APPENDIX B

REFERENCE DRAWINGS

THIS PAGE INTENTIONALLY LEFT BLANK

Appendix B
Reference Drawings

TABLE OF CONTENTS

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX B1

ALBERTA WEAK POST AND STRONG POST W-BEAM GUARDRAIL

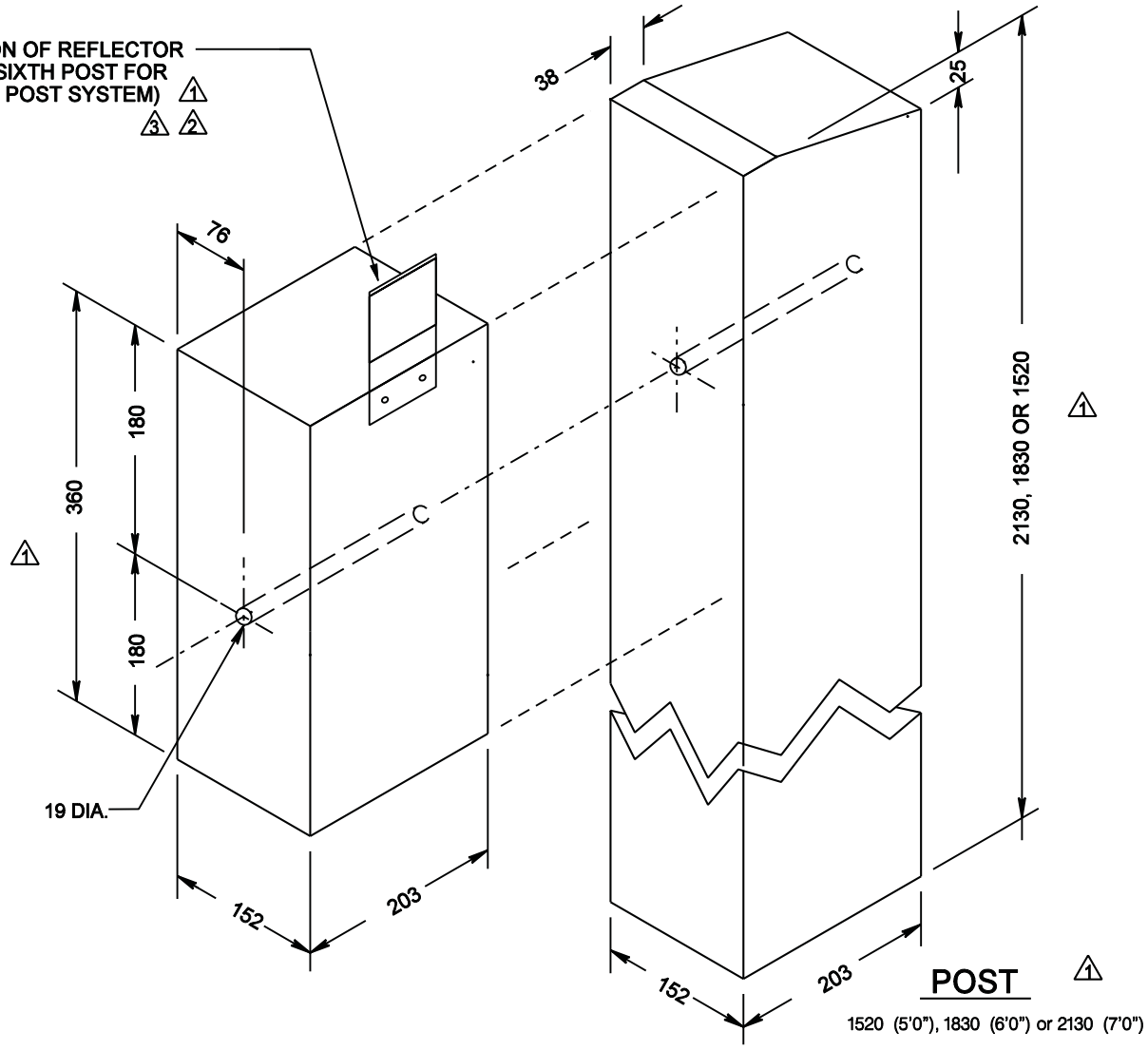
THIS PAGE INTENTIONALLY LEFT BLANK

Appendix B1
Alberta Weak Post and Strong Post W-Beam Guardrail

TABLE OF CONTENTS

Appendix B1
Alberta Weak Post and Strong Post W-Beam Guardrail

TABLE OF CONTENTS



SPACER BLOCK

NOT REQUIRED FOR WEAK POST

W–BEAM GUARDRAIL SYSTEM

No.	REVISIONS	BY	DATE
3	Reflector Type and Note Added	P.M.	8 JUL 09
2	Drawing Title and Reflector	P.M.	5 JUN 07
1	Post and Spacer Block	B.K.	12/07/05

Approved:
Original approved by
Traffic Engineering Section
Roadway Engineering Branch
Alberta Transportation and Utilities

Executive Director,
Technical Standards Branch

Date: NOVEMBER 11, 1992

Alberta Transportation

REFLECTOR 3

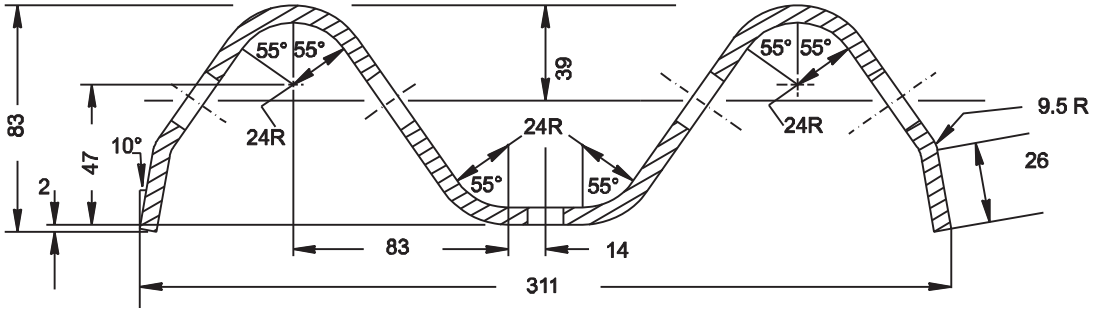
REFLECTOR COLOUR IS EITHER FLUORESCENT YELLOW OR WHITE SUCH THAT IT COMPLIES WITH THE PRINCIPLES FOR PAVEMENT EDGE LINES WITH RESPECT TO THEIR COLOUR.

REFLECTOR IS DOUBLE SIDED SHEETING 108mm x 76mm (MINIMUM) WHICH SHALL MEET ASTM D4956, TYPE X FOR LUMINANCE LEVEL. THE CONTRACTOR SHALL SELECT THE REFLECTOR FROM THE ALBERTA TRANSPORTATION PRODUCTS LIST.

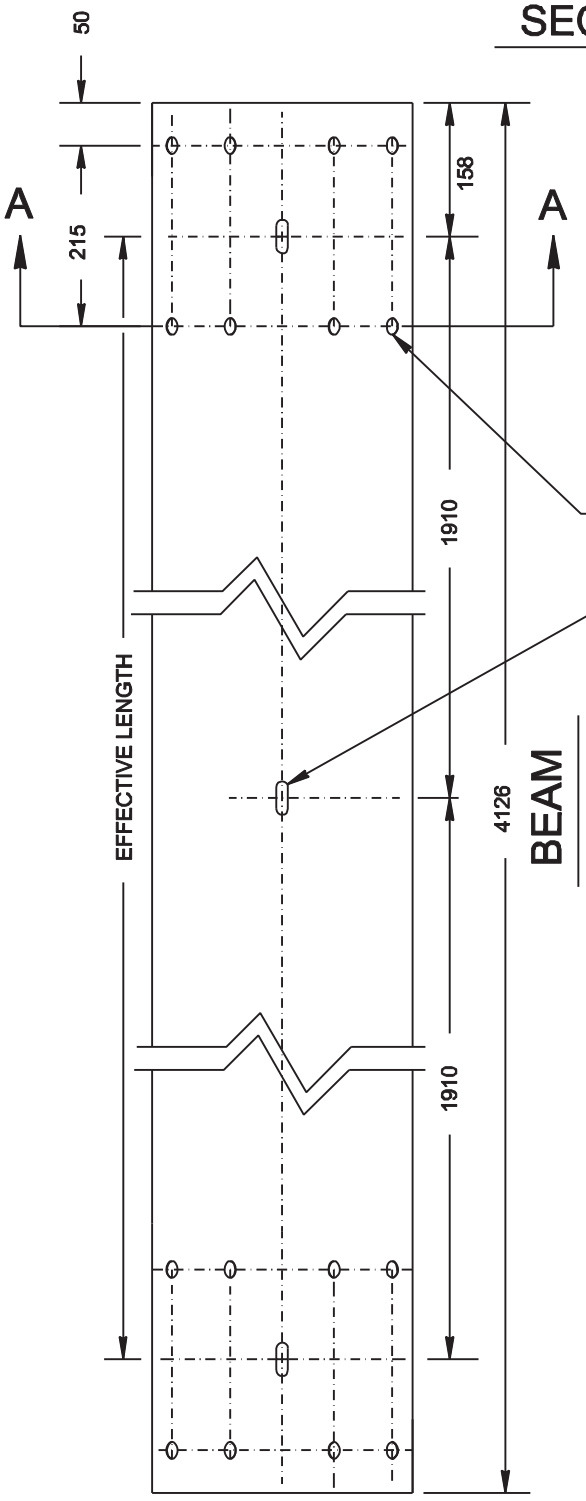
W - BEAM GUARDRAIL HARDWARE
WOOD SPACER BLOCK AND POST STRONG POST SYSTEM

All dimensions are in millimetres unless otherwise indicated.

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.01



SECTION A-A



EFFECTIVE LENGTH = 3820 (12' 6")

3 2 1 A FINISHED THICKNESS OF RAIL TO BE 2.82 mm NOMINAL STEEL AND HOT DIPPED GALVANIZED AFTER FABRICATION.

FOR 955 POST SPACING, SPECIFY RAIL ELEMENT WITH HOLES AT 955 CENTRES.

No.	REVISIONS	BY	DATE
2	Revised Note	B.K.	08/05/07
2	Steel Thickness	B.K.	01/03/06
1	Steel Thickness	B.K.	12/07/05

Approved:
Original approved by
Traffic Operations Branch
Alberta Transportation and Utilities

Executive Director,
Technical Standards Branch

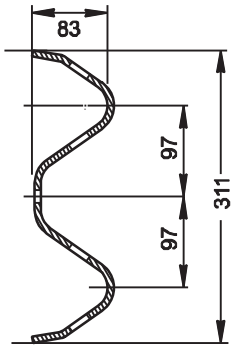
Date: NOVEMBER 11, 1992

Alberta
INFRASTRUCTURE AND TRANSPORTATION

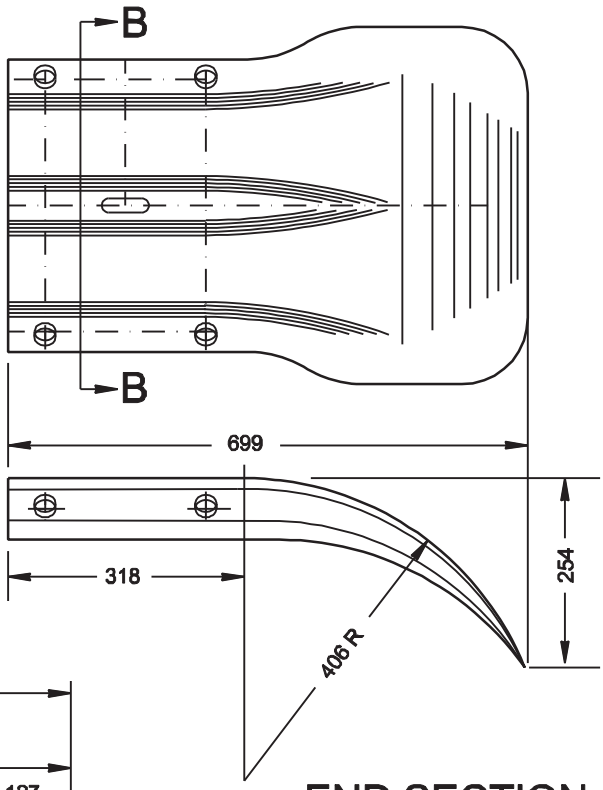
W - BEAM GUARDRAIL HARDWARE RAIL DETAIL

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.02

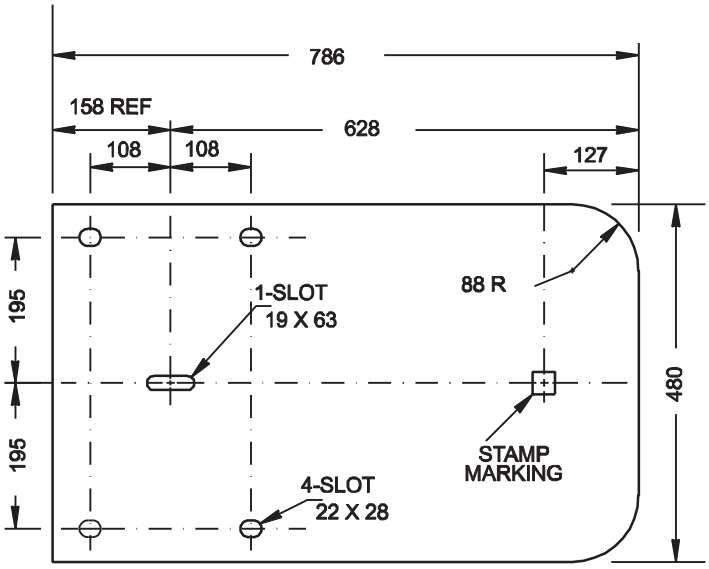
All dimensions are in millimetres unless otherwise indicated.



SECTION B - B



END SECTION



BLANK LAYOUT

THICKNESS OF STEEL=2.82mm AFTER GALVANIZING
1 2 3

No.	REVISIONS	BY	DATE
3	Galvanizing added	B.K.	08/05/07
2	Steel Thickness	P.M.	31/01/06
1	Steel Thickness	B.K.	12/07/05

Approved:

Original approved by
Traffic Operations Branch
Alberta Transportation and Utilities

Executive Director,
Technical Standards Branch

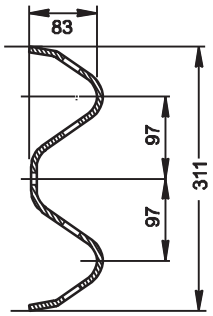
Date: NOVEMBER 11, 1992

Alberta
INFRASTRUCTURE AND
TRANSPORTATION

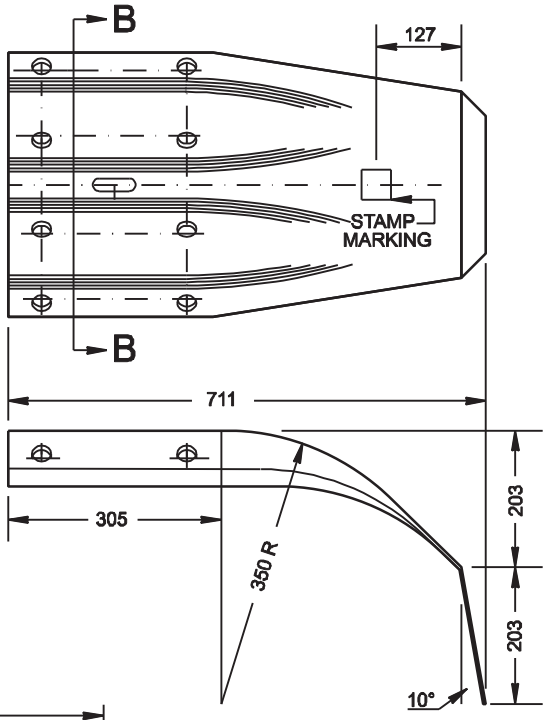
W - BEAM GUARDRAIL HARDWARE END SECTION - WING

All dimensions are in millimetres unless otherwise indicated.

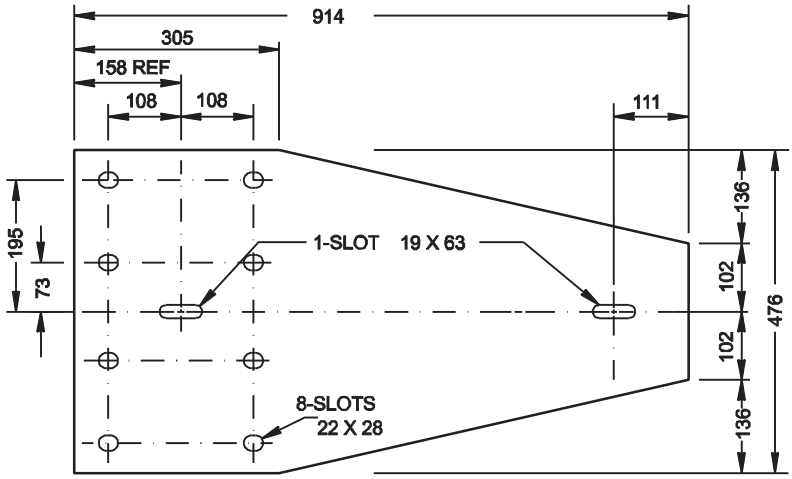
Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.03



SECTION B - B



END SECTION



BLANK LAYOUT

No.	REVISIONS	BY	DATE
3	Galvanizing added	B.K.	08/05/07
2	Steel Thickness	P.M.	31/01/06
1	Notes	B.K.	12/07/05

Approved:

Original approved by
Traffic Operations Branch
Alberta Transportation and Utilities

Executive Director,
Technical Standards Branch

Date: DECEMBER 11, 1992

Alberta
INFRASTRUCTURE AND TRANSPORTATION

NOTES: 1 2 3

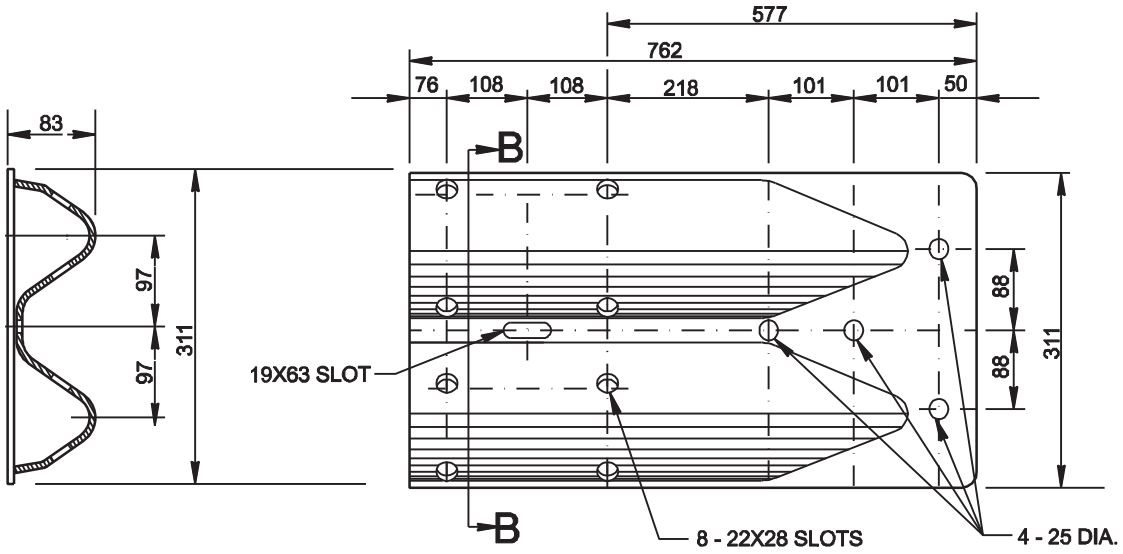
1. THICKNESS OF STEEL=2.82mm AFTER GALVANIZING

2. THIS END SECTION IS USED IN THE STANDARD W-BEAM WEAK POST TURN DOWN END TREATMENT (SEE DWG TEB 3.12 SECTION D-D).

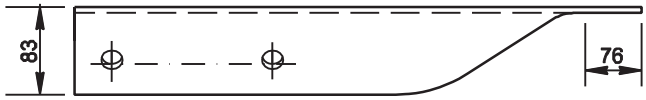
W - BEAM GUARDRAIL HARDWARE END SECTION - BURIED

All dimensions are in millimetres unless otherwise indicated.

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.04



SECTION B - B



END SECTION

THICKNESS OF STEEL=3.43mm ⚠1

⚠2	.	.	.
⚠1	Steel Thickness	B.K.	12/07/05
No.	REVISIONS	BY	DATE

Approved:

Original approved by
Traffic Operations Branch
Alberta Transportation and Utilities

Executive Director,
Technical Standards Branch

Date: DECEMBER 11, 1992

Alberta
INFRASTRUCTURE AND TRANSPORTATION

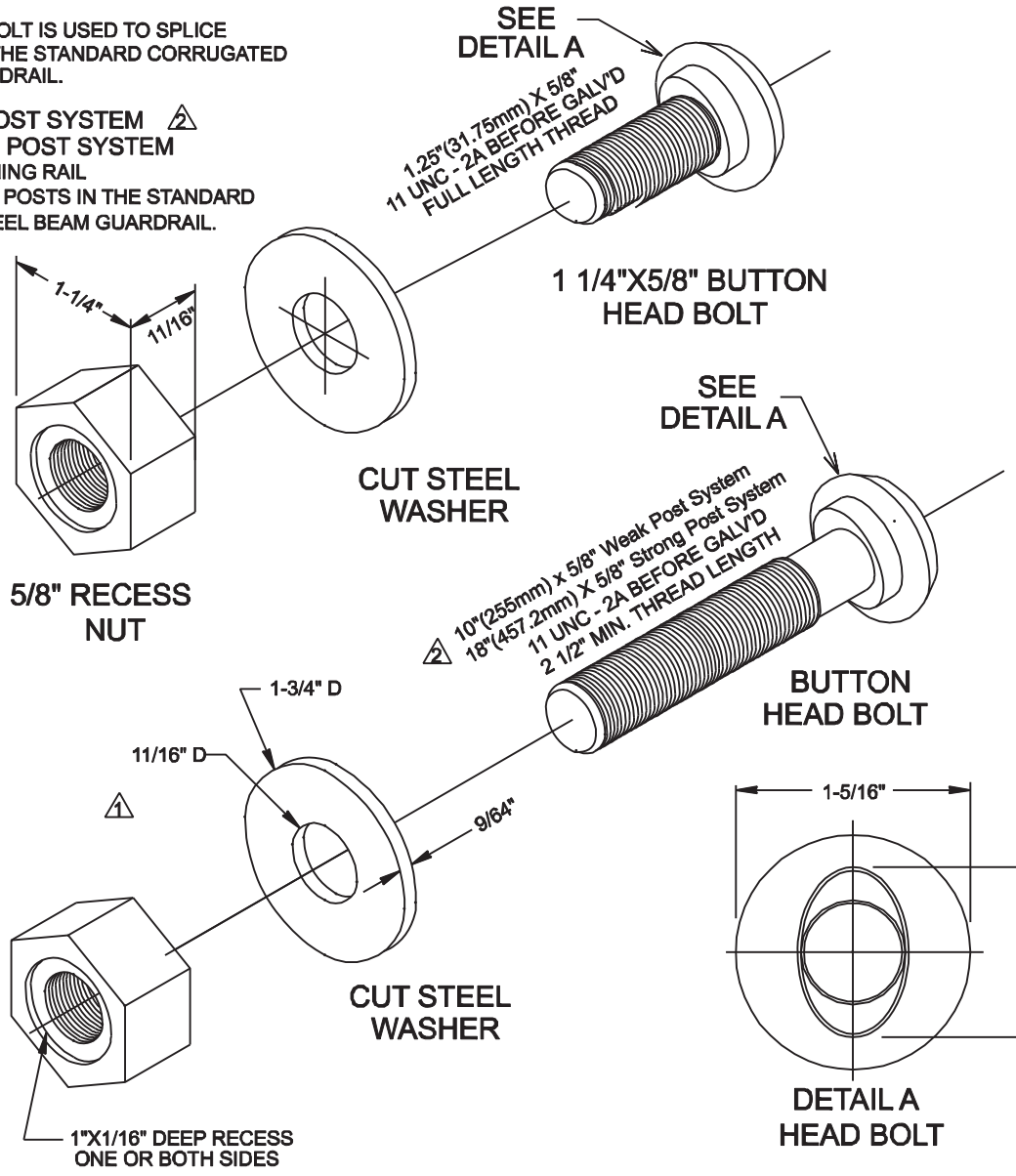
W - BEAM GUARDRAIL HARDWARE TERMINAL CONNECTOR

All dimensions are in millimetres unless otherwise indicated.

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.05

(1-1/4" LENGTH) THIS BOLT IS USED TO SPLICE RAIL ELEMENTS USED IN THE STANDARD CORRUGATED SHEET STEEL BEAM GUARDRAIL.

(10" LENGTH) WEAK POST SYSTEM ⚠2
(18" LENGTH) STRONG POST SYSTEM
THIS BOLT IS FOR FASTENING RAIL TO WOOD OR CONCRETE POSTS IN THE STANDARD CORRUGATED SHEET STEEL BEAM GUARDRAIL.



No.	REVISIONS	BY	DATE
⚠2	Bolt Dimension	P.M.	9/14/05
⚠1	Rectangular Washer Removed	B.K.	12/07/05

Approved:
Original approved by
Traffic Operations Branch
Alberta Transportation and Utilities

Executive Director,
Technical Standards Branch

Date: DECEMBER 11, 1992

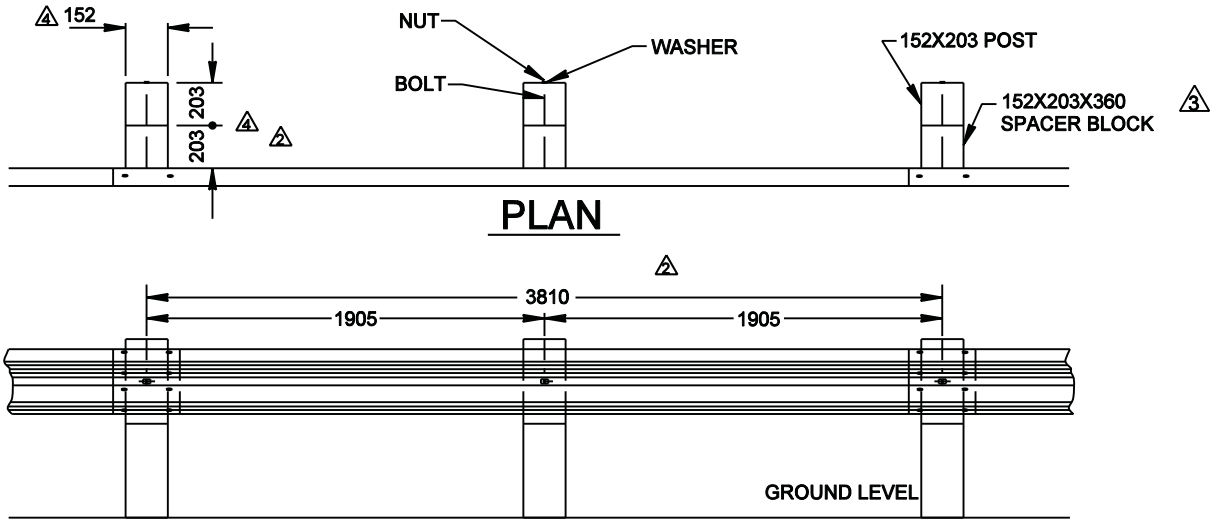
Alberta
INFRASTRUCTURE AND TRANSPORTATION

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF A.S.T.M A307 AND NUTS TO THE REQUIREMENT OF A.S.T.M A563, GRADE A OR BETTER, AND BE GALVANIZED IN ACCORDANCE WITH CSA G 164-M EXCEPT WHEN CORROSION RESISTANT STEEL IS REQUESTED IN WHICH CASE BOLTS AND NUTS SHALL BE MADE OF MATERIAL HAVING AN ATMOSPHERIC CORROSION RESISTANCE, APPROXIMATELY TWO TIMES THAT OF CARBON STRUCTURAL STEEL WITH COPPER AND SHALL NOT BE GALVANIZED.

W - BEAM GUARDRAIL HARDWARE BOLT, NUT AND WASHER

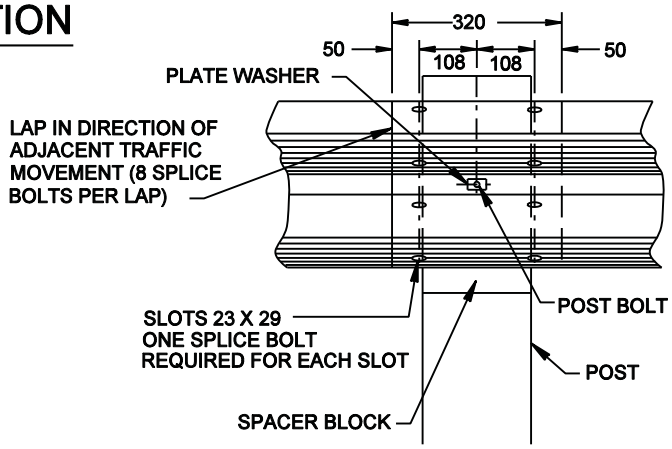
All dimensions are in millimetres unless otherwise indicated.

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.06

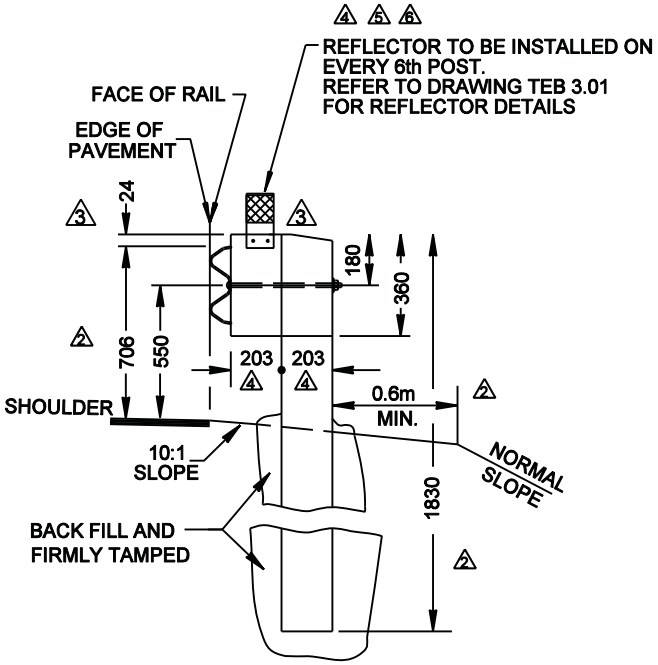


PLAN

ELEVATION



RAIL SPLICE DETAIL



POST AND SPACER DETAILS

2

NOTE: THE STANDARD POST LENGTH FOR STRONG POST SYSTEM IS 1830mm (6'0"). OTHER POST LENGTHS MAY BE USED IF DIRECTED BY THE ENGINEER.

All dimensions are in millimetres unless otherwise indicated.

No.	REVISIONS	BY	DATE
6	Reflector Note Revised	PM	8 JUL 09
5	Reflector Note Revised (Include Type IX)	BK	03/23/07
4	Reflector Note and Added Post Dimensions	BK	08/11/06
3	Dimensions and Reflector Detail	BK	12/07/05
2	Notes and Dimensions	BK	12-04
1	·	·	06-95

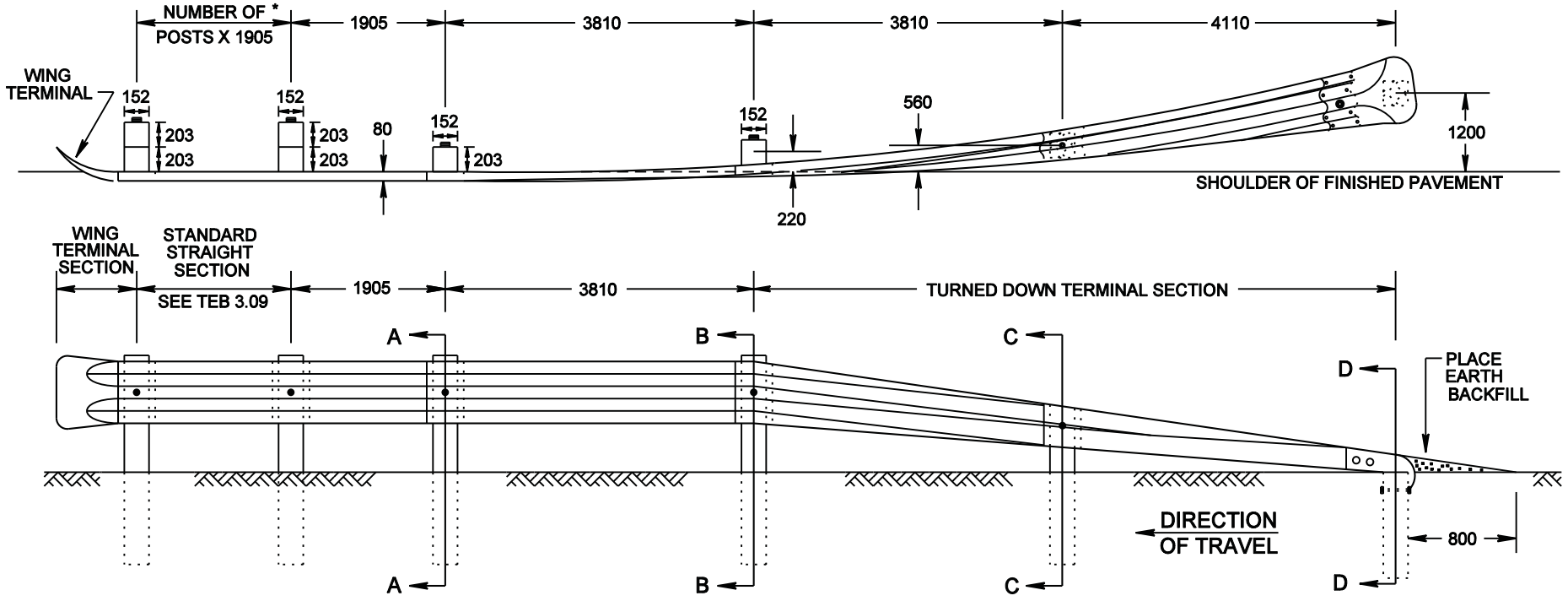
Approved:
Original signed by
A.D. Cherwenuk
Executive Director,
Technical Standards Branch

Date: DECEMBER 11, 1992

Alberta Transportation

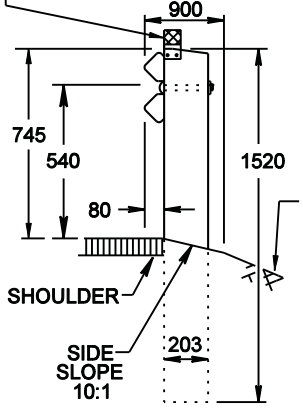
STRONG POST W-BEAM BLOCKED-OUT GUARDRAIL

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.09

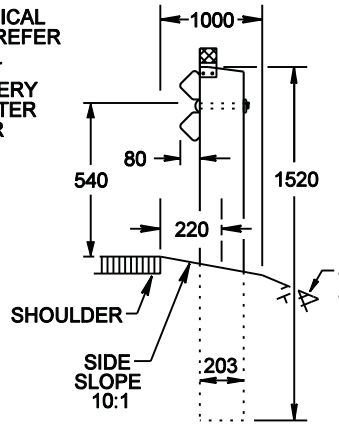


* LENGTH OF STANDARD STRAIGHT GUARDRAIL IS DETERMINED BY PHYSICAL NEED. STANDARD SPACING IS 1905. REFER TO TEB 3.09 FOR STANDARD DETAILS.

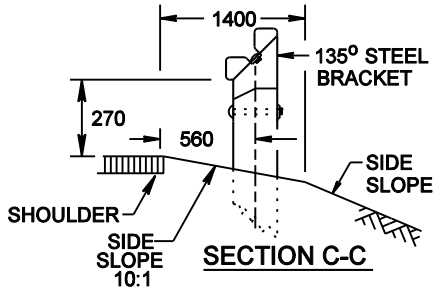
REFLECTOR TO BE INSTALLED ON EVERY 6th POST ON STRAIGHT SECTIONS AFTER SECTION A-A. REFER TO TEB 3.01 FOR REFLECTOR DETAILS.



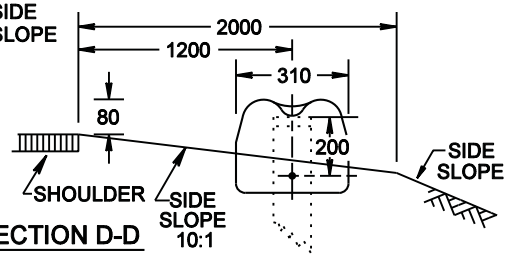
SECTION A-A



SECTION B-B



SECTION C-C



SECTION D-D

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
2. ALL JOINTS TO BE LAPPED IN THE DIRECTION OF TRAFFIC.
3. TURNED DOWN TERMINALS ARE TO BE USED AT BOTH ENDS OF GUARDRAIL INSTALLATIONS ON 2 LANE UNDIVIDED HIGHWAYS.
4. THE ACCEPTABLE DESIGN RANGE FOR HEIGHT OF GUARDRAIL IS +/- 75mm (TO BE SET BY THE CONSULTANT).
5. THE ACCEPTABLE TOLERANCE FOR HEIGHT OF GUARDRAIL AT TIME OF CONSTRUCTION OR MAINTENANCE IS SHOWN IN THE APPLICABLE SPECIFICATIONS.

No.	REVISIONS	BY	DATE
3			
2	REFLECTOR NOTE REVISED	PM	8 JU 09
1	REFLECTOR NOTE REVISED	BK	5 JUN 07

Approved:

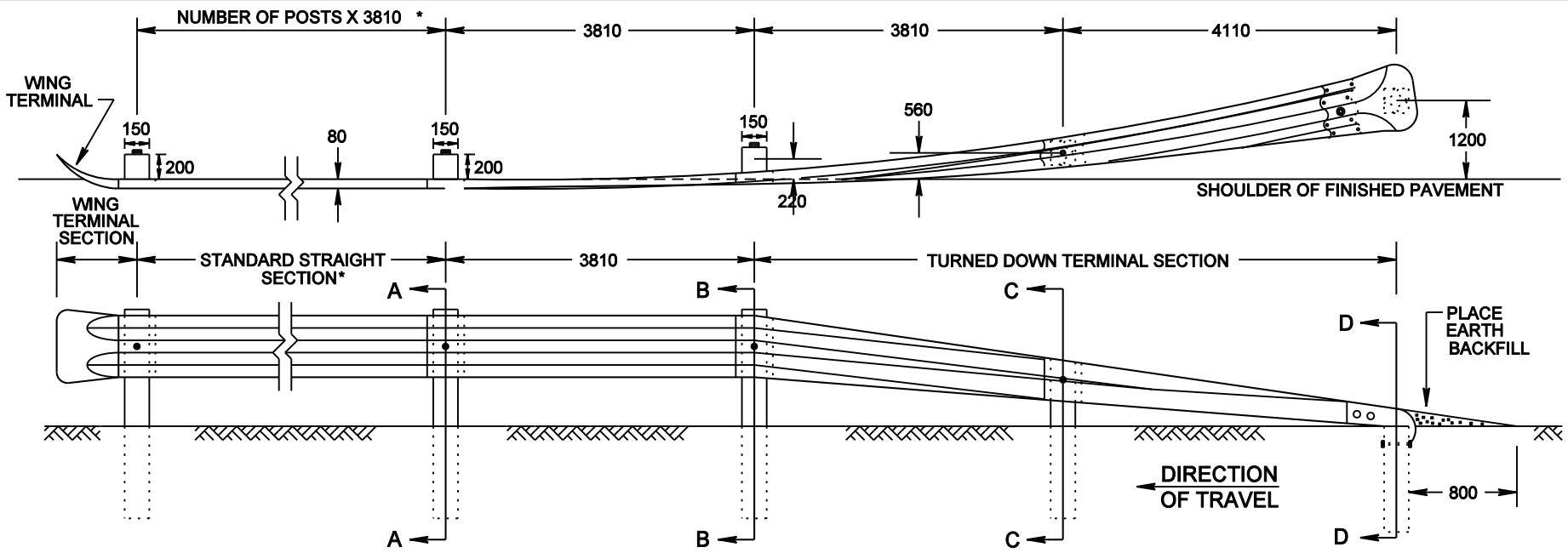
Executive Director,
Technical Standards Branch

Date: July, 2006

Alberta
INFRASTRUCTURE AND TRANSPORTATION

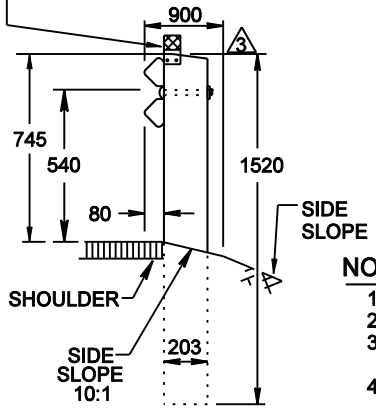
W - BEAM GUARDRAIL STRONG POST END TREATMENT TURN DOWN (1.9m SPACING - WITH BLOCKS)

Prepared By: G.E.C.	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.10

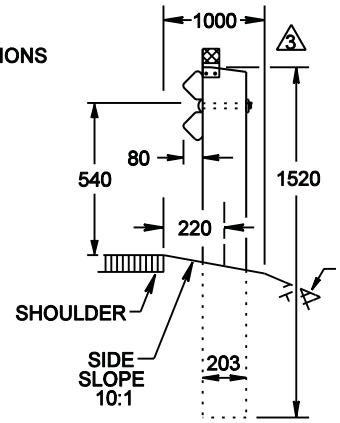


* LENGTH OF STANDARD STRAIGHT GUARDRAIL IS DETERMINED BY PHYSICAL NEED. STANDARD SPACING IS 3810.

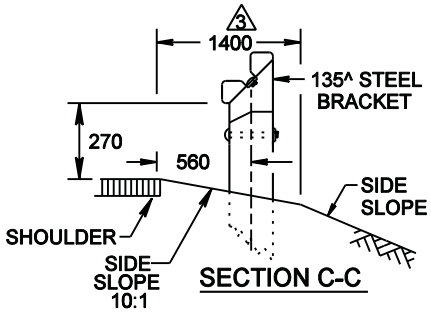
REFLECTOR TO BE INSTALLED ON EVERY 3rd POST ON STRAIGHT SECTIONS AFTER SECTION A-A. REFER TO DRAWING TEB 3.01 FOR REFLECTOR DETAILS △3 △5 △6



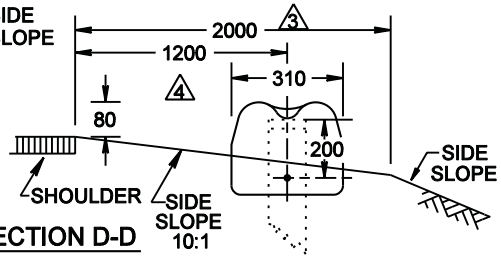
SECTION A-A



SECTION B-B △5



SECTION C-C



SECTION D-D

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
2. ALL JOINTS TO BE LAPPED IN THE DIRECTION OF TRAFFIC.
3. TURNED DOWN TERMINALS ARE TO BE USED AT BOTH ENDS OF GUARDRAIL INSTALLATIONS ON 2 LANE UNDIVIDED HIGHWAYS.
4. THE ACCEPTABLE DESIGN RANGE FOR HEIGHT OF GUARDRAIL IS +/- 75mm (TO BE SET BY THE CONSULTANT).
5. THE ACCEPTABLE TOLERANCE FOR HEIGHT OF GUARDRAIL AT TIME OF CONSTRUCTION OR MAINTENANCE IS SHOWN IN THE APPLICABLE SPECIFICATIONS.

No.	REVISIONS	BY	DATE
△6	REFLECTOR NOTE REVISED	PM	8 JUL 09
△5	REFLECTOR NOTE REVISED	BK	5 JUN 07
△4	DIMENSION	BK	12/07/05
△3	NOTES AND DIMENSIONS	BK	12/04
△2	REVISED NOTE	RD	8/03
△1	ADDED NOTE No. 4	TDN	10/98

Approved:

Executive Director,
Technical Standards Branch

Date: December, 1992

Alberta Transportation

W - BEAM GUARDRAIL
WEAK POST END TREATMENT
TURN DOWN
(3.8m SPACING - NO BLOCK)

Prepared By: T.S.	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.12

SECTION C-C
NOT TO SCALE

SECTION B-B
NOT TO SCALE

SECTION A-A
NOT TO SCALE

DETAIL B
OFFSETS FOR CURVED PORTION OF GUARDRAIL

No.	REVISIONS	BY	DATE
2	.	.	.
1	END TREATMENT NOTES	B.K.	12/01/05

Approved:
Original signed by
Allan Kwan

Executive Director,
Technical Standards Branch
Date: JUNE 24, 2005

Date: JULY 12, 2005

Alberta
INFRASTRUCTURE AND TRANSPORTATION

TYPICAL W-BEAM STRONG POST OR MODIFIED THRIE BEAM GUARDRAIL PLACEMENT ROADSIDE HAZARDS (TWO AND FOUR LANE HIGHWAYS)

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.15a

BARRIER MAY BE INSTALLED ON TANGENT OR WITH FLARING AT ONE OR BOTH ENDS. GUARDRAIL LENGTH MAY BE REDUCED BY FLARING. LENGTH IS TO BE DETERMINED BY PROTECTION ENVELOPE METHOD.

END TREATMENT BARRIER MAY BE TERMINATED WITH A TURN-DOWN NEAR SHOULDER (TEB 3.12), OR OTHER TREATMENT AS DETERMINED BY PROJECT ENGINEER IN EACH GIVEN SITUATION

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE
2	.	.	.
1	END TREATMENT NOTES	B.K.	12/01/05

Approved:

Original signed by
Allan Kwan

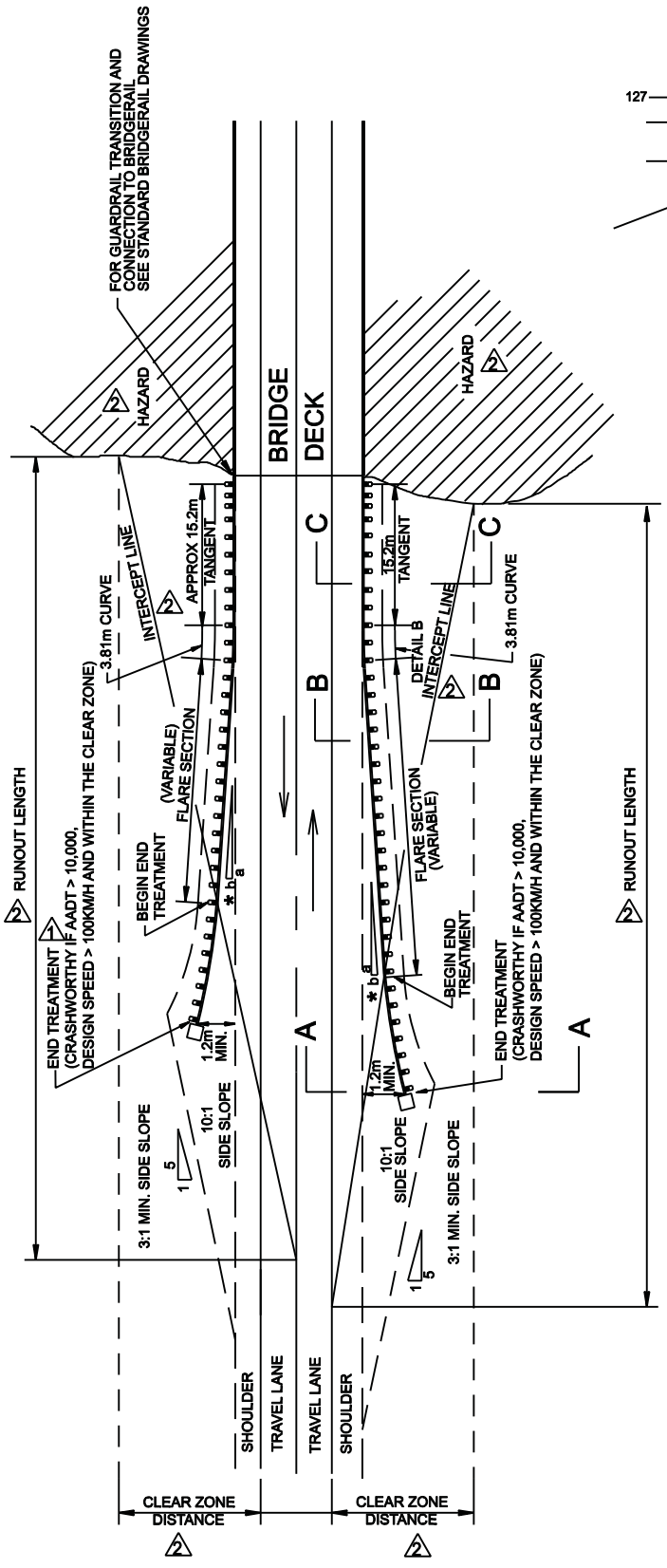
Executive Director,
Technical Standards Branch
Date: JUNE 24, 2005

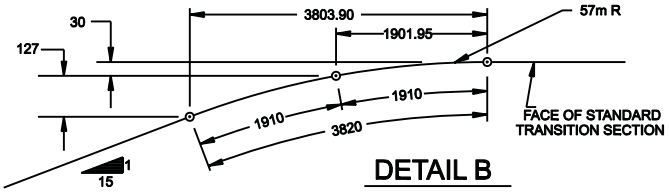
Date: JULY 12, 2005

Alberta
INFRASTRUCTURE AND TRANSPORTATION

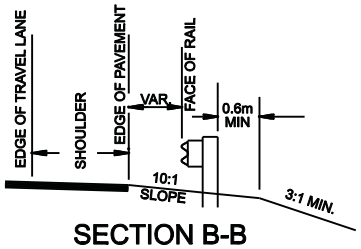
TYPICAL W-BEAM WEAK POST GUARDRAIL PLACEMENT ROADSIDE HAZARDS

Prepared By:	Checked By:	Scale:	Dwg No.:
M.T	B.K	N.T.S.	TEB 3.15b

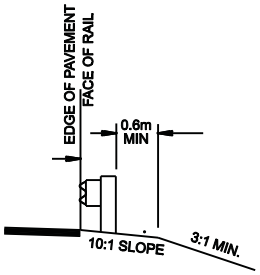




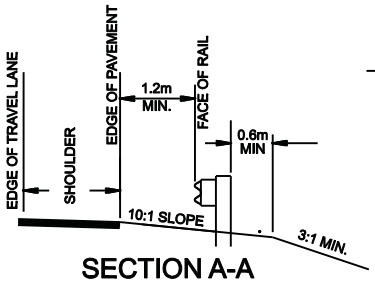
DETAIL B
OFFSETS FOR CURVED PORTION OF GUARDRAIL



SECTION B-B
NOT TO SCALE



SECTION C-C
NOT TO SCALE



SECTION A-A
NOT TO SCALE

END TREATMENT IS TO BE DETERMINED BY PROJECT MANAGER IN EACH GIVEN SITUATION

* FLARE RATES AS PER STANDARD

△2 RUNOUT LENGTH IS TO BE MEASURED FROM BEGINNING OF HAZARD ON ROADSIDE

LENGTH OF GUARDRAIL TO BE DETERMINED BY PROTECTION ENVELOPE METHOD

All dimensions are in millimetres unless otherwise indicated.

No.	REVISIONS	BY	DATE
△2	"LENGTH OF NEED" SHOWN	B.K.	12 SEP 07
△1	END TREATMENT NOTES	B.K.	12/01/05

Approved:

Original signed by
Allan Kwan

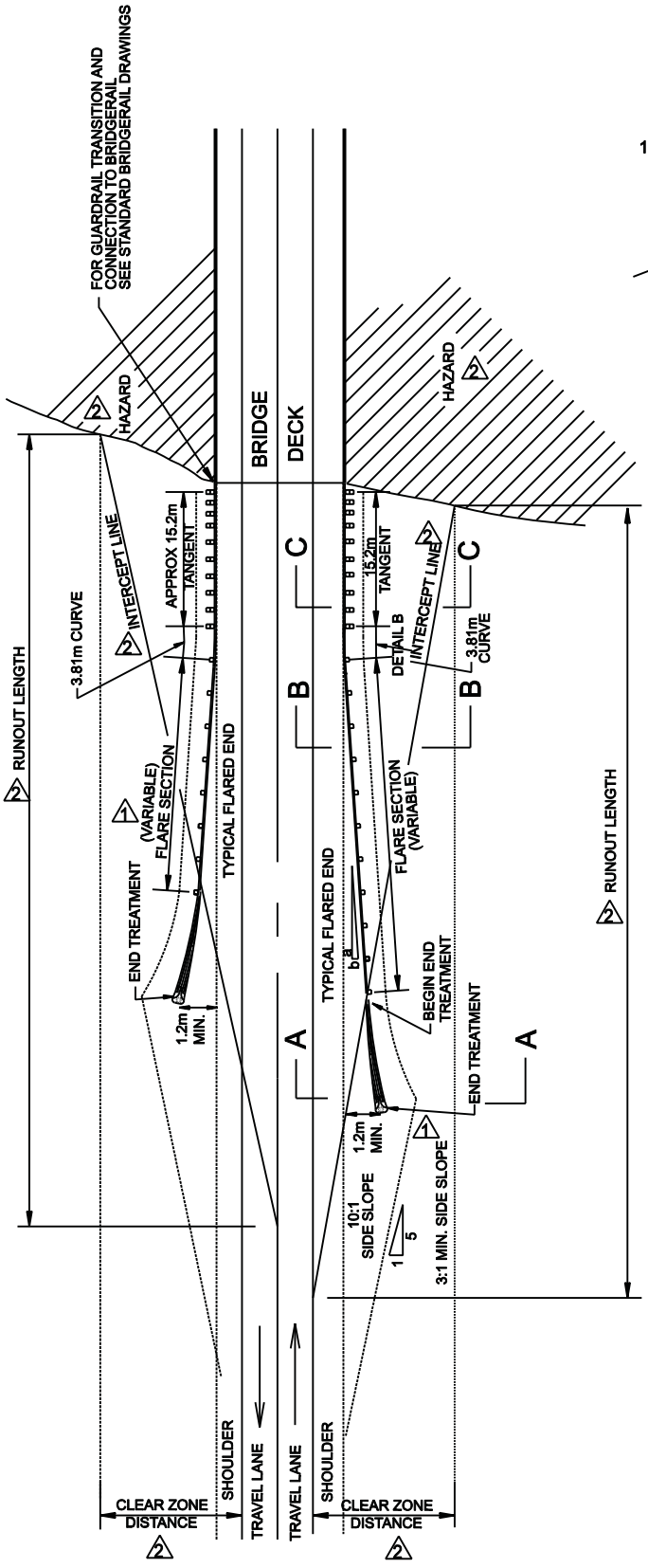
Executive Director,
Technical Standards Branch
Date: JUNE 24, 2005

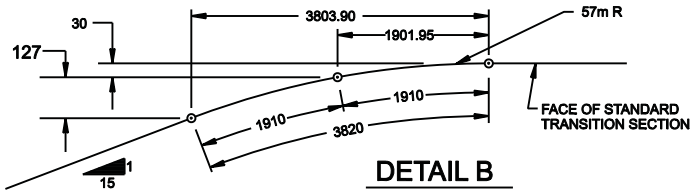
Date: JULY 12, 2005

Alberta
INFRASTRUCTURE AND TRANSPORTATION

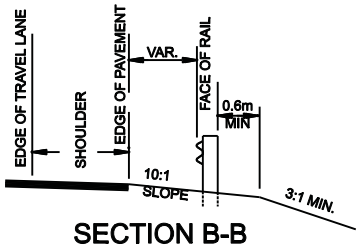
TYPICAL STRONG POST W-BEAM OR MODIFIED THRIE BEAM GUARDRAIL PLACEMENT AT BRIDGE APPROACHES (TWO-LANE HIGHWAY)

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.16a

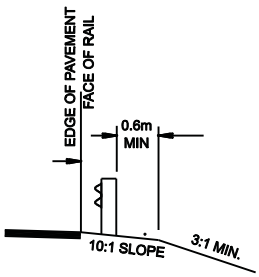




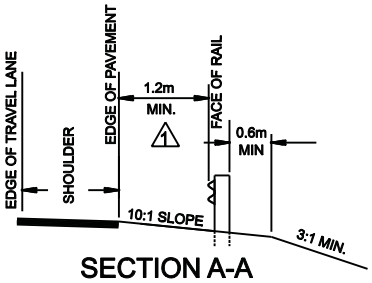
DETAIL B
OFFSETS FOR CURVED PORTION OF GUARDRAIL



SECTION B-B
NOT TO SCALE



SECTION C-C
NOT TO SCALE



SECTION A-A
NOT TO SCALE

END TREATMENT IS TO BE DETERMINED BY PROJECT MANAGER IN EACH GIVEN SITUATION

BARRIER MAY BE INSTALLED ON TANGENT OR WITH FLARING AT ONE OR BOTH ENDS. GUARDRAIL LENGTH MAY BE REDUCED BY FLARING. LENGTH IS TO BE DETERMINED BY PROTECTION ENVELOPE METHOD.

2 RUNOUT LENGTH IS TO BE MEASURED FROM BEGINNING OF HAZARD ON ROADSIDE.

all dimensions are in millimetres unless otherwise indicated.

No.	REVISIONS	BY	DATE
2	"LENGTH OF NEED" SHOWN	B.K.	12 SEP 07
1	END TREATMENT NOTES	B.K.	12/01/05

Approved:

Original signed by
Allan Kwan

Executive Director,
Technical Standards Branch
Date: JUNE 24, 2005

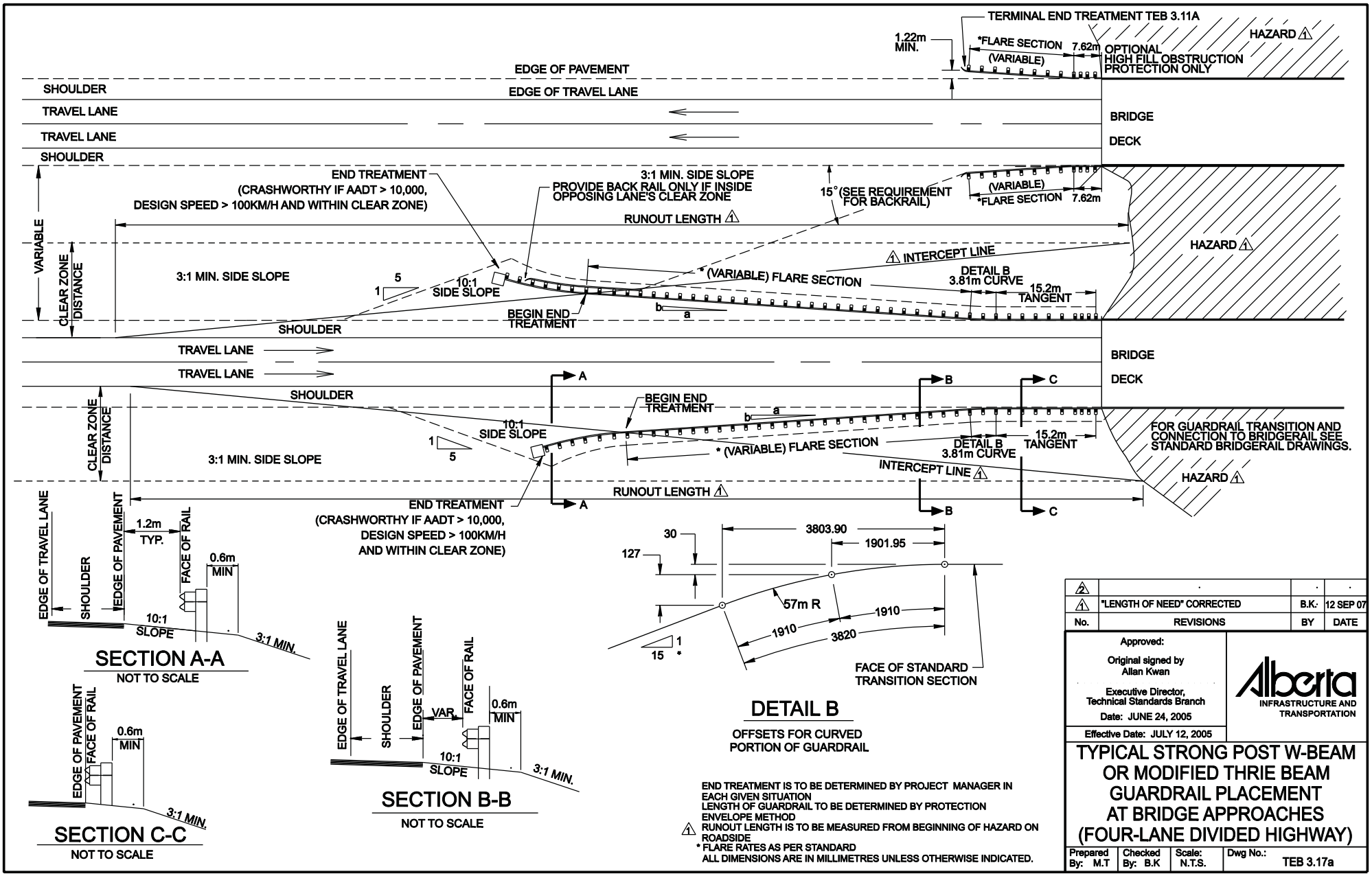
Date: JULY 12, 2005

Alberta
INFRASTRUCTURE AND TRANSPORTATION

TYPICAL W-BEAM WEAK POST GUARDRAIL PLACEMENT AT BRIDGE APPROACHES (TWO-LANE HIGHWAY)

Prepared By:	Checked By:	Scale:	Dwg No.:
M.T	B.K	N.T.S.	TEB 3.16b

THIS PAGE INTENTIONALLY LEFT BLANK



No.	REVISIONS	BY	DATE
⚠2	.	.	.
⚠1	"LENGTH OF NEED" CORRECTED	B.K.	12 SEP 07

Approved:
Original signed by Allan Kwan
Executive Director, Technical Standards Branch
Date: JUNE 24, 2005
Effective Date: JULY 12, 2005

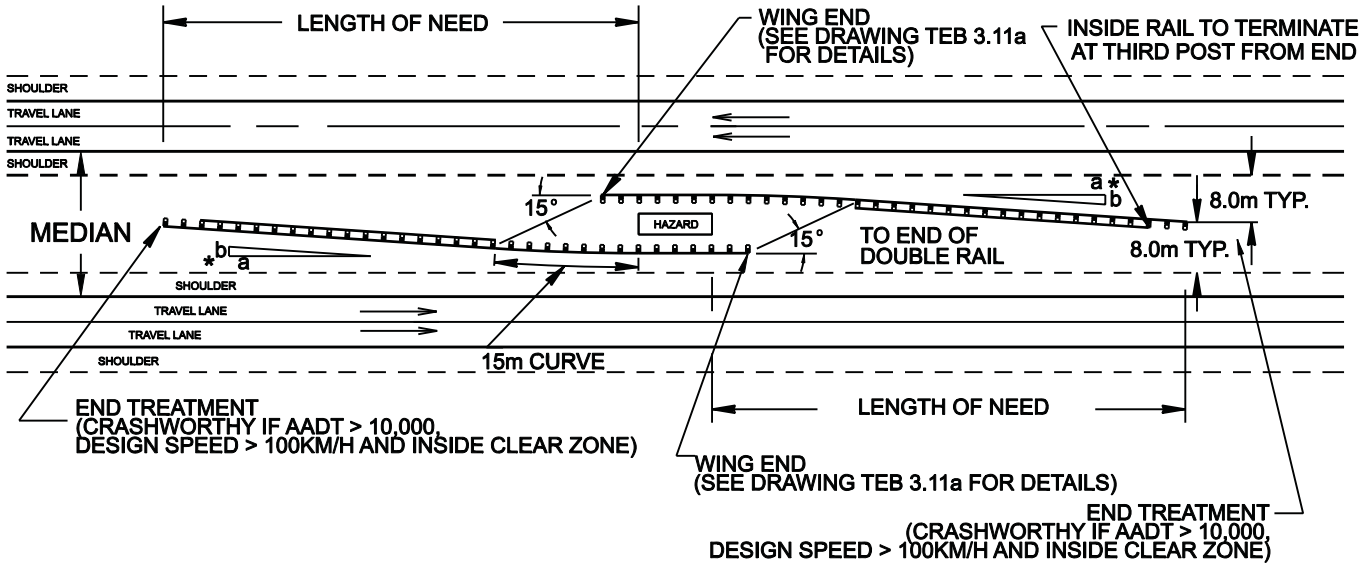
Alberta INFRASTRUCTURE AND TRANSPORTATION

TYPICAL STRONG POST W-BEAM OR MODIFIED THRIE BEAM GUARDRAIL PLACEMENT AT BRIDGE APPROACHES (FOUR-LANE DIVIDED HIGHWAY)

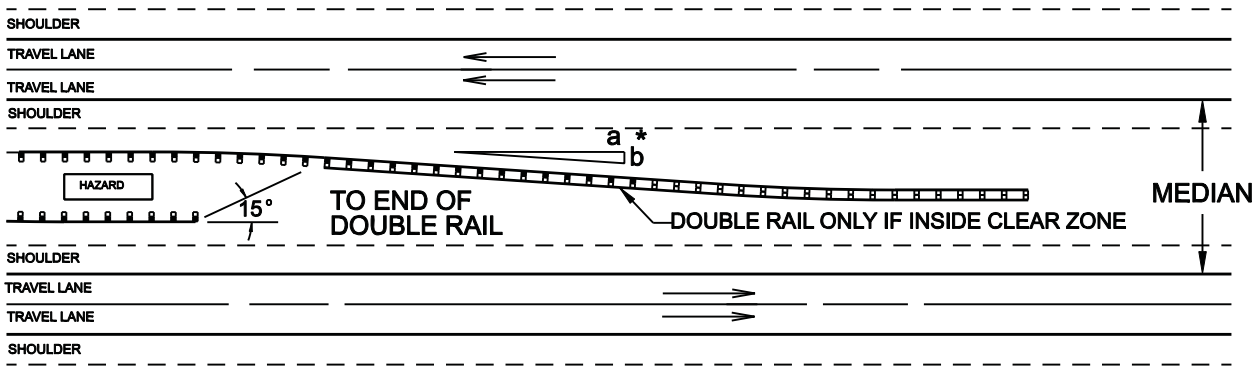
Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.17a

THIS PAGE LEFT INTENTIONALLY BLANK

INTRODUCED MEDIAN BARRIER



CONTINUOUS MEDIAN BARRIER



* FLARE RATE AS PER STANDARD FOR DESIGN SPEED.

CONSIDER ONLY WHERE MEDIAN WIDTH SUFFICIENT TO PROVIDE 8m MINIMUM FROM OPPOSING TRAVEL LANE TO BACK SIDE OF TERMINAL.

FOR NARROW MEDIAN, IMPACT SYSTEMS ARE REQUIRED.

THE LENGTH OF NEED SHALL BE BASED ON THE PROTECTION ENVELOPE.

CLEARANCE BETWEEN GUARDRAIL AND OBSTRUCTION:
STRONG POST (WOOD AND STEEL POSTS) 0.9m
THRIE BEAM 0.9m
STRONG POST (PLASTIC POSTS) 1.5m

DATA FOR 15m CURVE
D=38 3 0' R=225.0m
SR=7.508m CL=15.0m

END TREATMENT IS TO BE DETERMINED BY PROJECT MANAGER TO EACH GIVEN SITUATION.

All dimensions are in millimetres unless otherwise indicated.

No.	REVISIONS	BY	DATE
2	.	.	.
1	.	.	.

Approved:
Original signed by
Allan Kwan

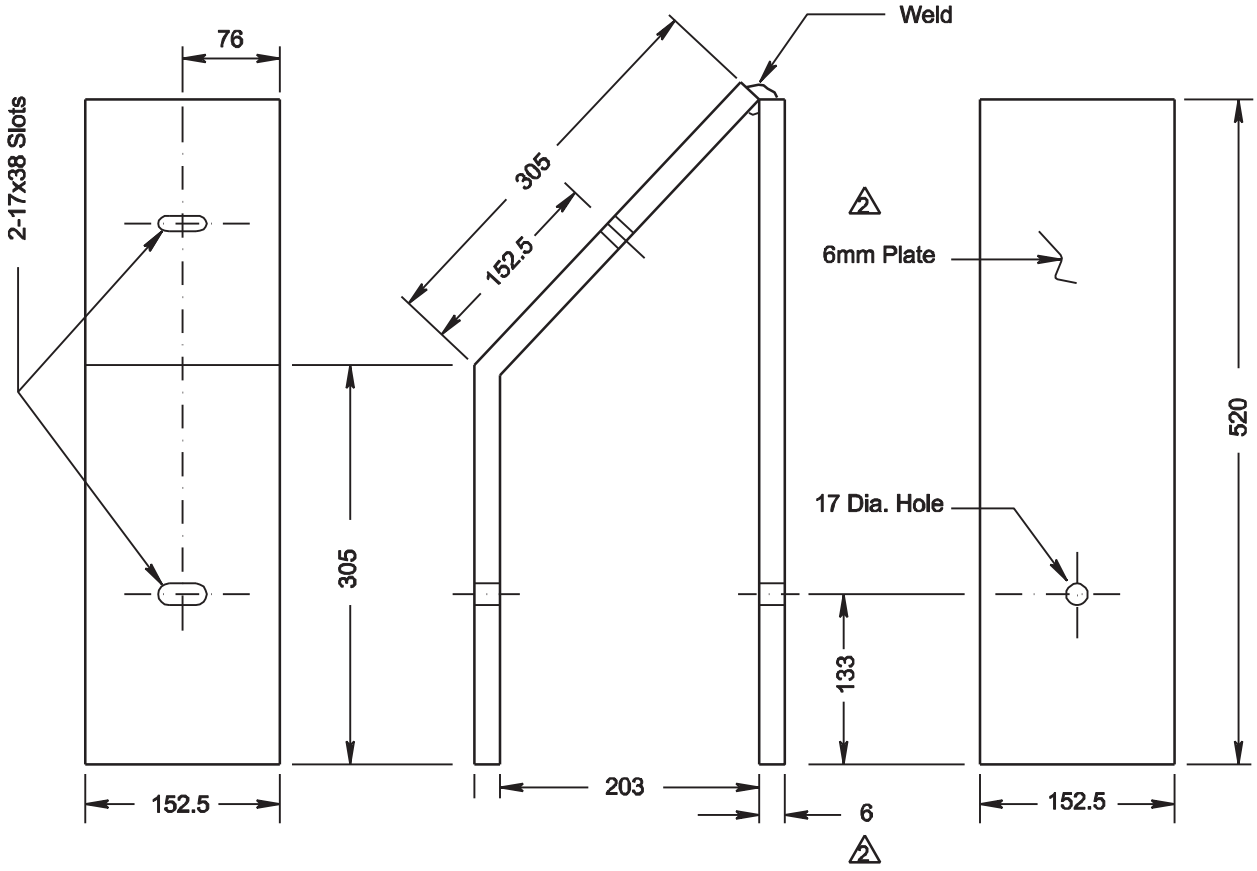
Executive Director,
Technical Standards Branch
Date: JUNE 24, 2005

Effective Date: JULY 12, 2005

Alberta
INFRASTRUCTURE AND TRANSPORTATION

TYPICAL STRONG POST W-BEAM OR MODIFIED THRIE BEAM GUARDRAIL PLACEMENT FOR MEDIAN HAZARDS

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.18a



NOTES:
THIS BRACKET IS REQUIRED FOR THE STANDARD W-BEAM GUARDRAIL WEAKPOST TURN DOWN END TREATMENT - SEE DRAWING TEB 3.12 SECTION C-C 2

No.	REVISIONS	BY	DATE
2	Plate Thickness and Notes	B.K.	12/07/05
1	N/A	·	06/95

Approved:
Original Approved by
Alberta Transportation and Utilities
Traffic Engineering Section
Roadway Engineering Branch
Executive Director,
Technical Standards Branch

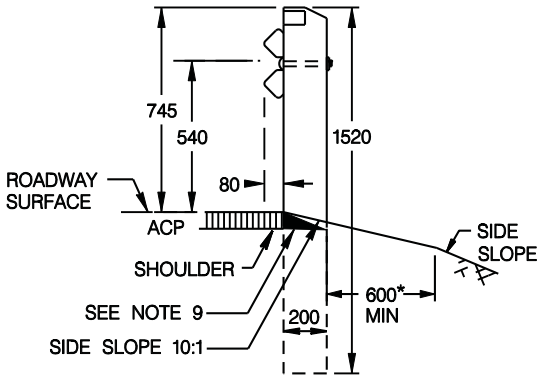
Date: NOVEMBER 25, 1992

Alberta
INFRASTRUCTURE AND TRANSPORTATION

W - BEAM GUARDRAIL TURN DOWN END HARDWARE

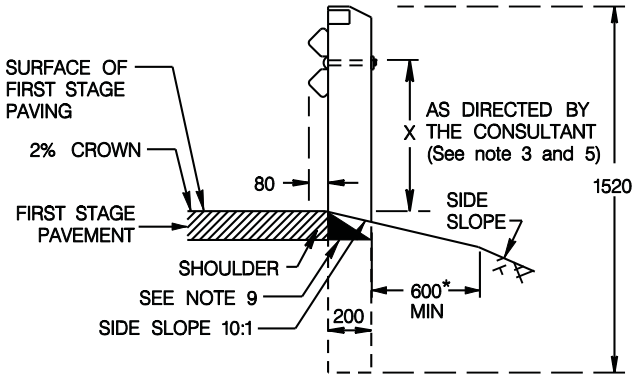
Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.53

All dimensions are in millimetres unless otherwise indicated.



SECTION A-A ⚠1

STANDARD GUARDRAIL INSTALLATION
(W–beam, no blocks).



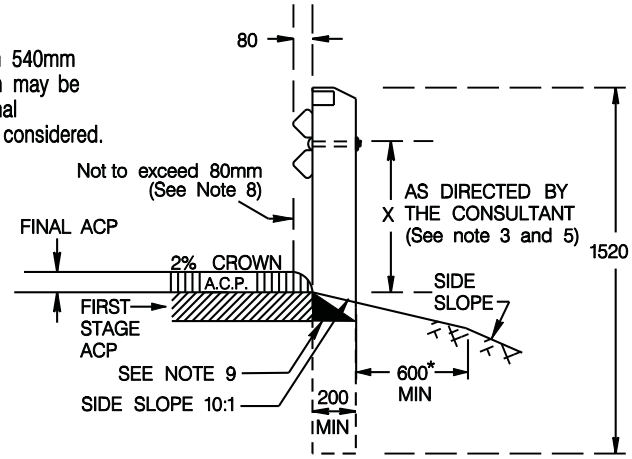
SECTION B-B ⚠1

STAGE 1: FIRST STAGE PAVING

NOTES: ⚠1

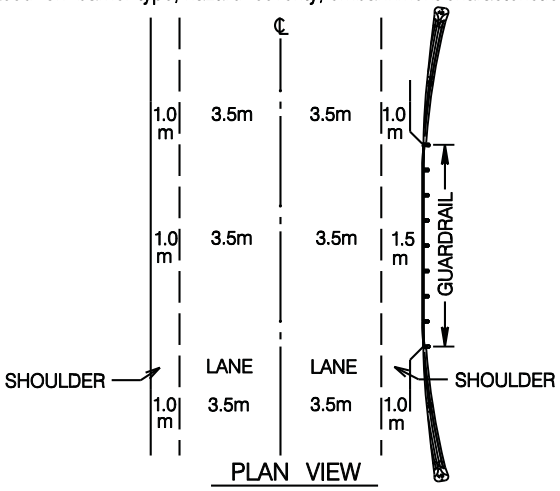
1. Sections B–B and C–C show the special installation of guardrail that is suggested on projects where final paving is anticipated within 10 years.
2. The standard height of guardrail from the road surface to the centre bolt is 540mm (Section A–A). The acceptable design range for height of guardrail installation is from 465mm to 615mm i.e. ± 75mm
3. The guardrail elevation 'x' is to be set by the consultant. An elevation between 540mm and 615mm is normally chosen for First Stage Paving projects. The elevation may be selected based on an estimate of the Final Pavement thickness. Where the final pavement thickness is not known, the highest permissible elevation should be considered.
4. The acceptable tolerance for height of guardrail at time of construction or maintenance is shown in the applicable specification.
5. By installing guardrail at the highest permissible elevation (Section B–B), the final pavement can be placed without the guardrail being removed or adjusted (Section C–C).
6. All dimensions are in millimetres unless otherwise noted.
7. Drawing is not to scale.
8. Pavement drop–off line must not be more than 80mm from the guardrail post line. This is to prevent snagging.
9. Insatllation of guardrail system normally requires post to be installed through ACP and GBC layers.

* The 600mm dimension may be exceeded if required by the consultant based on barrier type, hazard severity, embankment characteristics, etc.



SECTION C-C ⚠1

STAGE 2: FINAL PAVING ON FIRST STAGE PAVING JOB



PLAN VIEW

EXAMPLE SHOWING GUARDRAIL INSTALLATION ON A TYPICAL RAU–209 ROADWAY AT STAGE 2

No.	REVISIONS	BY	DATE
⚠2	·	·	·
⚠1	Notes and Sections ·	P.M.	8 JUL 09

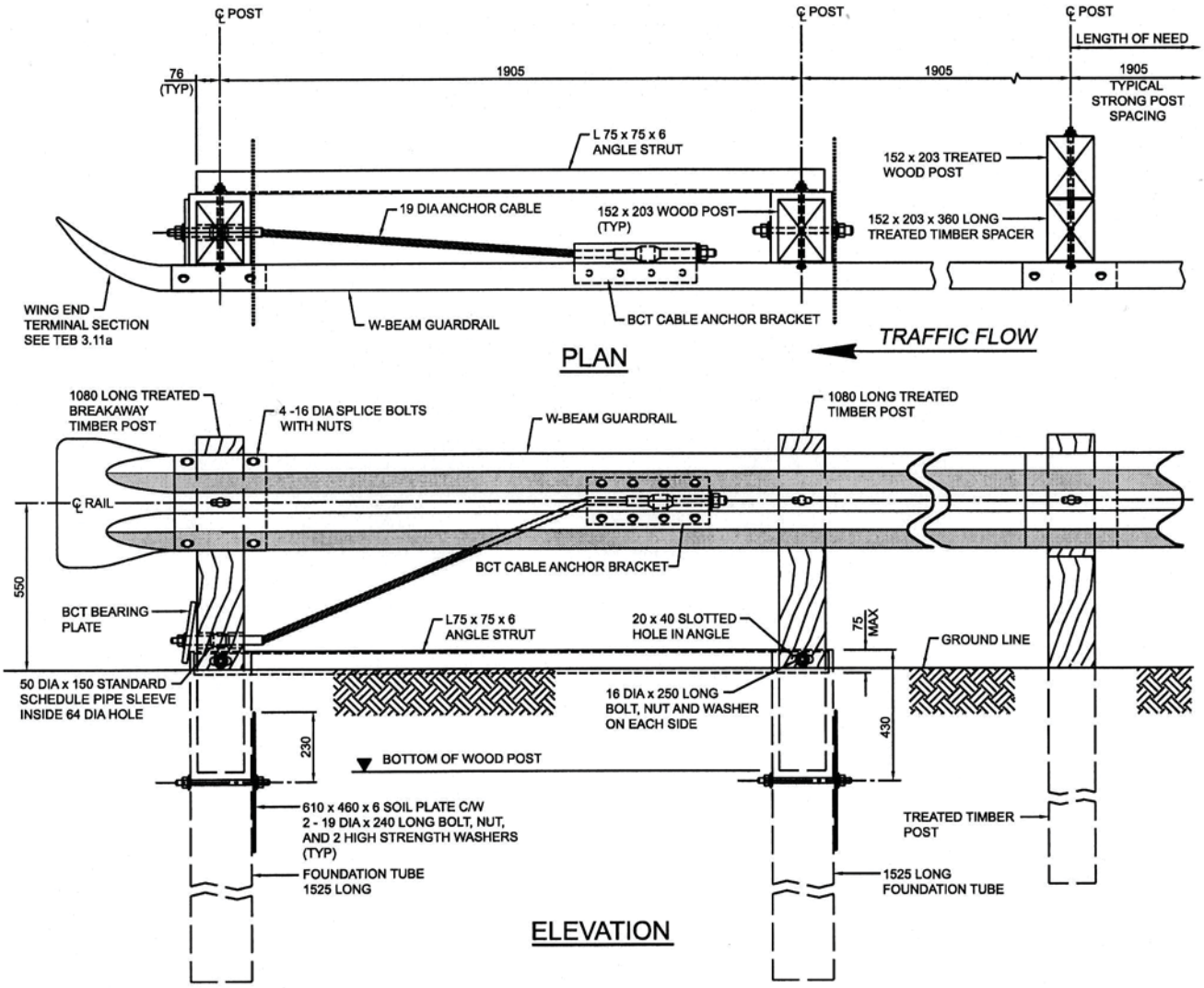
Approved:
Original approved by
Alberta Transportation and Utilities
Traffic Operations Branch
Executive Director,
Technical Standards Branch
Date: JUNE 24, 2005

Effective Date: JULY 12, 2005

Alberta
INFRASTRUCTURE AND TRANSPORTATION

WEAK POST W-BEAM INSTALLATION ON FIRST STAGE PAVING PROJECTS

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.56a



NOTES:

1. THIS END TREATMENT IS ACCEPTABLE FOR USE ON THE LEAVING END OF DIVIDED ROADWAYS ONLY. USE IN MEDIAN APPLICATIONS ARE LIMITED TO INSTALLATIONS OUTSIDE THE CLEAR ZONE OF OPPOSING TRAFFIC.
2. POSTS ARE TO BE SET BY INSTRUMENT FOR ALIGNMENT AND GRADE.
3. BCT CABLE ANCHOR HARDWARE SHALL CONFORM TO AASHTO TASK FORCE 13 REPORT "A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE."
4. LAP ALL GUARDRAIL SECTIONS IN THE DIRECTION OF TRAFFIC FLOW.
5. ALL REQUIRED FITTINGS AND HARDWARE SHALL BE GALVANIZED.
6. CABLE ANCHOR SHALL BE TIGHTENED DURING INSTALLATION TO TAKE OUT ANY SLACK.
7. REFER TO RGD-B1.2 AND RDG-B1.3 FOR STANDARD HARDWARE DETAILS.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE
2			
1			

Approved:

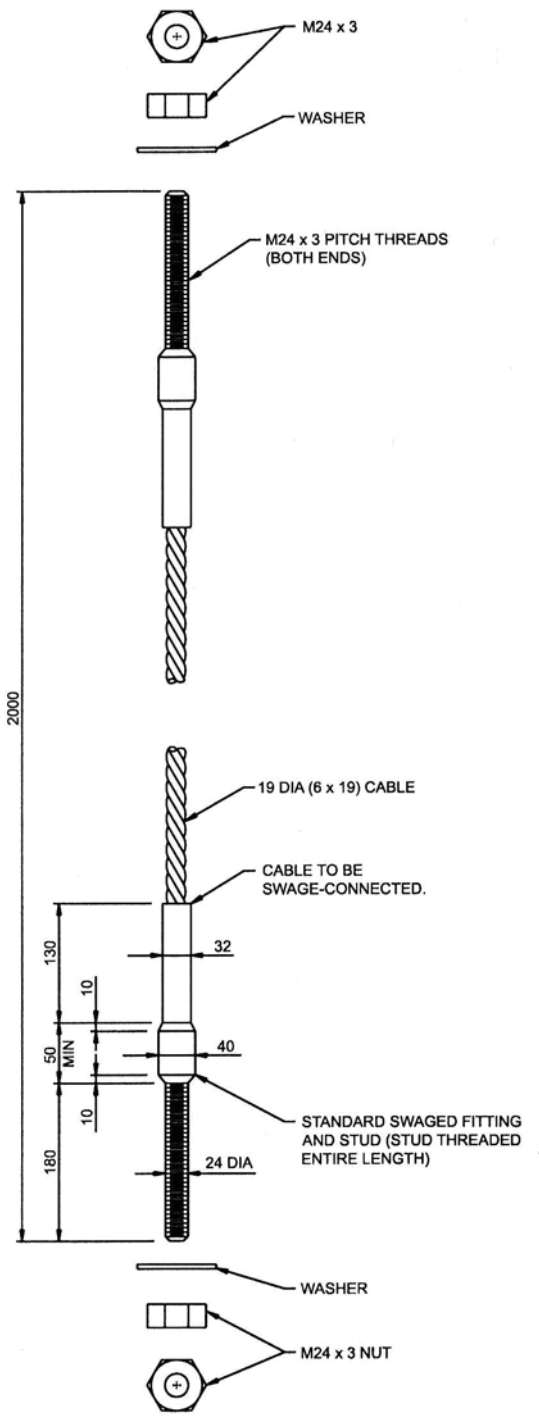
Executive Director,
Technical Standards Branch

Date: NOVEMBER, 2007

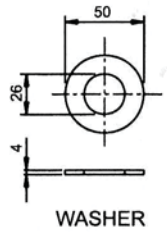
Alberta
INFRASTRUCTURE AND TRANSPORTATION

W-BEAM CABLE ANCHOR TERMINAL (EXIT END TREATMENT FOR DIVIDED HIGHWAYS)

Prepared By: MO	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B1.1

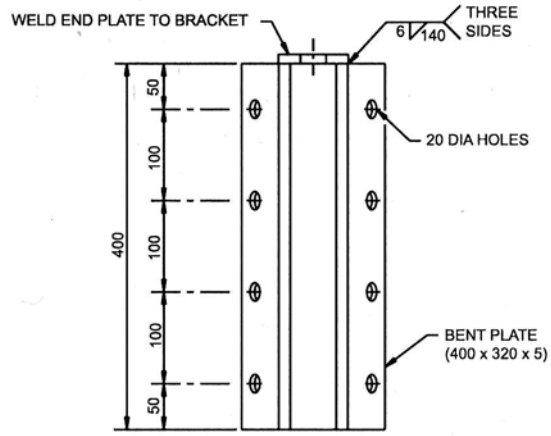


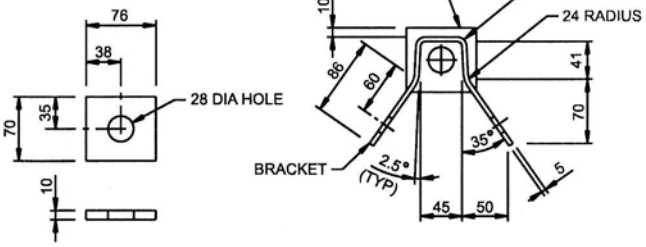
BCT CABLE ANCHOR ASSEMBLY



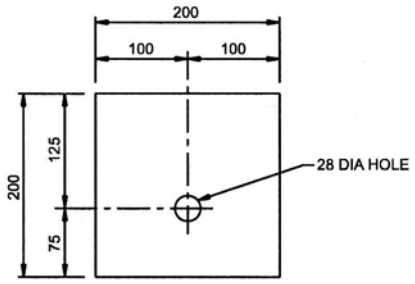
WASHER

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.





BCT CABLE ANCHOR BRACKET



200 x 200 x 16 BCT BEARING PLATE

No.	REVISIONS	BY	DATE
2			
1			

Approved:

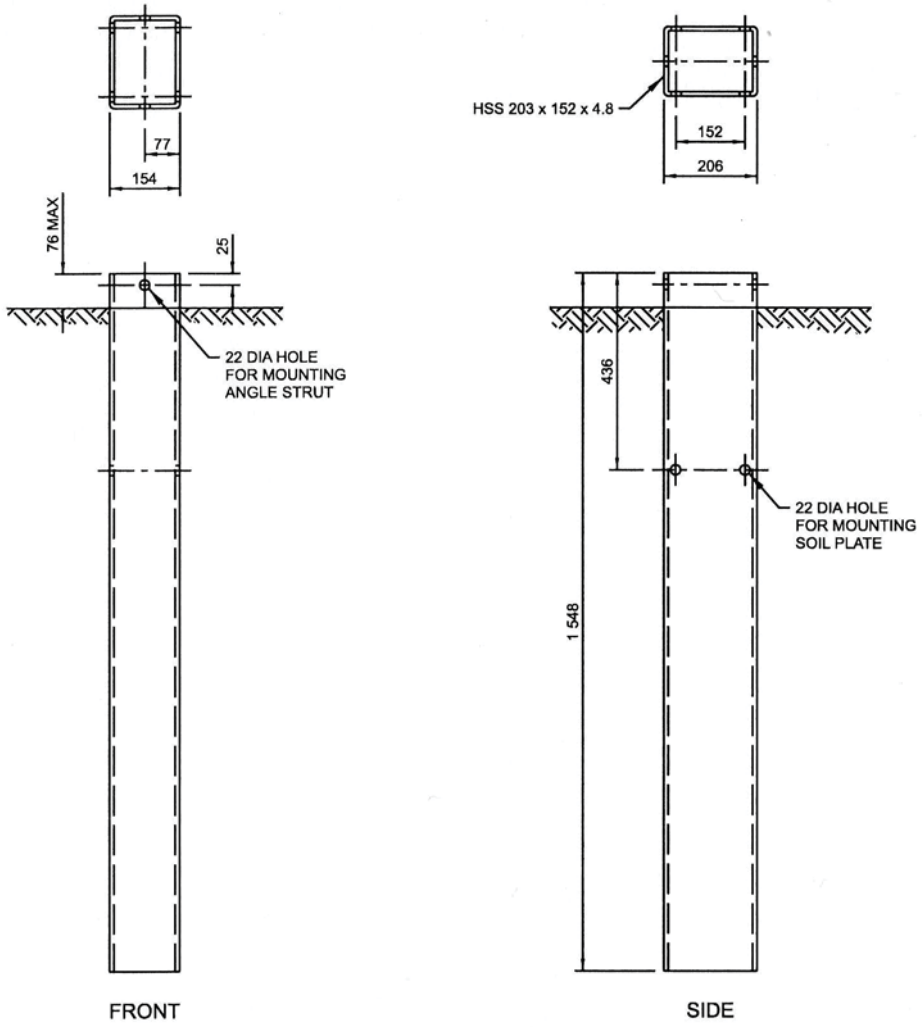
Executive Director,
Technical Standards Branch

Date: NOVEMBER, 2007

Alberta
INFRASTRUCTURE AND
TRANSPORTATION

HARDWARE DETAILS FOR W-BEAM AND THRIE BEAM GUARDRAIL CABLE ANCHOR TERMINAL

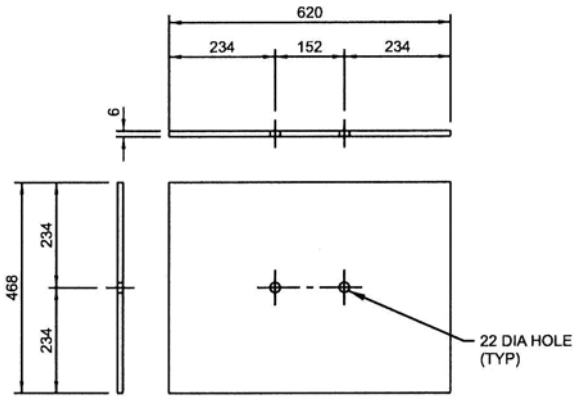
Prepared By: MO	Checked By: WS	Scale: NTS	Dwg No.: RDG-B1.2



FOUNDATION TUBE

NOTE:

WOOD POST SHOULD BE ABLE TO SLIDE INTO THE TOP OF FOUNDATION TUBE SO THE ACTUAL INSIDE DIMENSIONS OF FOUNDATION TUBE CAN NOT BE LESS THAN 190x140.



FOUNDATION TUBE SOIL PLATE

No.	REVISIONS	BY	DATE
2			
1			

Approved:

Executive Director,
Technical Standards Branch

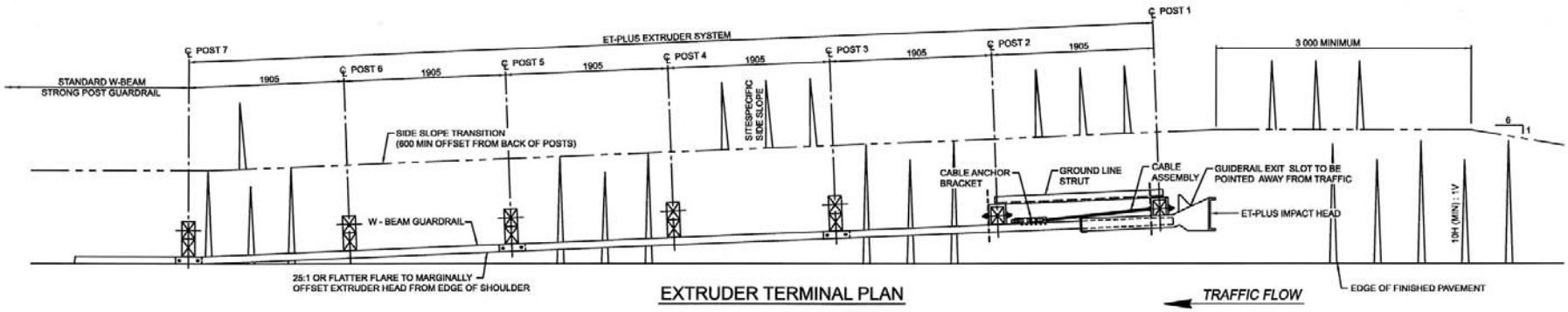
Date: NOVEMBER, 2007

Alberta
INFRASTRUCTURE AND TRANSPORTATION

FOUNDATION TUBE AND FOUNDATION TUBE SOIL PLATE DETAILS FOR W-BEAM AND THRIE BEAM CABLE ANCHOR TERMINAL

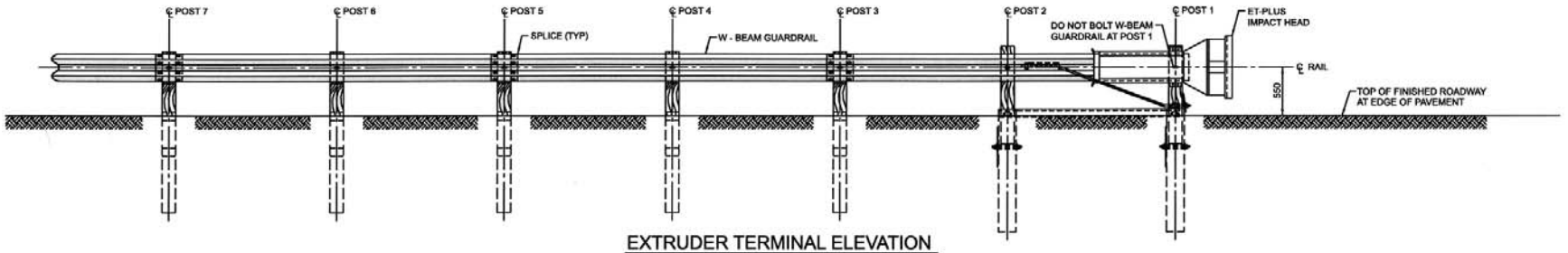
Prepared By: MO	Checked By: WS	Scale: NTS	Dwg No.: RDG-B1.3

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

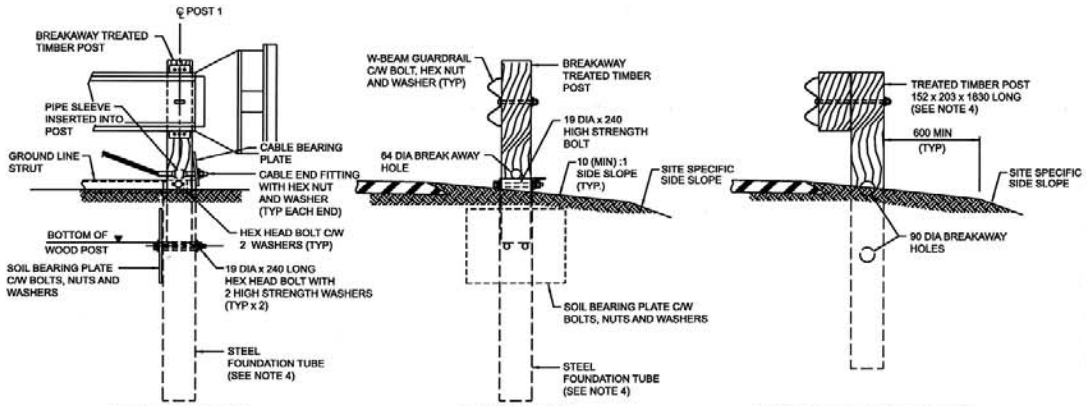


EXTRUDER TERMINAL PLAN

TRAFFIC FLOW



EXTRUDER TERMINAL ELEVATION



POST 1 ELEVATION
DO NOT BOLT W-BEAM GUARDRAIL TO POST 1

POST 2 SECTION

POSTS 3, 4, 5, 6 AND 7 SECTION

POST DETAILS

NOTES:

1. THE ET PLUS EXTRUDER SYSTEM DEPICTED ON THIS DRAWING IS PROPRIETARY TO TRINITY INDUSTRIES, INC. AND MEETS THE REQUIREMENTS OF NCHRP REPORT 350 FOR TEST LEVEL 3 (TL-3). THE INSTALLATION OF THIS SYSTEM SHALL BE AS PER THE TRINITY INSTALLATION INSTRUCTIONS MANUAL.
2. THIS DRAWING SHOWS THE INSTALLATION OF THE RIGHT SHOULDER EXTRUDER TERMINAL. INSTALLATION OF THE LEFT SHOULDER EXTRUDER TERMINAL IS INVERTED FOR UNIDIRECTIONAL TRAFFIC.
3. RAIL SECTIONS ARE TO BE LAPPED IN THE DIRECTION OF TRAFFIC FLOW.
4. ALTERNATE POST SIZES AND TYPES FOR POSTS 1 TO 7 INCLUSIVE MAY BE USED AS SPECIFIED IN THE TRINITY INSTALLATION INSTRUCTIONS MANUAL.
5. FOR INSTALLATION ON A CURVE, THE ET PLUS EXTRUDER SYSTEM MUST BE MAINTAINED STRAIGHT OVER THE LENGTH OF THE SYSTEM. REFER TO THE TRINITY INSTALLATION INSTRUCTIONS MANUAL FOR LIMITATIONS, INCLUDING MAXIMUM TERMINAL OFFSETS.
6. TO ENSURE PROPER DELINEATION, REFLECTIVE SHEETING ON THE FRONT FACE OF THE EXTRUDER HEAD SHALL BE PROVIDED AS PART OF THE INSTALLED SYSTEM.
7. ALL FITTINGS AND HARDWARE SHALL BE GALVANIZED.
8. POST 3 MARKS THE BEGINNING OF THE CALCULATED LENGTH OF NEED.
9. A MAXIMUM FLARE RATE OF 25 TO 1 IS ACCEPTABLE TO OFFSET THE IMPACT HEAD AWAY FROM EDGE OF SHOULDER.
10. POSTS SHALL BE SET BY INSTRUMENT FOR ALIGNMENT AND GRADE.
11. TOP OF FOUNDATION TUBES SHALL BE SET BETWEEN 64 AND 76 ABOVE THE TOP OF PAVED SHOULDER EDGE AND SHALL NOT PROJECT MORE THAN 100 ABOVE THE FINISHED SIDE SLOPE GRADE AT POST.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE
2			
1			

Approved:

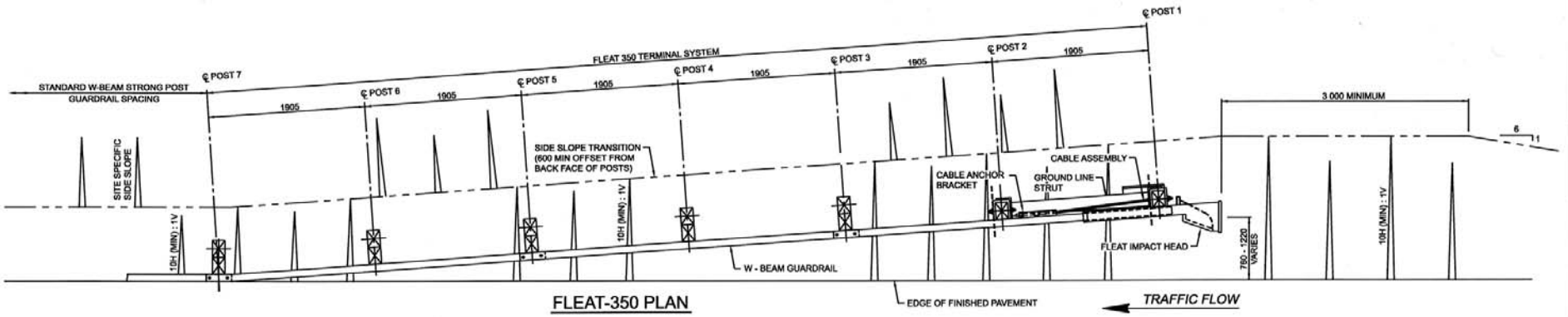
Executive Director,
Technical Standards Branch

Date: NOVEMBER, 2007

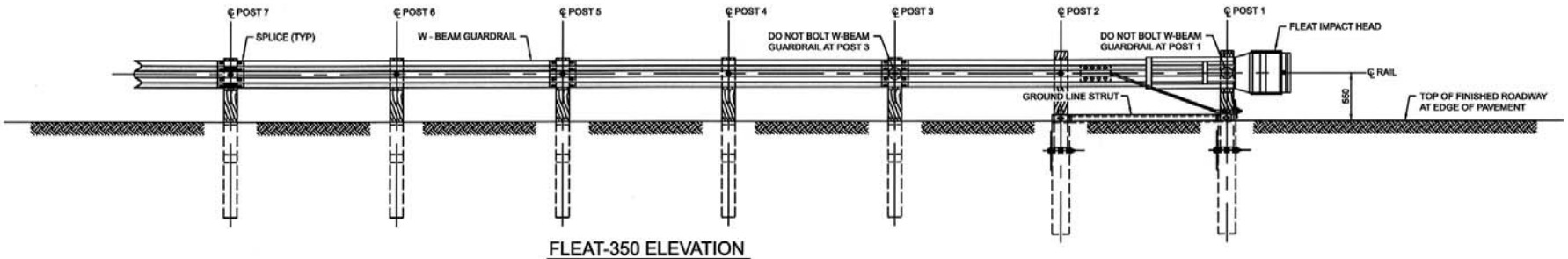
Alberta
INFRASTRUCTURE AND TRANSPORTATION

W-BEAM STRONG POST TL-3 ET-PLUS EXTRUDER ENERGY ABSORBING TERMINAL

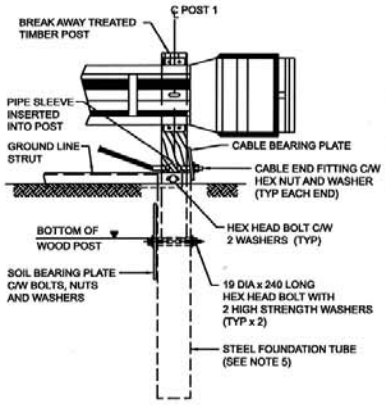
Prepared By: MO	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B1.4



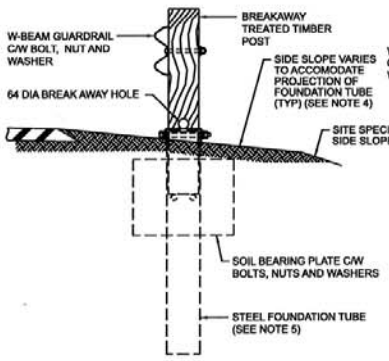
FLEAT-350 PLAN



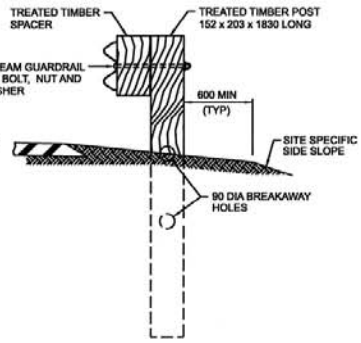
FLEAT-350 ELEVATION



POST 1 ELEVATION
DO NOT BOLT W-BEAM GUARDRAIL TO POST 1



POST 2 SECTION



POSTS 3, 4, 5, 6, AND 7 SECTION
(DO NOT BOLT W-BEAM GUARDRAIL TO POST 3)

POST DETAILS

NOTES:

1. THE FLEAT 350 SYSTEM DEPICTED ON THIS DRAWING IS PROPRIETARY TO ROAD SYSTEMS INC (RSI) AND MEETS THE REQUIREMENTS OF NCHRP REPORT 350 FOR TEST LEVEL 3 (TL-3). THE INSTALLATION OF THIS SYSTEM SHALL BE AS PER THE RSI INSTALLATION MANUAL.
2. THIS DRAWING SHOWS THE INSTALLATION OF THE RIGHT SHOULDER EXTRUDER TERMINAL. FOR LEFT SHOULDER INSTALLATIONS, SUCH AS FOR UNIDIRECTIONAL TRAFFIC OR DIVIDED HIGHWAYS WITH WIDE MEDIANS, THE EXTRUDER TERMINAL SHOWN IS INVERTED.
3. RAIL SECTIONS ARE TO BE LAPPED IN THE DIRECTION OF TRAFFIC FLOW.
4. TOP OF FOUNDATION TUBES SHALL BE SET BETWEEN 64 AND 76 ABOVE THE TOP OF PAVED SHOULDER EDGE AND SHALL NOT PROJECT MORE THAN 100 ABOVE THE FINISHED SIDE SLOPE GRADE AT POST.
5. FOR POSTS 1 AND 2, THE FOLLOWING FOUNDATION TUBES MAY BE USED:
   a. 1830 LONG SPLIT OR SOLID FOUNDATION TUBES WITHOUT SOIL BEARING PLATES.
   b. 1524 LONG SOLID OR 1370 LONG SOLID FOUNDATION TUBES WITH SOIL BEARING PLATES.
6. TO ENSURE PROPER DELINEATION, REFLECTIVE SHEETING ON THE FRONT FACE OF THE FLEAT 350 HEAD SHALL BE PROVIDED AS PART OF THE INSTALLED SYSTEM.
7. POST 3 MARKS THE BEGINNING OF THE CALCULATED LENGTH OF NEED.
8. ALL FITTINGS AND HARDWARE SHALL BE GALVANIZED.
9. POSTS SHALL BE SET BY INSTRUMENT FOR ALIGNMENT AND GRADE.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE
2			
1			

Approved:

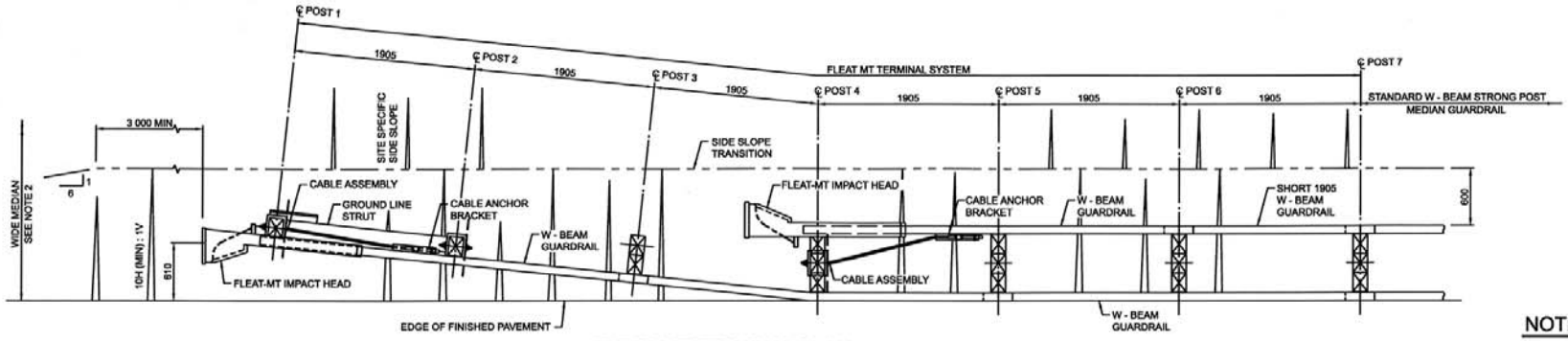
Executive Director,
Technical Standards Branch

Date: NOVEMBER, 2007

Alberta
INFRASTRUCTURE AND TRANSPORTATION

W-BEAM STRONG POST TL-3 FLEAT 350 ENERGY ABSORBING TERMINAL

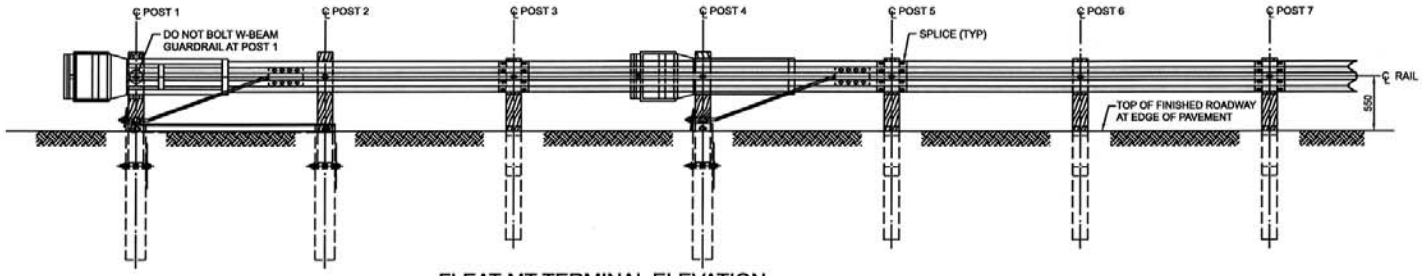
Prepared By: MO	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B1.5



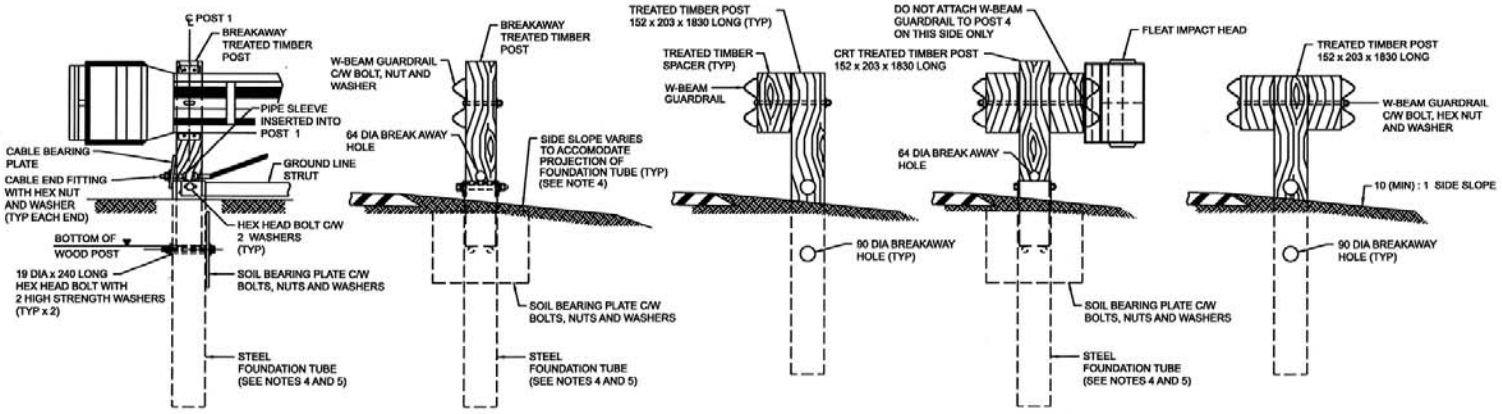
TRAFFIC FLOW

FLEAT-MT TERMINAL PLAN

FOR WIDE MEDIANS ONLY



FLEAT-MT TERMINAL ELEVATION



POST DETAILS

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

NOTES:

1. THE FLEAT MT SYSTEM DEPICTED ON THIS DRAWING IS PROPRIETARY TO ROAD SYSTEMS, INC (RSI) AND MEETS THE REQUIREMENTS OF NCHRP REPORT 350 FOR TEST LEVEL 3 (TL-3). THE INSTALLATION OF THIS SYSTEM SHALL BE AS PER THE RSI INSTALLATION MANUAL.
2. APPLICATION OF THIS SYSTEM SHALL ONLY BE USED FOR WIDE MEDIANS SUCH THAT THE INSTALLED SYSTEM CAN BE PHYSICALLY LOCATED OUTSIDE THE CLEAR ZONE FOR THE OPPOSING TRAFFIC.
3. RAIL SECTIONS ARE TO BE LAPPED IN THE DIRECTION OF TRAFFIC FLOW.
4. TOP OF FOUNDATION TUBES SHALL BE SET BETWEEN 64 AND 76 ABOVE TOP OF PAVED SHOULDER EDGE AND SHALL NOT PROJECT MORE THAN 100 ABOVE THE FINISHED SIDE SLOPE GRADE AT POST.
5. FOR POSTS 1, 2 AND 4 THE FOLLOWING FOUNDATION TUBES MAY BE USED:
   a. 1830 LONG SPLIT OR SOLID FOUNDATION TUBES WITHOUT SOIL BEARING PLATES.
   b. 1524 LONG SOLID OR 1370 LONG SOLID FOUNDATION TUBES WITH SOIL BEARING PLATES.
6. FOR POSTS 3, 5, 6 AND 7, PLUG WELDED STEEL BREAKAWAY POSTS MAY BE USED IN LIEU OF TREATED TIMBER POSTS AS PER RSI GUIDELINES, PROVIDED THAT THE APPROPRIATE INSTALLATION HARDWARE IS USED TO MAINTAIN COMPLIANCE WITH TL-3.
7. TO ENSURE PROPER DELINEATION, REFLECTIVE SHEETING OBJECT MARKER ON THE FRONT FACE OF THE FLEAT MT HEAD SHALL BE PROVIDED AS PART OF THE INSTALLED SYSTEM.
8. POST 3 MARKS THE BEGINNING OF THE CALCULATED LENGTH OF NEED.
9. ALL FITTINGS AND HARDWARE SHALL BE GALVANIZED.
10. POSTS SHALL BE SET BY INSTRUMENT FOR ALIGNMENT AND GRADE.

No.	REVISIONS	BY	DATE
2			
1			

Approved:

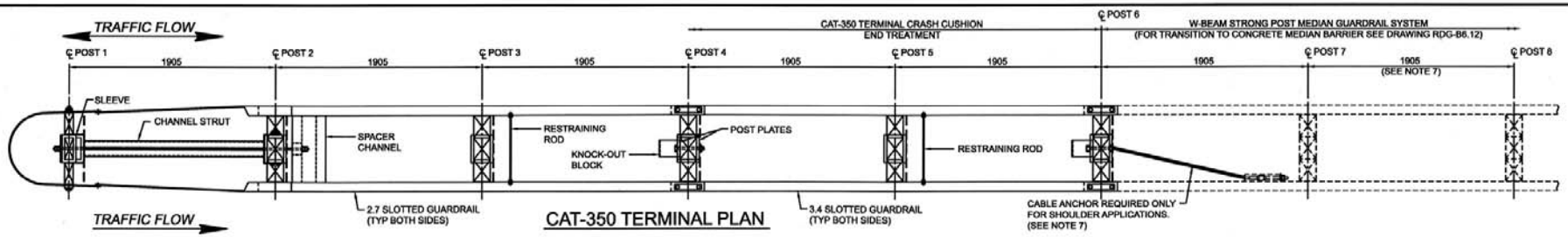
Executive Director,
Technical Standards Branch

Date: NOVEMBER, 2007

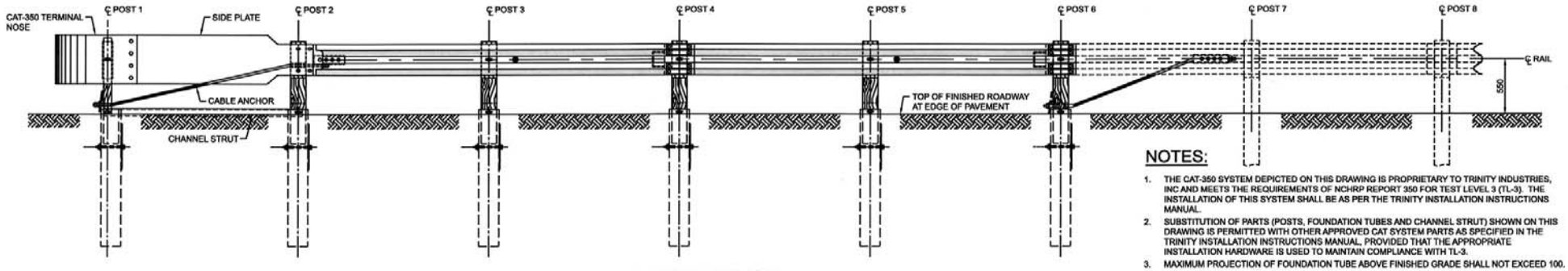
Alberta
INFRASTRUCTURE AND TRANSPORTATION

W-BEAM STRONG POST TL-3 FLEAT MT ENERGY ABSORBING TERMINAL FOR MEDIAN APPLICATIONS

Prepared By: MO	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B1.6



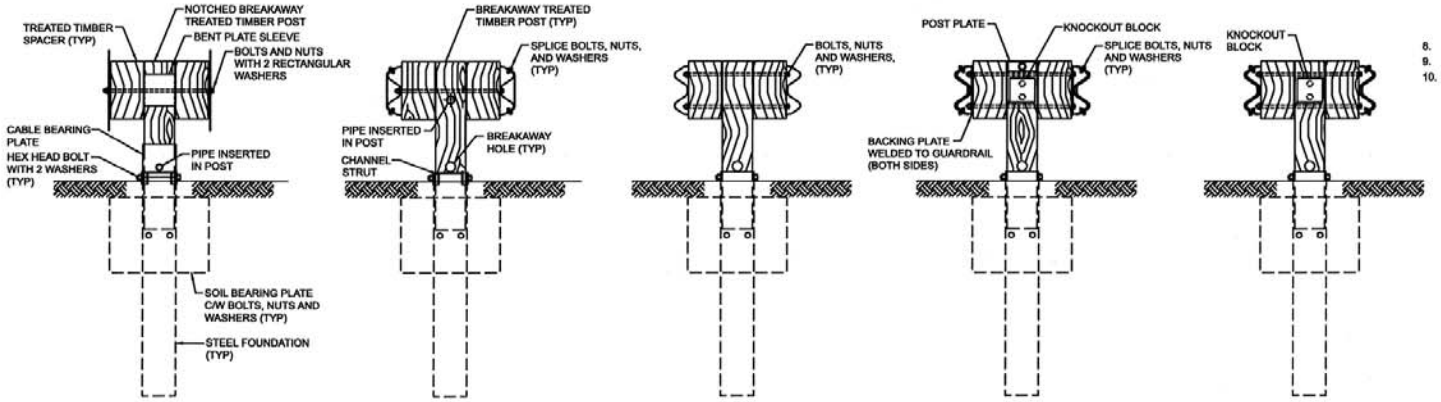
CAT-350 TERMINAL PLAN



CAT-350 TERMINAL ELEVATION

NOTES:

1. THE CAT-350 SYSTEM DEPICTED ON THIS DRAWING IS PROPRIETARY TO TRINITY INDUSTRIES, INC AND MEETS THE REQUIREMENTS OF NCHRP REPORT 350 FOR TEST LEVEL 3 (TL-3). THE INSTALLATION OF THIS SYSTEM SHALL BE AS PER THE TRINITY INSTALLATION INSTRUCTIONS MANUAL.
2. SUBSTITUTION OF PARTS (POSTS, FOUNDATION TUBES AND CHANNEL STRUT) SHOWN ON THIS DRAWING IS PERMITTED WITH OTHER APPROVED CAT SYSTEM PARTS AS SPECIFIED IN THE TRINITY INSTALLATION INSTRUCTIONS MANUAL, PROVIDED THAT THE APPROPRIATE INSTALLATION HARDWARE IS USED TO MAINTAIN COMPLIANCE WITH TL-3.
3. MAXIMUM PROJECTION OF FOUNDATION TUBE ABOVE FINISHED GRADE SHALL NOT EXCEED 100.
4. CAT RAIL SPLICE BOLTS SHALL BE USED AT POSTS 4 AND 6 TO ENSURE PROPER PERFORMANCE OF THE SYSTEM DURING IMPACT. THESE BOLTS ARE DESIGNED TO ALLOW TELESCOPING ACTION OF RAIL SLIDING ON RAIL.
5. RAIL SECTIONS ARE TO BE LAPPED IN THE DIRECTION OF TRAFFIC FLOW.
6. DO NOT ATTACH RAIL ELEMENTS TO POSTS 3, 5 AND 6.
7. A 3810 LONG CAT-350 TAIL-END SECTION SHALL BE PROVIDED FROM POST 6 TO POST 8 WHEN LESS THAN 11 430 OF W-BEAM MEDIAN GUARDRAIL IS INSTALLED BEYOND POST 6. FOR SHOULDER APPLICATIONS WHEN TRANSITIONING THE CAT-350 TERMINAL TO A SINGLE SIDED W-BEAM GUARDRAIL, A CABLE ATTACHMENT AND ANCHORAGE ASSEMBLY IS REQUIRED BETWEEN POSTS 6 AND 7. DETAILS FOR BOTH TYPES OF TRANSITIONS MAY BE OBTAINED FROM TRINITY.
8. ALL FITTINGS AND HARDWARE SHALL BE GALVANIZED.
9. POST 4 MARKS THE BEGINNING OF THE CALCULATED LENGTH OF NEED.
10. TO ENSURE PROPER DELINEATION, REFLECTIVE SHEETING SHALL BE PLACE ON THE NOSE AND SHALL BE PROVIDED AS PART OF THE INSTALLED SYSTEM.



POST DETAILS

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE
2			
1			

Approved:

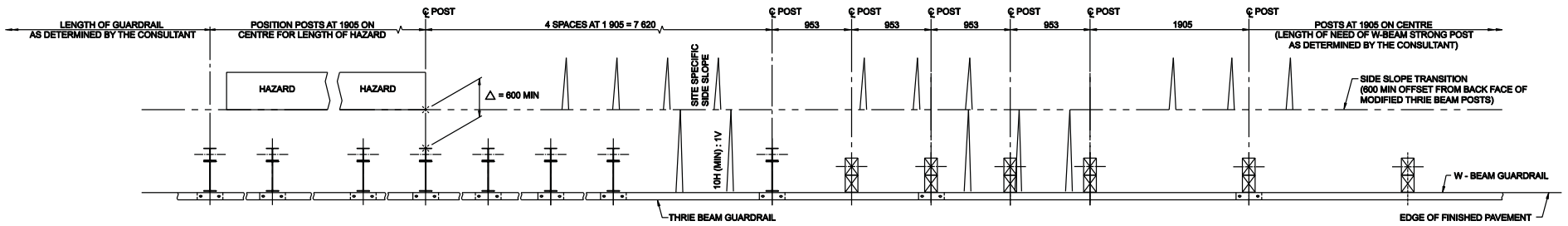
Executive Director,
Technical Standards Branch

Date: NOVEMBER, 2007

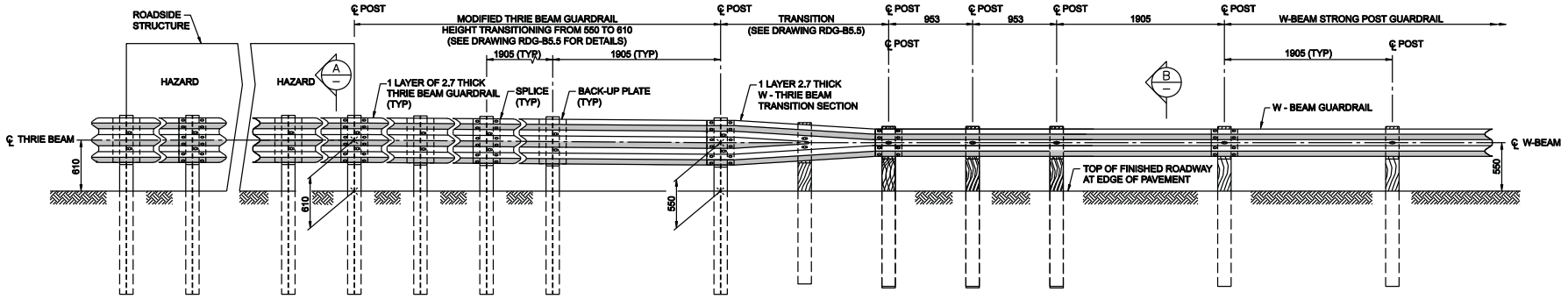
Alberta
INFRASTRUCTURE AND TRANSPORTATION

W-BEAM STRONG POST MEDIAN OR GORE AREA TERMINATION TL-3 CAT 350 TERMINAL

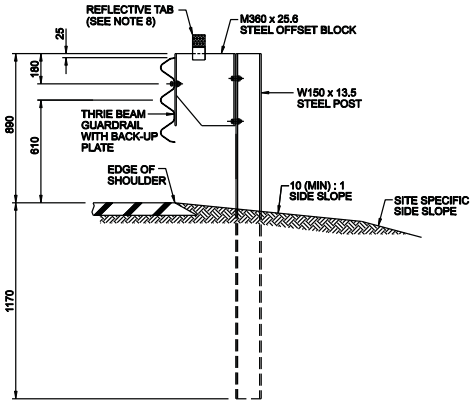
Prepared By: MO	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B1.7



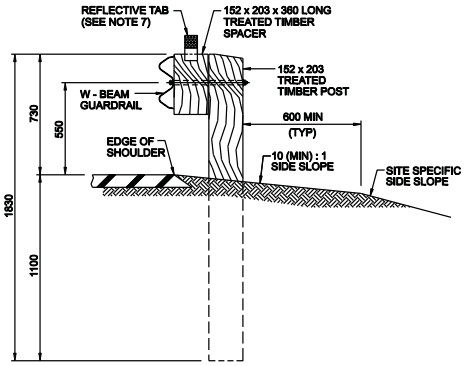
PLAN



ELEVATION



SECTION A
(FOR DETAILS SEE TEB DRAWING 3.70)



SECTION B
(FOR DETAILS SEE TEB DRAWING 3.09)

POST DETAILS

NOTES: △1

1. FOR GENERAL LAYOUT REFER TO TEB DRAWINGS 3.15a AND 3.18.
2. WHERE GUARDRAIL IS ADJACENT TO CURB, HEIGHT OF RAIL SHALL BE MEASURED AS FOLLOWS:
   a. VERTICALLY AT FACE OF GUARDRAIL WHEN FACE OF GUARDRAIL IS MORE THAN 300 BEYOND GUTTER LINE.
   b. VERTICALLY AT GUTTER LINE WHEN FACE OF GUARDRAIL IS 300 OR LESS BEYOND GUTTER LINE.
3. POSTS SHALL BE SET BY INSTRUMENT FOR ALIGNMENT AND GRADE, WITH TOP PARALLEL TO PAVEMENT GRADE.
4. THE ACCEPTABLE TOLERANCE FOR HEIGHT OF GUARDRAIL AT TIME OF CONSTRUCTION OR MAINTENANCE SHALL BE IN ACCORDANCE WITH THE MOST RECENT SPECIFICATIONS.
5. LAP ALL JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
6. ALL FITTINGS AND HARDWARE REQUIRED SHALL BE GALVANIZED.
7. FASTEN REFLECTOR TO TOP OF EVERY SIXTH GUARDRAIL STRONG POST SPACER BY MECHANICAL MEANS SUCH AS NAILING OR STAPLING. ADHESIVES ALONE WILL NOT BE ACCEPTED. REFER TO DRAWING TEB 3.01 FOR REFLECTOR DETAILS.
8. FASTEN REFLECTOR TO TOP OF EVERY SIXTH GUARDRAIL STEEL OFFSET BLOCK WITH APPROVED ADHESIVE. REFER TO DRAWING TEB 3.01 FOR REFLECTOR DETAILS.
9. THIS TRANSITION SATISFIES NCHRP REPORT 350 REQUIREMENTS FOR TEST LEVEL 3 (TL3).

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE
△2			
△1	NOTES 7 AND 8 REVISED	PM	8 JUL 09

Approved:

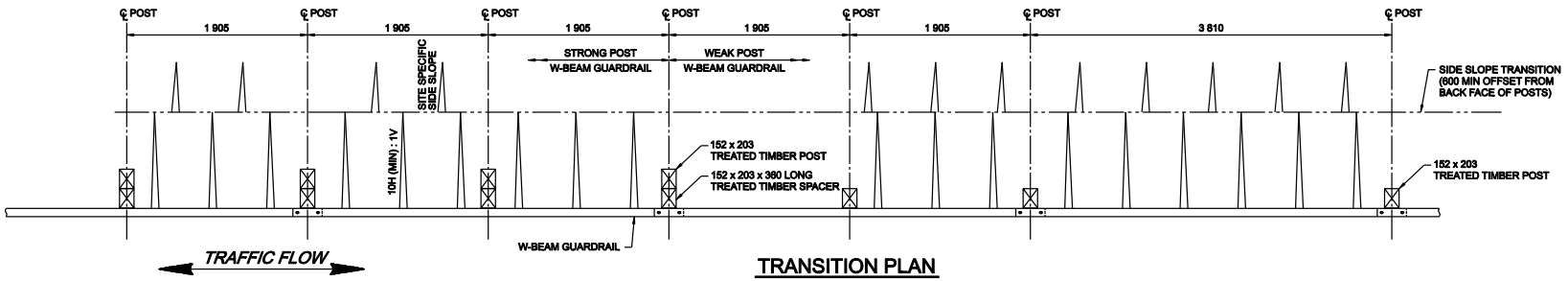
Allan Kwan
Executive Director,
Technical Standards Branch

Date: NOVEMBER, 2007

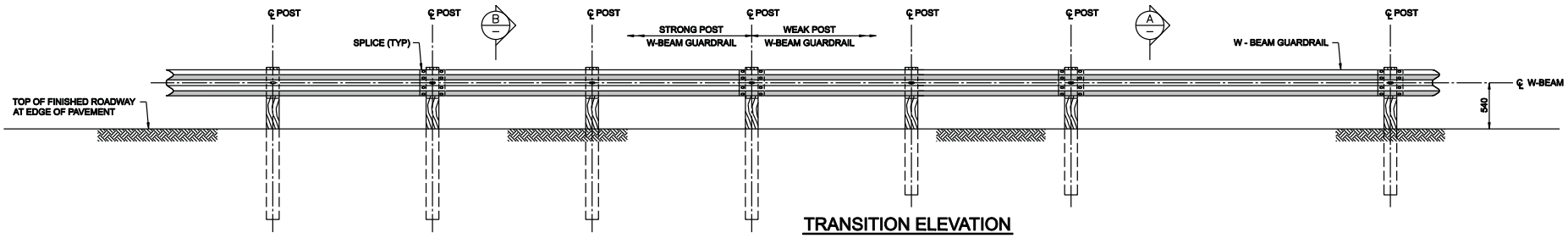
Alberta Transportation

W-BEAM STRONG POST TO MODIFIED THRIE BEAM GUARDRAIL TRANSITION AT ROADSIDE STRUCTURE

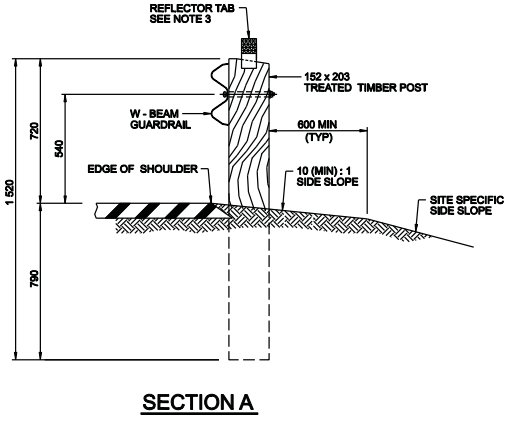
Prepared By: MO	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B1.8



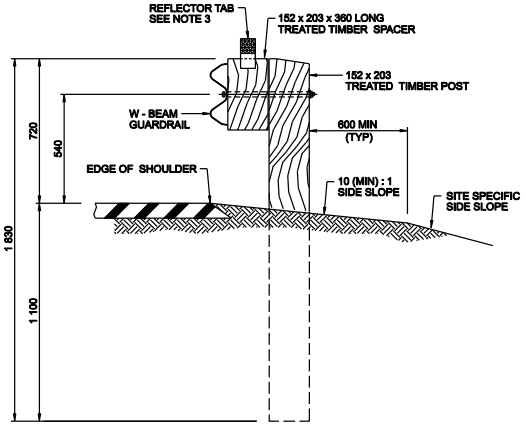
TRANSITION PLAN



TRANSITION ELEVATION



SECTION A



SECTION B

GENERAL NOTES: ⚠

1. LAP ALL JOINTS IN THE DIRECTION OF TRAFFIC.
2. THE ACCEPTABLE TOLERANCE FOR HEIGHT OF GUARDRAIL AT TIME OF CONSTRUCTION OR MAINTENANCE SHALL BE IN ACCORDANCE WITH THE MOST RECENT SPECIFICATIONS.
3. REFLECTOR TO BE INSTALLED ON EVERY 3RD POST. REFER TO DRAWING TEB 3.01 FOR REFLECTOR DETAILS.
4. POSTS SHALL BE SET BY INSTRUMENT FOR ALIGNMENT AND GRADE.
5. ALL FITTINGS AND HARDWARE REQUIRED SHALL BE GALVANIZED.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE
⚠2	·	·	·
⚠1	NOTE 3 REVISED ·	PM ·	8 JUL 09

Approved:

Allan Kwan

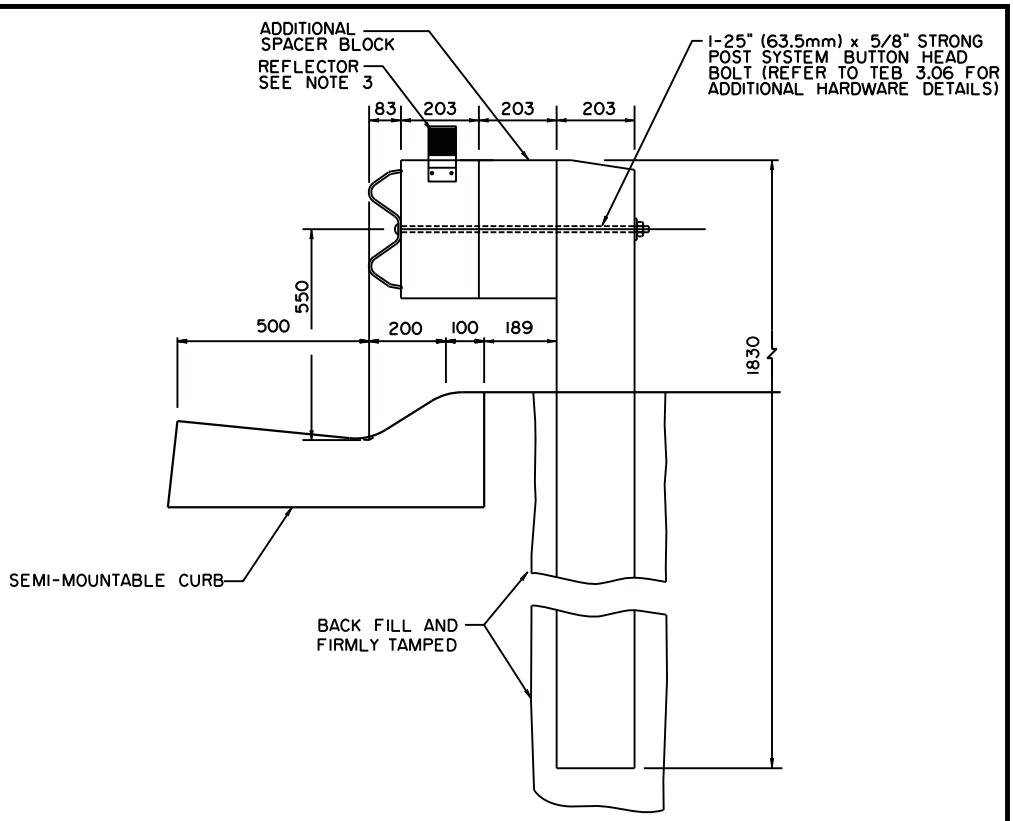
Executive Director,
Technical Standards Branch

Date: NOVEMBER, 2007

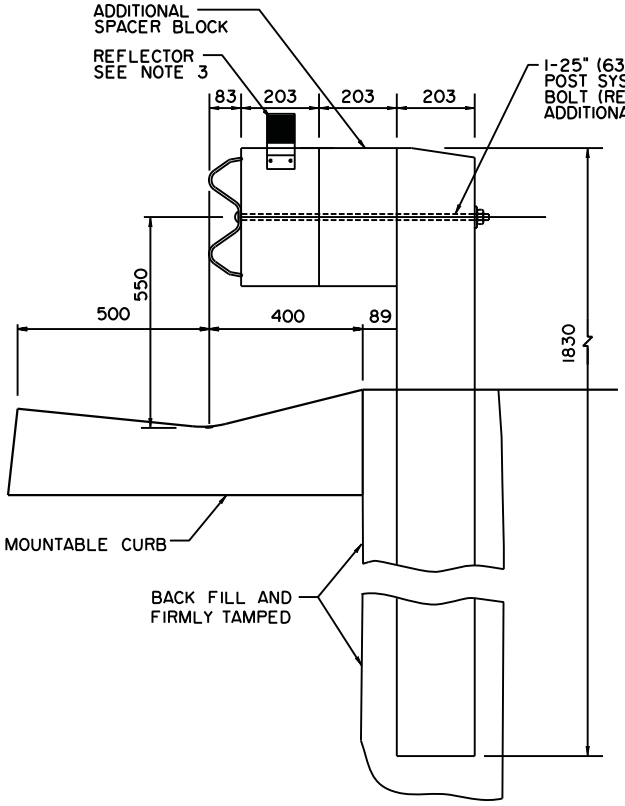
Alberta Transportation

TRANSITION OF WEAK POST W-BEAM GUARDRAIL TO STRONG POST W-BEAM GUARDRAIL

Prepared By: NSP	Checked By: WS	Scale:	Dwg No.: RDG-B1.9



STRONG POST W-BEAM BLOCKED-OUT
(2 SPACER BLOCKS) GUARDRAIL
WITH SEMI-MOUNTABLE CURB



STRONG POST W-BEAM BLOCKED-OUT
(2 SPACER BLOCKS) GUARDRAIL
WITH MOUNTABLE CURB

NOTES

1. REFER TO CB6 STANDARD DRAWINGS FOR SEMI-MOUNTABLE AND MOUNTABLE CURB AND GUTTER DETAILS
2. REFER TO DRAWING TEB 3.09 STRONG POST W-BEAM BLOCKED-OUT GUARDRAIL FOR FURTHER DETAILS
3. REFLECTOR TO BE INSTALLED ON EVERY 6TH POST. REFER TO DRAWING TEB 3.01 FOR REFLECTOR DETAILS.
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE
2			
1			

Approved:

Moh Lali

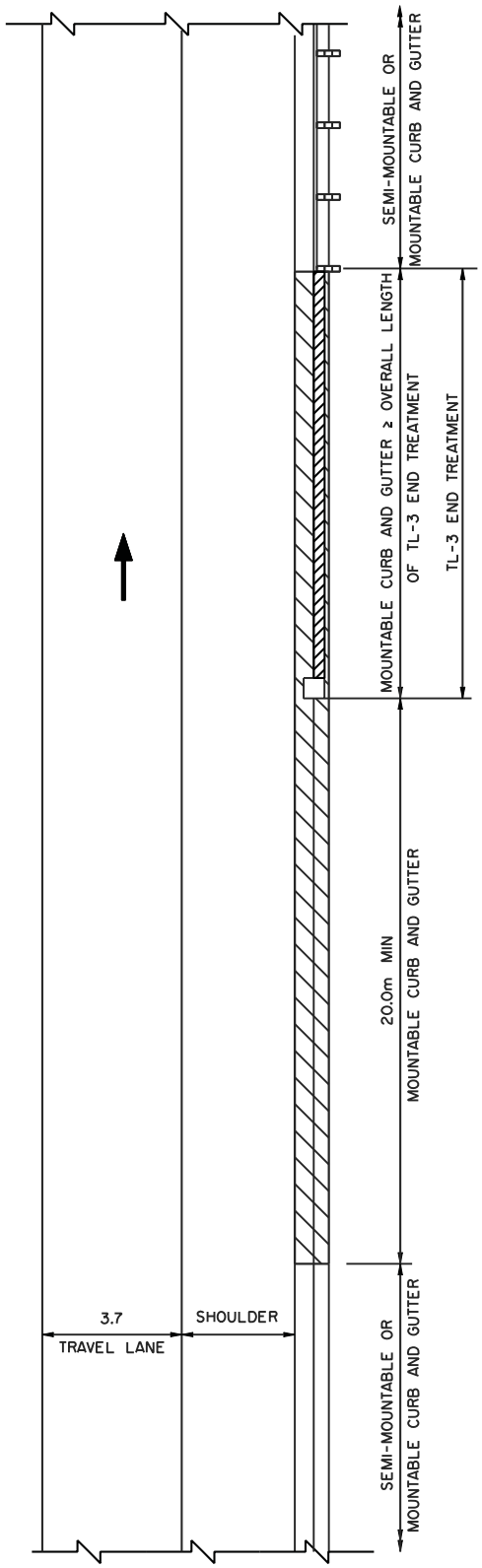
Executive Director,
Technical Standards Branch

Date: JULY, 2009

Government of Alberta
Transportation

STRONG POST W-BEAM GUARDRAIL FOR MOUNTABLE AND SEMI-MOUNTABLE CURB

Prepared By: GEC	Checked By: PM	Scale: NTS	Dwg No.: RDG-B1.10



No.	REVISIONS	BY	DATE
2			
1			

Approved:

Moh Lali

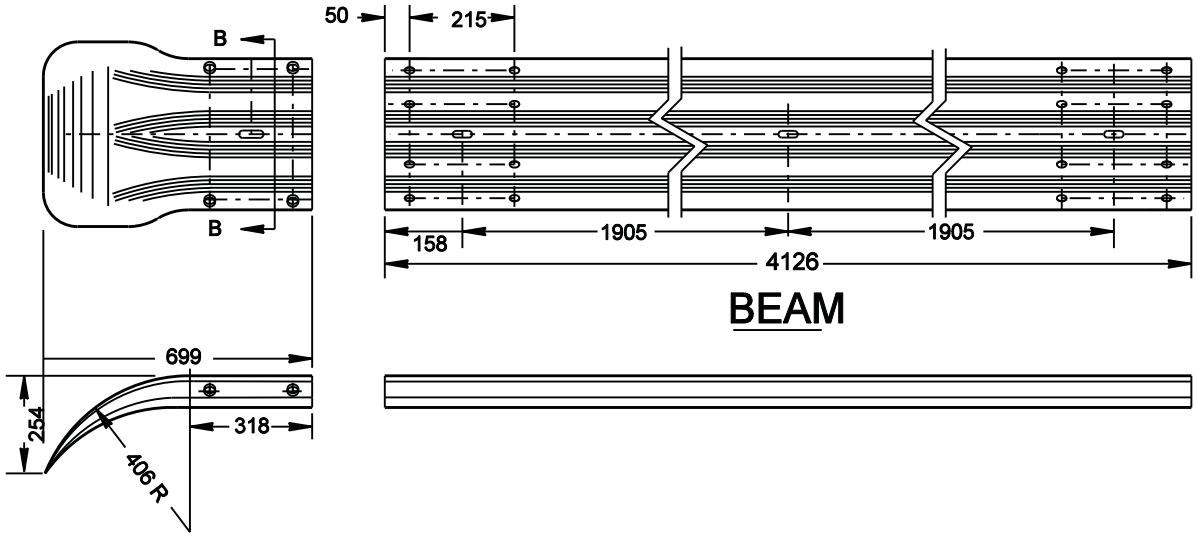
Executive Director,
Technical Standards Branch

Date: JULY, 2009

Government of Alberta
Transportation

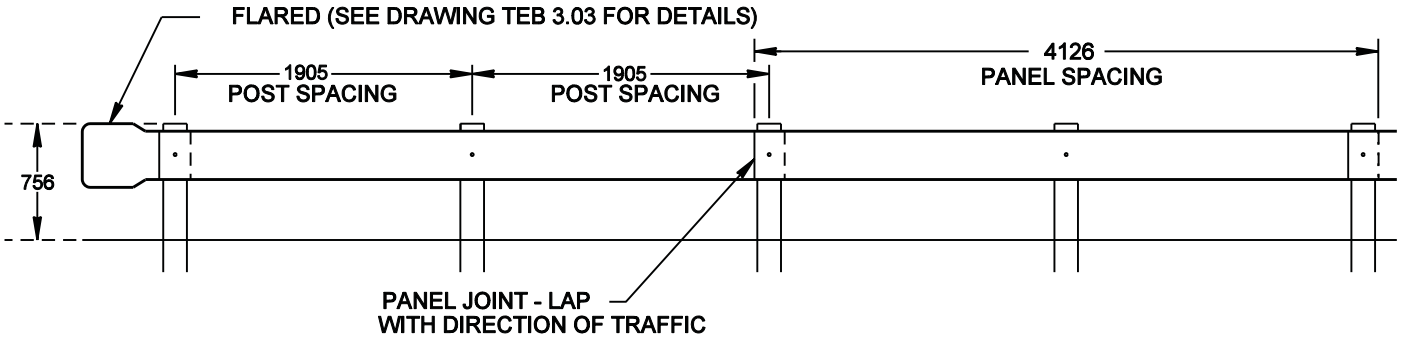
TYPICAL STRONG POST W-BEAM GUARDRAIL TL-3 END TREATMENT WITH CURB AND GUTTER TRANSITION

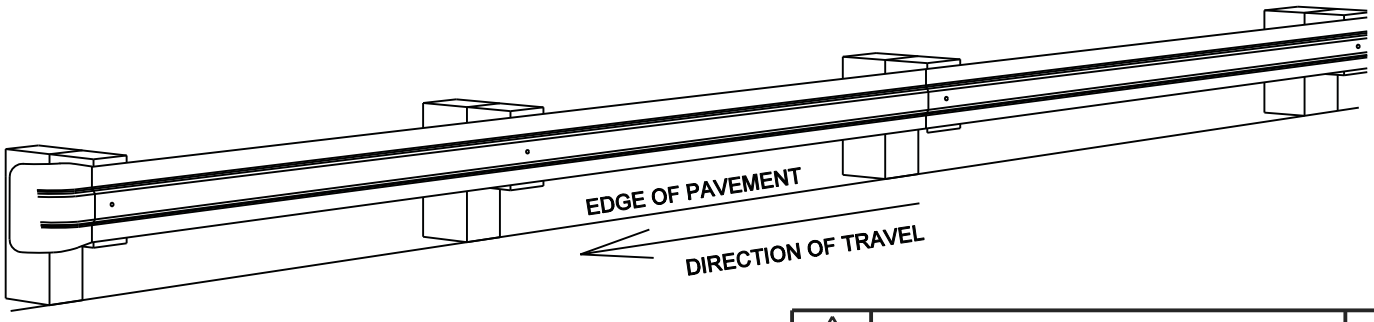
Prepared By: GEC	Checked By: PM	Scale: NTS	Dwg No.: RDG-B1.11

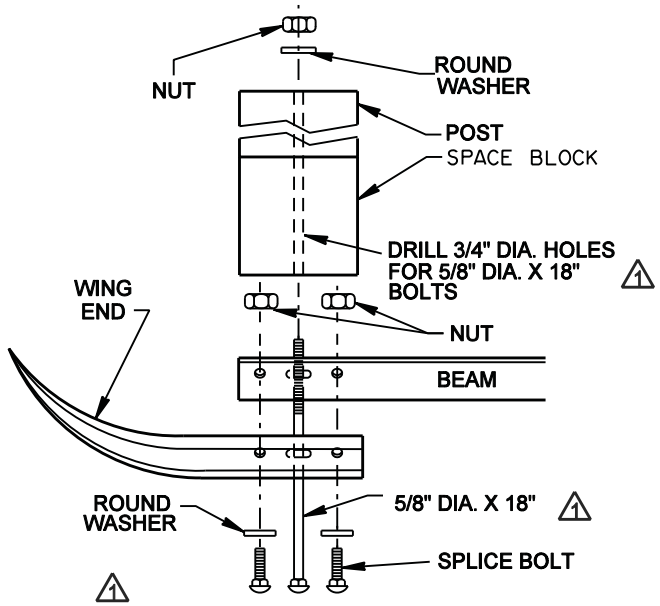


BEAM

END SECTION







All dimensions are in millimetres unless otherwise indicated.

No.	REVISIONS	BY	DATE
2			
1	Bolt and hole dimension, rectangular washer removed.	P.M.	9/14/05

Approved:

Original signed by
Allan Kwan

Executive Director,
Technical Standards Branch

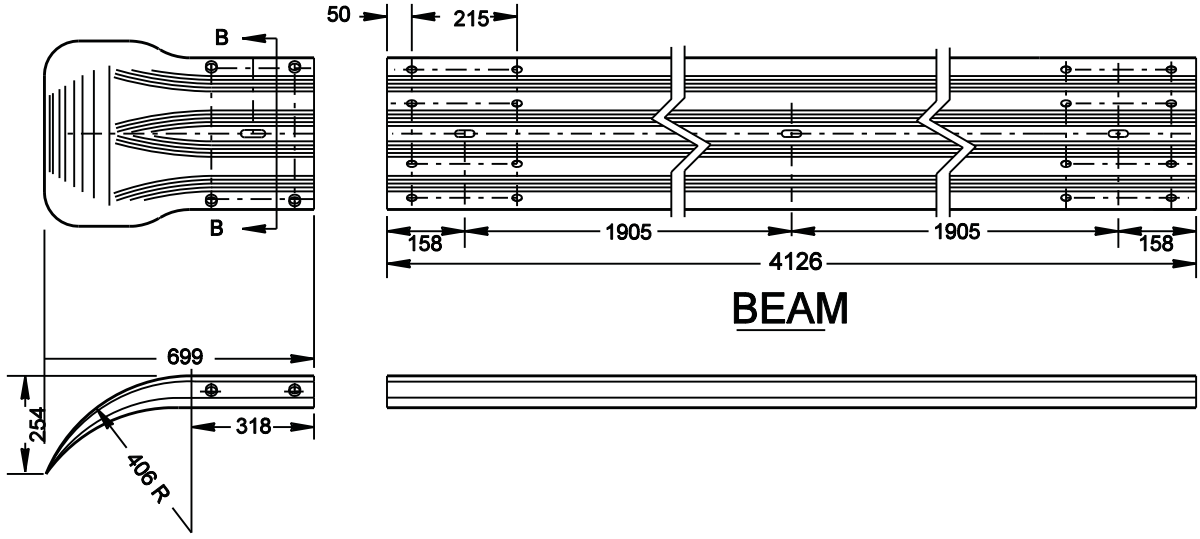
Date: JUNE 24, 2005

JULY 12, 2005

Alberta
INFRASTRUCTURE AND TRANSPORTATION

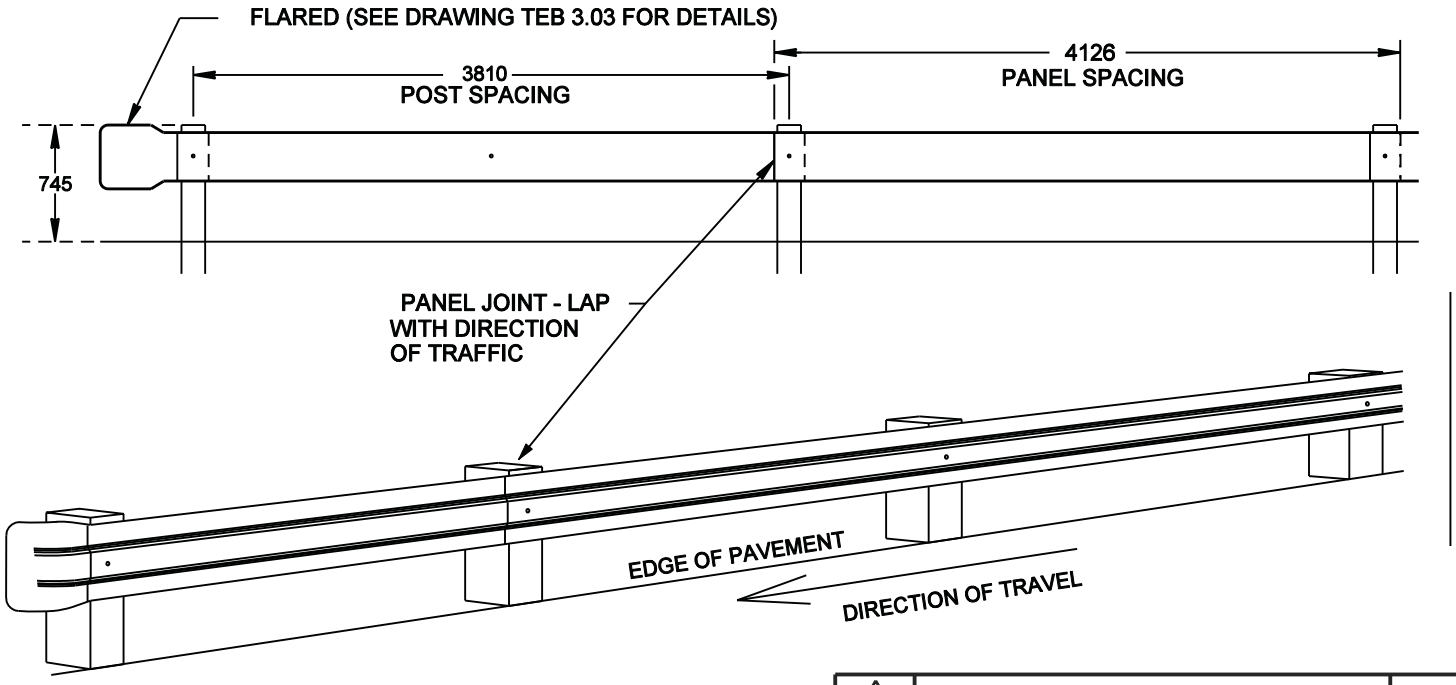
STRONG POST W-BEAM BLOCKED OUT TERMINAL END TREATMENT WING END

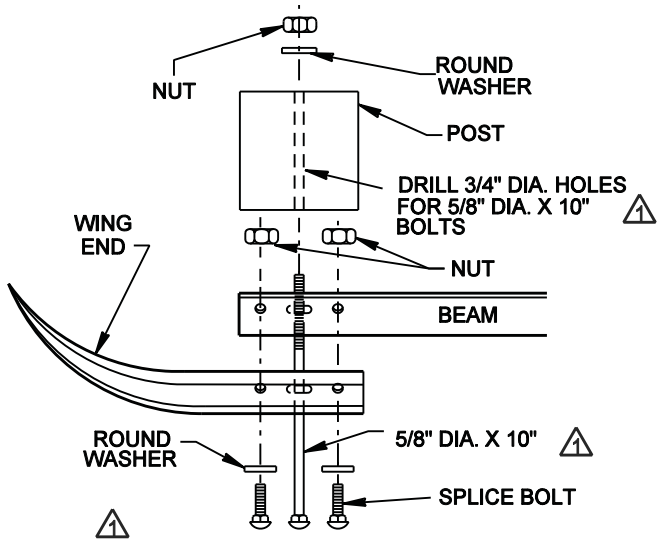
Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.11a



BEAM

END SECTION





All dimensions are in millimetres unless otherwise indicated.

No.	REVISIONS	BY	DATE
2			
1	Bolt and hole dimension, rectangular washer removed.	P.M.	9/14/05

Approved:
Original signed by
Allan Kwan

Executive Director,
Technical Standards Branch
Date: JUNE 24, 2005

JULY 12, 2005

Alberta
INFRASTRUCTURE AND
TRANSPORTATION

WEAK POST W-BEAM TERMINAL END TREATMENT WING END

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.11b

APPENDIX B2

HIGH TENSION CABLE SYSTEM

THIS PAGE INTENTIONALLY LEFT BLANK

The links to the Standard Drawings for the High-Tension Cable Systems are available on the internet. The links for the three cable systems currently approved by Alberta Infrastructure and Transportation are:

Brifen Wire Rope Safety Fence:

http://www.brifen.com/drawings.htm

Trinity CASS Cable Guardrail Safety System:

http://www.highwayguardrail.com/technical/default.html

Gibraltar Cable Barrier System:

http://www.gibraltartx.com/

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX B3

WEAK POST BOX BEAM GUARDRAIL

THIS PAGE INTENTIONALLY LEFT BLANK

Appendix B3
Weak Post Beam Guardrail

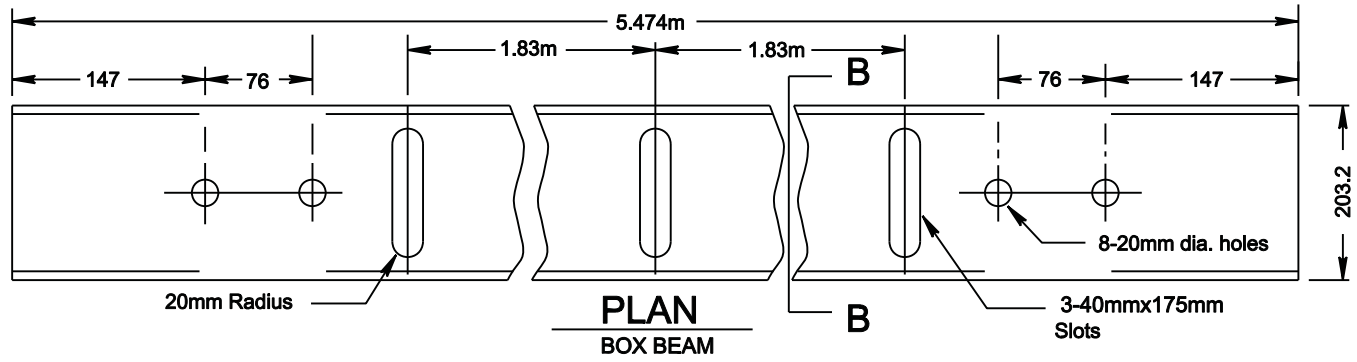
TABLE OF CONTENTS

THIS PAGE INTENTIONALLY LEFT BLANK

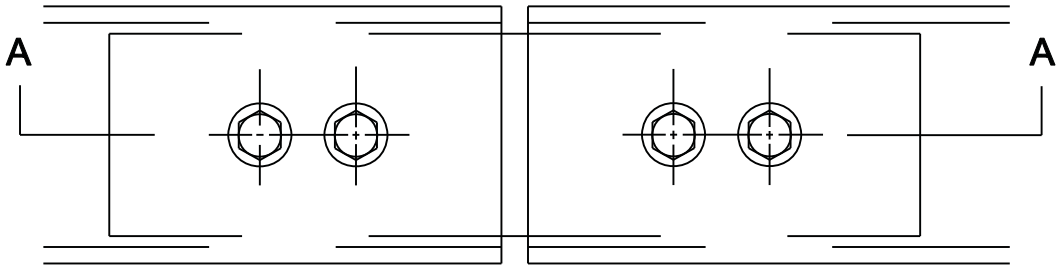
Alberta
TRANSPORTATION AND UTILITIES
Traffic Operations Branch

DWG. No.	TEB 3.22
Date	DEC.15/92
Revision	
Revision	

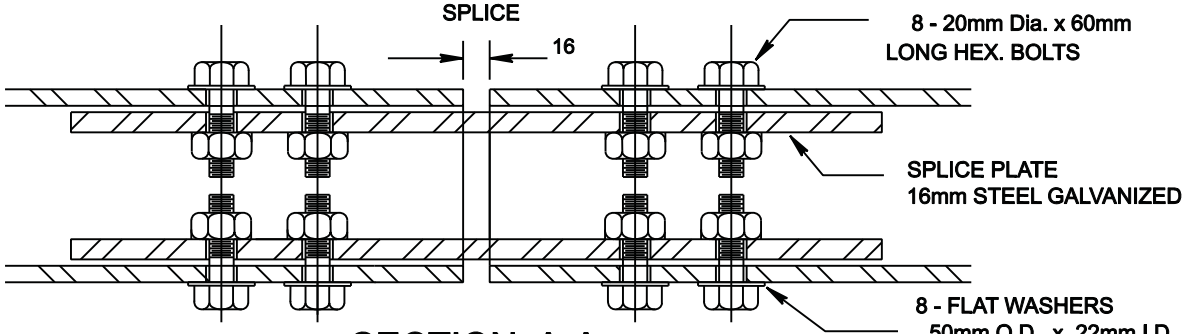
MEDIAN BOX BEAM BARRIER INSTALLATION DETAIL TREATMENT OF MEDIAN HAZARD



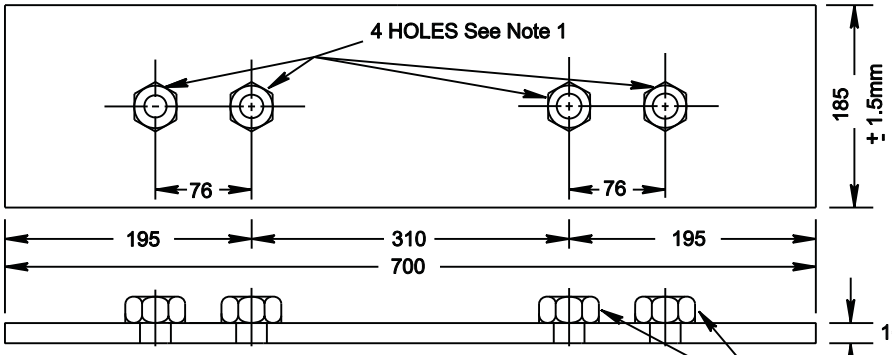
PLAN
BOX BEAM



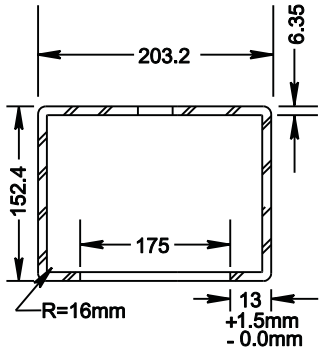
PLAN
SPLICE



SECTION A-A



SPLICE PLATE
2 to each splice



SECTION B-B

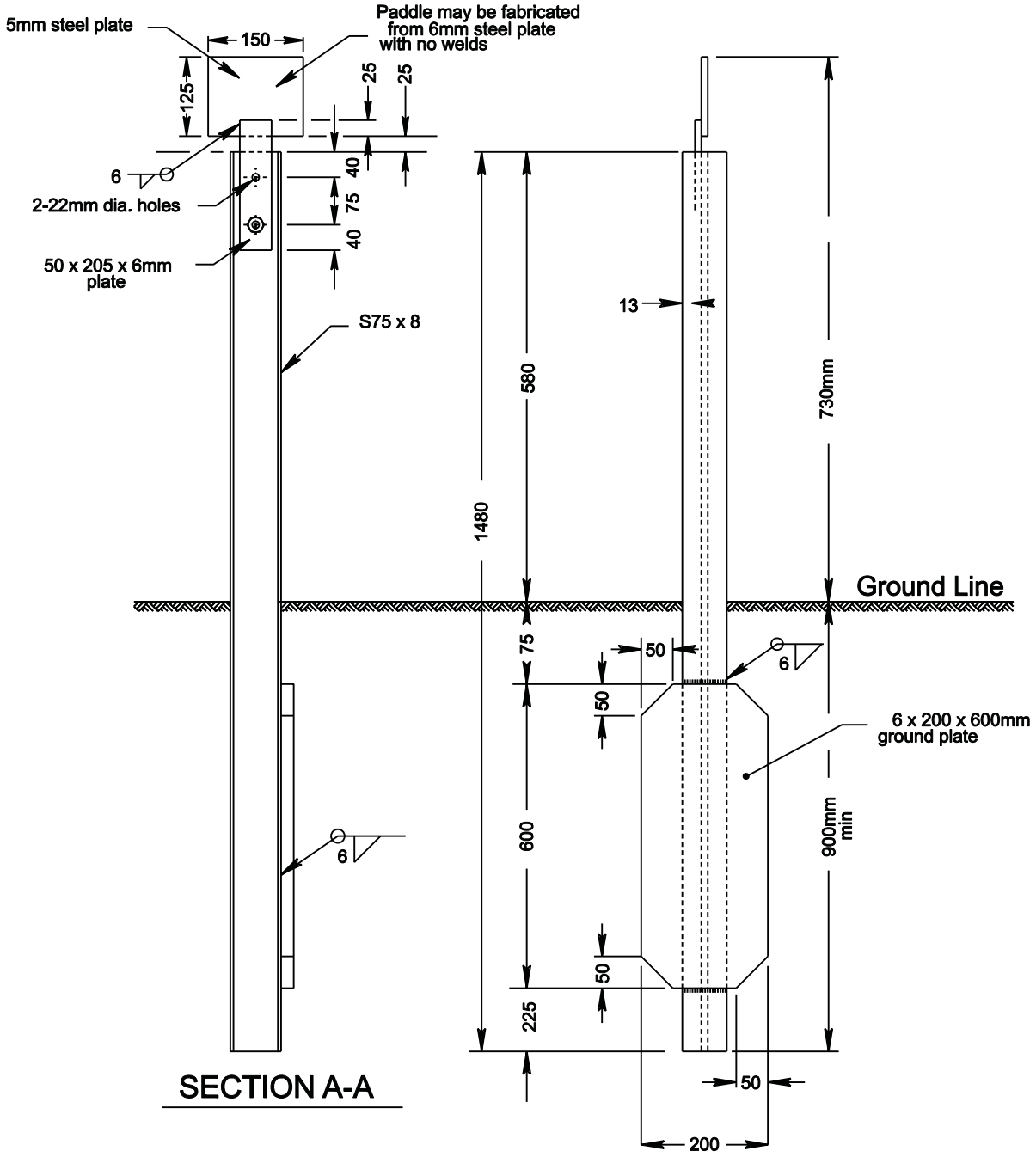
Alberta
TRANSPORTATION
AND UTILITIES
Traffic Operations Branch

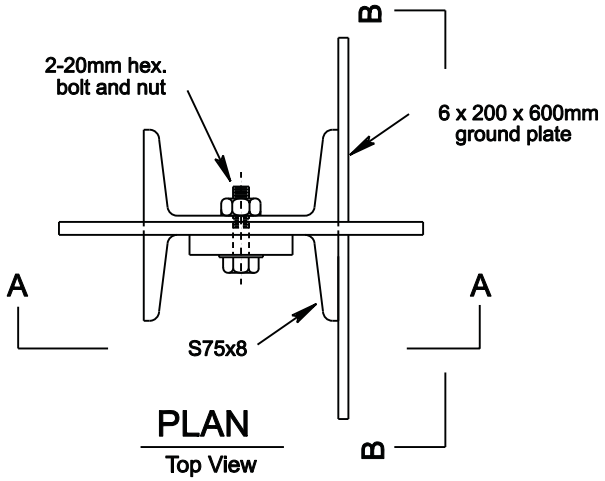
DWG. No.	TEB 3.23
Date	DEC. 21/92
Revision	
Revision	

MEDIAN BOX BEAM GUARDRAIL RAIL AND SPLICE PLATE DETAIL

Note 1: For details of nut attachment see TEB 3.28A

All dimensions are in millimetres unless otherwise indicated.



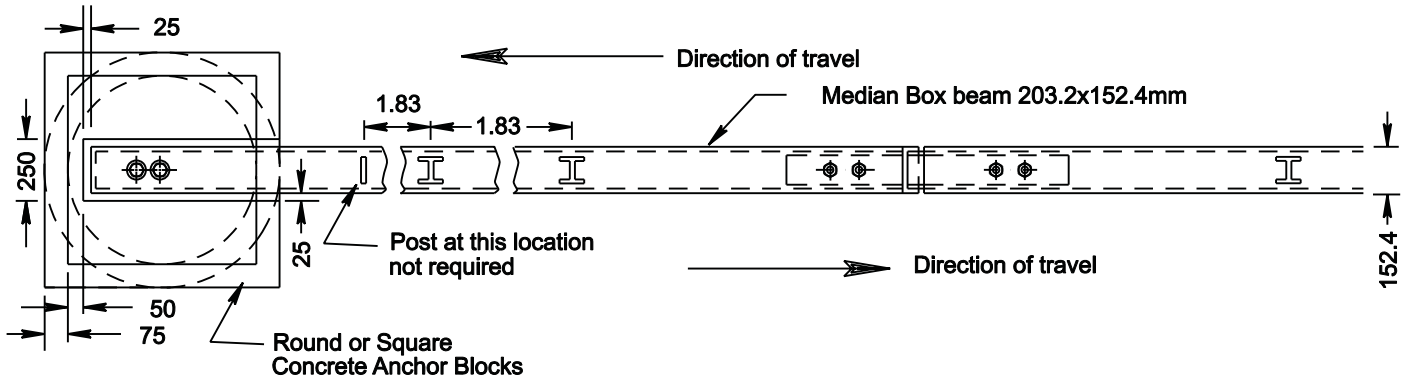


PLAN
Top View

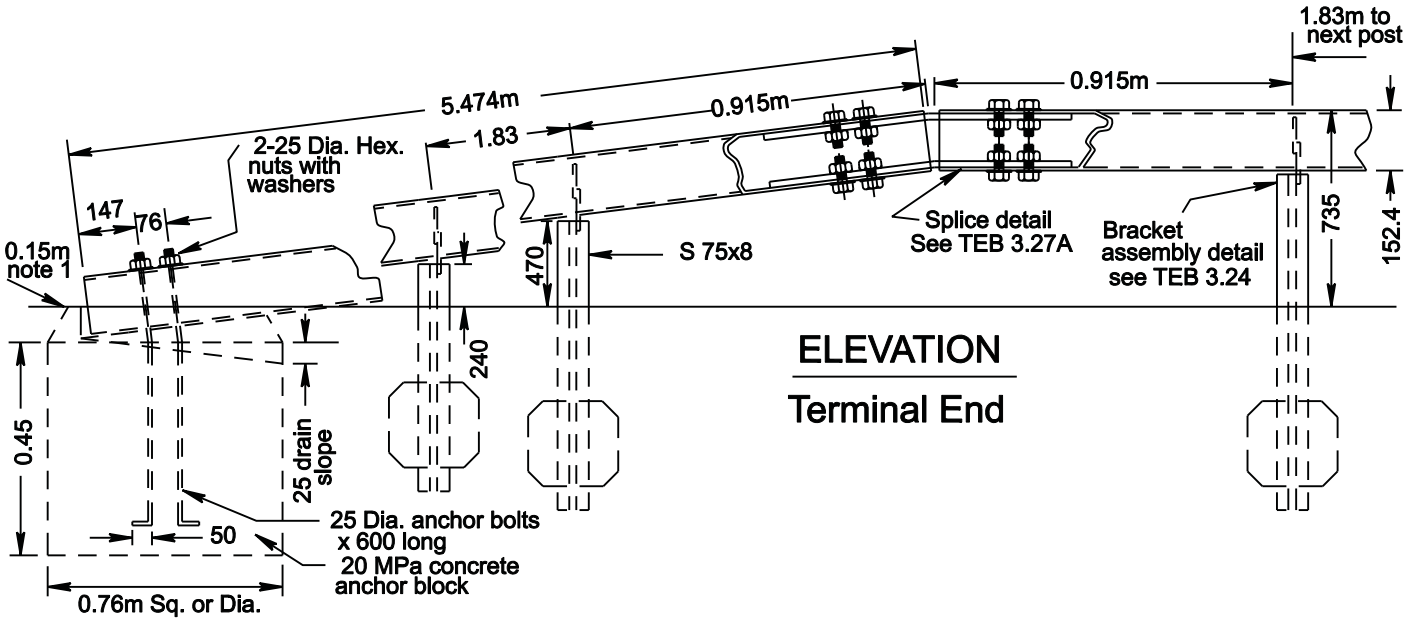
All dimensions are in millimetres unless otherwise indicated.

Alberta TRANSPORTATION AND UTILITIES Traffic Engineering Section Roadway Engineering Branch	DWG. No.	TEB 3.24
	Date	DEC. 21/92
	Revision	June 95
	Revision	

MEDIAN BOX BEAM GUARDRAIL POST DETAIL



PLAN

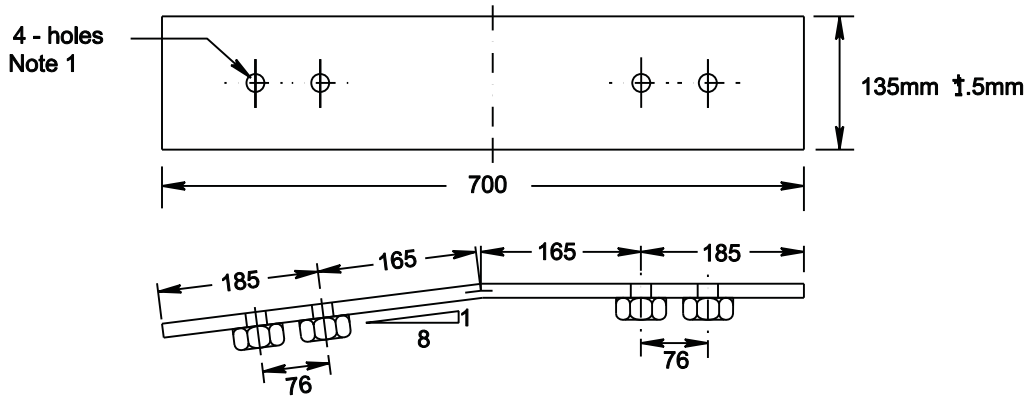


ELEVATION

Terminal End

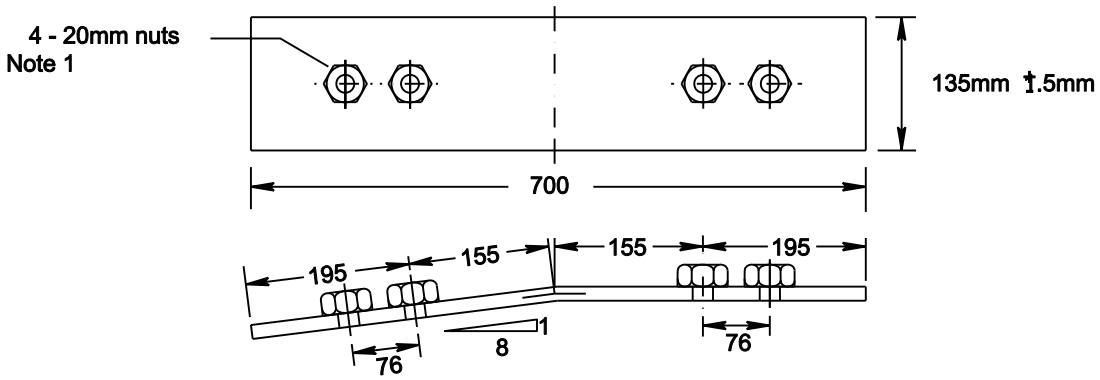
Alberta TRANSPORTATION AND UTILITIES Traffic Operations Branch	DWG. No.	TEB 3.26
	Date	DEC. 13/92
	Revision	
	Revision	

MEDIAN BOX BEAM GUARDRAIL INSTALLATION DETAIL FOR END TREATMENT



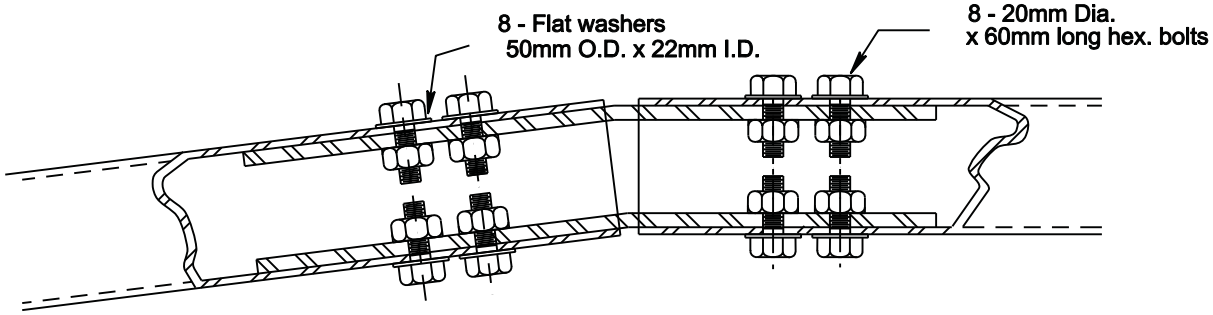
UPPER SPLICE PLATE

16mm galvanized steel plate



LOWER SPLICE PLATE

16mm galvanized steel plate



ASSEMBLY DETAIL

Note 1: For details of nut attachment see TEB 3.28.
All dimensions are in millimetres unless otherwise shown.

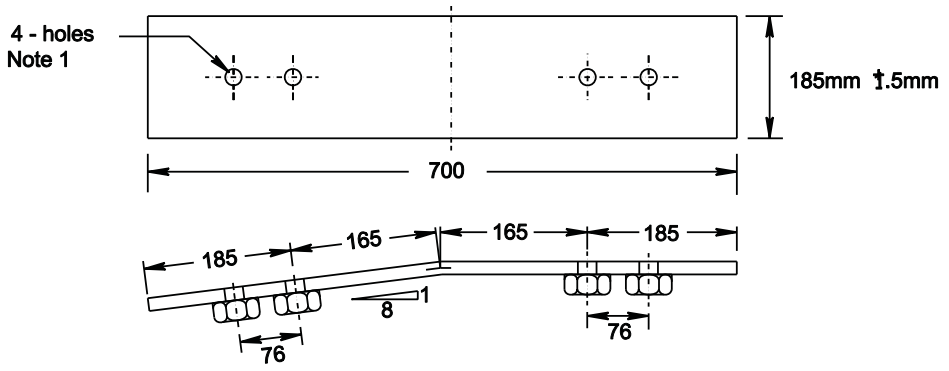
Alberta
TRANSPORTATION AND UTILITIES
Traffic Operations Branch

DWG. No.	TEB 3.27
Date	DEC 13/92
Revision	
Revision	

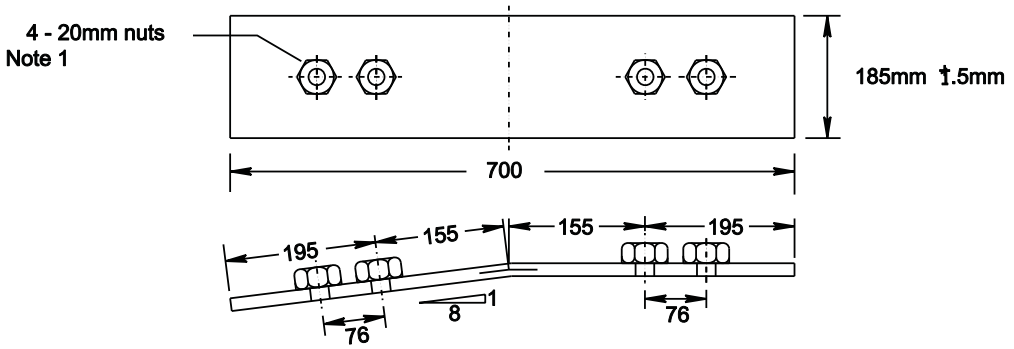
STANDARD BOX BEAM GUARDRAIL DETAIL OF SPLICE PLATE USED AT END TREATMENT

Original signed by:

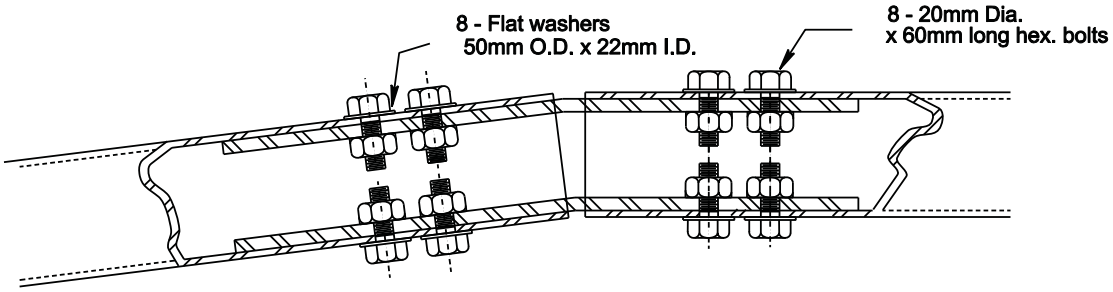
A.D. Cherwenuk, Director



UPPER SPLICE PLATE
16mm galvanized steel plate



LOWER SPLICE PLATE
16mm galvanized steel plate

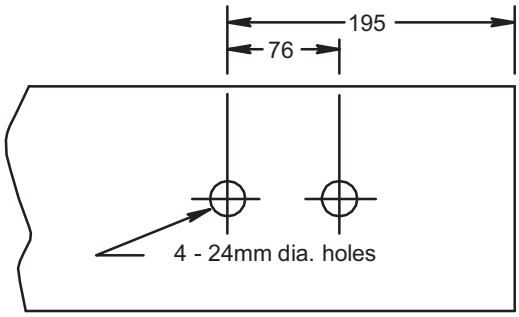


ASSEMBLY DETAIL

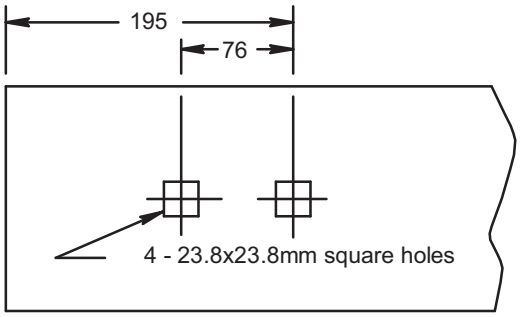
Note 1: For details of nut attachment see TEB 3.28A.
All dimensions are in millimetres unless otherwise shown.

Alberta TRANSPORTATION AND UTILITIES Traffic Operations Branch	DWG. No.	TEB 3.27A
	Date	DEC 13/92
	Revision	
	Revision	

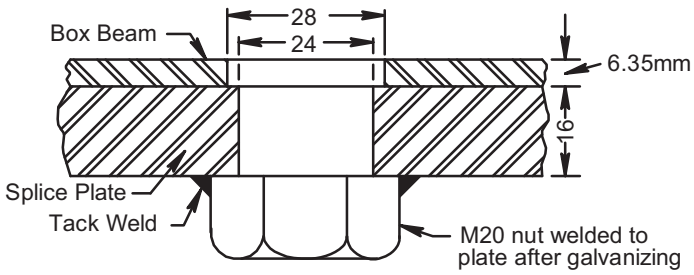
MEDIAN BOX BEAM GUARDRAIL DETAIL OF SPLICE PLATE USED AT END TREATMENT



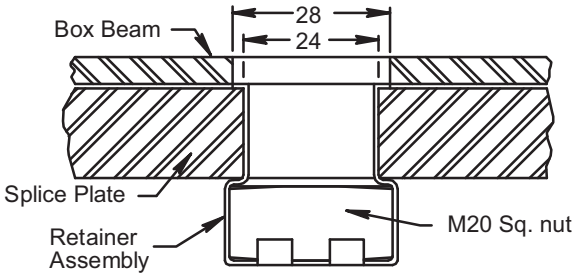
SPLICE PLATE
FOR TACK WELDING



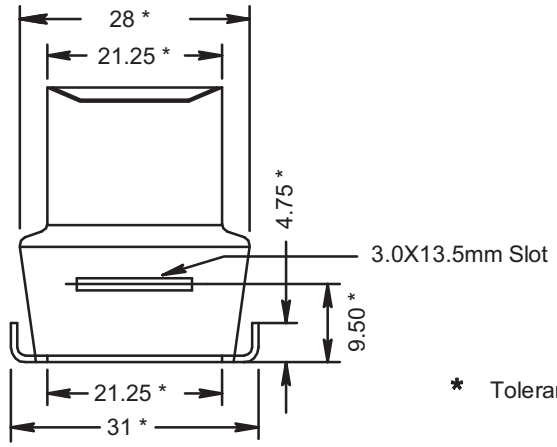
SPLICE PLATE
FOR RETAINER ASSEMBLY



NUT TACK WELDED
TO SPLICE PLATE

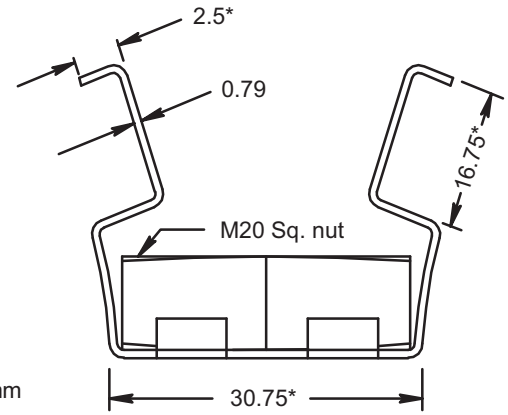


NUT CLIPPED
TO SPLICE PLATE



FRONT VIEW

* Tolerance ± 0.24mm



SIDE VIEW

RETAINER ASSEMBLY DETAIL

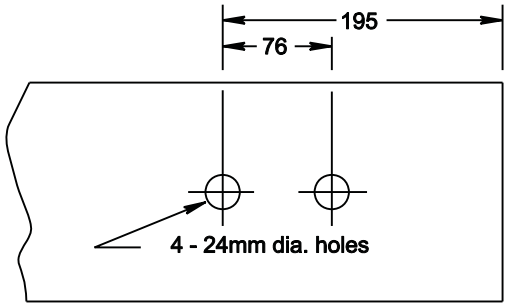
Alberta
TRANSPORTATION AND UTILITIES
Traffic Operations Branch

DWG. No.	TEB 3.28
Date	DEC 20/92
Revision	
Revision	

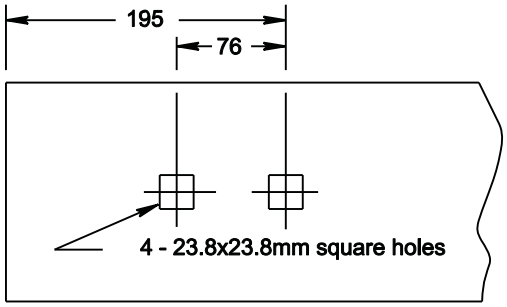
STANDARD BOX BEAM GUARDRAIL

RETAINER ASSEMBLY AND TRACK WELDING DETAILS

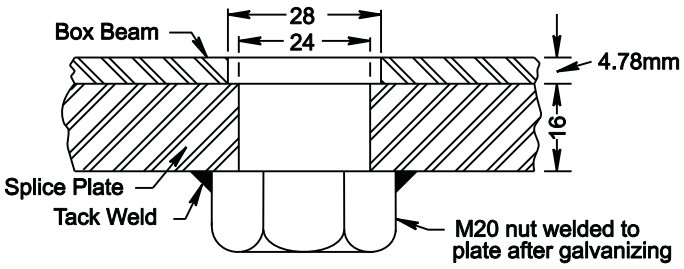
A.D. Cherwenuk, Director



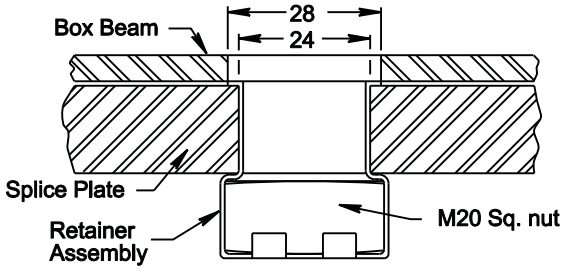
SPLICE PLATE
FOR TACK WELDING



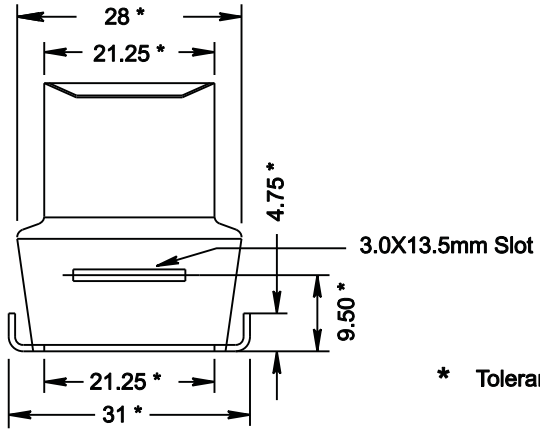
SPLICE PLATE
FOR RETAINER ASSEMBLY



NUT TACK WELDED
TO SPLICE PLATE

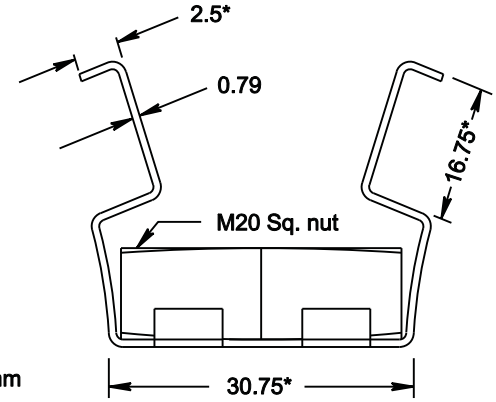


NUT CLIPPED
TO SPLICE PLATE



FRONT VIEW

* Tolerance ±0.24mm



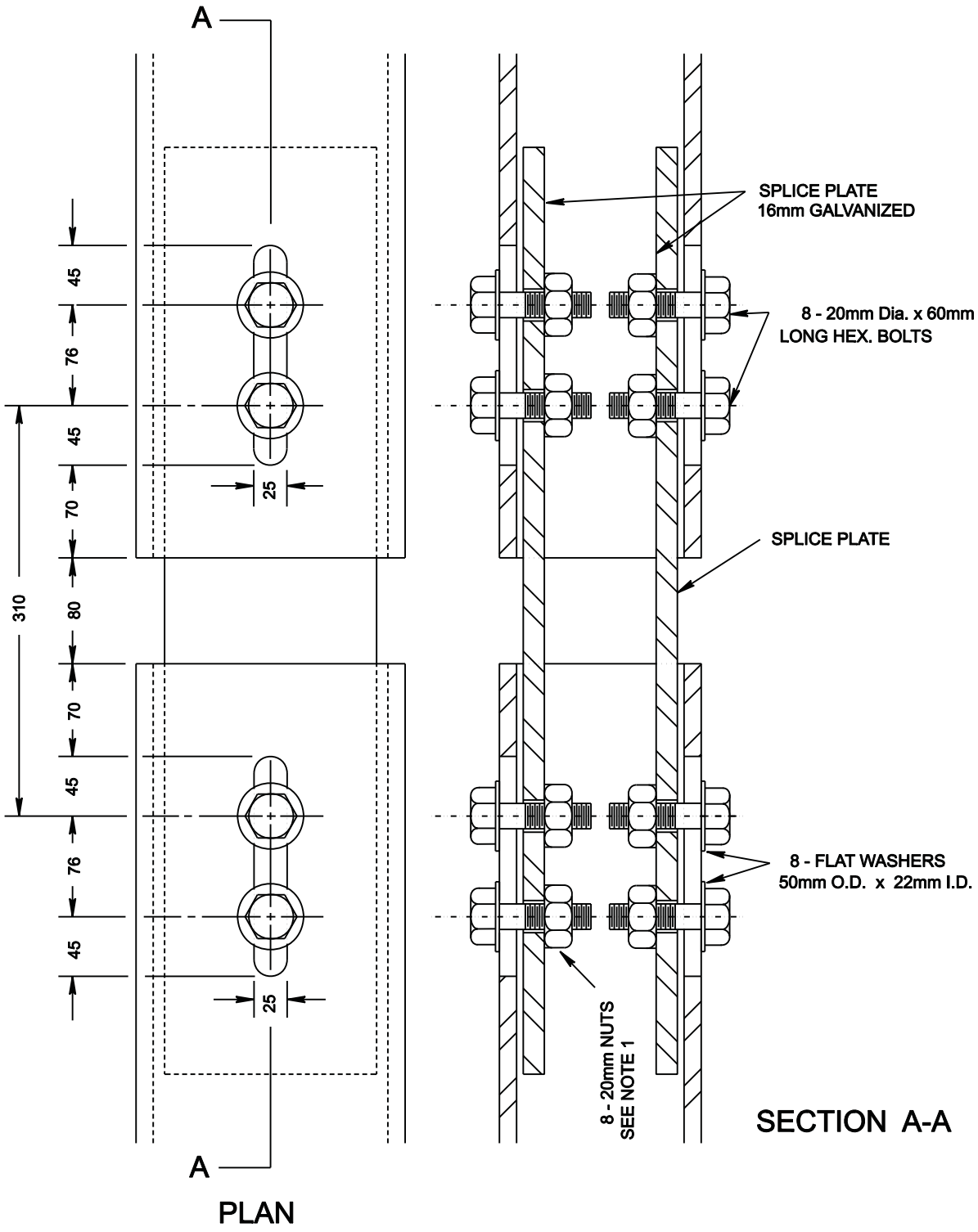
SIDE VIEW

RETAINER ASSEMBLY DETAIL

Alberta
TRANSPORTATION
AND UTILITIES
Traffic Operations Branch

DWG. No.	TEB 3.28A
Date	DEC 20/92
Revision	
Revision	

MEDIAN BOX BEAM GUARDRAIL RETAINER ASSEMBLY AND TRACK WELDING DETAILS



Note 1: For details of nut attachment see TEB 3.28A

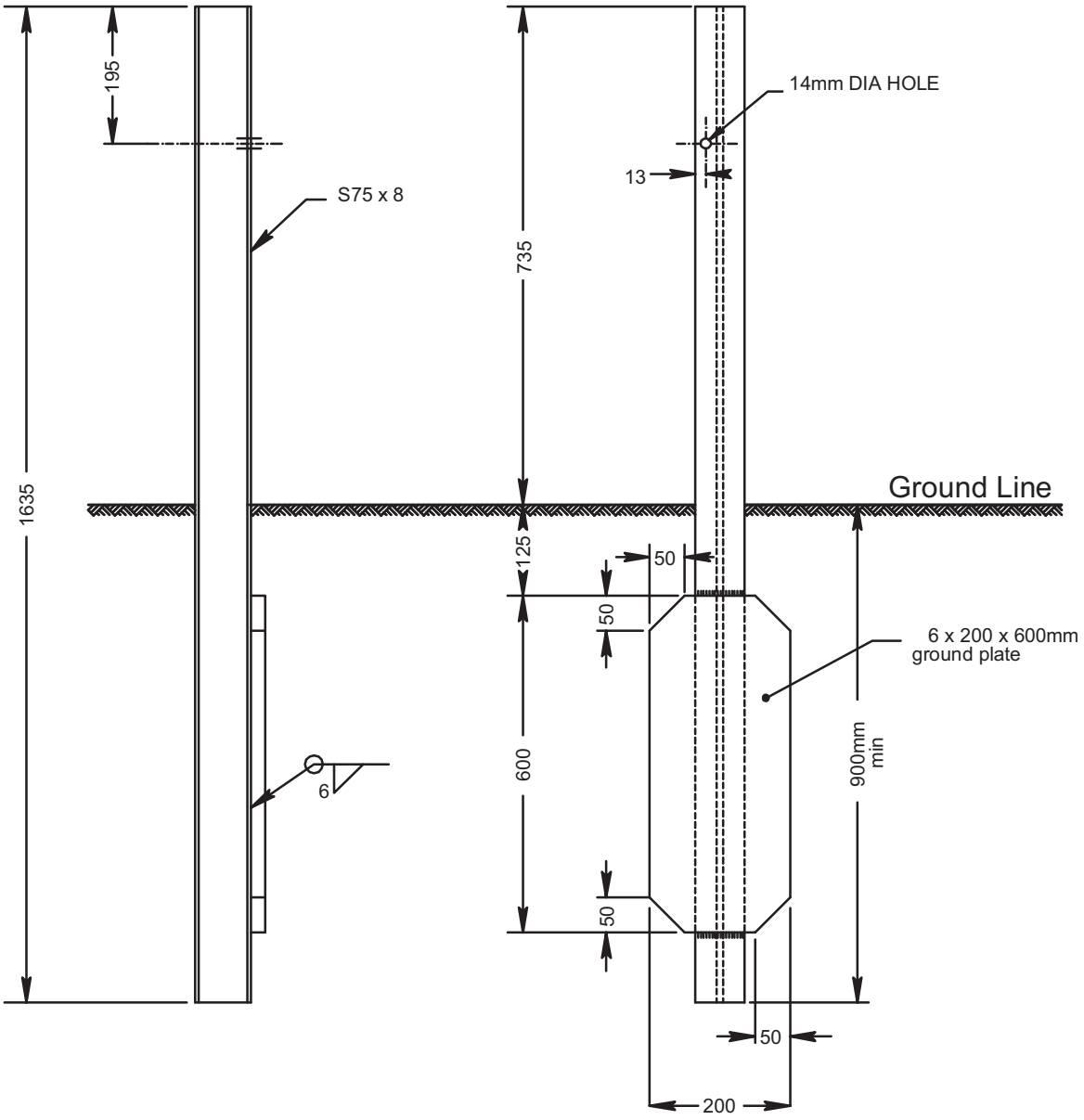
Field cut slots 25mm x 166mm
Expansion joint shall be used at
every tenth beam splice.
Post spacing at expansion joint shall be 1.90m.

All dimensions are in millimetres unless otherwise indicated.

Alberta
TRANSPORTATION
AND UTILITIES
Traffic Operations Branch

DWG. No.	TEB 3.30
Date	DEC.11/92
Revision	
Revision	

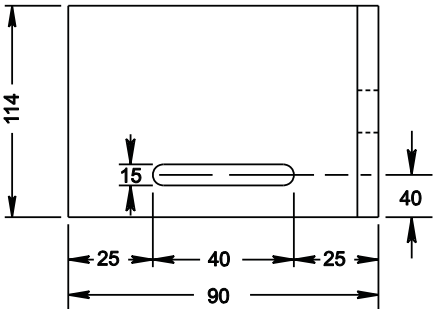
MEDIAN BOX BEAM GUARDRAIL EXPANSION JOINT SPLICE DETAIL

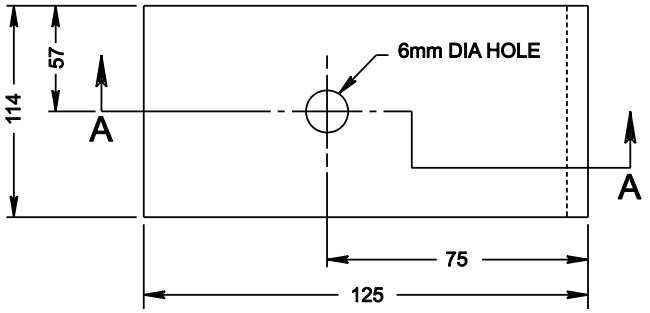


All dimensions are in millimetres unless otherwise indicated.

Alberta TRANSPORTATION AND UTILITIES Traffic Enigineering Section Roadway Engineering Branch	DWG. No.	TEB 3.33
	Date	DEC.17/92
	Revision	June 95
	Revision	

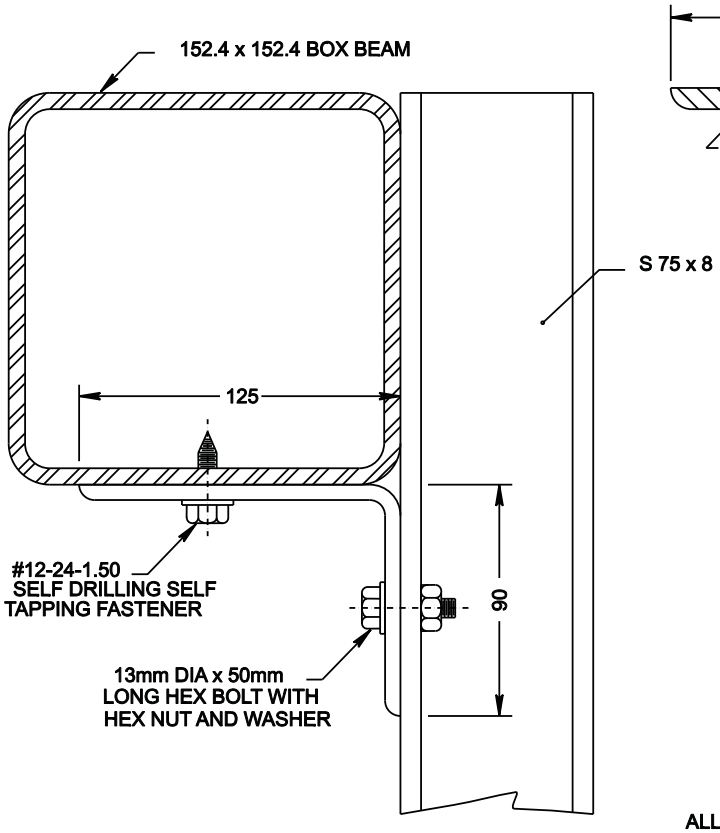
STANDARD BOX BEAM GUARDRAIL POST DETAIL

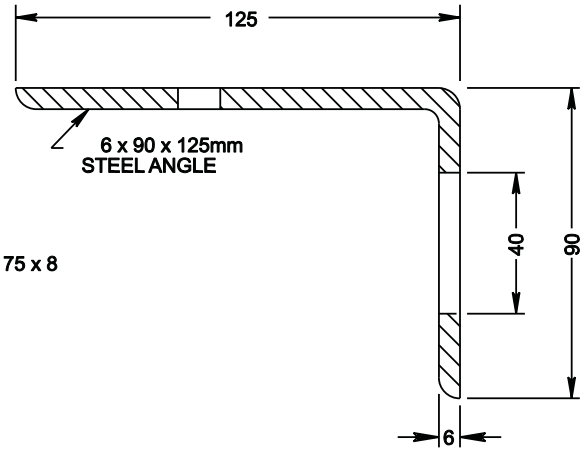




ELEVATION

PLAN



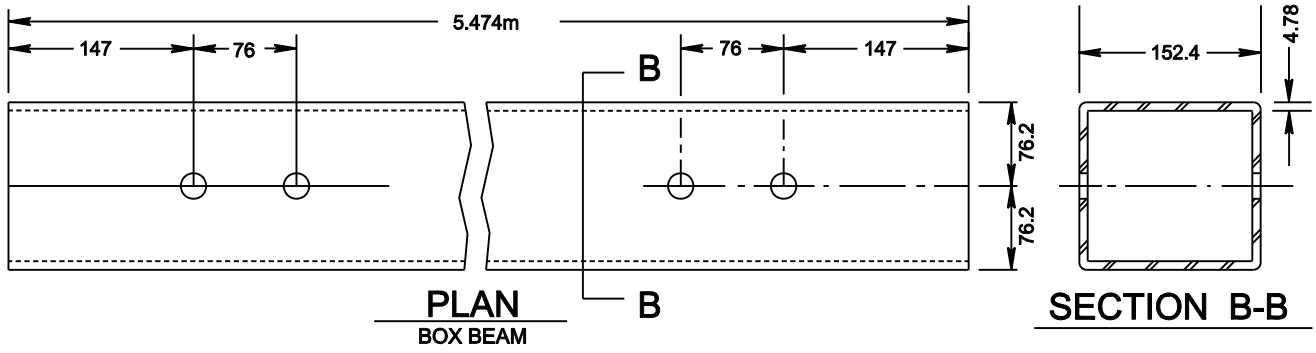


SECTION A-A

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

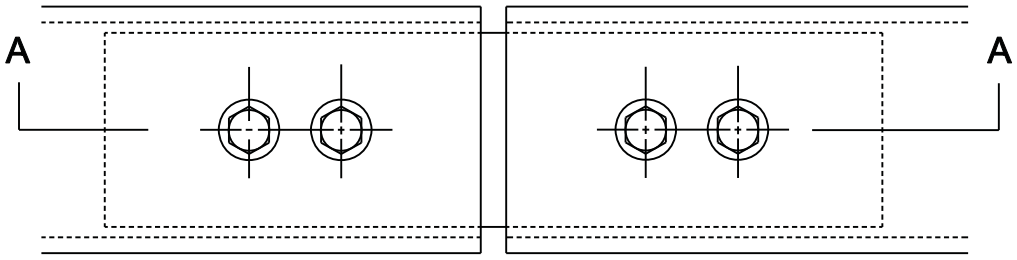
Alberta TRANSPORTATION AND UTILITIES Traffic Operations Branch	DWG. No.	TEB 3.34
	Date	DEC. 29/92
	Revision	
	Revision	

STANDARD BOX BEAM GUARDRAIL BRACKET ASSEMBLY DETAIL

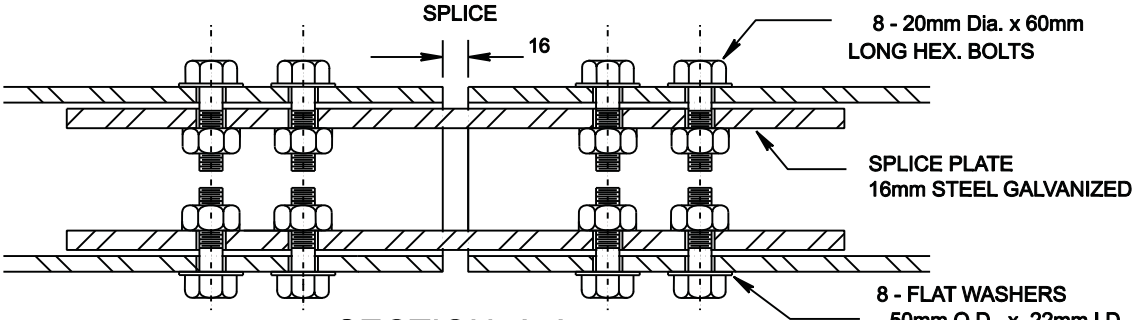


PLAN
BOX BEAM

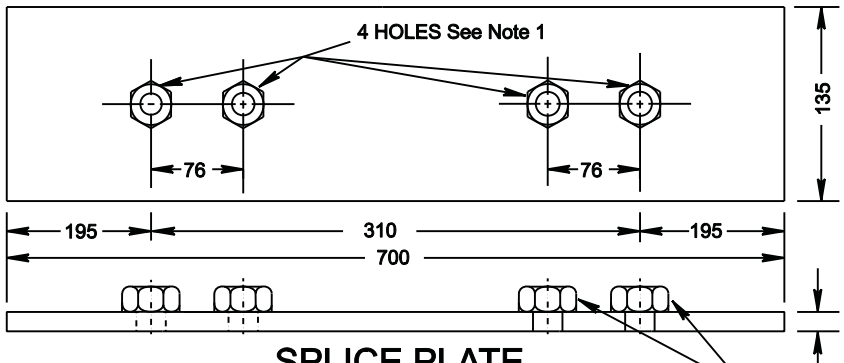
SECTION B-B



PLAN
SPLICE



SECTION A-A



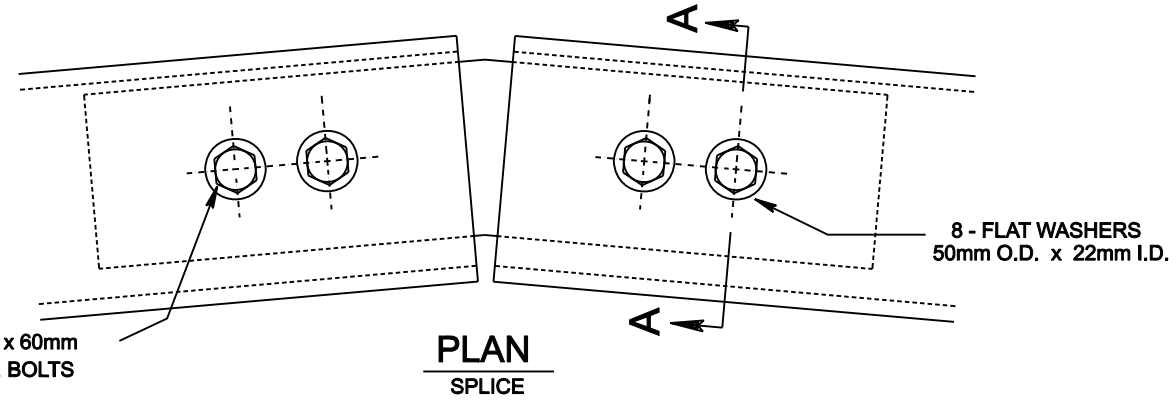
SPLICE PLATE
2 to each splice

Alberta
TRANSPORTATION
AND UTILITIES
Traffic Operations Branch

DWG. No.	TEB 3.35
Date	DEC.11/92
Revision	
Revision	

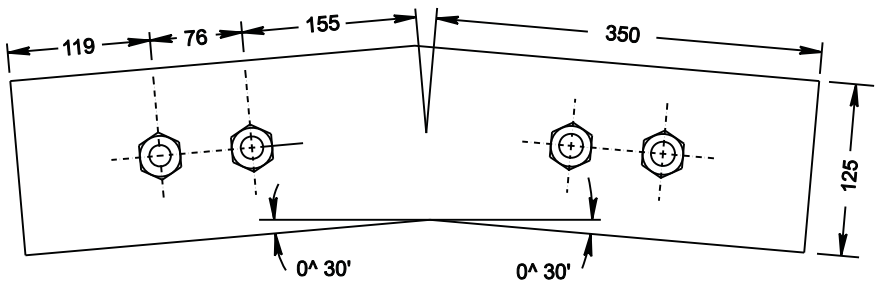
Note 1: For details of nut attachment see TEB 3.28
All dimensions are in millimetres unless otherwise indicated.

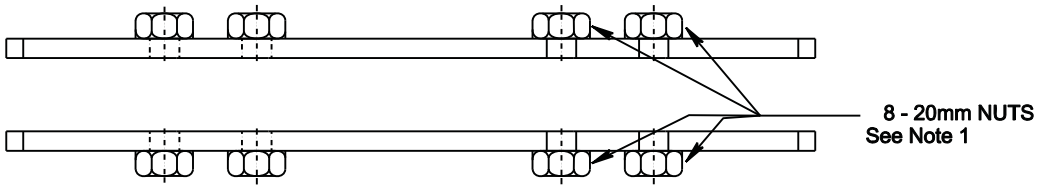
STANDARD BOX BEAM GUARDRAIL RAIL AND SPLICE PLATE DETAIL



PLAN

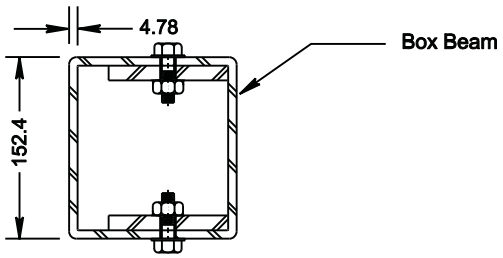
SPLICE





SPLICE PLATE

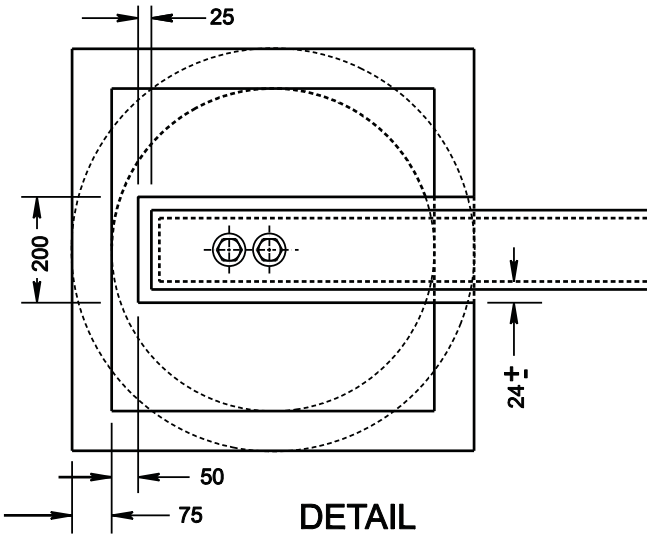
2 to each splice



SECTION A-A

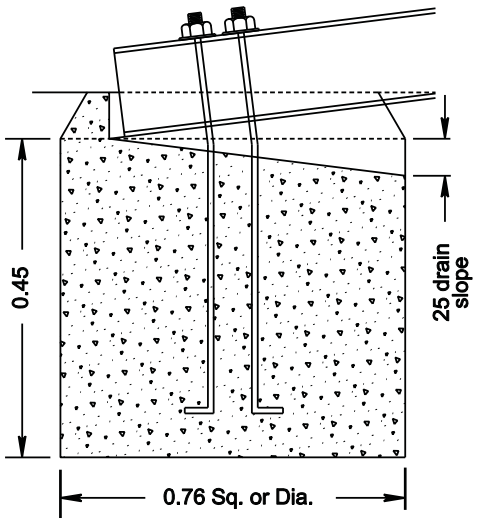
Alberta TRANSPORTATION AND UTILITIES Traffic Operations Branch	DWG. No.	TEB 3.36
	Date	DEC.20/92
	Revision	
	Revision	

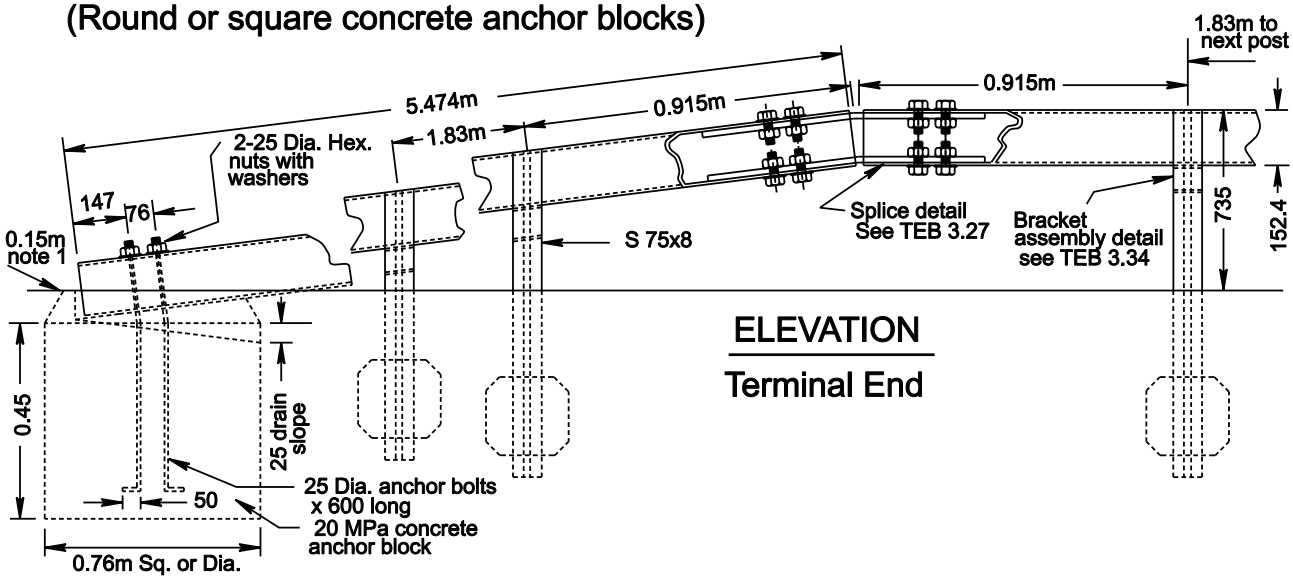
STANDARD BOX BEAM GUARDRAIL BENT SPLICE PLATE DETAIL



DETAIL

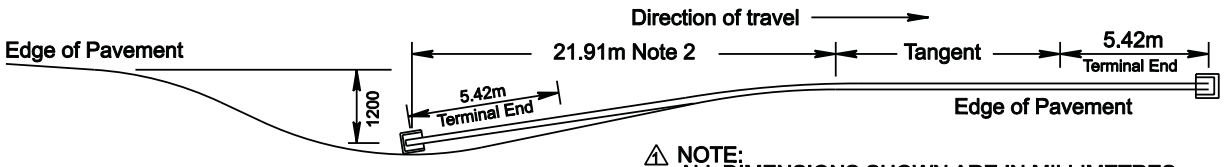
(Round or square concrete anchor blocks)





ELEVATION

Terminal End

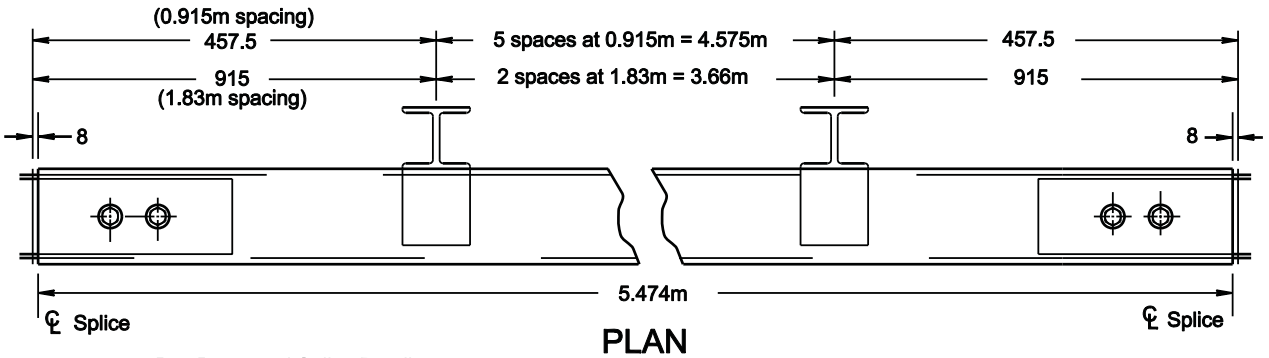


PLAN

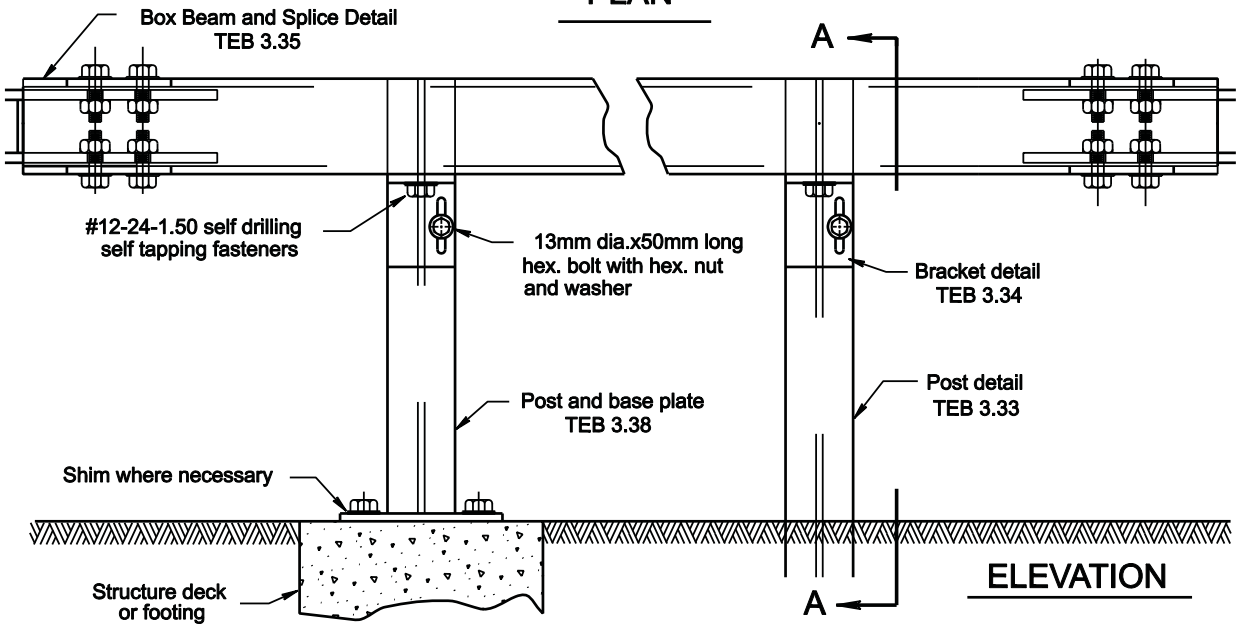
⚠ NOTE:
ALL DIMENSIONS SHOWN ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.

Alberta TRANSPORTATION AND UTILITIES Traffic Enigineering Section Roadway Engineering Branch	DWG. No.	TEB 3.37
	Date	DEC. 13/92
	Revision	June 95
	Revision	April 07

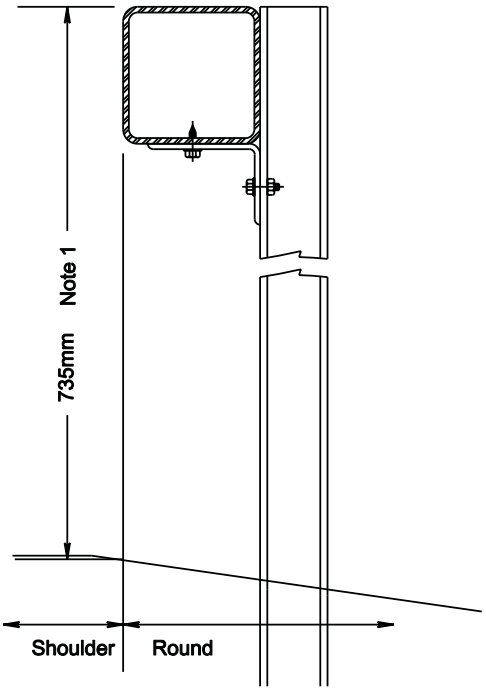
STANDARD BOX BEAM GUARDRAIL INSTALLATION DETAIL FOR END TREATMENT



PLAN



ELEVATION

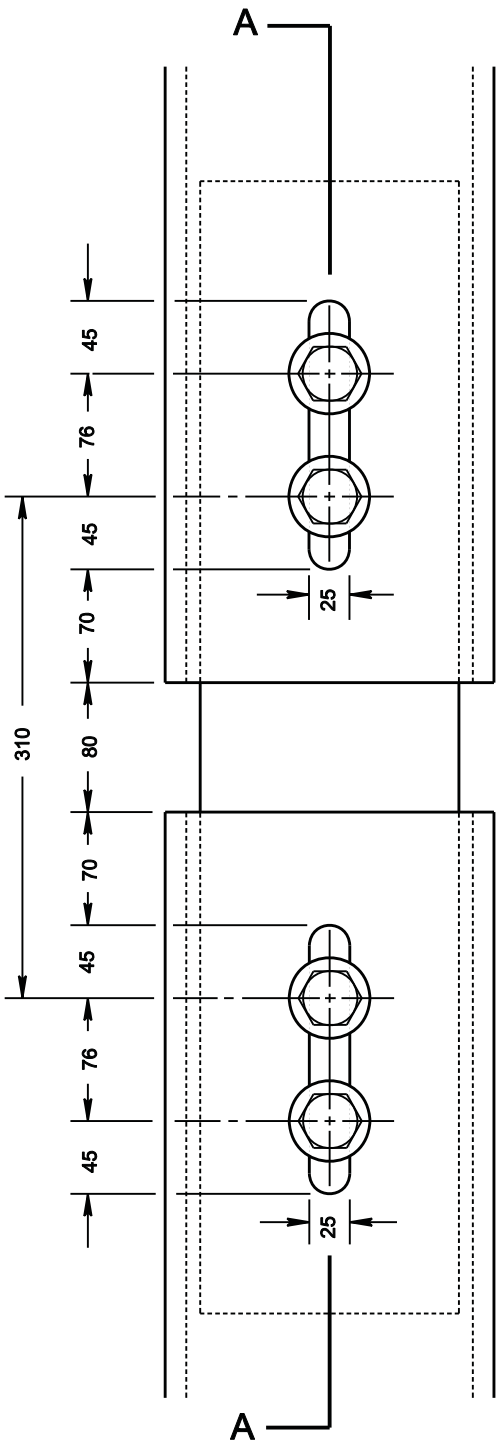


SECTION A - A

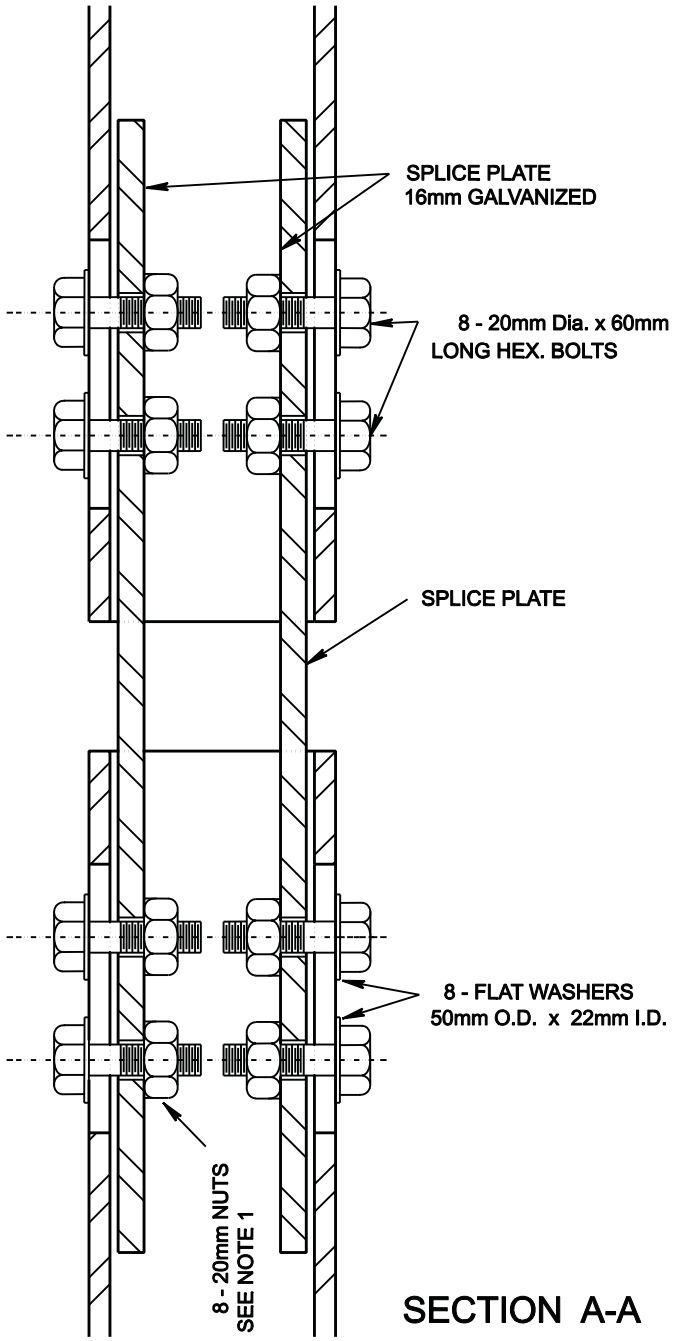
NOTE:
ALL DIMENSIONS SHOWN ARE IN MILLIMETRES
UNLESS OTHERWISE NOTED.

Alberta TRANSPORTATION AND UTILITIES Traffic Operations Branch	DWG. No.	TEB 3.39
	Date	DEC. 20/92
	Revision	
	Revision	

STANDARD BOX BEAM GUARDRAIL ASSEMBLY DETAIL FOR 0.915m AND 1.83m POST SPACING



PLAN



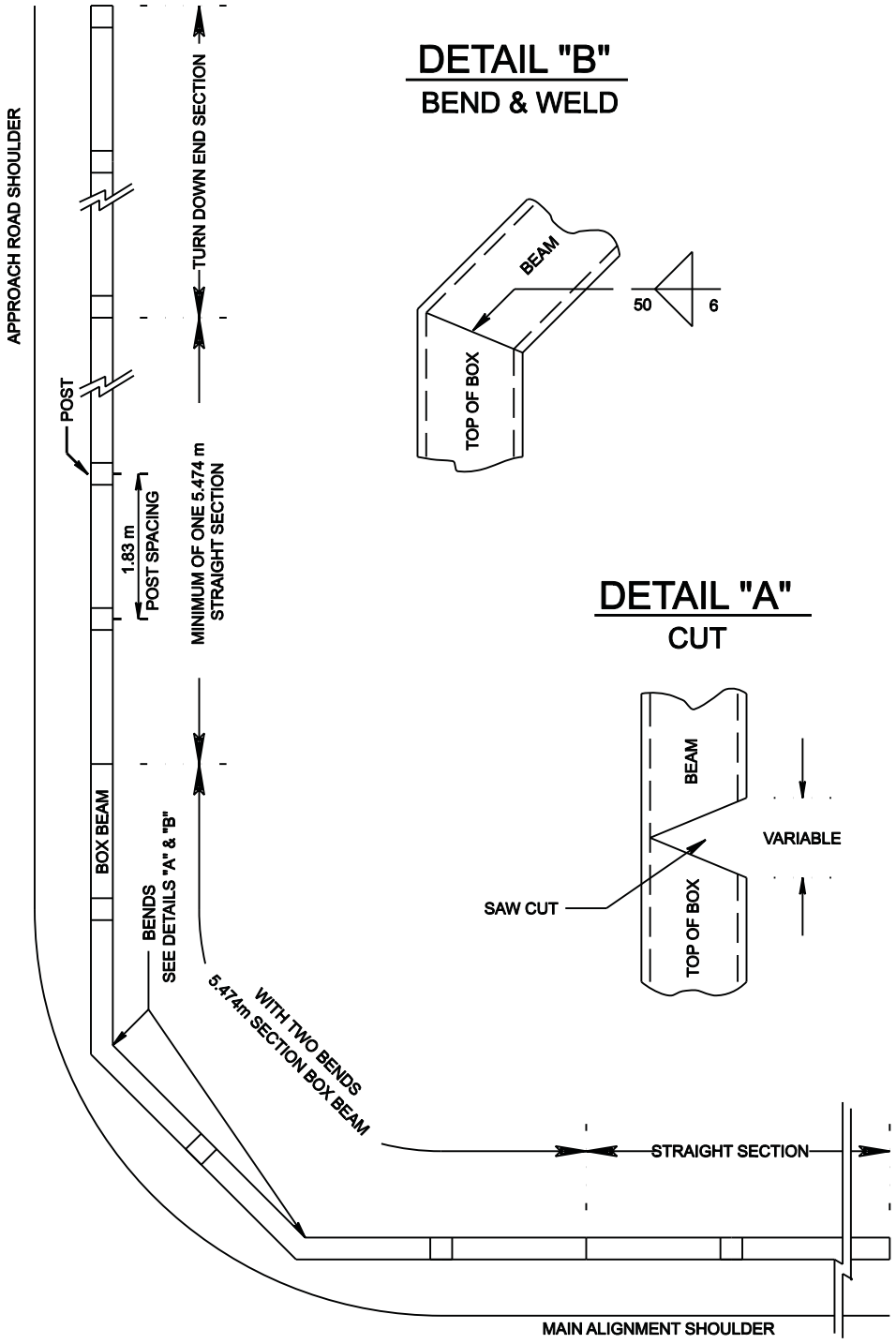
SECTION A-A

Note 1: For details of nut attachment see TEB 3.28.
Field cut slots 25mm x 166mm.
Expansion joint shall be used at every tenth beam splice.
Post spacing at expansion joint shall be 1.90m.
All dimensions are in millimetres unless otherwise indicated.

Alberta
TRANSPORTATION AND UTILITIES
Traffic Operations Branch

DWG. No.	TEB 3.40
Date	DEC.11/92
Revision	
Revision	

STANDARD BOX BEAM GUARDRAIL EXPANSION JOINT SPLICE DETAIL



PLAN VIEW

TOP VIEW

DETAIL "B"

BEND & WELD

DETAIL "A"

CUT

All dimensions are in millimetres unless otherwise indicated.

Alberta
TRANSPORTATION AND UTILITIES
Traffic Operations Branch

DWG. No.	TEB 3.46
Date	DEC.11/92
Revision	
Revision	

STANDARD BOX BEAM GUARDRAIL BEND DETAIL FOR APPROACH ROAD RADII

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX B4

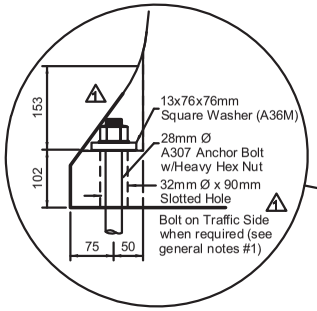
PRECAST F-SHAPE AND "NJ" SHAPE CONCRETE BARRIERS

THIS PAGE INTENTIONALLY LEFT BLANK

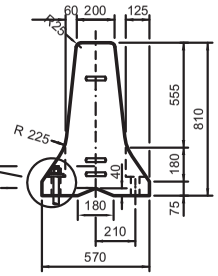
Appendix B4
Precast F-Shape and "NJ" Shape Concrete Barriers

TABLE OF CONTENTS

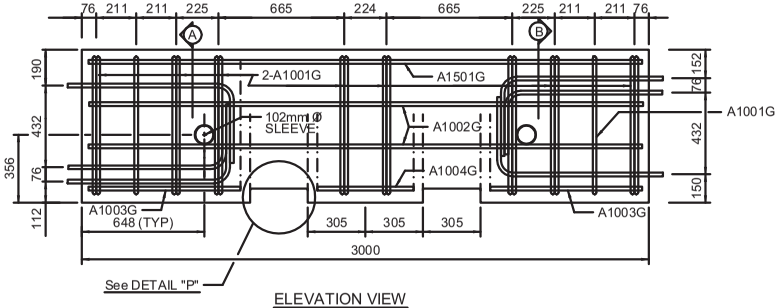
THIS PAGE INTENTIONALLY LEFT BLANK



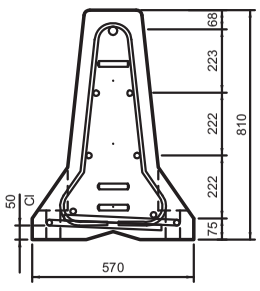
OPTIONAL ANCHOR BOLTS (Traffic Side Only)



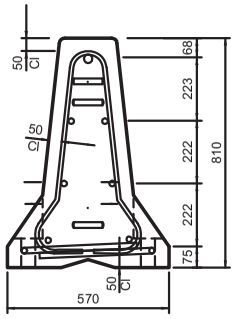
END VIEW



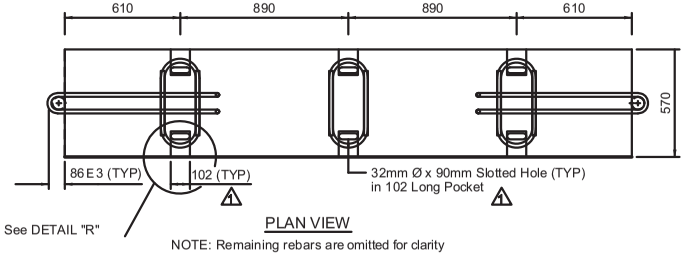
ELEVATION VIEW



A SECTION

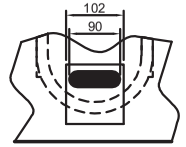


B SECTION

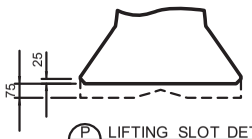


PLAN VIEW

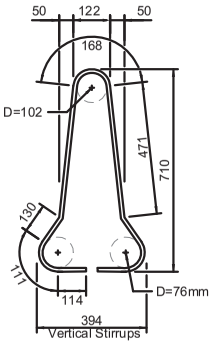
NOTE: Remaining rebars are omitted for clarity



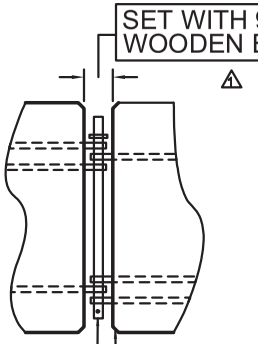
R SLOTTED HOLE DETAIL



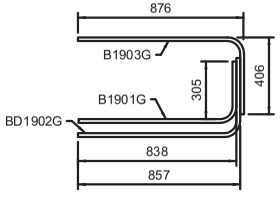
P LIFTING SLOT DETAIL
(25mm Chamfer to prevent spalling)



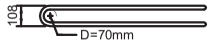
A1001G



DETAILS OF BARRIER CONNECTION

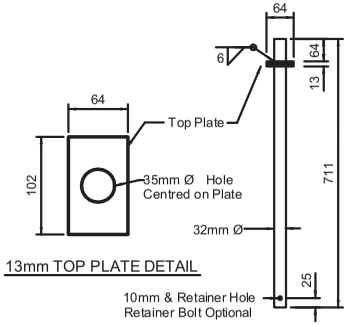


ELEVATION



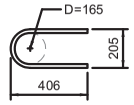
PLAN

LOOP BAR ASSEMBLY
Material as stated in General Notes



13mm TOP PLATE DETAIL

Q CONNECTION PIN DETAIL



A2001G

General Notes:

1. The barrier is based on a design that has been crash tested and meets the requirements of NCHRP Test Level 3. The following deflecton information is provided for guidance on the use of this barrier:

2000 kg pick-up truck test @ 100kph @ 25°	Approx deflection
Unanchored	1800 mm
Four 25 mm diameter by 1m long steel dowels per segment driven through holes provided	75 mm
Three 19 diameter anchor bolts c/w drop-in anchors in concrete slab on traffic side	900 mm (anchor failure is expected)
Three 28 diameter A307 fully developed tension anchor bolts on traffic side	300 mm (deflection on top edge only)

When using this barrier, it is the responsibility of the user to ensure appropriate deflection room or anchoring commensurate with the risks based on traffic and site conditions.

Materials:

1. Reinforcing bars – Grade 400W.
2. 19 mm diameter loop bars – Minimum yield 420 MPa, minimum tensile strength 550 MPa, minimum 14% elongation in 203 mm, pass a 180 degree bend test using a 3.5D bend diameter.
3. 32 mm diameter pin – ASTM A36.
4. All reinforcing bars and steel hardware to be hot-dip galvanized after fabrication to the requirements of CSA G164.
5. Concrete strength shall be 40 MPa @ 28 days, and all requirements of Section 7 -Precast Concrete Units of the Specifications for Bridge Construction shall be met.

Handling and installation:

1. At no time shall the barriers be lifted, moved, etc. by the use of the loop bars at the ends.
2. For barriers placed on a paved surface, all loose dirt and sand shall be removed from the roadway just prior to placement of the barriers. Barriers can also be placed on a compacted base material with a minimum thickness of 150 mm and a minimum width of 1.2 m.
3. Calculated mass of one segment = 1.8 tonnes

BAR LIST : 3000 SEGMENT

Mark	Size	Shape	No.	Length	Mass
A1001G	10		18	1820	26.0
A2001G	20		6	898	13.0
A1501G	15		1	2900	5.0
A1002G	10		4	2900	9.1
A1003G	10		4	790	2.0
A1004G	10		2	510	1.0

TOTAL Kg 55.0

No.	REVISIONS	BY	DATE
2	.	.	.
1	Notes and Details	BK	Sept/06

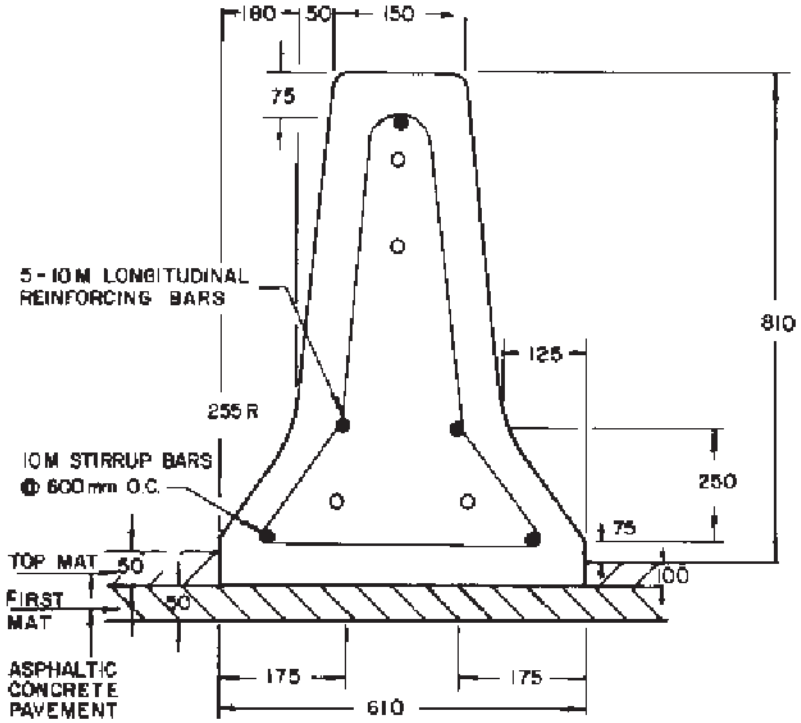
Approved:
Original signed by
Allan Kwan
Executive Director,
Technical Standards Branch

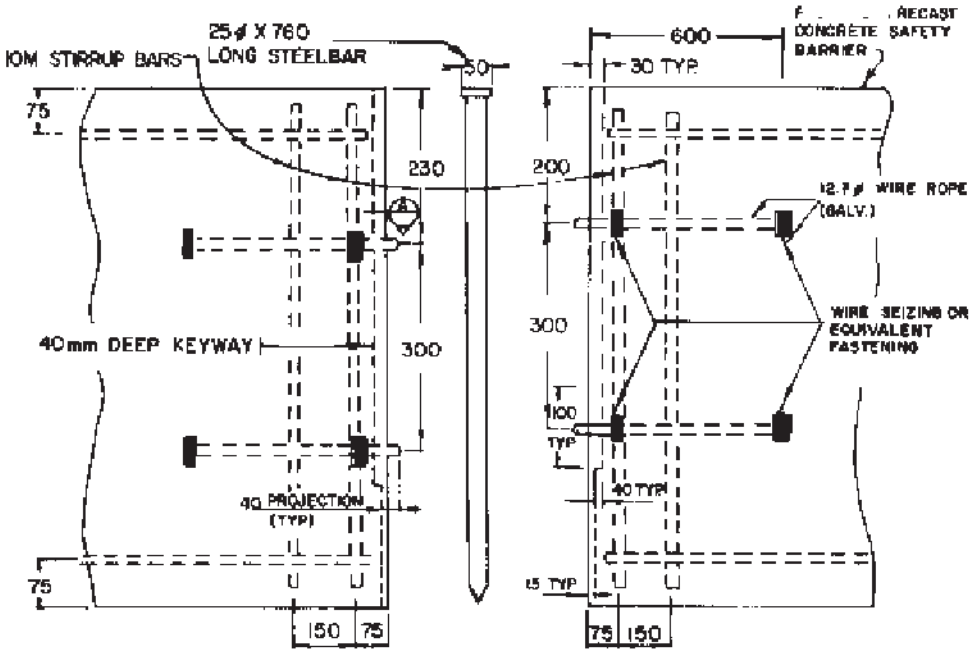
Date: NOVEMBER 23, 2004

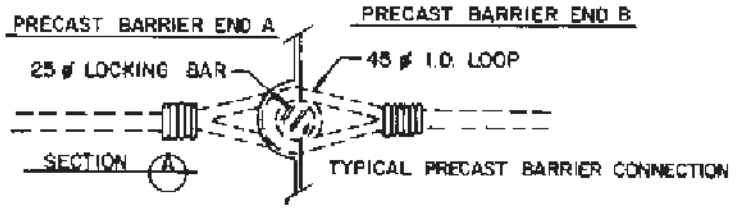
Alberta
INFRASTRUCTURE AND TRANSPORTATION

PRECAST 'F' SHAPE BARRIER NCHRP 350 TEST LEVEL 3

Prepared By:	Checked By:	Scale:	Dwg No.:
M.T	R.Y	N.T.S.	CB6 4.2 M 16







1. ALL CONCRETE SHALL BE 40 Mpa AT 28 DAYS.
2. ALL REINFORCEMENT SHALL BE EPOXY COATED REINFORCING BARS.
3. ALL EXPOSED CONCRETE SHALL HAVE A SMOOTH SURFACE.
4. EXPOSED SURFACES SHALL HAVE 20mm CHAMFER OR FILLET OR AS OTHERWISE SPECIFIED.
5. ALL SURFACES SHALL BE FORMED WITH OILED PLYWOOD OR STEEL FORMED FINISH
6. ALL VOIDS ARE TO BE CAPPED AND WATERPROOFED
7. EXPOSED SURFACES SHALL HAVE AN APPROVED SEALING SOLUTION APPLIED

ALL DIMENSIONS ARE IN MILLEMETRES UNLESS OTHERWISE NOTED

FOR RETROFIT ONLY

No.	REVISIONS	BY	DATE
2	.	.	.
1	"CURB" REMOVED FROM TITLE	B.K.	04-17-07

Alberta Infrastructure and Transportation

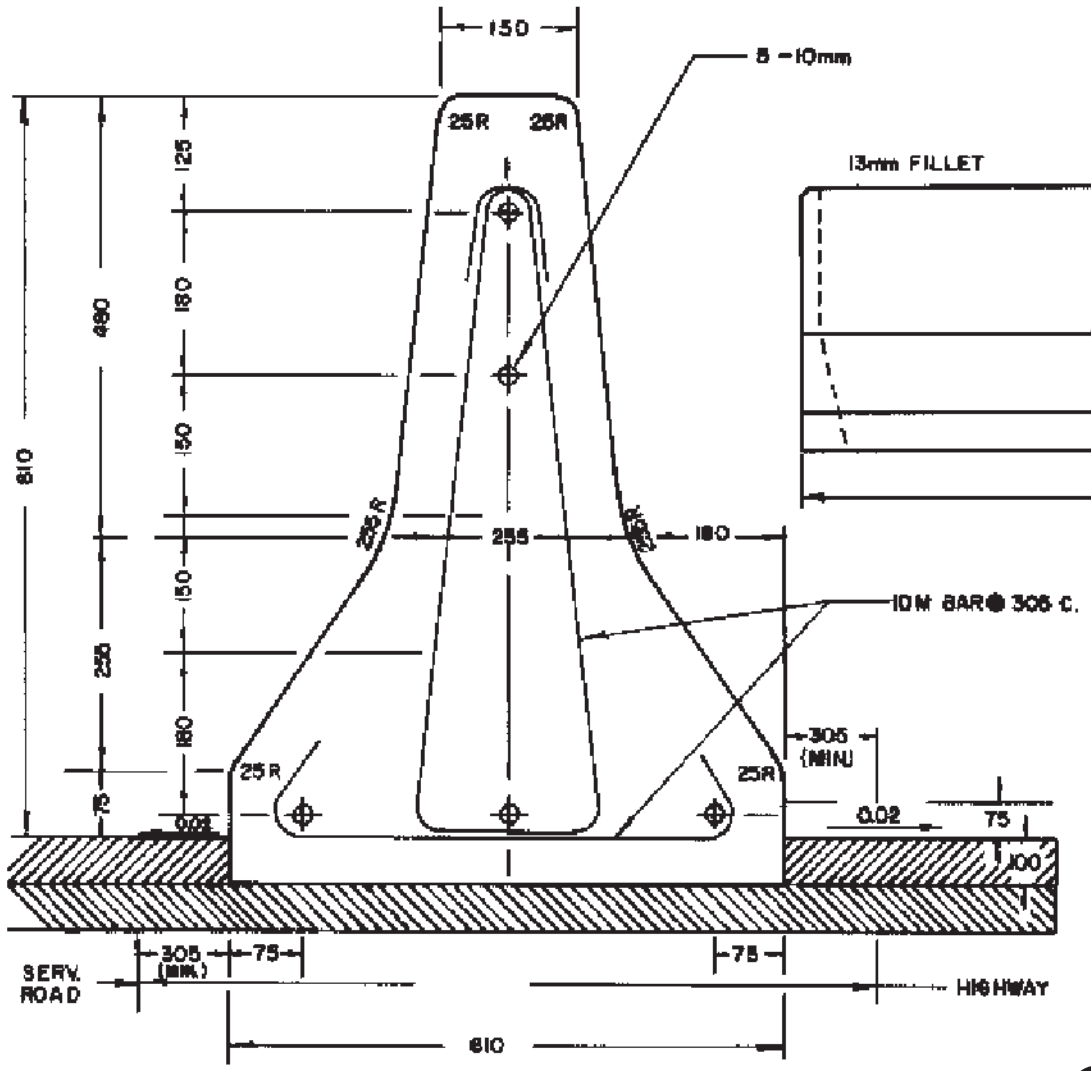
Effective Date: 1997

REINFORCED CONCRETE MEDIAN BARRIER ⚠

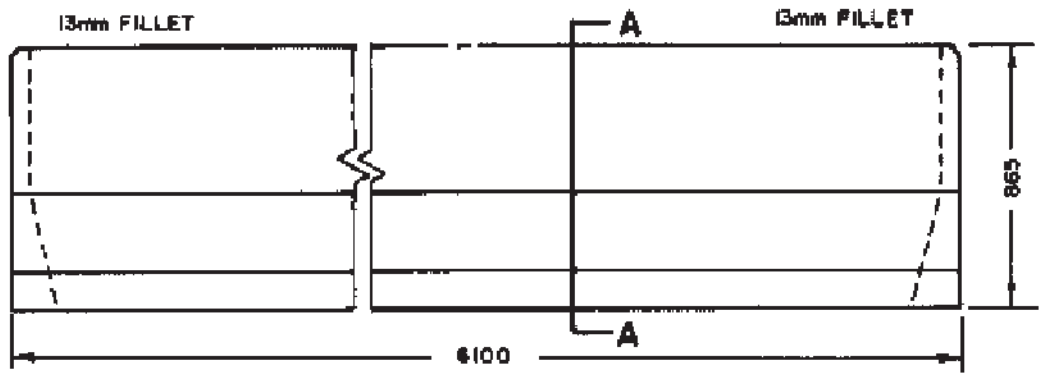
NJ SHAPE

Prepared By: N.N.	Checked By: B.K	Scale: N.T.S.	Dwg No.: CB6-4.3M1A

ALL DIMENSIONS ARE IN MILLIMETRES
UNLESS OTHERWISE NOTED



SECTION A-A VIEW



SIDE VIEW

FOR RETROFIT ONLY

No.	REVISIONS	BY	DATE
2	.	.	.
1	"CURB" REMOVED FROM TITLE	B.K.	04-17-07

Alberta Infrastructure and Transportation

Date: MAY, 1985

PRECAST CONCRETE BARRIER 1

NJ SHAPE

Prepared By: N.N.	Checked By: B.K	Scale: N.T.S.	Dwg No.: CB6-4.3M12

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX B5

THRIE BEAM GUARDRAIL

THIS PAGE INTENTIONALLY LEFT BLANK

Appendix B5
Thrie Beam Guardrail

TABLE OF CONTENTS

THIS PAGE INTENTIONALLY LEFT BLANK

No.	REVISIONS	BY	DATE
2	.	.	.
1	END TREATMENT NOTES	B.K.	12/01/05

Approved:
Original signed by
Allan Kwan

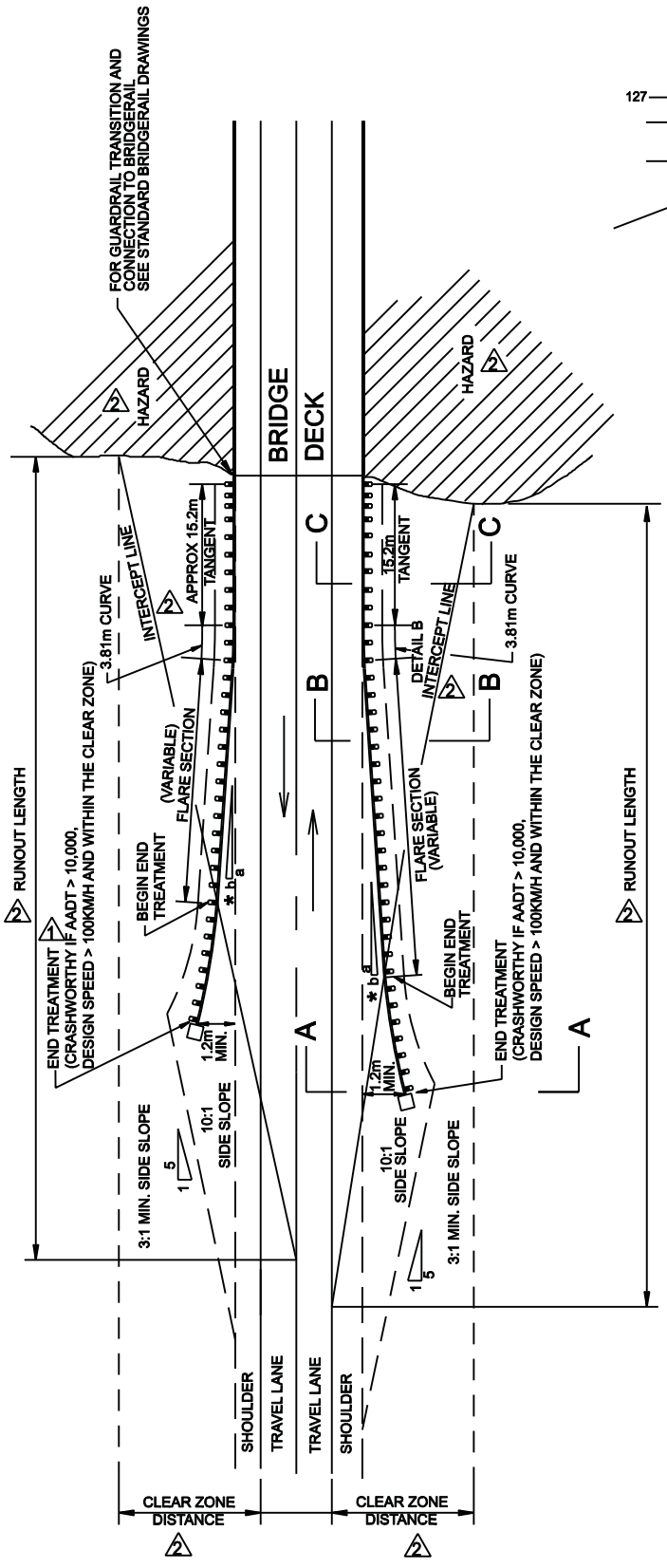
Executive Director,
Technical Standards Branch
Date: JUNE 24, 2005

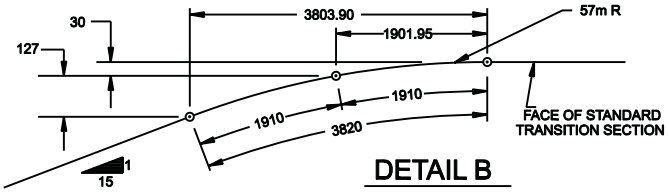
Date: JULY 12, 2005

Alberta
INFRASTRUCTURE AND TRANSPORTATION

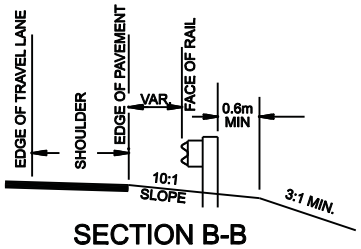
TYPICAL W-BEAM STRONG POST OR MODIFIED THRIE BEAM GUARDRAIL PLACEMENT ROADSIDE HAZARDS (TWO AND FOUR LANE HIGHWAYS)

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.15a

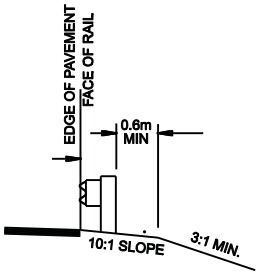




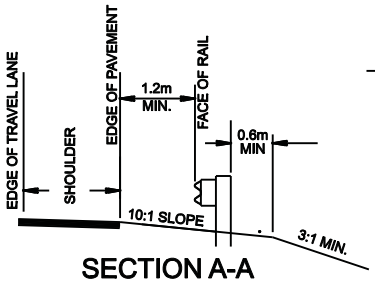
DETAIL B
OFFSETS FOR CURVED PORTION OF GUARDRAIL



SECTION B-B
NOT TO SCALE



SECTION C-C
NOT TO SCALE



SECTION A-A
NOT TO SCALE

END TREATMENT IS TO BE DETERMINED BY PROJECT MANAGER IN EACH GIVEN SITUATION

* FLARE RATES AS PER STANDARD

△2 RUNOUT LENGTH IS TO BE MEASURED FROM BEGINNING OF HAZARD ON ROADSIDE

LENGTH OF GUARDRAIL TO BE DETERMINED BY PROTECTION ENVELOPE METHOD

All dimensions are in millimetres unless otherwise indicated.

No.	REVISIONS	BY	DATE
△2	"LENGTH OF NEED" SHOWN	B.K.	12 SEP 07
△1	END TREATMENT NOTES	B.K.	12/01/05

Approved:

Original signed by
Allan Kwan

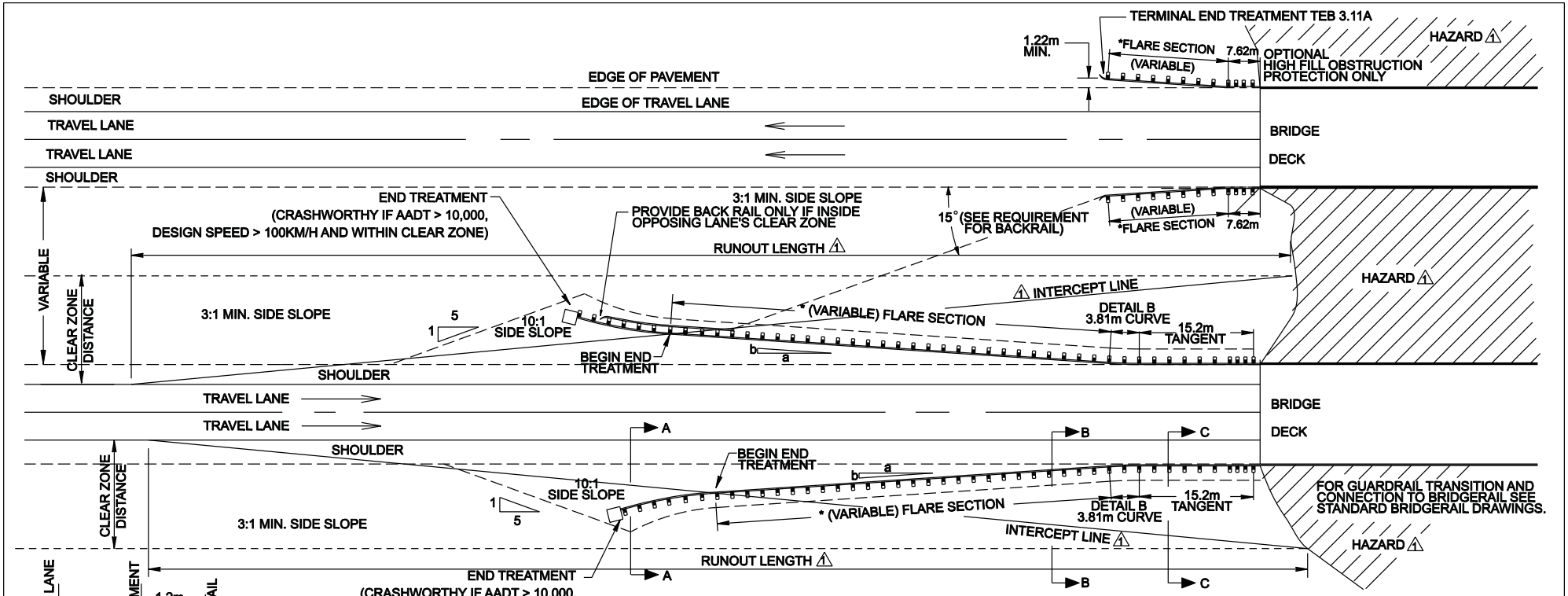
Executive Director,
Technical Standards Branch
Date: JUNE 24, 2005

Date: JULY 12, 2005

Alberta
INFRASTRUCTURE AND TRANSPORTATION

TYPICAL STRONG POST W-BEAM OR MODIFIED THRIE BEAM GUARDRAIL PLACEMENT AT BRIDGE APPROACHES (TWO-LANE HIGHWAY)

Prepared By:	Checked By:	Scale:	Dwg No.:
M.T	B.K	N.T.S.	TEB 3.16a



END TREATMENT IS TO BE DETERMINED BY PROJECT MANAGER IN EACH GIVEN SITUATION
LENGTH OF GUARDRAIL TO BE DETERMINED BY PROTECTION ENVELOPE METHOD
⚠1 RUNOUT LENGTH IS TO BE MEASURED FROM BEGINNING OF HAZARD ON ROADSIDE
* FLARE RATES AS PER STANDARD
ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE
⚠2	.	.	.
⚠1	"LENGTH OF NEED" CORRECTED	B.K.	12 SEP 07

Approved:
Original signed by Allan Kwan
Executive Director, Technical Standards Branch
Date: JUNE 24, 2005
Effective Date: JULY 12, 2005

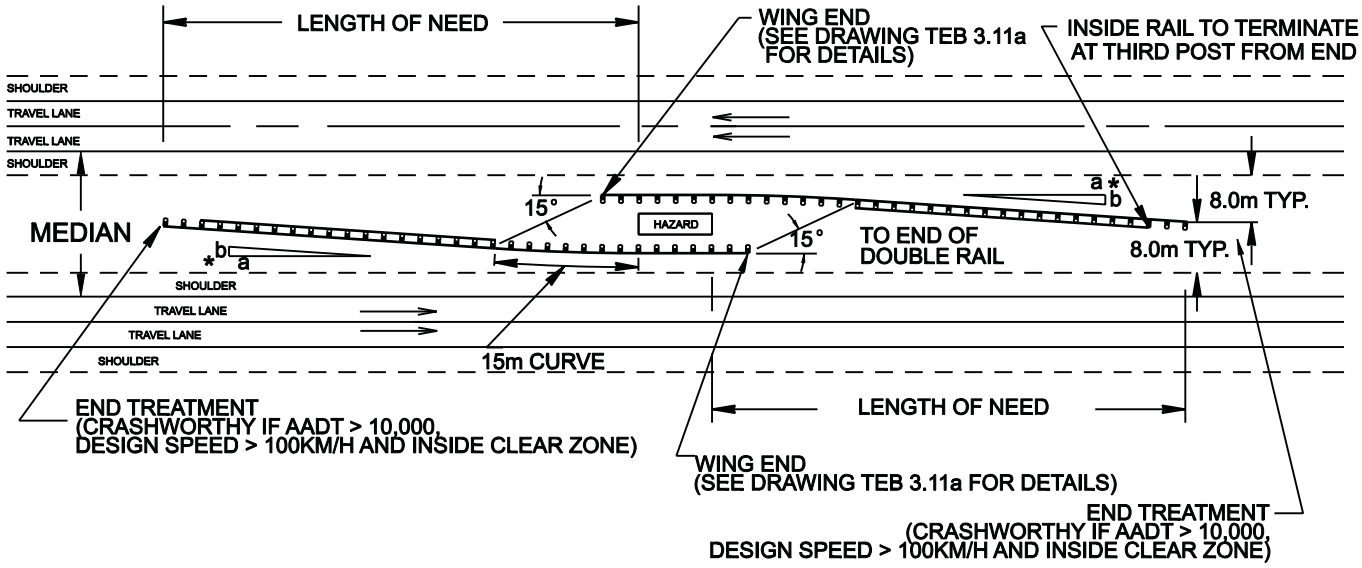
Alberta INFRASTRUCTURE AND TRANSPORTATION

TYPICAL STRONG POST W-BEAM OR MODIFIED THRIE BEAM GUARDRAIL PLACEMENT AT BRIDGE APPROACHES (FOUR-LANE DIVIDED HIGHWAY)

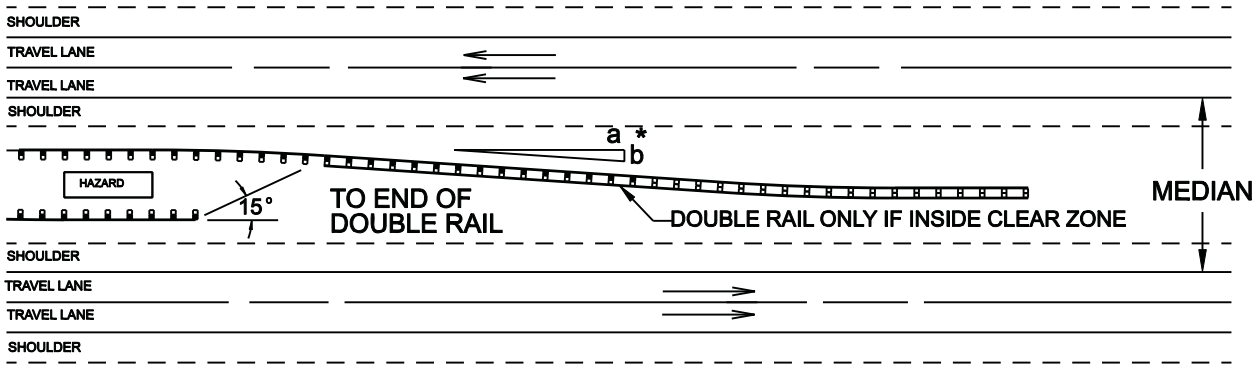
Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.17a

THIS PAGE LEFT INTENTIONALLY BLANK

INTRODUCED MEDIAN BARRIER



CONTINUOUS MEDIAN BARRIER



* FLARE RATE AS PER STANDARD FOR DESIGN SPEED.

CONSIDER ONLY WHERE MEDIAN WIDTH SUFFICIENT TO PROVIDE 8m MINIMUM FROM OPPOSING TRAVEL LANE TO BACK SIDE OF TERMINAL.

FOR NARROW MEDIAN, IMPACT SYSTEMS ARE REQUIRED.

THE LENGTH OF NEED SHALL BE BASED ON THE PROTECTION ENVELOPE.

CLEARANCE BETWEEN GUARDRAIL AND OBSTRUCTION:
STRONG POST (WOOD AND STEEL POSTS) 0.9m
THRIE BEAM 0.9m
STRONG POST (PLASTIC POSTS) 1.5m

DATA FOR 15m CURVE
D=38 30' R=225.0m
SR=7.508m CL=15.0m

END TREATMENT IS TO BE DETERMINED BY PROJECT MANAGER TO EACH GIVEN SITUATION.

All dimensions are in millimetres unless otherwise indicated.

No.	REVISIONS	BY	DATE
2	.	.	.
1	.	.	.

Approved:
Original signed by
Allan Kwan

Executive Director,
Technical Standards Branch
Date: JUNE 24, 2005

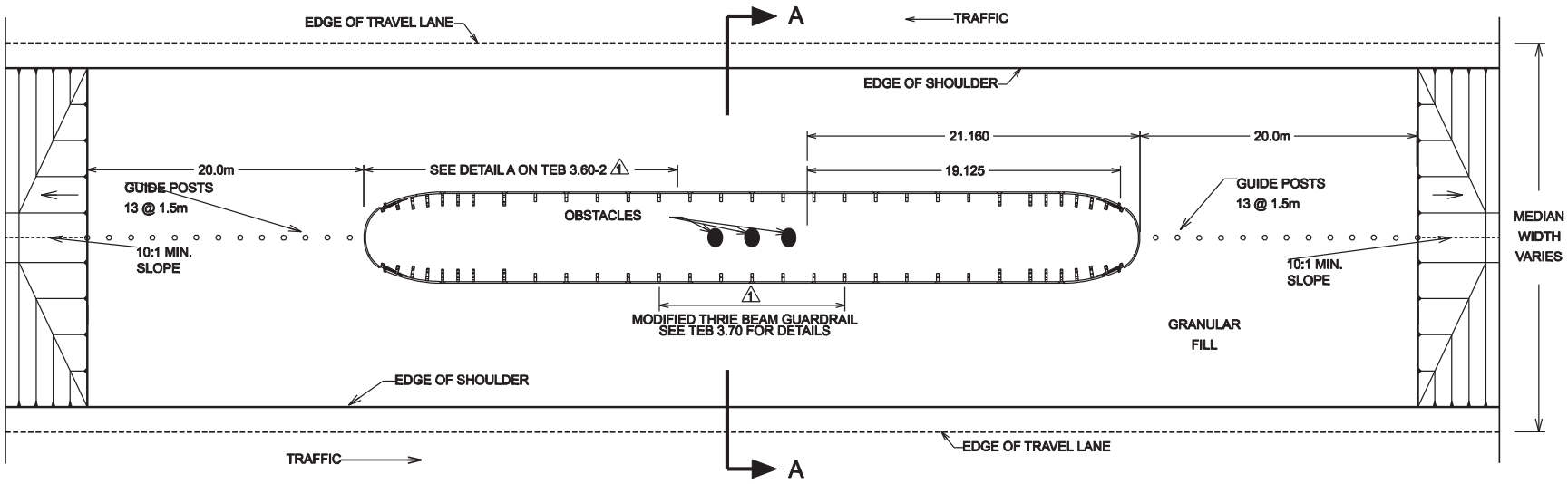
Effective Date: JULY 12, 2005

Alberta
INFRASTRUCTURE AND TRANSPORTATION

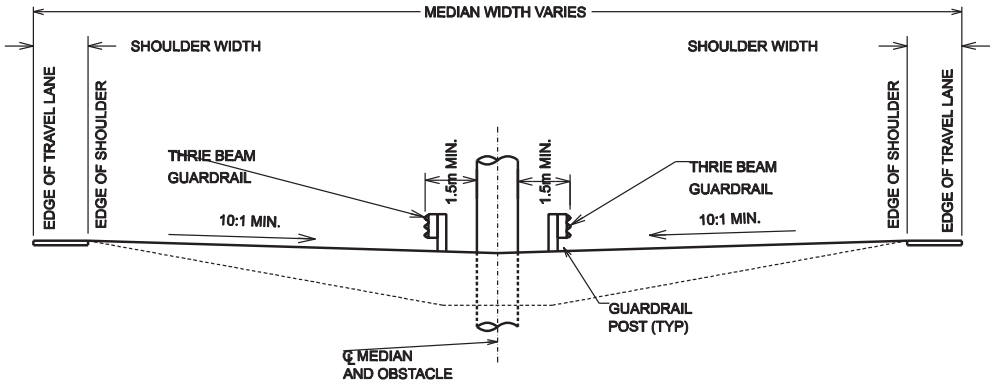
TYPICAL STRONG POST W-BEAM OR MODIFIED THRIE BEAM GUARDRAIL PLACEMENT FOR MEDIAN HAZARDS

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.18a

THIS PAGE INTENTIONALLY LEFT BLANK



PIER AT ℄ OF MEDIAN
PLAN VIEW



SECTION A-A

NOTES:

SUITABLE DRAINAGE MUST BE PROVIDED WHEN MEDIAN GRADING IMPEDES NORMAL FLOW.

ALL DIMENSIONS SHOWN ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.

No.	REVISIONS	BY	DATE
⚠2	THRIE BEAM ADDED AND TITLE REVISED	B.K.	18 JUN 07
⚠1	DWG. REFERENCE ·	B.K.	06/15/06

Approved:
Original signed by
Allan Kwan
Executive Director,
Technical Standards Branch
Date: JUNE 24, 2005

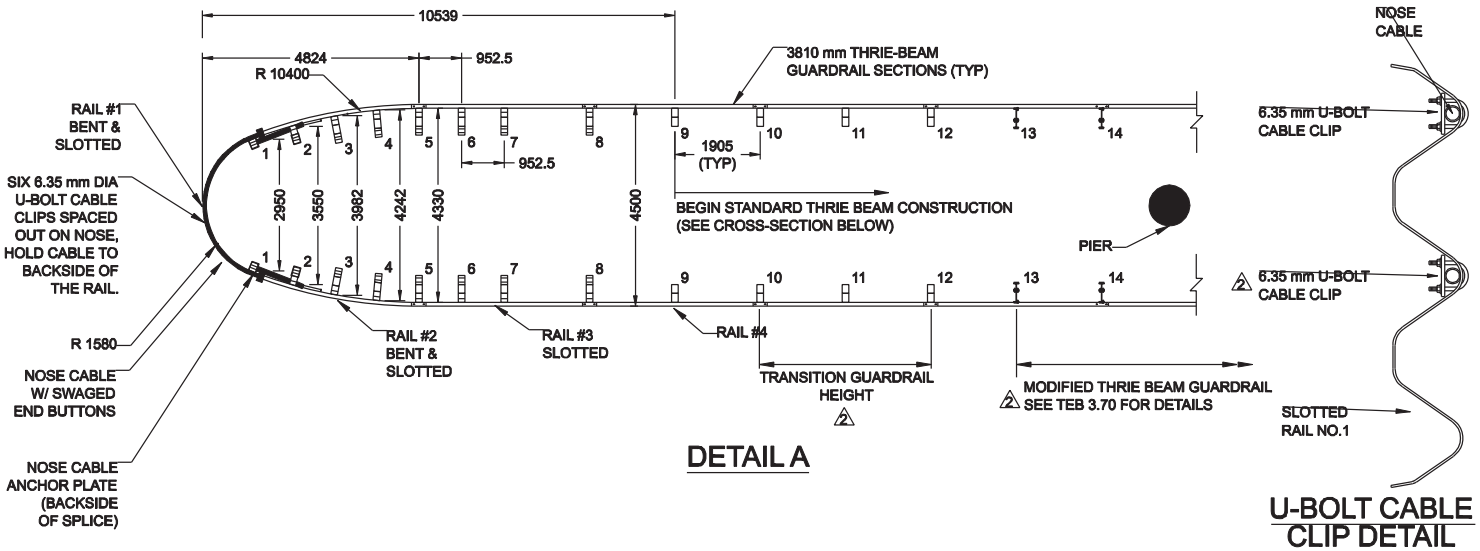
Effective Date: JULY 12, 2005

Alberta
INFRASTRUCTURE AND
TRANSPORTATION

BULLNOSE GUARDRAIL SYSTEM PROTECTION OF PIERS IN MEDIANS

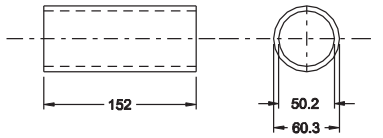
SHEET 1 of 9 ⚠2

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.60-1

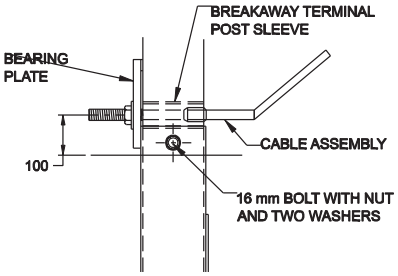


DETAIL A

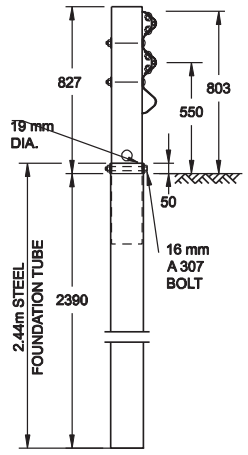
U-BOLT CABLE CLIP DETAIL



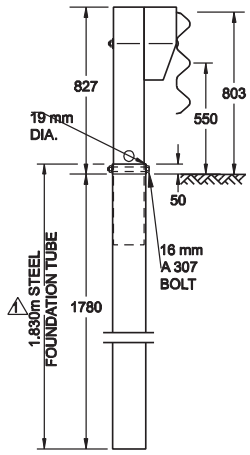
BREAKAWAY TERMINAL POST SLEEVE



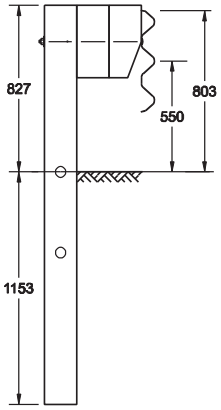
POST 1 DETAIL



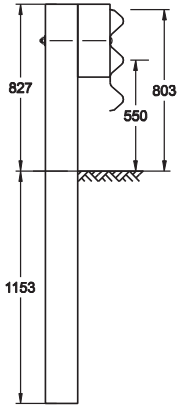
THRIE BEAM BCT POST
W/ 2440 mm FOUNDATION TUBE
POST 1



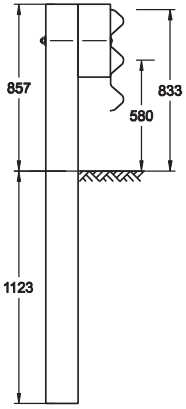
THRIE BEAM BCT POST
W/ 1830 mm FOUNDATION TUBE AND 360 mm TAPERED BLOCK
POST 2



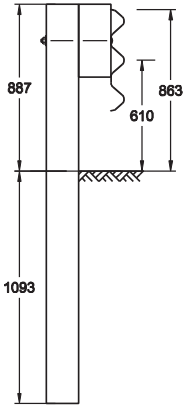
THRIE BEAM CRT* POST
1980 mm LONG
W/ 360 mm BLOCK AND
360 mm TAPERED BLOCK
POSTS 3, 4, 5, 6, 7, 8



THRIE BEAM POST
1980 mm LONG W/ 360 mm BLOCK
POSTS 9 AND 10
2



THRIE BEAM POST
1980 mm LONG W/ 360 mm BLOCK
POST 11
2



THRIE BEAM POST
1980 mm LONG W/ 360 mm BLOCK
POSTS 12
2

POST DETAILS

* CRT DENOTES CONTROLLED RELEASE TERMINAL 2

NOTES:

THRIE BEAM BASE METAL THICKNESS = 2.7mm

ALL DIMENSIONS SHOWN ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.

No.	REVISIONS	BY	DATE
3	.	.	.
2	POST DETAILS AND TITLE REVISED AND CRT NOTE ADDED	B.K.	18 JUN 07
1	FOUNDATION TUBE LENGTH	B.K.	11/04/05

Approved:

Original signed by Allan Kwan

Executive Director, Technical Standards Branch

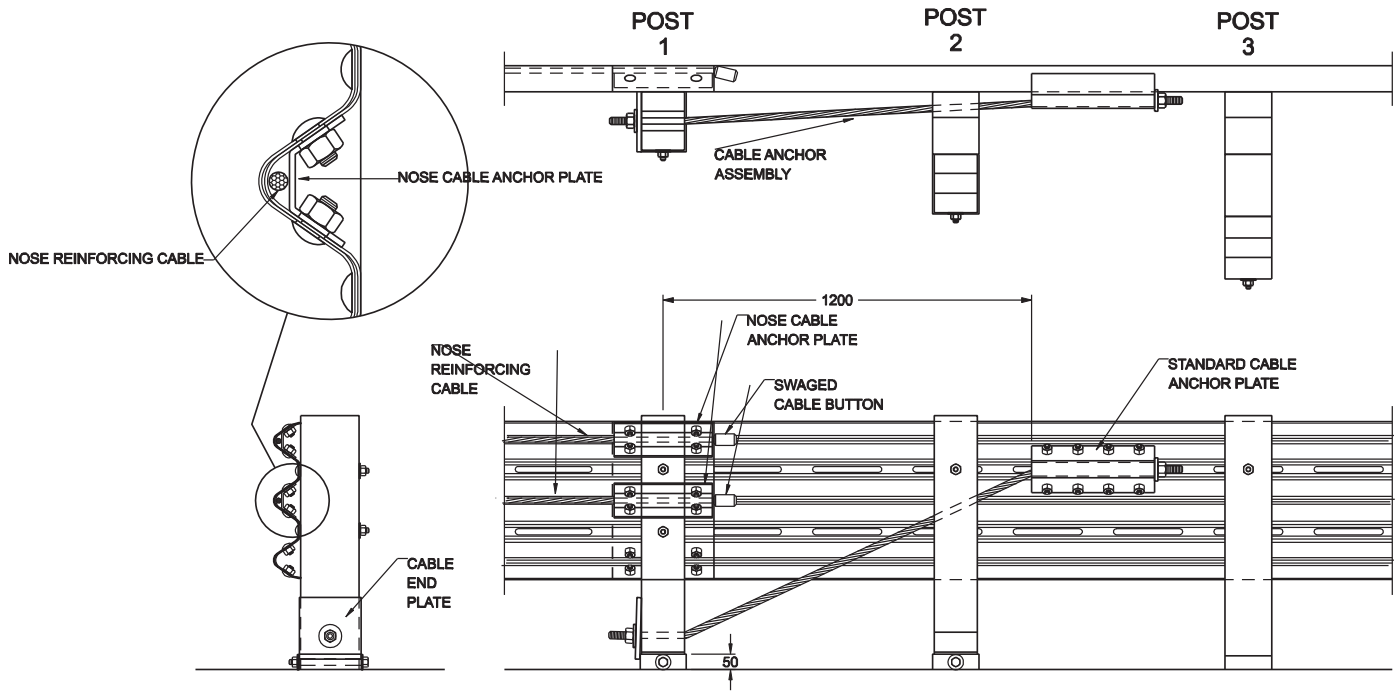
Date: JUNE 24, 2005

JULY 12, 2005

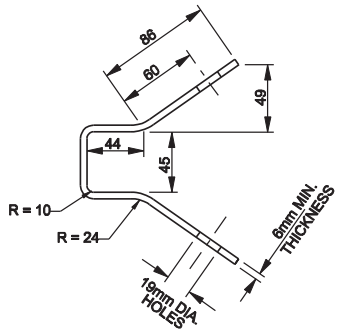
Alberta INFRASTRUCTURE AND TRANSPORTATION

BULLNOSE GUARDRAIL SYSTEM PROTECTION OF PIERS IN MEDIANS SHEET 2 of 9

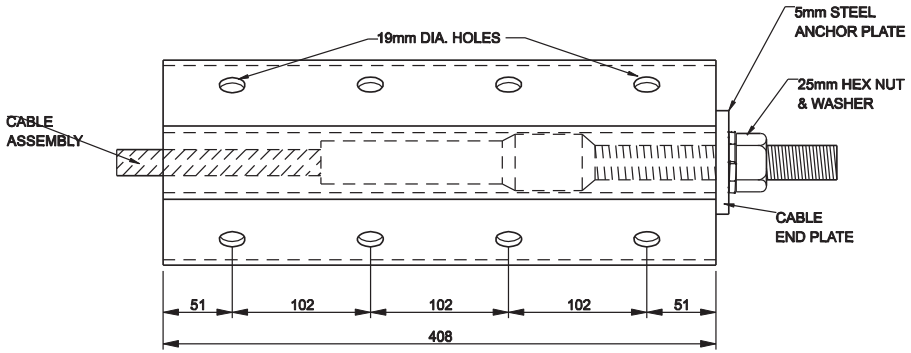
Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.60-2



DETAIL 'B'



END VIEW



DETAILS OF STANDARD CABLE ANCHOR PLATE

NOTE:

ALL DIMENSIONS SHOWN ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.

No.	REVISIONS	BY	DATE
2	·	·	·
1	TITLE REVISED ·	B.K	18 JUN 07

Approved:
Original signed by
Allan Kwan
Executive Director,
Technical Standards Branch
Date: JUNE 24, 2005

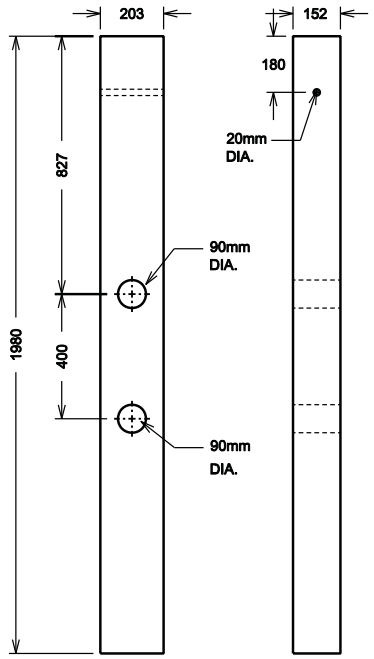
Effective Date: JULY 12, 2005

Alberta
INFRASTRUCTURE AND TRANSPORTATION

BULLNOSE GUARDRAIL SYSTEM CABLE ANCHOR

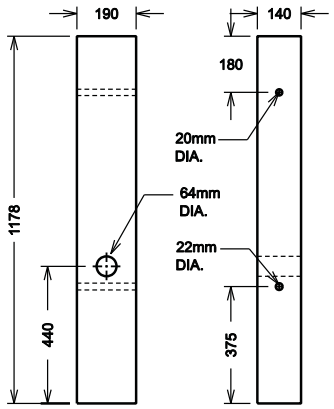
SHEET 3 of 9 ⚠1

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.60-3

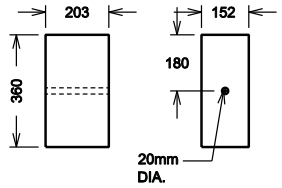


THRIE BEAM CRT* POSTS

* CRT DENOTES CONTROLLED RELEASE TERMINAL ⚠1

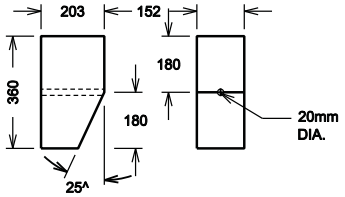


THRIE BEAM ANCHOR POSTS



POSTS 3 THROUGH 12
STANDARD BLOCKS

⚠1



TAPERED BLOCKS FOR POSTS
2 - 8

⚠1

NOTES:

CRT, ANCHOR AND BLOCK POSTS ARE WOOD.

ALL DIMENSIONS SHOWN ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.

No.	REVISIONS	BY	DATE
⚠2			
⚠1	BLOCK DETAILS AND TITLE REVISED AND CRT NOTE ADDED	B.K.	18 JUN 07

Approved:

Original signed by
Allan Kwan

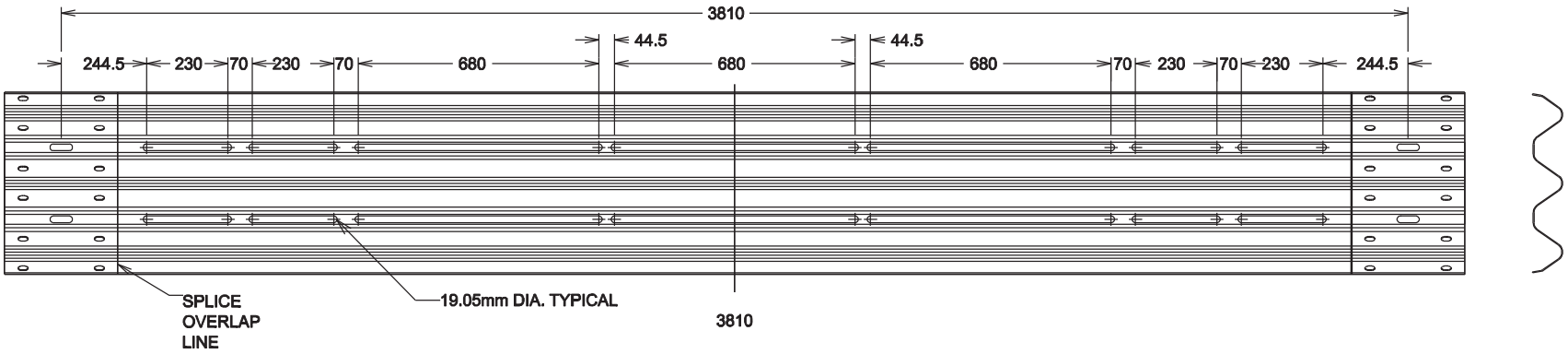
Executive Director,
Technical Standards Branch
Date: JUNE 24, 2005

Effective Date: JULY 12, 2005

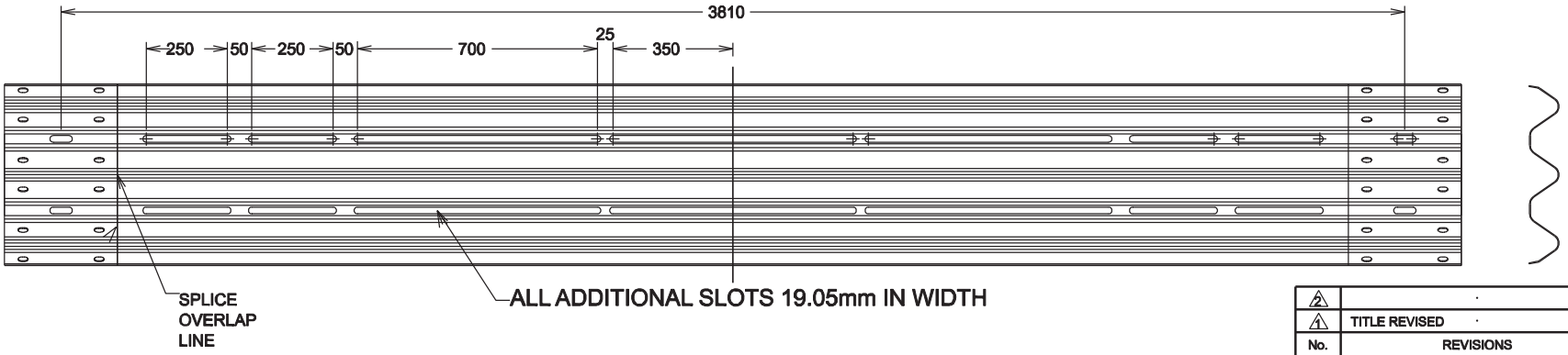
Alberta
INFRASTRUCTURE AND TRANSPORTATION

BULLNOSE GUARDRAIL SYSTEM
POSTS & BLOCKS
SHEET 4 of 9 ⚠1

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.60-4



RAIL SECTION 1 ("NOSE" SECTION)



RAIL SECTION 1 ("NOSE" SECTION)

NOTE:

ALL DIMENSIONS SHOWN ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.

No.	REVISIONS	BY	DATE
2			
1	TITLE REVISED	B.K.	18 JUN 07

Approved:

Original signed by
Allan Kwan

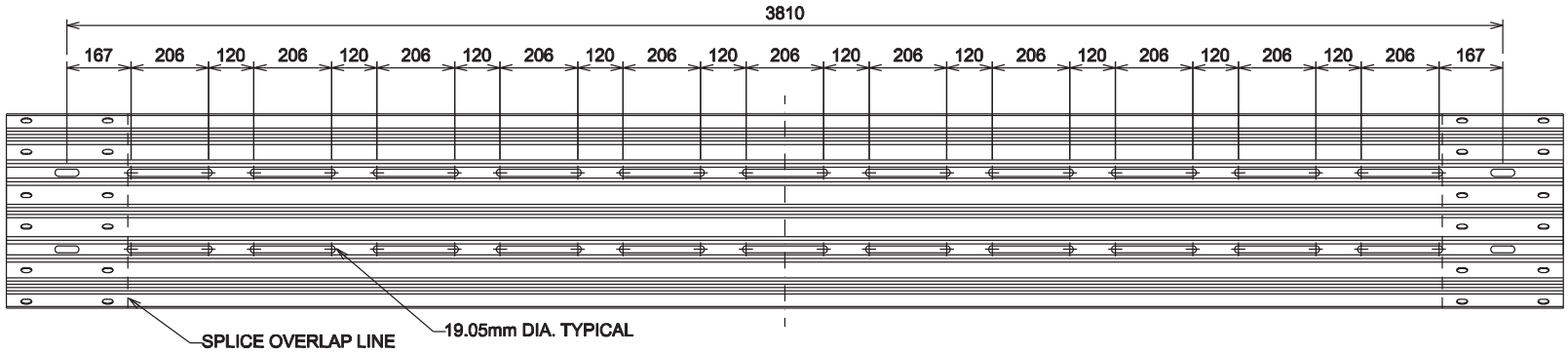
Executive Director,
Technical Standards Branch
Date: JUNE 24, 2005

Effective Date: JULY 12, 2005

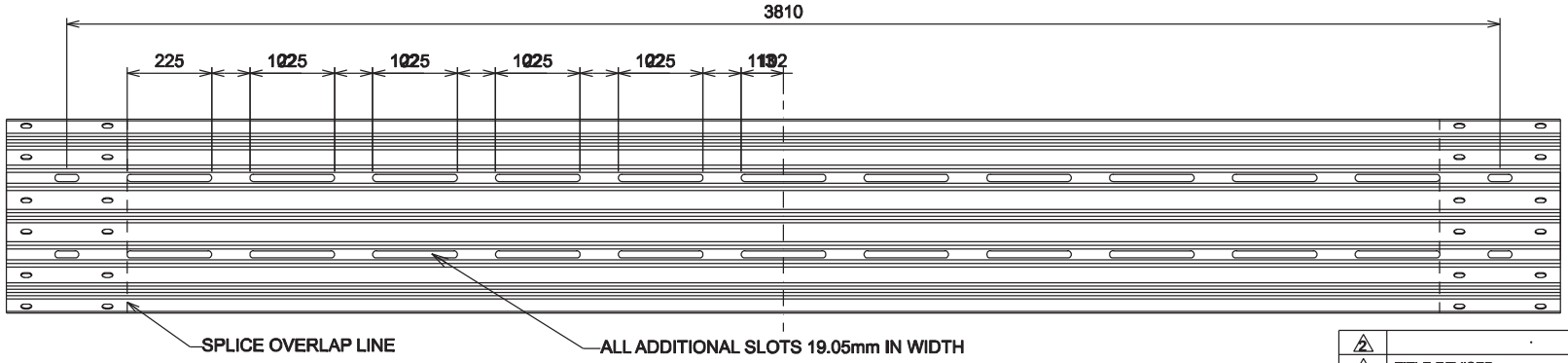
Alberta
INFRASTRUCTURE AND TRANSPORTATION

BULLNOSE GUARDRAIL SYSTEM
RAIL SECTION 1
SHEET 5 of 9 1

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.60-5



RAIL SECTION 2



RAIL SECTION 2

NOTE:

ALL DIMENSIONS SHOWN ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.

No.	REVISIONS	BY	DATE
2			
1	TITLE REVISED	B.K.	18 JUN 07

Approved:

Original signed by
Allan Kwan

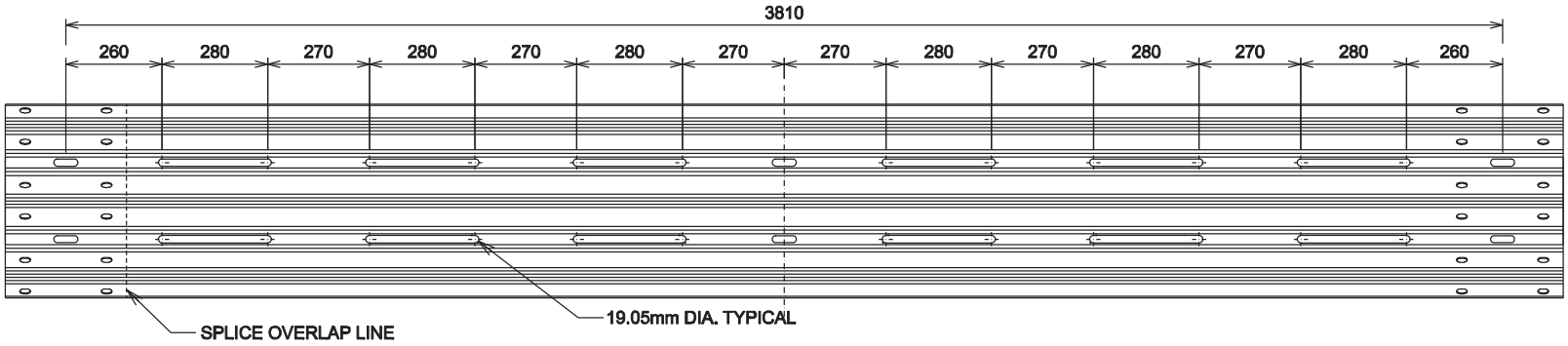
Executive Director,
Technical Standards Branch
Date: JUNE 24, 2005

Effective Date: JULY 12, 2005

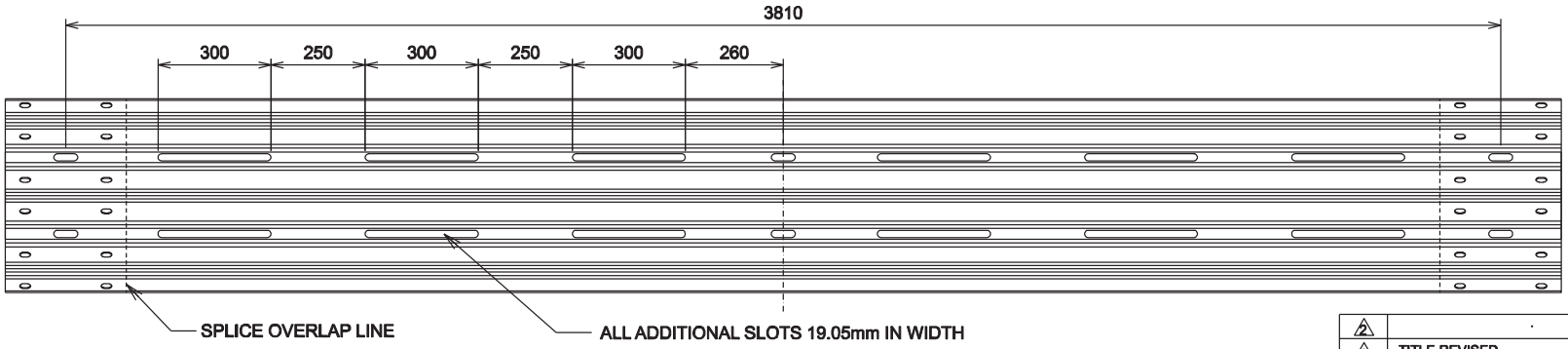
Alberta
INFRASTRUCTURE AND TRANSPORTATION

BULLNOSE GUARDRAIL SYSTEM
RAIL SECTION 2
SHEET 6 of 9 ⚠1

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.60-6



RAIL SECTION 3



RAIL SECTION 3

NOTE:

ALL DIMENSIONS SHOWN ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.

No.	REVISIONS	BY	DATE
2			
1	TITLE REVISED	B.K.	18 JUN 07

Approved:

Original signed by
Allan Kwan

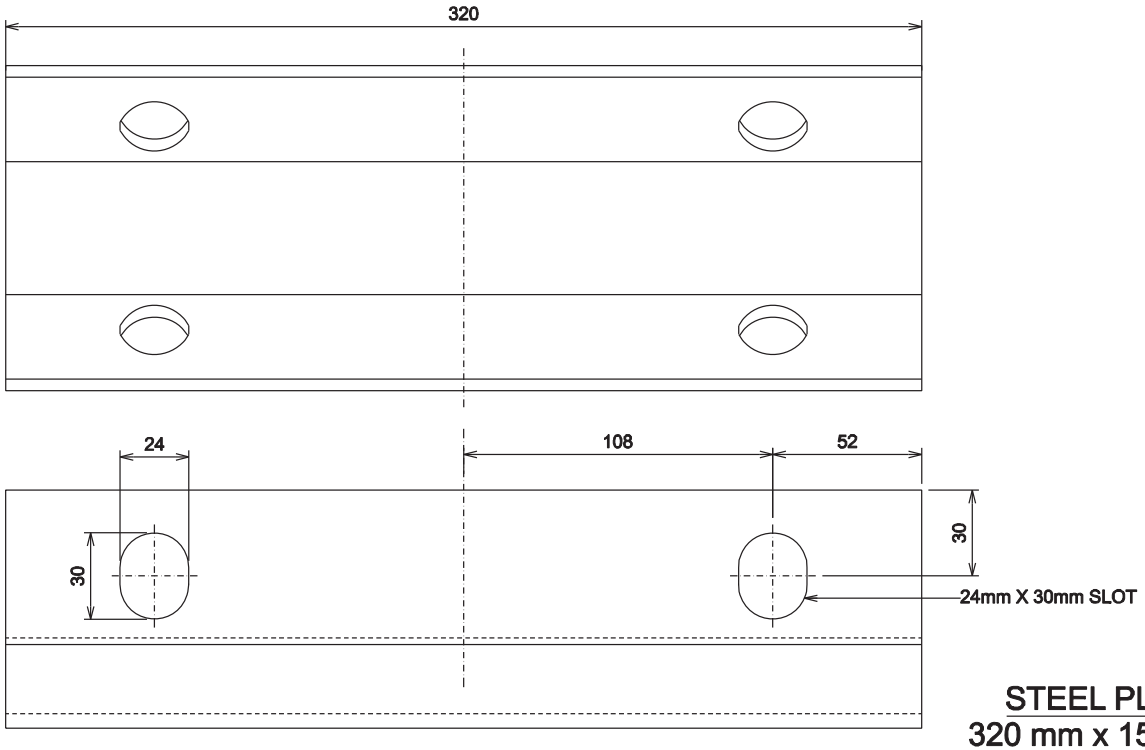
Executive Director,
Technical Standards Branch
Date: JUNE 24, 2005

Effective Date: JULY 12, 2005

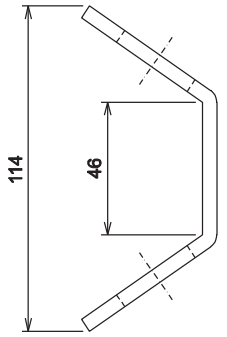
Alberta
INFRASTRUCTURE AND TRANSPORTATION

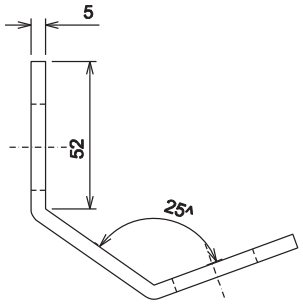
BULLNOSE GUARDRAIL SYSTEM
RAIL SECTION 3
SHEET 7 of 9 ⚠1

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.60-7



STEEL PLATE, A306
320 mm x 150 mm x 5 mm

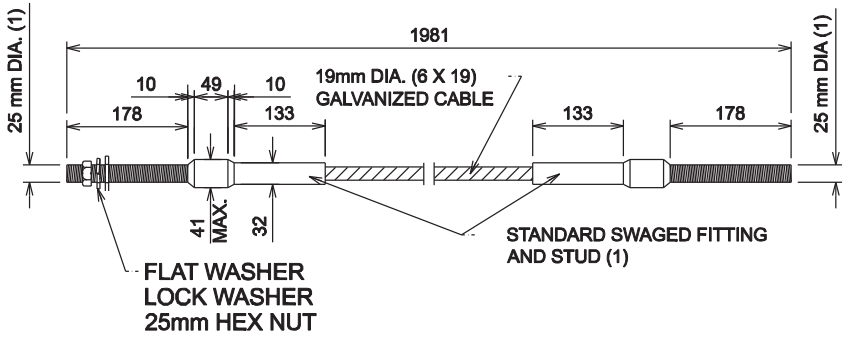




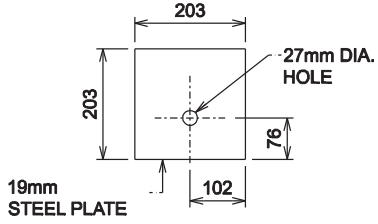
NOTE:

ALL DIMENSIONS SHOWN ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.

(1) STUD, THREADED ENTIRE LENGTH.



DETAIL OF CABLE ASSEMBLY



DETAIL OF
STEEL BEARING PLATE

No.	REVISIONS	BY	DATE
2	·	·	·
1	TITLE REVISED ·	B.K.	18 JUN 07

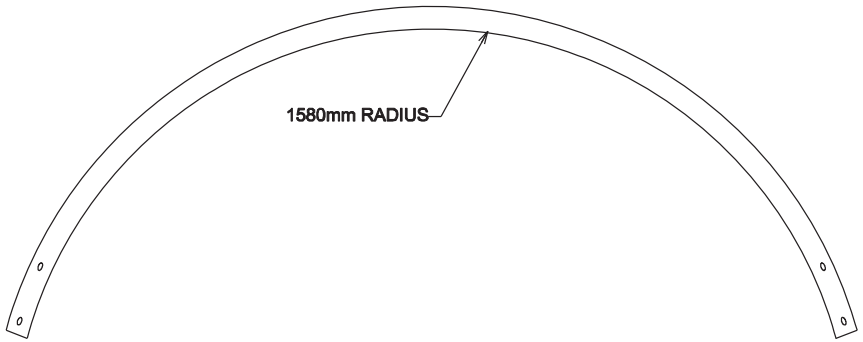
Approved:
Original signed by
Allan Kwan
Executive Director,
Technical Standards Branch
Date: JUNE 24, 2005

Effective Date: JULY 12, 2005

Alberta
INFRASTRUCTURE AND TRANSPORTATION

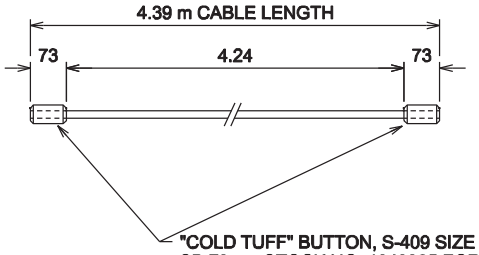
BULLNOSE GUARDRAIL SYSTEM PLATES AND CABLE ASSEMBLY SHEET 8 of 9 ⚠1

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.60-8

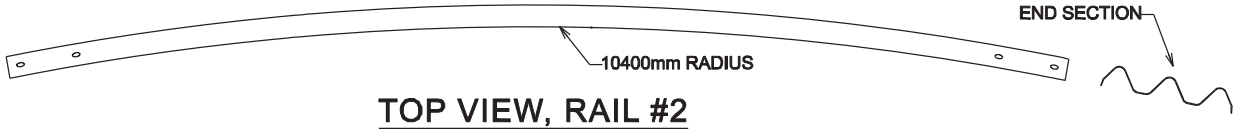


TOP VIEW, RAIL #1

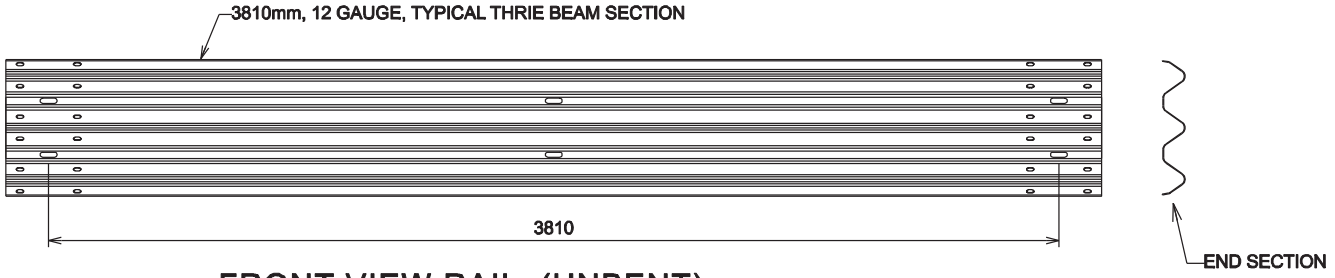
END SECTION



"COLD TUFF" BUTTON, S-409 SIZE NO. 12 SB 73mm STOCK NO. 1040395 FOR 15.9mm DIA (7 x 19) WIRE ROPE (OR ANY SIMILARLY SIZED SWAGE-GRIP BUTTON FERRULES)



TOP VIEW, RAIL #2



FRONT VIEW RAIL (UNBENT)

NOTE:

ALL DIMENSIONS SHOWN ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.

No.	REVISIONS	BY	DATE
2	·	·	·
1	TITLE REVISED ·	B.K.	18 JUN 07

Approved:

Original signed by
Allan Kwan

Executive Director,
Technical Standards Branch
Date: JUNE 24, 2005

Effective Date: JULY 12, 2005

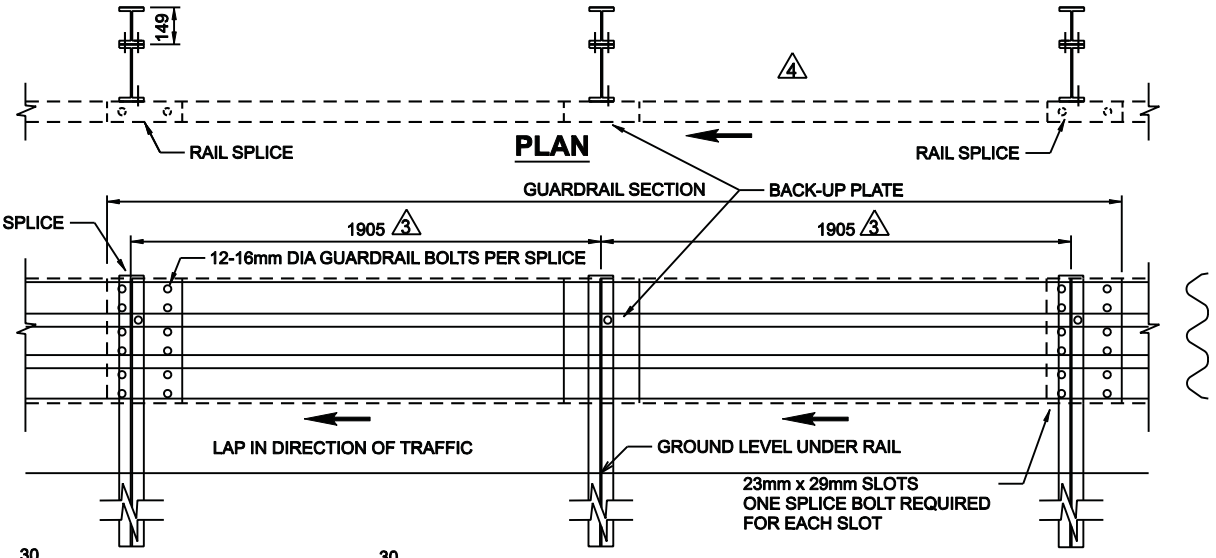
Alberta
INFRASTRUCTURE AND TRANSPORTATION

BULLNOSE GUARDRAIL SYSTEM THRIE BEAM AND CABLE LENGTH

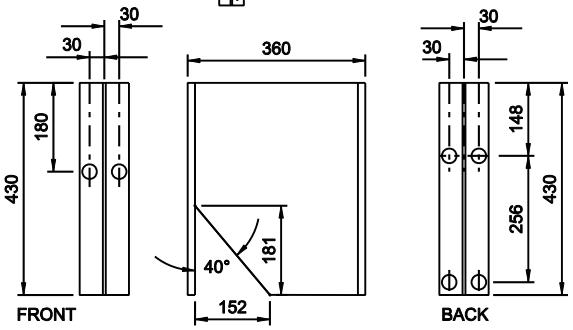
SHEET 9 of 9 1

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: TEB 3.60-9

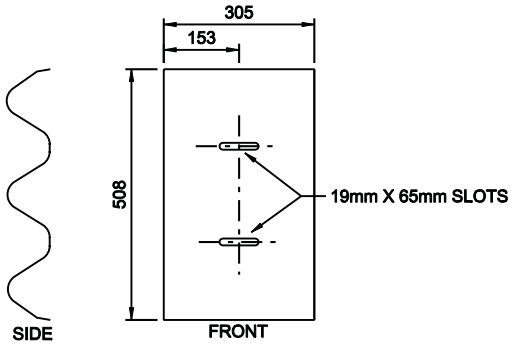
THIS PAGE LEFT INTENTIONALLY BLANK



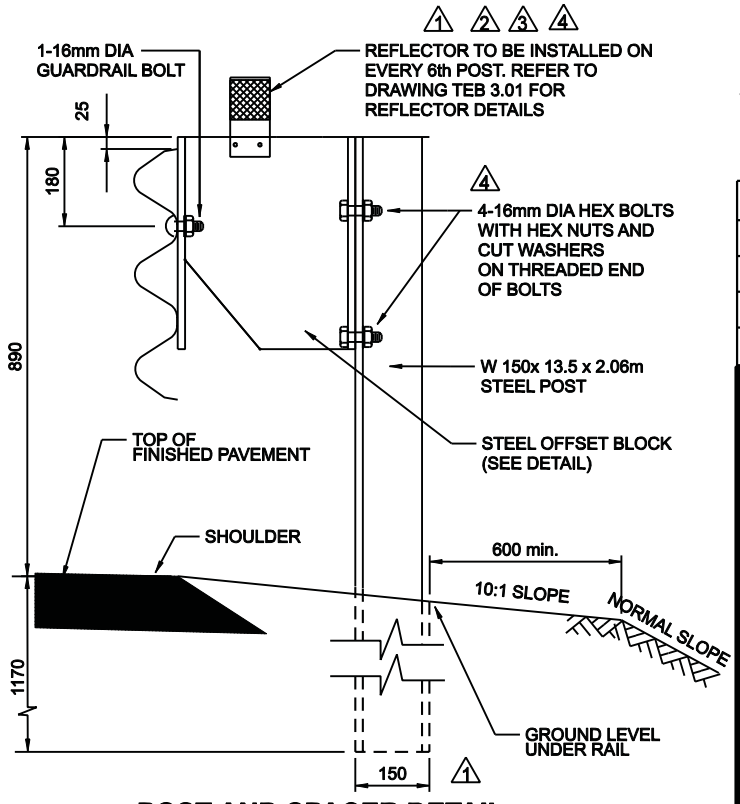
ELEVATION



M360 x 25.6 STEEL STEEL OFFSET BLOCK



THRIE BEAM BACK-UP PLATE DETAILS



POST AND SPACER DETAIL

BOLTS ARE TO BE INSTALLED AS SHOWN SO THAT THE THREADED END OF THE BOLTS AND NUTS ARE PLACED AWAY FROM TRAFFIC SIDE OF RAIL.

Notes: 4

1. ALL HARDWARE TO BE HOT-DIP GALVANIZED
2. DETAILS ARE NOT TO SCALE
3. DIRECTION OF TRAFFIC INDICATED BY ←
4. REFER TO A.T. ROADSIDE DESIGN GUIDE FOR DESIGN TOLERANCE OF INSTALLATION HEIGHT.
5. 10:1 SLOPE CAN BE CONSTRUCTED IN THE PAVEMENT SIDESLOPE ZONE WITH ACP, GBC AND/OR APPROVED FREE DRAINING MATERIAL AS DIRECTED BY THE ENGINEER.

No.	REVISIONS	BY	DATE
4	REFLECTOR NOTE, NUMBER AND TYPE OF BOLTS AND NOTES.	P.M.	8 JUL 09
3	REFLECTOR NOTE & POST SPACING REVISED	B.K.	5 JUN 07
2	REFLECTOR NOTE REVISED	B.K.	08/11/06
1	DIMENSION AND REFLECTOR DETAILS	B.K.	12/07/05

Approved:

Original signed by
Allan Kwan

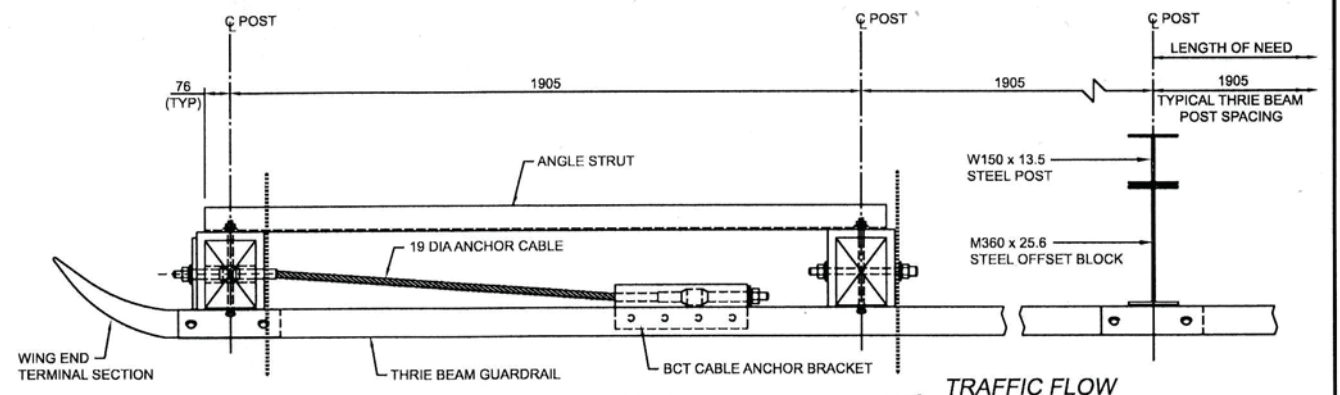
Executive Director,
Technical Standards Branch

Date: January, 2005

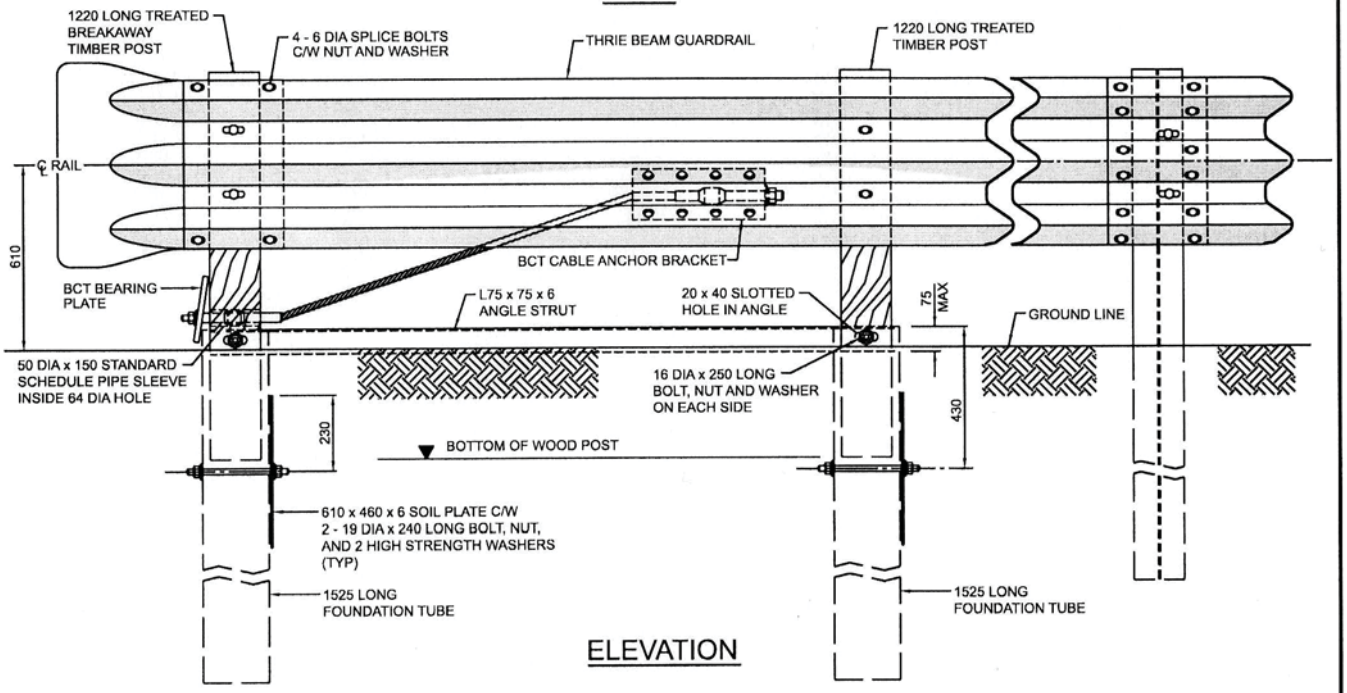
Alberta Transportation

MODIFIED THRIE BEAM GUARDRAIL

Prepared By:	Checked By:	Scale:	Dwg No.:
M.T	B.K	N.T.S.	TEB 3.70



PLAN



ELEVATION

NOTES:

1. THIS END TREATMENT IS ACCEPTABLE FOR USE ON THE LEAVING END OF DIVIDED ROADWAYS ONLY. USE IN MEDIAN APPLICATIONS ARE LIMITED TO INSTALLATIONS OUTSIDE THE CLEAR ZONE OF OPPOSING TRAFFIC.
2. POSTS ARE TO BE SET BY INSTRUMENT FOR ALIGNMENT AND GRADE.
3. BCT CABLE ANCHOR HARDWARE SHALL CONFORM TO AASHTO TASK FORCE 13 REPORT "A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE."
4. LAP ALL GUARDRAIL SECTIONS IN THE DIRECTION OF TRAFFIC FLOW.
5. ALL REQUIRED FITTINGS AND HARDWARE SHALL BE GALVANIZED.
6. CABLE ANCHOR SHALL BE TIGHTENED DURING INSTALLATION TO TAKE OUT ANY SLACK.
7. REFER TO RGD-B5.3 AND RDG-B5.4 FOR STANDARD HARDWARE DETAILS.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE
2			
1			

Approved:

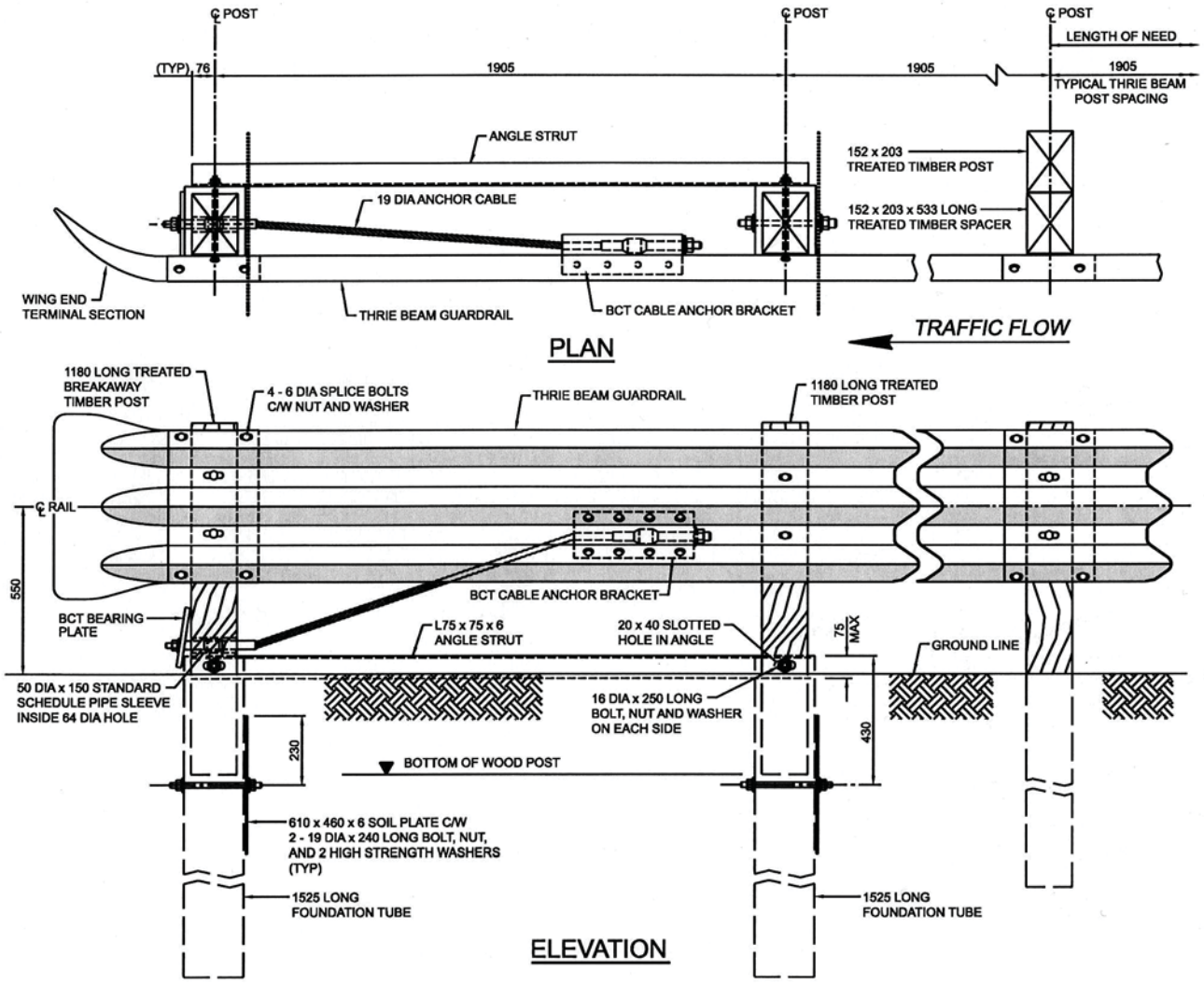
Executive Director,
Technical Standards Branch

Date: NOVEMBER, 2007

Alberta
INFRASTRUCTURE AND TRANSPORTATION

MODIFIED THRIE BEAM CABLE ANCHOR TERMINAL WITH WING END (EXIT END TREATMENT FOR DIVIDED HIGHWAYS)

Prepared By: MO	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B5.1



NOTES:

1. THIS END TREATMENT IS ACCEPTABLE FOR USE ON THE LEAVING END OF DIVIDED ROADWAYS ONLY. USE IN MEDIAN APPLICATIONS ARE LIMITED TO INSTALLATIONS OUTSIDE THE CLEAR ZONE OF OPPOSING TRAFFIC.
2. POSTS ARE TO BE SET BY INSTRUMENT FOR ALIGNMENT AND GRADE.
3. BCT CABLE ANCHOR HARDWARE SHALL CONFORM TO AASHTO TASK FORCE 13 REPORT "A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE."
4. LAP ALL GUARDRAIL SECTIONS IN THE DIRECTION OF TRAFFIC FLOW.
5. ALL REQUIRED FITTINGS AND HARDWARE SHALL BE GALVANIZED.
6. CABLE ANCHOR SHALL BE TIGHTENED DURING INSTALLATION TO TAKE OUT ANY SLACK.
7. REFER TO RGD-B1.2 AND RDG-B1.3 FOR STANDARD HARDWARE DETAILS.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE
2			
1			

Approved:

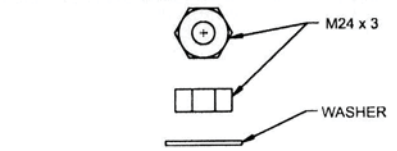
Executive Director,
Technical Standards Branch

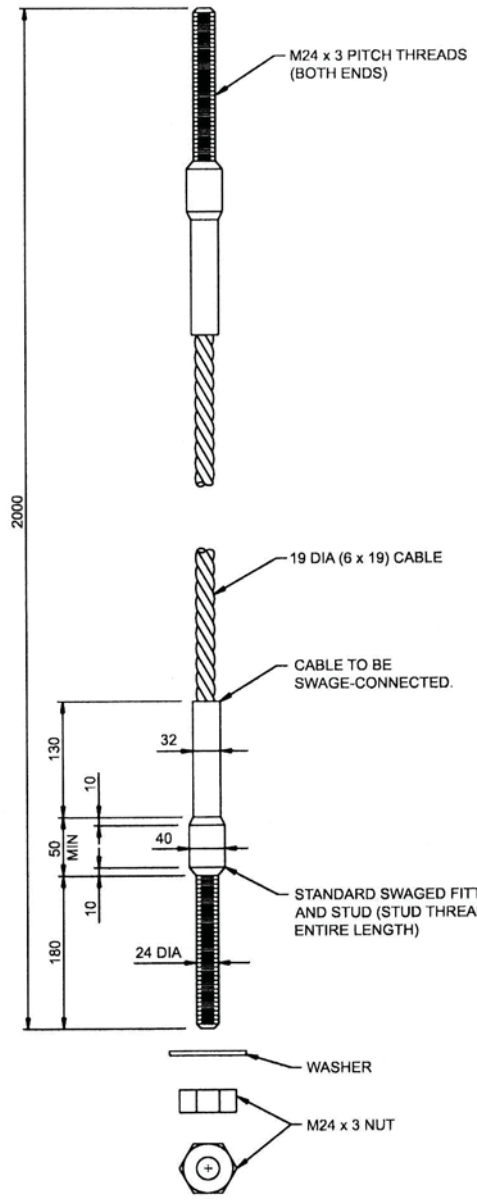
Date: NOVEMBER, 2007

Alberta
INFRASTRUCTURE AND TRANSPORTATION

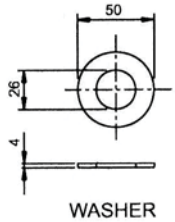
STANDARD THRIE BEAM CABLE ANCHOR TERMINAL WITH WING END (EXIT END TREATMENT FOR DIVIDED HIGHWAYS)

Prepared By: MO	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B5.2

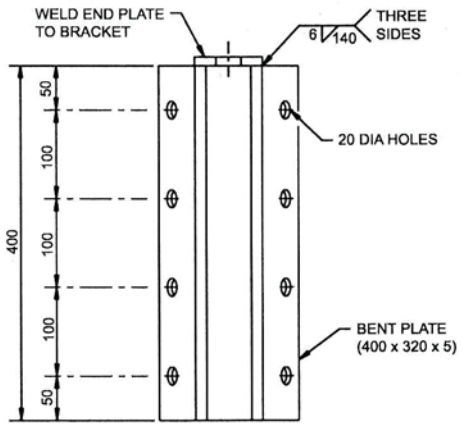


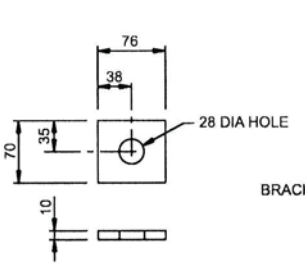


BCT CABLE ANCHOR ASSEMBLY

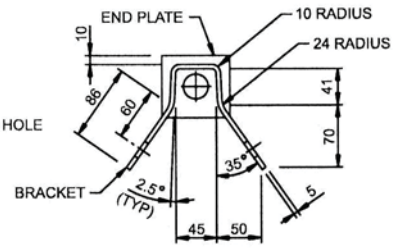


WASHER



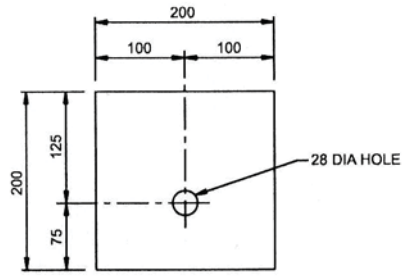


END PLATE



BRACKET

BCT CABLE ANCHOR BRACKET



200 x 200 x 16 BCT BEARING PLATE

No.	REVISIONS	BY	DATE
2			
1			

Approved:

Executive Director,
Technical Standards Branch

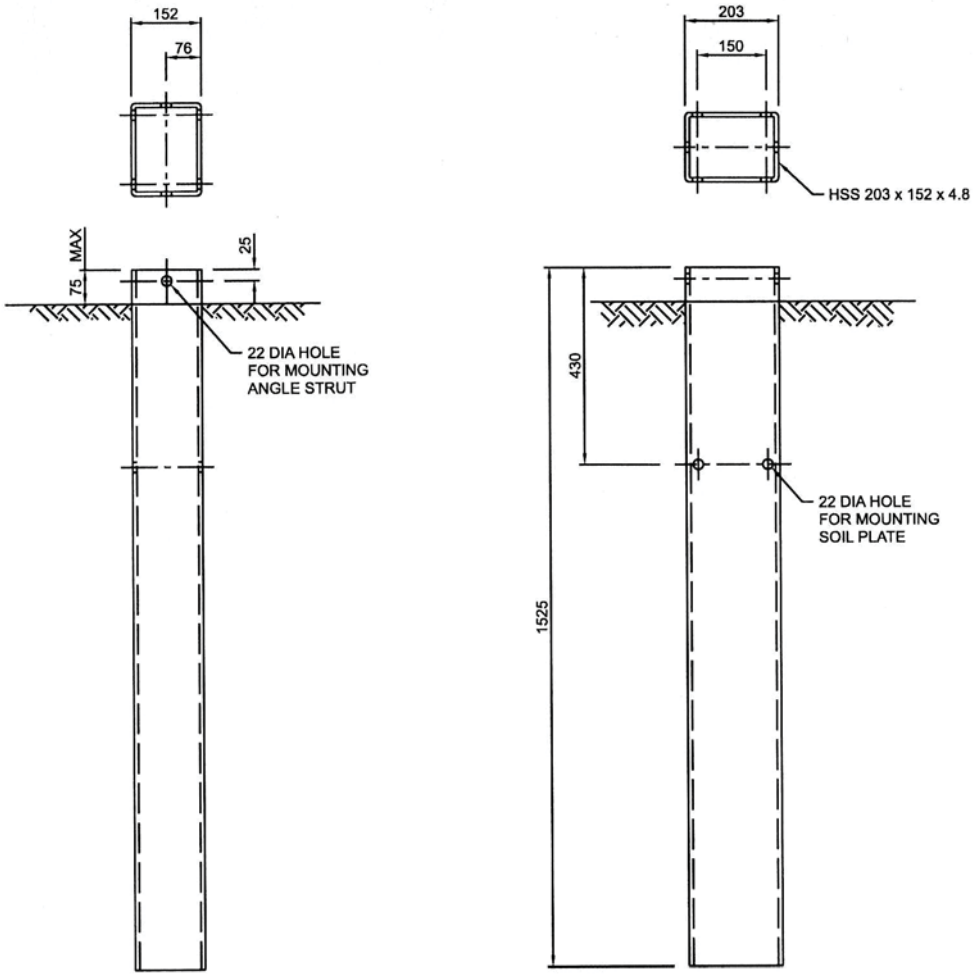
Date: NOVEMBER, 2007

Alberta
INFRASTRUCTURE AND
TRANSPORTATION

HARDWARE DETAILS FOR W-BEAM AND THRIE BEAM GUARDRAIL CABLE ANCHOR TERMINAL

Prepared By: MO	Checked By: WS	Scale: NTS	Dwg No.: RDG-B5.3

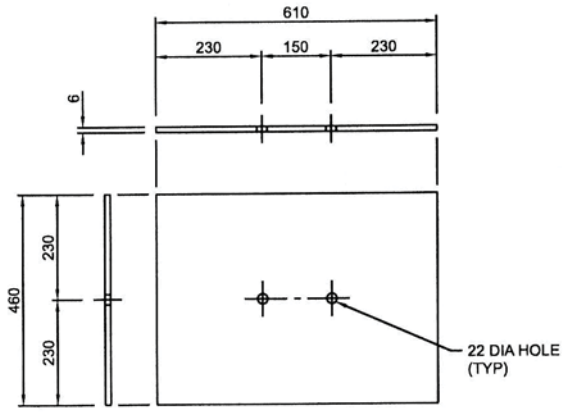
ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.



FOUNDATION TUBE

NOTE:

WOOD POST SHOULD BE ABLE TO SLIDE INTO THE TOP OF FOUNDATION TUBE SO THE ACTUAL INSIDE DIMENSIONS OF FOUNDATION TUBE CAN NOT BE LESS THAN 190x140.



FOUNDATION TUBE SOIL PLATE

No.	REVISIONS	BY	DATE
2			
1			

Approved:

Executive Director,
Technical Standards Branch

Date: NOVEMBER, 2007

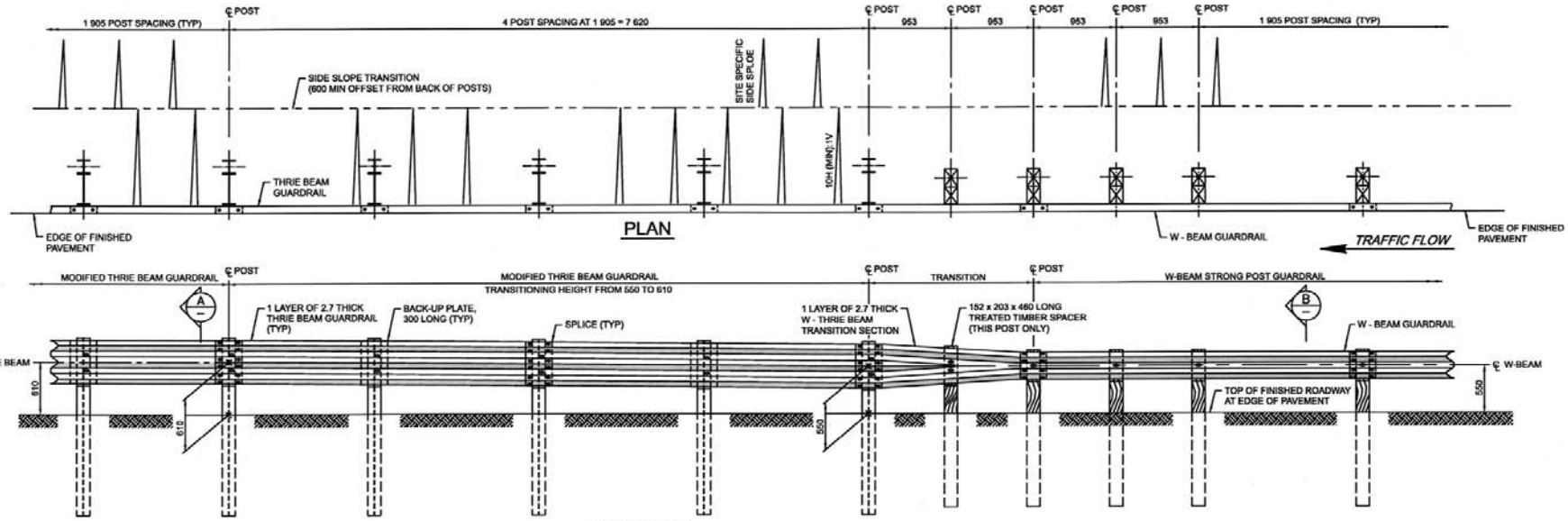
Alberta
INFRASTRUCTURE AND TRANSPORTATION

FOUNDATION TUBE AND FOUNDATION TUBE SOIL PLATE DETAILS FOR W-BEAM AND THRIE BEAM CABLE ANCHOR TERMINAL

Prepared By: MO	Checked By: WS	Scale: NTS	Dwg No.: RDG-B5.4

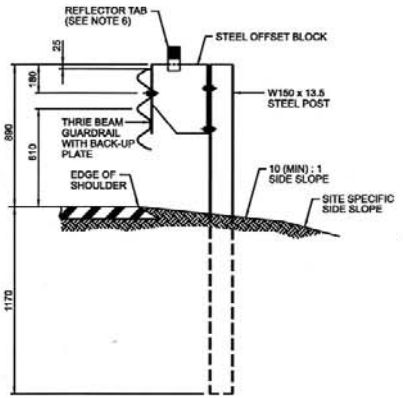
ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

THIS PAGE INTENTIONALLY LEFT BLANK

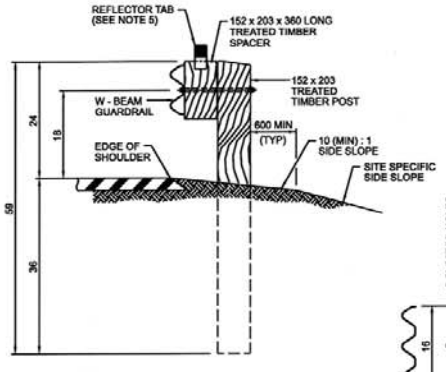


PLAN

ELEVATION



SECTION A
(FOR DETAILS SEE TEB DRAWING 3.70)

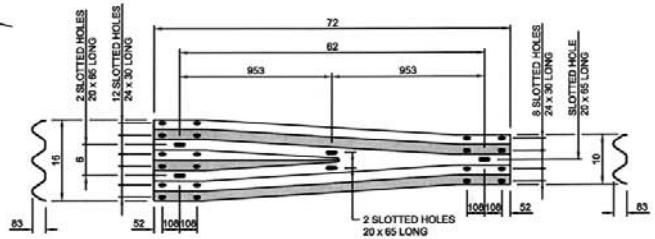


SECTION B
(FOR DETAILS SEE TEB DRAWING 3.09)

POST DETAILS

NOTES:

1. POSTS SHALL TO SET BY INSTRUMENT FOR ALIGNMENT AND GRADE.
2. THE ACCEPTABLE TOLERANCE FOR HEIGHT OF GUARDRAIL AT TIME OF CONSTRUCTION OR MAINTENANCE SHALL BE IN ACCORDANCE WITH THE MOST RECENT SPECIFICATIONS.
3. LAP ALL JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
4. ALL FITTINGS AND HARDWARE REQUIRED SHALL BE GALVANIZED.
5. STRAIGHT WHITE DOUBLE SIDED DIAMOND GRADE 127 x 76 REFLECTOR FROM DAVIDSON TRAFFIC CONTROL PRODUCTS OR APPROVED EQUIVALENT. FASTEN TO TOP OF EVERY SIXTH GUARDRAIL STRONG POST BY MECHANICAL MEANS SUSH AS NAILING OR STAPLING. ADHESIVES ALONE WILL NOT BE ACCEPTED.
6. STRAIGHT WHITE DOUBLE SIDED DIAMOND GRADE 127 x 76 REFLECTOR FROM DAVIDSON TRAFFIC CONTROL PRODUCTS OR APPROVED EQUIVALENT. FASTEN TO TOP OF EVERY SIXTH GUARDRAIL STEEL OFFSET BLOCK WITH APPROVED ADHESIVE.
7. THIS DESIGN MAY BE CONSIDERED TO MEET NCHRP REPORT 350 TL-3 EVALUATION CRITERIA.



W - THRIE BEAM TRANSITION SECTION

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE
2	.	.	.
1	.	.	.

Approved:

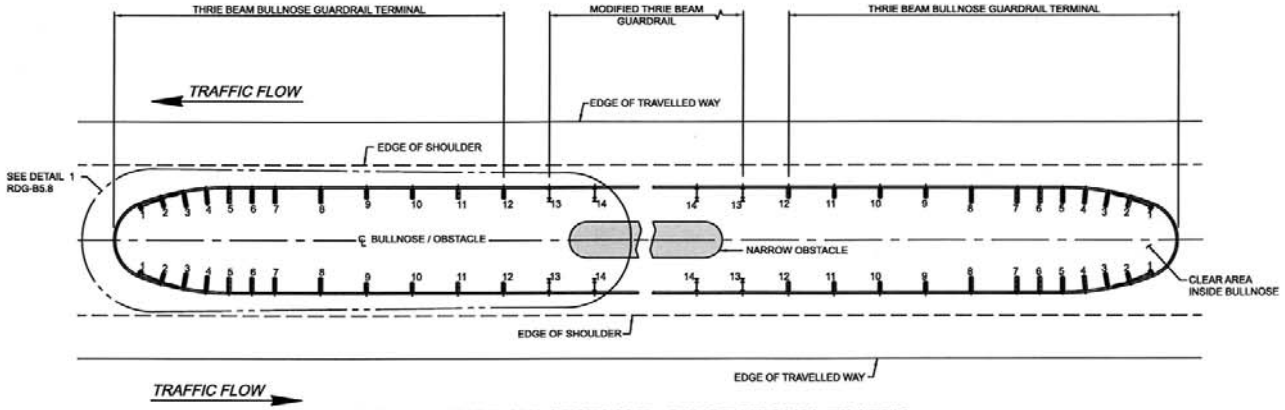
Executive Director,
Technical Standards Branch

Date: NOVEMBER, 2007

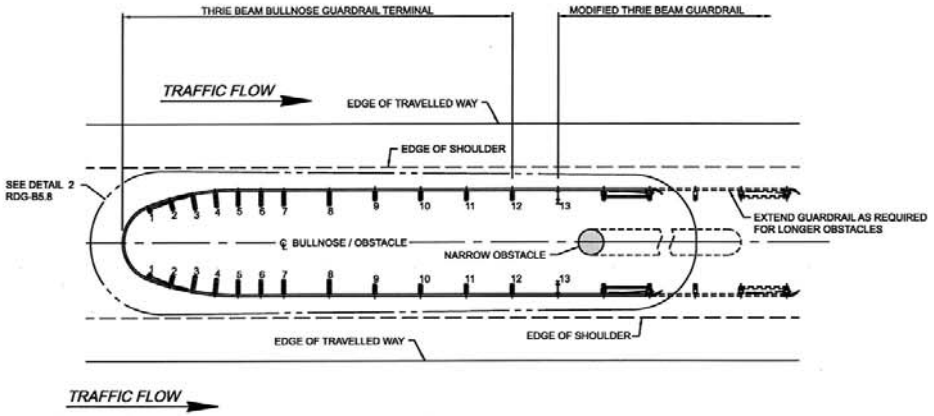
Alberta
INFRASTRUCTURE AND TRANSPORTATION

TL-3 TRANSITION FROM MODIFIED THRIE-BEAM GUARDRAIL TO W-BEAM STRONG POST GUARDRAIL

Prepared By: MO	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B5.5



LAYOUT A - NARROW OBSTACLE - BIDIRECTIONAL TRAFFIC



LAYOUT B - NARROW OBSTACLE - UNIDIRECTIONAL TRAFFIC

NOTES:

1. LAP ALL JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
2. POSTS SHALL BE SET BY INSTRUMENT FOR ALIGNMENT AND GRADE.
3. THE ACCEPTABLE TOLERANCE FOR HEIGHT OF GUARDRAIL AT TIME OF CONSTRUCTION OR MAINTENANCE SHALL BE IN ACCORDANCE WITH THE MOST RECENT SPECIFICATIONS.
4. ALL FITTINGS AND HARDWARE SHALL BE GALVANIZED.
5. FLARE RATE SHALL BE SPECIFIED WITHIN THE LIMITS SET BY THE MANUFACTURER OF THE CHOSEN CRASH WORTHY END TERMINAL TO MEET THE REQUIREMENTS OF NCHRP REPORT 350 FOR TEST LEVEL 3 (TL-3).
6. THE BULLNOSE GUARDRAIL SYSTEM SATISFIES THE REQUIREMENTS OF NCHRP REPORT 350 FOR TEST LEVEL 3 (TL-3) AND IS THEREFORE APPLICABLE FOR USE ON HIGH SPEED ROAD FACILITIES.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE
2			
1			

Approved:

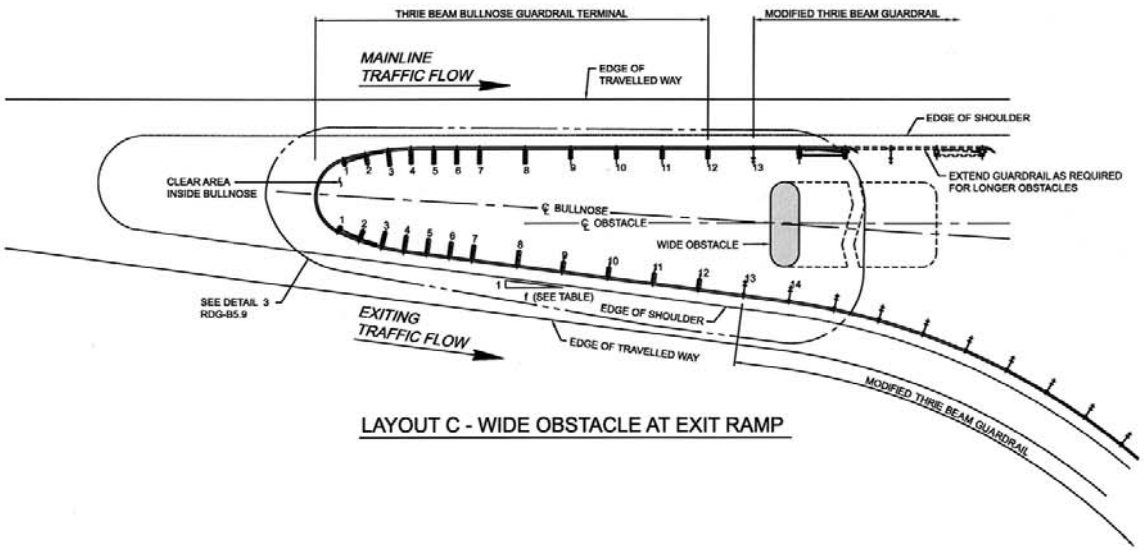
Executive Director,
Technical Standards Branch

Date: NOVEMBER, 2007

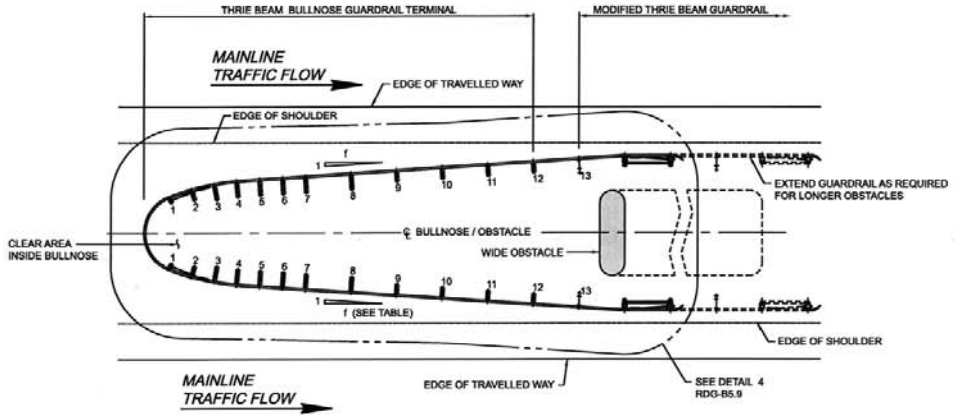
Alberta
INFRASTRUCTURE AND TRANSPORTATION

THRIE BEAM BULLNOSE GUARDRAIL GENERAL LAYOUTS

Prepared By: MO	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B5.6



LAYOUT C - WIDE OBSTACLE AT EXIT RAMP



LAYOUT D - WIDE OBSTACLE - UNIDIRECTIONAL TRAFFIC

NOTES:

1. LAP ALL JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
2. POSTS SHALL BE SET BY INSTRUMENT FOR ALIGNMENT AND GRADE.
3. THE ACCEPTABLE TOLERANCE FOR HEIGHT OF GUARDRAIL AT TIME OF CONSTRUCTION OR MAINTENANCE SHALL BE IN ACCORDANCE WITH THE MOST RECENT SPECIFICATIONS.
4. ALL FITTINGS AND HARDWARE SHALL BE GALVANIZED.
5. FLARE RATE SHALL BE SPECIFIED WITHIN THE LIMITS SET BY THE MANUFACTURER OF THE CHOSEN CRASH WORTHY END TERMINAL TO MEET THE REQUIREMENTS OF NCHRP REPORT 350 FOR TEST LEVEL 3 (TL-3).
6. THE BULLNOSE GUARDRAIL SYSTEM SATISFIES THE REQUIREMENTS OF NCHRP REPORT 350 FOR TEST LEVEL 3 (TL-3) AND IS THEREFORE APPLICABLE FOR USE ON HIGH SPEED ROAD FACILITIES.
7. FLARE RATES SHOWN ARE RELATIVE TO OBSTACLE CENTRELINE WHICH IS ALIGNED PARALLEL TO MAINLINE TRAFFIC FLOW. FLARING OF GUARDRAIL BEGINS AT POST 5.

FLARE RATE	
DESIGN SPEED (Km/h)	f
130	15:1
120	15:1
110	15:1
100	14:1
90	12:1
80	11:1
70	10:1
60	8:1
50	7:1

FLARE RATES ADOPTED FROM AASHTO 2002 ROADSIDE DESIGN GUIDE

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE

Approved:

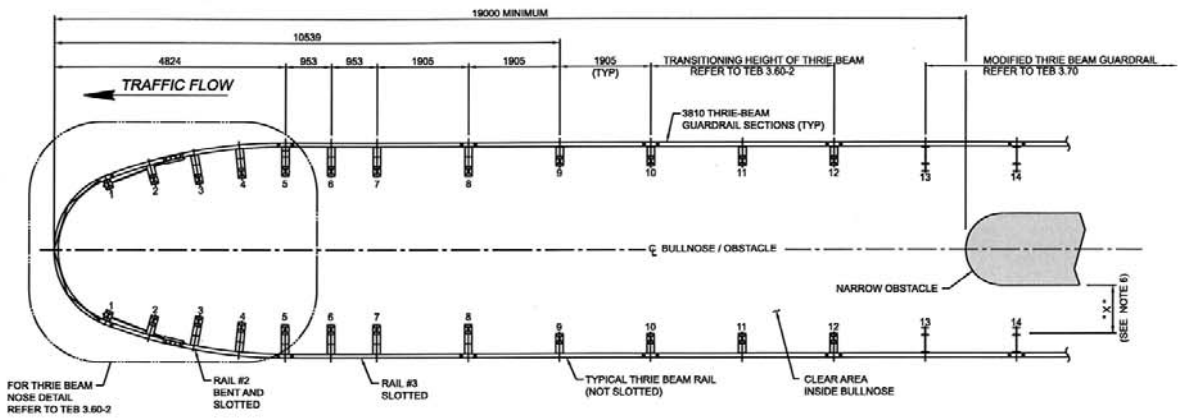
Executive Director,
Technical Standards Branch

Date: NOVEMBER, 2007

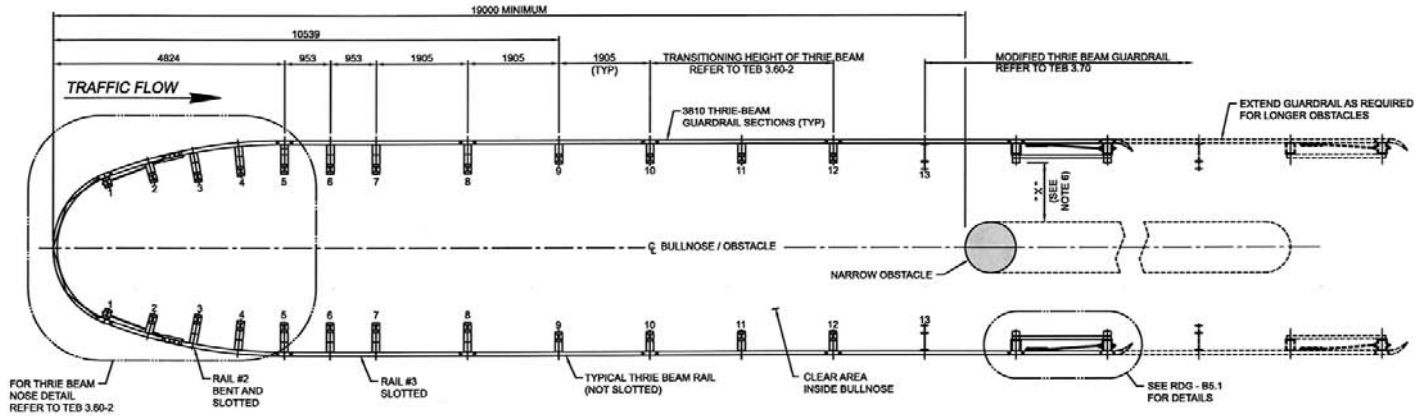
Alberta
INFRASTRUCTURE AND TRANSPORTATION

THRIE BEAM BULLNOSE GUARDRAIL GENERAL LAYOUTS

Prepared By: MO	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B5.7



DETAIL 1 - NARROW OBSTACLE - BIDIRECTIONAL TRAFFIC



DETAIL 2 - NARROW OBSTACLE - UNIDIRECTIONAL TRAFFIC

NOTES:

1. LAP ALL JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
2. HORIZONTAL DISTANCE BETWEEN CROSSWISE POSTS ARE MEASURED PERPENDICULAR FROM THE CENTRELINE OF BULLNOSE.
3. POSTS SHALL BE SET BY INSTRUMENT FOR ALIGNMENT AND GRADE.
4. THE ACCEPTABLE TOLERANCE FOR HEIGHT OF GUARDRAIL AT TIME OF CONSTRUCTION OR MAINTENANCE SHALL BE IN ACCORDANCE WITH THE MOST RECENT SPECIFICATIONS.
5. ALL FITTINGS AND HARDWARE SHALL BE GALVANIZED.
6. OFFSET DISTANCE "X" MEASURED FROM BACK FACE OF THRIE BEAM GUARDRAIL POST TO FACE OF OBSTACLE SHALL NOT BE LESS THAN 760 HOWEVER 1000 IS PREFERRED.
7. THIS GUARDRAIL SYSTEM SATISFIES THE REQUIREMENTS OF NCHRP REPORT 350 FOR TEST LEVEL 3 (TL-3) AND IS THEREFORE APPLICABLE FOR USE ON HIGH SPEED ROAD FACILITIES.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE
2			
1			

Approved:

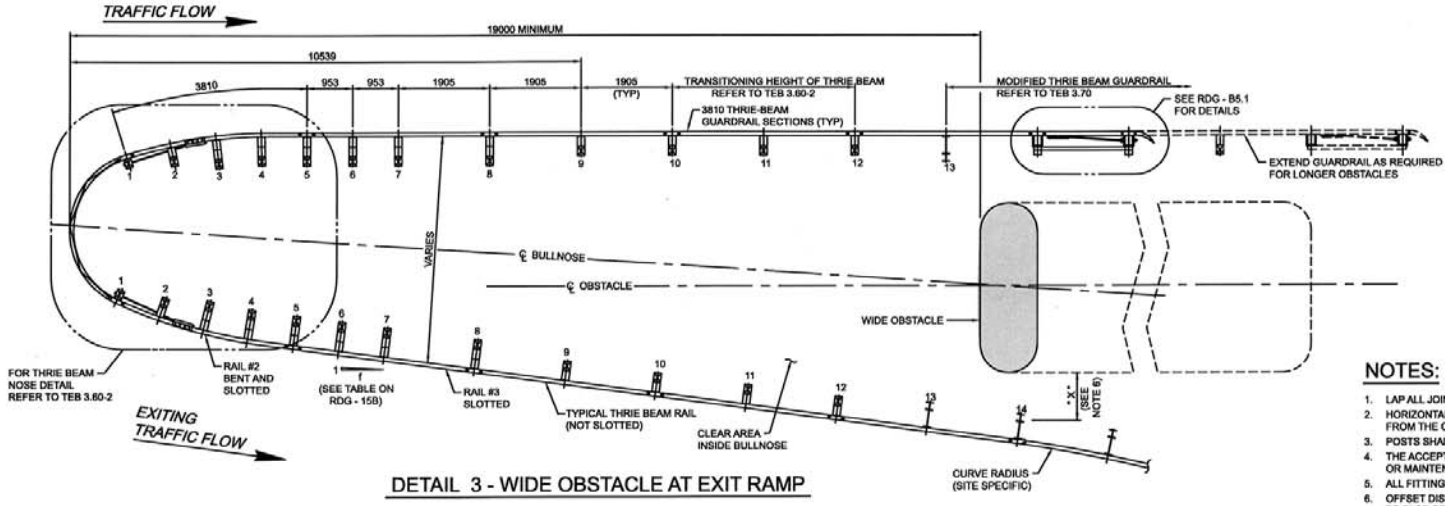
Executive Director,
Technical Standards Branch

Date: NOVEMBER, 2007

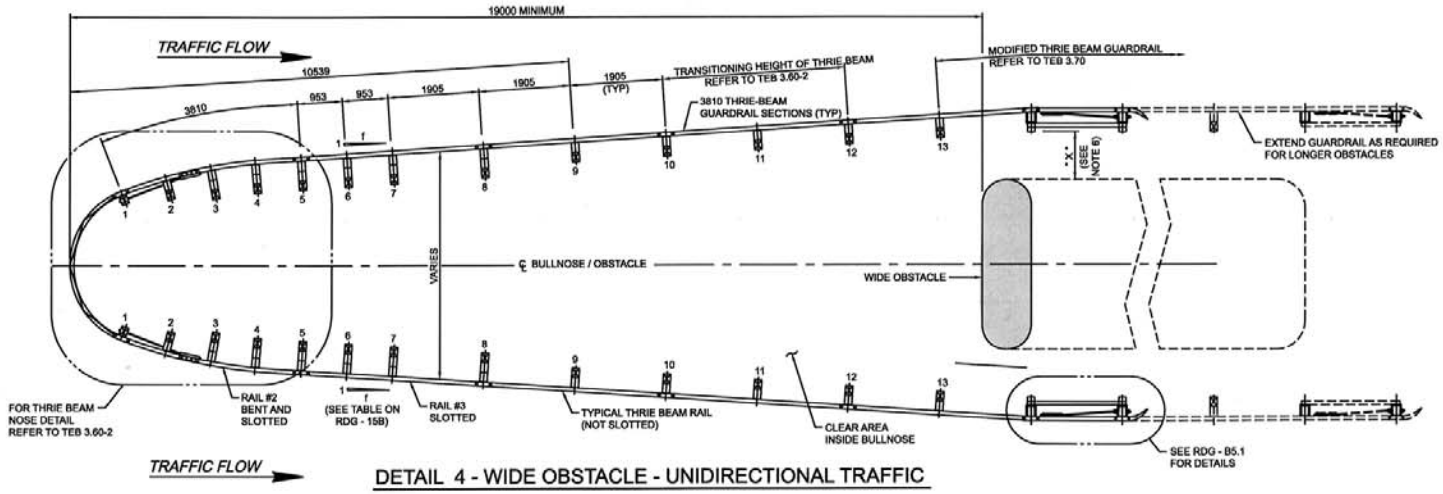
Alberta
INFRASTRUCTURE AND TRANSPORTATION

THRIE BEAM BULLNOSE GUARDRAIL DETAILED PLANS

Prepared By: MO	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B5.8



DETAIL 3 - WIDE OBSTACLE AT EXIT RAMP



DETAIL 4 - WIDE OBSTACLE - UNIDIRECTIONAL TRAFFIC

NOTES:

1. LAP ALL JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
2. HORIZONTAL DISTANCE BETWEEN CROSSWISE POSTS ARE MEASURED PERPENDICULAR FROM THE CENTRELINE OF BULLNOSE.
3. POSTS SHALL BE SET BY INSTRUMENT FOR ALIGNMENT AND GRADE.
4. THE ACCEPTABLE TOLERANCE FOR HEIGHT OF GUARDRAIL AT TIME OF CONSTRUCTION OR MAINTENANCE SHALL BE IN ACCORDANCE WITH THE MOST RECENT SPECIFICATIONS.
5. ALL FITTINGS AND HARDWARE SHALL BE GALVANIZED.
6. OFFSET DISTANCE "X" MEASURED FROM BACK FACE OF THRIE BEAM GUARDRAIL POST TO FACE OF OBSTACLE SHALL NOT BE LESS THAN 760 HOWEVER 1000 IS PREFERRED.
7. THIS GUARDRAIL SYSTEM SATISFIES THE REQUIREMENTS OF NCHRP REPORT 350 FOR TEST LEVEL 3 (TL-3) AND IS THEREFORE APPLICABLE FOR USE ON HIGH SPEED ROAD FACILITIES.
8. FLARE RATES SHOWN ARE RELATIVE TO OBSTACLE CENTRELINE WHICH IS ALIGNED PARALLEL TO MAINLINE TRAFFIC FLOW. FLARING OF GUARDRAIL BEGINS AT POST 5.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE
2			
1			

Approved:

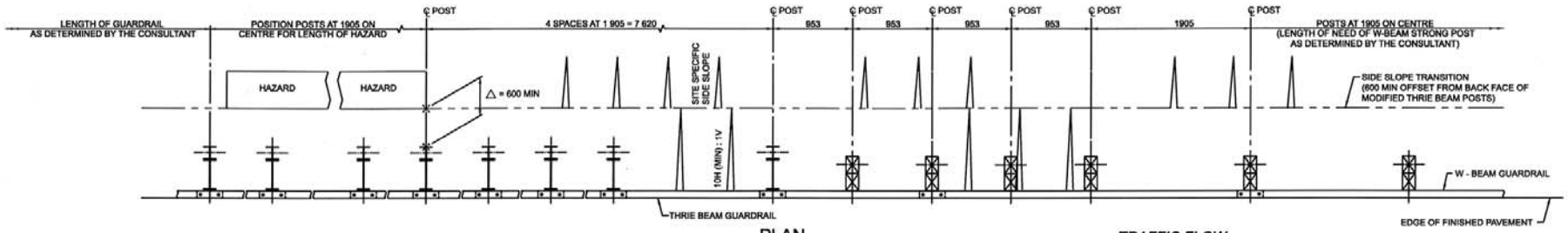
Executive Director,
Technical Standards Branch

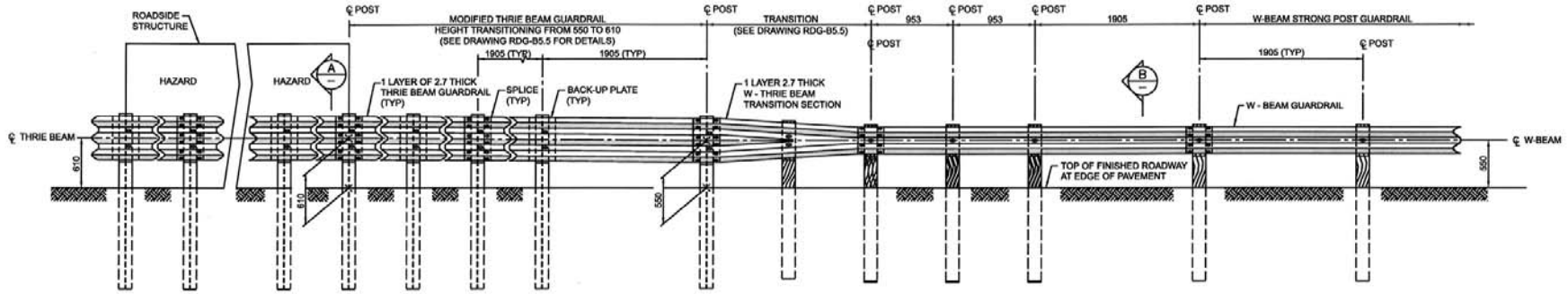
Date: NOVEMBER, 2007

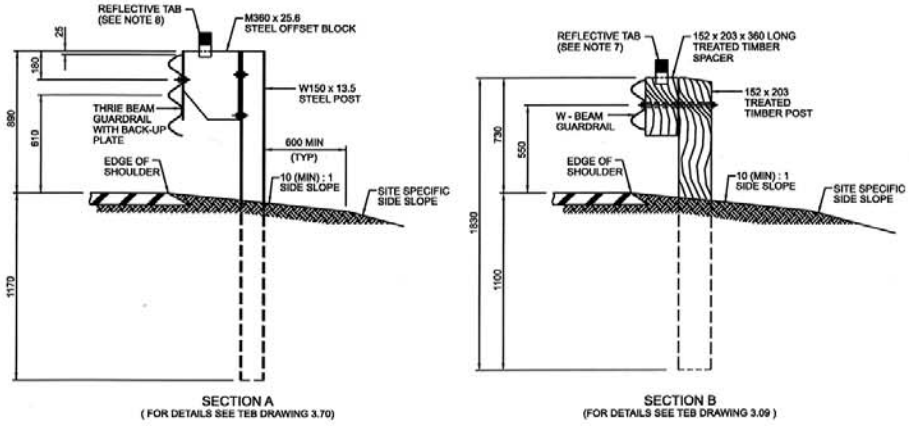
Alberta
INFRASTRUCTURE AND TRANSPORTATION

THRIE BEAM BULLNOSE GUARDRAIL DETAILED PLANS

Prepared By: MO	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B5.9







POST DETAILS

NOTES:

1. FOR GENERAL LAYOUT REFER TO TEB DRAWINGS 3.15a AND 3.18.
2. WHERE GUARDRAIL IS ADJACENT TO CURB, HEIGHT OF RAIL SHALL BE MEASURED AS FOLLOWS:
   a. VERTICALLY AT FACE OF GUARDRAIL WHEN FACE OF GUARDRAIL IS MORE THAN 300 BEYOND GUTTER LINE.
   b. VERTICALLY AT GUTTER LINE WHEN FACE OF GUARDRAIL IS 300 OR LESS BEYOND GUTTER LINE.
3. POSTS SHALL BE SET BY INSTRUMENT FOR ALIGNMENT AND GRADE, WITH TOP PARALLEL TO PAVEMENT GRADE.
4. THE ACCEPTABLE TOLERANCE FOR HEIGHT OF GUARDRAIL AT TIME OF CONSTRUCTION OR MAINTENANCE SHALL BE IN ACCORDANCE WITH THE MOST RECENT SPECIFICATIONS.
5. LAP ALL JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
6. ALL FITTINGS AND HARDWARE REQUIRED SHALL BE GALVANIZED.
7. STRAIGHT WHITE DOUBLE SIDED DIAMOND GRADE 127 x 76 REFLECTOR FROM DAVIDSON TRAFFIC CONTROL PRODUCTS OR APPROVED EQUIVALENT. FASTEN TO TOP OF EVERY SIXTH GUARDRAIL STRONG POST SPACER BY MECHANICAL MEANS SUCH AS NAILING OR STAPLING. ADHESIVES ALONE WILL NOT BE ACCEPTED.
8. STRAIGHT WHITE DOUBLE SIDED DIAMOND GRADE 127 x 76 REFLECTOR FROM DAVIDSON TRAFFIC CONTROL PRODUCTS OR APPROVED EQUIVALENT. FASTEN TO TOP OF EVERY SIXTH GUARDRAIL STEEL OFFSET BLOCK WITH APPROVED ADHESIVE.
9. THIS TRANSITION SATISFIES NCHRP REPORT 350 REQUIREMENTS FOR TEST LEVEL 3 (TL3).

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE
2			
1			

Approved:

Executive Director,
Technical Standards Branch

Date: NOVEMBER, 2007

Alberta
INFRASTRUCTURE AND TRANSPORTATION

W-BEAM STRONG POST TO MODIFIED THRIE BEAM GUARDRAIL TRANSITION AT ROADSIDE STRUCTURE

Prepared By: MO	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B5.10

APPENDIX B6

CAST-IN-PLACE OR EXTRUDED F-SHAPE CONCRETE BARRIER AND SINGLE SLOPE CONCRETE BARRIER

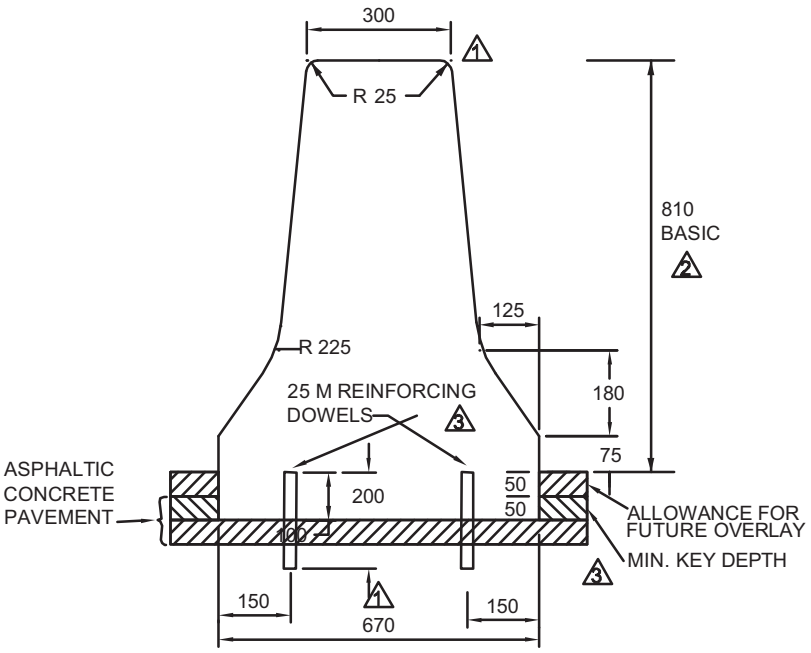
THIS PAGE INTENTIONALLY LEFT BLANK

Appendix B6

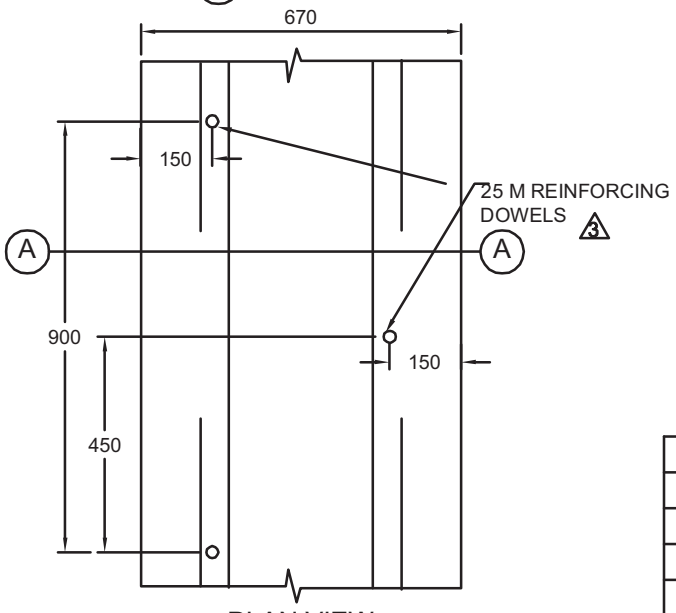
Cast-In Place Or Extruded F-Shape Concrete Barrier and Single Slope Concrete Barrier

TABLE OF CONTENTS

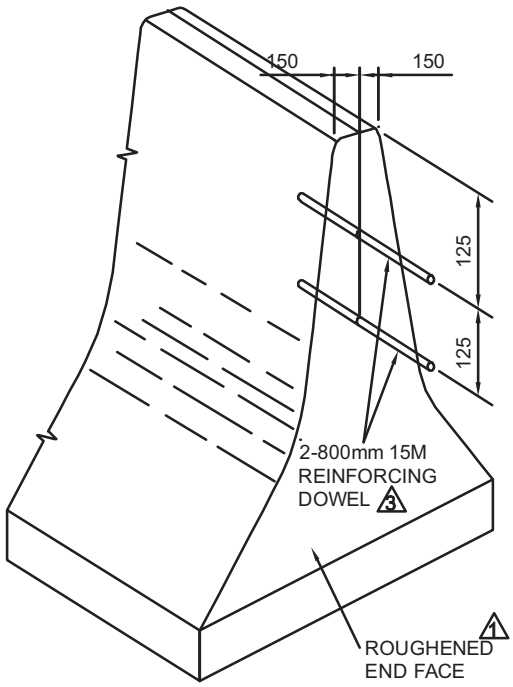
THIS PAGE INTENTIONALLY LEFT BLANK



A SECTION



PLAN VIEW



CONSTRUCTION JOINT DETAIL

GENERAL NOTES 3 4

1. All concrete shall meet the requirements of the Specifications for Bridge Construction Section 4 Modified, Class C, except that slump shall be ** ±1*mm and minimum cement content shall be 335 kg/m^3.

2. All reinforcement dowels shall be epoxy coated.

3. All exposed concrete shall be finished to a smooth, uniform and closed texture. 4

4. Exposed surfaces shall have an approved sealer applied in accordance with manufacturer's recommendations.

5. No longitudinal reinforcement required.

6. Tooled or saw cut all around every 3m (min. 50mm deep x 3-6mm wide).

7. No joint sealer required.

No.	REVISIONS	BY	DATE
4	REVISIONS TO NOTES 1 AND 3	BK	16/06/05
3	BASE DETAILS AND NOTES	BK	08/04
2	HEIGHT DIMENSION	BK	12/03
1	TOP WIDTH AND JOINT SPACING	BK	10/03

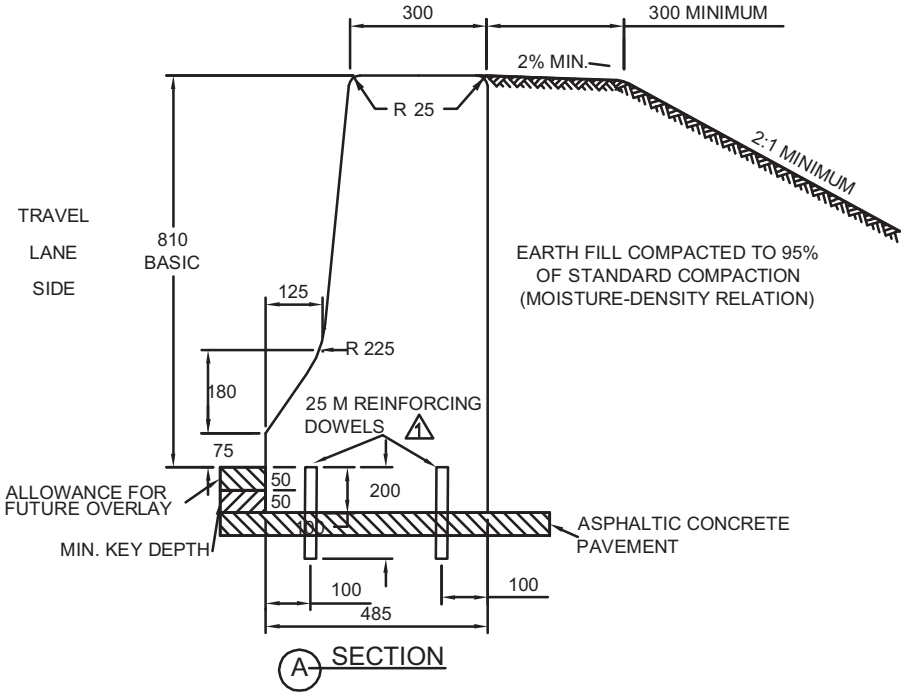
Approved:
Original signed by
Allan Kwan
-
Executive Director,
Technical Standards Branch

Date: APRIL, 1986

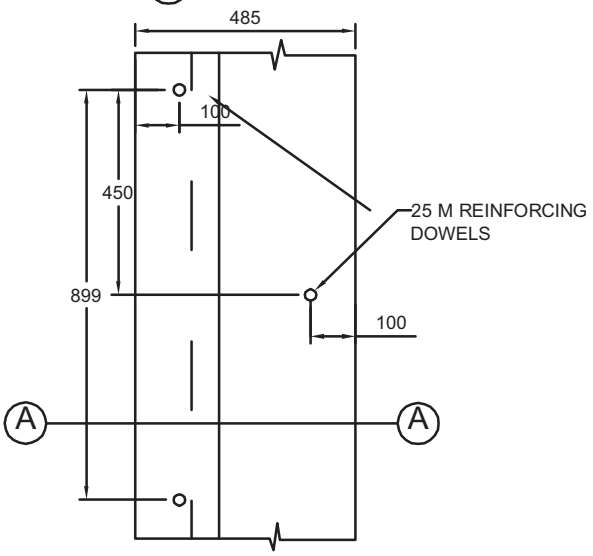
Alberta
INFRASTRUCTURE AND
TRANSPORTATION

SLIP-FORMED MEDIAN BARRIER
F-SHAPE

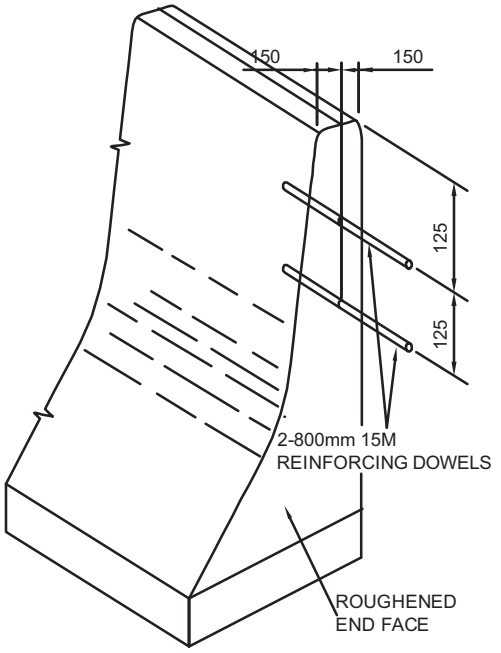
Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: CB6-4.3M3



A SECTION



PLAN VIEW



CONSTRUCTION JOINT DETAIL

All dimensions in millimetres unless otherwise noted.

GENERAL NOTES

1. All concrete shall meet the requirements of the Specifications for Bridge Construction Section 4,Modified Class C, except that slump shall be 20± 10mm and minimum cement content shall be 335 kg/m^3.
2. All reinforcement dowels shall be epoxy coated.
3. All exposed concrete shall be finished to a smooth, uniform and closed texture.
4. Exposed surfaces shall have an approved sealer applied in accordance with manufacturer's recommendations.
5. Half F barrier is for use with earth fill as shown.
6. No longitudinal reinforcement required.
7. Tooled or saw cut all around every 3m (min. 50mm deep x 3-6mm wide).
8. No joint sealer required.
9. Earth fill shall be suitable material as indicated under 2.3.2 of the Standard Specification for Highway Construction.

No.	REVISIONS	BY	DATE
2	.	.	.
1	REVISIONS TO NOTES 1 AND 3	BK	06/16/05

Approved:
Original signed by
Allan Kwan
Executive Director,
Technical Standards Branch

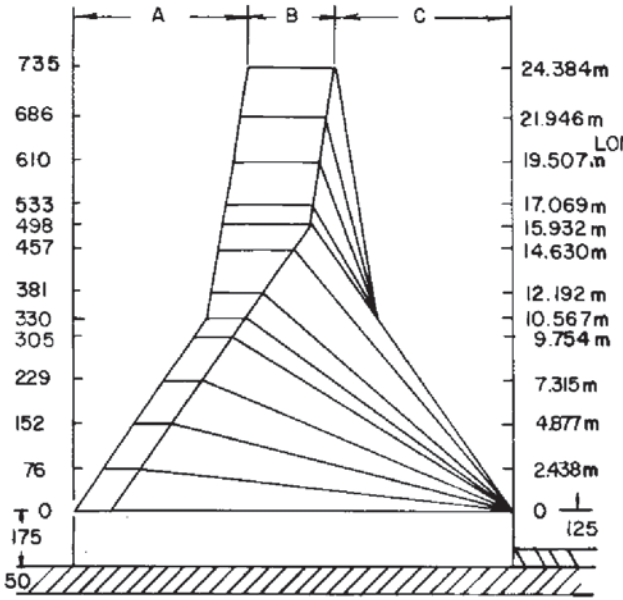
Date: SEPTEMBER, 2004

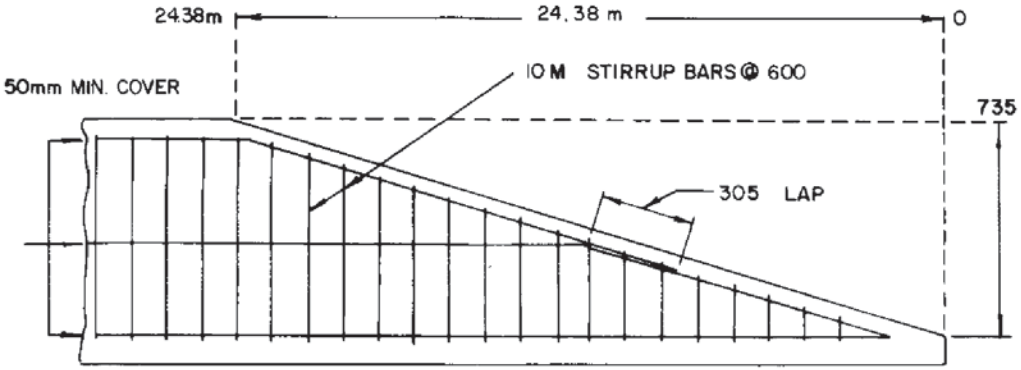
Alberta
INFRASTRUCTURE AND
TRANSPORTATION

SLIP-FORMED CONCRETE BARRIER
HALF F-SHAPE

Prepared By: M.T	Checked By: B.K	Scale: N.T.S.	Dwg No.: CB6-4.3M3A

JP WIDTH OF MEDIAN
B – OFFSET FROM REFERENCE LINE ON SIDE OF TRAFFIC GOING AWAY.
C – OFFSET FROM REFERENCE LINE ON SIDE OF APPROACHING TRAFFIC.





1. ALL CONCRETE SHALL BE 40MPa AT 28 DAYS.
2. ALL REINFORCEMENT SHALL BE EPOXY COATED REINFORCING BARS.
3. ALL EXPOSED CONCRETE SHALL HAVE A SMOOTH SURFACE.
4. EXPOSED SURFACES SHALL HAVE 20mm CHAMFER OR FILLET OR AS OTHERWISE SPECIFIED.
5. ALL SURFACES SHALL BE FORMED WITH OILED PLYWOOD OR STEEL FORMED FINISH.
6. ALL VOIDS ARE TO BE CAPPED AND WATERPROOFED.
7. EXPOSED SURFACES SHALL HAVE AN APPROVED SEALING SOLUTION APPLIED.

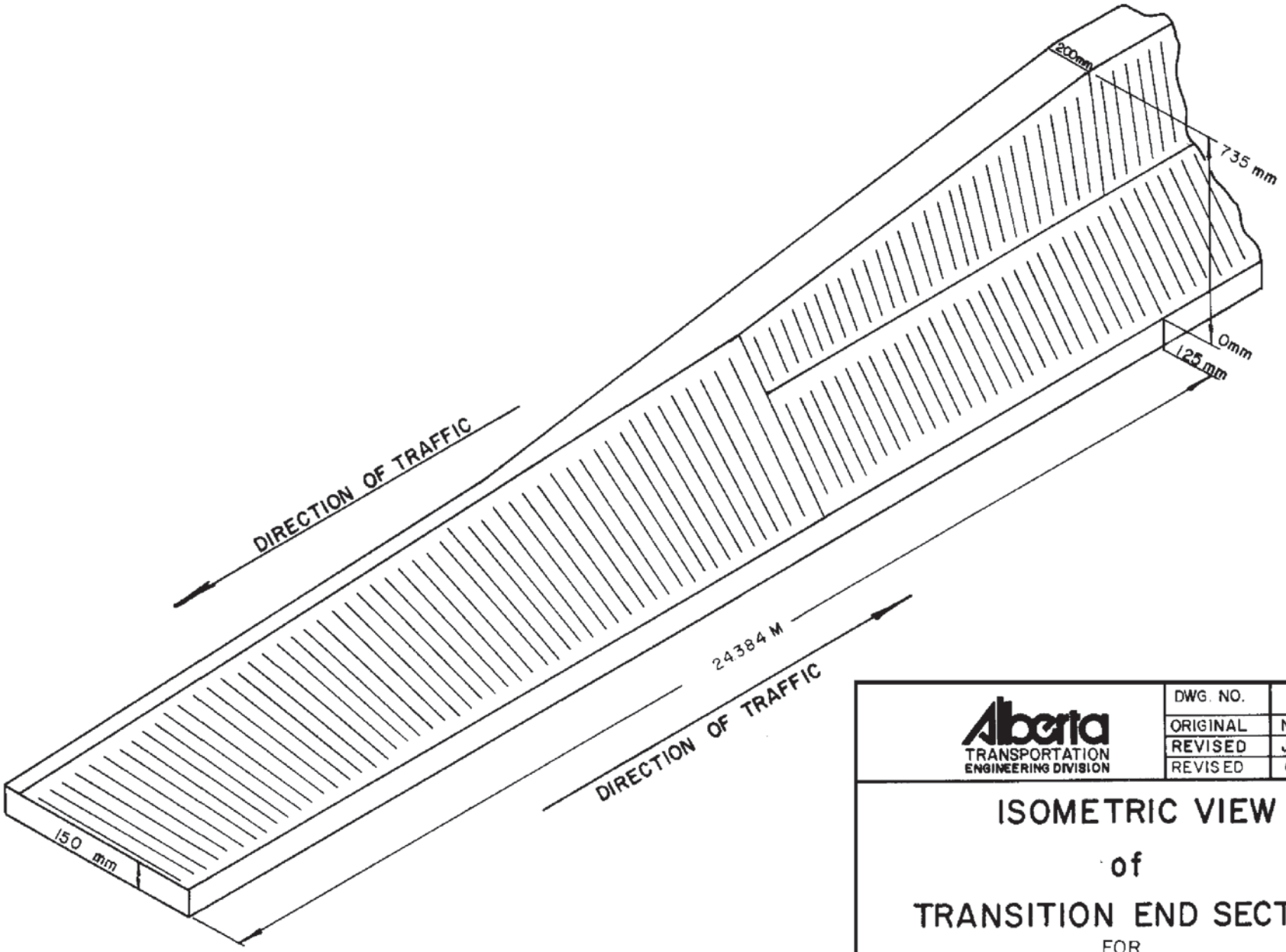
LENGTH FROM END m	RISE mm	A mm	B mm	C mm
24.384	735	200	280	280
21.946	686	200	268	292
19.507	610	200	257	303
17.069	533	200	244	316
15.932	498	200	239	321
14.630	457	172	233	348
12.192	381	118	221	398
10.567	330	82	209	431
9.754	305	82	193	447
7.315	229	82	141	497
4.877	152	82	97	546
2.438	76	82	49	595
0	0	82	0	645

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.

Alberta
TRANSPORTATION
ENGINEERING DIVISION

CB-6 PLAN NO.	4.3 M4
WORK	DATE
	MAY 1985
CHART REV.	JUNE 1986
	OCT. 1986

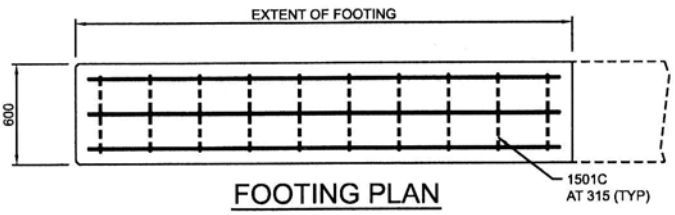
TRANSITION END SECTION
FOR
REINFORCED CONCRETE MEDIAN BARRIER CURB
F SHAPE



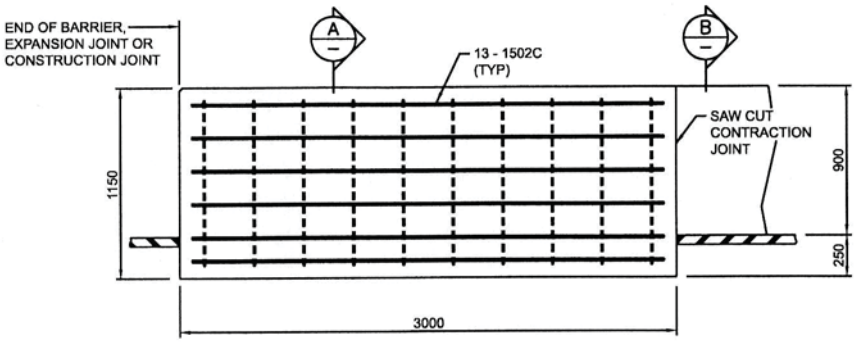
Alberta
TRANSPORTATION
ENGINEERING DIVISION

DWG. NO.	4.3 M 5
ORIGINAL	NOV. 1977
REVISED	JUNE 1983
REVISED	OCT. 1986

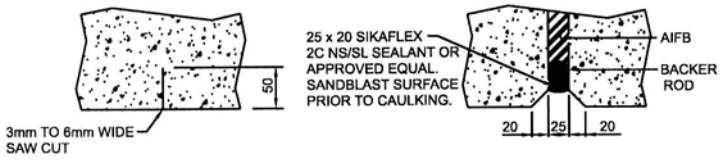
ISOMETRIC VIEW
of
TRANSITION END SECTION
FOR
REINFORCED CONCRETE MEDIAN BARRIER CURB



FOOTING PLAN

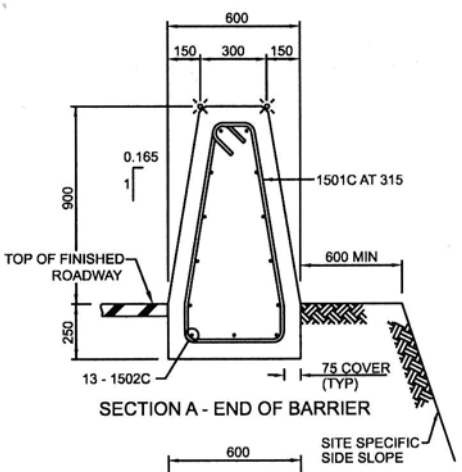


SECTION

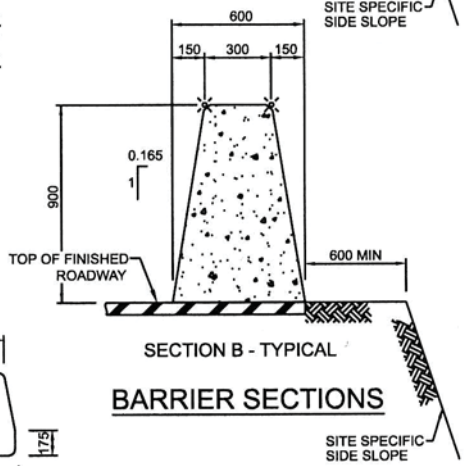


CONTRACTION EXPANSION/CONSTRUCTION

JOINT DETAILS

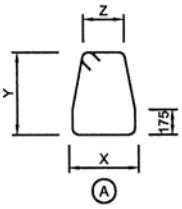


SECTION A - END OF BARRIER



SECTION B - TYPICAL

BARRIER SECTIONS



BAR LIST NOTES:

- DIAMETERS OF ALL BENDS AND DETAILS OF ALL HOOKS, UNLESS NOTED OTHERWISE, SHALL CONFORM TO THE RECOMMENDED SIZES DETAILED IN THE REINFORCING STEEL MANUAL OF STANDARD PRACTICE, FIRST CANADIAN EDITION 1992, PUBLISHED BY THE REINFORCING INSTITUTE OF CANADA.
- REINFORCING STEEL SHALL BE IN ACCORDANCE WITH CAN/CSA-G30.18M92 "BILLET STEEL BARS FOR CONCRETE REINFORCEMENT".
- ALL REINFORCING STEEL SHALL BE GRADE 400 UNLESS NOTED OTHERWISE.
- "C" DENOTES EPOXY COATED REINFORCEMENT.

BAR LIST: BARRIER

MARK	SIZE	NO.	TYPE	X	Y	Z	LENGTH	MASS
1501C	15	10	A	450	1 000	125	2 840	45
1502C	15	13	STR	-	-	-	2 850	58

EPOXY COATED TOTAL kg = 103

NOTES:

1. ALL BARRIERS SHALL BE CAST IN PLACE BY STATIONARY FORMING OR SLIPFORMING.
2. PROVIDE 20 mm CHAMFER AT TOP EDGES OF BARRIER AND AROUND ALL EXPOSED EDGES OF EXPANSION AND CONSTRUCTION JOINTS.
3. CONCRETE SHALL BE MODIFIED CLASS C UNLESS OTHERWISE SPECIFIED (MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 35 MPa).
4. BARRIERS ARE NON-REINFORCED EXCEPT AT FOOTING LOCATIONS.
5. BARRIER FOOTINGS SHALL BE PLACED ON EITHER SIDE OF ALL EXPANSION AND CONSTRUCTION JOINTS, AS WELL AS AT BARRIER ENDS.
6. PLACE BARRIER AND FOOTING MONOLITHICALLY. COLD JOINTS BETWEEN FOOTING AND BARRIER ARE NOT PERMITTED.
7. PLACEMENT OF FUTURE OVERLAYS ARE PERMITTED PROVIDED THAT THE HEIGHT OF BARRIER IS MAINTAINED AT LEAST 800 ABOVE FINISHED PAVEMENT.
8. CONTRACTION JOINTS SHALL BE FORMED EVERY 3 METRES EXCEPT WHERE SHORTER SPACING IS NECESSARY FOR CLOSURES.
9. BARRIER SHALL BE PLACED BY INSTRUMENT FOR ALIGNMENT AND GRADE.
10. THIS BARRIER MEETS THE CRASH TEST REQUIREMENTS OF NCHRP REPORT 350 FOR TEST LEVEL 3 (TL-3) AND IS THEREFORE ACCEPTABLE FOR USE ON HIGH SPEED ROAD FACILITIES.
11. TERMINATING THE SINGLE SLOPE CONCRETE BARRIER WITH A BLUNT END, AS SHOWN IN THIS DRAWING, IS RESTRICTED TO THE FOLLOWING APPLICATIONS:
    - ON THE LEAVING END OF BARRIERS INSTALLED ON THE ROADSIDE.
    - ON THE APPROACH END OF BARRIERS INSTALLED ON THE ROADSIDE, PROVIDED THAT THE BARRIER IS TERMINATED AT OR BEYOND THE CLEAR ZONE.
    - ON THE LEAVING END OF BARRIERS INSTALLED IN THE MEDIAN, PROVIDED THAT THE BARRIER IS TERMINATED AT OR BEYOND THE CLEAR ZONE FOR THE FLOW OF TRAFFIC IN THE OPPOSING DIRECTION.
12. WHEN THE CONDITIONS STATED IN NOTE 11 CANNOT BE MET, THE BLUNT END OF THE BARRIER SHALL BE SHIELDED USING AN APPROVED ENERGY ABSORBING END TERMINAL.
13. TAPERED END TREATMENTS ARE NOT CONSIDERED TO MEET THE REQUIREMENTS OF NCHRP REPORT 350 TL-3 AND SHOULD THEREFORE NOT BE USED WITHIN THE CLEAR ZONE.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE
2			
1			

Approved:

Executive Director,
Technical Standards Branch

Date: NOVEMBER, 2007

Alberta
INFRASTRUCTURE AND TRANSPORTATION

TL-4 STANDARD SINGLE SLOPE CONCRETE BARRIER DETAILS

Prepared By: MO	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B6.1

THIS PAGE INTENTIONALLY LEFT BLANK

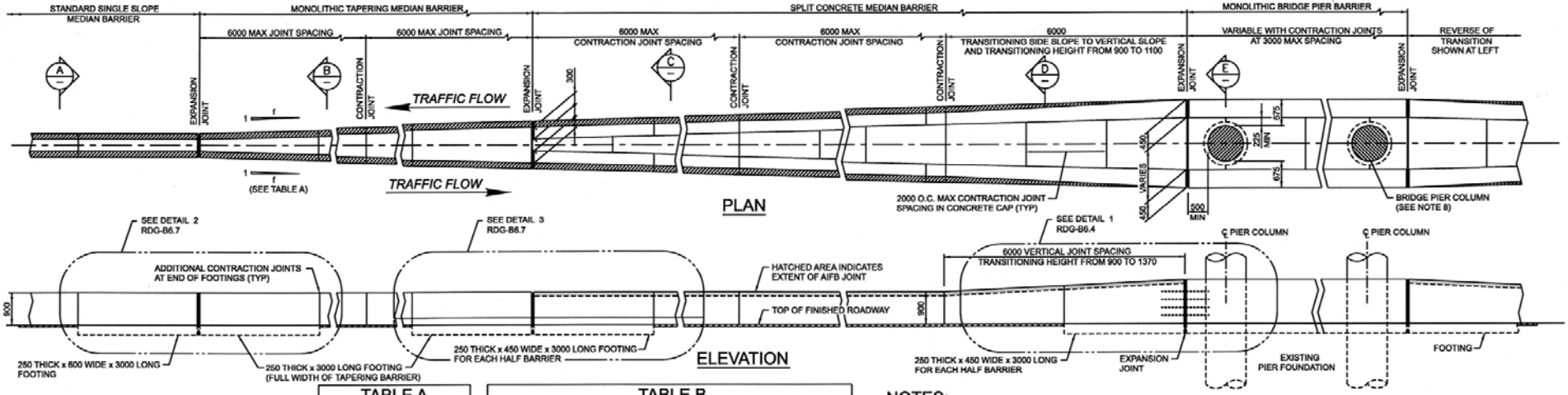


TABLE A	
FLARE RATE	
DESIGN SPEED (Km/h)	f
130	50:1
120	40:1
110	30:1
100	28:1
90	24:1
80	21:1
70	18:1
60	16:1
50	13:1

FLARE RATES ADOPTED FROM AASHTO 2002 ROADSIDE DESIGN GUIDE

TABLE B

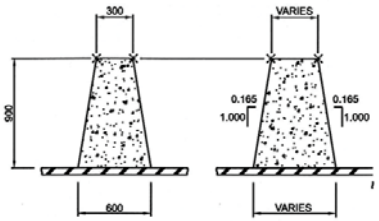
REDUCTION LIMITS TO INSIDE SHOULDER WIDTH FOR NARROW MEDIAN (URBAN ROADWAYS)

NUMBER OF LANES IN EACH DIRECTION	ROADWAY CROSS SECTION REFERENCE	NORMAL INSIDE SHOULDER WIDTH	MINIMUM INSIDE SHOULDER WIDTH
2	UFD-411.9-100/80	2500	1900 *
3	UFD/UAD-616.6-110/100/80	2500	2500 **
4	UFD/UAD-820.8-120/110/100	3000	2500 ***

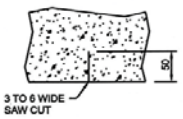
* ACCOMMODATES A MAXIMUM PIER COLUMN WIDTH OF 1000.
** ACCOMMODATES A MAXIMUM PIER COLUMN WIDTH OF 1800 (NO REDUCTION IN SHOULDER WIDTH REQUIRED).
*** ACCOMMODATES A MAXIMUM PIER COLUMN WIDTH OF 1600.

NOTES:

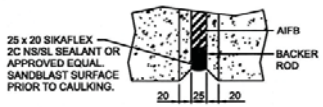
1. ALL BARRIERS SHALL BE CAST IN PLACE BY STATIONARY FORMING OR SLIPFORMING.
2. PROVIDE 20 CHAMFER AT TOP EDGES OF BARRIER AND AROUND ALL EXPOSED EDGES OF EXPANSION AND CONSTRUCTION JOINTS.
3. CONCRETE SHALL BE MODIFIED CLASS C (MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 35 MPa). UNLESS OTHERWISE SPECIFIED.
4. BARRIERS ARE NON-REINFORCED EXCEPT AT FOOTING LOCATIONS.
5. BARRIER FOOTINGS SHALL BE PLACED ON EITHER SIDE OF ALL EXPANSION AND CONSTRUCTION JOINTS, AS WELL AS AT BARRIER ENDS. REFER TO RDG-B6.4 AND RDG-6.7 FOR DETAILS ON GEOMETRY AND REINFORCING AT THESE LOCATIONS.
6. PLACE BARRIER AND FOOTING MONOLITHICALLY. COLD JOINTS BETWEEN FOOTING AND BARRIER ARE NOT PERMITTED.
7. EXPANSION JOINTS SHALL CONSIST OF A SINGLE LAYER OF 25 ASPHALT IMPREGNATED FIBREBOARD (AIFB) APPLIED TO FULL CROSS SECTION OF BARRIER AND SHALL EXTEND TO BASE OF FOOTING.
8. ACTUAL SHAPE OF PIER COLUMNS MAY VARY AS PER SITE SPECIFIC DRAWINGS.
9. PROVIDE ADDITIONAL CONTROL JOINTS AS DETERMINED BY THE CONSULTANT TO ACCOMMODATE PIER COLUMN GEOMETRY.
10. ADJUST HEIGHT OF CONCRETE BARRIER ON LOW SIDE OF OFFSET OR SUPERELEVATED ROADWAYS TO PROVIDE LEVEL GRADE ACROSS TOP OF BARRIER.
11. THIS TRANSITION DRAWING PROVIDES ALLOWANCE FOR A 100 FUTURE OVERLAY.
12. REDUCED INSIDE SHOULDER WIDTHS AT PIER COLUMNS ARE PERMITTED BUT SHOULD BE AVOIDED WHERE POSSIBLE. SEE TABLE B FOR MAXIMUM SHOULDER WIDTH REDUCTIONS.



SECTION A SECTION B

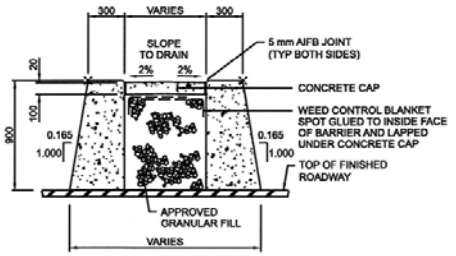


CONTRACTION

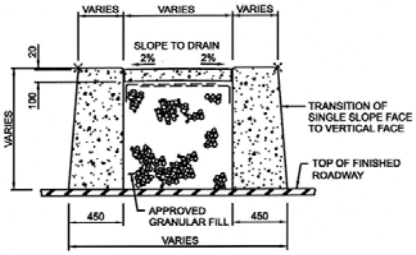


EXPANSION/CONSTRUCTION

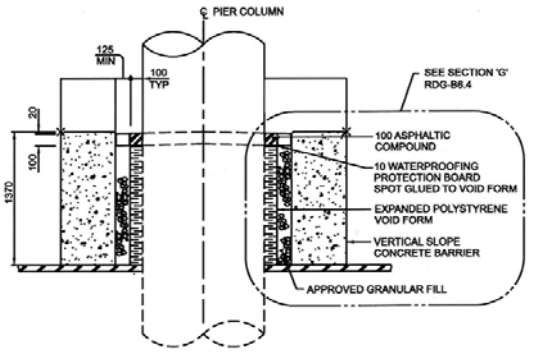
JOINT DETAILS



SECTION C



SECTION D



SECTION E

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE
2			
1			

Approved:

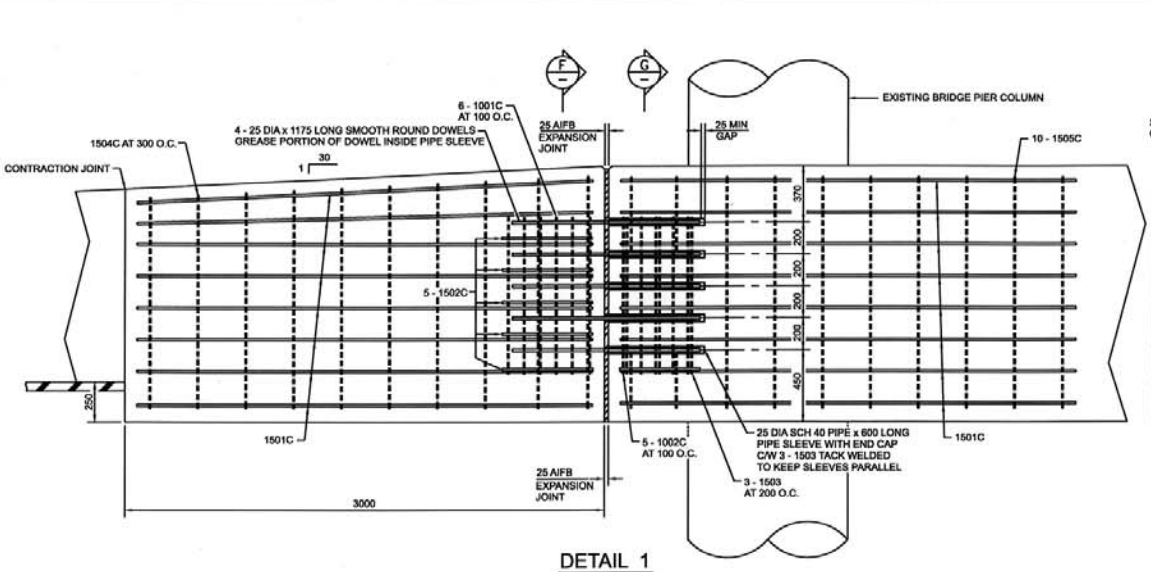
Executive Director, Technical Standards Branch

Date: NOVEMBER, 2007

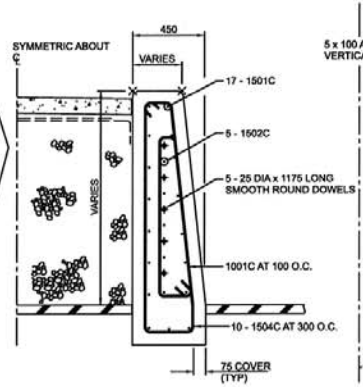
Alberta INFRASTRUCTURE AND TRANSPORTATION

TL-4 SINGLE SLOPE CONCRETE MEDIAN BARRIER TRANSITION AROUND EXISTING BRIDGE PIER - SHEET 1 OF 2

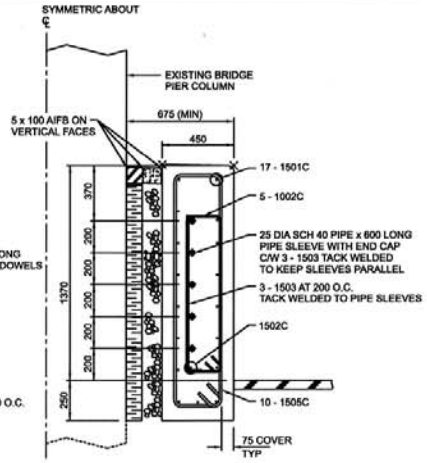
Prepared By: MO	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B6.3



DETAIL 1



SECTION F
SPLIT MEDIAN BARRIER

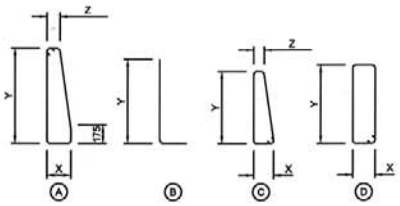


SECTION G
MONOLITHIC BRIDGE PIER BARRIER

BAR LIST: BARRIER

MARK	SIZE	NO.	TYPE	X	Y	Z	LENGTH	MASS
1001C	10	6	C	220	750	95	2 025	10
1002C	10	5	D	220	750		2 140	8
1501C	15	34	STR				2 850	152
1502C	15	6	STR				550	5
1503	15	3	B		750		930	4
1504C	15	10	A	LENGTH: X = 300 Y = VARIES FROM 1100 TO 1190 IN INCREMENTS OF 10 Z = VARIES FROM 175 TO 287 IN INCREMENTS OF 14			3105 (AVG)	49
1505C	15	10	D	300	1 200		2 780	44

PLAIN TOTAL kg = 4
EPOXY COATED TOTAL kg = 268



BAR LIST NOTES:

- DIAMETERS OF ALL BENDS AND DETAILS OF ALL HOOKS, UNLESS NOTED OTHERWISE, SHALL CONFORM TO THE RECOMMENDED SIZES DETAILED IN THE REINFORCING STEEL MANUAL OF STANDARD PRACTICE, FIRST CANADIAN EDITION 1992, PUBLISHED BY THE REINFORCING INSTITUTE OF CANADA.
- REINFORCING STEEL SHALL BE IN ACCORDANCE WITH CAN/CSA-G30.18M92 "BILLET STEEL BARS FOR CONCRETE REINFORCEMENT".
- ALL REINFORCING STEEL SHALL BE GRADE 400 UNLESS NOTED OTHERWISE.
- " C " DENOTES EPOXY COATED REINFORCEMENT.
- SMOOTH ROUND DOWELS SHALL BE ASTM GRADE A36, OR APPROVED EQUAL, WITH A MINIMUM YIELD STRENGTH OF 250 MPa.
- ALL CONCRETE SHALL BE MODIFIED CLASS C (MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 35 MPa) UNLESS OTHERWISE SPECIFIED.
- ALL CONCRETE CORNERS SHALL HAVE A 20 CHAMFER OR FILLET UNLESS NOTED OTHERWISE.
- ALL REINFORCING STEEL SHALL HAVE 75 CLEAR COVER UNLESS NOTED OTHERWISE.

CONSTRUCTION NOTES:

1. THE 3 - 1503 L-SHAPED DOWELS SHALL BE SHOP WELDED TO THE 25 DIA X 40 SCHEDULE PIPE SLEEVES, COMPLETE WITH END CAP, TO ENSURE THE SLEEVES ARE MAINTAINED PARALLEL.
2. A 25 DIA X 25 LONG COMPRESSIBLE PLUG, SUCH AS POLYSTYRENE, SHALL BE INSERTED INTO EACH PIPE SLEEVE PRIOR TO SLIDING THE 25 DIA SMOOTH ROUND DOWELS INSIDE THE SLEEVES.
3. DURING PLACEMENT OF THE BARRIER CONCRETE SHOWN IN SECTION G, THE 25 DIA SMOOTH ROUND DOWELS SHALL BE SET 575 FROM FACE OF THE 25 THICK AIFB EXPANSION JOINT. THE DOWELS SHALL BE TIED SECURELY TO THE 1001C STIRRUPS TO PREVENT THE DOWELS FROM SLIDING OUT DURING CONCRETE PLACING AND VIBRATING.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE
2			
1			

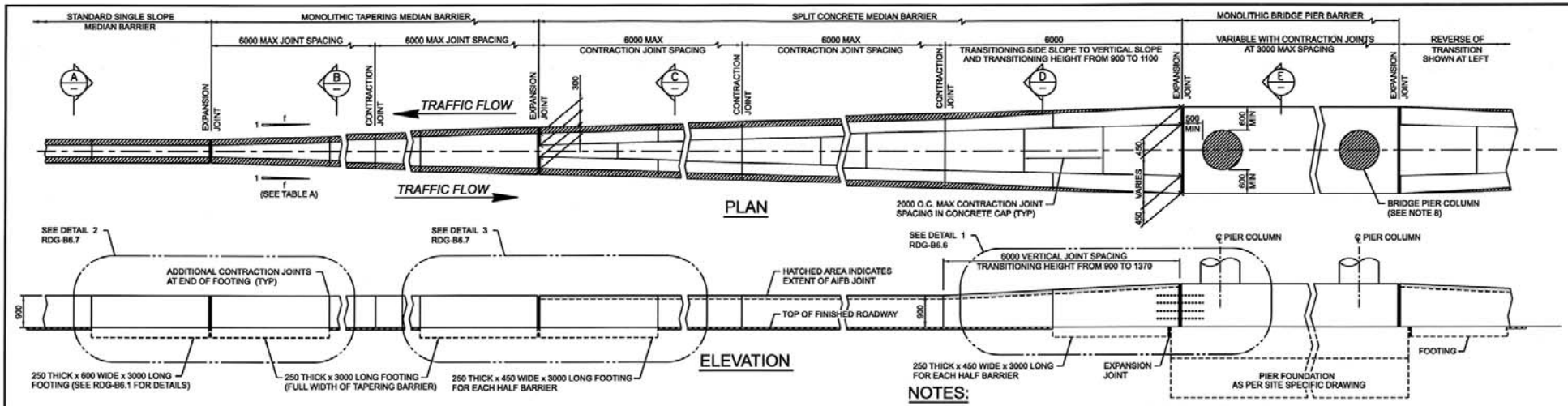
Approved:
Executive Director,
Technical Standards Branch

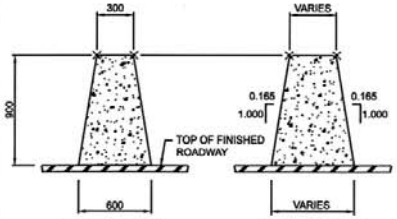
Date: NOVEMBER, 2007

Alberta
INFRASTRUCTURE AND TRANSPORTATION

TL-4 SINGLE SLOPE CONCRETE MEDIAN BARRIER TRANSITION AROUND EXISTING BRIDGE PIER - SHEET 2 OF 2

Prepared By: NS/MO	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B6.4





SECTION A SECTION B

TABLE A	
FLARE RATE	
DESIGN SPEED (Km/h)	f
130	50:1
120	40:1
110	30:1
100	26:1
90	24:1
80	21:1
70	18:1
60	16:1
50	13:1

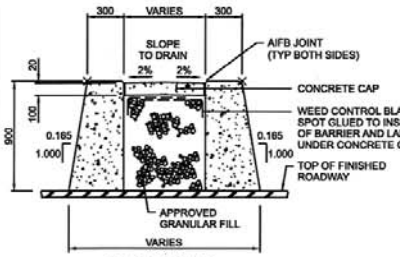
FLARE RATES ADOPTED FROM AASHTO 2002 ROADSIDE DESIGN GUIDE

TABLE B			
REDUCTION LIMITS TO INSIDE SHOULDER WIDTH FOR NARROW MEDIAN (URBAN ROADWAYS)			
NUMBER OF LANES IN EACH DIRECTION	ROADWAY CROSS SECTION REFERENCE	NORMAL INSIDE SHOULDER WIDTH	MINIMUM INSIDE SHOULDER WIDTH
2	UFD-411.9-100/80	2500	1900 *
3	UFD/UAD-616.6-110/100/80	2500	2500 **
4	UFD/UAD-820.8-120/110/100	3000	2500 ***

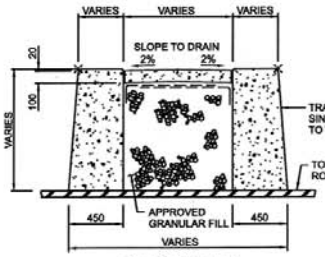
* ACCOMMODATES A MAXIMUM PIER COLUMN WIDTH OF 1000.
** ACCOMMODATES A MAXIMUM PIER COLUMN WIDTH OF 1800 (NO REDUCTION IN SHOULDER WIDTH REQUIRED).
*** ACCOMMODATES A MAXIMUM PIER COLUMN WIDTH OF 1600.

NOTES:

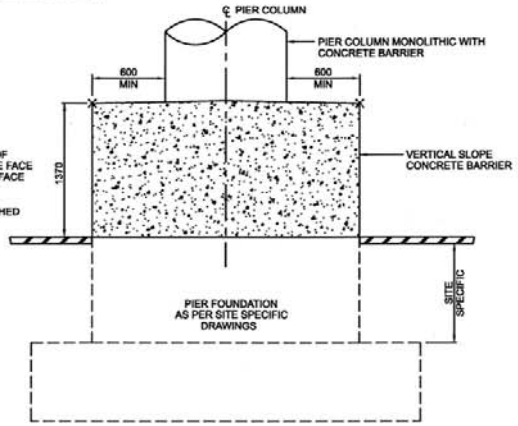
1. ALL BARRIERS SHALL BE CAST IN PLACE BY STATIONARY FORMING OR SLIPFORMING.
2. PROVIDE 20 CHAMFER AT TOP EDGES OF BARRIER AND AROUND ALL EXPOSED EDGES OF EXPANSION AND CONSTRUCTION JOINTS.
3. CONCRETE SHALL BE MODIFIED CLASS C (MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 35 MPa). UNLESS OTHERWISE SPECIFIED.
4. BARRIERS ARE NON-REINFORCED EXCEPT AT FOOTING LOCATIONS.
5. BARRIER FOOTINGS SHALL BE PLACED ON EITHER SIDE OF ALL EXPANSION AND CONSTRUCTION JOINTS, AS WELL AS AT BARRIER ENDS. REFER TO RDG-B6.6 AND RDG-B6.7 FOR DETAILS ON GEOMETRY AND REINFORCING AT THESE LOCATIONS.
6. PLACE BARRIER AND FOOTING MONOLITHICALLY. COLD JOINTS BETWEEN FOOTING AND BARRIER ARE NOT PERMITTED.
7. EXPANSION JOINTS SHALL CONSIST OF A SINGLE LAYER OF 25 ASPHALT IMPREGNATED FIBREBOARD (AIFB) APPLIED TO FULL CROSS SECTION OF BARRIER AND SHALL EXTEND TO BASE OF FOOTING.
8. ENDS OF PIER COLUMNS SHALL BE SEMI-CIRCULAR IN SHAPE. ACTUAL SHAPE OF PIER COLUMNS MAY VARY AS PER SITE SPECIFIC DRAWINGS.
9. PROVIDE ADDITIONAL CONTROL JOINTS AS DETERMINED BY THE CONSULTANT TO ACCOMMODATE PIER COLUMN GEOMETRY.
10. EXTEND PIER COLUMN CONCRETE REINFORCING THROUGH BARRIER AND INTO CONCRETE PIER FOUNDATION AS PER SITE SPECIFIC DRAWINGS.
11. ADJUST HEIGHT OF CONCRETE BARRIER ON LOW SIDE OF OFFSET OR SUPERELEVATED ROADWAYS TO PROVIDE LEVEL GRADE ACROSS TOP OF BARRIER.
12. THIS TRANSITION DRAWING PROVIDES ALLOWANCE FOR A 100 FUTURE OVERLAY.
13. REDUCED INSIDE SHOULDER WIDTHS AT PIER COLUMNS ARE PERMITTED BUT SHOULD BE AVOIDED WHERE POSSIBLE. SEE TABLE B FOR MAXIMUM SHOULDER WIDTH REDUCTIONS.



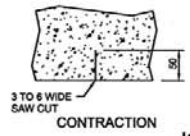
SECTION C



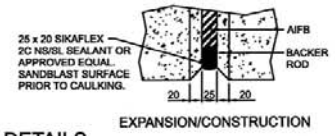
SECTION D



SECTION E



CONTRACTION



EXPANSION/CONSTRUCTION

JOINT DETAILS

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE
2			
1			

Approved:

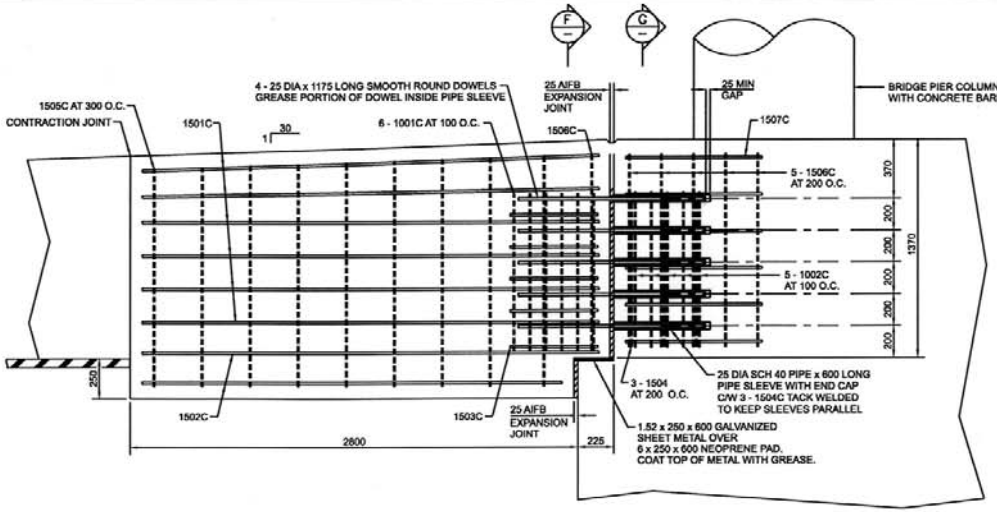
Executive Director, Technical Standards Branch

Date: NOVEMBER, 2007

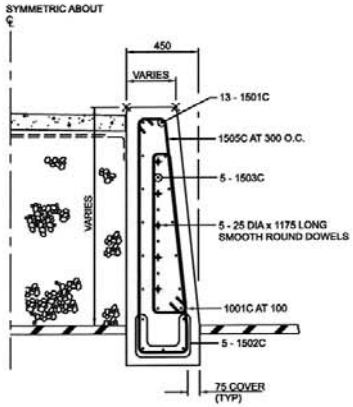
Alberta INFRASTRUCTURE AND TRANSPORTATION

TL-4 SINGLE SLOPE CONCRETE MEDIAN BARRIER TRANSITION AROUND NEW BRIDGE PIER - SHEET 1 OF 3

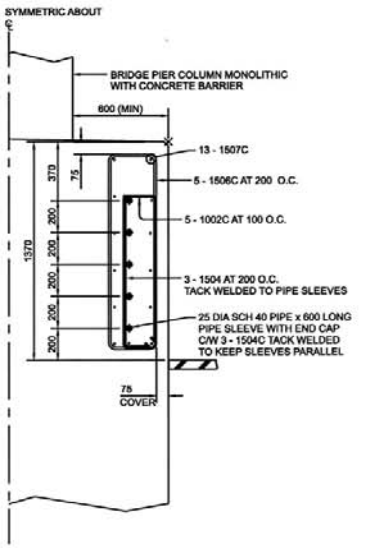
Prepared By: MO	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B6.5



DETAIL 1



SECTION F
SPLIT MEDIAN BARRIER

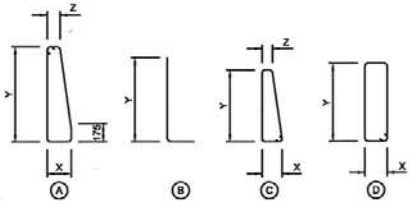


SECTION G
MONOLITHIC BRIDGE PIER BARRIER

BAR LIST: BARRIER

MARK	SIZE	NO.	TYPE	X	Y	Z	LENGTH	MASS
1001C	10	6	C	220	750	95	2 025	10
1002C	10	5	D	220	750		2 140	8
1501C	15	13	STR				2 850	58
1502C	15	5	STR				2 625	21
1503C	15	5	STR				550	4
1504	15	3	B		750		930	4
1505C	15	9	A	LENGTH: X = 300 Y = VARIES FROM 1100 TO 1180 IN INCREMENTS OF 10 Z = VARIES FROM 175 TO 287 IN INCREMENTS OF 14			3105 (AVG)	44
1506C	15	6	D	300	950		2 780	26
1507C	15	13	STR				850	17

PLAIN TOTAL kg = 4
EPOXY COATED TOTAL kg = 188



BAR LIST NOTES:

- DIAMETERS OF ALL BENDS AND DETAILS OF ALL HOOKS, UNLESS NOTED OTHERWISE, SHALL CONFORM TO THE RECOMMENDED SIZES DETAILED IN THE REINFORCING STEEL MANUAL OF STANDARD PRACTICE, FIRST CANADIAN EDITION 1992, PUBLISHED BY THE REINFORCING INSTITUTE OF CANADA.
- REINFORCING STEEL SHALL BE IN ACCORDANCE WITH CAN/CSA-G30.18M92 "BILLET STEEL BARS FOR CONCRETE REINFORCEMENT".
- ALL REINFORCING STEEL SHALL BE GRADE 400 UNLESS NOTED OTHERWISE.
- " C " DENOTES EPOXY COATED REINFORCEMENT.
- SMOOTH ROUND DOWELS SHALL BE ASTM GRADE A36, OR APPROVED EQUAL, WITH A MINIMUM YIELD STRENGTH OF 250 MPa.
- CONCRETE SHALL BE MODIFIED CLASS C (MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 35 MPa). UNLESS OTHERWISE SPECIFIED.
- ALL CONCRETE CORNERS SHALL HAVE A 20 CHAMFER OR FILLET UNLESS NOTED OTHERWISE.
- ALL REINFORCING STEEL SHALL HAVE 75 CLEAR COVER UNLESS NOTED OTHERWISE.

CONSTRUCTION NOTES:

1. THE 3 - 1504 L-SHAPED DOWELS SHALL BE SHOP WELDED TO THE 25 DIA X 40 SCHEDULE PIPE SLEEVES, COMPLETE WITH END CAP, TO ENSURE THE SLEEVES ARE MAINTAINED PARALLEL.
2. A 25 DIA X 25 LONG COMPRESSIBLE PLUG, SUCH AS POLYSTYRENE, SHALL BE INSERTED INTO EACH PIPE SLEEVE PRIOR TO SLIDING THE 25 DIA SMOOTH ROUND DOWELS INSIDE THE SLEEVES.
3. DURING PLACEMENT OF THE BARRIER CONCRETE SHOWN IN SECTION G, THE 25 DIA SMOOTH ROUND DOWELS SHALL BE SET 575 FROM FACE OF THE 25 THICK AIFB EXPANSION JOINT. THE DOWELS SHALL BE TIED SECURELY TO THE 1001C STIRRUPS TO PREVENT THE DOWELS FROM SLIDING OUT DURING CONCRETE PLACING AND VIBRATING.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE
2			
1			

Approved:

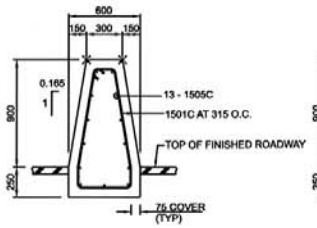
Executive Director,
Technical Standards Branch

Date: NOVEMBER, 2007

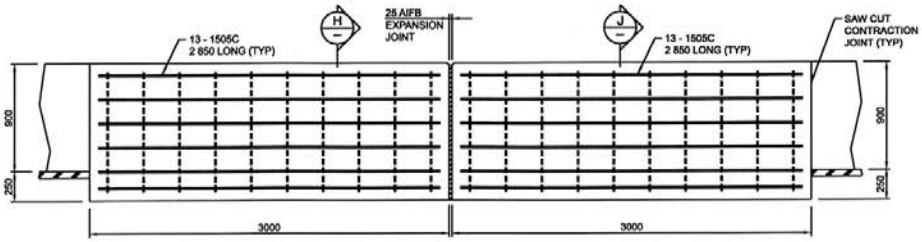
Alberta
INFRASTRUCTURE AND TRANSPORTATION

TL-4 SINGLE SLOPE CONCRETE MEDIAN BARRIER TRANSITION AROUND NEW BRIDGE PIER - SHEET 2 OF 3

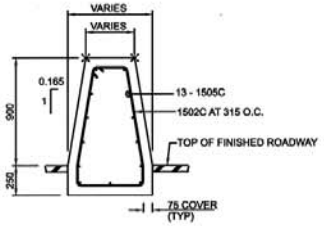
Prepared By: MO	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B6.6



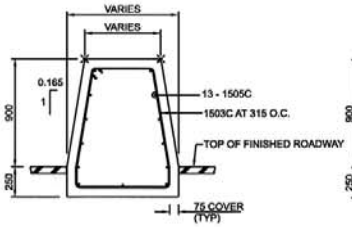
SECTION H



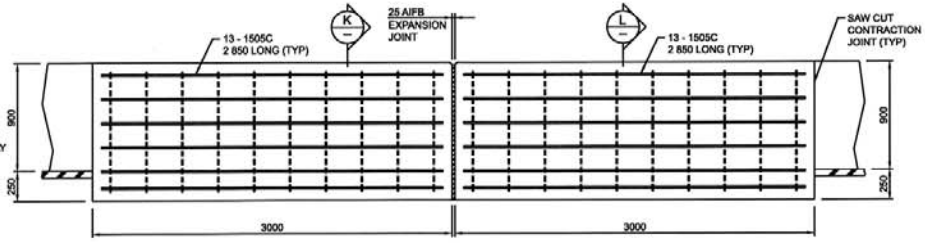
DETAIL 2



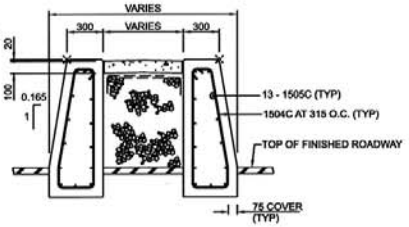
SECTION J



SECTION K



DETAIL 3

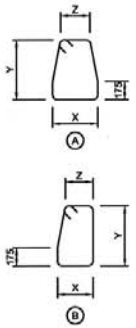


SECTION L

BAR LIST: BARRIER

MARK	SIZE	NO.	TYPE	X	Y	Z	LENGTH	MASS
1501C	15	10	A	450	1 000	178	2 930	46
1502C	15	10	A	LENGTH: X = VARIES FROM 450 TO (450 + 5700/f) IN INCREMENTS OF 633/f Y = 1 000 Z = VARIES FROM 178 TO (178 + 5700/f) IN INCREMENTS OF 633/f			2 930 + 5 700/f	46.00 + 89.49/f
1503C	15	10	A	LENGTH: X = VARIES FROM (1188 - 5700/f) TO 1188 IN INCREMENTS OF 633/f Y = 1 000 Z = VARIES FROM (763 - 5700/f) TO 763 IN INCREMENTS OF 633/f			4 253 - 5 700/f	66.77 - 89.49/f
1504C	15	20	B	LENGTH: X = VARIES FROM 164 TO (164 + 2850/f) IN INCREMENTS OF 633/f Y = 1 000 Z = VARIES FROM 314 TO (314 + 2850/f) IN INCREMENTS OF 633/f			2 489 + 2 850/f	39.10 + 44.75/f
1505C	15	65	STR				2 850	291

EPOXY COATED TOTAL kg = 443 + 44.8/f



BAR LIST NOTES:

- DIAMETERS OF ALL BENDS AND DETAILS OF ALL HOOKS, UNLESS NOTED OTHERWISE, SHALL CONFORM TO THE RECOMMENDED SIZES DETAILED IN THE REINFORCING STEEL MANUAL OF STANDARD PRACTICE, FIRST CANADIAN EDITION 1992, PUBLISHED BY THE REINFORCING INSTITUTE OF CANADA.
- REINFORCING STEEL SHALL BE IN ACCORDANCE WITH CAN/CSA-G30.18M92 "BILLET STEEL BARS FOR CONCRETE REINFORCEMENT".
- ALL REINFORCING STEEL SHALL BE GRADE 400 UNLESS NOTED OTHERWISE.
- " C " DENOTES EPOXY COATED REINFORCEMENT.
- THE FLARE RATE VALUE " f " IS DEFINED IN TABLE A ON RDG-B6.3 AND RDG-B6.5.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE
2			
1			

Approved:

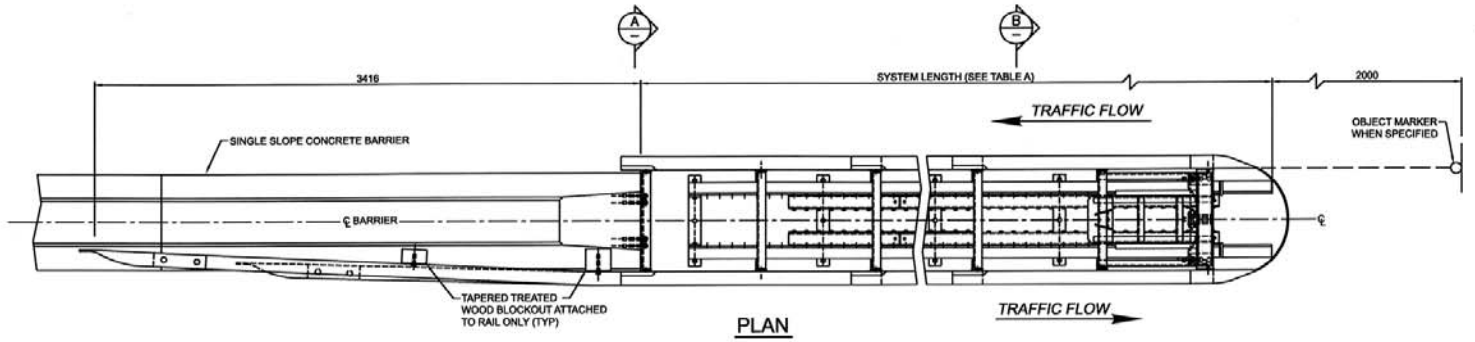
Executive Director, Technical Standards Branch

Date: NOVEMBER, 2007

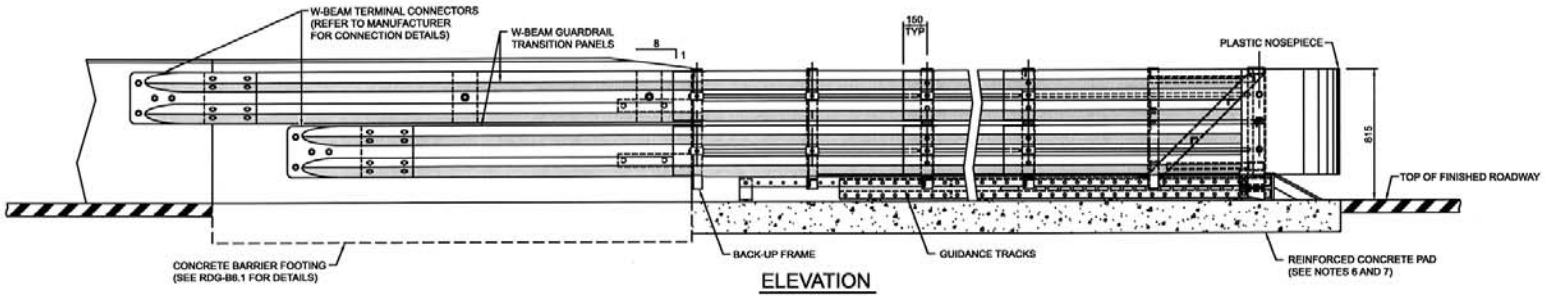
Alberta INFRASTRUCTURE AND TRANSPORTATION

TL-4 SINGLE SLOPE CONCRETE BARRIER TRANSITION AROUND EXISTING/NEW BRIDGE PIER - SHEET 3 OF 3

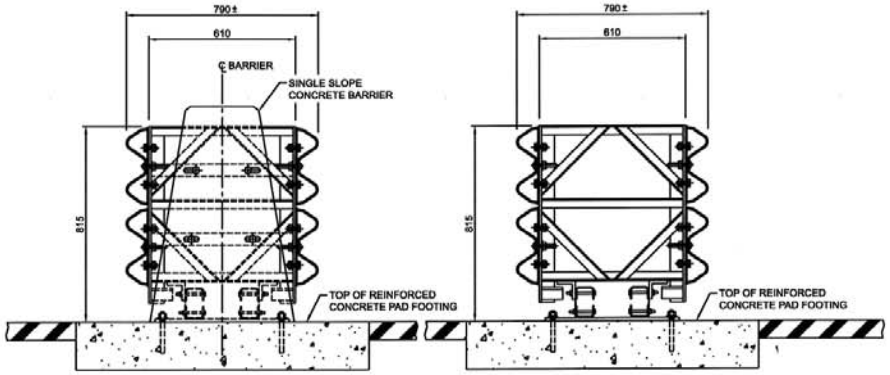
Prepared By: AK/MO	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B6.7



PLAN



ELEVATION



SECTION A SECTION B

NOTES:

1. THE TRINITY ATTENUATING CRASH CUSHION (TRACC) SYSTEM DEPICTED ON THIS DRAWING IS PROPRIETARY TO TRINITY INDUSTRIES, INC.
2. THE TRACC SYSTEM SHALL NOT BE PLACED DIRECTLY BEHIND A RAISED CURB.
3. THE APPROACH AREA IN FRONT OF THE INSTALLED UNIT SHALL BE GRADED TO A SLOPE NOT EXCEEDING 10:1 IN THE DIRECTION OF TRAFFIC FLOW. THE CROSS SLOPE SHALL NOT EXCEED 12:1.
4. THE ENTIRE LENGTH OF THE TRACC SYSTEM CAN BE USED IN LENGTH OF NEED CALCULATIONS AS IT IS FULLY REDIRECTING.
5. SIGNS AND OTHER APPURTENANCES SHALL NOT BE INSTALLED WITHIN 1500 OF THE END OF THE ADJOINING CONCRETE MEDIAN BARRIER. THIS IS TO ALLOW THE SIDE PANELS OF THE TRACC TO RETRACT DURING AN END-ON IMPACT.
6. THE TRACC SYSTEM SHALL BE ANCHORED TO A CONCRETE PAD FOUNDATION AS PER THE INSTALLATION INSTRUCTIONS PROVIDED BY THE MANUFACTURER. SEE DRAWING RDG-B6.11 FOR DETAILS.
7. FOR TEMPORARY APPLICATIONS, THE TRACC SYSTEM MAY BE ANCHORED INTO 150 OF ASPHALT UNDERLAIN WITH AT LEAST 150 OF COMPACTED SUBBASE USING 16 DIA X 460 LONG ANCHOR STUDS AS PER THE MANUFACTURER'S INSTRUCTIONS.

TABLE A		
POSTED SPEED km/h	< 70	≥ 70
NCHRP REPORT 350 TEST LEVEL	TL-2	TL-3
SYSTEM LENGTH	4750	6857

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE
2			
1			

Approved:

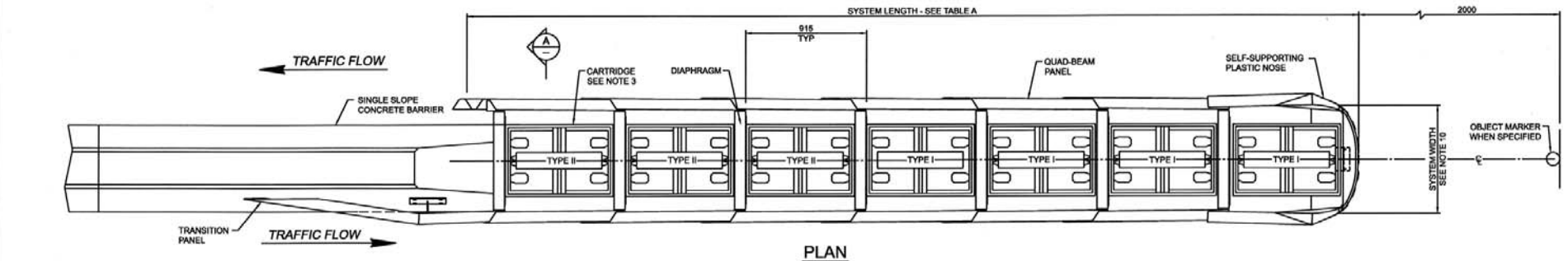
Executive Director, Technical Standards Branch

Date: NOVEMBER, 2007

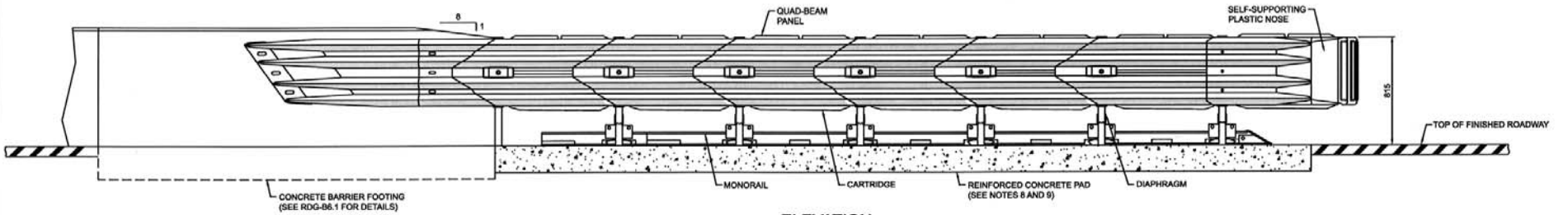
Alberta INFRASTRUCTURE AND TRANSPORTATION

TL-2 AND TL-3 CONCRETE MEDIAN BARRIER TERMINATION TRACC CRASH CUSHION SYSTEM (BIDIRECTIONAL)

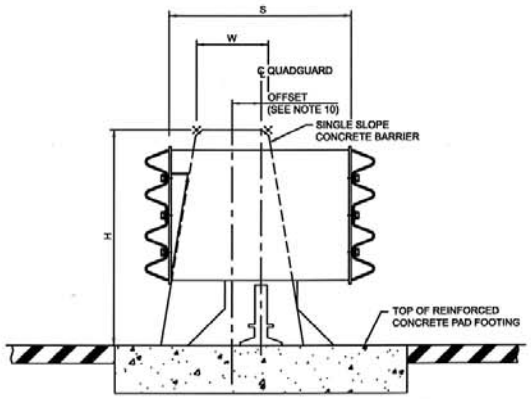
Prepared By: MO	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B6.8



PLAN



ELEVATION



SECTION A

NOTES:

1. THE QUADGUARD SYSTEM DEPICTED ON THIS DRAWING IS PROPRIETARY TO ENERGY ABSORPTION SYSTEMS, INC. THE SYSTEM SHOWN IS FOR A PERMANENT APPLICATION WITH THE SINGLE SLOPE CONCRETE BARRIER PROVIDING BACK-UP.
2. A TENSION STRUT BACKUP MAY BE USED AS PER THE MANUFACTURER'S INSTRUCTIONS WHEN A CONCRETE BACK-UP IS NOT PROVIDED DIRECTLY BEHIND THE QUADGUARD SYSTEM. FOR EXAMPLE, WHEN THE END OF THE CONCRETE BARRIER IS TRANSITIONED USING THRIE BEAM AND/OR W-BEAM BEFORE TERMINATING WITH THE QUADGUARD SYSTEM.
3. SEE TABLE A FOR NUMBER OF CARTRIDGE TYPES REQUIRED BASED ON POSTED SPEED.
4. THE QUADGUARD SYSTEM SHALL NOT BE PLACED DIRECTLY BEHIND A RAISED CURB.
5. THE APPROACH AREA IN FRONT OF THE INSTALLED SYSTEM SHALL BE GRADED TO A SLOPE NOT EXCEEDING 10:1 IN THE DIRECTION OF TRAFFIC FLOW. THE CROSS SLOPE SHALL NOT EXCEED 12:1.
6. THE ENTIRE LENGTH OF THE QUARDGUARD SYSTEM LESS 500 CAN BE USED IN LENGTH OF NEED CALCULATIONS AS IT IS FULLY REDIRECTING.
7. SIGNS AND OTHER APPURTENANCES SHALL NOT BE INSTALLED WITHIN 1500 OF THE END OF THE ADJOINING CONCRETE BARRIER. THIS IS TO ALLOW THE FENDER PANELS OF THE QUARDGUARD TO RETRACT DURING END-ON IMPACT.
8. THE QUADGUARD SYSTEM SHALL BE ANCHORED TO A CONCRETE PAD FOUNDATION AS PER THE INSTALLATION INSTRUCTIONS PROVIDED BY THE MANUFACTURER. SEE DRAWING RDG-B6.11 FOR DETAILS.
9. FOR TEMPORARY APPLICATIONS, THE QUADGUARD SYSTEM IS AVAILABLE IN A CZ CONFIGURATION AND MAY BE ANCHORED INTO 150 OF ASPHALT UNDERLAIN WITH AT LEAST 150 OF COMPACTED SUBBASE USING 16 DIA x 460 LONG ANCHOR STUDS AS PER THE MANUFACTURER'S INSTRUCTIONS.
10. FOR MEDIAN INSTALLATIONS IN BIDIRECTIONAL TRAFFIC FLOW AND WHEN CONNECTING DIRECTLY TO A SINGLE SLOPE CONCRETE BARRIER, A TRANSITION PANEL SHALL BE INSTALLED TO FACE OF BARRIER. THE OFFSET BETWEEN CENTERLINE OF THE QUARDGUARD SYSTEM WIDTH "S" AND CENTERLINE OF THE BARRIER SHALL BE DETERMINED USING THE FOLLOWING FORMULA:
W + (0.36)H - S - 10 = OFFSET (mm)

TABLE A

POSTED SPEED KM/H	< 70	≥ 70
NCHRP REPORT 350 TEST LEVEL	TL - 2	TL - 3
BAYS	3	6
TYPE I CARTRIDGES FRONT	3	4
TYPE II CARTRIDGES REAR	1	3
SYSTEM LENGTH	4000	6740

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE
2			
1			

Approved:

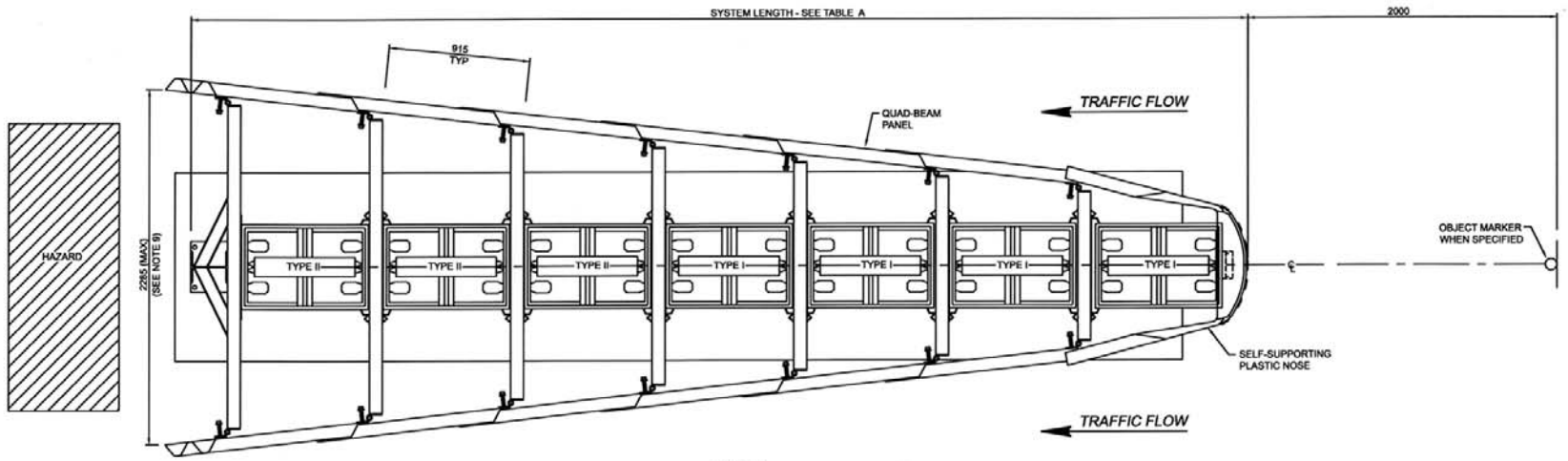
Executive Director,
Technical Standards Branch

Date: NOVEMBER, 2007

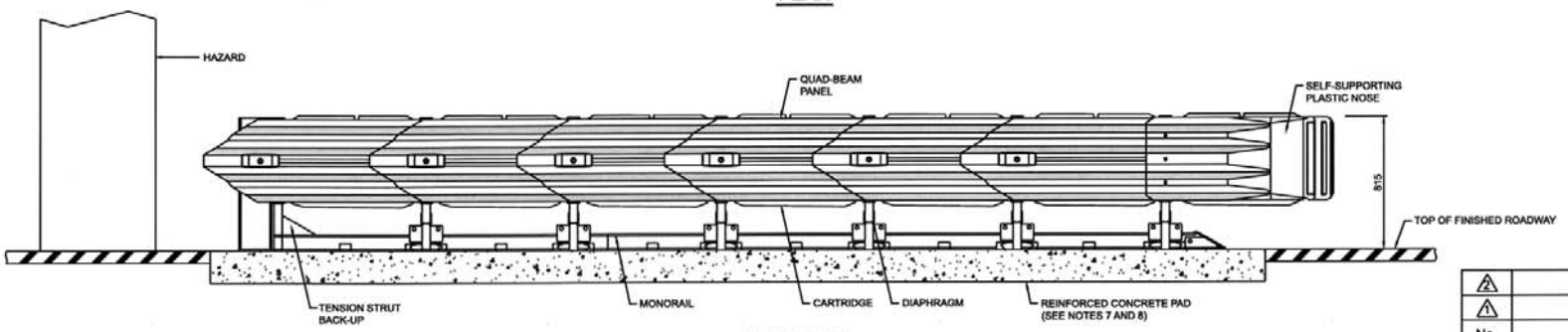
Alberta
INFRASTRUCTURE AND TRANSPORTATION

TL-2 AND TL-3 CONCRETE MEDIAN BARRIER TERMINATION QUADGUARD CRASH CUSHION SYSTEM (BIDIRECTIONAL)

Prepared By: MO	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B6.9



PLAN



ELEVATION

NOTES:

1. THE QUADGUARD SYSTEM DEPICTED ON THIS DRAWING IS PROPRIETARY TO ENERGY ABSORPTION SYSTEMS, INC. THE SYSTEM SHOWN IS FOR A PERMANENT APPLICATION WITH A TENSION STRUT PROVIDING BACK-UP.
2. SEE TABLE A FOR NUMBER OF CARTRIDGE TYPES REQUIRED BASED ON POSTED SPEED.
3. THE QUADGUARD SYSTEM SHALL NOT BE PLACED DIRECTLY BEHIND A RAISED CURB.
4. THE APPROACH AREA IN FRONT OF THE INSTALLED SYSTEM SHALL BE GRADED TO A SLOPE NOT EXCEEDING 10:1 IN THE DIRECTION OF TRAFFIC FLOW. THE CROSS SLOPE SHALL NOT EXCEED 12:1.
5. THE ENTIRE LENGTH OF THE QUARDGUARD SYSTEM LESS 500 CAN BE USED IN LENGTH OF NEED CALCULATIONS AS IT IS FULLY REDIRECTING.
6. SIGNS AND OTHER APPURTENANCES SHALL NOT BE INSTALLED WITHIN 1500 DIRECTLY BEHIND THE END OF THE FENDER PANELS. THIS IS TO ALLOW THE FENDER PANELS OF THE QUARDGUARD TO RETRACT DURING END-ON IMPACT.
7. THE QUADGUARD SYSTEM SHALL BE ANCHORED TO A CONCRETE PAD FOUNDATION AS PER THE INSTALLATION INSTRUCTIONS PROVIDED BY THE MANUFACTURER. SEE DRAWING RDG-B6.11 FOR DETAILS.
8. FOR TEMPORARY APPLICATIONS, THE QUADGUARD SYSTEM IS AVAILABLE IN A CZ CONFIGURATION AND MAY BE ANCHORED INTO 150 OF ASPHALT UNDERLAIN WITH AT LEAST 150 OF COMPACTED SUBBASE USING 16 DIA X 460 LONG ANCHOR STUDS AS PER THE MANUFACTURER'S INSTRUCTIONS.
9. THE QUADGUARD SYSTEM IS AVAILABLE IN 5 NOMINAL WIDTHS: 610, 760, 915, 1755 AND 2285. UNLESS OTHERWISE WARRANTED BY SITE SPECIFIC REQUIREMENTS, SELECTION OF THE NARROWEST WIDTH THAT ADEQUATELY SHIELDS THE HAZARD IS RECOMMENDED.

TABLE A		
POSTED SPEED KM/H	< 70	≥ 70
NCHRP REPORT 350 TEST LEVEL	TL - 2	TL - 3
BAYS	3	6
TYPE I CARTRIDGES FRONT	3	4
TYPE II CARTRIDGES REAR	1	3
SYSTEM LENGTH	4000	6740

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE
2			
1			

Approved:

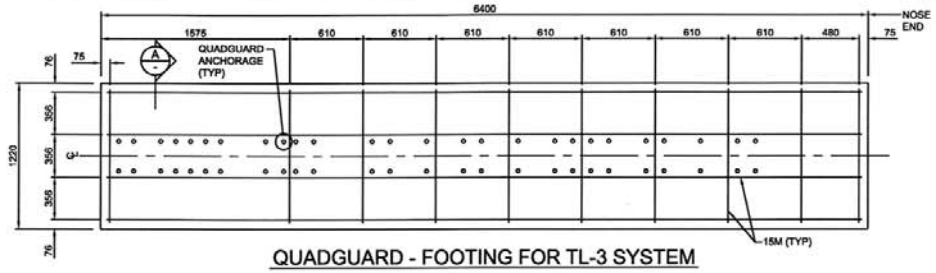
Executive Director,
Technical Standards Branch

Date: NOVEMBER, 2007

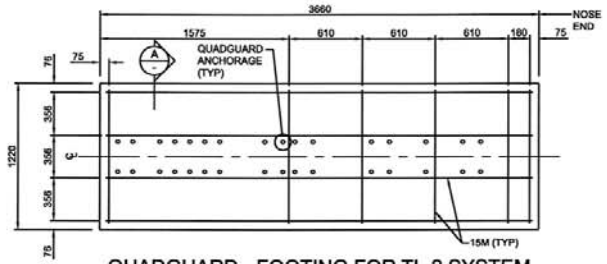
Alberta
INFRASTRUCTURE AND TRANSPORTATION

TL-2 AND TL-3 UNIDIRECTIONAL QUADGUARD CRASH CUSHION SYSTEM FOR WIDE MEDIAN HAZARDS

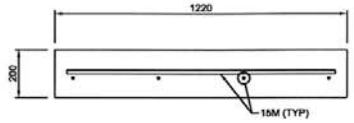
Prepared By: MO	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B6.10



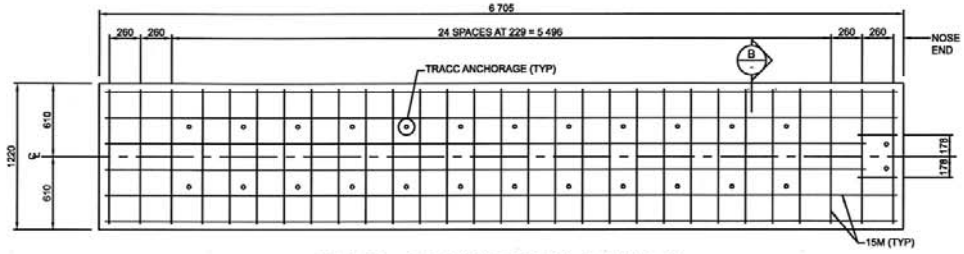
QUADGUARD - FOOTING FOR TL-3 SYSTEM



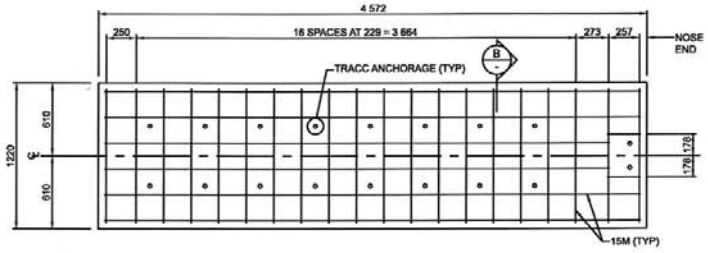
QUADGUARD - FOOTING FOR TL-2 SYSTEM



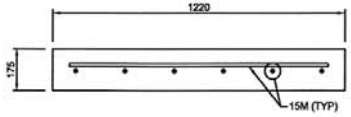
SECTION A



TRACC - FOOTING FOR TL-3 SYSTEM



TRACC - FOOTING FOR TL-2 SYSTEM



SECTION B

NOTES:

1. THIS DRAWING IS APPLICABLE FOR PERMANENT APPLICATIONS OF QUADGUARD AND TRACC SYSTEMS. FOR TEMPORARY APPLICATIONS, ALTERNATE FOUNDATIONS MAY BE USED AS RECOMMENDED BY THE MANUFACTURER, PROVIDED THAT THE INSTALLED SYSTEM MAINTAINS COMPLIANCE WITH NCHRP REPORT 350 FOR TEST LEVEL 3 (TL-3).
2. CONCRETE FOOTINGS SHALL BE PLACED ON WELL COMPACTED GRANULAR BASE TO 95% STANDARD PROCTOR MAXIMUM DRY DENSITY.
3. CONCRETE SHALL BE MODIFIED CLASS C (MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 35 MPa).
4. SUPPLY AND INSTALLATION OF CONCRETE AND REINFORCING STEEL AS PER THE CONTRACT SPECIFICATIONS.
5. CONCRETE REINFORCING STEEL SHALL BE EPOXY COATED.
6. PROVIDE 75 END COVER AND 75 BOTTOM COVER FOR ALL CONCRETE REINFORCEMENT.
7. REFER TO THE MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR ANCHORAGE DETAILS.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE
2			
1			

Approved:

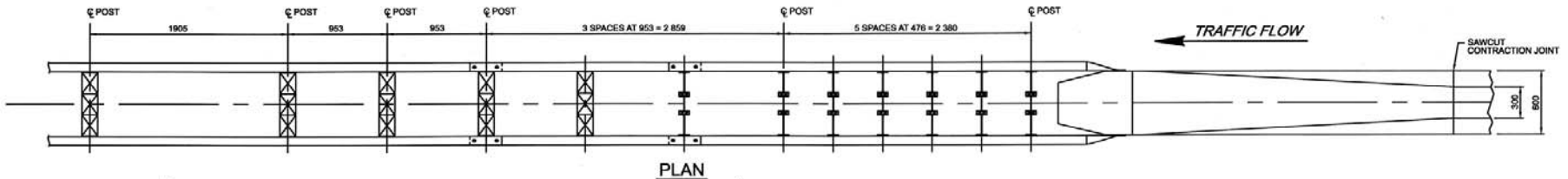
Executive Director,
Technical Standards Branch

Date: NOVEMBER, 2007

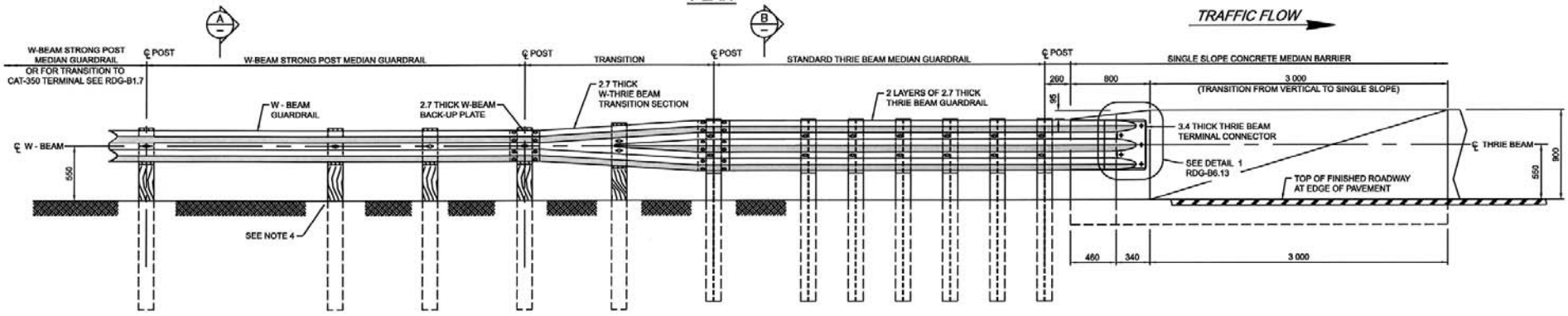
Alberta
INFRASTRUCTURE AND TRANSPORTATION

QUADGUARD AND TRACC CRASH CUSHION SYSTEMS CONCRETE PAD FOUNDATION

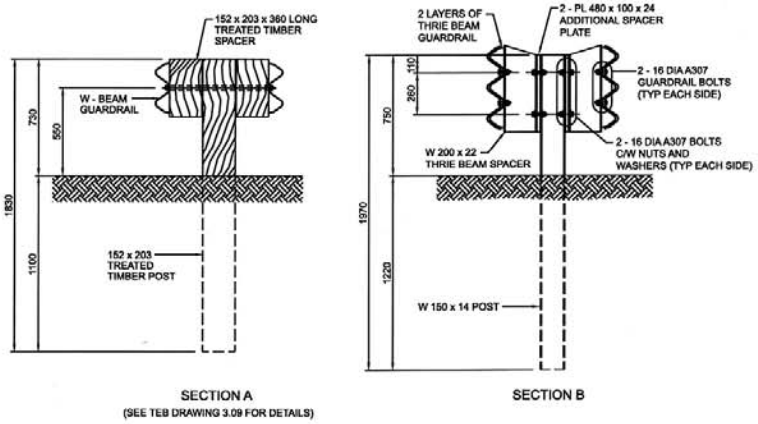
Prepared By: AK	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B6.11



PLAN



ELEVATION



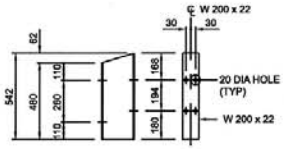
SECTION A
(SEE TEB DRAWING 3.09 FOR DETAILS)

SECTION B

POST DETAILS

NOTES:

1. LAP GUARDRAIL SECTIONS IN THE DIRECTION OF TRAFFIC FLOW.
2. ALL FITTINGS AND HARDWARE SHALL BE GALVANIZED.
3. LINE AND ELEVATION OF BARRIER SHALL BE SET BY INSTRUMENT.
4. ACP OR GRANULAR BASE COURSE MAY BE PROVIDED AROUND GUARDRAIL POSTS AS PER SITE SPECIFIC REQUIREMENTS.
5. THIS TRANSITION MAY BE CONSIDERED TO SATISFY NCHRP REPORT 350 REQUIREMENTS FOR TEST LEVEL 4 (TL4)



THRIE BEAM SPACER DETAIL

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE
2			
1			

Approved:

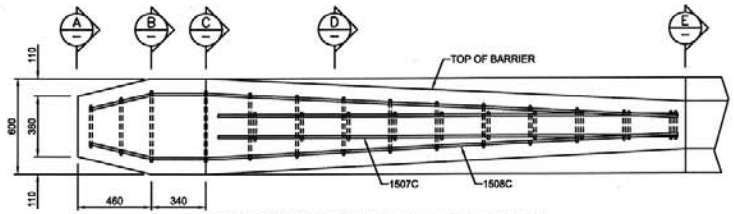
Executive Director,
Technical Standards Branch

Date: NOVEMBER, 2007

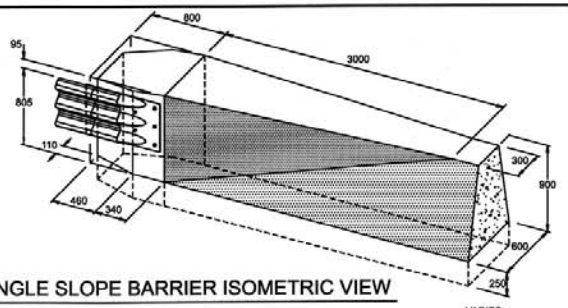
Alberta
INFRASTRUCTURE AND TRANSPORTATION

TRANSITION OF TL-4 SINGLE SLOPE CONCRETE BARRIER TO W-BEAM MEDIAN GUARDRAIL
SHEET 1 OF 2

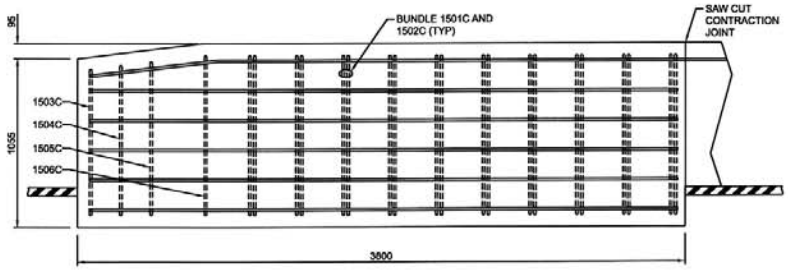
Prepared By: MO	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B6.12



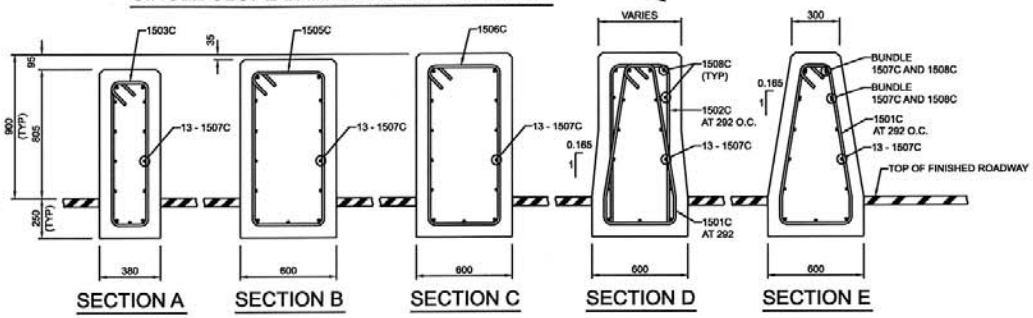
BARRIER REINFORCEMENT PLAN



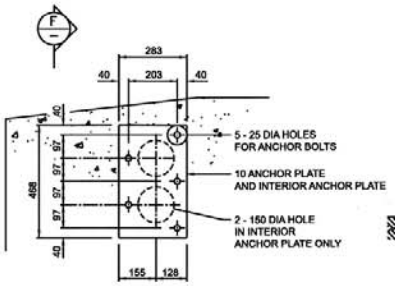
SINGLE SLOPE BARRIER ISOMETRIC VIEW



BARRIER REINFORCEMENT ELEVATION

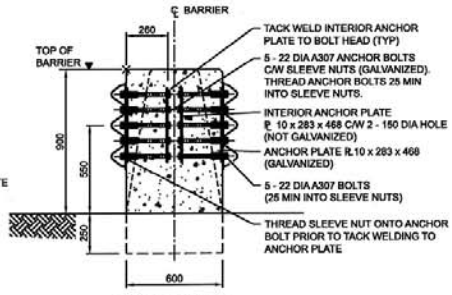


SECTION A SECTION B SECTION C SECTION D SECTION E



DETAIL 1

APPROACH RAIL TRANSITION ANCHORAGE (THRIE BEAM TERMINAL CONNECTOR NOT SHOWN FOR CLARITY)

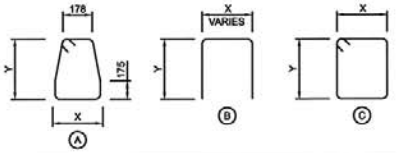


SECTION F

BAR LIST: BARRIER

MARK	SIZE	NO.	TYPE	X	Y	LENGTH	MASS
1501C	15	10	A	450	1 000	2 930	46
1502C	15	10	B	X VARIES FROM 422 TO 190 IN INCREMENTS OF 29, ONE BAR AT 178	1 000	2 295 (AVG)	36
1503C	15	1	C	265	900	2 550	4
1504C	15	1	C	380	930	2 620	4
1505C	15	1	C	450	955	2 810	4
1506C	15	1	C	450	1 000	2 900	5
1507C	15	13	STR	-	-	2 850	53
1508C	15	4	STR	-	-	3 650	23

EPOXY COATED TOTAL kg = 175



BAR LIST NOTES:

- DIAMETERS OF ALL BENDS AND DETAILS OF ALL HOOKS, UNLESS NOTED OTHERWISE, SHALL CONFORM TO THE RECOMMENDED SIZES DETAILED IN THE REINFORCING STEEL MANUAL OF STANDARD PRACTICE, FIRST CANADIAN EDITION 1992, PUBLISHED BY THE REINFORCING INSTITUTE OF CANADA.
- REINFORCING STEEL SHALL BE IN ACCORDANCE WITH CAN/CSA-G30.18M92 "BILLET STEEL BARS FOR CONCRETE REINFORCEMENT".
- ALL REINFORCING STEEL SHALL BE GRADE 400 UNLESS NOTED OTHERWISE.
- "C" DENOTES EPOXY COATED REINFORCEMENT.
- ALL CONCRETE SHALL BE MODIFIED CLASS C UNLESS OTHERWISE SPECIFIED (MINIMUM 28 DAY COMPREHENSIVE STRENGTH OF 35 MPa).
- ALL CONCRETE CORNERS SHALL HAVE A 20 CHAMFER OR FILLET UNLESS NOTED OTHERWISE.
- ALL REINFORCING STEEL SHALL HAVE 75 CLEAR COVER UNLESS NOTED OTHERWISE.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE
2			
1			

Approved:

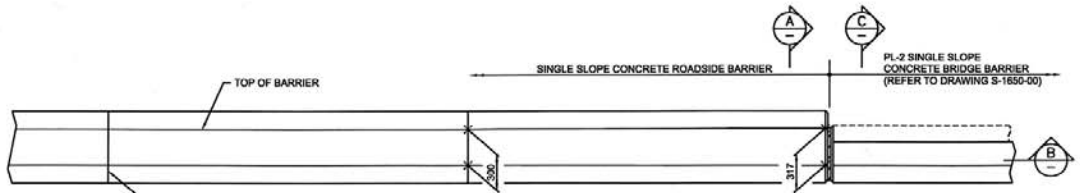
Executive Director, Technical Standards Branch

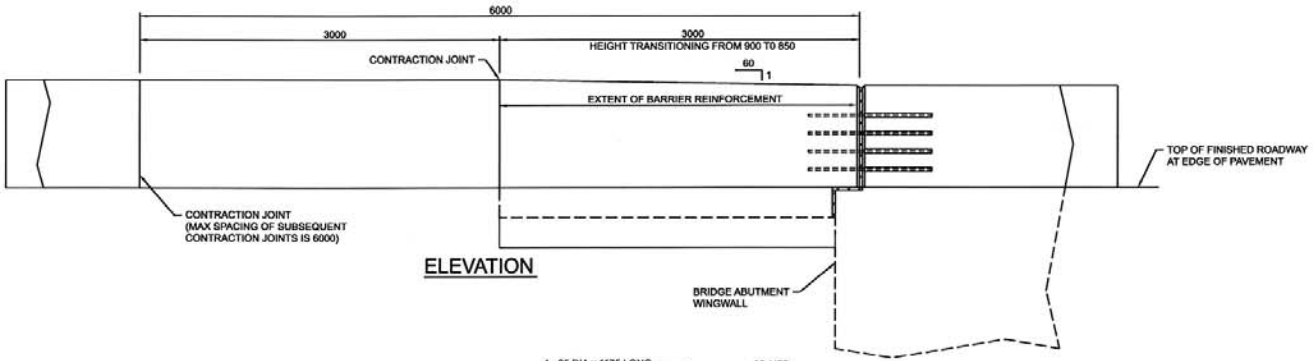
Date: NOVEMBER, 2007

Alberta
INFRASTRUCTURE AND TRANSPORTATION

TRANSITION OF TL-4 SINGLE SLOPE CONCRETE BARRIER TO W-BEAM MEDIAN GUARDRAIL SHEET 2 OF 2

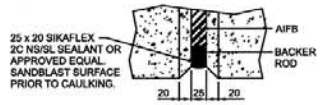
Prepared By: MO	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B6.13



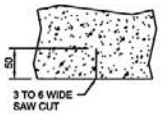


NOTES:

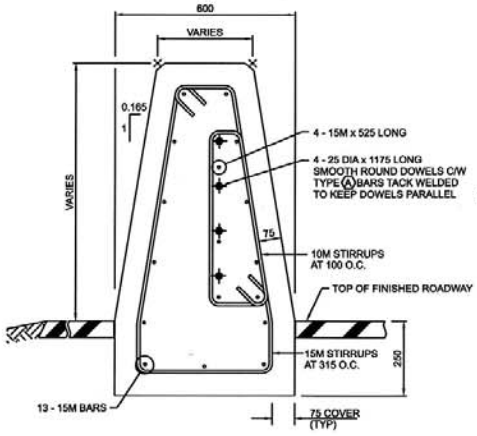
- DIAMETERS OF ALL BENDS AND DETAILS OF ALL HOOKS, UNLESS NOTED OTHERWISE, SHALL CONFORM TO THE RECOMMENDED SIZES DETAILED IN THE REINFORCING STEEL MANUAL OF STANDARD PRACTICE, FIRST CANADIAN EDITION 1992, PUBLISHED BY THE REINFORCING INSTITUTE OF CANADA.
- REINFORCING STEEL SHALL BE IN ACCORDANCE WITH CAN/CSA-G30.18M92 "BILLET STEEL BARS FOR CONCRETE REINFORCEMENT".
- ALL REINFORCING STEEL SHALL BE GRADE 400 UNLESS NOTED OTHERWISE.
- SMOOTH ROUND DOWELS SHALL BE ASTM GRADE A36, OR APPROVED EQUAL, WITH A MINIMUM YIELD STRENGTH OF 250 MPa.
- ALL REINFORCEMENT SHALL BE EPOXY COATED.
- ROADSIDE CONCRETE BARRIER SHALL BE MODIFIED CLASS C (MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 35 MPa.)
- ALL CONCRETE CORNERS SHALL HAVE A 20 CHAMFER OR FILLET UNLESS NOTED OTHERWISE.
- ALL REINFORCING STEEL SHALL HAVE 75 CLEAR COVER UNLESS NOTED OTHERWISE.



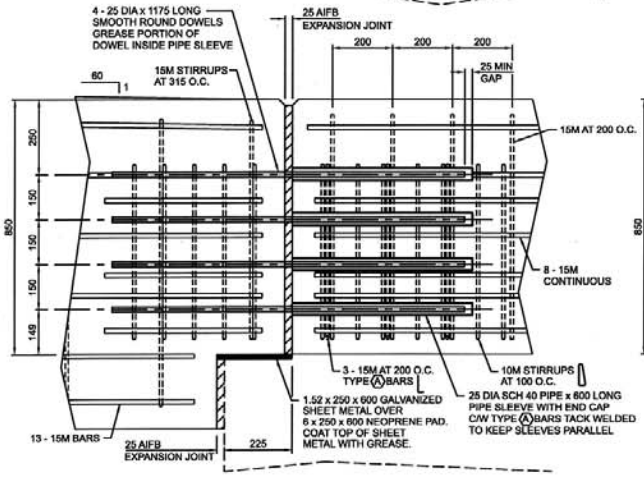
EXPANSION/CONSTRUCTION JOINT DETAIL



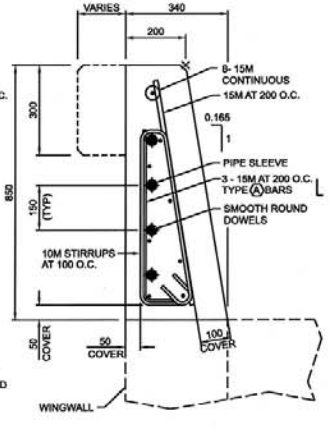
CONTRACTION JOINT DETAIL



SECTION A
ROADSIDE CONCRETE BARRIER



SECTION B



SECTION C
BRIDGE BARRIER

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

* WORK THIS DRAWING WITH S-1650-00

No.	REVISIONS	BY	DATE
2			
1			

Approved:

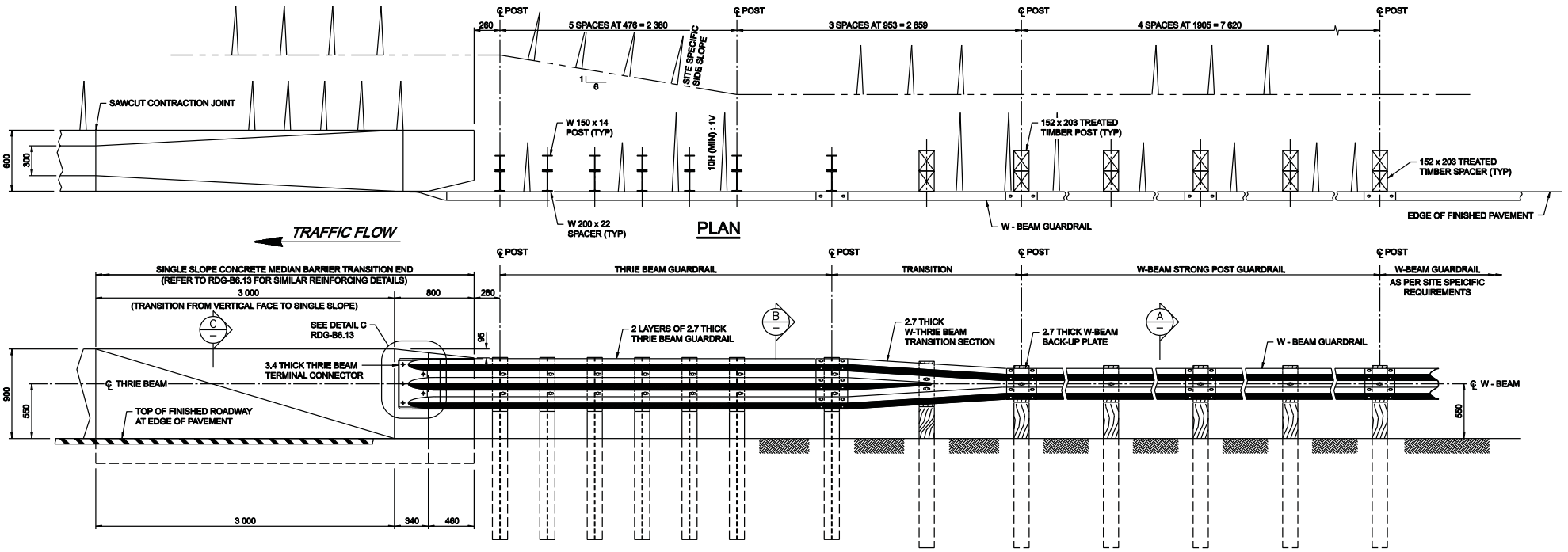
Executive Director, Technical Standards Branch

Date: NOVEMBER, 2007

Alberta
INFRASTRUCTURE AND TRANSPORTATION

TL-4 SINGLE SLOPE CONCRETE BARRIER TRANSITION TO PL-2 STANDARD BRIDGE CONCRETE BARRIER

Prepared By: MO	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B6.14



NOTES: ⚠1

1. LAP GUARDRAIL SECTION IN THE DIRECTION OF TRAFFIC FLOW.
2. ALL FITTINGS AND HARDWARE SHALL BE GALVANIZED.
3. LINE AND ELEVATION OF BARRIER SHALL BE SET BY INSTRUMENT.
4. ACP OR GRANULAR BASE COURSE MAY BE PROVIDED AROUND GUARDRAIL POSTS AS PER SITE SPECIFIC REQUIREMENTS.
5. THIS TRANSITION MAY BE CONSIDERED TO SATISFY NCHRD REPORT 350 REQUIREMENTS FOR TEST LEVEL 4 (TL4)
6. FASTEN REFLECTOR TO TOP OF EVERY SIXTH GUARDRAIL STRONG POST SPACER BY MECHANICAL MEANS SUCH AS NAILING OR STAPLING. ADHESIVE ALONE WILL NOT BE ACCEPTED. REFER TO DRAWING TEB 3.01 FOR REFLECTOR DETAILS.
7. FASTEN REFLECTOR TO TOP OF EVERY SIXTH GUARDRAIL STEEL OFFSET BLOCK WITH APPROVED ADHESIVE. REFER TO DRAWING TEB 3.01 FOR REFLECTOR DETAILS.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE
⚠2			
⚠1	NOTES 6 AND 7 REVISED	PM	9 JUL 98

Approved:

Allan Kwan
Executive Director,
Technical Standards Branch

Date: NOVEMBER, 2007

Alberta Transportation

TRANSITION OF W-BEAM GUARDRAIL TO TL-4 SINGLE SLOPE CONCRETE ROADSIDE BARRIER

Prepared By: NSP	Checked By: WS	Scale: N.T.S	Dwg No.: RDG-B6.15

THIS PAGE LEFT INTENTIONALLY BLANK

APPENDIX B7

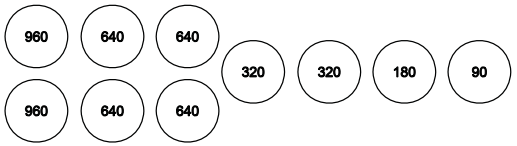
MISCELLANEOUS DRAWINGS

THIS PAGE INTENTIONALLY LEFT BLANK

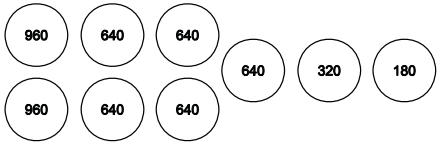
Appendix B7
Miscellaneous Drawings

TABLE OF CONTENTS

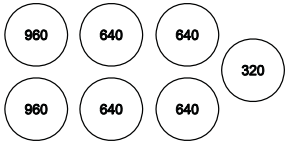
THIS PAGE INTENTIONALLY LEFT BLANK



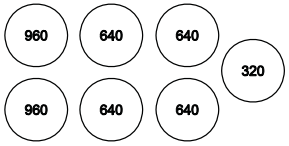
BARREL ARRAY - 80km/h



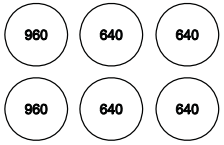
BARREL ARRAY - 70km/h



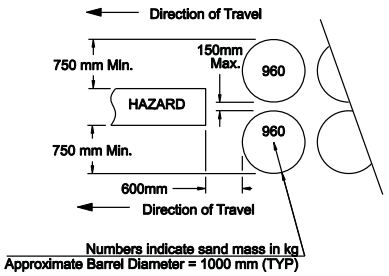
BARREL ARRAY - 60km/h



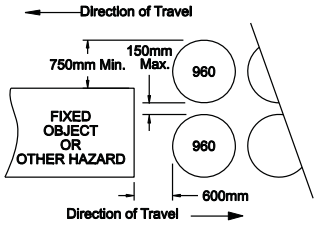
BARREL ARRAY - 50km/h



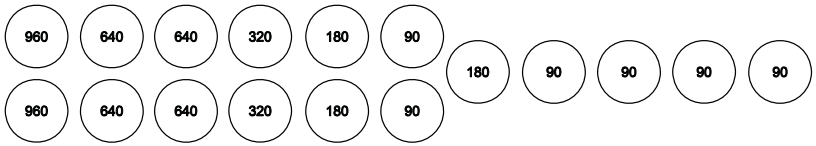
BARREL ARRAY - 40km/h



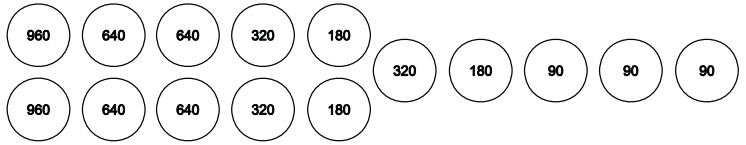
ONE DIRECTION TRAFFIC



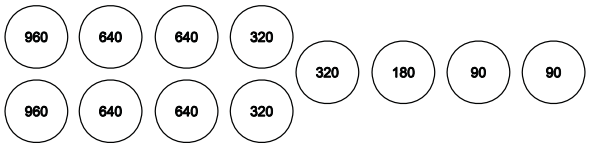
TWO DIRECTION TRAFFIC



BARREL ARRAY - 110km/h



BARREL ARRAY - 100km/h



BARREL ARRAY - 90km/h

General notes:

1. Only crash tested components meeting NCHRP 350 requirements shall be used. The systems currently available are:
   a. Energite Inertia Barrier System by Quixote Transportation Safety Inc.
   b. Fitch Sand Barrel System by Quixote Transportation Safety Inc.
   c. TrafFix Impact Attenuator Sand Barrels by TrafFix Devices Inc.
2. The sand mass shall be clearly marked on each barrel.
3. For permanent installations, the Fitch System shall be used.
4. The systems shall be installed strictly in accordance with manufacturer's recommendations.
5. The sand barrel systems are non-directive and break up during impact. The vehicle speed is slowed by transfer of it's momentum to the sand, allowing for safe, steady deceleration. Sand and plastic parts from the system will scatter in the direction of impact.
6. Fill sand shall conform to ASTM C-33 – washed concrete sand or approved equal. Moisture content of sand shall be three percent or less to minimize caking. The sand shall be mixed with an appropriate percentage of rock salt when use during freezing temperature is expected.
7. Barrels shall be set as far from the traveled way as possible to minimize the number of brush or nuisance hits.
8. Barrel layout shall conform with the configuration for the appropriate posted highway speed.
9. In the case of work zone installations, the design speed shall be at least equal to the speed posted through the work zone.

No.	REVISIONS	BY	DATE
2	.	.	.
1	.	.	.

Approved:
Original signed by
Allan Kwan

Executive Director,
Technical Standards Branch

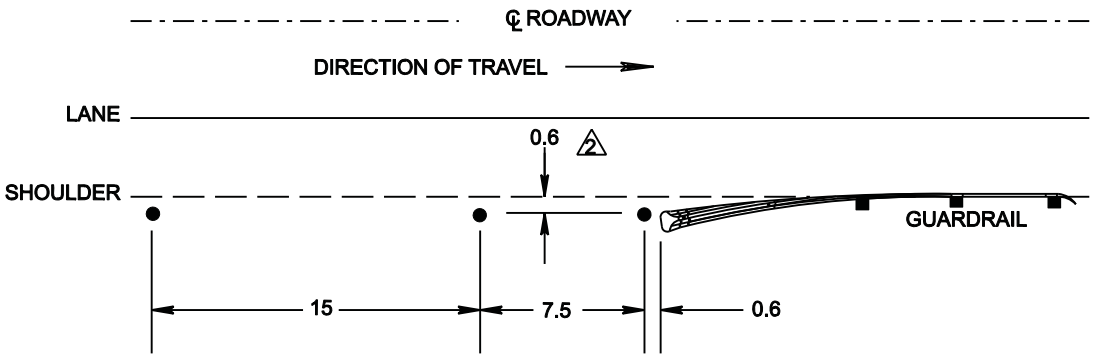
Date: NOVEMBER 23, 2004

Alberta
INFRASTRUCTURE AND TRANSPORTATION

SAND BARREL CUSHION SYSTEM

Prepared By: M.T.	Checked By: R.Y.	Scale: N.T.S.	Dwg No.: TEB 3.19

THIS PAGE LEFT INTENTIONALLY BLANK



ADJACENT TO END TREATMENT

LEGEND:

- DELINEATOR GUIDEPOST

NOTE: 1

VARIOUS TYPES OF END TREATMENTS MAY BE USED AS PER PROJECT REQUIREMENTS.

No.	REVISIONS	BY	DATE
1	Post Offset	B.K.	01 Nov 07
2	Note added	B.K.	12/07/05

Approved:
Original approved by
Alberta Transportation and Utilities
Traffic Operation Branch

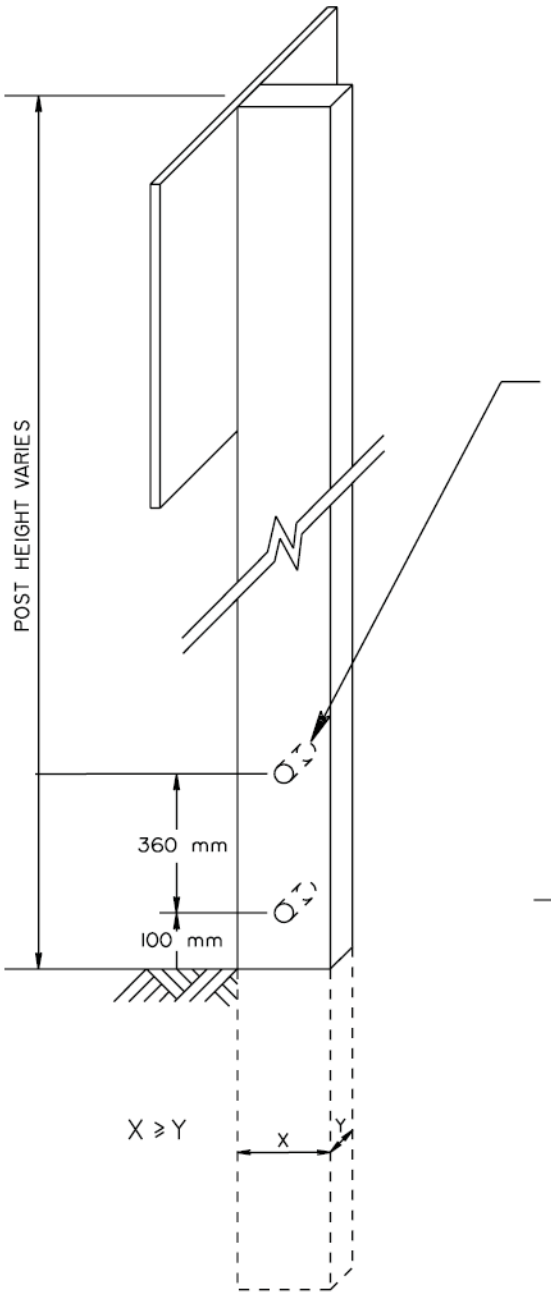
Executive Director,
Technical Standards Branch

Date: DECEMBER 11, 1992

Alberta
INFRASTRUCTURE AND TRANSPORTATION

GUIDE POST DELINEATION FOR GUARDRAIL

Prepared By:	Checked By:	Scale:	Dwg No.:
M.T	B.K	N.T.S.	TEB 3.51



2-38 mm DIA. HOLES TREATED WITH AN APPROVED WOOD PRESERVATIVE.

FILL EACH HOLE WITH A SINGLE PIECE OF CLOSED CELL INSULATION (E.G., EXPANDING STYROFOAM) CUT FLUSH WITH FACE OF POST.

THE ORIENTATION OF THE POSTS FOR THE SIGN MOUNTING SHALL BE IN ACCORDANCE WITH X AND Y AS SHOWN.

HOLES ARE TO BE DRILLED PERPENDICULAR TO THE DIRECTION OF TRAFFIC FLOW.

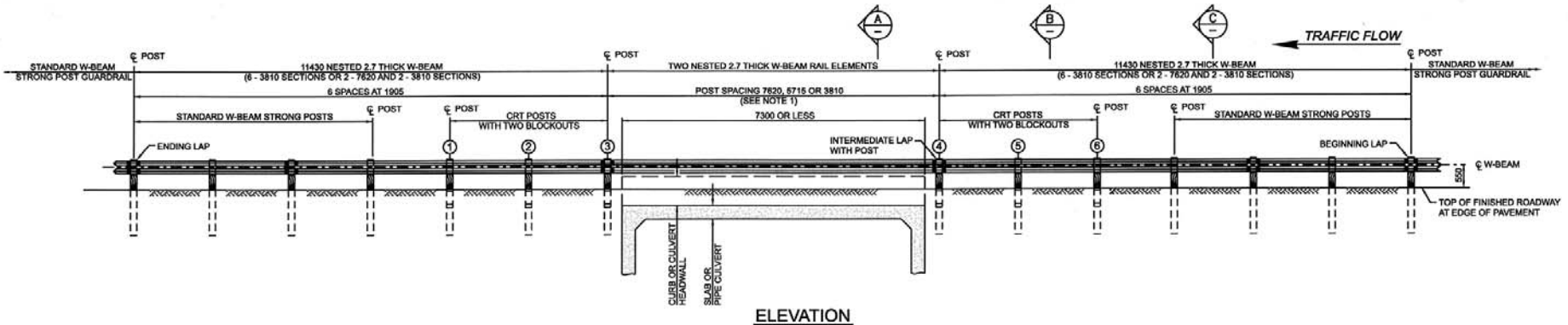
DIRECTION OF TRAFFIC FLOW →

NOTE:
THE BREAKAWAY FEATURE FOR WOOD POSTS WITH CROSS-SECTIONAL DIMENSIONS GREATER THAN 100 mm X 100 mm IS REQUIRED FOR POSTS LOCATED WITHIN THE CLEAR ZONE AND DESIRABLE FOR POSTS LOCATED OUTSIDE THE CLEAR ZONE (WITHIN HIGHWAY RIGHT-OF-WAY).

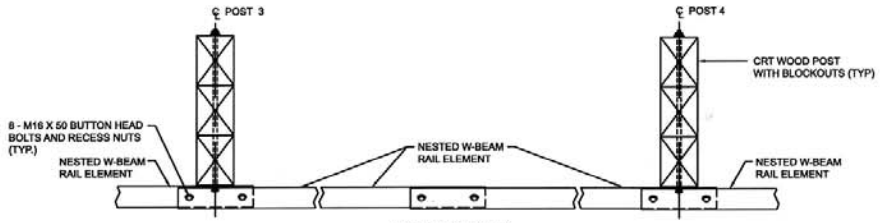
Alberta Transportation

DWG. No.	TEB 1.81
Date	JUNE 13/08
Revision	
Revision	

TYPICAL BREAKAWAY WOOD POST

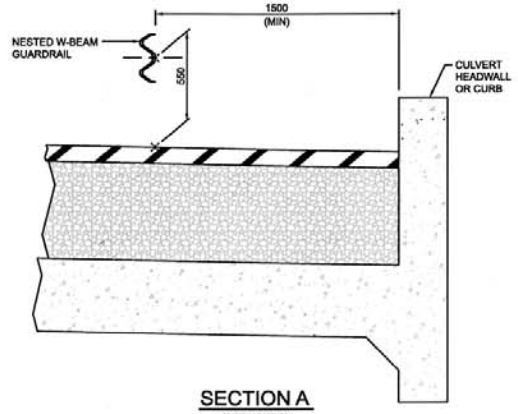


ELEVATION

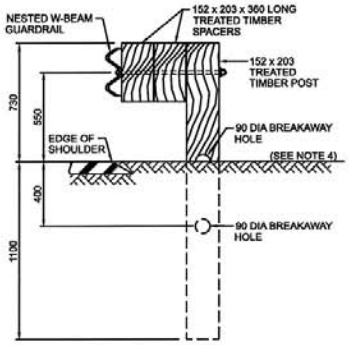


NOTES:

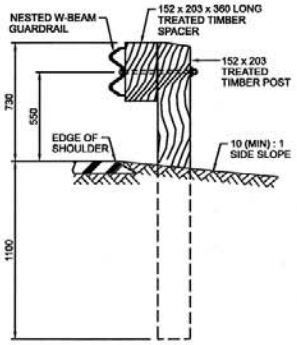
1. 7620 RAIL LENGTHS MAY BE USED TO ELIMINATE THE INTERMEDIATE LAP WITHOUT A POST. DO NOT PLACE A LAP WITHOUT A POST UNLESS NEEDED DUE TO LENGTH OF GAP.
2. POST 1 THRU 6 ARE CRT POSTS WITH TWO BLOCKOUTS. (SEE SECTION B FOR DETAILS)
3. INSTALL THE BACK FACE OF THE NESTED GUARDRAIL A MINIMUM OF 1500 FROM THE FACE OF THE CURB-LIKE HEADWALL.
4. MAINTAIN FLAT SIDE SLOPE GRATING AT POST LOCATIONS.
5. LAP ALL RAIL SECTIONS IN THE DIRECTION OF TRAFFIC FLOW.
6. ALL FITTINGS AND HARDWARE SHALL BE GALVANIZED.
7. THIS DESIGN MEETS NCHRP REPORT 350 EVALUATION CRITERIA FOR TL-3



SECTION A
(SEE NOTE 3)



SECTION B
CONTROLLED RELEASE TERMINAL (CRT) POST
(SEE NOTE 2)



SECTION C
STANDARD W-BEAM STRONG POST
(FOR DETAILS SEE TEB DRAWING 3.09)

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE
2	.	.	.
1	.	.	.

Approved:

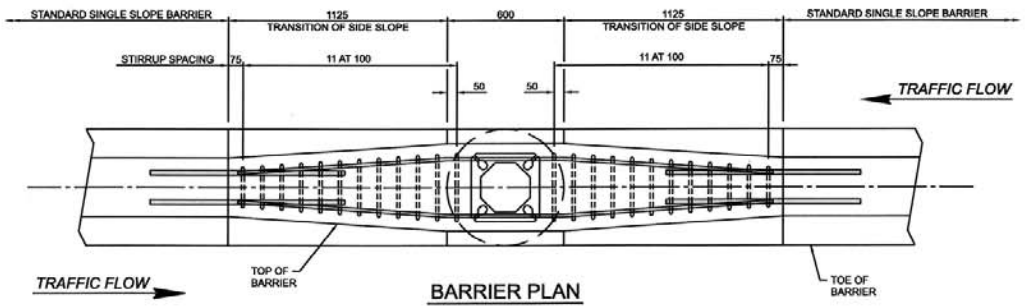
Executive Director,
Technical Standards Branch

Date: NOVEMBER, 2007

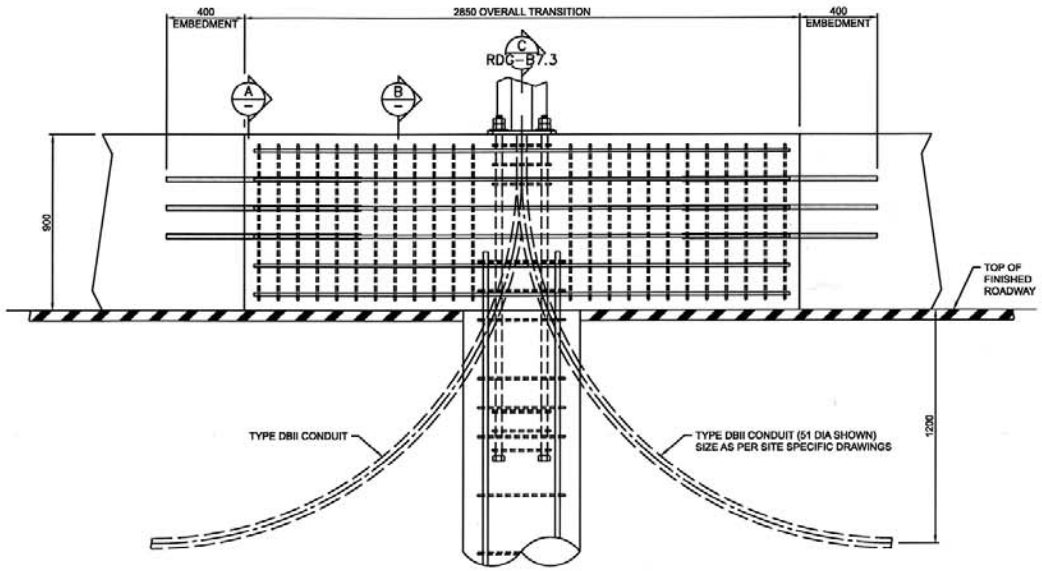
Alberta
INFRASTRUCTURE AND TRANSPORTATION

TL-3 W-BEAM GUARDRAIL PLACEMENT AT MINOR STRUCTURES AND BOX CULVERTS

Prepared By: MO	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG-B7.1



BARRIER PLAN



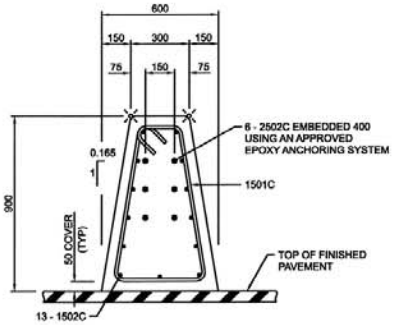
BARRIER ELEVATION

NOTES:

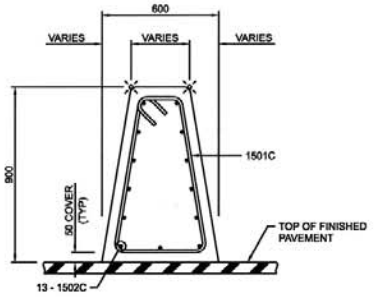
1. PROVIDE 20mm CHAMFER AT TOP EDGES OF BARRIER.
2. CONCRETE FOR PILES SHALL BE CLASS "PILE" UNLESS OTHERWISE SPECIFIED (MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 25 MPa).
3. BARRIER CONCRETE SHALL BE SULPHATE RESISTANT MODIFIED CLASS C UNLESS OTHERWISE SPECIFIED (MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 35 MPa).

CONSTRUCTION NOTES:

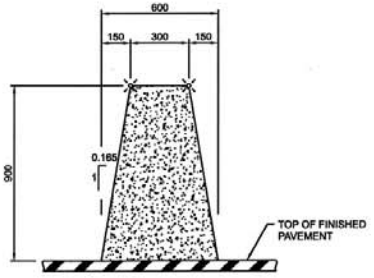
1. PLACING CONCRETE FOR THE BARRIER TRANSITION MAY BE DONE BY:
   i. REMOVING THE 2850mm LONG SECTION OF SLIP FORMED BARRIER BY SAW CUTTING,
   ii. OR BLOCKING OUT THE 2850mm LONG SECTION OF SLIP FORMED BARRIER USING FORMED CONSTRUCTION JOINTS DURING CONCRETE PLACEMENT OF THE STANDARD SINGLE SLOPE BARRIER.
2. EXCAVATIONS MADE THROUGH THE ACP AND SUPPORTING ROAD BASE MATERIAL TO EXPOSE THE ELECTRICAL CONDUIT SHALL BE MADE ONLY WITHIN THE 2850 X 600 FOOTPRINT OF THE TRANSITION BARRIER. COMPETENT MATERIAL SUCH AS COMPACTED ROAD BASE OR CONCRETE MAYBE USED FOR BACKFILLING THE EXCAVATION TO TOP OF FINISHED ROADWAY.
3. PROVIDE LONGITUDINAL SAW CUTS THROUGH ACP ALONG BOTTOM EDGE OF BARRIER PRIOR TO DRILLING OF PILE HOLE. SAW CUTS SHALL BE OF SUFFICIENT LENGTH AND DEPTH TO PREVENT CHIPPING DURING PILE HOLE DRILLING.
4. ALLOW PILE CONCRETE TO CURE AT LEAST 3 DAYS PRIOR TO PLACING BARRIER CONCRETE.
5. SIZE AND LOCATION OF CONDUIT MAY VARY AS PER SITE SPECIFIC DRAWINGS. MODIFICATIONS TO THE CONCRETE STEEL REINFORCING AND/OR ANCHOR BOLT ASSEMBLY, SUCH AS TO ACCOMMODATE PLACEMENT OF THE CONDUIT, SHALL NOT BE MADE WITHOUT THE CONSULTANT'S PERMISSION.



SECTION A



SECTION B



STANDARD SINGLE SLOPE BARRIER

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE
2			
1			

Approved:

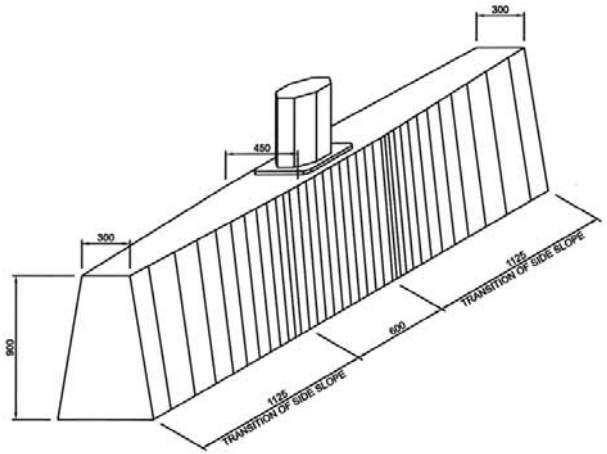
Executive Director,
Technical Standards Branch

Date: NOVEMBER, 2007

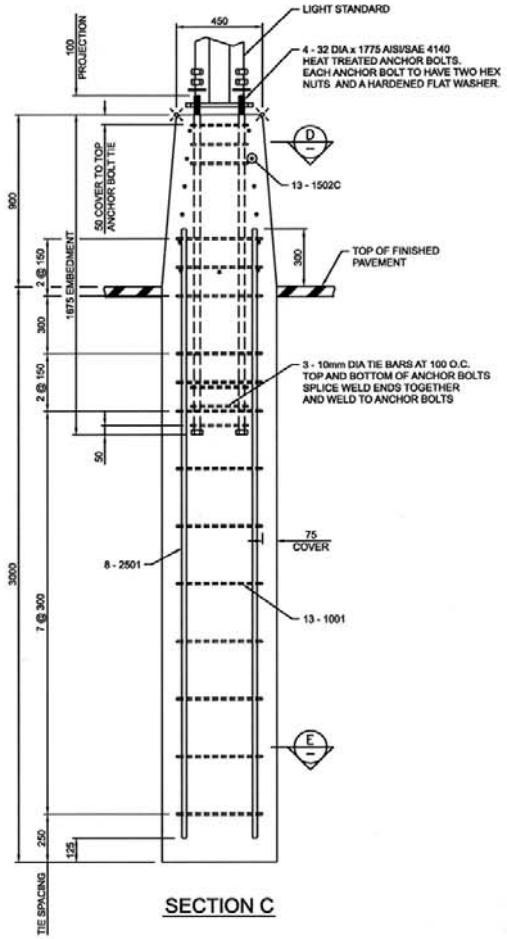
Alberta
INFRASTRUCTURE AND TRANSPORTATION

TL-4 SINGLE SLOPE CONCRETE BARRIER TRANSITION AT MEDIAN LIGHT STANDARD SHEET 1 OF 2

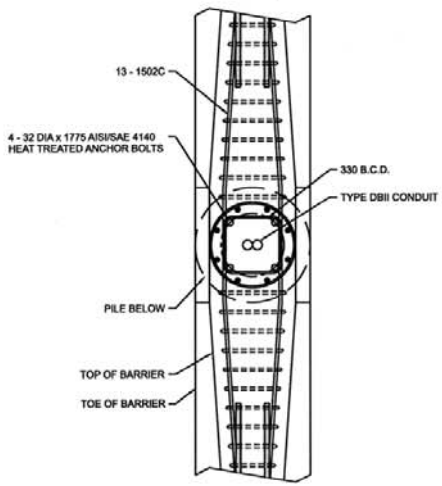
Prepared By: NVS	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG - B7.2



SINGLE SLOPE MEDIAN BARRIER TRANSITION ISOMETRIC



SECTION C

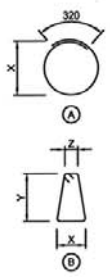


SECTION D

BAR LIST: TRANSITION BARRIER								
MARK	SIZE	NO.	TYPE	X	Y	Z	LENGTH	MASS
1001	10	13	A	450	-	-	1 750	18
1501C	15	24	B	LENGTH: X = 460 Y = 800 Z = VARIES FROM 210 TO 353 IN INCREMENTS OF 13			2 660 (AVG)	100
* 1502C	15	13	STR	-	-	-	2 750	56
2501	25	8	STR	-	-	-	3 175	100
2502C	25	12	STR	-	-	-	1 000	47

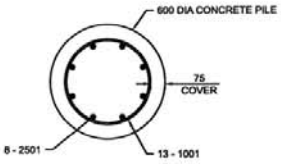
* FIELD BEND TO SUIT

PLAIN	TOTAL kg =	118
EPOXY COATED	TOTAL kg =	203
	TOTAL kg =	320



BAR LIST NOTES:

- DIAMETERS OF ALL BENDS AND DETAILS OF ALL HOOKS, UNLESS NOTED OTHERWISE, SHALL CONFORM TO THE RECOMMENDED SIZES DETAILED IN THE REINFORCING STEEL MANUAL OF STANDARD PRACTICE, FIRST CANADIAN EDITION 1992, PUBLISHED BY THE REINFORCING INSTITUTE OF CANADA.
- REINFORCING STEEL SHALL BE IN ACCORDANCE WITH CAN/CSA-G30.18M92 "BILLET STEEL BARS FOR CONCRETE REINFORCEMENT".
- ALL REINFORCING STEEL SHALL BE GRADE 400 UNLESS NOTED OTHERWISE.
- "C" DENOTES EPOXY COATED REINFORCEMENT.



SECTION E

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE
2			
1			

Approved:

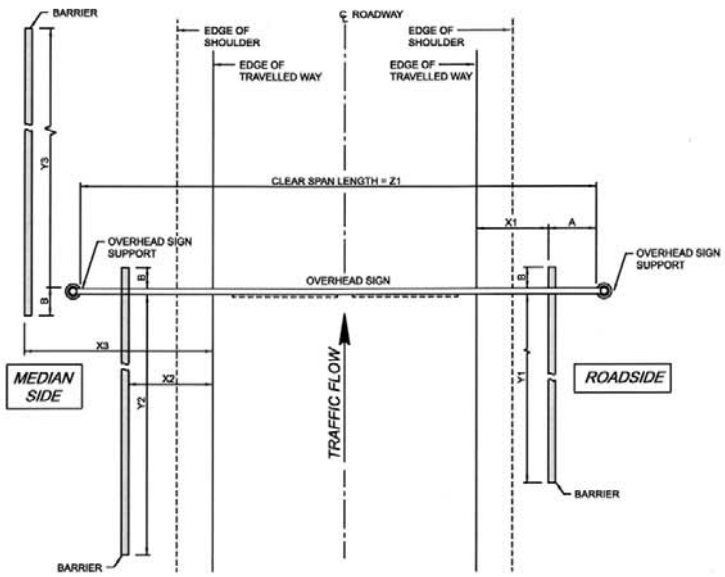
Executive Director,
Technical Standards Branch

Date: NOVEMBER, 2007

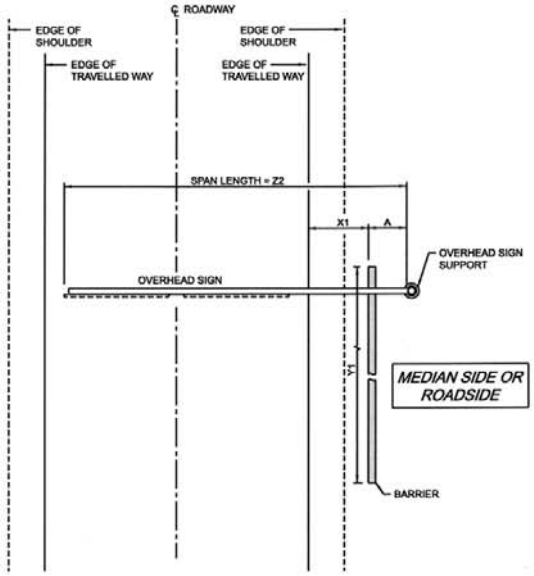
Alberta
INFRASTRUCTURE AND TRANSPORTATION

TL-4 SINGLE SLOPE CONCRETE BARRIER TRANSITION AT MEDIAN LIGHT STANDARD
SHEET 2 OF 2

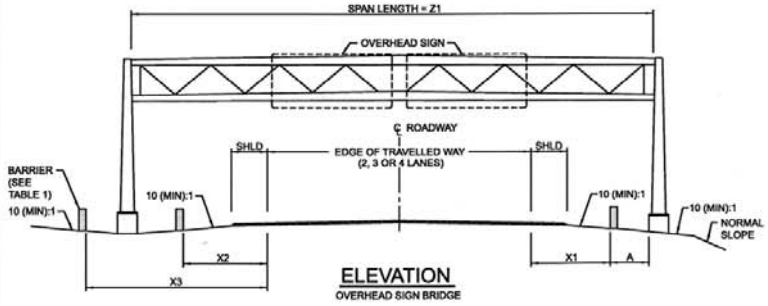
Prepared By: NVS	Checked By: WS	Scale: N.T.S.	Dwg No.: RDG - B7.3



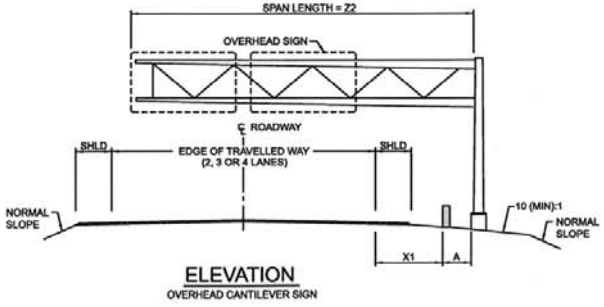
PLAN VIEW
OVERHEAD SIGN BRIDGE



PLAN VIEW
OVERHEAD CANTILEVER SIGN



ELEVATION
OVERHEAD SIGN BRIDGE



ELEVATION
OVERHEAD CANTILEVER SIGN

NOTES:

APPLICABLE FOR URBAN AND RURAL CROSS SECTIONS

1. BASED ON BENEFIT/COST ANALYSIS WITH CONSIDERATIONS FOR COLLISION COSTS, CANTILEVER SIGN STRUCTURES ARE GENERALLY PREFERRED OVER OVERHEAD SIGN BRIDGE STRUCTURES, UP TO THE SPECIFIED MAXIMUM CANTILEVER SPAN LENGTH PROVIDED IN TABLES 2 AND 3.
2. THE USE OF SAND BARRELS (SEE AIT STANDARD DRAWING TEB 3.19) IS RECOMMENDED WHEN OVERHEAD SIGN SUPPORTS ARE PLACED AT OR JUST BEYOND THE CLEAR ZONE LINE.
3. OVERHEAD SIGN SUPPORTS LOCATED WITHIN THE CLEAR ZONE REQUIRE BARRIER PROTECTION.
4. WHEN A BARRIER SYSTEM IS WARRANTED, THE THRIE BEAM BULLNOSE BARRIER SYSTEM IS GENERALLY RECOMMENDED, PROVIDED THAT THERE IS SUFFICIENT SPACE IN THE MEDIAN OR SHOULDER FOR PROPER INSTALLATION. REFER TO RDG-B5.6 AND RDG-B5.7 FOR THRIE BEAM BULLNOSE GENERAL LAYOUTS.
5. ALTERNATE BARRIER SYSTEMS SHOWN IN TABLE 1 MAY BE USED IF PROVEN BY BENEFIT-COST ANALYSIS.
6. BARRIERS SHALL BE LOCATED AT OR BEYOND THE RECOMMENDED SHY LINE OFFSET.
7. THE SELECTED BARRIER SYSTEM SHALL BE INSTALLED AS PER THE APPLICABLE AIT STANDARD DRAWING(S).
8. VARIANCES FROM TABLES 2 AND 3 MAY BE REQUIRED ON A SITE SPECIFIC BASIS TO ACCOMMODATE LIMITING FACTORS SUCH AS ROADSIDE OBSTACLES, ENCROACHING SIDESLOPES, AND ROAD CURVATURE. IN SUCH CASES, A SITE-SPECIFIC BENEFIT-COST ANALYSIS MAY BE REQUIRED TO DETERMINE THE OPTIMUM OVERHEAD SIGN SPAN AND BARRIER SYSTEM CONFIGURATION.
9. THE LENGTH OF NEED (LON) SHOWN IN TABLES 2 AND 3 ARE BASED ON ALIGNING THE BARRIER PARALLEL TO THE ROADWAY. THE LON MAY BE REDUCED BY FLARING THE BARRIER. REFER TO THE DEPARTMENT'S ROADSIDE DESIGN GUIDE FOR MAXIMUM FLARE RATES.
10. SUPPORTS FOR CANTILEVER SIGNS IN URBAN AREAS WITH NARROW MEDIANS WITH CONTINUOUS MEDIAN CONCRETE BARRIER ARE GENERALLY PREFERRED IF PLACED ON THE CONCRETE MEDIAN BARRIER AS OPPOSED TO THE SUPPORT BEING LOCATED ON THE ROADSIDE.
11. SUPPORTS FOR CANTILEVER SIGNS IN RURAL AND URBAN AREAS IN WIDER MEDIANS (WITHOUT CONTINUOUS CONCRETE MEDIAN BARRIER) ARE MORE ECONOMICAL IF PLACED ON THE ROADSIDE.
12. THE MINIMUM SETBACK DISTANCE "A" PROVIDES ALLOWANCE FOR THE MAXIMUM DYNAMIC DEFLECTION OF THE BARRIER.
13. REFER TO SECTION H.5.4.4 FOR ZONE OF INTRUSION CONSIDERATIONS.

ASSUMPTIONS

1. CLEAR ZONE DISTANCES USED IN THE DEVELOPMENT OF THIS STANDARD DRAWING WERE BASED ON THE ASSUMPTION OF FILL SIDE SLOPES OF 6:1 OR FLATTER.
2. TRAFFIC VOLUMES USED FOR BENEFIT-COST ANALYSIS IN THE DEVELOPMENT OF THIS STANDARD DRAWING WERE ASSUMED TO BE 10 000 VPD, 30 000 VPD, AND 50 000 VPD FOR 4-LANE, 6-LANE, AND 8-LANE DIVIDED HIGHWAYS, RESPECTIVELY.
3. COLLISION COSTS FOR BENEFIT-COST ANALYSIS WERE OBTAINED USING THE COMPUTER PROGRAM RSAP (ROADSIDE SAFETY ANALYSIS PROGRAM).

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE
2			
1			

Approved:

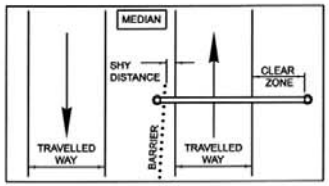
Executive Director,
Technical Standards Branch

Date: NOVEMBER, 2007

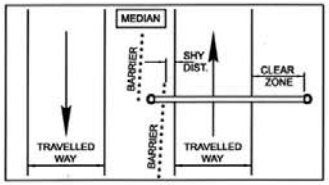
Alberta
INFRASTRUCTURE AND TRANSPORTATION

PLACEMENT AND PROTECTION OF OVERHEAD SIGN SUPPORTS FOR DIVIDED ROADS
SHEET 1 OF 2

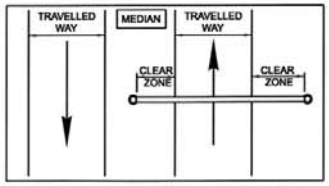
Prepared By: MO	Checked By: WS	Scale:	Dwg No.: RDG-B7.4



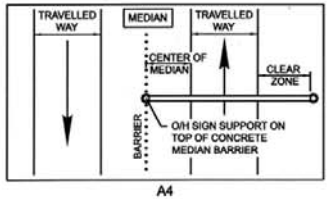
A1



A2

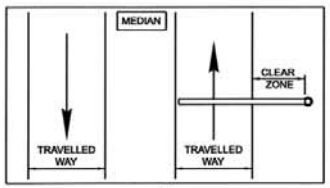


A3

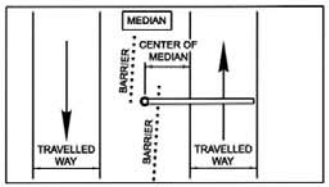


A4

SIGN BRIDGE SCENARIOS



B1



B2

CANTILEVER SIGN SCENARIOS

NOTES:

1. SETBACK DISTANCE "A" INCLUDES WIDTH OF BARRIER PLUS A DYNAMIC DEFLECTION ALLOWANCE.
2. FOR RIDGED BARRIERS, REFER TO SECTION H.5.5 OF THE ROADSIDE DESIGN GUIDE FOR ZONE OF INTRUSION CONSIDERATIONS.
3. "P" INDICATES THE OVERHEAD SIGN SUPPORT DIAMETER.
4. "C" INDICATES SITE SPECIFIC CLEARANCE DISTANCE, REFER TO SECTION H.3.2.1 OF THE ROADSIDE DESIGN GUIDE.
5. FOR OBSTACLE OFFSET FROM TRAVELLED WAY, REFER TO SHEET 1 OF 2. THE OBSTACLE COULD BE AN OVERHEAD SIGN SUPPORT OR BARRIER, WHICHEVER IS CLOSER TO THE TRAVELLED WAY. IF THE OBSTACLE IS AN OVERHEAD SIGN SUPPORT, THEN x ≥ C. IF THE OBSTACLE IS A BARRIER THEN x ≤ C (GENERALLY) IN ALL CASES "x" SHALL BE GREATER THAN THE SHYLINE OFFSET UNLESS OTHERWISE DICTATED BY UNIQUE SITE SPECIFIC CIRCUMSTANCES

TABLE 1 - MINIMUM BARRIER SETBACK AND EXTENSION

BARRIER TYPE	SETBACK FROM HAZARD, A (mm) - (SEE NOTE 1) (SEE SHEET 1 OF 2)	EXTENSION, B (mm)
HIGH TENSION CABLE	APPROX. 2500 (REFER TO PROPRIETOR SPECS.)	10000
PRECAST CONCRETE	VARIES (UP TO 2400 mm FOR UNANCHORED)	9000
STRONG POST W-BEAM	2100	4000 *
MODIFIED THRIE BEAM	1200	4000 *
THRIE BEAM BULLNOSE	1200	4000
CIP CONCRETE	750	3000

* WHEN ANCHORED WITH A CABLE ANCHOR TERMINAL (REFER TO RDG-B1.1 AND RDG-B5.1)

TABLE 2 - BARRIER GEOMETRIC PARAMETERS FOR " RURAL " CROSS SECTIONS

AIT DESIGN DESIGNATION	ROADWAY FACILITY (No. OF LANES)	DESIGN SPEED (Km/hr)	OBSTACLE OFFSET ** X1 (m)	OBSTACLE OFFSET ** X2 (m)	OBSTACLE OFFSET ** X3 (m)	LENGTH OF NEED Y1 (m)	LENGTH OF NEED Y2 (m)	LENGTH OF NEED Y3 (m)	OVERHEAD SIGN BRIDGE CLEAR SPAN Z1 (m)	OVERHEAD SIGN BRIDGE SCENARIO REFERENCE	CANTILEVER SIGN CLEAR SPAN Z2 (m)	CANTILEVER SIGN SCENARIO REFERENCE
RAD-410.4-80	4	80	C	C	-	-	-	-	7.4 + 2C	A3	MAX: 7.4 + C (ROADSIDE)	B1
RAD-410.4-100	4	100	C	2.4	-	-	150	-	9.8 + C+A	A1	MAX: 7.4 + C (ROADSIDE)	B1
RAD-410.4-110	4	110	C	2.8	2.8+ 2A+P	-	150	150	10.2 + C + A	A2	MAX: 7.4 + C (ROADSIDE)	B1
RAD-411.4-80	4	80	C	C	-	-	-	-	7.4 + 2C	A3	MAX: 7.4 + C (ROADSIDE)	B1
RAD-411.4-100	4	100	C	2.4	-	-	150	-	9.8 + C + A	A1	MAX: 7.4 + C (ROADSIDE)	B1
RAD-411.4-110	4	110	C	2.8	2.8+ 2A+P	-	150	150	10.2 + C + A	A2	MAX: 7.4 + C (ROADSIDE)	B1
RAD-412.4-120	4	120	C	C	-	-	-	-	7.4 + 2C	A3	MAX: 7.4 + C (ROADSIDE)	B1
RFD-412.4-130	4	130	C	C	-	-	-	-	7.4 + 2C	A3	MAX: 7.4 + C (ROADSIDE)	B1
RFD/RAD-616.6-130	6	130	C	C	-	-	-	-	11.1 + 2C	A3	MAX: 11.1 + C (ROADSIDE)	B1

** SEE NOTE 5

TABLE 3 - BARRIER GEOMETRIC PARAMETERS FOR " URBAN " CROSS SECTIONS

AIT DESIGN DESIGNATION	ROADWAY FACILITY (No. OF LANES)	DESIGN SPEED (km/hr)	OBSTACLE OFFSET ** X1 (m)	OBSTACLE OFFSET ** X2 (m)	OBSTACLE OFFSET ** X3 (m)	LENGTH OF NEED Y1 (m)	LENGTH OF NEED Y2 (m)	LENGTH OF NEED Y3 (m)	OVERHEAD SIGN BRIDGE CLEAR SPAN Z1 (m)	OVERHEAD SIGN BRIDGE SCENARIO REFERENCE	CANTILEVER SIGN CLEAR SPAN Z2 (m)	CANTILEVER SIGN SCENARIO REFERENCE
UCD-408.4-60	4	60	-	-	-	-	-	-	-	-	-	-
UAD/UCD-409.9-70	4	70	-	-	-	-	-	-	-	-	-	-
UAD-410.4-80	4	80	C	C	-	-	-	-	7.4 + 2C	A3	MAX: 7.4 + C (ROADSIDE)	B1
UAD-410.4-100	4	100	C	2.4	-	-	150	-	9.8 + C + A	A1	MAX: 7.4 + C (ROADSIDE)	B1
UAD-410.4-110	4	110	C	2.8	2.8 + 2A + P	-	150	150	10.2 + C + A	A2	MAX: 9.4 (MEDIAN)	B2
UAD-411.4-80	4	80	C	C	-	-	-	-	7.4 + 2C	A3	MAX: 7.4 + C (ROADSIDE)	B1
UFD-411.9-80	4	80	C	FLARED	FLARED	-	CONTINUOUS	CONTINUOUS	9.9 + C	A4	MAX: 9.4 (MEDIAN)	B2
UAD-411.4-100	4	100	C	2.4	-	-	150	-	9.8 + C + A	A1	MAX: 7.4 + C (ROADSIDE)	B1
UFD-411.9-100	4	100	C	FLARED	FLARED	-	CONTINUOUS	CONTINUOUS	9.9 + C	A4	MAX: 9.4 (MEDIAN)	B2
UAD-411.4-110	4	110	C	2.8	2.8 + 2A + P	-	150	150	10.2 + C + A	A2	MAX: 9.4 (MEDIAN)	B2
UAD-613.1-60	6	60	C	FLARED	FLARED	-	100	100	13.6 + C	A4	MAX: 11.1 + C (ROADSIDE)	B1
UAD-613.1-80	6	80	C	FLARED	FLARED	-	100	100	13.6 + C	A4	MAX: 11.1 + C (ROADSIDE)	B1
UAD/UFD-616.6-80	6	80	C	FLARED	FLARED	-	CONTINUOUS	CONTINUOUS	14.6 + C	A4	MAX: 14.6 (MEDIAN)	B2
UAD/UFD-616.6-100	6	100	C	FLARED	FLARED	-	CONTINUOUS	CONTINUOUS	14.6 + C	A4	MAX: 14.6 (MEDIAN)	B2
UAD/UFD-616.6-110	6	110	C	2.8	-	-	150	-	11.1 + C + A	A1	MAX: 11.1 + C (ROADSIDE)	B1
UAD/UFD-616.6-110	6	110	C	FLARED	FLARED	-	CONTINUOUS	CONTINUOUS	14.6 + C	A4	MAX: 14.6 (MEDIAN)	B2
UAD/UFD-616.6-120	6	120	C	3.2	3.2 + 2A+ P	-	150	150	11.1 + C + A	A2	MAX: 11.1 + C (ROADSIDE)	B1
UAD/UFD-820.8-100	8	100	C	FLARED	FLARED	-	CONTINUOUS	CONTINUOUS	18.2 + C	A4	MAX: 18.2 (MEDIAN)	B2
UAD/UFD-820.8-110	8	110	C	FLARED	FLARED	-	CONTINUOUS	CONTINUOUS	18.2 + C	A4	MAX: 18.2 (MEDIAN)	B2
UAD/UFD-820.8-130	8	120	C	FLARED	FLARED	-	CONTINUOUS	CONTINUOUS	18.2 + C	A4	MAX: 18.2 (MEDIAN)	B2

** SEE NOTE 5

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED.

No.	REVISIONS	BY	DATE
2	.	.	.
1	.	.	.

Approved:

Executive Director,
Technical Standards Branch

Date: NOVEMBER, 2007

Alberta
INFRASTRUCTURE AND TRANSPORTATION

PLACEMENT AND PROTECTION OF OVERHEAD SIGN SUPPORTS FOR DIVIDED ROADS SHEET 2 OF 2

Prepared By: MO	Checked By: WS	Scale: N.T.S	Dwg No.: RDG-B7.5