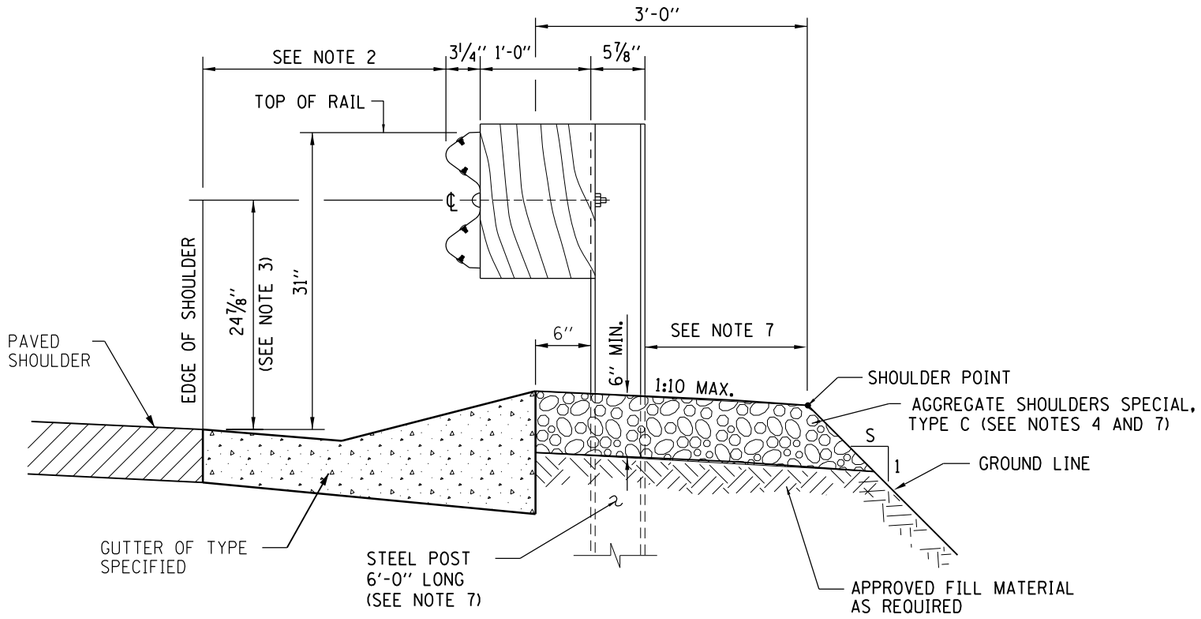
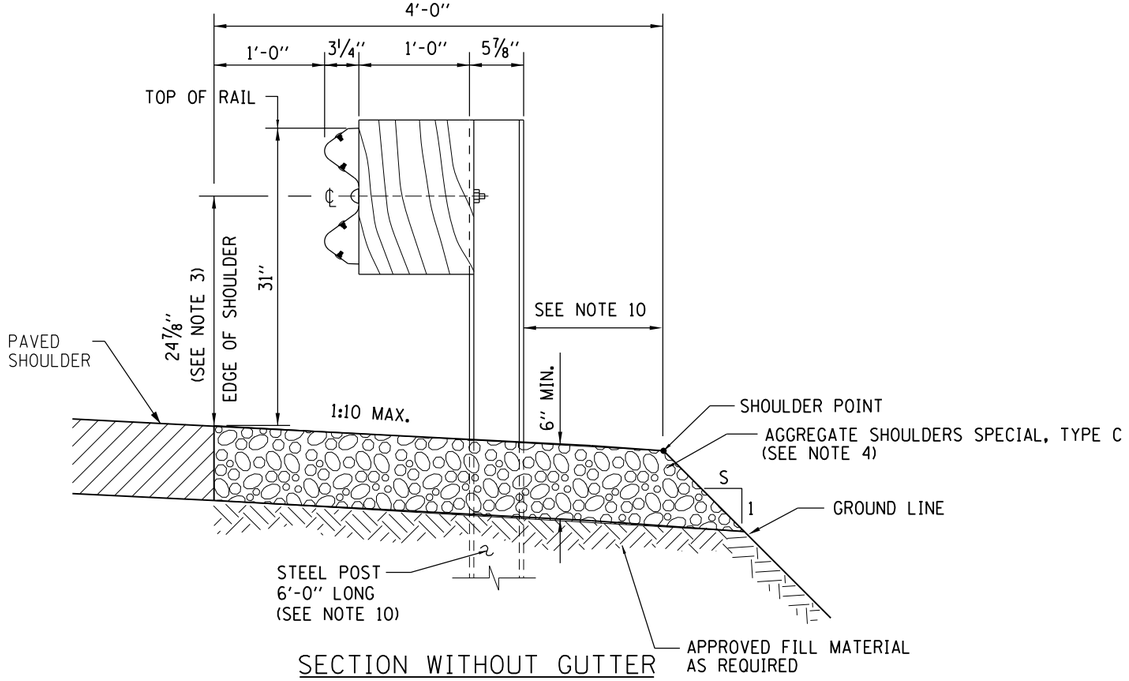
Tollway Standard Drawing Revisions

Section C	Guardrail / Median Barrier	
	Standard	**Modification Summary** **Effective: 03/31/14**
	C1	**Galvanized Steel Plate Beam Guardrail**
	Sheet 2	Removed Secondary Hole In Post
		Revised Table 2, Removed Desirable Barrier Clearance Distance
	C2	**Reserved**
		Median Pier Protection Standard has been Retired
	C3	**Single Face Reinforced Concrete Barrier**
		Redesign for TL-4 Loading
		Widen Base Slab for Slip Forming; Continuous 2'-0" Gutter
	C4	**Concrete Shoulder Barrier Transition**
		Redesign for TL-4 Loading
		Widen Base Slab for Slip Forming; Continuous 2'-0" Gutter
	C5	**Concrete Barrier Base and Concrete Barrier Double Face 42"**
		Widen Base Slab for Slip Forming; Continuous 2'-0" Gutter
		Removed Tie Bars
		Increased Number of Conduits in Base
	C6	**Traffic Barrier Terminal Type T1 (Special)**
		Revised Recovery Area Dimension; Added 5' In Advance of Terminal End
	C7	**Traffic Barrier Terminal Type T2**
		Revised Note 5
	C8	**Reserved**
		Traffic Barrier Terminal Type T5 has been retired
		Replaced With Traffic Barrier Terminal Type T10
	C9	**Traffic Barrier Terminal Type T6**
		Revised Note 7
	C10	**Traffic Barrier Terminal Type T6B**
		Revised Depth of Blockouts A-B-C-D To 1'-6"
	C11	**Traffic Barrier Terminal Type T10**
		Revised Note 4
	C12	**Traffic Barrier Terminal Type T1-A (Special)**
		Revised Recovery Area Dimension; Added 5' In Advance of Terminal End
	C13	**Concrete Median Barrier Transition Type V-F at Bridge Piers**
		Widen Base Slab for Slip Forming; Continuous 2'-0" Gutter
		Removed Tie Bars
	C14	**Concrete Barrier Transition, Type V at Biridge Piers**
		New Sheet



SECTION WITH GUTTER



SECTION WITHOUT GUTTER

NOTES:

1. 1' OFFSET FROM EDGE OF PAVED SHOULDER TO FACE OF RAIL IS TYPICAL FOR ALL INSTALLATIONS EXCEPT AS OTHERWISE DETAILED IN THE PLAN DRAWINGS.
2. WHERE GUTTERS SUCH AS TYPE G-2 , G-3 ARE REQUIRED IN FRONT OF THE GUARDRAIL, THE POSTS SHALL BE LOCATED 6" BEHIND THE GUTTER, OR AS OTHERWISE DETAILED IN THE PLANS. THE OFFSET FROM THE EDGE OF SHOULDER TO THE FACE OF THE GUARDRAIL SHALL BE AS SHOWN ON STANDARD B28.
3. THE 24⅞" TYPICAL RAIL HEIGHT IS MEASURED FROM EXISTING SURFACE 1' IN FRONT OF RAIL, OR FROM EDGE OF SHOULDER/EDGE OF GUTTER WHEN EDGE IS MORE THAN 1' IN FRONT OF RAIL TO CENTER OF RAIL.
4. AGGREGATE SHOULDERS SPECIAL, TYPE C SHALL COMPLY WITH THE REQUIREMENTS OF THE TOLLWAY RECURRING SPECIAL PROVISION. WHERE GUTTER IS PROPOSED WITH GUARDRAIL, A 6" MINIMUM THICKNESS OF AGGREGATE SHOULDERS SPECIAL, TYPE C SHALL BE PLACED BEHIND CURB. FOR GUARDRAIL WITHOUT CURB & GUTTER, AGGREGATE SHOULDER, OF THE SAME THICKNESS SHALL BE PLACED FROM THE EDGE OF PAVED SHOULDER SLOPING AWAY TO A 6" MIN. THICKNESS.
5. AGGREGATE SHOULDERS SPECIAL, TYPE C SHALL EXTEND A MINIMUM OF 1' BEHIND POST OR GUARDRAIL, WHICHEVER IS FURTHER, EXCEPT AS DETAILED ELSEWHERE IN THE PLANS.
6. PLASTIC BLOCK-OUTS SHALL NOT BE ALLOWED AS A SUBSTITUTE FOR WOOD BLOCK-OUTS ON NEW INSTALLATIONS.
7. WHEN $S \leq 3$ AND 3'-0" MIN. AGGREGATE SHOULDER CANNOT BE MET, THE POST LENGTH SHALL BE 9'-0" AND THE MIN. AGGREGATE SHOULDER SHALL BE 1'-0" MEASURED DISTANCE BEHIND POST TO THE SHOULDER POINT.
8. ALL SLOPES ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENTS (V:H).
9. UNDER NO CIRCUMSTANCES SHALL AN EXISTING GUARDRAIL, THAT WAS DESIGNED USING A PREVIOUS STANDARD, BE EXTENDED, ATTACHED TO OR MODIFIED IN ANYWAY FROM ITS ORIGINAL DESIGN. IF ANY MODIFICATION IS REQUIRED AND A PROPER BARRIER WARRANT HAS BEEN COMPLETED, THE ENTIRE BARRIER INSTALLATION SHALL BE COMPLETELY REMOVED AND REPLACED WITH A NEW SYSTEM THAT CONFORMS TO THE CURRENT STANDARD.
10. WHEN $S \leq 3$, THE POST LENGTH SHALL BE 9'-0" AND 4' AGGREGATE SHOULDER WIDTH MAINTAINED.
11. THE GUARDRAIL SYSTEM HAS BEEN PERFORMANCE-TESTED FOR CRASHWORTHINESS UNDER PROCEDURES DEFINED IN THE NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM (NCHRP) REPORT 350. NO MODIFICATION TO THIS STANDARD DRAWING SHALL BE PERMITTED.
12. GUARDRAIL POSTS SHALL NOT BE INSTALLED IN CONCRETE OR ASPHALT PAVEMENT. WHEN NECESSARY USE LEAVE-OUT DETAIL ON SHEET 3 OF THIS SERIES.
13. GUARDRAIL POSTS SHALL NOT BE ATTACHED TO ANY STRUCTURE.

Paul Kovacs
APPROVED ..... DATE 7-1-2009
CHIEF ENGINEER

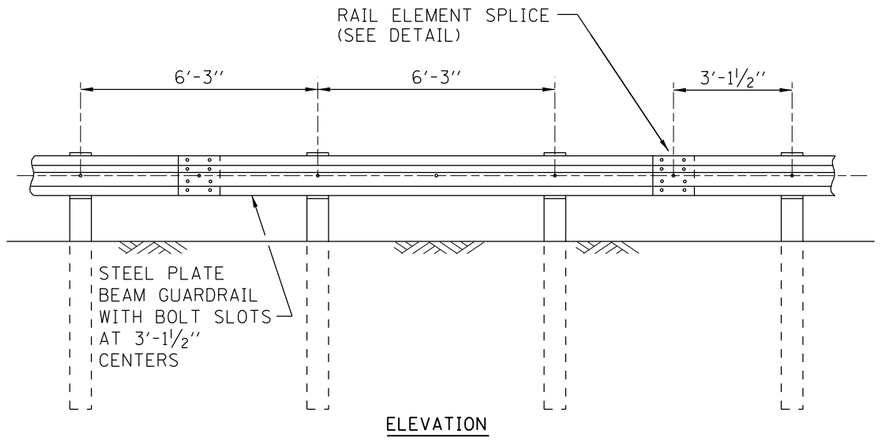
GUARDRAIL INSTALLATION DETAILS

	REVISIONS
2-7-2012	ADDED TYPE C GUARDRAIL, MODIFIED LEAVE-OUT CAP MATERIAL AND REVISED NOTES.
11-1-2012	MODIFIED AGGREGATE SHOULDERS.
3-31-2014	REMOVED SECONDARY HOLE FROM POST AND UPDATED NOTES.

Illinois Tollway

GALVANIZED STEEL PLATE BEAM GUARDRAIL

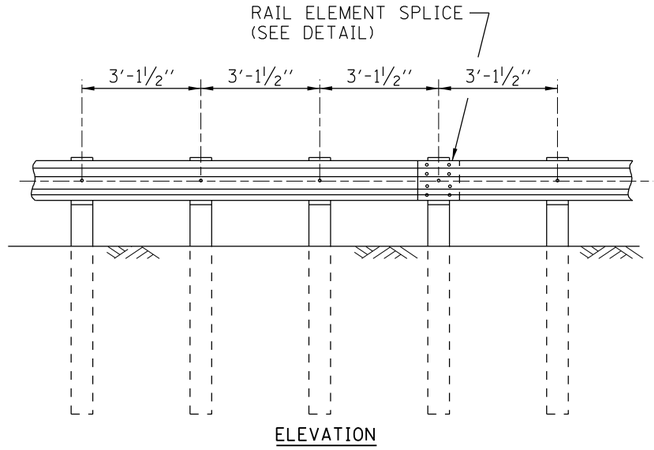
STANDARD C1-07



ELEVATION

TYPE A

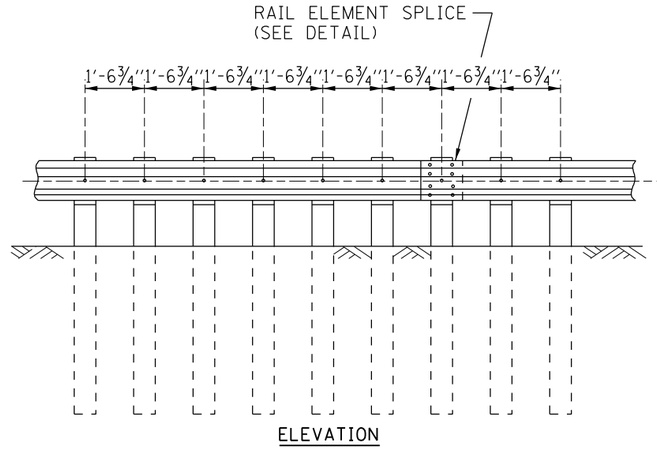
6'-3" TYPICAL POST SPACING



ELEVATION

TYPE B

3'-1½" ½ POST SPACING



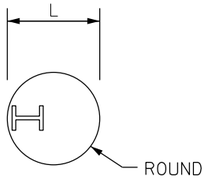
ELEVATION

TYPE C

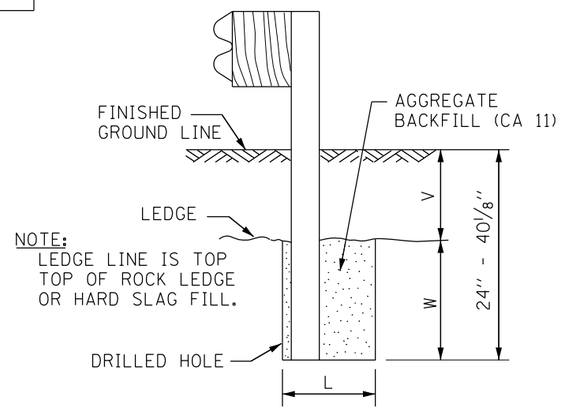
1'-6¾" ¼ POST SPACING

TABLE 1			
V	W	L	
		STEEL POST	WOOD POST
0 - 16⅛"	24"	21"	23"
> 16⅛" - 28⅛"	12"	8"	10"
> 28⅛" - 40⅛"	12" - 0 (*)	8"	10"

* V+W=40⅛"

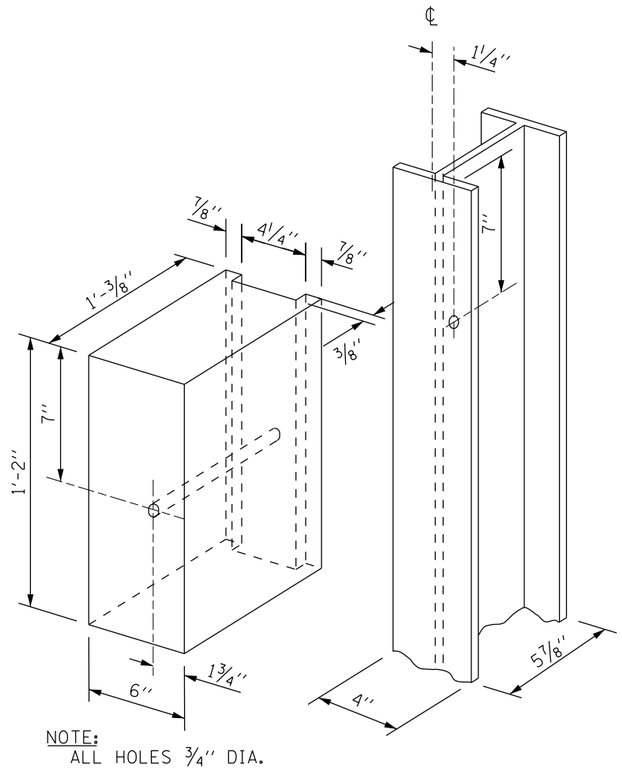


PLAN

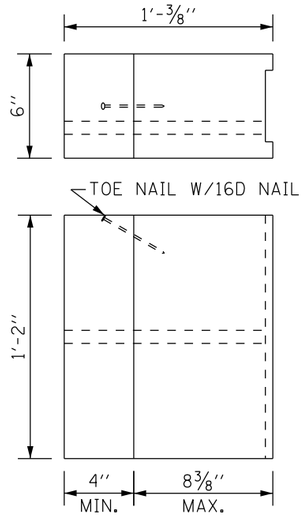


ELEVATION

FOOTING FOR POST WHEN IMPERVIOUS MATERIAL IS ENCOUNTERED



WOOD BLOCK-OUT AND STEEL POST DETAILS



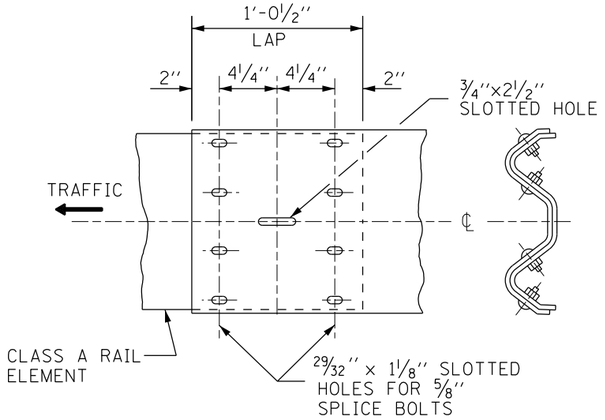
TWO-PIECE WOOD BLOCKOUT OPTION

APPROVED Paul Kovacs CHIEF ENGINEER DATE 7-1-2009

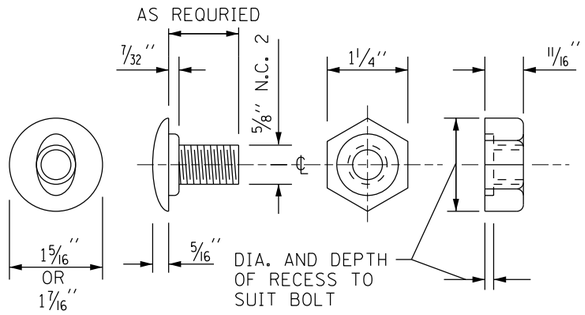
Illinois Tollway

GALVANIZED STEEL PLATE BEAM GUARDRAIL

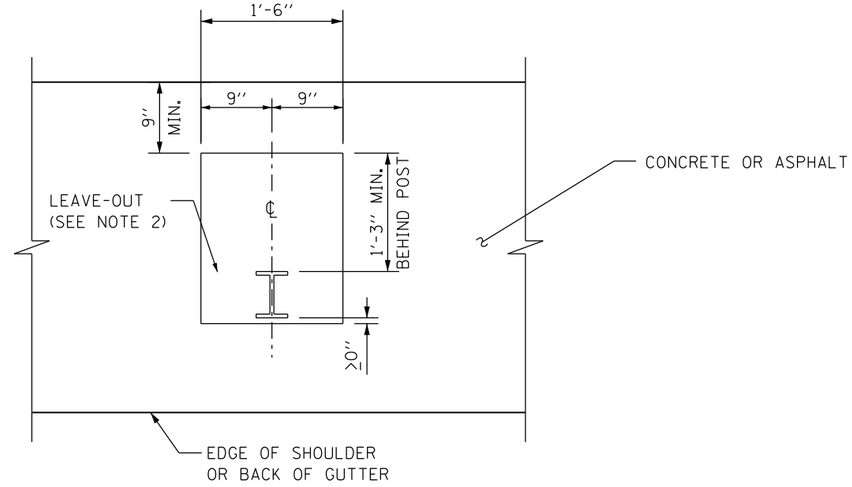
STANDARD C1-07



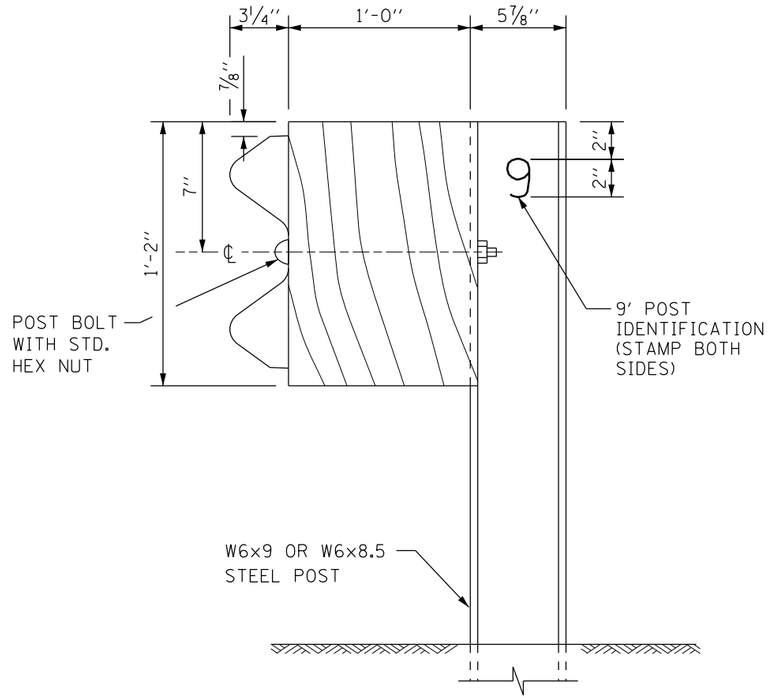
RAIL ELEMENT SPLICE



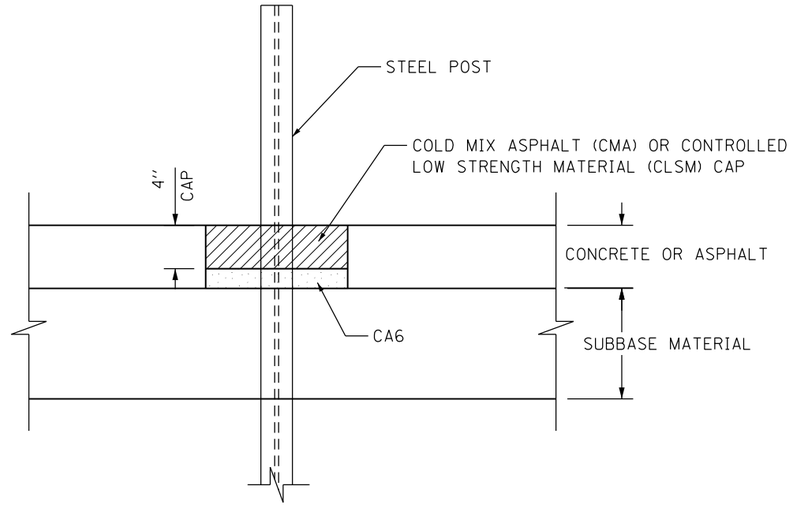
POST OR SPLICE BOLT & NUT



PLAN



STEEL POST CONSTRUCTION



ELEVATION

LEAVE-OUTS

NOTES:

1. CAP SHALL BE INSTALLED TO MATCH THE EXISTING CROSS SLOPE.
2. THE LEAVE-OUT SHALL BE DEFINED AS THE AREA AROUND THE POST THAT IS EITHER OMITTED FROM THE NEW CONSTRUCTION OR REMOVED FROM THE EXISTING CONCRETE OR ASPHALT.

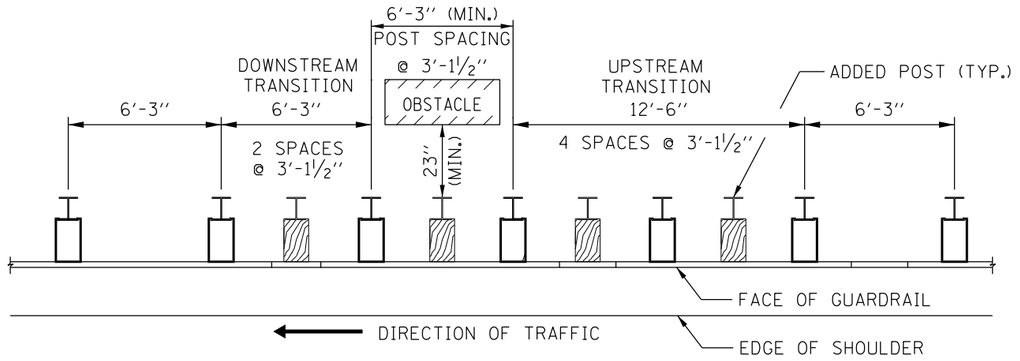
Paul Kovacs
APPROVED ..... DATE 7-1-2009
CHIEF ENGINEER

Illinois Tollway

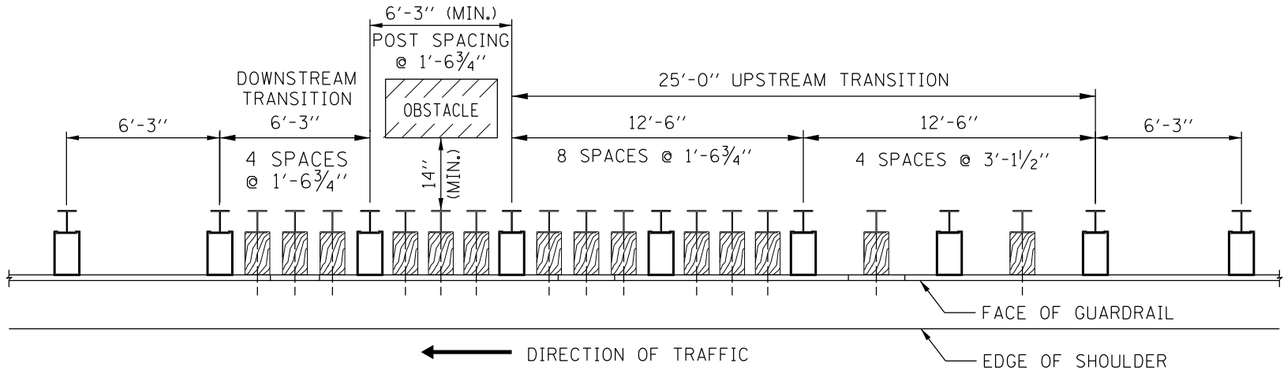
GALVANIZED STEEL PLATE
BEAM GUARDRAIL

STANDARD C1-07

TABLE 2		
BARRIER CLEARANCE DISTANCE		
GUARDRAIL SYSTEM	POST SPACING	MINIMUM BARRIER CLEARANCE DISTANCE
TYPE A	6'-3"	28"
TYPE B 1/2 POST SPACING	3'-1 1/2"	23"
TYPE C 1/4 POST SPACING	1'-6 3/4"	14"



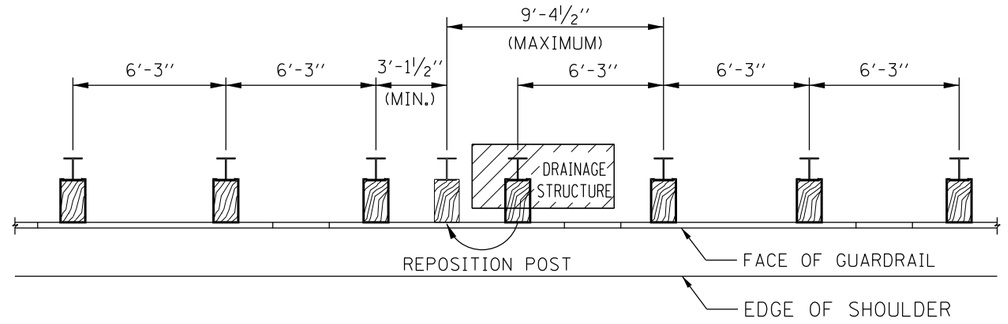
TRANSITION TO 1/2-POST SPACING



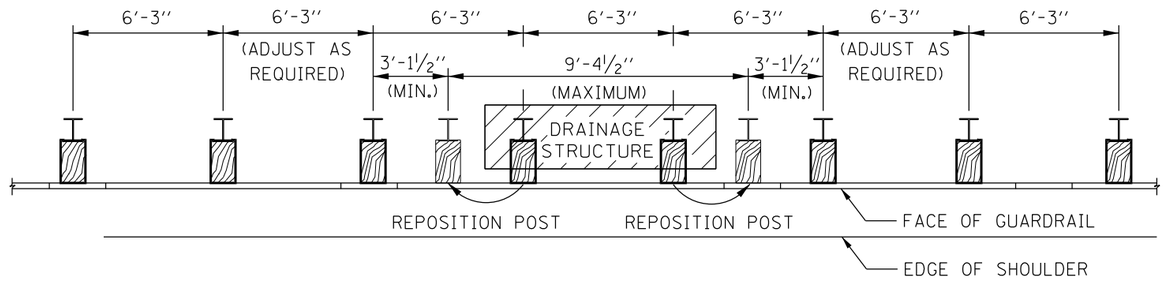
TRANSITION TO 1/4-POST SPACING

NOTE:

WHEN LENGTH OF OBSTACLES IS 1'-3" OR LESS, THE DOWNSTREAM TRANSITION SHALL BE OMITTED.



TYPE A GUARDRAIL-DRAINAGE STRUCTURE CONFLICT
ONE POST



TYPE A GUARDRAIL - DRAINAGE STRUCTURE CONFLICT
TWO POSTS

NOTES:

1. GUARDRAIL POSTS SHALL NOT BE ELIMINATED; ALL POSTS MUST BE USED.
2. GUARDRAIL POSTS SHALL NOT BE SET BACK TO AVOID CONFLICTS WITH A DRAINAGE STRUCTURE.
3. NO MODIFICATIONS OF ANY KIND TO THE TRANSITION POST SPACING ARE ALLOWED.

Paul Kovacs
APPROVED ..... DATE 7-1-2009
CHIEF ENGINEER

Illinois Tollway

GALVANIZED STEEL PLATE
BEAM GUARDRAIL

STANDARD C1-07

RESERVED

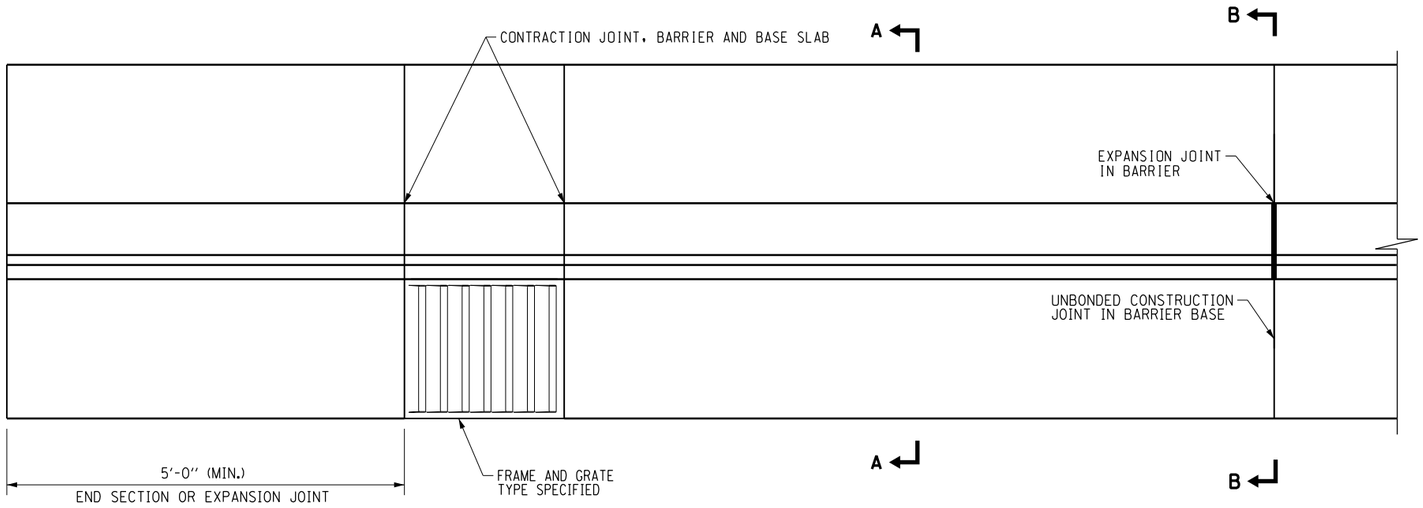
Paul Kovacs
APPROVED . . . . . DATE 3-31-2014
CHIEF ENGINEER

DATE	REVISIONS

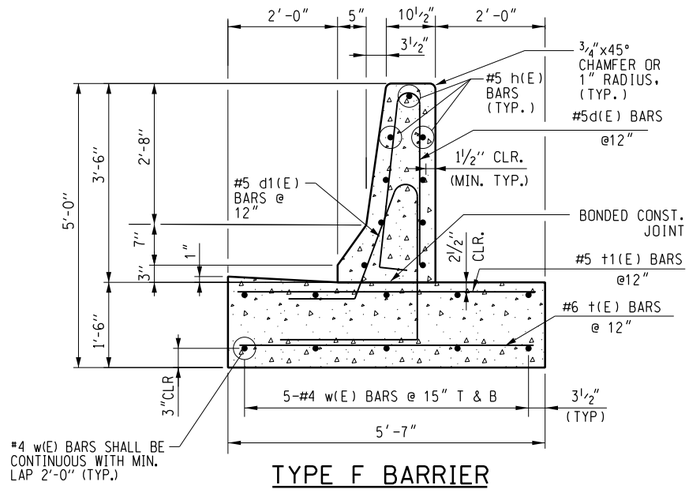
Illinois Tollway

RESERVED

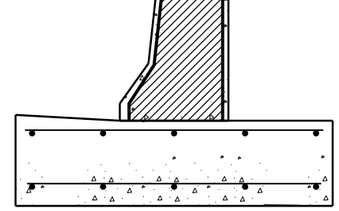
STANDARD C2-00



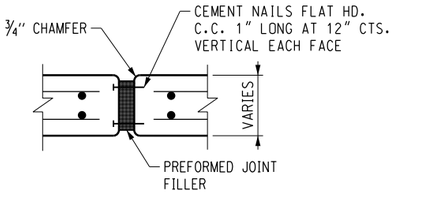
PLAN



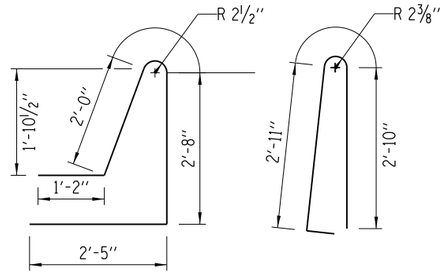
TYPE F BARRIER
SECTION A-A



TYPE F BARRIER
SECTION B-B



EXPANSION JOINT



BAR d1(E) BAR d(E)

BENDING DIAGRAMS

NOTES:

1. TOP SHOULDER EDGE OF BARRIER BASE GUTTER SHALL MATCH THE TOP OF SHOULDER ELEVATION.
2. 1" DEEP CONTRACTION JOINTS SHALL BE CONSTRUCTED IN BOTH THE REINFORCED CONCRETE BARRIER WALL AND BASE. CONTRACTION JOINTS SHALL ALSO BE CONSTRUCTED AT BOTH SIDES OF ALL DRAINAGE STRUCTURES. MAXIMUM JOINT SPACING SHALL BE 30 FEET.
3. THE FORMING OF CONTRACTION JOINTS SHALL BE DONE WITH AN APPROVED FINISHING TOOL OR BY SAWING AT THE DISCRETION OF THE ENGINEER SUBJECT TO THE SATISFACTORY CONTROL OF CRACKING.
4. REINFORCING BARS DESIGNATED "(E)" SHALL BE EPOXY COATED.
5. REINFORCEMENT BENDING DETAILS SHALL BE IN ACCORDANCE WITH THE "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES ", ACI 315, LATEST EDITION.
6. REINFORCEMENT BAR BENDING DIMENSIONS ARE OUT TO OUT.
7. AT DRAINAGE STRUCTURES, CUT FOOTING BARS TO FIT. ADD AN ADDITIONAL SET OF d, d1, t, AND t1 BARS ON EACH SIDE OF THE DRAINAGE STRUCTURE.
8. EXPANSION JOINTS SHALL BE CONSTRUCTED IN BARRIER WALL AT MAXIMUM JOINT SPACING OF 90 FEET. SEE SECTION B-B FOR DETAILS.
9. ANCHOR BOLTS SHALL BE CAST INTO WALL AS SHOWN ON STANDARD C8 WHEN PLANS INDICATE INSTALLATION OF A TRAFFIC BARRIER TERMINAL, TYPE T5.
10. MINIMUM LENGTH OF INSTALLATION SHALL BE 25 FEET.

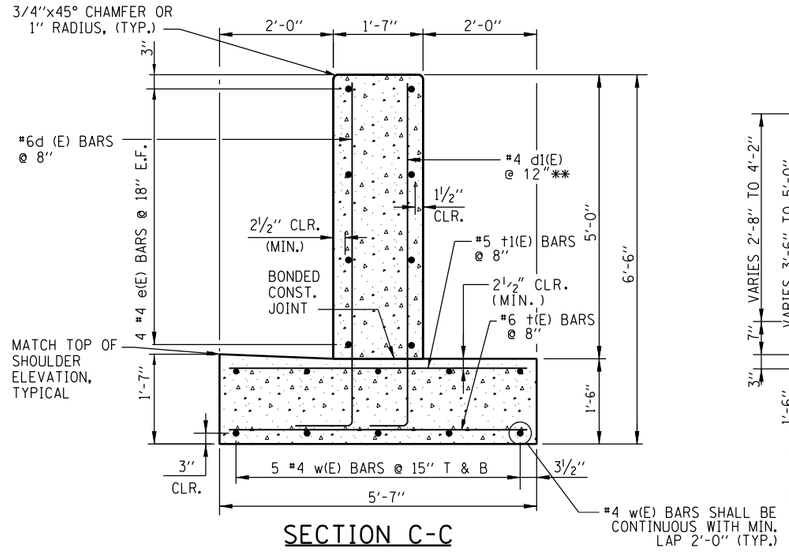
Paul Kovacs
APPROVED ..... DATE 2-7-2012
CHIEF ENGINEER

DATE	REVISIONS
2-7-2012	DELETED TYPE II BARRIER AND
	REVISED REINFORCEMENT BARS
11-1-2012	GUTTER TRANSITION TAPER DETAIL
	NEW JOINT DETAIL, REVISED NOTES
10-1-2013	REVISED REINFORCEMENT BARS, AND
	GUTTER WIDTH
3-31-2014	REDESIGNED FOR TL-4 LOADING

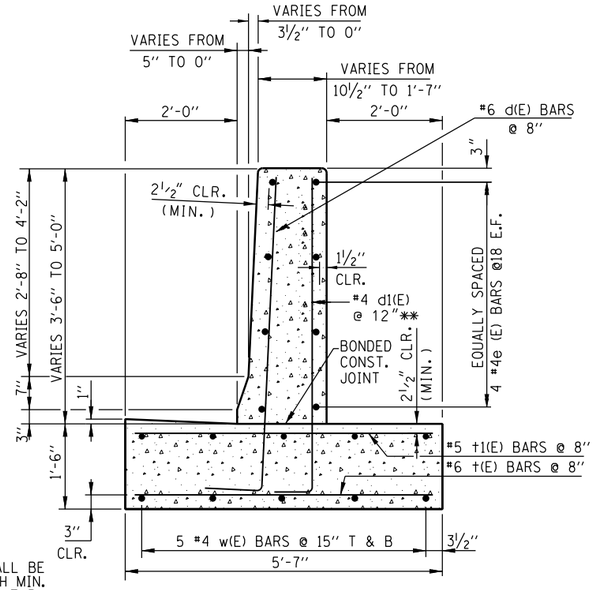
Illinois Tollway

SINGLE FACE REINFORCED CONCRETE BARRIER

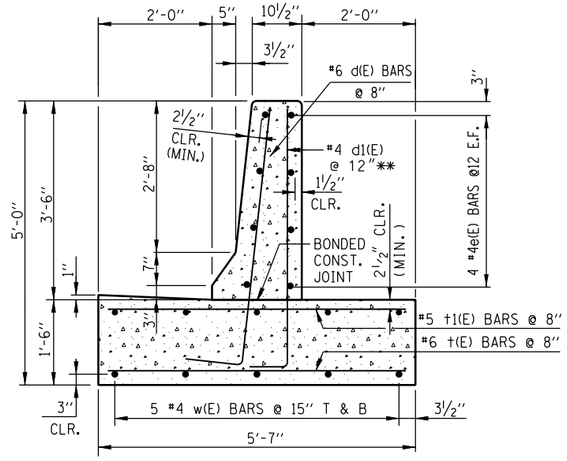
STANDARD C3-04



SECTION C-C

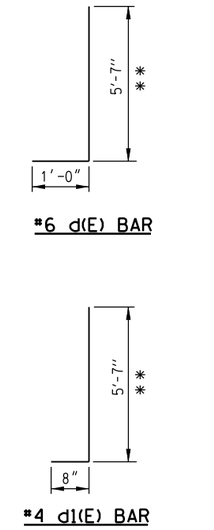


SECTION B-B

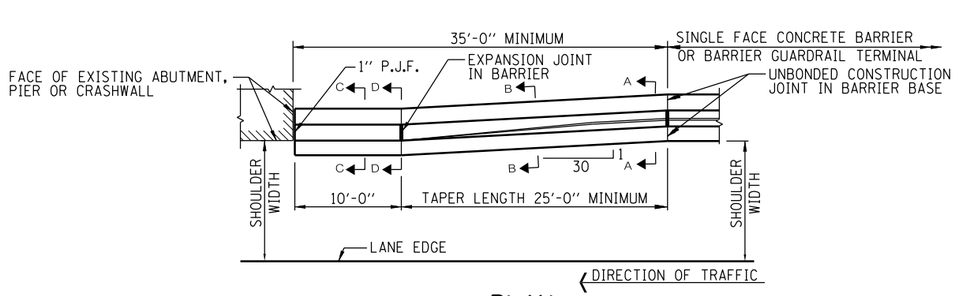


SECTION A-A

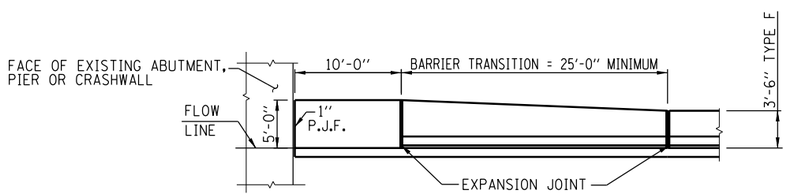
** CUT TO FIT IN FIELD
2" VERTICAL CLR.



BENDING DIAGRAMS

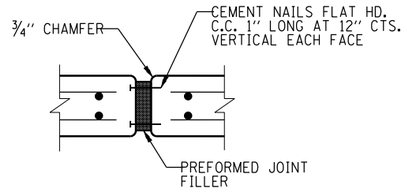


PLAN

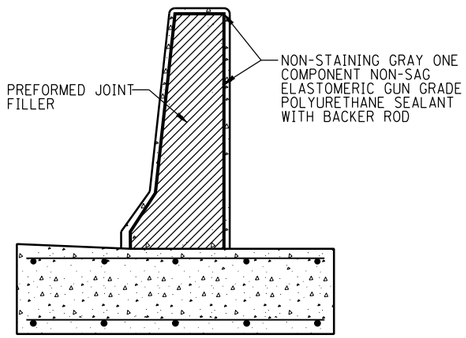


ELEVATION

CONCRETE SHOULDER BARRIER TRANSITION, TYPE F



EXPANSION JOINT



TYPE F BARRIER

SECTION D-D

NOTES:

1. TAPER LENGTH REQUIRED FOR THE WIDTH TRANSITION WILL BE 25'-0" MINIMUM. INCREASE TAPER RATE AS REQUIRED TO OBTAIN THE LENGTH OF 25'-0".
2. TOP SHOULDER EDGE OF BARRIER BASE GUTTER SHALL MATCH THE TOP OF SHOULDER ELEVATION.
3. 1" DEEP CONTRACTION JOINTS SHALL BE CONSTRUCTED IN BOTH THE REINFORCED CONCRETE BARRIER WALL AND BASE. CONTRACTION JOINTS SHALL ALSO BE CONSTRUCTED AT BOTH SIDES OF ALL DRAINAGE STRUCTURES. MAXIMUM JOINT SPACING SHALL BE 30 FEET.
4. THE FORMING OF CONTRACTION JOINTS SHALL BE DONE WITH AN APPROVED FINISHING TOOL OR BY SAWING AT THE DISCRETION OF THE ENGINEER SUBJECT TO THE SATISFACTORY CONTROL OF CRACKING.
5. REINFORCING BARS DESIGNATED "(E)" SHALL BE EPOXY COATED.
6. REINFORCEMENT BENDING DETAILS SHALL BE IN ACCORDANCE WITH THE "MANUAL OF STANDARD PRACTICES FOR DETAILING REINFORCED CONCRETE STRUCTURES", ACI 315, LATEST EDITION.
7. REINFORCEMENT BAR BENDING DIMENSIONS ARE OUT TO OUT.
8. TYPE F BARRIER SHALL BE USED WITH ALL NEW CONSTRUCTION, OR RECONSTRUCTION OF EXISTING BARRIERS.
9. E.F. DENOTES EACH FACE

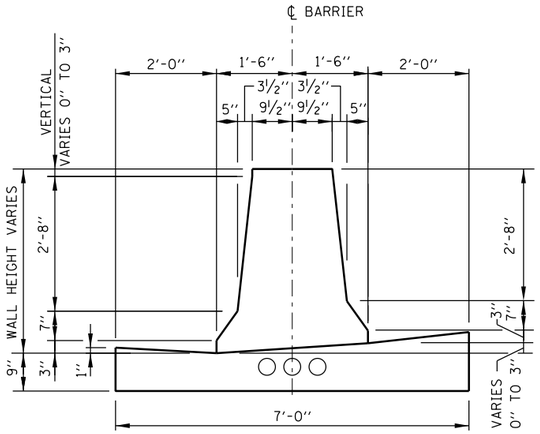
Paul Kovacs
APPROVED ..... CHIEF ENGINEER
DATE 2-7-2012

DATE	REVISIONS
2-7-2012	DELETED SHOULDER BARRIER TRANSITION
	TYPE II, TAPER CHART, REVISED
	REINFMNT. BARS AND REVISED LENGTH
	OF VERTICAL FACE BARRIER WALL.
11-1-2012	INCREASED BARRIER TRASITION, NEW
	JOINT DETAIL
10-1-2013	REVISED REBARS, REBAR LOCATIONS,
	BARRIER BASE THICKNESS AND NOTES
3-31-2014	REDESIGNED FOR TL-4 LOADING

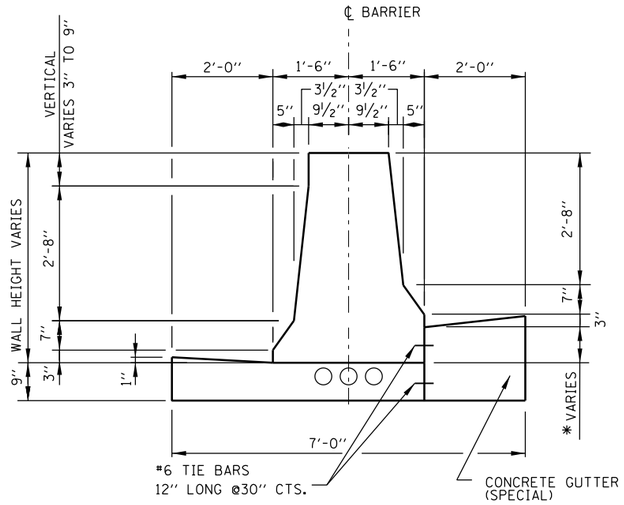
Illinois Tollway

CONCRETE SHOULDER BARRIER TRANSITION

STANDARD C4-04

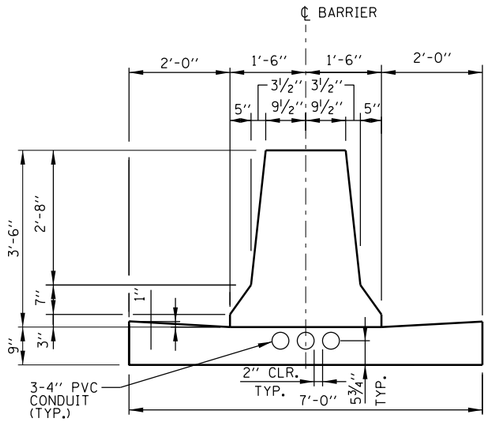


DETAIL A



DETAIL B

* WHEN 6" OR GREATER ADD TOP TIE BAR.



CONCRETE BARRIER, DOUBLE FACE, 42"
CONCRETE BARRIER BASE

CONCRETE BARRIER, DOUBLE FACE, VARIABLE
HEIGHT CONCRETE BARRIER BASE, VARIABLE HEIGHT

NOTES:

1. 2" DEEP CONTRACTION JOINTS SHALL BE CONSTRUCTED IN THE CONCRETE BARRIER WALL AND IN THE CONCRETE BARRIER BASE. CONTRACTION JOINTS SHALL ALSO BE CONSTRUCTED AT BOTH SIDES OF ALL DRAINAGE STRUCTURES. MAXIMUM JOINT SPACING SHALL BE 30'.
2. THE FORMING OF CONTRACTION JOINTS SHALL BE DONE WITH AN APPROVED FINISHING TOOL OR BY SAWING AT THE DISCRETION OF THE ENGINEER SUBJECT TO THE SATISFACTORY CONTROL OF CRACKING.
3. GUTTER PROFILE IN THE VICINITY OF SAG VERTICAL CURVES, ALONG FLAT GRADES AND AT THE MEETING OF PROPOSED AND EXISTING GUTTER, SHALL BE CAREFULLY CONTROLLED AND FIELD ADJUSTED IF NECESSARY TO ENSURE POSITIVE DRAINAGE AND AVOID PONDING.
4. IN AREAS OF RELATIVELY FLAT LONGITUDINAL PROFILE GRADES, THE 3" VERTICAL DIMENSION AT THE BOTTOM OF THE BARRIER CAN VARY FROM 2" TO 3 1/4" TO CREATE AN ACCEPTABLE LONGITUDINAL GRADE IN THE GUTTER.
5. TIE BARS ARE INCIDENTAL TO THE VARIOUS BARRIER & GUTTER ITEMS AND SHALL BE EPOXY COATED.
6. THREE CONDUITS SHALL BE INSTALLED IN THE BARRIER BASE WHETHER ELECTRICAL OR ITS ELEMENTS ARE INCLUDED FOR FUTURE USE.
7. WHEN VARIABLE HEIGHT VERTICAL DIFFERENTIAL EXCEEDS 10" SEE CONSTRUCTION PLANS FOR DETAILS.
8. GUTTER SLOPESHALL BE 4.17% SLOPED TOWARD THE MEDIAN UNLESS OTHERWISE NOTED. GUTTER SLOPE IS REVERSE PITCHED IN SUPERELEVATED SECTIONS. †RANSITION GUTTER SLOPE OVER 30'. GUTTER SLOPE TRANSITIONS ARE INCLUDE IN THE COST OF CONCRETE GUTTER (SPECIAL). SEE ROADWAY PLANS FOR LIMITS OR REVERSE PICHED GUTTER AND TRANSITIONS.

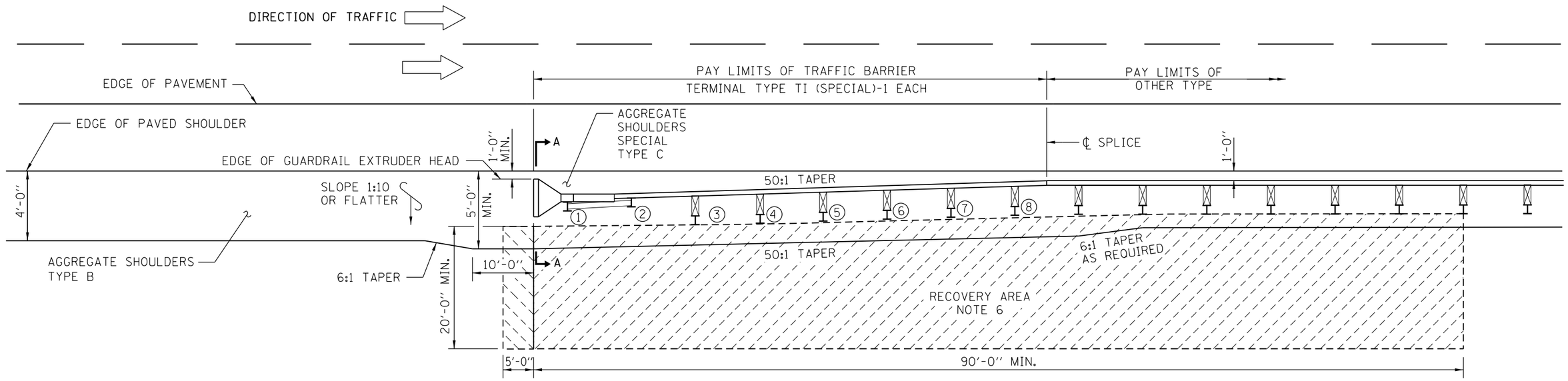
Paul Kovacs
APPROVED ..... CHIEF ENGINEER
DATE 2-7-2012

Illinois Tollway

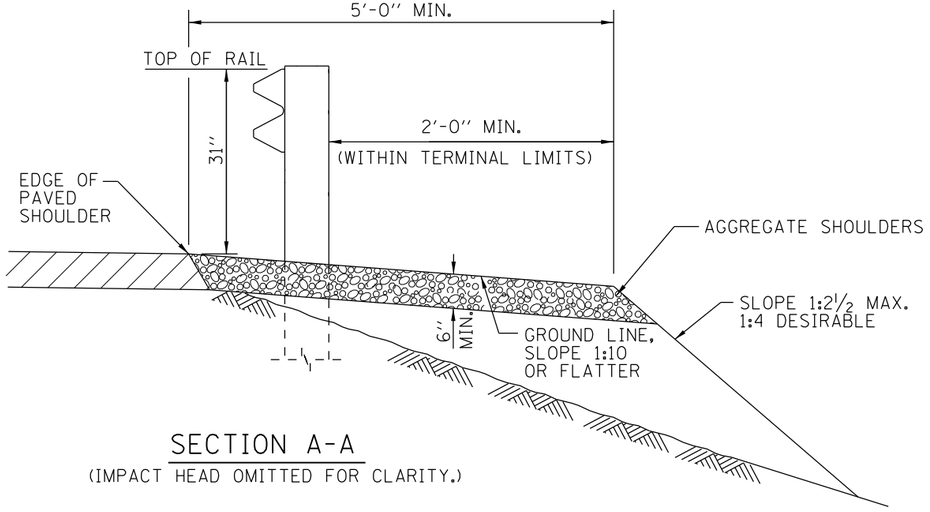
DATE	REVISIONS
2-7-2012	ADDED CONDUITS TO BARRIER BASE.
11-1-2012	ADDED GUTTER TRANSITION TAPER
	DETAIL AND NEW JOINT DETAIL.
3-31-2014	MODIFIED BARRIER BASE.

CONCRETE BARRIER BASE AND CONCRETE BARRIER, DOUBLE FACE, 42" AND VARIABLE HEIGHT

STANDARD C5-03



SHOULDER WIDENING TRANSITION-WITHOUT GUTTER FOR TRAFFIC BARRIER TERMINAL TYPE T1 (SPECIAL)



SECTION A-A

(IMPACT HEAD OMITTED FOR CLARITY.)

NOTE FOR INSTALLATION ON TANGENT ROADWAY:

TRAFFIC BARRIER TERMINAL SHALL BE INSTALLED AT A 50:1 TAPER MEASURED FROM EDGE OF TRAVELED WAY.

NOTE FOR INSTALLATION ON CURVED ROADWAY:

THE EDGE OF THE TERMINAL EXTRUDER HEAD SHALL BE OFFSET A DISTANCE FROM A POINT ON THE BACK OF THE CURVED EDGE OF PAVED SHOULDER AS SHOWN IN TABLE 1.

GENERAL NOTES:

1. ALL SLOPE RATIOS ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT (V:H).
2. THE TYPE T1 (SPECIAL) TERMINAL IS THE UPSTREAM END SECTION OF A GALVANIZED STEEL PLATE BEAM GUARDRAIL BARRIER SYSTEM.
3. REFERENCE STANDARD B28 FOR GUTTER TRANSITION AT TRAFFIC BARRIER TERMINAL TYPE T1 (SPECIAL).
4. UNDER NO CIRCUMSTANCES SHALL AN EXISTING TERMINAL, THAT WAS DESIGNED USING A PREVIOUS STANDARD, BE ATTACHED TO OR MODIFIED IN ANYWAY FROM ITS ORIGINAL DESIGN. IF ANY MODIFICATION IS REQUIRED AND A PROPER BARRIER WARRANT HAS BEEN COMPLETED, THE ENTIRE BARRIER INSTALLATION SHALL BE COMPLETELY REMOVED AND REPLACED WITH A NEW SYSTEM THAT CONFORMS TO THE CURRENT STANDARD.
5. TRAFFIC BARRIER TERMINAL SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S DETAILS AND SPECIFICATIONS.
6. NO ROADSIDE OBSTRUCTION OF ANY TYPE-FIXED OR BREAKAWAY, EITHER TEMPORARY OR PERMANENT SHALL BE ALLOWED WITHIN THIS RECOVERY AREA.
7. NO CURVED W-BEAM SECTIONS ARE PERMITTED WITHIN THE TERMINAL PAY LIMITS. THE TRAFFIC BARRIER TERMINAL TYPE T1 (SPECIAL) SHALL BE LAID OUT IN A STRAIGHT LINE.
8. TERMINAL POSTS SHALL NOT BE INSTALLED IN CONCRETE OR HMA. WHEN NECESSARY USE LEAVE-OUT DETAIL SHOWN ON STANDARD C1.
9. THE TERMINAL SYSTEM HAS BEEN PERFORMANCE-TESTED FOR CRASHWORTHINESS UNDER PROCEDURES DEFINED IN THE NATIONAL COOPERATIVE HIGHWAY RESEARCH REPORT (NCHRP) REPORT 350. NO MODIFICATION TO THIS STANDARD DRAWING SHALL BE PERMITTED.

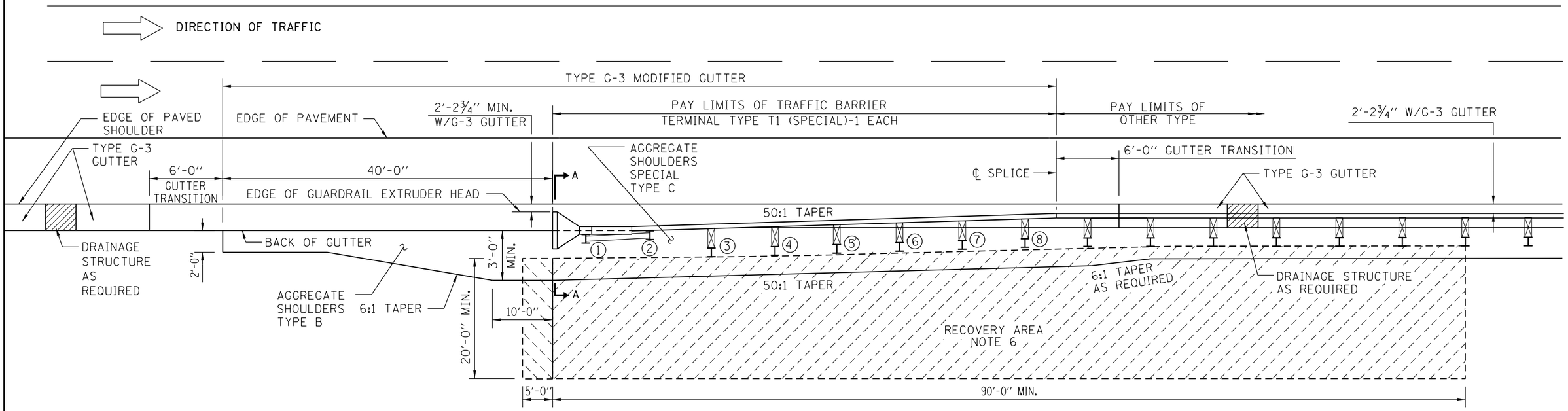
APPROVED Paul Kovacs CHIEF ENGINEER DATE 7-1-2009

Illinois Tollway

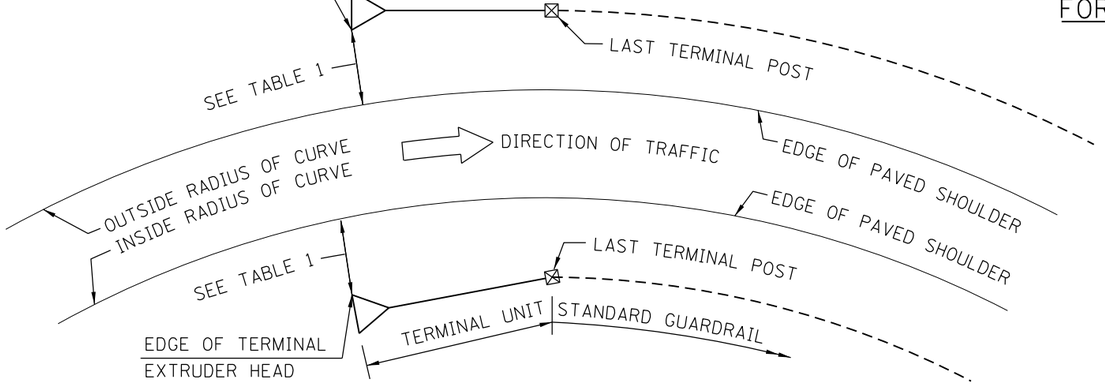
	REVISIONS
3-1-2013	TERMINAL CHANGED TO ALL STEEL POST SYSTEM, REVISED TERMINAL PAY LIMITS.
3-31-2014	REVISED RECOVERY AREA DIMENSION.

SHOULDER WIDENING FOR TRAFFIC BARRIER TERMINAL TYPE T1 (SPECIAL)

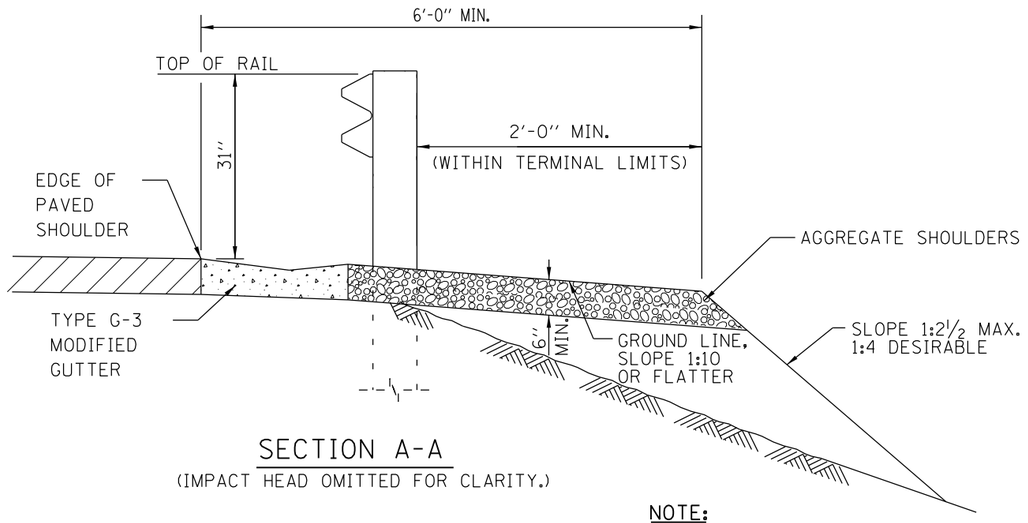
STANDARD C6-06



SHOULDER WIDENING TRANSITION-WITH GUTTER, TYPE G-3 FOR TRAFFIC BARRIER TERMINAL TYPE T1 (SPECIAL)



CURVED ROADWAY TRAFFIC BARRIER TERMINAL PLACEMENT



SECTION A-A

(IMPACT HEAD OMITTED FOR CLARITY.)

NOTE:

SEE SHEET 1 OF THIS SERIES FOR NOTES.

TABLE 1		
LATERAL OFFSET DIMENSION TO EDGE OF TERMINAL EXTRUDER HEAD		
	INSIDE RADIUS OF CURVE	OUTSIDE RADIUS OF CURVE
NO GUTTER	1'-0"	1'-0" MIN. *
TYPE G-2 GUTTER	1'-2¾"	1'-2¾" MIN. *
TYPE G-3 GUTTER	2'-2¾"	2'-2¾" MIN. *

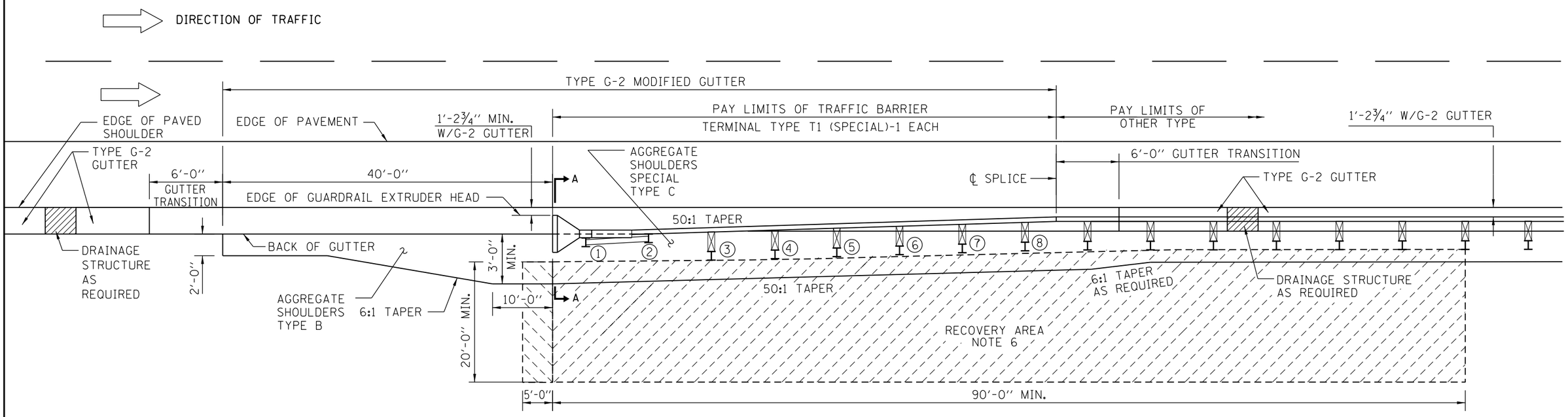
(*) OFFSET DISTANCE WILL VARY BASED ON RADIUS OF HORIZONTAL CURVE AND THE TERMINAL BEING INSTALLED IN A STRAIGHT LINE.

Paul Kovacs
APPROVED ..... CHIEF ENGINEER
DATE 7-1-2009

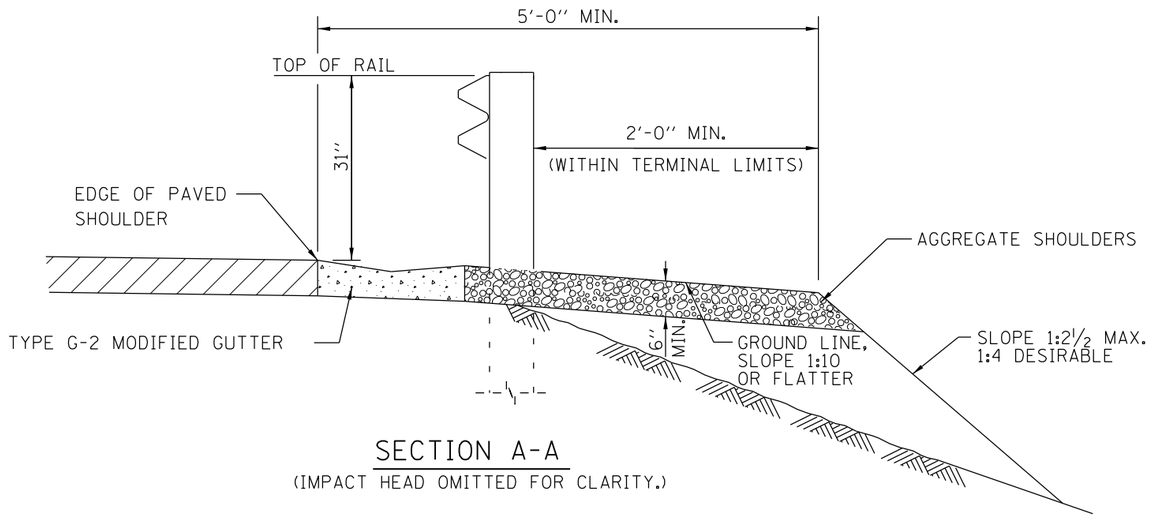
Illinois Tollway

SHOULDER WIDENING FOR TRAFFIC BARRIER TERMINAL TYPE T1 (SPECIAL)

STANDARD C6-06



SHOULDER WIDENING TRANSITION-WITH GUTTER, TYPE G-2 FOR TRAFFIC BARRIER TERMINAL TYPE T1 (SPECIAL)



SECTION A-A

(IMPACT HEAD OMITTED FOR CLARITY.)

NOTE:

SEE SHEET 1 OF THIS SERIES FOR NOTES.

Paul Kovacs

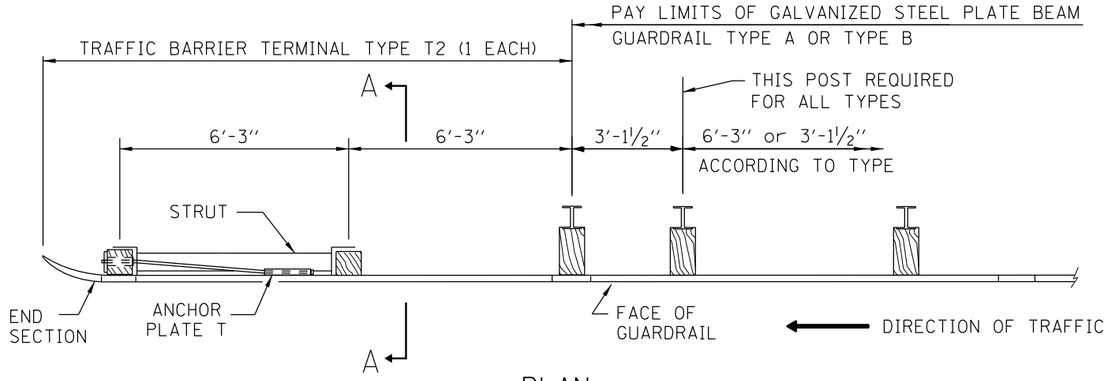
APPROVED ..... DATE 7-1-2009

CHIEF ENGINEER

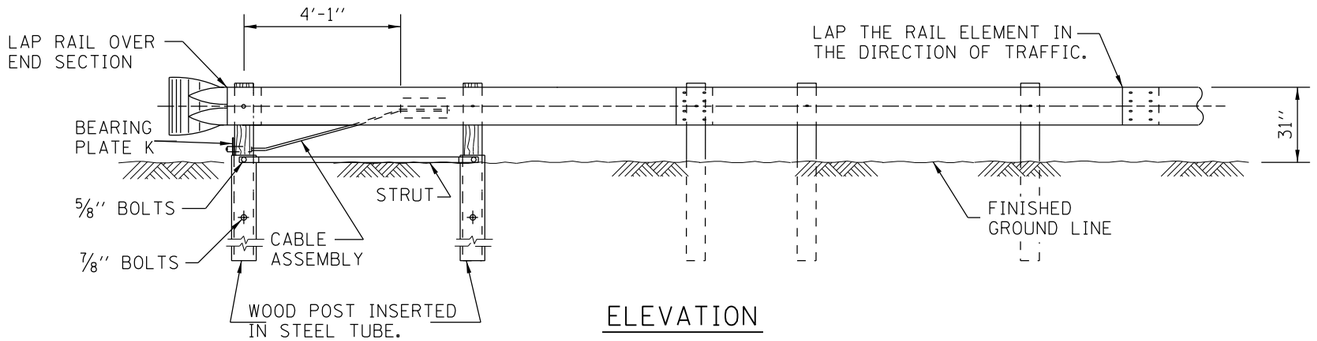
Illinois Tollway

SHOULDER WIDENING FOR TRAFFIC BARRIER TERMINAL TYPE T1 (SPECIAL)

STANDARD C6-06

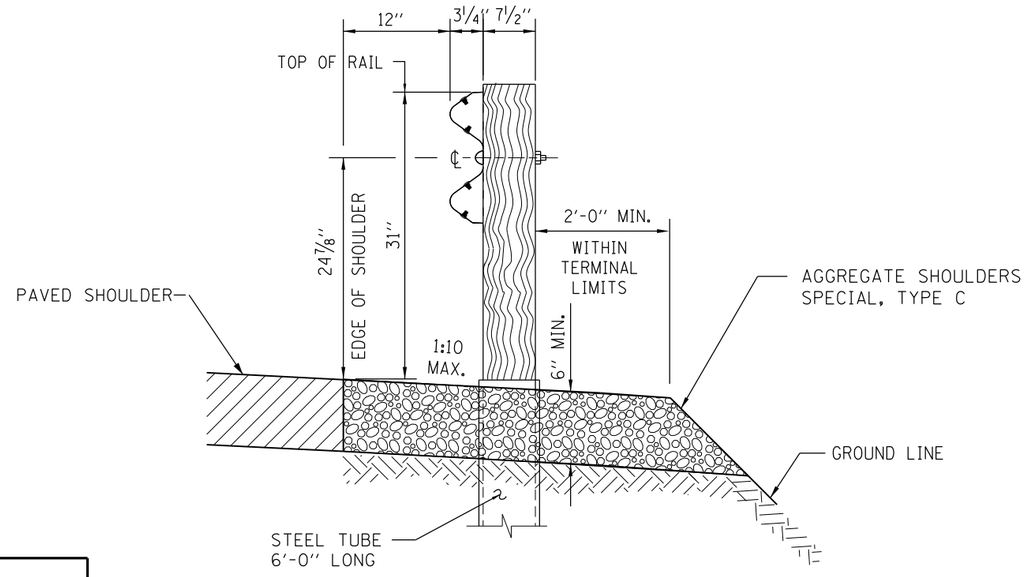


PLAN



ELEVATION

TRAFFIC BARRIER TERMINAL TYPE T2-WITHOUT GUTTER



SECTION A-A

NOTES:

1. SEE STANDARD C1 FOR DETAILS OF GUARDRAIL NOT SHOWN.
2. THE BEARING PLATE K SHALL BE HELD IN POSITION BY TWO 8D NAILS DRIVEN INTO THE POST AND BENT OVER THE TOP OF THE PLATE.
3. THE TYPE T2 TERMINAL IS TYPICALLY UTILIZED FOR THE DEPARTING END SECTION OF A GALVANIZED STEEL PLATE BEAM GUARDRAIL BARRIER SYSTEM.
4. UNDER NO CIRCUMSTANCES SHALL AN EXISTING TERMINAL, THAT WAS DESIGNED USING A PREVIOUS STANDARD, BE ATTACHED TO OR MODIFIED IN ANYWAY FROM ITS ORIGINAL DESIGN. IF ANY MODIFICATION IS REQUIRED AND A PROPER BARRIER WARRANT HAS BEEN COMPLETED, THE ENTIRE BARRIER INSTALLATION SHALL BE COMPLETELY REMOVED AND REPLACED WITH A NEW SYSTEM THAT CONFORMS TO THE CURRENT STANDARD.
5. TRAFFIC BARRIER TERMINAL SHALL BE IN ACCORDANCE WITH THE TOLLWAY'S DETAILS AND SPECIFICATIONS. NO MODIFICATIONS SHALL BE PERMITTED.
6. TERMINAL POSTS SHALL NOT BE INSTALLED IN CONCRETE OR ASPHALT PAVEMENT. WHEN NECESSARY USE LEAVE-OUT DETAIL PER STANDARD C1.
7. WHERE GUTTERS SUCH AS TYPE G-2 ,G-3 ARE REQUIRED IN FRONT OF THE GUARDRAIL, THE POSTS SHALL BE LOCATED 6" BEHIND THE GUTTER, OR AS OTHERWISE DETAILED IN THE PLANS. THE OFFSET FROM THE EDGE OF SHOULDER TO THE FACE OF THE GUARDRAIL SHALL BE AS SHOWN ON STANDARD B28.

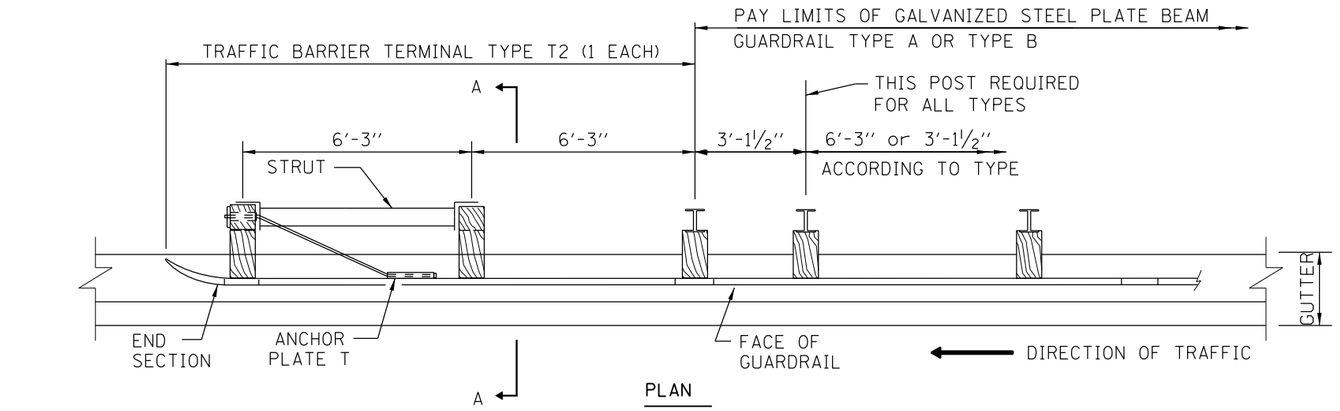
Paul Kovacs
APPROVED ..... DATE 7-1-2009
CHIEF ENGINEER

Illinois Tollway

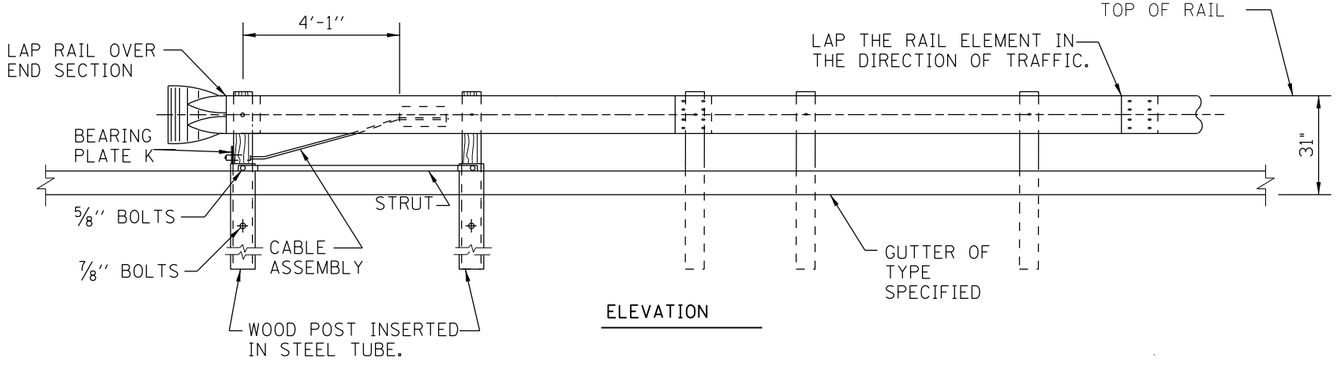
	REVISIONS
2-7-2012	REVISED DIMENSIONS OF BEARING PLATE, POST, CABLE STRUT AND TUBE, AND NOTES
11-1-2012	MODIFIED AGGREGATE SHOULDERS, REVISED WOOD POST DIMENSION
3-31-2014	REVISED NOTES.

TRAFFIC BARRIER TERMINAL, TYPE T2

STANDARD C7-05

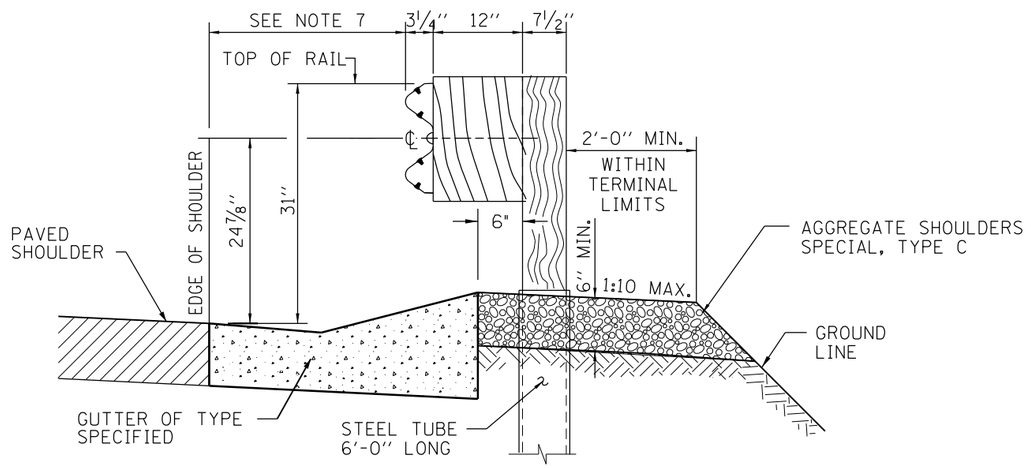


PLAN



ELEVATION

TRAFFIC BARRIER TERMINAL TYPE T2-WITH GUTTER



SECTION A-A

NOTE:

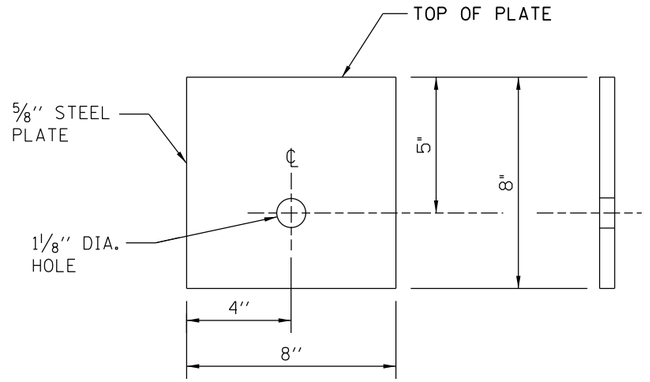
SEE SHEET 1 OF THIS SERIES FOR NOTES.

Paul Kovacs
APPROVED ..... DATE 7-1-2009
CHIEF ENGINEER

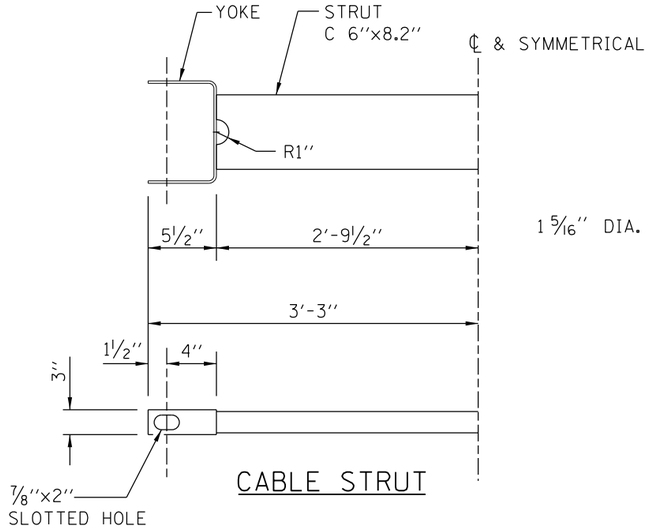
Illinois Tollway

TRAFFIC BARRIER TERMINAL, TYPE T2

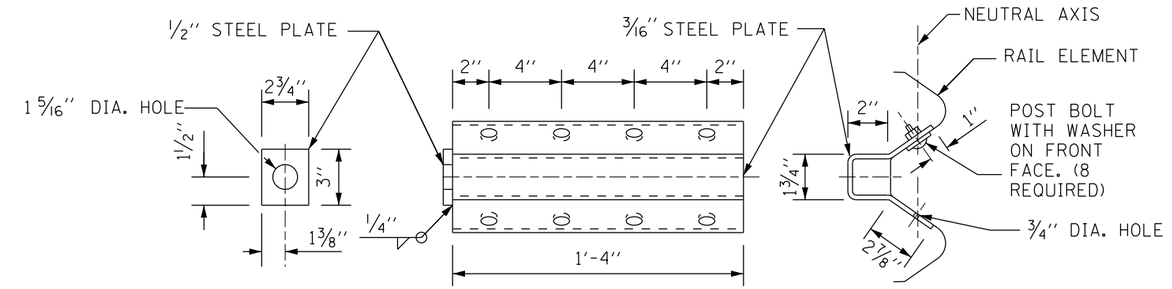
STANDARD C7-05



BEARING PLATE K



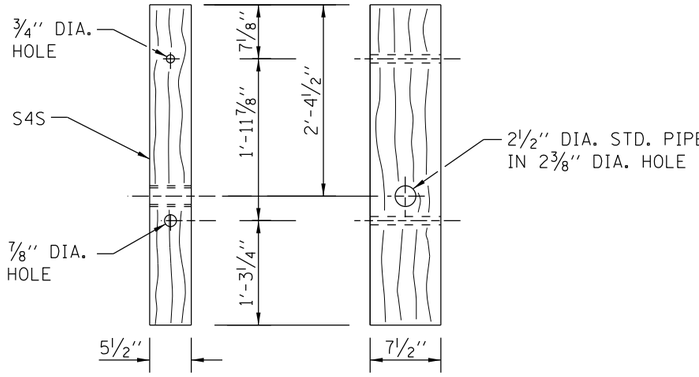
CABLE STRUT



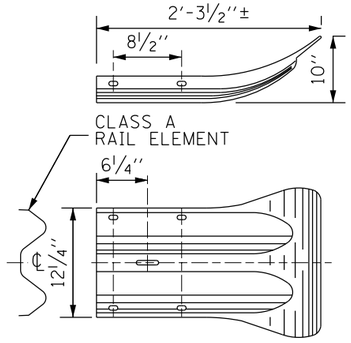
NOTE:

ANCHOR PLATE T SHALL BE USED TO ATTACH CABLE ASSEMBLY TO GUARDRAIL WHEN REQUIRED ON TRAFFIC BARRIER TERMINALS.

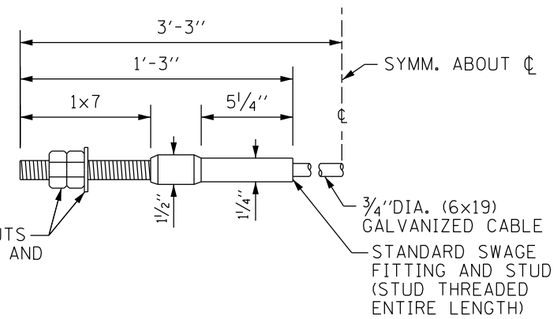
ANCHOR PLATE T DETAILS



WOOD POST

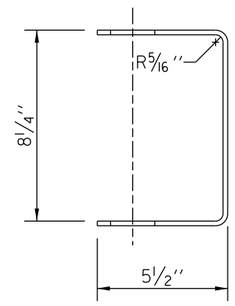


END SECTION



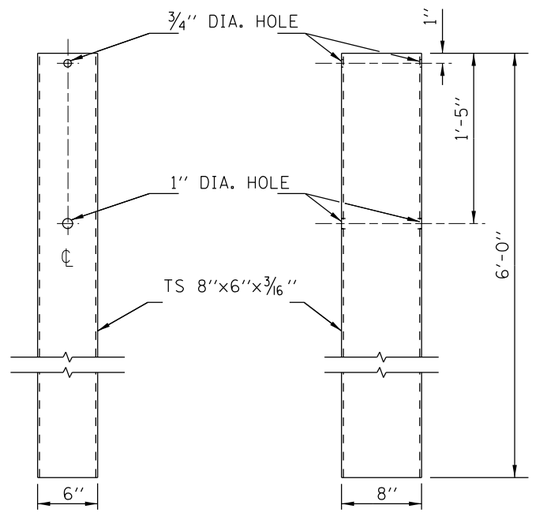
CABLE ASSEMBLY

(40,000 LBS.) MIN. BREAKING STRENGTH)
TIGHTEN TO TAUT TENSION.



YOKE

3/16'' THICK STEEL



FRONT SIDE

STEEL TUBE

NOTE:

SEE SHEET 1 OF THIS SERIES FOR NOTES.

APPROVED Paul Kovacs CHIEF ENGINEER DATE 7-1-2009

Illinois Tollway

TRAFFIC BARRIER TERMINAL, TYPE T2

STANDARD C7-05

RESERVED

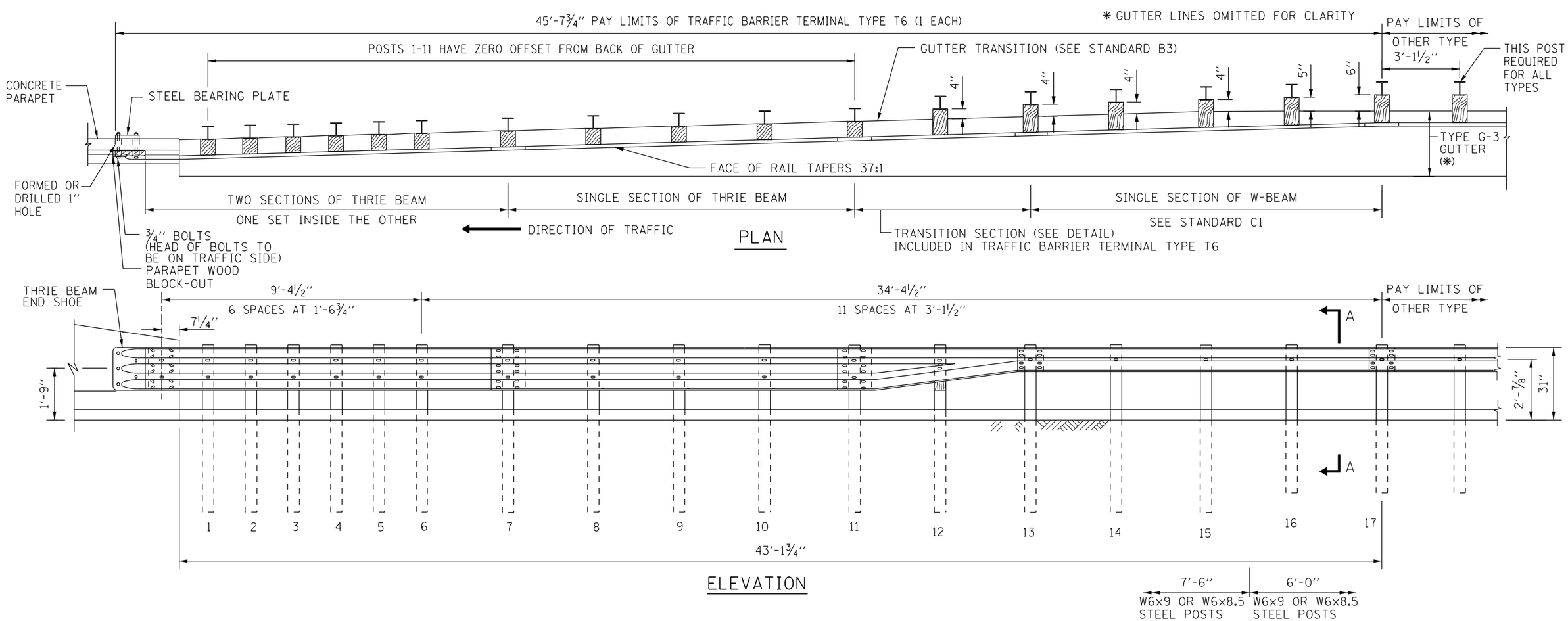
Paul Kovacs
APPROVED . . . . . DATE 3-31-2014
CHIEF ENGINEER

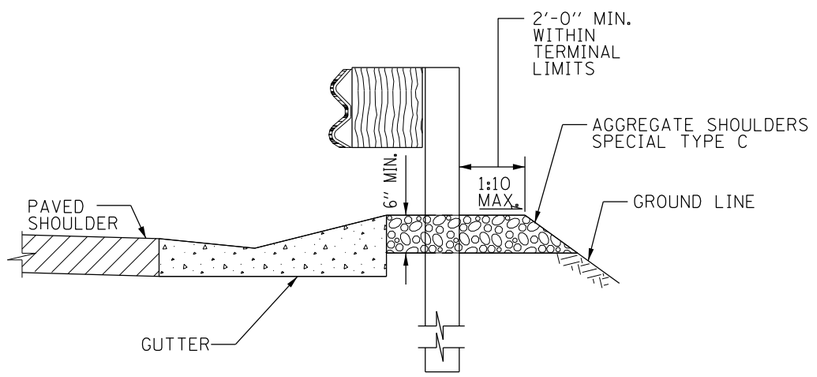
	REVISIONS

Illinois Tollway

RESERVED

STANDARD C8-00





WITH TYPE G-3 GUTTER

SECTION A-A

NOTES:

1. SEE STANDARD C1 FOR DETAILS OF GUARDRAIL NOT SHOWN.
2. THRIE BEAM RAIL SHALL BE BOLTED TO BLOCK-OUT AT ALL POSTS.
3. ALL SLOPE RATIOS ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT (V:H).
4. THE TYPE T6 TERMINAL IS TYPICALLY UTILIZED TO ATTACH GALVANIZED STEEL PLATE BEAM GUARDRAIL AT THE UPSTREAM END OF THE BRIDGES CONCRETE PARAPET, WHERE A ROADSIDE GUTTER IS TO BE INSTALLED.
5. SEE STANDARD B3 FOR GUTTER TRANSITION AT TRAFFIC BARRIER TERMINAL TYPE T6.
6. UNDER NO CIRCUMSTANCES SHALL AN EXISTING TERMINAL, THAT WAS DESIGNED USING A PREVIOUS STANDARD, BE ATTACHED TO OR MODIFIED IN ANYWAY FROM ITS ORIGINAL DESIGN. IF ANY MODIFICATION IS REQUIRED AND A PROPER WARRANT HAS BEEN COMPLETED, THE ENTIRE BARRIER INSTALLATION SHALL BE COMPLETELY REMOVED AND REPLACED WITH A NEW SYSTEM THAT COMFORMS TO THE CURRENT STANDARD.
7. TRAFFIC BARRIER TERMINAL SHALL BE IN ACCORDANCE WITH THE TOLLWAY'S DETAILS AND SPECIFICATIONS. NO MODIFICATIONS SHALL BE PERMITTED.
8. TERMINAL POSTS SHALL NOT BE INSTALLED IN CONCRETE OR ASPHALT PAVEMENTS. WHEN NECESSARY USE LEAVE-OUT DETAIL PER STANDARD C1.
9. TERMINAL POSTS TO BE INSTALLED PERPENDICULAR TO BACK OF GUTTER.
10. THE TERMINAL SYSTEM HAS BEEN PERFORMANCE-TESTED FOR CASHWORTHINESS UNDER PROCEDURES DEFINED IN THE NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM (NCHRP) REPORT 350. NO MODIFICATION TO THIS STANDARD DRAWING SHALL BE PERMITTED.
11. TERMINAL BARRIER CLEARANCE DISTANCE SHALL CONFORM WITH TABLE 2 ON STANDARD C1.
12. LEAVE-OUT DIMENSION BEHIND POSTS 1-6, SHALL BE A MINIMUM OF 4''.

FOR PARAPET (SAFETY FACE)
WITH TYPE G-3 GUTTER

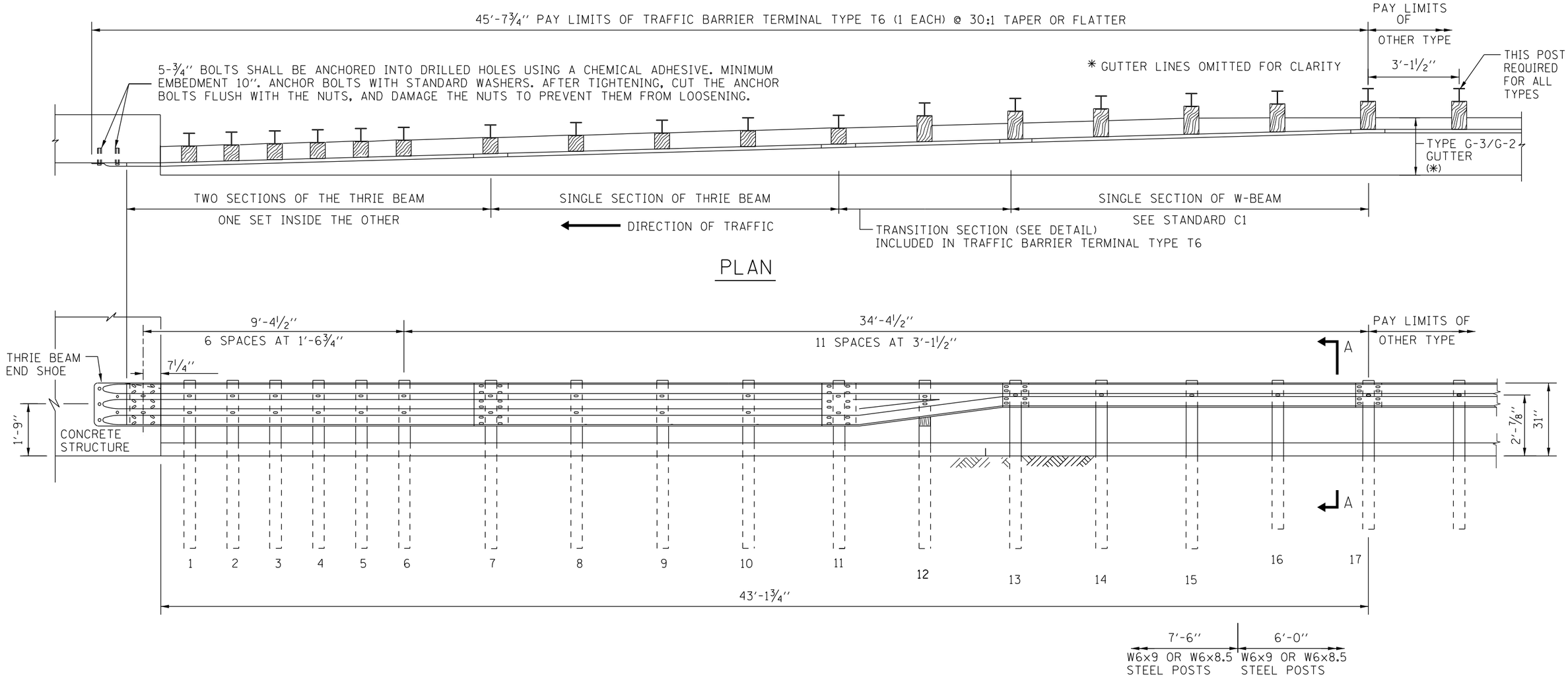
Paul Kovacs
APPROVED ..... DATE 7-1-2009
CHIEF ENGINEER

Illinois Tollway

REVISIONS	
2-7-2012	REVISED BOLT NOTES, ANCHORAGE ADHESIVE AND REVISED NOTES.
11-1-2012	MODIFIED AGGREGATE SHOULDERS, REVISED NOTES.
3-31-2014	REVISED NOTES.

TRAFFIC BARRIER TERMINAL, TYPE T6

STANDARD C9-05



FOR OTHER CONCRETE STRUCTURE (VERTICAL FACE) WITH TYPE G-3/G-2 GUTTER

NOTE:

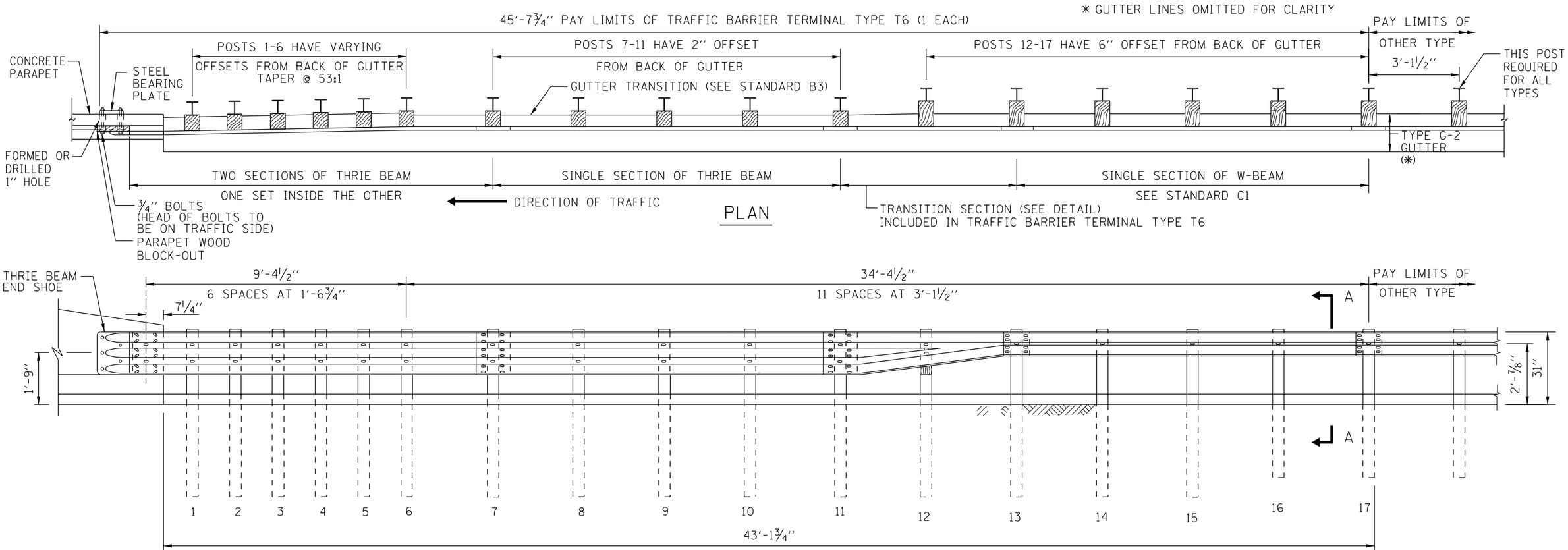
SEE SHEET 1 OF THIS SERIES FOR NOTES.

Paul Kovacs
APPROVED . . . . . DATE 7-1-2009
CHIEF ENGINEER

Illinois Tollway

TRAFFIC BARRIER TERMINAL, TYPE T6

STANDARD C9-05



NOTE:

SEE SHEET 1 OF THIS SERIES FOR NOTES.

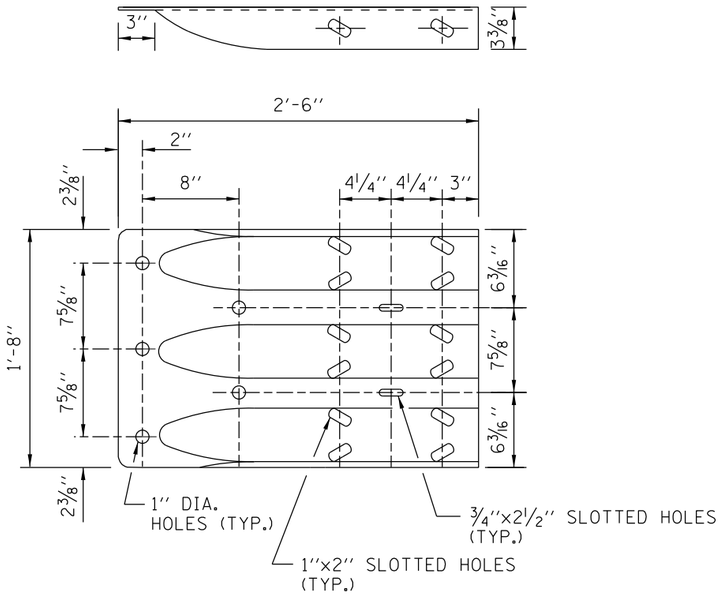
FOR PARAPET (SAFETY FACE)
WITH TYPE G-2 GUTTER

Paul Kovacs
APPROVED ..... DATE 7-1-2009
CHIEF ENGINEER

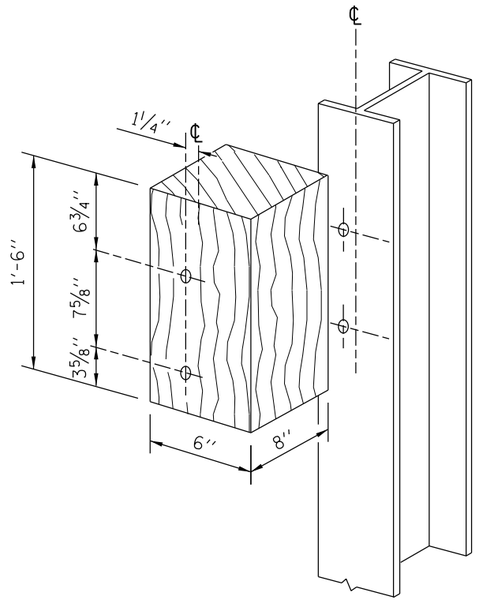
Illinois Tollway

TRAFFIC BARRIER TERMINAL, TYPE T6

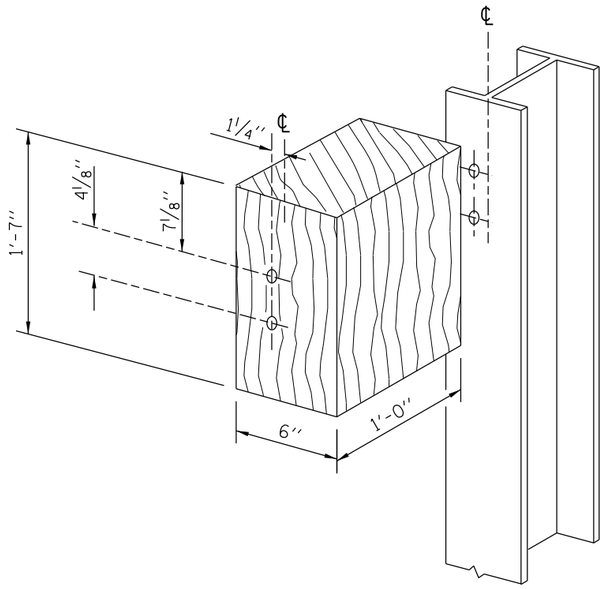
STANDARD C9-05



THRIE BEAM END SHOE DETAIL

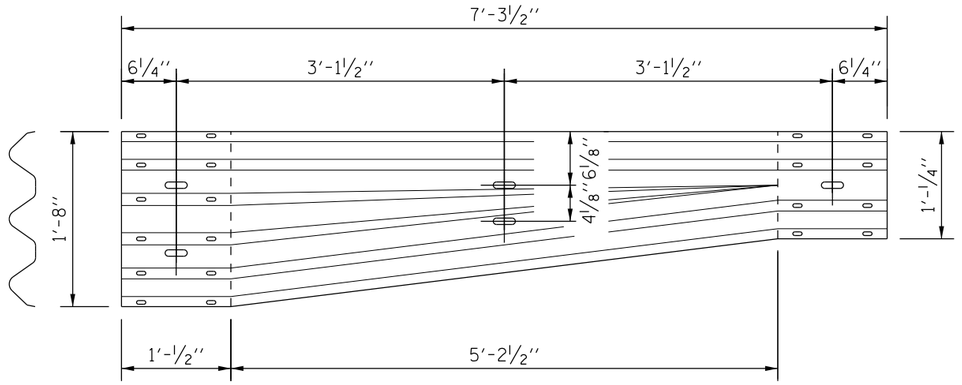


POSTS 1-11 WOOD BLOCKOUT DETAIL



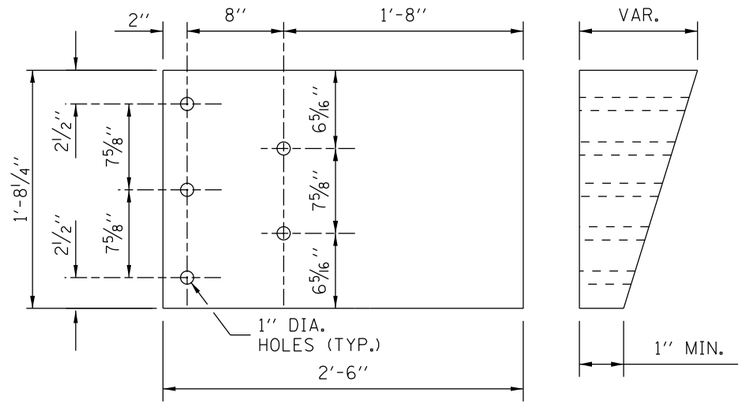
POST 12 WOOD BLOCKOUT DETAIL

(SEE STANDARD C1 FOR POST 13-17 BLOCKOUTS.)

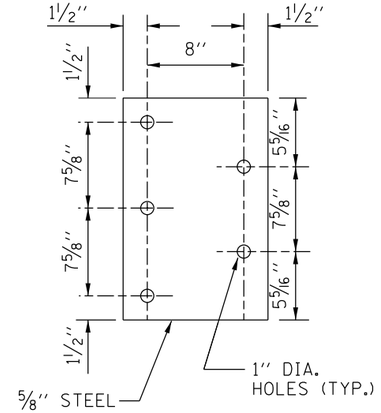


TRANSITION SECTION

(10 GUAGE RAIL ELEMENT)



PARAPET WOOD BLOCK-OUT DETAIL



PARAPET STEEL BEARING PLATE DETAIL

(5 EACH INDIVIDUAL 5''x5''x5/8'' STEEL PLATES WITH CENTERED 1'' HOLES MAY BE SUBSTITUTED FOR THE PLATE SHOWN.)

NOTE:

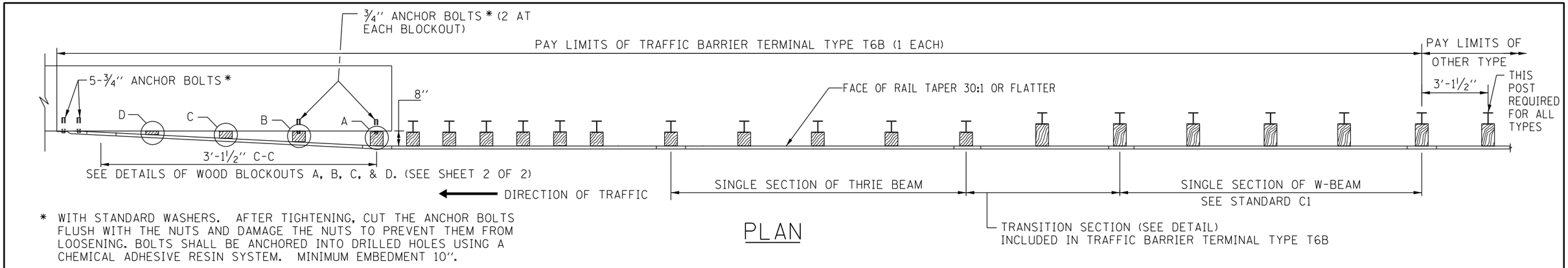
SEE SHEET 1 OF THIS SERIES FOR NOTES.

Paul Kovacs
APPROVED ..... DATE 7-1-2009
CHIEF ENGINEER

Illinois Tollway

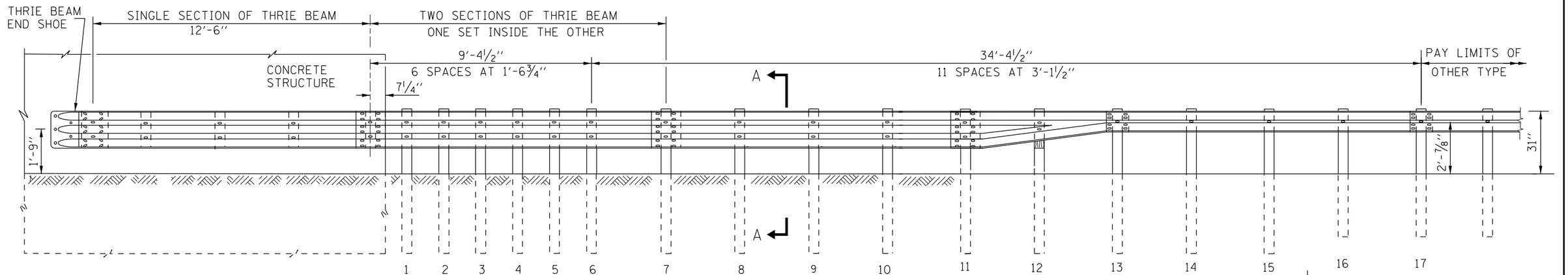
TRAFFIC BARRIER TERMINAL, TYPE T6

STANDARD C9-05

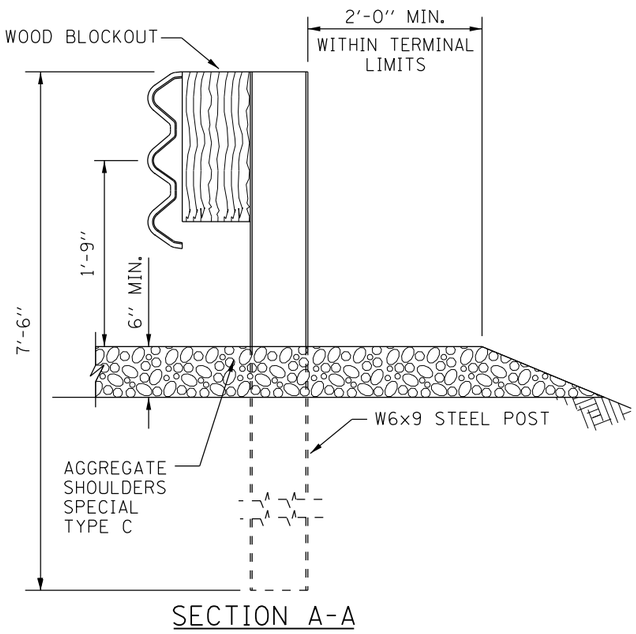


* WITH STANDARD WASHERS. AFTER TIGHTENING, CUT THE ANCHOR BOLTS FLUSH WITH THE NUTS AND DAMAGE THE NUTS TO PREVENT THEM FROM LOOSENING. BOLTS SHALL BE ANCHORED INTO DRILLED HOLES USING A CHEMICAL ADHESIVE RESIN SYSTEM. MINIMUM EMBEDMENT 10''.

PLAN



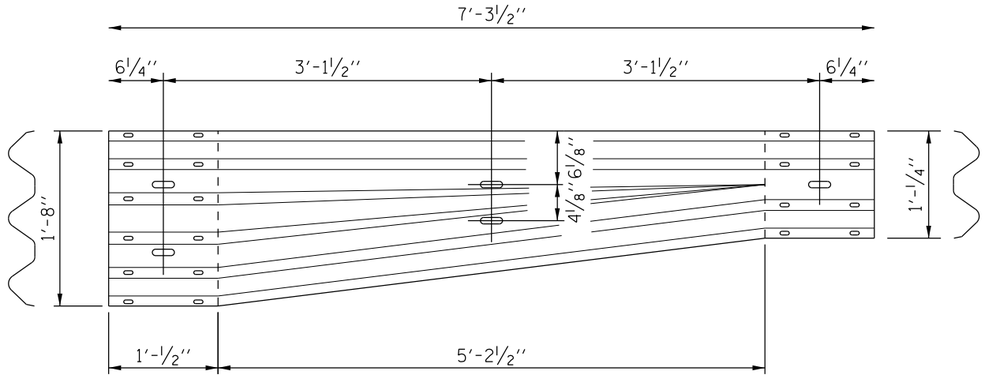
ELEVATION



SECTION A-A

NOTES:

1. SEE STANDARD C1 FOR DETAILS OF GUARDRAIL NOT SHOWN.
2. THRIE BEAM RAIL SHALL BE BOLTED TO BLOCK-OUT AT ALL POSTS.
3. ALL SLOPE RATIOS ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT (V:H).
4. THE TYPE T6B TERMINAL IS TYPICALLY UTILIZED TO ATTACH GALVANIZED STEEL PLATE BEAM GUARDRAIL AT THE UPSTREAM END OF THE BRIDGE CONCRETE PARAPET, WHERE A ROADSIDE GUTTER IS NOT TO BE INSTALLED.
5. UNDER NO CIRCUMSTANCES SHALL EXISTING TERMINAL, THAT WAS DESIGNED USING A PREVIOUS STANDARD, BE ATTACHED TO OR MODIFIED IN ANYWAY FROM ITS ORIGINAL DESIGN. IF ANY MODIFICATION IS REQUIRED AND A PROPER BARRIER WARRANT HAS BEEN COMPLETED, THE ENTIRE BARRIER INSTALLATION SHALL BE COMPLETELY REMOVED AND REPLACED WITH A NEW SYSTEM THAT CONFORMS TO THE CURRENT STANDARD.
6. TRAFFIC BARRIER TERMINAL SHALL BE IN ACCORDANCE WITH THE TOLLWAY'S DETAILS AND SPECIFICATIONS. NO MODIFICATIONS SHALL BE PERMITTED.
7. TERMINAL POSTS SHALL NOT BE INSTALLED IN CONCRETE OR ASPHALT PAVEMENTS. WHEN NECESSARY USE LEAVE-OUT DETAIL PER STANDARD C1, SHEET 4 OF 4.
8. TERMINAL BARRIER CLEARANCE DISTANCE SHALL CONFORM WITH TABLE 2 ON STANDARD C1.
9. LEAVE-OUT DIMENSION BEHIND POSTS 1-6, SHALL BE A MINIMUM OF 4''.



TRANSITION SECTION

(10 GUAGE RAIL ELEMENT)

Paul Kovacs
APPROVED ..... DATE 7-1-2009
CHIEF ENGINEER

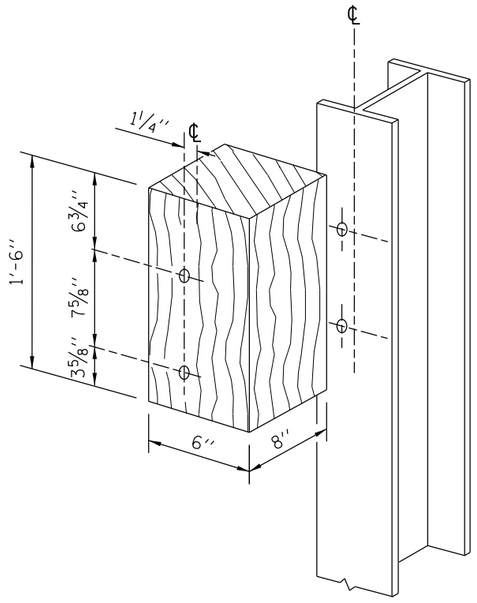
SHEET 1 OF 2

Illinois Tollway

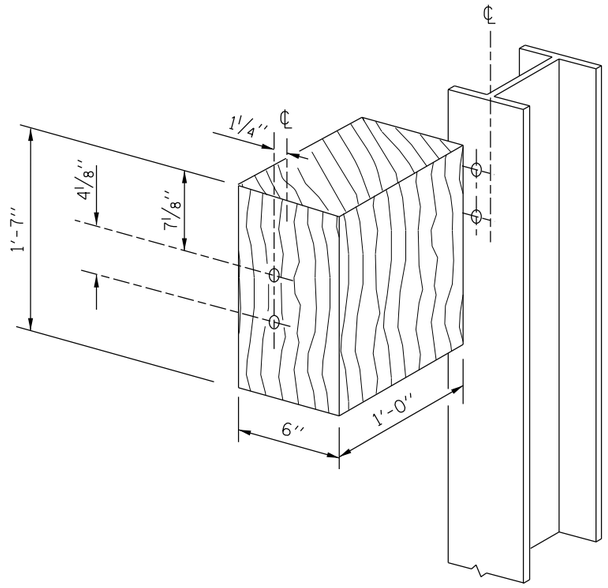
	REVISIONS
2-7-2012	REVISED WOOD BLOCKOUT DIMENSION ADHESIVE AND REVISED NOTES.
11-1-2012	MODIFIED AGGREGATE SHOULDERS, REVISED NOTES
3-31-2014	REVISED WOOD BLOCKS AND NOTES

TRAFFIC BARRIER TERMINAL, TYPE T6B

STANDARD C10-05

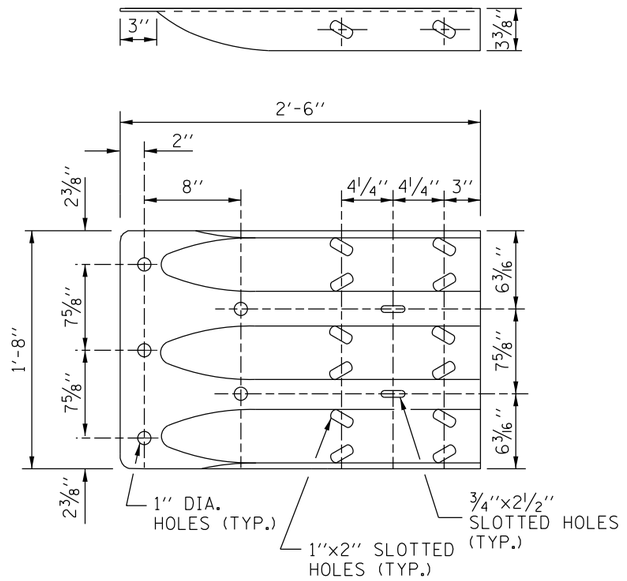


POSTS 1-11 WOOD BLOCKOUT DETAIL

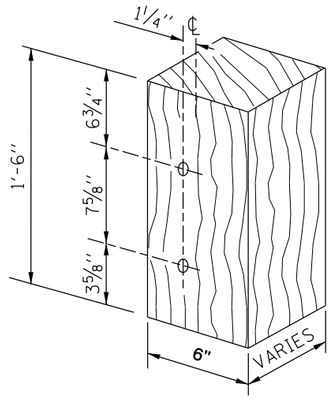


POST 12 WOOD BLOCKOUT DETAIL

(SEE STANDARD C1 FOR POST 13-17 BLOCKOUTS)

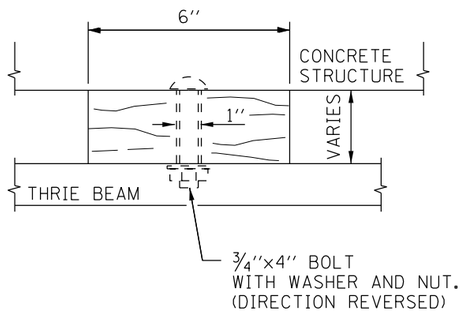


THRIE BEAM END SHOE DETAIL

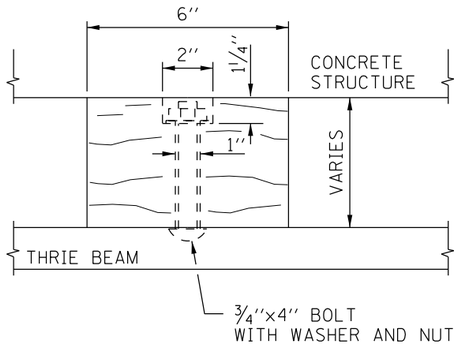


MODIFIED THICKNESS DETAIL

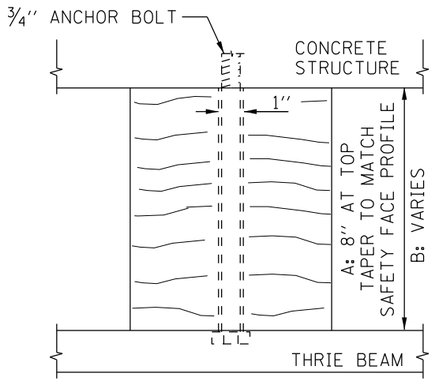
WOOD BLOCKOUTS A, B, C, & D



WOOD BLOCKOUT D



WOOD BLOCKOUT C



WOOD BLOCKOUT A & B

NOTE:

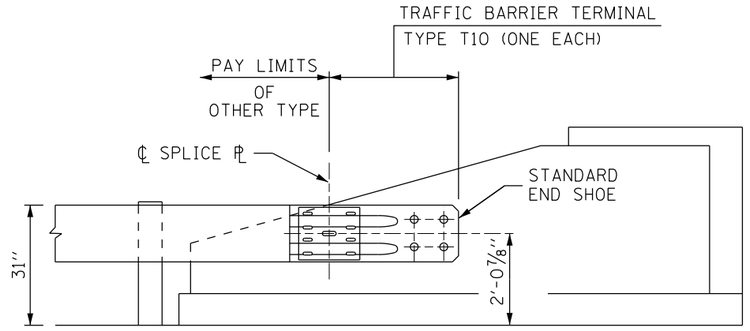
SEE SHEET 1 OF THIS SERIES FOR NOTES.

Paul Kovacs
APPROVED ..... DATE 7-1-2009
CHIEF ENGINEER

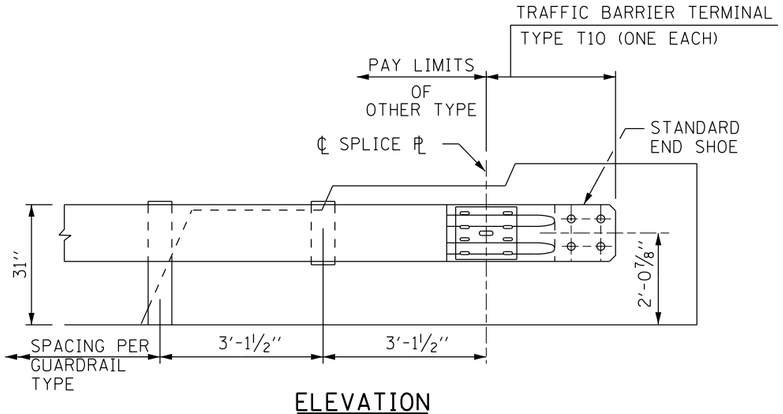
Illinois Tollway

TRAFFIC BARRIER
TERMINAL, TYPE T6B

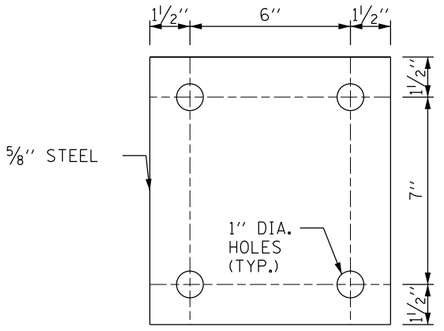
STANDARD C10-05



ELEVATION

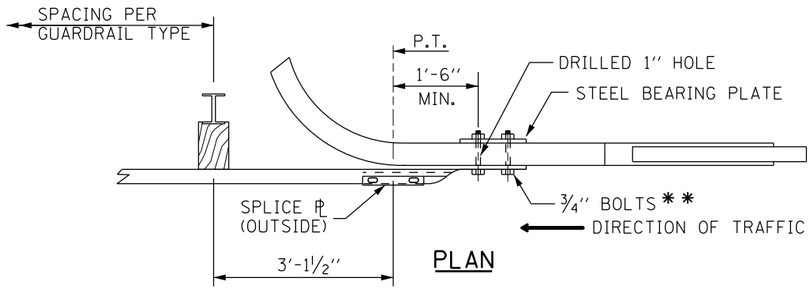


ELEVATION



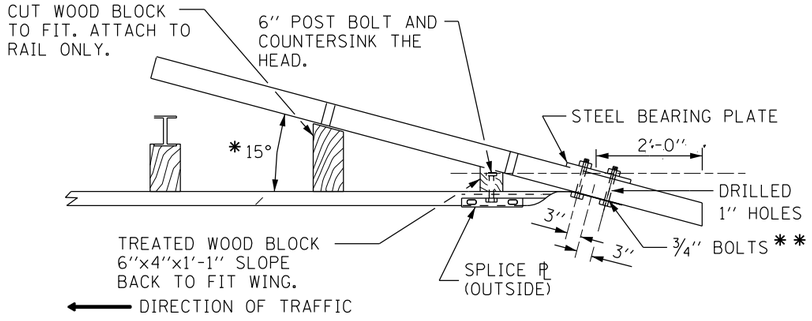
PARAPET STEEL BEARING
PLATE DETAIL

(4 EACH INDIVIDUAL 5''x5''x5/8'' STEEL PLATES WITH CENTERED HOLES MAY BE SUBSTITUTED FOR THE PLATE SHOWN)



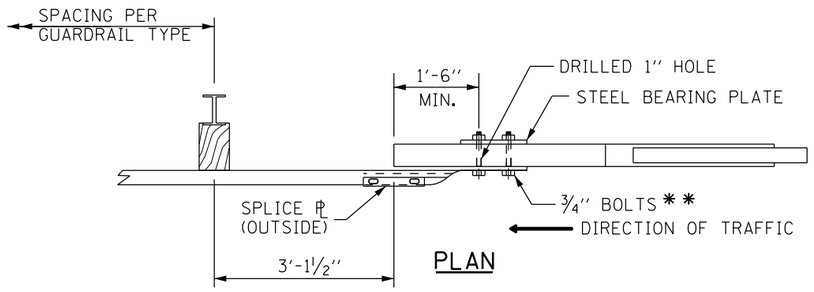
PLAN

CURVED WING



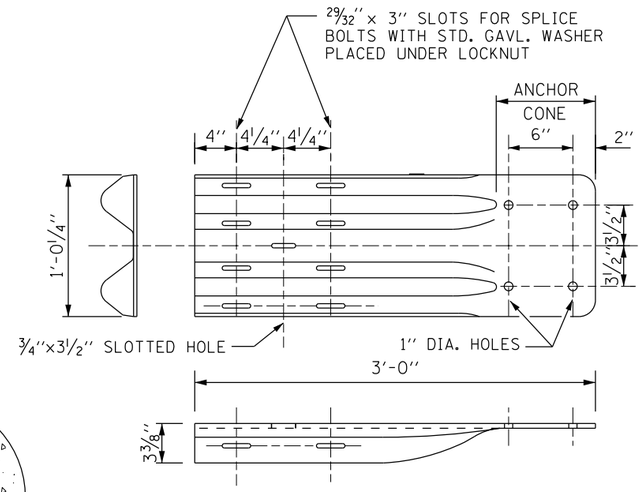
PLAN

FLARED WING



PLAN

TANGENT WING

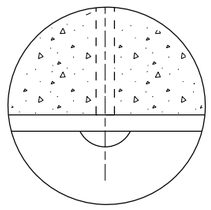


END SHOE

GENERAL NOTE:

* OR TO BE DETERMINED IN THE FIELD.

** HEAD OF BOLT TO BE ON TRAFFIC SIDE. SEE DETAIL "A"



DETAIL "A"

NOTES:

1. SEE STANDARD C1 FOR DETAILS OF GUARDRAIL NOT SHOWN.
2. THE TYPE T10 TERMINAL IS TYPICALLY UTILIZED TO CONNECT GALVANIZED STEEL PLATE BEAM GUARDRAIL TO THE DEPARTING END OF AN EXISTING BRIDGE CONCRETE WING WALL OR PARAPET.
3. UNDER NO CIRCUMSTANCES SHALL AN EXISTING TERMINAL, THAT WAS DESIGNED USING A PREVIOUS STANDARD, BE ATTACHED TO OR MODIFIED IN ANYWAY FROM ITS ORIGINAL DESIGN. IF ANY MODIFICATION IS REQUIRED AND A PROPER BARRIER WARRANT HAS BEEN COMPLETED, THE ENTIRE BARRIER INSTALLATION SHALL BE COMPLETELY REMOVED AND REPLACED WITH A NEW SYSTEM THAT CONFORMS TO THE CURRENT STANDARD.
4. TRAFFIC BARRIER TERMINAL SHALL BE IN ACCORDANCE WITH THE TOLLWAY'S DETAILS AND SPECIFICATIONS. NO MODIFICATIONS SHALL BE PERMITTED.
5. WHEN END SHOE IS ATTACHED TO A BRIDGE PARAPET WHICH HAS AN EXPANSION JOINT, THE BOLTS SHALL BE PROVIDED WITH A LOCKNUT OR DOUBLE NUT AND SHALL BE TIGHTENED ONLY TO A POINT THAT WILL ALLOW GUARDRAIL MOVEMENT.
6. THE ANCHOR CONE SHALL BE SET FLUSH WITH THE SURFACE OF THE CONCRETE.
7. EXTERNALLY THREADED STUDS PROTRUDING FROM THE SURFACE OF THE CONCRETE WILL NOT BE PERMITTED.
8. WHEN WING WALL THICKNESS IS GREATER THAN 18'' OR NOT ACCESSIBLE TO THE BACK SIDE, 4-3/4'' BOLTS SHALL BE ANCHORED INTO DRILLED HOLES, USING A CHEMICAL ADHESIVE. MINIMUM EMBEDMENT SHALL BE 10''. ANCHOR BOLTS WITH STANDARD WASHER SHALL BE USED . AFTER TIGHTENING, CUT THE ANCHOR BOLTS FLUSH WITH THE NUTS, AND DAMAGE THE NUTS TO PREVENT THEM FROM LOOSENING.

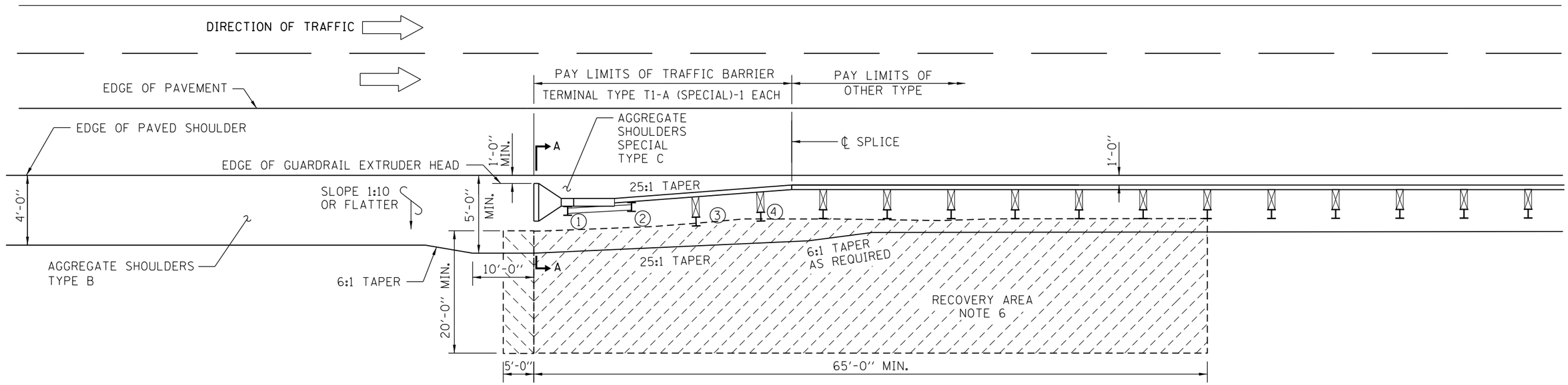
Paul Kovacs
APPROVED ..... DATE 7-1-2009
CHIEF ENGINEER

Illinois Tollway

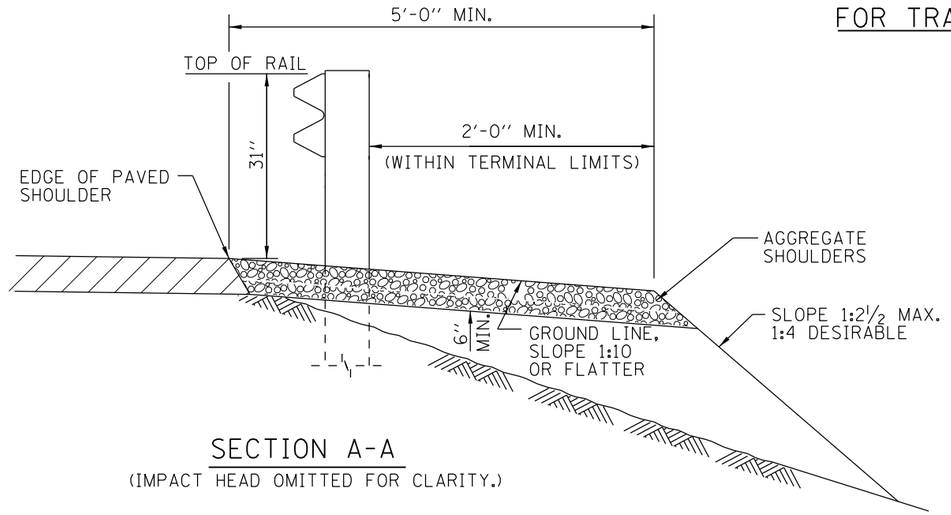
DATE	REVISIONS
3-1-2010	REVISED NOTES. ADDED END SHOE AND
	PARAPET BEARING PLATE DETAIL.
1-1-2011	REVISED END SHOE HEIGHT ATTACHEMENT.
2-7-2012	REVISED BOLT NOTE. ADDED DETAIL "A"
	AND REVISED NOTES.
3-31-2014	REVISED NOTES.

TRAFFIC BARRIER
TERMINAL, TYPE T10

STANDARD C11-04



SHOULDER WIDENING TRANSITION-WITHOUT GUTTER FOR TRAFFIC BARRIER TERMINAL TYPE T1-A (SPECIAL)



SECTION A-A

(IMPACT HEAD OMITTED FOR CLARITY.)

NOTES FOR INSTALLATION ON TANGENT ROADWAY:

TRAFFIC BARRIER TERMINAL SHALL BE INSTALLED AT A 25:1 TAPER MEASURED FROM EDGE OF TRAVELED WAY.

NOTES FOR INSTALLATION ON CURVED ROADWAY:

THE EDGE OF THE TERMINAL EXTRUDER HEAD SHALL BE OFFSET A DISTANCE FROM A POINT ON THE BACK OF THE CURVED EDGE OF PAVED SHOULDER AS SHOWN IN TABLE 1.

GENERAL NOTES:

1. ALL SLOPE RATIOS ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT (V:H).
2. THE TYPE T1-A (SPECIAL) IS THE UPSTREAM END SECTION OF A GALVANIZED STEEL PLATE BEAM GUARDRAIL BARRIER SYSTEM, FOR RAMP INSTALLATION WITH POSTED SPEED LIMIT OF 40 MPH OR LESS, NCHRP 350, TEST LEVEL (TL-2).
3. REFERENCE STANDARD B29 FOR GUTTER TRANSITION AT TRAFFIC BARRIER TERMINAL TYPE T1-A (SPECIAL).
4. UNDER NO CIRCUMSTANCES SHALL AN EXISTING TERMINAL, THAT WAS DESIGNED USING A PREVIOUS STANDARD, BE ATTACHED TO OR MODIFIED IN ANYWAY FROM ITS ORIGINAL DESIGN. IF ANY MODIFICATION IS REQUIRED AND A PROPER BARRIER WARRANT HAS BEEN COMPLETED, THE ENTIRE BARRIER INSTALLATION SHALL BE COMPLETELY REMOVED AND REPLACED WITH A NEW SYSTEM THAT CONFORMS TO THE CURRENT STANDARD.
5. TRAFFIC BARRIER TERMINAL SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S DETAILS AND SPECIFICATIONS.
6. NO ROADSIDE OBSTRUCTION OF ANY TYPE-FIXED OR BREAKAWAY, EITHER TEMPORARY OR PERMANENT SHALL BE ALLOWED WITHIN THIS RECOVERY AREA.
7. NO CURVED W-BEAM SECTIONS ARE PERMITTED WITHIN THE TERMINAL PAY LIMITS. THE TRAFFIC BARRIER TERMINAL TYPE T1-A (SPECIAL) SHALL BE LAID OUT IN A STRAIGHT LINE.
8. TERMINAL POSTS SHALL NOT BE INSTALLED IN CONCRETE OR HMA. WHEN NECESSARY USE LEAVE-OUT DETAIL SHOWN ON STANDARD C1.
9. THE TERMINAL SYSTEM HAS BEEN PERFORMANCE-TESTED FOR CRASHWORTHINESS UNDER PROCEDURCES DEFINED IN THE NATIONAL COOPERATIVE HIGHWAY RESEARCH REPORT (NCHRP) REPORT 350. NO MODIFICATION TO THIS STANDARD DRAWING SHALL BE PERMITTED.

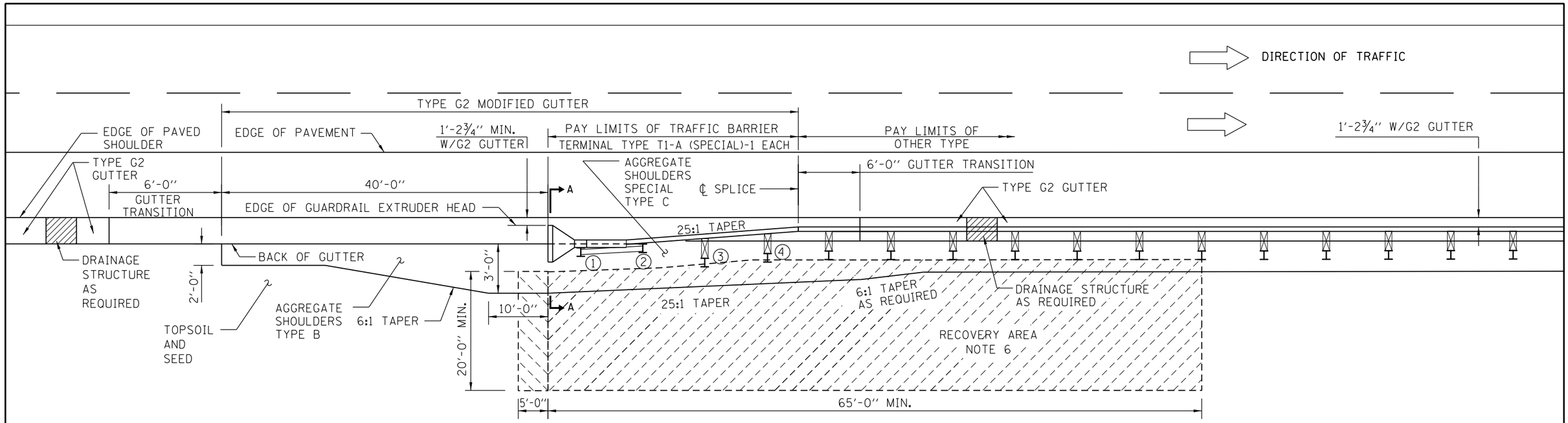
Paul Kovacs
APPROVED ..... DATE 1-1-2011
CHIEF ENGINEER

Illinois Tollway

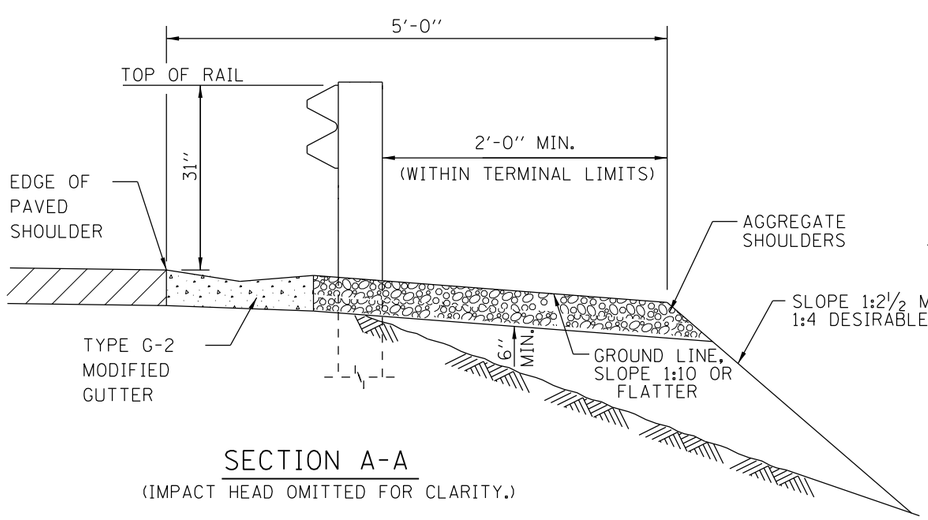
	REVISIONS
2-7-2012	REVISED SLOPE NOTE.
11-1-2012	MODIFIED AGGREGATE SHOULDERS
3-1-2013	TERMINAL CHANGED TO ALL STEEL POST, REVISED TERMINAL PAY LIMITS
3-31-2014	REVISED RECOVERY AREA DIMENSION.

TRAFFIC BARRIER TERMINAL TYPE T1-A (SPECIAL)

STANDARD C12-04

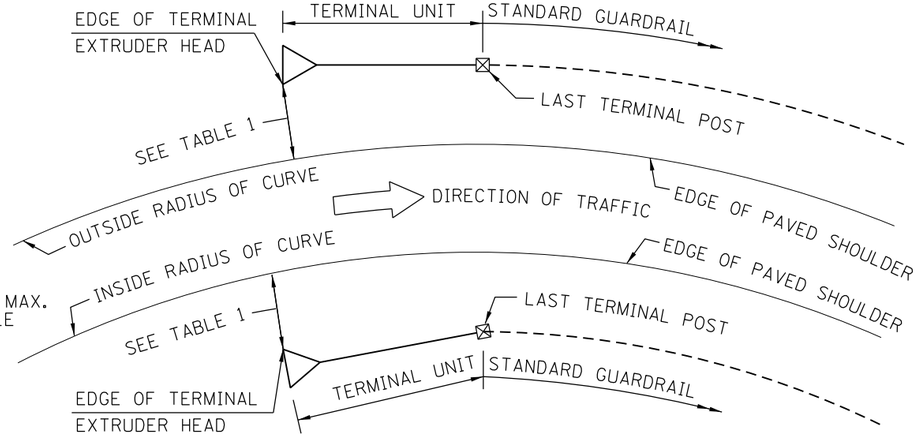


SHOULDER WIDENING TRANSITION-WITH GUTTER, TYPE G-2 FOR TRAFFIC BARRIER TERMINAL TYPE T1-A (SPECIAL)



SECTION A-A

(IMPACT HEAD OMITTED FOR CLARITY.)



CURVED ROADWAY TRAFFIC BARRIER TERMINAL PLACEMENT

TABLE 1		
LATERAL OFFSET DIMENSION TO EDGE OF TERMINAL EXTRUDER HEAD		
	INSIDE RADIUS OF CURVE	OUTSIDE RADIUS OF CURVE
NO GUTTER	1'-0"	1'-0" MIN. *
TYPE G-2 GUTTER	1'-2¾"	1'-2¾" MIN. *
TYPE G-3 GUTTER	2'-2¾"	2'-2¾" MIN. *

(*) OFFSET DISTANCE WILL VARY BASED ON RADIUS OF HORIZONTAL CURVE AND THE TERMINAL BEING INSTALLED IN A STRAIGHT LINE.

NOTE:

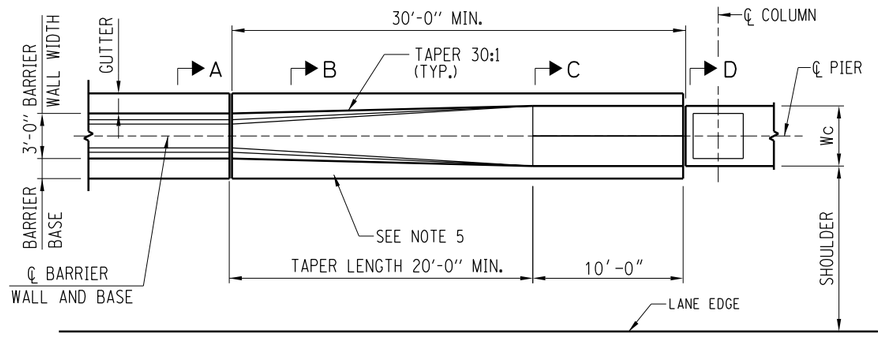
SEE SHEET 1 OF THIS SERIES FOR NOTES.

Paul Kovacs
APPROVED ..... DATE 1-1-2011
CHIEF ENGINEER

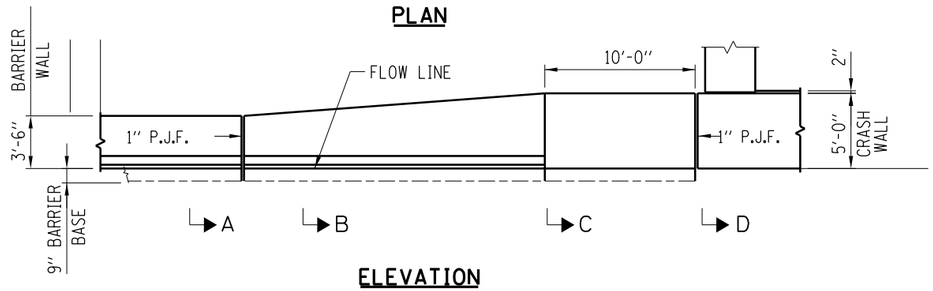
Illinois Tollway

TRAFFIC BARRIER TERMINAL TYPE T1-A (SPECIAL)

STANDARD C12-04

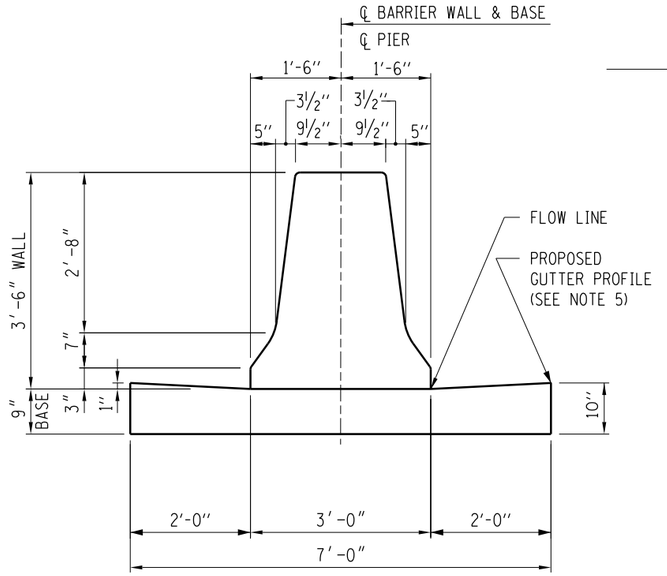


PLAN

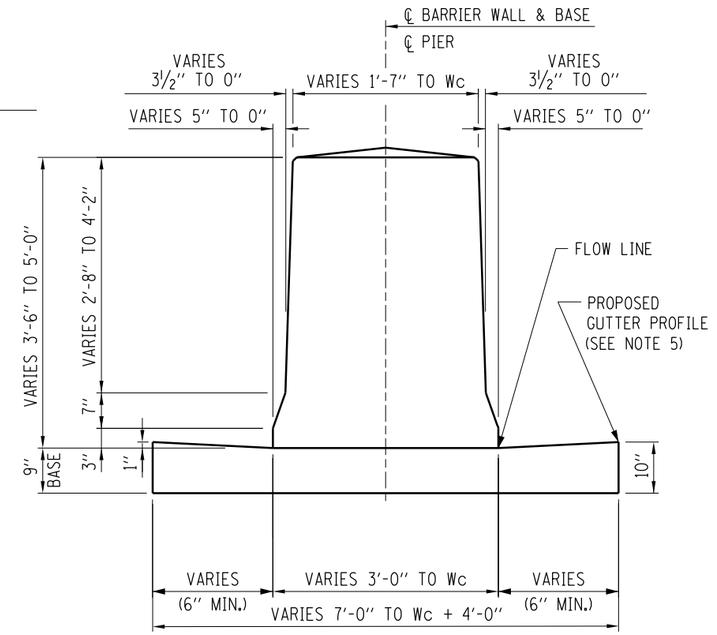


ELEVATION

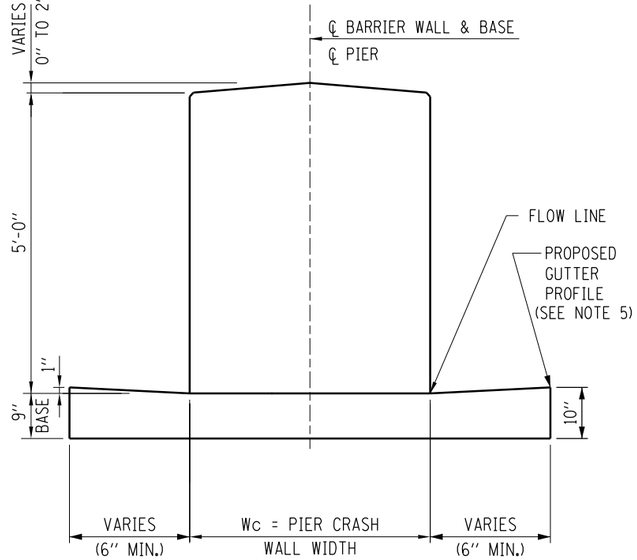
CONCRETE MEDIAN BARRIER TRANSITION, TYPE V-F AT BRIDGE PIERS



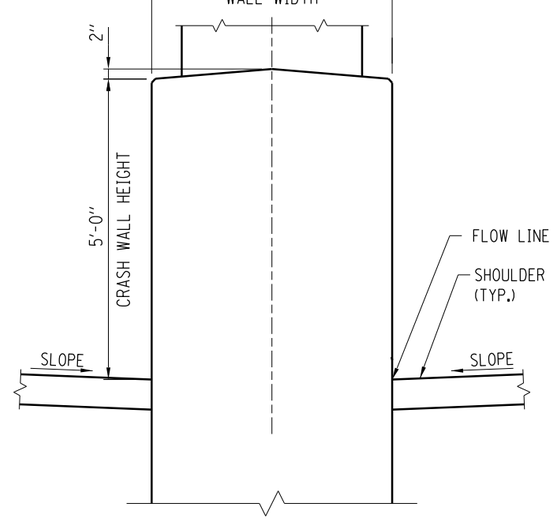
SECTION A-A



SECTION B-B



SECTION C-C



SECTION D-D

NOTES:

1. 1" DEEP CONTRACTION JOINTS SHALL BE CONSTRUCTED IN THE CONCRETE BARRIER WALL AND IN THE CONCRETE BARRIER BASE. CONTRACTION JOINTS SHALL ALSO BE CONSTRUCTED AT BOTH SIDES OF ALL DRAINAGE STRUCTURES. MAXIMUM JOINT SPACING SHALL BE 30'.
2. THE FORMING OF CONTRACTION JOINTS SHALL BE DONE WITH AN APPROVED FINISHING TOOL AT THE DISCRETION OF THE ENGINEER SUBJECT TO THE SATISFACTORY CONTROL OF CRACKING. THE SAWING OF CONTRACTION JOINTS IN THE BARRIER WALL SHALL NOT BE PERMITTED.
3. TAPER LENGTH REQUIRED FOR THE WIDTH TRANSITION WILL BE 20'-0" MINIMUM.
4. TOP SHOULDER EDGE OF GUTTER SLAB SHALL MATCH THE TOP OF SHOULDER ELEVATION.
5. GUTTER PROFILE IN THE VICINITY OF SAG VERTICAL CURVES, ALONG FLAT GRADES AND AT THE MEETING OF PROPOSED AND EXISTING GUTTER, SHALL BE CAREFULLY CONTROLLED AND FIELD ADJUSTED IF NECESSARY TO ENSURE POSITIVE DRAINAGE AND AVOID PONDING.

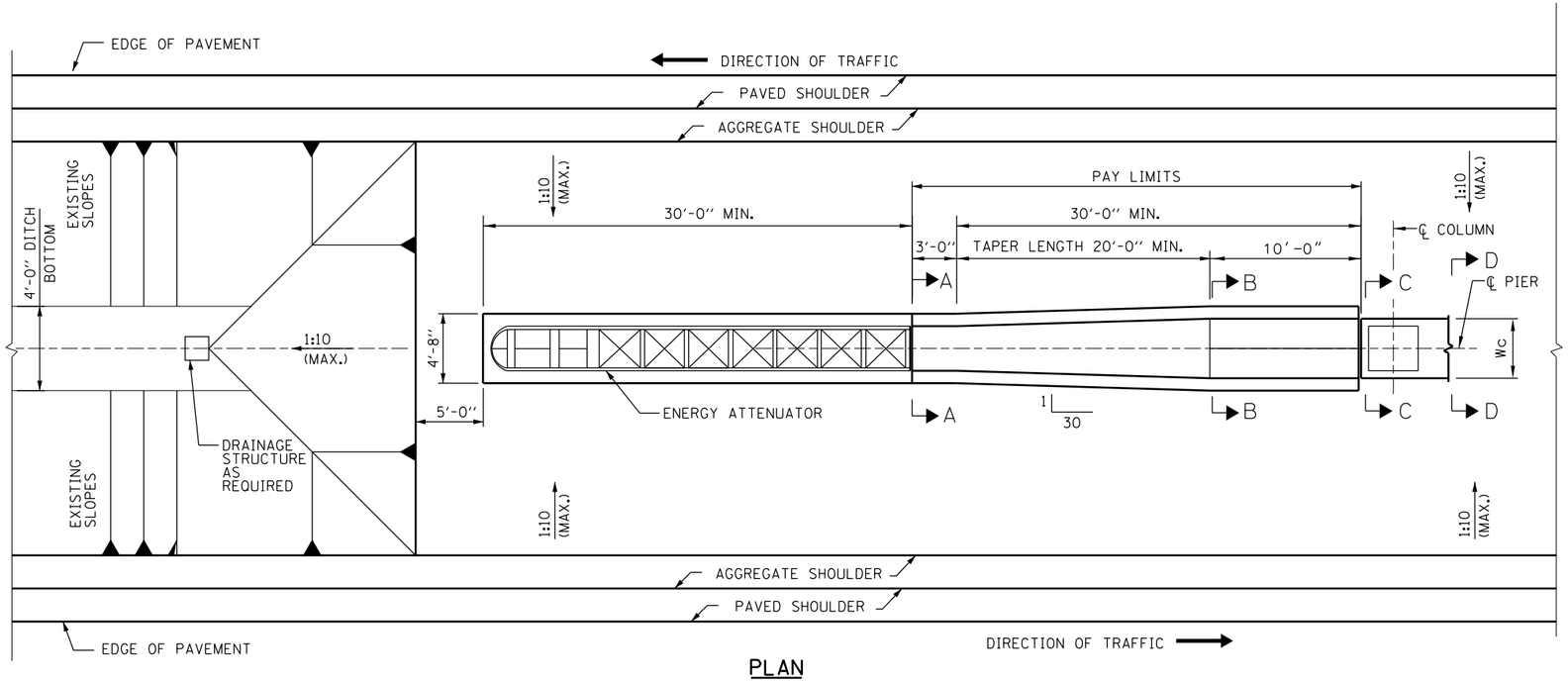
Paul Kovacs
APPROVED ..... CHIEF ENGINEER
DATE 2-7-2012

Illinois Tollway

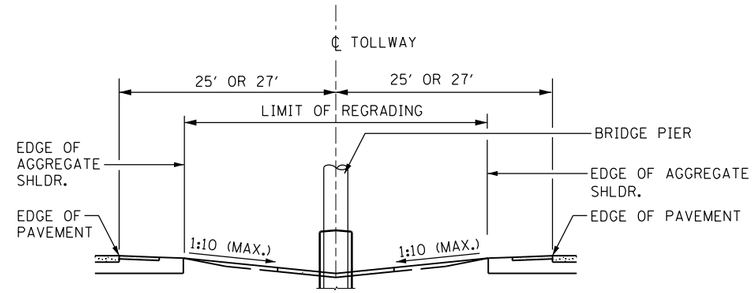
DATE	REVISIONS
11-1-2012	MODIFIED MEDIAN BARRIER TRANSITION
3-31-2014	MODIFIED BARRIER BASE.

CONCRETE MEDIAN BARRIER TRANSITION, TYPE V-F AT BRIDGE PIERS

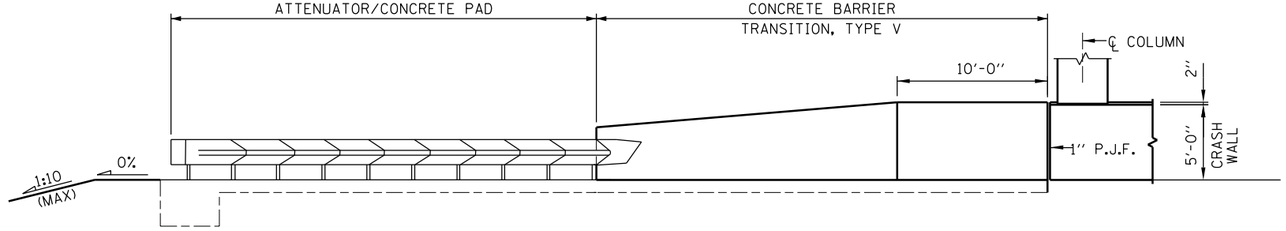
STANDARD C13-02



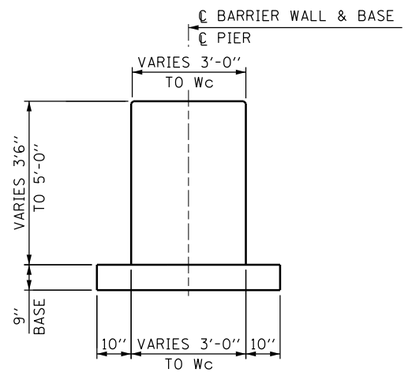
PLAN



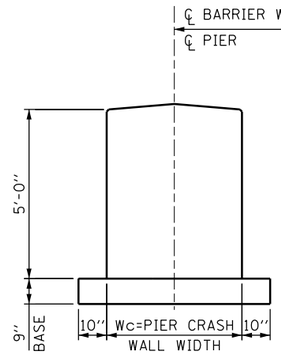
SECTION D-D



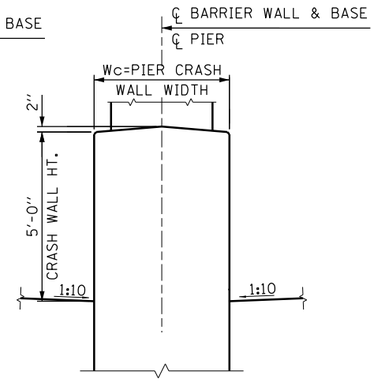
ELEVATION



SECTION A-A



SECTION B-B



SECTION C-C

NOTES:

1. SLOPE RATIOS ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT (V:H).
2. ENERGY ATTENTUATOR AND PAD SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S DETAILS AND SPECIFICATIONS.

Paul Kovacs
APPROVED ..... DATE 3-31-2014
CHIEF ENGINEER

Illinois Tollway

DATE	REVISIONS

CONCRETE BARRIER TRANSITION, TYPE V AT BRIDGE PIERS

STANDARD C14-00