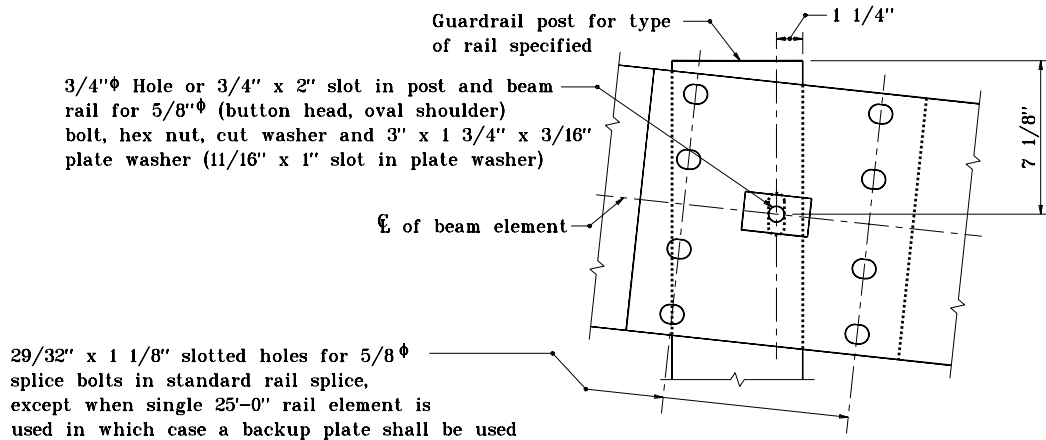


SPLICE PLATE ASSEMBLY DETAIL

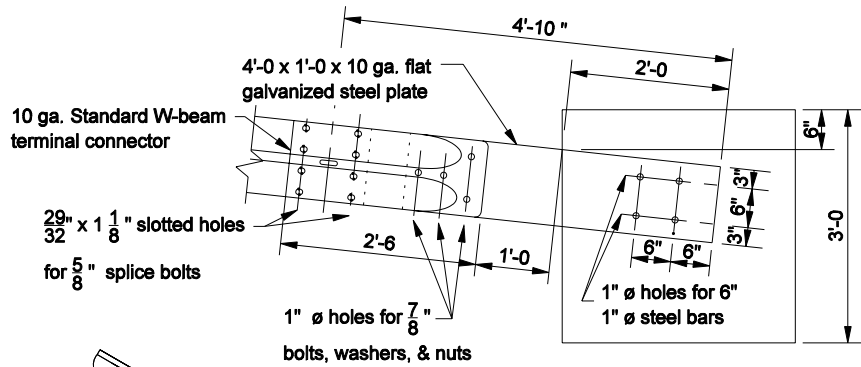
GENERAL NOTES

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.

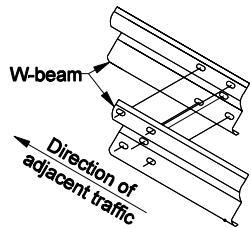


POST NO. 2 CONNECTION DETAIL

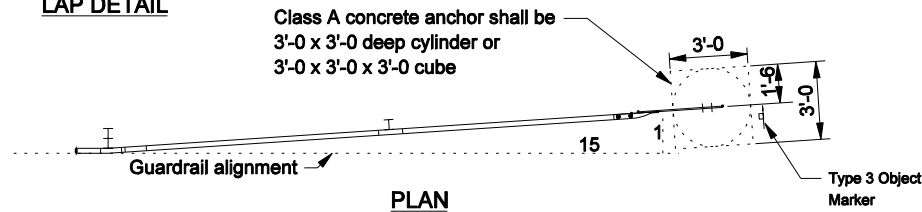
INDIANA DEPARTMENT OF TRANSPORTATION	
GUARDRAIL END TREATMENT TYPE I	
APRIL 1995	
STANDARD DRAWING NO. E 601-GRET-04	
DETAILS PLACED IN THIS FORMAT 11-15-99	
	/s/ Anthony L. Uremovich 11-15-99 DESIGN STANDARDS ENGINEER DATE
	/s/ Firooz Zandi 11-15-99 CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER	ORIGINALLY APPROVED 4-03-95



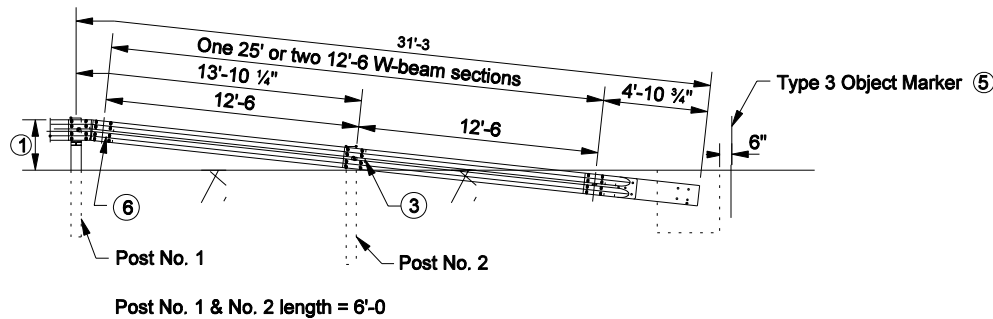
CONCRETE ANCHOR DETAIL



LAP DETAIL



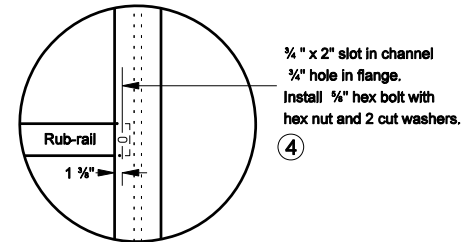
PLAN



ELEVATION

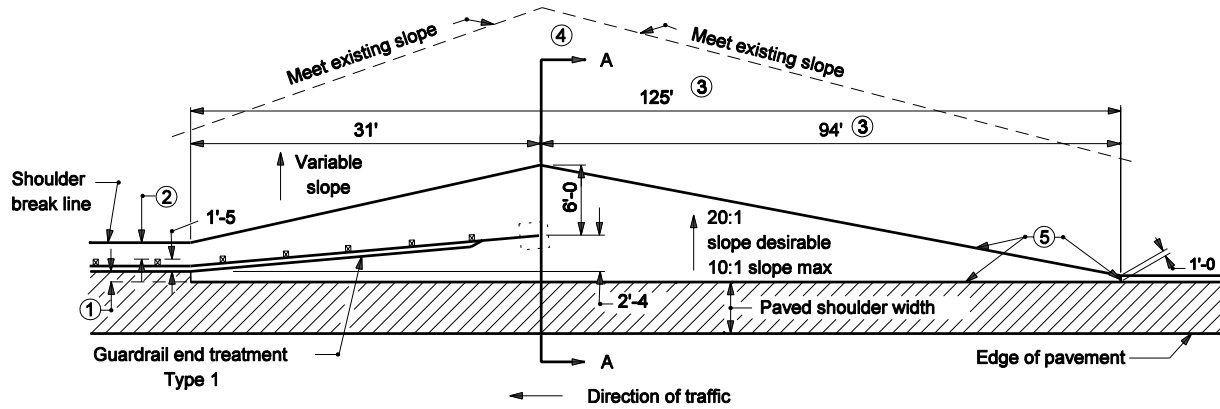
GENERAL NOTES

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



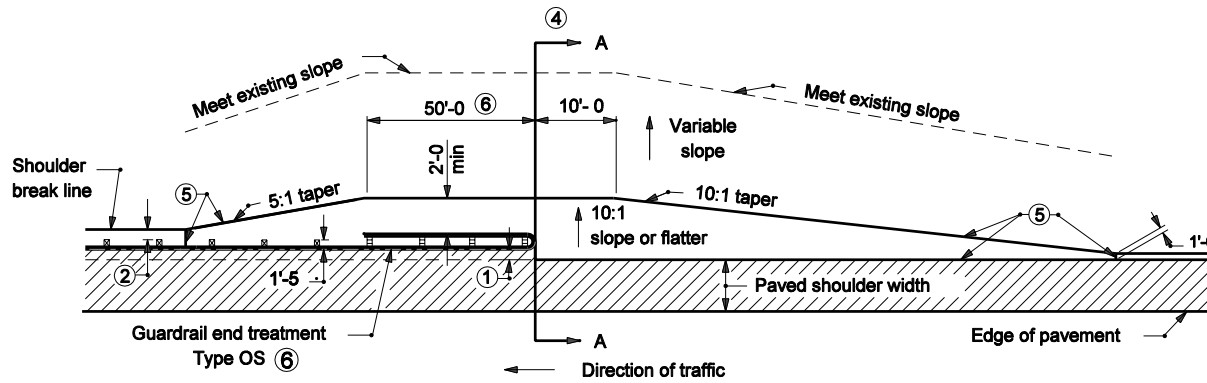
RUB-RAIL RELOCATION DETAIL

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



PLAN VIEW

GRADING DETAIL FOR GUARDRAIL END TREATMENT TYPE I



PLAN VIEW

GRADING DETAIL FOR GUARDRAIL END TREATMENT TYPE OS

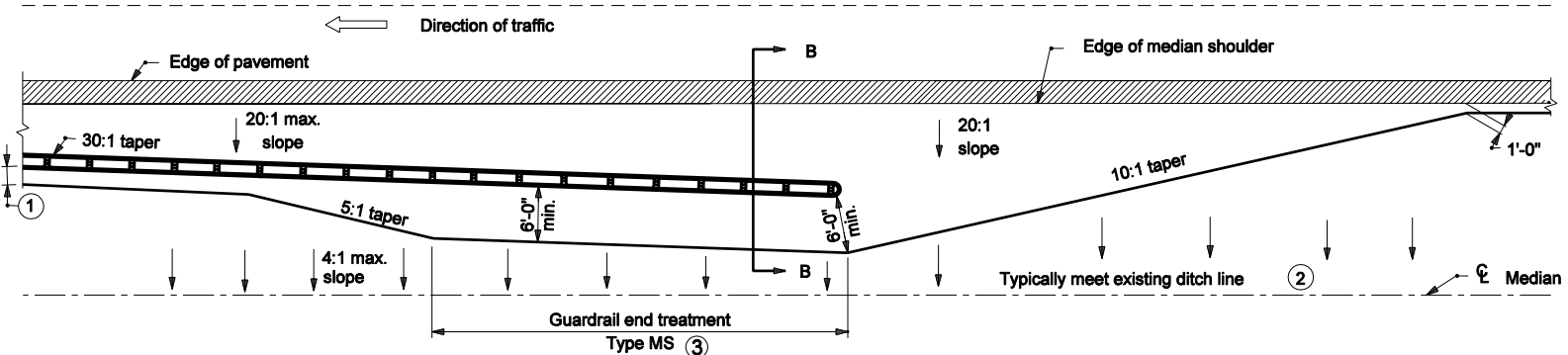
NOTES:

- 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"

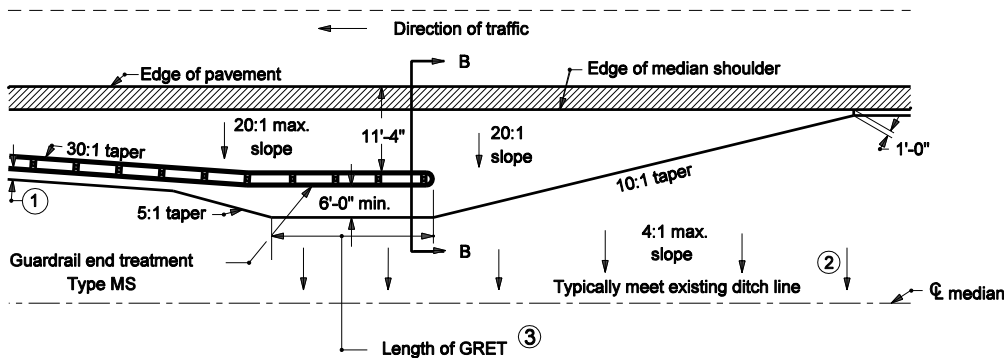
INDIANA DEPARTMENT OF TRANSPORTATION	
GRADING AT GUARDRAIL END TREATMENTS	
March 2004	
STANDARD DRAWING NO. E 601-GRET-06	
	/s/ Anthony L. Uremovich 3-01-04 DESIGN STANDARDS ENGINEER DATE
	/s/ Richard K. Smutzer 3-01-04 CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER	

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"

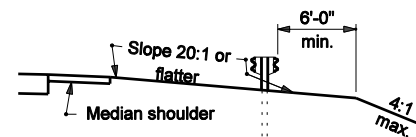


PLAN VIEW - GRADING DETAIL FOR G.R.E.T. TYPE MS ON FLARE



PLAN VIEW

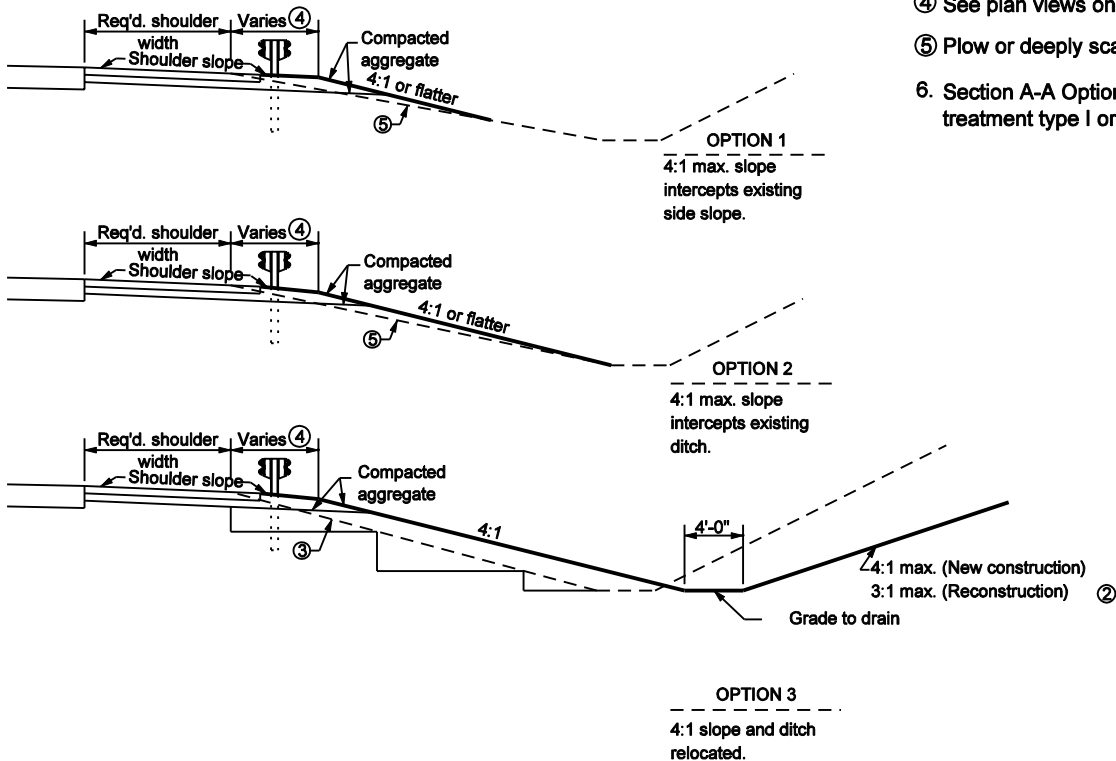
GRADING DETAIL FOR GUARDRAIL END TREATMENT TYPE MS PARALLEL TO SHOULDER



SECTION B-B

INDIANA DEPARTMENT OF TRANSPORTATION	
GRADING AT GUARDRAIL END TREATMENT	
MARCH 2005	
STANDARD DRAWING NO. E 601-GRET-07	
	/s/ Richard L. VanCleave 3-01-05 DESIGN STANDARDS ENGINEER DATE
	/s/ Richard K. Smutzer 3-01-05 CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER	

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



GRADING CROSS SECTIONS AT SECTION A-A

NOTES:

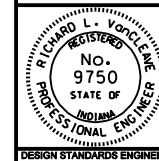
1. Grading cross section Option 1 is most desirable and shall be used on new construction. Option 7 is least desirable. The grading cross section to be used shall be as detailed or specified on the plans. A more desirable option may be used in lieu of the option specified.
- ② The backslope on Option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

INDIANA DEPARTMENT OF TRANSPORTATION

**GRADING AT GUARDRAIL
END TREATMENT**

SEPTEMBER 2002

STANDARD DRAWING NO. E 601-GRET-08

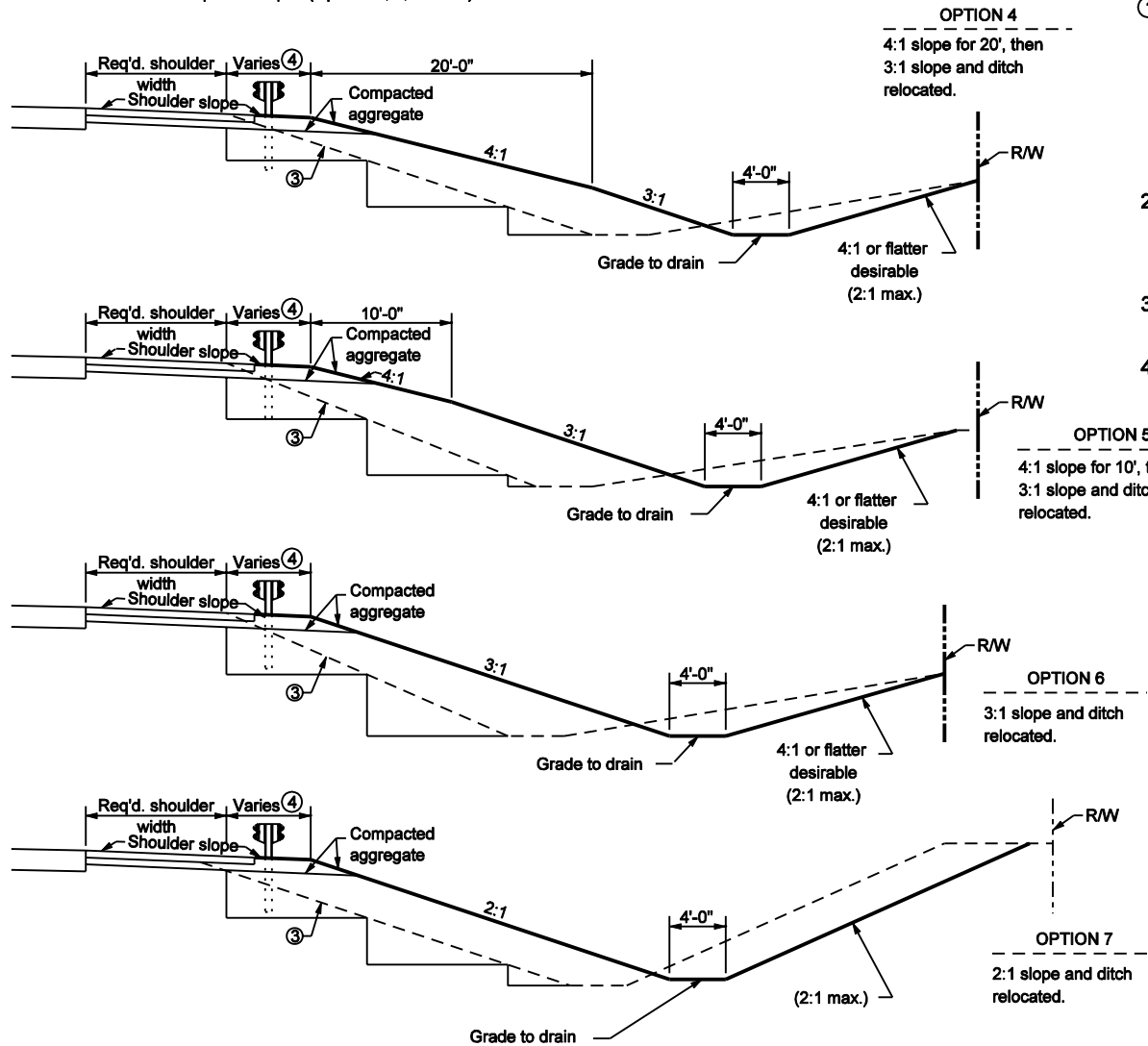


/s/ Richard L. VanCleave 9-03-02
DESIGN STANDARDS ENGINEER DATE

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

DESIGN STANDARDS ENGINEER

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

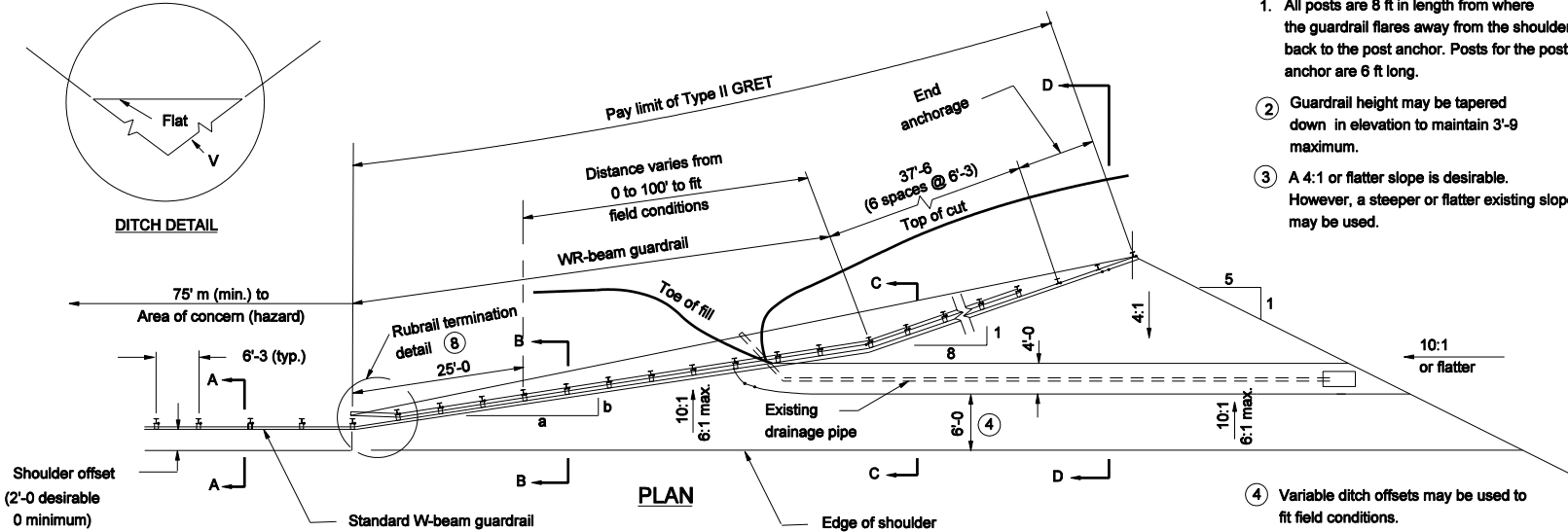
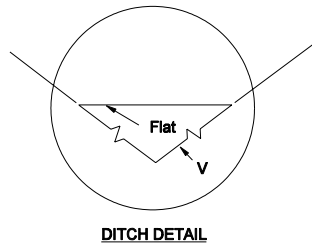


GRADING CROSS SECTIONS AT SECTION A-A

NOTES:

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

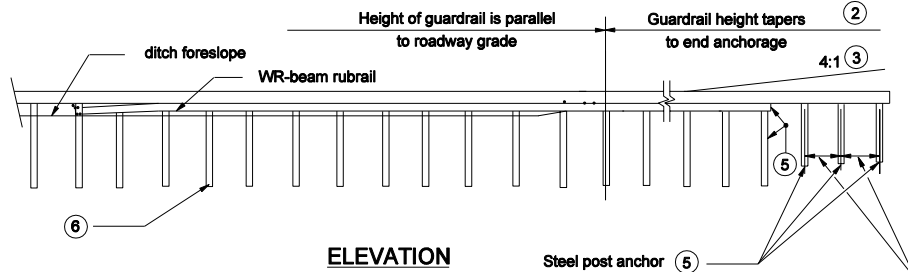
INDIANA DEPARTMENT OF TRANSPORTATION	
GRADING AT GUARDRAIL END TREATMENTS	
SEPTEMBER 2002	
STANDARD DRAWING NO. E 601-GRET-09	
	/s/ Richard L. VanCleave 9-03-02 DESIGN STANDARDS ENGINEER DATE
	/s/ Richard K. Smutzer 9-03-02 CHIEF HIGHWAY ENGINEER DATE
DESIGN STANDARDS ENGINEER	



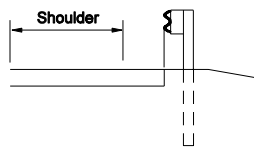
Shoulder offset
(2'-0 desirable
0 minimum)

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

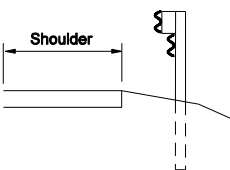
a:b RATIO



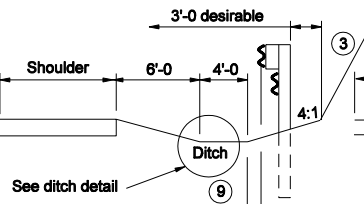
ELEVATION



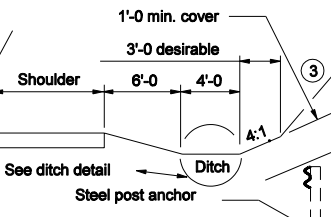
SECTION A-A



**SECTION B-B
(WITH RUBRAIL)**



**SECTION C-C
(WITH RUBRAIL)**



SECTION D-D

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. Guardrail height may be tapered down in elevation to maintain 3'-9 maximum.
3. A 4:1 or flatter slope is desirable. However, a steeper or flatter existing slope may be used.
4. Variable ditch offsets may be used to fit field conditions.
5. See Standard Drawing E 601-GRET-11 for rub rail anchor details and post anchor details.
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. See Standard Drawing E 601-WBGA-06 for detail.
9. Posts shall be installed offset from the required ditch cross section to maintain ditch's hydraulic capacity.

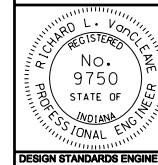
INDIANA DEPARTMENT OF TRANSPORTATION

GUARDRAIL END TREATMENT

TYPE II

SEPTEMBER 2004

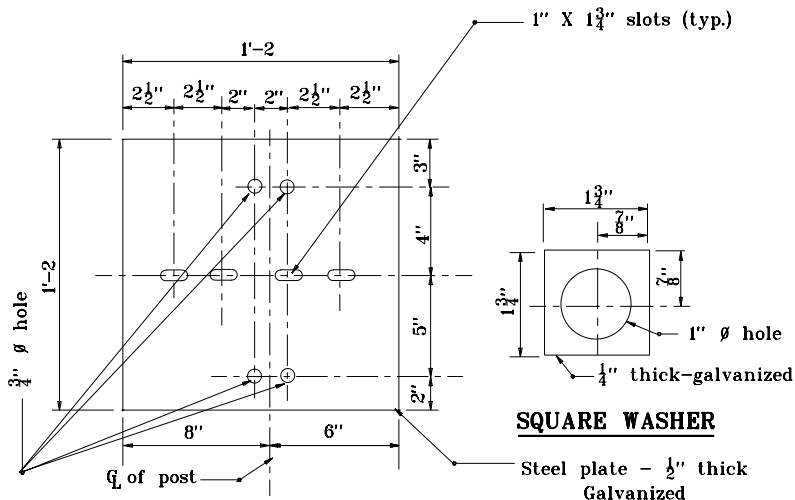
STANDARD DRAWING NO. E 601-GRET-10



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

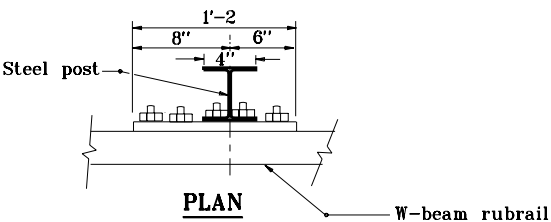
/s/ Richard K. Smutzer 9-01-04
CHIEF HIGHWAY ENGINEER DATE

DESIGN STANDARDS ENGINEER

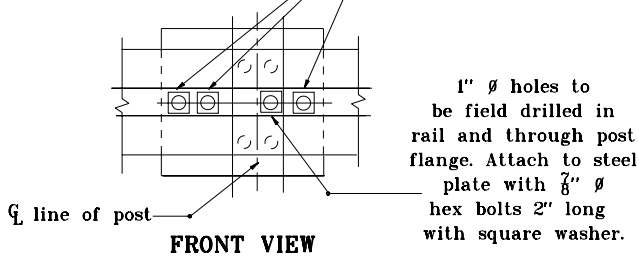


STEEL PLATE DETAIL

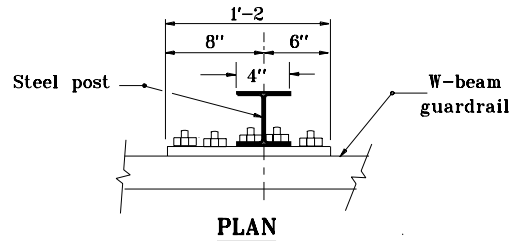
STEEL PLATE AND WASHER DETAILS



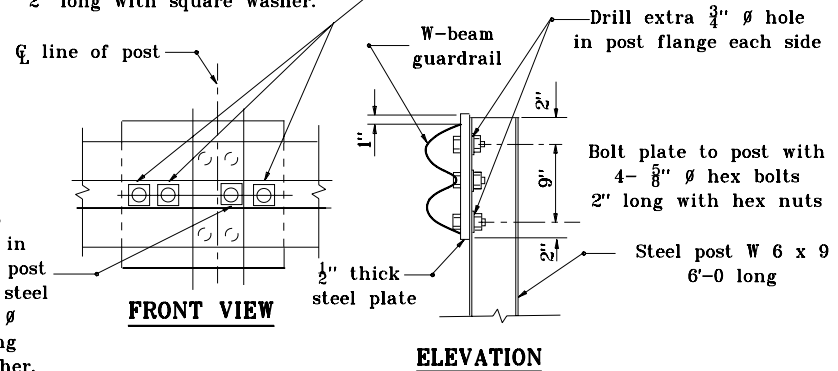
3 - 1" ϕ holes to be field drilled in rail and attached to steel plate with 7/8" ϕ hex bolts 2" long with square washer.



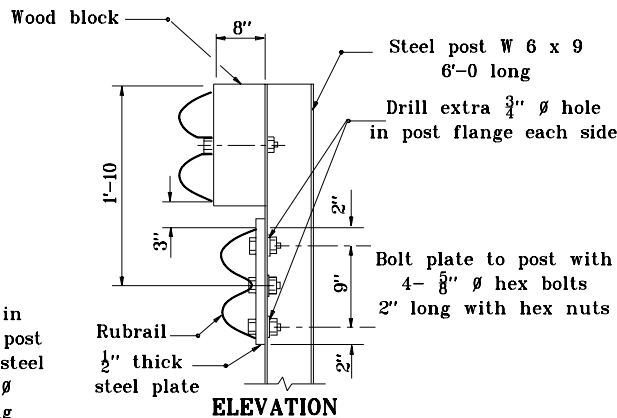
RUBRAIL ANCHOR DETAILS



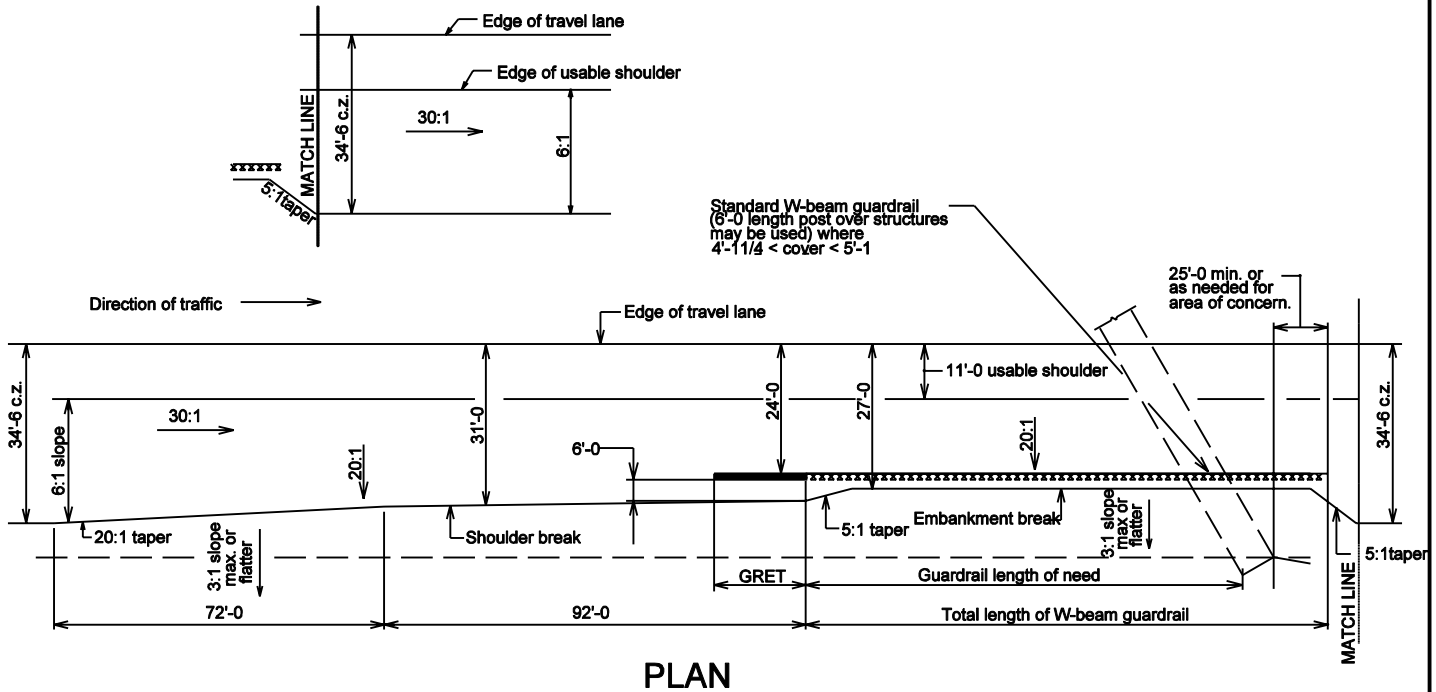
3 - 1" ϕ holes to be field drilled in rail and attached to steel plate with 7/8" ϕ hex bolts 2" long with square washer.



POST ANCHOR DETAILS



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



Standard W-beam guardrail
(6'-0 length post over structures
may be used) where
 $4'-11\frac{1}{4} < \text{cover} < 5'-1$

NOTES:

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

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