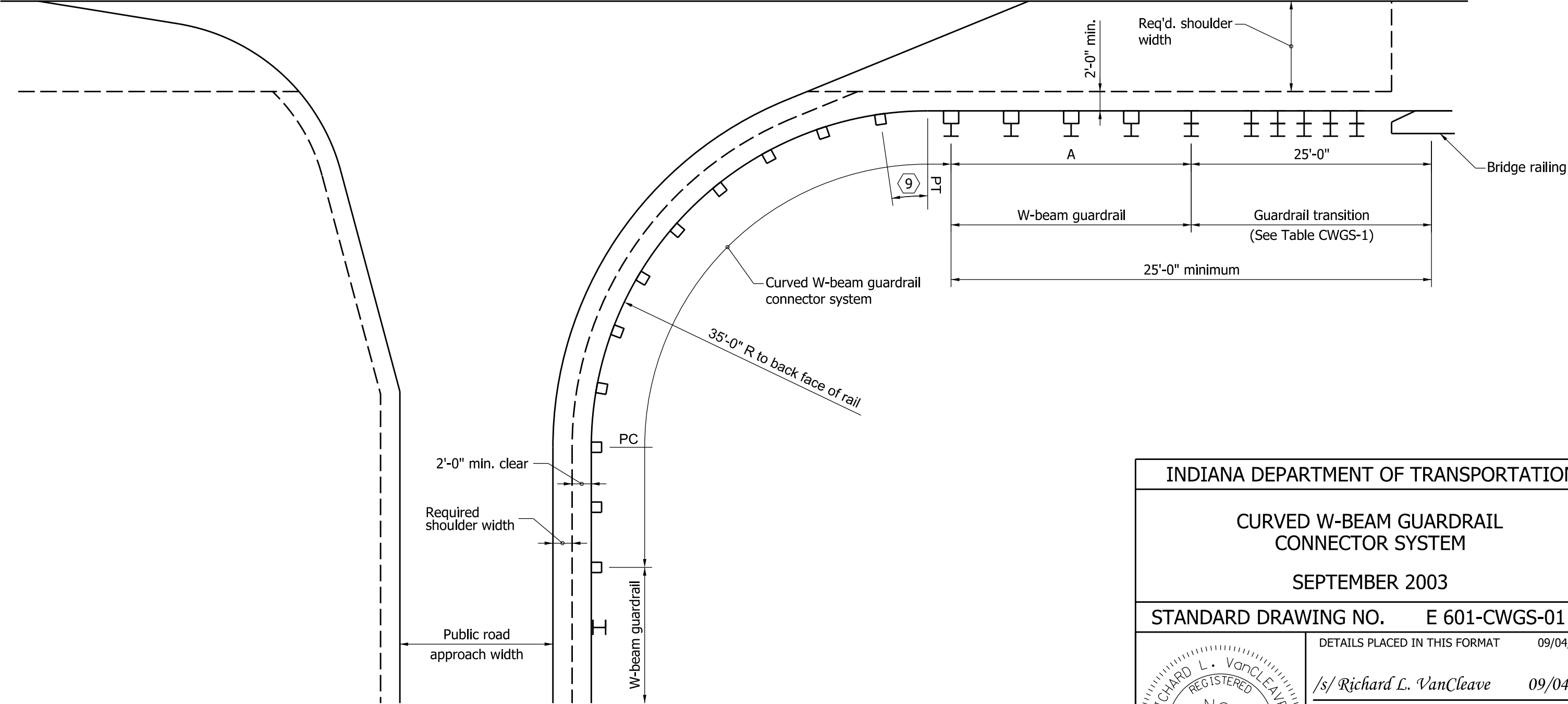


TABLE CWGS-1	
A	GUARDRAIL TRANSITION
< 25'	Type WGB
≥ 25'	Type TGB

NOTES:

1. See Standard Drawing E 601-CWGS-03 for General Notes.



**PUBLIC ROAD APPROACH INSTALLATION
AT BRIDGE END**

INDIANA DEPARTMENT OF TRANSPORTATION	
CURVED W-BEAM GUARDRAIL CONNECTOR SYSTEM	
SEPTEMBER 2003	
STANDARD DRAWING NO. E 601-CWGS-01	
	DETAILS PLACED IN THIS FORMAT 09/04/12
	/s/ <i>Richard L. VanCleave</i> 09/04/12
	SUPERVISOR, ROADWAY STANDARDS DATE
	/s/ <i>Mark A. Miller</i> 09/04/12
CHIEF ENGINEER	DATE

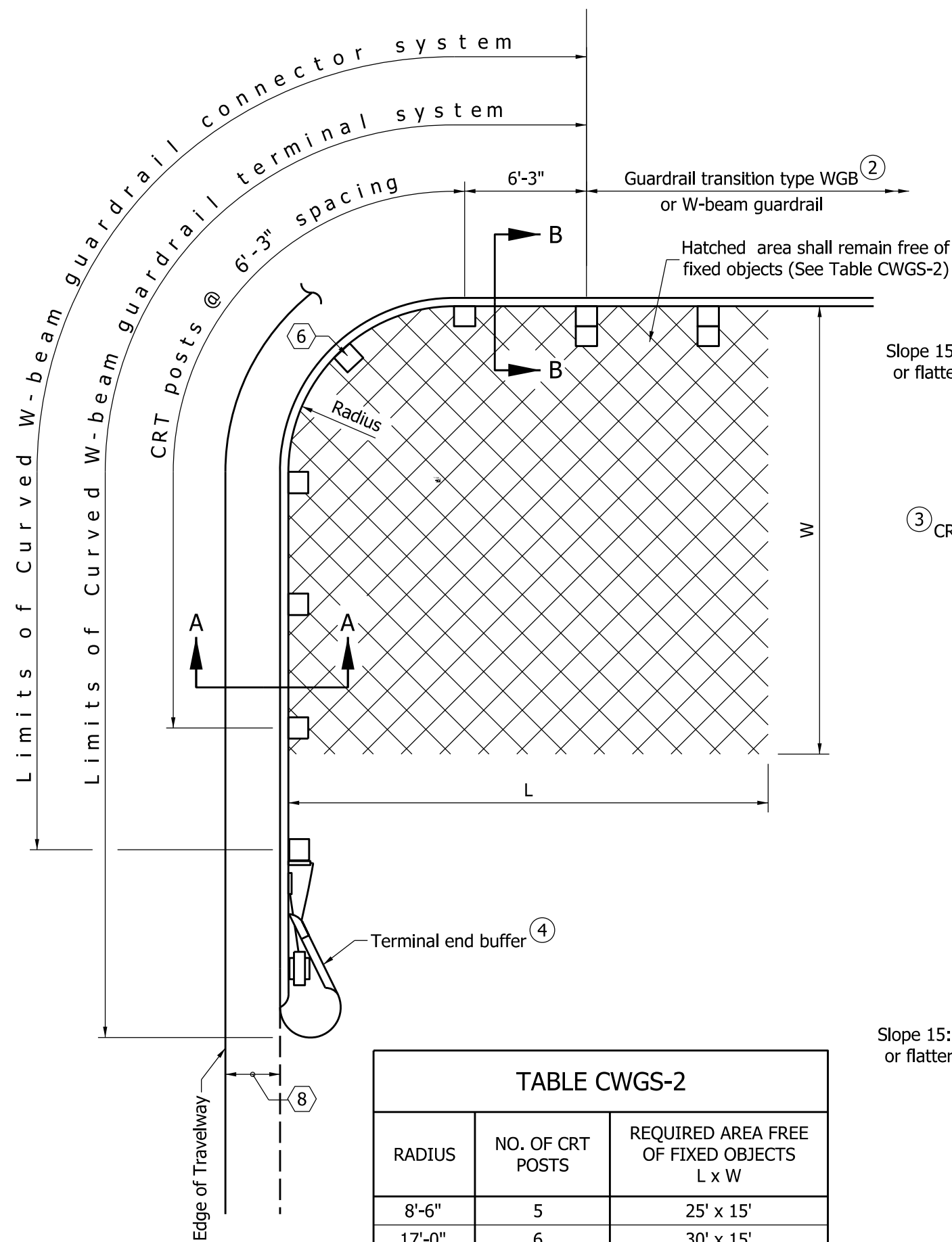
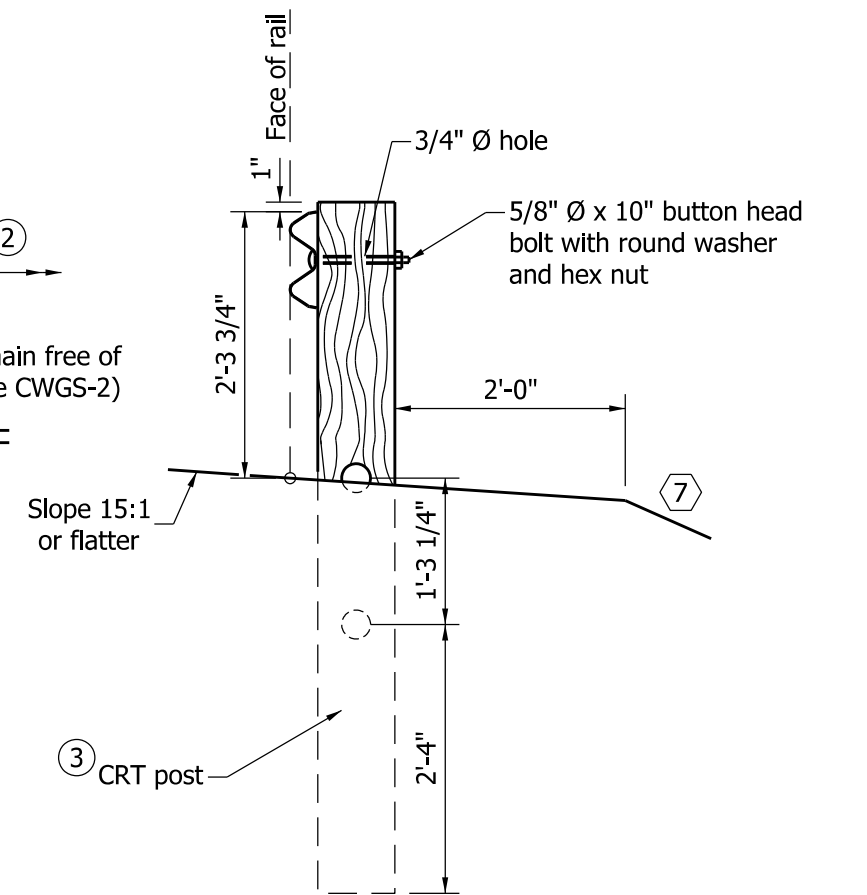
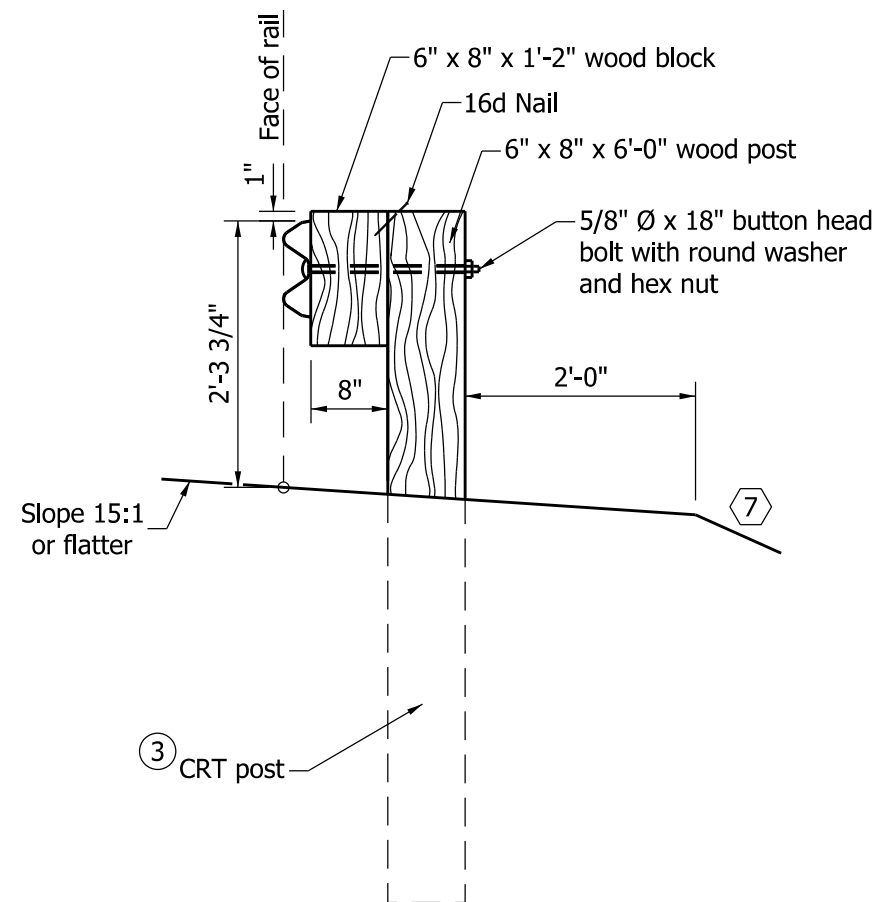


TABLE CWGS-2

RADIUS	NO. OF CRT POSTS	REQUIRED AREA FREE OF FIXED OBJECTS L x W
8'-6"	5	25' x 15'
17'-0"	6	30' x 15'
25'-6"	8	40' x 20'
35'-0"	11	50' x 20'



SECTION A-A



SECTION B-B

NOTES:

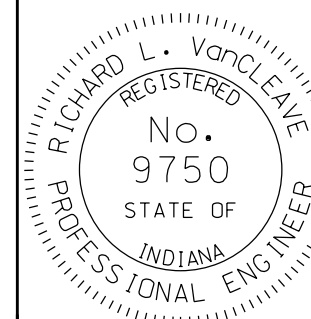
- See Standard Drawing E 601-CWGS-03 for General Notes.
- See Standard Drawing E 601-TWGB-02 for guardrail transition type WBG details.
- See Standard Drawing E 601-CWGS-06 for CRT post details.
- See Standard Drawing E 601-CWGS-04 and 05 for terminal end buffer details.

INDIANA DEPARTMENT OF TRANSPORTATION

CURVED W-BEAM
GUARDRAIL SYSTEM

SEPTEMBER 2011

STANDARD DRAWING NO. E 601-CWGS-02



DETAILS PLACED IN THIS FORMAT 09/04/12

/s/ Richard L. VanCleave 09/04/12

SUPERVISOR, ROADWAY STANDARDS DATE

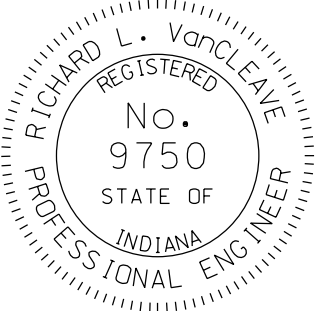
/s/ Mark A. Miller 09/04/12

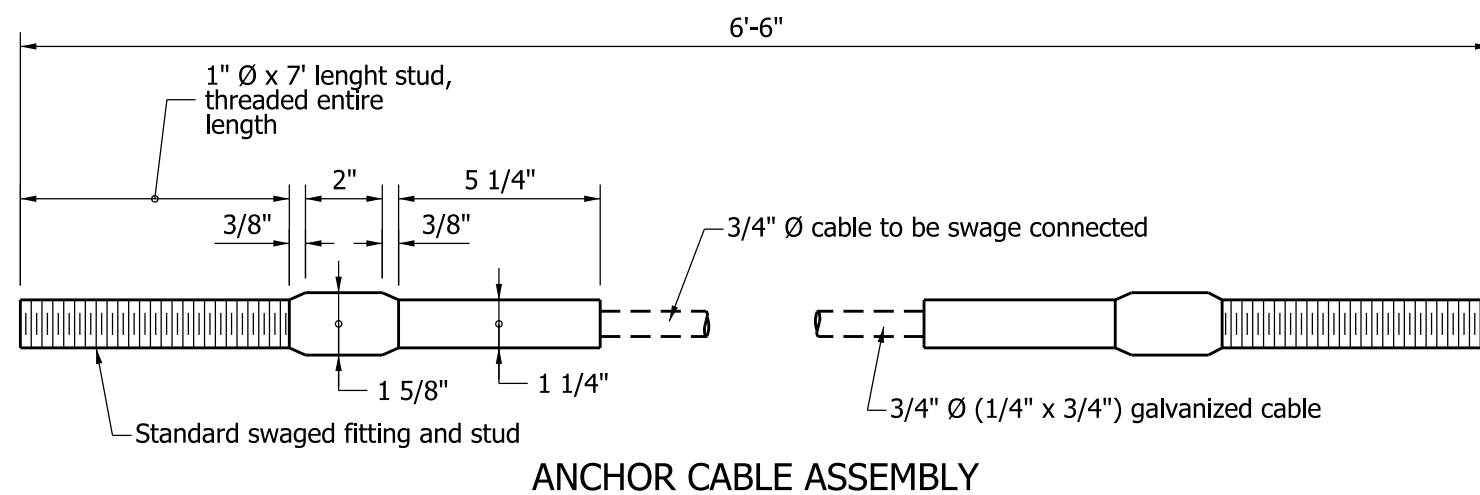
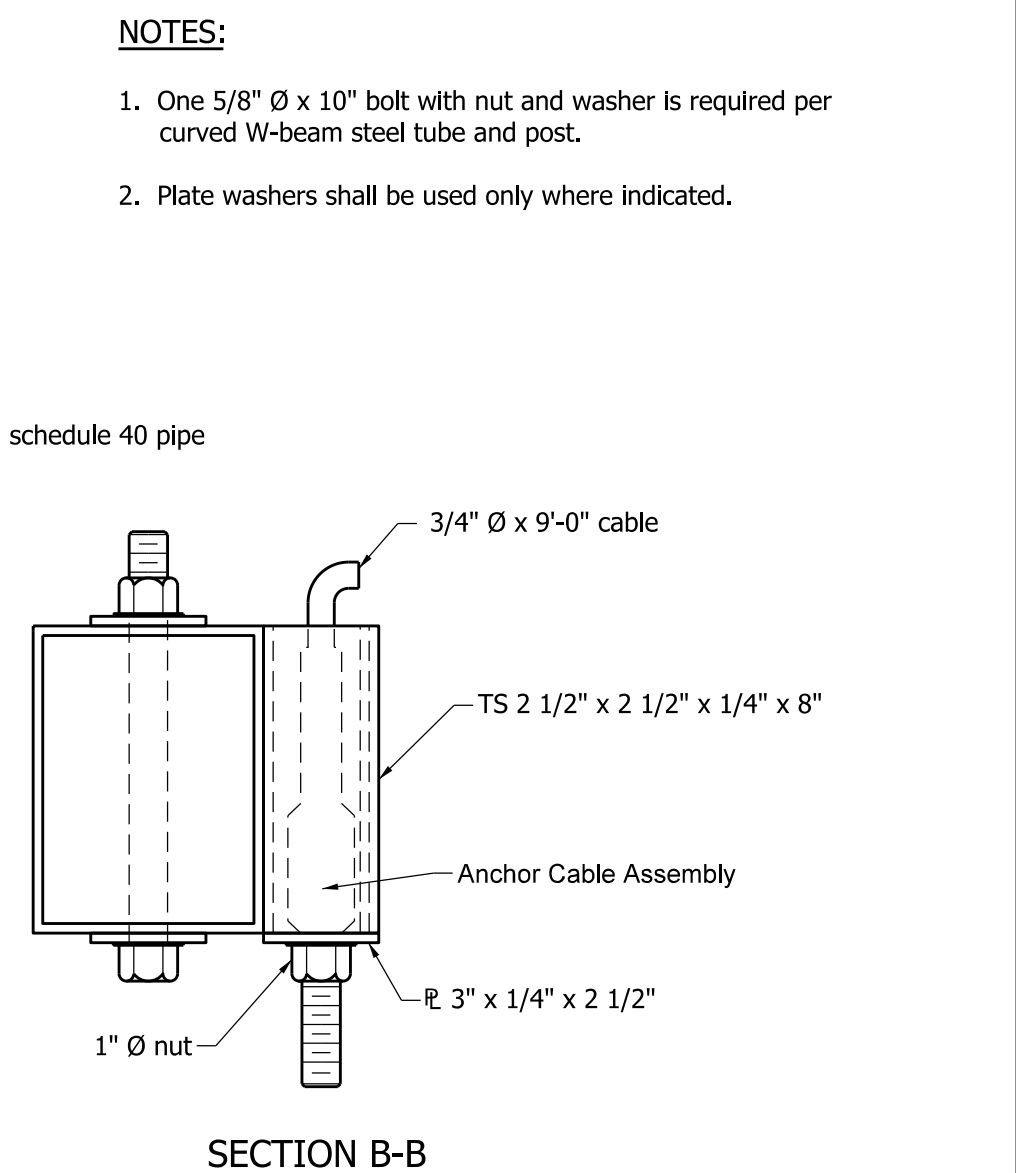
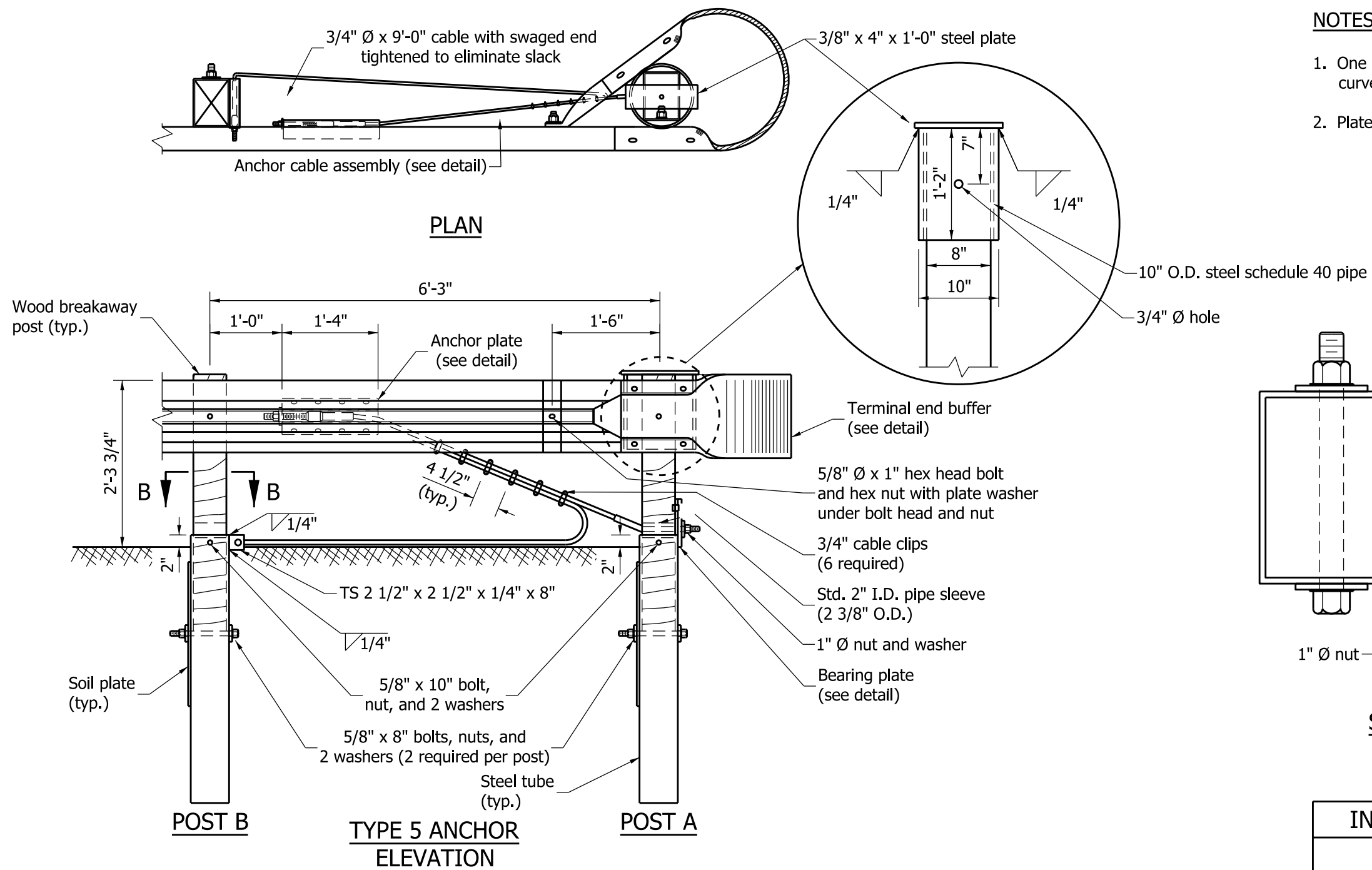
CHIEF ENGINEER DATE

GENERAL NOTES

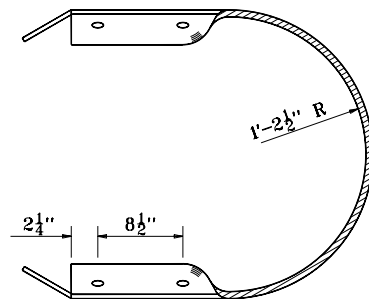
1. This drawing shall be used in conjunction with Standard Drawings E 601-CWGS-01 through -06, and E 601-CWGT-01 and -02 where a curved W-beam guardrail system is specified.
2. The type of curved W-beam guardrail system to be used shall be as shown on the plans in accordance with Table CWGS-3.
3. Except where otherwise shown, all hardware and installation shall be the same as for the guardrail specified for the adjacent run.
4. A curved W-beam guardrail terminal system shall be used to terminate a run of guardrail only at a driveway. For a public road approach, a curved W-beam guardrail connector system shall be used.
5. A maximum of two guardrail panels may be omitted from the curved W-beam guardrail terminal system only where the bridge railing falls outside of the clear zone and the plans specifically state that panels are to be omitted. See Table CWGS-03 for the number of guardrail panels to be removed for each type of curved W-beam guardrail system.
- 6 For the 8'-6" radius curved W-beam guardrail terminal system, guardrail shall not be bolted to this post.
- 7 The embankment slope behind the curved W-beam guardrail system shall be 2:1 or flatter.
- 8 A minimum 4 ft width shoulder shall be used with a 15 ft minimum drive radius.
- 9 This dimension shall be 5 ft for the 35 ft radius curved W-beam guardrail connector system.

TABLE CWGS-3		
CURVED W-BEAM GUARDRAIL SYSTEMS		
TYPE	RADIUS	NUMBER OF 6'-3" PANELS REMOVED
TERMINAL SYSTEM		
1	8'-6"	0
2	8'-6"	1
3	8'-6"	2
4	17'-0"	0
5	17'-0"	1
6	17'-0"	2
7	25'-0"	0
8	25'-0"	1
9	25'-0"	2
CONNECTOR SYSTEM		
1	25'-0"	0
2	35'-0"	0

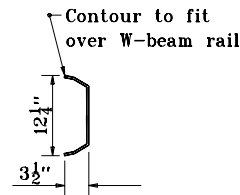
INDIANA DEPARTMENT OF TRANSPORTATION	
CURVED W-BEAM GUARDRAIL SYSTEM	
SEPTEMBER 1999	
STANDARD DRAWING NO. E 601-CWGS-03	
	DETAILS PLACED IN THIS FORMAT 09/04/12
	<i>/s/ Richard L. VanCleave</i> 09/04/12
	SUPERVISOR, ROADWAY STANDARDS DATE
	<i>/s/ Mark A. Miller</i> 09/04/12
CHIEF ENGINEER	DATE



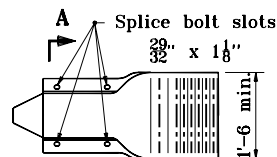
INDIANA DEPARTMENT OF TRANSPORTATION			
CURVED W-BEAM GUARDRAIL SYSTEM			
SEPTEMBER 2011			
STANDARD DRAWING NO.		E 601-CWGS-04	
	/s/ Richard L. VanCleave		09/01/11
	DESIGN STANDARDS ENGINEER		DATE
	/s/ Mark A. Miller		09/01/11
DESIGN STANDARDS ENGINEER	CHIEF HIGHWAY ENGINEER		DATE



TOP VIEW

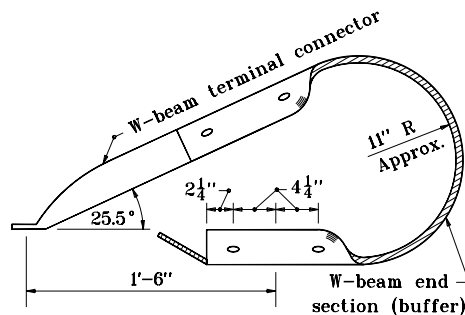


SECTION A-A

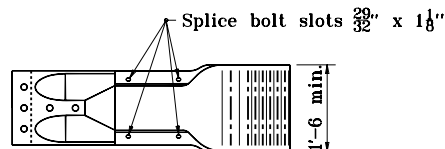


SIDE VIEW

W-BEAM END SECTION (BUFFER)

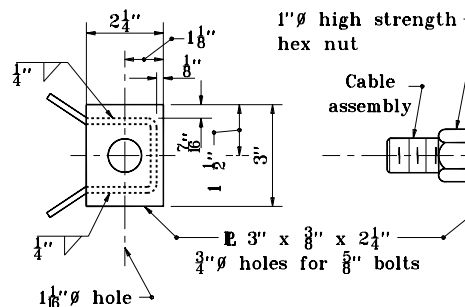


TOP VIEW

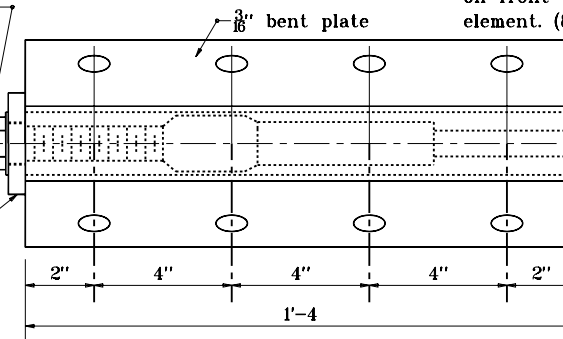


SIDE VIEW

TERMINAL END BUFFER

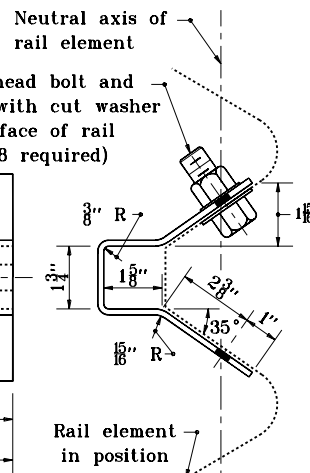


LEFT END VIEW



ANCHOR PLATE

M10 hex head bolt and hex nut with cut washer on front face of rail element. (8 required)



RIGHT END VIEW

GENERAL NOTES

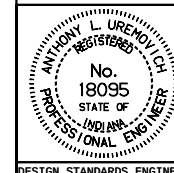
1. This sheet shall be used in conjunction with Standard Drawings E 601-CWGS-01, 02, 03, and 06.
2. An alternate single piece having a similar dimensional shape to the terminal end buffer and mating with the W-beam guardrail may be used.
3. The W-beam terminal connector shall be steel of 0.138 inch thickness (10 gauge).
4. If the W-beam terminal connector is lapped on the outside of the guardrail, a galvanized 1" I.D. 2" O.D., 0.134" thick, narrow plain washer shall be placed under the splice bolt heads.
5. Attach the W-beam to the steel pipe with a 3/8" diameter x 1 1/4" length button head bolt with no washer. No connection to the post is required.
6. Nuts for the anchor cable assembly shall be hand tightened, plus one complete turn at the anchor plate end. All other nuts shall be torqued to 50 ft.-lbs.

INDIANA DEPARTMENT OF TRANSPORTATION

CURVED W-BEAM GUARDRAIL SYSTEM

APRIL 1996

STANDARD DRAWING NO. E 601-CWGS-05



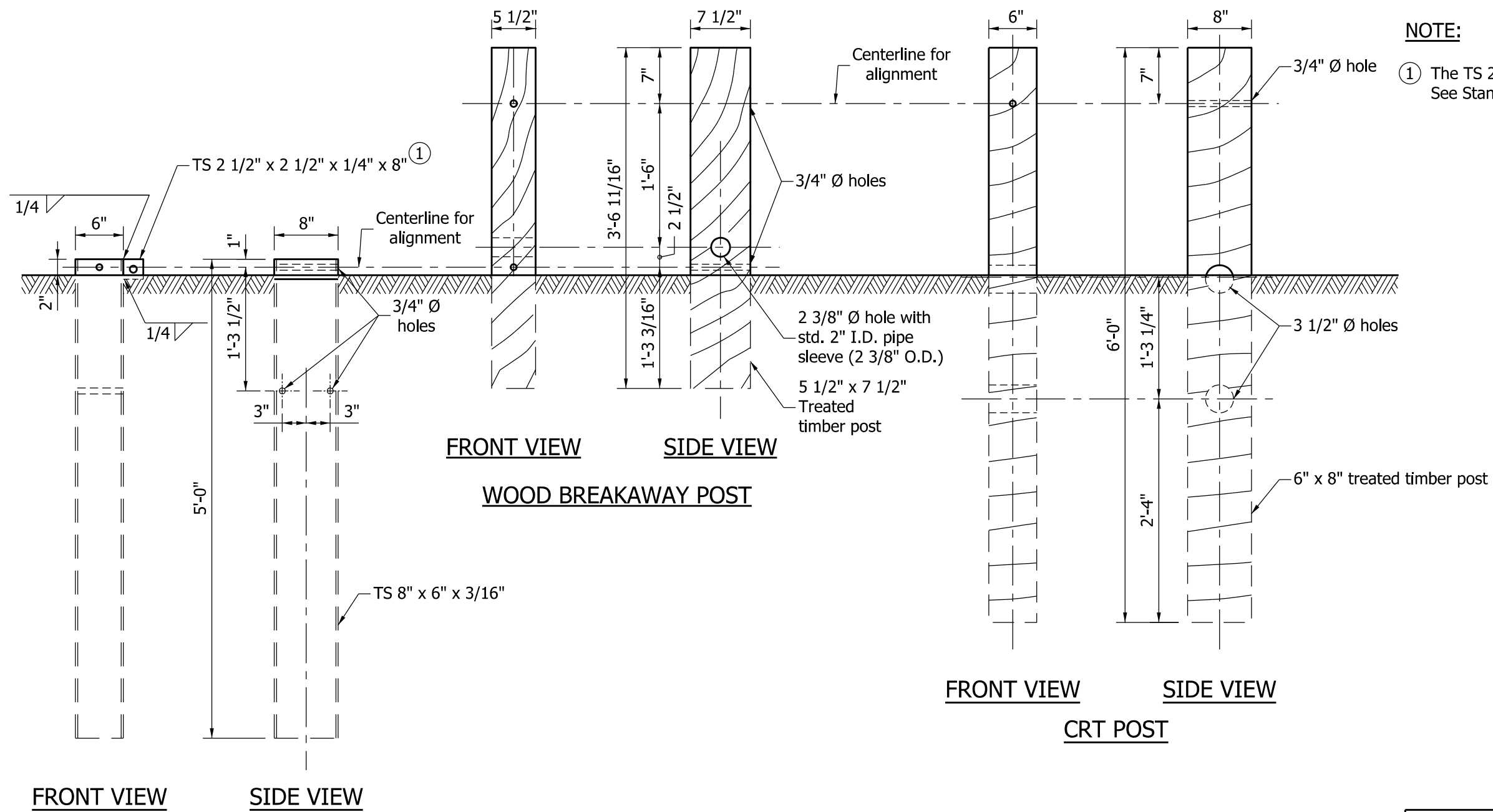
DETAILS PLACED IN THIS FORMAT 11-15-99

/s/ Anthony L. Uremovich 11-15-99
DESIGN STANDARDS ENGINEER DATE

/s/ Firooz Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

ORIGINALLY APPROVED 4-01-96



NOTE:

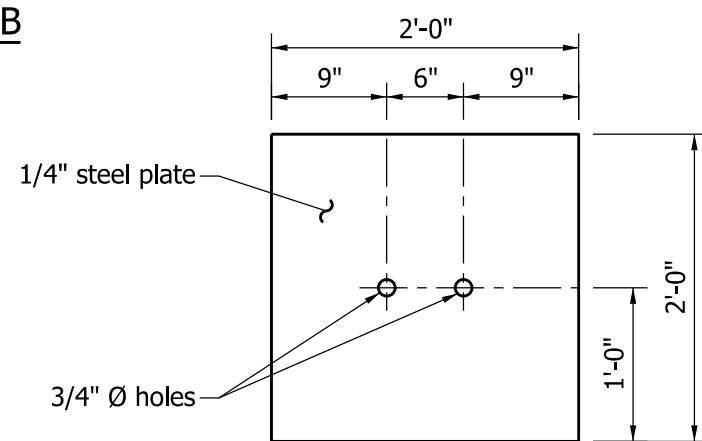
- ① The TS 2 1/2" x 2 1/2" structural tube shall be welded to Post B only. See Standard Drawing E 601-CWGS-04 for location of Post B.

FRONT VIEW

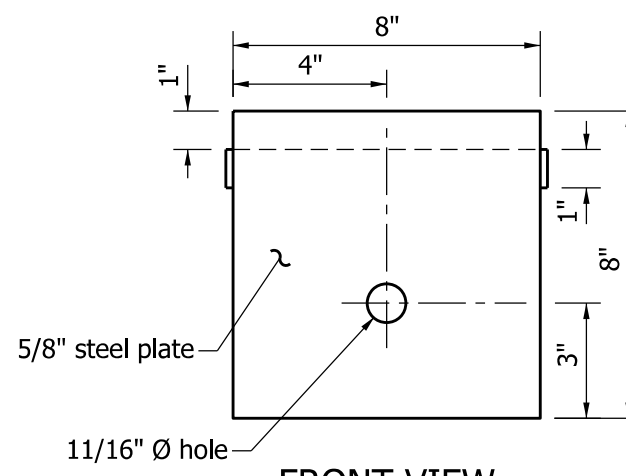
SIDE VIEW

STEEL TUBE

POST B

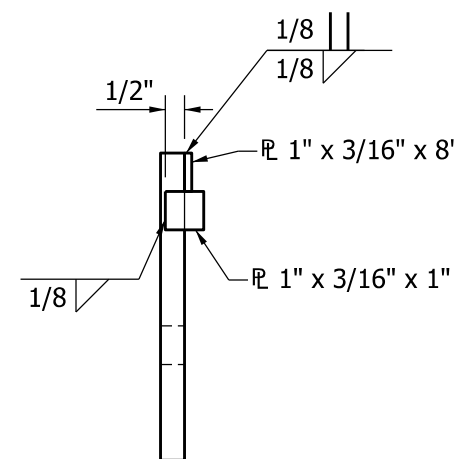


SOIL PLATE



FRONT VIEW

BEARING PLATE



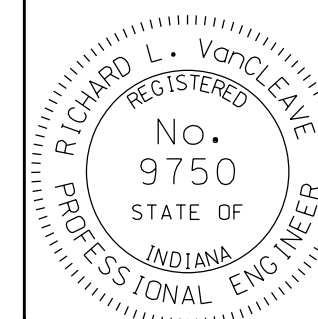
SIDE VIEW

INDIANA DEPARTMENT OF TRANSPORTATION

CURVED W-BEAM
GUARDRAIL SYSTEM

SEPTEMBER 2011

STANDARD DRAWING NO. E 601-CWGS-06



DETAILS PLACED IN THIS FORMAT 09/04/12

/s/ Richard L. VanCleave 09/04/12

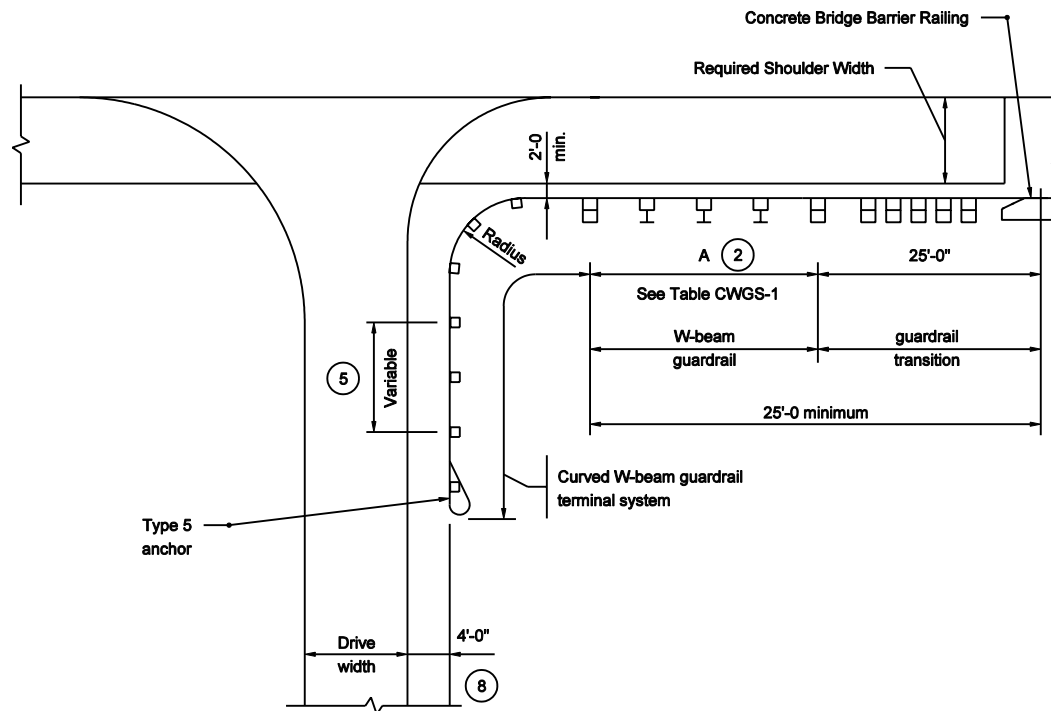
SUPERVISOR, ROADWAY STANDARDS DATE

/s/ Mark A. Miller 09/04/12

CHIEF ENGINEER DATE

NOTES

1. See Standard Drawing E 601-CWGS-03 for other General Notes.
- 2 See Standard Drawing E 601-CWGS-01 for Table CWGS-1.



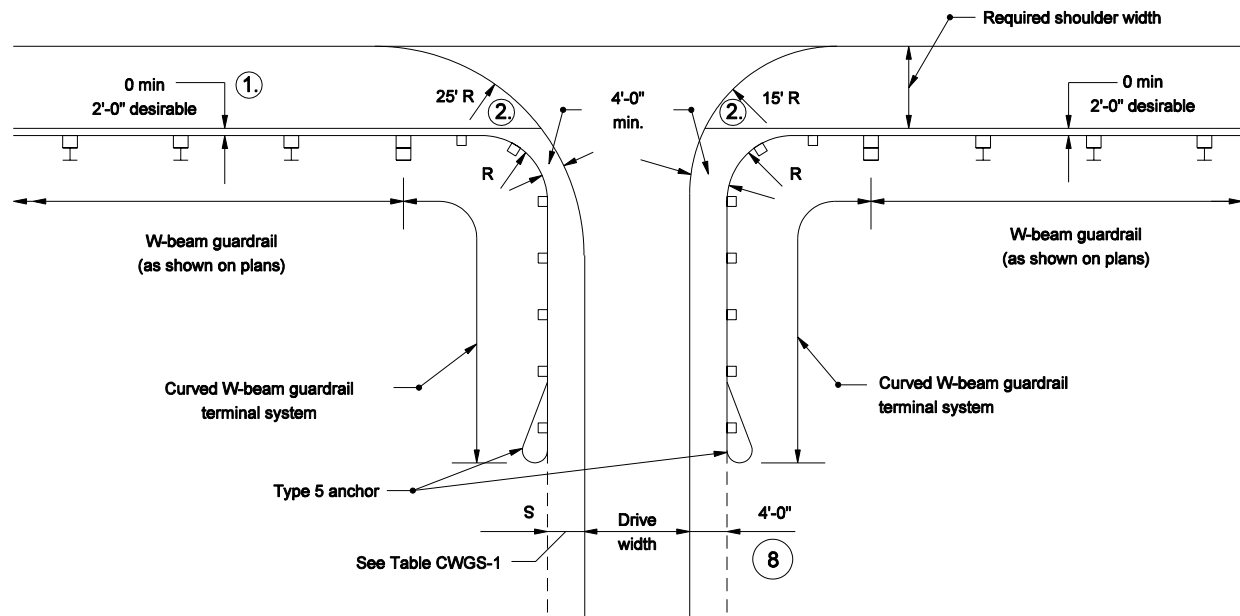
**DRIVE INSTALLATION FOR
W-BEAM GUARDRAIL AT BRIDGE END**

INDIANA DEPARTMENT OF TRANSPORTATION	
CURVED W-BEAM GUARDRAIL TERMINAL SYSTEM	
SEPTEMBER 2003	
STANDARD DRAWING NO. E 601-CWGT-01	
	/s/ Richard L. VanCleave DESIGN STANDARDS ENGINEER
	9-02-03 DATE
	/s/ Richard K. Smutzer CHIEF HIGHWAY ENGINEER
	9-02-03 DATE

NOTES:

- ① When the face of the guardrail is offset 0'-0 or 1'-0 from the edge of the paved shoulder, the width of the drive shoulder, S, must be increased to maintain the 4'-0 minimum distance between the face of the guardrail and the edge of the drive.
- ② For mainline paved shoulder widths equal to or greater than 8'-0 the drive radii should be referenced from the edge of the mainline paved shoulder rather than as shown
3. See Standard Drawing E 601-CWGS-03 for other General Notes.

TABLE CWGS-1	
DRIVE SHOULDER WIDTH FOR 25' RADIUS	
MAINLINE PAVED SHOULDER WIDTH	DRIVE SHOULDER WIDTH S
10'	5'-0
8'	6'-3
6'	7'-6

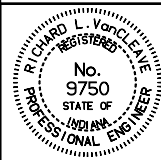


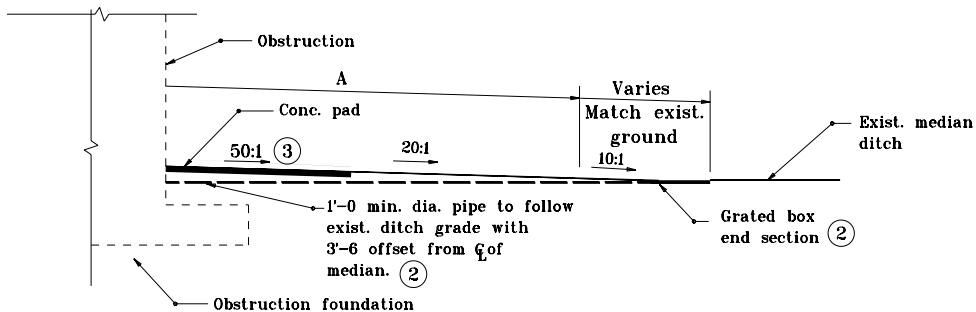
**DRIVE INSTALLATION FOR
W-BEAM GUARDRAIL RUN**

INDIANA DEPARTMENT OF TRANSPORTATION	
CURVED W- BEAM GUARDRAIL TERMINAL SYSTEM	
MARCH 2004	
STANDARD DRAWING NO. E 601-CWGT-02	
	/s/ Richard L. VanCleave 3-01-04 DESIGN STANDARDS ENGINEER DATE
	/s/ Richard K. Smutzer 3-01-04 CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER	

NOTES:

1. The pad and grading details shown on these drawings shall be used as applicable to the attenuator system required for either or both ends of the obstruction.
2. Contractor shall follow manufacturer's recommendations for actual pad size for a particular impact attenuator system.
- ③ Align the centerline of attenuator system parallel to centerline of the roadway. A maximum angle of 5°, as measured between the longitudinal centerline of the roadway and an impact attenuator system type ED is allowed for the gravel barrel array. See Standard Drawing E 601-IAED-01 for gravel barrel layout and pad size.
4. Variation in transverse slope over the length of the pad shall not exceed 2%.
5. Attenuator system including pad shall not encroach on usable shoulder of the roadway.
- ⑥ Longitudinal downward slope shall be 20:1 maximum.
- ⑦ Longitudinal transition slope shall be a maximum of 10:1 downward.
- ⑧ For a concrete pad adjacent to the outside shoulder area, a distance of 3'-3" beyond the far edge of concrete pad from the travel lane shall be sloped 20:1 before gradual transition to existing slope.
- ⑨ Transition from full height barrier curb to mountable curb shall be provided where barrier curb exists or is planned.

INDIANA DEPARTMENT OF TRANSPORTATION									
GRADING AT MEDIAN IMPACT ATTENUATOR									
MARCH 2002									
STANDARD DRAWING No.E 601-GA1A-01A									
	<table><tr><td>/s/ Richard L. VanCleave</td><td>3-01-02</td></tr><tr><td>DESIGN STANDARDS ENGINEER</td><td>DATE</td></tr><tr><td>/s/ Richard K. Smutzer</td><td>3-01-02</td></tr><tr><td>CHIEF HIGHWAY ENGINEER</td><td>DATE</td></tr></table>	/s/ Richard L. VanCleave	3-01-02	DESIGN STANDARDS ENGINEER	DATE	/s/ Richard K. Smutzer	3-01-02	CHIEF HIGHWAY ENGINEER	DATE
/s/ Richard L. VanCleave	3-01-02								
DESIGN STANDARDS ENGINEER	DATE								
/s/ Richard K. Smutzer	3-01-02								
CHIEF HIGHWAY ENGINEER	DATE								
DESIGN STANDARDS ENGINEER									

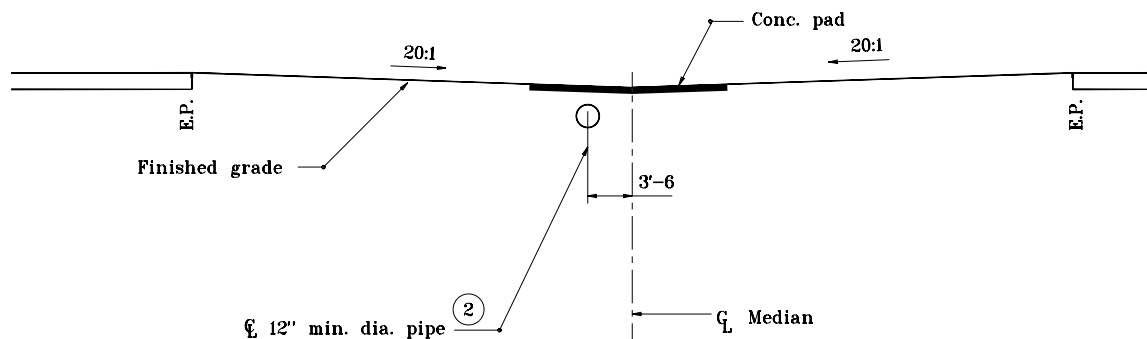


LONGITUDINAL SECTION

NOTES:

1. All slopes from the edge of shoulder to the center of the median and distance A upstation and downstation of the obstruction shall be sloped at 20:1 maximum.
- (2) Median drainage is to be determined by field inspection. If drainage is required, a 12" min. grated box end section type II, slope 10:1, and a 12" min. type 1 pipe shall be used.
- (3) Concrete pad slope

Distance A			Comment
Test Level 3	Test Level 2	Test Level 1	
148'-0	132'-0	100'-0 Desirable	Use appropriate designated impact attenuator test level

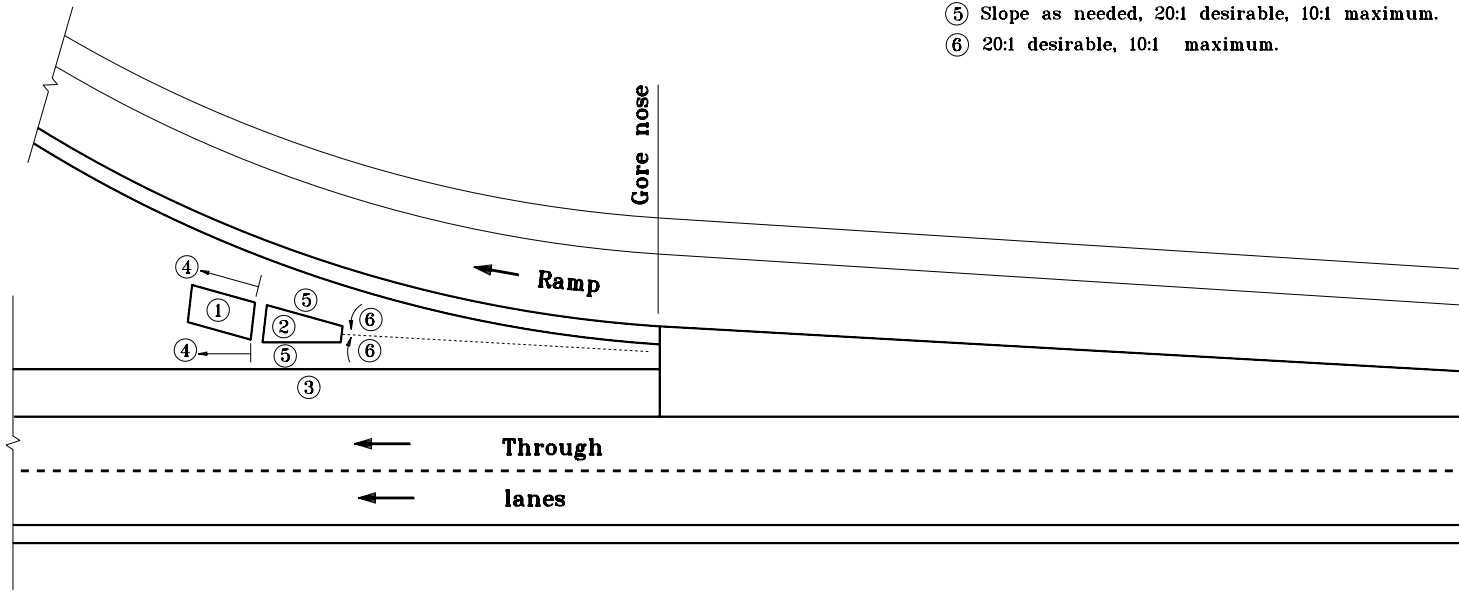


MEDIAN SECTION AT PAD

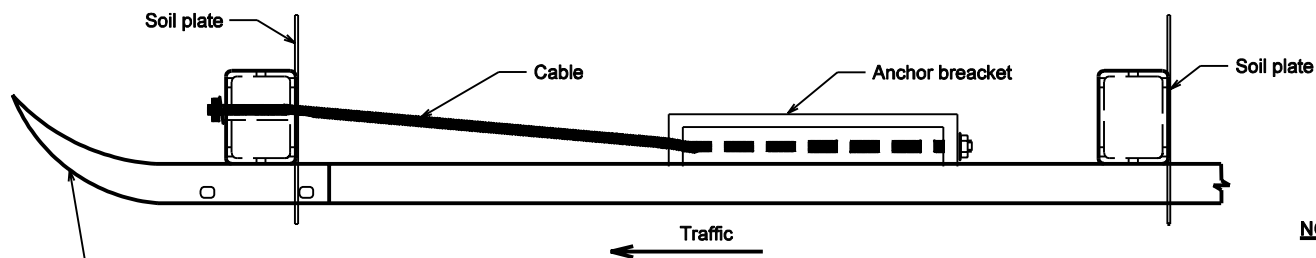
INDIANA DEPARTMENT OF TRANSPORTATION	
GRADING AT MEDIAN IMPACT ATTENUATOR	
MARCH 2002	
STANDARD DRAWING NO. E 601-GAIA-02	
	/s/ Richard L. VanCleave 3-01-02 DESIGN STANDARDS ENGINEER DATE
	/s/ Richard K. Smutzer 3-01-02 CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER	

LEGEND

- ① Obstruction
- ② Impact attenuator pad, transversely as level as conditions permit, maximum slope 20:1. Longitudinally sloping 20:1 maximum, with respect to roadway grade.
- ③ Shoulder slope 4% toward obstruction/impact attenuator pad/swale.
- ④ Transition slope 10:1 maximum transversely.
- ⑤ Slope as needed, 20:1 desirable, 10:1 maximum.
- ⑥ 20:1 desirable, 10:1 maximum.



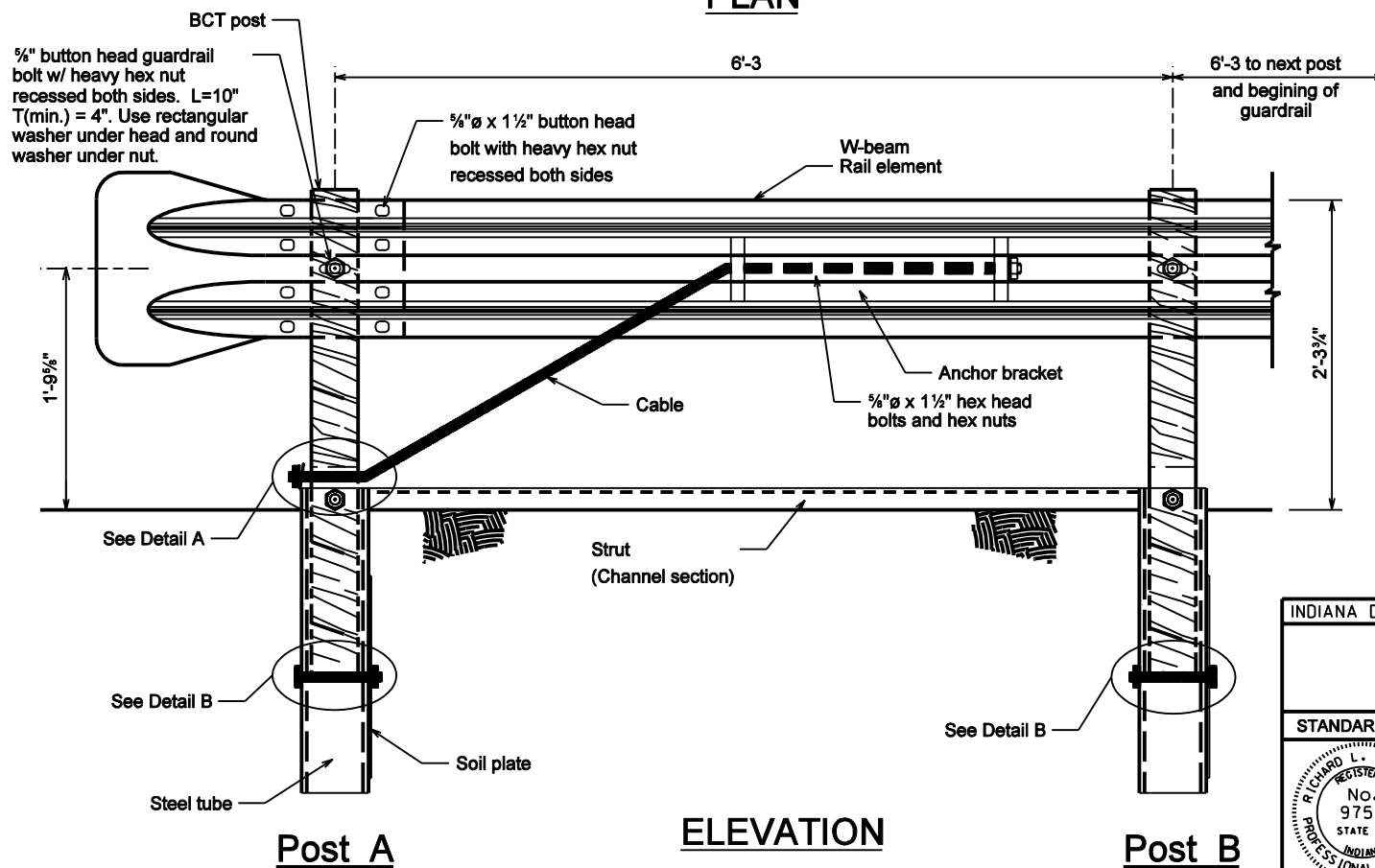
INDIANA DEPARTMENT OF TRANSPORTATION	
GRADING AT IMPACT ATTENUATOR IN GORE AREA	
MARCH 2002	
STANDARD DRAWING NO. E 601-GAIA-03	
	<i>/s/ Richard L. VanCleave</i> 3-01-02 DESIGN STANDARDS ENGINEER DATE
	<i>/s/ Richard K. Smutzer</i> 3-01-02 CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER	



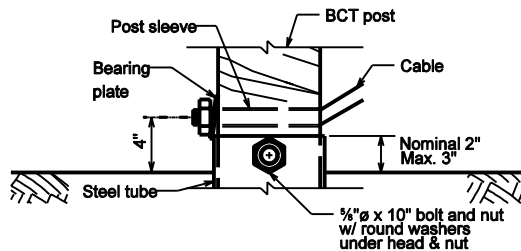
PLAN

NOTES:

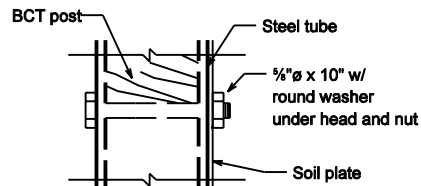
1. See Standards Drawing E 601-GCTA-02 for Details A and B.



INDIANA DEPARTMENT OF TRANSPORTATION	
CABLE TERMINAL ANCHOR SYSTEM	
SEPTEMBER 2001	
STANDARD DRAWING NO. E 601-GCTA-01	
	/s/ Richard L. VanCleave 9-04-01 DESIGN STANDARDS ENGINEER DATE
	/s/ Firooz Zandi 9-04-01 CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER	

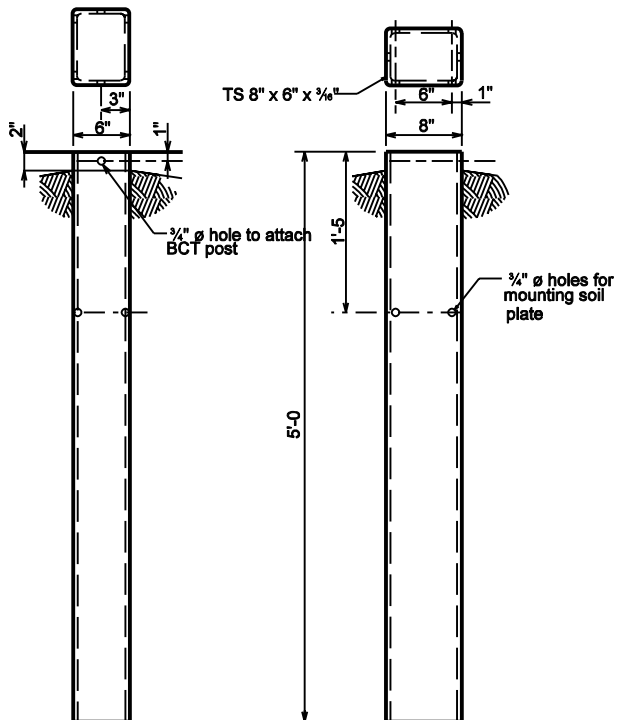


DETAIL A



DETAIL B

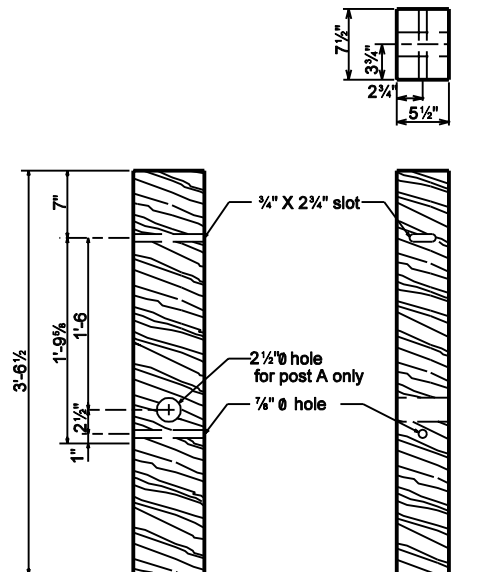
INDIANA DEPARTMENT OF TRANSPORTATION	
CABLE TERMINAL ANCHOR SYSTEM	
SEPTEMBER 2001	
STANDARD DRAWING NO. E 601-GCTA-02	
	/s/ Richard L. VanCleave 9-04-01 DESIGN STANDARDS ENGINEER DATE
	/s/ Firas Zandi 9-04-01 CHIEF HIGHWAY ENGINEER DATE



FRONT

SIDE

GALVANIZED STEEL
FOUNDATION TUBE

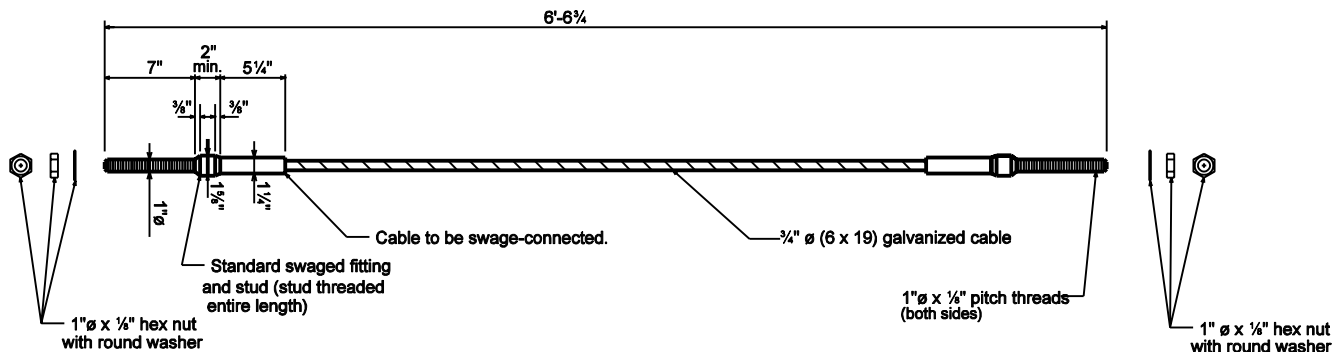


SIDE

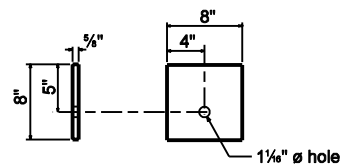
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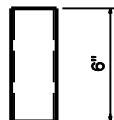
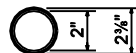
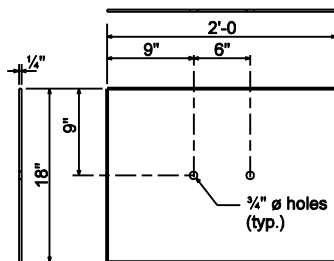
INDIANA DEPARTMENT OF TRANSPORTATION	
CABLE TERMINAL ANCHOR SYSTEM	
SEPTEMBER 2001	
STANDARD DRAWING NO. E 601-GCTA-03	
	/s/ Richard L. VanCleave 9-04-01 DESIGN STANDARDS ENGINEER DATE
	/s/ Firat Zandi 9-04-01 CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER	



BCT CABLE ANCHOR ASSEMBLY



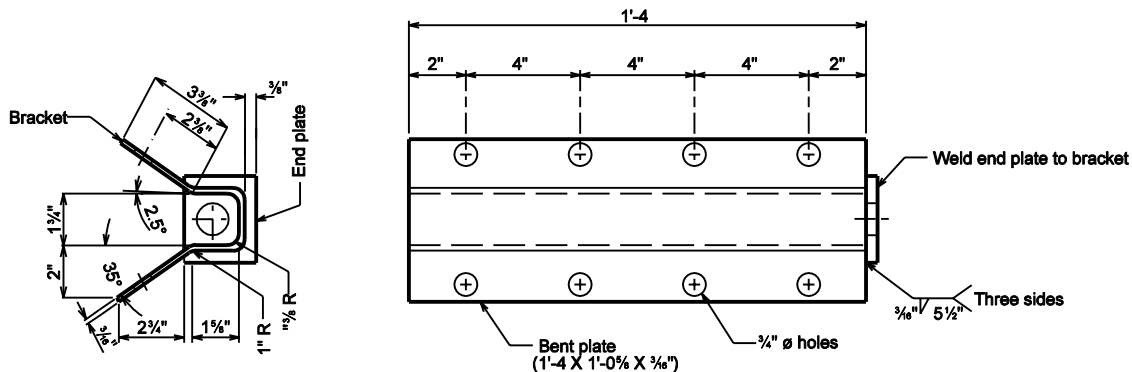
BCT BEARING PLATE



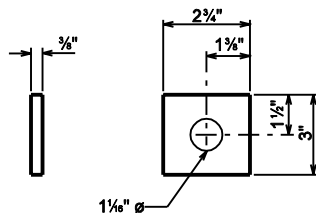
FOUNDATION TUBE SOIL PLATE

BCT POST SLEEVE

INDIANA DEPARTMENT OF TRANSPORTATION	
CABLE TERMINAL ANCHOR SYSTEM	
SEPTEMBER 2001	
STANDARD DRAWING NO. E 601-GCTA-04	
	/s/ Anthony L. Uremovich 9-04-01 DESIGN STANDARDS ENGINEER DATE
	/s/ Firas Zard 9-04-01 CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER	



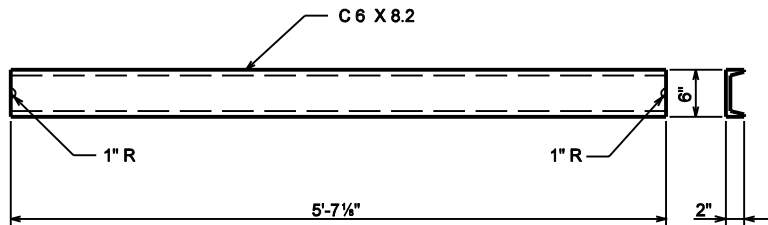
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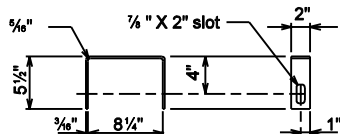
END PLATE

GUARDRAIL ANCHOR BRACKET

INDIANA DEPARTMENT OF TRANSPORTATION	
CABLE TERMINAL ANCHOR SYSTEM	
SEPTEMBER 2001	
STANDARD DRAWING NO. E 601-GCTA-05	
	/s/ Richard L. VanCleave DESIGN STANDARDS ENGINEER DATE
	/s/ Firooz Zandi CHIEF HIGHWAY ENGINEER DATE



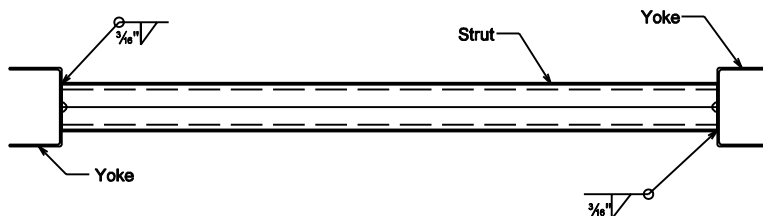
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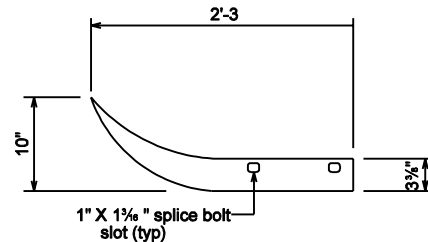
YOKE DETAILS

(2 required)

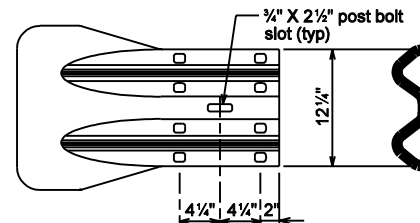
STRUT AND YOKE ASSEMBLY



ASSEMBLY DETAILS



PLAN



ELEVATION

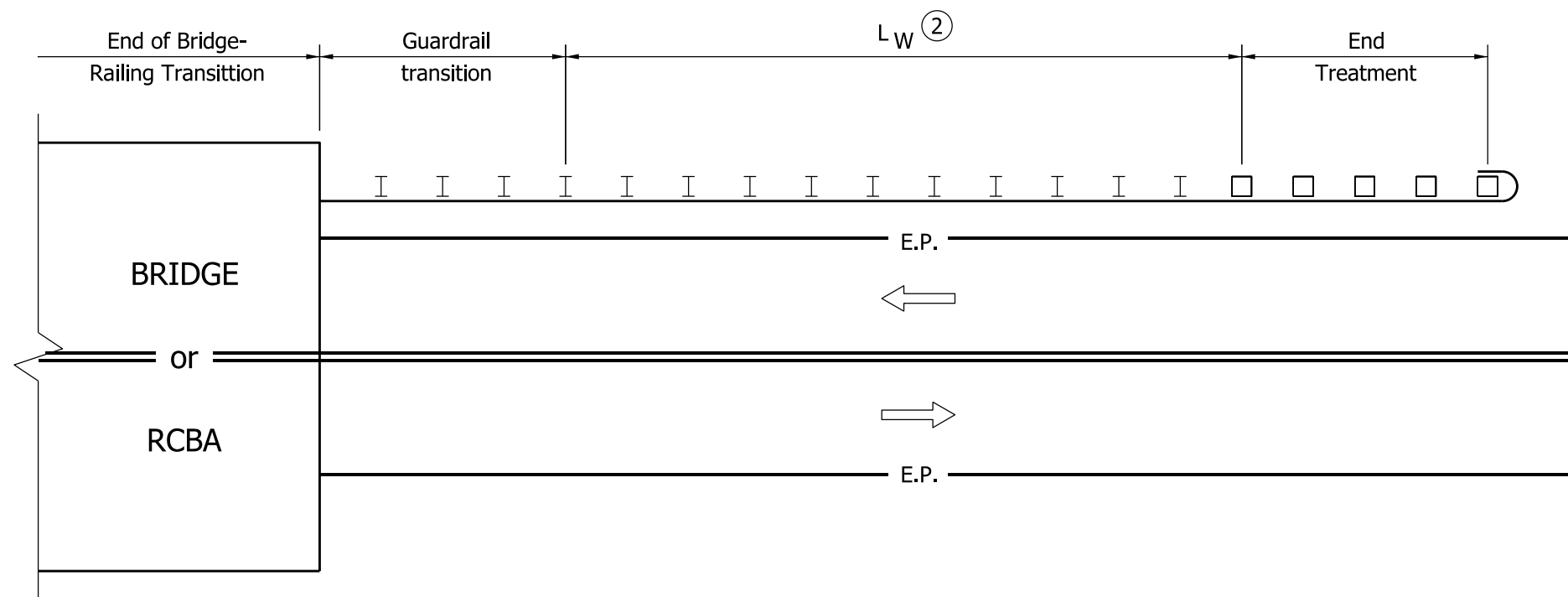
FLARED W-BEAM END SECTION

INDIANA DEPARTMENT OF TRANSPORTATION	
CABLE TERMINAL ANCHOR SYSTEM	
SEPTEMBER 2001	
STANDARD DRAWING NO. E 601-GCTA-06	
	/s/ Richard L. VanCleave DESIGN STANDARDS ENGINEER DATE 9-04-01
	/s/ Firas Zandi CHIEF HIGHWAY ENGINEER DATE 9-04-01

NOTES:

1. This configuration shall be used where W-beam guardrail is specified as the bridge-approach guardrail, and is connected to the bridge railing with guardrail transition type TGB. It shall be typical for all four corners.

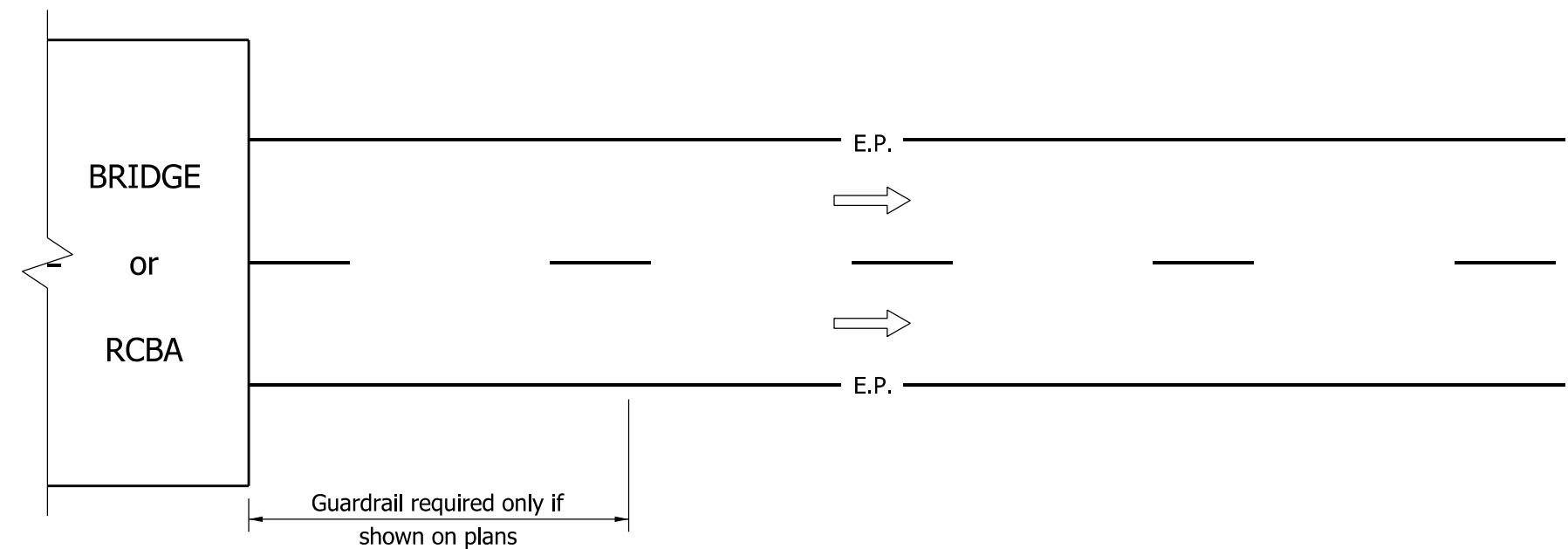
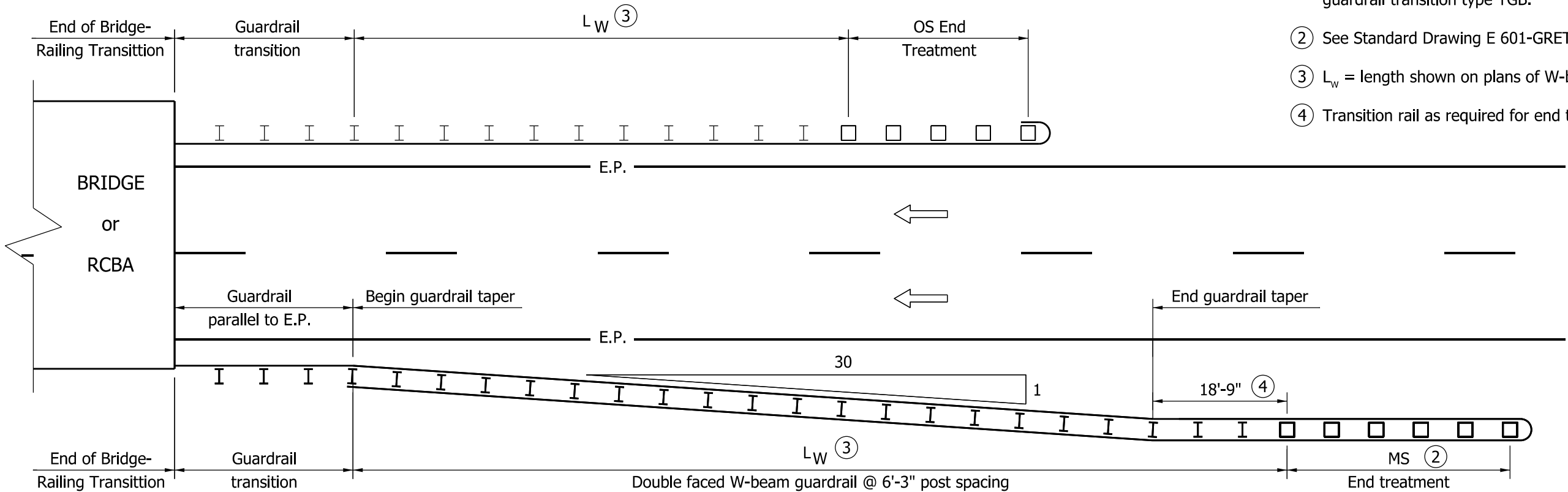
② L_w = length shown on plans of W-beam guardrail at 6'-3" post spacing. ft.



INDIANA DEPARTMENT OF TRANSPORTATION											
BRIDGE-APPROACH GUARDRAIL 2-LANE 2-WAY ROADWAY SEPTEMBER 2011											
STANDARD DRAWING NO. E 601-GRBA-01											
	<table border="0"> <tr> <td><i>/s/ Richard L. VanCleave</i></td> <td><i>09/01/11</i></td> </tr> <tr> <td>DESIGN STANDARDS ENGINEER</td> <td>DATE</td> </tr> <tr> <td colspan="2"> </td> </tr> <tr> <td><i>/s/ Mark A. Miller</i></td> <td><i>09/01/11</i></td> </tr> <tr> <td>CHIEF HIGHWAY ENGINEER</td> <td>DATE</td> </tr> </table>	<i>/s/ Richard L. VanCleave</i>	<i>09/01/11</i>	DESIGN STANDARDS ENGINEER	DATE			<i>/s/ Mark A. Miller</i>	<i>09/01/11</i>	CHIEF HIGHWAY ENGINEER	DATE
<i>/s/ Richard L. VanCleave</i>	<i>09/01/11</i>										
DESIGN STANDARDS ENGINEER	DATE										
<i>/s/ Mark A. Miller</i>	<i>09/01/11</i>										
CHIEF HIGHWAY ENGINEER	DATE										
DESIGN STANDARDS ENGINEER											

NOTES:

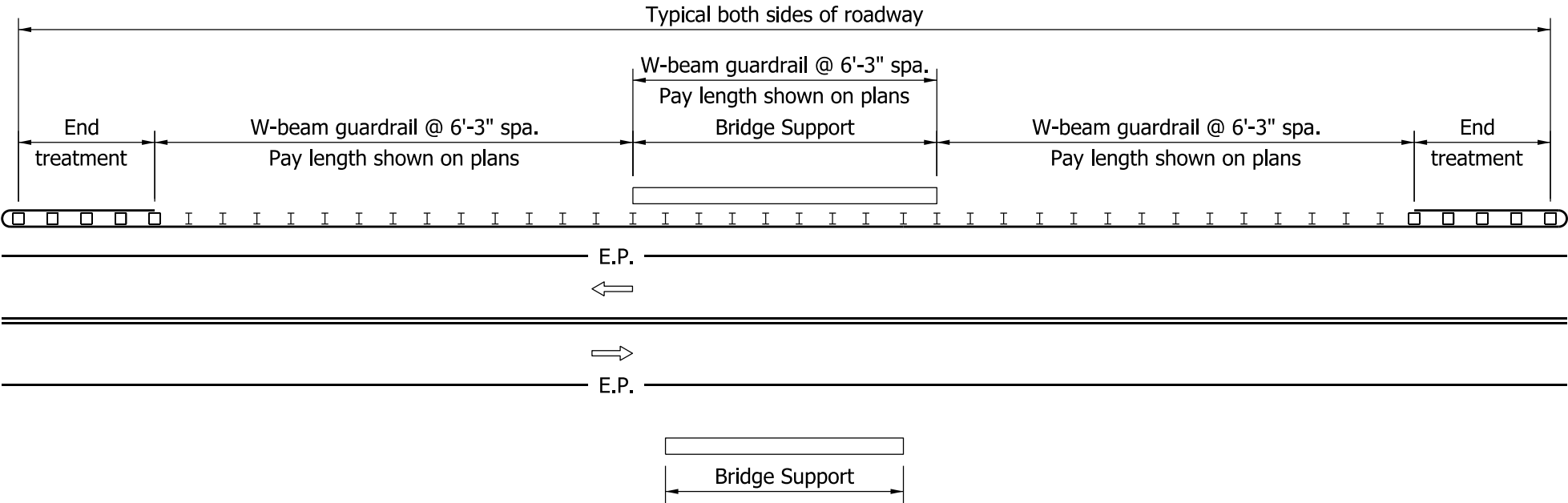
- 1. This configuration shall be used where W-beam guardrail is specified as the bridge-approach guardrail, and is connected to the bridge railing with guardrail transition type TGB.
- ② See Standard Drawing E 601-GRET-07 for alternate placement detail.
- ③ L_W = length shown on plans of W-beam guardrail at 6'-3" post spacing, ft.
- ④ Transition rail as required for end treatment type MS.



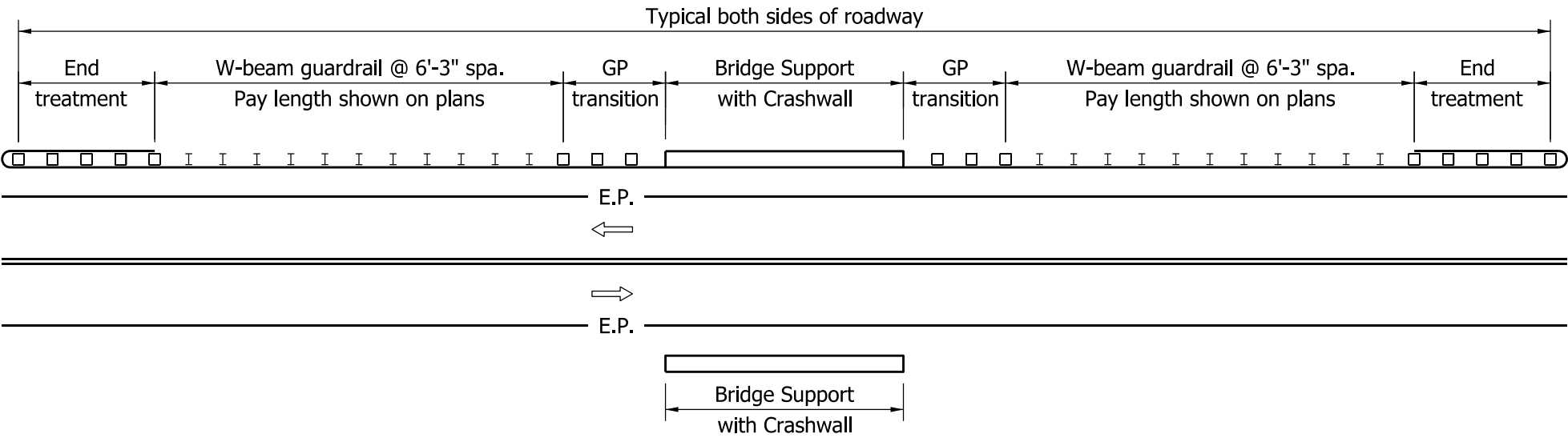
INDIANA DEPARTMENT OF TRANSPORTATION			
BRIDGE-APPROACH GUARDRAIL DIVIDED ROADWAY SEPTEMBER 2011			
STANDARD DRAWING NO.		E 601-GRBA-02	
	/s/ <i>Richard L. VanCleave</i>		09/01/11
	DESIGN STANDARDS ENGINEER		DATE
	/s/ <i>Mark A. Miller</i>		09/01/11
DESIGN STANDARDS ENGINEER	CHIEF HIGHWAY ENGINEER		DATE

NOTES:

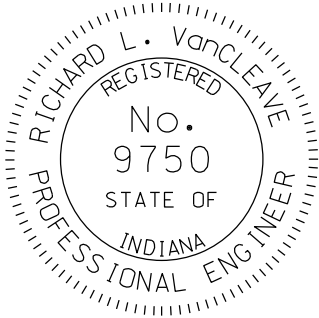
- 1. This configuration shall be used where W-beam guardrail is specified along a two-lane two-way roadway to shield the supports of an overhead structure.
- 2. Dimensions and details not shown hereon shall be as shown on the plans.

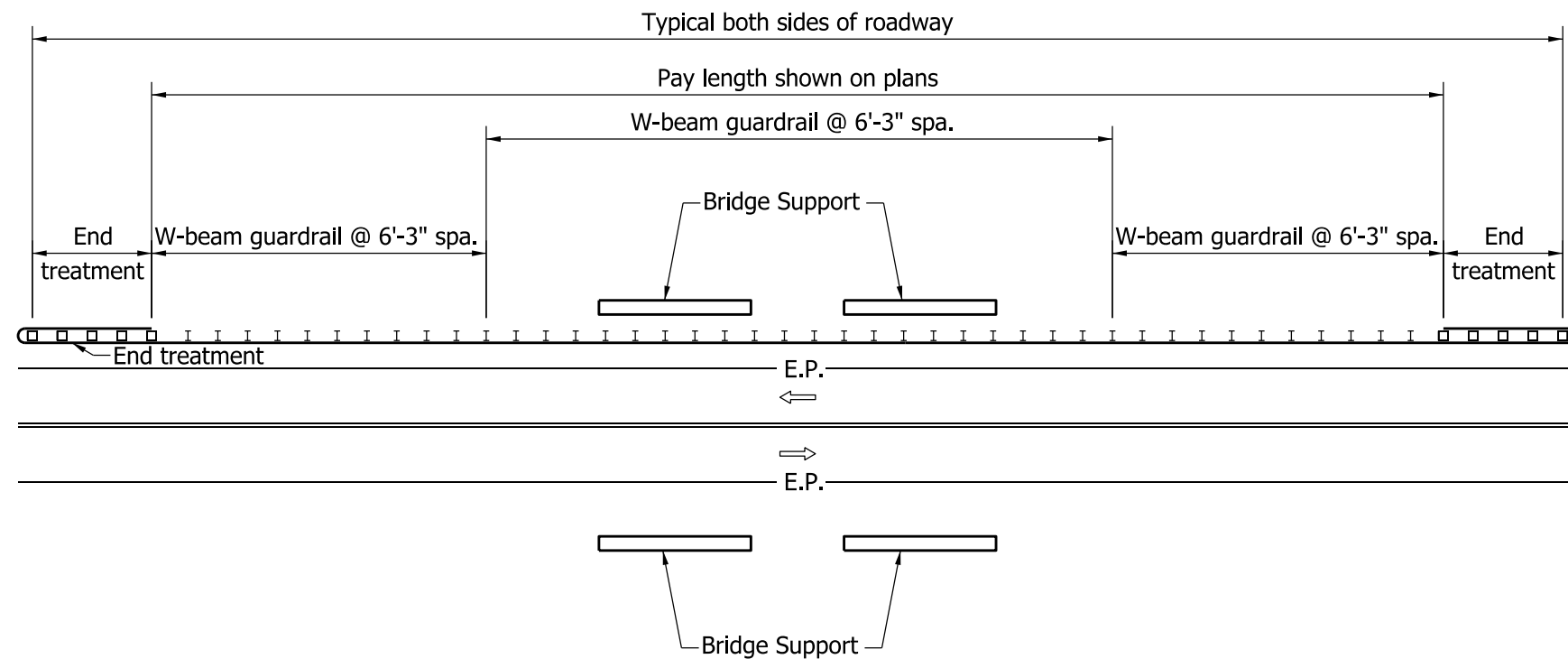


TWO-LANE TWO-WAY ROADWAY WITH SINGLE OVERHEAD STRUCTURE AND BRIDGE-SUPPORT DISTANCE TO E.P.> 16'

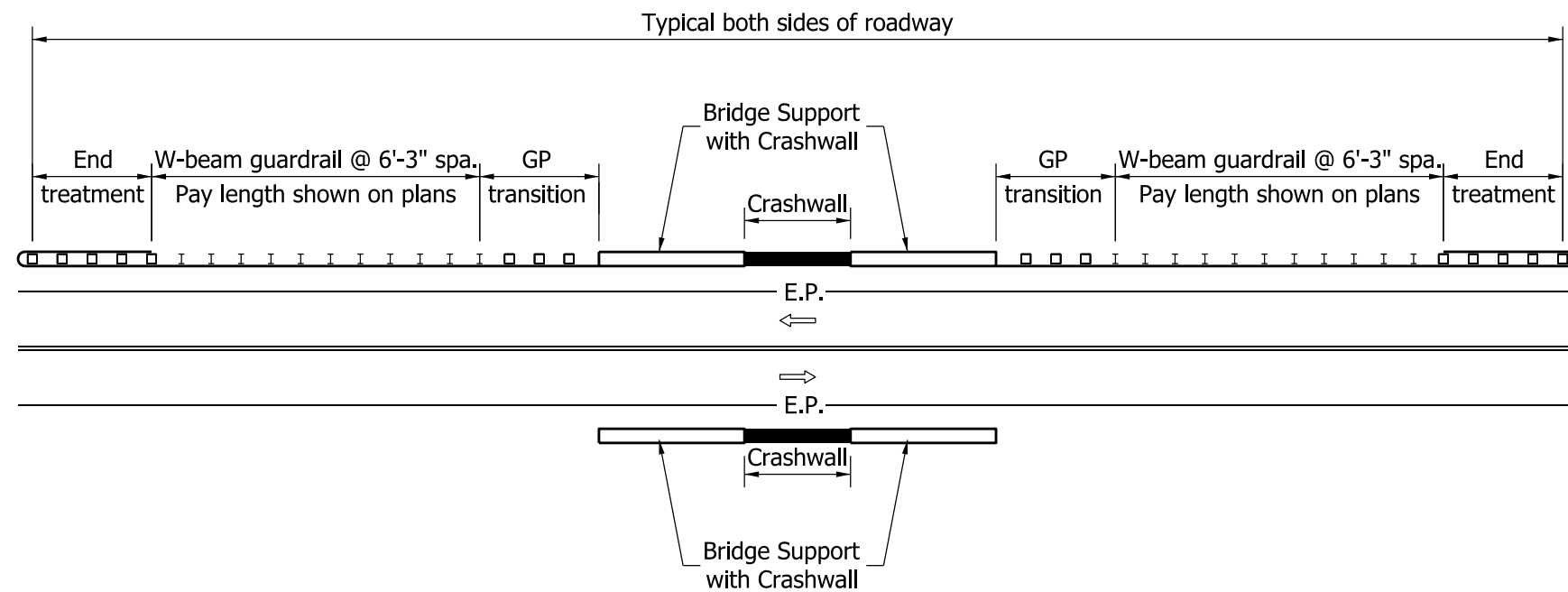


TWO-LANE TWO-WAY ROADWAY WITH SINGLE OVERHEAD STRUCTURE AND BRIDGE-SUPPORT DISTANCE TO E.P. ≤ 16'

INDIANA DEPARTMENT OF TRANSPORTATION			
GUARDRAIL AT ROADSIDE BRIDGE SUPPORT			
SEPTEMBER 2011			
STANDARD DRAWING NO.		E 601-GRBS-01	
	/s/ <i>Richard L. VanCleave</i>		09/01/11
	DESIGN STANDARDS ENGINEER		DATE
	/s/ <i>Mark A. Miller</i>		09/01/11
DESIGN STANDARDS ENGINEER		CHIEF HIGHWAY ENGINEER	
		DATE	



TWO-LANE TWO-WAY ROADWAY WITH TWIN OVERHEAD STRUCTURES AND BRIDGE-SUPPORT DISTANCE TO E.P. > 16'



TWO-LANE TWO-WAY ROADWAY WITH TWIN OVERHEAD STRUCTURES AND BRIDGE-SUPPORT DISTANCE TO E.P. ≤ 16'

NOTES:

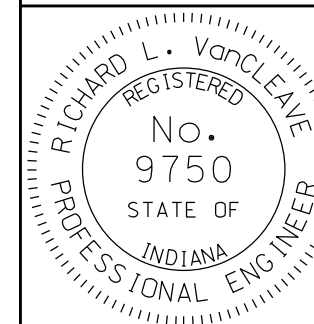
1. This configuration shall be used where W-beam guardrail is specified along a two-lane two-way roadway to shield the supports of twin overhead structures.
2. Dimensions and details not shown hereon shall be as shown on the plans.

INDIANA DEPARTMENT OF TRANSPORTATION

GUARDRAIL AT ROADSIDE
BRIDGE SUPPORTS

SEPTEMBER 2011

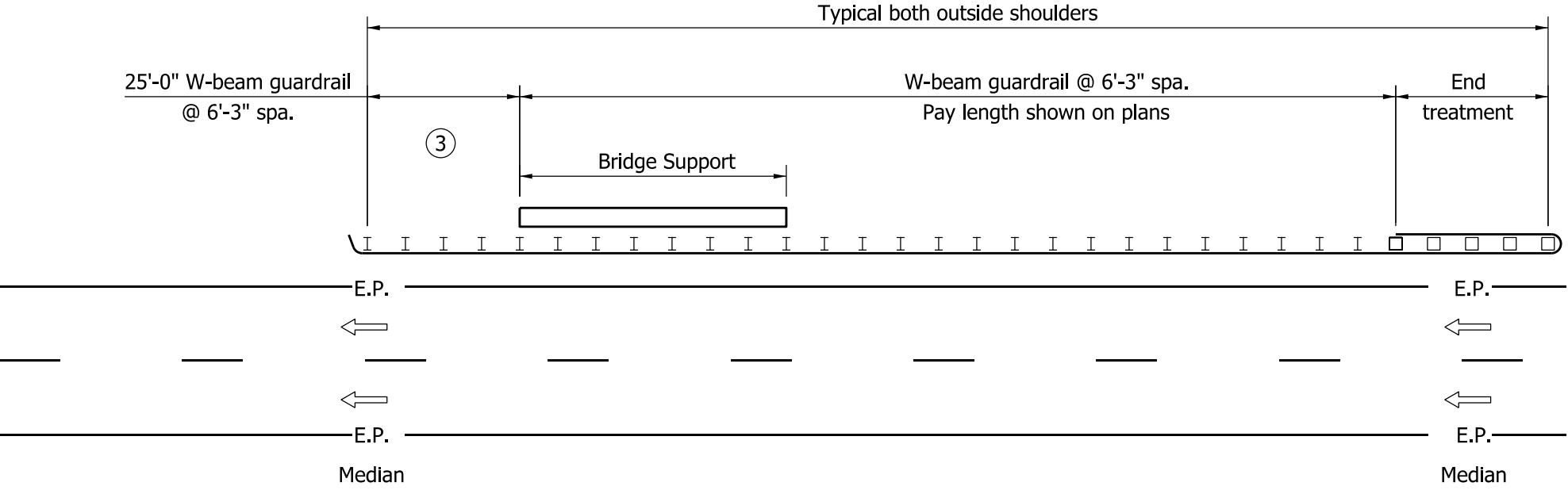
STANDARD DRAWING NO. E 601-GRBS-02



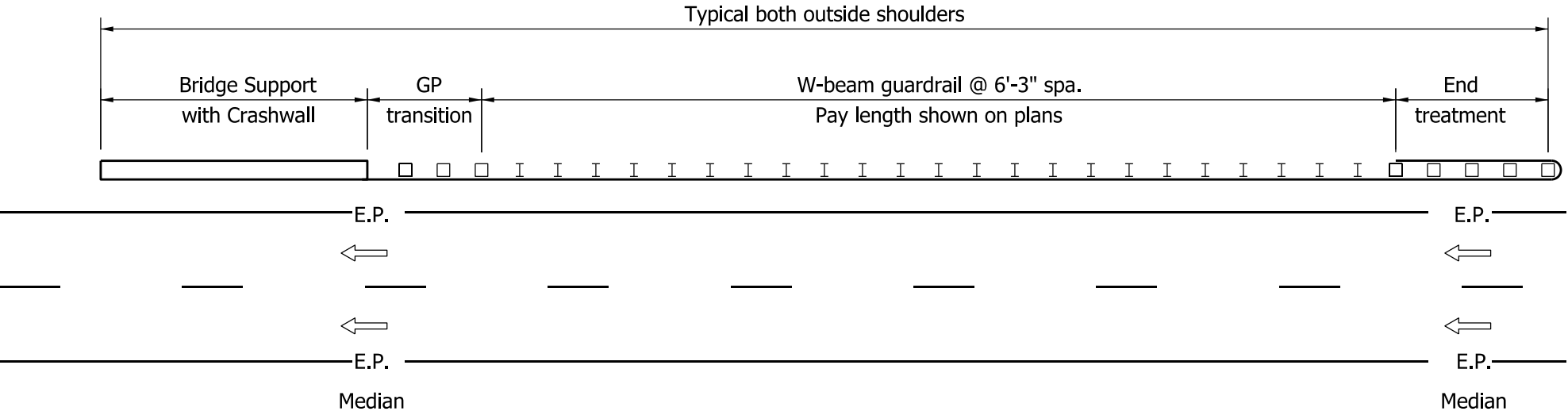
DESIGN STANDARDS ENGINEER

/s/ *Richard L. VanCleave* 09/01/11
DESIGN STANDARDS ENGINEER DATE

/s/ *Mark A. Miller* 09/01/11
CHIEF HIGHWAY ENGINEER DATE



DIVIDED ROADWAY WITH SINGLE OVERHEAD STRUCTURE AND OUTSIDE SHOULDER BRIDGE-SUPPORT DISTANCE TO E.P. > 16'

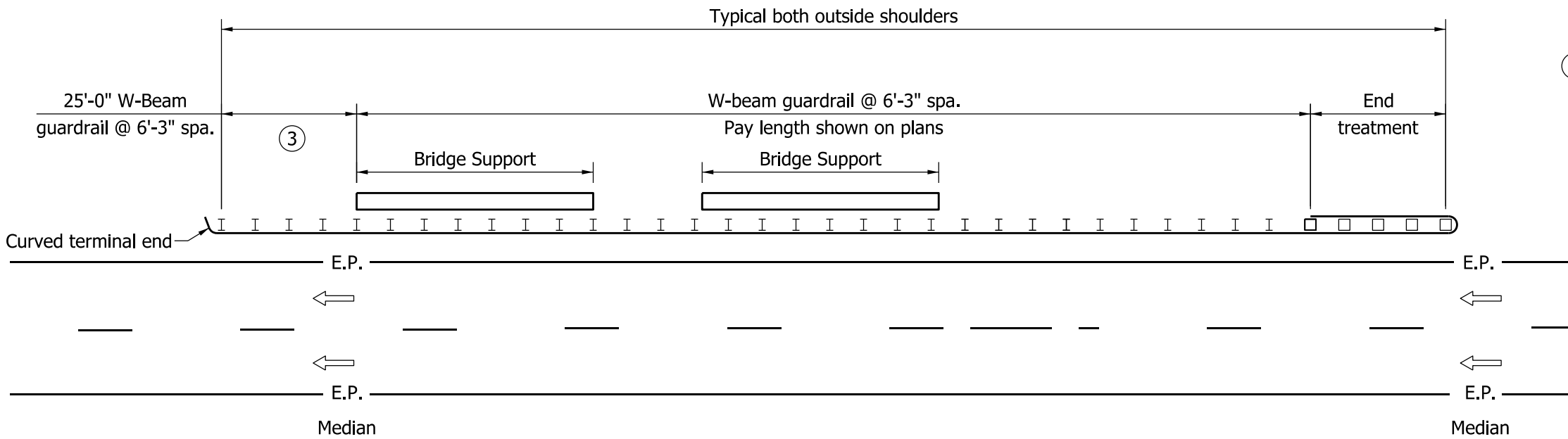


DIVIDED ROADWAY WITH SINGLE OVERHEAD STRUCTURE AND OUTSIDE SHOULDER BRIDGE-SUPPORT DISTANCE TO E.P. ≤ 16'

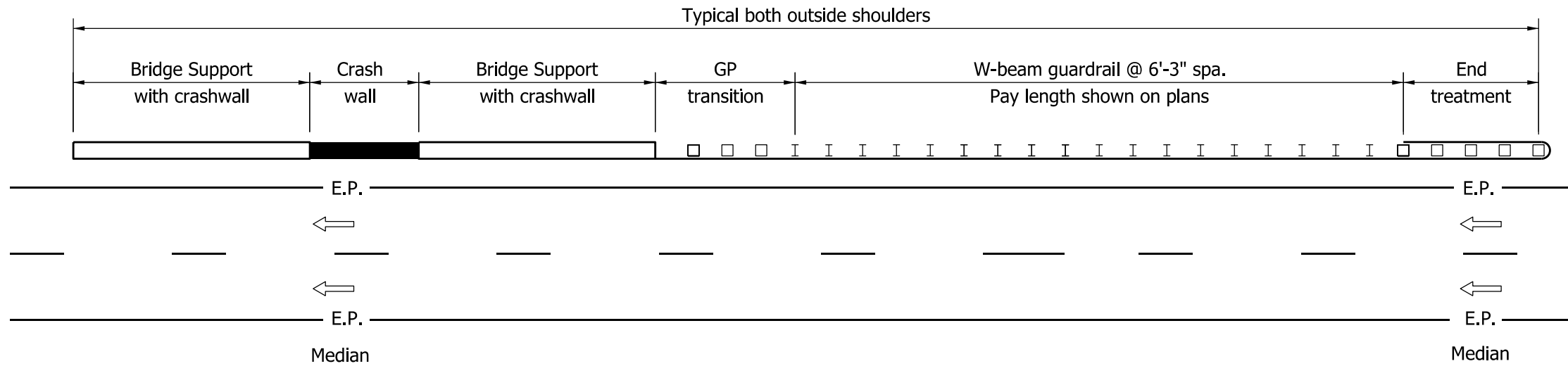
NOTES:

1. This configuration shall be used where W-beam guardrail is specified along the outside shoulder of a divided roadway to shield the supports of an overhead structure.
2. Dimensions and details not shown hereon shall be as shown on the plans.
- ③ Rectangular plate washers shall be installed at each post along this section. See Standard Drawing E 601-GRBS-08.

INDIANA DEPARTMENT OF TRANSPORTATION			
GUARDRAIL AT ROADSIDE BRIDGE SUPPORT			
SEPTEMBER 2011			
STANDARD DRAWING NO.		E 601-GRBS-03	
	/s/ <i>Richard L. VanCleave</i>		09/01/11
	DESIGN STANDARDS ENGINEER		DATE
	/s/ <i>Mark A. Miller</i>		09/01/11
DESIGN STANDARDS ENGINEER	CHIEF HIGHWAY ENGINEER		DATE



DIVIDED ROADWAY WITH TWIN OVERHEAD STRUCTURES AND OUTSIDE-SHOULDER BRIDGE-SUPPORT DISTANCE TO E.P. > 16'



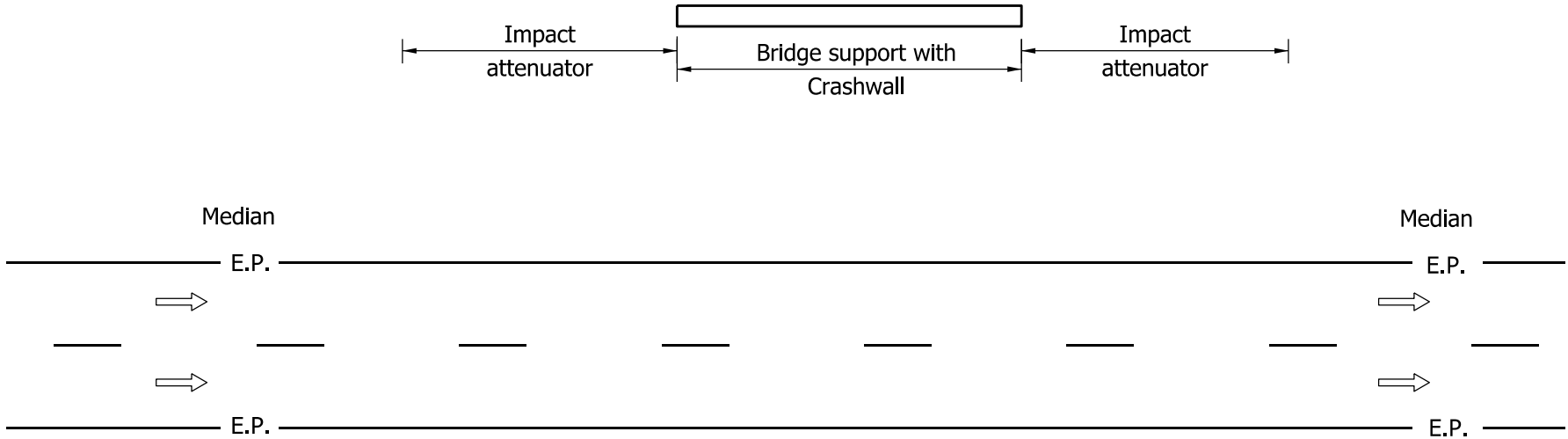
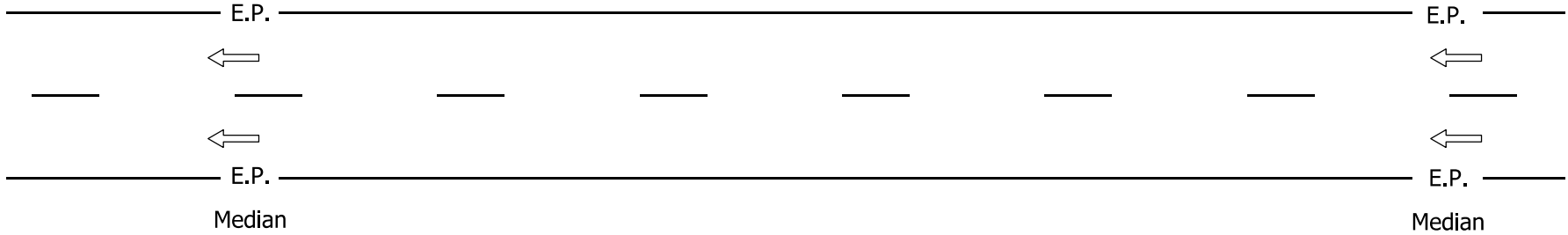
DIVIDED ROADWAY WITH TWIN OVERHEAD STRUCTURES AND OUTSIDE-SHOULDER BRIDGE-SUPPORT DISTANCE TO E.P. ≤ 16'

- NOTES:
1. This configuration shall be used where W-beam guardrail is specified along the outside shoulder of a divided roadway to shield the supports of twin overhead structures.
 2. Dimensions and details not shown hereon shall be as shown on the plans.
 - ③ Rectangular plate washers shall be installed at each post along this section. See Standard Drawing E 601-GRBS-08.

INDIANA DEPARTMENT OF TRANSPORTATION									
GUARDRAIL AT ROADSIDE BRIDGE SUPPORTS									
SEPTEMBER 2011									
STANDARD DRAWING NO. E 601-GRBS-04									
	<table><tr><td>/s/ Richard L. VanCleave</td><td>09/01/11</td></tr><tr><td>DESIGN STANDARDS ENGINEER</td><td>DATE</td></tr><tr><td>/s/ Mark A. Miller</td><td>09/01/11</td></tr><tr><td>CHIEF HIGHWAY ENGINEER</td><td>DATE</td></tr></table>	/s/ Richard L. VanCleave	09/01/11	DESIGN STANDARDS ENGINEER	DATE	/s/ Mark A. Miller	09/01/11	CHIEF HIGHWAY ENGINEER	DATE
/s/ Richard L. VanCleave	09/01/11								
DESIGN STANDARDS ENGINEER	DATE								
/s/ Mark A. Miller	09/01/11								
CHIEF HIGHWAY ENGINEER	DATE								
DESIGN STANDARDS ENGINEER									

NOTES:

- 1. This configuration shall be used where impact-attenuator units are specified in conjunction with a crashwall in the median of a divided roadway to shield the support of an overhead structure.
- 2. Dimensions and details not shown hereon shall be as shown on the plans.

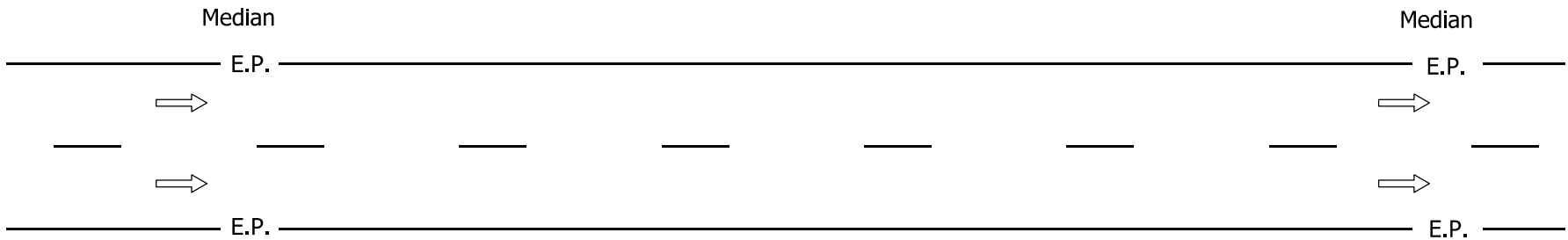
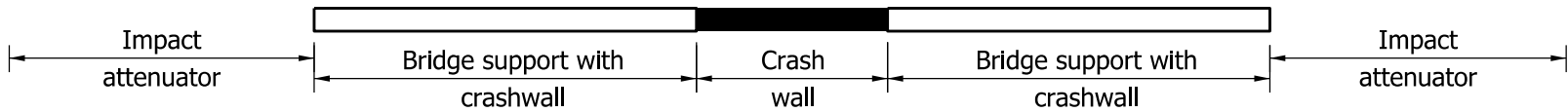
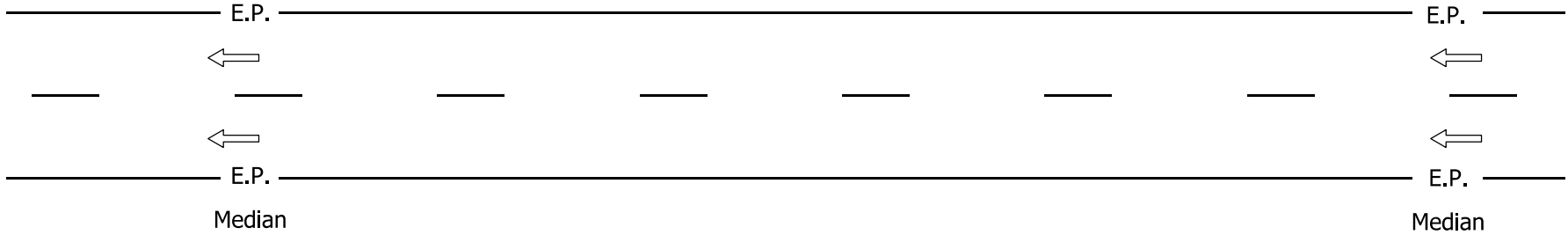


DIVIDED ROADWAY WITH SINGLE OVERHEAD STRUCTURE AND MEDIAN BRIDGE SUPPORT

INDIANA DEPARTMENT OF TRANSPORTATION		
GUARDRAIL AT MEDIAN-SIDE BRIDGE SUPPORT		
SEPTEMBER 2011		
STANDARD DRAWING NO.		E 601-GRBS-05
	<i>/s/ Richard L. VanCleave</i> 09/01/11	
	DESIGN STANDARDS ENGINEER	DATE
	<i>/s/ Mark A. Miller</i> 09/01/11	
	CHIEF HIGHWAY ENGINEER	DATE
DESIGN STANDARDS ENGINEER		

NOTES:

1. This configuration shall be used where impact-attenuator units are specified in conjunction with a crashwall in the median of a divided roadway to shield the supports of twin overhead structures.
2. Dimensions and details not shown hereon shall be as shown on the plans.

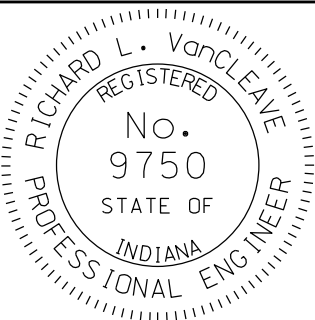


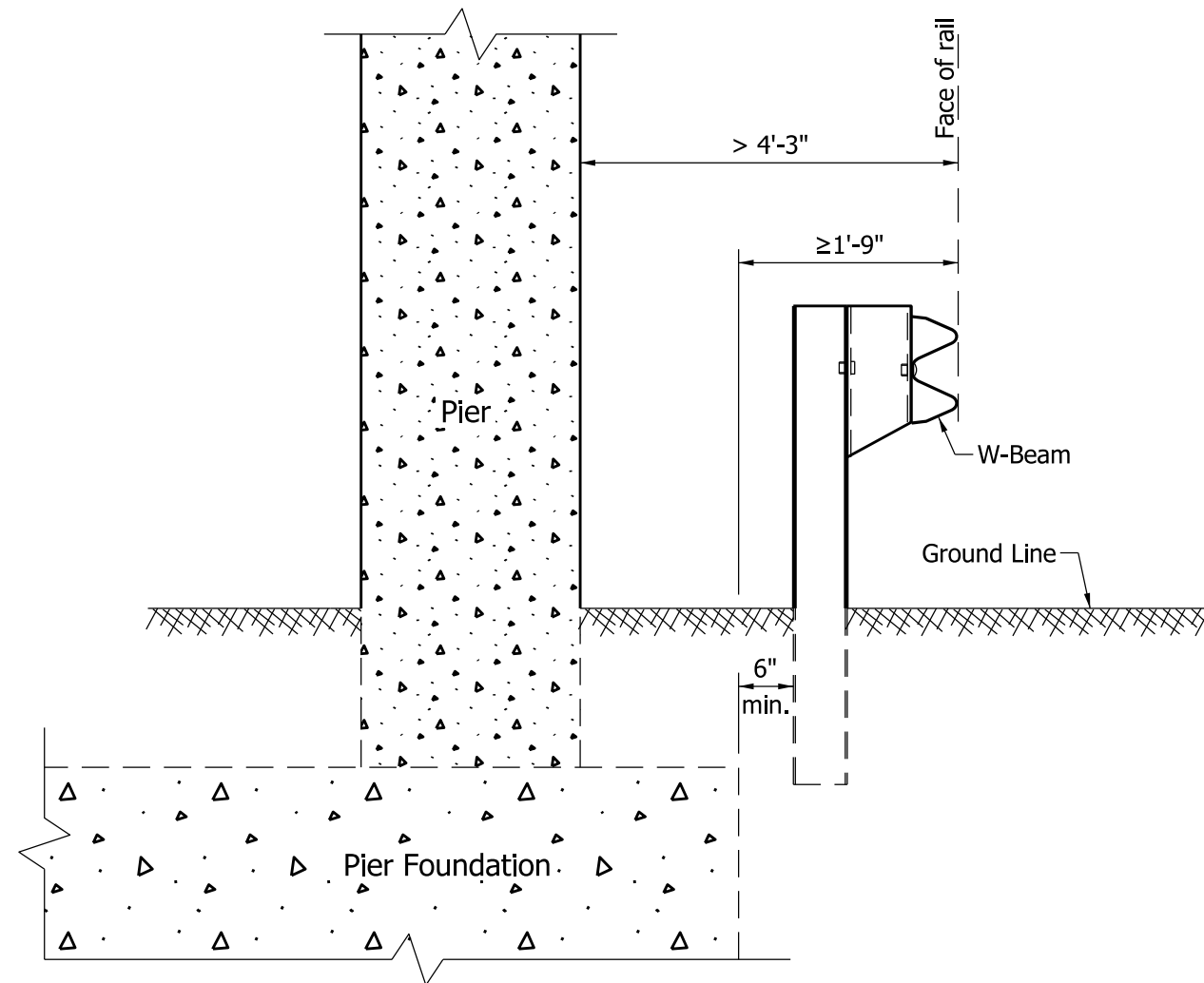
DIVIDED ROADWAY WITH TWIN OVERHEAD STRUCTURES AND MEDIAN BRIDGE SUPPORTS

INDIANA DEPARTMENT OF TRANSPORTATION			
GUARDRAIL AT MEDIAN-SIDE BRIDGE SUPPORTS			
SEPTEMBER 2011			
STANDARD DRAWING NO.		E 601-GRBS-06	
	<i>/s/ Richard L. VanCleave</i>		<i>09/01/11</i>
	DESIGN STANDARDS ENGINEER		DATE
	<i>/s/ Mark A. Miller</i>		<i>09/01/11</i>
DESIGN STANDARDS ENGINEER		CHIEF HIGHWAY ENGINEER	
		DATE	

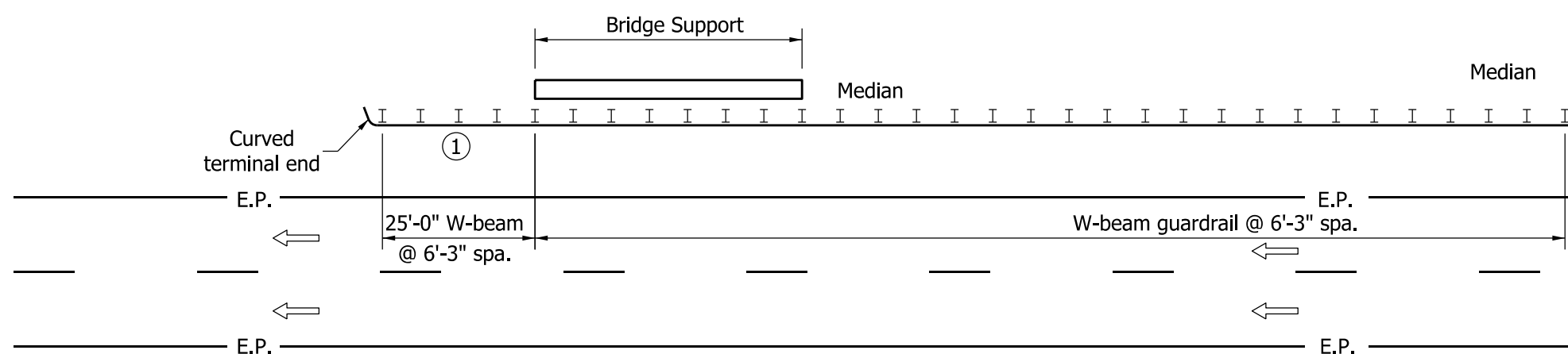


1. This configuration shall be used where W-beam guardrail is specified along the median-side shoulder of a divided roadway to shield the support of a tandem overhead structure.
2. Dimensions and details not shown hereon shall be as shown on the plans.
- ③ Rectangular plate washers shall be installed at each post along this section. See Standard Drawing E 601-GRBS-08.

INDIANA DEPARTMENT OF TRANSPORTATION											
GUARDRAIL AT MEDIAN-SIDE BRIDGE SUPPORT SEPTEMBER 2011											
STANDARD DRAWING NO. E 601-GRBS-07											
	<table border="0"> <tr> <td><i>/s/ Richard L. VanCleave</i></td> <td><i>09/01/11</i></td> </tr> <tr> <td>DESIGN STANDARDS ENGINEER</td> <td>DATE</td> </tr> <tr> <td colspan="2"> </td> </tr> <tr> <td><i>/s/ Mark A. Miller</i></td> <td><i>09/01/11</i></td> </tr> <tr> <td>CHIEF HIGHWAY ENGINEER</td> <td>DATE</td> </tr> </table>	<i>/s/ Richard L. VanCleave</i>	<i>09/01/11</i>	DESIGN STANDARDS ENGINEER	DATE			<i>/s/ Mark A. Miller</i>	<i>09/01/11</i>	CHIEF HIGHWAY ENGINEER	DATE
<i>/s/ Richard L. VanCleave</i>	<i>09/01/11</i>										
DESIGN STANDARDS ENGINEER	DATE										
<i>/s/ Mark A. Miller</i>	<i>09/01/11</i>										
CHIEF HIGHWAY ENGINEER	DATE										
DESIGN STANDARDS ENGINEER											



GUARDRAIL-TO-PIER CLEARANCE



DOWNSTREAM GUARDRAIL TREATMENT

NOTE:

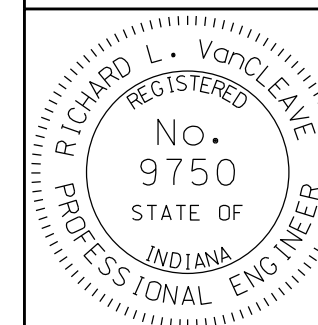
- ① Washers required for each post in this section shall be rectangular plate washers, as shown on Standard Drawing E 601-WBGC-02.

INDIANA DEPARTMENT OF TRANSPORTATION

GUARDRAIL AT BRIDGE SUPPORT

SEPTEMBER 2011

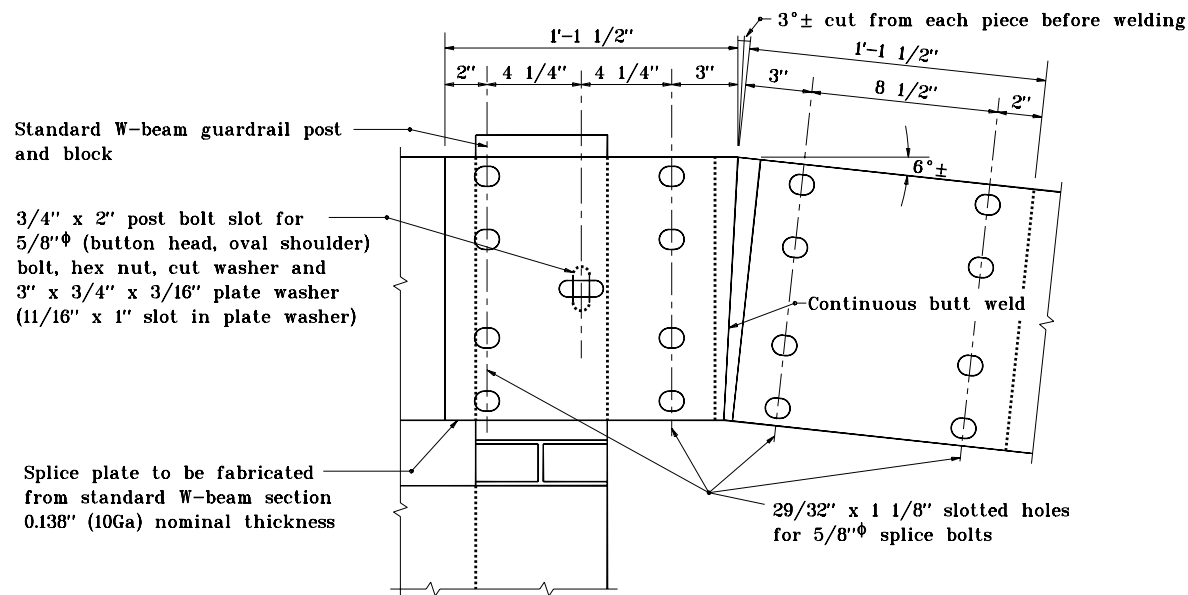
STANDARD DRAWING NO. E 601-GRBS-08



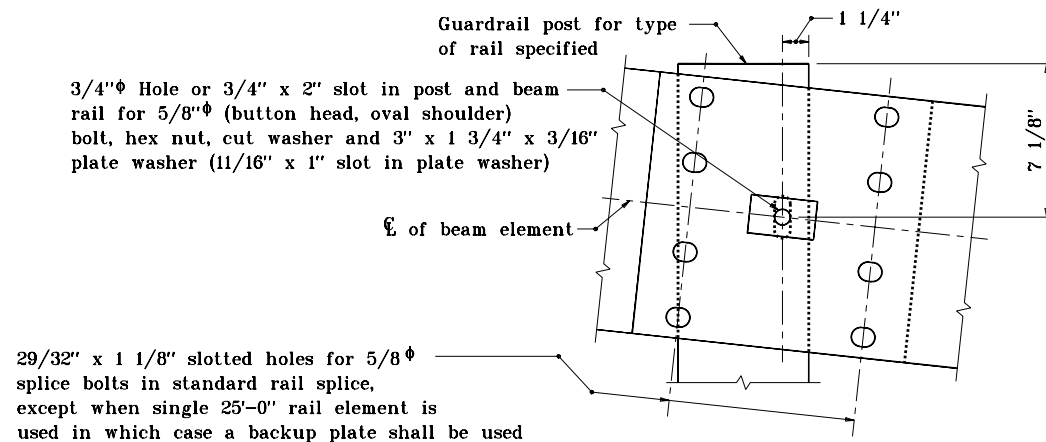
DESIGN STANDARDS ENGINEER

/s/ *Richard L. VanCleave* 09/01/11
DESIGN STANDARDS ENGINEER DATE

/s/ *Mark A. Miller* 09/01/11
CHIEF HIGHWAY ENGINEER DATE



SPLICE PLATE ASSEMBLY DETAIL



POST NO. 2 CONNECTION DETAIL

GENERAL NOTES

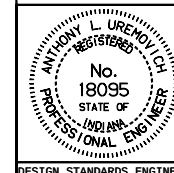
1. This sheet shall be used when guardrail end treatment type I is specified
2. The details on this sheet are for the assembly and the installation of the components of guardrail end treatment type I.

INDIANA DEPARTMENT OF TRANSPORTATION

**GUARDRAIL
END TREATMENT TYPE I**

APRIL 1995

STANDARD DRAWING NO. **E 601-GRET-04**



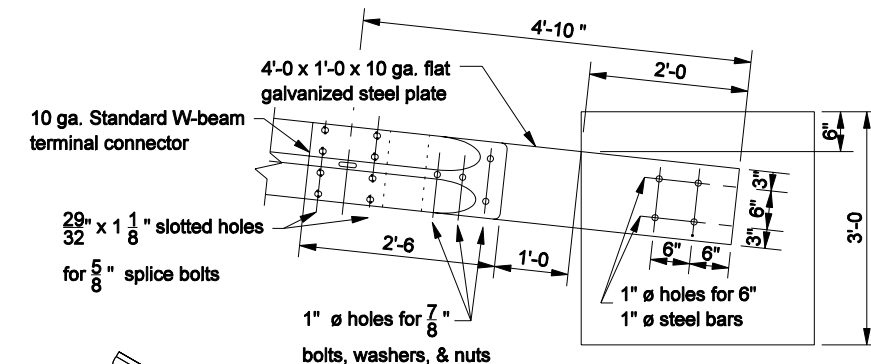
DETAILS PLACED IN THIS FORMAT 11-15-99

/s/ Anthony L. Uremovich 11-15-99
DESIGN STANDARDS ENGINEER DATE

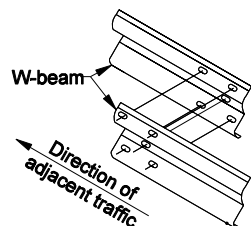
/s/ Firooz Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

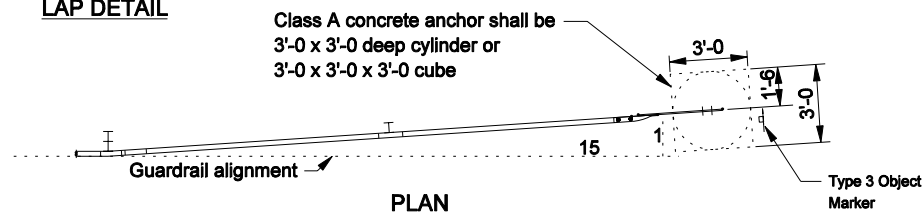
ORIGINALLY APPROVED 4-03-95



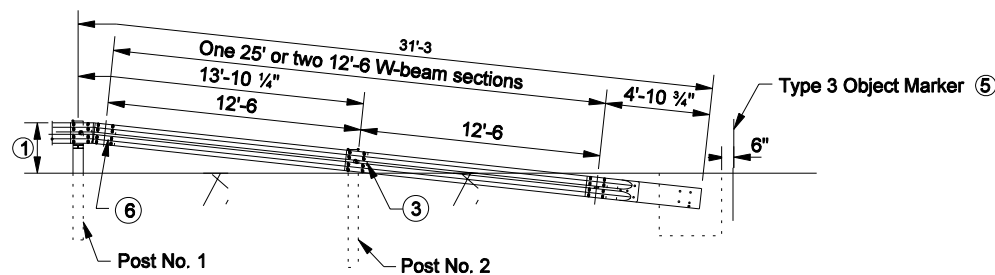
CONCRETE ANCHOR DETAIL



LAP DETAIL



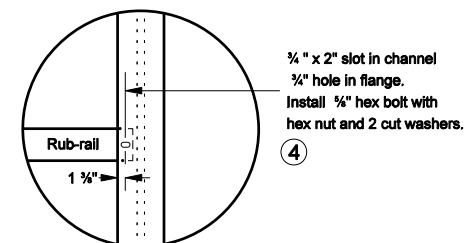
PLAN



ELEVATION

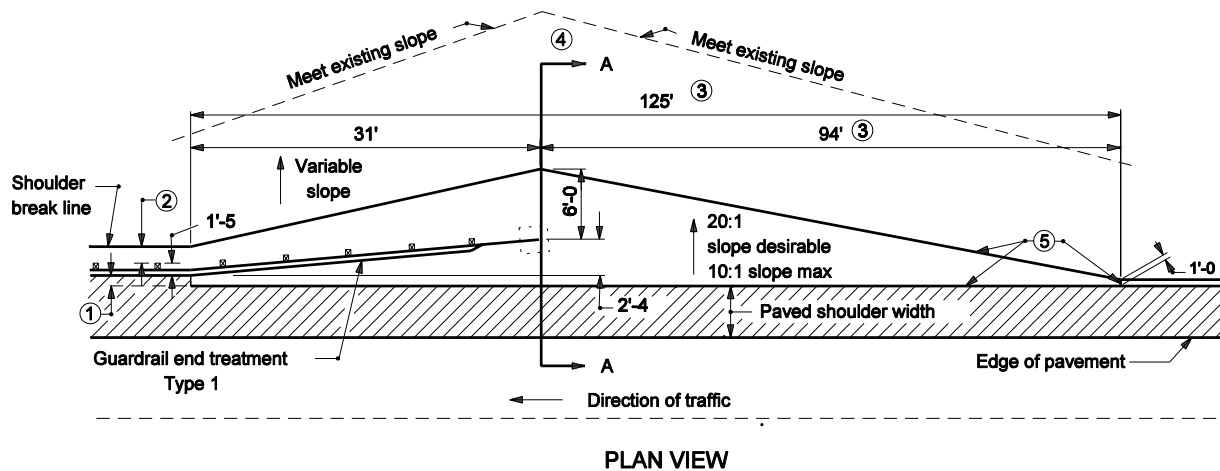
GENERAL NOTES

- ① The top of rail height at this post shall match the height of the adjacent guardrail.
2. Installation of guardrail end treatment type I at the end of a run of rub-rail type guardrail shall require the relocation of the rub-rail as shown.
- ③ See Standard Drawing E 601-GRET-04 for Post No.2 Connection Detail.
- ④ If rub-rail is not spliced at post, the channel shall be cut and repositioned behind the post flange.
- ⑤ See Standard Drawing E 808-MKNB-03 for Object Marker Type 3 Details.
- ⑥ See Standard Drawing E 601-GRET-04 for Splice Plate Assembly Detail.

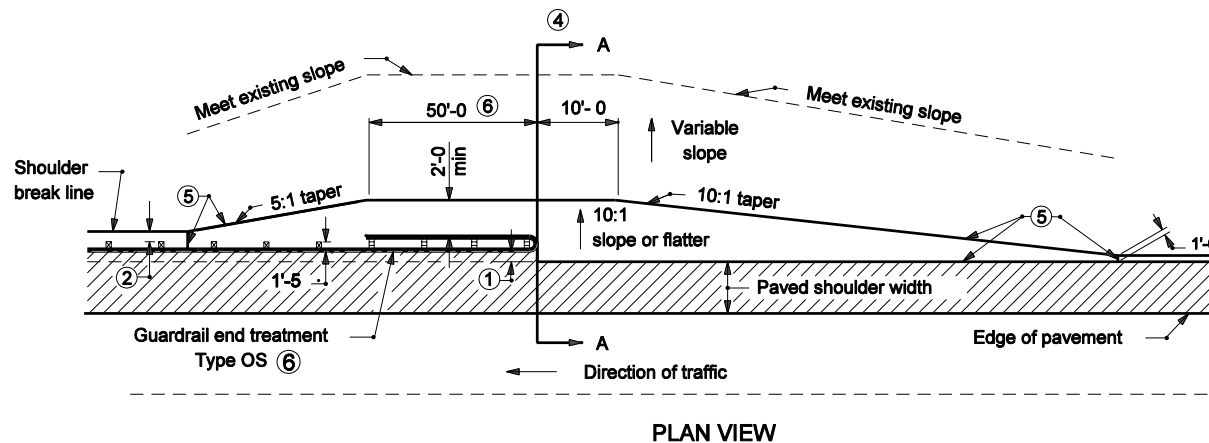


RUB-RAIL RELOCATION DETAIL

INDIANA DEPARTMENT OF TRANSPORTATION	
GUARDRAIL END TREATMENT TYPE I	
SEPTEMBER 2006	
STANDARD DRAWING NO. E 601-GRET-05	
	/s/ Richard L. VanCleave 9-01-06 DESIGN STANDARDS ENGINEER DATE
	/s/ Richard K. Smutzer 9-01-06 CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER	



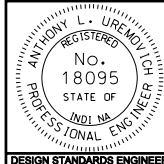
GRADING DETAIL FOR GUARDRAIL END TREATMENT TYPE I



GRADING DETAIL FOR GUARDRAIL END TREATMENT TYPE OS

NOTES:

- ① The required guardrail offset shall be 0 to 2'-0" desirable as specified in The plans. The offset used between the the edge of required shoulder and the face of rail shall also be used to establish the berm width at the end of the guardrail end treatment.
- ② This distance may vary from 0 to 2'-0" desirable.
- ③ These dimensions are based on a 2'-0" guardrail offset and must be adjusted for other offset distances to maintain a 10:1 taper.
- ④ Grading profiles at Section A-A for types OS and type I guardrail end treatments are shown on Standard Drawings E 601-GRET-08, and -09.
- ⑤ Limits of compacted aggregate.
- ⑥ Length and width of OS Unit Test Level 3 (TL-3)
Length = 50'-0"
Width = 2'-0"

INDIANA DEPARTMENT OF TRANSPORTATION					
GRADING AT GUARDRAIL END TREATMENTS					
March 2004					
STANDARD DRAWING NO. E 601-GRET-06					
	<table style="width: 100%; border: none;"> <tr> <td style="border: none;">/s/ Anthony L. Uremovitch DESIGN STANDARDS ENGINEER</td> <td style="border: none; text-align: right;">3-01-04 DATE</td> </tr> <tr> <td style="border: none;">/s/ Richard K. Smutzer CHIEF HIGHWAY ENGINEER</td> <td style="border: none; text-align: right;">3-01-04 DATE</td> </tr> </table>	/s/ Anthony L. Uremovitch DESIGN STANDARDS ENGINEER	3-01-04 DATE	/s/ Richard K. Smutzer CHIEF HIGHWAY ENGINEER	3-01-04 DATE
/s/ Anthony L. Uremovitch DESIGN STANDARDS ENGINEER	3-01-04 DATE				
/s/ Richard K. Smutzer CHIEF HIGHWAY ENGINEER	3-01-04 DATE				
DESIGN STANDARDS ENGINEER					

- ① This distance may vary from 0 to 2'-0" desirable.
- ② If necessary, move existing ditch line to obtain a 4:1 slope.
- ③ Length and width of MS Unit Test Level 3 (TL-3) and transition rail where required:
 Length = 31'-3" (MS unit) + 12' - 6" (transition rail) = 43' - 9" (typ)
 Width = 2'-4"



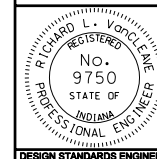
Diagram illustrating a cross-section of a road shoulder and slope. The diagram shows a horizontal line representing the ground surface, sloping downwards from left to right. A vertical line on the left represents the 'Median shoulder'. A horizontal dimension line above the slope indicates a distance of '6'-0" min.' from the shoulder to a vertical line. The slope is labeled 'Slope 20:1 or flatter'. At the bottom right, the slope is labeled '4:1 max.'

SECTION B-B

GRADING AT GUARDRAIL END TREATMENT

MARCH 2005

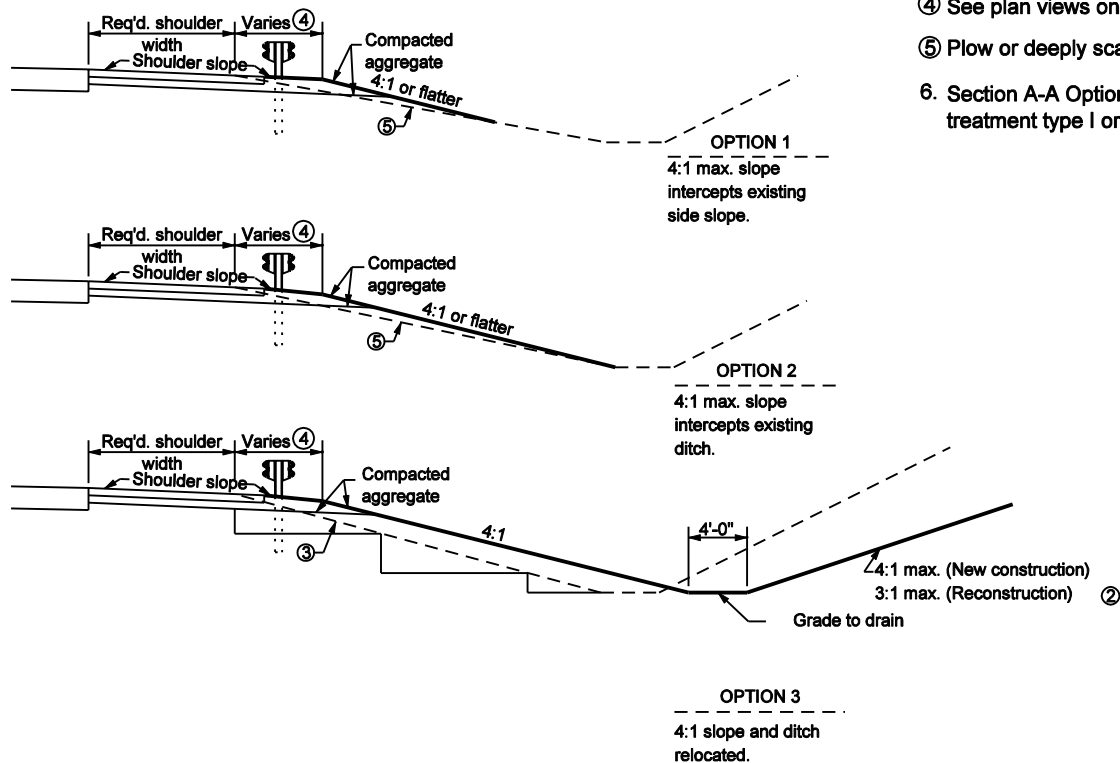
STANDARD DRAWING NO. E 601-GRET-07



/s/ Richard L. VanCleave 3-01-05
 DESIGN STANDARDS ENGINEER DATE

/s/ Richard K. Smutzer	3-01-05
CHIEF HIGHWAY ENGINEER	DATE

Recoverable Proposed Slopes (Options 1, 2, and 3)



GRADING CROSS SECTIONS AT SECTION A-A

NOTES:

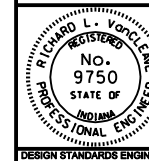
1. Grading cross section Option 1 is most desirable and shall be used on new construction. Option 7 is least desirable. The grading cross section to be used shall be as detailed or specified on the plans. A more desirable option may be used in lieu of the option specified.
- ② The backslope on Option 3 shall not exceed 2:1 on 3R projects.
- ③ Benching required for existing slopes steeper than 4:1.
- ④ See plan views on Standard Drawing E 601-GRET-06.
- ⑤ Plow or deeply scarify for existing slopes 4:1 or flatter.
6. Section A-A Options 1, 2, and 3 may be used with guardrail end treatment type I or OS.

INDIANA DEPARTMENT OF TRANSPORTATION

**GRADING AT GUARDRAIL
END TREATMENT**

SEPTEMBER 2002

STANDARD DRAWING NO. E 601-GRET-08

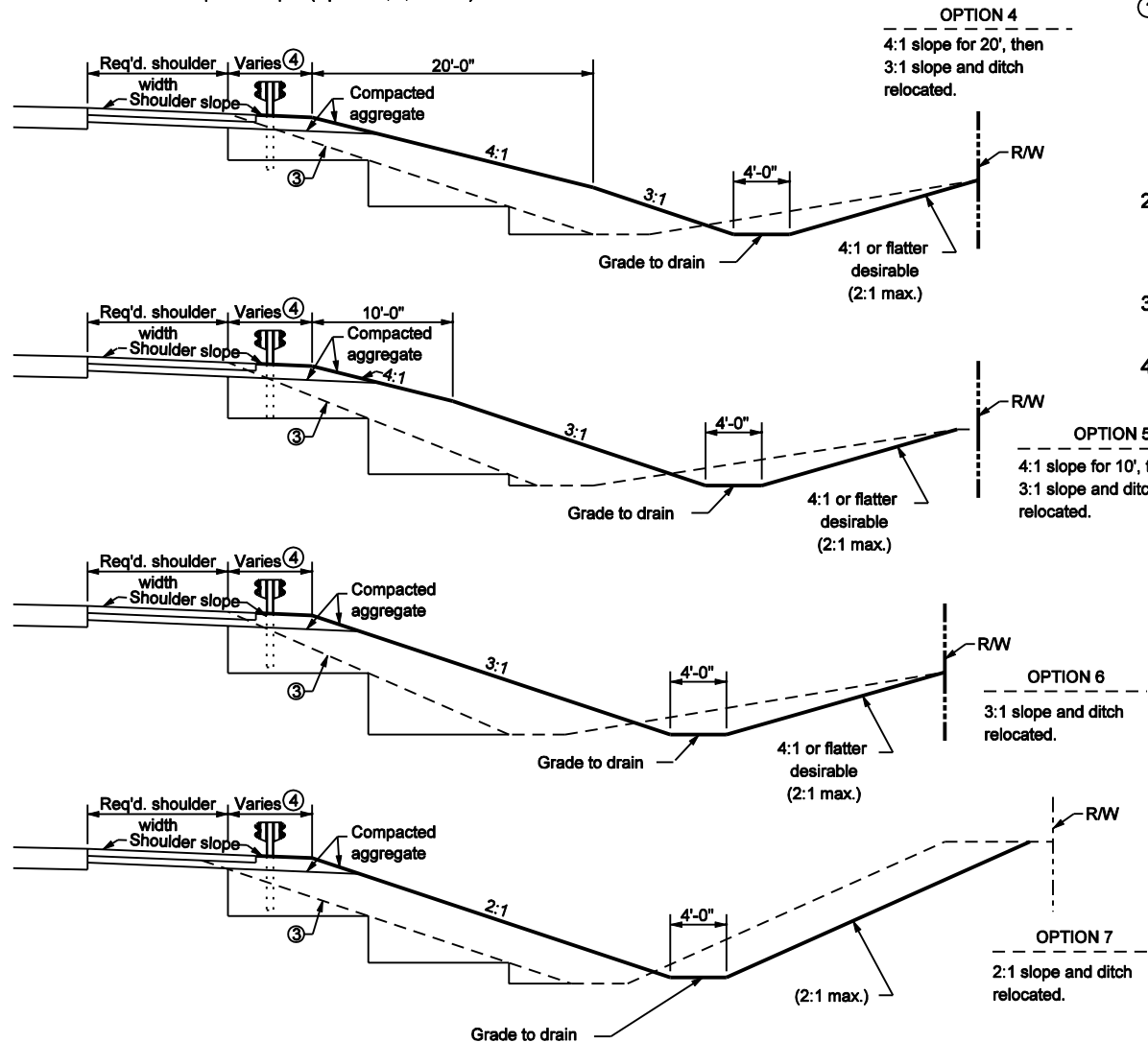


/s/ Richard L. VanCleave 9-03-02
DESIGN STANDARDS ENGINEER DATE

/s/ Richard K. Smutzer 9-03-02
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

Non-Recoverable Proposed Slopes (Options 4, 5, 6 and 7)

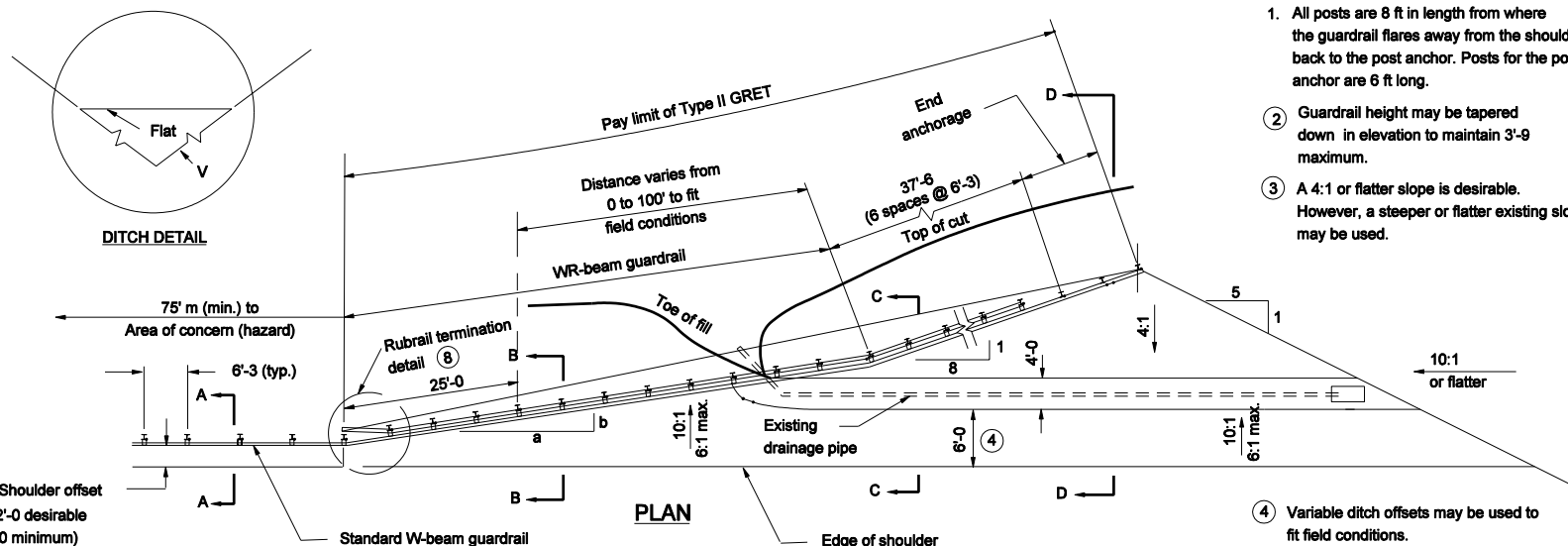


GRADING CROSS SECTIONS AT SECTION A-A

NOTES:

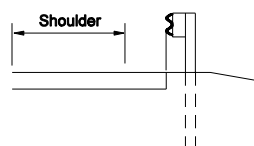
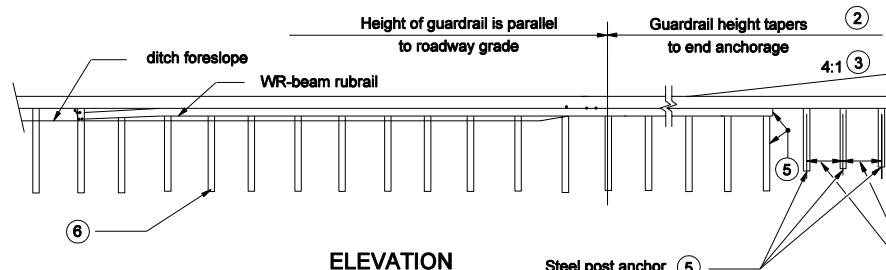
- ① Grading cross section Option 1 is most desirable and shall be used on new construction. Option 7 is least desirable. The grading cross section to be used shall be as detailed or specified on the plans. A more desirable option may be used in lieu of the option specified.
2. Options 4 through 7 may only be used on a 3R/4R partial reconstruction project with right-of-way restrictions.
3. Benching required for existing slopes steeper than 4:1.
4. See Standard Drawing E 601-GRET-06 for plan views.

INDIANA DEPARTMENT OF TRANSPORTATION	
GRADING AT GUARDRAIL END TREATMENTS	
SEPTEMBER 2002	
STANDARD DRAWING NO. E 601-GRET-09	
	/s/ Richard L. VanCleave 9-03-02 DESIGN STANDARDS ENGINEER DATE
	/s/ Richard K. Smutzer 9-03-02 CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER	

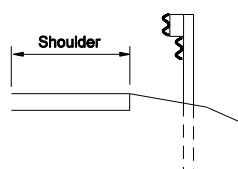


Design speed mph	a:b
≥ 60	13:1
55	12:1
50	11:1
45 or less	10:1

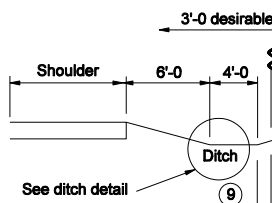
a:b RATIO



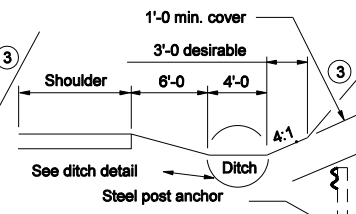
SECTION A-A



SECTION B-B
(WITH RUBRAIL)



SECTION C-C
(WITH RUBRAIL)



SECTION D-D

NOTES:

- All posts are 8 ft in length from where the guardrail flares away from the shoulder back to the post anchor. Posts for the post anchor are 6 ft long.
- Guardrail height may be tapered down in elevation to maintain 3'-9 maximum.
- A 4:1 or flatter slope is desirable. However, a steeper or flatter existing slope may be used.
- Variable ditch offsets may be used to fit field conditions.
- See Standard Drawing E 601-GRET-11 for rub rail anchor details and post anchor details.
- See Standard Drawing E 601-WBGA-06 for steel post and wood block details.
- Ditch cross section profile should be same as upstream ditch cross section profile and have same or greater hydraulic capacity.
- See Standard Drawing E 601-WBGA-06 for detail.
- Posts shall be installed offset from the required ditch cross section to maintain ditch's hydraulic capacity.

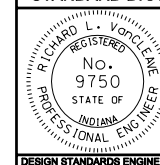
INDIANA DEPARTMENT OF TRANSPORTATION

GUARDRAIL END TREATMENT

TYPE II

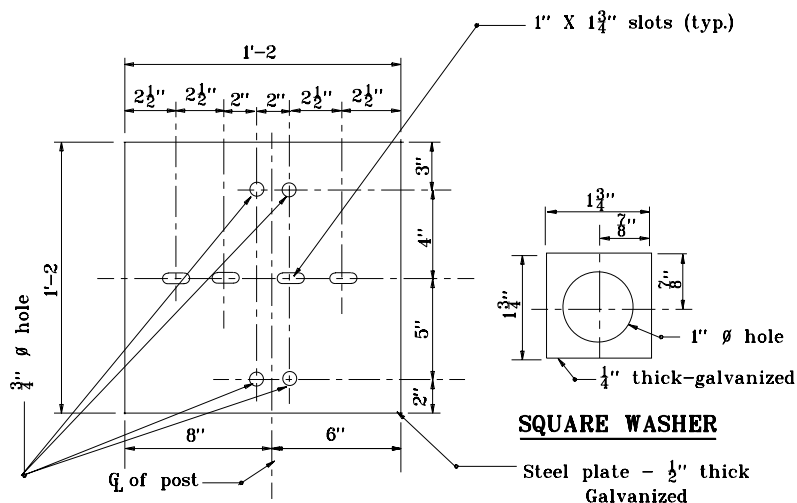
SEPTEMBER 2004

STANDARD DRAWING NO. E 601-GRET-10



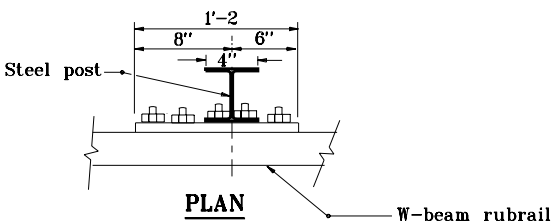
/s/ Richard L. VanCleave
DESIGN STANDARDS ENGINEER
9-01-04
DATE

/s/ Richard K. Smutzer
CHIEF HIGHWAY ENGINEER
9-01-04
DATE

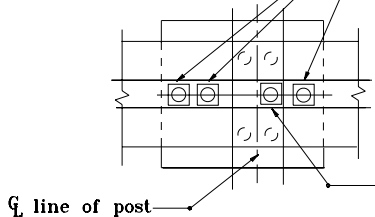


STEEL PLATE DETAIL

STEEL PLATE AND WASHER DETAILS

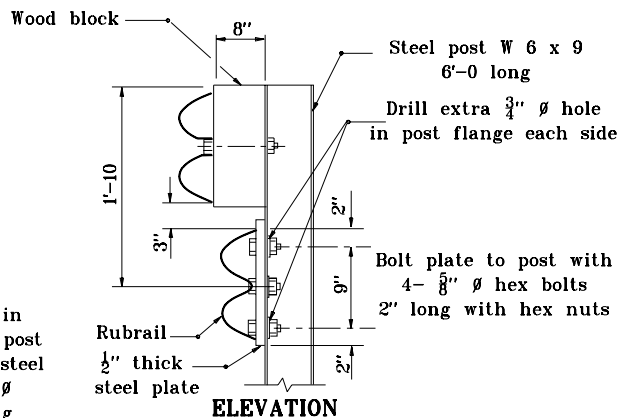


3 - 1" $\varnothing$ holes to be field drilled in rail and attached to steel plate with 7/8" $\varnothing$ hex bolts 2" long with square washer.

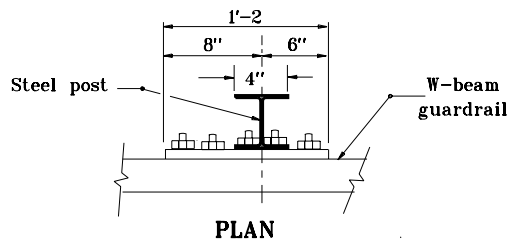


FRONT VIEW

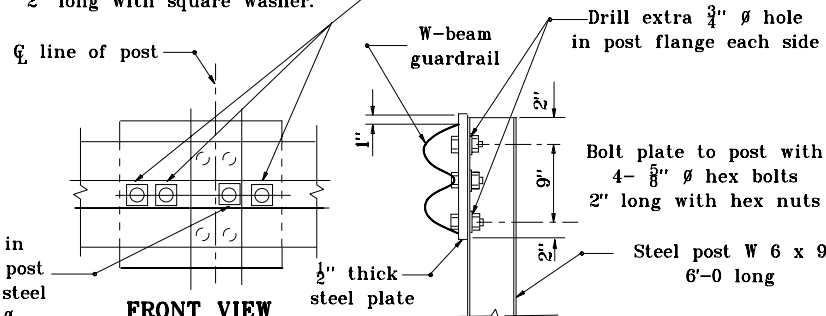
RUBRAIL ANCHOR DETAILS



1" $\varnothing$ holes to be field drilled in rail and through post flange. Attach to steel plate with 7/8" $\varnothing$ hex bolts 2" long with square washer.



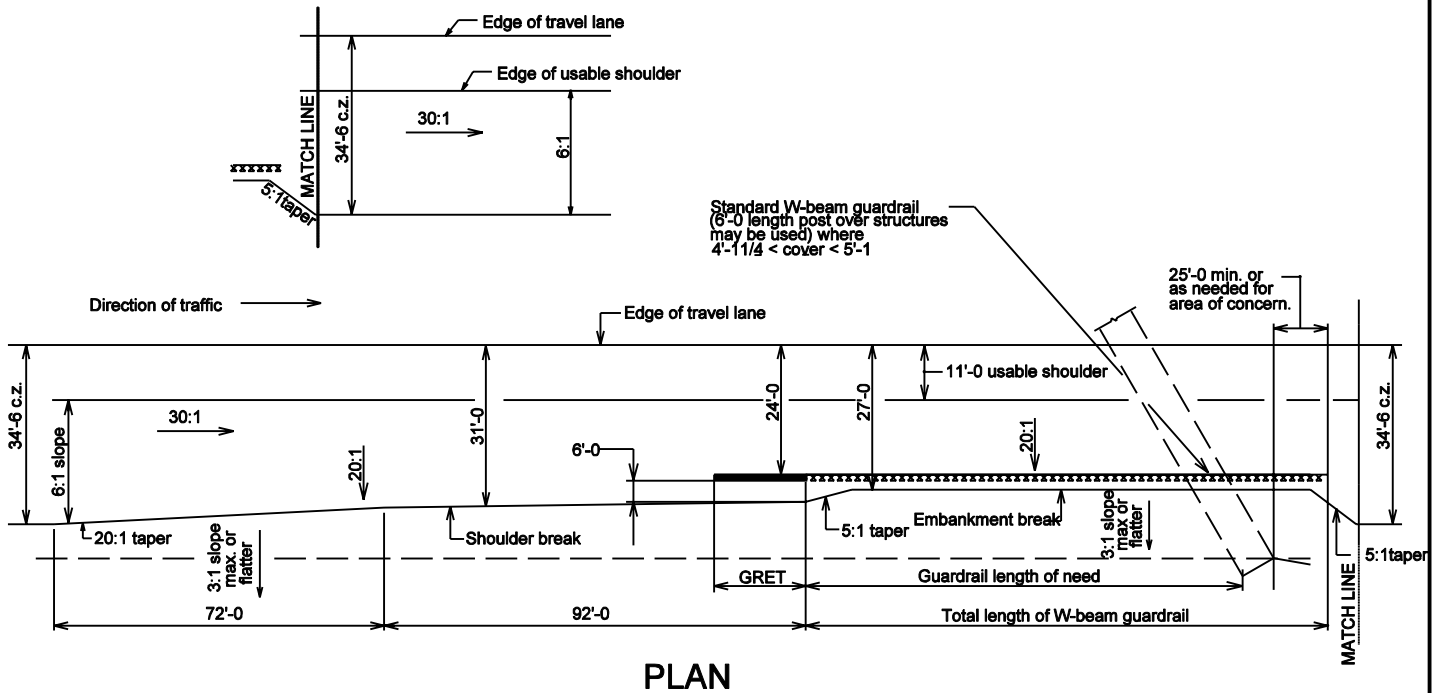
3 - 1" $\varnothing$ holes to be field drilled in rail and attached to steel plate with 7/8" $\varnothing$ hex bolts 2" long with square washer.



ELEVATION

POST ANCHOR DETAILS

INDIANA DEPARTMENT OF TRANSPORTATION	
GUARDRAIL END TREATMENT	
TPPE II-COMPONENTS	
SEPTEMBER 2000	
STANDARD DRAWING NO. E 601-GRET-11	
	/s/ Anthony L. Uremovich 9-01-00 DESIGN STANDARDS ENGINEER DATE
	/s/ Firooz Zandi 9-01-00 CHIEF HIGHWAY ENGINEER DATE



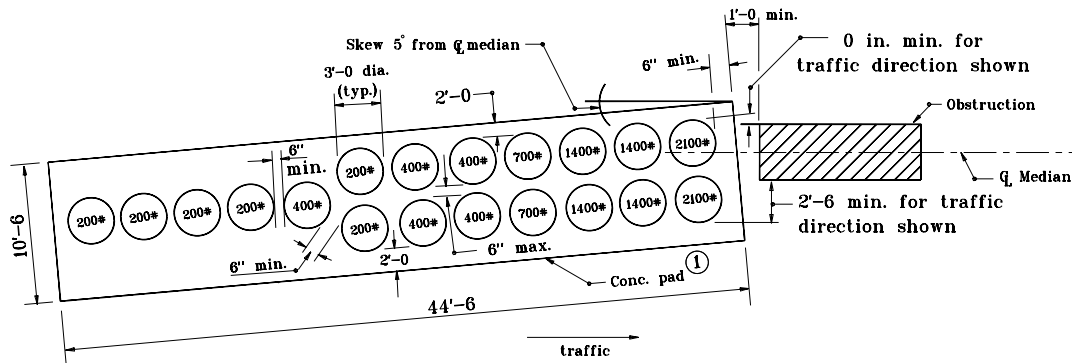
NOTES:

- Grading requirements shown are for 5'-6 or larger structures, and three-sided structures on project constructed on new alignment for design speed of 70 mph rural divided highway.
- Grading shown above is applicable for 25'-0 span nested guardrail also.
- Grading requirements for 5'-6 or larger structures and three sided structures constructed on existing alignments at all design speeds are shown in standard Drawings E 601-GRET 06 through 09.

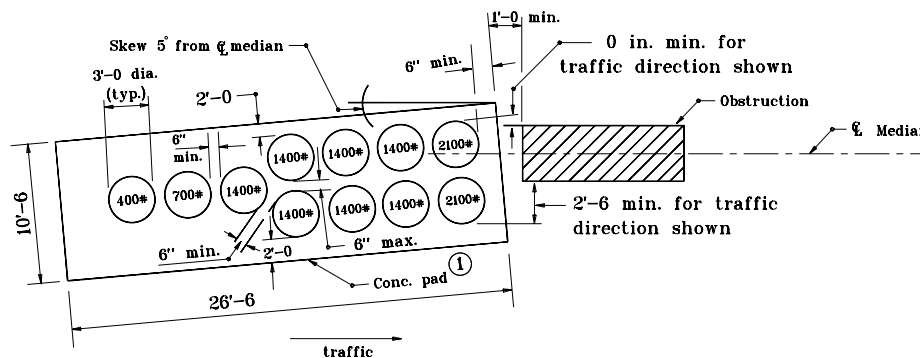
INDIANA DEPARTMENT OF TRANSPORTATION	
GRADING REQUIREMENTS FOR LARGE DRAINAGE STRUCTURE	
SEPTEMBER 2001	
STANDARD DRAWING NO. E 601-GRET-12	
	/s/ Richard L. VanCleave DESIGN STANDARDS ENGINEER DATE 9-04-01
	/s/ Firooz Zandi CHIEF HIGHWAY ENGINEER DATE 9-04-01

NOTES:

- ① Concrete pad shall be 6" thick with welded wire fabric 6" x 6", W3/W3 or equivalent. A clearance of 2" shall be provided between all sides and top of concrete pad and welded wire fabric.
- Appropriate impact attenuator Test Level shall be used to determine the concrete pad size and gravel barrel layout.
- See Standard Drawings E 601-GAIA-01, 01A and 02 for grading details.
- The details shown are for an impact attenuator type ED, gravel barrel array with a maximum obstruction width of 3'-0.

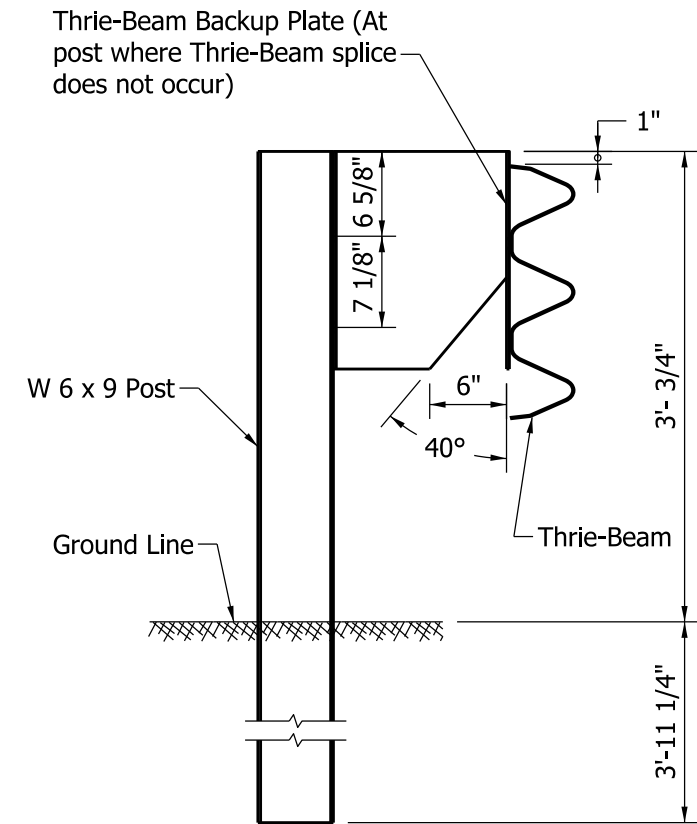


**CONCRETE PAD PLAN IMPACT ATTENUATOR TYPE ED
GRAVEL BARREL ARRAY FOR TEST LEVEL 3**

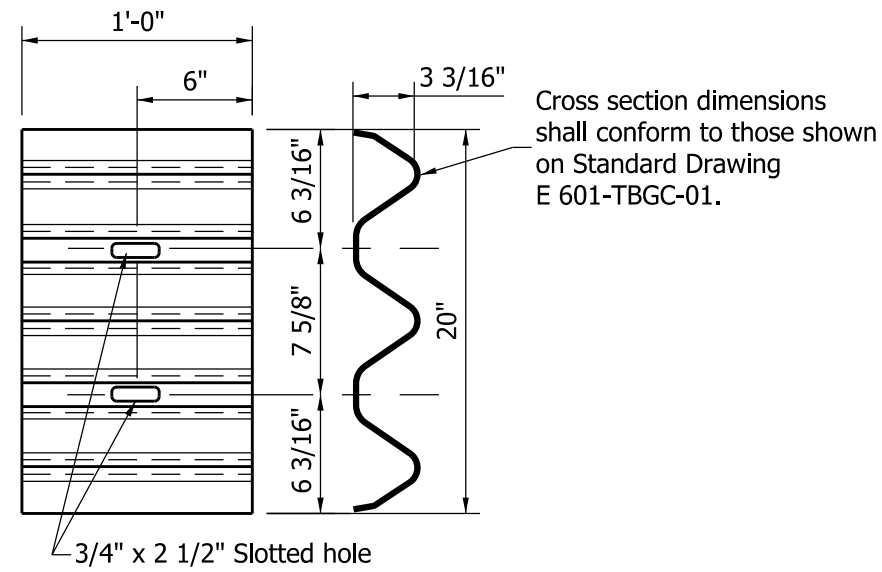


**CONCRETE PAD PLAN IMPACT ATTENUATOR TYPE ED
GRAVEL BARREL ARRAY FOR TEST LEVEL 2**

INDIANA DEPARTMENT OF TRANSPORTATION	
IMPACT ATTENUATOR ED LAYOUT	
MARCH 2002	
STANDARD DRAWING NO. E 601-IAED-01	
	/s/ Richard L. VanCleave 3-01-02 DESIGN STANDARDS ENGINEER DATE
	/s/ Richard K. Smutzer 3-01-02 CHIEF HIGHWAY ENGINEER DATE



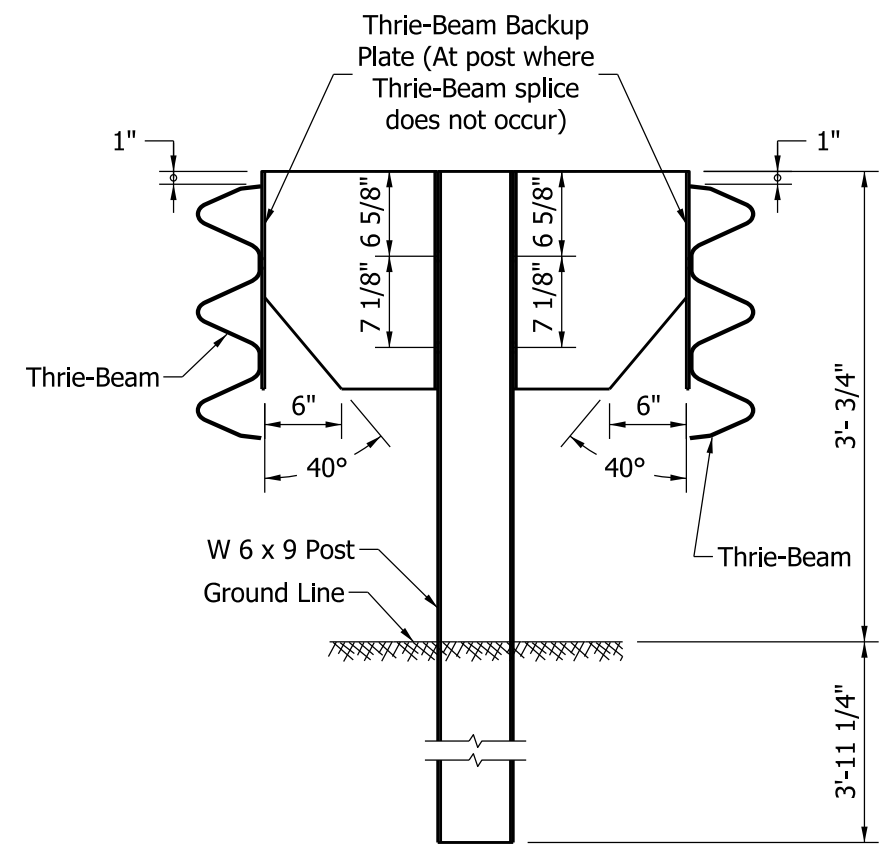
THRIE BEAM GUARDRAIL



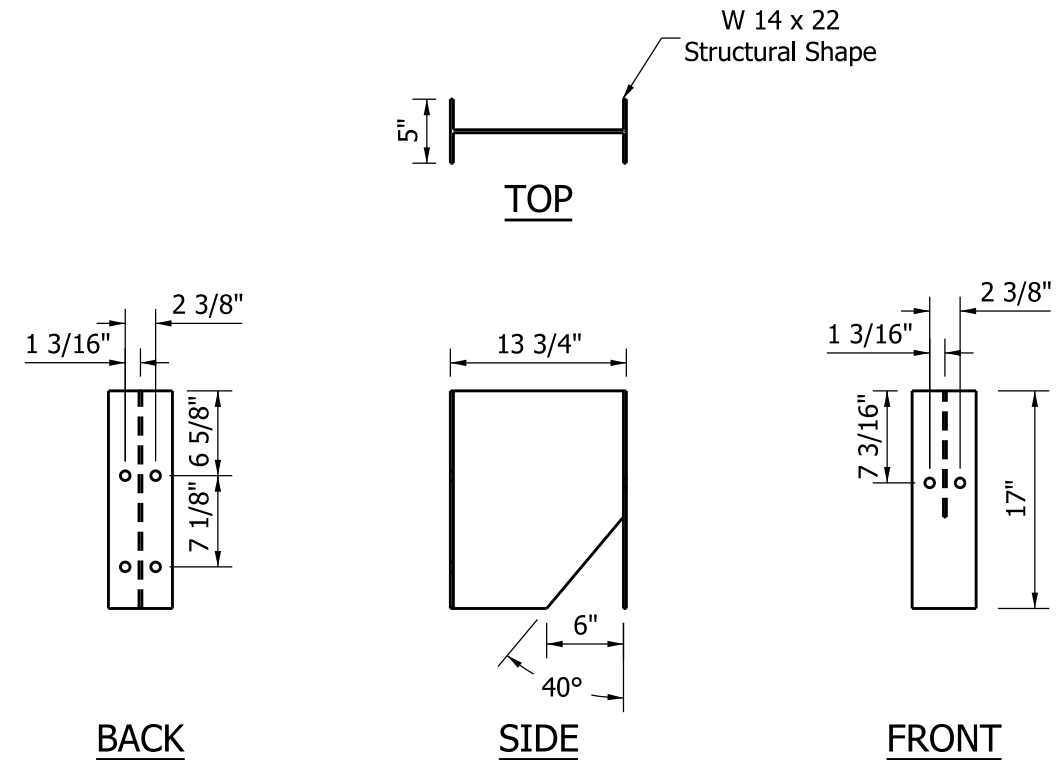
THRIE BEAM GUARDRAIL BACK-UP PLATE
AT LOCATIONS WITHOUT SPLICE

NOTES:

1. See Standard Drawing E 601-TBGC-01 for Thrie Beam rail section details.
2. See Standard Drawings E 601-TTGB-03 and E 601-TTGB-04 for W 6 x 9 post hole pattern details.
3. Typical post spacing for Thrie Beam Guardrail and Double Faced Thrie Beam Guardrail is 6'-3".
4. Only the blockout material shown may be used.

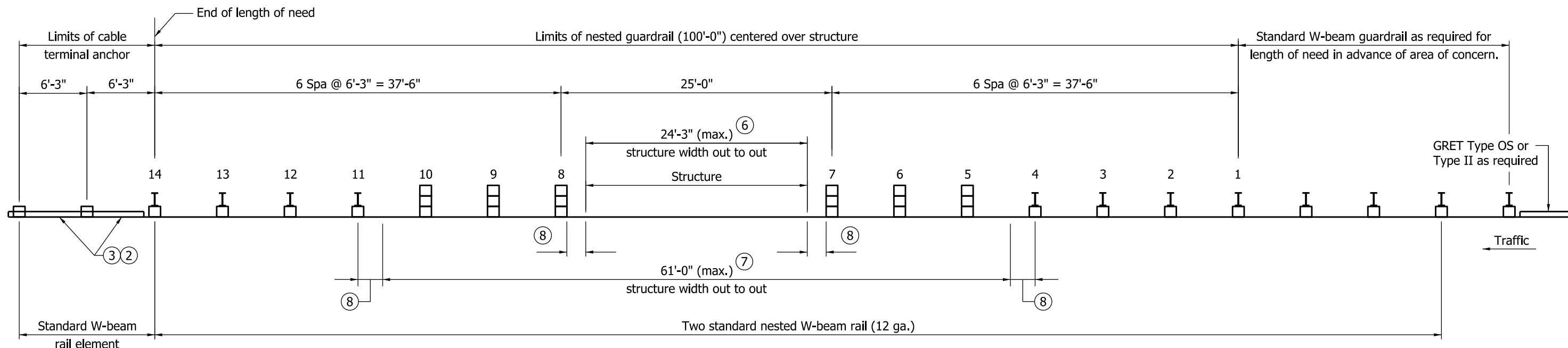


DOUBLE FACED THRIE BEAM GUARDRAIL

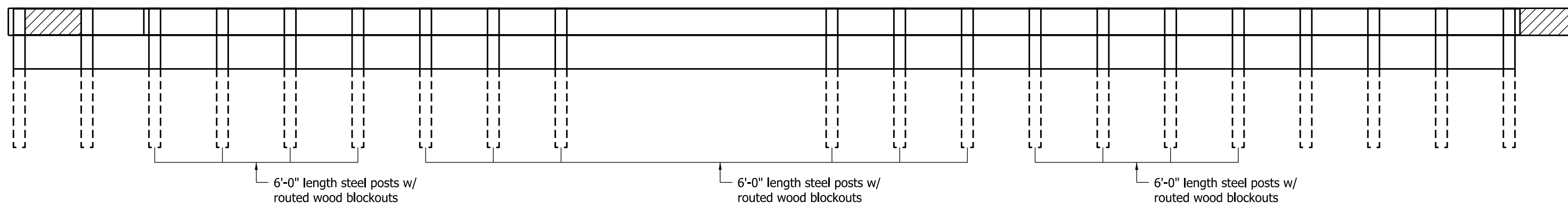


THRIE BEAM GUARDRAIL BLOCKOUT
(STEEL ONLY)

INDIANA DEPARTMENT OF TRANSPORTATION			
THRIE BEAM GUARDRAIL DETAILS			
SEPTEMBER 2011			
STANDARD DRAWING NO.		E 601-MTGR-01	
	/s/ <i>Richard L. VanCleave</i>		09/01/11
	DESIGN STANDARDS ENGINEER		DATE
	/s/ <i>Mark A. Miller</i>		09/01/11
	CHIEF HIGHWAY ENGINEER		DATE
DESIGN STANDARDS ENGINEER			



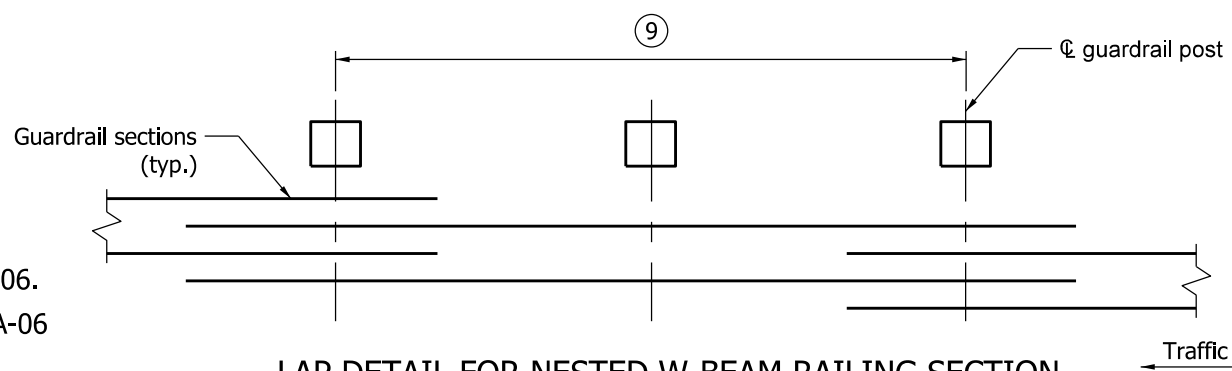
PLAN



ELEVATION

NOTES:

- ② For two-lane two-way operation, use GRET type OS. For structure width > 24'-3", provide three additional spans of standard W-beam guardrail at 6'-3" each before attaching the GRET.
- ③ For multi-lane divided operation, use cable terminal, anchor, See Standard Drawing E 601-GCTA-01 through E 601-GCTA-06.
4. See Standard Drawings E 601-GRET-10, 11 and E 601-WBGA-06 for GRET Type II details.
5. See Standard Drawings E 601-NWGA-02, 03 and 04 for post and block assemblies details.
- ⑥ Maximum structure width shall be 24'-3" out to out of structure(s) parallel to road centerline for skewed or perpendicular structure. In this case posts are not located over portion of structure.
- ⑦ Maximum structure width shall be 61'-0" out to out of structure(s) parallel to roadway centerline for skewed or perpendicular structure. Modified posts (5 through 10) over the structure where required, see Standard Drawing E 601-NWGA-03. The remaining wood posts shall be shown on Standard Drawing E 601-NWGA-02.



LAP DETAIL FOR NESTED W-BEAM RAILING SECTION

NOTES:

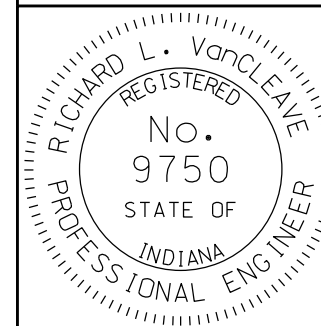
- ⑧ Post shall clear outer structure side by 4" min.
- ⑨ This dimension is 25'-0" between posts 7 and 8. The dimension is 12'-6" or 25'-0" elsewhere.
10. For grading requirements see Standard Drawings E 601-GRET-06 through 09 and E 601-GRET-12.

INDIANA DEPARTMENT OF TRANSPORTATION

**25'-0" SPAN NESTED GUARDRAIL
FOR LARGE DRAINAGE STRUCTURE**

SEPTEMBER 2010

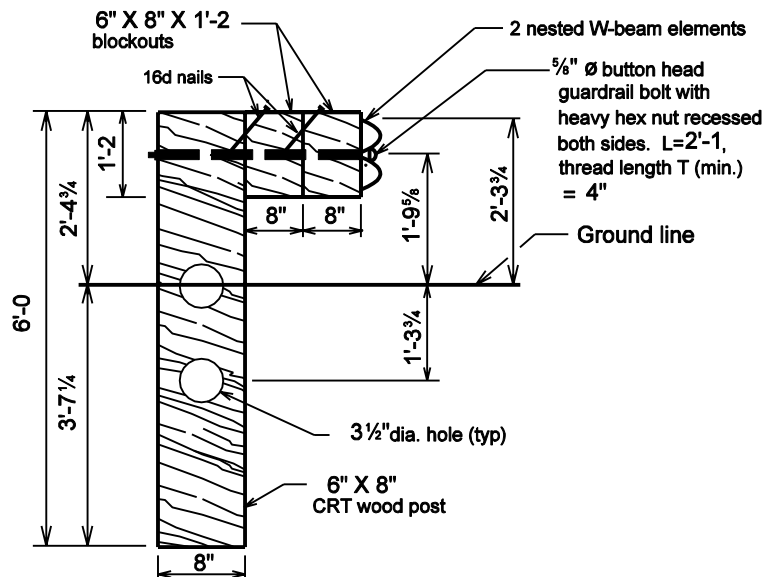
STANDARD DRAWING NO. E 601-NWGA-01



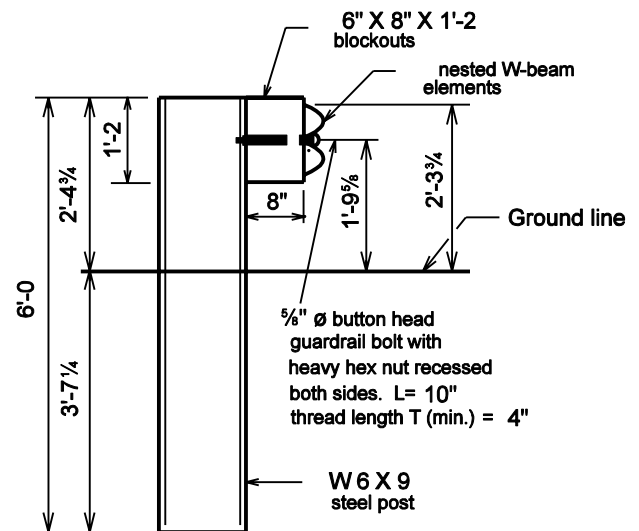
DESIGN STANDARDS ENGINEER

/s/ *Richard L. VanCleave* 09/01/10
DESIGN STANDARDS ENGINEER DATE

/s/ *Mark A. Miller* 09/01/10
CHIEF HIGHWAY ENGINEER DATE



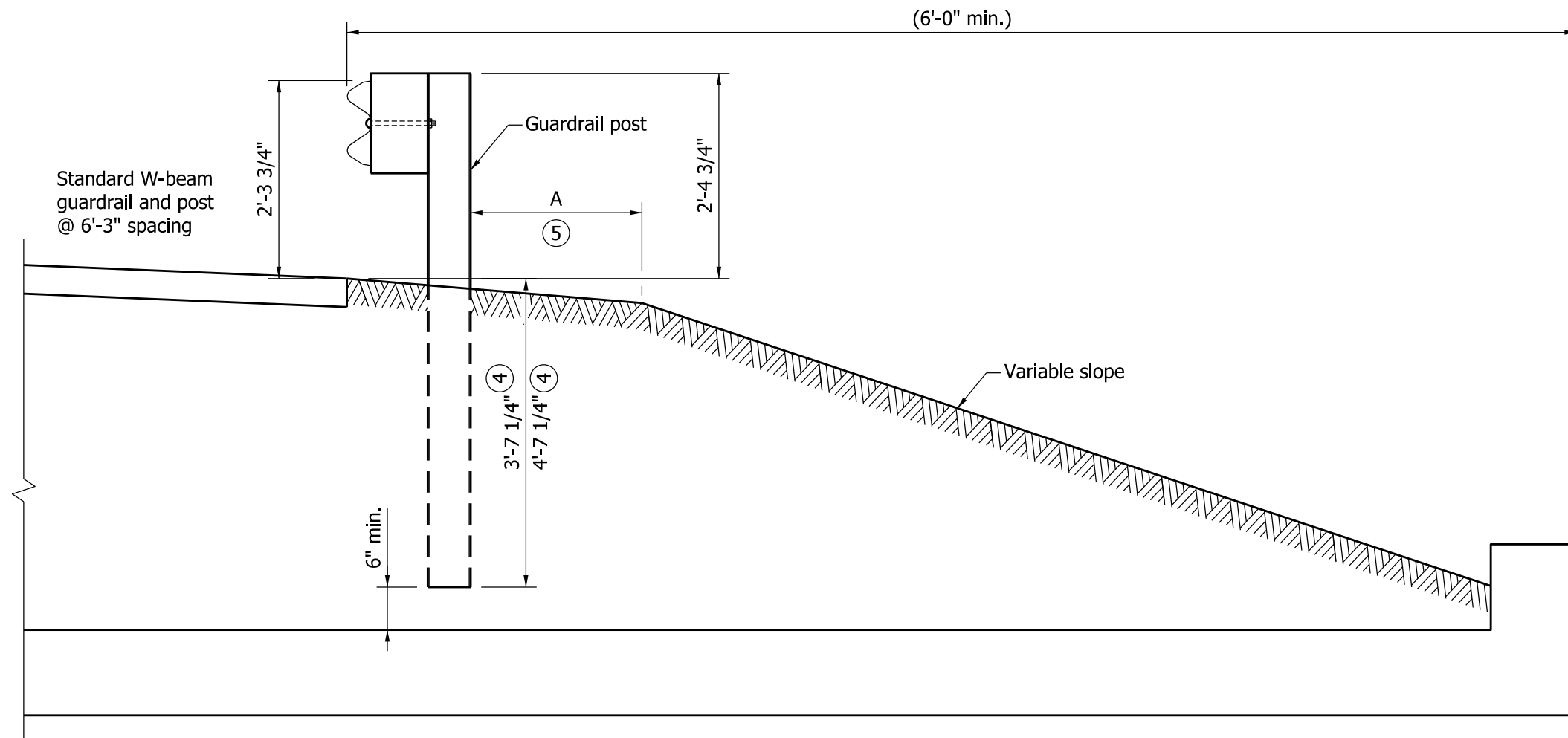
NESTED GUARDRAIL ASSEMBLY.
(Posts 5 to 10)



**STEEL POST AND BLOCK FOR USE WITH
NESTED GUARDRAIL ASSEMBLY**
(Posts 1 to 4 and 11 to 14)

INDIANA DEPARTMENT OF TRANSPORTATION		
NESTED GUARDRAIL ASSY. FOR STRUCTURE WIDTH ≤ 24'-3"		
SEPTEMBER 2001		
STANDARD DRAWING NO. E 601-NWGA-02		
	/s/ Richard L. VanCleave	9-04-01
	DESIGN STANDARDS ENGINEER	DATE
	/s/ Firooz Zandi	9-04-01
	CHIEF HIGHWAY ENGINEER	DATE

<u>/s/ Richard L. VanCleave</u>	<u>9-04-0</u>
DESIGN STANDARDS ENGINEER	DATE
<u>/s/ Firooz Zandi</u>	<u>9-04-0</u>
CHIEF HIGHWAY ENGINEER	DATE



GUARDRAIL ASSEMBLY FOR COVER $\geq$ 4'-1 1/4"
FOR ANY STRUCTURE WIDTH

NOTES:

1. This drawing shall be used for any structure width provided cover over structure $\geq$ 4'-1 1/4".
2. The 6'-0" length guardrail post shall be used if $4'-1\frac{1}{4}" \leq \text{cover} \leq 5'-1\frac{1}{4}"$.
3. The 7'-0" long guardrail post shall be used if cover $> 5'-1\frac{1}{4}"$.

④ 3'-7 1/4" for 6'-0" length post and 4'-7 1/4" for 7'-0" length post.

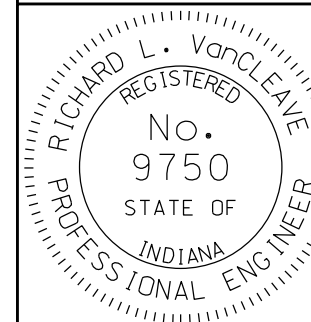
⑤ A = 2'-0" for 6'-0" length post.
A = 0 (min.) for 7'-0" length post.

INDIANA DEPARTMENT OF TRANSPORTATION

GUARDRAIL ASSEMBLY FOR
ANY STRUCTURE WIDTH

SEPTEMBER 2011

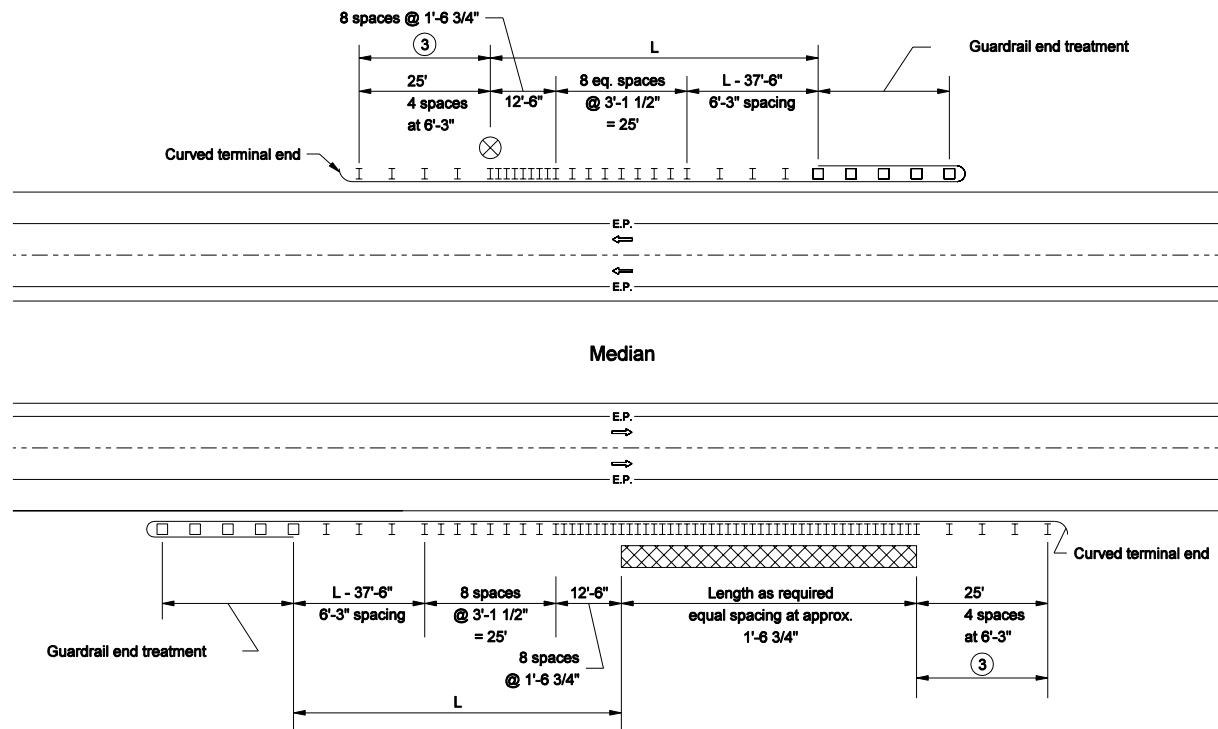
STANDARD DRAWING NO. E 601-NWGA-04



DESIGN STANDARDS ENGINEER

/s/ *Richard L. VanCleave* 09/01/11
DESIGN STANDARDS ENGINEER DATE

/s/ *Mark A. Miller* 09/01/11
CHIEF HIGHWAY ENGINEER DATE



LEGEND

L = Length of need

⊗ Isolated obstruction

⊠ Extended obstruction

MULTI-LANE DIVIDED ROADWAY GUARDRAIL LAYOUT FOR GUARDRAIL FACE TO OBSTRUCTION DISTANCE $\geq 2'-9"$ BUT $< 3'-3"$

GENERAL NOTES

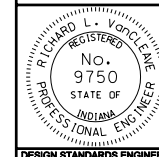
- This configuration shall be used where W-beam guardrail at 1'-6 3/4" post spacing is specified on a divided lane roadway to shield an isolated or extended obstruction.
- Dimensions and details not shown on this drawing shall be as shown on the plans.
- Rectangular plate washers shall be installed at each post along this section.

INDIANA DEPARTMENT OF TRANSPORTATION

ROADSIDE OBSTRUCTION PROTECTION GUARDRAIL

MARCH 2005

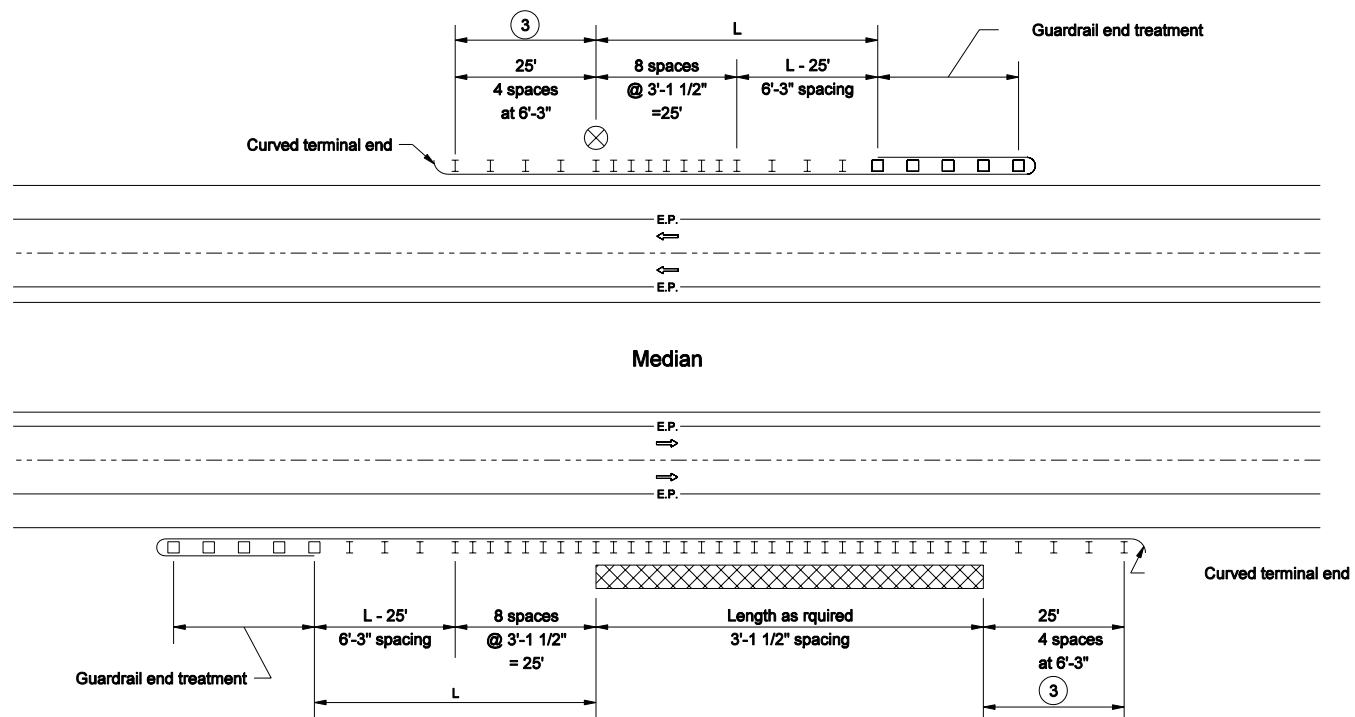
STANDARD DRAWING NO. E 601-RHPG-01



/s/ Richard L. VanCleave 3-01-05
DESIGN STANDARDS ENGINEER DATE

/s/ Richard K. Smutzer 3-01-05
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER



LEGEND

L = Length of need

⊗ Isolated obstruction

⊠ Extended obstruction

MULTI-LANE DIVIDED ROADWAY GUARDRAIL LAYOUT FOR GUARDRAIL FACE TO OBSTRUCTION DISTANCE $\geq 3'-3"$ BUT $< 4'-3"$

GENERAL NOTES

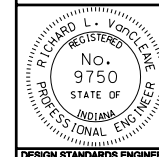
1. This configuration shall be used where W-beam guardrail at 3'-1 1/2" post spacing is specified on a divided lane roadway to shield an isolated or extended obstruction.
2. Dimensions and details not shown on this drawing shall be as shown on the plans.
3. Rectangular plate washers shall be installed at each post along this section.

INDIANA DEPARTMENT OF TRANSPORTATION

ROADSIDE OBSTRUCTION PROTECTION GUARDRAIL

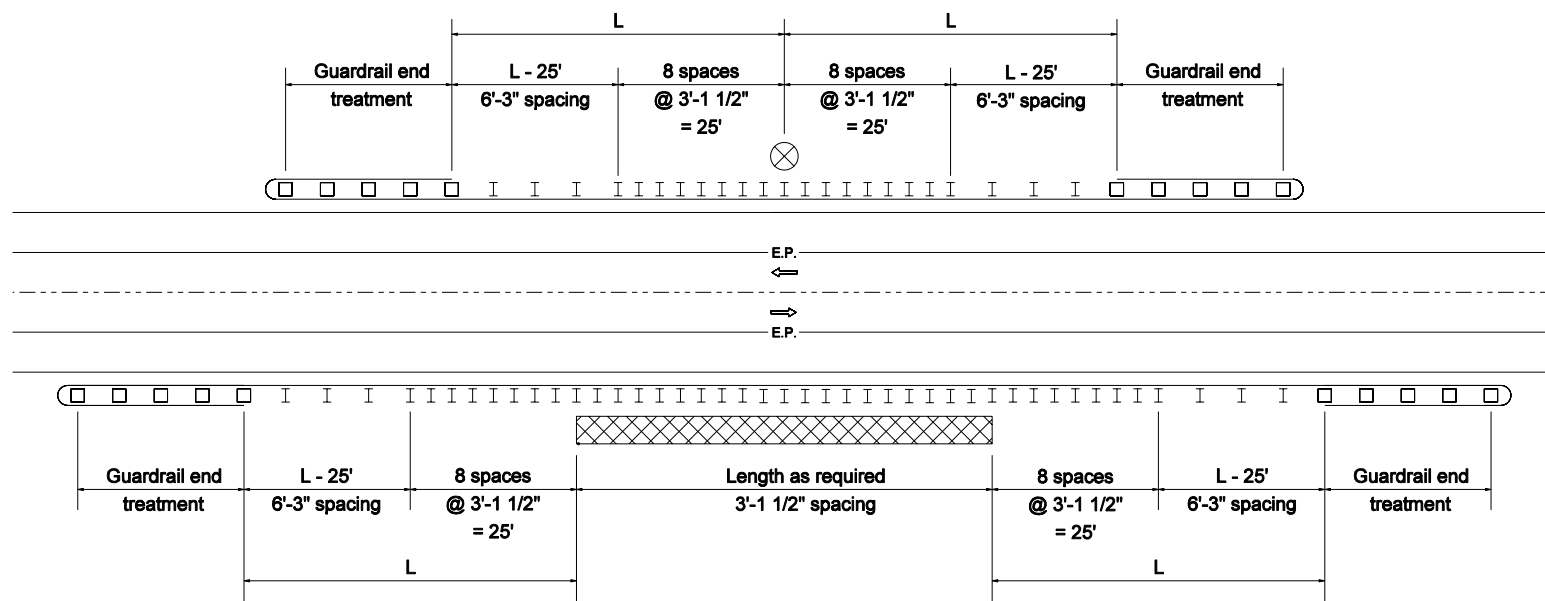
MARCH 2005

STANDARD DRAWING NO. E 601-RHPG-02



/s/ Richard L. VanCleave 3-01-05
DESIGN STANDARDS ENGINEER DATE

/s/ Richard K. Smutzer 3-01-05
CHIEF HIGHWAY ENGINEER DATE



**TWO-LANE TWO-WAY ROADWAY GUARDRAIL LAYOUT FOR
GUARDRAIL FACE TO OBSTRUCTION DISTANCE $\geq$ 3'-3" BUT $<$ 4'-3"**

GENERAL NOTES

1. This configuration shall be used where W-beam guardrail at 3'-1 1/2" post spacing is specified on a two-lane two-way roadway to shield an isolated or extended obstruction.
2. Dimensions and details not shown on this drawing shall be as shown on the plans.

LEGEND

L = Length of need

⊗ Isolated obstruction

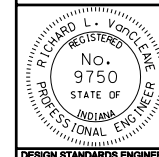
⊠ Extended obstruction

INDIANA DEPARTMENT OF TRANSPORTATION

**ROADSIDE OBSTRUCTION
PROTECTION GUARDRAIL**

MARCH 2005

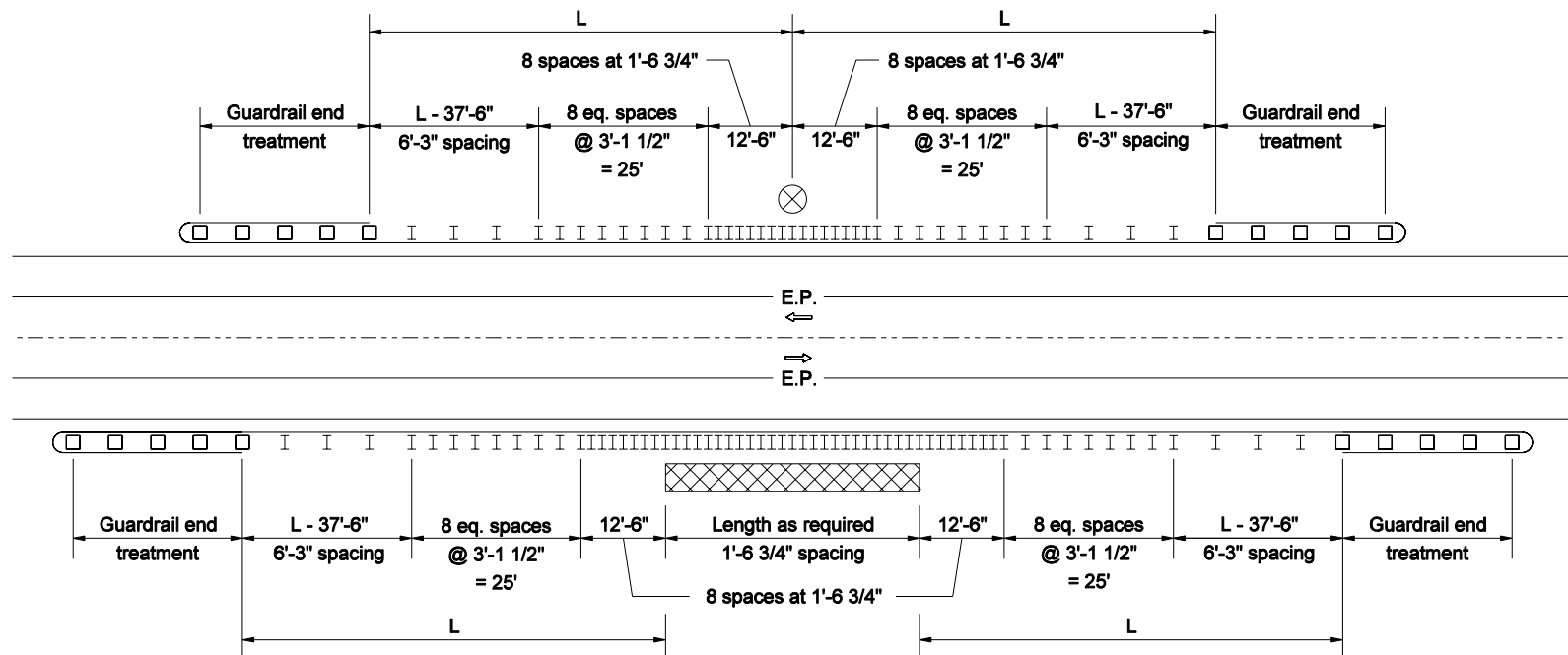
STANDARD DRAWING NO. E 601-RHPG-03



/s/ Richard L. VanCleave 3-01-05
DESIGN STANDARDS ENGINEER DATE

/s/ Richard K. Smutzer 3-01-05
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER



**TWO-LANE TWO-WAY ROADWAY GUARDRAIL LAYOUT FOR
GUARDRAIL FACE TO OBSTRUCTION DISTANCE $\geq 2'-9"$ BUT $< 3'-3"$**

GENERAL NOTES

1. This configuration shall be used where W-beam guardrail at 1'-6 3/4" or 3'-1 1/2" post spacing is specified on a two-lane two-way roadway to shield an isolated or extended obstruction.
2. Dimensions and details not shown on this sheet shall be as shown on the plans.

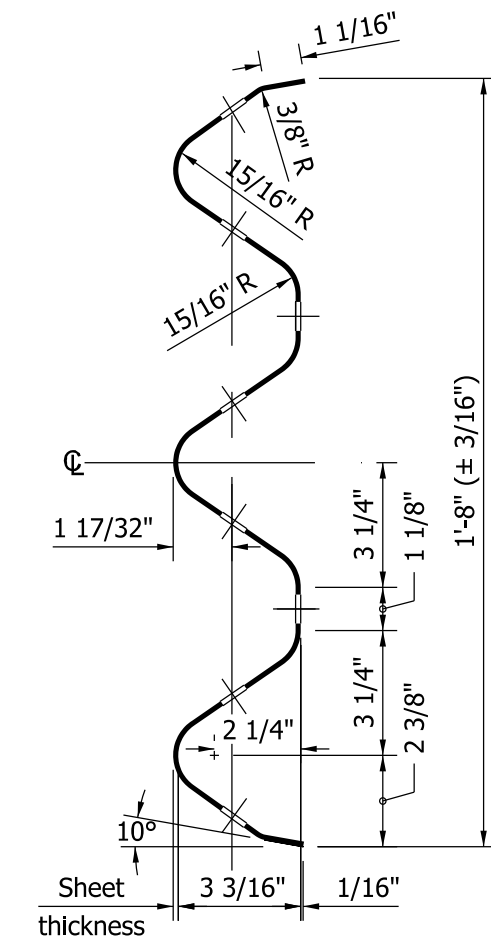
LEGEND

L = Length of need

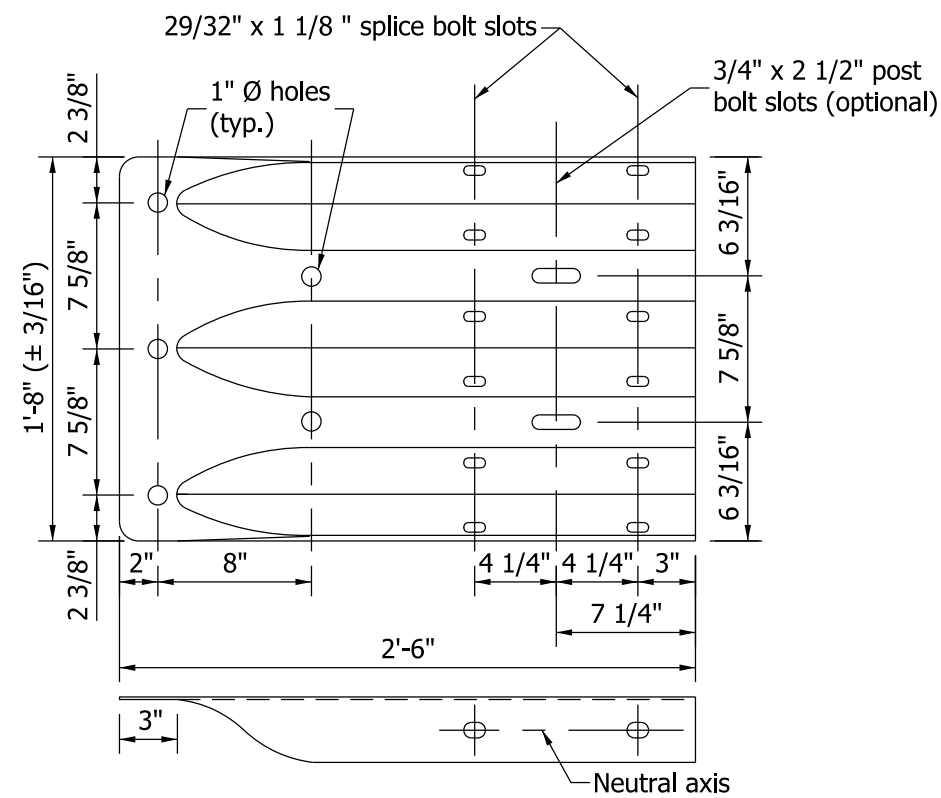
⊗ Isolated obstruction

▨ Extended obstruction

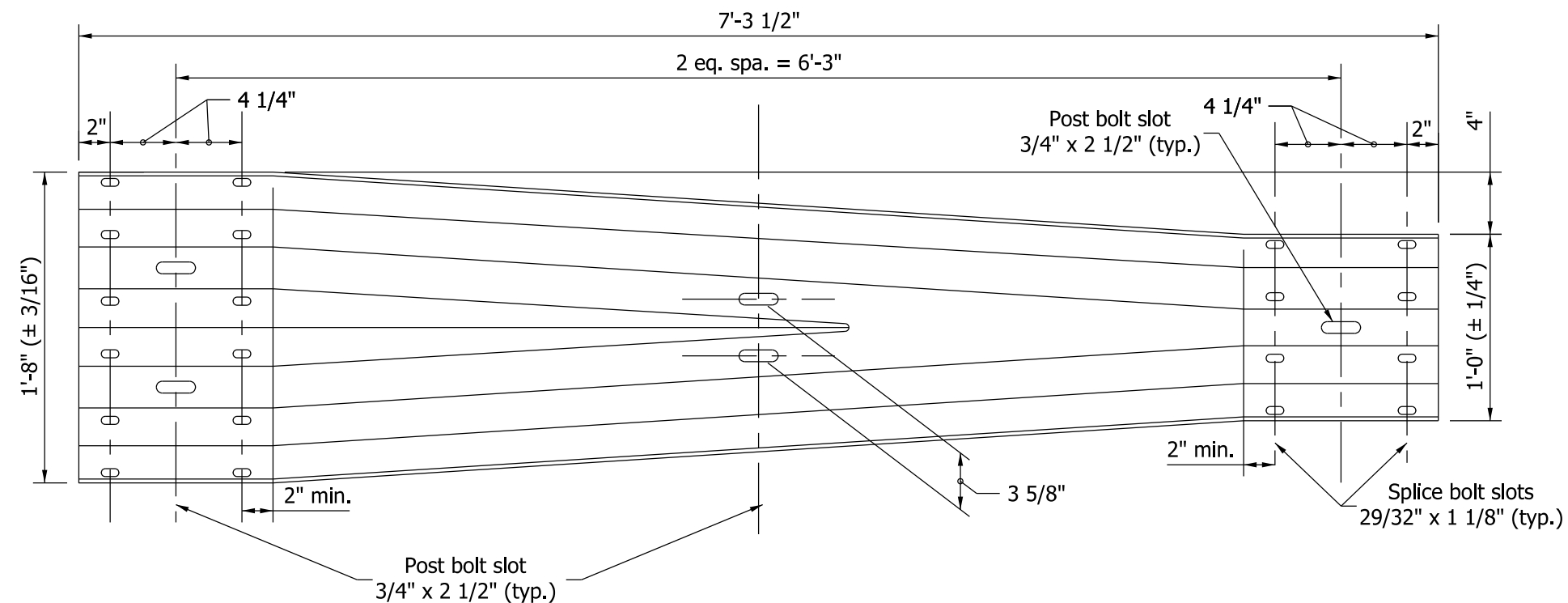
INDIANA DEPARTMENT OF TRANSPORTATION	
ROADSIDE OBSTRUCTION PROTECTION GUARDRAIL	
MARCH 2005	
STANDARD DRAWING NO. E 601-RHPG-04	
	/s/ Richard L. VanCleave 3-01-05 DESIGN STANDARDS ENGINEER DATE
	/s/ Richard K. Smutzer 3-01-05 CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER	



THRIE BEAM RAIL SECTION

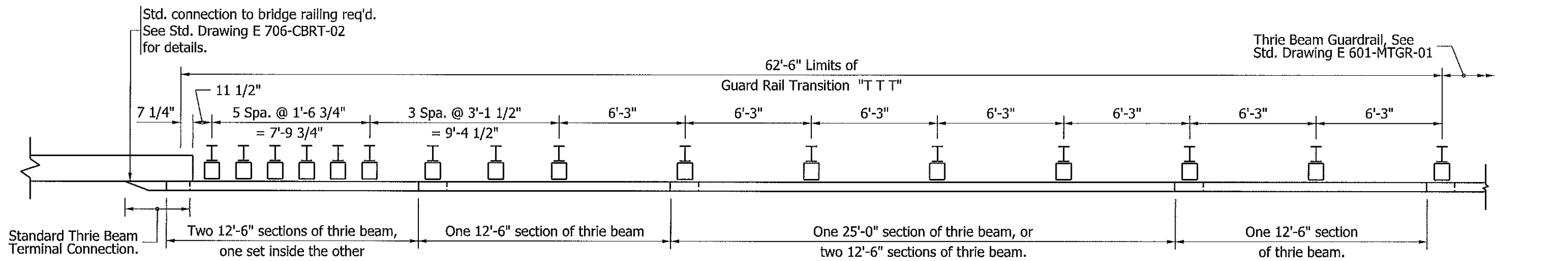


**THRIE BEAM
TERMINAL CONNECTOR**

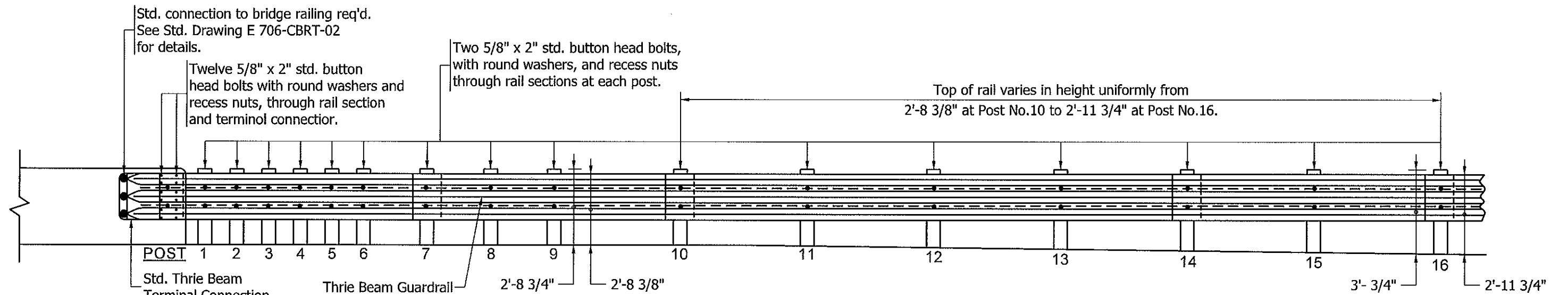


W-THRIE BEAM TRANSITION SECTION

INDIANA DEPARTMENT OF TRANSPORTATION		
THRIE-BEAM GUARDRAIL COMPONENTS		
SEPTEMBER 2011		
STANDARD DRAWING NO.		E 601-TBGC-01
	/s/ <i>Richard L. VanCleave</i>	09/01/11
	DESIGN STANDARDS ENGINEER	DATE
	/s/ <i>Mark A. Miller</i>	09/01/11
	CHIEF HIGHWAY ENGINEER	DATE
DESIGN STANDARDS ENGINEER		



PARTIAL PLAN



PARTIAL ELEVATION

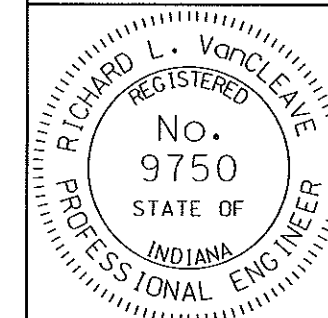
NOTES:

1. See Standard Drawings E 601-TTGB-01 and E 601-TTGB-03 for Thrie Beam Guardrail post and blockout details from bridge rail to Post No. 10.
2. See Standard Drawing E 601-TTGB-03 for Thrie Beam Guardrail post and blockout details with the exception of height above shoulder surface for Posts No. 11 through 16.

INDIANA DEPARTMENT OF TRANSPORTATION

THRIE BEAM GUARDRAIL
TO THRIE BEAM GUARDRAIL
TRANSITION, TTT
SEPTEMBER 2011

STANDARD DRAWING NO. E 601-TMTT-01



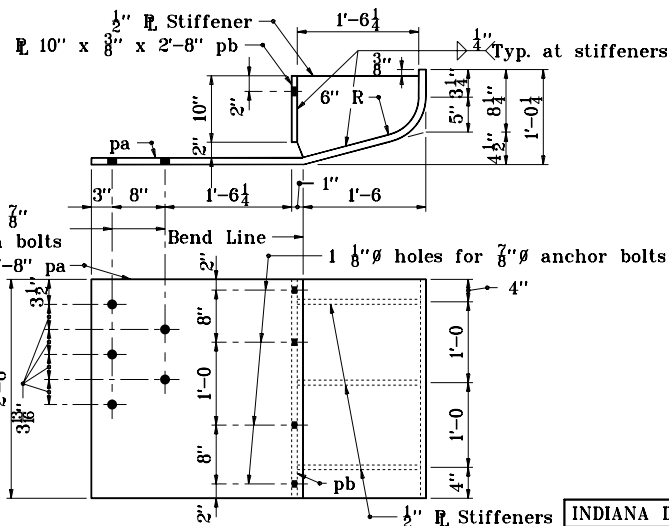
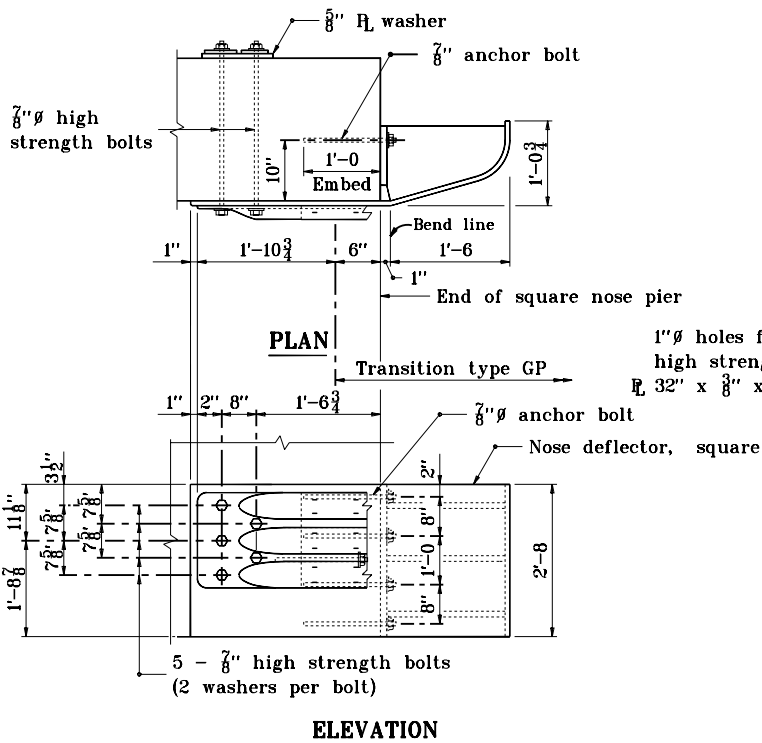
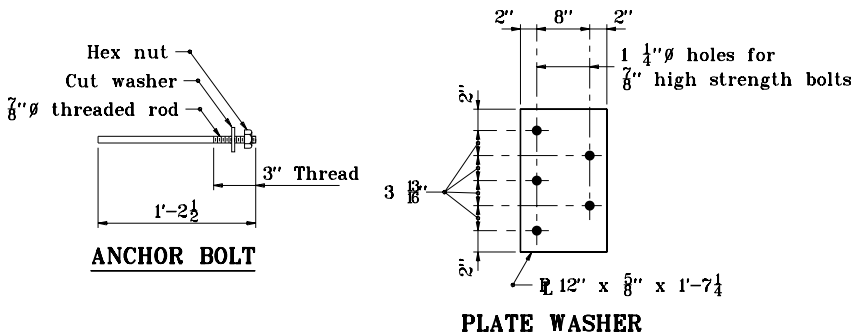
Richard L. Vancleave 9-1-11
DESIGN STANDARDS ENGINEER DATE

Michael J. McElroy 9/1/11
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

GENERAL NOTES

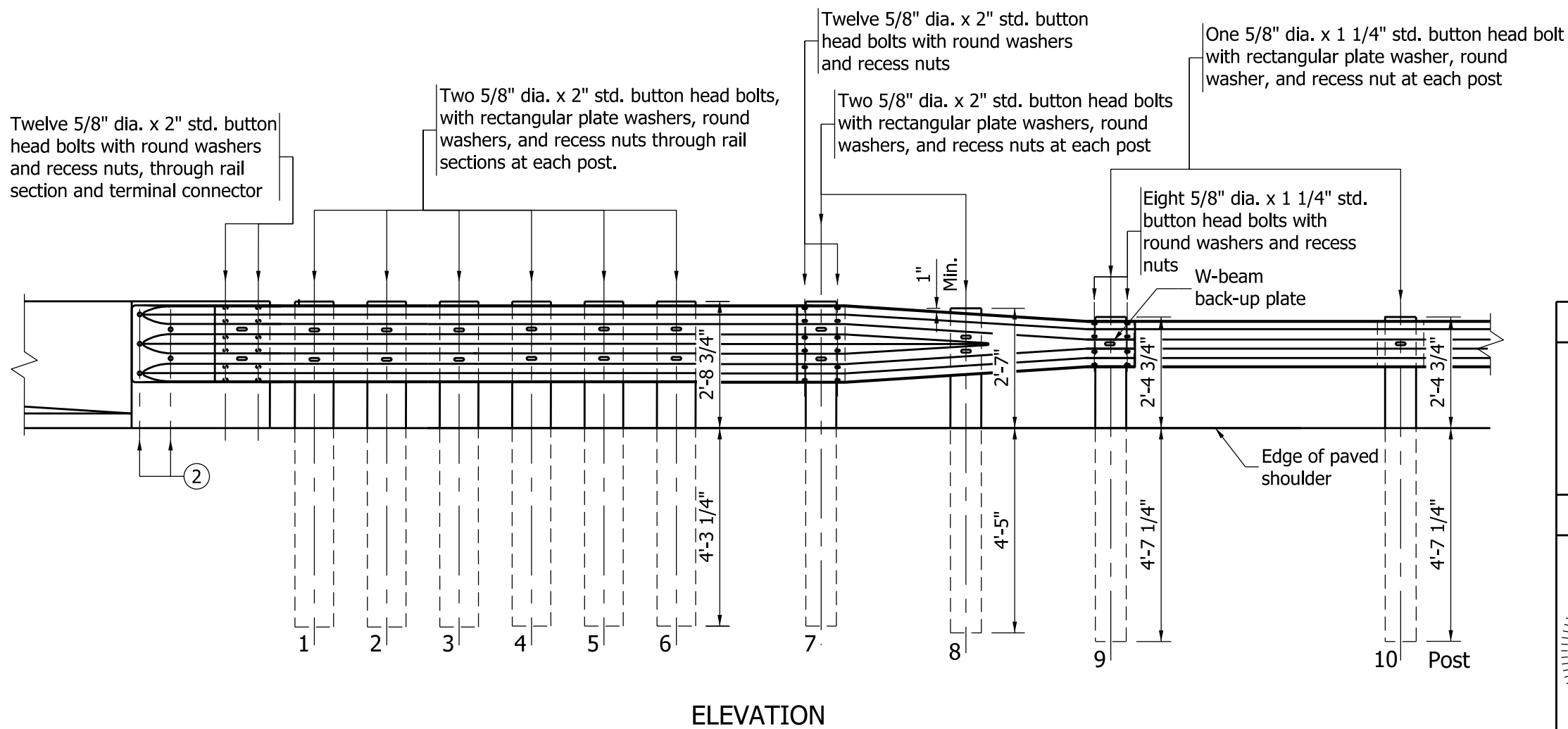
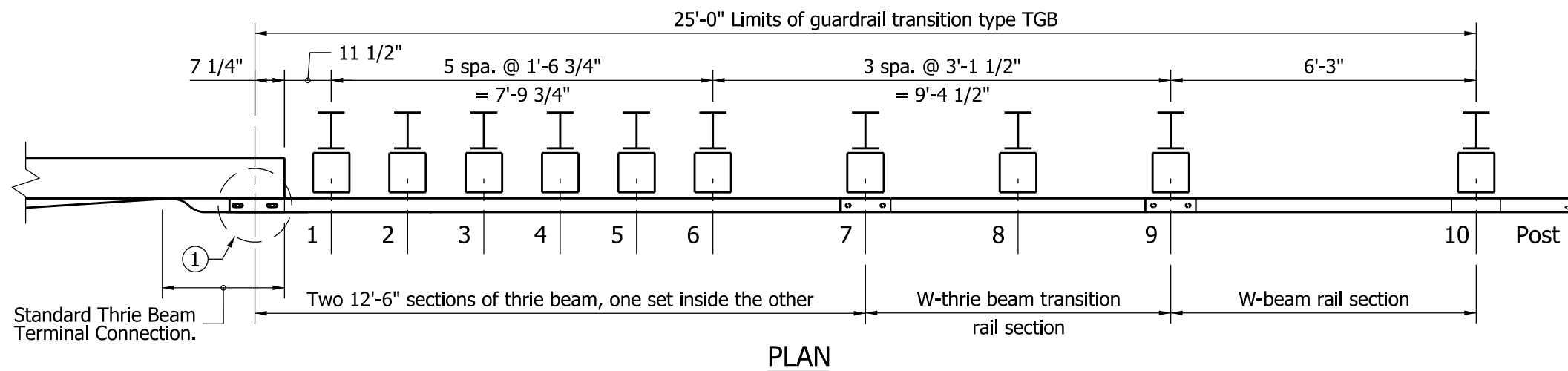
1. This drawing shall be used where guardrail transition type GP is specified to connect W-beam guardrail to a pier or frame bent collision wall.
2. The details on this drawing are for the assembly and installation of the deflector components for connecting guardrail transition type GP to a pier or frame bent collision wall.
3. The anchor bolt shall be anchored with a chemical anchor system shown on the Department's List of Approved Chemical Anchor Systems.



DETAIL OF NOSE DEFLECTOR - SQUARE

ATTACHMENT AT SQUARE NOSE PIER

INDIANA DEPARTMENT OF TRANSPORTATION	
TRANSITION AT PIER TYPE GP SEPTEMBER 1998	
STANDARD DRAWING NO. E 601-TPGP-01	
	DETAILS PLACED IN THIS FORMAT 11-15-99
	<i>/s/ Anthony L. Uremovich</i> <u>11-15-99</u> DESIGN STANDARDS ENGINEER DATE
	<i>/s/ Firooz Zandi</i> <u>11-15-99</u> CHIEF HIGHWAY ENGINEER DATE
	ORIGINALLY APPROVED 9-01-98
DESIGN STANDARDS ENGINEER	



NOTES:

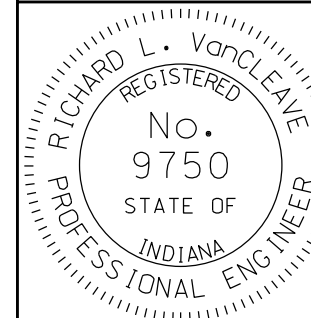
- See Standard Drawing E 601-TTGB-02 for Lap Detail.
- See Standard Drawing E 601-TBGC-01 for connection details.
- See Standard Drawings E 601-TTGB-03 through -05 for post and block details.

INDIANA DEPARTMENT OF TRANSPORTATION

GUARDRAIL TRANSITION
TYPE TGB

SEPTEMBER 2011

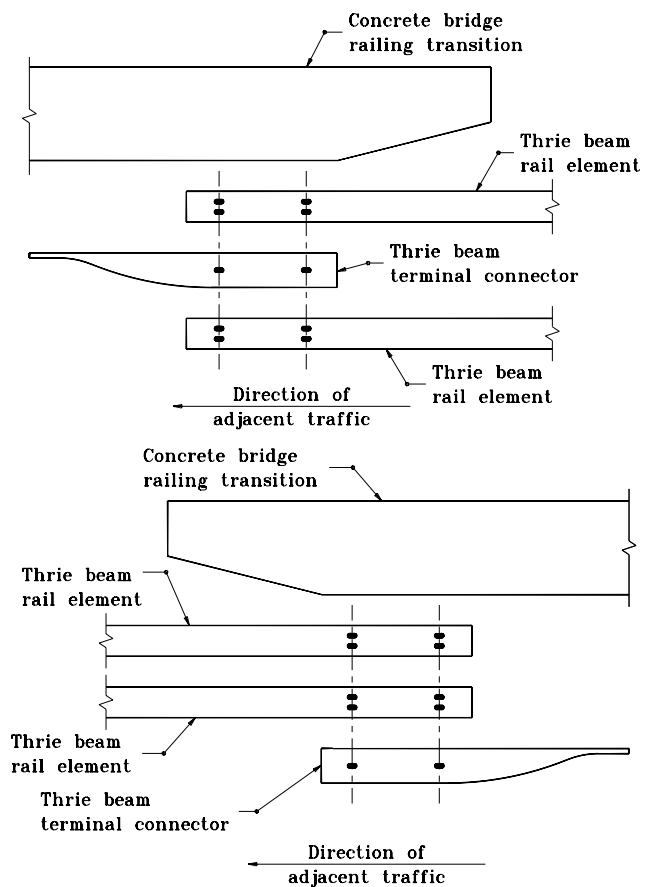
STANDARD DRAWING NO. E 601-TTGB-01



/s/ Richard L. VanCleave 09/01/11
DESIGN STANDARDS ENGINEER DATE

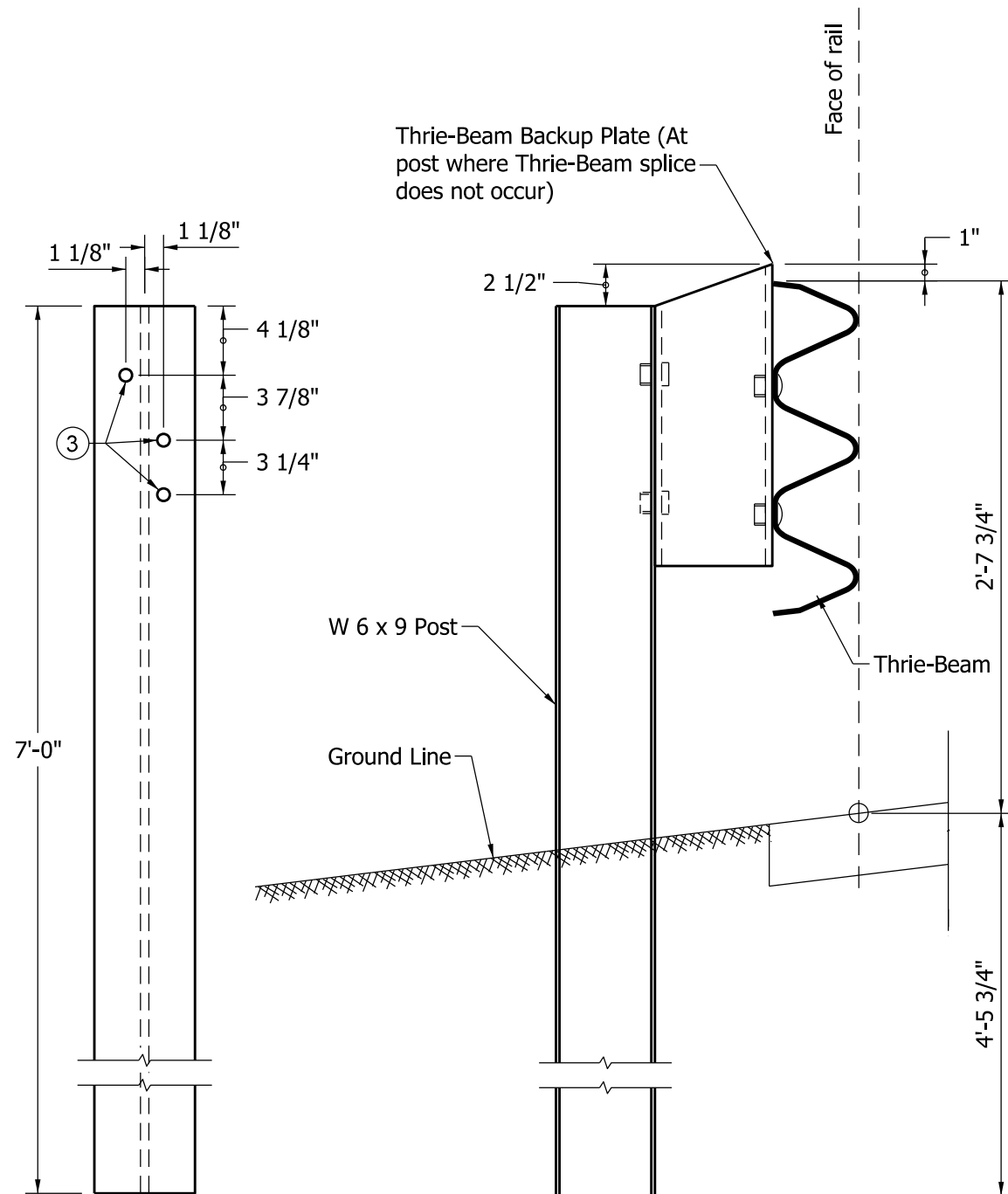
/s/ Mark A. Miller 09/01/11
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER



LAP DETAIL AT BRIDGE RAILING TRANSITION

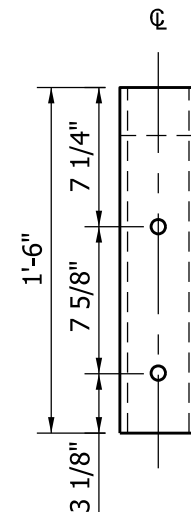
INDIANA DEPARTMENT OF TRANSPORTATION	
GUARDRAIL TRANSITION	
TYPE TGB	
MAY 2000	
STANDARD DRAWING NO. E 601-TTGB-02	
	<i>/s/ Anthony L. Uremovich</i> 5-01-00 DESIGN STANDARDS ENGINEER DATE
	<i>/s/ Firooz Zandi</i> 5-01-00 CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER	



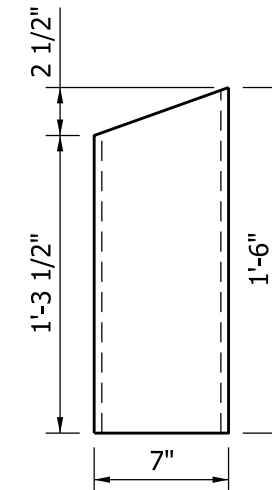
FRONT VIEW

SIDE VIEW

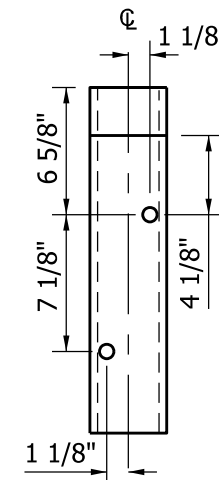
W 6 x 9 POST DETAILS



FRONT VIEW

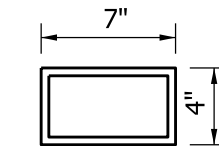


SIDE VIEW



BACK VIEW

TS 7 x 4 x 3/16" BLOCK DETAILS
POSTS 1 THROUGH 7

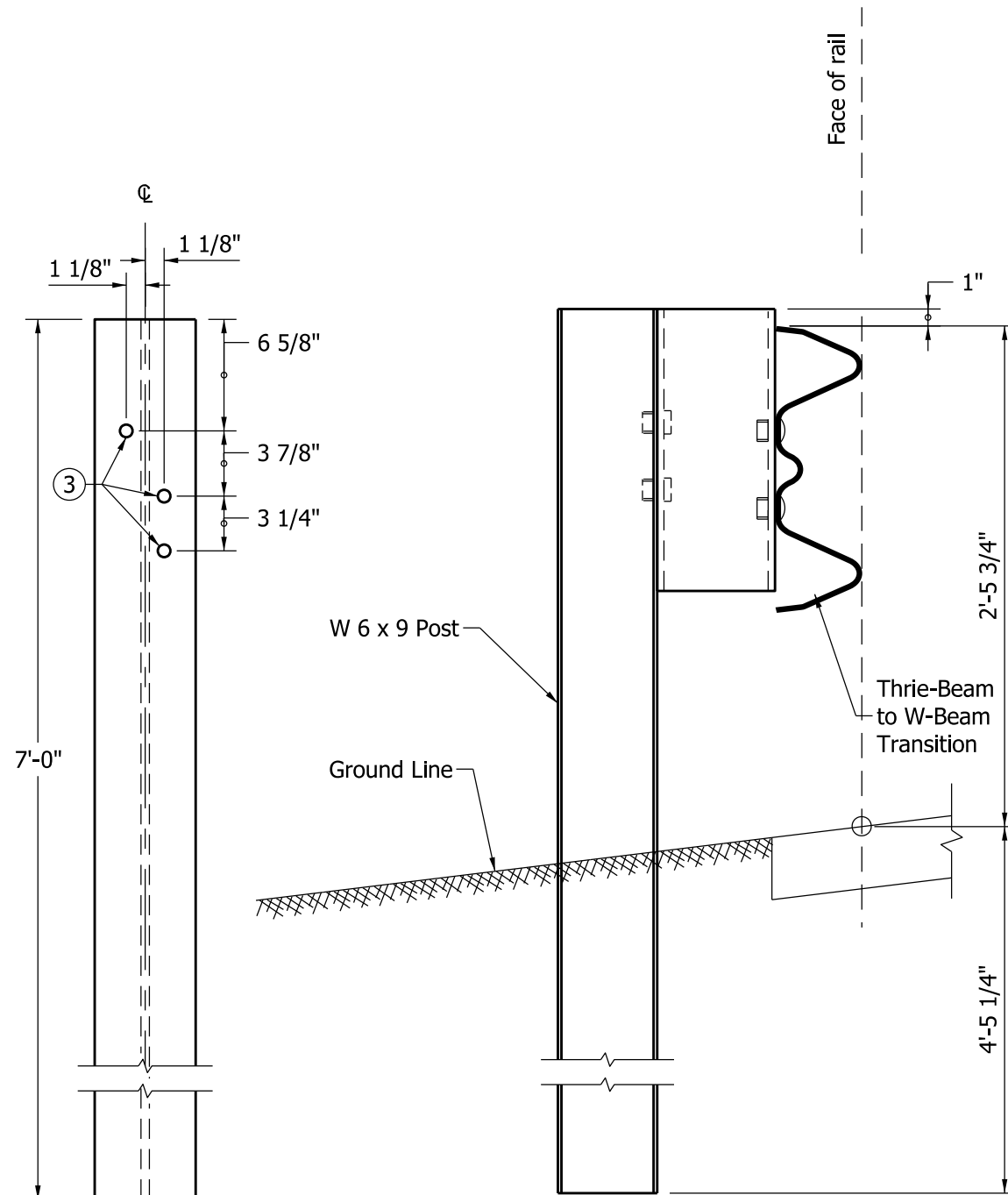


TOP VIEW

NOTES:

1. All holes drilled or punched to 3/4" dia.
2. See Standard Drawing E 601-TTGB-01 for post numbers.
- ③ Hole pattern for posts numbers 8 through 10 may be drilled in back flange. See Standard drawing E 601-TTGB-04 or E 601-TTGB-05.

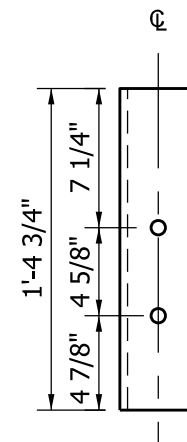
INDIANA DEPARTMENT OF TRANSPORTATION		
GUARDRAIL TRANSITION TYPE TGB		
SEPTEMBER 2011		
STANDARD DRAWING NO.		E 601-TTGB-03
	/s/ <i>Richard L. VanCleave</i>	09/01/11
	DESIGN STANDARDS ENGINEER	DATE
	/s/ <i>Mark A. Miller</i>	09/01/11
	CHIEF HIGHWAY ENGINEER	DATE
DESIGN STANDARDS ENGINEER		



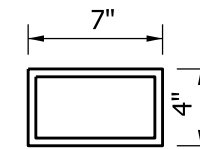
FRONT VIEW

SIDE VIEW

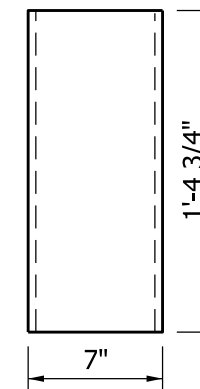
W 6 x 9 POST DETAILS



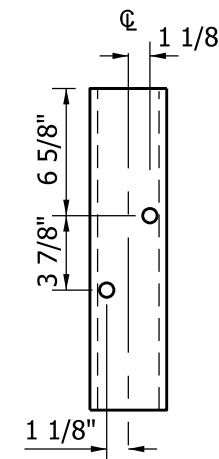
FRONT VIEW



TOP VIEW



SIDE VIEW



BACK VIEW

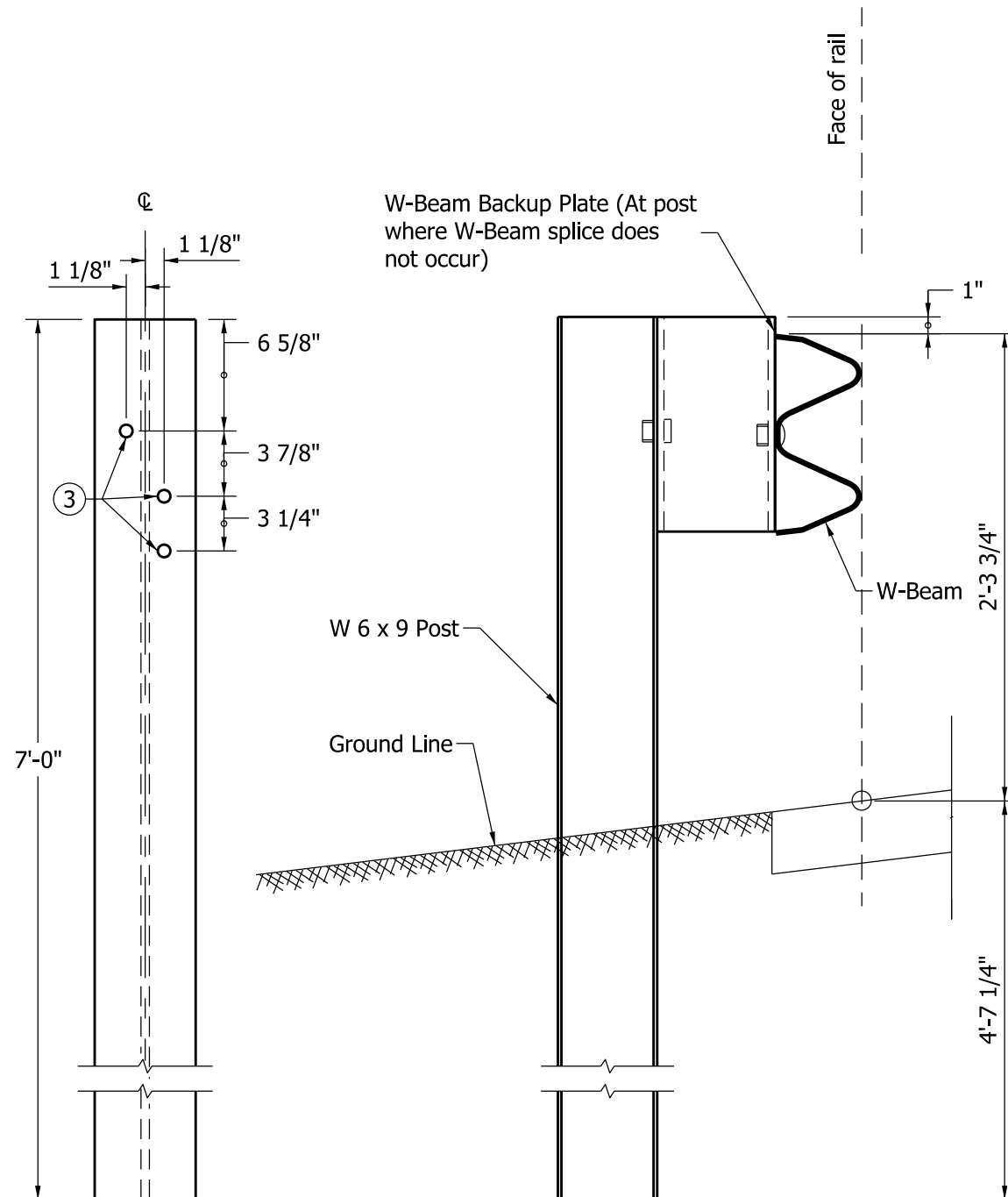
TS 7 x 4 x 3/16" BLOCK DETAILS

POST 8

NOTES:

1. All holes drilled or punched to 3/4" dia.
2. See Standard Drawing E 601-TTGB-01 for post numbers.
- ③ Hole pattern for posts numbers 1 through 7 may be drilled in back flange. See Standard drawing E 601-TTGB-03.

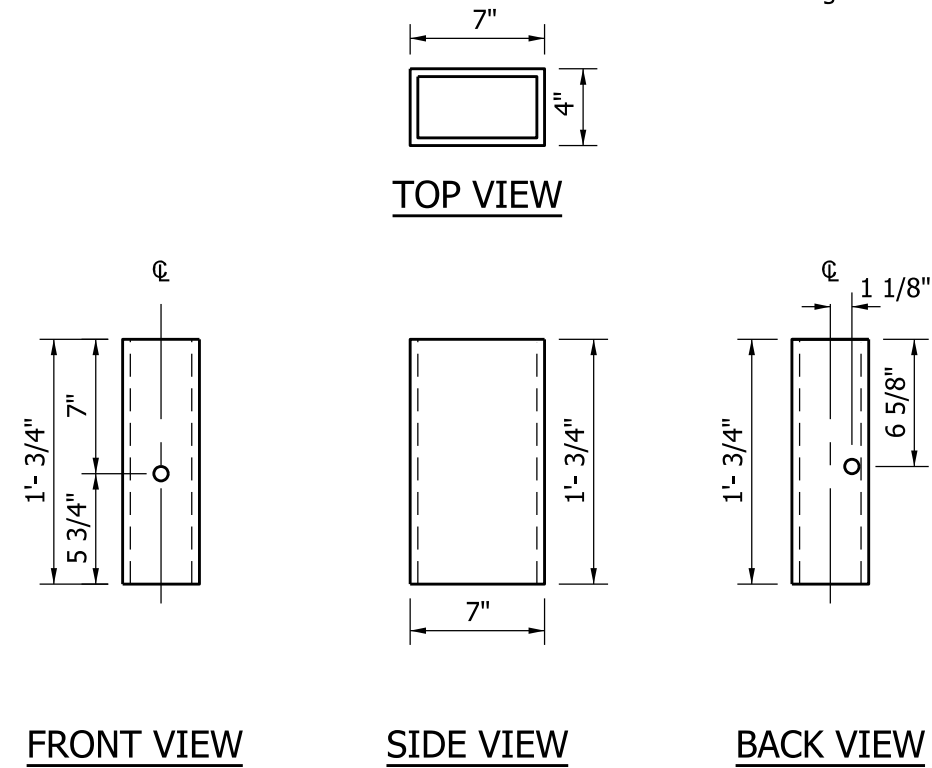
INDIANA DEPARTMENT OF TRANSPORTATION		
GUARDRAIL TRANSITION TYPE TGB		
SEPTEMBER 2011		
STANDARD DRAWING NO.		E 601-TTGB-04
	/s/ <i>Richard L. VanCleave</i>	09/01/11
	DESIGN STANDARDS ENGINEER	DATE
	/s/ <i>Mark A. Miller</i>	09/01/11
	CHIEF HIGHWAY ENGINEER	DATE
DESIGN STANDARDS ENGINEER		



FRONT VIEW

SIDE VIEW

W 6 x 9 POST DETAILS



FRONT VIEW

SIDE VIEW

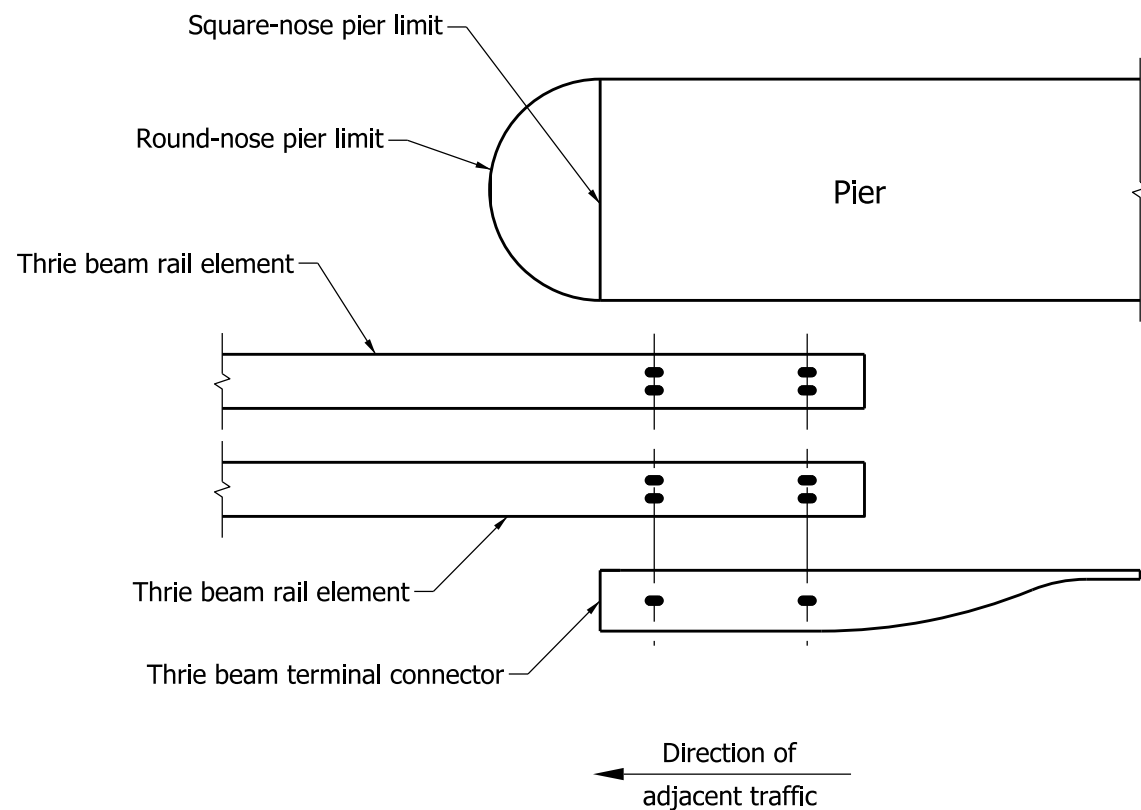
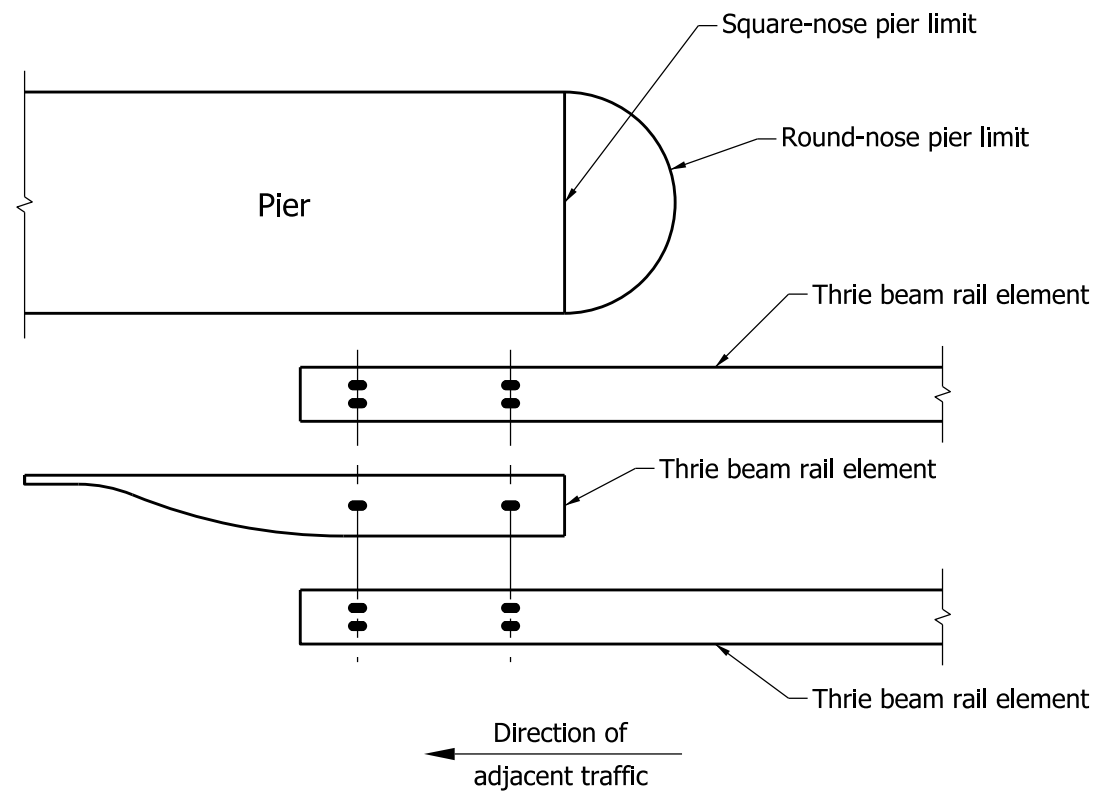
BACK VIEW

TS 7 x 4 x 3/16" BLOCK DETAILS
POSTS 9 and 10

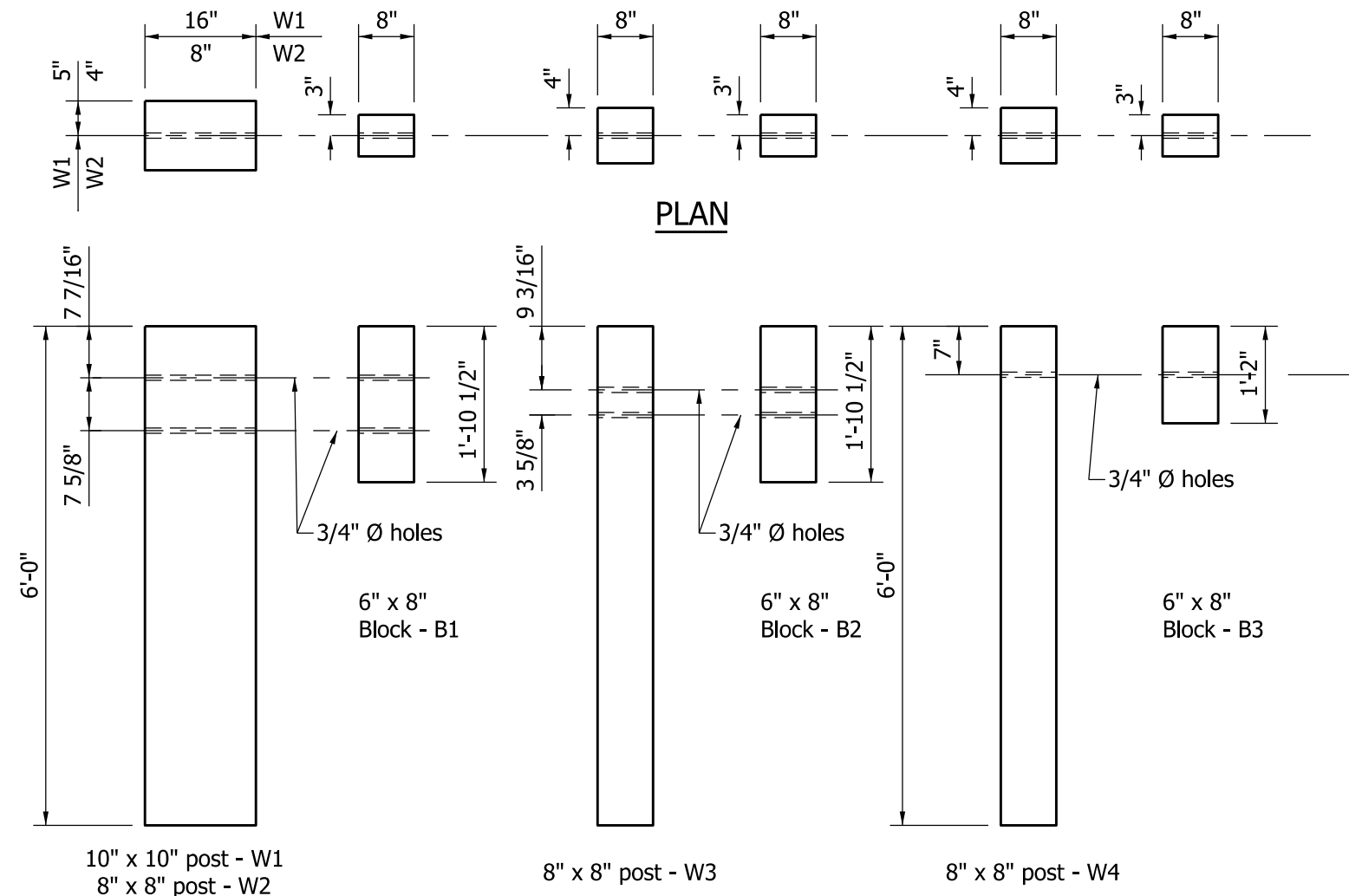
NOTES:

1. All holes drilled or punched to 3/4" dia.
2. See Standard Drawing E 601-TTGB-01 for post numbers.
- ③ Hole pattern for posts numbers 1 through 7 may be drilled in back flange. See Standard drawing E 601-TTGB-03.

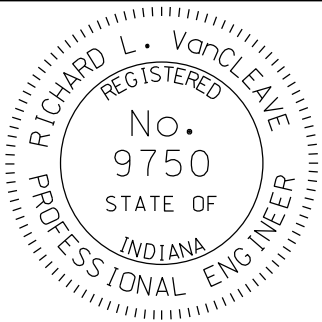
INDIANA DEPARTMENT OF TRANSPORTATION			
GUARDRAIL TRANSITION TYPE TGB			
SEPTEMBER 2011			
STANDARD DRAWING NO.		E 601-TTGB-05	
	/s/ <i>Richard L. VanCleave</i>		09/01/11
	DESIGN STANDARDS ENGINEER		DATE
	/s/ <i>Mark A. Miller</i>		09/01/11
DESIGN STANDARDS ENGINEER	CHIEF HIGHWAY ENGINEER		DATE

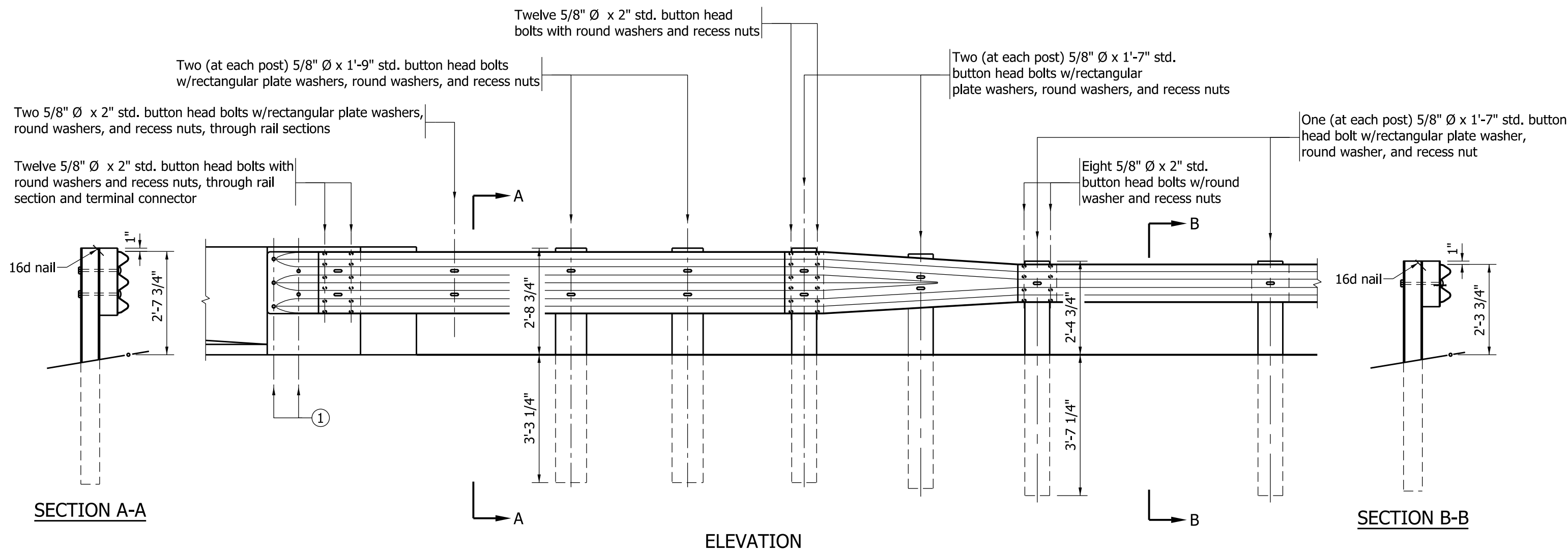


LAP DETAIL AT PIER CONNECTION



ELEVATION
POST & BLOCK DETAILS

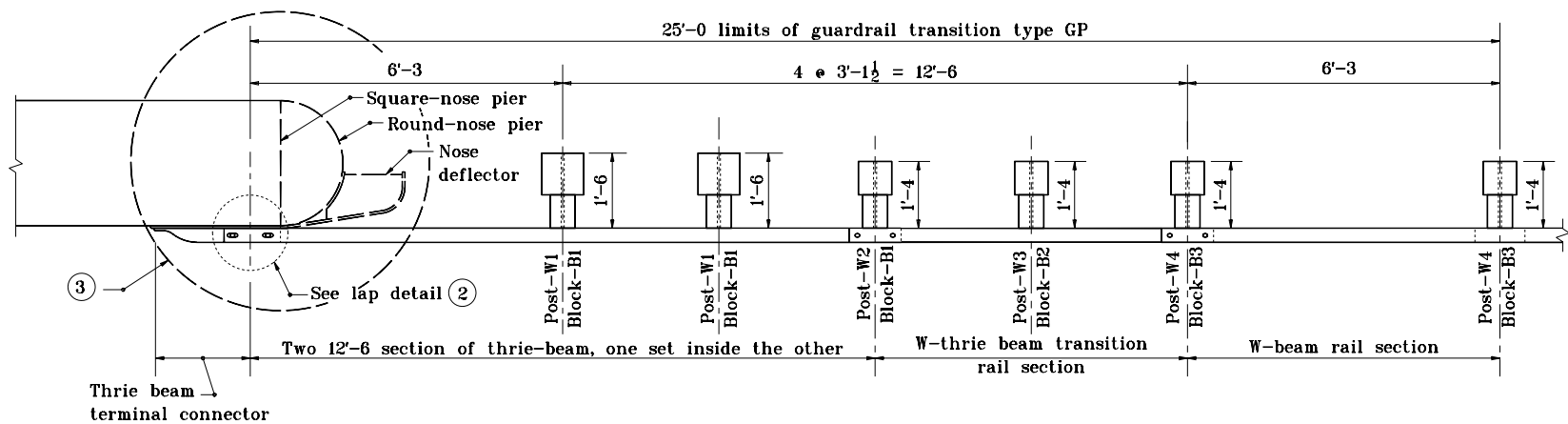
INDIANA DEPARTMENT OF TRANSPORTATION	
GUARDRAIL TRANSITION TYPE GP	
SEPTEMBER 2011	
STANDARD DRAWING NO.	E 601-TTGP-01
	<i>/s/ Richard L. VanCleave</i> 09/01/11
	DESIGN STANDARDS ENGINEER DATE
	<i>/s/ Mark A. Miller</i> 09/01/11
	CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER	



NOTE:

- ① See pier connection details for connection of terminal connector. See Standard Drawing E 601-TTGP-01 (use proper end detail).

INDIANA DEPARTMENT OF TRANSPORTATION		
GUARDRAIL TRANSITION TYPE GP		
SEPTEMBER 2011		
STANDARD DRAWING NO.		E 601-TTGP-02
	/s/ <i>Richard L. VanCleave</i>	09/01/11
	DESIGN STANDARDS ENGINEER	DATE
	/s/ <i>Mark A. Miller</i>	09/01/11
	CHIEF HIGHWAY ENGINEER	DATE
DESIGN STANDARDS ENGINEER		

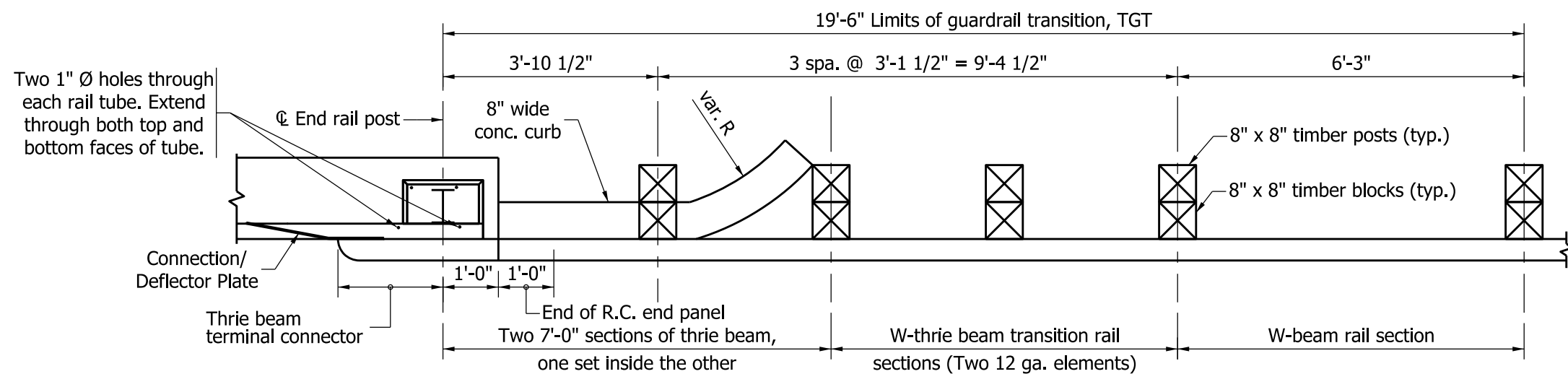


PLAN

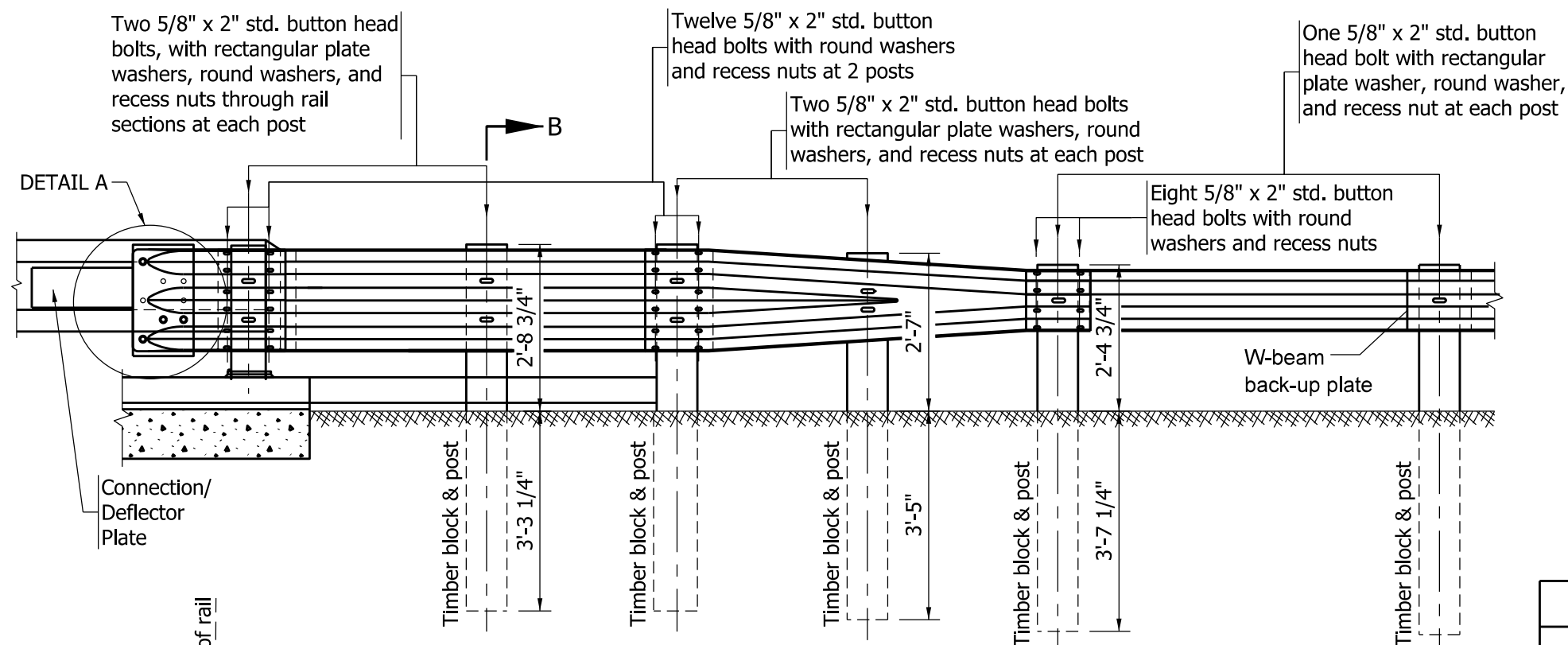
NOTES:

1. This drawing shall be used where guardrail transition type GP is specified to connect W-beam guardrail to a pier or frame bent collision wall.
- (2) See Standard Drawing E 601-TTGP-01 for lap detail at pier connection.
- (3) See Standard Drawings E 601-TPGP-01 and -02 for nose deflector details.

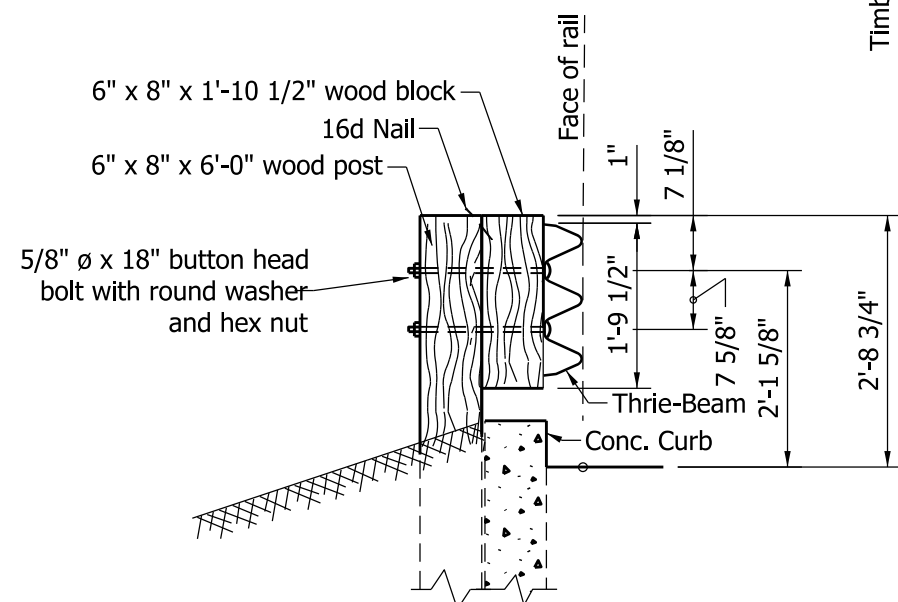
INDIANA DEPARTMENT OF TRANSPORTATION	
GUARDRAIL TRANSITION TYPE GP	
APRIL 1996	
STANDARD DRAWING NO. E 601-TTGP-03	
	DETAILS PLACED IN THIS FORMAT 11-15-99
	/s/ Anthony L. Uremovich 11-15-99 DESIGN STANDARDS ENGINEER DATE
	/s/ Firooz Zandi 11-15-99 CHIEF HIGHWAY ENGINEER DATE
	DESIGN STANDARDS ENGINEER ORIGINALLY APPROVED 4-01-96



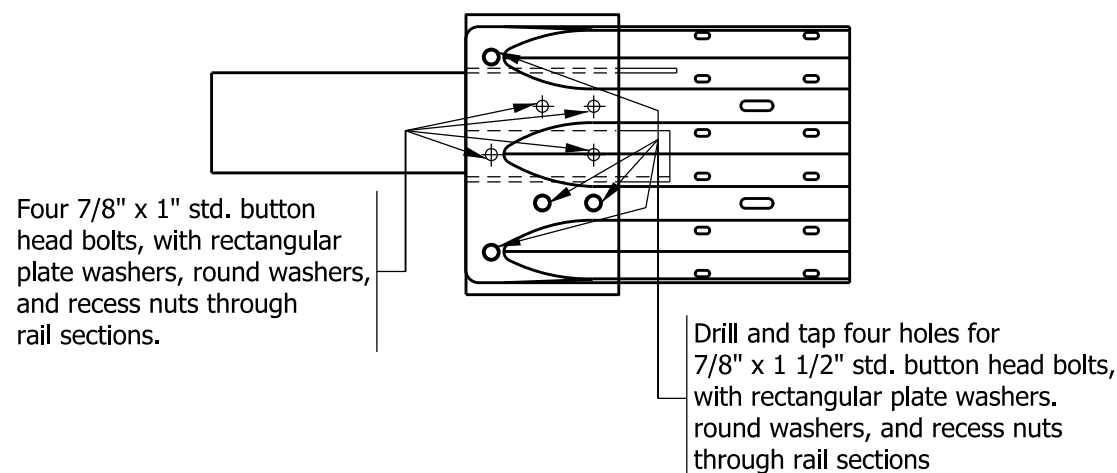
PLAN



ELEVATION



SECTION B-B



DETAIL A

NOTES:

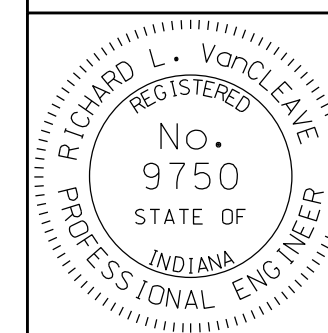
1. See Standard Drawing E 601-TBGC-01 and E 601-TBGC-02 for thrie-beam transition details.
2. See Standard Drawing E 601-TTGT-02 for transition connection detail, timber post detail and timber block detail.

INDIANA DEPARTMENT OF TRANSPORTATION

GUARDRAIL TRANSITION, TGT

SEPTEMBER 2011

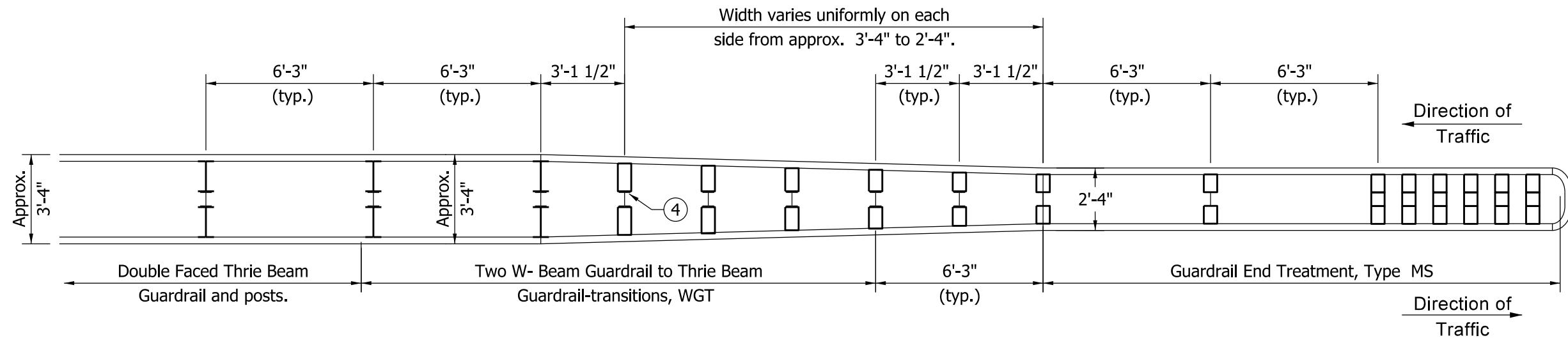
STANDARD DRAWING NO. E 601-TTGT-01



/s/ Richard L. VanCleave 09/01/11
DESIGN STANDARDS ENGINEER DATE

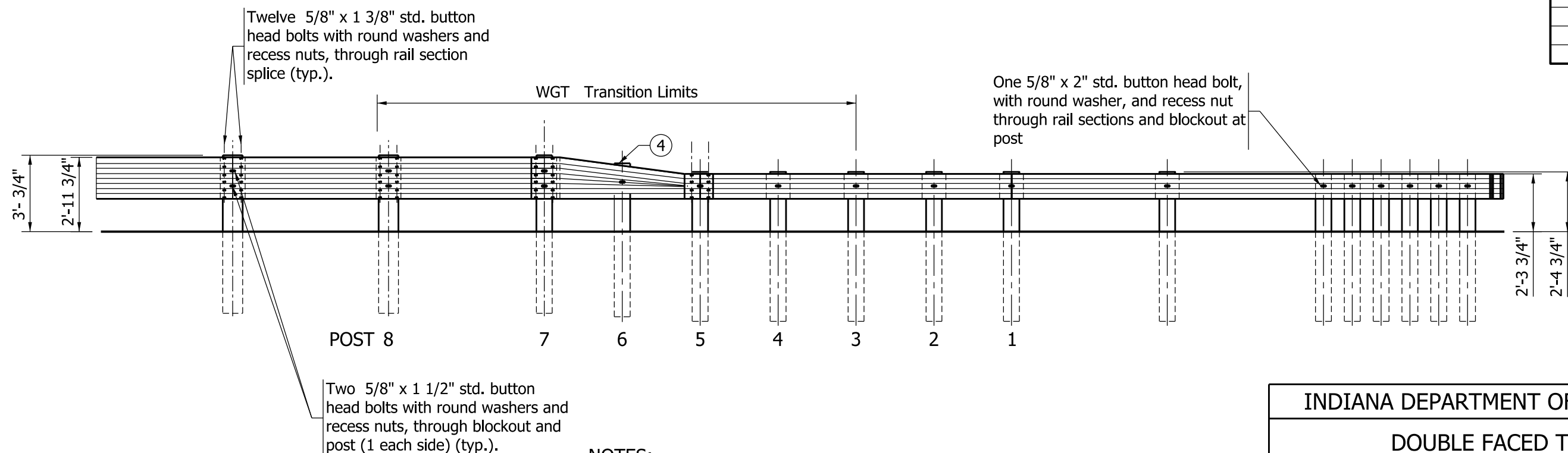
/s/ Mark A. Miller 09/01/11
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER



PARTIAL PLAN VIEW

Post	Blockouts
1	W-Beam
2	9" x 6"
3	10" x 6"
4	11" x 6"
5	12" x 6"
6	13" x 6"
7	W 14 x 22
8	W 14 x 22



LEGEND:

- ┃ - W 6 x 9 Post
- ┃ - W 14 x 22 Blockout
- - Approved W-Beam Blockout

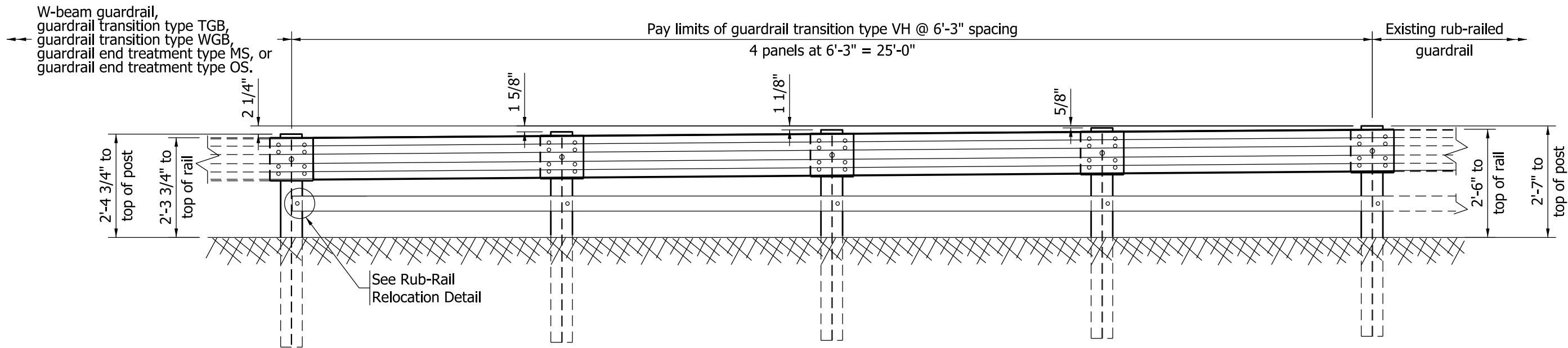
NOTES:

1. See Standard Drawing E 601-MTGR-01 for Thrie Beam Guardrail details.
2. See Standard Drawing E 601-TWGT-01 for Guardrail Transition WGT details.
3. See Standard Drawings E 601-WBGA-01 through -03 and E 601-WBGC-01 through -03 for W- Beam Guardrail details.
- ④ At post 6 on the thrie beam guardrail transition to W-Beam guardrail, the maximum post exposure above the top of the transition rail shall be limited to 1".

INDIANA DEPARTMENT OF TRANSPORTATION	
DOUBLE FACED THRIE BEAM GUARDRAIL TRANSITION TO GRET TYPE MS SEPTEMBER 2011	
STANDARD DRAWING NO. E 601-TTMS-01	
	/s/ Richard L. VanCleave 09/01/11
	DESIGN STANDARDS ENGINEER DATE
	/s/ Mark A. Miller 09/01/11
	CHIEF HIGHWAY ENGINEER DATE

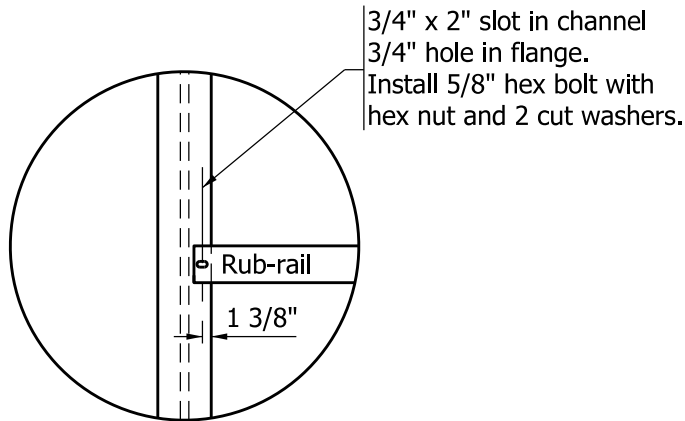
NOTES:

- 1. If rub-rail is not spliced at post, the channel shall be cut and repositioned behind the flange.
- 2. If rub-rail is spliced at post, the splice material shall be removed and the channel shall be repositioned behind the flange.



ELEVATION

GUARDRAIL TRANSITION TYPE VH AT 6'-3" POST SPACING

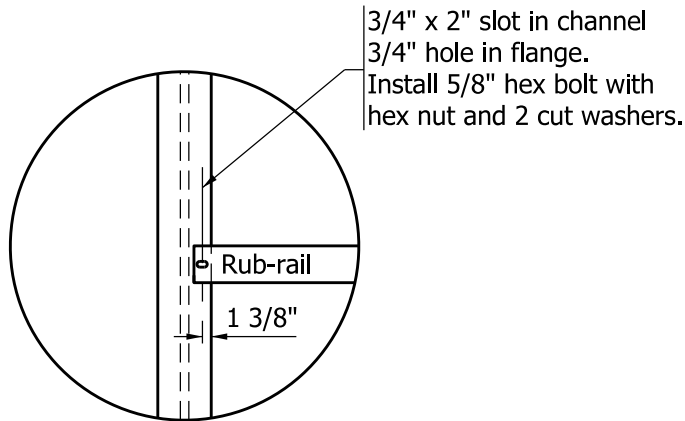
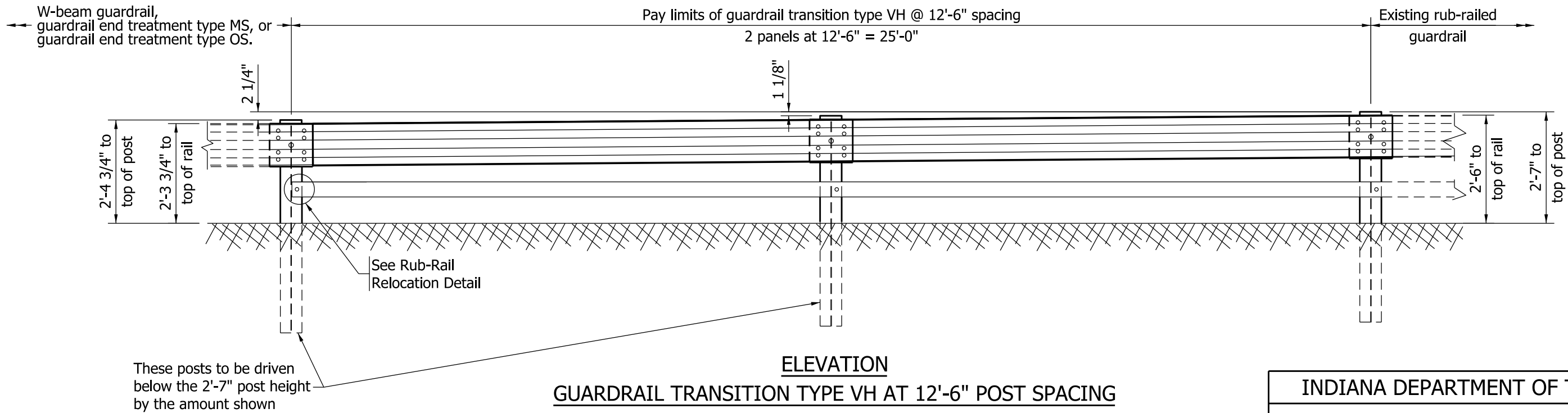


RUB-RAIL RELOCATION DETAIL

INDIANA DEPARTMENT OF TRANSPORTATION			
GUARDRAIL TRANSITION TYPE VH			
SEPTEMBER 2011			
STANDARD DRAWING NO.		E 601-TTVH-01	
	/s/ <i>Richard L. VanCleave</i>	09/01/11	
	DESIGN STANDARDS ENGINEER	DATE	
	/s/ <i>Mark A. Miller</i>	09/01/11	
DESIGN STANDARDS ENGINEER	CHIEF HIGHWAY ENGINEER	DATE	

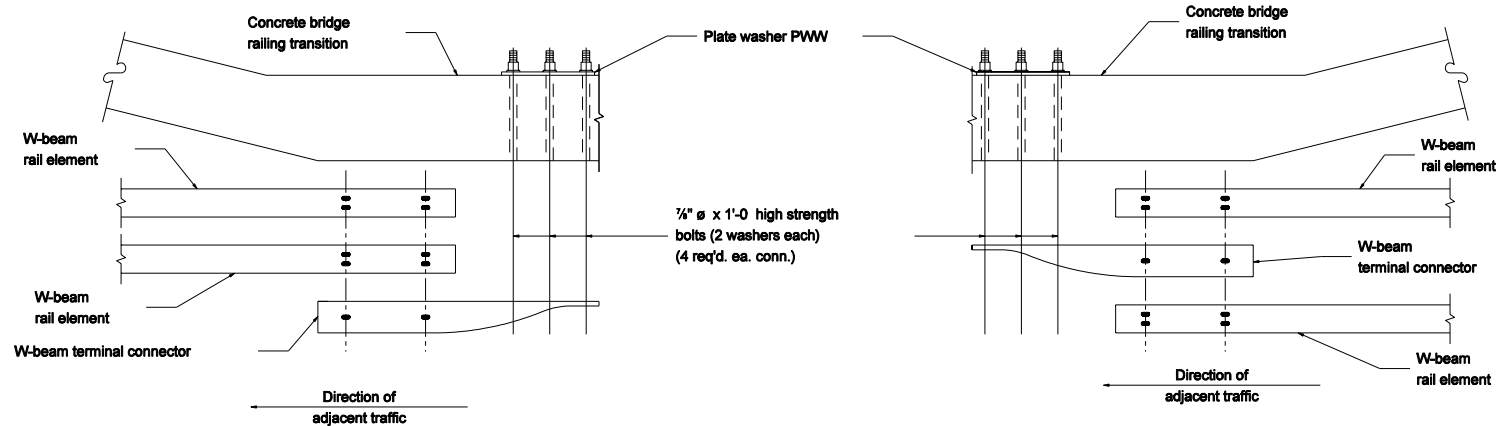
NOTES:

1. If rub-rail is not spliced at post, the channel shall be cut and repositioned behind the flange.
2. If rub-rail is spliced at post, the splice material shall be removed and the channel shall be repositioned behind the flange.

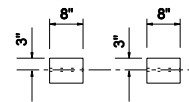


RUB-RAIL RELOCATION DETAIL

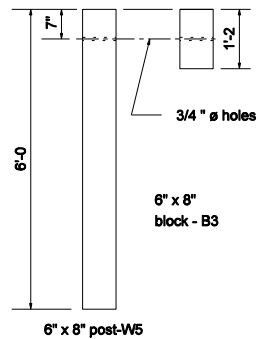
INDIANA DEPARTMENT OF TRANSPORTATION			
GUARDRAIL TRANSITION TYPE VH			
SEPTEMBER 2011			
STANDARD DRAWING NO.		E 601-TTVH-02	
	/s/ <i>Richard L. VanCleave</i>	09/01/11	
	DESIGN STANDARDS ENGINEER	DATE	
	/s/ <i>Mark A. Miller</i>	09/01/11	
DESIGN STANDARDS ENGINEER	CHIEF HIGHWAY ENGINEER	DATE	



LAP DETAIL AT BRIDGE RAILING TRANSITION



PLAN



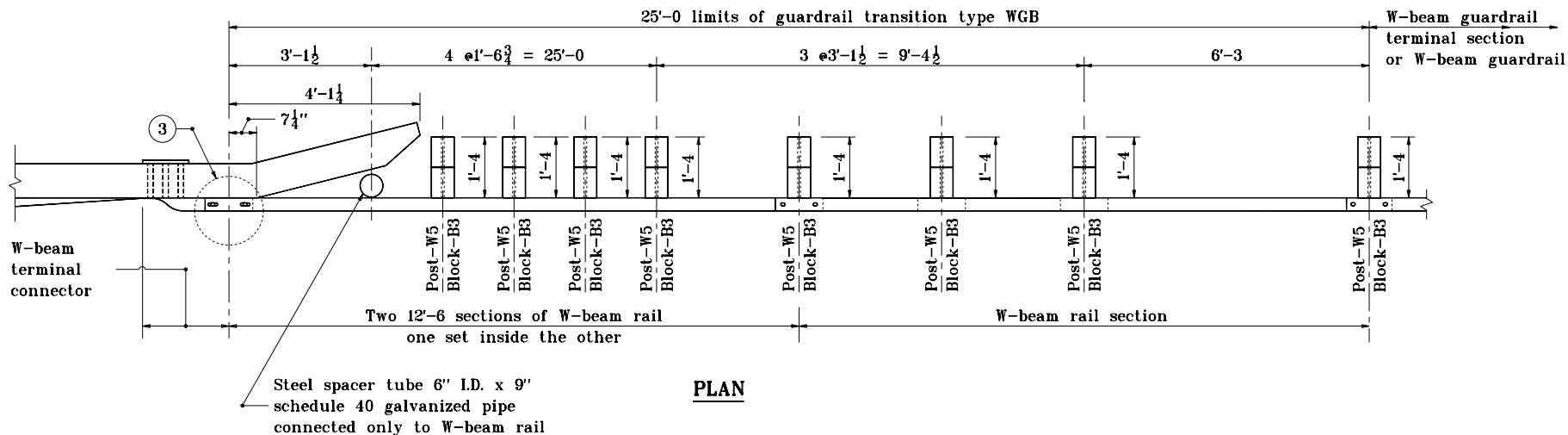
ELEVATION

POST & BLOCK DETAILS

GENERAL NOTES

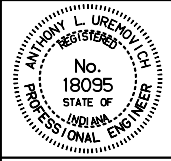
1. This lap shall be used where guardrail transition type WGB is specified to connect to concrete bridge railing transition WBC.

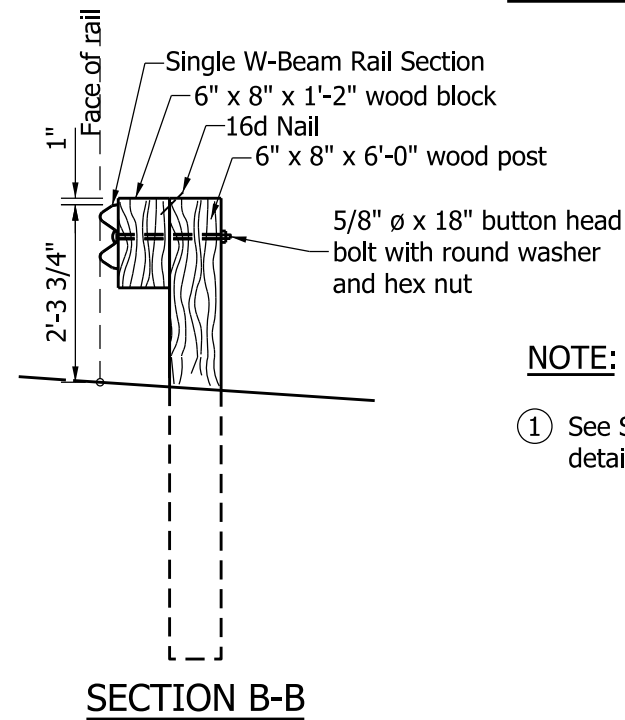
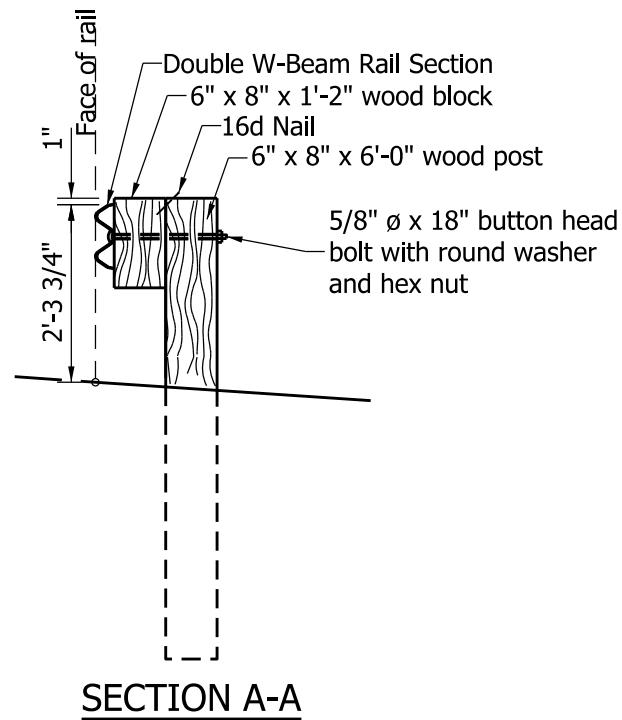
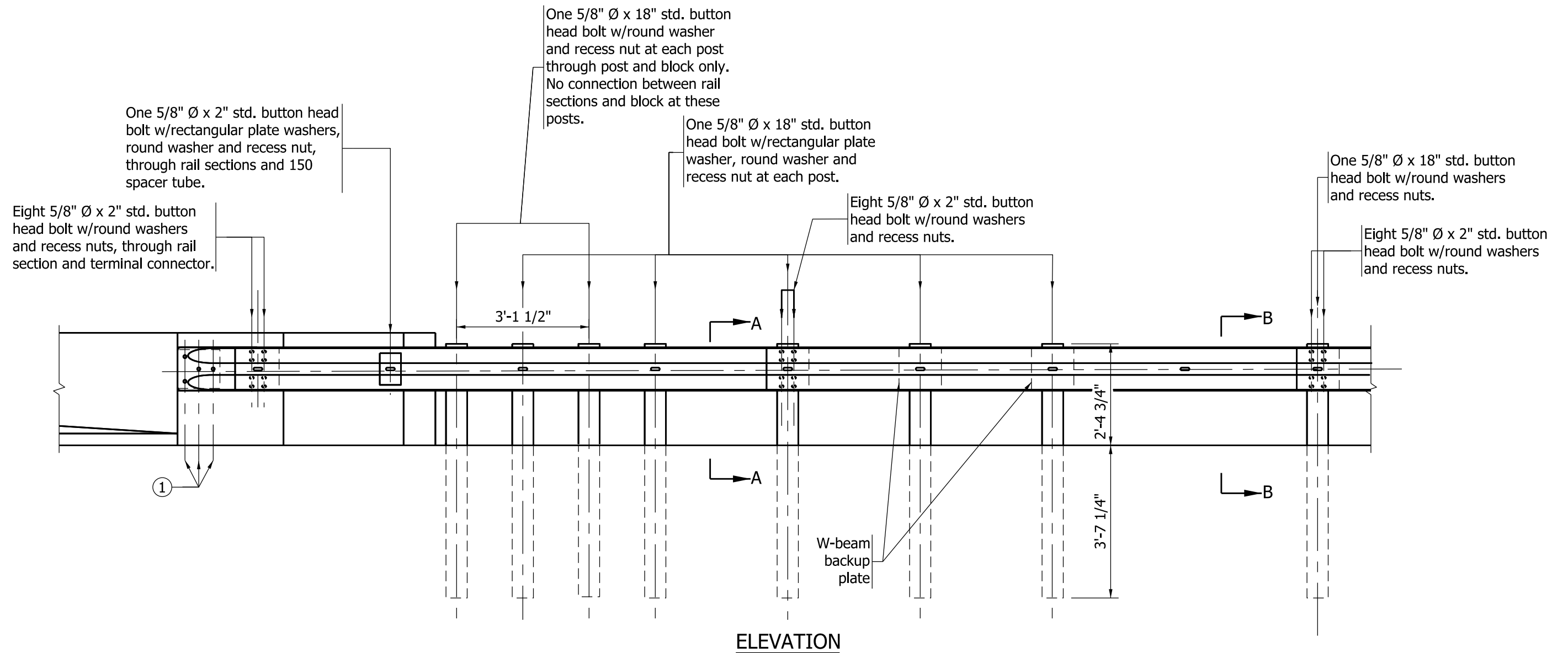
INDIANA DEPARTMENT OF TRANSPORTATION	
GUARDRAIL TRANSITION TYPE WGB	
MARCH 2005	
STANDARD DRAWING NO. E 601-TWGB-01	
	/s/ Richard L. VanCleave 3-01-05 DESIGN STANDARDS ENGINEER DATE
DESIGN STANDARDS ENGINEER	/s/ Richard K. Smutzer 3-01-05 CHIEF HIGHWAY ENGINEER DATE



NOTES:

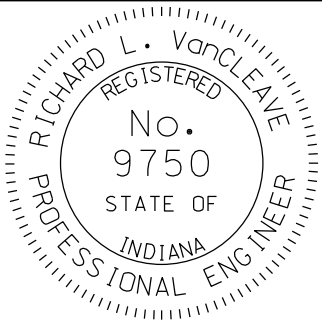
1. This transition shall be used where guardrail transition type WGB is specified to connect W-beam guardrail to concrete bridge railing.
2. See Standard Drawing E 601-TWGB-03 for elevation and assembly details.
- ③ See Standard Drawings E 601-TWGB-01 for lap details.

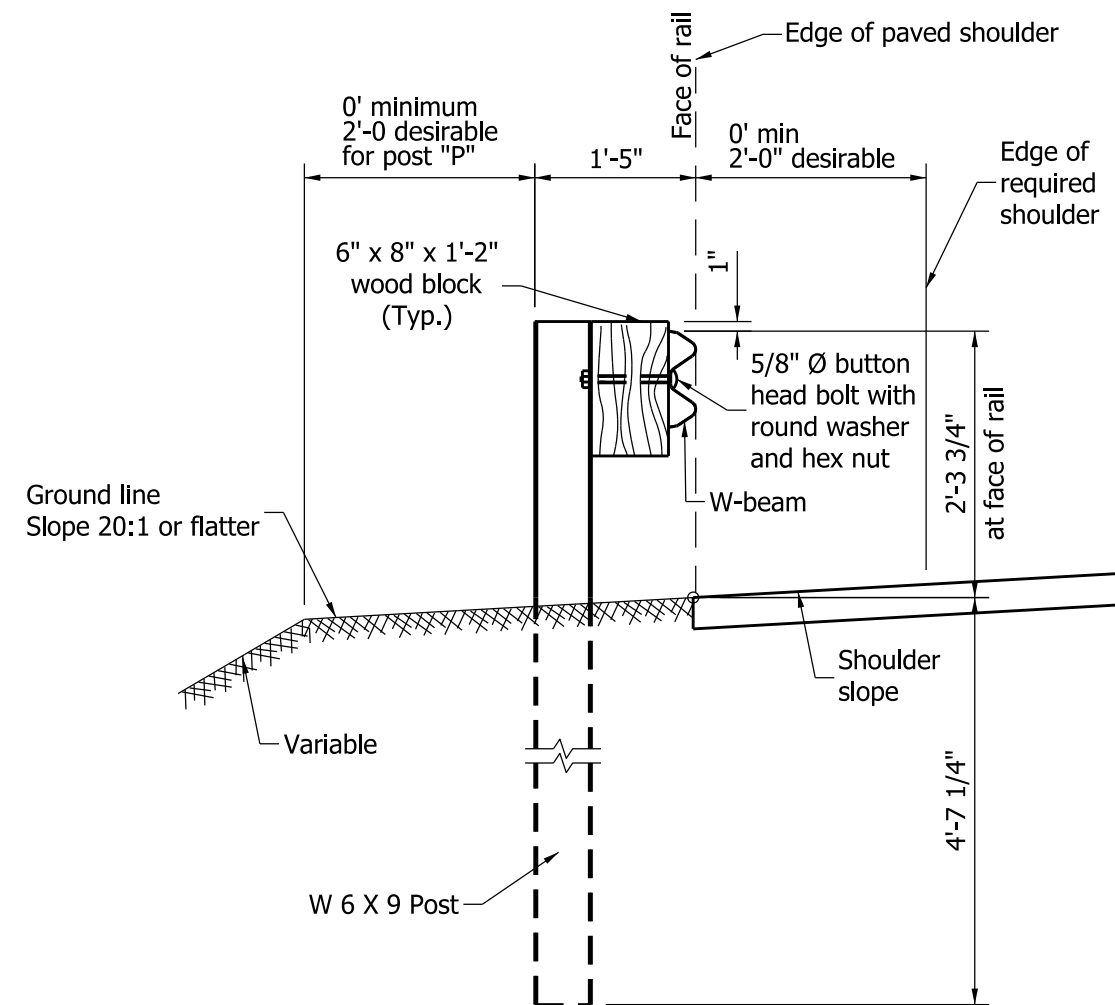
INDIANA DEPARTMENT OF TRANSPORTATION																	
GUARDRAIL TRANSITION TYPE WGB																	
APRIL 1996																	
STANDARD DRAWING NO. E 601-TWGB-02																	
	<table style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2" style="text-align: right; font-size: small;">DETAILS PLACED IN THIS FORMAT 7-27-99</td> </tr> <tr> <td style="width: 60%; border-bottom: 1px solid black; font-size: small;">/s/ Anthony L. Uremovich</td> <td style="width: 40%; border-bottom: 1px solid black; font-size: small;">7-27-99</td> </tr> <tr> <td style="font-size: x-small;">DESIGN STANDARDS ENGINEER</td> <td style="font-size: x-small;">DATE</td> </tr> <tr> <td colspan="2" style="border-top: 1px solid black; padding-top: 5px;"> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%; border-bottom: 1px solid black; font-size: small;">/s/ Firooz Zandi</td> <td style="width: 40%; border-bottom: 1px solid black; font-size: small;">7-27-99</td> </tr> <tr> <td style="font-size: x-small;">CHIEF HIGHWAY ENGINEER</td> <td style="font-size: x-small;">DATE</td> </tr> <tr> <td colspan="2" style="border-top: 1px solid black; padding-top: 5px;"> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%; font-size: x-small;">DESIGN STANDARDS ENGINEER</td> <td style="width: 40%; font-size: x-small;">ORIGINALLY APPROVED 4-01-96</td> </tr> </table> </td> </tr> </table> </td> </tr> </table>	DETAILS PLACED IN THIS FORMAT 7-27-99		/s/ Anthony L. Uremovich	7-27-99	DESIGN STANDARDS ENGINEER	DATE	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%; border-bottom: 1px solid black; font-size: small;">/s/ Firooz Zandi</td> <td style="width: 40%; border-bottom: 1px solid black; font-size: small;">7-27-99</td> </tr> <tr> <td style="font-size: x-small;">CHIEF HIGHWAY ENGINEER</td> <td style="font-size: x-small;">DATE</td> </tr> <tr> <td colspan="2" style="border-top: 1px solid black; padding-top: 5px;"> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%; font-size: x-small;">DESIGN STANDARDS ENGINEER</td> <td style="width: 40%; font-size: x-small;">ORIGINALLY APPROVED 4-01-96</td> </tr> </table> </td> </tr> </table>		/s/ Firooz Zandi	7-27-99	CHIEF HIGHWAY ENGINEER	DATE	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%; font-size: x-small;">DESIGN STANDARDS ENGINEER</td> <td style="width: 40%; font-size: x-small;">ORIGINALLY APPROVED 4-01-96</td> </tr> </table>		DESIGN STANDARDS ENGINEER	ORIGINALLY APPROVED 4-01-96
DETAILS PLACED IN THIS FORMAT 7-27-99																	
/s/ Anthony L. Uremovich	7-27-99																
DESIGN STANDARDS ENGINEER	DATE																
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%; border-bottom: 1px solid black; font-size: small;">/s/ Firooz Zandi</td> <td style="width: 40%; border-bottom: 1px solid black; font-size: small;">7-27-99</td> </tr> <tr> <td style="font-size: x-small;">CHIEF HIGHWAY ENGINEER</td> <td style="font-size: x-small;">DATE</td> </tr> <tr> <td colspan="2" style="border-top: 1px solid black; padding-top: 5px;"> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%; font-size: x-small;">DESIGN STANDARDS ENGINEER</td> <td style="width: 40%; font-size: x-small;">ORIGINALLY APPROVED 4-01-96</td> </tr> </table> </td> </tr> </table>		/s/ Firooz Zandi	7-27-99	CHIEF HIGHWAY ENGINEER	DATE	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%; font-size: x-small;">DESIGN STANDARDS ENGINEER</td> <td style="width: 40%; font-size: x-small;">ORIGINALLY APPROVED 4-01-96</td> </tr> </table>		DESIGN STANDARDS ENGINEER	ORIGINALLY APPROVED 4-01-96								
/s/ Firooz Zandi	7-27-99																
CHIEF HIGHWAY ENGINEER	DATE																
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%; font-size: x-small;">DESIGN STANDARDS ENGINEER</td> <td style="width: 40%; font-size: x-small;">ORIGINALLY APPROVED 4-01-96</td> </tr> </table>		DESIGN STANDARDS ENGINEER	ORIGINALLY APPROVED 4-01-96														
DESIGN STANDARDS ENGINEER	ORIGINALLY APPROVED 4-01-96																



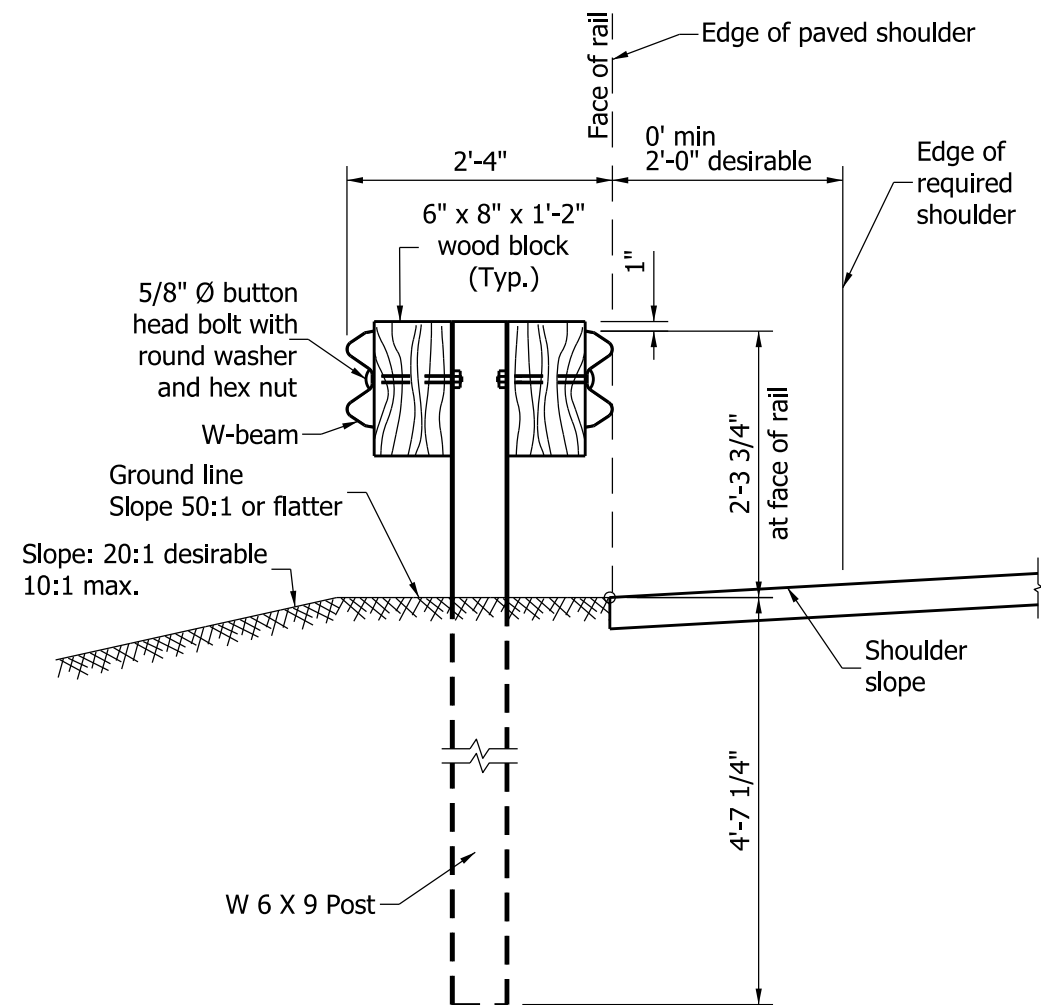
NOTE:

- ① See Standard Drawing E 601-TWGB-01 for lap details.

INDIANA DEPARTMENT OF TRANSPORTATION	
GUARDRAIL TRANSITION TYPE WGB	
SEPTEMBER 2011	
STANDARD DRAWING NO.	E 601-TWGB-03
	/s/ <i>Richard L. VanCleave</i>09/01/11 DESIGN STANDARDS ENGINEERDATE /s/ <i>Mark A. Miller</i>09/01/11 CHIEF HIGHWAY ENGINEERDATE
DESIGN STANDARDS ENGINEER	

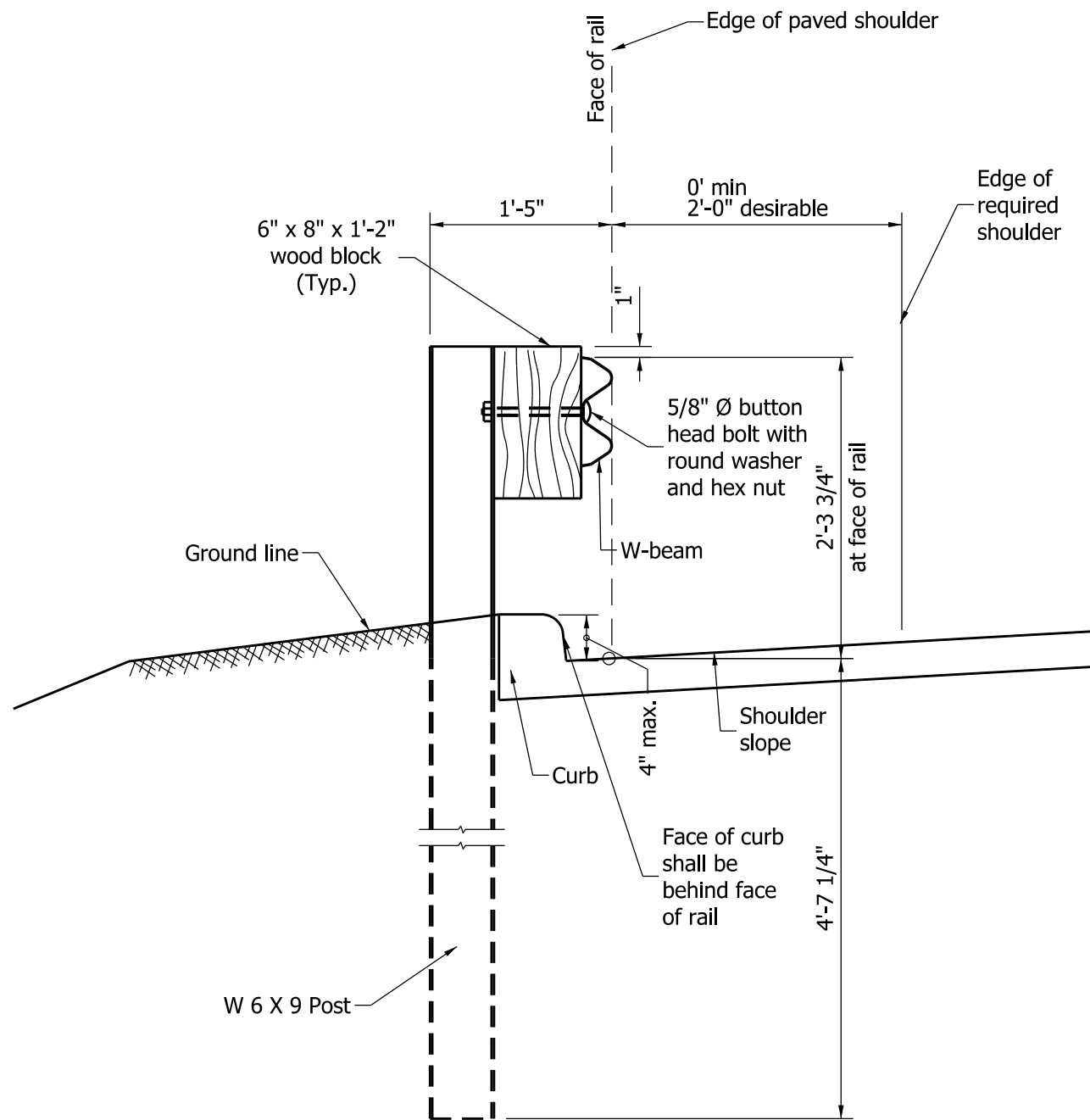


TYPICAL W-BEAM INSTALLATION

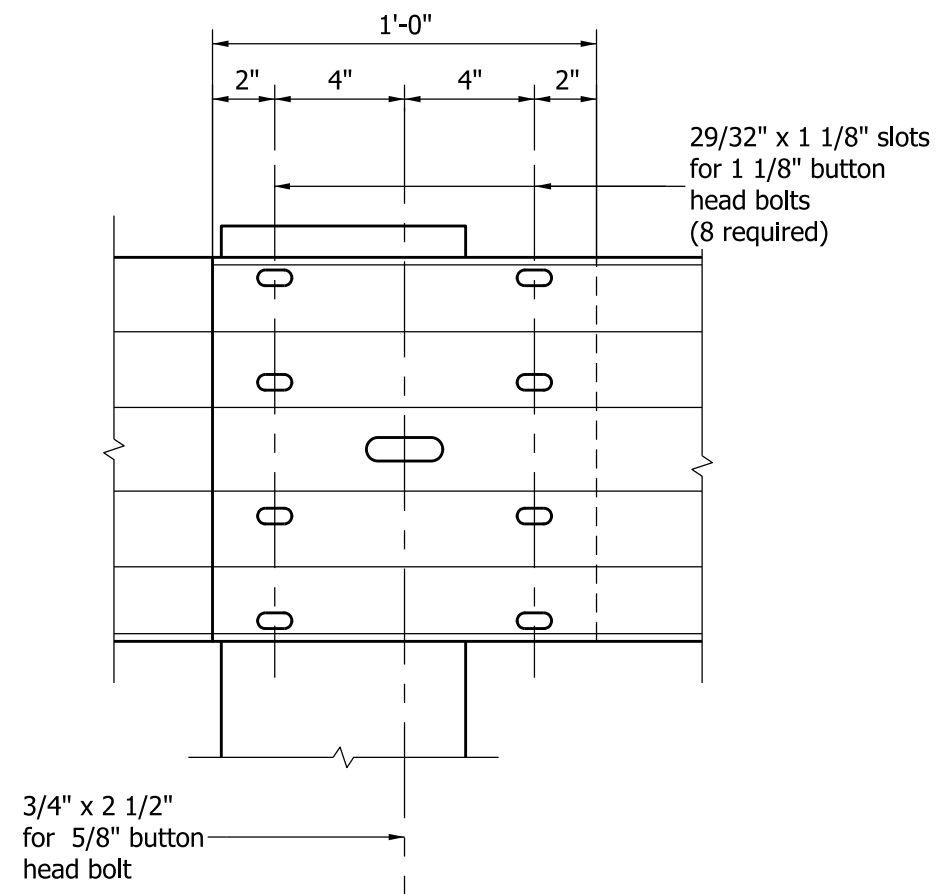


TYPICAL DOUBLE FACED W-BEAM INSTALLATION

INDIANA DEPARTMENT OF TRANSPORTATION			
W-BEAM GUARDRAIL ASSEMBLIES			
SEPTEMBER 2011			
STANDARD DRAWING NO.		E 601-WBGA-01	
	/s/ <i>Richard L. VanCleave</i>		09/01/11
	DESIGN STANDARDS ENGINEER		DATE
	/s/ <i>Mark A. Miller</i>		09/01/11
DESIGN STANDARDS ENGINEER	CHIEF HIGHWAY ENGINEER		DATE

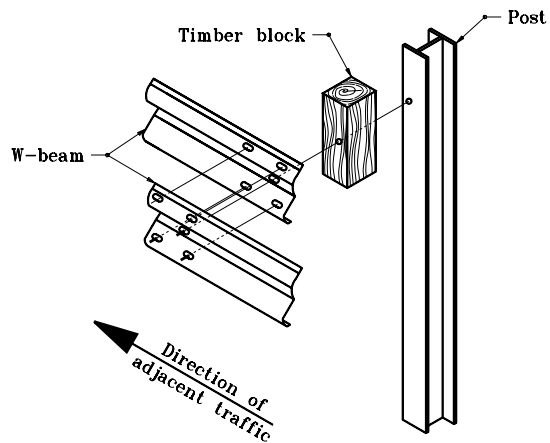


TYPICAL W-BEAM INSTALLATION AT CURB

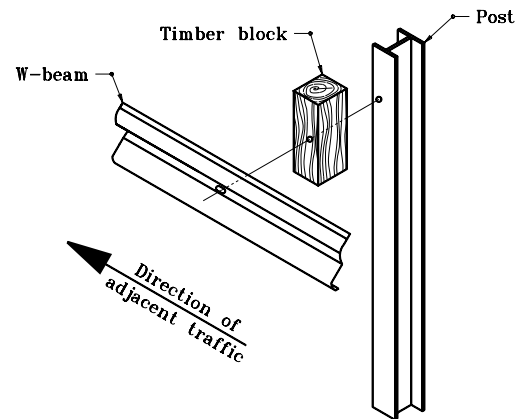


STEEL W-BEAM SPLICE DETAIL

INDIANA DEPARTMENT OF TRANSPORTATION			
W-BEAM GUARDRAIL ASSEMBLIES			
SEPTEMBER 2011			
STANDARD DRAWING NO.		E 601-WBGA-02	
	<i>/s/ Richard L. VanCleave</i>		09/01/11
	DESIGN STANDARDS ENGINEER		DATE
	DESIGN STANDARDS ENGINEER		
	<i>/s/ Mark A. Miller</i>		09/01/11
	CHIEF HIGHWAY ENGINEER		DATE

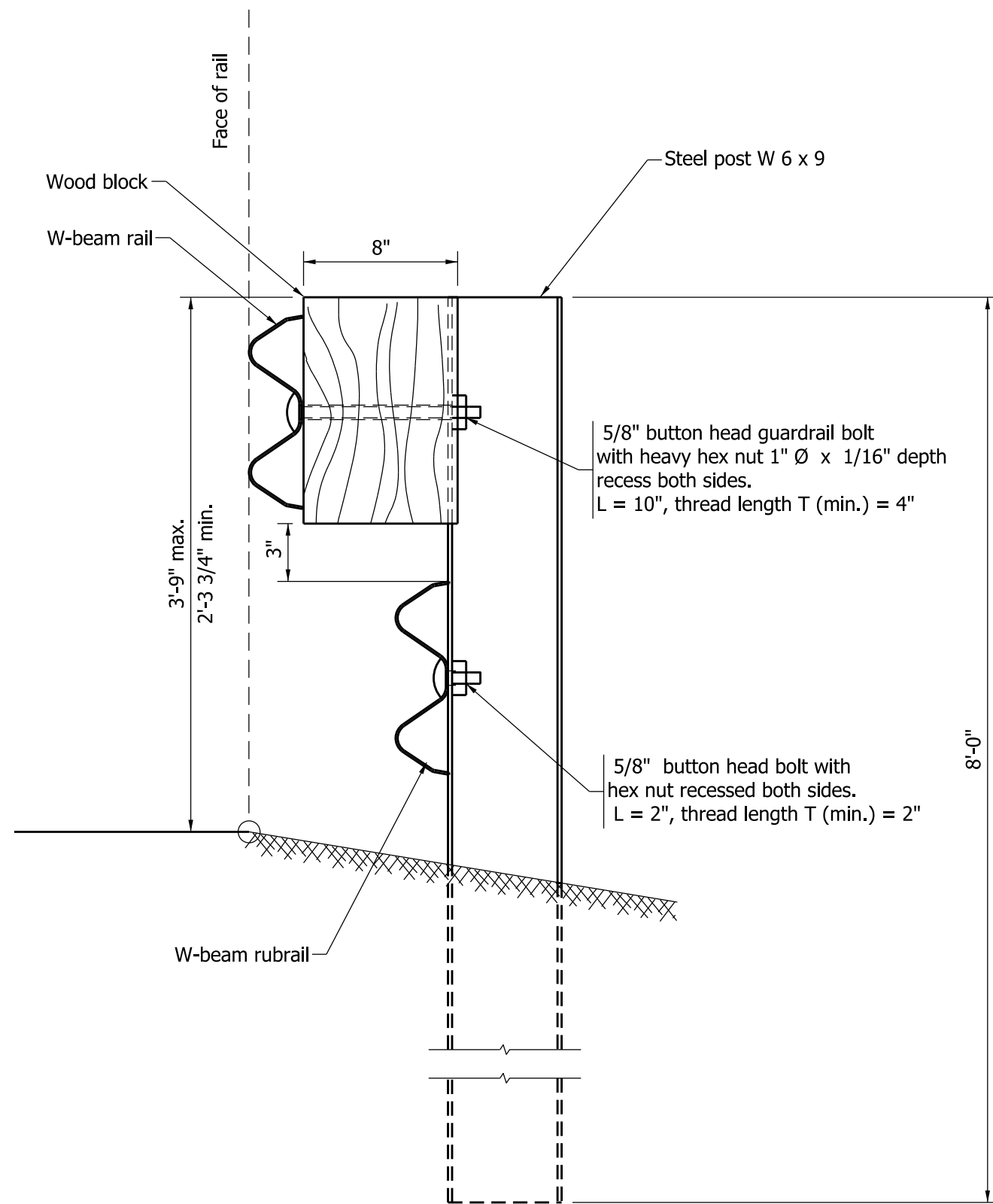


**W-BEAM SPLICE CONNECTION
DETAIL AT POST**



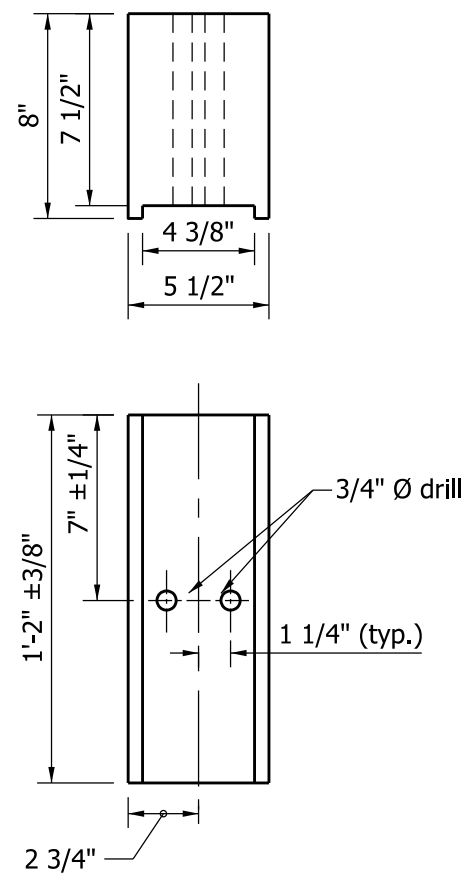
**W-BEAM SPLICE CONNECTION DETAIL
AT POST FOR NON-SPLICE CONNECTIONS**

INDIANA DEPARTMENT OF TRANSPORTATION	
W-BEAM GUARDRAIL ASSEMBLIES	
SEPTEMBER 1998	
STANDARD DRAWING NO. E 601-WBGA-03	
	DETAILS PLACED IN THIS FORMAT 11-15-99
	/s/ Anthony L. Uremovich 11-15-99 DESIGN STANDARDS ENGINEER DATE
	/s/ Firooz Zandi 11-15-99 CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER	ORIGINALLY APPROVED 9-01-98

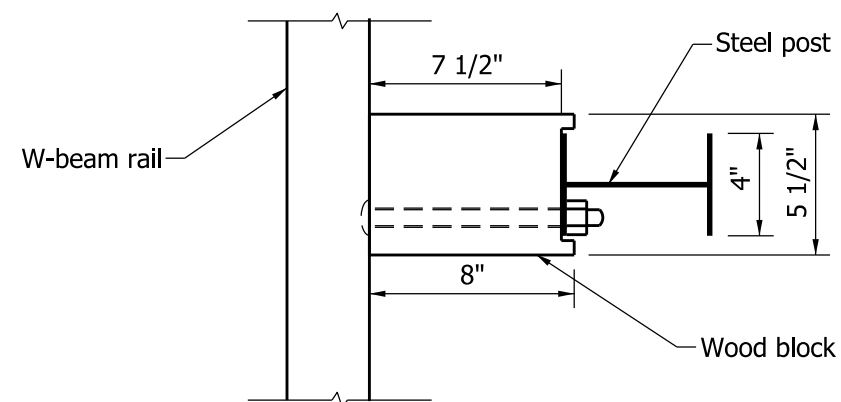


ELEVATION

**STEEL POST AND WOOD BLOCK DETAIL
FOR WR-BEAM GUARDRAIL**



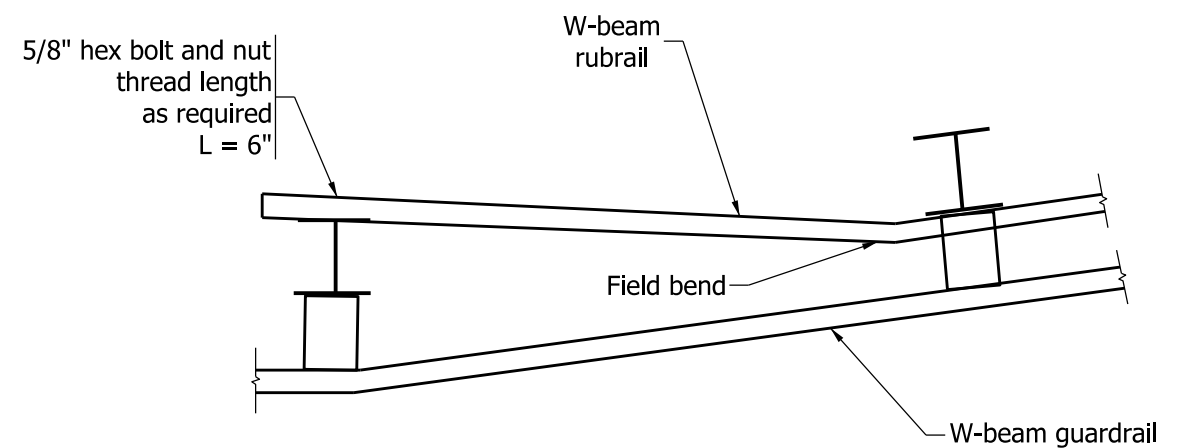
WOOD BLOCK



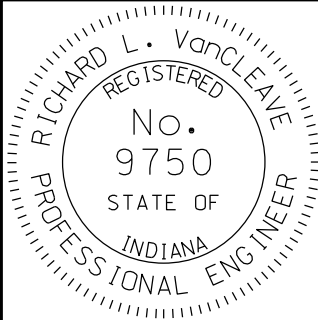
PLAN

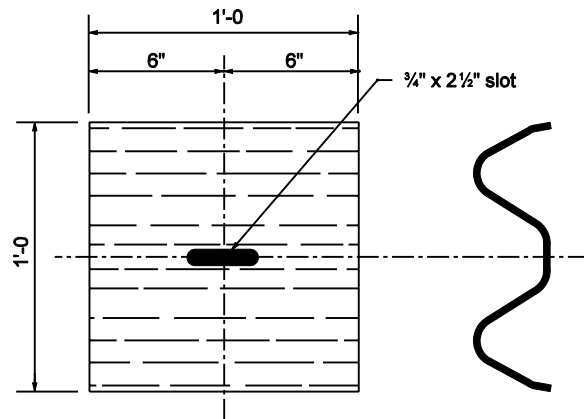
NOTE:

1. All posts shall be 8'-0" length and spaced at 6'-3".

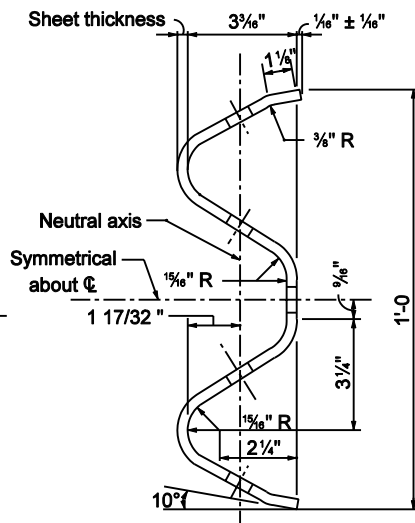


RUBRAIL TERMINATION DETAIL

INDIANA DEPARTMENT OF TRANSPORTATION			
WR-BEAM GUARDRAIL			
SEPTEMBER 2011			
STANDARD DRAWING NO.		E 601-WBGA-06	
	<i>/s/ Richard L. VanCleave</i>		<i>09/01/11</i>
	DESIGN STANDARDS ENGINEER		DATE
	<i>/s/ Mark A. Miller</i>		<i>09/01/11</i>
	CHIEF HIGHWAY ENGINEER		DATE
	DESIGN STANDARDS ENGINEER		

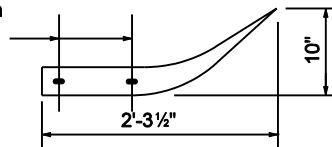


W-BEAM BACKUP PLATE

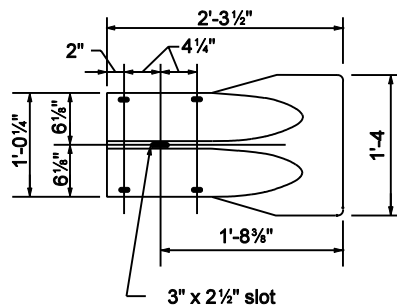


SECTION THROUGH BEAM ELEMENT

29/32" x 1 1/8" slot
for 3/8" button
head bolt

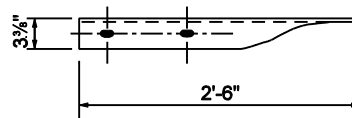


TOP VIEW

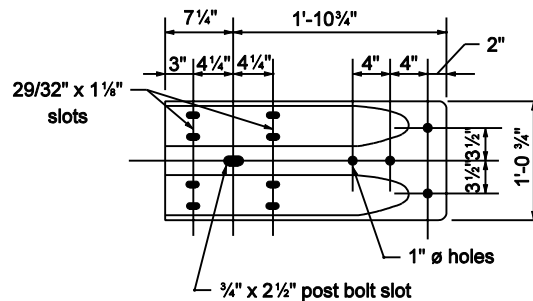


FRONT VIEW

CURVED TERMINAL END



TOP VIEW



FRONT VIEW

W-BEAM TERMINAL CONNECTOR

GENERAL NOTES

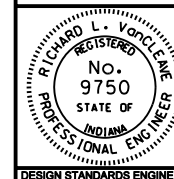
1. This sheet shall be used when W-beam guardrail is specified. This sheet shall also be used when a W-beam guardrail system requires the use of standard W-beam guardrail components.
2. The details on this sheet are for the standard components of W-beam guardrail.

INDIANA DEPARTMENT OF TRANSPORTATION

W-BEAM GUARDRAIL COMPONENTS

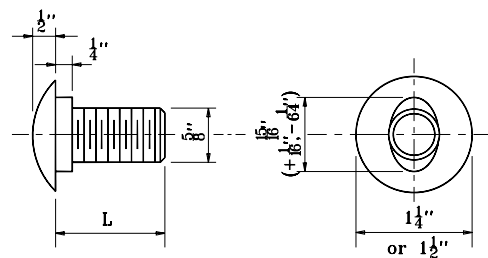
MARCH 2003

STANDARD DRAWING NO. E 601-WBGC-01



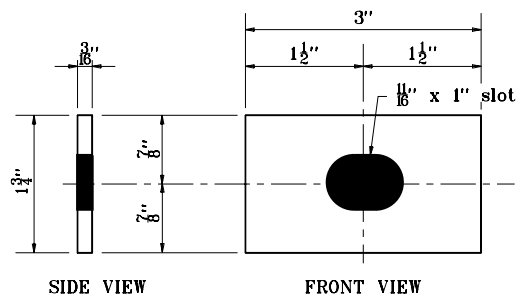
/s/ Richard L. VanCleave 3-03-03
DESIGN STANDARDS ENGINEER DATE

/s/ Richard K. Smutzer 3-03-03
CHIEF HIGHWAY ENGINEER DATE

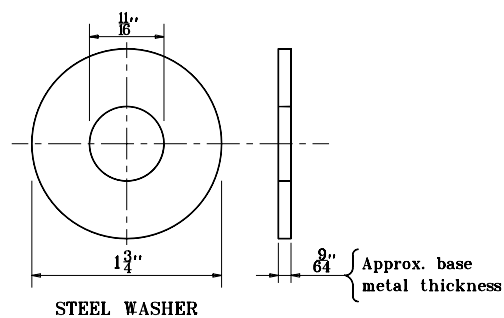


5/8" BUTTON HEAD BOLT

L	THREAD LENGTH
1 1/4"	Full Length Thread
2"	1 1/2" Min. Thread Length
8 1/2"	1 3/4" Min. Thread Length
1'-6	2 1/2" Min. Thread Length
2'-1	2" Min. Thread Length

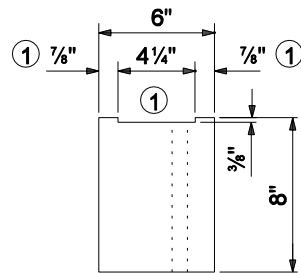


RECTANGULAR PLATE WASHER

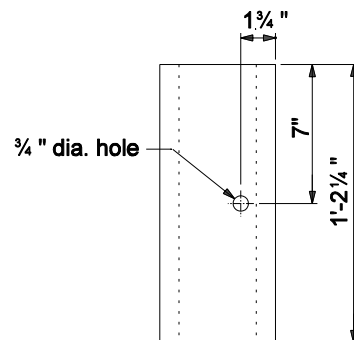


WASHER FOR 5/8" BOLT

INDIANA DEPARTMENT OF TRANSPORTATION	
W-BEAM	
GUARDRAIL COMPONENTS	
MAY 2000	
STANDARD DRAWING NO. E 601-WBGC-02	
	/s/ Anthony L. Uremovich 5-01-00 DESIGN STANDARDS ENGINEER DATE
	/s/ Firooz Zandi 5-01-00 CHIEF HIGHWAY ENGINEER DATE

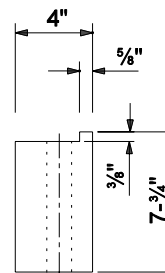


TOP VIEW

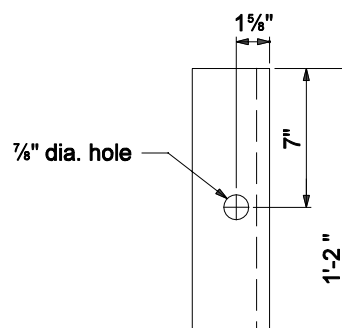


FRONT VIEW

TIMBER BLOCK DETAIL A



TOP VIEW

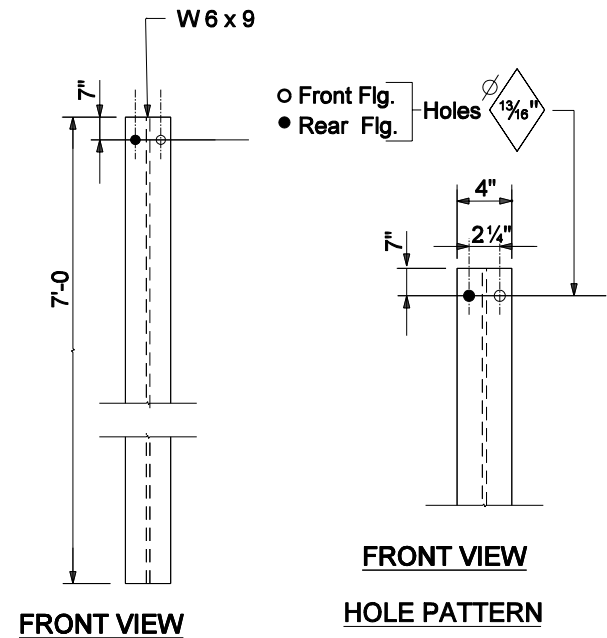


FRONT VIEW

TIMBER BLOCK DETAIL B

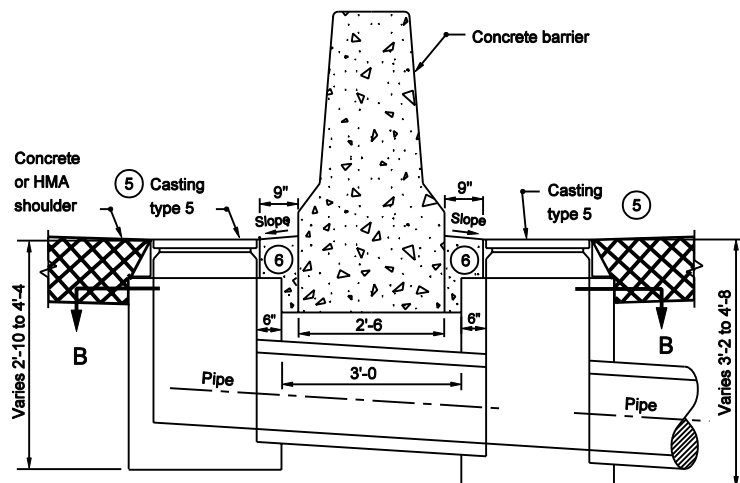
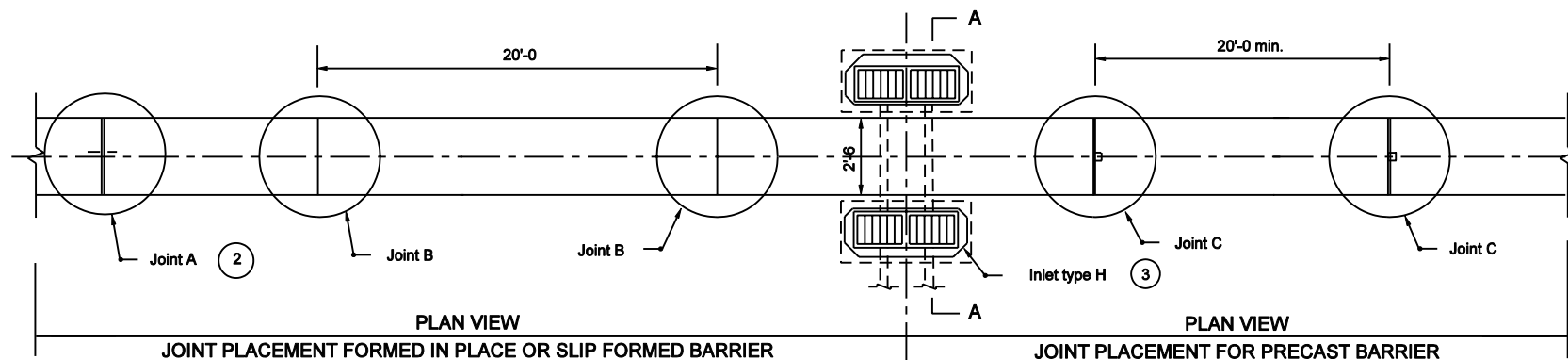
NOTES:

- ① These dimensions shall be adjusted as required to accommodate steel post flange.
- 2 Timber blocks shown in either Detail A or Detail B may be used.



STEEL POST DETAIL

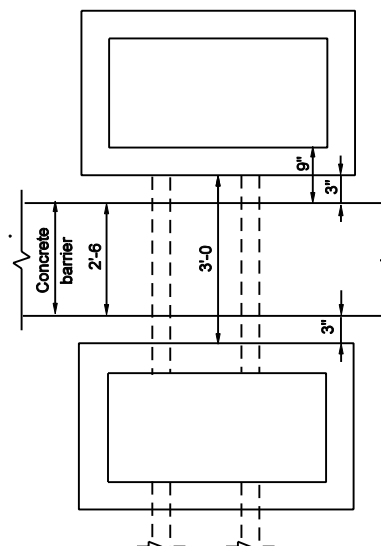
INDIANA DEPARTMENT OF TRANSPORTATION	
W - BEAM GUARDRAIL COMPONENTS	
SEPTEMBER 2004	
STANDARD DRAWING NO. E 601-WBGC-03	
	<i>/s/ Richard L. VanCleave</i> 3-01-04 DESIGN STANDARDS ENGINEER DATE
	<i>/s/ Richard K. Smutzer</i> 3-01-04 CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER	



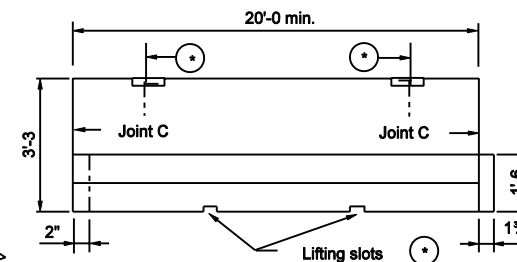
SECTION A-A

GENERAL NOTES :

1. See Standard Drawing E 602-CCMB-02 for joint details.
2. Cast-in-place or slip-formed concrete barrier shall have a joint type A at 10 ft from each end of a median bridge pier or bent. The maximum spacing between type A joints shall be 400 ft. Type A joint shall be placed at the end of each work period pour.
3. Each inlet type H includes two inlet boxes, the connector pipe between the inlet boxes, and two type 5 castings.
4. Type B joint shall be located and spaced as shown.
5. See Standard Drawings E 720-ICCA-01 to E 720-ICCA-03 for casting type 5 details.
6. Concrete shoulder or pavement between type 5 casting and concrete barrier wall.
7. See Standard Drawing E 720-INST-05B for information regarding inlet indicators.



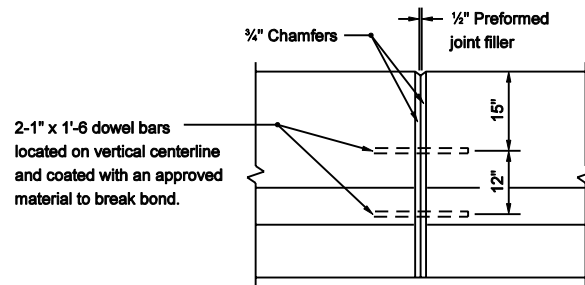
SECTION B-B



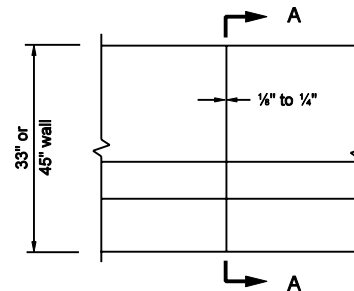
SIDE VIEW OF PRECAST SECTION

- * Precast concrete barrier shall have threaded inserts cast into the top of each section, a minimum of 1/4" below the surface, and embedded to a depth sufficient for safe lifting of the section.
- Lifting slots will be permitted in addition to the inserts. The dimensions and locations of these slots may be adjusted to accommodate variations in handling equipment.

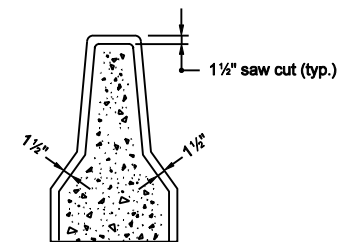
INDIANA DEPARTMENT OF TRANSPORTATION	
CONCRETE BARRIER DRAIN AND JOINT PLACEMENT	
MARCH 2003	
STANDARD DRAWING NO. E 602-CCMB-01	
	/s/ Richard L. VanCleave 3-03-03 DESIGN STANDARDS ENGINEER DATE
	/s/ Richard K. Smutzer 3-03-03 CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER	



JOINT A

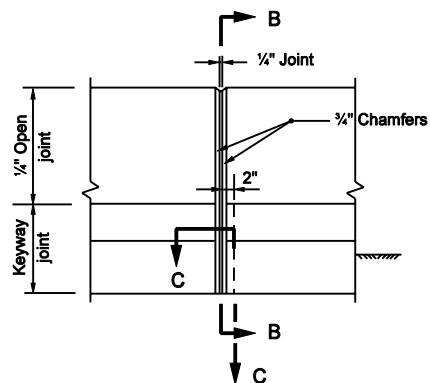


JOINT B

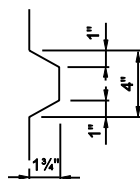


SECTION A-A

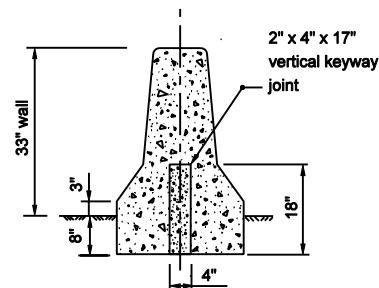
FORMED IN PLACE OR SLIP FORMED JOINTS



JOINT C



SECTION C-C



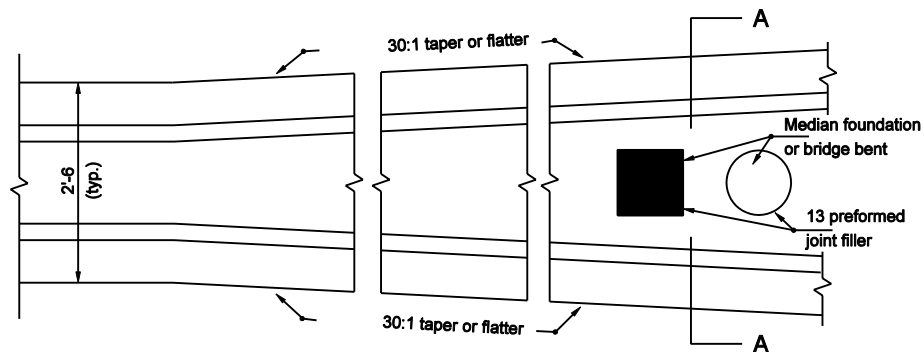
SECTION B-B

NOTES :

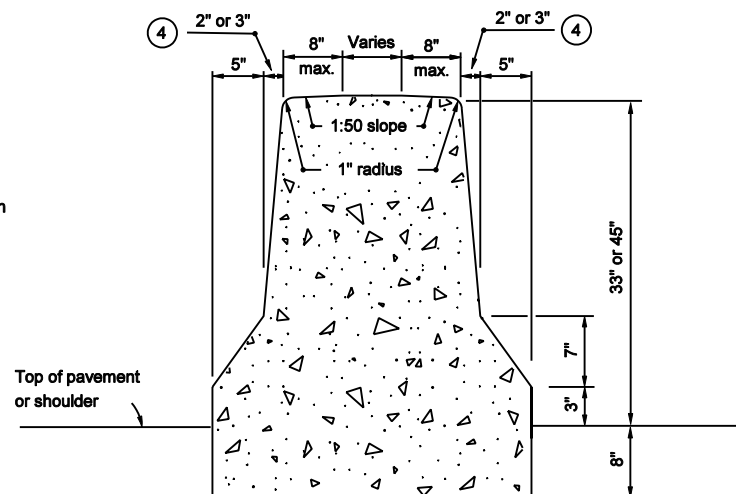
1. See Standard Drawing E 602-CCMB-01 for joint placement.

PRECAST JOINT

INDIANA DEPARTMENT OF TRANSPORTATION	
CONCRETE BARRIER JOINT	
MARCH 2003	
STANDARD DRAWING NO. E 602-CCMB-02	
	/s/ Richard L. VanCleave DESIGN STANDARDS ENGINEER
	3-03-03 DATE
	/s/ Richard K. Smutzer CHIEF HIGHWAY ENGINEER
	3-03-03 DATE



**PLAN VIEW AT
INTEGRAL MEDIAN FOUNDATION OR BRIDGE BENT**

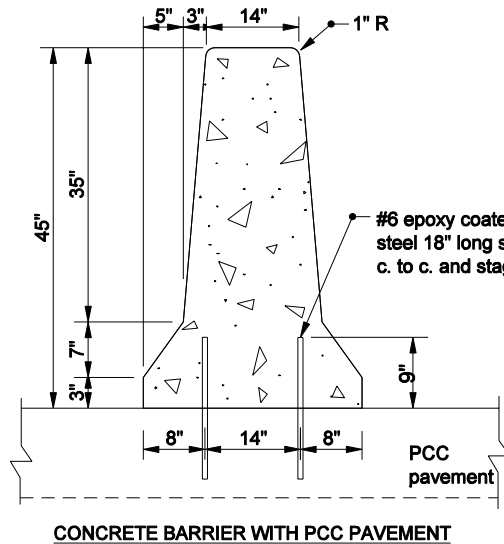
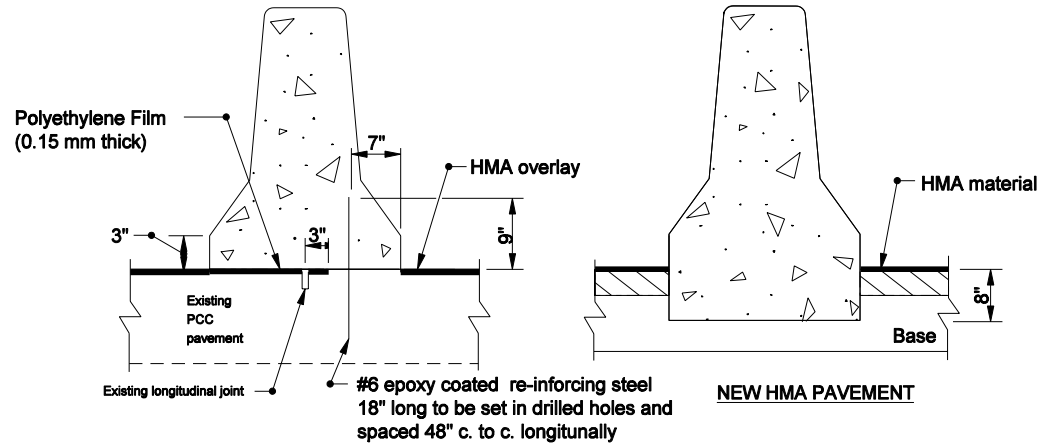
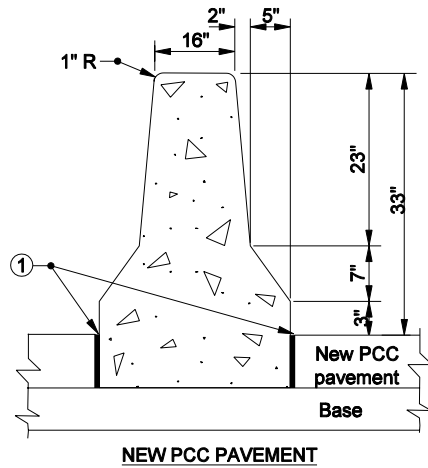


SECTION A-A

NOTES :

1. All integral median foundations shall be constructed as shown.
2. At a bridge pier, the faces of the concrete barrier shall be transitioned at a 30:1 taper to match configuration of the pier stem. At a median bridge bent, the faces of the concrete barrier shall be transitioned at a 30:1 taper to match the configuration of the crash wall. If the height of the crash wall is less than the height of the concrete barrier, the height of the crash wall shall be increased, as detailed elsewhere on the plans, to match the height of the concrete barrier.
3. An appropriate type of impact attenuator shall be designated for the ends of the concrete barrier, when it is exposed to traffic within the roadway clear zone.
- ④ Use 2" for 33" height concrete barrier wall and 3" for 45" height concrete barrier wall.

INDIANA DEPARTMENT OF TRANSPORTATION	
CONCRETE BARRIER DETAILS	
MARCH 2003	
STANDARD DRAWING NO. E 602-CCMB-03	
	/s/ Richard L. VanCleave 3-03-03 DESIGN STANDARDS ENGINEER DATE
	/s/ Richard K. Smulzer 3-03-03 CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER	



45" HEIGHT CONCRETE BARRIER WALL

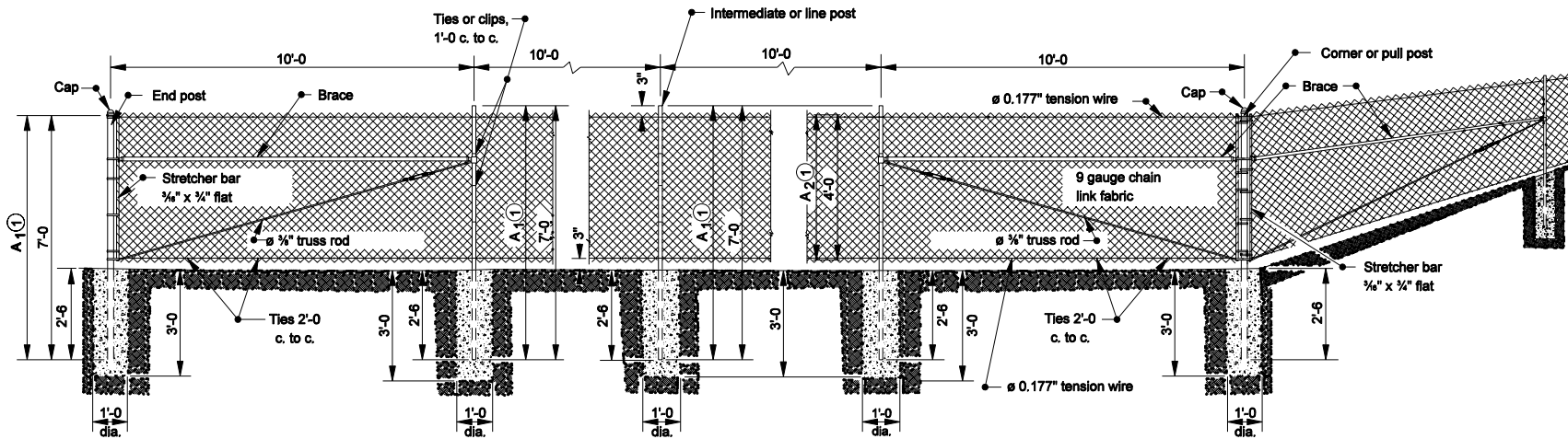
NEW HMA OVERLAY OVER EXISTING PCC PAVEMENT

33" HEIGHT CONCRETE BARRIER WALL

NOTES:

- ① $\frac{1}{2}$ " Preformed Joint Filler.

INDIANA DEPARTMENT OF TRANSPORTATION	
CONCRETE BARRIER DETAILS	
SEPTEMBER 2006	
STANDARD DRAWING NO. E 602-CCMB-04	
	/s/ Richard L. VanCleave 9-01-06 DESIGN STANDARDS ENGINEER DATE
DESIGN STANDARDS ENGINEER	/s/ Richard K. Smutzer 9-01-06 CHIEF HIGHWAY ENGINEER DATE



RIGHT OF WAY FENCE

Steel Chain Link Fence

GENERAL NOTES

- For each additional 1'-0" in height increase dimensions A₁ and A₂ by 1'-0".
- Dimensions as shown are for 4'-0" fence.
- For chain link type stream crossing or depression detail see Standard Drawing E 603-CLTF-02 for dimensions and installation.

TUBULAR POST CHART

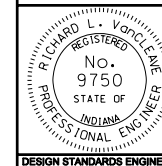
HEIGHT OF FENCE	GROUP 1				GROUP 2			
	< 6'		≥ 6'		< 6'		≥ 6'	
	NOM. DIA.	WEIGHT	NOM. DIA.	WEIGHT	NOM. DIA.	WEIGHT	NOM. DIA.	WEIGHT
	inches	lb/ft	inches	lb/ft	inches	lb/ft	inches	lb/ft
END, CORNER, AND PULL POSTS	2	3.65	2 1/2"	5.79	2	3.12	2 1/2"	4.64
LINE POSTS	1 1/4"	2.27	2	3.65	1 1/4"	1.84	2	3.12
BRACE	1 1/4"	2.27	1 1/4"	2.27	1 1/4"	1.84	1 1/4"	1.84

INDIANA DEPARTMENT OF TRANSPORTATION

CHAIN LINK TYPE FENCE

MARCH 2006

STANDARD DRAWING NO. E 603-CLTF-01



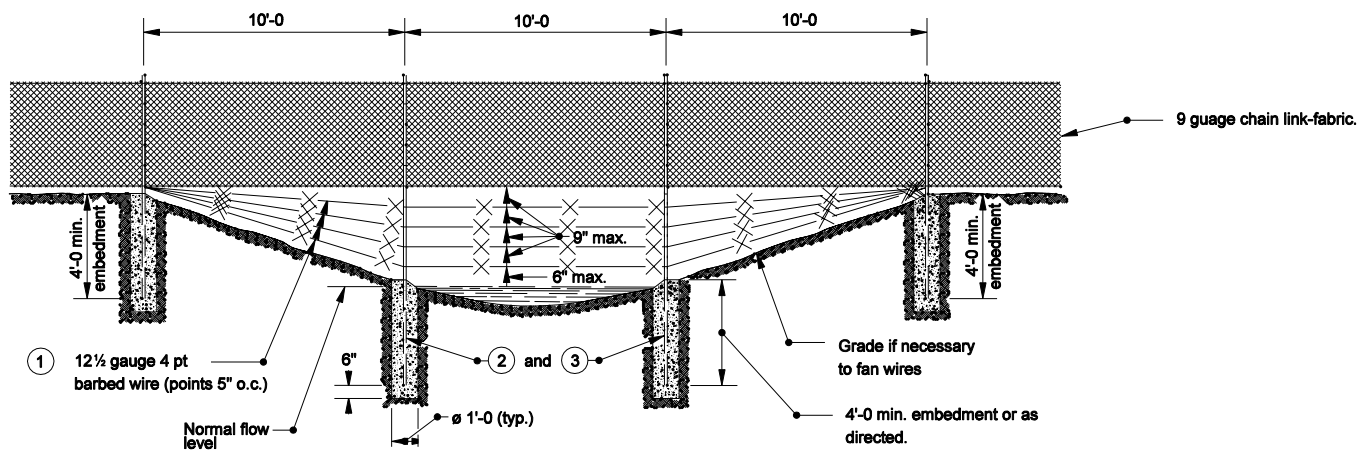
/s/ Richard L. VanCleave 3-01-06
DESIGN STANDARDS ENGINEER DATE

/s/ Richard K. Smutzer 3-01-06
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

GENERAL NOTES

- ① This installation to be made only where directed. Barbed wire will not be required at points where such installation would cause the collecting of drift in the channel.
- ② Line posts of 9'-6 or longer for crossing shall be 2" nominal tubing or 3 x 3 x 1/4 angles and shall be set in concrete footings.
- ③ Extra length posts to be used as directed.



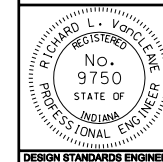
SECTION AT STREAM CROSSING OR DEPRESSION

INDIANA DEPARTMENT OF TRANSPORTATION

CHAIN LINK TYPE FENCE

SEPTEMBER 2004

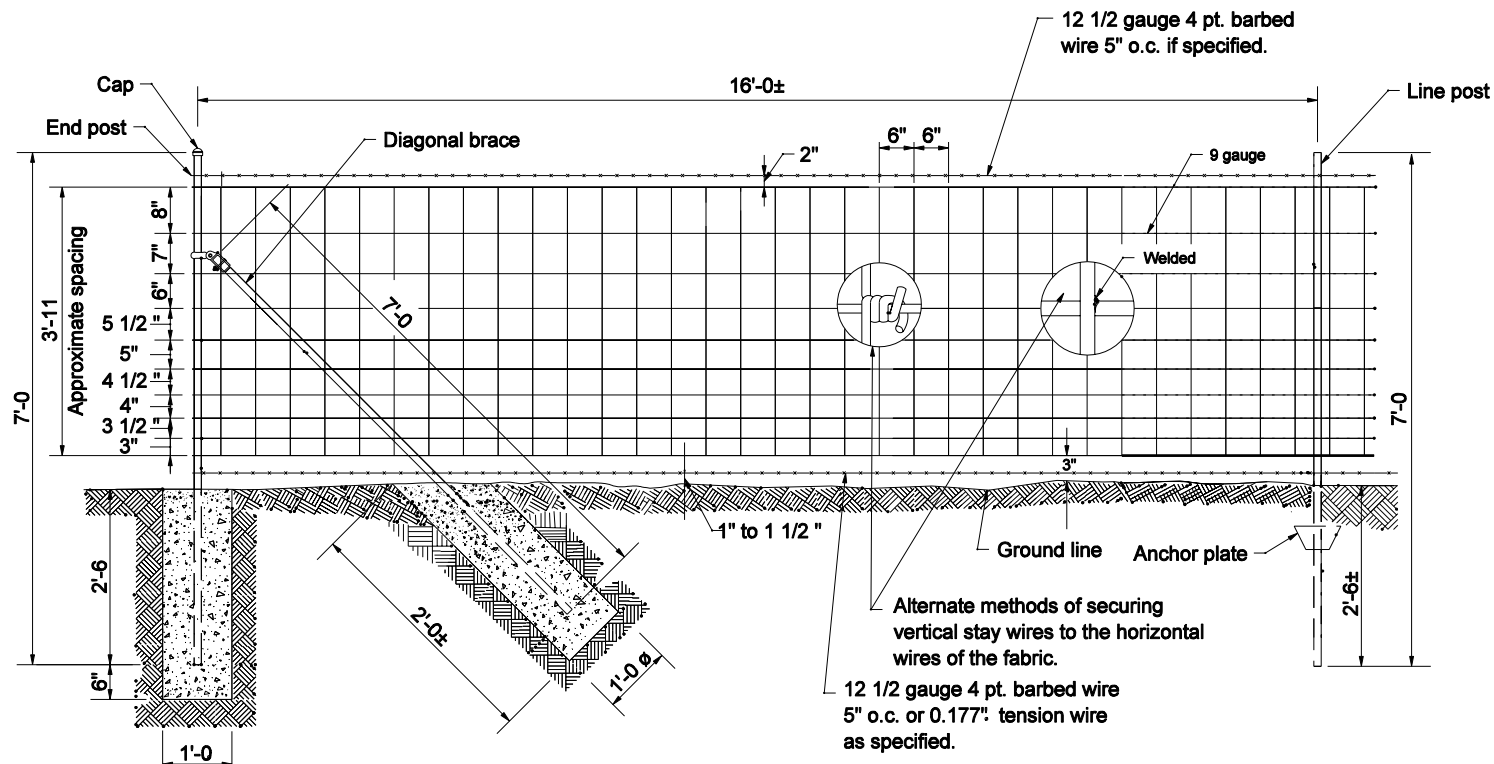
STANDARD DRAWING NO. E 603-CLTF-02



/s/ Richard L. VanCleave 9-01-04
DESIGN STANDARDS ENGINEER DATE

/s/ Richard K. Smutzer 9-01-04
CHIEF HIGHWAY ENGINEER DATE

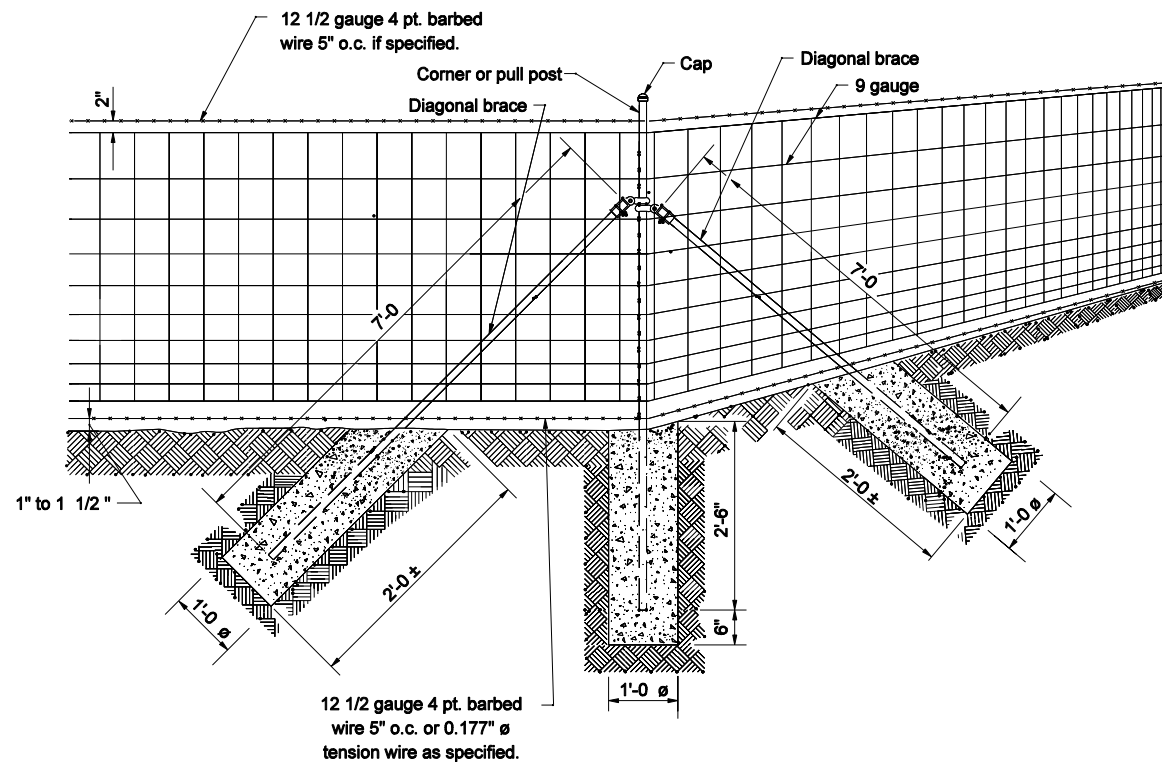
DESIGN STANDARDS ENGINEER



FARM FIELD TYPE FENCE

POST CHART					
4'-0 HEIGHT		GROUP 1		GROUP 2	
	WEIGHT	NOM. DIA.	WEIGHT	NOM. DIA.	WEIGHT
	lb/ft	in.	lb/ft	in.	lb/ft
END, CORNER, AND PULL POSTS		2	3.65	2	3.12
LINE POSTS	STUDDED "T"	1.33			
	"U"	1.33			
DIAGONAL BRACE		1 1/4	2.27	1 1/4	1.84

INDIANA DEPARTMENT OF TRANSPORTATION	
FARM FIELD TYPE FENCE	
SEPTEMBER 2004	
STANDARD DRAWING NO. E 603-FFTF-01	
	<i>/s/ Richard L. VanCleave</i> 9-01-04 DESIGN STANDARDS ENGINEER DATE
	<i>/s/ Richard K. Smutzer</i> 9-01-04 CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER	



FARM FIELD TYPE FENCE CORNER

GENERAL NOTES

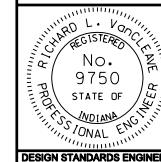
1. See Standard Drawing E 603-FFTF-01 for Post Chart.

INDIANA DEPARTMENT OF TRANSPORTATION

FARM FIELD TYPE FENCE

SEPTEMBER 2004

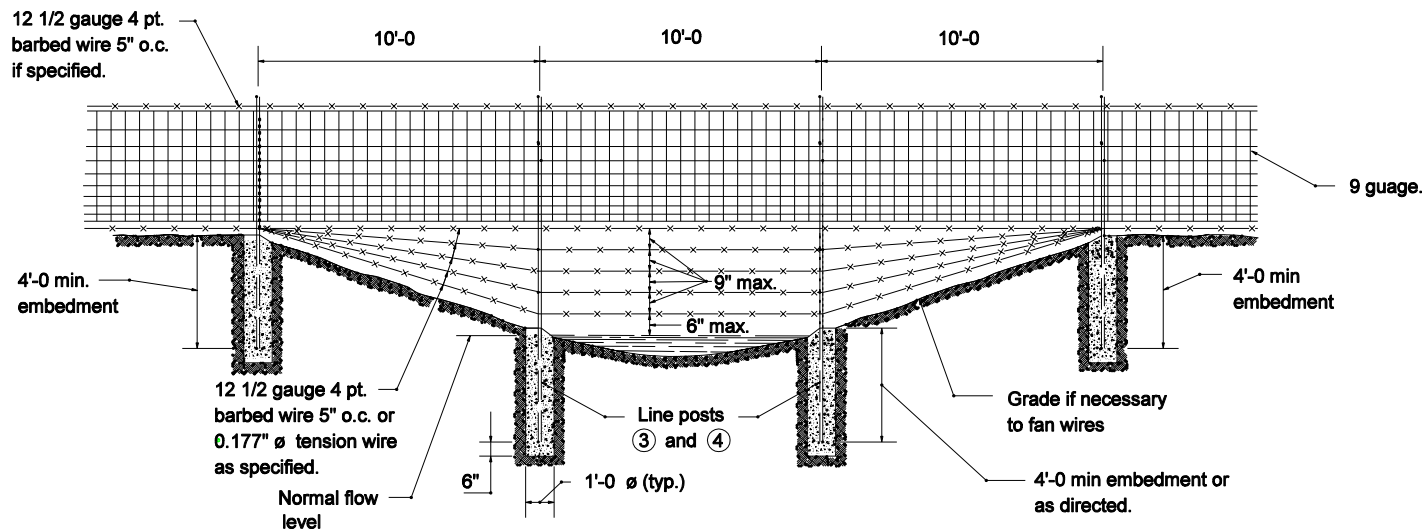
STANDARD DRAWING NO. E 603-FFTF-02



/s/ Richard L. VanCleave 9-01-04
DESIGN STANDARDS ENGINEER DATE

/s/ Richard K. Smutzer 9-01-04
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER



SECTION AT STREAM CROSSING OR DEPRESSION

GENERAL NOTES

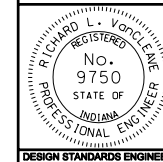
1. For farm field type gate see Standard Drawing E 603-CLTF-03 for dimensions and installation. Substitute farm field type fence for chain link type fence.
2. The placement of fence over a stream crossing or depression shall be as directed.
- ③ Extra length posts shall be used as directed.
- ④ Line posts 9'-6 or longer for crossing shall be 2" nom. dia. ϕ tubing or L 3 x 3 x $\frac{1}{4}$ " angles and shall be set in concrete footings.

INDIANA DEPARTMENT OF TRANSPORTATION

FARM FIELD TYPE FENCE

SEPTEMBER 2004

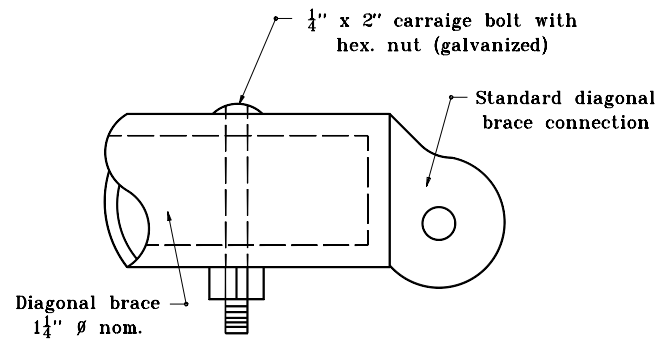
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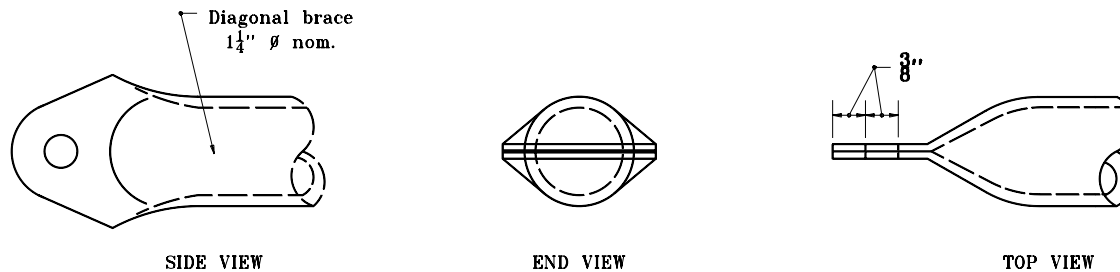
/s/ Richard L. VanCleave 9-01-04
DESIGN STANDARDS ENGINEER DATE

/s/ Richard K. Smutzer 9-01-04
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

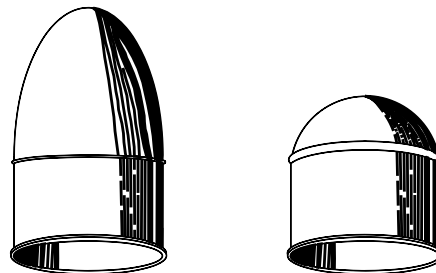


STANDARD METHOD



ALTERNATE METHOD

DIAGONAL BRACE CONNECTION

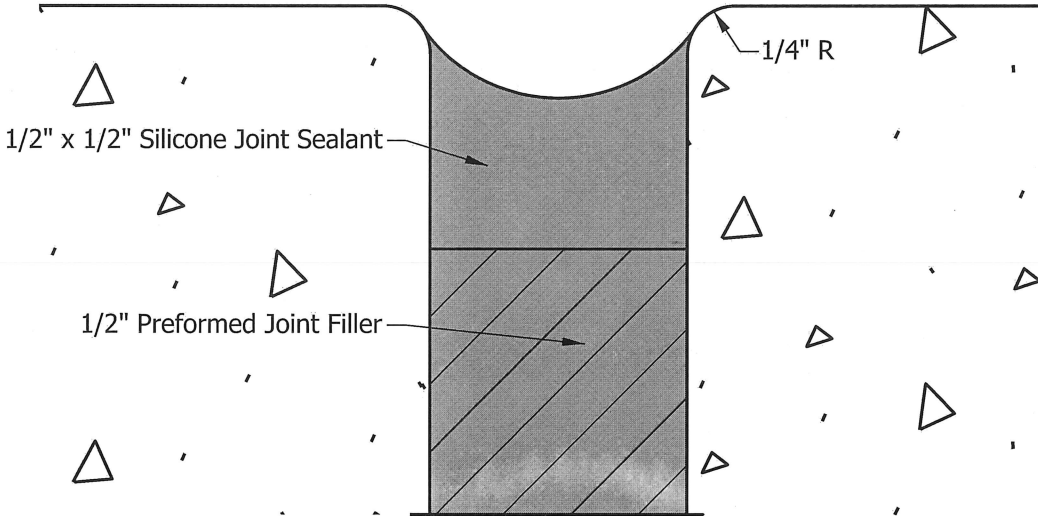


TYPICAL CAPS FOR TUBULAR POSTS

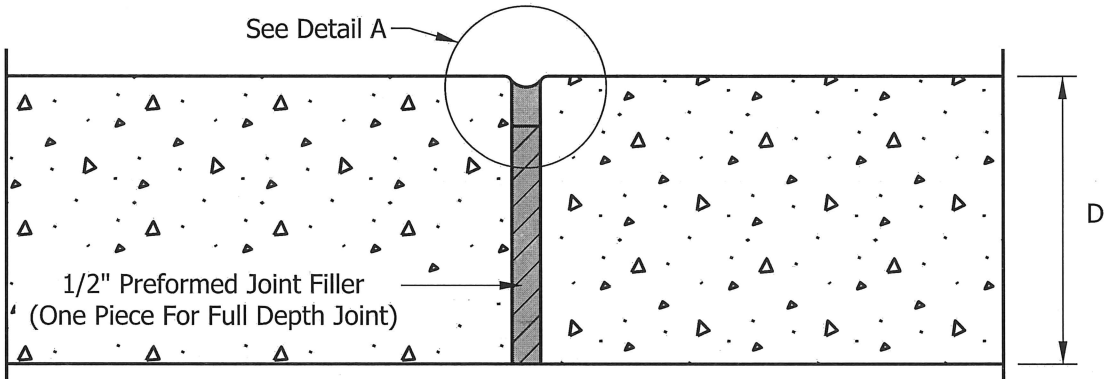
INDIANA DEPARTMENT OF TRANSPORTATION	
BRACE CONNECTIONS AND POST CAPS	
APRIL 1995	
STANDARD DRAWING NO. E 603-FFTF-04	
DETAILS PLACED IN THIS FORMAT	7-27-99
	/s/ Anthony L. Uremovich 7-27-99 DESIGN STANDARDS ENGINEER DATE
	/s/ Firooz Zandi 7-27-99 CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER	ORIGINALLY APPROVED 4-03-95

NOTES:

1. Dimension D is equal to the full depth of the sidewalk or curb ramp.



DETAIL A

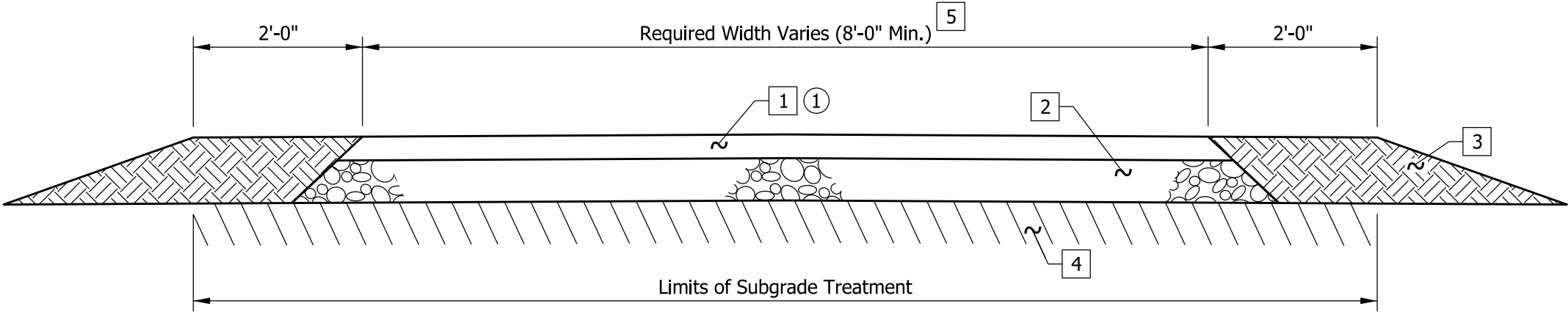


SIDEWALK EXPANSION JOINT

INDIANA DEPARTMENT OF TRANSPORTATION									
SIDEWALK EXPANSION JOINT									
SEPTEMBER 2015									
STANDARD DRAWING NO. E 604-CCSJ-01									
	<table><tr><td>/s/ Elizabeth W. Phillips</td><td>12/02/14</td></tr><tr><td>DESIGN STANDARDS ENGINEER</td><td>DATE</td></tr><tr><td>/s/ Mark A. Miller</td><td>12/02/14</td></tr><tr><td>CHIEF ENGINEER</td><td>DATE</td></tr></table>	/s/ Elizabeth W. Phillips	12/02/14	DESIGN STANDARDS ENGINEER	DATE	/s/ Mark A. Miller	12/02/14	CHIEF ENGINEER	DATE
/s/ Elizabeth W. Phillips	12/02/14								
DESIGN STANDARDS ENGINEER	DATE								
/s/ Mark A. Miller	12/02/14								
CHIEF ENGINEER	DATE								

NOTES:

- ① Construct safety edge as required for Surface and Intermediate layers at edge of pavement.



LEGEND

- 1 HMA for Sidewalk Consisting of
140 lb/yd² HMA Surface, Type A, on
220 lb/yd² HMA Intermediate, Type A
- 2 6" Compacted Aggregate No. 53, Base
- 3 Earth Shoulder
- 4 Subgrade Treatment Type III, 6" of Soil
Compacted to the Density and Moisture Requirement
- 5 Width and Cross Slope as Required

INDIANA DEPARTMENT OF TRANSPORTATION

NON-MOTORIZED VEHICLE USE FACILITY
HMA PAVEMENT SECTION

SEPTEMBER 2015

STANDARD DRAWING NO. E 604-NVUF-01

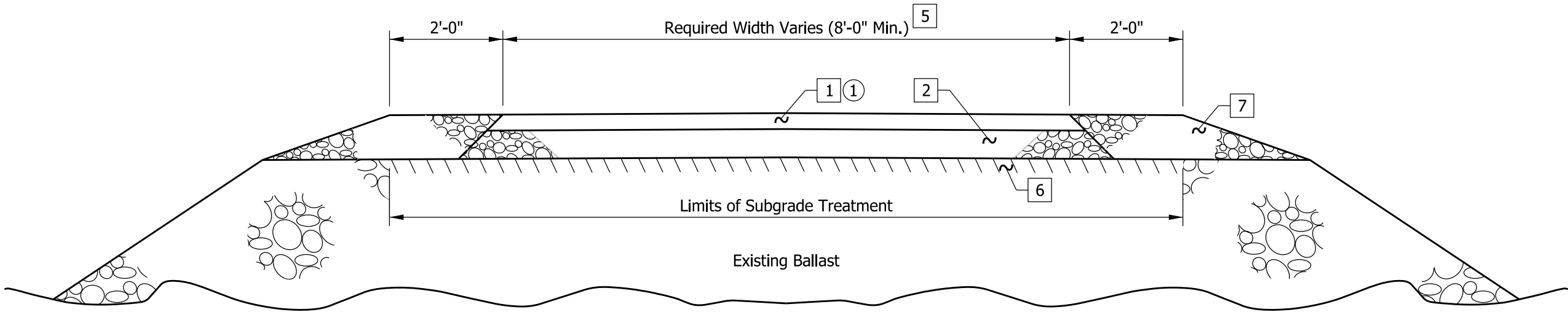


/s/ Elizabeth W. Phillips 03/06/15
DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller 03/09/15
CHIEF ENGINEER DATE

NOTE:

- ① Construct safety edge as required for Surface and Intermediate layers at edge of pavement.



LEGEND

- 1 HMA for Sidewalk Consisting of
140 lb/yd² HMA Surface, Type A, on
220 lb/yd² HMA Intermediate, Type A
- 2 6" Compacted Aggregate No. 53, Base
- 5 Width and Cross Slope as Required
- 6 Subgrade Treatment Type V, 3" Subgrade Excavated
and Replaced with 3" Coarse Aggregate No. 53
- 7 Variable-Depth Compacted Aggregate No. 53 or No. 73

INDIANA DEPARTMENT OF TRANSPORTATION

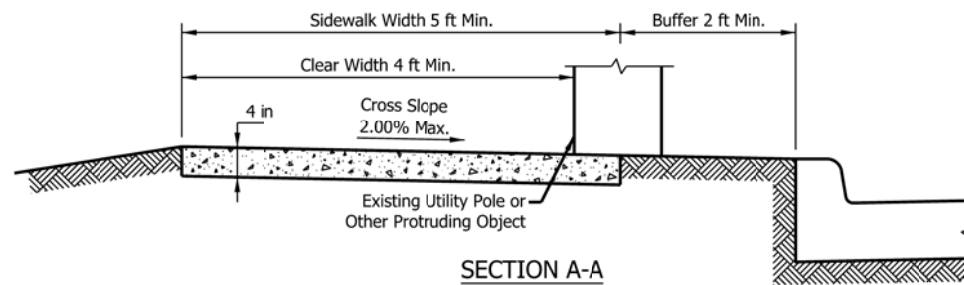
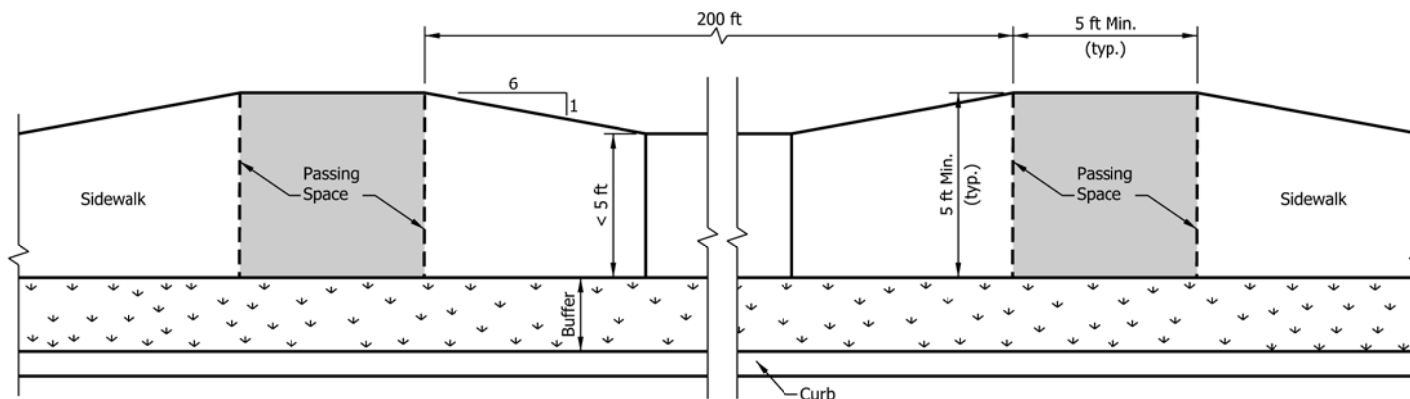
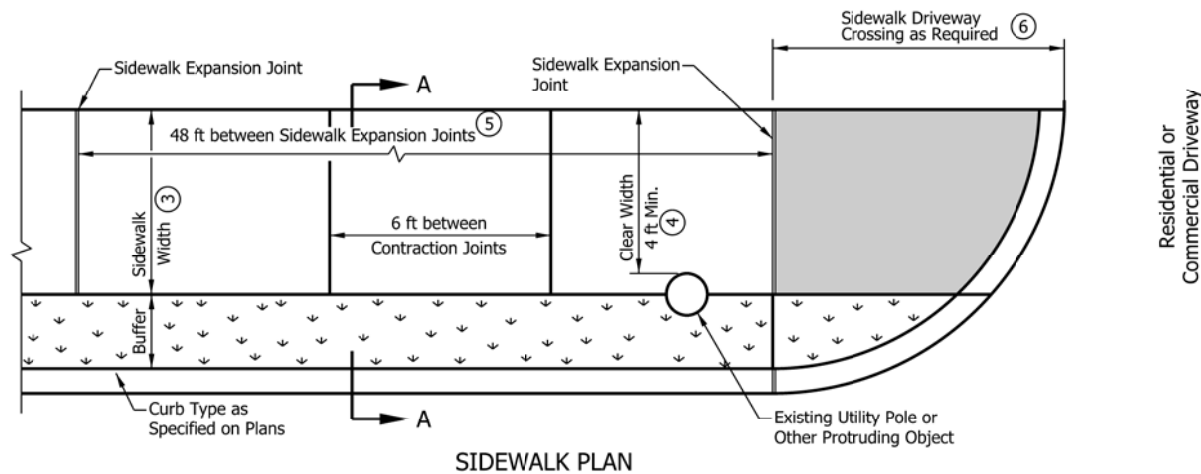
NON-MOTORIZED VEHICLE USE FACILITY
HMA PAVEMENT SECTION
ON ABANDONED RAILROAD CORRIDOR
SEPTEMBER 2015

STANDARD DRAWING NO. E 604-NVUF-02



/s/ Elizabeth W. Phillips 03/06/15
DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller 03/09/15
CHIEF ENGINEER DATE



NOTES:

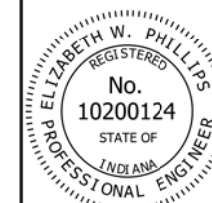
1. All slopes are absolute rather than relative to the sidewalk or roadway grade. Slopes at least 0.50% less than the maximum are preferred.
2. The grade of the sidewalk is measured in the direction of pedestrian travel. The grade of the sidewalk shall not exceed the grade of the adjacent roadway. The cross slope is measured perpendicular to the direction of pedestrian travel. The cross slope of the sidewalk shall not exceed 2.00%.
- ③ Where there is a buffer between the sidewalk and curb, the preferred minimum sidewalk clear width is 5 ft.
- ④ A 4-ft minimum clear width shall be provided adjacent to street furniture, mailbox, utility pole, or other protruding object. Where the sidewalk clear width is less than 5 ft, a passing space shall be provided at 200 ft intervals. The passing space minimum clear dimension shall be 5 ft x 5 ft.
- ⑤ See Standard Drawing E 604-CCSJ-01 for sidewalk expansion joint details.
- ⑥ See Standard Drawing E 604-SDWK-03 for sidewalk driveway crossing configurations.

INDIANA DEPARTMENT OF TRANSPORTATION

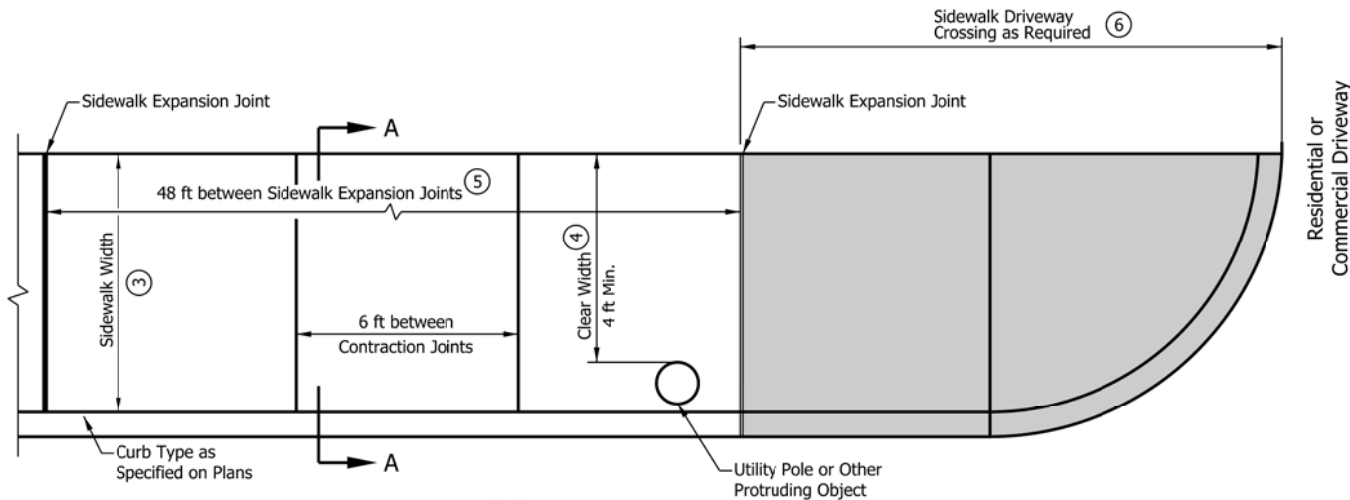
SIDEWALK DETAILS SIDEWALK WITH BUFFER

SEPTEMBER 2016

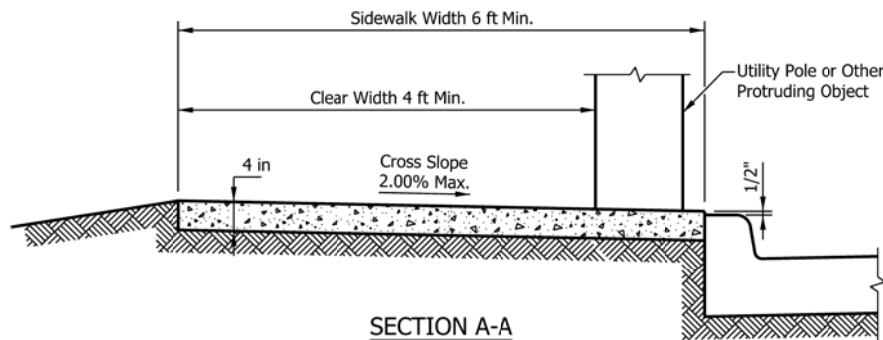
STANDARD DRAWING NO. E 604-SDWK-01



/s/ Elizabeth W. Phillips	03/16/16
DESIGN STANDARDS ENGINEER	DATE
/s/ Mark A. Miller	03/18/16
CHIEF ENGINEER	DATE



SIDEWALK PLAN



SECTION A-A

NOTES:

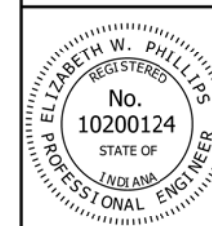
1. All slopes are absolute rather than relative to the sidewalk or roadway grade. Slopes at least 0.50% less than the maximum are preferred.
2. The grade of the sidewalk is measured in the direction of pedestrian travel. The grade of the sidewalk shall not exceed the grade of the adjacent roadway. The cross slope is measured perpendicular to the direction of pedestrian travel. The cross slope of the sidewalk shall not exceed 2.00%.
- ③ Where there is no buffer between the sidewalk and curb, the preferred minimum sidewalk width is 6 ft.
- ④ A 4-ft minimum clear width shall be provided adjacent to street furniture, mailbox, utility pole, or other protruding object. Where the sidewalk clear width is less than 5 ft, a passing space shall be provided at 200 ft intervals. See Standard Drawing E 604-SDWK-01 for sidewalk passing space details.
- ⑤ See Standard Drawing E 604-CCSJ-01 for sidewalk expansion joint details.
- ⑥ See Standard Drawing E 604-SDWK-03 for sidewalk driveway crossing configurations.

INDIANA DEPARTMENT OF TRANSPORTATION

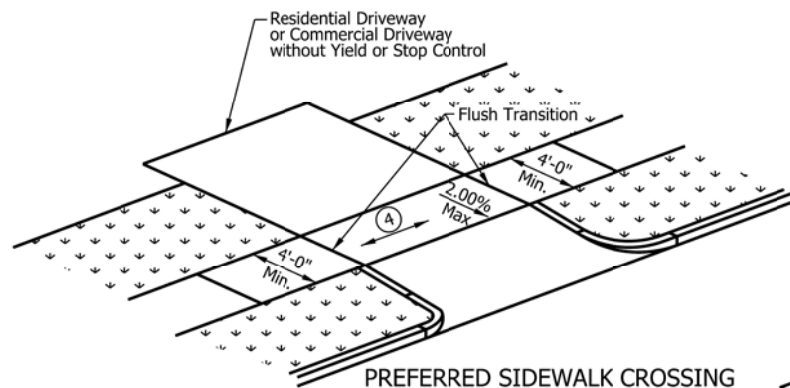
**SIDEWALK DETAILS
SIDEWALK ADJACENT TO CURB**

SEPTEMBER 2016

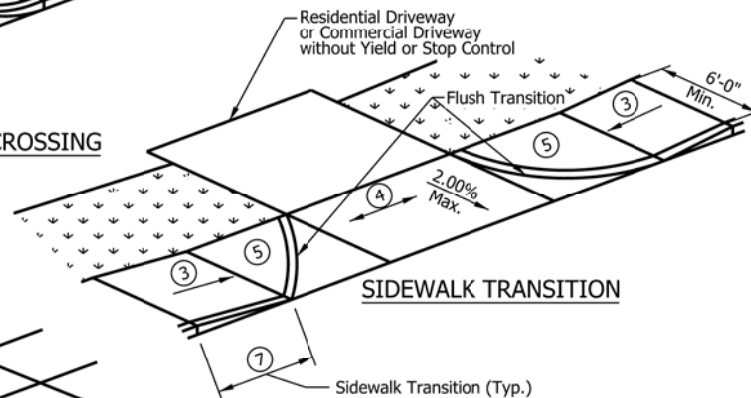
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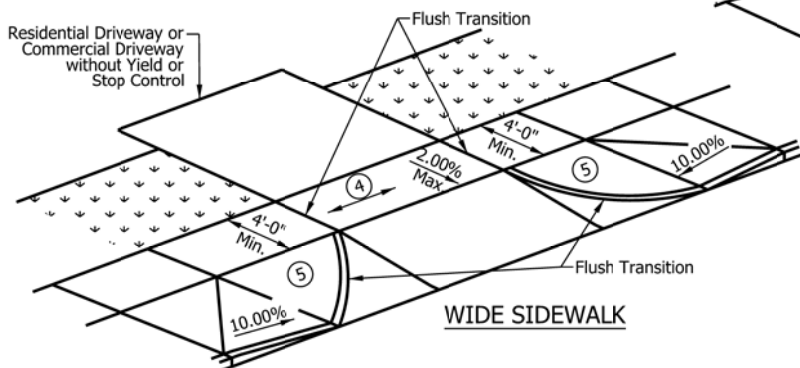
/s/ Elizabeth W. Phillips	03/16/16
DESIGN STANDARDS ENGINEER	DATE
/s/ Mark A. Miller	03/18/16
CHIEF ENGINEER	DATE



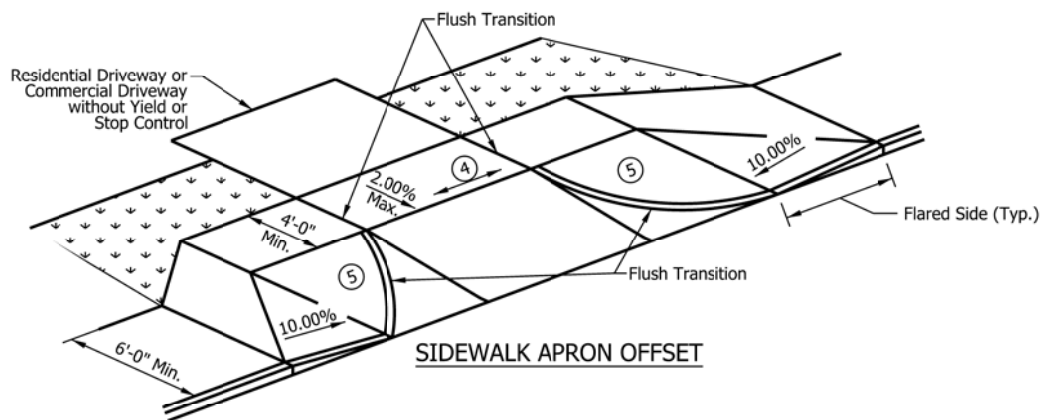
PREFERRED SIDEWALK CROSSING



SIDEWALK TRANSITION



WIDE SIDEWALK



SIDEWALK APRON OFFSET

NOTES:

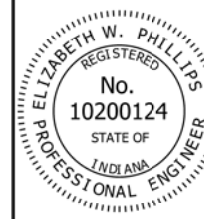
1. All slopes are absolute rather than relative to the sidewalk or roadway grade. Slopes at least 0.50% less than the maximum are preferred.
2. A sidewalk driveway crossing shall only be used on a sidewalk at a residential driveway or a commercial driveway without yield or stop control. A curb ramp shall be used at all other crossings. See Standard Drawing Series E 604-SWCR for curb ramp details.
- 3 Where a sidewalk transition is used to lower or raise the sidewalk to connect with a residential driveway or commercial driveway without yield or stop control, the running slope of the transition shall be 8.33% maximum.
- 4 The grade of the sidewalk across the driveway shall not exceed the grade of the adjacent roadway.
- 5 The area between the driveway and a flared side or sidewalk transition shall match the driveway profile and transverse slope.
6. A turning space is not required at the top of a sidewalk transition.
- 7 Objects such as a utility cover, vault frame, and grating shall be placed outside a sidewalk transition.
8. A detectable warning surface shall not be placed at the crossings of a residential driveway. A detectable warning surface may be placed at the crossing of a commercial driveway without yield or stop control.
9. See Standard Drawing E 604-SDWK-01 and -02 for Sidewalk Details.
10. See Standard Drawing Series E 610-DRIV for drives.

INDIANA DEPARTMENT OF TRANSPORTATION

SIDEWALK DRIVEWAY CROSSING

SEPTEMBER 2016

STANDARD DRAWING NO. E 604-SDWK-03



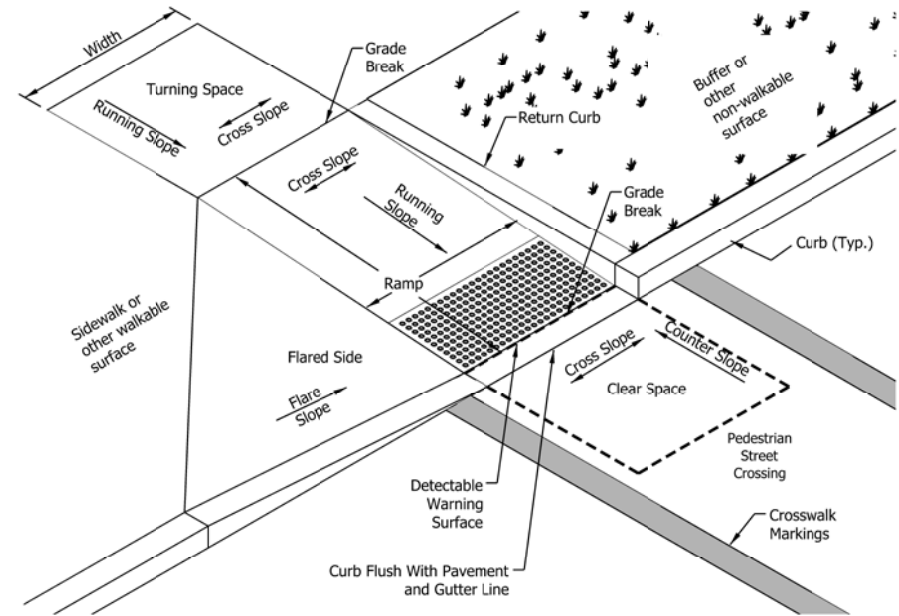
/s/ Elizabeth W. Phillips 03/16/16
DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller 03/18/16
CHIEF ENGINEER DATE

INDEX	
SHEET NO.	SUBJECT
1	Curb Ramp Drawing Index and General Notes
2-3	Perpendicular Curb Ramp Typical Placement
4	Perpendicular Curb Ramp Component Details
5	One-Way-Directional Perpendicular Curb Ramp Typical Placement
6	One-Way-Directional Perpendicular Curb Ramp Component Details
7	Parallel Curb Ramps Typical Placement
8	Parallel Curb Ramp Component Details
9	Blended Transition Curb Ramp, Depressed Curb Ramp and Diagonal Curb Ramp Typical Placement
10	Blended Transition Curb Ramp Component Details
11	Median Cut-Through and Median Perpendicular Curb Ramp Typical Placement
12-13	Detectable Warning Surface Placement and Configuration
14	Detectable Warning Surface Details

GENERAL NOTES:

- All slopes are absolute rather than relative to the sidewalk or roadway grade. Slopes at least 0.50% less than the maximum are preferred.
- Ramp or Blended Transition. A ramp or blended transition shall be used to lower or raise the sidewalk to connect with the street or highway.
- Turning Space. A turning space shall be provided at the top of a perpendicular ramp, bottom of a parallel ramp, or where the pedestrian travel requires a change in direction. A common turning space may be shared by adjacent ramps. The turning space shall have a minimum clear dimension of 4 ft x 4 ft. Where the turning space is constrained at the back of the sidewalk by a curb, retaining wall, building, or feature over 2 inches in height, the minimum clear dimension shall be 4 ft x 5 ft, with the 5-ft dimension in the direction of the ramp running slope.
- Flared Side. A flared side shall be used adjacent to a walkable surface. A flared side may be used adjacent to a non-walkable surface. A flared side shall have a maximum slope of 10.00% measured parallel to the back of the curb.
- Return Curb. A return curb is placed perpendicular to the roadway curb. A return curb may be used adjacent to a non-walkable surface. A return curb shall not be used adjacent to a walkable surface.
- Clear Space. A clear space shall be provided beyond the bottom grade break of a curb ramp wholly contained within the crosswalk and wholly outside the parallel vehicular travel path. The clear space shall have a minimum clear dimension of 4 ft x 4 ft.
- Detectable Warning Surface. A detectable warning surface shall be placed at each street, highway, or railroad crossing. A detectable warning surface shall extend a minimum of 2 ft in the direction of pedestrian travel and be placed the entire width of a ramp, blended transition, or turning space.
- Running Slope. The running slope of a ramp, blended transition, or turning space shall be measured parallel to the direction of pedestrian travel.
 - A running slope of 2.00% or less is considered level.
 - A ramp shall have a maximum running slope of 8.33% but shall not require a ramp length to exceed 15 ft.
 - A blended transition shall have a maximum running slope of 5.00%.
 - A turning space shall have a maximum running slope of 2.00%.
- Width. Unless otherwise noted, minimum width of a ramp, blended transition, or turning space, excluding flared sides or return curb, shall be 4 ft.
- Grade Break. A grade break at the top and bottom of a ramp, blended transition, or turning space shall be perpendicular to the running slope. Grade breaks shall not be within the ramp, blended transition, turning space, or detectable warning surface. Grade breaks shall be flush. Vertical discontinuities shall not be greater than 1/2 in. Where a discontinuity is greater than 1/4 in. the surface shall be beveled with a slope not steeper than 1V:2H.
- Cross Slope Exceptions. The cross slope of a ramp, blended transition, or turning space shall be measured perpendicular to the direction of pedestrian travel.
 - The maximum cross slope at a pedestrian street crossing without yield or stop control shall be 5.00%.
 - The maximum cross slope at a pedestrian street crossing with yield or stop control shall be 2.00%.
 - The maximum cross slope at a midblock crossing shall be the established grade of the adjacent roadway.
- Objects such as a utility cover, vault frame, and grating shall be placed outside the curb ramp.
- Curb ramps shall be placed within the marked crosswalk area.
- Drainage inlets should be located uphill from a curb ramp to prevent ponding in the path of pedestrian travel.

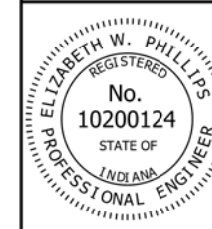


INDIANA DEPARTMENT OF TRANSPORTATION

CURB RAMP DRAWING INDEX AND GENERAL NOTES

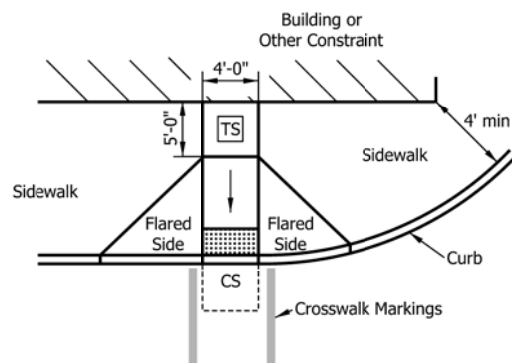
SEPTEMBER 2016

STANDARD DRAWING NO. E 604-SWCR-01

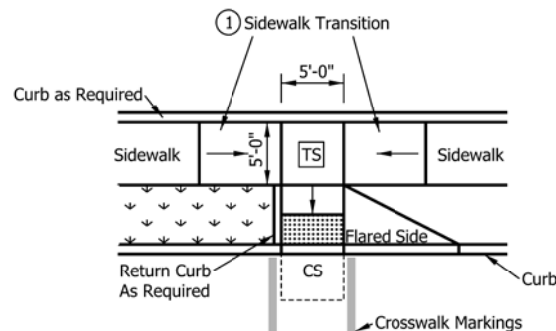


/s/ Elizabeth W. Phillips 03/15/16
DESIGN STANDARDS ENGINEER DATE

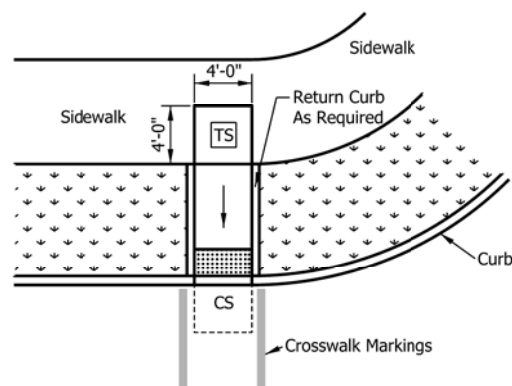
/s/ Mark A. Miller 03/18/16
CHIEF ENGINEER DATE



PERPENDICULAR CURB RAMP
ADJACENT WALKABLE SURFACE



TIERED PERPENDICULAR CURB RAMP



PERPENDICULAR CURB RAMP
ADJACENT NON-WALKABLE SURFACE

NOTES:

- ① Where insufficient width between the curb and back of sidewalk prevent a standard perpendicular curb ramp running slope, a sidewalk transition may be used to lower the sidewalk grade. The sidewalk transition running slope shall not exceed 8.33%.
2. The turning space shall have a minimum clear dimension of 4 ft x 4 ft. Where the turning space is constrained at the back of the sidewalk, the minimum clear dimension shall be 4 ft x 5 ft, with the 5-ft dimension in the direction of the ramp running slope. Where a tiered perpendicular curb ramp is used, a constrained turning space shall have a minimum clear dimension of 5 ft x 5 ft.

LEGEND:

	Buffer or Other Non-Walkable Surface
	Ramp
	Detectable Warning Surface
	Turning Space
	Clear Space

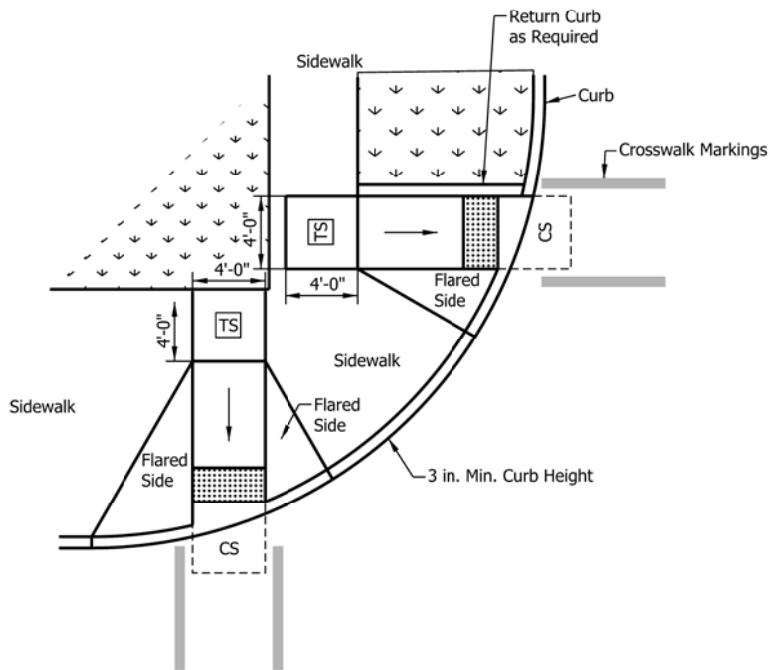
INDIANA DEPARTMENT OF TRANSPORTATION

PERPENDICULAR CURB RAMP TYPICAL PLACEMENT

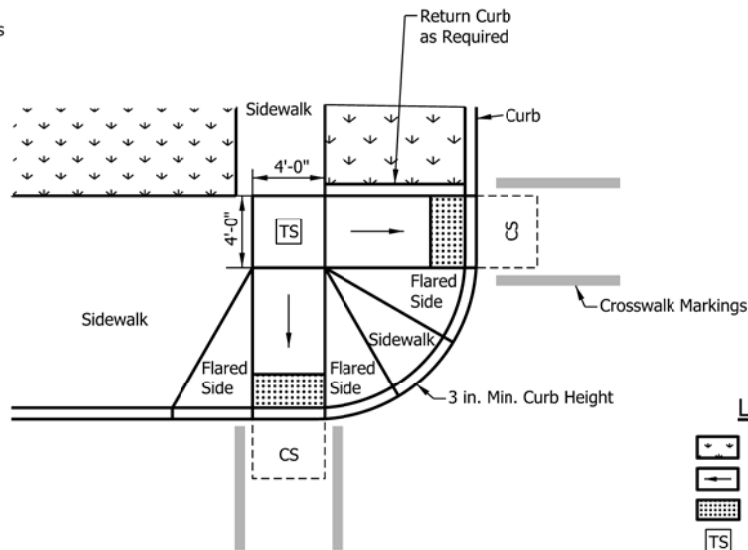
SEPTEMBER 2016

STANDARD DRAWING NO. E 604-SWCR-02

	/s/ Elizabeth W. Phillips	03/15/16
	DESIGN STANDARDS ENGINEER	DATE
	/s/ Mark A. Miller	03/18/16
	CHIEF ENGINEER	DATE



PAIRED PERPENDICULAR
CURB RAMPS AT LARGE RADIUS



PAIRED PERPENDICULAR
CURB RAMPS AT SMALL RADIUS

NOTES:

- The turning space shall have a minimum clear dimension of 4 ft x 4 ft and a running slope of 2.00% maximum. Where the turning space is constrained at the back of the sidewalk, the minimum clear dimension shall be 4 ft x 5 ft, with the 5-ft dimension in the direction of the ramp running slope.

LEGEND:

	Buffer or Other Non-Walkable Surface
	Ramp
	Detectable Warning Surface
	Turning Space
	Clear Space

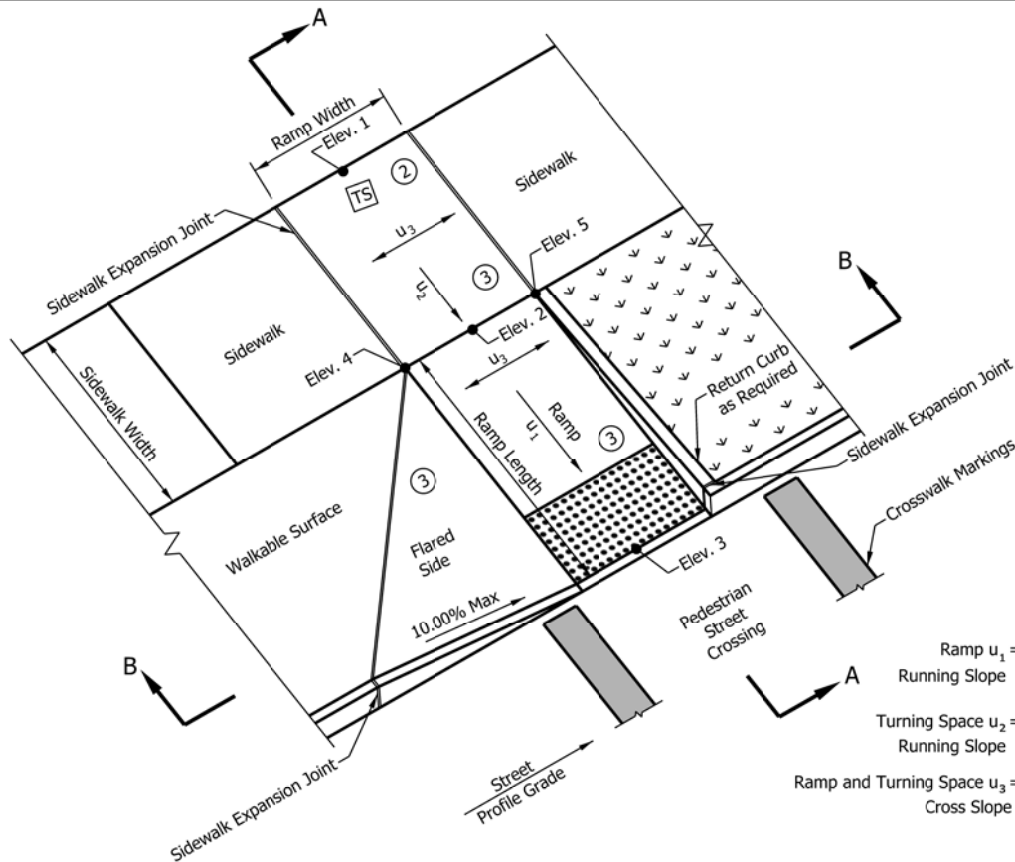
INDIANA DEPARTMENT OF TRANSPORTATION

PAIRED PERPENDICULAR CURB RAMPS TYPICAL PLACEMENT

SEPTEMBER 2016

STANDARD DRAWING NO. E 604-SWCR-03

	/s/ Elizabeth W. Phillips	03/15/16
	DESIGN STANDARDS ENGINEER	DATE
	/s/ Mark A. Miller	03/18/16
	CHIEF ENGINEER	DATE

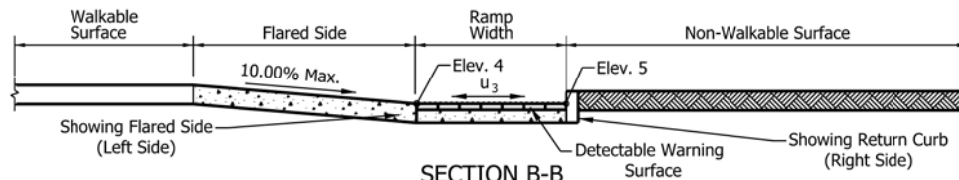


Component Slope Equations:

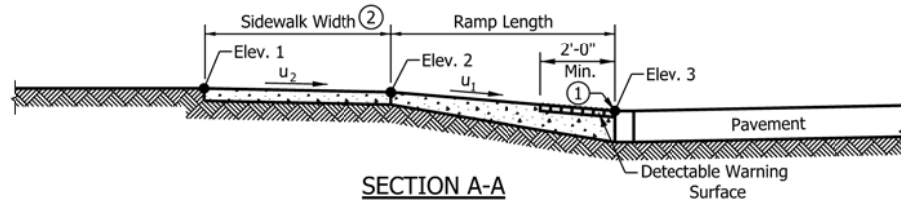
$$\text{Ramp } u_1 = \frac{\text{Elev. 2} - \text{Elev. 3}}{\text{Ramp Length}} \leq 8.33\%$$

$$\text{Turning Space } u_2 = \frac{\text{Elev. 1} - \text{Elev. 2}}{\text{Sidewalk Width}} \leq 2.00\%$$

$$\text{Ramp and Turning Space } u_3 = \frac{\text{Elev. 4} - \text{Elev. 5}}{\text{Ramp or Turning Space Width}} \leq 2.00\% \text{ (4)}$$



SECTION B-B



SECTION A-A

NOTES:

- ① The bottom edge of the ramp and top of curb shall be flush with the edge of adjacent pavement and gutter line.
- ② The turning space shall have a minimum clear dimension of 4 ft x 4 ft. Where the turning space is constrained at the back of the sidewalk, the minimum clear dimension shall be 4 ft x 5 ft, with the 5-ft dimension in the direction of the ramp running slope. Where a tiered perpendicular curb ramp is used, a constrained turning space shall have a minimum clear dimension of 5 ft x 5 ft.
- ③ Curb ramp surface shall be coarse broomed transverse to the running slope.
- ④ See Standard Drawing E 604-SWCR-01 for cross slope exceptions.
5. See Standard Drawing E 604-SWCR-12, -13, and -14 for Detectable Warning Surface placement, configuration, and details.
6. See Standard Drawing E 604-CCSJ-01 for sidewalk expansion joint details.

LEGEND:

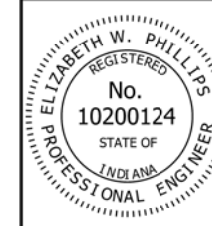
- Buffer or Other Non-Walkable Surface
- Ramp
- Detectable Warning Surface
- Turning Space

INDIANA DEPARTMENT OF TRANSPORTATION

PERPENDICULAR CURB RAMP COMPONENT DETAILS

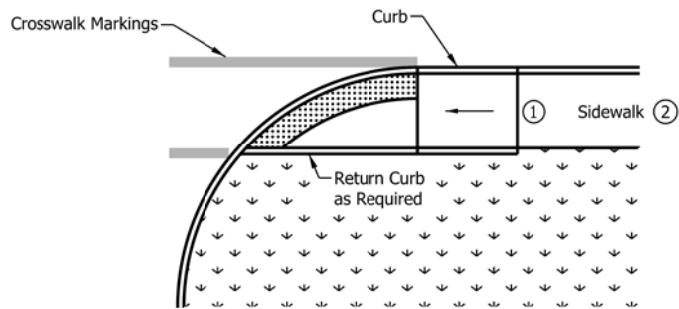
SEPTEMBER 2016

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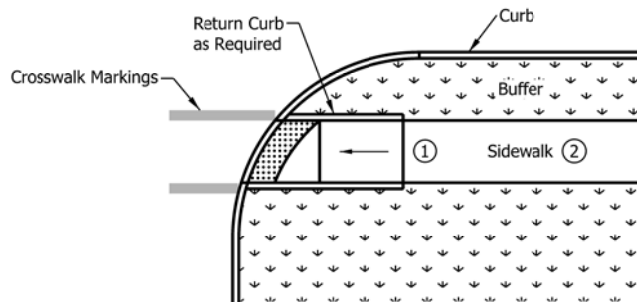


/s/ Elizabeth W. Phillips 03/15/16
DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller 03/18/16
CHIEF ENGINEER DATE



ONE-WAY DIRECTIONAL PERPENDICULAR CURB RAMP ADJACENT CURB



ONE-WAY DIRECTIONAL PERPENDICULAR CURB RAMP WITH BUFFER

NOTES:

- ① A turning space is not required at the top of the ramp for a one-way directional perpendicular curb ramp.
- ② Where there is no buffer between the sidewalk and curb the preferred minimum sidewalk width is 6 ft. Where a buffer is placed between the sidewalk and curb, the preferred minimum sidewalk width is 5 ft. See Standard Drawing Series E 604-SDWK for sidewalk details.

LEGEND:

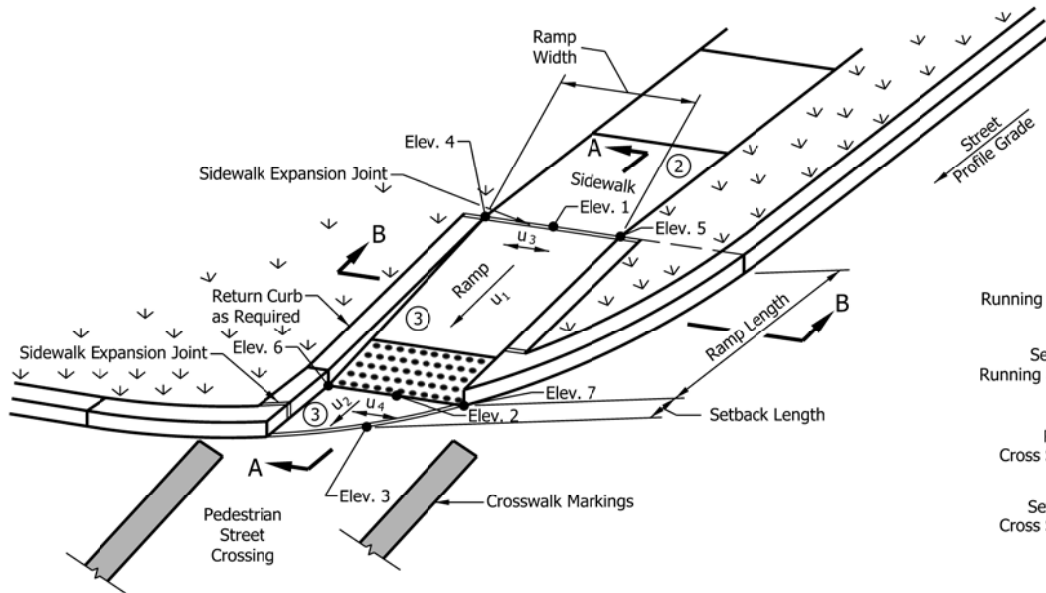
- Buffer or Other Non-Walkable Surface
- Ramp
- Detectable Warning Surface

INDIANA DEPARTMENT OF TRANSPORTATION

**ONE-WAY DIRECTIONAL
PERPENDICULAR CURB RAMP
TYPICAL PLACEMENT
SEPTEMBER 2016**

STANDARD DRAWING NO. E 604-SWCR-05

	/s/ Elizabeth W. Phillips	03/15/16
	DESIGN STANDARDS ENGINEER	DATE
	/s/ Mark A. Miller	03/18/16
	CHIEF ENGINEER	DATE



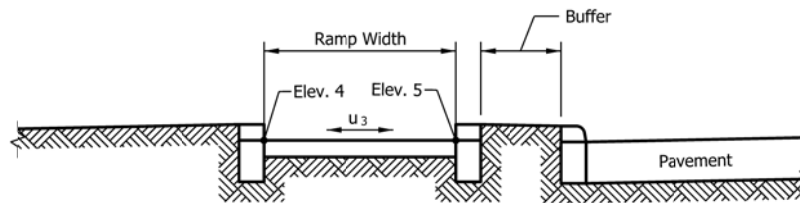
Component Slope Equations:

$$\text{Ramp } u_1 = \frac{|\text{Elev. 1} - \text{Elev. 2}|}{\text{Ramp Length}} \leq 8.33\%$$

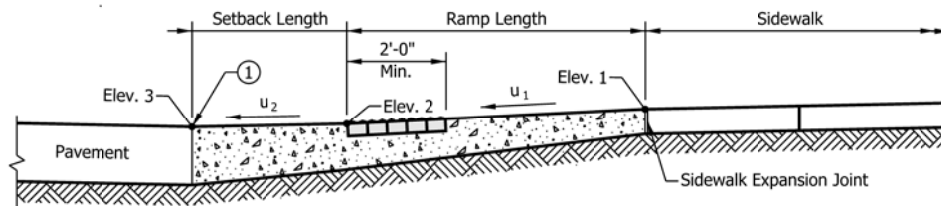
$$\text{Setback } u_2 = \frac{|\text{Elev. 2} - \text{Elev. 3}|}{\text{Setback Length}} \leq \text{Profile Grade of Adjacent Street}$$

$$\text{Ramp } u_3 = \frac{|\text{Elev. 4} - \text{Elev. 5}|}{\text{Ramp Width}} \leq 2.00\% \text{ (4)}$$

$$\text{Setback } u_4 = \frac{|\text{Elev. 6} - \text{Elev. 7}|}{\text{Ramp Width}} \leq 2.00\% \text{ (4)}$$



SECTION B-B



SECTION A-A

NOTES:

- ① The bottom edge of the ramp or setback and top of curb shall be flush with the edge of adjacent pavement and gutter line.
- ② A turning space is not required at the top of the ramp for a one-way directional perpendicular curb ramp.
- ③ Curb ramp surface shall be coarse broomed transverse to the running slope.
- ④ See Standard Drawing E 604-SWCR-01 for cross slope exceptions.
5. See Standard Drawing E 604-SWCR-12, -13, and -14 for Detectable Warning Surface placement, configuration, and details.
6. See Standard Drawing E 604-CCSJ-01 for sidewalk expansion joint details.

LEGEND:

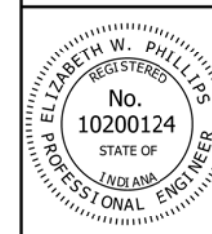
- Buffer or Other Non-Walkable Surface
- Ramp
- Detectable Warning Surface

INDIANA DEPARTMENT OF TRANSPORTATION

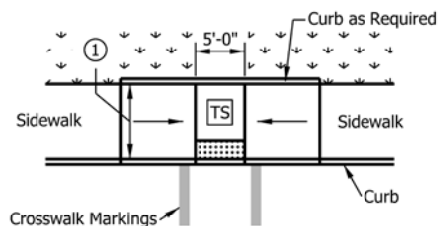
ONE-WAY DIRECTIONAL PERPENDICULAR
CURB RAMP COMPONENT DETAILS

SEPTEMBER 2016

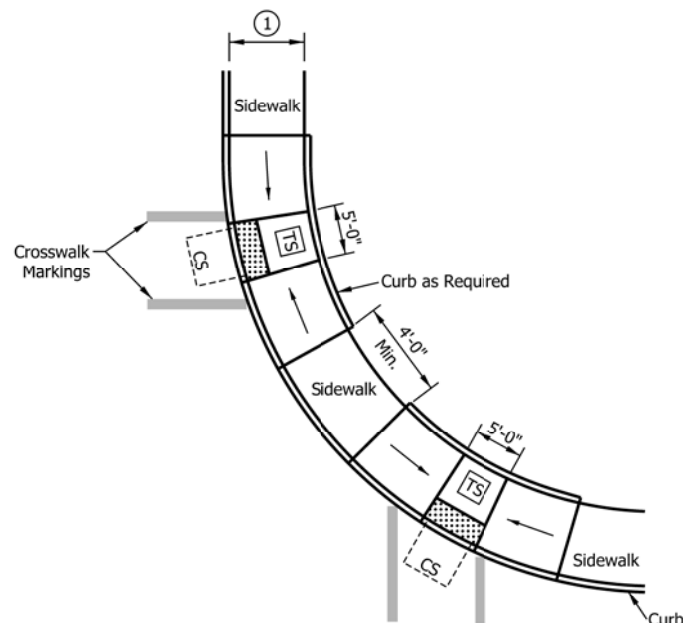
STANDARD DRAWING NO. E 604-SWCR-06



/s/ Elizabeth W. Phillips	03/15/16
DESIGN STANDARDS ENGINEER	DATE
/s/ Mark A. Miller	03/18/16
CHIEF ENGINEER	DATE



MIDBLOCK CROSSING CURB RAMP



PAIRED PARALLEL CURB RAMPS ALONG LARGE RADIUS

NOTES:

- ① Where there is no buffer between the sidewalk and curb the preferred minimum sidewalk width is 6 ft. Where a buffer is placed between the sidewalk and curb, the preferred minimum sidewalk width is 5 ft. See Standard Drawing Series E 604-SDWK for sidewalk details.
2. The turning space shall have a minimum clear dimension of 4 ft x 4 ft and a running slope of 2.00% maximum. Where the turning space is constrained at the back of the sidewalk, the minimum clear dimension shall be 4 ft x 5 ft, with the 5-ft dimension in the direction of the ramp running slope.

LEGEND:

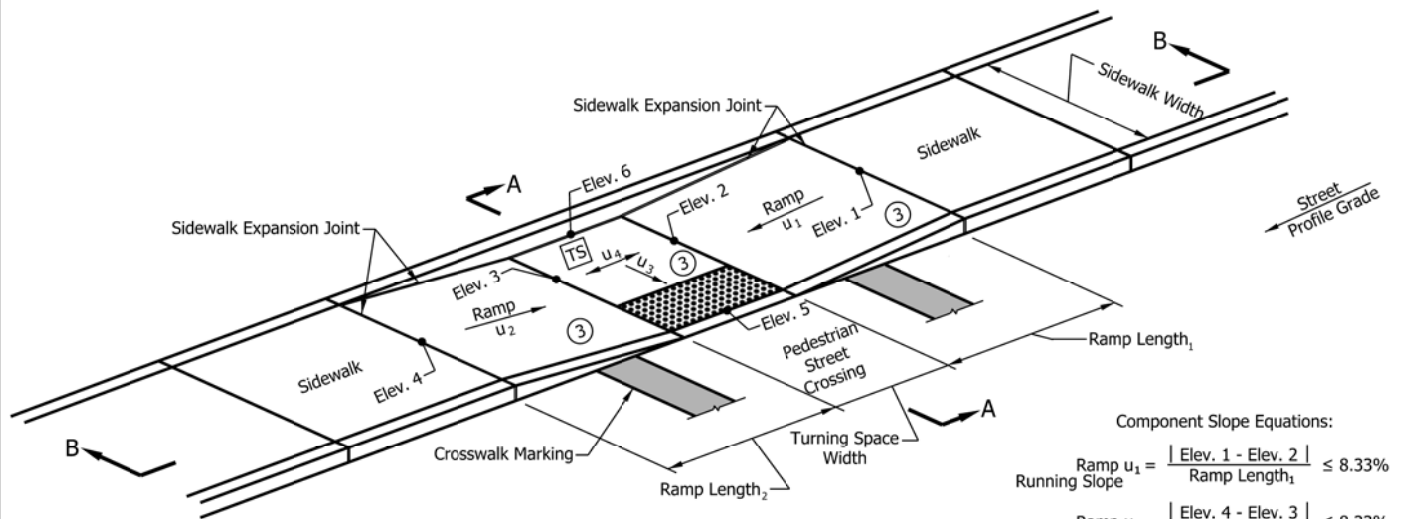
- Buffer or Other Non-Walkable Surface
- Ramp
- Detectable Warning Surface
- Turning Space
- Clear Space

INDIANA DEPARTMENT OF TRANSPORTATION

PAIRED PARALLEL CURB RAMPS AND
MIDBLOCK CROSSING CURB RAMP
TYPICAL PLACEMENT
SEPTEMBER 2016

STANDARD DRAWING NO. E 604-SWCR-07

	/s/ Elizabeth W. Phillips	03/15/16
	DESIGN STANDARDS ENGINEER	DATE
	/s/ Mark A. Miller	03/18/16
	CHIEF ENGINEER	DATE



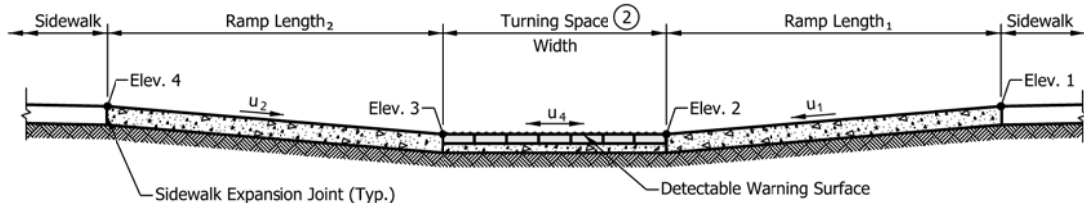
Component Slope Equations:

$$\text{Ramp } u_1 = \frac{\text{Elev. 1} - \text{Elev. 2}}{\text{Ramp Length}_1} \leq 8.33\%$$

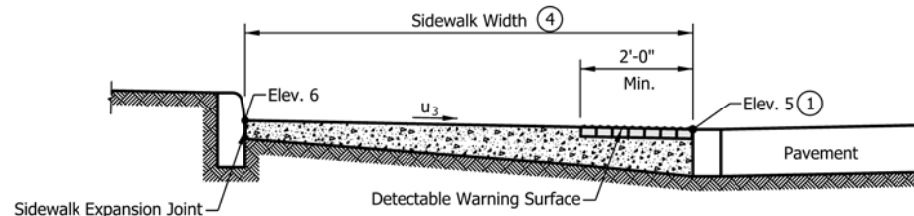
$$\text{Ramp } u_2 = \frac{\text{Elev. 4} - \text{Elev. 3}}{\text{Ramp Length}_2} \leq 8.33\%$$

$$\text{Turning Space } u_3 = \frac{\text{Elev. 6} - \text{Elev. 5}}{\text{Sidewalk Width}} \leq 2.00\%$$

$$\text{Turning Space } u_4 = \frac{\text{Elev. 2} - \text{Elev. 3}}{\text{Turning Space Width}} \leq 2.00\%$$



SECTION B-B



SECTION A-A

NOTES:

- ① The bottom edge of the turning space and top of curb shall be flush with the edge of adjacent pavement and gutter line.
- ② The turning space shall have a minimum clear dimension of 4 ft x 4 ft and a running slope of 2.00% maximum. Where the turning space is constrained at the back of the sidewalk, the minimum clear dimension shall be 4 ft x 5 ft, with the 5-ft dimension in the direction of the ramp running slope.
- ③ Curb ramp surface shall be coarse broomed transverse to the running slope.
- ④ Where there is no buffer between the sidewalk and curb, the preferred minimum sidewalk width is 6 ft. Where a buffer is placed between the sidewalk and curb, the preferred minimum sidewalk width is 5 ft. See Standard Drawing Series E 604-SDWK for sidewalk details.
- ⑤ See Standard Drawing E 604-SWCR-01 for cross slope exceptions.
6. See Standard Drawing E 604-SWCR-12, -13, and -14 for Detectable Warning Surface placement, configuration, and details.
7. See Standard Drawing E 604-CCSJ-01 for sidewalk expansion joint details.

LEGEND:

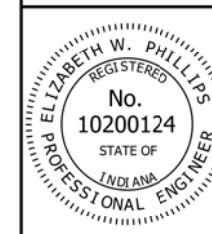
- Ramp
- Detectable Warning Surface
- Turning Space

INDIANA DEPARTMENT OF TRANSPORTATION

PARALLEL CURB RAMP
COMPONENT DETAILS

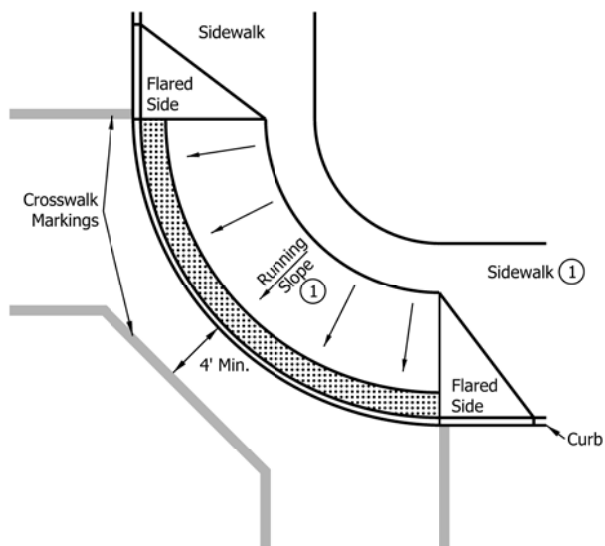
SEPTEMBER 2016

STANDARD DRAWING NO. E 604-SWCR-08

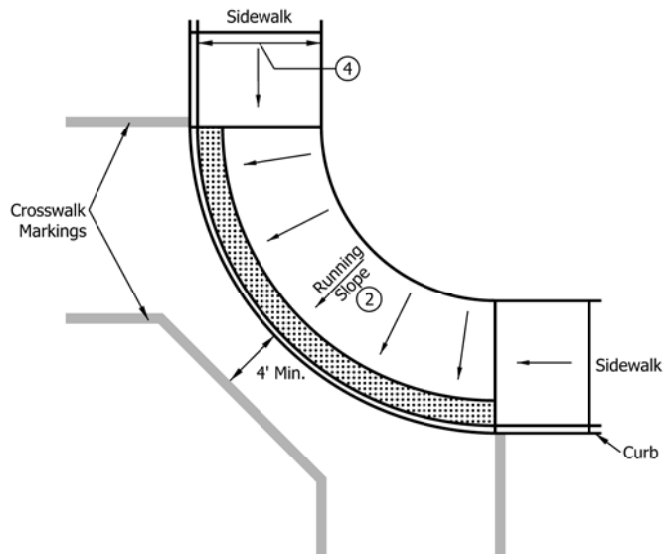


/s/ Elizabeth W. Phillips 03/15/16
DESIGN STANDARDS ENGINEER DATE

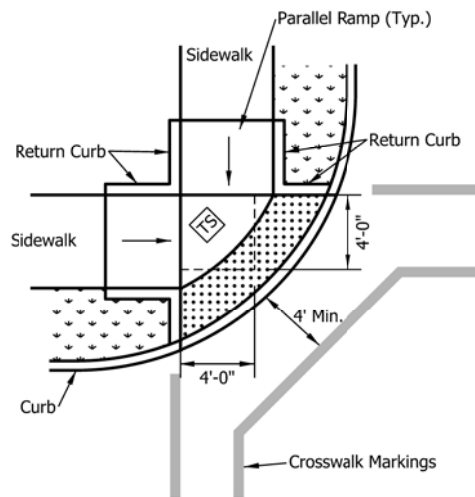
/s/ Mark A. Miller 03/18/16
CHIEF ENGINEER DATE



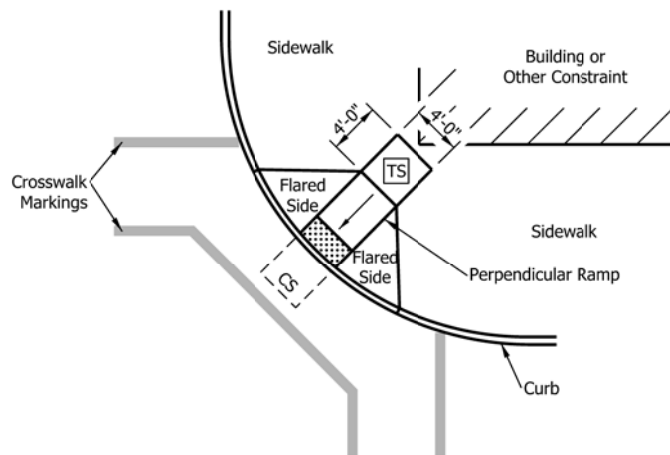
**BLENDING TRANSITION CURB RAMP
WITH RUNNING SLOPE > 2.00%**



**BLENDING TRANSITION CURB RAMP
WITH RUNNING SLOPE ≤ 2.00%**



DEPRESSED CORNER CURB RAMP



DIAGONAL CURB RAMP ③

NOTES:

- ① Where the running slope is greater than 2.00%, a 4-ft minimum sidewalk shall continue behind the blended transition. The running slope shall not exceed 5.00%.
- ② Where the running slope is less than or equal to 2.00% a 4-ft minimum sidewalk is not required behind the blended transition.
- ③ A diagonal curb ramp shall not be used for new construction. For an alteration project, a diagonal curb ramp shall be used only where existing physical conditions prevent paired curb ramps, a blended transition curb ramp, or a depressed corner curb ramp from being provided.
- ④ Where there is no buffer between the sidewalk and curb the preferred minimum sidewalk width is 6 ft. Where a buffer is placed between the sidewalk and curb, the preferred minimum sidewalk width is 5 ft. See Standard Drawing Series E 604-SDWK for sidewalk details.

LEGEND:

- Buffer or Other Non-Walkable Surface
- Ramp
- Detectable Warning Surface
- Turning Space
- Clear Space

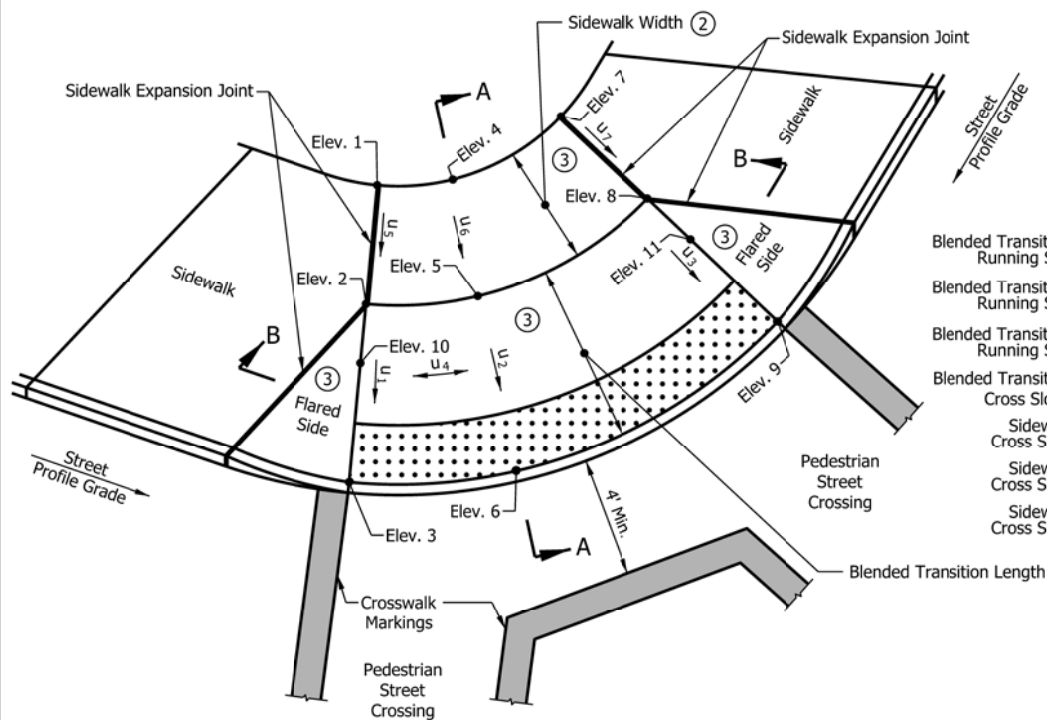
INDIANA DEPARTMENT OF TRANSPORTATION

BLENDING TRANSITION CURB RAMP, DEPRESSED CURB RAMP AND DIAGONAL CURB RAMP TYPICAL PLACEMENT

SEPTEMBER 2016

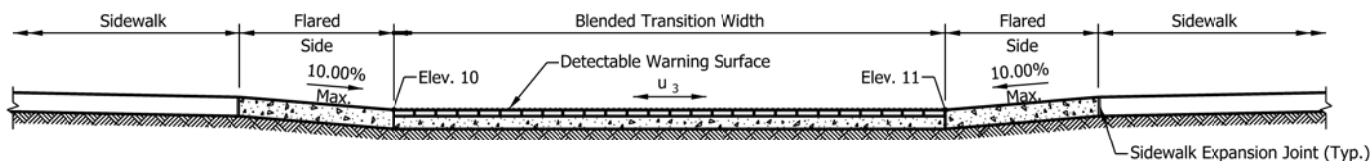
STANDARD DRAWING NO. E 604-SWCR-09

	<table> <tr> <td>/s/ Elizabeth W. Phillips</td><td>03/15/16</td></tr> <tr> <td>DESIGN STANDARDS ENGINEER</td><td>DATE</td></tr> <tr> <td>/s/ Mark A. Miller</td><td>03/18/16</td></tr> <tr> <td>CHIEF ENGINEER</td><td>DATE</td></tr> </table>	/s/ Elizabeth W. Phillips	03/15/16	DESIGN STANDARDS ENGINEER	DATE	/s/ Mark A. Miller	03/18/16	CHIEF ENGINEER	DATE
/s/ Elizabeth W. Phillips	03/15/16								
DESIGN STANDARDS ENGINEER	DATE								
/s/ Mark A. Miller	03/18/16								
CHIEF ENGINEER	DATE								

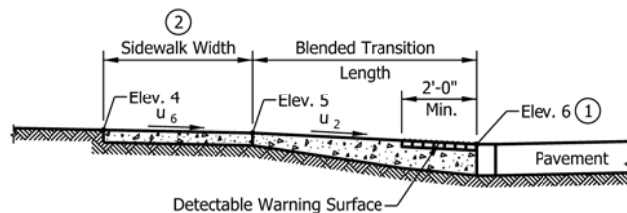


Component Slope Equations:

$$\begin{aligned} \text{Blended Transition } u_1 = \text{Running Slope} &= \frac{|\text{Elev. 2} - \text{Elev. 3}|}{\text{Blended Transition Length}} \leq 2.00\% \quad (2) \\ \text{Blended Transition } u_2 = \text{Running Slope} &= \frac{|\text{Elev. 5} - \text{Elev. 6}|}{\text{Blended Transition Length}} \leq 2.00\% \quad (2) \\ \text{Blended Transition } u_3 = \text{Running Slope} &= \frac{|\text{Elev. 8} - \text{Elev. 9}|}{\text{Blended Transition Length}} \leq 2.00\% \quad (2) \\ \text{Blended Transition } u_4 = \text{Cross Slope} &= \frac{|\text{Elev. 10} - \text{Elev. 11}|}{\text{Blended Transition Width}} \leq 2.00\% \quad (4) \\ \text{Sidewalk } u_5 = \text{Cross Slope} &= \frac{|\text{Elev. 1} - \text{Elev. 2}|}{\text{Sidewalk Width}} \leq 2.00\% \\ \text{Sidewalk } u_6 = \text{Cross Slope} &= \frac{|\text{Elev. 4} - \text{Elev. 5}|}{\text{Sidewalk Width}} \leq 2.00\% \\ \text{Sidewalk } u_7 = \text{Cross Slope} &= \frac{|\text{Elev. 7} - \text{Elev. 8}|}{\text{Sidewalk Width}} \leq 2.00\% \end{aligned}$$



SECTION B-B



SECTION A-A

NOTES:

- (1) The bottom edge of the blended transition and top of curb shall be flush with the edge of adjacent pavement and gutter line.
- (2) Where the running slope is less than or equal to 2.00% a 4-ft minimum sidewalk is not required, behind the blended transition. Where the running slope is greater than 2.00%, a 4-ft minimum sidewalk shall continue behind the blended transition and the running slope shall not exceed 5.00%.
- (3) Curb ramp surface shall be coarse broomed transverse to the running slope.
- (4) See Standard Drawing E 604-SWCR-01 for cross slope exceptions.
5. See Standard Drawing E 604-SWCR-12, -13, and -14 for Detectable Warning Surface placement, configuration, and details.
6. See Standard Drawing E 604-CCSJ-01 for sidewalk expansion joint details.

LEGEND:

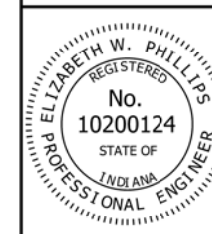
- Ramp
- Detectable Warning Surface

INDIANA DEPARTMENT OF TRANSPORTATION

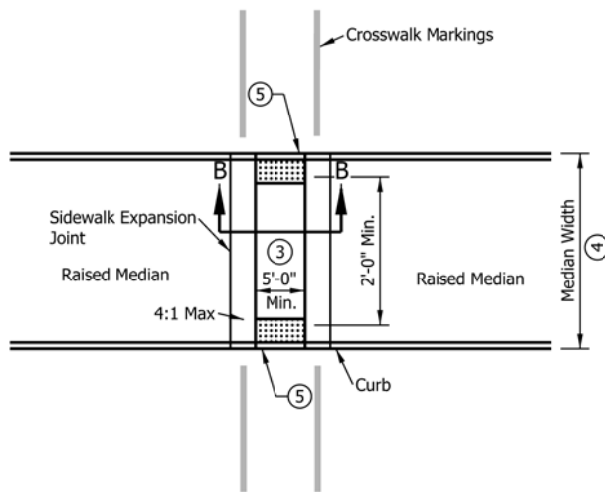
BLENDED TRANSITION CURB RAMP COMPONENT DETAILS

SEPTEMBER 2016

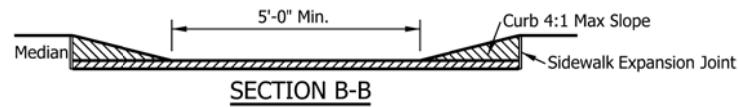
STANDARD DRAWING NO. E 604-SWCR-10



/s/ Elizabeth W. Phillips	03/15/16
DESIGN STANDARDS ENGINEER	DATE
/s/ Mark A. Miller	03/18/16
CHIEF ENGINEER	DATE



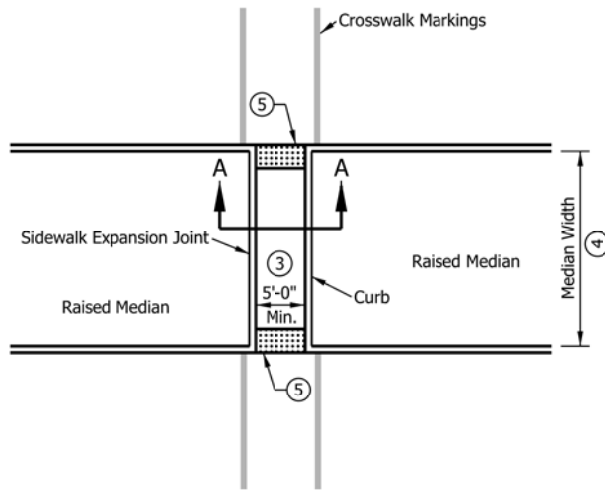
**MEDIAN CUT-THROUGH
WITH TAPERED CURB**



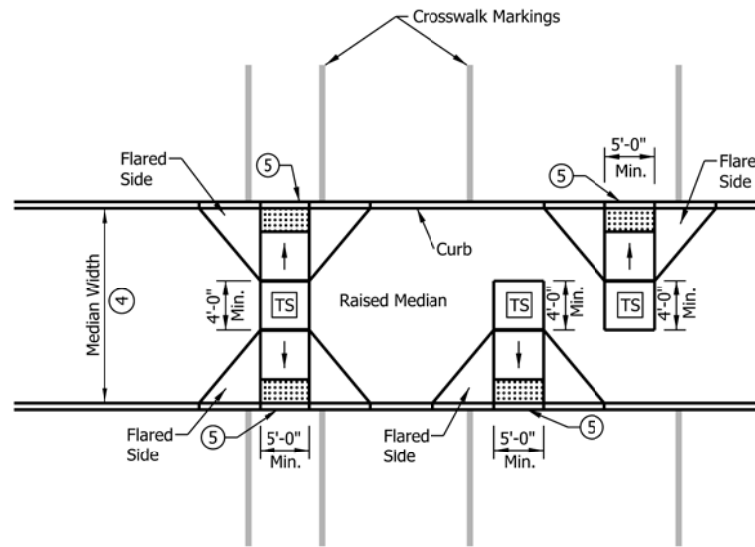
SECTION B-B



SECTION A-A



**MEDIAN CUT-THROUGH
WITH CURB**



MEDIAN PERPENDICULAR CURB RAMPS

NOTES:

1. The minimum width of a median cut-through and median perpendicular curb ramp shall be 5 ft.
2. Where in-line or offset perpendicular curb ramps are used within a median, the turning space shall have a minimum clear dimension of 4 ft x 5 ft.
3. Where a median cut through is used the running slope shall be 2.00% maximum.
4. Where median width is less than 6 ft, detectable warning surfaces shall not be placed.
5. The bottom edge of the median cut-through or median perpendicular curb ramp and the top of curb shall be flush with the edge of adjacent pavement gutter line.
6. See Standard Drawing E 604-SWCR-01 for cross slope exceptions.
7. See Standard Drawing E 604-SWCR-12, -13, and -14 for Detectable Warning Surface placement, configuration, and details.
8. See Standard Drawing E 604-CCSJ-01 for sidewalk expansion joint details.

LEGEND:

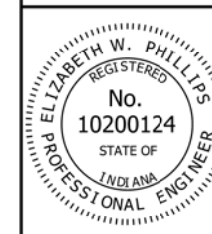
- Ramp
- Detectable Warning Surface
- Turning Space

INDIANA DEPARTMENT OF TRANSPORTATION

MEDIAN CUT-THROUGH AND
MEDIAN PERPENDICULAR CURB RAMP
TYPICAL PLACEMENT

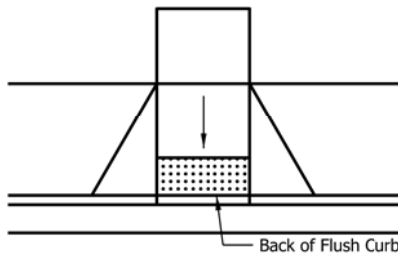
SEPTEMBER 2016

STANDARD DRAWING NO. E 604-SWCR-11

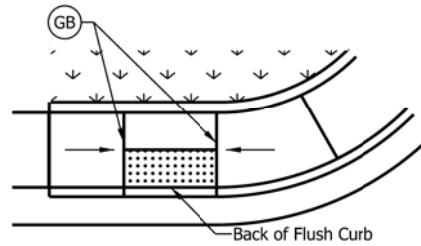


/s/ Elizabeth W. Phillips 03/15/16
DESIGN STANDARDS ENGINEER DATE

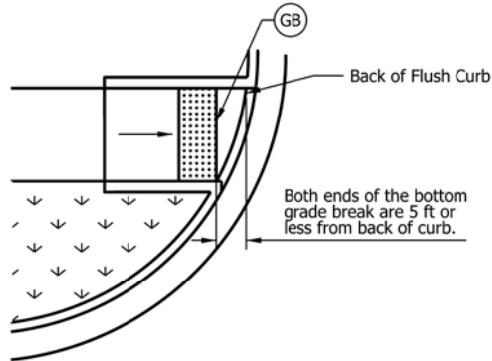
/s/ Mark A. Miller 03/18/16
CHIEF ENGINEER DATE



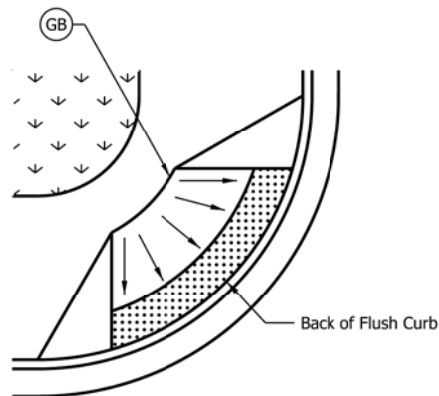
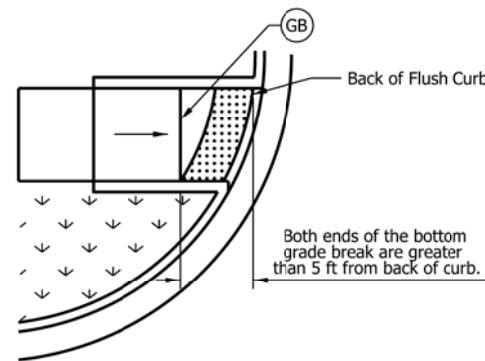
PERPENDICULAR CURB RAMP ③



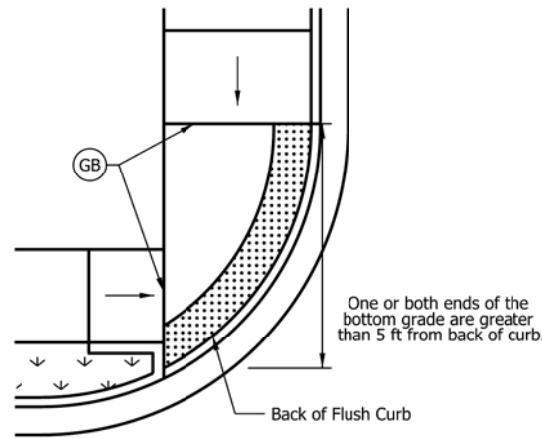
PARALLEL CURB RAMP ④



ONE-WAY DIRECTIONAL PERPENDICULAR CURB RAMPS ③



BLENDED TRANSITION CURB RAMP ⑤



DEPRESSED CORNER CURB RAMP ⑤

NOTES:

1. A detectable warning surface shall be placed at each street, highway, or railroad crossing. See Standard Drawing E 604-SDWK-03 for a detectable warning surface placement at a sidewalk driveway crossing.
2. The detectable warning surface shall extend a minimum of 2 ft in the direction of pedestrian travel and extend the full width as shown. The detectable warning surface shall not be placed across a grade break.
- ③ Where the of the bottom grade break on a perpendicular curb ramp is 5 ft or less from the back of curb, the detectable warning surface shall be placed on the ramp within one dome spacing of the bottom grade break. Where the bottom grade break is more than 5 ft from the back of curb, the detectable warning surface shall be placed at the back of curb.
- ④ The detectable warning surface on a parallel curb shall be placed on the turning space at the flush transition between the street and turning space at the back of curb.
- ⑤ The detectable warning surface on a blended transition or depressed corner curb ramp shall be placed at the back of curb.
6. See Standard Drawing E 604-SWCR-14 where a concrete border is used as an edge restraint for a brick detectable warning surface.

LEGEND:

- Buffer or Other Non-Walkable Surface
- Detectable Warning Surface
- Ramp
- GB Grade Break

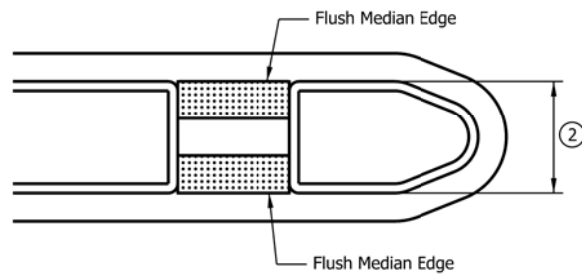
INDIANA DEPARTMENT OF TRANSPORTATION

DETECTABLE WARNING SURFACE PLACEMENT AND CONFIGURATION

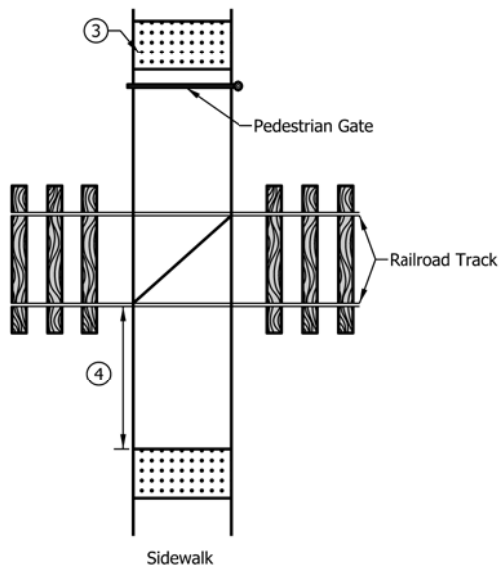
SEPTEMBER 2016

STANDARD DRAWING NO. E 604-SWCR-12

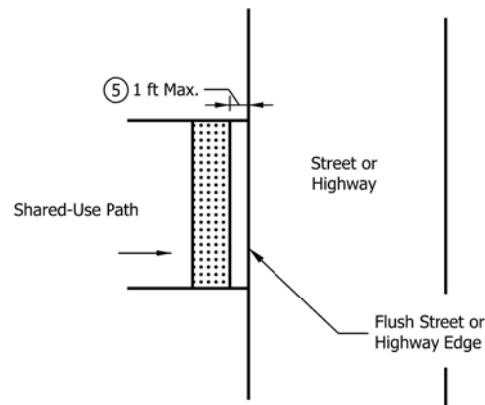
	<table> <tr> <td>/s/ Elizabeth W. Phillips</td><td>03/15/16</td></tr> <tr> <td>DESIGN STANDARDS ENGINEER</td><td>DATE</td></tr> <tr> <td>/s/ Mark A. Miller</td><td>03/18/16</td></tr> <tr> <td>CHIEF ENGINEER</td><td>DATE</td></tr> </table>	/s/ Elizabeth W. Phillips	03/15/16	DESIGN STANDARDS ENGINEER	DATE	/s/ Mark A. Miller	03/18/16	CHIEF ENGINEER	DATE
/s/ Elizabeth W. Phillips	03/15/16								
DESIGN STANDARDS ENGINEER	DATE								
/s/ Mark A. Miller	03/18/16								
CHIEF ENGINEER	DATE								



MEDIAN CUT-THROUGH



RAILROAD CROSSING



SHARED-USE PATH

NOTES:

1. The detectable warning surface shall extend a minimum of 2 ft in the direction of pedestrian travel and extend the full width as shown. The detectable warning surface shall not be placed across a grade break.
- ② The detectable warning surface on a median cut-through shall be placed at the flush transition between the street and median cut-through. Where a median is less than 6 ft, a detectable warning surface shall not be placed.
- ③ Where a pedestrian gate is provided at a railroad crossing, the detectable warning surface shall be placed on the side of the gate opposite the railroad crossing.
- ④ The edge of the detectable warning surface nearest to the railroad crossing shall be placed 6 ft minimum and 15 ft maximum from the centerline of the nearest rail.
- ⑤ Where a shared-use path intersects a street or highway, the detectable warning surface shall be placed on the shared-use path within 1 ft of the street or highway edge.
6. See Standard Drawing E 604-SWCR-14 where a concrete border is used as an edge restraint for a brick detectable warning surface.

LEGEND:

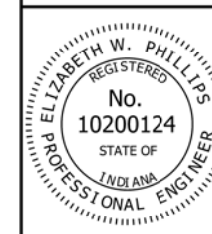
- Buffer or Other Non-Walkable Surface
- Detectable Warning Surface
- Ramp
- Grade Break

INDIANA DEPARTMENT OF TRANSPORTATION

DETECTABLE WARNING SURFACE
PLACEMENT AND CONFIGURATION

SEPTEMBER 2016

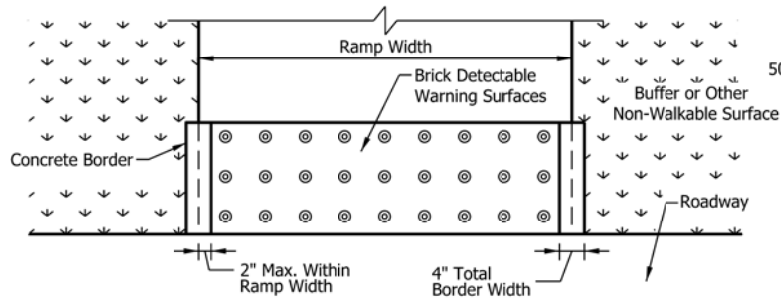
STANDARD DRAWING NO. E 604-SWCR-13



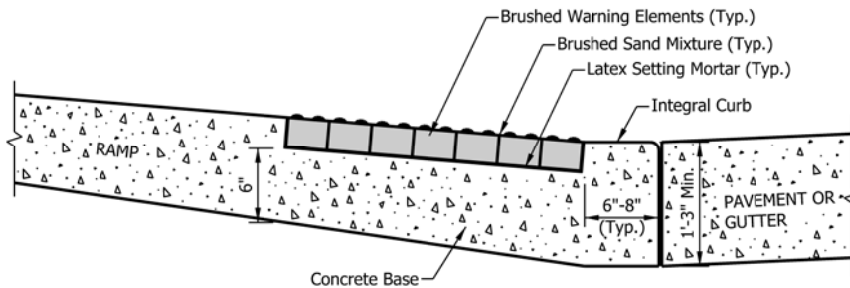
/s/ Elizabeth W. Phillips	03/15/16
DESIGN STANDARDS ENGINEER	DATE
/s/ Mark A. Miller	03/18/16
CHIEF ENGINEER	DATE

NOTES:

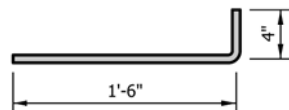
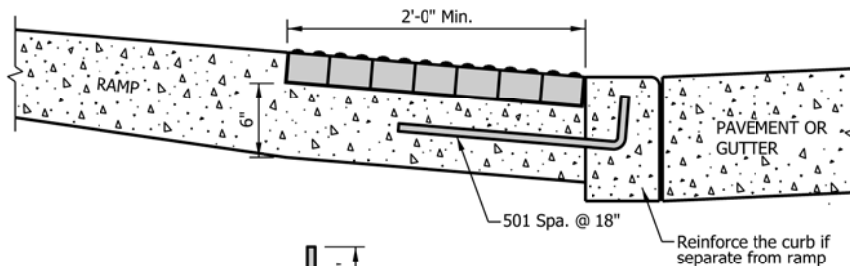
1. Detectable warning surface shall consist of truncated domes and shall be aligned in a square or radial grid pattern. Where truncated domes are arrayed radially, they may differ in diameter and center-to-center spacing within the ranges specified.
2. The detectable warning surface shall be manufactured to fit the radii. Field cutting shall not alter the truncated dome spacing between the adjacent panels outside of the allowable range.
3. The detectable warning surface shall contrast visually with adjacent surfaces, either light on dark or dark on light.
4. The detectable warning surface shall extend a minimum of 2 ft in the direction of pedestrian travel and extend the full width as shown. The detectable warning surface shall not be placed across a grade break.
5. The maximum counter slope of the gutter or street at the bottom of the ramp shall be 5.00%. Where the algebraic difference between the running slope and the counter slope exceeds 11%, a 2-ft minimum level strip should be provided at the bottom of the ramp.
6. Where concrete border is used for forming, the border shall be cast monolithically with the curb ramp concrete. The concrete border shall not exceed 2 in. within the ramp width.
7. Where forming other than a concrete border is used, the edge restraint shall not encroach upon the ramp width.



BRICK DETECTABLE WARNING SURFACE WITH CONCRETE BORDER ⑥ ⑦

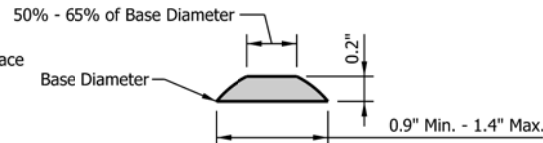


TYPICAL RAMP AND BRICK SURFACE CONSTRUCTION DETAIL

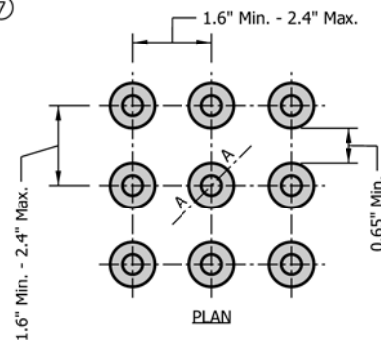


501 x 1'-10"

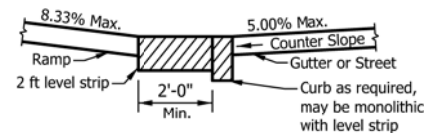
ALTERNATE CURB CONSTRUCTION



SECTION A-A



TRUNCATED DOMES



CHANGE OF GRADE > 11% ⑤

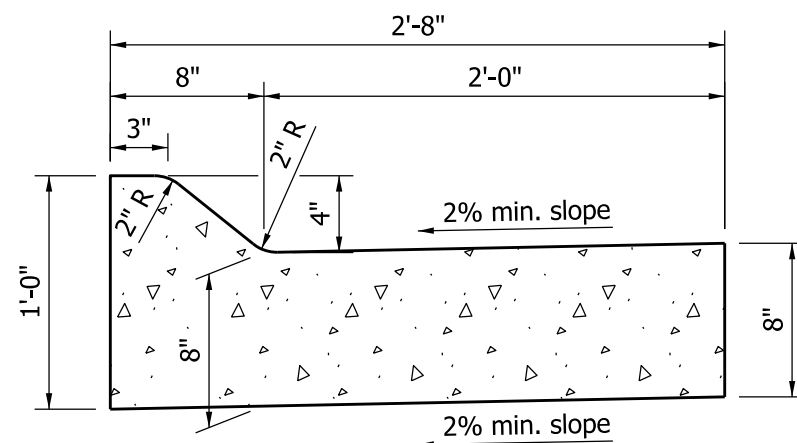
INDIANA DEPARTMENT OF TRANSPORTATION

DETECTABLE WARNING SURFACE DETAILS

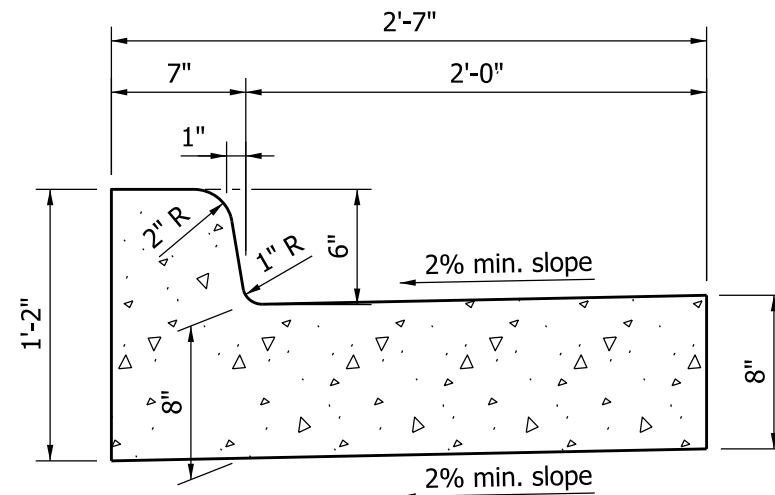
SEPTEMBER 2016

STANDARD DRAWING NO. E 604-SWCR-14

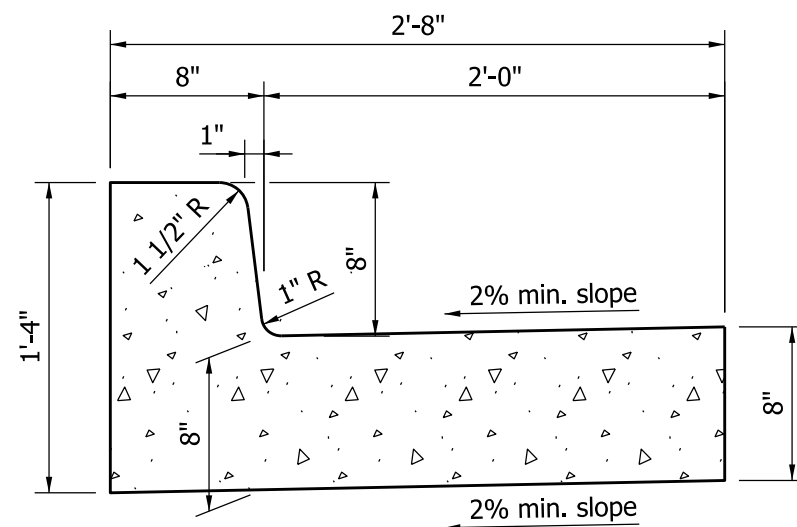
	/s/ Elizabeth W. Phillips	03/15/16
	DESIGN STANDARDS ENGINEER	DATE
	/s/ Mark A. Miller	03/18/16
	CHIEF ENGINEER	DATE



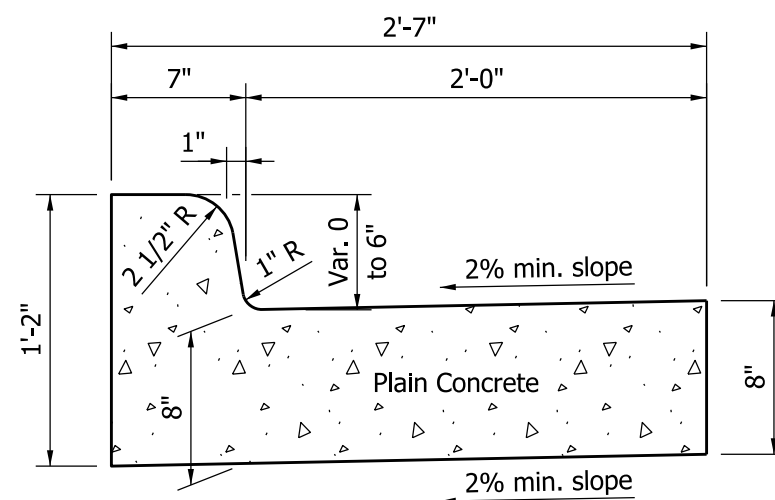
**COMBINED CONCRETE CURB
AND GUTTER, TYPE B
(SLOPING)**



**COMBINED CONCRETE CURB
AND GUTTER
(VERTICAL)**

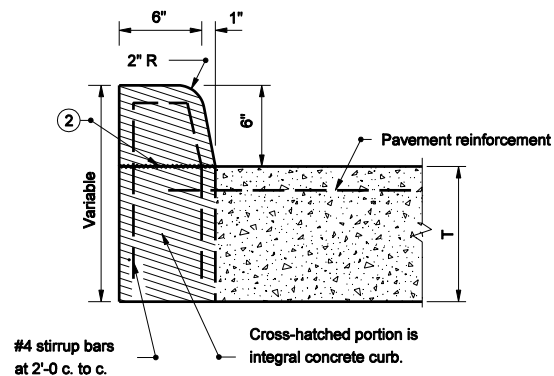


**COMBINED CONCRETE CURB
AND GUTTER, TYPE C
(VERTICAL)**

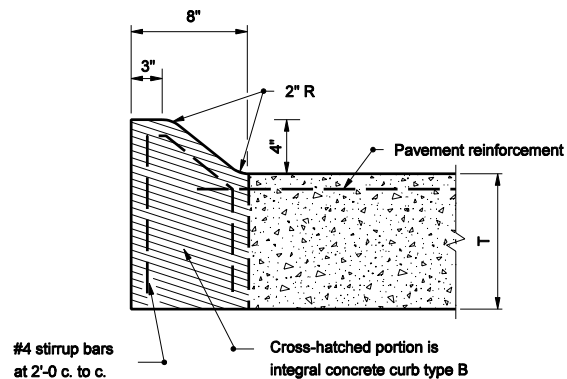


**MONOLITHIC CURB
(VERTICAL)**

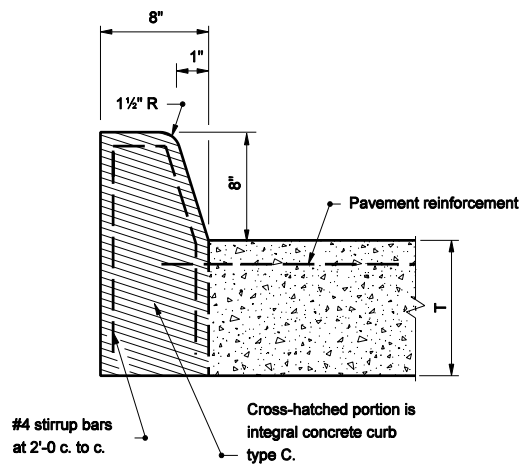
INDIANA DEPARTMENT OF TRANSPORTATION			
COMBINED CONCRETE CURB AND GUTTER			
SEPTEMBER 2011			
STANDARD DRAWING NO.		E 605-CCCG-01	
	/s/ <i>Richard L. VanCleave</i>		09/01/11
	DESIGN STANDARDS ENGINEER		DATE
	/s/ <i>Mark A. Miller</i>		09/01/11
DESIGN STANDARDS ENGINEER	CHIEF HIGHWAY ENGINEER		DATE



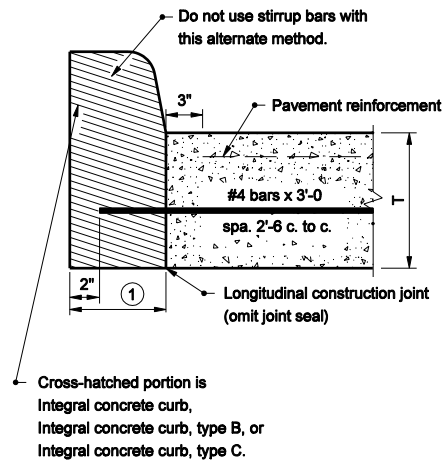
**INTEGRAL CONCRETE CURB
(BARRIER)**



**INTEGRAL CONCRETE CURB
TYPE B
(MOUNTABLE)**



**INTEGRAL CONCRETE CURB
TYPE C
(BARRIER)**



**ALTERNATE METHOD
OF CONSTRUCTION FOR ALL TYPES
OF INTEGRAL CONCRETE CURB**

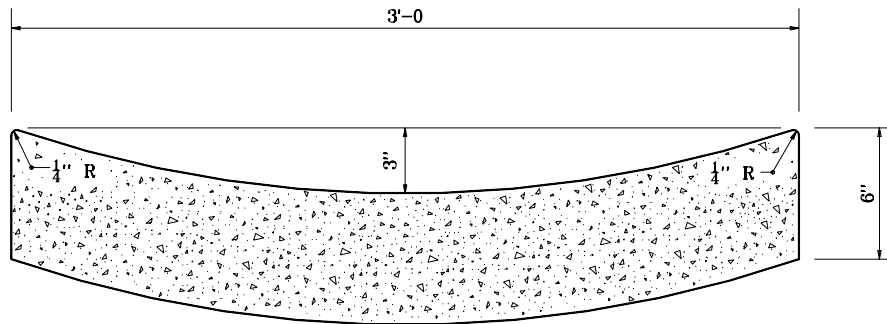
NOTES

- ① 8" for integral concrete curb type B or C and 7" for integral concrete curb.
- ② Concrete below this line may be poured with the pavement.

LEGEND

T = Nominal pavement thickness

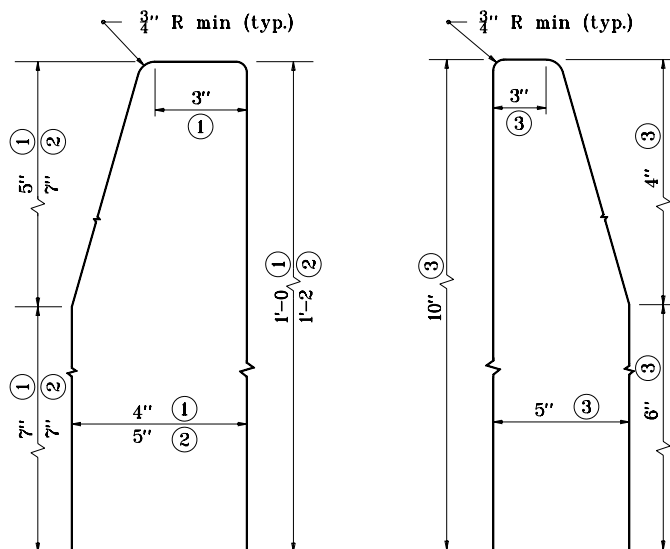
INDIANA DEPARTMENT OF TRANSPORTATION	
INTEGRAL CONCRETE CURB	
SEPTEMBER 2004	
STANDARD DRAWING NO. E 605-CCIN-01	
	/s/ Richard L. VanCleave 9-01-04 DESIGN STANDARDS ENGINEER DATE
	/s/ Richard K. Smutzer 9-01-04 CHIEF HIGHWAY ENGINEER DATE



CONCRETE GUTTER

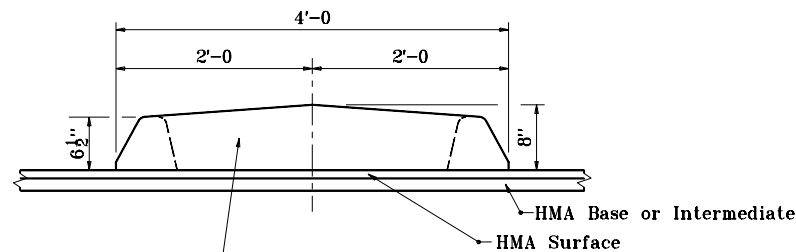
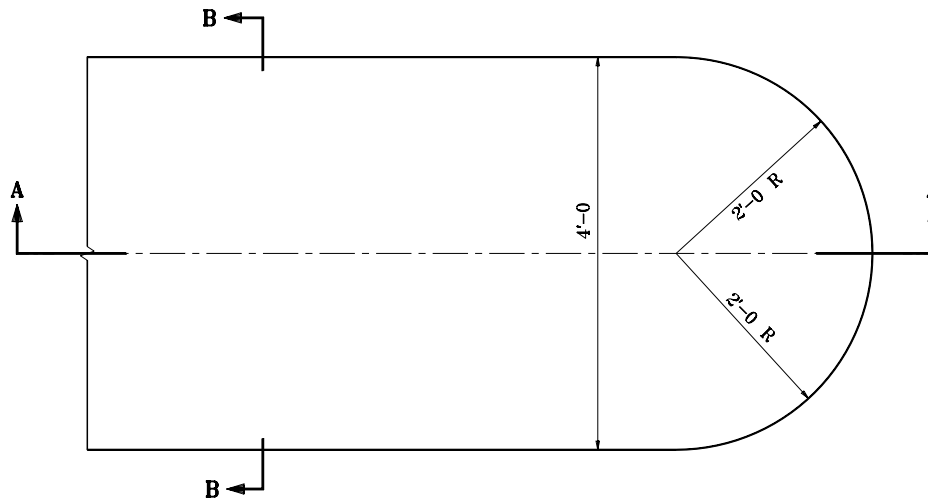
NOTES:

- ① For integral concrete curb
- ② For integral concrete curb Type C
- ③ For integral concrete curb Type B



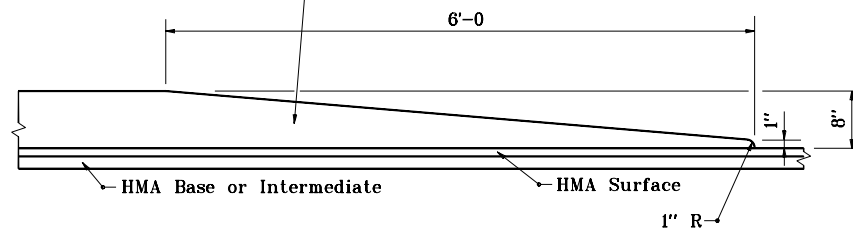
BENDING DIAGRAM FOR STIRRUPS

INDIANA DEPARTMENT OF TRANSPORTATION	
CONCRETE GUTTER AND CURB	
STIRRUP BENDING DIAGRAM	
APRIL 1995	
STANDARD DRAWING NO. E 605-CGCS-01	
	DETAILS PLACED IN THIS FORMAT 11-15-99
	/s/ Anthony L. Uremovich 11-15-99 DESIGN STANDARDS ENGINEER DATE
	/s/ Firooz Zandi 11-15-99 CHIEF HIGHWAY ENGINEER DATE
	DESIGN STANDARDS ENGINEER ORIGINALLY APPROVED 4-03-95



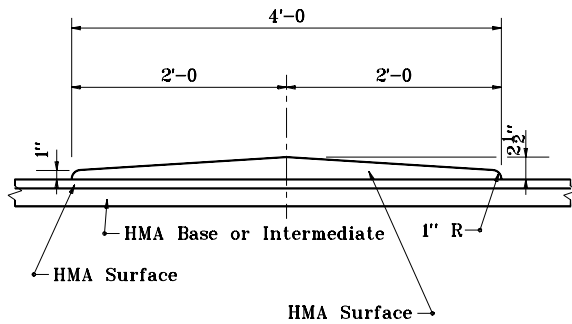
SECTION B-B

This section may be constructed as a monolithic unit or built up with an asphalt filler between two asphalt curbs.

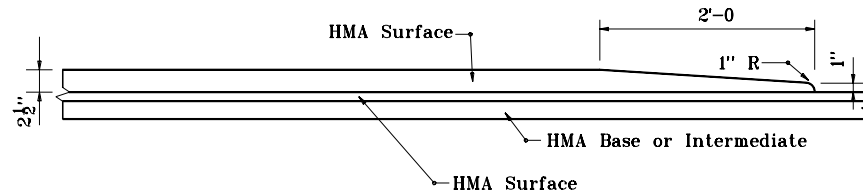


SECTION A-A

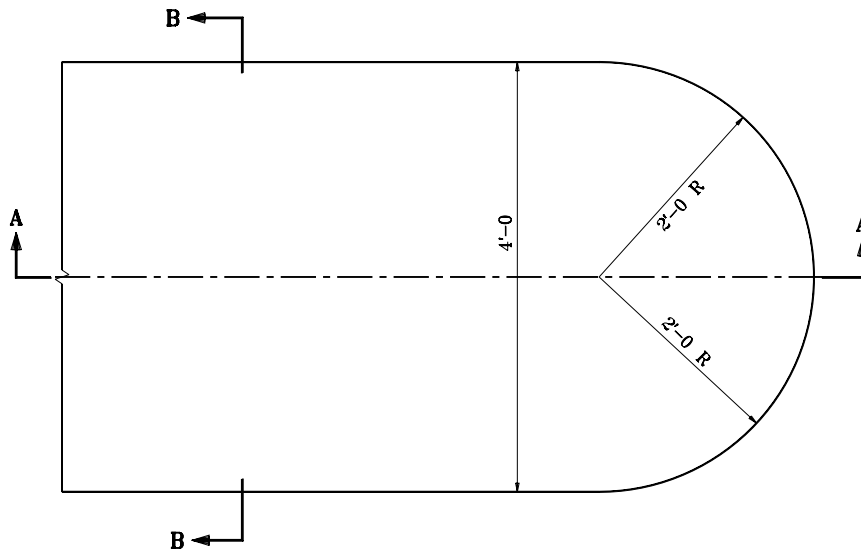
INDIANA DEPARTMENT OF TRANSPORTATION	
HMA CENTER CURB	
TYPE A	
JANUARY 2000	
STANDARD DRAWING NO. E 605-CNCB-01	
	<i>/s/ Anthony L. Uremovich</i> 1-03-00 DESIGN STANDARDS ENGINEER DATE
	<i>/s/ Firooz Zandi</i> 1-03-00 CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER	



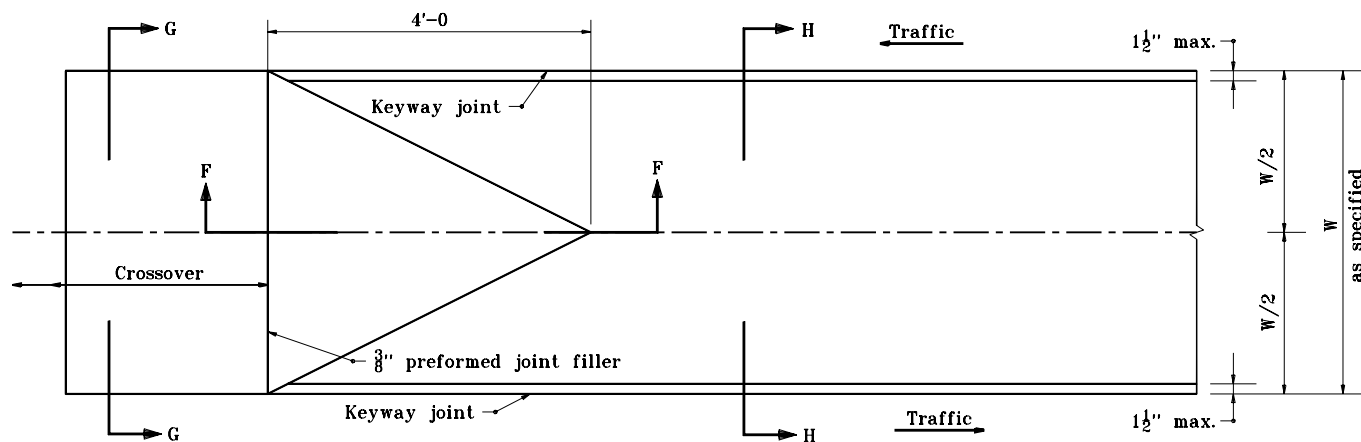
SECTION B-B



SECTION A-A



INDIANA DEPARTMENT OF TRANSPORTATION	
HMA CENTER CURB TYPE B	
JANUARY 2000	
STANDARD DRAWING NO. E 605-CNCB-02	
	/s/ Anthony L. Uremovich 1-03-00 DESIGN STANDARDS ENGINEER DATE
	/s/ Firooz Zandi 1-03-00 CHIEF HIGHWAY ENGINEER DATE



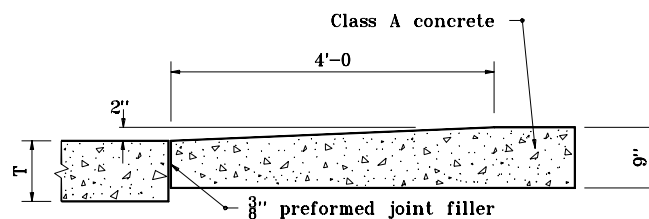
GENERAL NOTES

- ① For W greater than 4'-0 vary slope to hold 2" maximum height.

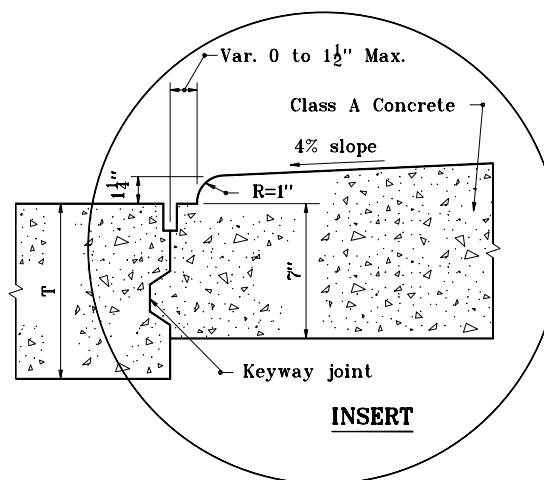
LEGEND

T = Normal pavement depth

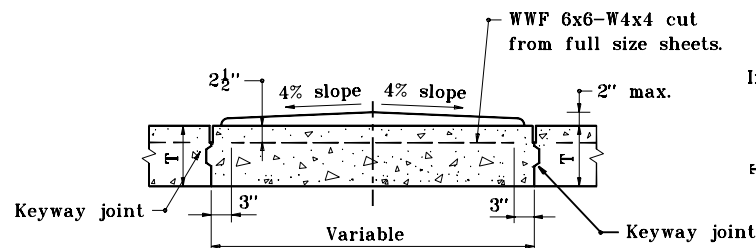
W = Center curb width



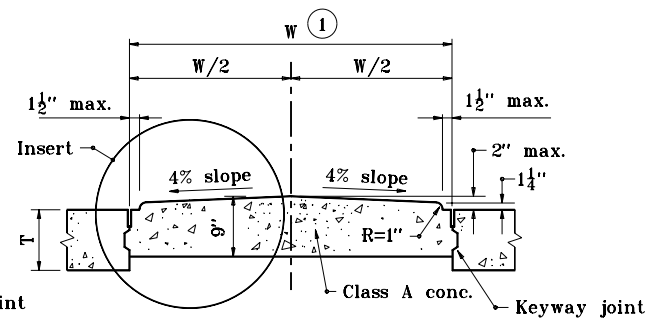
SECTION F-F



INSERT



SECTION G-G



SECTION H-H

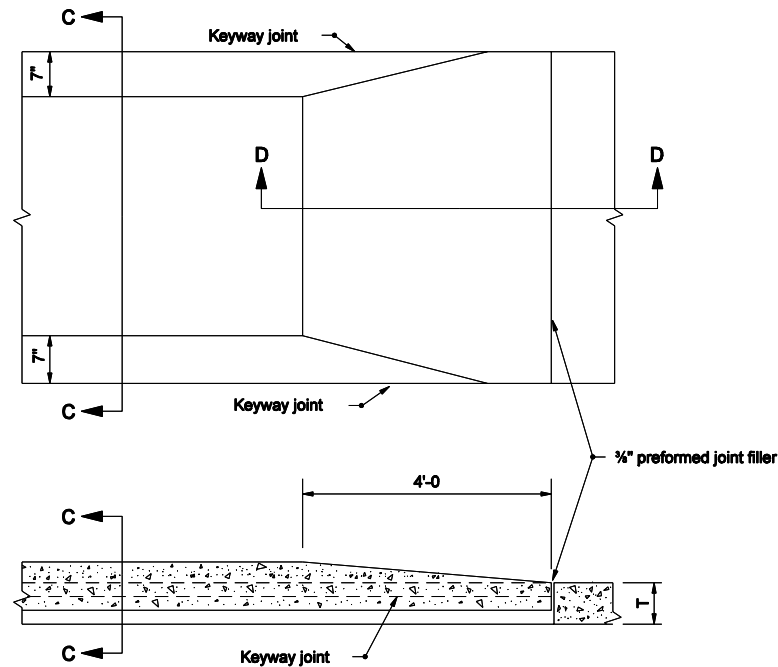
INDIANA DEPARTMENT OF TRANSPORTATION	
CONCRETE CENTER CURB	
TYPE A	
JANUARY 2001	
STANDARD DRAWING NO. E 605-CNCC-01	
	/s/ Anthony L. Uremovich 1-02-01 DESIGN STANDARDS ENGINEER DATE
	/s/ Firooz Zandi 1-02-01 CHIEF HIGHWAY ENGINEER DATE

NOTES :

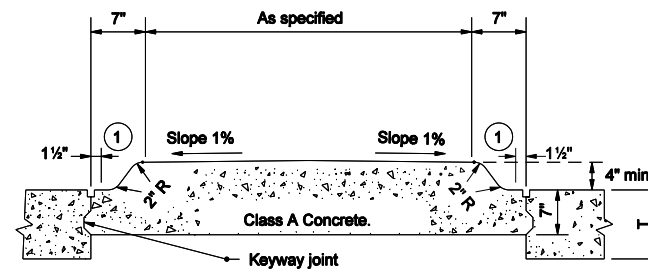
- 1 Curb radii and batter to conform to Type B curb, as shown on Standard Drawing E 605-CCSJ-01.

LEGEND

T = Normal pavement depth

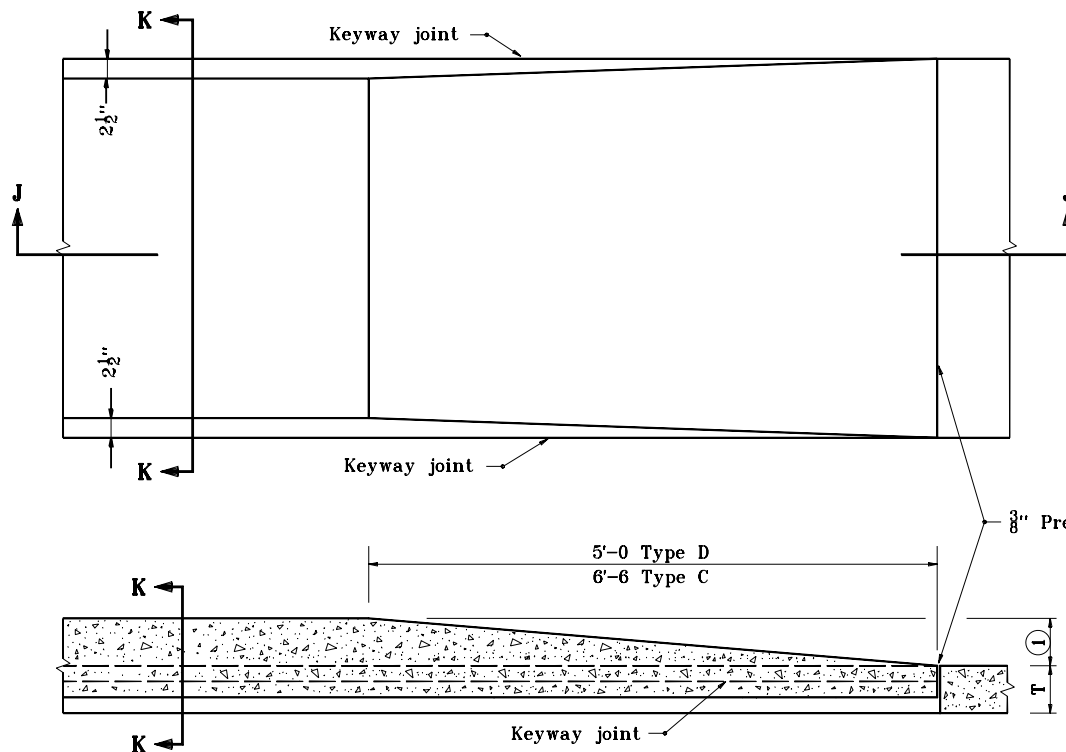


SECTION D-D



SECTION C-C

INDIANA DEPARTMENT OF TRANSPORTATION	
CONCRETE CENTER CURB TYPE B	
MARCH 2004	
STANDARD DRAWING NO. E 605-CNCC-02	
	/s/ Richard L. VanCleave 3/01/04 DESIGN STANDARDS ENGINEER DATE
	/s/ Richard K. Smutzer 3/01/04 CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER	



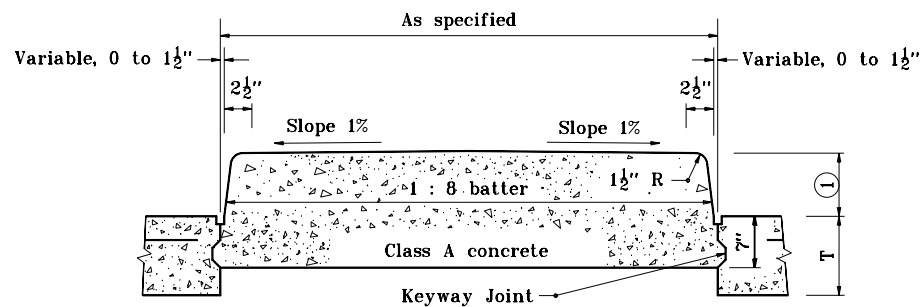
NOTES :

- ① 6" for concrete center curb, type D and 8" for concrete center curb, type C.

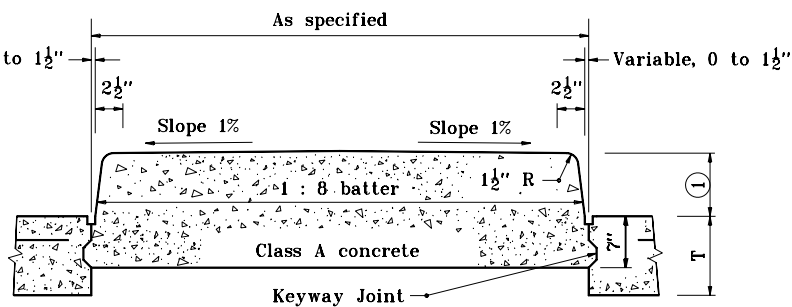
LEGEND

T = Normal pavement depth

SECTION J-J



SECTION K-K

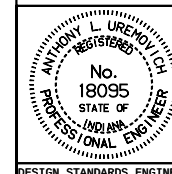


INDIANA DEPARTMENT OF TRANSPORTATION

CONCRETE CENTER CURBS
TYPE C & D

APRIL 1995

STANDARD DRAWING NO. E 605-CNCC-03



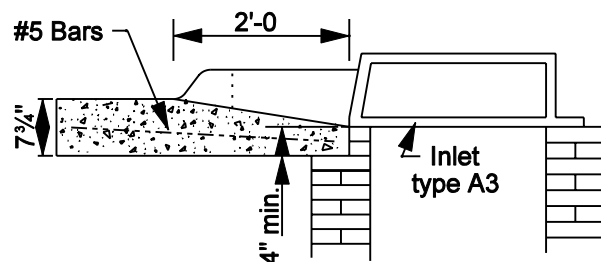
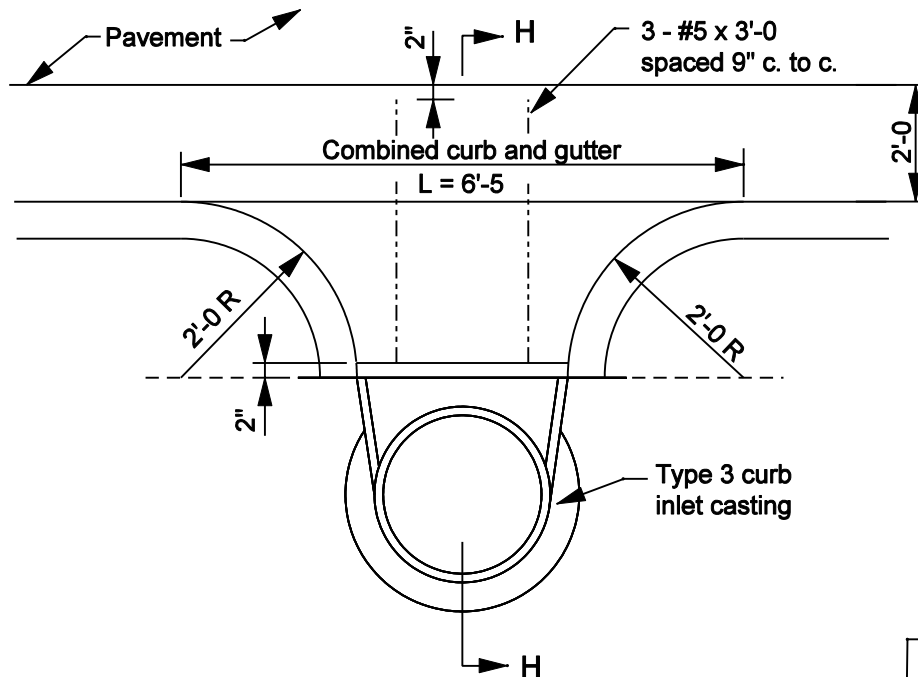
DETAILS PLACED IN THIS FORMAT 11-15-99

/s/ Anthony L. Uremovich 11-15-99
DESIGN STANDARDS ENGINEER DATE

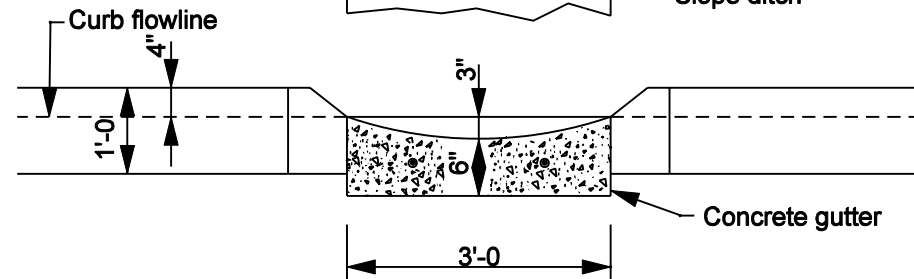
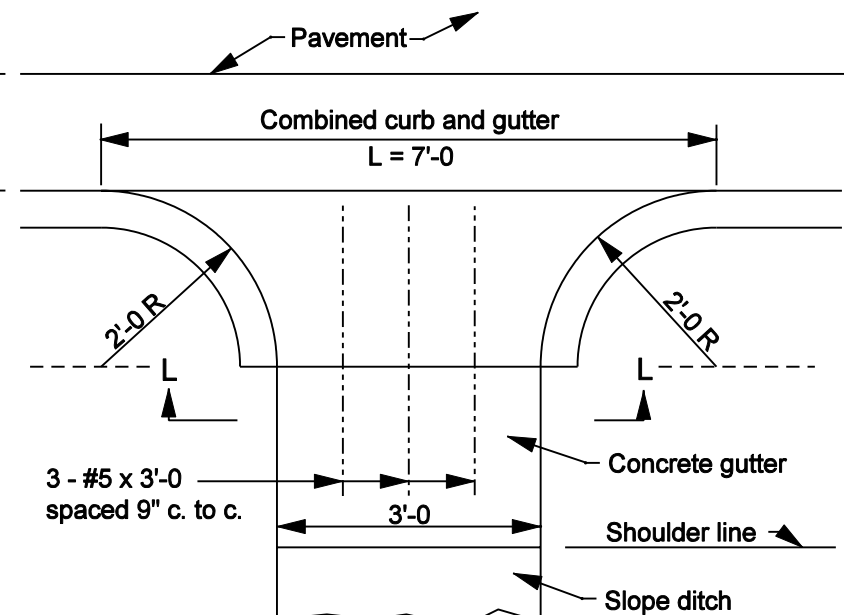
/s/ Firooz Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

ORIGINALLY APPROVED 4-03-95

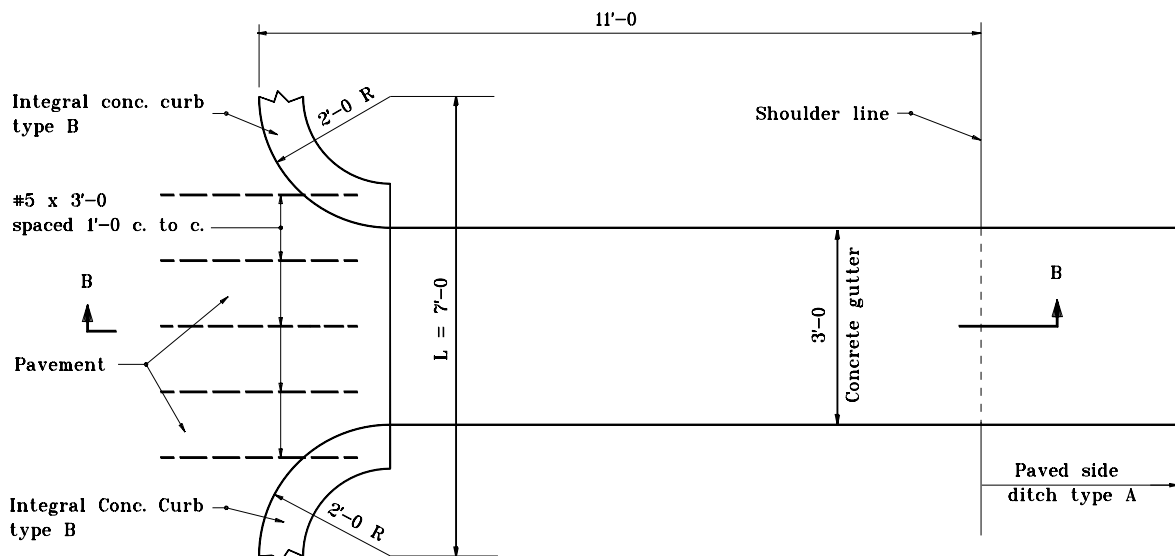


SECTION H-H



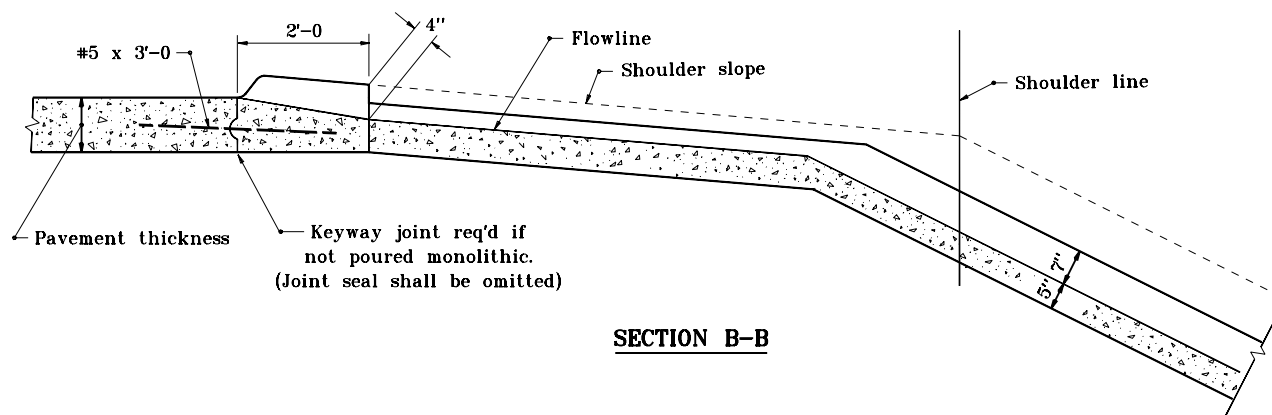
SECTION L-L

INDIANA DEPARTMENT OF TRANSPORTATION			
COMBINED CURB AND GUTTER TURNOUTS			
MARCH 2003			
STANDARD DRAWING NO. E 605-CTCG-01			
	/s/ Richard L. VanCleave	3-03-03	DATE
	DESIGN STANDARDS ENGINEER		
	/s/ Richard K. Smutzer	3-03-03	DATE
	CHIEF HIGHWAY ENGINEER		

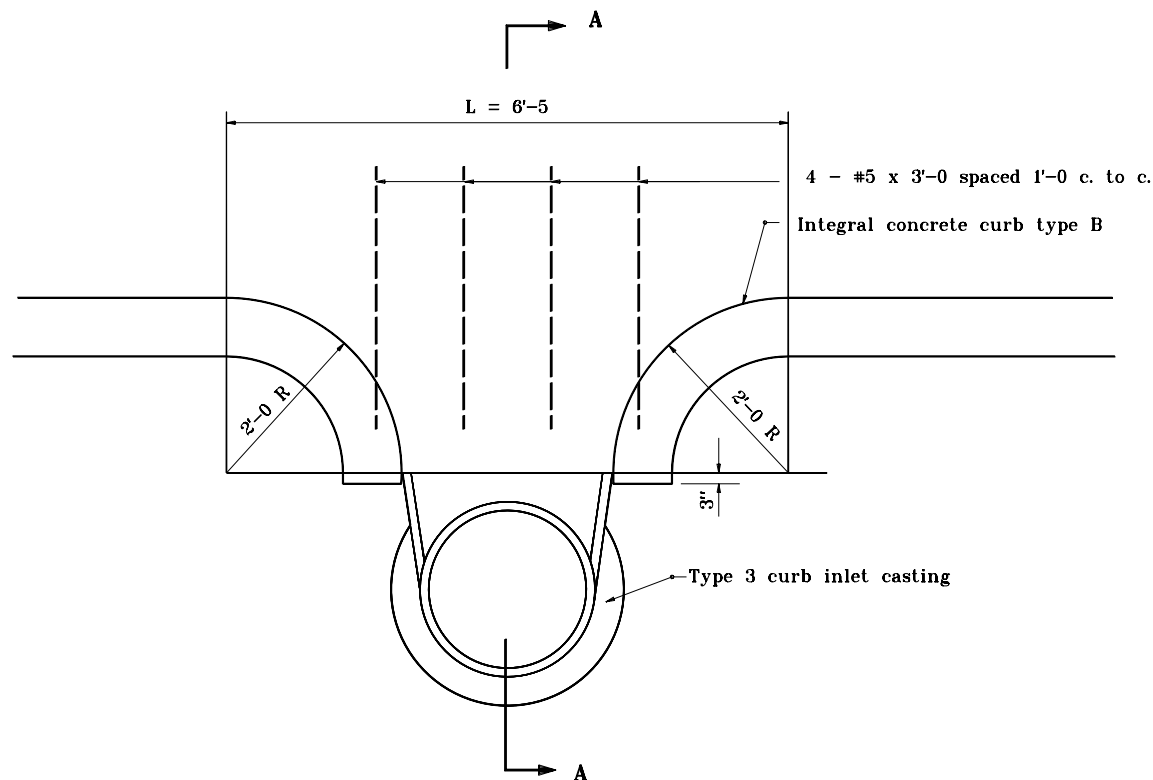


NOTES :

1. See Standard Drawing E 607-PSDT-01 for paved side ditch details.
2. See Standard Drawing E 501-CCPJ-08 for keyway joint details.

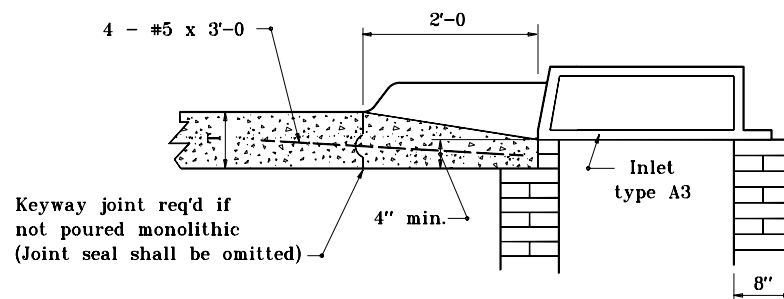


INDIANA DEPARTMENT OF TRANSPORTATION	
CURB TURNOUT TO CONCRETE GUTTER & PAVED SIDE DITCH	
SEPTEMBER 1997	
STANDARD DRAWING NO. E 605-CTCG-02	
	DETAILS PLACED IN THIS FORMAT 11-15-99 /s/ Anthony L. Uremovich 11-15-99 DESIGN STANDARDS ENGINEER DATE
DESIGN STANDARDS ENGINEER	/s/ Firooz Zandi 11-15-99 CHIEF HIGHWAY ENGINEER DATE ORIGINALLY APPROVED 9-01-97



NOTES :

1. See Standard Drawing E 501-CCPJ-08 for keyway joint details.



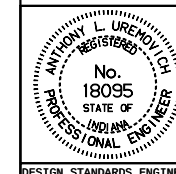
SECTION A-A

INDIANA DEPARTMENT OF TRANSPORTATION

CURB TURNOUT TO A3 INLET

SEPTEMBER 1997

STANDARD DRAWING NO. **E 605-CTIN-01**



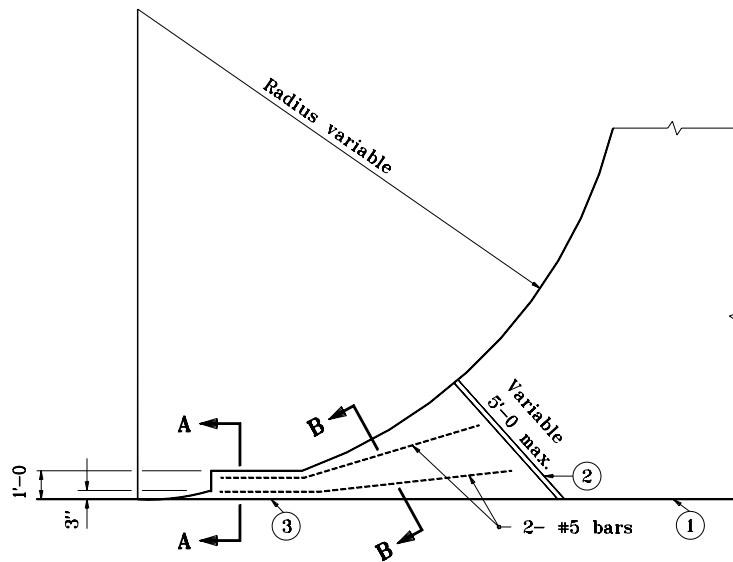
DETAILS PLACED IN THIS FORMAT 11-15-99

/s/ Anthony L. Uremovich 11-15-99
DESIGN STANDARDS ENGINEER DATE

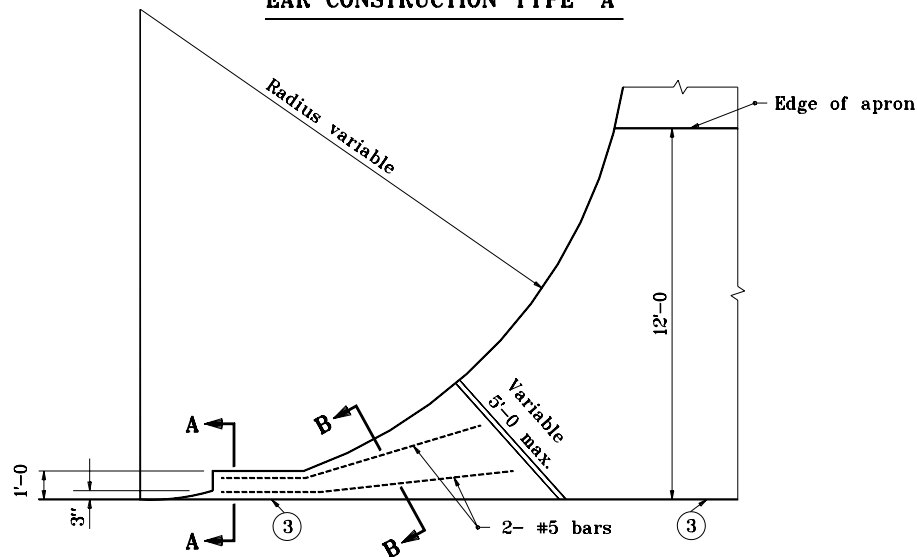
/s/ Firooz Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

ORIGINALLY APPROVED 9-01-97

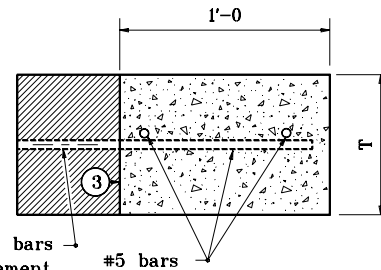


EAR CONSTRUCTION TYPE "A"

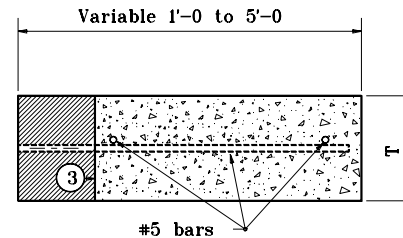


**EAR CONSTRUCTION TYPE "A"
FOR PAVED APRON**

Omit dowel bars
where pavement
is in place.



SECTION A-A



SECTION B-B

LEGEND

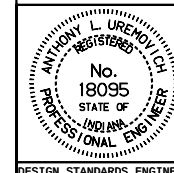
- ① Keyway joint
- ② 1" preformed joint filler
- ③ Longitudinal construction joint
- T = Thickness of pavement

INDIANA DEPARTMENT OF TRANSPORTATION

**EAR CONSTRUCTION
TYPE A**

SEPTEMBER 1997

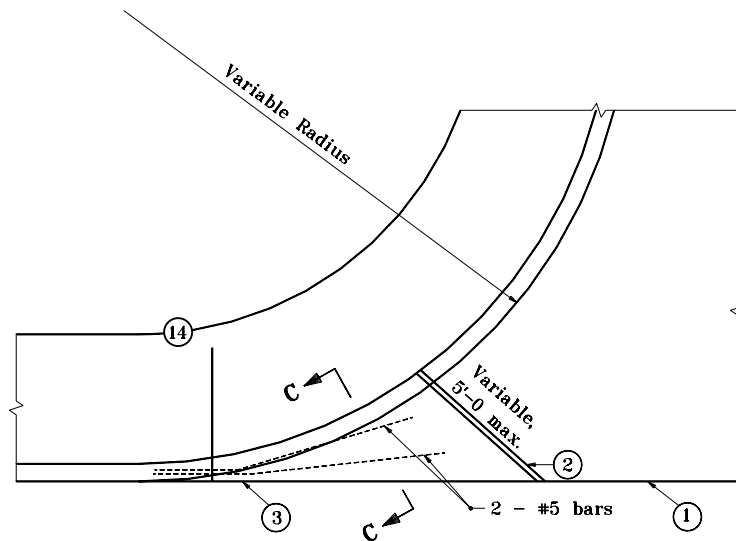
STANDARD DRAWING NO. **E 605-ERCN-01**



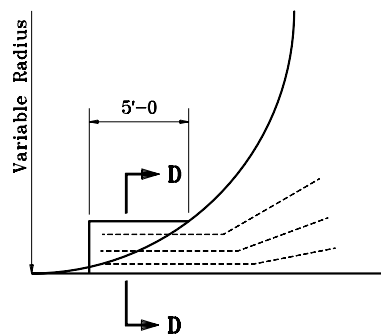
DETAILS PLACED IN THIS FORMAT 11-15-99

/s/ Anthony L. Uremovich 11-15-99
DESIGN STANDARDS ENGINEER DATE

/s/ Firooz Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE
ORIGINALLY APPROVED 9-01-97



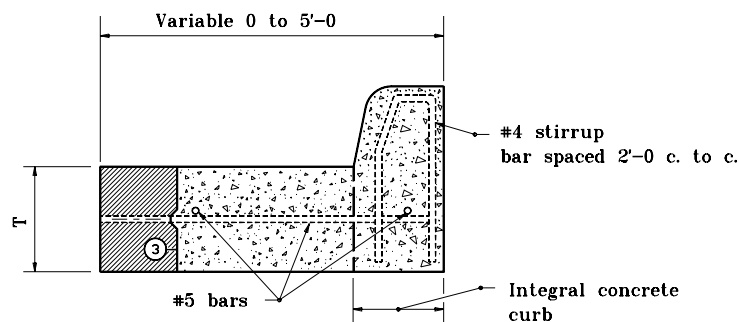
EAR CONSTRUCTION TYPE "B"



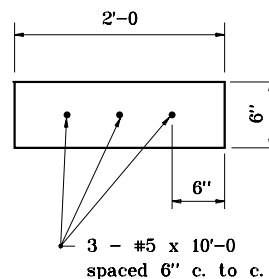
EAR CONSTRUCTION TYPE "C"

LEGEND

- ① Keyway joint
- ② 1' preformed joint filler
- ⑭ Integral concrete curb
- ③ Longitudinal construction joint
- T = Thickness of pavement



SECTION C-C



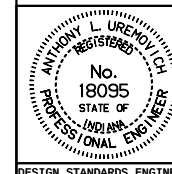
SECTION D-D

INDIANA DEPARTMENT OF TRANSPORTATION

**EAR CONSTRUCTION
TYPE B AND C**

JANUARY 1998

STANDARD DRAWING NO. **E 605-ERCN-02**



DETAILS PLACED IN THIS FORMAT 11-15-99

/s/ Anthony L. Uremovich 11-15-99
DESIGN STANDARDS ENGINEER DATE

/s/ Firooz Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE

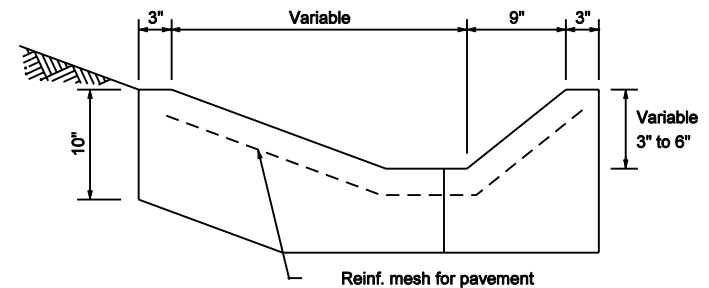
DESIGN STANDARDS ENGINEER

ORIGINALLY APPROVED 1-02-98

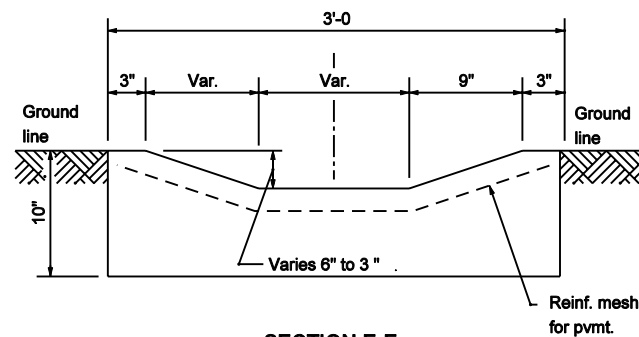


Diagram illustrating the repair of a concrete wall using a post-tensioning bar. The diagram shows a cross-section of the wall with the following dimensions and components:

- 2" (distance from bar to wall face)
- 6" (bar diameter)
- 2" (distance from bar to wall face)
- Inlet interior
- Inlet
- Wall
- Cut " thread (10" length)
- 1/2" nut and flat washer
- #4 bar in 1/2" hole

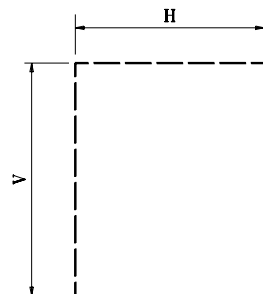


SECTION C-C

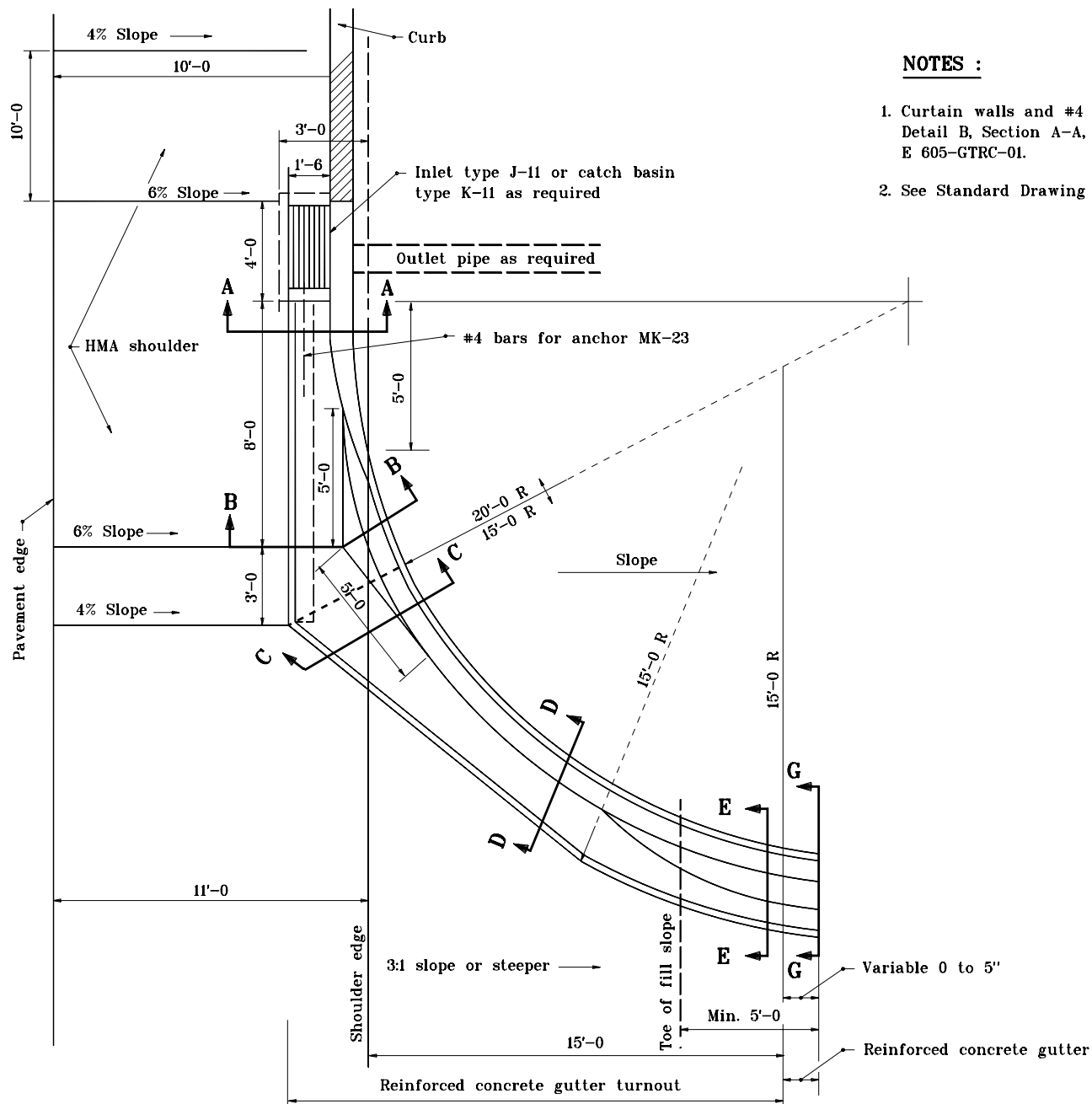


SECTION E-E

INDIANA DEPARTMENT OF TRANSPORTATION	
REINFORCED CONCRETE GUTTER TURNOUT MARCH 2003 STANDARD DRAWING NO. E 605-GTRC-01	
	<i>/s/ Richard L. VanCleave</i> 3-03-03 DESIGN STANDARDS ENGINEER DATE <i>/s/ Richard K. Smutzer</i> 3-03-03 CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER	



ORIGINALLY APPROVED 9-01-97



NOTES :

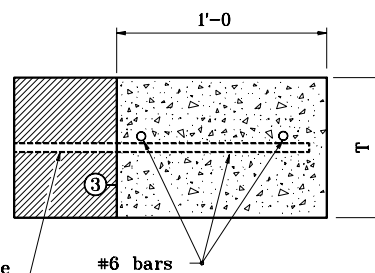
1. Curtain walls and #4 bars for anchor MK-23 shown in Detail A, Detail B, Section A-A, and Section B-B on Standard Drawing E 605-GTRC-01.
2. See Standard Drawing E 605-GTRC-02 for sections F-F and G-G.

INDIANA DEPARTMENT OF TRANSPORTATION	
REINFORCED CONCRETE GUTTER TURNOUT	
JANUARY 1999	
STANDARD DRAWING NO. E 605-GTRC-03	
ANTHONY L. UREMOWICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER	DETAILS PLACED IN THIS FORMAT 11-15-99 /s/ Anthony L. Uremovich 11-15-99 DESIGN STANDARDS ENGINEER DATE /s/ Firooz Zandi 11-15-99 CHIEF HIGHWAY ENGINEER DATE DESIGN STANDARDS ENGINEER ORIGINALLY APPROVED 1-04-99

① Longitudinal joint
③ Longitudinal construction joint
T = Nominal pavement thickness

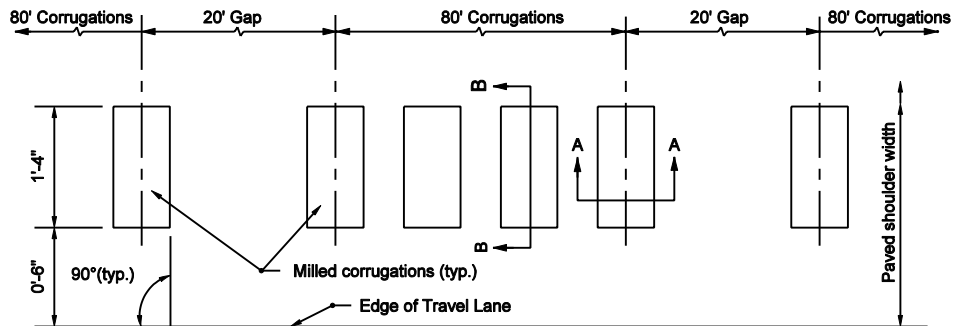
The diagram illustrates the transition from a two-lane road with an earth shoulder to a two-lane road with a curb. The top section shows the 'Earth Shoulder Section' with a total width of 100'-0" between vertical lines. The left shoulder is 65'-0" wide, and the right shoulder is 65'-0" wide. A variable width 'W' is indicated for the right shoulder. A 4'-0" slope is shown for the right shoulder. The bottom section shows the 'Curb Section' with a total width of 65'-0" between vertical lines. A 4'-0" slope is shown for the right shoulder. The diagram is labeled 'TRANSITION FROM TWO LANES (Earth Shoulder Section) TO TWO LANES (Curb Section)'.

TRANSITION FROM TWO LANES (Earth Shoulder Section)
TO TWO LANES (Curb Section)

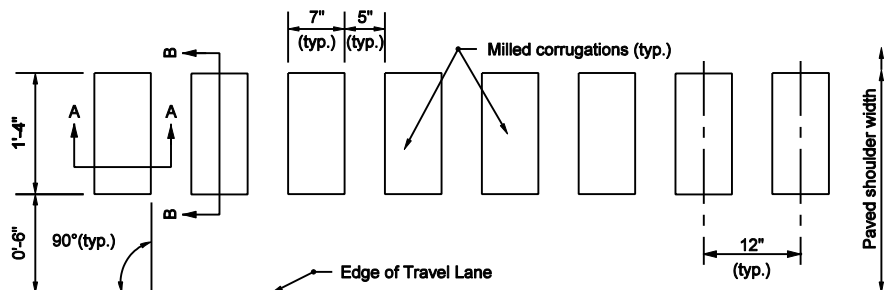


Omit dowel bars where
pavement is in place.

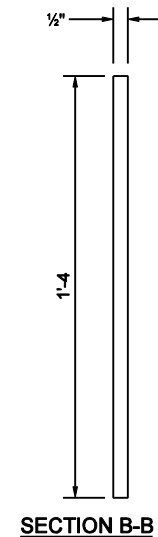
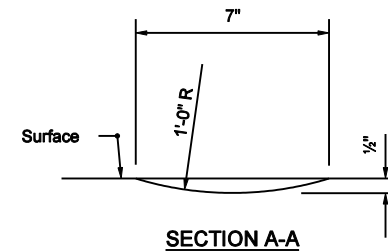
INDIANA DEPARTMENT OF TRANSPORTATION	
TRANSITION OF EARTH SHOULDER TO CURB SECTION SEPTEMBER 1997	
STANDARD DRAWING NO. E 605-TSCS-01	
	DETAILS PLACED IN THIS FORMAT 11-15-99 <u>/s/ Anthony L. Uremovich</u> <u>11-15-99</u> DESIGN STANDARDS ENGINEER DATE
DESIGN STANDARDS ENGINEER	<u>/s/ Firooz Zandi</u> <u>11-15-99</u> CHIEF HIGHWAY ENGINEER DATE ORIGINALLY APPROVED 9-01-97



INTERMITTENT INSTALLATION
PLAN VIEW



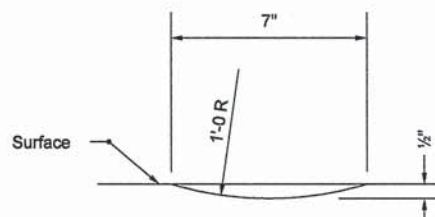
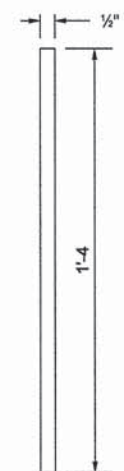
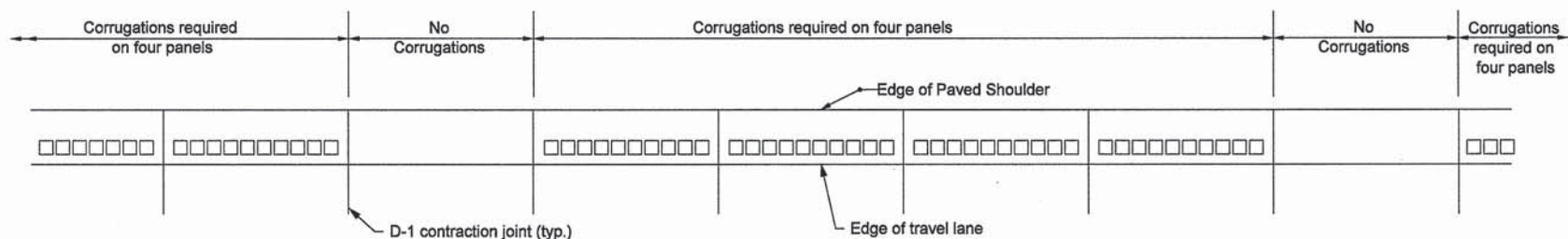
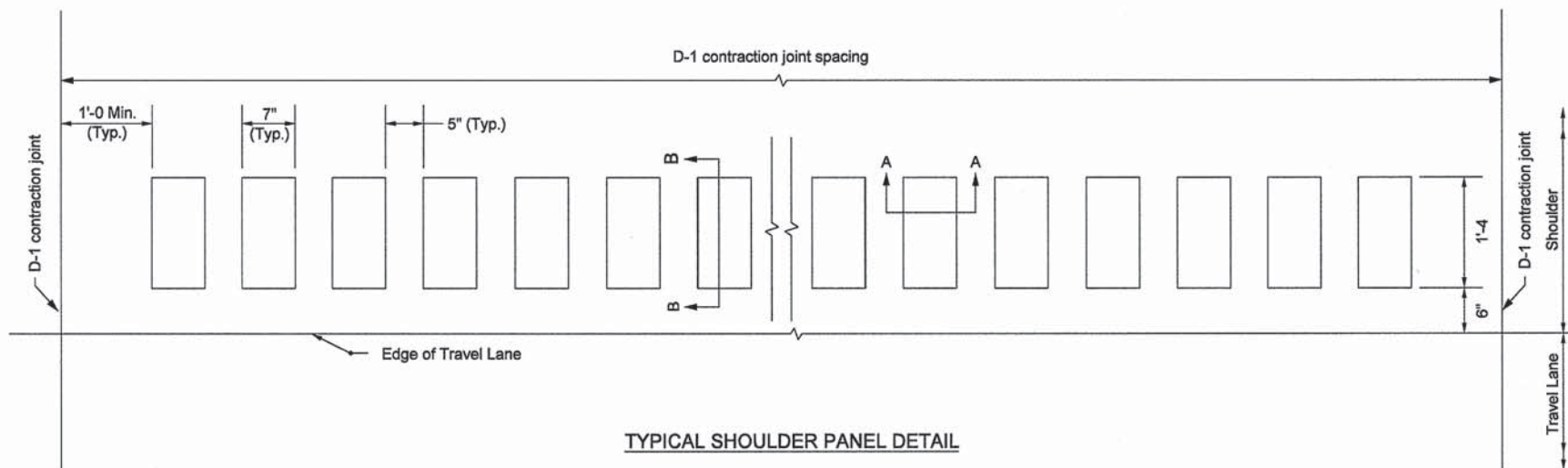
CONTINUOUS INSTALLATION
PLAN VIEW



NOTES

1. Continuous corrugation installation shall be used on Interstates and intermittent installation shall be used on all other facilities.
2. Refer to E 606-SHCG-02 for corrugation instructions for HMA shoulders adjacent to a widened PCCP outside lane.

INDIANA DEPARTMENT OF TRANSPORTATION	
MILLED HMA SHOULDER CORRUGATIONS	
MARCH 2003	
STANDARD DRAWING NO. E 606-SHCG-01	
	/s/ Richard L. VanCleave 3-03-03 DESIGN STANDARDS ENGINEER DATE
	/s/ Richard K. Smutzer 3-03-03 CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER	



NOTES

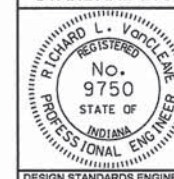
1. Continuous corrugations shall be required on every PCC shoulder panel on Interstates. Intermittent corrugations shall be required for all other facilities.
2. On facilities with a widened outside PCCP lane, the corrugations shall be installed on the portion of the PCCP located outside the edge of travel lane and in accordance with this sheet.

INDIANA DEPARTMENT OF TRANSPORTATION

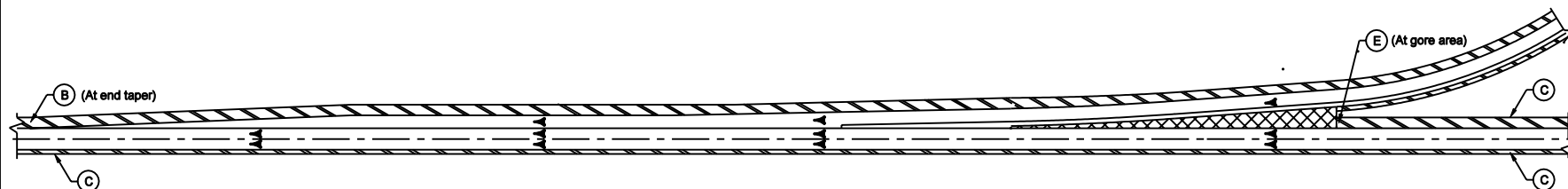
MILLED PCCP SHOULDER CORRUGATIONS

MARCH 2003

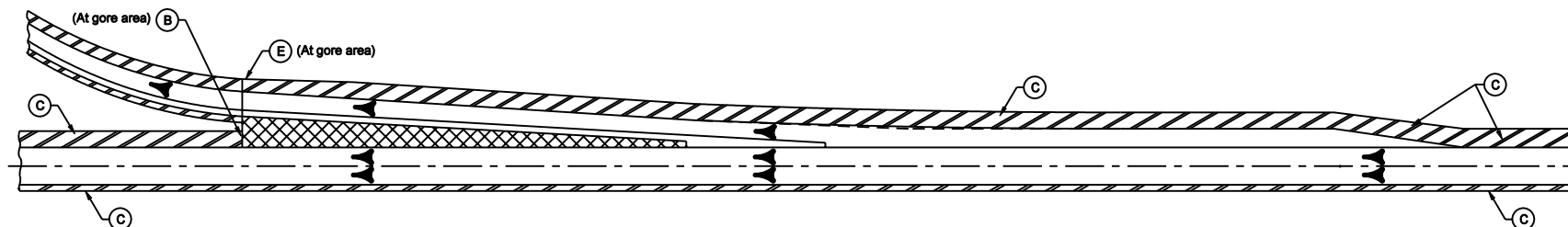
STANDARD DRAWING NO. E 606-SHCG-02



Richard L. Vancleave 3-3-03
DESIGN STANDARDS ENGINEER DATE
Richard L. Vancleave 3-3-03
CHIEF HIGHWAY ENGINEER DATE



ENTRANCE RAMP



EXIT RAMP

LEGEND

- (B) Begin Shoulder Corrugations
- (C) Shoulder Corrugations
- (E) End Shoulder Corrugations

 Gore Area

 Shoulder

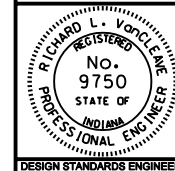
 Direction of Traffic

INDIANA DEPARTMENT OF TRANSPORTATION

SHOULDER CORRUGATION LIMITS

MARCH 2003

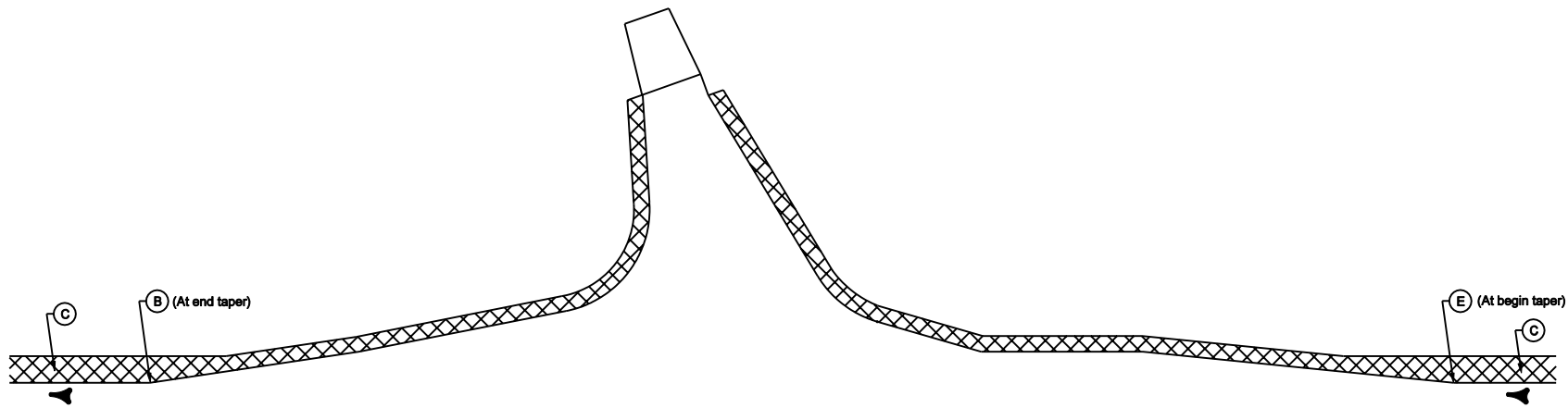
STANDARD DRAWING NO. E 606-SHCG-03



/s/ Richard L. VanCleave 3-03-03
DESIGN STANDARDS ENGINEER DATE

/s/ Richard K. Smutzer 3-03-03
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER



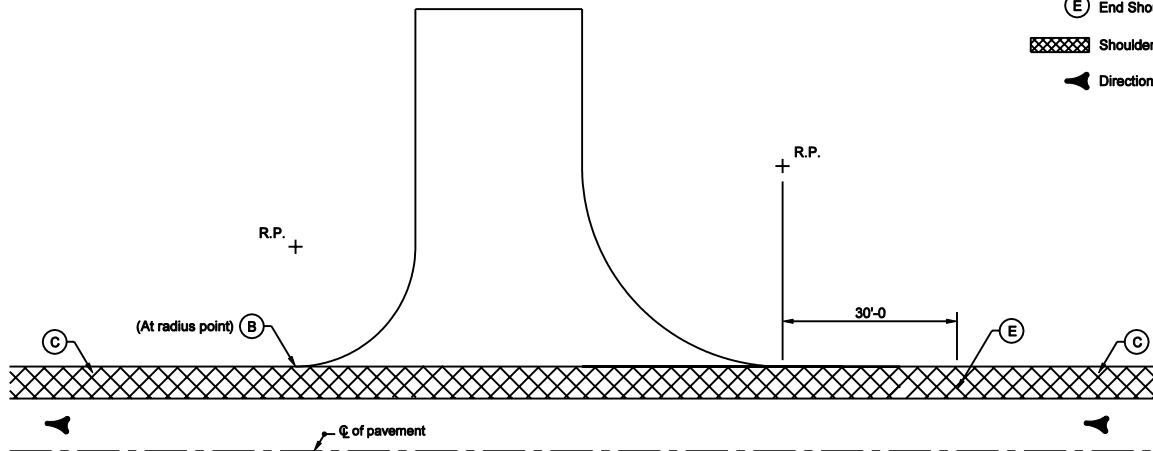
APPROACH WITH TURN LANE

LEGEND

- (B) Begin Shoulder Corrugations
- (C) Shoulder Corrugations
- (E) End Shoulder Corrugations

 Shoulder

 Direction of Traffic



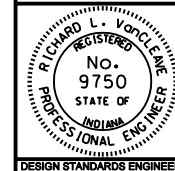
APPROACH WITHOUT TURN LANE

INDIANA DEPARTMENT OF TRANSPORTATION

SHOULDER CORRUGATION LIMITS

MARCH 2003

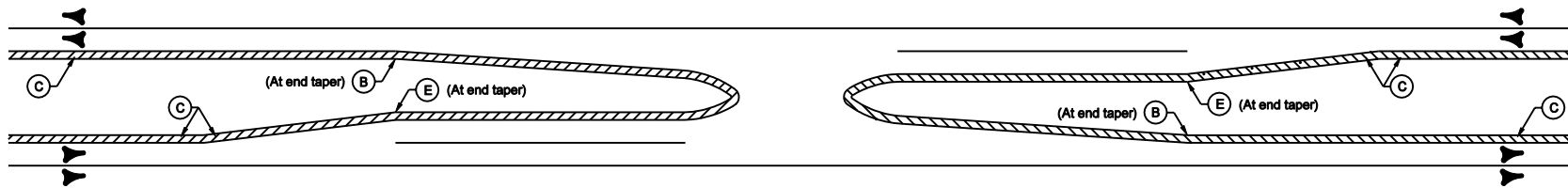
STANDARD DRAWING NO. E 606-SHCG-04



/s/ Richard L. VanCleave 3-03-03
DESIGN STANDARDS ENGINEER DATE

/s/ Richard K. Smutzer 3-03-03
CHIEF HIGHWAY ENGINEER DATE

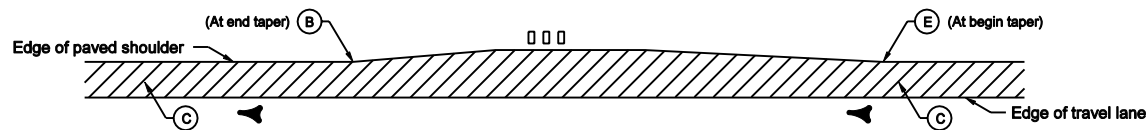
DESIGN STANDARDS ENGINEER



MEDIAN CROSSOVER / LEFT TURN LANE

LEGEND

- (B) Begin Shoulder Corrugations
- (C) Shoulder Corrugations
- (E) End Shoulder Corrugations
-  Shoulder
-  Direction of Traffic



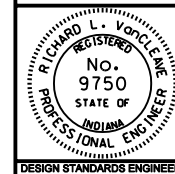
TYPICAL MAILBOX APPROACH

INDIANA DEPARTMENT OF TRANSPORTATION

SHOULDER CORRUGATION LIMITS

MARCH 2003

STANDARD DRAWING NO. E 606-SHCG-05

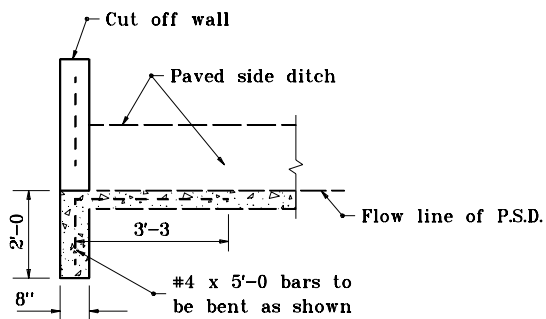


/s/ Richard L. VanCleave 3-03-03
DESIGN STANDARDS ENGINEER DATE

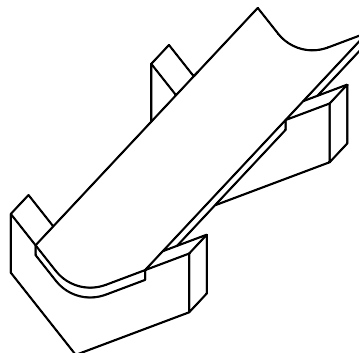
/s/ Richard K. Smutzer 3-03-03
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

INDIANA DEPARTMENT OF TRANSPORTATION	
PAVED SIDE DITCH ELEVATIONS SEPTEMBER 2000	
STANDARD DRAWING NO. E 607-PSDT-01	
	<u>s/ Anthony L. Uremovich</u> <u>9-01-00</u> DESIGN STANDARDS ENGINEER DATE
	<u>s/ Firooz Zandi</u> <u>9-01-00</u> CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER	

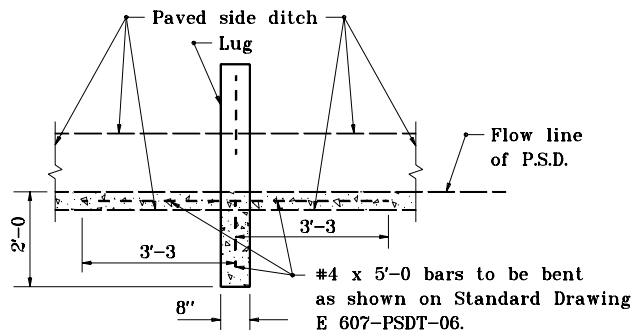


SECTION A-A

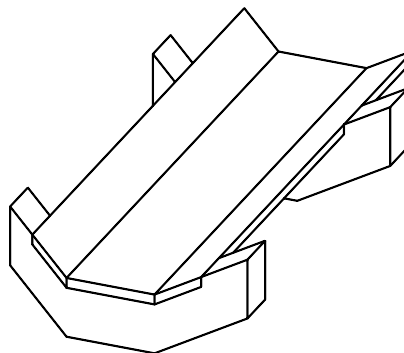


ISOMETRIC VIEW

PAVED SIDE DITCH TYPE A THROUGH D

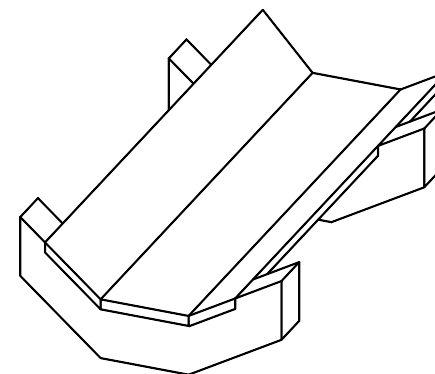


SECTION B-B



ISOMETRIC VIEW

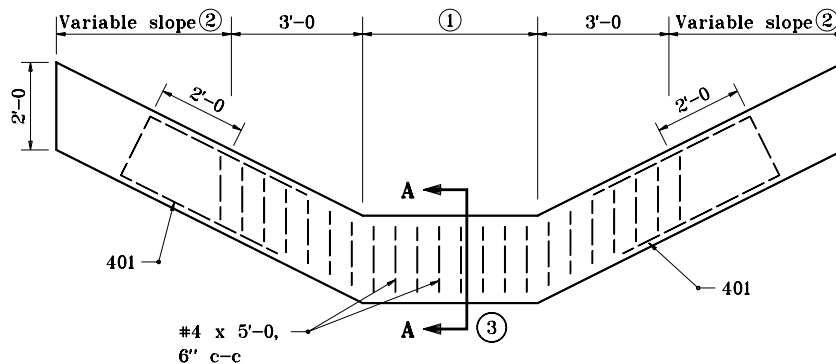
PAVED SIDE DITCH TYPE E THROUGH H



ISOMETRIC VIEW

PAVED SIDE DITCH TYPES J THROUGH M

INDIANA DEPARTMENT OF TRANSPORTATION	
PAVED SIDE DITCH SECTIONS AND ISOMETRICS	
SEPTEMBER 1997	
STANDARD DRAWING NO. E 607-PSDT-02	
	DETAILS PLACED IN THIS FORMAT 11-15-99
	/s/ Anthony L. Uremovich 11-15-99 DESIGN STANDARDS ENGINEER DATE
	/s/ Firooz Zandi 11-15-99 CHIEF HIGHWAY ENGINEER DATE
	DESIGN STANDARDS ENGINEER ORIGINALLY APPROVED 9-01-97

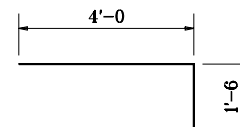


ELEVATION VIEW

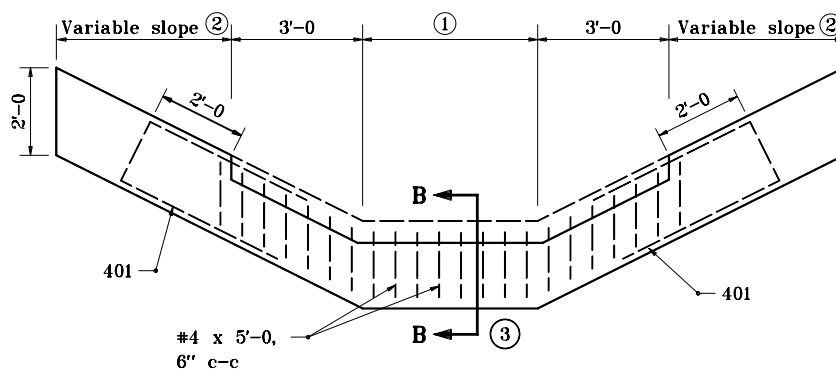
CUT-OFF WALL FOR PAVED SIDE DITCH TYPES E THROUGH H

GENERAL NOTES

- ① 1'-0 For Type E
2'-0 For Type F
3'-0 For Type G
4'-0 For Type H
- ② 3'-0 For Type E & F
4'-0 For Type G & H
- ③ See Standard Drawing E 607-PSDT-02 for Sections A-A and B-B.



401 x 9'-6



ELEVATION VIEW

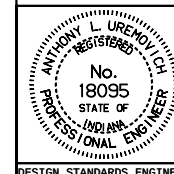
LUG FOR PAVED SIDE DITCH TYPES E THROUGH H

INDIANA DEPARTMENT OF TRANSPORTATION

**PAVED SIDE DITCH
CUT-OFF WALL AND LUG**

SEPTEMBER 1997

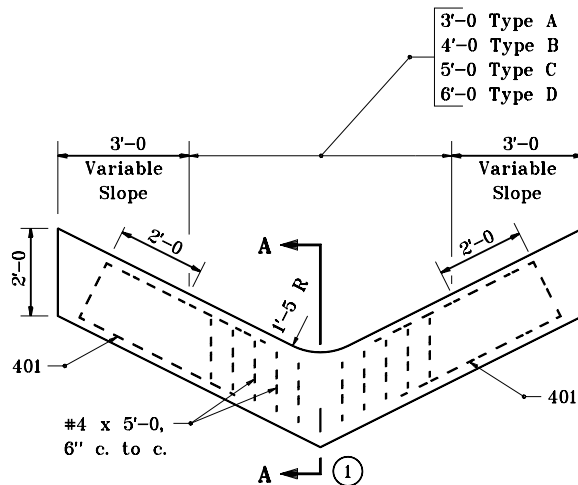
STANDARD DRAWING NO. E 607-PSDT-03



DETAILS PLACED IN THIS FORMAT 11-15-99

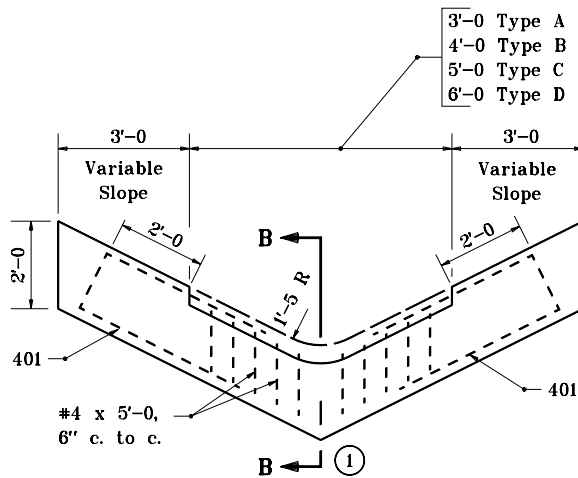
/s/ Anthony L. Uremovich 11-15-99
DESIGN STANDARDS ENGINEER DATE

/s/ Firooz Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE
ORIGINALLY APPROVED 9-01-97



ELEVATION VIEW

CUT-OFF WALL FOR PAVED SIDE DITCH TYPES A THROUGH D



ELEVATION VIEW

LUG FOR PAVED SIDE DITCH TYPES A THROUGH D

GENERAL NOTES

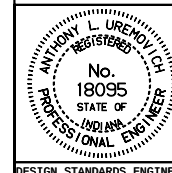
- ① See Standard Drawing E 607-PSDT-02 for Sections A-A and B-B.
2. See Standard Drawing E 607-PSDT-03 for 401 bending diagram.

INDIANA DEPARTMENT OF TRANSPORTATION

**PAVED SIDE DITCH
CUT-OFF WALL AND LUG**

SEPTEMBER 1997

STANDARD DRAWING NO. **E 607-PSDT-04**



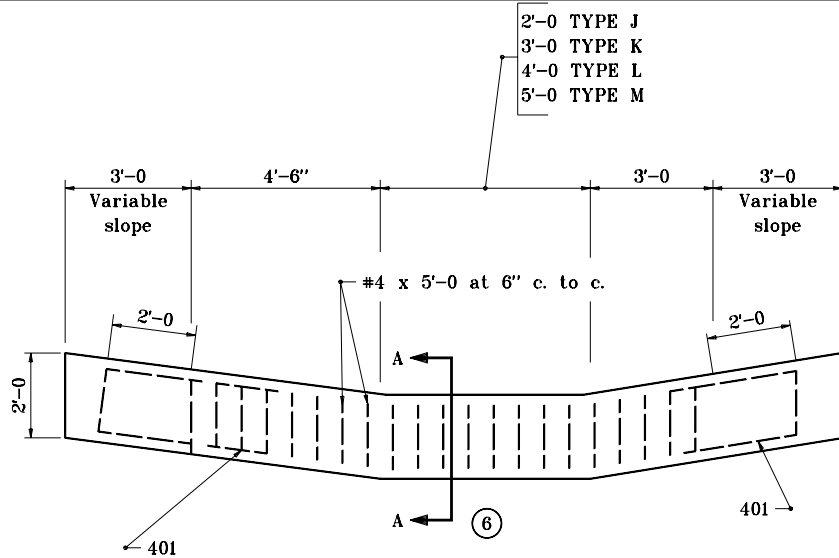
DETAILS PLACED IN THIS FORMAT 11-15-99

/s/ Anthony L. Uremovich 11-15-99
DESIGN STANDARDS ENGINEER DATE

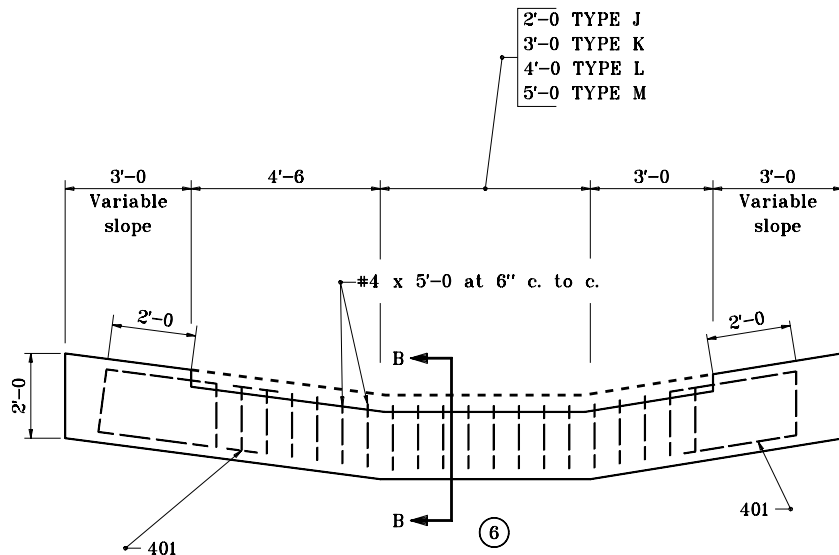
/s/ Firooz Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

ORIGINALLY APPROVED 9-01-97



ELEVATION VIEW
CUT-OFF WALL FOR PAVED SIDE DITCH TYPES J THROUGH M



ELEVATION VIEW
LUG FOR PAVED SIDE DITCH TYPES J THROUGH M

GENERAL NOTES

- The 6:1 sloped side shall be placed nearest the roadway.
- Cutt-off walls shall be used at the begining and end of all paved side ditch.
- Lugs shall be used at the following locations:
 - 10 ft downslope from a grade change.
 - 10 ft downslope from the intersection of different types of paved side ditch.
 - At the downslope end of a transition between different types of paved side ditch.
 - At the intervals as follows:

Interval	Grade
200 ft	3% to 5%
150 ft	5% to 8%
100 ft	8% to 10%
50 ft	10% & above

- Paved side ditch transitions shall be required at intersections with earth ditches and pipe culverts. These transitions shall be converted to equivalent lengths of the type of paved side ditch specified at these locations.
- Transitions of 10 ft or less shall be required between two different types of paved side ditch. Such transitions shall be converted to equivalent lengths of the larger type of paved side ditch specified at these locations.

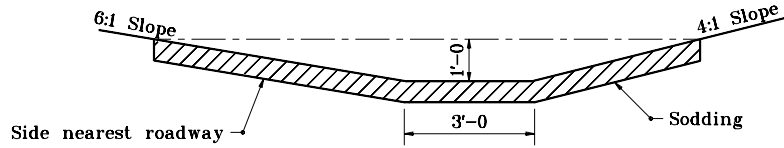
⑥ See Standard Drawing E 607-PSDT-04 for Sections A-A and B-B.

- See Standard Drawing E 607-PSDT-03 for 401 bending diagram.

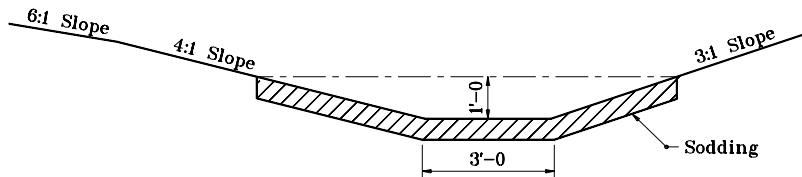
INDIANA DEPARTMENT OF TRANSPORTATION	
P.S.D. CUT-OFF WALL & LUG AND GENERAL NOTES	
JANUARY 2000	
STANDARD DRAWING NO. E 607-PSDT-05	
	/s/ Anthony L. Uremovich 1-03-00 DESIGN STANDARDS ENGINEER DATE
	/s/ Firooz Zandi 1-03-00 CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER	

GENERAL NOTES

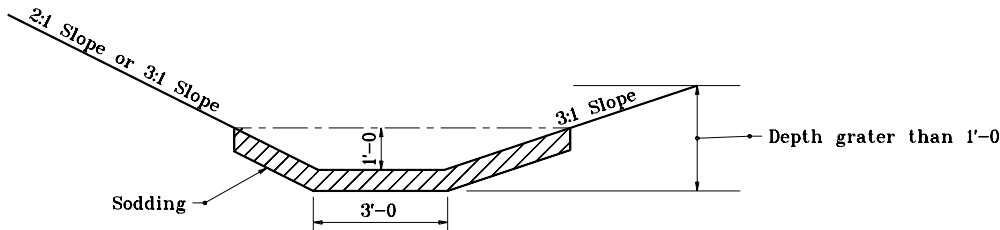
- See Standard Drawing E 607-PSDT-02 for Section B-B.



STANDARD 3' BOTTOM DITCH
(LOCATED WITHIN CLEAR ZONE)

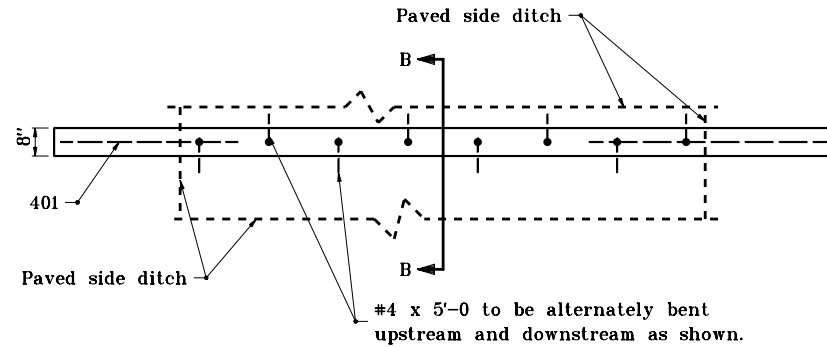


SPECIAL 3' BOTTOM DITCH
(LOCATED BEYOND CLEAR ZONE)



SPECIAL 3' BOTTOM DITCH
(LOCATED BEYOND CLEAR ZONE)

SODDED DITCH DETAILS

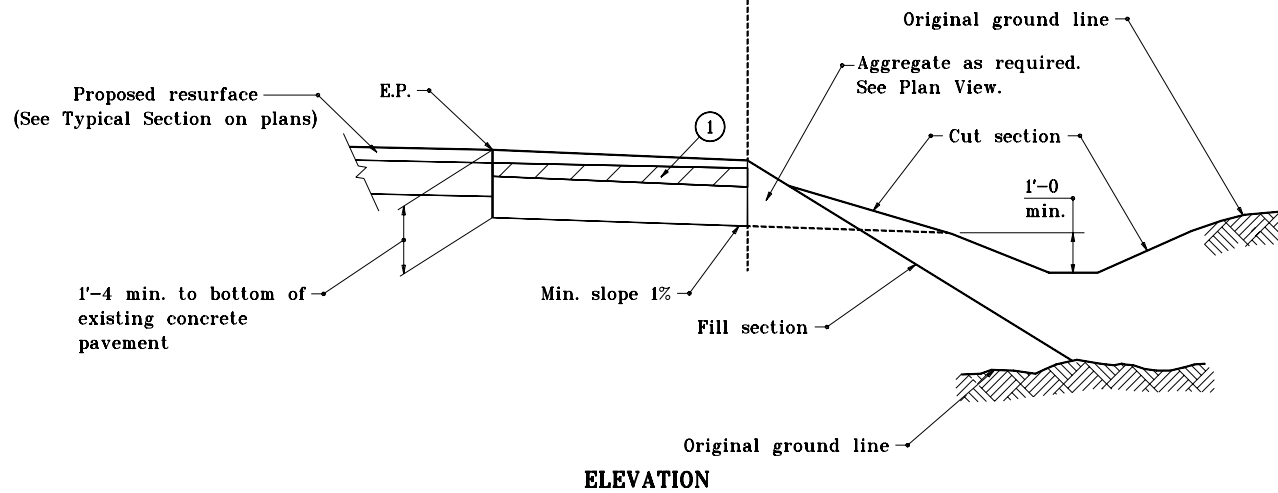
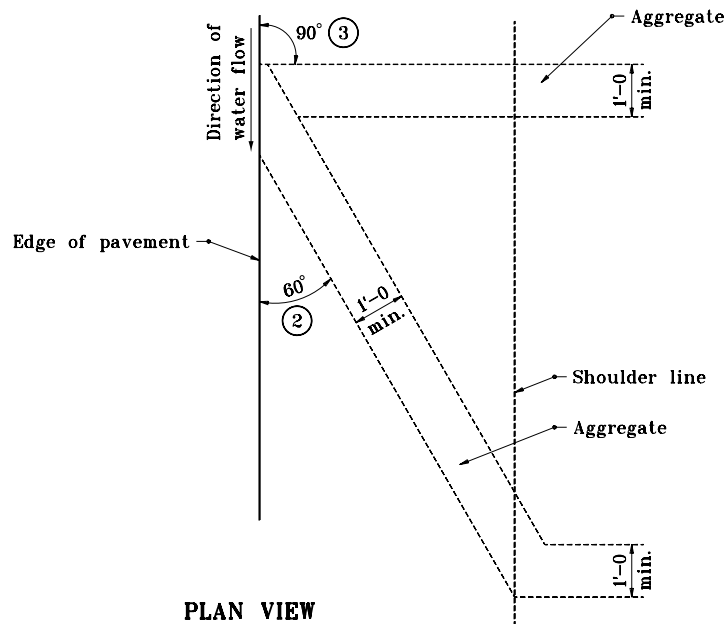


PLAN VIEW OF LUG (TYPICAL FOR ALL TYPES)

INDIANA DEPARTMENT OF TRANSPORTATION	
P.S.D. LUGS & SODDED DITCH DETAILS	
SEPTEMBER 1997	
STANDARD DRAWING NO. E 607-PSDT-06	
	DETAILS PLACED IN THIS FORMAT 7-27-99
	/s/ Anthony L. Uremovich 7-27-99 DESIGN STANDARDS ENGINEER DATE
	/s/ Firooz Zandi 7-27-99 CHIEF HIGHWAY ENGINEER DATE
	DESIGN STANDARDS ENGINEER ORIGINALLY APPROVED 9-01-97

GENERAL NOTES

- ① 660#/syd HMA mixture for patching required. Width of patch to be equal to width of asphalt shoulder in place.
- ② For pavement grades of 1% or steeper.
- ③ For pavement grades of flatter than 1%.



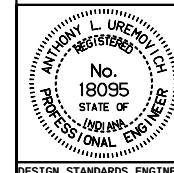
SHOULDER DRAIN

INDIANA DEPARTMENT OF TRANSPORTATION

SHOULDER DRAIN

MAY 1998

STANDARD DRAWING NO. E 608-SHDR-01



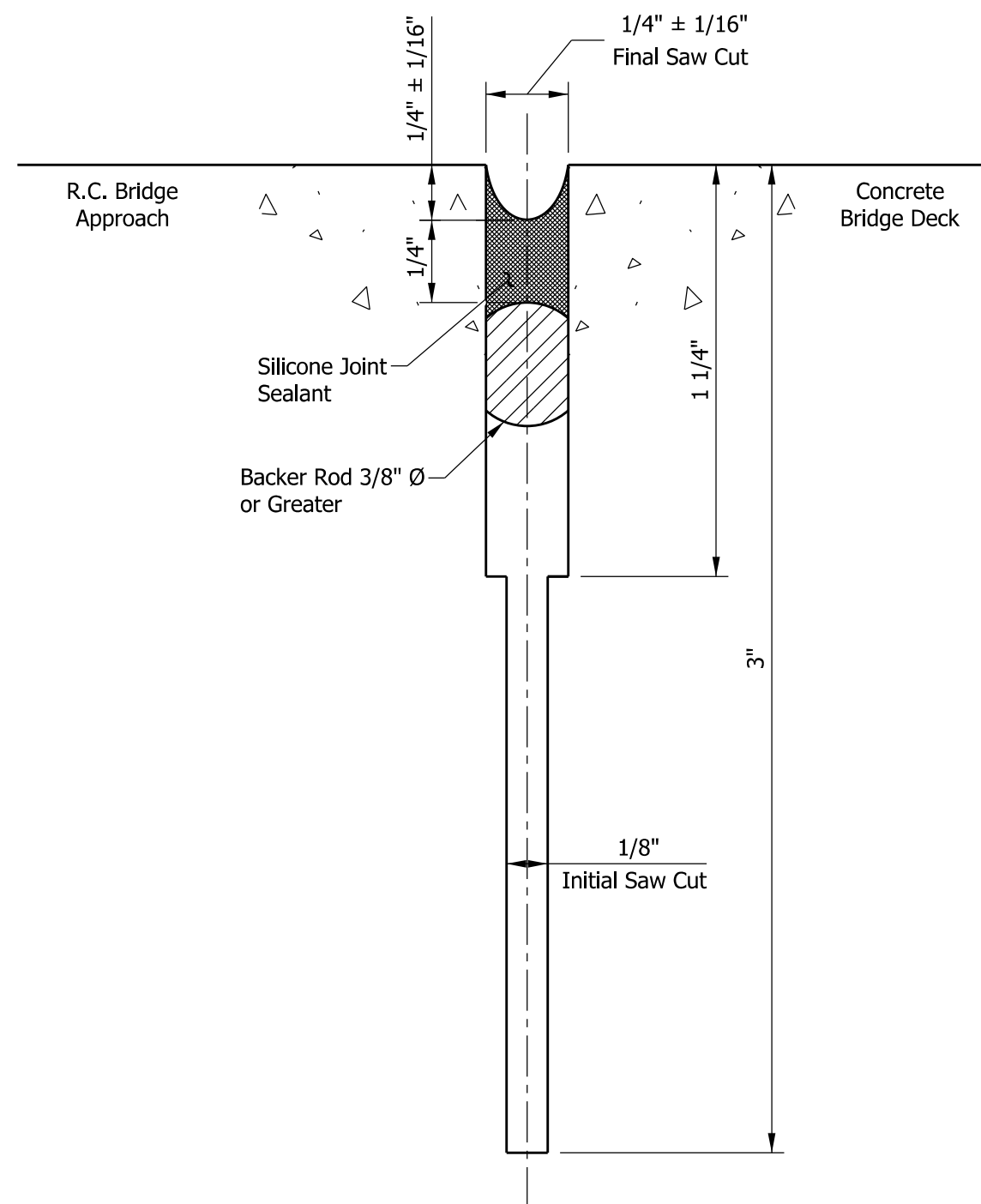
DETAILS PLACED IN THIS FORMAT 11-15-99

/s/ Anthony L. Uremovich 11-15-99
DESIGN STANDARDS ENGINEER DATE

/s/ Firooz Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE

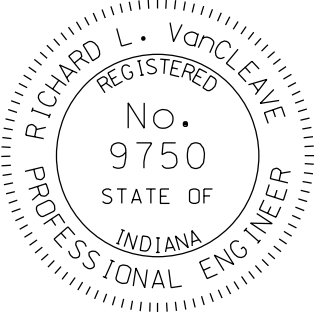
DESIGN STANDARDS ENGINEER

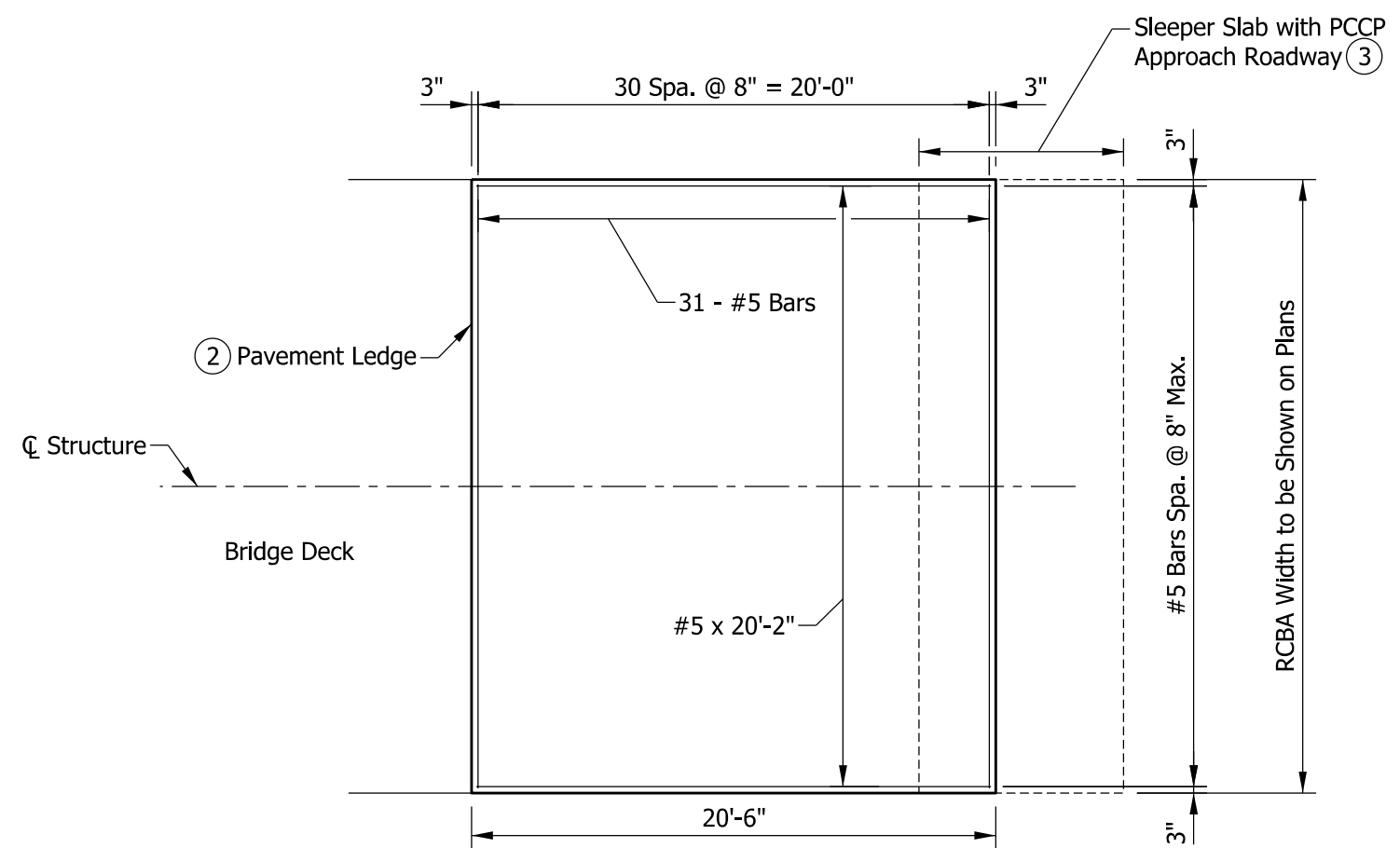
ORIGINALLY APPROVED 5-01-98



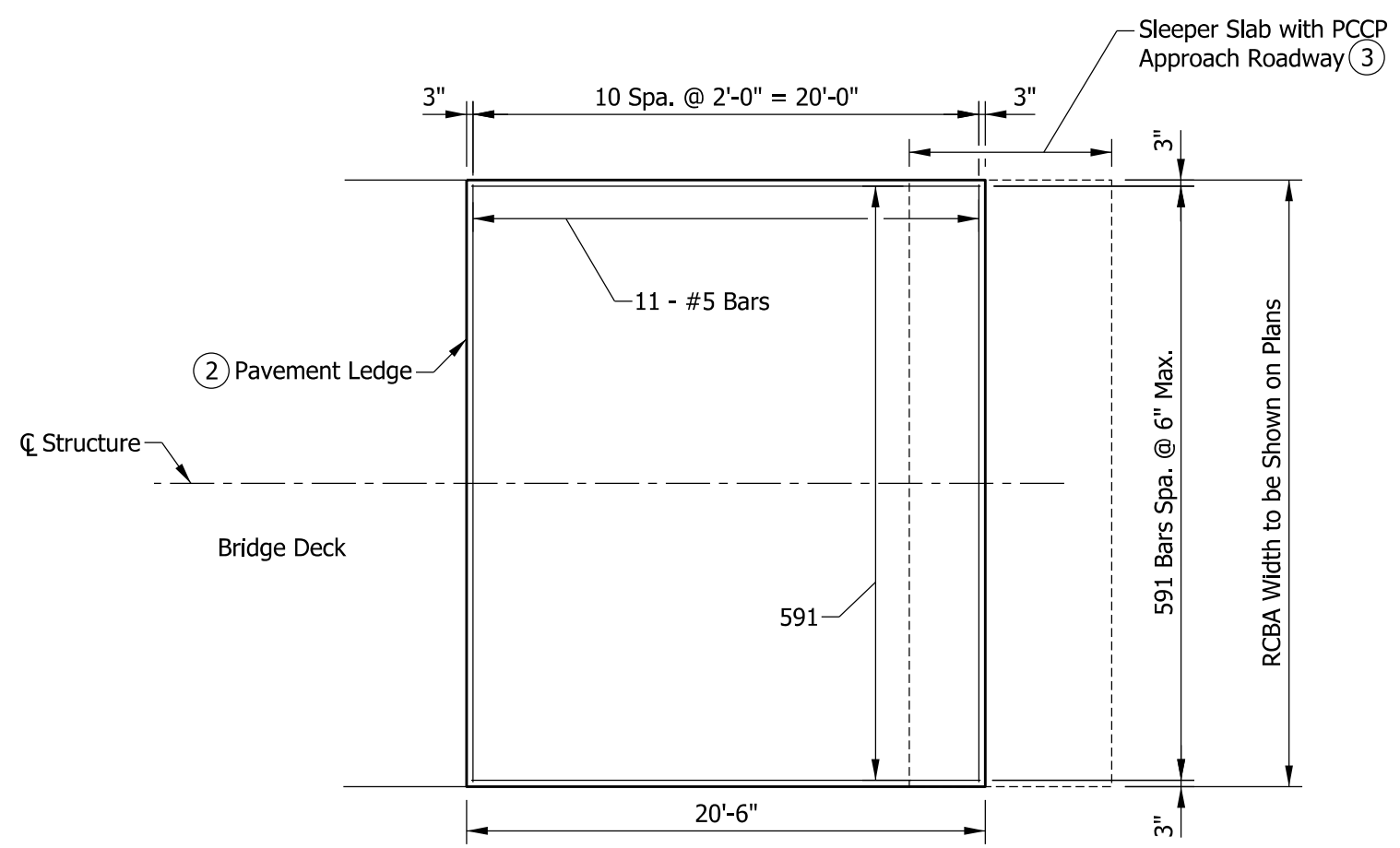
NOTES:

1. See Standard Drawing E-609-RCBA-01 for joint location.

INDIANA DEPARTMENT OF TRANSPORTATION			
TYPE I-A JOINT			
SEPTEMBER 2012			
STANDARD DRAWING NO.		E 609-BRJT-01	
	DETAILS PLACED IN THIS FORMAT		09/04/12
	<i>/s/ Richard L. VanCleave</i>		09/04/12
	SUPERVISOR, ROADWAY STANDARDS		DATE
	<i>/s/ Mark A. Miller</i>		09/04/12
CHIEF ENGINEER		DATE	



PLAN SHOWING TOP REINFORCING



PLAN SHOWING BOTTOM REINFORCING

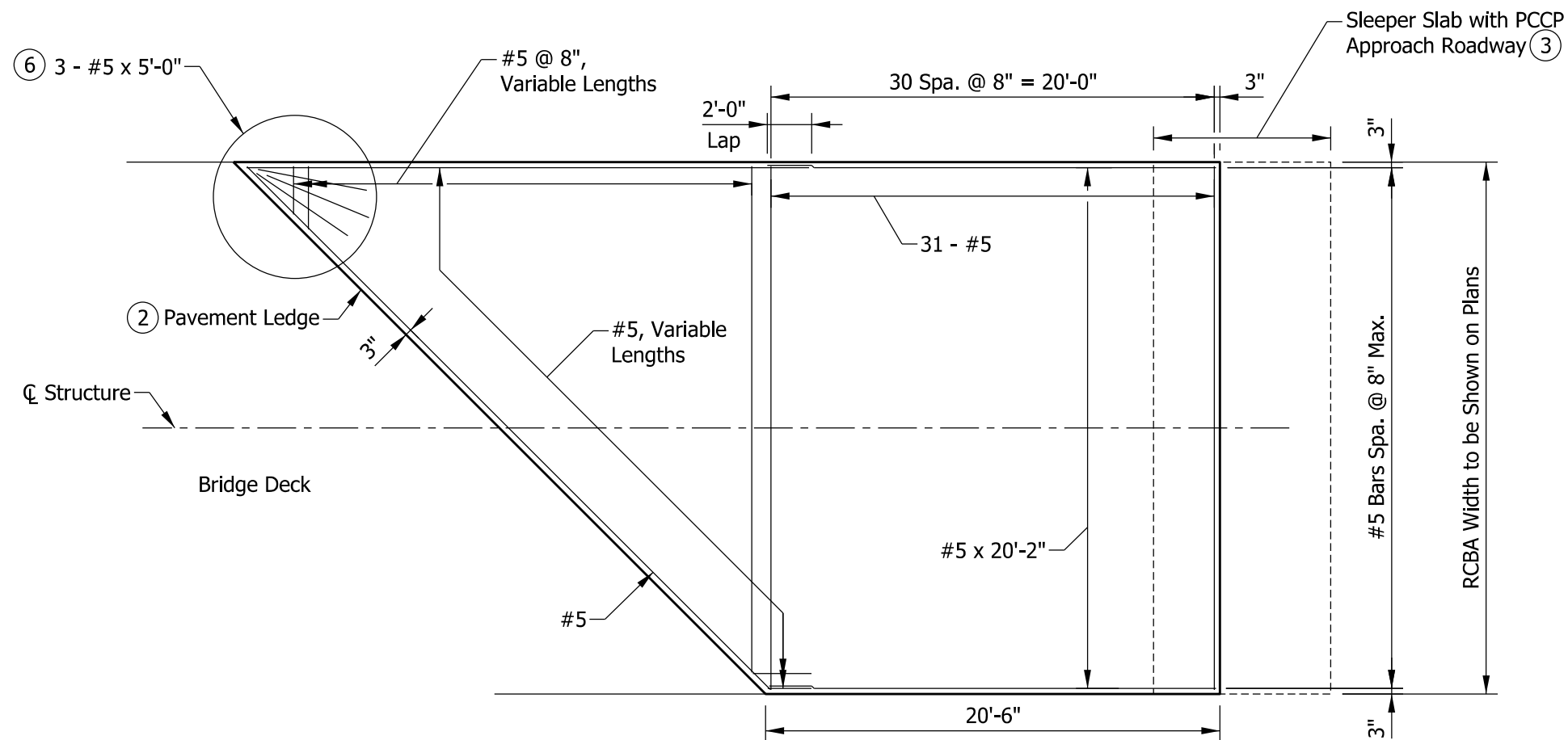
NOTES:

- 1. All reinforcing bars shall be epoxy-coated.
- 2 See Standard Drawing E 609-RCBA-03 for section, pavement ledge detail, and reinforcing bar bending diagram.
- 3 See Standard Drawing E 503-BATJ-01 for terminal joint and sleeper slab details.
- 4. See Standard Drawings E 609-TBAE-01 through -04 for RCBA extensions used with bridge railing transitions.
- 5. RCBA shall be surface sealed.

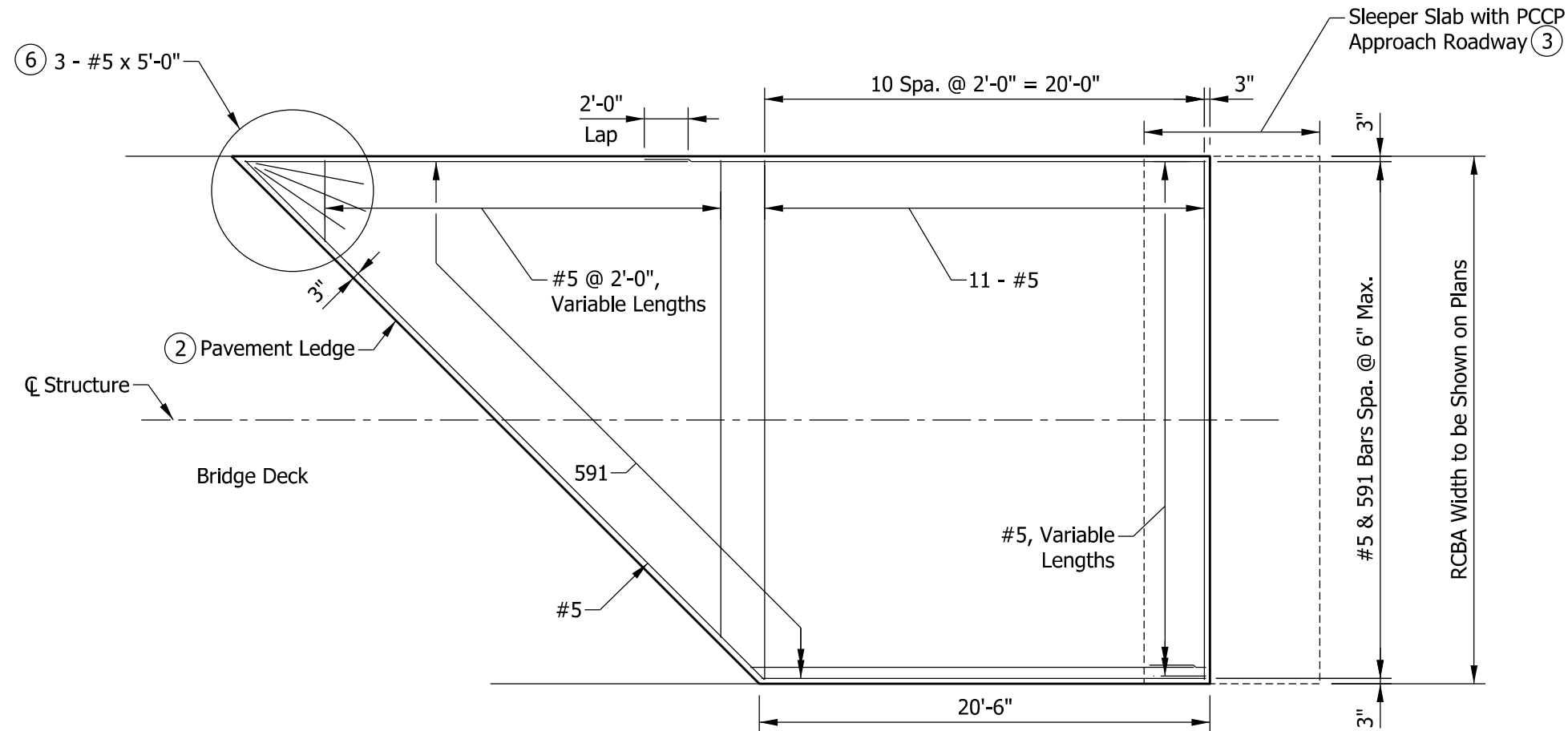
KEY:

RCBA = Reinforced Concrete Bridge Approach
PCCP = Portland Cement Concrete Pavement

INDIANA DEPARTMENT OF TRANSPORTATION			
REINFORCED CONCRETE BRIDGE APPROACH SQUARE			
SEPTEMBER 2014			
STANDARD DRAWING NO.		E 609-RCBA-01	
	<i>/s/ Elizabeth W. Phillips</i>		<i>03/04/14</i>
	DESIGN STANDARDS ENGINEER		DATE
	<i>/s/ Mark A. Miller</i>		<i>03/04/14</i>
	CHIEF ENGINEER		DATE



PLAN SHOWING TOP REINFORCING



PLAN SHOWING BOTTOM REINFORCING

NOTES:

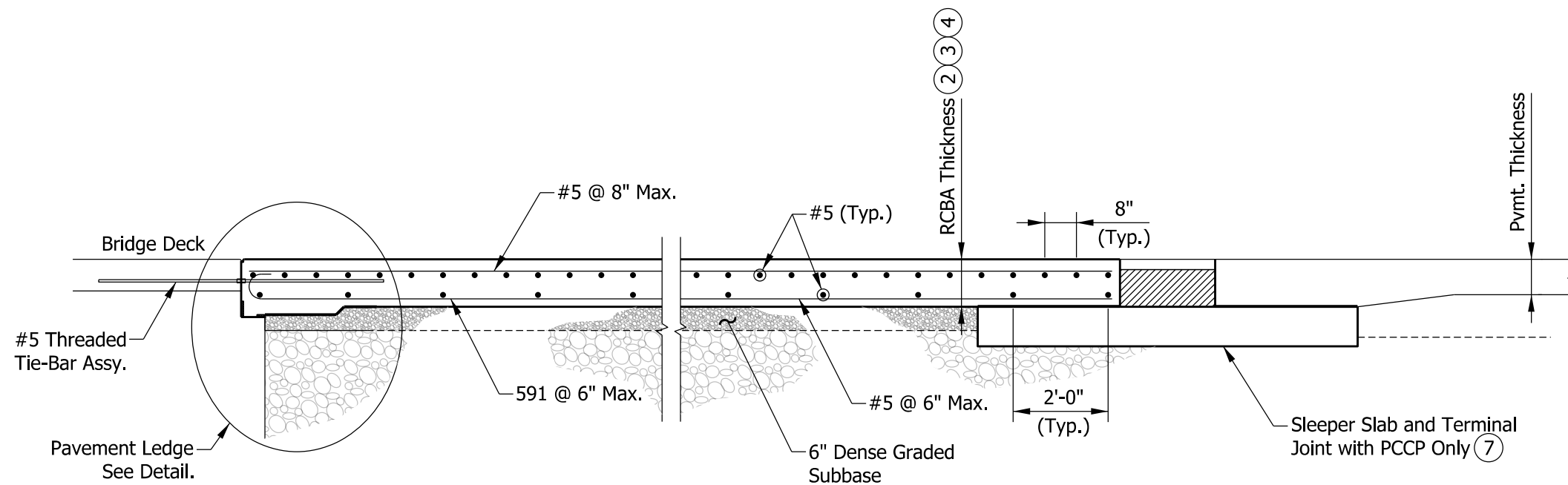
1. All reinforcing bars shall be epoxy-coated.
- ② See Standard Drawing E 609-RCBA-03 for section, pavement ledge detail, and reinforcing bar bending diagram.
- ③ See Standard Drawing E 503-BATJ-01 for terminal joint and sleeper slab details.
4. Variable-length #5 bars shall be detailed by means of cutting diagrams on the plans.
5. See Standard Drawings E 609-TBAE-01 through -04 for RCBA extensions used with bridge railing transitions.
- ⑥ For skew > 15° where variable-length transverse bars would be shorter than 2'-0", a fanned configuration of three #5 x 5'-0" reinforcing bars shall be provided.
7. RCBA shall be surface sealed.

KEY:

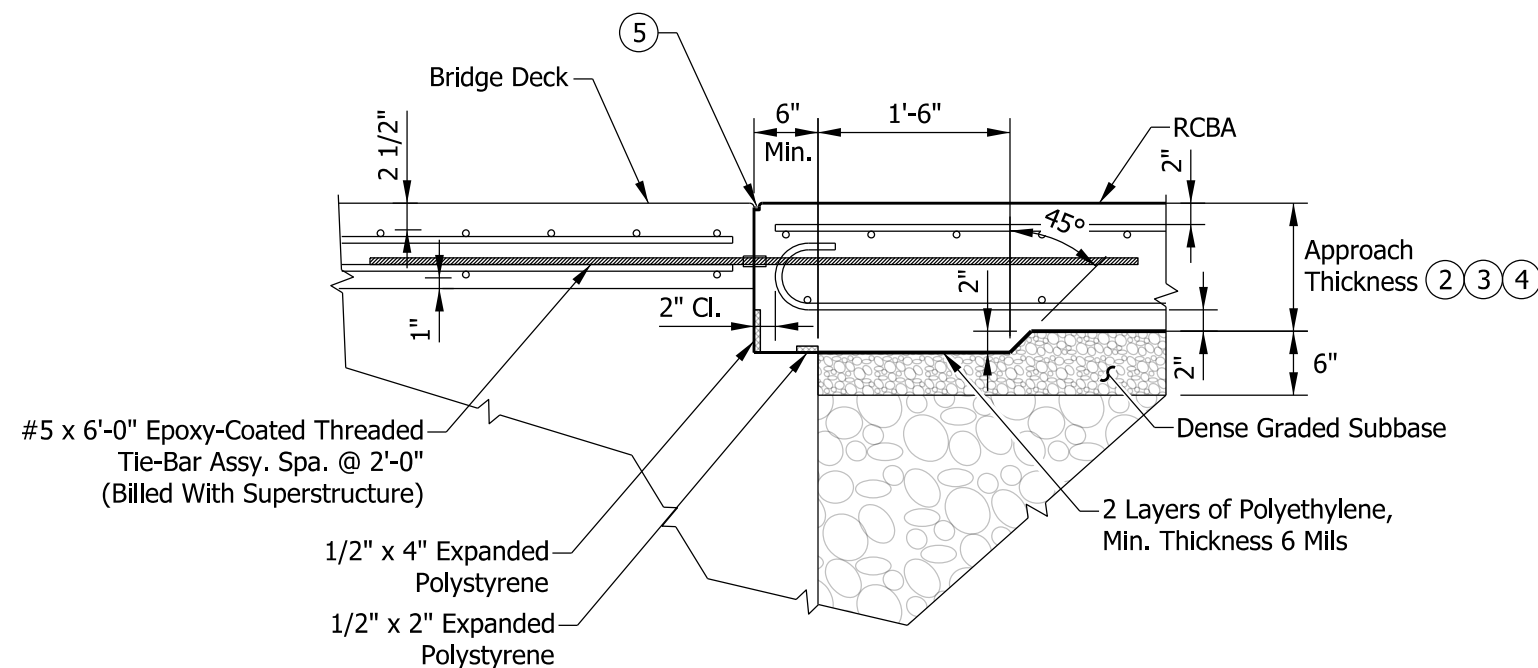
RCBA = Reinforced Concrete Bridge Approach

PCCP = Portland Cement Concrete Pavement

INDIANA DEPARTMENT OF TRANSPORTATION		
REINFORCED CONCRETE BRIDGE APPROACH SKEWED		
SEPTEMBER 2014		
STANDARD DRAWING NO.		E 609-RCBA-02
	/s/ Elizabeth W. Phillips	03/04/14
	DESIGN STANDARDS ENGINEER	DATE
	/s/ Mark A. Miller	03/04/14
	CHIEF ENGINEER	DATE



SECTION THROUGH APPROACH



PAVEMENT LEDGE DETAIL

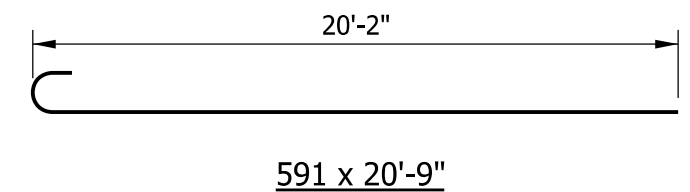
NOTES:

1. All reinforcing bars shall be epoxy-coated.
- 2 See plans for approach thickness.
- 3 For HMA pavement:
10 in. if design year AADT < 1000
12 in. if design year AADT ≥ 1000
- 4 For PCCP:
12 in. if pavement thickness < 12 in.
Same as pavement thickness, if pavement thickness ≥ 12 in.
- 5 Joint type I-A. See Standard Drawing E 609-BRJT-01 for details.
6. See Standard Drawing E 703-BRST-01 for reinforcing-bar bending details and notes.
- 7 See Standard Drawing E 503-BATJ-01 for terminal joint and sleeper slab details.

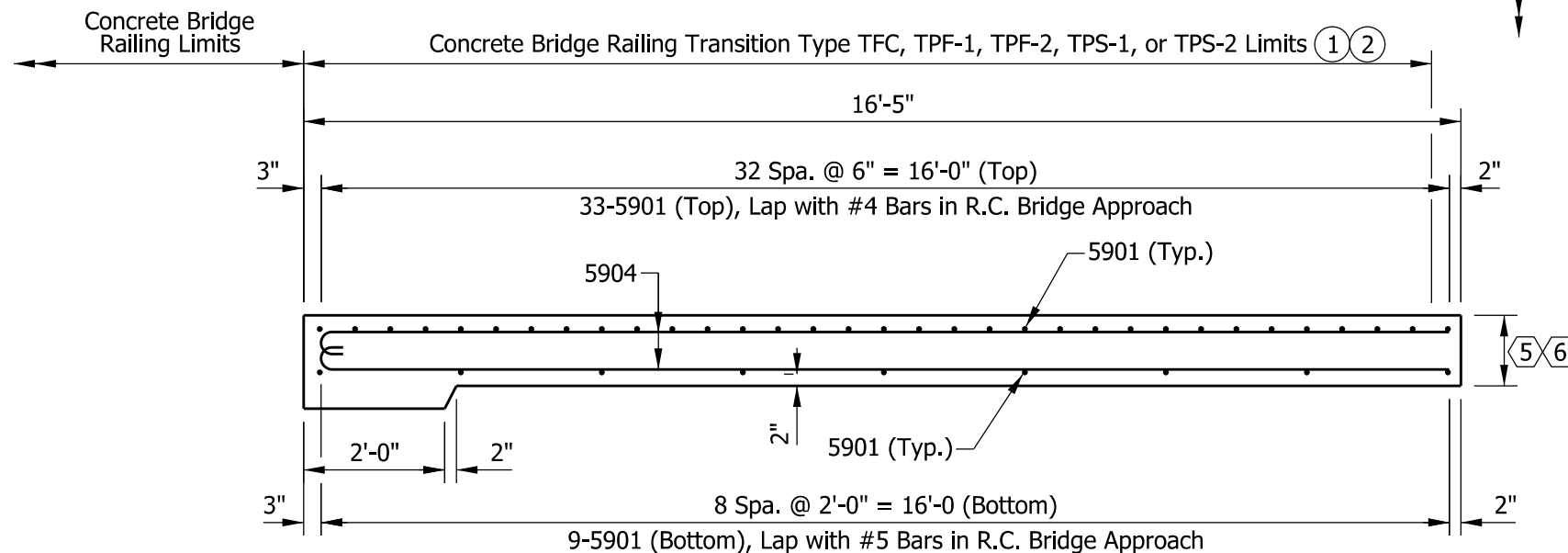
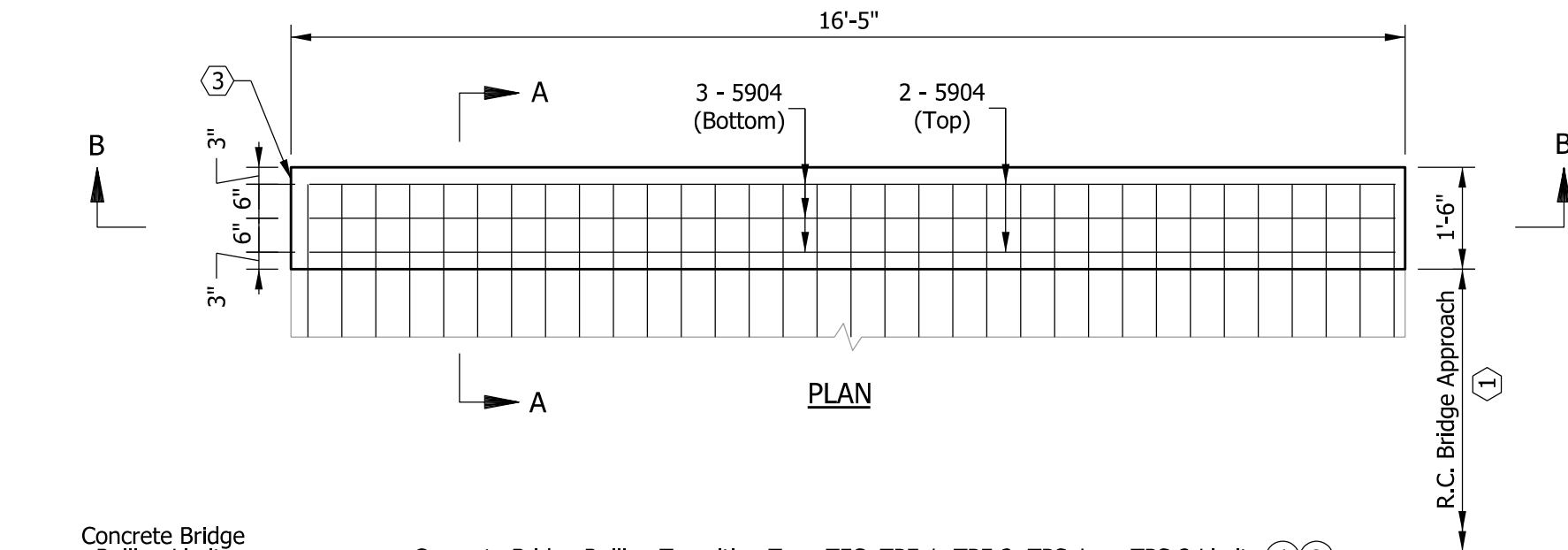
KEY:

RCBA = Reinforced Concrete Bridge Approach

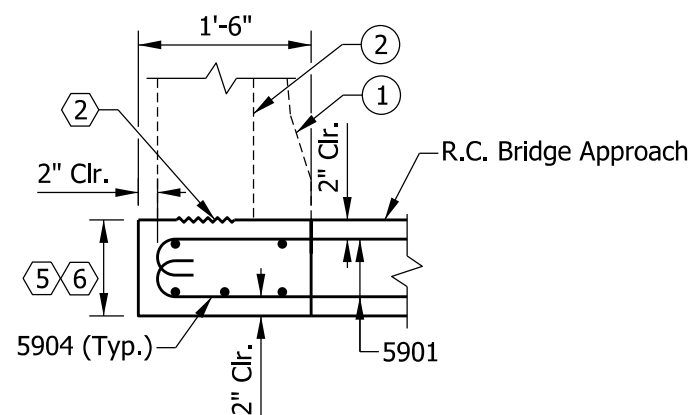
PCCP = Portland Cement Concrete Pavement



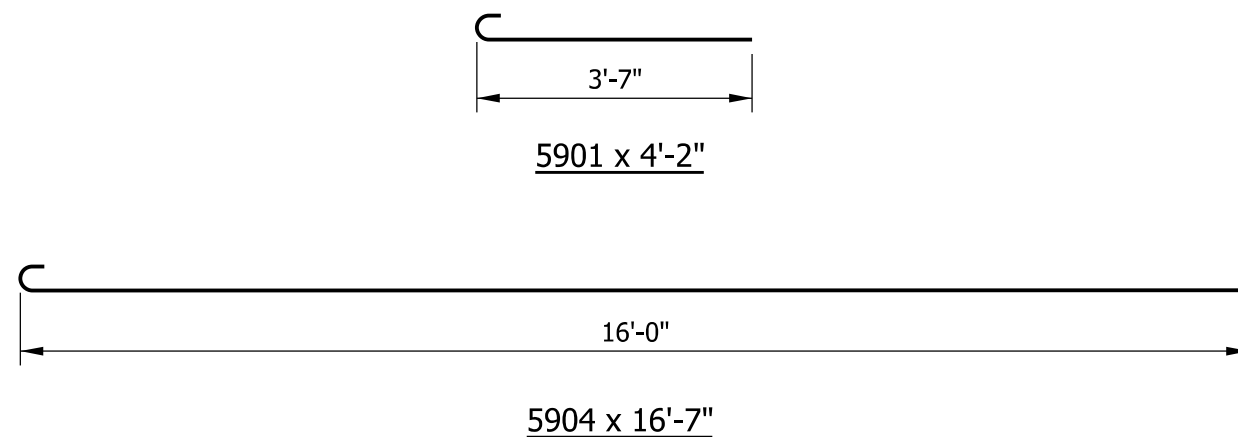
INDIANA DEPARTMENT OF TRANSPORTATION		
REINFORCED CONCRETE BRIDGE APPROACH SECTION AND PAVEMENT LEDGE DETAIL		
SEPTEMBER 2014		
STANDARD DRAWING NO.		E 609-RCBA-03
	/s/ Elizabeth W. Phillips	02/21/14
	DESIGN STANDARDS ENGINEER	DATE
	/s/ Mark A. Miller	03/03/14
	CHIEF ENGINEER	DATE



SECTION B-B



SECTION A-A



NOTES

- See Standard Drawings E 706-TTFC-01 through -03 for concrete bridge railing transition type TFC details.
- See Standard Drawings E 706-TTPP-01 and -02 for concrete bridge railing transition type TPF-1 details.
See Standard Drawings E 706-TTPP-03 and -04 for concrete bridge railing transition type TPF-2 details.
See Standard Drawings E 706-TTPP-05 and -06 for concrete bridge railing transition type TPS-1 details.
See Standard Drawings E 706-TTPP-07 and -08 for concrete bridge railing transition type TPS-2 details.
- See Standard Drawing E 609-TBAE-04 for General Notes.

BILL OF MATERIALS

Quantities are for one RCBA extension

EPOXY-COATED REINFORCING BARS

MARK OR SIZE	NO. OF BARS	LENGTH	WEIGHT
5901	42	4'-2"	
5904	5	16'-7"	
Total Epoxy-Coated Reinforcing Bars			269 LBS

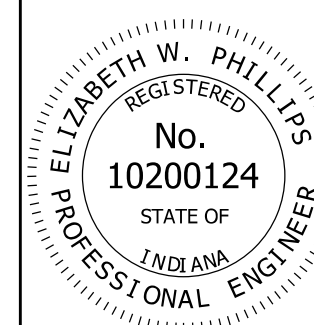
MISCELLANEOUS

RCBA Extension Area	2.7 SYS
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INDIANA DEPARTMENT OF TRANSPORTATION

RCBA EXTENSION FOR BRIDGE RAILING TRANSITION TFC, TPF-1, TPF-2, TPS-1, OR TPS-2 SEPTEMBER 2013

STANDARD DRAWING NO. E 609-TBAE-01

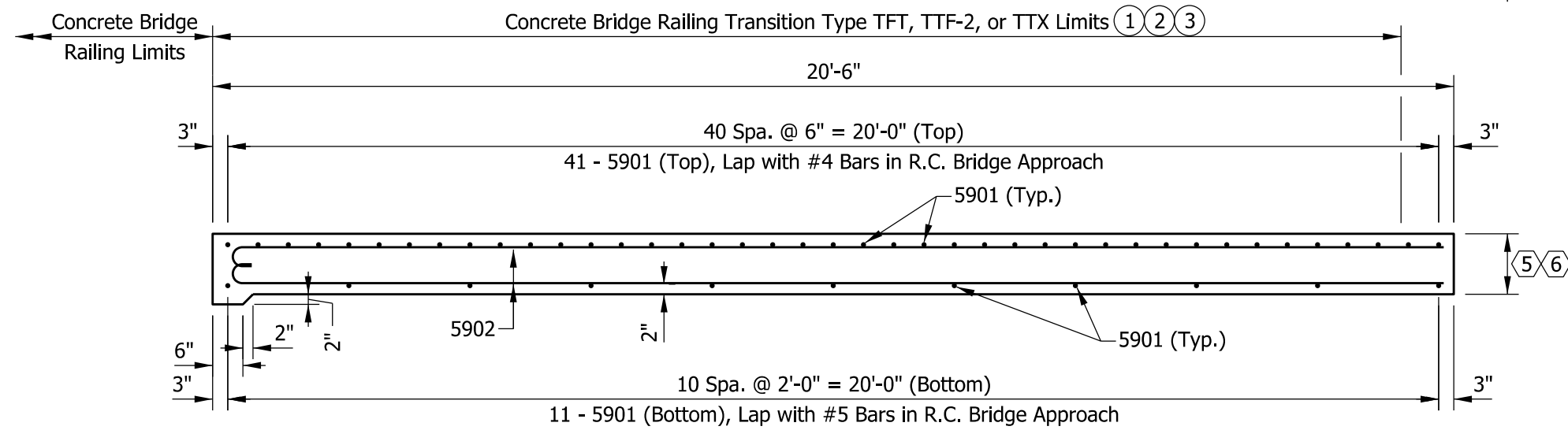
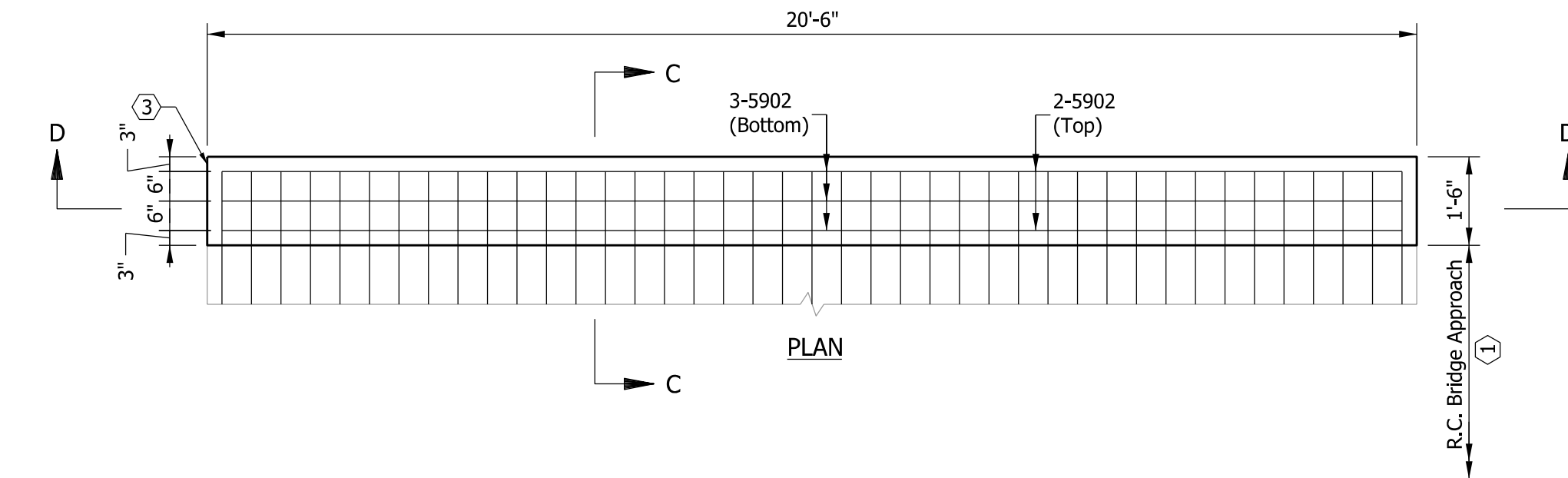


/s/ Elizabeth W. Phillips 02/28/13

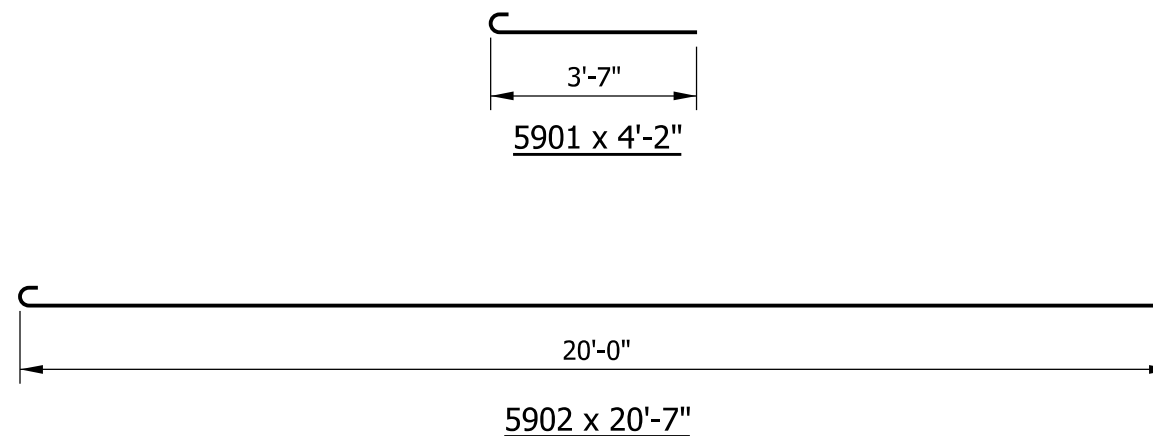
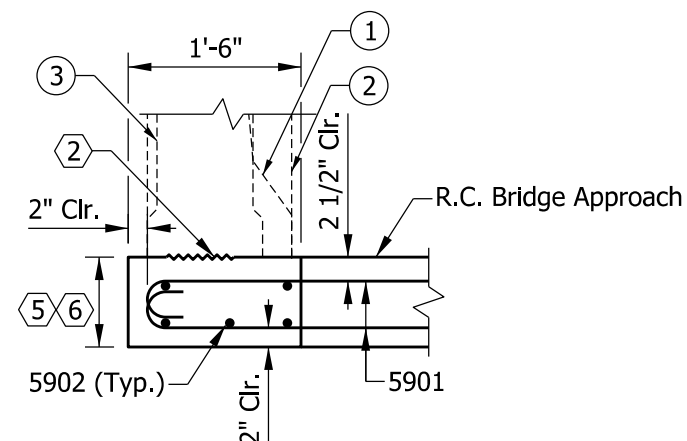
DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller 03/27/13

CHIEF ENGINEER DATE



SECTION D-D



NOTES

- ① See Standard Drawing E 706-TTFT-01 through -03 for concrete bridge railing transition type TFT details.
- ② See Standard Drawing E 706-TTTF-01 through -04 for concrete bridge railing transition type TTF-2 details.
- ③ See Standard Drawing E 706-TTTX-01 and -02 for concrete bridge railing transition type TTX details.
4. See Standard Drawing E 609-TBAE-04 for General Notes ⑤.

BILL OF MATERIALS

Quantities are for one RCBA extension

EPOXY-COATED REINFORCING BARS

MARK OR SIZE	NO. OF BARS	LENGTH	WEIGHT
5901	52	4'-2"	
5902	5	20'-7"	

Total Epoxy-Coated Reinforcing Bars 333 LBS

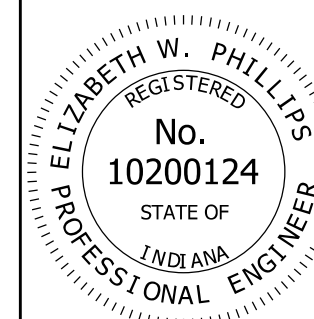
MISCELLANEOUS

RCBA Extension Area	3.4 SYS
---------------------	---------

INDIANA DEPARTMENT OF TRANSPORTATION

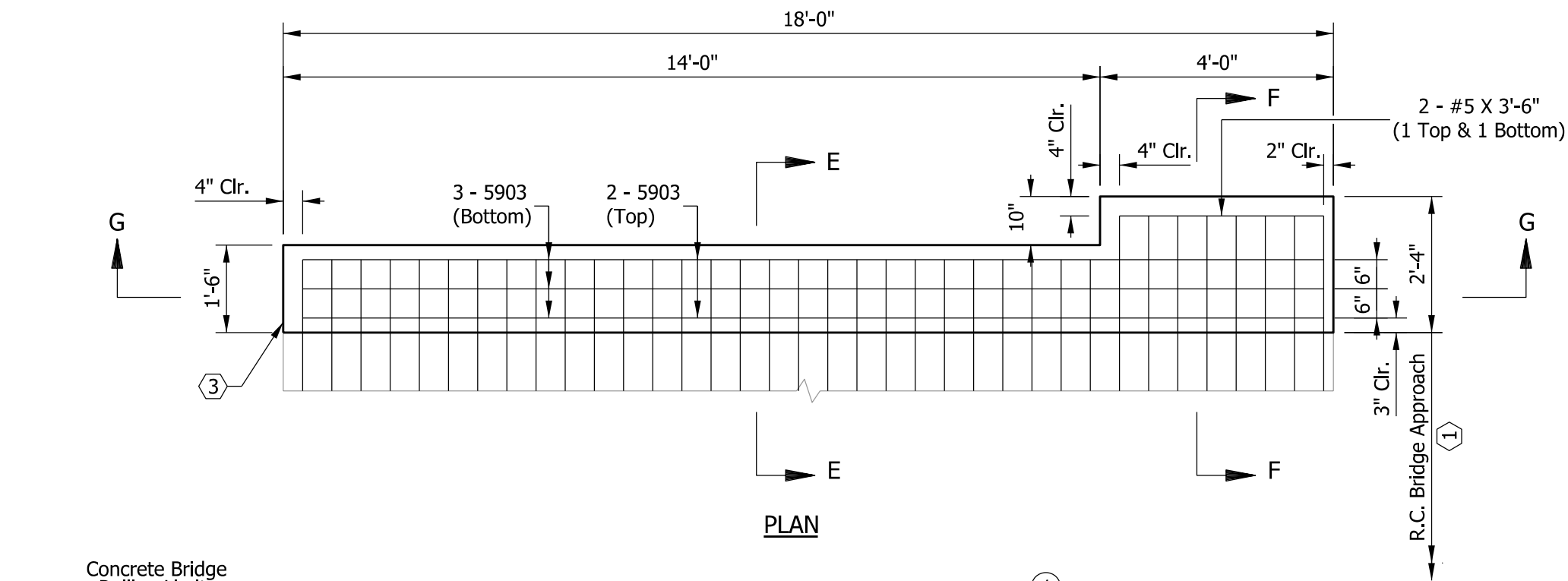
RCBA EXTENSION FOR
BRIDGE RAILING TRANSITION
TFT, TTF-2, OR TTX
SEPTEMBER 2013

STANDARD DRAWING NO. E 609-TBAE-02

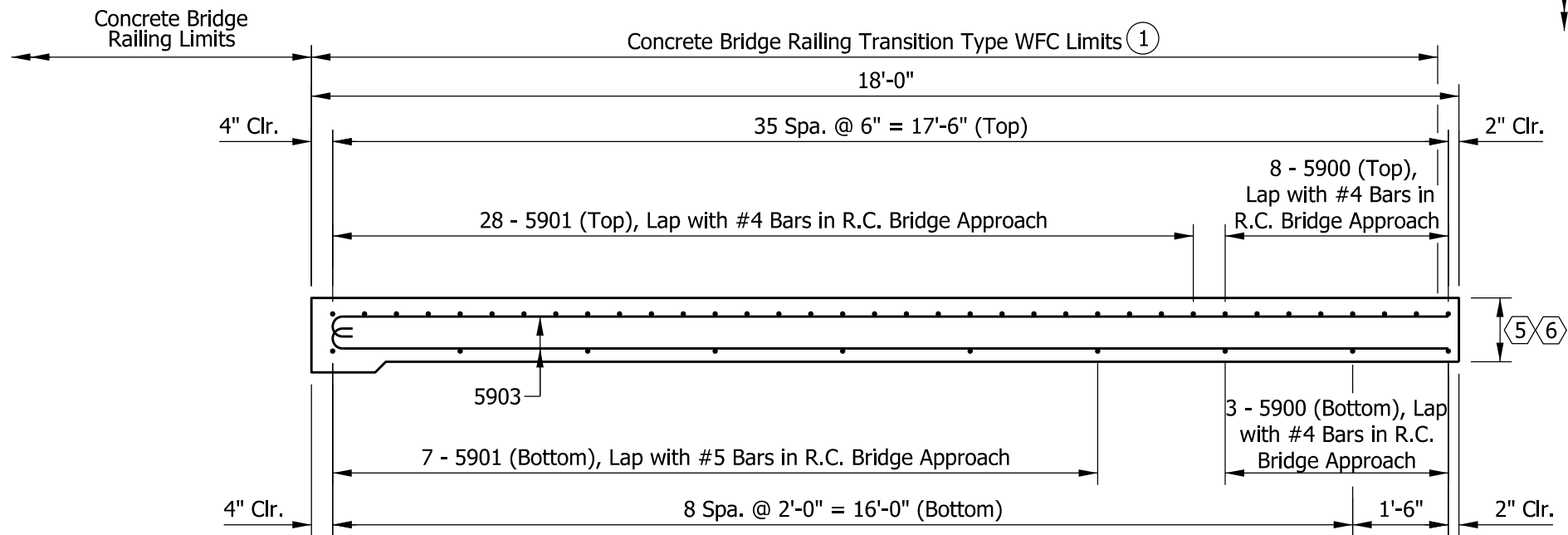


/s/ Elizabeth W. Phillips 02/28/13
DESIGN STANDARDS ENGINEER DATE

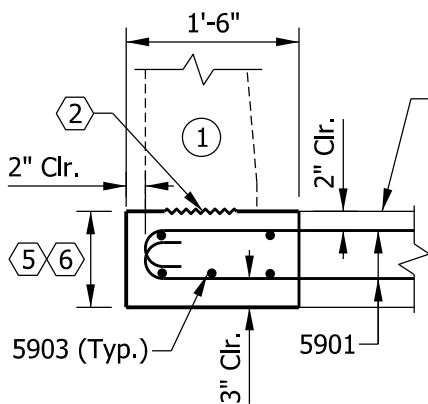
/s/ Mark A. Miller 03/27/13
CHIEF ENGINEER DATE



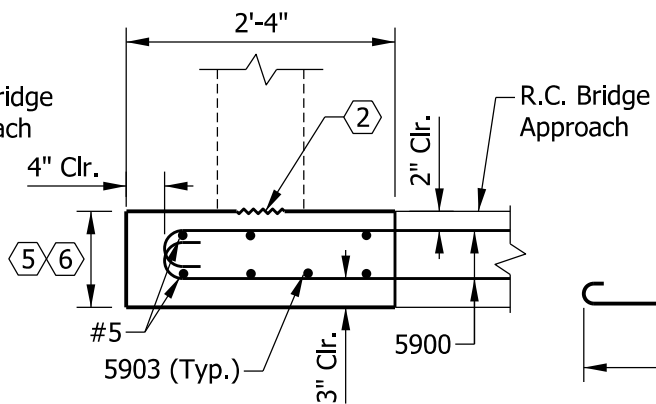
PLAN



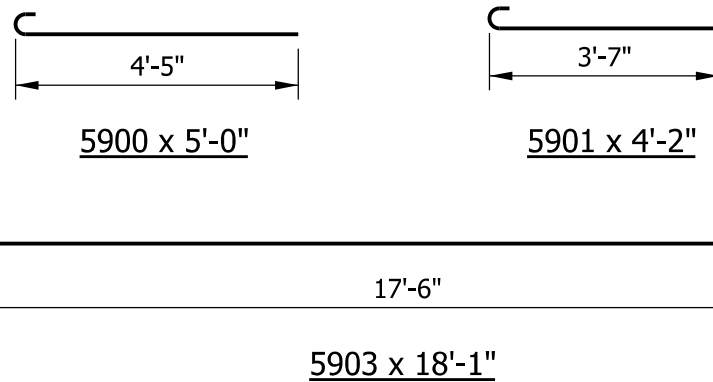
SECTION G-G



SECTION E-E



SECTION F-F



NOTES

- See Standard Drawings E 706-TWFC-01 through -03 for concrete bridge railing transition WFC details.
- See Standard Drawing E 609-TBAE-04 for General Notes.

BILL OF MATERIALS

Quantities are for one RCBA extension

EPOXY-COATED REINFORCING BARS

MARK OR SIZE	NO. OF BARS	LENGTH	WEIGHT
5900	11	5'-0"	
5901	35	4'-2"	
5903	5	18'-1"	
#5	2	3'-6"	

Total Epoxy-Coated Reinforcing Bars 312 LBS

MISCELLANEOUS

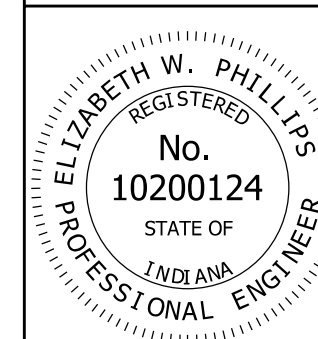
RCBA Extension Area 3.4 SYS

INDIANA DEPARTMENT OF TRANSPORTATION

RCBA EXTENSION FOR BRIDGE RAILING TRANSITION WFC

SEPTEMBER 2013

STANDARD DRAWING NO. E 609-TBAE-03



/s/ Elizabeth W. Phillips 02/28/13

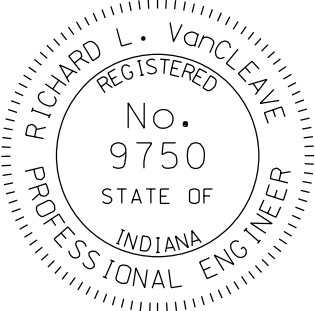
DESIGN STANDARDS ENGINEER DATE

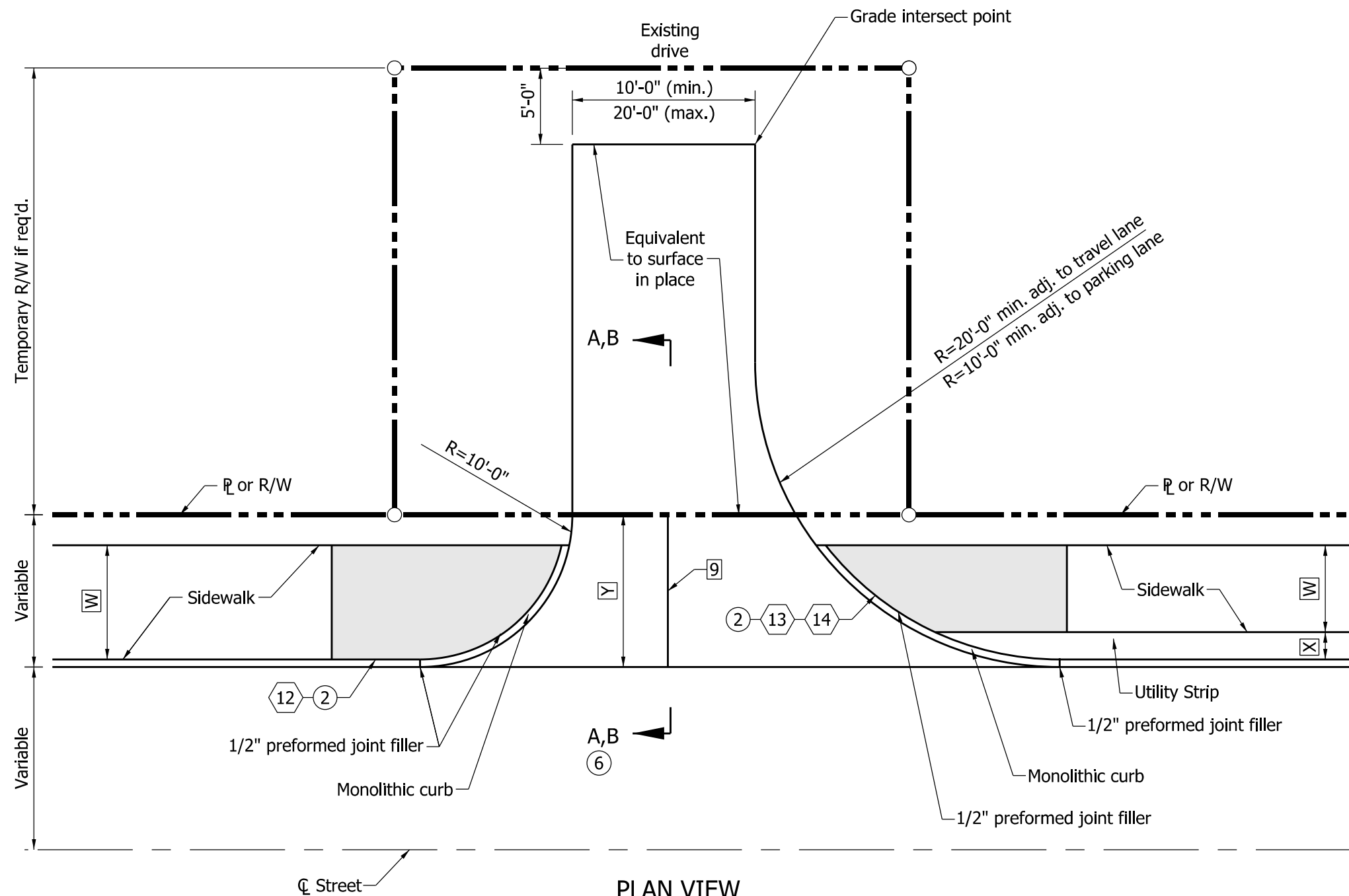
/s/ Mark A. Miller 03/27/13

CHIEF ENGINEER DATE

GENERAL NOTES

- 1
- See Standard Drawing E 609-RCBA-01 and the plans for reinforced concrete bridge approach details.
- 2
- Construction joint type A. See Standard Drawing E 702-CJTA-01 for details.
- 3
- This end of the reinforced concrete bridge approach extension shall match the construction at the bridge end as shown on the plans.
- 4
- See Standard Drawing E 703-BRST-01 for reinforcing-bar bending details and notes.
- 5
- See the plans for thickness of RCBA and its extension to be used with asphalt pavement.
- 6
- See the plans for thickness of RCBA and its extension to be used with a terminal joint and portland cement concrete pavement.

INDIANA DEPARTMENT OF TRANSPORTATION			
RCBA EXTENSION FOR BRIDGE RAILING TRANSITION GENERAL NOTES SEPTEMBER 2012			
STANDARD DRAWING NO.		E 609-TBAE-04	
	<i>/s/ Richard L. VanCleave</i>		<i>09/04/12</i>
	SUPERVISOR, ROADWAY STANDARDS		DATE
	<i>/s/ Mark A. Miller</i>		<i>09/04/12</i>
	CHIEF ENGINEER		DATE



NOTES:

- See Standard Drawing E 610-DRIV-13 for General Notes and additional Legend.
- See Standard Drawings E 604-SDWK-01 or E 604-SDWK-02 for sidewalk elevation transition details.
- See Standard Drawings E 610-DRIV-03 for concrete curb and gutter connection detail.
- See Standard Drawings E 610-DRIV-07 for PCCP joint placement detail.
- Pavement shall be PCCP for Approaches, 6 in., on subgrade treatment Type IIIA.
- See Standard Drawing E 610-DRIV-08 for sections A-A and B-B.
- See Standard Drawing E 503-CCPJ-02 for longitudinal joint details.

LEGEND

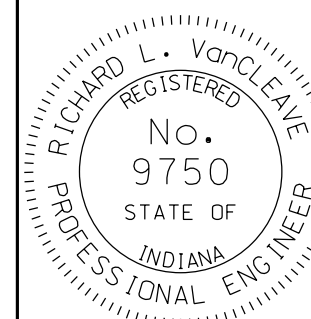
- W = Width of sidewalk
 X = Distance between back face of curb to sidewalk.
 Y = Distance from front face of curb to $\bar{R}$ or R/W.
 [Shaded Area] = Sidewalk elevation transition.

INDIANA DEPARTMENT OF TRANSPORTATION

CLASS I DRIVE

SEPTEMBER 2012

STANDARD DRAWING NO. E 610-DRIV-01

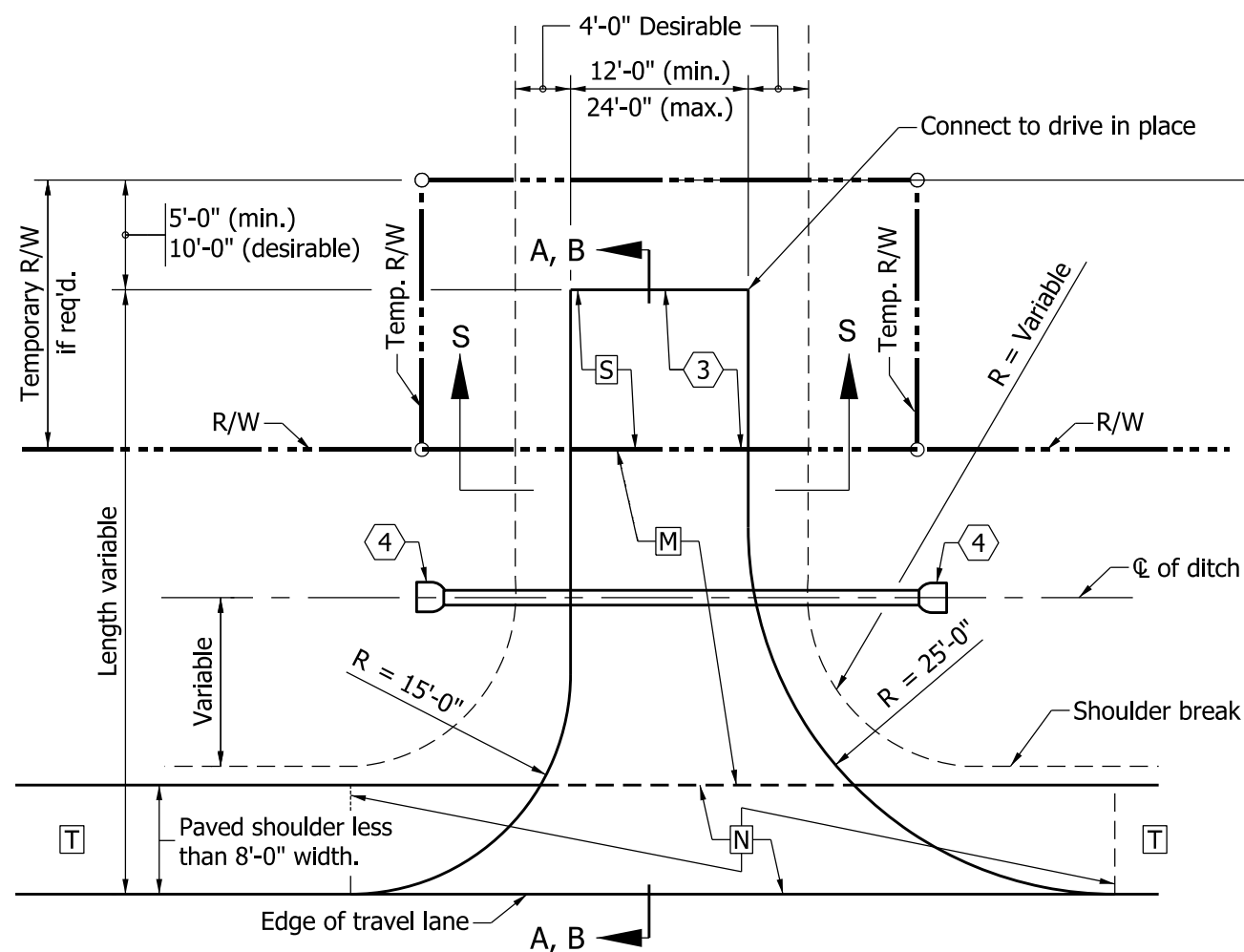


/s/ Richard L. VanCleave 09/04/12

SUPERVISOR, ROADWAY STANDARDS DATE

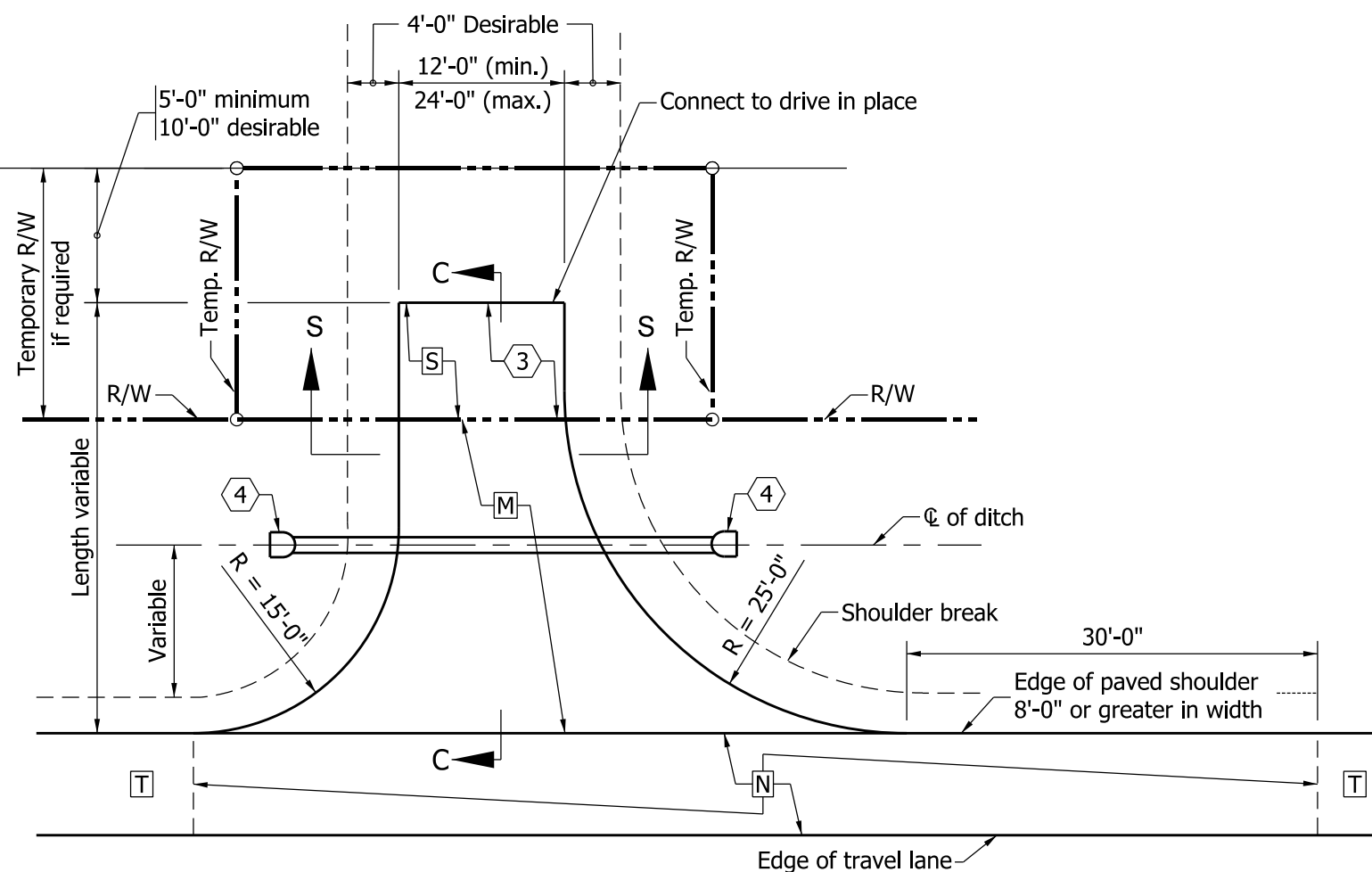
/s/ Mark A. Miller 09/04/12

CHIEF ENGINEER DATE



PLAN VIEW

(PAVED SHOULDER LESS THAN 8'-0" IN WIDTH OR UNPAVED SHOULDER)



PLAN VIEW

(PAVED SHOULDER 8'-0" OR GREATER IN WIDTH)

NOTES:

1. See Standard Drawing E 610-DRIV-13 for General Notes and additional Legend.
2. See Standard Drawings E 610-DRIV-10 for Sections A-A, B-B and C-C.
3. See Standard Drawings E 610-DRIV-10 for approach grades.
4. See Standard Drawings E 610-DRIV-09 for Section S-S.

LEGEND

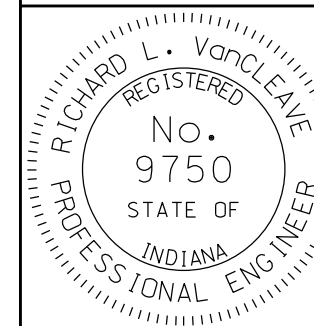
- [M] HMA for Approaches:
165#/syd HMA Surface Type B on
385#/syd HMA Intermediate Type B on
subgrade treatment Type IIIA
or
PCCP for Approaches, 6",
subgrade treatment Type IIIA
- [N] The greater thickness of either the drive [M]
or the paved shoulder [T] section.
- [T] Plan shoulder section.
- [S] For type and thickness equivalent
to surface in place, see plans.

INDIANA DEPARTMENT OF TRANSPORTATION

CLASS II DRIVE

SEPTEMBER 2010

STANDARD DRAWING NO. E 610-DRIV-02



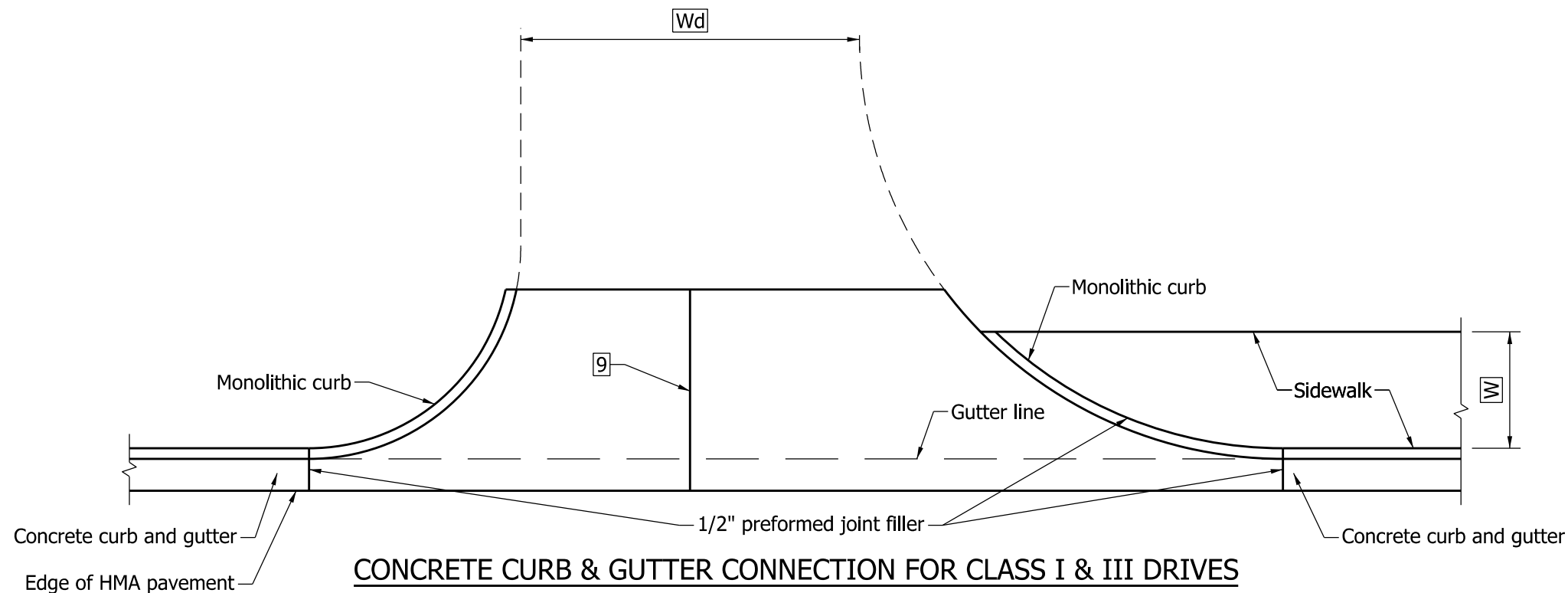
DESIGN STANDARDS ENGINEER

/s/ *Richard L. VanCleave* 09/01/10

DESIGN STANDARDS ENGINEER DATE

/s/ *Mark A. Miller* 09/01/10

CHIEF HIGHWAY ENGINEER DATE

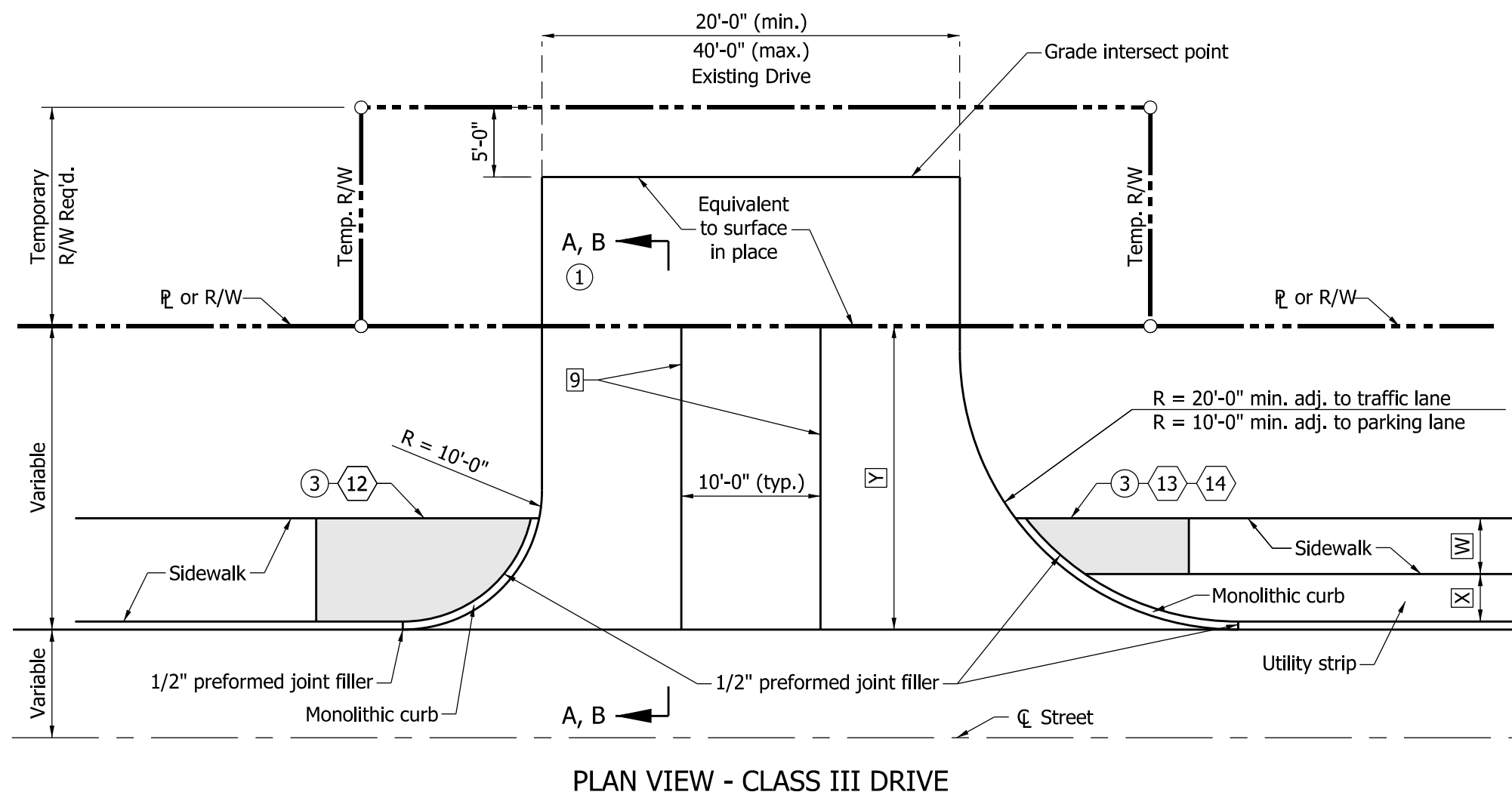


NOTES:

- ① See Standard Drawing E 610-DRIV-08 for Section A-A, and Section B-B.
2. Pavement shall be PCCP for Approaches, 9 in., on subgrade treatment Type IIIA.
- ③ See Standard Drawings E 604-SDWK-01 or E 604-SDWK-02 for sidewalk elevation transition details, or Standard Drawing E 604-SWCR-09 for sidewalk curb ramp details if the drive is signalized.
4. See Standard Drawing E 610-DRIV-07 for joint placement details.
5. See Standard Drawing E 610-DRIV-13 for General Notes and additional Legend.
6. See Standard Drawing 503-CCPJ-02 for longitudinal joint details.

LEGEND

- W = Width of sidewalk
Wd = Driveway width
X = Distance between back face of curb and sidewalk
Y = Distance from front face of curb to $\mathcal{R}$ or R/W
 = Sidewalk elevation transition

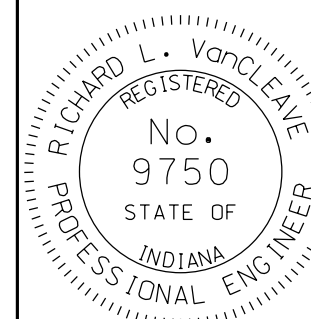


INDIANA DEPARTMENT OF TRANSPORTATION

CLASS III DRIVE

SEPTEMBER 2012

STANDARD DRAWING NO. E 610-DRIV-03

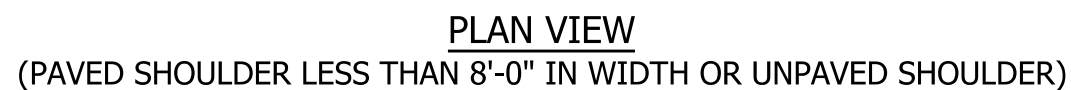


/s/ *Richard L. VanCleave* 09/04/12

SUPERVISOR, ROADWAY STANDARDS DATE

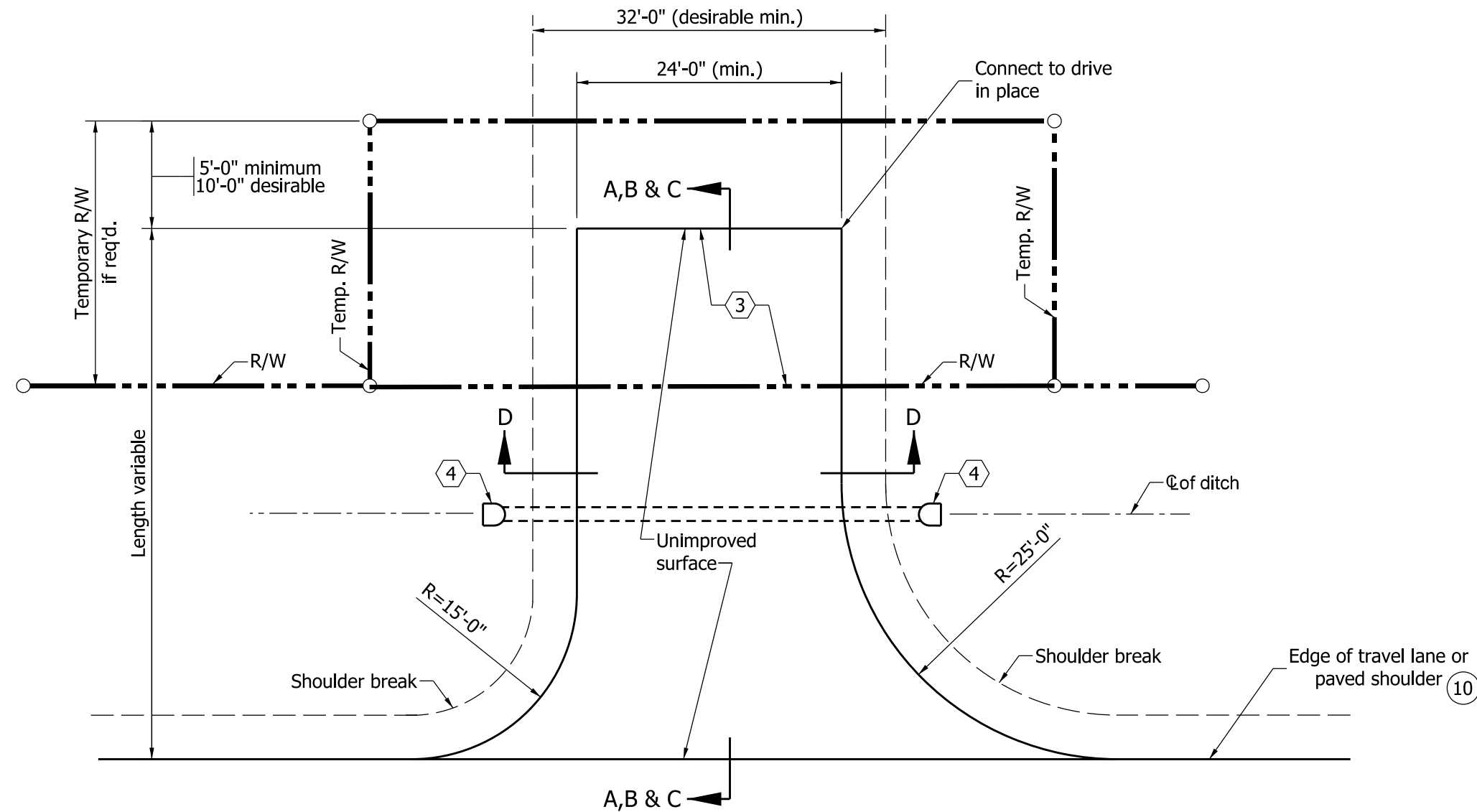
/s/ *Mark A. Miller* 09/04/12

CHIEF ENGINEER DATE

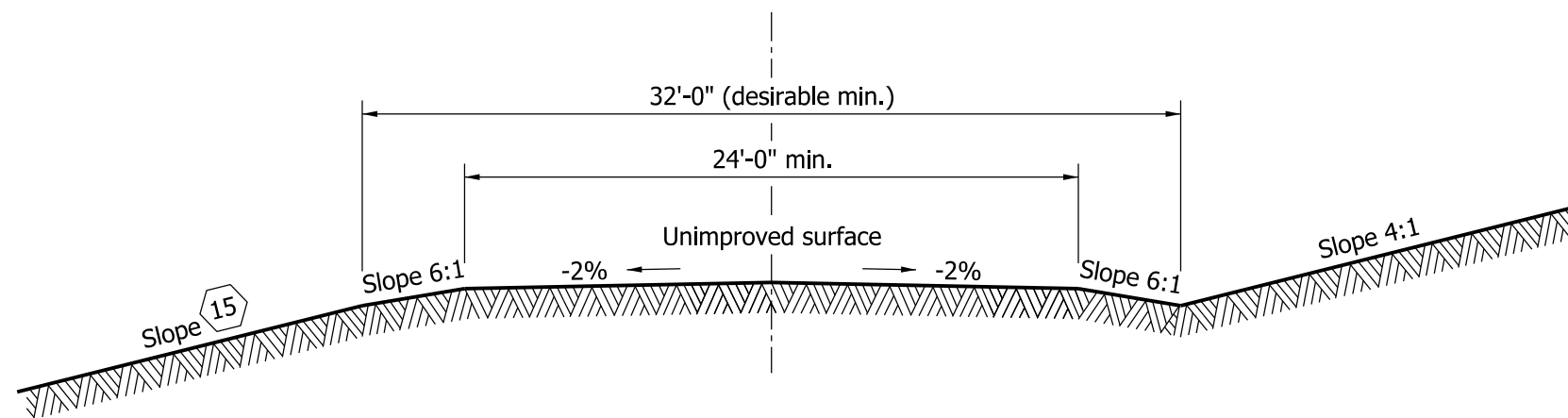


CHIEF HIGHWAY ENGINEER _____ DATE _____

DESIGN STANDARDS ENGINEER



PLAN VIEW



SECTION D-D

Notes:

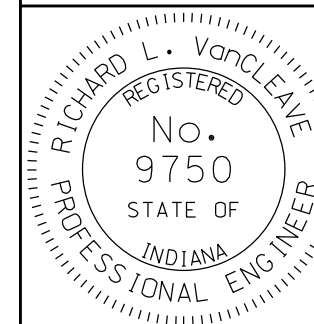
1. See Standard Drawing E 610-DRIV-13 for General Notes.
 2. See Standard Drawing E 610-DRIV-10 for Section A-A, B-B and C-C.
- 10 Where the shoulder is earth or aggregate or the paved width is less than 8'-0", the drive radii shall be tangent to the edge of the travel lane. Where the paved shoulder width is 8'-0" or more, the drive radii shall be tangent to the edge of the paved shoulder.

INDIANA DEPARTMENT OF TRANSPORTATION

CLASS V DRIVE
FIELD ENTRANCE

SEPTEMBER 2010

STANDARD DRAWING NO. E 610-DRIV-05



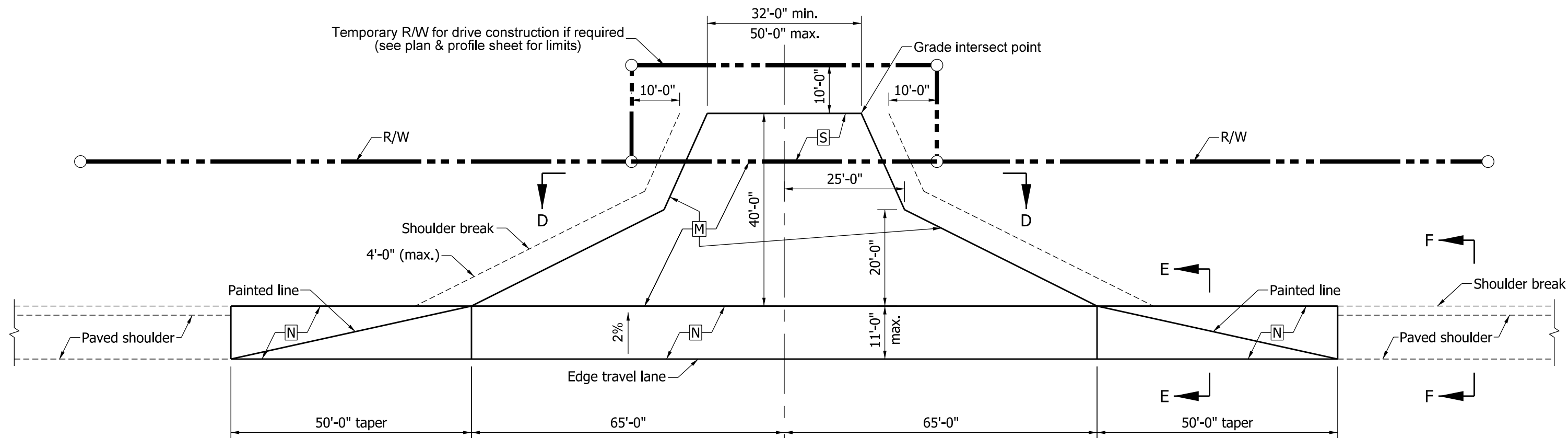
/s/ Richard L. VanCleave 09/01/10

DESIGN STANDARDS ENGINEER DATE

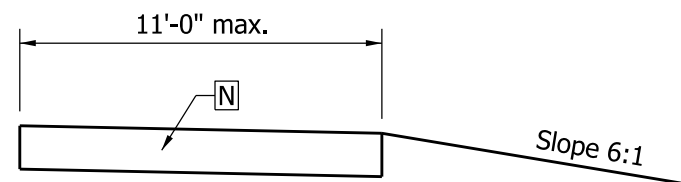
/s/ Mark A. Miller 09/01/10

CHIEF HIGHWAY ENGINEER DATE

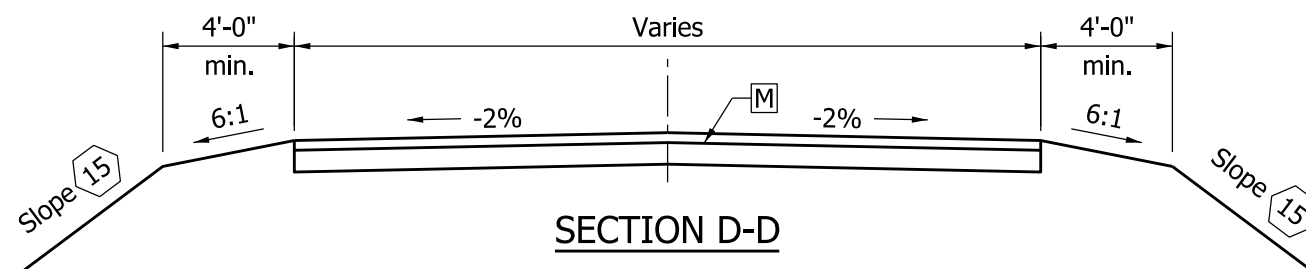
DESIGN STANDARDS ENGINEER



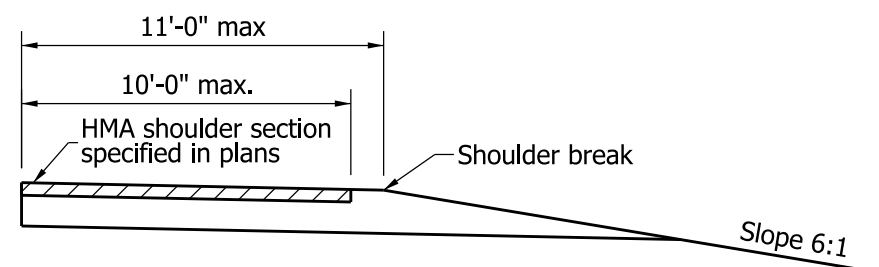
PLAN VIEW



SECTION E-E



SECTION D-D



SECTION F-F

NOTES:

1. See Standard Drawing E 610-DRIV-13 for General Notes and additional Legend.
2. See Standard Drawings E 610-DRIV-11 for drive profile grades.
3. Class VI Drive accommodates a WB-65 (IDV) design vehicle with a 45'-0" turning radius.

LEGEND

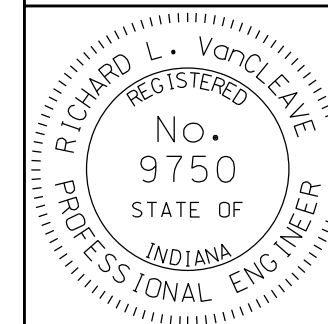
- [M] HMA for Approaches:
165#/syd HMA Surface Type B on
275#/syd HMA Intermediate Type B on
880#/syd HMA base, Type B on
subgrade treatment Type IIIA
or
PCCP for Approaches, 9", on
subgrade treatment Type IIIA
- [N] The greater thickness of either the drive [M]
or the paved shoulder section.
- [S] For type and thickness equivalent
to surface in place, see plans.

INDIANA DEPARTMENT OF TRANSPORTATION

**CLASS VI DRIVE
PLAN AND SECTIONS**

SEPTEMBER 2010

STANDARD DRAWING NO. E 610-DRIV-06



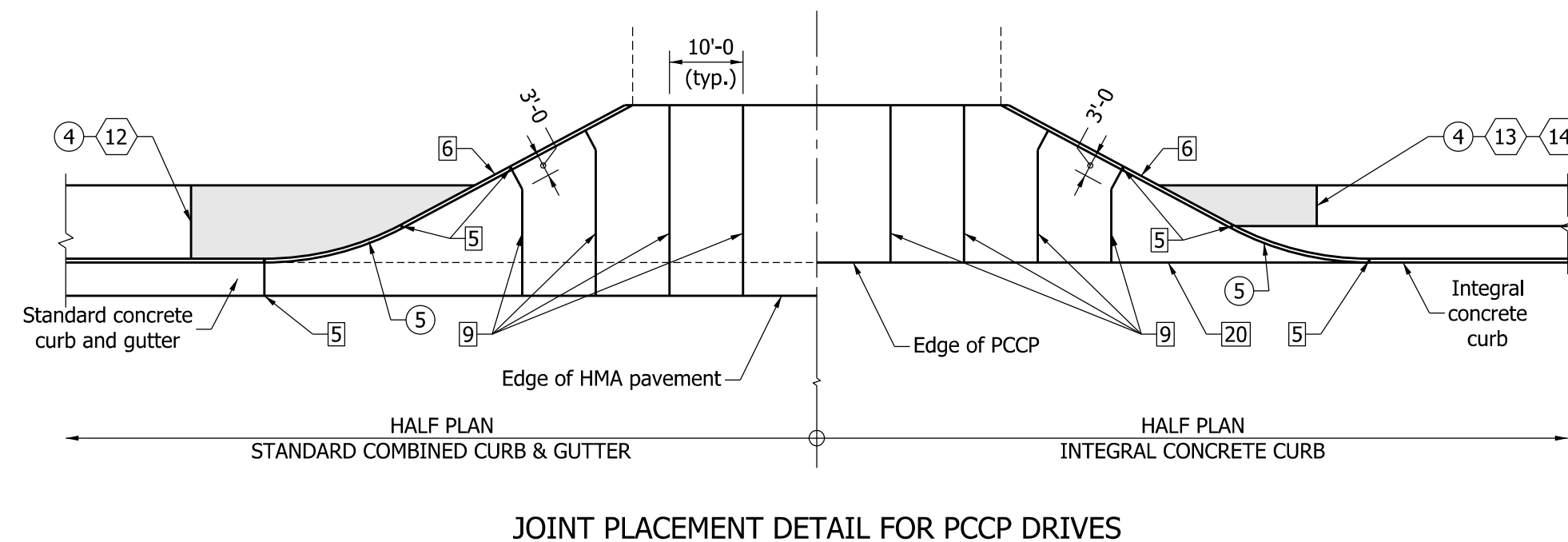
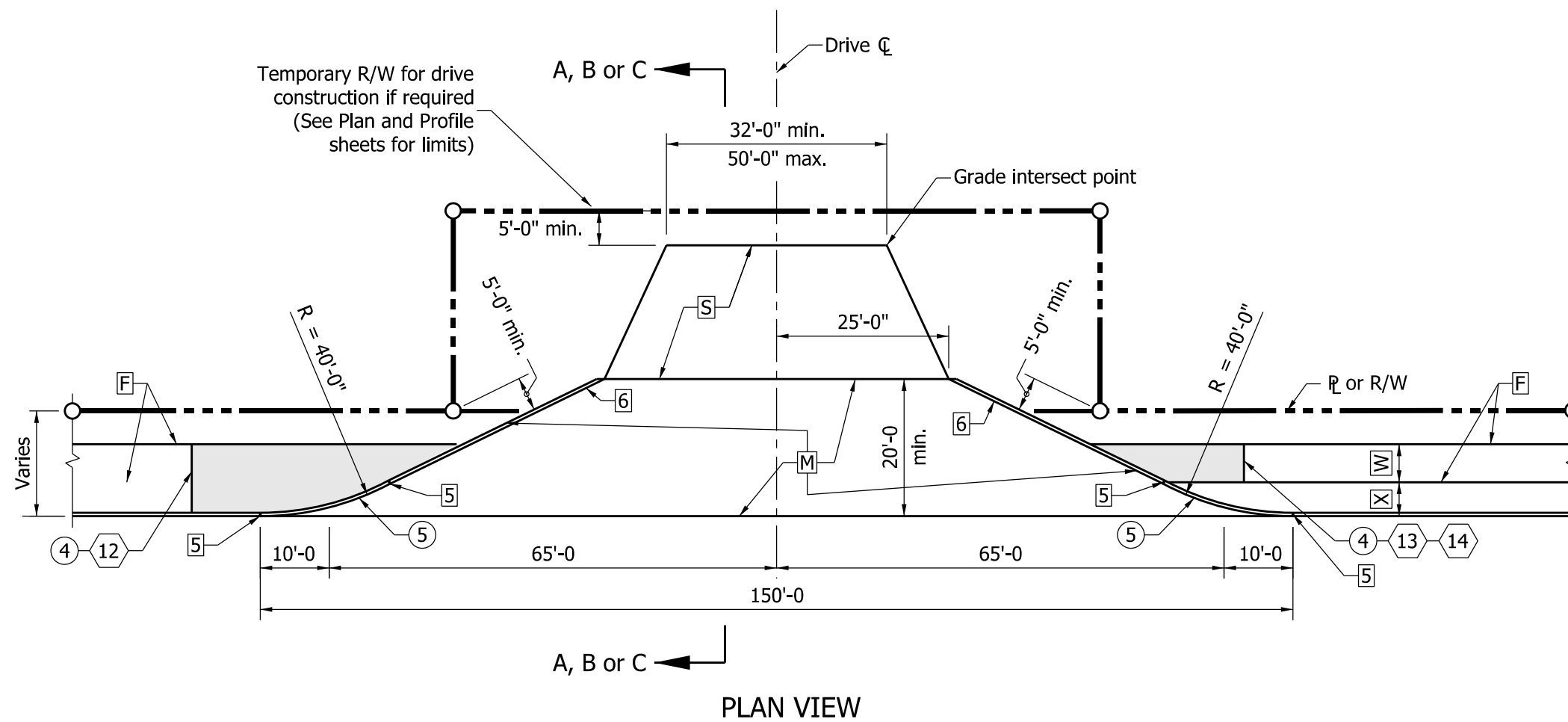
DESIGN STANDARDS ENGINEER

/s/ *Richard L. VanCleave* 09/01/10

DESIGN STANDARDS ENGINEER DATE

/s/ *Mark A. Miller* 09/01/10

CHIEF HIGHWAY ENGINEER DATE



NOTES:

- See Standard Drawings E 610-DRIV-13 for General Notes and additional Legend.
- See Standard Drawing E 610-DRIV-12 for sections A-A, B-B and C-C.
- Joint Placement Detail should be used with Class I, III and VII drives.
- See Standard Drawing E 604-SDWK-01 or E 604-SDWK-02 for sidewalk elevation transition details.
- See Standard Drawing E 610-DRIV-16 for details and corners.
- See Standard Drawing 503-CCPJ-02 for longitudinal joint details.

LEGEND

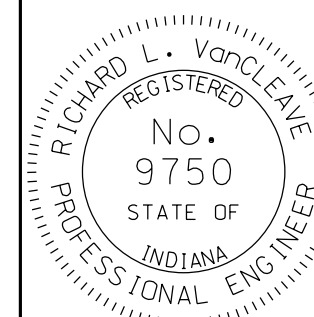
- [M] HMA for Approaches:
165#/syd HMA Surface Type B on
275#/syd HMA Intermediate Type B on
880#/syd HMA base, Type B on
subgrade treatment Type IIIA
or
PCCP for Approaches, 9 in., on
subgrade treatment Type IIIA
- [] Sidewalk elevation transition
- [S] For type and thickness equivalent to surface in place, see plans.

INDIANA DEPARTMENT OF TRANSPORTATION

CLASS VII DRIVE AND JOINT PLACEMENT DETAIL

SEPTEMBER 2012

STANDARD DRAWING NO. E 610-DRIV-07

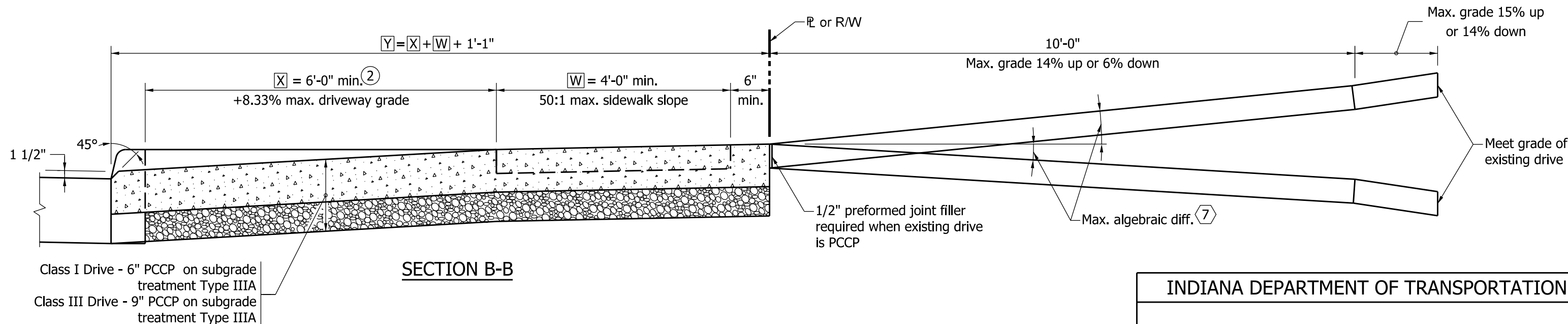
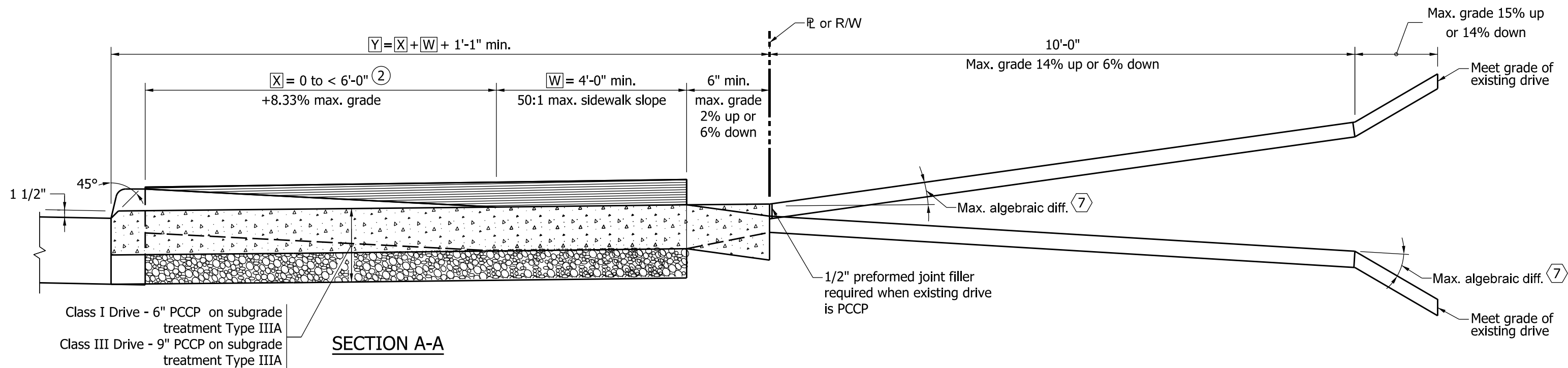


/s/ Richard L. VanCleave 09/04/12

SUPERVISOR, ROADWAY STANDARDS DATE

/s/ Mark A. Miller 09/04/12

CHIEF ENGINEER DATE



NOTES:

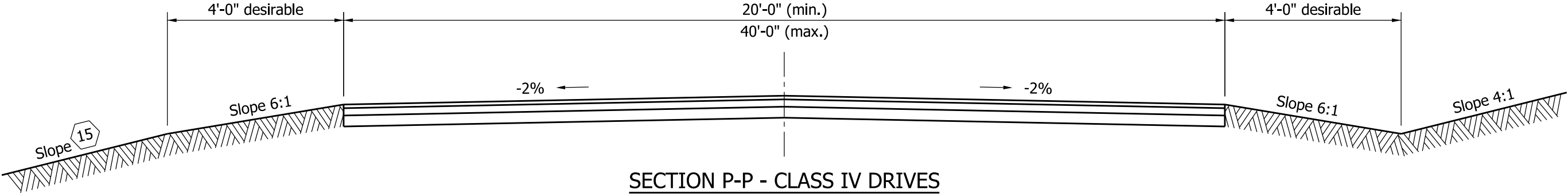
- ② The limits for X are based on a 6" curb height. For other curb heights, the limits for X shall be adjusted.
3. See Standard Drawing E 604-SDWK-01 or E 604-SDWK-02 for sidewalk elevation transition details.
4. See Standard Drawing E 610-DRIV-13 for General Notes.

LEGEND

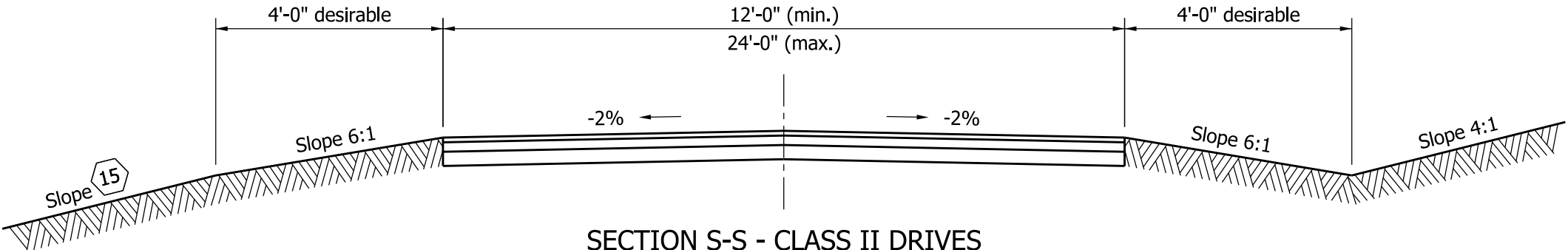
- W = Width of sidewalk
- X = Distance between back face of curb to sidewalk.
- Y = Distance from front face of curb to R/W .
- = Sidewalk elevation transition section view.
- = PCCP

INDIANA DEPARTMENT OF TRANSPORTATION			
CLASS I AND CLASS III DRIVE GRADE PROFILES			
SEPTEMBER 2010			
STANDARD DRAWING NO.		E 610-DRIV-08	
	/s/ <i>Richard L. VanCleave</i>		09/01/10
	DESIGN STANDARDS ENGINEER		DATE
	/s/ <i>Mark A. Miller</i>		09/01/10
DESIGN STANDARDS ENGINEER		CHIEF HIGHWAY ENGINEER	
		DATE	

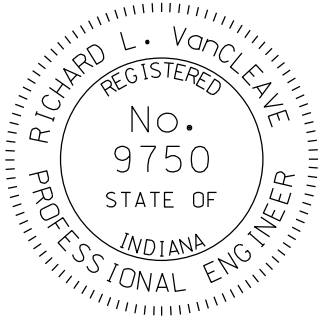
- Notes:
- 1. See Standard Drawing E 610-DRIV-02 for Class II Drive details.
 - 2. See Standard Drawing E 610-DRIV-04 for Class IV Drive details.
 - 3. See Standard Drawing E 610-DRIV-13 for General Notes.

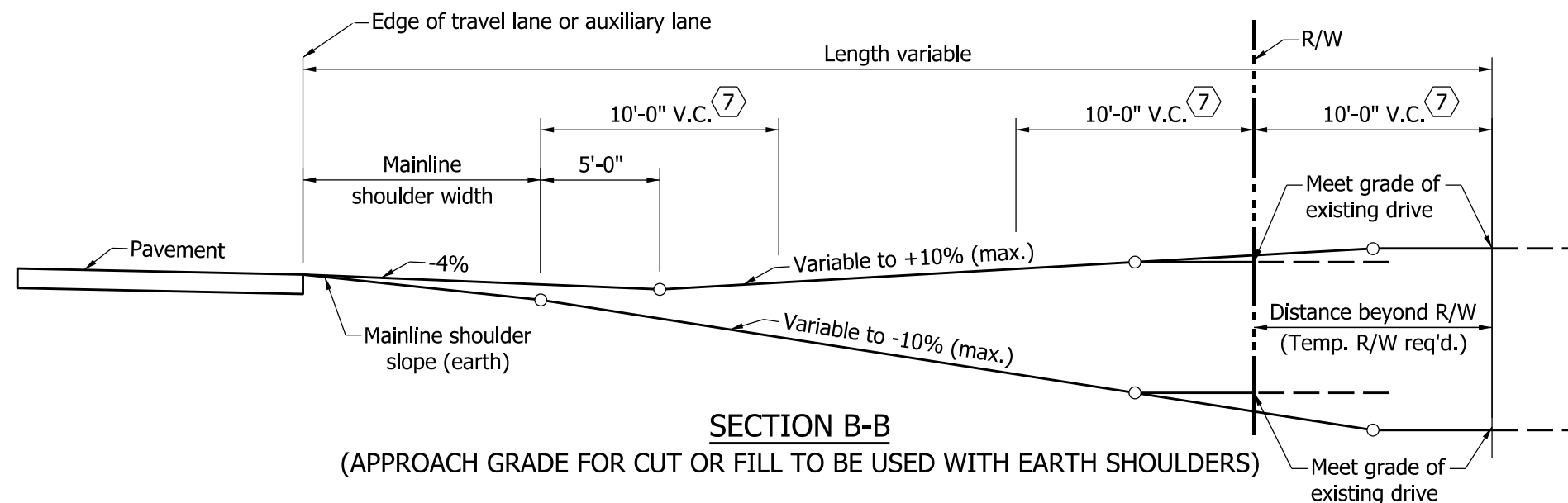


SECTION P-P - CLASS IV DRIVES

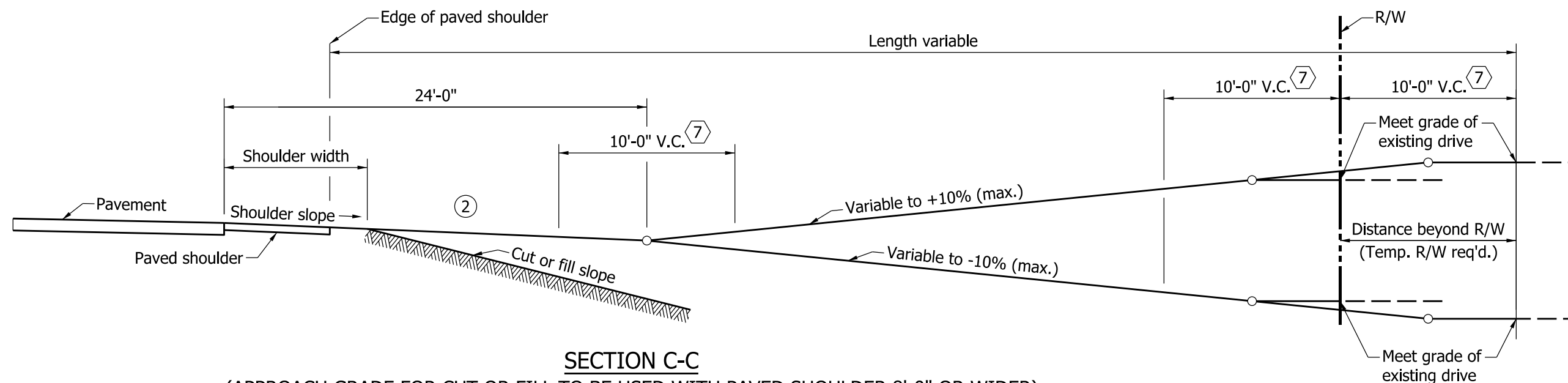


SECTION S-S - CLASS II DRIVES

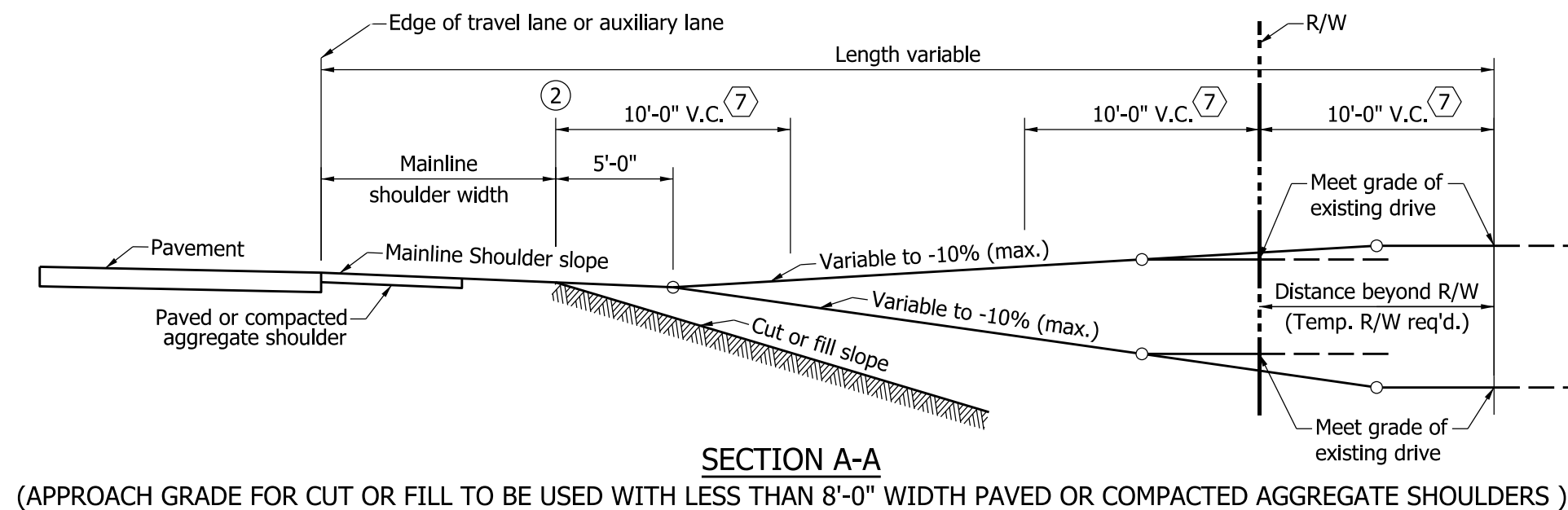
INDIANA DEPARTMENT OF TRANSPORTATION			
CLASS II AND CLASS IV SECTIONS			
SEPTEMBER 2010			
STANDARD DRAWING NO.		E 610-DRIV-09	
	/s/ <i>Richard L. VanCleave</i>	09/01/10	
	DESIGN STANDARDS ENGINEER	DATE	
	/s/ <i>Mark A. Miller</i>	09/01/10	
DESIGN STANDARDS ENGINEER	CHIEF HIGHWAY ENGINEER	DATE	



SECTION B-B
(APPROACH GRADE FOR CUT OR FILL TO BE USED WITH EARTH SHOULDERS)



SECTION C-C
(APPROACH GRADE FOR CUT OR FILL TO BE USED WITH PAVED SHOULDER 8'-0" OR WIDER)



SECTION A-A
(APPROACH GRADE FOR CUT OR FILL TO BE USED WITH LESS THAN 8'-0" WIDTH PAVED OR COMPACTED AGGREGATE SHOULDERS)

Notes:

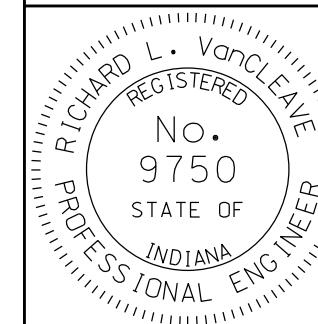
- See Standard Drawing E 610-DRIV-02, -04 and -05 for location of Sections A-A, B-B and C-C.
- Where physical restrictions limit the space available for the construction of a drive from a roadway in an embankment section the downgrade breakpoint of the drive may begin at the edge of the shoulder without a crest vertical curve if the algebraic difference in grades meets the criteria in Note 7 on Standard Drawing E 610-DRIV-13.

INDIANA DEPARTMENT OF TRANSPORTATION

**CLASS II, IV & V DRIVES
APPROACH GRADES**

SEPTEMBER 2010

STANDARD DRAWING NO. E 610-DRIV-10



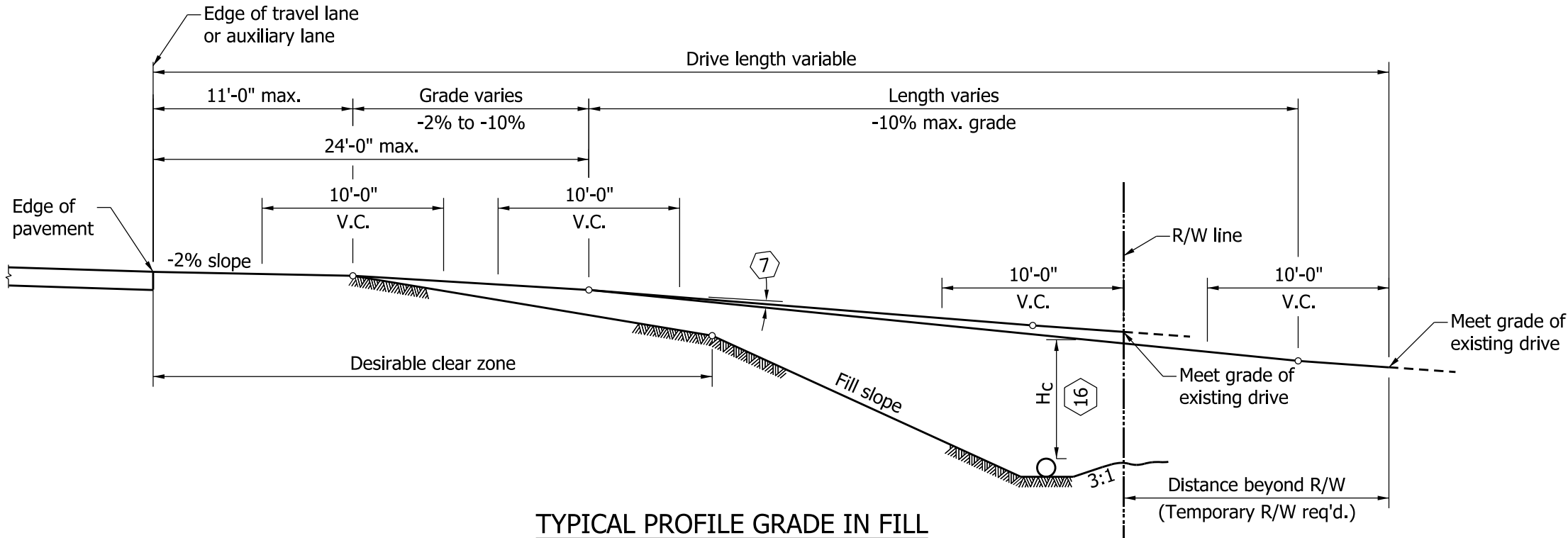
DESIGN STANDARDS ENGINEER

/s/ *Richard L. VanCleave* 09/01/10
DESIGN STANDARDS ENGINEER DATE

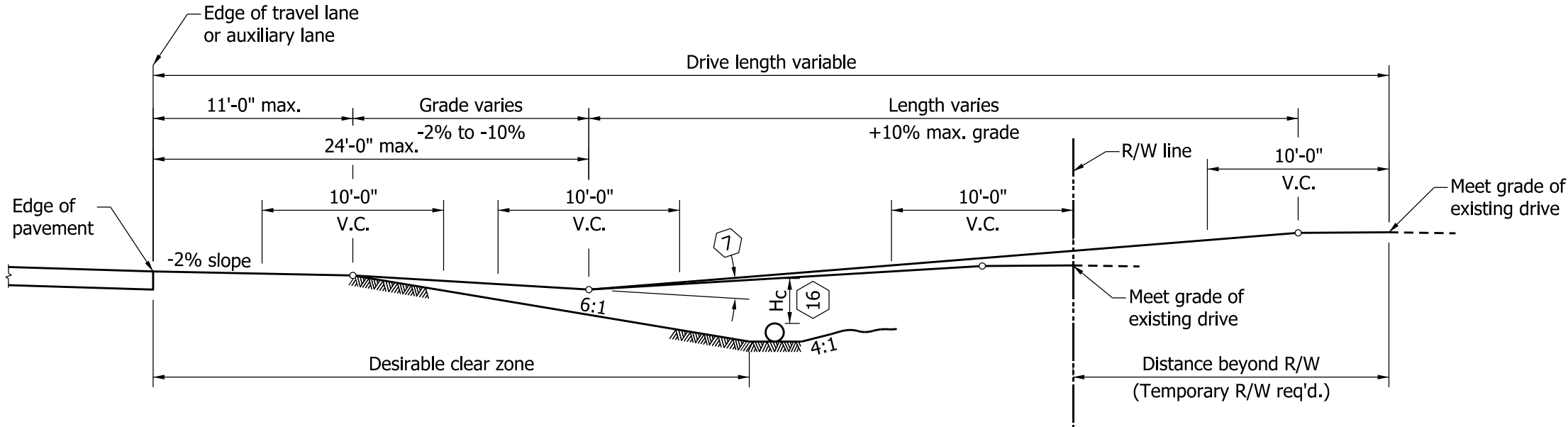
/s/ *Mark A. Miller* 09/01/10
CHIEF HIGHWAY ENGINEER DATE

NOTES

- 1. See Standard Drawing E 610-DRIV-06 for plan and sections of Class VI Drive.
- 2. See Standard Drawings E 610-DRIV-13 for General Notes.



TYPICAL PROFILE GRADE IN FILL



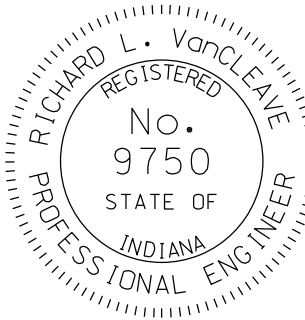
TYPICAL PROFILE GRADE IN CUT

INDIANA DEPARTMENT OF TRANSPORTATION

CLASS VI DRIVE
TYPICAL PROFILE GRADES

SEPTEMBER 2010

STANDARD DRAWING NO. E 610-DRIV-11



DESIGN STANDARDS ENGINEER

/s/ Richard L. VanCleave 09/01/10

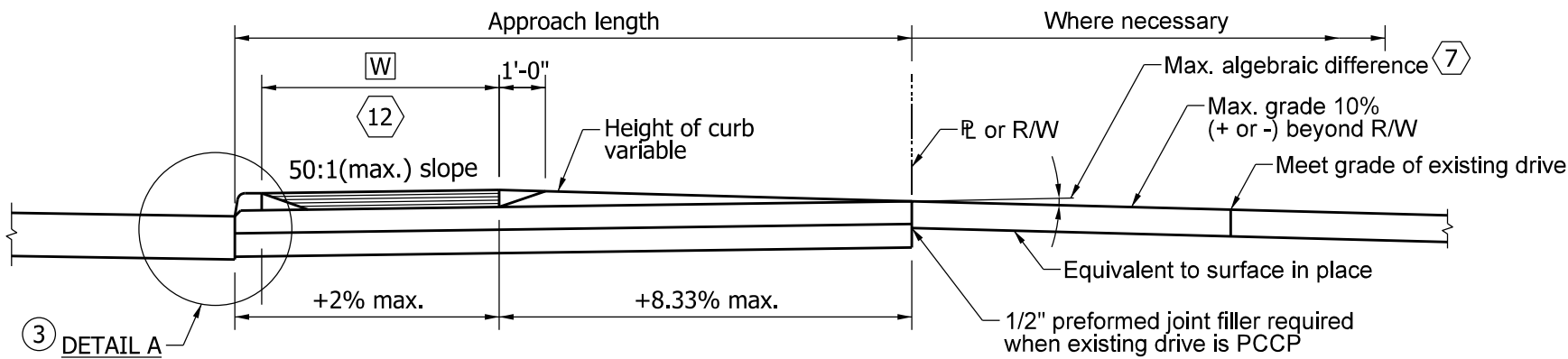
DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller 09/01/10

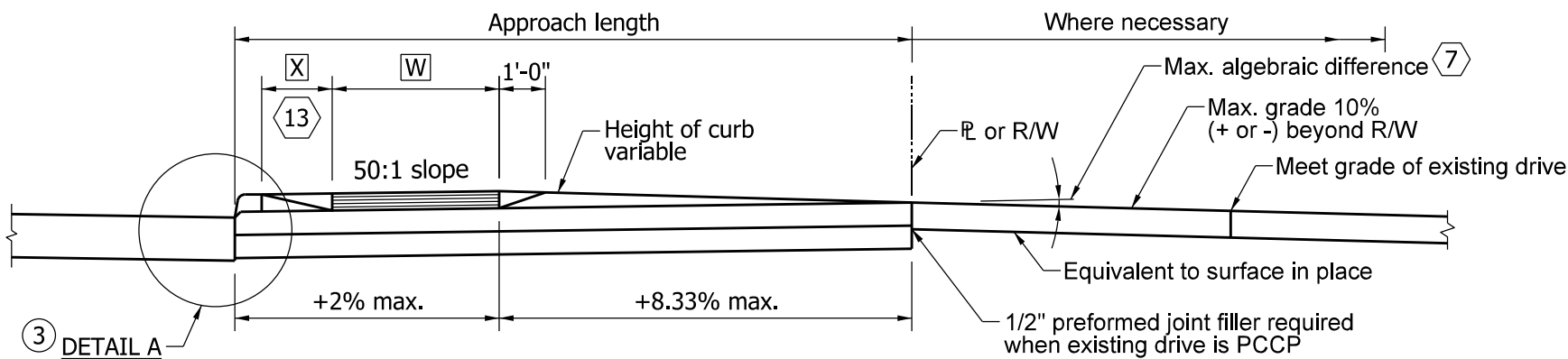
CHIEF HIGHWAY ENGINEER DATE

NOTES

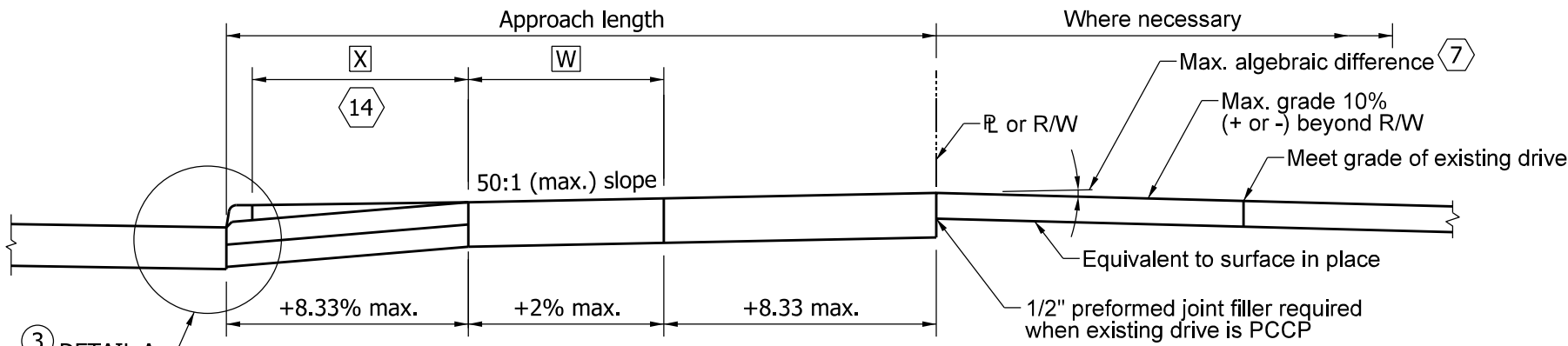
- 1. See Standard Drawing E 610-DRIV-07 for plan of Class VII Drive.
- 2. See Standard Drawings E 610-DRIV-13 for General Notes.
- 3 See Standard Drawing E 610-DRIV-16 for keyway joint shown in Detail A and for joint placement and corner reinforcement.



SECTION A-A



SECTION B-B



SECTION C-C

INDIANA DEPARTMENT OF TRANSPORTATION

CLASS VII DRIVE
PROFILE GRADE

SEPTEMBER 2010

STANDARD DRAWING NO. E 610-DRIV-12



/s/ Richard L. VanCleave 09/01/10

DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller 09/01/10

CHIEF HIGHWAY ENGINEER DATE

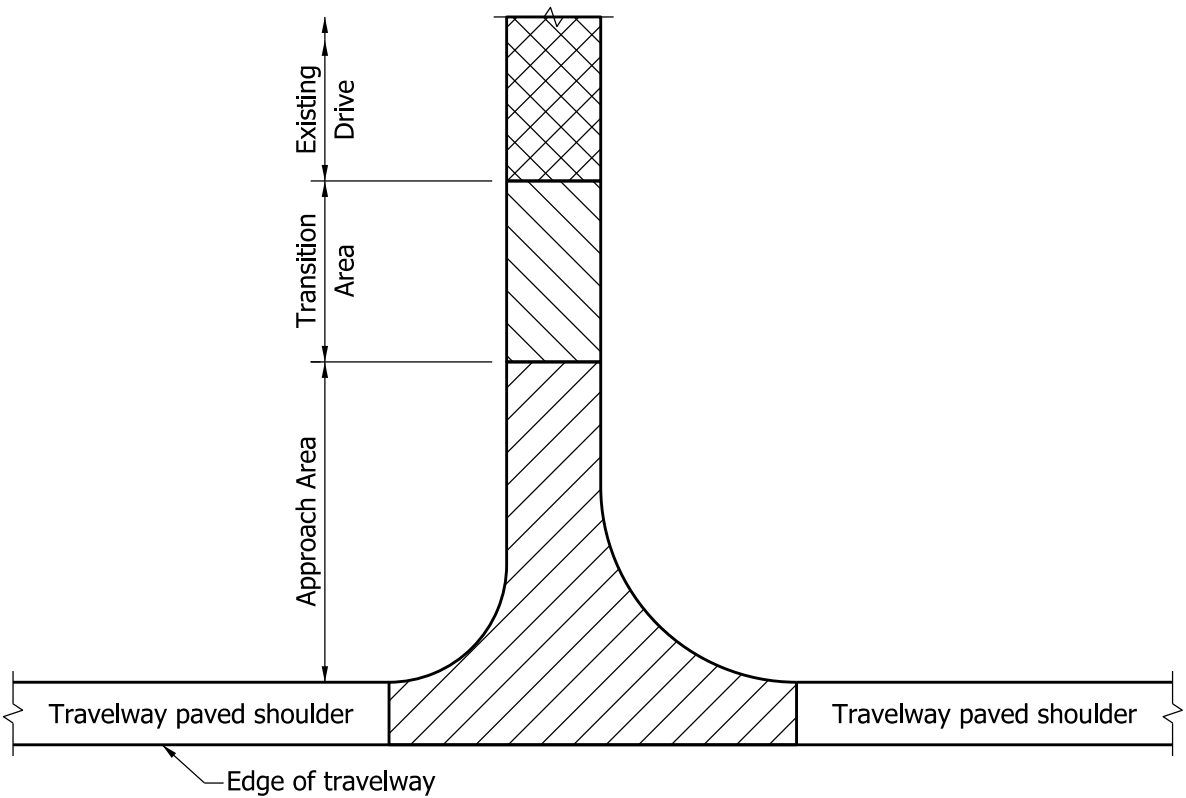
DESIGN STANDARDS ENGINEER

GENERAL NOTES

1. These notes apply to Standard Drawings E 610-DRIV-01 through 12.
2. If a PCCP approach is Class III or Class IV, the radii shall be constructed using ear construction Type C as detailed on Standard Drawing E 605-ERCN-02.
3. When the maximum approach grade of ±10% does not meet the grade of the existing drive before the R/W line, the approach grade of ±10% shall extend beyond the R/W to the point of intersection with the existing driveway grade. Construction beyond the R/W line shall be done in temporary R/W.
4. The appropriate pipe end treatment should be provided for pipes located either inside the clear zone or outside the clear zone.
7. The maximum algebraic difference in grades shall not exceed 8% for crested grade nor 12% for sagged grades for Types I and III drives, nor 11% for crested grade and 14% for sagged grades for Types II, IV, and V drives.
8. The minimum driveway pavement sections for Class III, IV, VI and VII Drives have been designed for 400 trucks per day. If the truck traffic count is greater than 400 per day, the required pavement section shall be as shown elsewhere on the plans.
11. See Standard Drawing E 610-DRIV-14 for shoulder treatment at driveways.
12. Curb Ramp Type H, as shown on Standard Drawing E 604-SWCR-09, when the approach is signalized, or a sidewalk elevation transition as shown on Standard Drawing E 604-SDWK-02 shall be used when sidewalk is adjacent to curb.
13. When X is equal to or greater than 2 ft but less than 6 ft, either a Curb Ramp Type G as shown on Standard Drawing E 604-SWCR-09, when the approach is signalized, or a sidewalk elevation transition as shown on Standard Drawing E 604-SDWK-01 shall be used.
14. When X is equal to or greater than 6 ft, no curb ramp or sidewalk elevation transition is required unless the curb height is in excess of 6 inches.
15. Embankment slopes within the mainline clear zone for new construction/reconstruction projects or within the obstruction-free zone for 3R projects should be as shown in the table on Standard Drawing E 610-PRAP-04. Outside the clear zone or the obstruction-free zone, the embankment slopes should desirably be 4:1 but not steeper than 3:1.
16. H_C - earth cover over culvert shall be 1 foot or greater.

LEGEND

- 5 1/2 in. preformed joint filler
- 6 Monolithic curb for PCCP Approaches or concrete curb and gutter for HMA for Approaches.
- 9 Longitudinal joint
- F Concrete sidewalk
- S For type and thickness equivalent to surface in place, see plans.
- 20 Keyway construction joint
- X = Distance between back face of curb and sidewalk.
- W = Width of sidewalk
- PCCP
- Curb ramp, if signalized, or typically, sidewalk elevation transition.
- Curb ramp or sidewalk elevation transition section view.

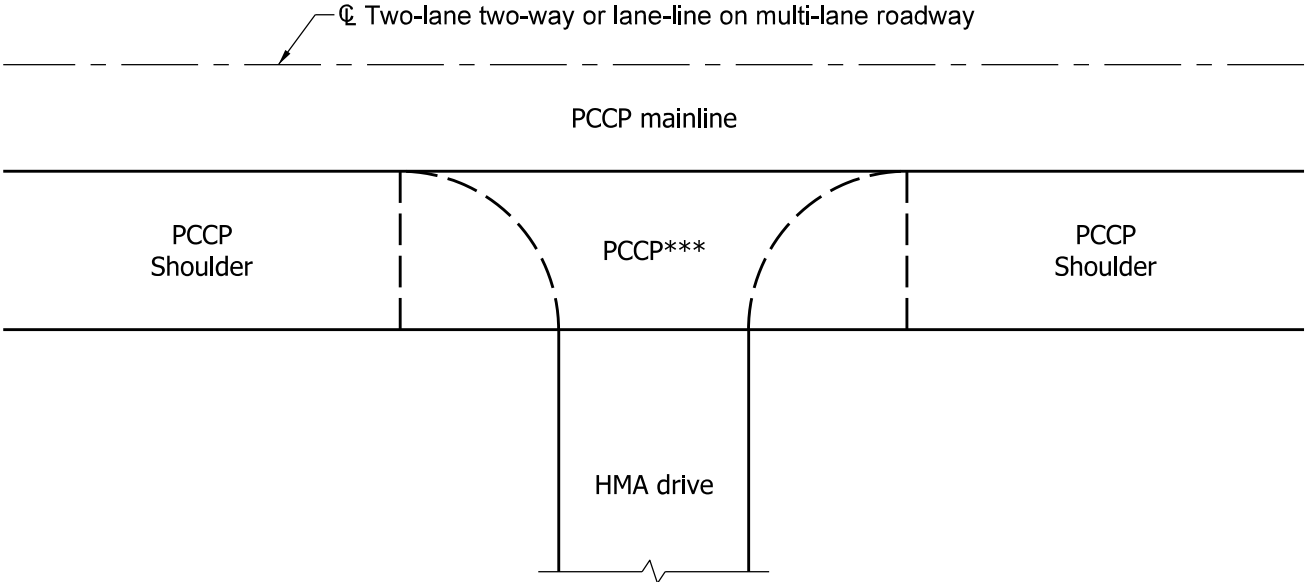
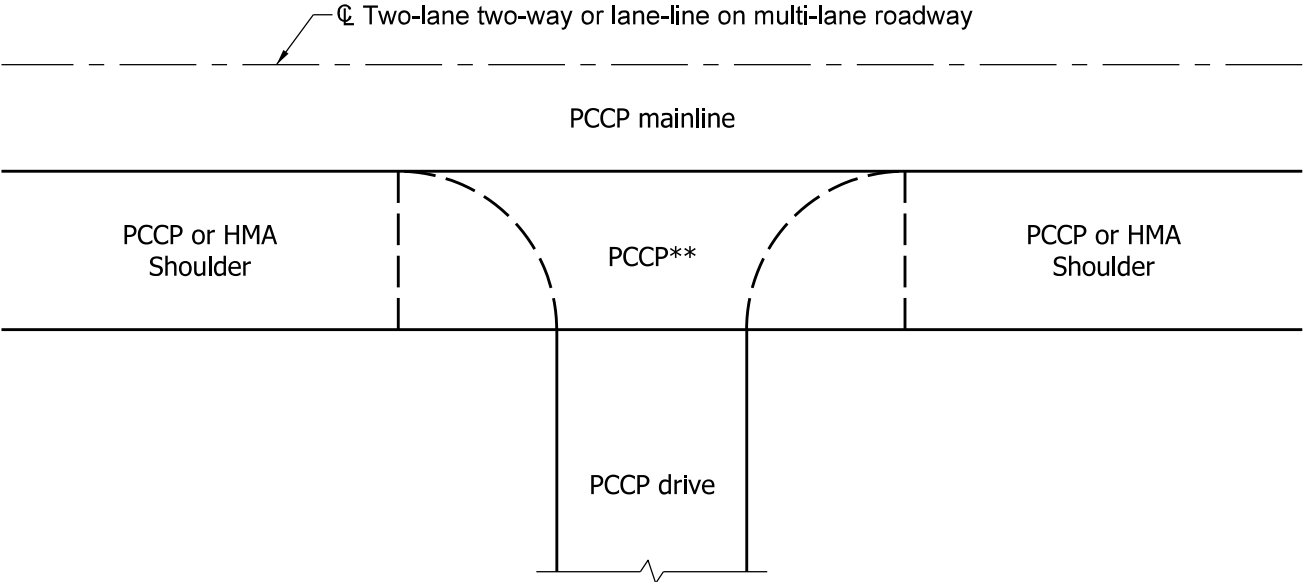
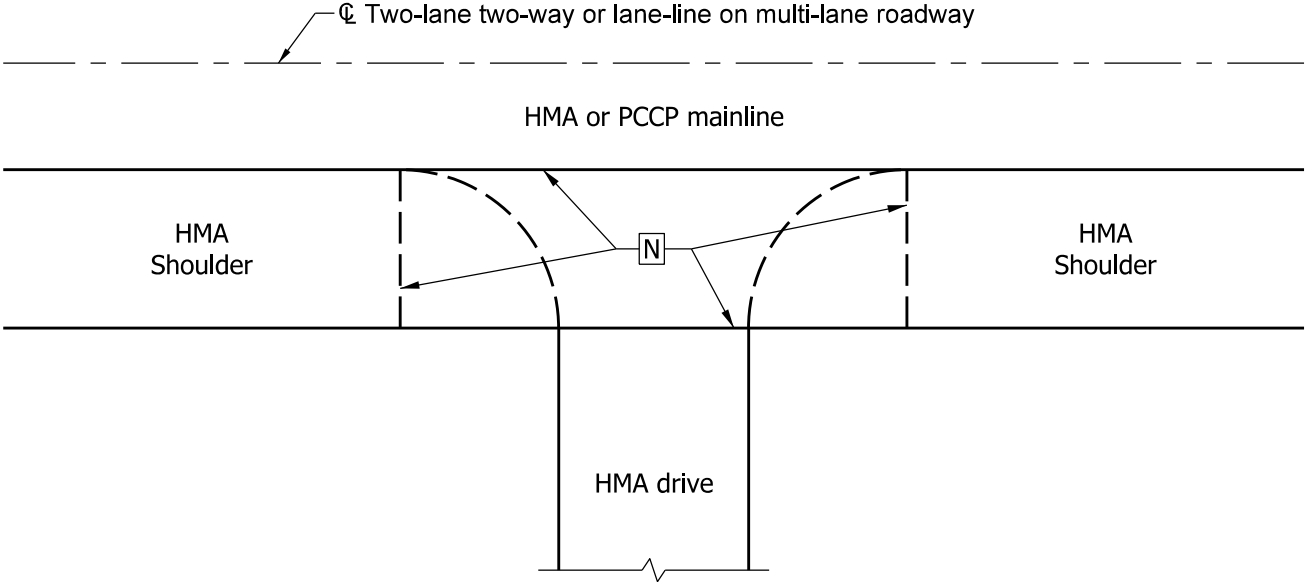
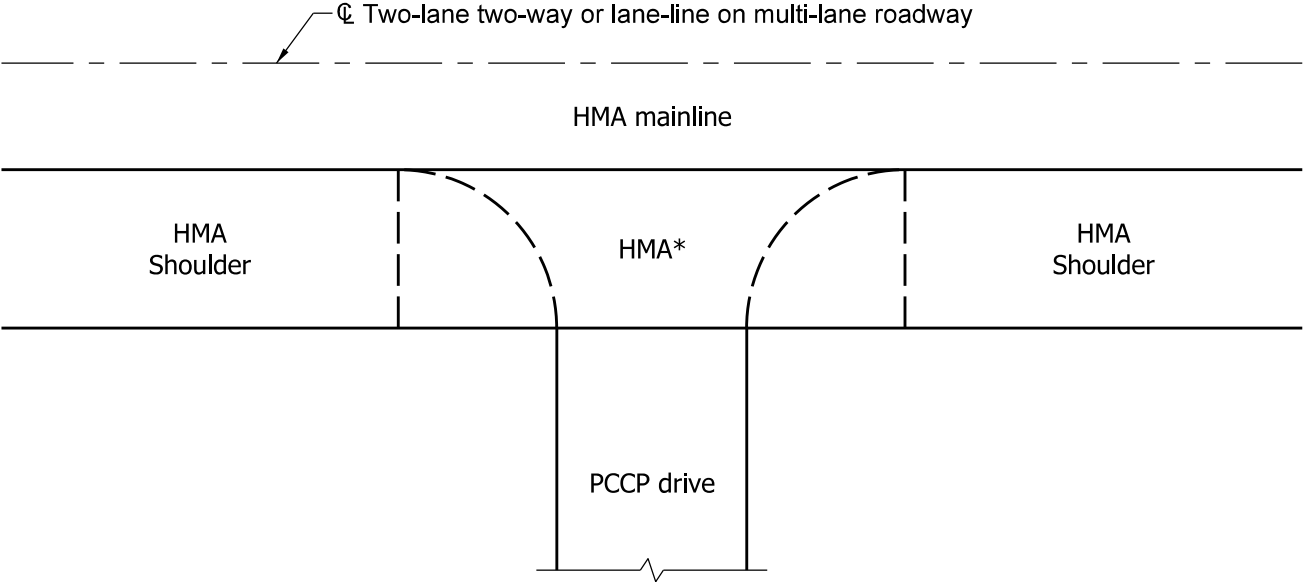


TYPE I, II, III, IV, VI AND VII DRIVES

NOTES

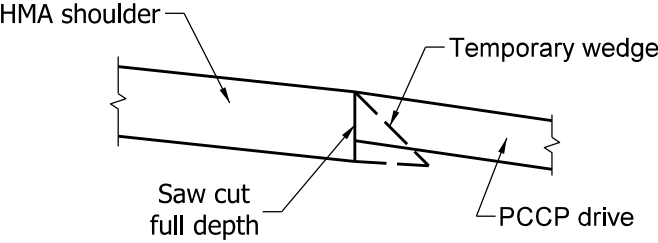
1. The pay limits shown hereon generally apply to Type I, II, III, IV, VI and VII Drives as shown on Standard Drawings E 610-DRIV-01, -02, -03, 04, -06 and -07 respectively.
2. Approach Area - HMA for Approaches or PCCP for Approaches. This area typically extends from the edge of an 8 foot or wider paved travelway shoulder to the right of way or property line or within a few feet of the right of way or property line where the new drive meets the grade of the existing drive, depending on the site-specific conditions. Where the travelway paved shoulder width is less than 8 feet, this area will be measured from the edge of travelway.
3. Transition Area - an equivalent pavement section to the existing drive. This area typically extends from the right of way or property line to a point on the property owner's drive where the new drive grade can match the existing drive grade.

INDIANA DEPARTMENT OF TRANSPORTATION			
DRIVES GENERAL NOTES AND LEGEND			
SEPTEMBER 2010			
STANDARD DRAWING NO.		E 610-DRIV-13	
	/s/ <i>Richard L. VanCleave</i>	09/01/10	
	DESIGN STANDARDS ENGINEER	DATE	
	/s/ <i>Mark A. Miller</i>	09/01/10	
DESIGN STANDARDS ENGINEER	CHIEF HIGHWAY ENGINEER	DATE	



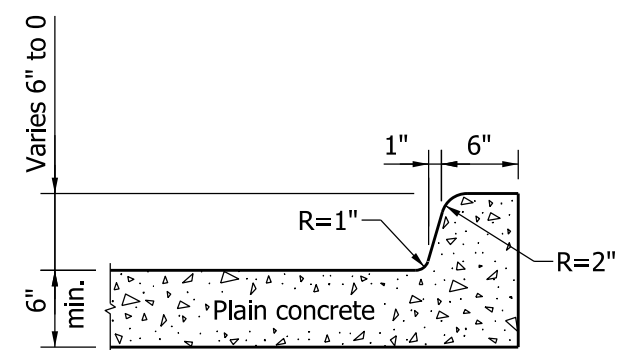
LEGEND

- N** Greater thickness of drive or shoulder section
- * Mainline pavement section
- ** Greater thickness of PCCP drive or PCCP shoulder
- *** Same section as mainline shoulder

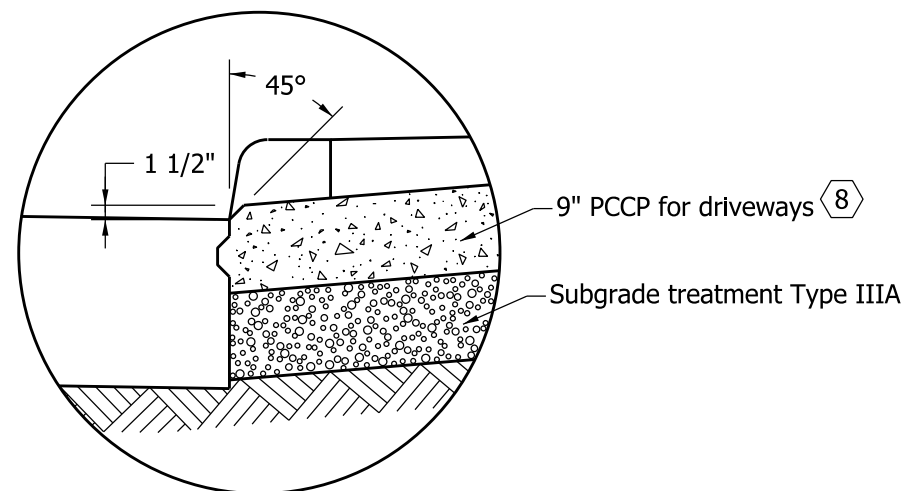


TEMPORARY EDGE OF HMA SHOULDER
(TREATMENT WHERE PCCP DRIVE IS TO BE CONSTRUCTED)

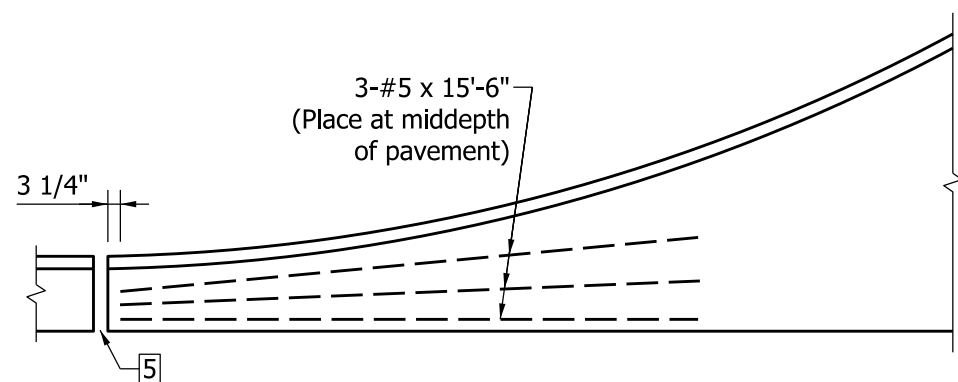
INDIANA DEPARTMENT OF TRANSPORTATION	
SHOULDER TREATMENT AT DRIVEWAYS	
SEPTEMBER 2010	
STANDARD DRAWING NO. E 610-DRIV-14	
DESIGN STANDARDS ENGINEER	/s/ <i>Richard L. VanCleave</i> 09/01/10 DESIGN STANDARDS ENGINEER DATE /s/ <i>Mark A. Miller</i> 09/01/10 CHIEF HIGHWAY ENGINEER DATE



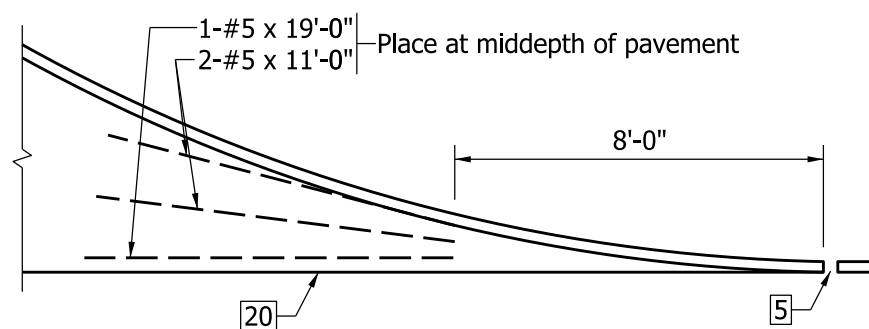
MONOLITHIC CURB



DETAIL A



COMBINED CURB & GUTTER



INTEGRAL CONCRETE CURB

TYPICAL CORNER REINFORCING

NOTES

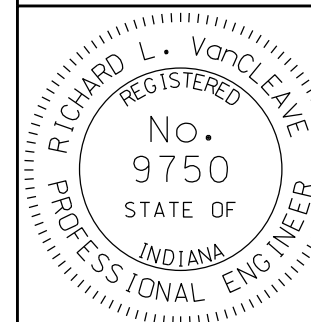
1. See Standard Drawing E 610-DRIV-07 for plan and Standard Drawing E 610-DRIV-12 for profile of Class VII drive.
2. See Standard Drawings E 610-DRIV-13 for General Notes and additional Legend.
3. See Standard Drawing E 610-DRIV-07 for keyway joint shown in Detail A and for joint placement and corner reinforcement.
4. See Standard Drawing E 605-ERCN-01 for ear construction Type A. See Standard Drawing E 605-ERCN-02 for ear construction Type B.

INDIANA DEPARTMENT OF TRANSPORTATION

CLASS VII DRIVE
JOINT PLACEMENT AND CORNERS

SEPTEMBER 2010

STANDARD DRAWING NO. E 610-DRIV-16



/s/ Richard L. VanCleave 09/01/10
DESIGN STANDARDS ENGINEER DATE

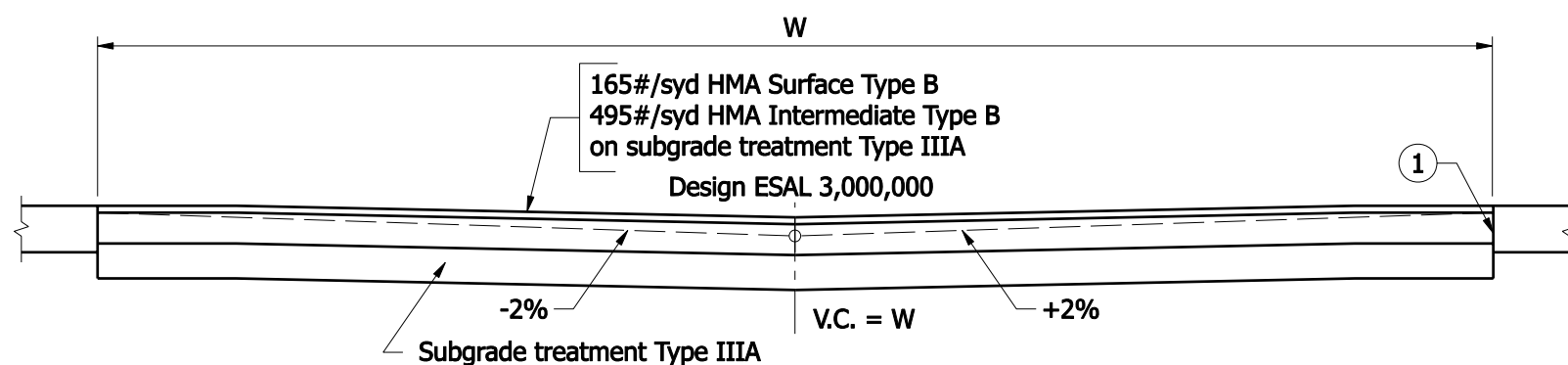
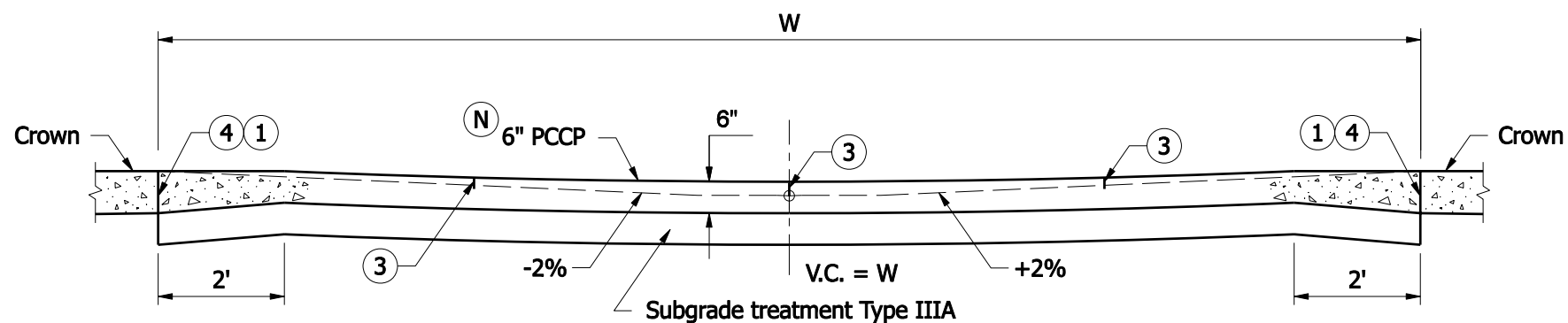
/s/ Mark A. Miller 09/01/10
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

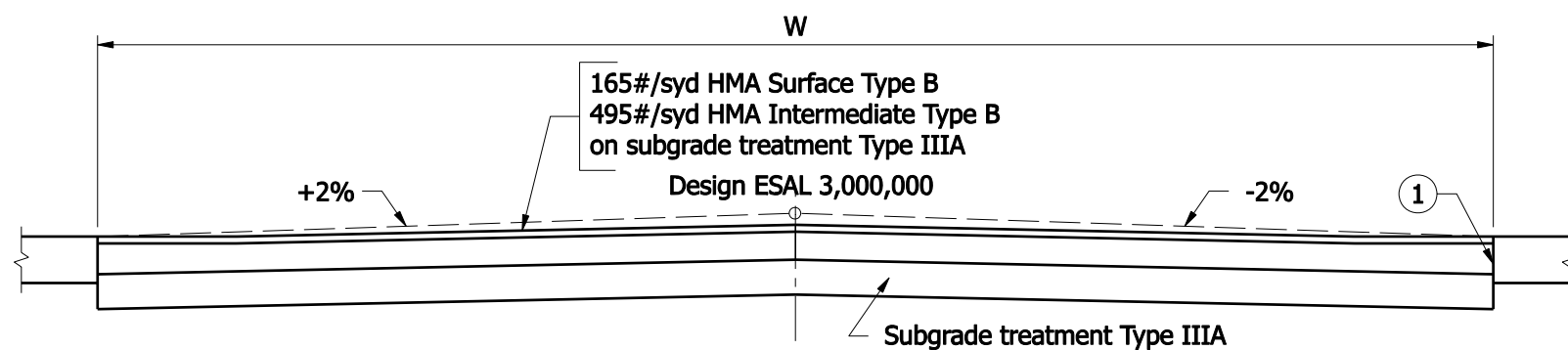
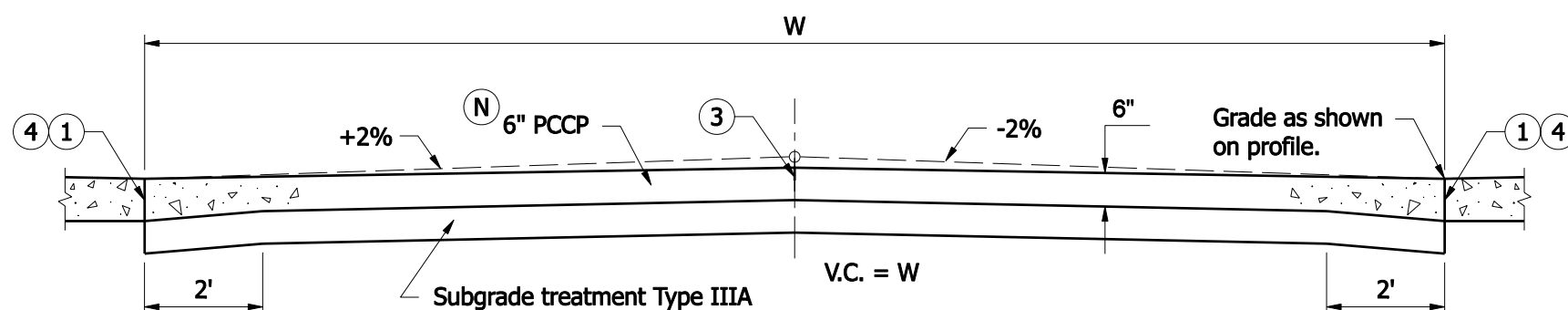


- ① Thickened edge
2. See Standard Drawings:
E 605-ERCN-01 for TYPE "A" Ear Construction
E 605-ERCN-02 for TYPE "B" Ear Construction
E 610-DRIV-18 for sections A-A and B-B
- ③ Contraction Joint Type D-1, see Standard Drawing E 503-CCPJ-01 for details.
- ④ Keyway Construction Joint, see Standard Drawing E 610-DRIV-16 for details.
- ⑤ 1" Preformed Joint Filler.
6. Private drive crossovers shall be constructed of HMA or PCCP as shown on the plans section unless otherwise directed.
- ⑦ Integral Concrete Curb, see Standard Drawing E 605-CCIN-01 for details.

INDIANA DEPARTMENT OF TRANSPORTATION	
PRIVATE DRIVE CROSSOVER PLANS	
SEPTEMBER 2010	
STANDARD DRAWING NO.	E 610-DRIV-17
	<i>/s/ Richard L. VanCleave</i> 09/01/10 DESIGN STANDARDS ENGINEER DATE
	<i>/s/ Mark A. Miller</i> 09/01/10 CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER	



**SECTION A-A
TO BE USED WITH CROWN PAVEMENTS.**



**SECTION B-B
TO BE USED WITH 3 in. TILTED PAVEMENTS**

NOTES :

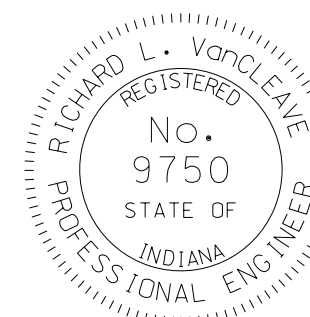
- (N) Private drive crossover shall be constructed of HMA or PCCP as shown on the plans, unless otherwise directed.
- (1) Thickened edge to be same thickness as mainline pavement.
- 2. For location of cross sections see Standard Drawing E 610-DRIV-17.
- (3) Contraction joint type D-1, see Standard Drawing E 501-CCPJ-06 for details, and Standard Drawing E DRIV-17 for spacing.
- (4) Keyway construction joint, see Standard Drawing E 610-DRIV-16 for details.

INDIANA DEPARTMENT OF TRANSPORTATION

**PRIVATE DRIVE CROSSOVERS
CROSS SECTIONS**

SEPTEMBER 2007

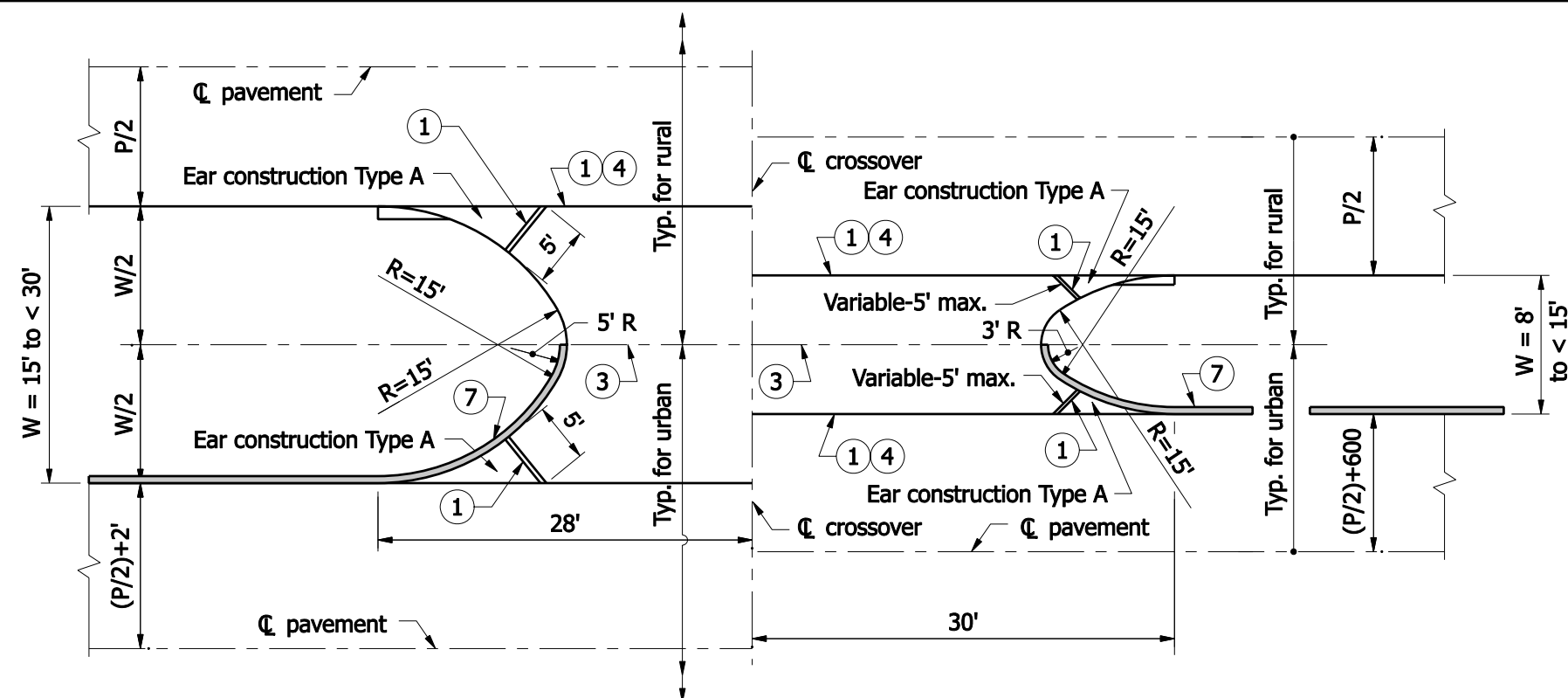
STANDARD DRAWING NO. E 610-DRIV-18



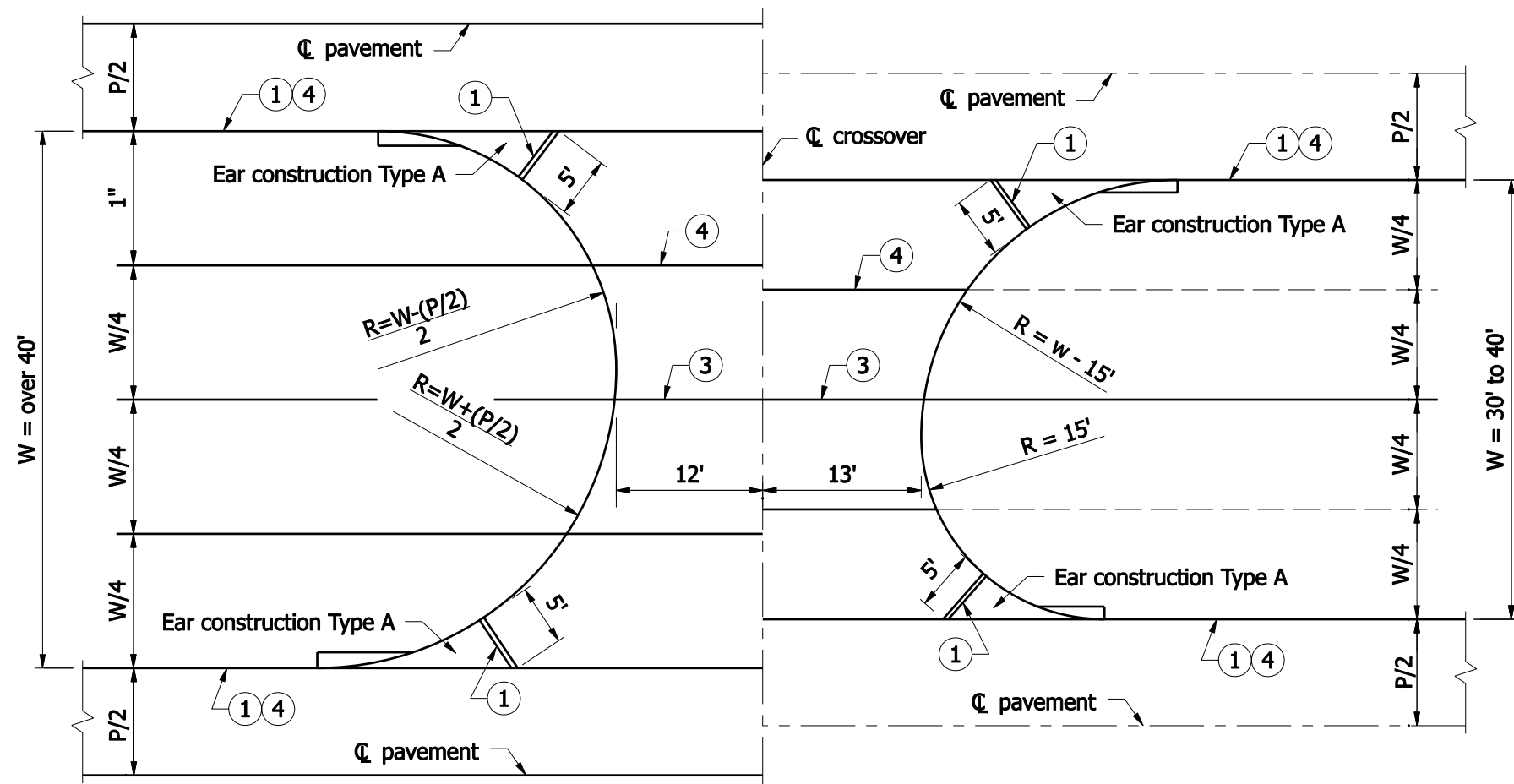
DESIGN STANDARDS ENGINEER

/s/ Richard L. VanCleave 09/04/07
DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller 09/04/07
CHIEF HIGHWAY ENGINEER DATE



COMMERCIAL DRIVE CROSSOVER PLAN FOR $W = 8'$ to less than $30'$



COMMERCIAL DRIVE CROSSOVER PLAN FOR $W = 30'$ to over $40'$

NOTES :

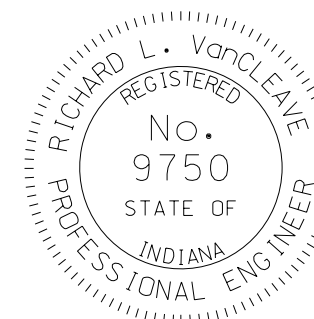
- 1 Thickened edge
- 2 See Standard Drawings :
E 605-ERCN-01 for TYPE "A" ear construction
E 605-ERCN-02 for TYPE "B" ear construction
- 3 Contraction joint type D-1, see Standard Drawing
E 503-CCPJ-01 for details.
- 4 Keyway construction joint - see Drawing
E 610-DRIV-16 for details.
- 6 Grade for commercial drive crossover shall be
the same as for private drive crossover. For cross
sections see Standard Drawing E 610-DRIV-18, except
the PCCP thickness shall be 9 in.
- 7 Integral concrete curb, see Standard Drawing
E 605-CCIN-01 for details.
- 8 Commercial drive crossover shall be constructed
of HMA or PCCP as shown on the plans, unless
otherwise directed by the Engineer.

INDIANA DEPARTMENT OF TRANSPORTATION

COMMERCIAL DRIVE CROSSOVERS
PLANS

SEPTEMBER 2007

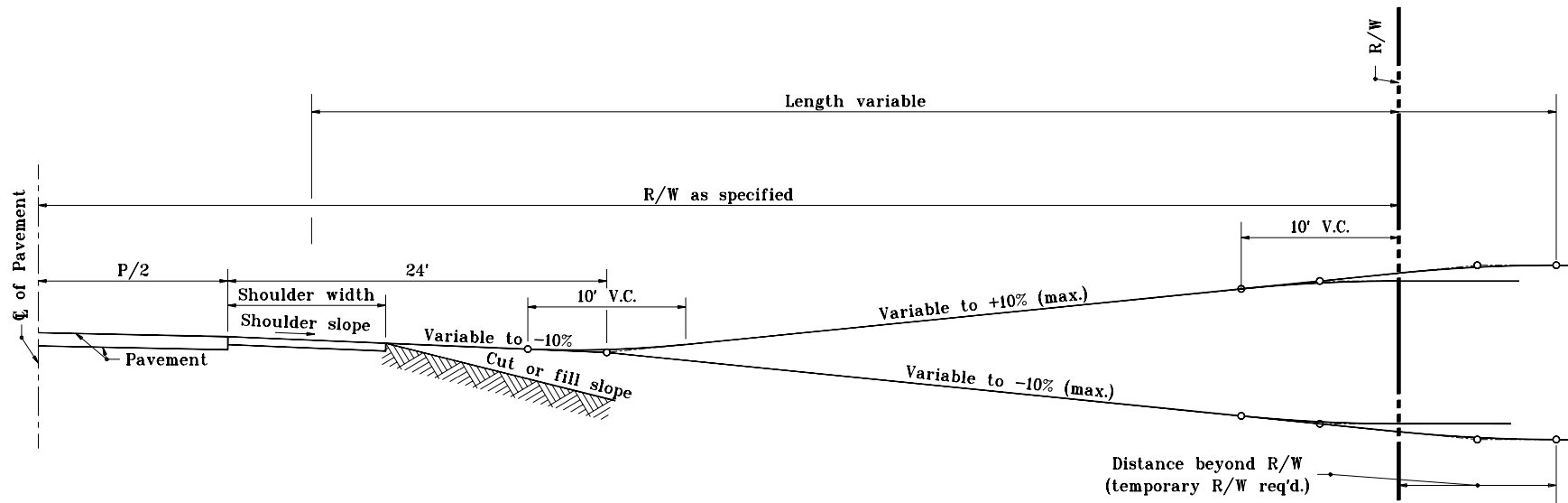
STANDARD DRAWING NO. E 610-DRIV-19



/s/ Richard L. Van Cleave 09/04/07
DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller 09/04/07
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

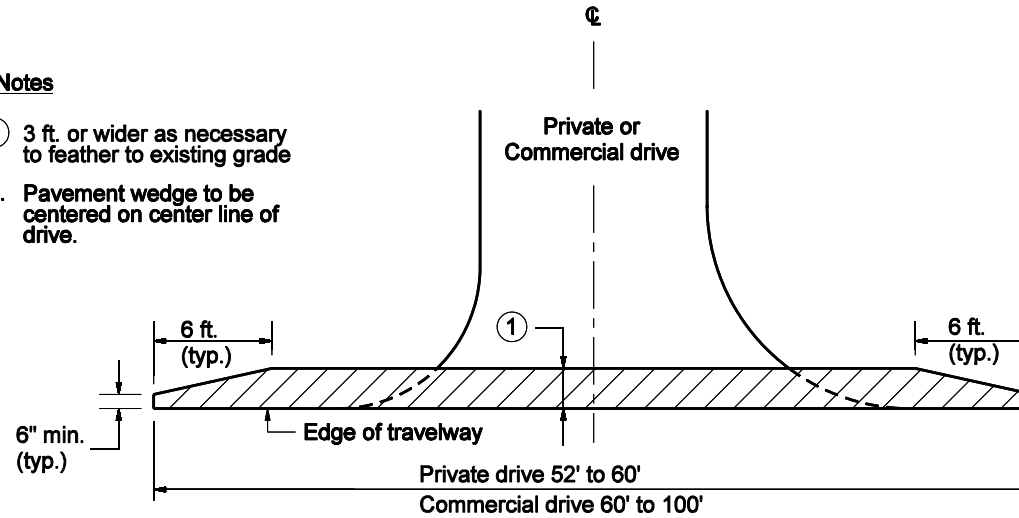


**APPROACH GRADE FOR CUT OR FILL
TO BE USED WITH PAVED SHOULDER**

INDIANA DEPARTMENT OF TRANSPORTATION	
APPROACH GRADE CUT OR FILL	
JANUARY 2000	
STANDARD DRAWING NO. E 610-DRIV-20	
	/s/ Anthony L. Uremovich 1-03-00 DESIGN STANDARDS ENGINEER DATE
	/s/ Firooz Zandi 1-03-00 CHIEF HIGHWAY ENGINEER DATE

Notes

- ① 3 ft. or wider as necessary to feather to existing grade
2. Pavement wedge to be centered on center line of drive.



 Drive area to be treated with HMA for Approaches

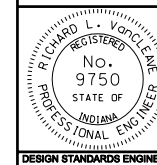
PRIVATE OR COMMERCIAL DRIVE

INDIANA DEPARTMENT OF TRANSPORTATION

PAVEMENT WEDGE LIMITS

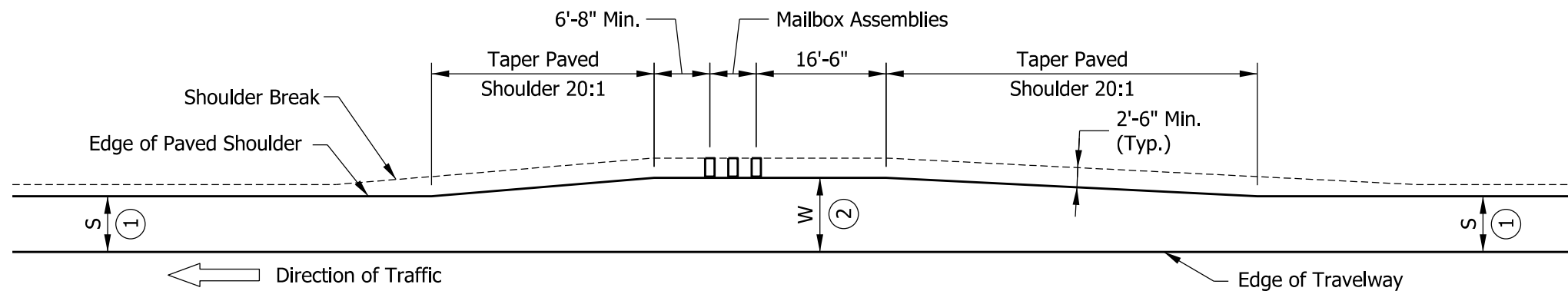
MARCH 2004

STANDARD DRAWING NO. E 610-DRIV-21

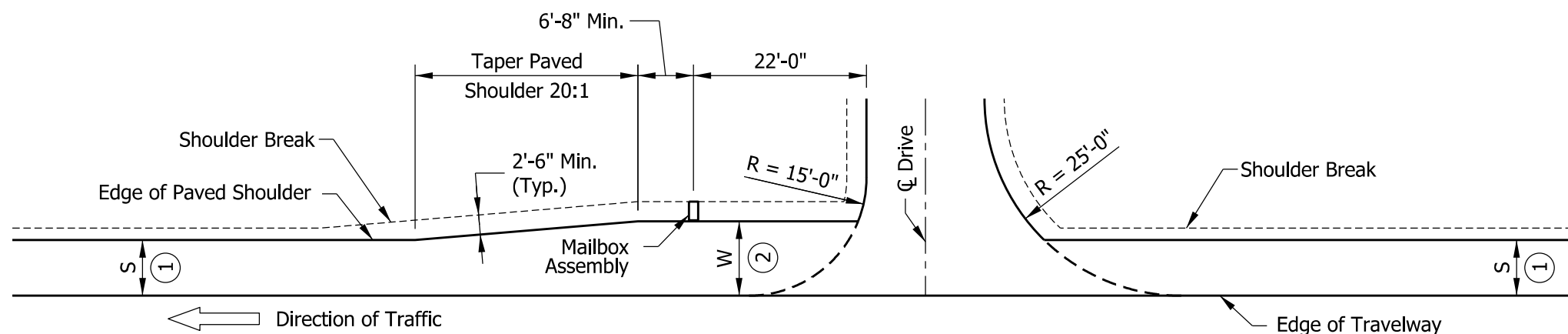


/s/ Richard L. VarCleave	3-01-04
DESIGN STANDARDS ENGINEER	DATE
/s/ Richard K. Smutzer	3-01-04
CHIEF HIGHWAY ENGINEER	DATE

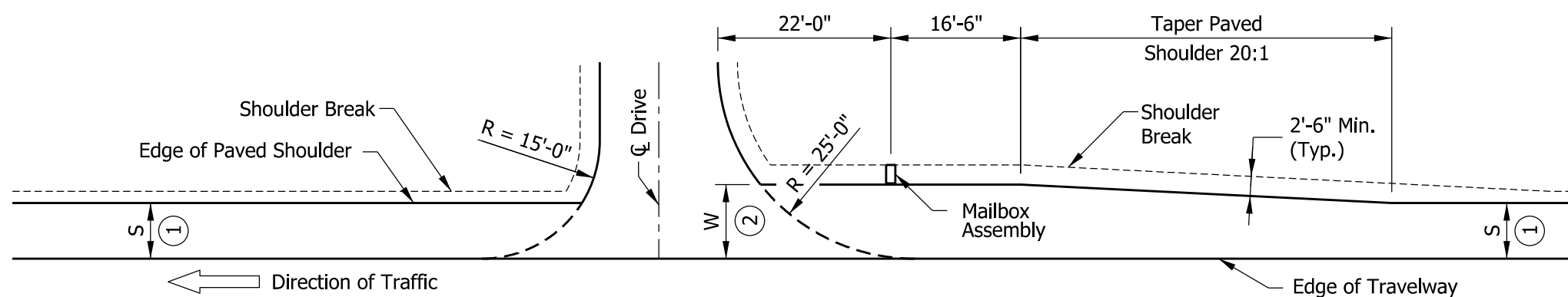
DESIGN STANDARDS ENGINEER



TYPICAL MAILBOX APPROACH



COMBINATION MAILBOX APPROACH & DRIVE
(Mailbox Located Beyond Drive)



COMBINATION MAILBOX APPROACH & DRIVE
(Mailbox Located in Advance of Drive)

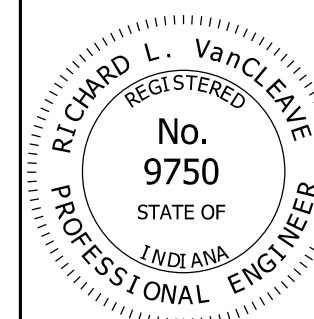
NOTES:

- ① S = Normal width of paved shoulder as shown on plans.
- ② See plans for W.
3. Mailbox approach pavement section shall be the same as the shoulder pavement section.

INDIANA DEPARTMENT OF TRANSPORTATION

MAILBOX APPROACHES
HIGH SPEED ROADWAY
(V ≥ 50 MPH)
SEPTEMBER 2014

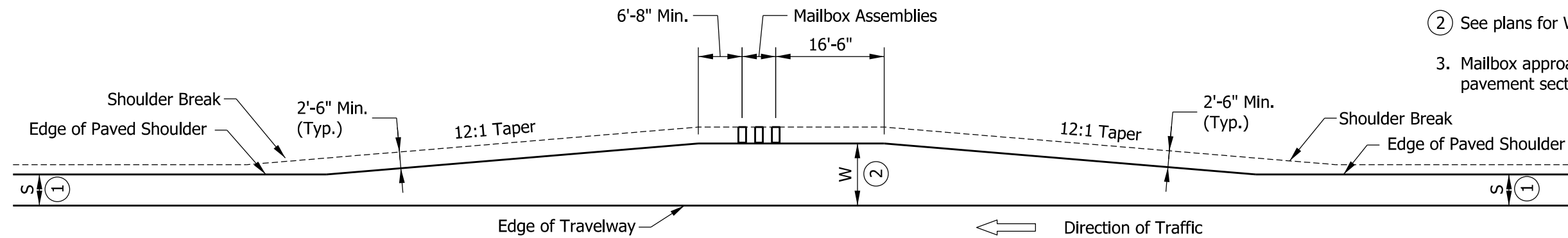
STANDARD DRAWING NO. E 610-MBAP-01



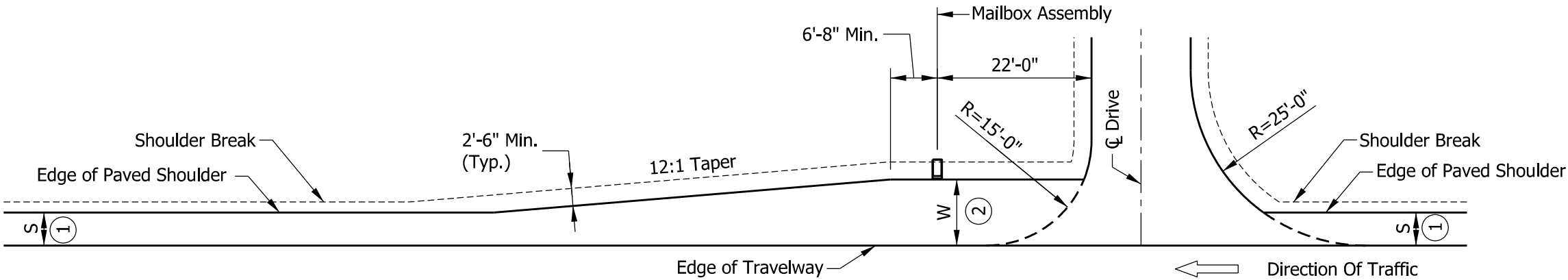
/s/ Richard L. VanCleave	02/20/14
DESIGN STANDARDS ENGINEER	DATE
/s/ Mark A. Miller	03/03/14
CHIEF ENGINEER	DATE

NOTES:

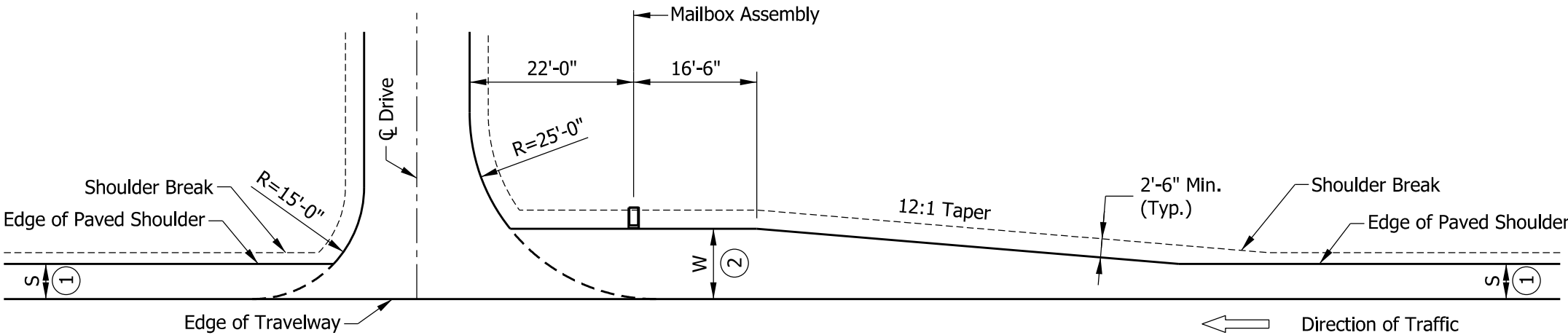
- ① S = Normal width of paved shoulder as shown on plans.
- ② See plans for W.
- 3. Mailbox approach pavement section shall be the same as the shoulder pavement section.



TYPICAL MAILBOX APPROACH

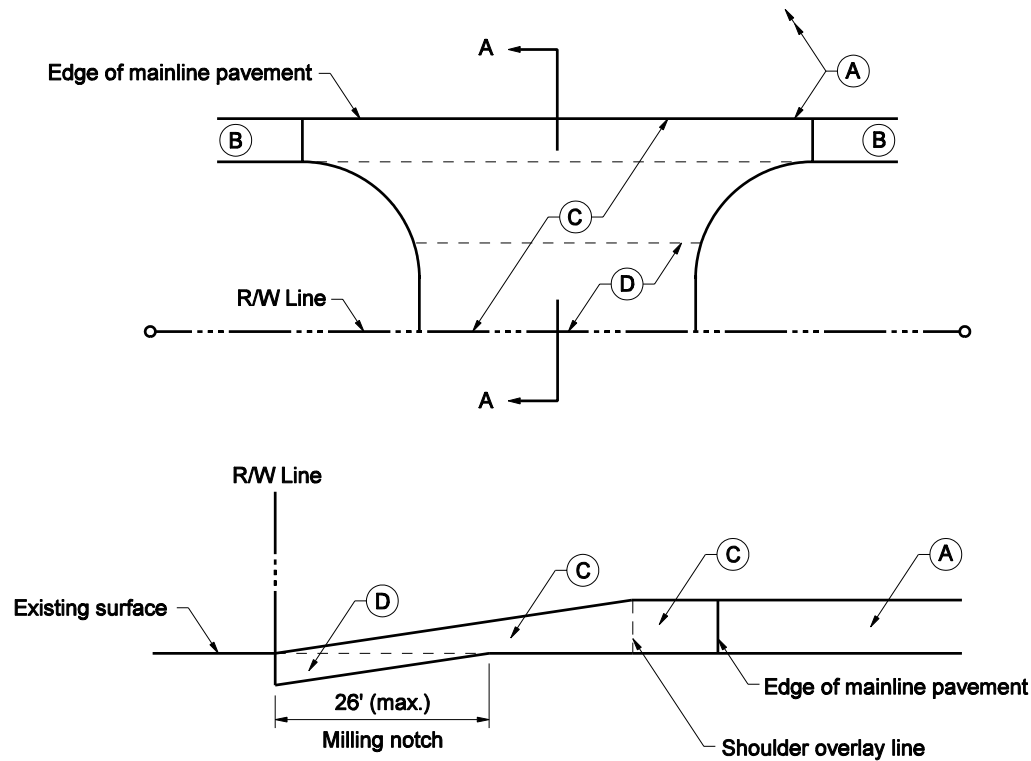


COMBINATION MAILBOX APPROACH & DRIVE
(Mailbox Located Beyond Drive)



COMBINATION MAILBOX APPROACH & DRIVE
(Mailbox Located in Advance of Drive)

INDIANA DEPARTMENT OF TRANSPORTATION			
MAILBOX APPROACHES LOW SPEED ROADWAY (V ≤ 45 MPH) SEPTEMBER 2014			
STANDARD DRAWING NO.		E 610-MBAP-02	
	/s/ Richard L. VanCleave	02/20/14	
	DESIGN STANDARDS ENGINEER	DATE	
	/s/ Mark A. Miller	03/03/14	
	CHIEF ENGINEER	DATE	



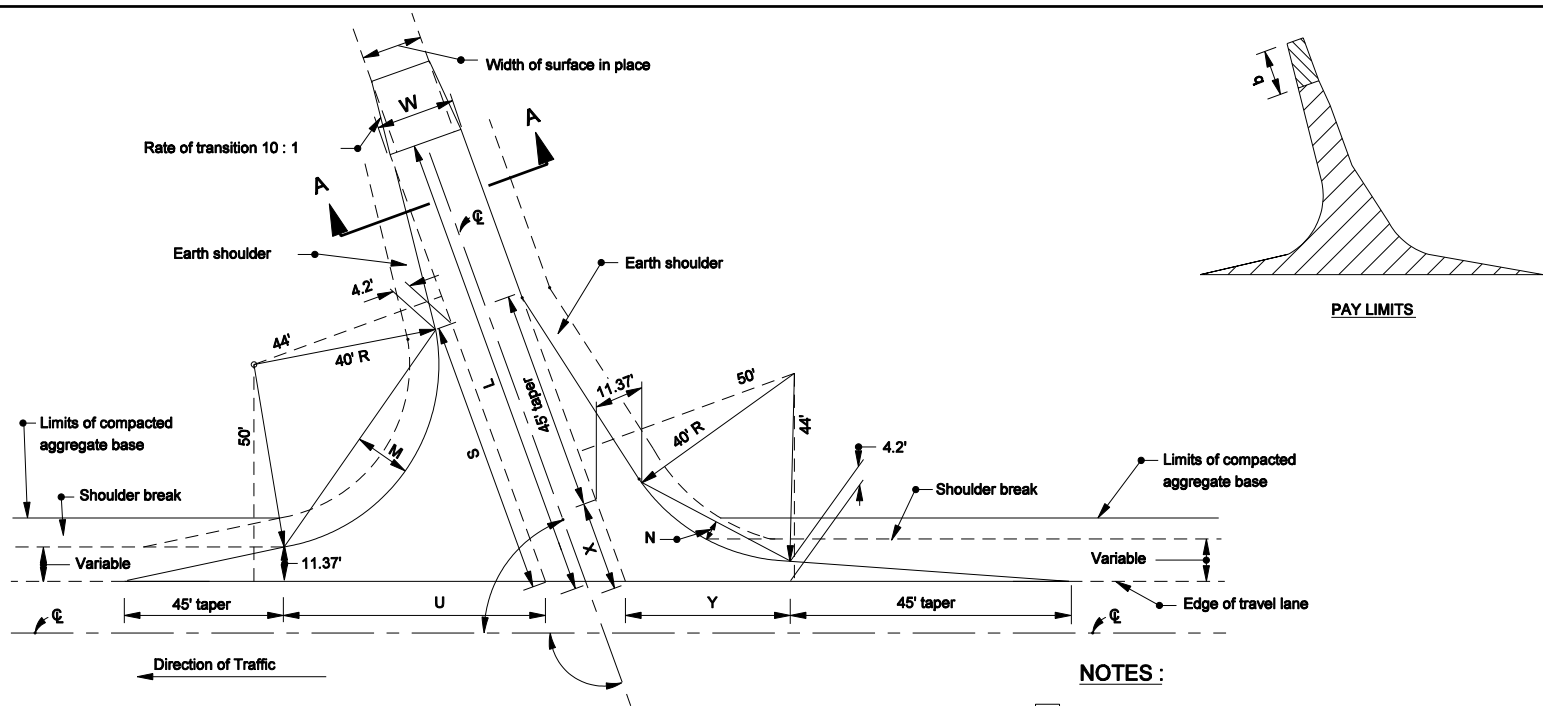
SECTION A-A

LEGEND

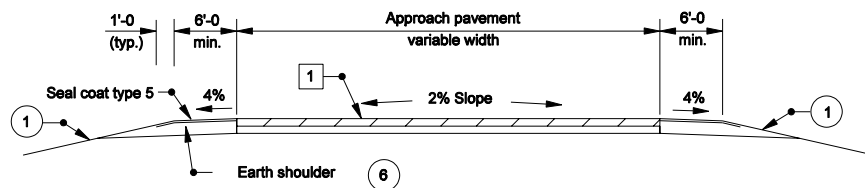
- (A) Typical HMA overlay, mainline
- (B) Typical HMA overlay, shoulder
- (C) HMA for approaches
- (D) Surface milling, asphalt

PUBLIC ROAD APPROACH PAVING

INDIANA DEPARTMENT OF TRANSPORTATION	
PUBLIC ROAD APPROACH PAVING	
MARCH 2004	
STANDARD DRAWING NO. E 610-PRAP-01	
	/s/ Richard L. VanCleave 3-01-04 DESIGN STANDARDS ENGINEER DATE
	/s/ Richard K. Smutzer 3-01-04 CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER	



PUBLIC ROAD APPROACH TYPE A



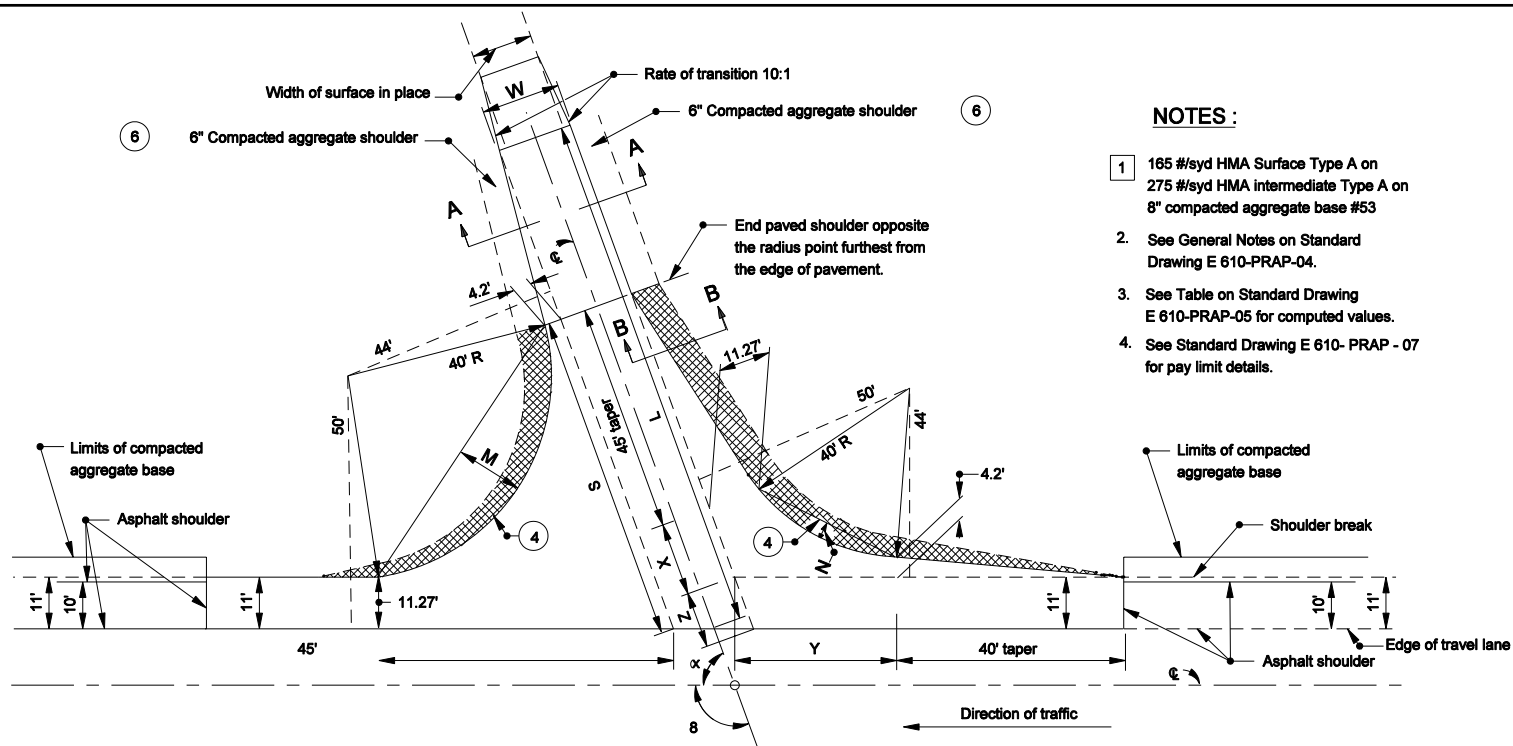
SECTION A-A MINIMUM PAVEMENT SECTION

For ADT ≤ 1000 7

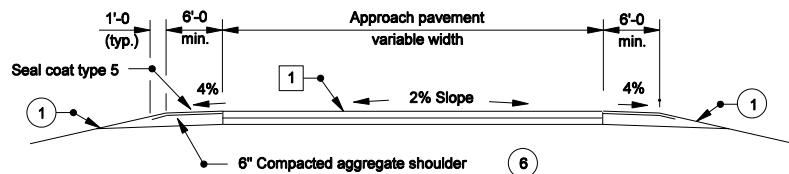
NOTES :

1. 165 #/syd. HMA Surface Type A on 275 #/syd. HMA Intermediate Type A on 8" compacted aggregate base #53
2. See General Notes on Standard Drawing E 610-PRAP-04.
3. See Table on Standard Drawing E 610-PRAP-05 for computed values.
4. See Standard Drawing E 610 - PRAP - 07 for pay limit details.

INDIANA DEPARTMENT OF TRANSPORTATION	
PUBLIC ROAD APPROACH TYPE A	
MARCH 2006	
STANDARD DRAWING NO. E 610-PRAP-02	
	/s/ Richard L. VanCleave 3-01-06 DESIGN STANDARDS ENGINEER DATE
DESIGN STANDARDS ENGINEER	/s/ Richard K. Smutzer 3-01-06 CHIEF HIGHWAY ENGINEER DATE

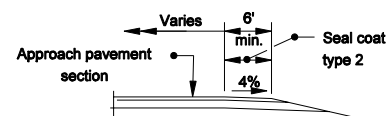


PUBLIC ROAD APPROACH TYPE "B"

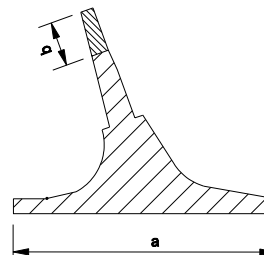


SECTION A-A MINIMUM PAVEMENT SECTION

For ADT $\leq$ 1000



SECTION B-B



PAY LIMITS

NOTES :

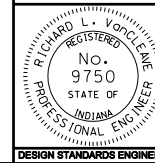
1. 165 #/syd HMA Surface Type A on 275 #/syd HMA intermediate Type A on 8" compacted aggregate base #53
2. See General Notes on Standard Drawing E 610-PRAP-04.
3. See Table on Standard Drawing E 610-PRAP-05 for computed values.
4. See Standard Drawing E 610- PRAP - 07 for pay limit details.

INDIANA DEPARTMENT OF TRANSPORTATION

PUBLIC ROAD APPROACH TYPE B

MARCH 2006

STANDARD DRAWING NO. E 610-PRAP-03



/s/ Richard L. VanCleave 3-01-06
DESIGN STANDARDS ENGINEER DATE

/s/ Richard K. Smutzer 3-01-06
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

GENERAL NOTES

These notes are for Standard Drawings E 610-PRAP-02, -03, and -05.

- 1 Embankment slopes on either side of an approach or drive within the mainline clear zone for new construction/reconstruction projects or the obstruction free zone on 3R projects should conform to the following table:

DESIGN YEAR		High, ≥ 50 mph		Low, ≤ 45 mph
Design Year AADT		≥ 6000	< 6000	All
Multi-Lane Divided, All Functional Class.	Incoming Slope	10:1	10:1	10:1
	Outgoing Slope	4:1	4:1	4:1
Multi-Lane Undivided, All Functional Class.	Incoming Slope	10:1	6:1	6:1
	Outgoing Slope	4:1	4:1	4:1
2-Lane Arterial or collector		6:1	6:1	4:1
2-Lane Local Road		4:1	4:1	4:1

Outside the clear zone or the obstruction free zone, the embankment slopes should desirably be 4:1 but not steeper than 3:1.

2. Cross culverts under the public road approach which cannot be located outside the mainline clear zone will require appropriate end treatments.
- 4 The cross hatched  shoulder area indicates the limits where the shoulder is the same as the approach pavement.
5. If the approach is to be constructed of PCCP, the details shall be as shown elsewhere in the plans for thickness, joint type, and location.
- 6 Earth shoulder shall be used with the Type A public road approach. The Type B public road approach shall have 6 in. compacted aggregate and full approach pavement section shoulders as shown on the Type A approach detail.
- 7 If the ADT for the public road is greater than 1000, the required pavement section shall be as shown elsewhere in the plans.

INDIANA DEPARTMENT OF TRANSPORTATION	
PUBLIC ROAD APPROACH TYPE A & B - GENERAL NOTES	
SEPTEMBER 2007	
STANDARD DRAWING NO. E 610-PRAP-04	
	<i>/s/ Richard L. VanCleave</i> DESIGN STANDARDS ENGINEER <i>09/04/07</i> DATE <i>/s/ Mark A. Miller</i> CHIEF HIGHWAY ENGINEER <i>09/04/07</i> DATE
DESIGN STANDARDS ENGINEER	

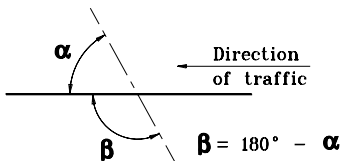
β	U	S	M	X	Y	N	L							TOTAL APPROACH AREA A						Hatched shoulder area	C.A.B. shoulder area	β
							TYPE A			TYPE B				TYPE A			TYPE B					
							W=20	W=22	W=24	W=20	W=22	W=24	Z	W=20	W=22	W=24	W=20	W=22	W=24			
(°)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(SYS)	(SYS)	(SYS)	(SYS)	(SYS)	(SYS)	(SYS)	(SYS)	(°)	
110	55.02	65.23	11.66	18.63	33.20	3.72	108.87	109.23	109.60	108.87	109.23	109.60	11.71	531.19	556.20	501.52	645.05	670.14	695.38	112.40	52.60	110
109	53.75	64.04	11.42	19.32	33.74	3.86	107.48	107.82	108.17	107.48	107.48	108.17	11.63	524.90	549.63	574.51	639.55	664.28	689.15	112.50	51.00	109
108	52.51	62.88	11.19	20.02	34.28	4.02	106.12	106.45	106.77	106.12	106.45	106.77	11.57	518.88	543.25	567.78	634.32	658.70	683.22	112.60	49.50	108
107	51.30	61.74	10.94	20.72	34.84	4.17	104.80	105.10	105.41	104.80	105.10	105.41	11.50	513.11	537.15	561.32	629.37	653.40	677.37	112.60	48.00	107
106	50.11	60.64	10.70	21.44	35.40	4.33	103.50	103.79	104.48	103.50	103.79	104.08	11.44	507.60	531.30	555.13	624.67	648.37	672.20	112.80	46.40	106
105	48.95	59.56	10.46	22.16	35.98	4.49	102.24	102.51	102.77	102.24	102.51	102.77	11.39	502.33	525.70	549.20	620.23	643.61	667.10	112.90	45.10	105
104	47.81	58.51	10.23	22.88	36.56	4.65	101.00	101.25	101.50	101.00	102.25	101.50	11.34	497.30	520.35	543.52	616.04	639.10	662.26	112.90	43.60	104
103	46.70	57.48	9.99	23.62	37.16	4.81	99.79	100.02	100.25	99.79	100.02	100.25	11.29	492.50	515.24	538.06	612.10	634.83	657.68	113.00	42.20	103
102	45.81	56.48	9.76	24.36	37.77	4.98	98.60	98.81	99.02	98.60	98.81	99.02	11.25	487.92	510.35	532.88	608.39	630.82	653.34	113.10	40.80	102
101	44.54	55.49	9.54	25.10	38.39	5.15	97.44	97.63	97.83	97.44	97.63	97.83	11.21	483.57	505.69	527.91	604.91	627.04	649.25	113.10	39.40	101
100	43.50	54.54	9.31	25.86	39.02	5.35	96.30	96.47	96.65	96.30	96.47	96.65	11.17	479.42	501.26	523.16	601.66	623.49	645.40	113.10	37.90	100
99	42.47	53.60	9.09	26.63	39.66	5.50	95.18	95.34	95.50	95.18	95.34	95.50	11.14	475.49	497.03	518.64	598.63	620.17	641.78	113.20	36.30	99
98	41.46	52.68	8.87	27.41	40.31	5.68	94.09	94.23	94.37	94.09	94.23	94.37	11.11	471.77	493.02	514.34	595.83	617.08	638.39	113.20	34.90	98
97	40.47	51.78	8.65	28.19	40.98	5.86	93.10	93.13	93.26	93.01	93.13	93.26	11.08	468.25	489.22	510.24	593.24	614.21	635.23	113.20	33.50	97
96	39.50	50.90	8.44	28.99	41.66	6.04	91.96	92.06	92.17	91.96	92.06	92.17	11.06	464.93	485.62	506.36	590.86	611.56	632.29	113.30	32.40	96
95	38.64	50.04	8.22	29.79	42.35	6.22	90.92	91.01	91.10	90.92	91.01	91.10	11.04	461.80	482.21	502.68	588.70	609.12	629.58	113.30	31.00	95
94	37.60	49.20	8.01	30.61	43.05	6.41	89.90	89.97	90.04	89.90	89.97	90.04	11.03	458.87	479.02	499.20	586.74	606.89	627.07	113.30	29.40	94
93	36.68	48.38	7.80	31.44	43.77	6.60	88.90	88.96	89.01	88.90	88.96	89.01	11.02	456.12	476.01	495.91	584.99	604.88	624.79	113.40	28.00	93
92	35.77	47.57	7.60	32.28	44.50	6.80	87.92	87.96	87.99	87.92	87.96	87.99	11.01	453.57	473.19	492.83	583.45	603.07	622.71	113.40	26.80	92
91	34.88	46.78	7.39	33.14	45.24	6.99	86.96	86.97	86.99	86.96	86.94	86.93	11.00	451.20	470.56	489.94	586.57	606.29	626.01	113.40	27.90	91
90	34.00	46.00	7.19	34.00	46.00	7.19	86.00	86.00	86.00	90.00	90.00	90.00	11.00	449.01	468.12	487.23	589.85	609.85	629.85	113.40	29.30	90
89	33.14	45.24	6.99	34.88	46.78	7.39	85.07	85.05	85.04	91.06	91.07	91.09	11.00	447.01	465.87	484.72	593.33	613.61	633.90	113.40	30.60	89
88	32.28	44.50	6.80	35.77	47.57	7.60	84.15	84.12	84.08	92.13	92.16	92.20	11.01	445.18	463.80	482.40	597.03	617.58	638.16	113.30	32.00	88
87	31.44	43.77	6.60	36.68	48.38	7.80	83.24	83.19	83.14	93.22	93.27	93.33	11.02	443.54	461.91	480.26	600.93	621.77	642.64	113.30	33.40	87
86	30.61	43.05	6.41	37.60	49.20	8.01	83.30	83.37	83.44	94.33	94.40	94.47	11.03	444.20	462.79	481.60	605.04	626.18	647.34	113.30	34.80	86
85	29.79	42.35	6.22	38.64	50.04	8.22	84.42	84.51	84.59	95.46	95.55	95.64	11.04	447.35	466.32	485.34	609.37	630.80	652.27	113.30	36.20	85
84	28.99	41.66	6.04	39.50	50.90	8.44	85.55	85.65	85.76	96.61	96.72	96.82	11.06	450.69	469.96	489.27	613.92	635.65	657.42	113.30	37.60	84
83	28.19	40.98	5.86	40.47	51.78	8.65	86.70	86.82	86.94	97.78	97.90	98.03	11.08	454.22	473.79	493.41	618.70	640.72	662.81	113.30	39.00	83
82	27.41	40.31	5.68	41.46	52.68	8.87	87.87	88.01	88.15	98.97	99.11	99.26	11.11	457.95	477.82	497.75	623.70	646.03	668.43	113.30	40.40	82
81	26.63	39.66	5.50	42.47	53.60	9.09	89.05	89.21	89.37	100.19	100.35	100.51	11.14	461.88	482.05	502.30	628.93	651.58	674.30	113.20	41.80	81
80	25.86	39.02	5.35	43.50	54.54	9.31	90.26	90.44	90.61	101.43	101.61	101.78	11.17	466.00	486.49	507.06	634.40	657.37	680.42	113.20	43.20	80
79	25.10	38.39	5.15	44.54	55.49	9.54	91.49	91.68	91.88	102.69	102.89	103.08	11.21	470.34	491.15	512.04	640.11	663.40	686.78	113.10	44.60	79
78	24.36	37.77	4.98	45.61	56.48	9.76	92.74	92.95	93.16	103.96	104.20	104.41	11.25	474.89	496.02	517.24	646.07	669.69	693.41	113.00	46.10	78
77	23.62	37.16	4.81	46.70	57.48	9.99	94.01	94.24	94.47	105.30	105.53	105.76	11.29	479.66	501.11	522.67	652.78	676.24	700.31	113.00	47.50	77
76	22.88	36.56	4.65	47.81	58.51	10.23	95.31	95.56	95.81	106.64	106.89	107.14	11.34	484.65	506.44	528.34	658.75	683.06	707.48	113.00	49.00	76
75	22.16	35.98	4.49	48.95	59.56	10.46	96.63	96.90	97.17	108.02	108.29	108.55	11.39	489.87	511.99	534.24	665.50	690.16	714.94	112.90	50.50	75
74	21.44	35.40	4.33	50.11	60.64	10.70	97.98	98.26	98.55	109.42	109.71	110.00	11.44	495.32	517.79	540.39	672.52	697.54	722.68	112.80	52.00	74
73	20.72	34.84	4.17	51.30	61.74	10.94	99.36	99.66	99.97	110.86	111.16	111.47	11.50	501.01	523.84	546.80	679.82	705.21	730.72	112.80	53.50	73
72	20.02	34.28	4.02	52.51	62.88	11.18	100.76	101.08	101.41	112.33	112.65	112.98	11.57	506.96	530.14	553.47	687.42	713.18	739.08	112.70	55.00	72
71	19.32	33.74	3.86	53.75	64.04	11.42	102.20	102.54	102.88	113.83	114.17	114.52	11.63	513.16	536.71	560.42	695.32	721.46	747.75	112.60	56.60	71
70	18.63	33.20	3.72	55.02	65.23	11.66	103.66	104.03	104.39	115.37	115.73	116.10	11.71	519.62	543.55	567.64	703.54	730.07	756.76	112.50	58.10	70

LEGEND

α = ANGLE OF TURN

The angle through which a vehicle travels on the public road approach toward making a right hand turn. It is measured from the extension of the tangent on which a vehicle approaches the intersecting road to the corresponding tangent on the intersecting road to which the vehicle turns.

β = INTERSECTION CONTROL ANGLE



NOTES :

- See Standard Drawing E 610-PRAP-02 for public road approach type A.
- See Standard Drawing E 610-PRAP-03 for public road approach type B.
- See Standard Drawing E 610-PRAP-04 for General Notes.

INDIANA DEPARTMENT OF TRANSPORTATION

PUBLIC ROAD APPROACH TYPE A & TYPE B - TABLE OF VALUE

SEPTEMBER 2001

STANDARD DRAWING NO. E 610-PRAP-05



/s/ Anthony L. Uremovich 9-04-01
DESIGN STANDARDS ENGINEER DATE

/s/ Firooz Zandi 9-04-01
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

/s/ Richard L. VanCleave	3-01-06
DESIGN STANDARDS ENGINEER	DATE
/s/ Richard K. Smutzer	3-01-06
CHIEF HIGHWAY ENGINEER	DATE

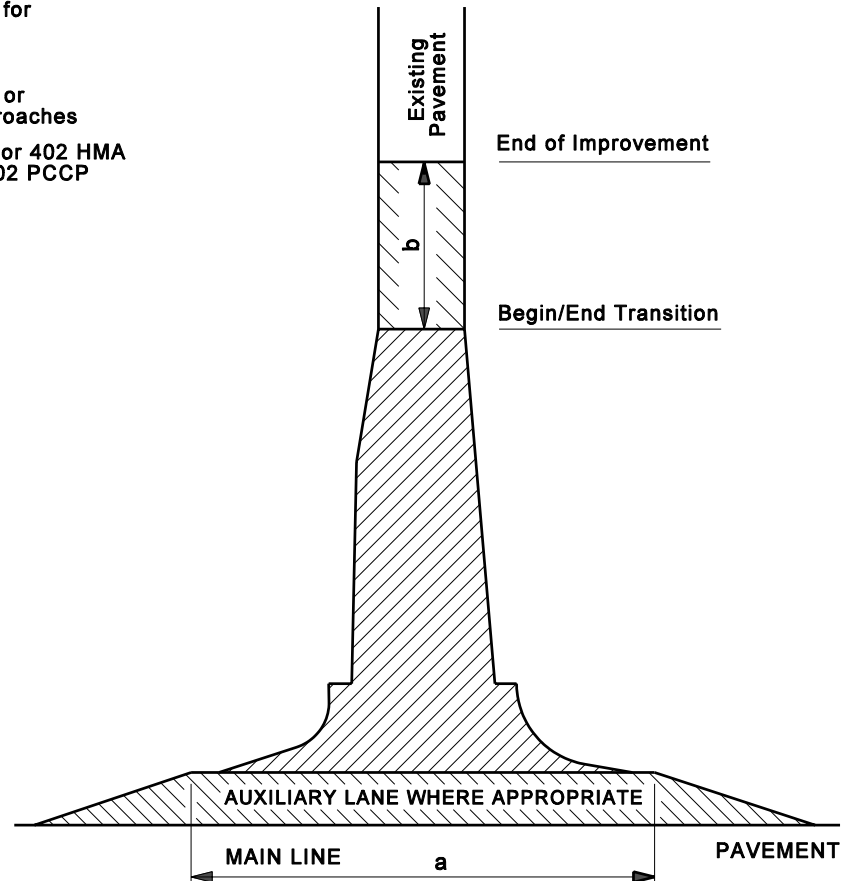
 a < 100', HMA or PCCP for Approaches

a > 100', 401 or 402 HMA
or 501 or 502 PCCP

 HMA or PCCP for Approaches

 b < 100', HMA or PCCP for Approaches

b > 100', 401 or 402 HMA
or 501 or 502 PCCP



NOTES:

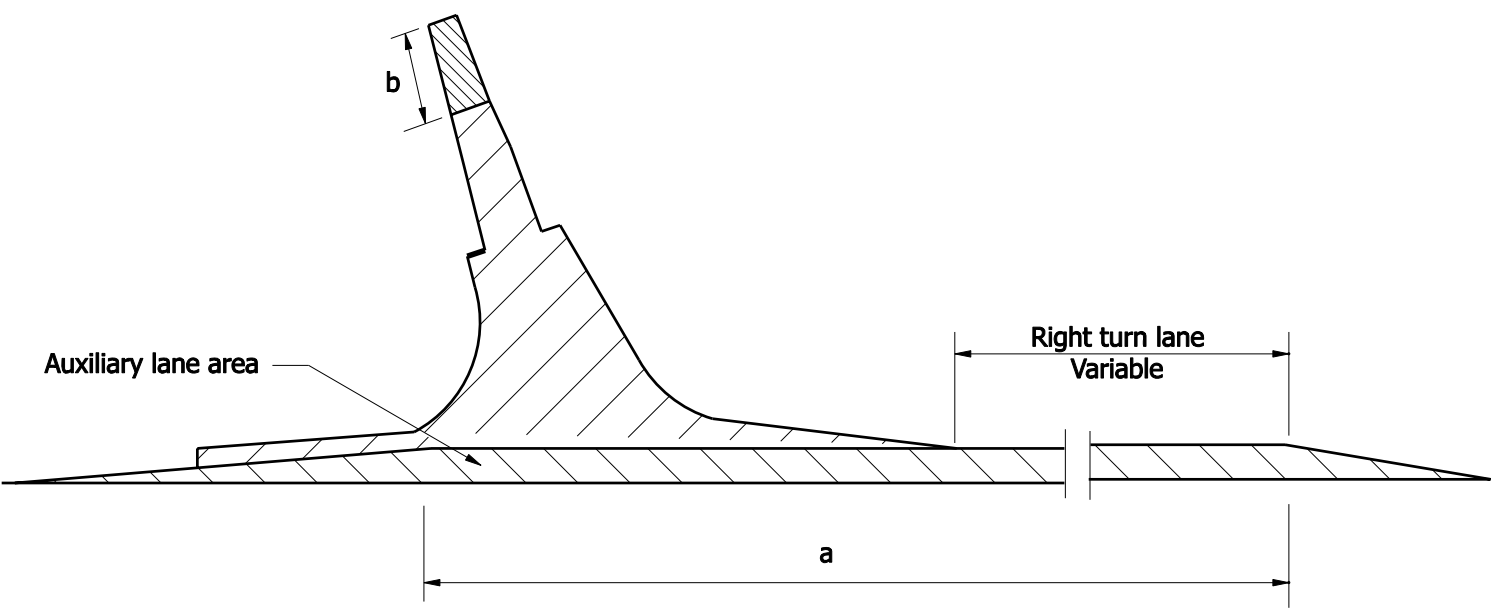
1. The pay limits shown hereon generally apply to Types A, B, C, and D Public Road Approaches as shown on Standard Drawings E 610-PRAP-02, -03, -06, and -10 respectively.

INDIANA DEPARTMENT OF TRANSPORTATION	
PUBLIC ROAD APPROACH PAY LIMITS	
MARCH 2006	
STANDARD DRAWING NO. E 610-PRAP-07	
	/s/ Richard L. VanCleave 3-01-06 DESIGN STANDARDS ENGINEER DATE
	/s/ Richard K. Smutzer 3-01-06 CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER	

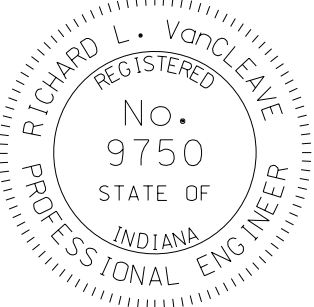
GENERAL NOTES

These notes are for Standard Drawings
E 610-PRAP-06 and E 610-PRAP-09.

- ① See table on Standard Drawing E 610-PRAP-04 for embankment slopes to be built on either side of the approach.
2. Cross culverts under the public road approach which cannot be located outside the mainline clear zone will require appropriate end treatments at each end as shown on the plans.
3. If the approach is to be constructed of concrete, the details shall be as shown elsewhere in the plans for pavement thickness, joint type, and location.
- ④ The cross hatched  shoulder area indicates the limits where the shoulder is the same section as the approach pavement.
- ⑤ The pavement section for the auxiliary lane shall be as detailed elsewhere in the plans.
- ⑥ If the ADT for the public road is greater than 1000, the required pavement section shall be as shown elsewhere in the plans.
7. See Standard Drawing E 610 - PRAP - 07 for pay limit details.



PAY LIMITS

INDIANA DEPARTMENT OF TRANSPORTATION	
PUBLIC ROAD APPROACH TYPE C - GENERAL NOTES	
SEPTEMBER 2007	
STANDARD DRAWING NO. E 610-PRAP-08	
	/s/ <i>Richard L. VanCleave</i> 09/04/07 DESIGN STANDARDS ENGINEER DATE /s/ <i>Mark A. Miller</i> 09/04/07 CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER	

β degree	L ft.	S ft.	U ft.	X ft.	Y ft.	V ft.	Shoulder gap ft.	Chord		M		Approach Areas			Auxiliary lane part.area ⑦ sys.	β degree
								Lt. ft.	Rt. ft.	Lt. ft.	Rt. ft.	Ⓐ sys.	Ⓑ sys.	Total sys.		
110	98.95	54.59	61.38	18.63	33.20	25.54	330.12	63.16	33.68	15.45	3.72	116.48	85.95	466.32	326.83	110
109	97.59	53.46	60.31	19.32	33.74	25.38	329.43	62.72	34.31	15.17	3.86	112.89	87.65	460.78	325.90	109
108	96.26	52.36	59.26	20.02	34.28	25.24	328.78	62.29	34.94	14.90	4.02	109.42	89.37	455.49	325.04	108
107	94.95	51.28	58.24	20.72	34.84	25.10	328.18	61.85	35.56	14.63	4.17	106.08	91.14	450.43	324.23	107
106	93.68	50.23	57.24	21.44	35.40	24.97	327.61	61.40	36.19	14.36	4.33	102.85	92.95	445.59	323.48	106
105	92.42	49.21	56.27	22.16	35.98	24.85	327.10	60.95	36.81	14.09	4.49	99.72	94.80	440.98	322.79	105
104	91.19	48.20	55.32	22.88	36.56	24.74	326.62	60.50	37.43	13.83	4.65	96.70	96.70	436.58	322.16	104
103	89.99	47.22	54.39	23.62	37.16	24.63	326.18	60.04	38.04	13.56	4.81	93.79	98.65	432.39	321.58	103
102	88.60	46.25	53.48	24.36	37.77	24.54	325.79	60.58	38.66	13.30	4.98	90.96	100.64	428.41	321.05	102
101	87.64	45.31	52.60	25.10	38.39	24.45	325.44	59.11	39.27	13.04	5.15	88.24	102.68	424.62	320.58	101
100	86.50	44.38	51.73	25.86	39.02	24.37	325.12	58.64	39.87	12.79	5.32	85.60	104.77	421.03	320.16	100
99	85.37	43.47	50.88	26.63	39.66	24.30	324.84	58.16	40.48	12.53	5.50	83.05	108.92	417.63	319.79	99
98	84.27	42.58	50.05	27.41	40.31	24.24	324.60	57.68	41.08	12.28	5.68	80.58	109.12	414.41	319.47	98
97	83.18	41.71	49.24	28.19	40.98	24.18	324.40	57.19	41.68	12.03	5.86	78.19	111.38	411.38	319.20	97
96	82.11	40.85	48.45	28.99	41.66	24.13	324.24	56.70	42.27	11.78	6.04	76.87	113.70	408.53	318.98	96
95	81.06	40.01	47.67	29.79	42.35	24.09	324.11	56.21	42.86	11.54	6.22	73.63	116.07	405.86	318.81	95
94	80.02	39.16	46.90	30.61	43.05	24.06	324.01	56.71	43.45	11.29	6.41	71.47	118.51	403.36	318.68	94
93	79.00	38.37	46.16	31.44	43.77	24.03	323.96	55.20	44.03	11.05	6.60	69.37	121.02	401.04	318.61	93
92	77.98	37.57	45.42	32.28	44.50	24.02	323.94	54.70	44.62	10.81	6.80	67.33	123.59	398.88	318.58	92
91	77.92	36.79	44.70	33.14	45.24	24.00	323.94	54.18	45.19	10.57	6.99	65.36	126.23	399.40	318.60	91
90	79.00	36.00	44.00	34.00	46.00	24.00	324.00	53.67	48.77	10.34	7.19	63.48	128.84	403.07	318.67	90
89	80.09	35.24	43.31	34.88	46.78	24.00	324.09	53.15	46.34	10.10	7.39	61.61	131.73	406.91	318.79	89
88	81.19	34.49	42.63	35.77	47.57	24.02	324.22	52.63	46.90	9.87	7.60	59.82	134.60	410.93	318.96	88
87	82.31	33.75	41.96	36.68	48.38	24.03	324.37	52.10	47.47	9.64	7.80	58.08	137.54	415.12	319.17	87
86	83.44	33.03	41.31	37.60	49.20	24.06	324.57	51.57	48.03	9.42	8.01	58.40	140.57	419.49	319.43	86
85	84.59	32.31	40.67	38.54	50.04	24.09	324.80	51.03	48.58	9.20	8.22	54.77	143.68	424.04	319.74	85
84	85.76	31.60	40.04	39.50	50.09	24.13	325.07	50.49	49.14	8.97	8.44	53.20	146.88	428.77	320.10	84
83	86.94	30.94	39.42	40.47	51.78	24.18	325.38	49.95	49.69	8.75	8.65	51.67	150.18	433.69	320.51	83
82	88.15	30.21	38.81	41.46	52.68	24.24	325.73	49.40	50.23	8.54	8.87	50.18	153.57	438.81	320.97	82
81	89.37	29.54	38.21	42.47	53.60	24.30	326.11	48.85	50.77	8.32	9.09	48.74	157.06	444.12	321.48	81
80	90.61	28.86	37.63	43.50	54.54	24.37	326.54	48.30	51.31	8.11	9.31	47.35	160.66	449.04	322.04	80
79	91.88	28.20	37.05	44.54	55.49	24.45	326.99	47.74	51.84	7.90	9.54	46.00	164.36	455.36	322.65	79
78	93.16	27.55	36.48	45.61	58.48	24.54	327.50	47.17	52.38	7.69	9.76	44.69	168.17	461.29	323.32	78
77	94.47	26.90	35.92	46.70	57.48	24.63	328.30	46.61	52.90	7.49	9.99	43.42	172.10	467.44	324.04	77
76	95.81	26.26	35.37	47.81	58.51	24.74	328.82	46.04	53.42	7.29	10.23	42.18	176.15	473.82	324.82	76
75	97.17	25.63	35.83	48.95	59.56	24.85	328.24	45.47	53.94	7.09	10.46	40.99	180.33	480.43	325.65	75
74	98.55	25.00	34.30	50.11	60.64	24.97	329.91	44.89	54.45	6.89	10.70	39.83	184.64	487.28	326.54	74
73	99.97	24.38	33.78	51.30	61.74	25.10	330.62	44.31	54.96	6.70	10.94	38.71	189.08	494.37	327.49	73
72	101.41	23.77	33.27	52.51	62.88	25.24	331.39	43.73	55.47	6.50	11.18	37.62	193.67	501.72	328.50	72
71	102.88	23.16	32.76	53.75	64.04	25.38	332.18	43.14	55.97	6.32	11.42	36.56	198.41	509.33	329.58	71
70	104.39	22.56	32.26	55.06	65.23	25.54	333.03	42.55	56.47	6.13	11.66	35.54	203.30	517.21	330.71	70

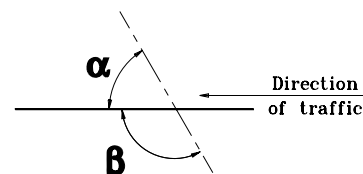
LEGEND

α = ANGLE OF TURN

It is the angle which a vehicle travels on the public road approach toward making a right hand turn. It is measured from the extension of the tangent on which a vehicle approaches the intersecting road to the corresponding tangent on the intersecting road to which the vehicle turns.

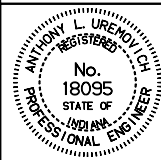
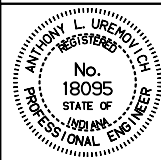
β = INTERSECTION CONTROL ANGLE

$$\beta = 180^\circ - \alpha$$

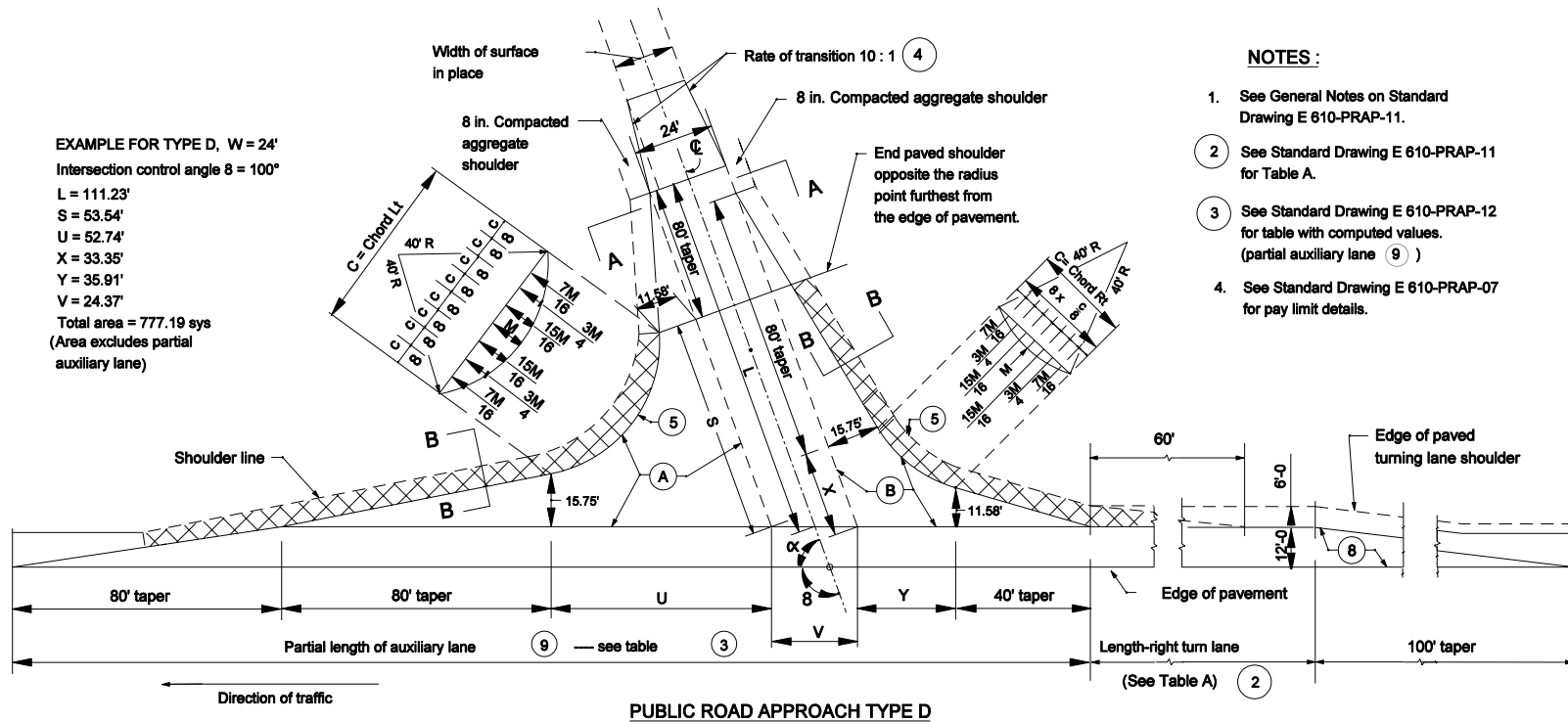


NOTES :

1. See Standard Drawing E 610-PRAP-06 for public road approach type C.
2. See Standard Drawing E 610-PRAP-08 for General Notes.

INDIANA DEPARTMENT OF TRANSPORTATION	
PUBLIC ROAD APPROACH TYPE C – TABLE OF VALUES SEPTEMBER 2001	
STANDARD DRAWING NO. E 610-PRAP-09	
	/s/ Anthony L. Uremovich 9-04-01 DESIGN STANDARDS ENGINEER DATE
	/s/ Firooz Zandi 9-04-01 CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER	

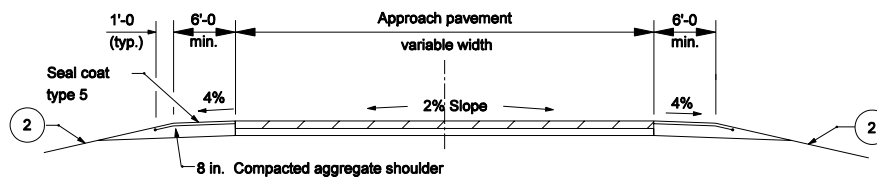
EXAMPLE FOR TYPE D, W = 24'
 Intersection control angle $\delta = 100^\circ$
 $L = 111.23'$
 $S = 53.54'$
 $U = 52.74'$
 $X = 33.35'$
 $Y = 35.91'$
 $V = 24.37'$
 Total area = 777.19 sqs
 (Area excludes partial
 auxiliary lane)



NOTES :

1. See General Notes on Standard Drawing E 610-PRAP-11.
2. See Standard Drawing E 610-PRAP-11 for Table A.
3. See Standard Drawing E 610-PRAP-12 for table with computed values. (partial auxiliary lane 9)
4. See Standard Drawing E 610-PRAP-07 for pay limit details.

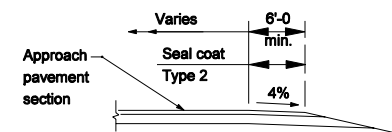
PUBLIC ROAD APPROACH TYPE D



SECTION A-A MINIMUM PAVEMENT SECTION

FOR ≤ 50 : TRUCKS, CLASS V OR ABOVE PER DAY

165#/syd HMA Surface 9.5mm Type A on
 495 #/syd HMA Intermediate 19.0 mm Type A on
 8" compacted aggregate base #53



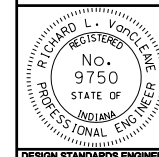
SECTION B-B

INDIANA DEPARTMENT OF TRANSPORTATION

PUBLIC ROAD APPROACH TYPE D

MARCH 2006

STANDARD DRAWING NO. E 610-PRAP-10



/s/ Richard L. VanCleave 3-01-06
 DESIGN STANDARDS ENGINEER DATE

/s/ Richard K. Smutzer 3-01-06
 CHIEF HIGHWAY ENGINEER DATE

GENERAL NOTES

These notes are for Standard Drawings E 610-PRAP-10 and E 610-PRAP-12.

1.

Standard Drawings E 610-PRAP-10 and -12 are for intersection control angle 70° to 110° .
If intersection control angle is less than 70° or greater than 110° a special design will be required.
- 2

See table on Standard Drawing E 610-PRAP-04 for embankment slopes to be built on either side of the approach
3.

Cross culverts under the public road approach which cannot be located outside the mainline clear zone will require an appropriate end section at each end.
- 4

If the existing pavement is asphalt the transition area shall be the same section as the approach and will be included in the pay limits for HMA for Approaches.
- 5

The cross hatched  shoulder area indicates the limits where the shoulder is the same as the approach pavement.
6.

If the approach is to be constructed of PCCP, the details shall be as shown elsewhere in the plans for pavement thickness, joint type, and location.
7.

If the Class V or above truck count for the public road approach is greater than 50 per day, the required pavement section shall be as provided elsewhere in the plans
- 8

The pavement section for the turn lane shall be as shown elsewhere in the plans.

Design speed (m.p.h.)	TABLE A									
	MINIMUM LENGTH OF TURNING LANES (excluding taper) , ft.									
	Downgrade slope in %					Upgrade slope in %				
	6 to 5	4.99 to 4	3.99 to 3	2.99 to 2.01	2 to 0	0 to 2	2.01 to 2.99	3 to 3.99	4 to 4.99	5 to 6
40	400	380	355	325	295	295	280	265	250	235
50	550	520	485	445	405	405	385	365	345	325
60	675	640	600	555	500	500	475	450	425	400
65	730	690	650	595	540	540	515	485	460	435
70	800	755	710	650	590	590	560	530	505	475

INDIANA DEPARTMENT OF TRANSPORTATION

PUBLIC ROAD APPROACH TYPE D
GENERAL NOTES AND TABLE A

SEPTEMBER 2007

STANDARD DRAWING NO. E 610-PRAP-11



/s/ Richard L. VanCleave

DESIGN STANDARDS ENGINEER

09/04/07

DATE

/s/ Mark A. Miller

CHIEF HIGHWAY ENGINEER

09/04/07

DATE

DESIGN STANDARDS ENGINEER

β degree	L ft	S ft	U ft	X ft	Y ft	V ft	Shoulder gap ft	Chord		M		Approach Areas			Auxiliary lane part area ⑨ sys	β degree
								Lt ft	Rt ft	Lt ft	Rt ft	① sys	② sys	Total sys		
110	109.97	65.61	65.50	25.46	29.21	25.54	320.25	52.66	29.14	9.98	2.75	335.88	174.50	803.64	373.67	110
109	108.40	64.26	64.09	26.22	29.83	25.38	319.31	52.34	29.79	9.75	2.88	329.40	176.97	795.42	372.41	109
108	106.85	62.98	62.72	26.97	30.46	25.24	318.41	51.81	30.43	9.52	3.01	323.11	179.49	787.55	371.22	108
107	105.35	61.68	61.37	27.74	31.11	25.10	317.57	51.27	31.08	9.30	3.14	317.01	182.07	780.00	370.10	107
106	105.08	60.43	60.06	28.52	31.76	24.97	316.78	50.73	31.72	9.07	3.28	311.08	184.70	775.99	369.04	106
105	106.08	59.22	58.77	29.30	32.42	24.85	316.04	50.19	32.36	8.85	3.42	305.33	187.38	775.60	368.06	105
104	107.10	58.03	57.52	30.09	33.10	24.73	315.35	49.65	33.00	8.63	3.56	299.74	190.12	775.45	367.13	104
103	108.12	56.87	56.28	30.89	33.78	24.63	314.70	49.10	33.63	8.42	3.71	294.31	192.92	775.54	366.26	103
102	109.15	55.74	55.08	31.70	34.48	24.54	314.10	48.54	34.26	8.21	3.85	289.03	195.78	775.87	365.46	102
101	110.18	54.63	53.90	32.52	35.19	24.45	313.54	47.99	34.89	8.00	4.01	283.89	198.70	776.42	364.72	101
100	111.23	53.54	52.74	33.35	35.91	24.37	313.02	47.43	35.52	7.79	4.16	278.90	201.68	777.19	364.03	100
99	112.28	52.48	51.61	34.18	36.65	24.30	312.55	46.86	36.14	7.58	4.32	274.04	204.73	778.19	363.40	99
98	113.35	51.45	50.49	35.03	37.39	24.24	312.12	46.30	36.77	7.38	4.47	269.31	207.85	779.42	362.83	98
97	114.42	50.43	49.40	35.89	38.15	24.18	311.73	45.72	37.38	7.18	4.64	264.70	211.04	780.86	362.31	97
96	115.51	49.44	48.33	36.77	38.93	24.13	311.39	45.15	38.00	6.98	4.80	260.21	214.31	782.53	361.85	96
95	116.60	48.46	47.27	37.65	39.71	24.09	311.08	44.57	38.61	6.78	4.97	255.84	217.65	784.42	361.44	95
94	117.71	47.51	46.24	38.55	40.52	24.06	310.82	43.99	39.22	6.59	5.14	251.58	221.01	786.54	361.09	94
93	118.83	46.57	45.22	39.46	41.33	24.03	310.59	43.41	39.83	6.40	5.31	247.43	224.56	788.87	360.79	93
92	119.96	45.66	44.22	40.38	42.17	24.01	310.40	42.82	40.43	6.21	5.48	243.38	228.15	791.43	360.54	92
91	121.11	44.76	43.24	41.32	43.01	24.00	310.26	42.23	41.03	6.03	5.66	239.43	231.82	794.21	360.34	91
90	122.27	43.88	42.27	42.27	43.88	24.00	310.15	41.63	41.63	5.84	5.84	235.58	235.58	797.21	360.20	90
89	123.45	43.01	41.32	43.24	44.76	24.00	310.08	41.03	42.23	5.66	6.03	231.82	239.43	800.44	360.11	89
88	124.64	42.17	40.38	44.22	45.66	24.01	310.06	40.43	42.82	5.48	6.21	228.15	243.38	803.90	360.07	88
87	125.85	41.33	39.46	45.22	46.57	24.03	310.07	39.83	43.41	5.31	6.40	224.56	247.38	807.60	360.09	87
86	127.08	40.52	38.55	46.24	47.51	24.06	310.12	39.22	43.99	5.14	6.59	221.06	251.56	811.52	360.16	86
85	128.32	39.71	37.65	47.27	48.46	24.09	310.21	38.61	44.57	4.97	6.78	217.65	255.84	815.69	360.28	85
84	129.59	38.93	36.77	48.33	49.44	24.13	310.34	38.00	45.15	4.80	6.98	214.31	260.21	820.09	360.45	84
83	130.87	38.15	35.89	49.40	50.43	24.18	310.51	37.38	45.72	4.64	7.18	211.04	264.70	824.74	360.67	83
82	132.18	37.39	35.03	50.49	51.45	24.24	310.72	36.77	46.30	4.47	7.38	207.85	269.31	829.64	360.95	82
81	133.51	36.65	34.18	51.61	52.48	24.30	310.97	36.14	46.86	4.32	7.58	204.73	274.04	834.79	361.29	81
80	134.86	35.91	33.35	52.74	53.54	24.37	311.26	35.52	47.43	4.16	7.79	201.68	278.90	840.20	361.68	80
79	136.23	35.19	32.52	53.90	54.63	24.45	311.59	34.89	47.99	4.01	8.00	198.70	283.89	845.87	362.12	79
78	137.63	34.48	31.70	55.08	55.74	24.54	311.97	34.26	48.54	3.85	8.21	195.78	289.03	851.82	362.63	78
77	139.06	33.78	30.89	56.28	56.87	24.63	312.39	33.63	49.10	3.71	8.42	192.92	294.31	858.04	363.19	77
76	140.51	33.10	30.09	57.52	58.03	24.73	312.85	33.00	49.65	3.56	8.63	190.12	299.74	864.55	363.80	76
75	141.99	32.42	29.30	58.77	59.22	24.85	313.36	32.36	50.19	3.42	8.85	187.38	305.33	871.35	364.48	75
74	143.50	31.76	28.52	60.06	60.43	24.97	313.92	31.72	50.73	3.28	9.07	184.70	311.08	878.44	365.22	74
73	145.04	31.11	27.74	61.37	61.68	25.10	313.92	31.08	51.27	3.14	9.30	182.07	317.01	885.85	366.02	73
72	146.61	30.46	26.97	62.72	62.96	25.24	315.17	30.43	51.81	3.01	9.52	179.49	323.11	893.57	366.89	72
71	148.22	29.83	26.22	64.09	64.26	25.38	315.86	29.79	52.34	2.88	9.75	176.97	329.40	901.63	367.82	71
70	149.87	29.21	25.46	65.50	65.61	25.54	316.61	29.14	52.66	2.75	9.98	174.50	335.88	910.02	368.81	70

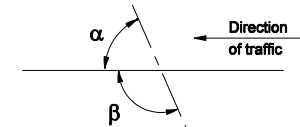
LEGEND

α = ANGLE OF TURN

The angle which a vehicle travels on the public road approach toward making a right hand turn. It is measured from the extension of the tangent on which a vehicle approaches the intersecting road to the corresponding tangent on the intersecting road to which the vehicle turns.

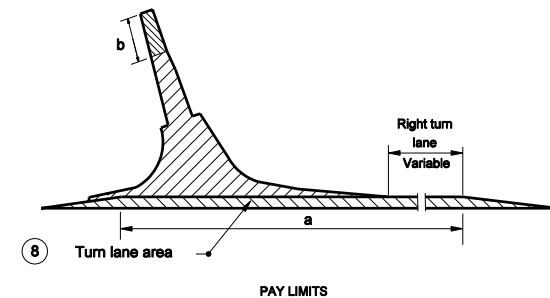
β = INTERSECTION CONTROL ANGLE

$$\beta = 180^\circ - \alpha$$



NOTES:

- See Standard Drawing E 610-PRAP-10 for public road approach type D.
- See Standard Drawing E 610-PRAP-11 for General Notes.

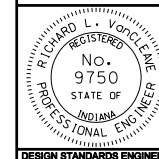


INDIANA DEPARTMENT OF TRANSPORTATION

PUBLIC ROAD APPROACH TYPE D - TABLE OF VALUES

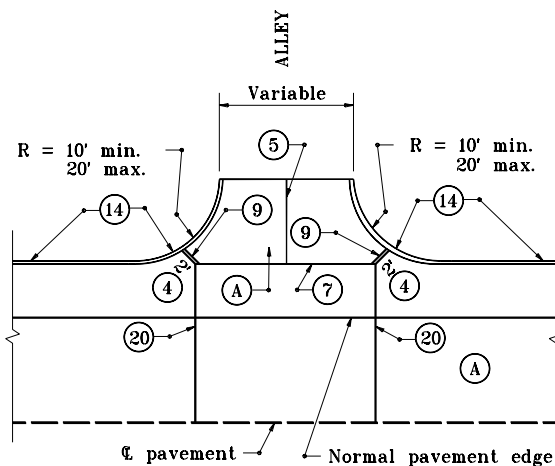
MARCH 2006

STANDARD DRAWING NO. E 610-PRAP-12

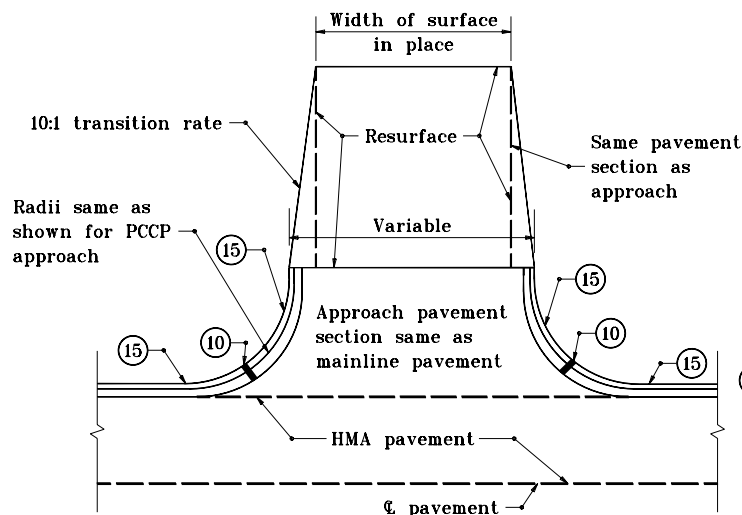


/s/ Richard L. VanCleave
DESIGN STANDARDS ENGINEER
3-01-06
DATE

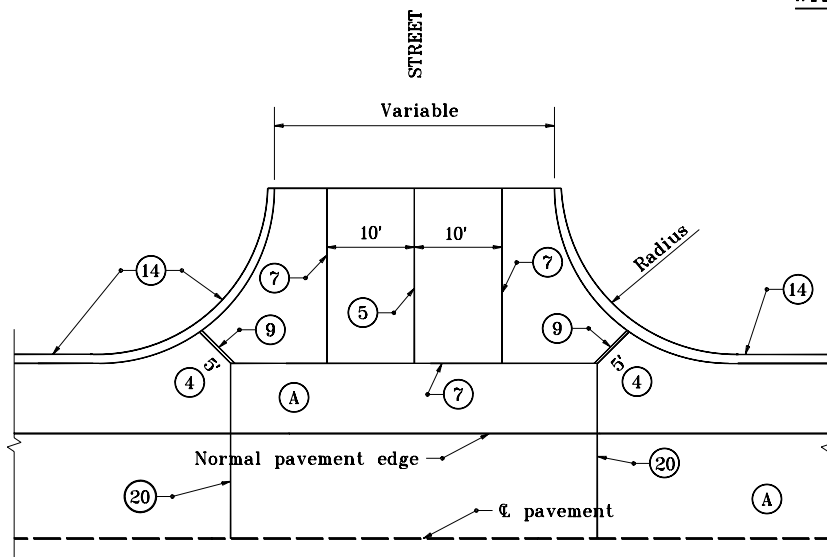
/s/ Richard K. Smutzer
CHIEF HIGHWAY ENGINEER
3-01-06
DATE



**ALLEY APPROACH
WITH PCCP MAINLINE PAVEMENT**



**STREET OR ALLEY APPROACH
WITH HMA MAINLINE PAVEMENT**



**STREET APPROACH
WITH PCCP MAINLINE PAVEMENT**

GENERAL NOTES

1. Radii of 25' at minor cross streets shall be provided on new construction and on reconstruction where space permits.
2. Radii of 30' or more at major cross streets shall be provided where feasible so that a truck may turn without encroachment.
3. Radii of 40' or more at major cross streets shall be provided where trucks and buses repeatedly turn.
4. Ear construction type B permitted as shown on Standard Drawing E 605-ERCN-02.

LEGEND

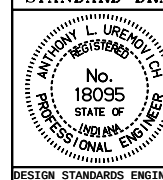
- (A) PCCP
- (5) Longitudinal joint
- (7) Keyway joint
- (9) 1" preformed joint filler
- (10) 1/2" preformed joint filler
- (14) Integral concrete curb
- (15) Combined curb and gutter
- (20) Contraction joint

INDIANA DEPARTMENT OF TRANSPORTATION

STREET or ALLEY APPROACH HMA MAINLINE PAVEMENT

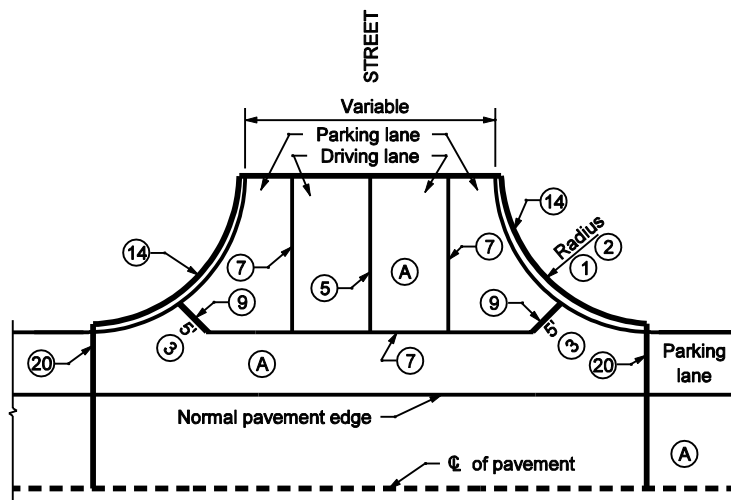
JANUARY 2000

STANDARD DRAWING NO. E 610-PRAP-13

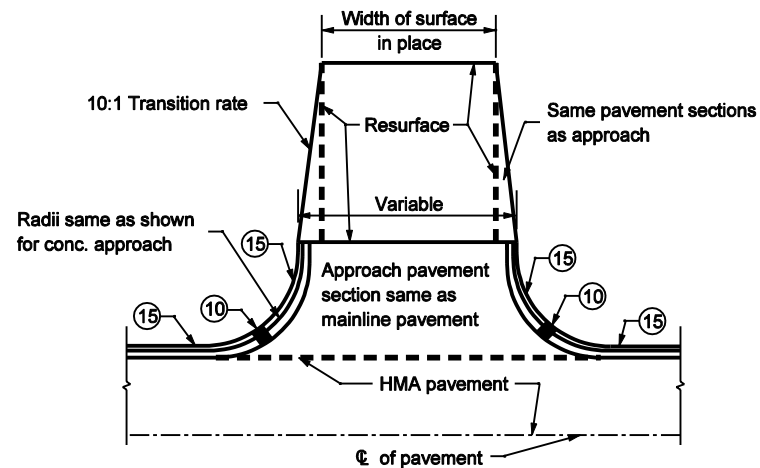


/s/ Anthony L. Uremovich 1-03-00
DESIGN STANDARDS ENGINEER DATE

/s/ Firooz Zandi 1-03-00
CHIEF HIGHWAY ENGINEER DATE



**STREET APPROACH
WITH PCCP MAINLINE APPROACH**



**STREET APPROACH
WITH HMA MAINLINE PAVEMENT**

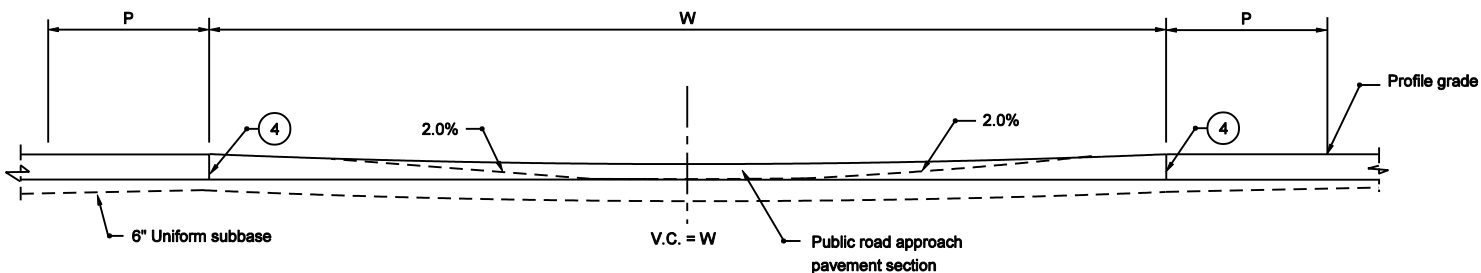
GENERAL NOTES

- ① Provide radii of 30' or more at major cross streets where WB-15 trucks and or buses turn repeatedly.
- ② Provide radii of 60' or more at the intersection of two State or U.S. highways and streets servicing heavy industrial areas requiring repeated turns by the Indiana Single Unit Vehicle.
- ③ Ear construction Type B as shown on Standard Drawing E 605-ERCN-02 will be permitted.
4. See General Notes on Standard Drawing E 610-PRAP-11.

LEGEND

- Ⓐ PCCP
- Ⓚ HMA pavement
- ⑤ Longitudinal joint
- ⑦ Keyway joint
- ⑨ 1" Preformed joint filler
- ⑩ 1/2" Preformed joint filler
- ⑭ Integral concrete curb
- ⑮ Combined curb and gutter
- ⑳ Contraction joint

INDIANA DEPARTMENT OF TRANSPORTATION	
STREET APPROACH WITH PCCP OR HMA MAINLINE PAVEMENT	
SEPTEMBER 2002	
STANDARD DRAWING NO. E 610-PRAP-14	
	/s/ Richard L. VanCleave 9-03-02 DESIGN STANDARDS ENGINEER DATE
	/s/ Richard K. Smutzer 9-03-02 CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER	



SECTION A-A

LEGEND

- 3 Construction joint type D-1. See Standard Drawing E 503-CCPJ-01 for details.
- 4 Longitudinal keyway joint, if pavement is PCCP. See Standard Drawing E 503-CCPJ-04 for details.
- 8 Longitudinal contraction joint. See Standard Drawings E 503-CCPJ-07 AND -08 for details.
- 9 1" preformed joint filler
- 10 Ear construction type A. See Standard Drawing E 605-ERCN-01 for details.
- 11 Ear construction type B. See Standard Drawing E 605-ERCN-02 for details.
- 14 Integral concrete curb

L = Minimum longitudinal length of crossover

P = Travel lane or turn lane width

W = Width of median

$V.C.$ = Vertical curve length

 = Stabilized shoulder

GENERAL NOTES :

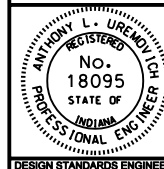
1. The crossover length L is based on a 90° road intersection.
2. PCCP crossover shall be constructed if the cross road approach is concrete
HMA crossover shall be constructed if the cross road approach asphalt.
3. See Standard Drawings E 610-PRCO-01A through -07 for crossover plans.

INDIANA DEPARTMENT OF TRANSPORTATION

**PUBLIC ROAD CROSSOVER
SECTION**

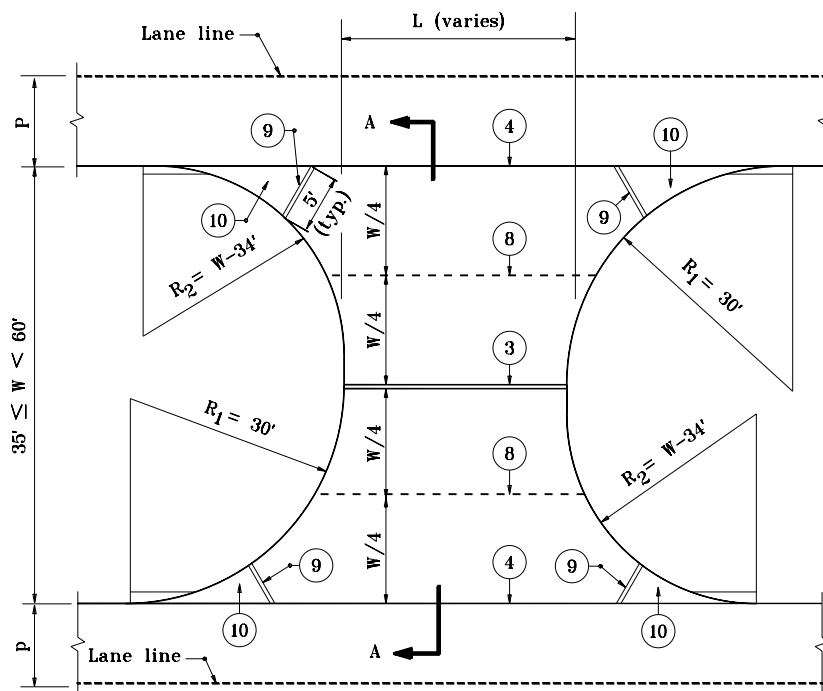
MARCH 2003

STANDARD DRAWING NO. E 610-PRCO-01

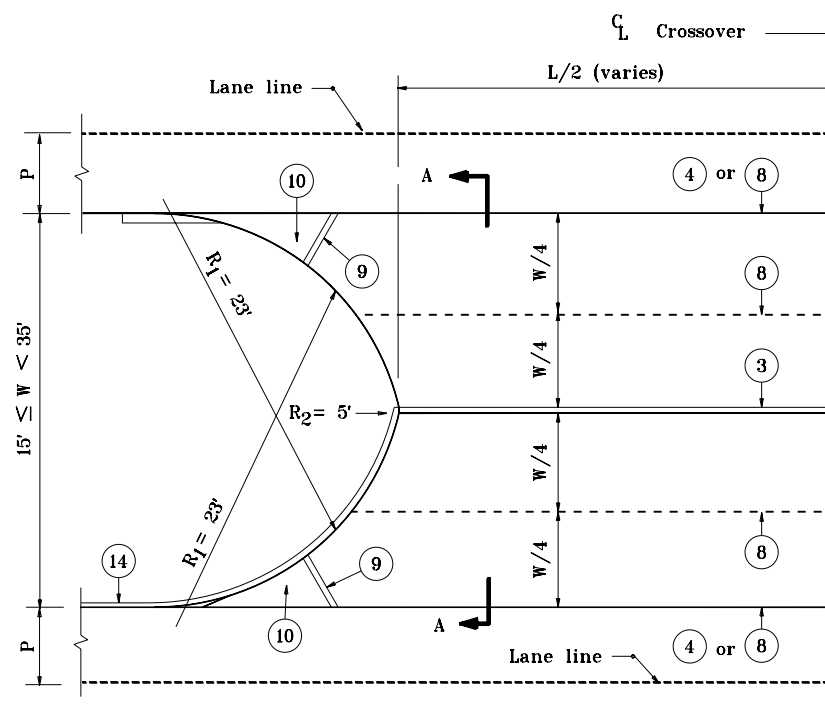


/s/ Anthony L. Uremowich 3-03-03
DESIGN STANDARDS ENGINEER DATE

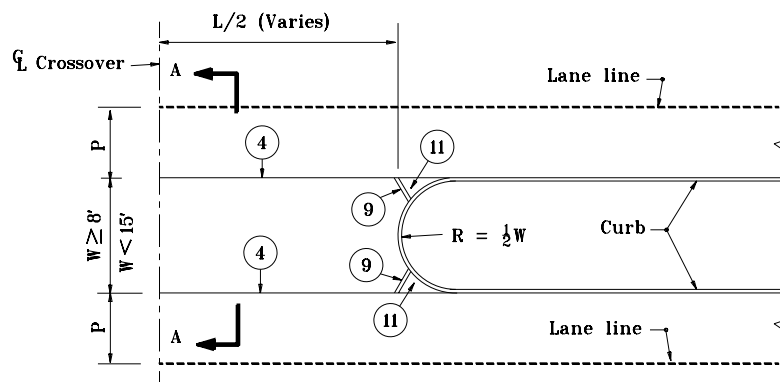
/s/ Richard K. Smutzer 3-03-03
CHIEF HIGHWAY ENGINEER DATE



**CROSSOVER PLAN FOR MEDIAN WIDTH OF
35 ft OR GREATER BUT LESS THAN 60 ft**



**CROSSOVER PLAN FOR MEDIAN WIDTH OF
15 ft OR GREATER BUT LESS THAN 35 ft**

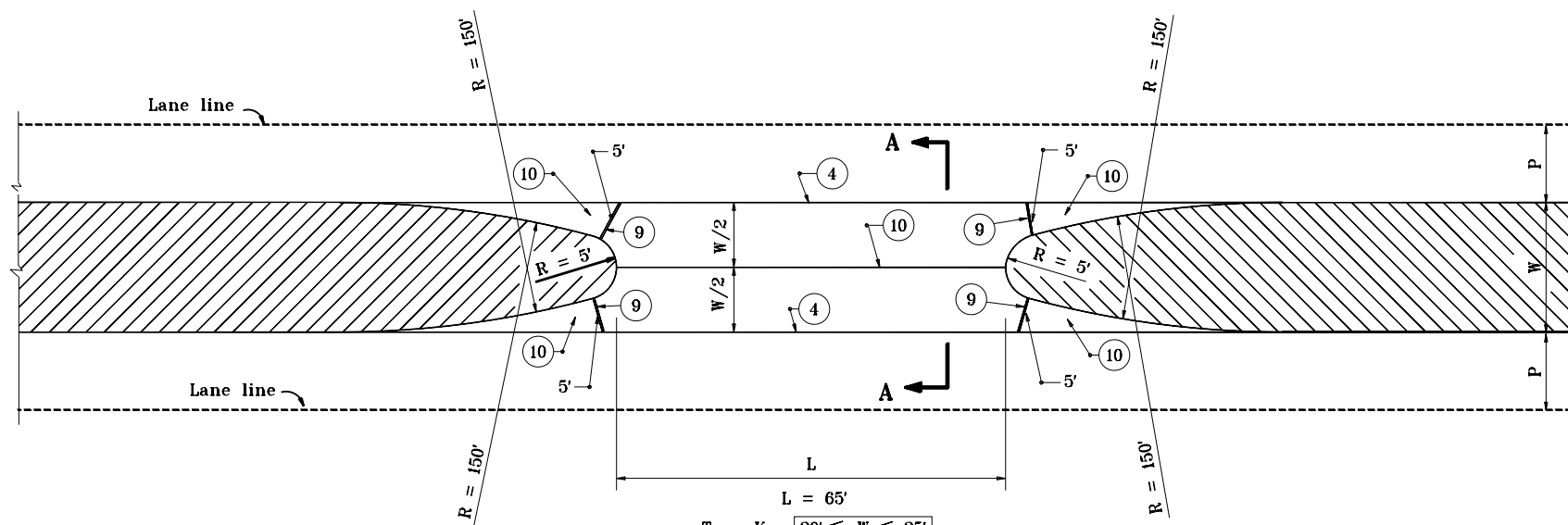


**CROSSOVER PLAN FOR MEDIAN WIDTH OF
8 ft OR GREATER BUT LESS THAN 15 ft**

NOTES :

1. For median width W of 60' or greater, R = 30'.
2. For median width W of less than 8', L = 100' min.
3. See Standard Drawing E 610-PRCO-01 for Legend and Section A-A.
- ⑧ Use construction joint in place of keyway joint if W is 32' or more.

INDIANA DEPARTMENT OF TRANSPORTATION	
PUBLIC ROAD CROSSOVER	
PLANS	
MAY 2000	
STANDARD DRAWING NO. E 610-PRCO-01A	
	/s/ Anthony L. Uremovich 5-01-00 DESIGN STANDARDS ENGINEER DATE
	/s/ Firooz Zandi 5-01-00 CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER	



Type K $20' \leq W < 25'$

L = 65'

Type L $25' \leq W < 30'$

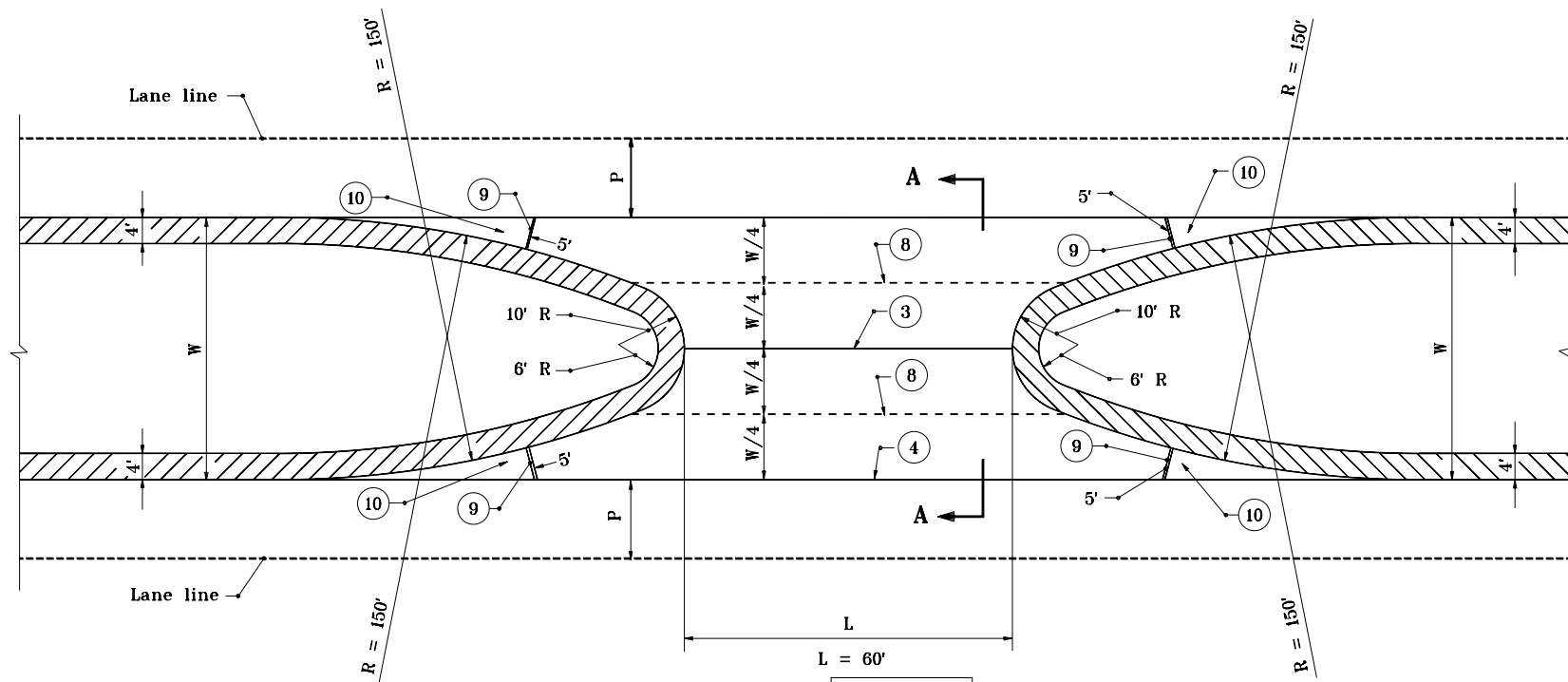
L = 60'

PLAN

NOTES :

- See Standard Drawing E 610-PRC0-01 for Legend and Section A-A.

INDIANA DEPARTMENT OF TRANSPORTATION	
PUBLIC ROAD CROSSOVERS TYPE K & L MAY 2000	
STANDARD DRAWING NO. E 610-PRC0-02	
	/s/ Anthony L. Uremovich 5-01-00 DESIGN STANDARDS ENGINEER DATE
	/s/ Firooz Zandi 5-01-00 CHIEF HIGHWAY ENGINEER DATE



Type M $30' \leq W < 45'$

L = 60'

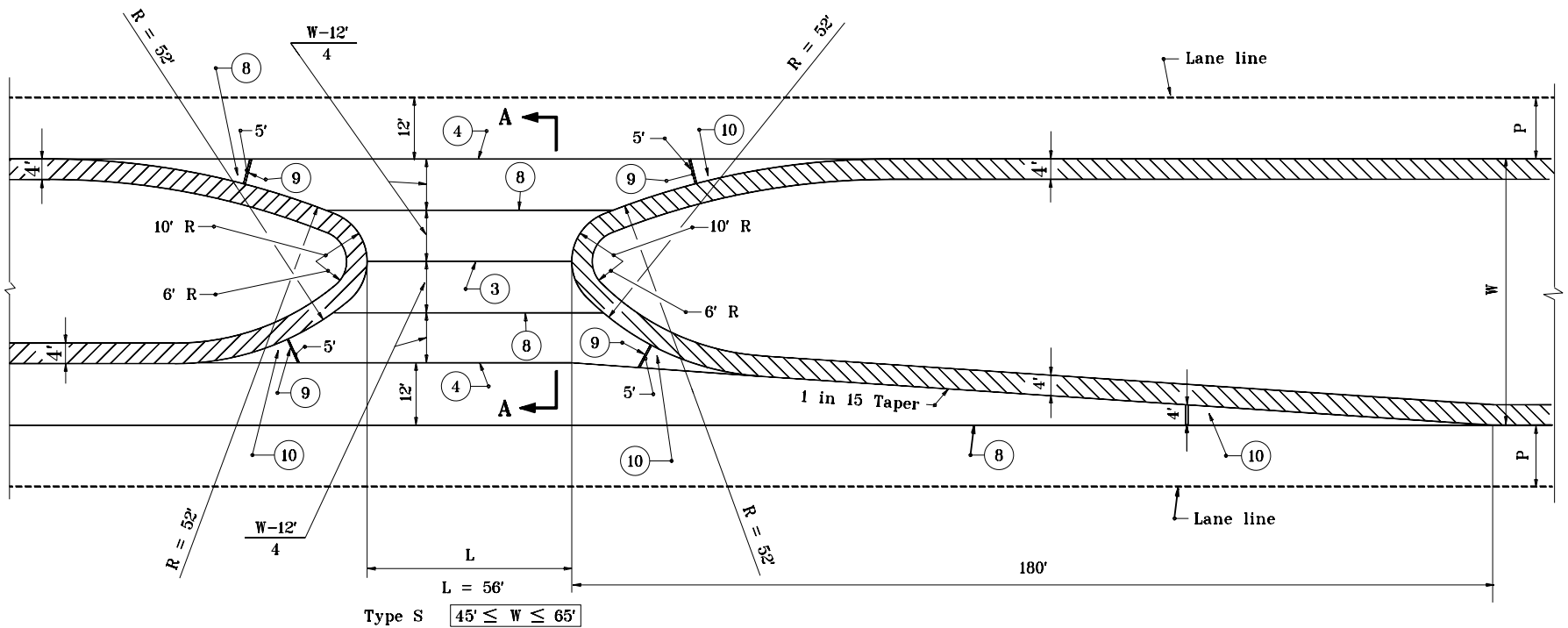
Type N $45' \leq W < 65'$

PLAN

NOTES :

1. See Standard Drawing E 610-PRC0-01 for Legend and Section A-A.

INDIANA DEPARTMENT OF TRANSPORTATION	
PUBLIC ROAD CROSSOVERS TYPE M & N MAY 2000	
STANDARD DRAWING NO. E 610-PRC0-03	
	/s/ Anthony L. Uremovich 5-01-00 DESIGN STANDARDS ENGINEER DATE
	/s/ Firooz Zandi 5-01-00 CHIEF HIGHWAY ENGINEER DATE

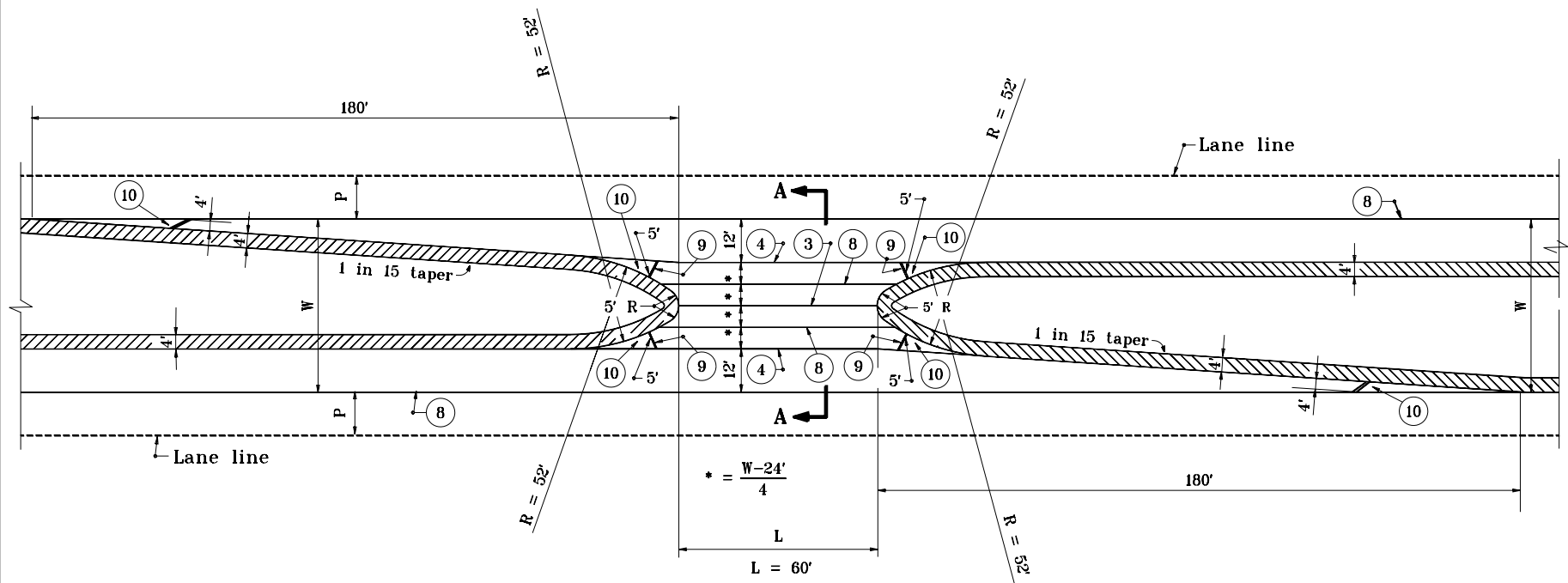


PLAN

NOTES :

1. See Standard Drawing E 610-PRCO-01 for Legend and Section A-A.

INDIANA DEPARTMENT OF TRANSPORTATION	
PUBLIC ROAD CROSSOVER TYPE S	
MAY 2000	
STANDARD DRAWING NO. E 610-PRCO-05	
	/s/ Anthony L. Uremovich 5-01-00 DESIGN STANDARDS ENGINEER DATE
	/s/ Firooz Zandi 5-01-00 CHIEF HIGHWAY ENGINEER DATE



Type T $40' \leq W < 45'$

$L = 56'$

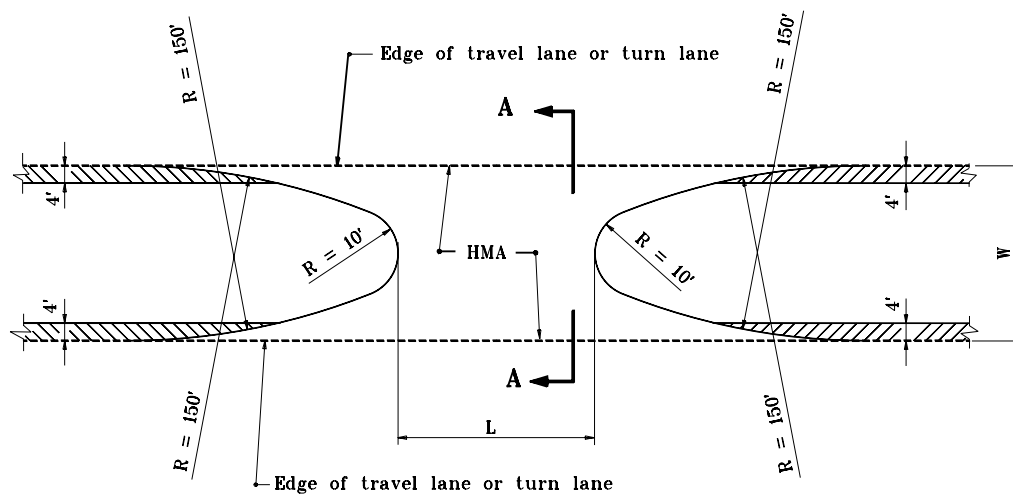
Type U $45' \leq W \leq 65'$

PLAN

NOTES :

- See Standard Drawing E 610-PRCO-01 for Legend and Section A-A.

INDIANA DEPARTMENT OF TRANSPORTATION	
PUBLIC ROAD CROSSOVERS	
TYPE T & U	
MAY 2000	
STANDARD DRAWING NO. E 610-PRCO-06	
	/s/ Anthony L. Uremovich 5-01-00 DESIGN STANDARDS ENGINEER DATE
	/s/ Firooz Zandi 5-01-00 CHIEF HIGHWAY ENGINEER DATE

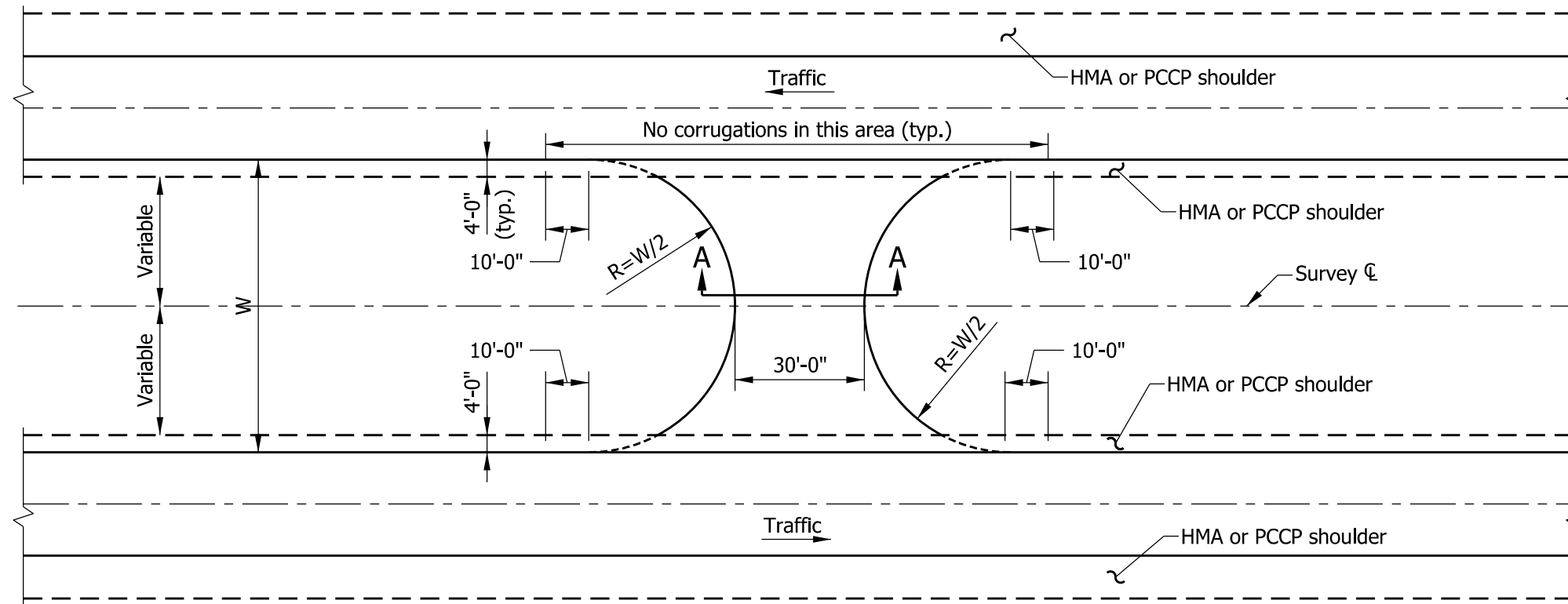


PLAN

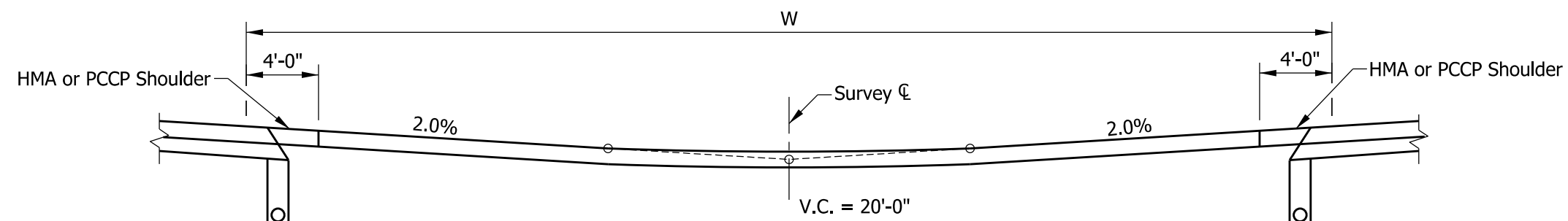
NOTES :

1. Plan dimensions for HMA pavement crossover shall be as shown for PCCP on Standard Drawings E 610-PRCO-01A through -07.
2. See Standard Drawing E 610-PRCO-01 for Legend and Section A-A.

INDIANA DEPARTMENT OF TRANSPORTATION	
PUBLIC ROAD CROSSOVER PLAN FOR HMA PAVEMENT	
MAY 2000	
STANDARD DRAWING NO. E 610-PRCO-07	
	/s/ Anthony L. Uremovich 5-01-00 DESIGN STANDARDS ENGINEER DATE
	/s/ Firooz Zandi 5-01-00 CHIEF HIGHWAY ENGINEER DATE

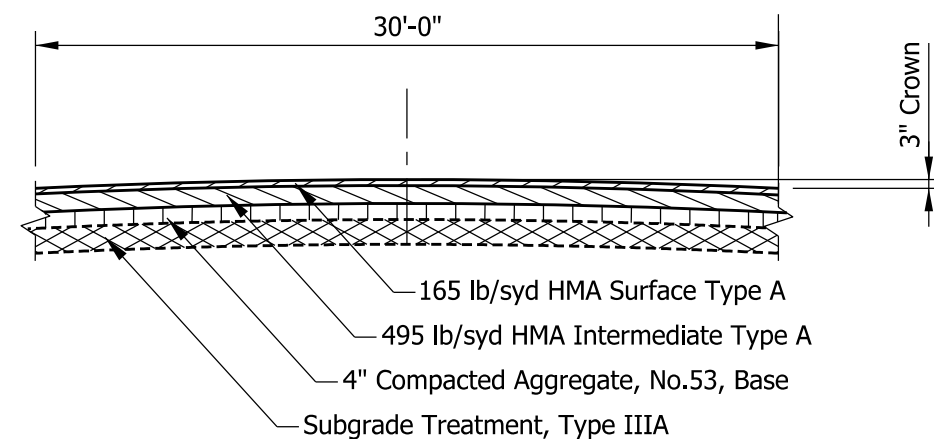


PLAN



GRADE OF U-TURN MEDIAN OPENING

Vertical scale exaggerated for clarity



SECTION A-A

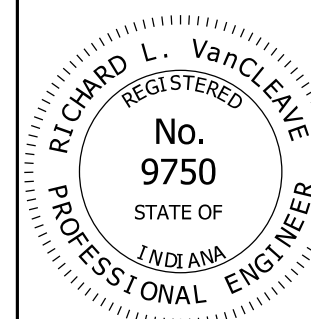
Vertical scale exaggerated for clarity

INDIANA DEPARTMENT OF TRANSPORTATION

U-TURN MEDIAN OPENING

SEPTEMBER 2013

STANDARD DRAWING NO. E 610-UTMO-01

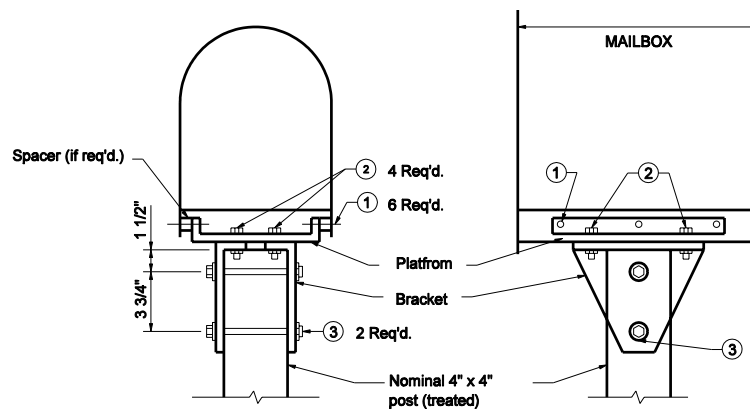


/s/ Richard L. VanCleave 02/04/13

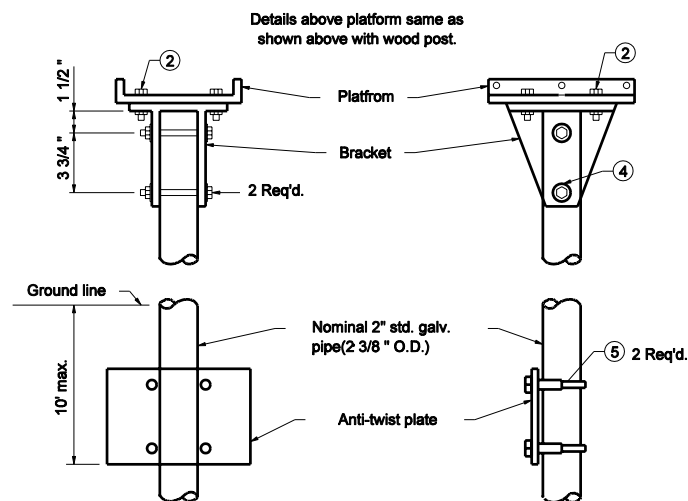
DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller 03/27/13

CHIEF ENGINEER DATE



WITH WOOD POST



WITH PIPE POST

LEGEND

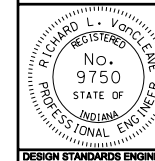
- ① #8-32 x "L" truss head machine screw with two #8 flat washers, #8 lock washers, and #8 hex nut.
- ② 5/16"-18 x 3/4" hex cap screw with two 5/16" flat washers, 5/16" lock washer and 5/16" hex nut.
- ③ 5/16"-18 x 4 1/2" hex cap screw with two 5/16" flat washers, 5/16" lock washer, and 5/16" hex nut.
- ④ 5/16"-18 x 3" hex cap screw with two 5/16" flat washers, 5/16" lock washer, and 5/16" hex nut.
- ⑤ Nominal 2 3/4" muffler clamp
- ⑥ For platform, bracket, shelf, spacer and anti-twist plate details, see Standard Drawing E 611-MBAS-03.

INDIANA DEPARTMENT OF TRANSPORTATION

SINGLE MAILBOX ASSEMBLY

MARCH 2005

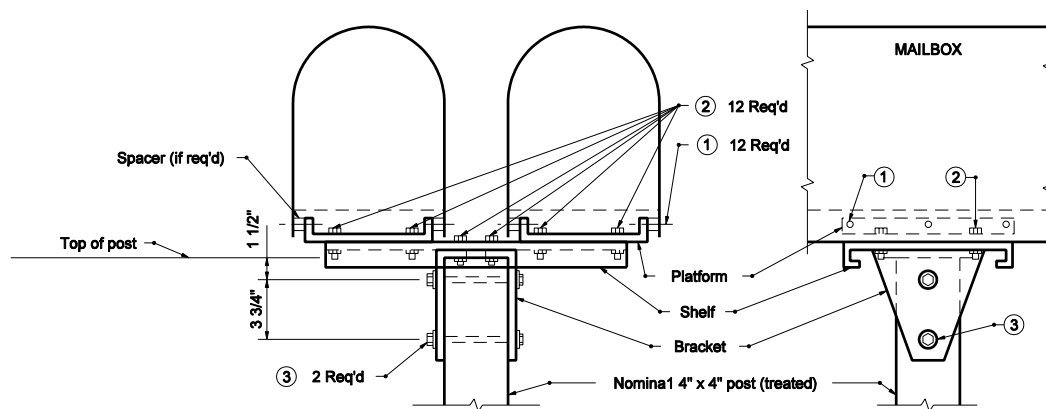
STANDARD DRAWING NO. E 611-MBAS-01



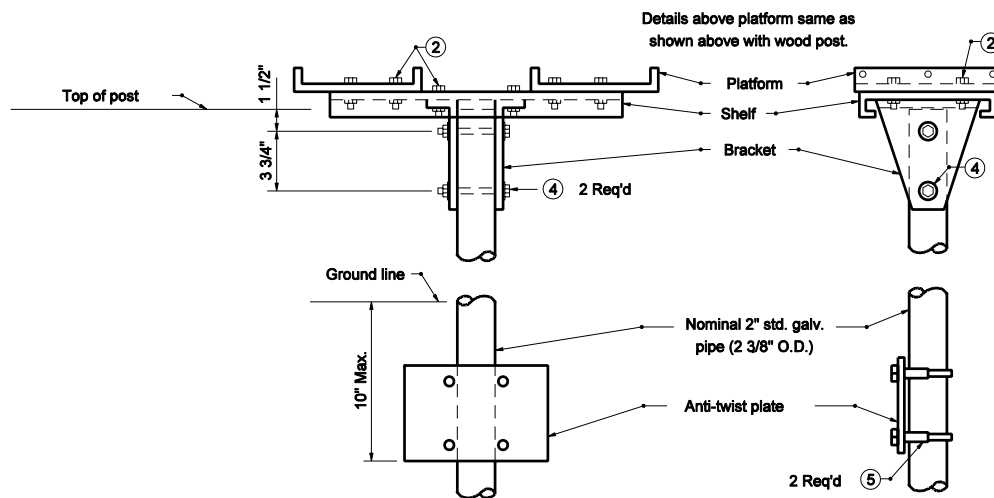
/s/ Richard L. VanCleave 3-01-05
DESIGN STANDARDS ENGINEER DATE

/s/ Richard K. Smutzer 3-01-05
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER



WITH WOOD POST



WITH PIPE POST

LEGEND

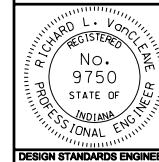
- ① #8-32 x "L" truss head machine screw with two #8 flat washers, #8 lock washers, and #8 hex nut.
- ② 5/16"-18 x 3/4" hex cap screw with two 5/16" flat washers, 5/16" lock washer and 5/16" hex nut.
- ③ 5/16"-18 x 4 1/2" hex cap screw with two 5/16" flat washers, 5/16" lock washer, and 5/16" hex nut.
- ④ 5/16"-18 x 3" hex cap screw with two 5/16" flat washers, 5/16" lock washer, and 5/16" hex nut.
- ⑤ Nominal 2 3/4" muffler clamp
- ⑥ For platform, bracket, shelf, spacer and anti-twist plate details, see Standard Drawing E 611-MBAS-03.

INDIANA DEPARTMENT OF TRANSPORTATION

DOUBLE MAILBOX ASSEMBLY

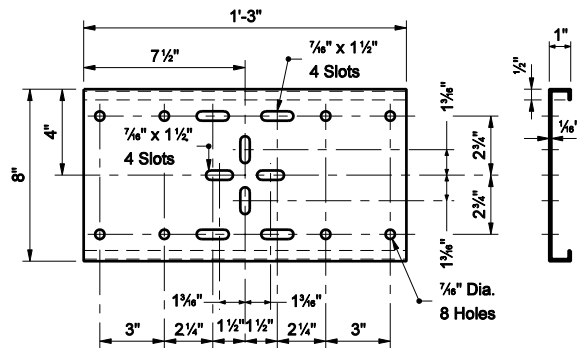
MARCH 2005

STANDARD DRAWING NO. E 611-MBAS-02

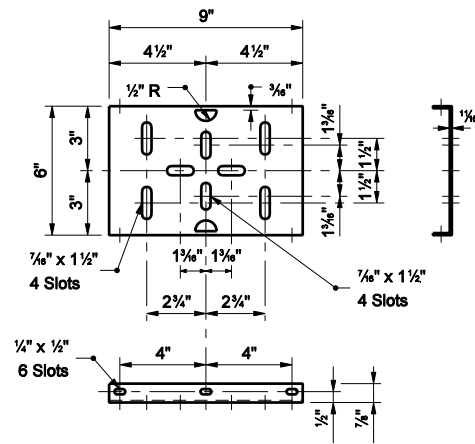


/s/ Richard L. VanCleave	3-01-05
DESIGN STANDARDS ENGINEER	DATE
/s/ Richard K. Smutzer	3-01-05
CHIEF HIGHWAY ENGINEER	DATE

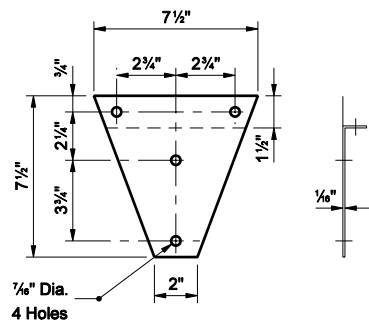
DESIGN STANDARDS ENGINEER



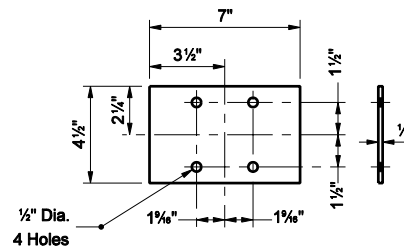
SHELF



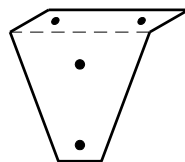
PLATFORM



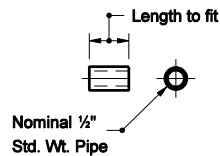
BRACKET



ANTI-TWIST PLATE

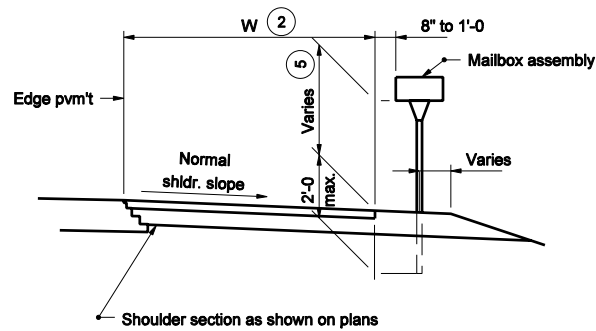


**FINISHED BRACKET
ISOMETRIC**

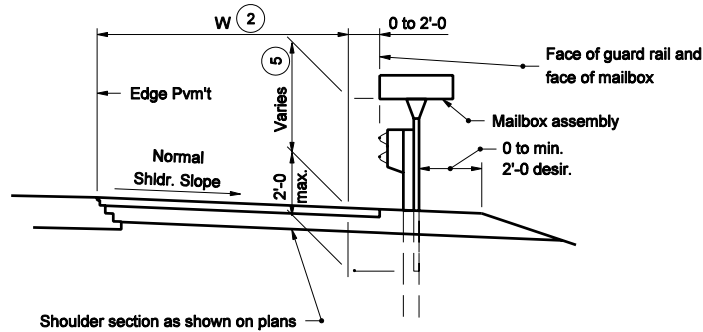


SPACER

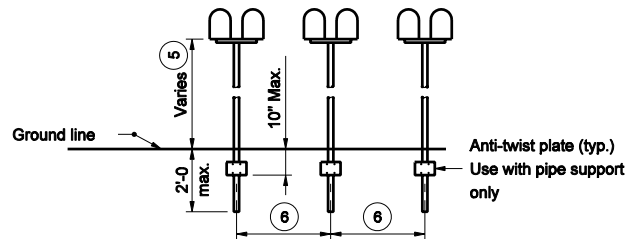
INDIANA DEPARTMENT OF TRANSPORTATION	
MAILBOX SUPPORT HARDWARE	
MARCH 2005	
STANDARD DRAWING NO. E 611-MBAS-03	
	<i>/s/ Richard L. VanCleave</i> 3-01-05 DESIGN STANDARDS ENGINEER DATE
	<i>/s/ Richard K. Smutzer</i> 3-01-05 CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER	



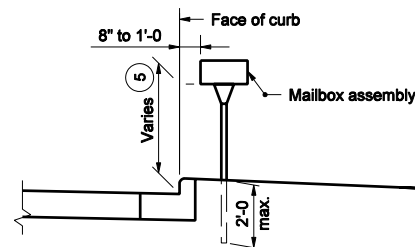
NORMAL SHOULDER SECTION



SHOULDER SECTION WITH GUARDRAIL



SPACING FOR MULTIPLE POST INSTALLATION



CURBED SECTION

GENERAL NOTES

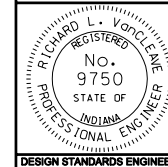
- ② See plans for W
- ⑤ The normal height range is 3'-3 to 3'-11. Contact the local postmaster to establish appropriate installation height.
- ⑥ Established by the U.S. Postal Service, usually 3'-4 to 4'-0.

INDIANA DEPARTMENT OF TRANSPORTATION

**MAILBOX ASSEMBLIES
ELEVATION VIEW**

MARCH 2005

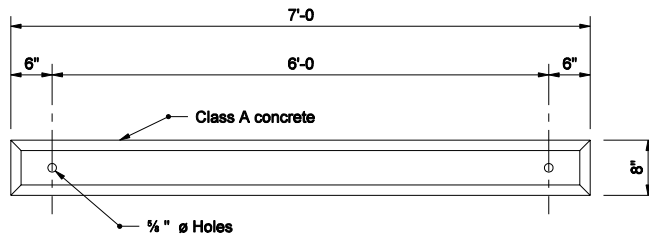
STANDARD DRAWING NO. E 611-MBAS-04



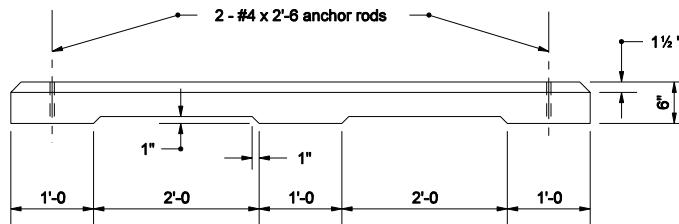
/s/ Richard L. VanCleave 3-01-05
DESIGN STANDARDS ENGINEER DATE

/s/ Richard K. Smutzer 3-01-05
CHIEF HIGHWAY ENGINEER DATE

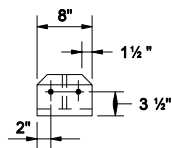
DESIGN STANDARDS ENGINEER



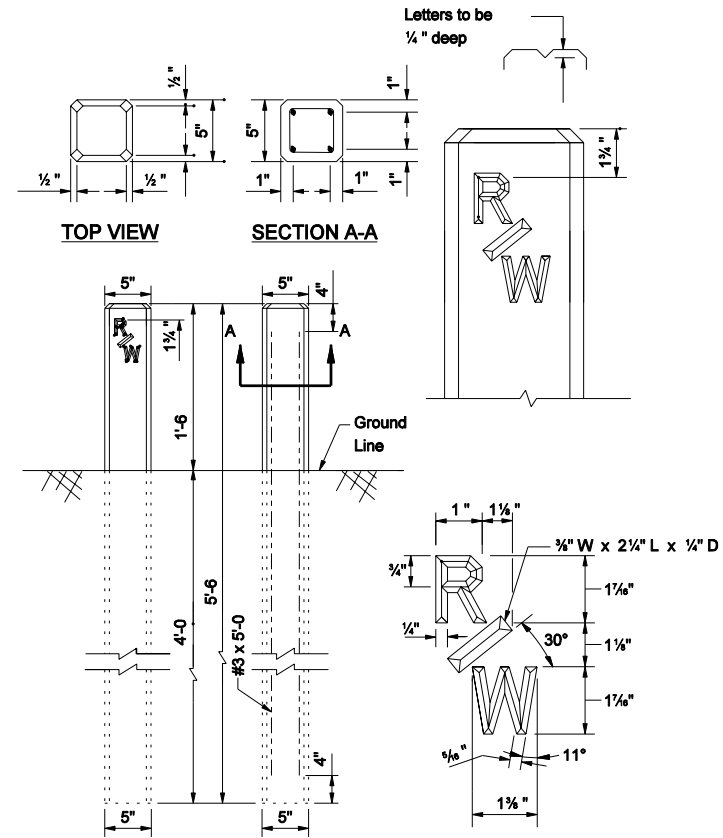
TOP VIEW



SIDE VIEW



END VIEW



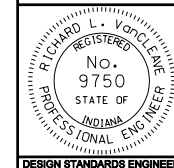
ELEVATION

INDIANA DEPARTMENT OF TRANSPORTATION

**RIGHT-OF-WAY MARKER AND
CONCRETE PARKING BARRIER**

MARCH 2004

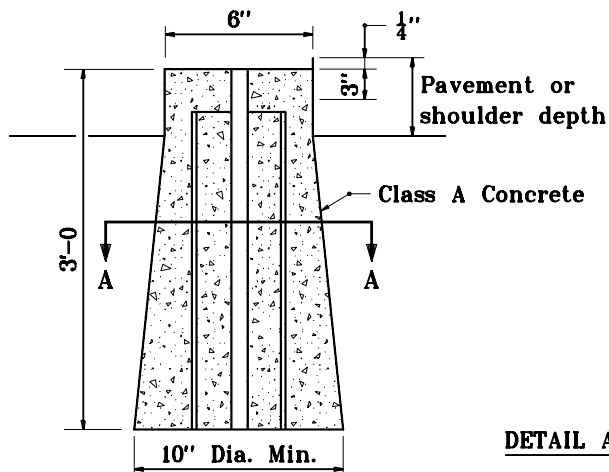
STANDARD DRAWING NO. E 615-RWPB-01



/s/ Richard L. VanCleave X-0X-0X
DESIGN STANDARDS ENGINEER DATE

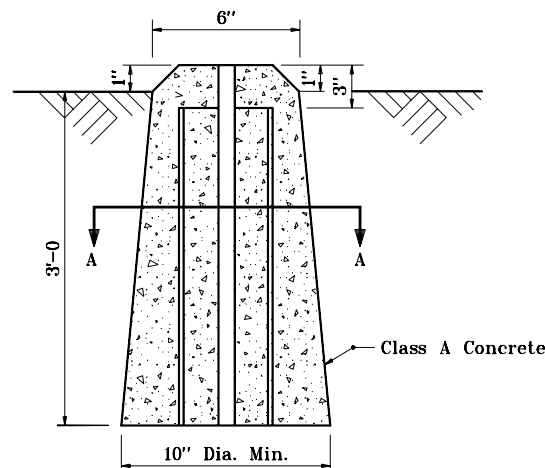
/s/ Richard K. Smutzer X-0X-0X
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER



DETAIL A

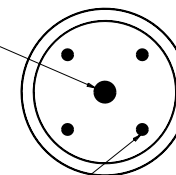
INSIDE PAVEMENT OR SHOULDER AREA



OUTSIDE PAVEMENT OR SHOULDER AREA

1"Ø Smooth round steel bar
(See plans for length)

4-#4 Rebars as req'd. in details
(See plans for length)

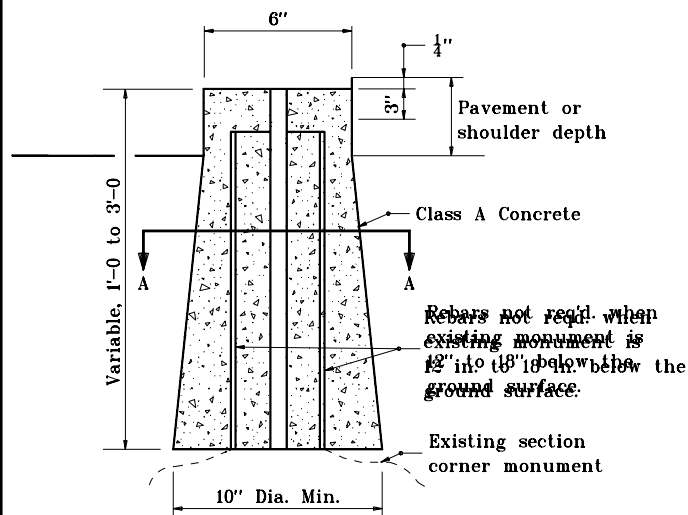


SECTION A-A

NOTES

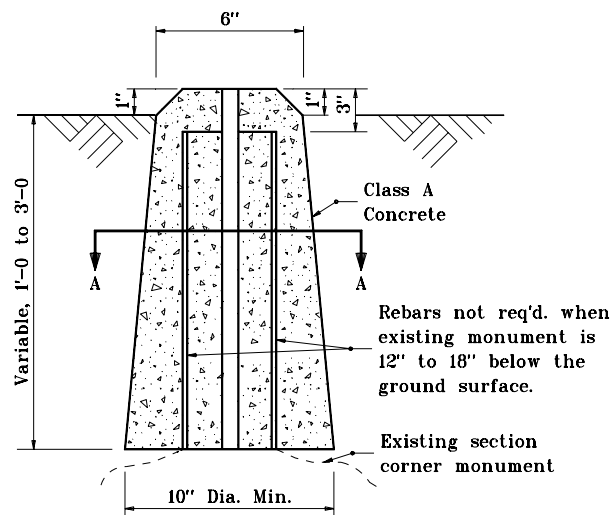
1. If the existing section corner monument is 0 to 1 ft below surface, it shall be removed and replaced as shown in Detail A.
2. If the existing section corner monument is over 1 ft to 3 ft below surface, the county surveyor shall determine whether it shall remain in place or be replaced. If the monument is to be replaced, the installation shall be as shown in Detail A. If the existing monument is to remain in place, it shall be extended as shown in Detail B.

NEW SECTION CORNER MONUMENT INSTALLATION



DETAIL B

INSIDE PAVEMENT OR SHOULDER AREA



OUTSIDE PAVEMENT OR SHOULDER AREA

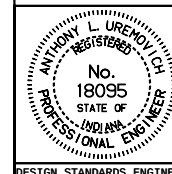
EXTENSION OF EXISTING SECTION CORNER MONUMENT

INDIANA DEPARTMENT OF TRANSPORTATION

SECTION CORNER MONUMENTS

APRIL 1995

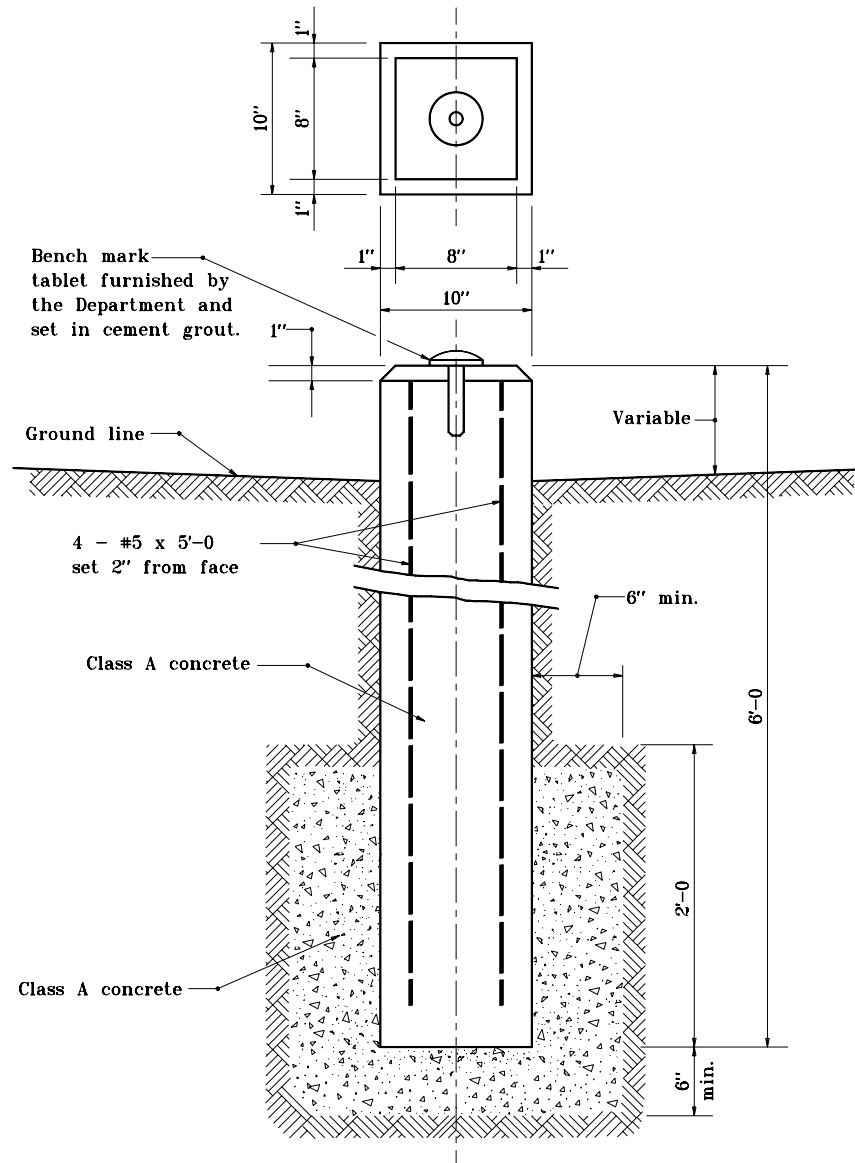
STANDARD DRAWING NO. E 615-SCMN-01



DETAILS PLACED IN THIS FORMAT 11-15-99

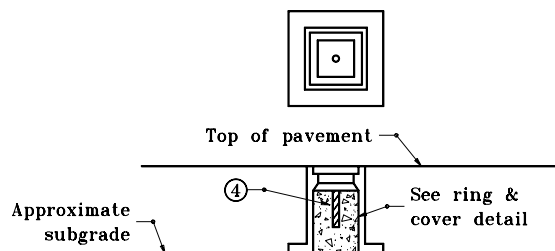
/s/ Anthony L. Uremovich 11-15-99
DESIGN STANDARDS ENGINEER DATE

/s/ Firooz Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE
ORIGINALLY APPROVED 4-03-95

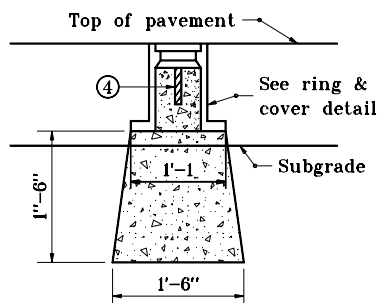


BENCH MARK POST

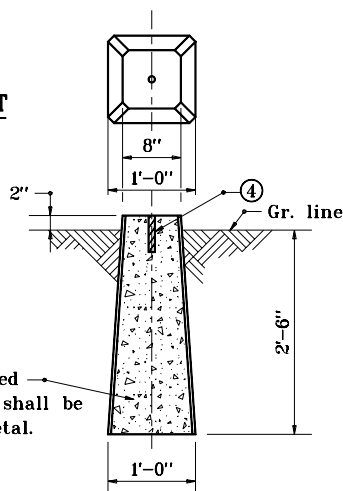
INDIANA DEPARTMENT OF TRANSPORTATION	
BENCH MARK POST	
SEPTEMBER 1997	
STANDARD DRAWING NO. E 615-SLBM-01	
	DETAILS PLACED IN THIS FORMAT 11-15-99 /s/ Anthony L. Uremovich 11-15-99 DESIGN STANDARDS ENGINEER DATE
DESIGN STANDARDS ENGINEER	/s/ Firooz Zandi 11-15-99 CHIEF HIGHWAY ENGINEER DATE ORIGINALLY APPROVED 9-01-97



**INSTALLATION FOR VITRIFIED BRICK OR BITUMINOUS SURFACE ON CONCRETE BASE
(TYPE A)**

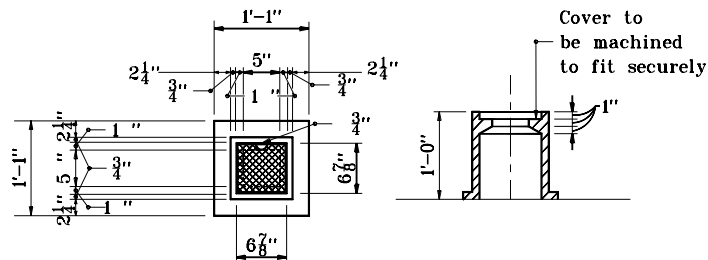


**INSTALLATION FOR FLEXIBLE PAVEMENT
(TYPE B)**

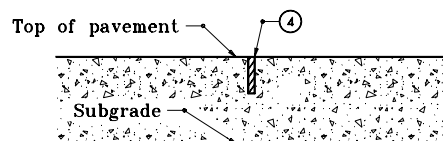


Where monument is required inside of surfaced area it shall be set with the top below metal.

**INSTALLATION OUTSIDE OF PAVEMENT
(TYPE C)**



SURVEY LINE MONUMENT RING & COVER

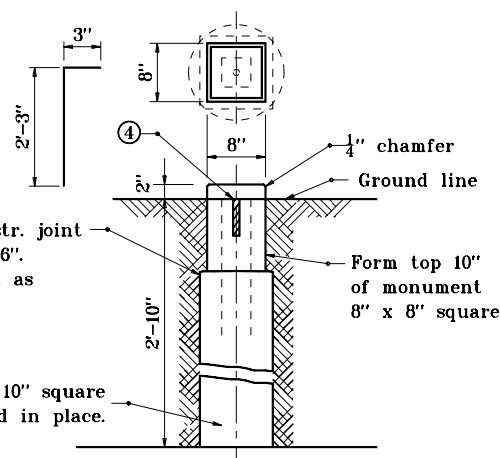


**INSTALLATION FOR CONCRETE PAVEMENT
(TYPE D)**

#4 for optional constr. joint

Optional constr. joint
4 - #4 x 2'-6\"/>

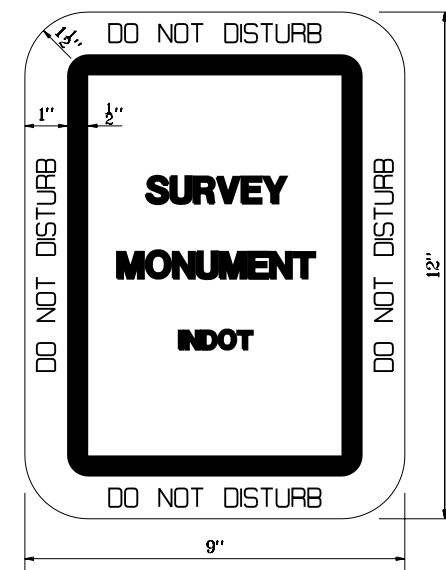
12"Ø or 10" x 10" square hole poured in place.



OPTIONAL INSTALLATION FOR TYPE C MONUMENT

GENERAL NOTES

- Sign shall be white background with black copy.
- One steel type A or 4" x 4" wood post required.
- Letter height shall be as follows:
Border: 1/2" series D
Line 1: 1" series B
Line 2: 1" series B
Line 3: 1" series B
- 1"Ø x 5" steel rod

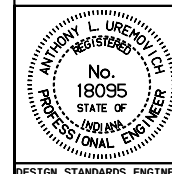


INDIANA DEPARTMENT OF TRANSPORTATION

SURVEY LINE MONUMENTS

SEPTEMBER 1997

STANDARD DRAWING NO. E 615-SLMN-01



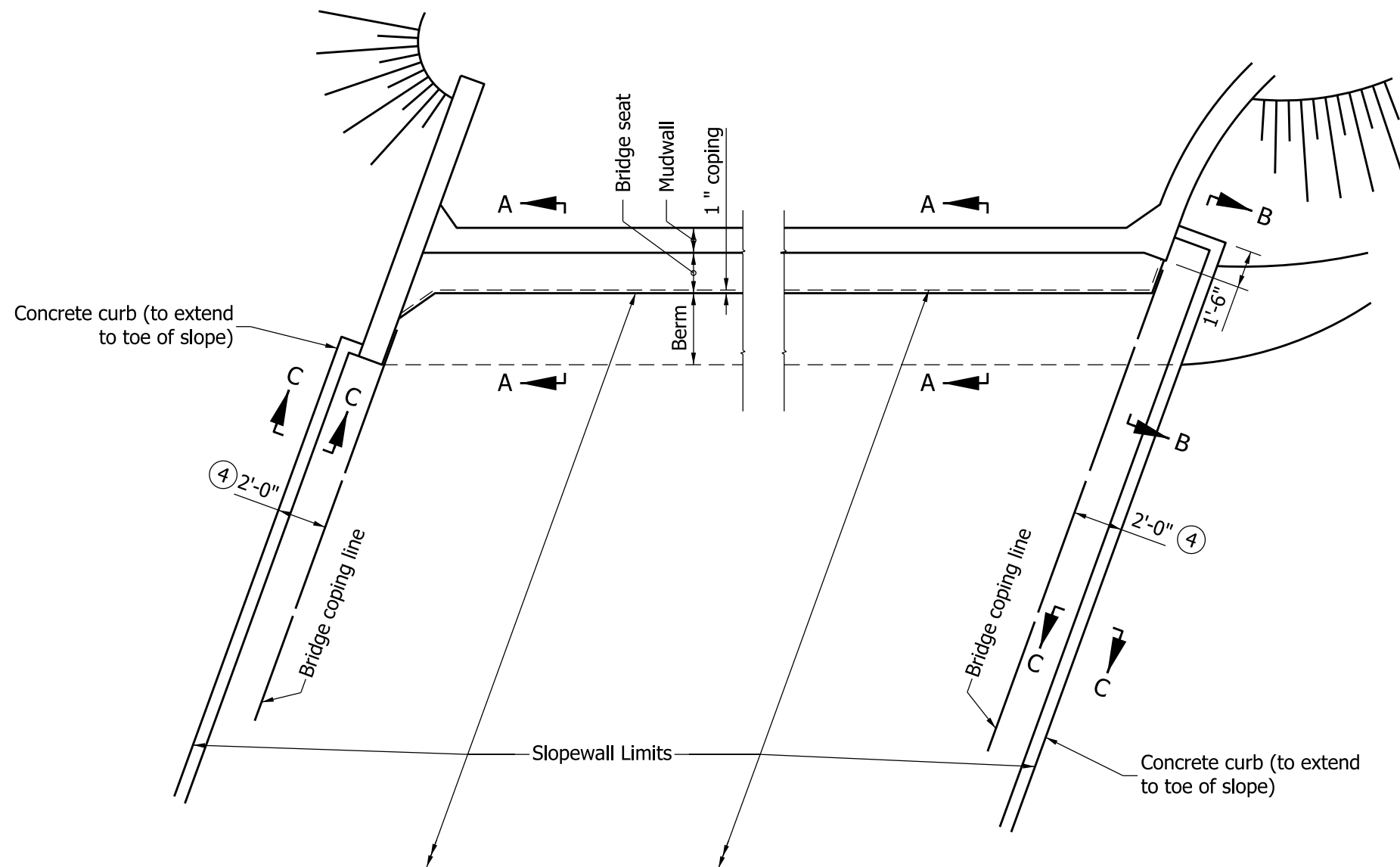
DETAILS PLACED IN THIS FORMAT 11-15-99

/s/ Anthony L. Uremovich 11-15-99
DESIGN STANDARDS ENGINEER DATE

/s/ Firooz Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

ORIGINALLY APPROVED 9-01-97



STRAIGHT WINGS

FLARED WINGS

NOTES:

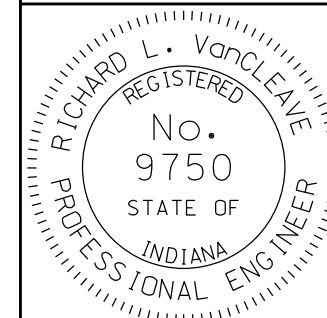
1. See Standard Drawing E 616-SWCO-03 for Sections A-A, B-B, and C-C.
2. When paved sloewall abuts or surrounds columns, piers or other structures, use 1/2" bituminous expansion joint material between sloewall and structure.
3. If sloewall is specified, 1'-0" hand-laid riprap or precast concrete riprap type A may be used.
- ④ This dimension shall be increased to 5'-0" where no curb is used on the bridge.

INDIANA DEPARTMENT OF TRANSPORTATION

CONCRETE SLOEWALL DETAILS

SEPTEMBER 2011

STANDARD DRAWING NO. E 616-SWCO-01



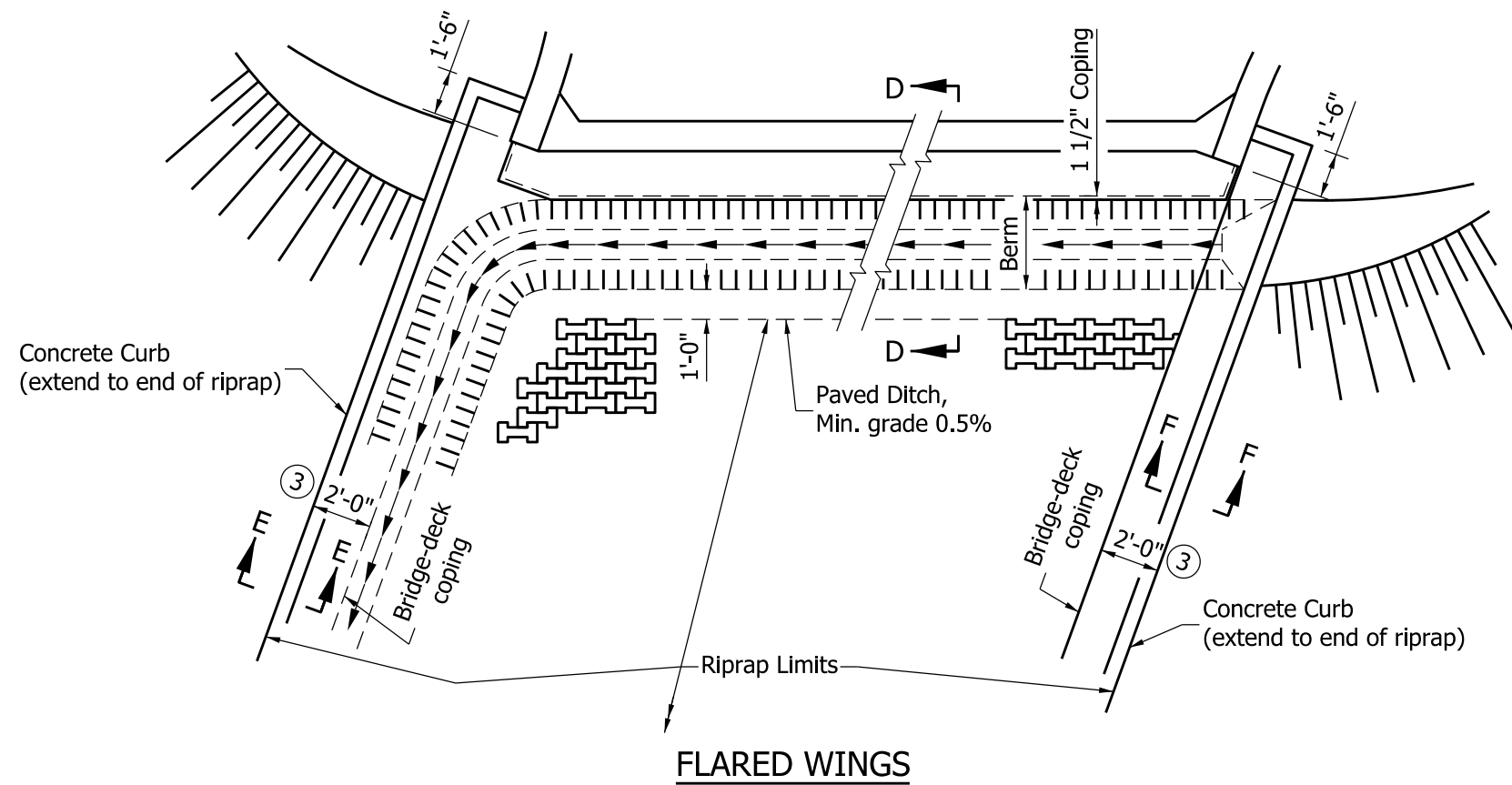
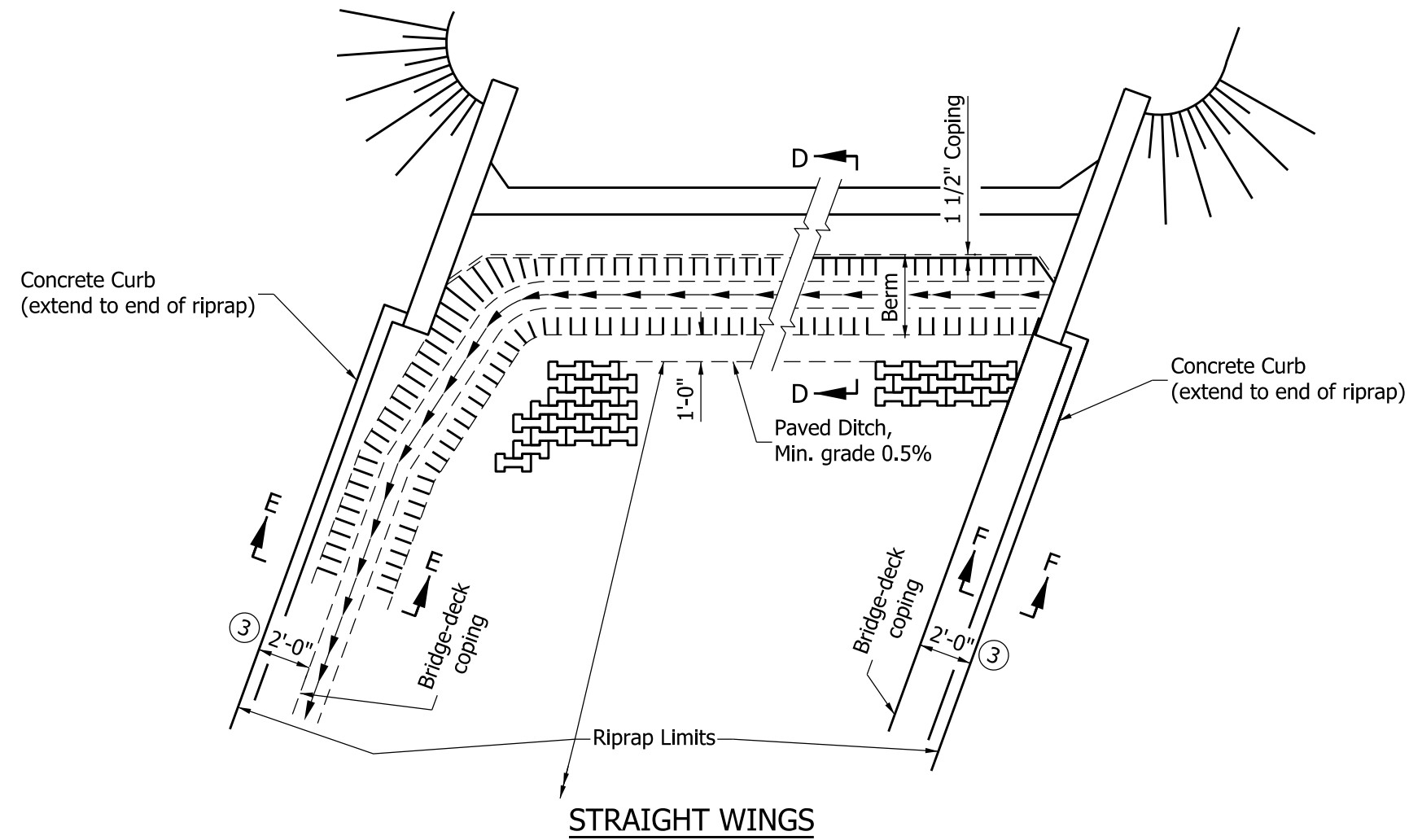
/s/ Richard L. VanCleave 9/01/11

DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller 9/01/01

CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER



NOTES:

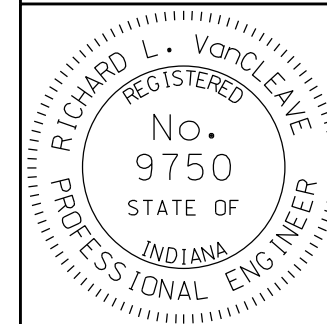
1. These configurations to be used with precast or hand-laid riprap.
2. See Standard Drawing E 616-SWRR-01 for Sections D-D, E-E, and F-F.
- ③ This dimension shall be increased to 5'-0" where no curb is used on the bridge.

INDIANA DEPARTMENT OF TRANSPORTATION

DRAINAGE DETAILS
AT END BENTS

SEPTEMBER 2011

STANDARD DRAWING NO. E 616-SWCO-02



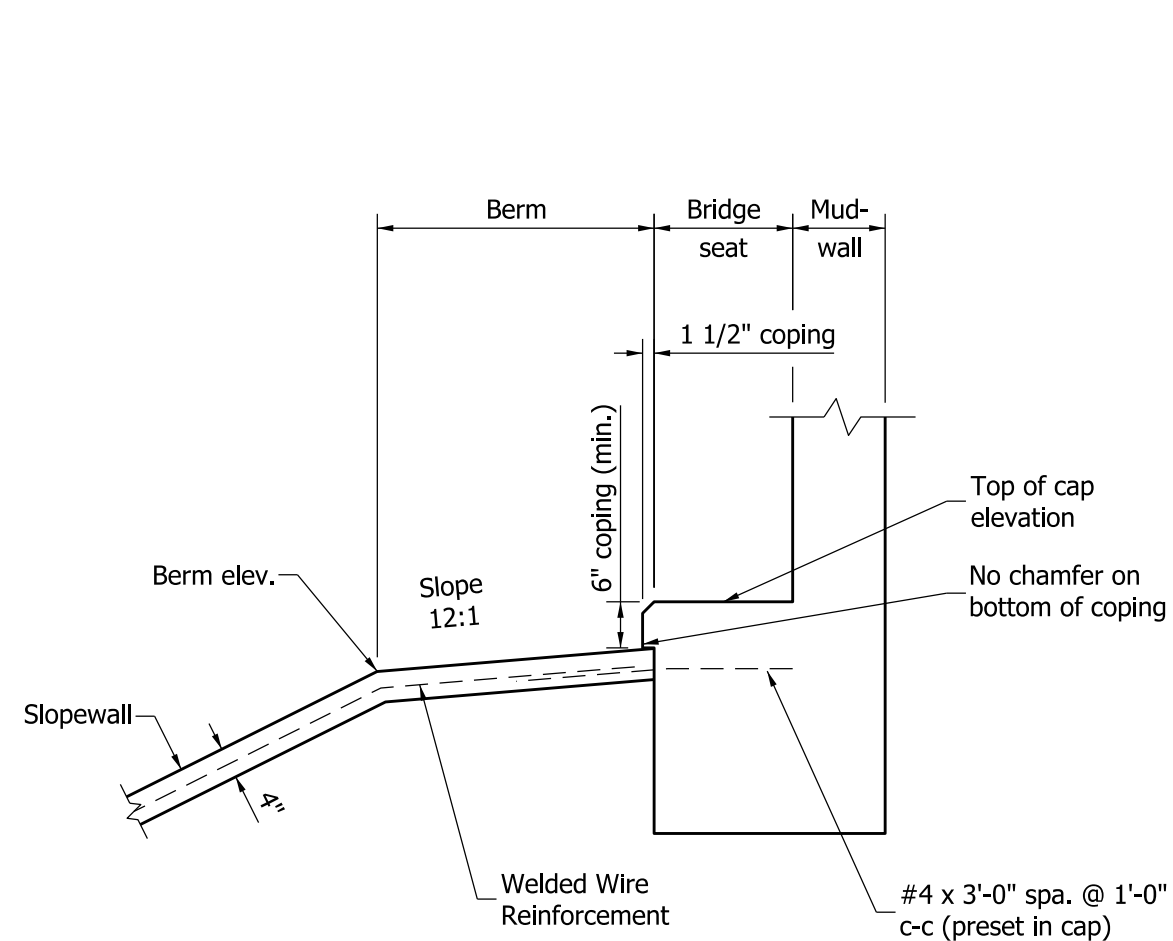
/s/ Richard L. VanCleave 09/01/11

DESIGN STANDARDS ENGINEER DATE

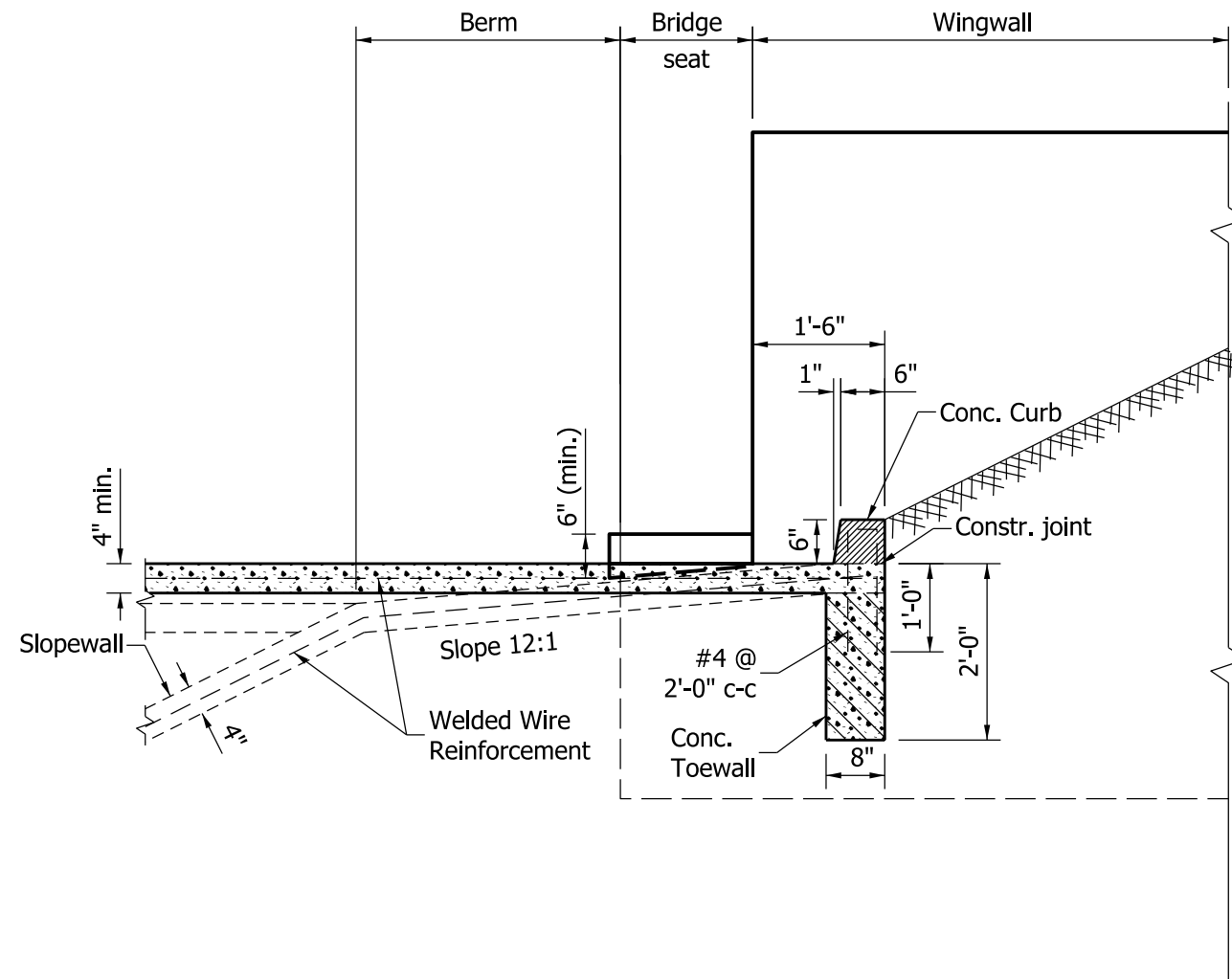
/s/ Mark A. Miller 09/01/11

CHIEF HIGHWAY ENGINEER DATE

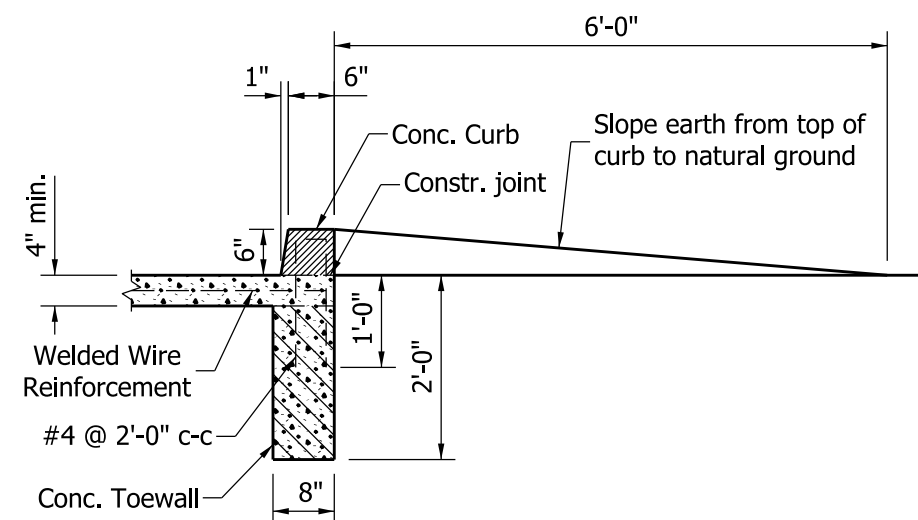
DESIGN STANDARDS ENGINEER



SECTION A-A



SECTION B-B



SECTION C-C

INDIANA DEPARTMENT OF TRANSPORTATION		
CONCRETE SLOPEWALL DETAILS		
SEPTEMBER 2011		
STANDARD DRAWING NO.		E 616-SWCO-03
	/s/ <i>Richard L. VanCleave</i>	09/01/11
	DESIGN STANDARDS ENGINEER	DATE
	/s/ <i>Mark A. Miller</i>	09/01/11
	CHIEF HIGHWAY ENGINEER	DATE
DESIGN STANDARDS ENGINEER		



- INDIANA DEPARTMENT OF TRANSPORTATION

CONCRETE AND RIPRAP SLOPEWALL DETAILS

SEPTEMBER 2011

STANDARD DRAWING NO. E 616-SWCO-04

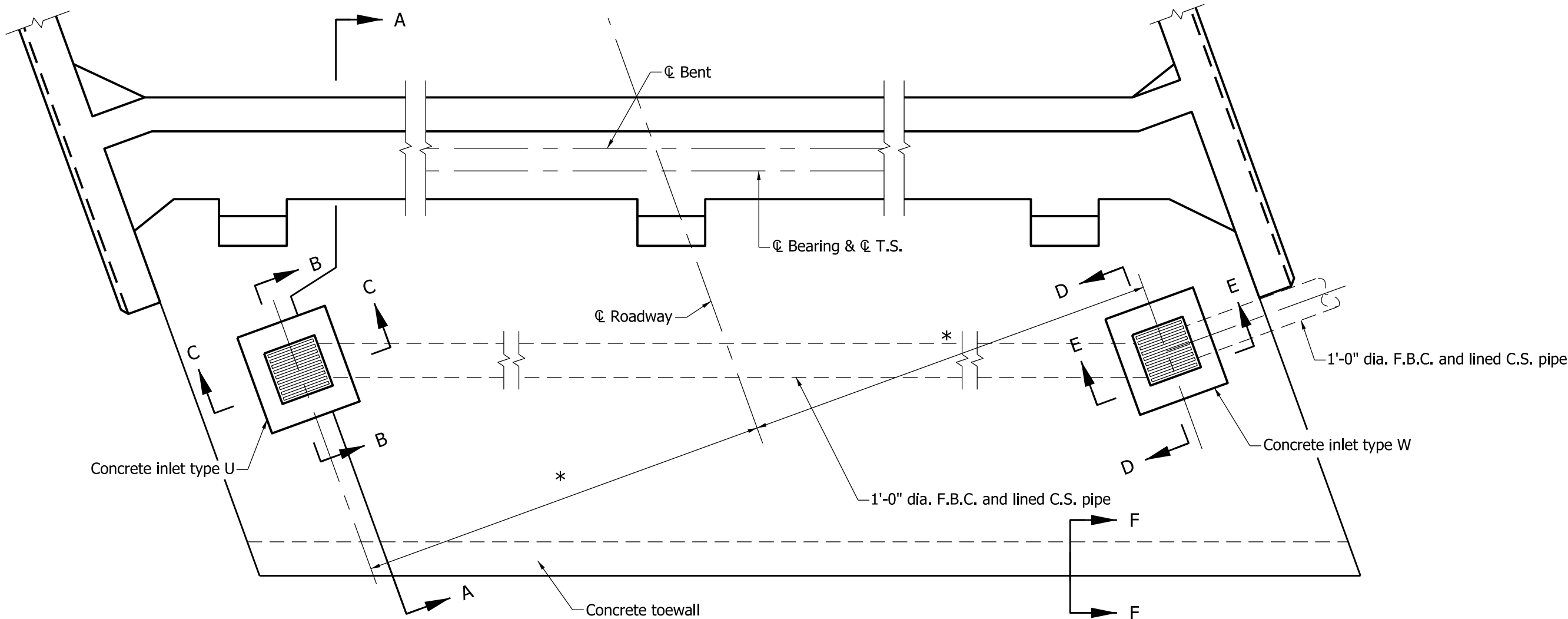


<i>/s/ Mark A. Miller</i>	<i>09/01/11</i>
CHIEF HIGHWAY ENGINEER	DATE

DESIGN STANDARDS ENGINEER

NOTES:

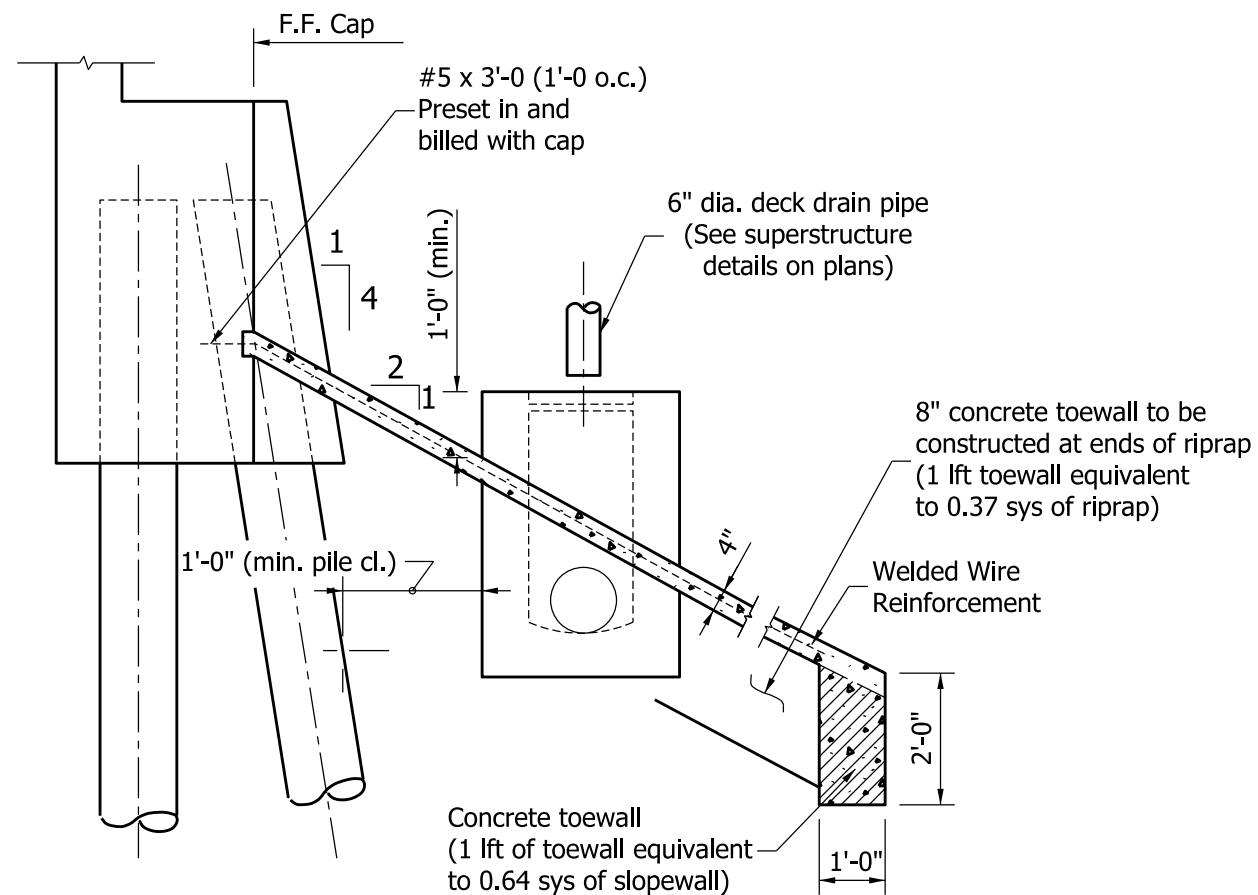
- 1. See Standard Drawing E 616-SWCO-06 for Sections A-A, B-B, C-C, D-D, and E-E.
- 2. See General Plan for stations and locations of inlets and pipe.



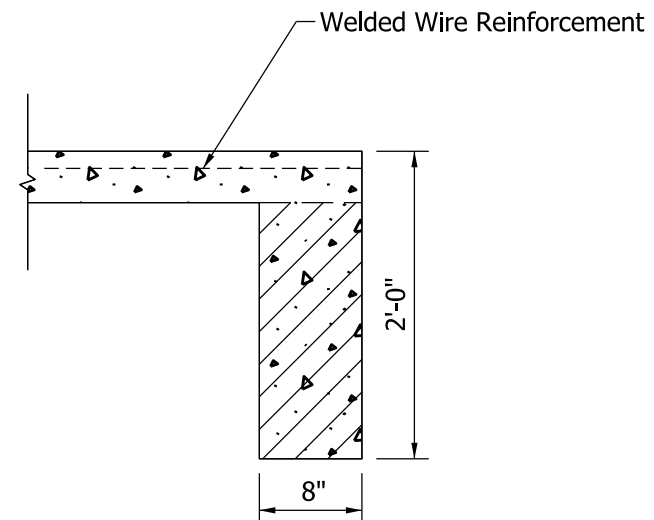
PLAN
(to be used on structures without berms)

* Dimension varies according to roadway width and type of drain used

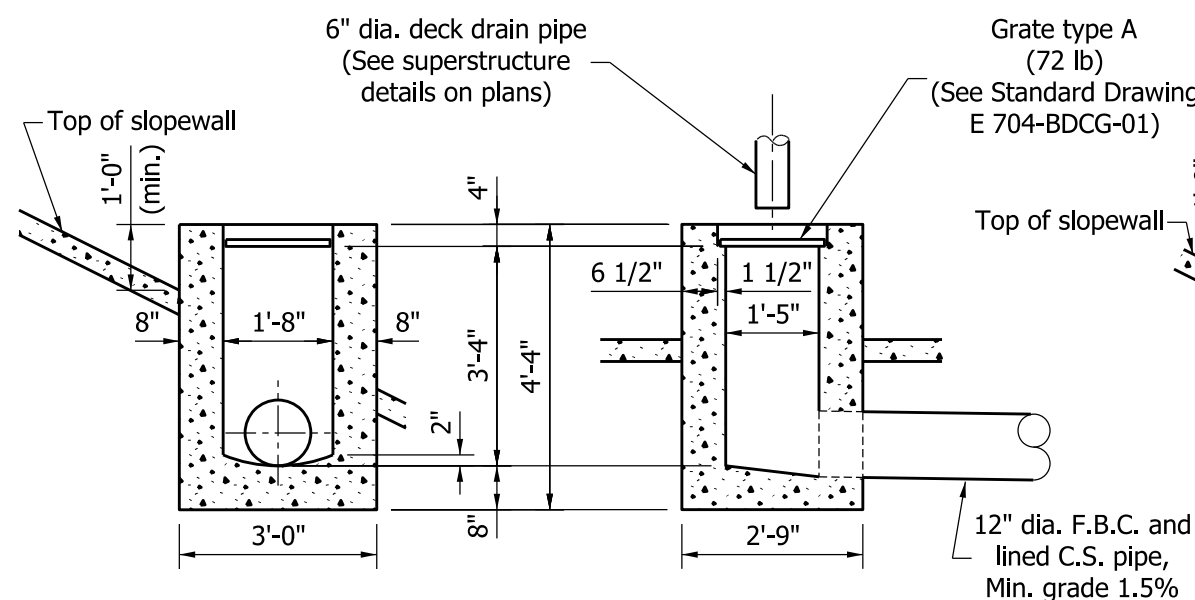
INDIANA DEPARTMENT OF TRANSPORTATION		
SLOPEWALL AND DRAINAGE DETAILS		
SEPTEMBER 2011		
STANDARD DRAWING NO.		E 616-SWCO-05
	/s/ Richard L. VanCleave	09/01/11
	DESIGN STANDARDS ENGINEER	DATE
	/s/ Mark A. Miller	09/01/11
	CHIEF HIGHWAY ENGINEER	DATE
DESIGN STANDARDS ENGINEER		



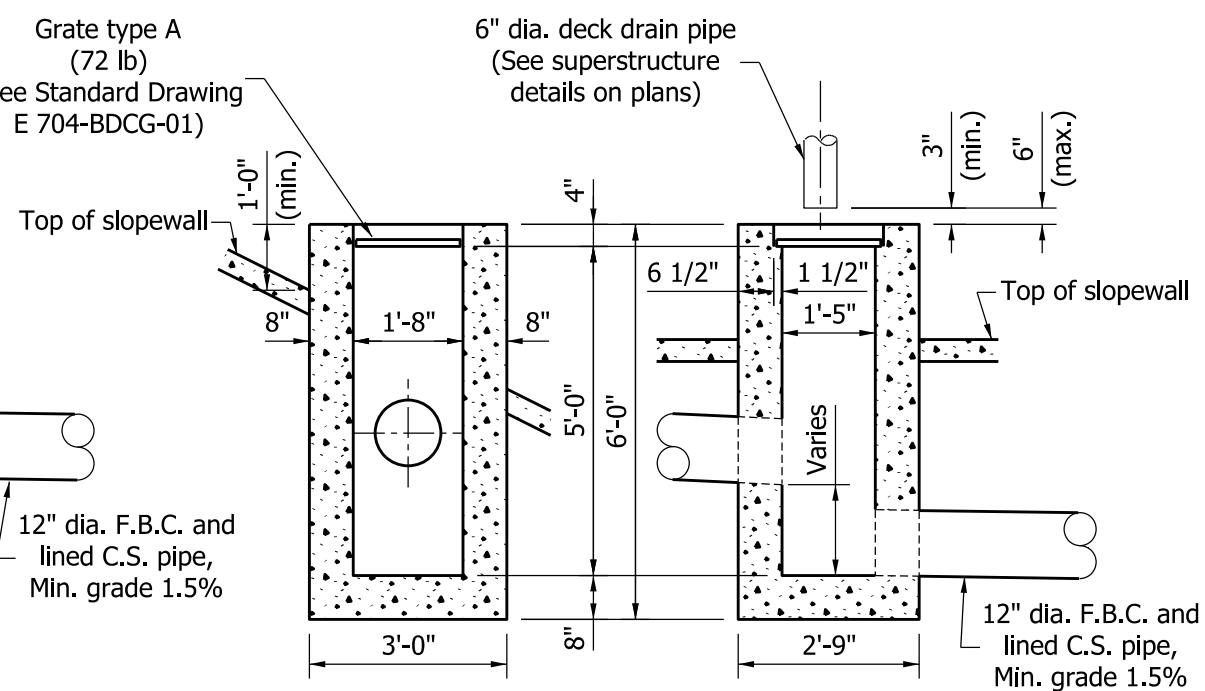
SECTION A-A
TYPICAL ELEVATION THRU SLOPEWALL



SECTION F-F



SECTION B-B
DETAIL OF CONCRETE INLET TYPE U

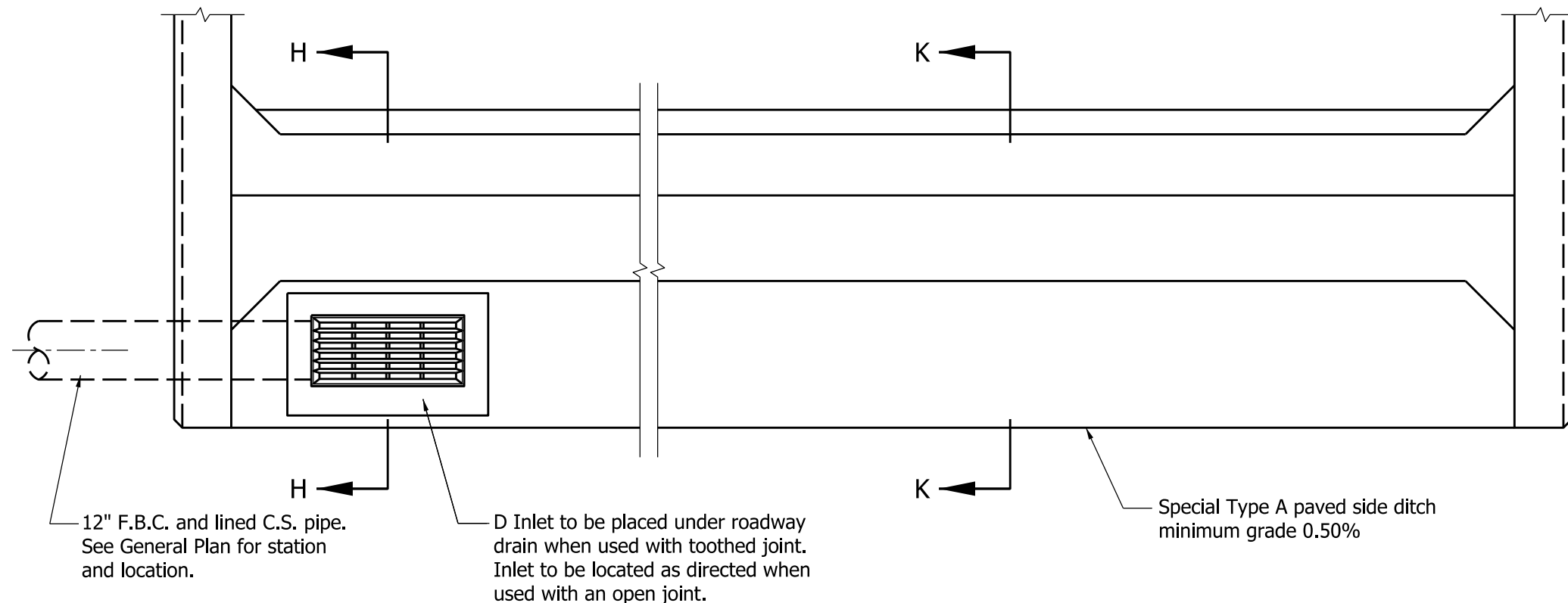


SECTION C-C
DETAIL OF CONCRETE INLET TYPE W

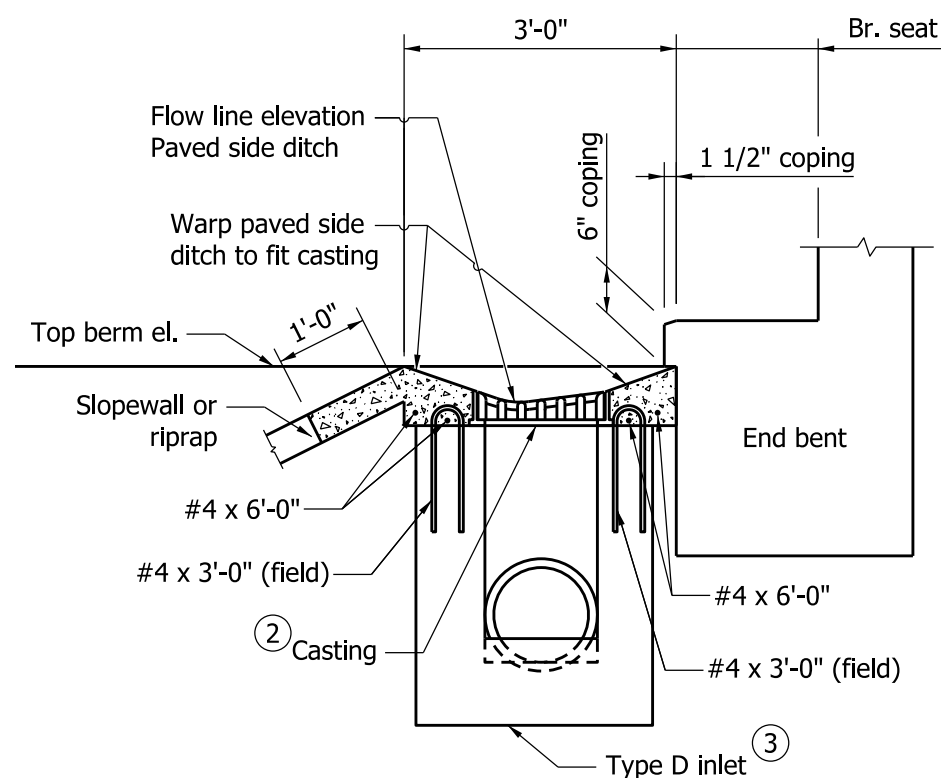
SECTION D-D
DETAIL OF CONCRETE INLET TYPE W

SECTION E-E

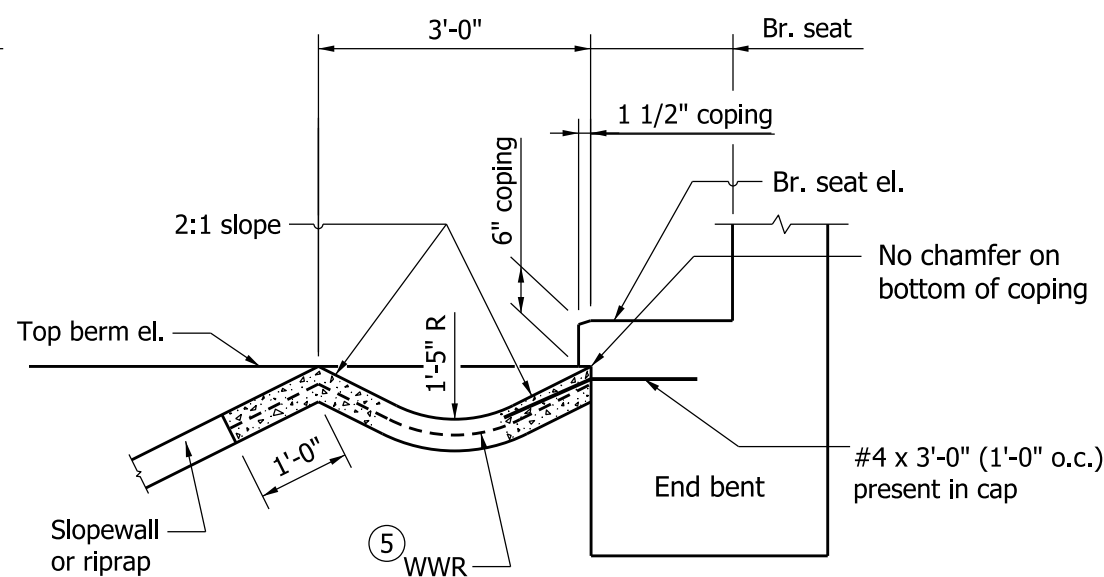
INDIANA DEPARTMENT OF TRANSPORTATION			
SLOPEWALL AND DRAINAGE DETAILS			
SEPTEMBER 2011			
STANDARD DRAWING NO.		E 616-SWCO-06	
	/s/ Richard L. VanCleave		09/01/11
	DESIGN STANDARDS ENGINEER		DATE
	/s/ Mark A. Miller		09/01/11
DESIGN STANDARDS ENGINEER		CHIEF HIGHWAY ENGINEER	
		DATE	



PLAN
(to be used on structures with berms)



SECTION H-H



SECTION K-K

NOTES:

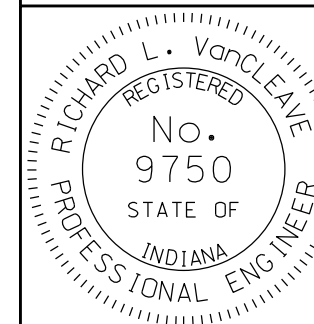
1. Precast concrete riprap may be used as an alternate to concrete sloped side ditch only on a structure having a berm adjacent to a cap.
2. For appropriate casting, see Standard Drawing E 720-CDSC-01.
3. For additional details of type D inlet, see Standard Drawing E 720-INST-03.
4. WWR shall be placed within the middle third of sloped side ditch thickness and shall extend through all construction joints.
5. WWR 6" x 6", W2.9 x W2.9 at 42 lb/100 sq. ft., or equivalent.

INDIANA DEPARTMENT OF TRANSPORTATION

SLOPEWALL AND DRAINAGE
DETAILS

SEPTEMBER 2011

STANDARD DRAWING NO. E 616-SWCO-07



/s/ Richard L. VanCleave 09/01/11
DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller 09/01/11
CHIEF HIGHWAY ENGINEER DATE

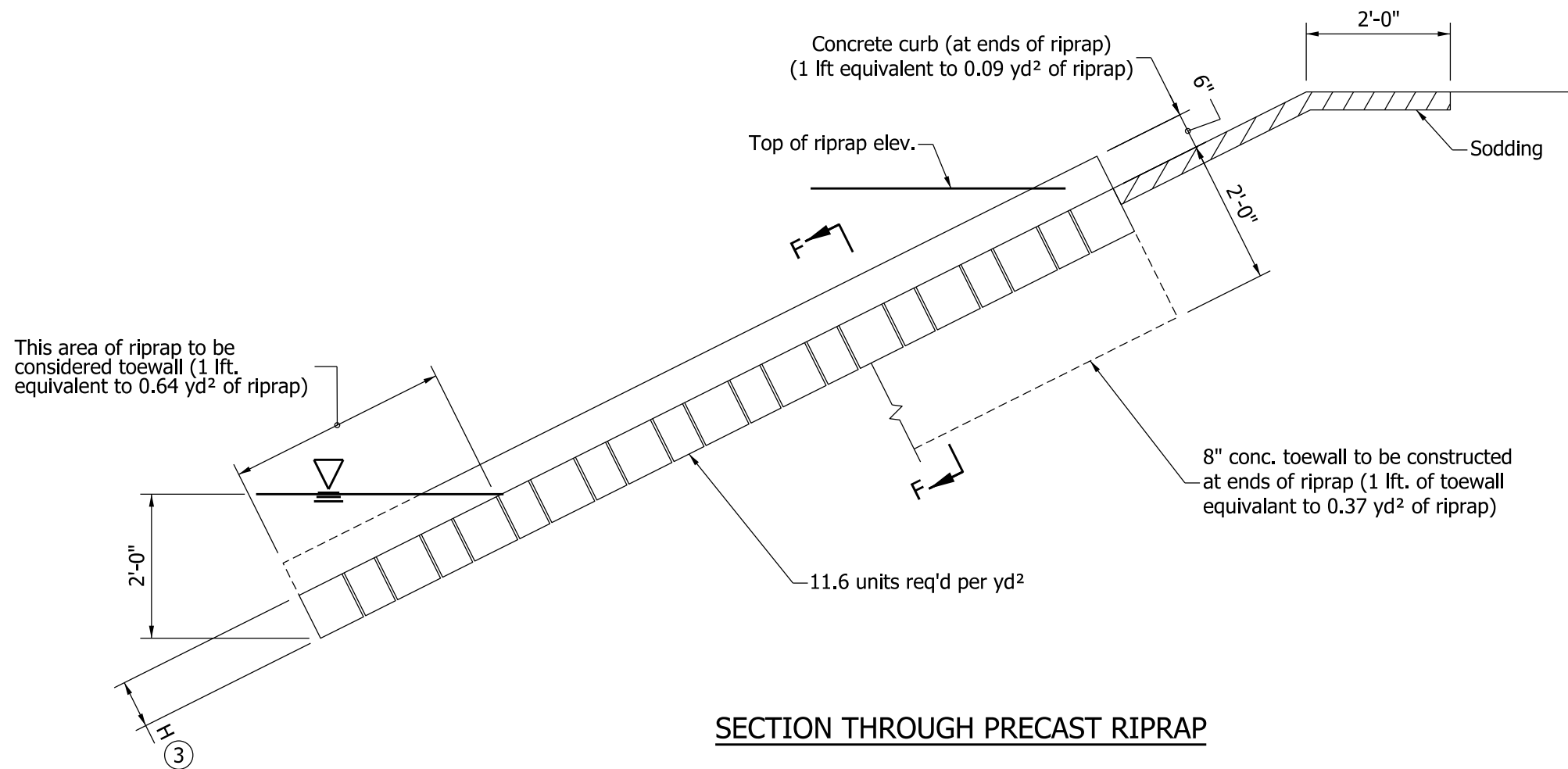
DESIGN STANDARDS ENGINEER



SECTION E-E

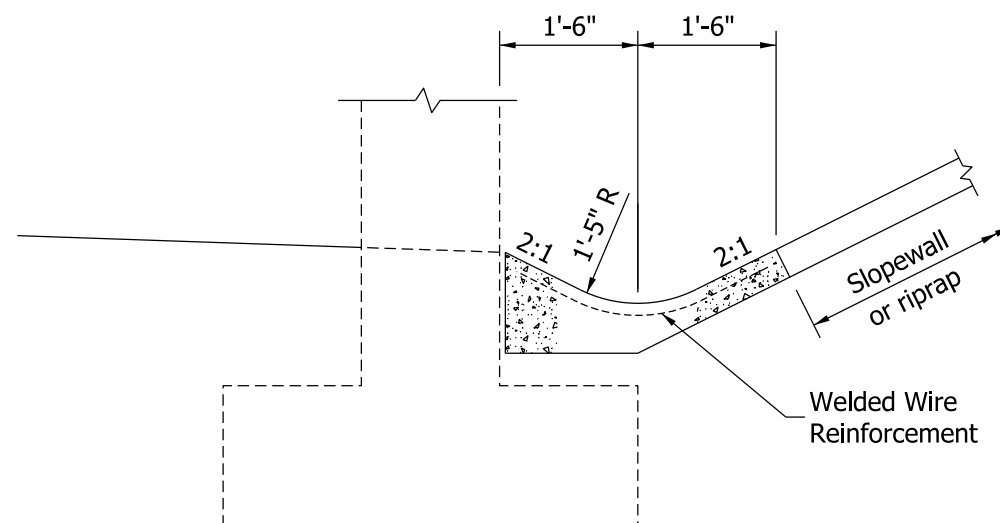
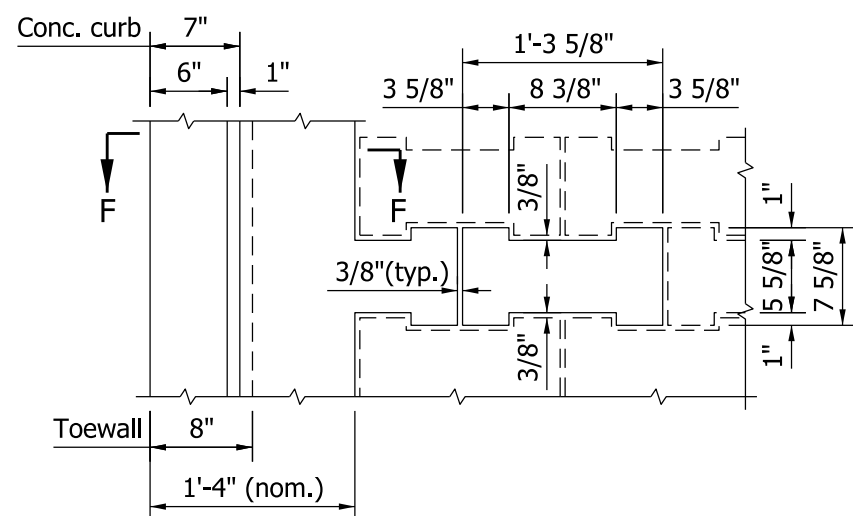
Where riprap terminates more than 2'-0" outside of coping line

INDIANA DEPARTMENT OF TRANSPORTATION									
RIPRAP SLOPEWALL DETAILS									
SEPTEMBER 2011									
STANDARD DRAWING NO. E 616-SWRR-01									
	<table><tr><td><i>/s/ Richard L. VanCleave</i></td><td><i>09/01/11</i></td></tr><tr><td>DESIGN STANDARDS ENGINEER</td><td>DATE</td></tr><tr><td><i>/s/ Mark A. Miller</i></td><td><i>09/01/11</i></td></tr><tr><td>CHIEF HIGHWAY ENGINEER</td><td>DATE</td></tr></table>	<i>/s/ Richard L. VanCleave</i>	<i>09/01/11</i>	DESIGN STANDARDS ENGINEER	DATE	<i>/s/ Mark A. Miller</i>	<i>09/01/11</i>	CHIEF HIGHWAY ENGINEER	DATE
<i>/s/ Richard L. VanCleave</i>	<i>09/01/11</i>								
DESIGN STANDARDS ENGINEER	DATE								
<i>/s/ Mark A. Miller</i>	<i>09/01/11</i>								
CHIEF HIGHWAY ENGINEER	DATE								
DESIGN STANDARDS ENGINEER									



NOTES:

1. See Standard Drawing E 616-SWRR-01 for Section F-F.
2. If riprap is specified, 1'-0" hand-laid riprap or precast concrete riprap type A may be used.
- ③ Precast concrete riprap:
Type A: H = 7 5/8" (8" nom.)
Type B: H = 3 5/8" (4" nom.)

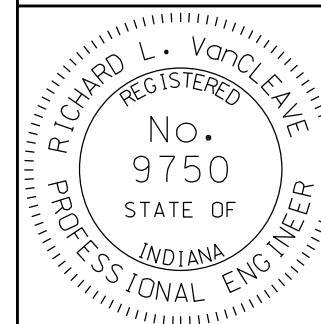


INDIANA DEPARTMENT OF TRANSPORTATION

RIPRAP SLOPEWALL DETAILS

SEPTEMBER 2011

STANDARD DRAWING NO. E 616-SWRR-02



/s/ Richard L. VanCleave 09/01/11

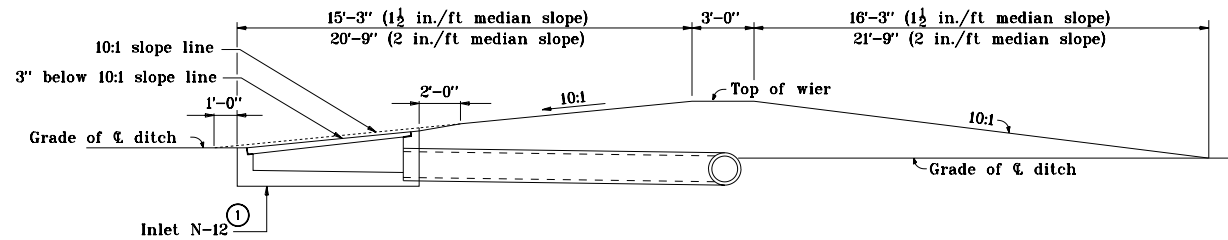
DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller 09/01/11

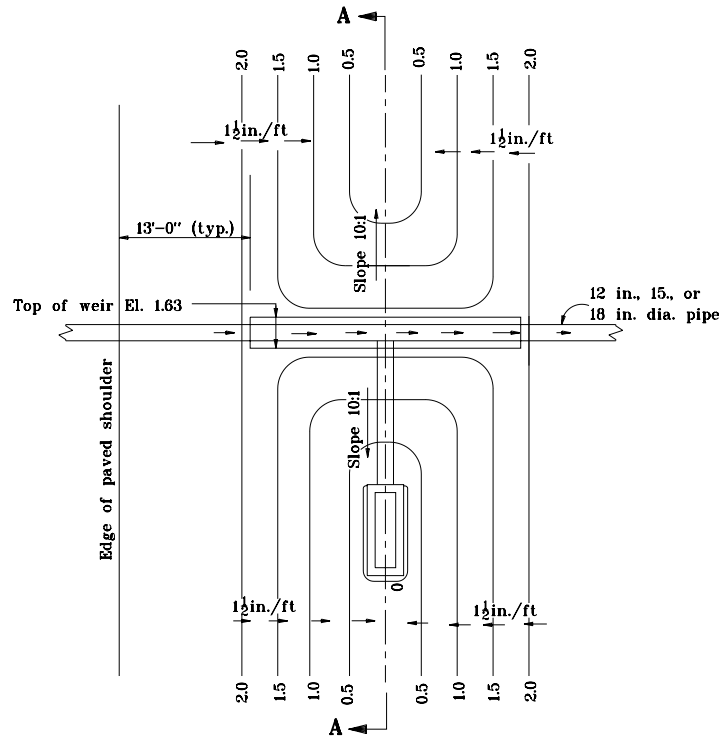
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

- GENERAL NOTES:**
- ① See Standard Drawing MS for inlet type N-12 details.
 - Contours and top of weir elevation shown in Section A-A are in feet relative to the ditch grade.
 - The type N-12 inlet may be placed at the cross pipe structure to eliminate the longitudinal pipe which connects the inlet to the cross pipe.

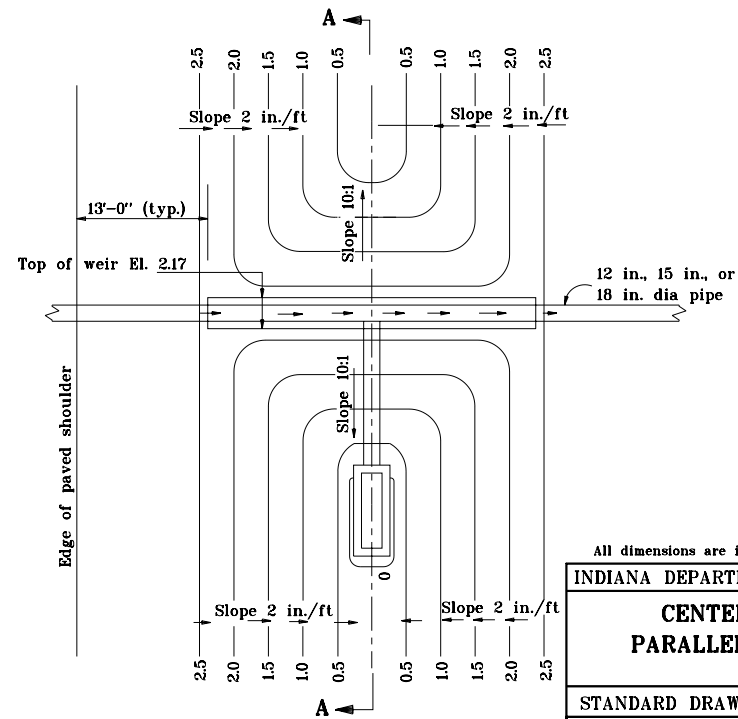


SECTION A-A



PLAN

1 1/2 in./ft MEDIAN SLOPE



PLAN

2 in./ft MEDIAN SLOPE

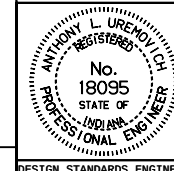
Source Sheet: MSI

All dimensions are in mm unless otherwise specified.

INDIANA DEPARTMENT OF TRANSPORTATION

**CENTER DITCH INLET
PARALLEL TO ö ROADWAY**
MAY 1998

STANDARD DRAWING NO. **E 617-CDIN-01**

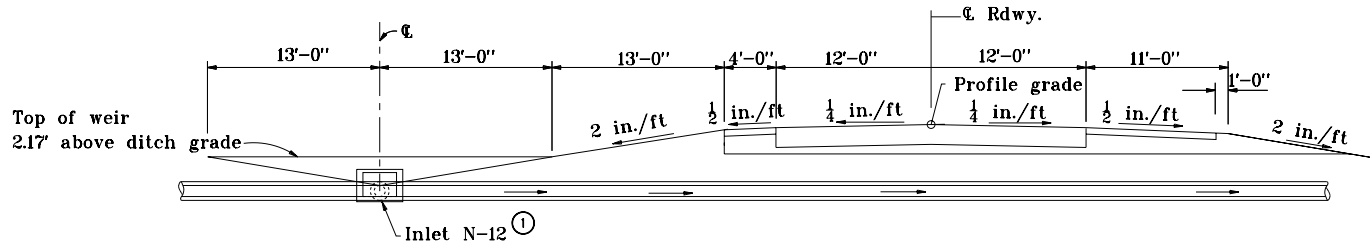


/s/ Anthony L. Uremovich 5-01-98
DESIGN STANDARDS ENGINEER DATE

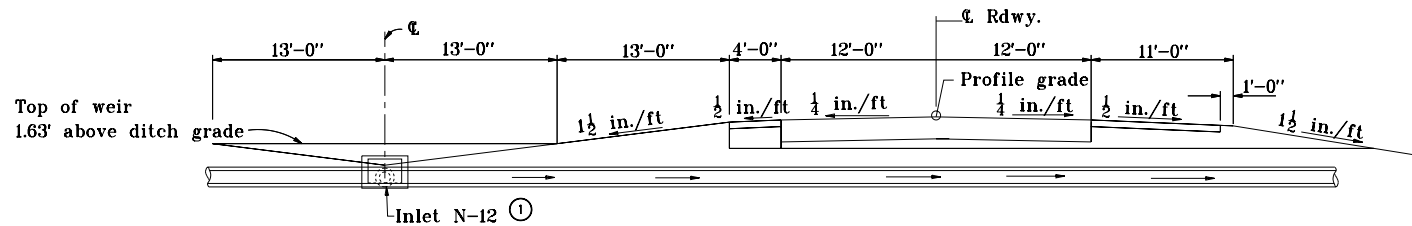
/s/ Donald W. Lucas 5-01-98
CHIEF HIGHWAY ENGINEER DATE

GENERAL NOTES

① See Standard Drawing MS for inlet type N-12 details.



USE WITH MEDIAN SLOPE OF 2 in./ft



USE WITH MEDIAN SLOPE OF 1 1/2 in./ft

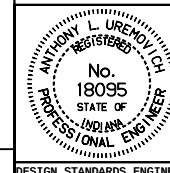
All dimensions are in mm unless otherwise specified.

INDIANA DEPARTMENT OF TRANSPORTATION

CENTER DITCH INLET
PARALLEL TO ℄ ROADWAY

MAY 1998

STANDARD DRAWING NO. E 617-CDIN-02



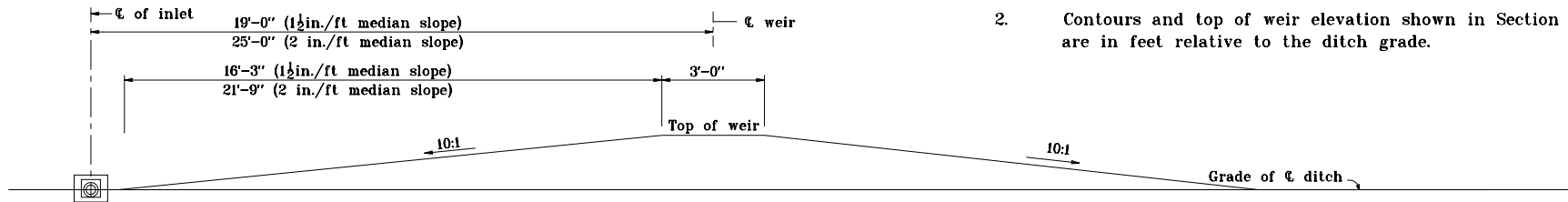
/s/ Anthony L. Uremovich 5-01-98
DESIGN STANDARDS ENGINEER DATE

/s/ Donald W. Lucas 5-01-98
CHIEF HIGHWAY ENGINEER DATE

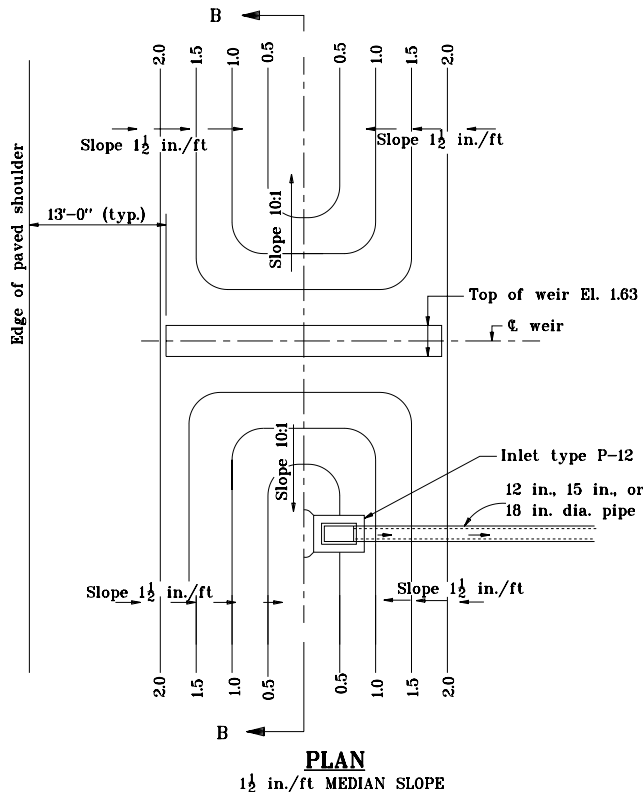
Source Sheet: MS1

GENERAL NOTES:

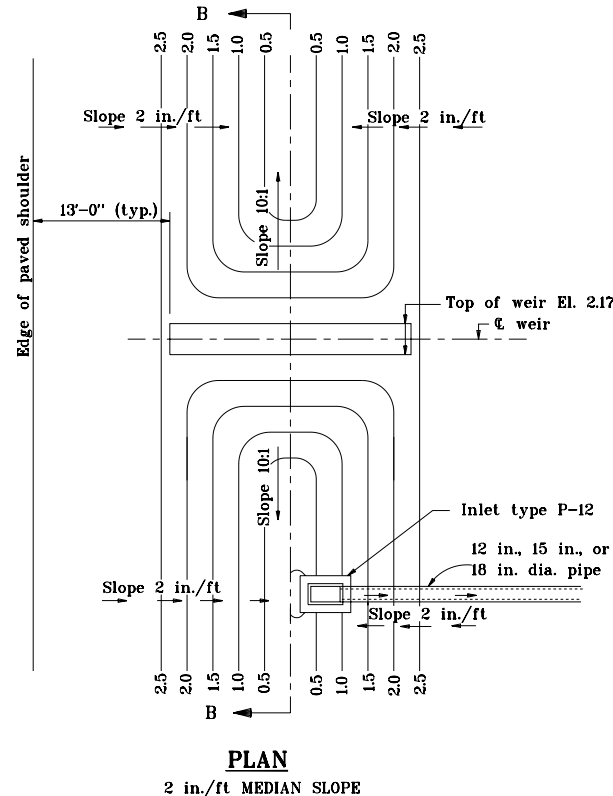
- See Standard Drawing MS for inlet type P-12 details.
- Contours and top of weir elevation shown in Section B-B are in feet relative to the ditch grade.



SECTION B-B



PLAN
1 1/2 in./ft MEDIAN SLOPE



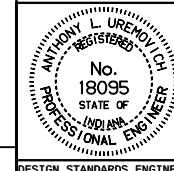
PLAN
2 in./ft MEDIAN SLOPE

All dimensions are in mm unless otherwise specified.

INDIANA DEPARTMENT OF TRANSPORTATION

CENTER DITCH INLET
PERPENDICULAR TO CL ROADWAY
MAY 1998

STANDARD DRAWING NO. E 617-CDIN-03



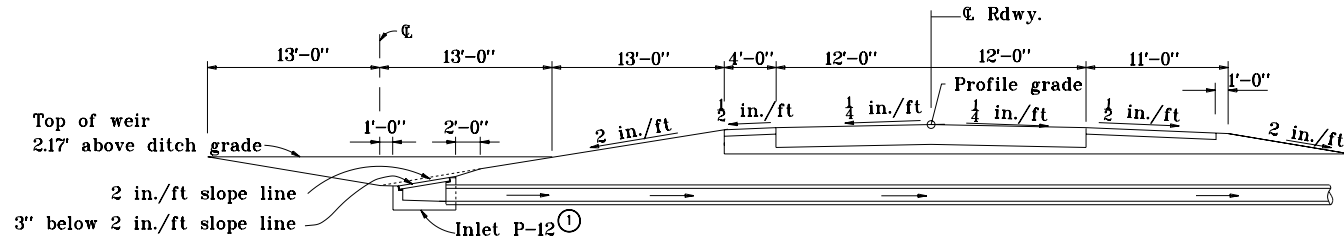
/s/ Anthony L. Uremovich 5-01-98
DESIGN STANDARDS ENGINEER DATE

/s/ Donald W. Lucas 5-01-98
CHIEF HIGHWAY ENGINEER DATE

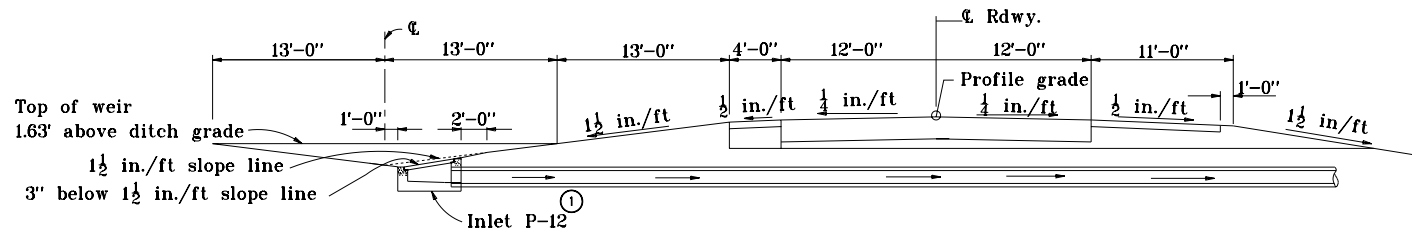
Source Sheet: MS1

GENERAL NOTES

- ① See Standard drawing MS for inlet type P-12 details.



USE WITH MEDIAN SLOPE OF 2 in./ft



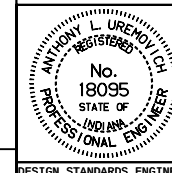
USE WITH MEDIAN SLOPE OF 1 1/2 in./ft

All dimensions are in mm unless otherwise specified.

INDIANA DEPARTMENT OF TRANSPORTATION

CENTER DITCH INLET
PERPENDICULAR TO ℄ ROADWAY
MAY 1998

STANDARD DRAWING NO. E 617-CDIN-04



/s/ Anthony L. Uremovich 5-01-98
DESIGN STANDARDS ENGINEER DATE

/s/ Donald W. Lucas 5-01-98
CHIEF HIGHWAY ENGINEER DATE

Source Sheet: MS1

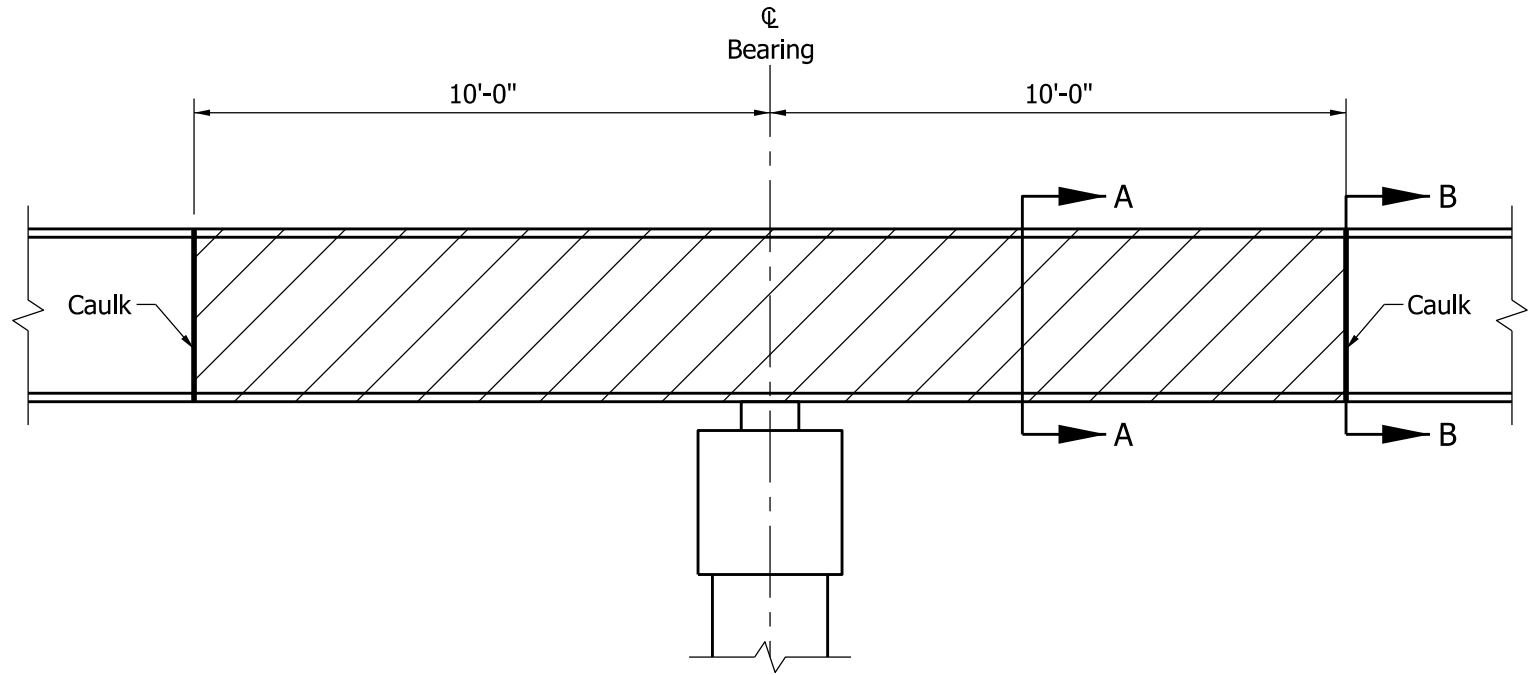
NOTE:

1. Caulk shall be placed on the painted surface at the painted/unpainted interface and is intended to function as a drip bead.

LEGEND:

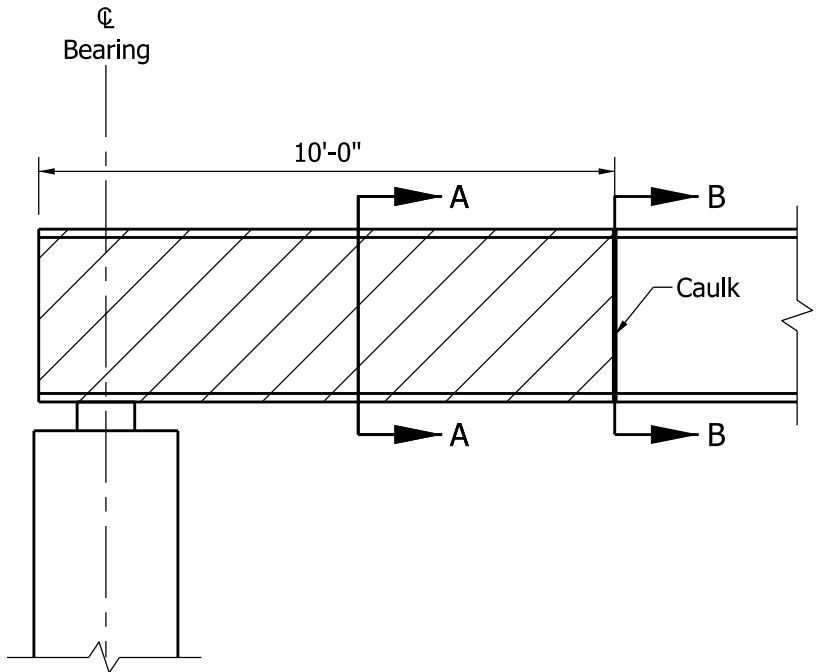
 = Area to be painted

 = Caulk Bead



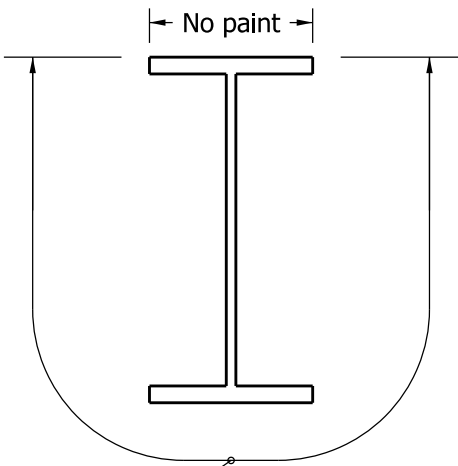
BEAM OR GIRDER AT INTERIOR SUPPORT

ELEVATION VIEW
(Bridge Deck not shown for clarity)



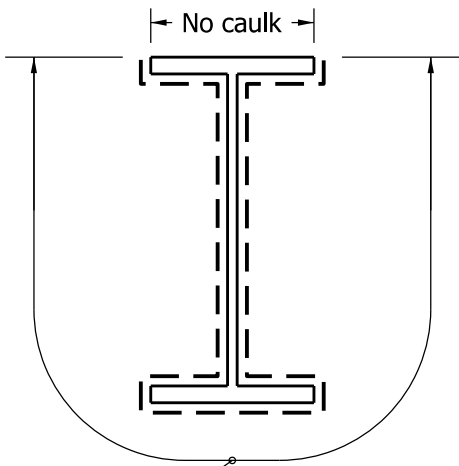
BEAM OR GIRDER AT END-BENT SUPPORT

ELEVATION VIEW
(Bridge Deck, Mudwall, and Concrete Encasement not shown for clarity)



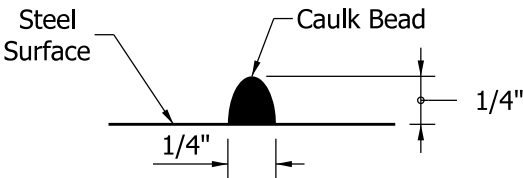
Limits of painting

SECTION A-A



Limits of caulking

SECTION B-B



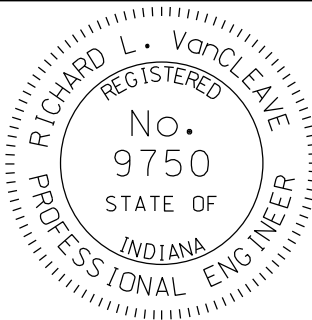
CAULK BEAD DETAIL

INDIANA DEPARTMENT OF TRANSPORTATION

**PAINTING REQUIREMENTS
FOR WEATHERING STEEL**

SEPTEMBER 2011

STANDARD DRAWING NO. E 619-PRWS-01



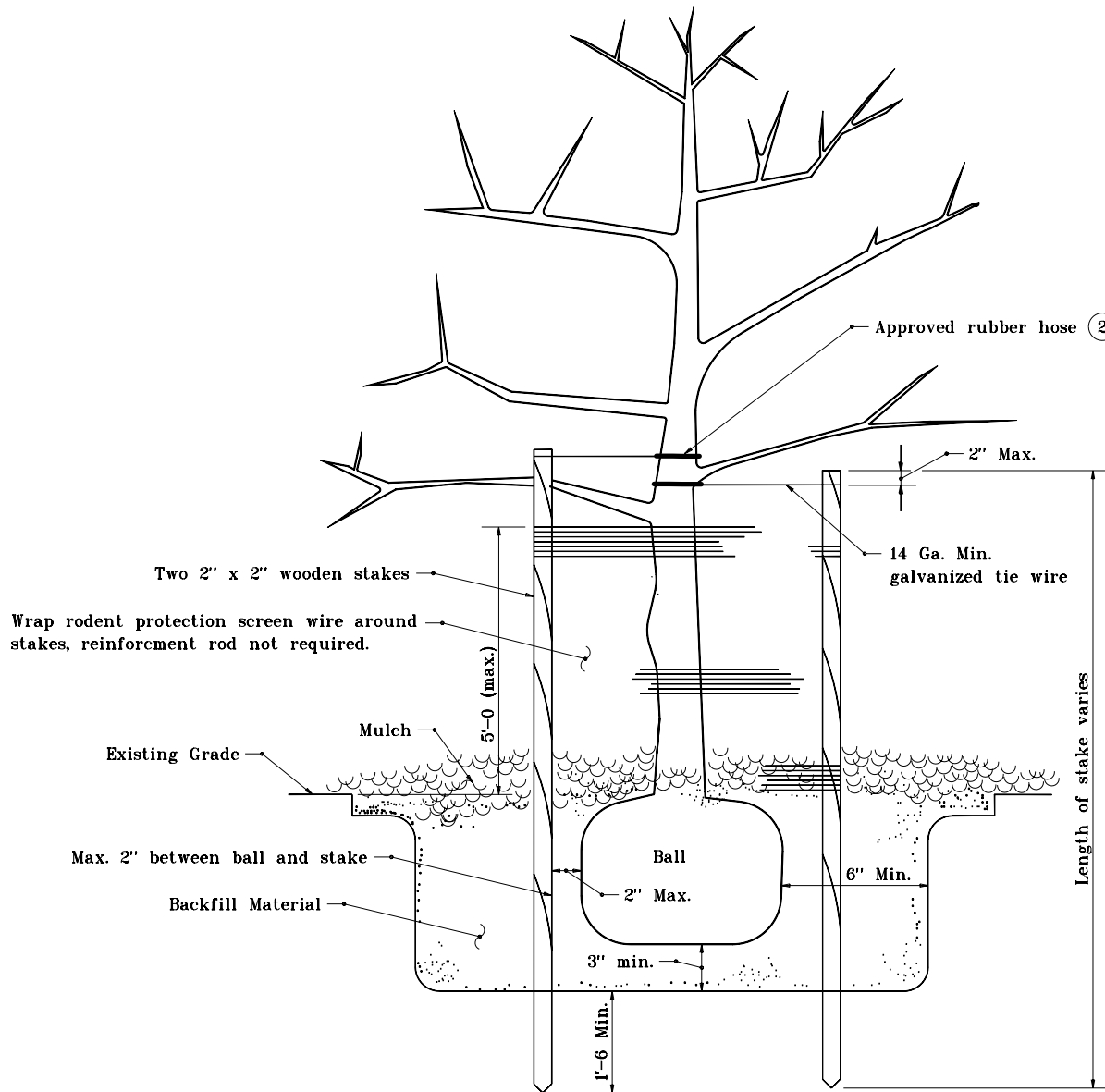
DESIGN STANDARDS ENGINEER

/s/ Richard L. VanCleave 09/01/11
DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller 09/01/11
CHIEF HIGHWAY ENGINEER DATE

GENERAL NOTES

1. Tie wire securement points on tree shall be above the first or second main branch.
2. See Standard Drawing E 622-LSPL-04 for Rubber Hose Detail.



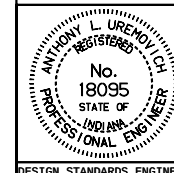
Detail applies to trees less than 1 1/4" caliper.

INDIANA DEPARTMENT OF TRANSPORTATION

PLANTING BALLED AND BURLAPPED TREE

APRIL 1995

STANDARD DRAWING NO. E 622-LSPL-01



DETAILS PLACED IN THIS FORMAT 11-15-99

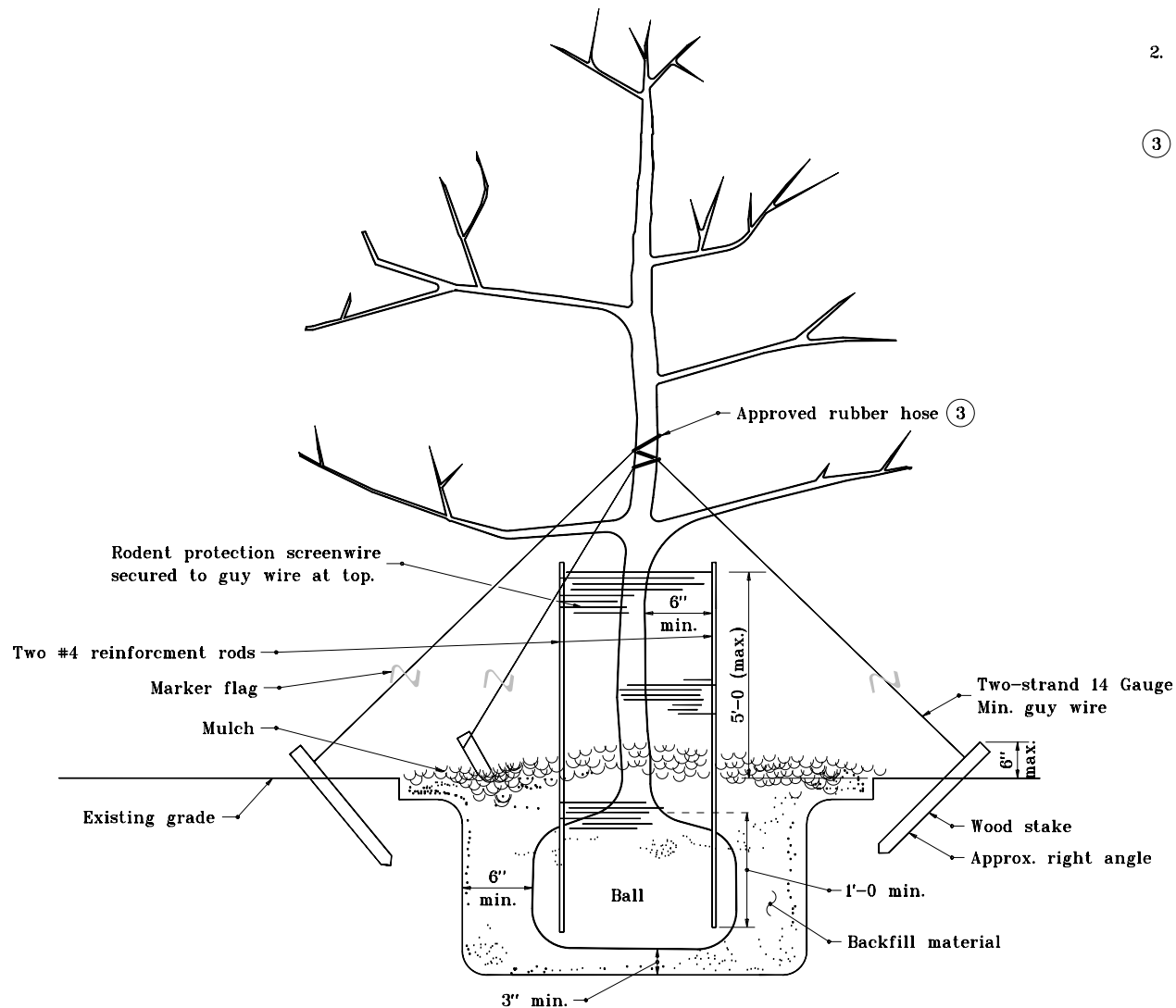
/s/ Anthony L. Uremovich 11-15-99
DESIGN STANDARDS ENGINEER DATE

/s/ Firooz Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER ORIGINALLY APPROVED 4-03-95

GENERAL NOTES

1. This detail applies to Pine Trees (48" and over) with exception that screen wire protection shall not be required.
2. Plastic coil-type protective wrapping is an acceptable alternative to screen wire and reinforcement rod method of tree protection.
- ③ See Standard Drawing E 622-LSPL-04 for Rubber Hose Detail.

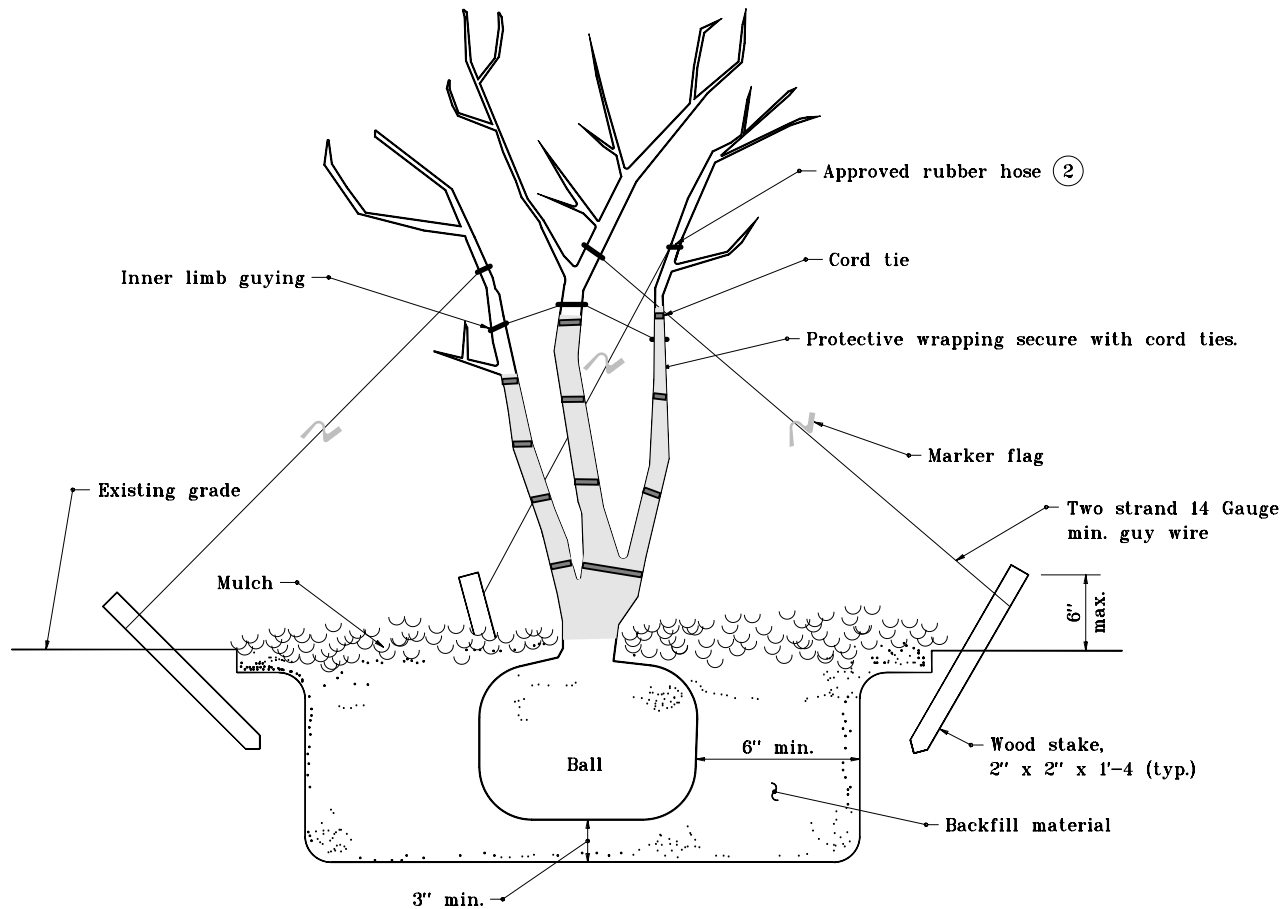


Detail applies to trees
1 1/4" caliper and greater

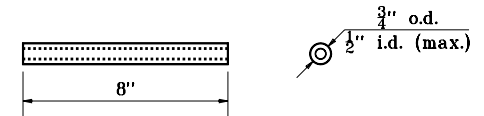
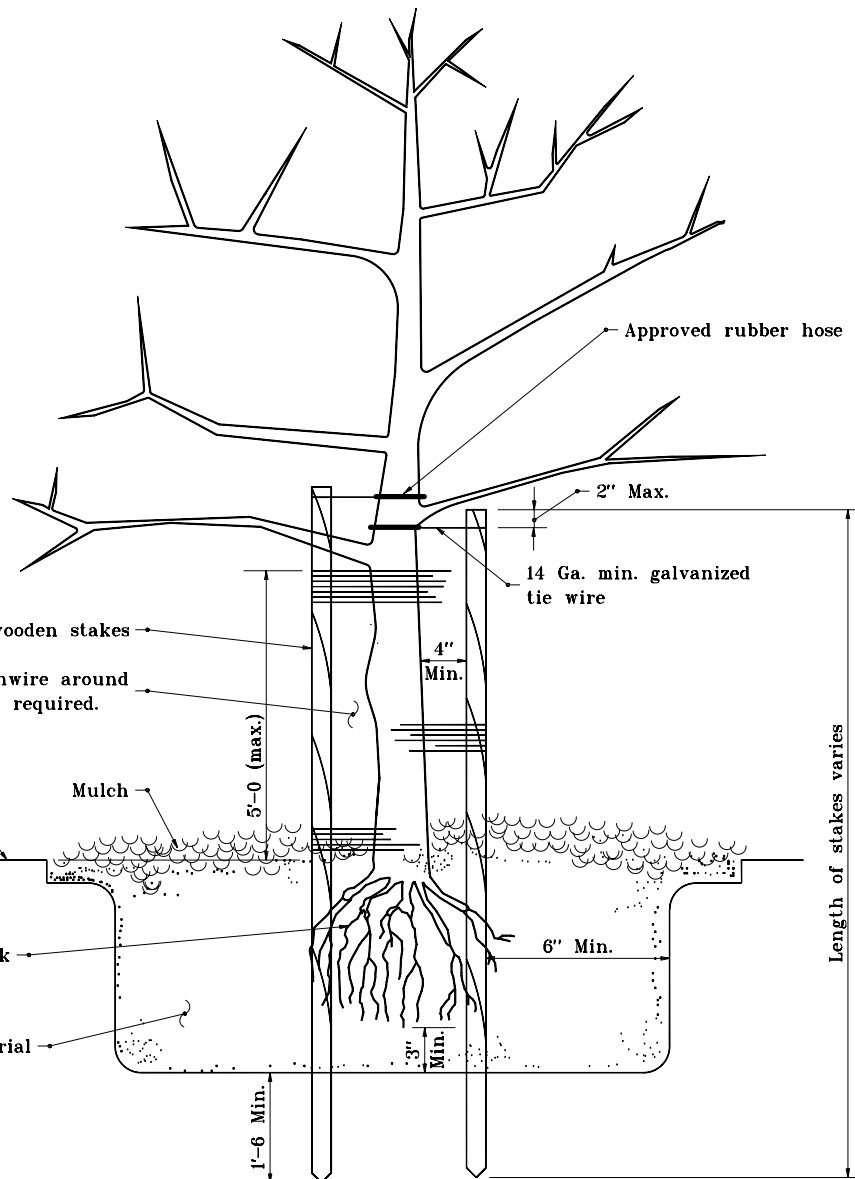
INDIANA DEPARTMENT OF TRANSPORTATION	
PLANTING BALLED AND BURLAPPED TREE	
APRIL 1995	
STANDARD DRAWING NO. E 622-LSPL-02	
	DETAILS PLACED IN THIS FORMAT 11-15-99 /s/ Anthony L. Uremovich 11-15-99 DESIGN STANDARDS ENGINEER DATE
DESIGN STANDARDS ENGINEER	/s/ Firooz Zandi 11-15-99 CHIEF HIGHWAY ENGINEER DATE ORIGINALLY APPROVED 4-01-95

GENERAL NOTES

1. This detail applies to trees over 72".
- ② See Standard Drawing E 622-LSPL-04 for Rubber Hose Detail.



INDIANA DEPARTMENT OF TRANSPORTATION	
PLANTING MULTI-STEM TREE	
JANUARY 2000	
STANDARD DRAWING NO. E 622-LSPL-03	
	/s/ Anthony L. Uremovich 4-03-95 DESIGN STANDARDS ENGINEER DATE
	/s/ Donald W. Lucas 4-03-95 CHIEF HIGHWAY ENGINEER DATE



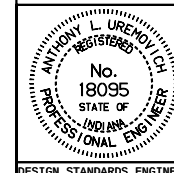
RUBBER HOSE DETAIL

INDIANA DEPARTMENT OF TRANSPORTATION

**PLANTING BARE ROOT
TREE**

APRIL 1995

STANDARD DRAWING NO. **E 622-LSPL-04**



DETAILS PLACED IN THIS FORMAT 11-15-99

/s/ Anthony L. Uremovich 11-15-99
DESIGN STANDARDS ENGINEER DATE

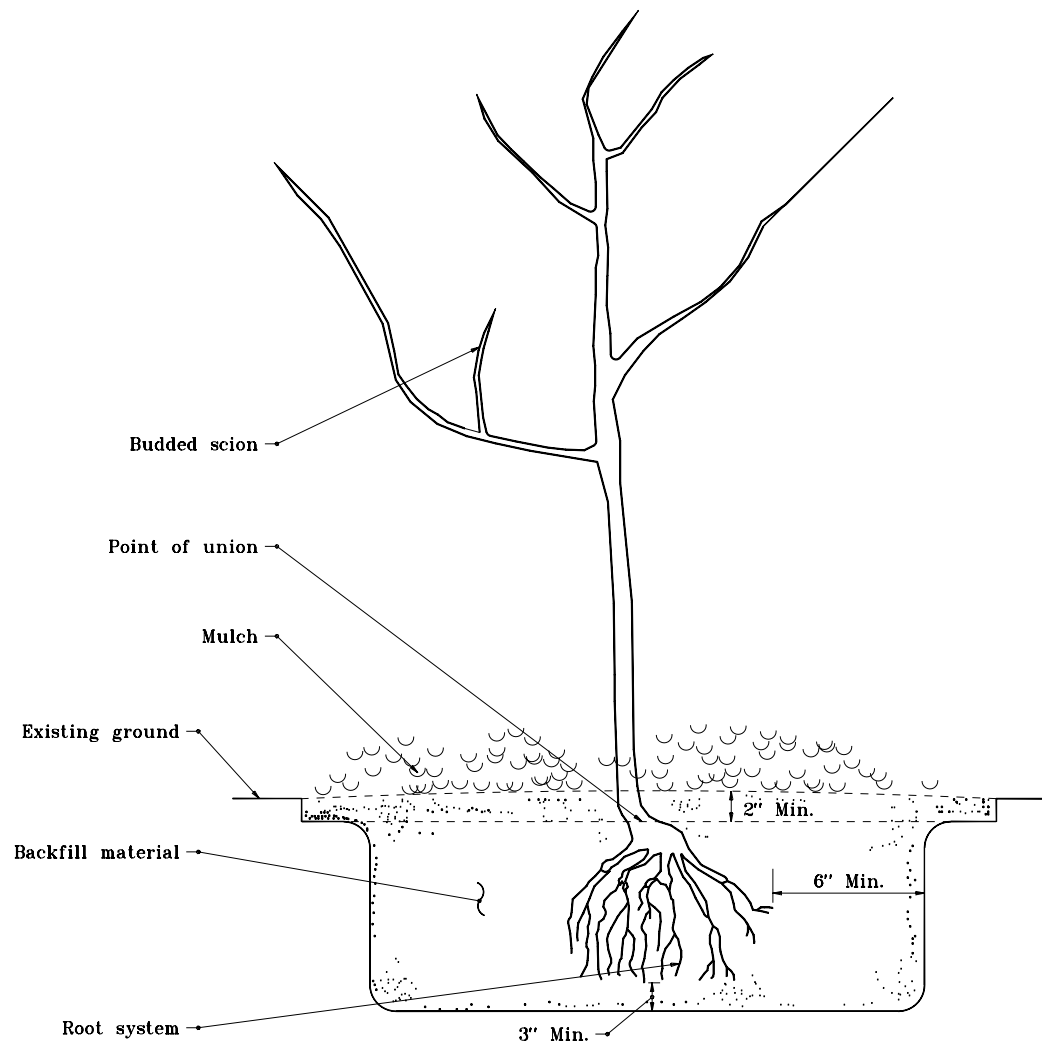
/s/ Firooz Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

ORIGINALLY APPROVED 4-01-95

GENERAL NOTES

1. This detail to be followed in the planting of grafted bare root stock.

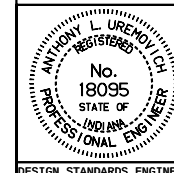


INDIANA DEPARTMENT OF TRANSPORTATION

PLANTING GRAFTED TREE

APRIL 1995

STANDARD DRAWING NO. E 622-LSPL-05



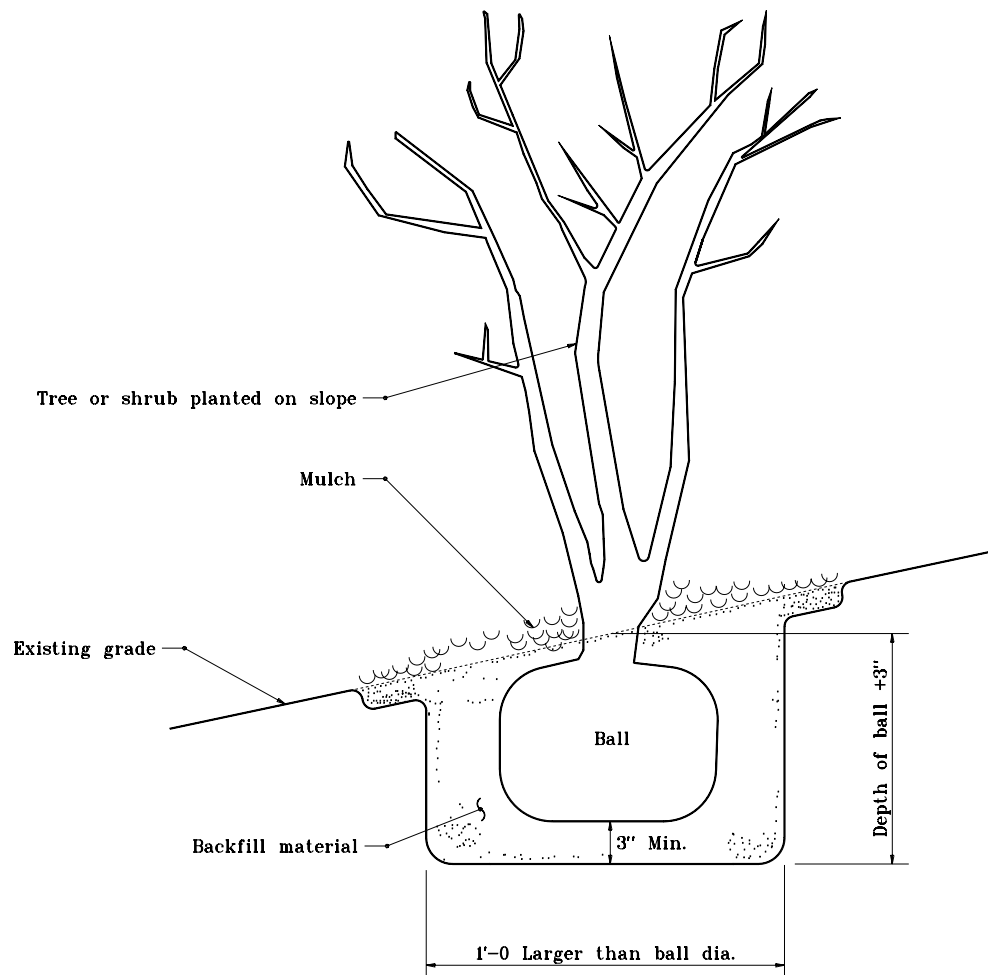
DETAILS PLACED IN THIS FORMAT 11-15-99

/s/ Anthony L. Uremovich 11-15-99
DESIGN STANDARDS ENGINEER DATE

/s/ Firooz Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

ORIGINALLY APPROVED 4-01-95

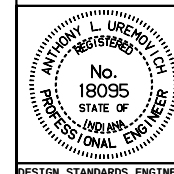


INDIANA DEPARTMENT OF TRANSPORTATION

PLANTING ON SLOPE

APRIL 1995

STANDARD DRAWING NO. **E 622-LSPL-06**



DETAILS PLACED IN THIS FORMAT 11-15-99

/s/ Anthony L. Uremovich 11-15-99
DESIGN STANDARDS ENGINEER DATE

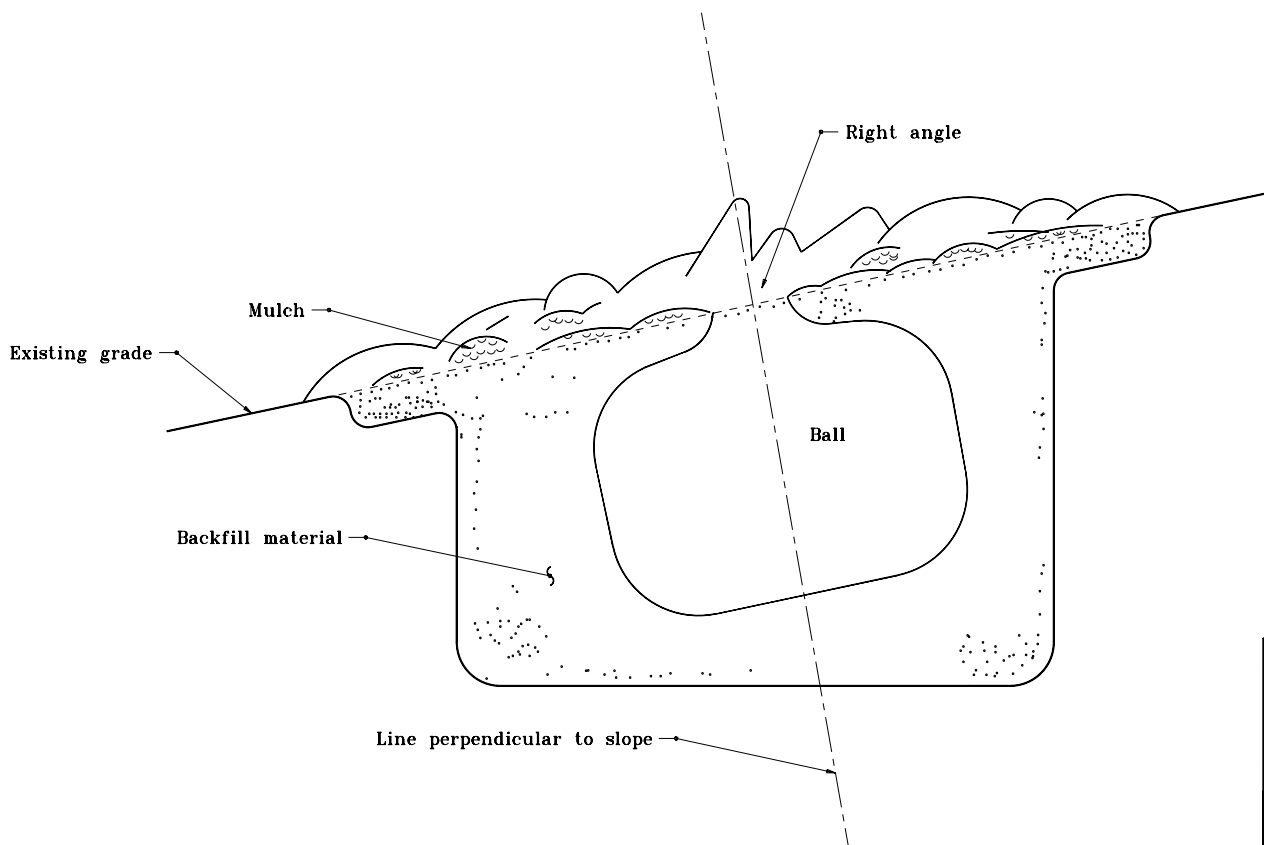
/s/ Firooz Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

ORIGINALLY APPROVED 4-03-95

GENERAL NOTES

1. Prostrate shrub planted at right angle to slope.

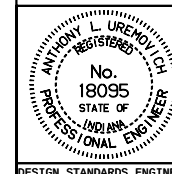


INDIANA DEPARTMENT OF TRANSPORTATION

PLANTING ON SLOPE

APRIL 1995

STANDARD DRAWING NO. **E 622-LSPL-07**



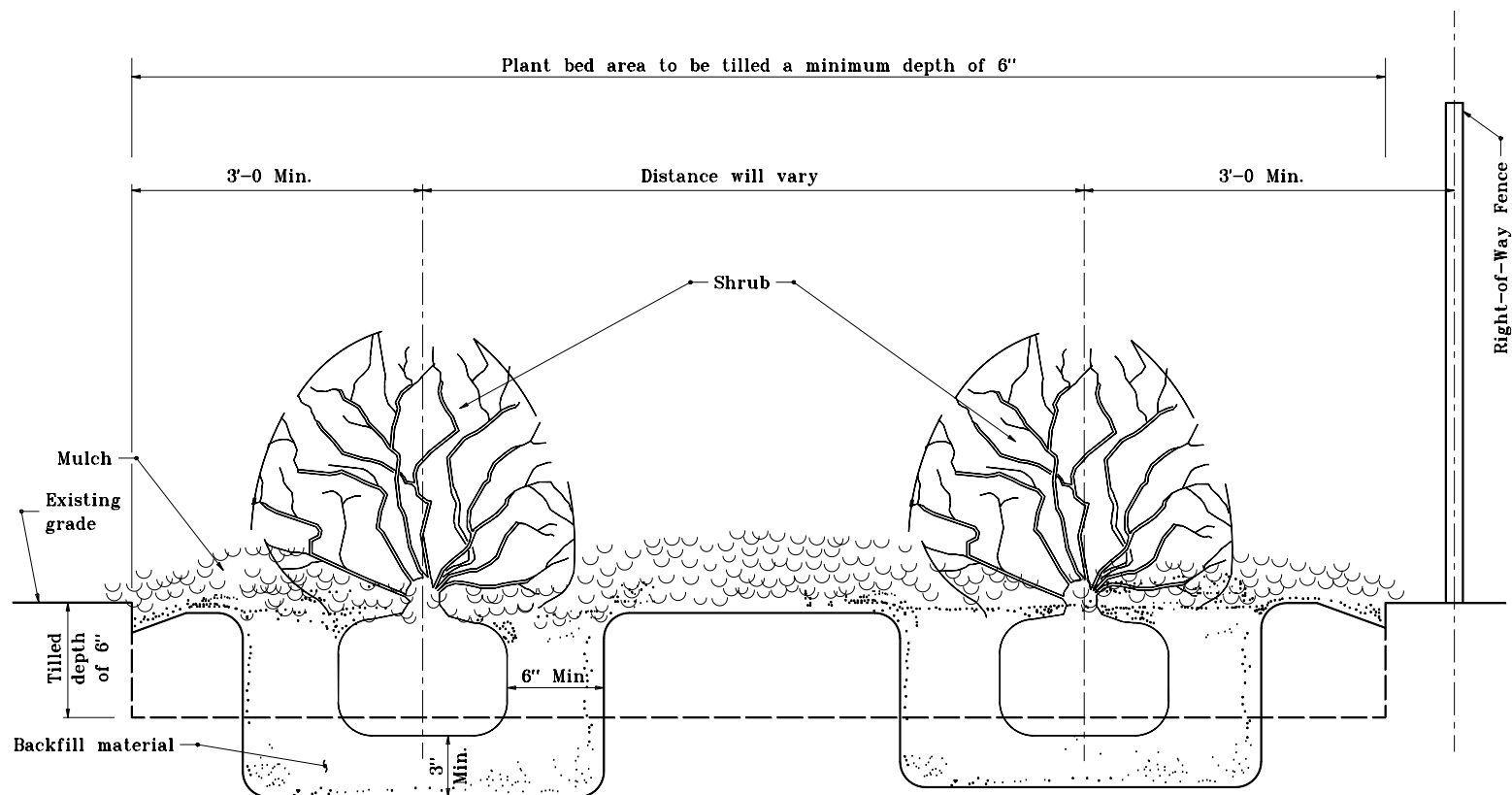
DETAILS PLACED IN THIS FORMAT 11-15-99

/s/ Anthony L. Uremovich 11-15-99
DESIGN STANDARDS ENGINEER DATE

/s/ Firooz Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

ORIGINALLY APPROVED 4-01-95



GENERAL NOTES

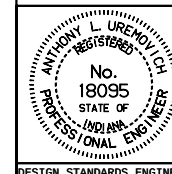
1. Take specified mulch depth to edge of bed over 3'-0 distance from center of outer plant.
2. See Standard Drawing E 622-LSPL-10 for typical plan of shrub bed.

INDIANA DEPARTMENT OF TRANSPORTATION

TYPICAL SECTION OF SHRUB BED

APRIL 1995

STANDARD DRAWING NO. **E 622-LSPL-08**



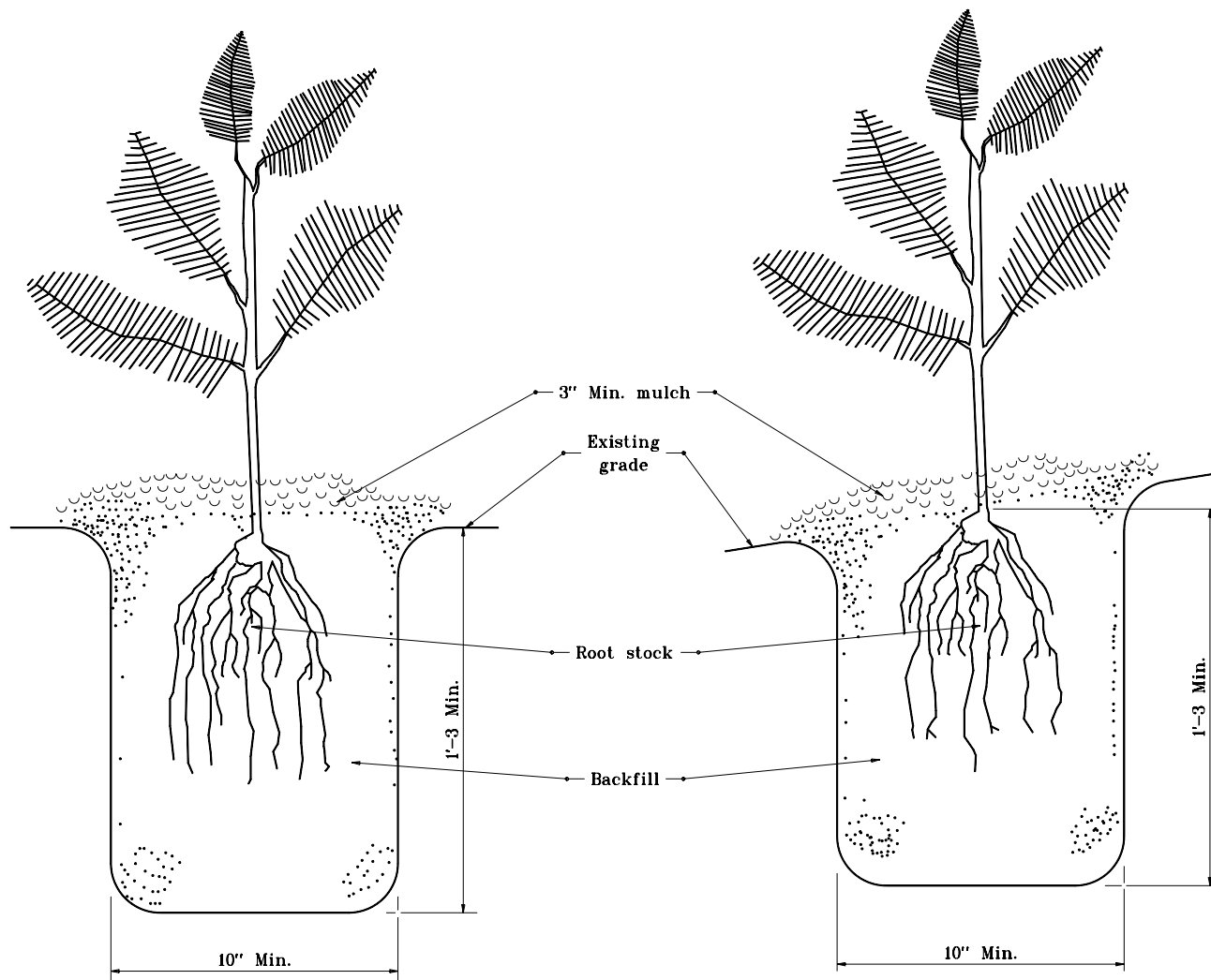
DETAILS PLACED IN THIS FORMAT 11-15-99

/s/ Anthony L. Uremovich 11-15-99
DESIGN STANDARDS ENGINEER DATE

/s/ Firooz Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

ORIGINALLY APPROVED 4-01-95



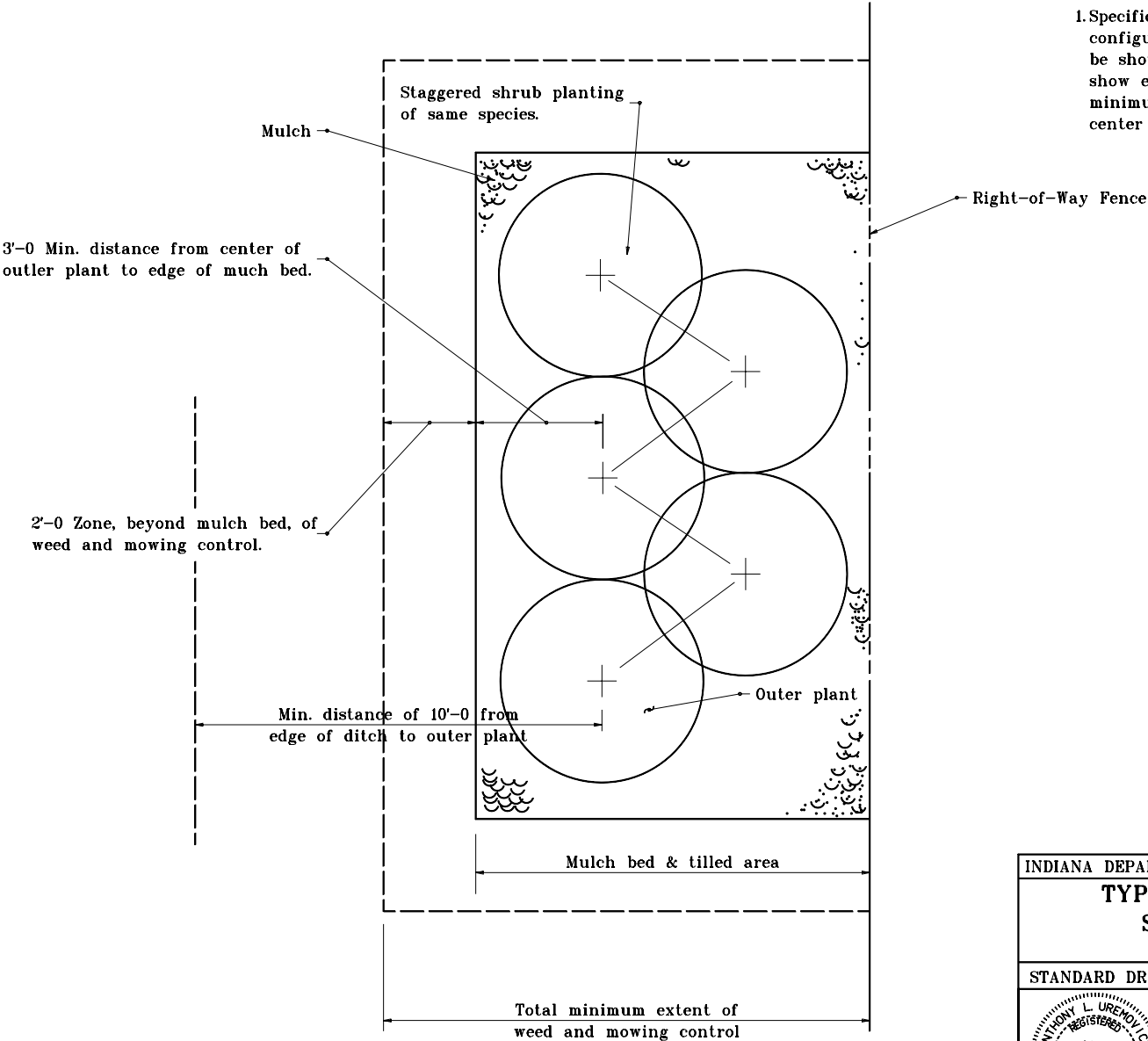
Seedling Variety on Level Land

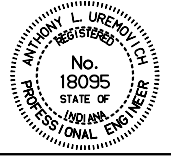
Seedling Variety on Slope

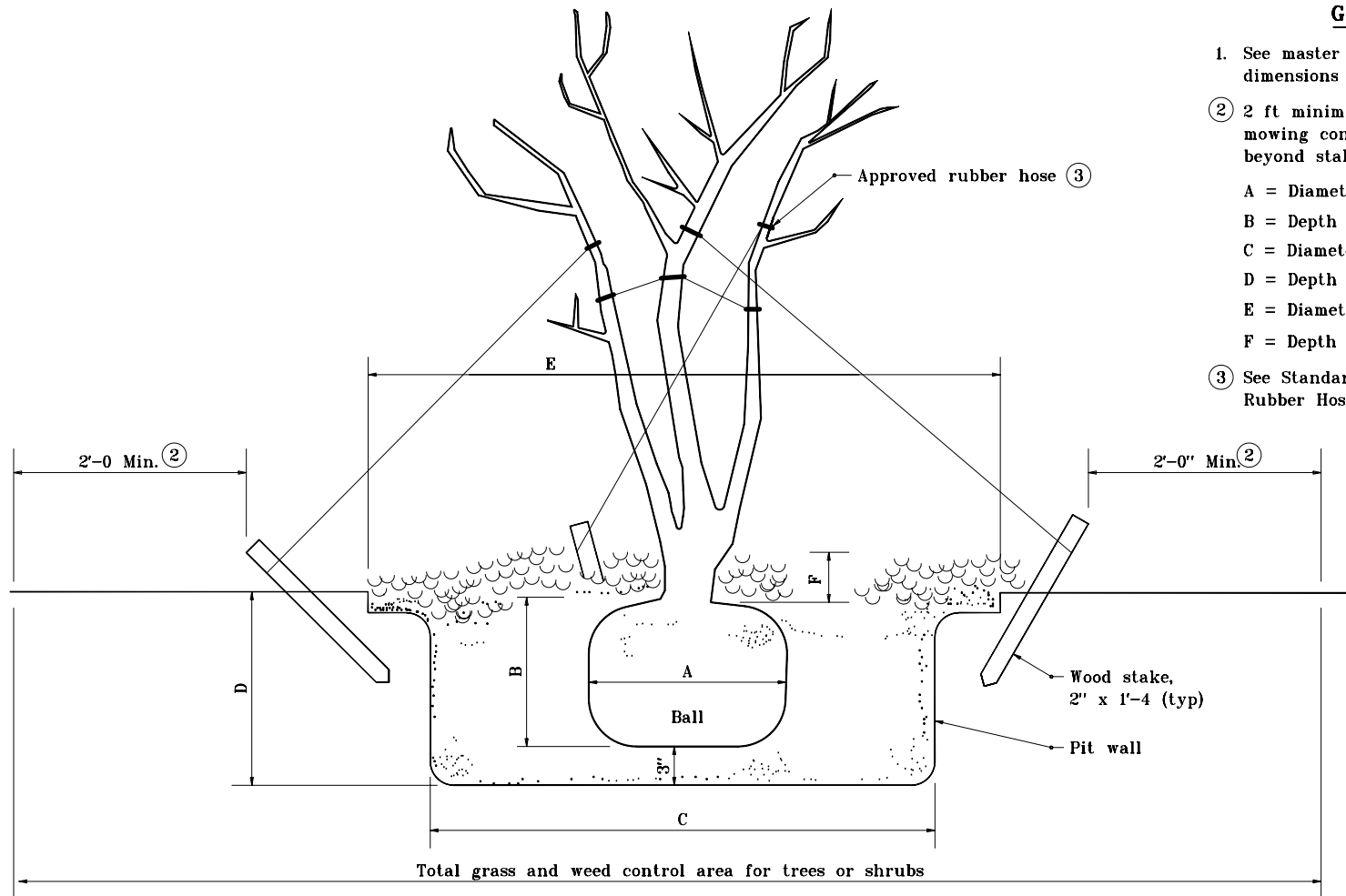
INDIANA DEPARTMENT OF TRANSPORTATION	
PLANTING SEEDLING VARIETIES	
APRIL 1995	
STANDARD DRAWING NO. E 622-LSPL-09	
	DETAILS PLACED IN THIS FORMAT 11-15-99 /s/ Anthony L. Uremovich 11-15-99 DESIGN STANDARDS ENGINEER DATE
DESIGN STANDARDS ENGINEER	/s/ Firooz Zandi 11-15-99 CHIEF HIGHWAY ENGINEER DATE ORIGINALLY APPROVED 4-01-95

GENERAL NOTES

1. Specific variations on shrub bed configurations and layout will be shown on plans. Plans will show exceptions to 10 ft minimum distance from ditch to center of outer plants.



INDIANA DEPARTMENT OF TRANSPORTATION	
TYPICAL PLAN OF	
SHRUB BED	
APRIL 1995	
STANDARD DRAWING NO. E 622-LSPL-10	
	DETAILS PLACED IN THIS FORMAT 11-15-99
	/s/ Anthony L. Uremovich 11-15-99 DESIGN STANDARDS ENGINEER DATE
	/s/ Firooz Zandi 11-15-99 CHIEF HIGHWAY ENGINEER DATE
	DESIGN STANDARDS ENGINEER ORIGINALLY APPROVED 4-01-95



GENERAL NOTES

1. See master plant list for specific dimensions applied to individual plants.

(2) 2 ft minimum distance for weed and mowing control applies to zone beyond stakes or mulch bed.

A = Diameter of ball

B = Depth of ball

C = Diameter of pit

D = Depth of pit

E = Diameter of mulch bed

F = Depth of mulch bed

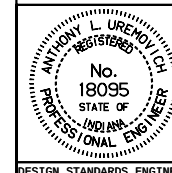
(3) See Standard Drawing E 622-LSPL-04 for Rubber Hose Detail.

INDIANA DEPARTMENT OF TRANSPORTATION

COMMONLY USED DIMENSIONS

APRIL 1995

STANDARD DRAWING NO. E 622-LSPL-11



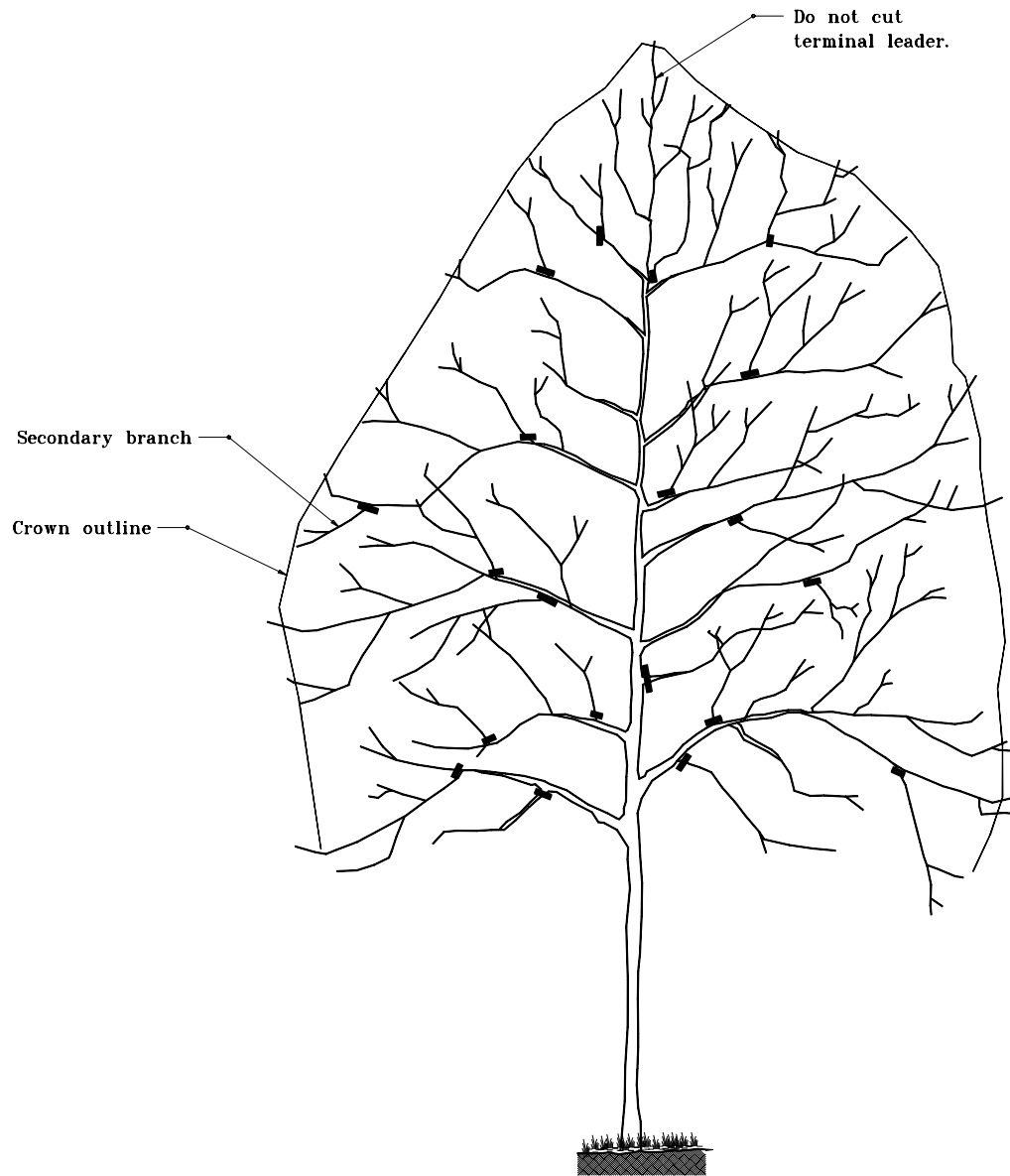
DETAILS PLACED IN THIS FORMAT 11-15-99

/s/ Anthony L. Uremovich 11-15-99
DESIGN STANDARDS ENGINEER DATE

/s/ Firooz Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

ORIGINALLY APPROVED 4-03-95



GENERAL NOTES

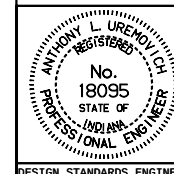
1. Pruning cuts shall be made as close as possible to remaining branch and in direction of symbol for cuts (■).
2. Cut back secondary branching to reduce foliage by a minimum of $\frac{1}{3}$ to a maximum of $\frac{1}{2}$.

INDIANA DEPARTMENT OF TRANSPORTATION

TREE PRUNING TALL SHADE TREE

APRIL 1995

STANDARD DRAWING NO. E 622-LSPR-01



DETAILS PLACED IN THIS FORMAT 11-15-99

/s/ Anthony L. Uremovich 11-15-99
DESIGN STANDARDS ENGINEER DATE

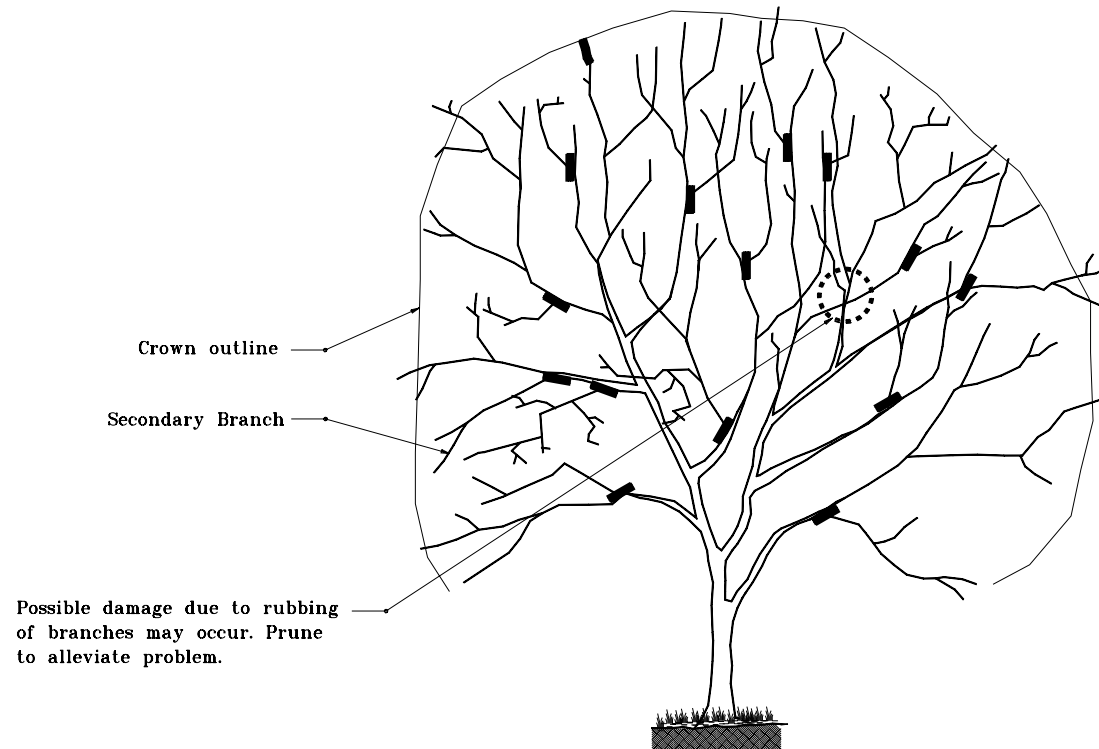
/s/ Firooz Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

ORIGINALLY APPROVED 4-01-95

GENERAL NOTES

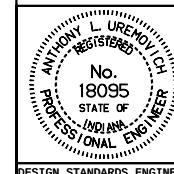
1. Pruning cuts shall be made as close as possible to remaining branch and in direction of symbol for cuts (■).
2. Cut back secondary branching to reduce foliage by a minimum of $\frac{1}{3}$ to a maximum of $\frac{1}{2}$.



INDIANA DEPARTMENT OF TRANSPORTATION

TREE PRUNING INTERMEDIATE TREE-ONE STEM APRIL 1995

STANDARD DRAWING NO. **E 622-LSPR-02**



DETAILS PLACED IN THIS FORMAT 11-15-99

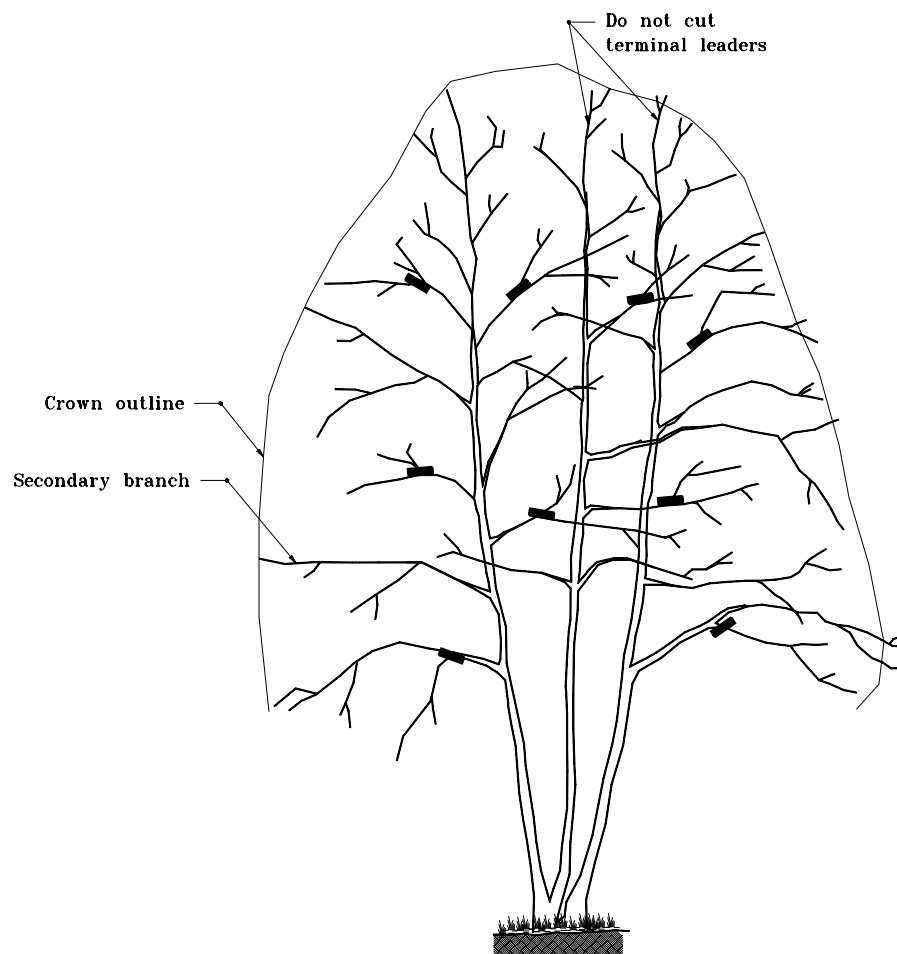
/s/ Anthony L. Uremovich 11-15-99
DESIGN STANDARDS ENGINEER DATE

/s/ Firooz Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER ORIGINALLY APPROVED 4-01-95

GENERAL NOTES

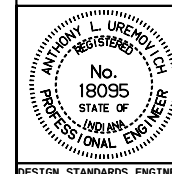
1. Pruning cuts shall be made as close as possible to remaining branch and in direction of symbol for cuts (■).
2. Cut back secondary branching to reduce foliage by a minimum of 1/3 to a maximum of 1/2



INDIANA DEPARTMENT OF TRANSPORTATION

TREE PRUNING INTERMED. TREE-MULT. STEM APRIL 1995

STANDARD DRAWING NO. **E 622-LSPR-03**



DETAILS PLACED IN THIS FORMAT 11-15-99

/s/ Anthony L. Uremovich 11-15-99
DESIGN STANDARDS ENGINEER DATE

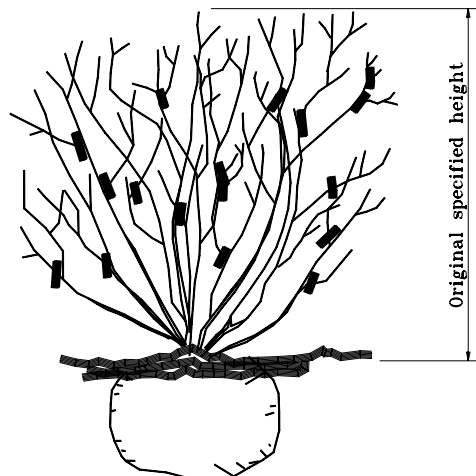
/s/ Firooz Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

ORIGINALLY APPROVED 4-01-95

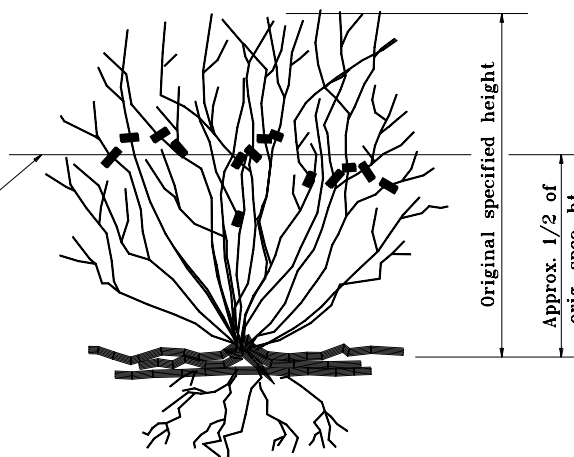
GENERAL NOTES

1. Pruning operations for balled & burlapped stock shall maintain the natural shape and characteristic branching pattern.
2. Cut back secondary branching to reduce foliage by a minimum of $1/3$ to a maximum of $1/2$.
3. Budding variations and different growth characteristic of the various shrub species may alter pruning procedures. See suggested procedure on Standard Drawing E 622-LSPR-05 which applies to most shrub species.



BALLED & BURLAPPED SHRUB

Line designating approx.
 $1/2$ of original height.



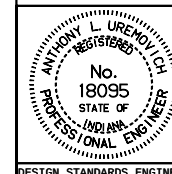
BARE ROOT SHRUB

INDIANA DEPARTMENT OF TRANSPORTATION

SHRUB PRUNING

APRIL 1995

STANDARD DRAWING NO. **E 622-LSPR-04**



DETAILS PLACED IN THIS FORMAT 11-15-99

/s/ Anthony L. Uremovich 11-15-99
DESIGN STANDARDS ENGINEER DATE

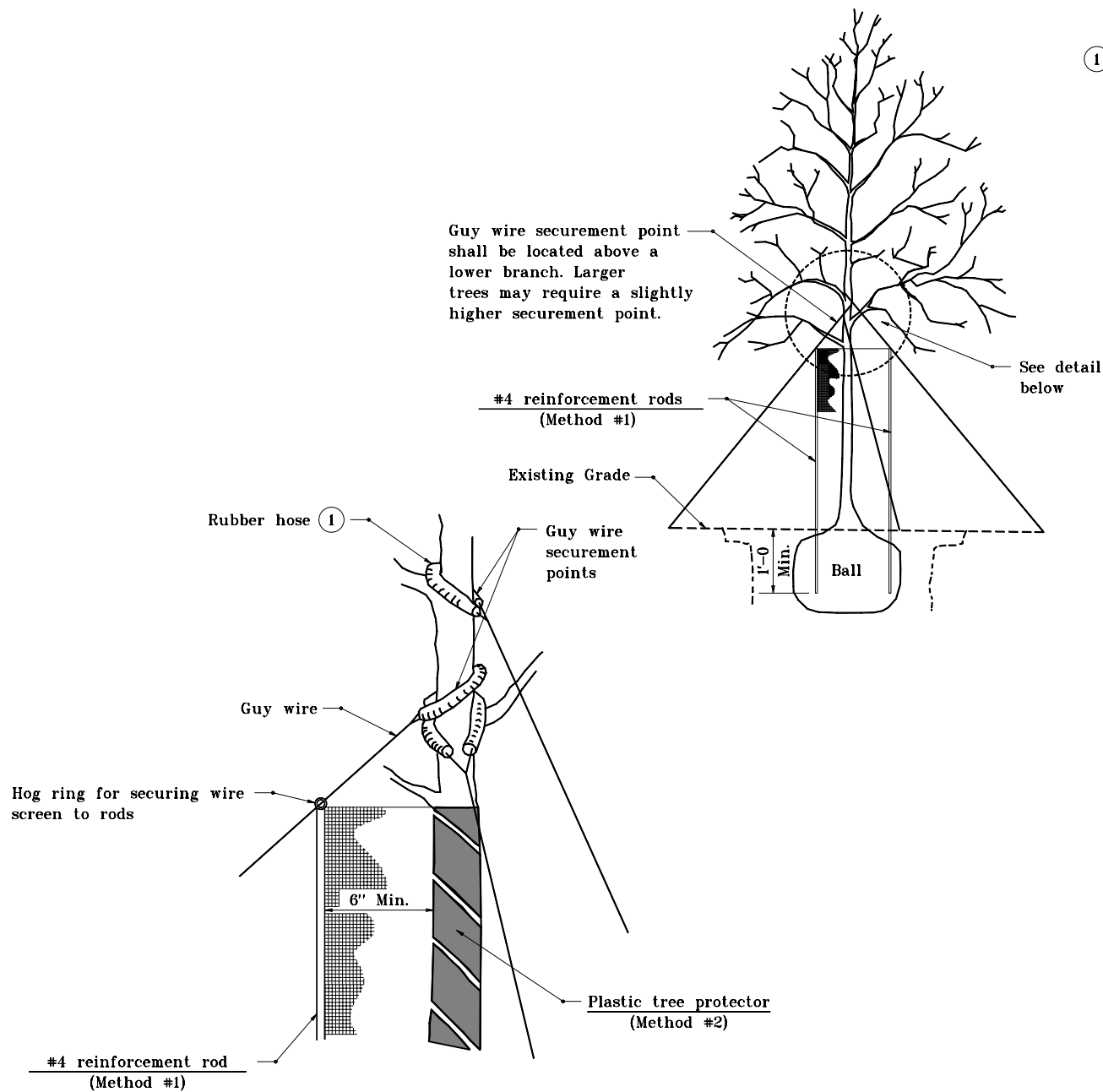
/s/ Firooz Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

ORIGINALLY APPROVED 4-01-95

GENERAL NOTES

- ① See Standard Drawing E 622-LSPL-04 for Rubber Hose Detail.



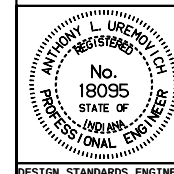
DETAIL APPLIES TO TREES 1½" CALIPER AND GREATER

INDIANA DEPARTMENT OF TRANSPORTATION

TREE PROTECTION

APRIL 1995

STANDARD DRAWING NO. E 622-LSPR-05



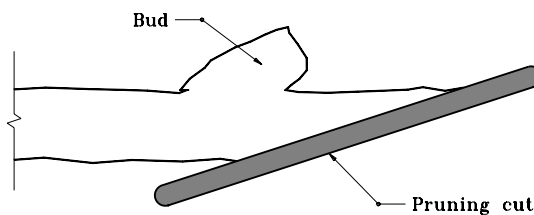
DETAILS PLACED IN THIS FORMAT 11-15-99

/s/ Anthony L. Uremovich 11-15-99
DESIGN STANDARDS ENGINEER DATE

/s/ Firooz Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE
ORIGINALLY APPROVED 4-01-95

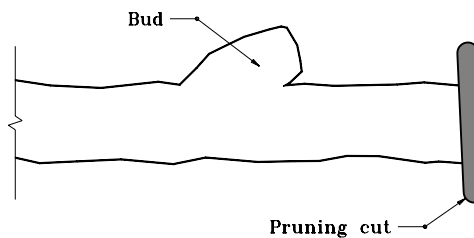
Improper Cut

Pruning cut too slanting (too much heartwood is exposed). Die-back will occur.



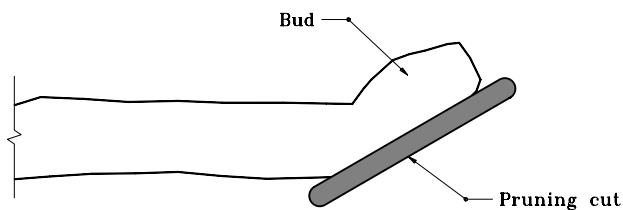
Improper Cut

Pruning cut too far beyond bud. Die-back will occur.

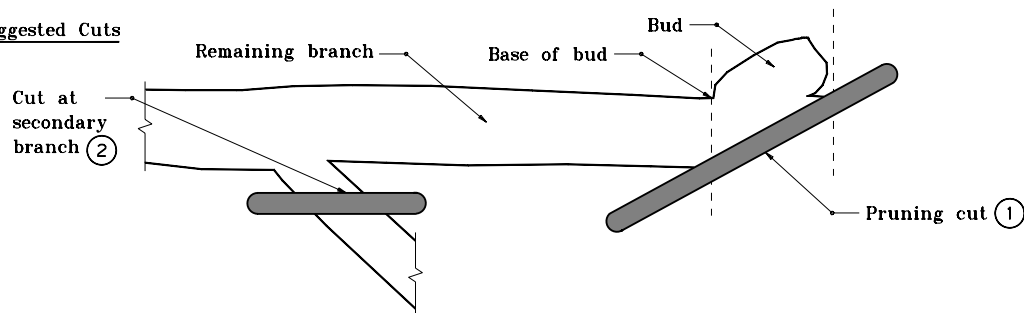


Improper Cut

Pruning cut too close to bud (will interfere with bud growth).



Suggested Cuts



GENERAL NOTES

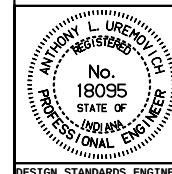
- ① Cut at bud starts opposite the base of bud and slants up toward top of bud.
- ② Cut at secondary branch shall be parallel to remaining branch.

INDIANA DEPARTMENT OF TRANSPORTATION

PRUNING PROCEDURE TREES AND SHRUBS

APRIL 1995

STANDARD DRAWING NO. E 622-LSPR-06



DETAILS PLACED IN THIS FORMAT 11-15-99

/s/ Anthony L. Uremovich 11-15-99
DESIGN STANDARDS ENGINEER DATE

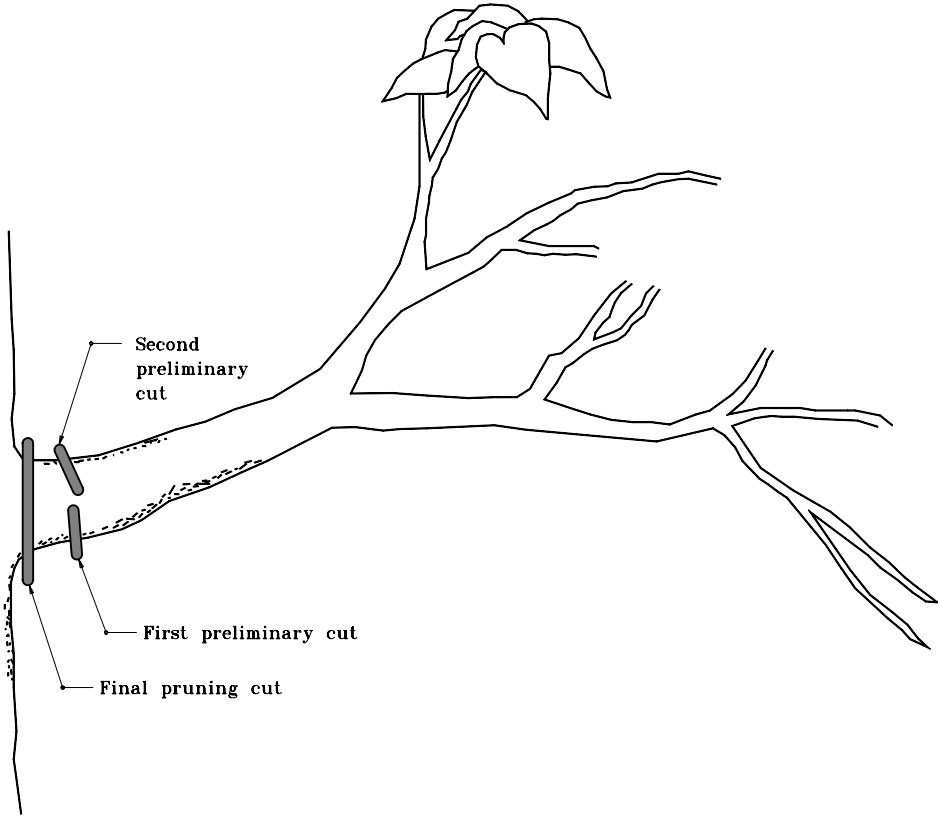
/s/ Firooz Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

ORIGINALLY APPROVED 4-01-95

GENERAL NOTES

1. This is a suggested method for pruning heavier limbs. If these limbs are not properly cut, damage to adjacent portions of the tree may occur.

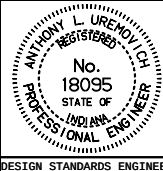


INDIANA DEPARTMENT OF TRANSPORTATION

**PRUNING PROCEDURE
HEAVIER LIMBS**

APRIL 1995

STANDARD DRAWING NO. **E 622-LSPR-07**



DETAILS PLACED IN THIS FORMAT 11-15-99

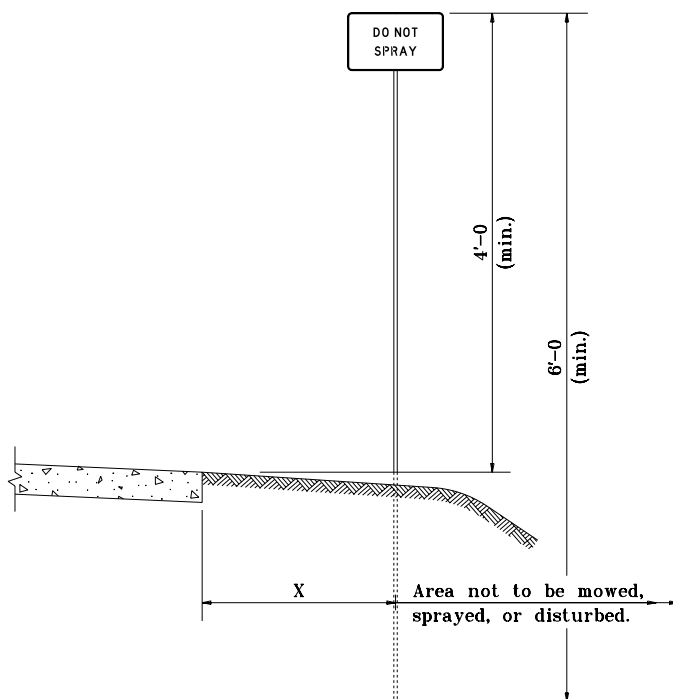
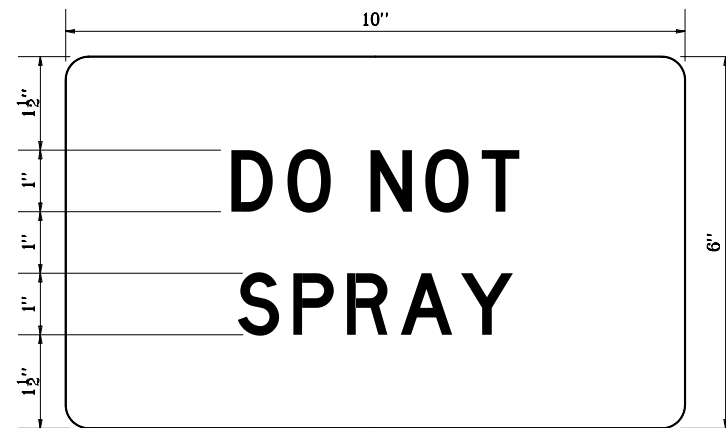
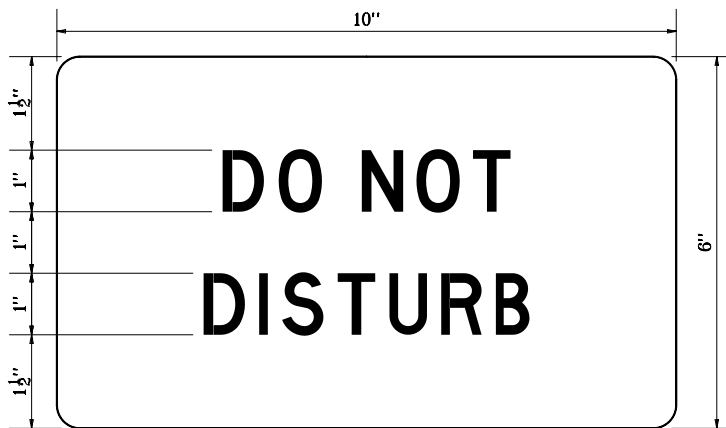
/s/ Anthony L. Uremovich 11-15-99
DESIGN STANDARDS ENGINEER DATE

/s/ Firooz Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE

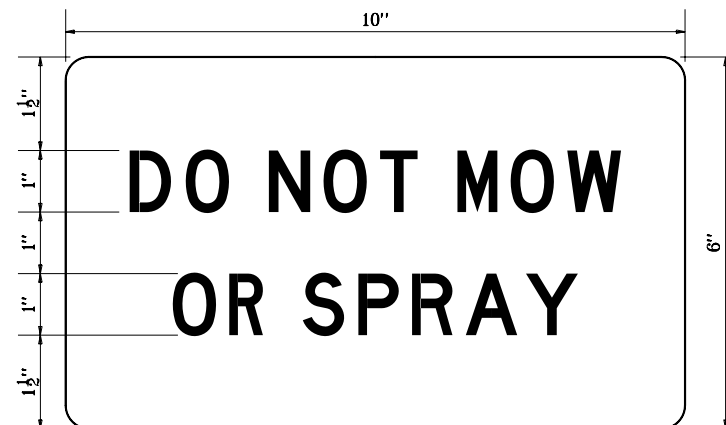
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ORIGINALLY APPROVED

4-01-95



X = Approximate distance from edge of paved shoulder to edge of area not to be mowed, sprayed, or disturbed.



INDIANA DEPARTMENT OF TRANSPORTATION	
LANDSCAPE SIGNS	
JUNE 1996	
STANDARD DRAWING NO. E 622-LSSN-01	
	DETAILS PLACED IN THIS FORMAT 11-15-99 /s/ Anthony L. Uremovich 11-15-99 DESIGN STANDARDS ENGINEER DATE /s/ Firooz Zandi 11-15-99 CHIEF HIGHWAY ENGINEER DATE DESIGN STANDARDS ENGINEER ORIGINALLY APPROVED 6-03-96