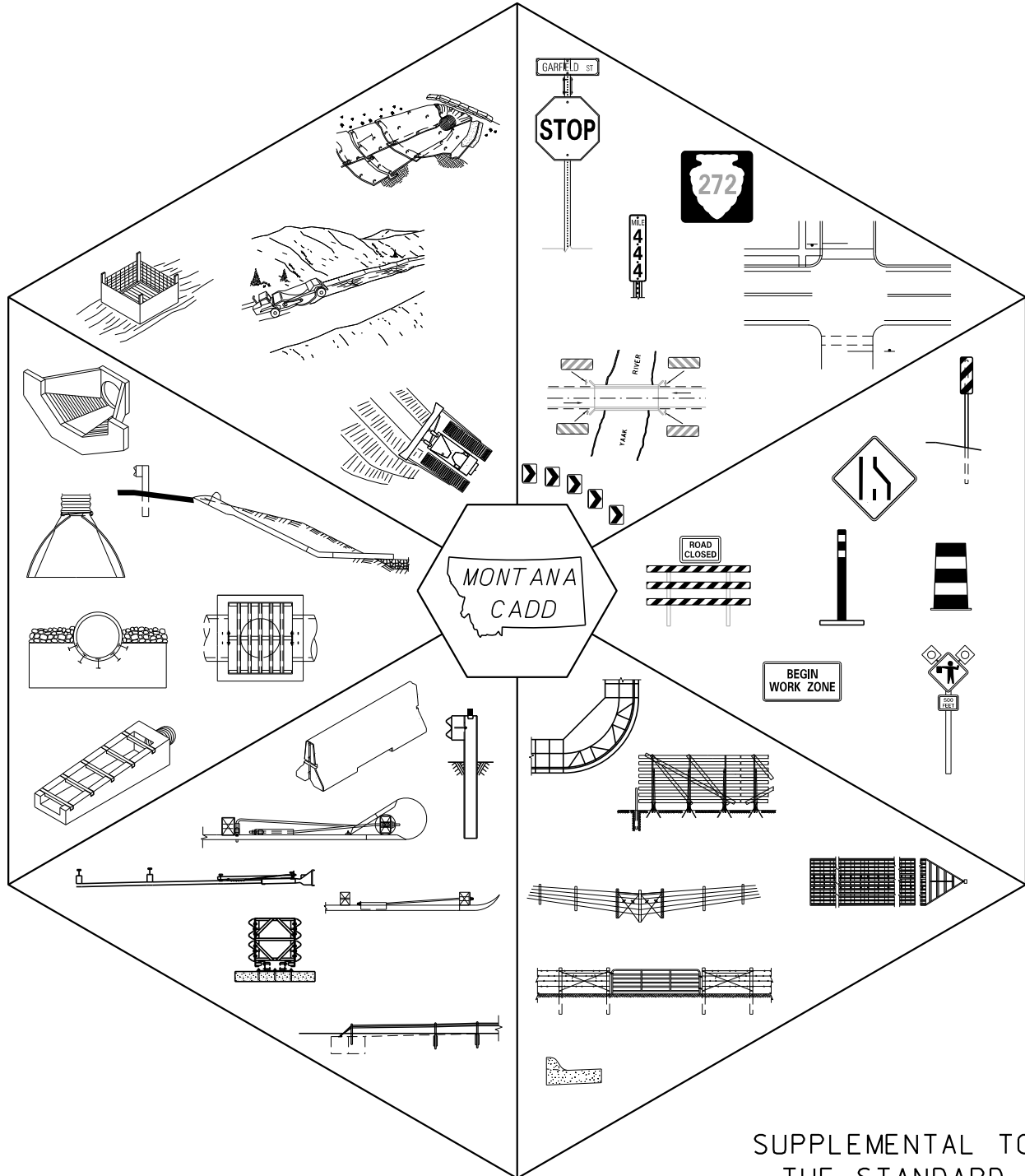


DETAILED DRAWINGS

SUPPLEMENT TO
2005 ENGLISH EDITION
EFFECTIVE: DECEMBER 2011



SUPPLEMENTAL TO
THE STANDARD
SPECIFICATIONS FOR
ROAD AND BRIDGE
CONSTRUCTION

**STANDARD SPECIFICATION SECTION AND
DRAWING TITLE**

**DRAWING
NUMBER**

MAINTENANCE GUIDELINE FOR SHORT-TERM TWO-LANE CRACK SEALING WORK ZONE	618-M1
MAINTENANCE GUIDELINE FOR SHORT-TERM TWO-LANE CHIP SEAL AND OVERLAY (PILOTED TRAFFIC)	618-M2
MAINTENANCE GUIDELINE FOR SHORT-TERM LANE CLOSURE ON INTERSTATE	618-M3
MOBILE OPERATIONS	618-M4
LANE CLOSURE – FLAGGER CONTROLLED (URBAN TWO-LANE, TWO-WAY ROAD)	618-U01
WORK ZONE OCCUPIES ONE HALF OF ROAD (LOW SPEED URBAN TWO-LANE, TWO-WAY ROAD)	618-U02
WORK ZONE IN CENTER OF ROAD (URBAN TWO-LANE, TWO-WAY ROAD)	618-U03
SIDEWALK CLOSURES AND BYPASS WALKWAY	618-U05
CROSSWALK CLOSURES AND PEDESTRIAN DETOURS	618-U10
LANE CLOSURE (URBAN TWO-LANE, TWO-WAY ROAD WITH TWO-WAY LEFT TURN LANE) ..	618-U15
TURN LANE CLOSURE (URBAN TWO-LANE, TWO-WAY ROAD WITH TWO-WAY LEFT TURN LANE)	618-U16
RIGHT LANE CLOSURE (URBAN MULTI-LANE, UNDIVIDED ROAD)	618-U20
LEFT LANE CLOSURE (LOW SPEED URBAN MULTI-LANE, UNDIVIDED ROAD)	618-U25
LEFT LANE CLOSURES (LOW SPEED URBAN MULTI-LANE, UNDIVIDED ROAD)	618-U30
DOUBLE LANE CLOSURE (URBAN MULTI-LANE, UNDIVIDED ROAD)	618-U35
RIGHT LANE CLOSURE – WORK ZONE BEYOND INTERSECTION (URBAN MULTI-LANE, UNDIVIDED ROAD)	618-U40
LEFT LANE CLOSER – WORK ZONE BEYOND INTERSECTION (URBAN MULTI-LANE, UNDIVIDED ROAD)	618-U45
DOUBLE LANE CLOSURE AT INTERSECTION (URBAN MULTI-LANE, UNDIVIDED ROAD) ..	618-U50
LEFT LANE CLOSURE (URBAN LOW SPEED, MULTI-LANE UNDIVIDED ROAD WITH TWO-WAY LEFT TURN LANE)	618-U60

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ALUMINUM SHEET INCREMENT SIGN CONSTRUCTION DETAILS	619-04
PLYWOOD SHEET INCREMENT GUIDE SIGN CONSTRUCTION DETAILS	619-06
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BREAKAWAY AND FOUNDATION DETAILS FOR MULTIPLE GUIDE SIGN SUPPORTS	619-13
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CANTILEVER TYPE SIGN SUPPORT DETAILS FOR SIDEWALK AREAS	619-18
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**STANDARD SPECIFICATION SECTION AND
DRAWING TITLE**

**DRAWING
NUMBER**

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PAVEMENT MARKINGS (ARROWS)	620-15
PAVEMENT MARKINGS (SYMBOLS)	620-20

SECTION 621: REMOVE, RE-SET AND ADJUST FACILITIES

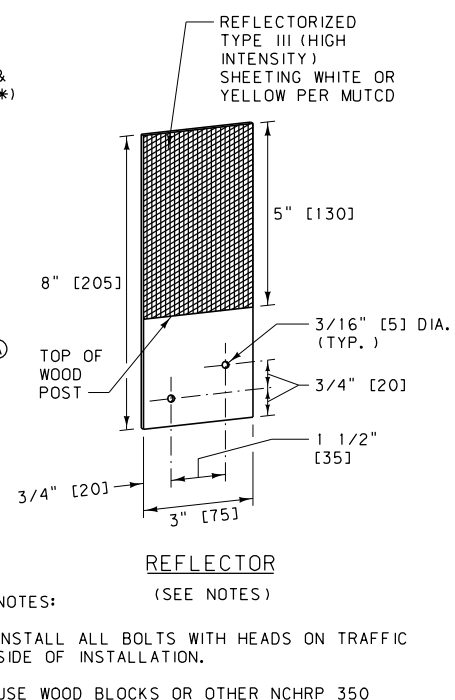
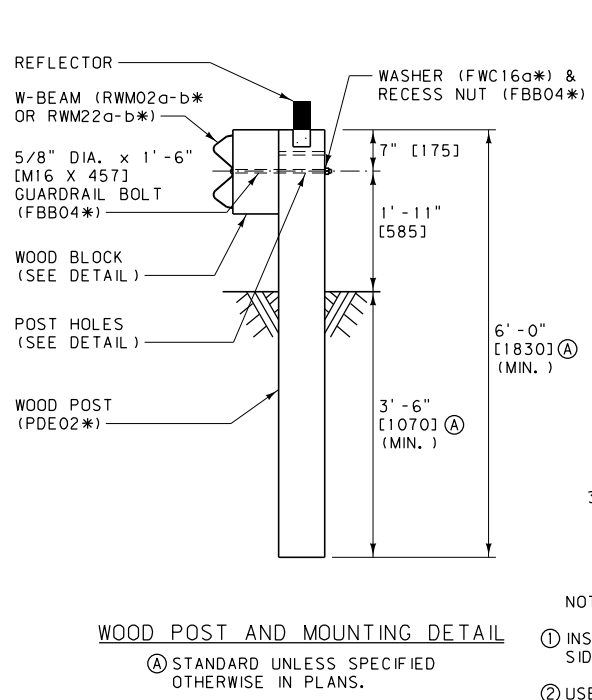
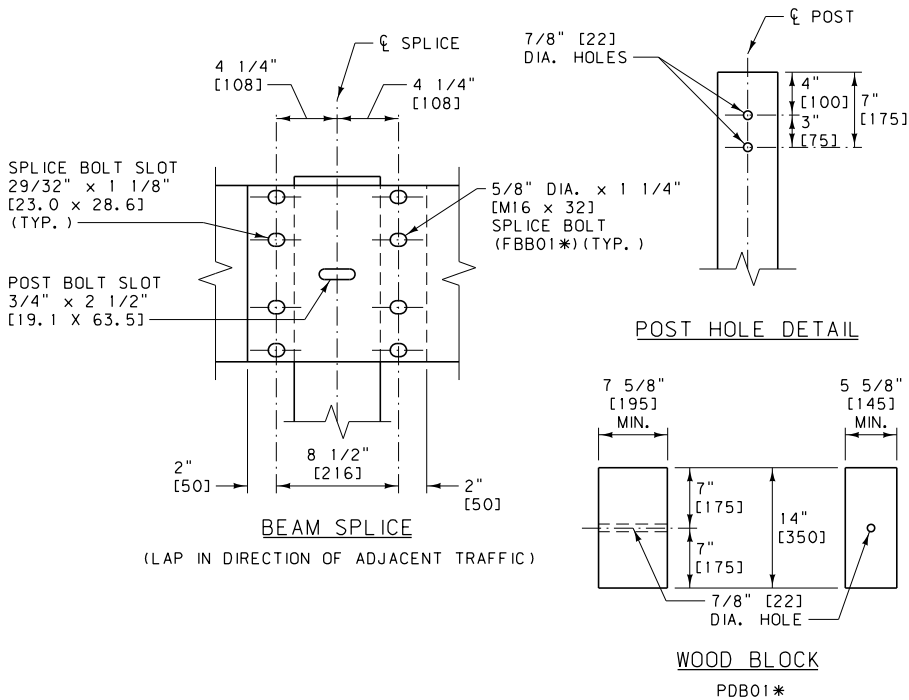
MANHOLE AND VALVE BOX ADJUSTMENT DETAILS	621-00
OPTIONAL MANHOLE AND VALVE BOX ADJUSTMENT DETAILS	621-05

SECTION 623: MAILBOXES

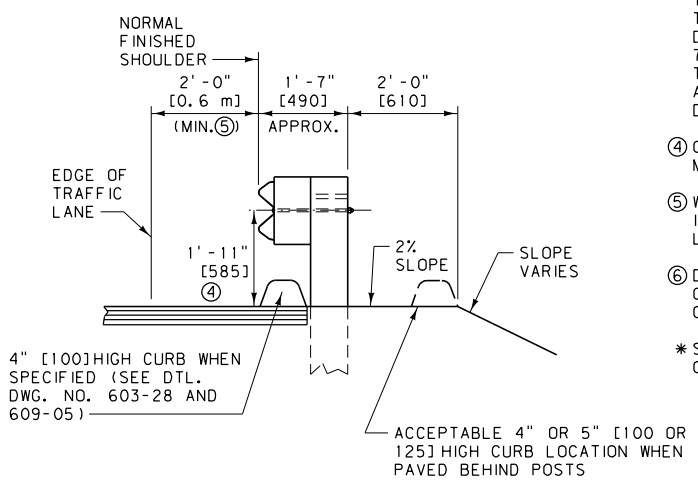
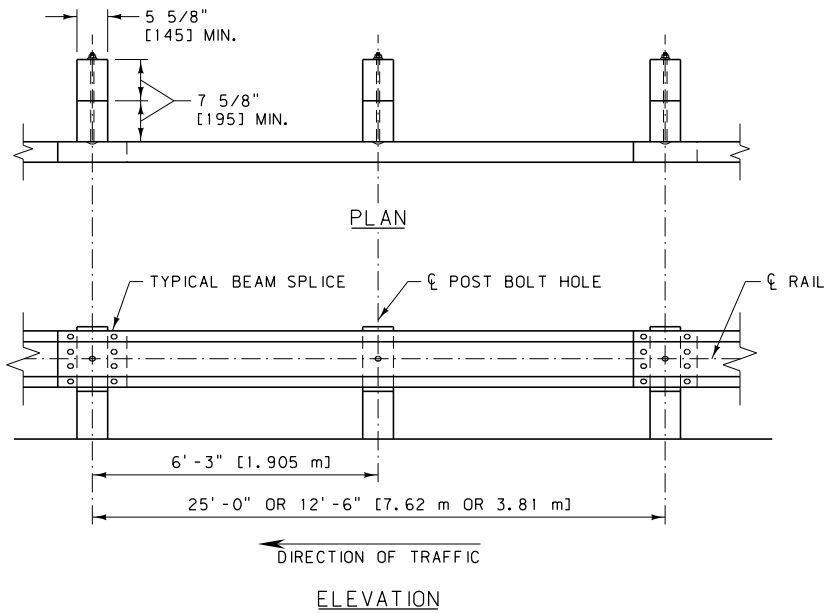
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MISCELLANEOUS

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- NOTES:
- INSTALL ALL BOLTS WITH HEADS ON TRAFFIC SIDE OF INSTALLATION.
 - USE WOOD BLOCKS OR OTHER NCHRP 350 APPROVED BLOCKS. AFFIX BLOCKS TO POSTS WITH TWO 16 PENNY GALV. NAILS OR 14 GAGE WIRE WRAP.
 - ATTACH REFLECTORS TO POSTS EVERY 25 FEET [7.62 m], INCLUDING TERMINAL SECTIONS, WITH THE REFLECTORIZED SURFACE FACING ADJACENT TRAFFIC. FABRICATE REFLECTORS FROM 0.063" [1.6 mm] THICK ALUMINUM ALLOW PER SECTION 704. FASTEN REFLECTOR TO WOOD POST USING TWO 16 PENNY RING-SHANKED GALVANIZED NAILS AND TWO 3/16" [4.8 mm] DIA. WASHERS IN PRE-DRILLED HOLES.
 - ON EXISTING GUARDRAIL INSTALLATIONS, THE MINIMUM RAIL HEIGHT IS 1'-8" [510 mm].
 - WIDENING IS REQUIRED IF FINISHED SHOULDER IS LESS THAN 2'-0" [0.6 m] FROM THE TRAFFIC LANE.
 - DO NOT INSTALL W-BEAM GUARDRAIL FOR OBSTACLES WITHIN 5.6' [1.7 m] OF THE FACE OF THE RAIL.
- * SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.



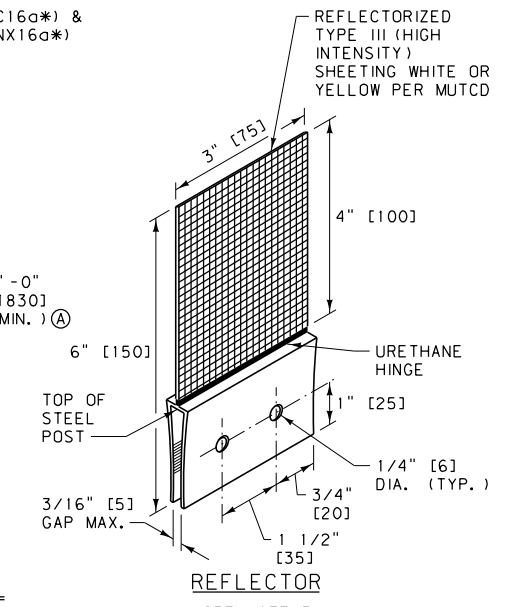
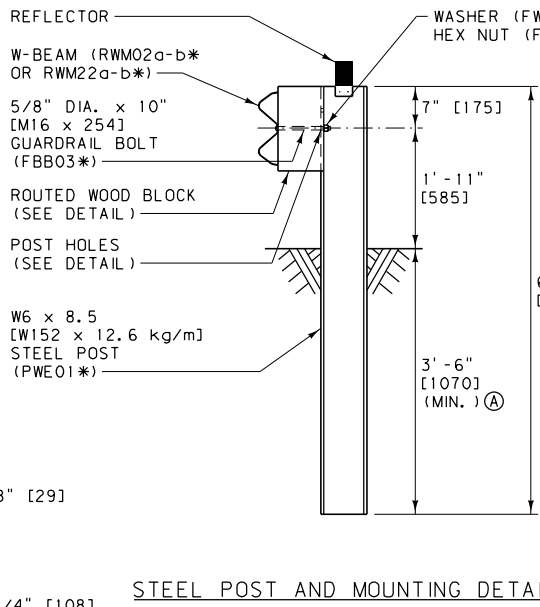
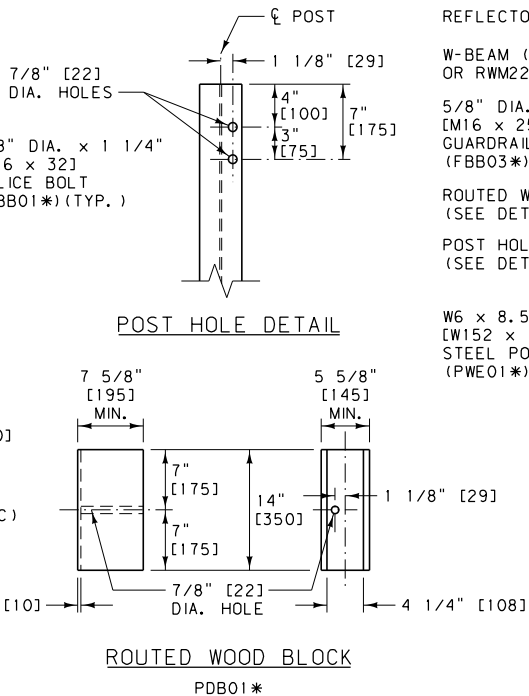
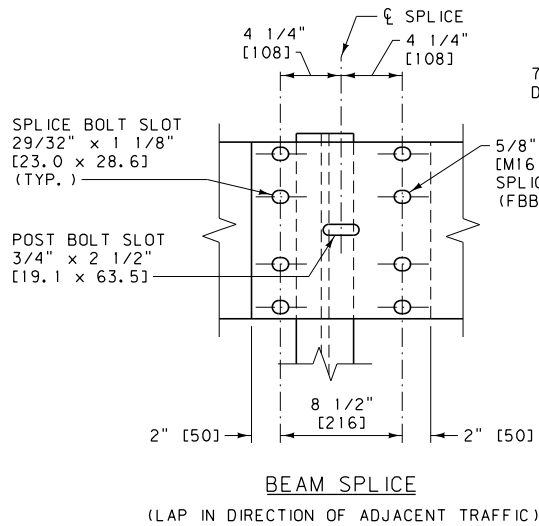
UNITS SHOWN IN BRACKETS [] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 606, 704	DWG. NO. 606-05A

METAL GUARDRAIL - WOOD POSTS

--REVISED--	EFFECTIVE: APRIL 2006
MAY 2011	
DECEMBER 2011	

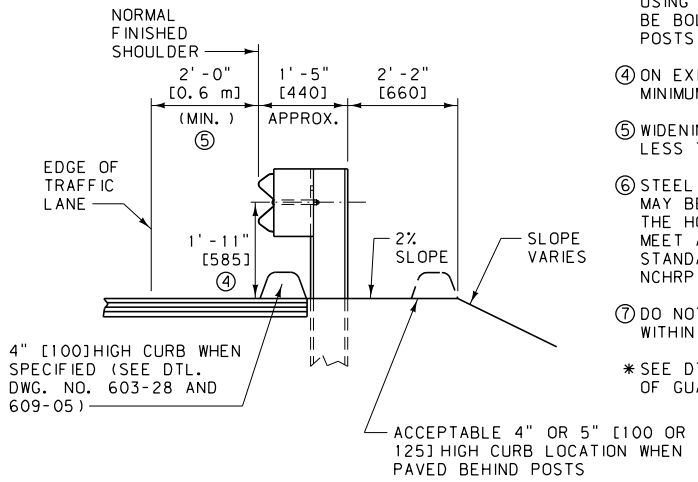
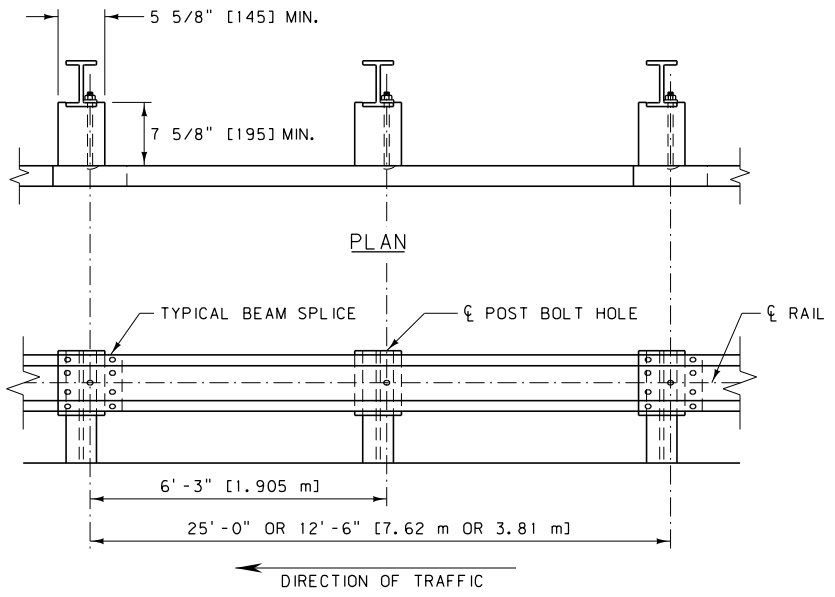




(A) STANDARD UNLESS SPECIFIED OTHERWISE IN PLANS.

- NOTES:
- INSTALL ALL BOLTS WITH HEADS ON TRAFFIC SIDE OF INSTALLATION.
 - USE ROUTED WOOD BLOCKS OR OTHER NCHRP 350 APPROVED BLOCKS.
 - ATTACH REFLECTORS TO POSTS EVERY 25 FEET [7.62 m], INCLUDING TERMINAL SECTIONS, WITH THE REFLECTORIZED SURFACE FACING ADJACENT TRAFFIC. FASTEN REFLECTOR TO STEEL POST USING AN APPROVED ADHESIVE. REFLECTORS MAY BE BOLTED TO POSTS PROVIDED HOLES IN POSTS ARE DRILLED BEFORE BEING GALVANIZED.
 - ON EXISTING GUARDRAIL INSTALLATIONS, THE MINIMUM RAIL HEIGHT IS 1'-8" [510 mm].
 - WIDENING IS REQUIRED IF FINISHED SHOULDER IS LESS THAN 2'-0" [0.6 m] FROM THE TRAFFIC LANE.
 - STEEL POSTS WITH OTHER POST HOLE CONFIGURATIONS MAY BE ACCEPTED, PROVIDED THEY HAVE AT LEAST THE HOLES DETAILED ON THIS DRAWING AND THEY MEET AASHTO'S PUBLICATION, "A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE" AND NCHRP 350 REQUIREMENTS.
 - DO NOT INSTALL W-BEAM GUARDRAIL FOR OBSTACLES WITHIN 5.6' [1.7 m] OF THE FACE OF THE RAIL.

* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.

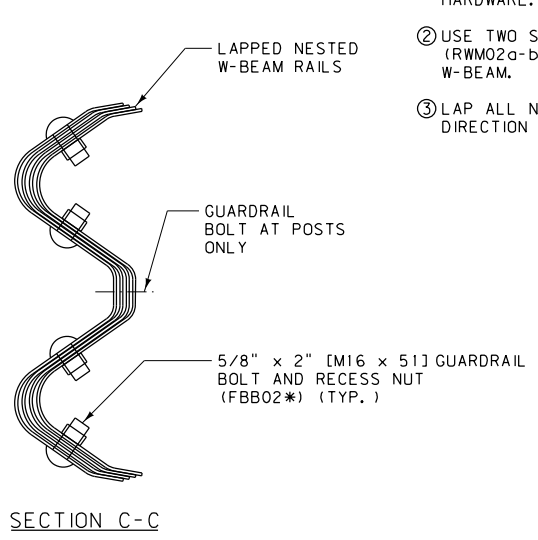
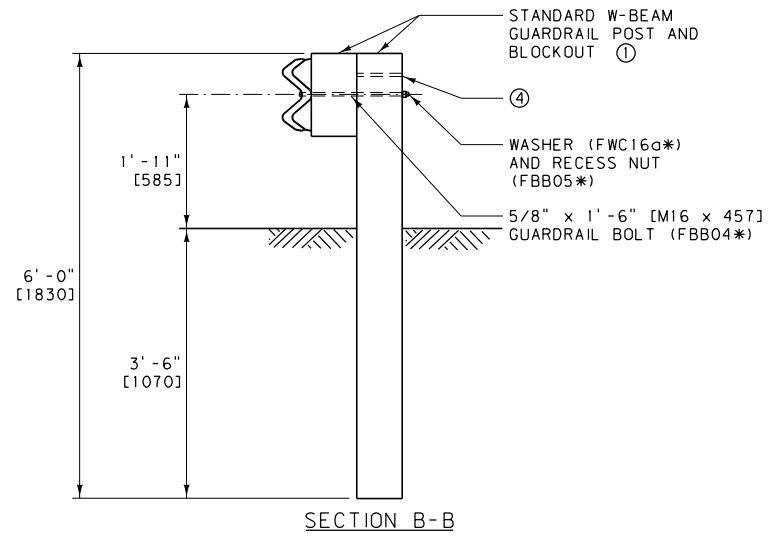
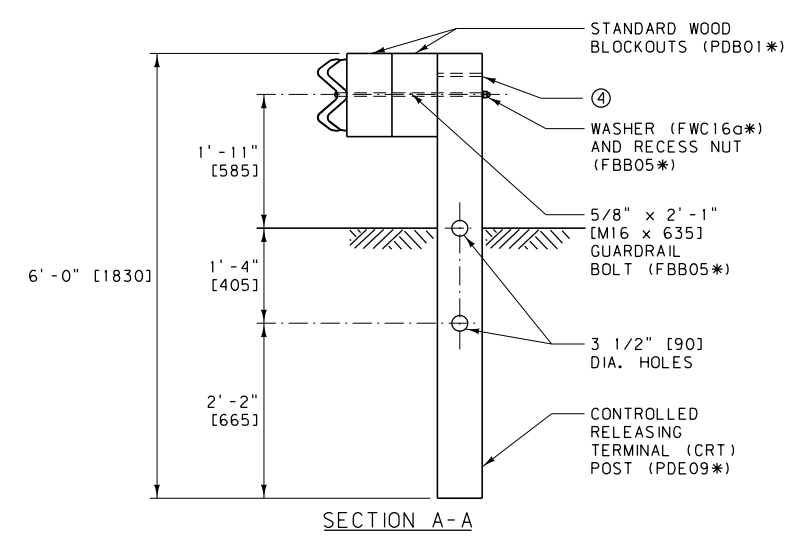
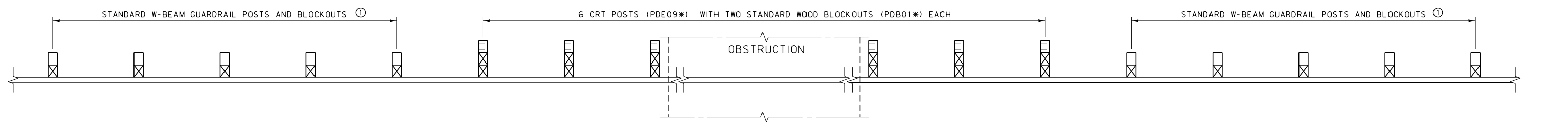
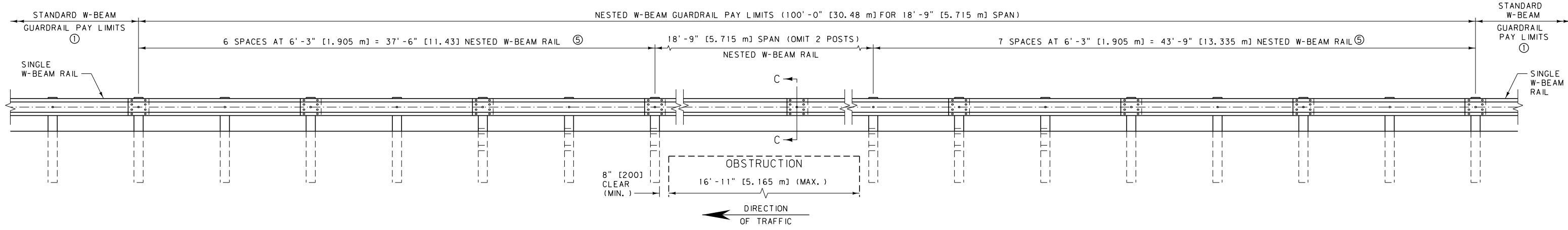
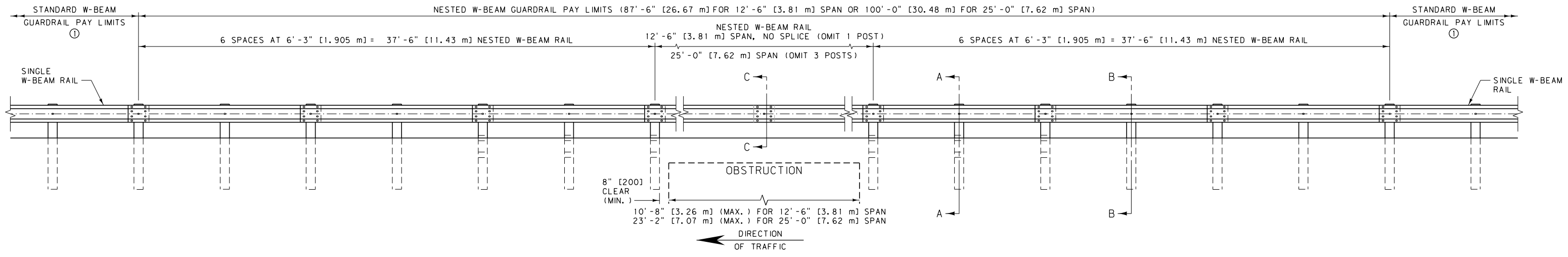


DETAILED DRAWING	
REFERENCE	DWG. NO.
STANDARD SPEC.	606-05B
SECTION 606	

METAL GUARDRAIL - STEEL POSTS

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MAY 2011	
DECEMBER 2011	
MDT	MONTANA DEPARTMENT OF TRANSPORTATION

UNITS SHOWN IN BRACKETS [] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.



- NOTES:
- ① SEE DTL. DWG. NO. 606-05A AND 606-05B FOR STANDARD W-BEAM GUARDRAIL AND ASSOCIATED HARDWARE.
 - ② USE TWO STANDARD W-BEAM RAILS (RWM02a-b* OR RWM22a-b*) FOR NESTED W-BEAM.
 - ③ LAP ALL NESTED W-BEAM RAIL IN THE DIRECTION OF ADJACENT TRAFFIC.


- ④ ALL POSTS ARE TO HAVE A SECOND BOLT HOLE AT 3" (75) ABOVE THE FIRST.
 - ⑤ THE SPLICE LOCATIONS ON THE 18'-9" (5.715 m) SPAN MAY BE SHIFTED DOWNSTREAM BY 6'-3" (1.905 m).
 - ⑥ DO NOT INSTALL NESTED W-BEAM GUARDRAIL FOR OBSTACLES WITHIN 7.3' (2.2 m) OF THE FACE OF THE RAIL.
- * SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.

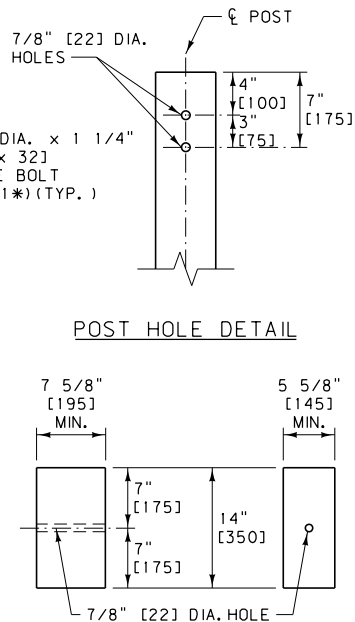
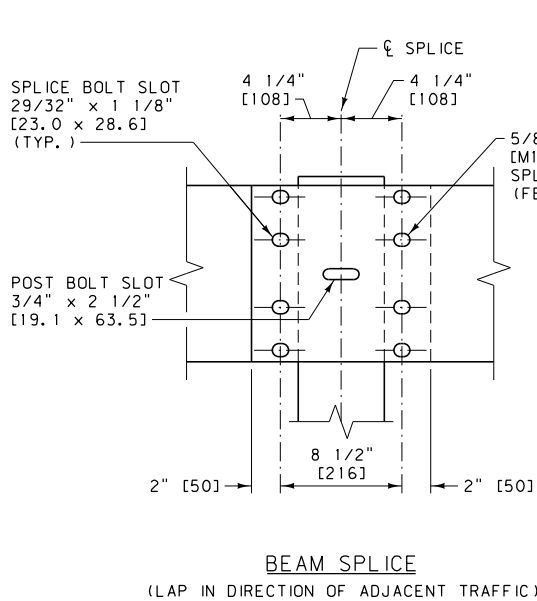
UNITS SHOWN IN BRACKETS [] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

DETAILED DRAWING	
REFERENCE	DWG. NO.
STANDARD SPEC.	606-09
SECTION 606	

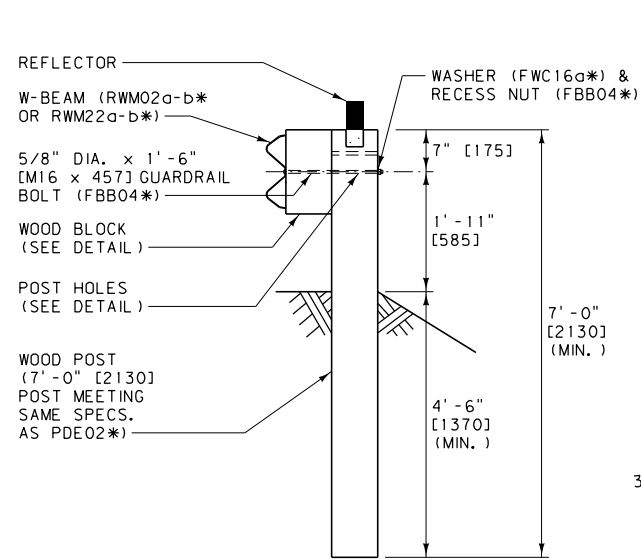
NESTED W-BEAM GUARDRAIL

--REVISED--
DECEMBER 2011

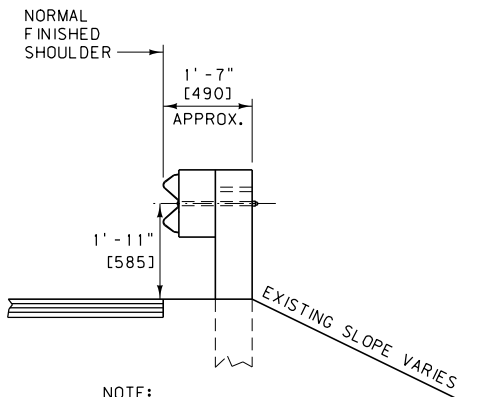
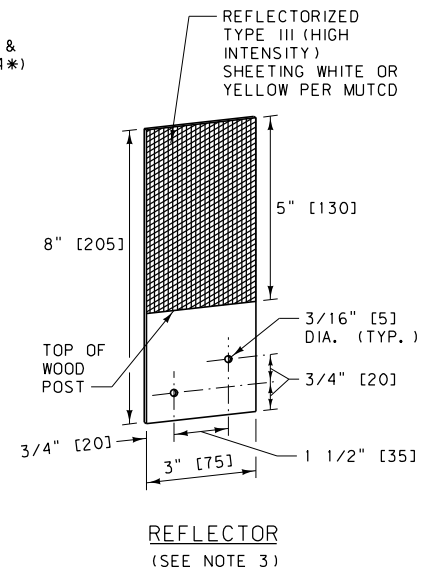
EFFECTIVE: APRIL 2006
 MONTANA DEPARTMENT OF TRANSPORTATION
servicing you with pride



WOOD BLOCK
PDB01*



WOOD POST AND MOUNTING DETAIL



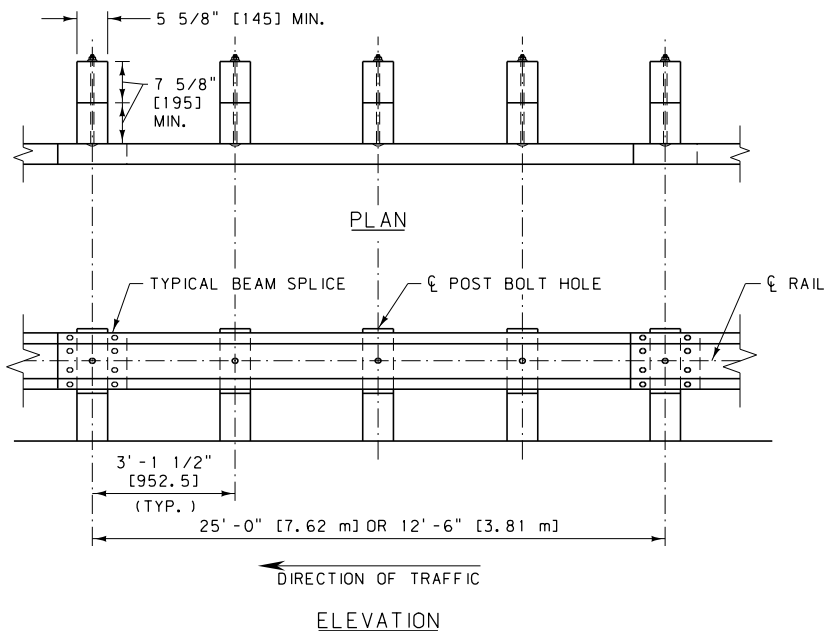
NOTE:
THIS GUARDRAIL SYSTEM IS USED WHEN THE 2'-0" [610] WIDENING BEHIND THE POSTS CANNOT BE PROVIDED, AS PER DTL. DWG. NO. 606-05A & 606-05B.

PROFILE

NOTES:

- ① INSTALL ALL BOLTS WITH HEADS ON TRAFFIC SIDE OF INSTALLATION.
- ② USE WOOD BLOCKS OR OTHER NCHRP 350 APPROVED BLOCKS. AFFIX BLOCKS TO POSTS WITH TWO 16 PENNY GALV. NAILS OR 14 GAGE WIRE WRAP.
- ③ ATTACH REFLECTORS TO POSTS EVERY 25' [7.62 m], INCLUDING TERMINAL SECTIONS, WITH THE REFLECTORIZED SURFACE FACING ADJACENT TRAFFIC. FABRICATE REFLECTORS FROM 0.063" [1.6] THICK ALUMINUM ALLOY PER SECTION 704. FASTEN REFLECTOR TO WOOD POST USING TWO 16 PENNY RING-SHANKED GALVANIZED NAILS AND TWO 3/16" [4.8] DIA. WASHERS IN PRE-DRILLED HOLES.
- ④ ON EXISTING GUARDRAIL INSTALLATIONS, THE MINIMUM RAIL HEIGHT IS 1'-8" [510].
- ⑤ THE W-BEAM RAIL ON THIS SYSTEM REQUIRES ADDITIONAL HOLES TO ACCOMMODATE BEING BOLTED TO POSTS AT HALF THE NORMAL POST SPACING. DRILL ADDITIONAL HOLES IN THE W-BEAM RAIL PRIOR TO APPLYING CORROSION PROTECTION.
- ⑥ DO NOT INSTALL W-BEAM GUARDRAIL WITH 7' [2.1 m] POSTS FOR OBSTACLES WITHIN 4.6' [1.4 m] OF THE FACE OF THE RAIL.

* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.



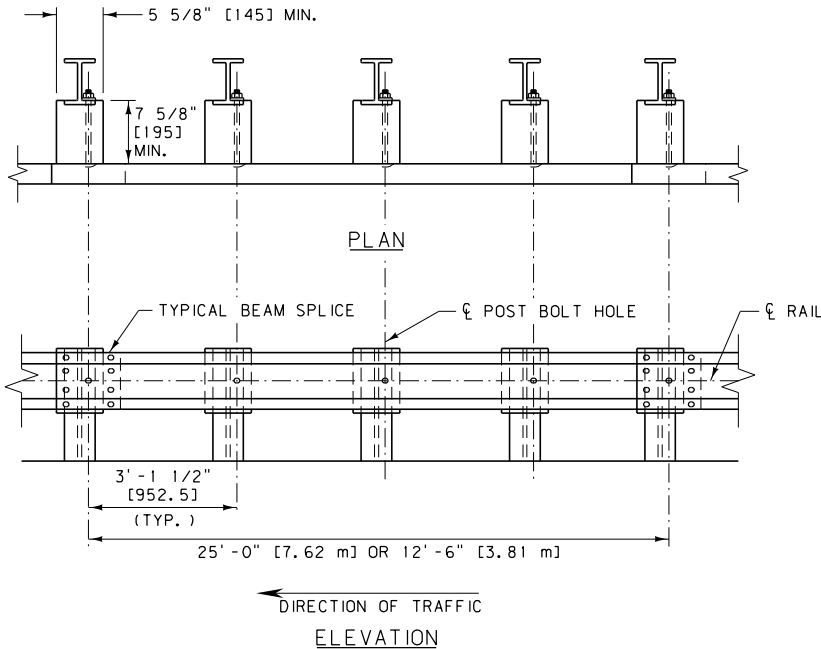
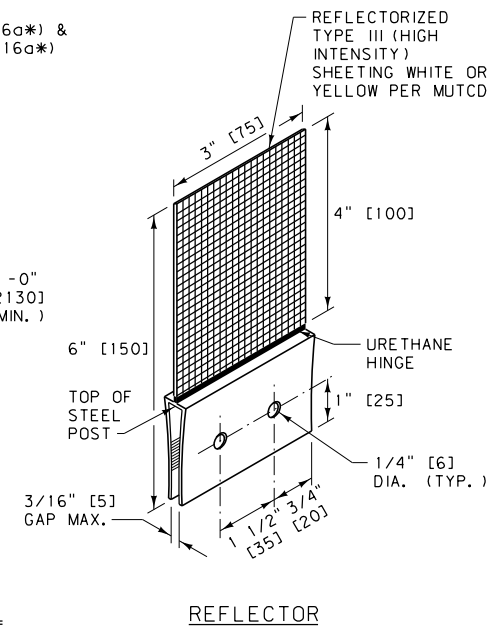
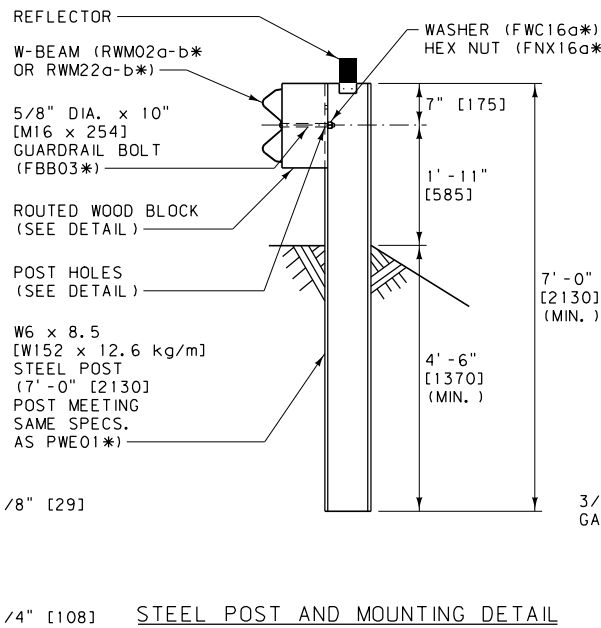
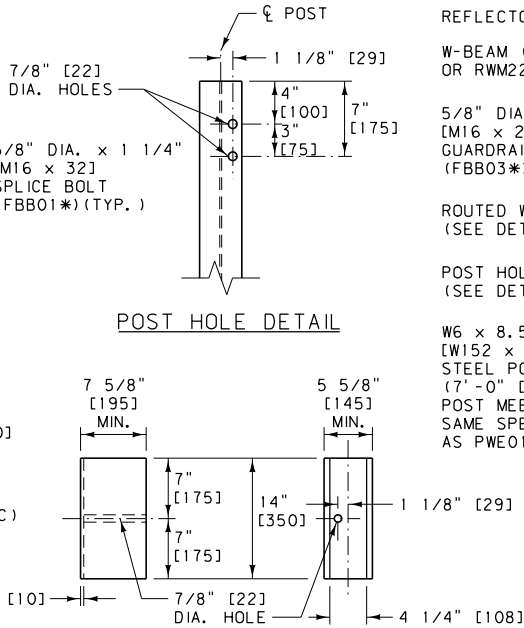
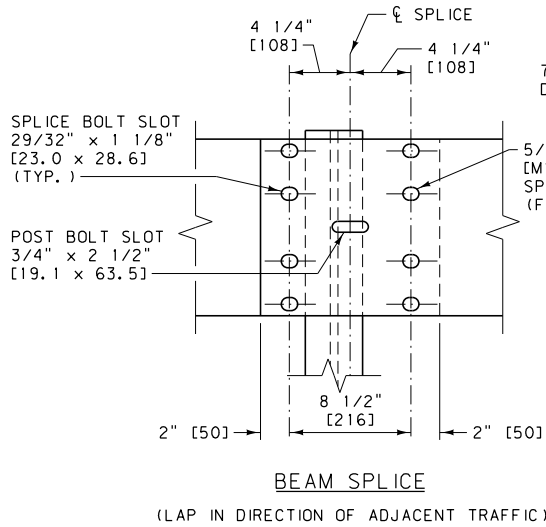
UNITS SHOWN IN BRACKETS [] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 606, 704	DWG. NO. 606-11A
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METAL GUARDRAIL -
7' [2.1 m] WOOD POSTS

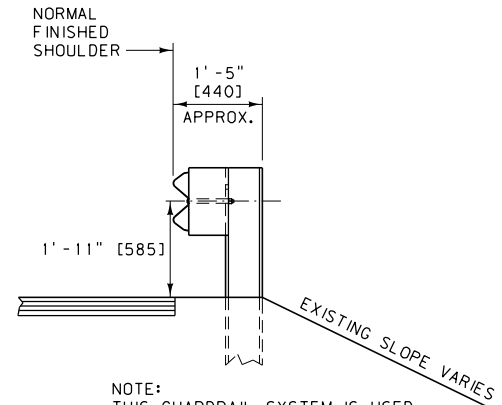
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MDT MONTANA DEPARTMENT OF TRANSPORTATION	



NOTES:

- ① INSTALL ALL BOLTS WITH HEADS ON TRAFFIC SIDE OF INSTALLATION.
- ② USE ROUTED WOOD BLOCKS OR OTHER NCHRP 350 APPROVED BLOCKS.
- ③ ATTACH REFLECTORS TO POSTS EVERY 25' [7.62 m], INCLUDING TERMINAL SECTIONS, WITH THE REFLECTORIZED SURFACE FACING ADJACENT TRAFFIC. FASTEN REFLECTOR TO STEEL POST USING AN APPROVED ADHESIVE. REFLECTORS MAY BE BOLTED TO POSTS PROVIDED HOLES IN POSTS ARE DRILLED BEFORE BEING GALVANIZED.
- ④ ON EXISTING GUARDRAIL INSTALLATIONS, THE MINIMUM RAIL HEIGHT IS 1'-8" [510].
- ⑤ STEEL POSTS WITH OTHER POST HOLE CONFIGURATIONS MAY BE ACCEPTED, PROVIDED THEY HAVE AT LEAST THE HOLES DETAILED ON THIS DRAWING AND THEY MEET AASHTO'S PUBLICATION, "A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE" AND NCHRP 350 REQUIREMENTS.
- ⑥ THE W-BEAM RAIL ON THIS SYSTEM REQUIRES ADDITIONAL HOLES TO ACCOMMODATE BEING BOLTED TO POSTS AT HALF THE NORMAL POST SPACING. DRILL ADDITIONAL HOLES IN THE W-BEAM RAIL PRIOR TO APPLYING CORROSION PROTECTION.
- ⑦ DO NOT INSTALL W-BEAM GUARDRAIL WITH 7' [2.1 m] POSTS FOR OBSTACLES WITHIN 4.6' [1.4 m] OF THE FACE OF THE RAIL.

* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.



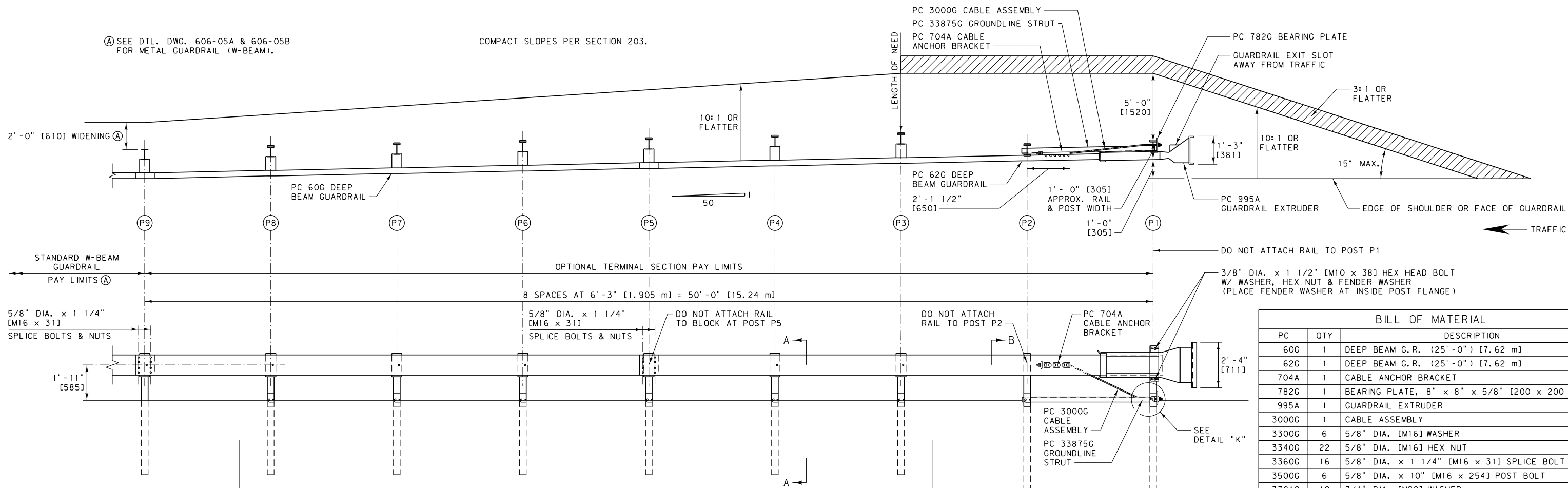
NOTE:
THIS GUARDRAIL SYSTEM IS USED WHEN THE 2'-0" [610] WIDENING BEHIND THE POSTS CANNOT BE PROVIDED, AS PER DTL. DWG. NO. 606-05A & 606-05B.

DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 606	DWG. NO. 606-11B
METAL GUARDRAIL - 7' [2.1 m] STEEL POSTS	
--REVISED-- DECEMBER 2011	EFFECTIVE: APRIL 2006
MDT MONTANA DEPARTMENT OF TRANSPORTATION	

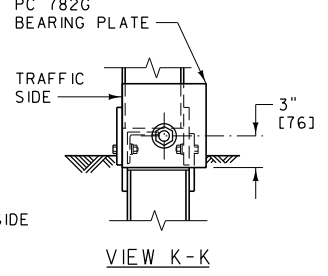
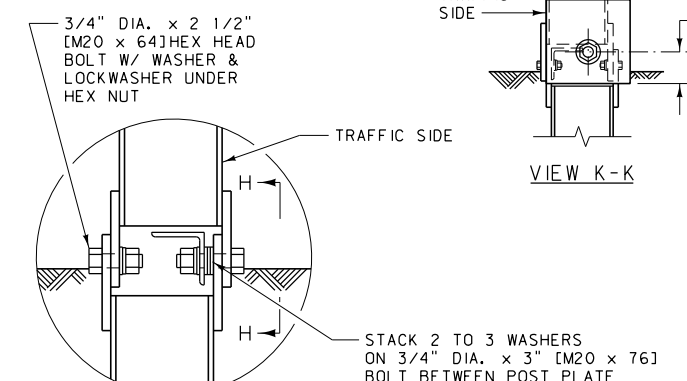
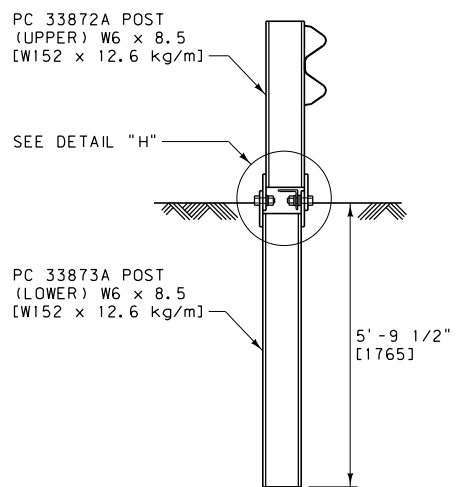
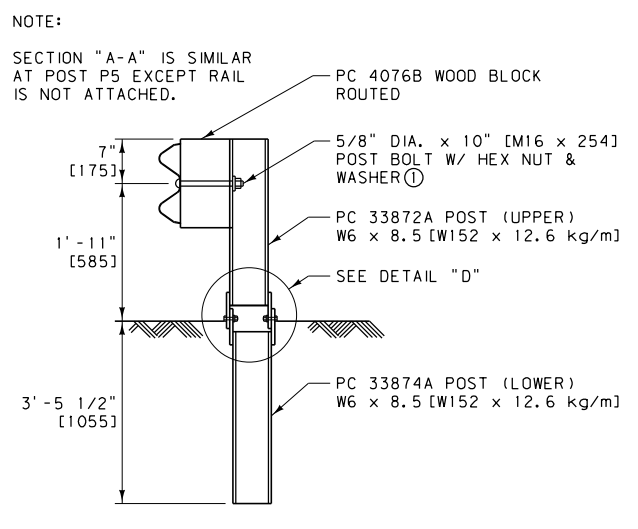
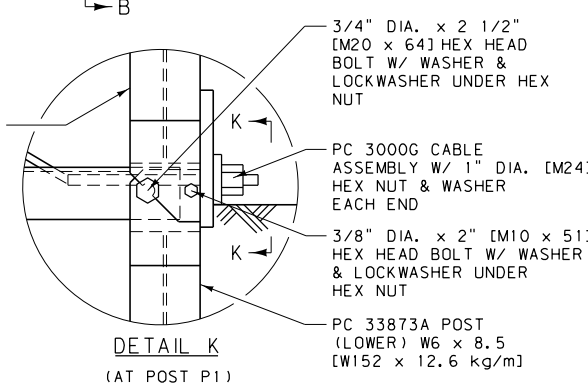
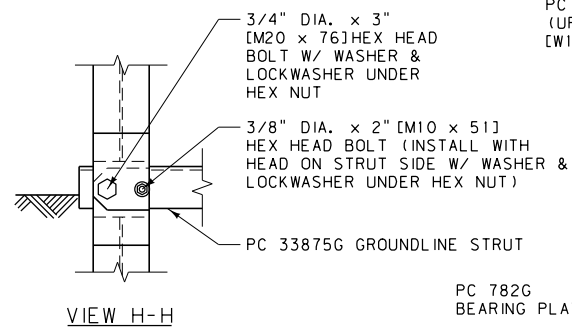
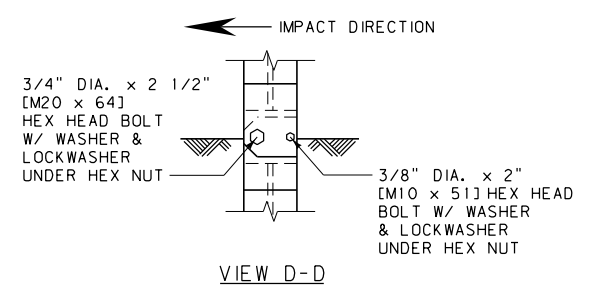
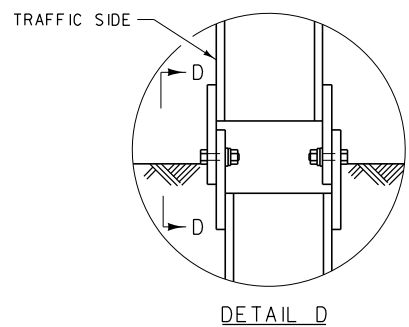
UNITS SHOWN IN BRACKETS [] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

SEE DTL. DWG. 606-05A & 606-05B FOR METAL GUARDRAIL (W-BEAM).

COMPACT SLOPES PER SECTION 203.



BILL OF MATERIAL		
PC	QTY	DESCRIPTION
60G	1	DEEP BEAM G.R. (25'-0") [7.62 m]
62G	1	DEEP BEAM G.R. (25'-0") [7.62 m]
704A	1	CABLE ANCHOR BRACKET
782G	1	BEARING PLATE, 8" x 8" x 5/8" [200 x 200 x 16]
995A	1	GUARDRAIL EXTRUDER
3000G	1	CABLE ASSEMBLY
3300G	6	5/8" DIA. [M16] WASHER
3340G	22	5/8" DIA. [M16] HEX NUT
3360G	16	5/8" DIA. x 1 1/4" [M16 x 31] SPLICE BOLT
3500G	6	5/8" DIA. x 10" [M16 x 254] POST BOLT
3701G	19	3/4" DIA. [M20] WASHER
3704G	16	3/4" DIA. [M20] HEX NUT
3717G	15	3/4" DIA. x 2 1/2" [M20 x 64] HEX HEAD BOLT
3718G	1	3/4" DIA. x 3" [M20 x 76] HEX HEAD BOLT
3900G	2	1" DIA. [M24] WASHER
3910G	2	1" DIA. [M24] HEX NUT
4076B	6	WOOD BLOCK, 6" x 8" x 1'-2" [150 x 200 x 350]
4254G	18	3/8" DIA. [M10] WASHER
4255G	2	3/8" DIA. [M10] FENDER WASHER (1 1/2" [38] O.D.)
4258G	16	3/8" DIA. [M10] LOCKWASHER
4261G	2	3/8" DIA. x 1 1/2" [M10 x 38] HEX HEAD BOLT
4699G	16	3/4" DIA. [M20] LOCKWASHER
6321G	16	3/8" DIA. x 2" [M10 x 51] HEX HEAD BOLT
6405G	18	3/8" DIA. [M10] HEX NUT
33871A	1	ETPLUS HBA POST P1 (UPPER)
33872A	7	ETPLUS HBA POST P2 TO P8 (UPPER)
33873A	2	ETPLUS HBA POST P1 & P2 (LOWER)
33874A	6	ETPLUS HBA POST P3 TO P8 (LOWER)
33875G	1	6'-6" [198] ANGLE STRUT ET HBA



SECTION A-A (TYP AT POSTS P3, P4, P6, P7 & P8)

SECTION B-B (AT POST P2)

DETAIL H (AT POST P2)

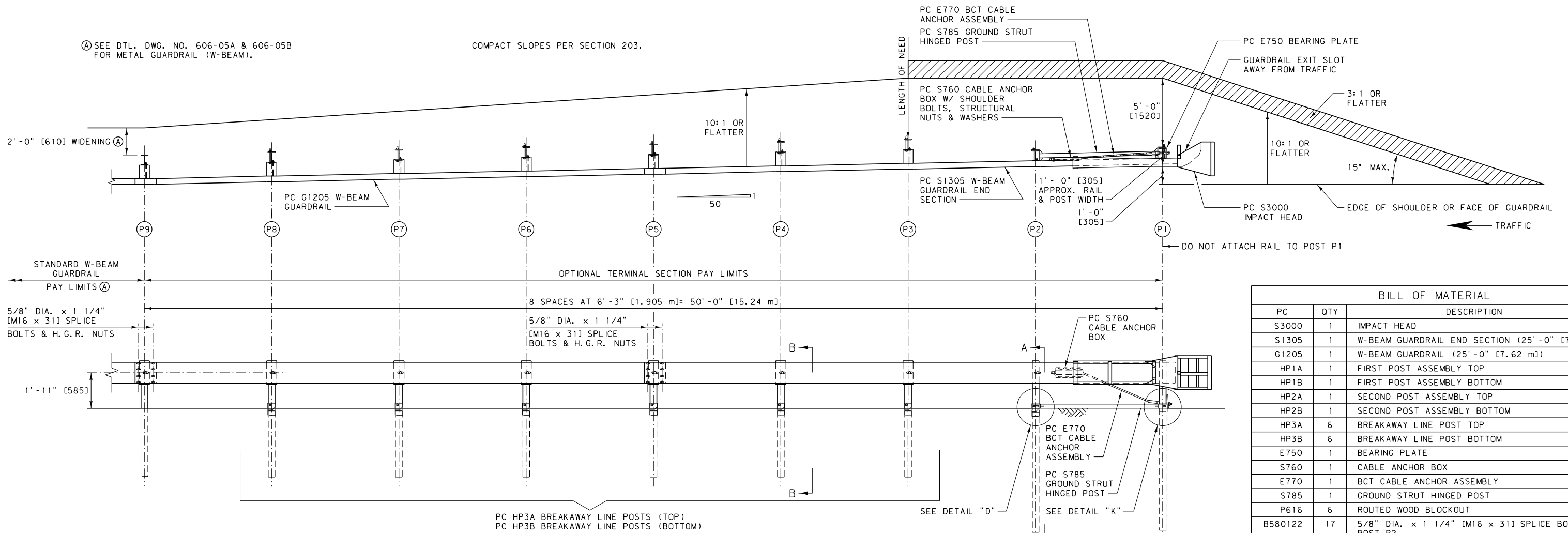
- NOTES:
- THE 5/8" DIA. [M16] FLAT WASHER IS USED UNDER THE NUT, BEHIND THE POST ONLY. NO WASHER IS USED AT THE RAIL.
 - USE THE ET-PLUS TERMINAL SECTION ON DIVIDED ROADWAYS IF THE WIDTH IS 25 FEET [7.5 m] OR GREATER BETWEEN FINISHED SURFACES. CONSIDER OTHER TERMINAL SECTIONS IF THE WIDTH IS LESS THAN 25 FEET [7.5 m] BETWEEN FINISHED SURFACES.
 - FLARE THE END SECTION AWAY FROM TRAFFIC AT A RATE OF 50:1 FOR 50 FEET [15.24 m] (ILLUSTRATED). FLARES OF 50:1 FOR 100 FEET [30.48 m] MAY ALSO BE USED. THE FLARE MAY BE OMITTED ON ROADS WITH SHOULDERS GREATER THAN 2 FEET [0.6 m] IN WIDTH.
 - PLACE A SELF-ADHESIVE OBJECT MARKER ON THE GUARDRAIL EXTRUDER FACE, HAVING ALTERNATING RETRO-REFLECTIVE BLACK AND YELLOW STRIPES SLOPED DOWNWARD AT AN ANGLE OF 45° TOWARDS THE SIDE ON WHICH TRAFFIC IS TO PASS.
 - ATTACH REFLECTORS TO TERMINAL SECTION POSTS, PER DTL. DWG. NO. 606-05A & 606-05B.
 - OBTAIN ENGINEER'S APPROVAL OF MANUFACTURER INSTALLATION OPTIONS WHEN SITE CONDITIONS PREVENT THE USE OF THE OPTION SHOWN ON THIS DETAIL.
 - AFTER FINAL ASSEMBLY, RECHECK CABLE TO MAKE SURE IT IS TAUT AND HAS NOT RELAXED.
 - LAP ALL W-BEAM SPLICES IN THE DIRECTION OF ADJACENT TRAFFIC.

UNITS SHOWN IN BRACKETS [] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

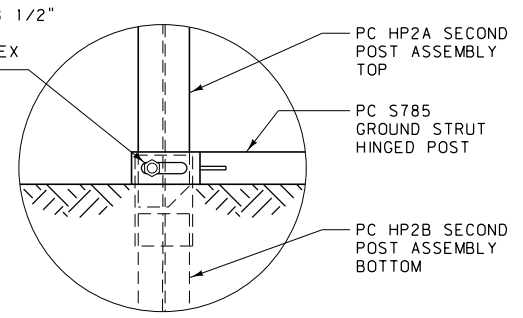
DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 606, 203	DWG. NO. 606-13A
OPTIONAL TERMINAL SECTION - ET-PLUS	
EFFECTIVE: FEBRUARY 2005	
REVISED: DECEMBER 2011	MONTANA DEPARTMENT OF TRANSPORTATION

(A) SEE DTL. DWG. NO. 606-05A & 606-05B FOR METAL GUARDRAIL (W-BEAM).

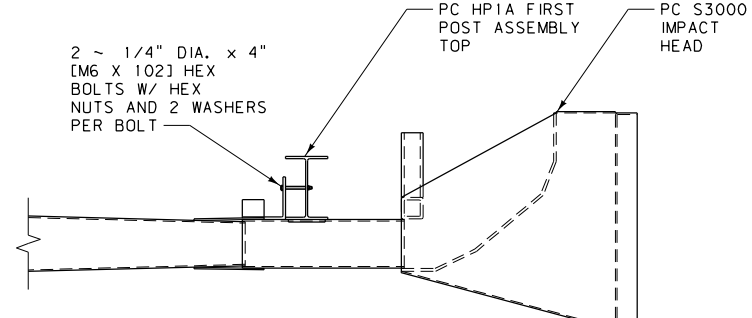
COMPACT SLOPES PER SECTION 203.



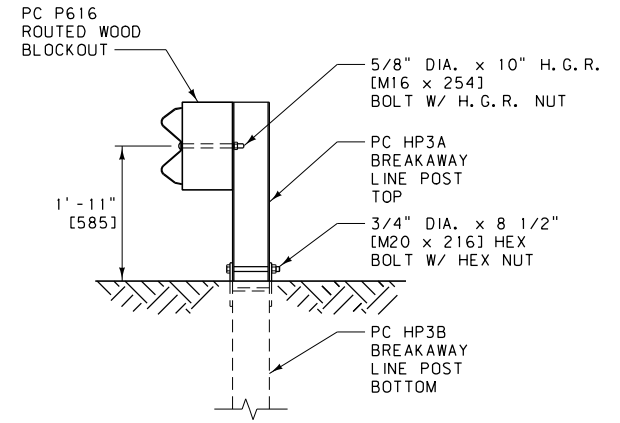
BILL OF MATERIAL		
PC	QTY	DESCRIPTION
S3000	1	IMPACT HEAD
S1305	1	W-BEAM GUARDRAIL END SECTION (25'-0" [7.62 m])
G1205	1	W-BEAM GUARDRAIL (25'-0" [7.62 m])
HP1A	1	FIRST POST ASSEMBLY TOP
HP1B	1	FIRST POST ASSEMBLY BOTTOM
HP2A	1	SECOND POST ASSEMBLY TOP
HP2B	1	SECOND POST ASSEMBLY BOTTOM
HP3A	6	BREAKAWAY LINE POST TOP
HP3B	6	BREAKAWAY LINE POST BOTTOM
E750	1	BEARING PLATE
S760	1	CABLE ANCHOR BOX
E770	1	BCT CABLE ANCHOR ASSEMBLY
S785	1	GROUND STRUT HINGED POST
P616	6	ROUTED WOOD BLOCKOUT
B580122	17	5/8" DIA. x 1 1/4" [M16 x 31] SPLICE BOLT, POST P2
B580904A	1	5/8" DIA. x 9" [M16 x 229] HEX BOLT
B581002	6	5/8" DIA. x 10" [M16 x 254] H.G.R. BOLT
N050	24	5/8" DIA. [M16] H.G.R. NUT
W050	2	5/8" DIA. [M16] WASHER
B340854A	7	3/4" DIA. x 8 1/2" [M20 x 216] HEX BOLT
N030	7	3/4" [M20] DIA. HEX NUT
N100	2	1" DIA. [M24] ANCHOR CABLE HEX NUT
W100	2	1" DIA. [M24] ANCHOR CABLE WASHER
B140404	2	1/4" DIA. x 4" [M6 x 102] HEX BOLT
N014	2	1/4" DIA. [M6] HEX NUT
W014	4	1/4" DIA. [M6] WASHER
SB58A	8	CABLE ANCHOR BOX SHOULDER BOLT
N055A	8	1/2" DIA. [M12] A325 STRUCTURAL NUT
W050A	16	9/16" DIA. [M14] (1 1/16" [27] O.D.) A325 STRUCTURAL WASHER



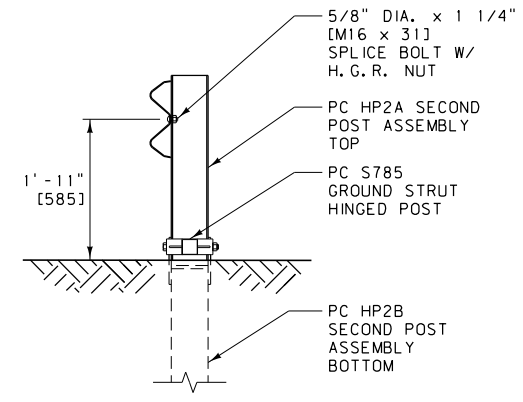
DETAIL D
(AT POST P2)



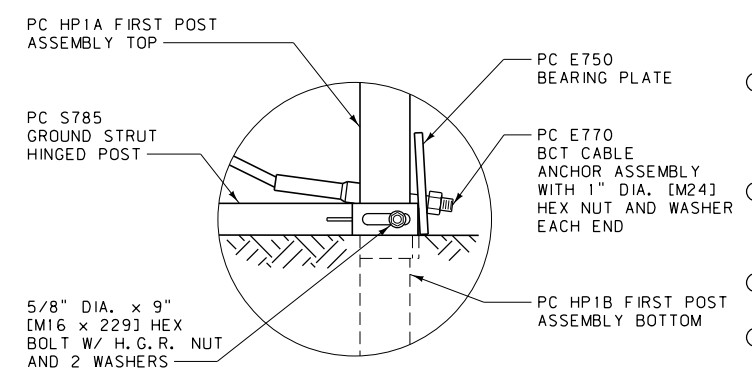
IMPACT HEAD CONNECTION DETAIL



SECTION B-B
(TYP. AT POSTS P3 THRU P8)



SECTION A-A
(AT POST P2)



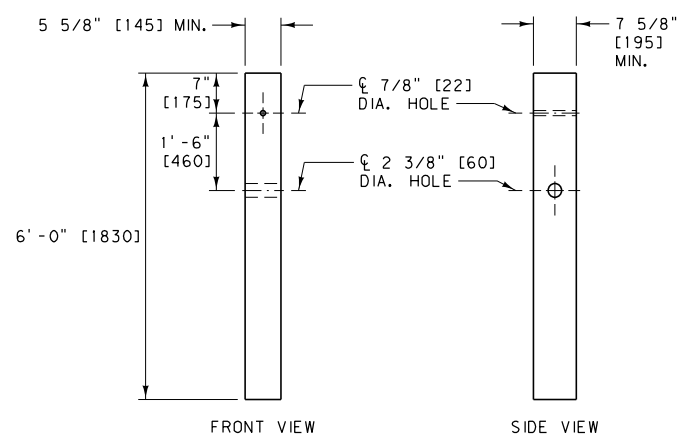
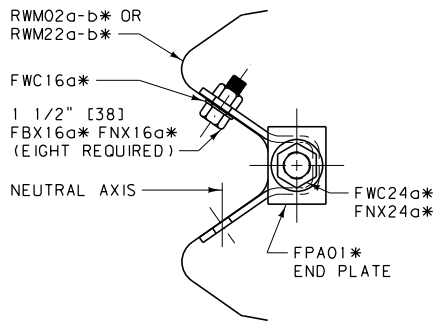
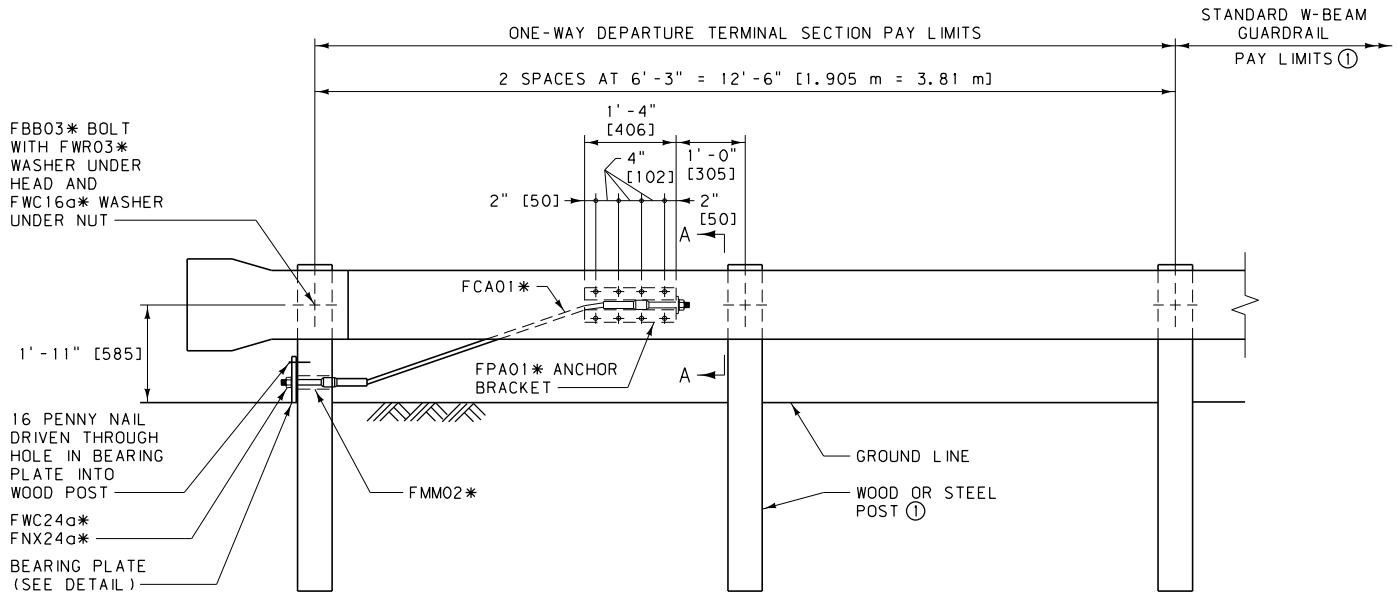
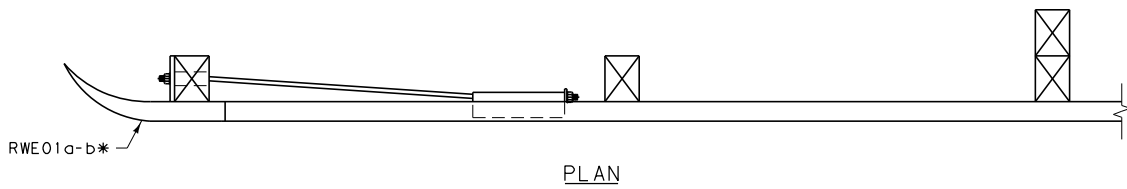
DETAIL K
(AT POST P1)

NOTES:

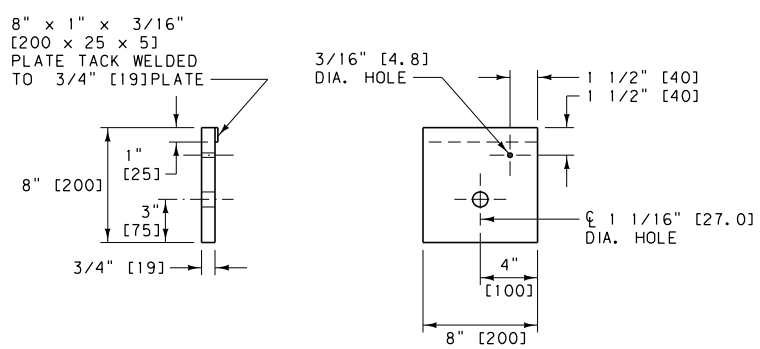
- USE THE SKT 350 TERMINAL SECTION ON DIVIDED ROADWAYS IF THE WIDTH IS 25 FEET [7.5 m] OR GREATER BETWEEN FINISHED SURFACES. CONSIDER OTHER TERMINAL SECTIONS IF THE WIDTH IS LESS THAN 25 FEET [7.5 m] BETWEEN FINISHED SURFACES.
- FLARE THE END SECTION AWAY FROM TRAFFIC AT A RATE OF 50:1 FOR 50 FEET [15.24 m] (ILLUSTRATED). FLARES OF 50:1 FOR 100 FEET [30.48 m] MAY ALSO BE USED. THE FLARE MAY BE OMITTED ON ROADS WITH SHOULDERS GREATER THAN 2 FEET [0.6 m] IN WIDTH.
- PLACE A SELF-ADHESIVE OBJECT MARKER ON THE GUARDRAIL IMPACT HEAD FACE, HAVING ALTERNATING RETRO-REFLECTIVE BLACK AND YELLOW STRIPES SLOPED DOWNWARD AT AN ANGLE OF 45° TOWARDS THE SIDE ON WHICH TRAFFIC IS TO PASS.
- ATTACH REFLECTORS TO TERMINAL SECTION POSTS, PER DTL. DWG. NO. 606-05A & 606-05B.
- AFTER FINAL ASSEMBLY, RECHECK CABLE TO MAKE SURE IT IS TAUT AND HAS NOT RELAXED.
- OBTAIN ENGINEER'S APPROVAL OF MANUFACTURER INSTALLATION OPTIONS WHEN SITE CONDITIONS PREVENT THE USE OF THE OPTION SHOWN ON THIS DETAIL.
- LAP ALL W-BEAM SPLICES IN THE DIRECTION OF ADJACENT TRAFFIC.

UNITS SHOWN IN BRACKETS [] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 606, 203	DWG. NO. 606-13B
OPTIONAL TERMINAL SECTION - SKT 350	
EFFECTIVE: APRIL 2006	
--REVISED-- DECEMBER 2011	MDT MONTANA DEPARTMENT OF TRANSPORTATION



END POST DETAILS
PDF03*



BEARING PLATE DETAIL
FPB01*

NOTE:

① SEE DTL. DWG. NO. 606-05A AND 606-05B FOR METAL GUARDRAIL (W-BEAM).

* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.

DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 606	DWG. NO. 606-18

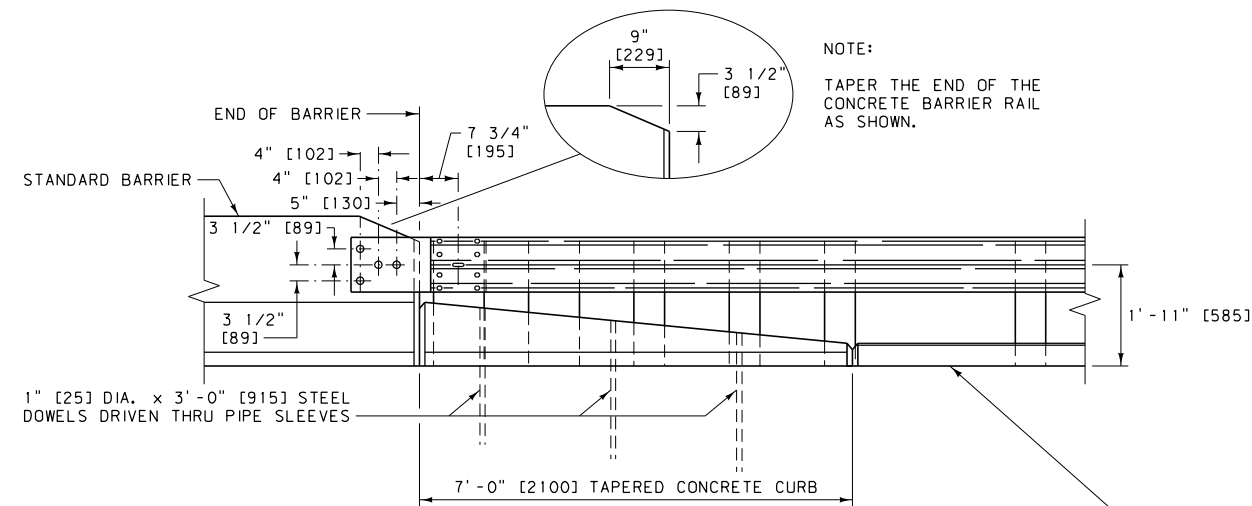
ONE-WAY DEPARTURE TERMINAL SECTION

EFFECTIVE: FEBRUARY 2005

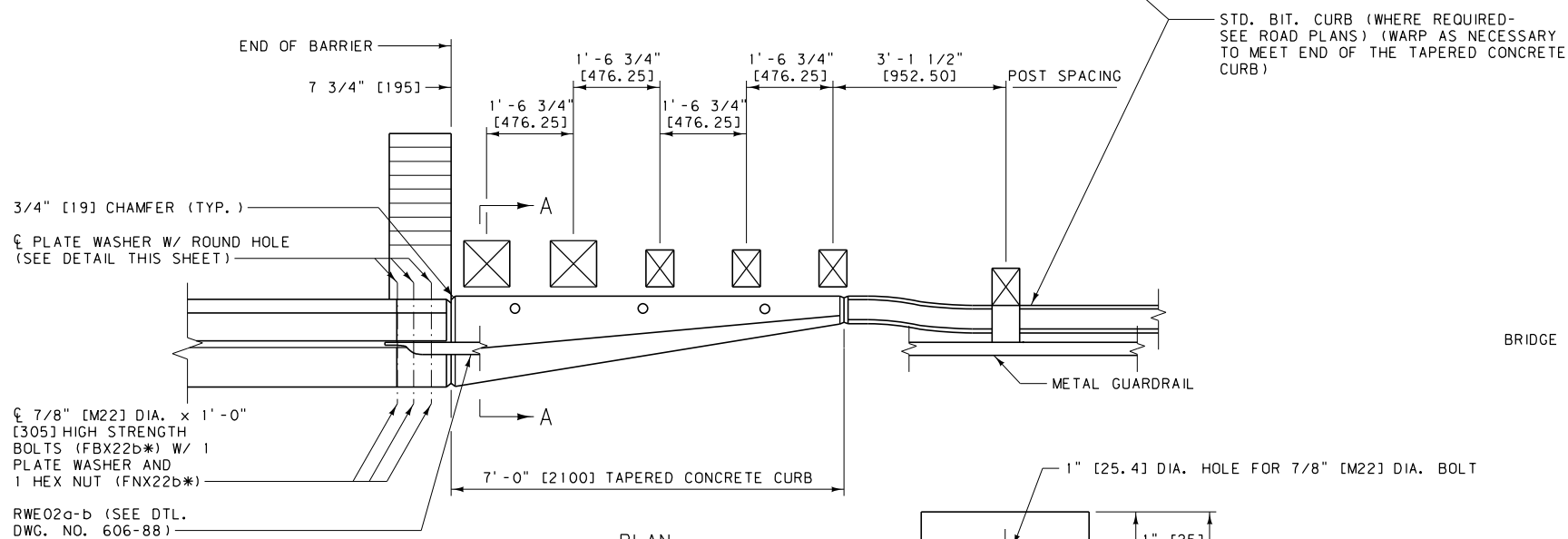
--REVISED--
DECEMBER 2011



UNITS SHOWN IN BRACKETS [] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.



ELEVATION



PLAN

DETAIL "A"

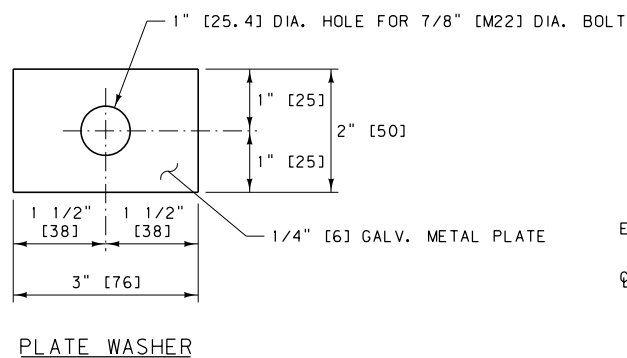
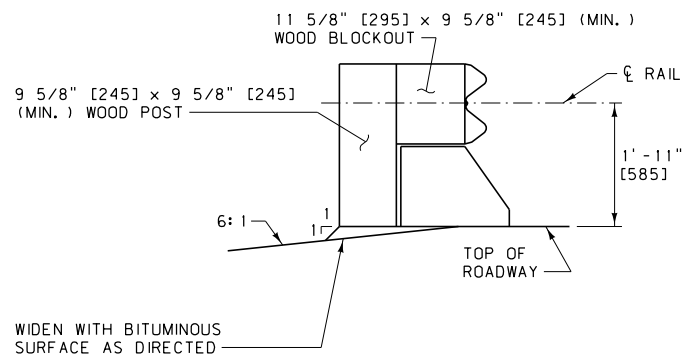


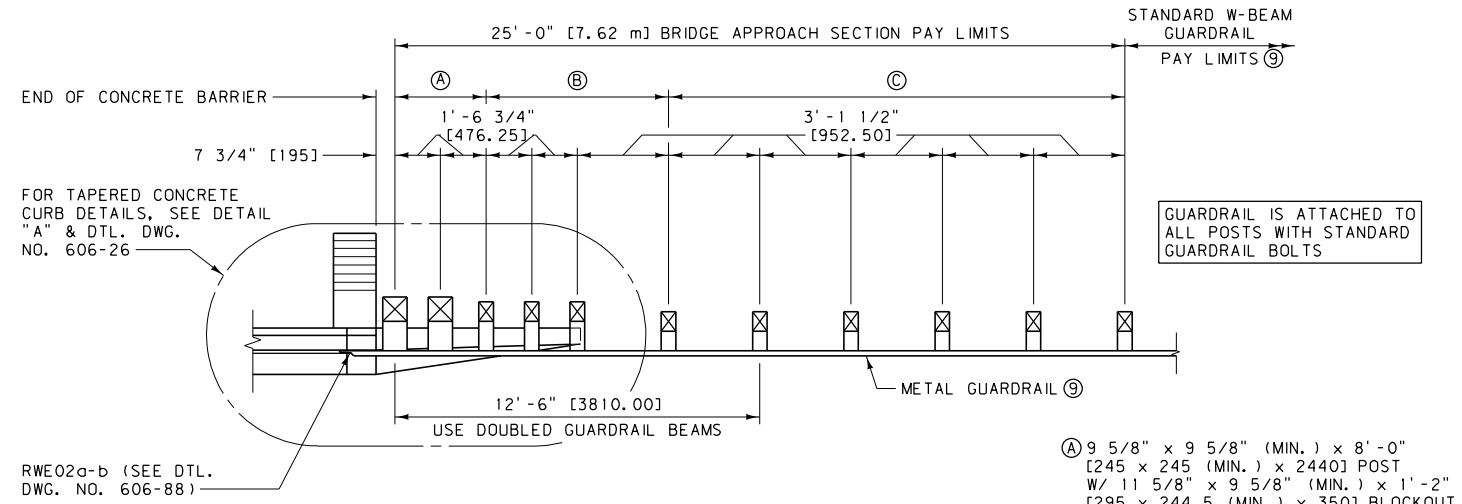
PLATE WASHER



SECTION A-A

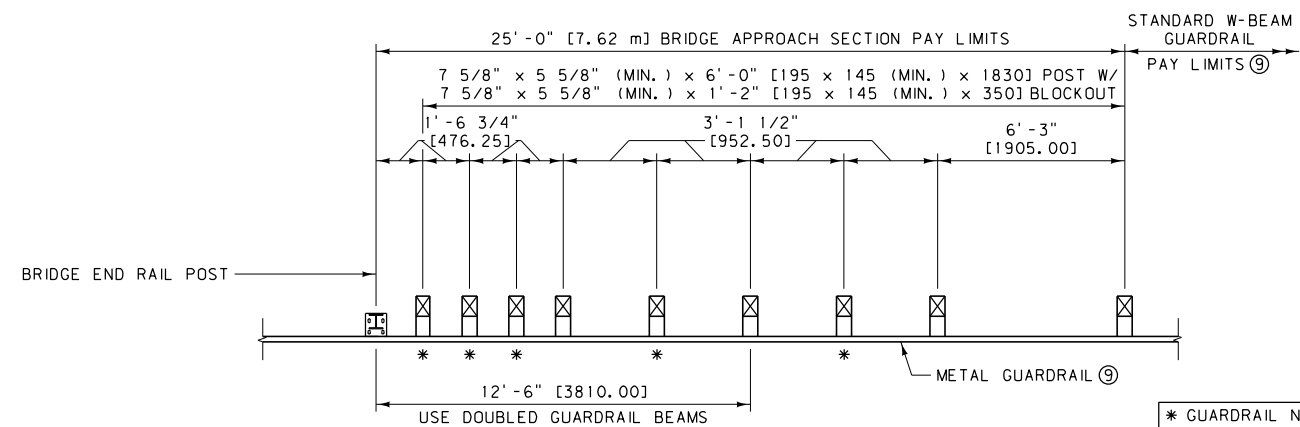
NOTES:

- ① TAPERED CONCRETE CURBS:
TYPE 1, SEE DTL. DWG. NO. 606-26
TYPE 3, SEE DTL. DWG. NO. 606-27
 - ② TAPERED CONCRETE CURBS ARE ALSO REQUIRED ON CONCRETE APPROACH SLABS.
 - ③ PORTIONS OF GUARDRAIL & BLOCKOUTS ARE OMITTED FOR CLARITY.
 - ④ LAP GUARDRAIL IN THE DIRECTION OF THE ADJACENT TRAFFIC LANE. (SEE DTL. DWG. NO. 606-05A).
 - ⑤ LAP W-BEAM TERMINAL CONNECTOR (RWE02a-b) IN THE DIRECTION OF THE ADJACENT TRAFFIC LANE.
 - ⑥ USE WOOD BLOCKS OR OTHER NCHRP 350 APPROVED BLOCKS FOR BLOCKOUTS.
 - ⑦ DO NOT FLARE BRIDGE APPROACH SECTIONS.
 - ⑧ SEE DTL. DWG. NO. 606-25A FOR SKEWED BRIDGES.
 - ⑨ SEE DTL. DWG. NO. 606-05A FOR METAL GUARDRAIL (W-BEAM).
- * SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.



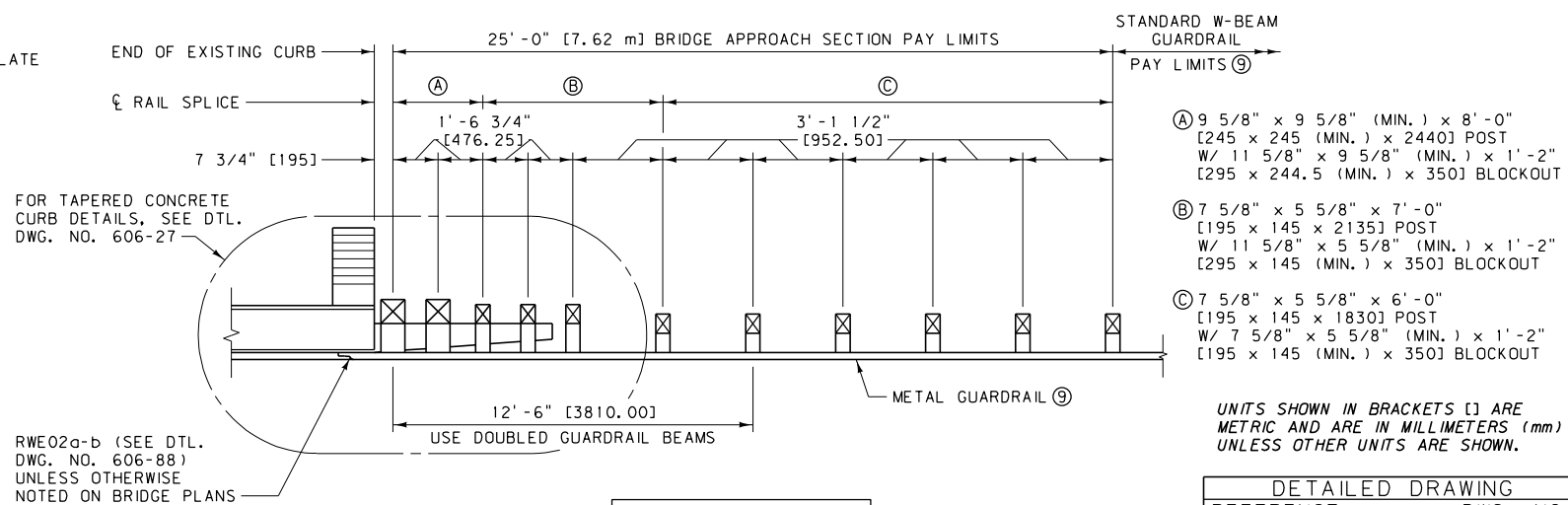
METAL GUARDRAIL-BRIDGE APPROACH SECTION TYPE 1
(FOR BRIDGES USING CONCRETE BARRIER RAIL)

- Ⓐ 9 5/8" x 9 5/8" (MIN.) x 8'-0" [245 x 245 (MIN.) x 2440] POST W/ 11 5/8" x 9 5/8" (MIN.) x 1'-2" [295 x 244.5 (MIN.) x 350] BLOCKOUT
- Ⓑ 7 5/8" x 5 5/8" x 7'-0" [195 x 145 x 2135] POST W/ 11 5/8" x 5 5/8" (MIN.) x 1'-2" [295 x 145 (MIN.) x 350] BLOCKOUT
- Ⓒ 7 5/8" x 5 5/8" x 6'-0" [195 x 145 x 1830] POST W/ 7 5/8" x 5 5/8" (MIN.) x 1'-2" [195 x 145 (MIN.) x 350] BLOCKOUT



METAL GUARDRAIL-BRIDGE APPROACH SECTION TYPE 2
(FOR BRIDGES WITHOUT CURBS)

* GUARDRAIL NOT ATTACHED TO POSTS. BLOCKOUT FASTENED TO POST WITH STANDARD POST BOLT.



METAL GUARDRAIL-BRIDGE APPROACH SECTION TYPE 3
(FOR BRIDGES WITH EXISTING CONCRETE CURBS)

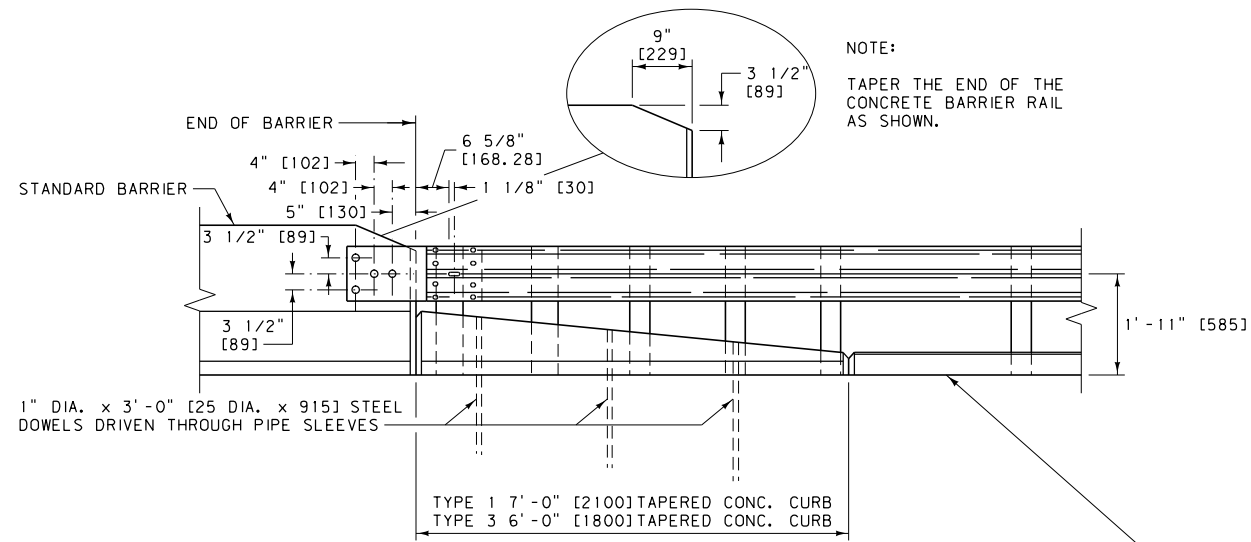
UNITS SHOWN IN BRACKETS [] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

DETAILED DRAWING	
REFERENCE DWG. NO.	606-24A
STANDARD SPEC. SECTION 606	
BRIDGE APPROACH SECTIONS - WOOD POSTS	

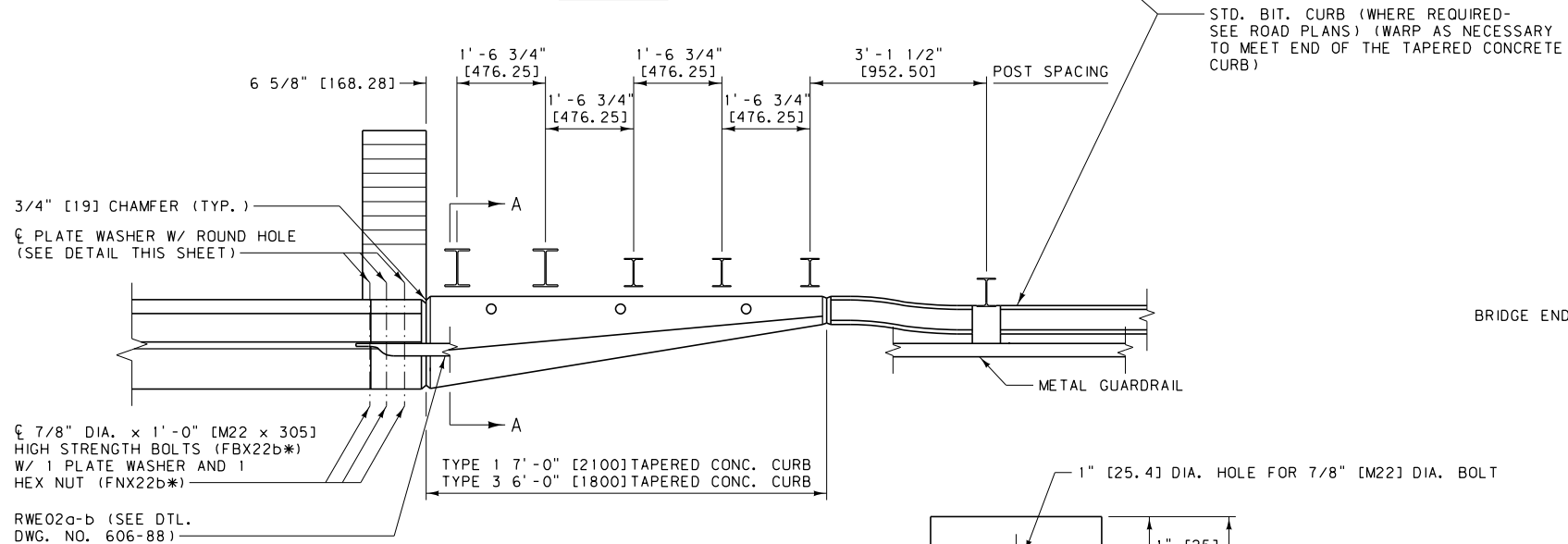
--REVISED--
JANUARY 2008
DECEMBER 2011

EFFECTIVE: FEBRUARY 2005

MDT MONTANA DEPARTMENT OF TRANSPORTATION



ELEVATION



PLAN

DETAIL "A"

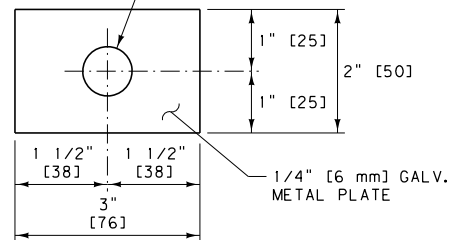
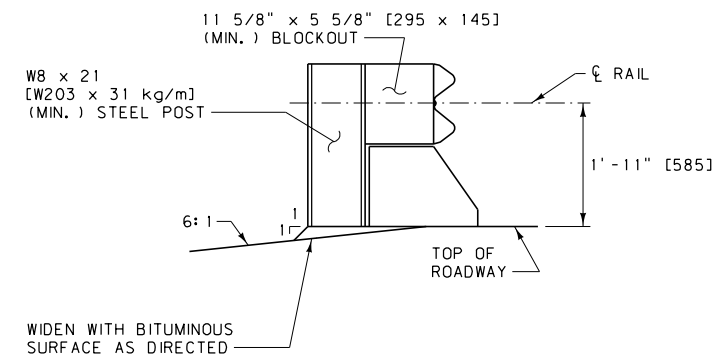


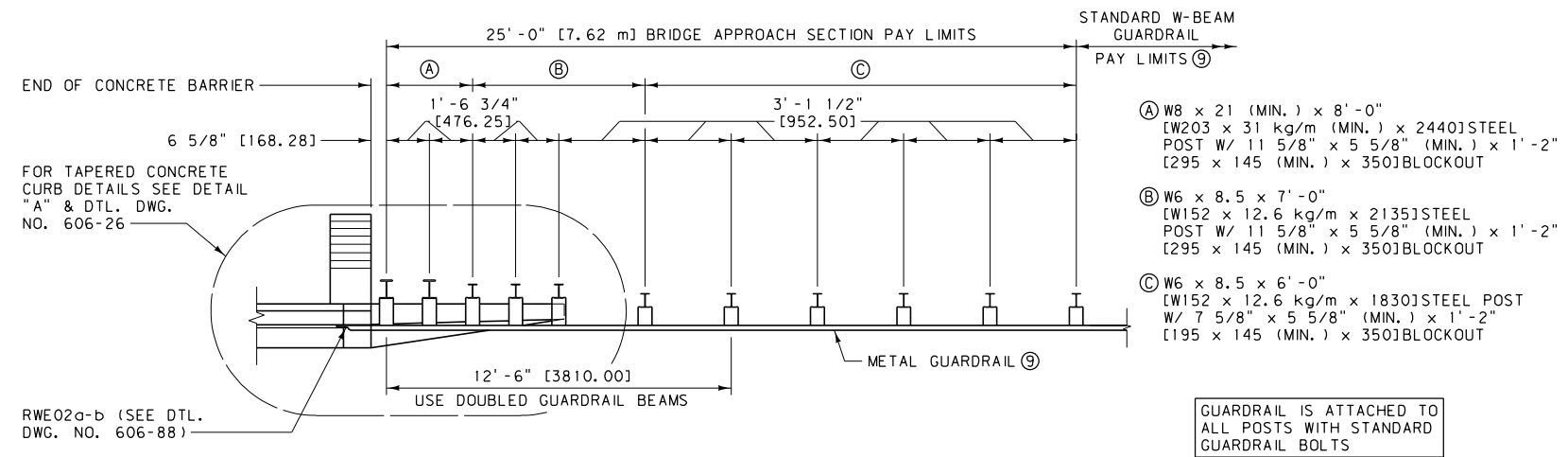
PLATE WASHER



SECTION A-A

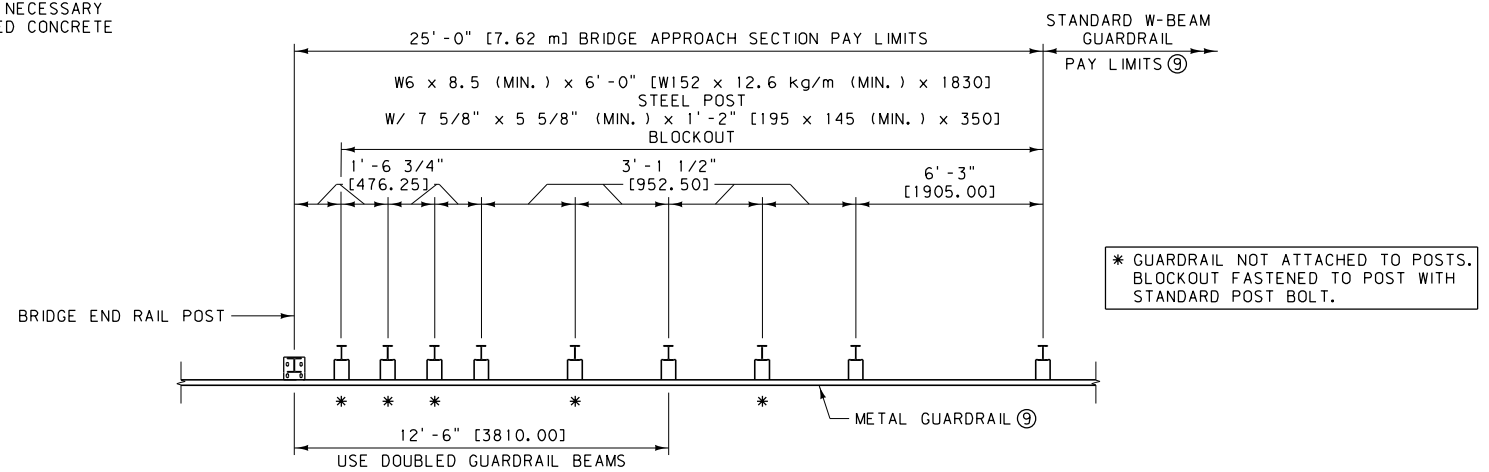
NOTES:

- ① TAPERED CONCRETE CURBS:
TYPE 1, SEE DTL. DWG. NO. 606-26
TYPE 3, SEE DTL. DWG. NO. 606-27
 - ② TAPERED CONCRETE CURBS ARE ALSO REQUIRED ON CONCRETE APPROACH SLABS.
 - ③ PORTIONS OF GUARDRAIL & BLOCKOUTS ARE OMITTED FOR CLARITY.
 - ④ LAP GUARDRAIL IN THE DIRECTION OF THE ADJACENT TRAFFIC LANE. (SEE DTL. DWG. NO. 606-05B).
 - ⑤ LAP W-BEAM TERMINAL CONNECTOR (RWE02a-b) IN THE DIRECTION OF THE ADJACENT TRAFFIC LANE.
 - ⑥ USE ROUTED WOOD BLOCKS OR OTHER NCHRP 350 APPROVED BLOCKS FOR BLOCKOUTS.
 - ⑦ DO NOT FLARE BRIDGE APPROACH SECTIONS.
 - ⑧ SEE DTL. DWG. NO. 606-25B FOR SKEWED BRIDGES.
 - ⑨ SEE DTL. DWG. NO. 606-05B FOR METAL GUARDRAIL (W-BEAM).
- * SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.



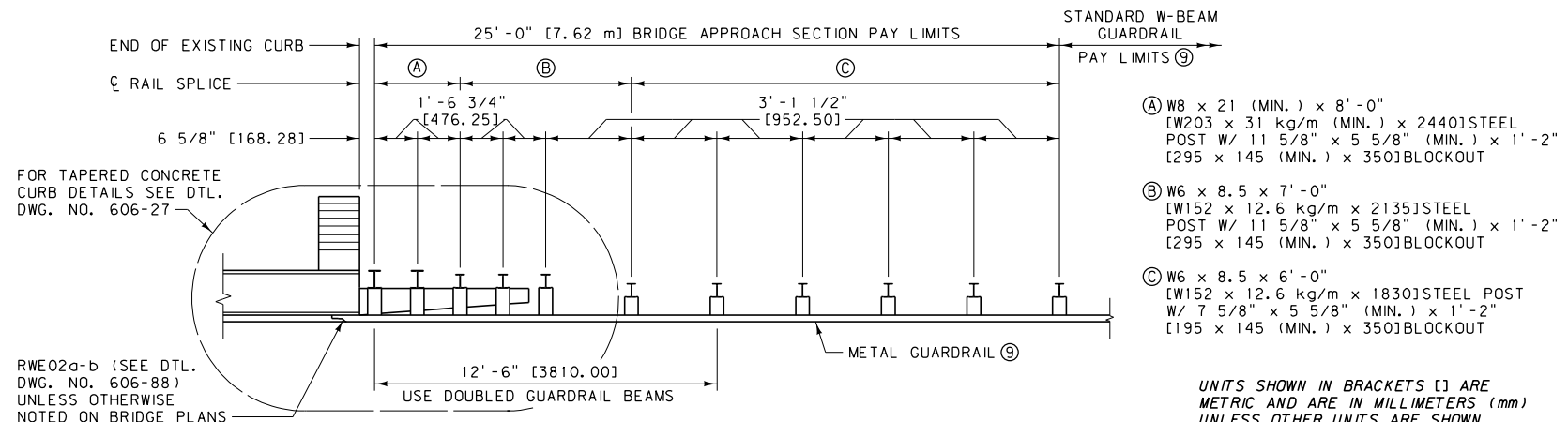
METAL GUARDRAIL-BRIDGE APPROACH SECTION TYPE 1

(FOR BRIDGES USING CONCRETE BARRIER RAIL)



METAL GUARDRAIL-BRIDGE APPROACH SECTION TYPE 2

(FOR BRIDGES WITHOUT CURBS)



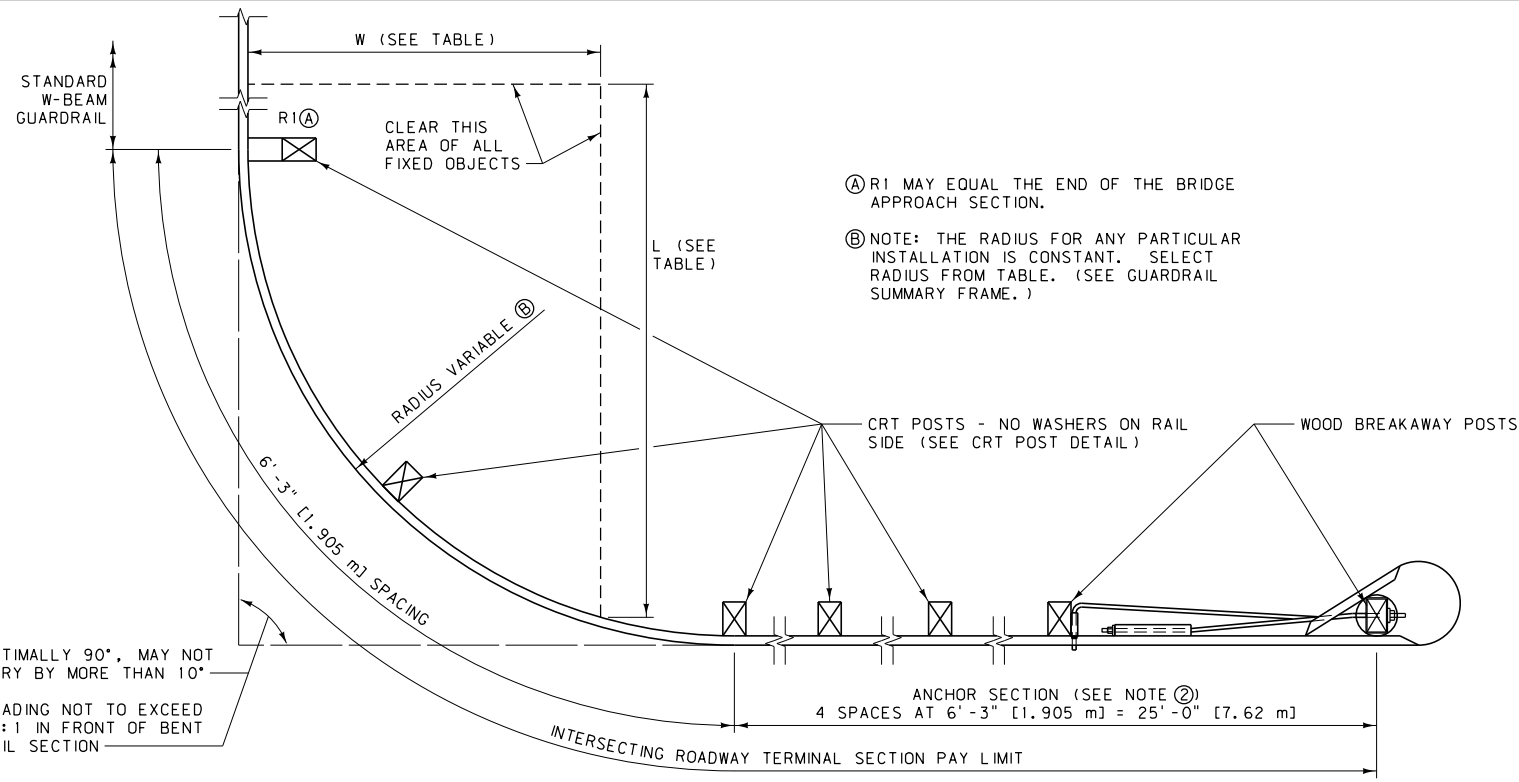
METAL GUARDRAIL-BRIDGE APPROACH SECTION TYPE 3

(FOR BRIDGES WITH EXISTING CONCRETE CURBS)

UNITS SHOWN IN BRACKETS [] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

GUARDRAIL IS ATTACHED TO ALL POSTS WITH STANDARD GUARDRAIL BOLTS

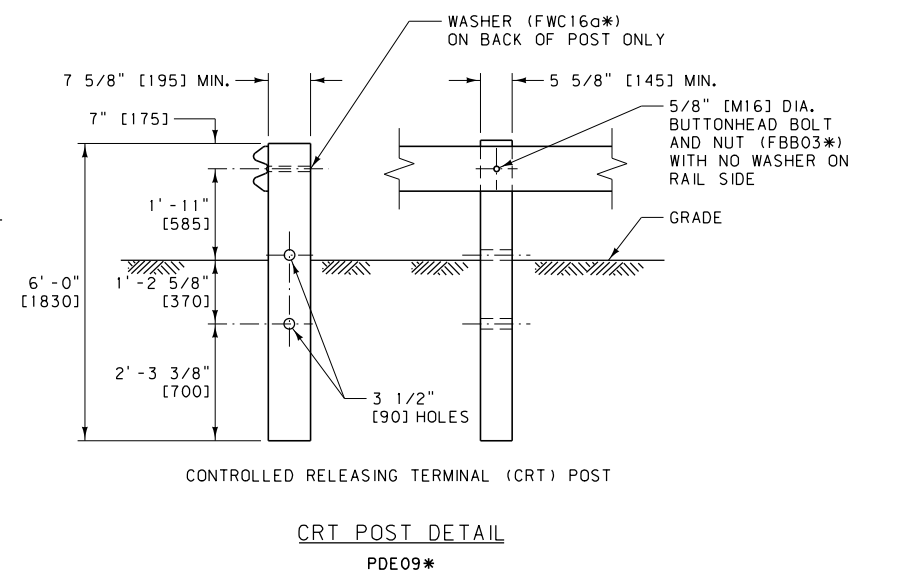
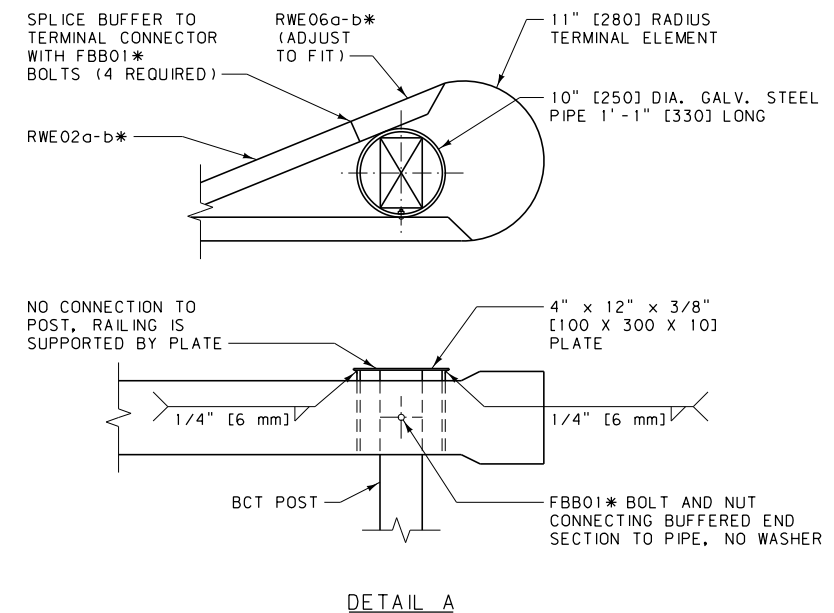
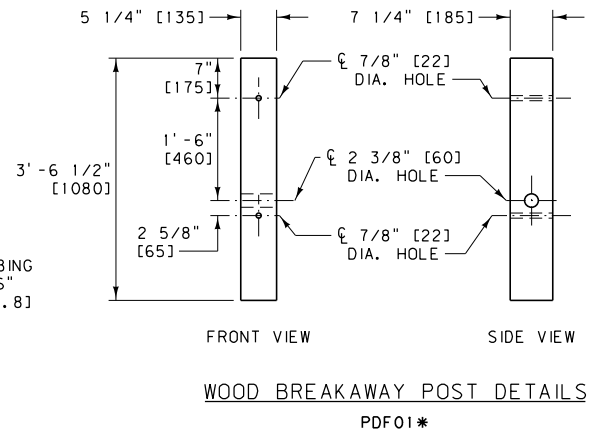
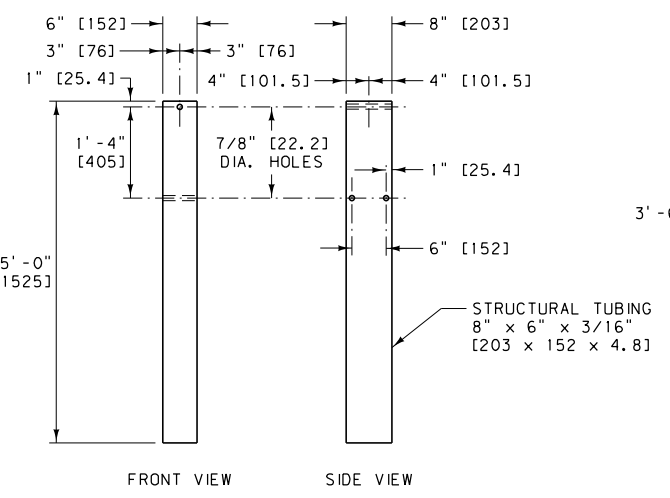
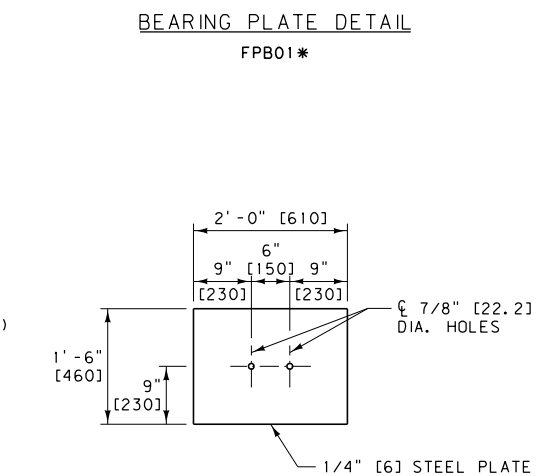
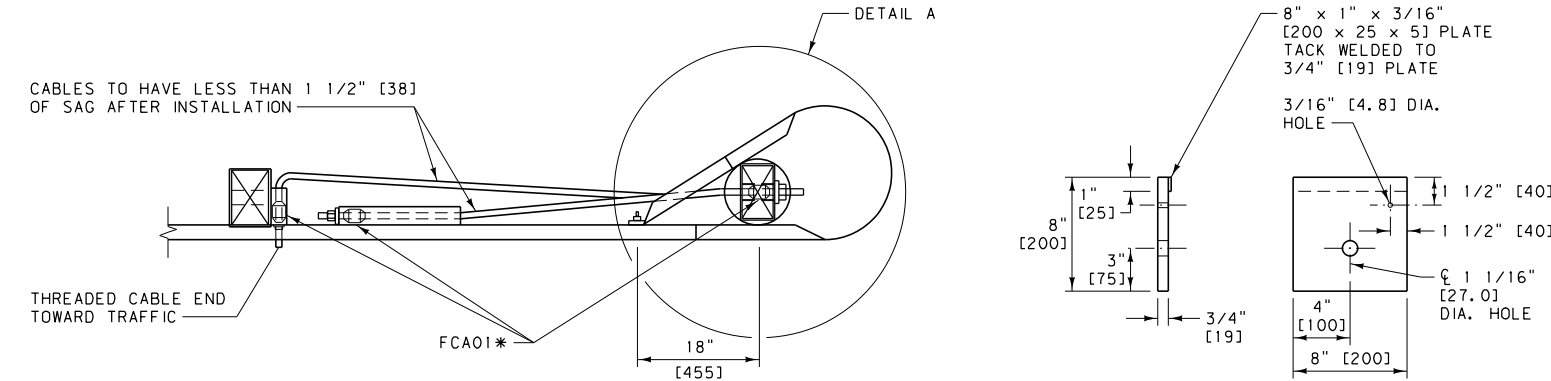
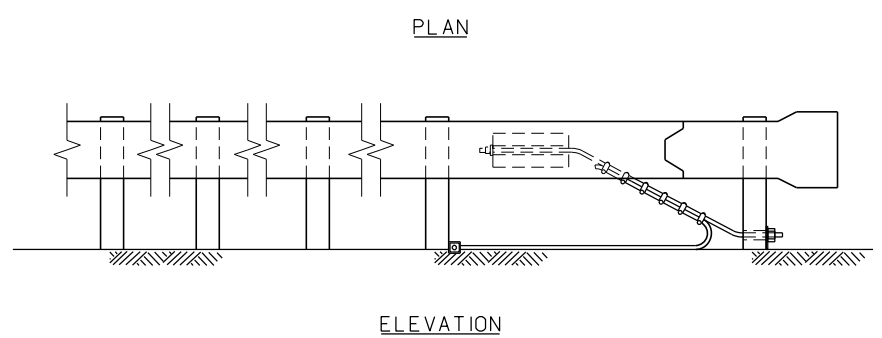
DETAILED DRAWING	
REFERENCE	DWG. NO.
STANDARD SPEC.	606-24B
SECTION 606	
BRIDGE APPROACH SECTIONS - STEEL POSTS	



(A) R1 MAY EQUAL THE END OF THE BRIDGE APPROACH SECTION.
 (B) NOTE: THE RADIUS FOR ANY PARTICULAR INSTALLATION IS CONSTANT. SELECT RADIUS FROM TABLE. (SEE GUARDRAIL SUMMARY FRAME.)

RADIUS TABLE			
RADIUS	LENGTH OF BENT RAIL	L	W
8'	12.5'	25'	15'
16'	25.0'	30'	15'
24'	37.5'	40'	20'
32'	50.0'	50'	20'

METRIC RADIUS TABLE			
RADIUS	LENGTH OF BENT RAIL	L	W
2450 mm	3.81 m	7.6 m	4.6 m
4850 mm	7.62 m	9.1 m	4.6 m
7300 mm	11.43 m	12.2 m	6.1 m
9700 mm	15.24 m	15.2 m	6.1 m



NOTES:
 ① DO NOT INSTALL ON SLOPES STEEPER THAN 2:1.
 ② DO NOT OMIT OR SHORTEN ANCHOR SECTION.
 ③ SEE DTL. DWG. NO. 606-05A FOR GUARDRAIL WIDENING REQUIREMENTS.
 * SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.

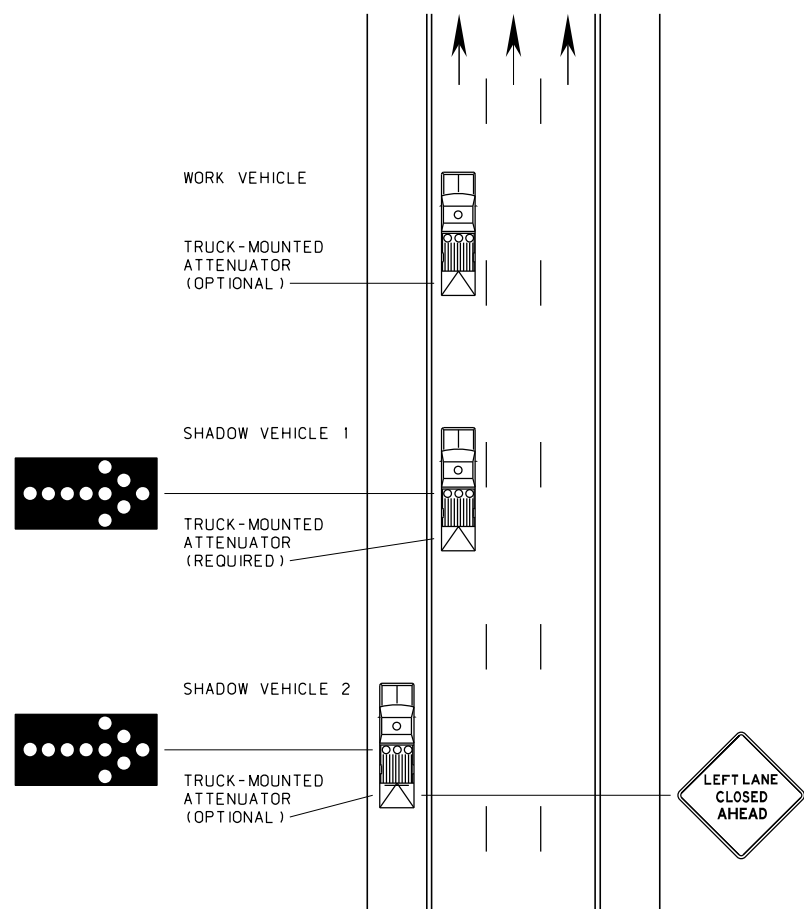
UNITS SHOWN IN BRACKETS [] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 606	DWG. NO. 606-46

INTERSECTING ROADWAY TERMINAL SECTION

--REVISED--	EFFECTIVE: FEBRUARY 2005
JANUARY 2008	MONTANA DEPARTMENT OF TRANSPORTATION <i>serving you with pride</i>
DECEMBER 2011	

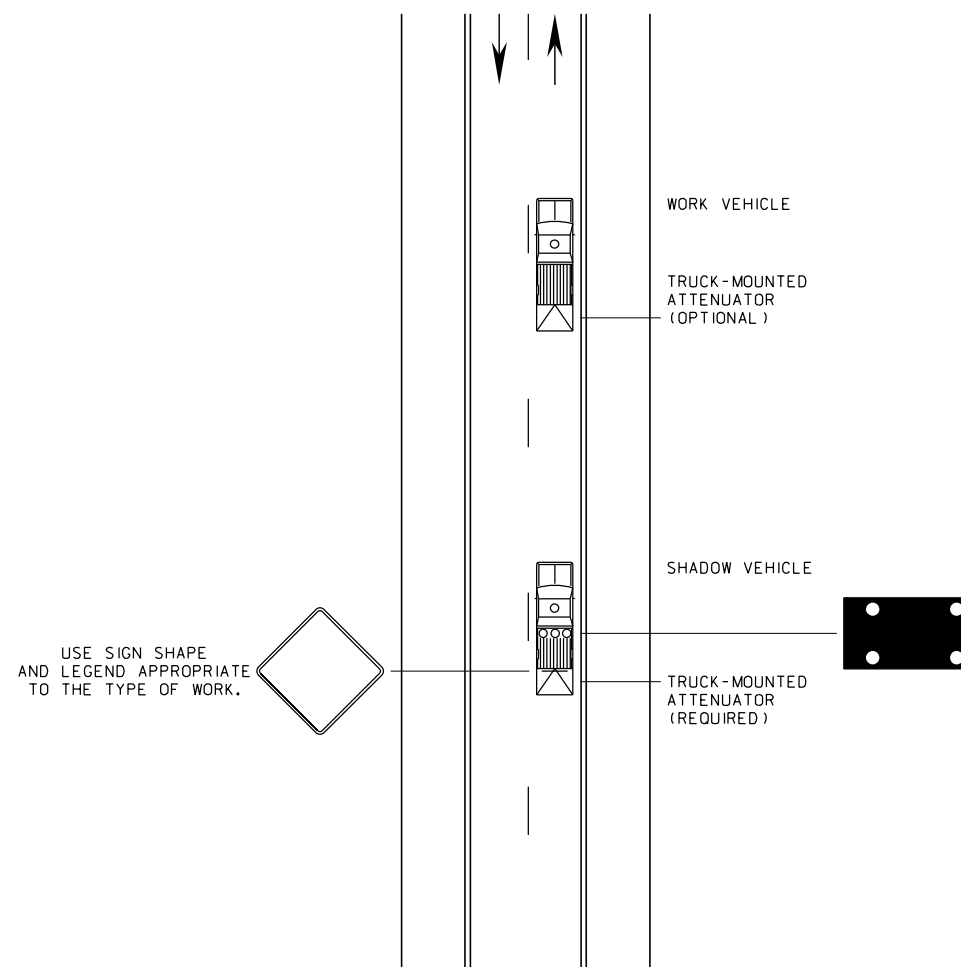
MOBILE OPERATIONS ON MULTILANE ROAD



NOTES:

- ① PLACE APPROPRIATE LANE CLOSURE SIGN ON SHADOW VEHICLE 2 SO AS NOT TO OBSCURE THE ARROW BOARD.
- ② FOLLOW THE WORK OPERATION WITH SHADOW VEHICLE 2 SO AS TO PROVIDE ADEQUATE SIGHT DISTANCE FOR VEHICULAR TRAFFIC APPROACHING FROM THE REAR.
- ③ COVER OR TURN THE SIGN LEGENDS ON VEHICLE-MOUNTED SIGNS FROM VIEW WHEN WORK IS NOT IN PROGRESS.
- ④ WHEN THE WORK VEHICLE OCCUPIES AN INTERIOR LANE OF A DIRECTIONAL ROADWAY HAVING A RIGHT SHOULDER 10 FEET [3 m] OR MORE IN WIDTH, DRIVE SHADOW VEHICLE 2 ALONG THE RIGHT-HAND SHOULDER WITH A SIGN INDICATING WORK IS TAKING PLACE IN THE INTERIOR LANE.
- ⑤ ON HIGH-SPEED ROADWAYS, A THIRD SHADOW VEHICLE MAY BE USED WITH SHADOW VEHICLE 1 IN THE CLOSED LANE, SHADOW VEHICLE 2 STRADDLING THE EDGE LINE, AND SHADOW VEHICLE 3 ON THE SHOULDER. WHERE ADEQUATE SHOULDER WIDTH IS NOT AVAILABLE, SHADOW VEHICLE 3 MAY ALSO STRADDLE THE EDGE LINE.
- ⑥ THE MINIMUM ARROW BOARD SIZE IS TYPE B, 60 INCHES X 30 INCHES [1500 X 750].
- ⑦ VARY THE DISTANCE BETWEEN THE WORK LOCATION AND SHADOW VEHICLE 2 TO PROVIDE ADEQUATE SIGHT DISTANCE FOR VEHICULAR TRAFFIC APPROACHING FROM THE REAR.
- ⑧ MAINTAIN A MINIMUM SPACING BETWEEN THE WORK VEHICLE AND SHADOW VEHICLES, AND BETWEEN EACH SHADOW VEHICLE TO DETER ROAD USERS FROM DRIVING IN BETWEEN.

MOBILE OPERATIONS ON TWO-LANE ROAD



NOTES:

- ① TRUCK-MOUNTED ATTENUATOR IS REQUIRED FOR SHADOW VEHICLE.
- ② EQUIP SHADOW VEHICLE WITH VEHICLE-MOUNTED SIGN. USE SIGN SHAPE AND LEGEND APPROPRIATE TO THE TYPE OF WORK.
- ③ MOUNT VEHICLE-MOUNTED SIGN IN A MANNER SO EQUIPMENT OR SUPPLIES DO NOT OBSCURE THE SIGN.
- ④ COVER OR TURN THE SIGN LEGENDS ON VEHICLE-MOUNTED SIGNS FROM VIEW WHEN WORK IS NOT IN PROGRESS.
- ⑤ WHENEVER ADEQUATE STOPPING SIGHT DISTANCE EXISTS TO THE REAR, MAINTAIN A MINIMUM DISTANCE FROM THE WORK VEHICLE WITH THE SHADOW VEHICLE AND PROCEED AT THE SAME SPEED.
- ⑥ SLOW DOWN THE SHADOW VEHICLE IN ADVANCE OF VERTICAL OR HORIZONTAL CURVES THAT RESTRICT SIGHT DISTANCE.

UNITS SHOWN IN BRACKETS [] ARE METRIC AND ARE IN MILLIMETERS (mm) UNLESS OTHER UNITS ARE SHOWN.

DETAILED DRAWING	
REFERENCE	DWG. NO.
STANDARD SPEC.	618-M4
SECTION 618	

MOBILE OPERATIONS

EFFECTIVE: DECEMBER 2011