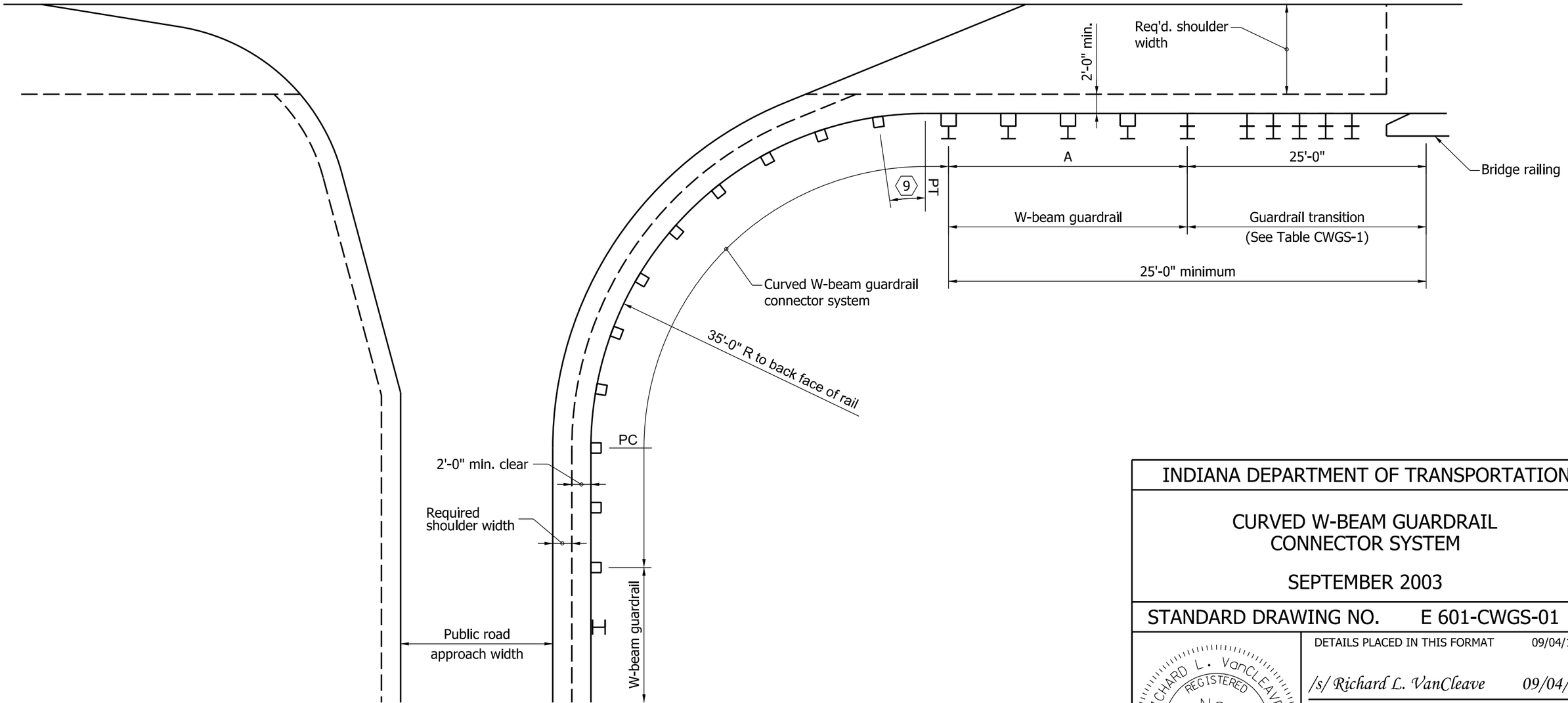
TABLE CWGS-1	
A	GUARDRAIL TRANSITION
< 25'	Type WGB
≥ 25'	Type TGB

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

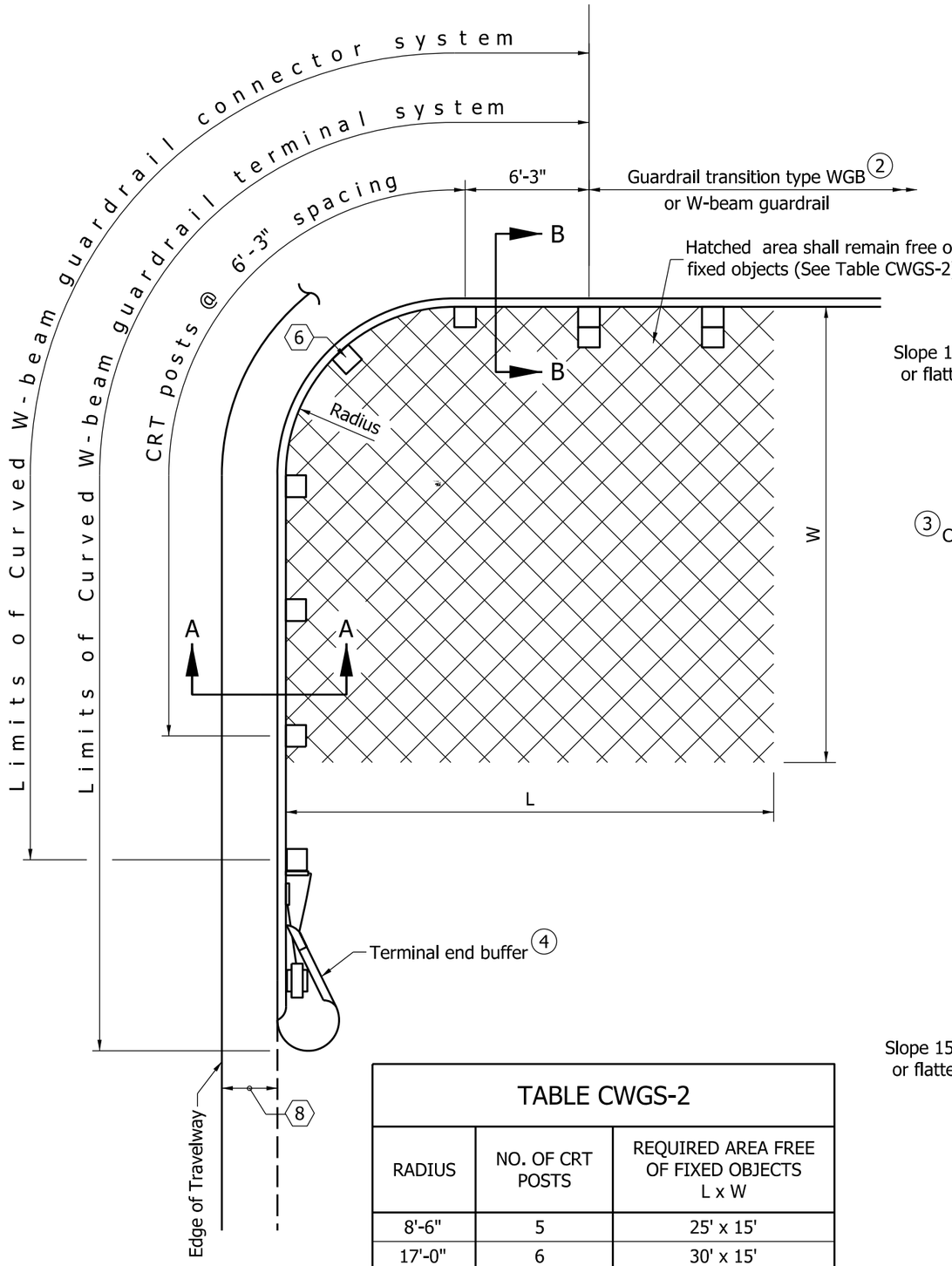
STANDARD DRAWING NO. E 601-CWGS-01

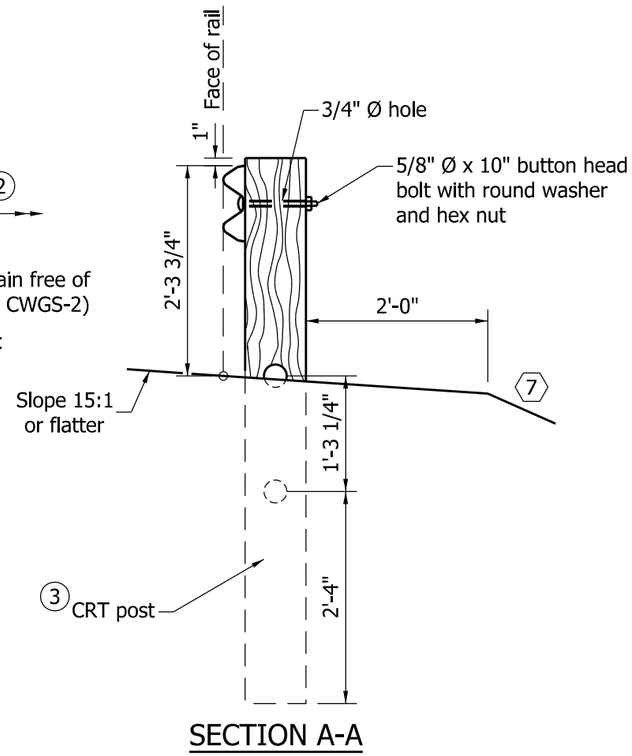
RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DETAILS PLACED IN THIS FORMAT 09/04/12

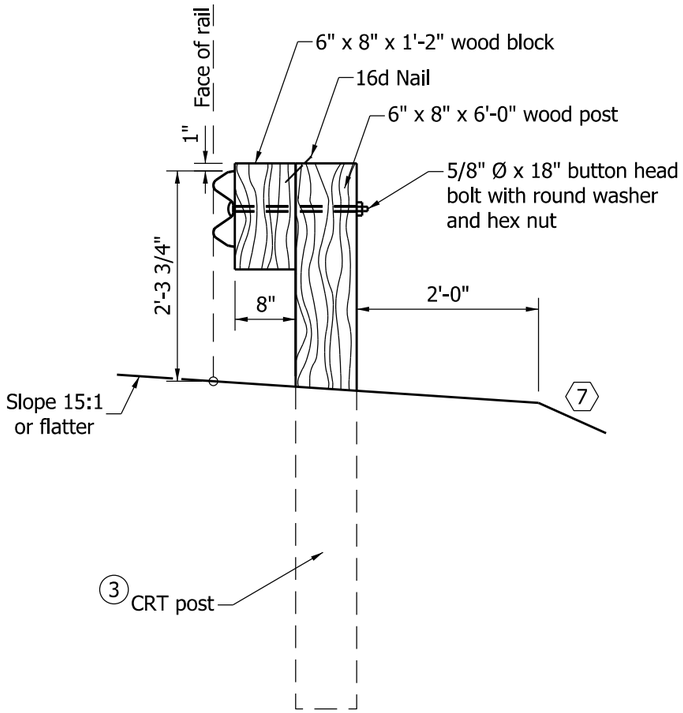
/s/ Richard L. VanCleave 09/04/12
SUPERVISOR, ROADWAY STANDARDS DATE

/s/ Mark A. Miller 09/04/12
CHIEF ENGINEER DATE





SECTION A-A



SECTION B-B

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'

NOTES:

1. See Standard Drawing E 601-CWGS-03 for General Notes.
2. See Standard Drawing E 601-TWGB-02 for guardrail transition type WBG details.
3. See Standard Drawing E 601-CWGS-06 for CRT post details.
4. 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

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

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

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

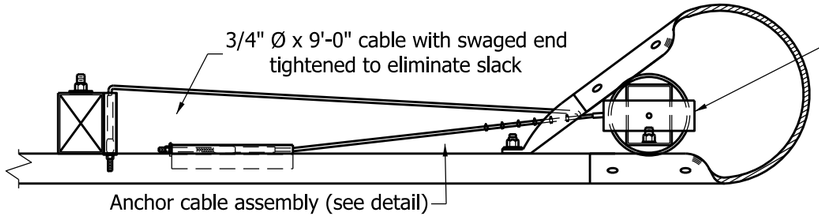
DETAILS PLACED IN THIS FORMAT 09/04/12

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

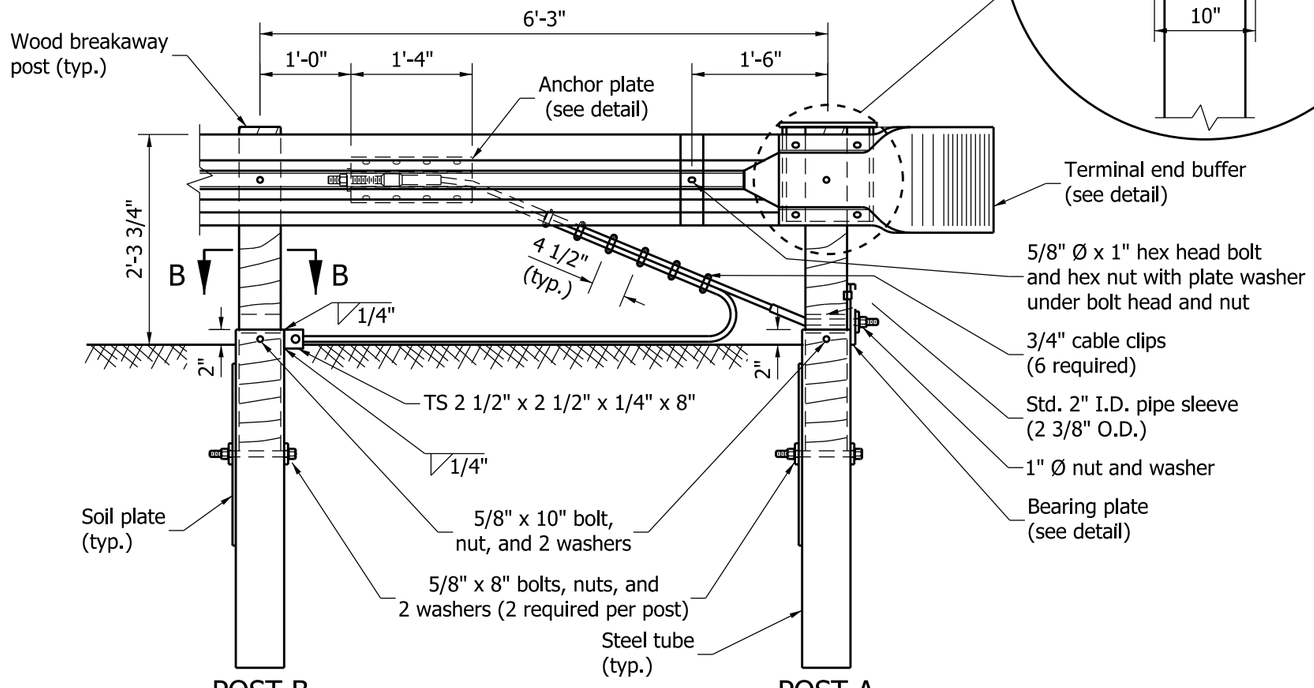
SUPERVISOR, ROADWAY STANDARDS DATE

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

CHIEF ENGINEER DATE



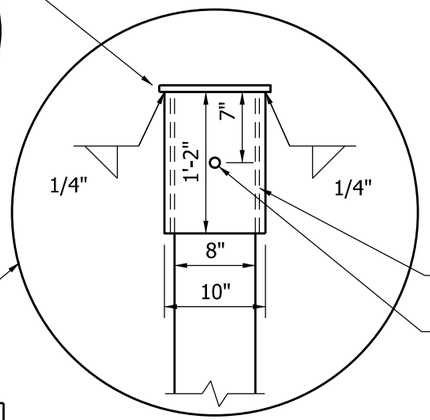
PLAN



POST B

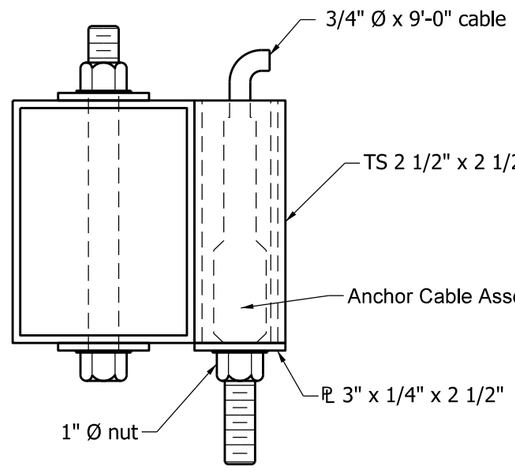
TYPE 5 ANCHOR ELEVATION

POST A

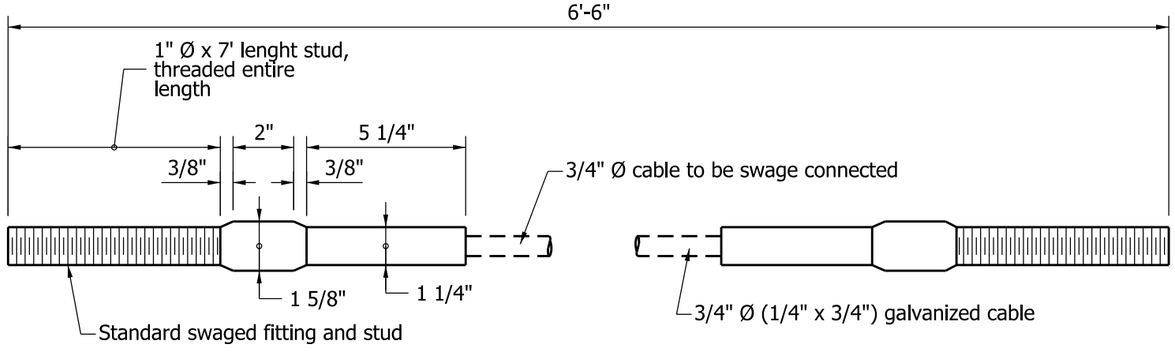


NOTES:

1. One 5/8" Ø x 10" bolt with nut and washer is required per curved W-beam steel tube and post.
2. Plate washers shall be used only where indicated.



SECTION B-B



ANCHOR CABLE ASSEMBLY

INDIANA DEPARTMENT OF TRANSPORTATION

CURVED W-BEAM GUARDRAIL SYSTEM

SETEMBER 2011

STANDARD DRAWING NO. E 601-CWGS-04

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

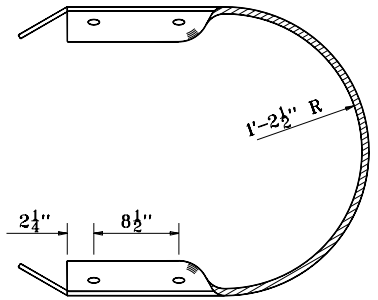
/s/ Richard L. VanCleave 09/01/11
DESIGN STANDARDS ENGINEER DATE

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

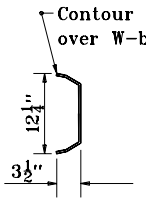
GENERAL NOTES

1. This sheet shall be used in conjuction 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 $\frac{5}{8}$" diameter x $1\frac{1}{4}$" 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 torqured to 50 ft.-lbs.

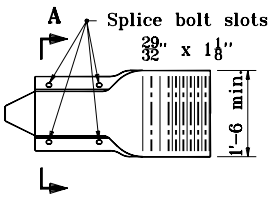
W-BEAM END SECTION (BUFFER)



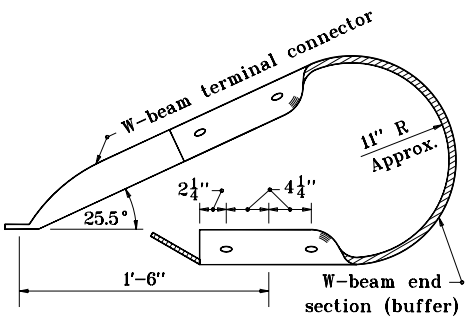
TOP VIEW



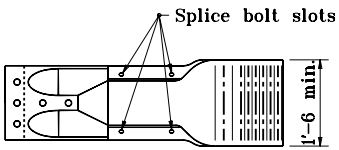
SECTION A-A



SIDE VIEW

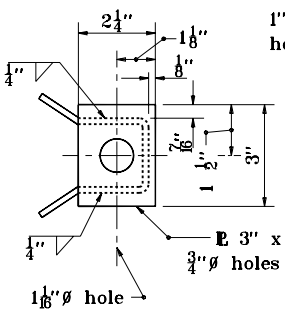


TOP VIEW

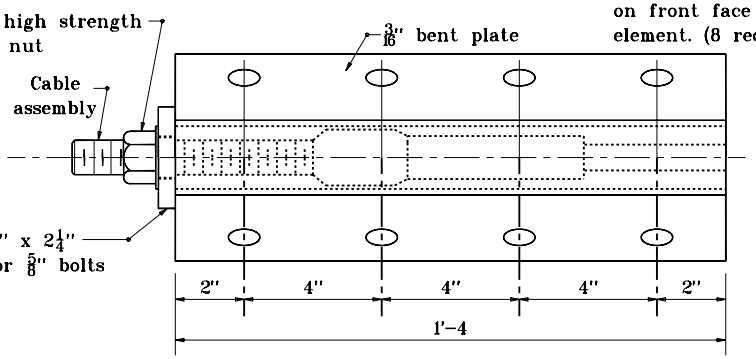


SIDE VIEW

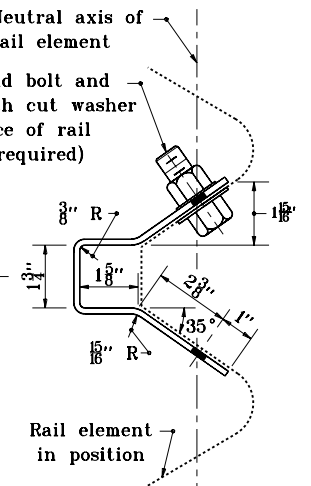
TERMINAL END BUFFER



LEFT END VIEW



ANCHOR PLATE



RIGHT END VIEW

INDIANA DEPARTMENT OF TRANSPORTATION

CURVED W-BEAM GUARDRAIL SYSTEM

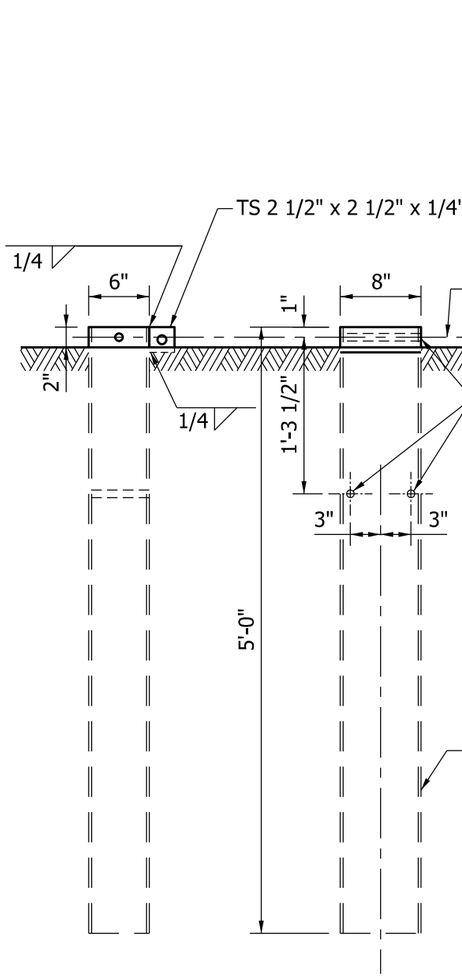
APRIL 1996

STANDARD DRAWING NO. **E 601-CWGS-05**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

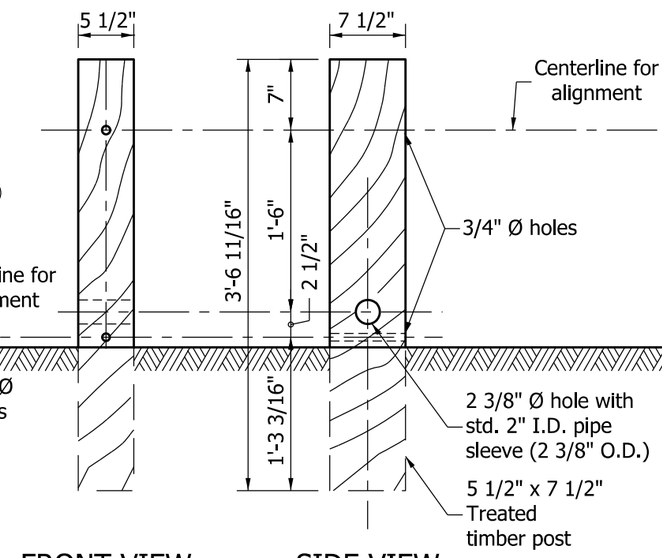
DESIGN STANDARDS ENGINEER

DETAILS PLACED IN THIS FORMAT	11-15-99
/s/ Anthony L. Uremovich, DESIGN STANDARDS ENGINEER	11-15-99
/s/ Firooz Zandi, CHIEF HIGHWAY ENGINEER	11-15-99
ORIGINALLY APPROVED	4-01-96



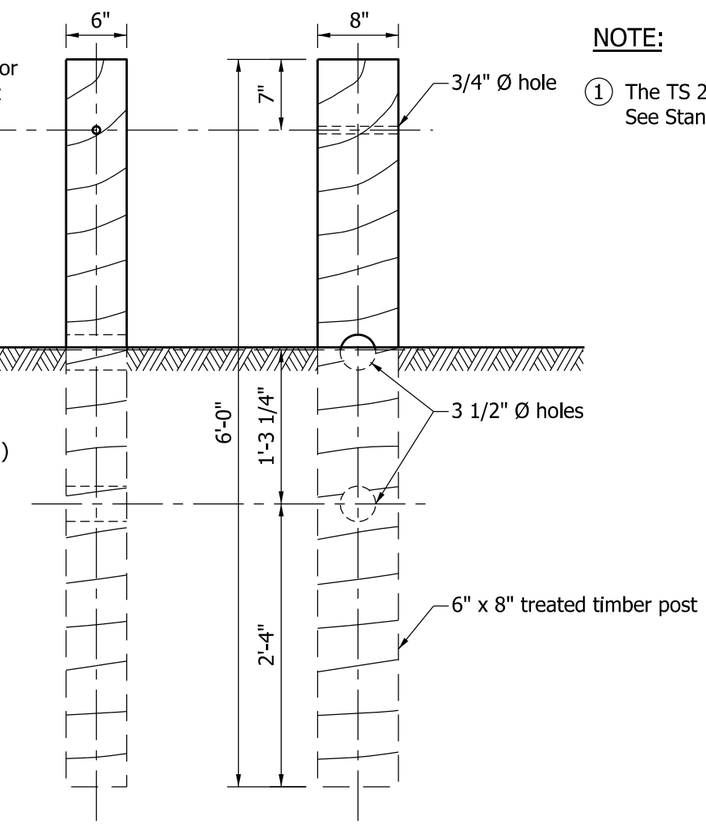
FRONT VIEW SIDE VIEW

STEEL TUBE POST B



FRONT VIEW SIDE VIEW

WOOD BREAKAWAY POST

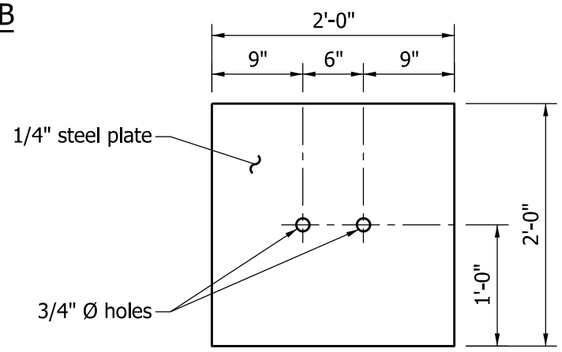


FRONT VIEW SIDE VIEW

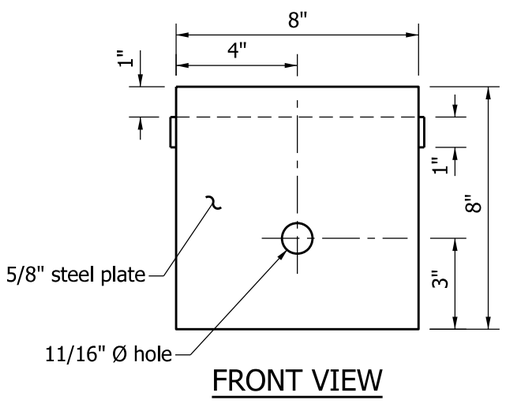
CRT POST

NOTE:

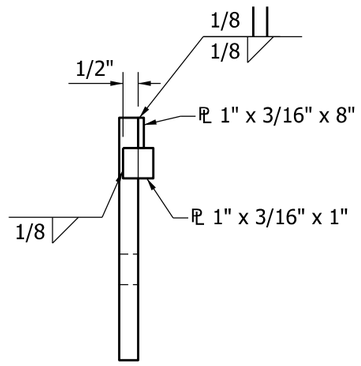
① The TS 2 1/2" x 2 1/2" structural tube shall be welded to Post B only. See Standard Drawing E 601-CWGS-04 for location of Post B.



SOIL PLATE



FRONT VIEW



SIDE VIEW

BEARING PLATE

INDIANA DEPARTMENT OF TRANSPORTATION

CURVED W-BEAM GUARDRAIL SYSTEM

SEPTEMBER 2011

STANDARD DRAWING NO. E 601-CWGS-06

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DETAILS PLACED IN THIS FORMAT 09/04/12

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

SUPERVISOR, ROADWAY STANDARDS DATE

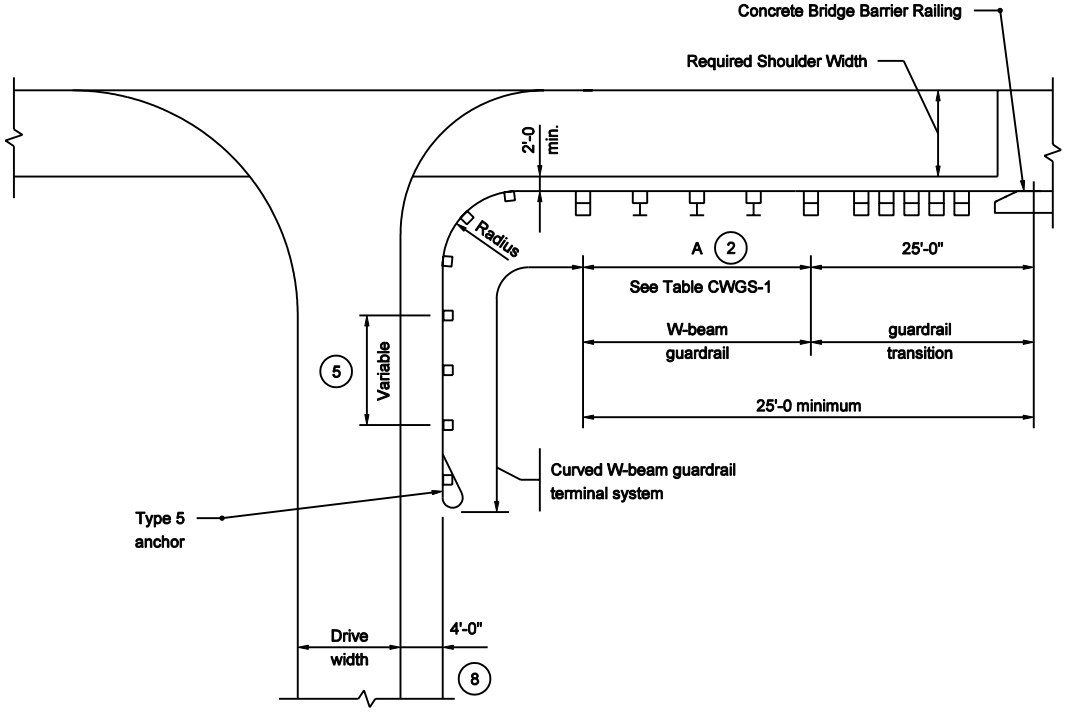
/s/ Mark A. Miller 09/04/12

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

RICHARD L. VANCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

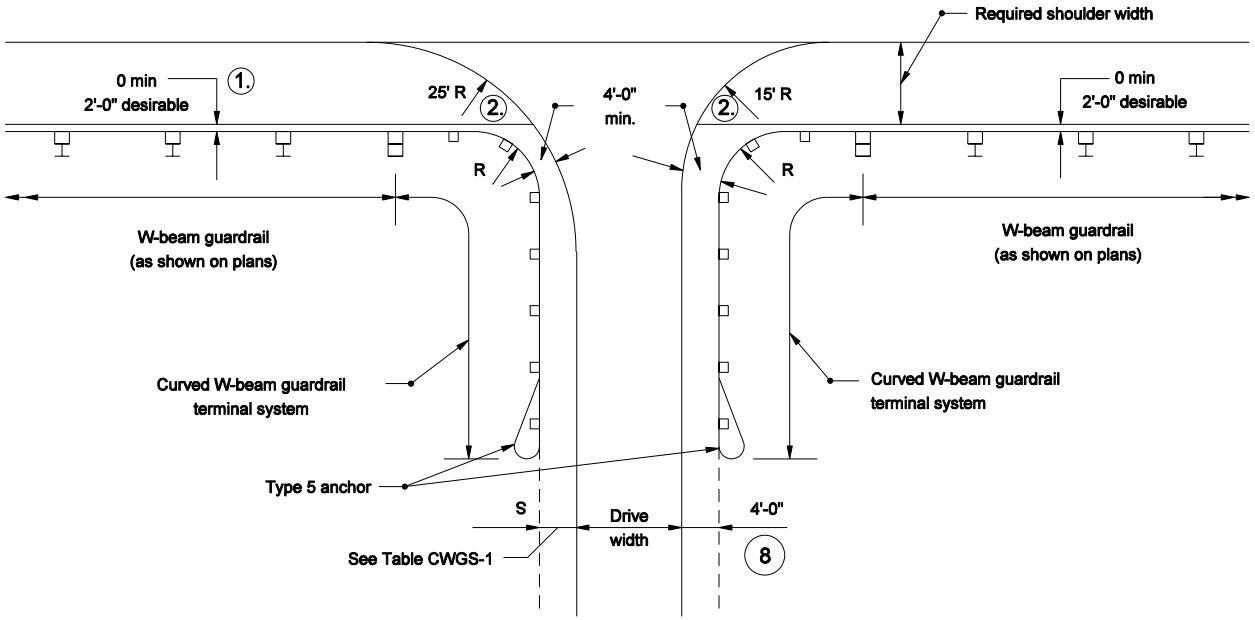
/s/ Richard L. VanCleave 9-02-03
DESIGN STANDARDS ENGINEER DATE

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

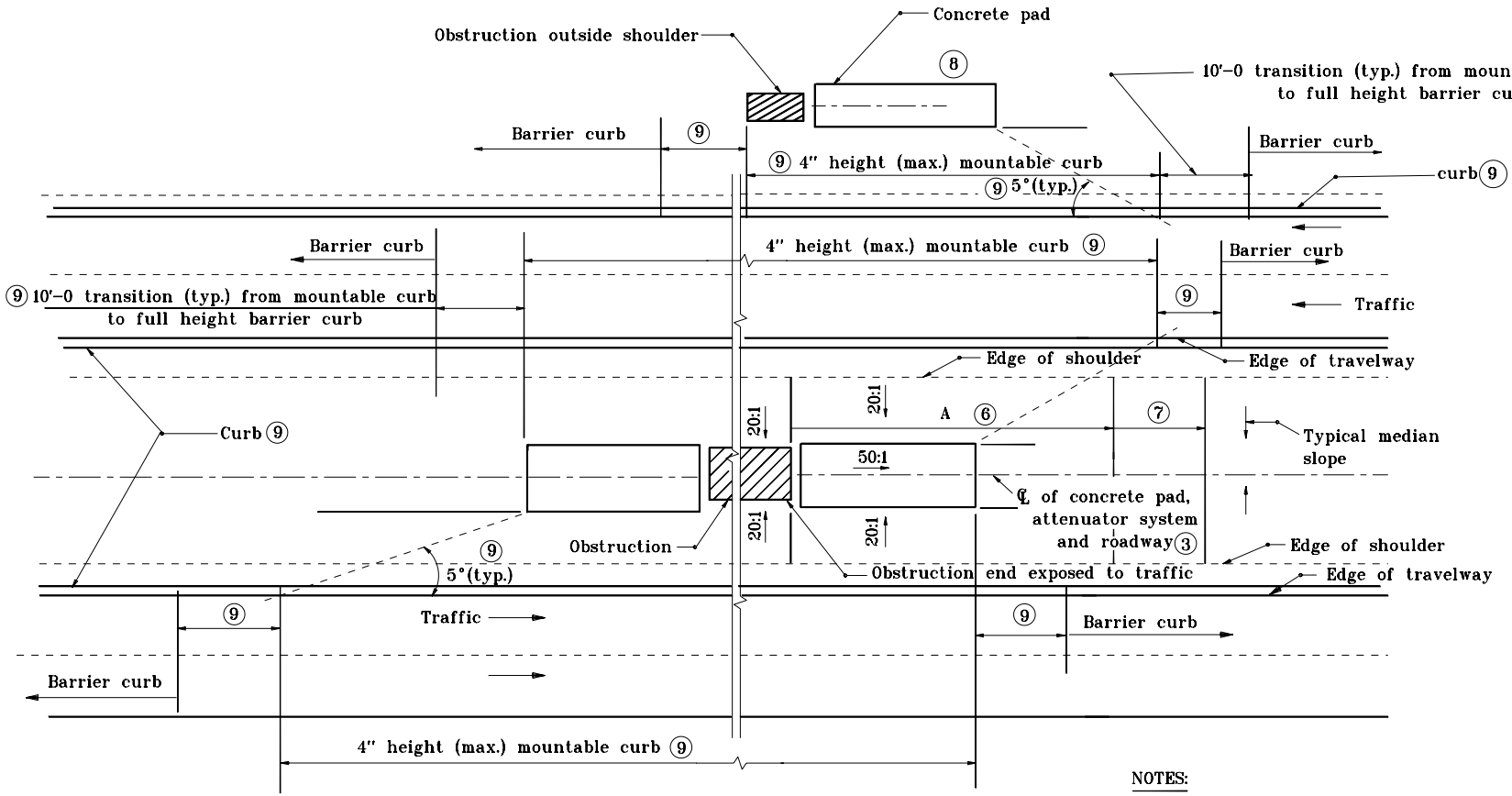
STANDARD DRAWING NO. E 601-CWGT-02

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

/s/ Richard L. VanCleave 3-01-04
DESIGN STANDARDS ENGINEER DATE

/s/ Richard K. Smutzer 3-01-04
CHIEF HIGHWAY ENGINEER DATE



ALIGNMENT OF ATTENUATOR, PAD AND ROADWAY

NOTES:

1. See Standard Drawing E 601–GAIA–01A for notes.

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

INDIANA DEPARTMENT OF TRANSPORTATION

GRADING AT MEDIAN IMPACT ATTENUATOR

MARCH 2002

STANDARD DRAWING NO. **E 601–GAIA–01**

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

/s/ Richard L. VanCleave 3–01–02
DESIGN STANDARDS ENGINEER — DATE

/s/ Richard K. Smutzer 3–01–02
CHIEF HIGHWAY ENGINEER — DATE

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

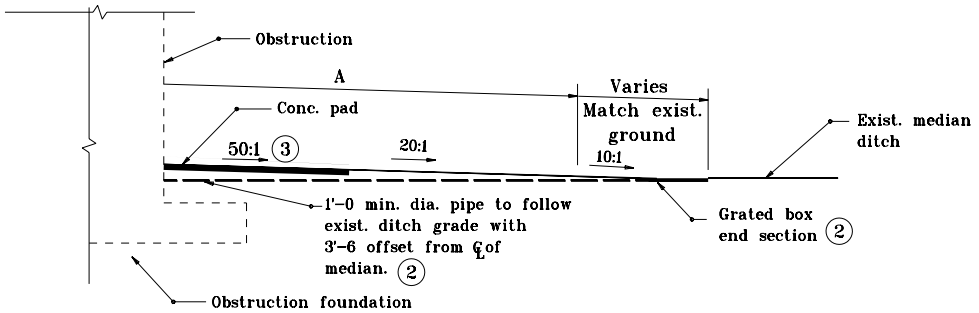
STANDARD DRAWING NO. **E 601-GAIA-01A**

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

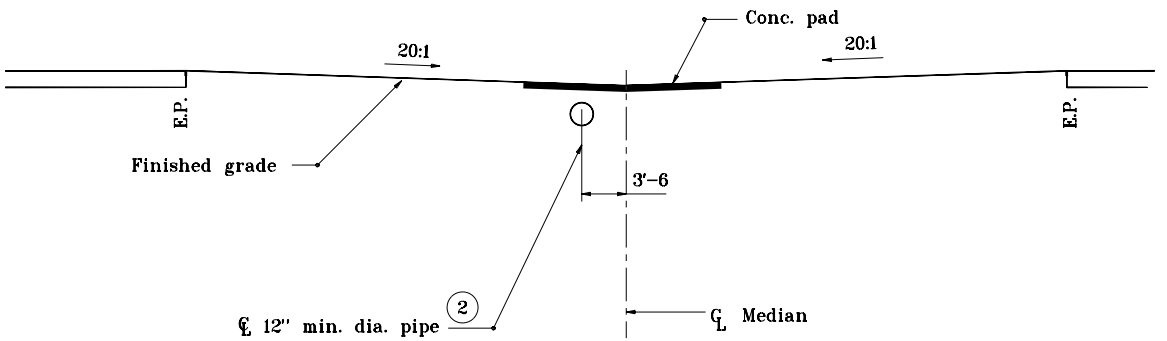
/s/ Richard L. VanCleave 3-01-02
DESIGN STANDARDS ENGINEER — DATE

/s/ Richard K. Smutzer 3-01-02
CHIEF HIGHWAY ENGINEER — DATE



LONGITUDINAL SECTION

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

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

INDIANA DEPARTMENT OF TRANSPORTATION

GRADING AT MEDIAN IMPACT ATTENUATOR

MARCH 2002

STANDARD DRAWING NO. **E 601-GAIA-02**

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

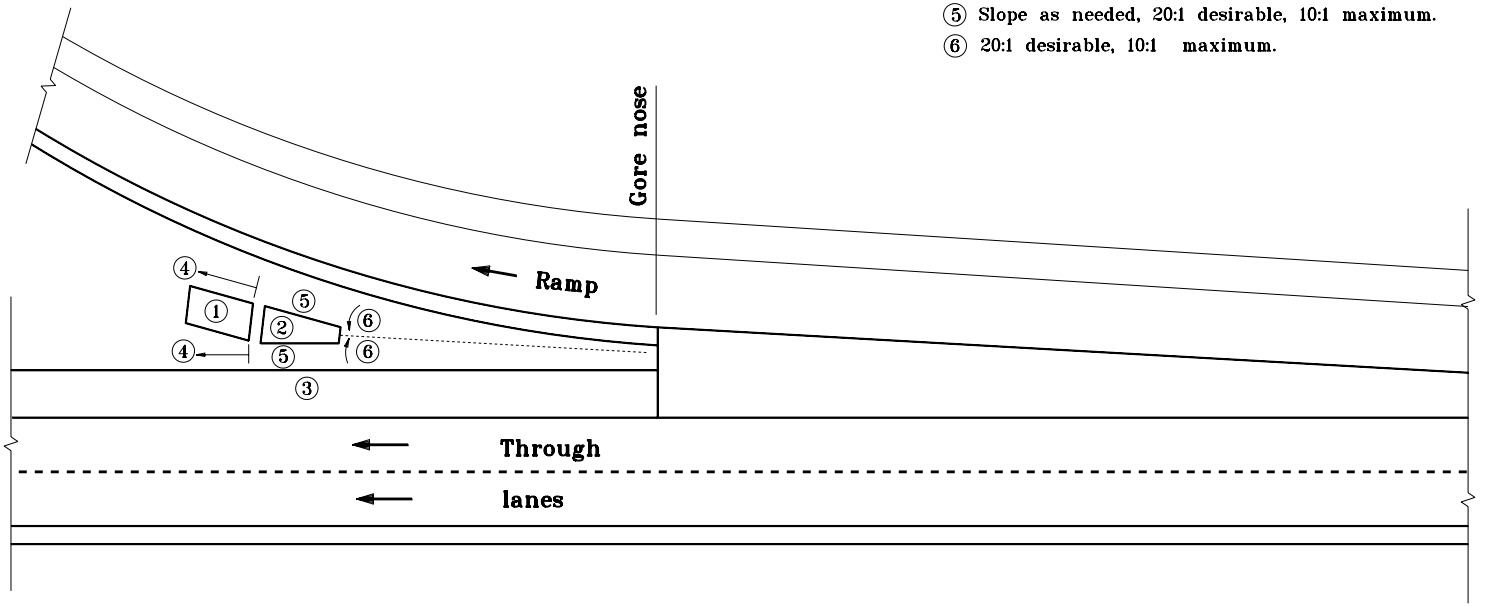
DESIGN STANDARDS ENGINEER

/s/ Richard L. VanCleave 3-01-02
DESIGN STANDARDS ENGINEER — DATE

/s/ Richard K. Smutzer 3-01-02
CHIEF HIGHWAY ENGINEER — DATE

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

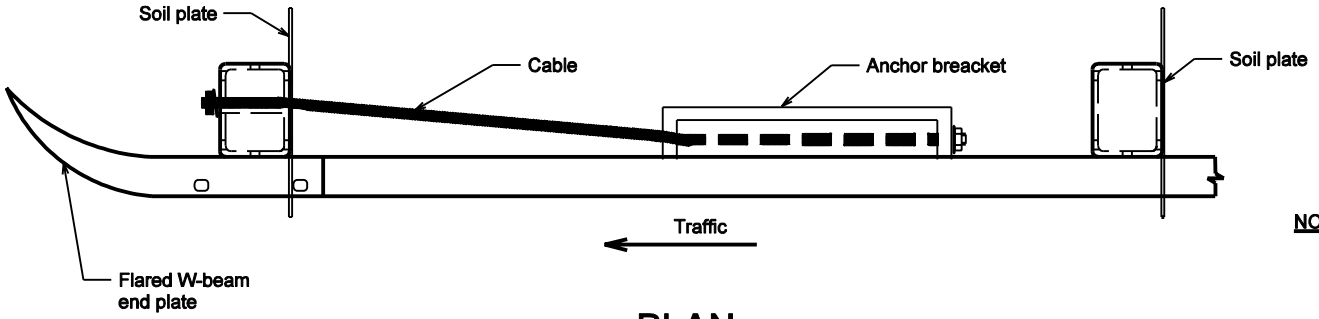
STANDARD DRAWING NO. **E 601-GAIA-03**

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

/s/ Richard L. VanCleave 3-01-02
DESIGN STANDARDS ENGINEER — DATE

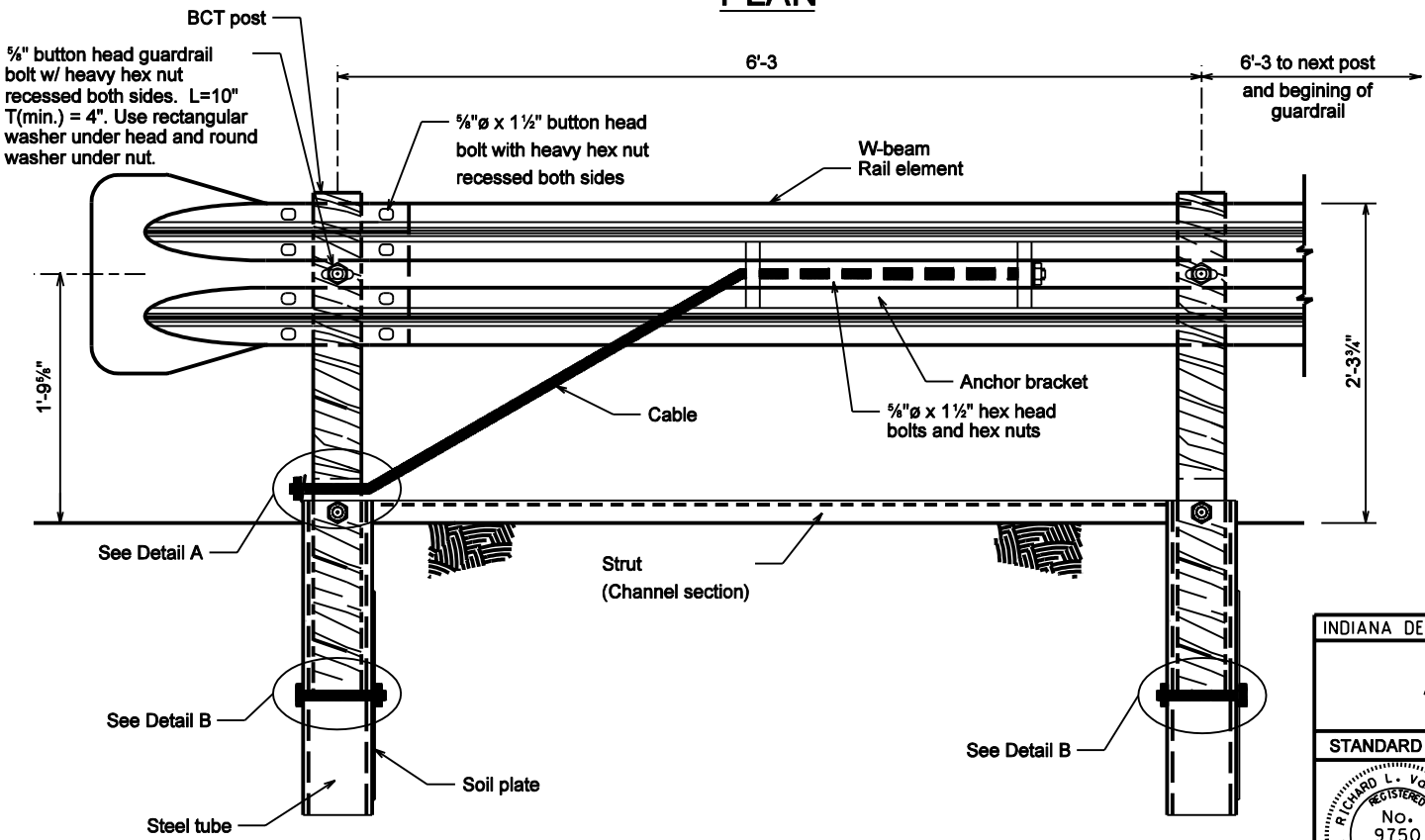
/s/ Richard K. Smutzer 3-01-02
CHIEF HIGHWAY ENGINEER — DATE



PLAN

NOTES :

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



Post A

ELEVATION

Post B

INDIANA DEPARTMENT OF TRANSPORTATION

CABLE TERMINAL ANCHOR SYSTEM

SEPTEMBER 2001

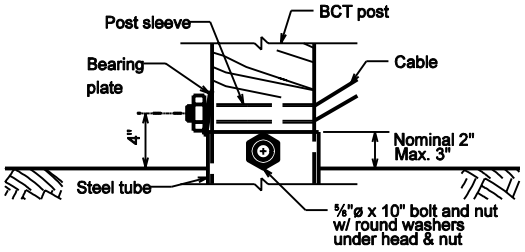
STANDARD DRAWING NO. E 601-GCTA-01

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

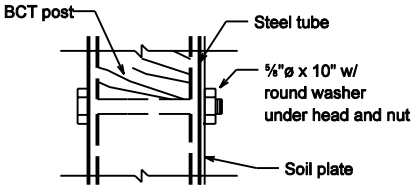
DESIGN STANDARDS ENGINEER

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

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



DETAIL A



DETAIL B

INDIANA DEPARTMENT OF TRANSPORTATION

CABLE TERMINAL ANCHOR SYSTEM

SEPTEMBER 2001

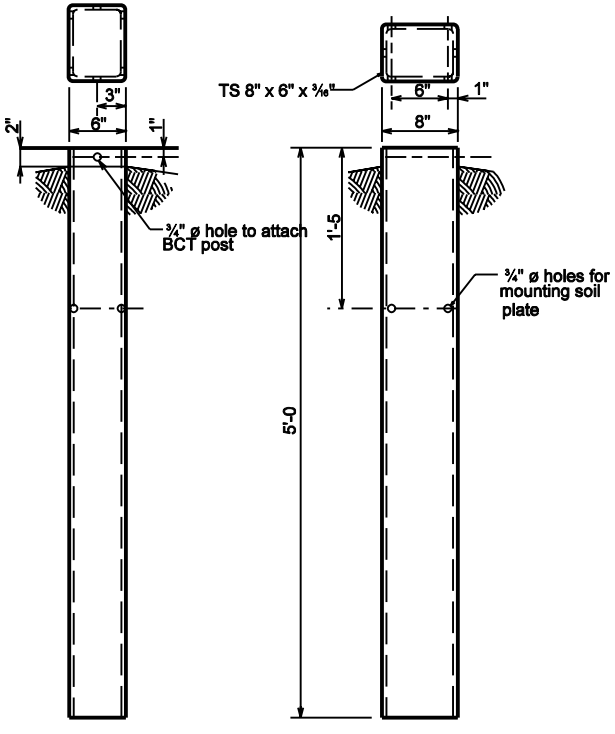
STANDARD DRAWING NO. E 601-GCTA-02

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF Indiana PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

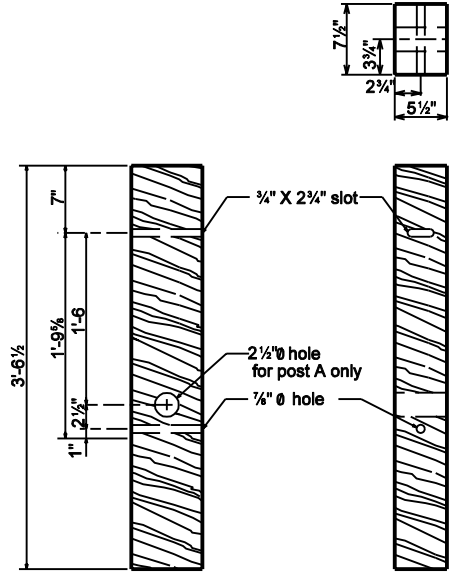
/s/ Richard L. VanCleave 9-04-01
DESIGN STANDARDS ENGINEER DATE

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



FRONT SIDE

GALVANIZED STEEL FOUNDATION TUBE



SIDE FRONT

BCT TIMBER POST

INDIANA DEPARTMENT OF TRANSPORTATION

CABLE TERMINAL ANCHOR SYSTEM

SEPTEMBER 2001

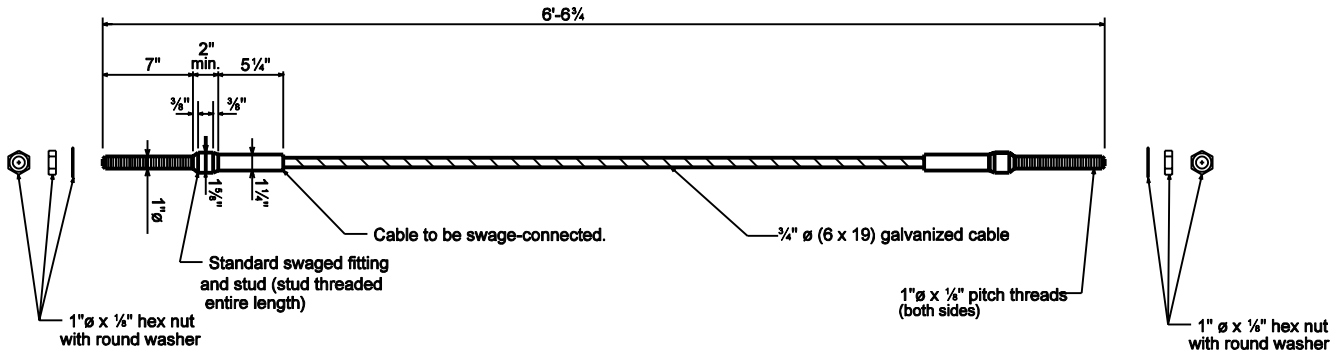
STANDARD DRAWING NO. E 601-GCTA-03

RICHARD L. VANCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

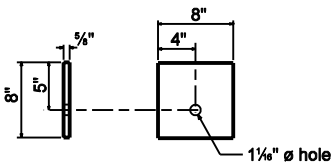
DESIGN STANDARDS ENGINEER

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

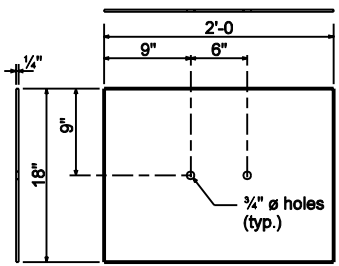
/s/ Firooz Zandi 9-04-01
CHIEF HIGHWAY ENGINEER DATE



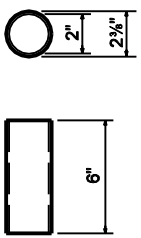
BCT CABLE ANCHOR ASSEMBLY



BCT BEARING PLATE



FOUNDATION TUBE SOIL PLATE



BCT POST SLEEVE

INDIANA DEPARTMENT OF TRANSPORTATION

CABLE TERMINAL ANCHOR SYSTEM

SEPTEMBER 2001

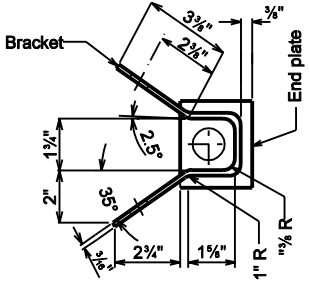
STANDARD DRAWING NO. E 601-GCTA-04

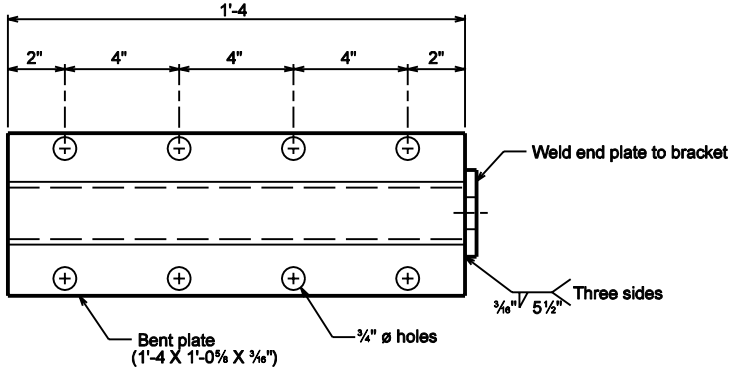
ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

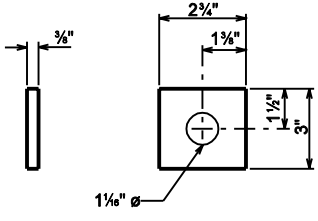
/s/ Anthony L Uremovich — DESIGN STANDARDS ENGINEER — 9-04-01 DATE

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





BRACKET



END PLATE

GUARDRAIL ANCHOR BRACKET

INDIANA DEPARTMENT OF TRANSPORTATION

CABLE TERMINAL ANCHOR SYSTEM

SEPTEMBER 2001

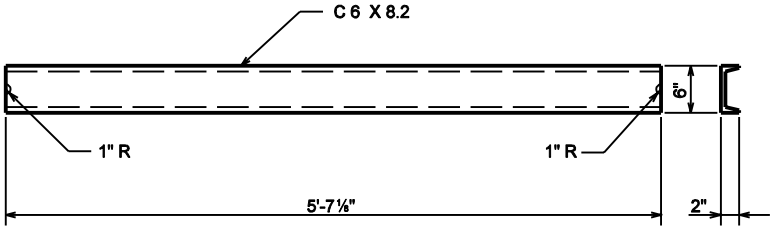
STANDARD DRAWING NO. E 601-GCTA-05

RICHARD L. VANCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

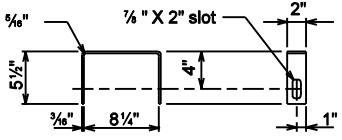
DESIGN STANDARDS ENGINEER

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

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

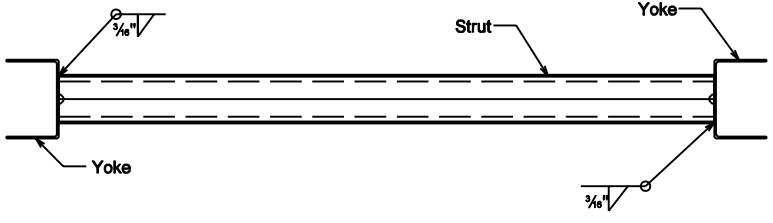


STRUT DETAILS

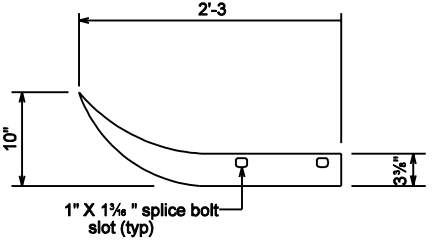


YOKE DETAILS
(2 required)

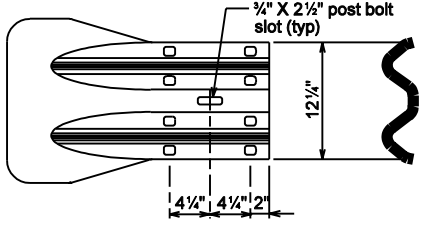
STRUT AND YOKE ASSEMBLY



ASSEMBLY DETAILS



PLAN



ELEVATION

FLARED W-BEAM END SECTION

INDIANA DEPARTMENT OF TRANSPORTATION

CABLE TERMINAL ANCHOR SYSTEM

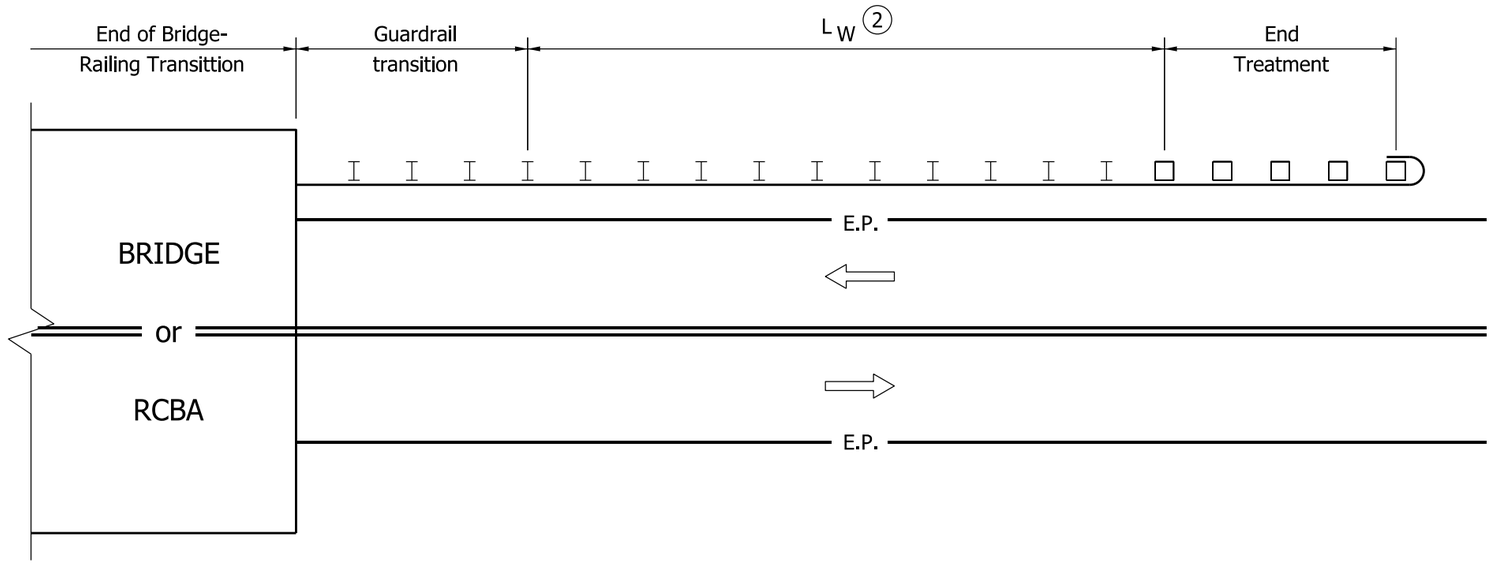
SEPTEMBER 2001

STANDARD DRAWING NO. E 601-GCTA-06

RICHARD L. VONCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER
DESIGN STANDARDS ENGINEER

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

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



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

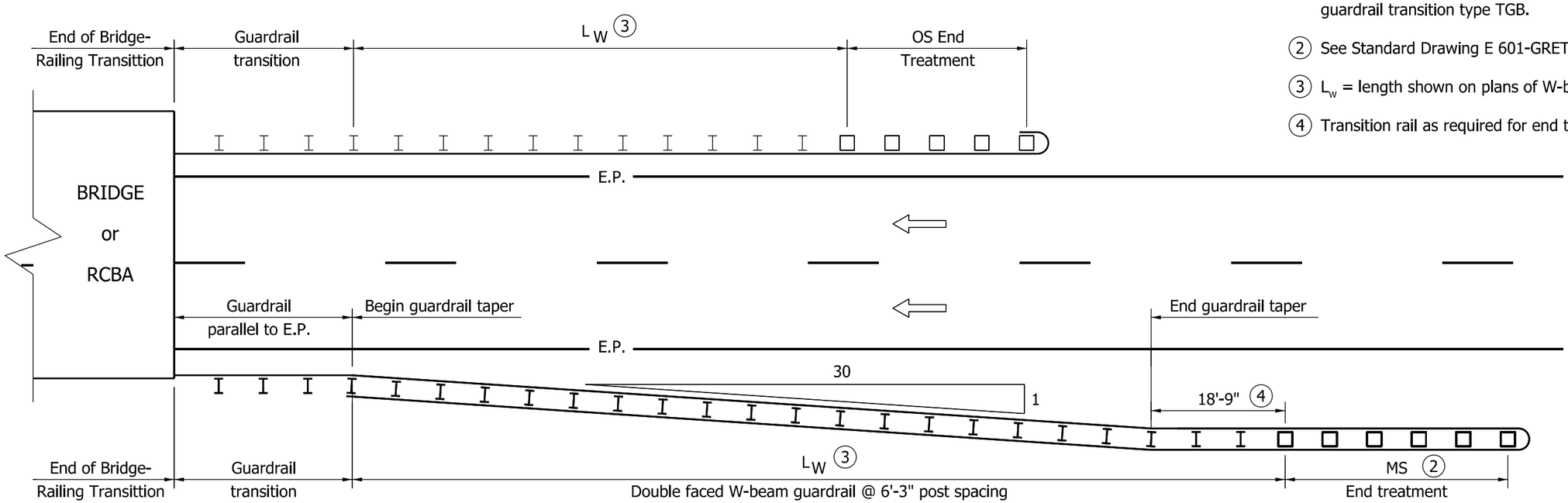
STANDARD DRAWING NO. E 601-GRBA-01

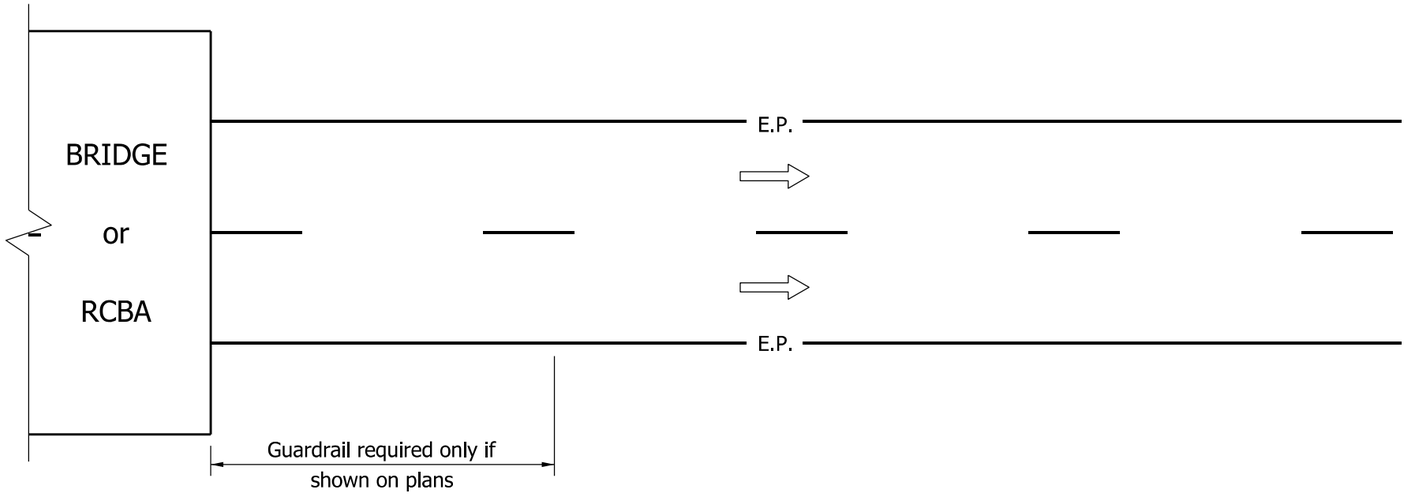
RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

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





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

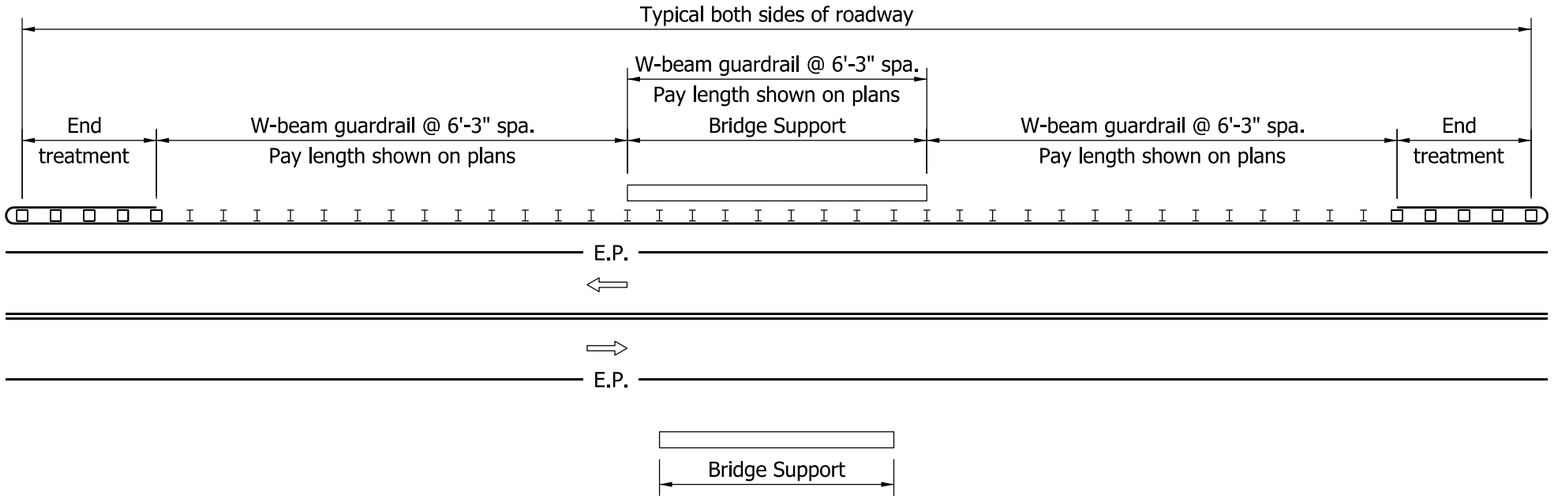
STANDARD DRAWING NO. E 601-GRBA-02

RICHARD L. VanCLEAVE
REGISTERED
No. 9750
STATE OF INDIANA
PROFESSIONAL ENGINEER

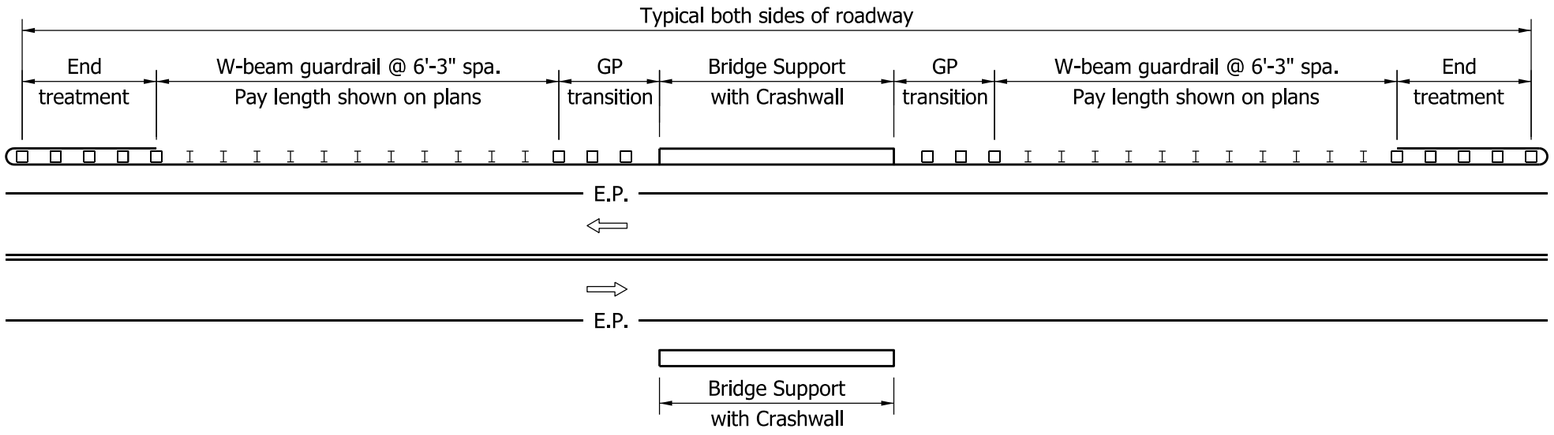
DESIGN STANDARDS ENGINEER

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

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



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'

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.

INDIANA DEPARTMENT OF TRANSPORTATION

GUARDRAIL AT ROADSIDE
BRIDGE SUPPORT

SEPTEMBER 2011

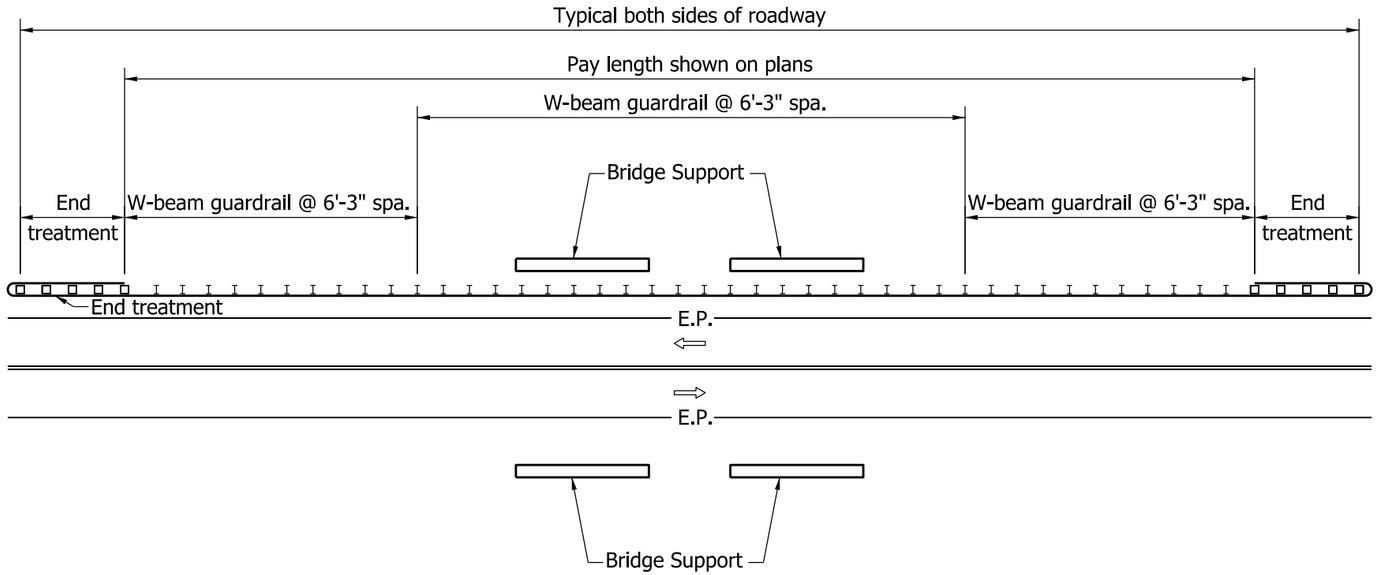
STANDARD DRAWING NO. E 601-GRBS-01

RICHARD L. VanCLEAVE
REGISTERED
No. 9750
STATE OF INDIANA
PROFESSIONAL ENGINEER

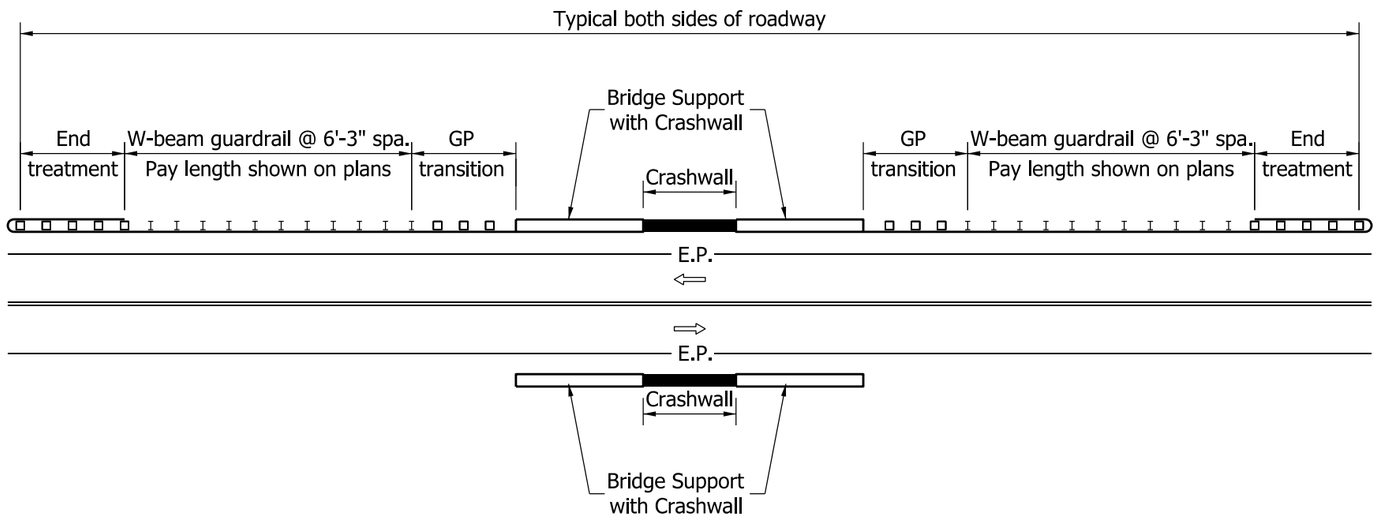
DESIGN STANDARDS ENGINEER

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

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



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

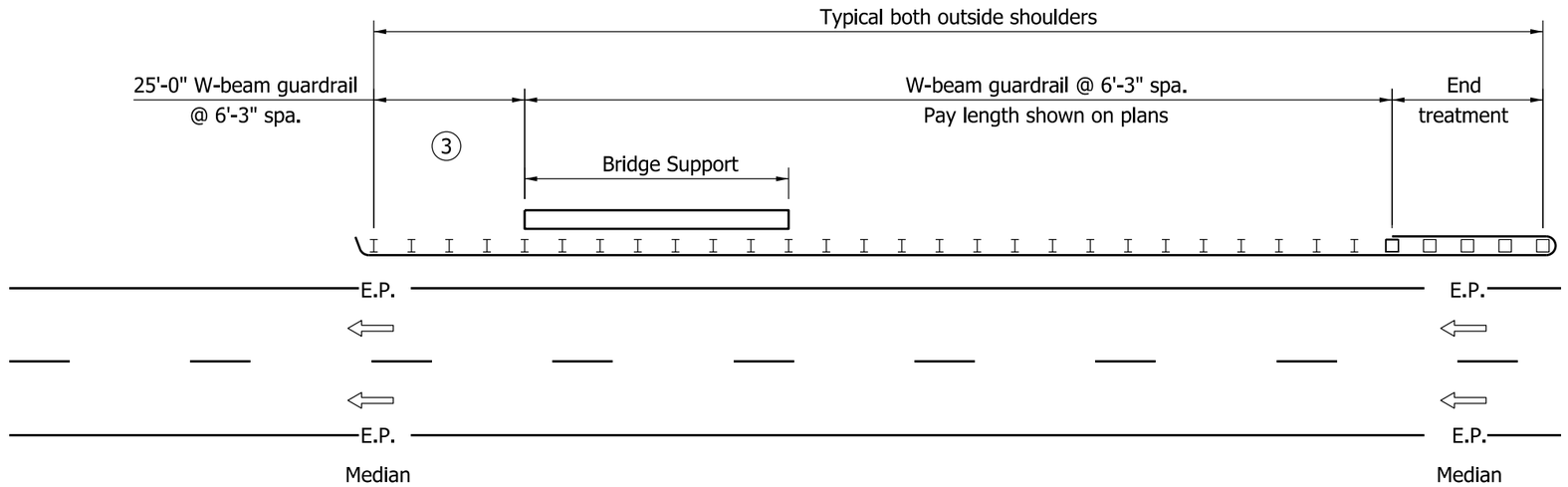
STANDARD DRAWING NO. E 601-GRBS-02

RICHARD L. VanCLEAVE
REGISTERED
No. 9750
STATE OF INDIANA
PROFESSIONAL ENGINEER

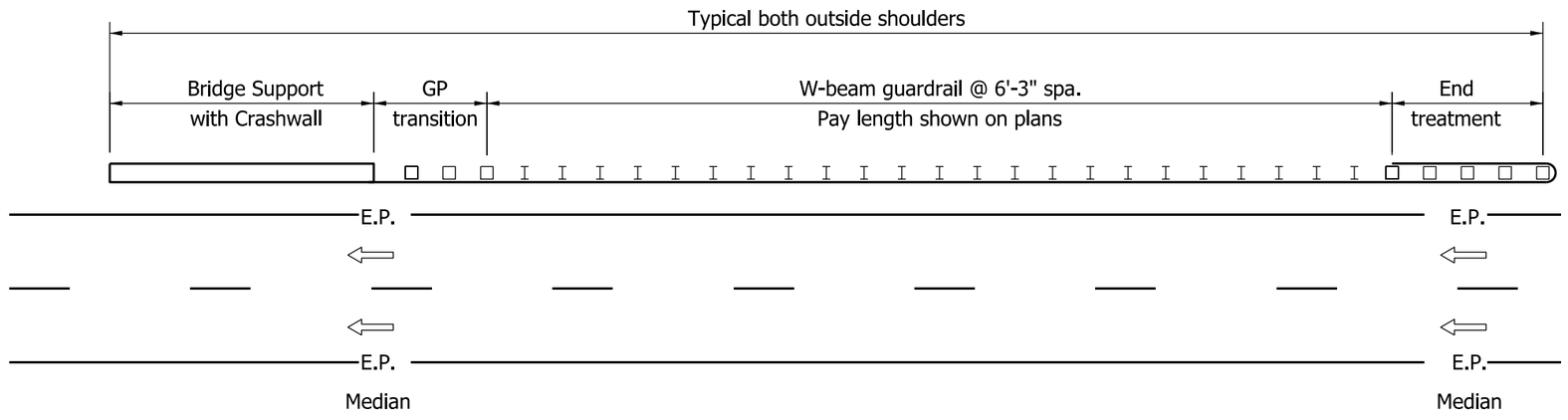
DESIGN STANDARDS ENGINEER

/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

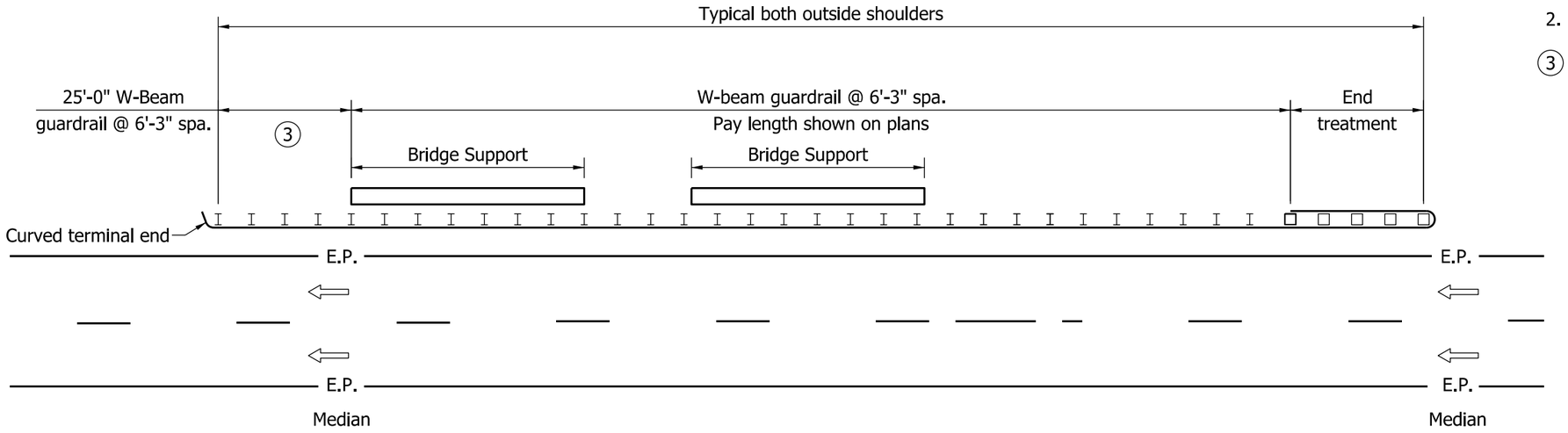
STANDARD DRAWING NO. E 601-GRBS-03

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

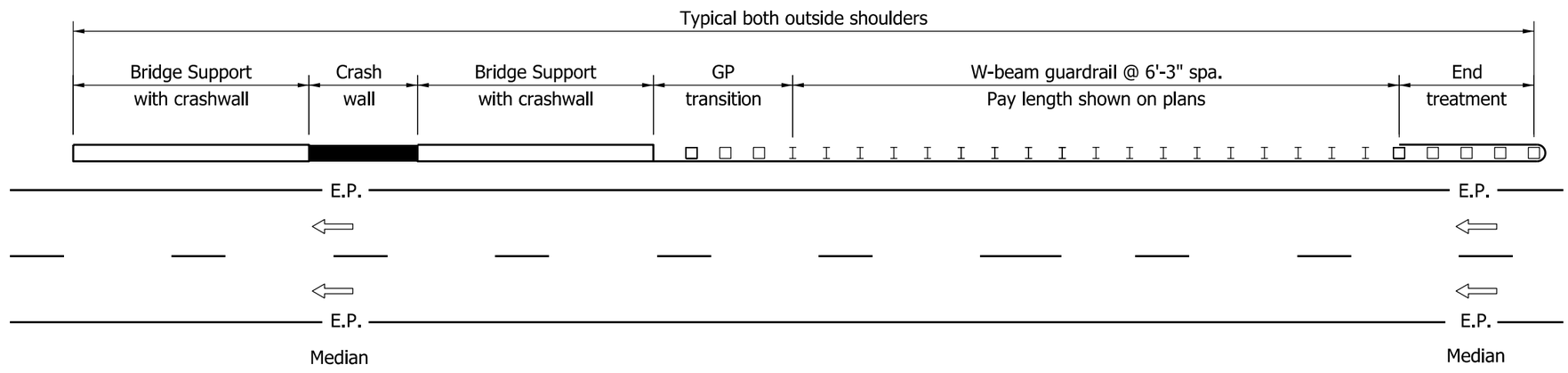
DESIGN STANDARDS ENGINEER

/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 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

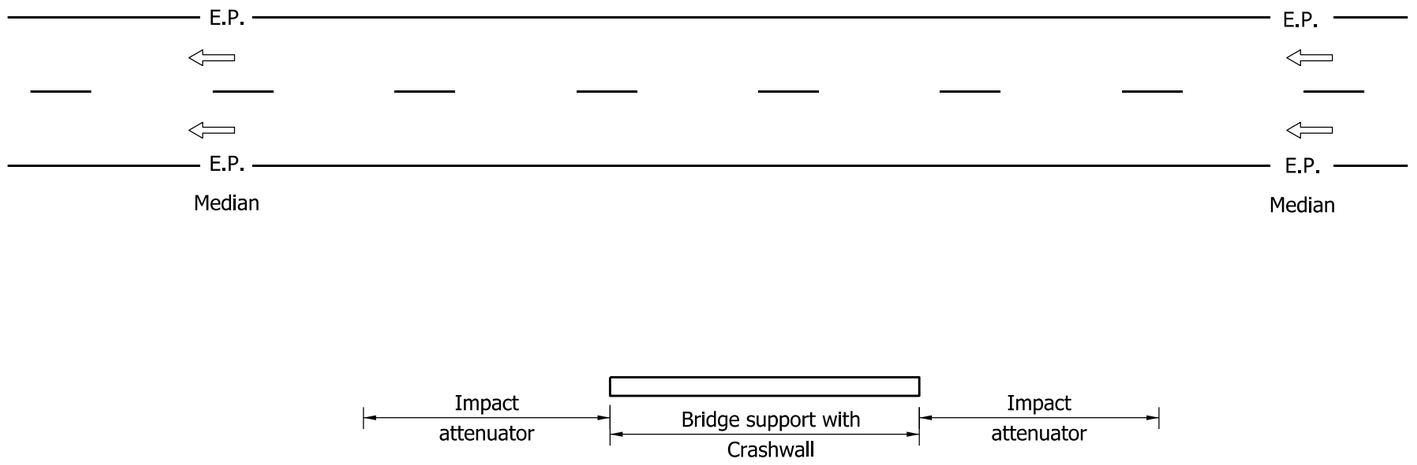
STANDARD DRAWING NO. E 601-GRBS-04

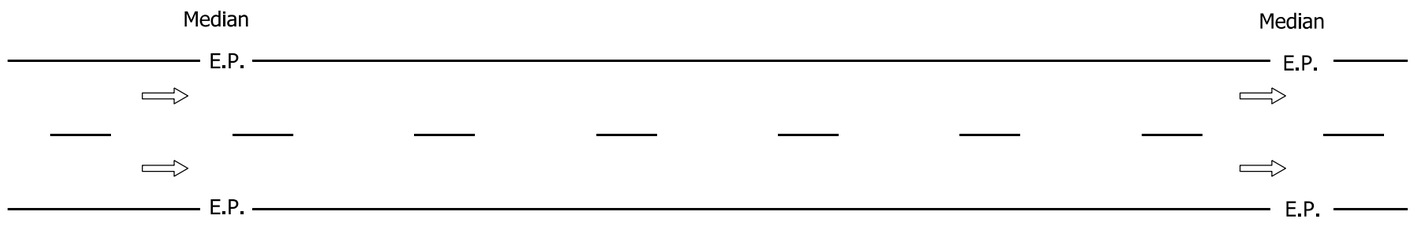
RICHARD L. VanCLEAVE
REGISTERED
No. 9750
STATE OF INDIANA
PROFESSIONAL ENGINEER

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 MEDIAN BRIDGE SUPPORT

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.

INDIANA DEPARTMENT OF TRANSPORTATION

GUARDRAIL AT MEDIAN-SIDE
BRIDGE SUPPORT

SEPTEMBER 2011

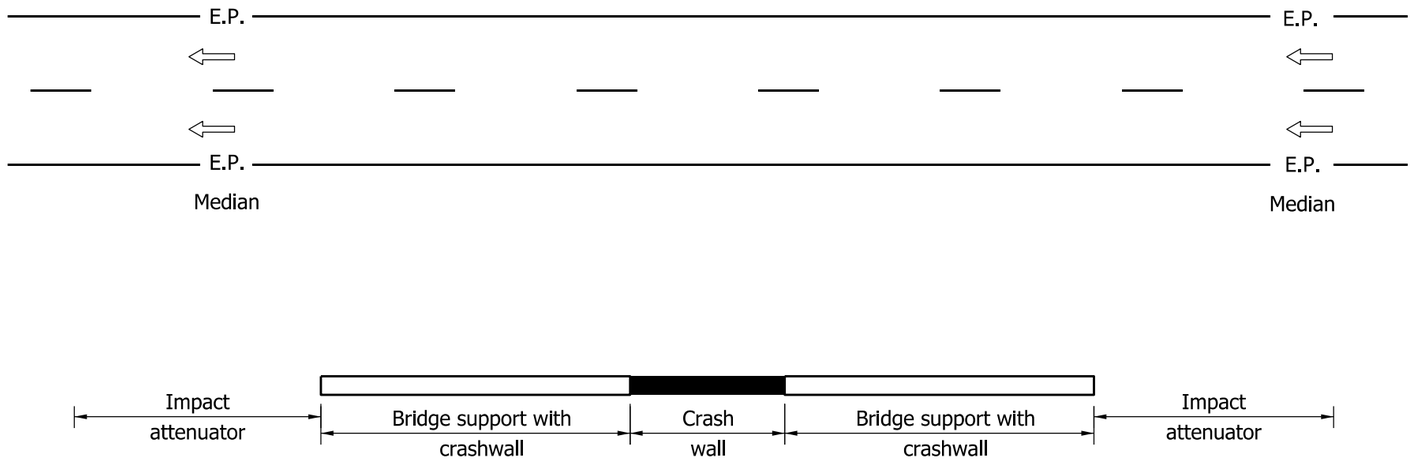
STANDARD DRAWING NO. E 601-GRBS-05

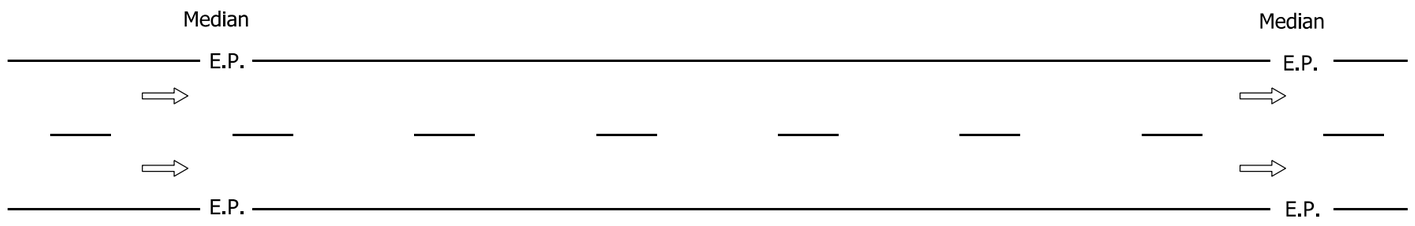
RICHARD L. VanCLEAVE
REGISTERED
No. 9750
STATE OF INDIANA
PROFESSIONAL ENGINEER

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 TWIN OVERHEAD STRUCTURES AND MEDIAN BRIDGE SUPPORTS

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.

INDIANA DEPARTMENT OF TRANSPORTATION

GUARDRAIL AT MEDIAN-SIDE
BRIDGE SUPPORTS

SEPTEMBER 2011

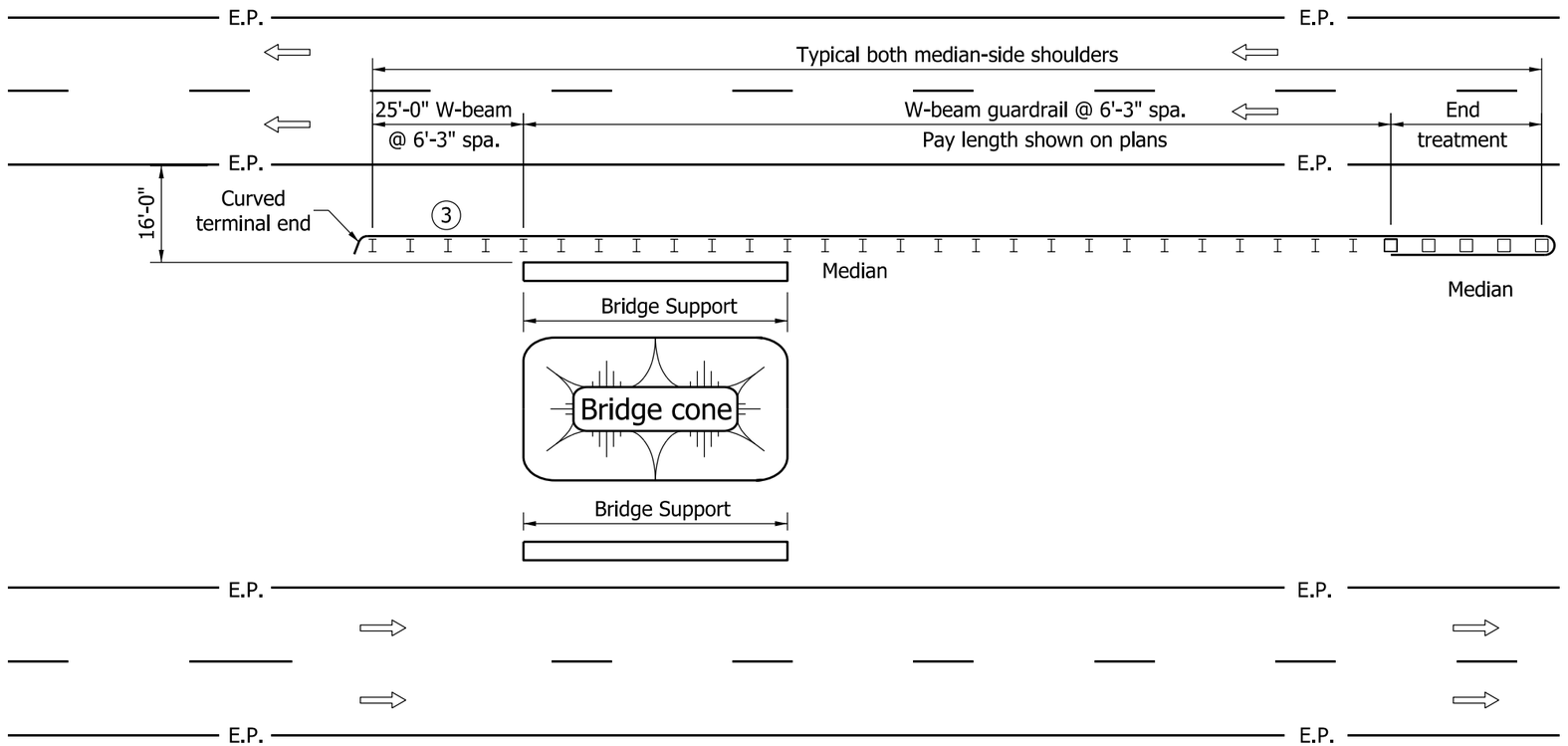
STANDARD DRAWING NO. E 601-GRBS-06

RICHARD L. VanCLEAVE
REGISTERED
No. 9750
STATE OF INDIANA
PROFESSIONAL ENGINEER

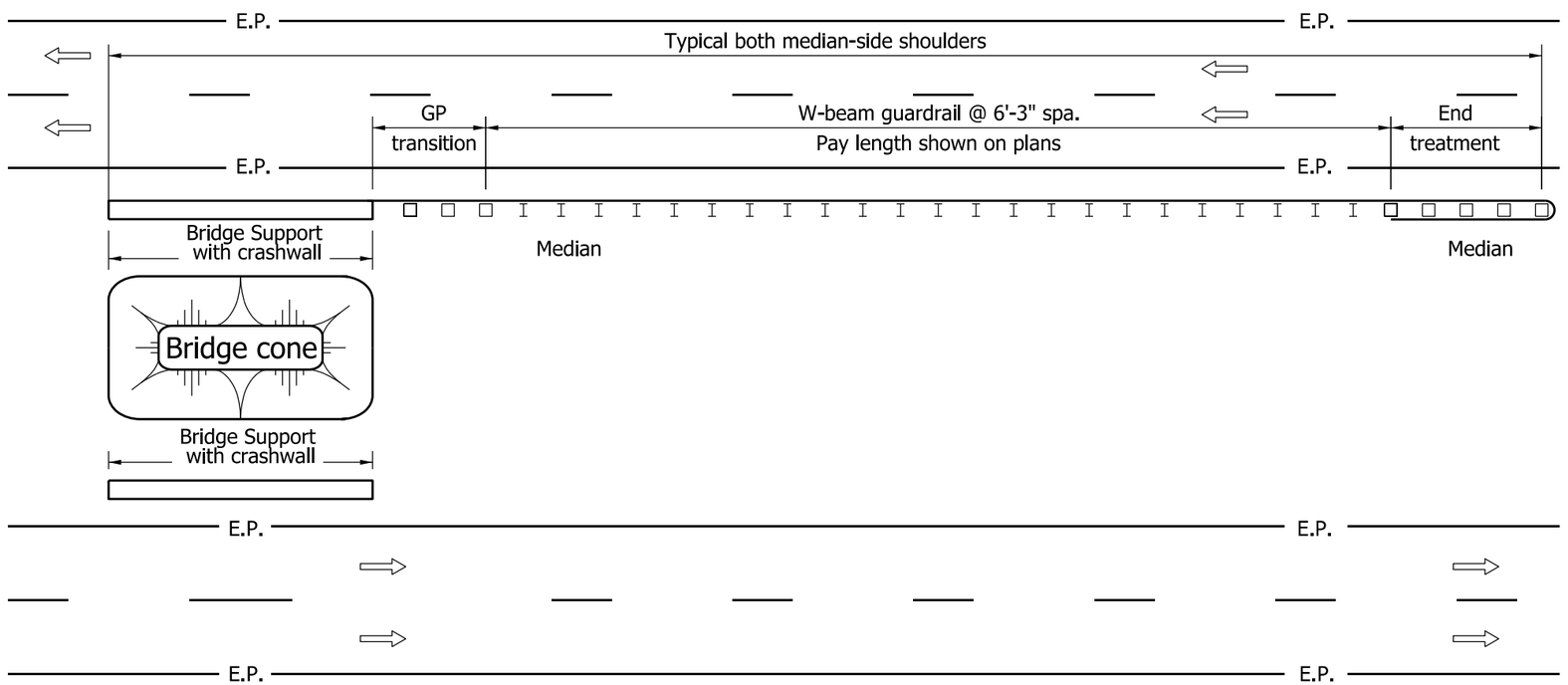
DESIGN STANDARDS ENGINEER

/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 TANDEM OVERHEAD STRUCTURES AND MEDIAN-SIDE BRIDGE-SUPPORT DISTANCE TO E.P. > 16'



DIVIDED ROADWAY WITH TANDEM OVERHEAD STRUCTURES AND MEDIAN-SIDE BRIDGE-SUPPORT DISTANCE TO E.P. ≤ 16'

NOTES:

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

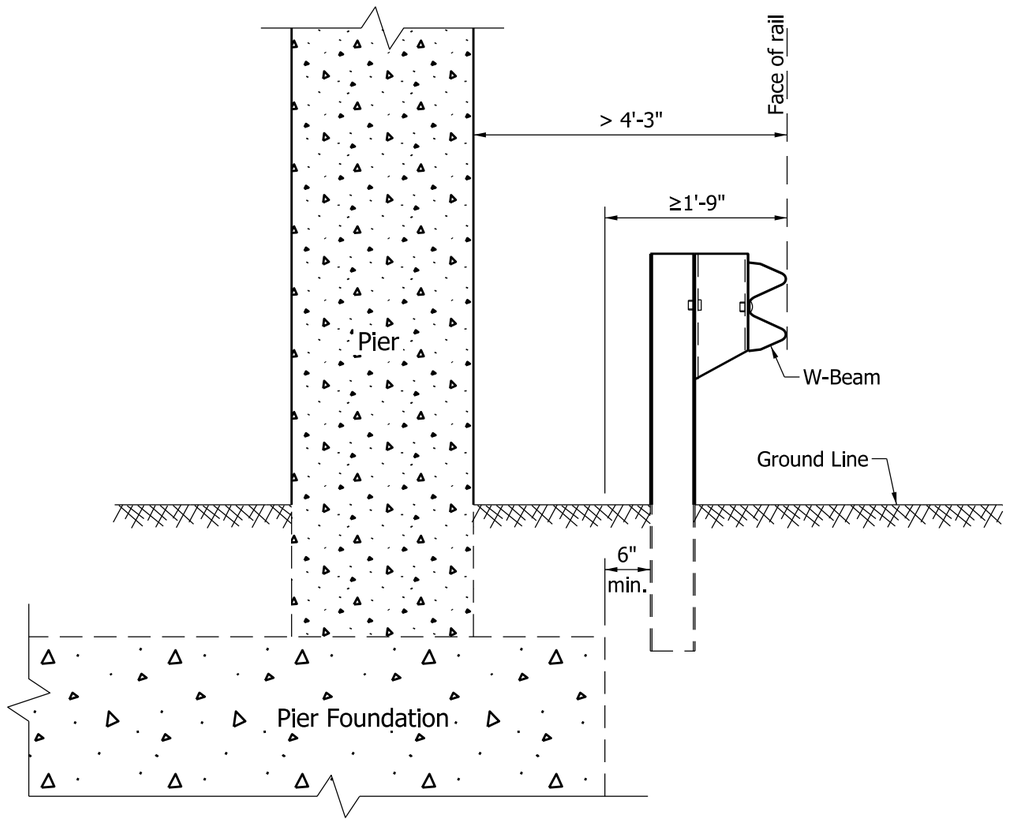
STANDARD DRAWING NO. E 601-GRBS-07

RICHARD L. VanCLEAVE
REGISTERED
No. 9750
STATE OF INDIANA
PROFESSIONAL ENGINEER

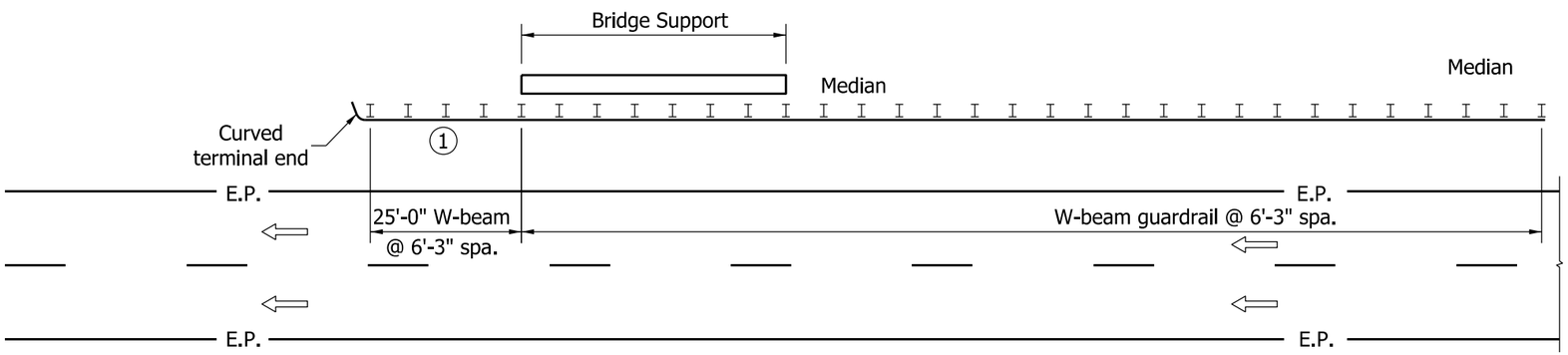
DESIGN STANDARDS ENGINEER

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

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



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

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

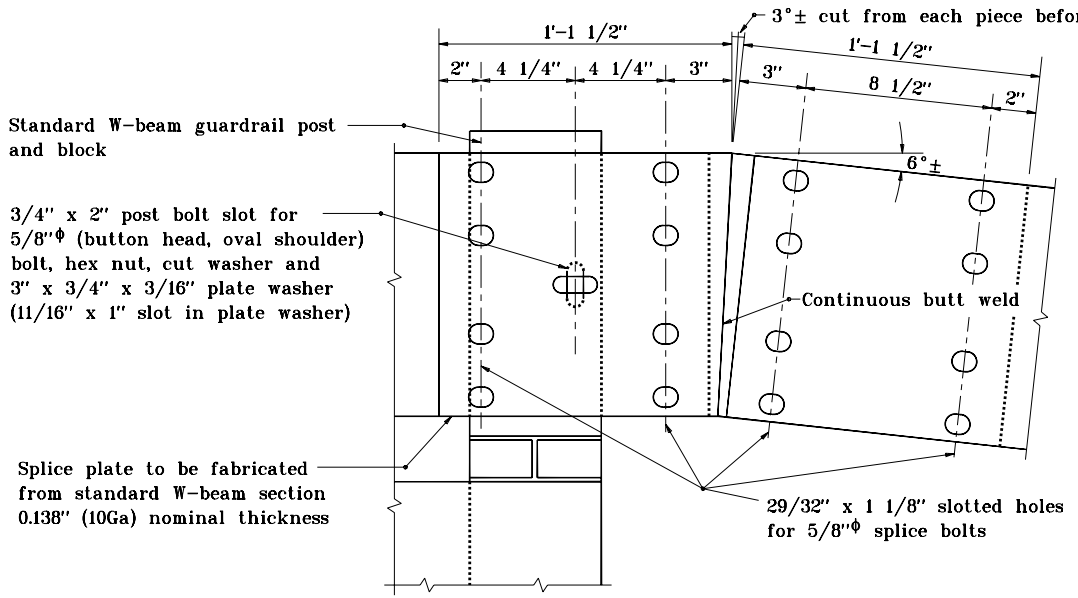
DESIGN STANDARDS ENGINEER

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

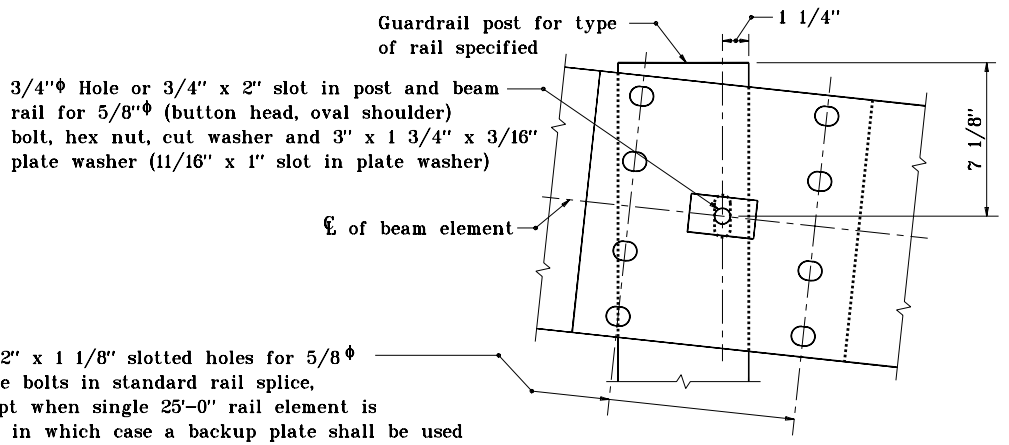
DESIGN STANDARDS ENGINEER DATE

/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**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

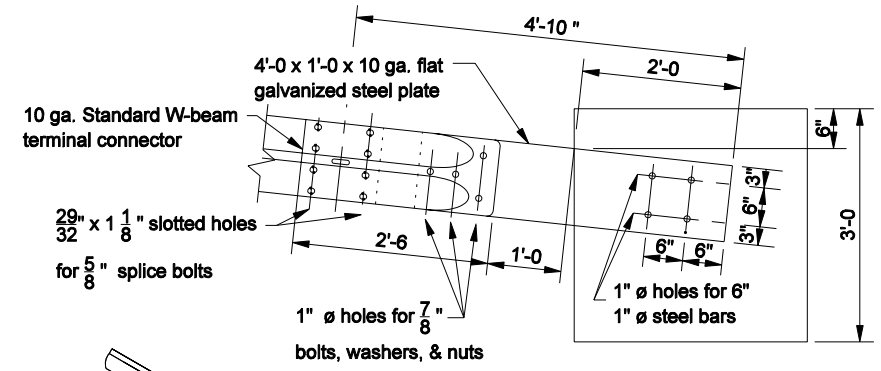
DESIGN STANDARDS ENGINEER

DETAILS PLACED IN THIS FORMAT 11-15-99

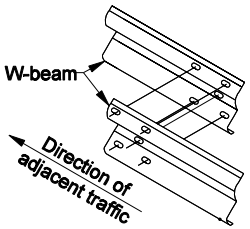
/s/ Anthony L. Uremovich 11-15-99
DESIGN STANDARDS ENGINEER DATE

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

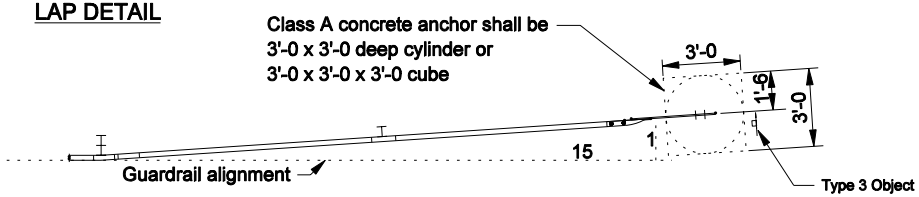
ORIGINALLY APPROVED 4-03-95



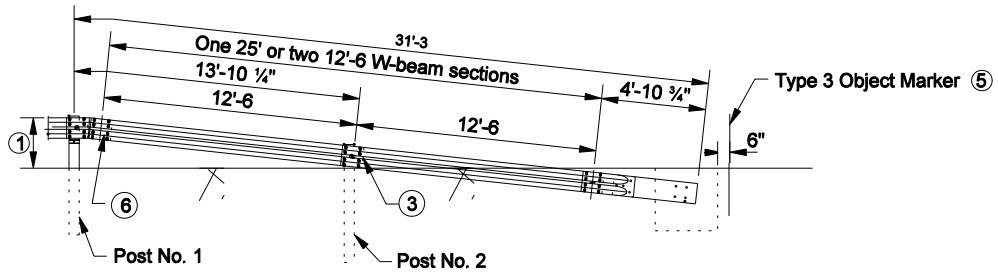
CONCRETE ANCHOR DETAIL



LAP DETAIL



PLAN



Post No. 1 & No. 2 length = 6'-0

ELEVATION

GENERAL NOTES

① The top of rail height at this post shall match the height of the adjacent guardrail.

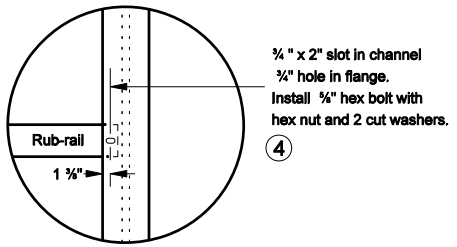
2. Installation of guardrail end treatment type I at the end of a run of rub-rail type guardrail shall require the relocation of the rub-rail as shown.

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

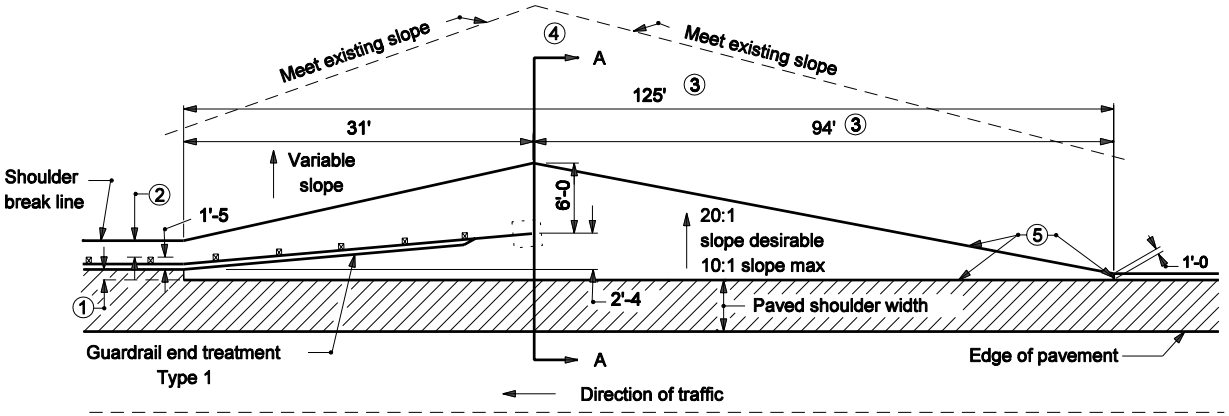
STANDARD DRAWING NO. E 601-GRET-05

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

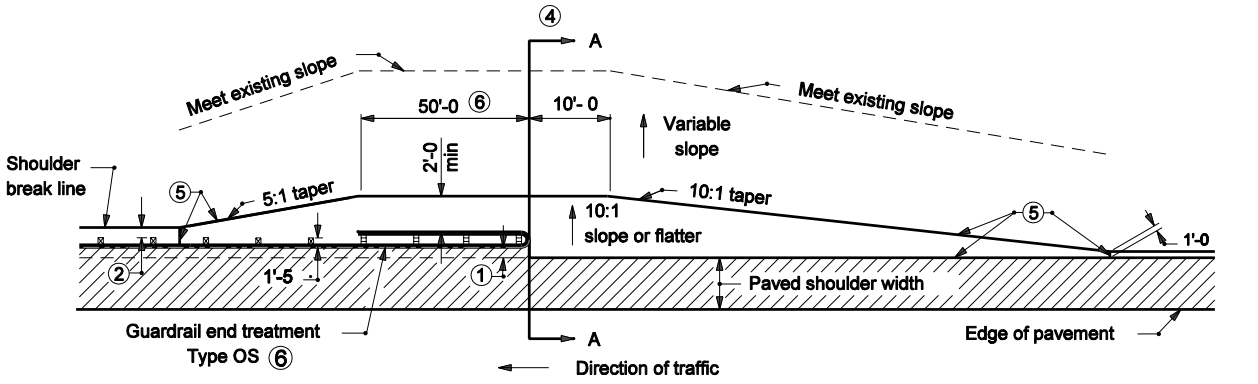
/s/ Richard L. VanCleave 9-01-06
DESIGN STANDARDS ENGINEER DATE

/s/ Richard K. Smutzer 9-01-06
CHIEF HIGHWAY ENGINEER DATE



PLAN VIEW

GRADING DETAIL FOR GUARDRAIL END TREATMENT TYPE I



PLAN VIEW

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

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

/s/ Anthony L.Uremovich 3-01-04
DESIGN STANDARDS ENGINEER DATE

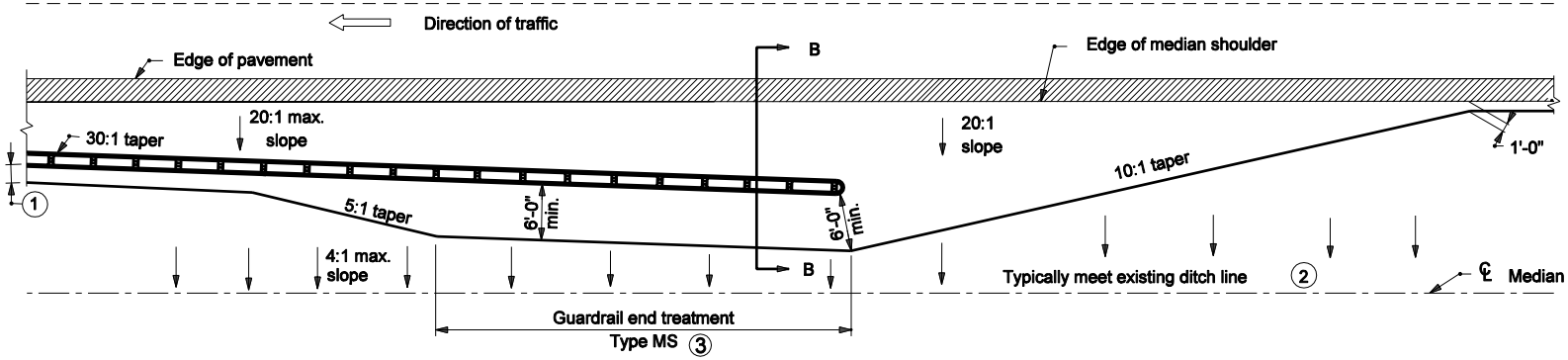
/s/ Richard K.Smutzer 3-01-04
CHIEF HIGHWAY ENGINEER DATE

NOTES:

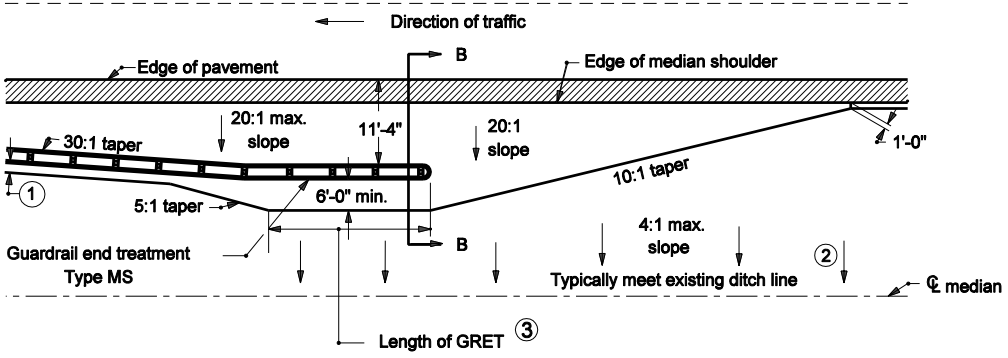
① This distance may vary from 0 to 2'-0" desirable.

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"

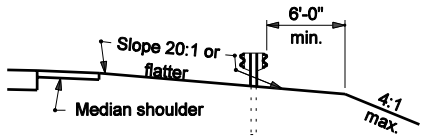


PLAN VIEW - GRADING DETAIL FOR G.R.E.T. TYPE MS ON FLARE



PLAN VIEW

GRADING DETAIL FOR GUARDRAIL END TREATMENT TYPE MS PARALLEL TO SHOULDER



SECTION B-B

INDIANA DEPARTMENT OF TRANSPORTATION

GRADING AT GUARDRAIL END TREATMENT

MARCH 2005

STANDARD DRAWING NO. E 601-GRET-07

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

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

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

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.

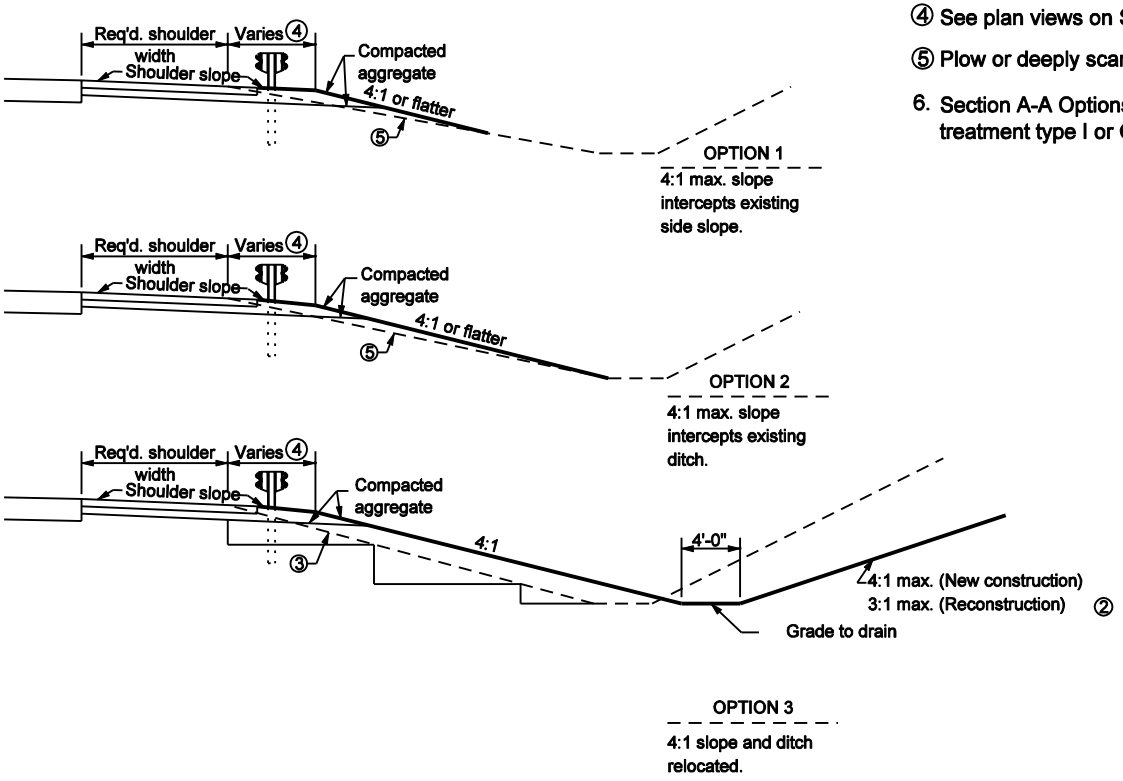
③ Benching required for existing slopes steeper than 4:1.

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.

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



GRADING CROSS SECTIONS AT SECTION A-A

INDIANA DEPARTMENT OF TRANSPORTATION

GRADING AT GUARDRAIL END TREATMENT

SEPTMBER 2002

STANDARD DRAWING NO. E 601-GRET-08

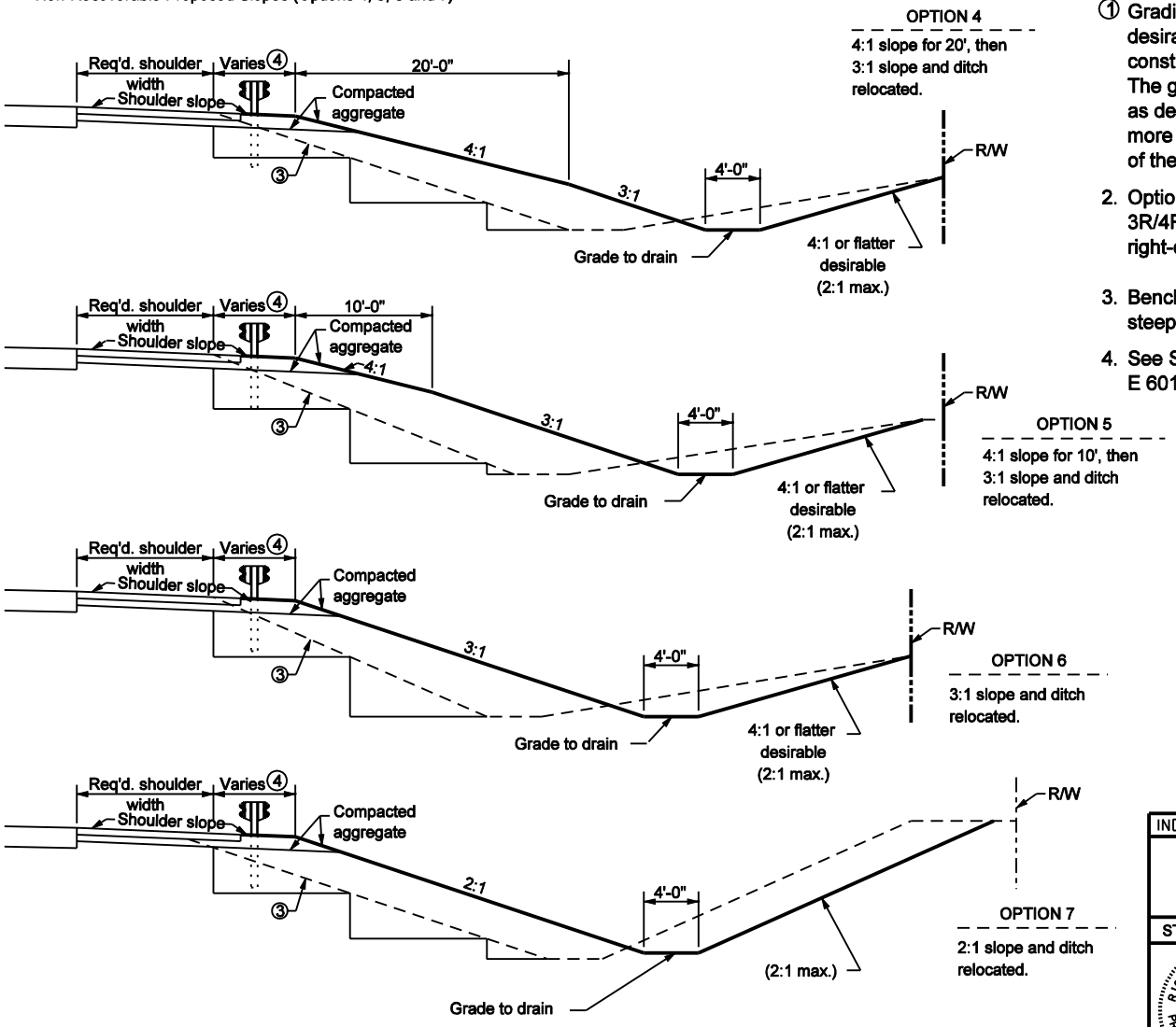
RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

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

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

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 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

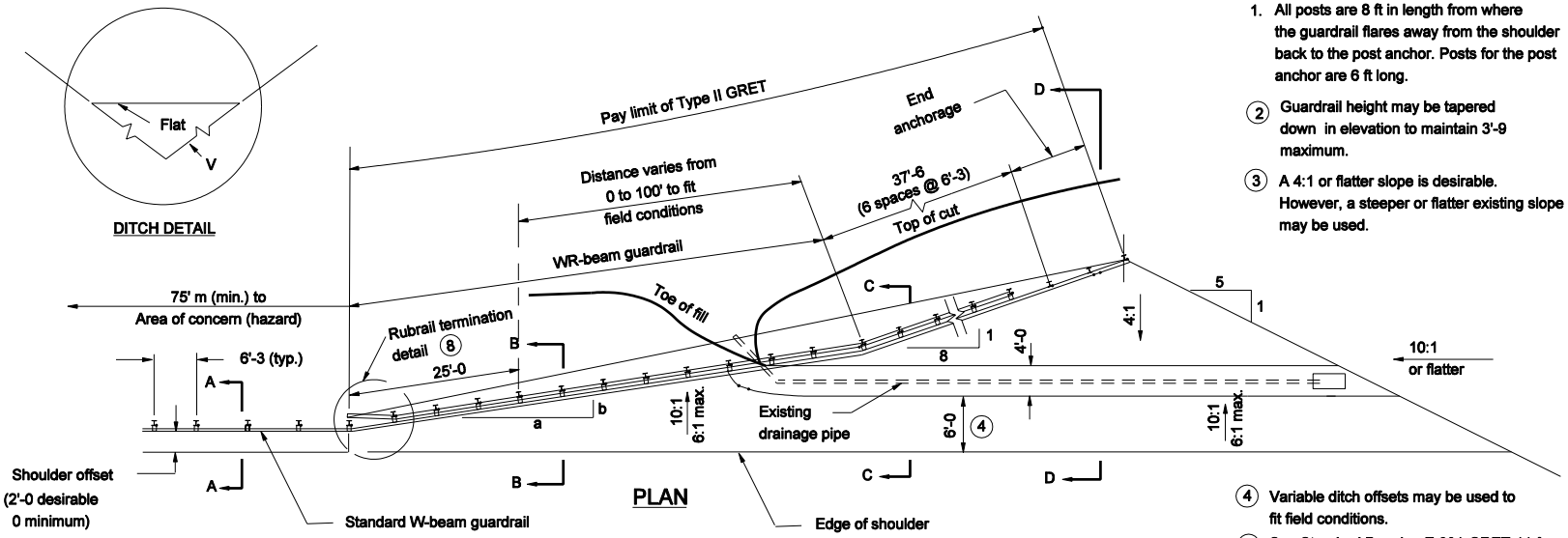
RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

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

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

DITCH DETAIL



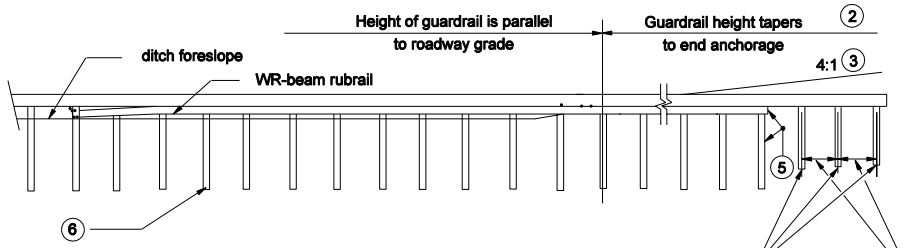
PLAN

NOTES:

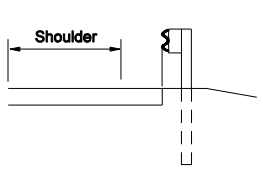
1. All posts are 8 ft in length from where the guardrail flares away from the shoulder back to the post anchor. Posts for the post anchor are 6 ft long.
2. (2) Guardrail height may be tapered down in elevation to maintain 3'-9 maximum.
3. (3) A 4:1 or flatter slope is desirable. However, a steeper or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

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

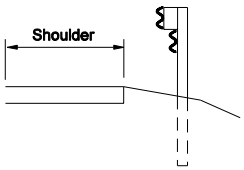
a:b RATIO



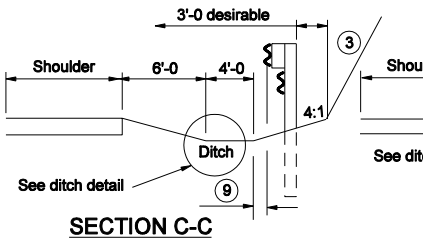
ELEVATION



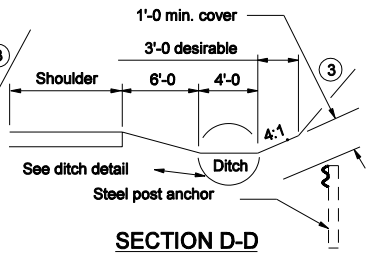
SECTION A-A



SECTION B-B
(WITH RUBRAIL)



SECTION C-C
(WITH RUBRAIL)



SECTION D-D

INDIANA DEPARTMENT OF TRANSPORTATION

GUARDRAIL END TREATMENT TYPE II

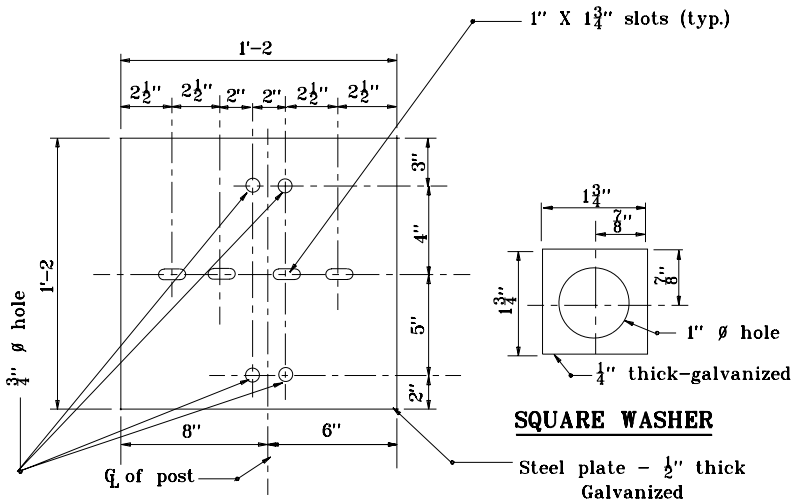
SEPTEMBER 2004

STANDARD DRAWING NO. E 601-GRET-10

REGISTERED RICHARD L. VanCLEAVE No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER
DESIGN STANDARDS ENGINEER

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

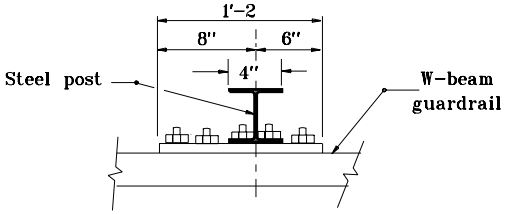
/s/ Richard K. Smutzer 9-01-04
CHIEF HIGHWAY ENGINEER DATE



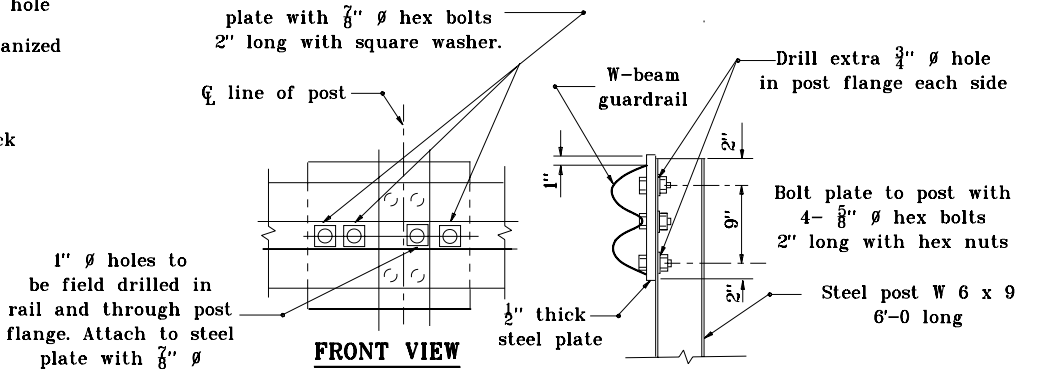
SQUARE WASHER

STEEL PLATE DETAIL

STEEL PLATE AND WASHER DETAILS



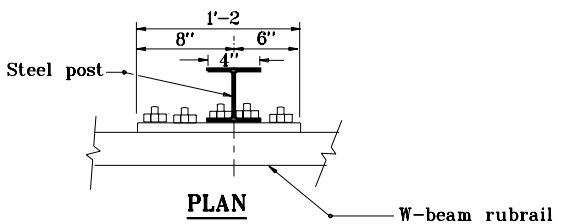
PLAN



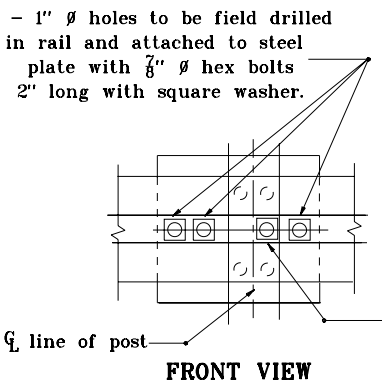
FRONT VIEW

ELEVATION

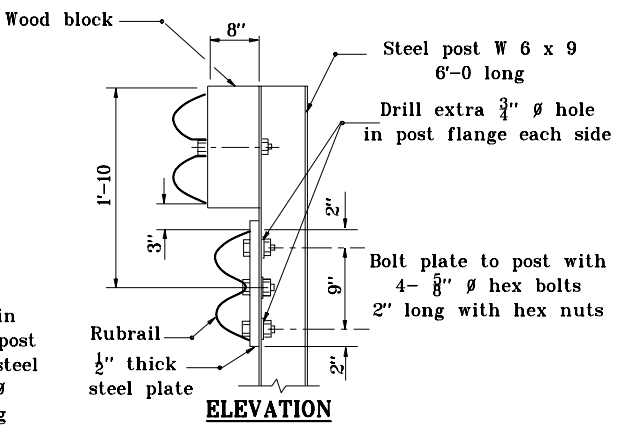
POST ANCHOR DETAILS



PLAN



FRONT VIEW



ELEVATION

RUBRAIL ANCHOR DETAILS

INDIANA DEPARTMENT OF TRANSPORTATION

GUARDRAIL END TREATMENT TPPE II–COMPONENTS

SEPTEMBER 2000

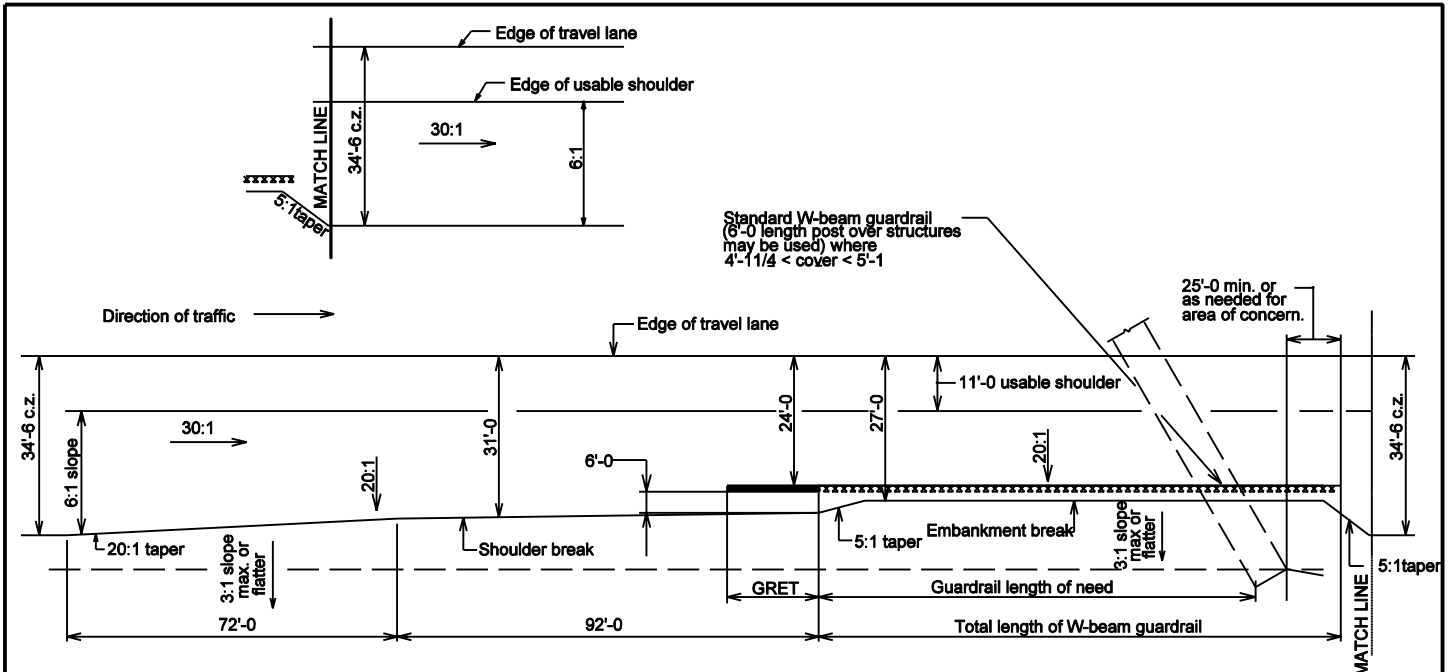
STANDARD DRAWING NO. **E 601–GRET–11**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

/s/ Anthony L. Uremovich 9–01–00
DESIGN STANDARDS ENGINEER — DATE

/s/ Firooz Zandi 9–01–00
CHIEF HIGHWAY ENGINEER — DATE



PLAN

NOTES:

1. 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.
2. Grading shown above is applicable for 25'-0 span nested guardrail also.
3. 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

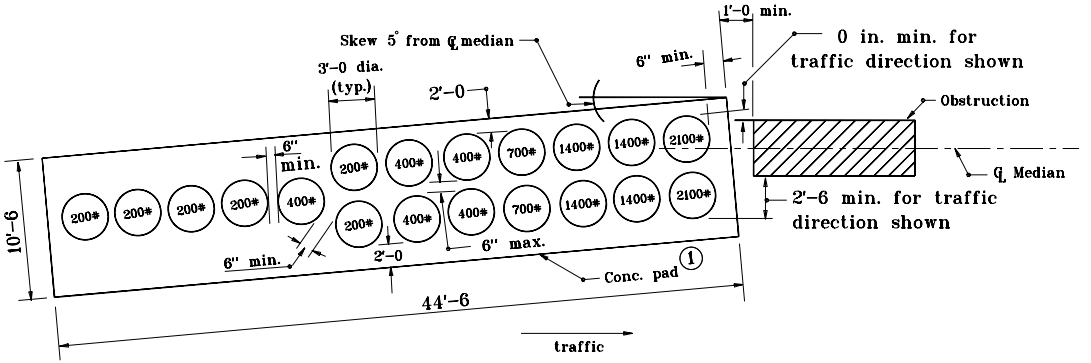
STANDARD DRAWING NO. E 601-GRET-12

RICHARD L. VANCLEAVE REGISTERED NO. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

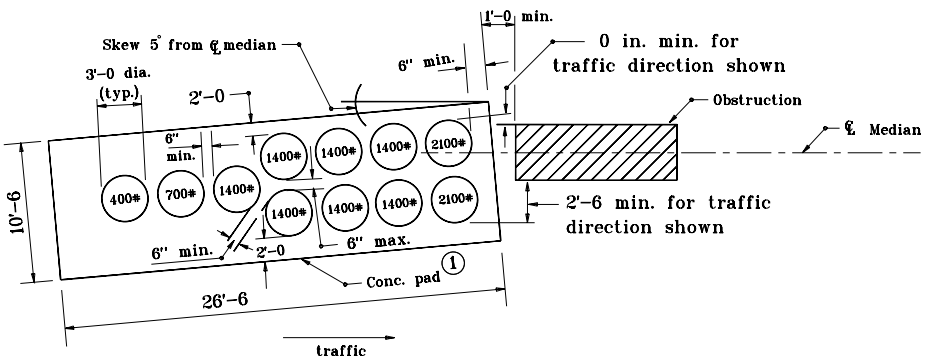
DESIGN STANDARDS ENGINEER

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

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



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

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.
2. Appropriate impact attenuator Test Level shall be used to determine the concrete pad size and gravel barrel layout.
3. See Standard Drawings E 601-GAIA-01, 01A and 02 for grading details.
4. The details shown are for an impact attenuator type ED, gravel barrel array with a maximum obstruction width of 3'-0.

INDIANA DEPARTMENT OF TRANSPORTATION

IMPACT ATTENUATOR ED LAYOUT

MARCH 2002

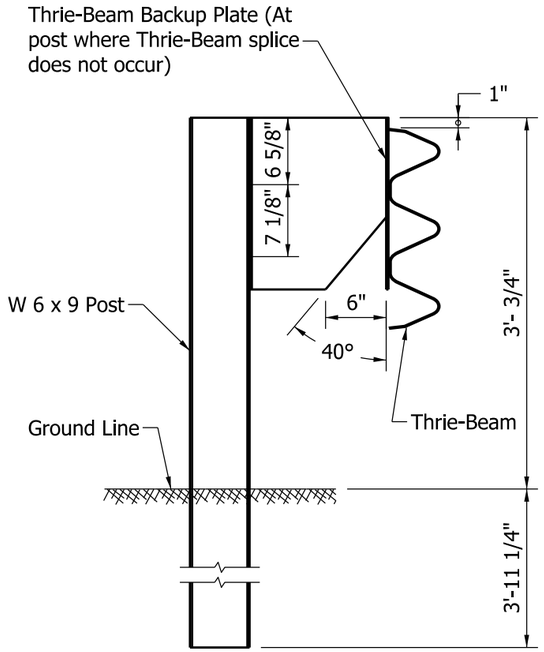
STANDARD DRAWING NO. **E 601-IAED-01**

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

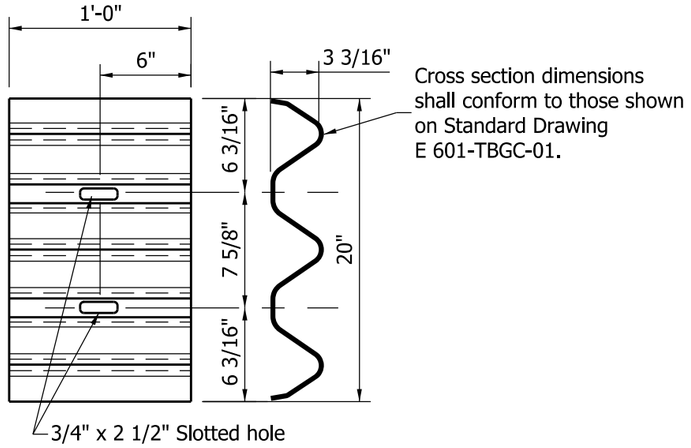
DESIGN STANDARDS ENGINEER

/s/ Richard L. VanCleave 3-01-02
DESIGN STANDARDS ENGINEER — DATE

/s/ Richard K. Smutzer 3-01-02
CHIEF HIGHWAY ENGINEER — DATE



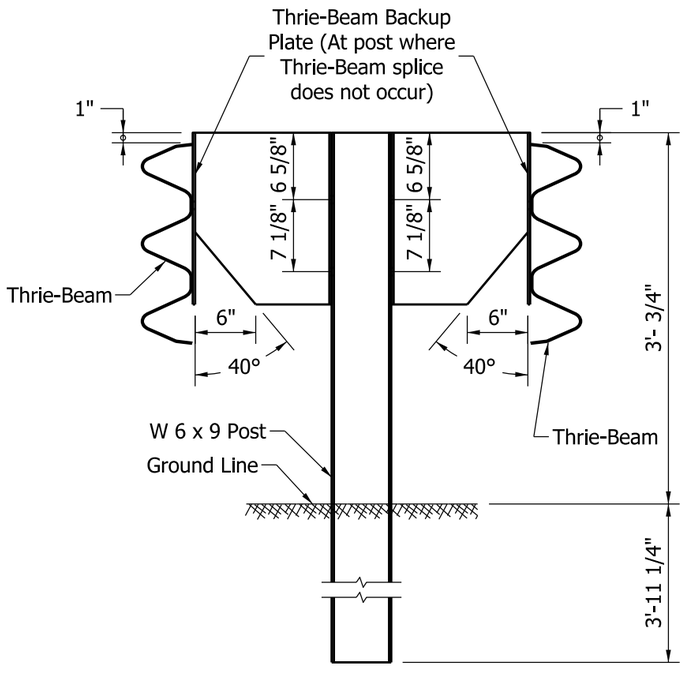
THRIE BEAM GUARDRAIL



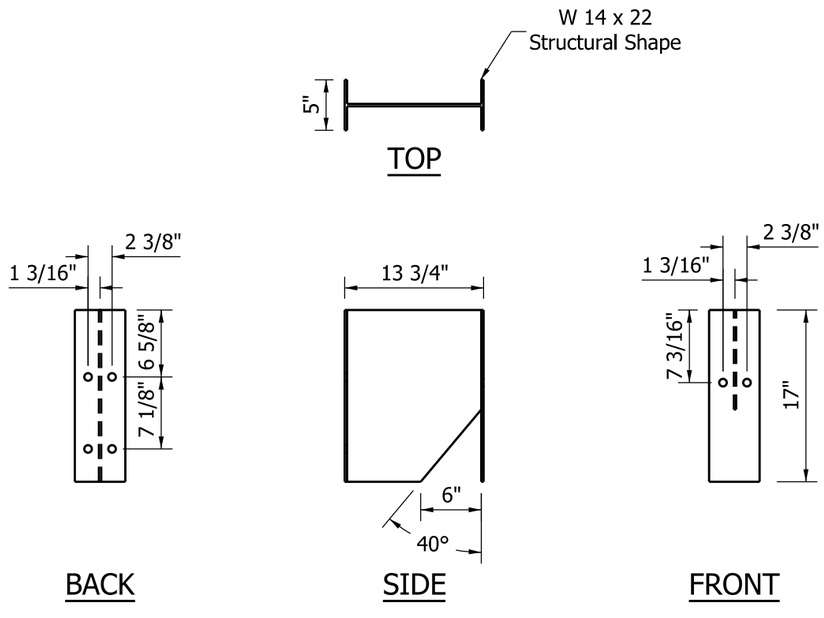
THRIE BEAM GUARDRAIL BACK-UP PLATE AT LOCATIONS WITHOUT SPLICE

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

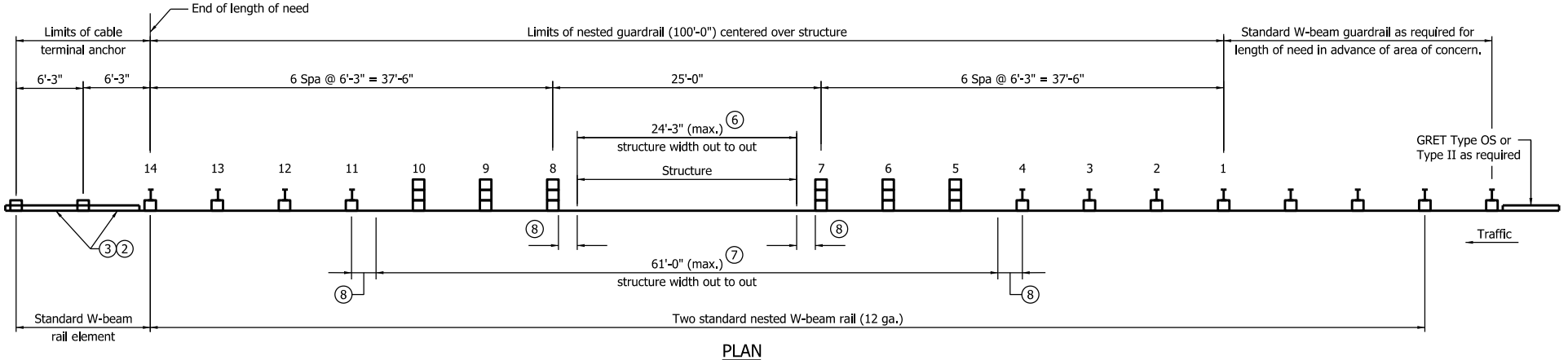
STANDARD DRAWING NO. E 601-MTGR-01

RICHARD L. VanCLEAVE
REGISTERED
No. 9750
STATE OF INDIANA
PROFESSIONAL ENGINEER

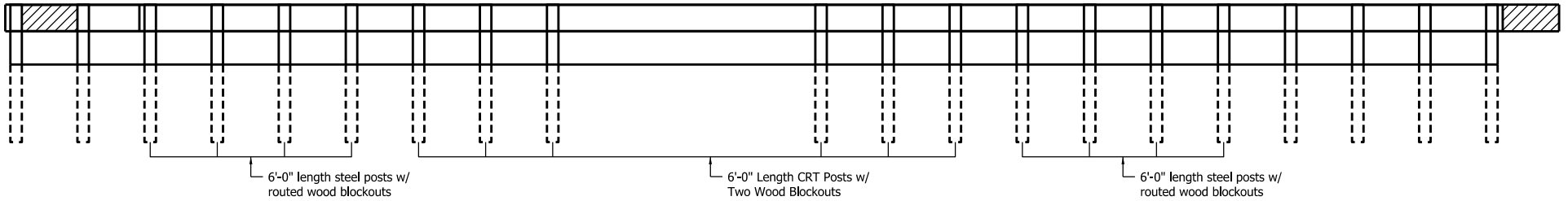
DESIGN STANDARDS ENGINEER

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

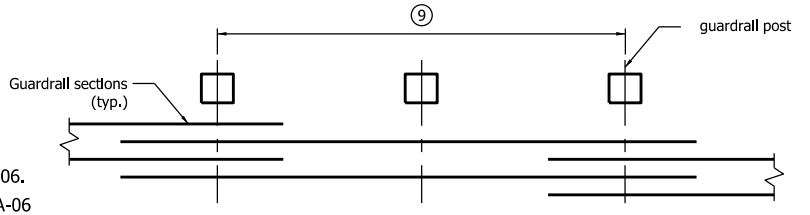
/s/ Mark A. Miller 09/01/11
CHIEF HIGHWAY ENGINEER DATE



PLAN



ELEVATION



LAP DETAIL FOR NESTED W-BEAM RAILING SECTION

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.

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

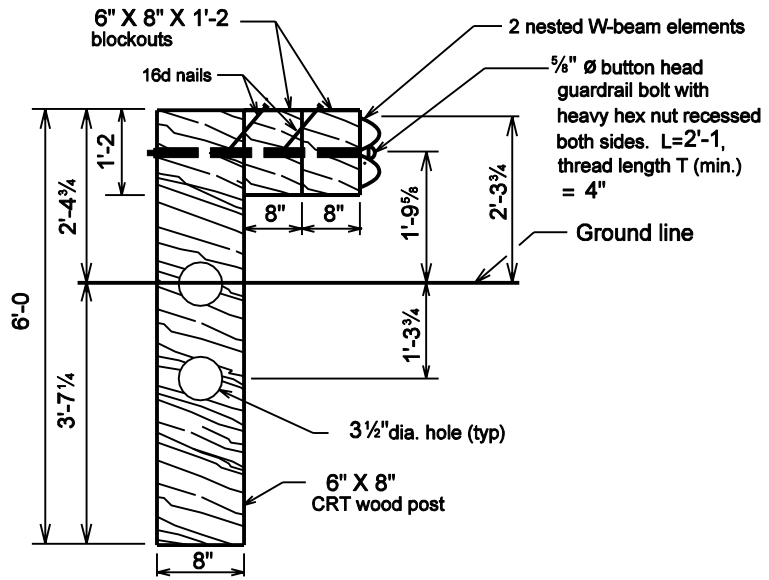
STANDARD DRAWING NO. E 601-NWGA-01

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

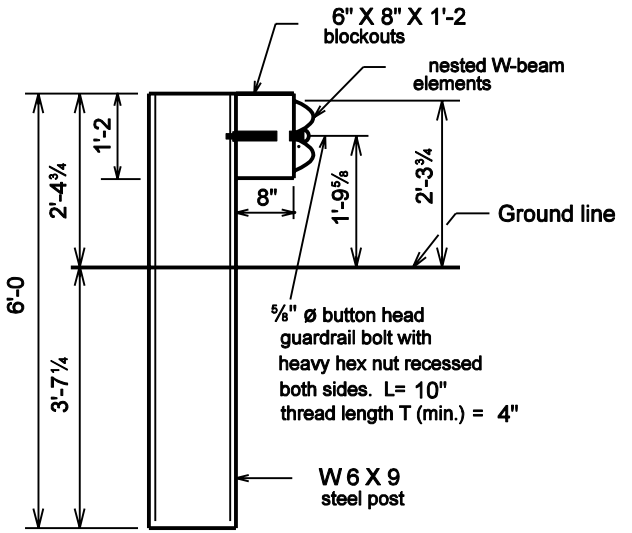
/s/ Richard L. VanCleave 09/01/10
DESIGN STANDARDS ENGINEER DATE

/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

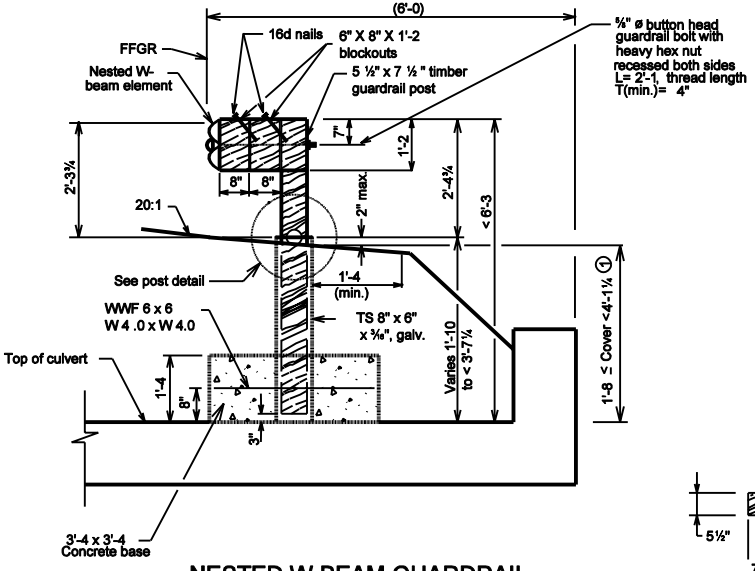
STANDARD DRAWING NO. E 601-NWGA-02

RICHARD L. VANCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

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

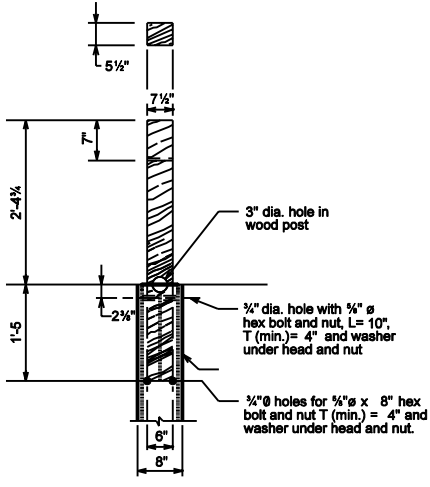
/s/ Firooz Zandi 9-04-01
CHIEF HIGHWAY ENGINEER DATE



NESTED W-BEAM GUARDRAIL ASSY. WITH MODIFIED POSTS OVER STRUCTURE WIDTH (POSTS 5 TO 10)

NOTES:

① Use modified guardrail posts.



POST DETAIL

INDIANA DEPARTMENT OF TRANSPORTATION

GUARDRAIL ASSEMBLY FOR STRUCTURE WIDTH > 24'-3

SEPTEMBER 2001

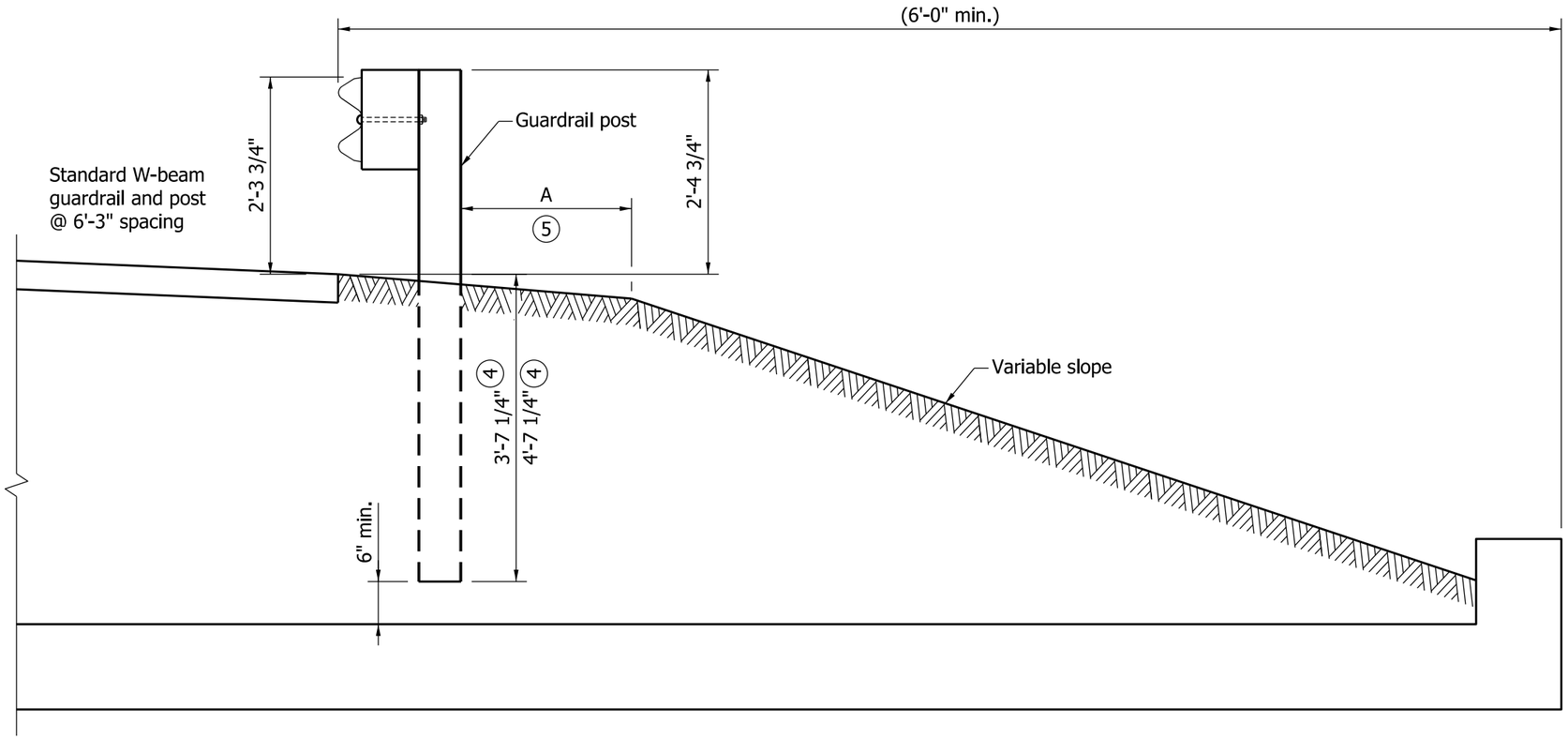
STANDARD DRAWING NO. E 601-NWGA-03

RICHARD L. VANCLEAVE REGISTERED No. 9750 STATE OF Indiana PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

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

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



NOTES:

1. This drawing shall be used for any structure width provided cover over structure ≥ 4'-1 1/4".
2. The 6'-0" length guardrail post shall be used if 4'-1 1/4" ≤ cover ≤ 5'-1 1/4".
3. The 7'-0" long guardrail post shall be used if cover > 5'-1 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.

GUARDRAIL ASSEMBLY FOR COVER ≥ 4'-1 1/4"
FOR ANY STRUCTURE WIDTH

INDIANA DEPARTMENT OF TRANSPORTATION

GUARDRAIL ASSEMBLY FOR
ANY STRUCTURE WIDTH

SEPTEMBER 2011

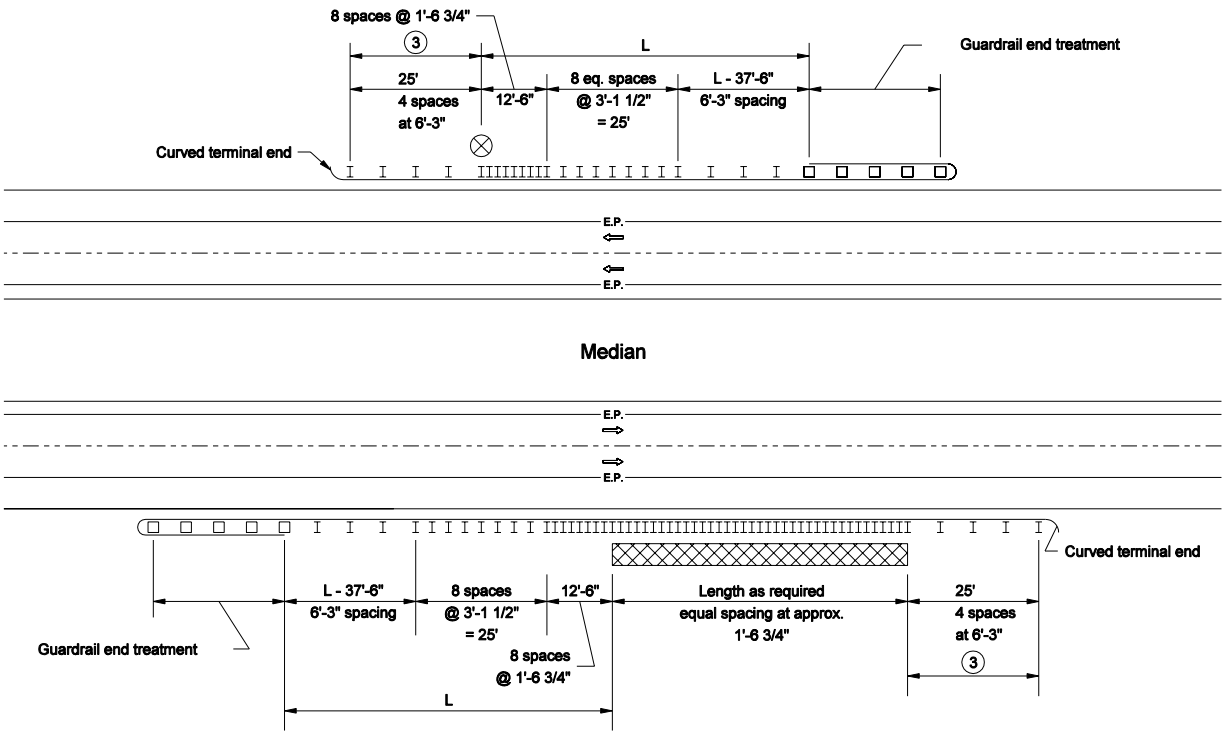
STANDARD DRAWING NO. E 601-NWGA-04

RICHARD L. VanCLEAVE
REGISTERED
No. 9750
STATE OF INDIANA
PROFESSIONAL ENGINEER

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 ≥ 2'-9" BUT < 3'-3"

GENERAL NOTES

1. 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.
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

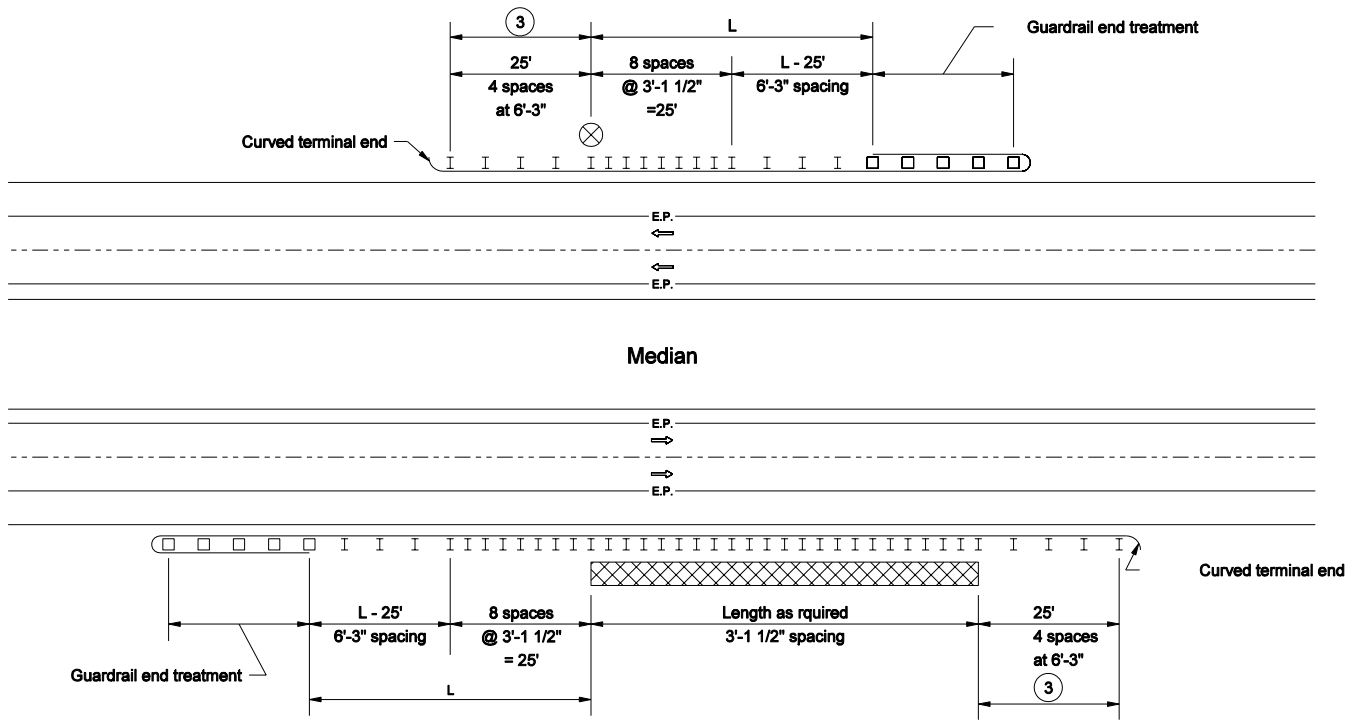
STANDARD DRAWING NO. E 601-RHPG-01

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

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

/s/ Richard K. Smutzer 3-01-05
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 ≥ 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

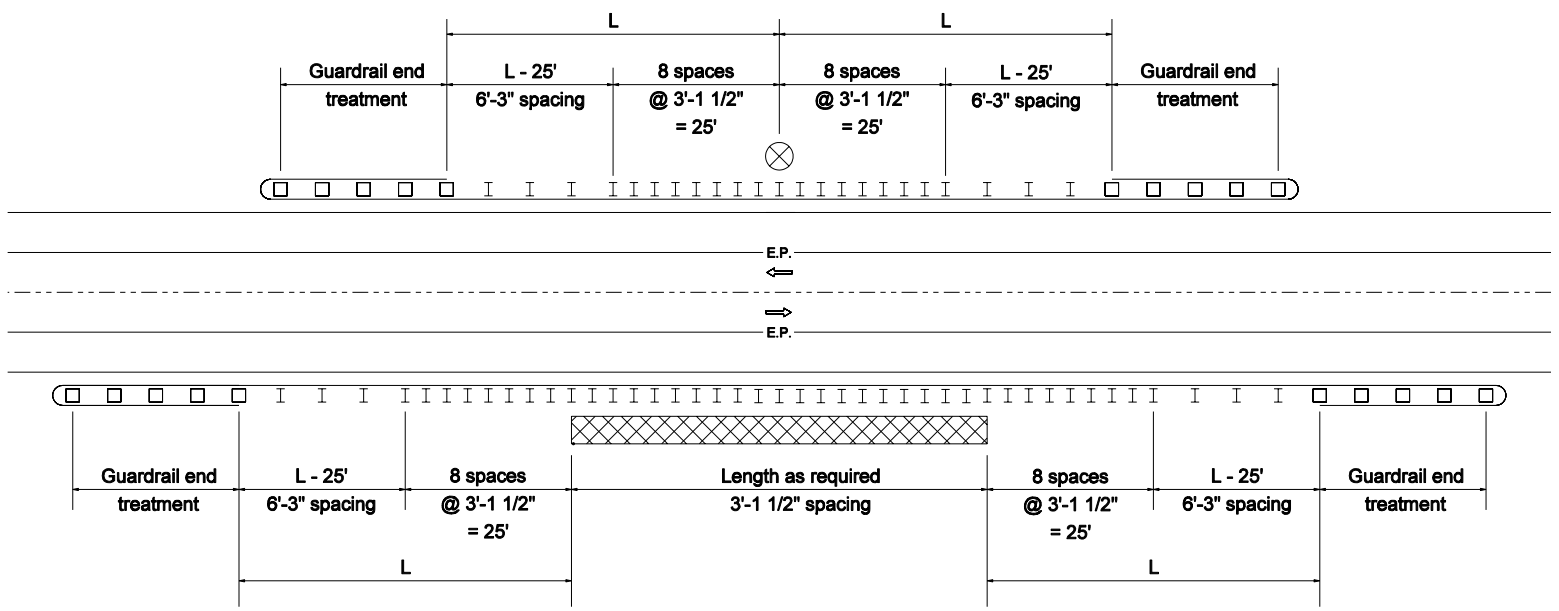
STANDARD DRAWING NO. E 601-RHPG-02

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

/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 ≥ 3'-3" BUT < 4'-3"

LEGEND

L = Length of need

⊗ Isolated obstruction

⊠ Extended obstruction

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.

INDIANA DEPARTMENT OF TRANSPORTATION

ROADSIDE OBSTRUCTION PROTECTION GUARDRAIL

MARCH 2005

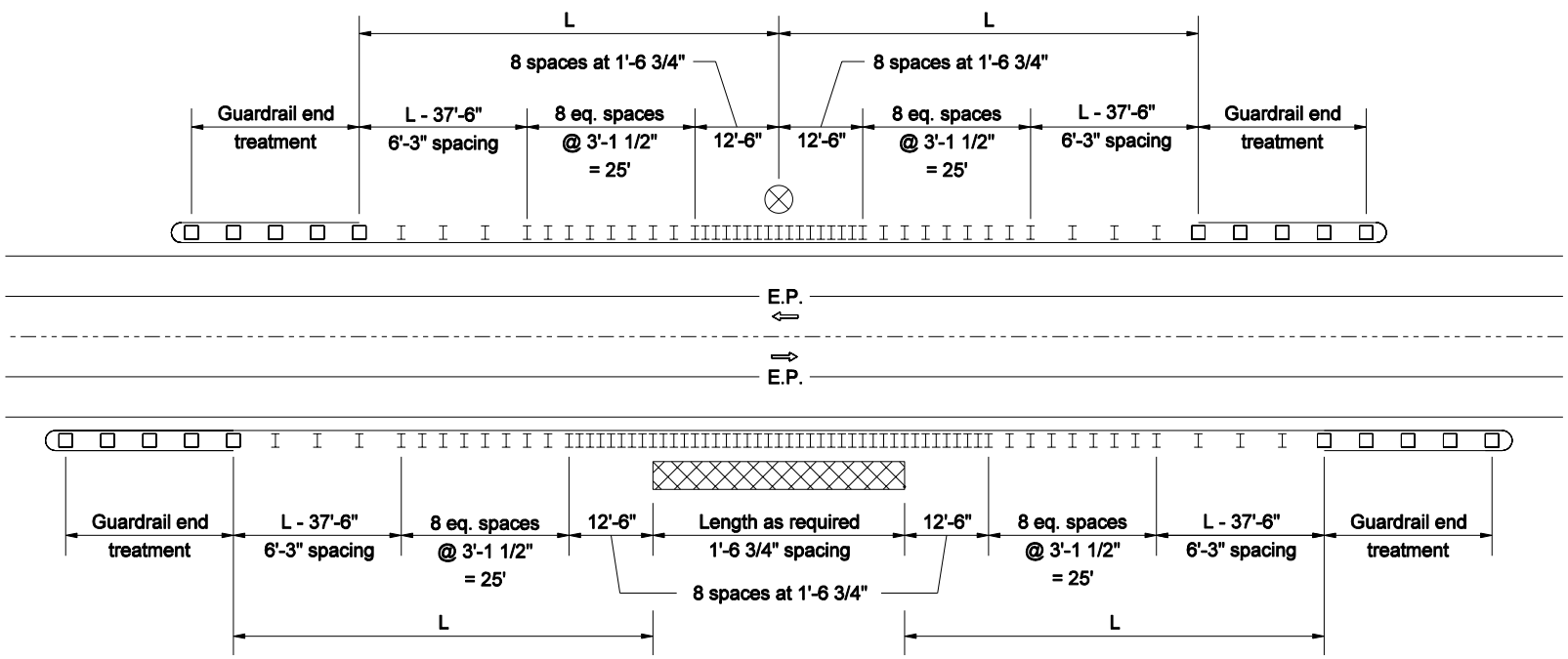
STANDARD DRAWING NO. E 601-RHPG-03

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

/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 ≥ 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

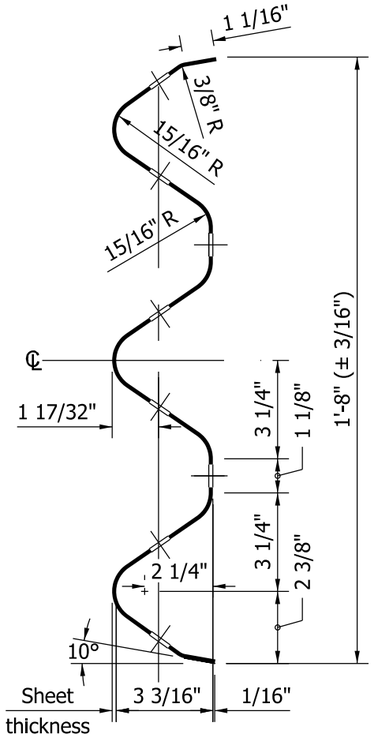
STANDARD DRAWING NO. E 601-RHPG-04

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

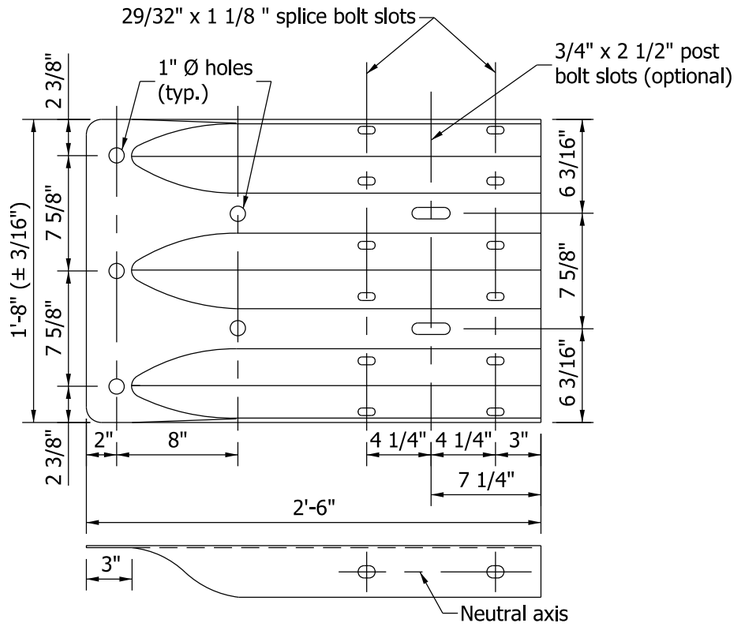
DESIGN STANDARDS ENGINEER

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

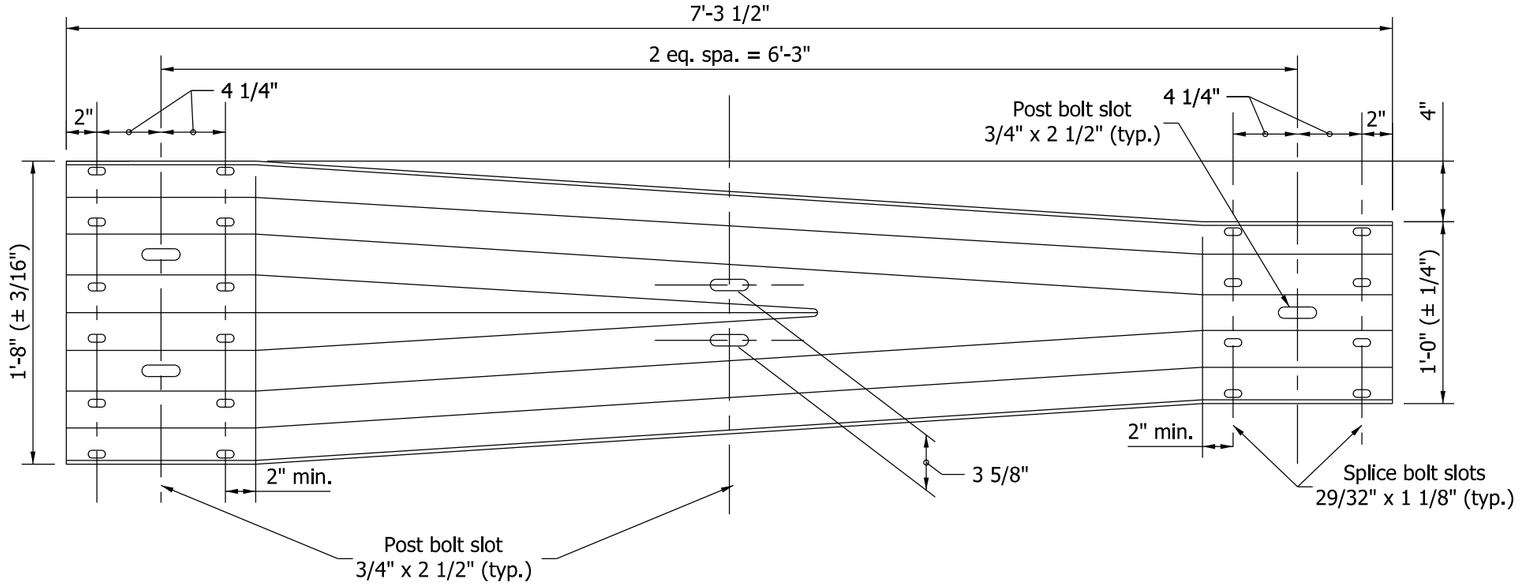
/s/ Richard K. Smutzer 3-01-05
CHIEF HIGHWAY ENGINEER DATE



THRIE BEAM RAIL SECTION



THRIE BEAM
TERMINAL CONNECTOR



W-THRIE BEAM TRANSITION SECTION

INDIANA DEPARTMENT OF TRANSPORTATION

THRIE-BEAM
GUARDRAIL COMPONENTS

SEPTEMBER 2011

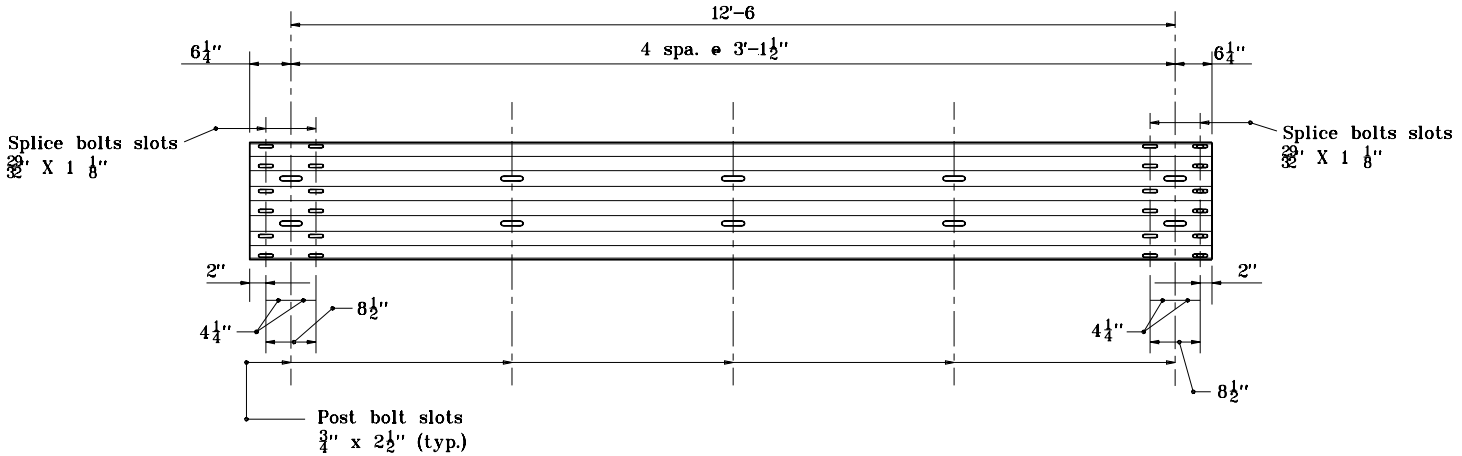
STANDARD DRAWING NO. E 601-TBGC-01

RICHARD L. VanCLEAVE
REGISTERED
No. 9750
STATE OF INDIANA
PROFESSIONAL ENGINEER

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



THRIE BEAM RAIL SECTION

INDIANA DEPARTMENT OF TRANSPORTATION

THRIE-BEAM GUARDRAIL COMPONENTS

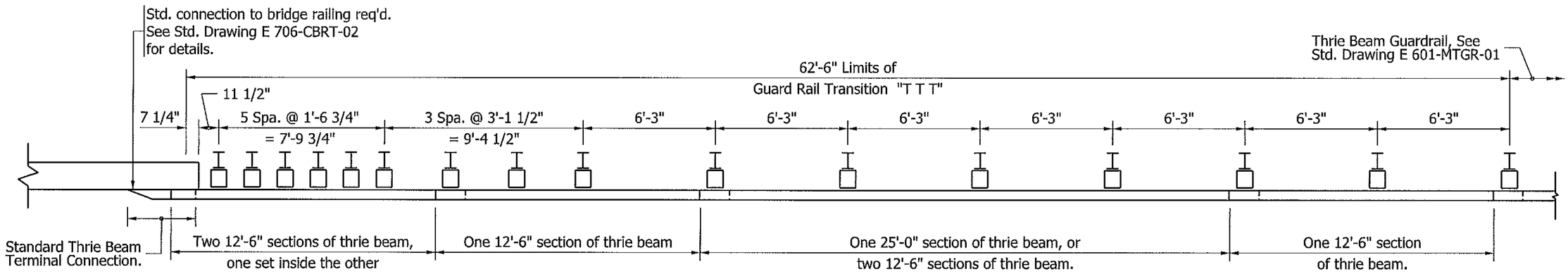
APRIL 1996

STANDARD DRAWING NO. **E 601-TBGC-02**

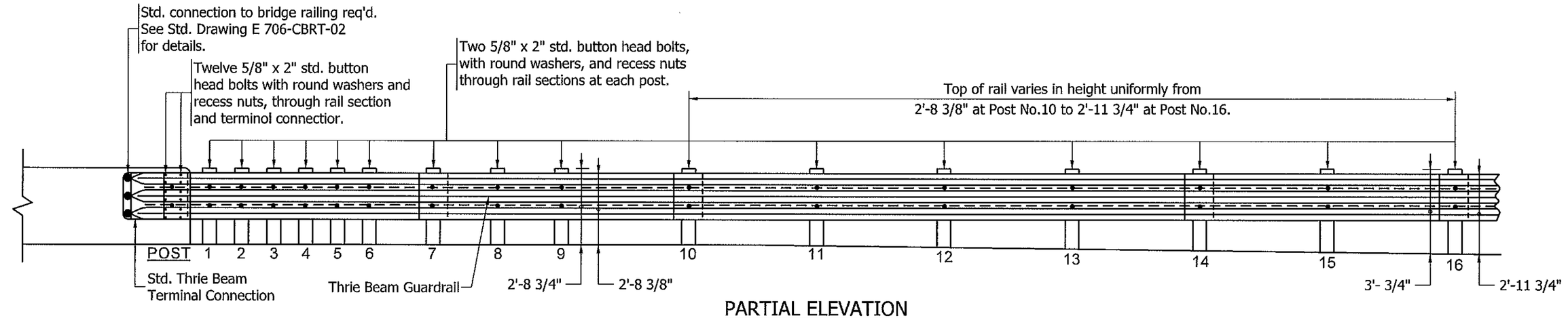
ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

DETAILS PLACED IN THIS FORMAT	11-15-99
/s/ Anthony L. Uremovich DESIGN STANDARDS ENGINEER	11-15-99 DATE
/s/ Firooz Zandi CHIEF HIGHWAY ENGINEER	11-15-99 DATE
ORIGINALLY APPROVED	4-01-96



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
REGISTERED
No. 9750
STATE OF INDIANA
PROFESSIONAL ENGINEER

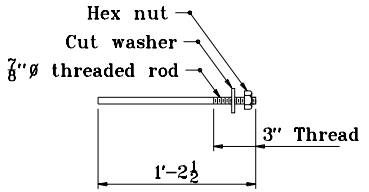
DESIGN STANDARDS ENGINEER

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

9/1/11
CHIEF HIGHWAY ENGINEER DATE

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.



ANCHOR BOLT

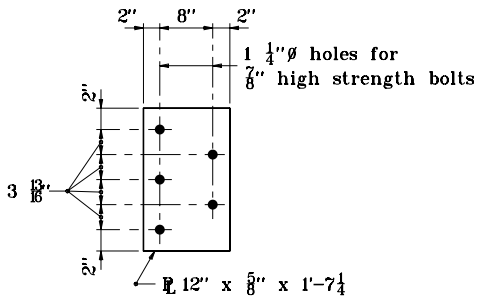
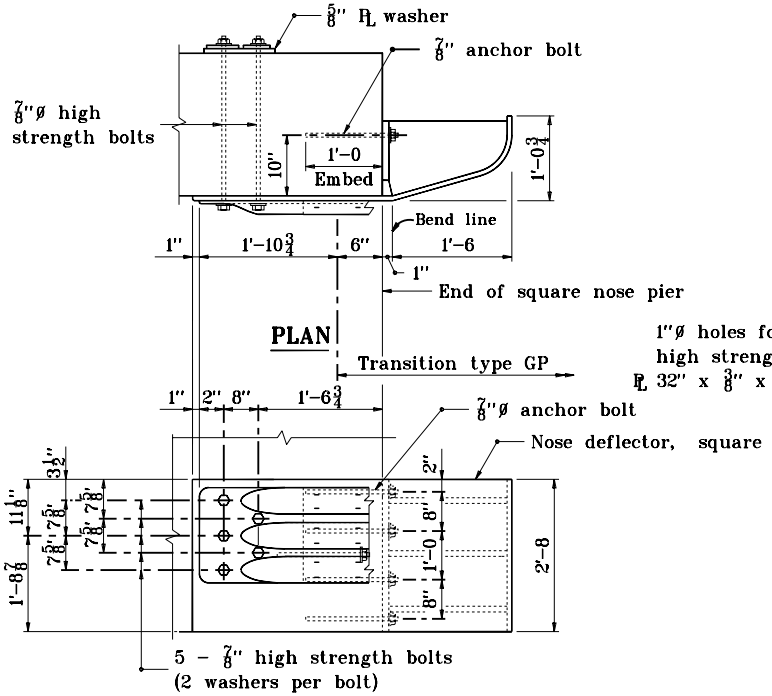
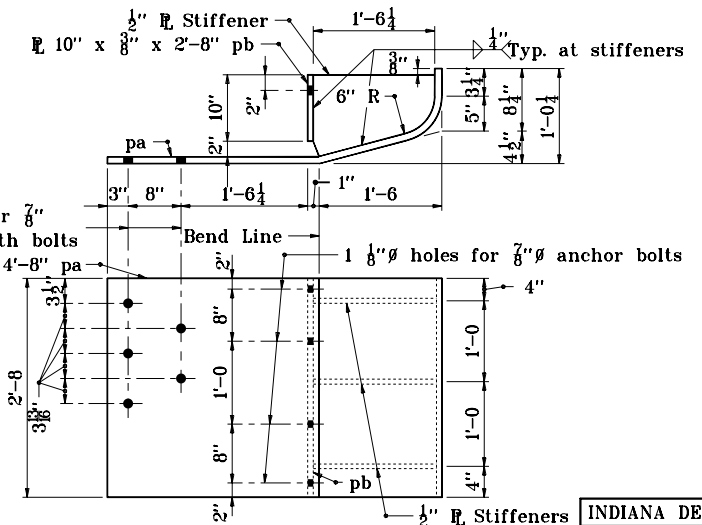


PLATE WASHER



ELEVATION



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**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

DETAILS PLACED IN THIS FORMAT	11-15-99
/s/ Anthony L. Uremovich, DESIGN STANDARDS ENGINEER	11-15-99
/s/ Firooz Zandi, CHIEF HIGHWAY ENGINEER	11-15-99
ORIGINALLY APPROVED	9-01-98

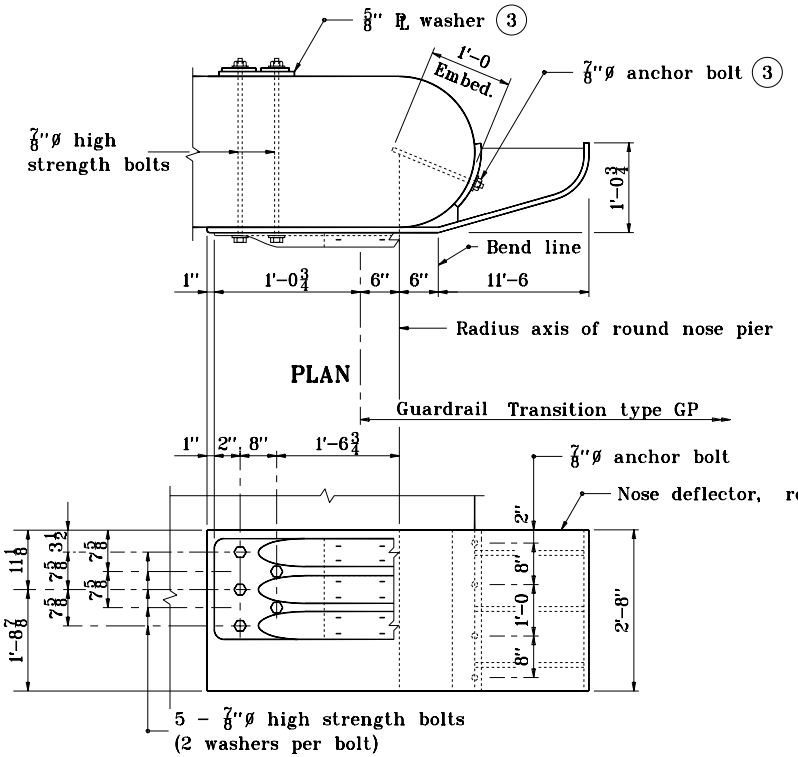
Radius	A	B	C	D
1'-0	$2\frac{3}{4}$	$9\frac{1}{2}$	$11\frac{1}{4}$"	$2\frac{3}{4}$"
1'-$1\frac{1}{2}$	$2\frac{3}{16}$	$10\frac{1}{2}$	$9\frac{13}{16}$"	$4\frac{3}{8}$"
1'-3	$1\frac{3}{4}$	$11\frac{1}{2}$	$8\frac{9}{16}$"	$4\frac{3}{8}$"
1'-$4\frac{1}{2}$	$1\frac{1}{2}$	$12\frac{1}{2}$	$7\frac{3}{16}$"	$7\frac{3}{8}$"
1'-6	$1\frac{1}{4}$	$13\frac{1}{2}$	$6\frac{1}{4}$"	$8\frac{3}{4}$"

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.

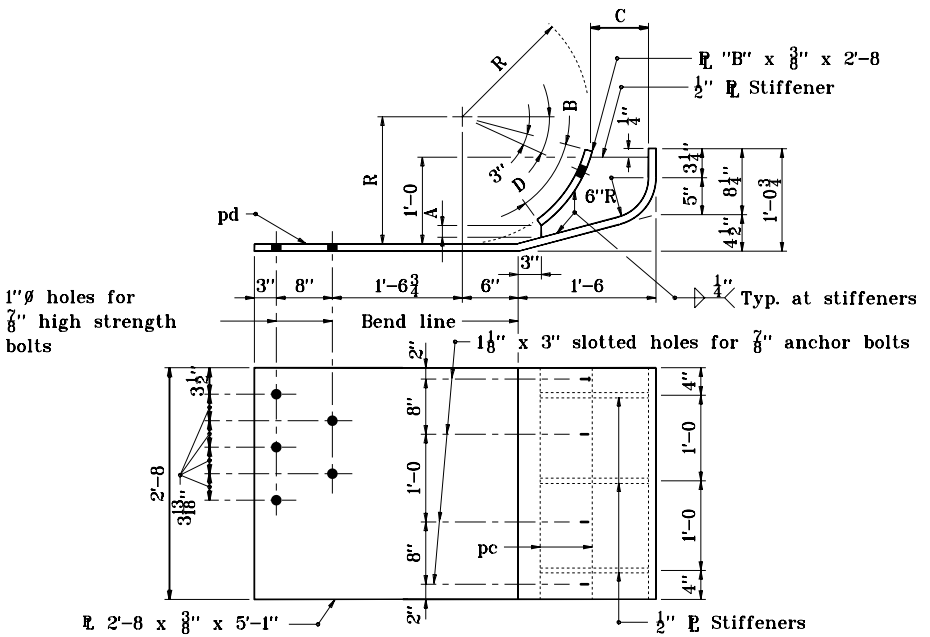
2. The details on this drawing are for the assembly and installation of the deflector components for connecting guardrail transition type GP to a pier or frame bent collision wall.

(3) See Standard Drawing E 601-TPGP-01 for anchor bolt and plate washer details.



ELEVATION

ATTACHMENT AT ROUND NOSE PIER



DETAIL OF NOSE DEFLECTOR - ROUND

INDIANA DEPARTMENT OF TRANSPORTATION

TRANSITION AT PIER TYPE GP

SEPTEMBER 1998

STANDARD DRAWING NO. E 601-TPGP-02

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

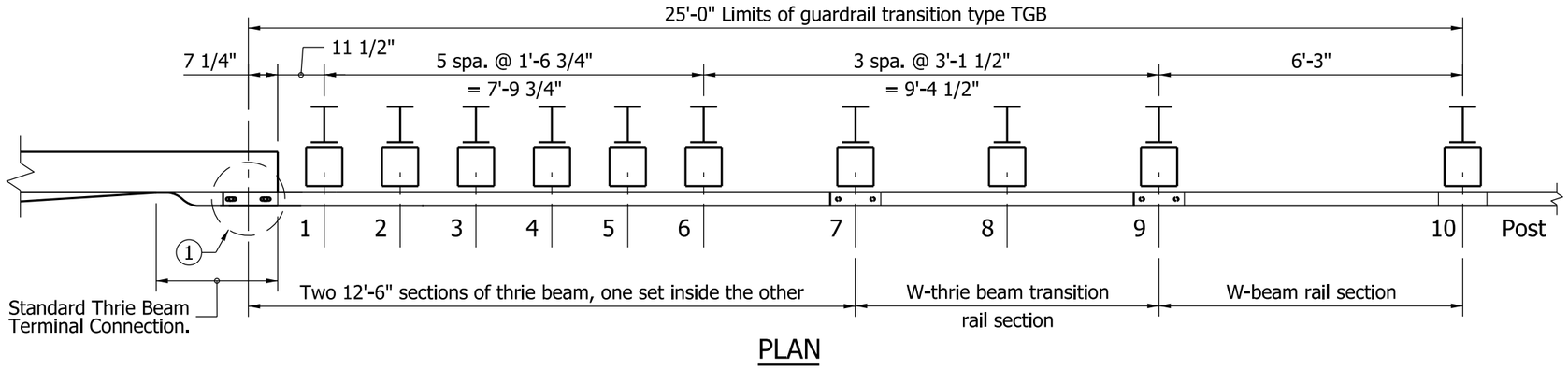
DESIGN STANDARDS ENGINEER

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

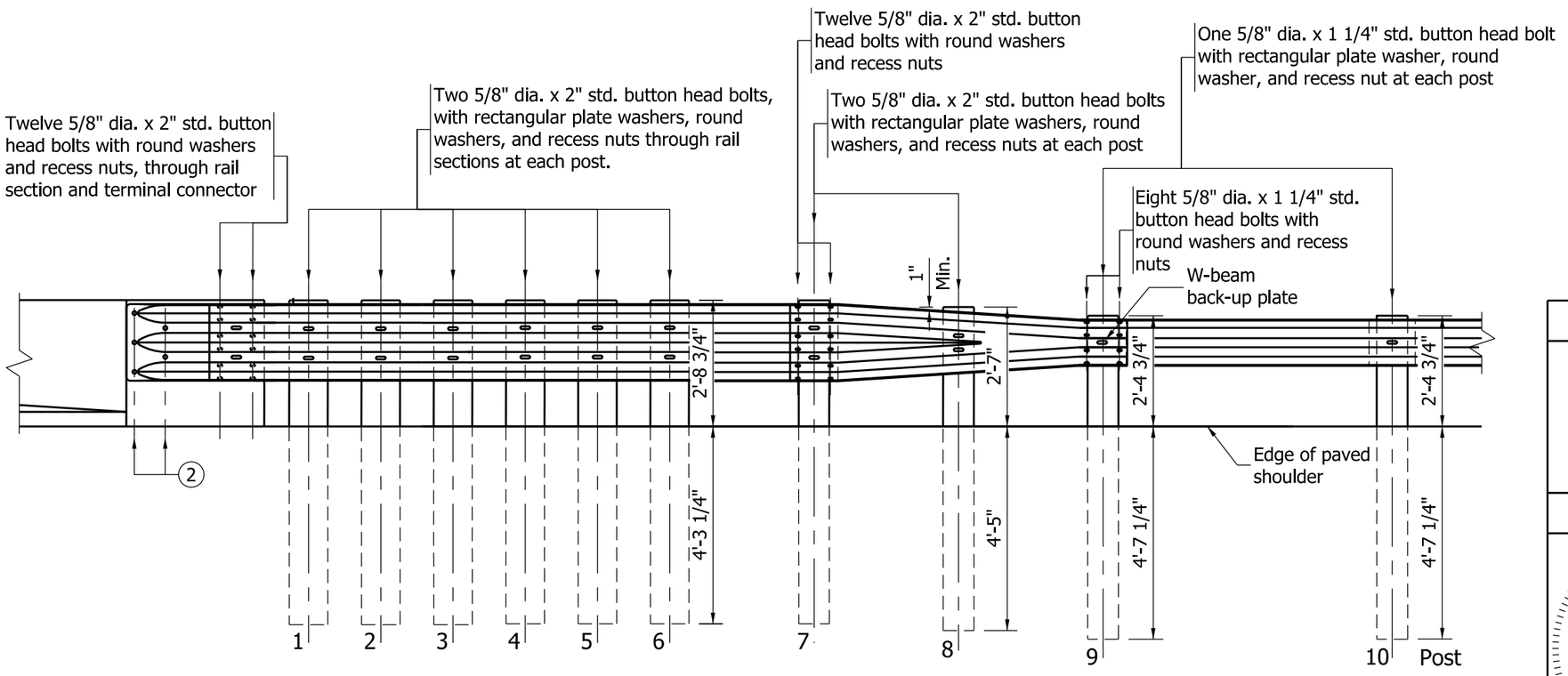
ORIGINALLY APPROVED 9-01-98



PLAN

NOTES:

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



ELEVATION

INDIANA DEPARTMENT OF TRANSPORTATION

GUARDRAIL TRANSITION
TYPE TGB

SEPTEMBER 2011

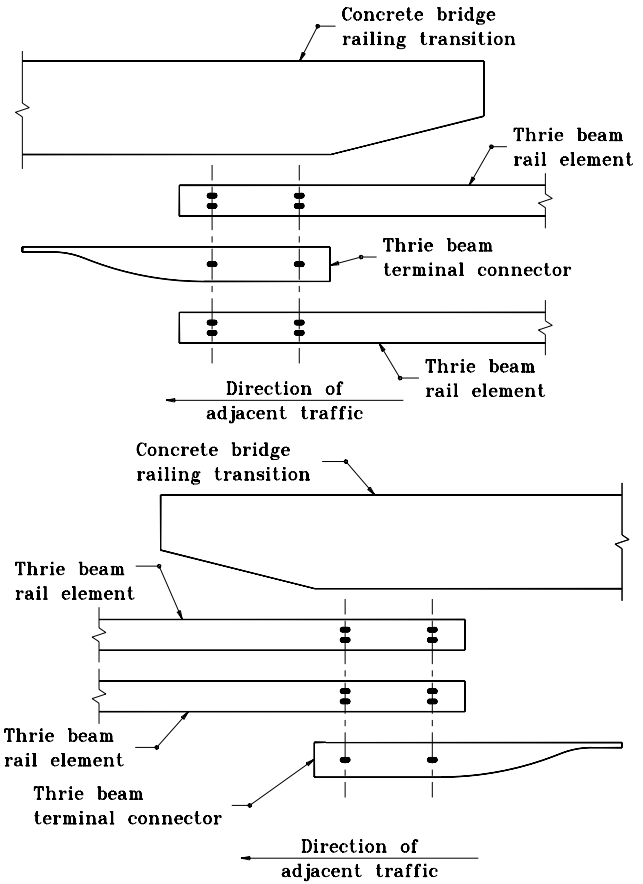
STANDARD DRAWING NO. E 601-TTGB-01

RICHARD L. VanCLEAVE
REGISTERED
No. 9750
STATE OF INDIANA
PROFESSIONAL ENGINEER

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



LAP DETAIL AT BRIDGE RAILING TRANSITION

INDIANA DEPARTMENT OF TRANSPORTATION

GUARDRAIL TRANSITION
TYPE TGB

MAY 2000

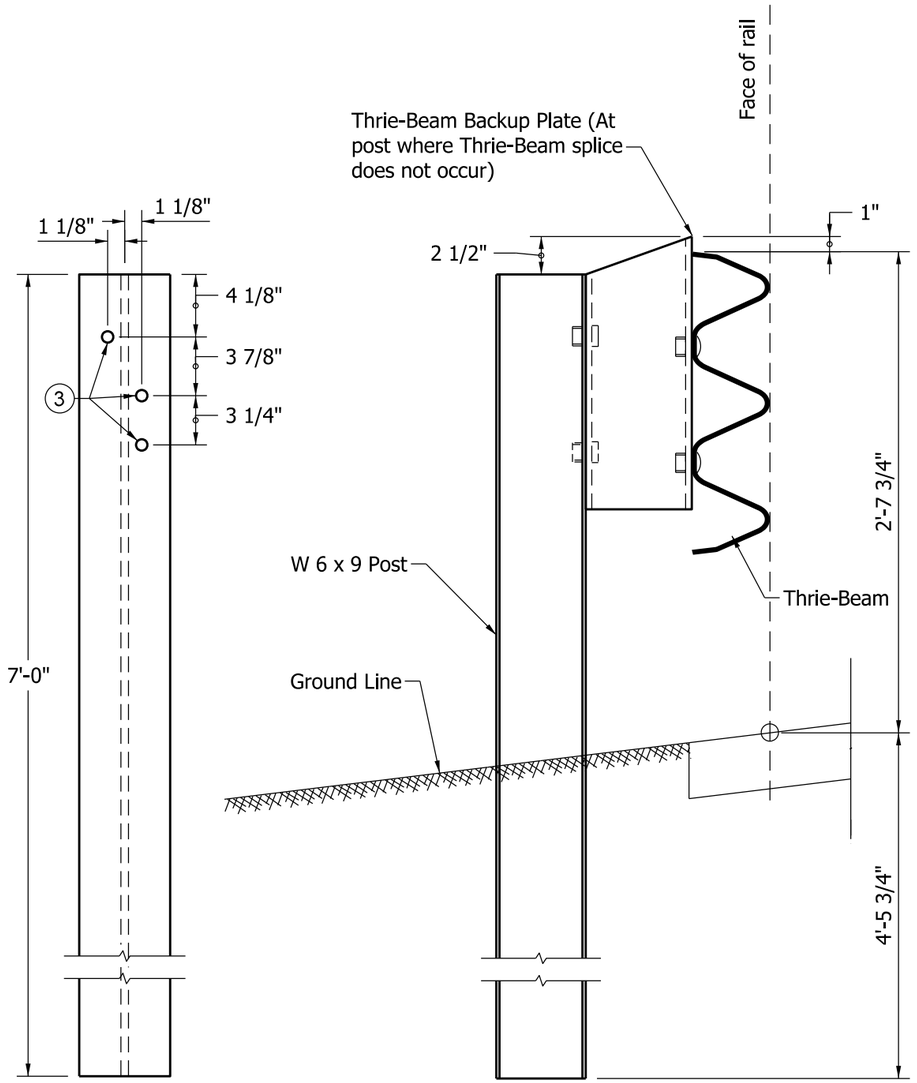
STANDARD DRAWING NO. **E 601-TTGB-02**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

/s/ Anthony L. Uremovich 5-01-00
DESIGN STANDARDS ENGINEER — DATE

/s/ Firooz Zandi 5-01-00
CHIEF HIGHWAY ENGINEER — DATE

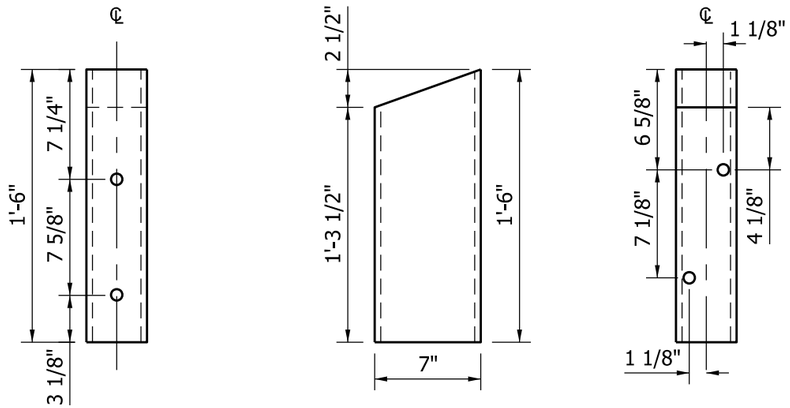


FRONT VIEW SIDE VIEW

W 6 x 9 POST DETAILS

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.



TOP VIEW

FRONT VIEW SIDE VIEW BACK VIEW

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

INDIANA DEPARTMENT OF TRANSPORTATION

GUARDRAIL TRANSITION
TYPE TGB

SEPTEMBER 2011

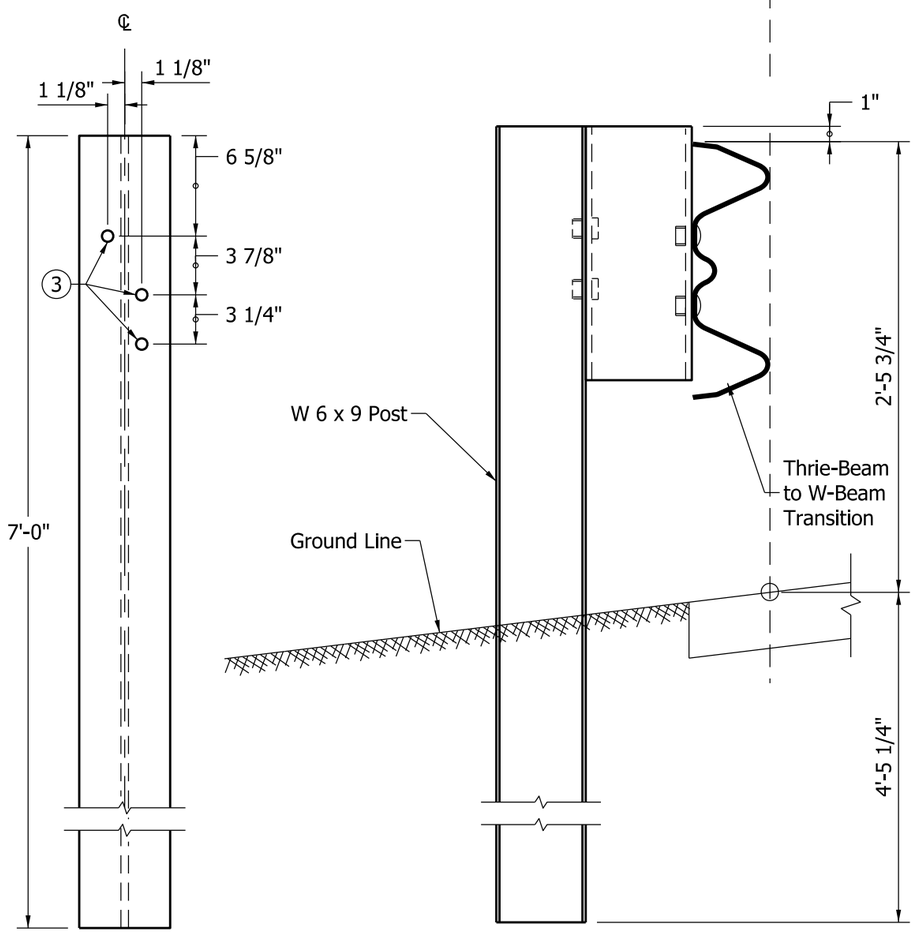
STANDARD DRAWING NO. E 601-TTGB-03

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

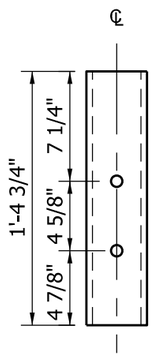
/s/ Richard L. VanCleave 09/01/11
DESIGN STANDARDS ENGINEER DATE

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

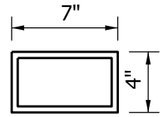


FRONT VIEW SIDE VIEW

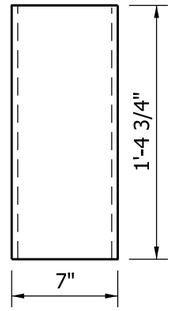
W 6 x 9 POST DETAILS



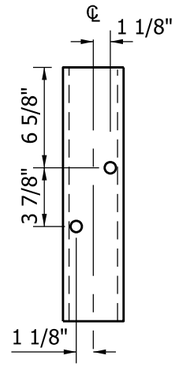
FRONT VIEW



TOP VIEW



SIDE VIEW



BACK 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 1 through 7 may be drilled in back flange. See Standard drawing E 601-TTGB-03.

TS 7 x 4 x 3/16" BLOCK DETAILS

POST 8

INDIANA DEPARTMENT OF TRANSPORTATION

GUARDRAIL TRANSITION
TYPE TGB

SEPTEMBER 2011

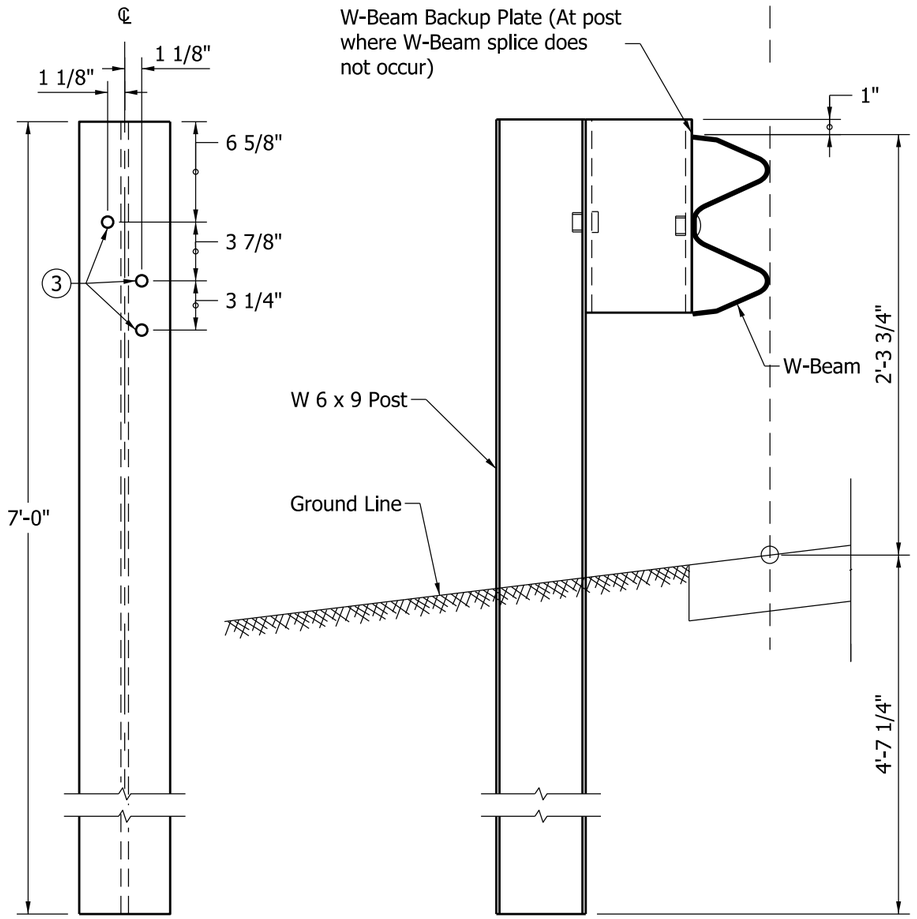
STANDARD DRAWING NO. E 601-TTGB-04

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

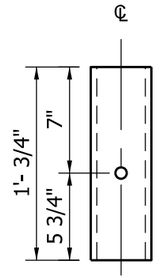
/s/ Richard L. VanCleave 09/01/11
DESIGN STANDARDS ENGINEER DATE

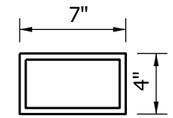
/s/ Mark A. Miller 09/01/11
CHIEF HIGHWAY ENGINEER DATE



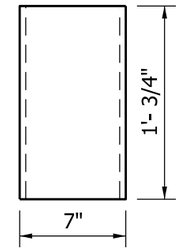
FRONT VIEW SIDE VIEW

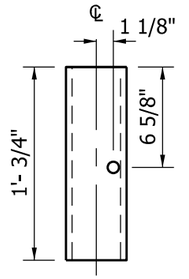
W 6 x 9 POST DETAILS





TOP VIEW





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

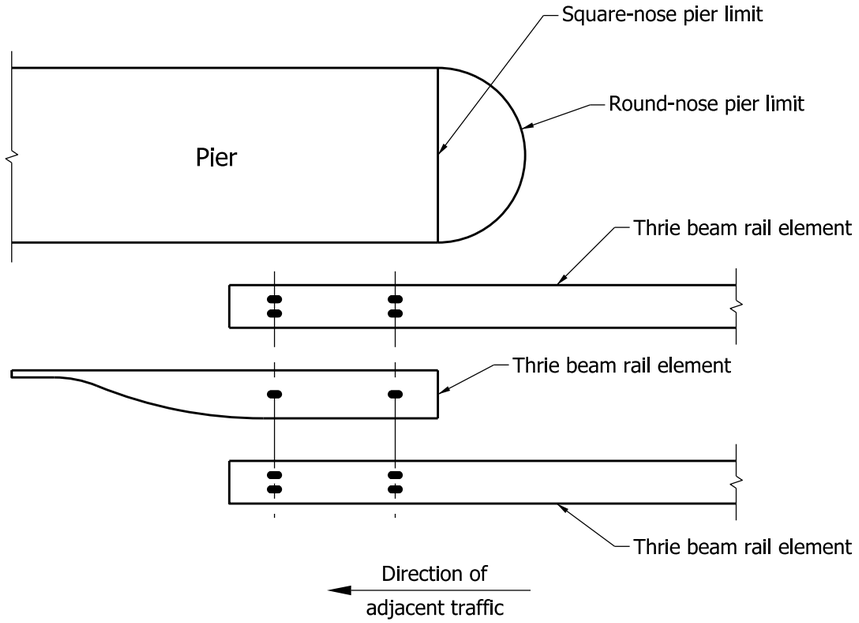
STANDARD DRAWING NO. E 601-TTGB-05

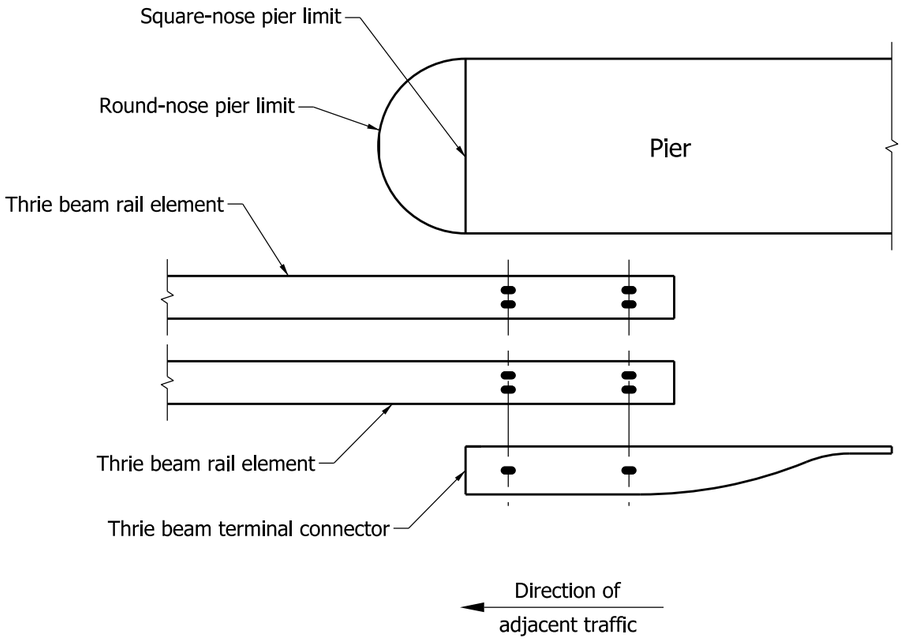
RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

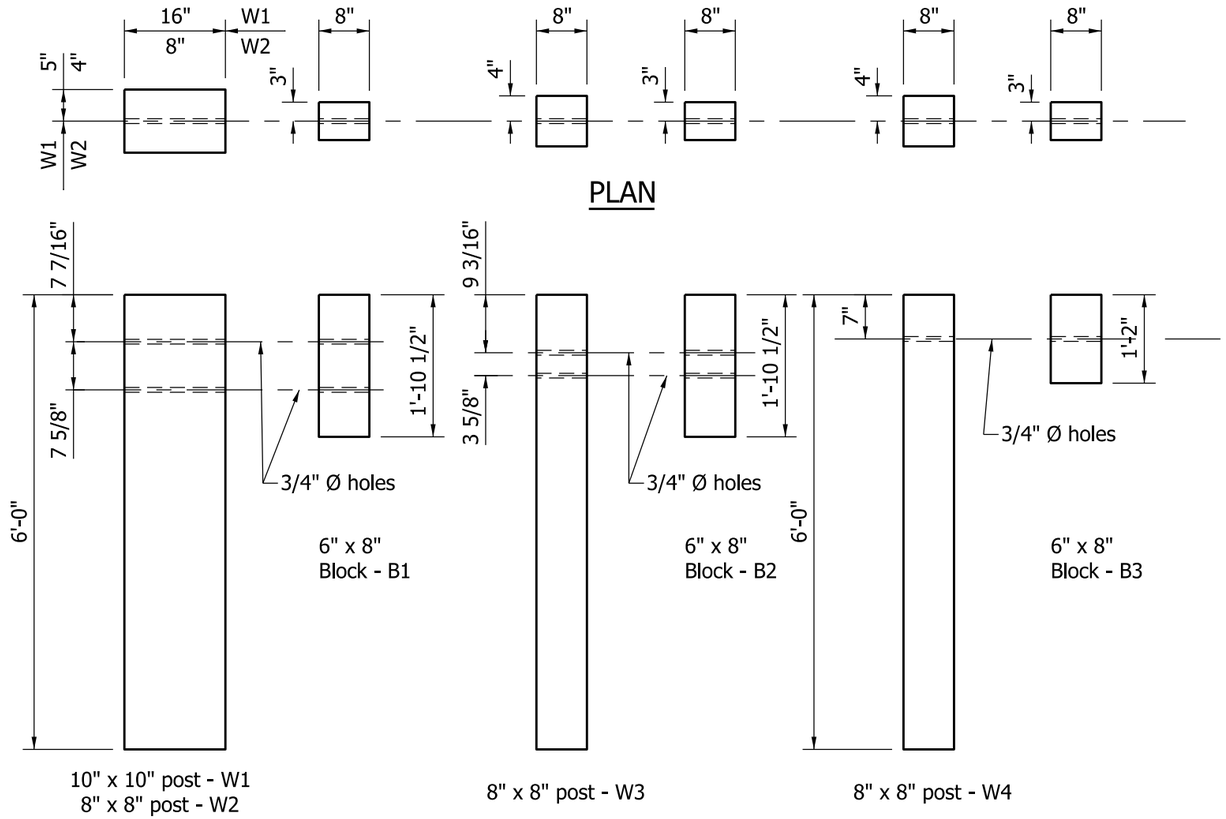
/s/ Richard L. VanCleave 09/01/11
DESIGN STANDARDS ENGINEER DATE

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





LAP DETAIL AT PIER CONNECTION



ELEVATION

POST & BLOCK DETAILS

INDIANA DEPARTMENT OF TRANSPORTATION

GUARDRAIL TRANSITION
TYPE GP

SEPTEMBER 2011

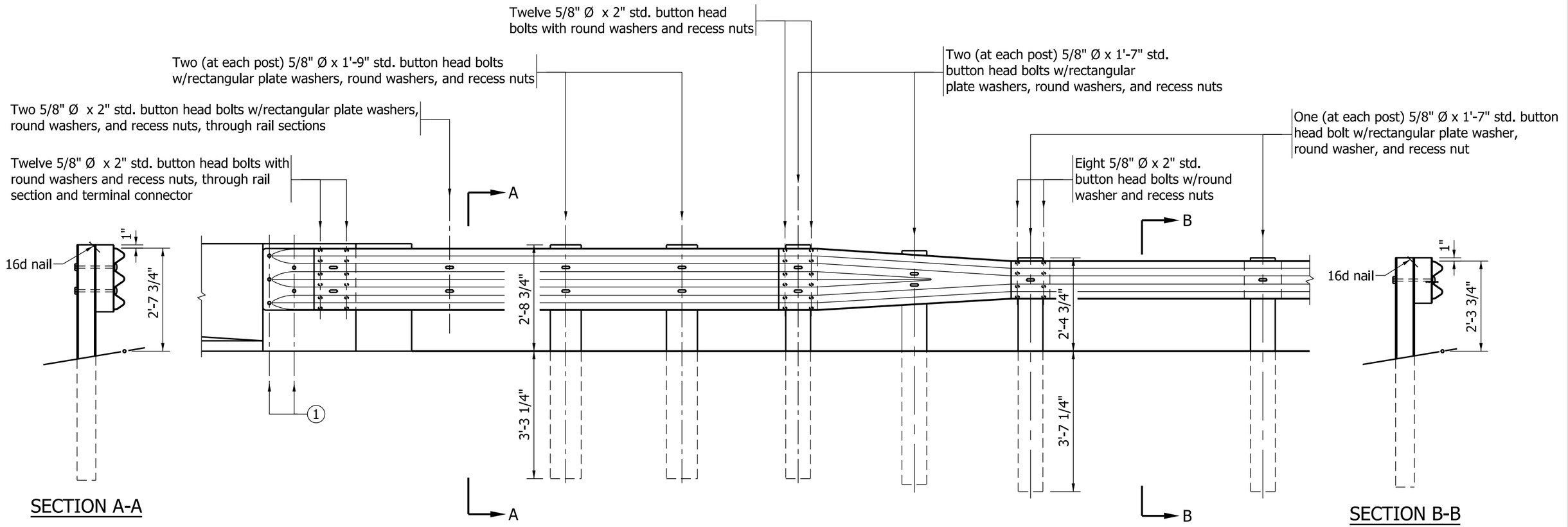
STANDARD DRAWING NO. E 601-TTGP-01

RICHARD L. VanCLEAVE
REGISTERED
No. 9750
STATE OF INDIANA
PROFESSIONAL ENGINEER

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



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

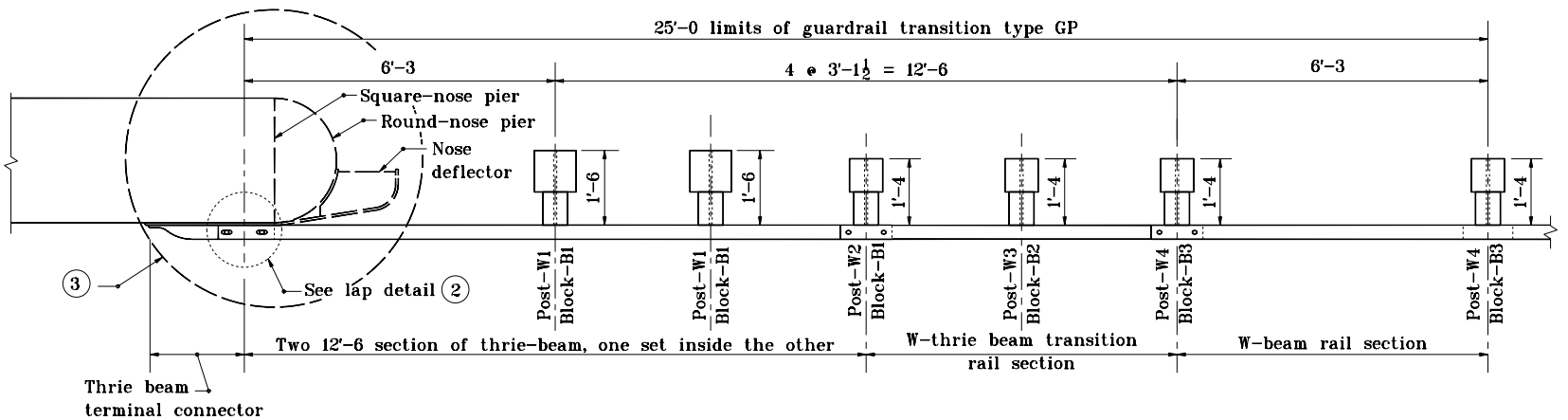
STANDARD DRAWING NO. E 601-TTGP-02

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

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



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

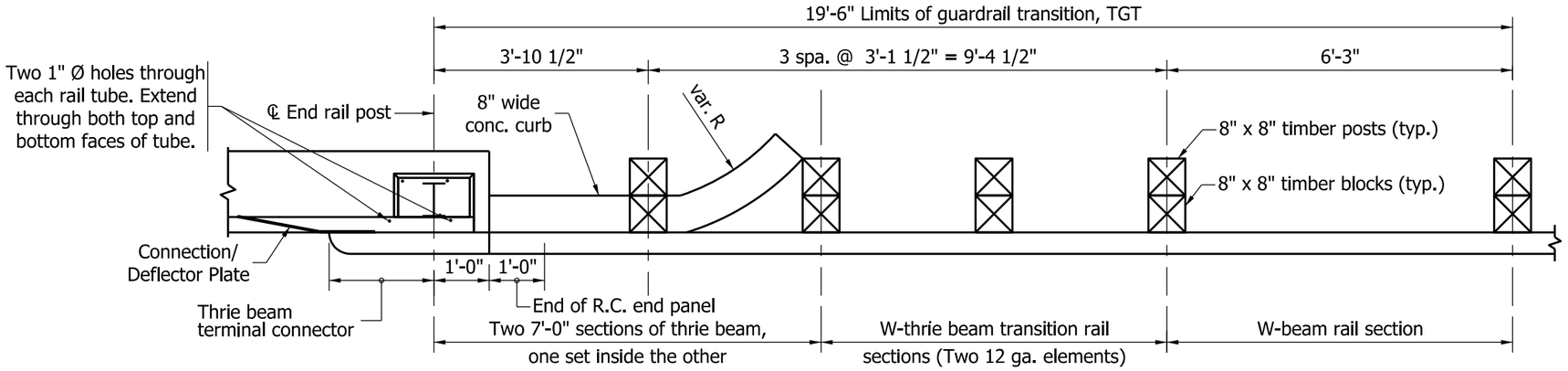
APRIL 1996

STANDARD DRAWING NO. **E 601-TTGP-03**

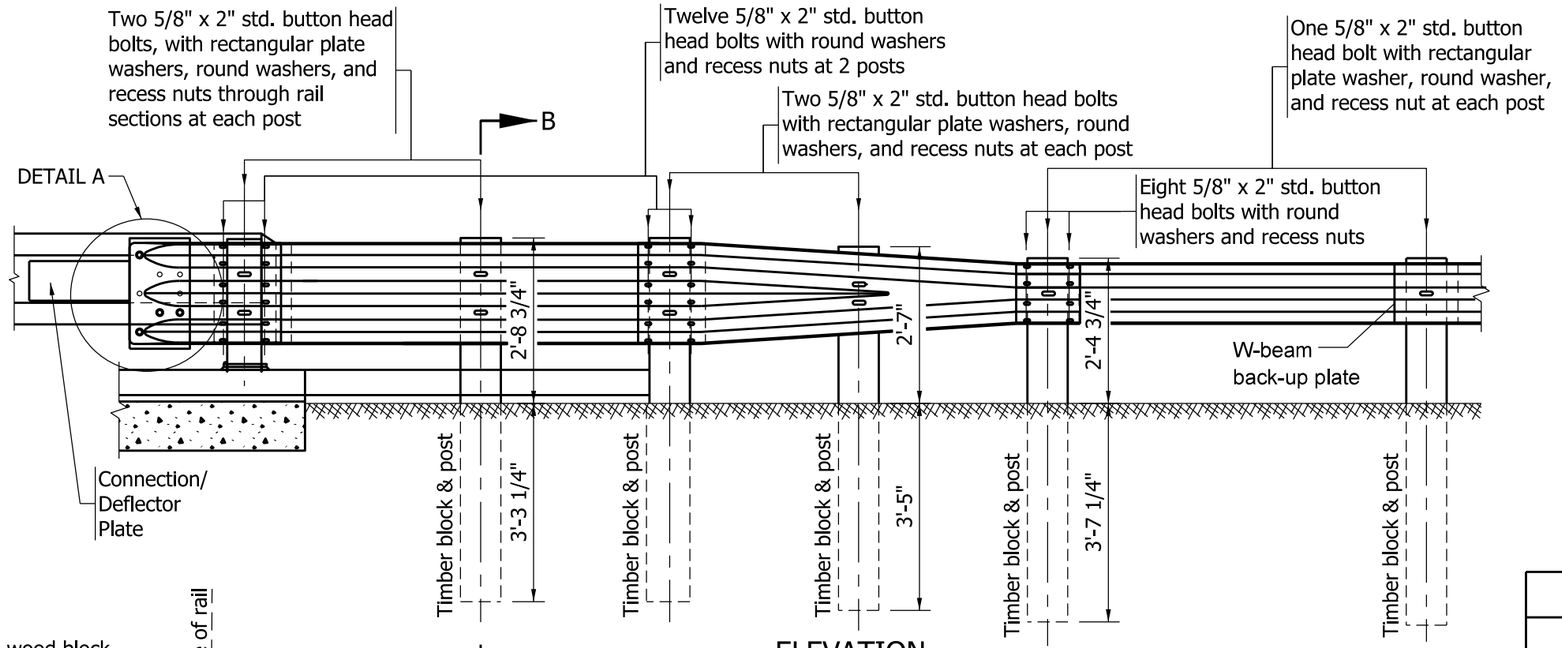
ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

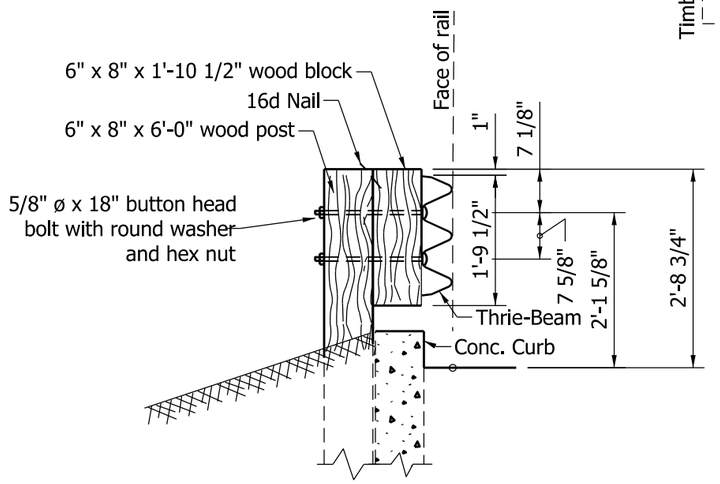
DETAILS PLACED IN THIS FORMAT	11-15-99
/s/ Anthony L. Uremovich, DESIGN STANDARDS ENGINEER	11-15-99
/s/ Firooz Zandi, CHIEF HIGHWAY ENGINEER	11-15-99
ORIGINALLY APPROVED	4-01-96



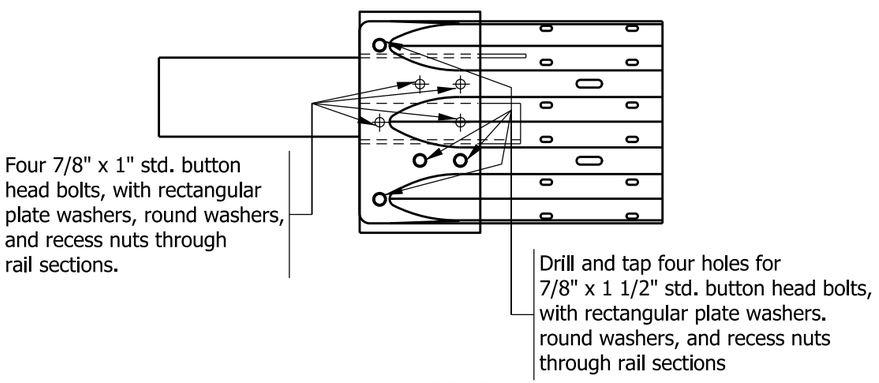
PLAN



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

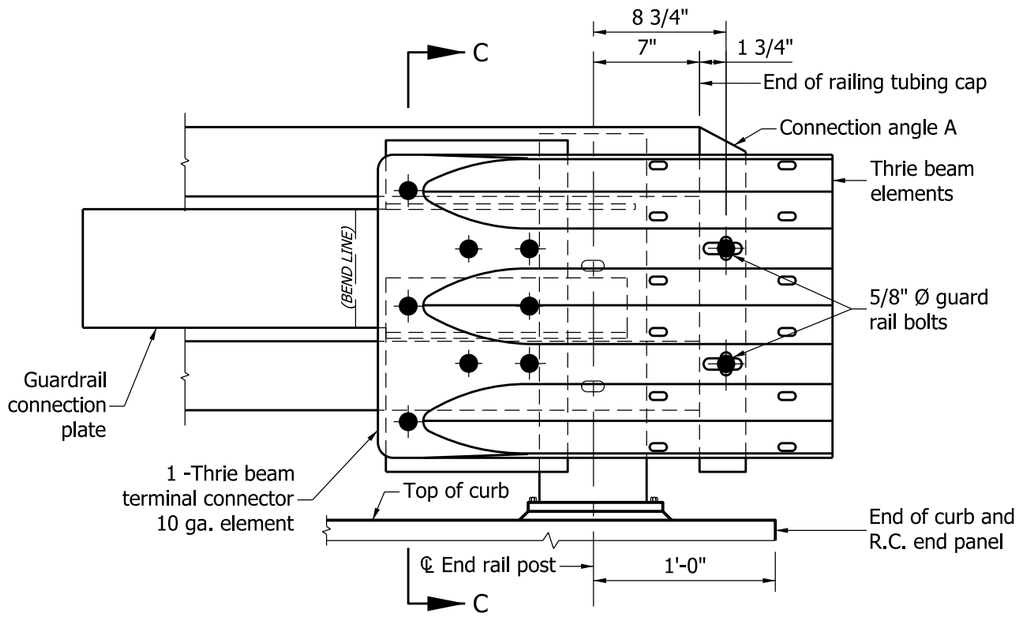
STANDARD DRAWING NO. E 601-TTGT-01

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

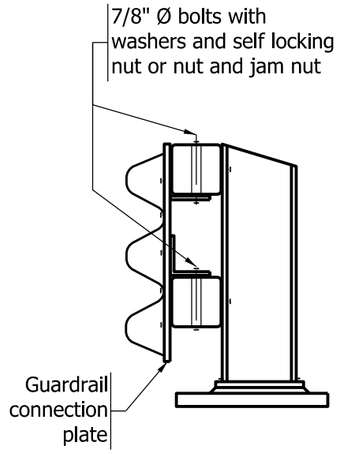
DESIGN STANDARDS ENGINEER

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

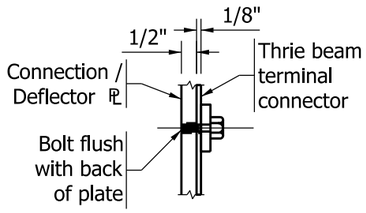
/s/ Mark A. Miller 09/01/11
CHIEF HIGHWAY ENGINEER DATE



ELEVATION - TRANSITION CONNECTION



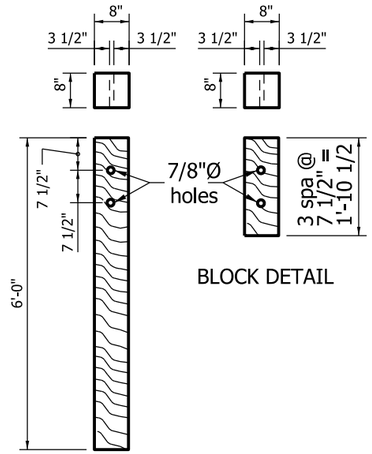
SECTION C-C



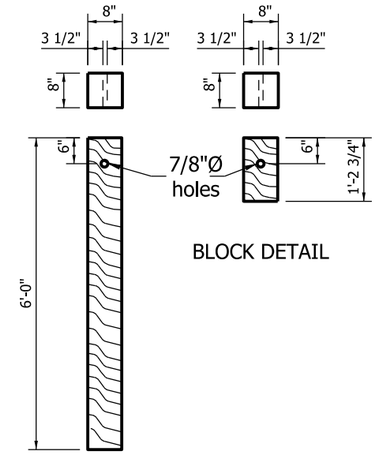
DETAIL A

NOTE:

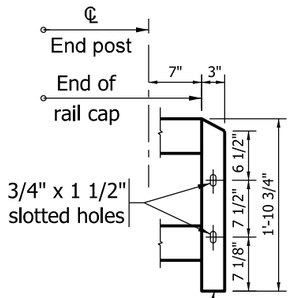
1. See Standard Drawing E 706-BRTM-02 for railing tubing cap details.

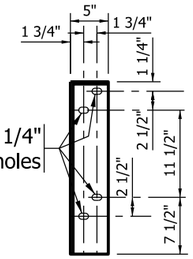


TIMBER POST DETAIL FOR THRIE-BEAM GUARDRAIL CONNECTION



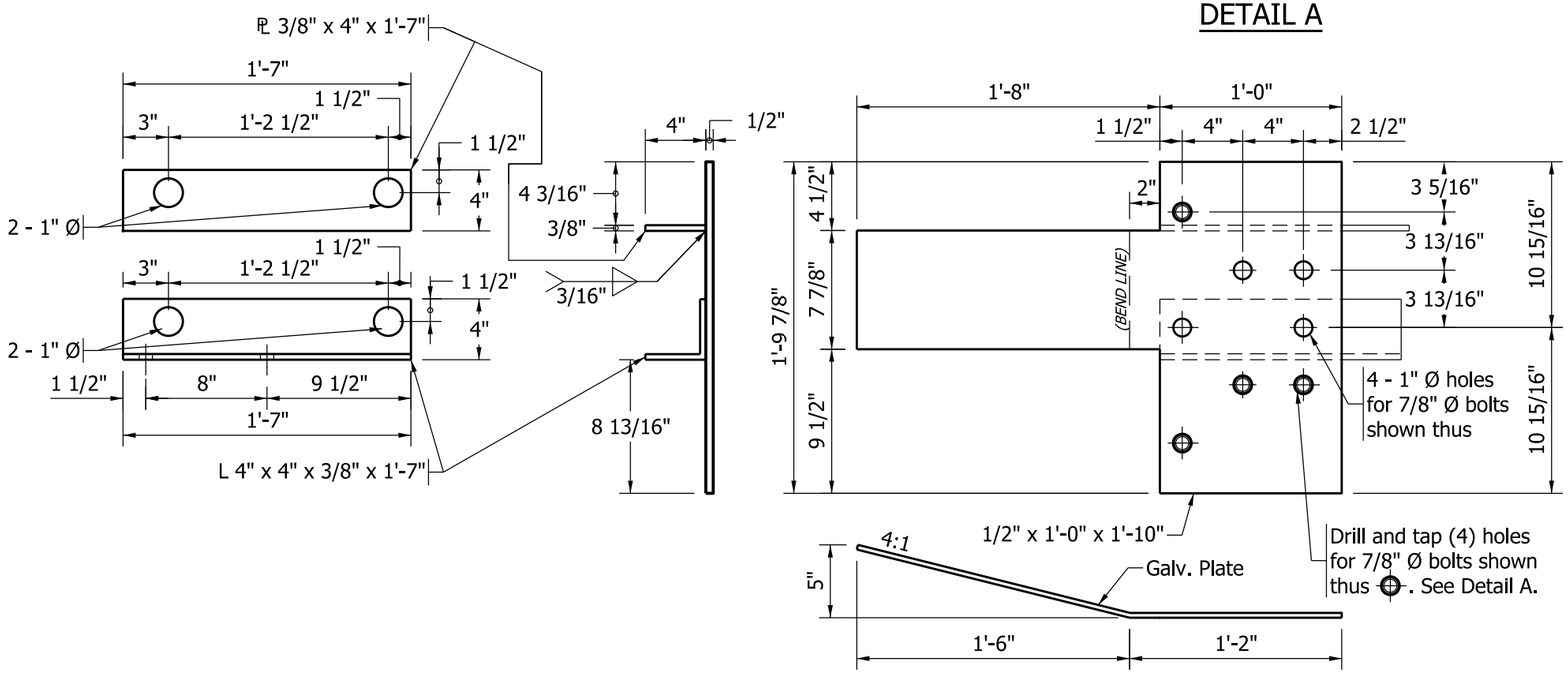
TIMBER POST DETAIL FOR W-BEAM GUARDRAIL CONNECTION





L 5" x 3" x 1/4" x 1'-10 3/4"

CONNECTION ANGLE A



GUARDRAIL CONNECTION / DEFLECTOR PLATE DETAILS

INDIANA DEPARTMENT OF TRANSPORTATION

GUARDRAIL TRANSITION, TGT

SEPTEMBER 2011

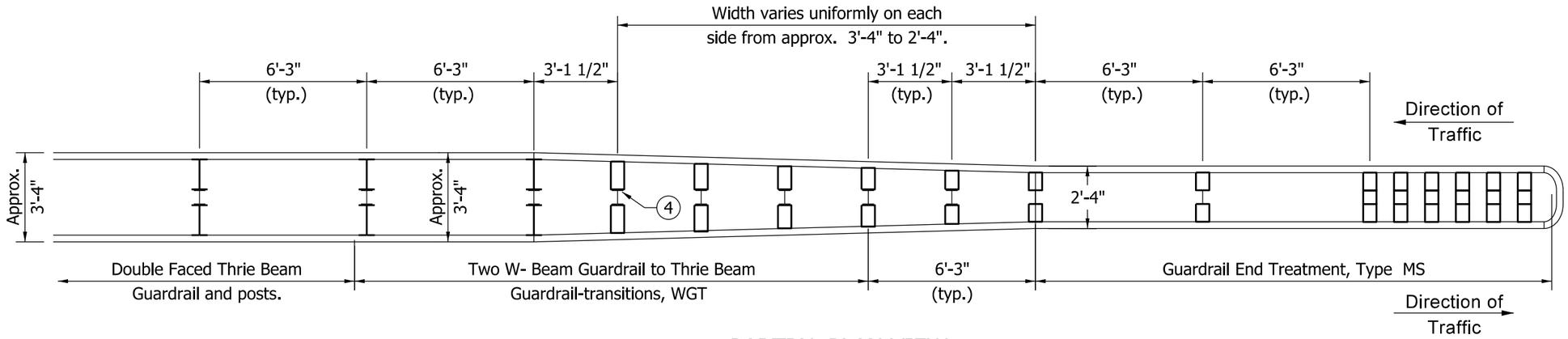
STANDARD DRAWING NO. E 601-TTGT-02

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

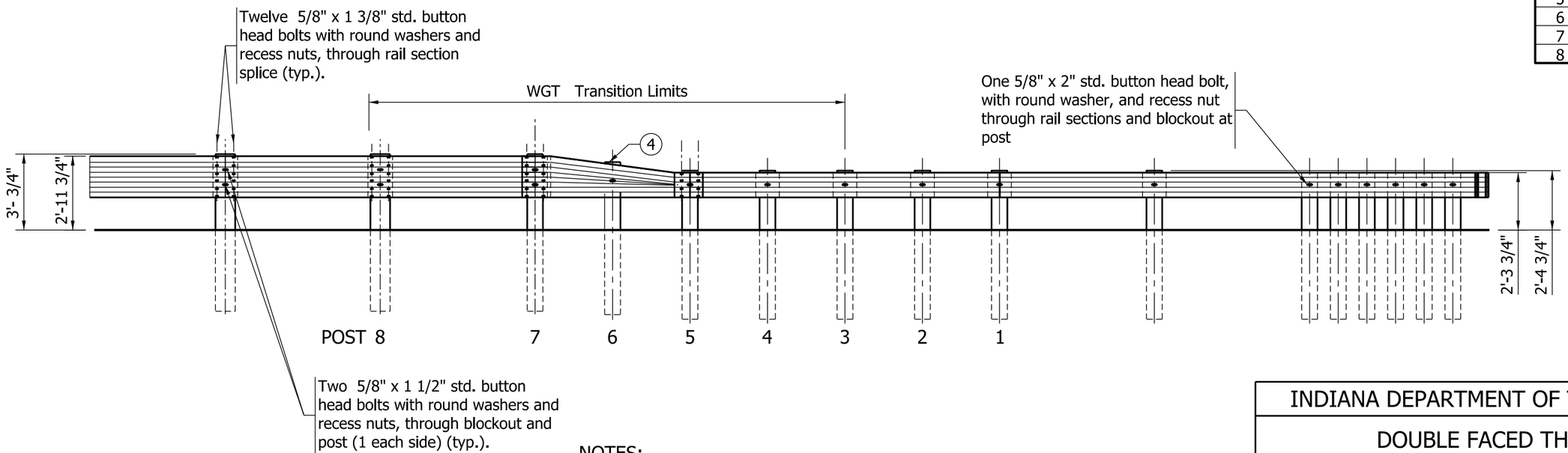
/s/ Richard L. VanCleave 09/01/11
DESIGN STANDARDS ENGINEER DATE

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



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:

- I - W 6 x 9 Post
- I - 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

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

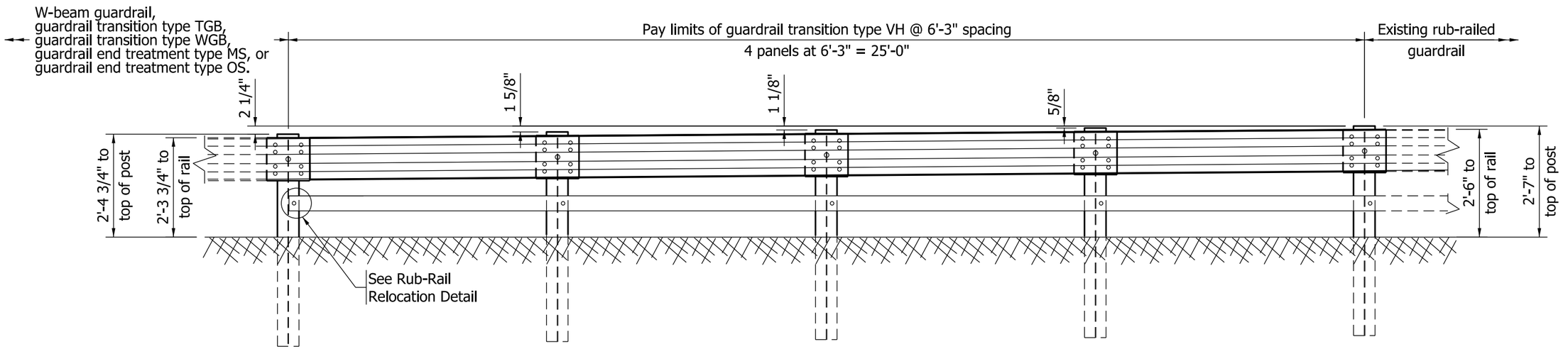
DESIGN STANDARDS ENGINEER

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

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

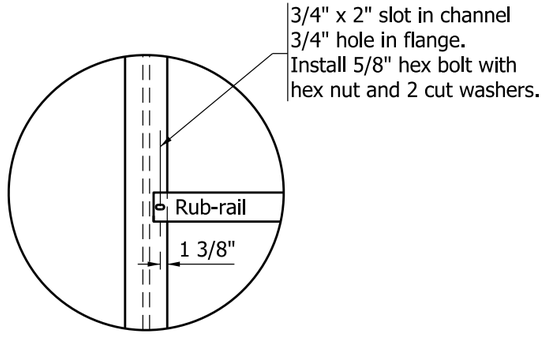
NOTES:

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

RICHARD L. VanCLEAVE
REGISTERED
No. 9750
STATE OF INDIANA
PROFESSIONAL ENGINEER

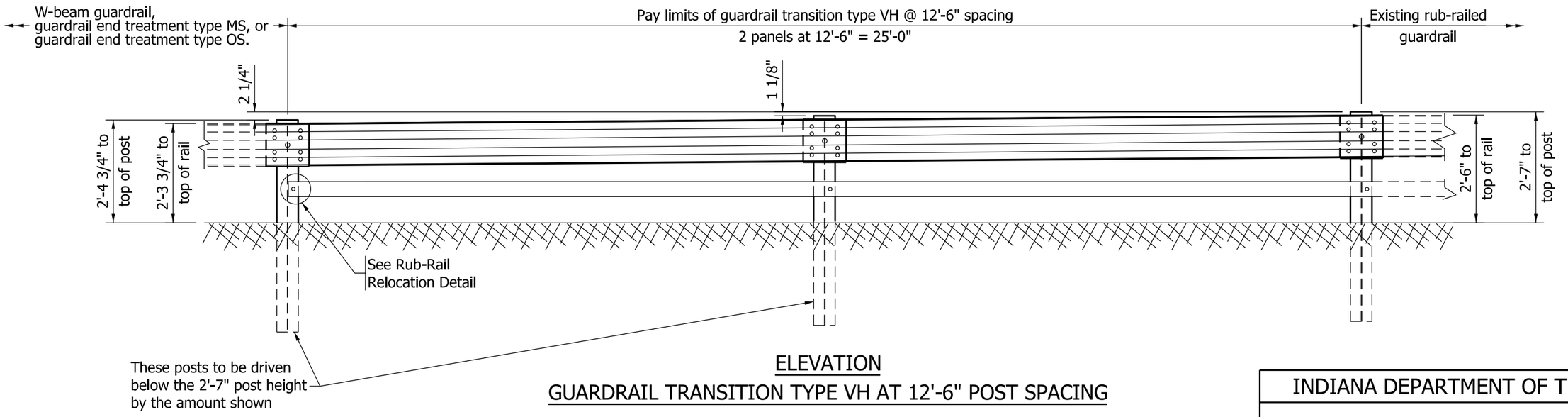
DESIGN STANDARDS ENGINEER

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

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

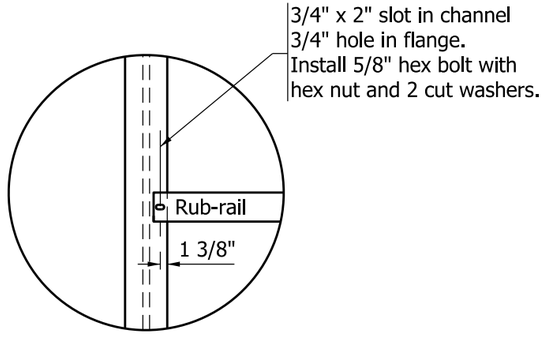
NOTES:

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 12'-6" POST SPACING



RUB-RAIL RELOCATION DETAIL

INDIANA DEPARTMENT OF TRANSPORTATION

GUARDRAIL TRANSITION
TYPE VH

SEPTEMBER 2011

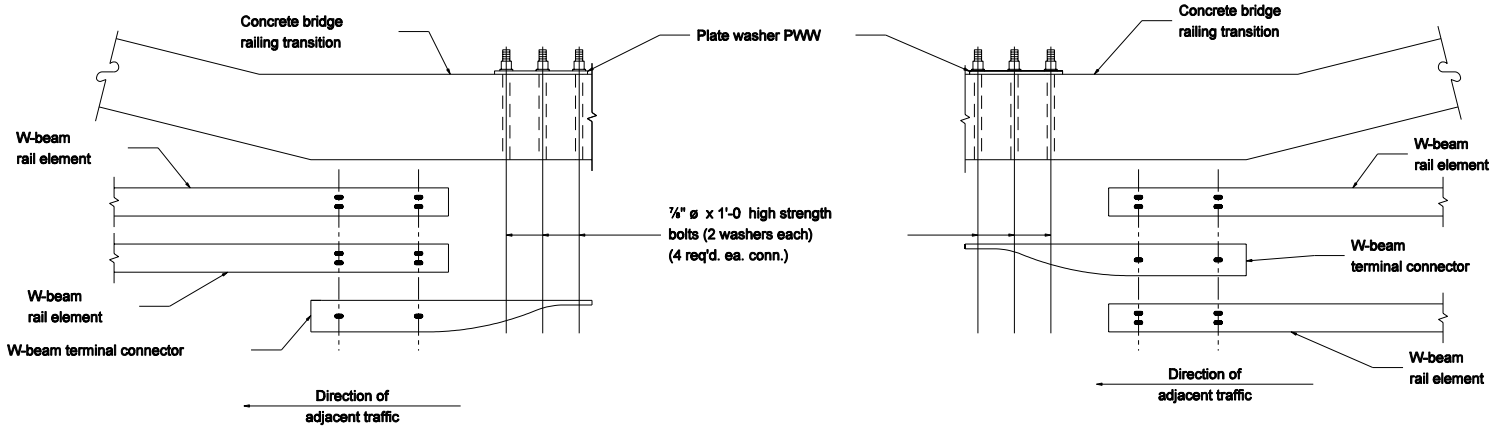
STANDARD DRAWING NO. E 601-TTVH-02

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

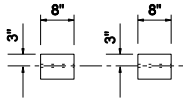
DESIGN STANDARDS ENGINEER

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

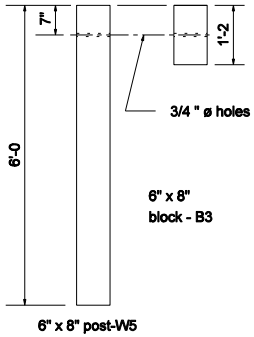
/s/ Mark A. Miller 09/01/11
CHIEF HIGHWAY ENGINEER DATE



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

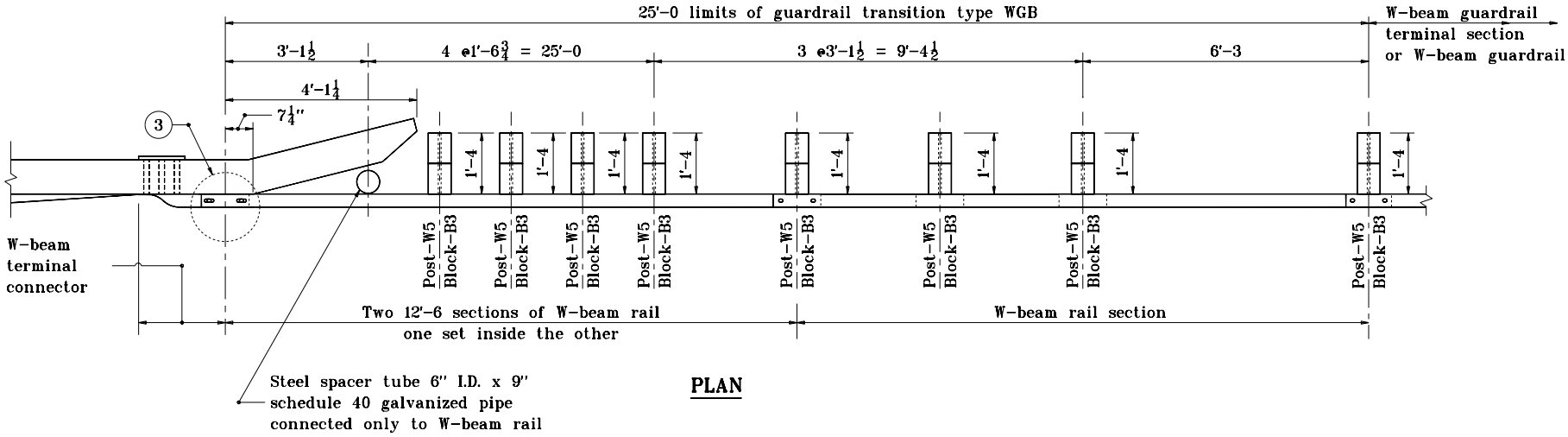
STANDARD DRAWING NO. E 601-TWGB-01

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

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

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



PLAN

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**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

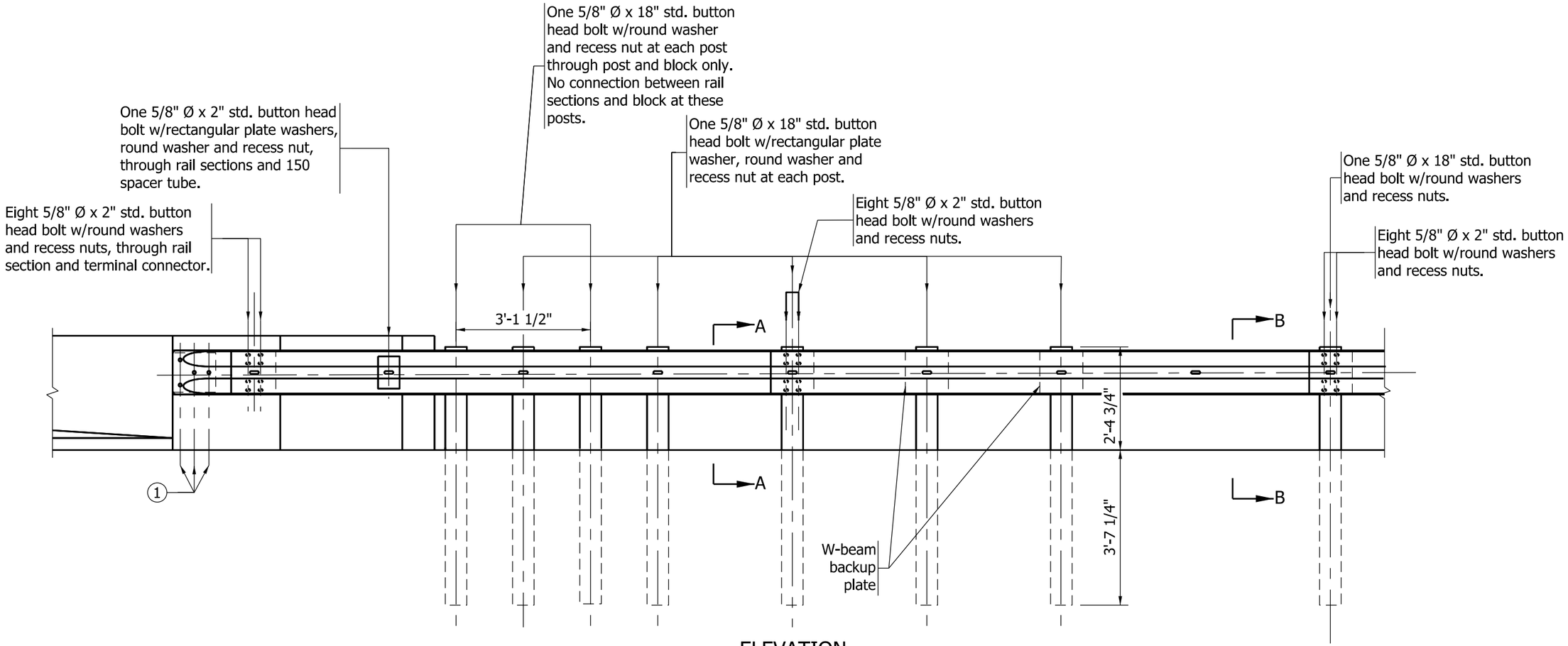
DESIGN STANDARDS ENGINEER

DETAILS PLACED IN THIS FORMAT 7-27-99

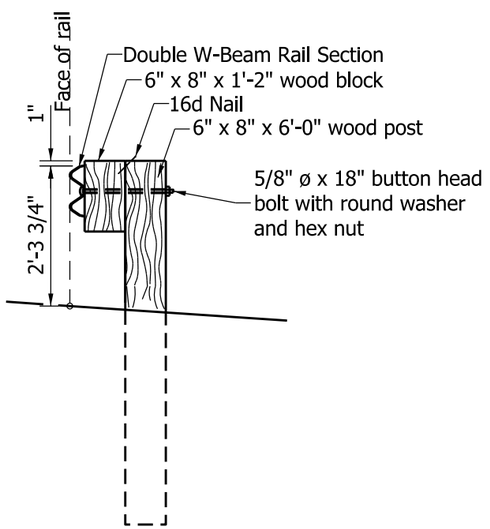
/s/ Anthony L. Uremovich 7-27-99
DESIGN STANDARDS ENGINEER DATE

/s/ Firooz Zandi 7-27-99
CHIEF HIGHWAY ENGINEER DATE

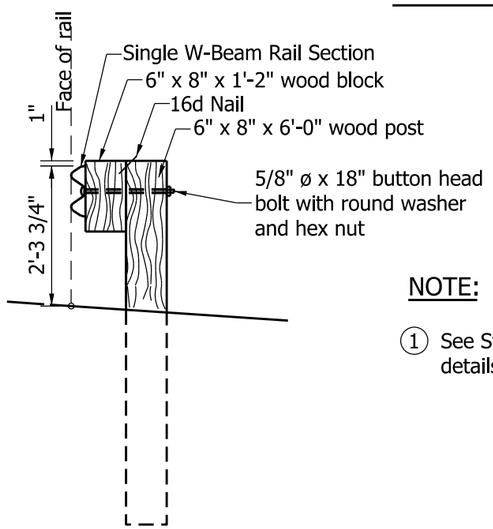
ORIGINALLY APPROVED 4-01-96



ELEVATION



SECTION A-A



SECTION B-B

NOTE:

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

INDIANA DEPARTMENT OF TRANSPORTATION

GUARDRAIL TRANSITION
TYPE WGB

SEPTEMBER 2011

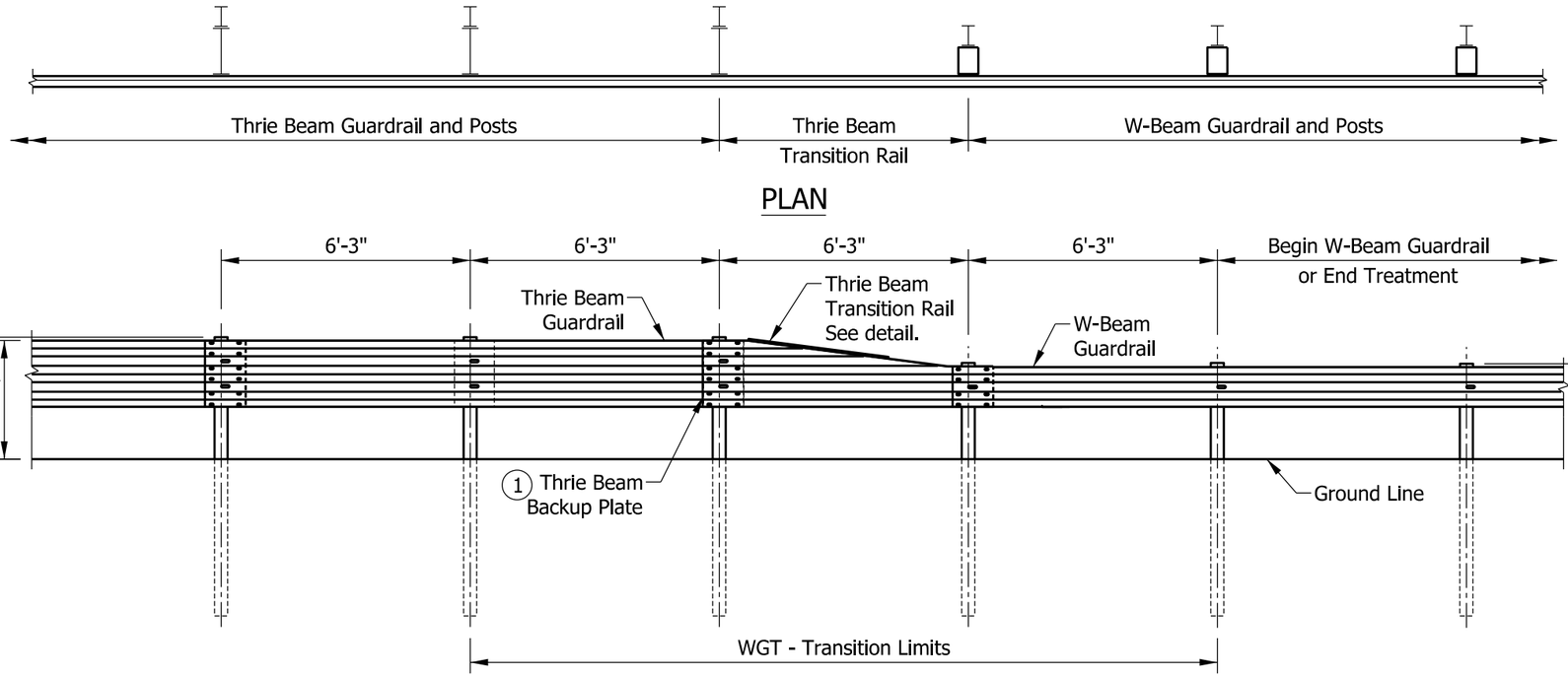
STANDARD DRAWING NO. E 601-TWGB-03

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

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



PLAN

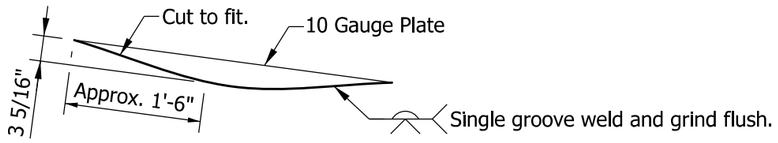
ELEVATION
THRIE BEAM TO W-BEAM GUARDRAIL TRANSITION

NOTES:

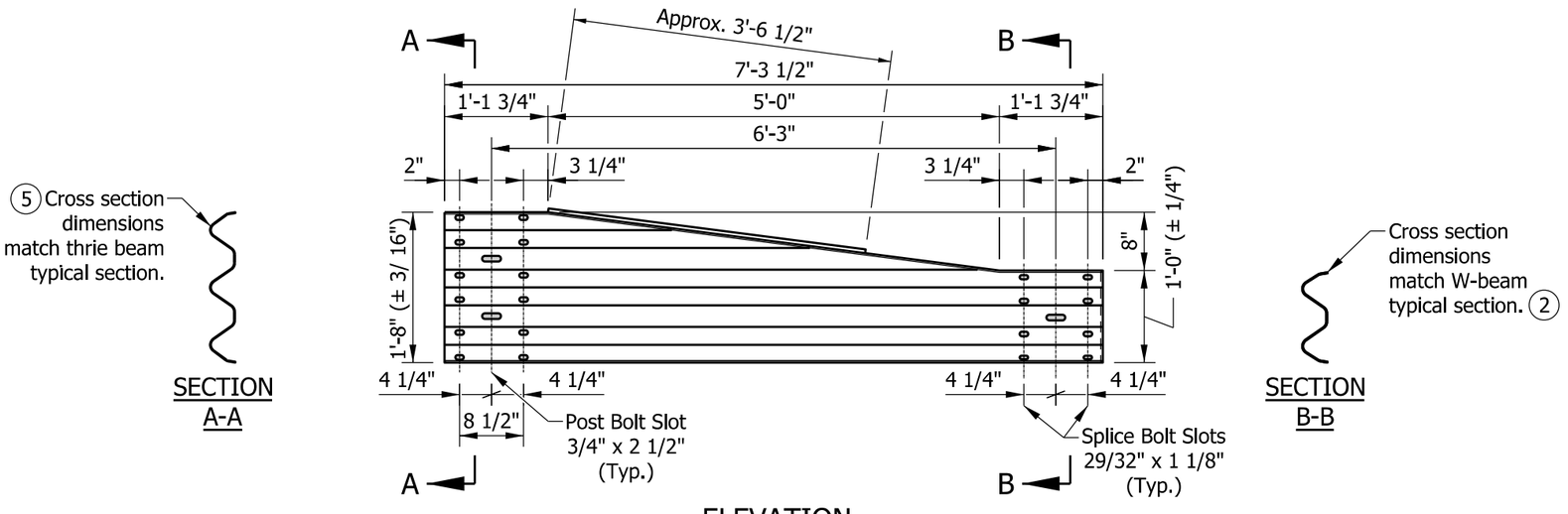
1. See Standard Drawing E 601-MTGR-01 for Thrie Beam Guardrail details. Thrie beam backup plate required at posts where there is no thrie-beam splice and at other locations as shown.
2. See Standard Drawing E 601-WBGC-01 for W-Beam Guardrail Components.
3. See Standard Drawings E 601-WBGA-01 through -03 for W-Beam Guardrail Assembly details.
4. Slope on thrie beam transition shall be reversed where thrie beam to W-beam guardrail relative orientation is opposite to that shown hereon.
5. See Standard Drawing E 601-TBGC-01 for Thrie Beam Rail Section.

LEGEND:

- W 6 x 9 Post
- W 14 x 22 Blockout
- Timber or Composite W-Beam Blockout



CAP PLATE PLAN



ELEVATION
THRIE BEAM TRANSITION RAIL

INDIANA DEPARTMENT OF TRANSPORTATION

W-BEAM GUARDRAIL TO THRIE BEAM GUARDRAIL TRANSITION, WGT

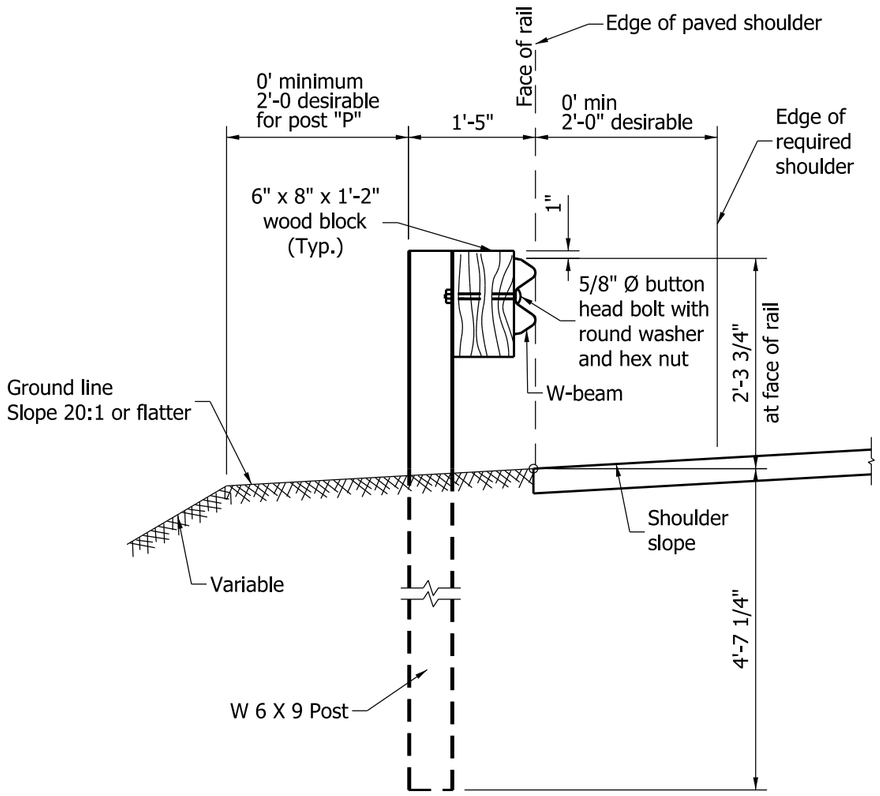
SEPTEMBER 2014

STANDARD DRAWING NO. E 601-TWGT-01

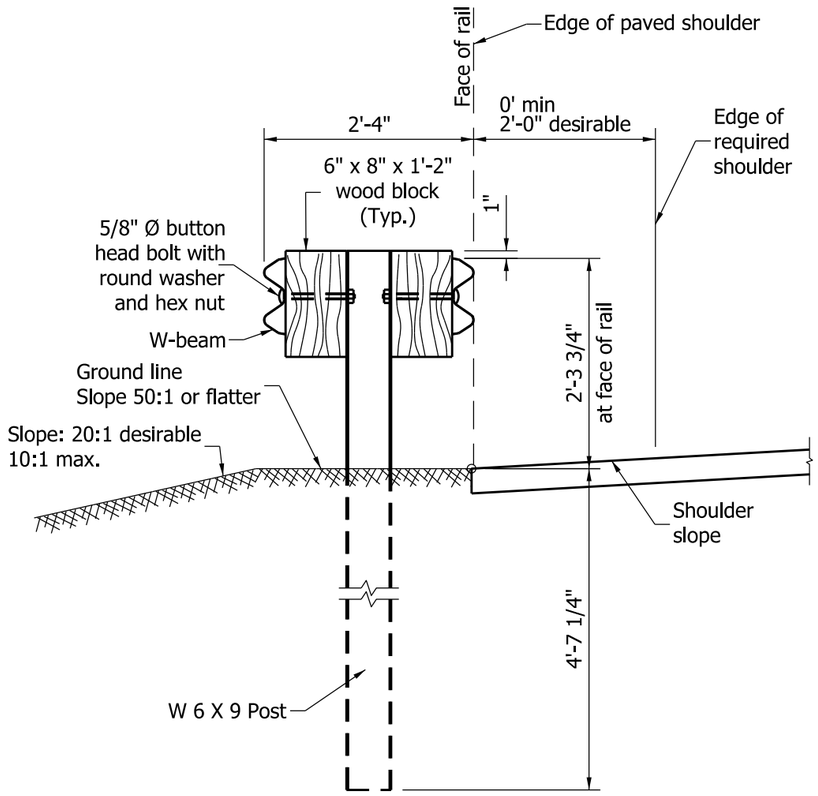
RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

/s/ Richard L. VanCleave 02/20/14
DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller 03/03/14
CHIEF ENGINEER DATE



TYPICAL W-BEAM INSTALLATION



TYPICAL DOUBLE FACED W-BEAM INSTALLATION

INDIANA DEPARTMENT OF TRANSPORTATION

W-BEAM
GUARDRAIL ASSEMBLIES

SEPTEMBER 2011

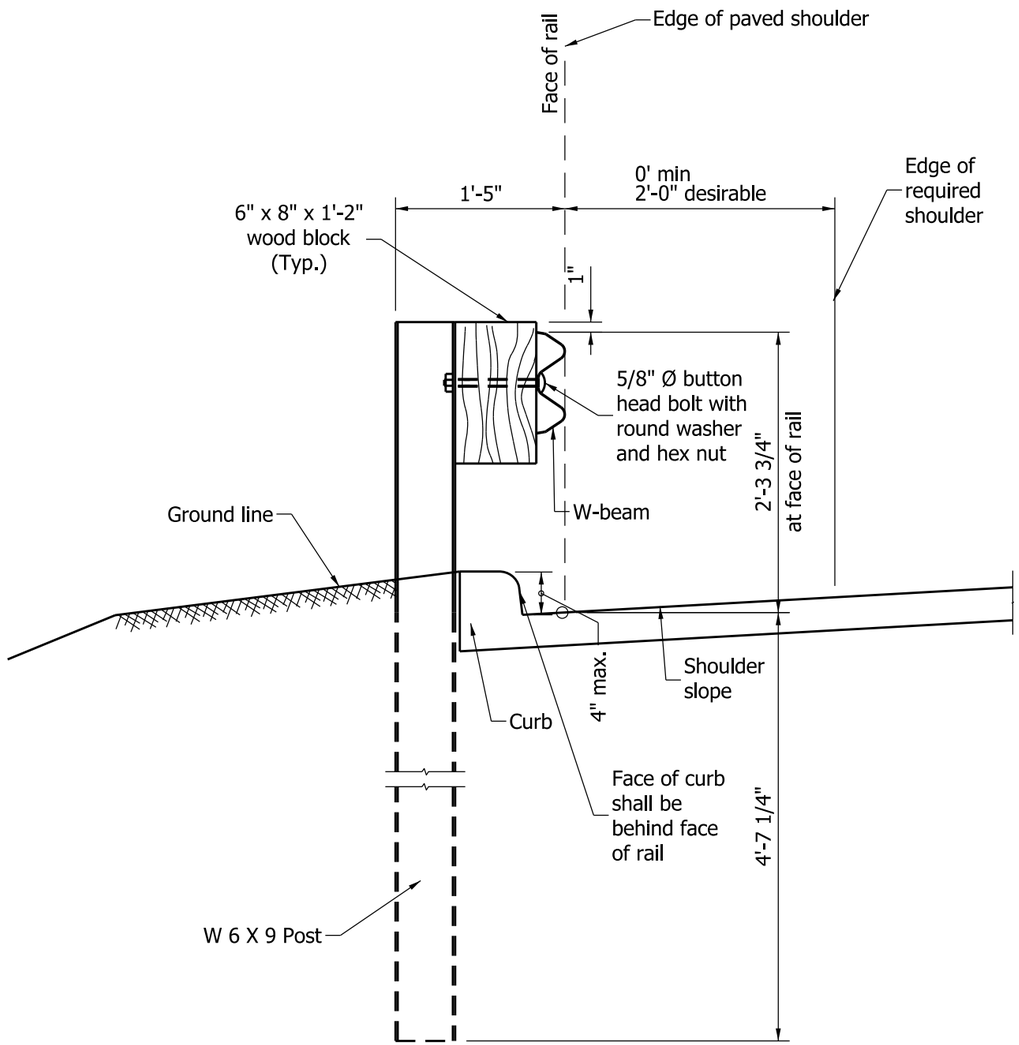
STANDARD DRAWING NO. E 601-WBGA-01

RICHARD L. VanCLEAVE
REGISTERED
No. 9750
STATE OF INDIANA
PROFESSIONAL ENGINEER

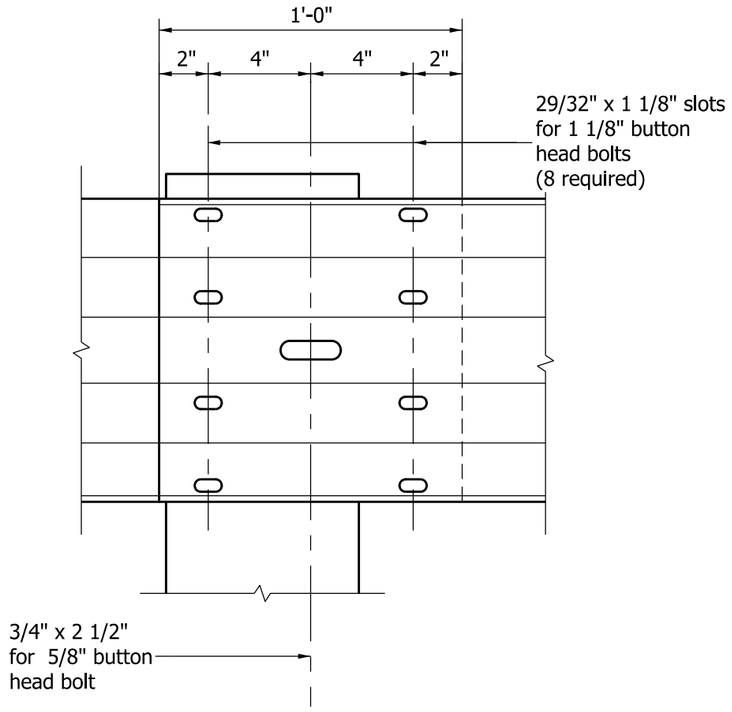
DESIGN STANDARDS ENGINEER

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

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



TYPICAL W-BEAM INSTALLATION AT CURB



STEEL W-BEAM SPLICE DETAIL

INDIANA DEPARTMENT OF TRANSPORTATION

W-BEAM GUARDRAIL ASSEMBLIES

SEPTEMBER 2011

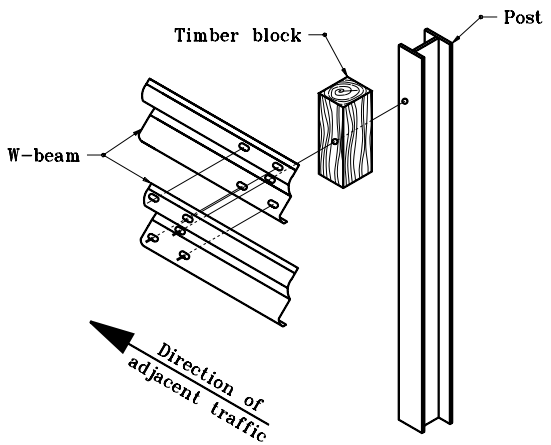
STANDARD DRAWING NO. E 601-WBGA-02

RICHARD L. VanCLEAVE
REGISTERED
No. 9750
STATE OF INDIANA
PROFESSIONAL ENGINEER

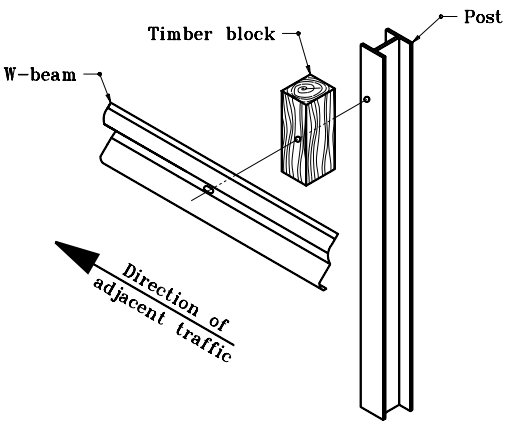
DESIGN STANDARDS ENGINEER

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

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



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

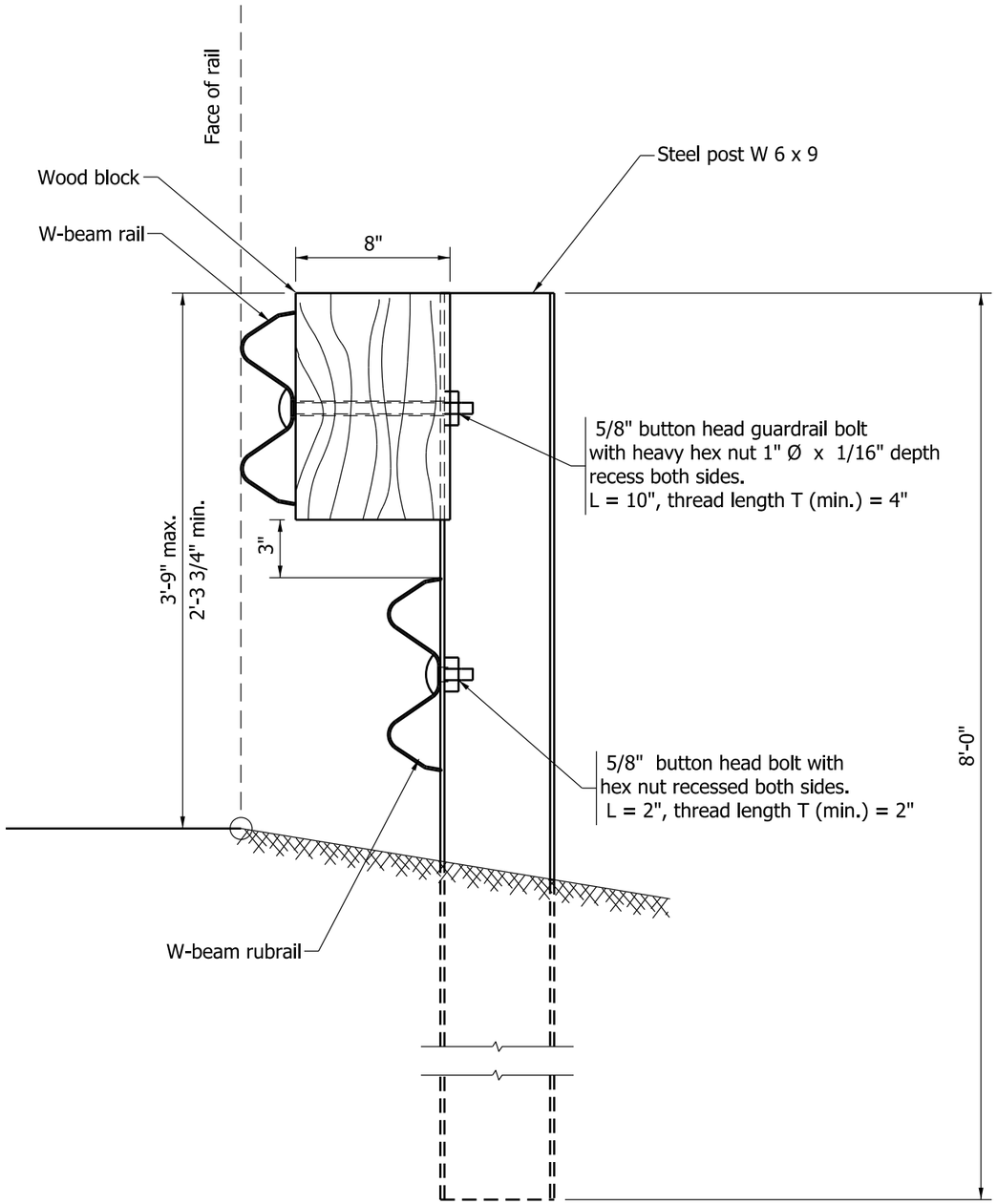
SEPTEMBER 1998

STANDARD DRAWING NO. **E 601-WBGA-03**

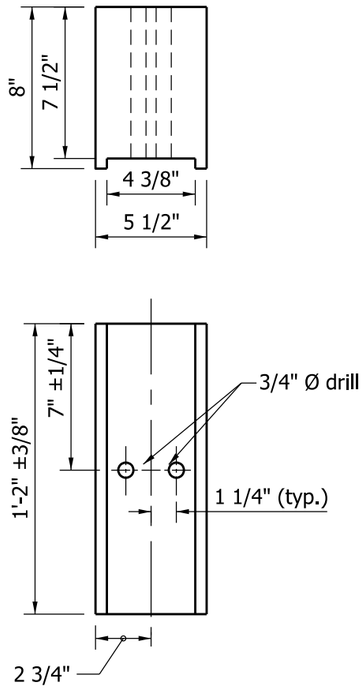
ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

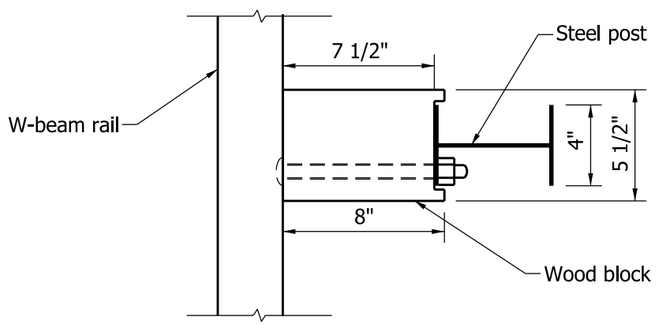
DETAILS PLACED IN THIS FORMAT	11-15-99
/s/ Anthony L. Uremovich DESIGN STANDARDS ENGINEER	11-15-99 DATE
/s/ Firooz Zandi CHIEF HIGHWAY ENGINEER	11-15-99 DATE
ORIGINALLY APPROVED	9-01-98



ELEVATION



WOOD BLOCK

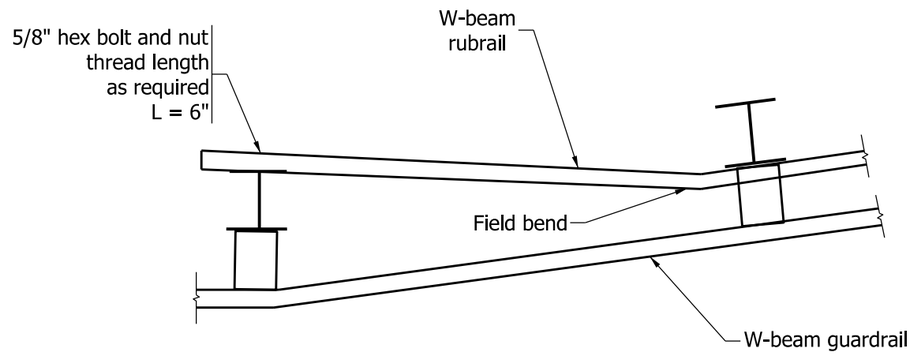


PLAN

STEEL POST AND WOOD BLOCK DETAIL
FOR WR-BEAM GUARDRAIL

NOTE:

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



RUBRAIL TERMINATION DETAIL

INDIANA DEPARTMENT OF TRANSPORTATION

WR-BEAM GUARDRAIL

SEPTEMBER 2011

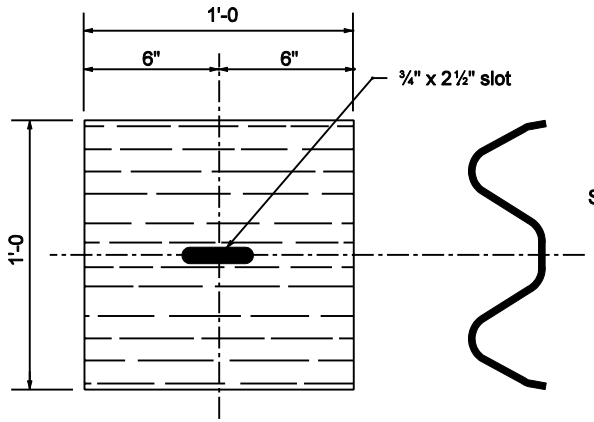
STANDARD DRAWING NO. E 601-WBGA-06

RICHARD L. VanCLEAVE
REGISTERED
No. 9750
STATE OF INDIANA
PROFESSIONAL ENGINEER

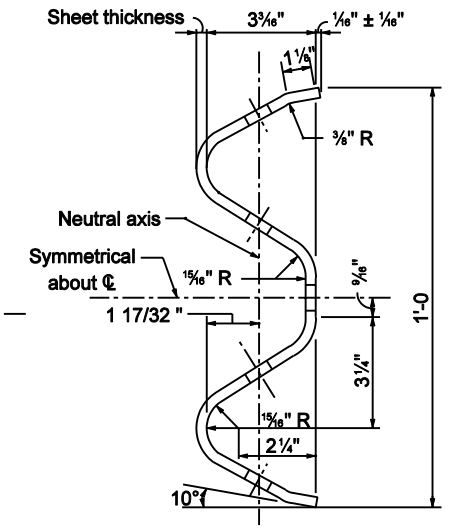
DESIGN STANDARDS ENGINEER

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

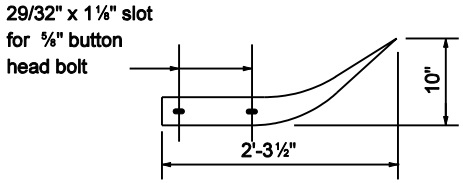
/s/ Mark A. Miller 09/01/11
CHIEF HIGHWAY ENGINEER DATE



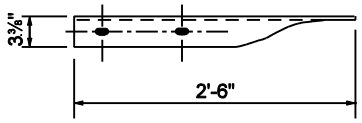
W-BEAM BACKUP PLATE



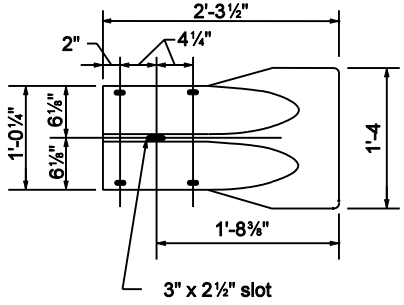
SECTION THROUGH BEAM ELEMENT



TOP VIEW

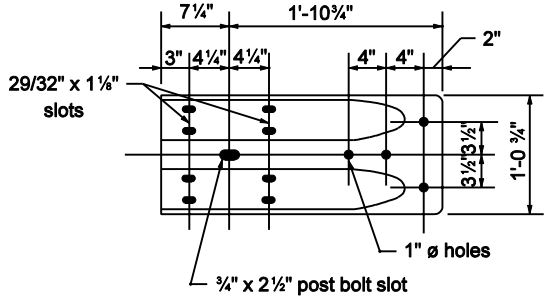


TOP VIEW



FRONT VIEW

CURVED TERMINAL END



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 ths sheet are for the standard components of W-beam guardrail.

INDIANA DEPARTMENT OF TRANSPORTATION

W-BEAM GUARDRAIL COMPONENTS

MARCH 2003

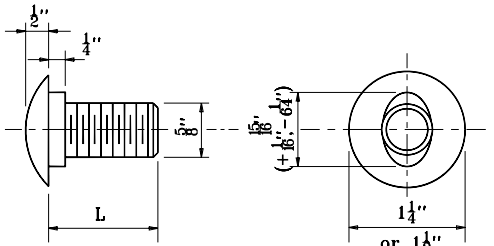
STANDARD DRAWING NO. E 601-WBGC-01

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

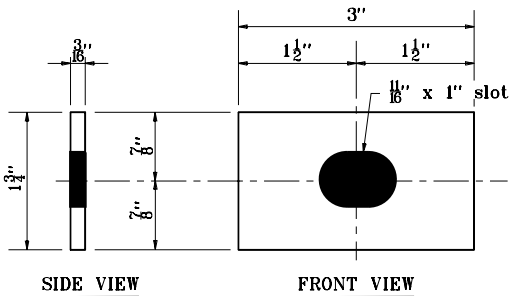
/s/ Richard L. VanCleave 3-03-03
DESIGN STANDARDS ENGINEER DATE

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

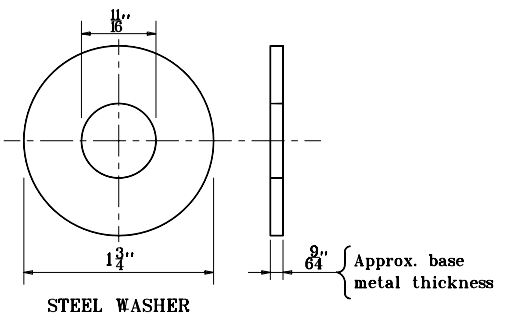


5/8" BUTTON HEAD BOLT

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**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

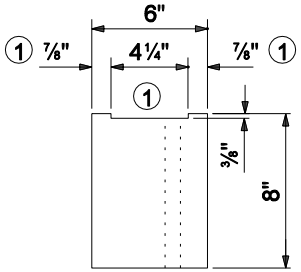
/s/ Anthony L. Uremovich 5-01-00
DESIGN STANDARDS ENGINEER — DATE

/s/ Firooz Zandi 5-01-00
CHIEF HIGHWAY ENGINEER — DATE

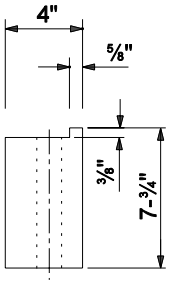
NOTES:

① These dimensions shall be adjusted as required to accommodate steel post flange.

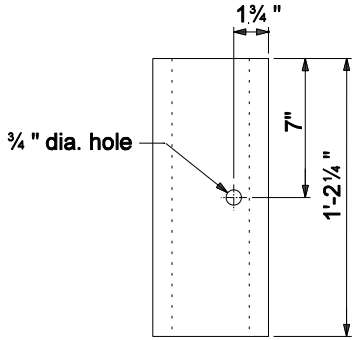
2 Timber blocks shown in either Detail A or Detail B may be used.



TOP VIEW

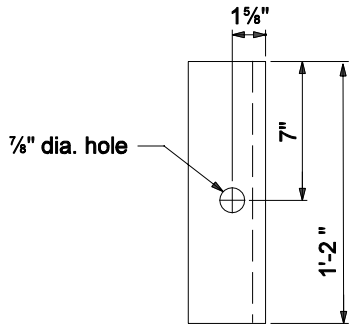


TOP VIEW



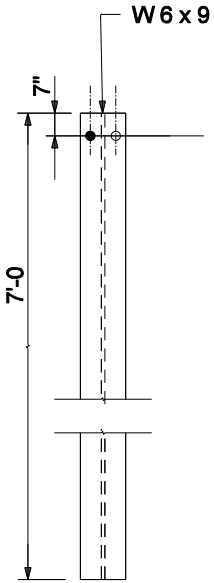
FRONT VIEW

TIMBER BLOCK DETAIL A

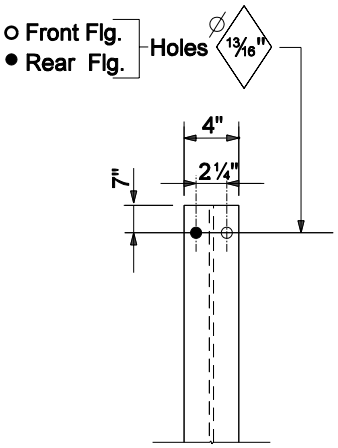


FRONT VIEW

TIMBER BLOCK DETAIL B



FRONT VIEW



FRONT VIEW

HOLE PATTERN

STEEL POST DETAIL

INDIANA DEPARTMENT OF TRANSPORTATION

W - BEAM
GUARDRAIL COMPONENTS

SEPTEMBER 2004

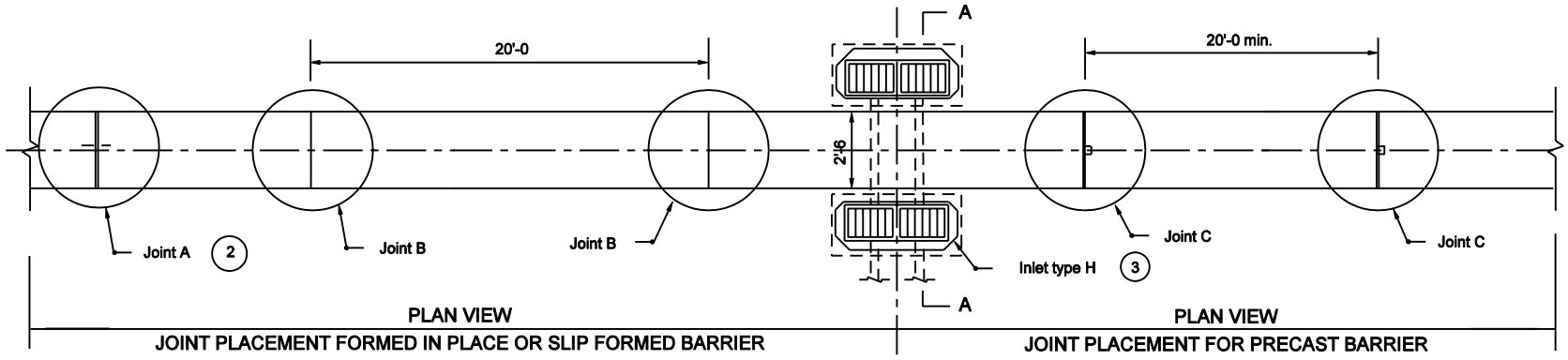
STANDARD DRAWING NO. E 601-WBGC-03

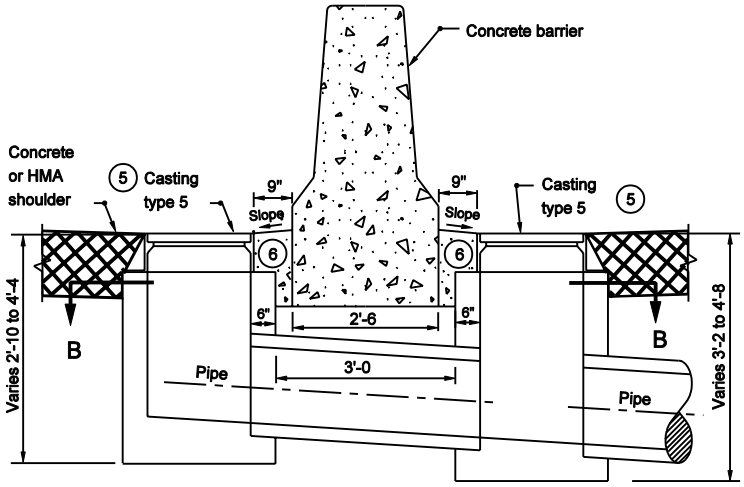
RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

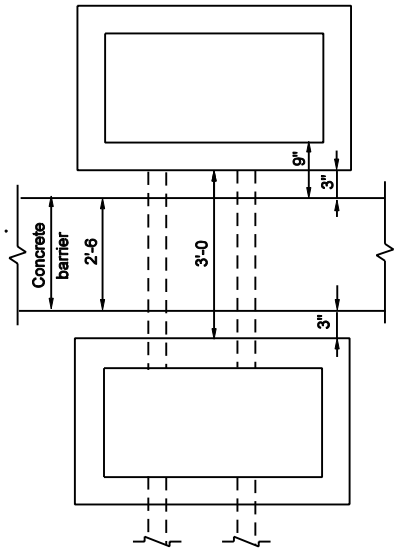
/s/ Richard L.VanCleave 3-01-04
DESIGN STANDARDS ENGINEER DATE

/s/ Richard K.Smutzer 3-01-04
CHIEF HIGHWAY ENGINEER DATE

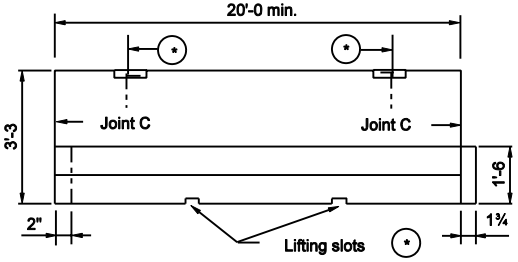




SECTION A-A



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 ¼" below the surface, and embeded 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 accomodate variations in handling equipment.

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.

INDIANA DEPARTMENT OF TRANSPORTATION

CONCRETE BARRIER DRAIN AND JOINT PLACEMENT

MARCH 2003

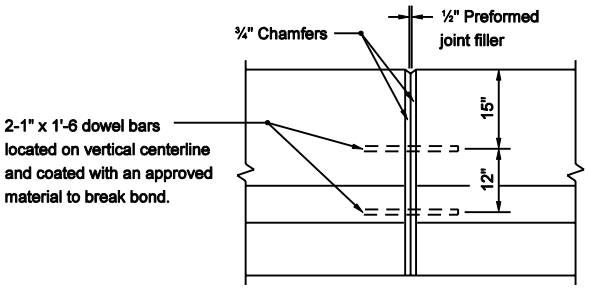
STANDARD DRAWING NO. E 602-CCMB-01

RICHARD L. VanCLEAVE REGISTERED NO. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

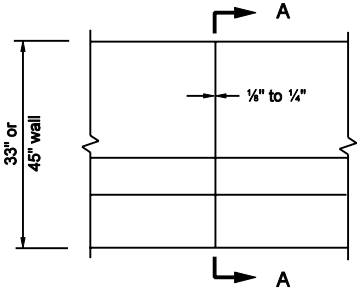
DESIGN STANDARDS ENGINEER

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

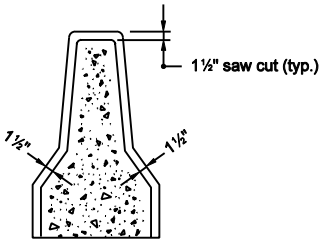
/s/ Richard K. Smutzer 3-03-03
CHIEF HIGHWAY ENGINEER DATE



JOINT A

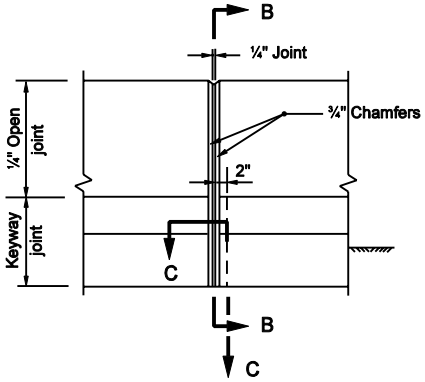


JOINT B

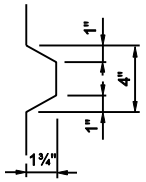


SECTION A-A

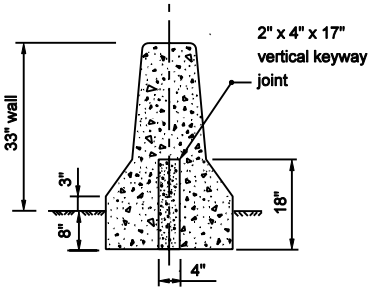
FORMED IN PLACE OR SLIP FORMED JOINTS



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

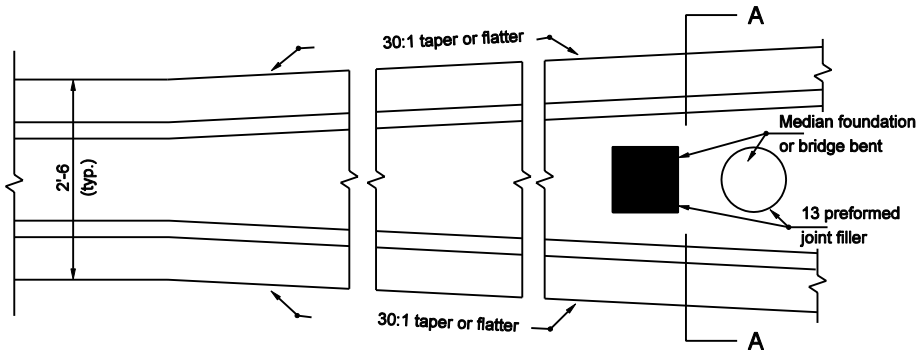
STANDARD DRAWING NO. E 602-CCMB-02

RICHARD L. VANCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

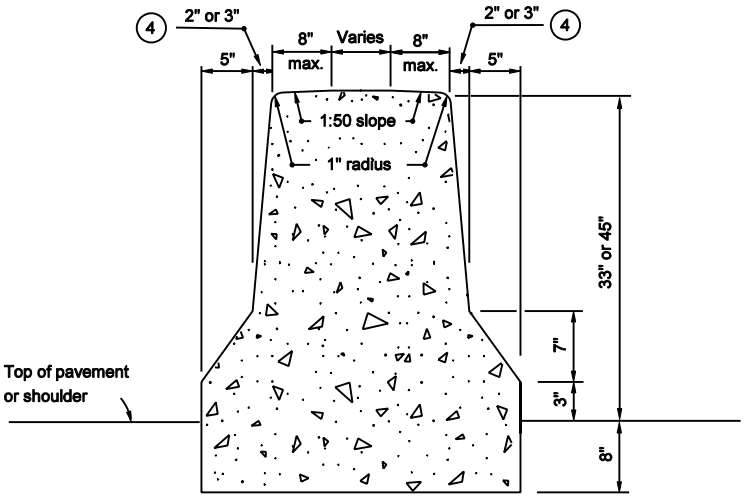
DESIGN STANDARDS ENGINEER

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

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

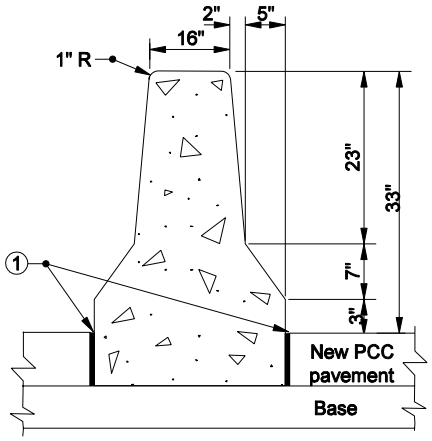
STANDARD DRAWING NO. E 602-CCMB-03

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

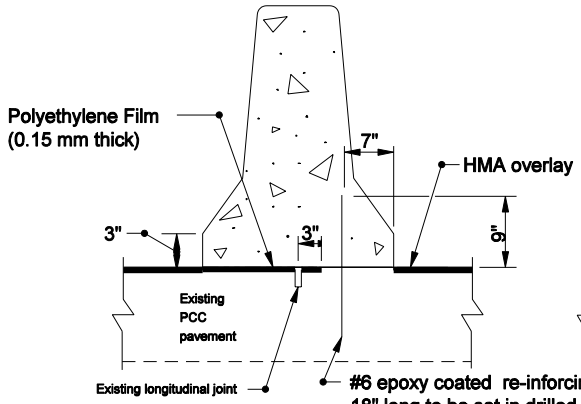
DESIGN STANDARDS ENGINEER

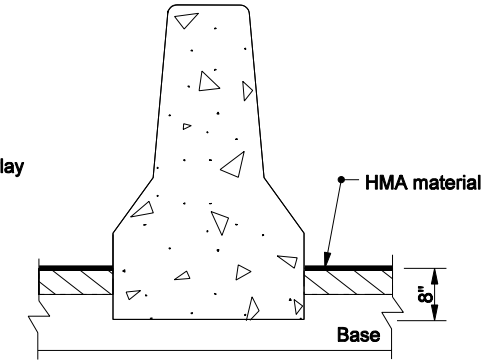
/s/ Richard L. VanCleave 3-03-03
DESIGN STANDARDS ENGINEER DATE

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



NEW PCC PAVEMENT

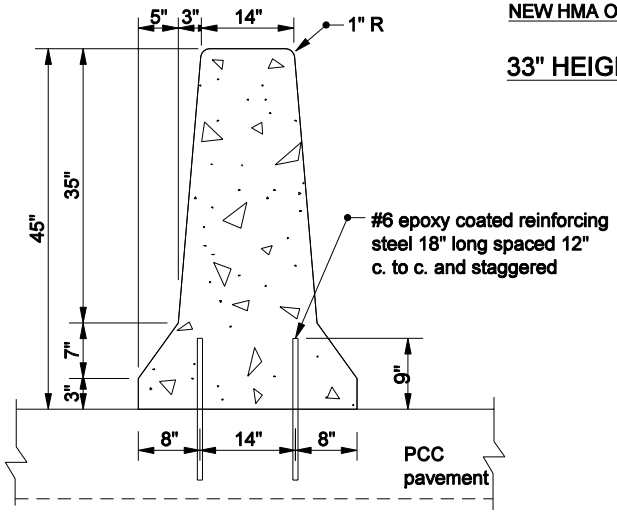




NEW HMA PAVEMENT

NEW HMA OVERLAY OVER EXISTING PCC PAVEMENT

33" HEIGHT CONCRETE BARRIER WALL



CONCRETE BARRIER WITH PCC PAVEMENT

45" HEIGHT CONCRETE BARRIER WALL

NOTES:

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

INDIANA DEPARTMENT OF TRANSPORTATION

CONCRETE BARRIER DETAILS

SEPTEMBER 2006

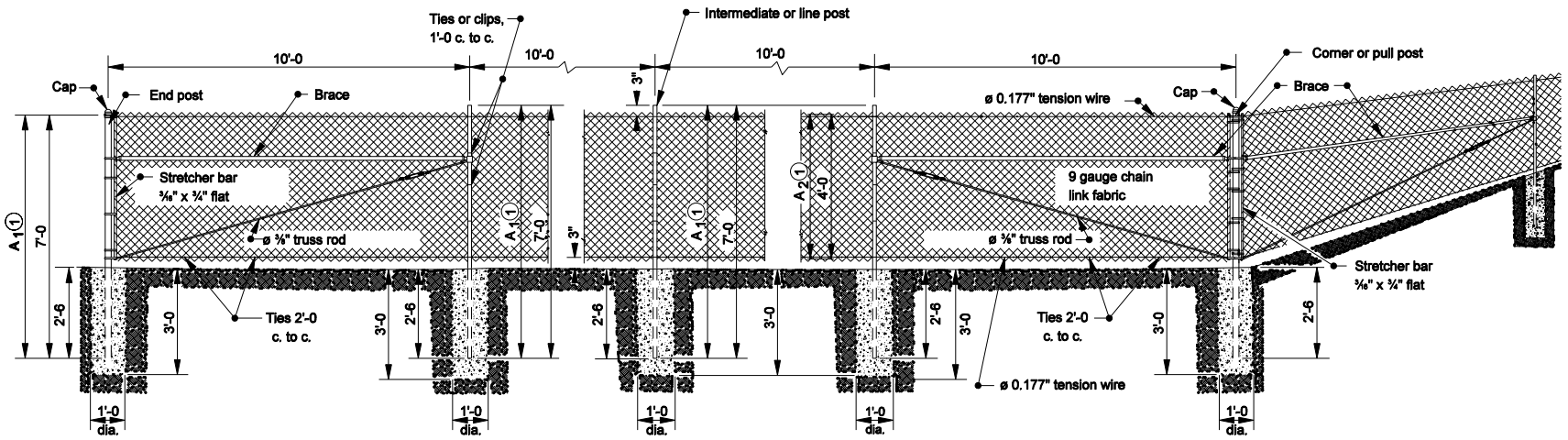
STANDARD DRAWING NO. E 602-CCMB-04

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

/s/ Richard L. VanCleave 9-01-06
DESIGN STANDARDS ENGINEER DATE

/s/ Richard K. Smutzer 9-01-06
CHIEF HIGHWAY ENGINEER DATE



RIGHT OF WAY FENCE

Steel Chain Link Fence

GENERAL NOTES

(1) For each additional 1'-0 in height increase dimensions A_1 and A_2 by 1'-0.

2. Dimensions as shown are for 4'-0 fence.

3. For chain link type stream crossing or depression detail see Standard Drawing E 603-CLTF-02 for dimensions and installation.

TUBULAR POST CHART								
	GROUP 1				GROUP 2			
HEIGHT OF FENCE	< 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	2½"	5.79	2	3.12	2½"	4.64
LINE POSTS	1¼"	2.27	2	3.65	1¼"	1.84	2	3.12
BRACE	1¼"	2.27	1¼"	2.27	1¼"	1.84	1¼"	1.84

INDIANA DEPARTMENT OF TRANSPORTATION

CHAIN LINK TYPE FENCE

MARCH 2006

STANDARD DRAWING NO. E 603-CLTF-01

RICHARD L. VANCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

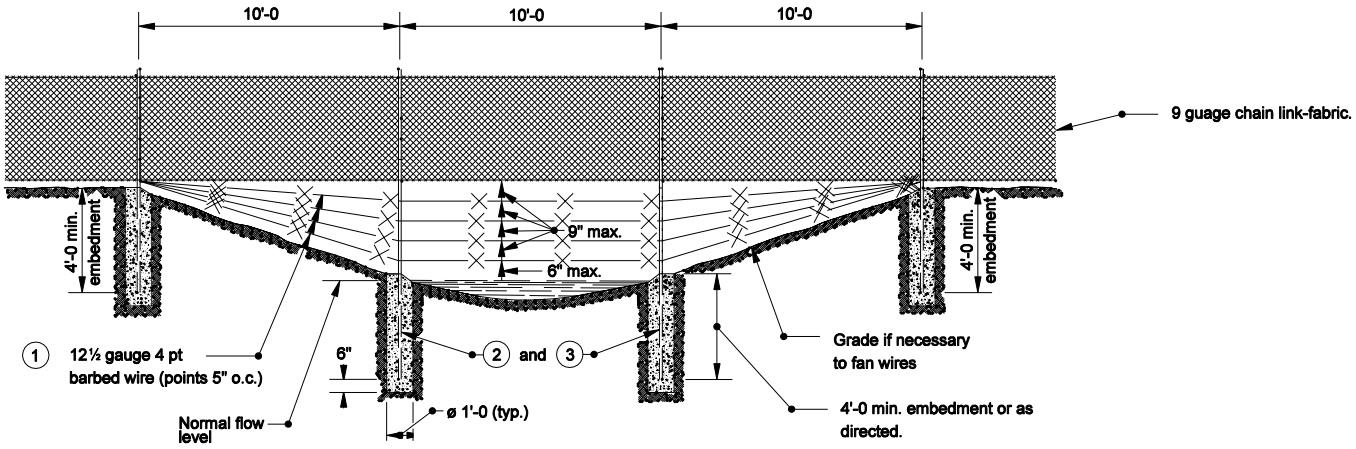
DESIGN STANDARDS ENGINEER

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

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

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

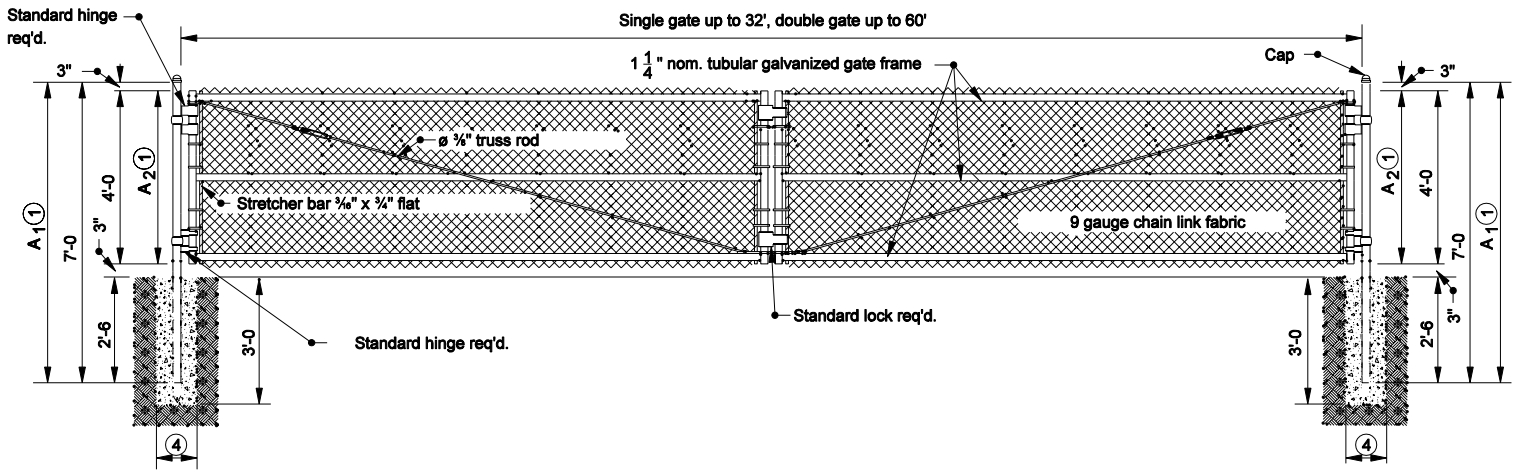
STANDARD DRAWING NO. E 603-CLTF-02

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

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

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



CHAIN LINK GATE

GENERAL NOTES

(1) For each additional 1'-0 in height increase dimension A_1 and A_2 by 1'-0.

2. See Standard Drawing E 603-CLTF-01 for the tubular post chart.

3. Dimensions as shown are for 4'-0 fence.

(4) Diameter equals 10" plus the outside diameter of the post.

INDIANA DEPARTMENT OF TRANSPORTATION

CHAIN LINK TYPE GATE

SEPTEMBER 2004

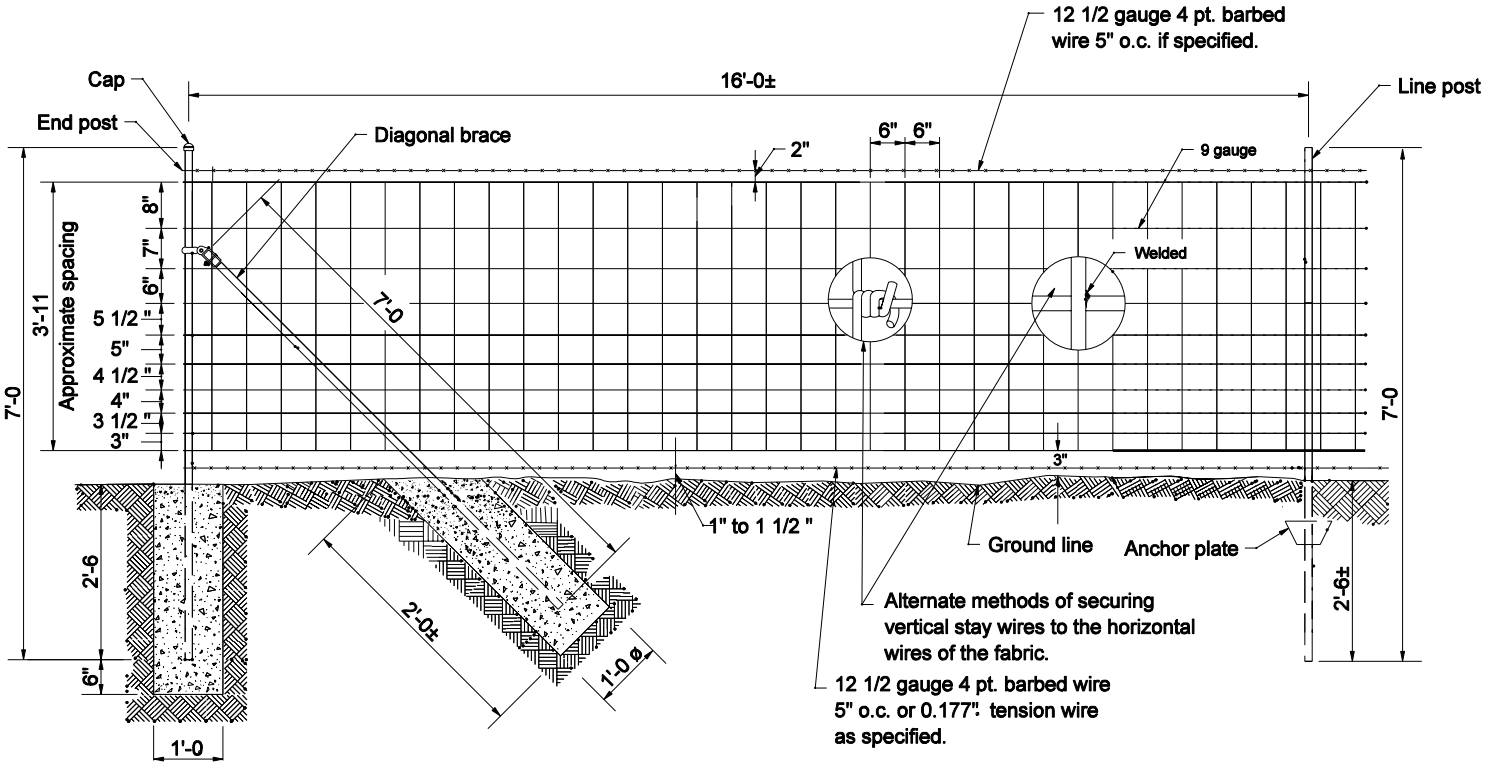
STANDARD DRAWING NO. E 603-CLTF-03

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

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

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



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

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

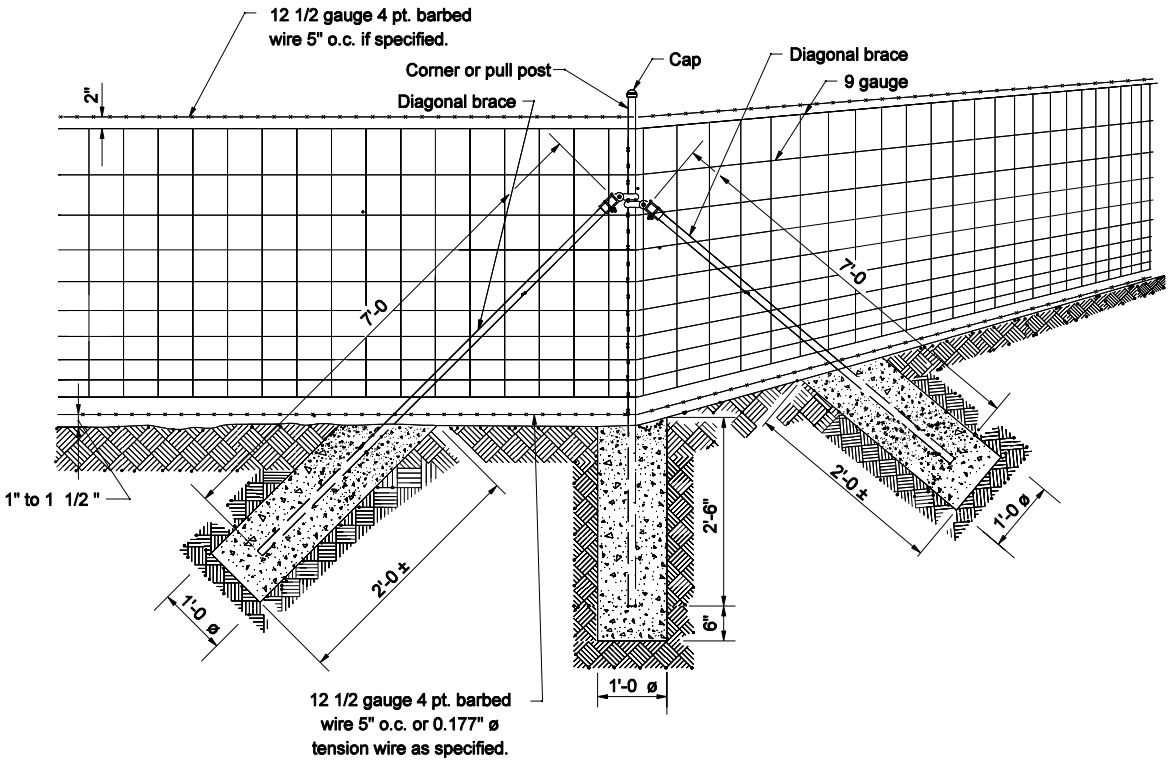
DESIGN STANDARDS ENGINEER

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

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

GENERAL NOTES

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



FARM FIELD TYPE FENCE CORNER

INDIANA DEPARTMENT OF TRANSPORTATION

FARM FIELD TYPE FENCE

SEPTEMBER 2004

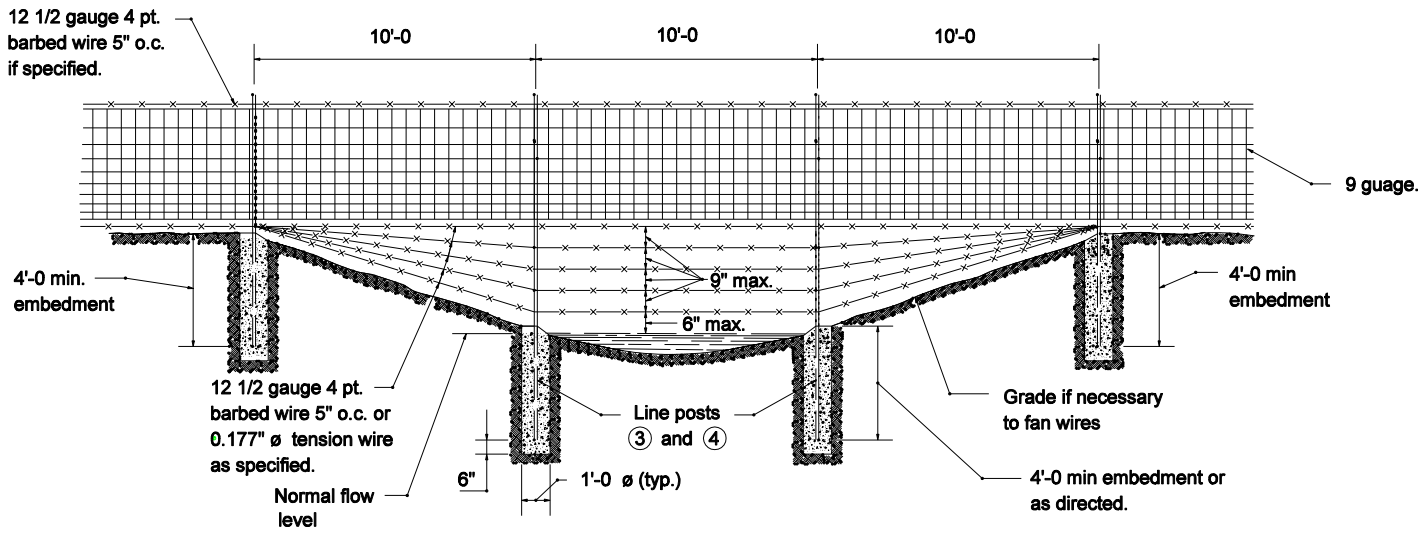
STANDARD DRAWING NO. E 603-FFTF-02

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

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

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



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. ø 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

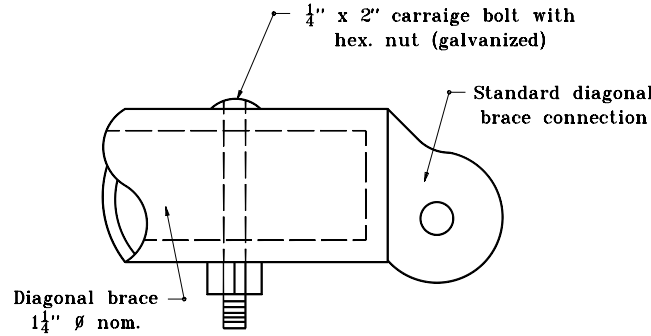
STANDARD DRAWING NO. E 603-FFTF-03

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

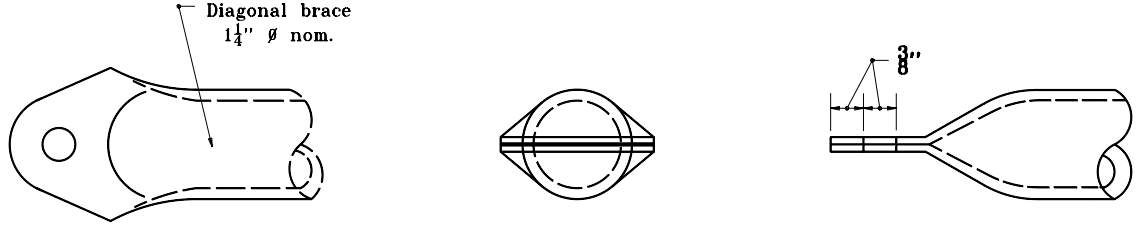
DESIGN STANDARDS ENGINEER

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

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



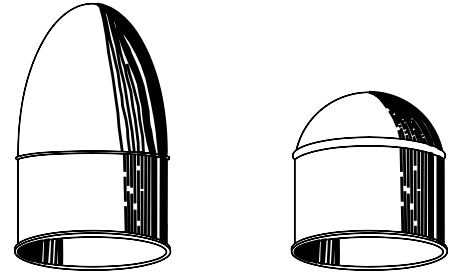
STANDARD METHOD



SIDE VIEW | END VIEW | TOP VIEW

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**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

DETAILS PLACED IN THIS FORMAT 7-27-99

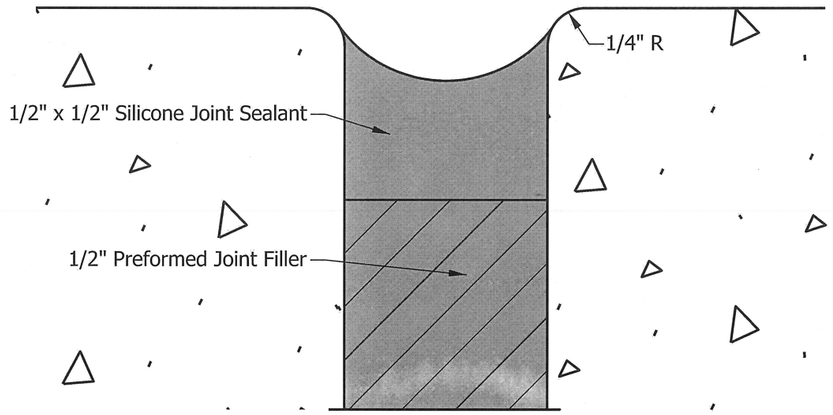
/s/ Anthony L. Uremovich 7-27-99
DESIGN STANDARDS ENGINEER DATE

/s/ Firooz Zandi 7-27-99
CHIEF HIGHWAY ENGINEER DATE

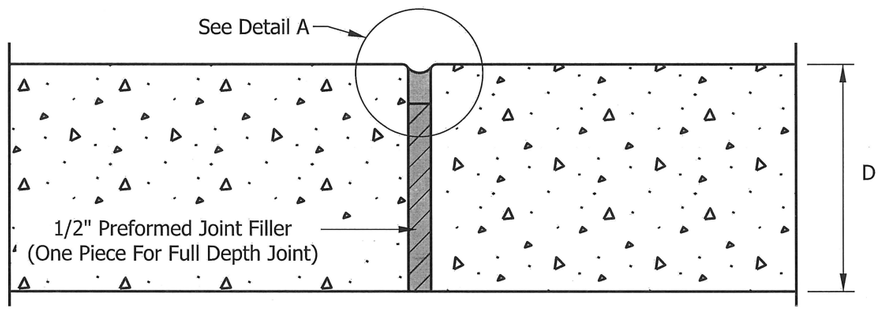
ORIGINALLY APPROVED 4-03-95

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

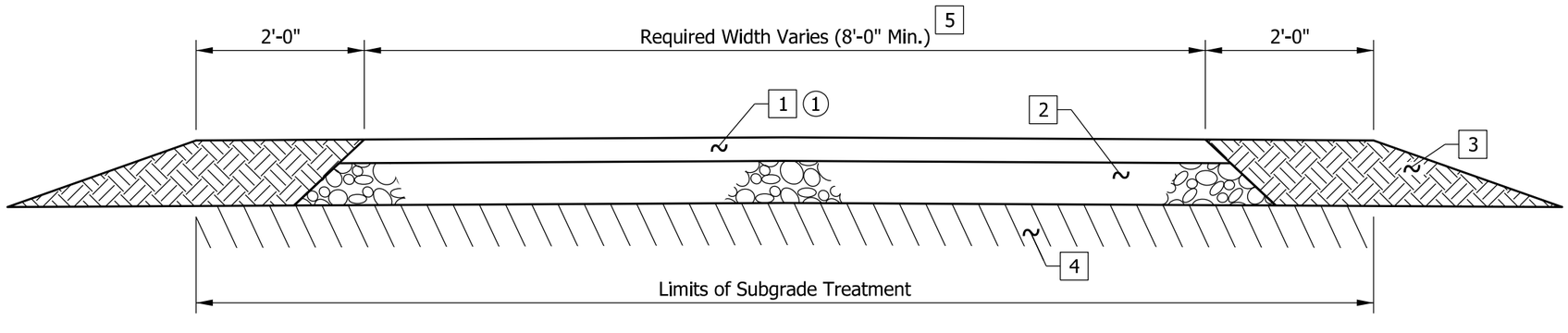
SEPTEMBER 2015

STANDARD DRAWING NO. E 604-CCSJ-01

ELIZABETH W. PHILLIPS
REGISTERED
No. 10200124
STATE OF INDIANA
PROFESSIONAL ENGINEER

/s/ Elizabeth W. Phillips *12/02/14*
DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller *12/02/14*
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 B, on 220 lb/yd² HMA Intermediate, Type B
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 2017

STANDARD DRAWING NO. E 604-NVUF-01

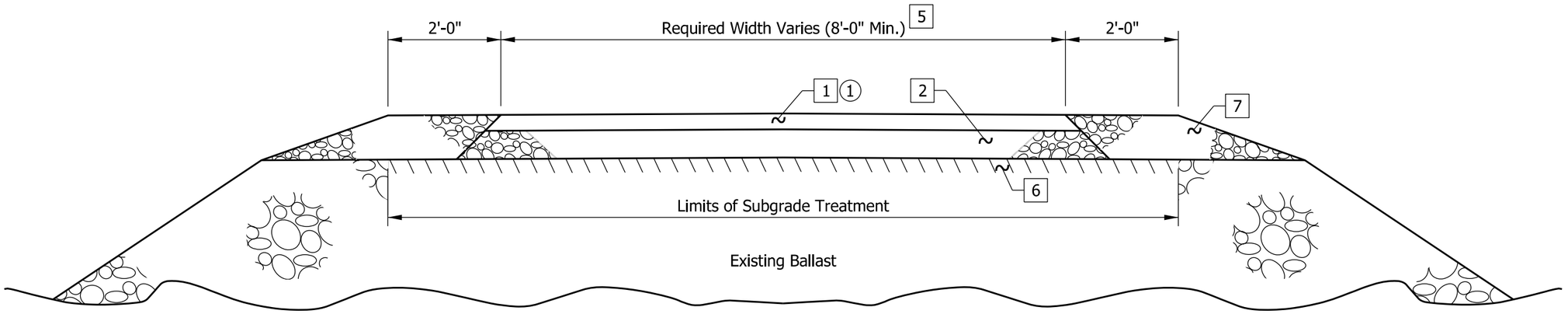
ELIZABETH W. PHILLIPS
REGISTERED
No. 10200124
STATE OF INDIANA
PROFESSIONAL ENGINEER

/s/ Elizabeth W. Phillips 04/27/17
DESIGN STANDARDS ENGINEER DATE

/s/ John Leckie 04/28/17
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 B, on 220 lb/yd² HMA Intermediate, Type B

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

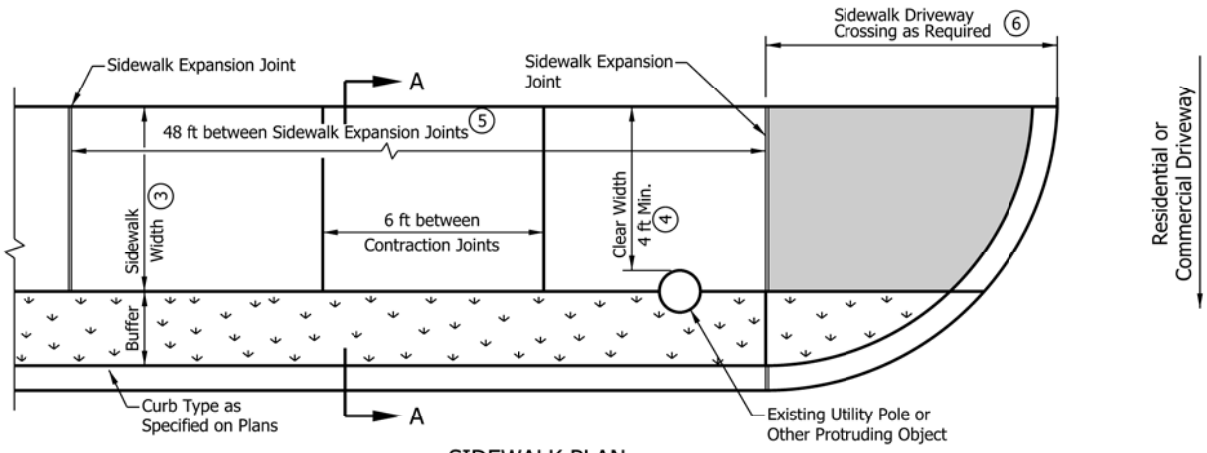
SEPTEMBER 2017

STANDARD DRAWING NO. E 604-NVUF-02

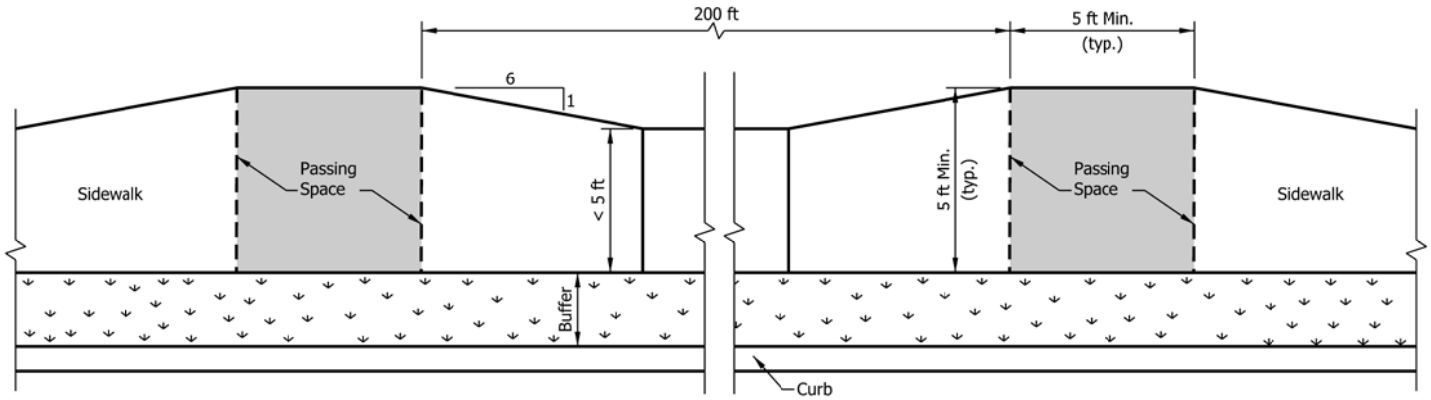
ELIZABETH W. PHILLIPS
REGISTERED
No. 10200124
STATE OF INDIANA
PROFESSIONAL ENGINEER

/s/ Elizabeth W. Phillips 04/27/17
DESIGN STANDARDS ENGINEER DATE

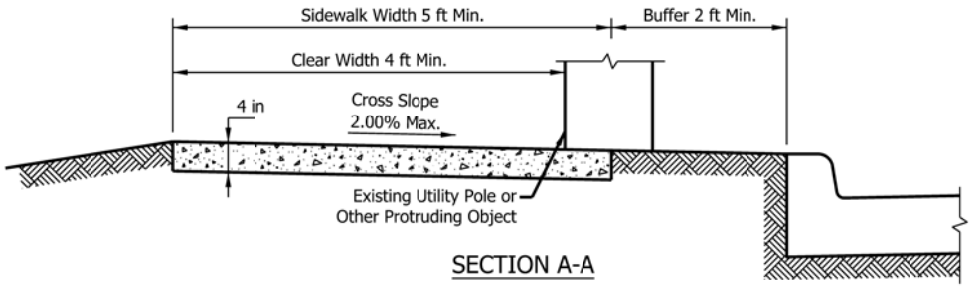
/s/ John Leckie 04/28/17
CHIEF ENGINEER DATE



SIDEWALK PLAN



PASSING SPACE



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 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

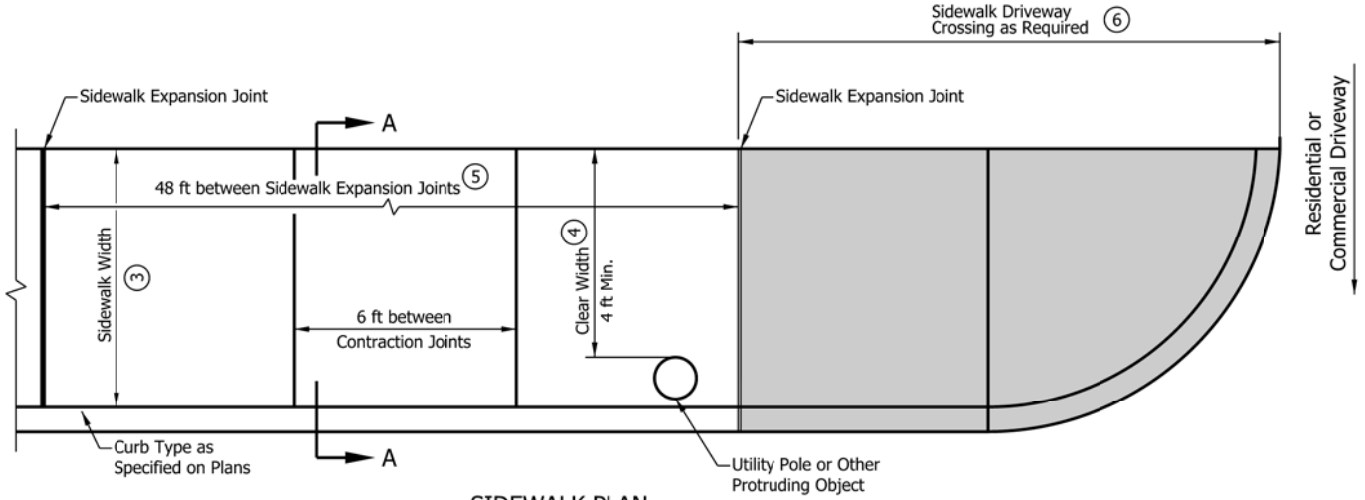
SEPTEMBER 2016

STANDARD DRAWING NO. E 604-SDWK-01

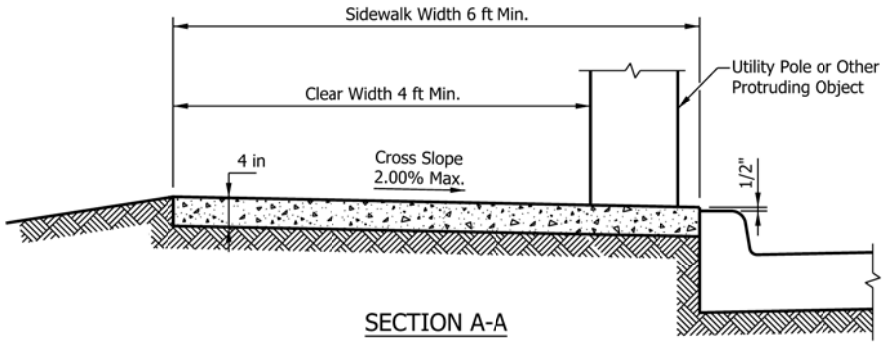
ELIZABETH W. PHILLIPS
REGISTERED
No. 10200124
STATE OF INDIANA
PROFESSIONAL ENGINEER

/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

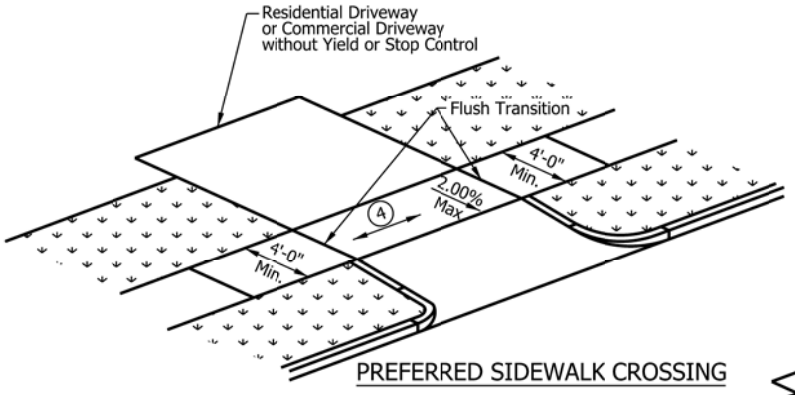
SEPTEMBER 2016

STANDARD DRAWING NO. E 604-SDWK-02

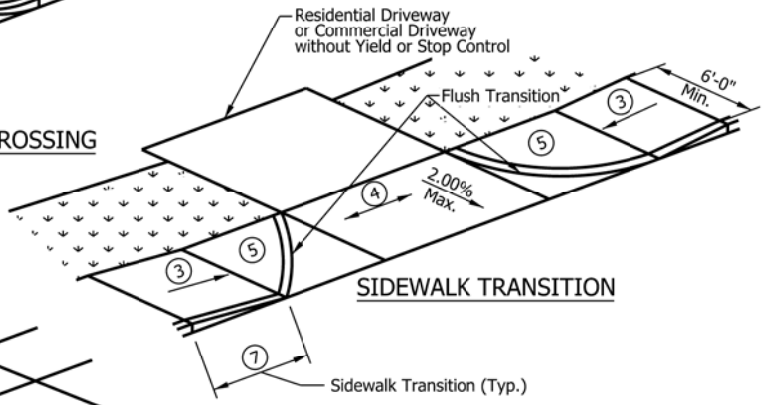
ELIZABETH W. PHILLIPS REGISTERED No. 10200124 STATE OF INDIANA PROFESSIONAL ENGINEER

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

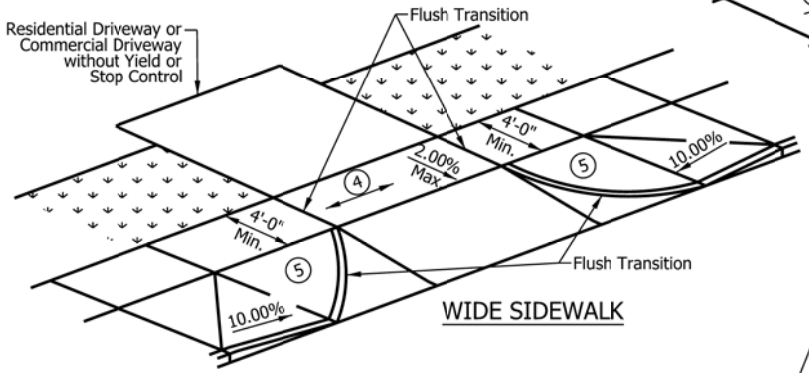
/s/ Mark A. Miller 03/18/16
CHIEF ENGINEER DATE



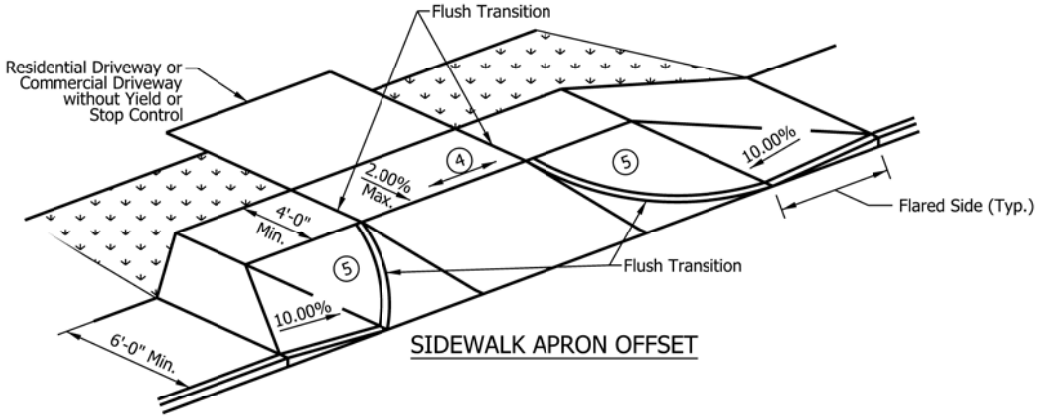
PREFERRED SIDEWALK CROSSING



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

ELIZABETH W. PHILLIPS
REGISTERED
No. 10200124
STATE OF INDIANA
PROFESSIONAL ENGINEER

/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:

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. 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.

3. 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.

4. 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.

5. 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.

6. 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.

7. 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.

8. Running Slope. The running slope of a ramp, blended transition, or turning space shall be measured parallel to the direction of pedestrian travel.
   a. A running slope of 2.00% or less is considered level.
   b. A ramp shall have a maximum running slope of 8.33% but shall not require a ramp length to exceed 15 ft.
   c. A blended transition shall have a maximum running slope of 5.00%.
   d. A turning space shall have a maximum running slope of 2.00%.

9. Width. Unless otherwise noted, minimum width of a ramp, blended transition, or turning space, excluding flared sides or return curb, shall be 4 ft.

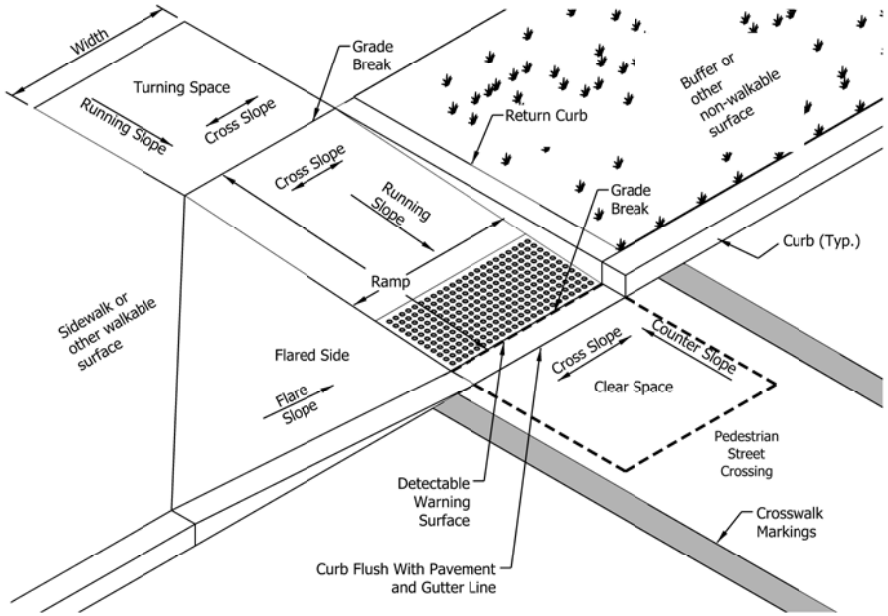
10. Grade Break. A grade break at the top and bottom of a ramp, blended transition, or turning space shall be perpendicular to the running slope. Grade breaks shall not be within the ramp, blended transition, turning space, or detectable warning surface. Grade breaks shall be flush. Vertical discontinuities 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.

11. Cross Slope Exceptions. The cross slope of a ramp, blended transition, or turning space shall be measured perpendicular to the direction of pedestrian travel.
   a. The maximum cross slope at a pedestrian street crossing without yield or stop control shall be 5.00%.
   b. The maximum cross slope at a pedestrian street crossing with yield or stop control shall be 2.00%.
   c. The maximum cross slope at a midblock crossing shall be the established grade of the adjacent roadway.

12. Objects such as a utility cover, vault frame, and grating shall be placed outside the curb ramp.

13. Curb ramps shall be placed within the marked crosswalk area.

14. 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

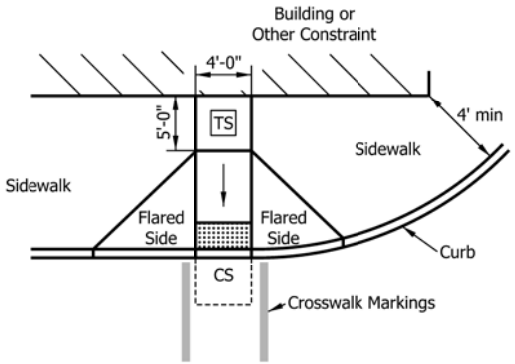
SEPTEMBER 2016

STANDARD DRAWING NO. E 604-SWCR-01

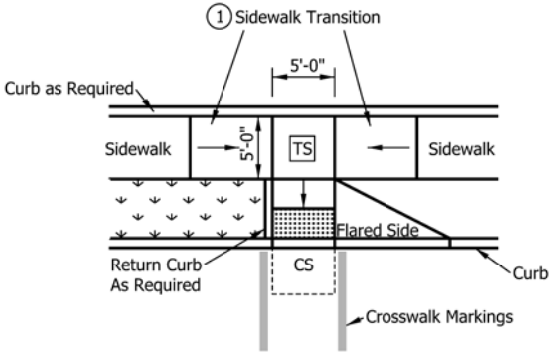
ELIZABETH W. PHILLIPS REGISTERED No. 10200124 STATE OF INDIANA PROFESSIONAL ENGINEER

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

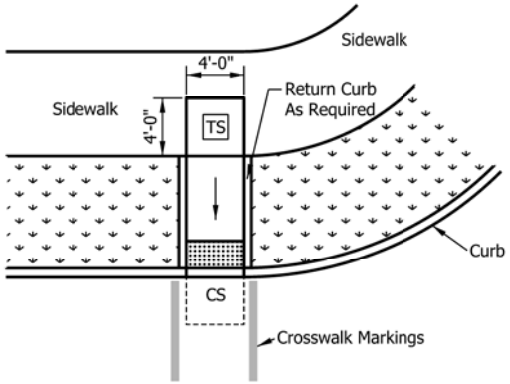
/s/ Mark A. Miller 03/18/16
CHIEF ENGINEER DATE



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
- TS — Turning Space
- CS — Clear Space

INDIANA DEPARTMENT OF TRANSPORTATION

PERPENDICULAR CURB RAMP
TYPICAL PLACEMENT

SEPTEMBER 2016

STANDARD DRAWING NO. E 604-SWCR-02

ELIZABETH W. PHILLIPS
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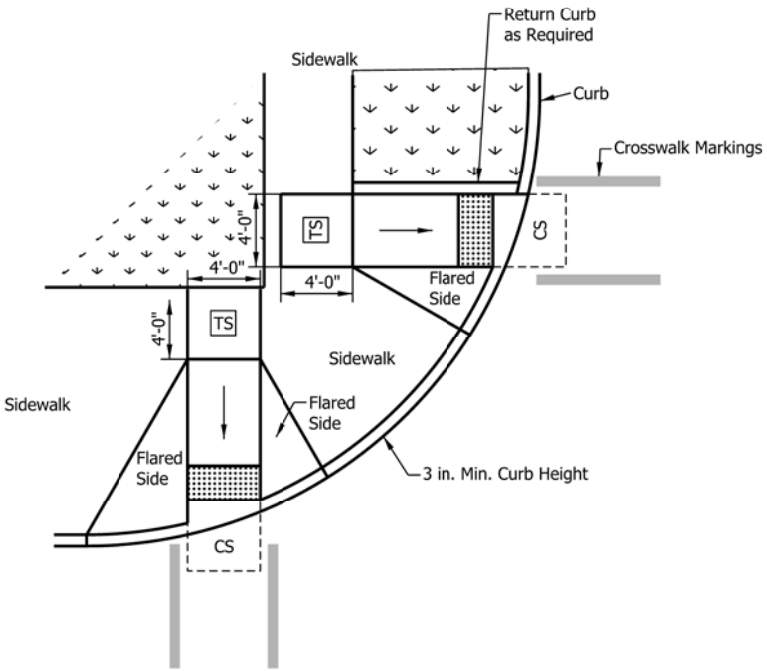
No. 10200124
STATE OF INDIANA
PROFESSIONAL ENGINEER

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

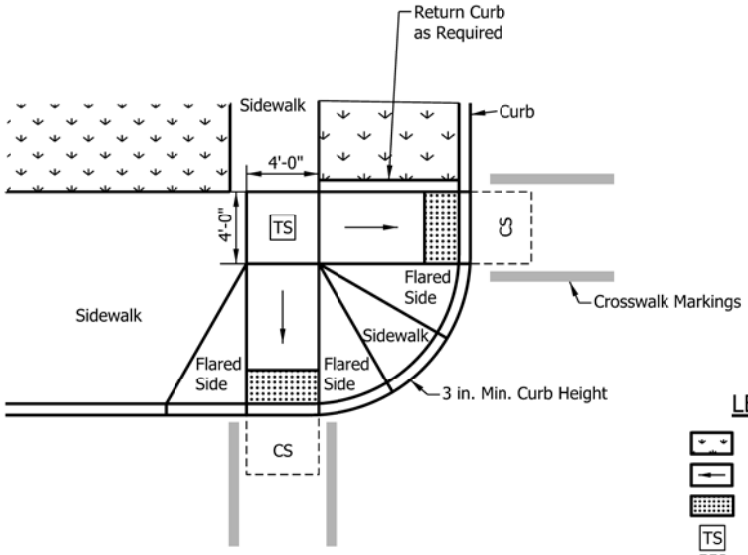
/s/ Mark A. Miller 03/18/16
CHIEF ENGINEER DATE

NOTES:

1. 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.



PAIRED PERPENDICULAR
CURB RAMPS AT LARGE RADIUS



PAIRED PERPENDICULAR
CURB RAMPS AT SMALL RADIUS

LEGEND:

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

INDIANA DEPARTMENT OF TRANSPORTATION

PAIRED PERPENDICULAR CURB RAMPS
TYPICAL PLACEMENT

SEPTEMBER 2016

STANDARD DRAWING NO. E 604-SWCR-03

ELIZABETH W. PHILLIPS
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No. 10200124
STATE OF INDIANA
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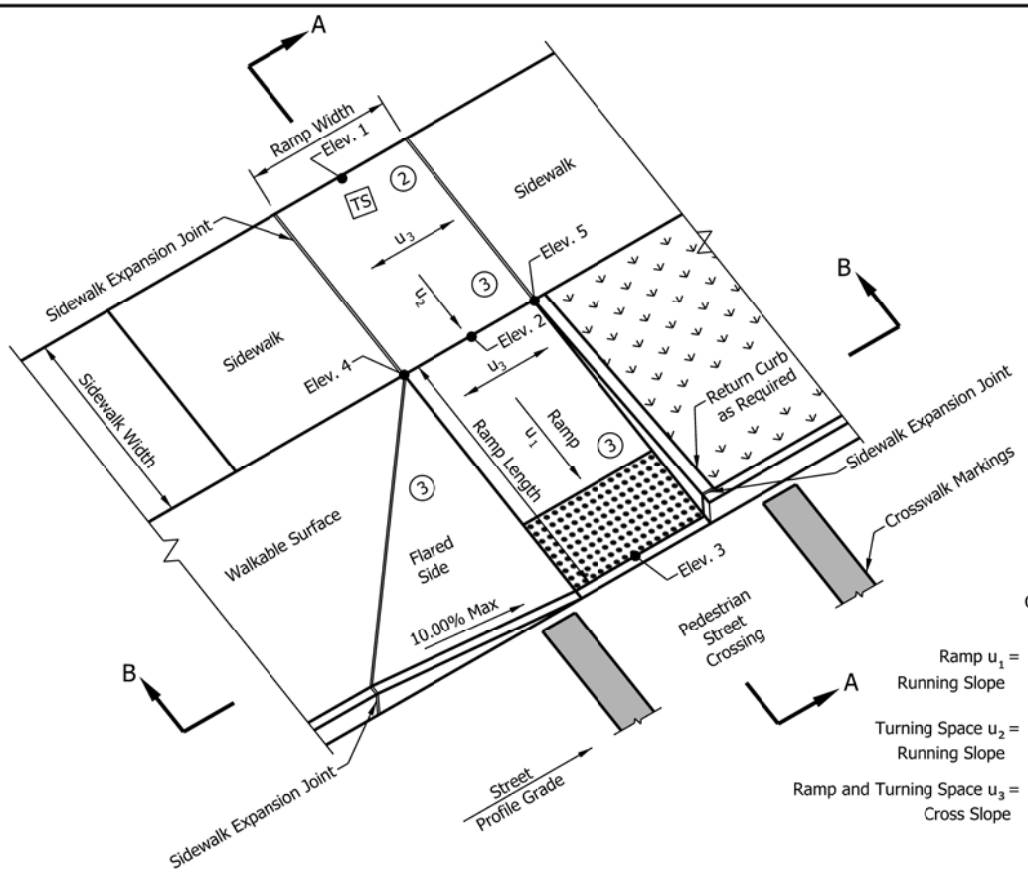
/s/ Elizabeth W. Phillips 03/15/16
DESIGN STANDARDS ENGINEER DATE

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

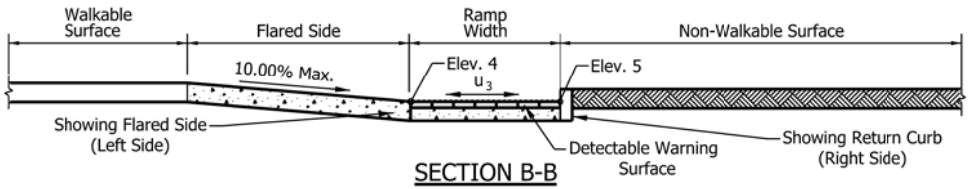


Component Slope Equations:

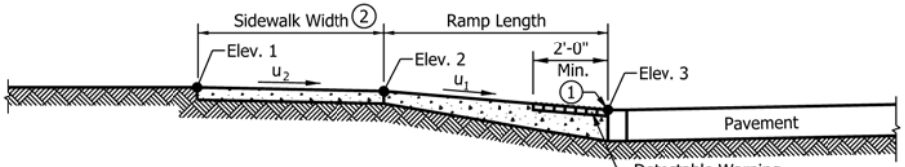
Ramp u_1 = Running Slope: $\frac{|\text{Elev. 2 - Elev. 3}|}{\text{Ramp Length}} \leq 8.33\%$

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

Ramp and Turning Space u_3 = Cross Slope: $\frac{|\text{Elev. 4 - Elev. 5}|}{\text{Ramp or Turning Space Width}} \leq 2.00\%$ (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
- TS — Turning Space

INDIANA DEPARTMENT OF TRANSPORTATION

PERPENDICULAR CURB RAMP COMPONENT DETAILS

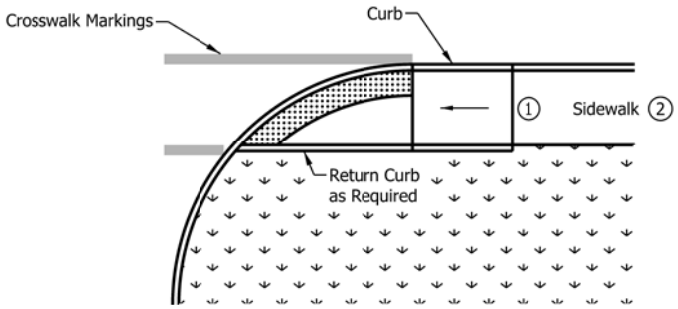
SEPTEMBER 2016

STANDARD DRAWING NO. E 604-SWCR-04

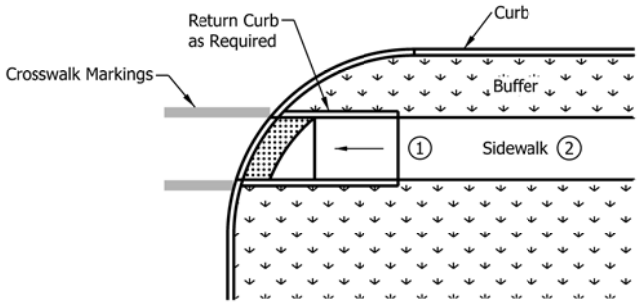
ELIZABETH W. PHILLIPS — REGISTERED — No. 10200124 — STATE OF INDIANA — PROFESSIONAL ENGINEER

/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

ELIZABETH W. PHILLIPS
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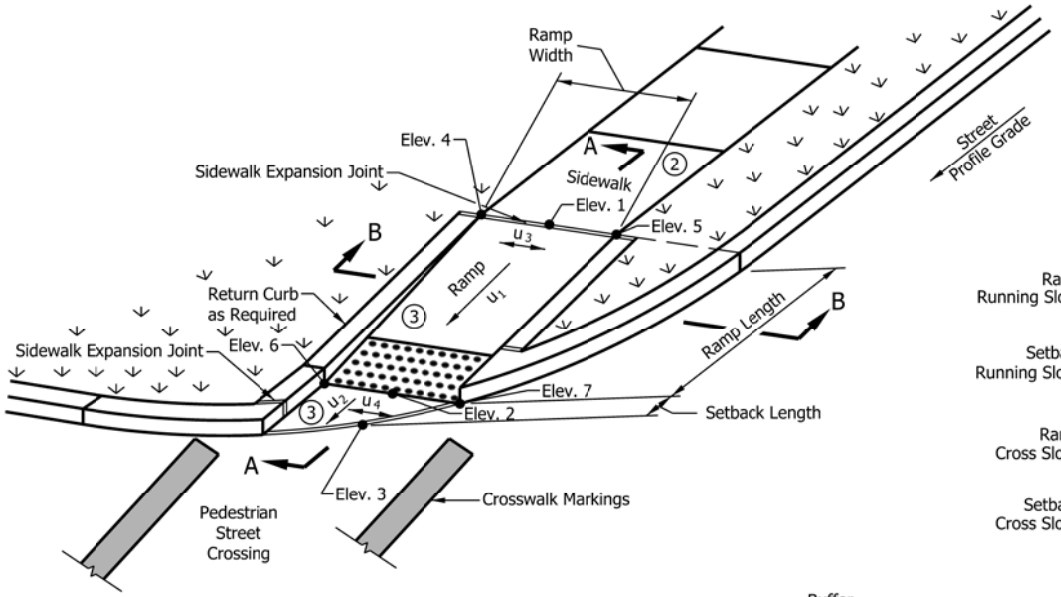
PROFESSIONAL ENGINEER

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

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



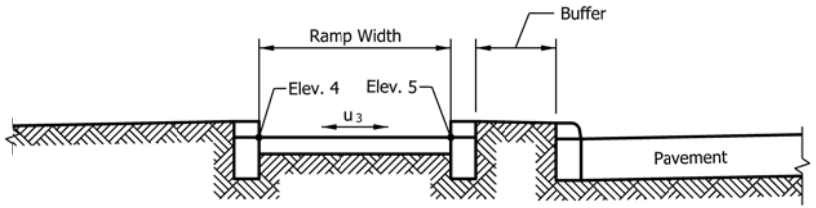
Component Slope Equations:

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

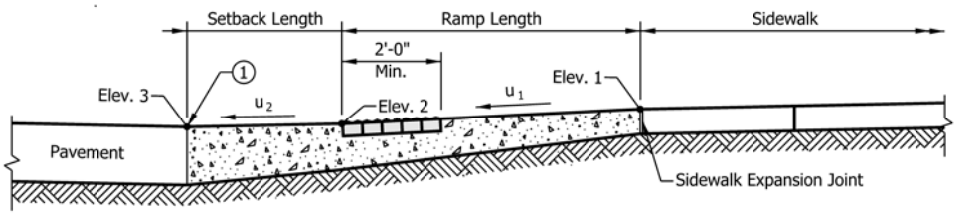
$$\text{Setback Running Slope } u_2 = \frac{|\text{Elev. 2} - \text{Elev. 3}|}{\text{Setback Length}} \leq \text{Profile Grade of Adjacent Street}$$

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

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



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

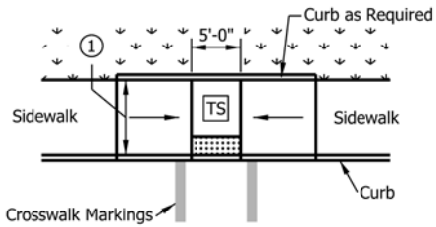
SEPTEMBER 2016

STANDARD DRAWING NO. E 604-SWCR-06

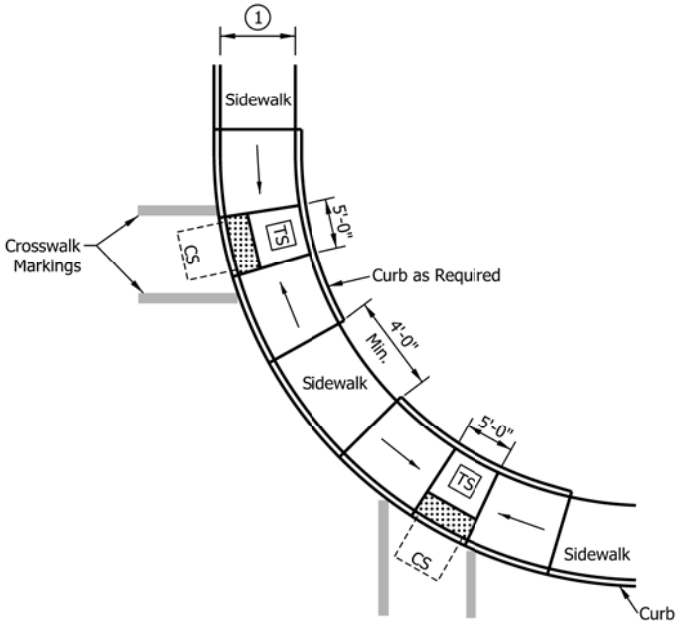
ELIZABETH W. PHILLIPS REGISTERED No. 10200124 STATE OF INDIANA PROFESSIONAL ENGINEER

/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
- TS — Turning Space
- CS — Clear Space

INDIANA DEPARTMENT OF TRANSPORTATION

PAIRED PARALLEL CURB RAMPS AND MIDBLOCK CROSSING CURB RAMP TYPICAL PLACEMENT

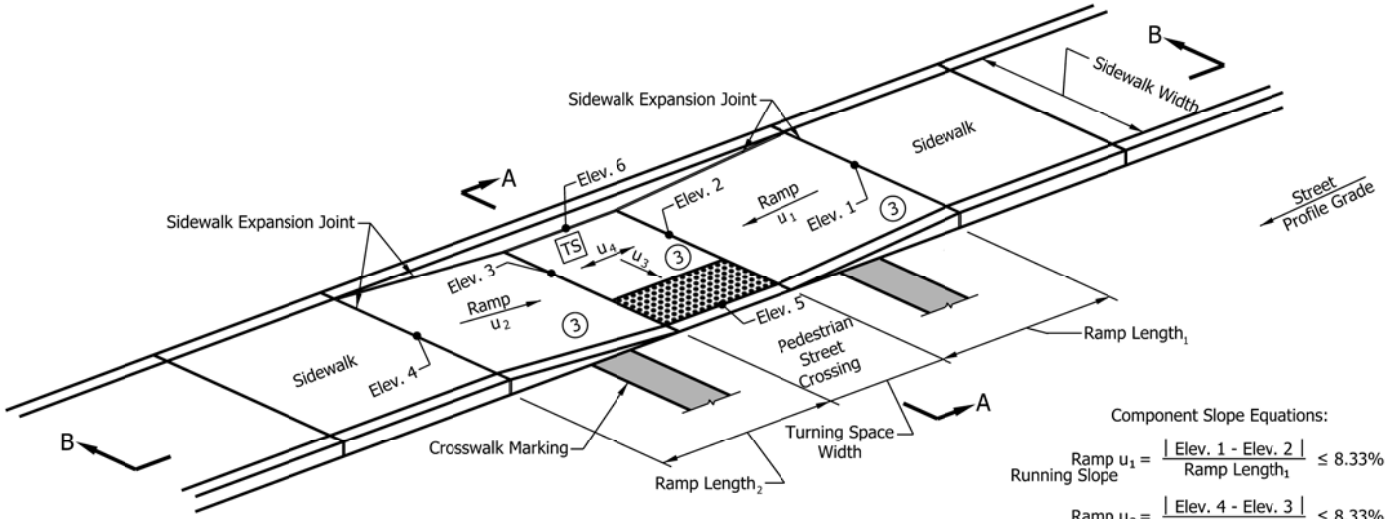
SEPTEMBER 2016

STANDARD DRAWING NO. E 604-SWCR-07

ELIZABETH W. PHILLIPS — REGISTERED — No. 10200124 — STATE OF INDIANA — PROFESSIONAL ENGINEER

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

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



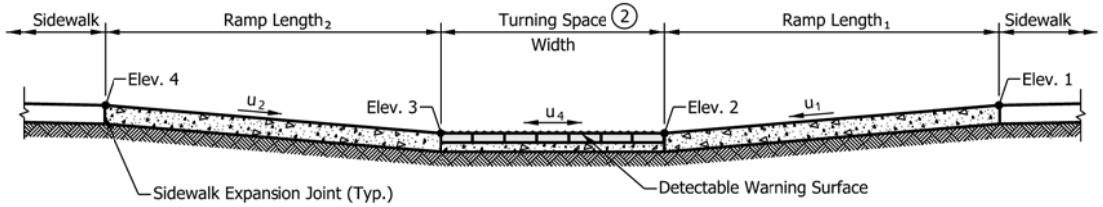
Component Slope Equations:

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

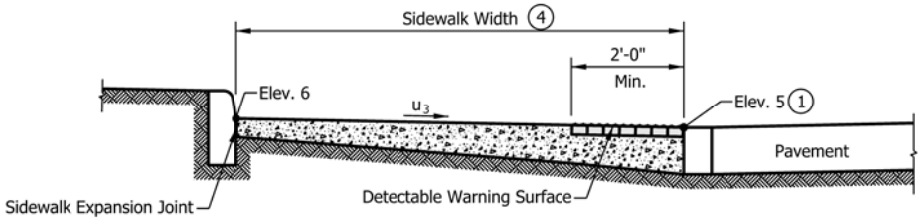
$$\text{Ramp Running Slope } u_2 = \frac{|\text{Elev. 4} - \text{Elev. 3}|}{\text{Ramp Length}_2} \leq 8.33\%$$

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

$$\text{Turning Space Cross Slope } u_4 = \frac{|\text{Elev. 2} - \text{Elev. 3}|}{\text{Turning Space Width}} \leq 2.00\% \ (5)$$



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
- TS — Turning Space

INDIANA DEPARTMENT OF TRANSPORTATION

PARALLEL CURB RAMP COMPONENT DETAILS

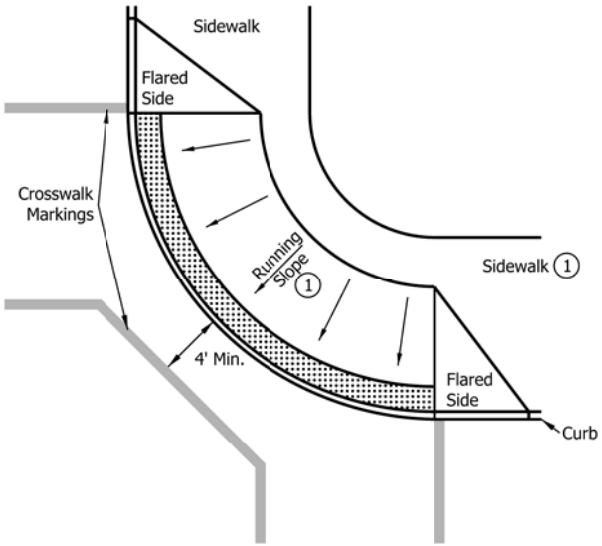
SEPTEMBER 2016

STANDARD DRAWING NO. E 604-SWCR-08

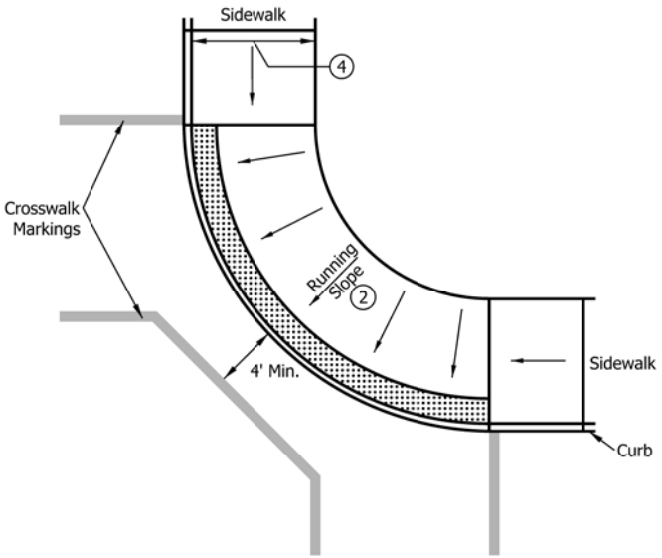
ELIZABETH W. PHILLIPS — REGISTERED — No. 10200124 — STATE OF INDIANA — PROFESSIONAL ENGINEER

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

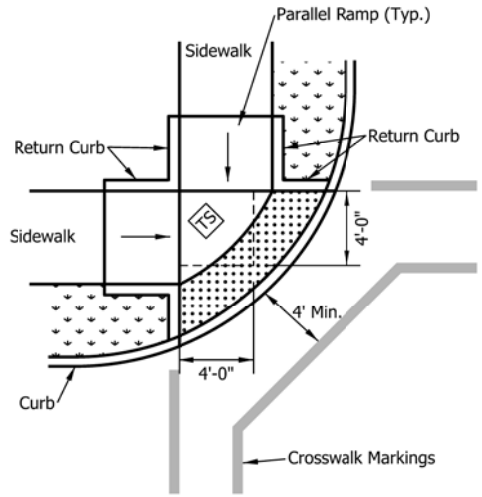
/s/ Mark A. Miller 03/18/16
CHIEF ENGINEER DATE



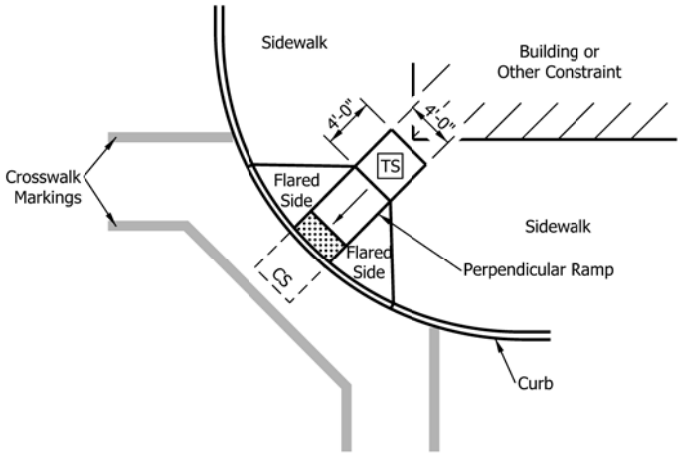
BLENDED TRANSITION CURB RAMP
WITH RUNNING SLOPE > 2.00%



BLENDED 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
- TS — Turning Space
- CS — Clear Space

INDIANA DEPARTMENT OF TRANSPORTATION

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

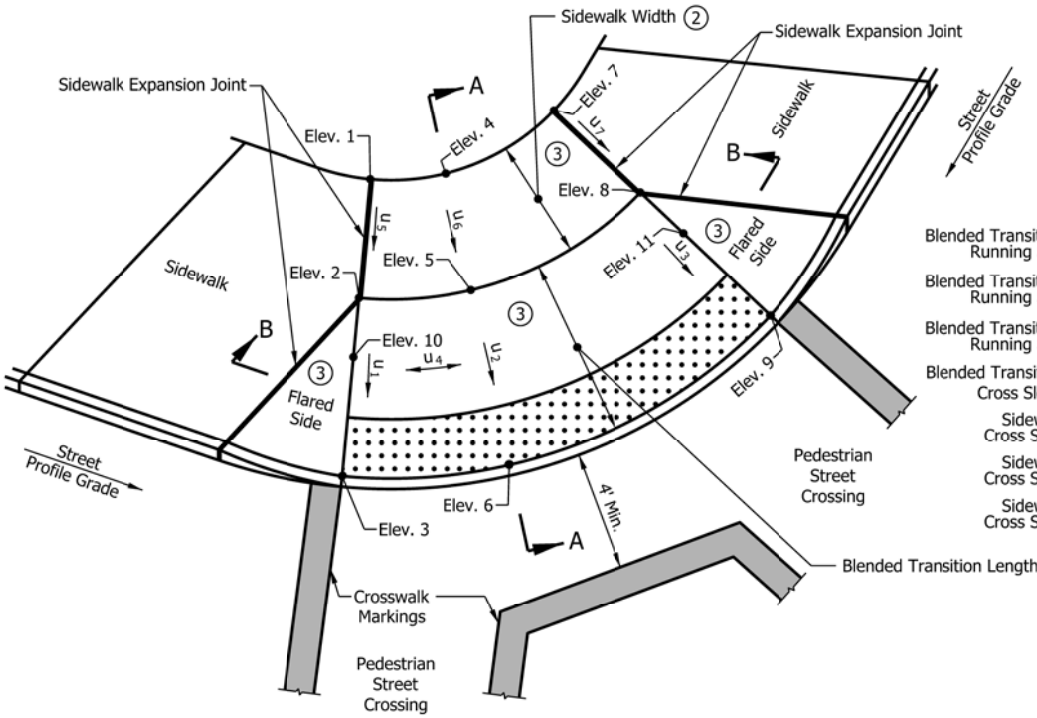
SEPTEMBER 2016

STANDARD DRAWING NO. E 604-SWCR-09

ELIZABETH W. PHILLIPS REGISTERED No. 10200124 STATE OF INDIANA PROFESSIONAL ENGINEER

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

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



Component Slope Equations:

$$\text{Blended Transition } u_1 \text{ Running Slope} = \frac{|\text{Elev. 2} - \text{Elev. 3}|}{\text{Blended Transition Length}} \leq 2.00\% \ (2)$$

$$\text{Blended Transition } u_2 \text{ Running Slope} = \frac{|\text{Elev. 5} - \text{Elev. 6}|}{\text{Blended Transition Length}} \leq 2.00\% \ (2)$$

$$\text{Blended Transition } u_3 \text{ Running Slope} = \frac{|\text{Elev. 8} - \text{Elev. 9}|}{\text{Blended Transition Length}} \leq 2.00\% \ (2)$$

$$\text{Blended Transition } u_4 \text{ Cross Slope} = \frac{|\text{Elev. 10} - \text{Elev. 11}|}{\text{Blended Transition Width}} \leq 2.00\% \ (4)$$

$$\text{Sidewalk } u_5 \text{ Cross Slope} = \frac{|\text{Elev. 1} - \text{Elev. 2}|}{\text{Sidewalk Width}} \leq 2.00\%$$

$$\text{Sidewalk } u_6 \text{ Cross Slope} = \frac{|\text{Elev. 4} - \text{Elev. 5}|}{\text{Sidewalk Width}} \leq 2.00\%$$

$$\text{Sidewalk } u_7 \text{ Cross Slope} = \frac{|\text{Elev. 7} - \text{Elev. 8}|}{\text{Sidewalk Width}} \leq 2.00\%$$

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.

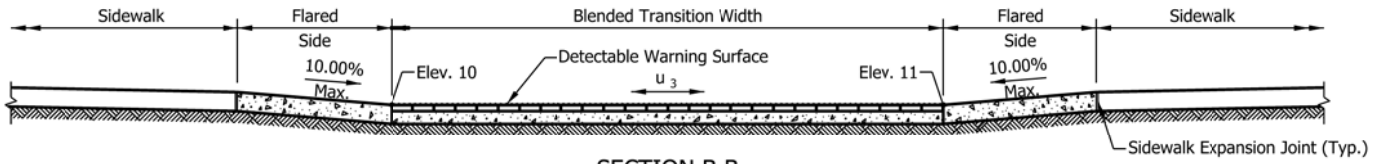
5. See Standard Drawing E 604-SWCR-12, -13, and -14 for Detectable Warning Surface placement, configuration, and details.

6. See Standard Drawing E 604-CCSJ-01 for sidewalk expansion joint details.

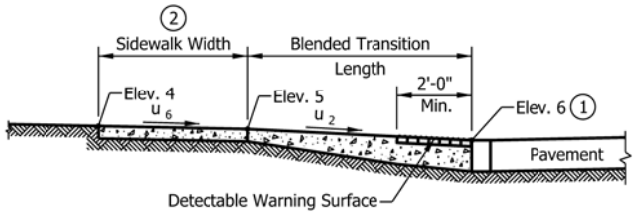
LEGEND:

Ramp

Detectable Warning Surface



SECTION B-B



SECTION A-A

INDIANA DEPARTMENT OF TRANSPORTATION

BLENDED TRANSITION CURB RAMP COMPONENT DETAILS

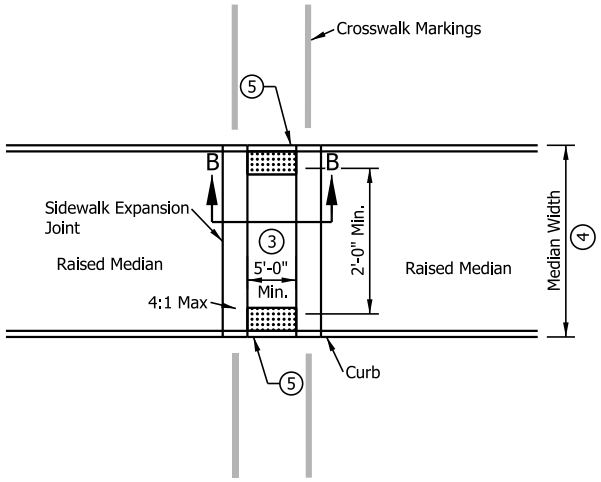
SEPTEMBER 2016

STANDARD DRAWING NO. E 604-SWCR-10

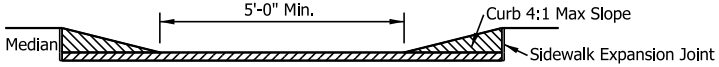
ELIZABETH W. PHILLIPS REGISTERED No. 10200124 STATE OF INDIANA PROFESSIONAL ENGINEER

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

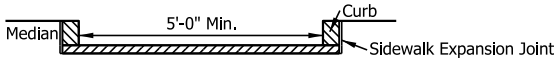
/s/ Mark A. Miller 03/18/16
CHIEF ENGINEER DATE



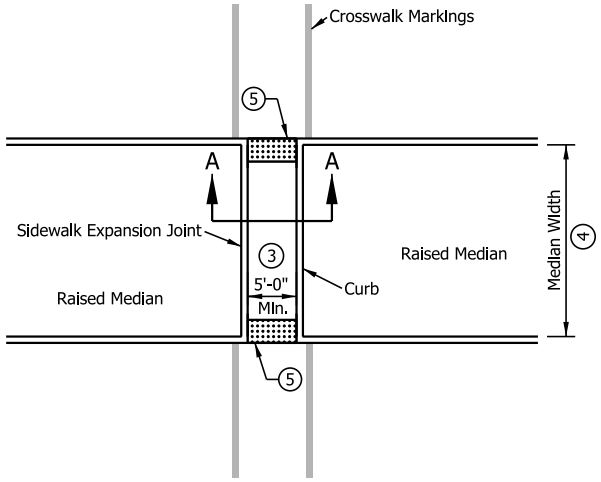
MEDIAN CUT-THROUGH WITH TAPERED CURB



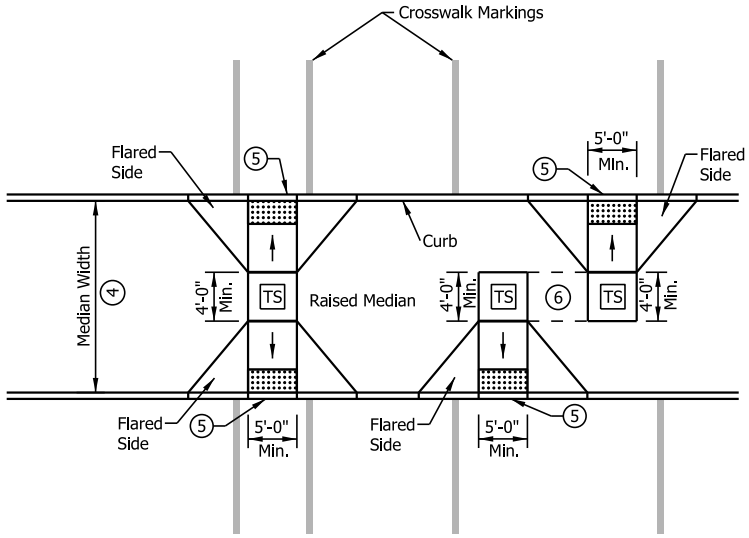
SECTION B-B



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. Walkable Surface. The cross slope shall be 2.00% maximum.
7. See Standard Drawing E 604-SWCR-01 for cross slope exceptions.
8. See Standard Drawing E 604-SWCR-12, -13, and -14 for Detectable Warning Surface placement, configuration, and details.
9. See Standard Drawing E 604-CCSJ-01 for sidewalk expansion joint details.

LEGEND:

- Ramp
- Detectable Warning Surface
- TS — Turning Space

INDIANA DEPARTMENT OF TRANSPORTATION

MEDIAN CUT-THROUGH AND MEDIAN PERPENDICULAR CURB RAMP TYPICAL PLACEMENT

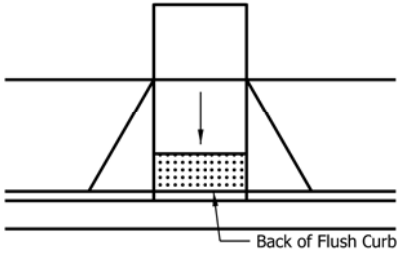
SEPTEMBER 2016

STANDARD DRAWING NO. E 604-SWCR-11

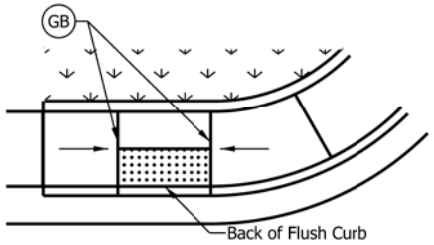
ELIZABETH W. PHILLIPS — REGISTERED — No. 10200124 — STATE OF INDIANA — PROFESSIONAL ENGINEER

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

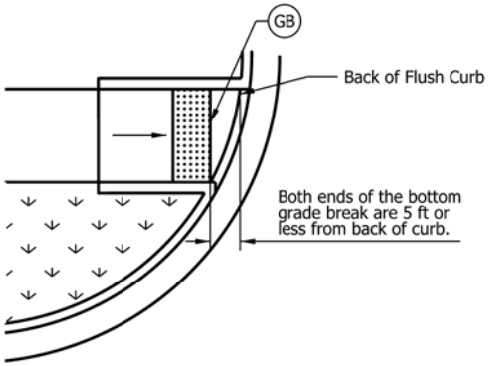
/s/ Mark A. Miller 03/18/16
CHIEF ENGINEER DATE

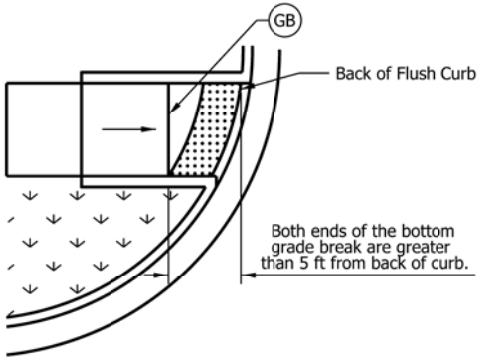


PERPENDICULAR CURB RAMP (3)

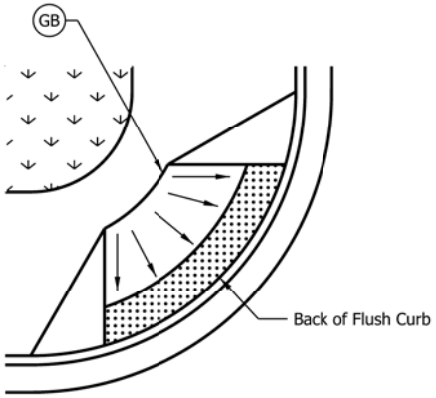


PARALLEL CURB RAMP (4)

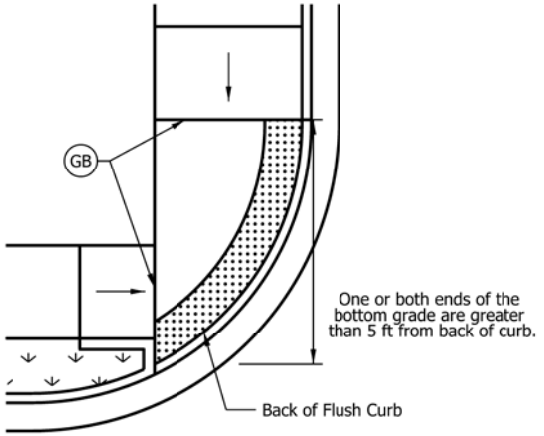




ONE-WAY DIRECTIONAL PERPENDICULAR CURB RAMPS (3)



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

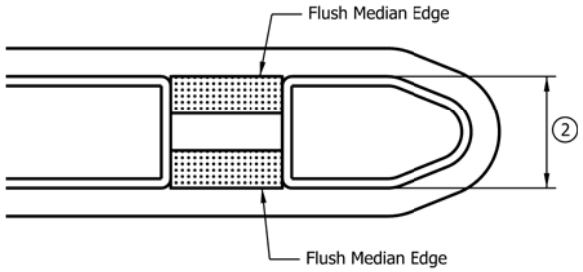
SEPTEMBER 2016

STANDARD DRAWING NO. E 604-SWCR-12

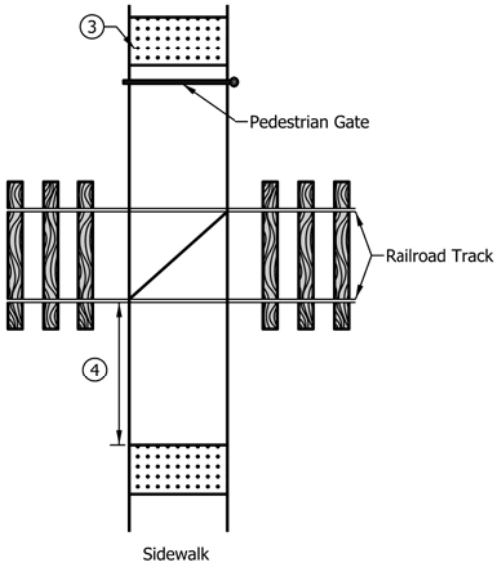
ELIZABETH W. PHILLIPS
REGISTERED
No. 10200124
STATE OF INDIANA
PROFESSIONAL ENGINEER

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

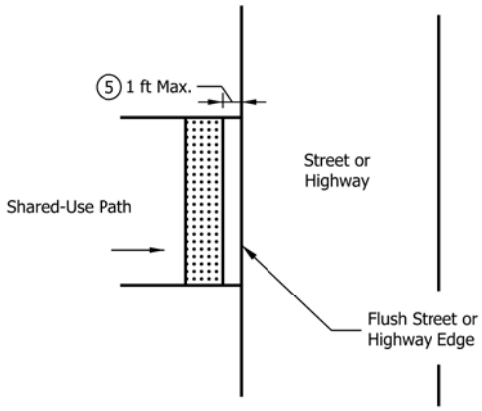
/s/ Mark A. Miller 03/18/16
CHIEF ENGINEER DATE



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 a 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
- GB Grade Break

INDIANA DEPARTMENT OF TRANSPORTATION

DETECTABLE WARNING SURFACE PLACEMENT AND CONFIGURATION

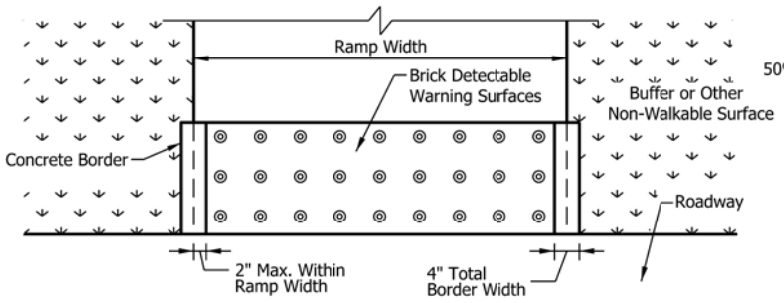
SEPTEMBER 2016

STANDARD DRAWING NO. E 604-SWCR-13

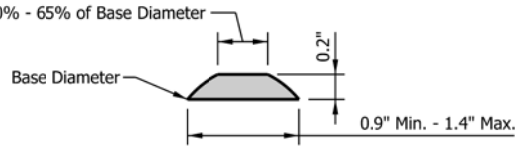
ELIZABETH W. PHILLIPS REGISTERED No. 10200124 STATE OF INDIANA PROFESSIONAL ENGINEER

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

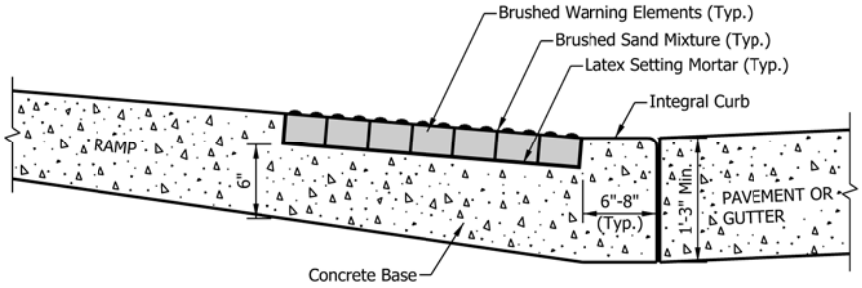
/s/ Mark A. Miller 03/18/16
CHIEF ENGINEER DATE



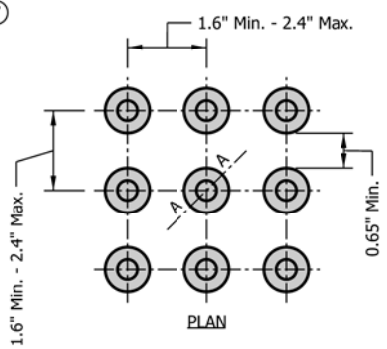
BRICK DETECTABLE WARNING SURFACE WITH CONCRETE BORDER ⑥⑦



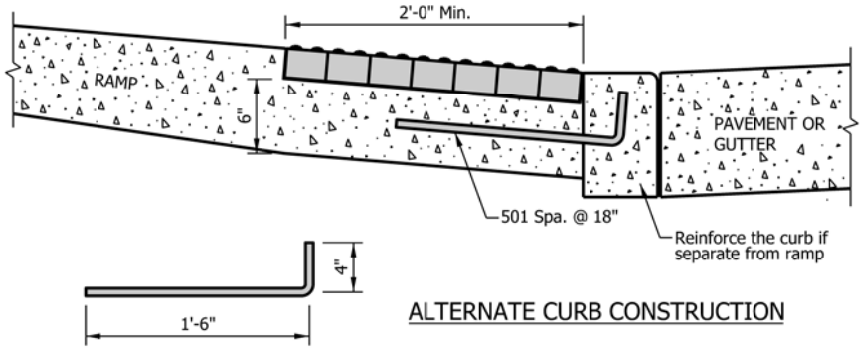
SECTION A-A



TYPICAL RAMP AND BRICK SURFACE CONSTRUCTION DETAIL

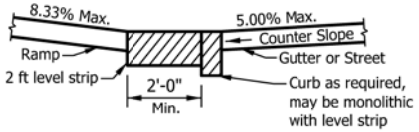


TRUNCATED DOMES



501 x 1'-10"

ALTERNATE CURB CONSTRUCTION



CHANGE OF GRADE > 11% ⑤

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.

INDIANA DEPARTMENT OF TRANSPORTATION

DETECTABLE WARNING SURFACE DETAILS

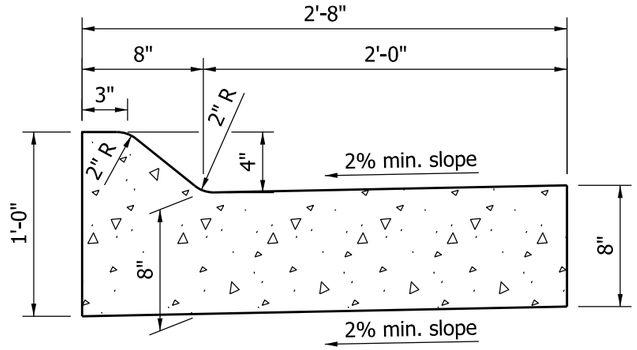
SEPTEMBER 2016

STANDARD DRAWING NO. E 604-SWCR-14

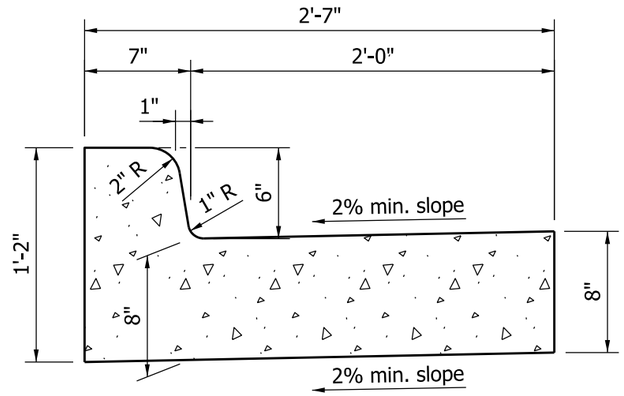
ELIZABETH W. PHILLIPS REGISTERED No. 10200124 STATE OF INDIANA PROFESSIONAL ENGINEER

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

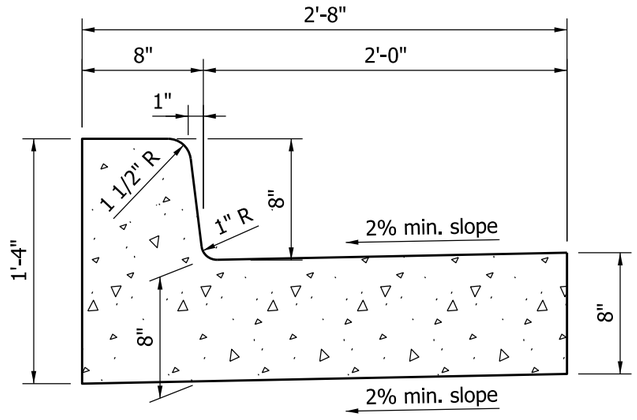
/s/ Mark A. Miller 03/18/16
CHIEF ENGINEER DATE



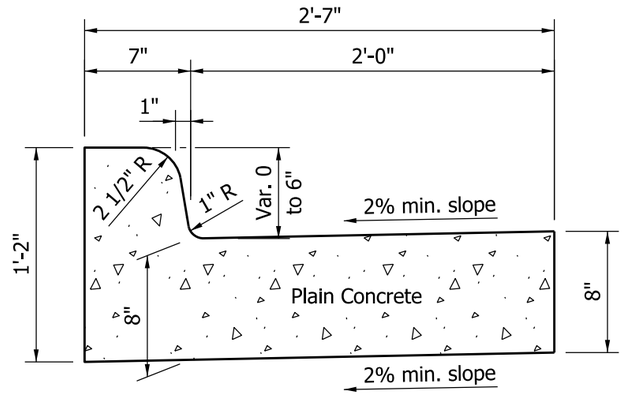
COMBINED CONCRETE CURB
AND GUTTER, TYPE B
(SLOPING)



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

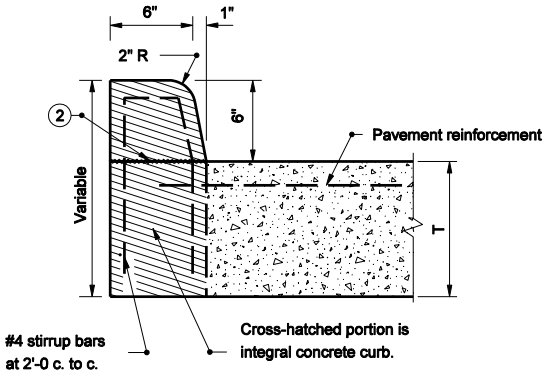
STANDARD DRAWING NO. E 605-CCCG-01

RICHARD L. VanCLEAVE
REGISTERED
No. 9750
STATE OF INDIANA
PROFESSIONAL ENGINEER

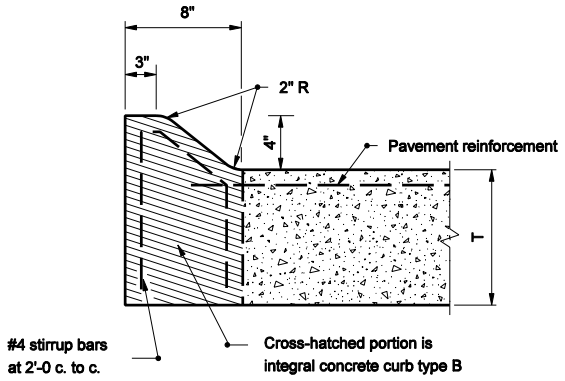
DESIGN STANDARDS ENGINEER

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

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



INTEGRAL CONCRETE CURB
(BARRIER)



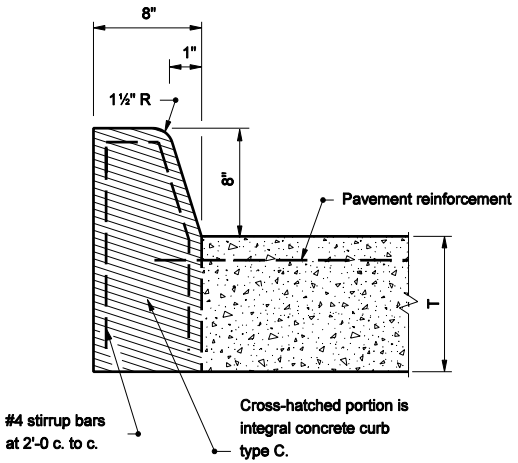
INTEGRAL CONCRETE CURB
TYPE B
(MOUNTABLE)

NOTES

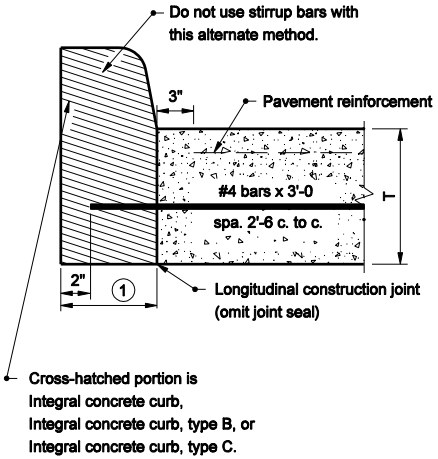
1. 8" for integral concrete curb type B or C and 7" for integral concrete curb.
2. Concrete below this line may be poured with the pavement.

LEGEND

T = Nominal pavement thickness



INTEGRAL CONCRETE CURB
TYPE C
(BARRIER)



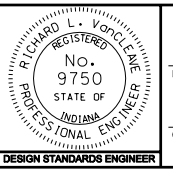
ALTERNATE METHOD
OF CONSTRUCTION FOR ALL TYPES
OF INTEGRAL CONCRETE CURB

INDIANA DEPARTMENT OF TRANSPORTATION

INTEGRAL CONCRETE CURB

SEPTEMBER 2004

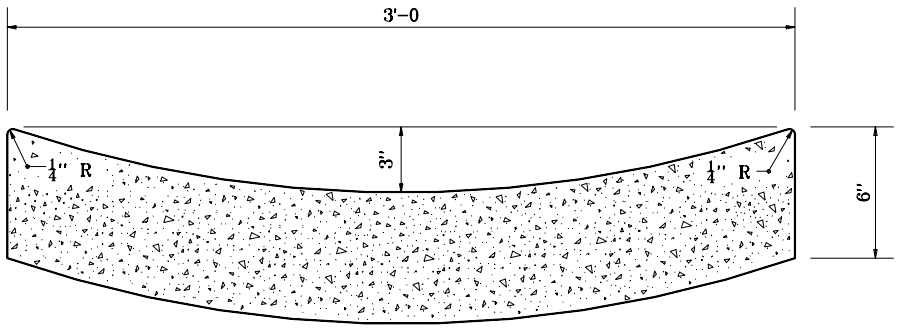
STANDARD DRAWING NO. E 605-CCIN-01



DESIGN STANDARDS ENGINEER

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

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



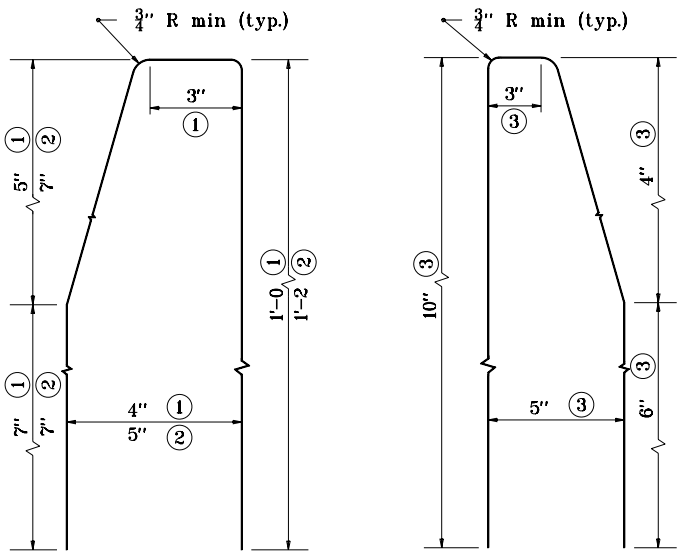
CONCRETE GUTTER

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

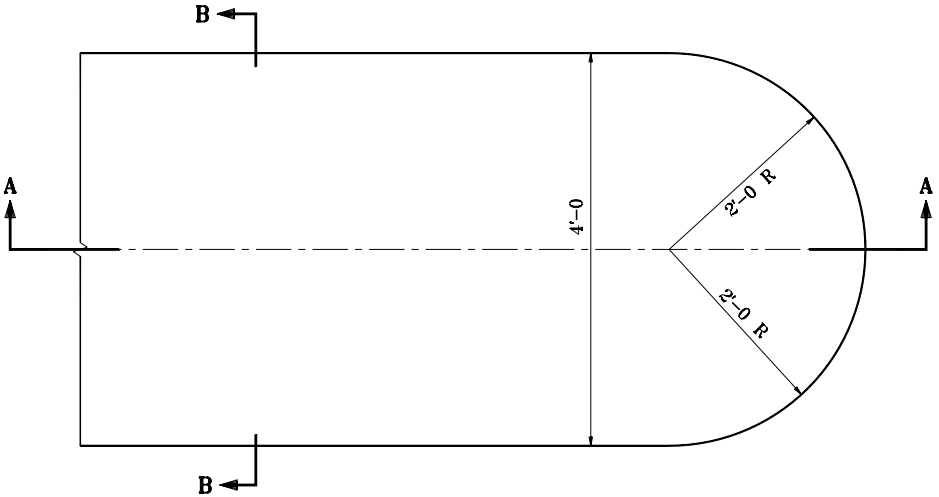
APRIL 1995

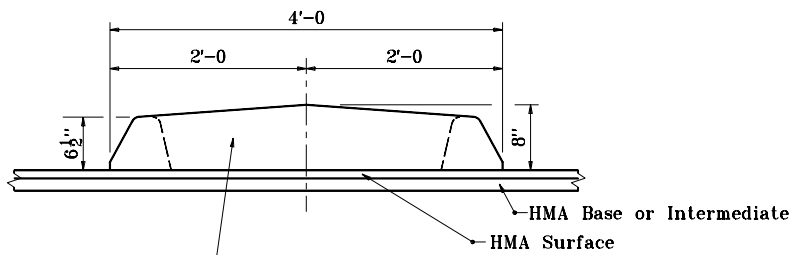
STANDARD DRAWING NO. **E 605-CGCS-01**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

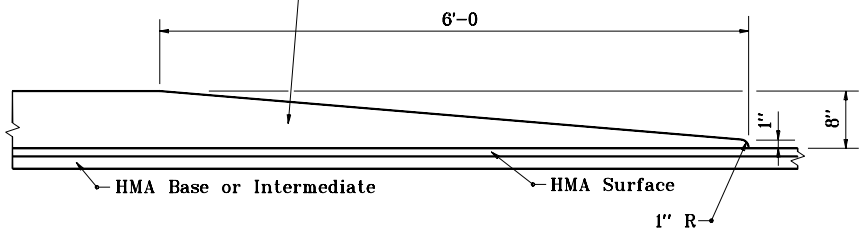
DETAILS PLACED IN THIS FORMAT	11-15-99
/s/ Anthony L. Uremovich DESIGN STANDARDS ENGINEER	11-15-99 DATE
/s/ Firooz Zandi CHIEF HIGHWAY ENGINEER	11-15-99 DATE
ORIGINALLY APPROVED	4-03-95





SECTION B–B

This section my 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

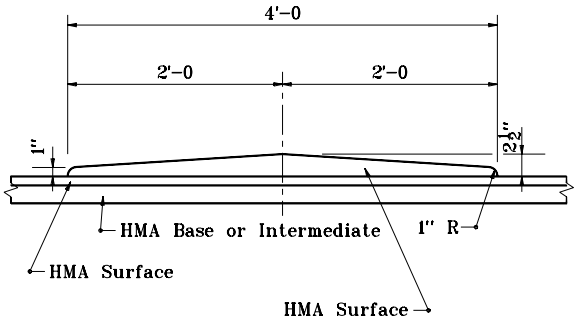
STANDARD DRAWING NO. **E 605–CNCB–01**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

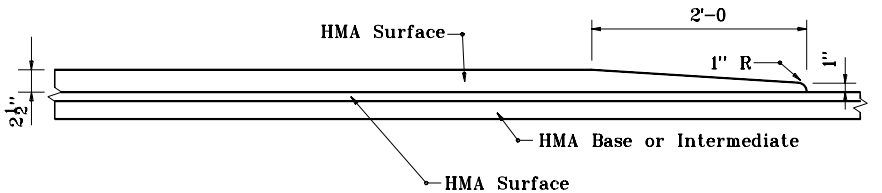
DESIGN STANDARDS ENGINEER

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

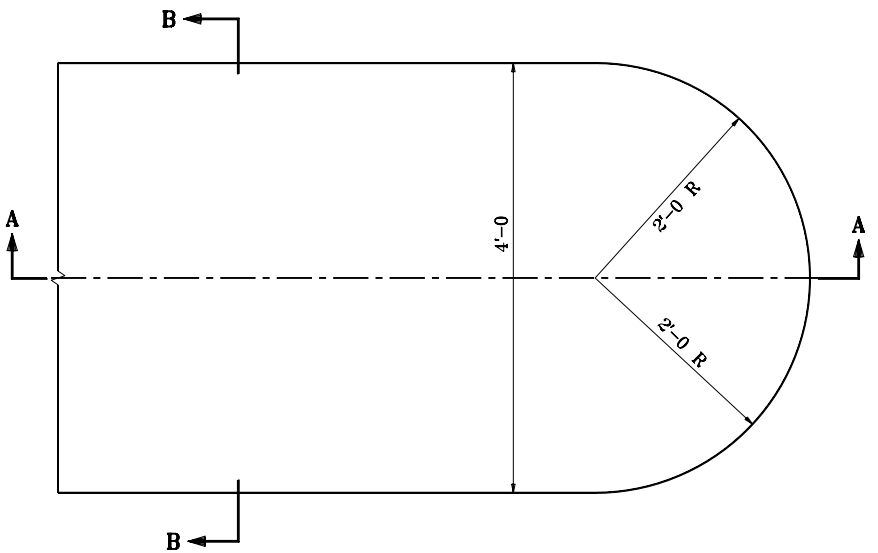
/s/ Firooz Zandi — CHIEF HIGHWAY ENGINEER — 1–03–00 DATE



SECTION B–B



SECTION A–A



INDIANA DEPARTMENT OF TRANSPORTATION

HMA CENTER CURB TYPE B

JANUARY 2000

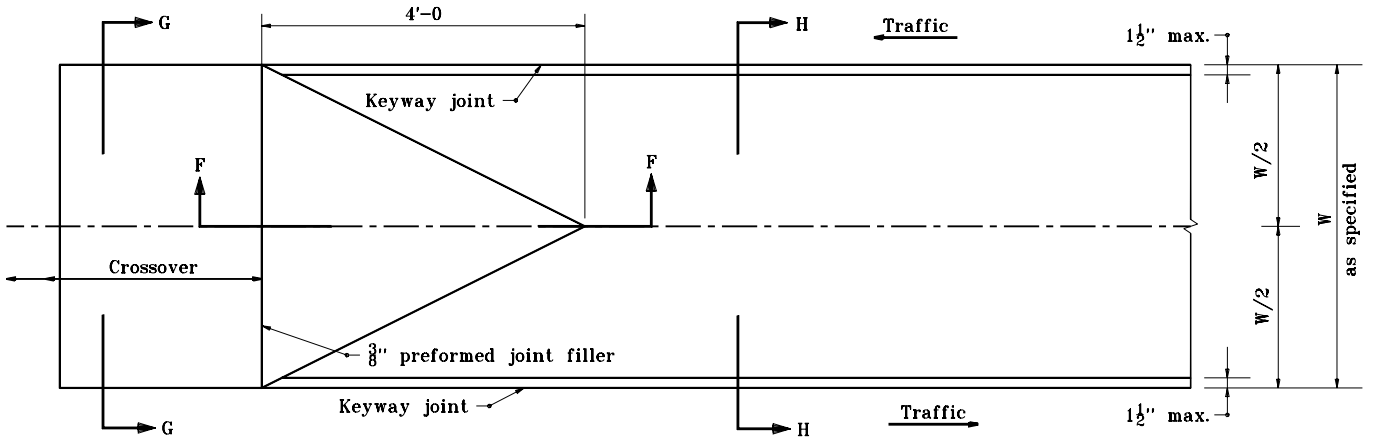
STANDARD DRAWING NO. **E 605–CNCB–02**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

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

/s/ Firooz Zandi 1–03–00
CHIEF HIGHWAY ENGINEER — DATE



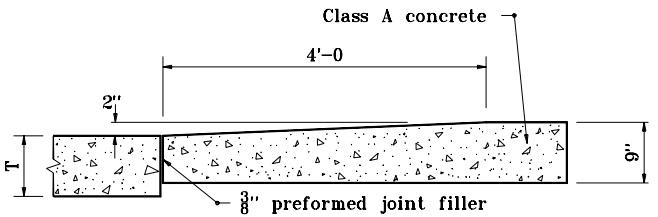
GENERAL NOTES

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

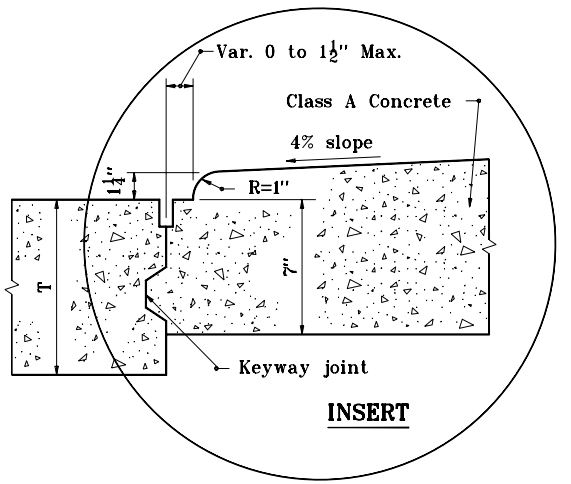
LEGEND

T = Normal pavement depth

W = Center curb width



SECTION F-F



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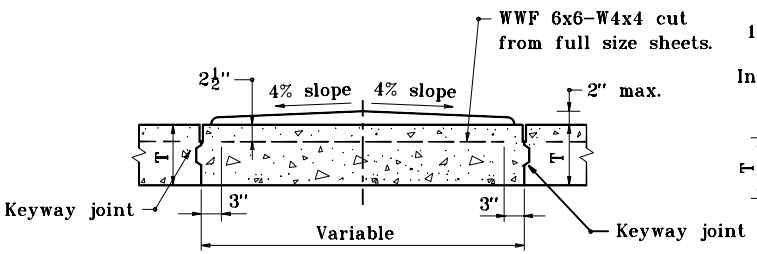
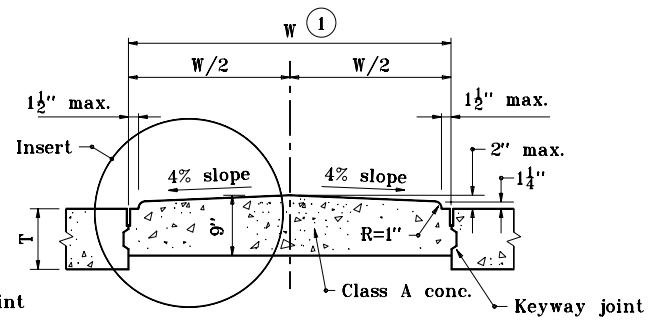


SECTION G-G



SECTION H-H

INDIANA DEPARTMENT OF TRANSPORTATION

CONCRETE CENTER CURB TYPE A

JANUARY 2001

STANDARD DRAWING NO. E 605-CNCC-01

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

/s/ Anthony L. Uremovich — DESIGN STANDARDS ENGINEER — 1-02-01 DATE

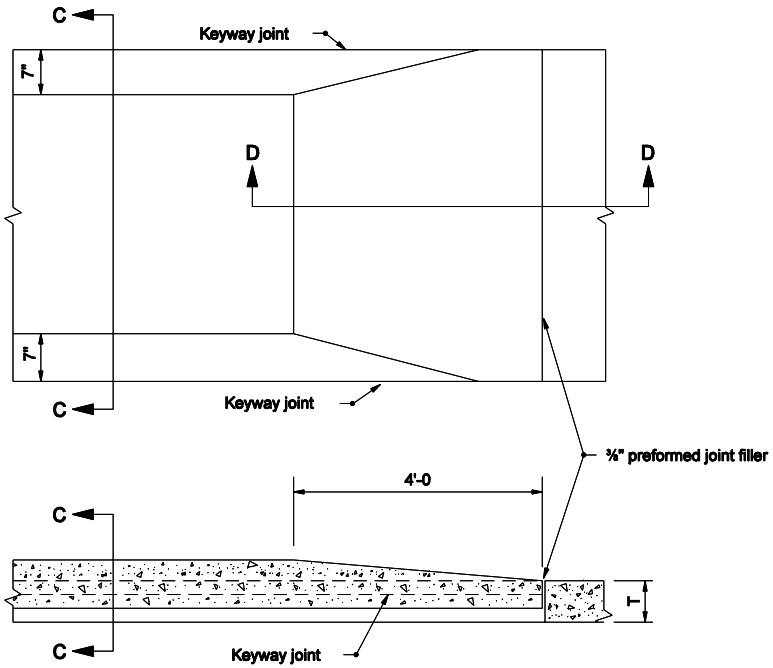
/s/ Firooz Zandi — CHIEF HIGHWAY ENGINEER — 1-02-01 DATE

NOTES :

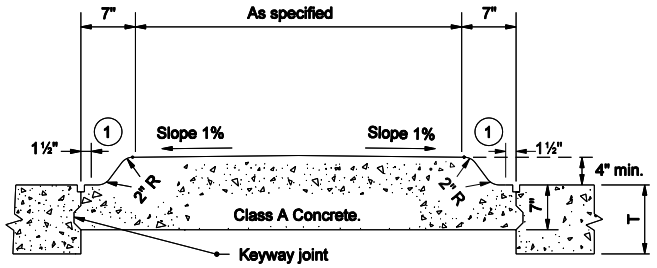
(1) Curb radii and batter to conform to Type B curb, as shown on Standard Drawing E 605-CCSJ-01.

LEGEND

T = Normal pavement depth



SECTION D-D



SECTION C-C

INDIANA DEPARTMENT OF TRANSPORTATION

CONCRETE CENTER CURB TYPE B

MARCH 2004

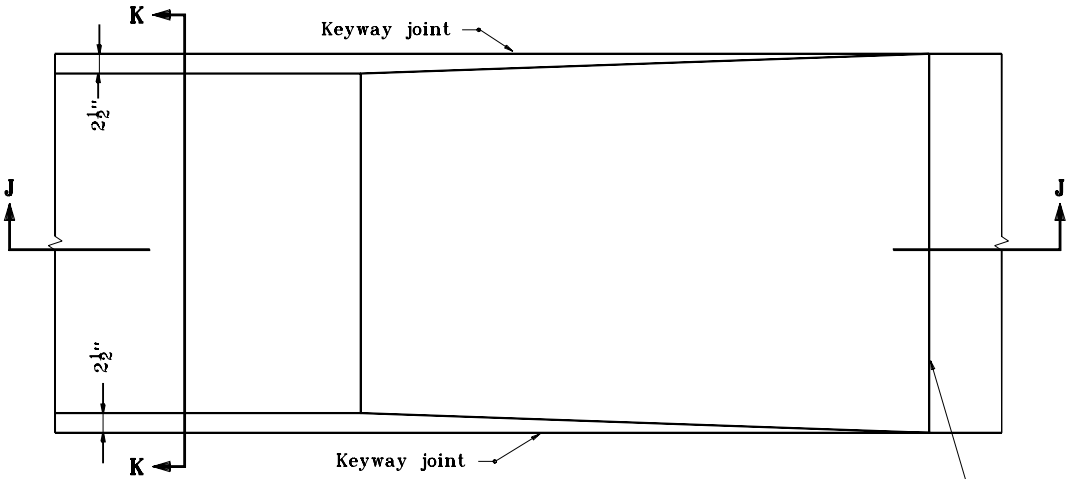
STANDARD DRAWING NO. E 605-CNCC-02

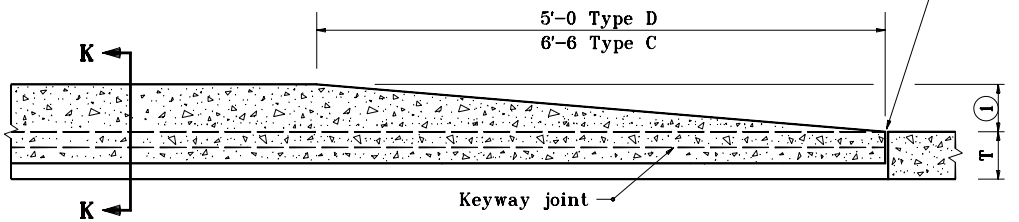
RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

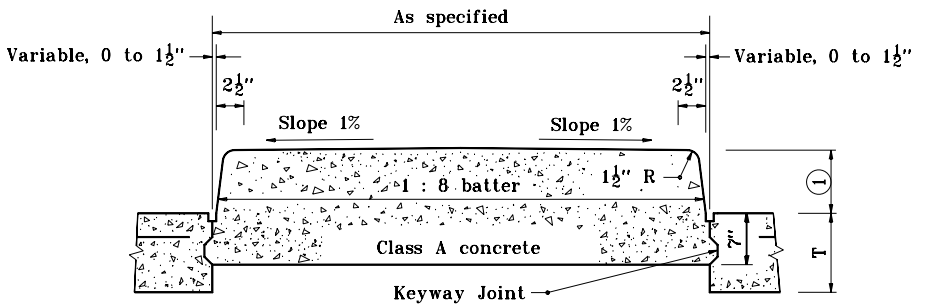
/s/ Richard L. VanCleave 3/01/04
DESIGN STANDARDS ENGINEER DATE

/s/ Richard K. Smutzer 3/01/04
CHIEF HIGHWAY ENGINEER DATE





SECTION J-J



SECTION K-K

NOTES :

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

LEGEND

T = Normal pavement depth

INDIANA DEPARTMENT OF TRANSPORTATION

CONCRETE CENTER CURBS TYPE C & D

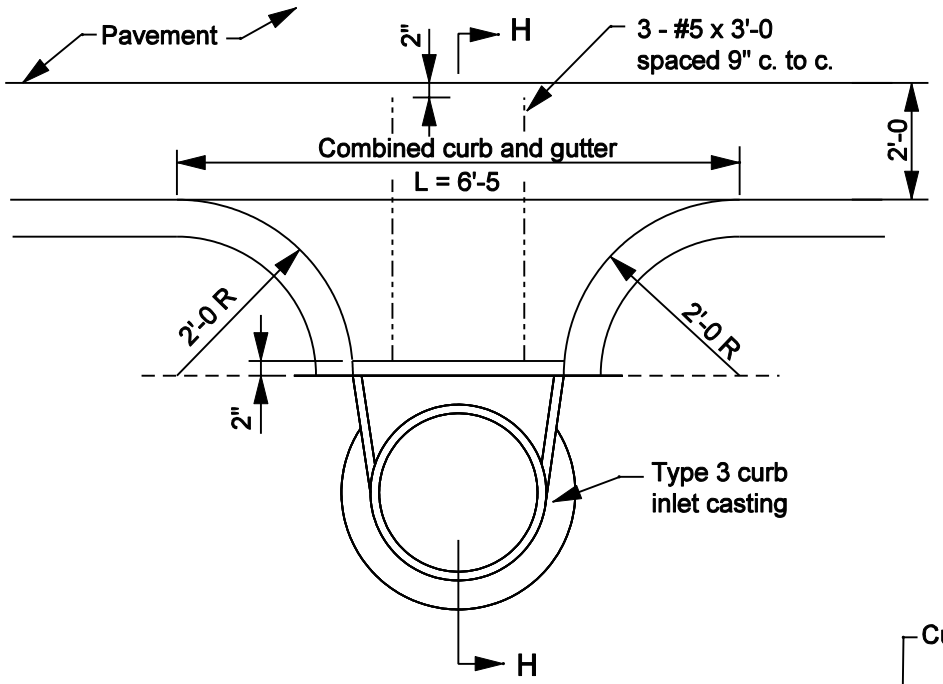
APRIL 1995

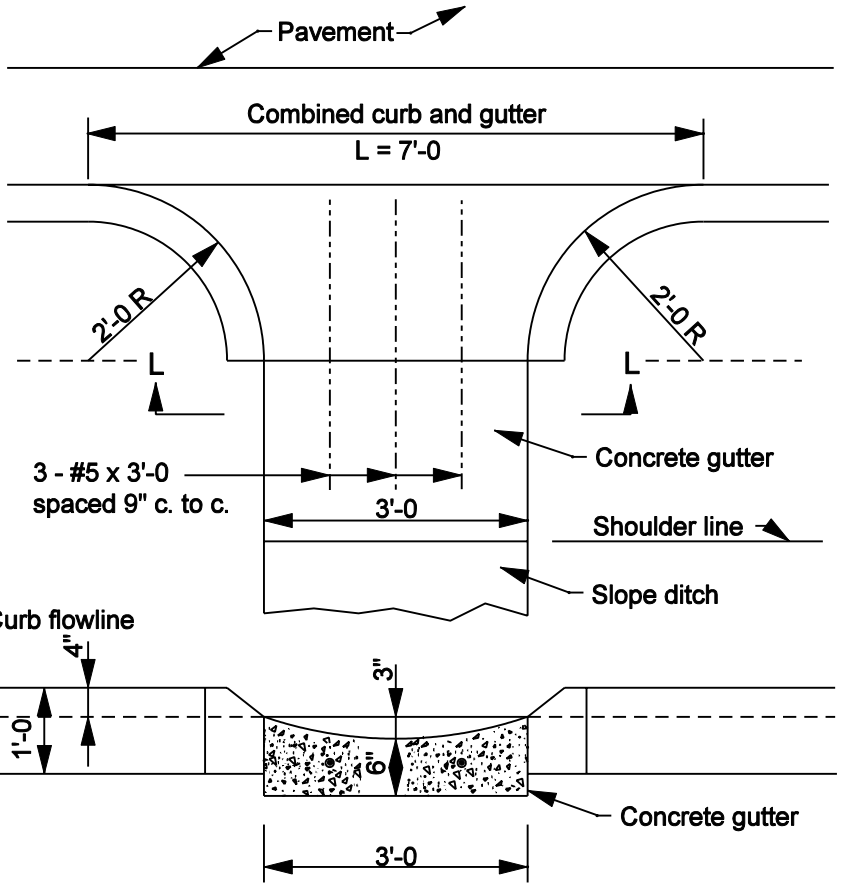
STANDARD DRAWING NO. **E 605-CNCC-03**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

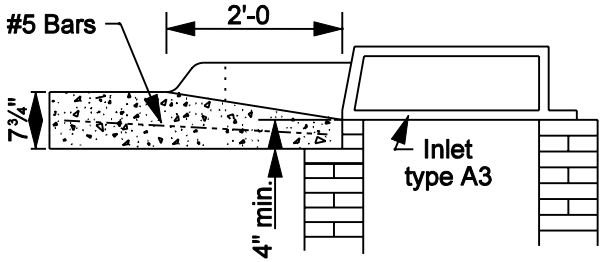
DESIGN STANDARDS ENGINEER

DETAILS PLACED IN THIS FORMAT	11-15-99
/s/ Anthony L. Uremovich, DESIGN STANDARDS ENGINEER	11-15-99
/s/ Firooz Zandi, CHIEF HIGHWAY ENGINEER	11-15-99
ORIGINALLY APPROVED	4-03-95





SECTION L-L



SECTION H-H

INDIANA DEPARTMENT OF TRANSPORTATION

COMBINED CURB AND GUTTER TURNOUTS

MARCH 2003

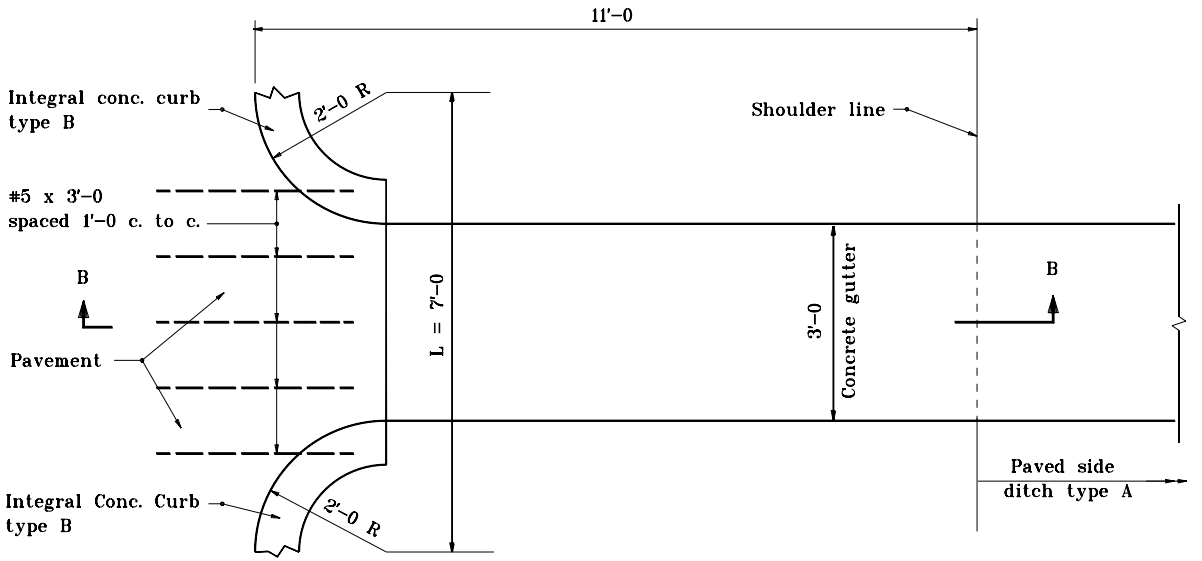
STANDARD DRAWING NO. E 605-CTCG-01

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

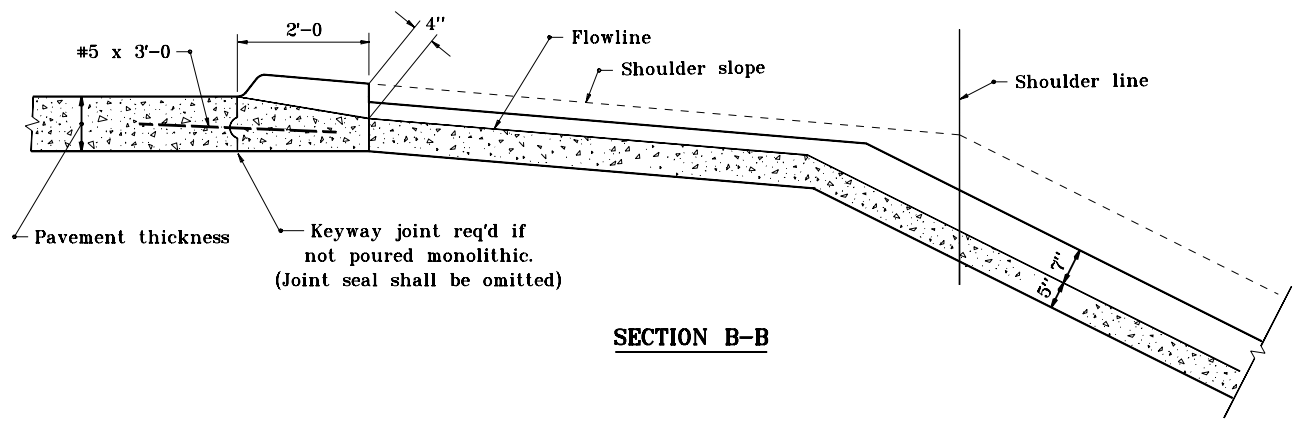
/s/ Richard L. VanCleave 3-03-03
DESIGN STANDARDS ENGINEER DATE

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



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.



SECTION B-B

INDIANA DEPARTMENT OF TRANSPORTATION

CURB TURNOUT TO CONCRETE GUTTER & PAVED SIDE DITCH

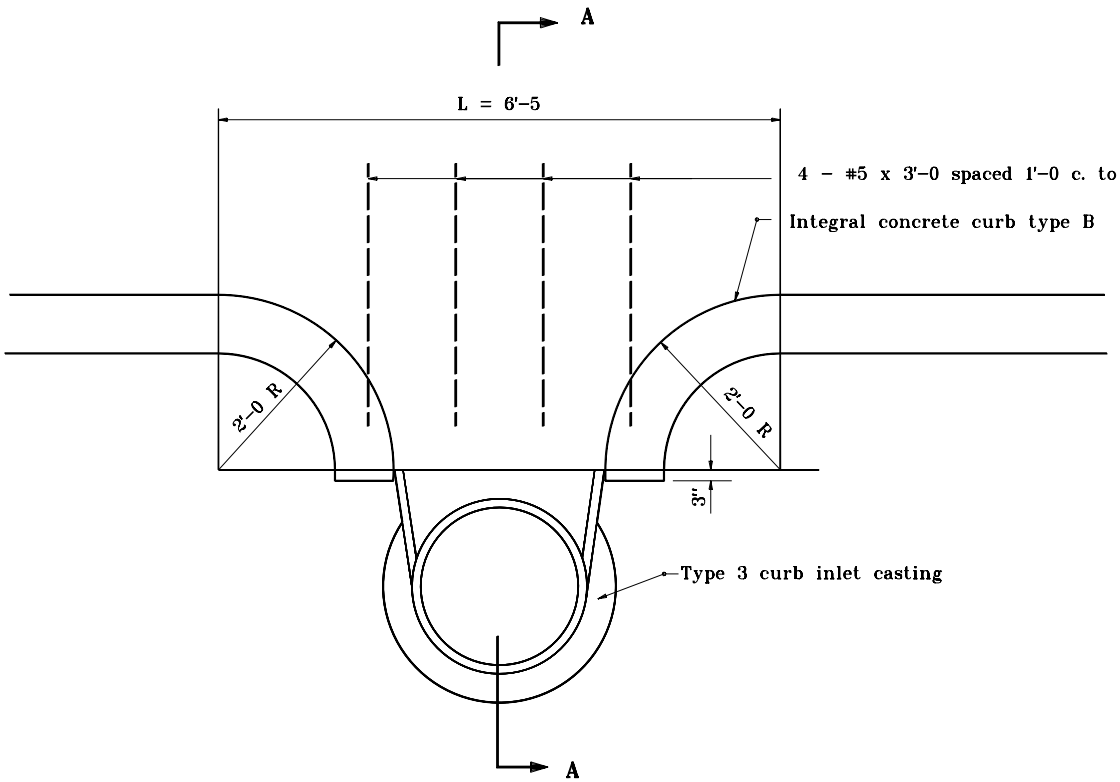
SEPTEMBER 1997

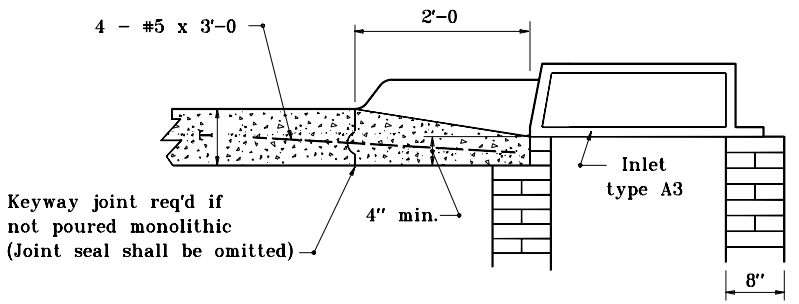
STANDARD DRAWING NO. **E 605-CTCG-02**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

DETAILS PLACED IN THIS FORMAT	11-15-99
/s/ Anthony L. Uremovich DESIGN STANDARDS ENGINEER	11-15-99 DATE
/s/ Firooz Zandi CHIEF HIGHWAY ENGINEER	11-15-99 DATE
ORIGINALLY APPROVED	9-01-97





SECTION A-A

NOTES :

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

INDIANA DEPARTMENT OF TRANSPORTATION

CURB TURNOUT TO A3 INLET

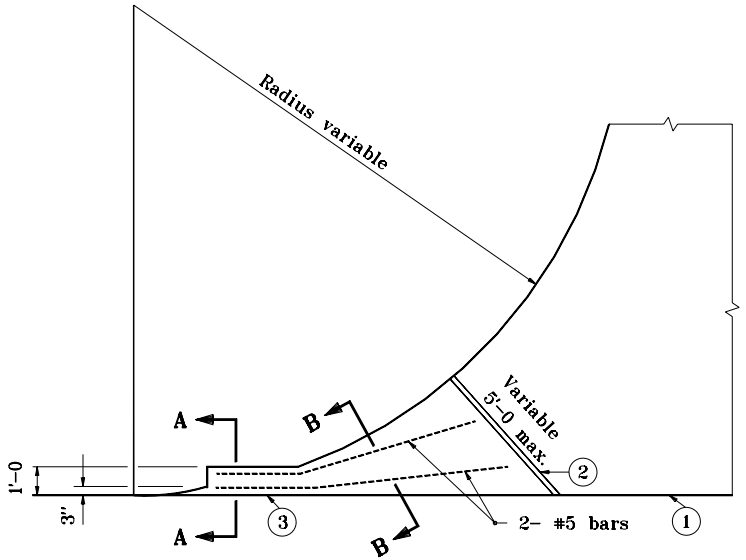
SEPTEMBER 1997

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

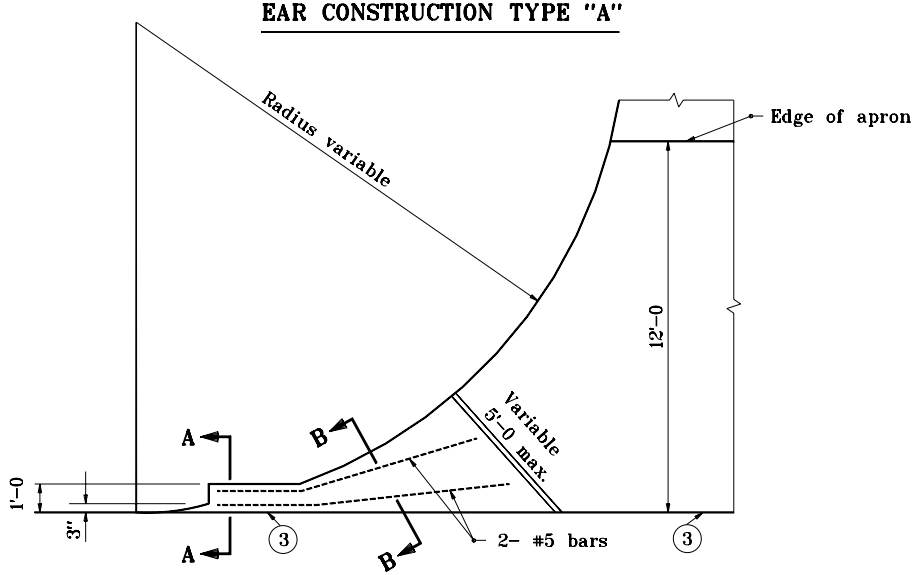
ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

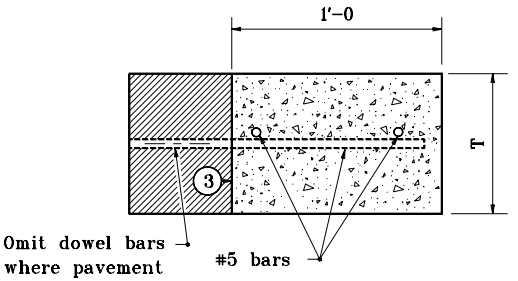
DETAILS PLACED IN THIS FORMAT	11-15-99
/s/ Anthony L. Uremovich	11-15-99
DESIGN STANDARDS ENGINEER	DATE
/s/ Firooz Zandi	11-15-99
CHIEF HIGHWAY ENGINEER	DATE
ORIGINALLY APPROVED	9-01-97



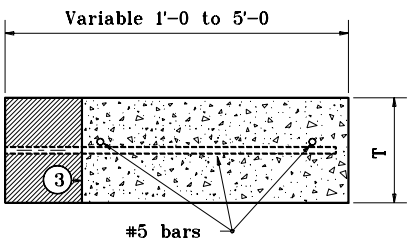
EAR CONSTRUCTION TYPE "A"



EAR CONSTRUCTION TYPE "A"
FOR PAVED APRON



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**

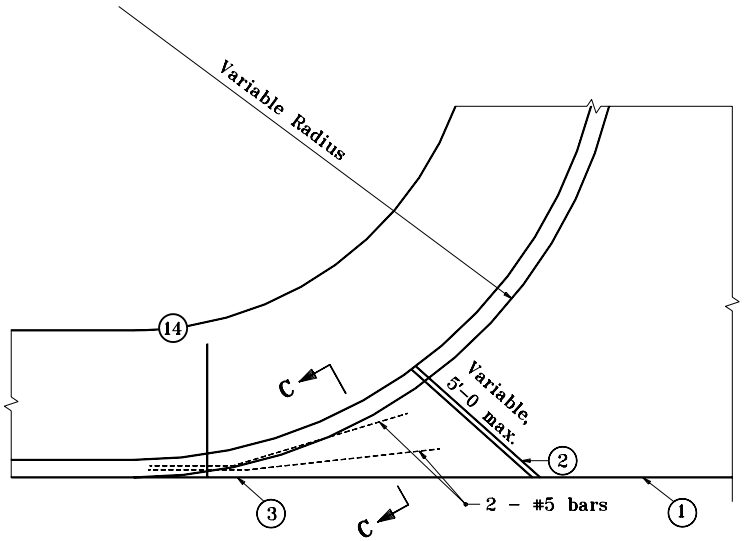
ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

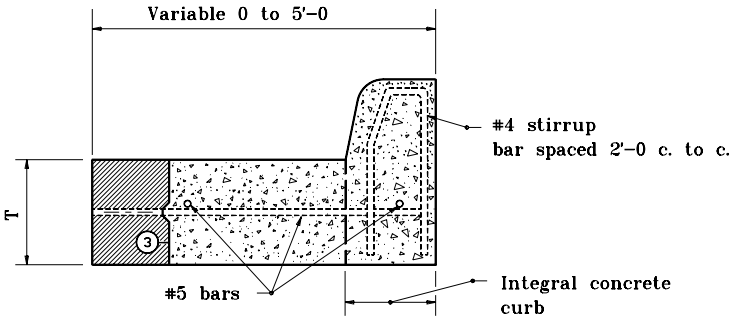
DETAILS PLACED IN THIS FORMAT	11-15-99
/s/ Anthony L. Uremovich, DESIGN STANDARDS ENGINEER	11-15-99
/s/ Firooz Zandi, CHIEF HIGHWAY ENGINEER	11-15-99
ORIGINALLY APPROVED	9-01-97

LEGEND

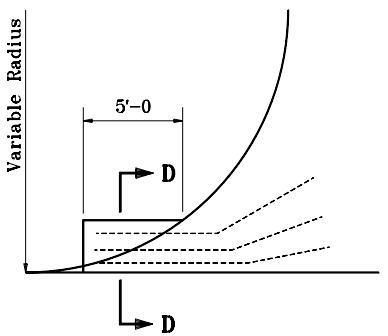
(1) Keyway joint
(2) 1" preformed joint filler
(14) Integral concrete curb
(3) Longitudinal construction joint
T = Thickness of pavement



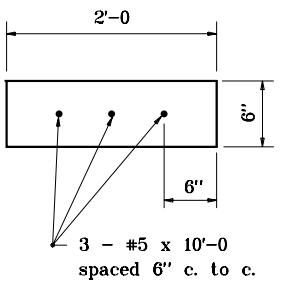
EAR CONSTRUCTION TYPE "B"



SECTION C-C



EAR CONSTRUCTION TYPE "C"



SECTION D-D

INDIANA DEPARTMENT OF TRANSPORTATION

EAR CONSTRUCTION TYPE B AND C

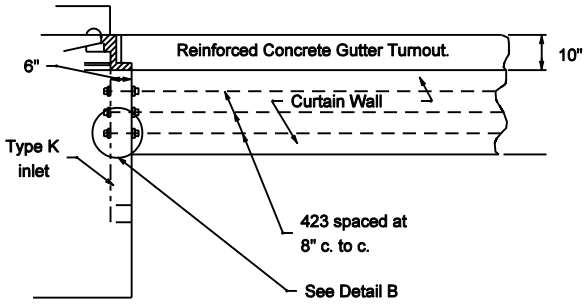
JANUARY 1998

STANDARD DRAWING NO. E 605-ERCN-02

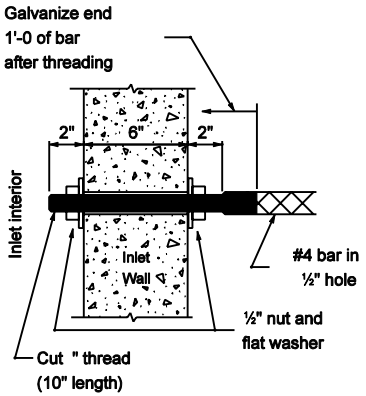
ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

DETAILS PLACED IN THIS FORMAT	11-15-99
/s/ Anthony L. Uremovich DESIGN STANDARDS ENGINEER	11-15-99 DATE
/s/ Firooz Zandi CHIEF HIGHWAY ENGINEER	11-15-99 DATE
ORIGINALLY APPROVED	1-02-98



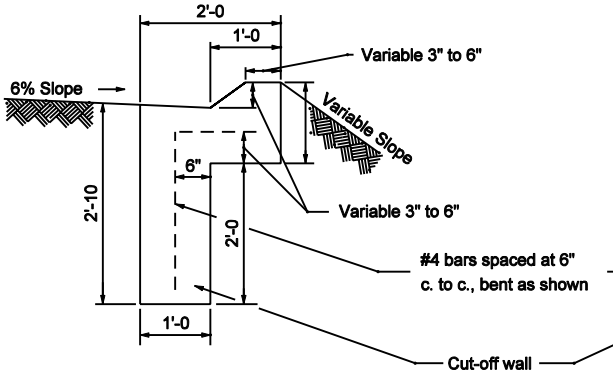
DETAIL A



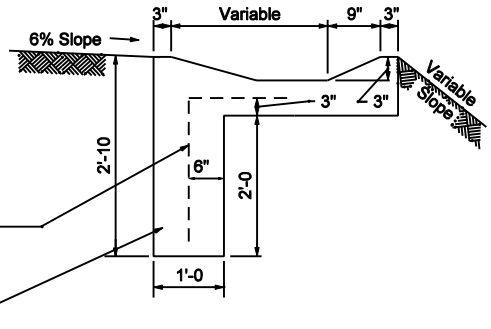
DETAIL B

GENERAL NOTES

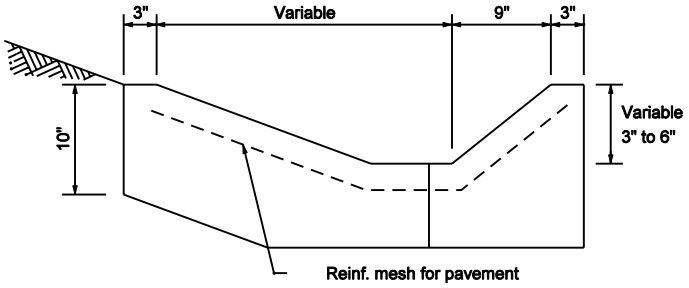
1. For location of details and sections see Standard Drawing E 605-GTRC-03.



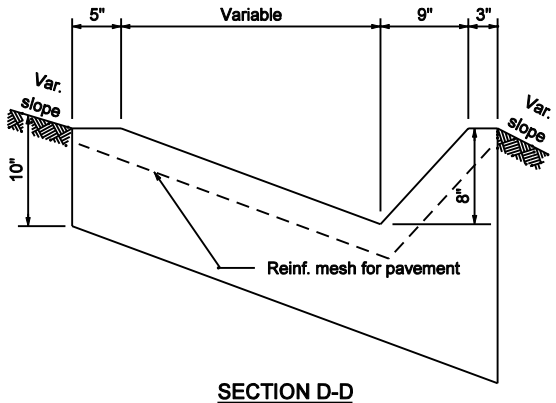
SECTION A-A



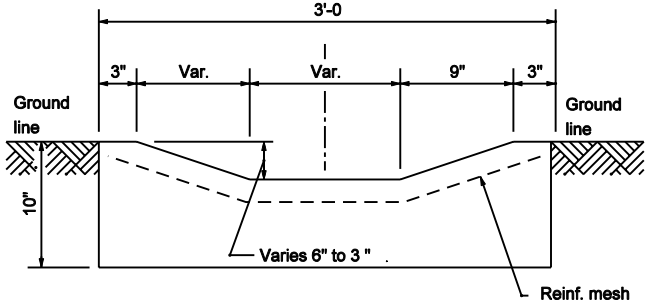
SECTION B-B



SECTION C-C



SECTION D-D



SECTION E-E

INDIANA DEPARTMENT OF TRANSPORTATION

REINFORCED CONCRETE GUTTER TURNOUT

MARCH 2003

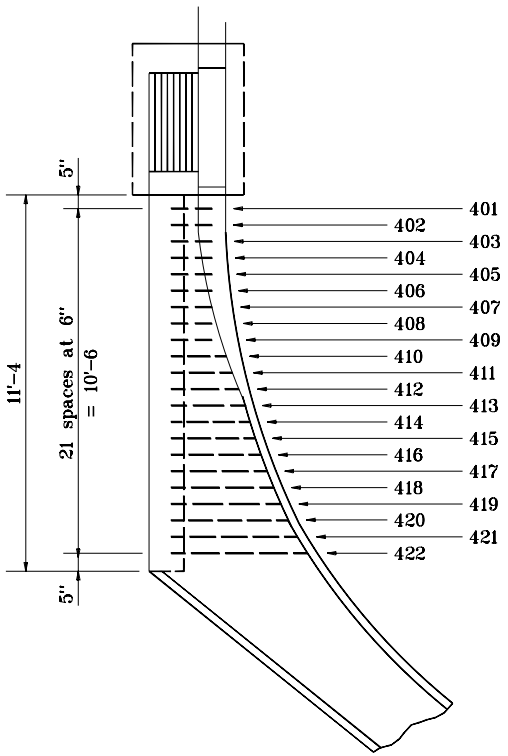
STANDARD DRAWING NO. E 605-GTRC-01

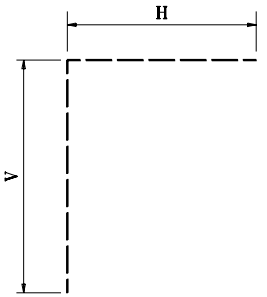
RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

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

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



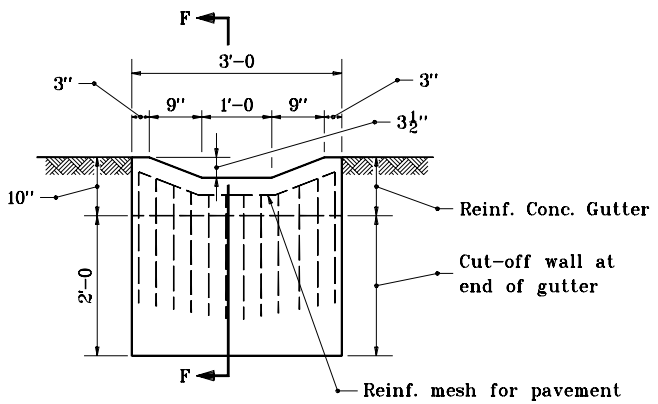


#4 BAR

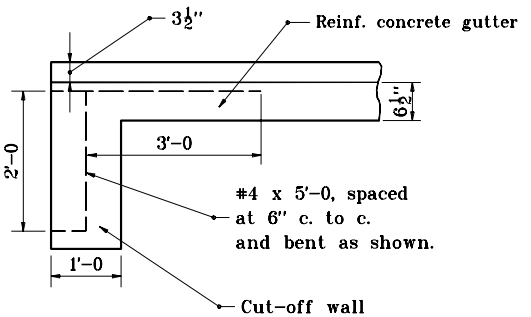
MK	QTY.	SIZE	BAR LENGTHS		
			V	H	TOTAL
401	1	#4	2'-0	1'-3	3'-3
402				1'-4	3'-4
403				1'-5	3'-5
404				1'-6	3'-6
405				1'-7	3'-7
406				1'-8	3'-8
407				1'-9	3'-9
408				1'-10	3'-10
409				1'-11	3'-11
410				2'-0	4'-0
411				2'-2	4'-2
412				2'-4	4'-4
413				2'-6	4'-6
414				2'-8	4'-8
415				2'-10	4'-10
416				3'-0	5'-0
417				3'-4	5'-4
418				3'-6	5'-8
419				3'-11	5'-11
420				4'-2	6'-2
421				4'-6	6'-6
422			2'-0	4'-10	6'-10
423	3	#4	1'-3	3'-0	4'-3

MK 423 bars to be threaded, galvanized, and installed as shown in Detail B on Standard Drawing E 605-GTRC-01.

REINFORCING PLAN CONCRETE GUTTER TURNOUT



SECTION G-G



SECTION F-F

INDIANA DEPARTMENT OF TRANSPORTATION

REINFORCED CONCRETE GUTTER TURNOUT

SEPTEMBER 1997

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

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

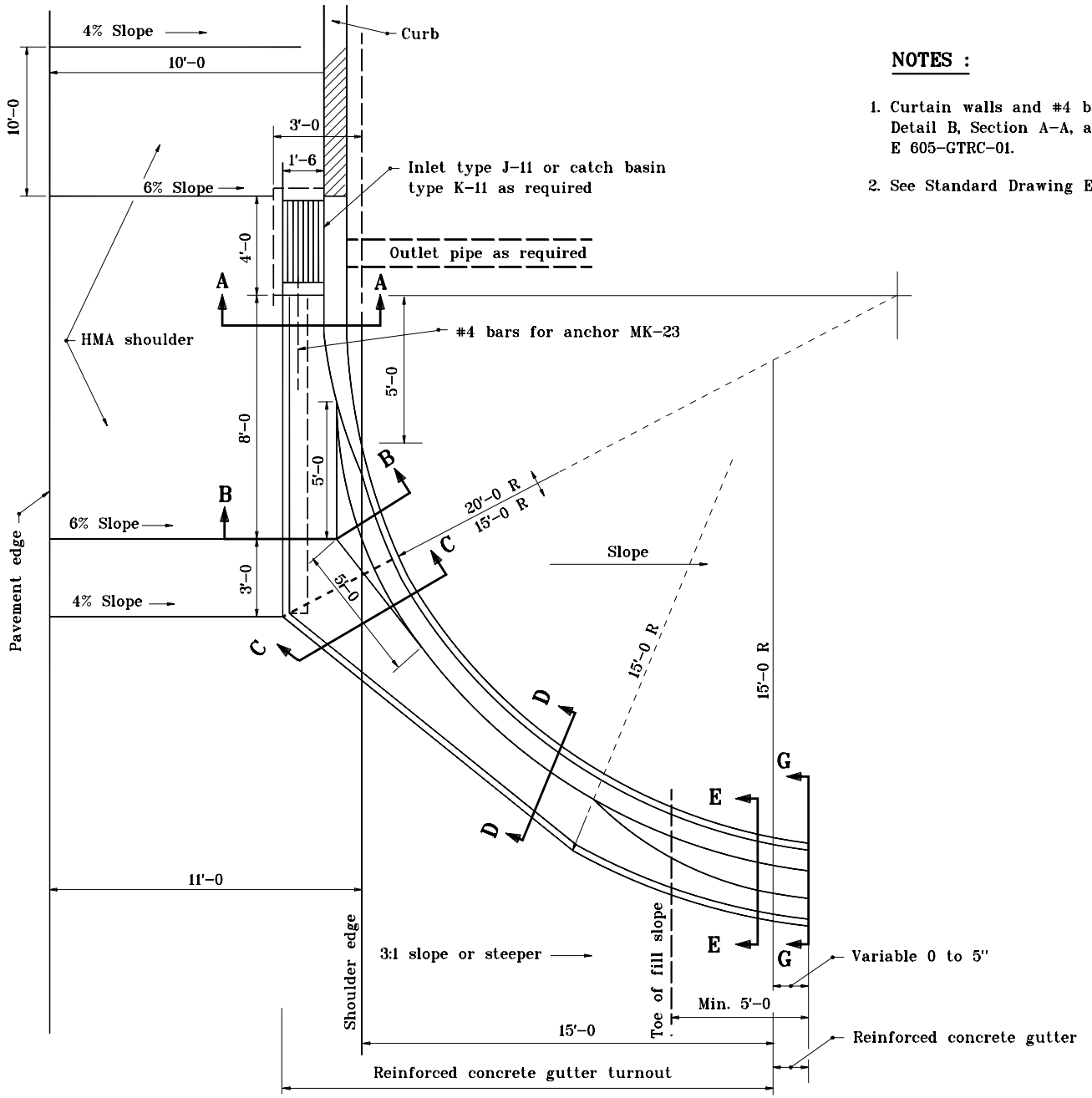
DESIGN STANDARDS ENGINEER

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

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. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

DETAILS PLACED IN THIS FORMAT	11-15-99
/s/ Anthony L. Uremovich, DESIGN STANDARDS ENGINEER	11-15-99
/s/ Firooz Zandi, CHIEF HIGHWAY ENGINEER	11-15-99
ORIGINALLY APPROVED	1-04-99

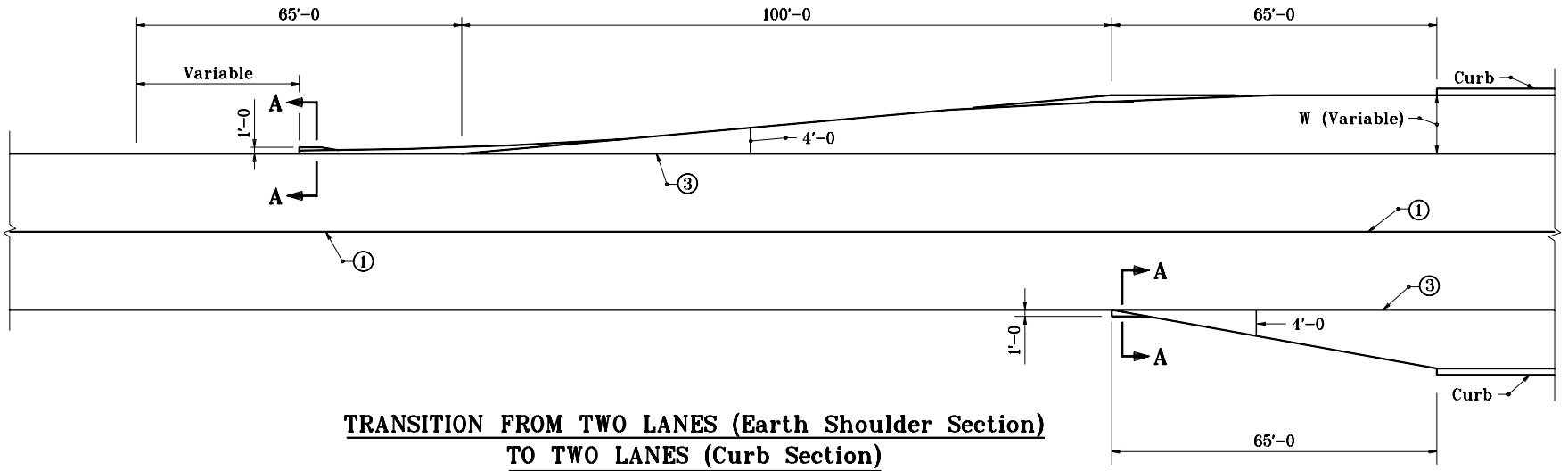
LEGEND

(1) Longitudinal joint

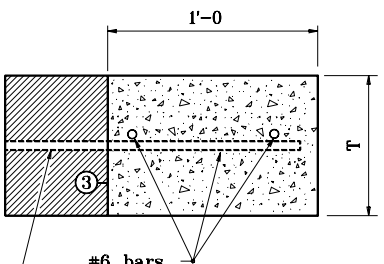
(3) Longitudinal construction joint

T = Nominal pavement thickness

Curve data variable
except tangent length = 50'–0



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



Omit dowel bars where pavement is in place.

SECTION A–A

INDIANA DEPARTMENT OF TRANSPORTATION

TRANSITION OF EARTH SHOULDER TO CURB SECTION

SEPTEMBER 1997

STANDARD DRAWING NO. **E 605–TSCS–01**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

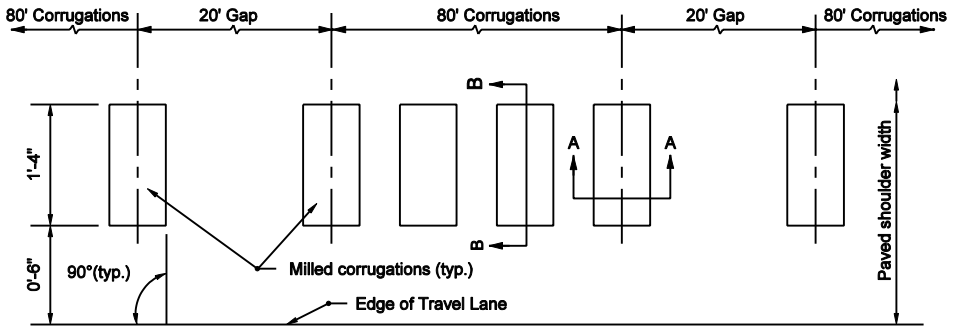
DESIGN STANDARDS ENGINEER

DETAILS PLACED IN THIS FORMAT 11-15-99

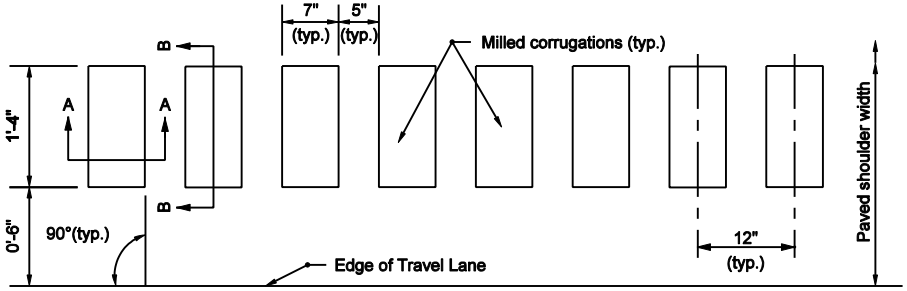
/s/ Anthony L. Uremovich 11-15-99
DESIGN STANDARDS ENGINEER DATE

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

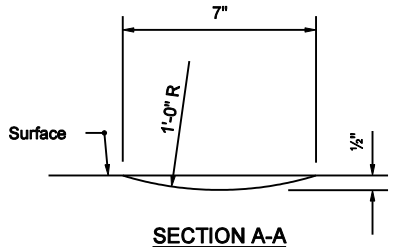
ORIGINALLY APPROVED 9-01-97



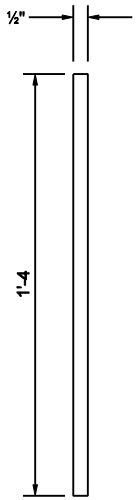
INTERMITTENT INSTALLATION
PLAN VIEW



CONTINUOUS INSTALLATION
PLAN VIEW



SECTION A-A



SECTION B-B

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

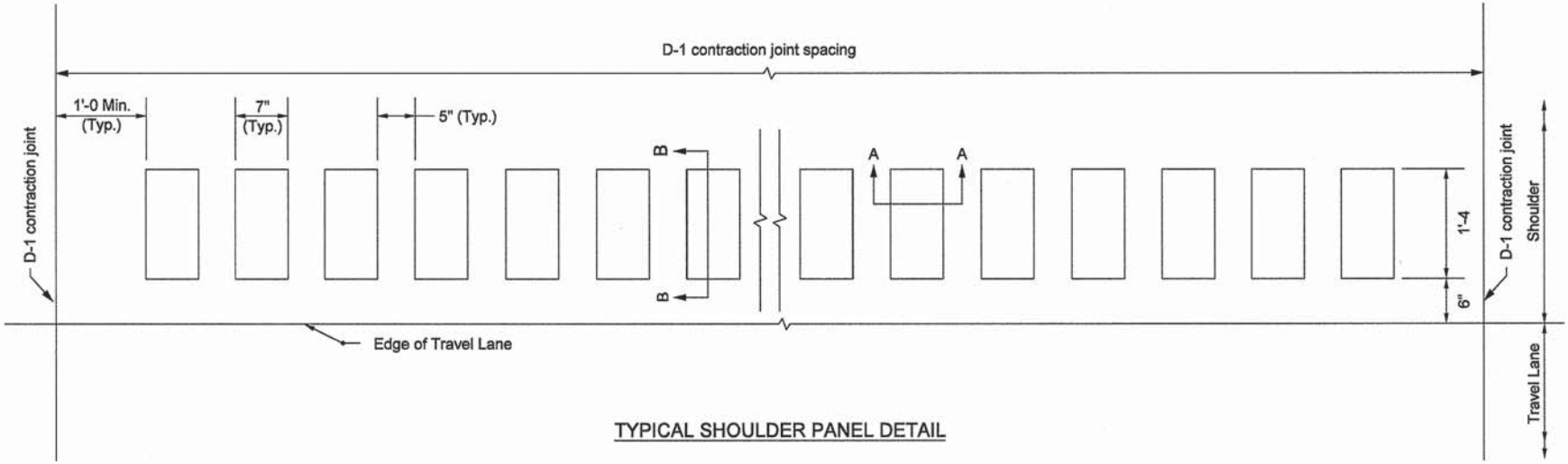
STANDARD DRAWING NO. E 606-SHCG-01

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

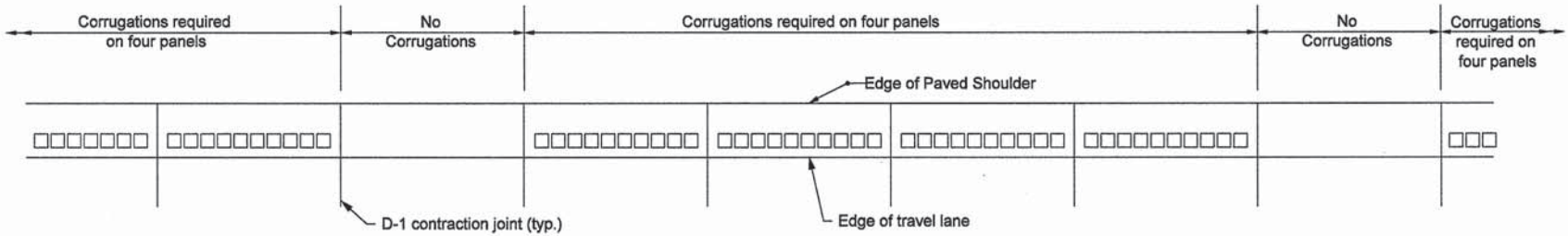
DESIGN STANDARDS ENGINEER

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

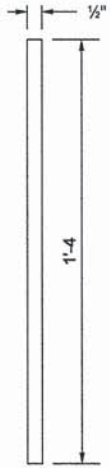
/s/ Richard K. Smutzer 3-03-03
CHIEF HIGHWAY ENGINEER DATE



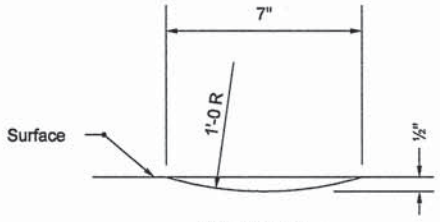
TYPICAL SHOULDER PANEL DETAIL



INTERMITTENT INSTALLATION DETAIL



SECTION B-B



SECTION A-A

NOTES

1. Continuous corrugations shall be required on every PCC shoulder panel on Interstates. Intermittent corrgation tions 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

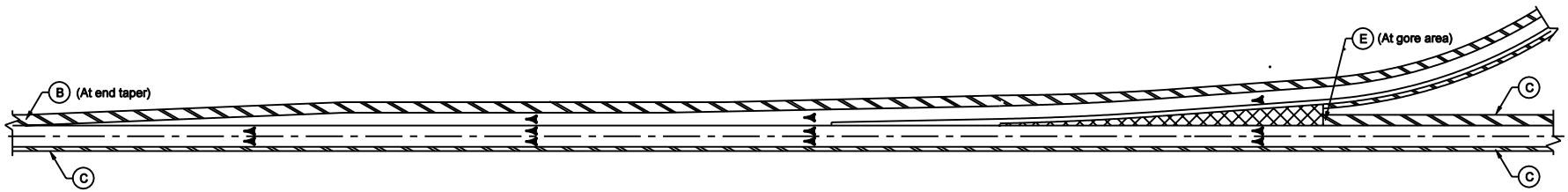
STANDARD DRAWING NO. E 606-SHCG-02

RICHARD L. VANCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

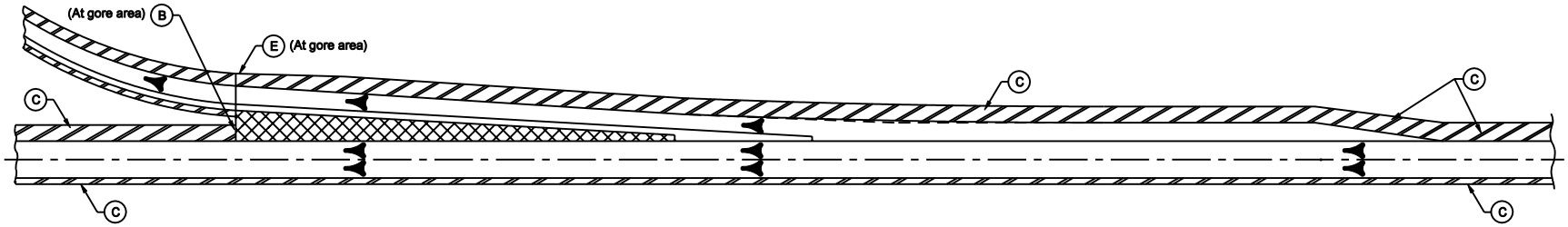
DESIGN STANDARDS ENGINEER

3-3-03
DESIGN STANDARDS ENGINEER DATE

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

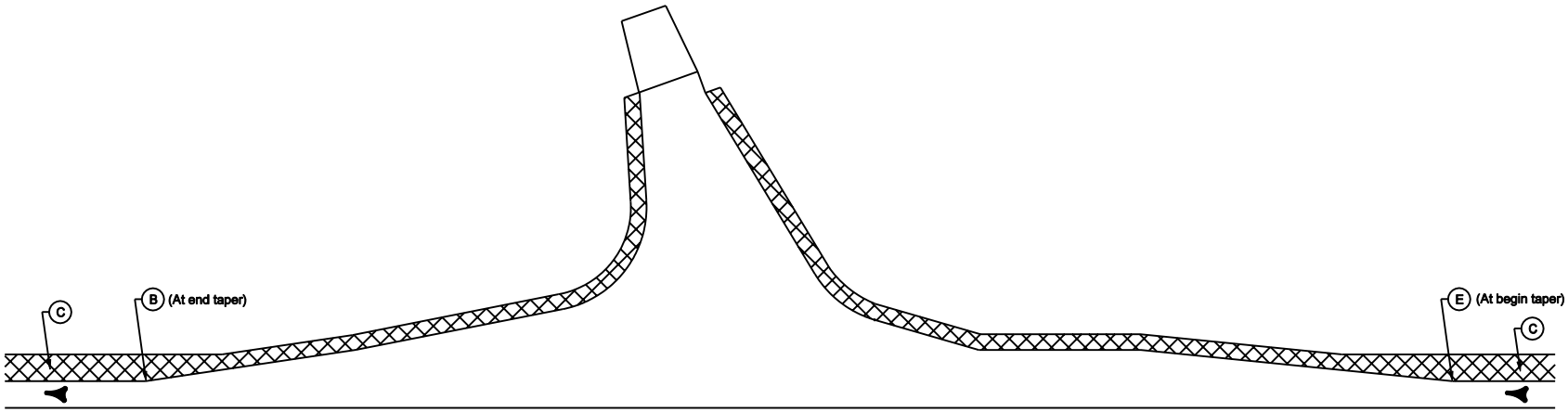
STANDARD DRAWING NO. E 606-SHCG-03

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

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

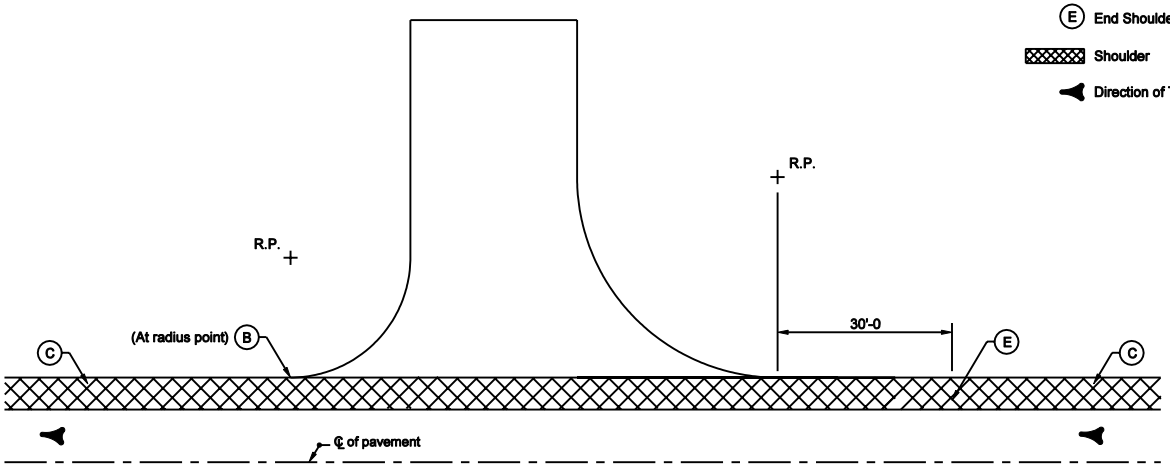
/s/ Richard K. Smutzer 3-03-03
CHIEF HIGHWAY ENGINEER DATE



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

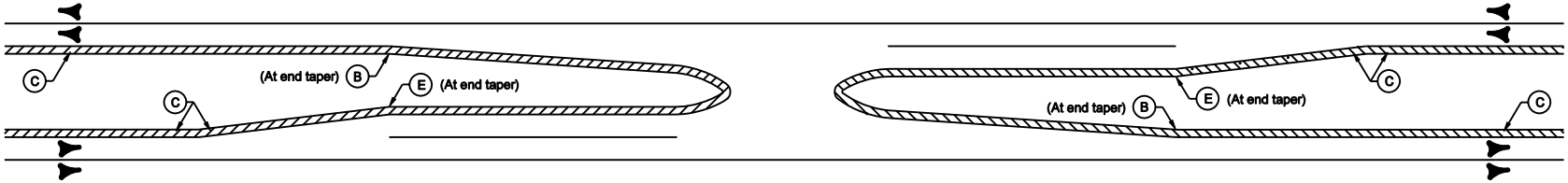
STANDARD DRAWING NO. E 606-SHCG-04

RICHARD L. VANCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

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

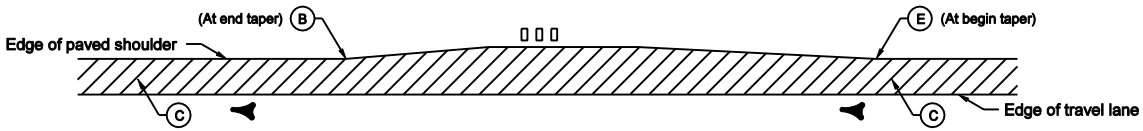
/s/ Richard K. Smutzer 3-03-03
CHIEF HIGHWAY ENGINEER DATE



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

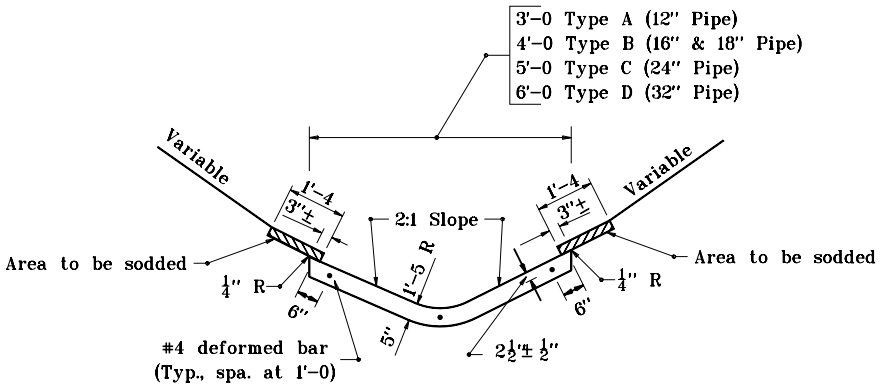
STANDARD DRAWING NO. E 606-SHCG-05

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

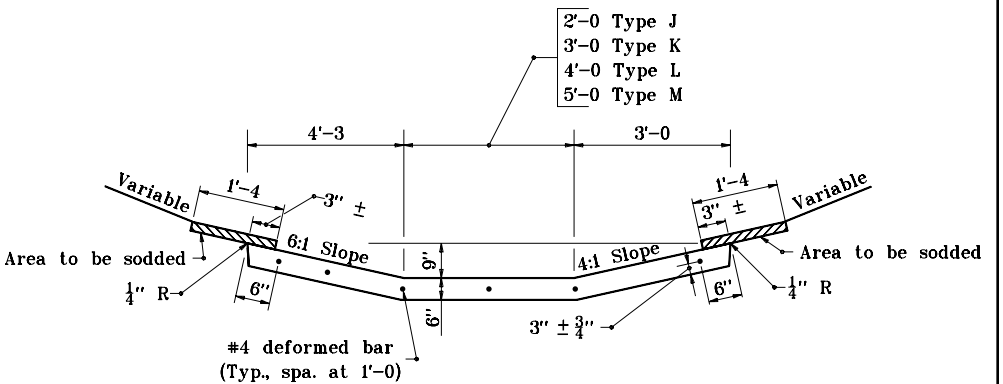
/s/ Richard L. VanCleave 3-03-03
DESIGN STANDARDS ENGINEER DATE

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



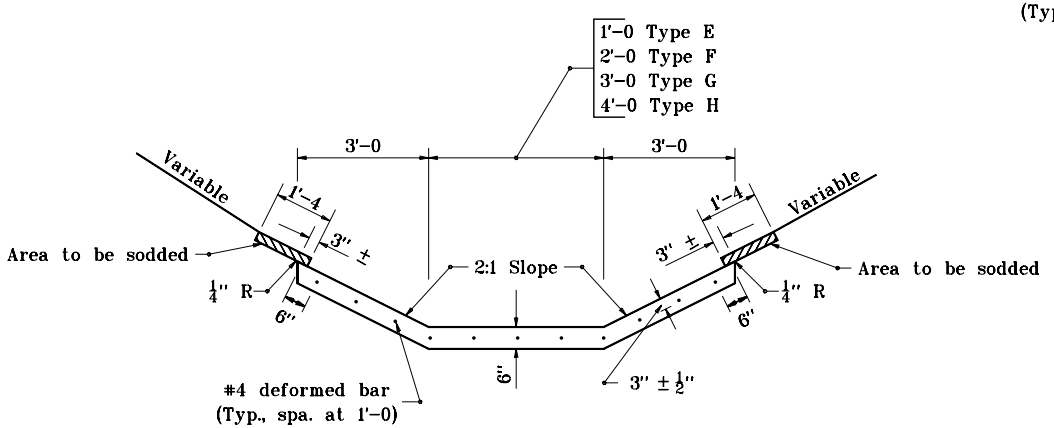
ELEVATION VIEW

PAVED SIDE DITCH TYPES A THROUGH D



ELEVATION VIEW

PAVED SIDE DITCH TYPES J THROUGH M



ELEVATION VIEW

PAVED SIDE DITCH TYPES E THROUGH H

INDIANA DEPARTMENT OF TRANSPORTATION

PAVED SIDE DITCH ELEVATIONS

SEPTEMBER 2000

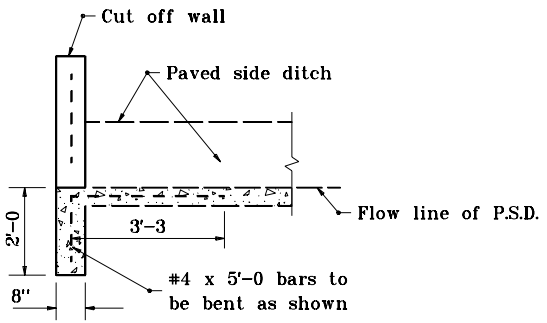
STANDARD DRAWING NO. **E 607–PSDT–01**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

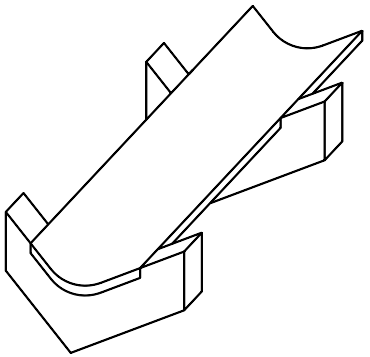
DESIGN STANDARDS ENGINEER

/s/ Anthony L. Uremovich 9–01–00
DESIGN STANDARDS ENGINEER — DATE

/s/ Firooz Zandi 9–01–00
CHIEF HIGHWAY ENGINEER — DATE

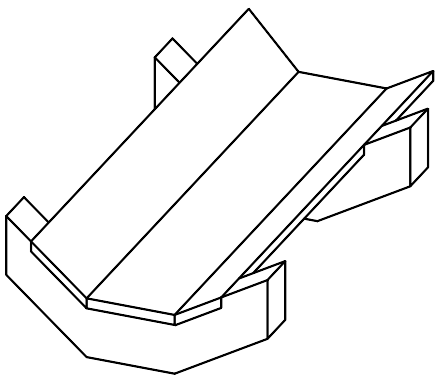


SECTION A-A



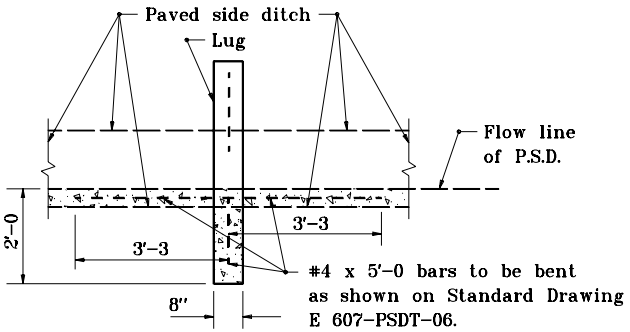
ISOMETRIC VIEW

PAVED SIDE DITCH TYPE A THROUGH D

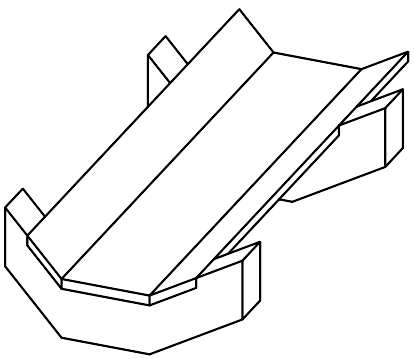


ISOMETRIC VIEW

PAVED SIDE DITCH TYPES J THROUGH M



SECTION B-B



ISOMETRIC VIEW

PAVED SIDE DITCH TYPE E THROUGH H

INDIANA DEPARTMENT OF TRANSPORTATION

PAVED SIDE DITCH SECTIONS AND ISOMETRICS

SEPTEMBER 1997

STANDARD DRAWING NO. **E 607-PSDT-02**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

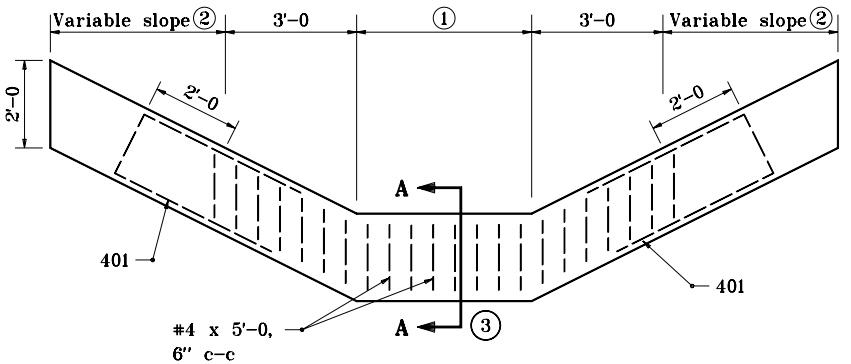
DESIGN STANDARDS ENGINEER

DETAILS PLACED IN THIS FORMAT 11-15-99

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

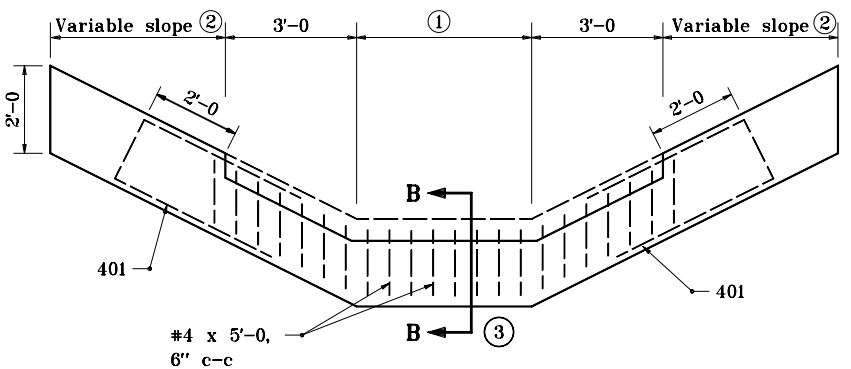
/s/ Firooz Zandi 11-15-99
CHIEF HIGHWAY ENGINEER DATE

ORIGINALLY APPROVED 9-01-97



ELEVATION VIEW

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



ELEVATION VIEW

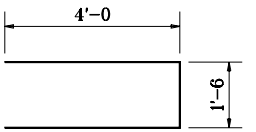
LUG FOR PAVED SIDE DITCH TYPES E THROUGH H

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

INDIANA DEPARTMENT OF TRANSPORTATION

PAVED SIDE DITCH CUT-OFF WALL AND LUG

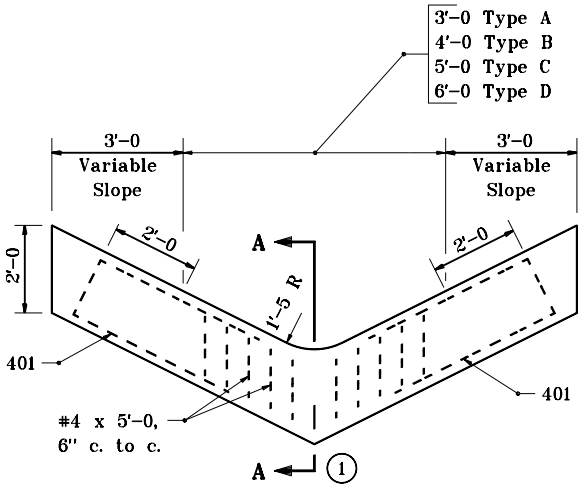
SEPTEMBER 1997

STANDARD DRAWING NO. **E 607-PSDT-03**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

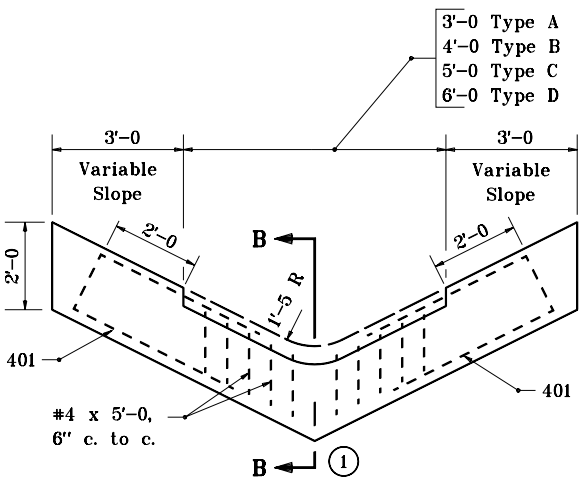
DESIGN STANDARDS ENGINEER

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
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**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

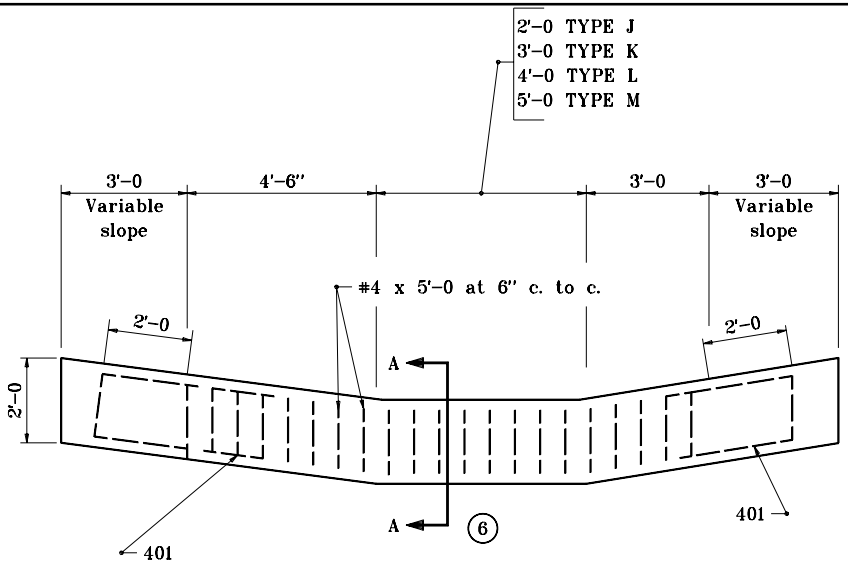
DESIGN STANDARDS ENGINEER

DETAILS PLACED IN THIS FORMAT 11-15-99

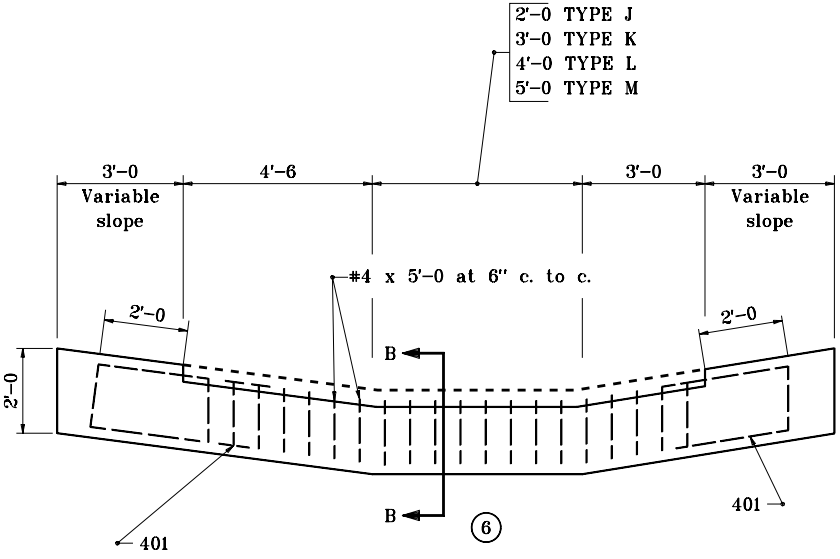
/s/ Anthony L. Uremovich 11-15-99
DESIGN STANDARDS ENGINEER DATE

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

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

1. The 6:1 sloped side shall be placed nearest the roadway.

2. Cutt-off walls shall be used at the begining and end of all paved side ditch.

3. Lugs shall be used at the following locations:

   a. 10 ft downslope from a grade change.
   b. 10 ft downslope from the intersection of different types of paved side ditch.
   c. At the downslope end of a transition between different types of paved side ditch.
   d. 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

4. 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.

5. 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.

7. 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**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

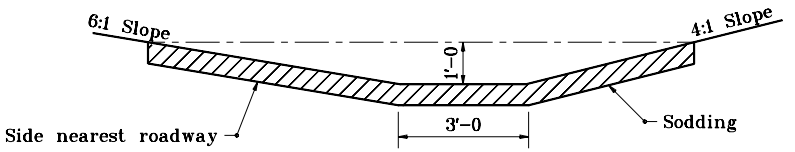
DESIGN STANDARDS ENGINEER

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

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

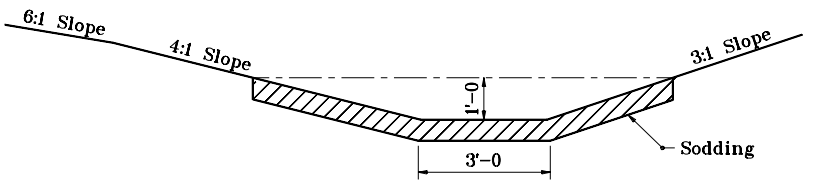
GENERAL NOTES

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



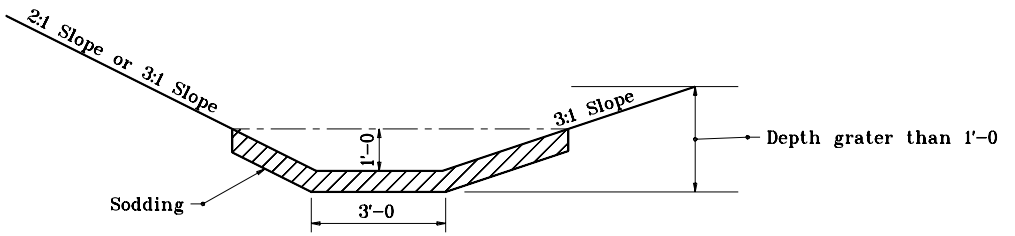
STANDARD 3' BOTTOM DITCH

(LOCATED WITHIN CLEAR ZONE)



SPECIAL 3' BOTTOM DITCH

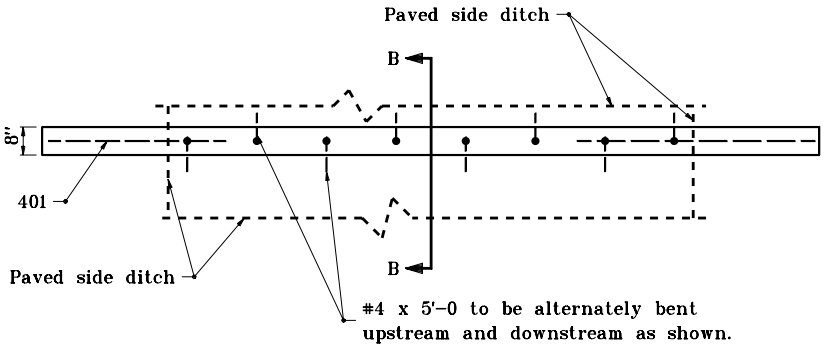
(LOCATED BEYOND CLEAR ZONE)



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**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

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

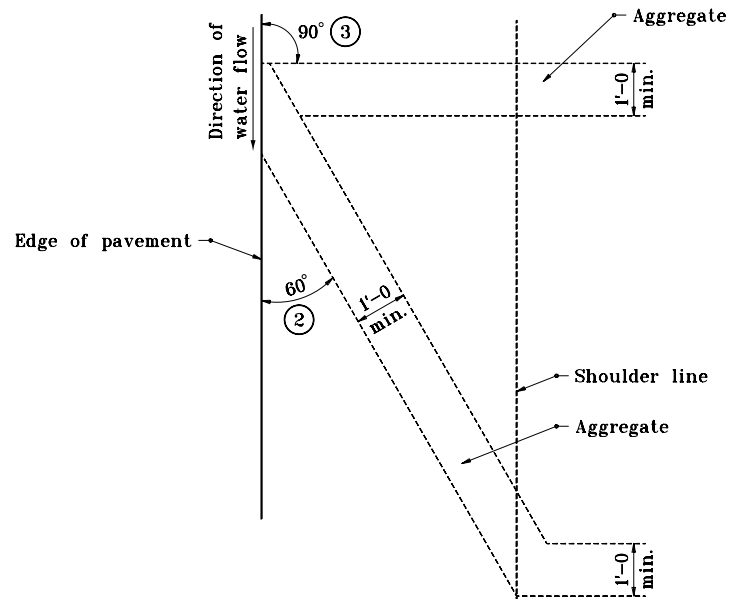
ORIGINALLY APPROVED 9-01-97

GENERAL NOTES

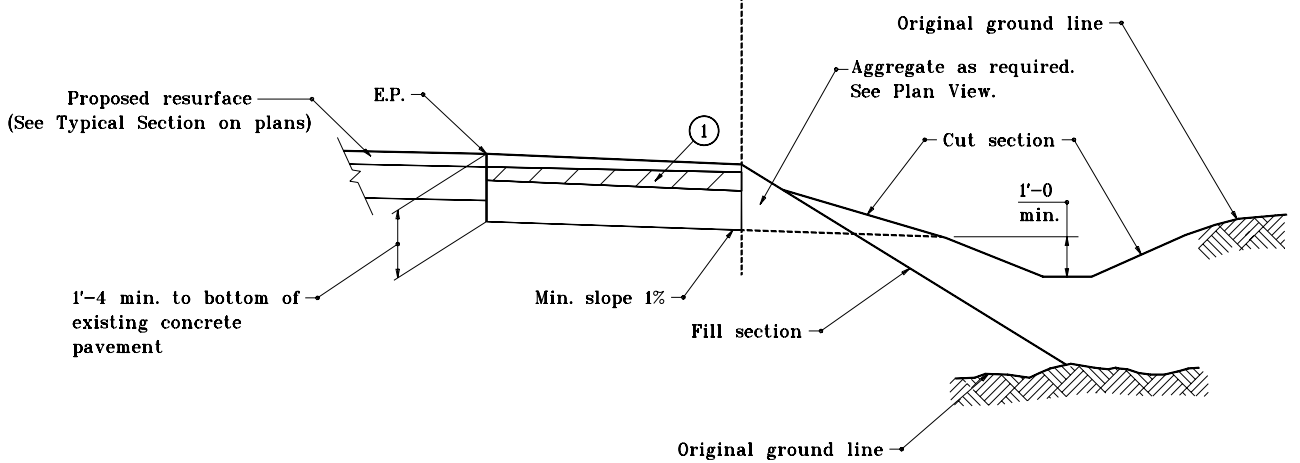
(1) 660#/syd HMA mixture for patching required. Width of patch to be equal to width of asphalt shoulder in place.

(2) For pavement grades of 1% or steeper.

(3) For pavement grades of flatter than 1%.



PLAN VIEW



ELEVATION

SHOULDER DRAIN

INDIANA DEPARTMENT OF TRANSPORTATION

SHOULDER DRAIN

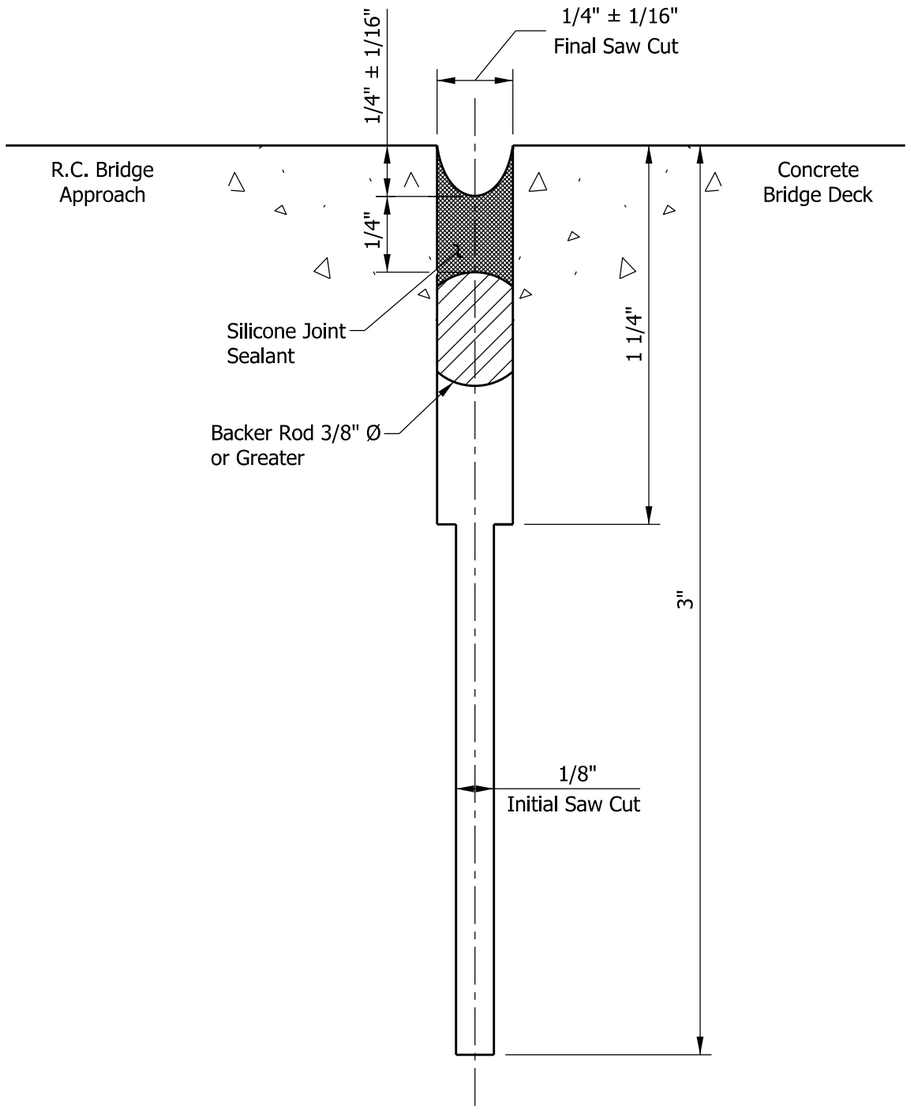
MAY 1998

STANDARD DRAWING NO. **E 608-SHDR-01**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

DETAILS PLACED IN THIS FORMAT	11-15-99
/s/ Anthony L. Uremovich, DESIGN STANDARDS ENGINEER	11-15-99
/s/ Firooz Zandi, CHIEF HIGHWAY ENGINEER	11-15-99
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

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

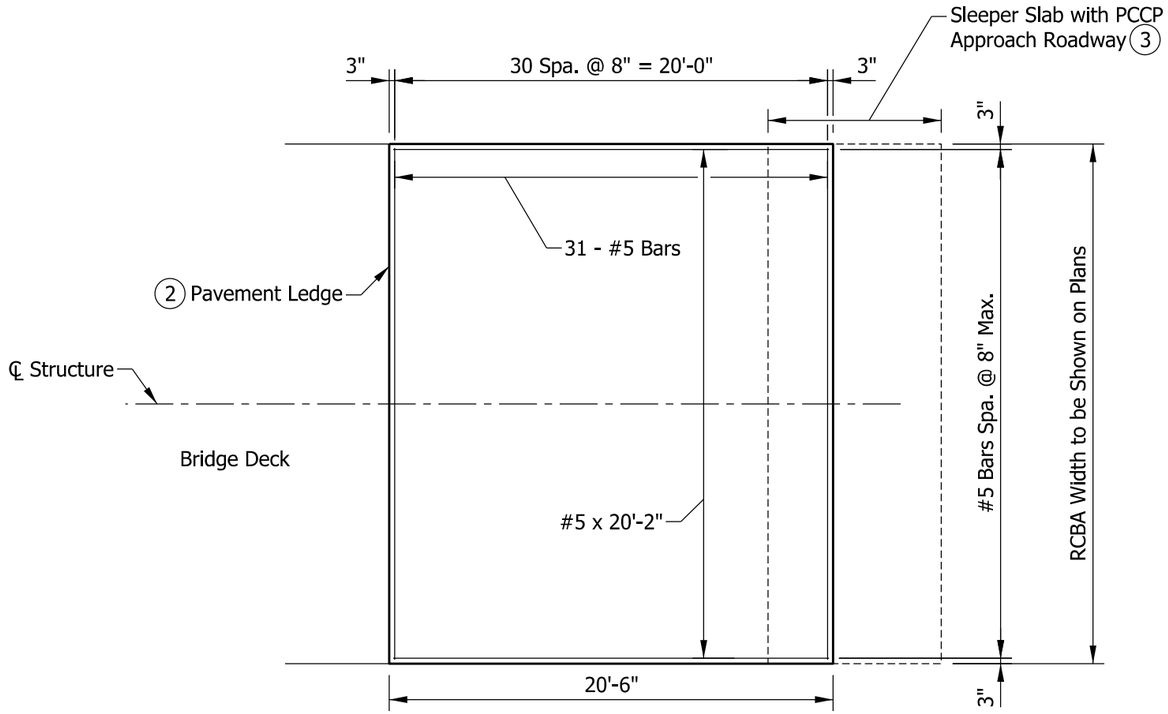
DETAILS PLACED IN THIS FORMAT 09/04/12

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

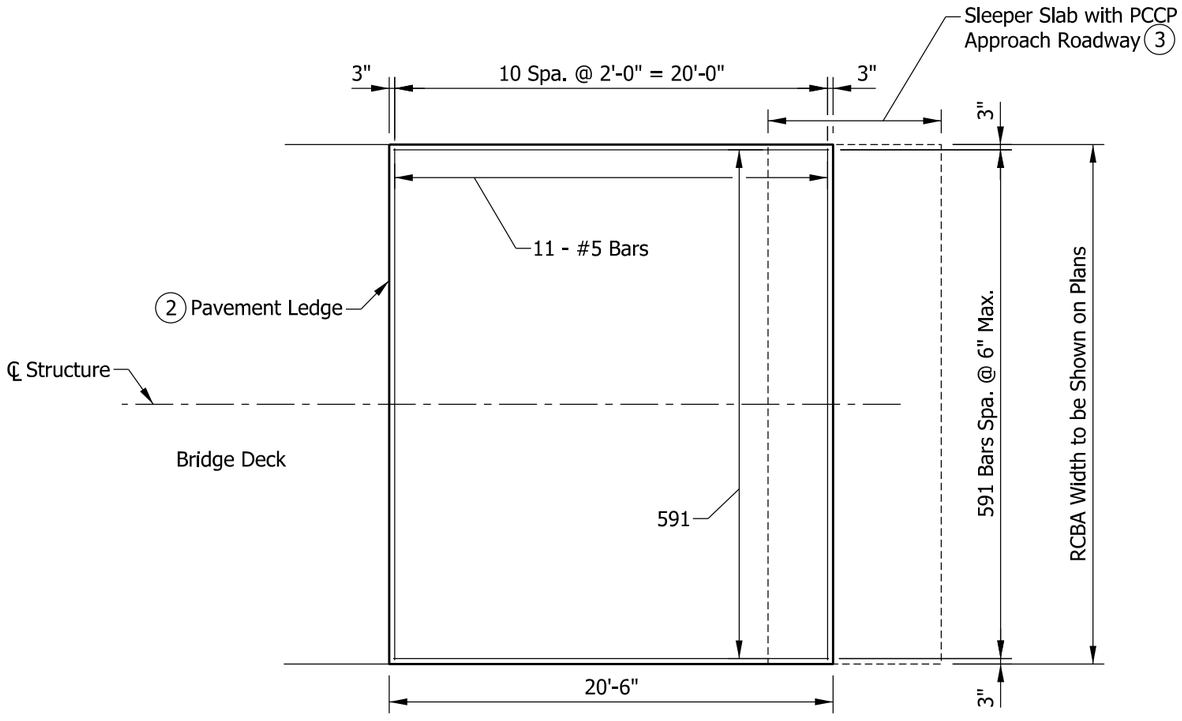
SUPERVISOR, ROADWAY STANDARDS DATE

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

CHIEF ENGINEER DATE



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

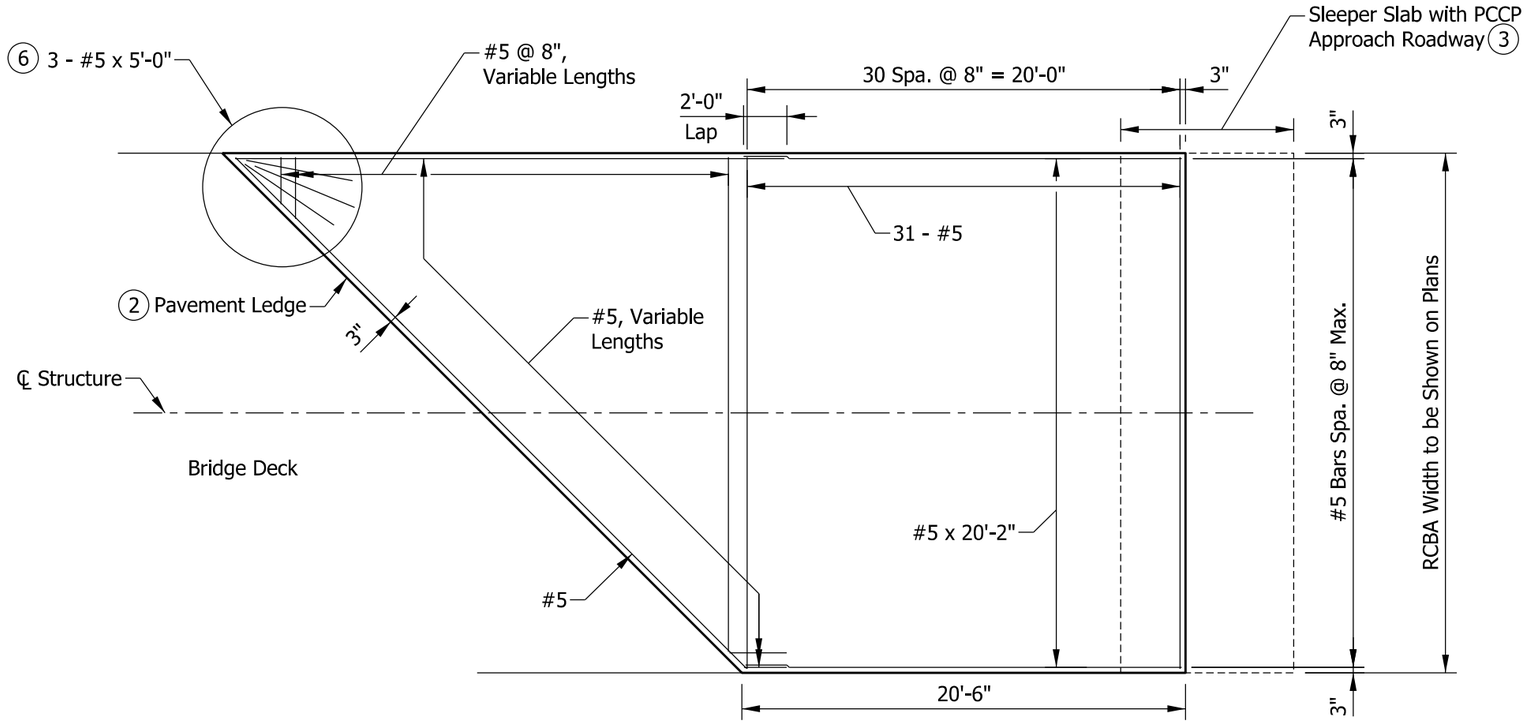
SEPTEMBER 2014

STANDARD DRAWING NO. E 609-RCBA-01

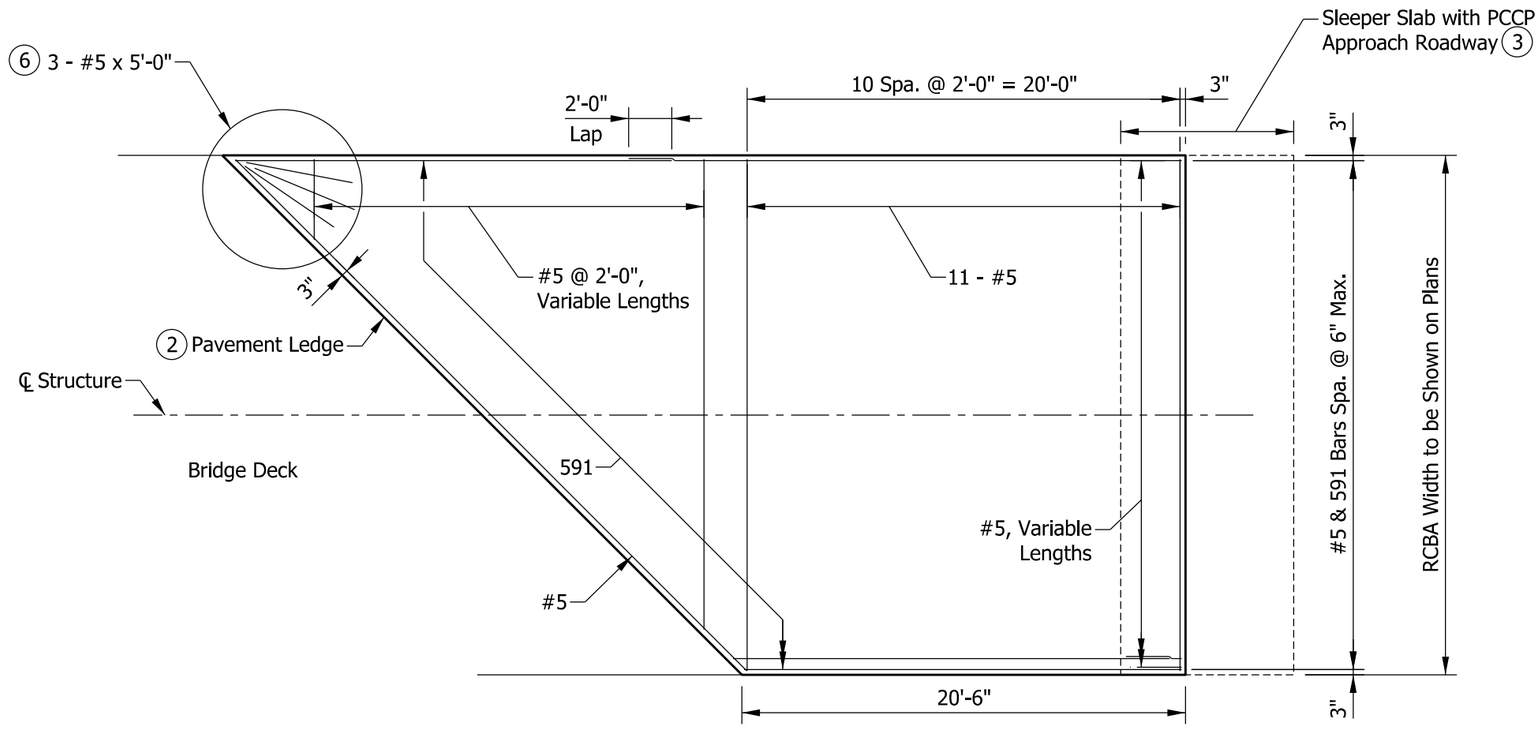
ELIZABETH W. PHILLIPS
REGISTERED
No. 10200124
STATE OF INDIANA
PROFESSIONAL ENGINEER

/s/ Elizabeth W. Phillips 03/04/14
DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller 03/04/14
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

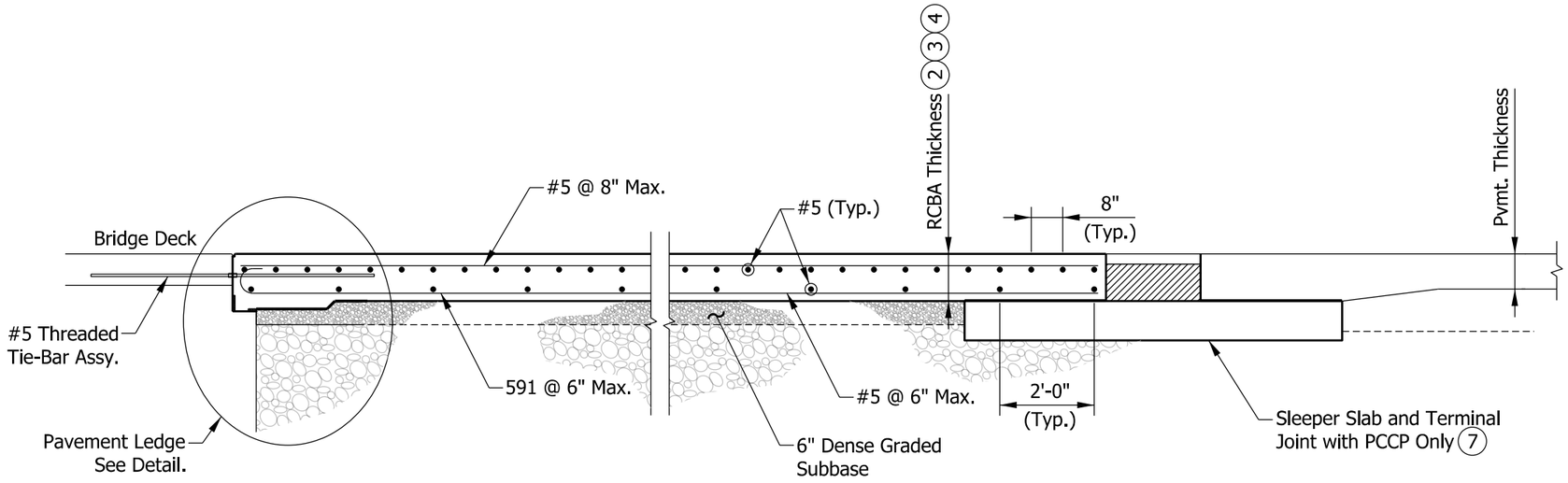
SEPTEMBER 2014

STANDARD DRAWING NO. E 609-RCBA-02

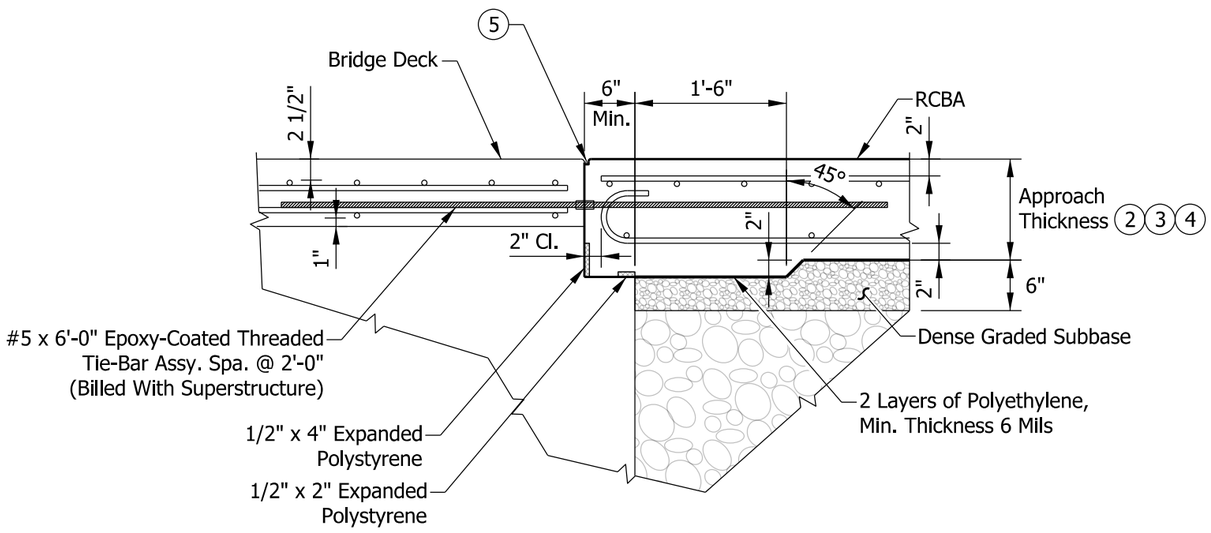
ELIZABETH W. PHILLIPS
REGISTERED
No. 10200124
STATE OF INDIANA
PROFESSIONAL ENGINEER

/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.

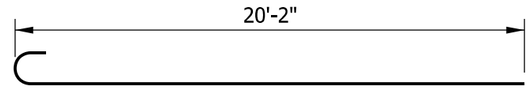
6. See Standard Drawing E 703-BRST-01 for reinforcing-bar bending details and notes.

(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



591 x 20'-9"

INDIANA DEPARTMENT OF TRANSPORTATION

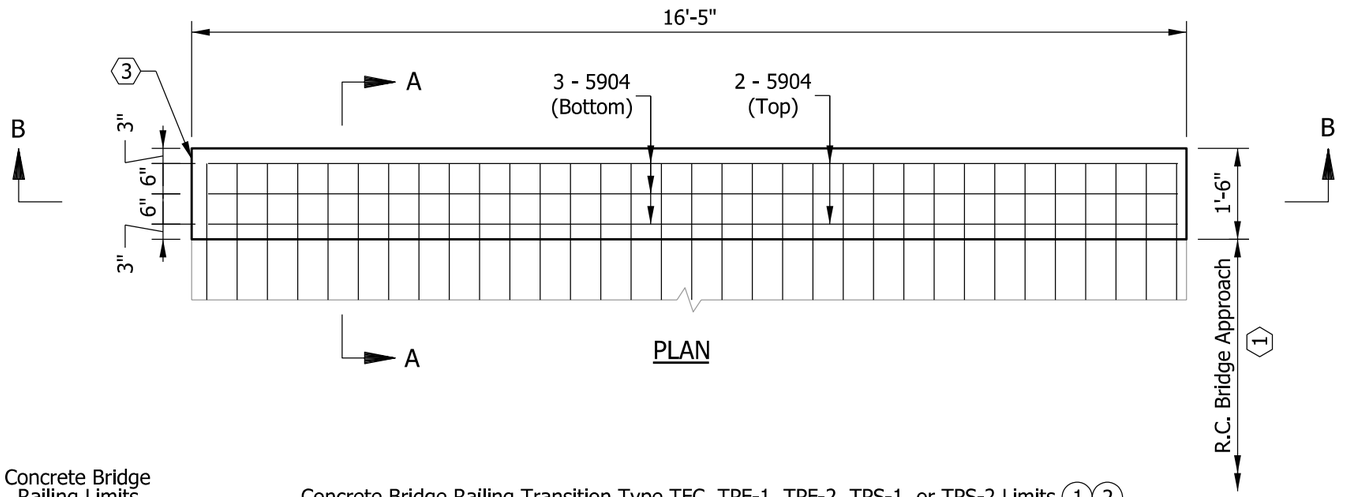
REINFORCED CONCRETE BRIDGE APPROACH
SECTION AND PAVEMENT LEDGE DETAIL

SEPTEMBER 2014

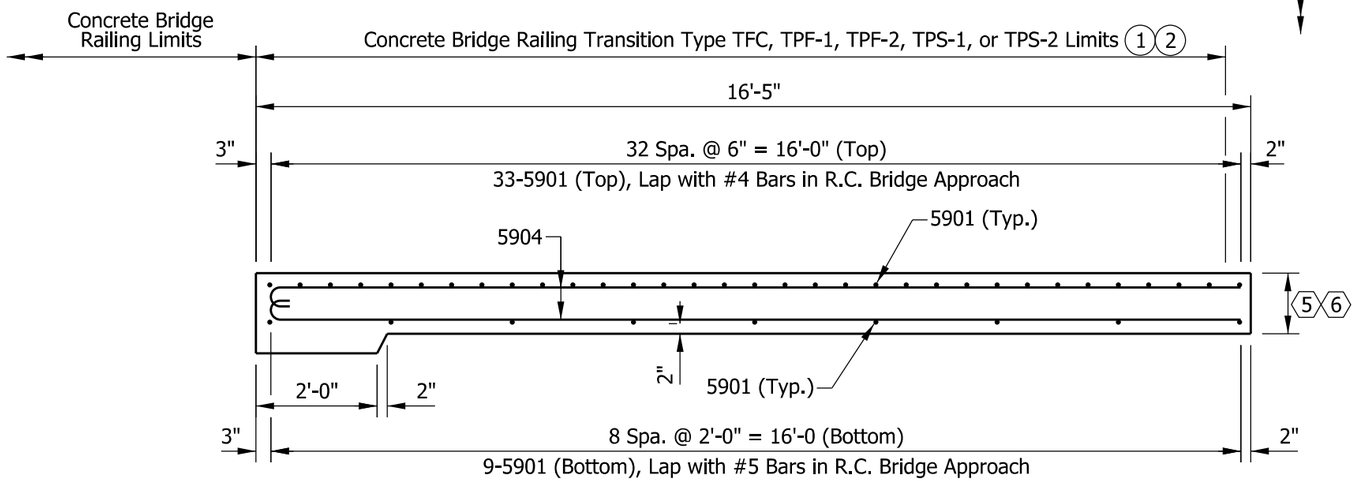
STANDARD DRAWING NO. E 609-RCBA-03

ELIZABETH W. PHILLIPS
REGISTERED
No. 10200124
STATE OF INDIANA
PROFESSIONAL ENGINEER

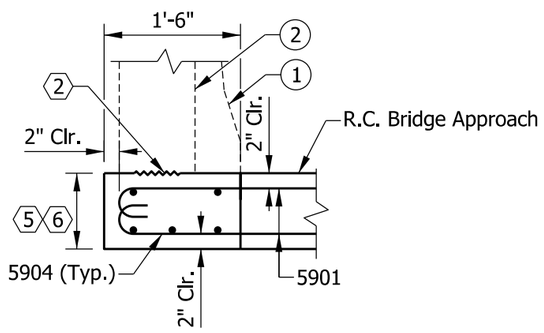
/s/ Elizabeth W. Phillips	02/21/14
DESIGN STANDARDS ENGINEER	DATE
/s/ Mark A. Miller	03/03/14
CHIEF ENGINEER	DATE



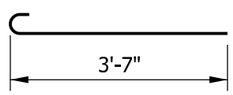
PLAN



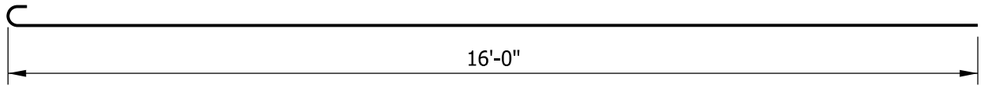
SECTION B-B



SECTION A-A



5901 x 4'-2"



5904 x 16'-7"

NOTES

1. See Standard Drawings E 706-TTFC-01 through -03 for concrete bridge railing transition type TFC details.

2. 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.

3. 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

INDIANA DEPARTMENT OF TRANSPORTATION

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

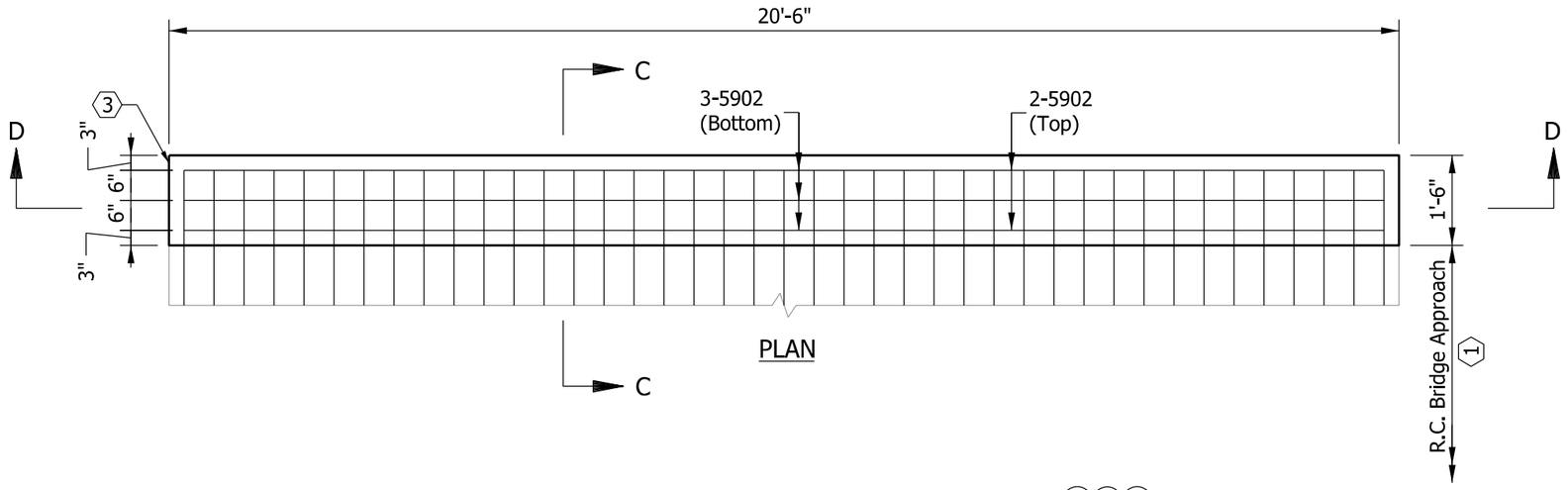
SEPTEMBER 2013

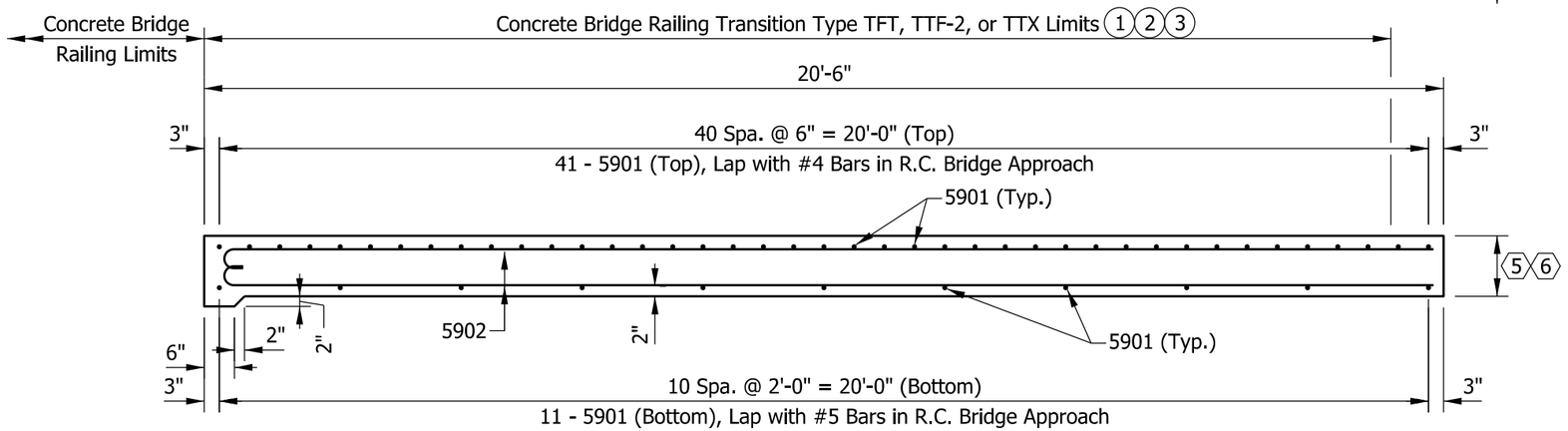
STANDARD DRAWING NO. E 609-TBAE-01

ELIZABETH W. PHILLIPS
REGISTERED
No. 10200124
STATE OF INDIANA
PROFESSIONAL ENGINEER

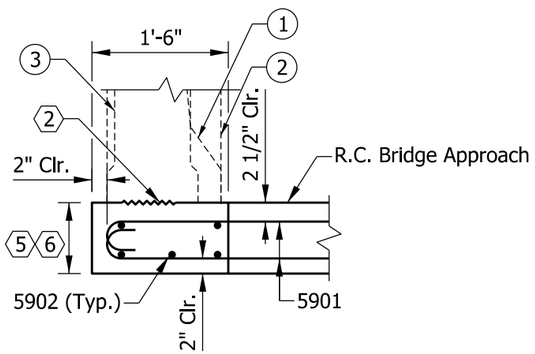
/s/ Elizabeth W. Phillips 02/28/13
DESIGN STANDARDS ENGINEER DATE

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

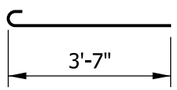




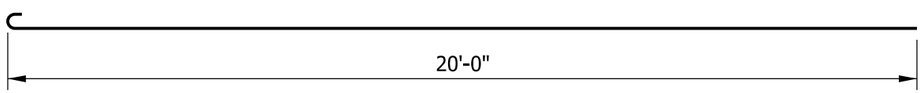
SECTION D-D



SECTION C-C



5901 x 4'-2"



5902 x 20'-7"

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 ⬡.

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

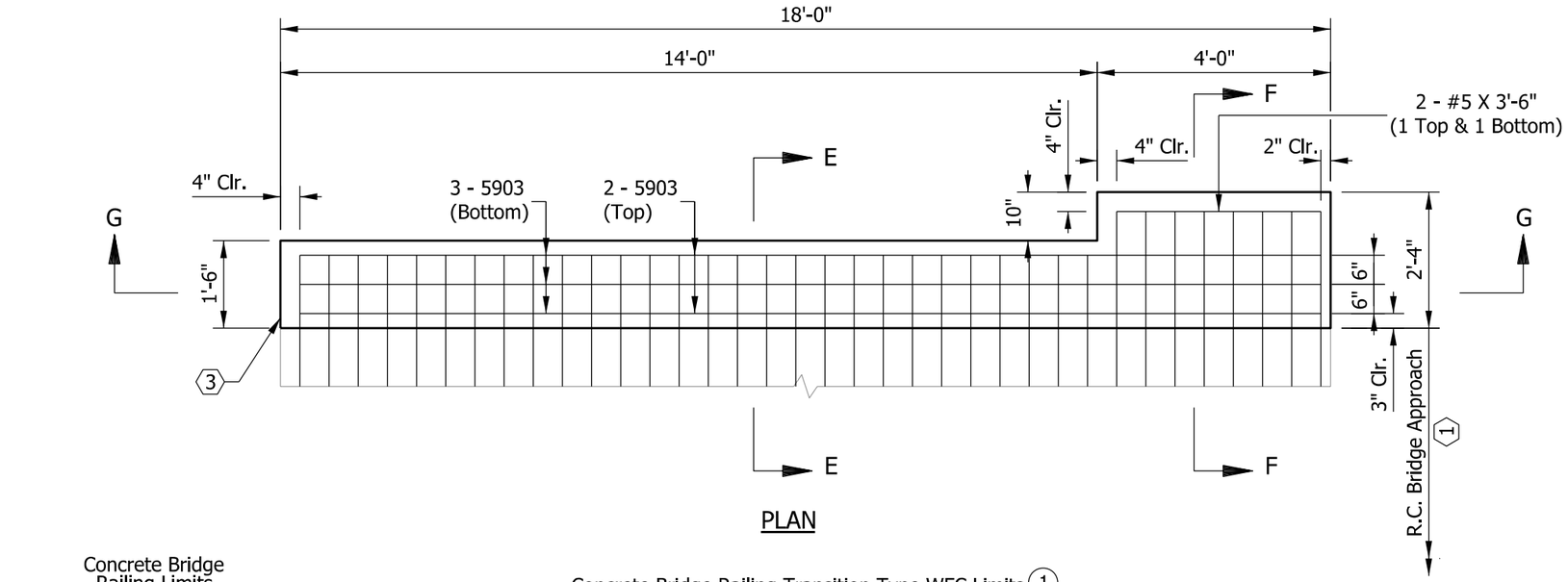
SEPTEMBER 2013

STANDARD DRAWING NO. E 609-TBAE-02

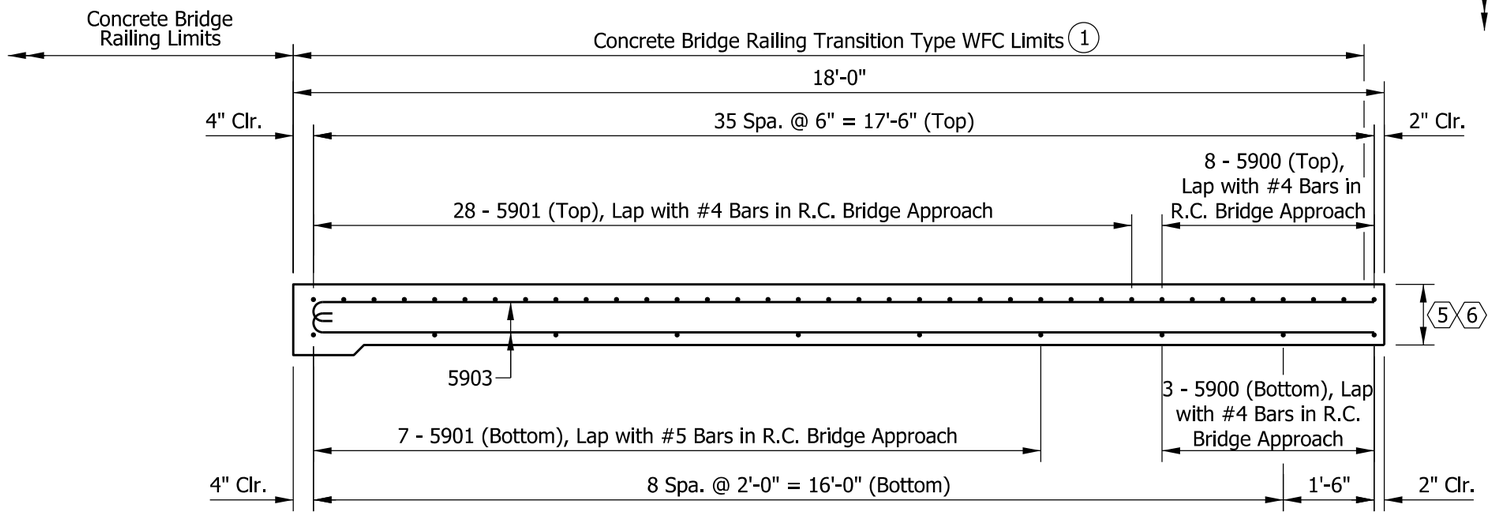
ELIZABETH W. PHILLIPS REGISTERED No. 10200124 STATE OF INDIANA PROFESSIONAL ENGINEER

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

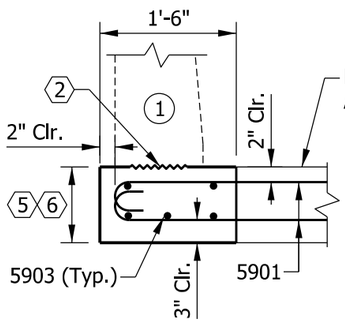
/s/ Mark A. Miller 03/27/13
CHIEF ENGINEER DATE



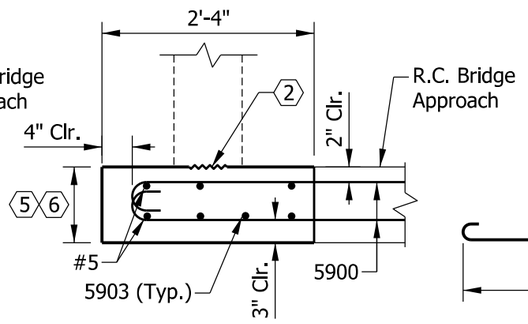
PLAN



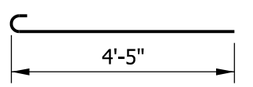
SECTION G-G



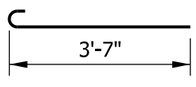
SECTION E-E



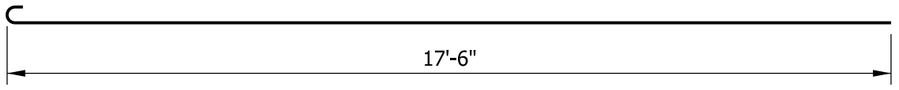
SECTION F-F



5900 x 5'-0"



5901 x 4'-2"



5903 x 18'-1"

NOTES

1. See Standard Drawings E 706-TWFC-01 through -03 for concrete bridge railing transition WFC details.
2. 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

ELIZABETH W. PHILLIPS
REGISTERED
No. 10200124
STATE OF INDIANA
PROFESSIONAL ENGINEER

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

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

GENERAL NOTES

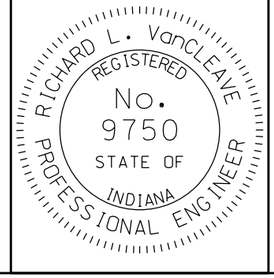
1. See Standard Drawing E 609-RCBA-01 and the plans for reinforced concrete bridge approach details.
2. Construction joint type A. See Standard Drawing E 702-CJTA-01 for details.
3. This end of the reinforced concrete bridge approach extension shall match the construction at the bridge end as shown on 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

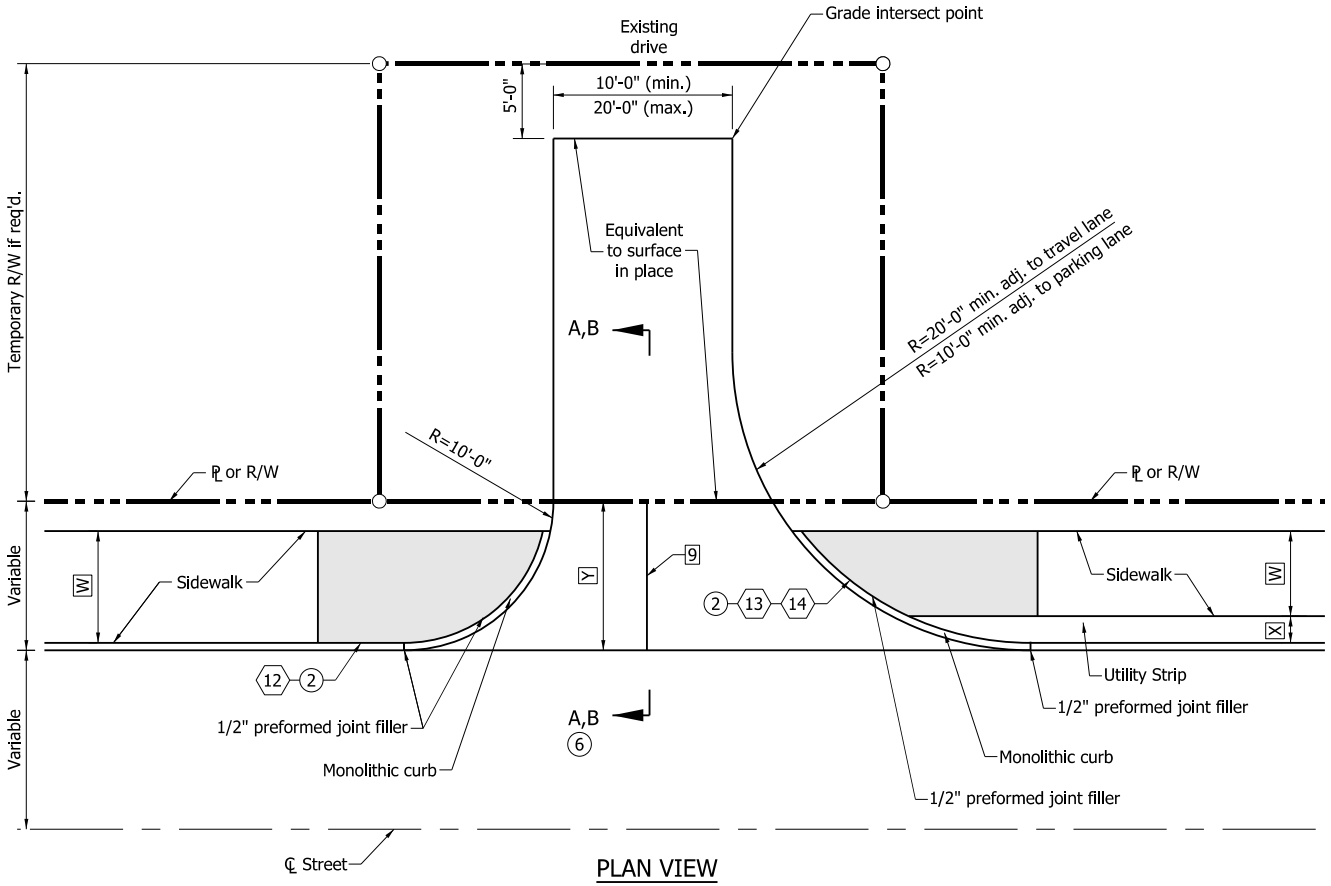
SEPTEMBER 2012

STANDARD DRAWING NO. E 609-TBAE-04



/s/ Richard L. Van Cleave *09/04/12*
SUPERVISOR, ROADWAY STANDARDS DATE

/s/ Mark A. Miller *09/04/12*
CHIEF ENGINEER DATE



PLAN VIEW

NOTES:

1. See Standard Drawing E 610-DRIV-13 for General Notes and additional Legend.
2. See Standard Drawings E 604-SDWK-01 or E 604-SDWK-02 for sidewalk elevation transition details.
3. See Standard Drawings E 610-DRIV-03 for concrete curb and gutter connection detail.
4. See Standard Drawings E 610-DRIV-07 for PCCP joint placement detail.
5. Pavement shall be PCCP for Approaches, 6 in., on subgrade treatment Type II.
6. See Standard Drawing E 610-DRIV-08 for sections A-A and B-B.
7. 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 ℄ or R/W.

= Sidewalk elevation transition.

INDIANA DEPARTMENT OF TRANSPORTATION

CLASS I DRIVE

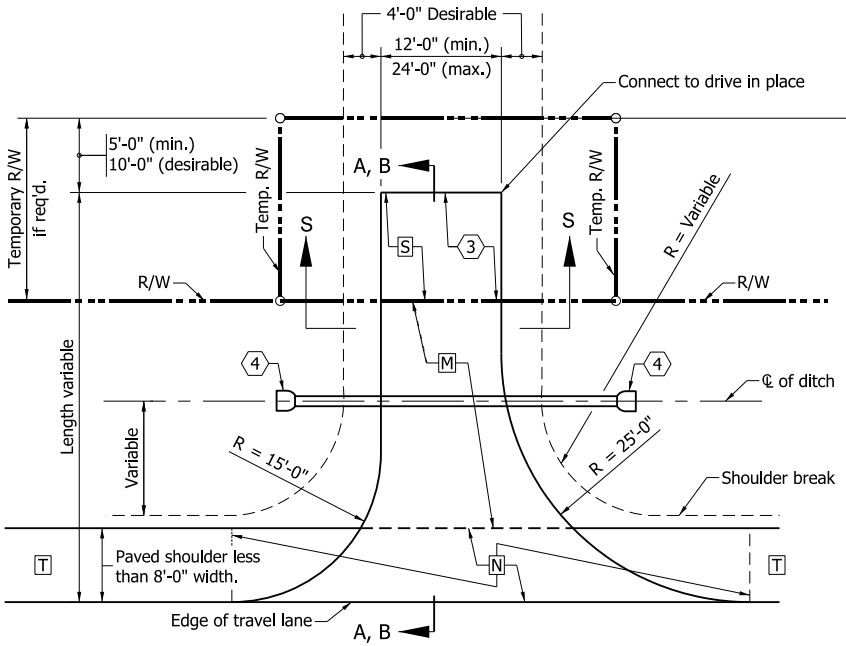
SEPTEMBER 2012

STANDARD DRAWING NO. E 610-DRIV-01

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

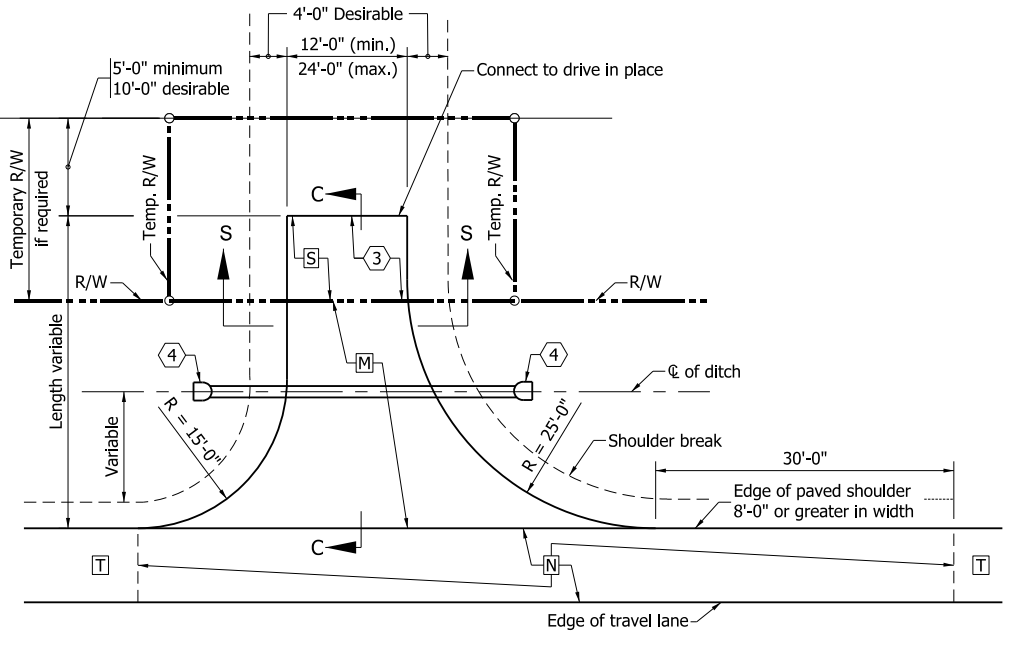
/s/ Richard L. VanCleave 09/04/12
SUPERVISOR, ROADWAY STANDARDS DATE

/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 II
or
PCCP for Approaches, 6",
subgrade treatment Type II

[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

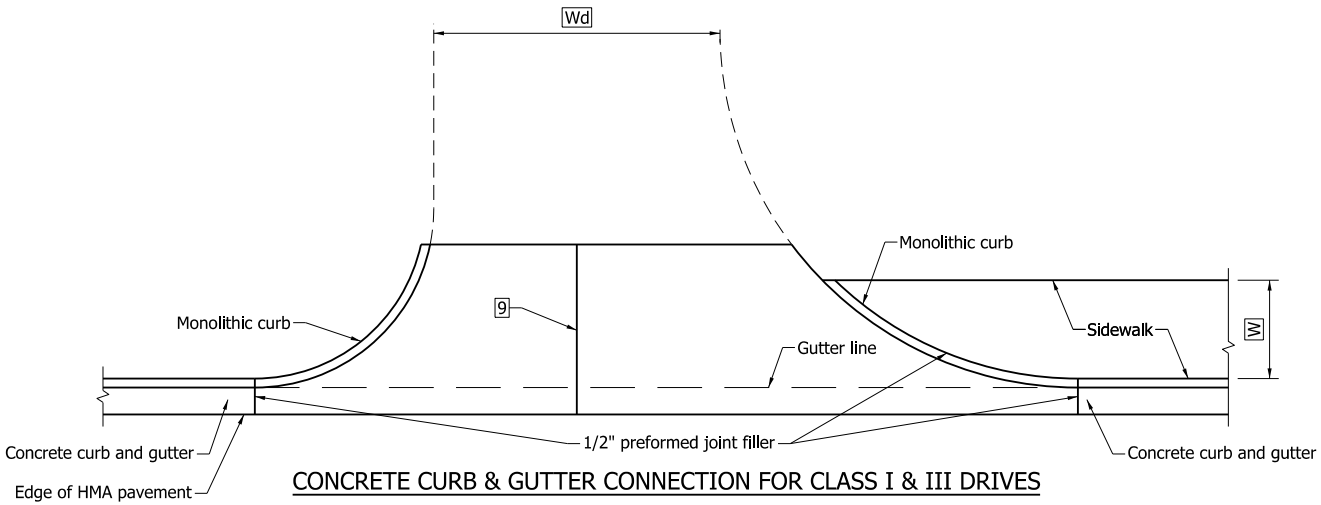
STANDARD DRAWING NO. E 610-DRIV-02

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

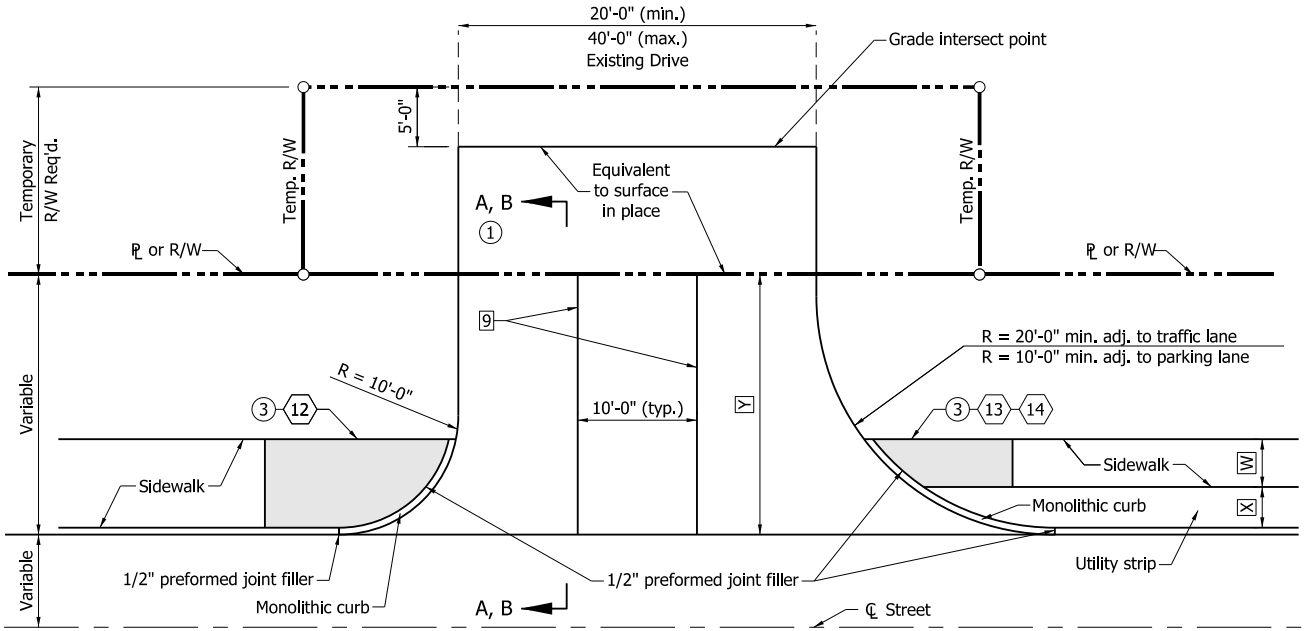
DESIGN STANDARDS ENGINEER

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

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



CONCRETE CURB & GUTTER CONNECTION FOR CLASS I & III DRIVES



PLAN VIEW - CLASS III DRIVE

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 II.
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 ℄ or R/W
- = Sidewalk elevation transition

INDIANA DEPARTMENT OF TRANSPORTATION

CLASS III DRIVE

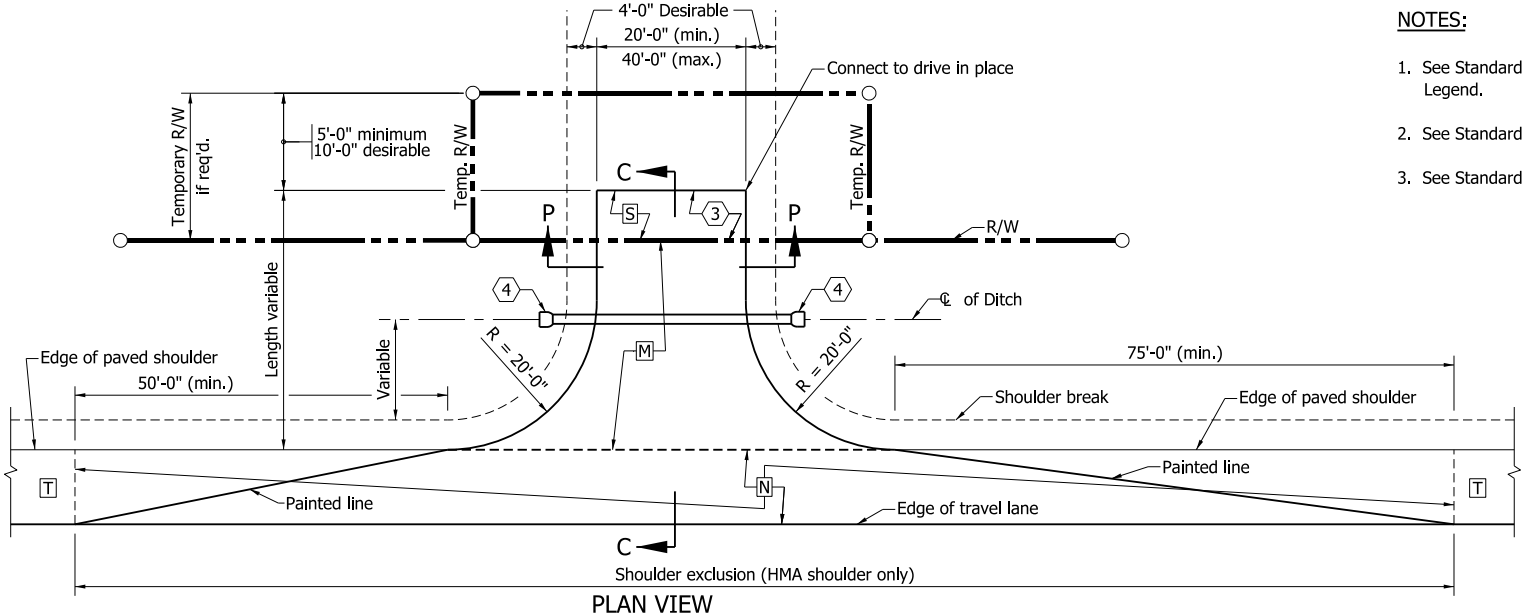
SEPTEMBER 2012

STANDARD DRAWING NO. E 610-DRIV-03

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

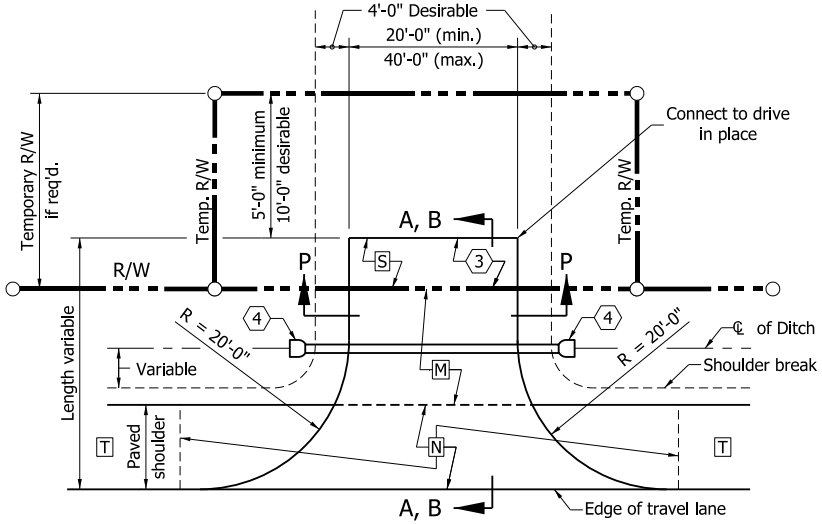
/s/ Richard L. VanCleave 09/04/12
SUPERVISOR, ROADWAY STANDARDS DATE

/s/ Mark A. Miller 09/04/12
CHIEF ENGINEER DATE



PLAN VIEW

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



PLAN VIEW

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

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-09 for Section P-P.

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 II
or
PCCP for Approaches, 9", on
subgrade treatment Type II

[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 IV DRIVE

SEPTEMBER 2010

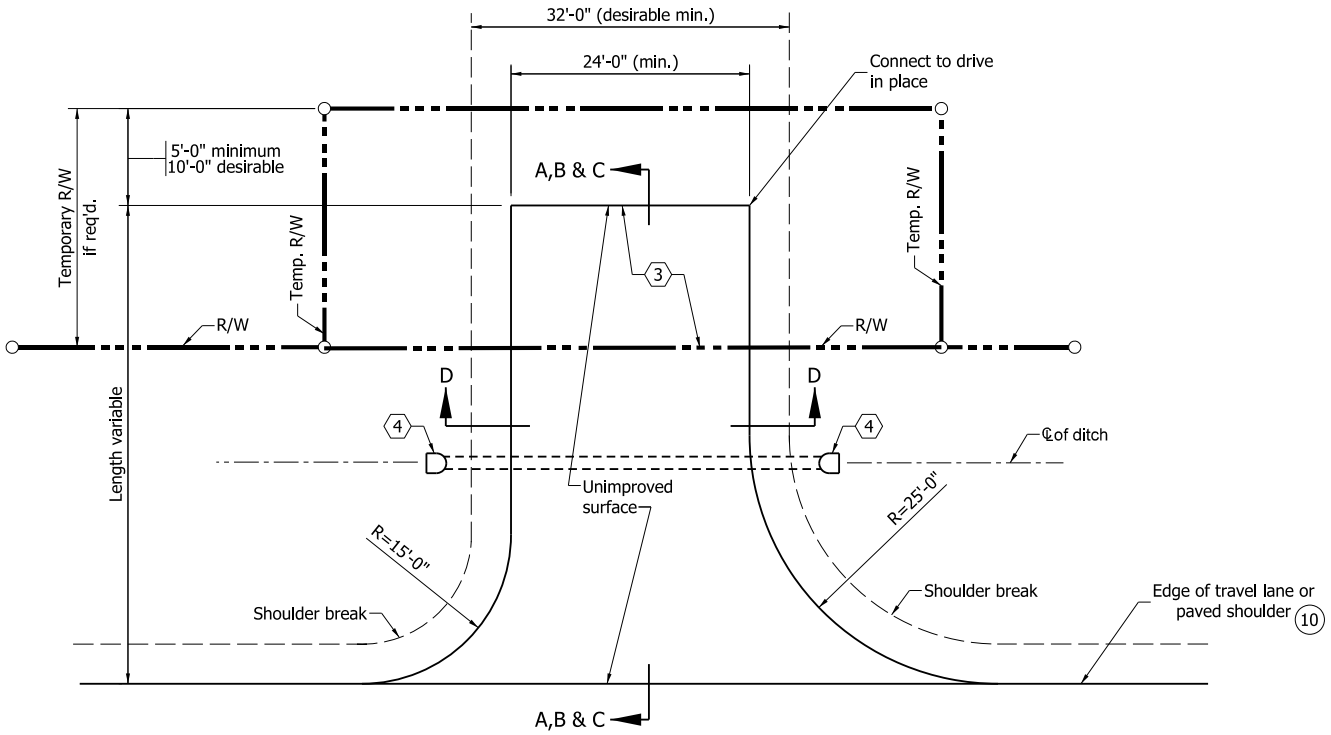
STANDARD DRAWING NO. E 610-DRIV-04

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

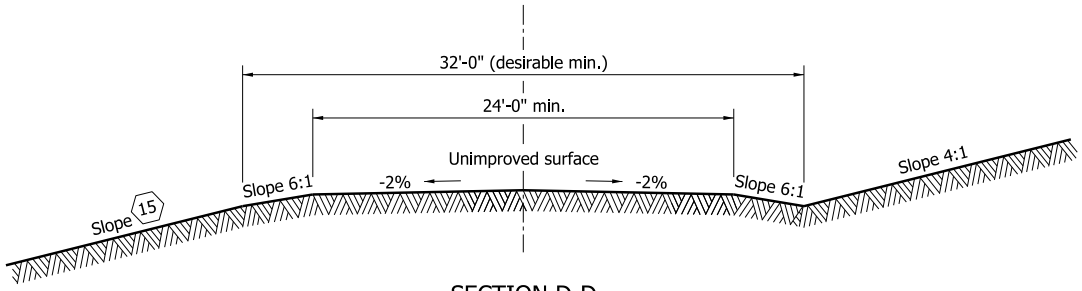
DESIGN STANDARDS ENGINEER

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

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



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

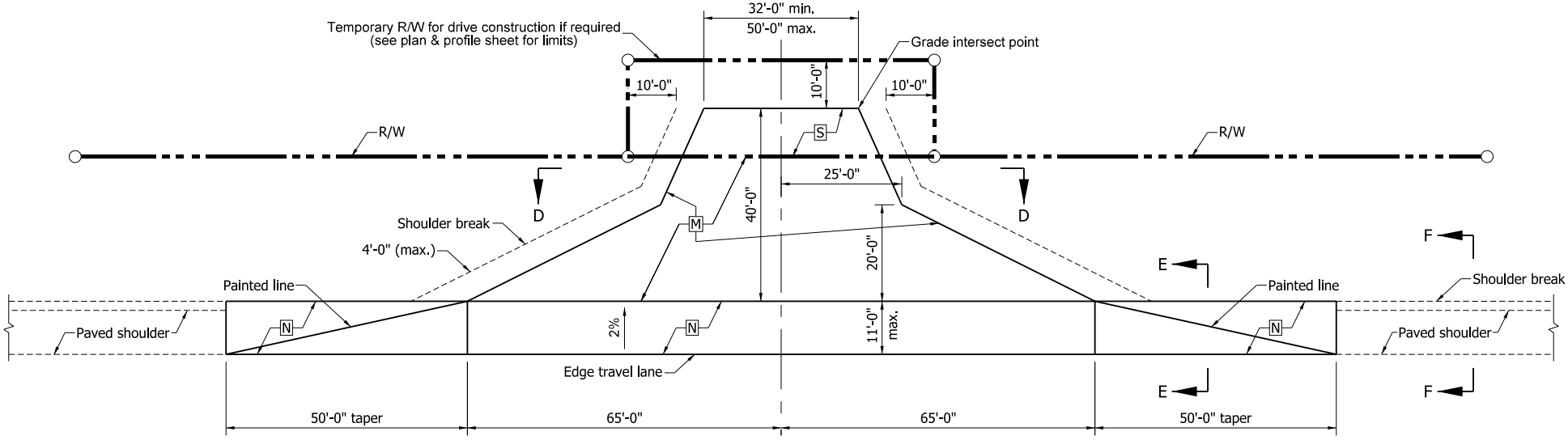
STANDARD DRAWING NO. E 610-DRIV-05

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

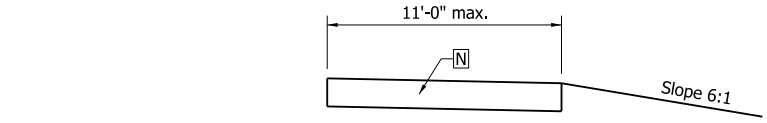
DESIGN STANDARDS ENGINEER

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

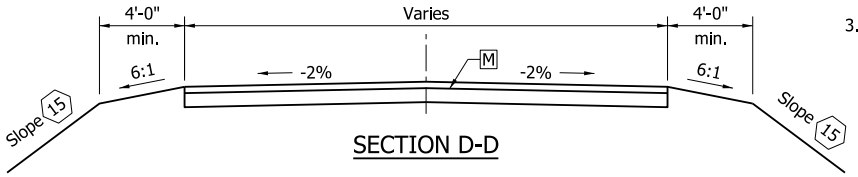
/s/ Mark A. Miller 09/01/10
CHIEF HIGHWAY ENGINEER DATE



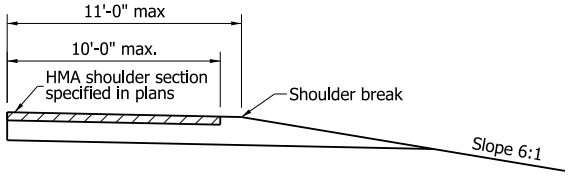
PLAN VIEW



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 II
or
PCCP for Approaches, 9", on
subgrade treatment Type II

[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

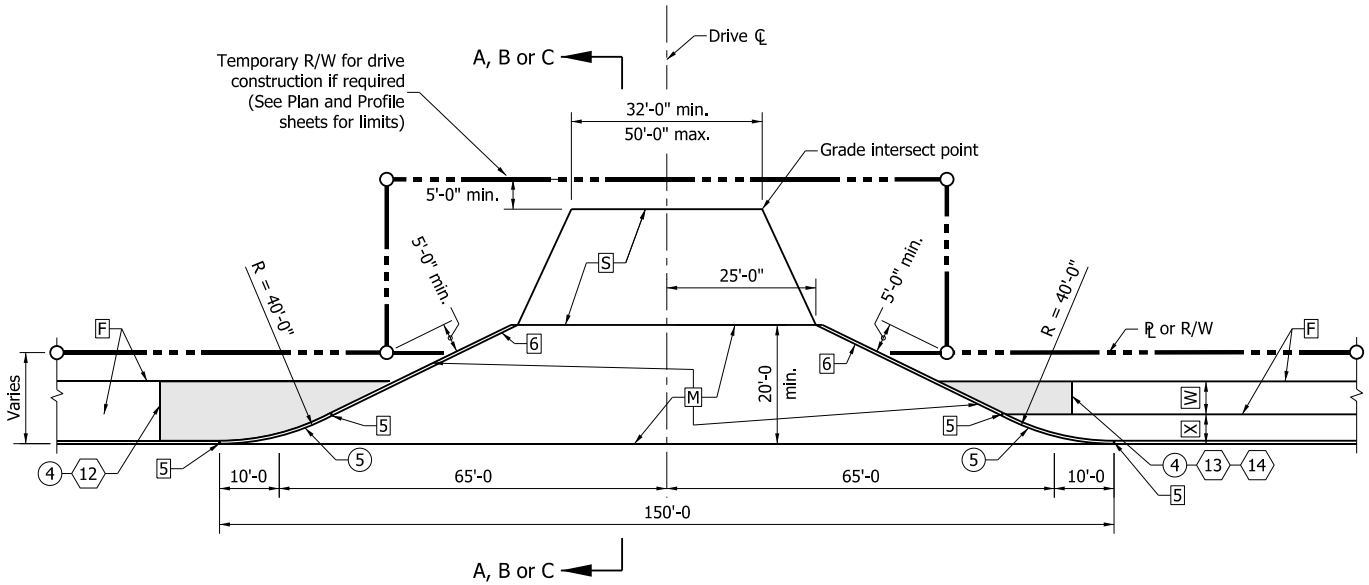
STANDARD DRAWING NO. E 610-DRIV-06

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

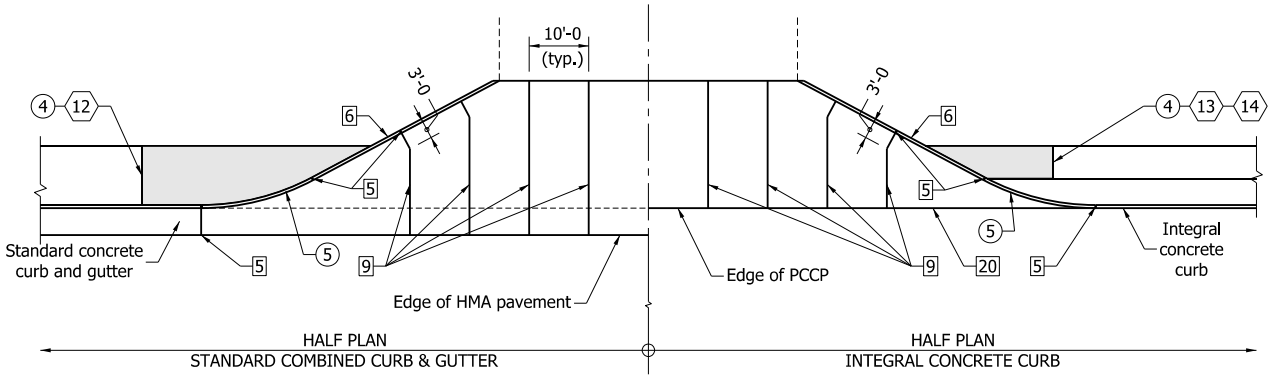
DESIGN STANDARDS ENGINEER

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

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



PLAN VIEW



JOINT PLACEMENT DETAIL FOR PCCP DRIVES

NOTES:

1. See Standard Drawings E 610-DRIV-13 for General Notes and additional Legend.
2. See Standard Drawing E 610-DRIV-12 for sections A-A, B-B and C-C.
3. Joint Placement Detail should be used with Class I, III and VII drives.
4. See Standard Drawing E 604-SDWK-01 or E 604-SDWK-02 for sidewalk elevation transition details.
5. See Standard Drawing E 610-DRIV-16 for details and corners.
6. 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 II
  or
  PCCP for Approaches, 9 in., on
  subgrade treatment Type II
- 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

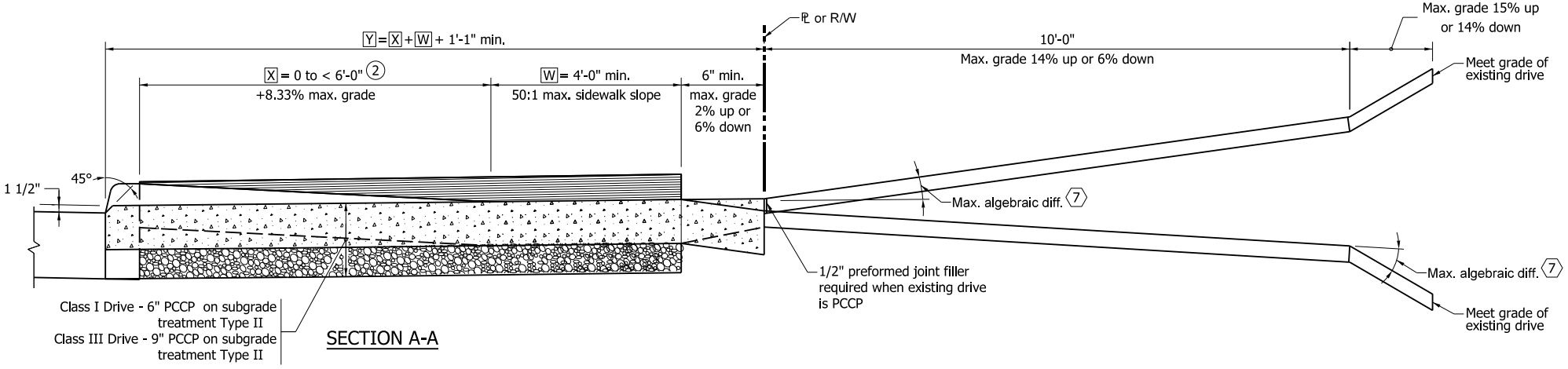
SEPTEMBER 2012

STANDARD DRAWING NO. E 610-DRIV-07

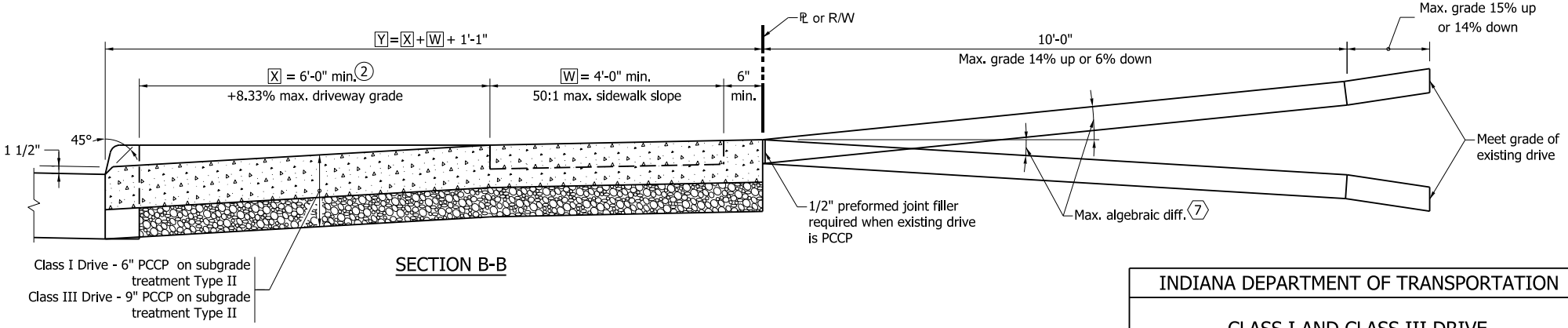
RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

/s/ Richard L. VanCleave 09/04/12
SUPERVISOR, ROADWAY STANDARDS DATE

/s/ Mark A. Miller 09/04/12
CHIEF ENGINEER DATE



SECTION A-A



SECTION B-B

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 ℄ or 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

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

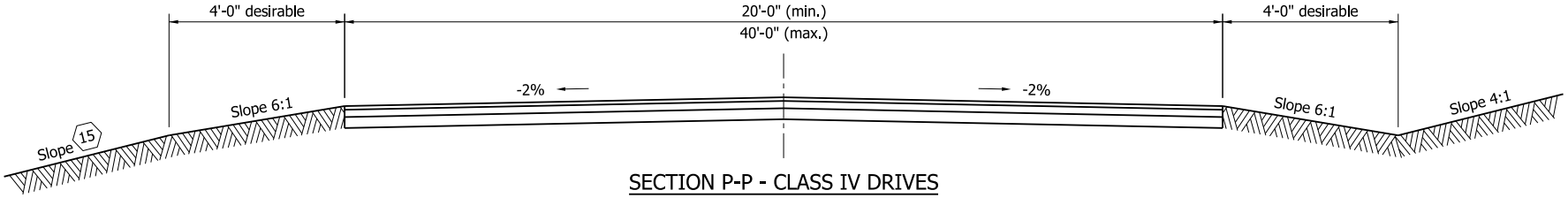
DESIGN STANDARDS ENGINEER

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

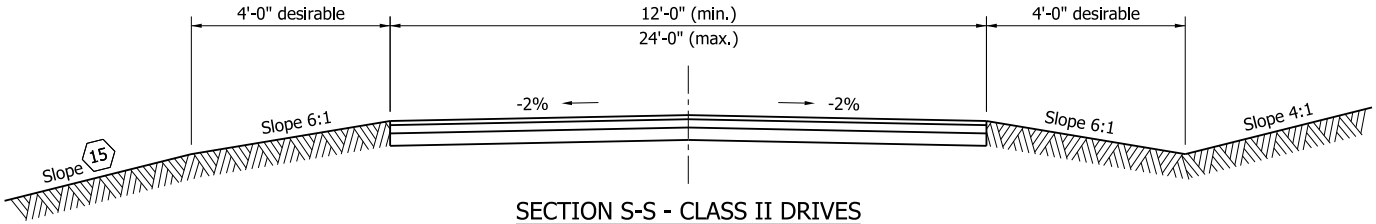
/s/ Mark A. Miller 09/01/10
CHIEF HIGHWAY ENGINEER DATE

Notes:

1. See Standard Drawing E 610-DRIV-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

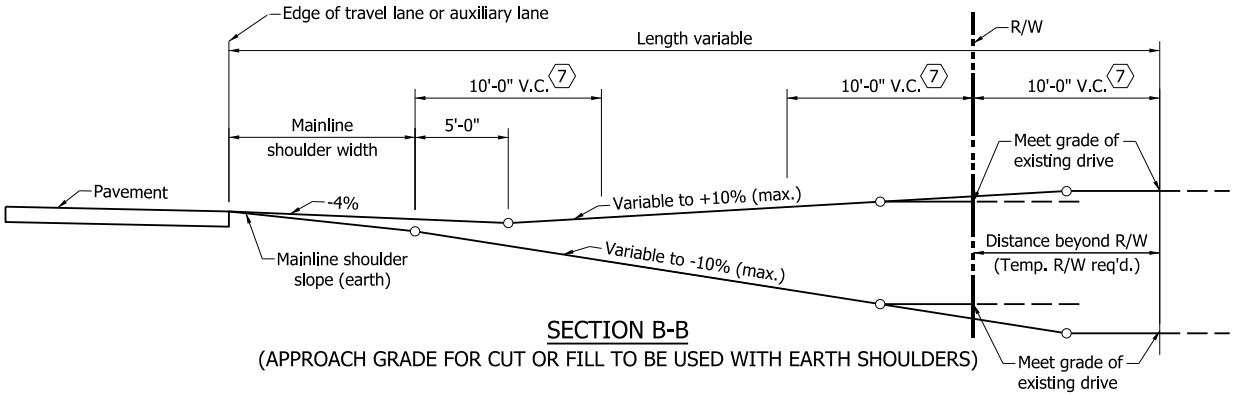
STANDARD DRAWING NO. E 610-DRIV-09

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

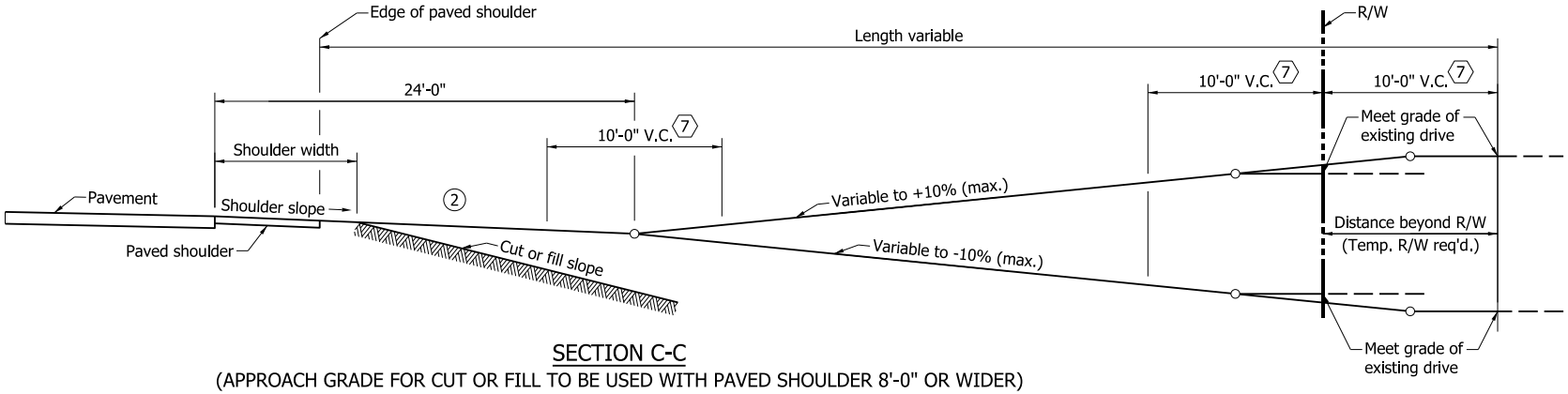
/s/ Richard L. VanCleave 09/01/10
DESIGN STANDARDS ENGINEER DATE

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



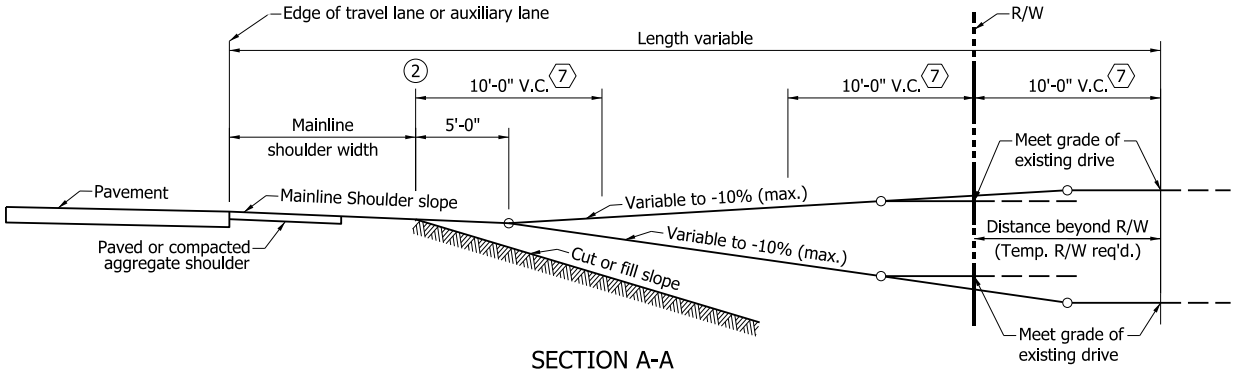
SECTION B-B

(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:

1. See Standard Drawing E 610-DRIV-02, -04 and -05 for location of Sections A-A, B-B and C-C.

(2) 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

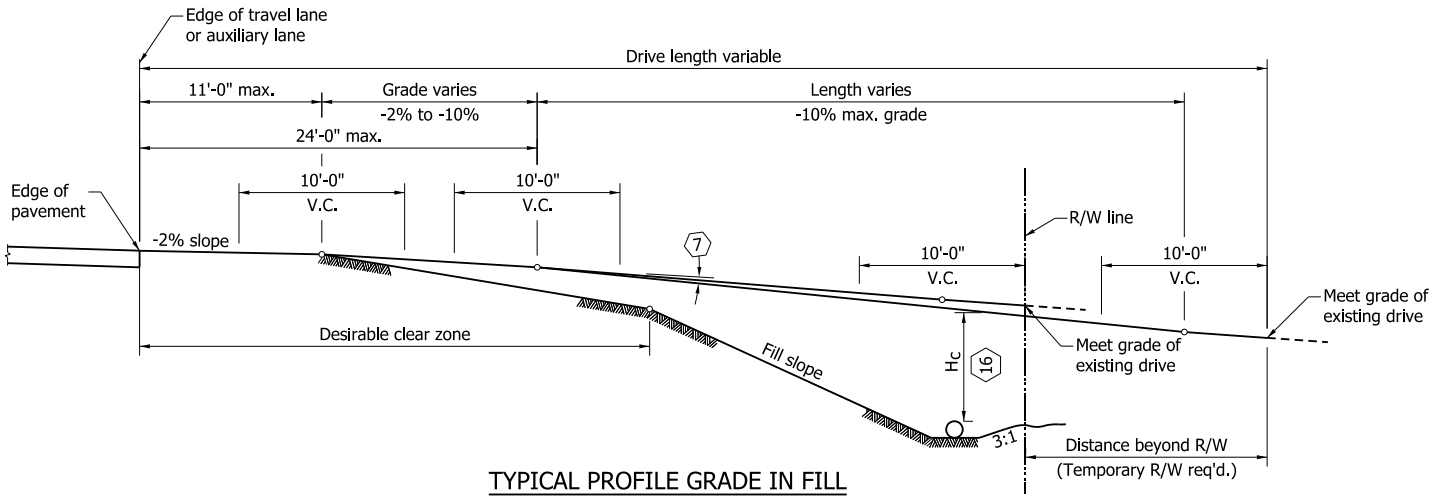
STANDARD DRAWING NO. E 610-DRIV-10

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

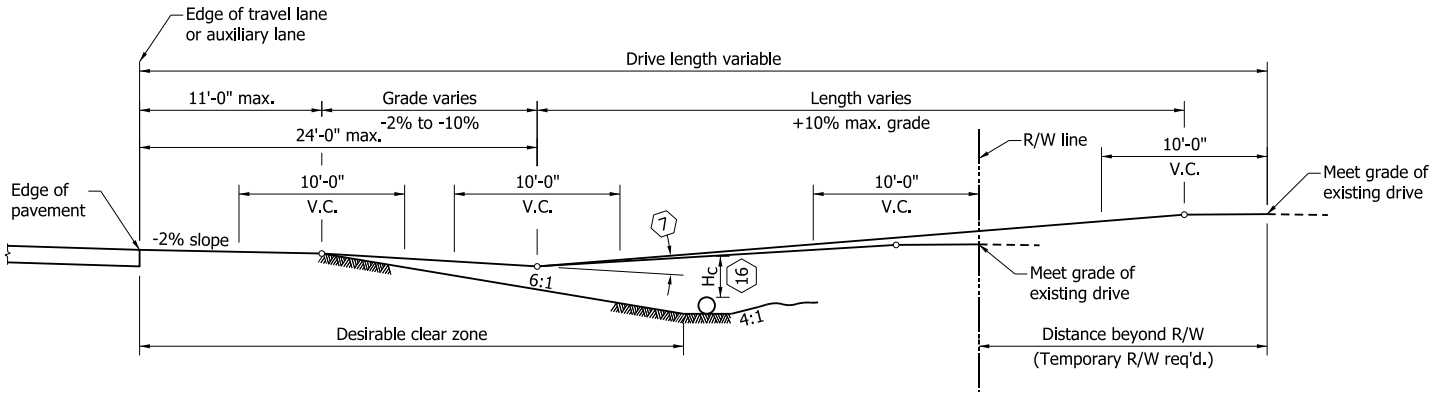
DESIGN STANDARDS ENGINEER

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

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



TYPICAL PROFILE GRADE IN FILL



TYPICAL PROFILE GRADE IN CUT

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.

INDIANA DEPARTMENT OF TRANSPORTATION

CLASS VI DRIVE
TYPICAL PROFILE GRADES

SEPTEMBER 2010

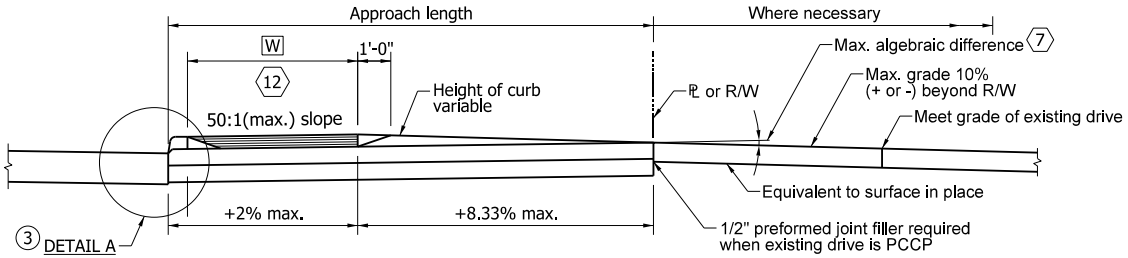
STANDARD DRAWING NO. E 610-DRIV-11

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

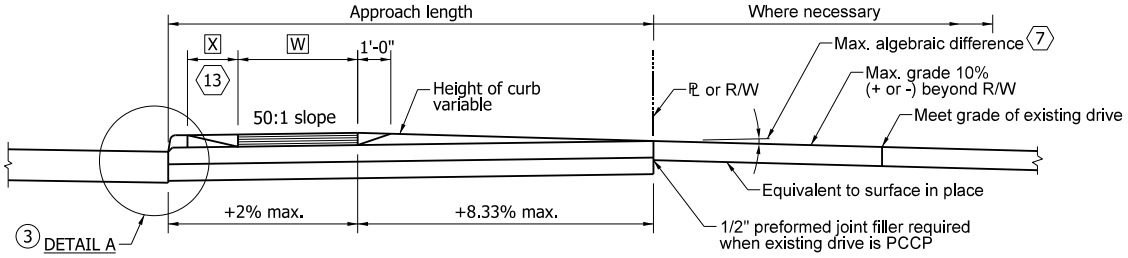
DESIGN STANDARDS ENGINEER

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

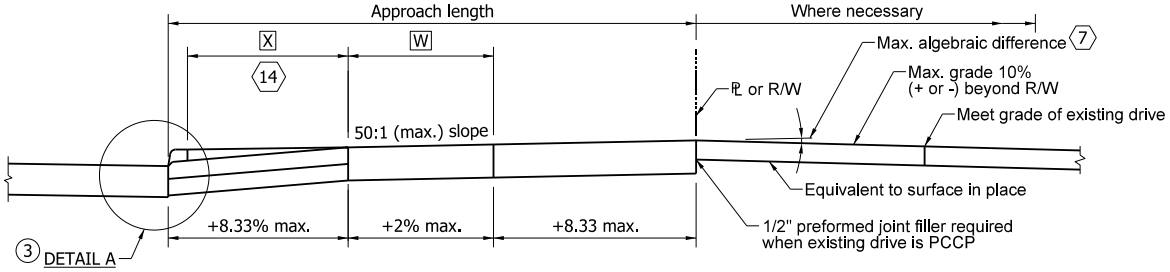
/s/ Mark A. Miller 09/01/10
CHIEF HIGHWAY ENGINEER DATE



SECTION A-A



SECTION B-B



SECTION C-C

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.

INDIANA DEPARTMENT OF TRANSPORTATION

CLASS VII DRIVE
PROFILE GRADE

SEPTEMBER 2010

STANDARD DRAWING NO. E 610-DRIV-12

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

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

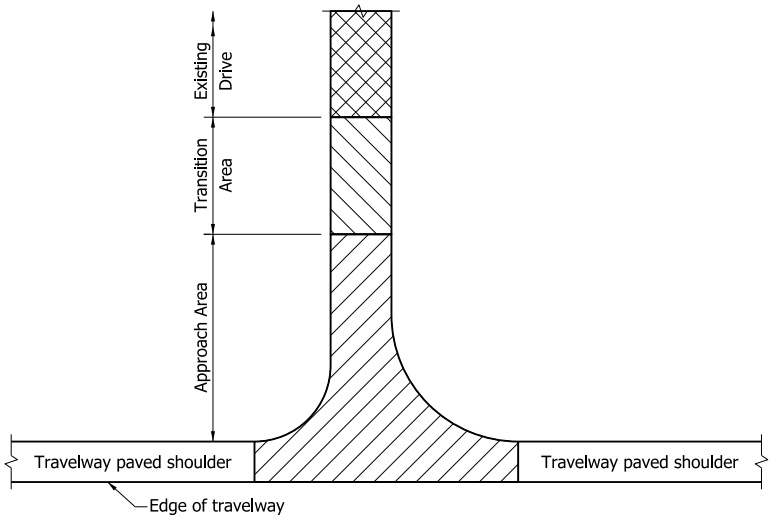
GENERAL NOTES

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 conrete 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

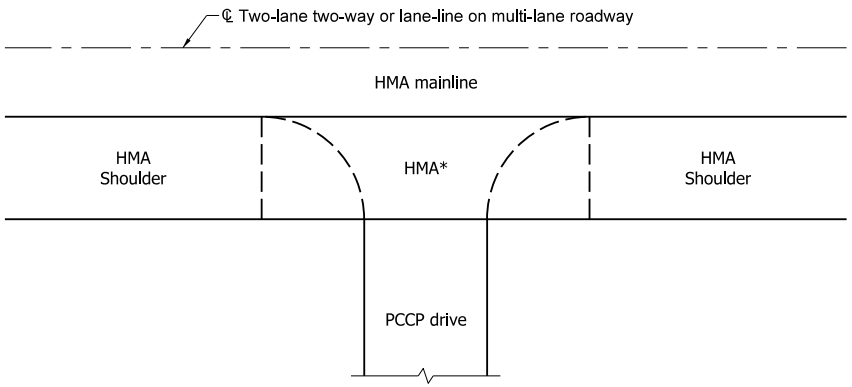
STANDARD DRAWING NO. E 610-DRIV-13

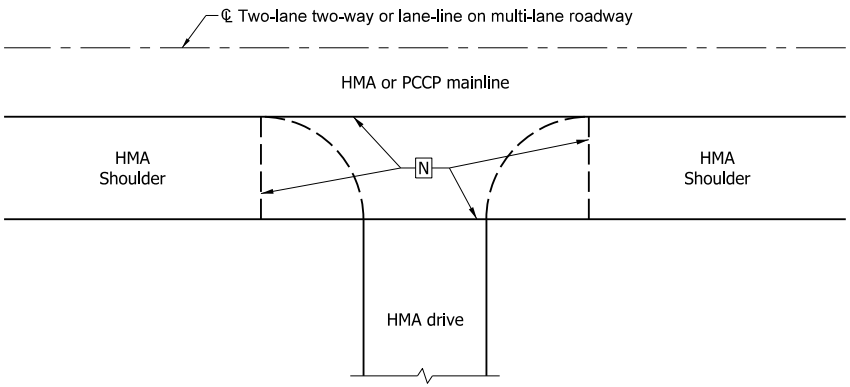
RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

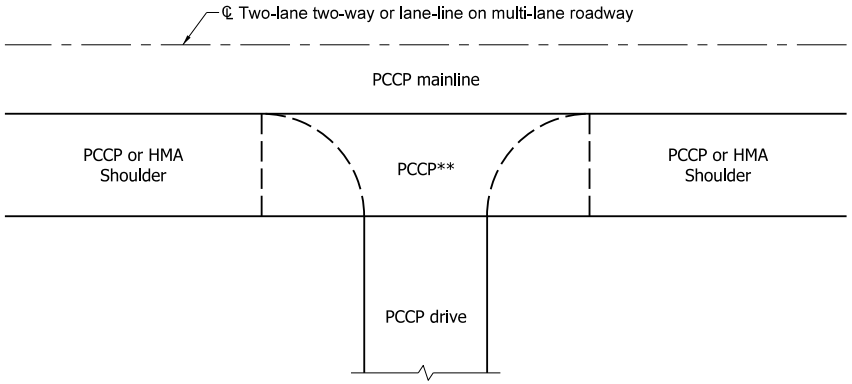
DESIGN STANDARDS ENGINEER

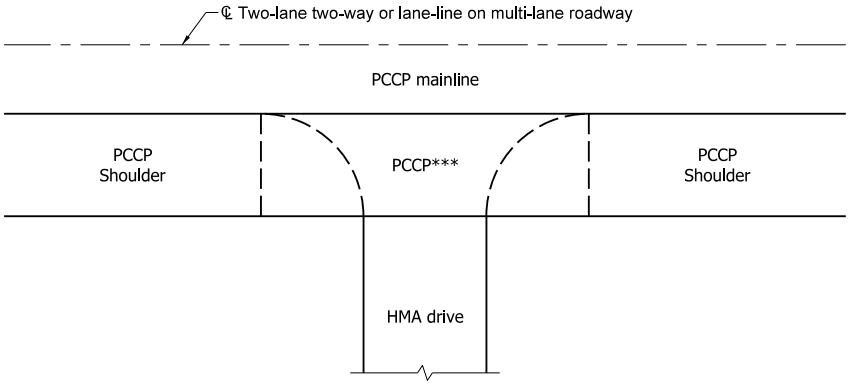
/s/ Richard L. VanCleave 09/01/10
DESIGN STANDARDS ENGINEER DATE

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









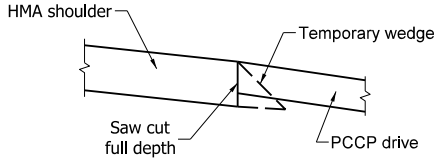
LEGEND

[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

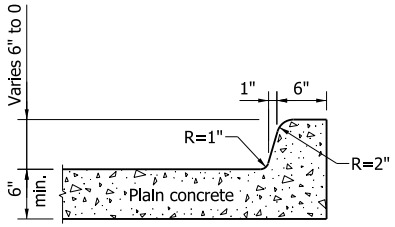
STANDARD DRAWING NO. E 610-DRIV-14

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

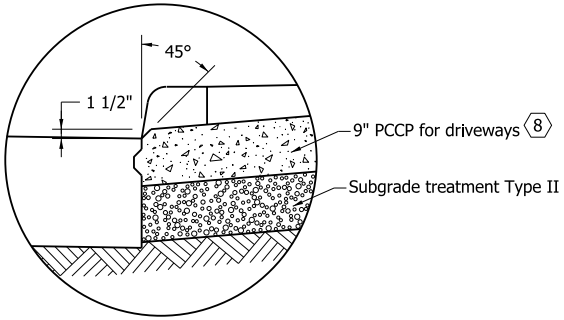
DESIGN STANDARDS ENGINEER

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

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



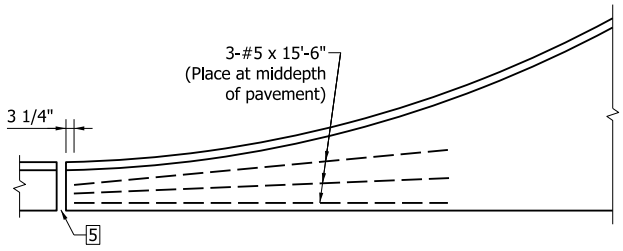
MONOLITHIC CURB



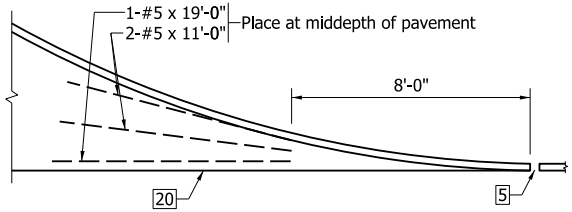
DETAIL A

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.



COMBINED CURB & GUTTER



INTEGRAL CONCRETE CURB

TYPICAL CORNER REINFORCING

INDIANA DEPARTMENT OF TRANSPORTATION

CLASS VII DRIVE
JOINT PLACEMENT AND CORNERS

SEPTEMBER 2010

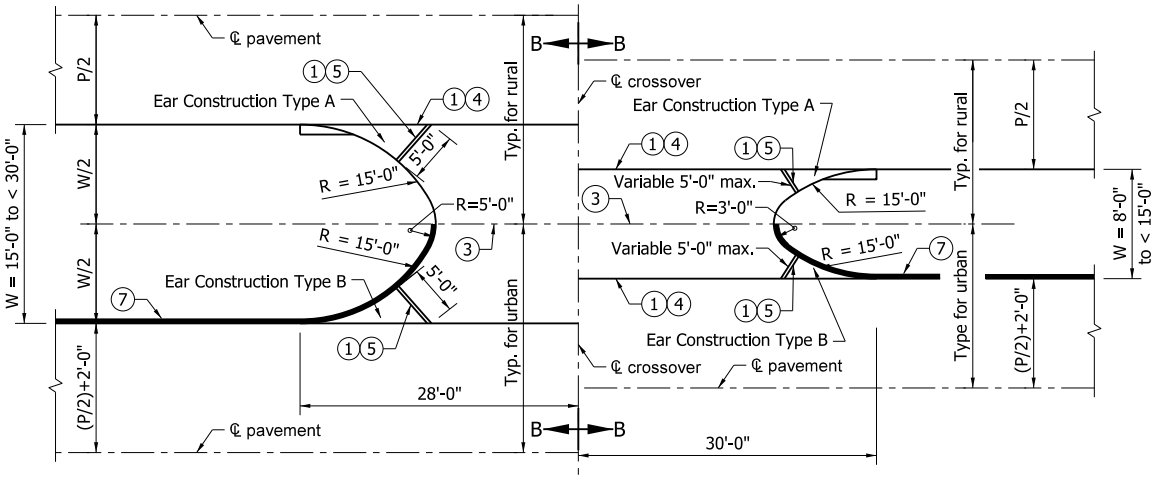
STANDARD DRAWING NO. E 610-DRIV-16

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

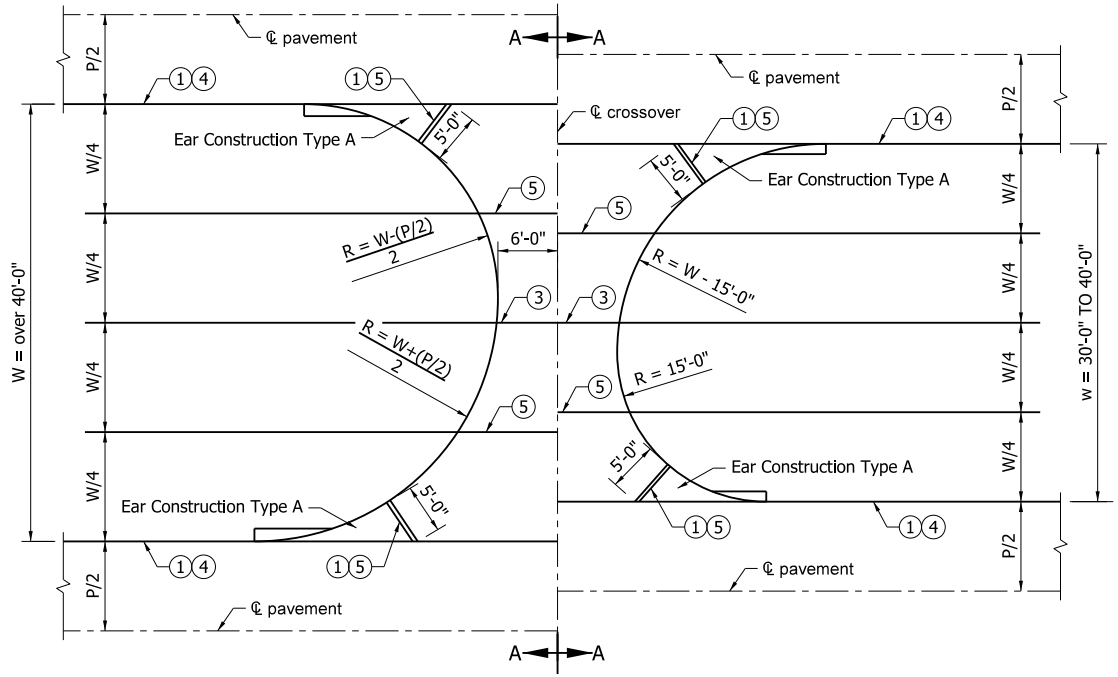
DESIGN STANDARDS ENGINEER

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

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



PRIVATE DRIVE CROSSOVER PLAN FOR W = 8'-0" to less than 30'-0"



PRIVATE DRIVE CROSSOVER PLAN FOR W = 30'-0" to over 40'-0"

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
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

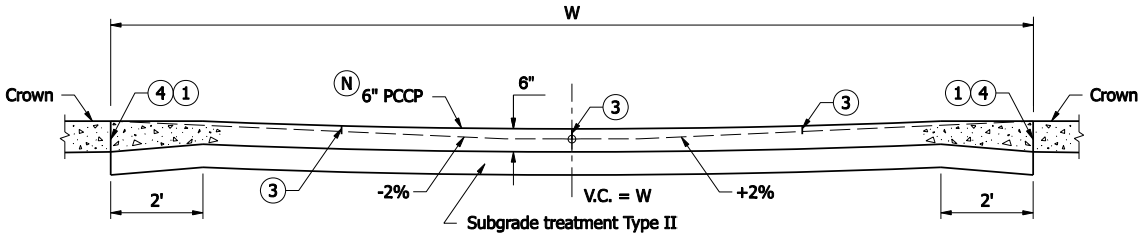
STANDARD DRAWING NO. E 610-DRIV-17

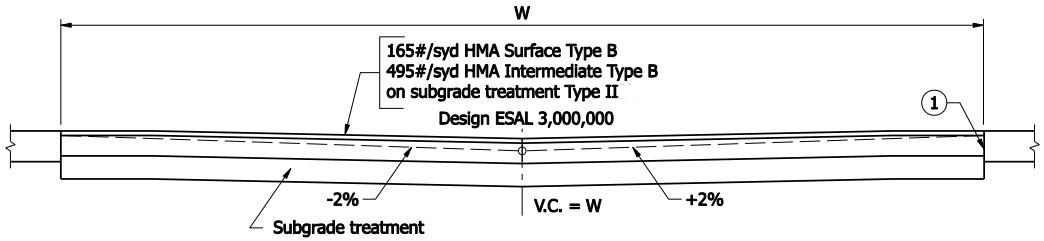
RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

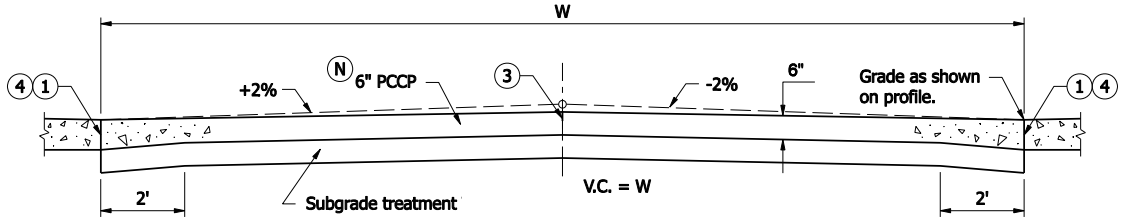
/s/ Richard L. VanCleave 09/01/10
DESIGN STANDARDS ENGINEER DATE

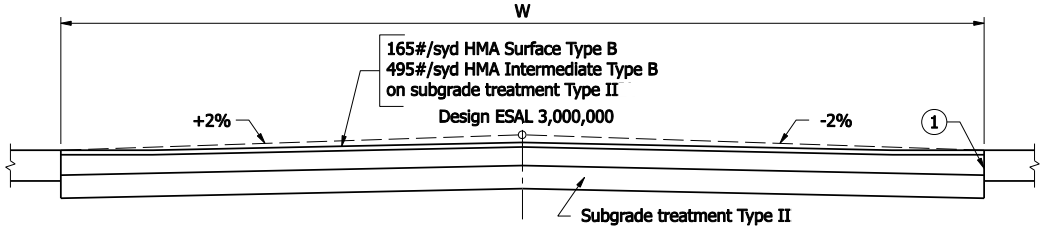
/s/ Mark A. Miller 09/01/10
CHIEF HIGHWAY ENGINEER DATE





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

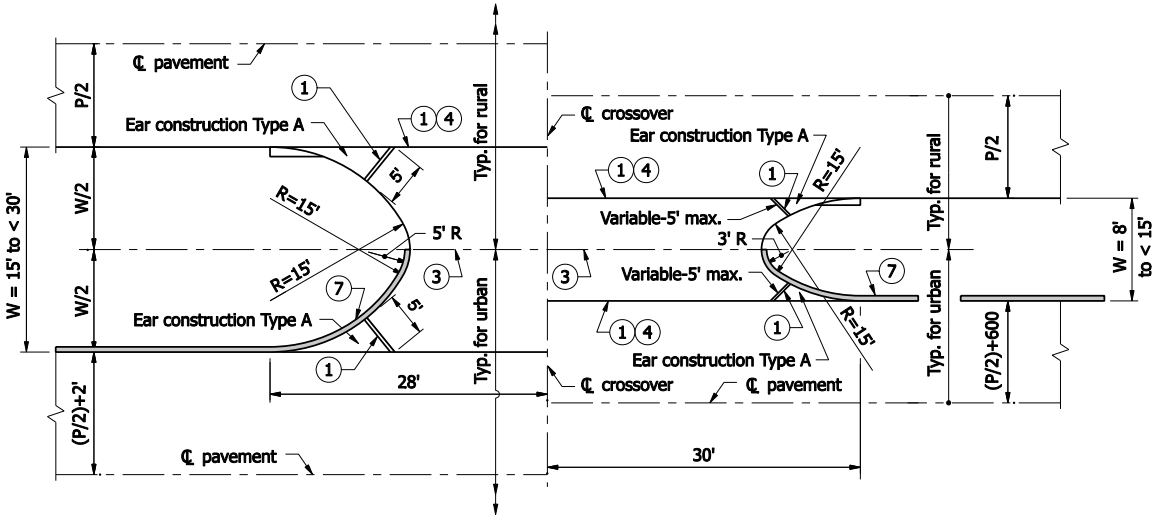
STANDARD DRAWING NO. E 610-DRIV-18

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

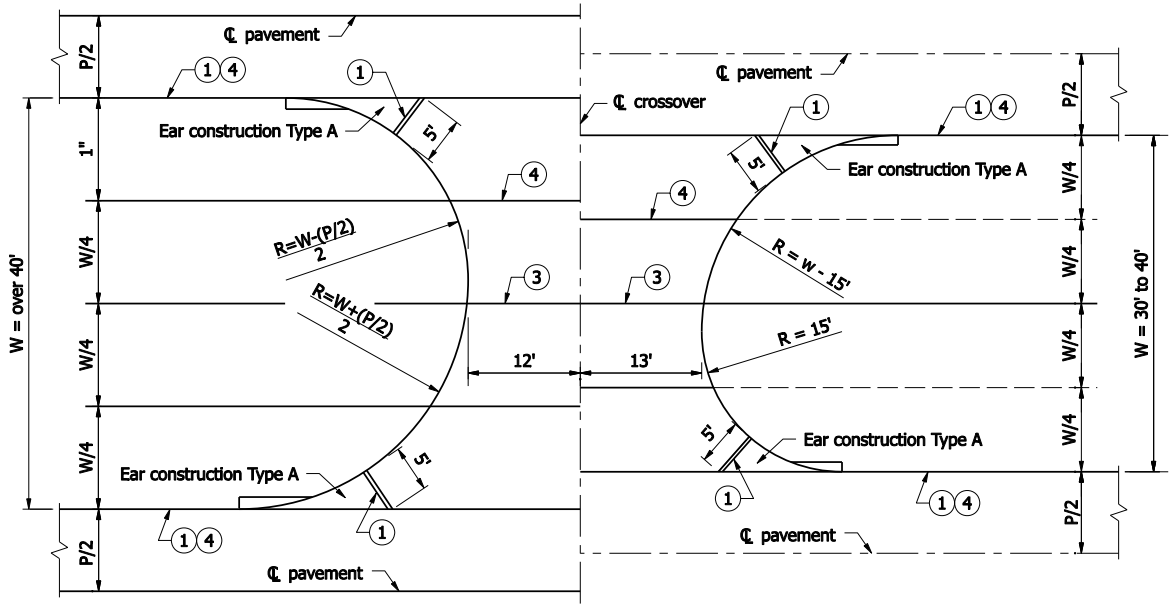
DESIGN STANDARDS ENGINEER

/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

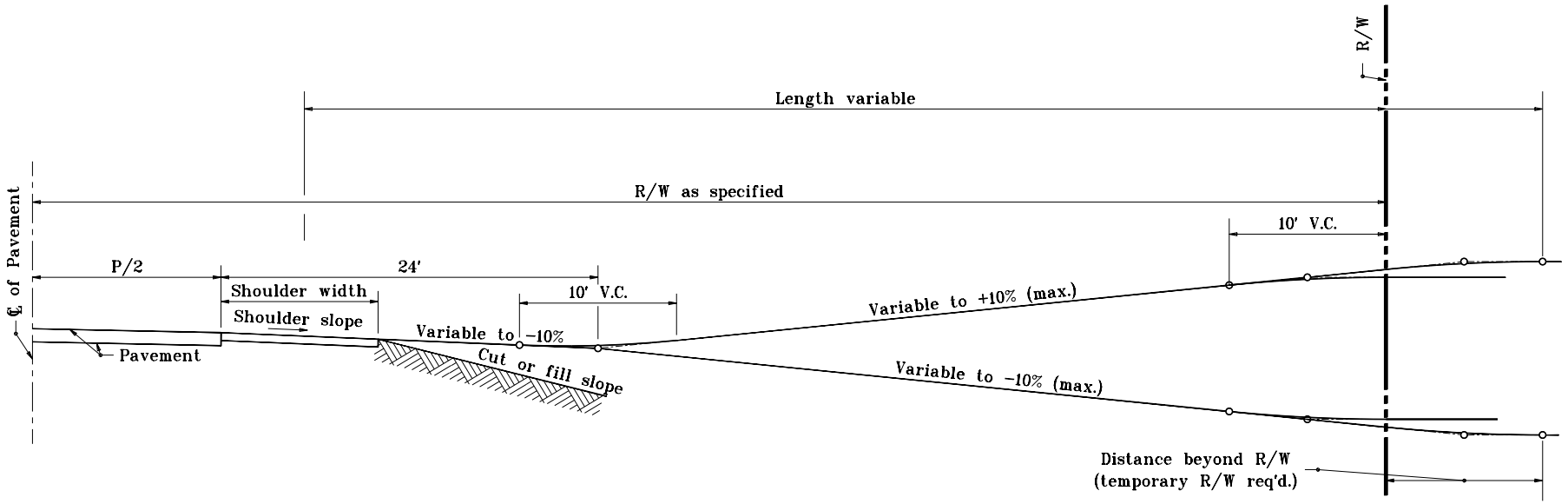
STANDARD DRAWING NO. E 610-DRIV-19

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

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

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



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**

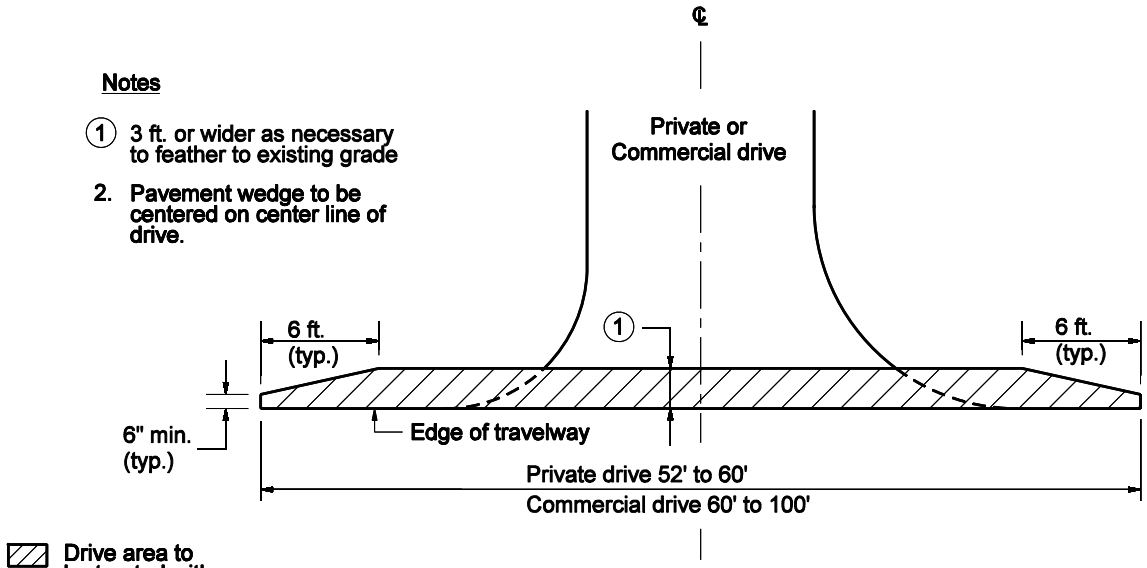
ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER
DESIGN STANDARDS ENGINEER

/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

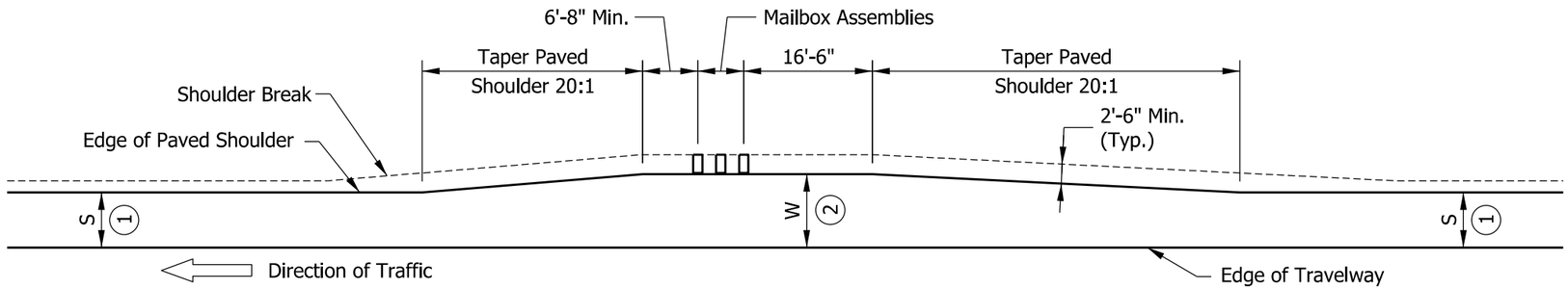
STANDARD DRAWING NO. E 610-DRIV-21

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

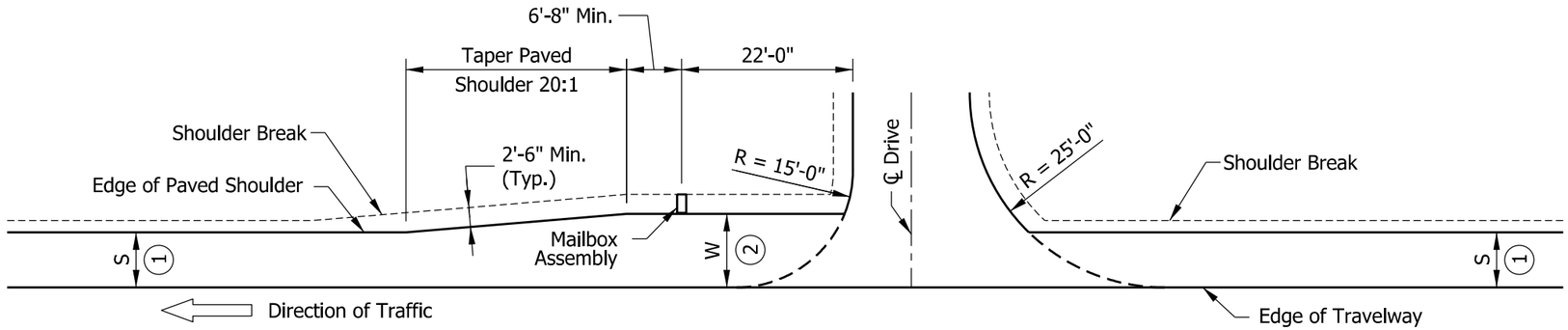
DESIGN STANDARDS ENGINEER

/s/ Richard L.VanCleave 3-01-04
DESIGN STANDARDS ENGINEER DATE

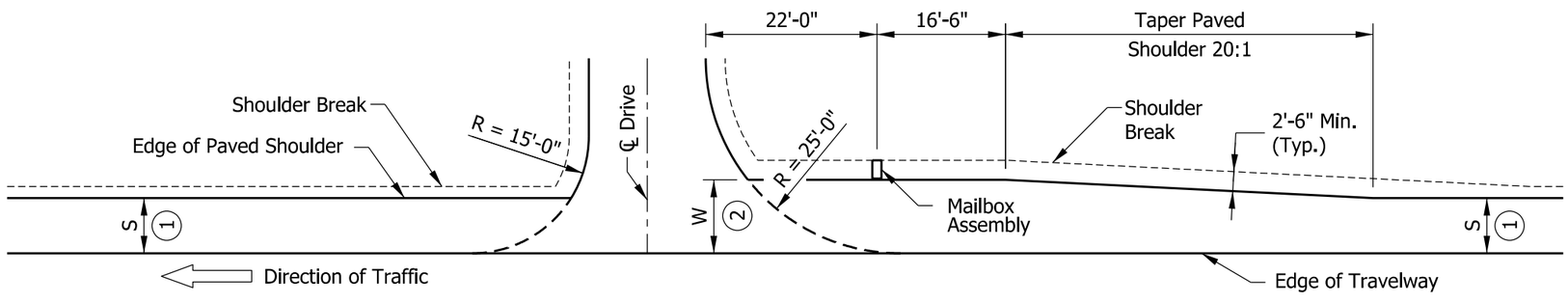
/s/ Richard K.Smutzer 3-01-04
CHIEF HIGHWAY ENGINEER DATE



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

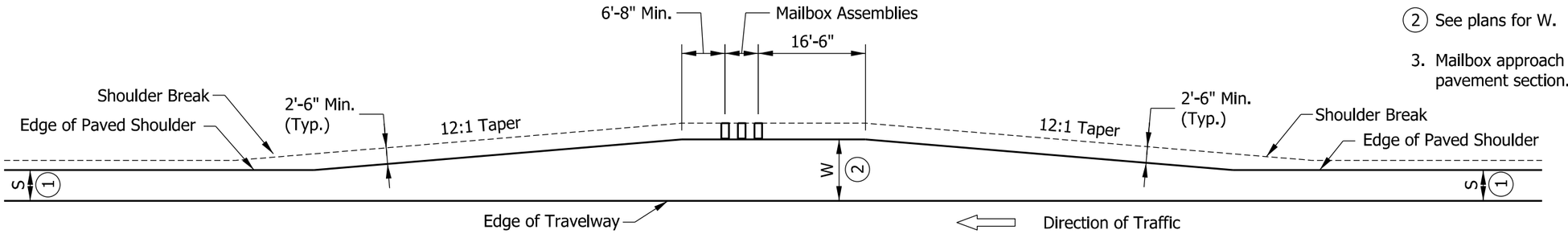
RICHARD L. VanCLEAVE
REGISTERED
No. 9750
STATE OF INDIANA
PROFESSIONAL ENGINEER

/s/ Richard L. VanCleave 02/20/14
DESIGN STANDARDS ENGINEER DATE

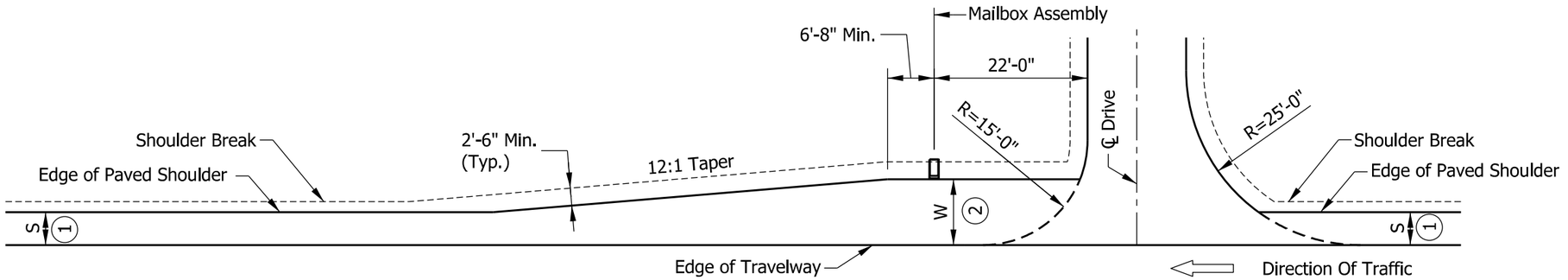
/s/ Mark A. Miller 03/03/14
CHIEF ENGINEER DATE

NOTES:

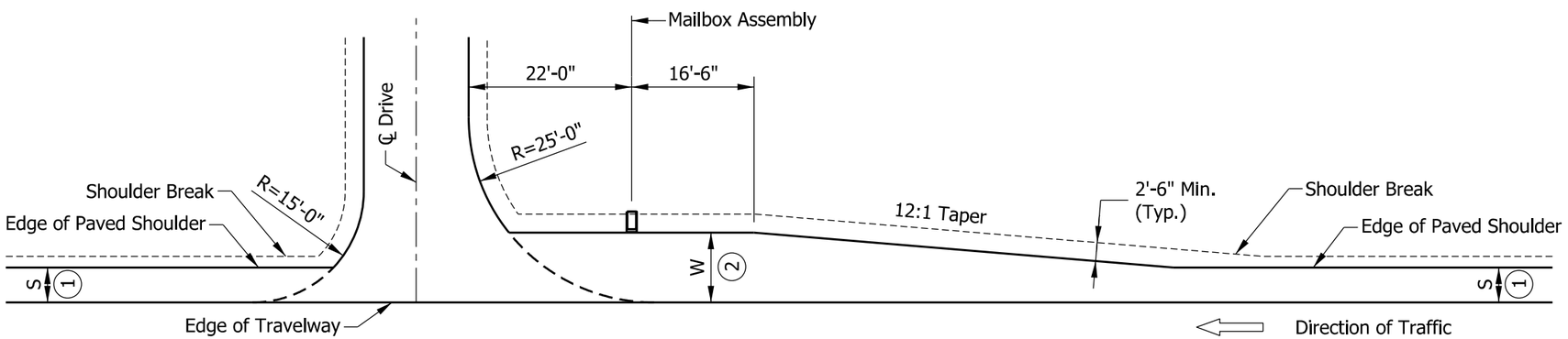
1. S = Normal width of paved shoulder as shown on plans.
2. See plans for W.
3. Mailbox approach pavement section shall be the same as the shoulder pavement section.



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

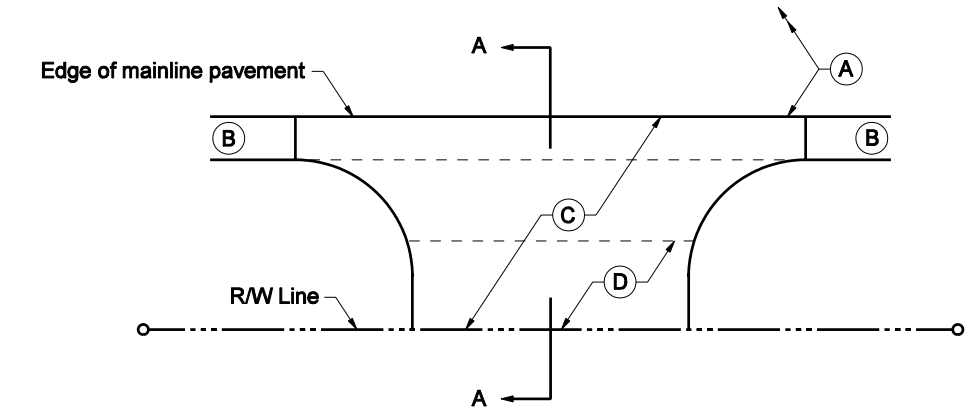
MAILBOX APPROACHES
LOW SPEED ROADWAY
(V ≤ 45 MPH)
SEPTEMBER 2014

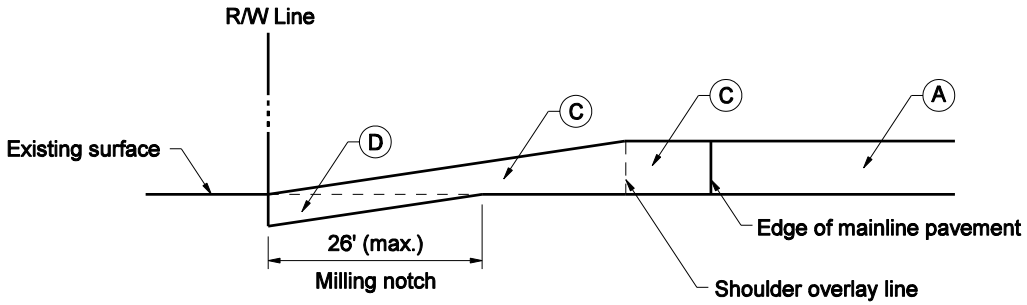
STANDARD DRAWING NO. E 610-MBAP-02

RICHARD L. VanCLEAVE
REGISTERED
No. 9750
STATE OF INDIANA
PROFESSIONAL ENGINEER

/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

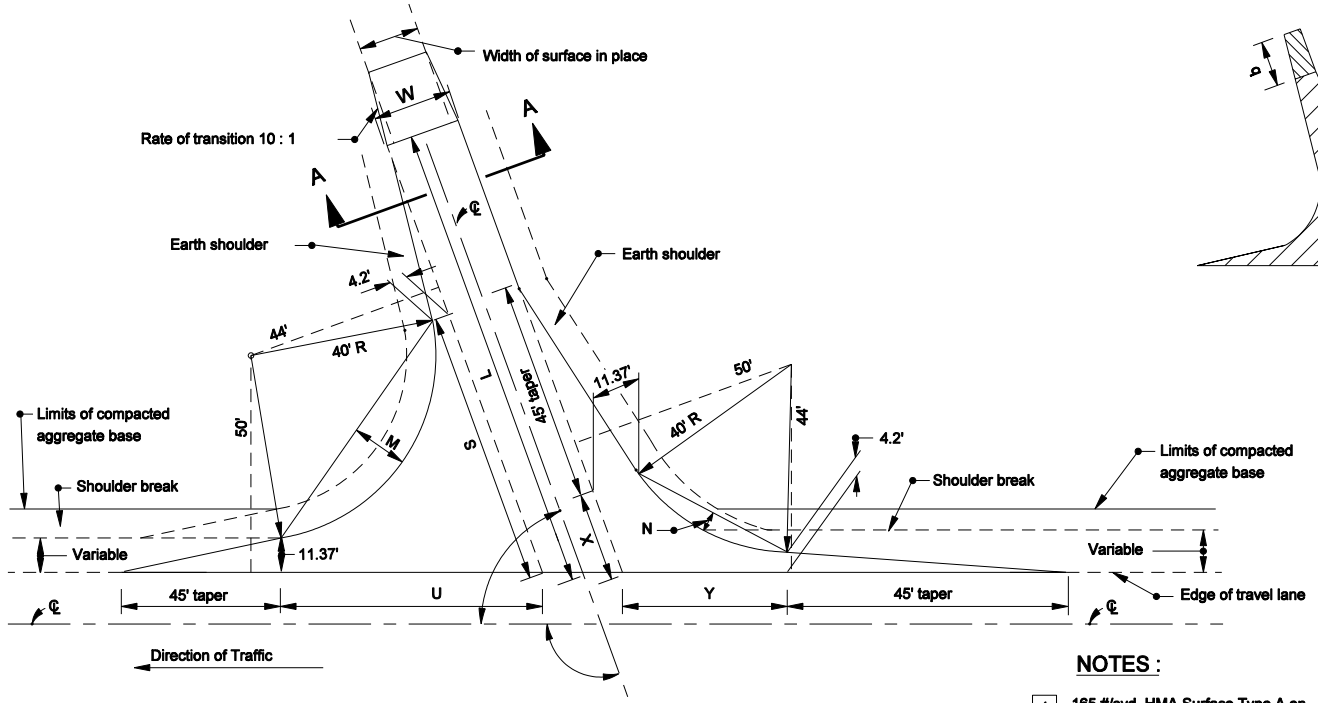
STANDARD DRAWING NO. E 610-PRAP-01

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

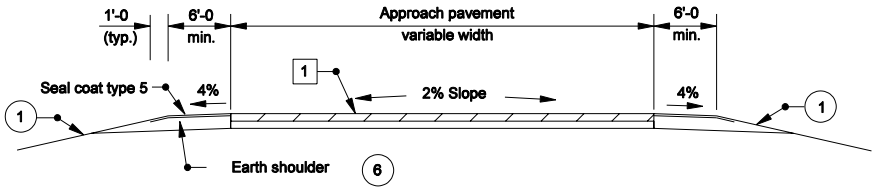
DESIGN STANDARDS ENGINEER

/s/ Richard L.VanCleave 3-01-04
DESIGN STANDARDS ENGINEER DATE

/s/ Richard K.Smutzer 3-01-04
CHIEF HIGHWAY ENGINEER DATE

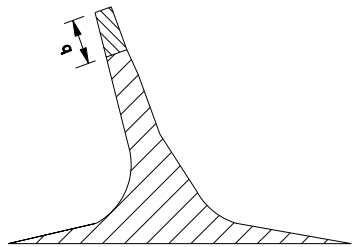


PUBLIC ROAD APPROACH TYPE A



SECTION A-A MINIMUM PAVEMENT SECTION

For ADT ≤ 1000 (7)



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 A

MARCH 2006

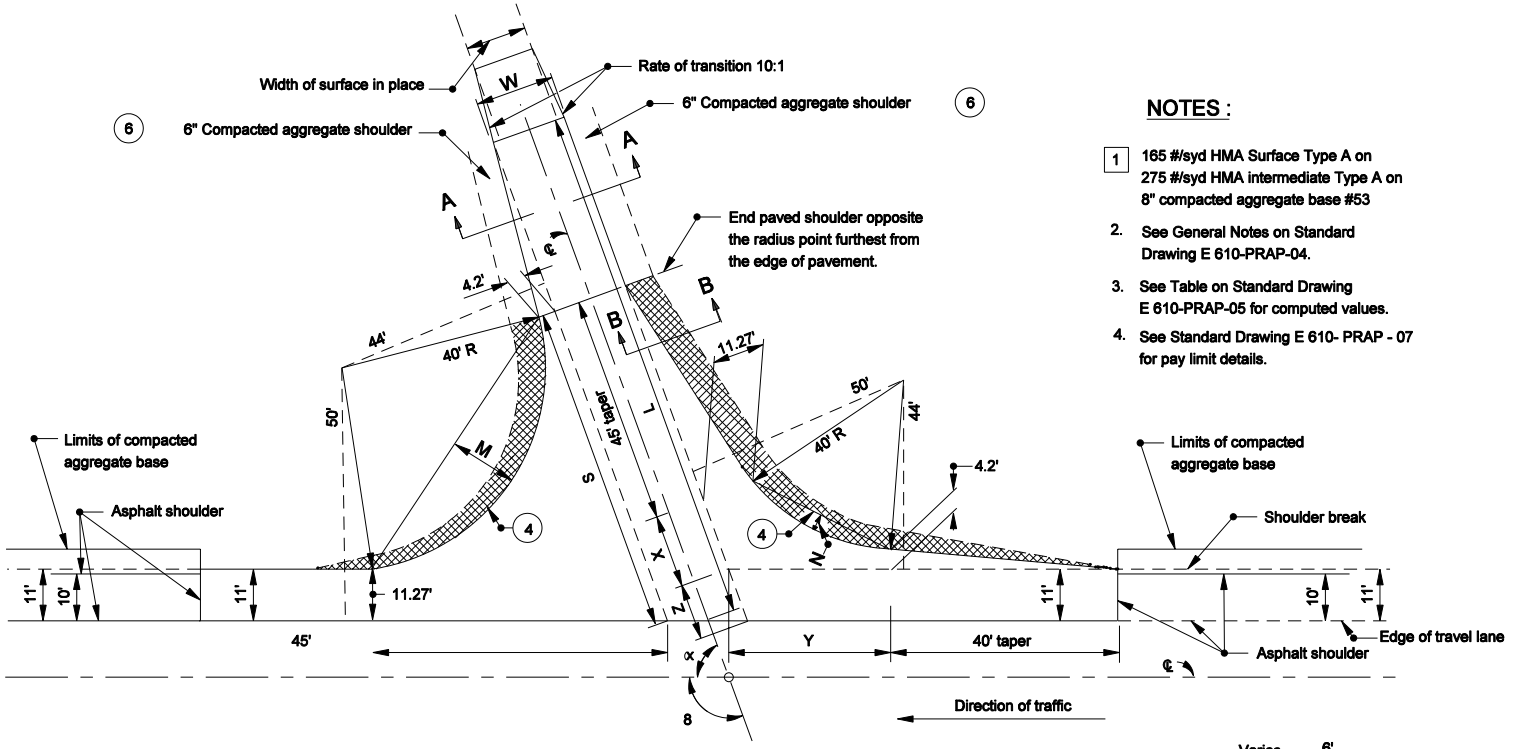
STANDARD DRAWING NO. E 610-PRAP-02

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

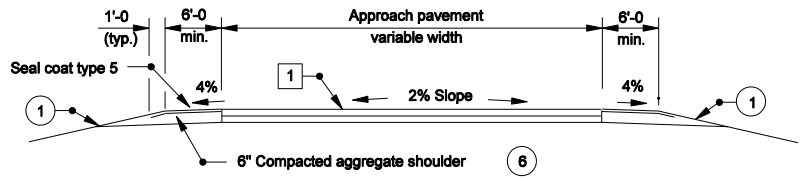
DESIGN STANDARDS ENGINEER

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

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

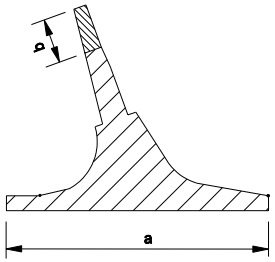


PUBLIC ROAD APPROACH TYPE "B"



SECTION A-A MINIMUM PAVEMENT SECTION

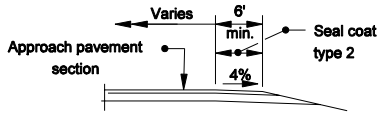
For ADT ≤ 1000 (7)



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.



SECTION B-B

INDIANA DEPARTMENT OF TRANSPORTATION

PUBLIC ROAD APPROACH TYPE B

MARCH 2006

STANDARD DRAWING NO. E 610-PRAP-03

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

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

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

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

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

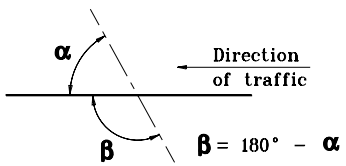
β	U	S	M	X	Y	N	L							TOTAL APPROACH AREA A						Hatched shoulder area	C.A.B. shoulder area	β
							TYPE A			TYPE B				TYPE A			TYPE B					
							W=20	W=22	W=24	W=20	W=22	W=24	Z	W=20	W=22	W=24	W=20	W=22	W=24			
(°)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(SYS)	(SYS)	(SYS)	(SYS)	(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	88.96	88.94	88.93	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 :

1. See Standard Drawing E 610–PRAP–02 for public road approach type A.
2. See Standard Drawing E 610–PRAP–03 for public road approach type B.
3. 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**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

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

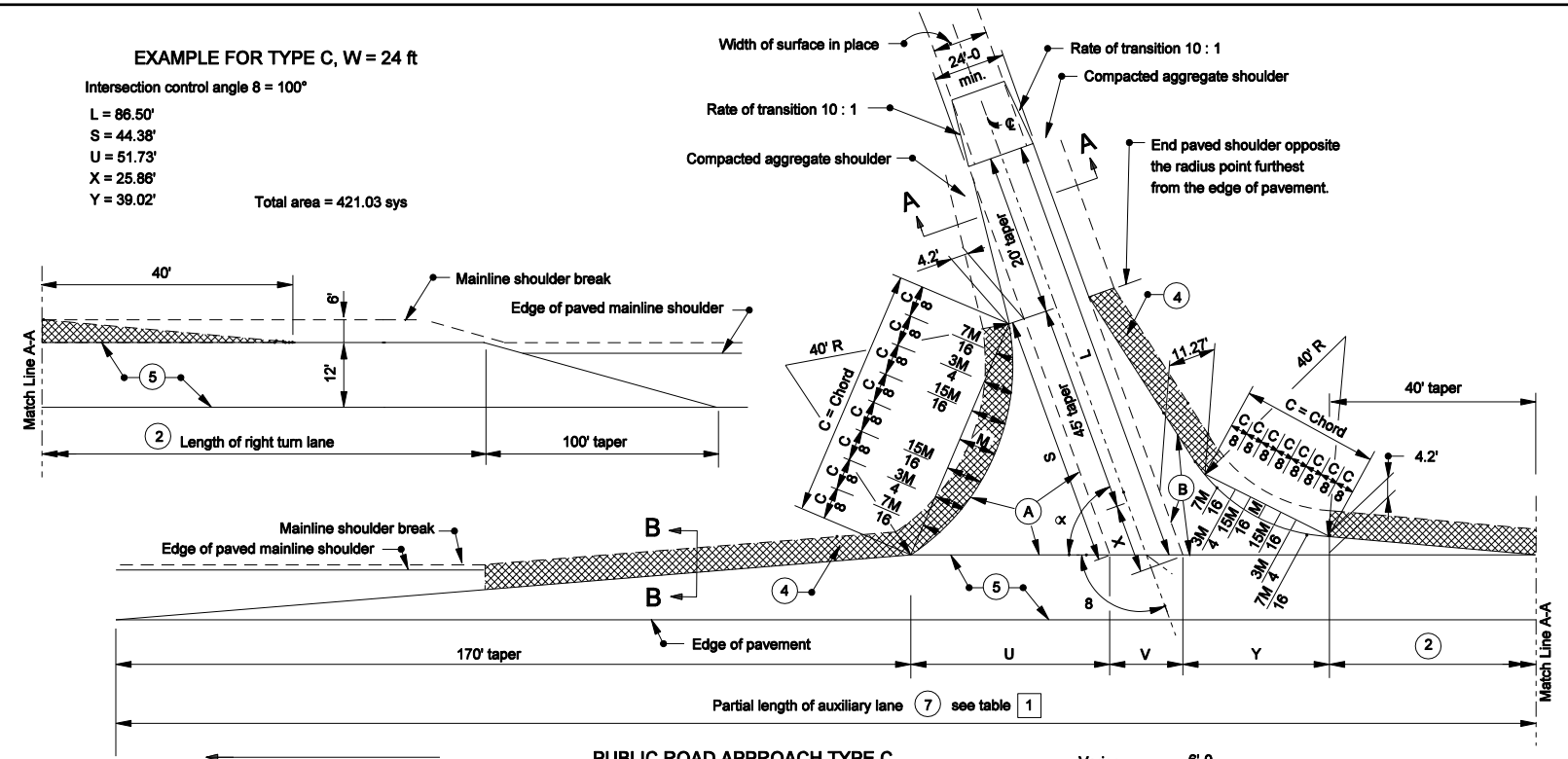
/s/ Firooz Zandi 9-04-01
CHIEF HIGHWAY ENGINEER — DATE

EXAMPLE FOR TYPE C, W = 24 ft

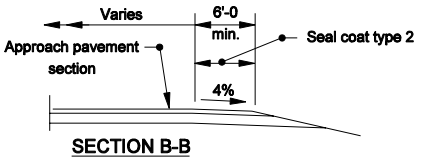
Intersection control angle 8 = 100°

L = 86.50'
S = 44.38'
U = 51.73'
X = 25.86'
Y = 39.02'

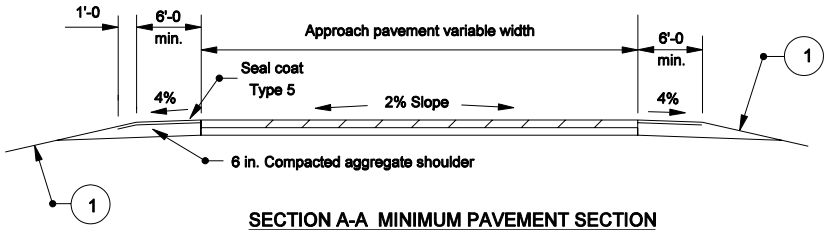
Total area = 421.03 sys



PUBLIC ROAD APPROACH TYPE C



SECTION B-B



SECTION A-A MINIMUM PAVEMENT SECTION

For ADT ≤ 1000

165#/syd HMA Surface Type A on
275#/syd HMA Intermediate Type A on
8" compacted aggregate base #53

NOTES :

[1] See Standard Drawing E 610-PRAP-09 for table with computed values.

(2) See Standard Drawing E 610-PRAP-11 for Table A.

3. See Standard Drawing E-610-PRAP-08 for General Notes and pay limits.

INDIANA DEPARTMENT OF TRANSPORTATION

PUBLIC ROAD APPROACH TYPE C

MARCH 2006

STANDARD DRAWING NO. E 610-PRAP-06

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

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

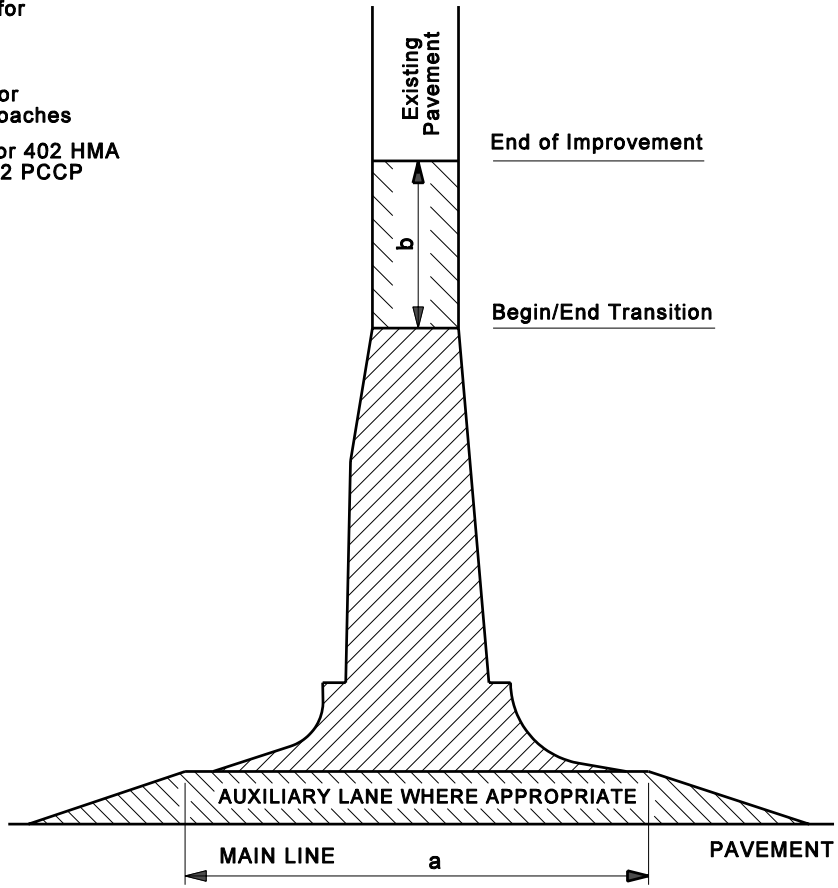
a < 100', HMA or PCCP for Approaches

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

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

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

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.

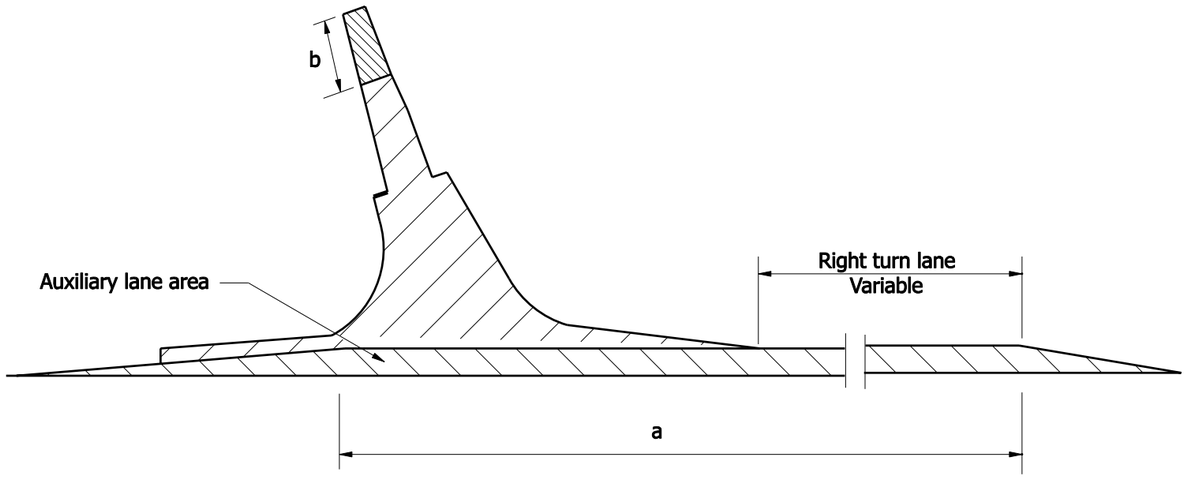
3. If the approach is to be constructed of concrete, the details shall be as shown elsewhere in the plans for pavement thickness, joint type, and location.

(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 elswhere 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

RICHARD L. VanCLEAVE
REGISTERED
No. 9750
STATE OF INDIANA
PROFESSIONAL ENGINEER

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

β	L	S	U	X	Y	V	Shoulder gap	Chord		M		Approach Areas			Auxiliary lane part.area	β
								Lt.	Rt.	Lt.	Rt.	(A)	(B)	Total	(7)	
degree	ft.	ft.	ft.	ft.	ft.	ft.	ft.	ft.	ft.	ft.	ft.	sys.	sys.	sys.	sys.	degree
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	328.18	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

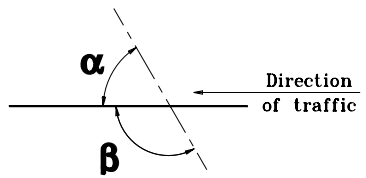
LEGEND

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

$\beta = 180° - \alpha$



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

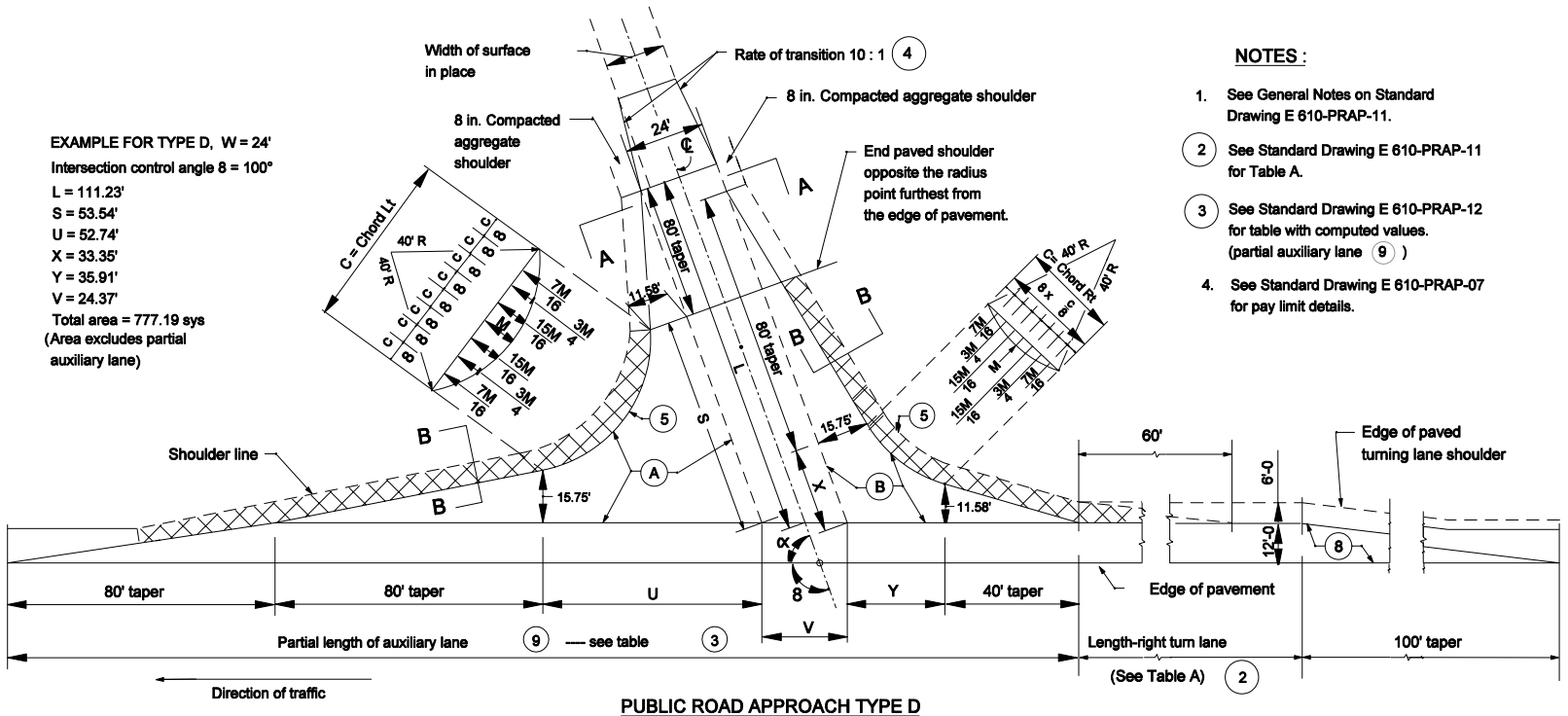
STANDARD DRAWING NO. **E 610-PRAP-09**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

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

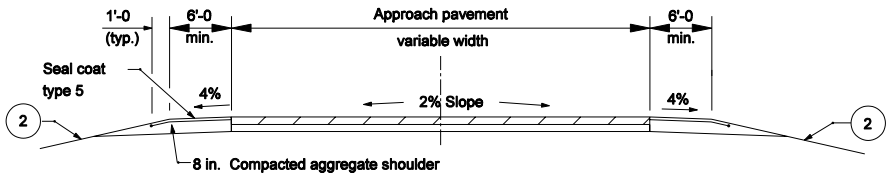
/s/ Firooz Zandi — CHIEF HIGHWAY ENGINEER — 9-04-01 DATE



PUBLIC ROAD APPROACH TYPE D

NOTES :

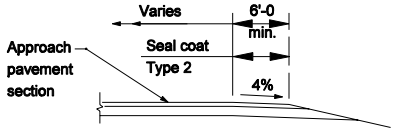
1. See General Notes on Standard Drawing E 610-PRAP-11.
2. See Standard Drawing E 610-PRAP-11 for Table A.
3. See Standard Drawing E 610-PRAP-12 for table with computed values. (partial auxiliary lane 9)
4. See Standard Drawing E 610-PRAP-07 for pay limit details.



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

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

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

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

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

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

β degree	L ft	S ft	U ft	X ft	Y ft	V ft	Shoulder gap ft	Chord Lt. ft	Chord Rt. ft	M Lt. ft	M Rt. ft	Approach Areas (A) sys	Approach Areas (B) sys	Approach Areas Total sys	Auxiliary lane part.area (9) sys	β degree
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	3.63	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	52.86	2.75	9.99	174.50	335.88	910.02	368.81	70

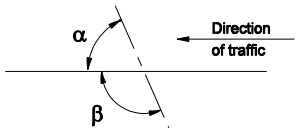
LEGEND

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 extention of the tangent on which a vehicle approaches the intersecting road to the corresponding tangent on the intersecting road to which the vehicle turns.

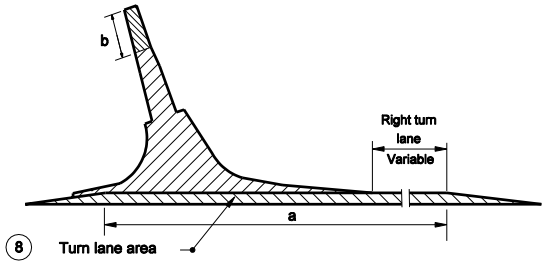
β = INTERSECTION CONTROL ANGLE

β = 180°- α



NOTES:

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



PAY LIMITS

INDIANA DEPARTMENT OF TRANSPORTATION

PUBLIC ROAD APPROACH TYPE D - TABLE OF VALUES

MARCH 2006

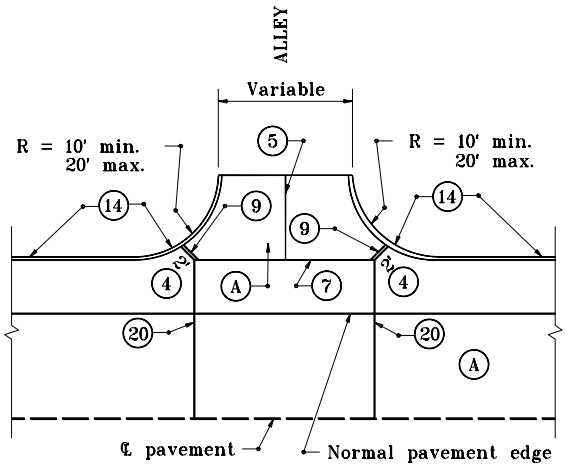
STANDARD DRAWING NO. E 610-PRAP-12

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

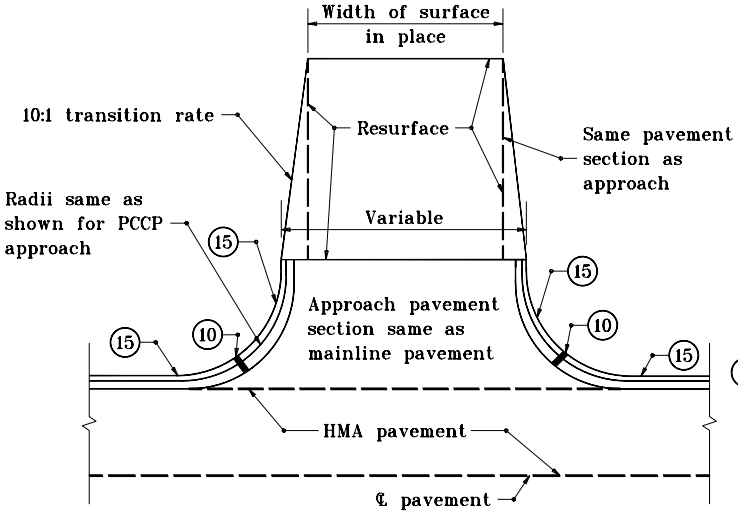
DESIGN STANDARDS ENGINEER

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

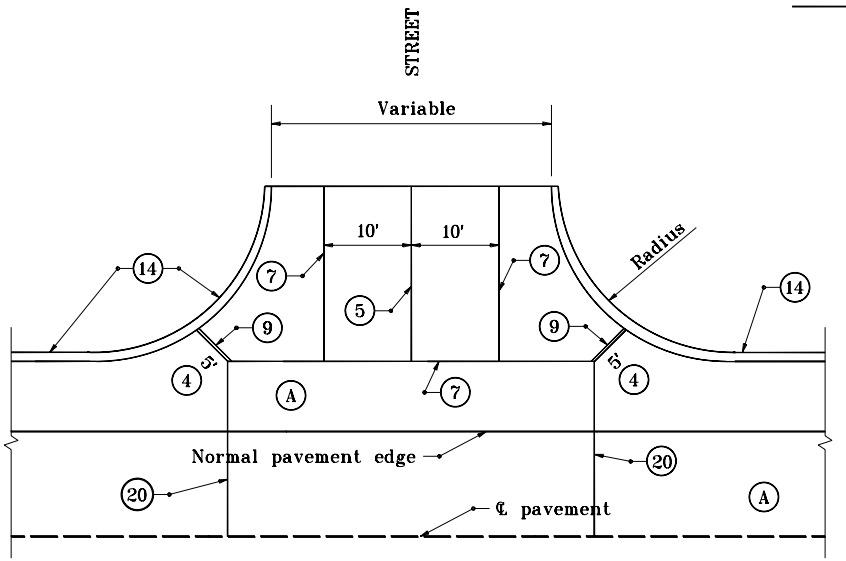
/s/ Richard K. Smutzer 3-01-06
CHIEF HIGHWAY ENGINEER DATE



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) ½" 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

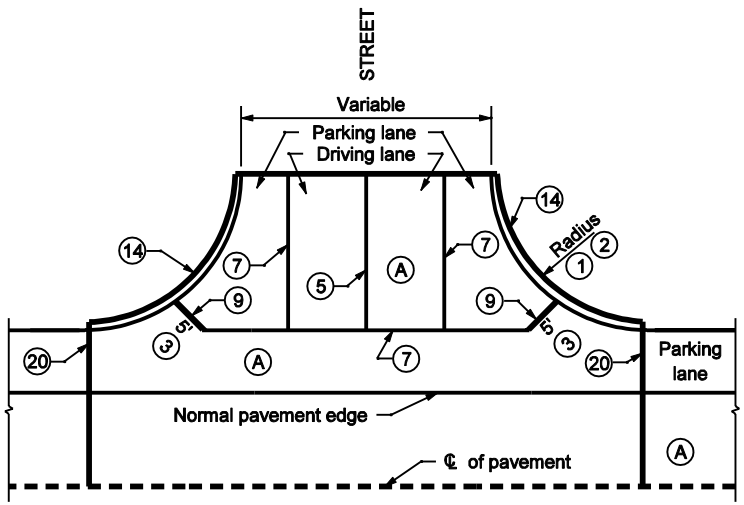
STANDARD DRAWING NO. **E 610-PRAP-13**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

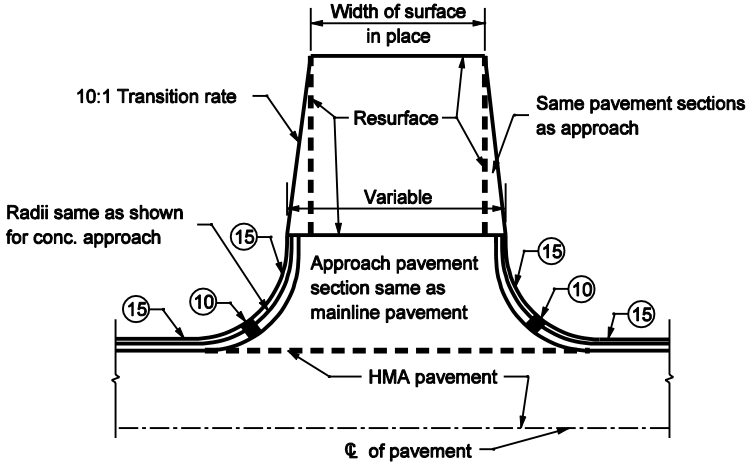
DESIGN STANDARDS ENGINEER

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

/s/ Firooz Zandi — CHIEF HIGHWAY ENGINEER — 1-03-00 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 ½" 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

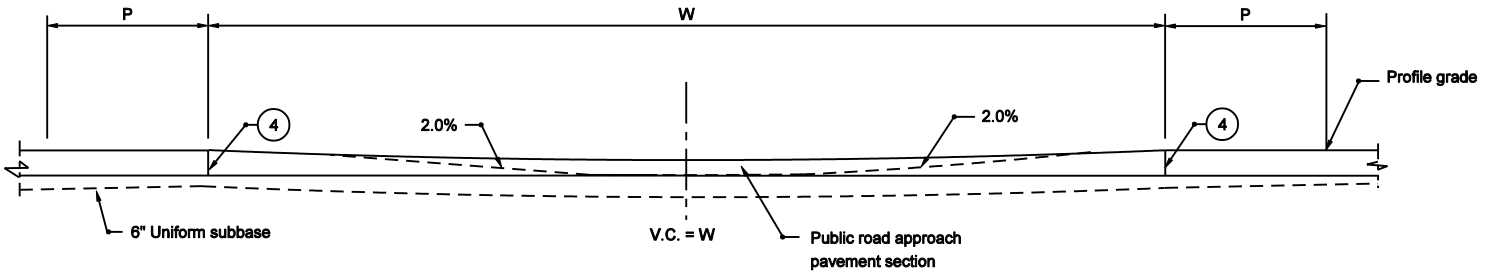
STANDARD DRAWING NO. E 610-PRAP-14

RICHARD L. VANCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

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

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



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

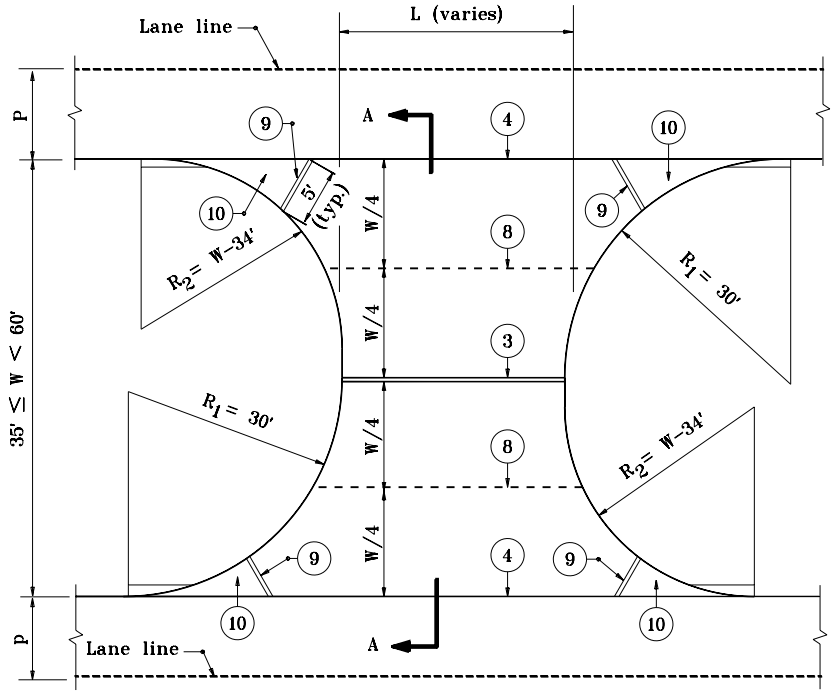
STANDARD DRAWING NO. E 610-PRCO-01

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

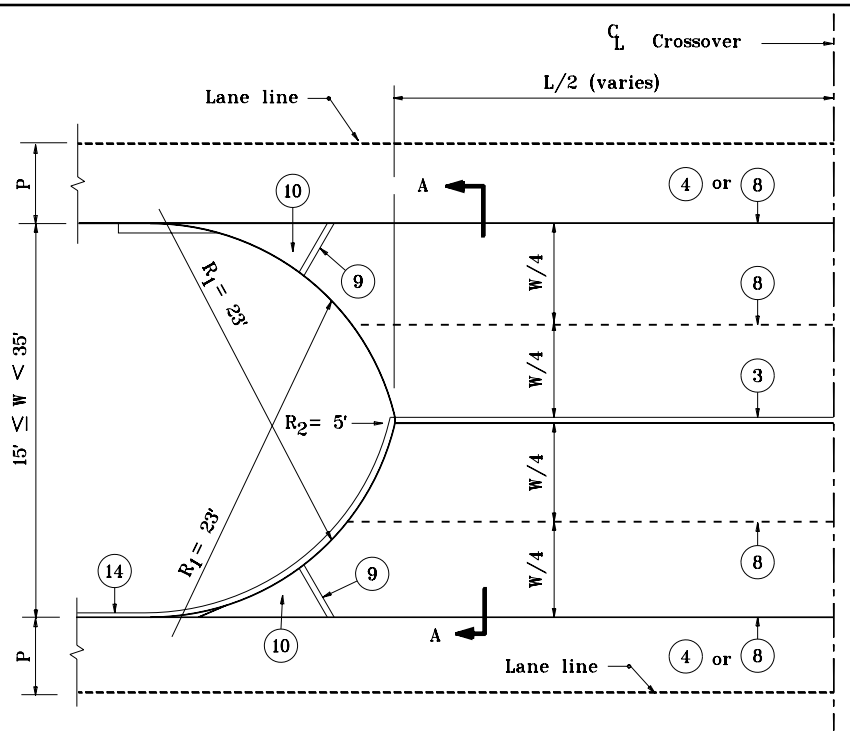
DESIGN STANDARDS ENGINEER

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

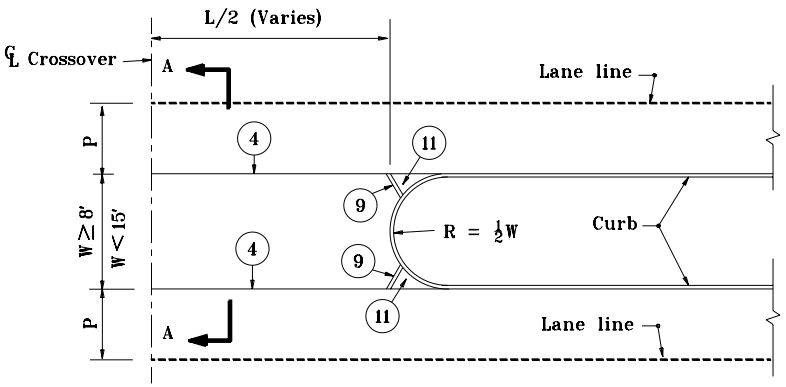
/s/ Richard K.Smutzer 3-03-03
CHIEF HIGHWAY ENGINEER DATE



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

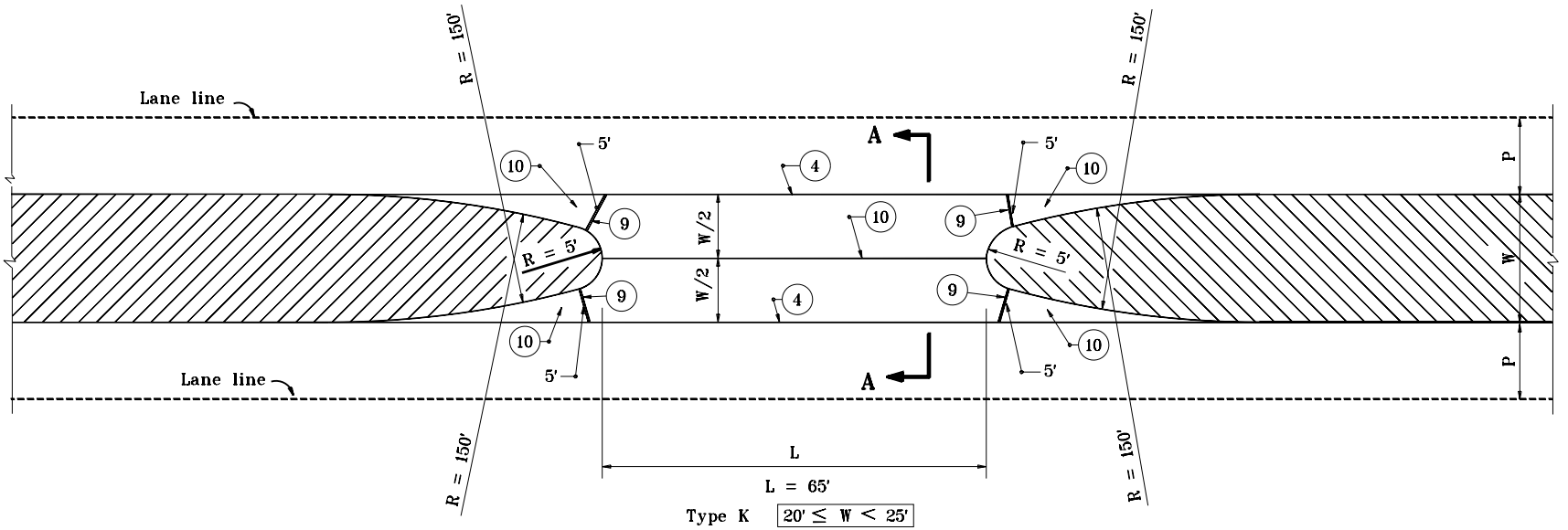
STANDARD DRAWING NO. **E 610-PRCO-01A**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

/s/ Anthony L. Uremovich 5-01-00
DESIGN STANDARDS ENGINEER — DATE

/s/ Firooz Zandi 5-01-00
CHIEF HIGHWAY ENGINEER — DATE



L = 65'

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

L = 60'

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

PLAN

NOTES :

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

INDIANA DEPARTMENT OF TRANSPORTATION

PUBLIC ROAD CROSSOVERS TYPE K & L

MAY 2000

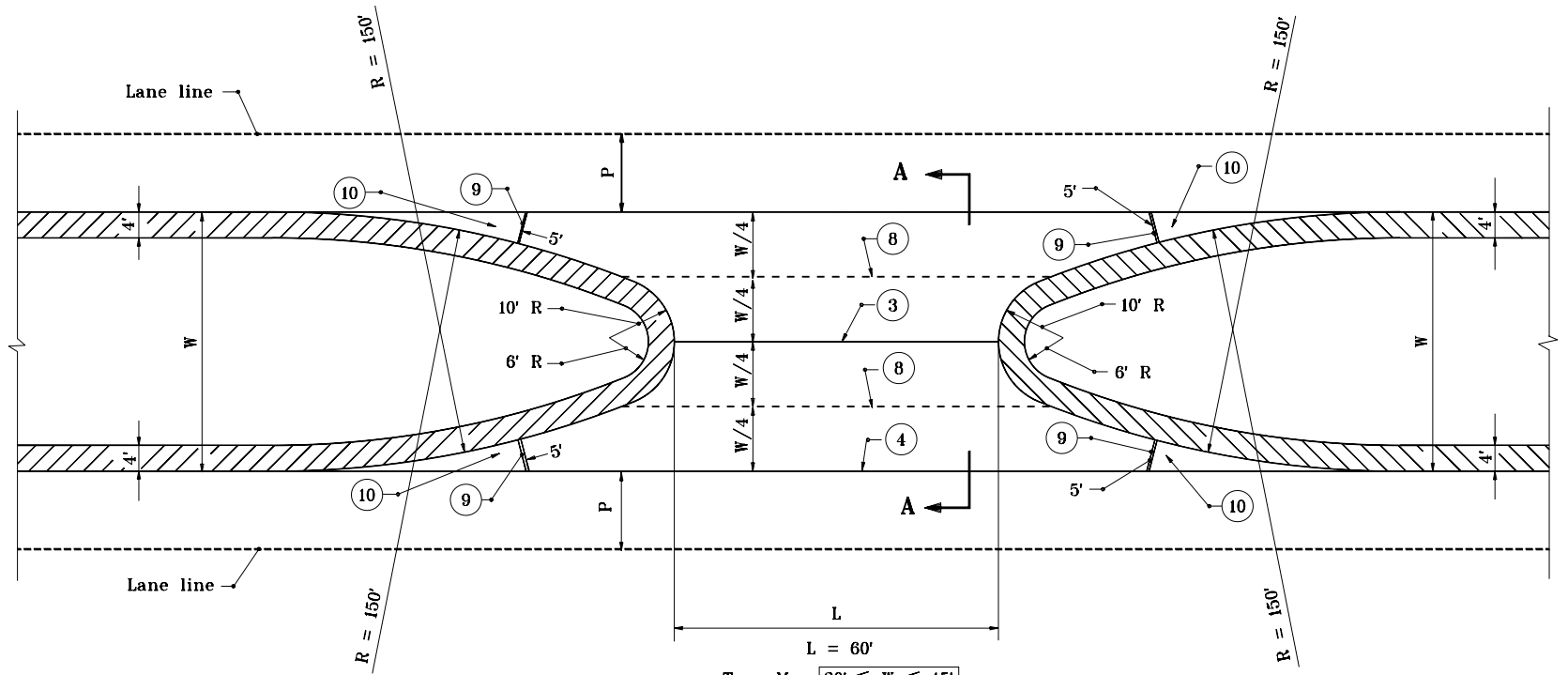
STANDARD DRAWING NO. **E 610-PRCO-02**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

/s/ Anthony L. Uremovich 5-01-00
DESIGN STANDARDS ENGINEER — DATE

/s/ Firooz Zandi 5-01-00
CHIEF HIGHWAY ENGINEER — DATE



L = 60'

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

L = 50'

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

PLAN

NOTES :

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

INDIANA DEPARTMENT OF TRANSPORTATION

PUBLIC ROAD CROSSOVERS TYPE M & N

MAY 2000

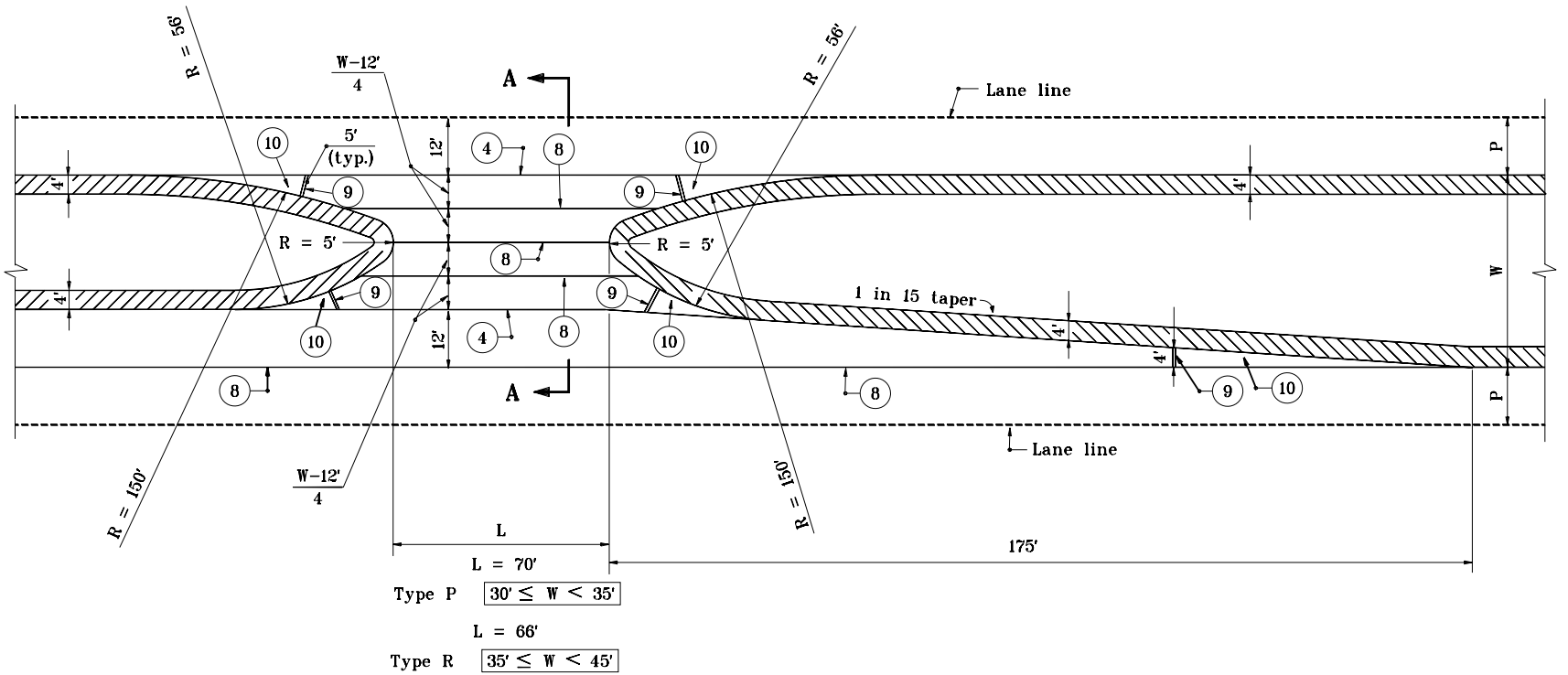
STANDARD DRAWING NO. **E 610-PRCO-03**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

/s/ Anthony L. Uremovich 5-01-00
DESIGN STANDARDS ENGINEER — DATE

/s/ Firooz Zandi 5-01-00
CHIEF HIGHWAY ENGINEER — DATE



L = 70'

Type P $30' \leq W < 35'$

L = 66'

Type R $35' \leq W < 45'$

PLAN

NOTES :

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

INDIANA DEPARTMENT OF TRANSPORTATION

PUBLIC ROAD CROSSOVERS TYPE P & R

MAY 2000

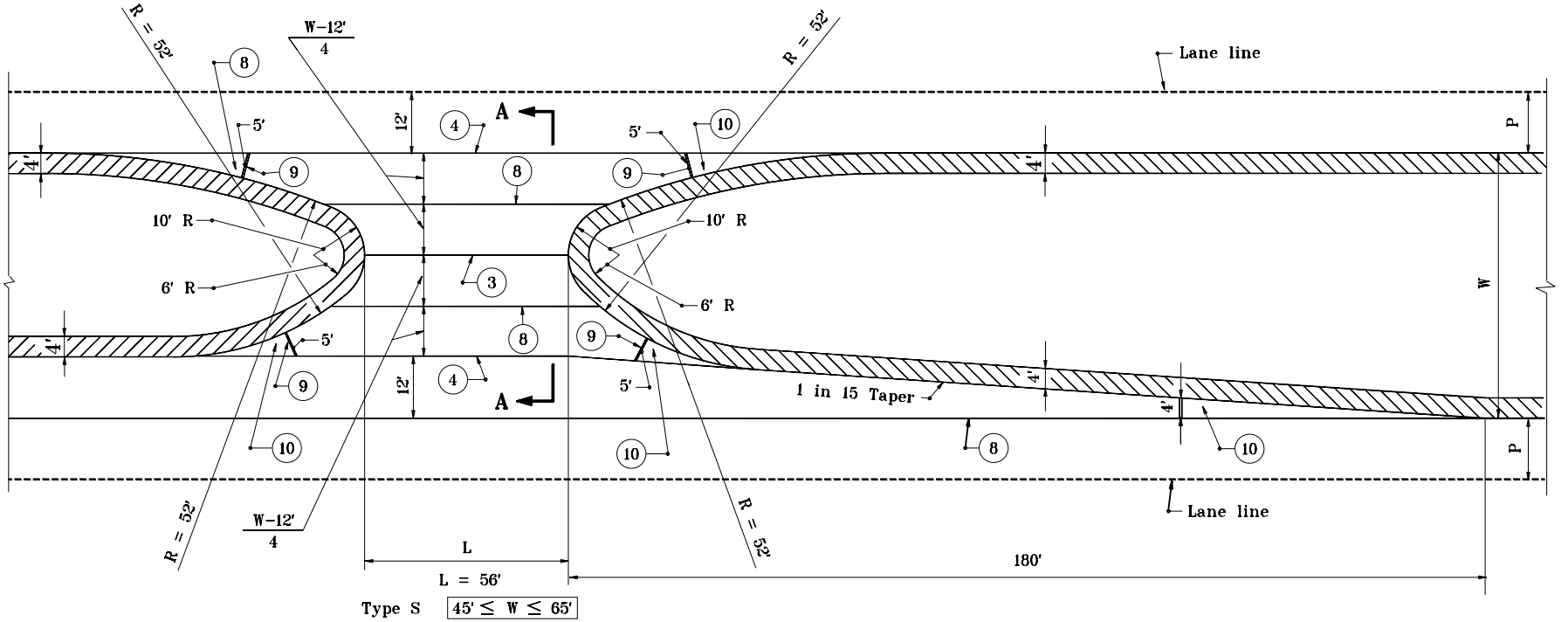
STANDARD DRAWING NO. **E 610-PRCO-04**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

/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

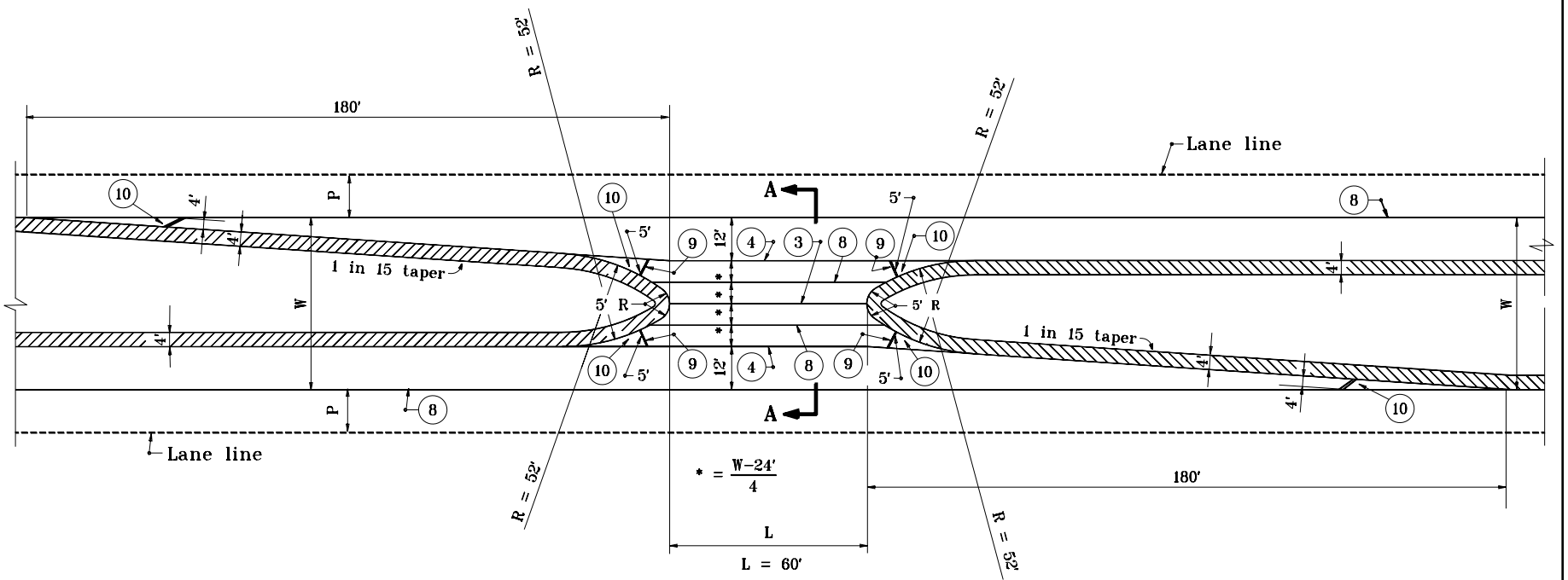
STANDARD DRAWING NO. **E 610-PRCO-05**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

/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 CROSSOVERS TYPE T & U

MAY 2000

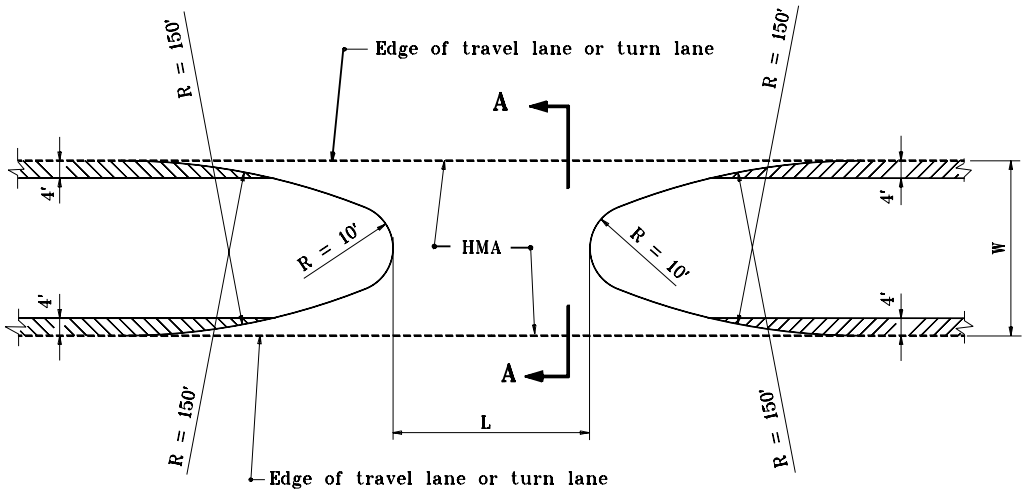
STANDARD DRAWING NO. **E 610-PRCO-06**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

/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

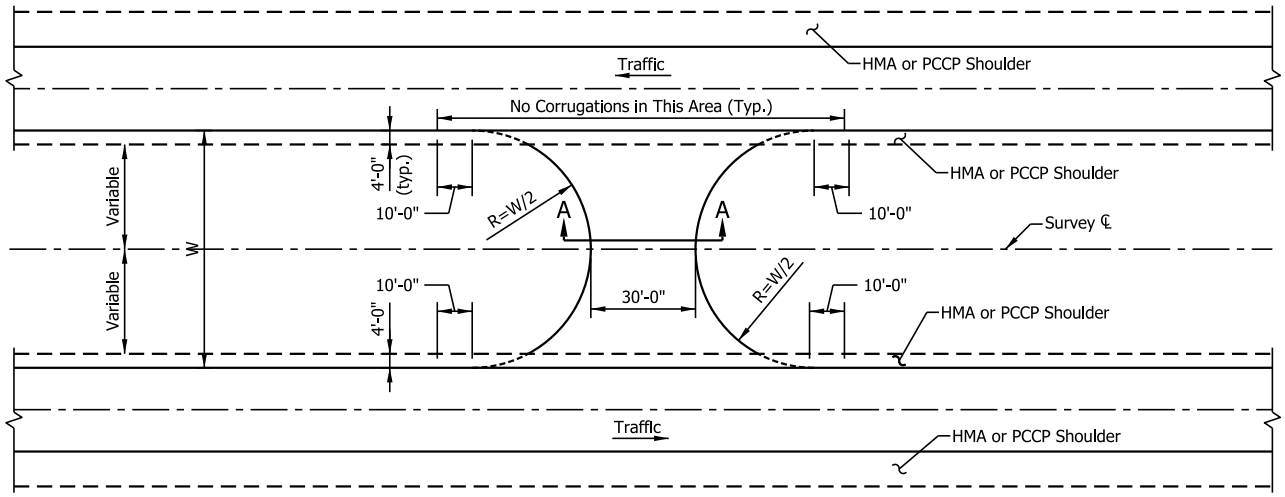
STANDARD DRAWING NO. **E 610-PRCO-07**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

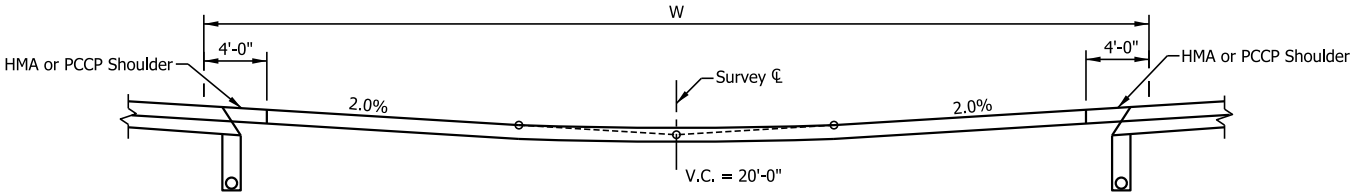
DESIGN STANDARDS ENGINEER

/s/ Anthony L. Uremovich 5-01-00
DESIGN STANDARDS ENGINEER — DATE

/s/ Firooz Zandi 5-01-00
CHIEF HIGHWAY ENGINEER — DATE

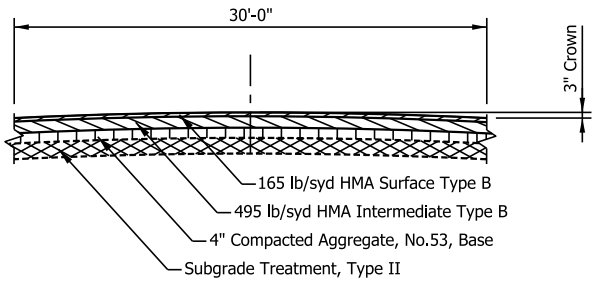


PLAN



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 2017

STANDARD DRAWING NO. E 610-UTMO-01

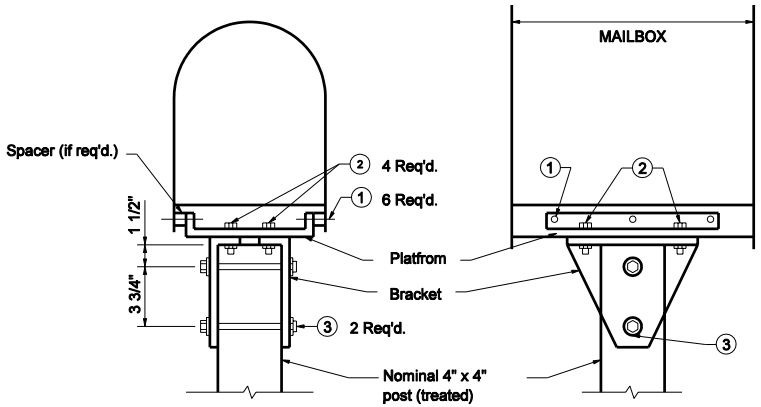
ELIZABETH W. PHILLIPS REGISTERED No. 10200124 STATE OF INDIANA PROFESSIONAL ENGINEER

/s/ Elizabeth W. Phillips 04/27/17

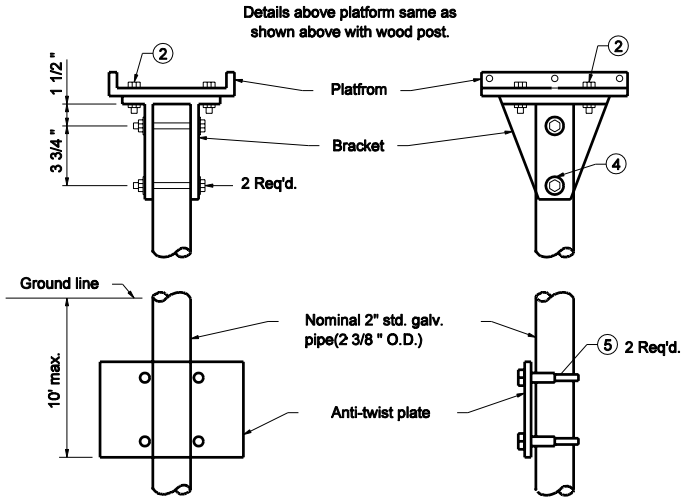
DESIGN STANDARDS ENGINEER DATE

/s/ John Leckie 04/28/17

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 platfrom, bracket, shelf, spacer and anti-twist plate details, see Standard Drawing E 611-MBAS-03.

INDIANA DEPARTMENT OF TRANSPORTATION

SINGLE MAILBOX ASSEMBLY

MARCH 2005

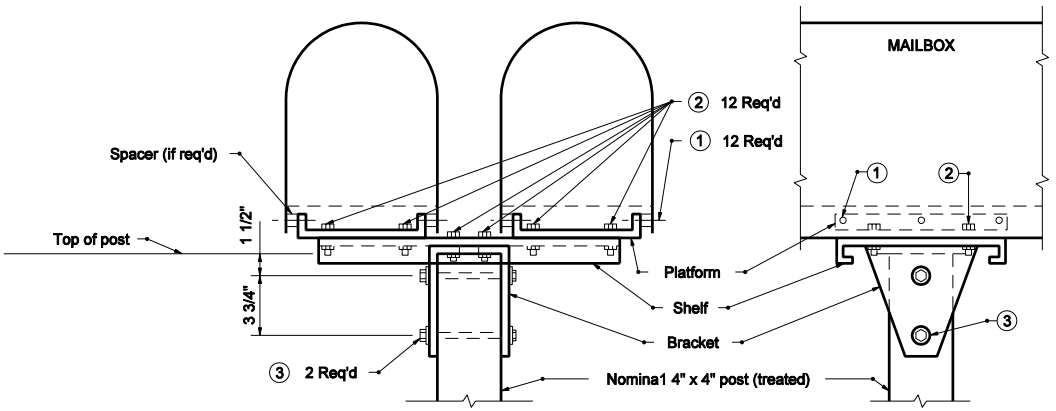
STANDARD DRAWING NO. E 611-MBAS-01

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

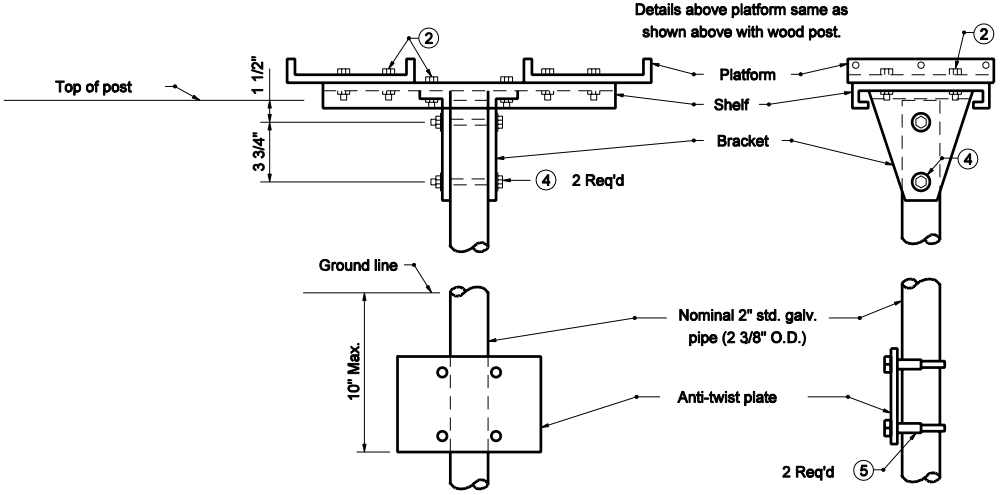
DESIGN STANDARDS ENGINEER

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

/s/ Richard K.Smutzer 3-01-05
CHIEF HIGHWAY 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 platfrom, bracket, shelf, spacer and anti-twist plate details, see Standard Drawing E 611-MBAS-03.

INDIANA DEPARTMENT OF TRANSPORTATION

DOUBLE MAILBOX ASSEMBLY

MARCH 2005

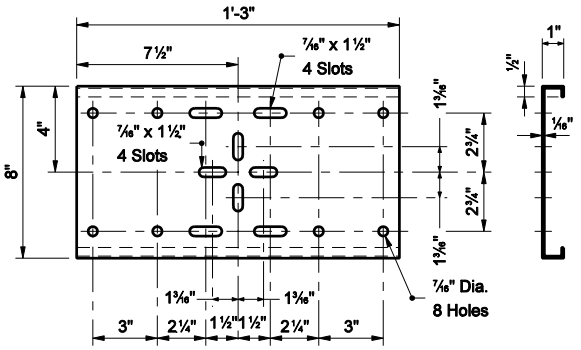
STANDARD DRAWING NO. E 611-MBAS-02

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

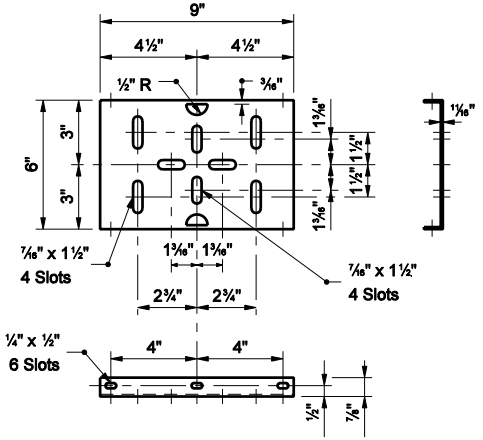
DESIGN STANDARDS ENGINEER

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

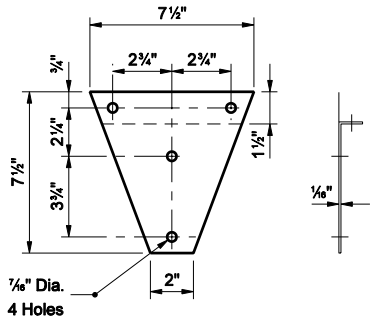
/s/ Richard K.Smutzer 3-01-05
CHIEF HIGHWAY ENGINEER DATE



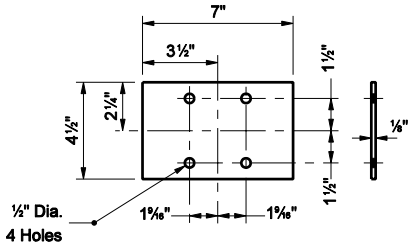
SHELF



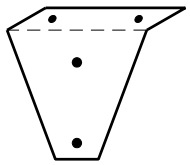
PLATFORM



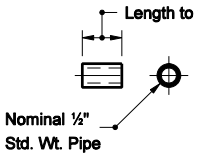
BRACKET



ANTI-TWIST PLATE



FINISHED BRACKET
ISOMETRIC



SPACER

INDIANA DEPARTMENT OF TRANSPORTATION

MAILBOX SUPPORT HARDWARE

MARCH 2005

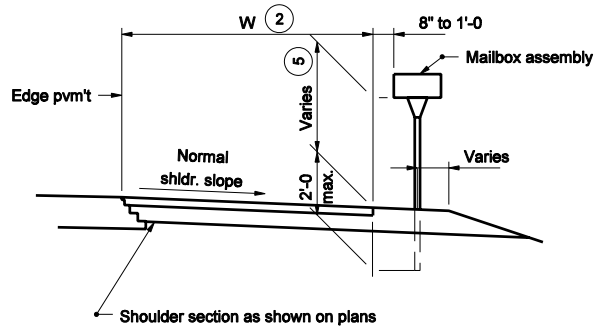
STANDARD DRAWING NO. E 611-MBAS-03

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

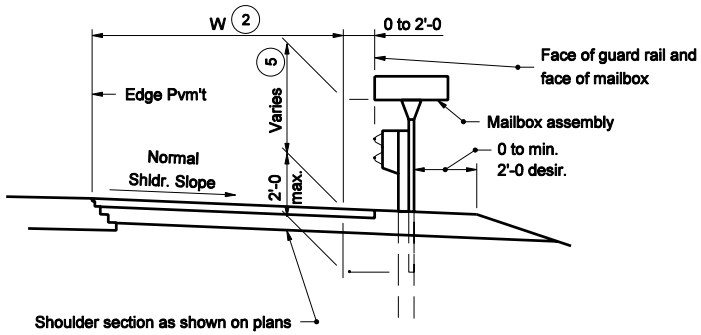
DESIGN STANDARDS ENGINEER

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

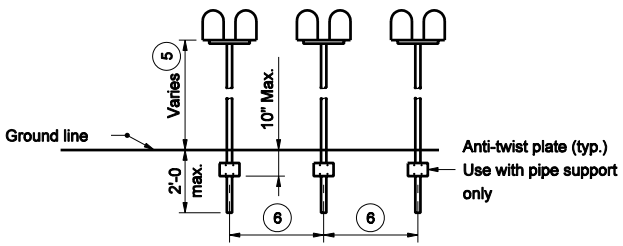
/s/ Richard K.Smutzer 3-01-05
CHIEF HIGHWAY ENGINEER DATE



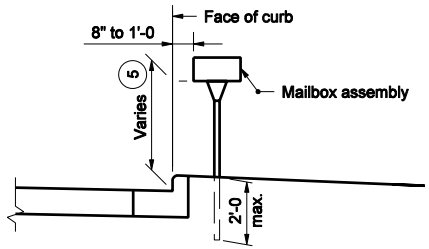
NORMAL SHOULDER SECTION



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 ASSEMBIES ELEVATION VIEW

MARCH 2005

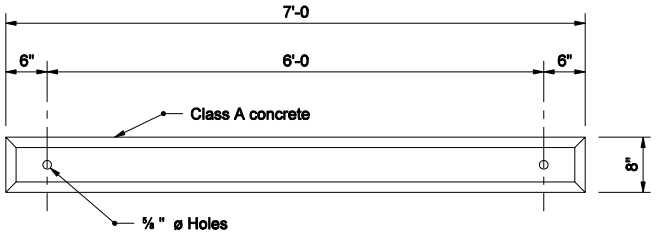
STANDARD DRAWING NO. E 611-MBAS-04

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

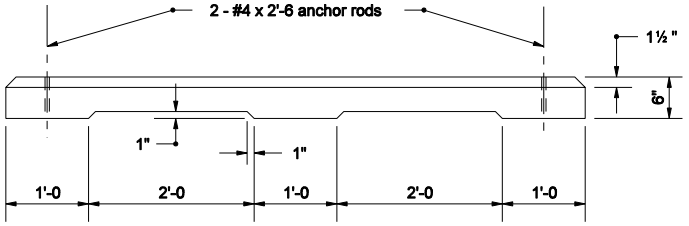
DESIGN STANDARDS ENGINEER

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

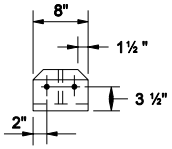
/s/ Richard K. Smutzer 3-01-05
CHIEF HIGHWAY ENGINEER DATE



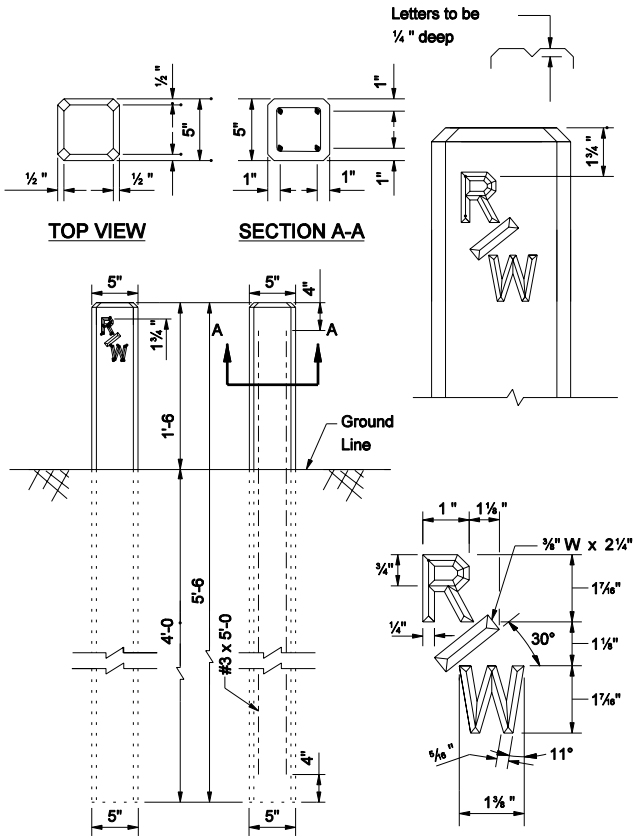
TOP VIEW



SIDE VIEW



END VIEW



ELEVATION

INDIANA DEPARTMENT OF TRANSPORTATION

RIGHT-OF-WAY MARKER AND CONCRETE PARKING BARRIER

MARCH 2004

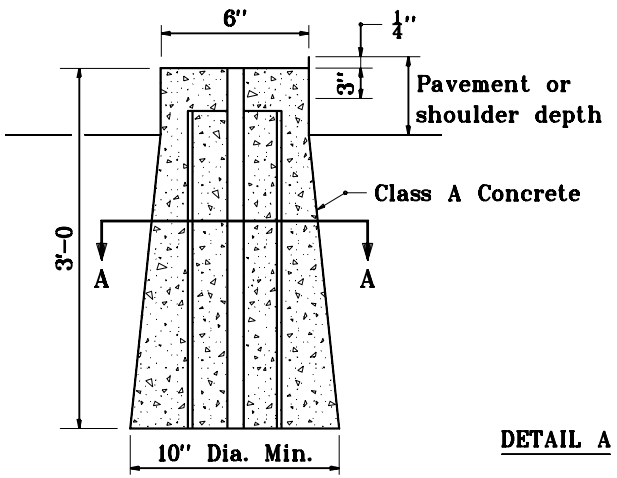
STANDARD DRAWING NO. E 615-RWPB-01

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

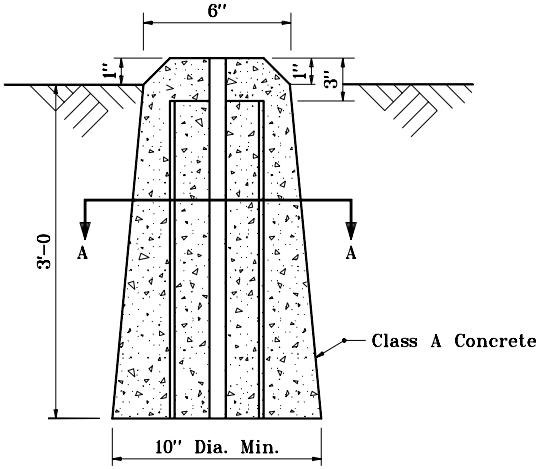
DESIGN STANDARDS ENGINEER

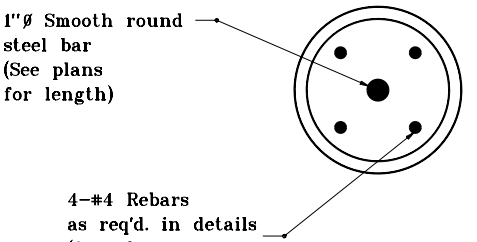
/s/ Richard L. VanCleave X-OX-OX
DESIGN STANDARDS ENGINEER DATE

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



DETAIL A





SECTION A-A

INSIDE PAVEMENT OR SHOULDER AREA

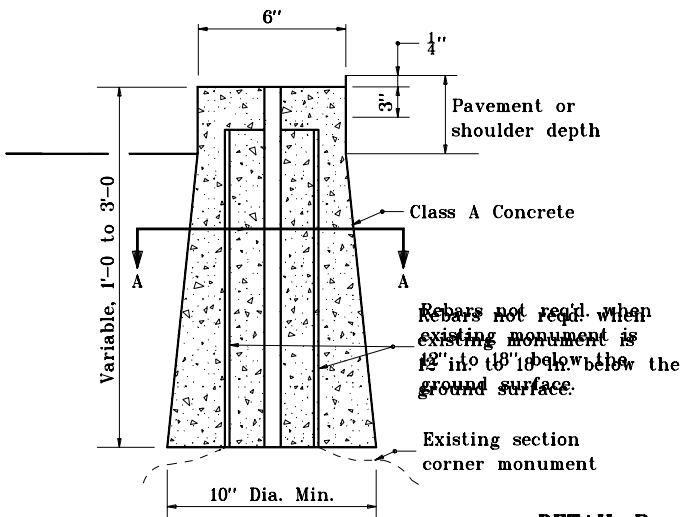
OUTSIDE PAVEMENT OR SHOULDER AREA

NEW SECTION CORNER MONUMENT INSTALLATION

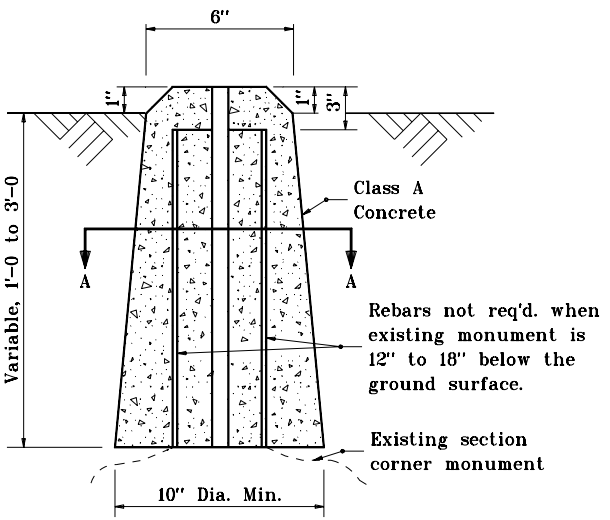
NOTES

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 A.



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

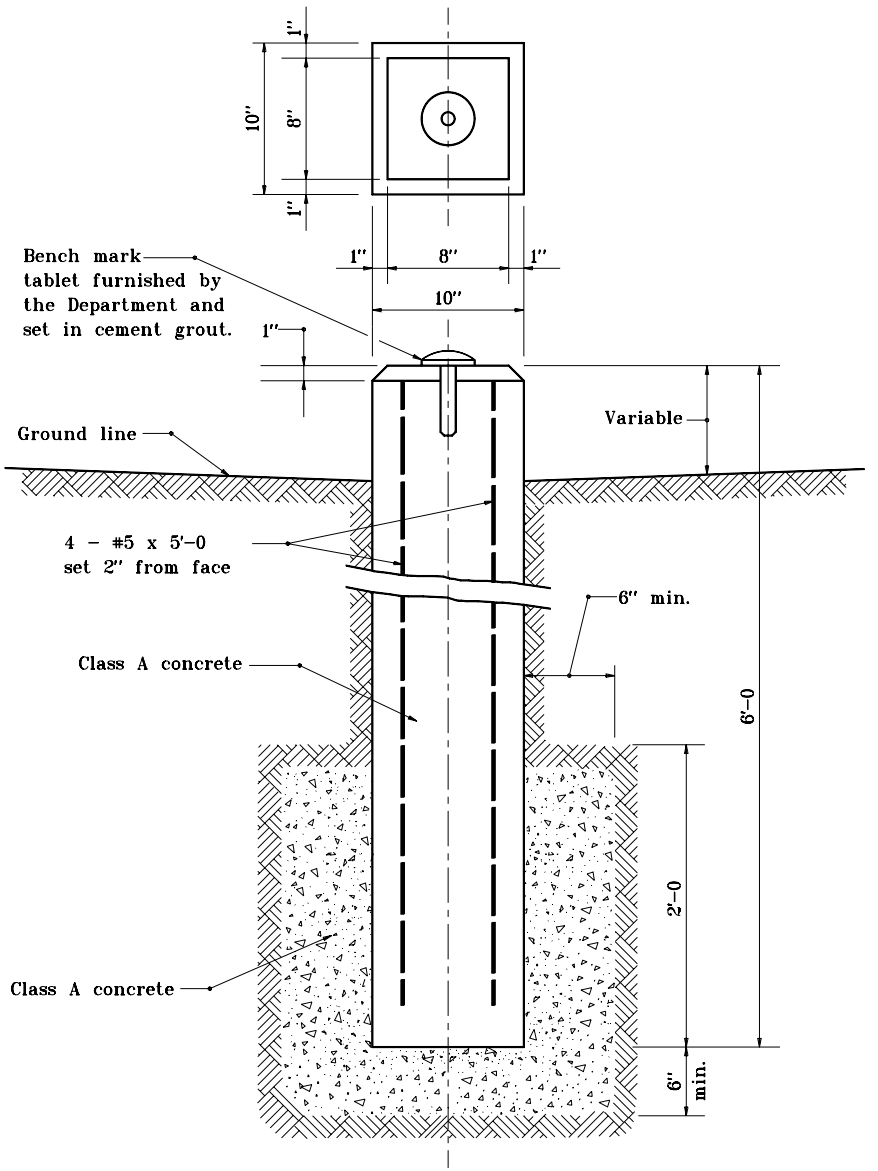
APRIL 1995

STANDARD DRAWING NO. **E 615-SCMN-01**

ANTHONY L. URENOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS 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
ORIGINALLY APPROVED	4-03-95



BENCH MARK POST

INDIANA DEPARTMENT OF TRANSPORTATION

BENCH MARK POST

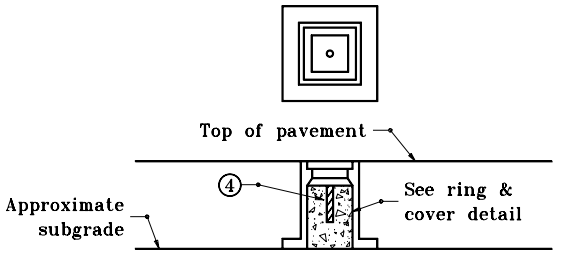
SEPTEMBER 1997

STANDARD DRAWING NO. **E 615-SLBM-01**

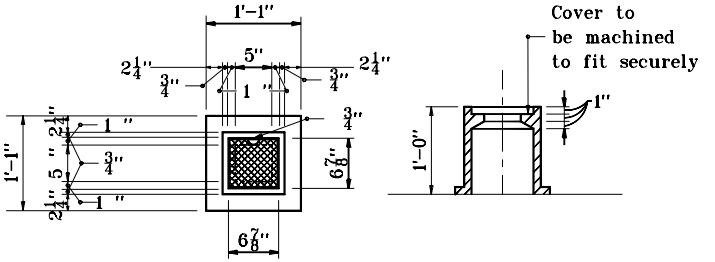
ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS 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
ORIGINALLY APPROVED	9-01-97



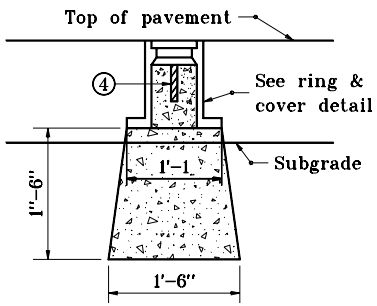
INSTALLATION FOR VITRIFIED BRICK OR BITUMINOUS SURFACE ON CONCRETE BASE (TYPE A)



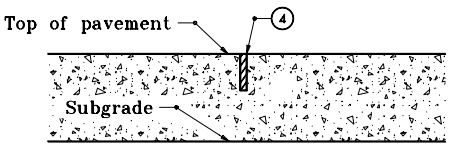
SURVEY LINE MONUMENT RING & COVER

GENERAL NOTES

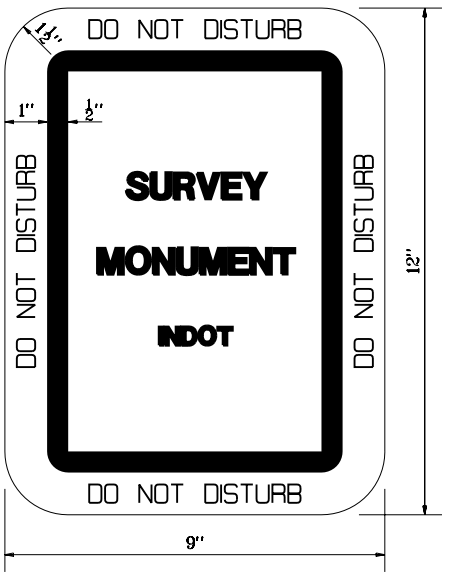
1. Sign shall be white background with black copy.
2. One steel type A or 4" x 4" wood post required.
3. Letter height shall be as follows:
   Border: ½" series D
   Line 1: 1" series B
   Line 2: 1" series B
   Line 3: 1" series B
4. 1"Ø x 5" steel rod

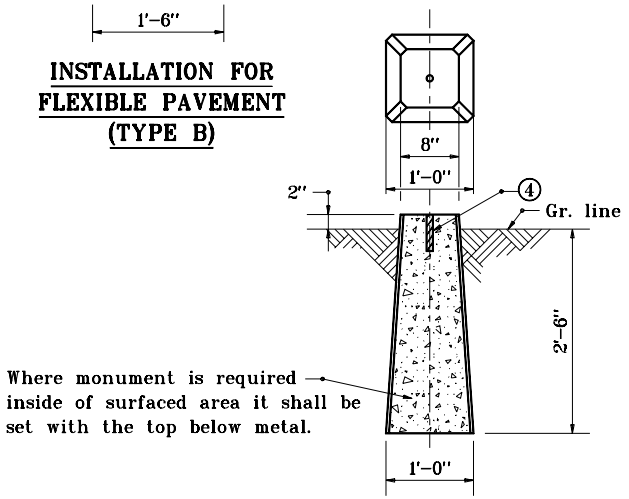


INSTALLATION FOR FLEXIBLE PAVEMENT (TYPE B)

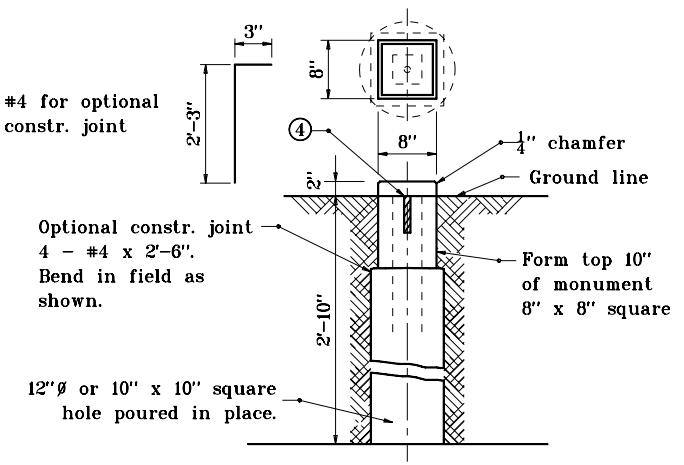


INSTALLATION FOR CONCRETE PAVEMENT (TYPE D)





INSTALLATION OUTSIDE OF PAVEMENT (TYPE C)



OPTIONAL INSTALLATION FOR TYPE C MONUMENT

INDIANA DEPARTMENT OF TRANSPORTATION

SURVEY LINE MONUMENTS

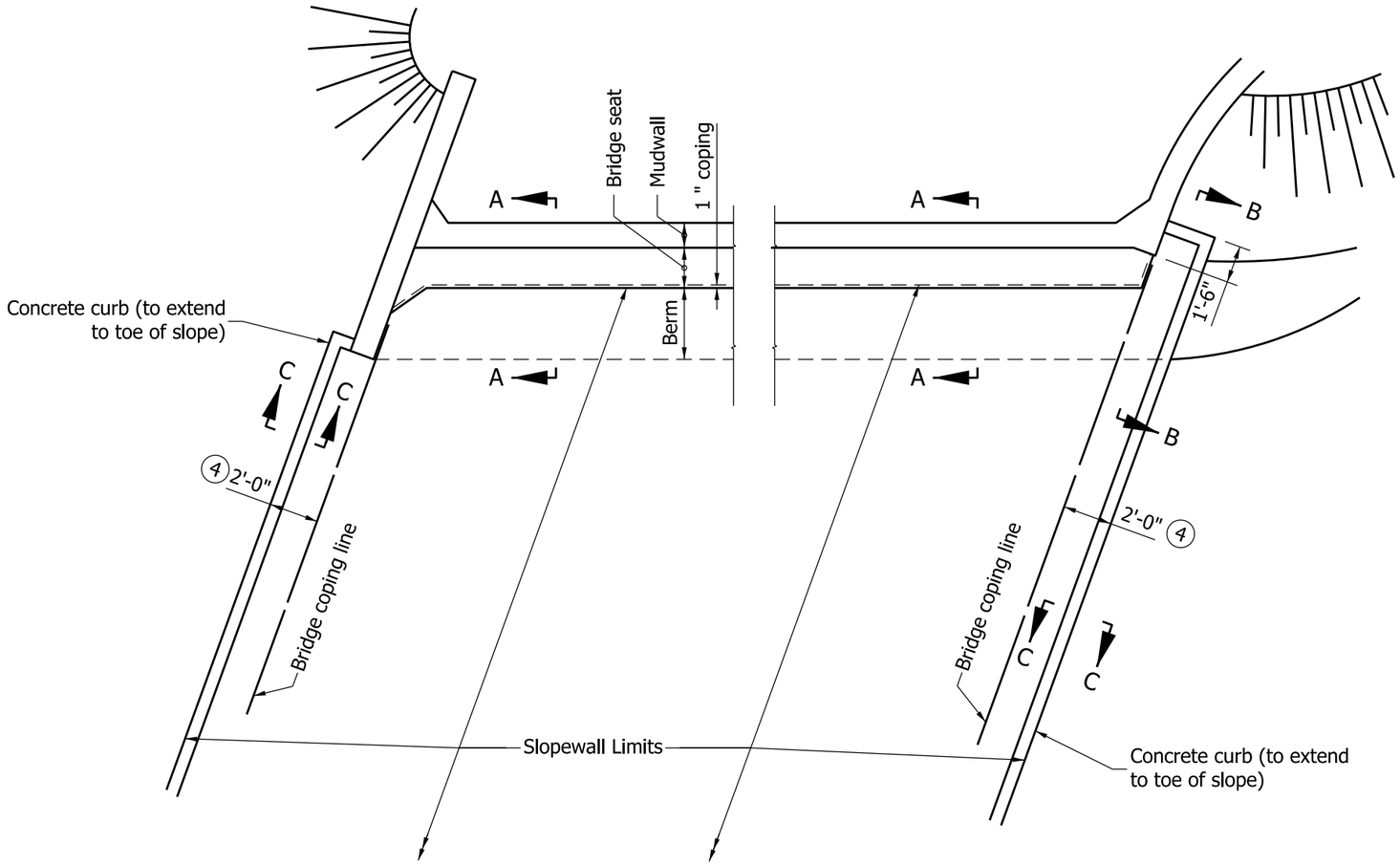
SEPTEMBER 1997

STANDARD DRAWING NO. **E 615-SLMN-01**

ANTHONY L. URENOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

DETAILS PLACED IN THIS FORMAT	11-15-99
/s/ Anthony L. Uremovich, DESIGN STANDARDS ENGINEER	11-15-99
/s/ Firooz Zandi, CHIEF HIGHWAY ENGINEER	11-15-99
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 slopewall abuts or surrounds columns, piers or other structures, use 1/2" bituminous expansion joint material between slopewall and structure.
3. If slopewall 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 SLOPEWALL DETAILS

SEPTEMBER 2011

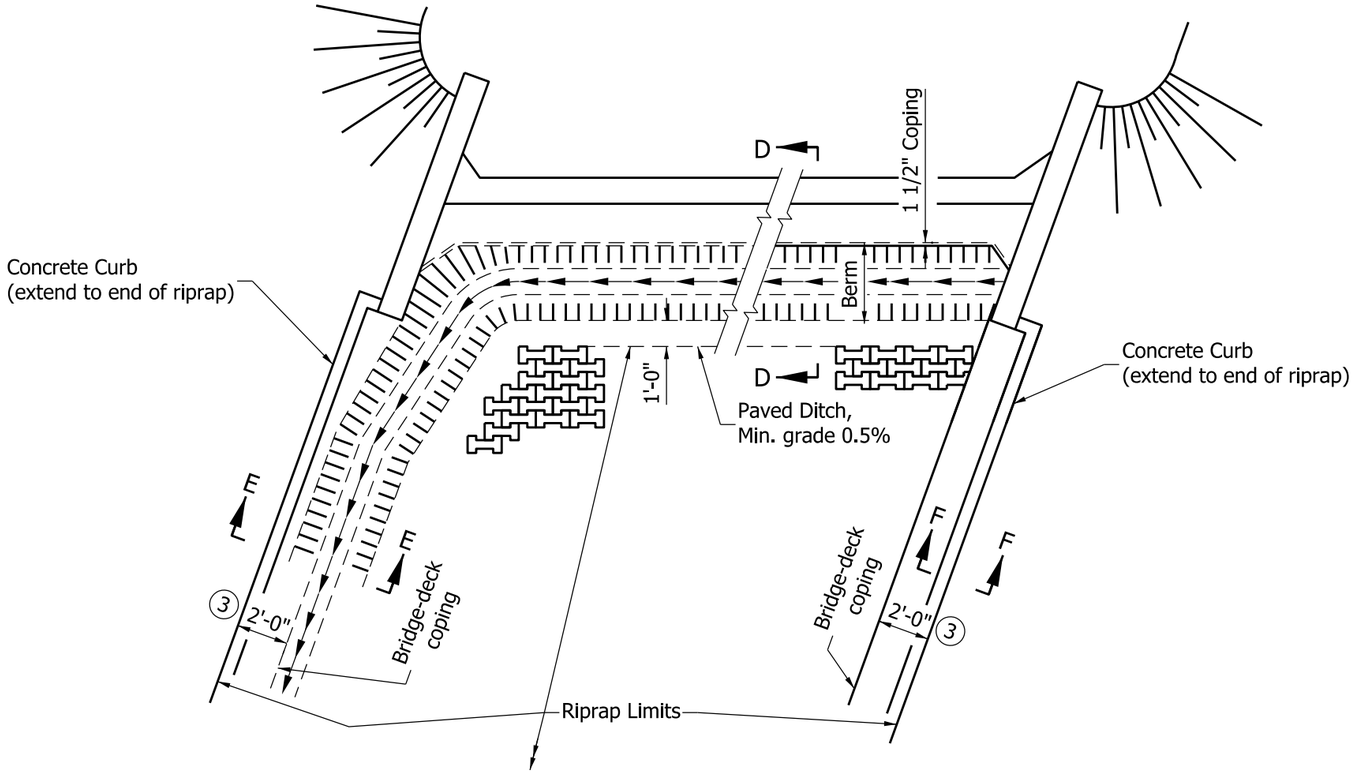
STANDARD DRAWING NO. E 616-SWCO-01

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

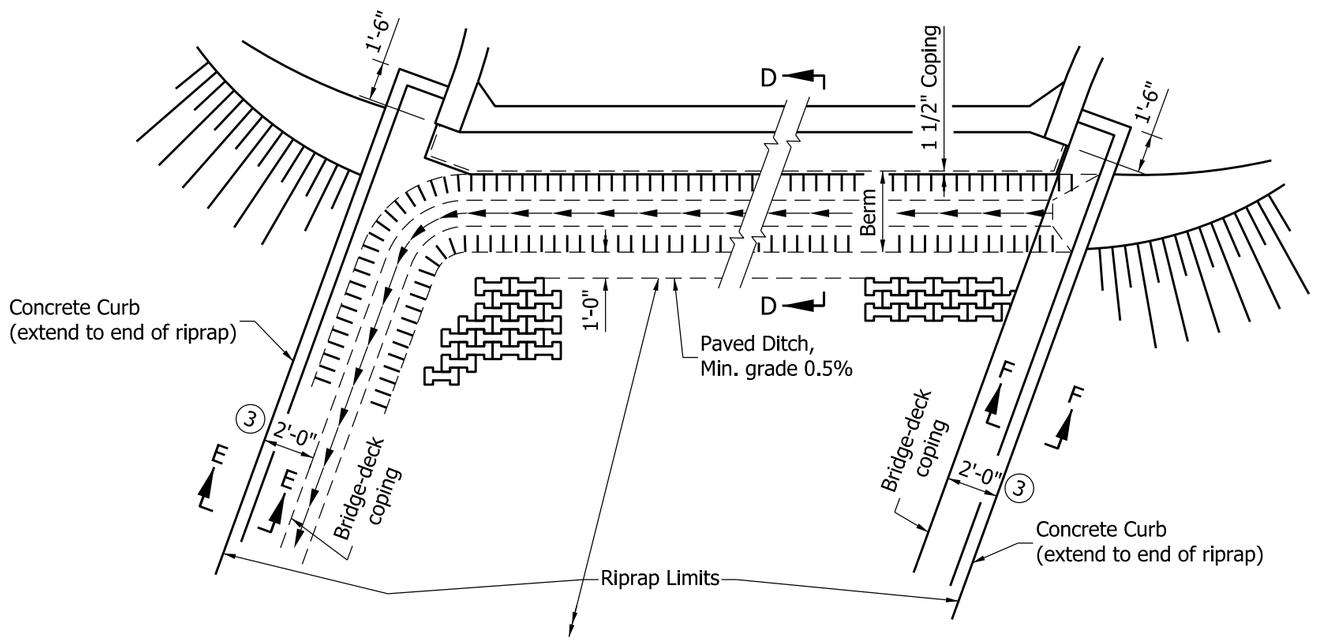
DESIGN STANDARDS ENGINEER

/s/ Richard L. VanCleave 9/01/11
DESIGN STANDARDS ENGINEER DATE

/s/ Mark A. Miller 9/01/01
CHIEF HIGHWAY ENGINEER DATE



STRAIGHT WINGS



FLARED WINGS

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

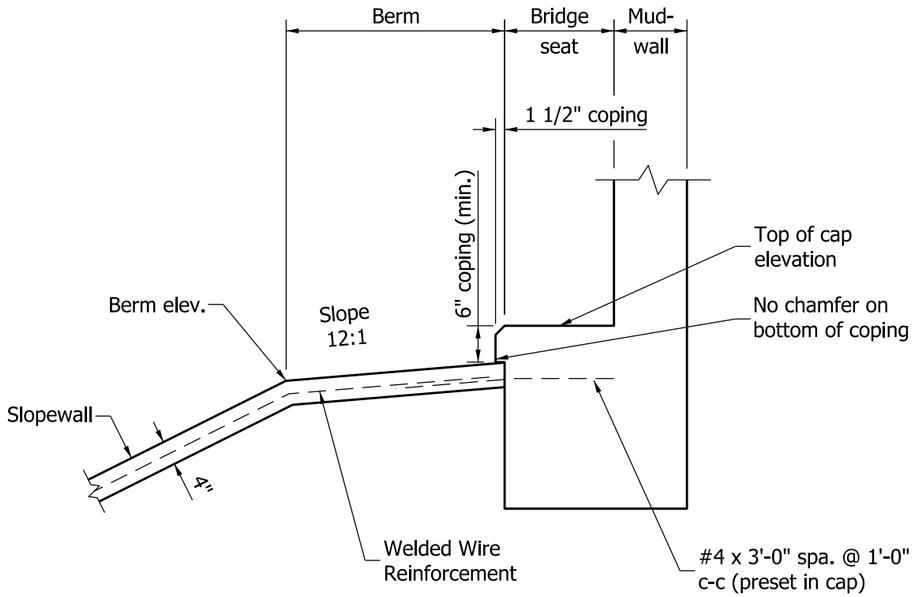
STANDARD DRAWING NO. E 616-SWCO-02

RICHARD L. VanCLEAVE
REGISTERED
No. 9750
STATE OF INDIANA
PROFESSIONAL ENGINEER

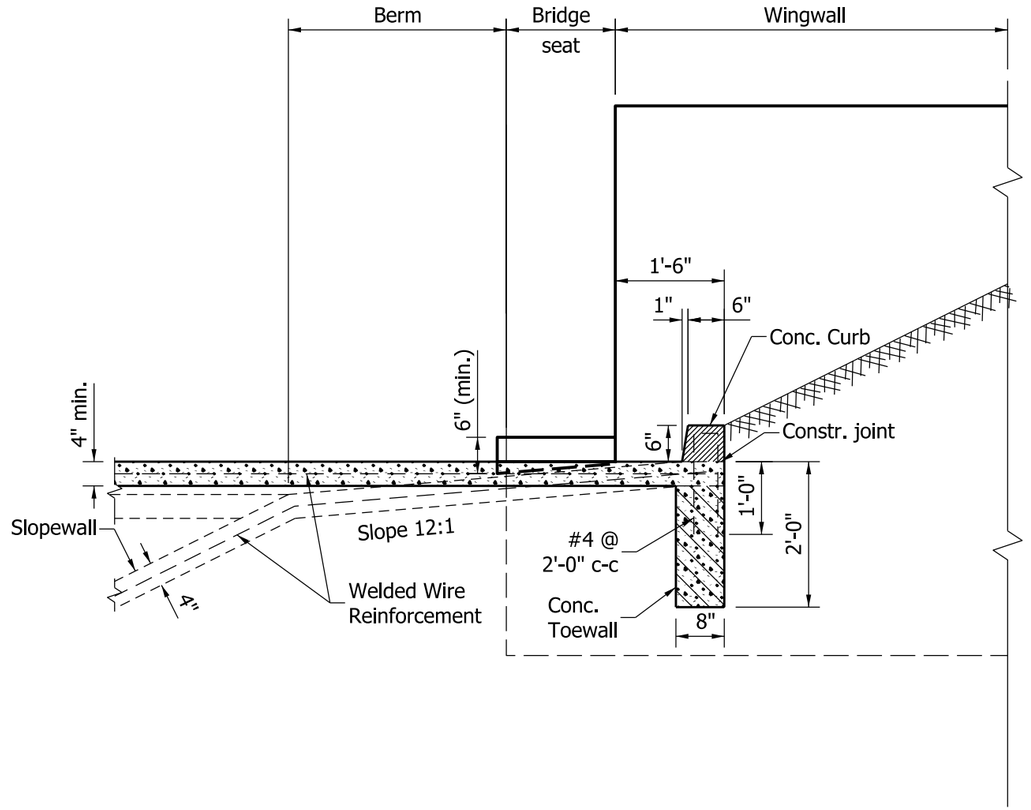
DESIGN STANDARDS ENGINEER

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

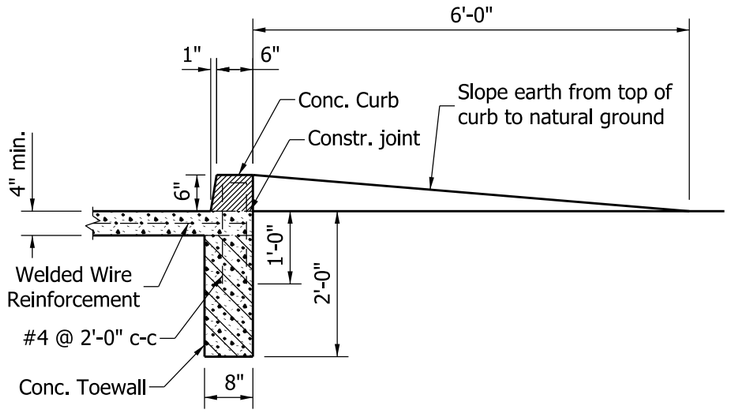
/s/ Mark A. Miller 09/01/11
CHIEF HIGHWAY ENGINEER DATE



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

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

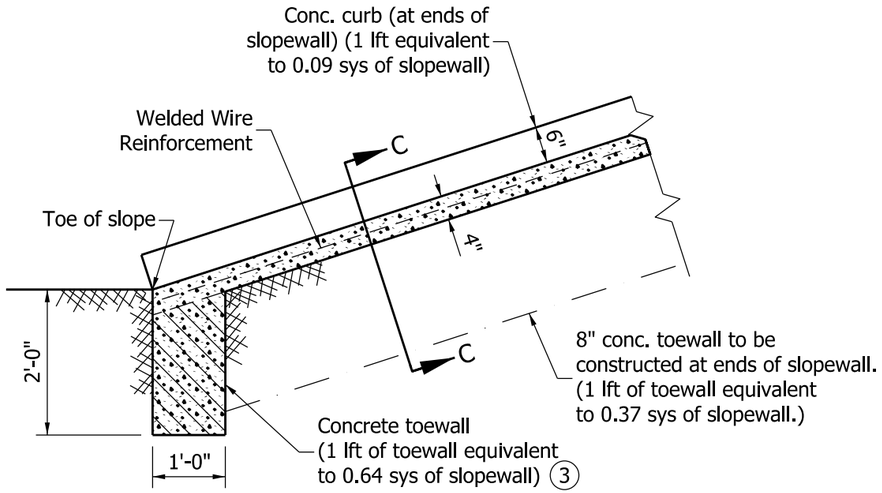
DESIGN STANDARDS ENGINEER

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

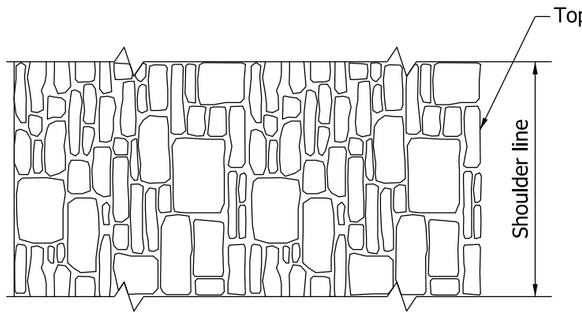
DESIGN STANDARDS ENGINEER DATE

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

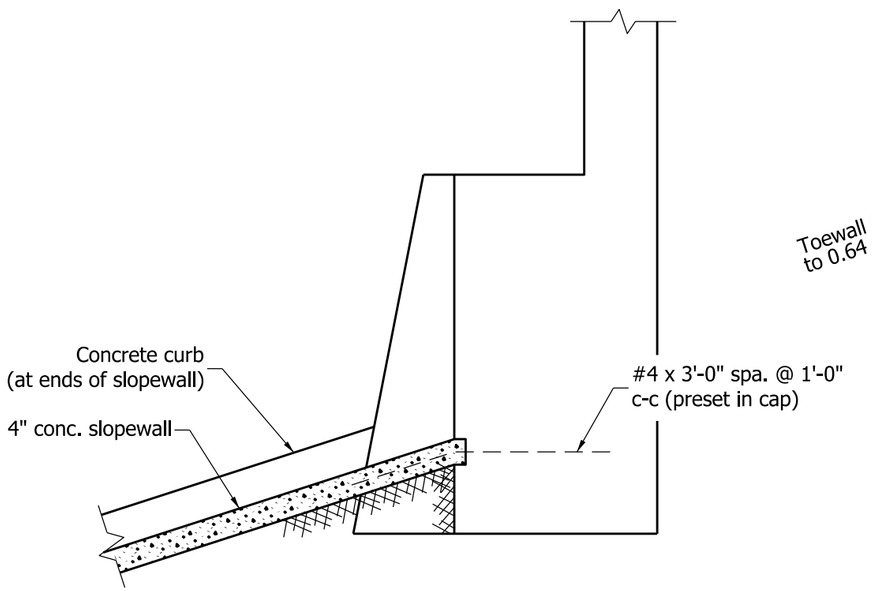
CHIEF HIGHWAY ENGINEER DATE



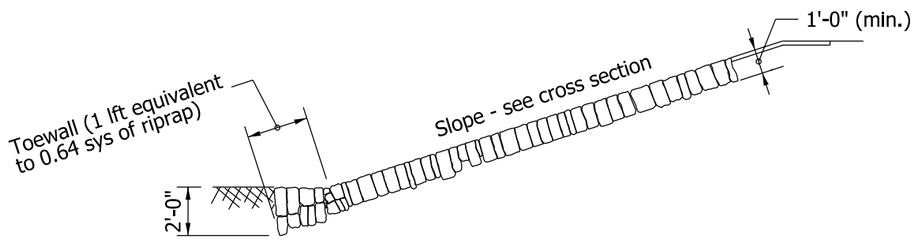
SECTION THROUGH CONCRETE SLOPEWALL



PLAN



TYPICAL SECTION THROUGH SLOPEWALL AT STRUCTURES WITHOUT BERMS



SECTION THROUGH HAND-LAID RIPRAP

NOTES:

1. See Section F-F on Standard Drawing E 616-SWCO-03 for Section C-C.
2. Where hand-laid riprap is used under a structure, a drainage configuration similar to that shown for precast concrete riprap shall be used. See Standard Drawing E 616-SWRR-02 for such configuration.

(3) Toewall is not required adjacent to a pier or bent.

INDIANA DEPARTMENT OF TRANSPORTATION

CONCRETE AND RIPRAP SLOPEWALL DETAILS

SEPTEMBER 2011

STANDARD DRAWING NO. E 616-SWCO-04

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

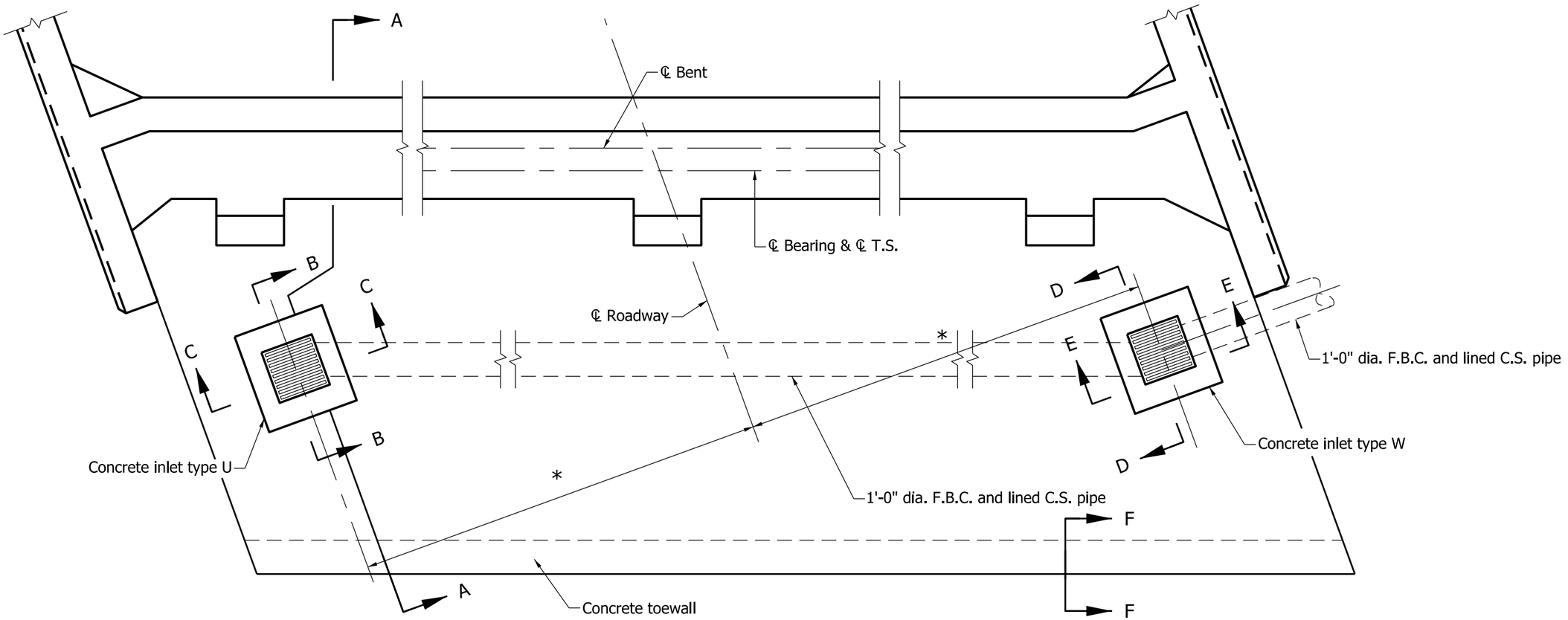
DESIGN STANDARDS ENGINEER

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

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

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

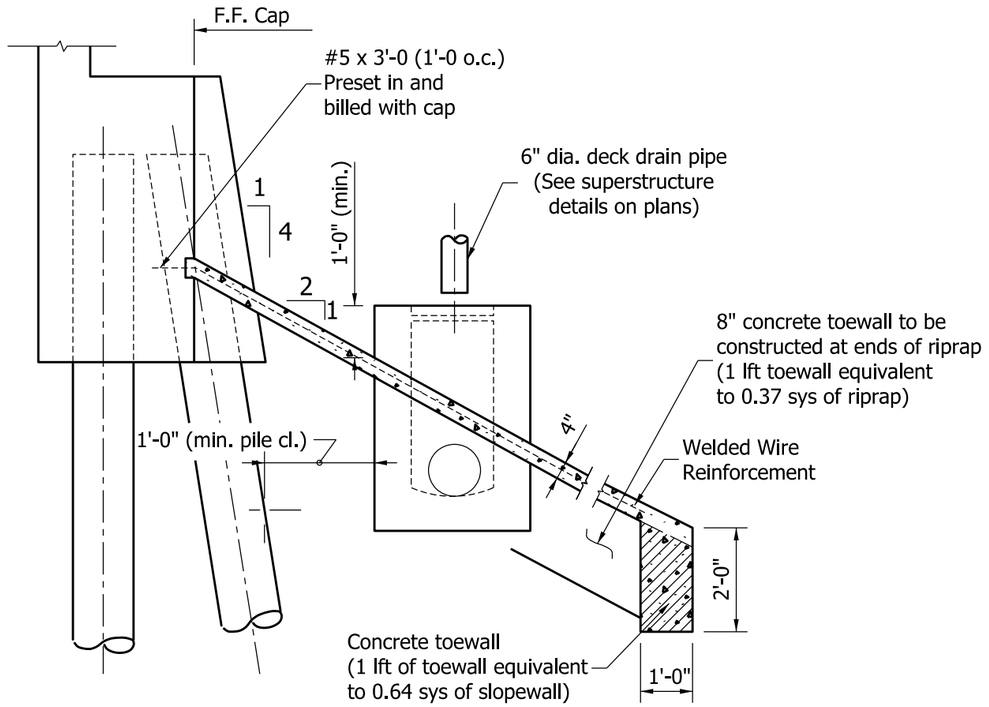
STANDARD DRAWING NO. E 616-SWCO-05

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

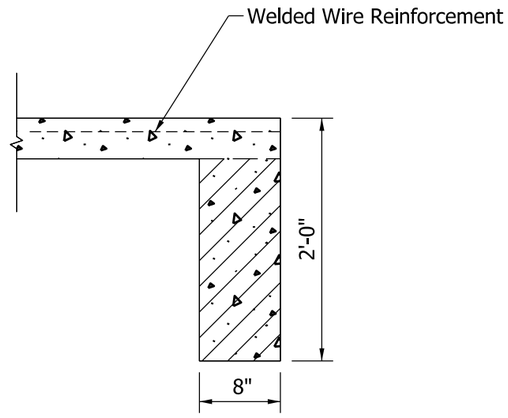
DESIGN STANDARDS ENGINEER

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

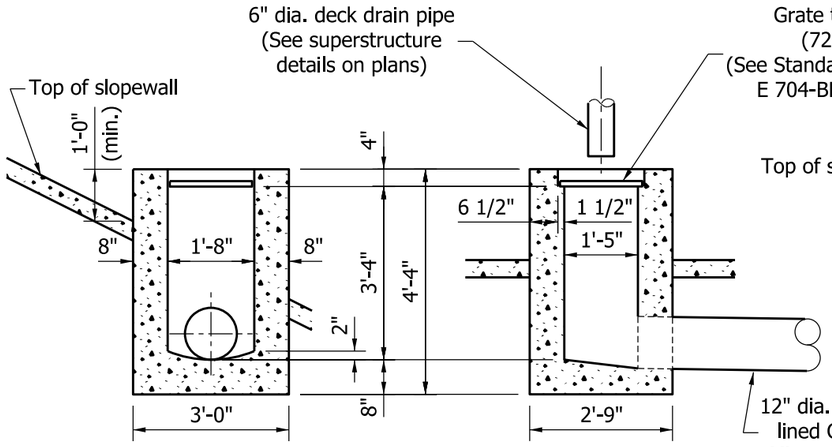
/s/ Mark A. Miller 09/01/11
CHIEF HIGHWAY ENGINEER DATE



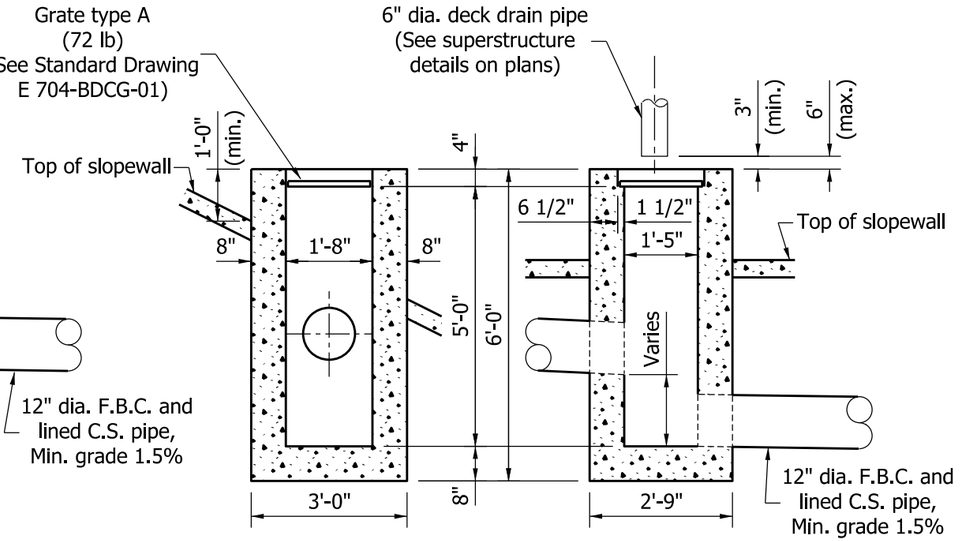
SECTION A-A
TYPICAL ELEVATION THRU SLOPEWALL



SECTION F-F



SECTION B-B



SECTION C-C

DETAIL OF CONCRETE INLET TYPE U

SECTION D-D

SECTION E-E

DETAIL OF CONCRETE INLET TYPE W

INDIANA DEPARTMENT OF TRANSPORTATION

SLOPEWALL AND DRAINAGE
DETAILS

SEPTEMBER 2011

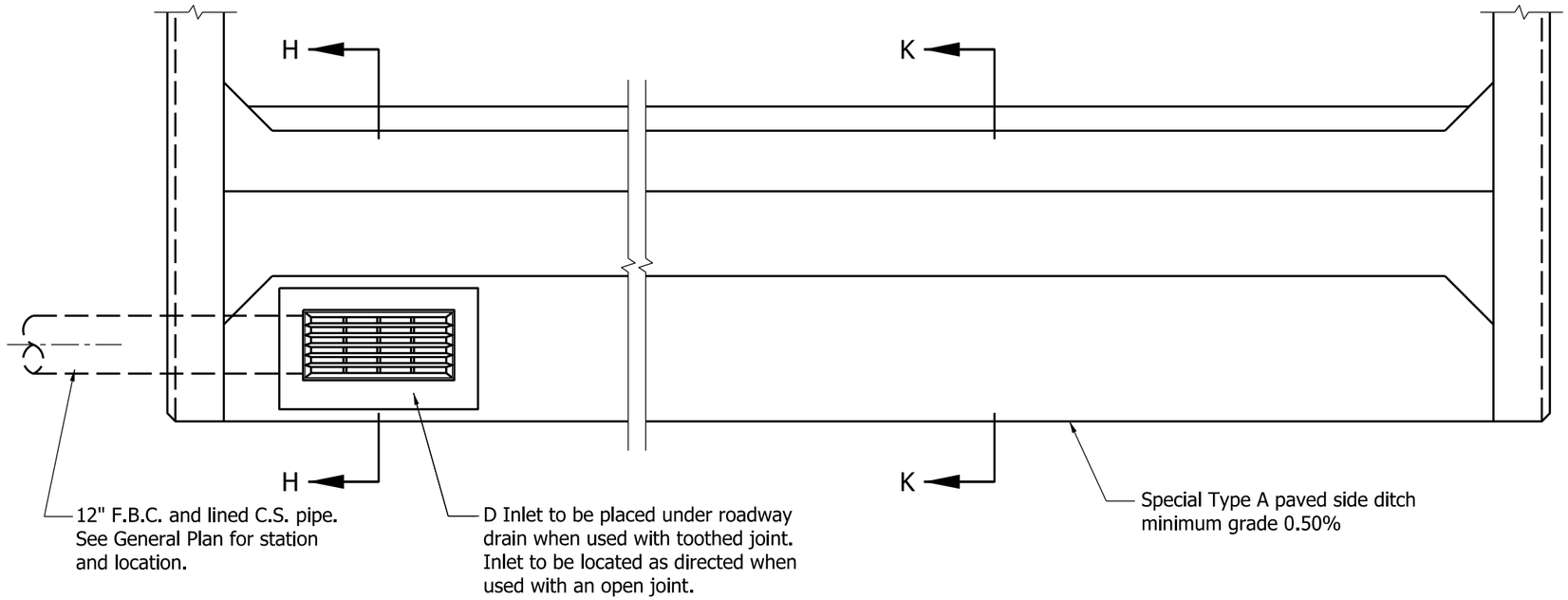
STANDARD DRAWING NO. E 616-SWCO-06

RICHARD L. VanCLEAVE
REGISTERED
No. 9750
STATE OF INDIANA
PROFESSIONAL ENGINEER

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



PLAN
(to be used on structures with berms)

NOTES:

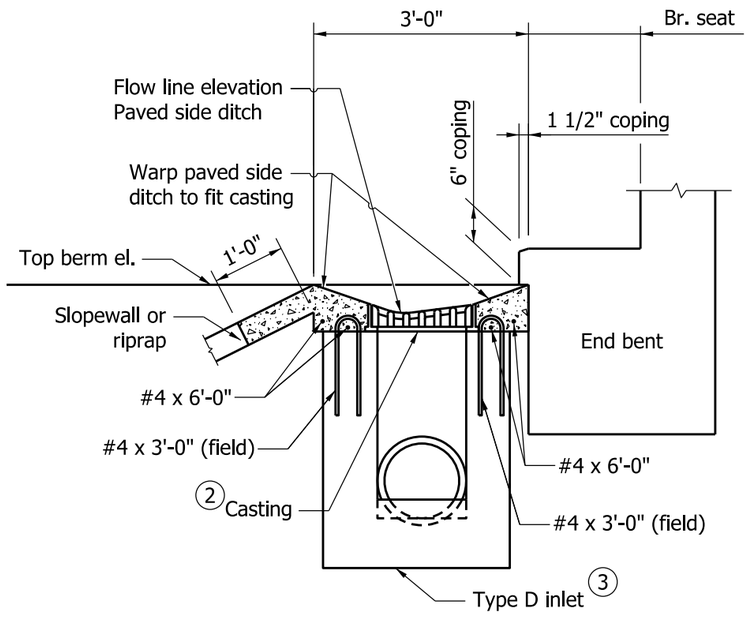
1. Precast concrete riprap may be used as an alternate to concrete slopewall only on a structure having a berm adjacent to a cap.

(2) For appropriate casting, see Standard Drawing E 720-CDSC-01.

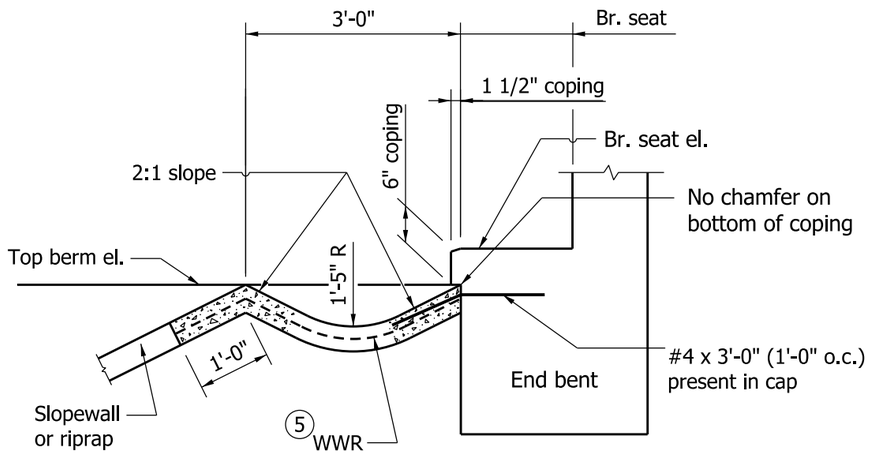
(3) For additional details of type D inlet, see Standard Drawing E 720-INST-03.

4. WWR shall be placed within the middle third of slopewall 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.



SECTION H-H



SECTION K-K

INDIANA DEPARTMENT OF TRANSPORTATION

SLOPEWALL AND DRAINAGE DETAILS

SEPTEMBER 2011

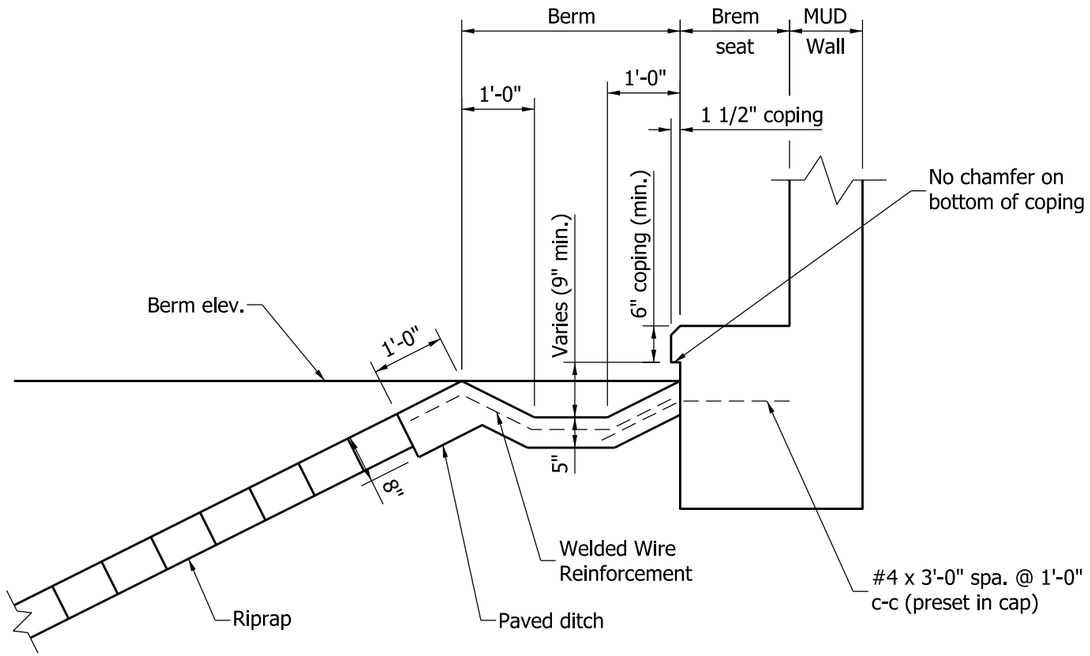
STANDARD DRAWING NO. E 616-SWCO-07

RICHARD L. VanCLEAVE
REGISTERED
No. 9750
STATE OF INDIANA
PROFESSIONAL ENGINEER

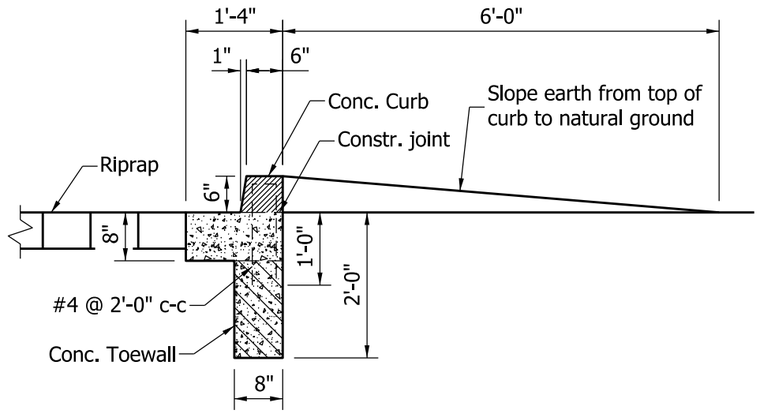
DESIGN STANDARDS ENGINEER

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

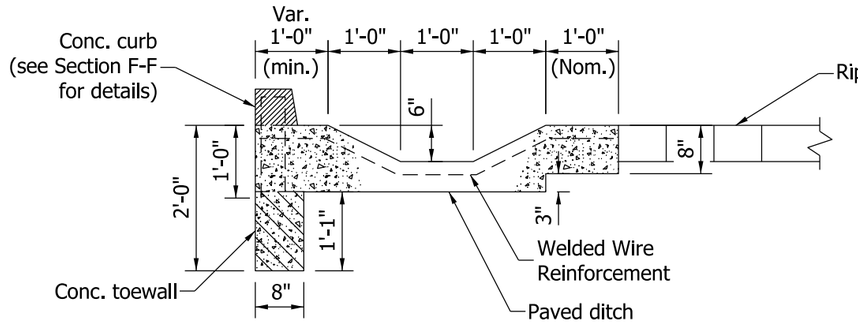
/s/ Mark A. Miller 09/01/11
CHIEF HIGHWAY ENGINEER DATE



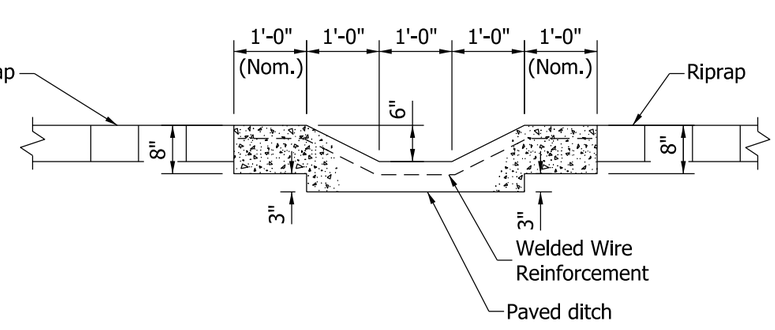
SECTION D-D



SECTION F-F



SECTION E-E
Where riprap terminates
2'-0" outside of coping line



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

INDIANA DEPARTMENT OF TRANSPORTATION

RIPRAP SLOPEWALL DETAILS

SEPTEMBER 2011

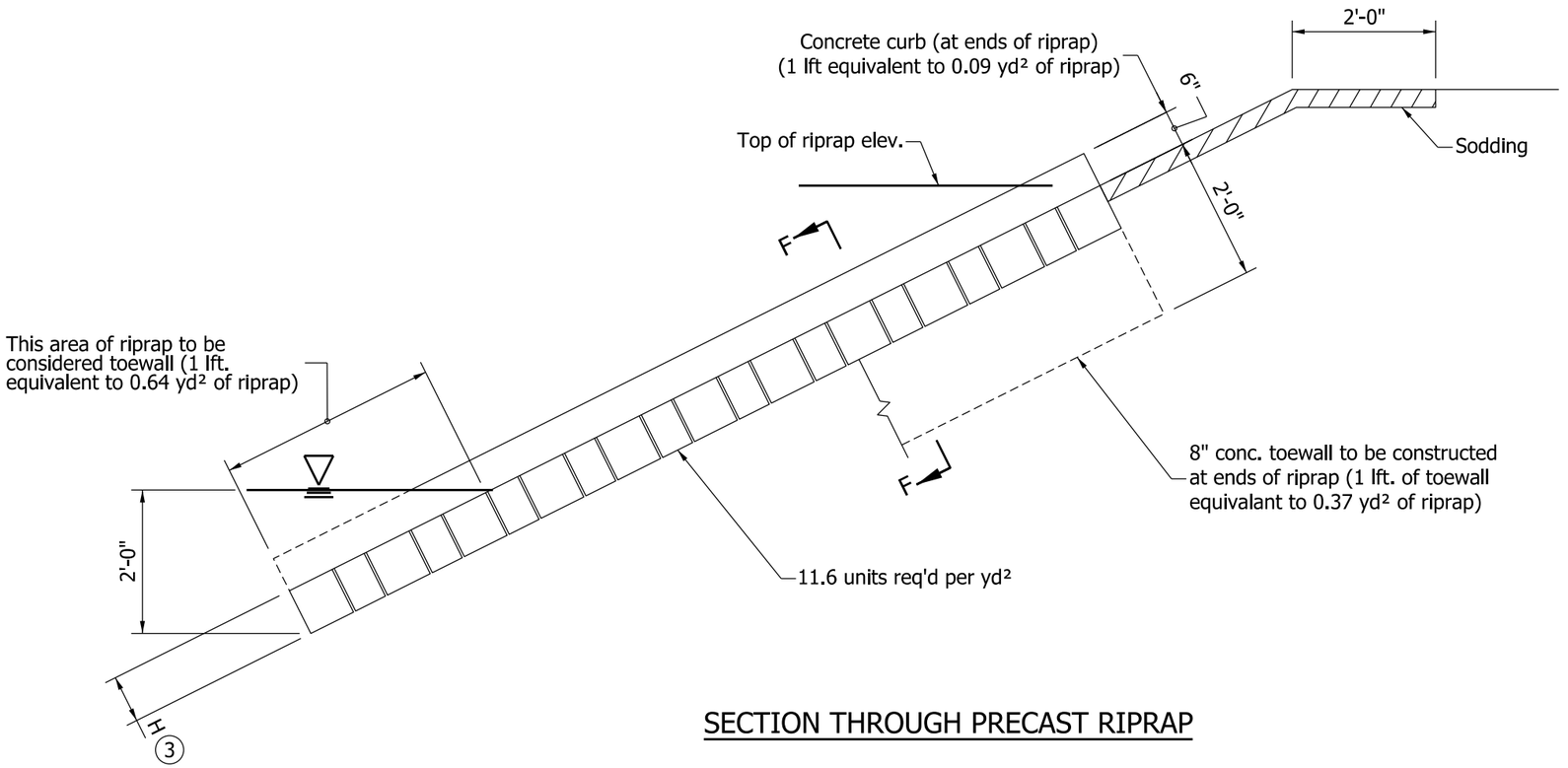
STANDARD DRAWING NO. E 616-SWRR-01

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

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

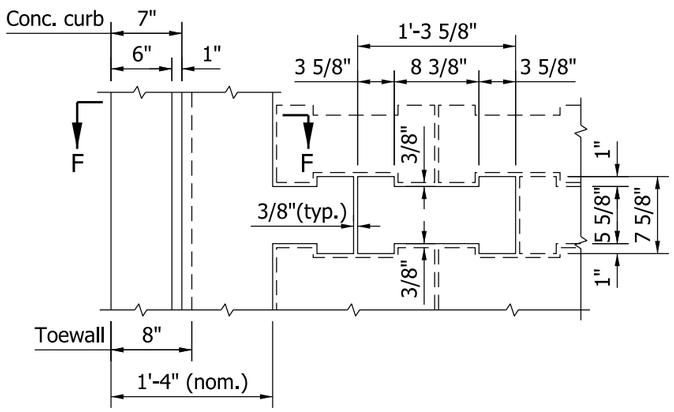


SECTION THROUGH PRECAST RIPRAP

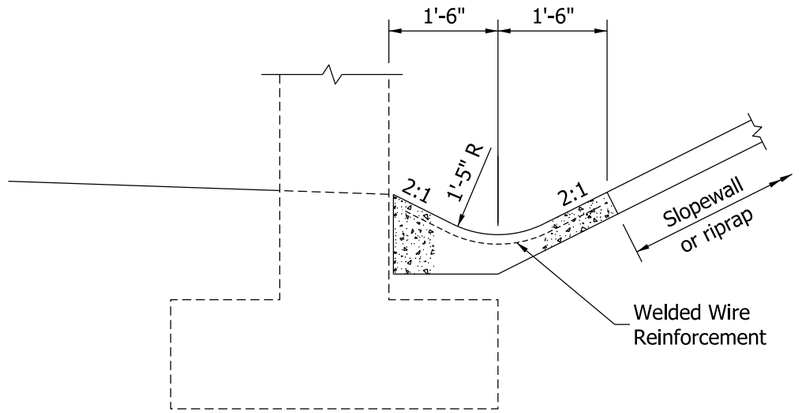
NOTES:

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.)



PLAN - PRECAST CONCRETE RIPRAP
(Type A shown)



SECTION THROUGH PAVED DITCH AT TOE OF SLOPE
(See layout on plans for location of paved ditch)

INDIANA DEPARTMENT OF TRANSPORTATION

RIPRAP SLOPEWALL DETAILS

SEPTEMBER 2011

STANDARD DRAWING NO. E 616-SWRR-02

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

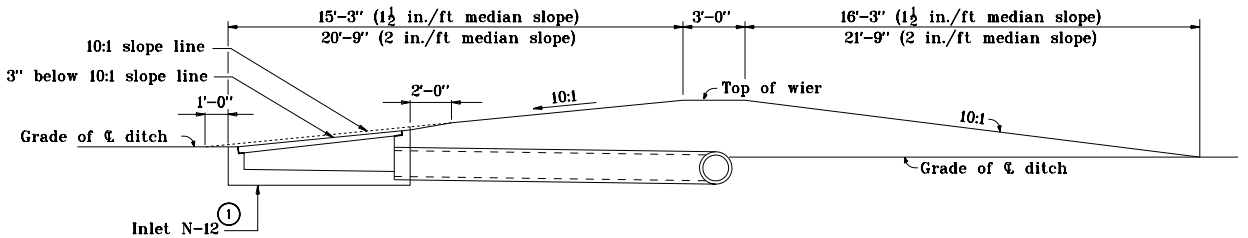
DESIGN STANDARDS ENGINEER

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

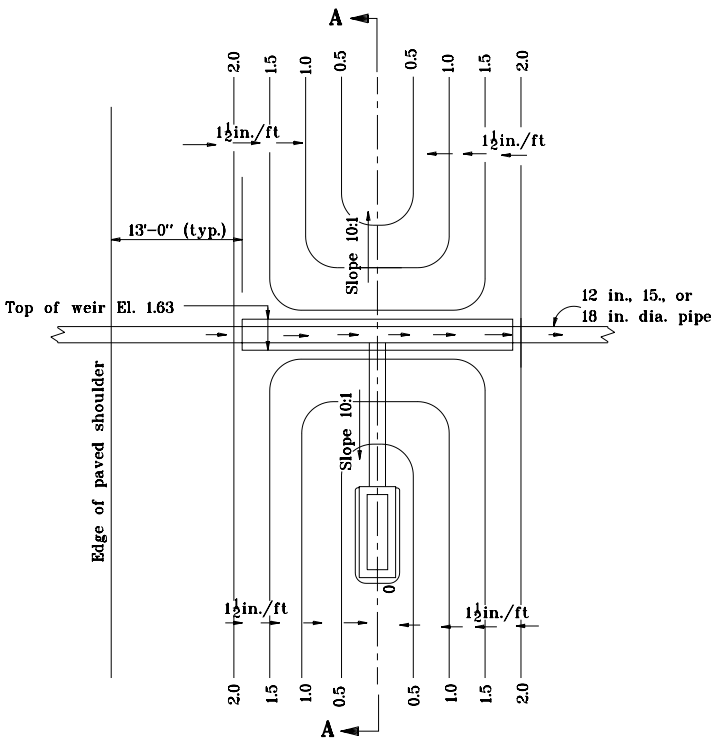
/s/ Mark A. Miller 09/01/11
CHIEF HIGHWAY ENGINEER DATE

GENERAL NOTES:

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

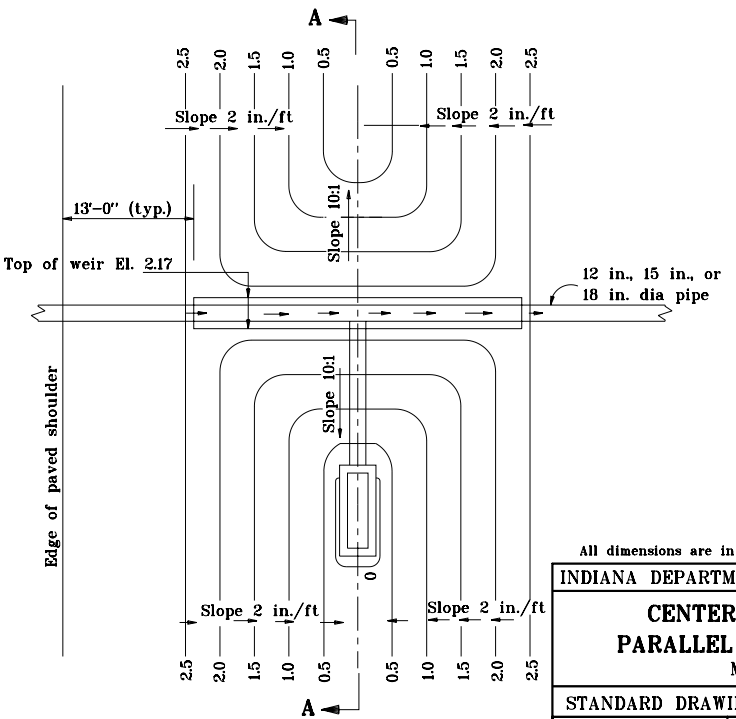


SECTION A-A



PLAN

1½ 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 PARALLEL TO ℄ ROADWAY

MAY 1998

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

Source Sheet: MS1

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

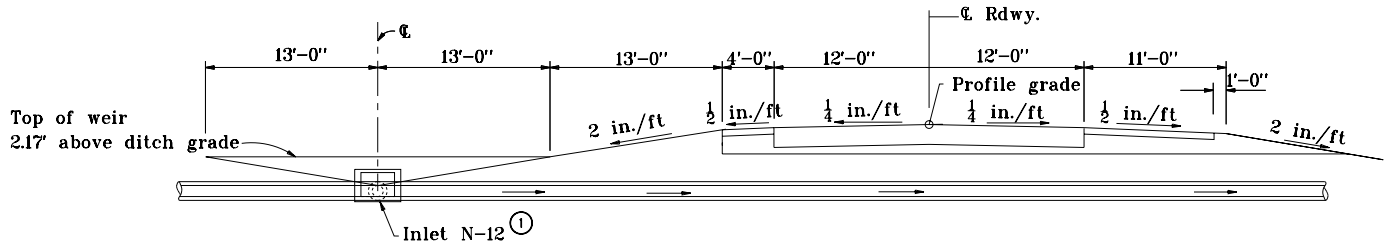
DESIGN STANDARDS ENGINEER

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

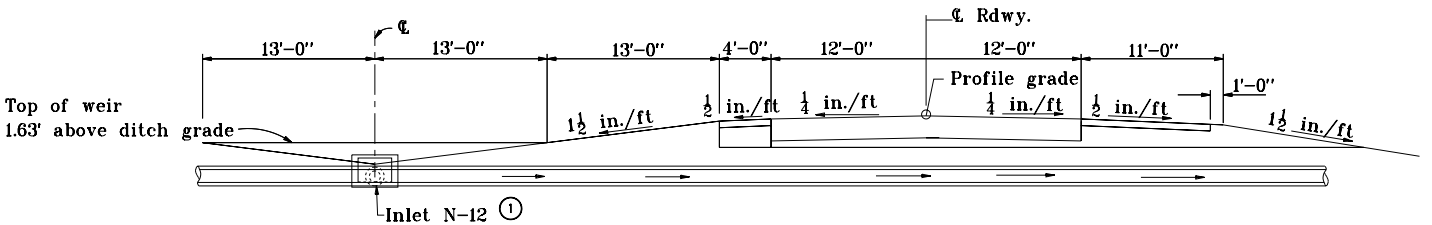
/s/ Donald W. Lucas 5-01-98
CHIEF HIGHWAY ENGINEER — DATE

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 1½ 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**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

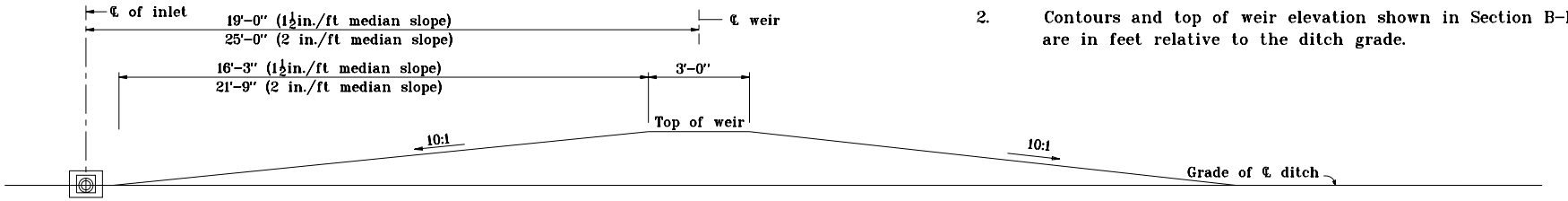
/s/ Anthony L. Uremovich 5-01-98
DESIGN STANDARDS ENGINEER DATE

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

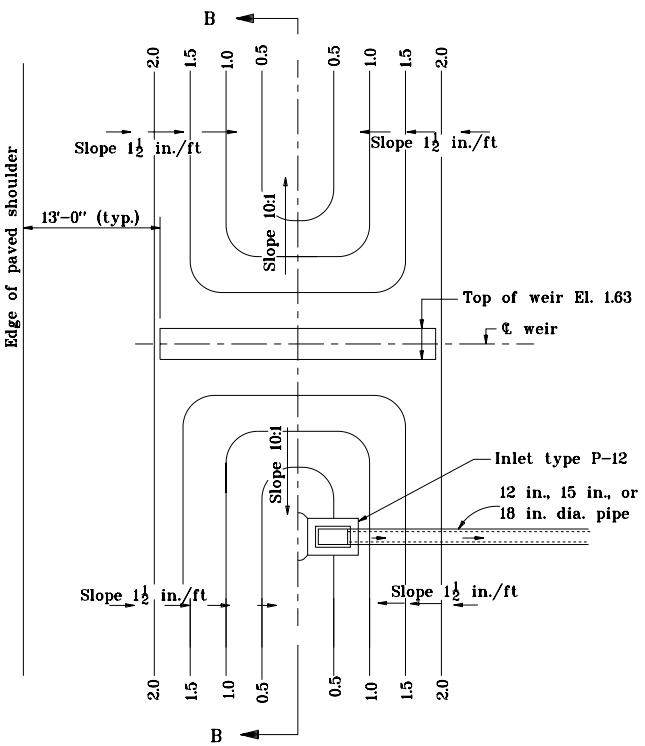
Source Sheet: MS1

GENERAL NOTES:

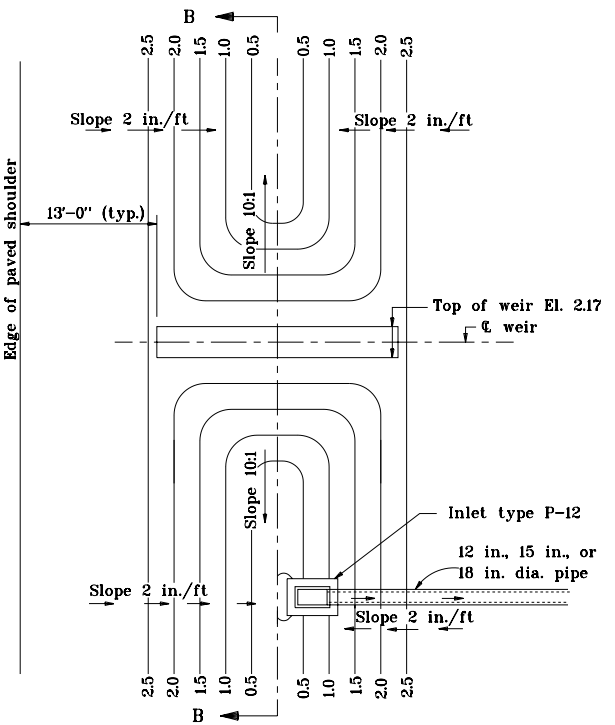
1. See Standard Drawing MS for inlet type P-12 details.
2. Contours and top of weir elevation shown in Section B-B are in feet relative to the ditch grade.



SECTION B-B



PLAN
1½ 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 ℄ ROADWAY

MAY 1998

STANDARD DRAWING NO. **E 617-CDIN-03**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

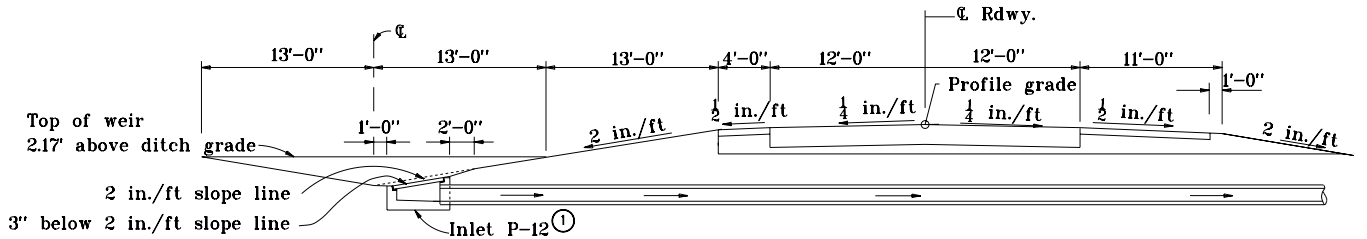
/s/ Anthony L. Uremovich 5-01-98
DESIGN STANDARDS ENGINEER — DATE

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

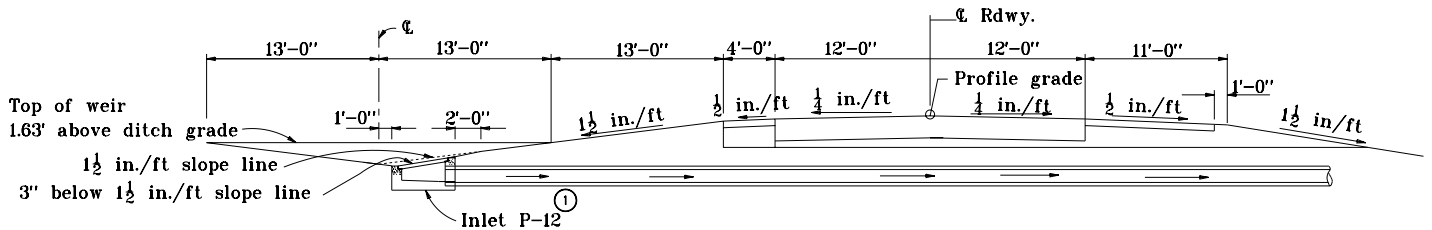
Source Sheet: MS1

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 1½ 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**

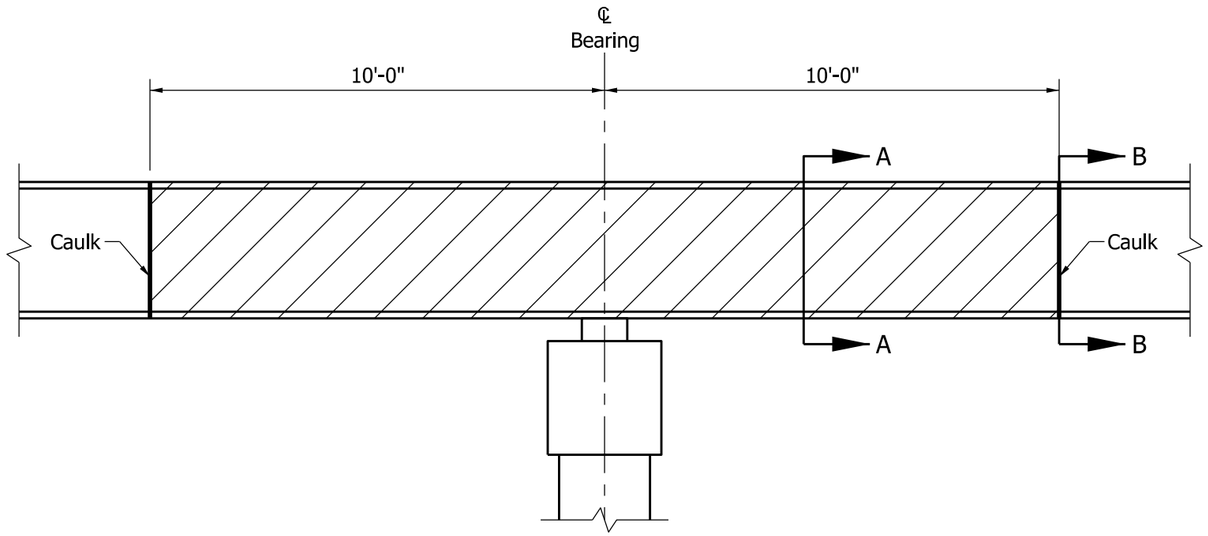
ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

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

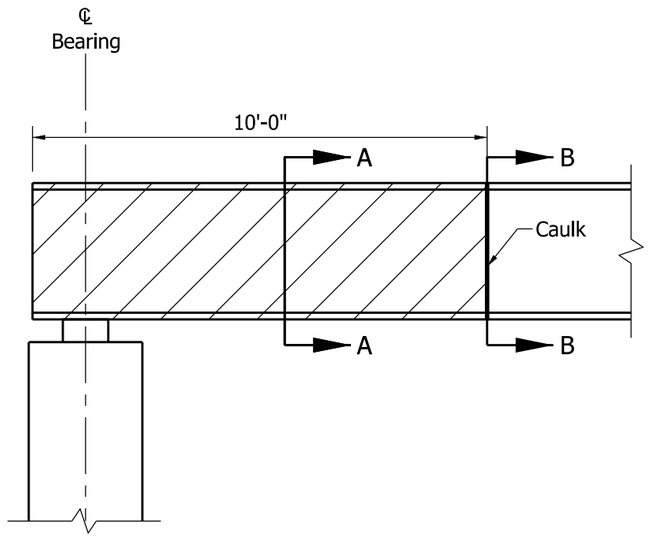
/s/ Donald W. Lucas 5-01-98
CHIEF HIGHWAY ENGINEER — DATE

Source Sheet: MS1



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)

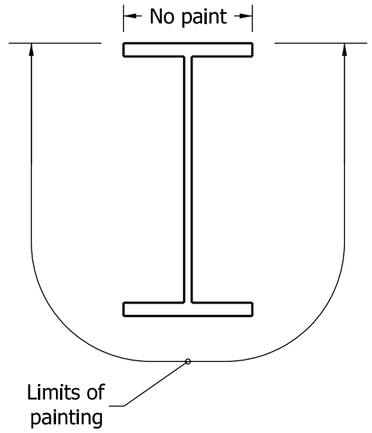
NOTE:

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

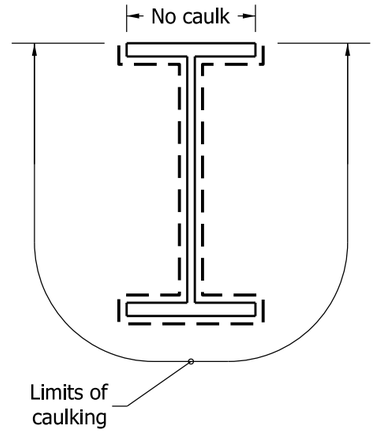
LEGEND:

= Area to be painted

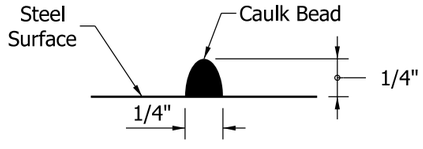
= Caulk Bead



SECTION A-A



SECTION B-B



CAULK BEAD DETAIL

INDIANA DEPARTMENT OF TRANSPORTATION

PAINTING REQUIREMENTS
FOR WEATHERING STEEL

SEPTEMBER 2011

STANDARD DRAWING NO. E 619-PRWS-01

RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

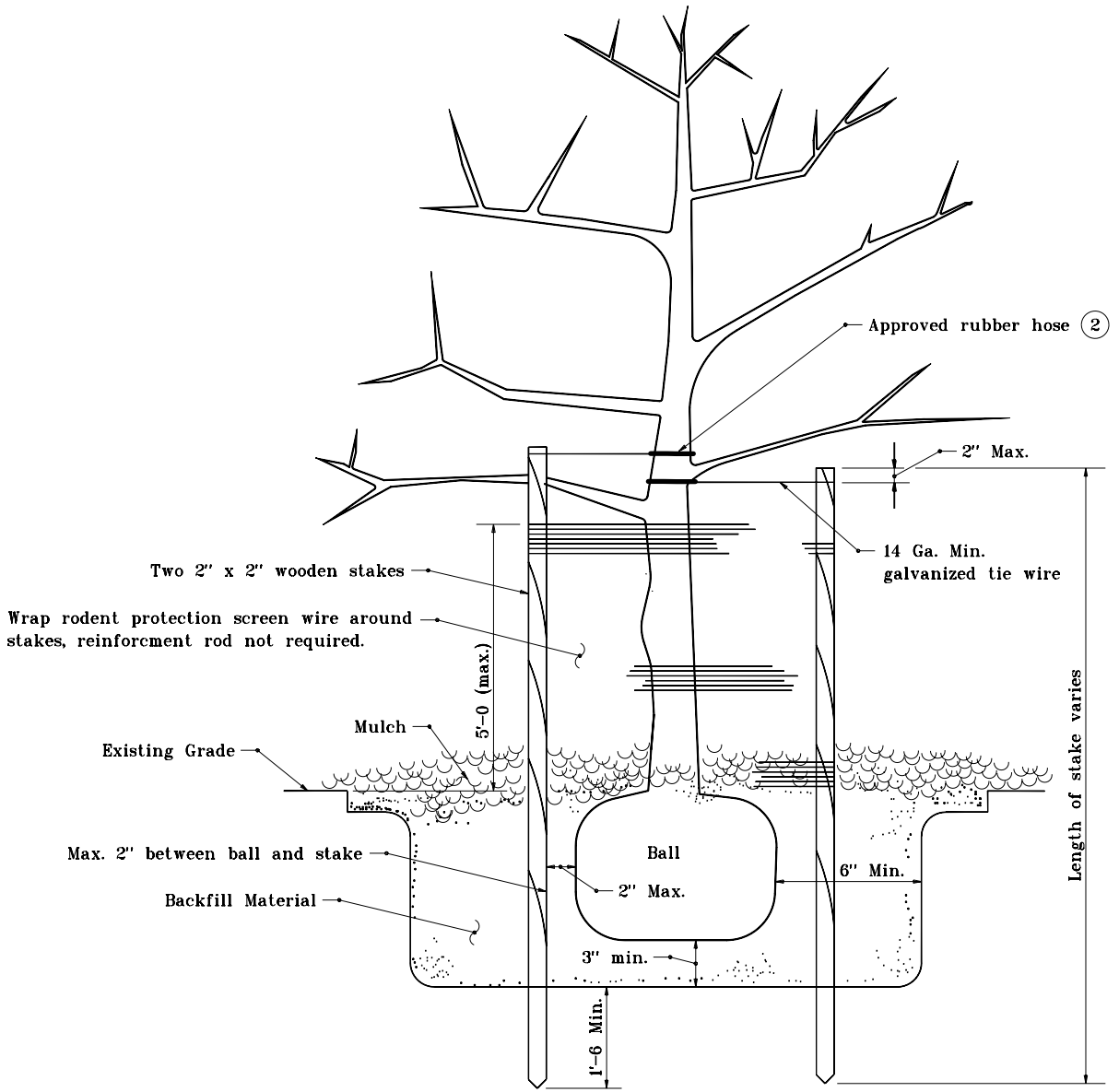
/s/ Richard L. VanCleave 09/01/11
DESIGN STANDARDS ENGINEER DATE

/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 for Rubber Hose Detail.



Detail applies to trees
less than $1\frac{1}{4}$" caliper.

INDIANA DEPARTMENT OF TRANSPORTATION

PLANTING BALLED AND BURLAPPED TREE

APRIL 1995

STANDARD DRAWING NO. **E 622-LSPL-01**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

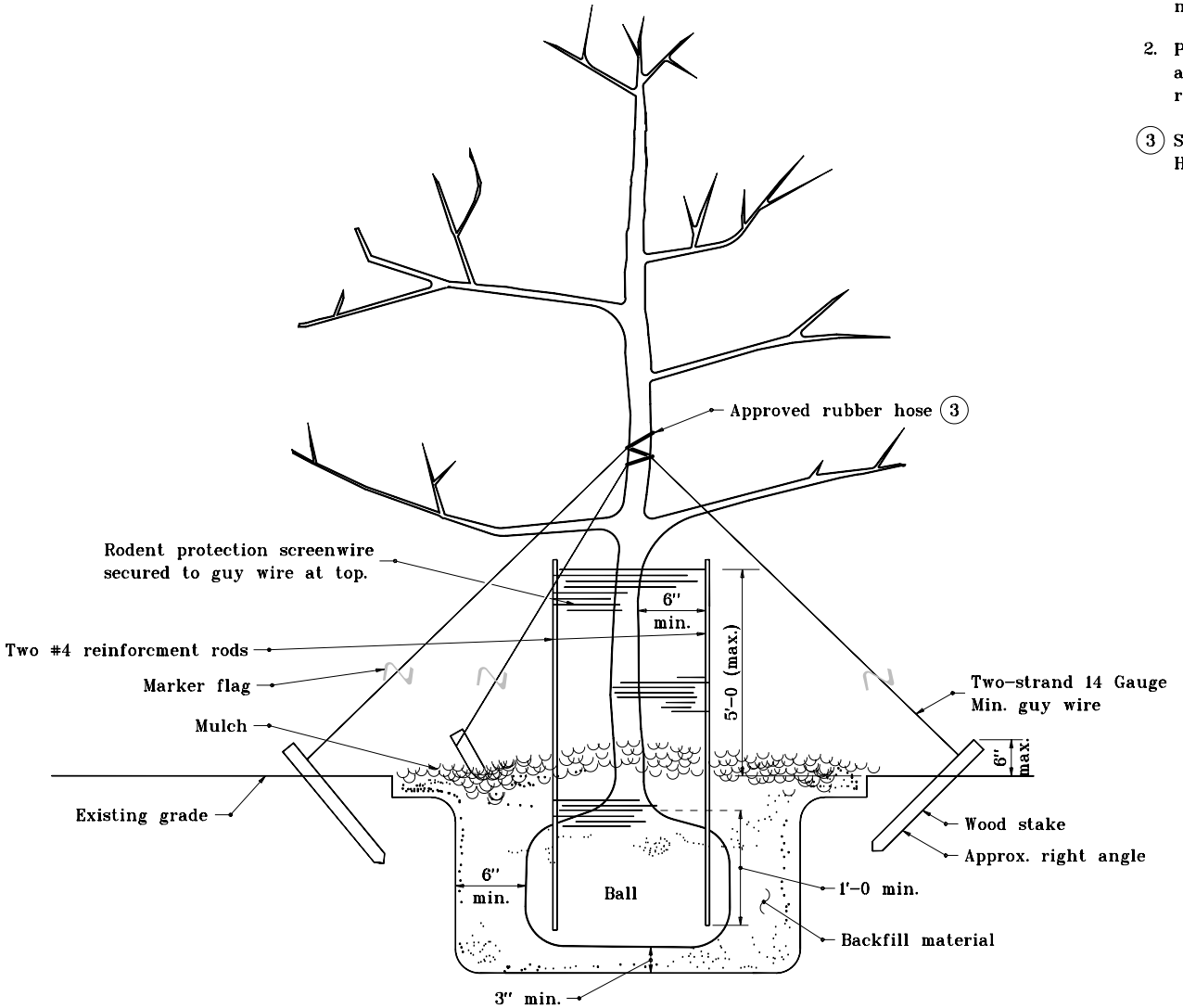
DESIGN STANDARDS ENGINEER

DETAILS PLACED IN THIS FORMAT	11-15-99
/s/ Anthony L. Uremovich DESIGN STANDARDS ENGINEER	11-15-99 DATE
/s/ Firooz Zandi CHIEF HIGHWAY ENGINEER	11-15-99 DATE
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 $1\frac{1}{4}$" caliper and greater

INDIANA DEPARTMENT OF TRANSPORTATION

PLANTING BALLED AND BURLAPPED TREE

APRIL 1995

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

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

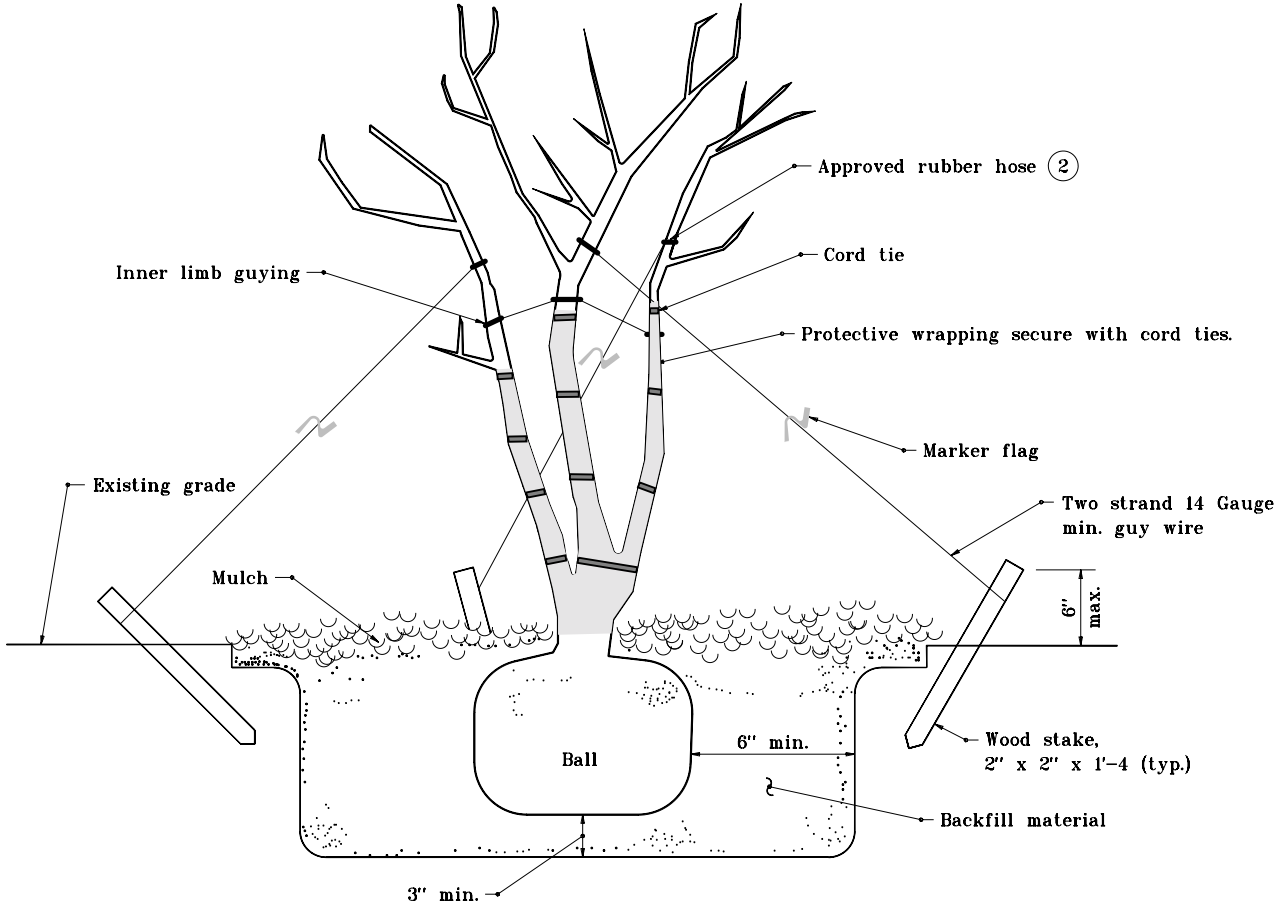
DESIGN STANDARDS ENGINEER

DETAILS PLACED IN THIS FORMAT	11-15-99
/s/ Anthony L. Uremovich DESIGN STANDARDS ENGINEER	11-15-99 DATE
/s/ Firooz Zandi CHIEF HIGHWAY ENGINEER	11-15-99 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

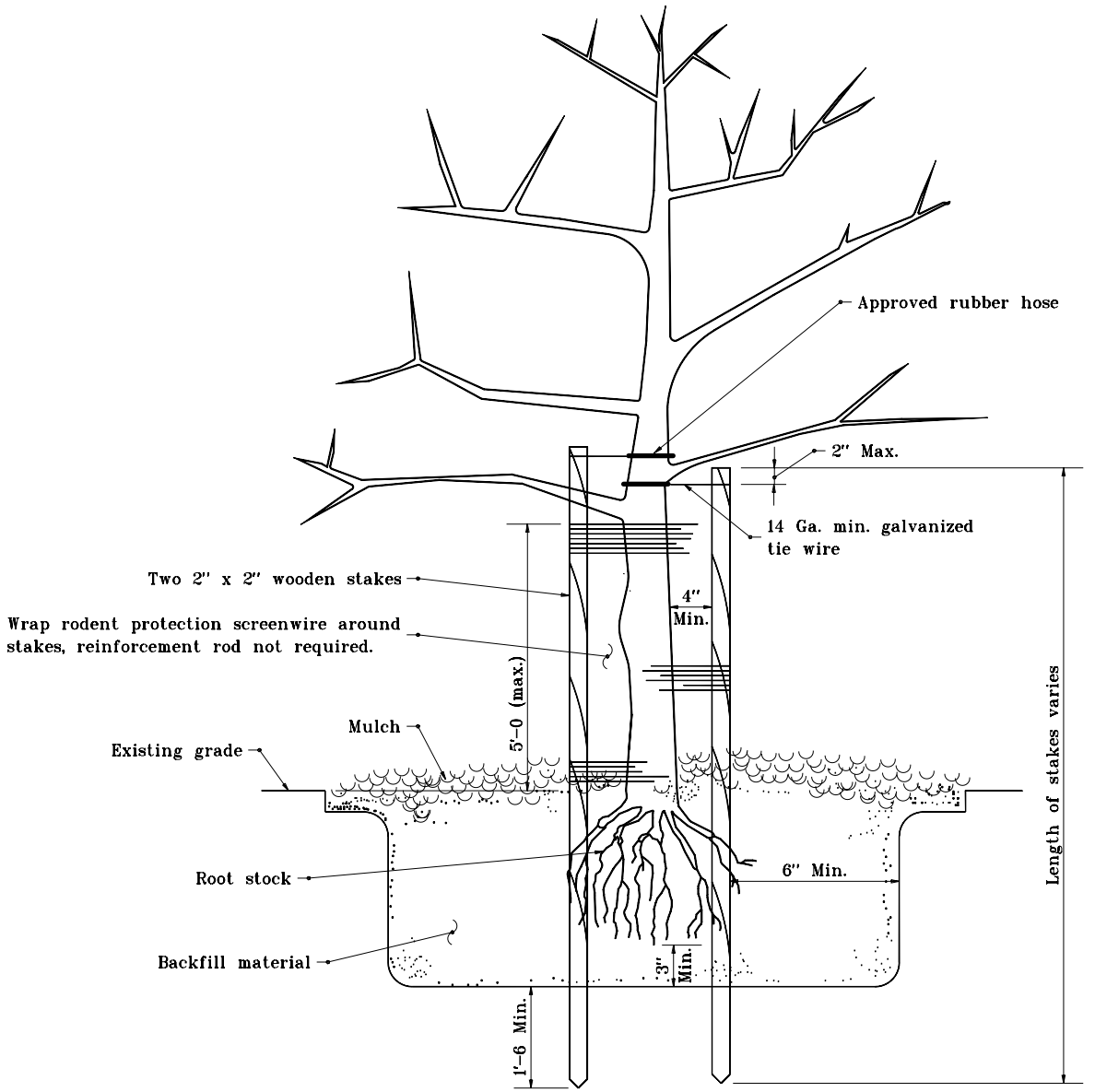
STANDARD DRAWING NO. **E 622-LSPL-03**

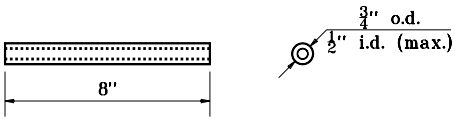
ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

/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**

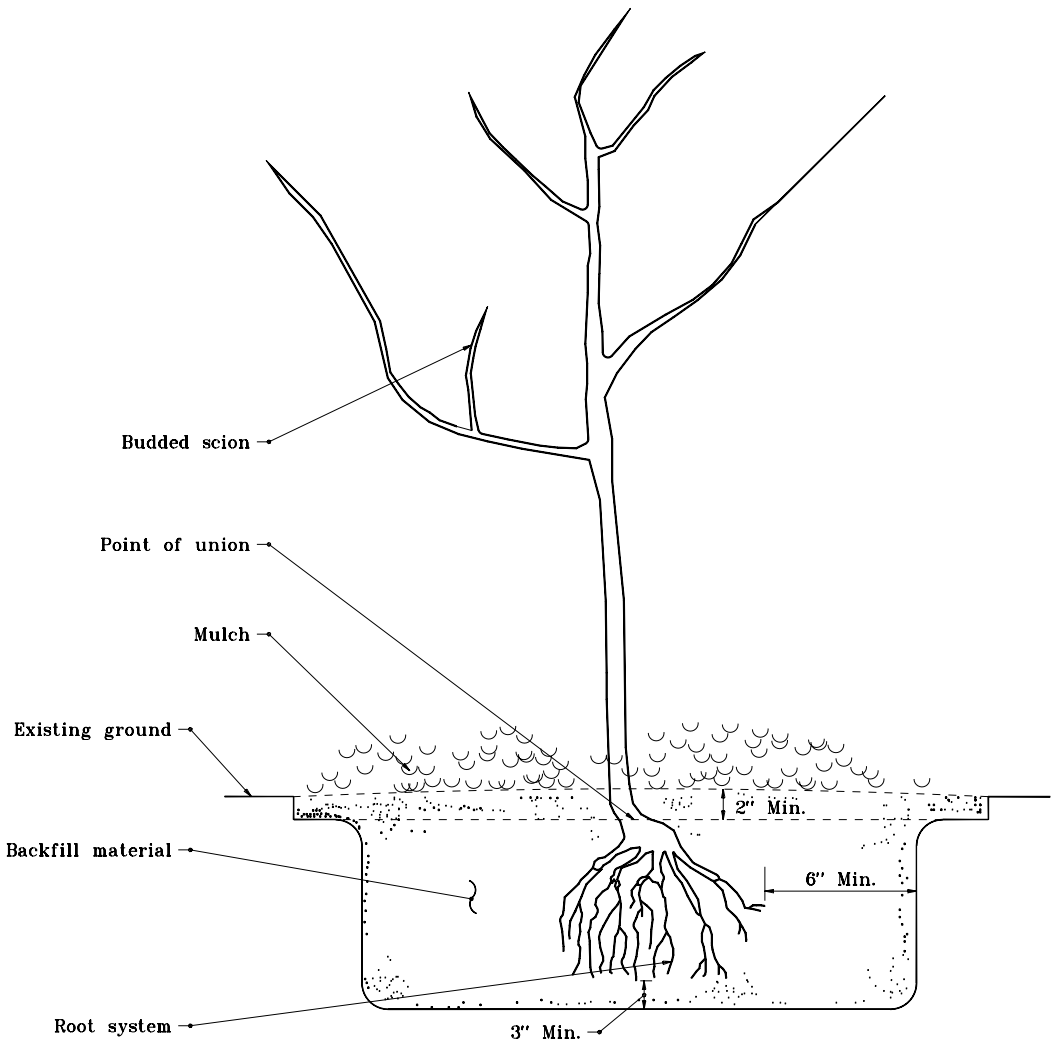
ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS 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
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**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

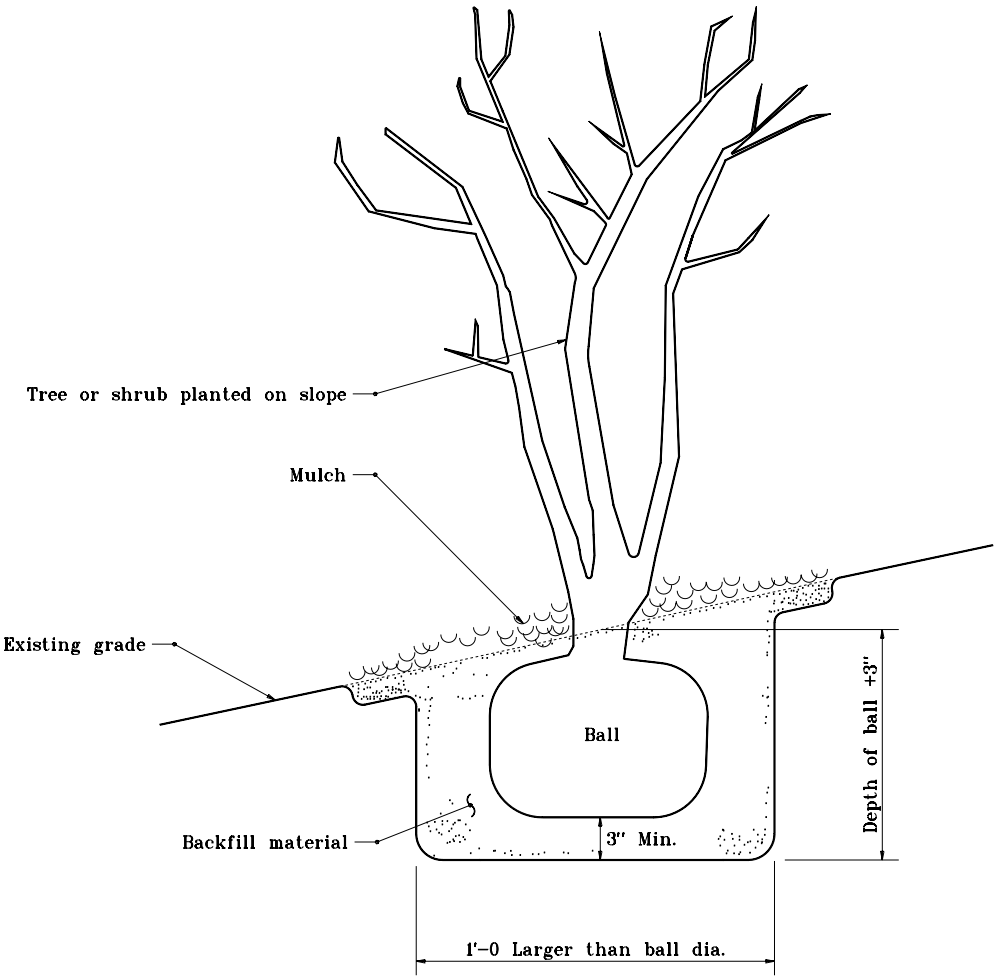
DESIGN STANDARDS ENGINEER

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

ORIGINALLY APPROVED 4-01-95



INDIANA DEPARTMENT OF TRANSPORTATION

PLANTING ON SLOPE

APRIL 1995

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

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

DETAILS PLACED IN THIS FORMAT 11-15-99

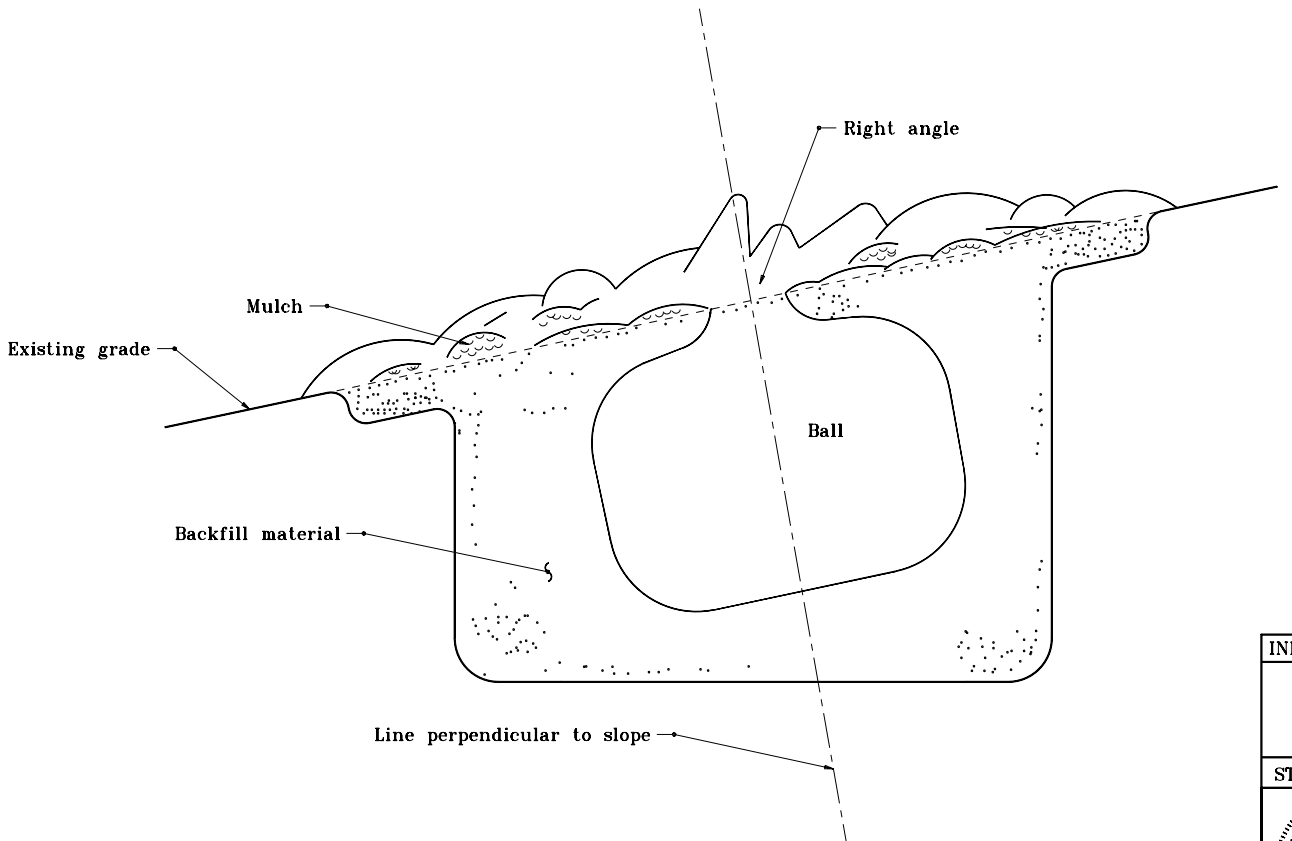
/s/ Anthony L. Uremovich 11-15-99
DESIGN STANDARDS ENGINEER DATE

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

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**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

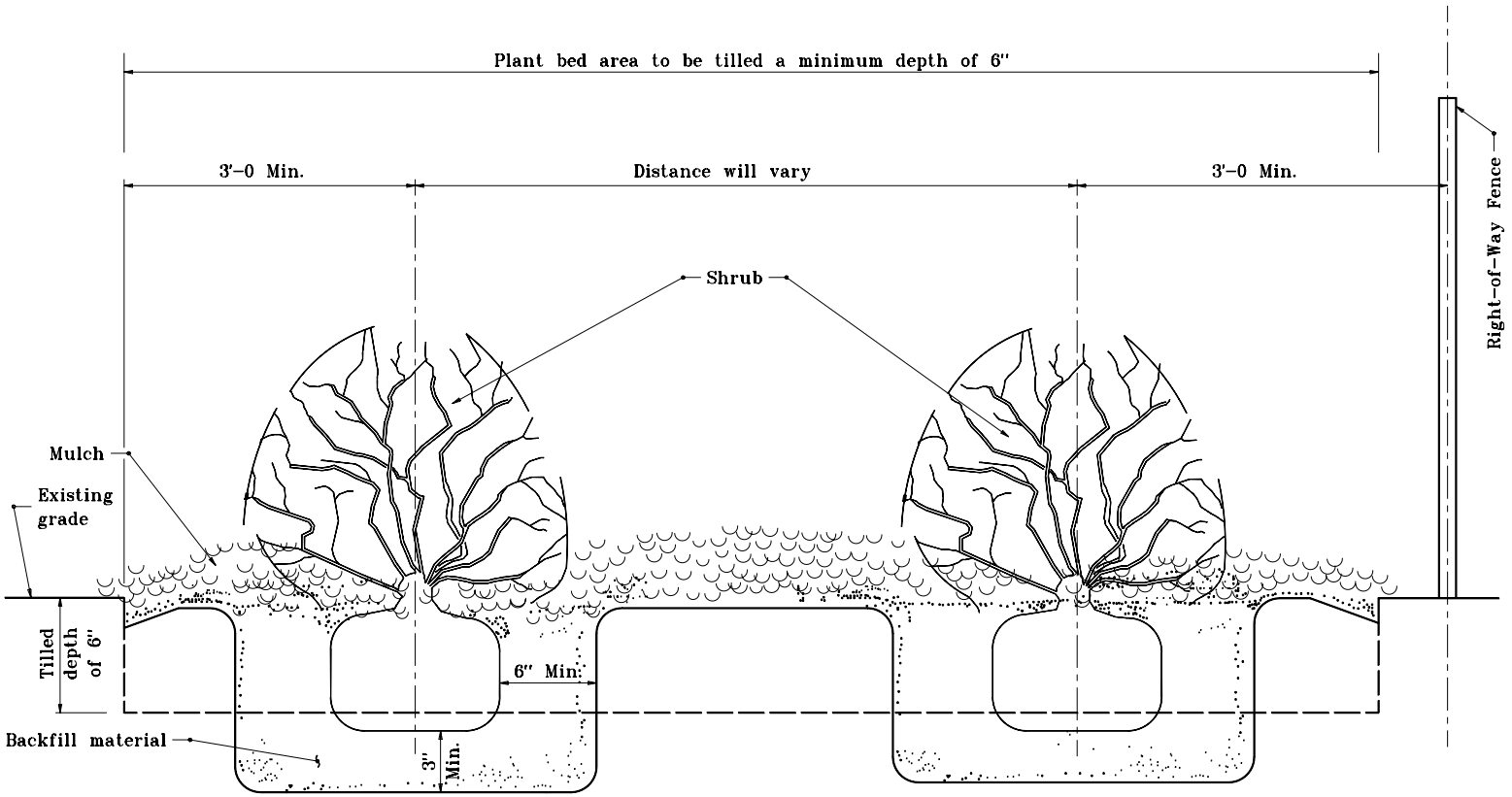
DESIGN STANDARDS ENGINEER

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

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

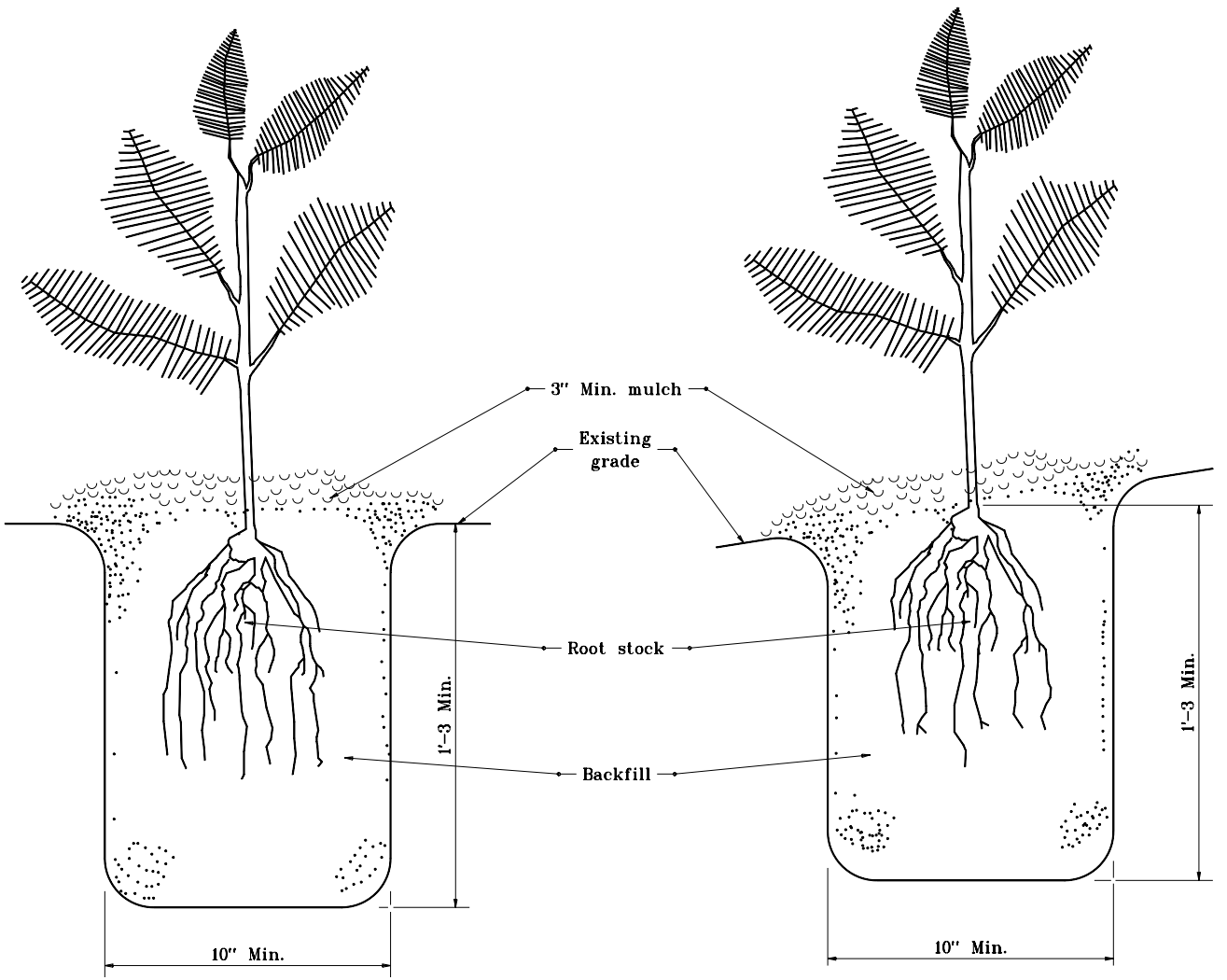
APRIL 1995

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

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

DETAILS PLACED IN THIS FORMAT	11-15-99
/s/ Anthony L. Uremovich, DESIGN STANDARDS ENGINEER	11-15-99
/s/ Firooz Zandi, CHIEF HIGHWAY ENGINEER	11-15-99
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**

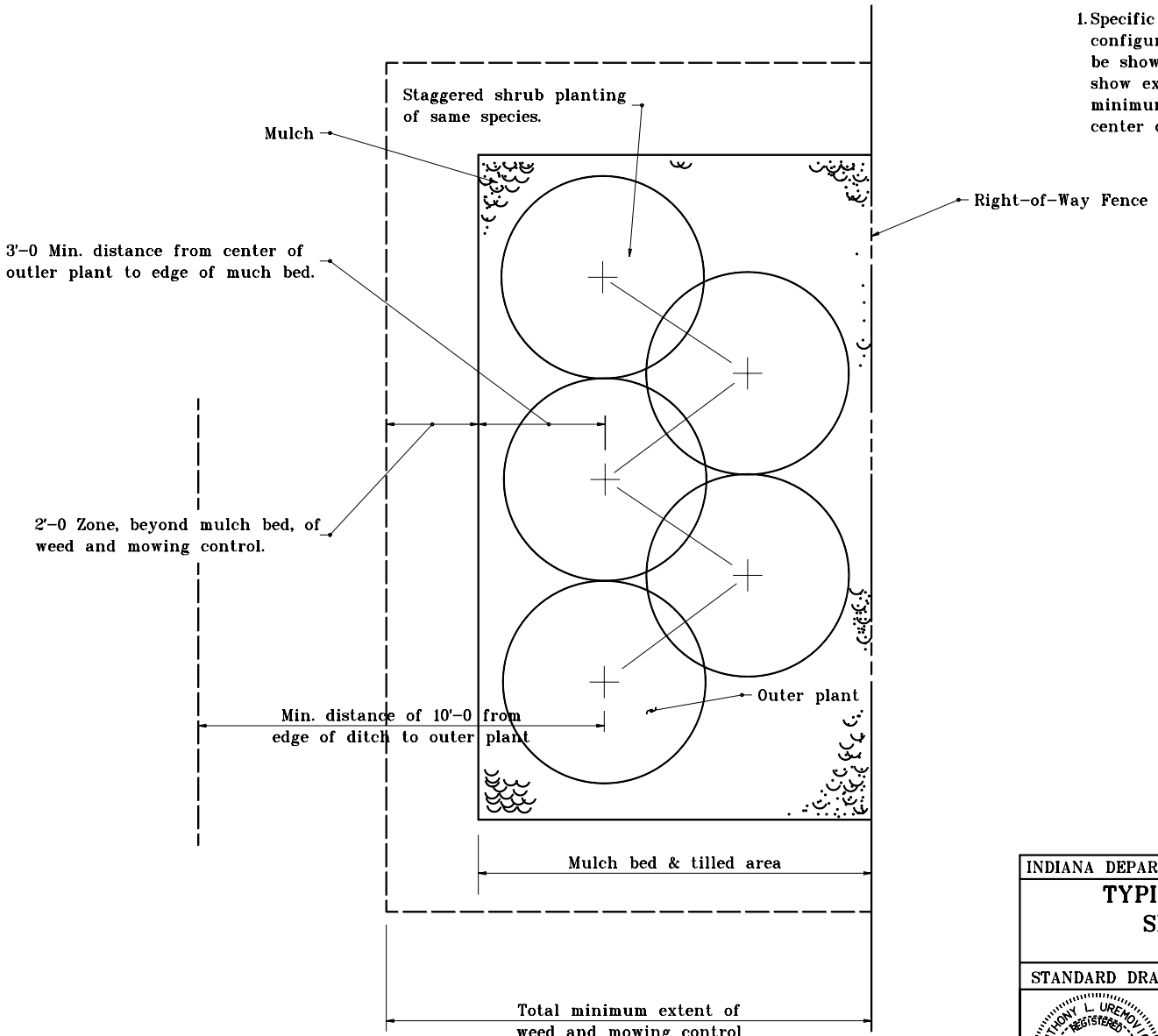
ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS 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
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**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS 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
ORGINALLY 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

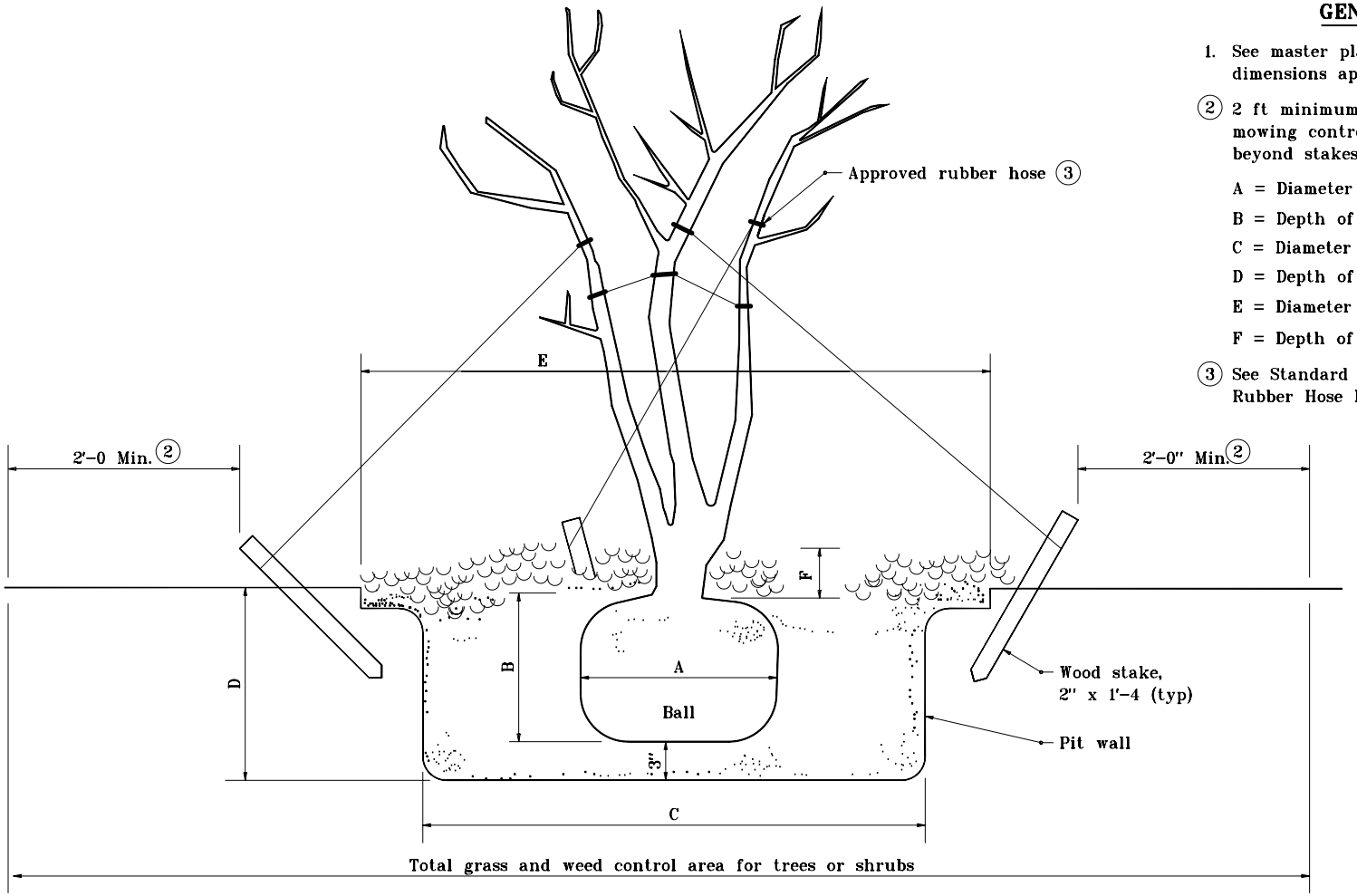
C = Diameter of pit

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**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

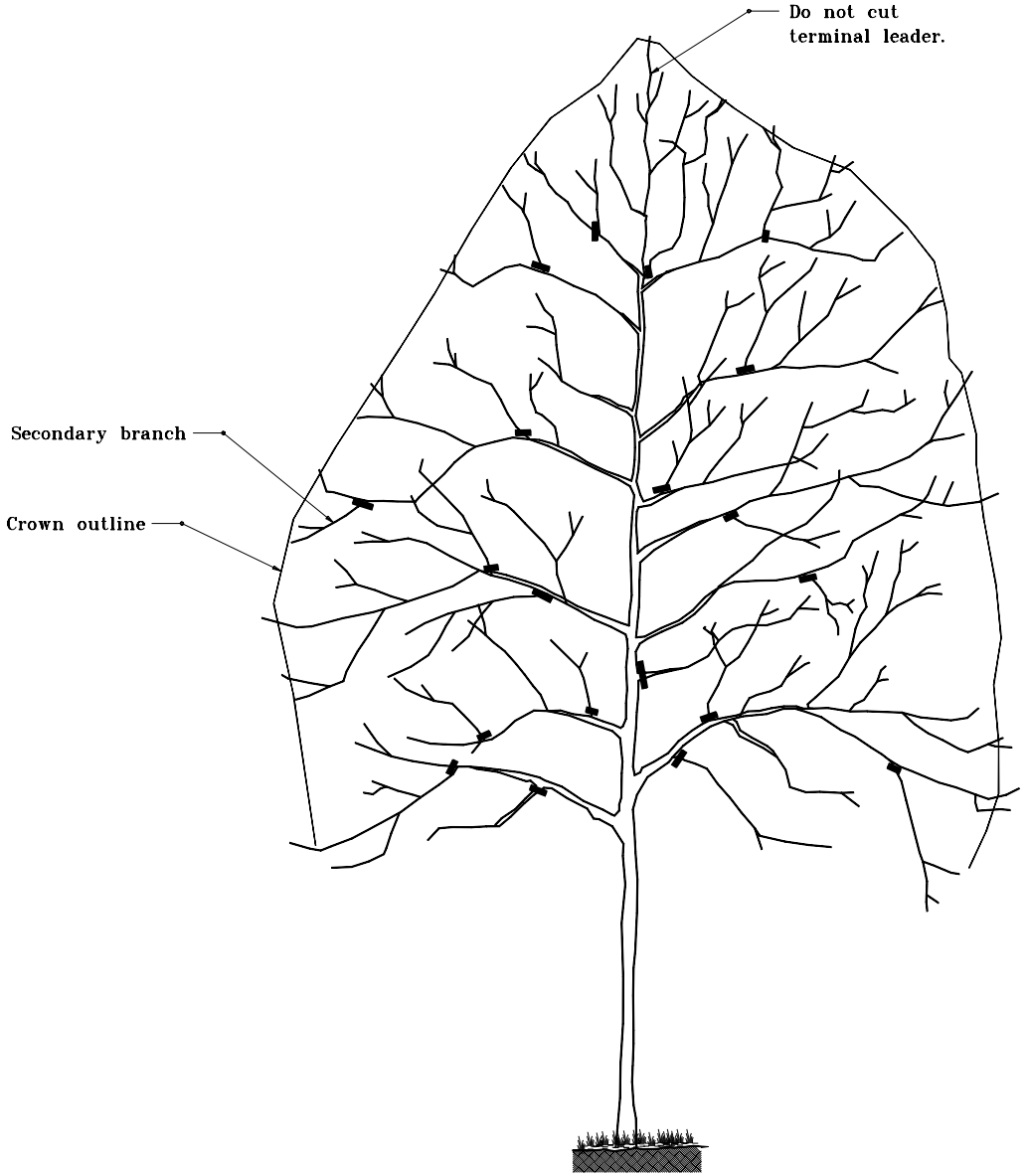
DESIGN STANDARDS ENGINEER

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

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 1/3 to a maximum of 1/2.

INDIANA DEPARTMENT OF TRANSPORTATION

TREE PRUNING
TALL SHADE TREE

APRIL 1995

STANDARD DRAWING NO. **E 622-LSPR-01**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

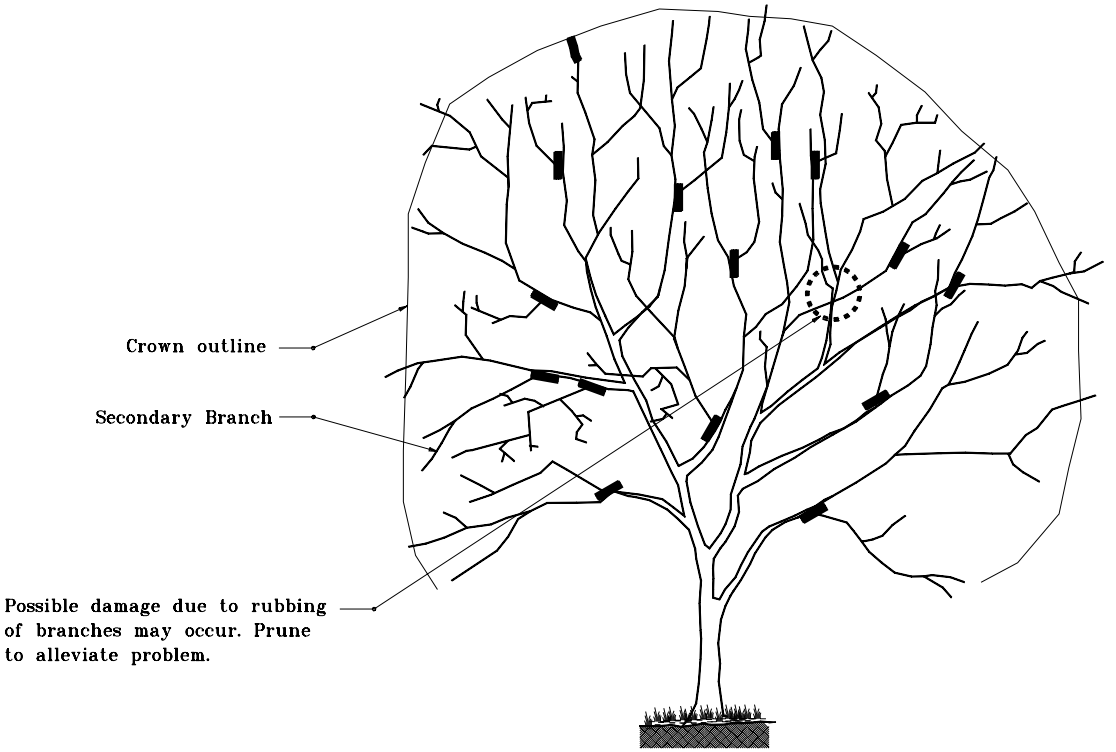
DESIGN STANDARDS ENGINEER

DETAILS PLACED IN THIS FORMAT	11-15-99
/s/ Anthony L. Uremovich DESIGN STANDARDS ENGINEER	11-15-99 DATE
/s/ Firooz Zandi CHIEF HIGHWAY ENGINEER	11-15-99 DATE
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
INTERMEDIATE TREE–ONE STEM

APRIL 1995

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

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

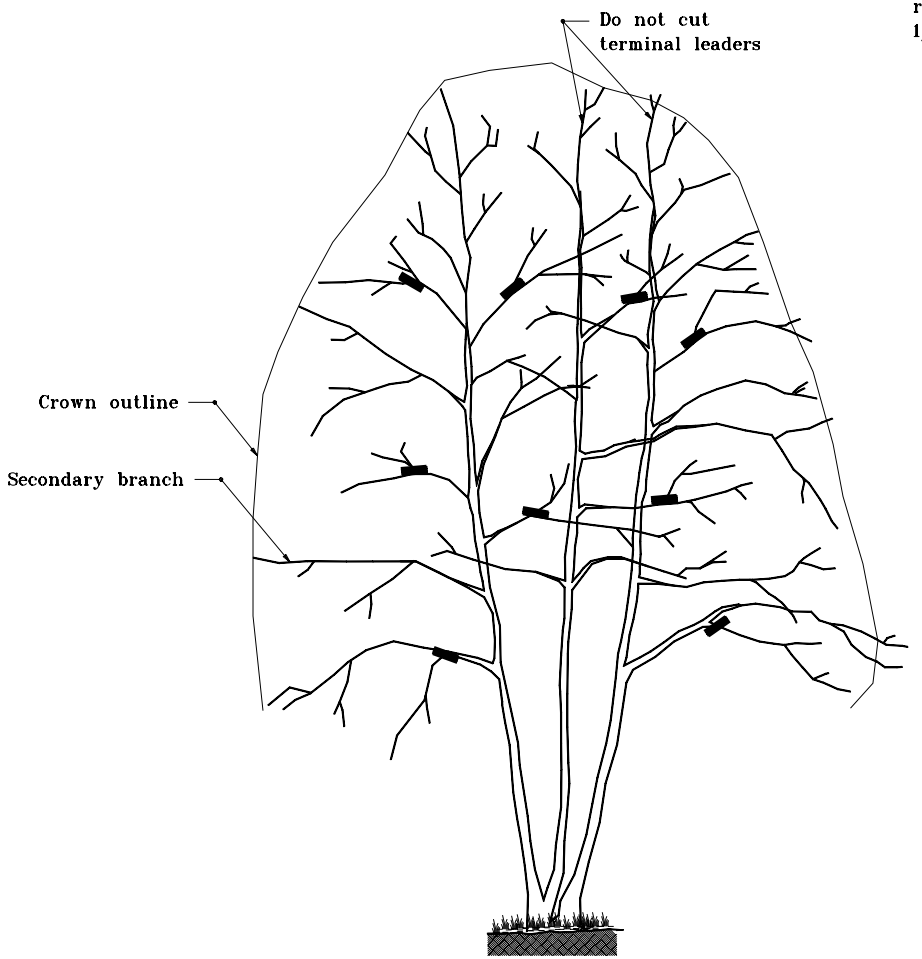
DESIGN STANDARDS ENGINEER

DETAILS PLACED IN THIS FORMAT	11-15-99
/s/ Anthony L. Uremovich DESIGN STANDARDS ENGINEER	11-15-99 DATE
/s/ Firooz Zandi CHIEF HIGHWAY ENGINEER	11-15-99 DATE
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

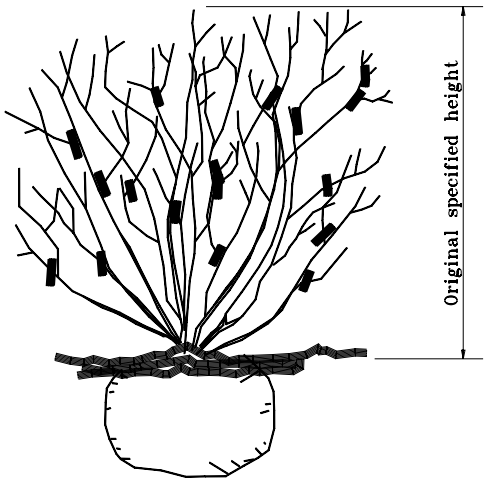
APRIL 1995

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

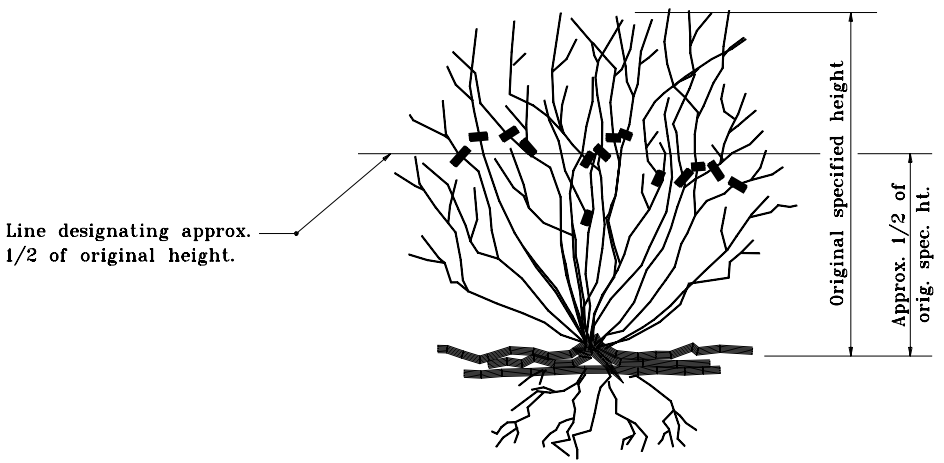
ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

DETAILS PLACED IN THIS FORMAT	11-15-99
/s/ Anthony L. Uremovich DESIGN STANDARDS ENGINEER	11-15-99 DATE
/s/ Firooz Zandi CHIEF HIGHWAY ENGINEER	11-15-99 DATE
ORIGINALLY APPROVED	4-01-95



BALLED & BURLAPPED SHRUB



BARE ROOT SHRUB

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.

INDIANA DEPARTMENT OF TRANSPORTATION

SHRUB PRUNING

APRIL 1995

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

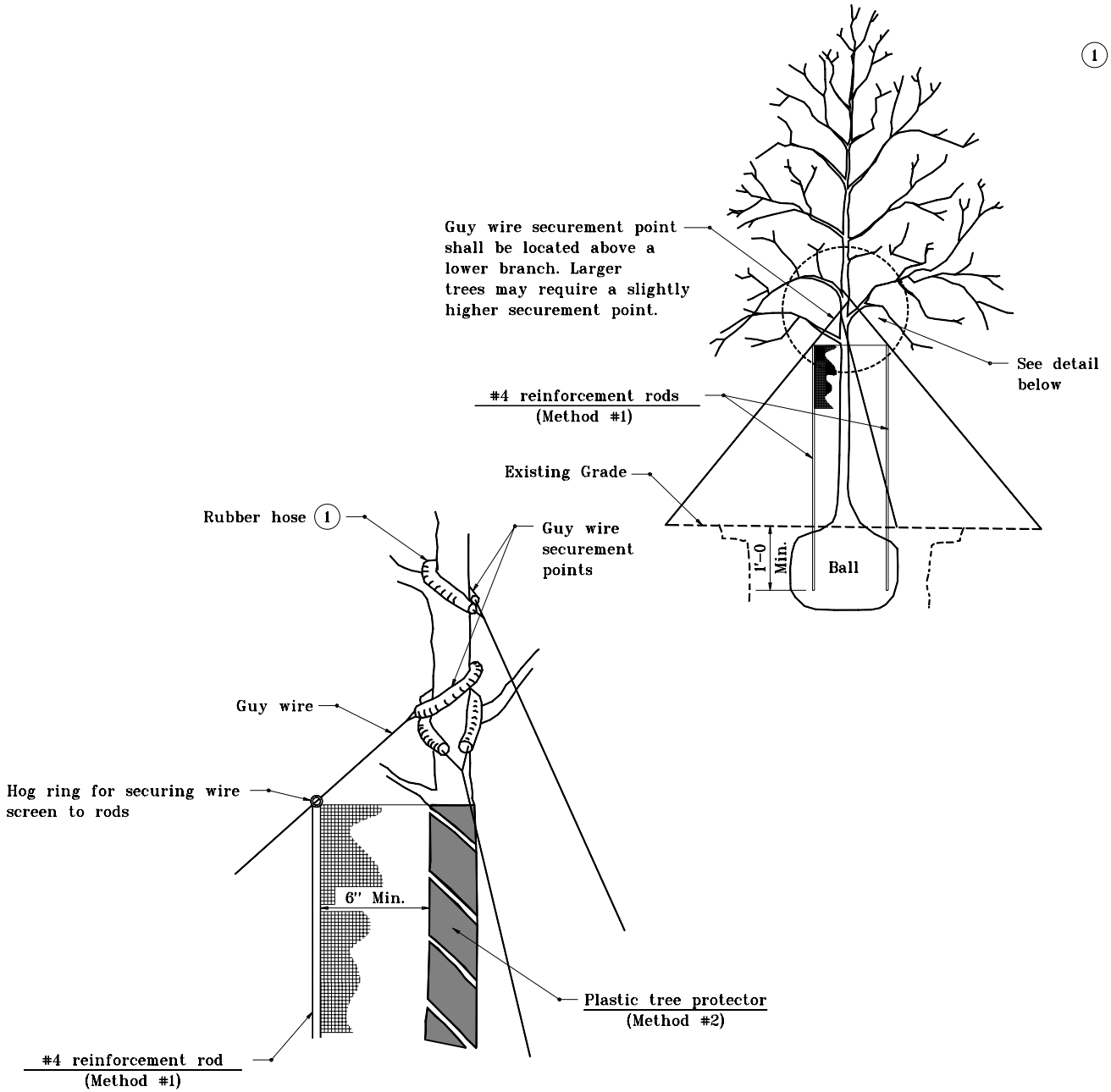
ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

DETAILS PLACED IN THIS FORMAT	11-15-99
/s/ Anthony L. Uremovich DESIGN STANDARDS ENGINEER	11-15-99 DATE
/s/ Firooz Zandi CHIEF HIGHWAY ENGINEER	11-15-99 DATE
ORIGINALLY APPROVED	4-01-95

GENERAL NOTES

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



DETAIL APPLIES TO TREES 1¼" CALIPER AND GREATER

INDIANA DEPARTMENT OF TRANSPORTATION

TREE PROTECTION

APRIL 1995

STANDARD DRAWING NO. **E 622-LSPR-05**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

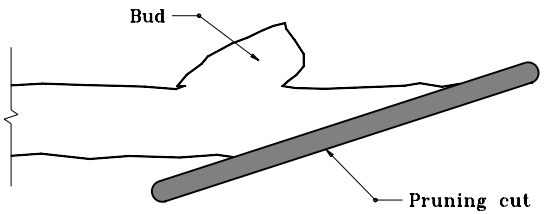
DETAILS PLACED IN THIS FORMAT	11-15-99
/s/ Anthony L. Uremovich, DESIGN STANDARDS ENGINEER	11-15-99
/s/ Firooz Zandi, CHIEF HIGHWAY ENGINEER	11-15-99
ORIGINALLY APPROVED	4-01-95

GENERAL NOTES

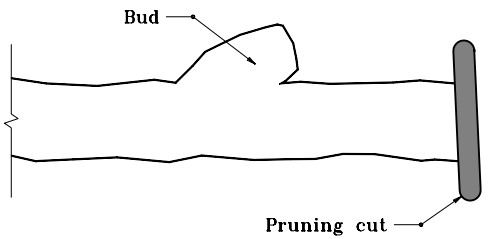
(1) Cut at bud starts opposite the base of bud and slants up toward top of bud.

(2) Cut at secondary branch shall be parallel to remaining branch.

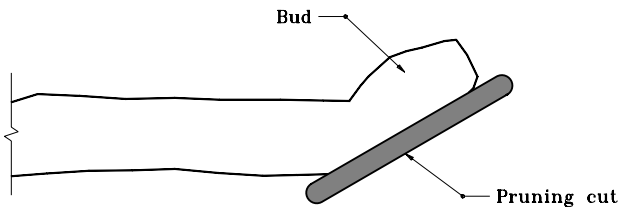
Improper Cut
Pruning cut too slanting (too much heartwood is exposed). Die-back will occur.



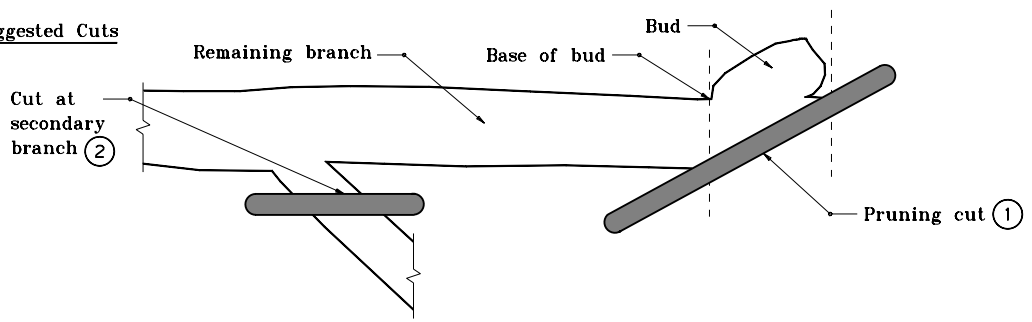
Improper Cut
Pruning cut too far beyond bud. Die-back will occur.



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



Suggested Cuts



INDIANA DEPARTMENT OF TRANSPORTATION

PRUNING PROCEDURE TREES AND SHRUBS

APRIL 1995

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

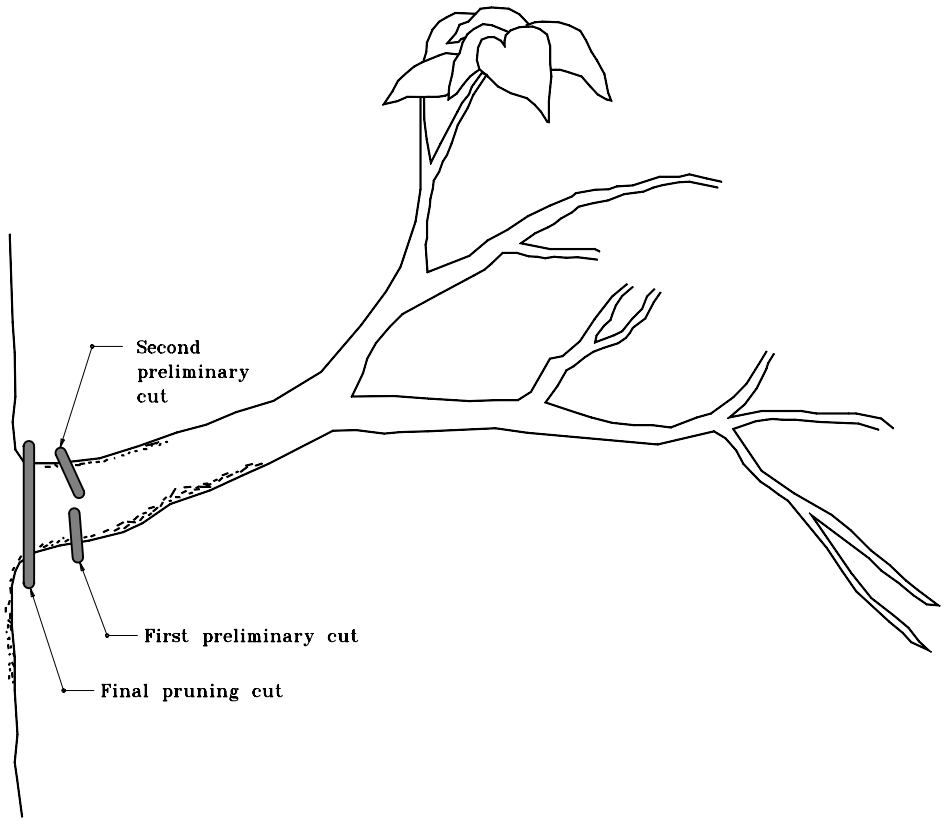
ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

DETAILS PLACED IN THIS FORMAT	11-15-99
/s/ Anthony L. Uremovich, DESIGN STANDARDS ENGINEER	11-15-99
/s/ Firooz Zandi, CHIEF HIGHWAY ENGINEER	11-15-99
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

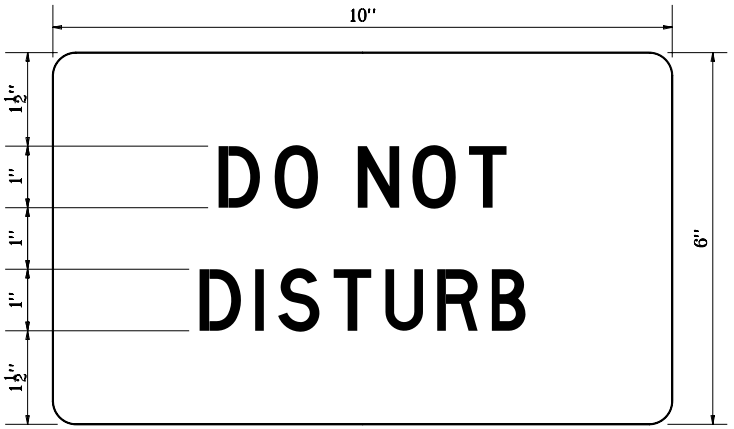
APRIL 1995

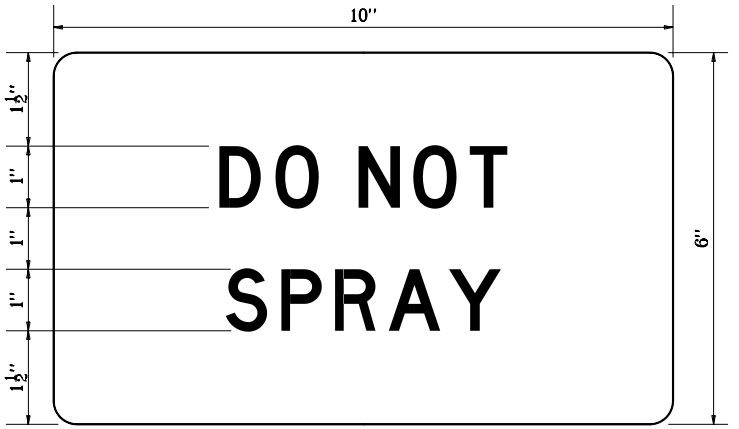
STANDARD DRAWING NO. **E 622-LSPR-07**

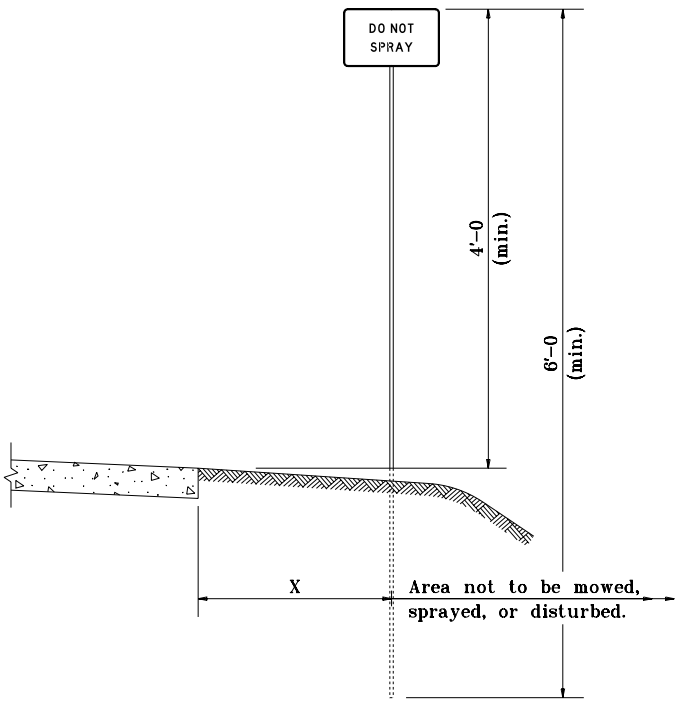
ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

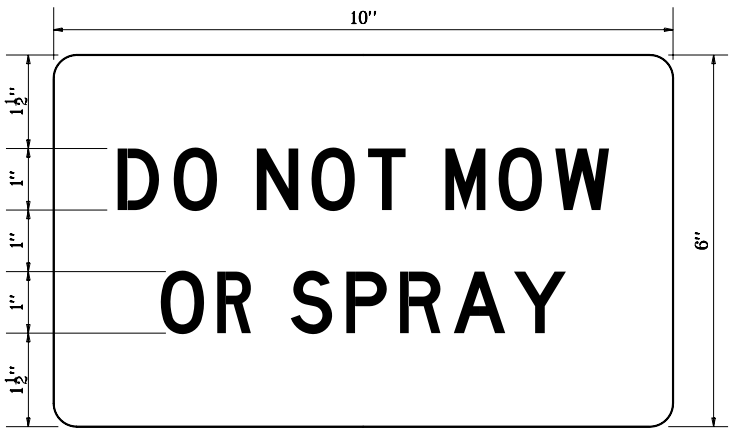
DESIGN STANDARDS ENGINEER

DETAILS PLACED IN THIS FORMAT	11-15-99
/s/ Anthony L. Uremovich DESIGN STANDARDS ENGINEER	11-15-99 DATE
/s/ Firooz Zandi CHIEF HIGHWAY ENGINEER	11-15-99 DATE
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**

ANTHONY L. UREMOVICH REGISTERED No. 18095 STATE OF INDIANA PROFESSIONAL ENGINEER

DESIGN STANDARDS ENGINEER

DETAILS PLACED IN THIS FORMAT	11-15-99
/s/ Anthony L. Uremovich DESIGN STANDARDS ENGINEER	11-15-99 DATE
/s/ Firooz Zandi CHIEF HIGHWAY ENGINEER	11-15-99 DATE
ORIGINALLY APPROVED	6-03-96