



# Crawford County Road Commission

Donald A. Babcock, Managing Director

## NOTICE TO BIDDERS

The Crawford County Road Commission will receive sealed bids until 4:00 p.m. (for a bid opening during the regular meeting) commencing at 4:30 p.m., on Thursday July 18, 2024, at their Grayling office located at 500 Huron Street, Grayling, MI 49738, for furnishing the following:

### I-75 GUARDRAIL INSTALLATION AND EMBANKMENT

Bidder shall be responsible for furnishing all necessary equipment, labor and materials to complete the project.

**Completion date September 30, 2024**

Michigan Department of Transportation will provide traffic control during construction. All work and materials must meet the current Michigan Department of Transportation 2020 Standard Specifications for Construction. Additional information may be obtained at the office of the undersigned. Bidding documents are available upon request.

The contractor shall provide the Certificate of Insurance prior to commencing work. Certificate shall include:

Board of County Road Commissioners **AND** the Crawford County Road Commission named as additional insured to all coverage, **2) Bodily Injury Liability** – each person - \$500,000.00 each occurrence, **3) Bodily Injury Liability** – each accident - \$1,000,000.00, **4) Property Damage Liability** – each accident - \$1,000,000.00, **5). Single Limit Policy** - \$1,000,000.00 and **6) Worker's compensation- statutory limits.**

“The Crawford County Road Commission, in accordance with Title VI of the Civil Rights Act of 1964, 78 Stat. 252, 42 USC 2000d to 2000d-4 and Title 49, Code of Federal Regulations, Department of Federally-assisted programs of the Department of Transportation issued pursuant to such Act, hereby notifies all bidders that it will affirmatively insure that in any contract entered into pursuant to this advertisement, minority business enterprises will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of gender, disability, race, color, or national origin in consideration for an award.”

Submit bids in a sealed envelope that is clearly marked with the words: **“2024 Guardrail Installation Bid”**

Crawford County Road Commission reserves the right to reject any or all bids, to waive irregularities in the bid, to waive details in the specifications, to add or delete quantities or projects to or from the bid and to accept the bid deemed to be in the best interest of Crawford County.

### Board of Crawford County Road Commissioners

Ryan Halstead, Chairman  
Gary Summers, Vice Chairman  
Cris Jones, Commissioner  
Scott Hanson, Commissioner  
Ronald Larson, Commissioner

For publication:  
Avalanche

500 Huron Street • Grayling, Michigan 49738

Phone: (989) 348-2281 • Fax: (989) 348-6933

**PROJECT INFORMATION & BID PROPOSAL  
I-75 GUARDRAIL INSTALLATION AND  
EMBANKMENT**

**SCOPE OF WORK**

The proposed work includes installation of guardrail along I-75 at bridges passing over I-75 in Crawford and Roscommon Counties as described in the "Location Log", or as directed by the engineer and slope flattening as required to install the guardrail. All work will be done in accordance with the Michigan Department of Transportation 2020 Standard Specifications for Construction.

**:GENERAL NOTES:**

**UTILITIES**

Miss Dig/Underground Utility Notification

Contact MISS DIG System, Inc. for the protection of underground utilities and in conformance with MCL 460.721 et seq, by phone at 811 or 800-482-7171 or via the web at either [elocate.missdig.org](http://elocate.missdig.org) for single address or [rte.missdig.org](http://rte.missdig.org), a minimum of 3 working days prior to excavating, excluding weekends and holidays.

**EARTHWORK**

Soil Erosion Measures

Place appropriate soil erosion and sedimentation control measures prior to earth-disturbing activities. Place turf establishment items as soon as possible on potential erodible slopes as directed by the Engineer. Protect critical ditch grades with either sod or seed/mulch or mulch blanket as directed by the Engineer.

**Guardrail**

Guardrail will be installed in accordance with the applicable standard plans.

GUARDRAIL TYPES A, B, BD, T, TD, MGS-8, & MGS-8D R-60-J GUARDRAIL APPROACH  
TERMINAL TYPE 2M R-62-H GUARDRAIL DEPARTING TERMINAL TYPES B, T & MGS R-66-E

PROJECT QUANTITIES. Quantities listed below are provided for informational purposes only. The Contractor is responsible for verifying the work items and quantities. No additional compensation will be paid for increases in quantities or additional incidental items necessary to complete the work. All completed work will be measured and paid as one Lump Sum (LSUM).

**TRAFFIC CONTROL:**

Michigan Department of Transportation personnel shall provide traffic control and traffic control devices during the project. Traffic Control Coordination shall be directed to Rob Hall, North Region, Gaylord TSC office, 1088 E. M-32, Gaylord, Michigan 49735, (989)-731-5090

**BID SHEET**

Total Lump Sum Bid \$ \_\_\_\_\_

Company Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_ Phone: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

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Board of Crawford County Road Commissioners

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## Location Log

Location	Length of Guardrail *	Offset from the white line (FT)	Reflector quantity	Post Length (FT)	Full length Embankment (cu yd)	Embankment at Terminal (cu yd)
7 mile Rd SB Outside	275	12	6	9		0.5
7 mile Rd SB Median	275	12	6	9		0.5
7 mile Rd NB Outside	275	12	6	6		
7 mile Rd NB Median	275	12	6	9	2.1	1.9
Federal Hwy SB Outside	300	12	6	9		1.7
Federal Hwy SB Median	287.5	12	6	9		0.9
Federal Hwy NB Outside	300	12	6	6		
Federal Hwy NB Median	275	12	6	9	0.6	0.9
Co Rd 100 SB Outside	287.5	13	6	6		
Co Rd 100 SB Median	287.5	12	6	9	0.7	1.2
Co Rd 100 NB Outside	87.5	31.1	2	6		**
Co Rd 100 NB Median	275	13	6	6		
Roscommon Rd SB Outside	287.5	12	6	9		1.2
Roscommon Rd SB Median	287.5	12	6	9	0.7	1.1
Roscommon Rd NB Outside	300	12	6	9		0.9
Roscommon Rd NB Median	275	12	6	9	0.6	1.0

\* Lengths are of standard MGS-8 rail of the appropriate post length, terminals will be in addition to these lengths

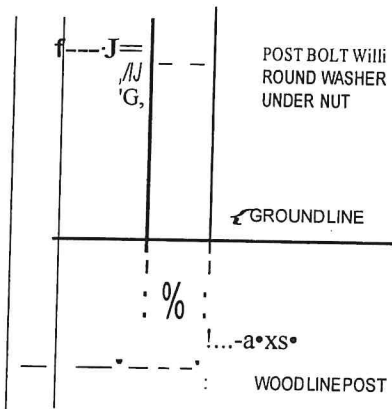
\*\* Some embankment may be needed

All runs will have a Type 2M Approach Terminal and a Type MGS Departing Terminal

**Southbound** I-75 guardrail should start at the southern most point of the southern most pier being protected and continue north to the approach terminal. The departing terminal should extend south past the southern most pier. **Northbound** I-75 guardrail should start at the northern most point of the northern most pier being protected and continue south to the approach terminal. The departing terminal should extend north past the northern most pier. Include 4,350FT of **Unidirectional Enhanced Delineation - Guardrail Post Mount-20RC810(A120)**

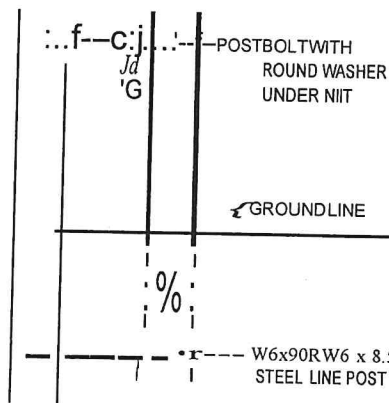


SP L I C E B O L T  
 C T Y P . ) \ 11

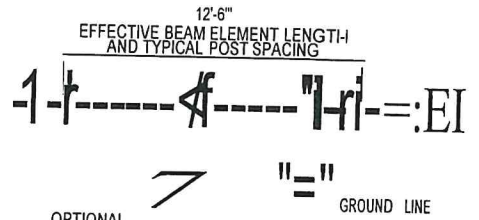


WOOD POST

S P L I C E B O L T  
 C T Y P . ) \ 11



STEEL POST



OPTIONAL  
 ELEVATION SHOWING POST SPACING  
 SEE NOTES FOR GUARDRAIL IN CONJUNCTION WITH CURB

GUARDRAIL, TYPE A

APPROVED BY: \_\_\_\_\_  
 DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: \_\_\_\_\_  
 DIRECTOR, BUREAU OF DEVELOPMENT

Michigan O. p l l r t m o n l D I T n i n s p a r b d i a n

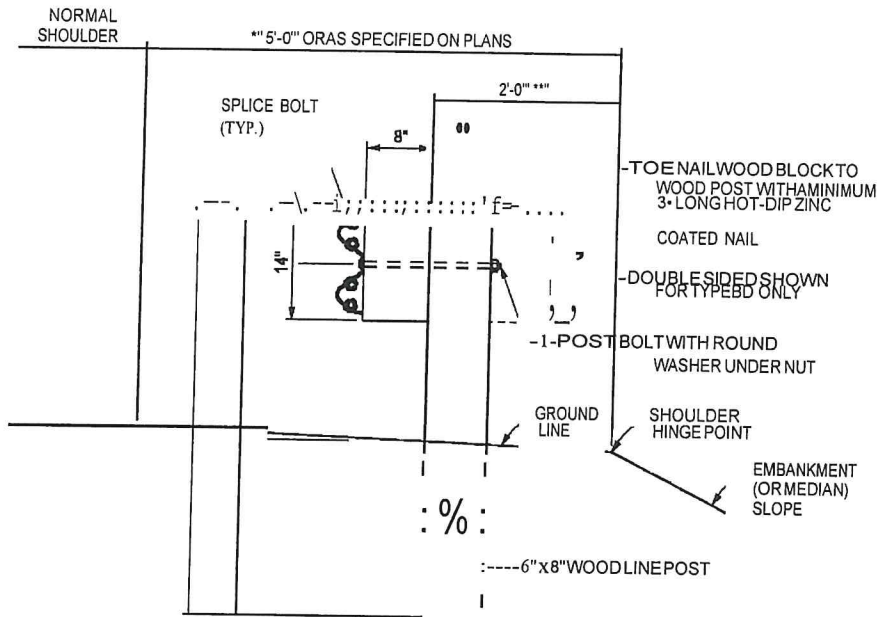
DEPARTMENT DIRECTOR  
 BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR  
 GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D

(SPECIAL DETAIL) 01/29/2024  
 FHWA APPROVAL PLAN DATE

R-60-J

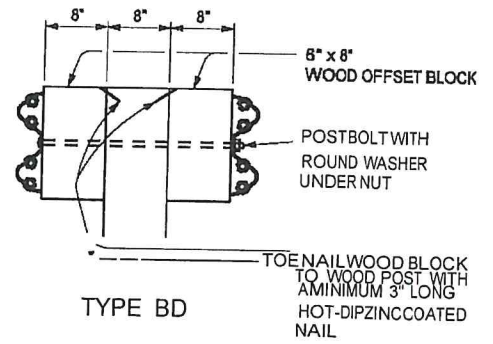
SHEET  
 1 OF 6



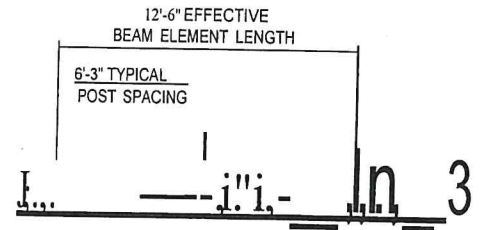
"FOR PAVED SHOULDER WIDTH IS OF AT LEAST 12', USE 3'-0".

-IF THE OFFSET FROM THE FACE OF POST TO THE SHOULDER HINGE POINT IS LESS THAN 2'-0" AND THE EMBANKMENT (OR MEDIAN) SLOPE IS STEEPER THAN 1:10, USE 8'-0" POST WITH THE ADDITIONAL LENGTH EMBEDDED.

GUARDRAIL, TYPE B (OR BD)  
(WOOD POST)



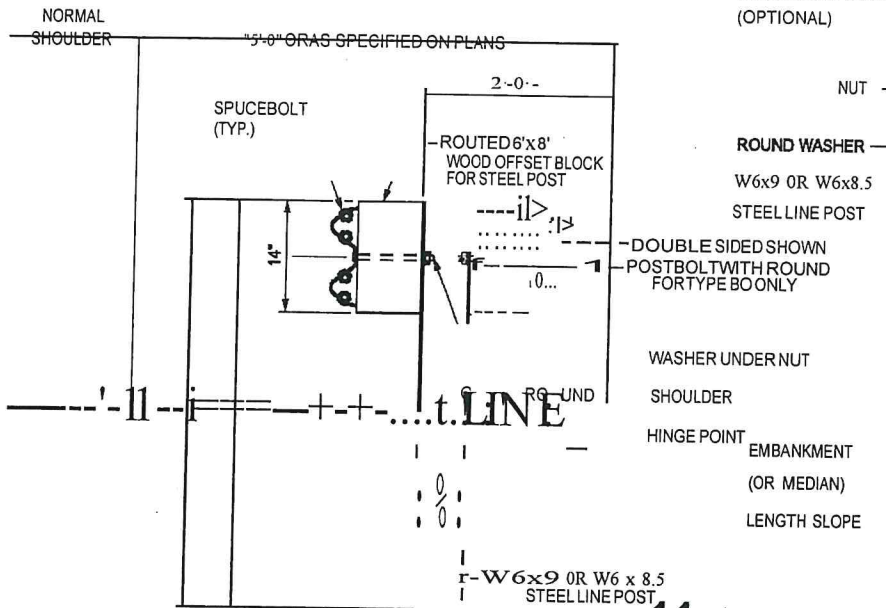
TYPE BD



"=GROUND LINE

ELEVATION SHOWING POST SPACING

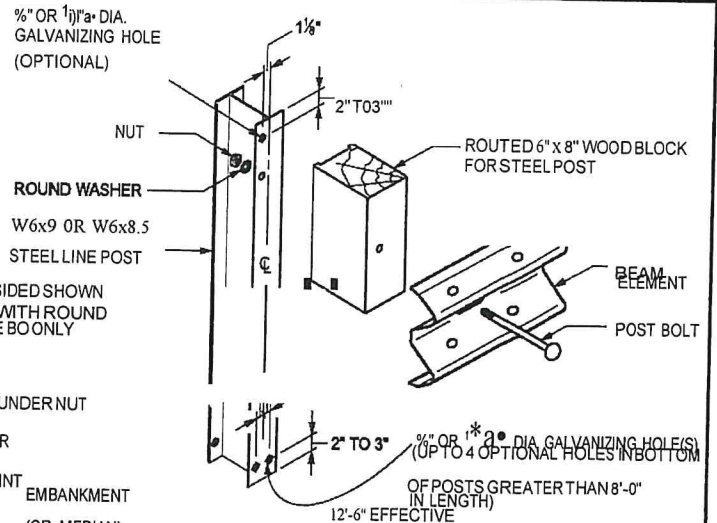
\*SEE NOTES FOR GUARDRAIL IN CONJUNCTION WITH CURB



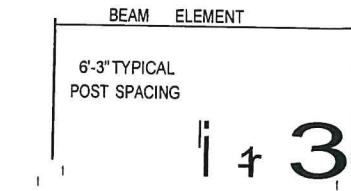
.. FOR PAVED SHOULDER WIDTH IS OF AT LEAST 12', USE 3'-0".

\*\*\* IF THE OFFSET FROM THE FACE OF POST TO THE SHOULDER HINGE POINT IS LESS THAN 2'-0" AND THE EMBANKMENT (OR MEDIAN) SLOPE IS STEEPER THAN 1:10, USE 8'-0" POST WITH THE ADDITIONAL LENGTH EMBEDDED.

GUARDRAIL, TYPE B (OR BD)  
(STEEL POST)



1/2" OR 1/4" DIA. GALVANIZING HOLE(S) (UP TO 4 OPTIONAL HOLES IN BOTTOM OF POSTS GREATER THAN 8'-0" IN LENGTH)



"=GROUND LINE

ELEVATION SHOWING POST SPACING

\*SEE NOTES FOR GUARDRAIL IN CONJUNCTION WITH CURB

Michigan Department of Transportation

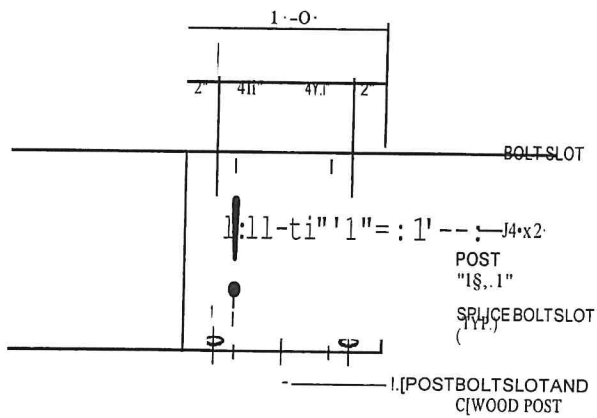
DEPARTMENT DIRECTOR  
BRADLEY C. WILFRIED, P.E.

STANDARD PLAN FOR  
GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D

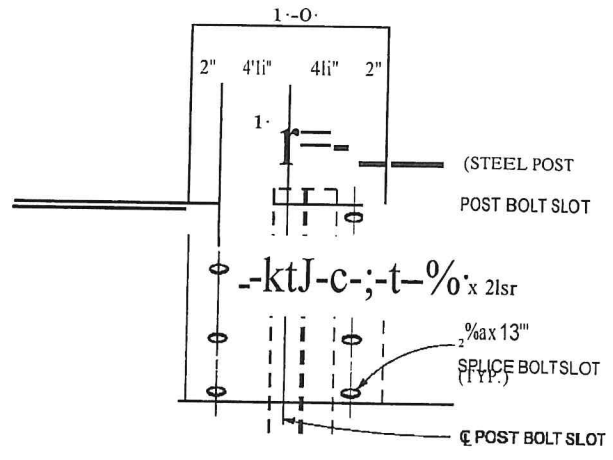
(SPECIAL DETAIL) 01/29/2024  
FHWA APPROVAL PLAN DATE

R-60-J

SHEET  
2 OF 16

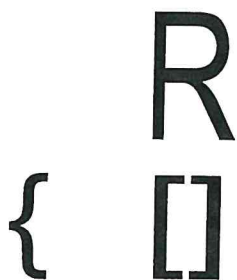


WOOD POST

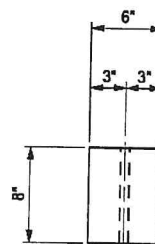


STEEL POST

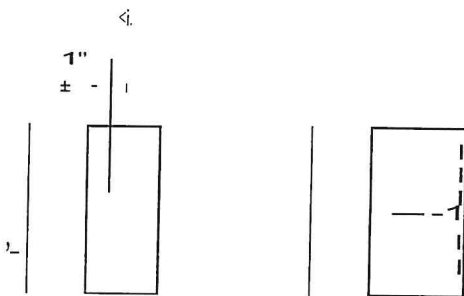
BEAM ELEMENT SPLICE DETAILS



TOP



TOP

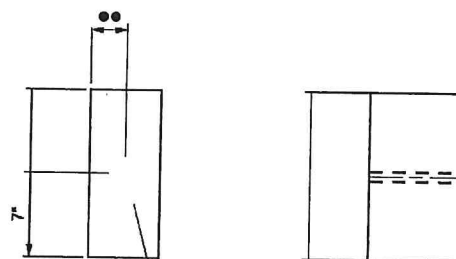


1" DIA. HOLE

FRONT

SIDE

FOR USE ON STEEL POSTS



1" DIA. HOLE

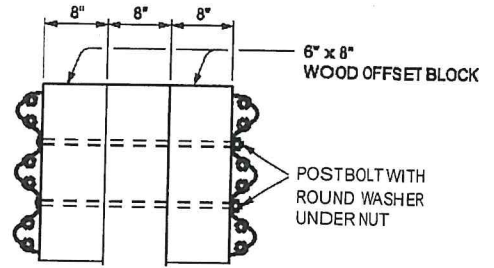
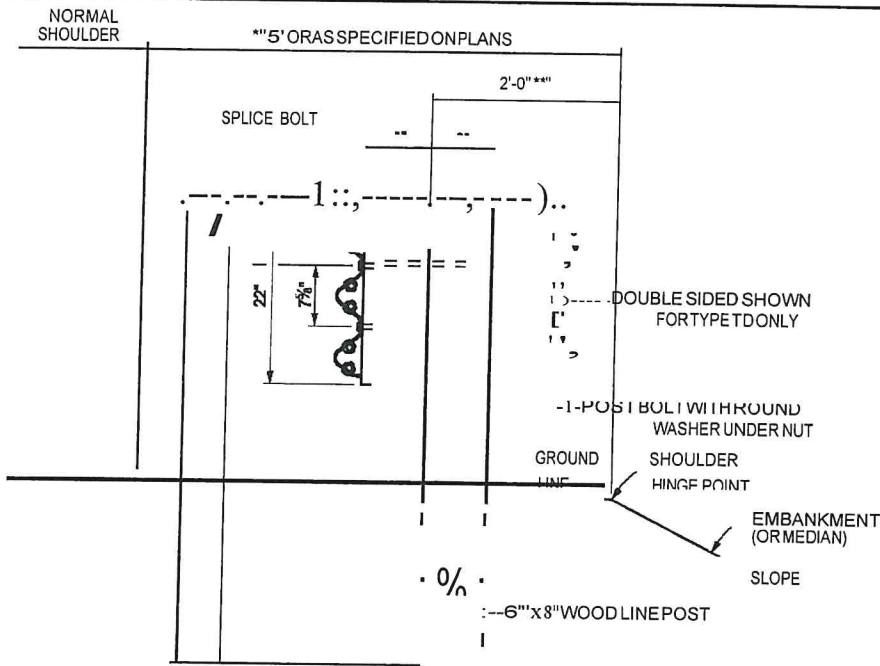
FRONT

SIDE

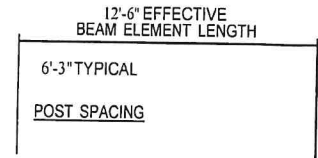
FOR USE ON WOOD POSTS  
(SEE NOTES ON SHEET 16 OF 16)

WOOD OFFSET BLOCKS FOR GUARDRAIL, TYPE BAND TYPE BD

Mich9m O. p11tmonl DITninsparbdian DEPARTMENT DIRECTOR BRADLEY C. WILFEL RICH, PI.	STANDARD PLAN FOR GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D		SHEET 30F 16
	(SPECIAL DETAIL)	01/29/2024	
FHWA APPROVAL	PLAN DATE		



TYPE TD



\*\*\* FOR PAVED SHOULDER WIDTHS OF AT LEAST 12', USE 3'-0".

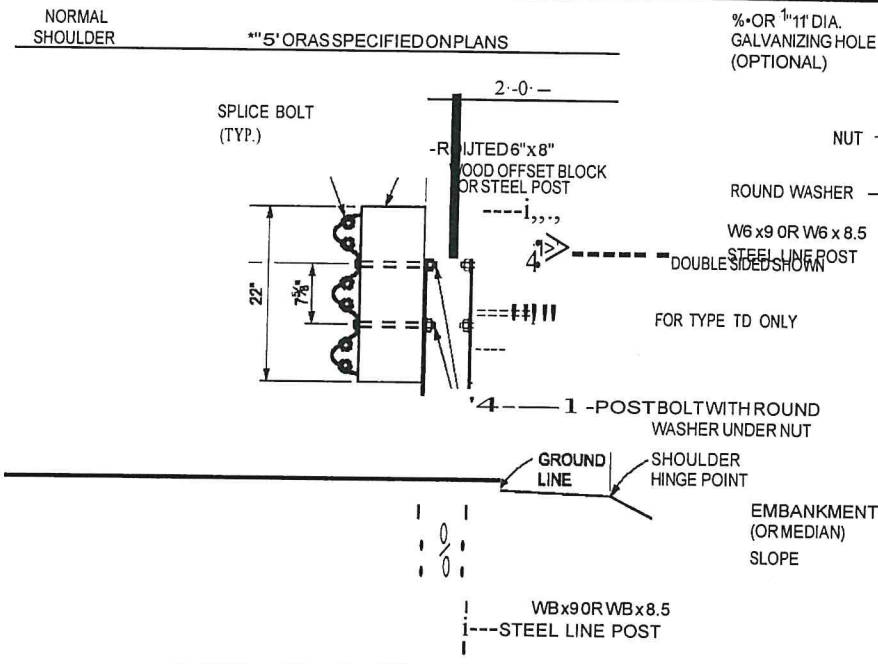
\*\*\* IF THE OFFSET FROM THE FACE OF POST TO THE SHOULDER HINGE POINT IS LESS THAN 2'-0" AND THE EMBANKMENT (OR MEDIAN) SLOPE IS STEEPER THAN 1:10, USE 8'-0" POST WITH THE ADDITIONAL LENGTH EMBEDDED.

"=GROUND LINE

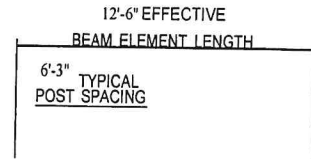
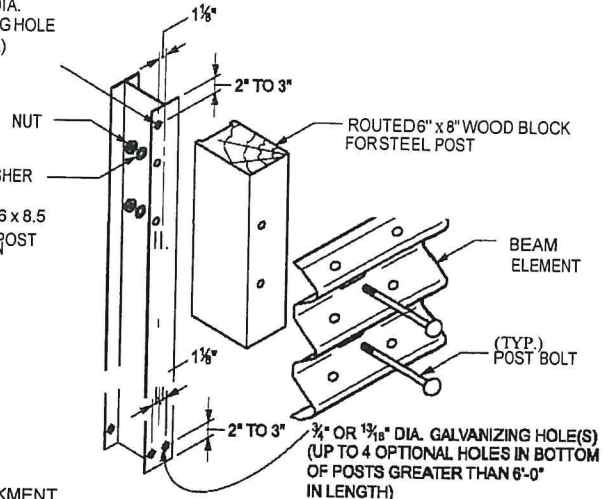
ELEVATION SHOWING POST SPACING

\* SEE NOTES FOR GUARDRAIL IN CONJUNCTION WITH CURB

GUARDRAIL, TYPE T (OR TD)  
(WOOD POST)



3/4" OR 1 1/4" DIA. GALVANIZING HOLE (OPTIONAL)



\*\*\* FOR PAVED SHOULDER WIDTHS OF AT LEAST 12', USE 3'-0".

IF THE OFFSET FROM THE FACE OF POST TO THE SHOULDER HINGE POINT IS LESS THAN 2'-0" AND THE EMBANKMENT (OR MEDIAN) SLOPE IS STEEPER THAN 1:10, USE 8'-0" POST WITH THE ADDITIONAL LENGTH EMBEDDED.

"=GROUND LINE

ELEVATION SHOWING POST SPACING

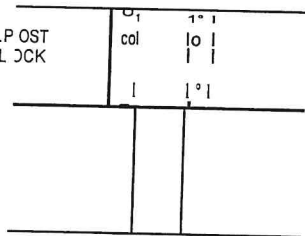
\* SEE NOTES FOR GUARDRAIL IN CONJUNCTION WITH CURB

GUARDRAIL, TYPE T (OR TD)  
(STEEL POST)

Michigan Department of Transportation DEPARTMENT DIRECTOR BRADLEY C. WILFELICH, P.E.	STANDARD PLAN FOR		R-60-J	SHEET
	GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D			
		FHWA APPROVAL	PLAN DATE	4 OF 16

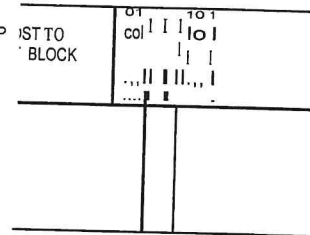


POST BOLT  
CONNECTING STEEL POST  
TO WOOD OFFSET BLOCK



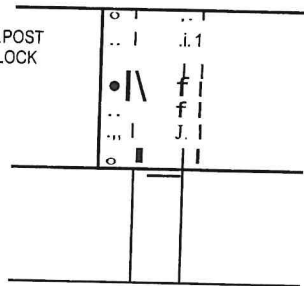
GUARDRAIL, TYPE B  
WOOD POST

POST BOLT  
CONNECTING STEEL POST TO  
ROUTED WOOD BLOCK



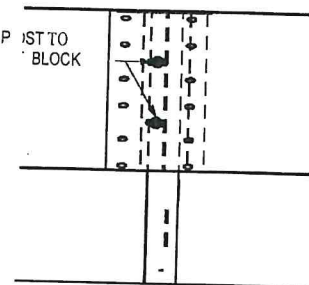
GUARDRAIL, TYPE B  
STEEL POST

POST BOLT  
CONNECTING STEEL POST  
TO WOOD OFFSET BLOCK



GUARDRAIL, TYPE T  
WOOD POST

POST BOLT  
CONNECTING STEEL POST TO  
ROUTED WOOD BLOCK



GUARDRAIL, TYPE T  
STEEL POST

BLOCK AND POST CONNECTION DETAILS

Michigan Department of Transportation

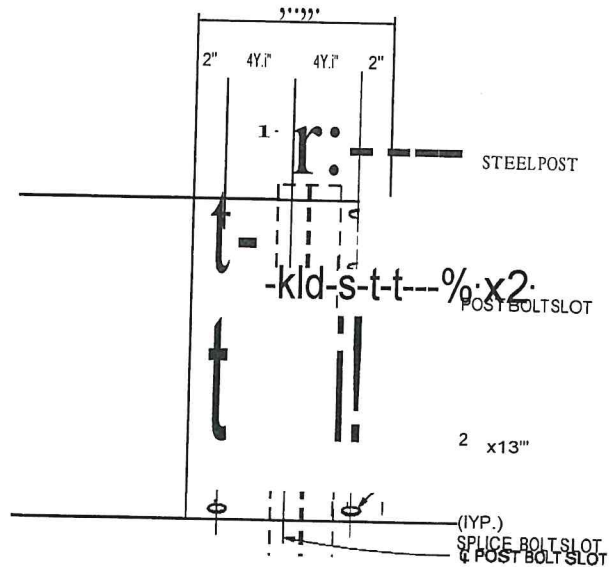
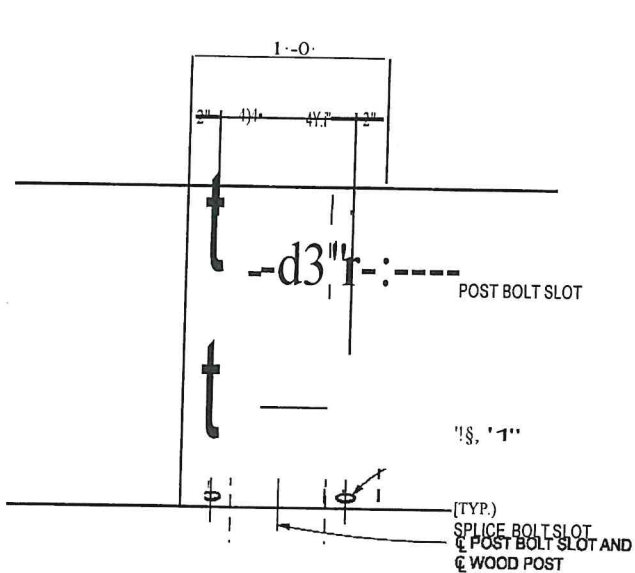
DEPARTMENT DIRECTOR  
BRADLEY C. WILFRIED, P.E.

STANDARD PLAN FOR  
GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D

(SPECIAL DETAIL) 01/29/2024  
FHWA APPROVAL PLAN DATE

R-60-J

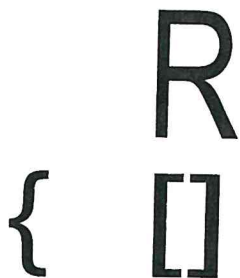
SHEET  
5 OF 16



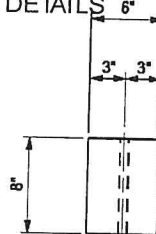
WOOD POST

STEEL POST

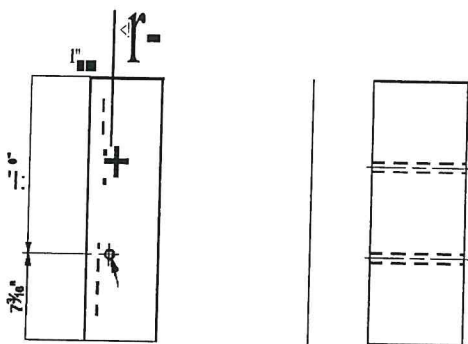
THREE BEAM ELEMENT SPLICE DETAILS



TOP



TOP

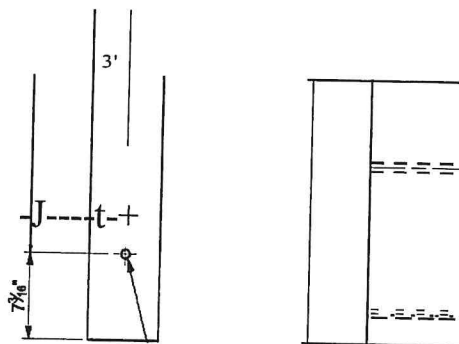


J<sub>i</sub> DIA. HOLE

FRONT

SIDE

FOR USE ON STEEL POSTS



3/4" DIA. HOLE

FRONT

SIDE

FOR USE ON WOOD POSTS  
(SEE NOTES ON SHEET 18 OF 16)

WOOD OFFSET BLOCKS FOR GUARDRAIL, TYPE T AND TYPE TD

Mich9m O.p11rtmonl OITninsparbdian

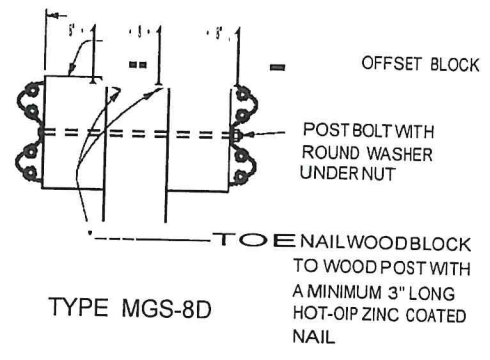
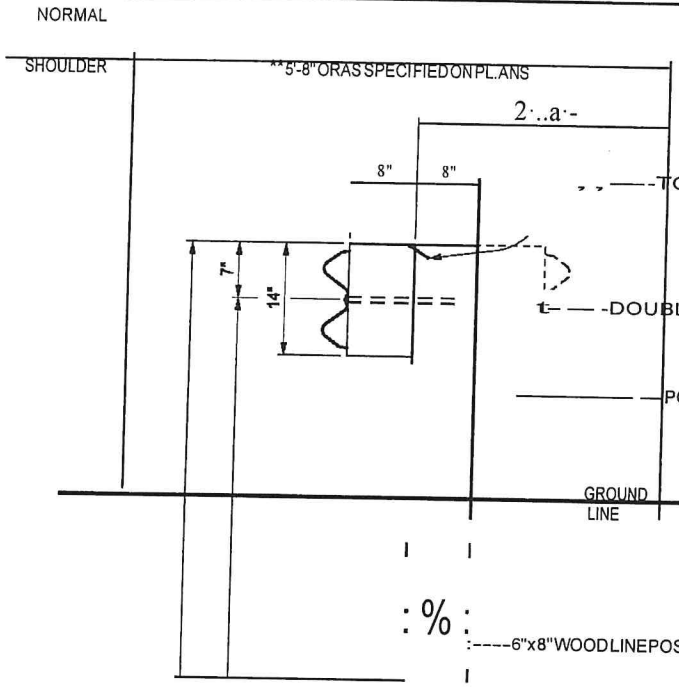
DEPARTMENT DIRECTOR  
BRADLEY C. WILFELICH, P.E.

STANDARD PLAN FOR  
GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D

(SPECIAL DETAIL) 01/29/2024  
FHWA APPROVAL PLAN DATE

R-60-J

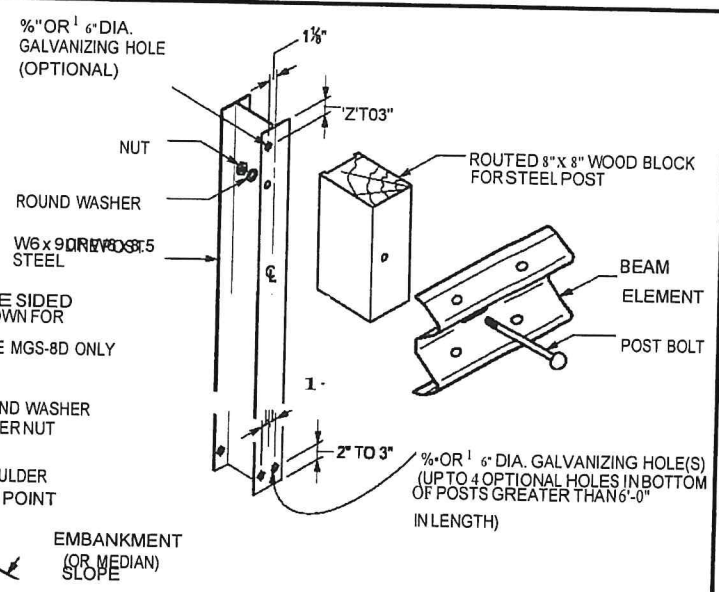
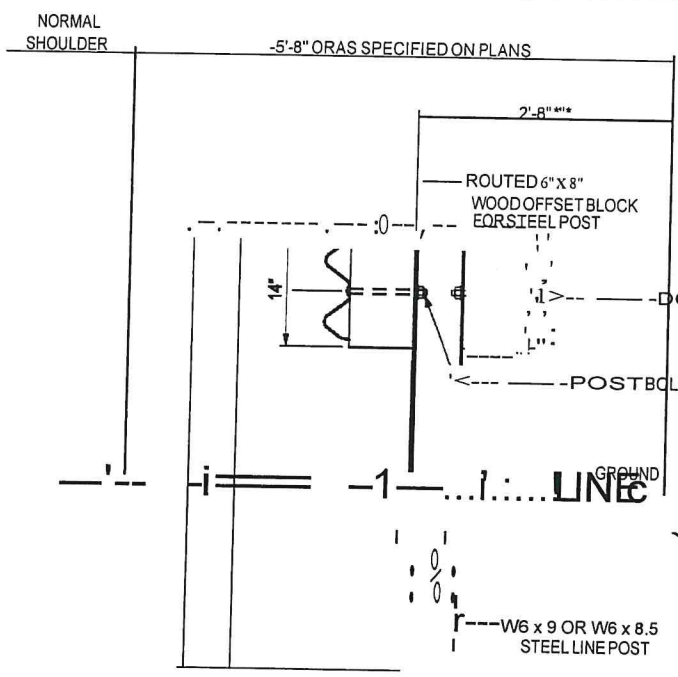
SHEET  
6 OF 16



\*\* FOR PAVED SHOULDER WIDTHS OF AT LEAST 12', USE 3'-8".

IF THE OFFSET FROM THE FACE OF POST TO THE SHOULDER HINGE POINT IS LESS THAN 2'-8" AND THE EMBANKMENT (OR MEDIAN) SLOPE IS STEEPER THAN 1:10, USE 9'-0" POST WITH THE ADDITIONAL LENGTH EMBEDDED.

GUARDRAIL, TYPE MGS-8 (OR MGS-8D)  
(WOOD POST)

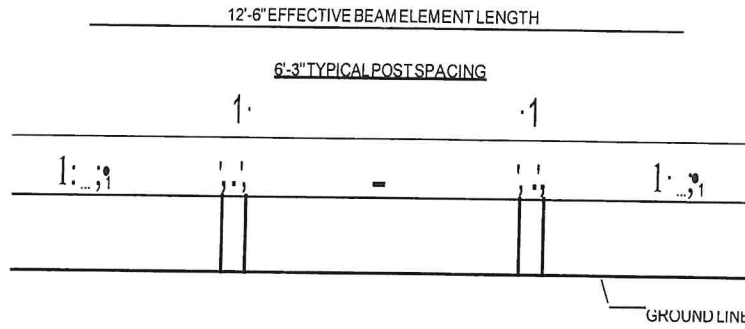


\*\* FOR PAVED SHOULDER WIDTHS OF AT LEAST 12', USE 3'-8".

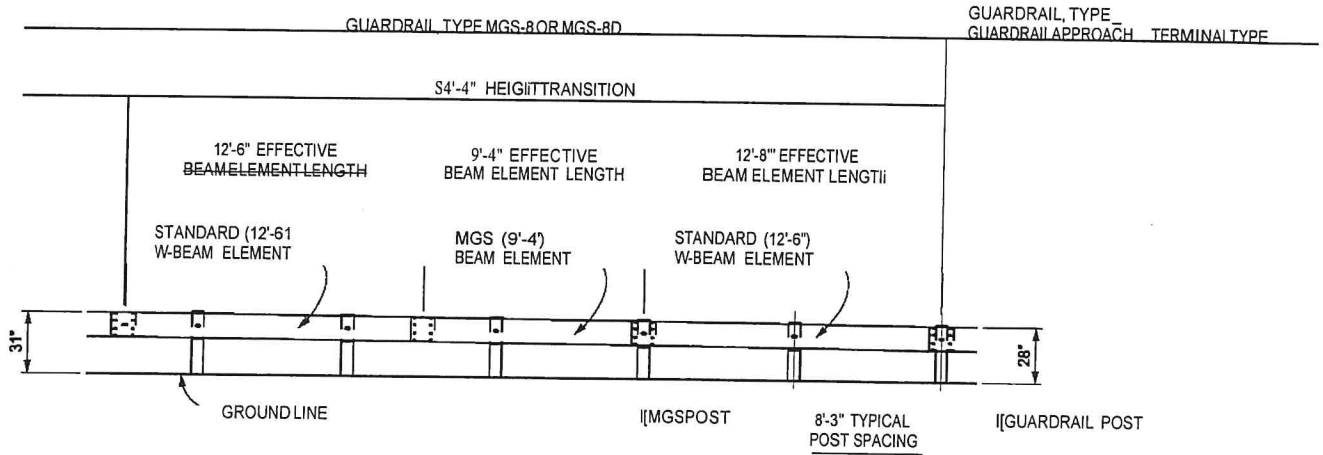
\*\* IF THE OFFSET FROM THE FACE OF POST TO THE SHOULDER HINGE POINT IS LESS THAN 2'-8" AND THE EMBANKMENT (OR MEDIAN) SLOPE IS STEEPER THAN 1:10, USE 9'-0" POST WITH THE ADDITIONAL LENGTH EMBEDDED.

GUARDRAIL, TYPE MGS-8 (OR MGS-8D)  
(STEEL POST)

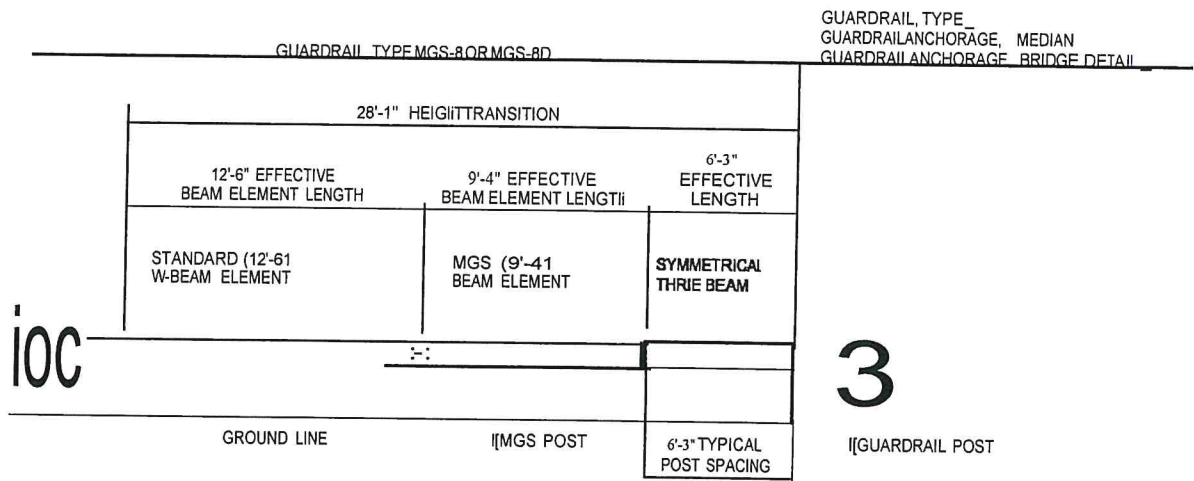
<p>Maligan Department of Transportation</p> <p>DEPARTMENT DIRECTOR BRADLEY C. WIEFERICH, PE</p>	<p>STANDARD PLAN FOR GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, &amp; MGS-8D</p>		<p>R-60-J</p>	<p>SHEET 7 OF 16</p>
	<p>(SPECIAL DETAIL) 0112912024</p> <p>FHWA APPROVAL _____ PLAN DATE _____</p>			



ELEVATION SHOWING POST SPACING FOR  
 GUARDRAIL, TYPE MGS-8 (OR MGS 8D)  
 SEE NOTES FOR GUARDRAIL IN CONJUNCTION WITH CURB



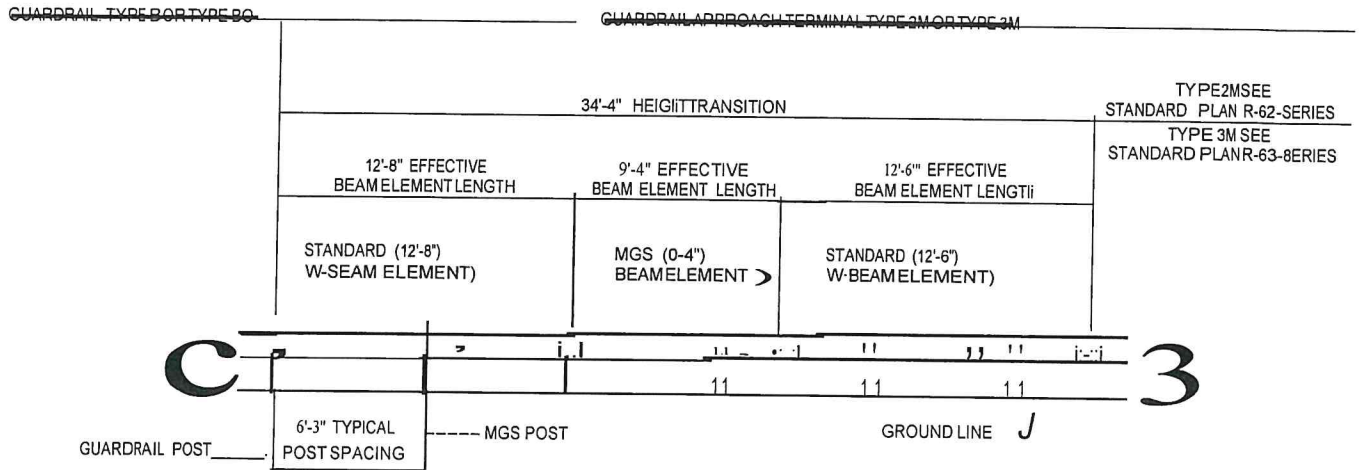
ELEVATION SHOWING TRANSITION DETAIL FOR CONNECTING  
 GUARDRAIL, TYPE MGS-8 (OR MGS-8D) TO  
 GUARDRAIL, TYPE B, GUARDRAIL, TYPE BD, OR  
 GUARDRAIL APPROACH TERMINAL TYPE 18, 28, OR 38



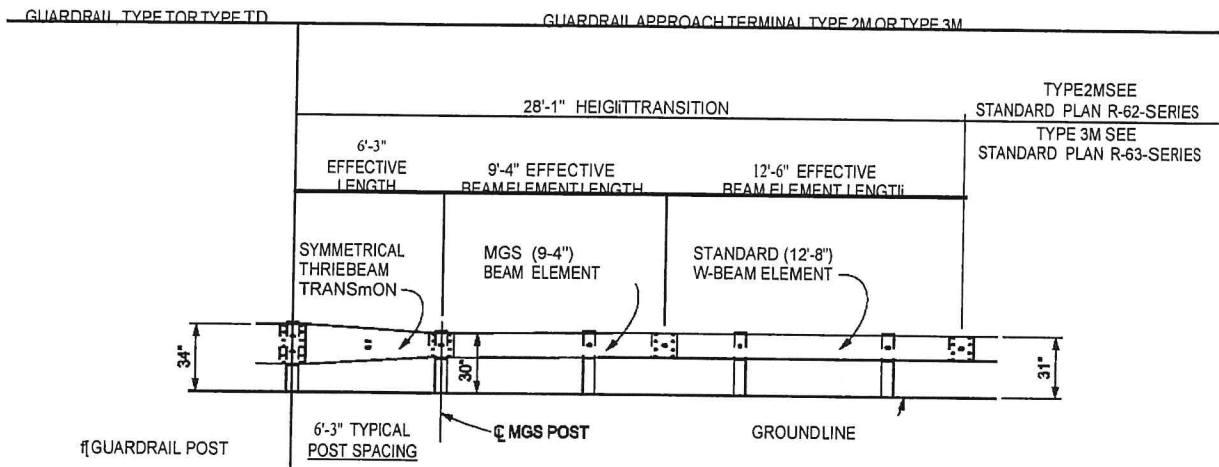
ELEVATION SHOWING TRANSITION DETAIL FOR CONNECTING  
 GUARDRAIL, TYPE MGS-8 (OR MGS-8D) TO  
 GUARDRAIL, TYPE T, GUARDRAIL, TYPE TD,  
 GUARDRAIL ANCHORAGE, MEDIAN,  
 GUARDRAIL ANCHORAGE, BRIDGE DETAIL A1, T1, T4 OR T6

Mich9m O.p11rtimoml OITninsparbdian DEPARTMENT DIRECTOR BRADLEY C. WILFELICH, P.E.		STANDARD PLAN FOR GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D	
		(SPECIAL DETAIL) 01/29/2024 FHWA APPROVAL PLAN DATE	R-60-J SHEET 9 OF 16



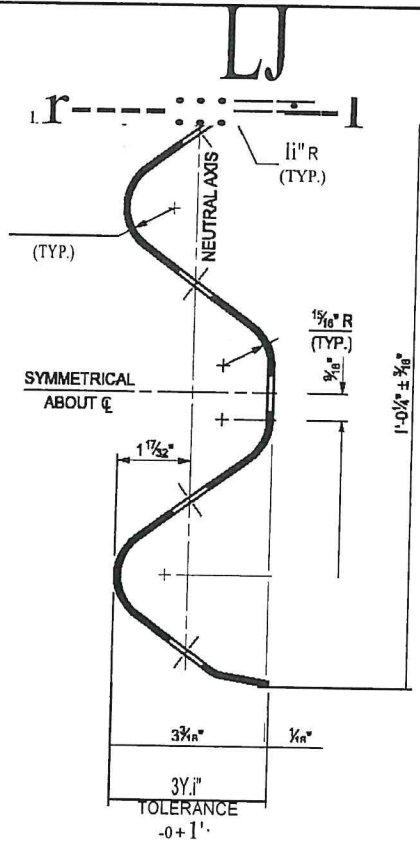


ELEVATION SHOWING TRANSITION DETAIL FOR CONNECTING  
 GUARDRAIL, TYPE B (OR TYPE BD) TO  
 GUARDRAIL APPROACH TERMINAL TYPE 2M OR TYPE 3M

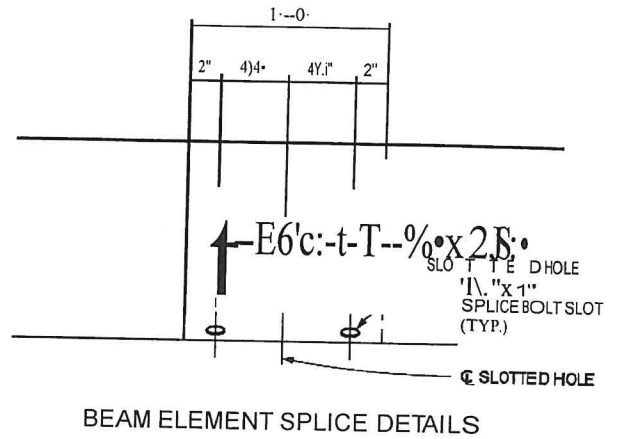


ELEVATION SHOWING TRANSITION DETAIL FOR CONNECTING  
 GUARDRAIL, TYPE T (OR TYPE TD) TO  
 GUARDRAIL APPROACH TERMINAL TYPE 2M OR TYPE 3M

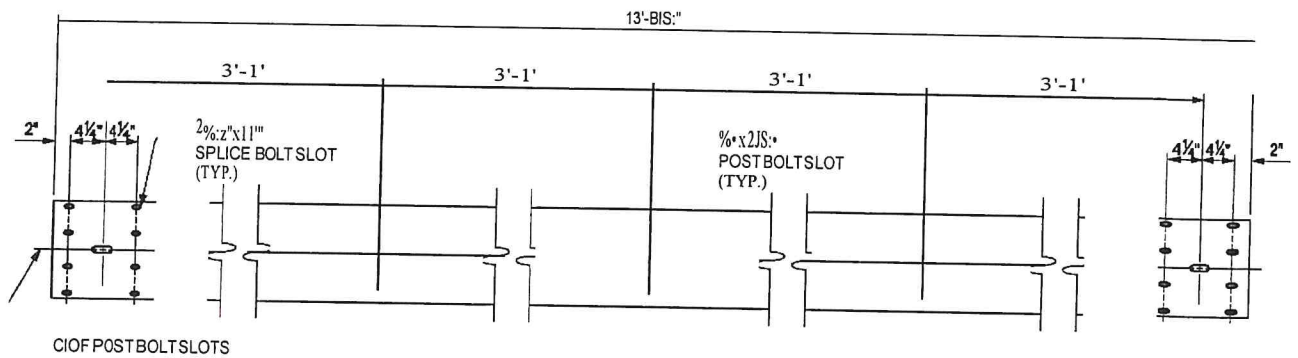
Michigan Department of Transportation DEPARTMENT DIRECTOR BRADLEY C. WILFRIED, P.E.	STANDARD PLAN FOR <b>GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, &amp; MGS-8D</b>		SHEET 100F 16
	(SPECIAL DETAIL) FHWA APPROVAL	01/29/2024 PLAN DATE	



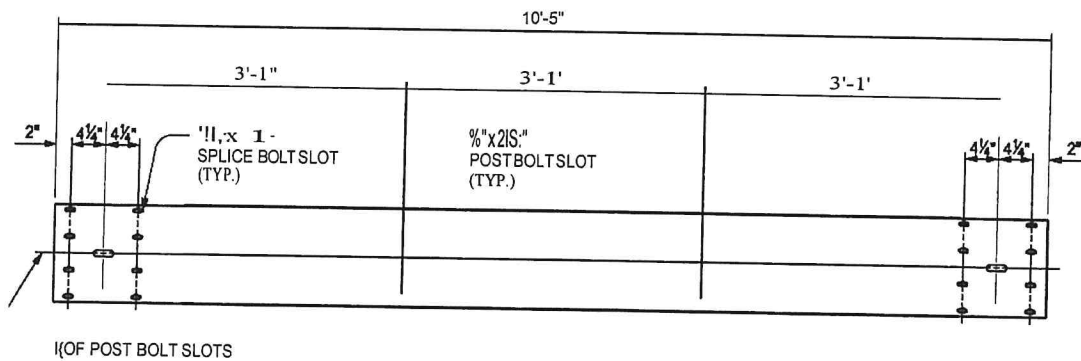
SECTION THROUGH BEAM ELEMENT



BEAM ELEMENT SPLICE DETAILS

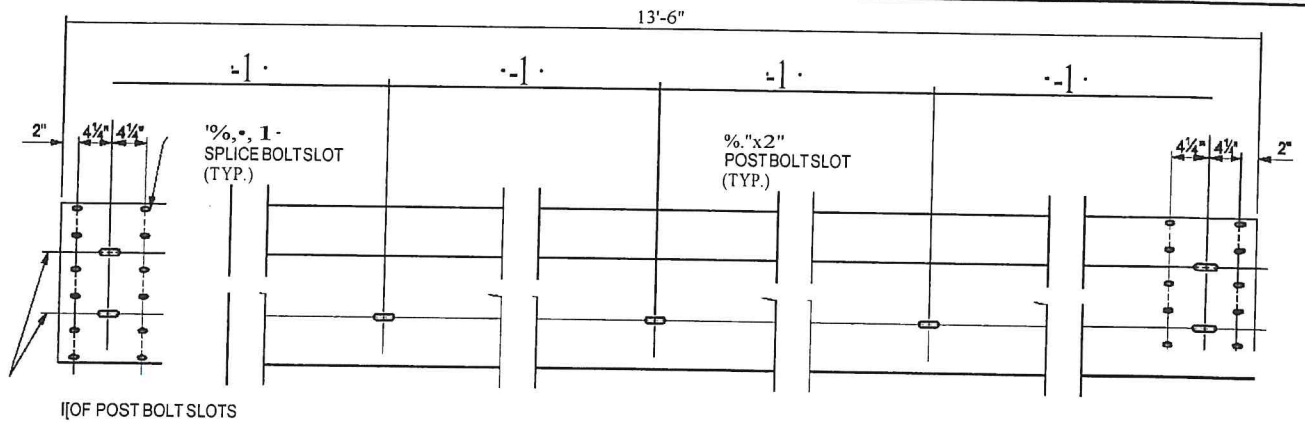


FRONT ELEVATION OF BEAM ELEMENT



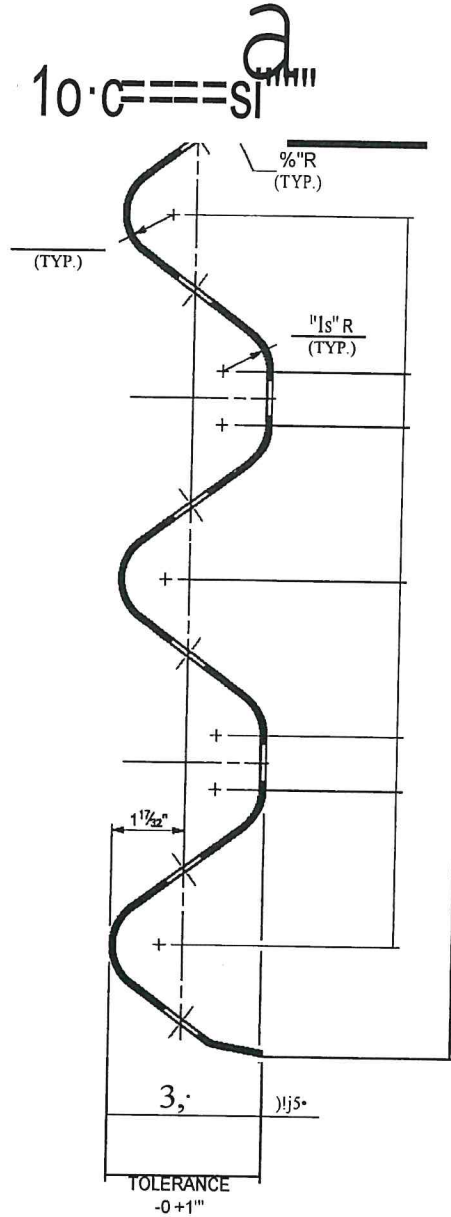
FRONT ELEVATION OF MGS (9'-4") BEAM ELEMENT

Michigan Department of Transportation DEPARTMENT DIRECTOR BRADLEY C. WILFRIED, P.E.	STANDARD PLAN FOR GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D		SHEET 11 OF 16
	(SPECIAL DETAIL) FHWA APPROVAL	01/29/2024 PLAN DATE	



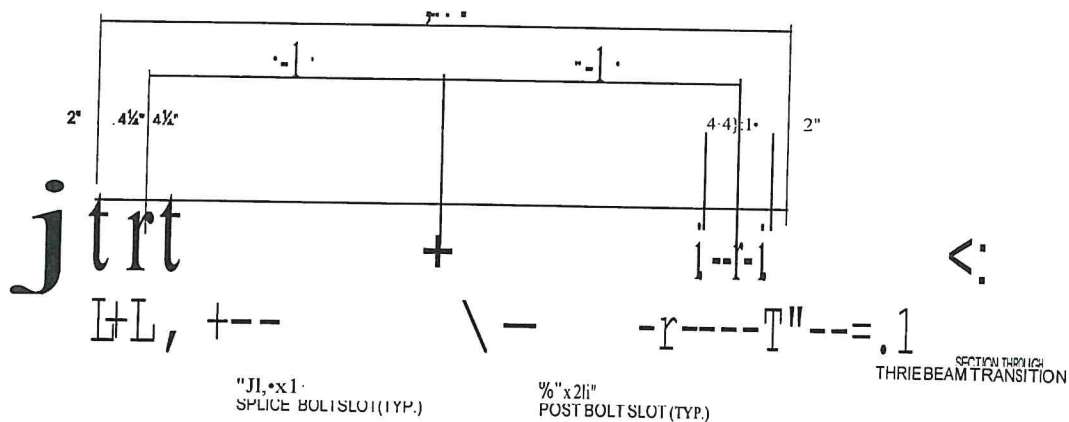
1/2 OF POST BOLT SLOTS

FRONT ELEVATION OF THREE BEAM ELEMENT



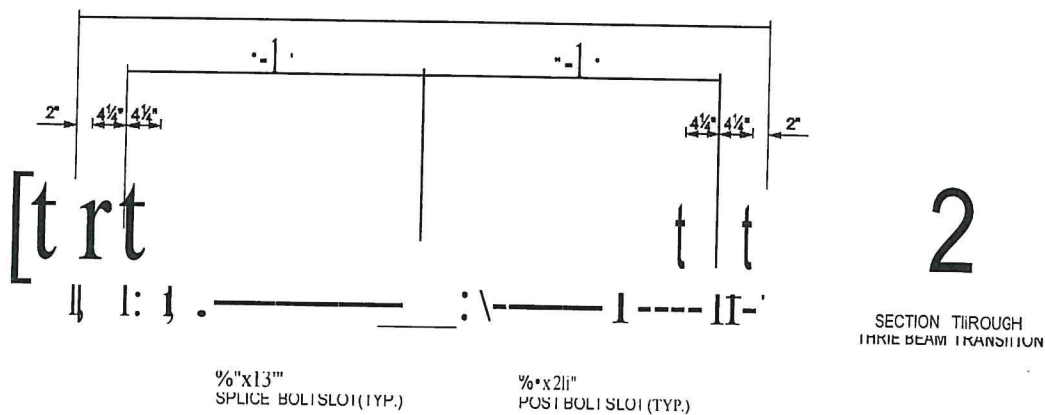
SECTION THROUGH THREE BEAM ELEMENT  
(FOR GUARDRAIL TYPES A, B, BD, T, TD, MGS-8, & MGS-8D)

Michigan Department of Transportation DEPARTMENT DIRECTOR BRADLEY C. WILFRIED, P.E.	STANDARD PLAN FOR <b>GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, &amp; MGS-8D</b>		SHEET 12 OF 16
	(SPECIAL DETAIL)	01/29/2024	
	FHWA APPROVAL	PLAN DATE	



SECTION THROUGH THRIE BEAM TRANSITION

SYMMETRICAL THRIE BEAM TRANSITIONS

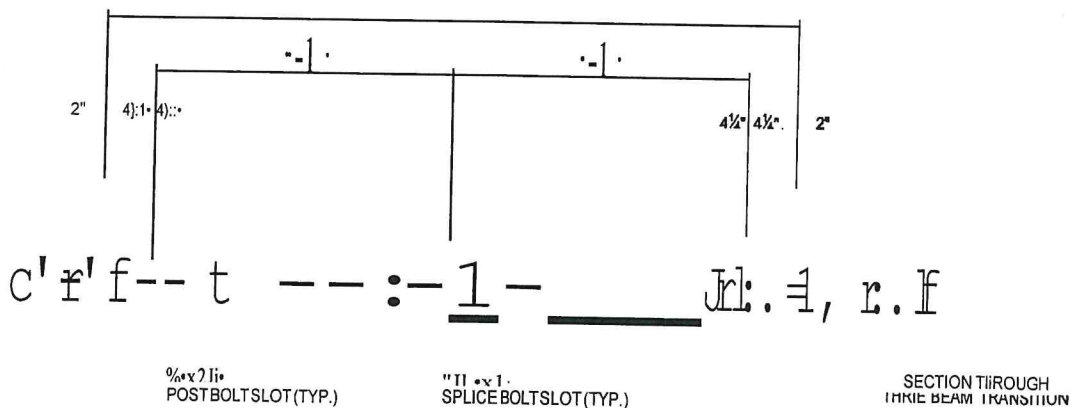


SECTION THROUGH THRIE BEAM TRANSITION

2

SECTION THROUGH THRIE BEAM TRANSITION

S SECTION THROUGH THRIE BEAM TRANSITION

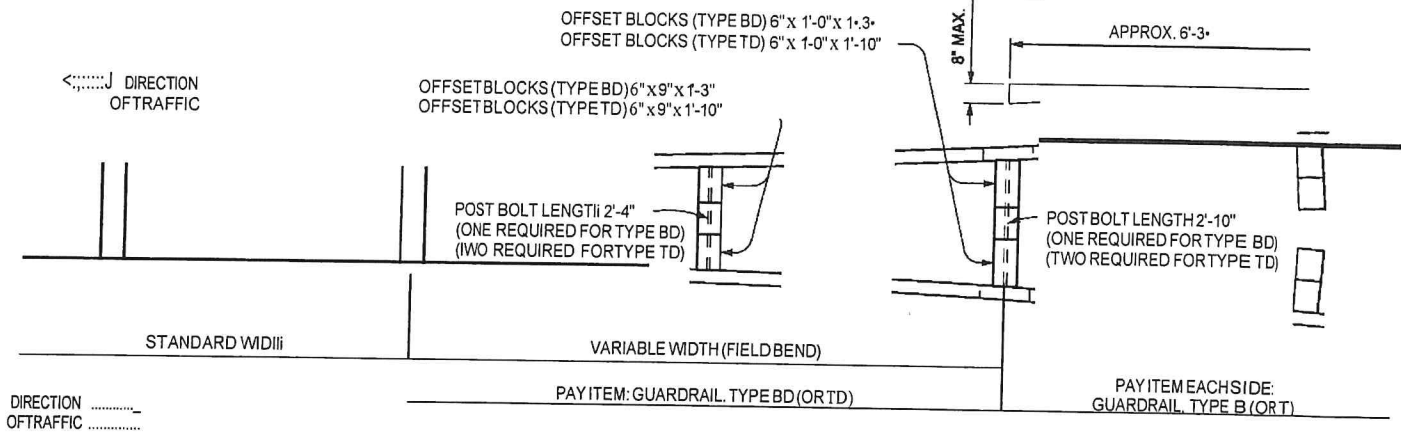


ASYMMETRICAL THRIE BEAM TRANSITIONS

NOTE: ASYMMETRICAL TRANSITION TYPE WILL VARY BY LOCATION DEPENDING ON GUARDRAIL LAYOUT

Mich9m O.p11rtmonl DITninsparbdian DEPARTMENT DIRECTOR BRADLEY C. WILFRICH, PE:	STANDARD PLAN FOR GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D		SHEET 13 OF 16
	(SPECIAL DETAIL)	01/29/2024 PLAN DATE	

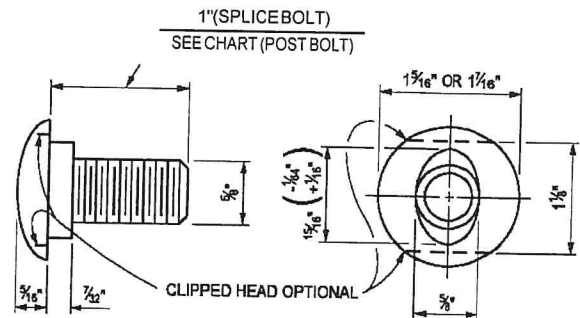




DETAIL SHOWING TRANSITION FROM GUARDRAIL, TYPE B (OR TYPE T)  
TO GUARDRAIL, TYPE BD (OR TYPE TD)

POST BOLTS, SPLICE BOLTS AND WASHERS AT BEAM ELEMENT SPLICE POSTS AND AT INTERMEDIATE POSTS						
GUARDRAIL TYPE	POST	OFFSET BLOCK	POST BOLTS		SPLICE BOLTS (1" LONG) (NO. REQ'D)	WASHERS (ROUND) (NO. REQ'D)
			NO. REQ'D	LENGTH		
A	WOOD	A	1		8	1
	STEEL	A	1	2"		1
B	WOOD	WOOD	1	18"	8	1
	STEEL	WOOD	1	18"		1
BD	WOOD	WOOD	1		18	
	STEEL	WOOD	2	18"		2
T	WOOD	WOOD	2	18"	12	2
	STEEL	WOOD	2	18"		2
TD	WOOD	WOOD	2	26"	24	
	STEEL	WOOD	4	26"		4

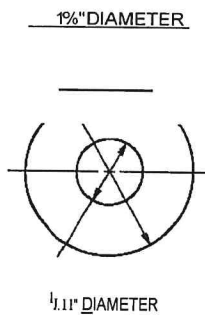
MINIMUM POST BOLT THREAD LENGTH	
BOLT LENGTH	MINIMUM THREAD LENGTH
18"	1"
24"	3"



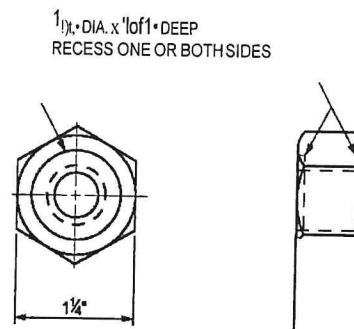
SPLICE BOLT AND POST BOLT

THREE BEAM TRANSITIONS REQUIRE 20 SPLICE BOLTS EACH (12 ON TYPE T AND 8 ON TYPE BEND).

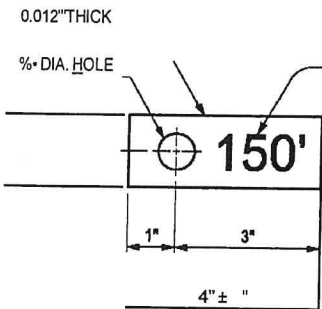
"EXCEPT AS SPECIFIED ON DETAIL SHOWING TRANSITION FROM GUARDRAIL, TYPE B (OR TYPE T) TO GUARDRAIL, TYPE BD (OR TYPE TD), POST BOLTS SHALL NOT EXTEND MORE THAN BEYOND NUT.



ROUND WASHER



NUT



METAL TAG

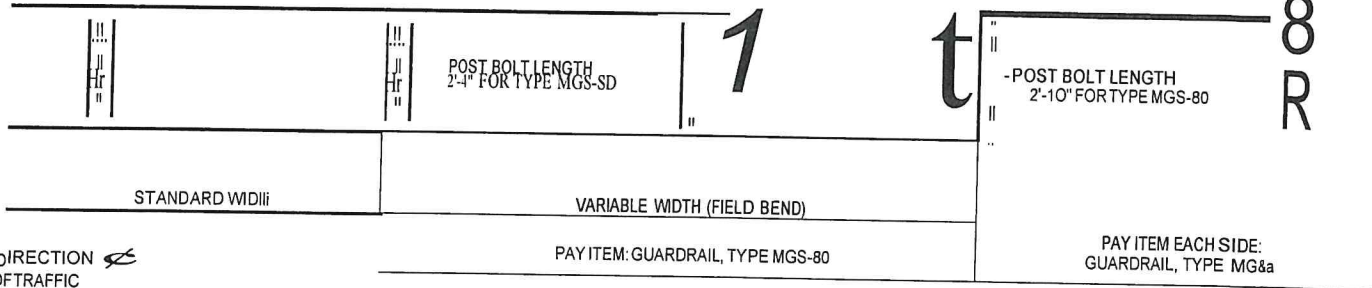
FOR CURVED GUARDRAIL WITH RADIUS OF 150' OR LESS

Mich9m O.p1 Inmonl DITninsparbidan DEPARTMENT DIRECTOR BRADLEY C. WILFEL: RICH. PI.	STANDARD PLAN FOR <b>GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, &amp; MGS-8D</b>		SHEET <b>R-60-J</b> 14 OF 16
	(SPECIAL DETAIL) 01/29/2024	FHWA APPROVAL PLAN DATE	

← OF TRAFFIC DIRECTION

OFFSET BLOCKS (TYPE MGS-80) 6" x gw x 1'-2"

APPROX. 6'-3"



DETAIL SHOWING TRANSITION FROM GUARDRAIL, TYPE MGS-8 TO GUARDRAIL, TYPE MGS-8D

POST BOLTS, SPLICE BOLTS AND WASHERS AT BEAM ELEMENT SPLICE POSTS AND AT INTERMEDIATE POSTS						
GUARDRAIL TYPE	POST	OFFSET BLOCK	POST BOLTS		SPLICE BOLTS (1" LONG) (NO. REQ'D)	WASHERS (ROUND) (NO. REQ'D)
			NO. REQ'D	LENGTH		
MGS-8	WOOD	WOOD	1	18'	8	1
	STEEL	WOOD	1	11		1
MGS-80	WOOD	WOOD	1	20'	16	1
	STEEL	WOOD	2	20'		2

MINIMUM POST BOLT THREAD LENGTH	
BOLT LENGTH	MINIMUM THREAD LENGTH
11	1 1/2"
18'	2"
20'	3"

THREE BEAM TRANSOMONS REQUIRE 20 SPLICE BOLTS EACH (12 ON TYPE T END AND 8 ON TYPE MGS END).

\*EXCEPT AS SPECIFIED ON DETAIL SHOWING TRANSITION FROM GUARDRAIL, TYPE MGS-8 TO GUARDRAIL, TYPE MGS-80 POST BOLTS SHALL NOT EXTEND MORE THAN BEYOND NUT.

Michigan Department of Transportation DEPARTMENT DIRECTOR BRADLEY C. WILFEL, P.E.	STANDARD PLAN FOR <b>GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, &amp; MGS-80</b>		<b>R-60-J</b>	SHEET 15 OF 16
	(SPECIAL DETAIL) FHWA APPROVAL	01/29/2024 PLAN DATE		

DIRECTION OF TRAFFIC

DIRECTION OF TRAFFIC

ONE-WAY TRAFFIC

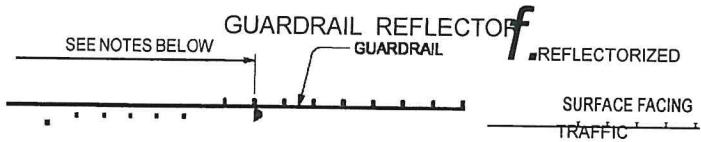
DIRECTION OF TRAFFIC

DIRECTION OF TRAFFIC

TWO-WAY TRAFFIC  
DIRECTION OF RAIL LAP

(0.0934") NOMINAL

13 GAGE GALVANIZED



DIRECTION OF TRAFFIC

DIRECTION OF TRAFFIC

ONE-WAY TRAFFIC



DIRECTION OF TRAFFIC

DIRECTION OF TRAFFIC

TWO-WAY TRAFFIC

### PLACEMENT OF GUARDRAIL REFLECTORS

#### NOTES GOVERNING THE USE OF GUARDRAIL REFLECTORS

- GUARDRAIL REFLECTORS SHALL BE USED ON ALL STANDARD GUARDRAIL RUNS, REGARDLESS OF ROADWAY LIGHTING.
- GUARDRAIL REFLECTORS ARE TO BE SPACED AT THE FOLLOWING INTERVALS:
  - 50'-0" ON TANGENT SECTIONS AND CURVES WITH A RADIUS OF 1150' OR MORE.
  - 25'-0" ON CURVES WITH A RADIUS LESS THAN 1150'.
- A GUARDRAIL REFLECTOR IS TO BE PLACED ON THE SECOND POST FROM THE GUARDRAIL DEPARTING TERMINAL.
- ON GUARDRAIL, TYPE T AND TYPE TD GUARDRAIL REFLECTORS ARE TO BE PLACED ON THE UPPER POST BOLT.
- GUARDRAIL REFLECTORS SHALL MATCH COLOR OF EDGE LINE.

DETAILS SPECIFIED ON THIS STANDARD ARE ACCORDING TO THE AASHTO-

AGC-ARTBA JOINT COMMITTEE, TASK FORCE 13 PUBLICATION TITLED "A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE:"

BEAM ELEMENTS SHALL BE SHOP BENT TO PLAN RADIUS FOR CURVE RADIUS 150' OR LESS. A TAG IDENTIFYING THE CURVATURE OF THE SHOP BENT SECTION WILL BE REQUIRED FOR EACH CURVED ELEMENT.

SEE STANDARD PLAN R-62-SERIES OR R-63-SERIES FOR GUARDRAIL APPROACH TERMINALS, STANDARD PLAN R-66-SERIES FOR GUARDRAIL DEPARTING TERMINALS AND STANDARD PLAN R-67-SERIES FOR GUARDRAIL ANCHORAGE, BRIDGE.

WOOD POSTS WITH BEVELS AT THE TOP MAY BE USED IN LIEU OF WOOD POSTS WITHOUT BEVELS SPECIFIED. THE LENGTH, WIDTH AND DEPTH OF THE POST SHALL BE AS SPECIFIED ON THIS STANDARD AND THE POST BOLT HOLES SHALL BE LOCATED TO ENSURE PROPER RAIL HEIGHT.

WOOD OFFSET BLOCKS WITH BEVELS AT THE TOP AND BOTTOM OR A 1" BEVELED TOP MAY BE USED IN LIEU OF WOOD BLOCKS WITHOUT BEVELS SPECIFIED. THE LENGTH (FRONT AND BACK FACE), WIDTH AND DEPTH OF THE BLOCK SHALL BE AS SPECIFIED ON THIS STANDARD AND THE POST BOLT HOLES SHALL BE LOCATED TO ENSURE PROPER RAIL HEIGHT AND COMPATIBILITY WITH POST HOLES.

WHEN THE FACE OF GUARDRAIL IS PLACED FLUSH WITH FACE OF CURB, THE RAIL HEIGHT SHOULD BE MEASURED FROM THE FRONT EDGE OF THE GUTTER PAN, WHICH IS THE POINT ON THE GUTTER PAN THAT IS CLOSEST TO THE EDGE OF THE TRAVELED LANE. WHEN THE FACE OF THE GUARDRAIL PANEL IS LOCATED BEHIND THE CURB THE RAIL HEIGHT

STANDARD PLAN FOR  
GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D

Michigan Dept. of Transportation

DEPARTMENT DIRECTOR  
BRADLEY C. WILFRIED, P.E.

(SPECIAL DETAIL) 01/29/2024

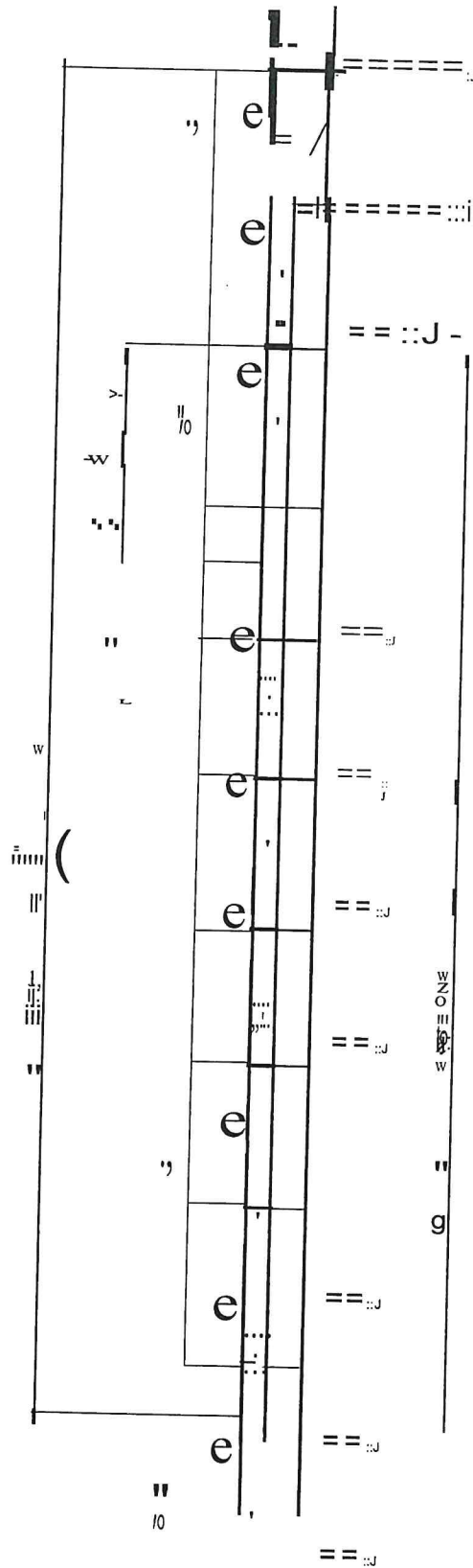
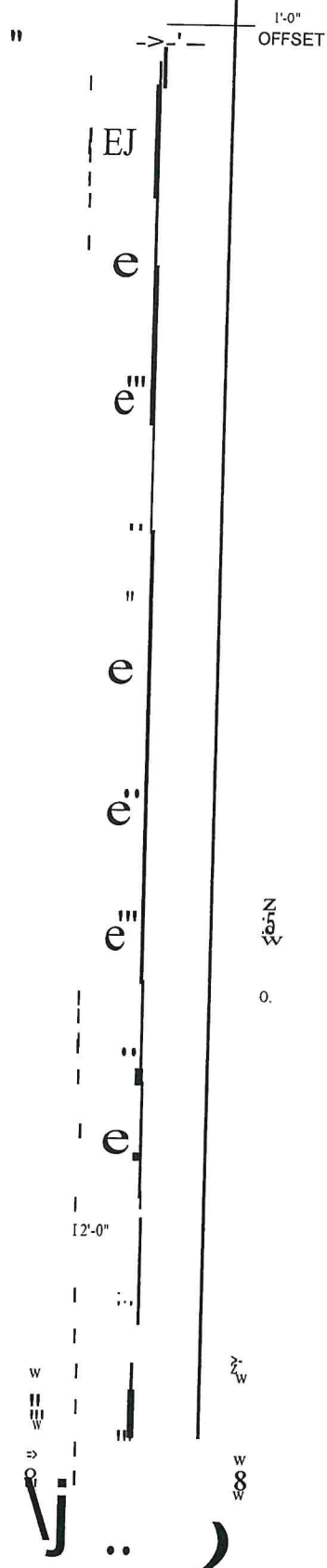
FHWA APPROVAL LAN OF

R-60-J

SHEET

16 OF 16

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OPTION 1

W



APPROVED BY: \_\_\_\_\_  
DIRECTOR, BUREAU OF FIELD SERVICES

Mich9m O. p11rtmml DITrainsparbdian

STANDARD PLAN FOR  
GUARDRAIL APPROACH TERMINAL TYPE 2M

APPROVED BY: \_\_\_\_\_  
DIRECTOR, BUREAU OF DEVELOPMENT

DEPARTMENT DIRECTOR  
BRADLEY C. WIEFERICH, PE

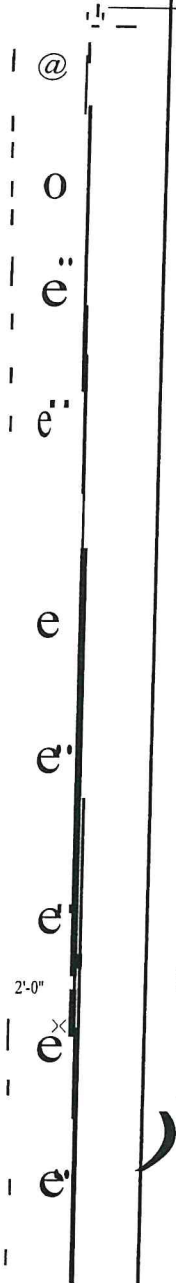
(SPECIAL DETAIL)  
FHWA APPROVAL

06/16/2022  
PLAN DATE

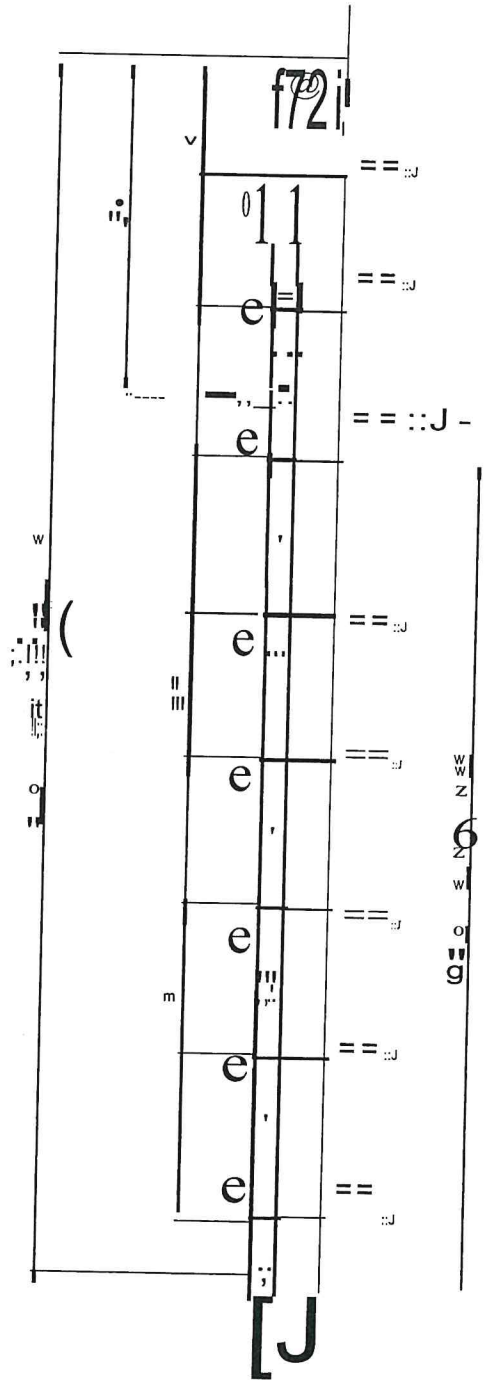
R-62-H

SHEET  
1 OF 4

It--



1'-0" OFFSET



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OPTION 2

STANDARD PLAN FOR <b>GUARDRAIL APPROACH TERMINAL TYPE 2M</b>		
DEPARTMENT DIRECTOR BRADLEY C. WILFRIED, PE	(SPECIAL DETAIL) FHWA APPROVAL	06/16/2022 PLAN DATE
R-62-H		SHEET 2 OF 4

C: NEN

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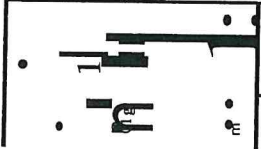
4" J

m

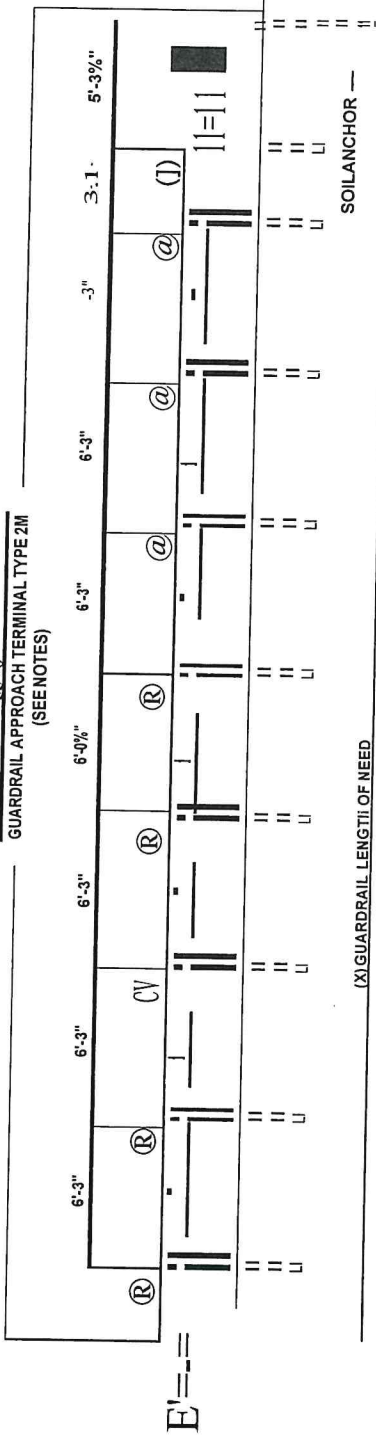
--- EDGE OF PAVEMENT

PLAN VIEW

Q - t



55'-0" GUARDRAIL APPROACH TERMINAL TYPE 2M (SEE NOTES)



(X) GUARDRAIL LENGTH OF NEED

SOIL ANCHOR

ELEVATION  
GUARDRAIL APPROACH TERMINAL TYPE 2M  
"MAX-TENSION"

2J

#

10'

m

10'

10'

NOTES:

SEE STANDARD PLAN R-60-SERIES FOR ADDITIONAL TRANSITION LENGTHS WHEN ATTACHING TERMINALS TO OTHER THAN TYPE MGS-8 GUARDRAIL.

ALL POSTS, OFFSET BLOCKS, BEAM ELEMENTS, AND HARDWARE (INCLUDING BOLTS, NUTS, AND WASHERS) SHALL CONFORM TO THE MANUFACTURER'S DETAILS AND SPECIFICATIONS.

ALL 1:10 SLOPES SHALL BE GRADED TO CLASS A SLOPE TOLERANCES.

WHEN SITE CONDITIONS WARRANT AND WITH THE APPROVAL OF THE ENGINEER, GUARDRAIL APPROACH TERMINAL TYPE 2M CAN BE INSTALLED STRAIGHT (WITHOUT THE 1'-0" OFFSET FROM THE TANGENT LINE TO THE TRAFFIC FACE OF POST 1).

GUARDRAIL REFLECTORS AND OTHER ATTACHMENTS ARE NOT TO BE USED ON THE GUARDRAIL APPROACH TERMINAL. PLACE REFLECTORS BEGINNING ON STANDARD RUN OF GUARDRAIL.

USE REFLECTIVE SHEETING ACCORDING TO THE FOLLOWING TRAFFIC CONDITIONS: (NOTE: ALTERNATE 3" BLACK AND 3" YELLOW STRIPES ON A 45° ANGLE)

TRAFFIC PASSING ON  
THE LEFT SIDE

TRAFFIC PASSING ON  
BOTH SIDES

TRAFFIC PASSING ON  
THE RIGHT SIDE

THE PORTION OF THE IMPACT HEAD ASSEMBLY FACING TRAFFIC SHALL BE COMPLETELY COVERED WITH HIGH INTENSITY ADHESIVE REFLECTIVE SHEETING.

Michigan Department of Transportation

DEPARTMENT DIRECTOR  
BRADLEY C. WILFRIED, P.E.

STANDARD PLAN FOR  
GUARDRAIL APPROACH TERMINAL TYPE 2M

(SPECIAL DETAIL)  
FHWA APPROVAL

06/16/2022  
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R-62-H

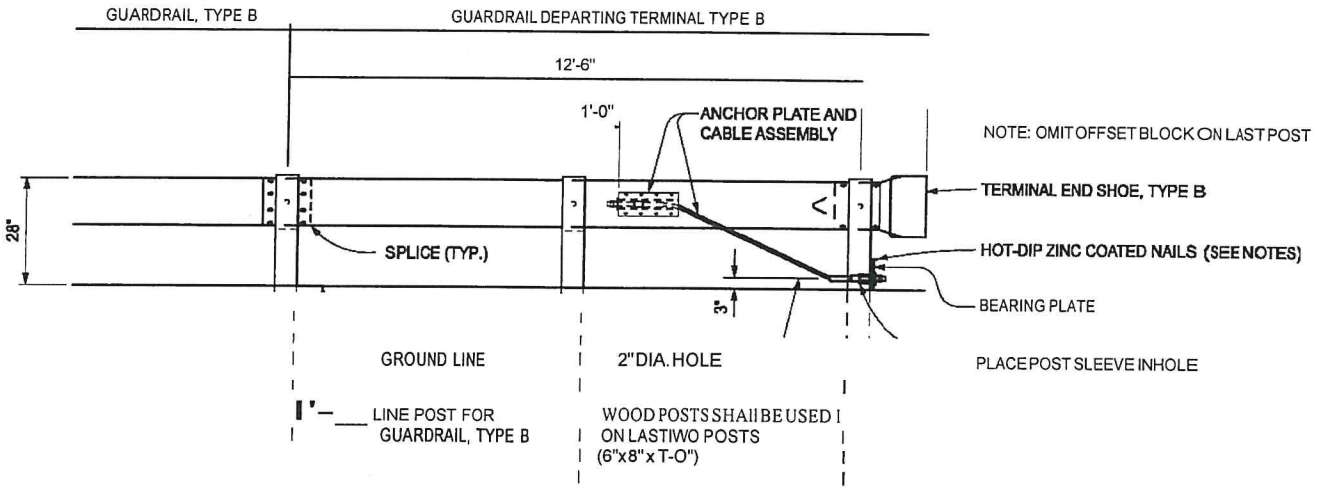
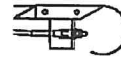
SHEET  
4 OF 4



DIRECTION OF TRAFFIC



8



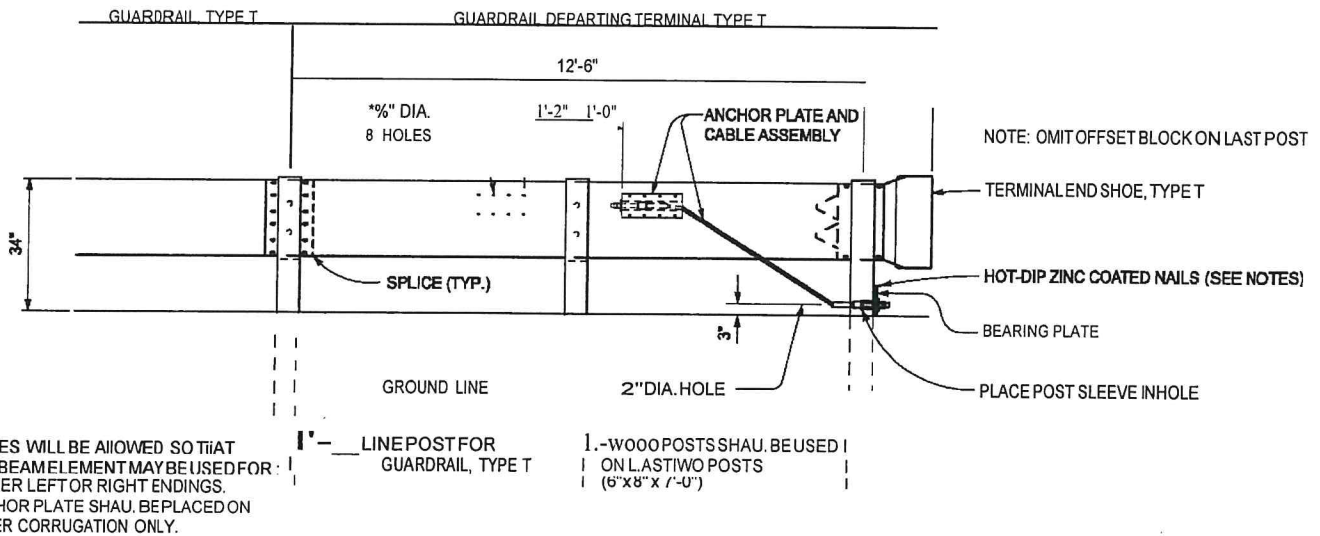
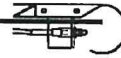
GUARDRAIL DEPARTING TERMINAL TYPE B

DIRECTION OF TRAFFIC

7



8



GUARDRAIL DEPARTING TERMINAL TYPE T

APPROVED BY: \_\_\_\_\_  
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: \_\_\_\_\_  
DIRECTOR, BUREAU OF DEVELOPMENT

Michigan O. p. l. t. r. m. o. n. d. i. t. n. s. p. a. r. d. i. a. n.

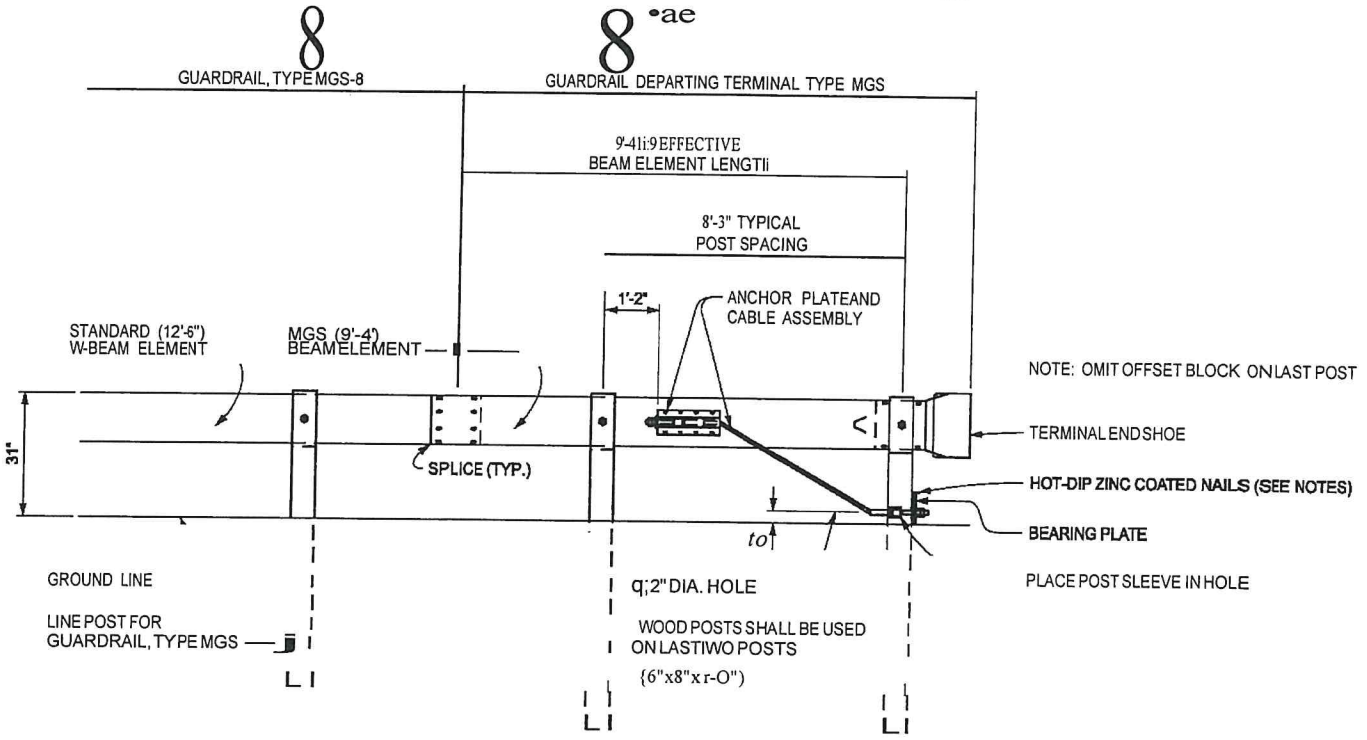
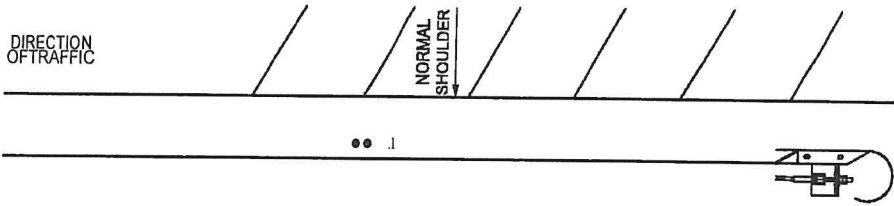
DEPARTMENT DIRECTOR  
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR  
GUARDRAIL DEPARTING TERMINAL TYPES B, T, & MGS

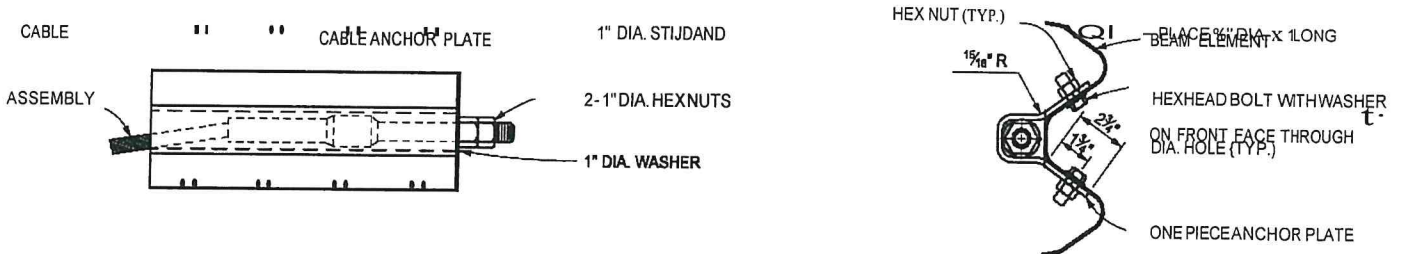
(SPECIAL DETAIL) 0911412023  
FHWA APPROVAL PLAN DATE

R-66-E

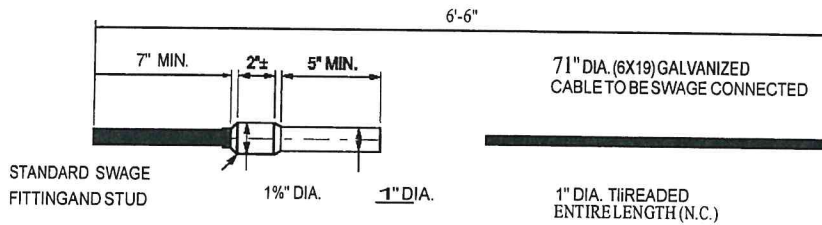
SHEET  
1 OF 4



GUARDRAIL DEPARTING TERMINAL TYPE MGS

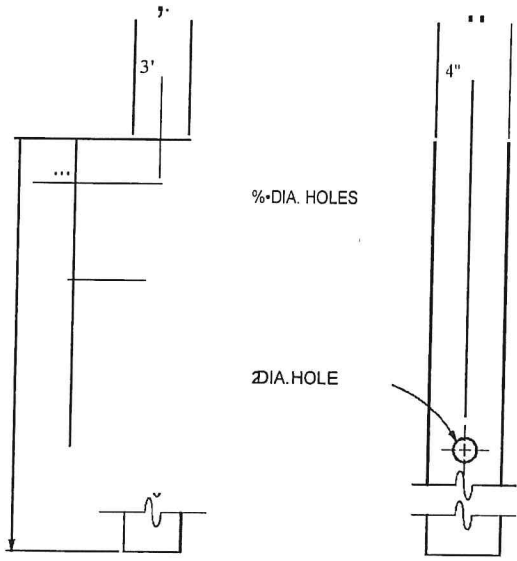


CABLE ANCHOR PLATE DETAILS

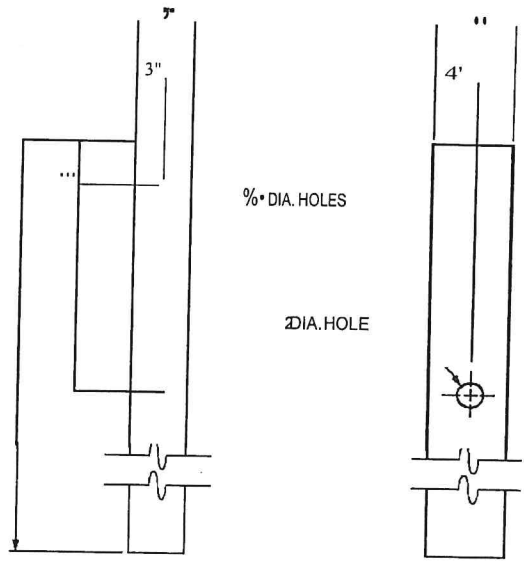


CABLE ASSEMBLY

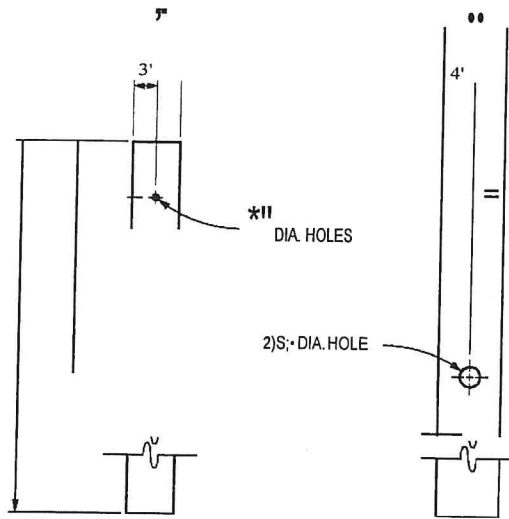
Michigan Department of Transportation DEPARTMENT DIRECTOR BRADLEY C. WILFRIED, P.E.	STANDARD PLAN FOR <b>GUARDRAIL DEPARTING TERMINAL TYPES B, T, &amp; MGS</b>		SHEET <b>2 OF 4</b>
	(SPECIAL DETAIL) _____ FHWA APPROVAL	09/14/2023 PLAN DATE	



**WOOD POST DETAIL**  
 (FOR LAST POST, GUARDRAIL DEPARTING TERMINAL TYPE T)



**WOOD POST DETAIL**  
 (FOR LAST POST, GUARDRAIL DEPARTING TERMINAL TYPE B)

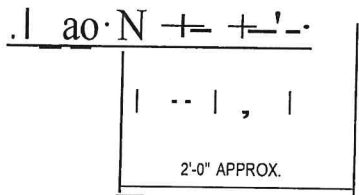


**WOOD POST DETAIL**  
 (FOR LAST POST, GUARDRAIL DEPARTING TERMINAL TYPE MGS)

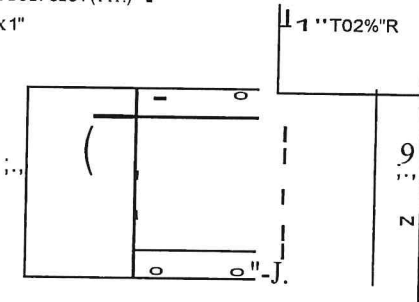
Michigan Department of Transportation DEPARTMENT DIRECTOR BRADLEY C. WILFRIED, P.E.	STANDARD PLAN FOR <b>GUARDRAIL DEPARTING TERMINAL TYPES B, T, &amp; MGS</b>		SHEET 30F 4
	(SPECIAL DETAIL) FHWA APPROVAL	09/14/2023 PLAN DATE	

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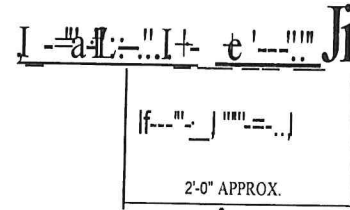
VJ



SPLICE BOLT SLOT (TYP.)  
 1'-0" x 1"



TERMINAL END SHOE, TYPE T

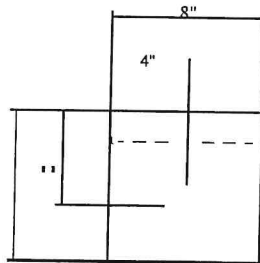


1'-0" x 1"

SPLICE BOLT SLOT (TYP.)

LO

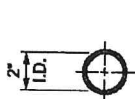
TERMINAL END SHOE,  
 TYPE A, TYPE B OR TYPE MGS



1/2" THICK x 1" x B" STEEL PLATE  
 TACK WELDED TO 3/8" THICK STEEL PLATE

1 1/2" DIA. HOLE

BEARING PLATE



POST SLEEVE

NOTES:

ALL POSTS, OFFSET BLOCKS, BEAM ELEMENTS, AND HARDWARE (INCLUDING BOLTS, NUTS, AND WASHERS) SHALL CONFORM TO THE STANDARD SPECIFICATIONS FOR CONSTRUCTION AND TO STANDARD PLAN R-60-SERIES,

WHERE APPLICABLE, EXCEPT AS SPECIFIED ON THIS STANDARD, ALL 1:10 SLOPES SHALL BE GRADED TO CLASS A SLOPE TOLERANCES.

FOR DETAILS OF GUARDRAIL PLACEMENT, SEE STANDARD PLAN R-59-SERIES.

AFTER THE CABLE ASSEMBLY HAS BEEN TIGHTENED, A SECOND NUT SHALL BE INSTALLED ON EACH END OF THE CABLE SO THAT THE CABLE WILL NOT LOOSEN.

TWO HOT-DIP ZINC COATED NAILS SHALL BE DRIVEN INTO THE WOOD POST AT THE TOP OF THE BEARING PLATE TO KEEP THE BEARING PLATE FROM ROTATING.

<p>Michigan Department of Transportation          DEPARTMENT DIRECTOR          BRADLEY C. WILFELT, P.E.</p>	<p>STANDARD PLAN FOR  <b>GUARDRAIL DEPARTING TERMINAL TYPES B, T, &amp; MGS</b></p> <p>(SPECIAL DETAIL)   09/14/2023   SHEET          FHWA APPROVAL PLAN DATE   <b>R-66-E</b>   4 OF 4</p>
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