16.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

DOUBLE ARROW SIGN

W12-1 48 x 48 16.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

CLEARANCE SIGN

W12-2 48 x 48 16.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

ADVISORY SPEED SIGN *

W13-1P 18 x 18 2.25 SF
W13-1PE 24 x 24 4.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

XX FEET SIGN *

W16-2P 24 x 18 3.00 SF
W16-2PE 30 x 24 5.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

DESCRIPTION	REVISIONS	DATE

NOTES:
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BASIS OF PAYMENT

ITEM NO.	ITEM	UNIT
880(B)	CONSTRUCTION SIGNS	SD

APPROVED BY TRAFFIC ENGINEER: Harold Sanders DATE: 6/22/10

TRAFFIC STANDARD

TRAFFIC CONTROL STANDARD
CONSTRUCTION SIGNS

2009 SPECIFICATIONS

TCS13-1 00

T-513

DESCRIPTION	REVISIONS	DATE

ROAD WORK SIGN

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

DETOUR SIGN

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

ROAD CLOSED SIGN

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

STREET CLOSED SIGN

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

ONE LANE ROAD SIGN

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

LEFT LANE CLOSED SIGN

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

RIGHT LANE CLOSED SIGN

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

FLAGGER SIGN

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

FLAGGER SIGN

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

WORKERS SIGN

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

FRESH OIL SIGN

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

ROAD MACHINERY AHEAD SIGN

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

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BASIS OF PAYMENT

ITEM NO.	ITEM	UNIT
880(B)	CONSTRUCTION SIGNS	SD

APPROVED BY TRAFFIC ENGINEER: _____ DATE: 6/23/10

TRAFFIC STANDARD

TRAFFIC CONTROL STANDARD
CONSTRUCTION SIGNS

2009 SPECIFICATIONS

TCS14-1 00

T-514

TRFPK36, MA\2009_Standards_TC\194.dgn 8:37:49 AM 6/23/2010 RaTRAF_PLOT\leroy.pen RaTRAF_PLOT\hw.ctb

DOUBLE REVERSE CURVE (1 LANE)

W24-1(L) 48 X 48 16.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

DOUBLE REVERSE CURVE (1 LANE)

W24-1(R) 48 X 48 16.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

DOUBLE REVERSE CURVE (2 LANE)

W24-1a(L) 48 X 48 16.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

DOUBLE REVERSE CURVE (2 LANE)

W24-1a(R) 48 X 48 16.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

DOUBLE REVERSE CURVE (3 LANE)

W24-1b(L) 48 X 48 16.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

DOUBLE REVERSE CURVE (3 LANE)

W24-1b(R) 48 X 48 16.00 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

ALL LANES*

W24-1cP 24 X 24 4.00 SF
W24-1cEP 30 X 30 6.25 SF

COLOR:
LEGEND AND BORDER:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLUORESCENT ORANGE (REFLECTORIZED)

REVISIONS	
DESCRIPTION	DATE

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

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BASIS OF PAYMENT

ITEM NO.	ITEM	UNIT
880(B)	CONSTRUCTION SIGNS	SD

APPROVED BY TRAFFIC ENGINEER: [signature] DATE 6/22/10

TRAFFIC STANDARD

TRAFFIC CONTROL STANDARD
CONSTRUCTION SIGNS

2009 SPECIFICATIONS

TCS16-1 00

T-516

TRFPC36 M:\2009_Standards_TC\516.dgn 8:39:54 AM 6/23/2010 R:\TRAF_PLOT\leroy.pen R:\TRAF_PLOT\bw.ctb

REVISIONS		
DESCRIPTION		DATE
CHANGED DECRIPTIONS		3/15/2011

SIGN NUMBER	CS-13
WIDTH x HGHT.	2'-0" x 1'-0"
BORDER WIDTH	0.63"
CORNER RADIUS	1.5"
MOUNTING	Ground
SIGN AREA	2.0 Sq.Ft.
BACKGROUND	TYPE: Reflective
	COLOR: FLO•
LEGEND&BORDER	TYPE: Non-Reflective
	COLOR: Black

Dimensions are in Inches.tenths

LETTER POSITIONS (X)									LENGTH	SERIES-SIZE
B	E	G	I	N						D 2000
4.8	8.2	11.3	14.9	16.5					14.4	

SIGN NUMBER	CS-13E
WIDTH x HGHT.	3'-0" x 1'-0"
BORDER WIDTH	0.63"
CORNER RADIUS	1.5"
MOUNTING	Ground
SIGN AREA	3.0 Sq.Ft.
BACKGROUND	TYPE: Reflective
	COLOR: FLO•
LEGEND&BORDER	TYPE: Non-Reflective
	COLOR: Black

Dimensions are in Inches.tenths

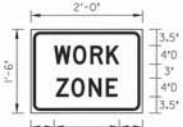
LETTER POSITIONS (X)									LENGTH	SERIES-SIZE
B	E	G	I	N						D 2000
7.2	12.3	16.9	22.3	24.7					21.6	

SIGN NUMBER	CS-13F
WIDTH x HGHT.	4'-0" x 1'-6"
BORDER WIDTH	0.63"
CORNER RADIUS	1.5"
MOUNTING	Ground
SIGN AREA	6.0 Sq.Ft.
BACKGROUND	TYPE: Reflective
	COLOR: FLO•
LEGEND&BORDER	TYPE: Non-Reflective
	COLOR: Black

Dimensions are in Inches.tenths

LETTER POSITIONS (X)									LENGTH	SERIES-SIZE
B	E	G	I	N						E 2000
7.1	15.2	22.6	30.9	34.4					33.8	

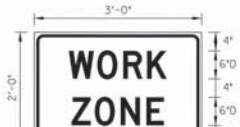
FLO• = FLUORESCENT ORANGE



SIGN NUMBER	CS-14
WIDTH x HGHT.	2'-0" x 1'-6"
BORDER WIDTH	0.63"
CORNER RADIUS	1.5"
MOUNTING	Ground
SIGN AREA	3.0 Sq.Ft.
BACKGROUND	TYPE: Reflective
	COLOR: FLO•
LEGEND&BORDER	TYPE: Non-Reflective
	COLOR: Black

Dimensions are in Inches.tenths

LETTER POSITIONS (X)									LENGTH	SERIES-SIZE
W	O	R	K							D 2000
5	9.1	12.8	16.2						14	
Z	O	N	E							D 2000
5.4	8.7	12.5	16.1						13.2	



SIGN NUMBER	CS-14E
WIDTH x HGHT.	3'-0" x 2'-0"
BORDER WIDTH	0.63"
CORNER RADIUS	1.5"
MOUNTING	Ground
SIGN AREA	6.0 Sq.Ft.
BACKGROUND	TYPE: Reflective
	COLOR: FLO•
LEGEND&BORDER	TYPE: Non-Reflective
	COLOR: Black

Dimensions are in Inches.tenths

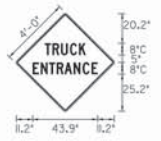
LETTER POSITIONS (X)									LENGTH	SERIES-SIZE
W	O	R	K							D 2000
7.5	13.6	19.2	24.3						21	
Z	O	N	E							D 2000
8.1	13.1	18.7	24.2						19.8	

SIGN NUMBER	CS-14F
WIDTH x HGHT.	4'-0" x 3'-0"
BORDER WIDTH	0.63"
CORNER RADIUS	1.5"
MOUNTING	Ground
SIGN AREA	12.0 Sq.Ft.
BACKGROUND	TYPE: Reflective
	COLOR: FLO•
LEGEND&BORDER	TYPE: Non-Reflective
	COLOR: Black

Dimensions are in Inches.tenths

LETTER POSITIONS (X)									LENGTH	SERIES-SIZE
W	O	R	K							E 2000
7.6	17.2	25.7	33.8						32.9	
Z	O	N	E							E 2000
8.5	16.4	24.9	33.5						31	

CONSTRUCTION
BEGIN WORK ZONE
SPEED LIMIT
ASSEMBLY



SIGN NUMBER	CS-15
WIDTH x HGHT	4'-0" x 4'-0"
BORDER WIDTH	0.75"
CORNER RADIUS	1.38"
MOUNTING	Ground
SIGN AREA	16.0 Sq.Ft.
BACKGROUND	TYPE: Reflective
	COLOR: Yellow
LEGEND&BORDER	TYPE: Reflective
	COLOR: Black

Dimensions are in Inches.tenths

LETTER POSITIONS (X)										LENGTH	SERIES-SIZE
T	R	U	C	K							C 2000
19.3	24.5	30.4	36.5	42.5						27.7	
E	N	T	R	A	N	C	E				C 2000
11.2	16.7	22.3	27.5	32.7	38.9	45	51.1			43.9	

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

APPROVED BY TRAFFIC ENGINEER: DATE: 3/21/11

TRAFFIC STANDARD

TRAFFIC CONTROL STANDARD
CONSTRUCTION SIGNS

2009 SPECIFICATIONS

TCS19-1 | 01

T-519

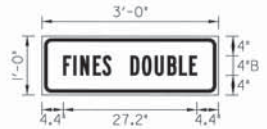
$$date$$

DESCRIPTION	REVISIONS	DATE

SIGN NUMBER	CS-16
WIDTH x HGHT.	3'-0" x 1'-0"
BORDER WIDTH	0.63"
CORNER RADIUS	1.5"
MOUNTING	Ground
SIGN AREA	3.0 Sq.Ft.
BACKGROUND	TYPE: Reflective
	COLOR: Orange
LEGEND&BORDER	TYPE: Non-Reflective
	COLOR: Black

Dimensions are in Inches.tenths

LETTER POSITIONS (X)											LENGTH	SERIES&SIZE
W	O	R	K		Z	O	N	E			27	C 2000
4.5	8	11.2	14.1	16.3	20.3	23.2	26.3	29.5				



SIGN NUMBER	CS-17
WIDTH x HGHT.	3'-0" x 1'-0"
BORDER WIDTH	0.63"
CORNER RADIUS	1.5"
MOUNTING	Ground
SIGN AREA	3.0 Sq.Ft.
BACKGROUND	TYPE: Reflective
	COLOR: White
LEGEND&BORDER	TYPE: Non-Reflective
	COLOR: Black

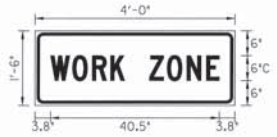
Dimensions are in Inches.tenths

LETTER POSITIONS (X)													LENGTH	SERIES&SIZE
F	I	N	E	S		D	O	U	B	L	E		28	B 2000
4.4	6.5	7.9	10.5	12.4	14.1	18.1	20.5	23.1	25.7	28	30.1	27.2		

SIGN NUMBER	CS-18
WIDTH x HGHT.	3'-0" x 1'-6"
BORDER WIDTH	0.63"
CORNER RADIUS	1.5"
MOUNTING	Ground
SIGN AREA	4.5 Sq.Ft.
BACKGROUND	TYPE: Reflective
	COLOR: White
LEGEND&BORDER	TYPE: Non-Reflective
	COLOR: Black

Dimensions are in Inches.tenths

LETTER POSITIONS (X)														LENGTH	SERIES&SIZE
W	H	E	N		W	O	R	K	E	R	S			B 2000	
3	6.1	8.7	10.9	12.6	16.6	19.6	22.2	24.6	27	29.1	31.3	30			
A	R	E		P	R	E	S	E	N	T				B 2000	
5.3	8	10.3	11.9	15.9	18.1	20.5	22.4	24.8	26.9	29.2		25.5			



SIGN NUMBER	CS-16E
WIDTH x HGHT.	4'-0" x 1'-6"
BORDER WIDTH	0.63"
CORNER RADIUS	1.5"
MOUNTING	Ground
SIGN AREA	6.0 Sq.Ft.
BACKGROUND	TYPE: Reflective
	COLOR: Orange
LEGEND&BORDER	TYPE: Non-Reflective
	COLOR: Black

Dimensions are in Inches.tenths

LETTER POSITIONS (X)											LENGTH	SERIES&SIZE
W	O	R	K		Z	O	N	E			40.5	C 2000
3.8	9	13.8	18.2	21.5	27.5	31.8	36.5	41.2				

SIGN NUMBER	CS-17E
WIDTH x HGHT.	4'-0" x 1'-6"
BORDER WIDTH	0.63"
CORNER RADIUS	1.5"
MOUNTING	Ground
SIGN AREA	6.0 Sq.Ft.
BACKGROUND	TYPE: Reflective
	COLOR: White
LEGEND&BORDER	TYPE: Non-Reflective
	COLOR: Black

Dimensions are in Inches.tenths

LETTER POSITIONS (X)												LENGTH	SERIES&SIZE
F	I	N	E	S	D	O	U	B	L	E		37.9	B 2000
5.1	8.2	10.3	14.2	17.1	22.7	26.2	30.1	34	37.5	40.7	37.9		

SIGN NUMBER	CS-18E
WIDTH x HGHT.	4'-0" x 2'-0"
BORDER WIDTH	0.63"
CORNER RADIUS	1.13"
MOUNTING	Ground
SIGN AREA	8.0 Sq.Ft.
BACKGROUND	TYPE: Reflective
	COLOR: White
LEGEND&BORDER	TYPE: Non-Reflective
	COLOR: Black

Dimensions are in Inches.tenths

LETTER POSITIONS (X)													LENGTH	SERIES&SIZE
W	H	E	N	W	O	R	K	E	R	S			B 2000	
3	7.7	11.6	14.9	20.4	24.9	28.8	32.4	36	39.2	42.4	41.9			
A	R	E	P	R	E	S	E	N	T				B 2000	
6.4	10.5	14	19.3	22.7	26.3	29.1	32.7	35.9	39.3		35.2			

CS-16, E

CS-17, E

CS-18, E

CONSTRUCTION
FINES DOUBLE
ASSEMBLY

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

APPROVED BY TRAFFIC ENGINEER: Donald Stewart DATE 6/23/10

TRAFFIC STANDARD

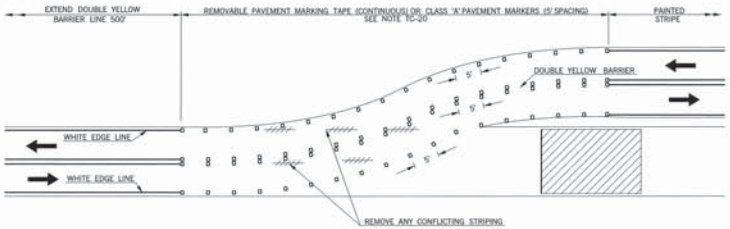
TRAFFIC CONTROL STANDARD
CONSTRUCTION SIGNS

2009 SPECIFICATIONS

TCS20-1 | 00

T-520

REVISIONS		
DESCRIPTION		DATE
ADDED TRAFFIC STRIPE NOTES		4/16/12
REDEFINED TERMS, MOD. PM SPACING		4/2/2013



CONSTRUCTION ZONE PAVEMENT MARKINGS THRU SHOO–FLY

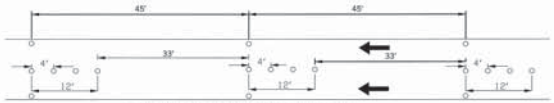
ONE–WAY PAVEMENT MARKING REMOVABLE TAPE OR PAINT

PAVEMENT MARKINGS: REMOVABLE TAPE OR PAINT

WIDTH OF STRIPED LANE LINES SHALL BE A MINIMUM OF 4".

INTERMEDIATE-TERM STATIONARY PAVEMENT MARKINGS ARE THOSE THAT MAY BE USED UNTIL THE EARLIEST DATE WHEN IT IS PRACTICAL AND POSSIBLE TO INSTALL PERMANENT PAVEMENT MARKINGS THAT MEET THE FULL OKLAHOMA DEPARTMENT OF TRANSPORTATION STANDARDS FOR PAVEMENT MARKINGS.

TWO–WAY PAVEMENT MARKING REMOVABLE TAPE OR PAINT



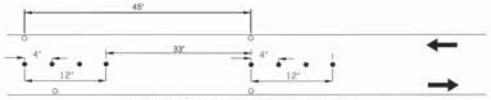
ONE–WAY PAVEMENT MARKING FLEX TABS

PAVEMENT MARKINGS: FLEX TABS

TYPE I – FLEX TAB MARKERS SHALL HAVE REFLECTORIZED MATERIAL ON BOTH SIDES.

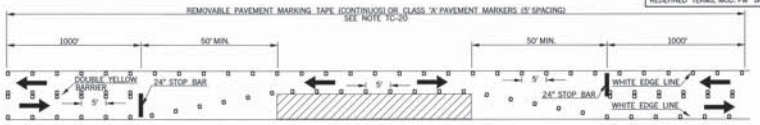
TYPE II – FLEX TAB MARKERS SHALL HAVE REFLECTORIZED MATERIAL ON BOTH SIDES AND SHALL HAVE A CLEAR REMOVABLE COVER.

FLEX TABS MAY BE INSTALLED AS SHOWN FOR LONG-TERM STATIONARY PAVEMENT MARKINGS.



TWO–WAY PAVEMENT MARKING FLEX TABS

INTERMEDIATE–TERM STATIONARY PAVEMENT MARKINGS



TYPICAL PAVEMENT MARKINGS FOR ONE LANE CLOSURE ON TWO LANE /TWO WAY ROADWAY REMOVABLE TAPE OR CONSTRUCTION ZONE PAVEMENT MARKERS

NOTES:

CONSTRUCTION ZONE PAVEMENT MARKINGS SHALL CONSIST OF EITHER PAINT, CONSTRUCTION ZONE PAVEMENT MARKERS (FLEX TABS) OR REMOVABLE MARKING TAPE. THERMO-PLASTIC STRIPE MAY BE USED IN CONJUNCTION WITH PAINT, FLEX TABS OR TAPE WHEN SPECIFIED IN THE PLANS.

ALL PAVEMENT MARKINGS TO BE PLACED ON TEMPORARY SURFACES OR ON SURFACES SCHEDULED TO BE REMOVED SHALL BE DONE WITH PAINT UNLESS OTHERWISE SHOWN IN THE PLANS OR STANDARD DRAWINGS. ALL FINAL OR FINISHED SURFACES SHALL BE MARKED WITH EITHER REMOVABLE PAVEMENT MARKING TAPE OR CONSTRUCTION ZONE PAVEMENT MARKERS, UNLESS OTHERWISE NOTED ON THE PLANS.

WIDTH OF STRIPED LANE LINES SHALL BE A MINIMUM OF 4".

KEY:

- WORK ZONE
- WHITE LANE LINE (PAINT OR TAPE)
- YELLOW LANE LINE (PAINT OR TAPE)
- WHITE FLEX TAB
- YELLOW FLEX TAB
- CLASS A PAVEMENT MARKER

TWO–LANE /TWO–WAY

4 –LANE DIVIDED ROADWAY

WHITE DOTTED LINE

LONG–TERM STATIONARY PAVEMENT MARKINGS

MUTCD DEFINITIONS OF THE FIVE CATEGORIES OF WORK DURATION, AND THEIR TIME AT A LOCATION SHALL BE:

A. LONG-TERM STATIONARY IS WORK THAT OCCUPIES A LOCATION MORE THAN 3 DAYS.
B. INTERMEDIATE-TERM STATIONARY IS WORK THAT OCCUPIES A LOCATION MORE THAN ONE DAYLIGHT PERIOD UP TO 3 DAYS, OR NIGHTTIME WORK LASTING MORE THAN 1 HOUR.
C. SHORT-TERM STATIONARY IS DAYTIME WORK THAT OCCUPIES A LOCATION FOR MORE THAN 1 HOUR WITHIN A SINGLE DAYLIGHT PERIOD.
D. SHORT DURATION IS WORK THAT OCCUPIES A LOCATION UP TO 1 HOUR.
E. MOBILE IS WORK THAT MOVES INTERMITTENTLY OR CONTINUOUSLY.

APPROVED BY TRAFFIC ENGINEER: _____ DATE: 4/2/2013

TRAFFIC STANDARD

TRAFFIC CONTROL STANDARD CONSTRUCTION ZONE PAVEMENT MARKINGS

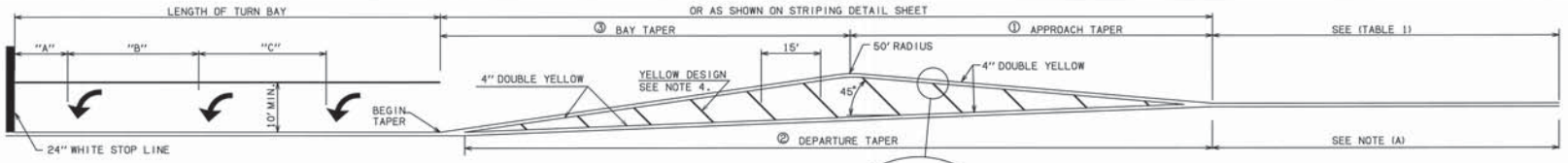
2009 SPECIFICATIONS

TCS21–1	02

T–521

$$date$$

REVISIONS	
DESCRIPTION	DATE
ADDED GENERAL NOTE 4.	7/08/208
UPDATED SYMBOLS	4/2/203



LEFT TURN BAY AND STRIPED MEDIAN DETAIL

SEE PLANS FOR LENGTH OF LEFT TURN BAYS AND TAPERS ON STRIPED MEDIANS

① THE PREFERRED APPROACH TAPER RATE IS V:1, WHERE V IS THE DESIGN SPEED. FOR V≤40 MPH, IT IS ACCEPTABLE FOR THE APPROACH TAPER TO BE ($V^2/60$):1.

② THE PREFERRED DEPARTURE TAPER RATE IS V:1, WHERE V IS THE DESIGN SPEED. FOR V≤40 MPH, IT IS ACCEPTABLE FOR THE DEPARTURE TAPER TO BE ($V^2/60$):1.

③ SEE RECOMMENDED BAY TAPER RATES TABLE.

RECOMMENDED BAY TAPER RATES

DESIGN SPEED (MPH)	TAPER RATE
V < 30	8:1
30 ≤ V ≤ 50	10:1
50 > V	15:1

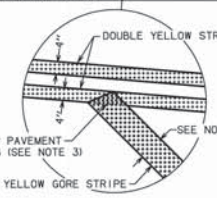
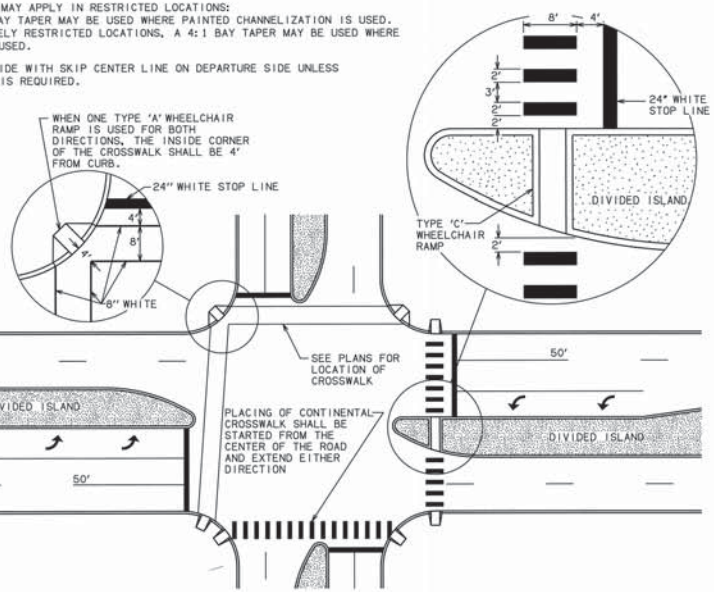


TABLE 1	
POSTED SPEED	NO PASS LENGTH (MINIMUM)
60 MPH	790'
55 MPH	725'
50 MPH	660'
45 MPH	590'
40 MPH	360'
35 MPH	260'
30 MPH	200'
25 MPH	150'

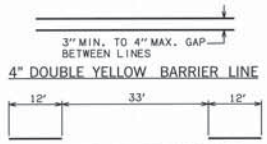
THE FOLLOWING MINIMUM VALUES MAY APPLY IN RESTRICTED LOCATIONS:
1. RIGHT-TURN LANES. A 4:1 BAY TAPER MAY BE USED WHERE PAINTED CHANNELIZATION IS USED.
2. LEFT-TURN LANES. IN SEVERELY RESTRICTED LOCATIONS, A 4:1 BAY TAPER MAY BE USED WHERE PAINTED CHANNELIZATION IS USED.

(A) NO PASS LINE ON APPROACH SIDE WITH SKIP CENTER LINE ON DEPARTURE SIDE UNLESS DOUBLE YELLOW CENTER LINE IS REQUIRED.

TURN BAY TABLE			
LENGTH OF BAY FT.	"A" FT.	"B" FT.	"C" FT.
75 TO 99	20	35	--
100 TO 149	20	35	35
150 TO 200	30	55	55



CROSSWALK INSTALLATIONS



4" DOUBLE YELLOW BARRIER LINE

4" DASHED WHITE LANE LINE

TYPICAL PAVEMENT MARKING DETAILS

FOR SPACING OF ARROWS SEE "TURN BAY TABLE"

MATERIAL SPECIFICATIONS

A. UNLESS OTHERWISE SPECIFIED, RETROREFLECTIVE PAVEMENT MARKING SHALL BE APPLIED BY THE EXTRUSION METHOD.

B. THE THICKNESS OF THE PLASTIC PAVEMENT MARKING SHALL BE MEASURED FROM THE PLANE OF THE PAVEMENT SURFACE WITH A DEVICE SUPPLIED BY CONTRACTOR AND SUITABLE TO THE ENGINEER. THICKNESSES ARE AS FOLLOWS:

LANE LINES, STOP LINES, WORDS, ARROWS AND SYMBOLS.....0.120" MIN. & 0.188" MAX.
EDGE, GORE AND DIAGONAL LINES.... 0.090" MIN. & 0.188" MAX.

C. THE THICKNESS OF THE MULTI-POLYMER PAVEMENT MARKING SHALL BE MEASURED FROM THE PLANE OF THE PAVEMENT SURFACE WITH A DEVICE SUPPLIED BY CONTRACTOR AND SUITABLE TO THE ENGINEER. THICKNESSES ARE AS FOLLOWS:

LANE LINES, STOP LINES, WORDS, ARROWS, SYMBOLS, EDGE, GORE AND DIAGONAL LINES.... 0.020" MIN. & 0.025" MAX.

GENERAL NOTES

1. LANE WIDTH IS THE DISTANCE BETWEEN PAVEMENT MARKINGS, OR PAVEMENT MARKING AND EDGE OF PAVEMENT. LANE WIDTH IS MEASURED FROM CENTER OF STRIPE TO CENTER OF STRIPE.
2. LANE LINES SHALL BE PLACED LEFT OF THE LONGITUDINAL PAVEMENT JOINTS.
3. ALL PAVEMENT MARKING SHALL OVERLAP WHERE IT MEETS OTHER PAVEMENT MARKING.
4. WIDTH OF DIAGONALS ARE AS FOLLOWS:
   ≥45 MPH - 12" WIDE
   <45 MPH - 8" WIDE

BASIS OF PAYMENT

ITEM NO.	ITEM	UNIT
854(A)	TRAFFIC STRIPE (PAINT) (4" WIDE)	LF
854(B)	TRAFFIC STRIPE (PAINT) (ARROW, WORDS, OR SYMBOLS)	EA
855(A)	TRAFFIC STRIPE (PLASTIC) (4" WIDE)	LF
855(A)	TRAFFIC STRIPE (PLASTIC) (6" WIDE)	LF
855(A)	TRAFFIC STRIPE (PLASTIC) (8" WIDE)	LF
855(A)	TRAFFIC STRIPE (PLASTIC) (24" WIDE)	LF
855(B)	TRAFFIC STRIPE (PLASTIC) (ARROW)	EA
855(B)	TRAFFIC STRIPE (PLASTIC) (WORDS)	EA
856(A)	TRAFFIC STRIPE (MULTI-POLYMER) (4" WIDE)	LF
856(A)	TRAFFIC STRIPE (MULTI-POLYMER) (6" WIDE)	LF
856(A)	TRAFFIC STRIPE (MULTI-POLYMER) (8" WIDE)	LF
856(A)	TRAFFIC STRIPE (MULTI-POLYMER) (24" WIDE)	LF
856(B)	TRAFFIC STRIPE (MULTI-POLYMER) (SYMBOLS, WORDS, ETC)	EA

APPROVED BY TRAFFIC ENGINEER: David Smith DATE: 4/8/2013

TRAFFIC STANDARD

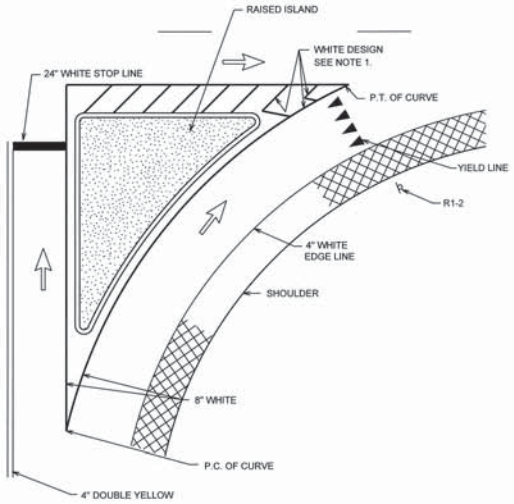
PAVEMENT MARKING (CROSSWALKS AND LEFT TURN BAY)

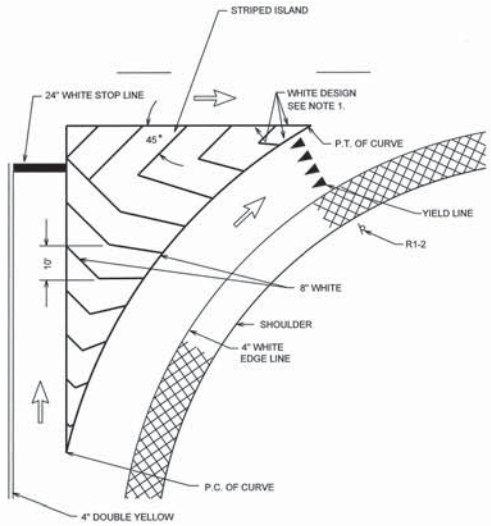
2009 SPECIFICATIONS

PM1-1 | 02

T-101

DESCRIPTION	REVISIONS	DATE
ADDED GENERAL NOTE 1.		7/08/2011



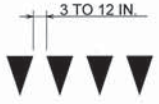


GENERAL NOTE

1. WIDTH OF DIAGONALS ARE AS FOLLOWS:
   ≥45 MPH - 12" WIDE
   <45 MPH - 8" WIDE

SUGGESTED STRIPING FOR ISLANDS

PAVEMENT MARKING FOR TRAFFIC CHANNELIZING ISLANDS SHALL BE APPLIED FROM P.C. TO P.T. OF CURVE.



YIELD LINE

4" DOUBLE YELLOW BARRIER LINE

BASIS OF PAYMENT

ITEM NO.	ITEM	UNIT
854(A)	TRAFFIC STRIPE (PAINT) (4" WIDE)	LF
854(B)	TRAFFIC STRIPE (PAINT) (ARROW, WORDS, OR SYMBOLS)	EA
855(A)	TRAFFIC STRIPE (PLASTIC) (4" WIDE)	LF
855(A)	TRAFFIC STRIPE (PLASTIC) (8" WIDE)	LF
855(A)	TRAFFIC STRIPE (PLASTIC) (24" WIDE)	LF
855(B)	TRAFFIC STRIPE (PLASTIC) (ARROW)	EA
855(B)	TRAFFIC STRIPE (PLASTIC) (SYMBOLS)	EA
856(A)	TRAFFIC STRIPE (MULTI-POLYMER) (4" WIDE)	LF
856(A)	TRAFFIC STRIPE (MULTI-POLYMER) (8" WIDE)	LF
856(A)	TRAFFIC STRIPE (MULTI-POLYMER) (24" WIDE)	LF
856(B)	TRAFFIC STRIPE (MULTI-POLYMER) (SYMBOLS, WORDS, ETC)	EA

APPROVED BY TRAFFIC ENGINEER: _____ DATE: 7/22/2011

TRAFFIC STANDARD

PAVEMENT MARKING (ISLANDS)

2009 SPECIFICATIONS

PM2-1 | 01

T-102

TWO-WAY TRAFFIC

W6-3	36 x 36	9.00 SF
W6-3E	48 x 48	16.00 SF

COLOR:
BORDER AND ARROW:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLOURESCENT YELLOW
(REFLECTORIZED)

SLIPPERY WHEN WET

W8-5	30 x 30	6.25 SF
W8-5E	36 x 36	9.00 SF
W8-5F	48 x 48	16.00 SF

COLOR:
BORDER AND SYMBOL:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLOURESCENT YELLOW
(REFLECTORIZED)

TRUCK CROSSING

W8-6	36 x 36	9.00 SF
W8-6F	48 x 48	16.00 SF

COLOR:
BORDER AND LEGEND:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLOURESCENT YELLOW
(REFLECTORIZED)

BRIDGE ICES BEFORE ROAD

W8-13	30 X 30	6.25 SF
W8-13E	36 X 36	9.00 SF
W8-13F	48 X 48	16.00 SF

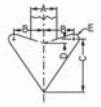
COLOR:
BORDER AND LEGEND:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLOURESCENT YELLOW
(REFLECTORIZED)

RAILROAD ADVANCE WARNING

W10-1	36 DIA	7.07 SF
W10-1E	48 DIA	12.57 SF

COLOR:
BORDER, LEGEND AND SYMBOL:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLOURESCENT YELLOW
(REFLECTORIZED)

DESCRIPTION	REVISIONS	DATE



ARROW DIMENSIONS				
A	B	C	D	E
6"	5-3/16"	9-1/8"	11/16"	7/8"

ARROW DETAILS FOR
W13-6 & W13-7

PEDESTRAIN CROSSING

W11-2	30 x 30	6.25 SF
W11-2E	36 x 36	9.00 SF

COLOR:
BORDER AND SYMBOL:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLOURESCENT YELLOW
(REFLECTORIZED)

TRUCK CROSSING

W11-10	30 x 30	6.25 SF
W11-10E	36 x 36	9.00 SF
W11-10F	48 x 48	16.00 SF

COLOR:
BORDER AND SYMBOL:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLOURESCENT YELLOW
(REFLECTORIZED)

DOUBLE ARROW

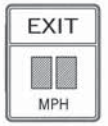
W12-1	30 x 30	6.25 SF
W12-1E	36 x 36	9.00 SF

COLOR:
BORDER AND ARROW:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLOURESCENT YELLOW
(REFLECTORIZED)

ADVISORY SPEED

W13-1P	18 x 18	2.25 SF
W13-1PE	24 x 24	4.00 SF
W13-1PF	30 x 30	6.25 SF

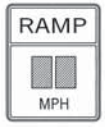
COLOR:
BORDER AND LEGEND:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLOURESCENT YELLOW
(REFLECTORIZED)



ADVISORY EXIT SPEED

W13-2	24 x 30	5.00 SF
W13-2E	36 x 48	12.00 SF
W13-2F	48 x 60	20.00 SF

COLOR:
BORDER AND LEGEND:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLOURESCENT YELLOW
(REFLECTORIZED)



ADVISORY RAMP SPEED

W13-3	24 x 30	5.00 SF
W13-3E	36 x 48	12.00 SF
W13-3F	48 x 60	20.00 SF

COLOR:
BORDER AND LEGEND:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLOURESCENT YELLOW
(REFLECTORIZED)

ADVISORY EXIT SPEED

W13-6E	36 x 60	15.00 SF
W13-6F	48 x 84	28.00 SF

COLOR:
BORDER AND ARROW:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLOURESCENT YELLOW
(REFLECTORIZED)

ADVISORY RAMP SPEED

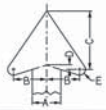
W13-7E	36 x 60	15.00 SF
W13-7F	48 x 84	28.00 SF

COLOR:
BORDER AND ARROW:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLOURESCENT YELLOW
(REFLECTORIZED)

ARROW

W16-7p	24 x 12	2.00 SF
W16-7pE	30 x 18	3.75 SF

COLOR:
BORDER AND ARROW:
BLACK (NON-REFLECTORIZED)
BACKGROUND:
FLOURESCENT YELLOW
(REFLECTORIZED)



SIGN SIZE	DIMENSIONS					
	A	B	C	D	E	
30" X 30"	3-3/4"	4-5/16"	7-5/8"	9/16"	3/4"	
36" X 36"	4-1/2"	5-3/16"	9-1/8"	11/16"	7/8"	
48" X 48"	6"	6-7/8"	12-3/16"	15/16"	1-3/16"	

ARROW DETAILS FOR
W6-3 & W6-3E

SIGNS	MARGIN	BORDER	BLANK
30 x 30	.500	.750	B-30(D)
36 x 36	.625	.875	B-36(D)
48 x 48	.750	1.250	B-48(D)

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
850(A)	SHEET ALUMINUM SIGNS	SF

APPROVED BY TRAFFIC ENGINEER: Phil Smith DATE: 8/31/2010

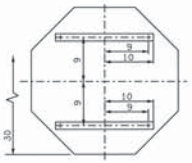
TRAFFIC STANDARD
WARNING SIGN DETAILS
(W-SERIES)

2009 SPECIFICATIONS

WSD3-1 | 00

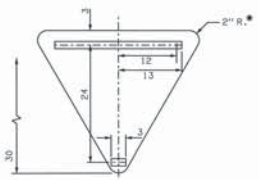
T-118

DESCRIPTION	REVISIONS	DATE



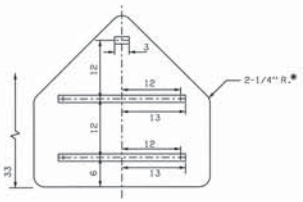
B-30(0)

(1) 2" SQUARE TUBE POST
(1) 2" PIPE POST



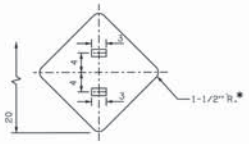
B-36(T)

(1) 2" SQUARE TUBE POST
(1) 2" PIPE POST



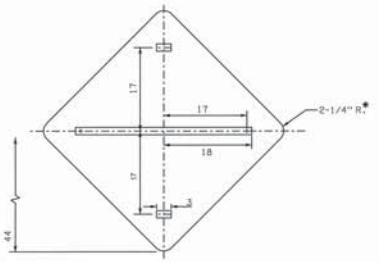
B-36(P)

(1) 2" SQUARE TUBE POST
(1) 2" PIPE POST



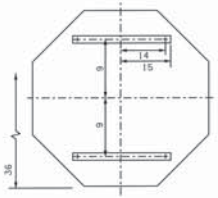
B-18(D)

(1) 2" SQUARE TUBE POST
(1) 1-1/2" PIPE POST



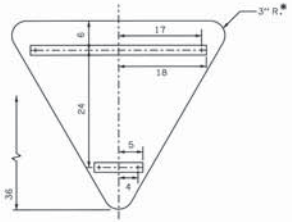
B-36(D)

(1) 2" SQUARE TUBE POST
(1) 2-1/2" PIPE POST



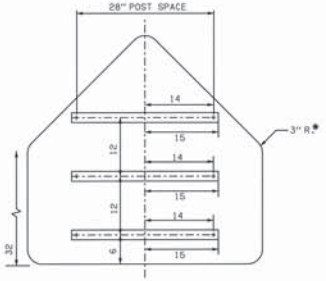
B-36(O)

(1) 2" SQUARE TUBE POST
(1) 2-1/2" PIPE POST



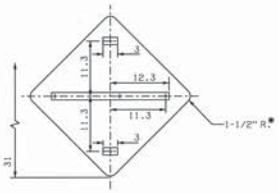
B-48(T)

(2) 2" SQUARE TUBE POSTS
(1) 2-1/2" PIPE POST



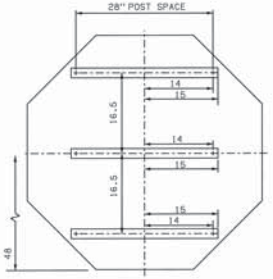
B-48(P)

(2) 2" SQUARE TUBE POSTS
(2) 2" PIPE POSTS



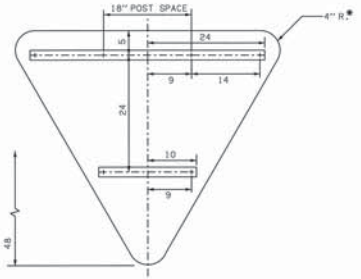
B-24(D)

(1) 2" SQUARE TUBE POST
(1) 2" PIPE POST



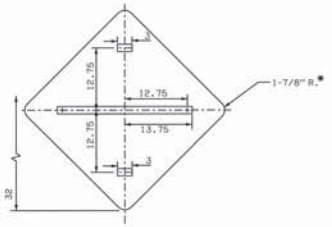
B-48(O)

(2) 2" SQUARE TUBE POSTS
(2) 2-1/2" PIPE POSTS



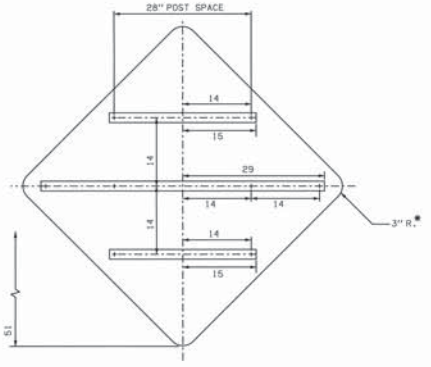
B-60(T)

(2) 2" SQUARE TUBE POSTS
(2) 2" PIPE POSTS



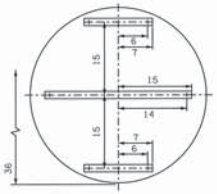
B-30(D)

(1) 2" SQUARE TUBE POST
(1) 2" PIPE POST



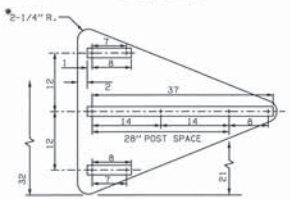
B-48(D)

(2) 2" SQUARE TUBE POSTS
(2) 2-1/2" PIPE POSTS



B-36(R)

(1) 2" SQUARE TUBE POST
(1) 2-1/2" PIPE POST



B-4836(T)

(2) 2" SQUARE TUBE POSTS
(2) 2" PIPE POSTS

CONSTRUCTION NOTES:

(1) ALL FLAT SHEET SIGNS SHALL USE GALVANIZED STEEL POSTS.

(2) THICKNESS OF MATERIALS FOR FLAT SHEET SIGNS SHALL BE AS FOLLOWS, DETERMINED BY THE LONGEST DIMENSION OF THE SIGN UNLESS OTHERWISE SPECIFIED.

ALUMINUM ALLOY 6061-T6 OR 5052-H38	GALVANIZED STEEL
0.063" FOR SIGNS THROUGH 24"	16 GAUGE FOR SIGNS THROUGH 24"
0.080"FOR SIGNS 25" THROUGH 35"	14 GAUGE FOR SIGNS 25" THROUGH 35"
0.100" FOR SIGNS 36" AND LARGER	12 GAUGE FOR SIGNS 36" AND LARGER

(3) SIGN BRACKETS SHALL BE GALVANIZED STEEL OR ALUMINUM. HOLES FOR MOUNTING BRACKETS TO SIGN SHALL BE 5/16"D. HOLES FOR MOUNTING SIGN AND BRACKETS TO POST SHALL BE 3/8"D. HOLES SHALL BE PUNCHED BEFORE GALVANIZING. SIZE OF BRACKETS SHALL BE AS FOLLOWS: SIGNS THROUGH 36" SHALL USE A GALVANIZED STEEL OR ALUMINUM CHANNEL 1-1/2" X 1/2" X 1/8". SIGNS LARGER THAN 36" SHALL USE A GALVANIZED STEEL OR ALUMINUM CHANNEL 2" X 1/2" X 1/8". ALUMINUM SIGN BRACKETS SHALL BE ALLOY 6061-T6, 6062-T6 OR 6063-T6.

(4) ALL BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED STEEL OR CADMIUM PLATED. ALL BOLT ENDS SHALL BE SUFFICIENTLY BRADDED AFTER INSTALLATION TO MINIMIZE REMOVAL BY VANDALISM.

(5) ALL POSTS SHALL EXTEND 2" ABOVE THE TOP SIGN BRACKET, BUT NOT ABOVE THE TOP OF THE SIGN.

* (6) CORNER RADIUS FOR ALL FLAT SHEET SIGNS SHALL BE AS SHOWN.

(7) ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

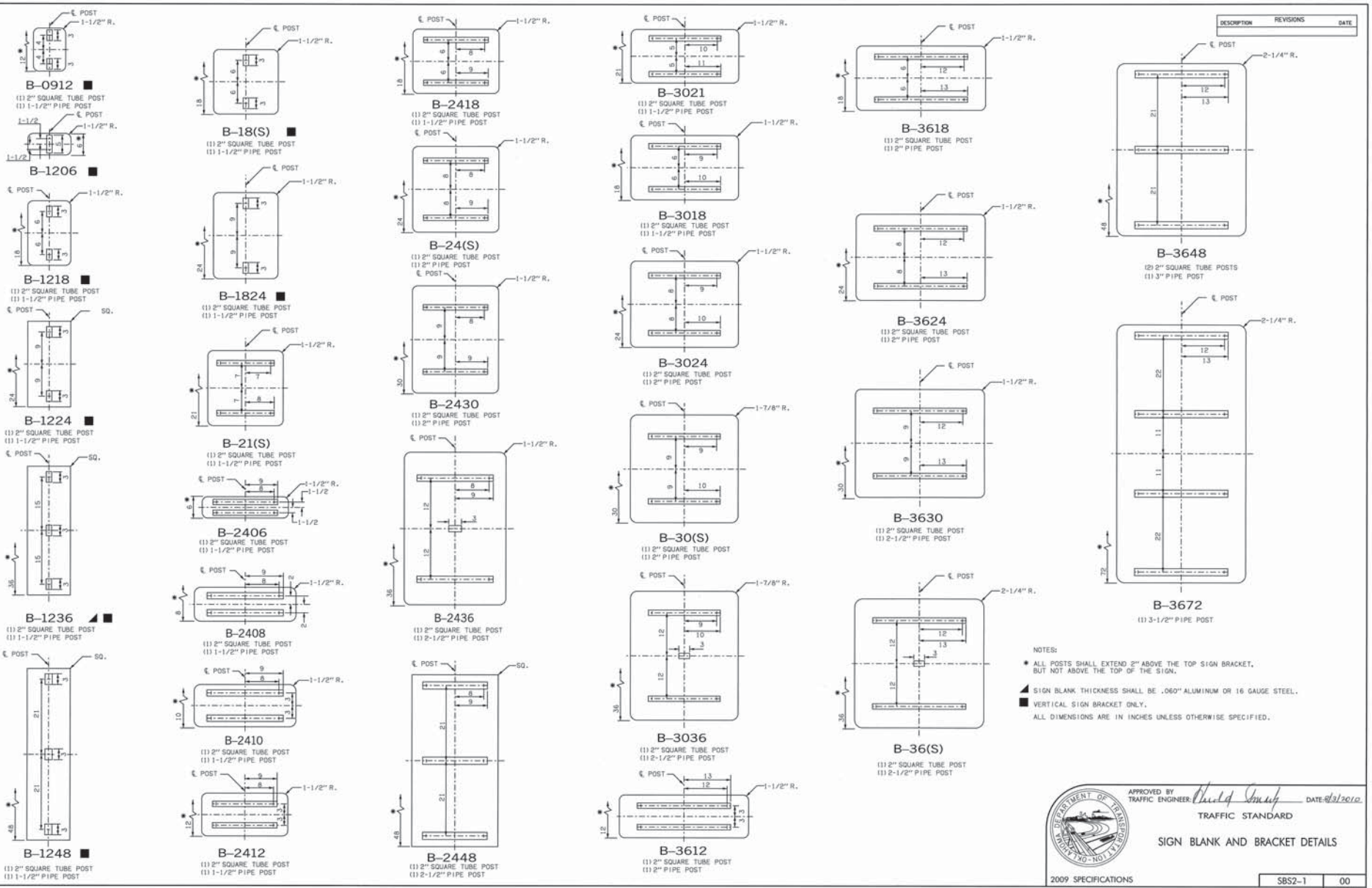
APPROVED BY TRAFFIC ENGINEER: _____ DATE: 8/3/2010

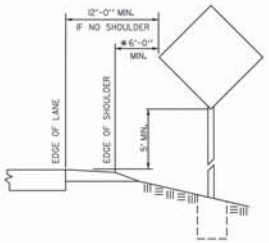
TRAFFIC STANDARD

SIGN BLANK AND BRACKET DETAILS

2009 SPECIFICATIONS

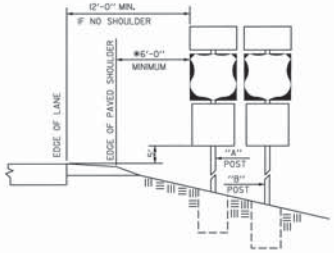
SBS1-1	00
T-130	


B-0912 ■
(1) 2" SQUARE TUBE POST
(1) 1-1/2" PIPE POST
B-1206 ■
B-1218 ■
(1) 2" SQUARE TUBE POST
(1) 1-1/2" PIPE POST
B-1224 ■
(1) 2" SQUARE TUBE POST
(1) 1-1/2" PIPE POST
B-1236 ◢ ■
(1) 2" SQUARE TUBE POST
(1) 1-1/2" PIPE POST
B-1248 ■
(1) 2" SQUARE TUBE POST
(1) 1-1/2" PIPE POST
B-18(S) ■
(1) 2" SQUARE TUBE POST
(1) 1-1/2" PIPE POST
B-1824 ■
(1) 2" SQUARE TUBE POST
(1) 1-1/2" PIPE POST
B-21(S)
(1) 2" SQUARE TUBE POST
(1) 1-1/2" PIPE POST
B-2406
(1) 2" SQUARE TUBE POST
(1) 1-1/2" PIPE POST
B-2408
(1) 2" SQUARE TUBE POST
(1) 1-1/2" PIPE POST
B-2410
(1) 2" SQUARE TUBE POST
(1) 1-1/2" PIPE POST
B-2412
(1) 2" SQUARE TUBE POST
(1) 1-1/2" PIPE POST
B-2418
(1) 2" SQUARE TUBE POST
(1) 1-1/2" PIPE POST
B-24(S)
(1) 2" SQUARE TUBE POST
(1) 2" PIPE POST
B-2430
(1) 2" SQUARE TUBE POST
(1) 2" PIPE POST
B-2436
(1) 2" SQUARE TUBE POST
(1) 2-1/2" PIPE POST
B-2448
(1) 2" SQUARE TUBE POST
(1) 2-1/2" PIPE POST
B-3021
(1) 2" SQUARE TUBE POST
(1) 1-1/2" PIPE POST
B-3018
(1) 2" SQUARE TUBE POST
(1) 1-1/2" PIPE POST
B-3024
(1) 2" SQUARE TUBE POST
(1) 2" PIPE POST
B-30(S)
(1) 2" SQUARE TUBE POST
(1) 2" PIPE POST
B-3036
(1) 2" SQUARE TUBE POST
(1) 2-1/2" PIPE POST
B-3612
(1) 2" SQUARE TUBE POST
(1) 2" PIPE POST
B-3618
(1) 2" SQUARE TUBE POST
(1) 2" PIPE POST
B-3624
(1) 2" SQUARE TUBE POST
(1) 2" PIPE POST
B-3630
(1) 2" SQUARE TUBE POST
(1) 2-1/2" PIPE POST
B-36(S)
(1) 2" SQUARE TUBE POST
(1) 2-1/2" PIPE POST
B-3648
(2) 2" SQUARE TUBE POSTS
(1) 3" PIPE POST
B-3672
(1) 3-1/2" PIPE POST
DESCRIPTION
REVISIONS
DATE
NOTES:
* ALL POSTS SHALL EXTEND 2" ABOVE THE TOP SIGN BRACKET, BUT NOT ABOVE THE TOP OF THE SIGN.
◢ SIGN BLANK THICKNESS SHALL BE .060" ALUMINUM OR 16 GAUGE STEEL.
■ VERTICAL SIGN BRACKET ONLY.
ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.
APPROVED BY TRAFFIC ENGINEER:
DATE: 6/3/2010
TRAFFIC STANDARD
SIGN BLANK AND BRACKET DETAILS
2009 SPECIFICATIONS
SBS2-1
00
T-131



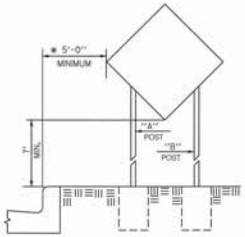
SINGLE POST (RURAL)

SINGLE POST WITH
AUXILIARY SIGN (RURAL)

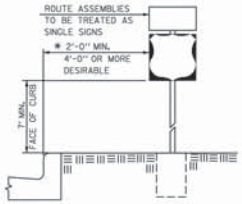


ROADSIDE ASSEMBLY
(RURAL)

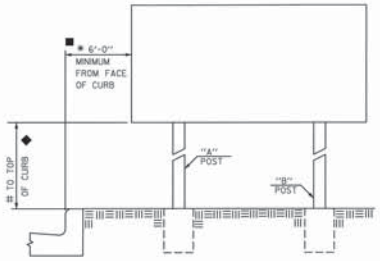
DOUBLE POST MAXIMUM &
MINIMUM SPEED LIMIT SIGNS (RURAL)



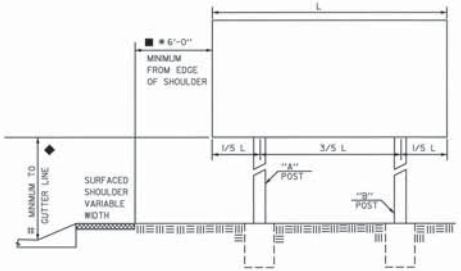
BUSINESS, COMMERCIAL OR
RESIDENTIAL AREA



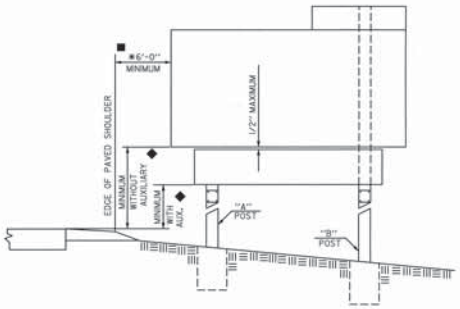
BUSINESS, COMMERCIAL OR
RESIDENTIAL AREA



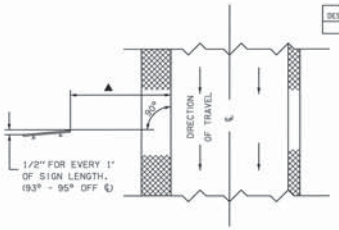
INFORMATION SIGN WITH
NON-MOUNTABLE CURB



INFORMATION SIGN WITH
MOUNTABLE CURB



FREEWAY OR EXPRESSWAY SIGN
(WITH OR WITHOUT AUXILIARY SIGN)



SIGN POSITIONING DETAIL

DESCRIPTION	REVISIONS	DATE

*1 SIGNS SHALL BE SO POSITIONED TO ELIMINATE OR MINIMIZE SPECULAR REFLECTION. DUE TO THE NUMEROUS VARIATIONS IN ROAD CURVES AND GRADES, THIS GENERAL RULE MAY NOT ALWAYS BE APPLICABLE, AND SIGNS SHALL BE POSITIONED AS DETERMINED BY THE ENGINEER.

*2 IF FURTHER CLARIFICATION OF VERTICAL AND LATERAL CLEARANCES IS REQUIRED, SEE THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (LATEST REVISION).

◆ WHEN LATERAL CLEARANCE OF STANDARD OR SPECIAL INFORMATION GUIDE SIGNS IS 30' OR GREATER (AS REQUIRED BY CLEAR ZONE) FROM THE EDGE LINE, THE MINIMUM VERTICAL CLEARANCE IS 7'. IF AN AUXILIARY SIGN IS MOUNTED BELOW A STANDARD OR SPECIAL INFORMATION GUIDE SIGN, THE RECOMMEND VERTICAL CLEARANCE FOR THE STANDARD OR SPECIAL INFORMATION GUIDE SIGN IS MINIMUM 8' AND THE AUXILIARY SIGN IS MINIMUM 5'.

* THE MINIMUM LATERAL CLEARANCE OF THE SIGN FROM THE EDGE OF SHOULDER OR FACE OF CURB SHALL BE AS SHOWN ON THIS STANDARD DRAWING UNLESS OTHERWISE SHOWN OR NOTED ON PLANS. WHEN SIGNS ARE NOTED TO BE PLACED 5' TO 9' FROM SHOULDER, THE TOLERANCE SHALL BE THE DISTANCE SHOWN +2'.

IN INSTANCES WHERE THE LATERAL CLEARANCE SHOWN CAUSES THE FOOTING TO BE LOCATED UNDESIREABLY, SUCH AS THE BOTTOM OF DITCHES, ETC., THE LOCATION MAY BE ADJUSTED OUTWARD FROM THE ROADWAY IF NECESSARY AT THE DISCRETION OF THE ENGINEER.

IN RURAL AREAS THERE SHALL BE A 12' MINIMUM FROM TRAVELWAY (EDGELINE) TO THE EDGE OF THE SIGN IF NO SHOULDER EXISTS.

■ NORMALLY, ON FREEWAY AND EXPRESSWAY MAINLINE, STANDARD OR SPECIAL INFORMATION SIGNS SHALL BE LOCATED WITH A LATERAL CLEARANCE OF 10' FROM THE FACE OF NON-MOUNTABLE CURBS OR GUARD RAILS, 20' FROM EDGE OF SHOULDER. IN ALL CASES EXCEPT WHEN SIGN SUPPORTS ARE PROTECTED BY BARRIERS, SIGNS SHALL HAVE A LATERAL CLEARANCE OF 30' OR GREATER (AS REQUIRED BY CLEAR ZONE) FROM EDGE OF DRIVING LANE.

ALONG INTERCHANGE RAMPS THE LATERAL CLEARANCE SHALL NORMALLY BE 10' OR GREATER (AS REQUIRED BY CLEAR ZONE).

▲ WHEN LATERAL CLEARANCE IS 30'-0" OR GREATER FROM EDGE OF PAVEMENT, THE SIGN IS TO BE APPROXIMATELY PERPENDICULAR TO ROADWAY.

APPROVED BY
TRAFFIC ENGINEER: Christopher Gruwell DATE: 8/3/2010

TRAFFIC STANDARD

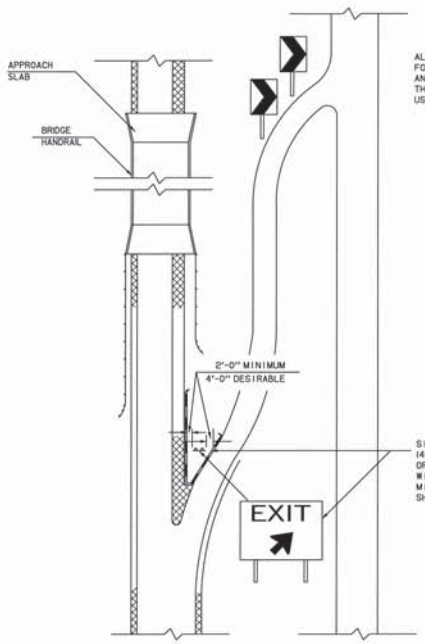
TYPICAL INSTALLATIONS OF GROUND MOUNTED SIGNS

2009 SPECIFICATIONS

GMS1-1 | 00

T-136

DESCRIPTION	REVISIONS	DATE

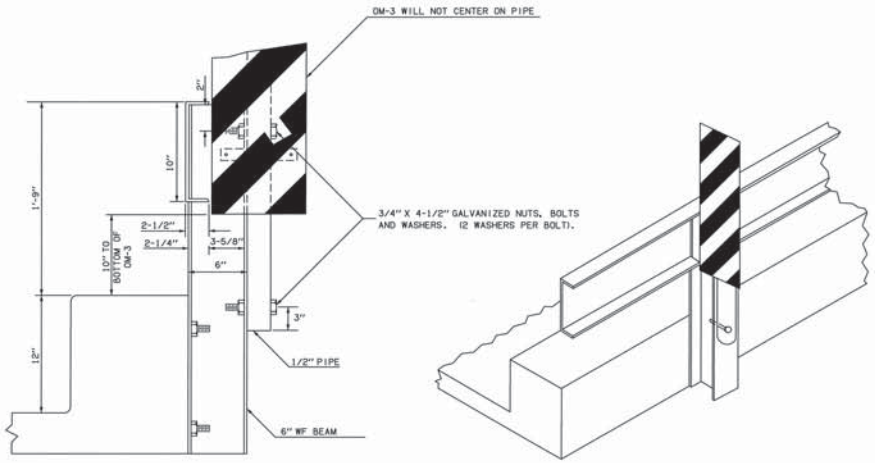


ALIGNMENT OF W1-8 MAY BE ADJUSTED FOR SIGHT DISTANCE DUE TO VERTICAL AND HORIZONTAL ALIGNMENT OF RAMP AT THE DISCRETION OF THE ENGINEER. USE ONLY WHEN SPECFIED ON PLANS.

SIGNS MOUNTED IN GORE SHALL BE 2'-0" MINIMUM (4'-0" DESIRABLE) FROM THE EDGE OF SHOULDER OR NON-MOUNTABLE CURB. WHERE MOUNTABLE CURB WITH SHOULDER EXISTS THE SIGN SHALL BE 2'-0" MINIMUM (4'-0" DESIRABLE) FROM THE EDGE OF SHOULDER LINE.

TYPICAL INSTALLATION OF:

"SIGN MOUNTED IN GORE"



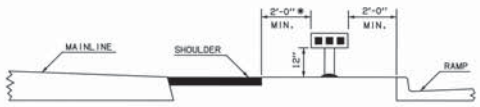
"OM-3'S IN REGARD TO BRIDGES"

MOUNTING HEIGHT FOR OBJECT MARKERS

WHEN USED FOR MARKING OBJECTS 8'-0" OR LESS FROM THE SHOULDER OR CURB, THE MOUNTING HEIGHT SHOULD BE 4'-0" ABOVE NEAR TRAFFIC LANE. WHEN MORE THAN 8'-0" FROM THE SHOULDER OR CURB THE MOUNTING HEIGHT MAY BE 4'-0" ABOVE THE GROUND. THE MOUNTING HEIGHT MAY VARY AS TO NEED.

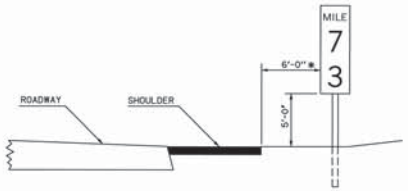
SPECIAL (TO BE USED ONLY WHEN SPECIFIED ON PROJECT.)

TYPICAL OM-3 INSTALLATION MOUNTED TO STEEL HANDRAIL



TYPICAL OM-2 INSTALLATION WHEN SPECIFIED ON PLANS

* FROM EDGE OF SHOULDER



TYPICAL D10-2F INSTALLATION

APPROVED BY TRAFFIC ENGINEER: _____ DATE: 8/31/2010

TRAFFIC STANDARD

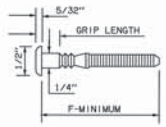
TYPICAL INSTALLATION OF GROUND MOUNTED SIGNS AND OBJECT MARKERS

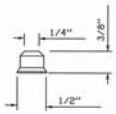
2009 SPECIFICATIONS

GMS2-1 | 00

T-137

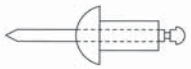
DESCRIPTION	REVISIONS	DATE





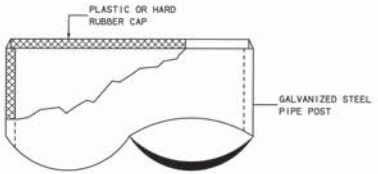
1/4" FASTENER AND 1/4" COLLAR (TYPICAL)

GRIP NO.	GRIP LENGTH	F-MIN.
2	0.094 - 0.156	1-7/16"
3	0.157 - 0.218	1-1/2"
4	0.219 - 0.281	1-9/16"
5	0.282 - 0.343	1-5/8"
6	0.344 - 0.406	1-11/16"
17	0.407 - 1.093	2-3/8"

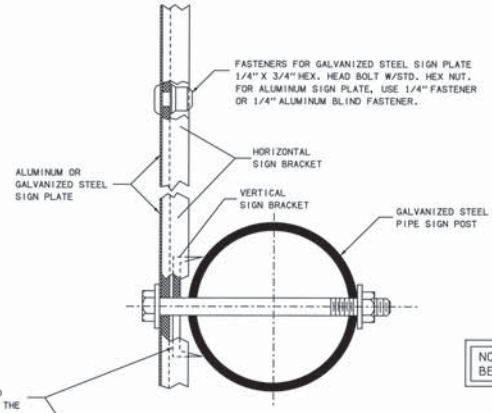


ALUMINUM ALLOY BODY AND MANDREL. GRIP RANGE 1/16" TO 1/4"

1/4" BLIND FASTENERS



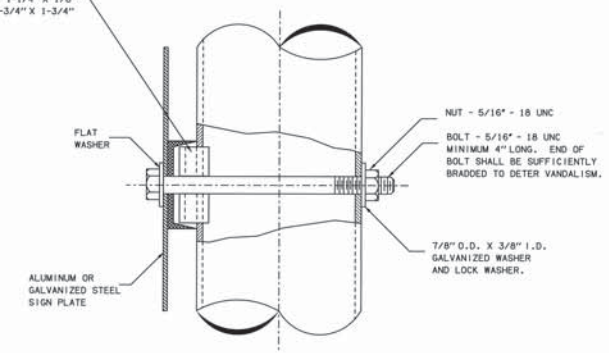
POST CAP NOT REQUIRED FOR 1-1/2" AND 2" PIPE POSTS



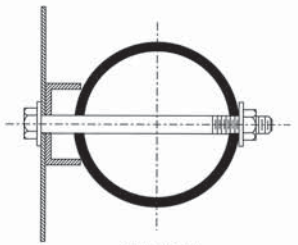
TOP VIEW

NOTE: ALL NUTS SHALL BE SELF-LOCKING.

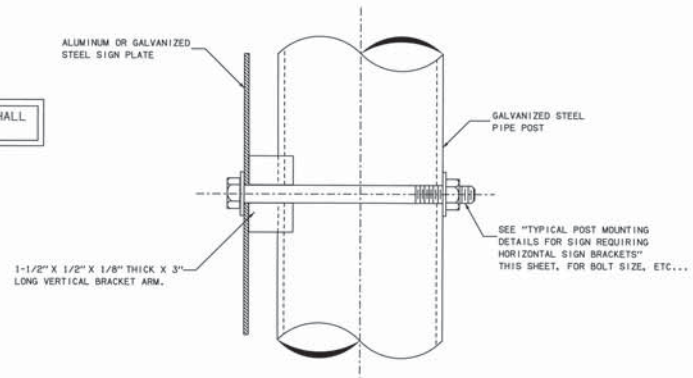
WHEN CONSTANT THICKNESS EXTRUDED ALUMINUM SIGN BRACKETS ARE USED THE HORIZONTAL SIGN BRACKET MAY CONTACT THE SIGN POST PREVENTING A SNUG AND PROPER FIT. WHEN THIS OCCURS AN ALUMINUM SPACER EITHER 1-1/4" X 1-1/4" X 1/8" THICK FOR 1-1/2" BRACKETS, OR 1-3/4" X 1-3/4" X 1/8" THICK FOR 2" BRACKETS SHALL BE USED.



SIDE VIEW
TYPICAL POST MOUNTING DETAILS FOR SIGN REQUIRING HORIZONTAL SIGN BRACKETS



TOP VIEW



SIDE VIEW
TYPICAL POST MOUNTING DETAILS FOR SIGN REQUIRING VERTICAL SIGN BRACKETS ONLY

APPROVED BY TRAFFIC ENGINEER: _____ DATE: 07/31/2010

TRAFFIC STANDARD

SHEET SIGN ASSEMBLY DETAIL (GALVANIZED PIPE)

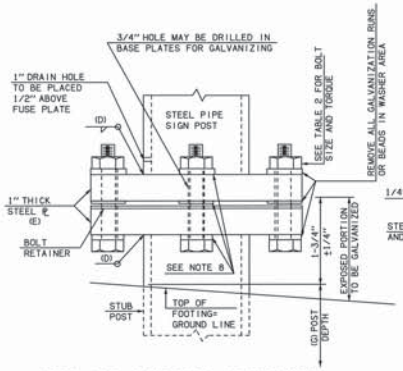
2009 SPECIFICATIONS

SSA2-1	00
	T-140

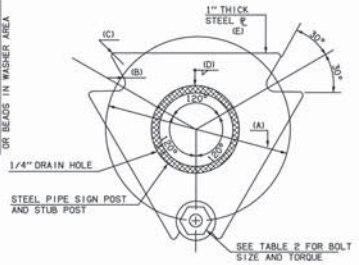
TRFPC## D:\usr2\2009Standards_ss\t140_SSA2-1-00.dgn 2:13:09 PM 7/29/2010 R:\TRAF_PLOT\leroy.pen R:\TRAF_PLOT\bw.ctb

DESCRIPTION	REVISIONS	DATE

TABLE I														
FTG. DES. NO.	POST SIZE REQUIRED	BASE PLATE DIMENSIONS					FOOTING DIMENSIONS					QUANTITIES	
		TRIANGLE SIZE	A	B	C	D	E	SIZE DIA.	LENGTH	POST (G) DEPTH	VERTICAL BARS NO./SIZE	HORIZONTAL BARS NO./SIZE	CLASS "A" CONCRETE	REINFORCING STEEL
A-1	1-1/2" ø 2.72 plf	NO BASE PLATE REQUIRED						12"	2'-0"	24"	NONE	NONE	.06 CY	NONE
A-2	2" ø 3.65 plf	NO BASE PLATE REQUIRED						12"	2'-0"	24"	NONE	NONE	.06 CY	NONE
A-3	2-1/2" ø 5.79 plf	9" x 9" x 9"	6-1/4"	9/16"	1/4"	1/4"	1"	18"	3'-0"	24"	4 / #5	4 #4	.20 CY	24 lbs
A-4	3" ø 7.58 plf	9" x 9" x 9"	6-1/4"	9/16"	1/4"	1/4"	1"	18"	3'-6"	24"	6 / #5	4 #4	.23 CY	32 lbs
A-5	3-1/2" ø 9.11 plf	10" x 10" x 10"	7-1/16"	8/16"	1/4"	5/16"	1"	18"	4'-0"	30"	6 / #5	5 #4	.26 CY	38 lbs
A-6	4" ø 10.79 plf	10" x 10" x 10"	7-1/16"	8/16"	1/4"	5/16"	1"	18"	4'-6"	30"	6 / #5	5 #4	.30 CY	42 lbs



STEEL PIPE POST BASE CONNECTION



NOTE : BASE PLATE FOR STUB POST SAME AS BASE PLATE FOR SIGN POST.

PIPE POST BASE PLATE

PROCEDURE FOR ASSEMBLY OF BASE CONNECTION

1. ASSEMBLE POST TO STUB WITH BOLTS AND WASHERS. USE ONE FLAT WASHER PER BOLT AND BOLT RETAINER BETWEEN BASE PLATES.
2. SHIM AS REQUIRED TO PLUMB AND ALIGN POST(S) BEFORE OR IMMEDIATELY AFTER POURING CONCRETE FOOTING.
3. TIGHTEN ALL BOLTS, IN A SYSTEMATIC ORDER, TO THE PRESCRIBED TORQUE TO BED WASHERS AND SHIMS AND CLEAN BOLT THREADS.
4. LOOSEN AND RETIGHTEN TO PRESCRIBED TORQUE IN THE SAME ORDER AS INITIAL TIGHTENING. DO NOT OVER TIGHTEN.

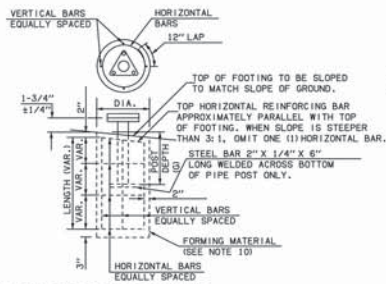
NO. REQ'D. ℄ 9" X 9" X 9"
(3) 1/2" ϕ X 3-1/4" H. S. BOLT
(3) HEX. NUTS
(9) FLAT WASHERS (SEE NOTE 8)

NO. REQ'D. ℄ 10" X 10" X 10"
(3) 5/8" ϕ X 3-3/4" H. S. BOLT
(3) HEX. NUTS
(9) FLAT WASHERS (SEE NOTE 8)

TABLE 2		
BASE PLATE CONNECTION DATA TABLE		
BOLT TORQUE FOR BASE PLATES		
BOLT SIZE	MINIMUM	MAXIMUM
1/2" ϕ X 3-1/4"	16.6 FT LBS	25.0 FT LBS
5/8" ϕ X 3-1/4"	37.5 FT LBS	56.6 FT LBS
3/4" ϕ X 3"	67.5 FT LBS	88.3 FT LBS

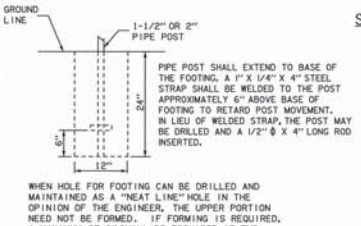
BOLT TORQUE LIMITS

THE HIGH STRENGTH BOLTS AT THE BASE CONNECTION SHOULD BE TORQUED WITHIN THE LIMITS SPECIFIED IN THE ABOVE TABLE. HOWEVER THE LOWER LIMIT SHOWN IN THE "BASE PLATE CONNECTION DATA TABLE" IS MORE DESIRABLE.



NOTE : PIPE STUB POST MAY BE INSTALLED TO THE BASE OF THE FOOTING IF DESIRED, BUT ONLY THE PIPE POST SPECIFIED IN THE FOOTING DESIGN WILL BE PAID FOR. PIPE POST EXTENDING TO THE BASE OF THE FOOTING SHALL HAVE THE STEEL BAR WELDED TO THE POST A MINIMUM OF 6" ABOVE THE BASE OF THE FOOTING.

TYPICAL "A" FOOTING DETAIL



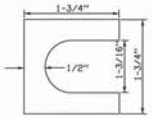
PIPE POST SHALL EXTEND TO BASE OF THE FOOTING. A 1" X 1/4" X 4" STEEL STRAP SHALL BE WELDED TO THE POST APPROXIMATELY 6" ABOVE BASE OF FOOTING TO RETARD POST MOVEMENT. IN LIEU OF WELDED STRAP, THE POST MAY BE DRILLED AND A 1/2" ϕ X 4" LONG ROD INSERTED.

WHEN HOLE FOR FOOTING CAN BE DRILLED AND MAINTAINED AS A "NEAT LINE" HOLE IN THE OPINION OF THE ENGINEER, THE UPPER PORTION NEED NOT BE FORMED. IF FORMING IS REQUIRED, A MINIMUM OF 6" SHALL BE REQUIRED AT THE TOP OF FOOTING. FORMING MAY BE ACCOMPLISHED BY USE OF A CARDBOARD CASING OR SIMILAR MATERIAL THAT MAY BE LEFT IN PLACE. ANY VOID AROUND FINAL FOOTING SHALL BE BACK-FILLED AND FIRMLY TAMPED.

TYPICAL "A-1" & "A-2" FOOTING DETAIL

CUT FROM 30 GAUGE GALVANIZED SHEET METAL. PLACE BETWEEN BASE PLATES. SIZE---VARIES TO FIT BASE PLATES.

SHEET METAL BOLT RETAINER



FURNISH 2 ϕ 0.012 THICK AND 2 ϕ 0.32 THICK SHIMS FOR POST. SHIMS SHALL BE FABRICATED FROM BRASS SHIM STOCK OR STRIP CONFORMING TO ASTM-B36.

SHIM DETAIL

CONSTRUCTION NOTES

1. ALL PIPE AND WIDE FLANGE BEAM POST SHALL CONFORM TO THE 2009 STANDARD SPECIFICATIONS.
2. ALL BOLTS, NUTS AND WASHERS SHALL NOT BE GALVANIZED OR PLATED, BUT SHALL BE PAINTED, AFTER INSTALLATION, WITH A ZINC RICH PAINT.
3. STRUCTURAL STEEL TO BE GALVANIZED AFTER FABRICATION, EXCEPT AS NOTED, IN ACCORDANCE WITH THE 2009 STANDARD SPECIFICATIONS.
4. POST LENGTHS AS SHOWN ON THE PLANS INCLUDE BOTH SIGN POST AND STUB POST WHICH IS SET IN THE CONCRETE FOOTING.
5. ALL WELDING MATERIALS AND METHODS, INCLUDING QUALIFICATIONS OF WELDERS, SHALL CONFORM WITH THE REQUIREMENTS OF THE 2009 STANDARD SPECIFICATIONS.
6. STRUCTURAL EXCAVATION TO BE PAID FOR IN OTHER ITEMS OF WORK.
7. TOP AND BOTTOM WASHERS ON BASE PLATE SHALL BE 1/4" THICK. WASHERS MAY BE ROUND OR SQUARE. USE STANDARD ROUND WASHERS BETWEEN BASE PLATES. REMOVE ALL GALVANIZING RUNS OR BEADS IN WASHER AREA.

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
804(A)	STRUCTURAL CONCRETE	CY
804(B)	REINFORCING STEEL	LB
851(B)	GALVANIZED STEEL PIPE POST	LF

APPROVED BY TRAFFIC ENGINEER: _____ DATE: 8/31/2010

TRAFFIC STANDARD

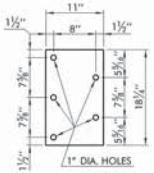
STANDARD FOOTINGS FOR GROUND MOUNTED SIGNS (GALVANIZED PIPE)

2009 SPECIFICATIONS

FGS1-1 | 00

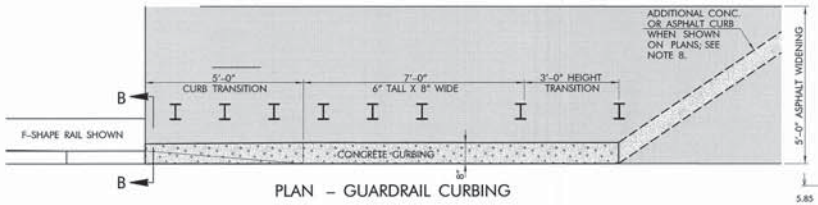
T-141

DESCRIPTION	REVISIONS	DATE
REVISED NOTE 8 & GUARDRAIL PAY ITEM		4/2/2013
REVISED THRIE BEAM TO W-BEAM SPACING		6/18/2013

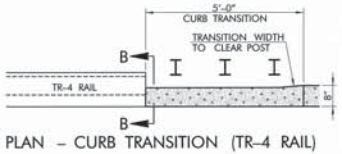


BEARING PLATE

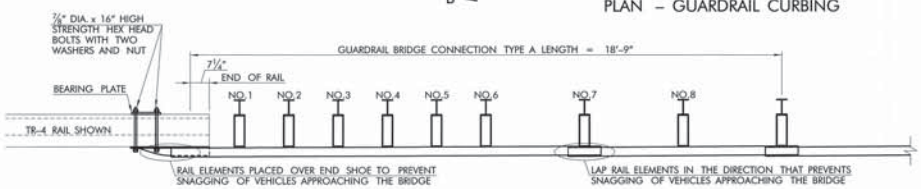
BEARING PLATE SHALL BE ⅝" THICK, GRADE 36 STRUCTURAL STEEL MEETING REQUIREMENTS OF AASHTO M270.



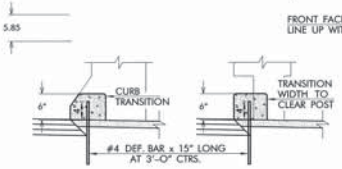
PLAN – GUARDRAIL CURBING



PLAN – CURB TRANSITION (TR-4 RAIL)

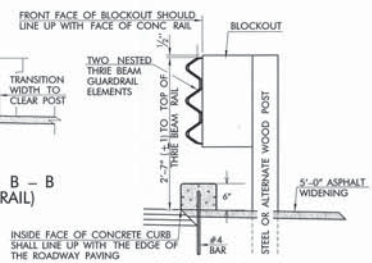


PLAN – GUARDRAIL INSTALLATION

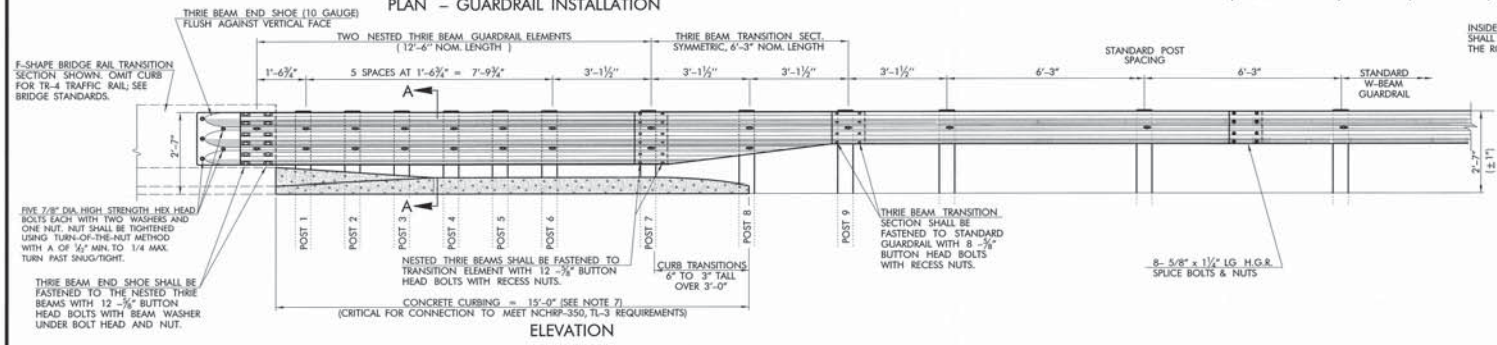


SECTION B – B (F-SHAPE RAIL)

SECTION B – B (TR-4 RAIL)



SECTION A – A

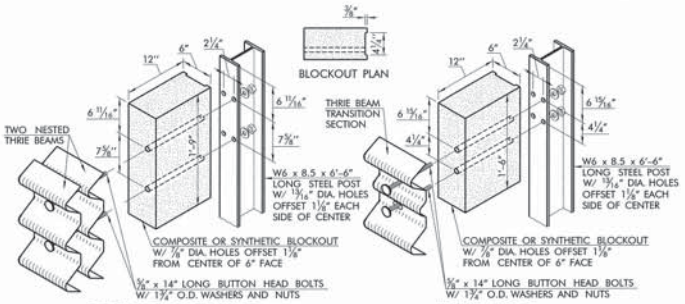


ELEVATION

GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
2. ALL GUARDRAIL, METAL POSTS, BEARING PLATES, BOLTS, WASHERS, AND NUTS SHALL BE GALVANIZED AFTER FABRICATION.
3. ANY FIELD CUTS OR HOLES DRILLED IN GALVANIZED MATERIALS SHALL BE COATED WITH A ZINC OXIDE PAINT, ACCORDING TO SECTION 730.06 OF THE SPECIFICATIONS.
4. ALTERNATIVE POSTS MAY BE USED IN LIEU OF THE POSTS SHOWN ON THIS STANDARD, IF THEY ARE CERTIFIED AS NCHRP-350, TL-3, TESTED AND APPROVED BY THE ENGINEER.
5. WOOD BLOCKOUTS MAY BE USED IN LIEU OF COMPOSITE OR SYNTHETIC BLOCKOUTS, IF BLOCKOUT IS ODOT APPROVED.
6. FOR DETAILS OF GUARDRAIL HARDWARE INCLUDING THRIE BEAM GUARDRAIL ELEMENT, THRIE BEAM TRANSITION SECTION, END SHOE, BEAM WASHER, BUTTON HEAD BOLTS & RECESS NUTS, SEE TRAFFIC STANDARD GHW2-1.
7. PAY ITEM 'GUARDRAIL BRIDGE CONNECTION-THRIE BEAM' INCLUDES ALL COST OF MATERIALS AND INSTALLATION OF THE THRIE BEAM RAIL ELEMENTS, TRANSITION SECTION, END SHOE, POSTS, BLOCKOUTS, CONCRETE CURB, BEARING PLATE, BOLTS, WASHERS AND NUTS SHOWN ON DETAILS.
8. PAY ITEM 'GUARDRAIL CURBING' INCLUDES ALL COST OF MATERIALS AND INSTALLATION OF CLASS A CONCRETE CURB AND #4 BARS AS SHOWN ON DETAILS WHEN ADDITIONAL LENGTH IS REQUIRED.

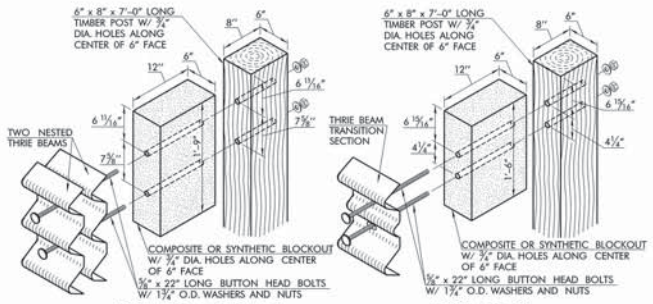
BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
623(1)	GUARDRAIL BRIDGE CONN-THRIE BEAM (31")	EA.
623	(PL) GUARDRAIL CURBING	EA.



POST NO. 1 THRU 7

POST NO. 8

STEEL POST AND COMPOSITE OR SYNTHETIC BLOCKOUT



POST NO. 1 THRU 7

POST NO. 8

OPTIONAL WOOD POST AND COMPOSITE OR SYNTHETIC BLOCKOUT

APPROVED BY TRAFFIC ENGINEER: Ronald Sonnelly DATE: 6/18/2013

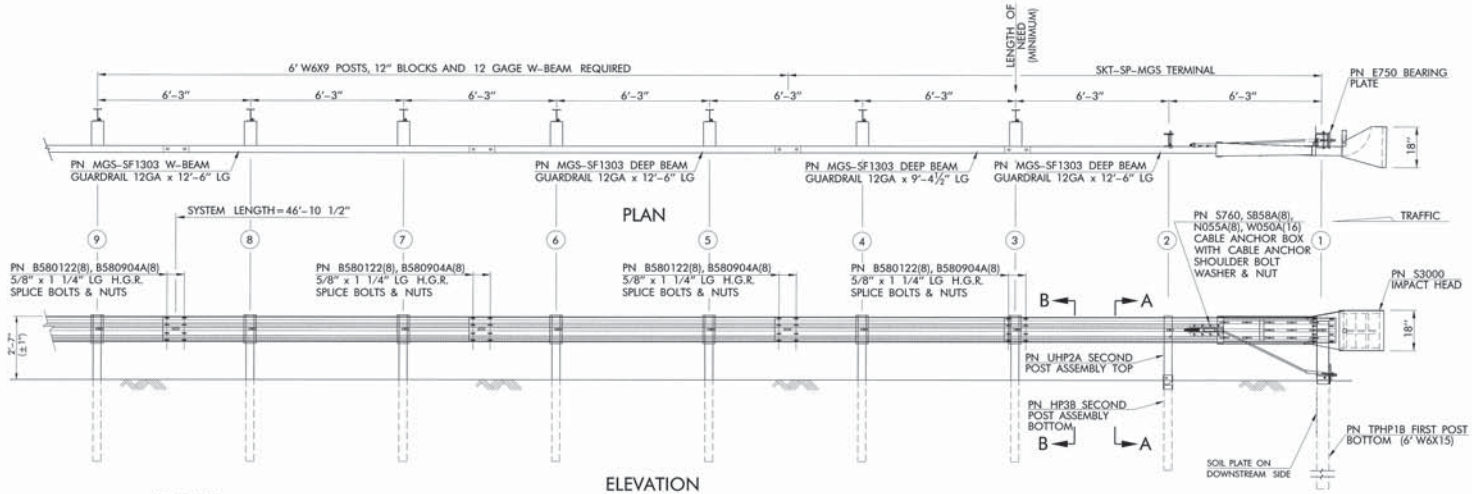
TRAFFIC STANDARD

GUARDRAIL BRIDGE CONNECTION– THRIE BEAM (31" SYSTEM)

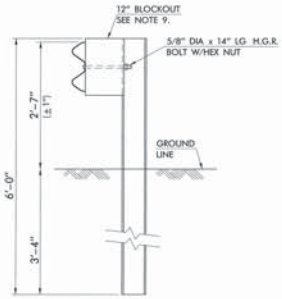
2009 SPECIFICATIONS

THRI–1 02

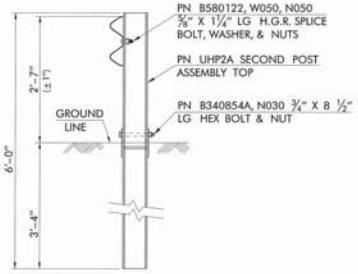
T–601



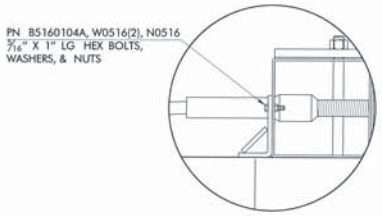
OPTIONAL FLARED INSTALLATION
25:1 MAXIMUM FLARE RATE



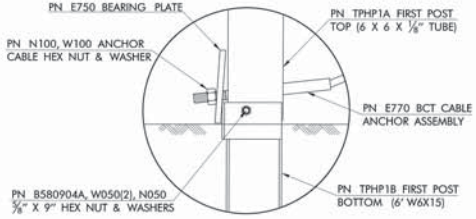
SECTION B–B
TYP AT POSTS #3 THRU #8



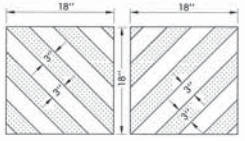
SECTION A–A
POST #2



IMPACT HEAD CONNECTION DETAIL



POST #1 CONNECTION DETAIL



REFLECTIVE MARKER DETAIL

REFLECTIVE MARKER

A. REFLECTORIZED MARKER(S) SHOULD BE ATTACHED TO THE VERTICAL END (12" x 24" FACE – TYP.) OF THE G.E.T PRIOR TO INSTALLATION.
B. ATTACHMENT SURFACE SHOULD BE THOROUGHLY CLEANED & DRY BEFORE ATTACHING ADHESIVE MARKER (STICK–ON SHEETING).
C. ATTACHED ADHESIVE SHEETING SHOULD BE FREE OF AIR BUBBLES WITH ALL EDGES FIRMLY BONDED.
D. STRIPING PATTERN MAY CONSIST OF 3" OR 4" STRIPES.

REVISIONS

DESCRIPTION	DATE

BILL OF MATERIAL

PN	QTY	DESCRIPTION
S3000	1	IMPACT HEAD
MGS–SF1303	1	W–BEAM GUARDRAIL END SECTION, 12 Ga.
TPHP1A	1	FIRST POST TOP (6X6X⅛" Tube)
TPHP1B	1	FIRST POST BOTTOM (6' W6X15)
UHP2A	1	SECOND POST ASSEMBLY TOP
HP3B	1	SECOND POST ASSEMBLY BOTTOM
E750	1	BEARING PLATE
S760	1	CABLE ANCHOR BOX
E770	1	BCT CABLE ANCHOR ASSEMBLY
B5160104A	2	5/16 x 1 HEX BOLT GRD 5
W0516	4	5/16 WASHER
N0516	2	5/16 HEX NUT
B580122	25	5/8 Dia. x 1 1/4 SPLICE BOLT (POST #2)
B580904A	2	5/8 Dia. x 9 HEX BOLT GRD 5
W050	3	5/8 WASHER
N050	26	5/8 Dia. H.G.R NUT
B340854A	1	3/4 Dia. x 8 1/2 HEX BOLT GRD A449
N030	1	3/4 Dia. HEX NUT
N100	1	1 ANCHOR CABLE HEX NUT
W100	1	1 ANCHOR CABLE WASHER
SB58A	8	CABLE ANCHOR BOX SHOULDER BOLT
N055A	8	1/2 A325 STRUCTURAL NUT
W050A	16	1 1/16 OD x 9/16 ID A325 STR. WASHER

GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
2. ALL BOLTS, NUTS, CABLE ASSEMBLIES, CABLE ANCHORS AND BEARING PLATES SHALL BE GALVANIZED.
3. THE LOWER SECTIONS OF THE POSTS 1 & 2 SHALL NOT PROTRUDE MORE THAN 4 IN ABOVE THE GROUND (MEASURED ALONG A 5' CORD). SITE GRADING MAY BE NECESSARY TO MEET THIS REQUIREMENT.
4. THE LOWER SECTIONS OF THE HINGED POSTS SHOULD NOT BE DRIVEN WITH THE UPPER POST ATTACHED. IF THE POST IS PLACED IN A DRILLED HOLE, THE BACKFILL MATERIAL MUST BE SATISFACTORILY COMPACTED TO PREVENT SETTLEMENT.
5. WHEN COMPETENT ROCK IS ENCOUNTERED, A 12" DIA POST HOLE, 20 IN. DEEP CORED INTO THE ROCK SURFACE MAY BE USED IF APPROVED BY THE ENGINEER FOR POST 1. GRANULAR MATERIAL WILL BE PLACED IN THE BOTTOM OF THE HOLE, APPROXIMATELY 2.5" DEEP TO PROVIDE DRAINAGE. THE FIRST POST CAN BE FIELD CUT TO LENGTH, PLACED IN THE HOLE AND BACKFILLED WITH SUITABLE BACKFILL. THE SOIL PLATE MAY BE TRIMMED IF REQUIRED.
6. A SITE EVALUATION SHOULD BE CONSIDERED IF THERE IS LESS THAN 25' BETWEEN THE OUTLET SIDE OF THE TERMINAL AND ANY ADJACENT DRIVING LANE.
7. THE BREAKAWAY CABLE ASSEMBLY MUST BE TAUT. A LOCKING DEVICE (VICE GRIPS OR CHANNEL LOCK PLIERS) SHOULD BE USED TO PREVENT THE CABLE FROM TWISTING WHEN TIGHTENING NUTS.
8. EXTRUDER TYPE TERMINALS SHALL NOT BE INSTALLED WHEN ADJACENT DRIVING LANES ARE WITHIN 25 FEET (HORIZONT.) OF EXTRUSION SIDE OF THE EXTRUDER TERMINAL.
9. RECYCLED COMPOSITE (PLASTIC) OR WOOD BLOCKOUTS MAY BE USED THROUGHOUT THE LENGTH OF THE TERMINAL, IF APPROVED BY THE ENGINEER.

BASIS OF PAYMENT

ITEM NO.	ITEM	UNIT
623(G)	GUARDRAIL END TREATMENT (31")	EA.

APPROVED BY TRAFFIC ENGINEER: Donald Smith DATE: 4/9/12

TRAFFIC STANDARD

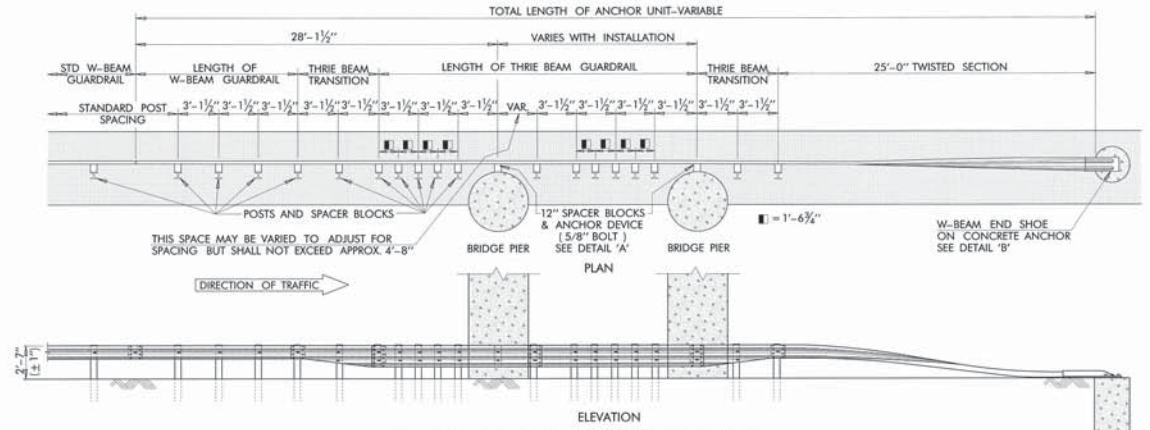
GUARDRAIL END TREATMENT (SKT–SP–MGS EXTRUDER TERMINAL) (31" SYSTEM)

2009 SPECIFICATIONS

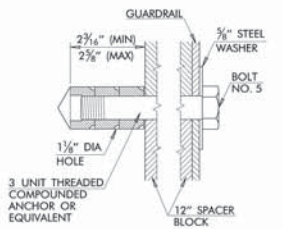
SKT–1 | 00

T–602

DESCRIPTION	REVISIONS	DATE

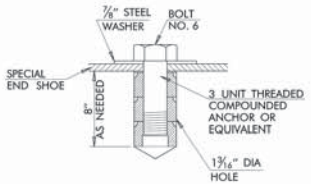


GUARDRAIL SYSTEM – PIER PROTECTION



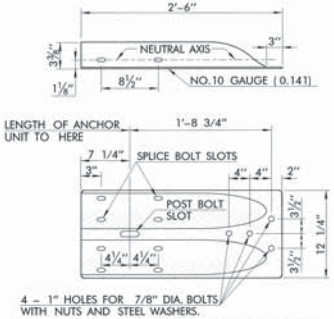
DETAIL 'A' ANCHOR DEVICE (5/8" BOLT)

USE WHEN CONNECTION IS MADE TO ROUND PIERS.

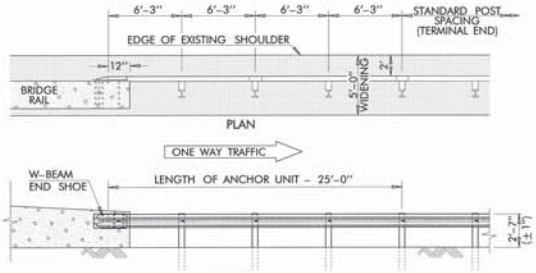


DETAIL 'B' ANCHOR DEVICE (7/8" BOLT)

USE TO ANCHOR SPECIAL END SHOE TO THE BRIDGE PIER, BRIDGE CURB, OR TO CONCRETE PARAPET IN LIEU OF BOLTS THROUGH THE PARAPET.

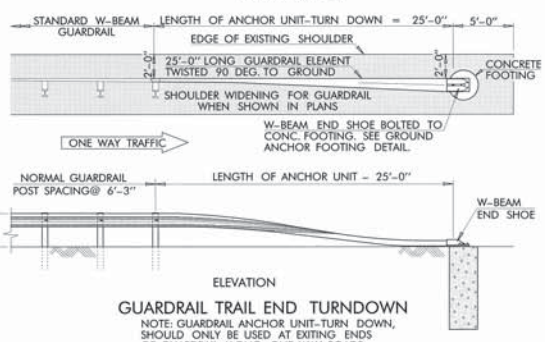


W–BEAM TERMINAL CONNECTION (END SHOE)



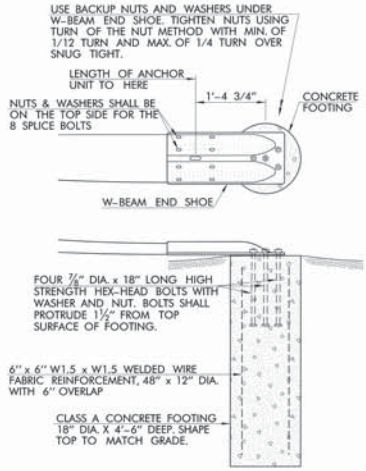
GUARDRAIL BRIDGE CONN – TRAIL END

NOTE: GUARDRAIL ANCHOR UNIT–BRIDGE LEAVE END, SHOULD ONLY BE USED AT EXITING ENDS OF ONE WAY BRIDGES ALONG ONE WAY ROADS.



GUARDRAIL TRAIL END TURNDOWN

NOTE: GUARDRAIL ANCHOR UNIT–TURN DOWN, SHOULD ONLY BE USED AT EXITING ENDS OF GUARDRAIL ALONG ONE WAY ROADS.



GROUND ANCHOR FOOTING DETAIL

GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ENGLISH STANDARD SPECIFICATIONS.
2. GUARDRAIL POST HOLES DRILLED THROUGH THE APPROACH SLAB, CURB, OR DRAIN SHALL BE RESTORED TO THE ORIGINAL SHAPE OF THE SLAB, CURB, OR DRAIN WITH CONCRETE IN A MANNER APPROVED BY THE ENGINEER WITH COST TO BE INCLUDED IN OTHER ITEMS OF WORK.
3. EXTRA LENGTH POSTS OR ADDITIONAL COMPACTED EARTH MAY BE REQUIRED NEAR BRIDGE AS DIRECTED BY THE ENGINEER. SPECIAL BLOCKOUT MAY BE REQUIRED.
4. GUARDRAIL COMPONENTS SHALL MEET NCHRP 350 THE APPLICABLE STANDARDS OF 'A GUIDE TO STANDARDIZED HIGHWAY BARRIER RAIL HARDWARE' PREPARED AND APPROVED BY THE AASHTO–ARTBA–AGC JOINT COOPERATIVE COMMITTEE, TECHNICAL BULLETIN NUMBER 268 B.
5. ALL ANCHOR UNITS SHALL INCLUDE GUARDRAIL, ALL HARDWARE AND OTHER APPURTENANCES NECESSARY TO CONSTRUCT UNIT.

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
623 (F)	GUARDRAIL BRIDGE CONN–TRAIL END (31")	EA.
623 (F)	GUARDRAIL TRAIL END TURNDOWN (31")	EA.
623 (J)	GUARDRAIL SYSTEM–PIER PROTECTION (31")	EA.

APPROVED BY TRAFFIC ENGINEER: _____ DATE: 4/9/13

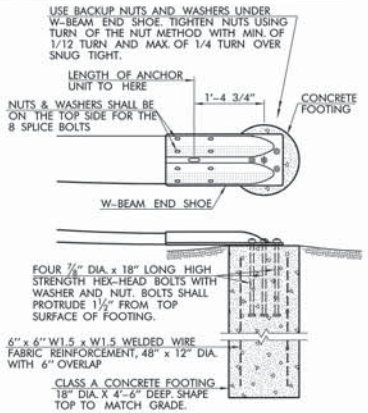
TRAFFIC STANDARD

GUARDRAIL ANCHOR UNITS (31" SYSTEM)

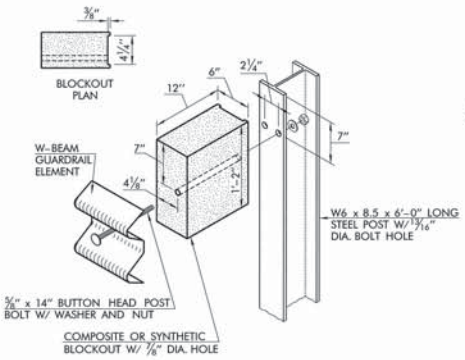
2009 SPECIFICATIONS

GA31–1 | 00

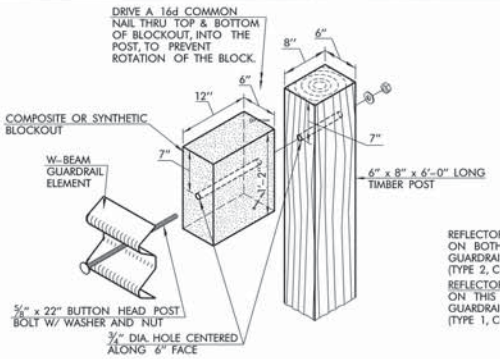
T–604



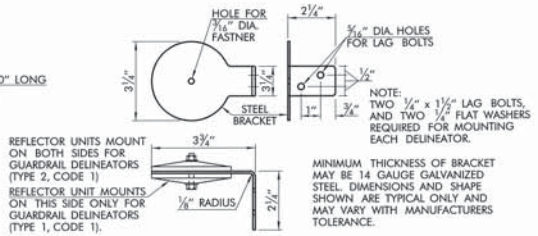
GROUND ANCHOR FOOTING DETAIL



STEEL POST AND COMPOSITE OR SYNTHETIC BLOCKOUT

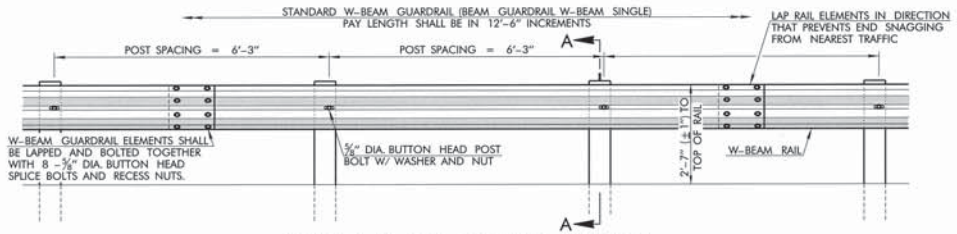


OPTIONAL WOOD POST AND COMPOSITE OR SYNTHETIC BLOCKOUT

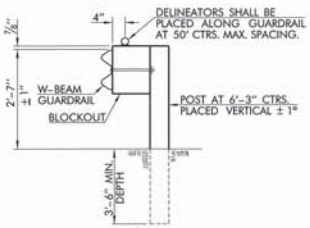


TYPICAL BRACKET FOR MOUNTING 3 1/4" ROUND DELINEATOR TO GUARD RAIL BLOCKOUT

CONTRACTOR MAY USE ALTERNATE DELINEATORS LISTED ON TRAFFIC ENGINEERING DIVISIONS QUALIFIED PRODUCTS LIST (QPL). THE USE OF ALTERNATE DELINEATORS (NOT DESCRIBED IN THIS STANDARD) MUST BE APPROVED BY THE RESIDENT ENGINEER.



STANDARD W-BEAM GUARDRAIL ELEVATION

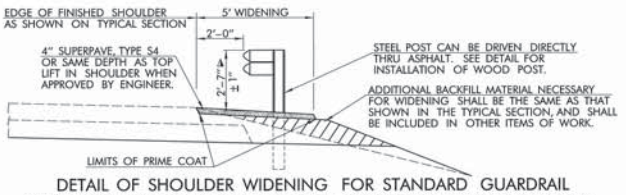


A–A

STANDARD W-BEAM GUARDRAIL SECTION

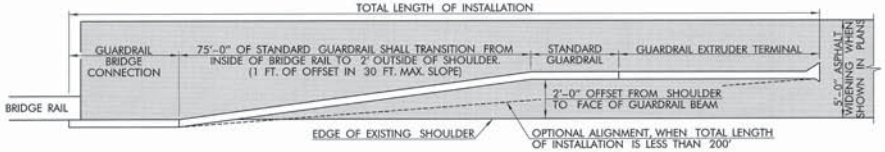
OPTIONAL TYPE POSTS OR BLOCKOUTS FOR STANDARD GUARDRAIL

THE CONTRACTOR MAY, AT HIS OPTION, SELECT AND USE ONE OF THE TYPE POSTS AND BLOCKOUTS SHOWN ABOVE, OR AN APPROVED ALTERNATE. THIS POST & BLOCKOUT CHOICE MUST BE USED ON THE ENTIRE PROJECT. ALTERNATE POST (INCLUDING SPECIAL SHAPES) MAY BE USED UPON THE APPROVAL OF THE ENGINEER. ALTERNATE BLOCKOUTS SUCH AS WOOD MAY BE USED IF PRODUCT HAS BEEN EVALUATED AND APPROVED BY ODOT.

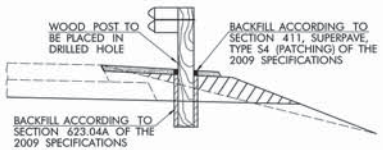


DETAIL OF SHOULDER WIDENING FOR STANDARD GUARDRAIL

Δ MEASURE FROM TOP OF RAIL, GUARDRAIL TO BE INSTALLED WITH THIS DIMENSION. WHEN INSTALLING GUARDRAIL IN AN AREA WITH NO SHOULDER WIDENING, THE RAIL HEIGHT SHALL BE MEASURED AS FOLLOWS:
–FOR NEGATIVE GRADE SHOULDERS, MEASURE TO A LINE FROM THE SHOULDER ON THE SAME SLOPE AS THE SHOULDER.
–FOR POSITIVE GRADE & LEVEL SHLDRS, MEASURE FROM A LINE LEVEL WITH THE EDGE OF SHOULDER.



TYPICAL GUARDRAIL INSTALLATION AT BRIDGE



INSTALLATION OF WOOD POST IN ASPHALT WIDENING

GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
2. STANDARD GUARDRAIL WITH 6'-3" POST SPACING MEETS NHCRP-350, TEST LEVEL 3. IF A RIGID HAZARD IS TO BE LEFT BEHIND THE GUARDRAIL, WITHIN 3'-0" OF THE RAIL, CONSIDER USING A DIFFERENT TREATMENT.
3. IF OPTIONAL WOOD POSTS AND BLOCKOUTS ARE USED, THEN THEY SHALL BE STRESS GRADE 1200F.
4. ALL STANDARD GUARDRAIL AND GUARDRAIL EXTRUDER TERMINALS SHALL BE OFFSET SO THAT RAIL FACE IS TWO FEET OUTSIDE THE SHOULDER. FOR TRANSITION FROM BRIDGE RAIL TO TWO FOOT OFFSET, BEGINNING AT THE GUARDRAIL BRIDGE CONNECTION, TRANSITION THE STANDARD GUARDRAIL, AT A 30:1 TAPER, UNTIL THE RAIL REACHES THE OFFSET DISTANCE.
5. ALL GUARDRAIL, METAL POSTS, PLATES AND HARDWARE SHALL BE GALVANIZED AFTER FABRICATION.
6. ANY FIELD CUTS OR HOLES DRILLED IN GALVANIZED MATERIALS SHALL BE COATED WITH A ZINC OXIDE PAINT. SEE SECTION 730 OF THE 2009 SPECIFICATIONS.
7. GUARDRAIL DELINEATORS (TYPE 2, CODE 1) WILL BE REQUIRED FOR ALL TWO-LANE ROADWAYS. ALL OTHER ROADWAYS WILL REQUIRE GUARDRAIL DELINEATORS (TYPE 1, CODE 1).

BASIS OF PAYMENT		
ITEM NO.	ITEM	UNIT
623(A)	BEAM GUARDRAIL W-BEAM SINGLE	L.F.
623(F)	GUARDRAIL TRAIL END TURNDOWN (31")	EA.
853	GUARDRAIL DELINEATORS (TYPE 1, CODE 1)	EA.
853	GUARDRAIL DELINEATORS (TYPE 2, CODE 1)	EA.

NOTE: PAY ITEM GUARDRAIL ANCHOR UNIT–TURN DOWN INCLUDES ALL LABOR AND MATERIALS TO INSTALL 25'-0" TWISTED RAIL ELEMENT, W-BEAM END SHOE, CONC. FOOTING, AND FOUR ANCHOR BOLTS.

REVISIONS	
DESCRIPTION	DATE

APPROVED BY TRAFFIC ENGINEER: _____ DATE: 4/5/2012

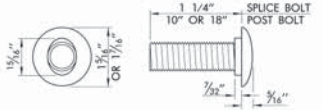
TRAFFIC STANDARD

GUARDRAIL AND HARDWARE
(1 OF 2)
(31" SYSTEM)

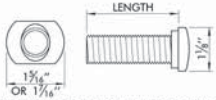
2009 SPECIFICATIONS

GHW1-1 | 00

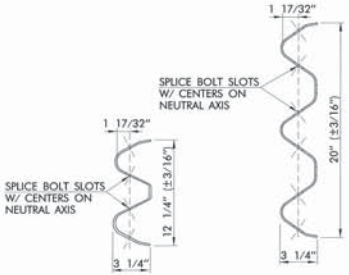
T-605



5/8" DIA. BUTTON HEAD BOLT & RECESS NUT

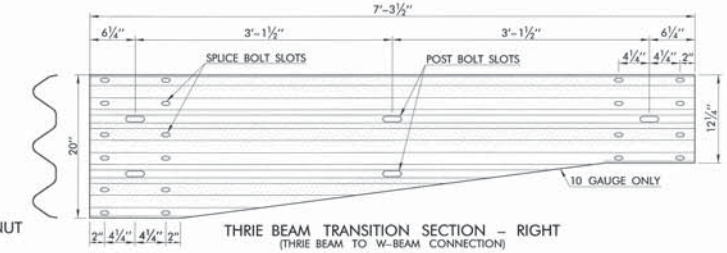


ALTERNATE BUTTON HEAD BOLT

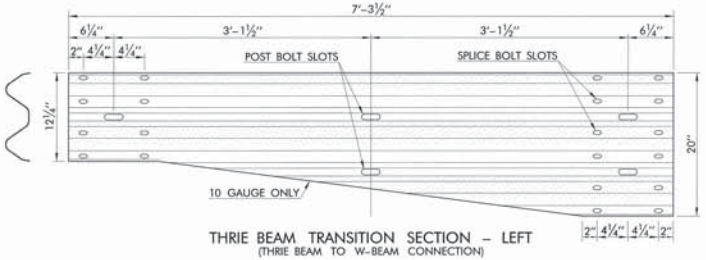


W-BEAM GUARDRAIL SECTION

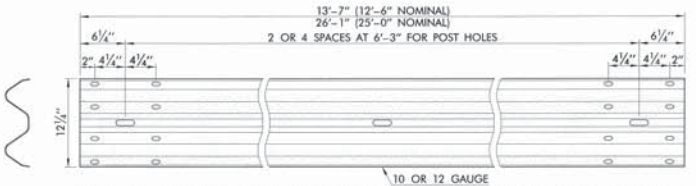
THRIE BEAM GUARDRAIL SECTION



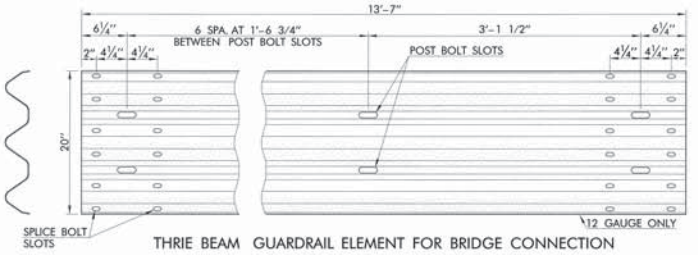
THRIE BEAM TRANSITION SECTION – RIGHT
(THRIE BEAM TO W-BEAM CONNECTION)



THRIE BEAM TRANSITION SECTION – LEFT
(THRIE BEAM TO W-BEAM CONNECTION)

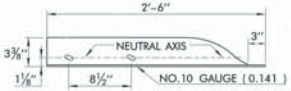


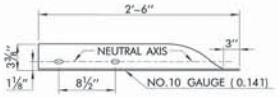
STANDARD W-BEAM GUARDRAIL ELEMENT (12'-6" OR 25'-0" NOMINAL LENGTH)

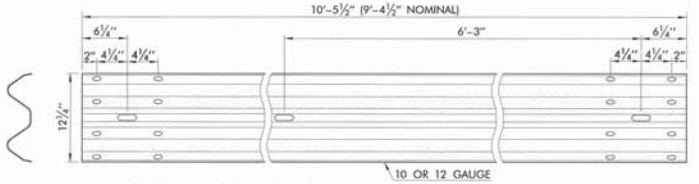


THRIE BEAM GUARDRAIL ELEMENT FOR BRIDGE CONNECTION

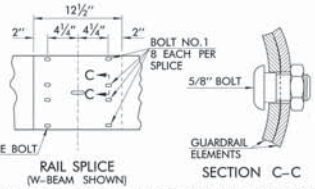
3" x 1 3/4" x 3/16" BEAM WASHER







SPECIAL W-BEAM GUARDRAIL ELEMENT (9'-4 1/2" NOMINAL LENGTH)

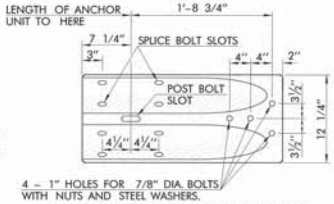


RAIL SPLICE
(W-BEAM SHOWN)

SECTION C-C

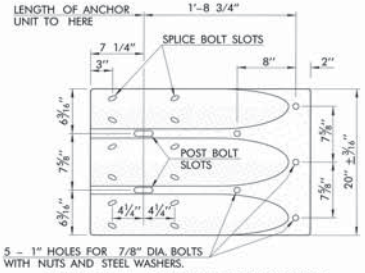
GUARDRAIL SHALL BE LAPPED IN THE DIRECTION OF NEAREST TRAFFIC AT ALL LOCATIONS WHERE SPLICES OCCUR (EXCEPT AT NARROW OR ONE LANE BRIDGE APPROACHES, WHERE LAPS SHALL BE TOWARD THE BRIDGE ON BOTH SIDES OF THE APPROACH ROADWAY).

RAIL SPLICE



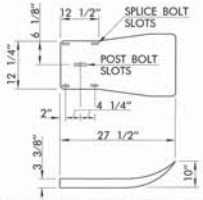
4 - 1" HOLES FOR 7/8" DIA. BOLTS WITH NUTS AND STEEL WASHERS.

W-BEAM TERMINAL CONNECTION
10 GAUGE ONLY (END SHOE)



5 - 1" HOLES FOR 7/8" DIA. BOLTS WITH NUTS AND STEEL WASHERS.

THRIE BEAM TERMINAL CONNECTION
10 GAUGE ONLY (END SHOE)



W-BEAM END SECTION (FLARED)

GENERAL NOTES

1. ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
2. ALL GUARDRAIL BEAMS, END SHOES, AND END SECTIONS ON THIS STANDARD DRAWING SHALL BE IN ACCORDANCE WITH AASHTO M 180.
3. ALL SPLICE BOLT SLOTS SHALL BE 29/32" WIDE x 1 1/8" LONG.
4. ALL POST BOLT SLOTS SHALL BE 3/4" WIDE x 2 1/2" LONG.

APPROVED BY TRAFFIC ENGINEER: [signature] DATE: 4/5/12

TRAFFIC STANDARD

GUARDRAIL AND HARDWARE
(2 OF 2)
(31" SYSTEM)

2009 SPECIFICATIONS	GHW2-1	00
		T-606