



DATE	REVISION	BY	DATE	REVISION	BY
DEC. 17	MASH IMPLEMENTATION	JR			

CONCRETE BARRIER INDEX

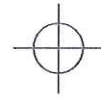
SHEET NO.	DESCRIPTION	EFFECTIVE DATE
CB-01	INDEX AND NOTES	DEC - 2017
CB-02	F SHAPE DETAILS	DEC - 2017
CB-03	F SHAPE DETAILS	DEC - 2017
CB-04	SINGLE SLOPE DETAILS	DEC - 2017
CB-05	TRANSITION SINGLE SLOPE TO F SHAPE	DEC - 2017
CB-06	END SECTION DETAILS	DEC - 2017
CB-07	END SECTION DETAILS	DEC - 2017
CB-08	END SECTION DETAILS FOR SPEED 35 MPH OR LESS	DEC - 2017
CB-09	REFLECTOR DETAILS	DEC - 2017
CB-10	LIGHTING POLE COVER	DEC - 2017
CB-11	OVERHEAD SIGN PROTECTION	DEC - 2017
CB-12	PIER PROTECTION DETAILS	DEC - 2017

NOTES:

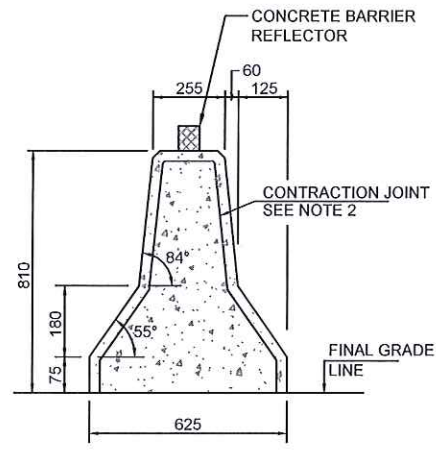
1. DIMENSIONS IN MILLIMETERS SYSTEM UNLESS OTHERWISE NOTED.
2. ALL MATERIALS, LABOR AND EQUIPMENT NECESSARY TO CONSTRUCT THE CONCRETE BARRIERS, CONNECTIONS AND END SECTIONS ILLUSTRATED IN THESE DRAWINGS SHALL BE A SUBSIDIARY OBLIGATION.
3. DIMENSIONAL TOLERANCES NOT SHOWN OR IMPLIED ARE INTENDED TO BE THOSE CONSISTENT WITH THE PROPER FUNCTIONING OF THE PART, INCLUDING ITS APPEARANCE AND ACCEPTED MANUFACTURING PRACTICES.
4. MATERIALS NOT COMPLYING WITH THE REQUIREMENTS INDICATED IN THE STANDARD DRAWINGS WILL NOT BE ACCEPTED.
5. INSTALL BARRIER REFLECTORS ACCORDING TO STANDARD DRAWING CB-9.
6. CLASS A CONCRETE SHALL BE USED ON ALL TYPES OF CONCRETE BARRIERS.

DESIGN AREA

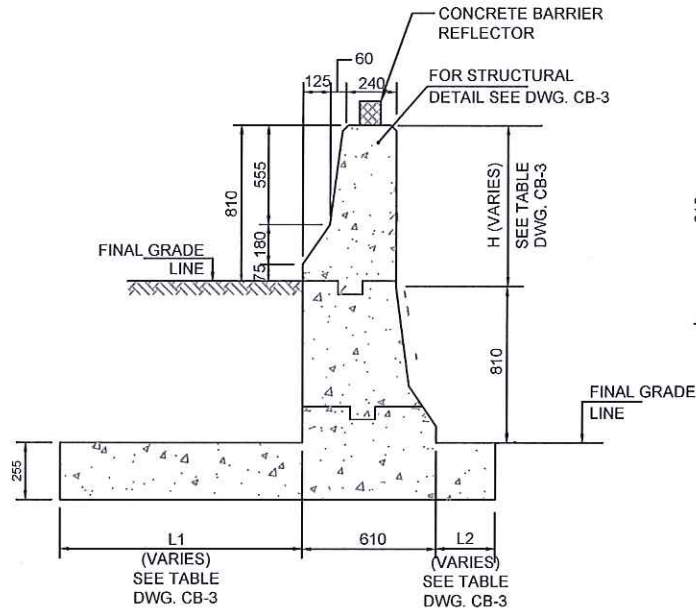
	<p>PUERTO RICO DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS HIGHWAY AND TRANSPORTATION AUTHORITY</p>	STANDARD DRAWING APPROVAL		<p>CONCRETE BARRIER INDEX AND NOTES</p>	<p>CB-01 DECEMBER 2017</p>
		<p>DATE: 18/DEC/17</p> <p>RECOMMENDED BY: <i>J. Lopez</i> DESIGN AREA DIRECTOR</p>	<p>DATE: 19/Dec/17</p> <p>APPROVED BY: <i>[Signature]</i> EXECUTIVE DIRECTOR</p>		



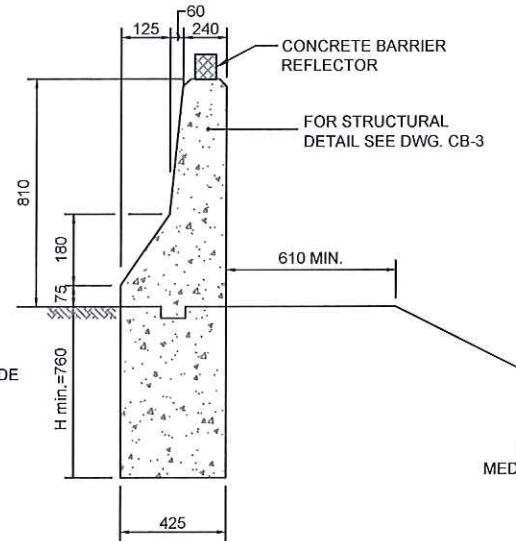
BY	REVISION
DATE	REVISION
BY	REVISION
DATE	REVISION
BY	REVISION
DATE	REVISION
BY	REVISION
DATE	REVISION
BY	REVISION
DATE	REVISION
BY	REVISION
DATE	REVISION



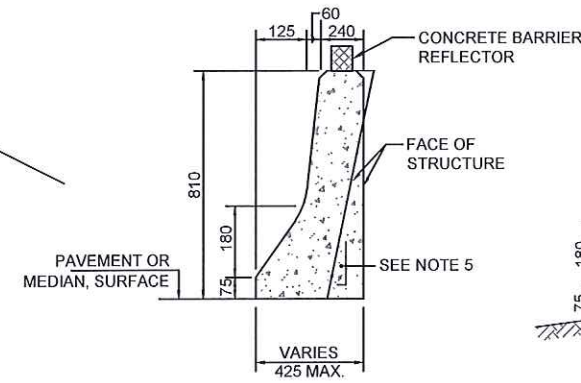
TYPE "A"
CONCRETE MEDIAN BARRIER



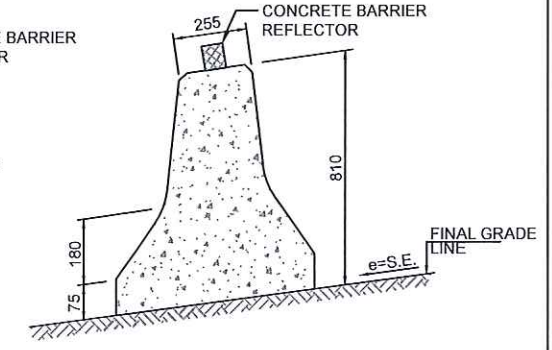
CONCRETE BARRIER TYPE "B"



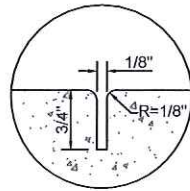
TYPE "C"
CONCRETE BARRIER AT SHOULDER



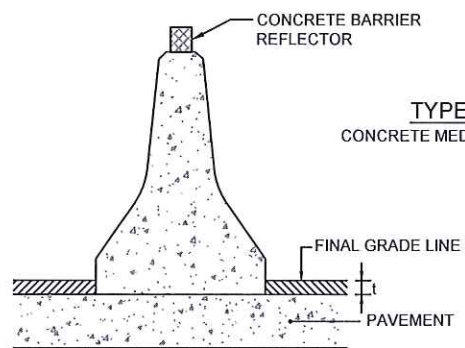
TYPE "D"
CONCRETE BARRIER PLACED ON FACE OF STRUCTURE



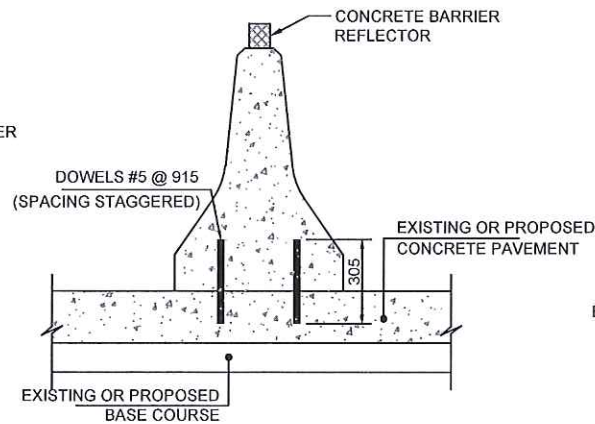
TYPE "E"
CONCRETE BARRIER FOR SUPERELEVATED SECTIONS



DETAIL OF CONTRACTION JOINT



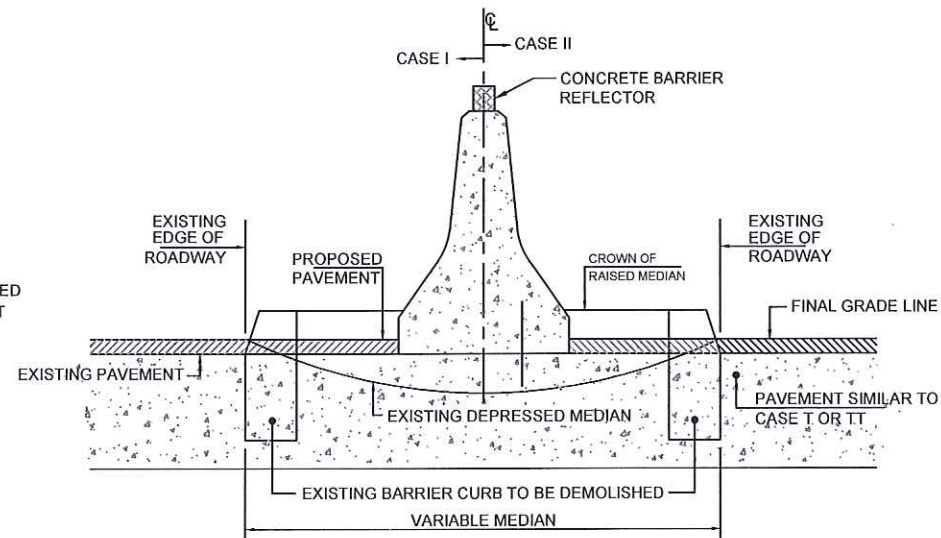
TYPE "A"
CONCRETE MEDIAN BARRIER



CASE II
ON EXISTING OR NEW PORTLAND CEMENT CONCRETE BASE

CASE I
ON EXISTING OR NEW PAVEMENT AND ANCHORED BY BITUMINOUS OVERLAY

BITUMINOUS PAVEMENT MIX	t
S1	64
S2	25



EXCAVATION OR BACKFILL ON MEDIAN IN PREPARATION OF CASE I OR II

GENERAL NOTES:

1. CLASS "A" CONCRETE SHALL BE USED ON ALL TYPES OF CONCRETE BARRIERS.
2. CONTRACTION JOINT, 1/8"x3/4" @ 6000 SPACING, SEE DETAIL TO BE USED ON ALL CASES AND TYPES OF BARRIER.
3. WHERE TOP OF EXISTING FOOTING IS 12" OR LESS FROM SURFACE, EXTEND BASE OF TYPE "D" BARRIER TO TOP OF FOOTING.
4. BATTER TO CONFORM TO FACE OF STRUCTURE, 1:6 MAXIMUM.
5. TYPE "A" BARRIER WILL BE USED ALSO WHERE LIGHTING IS INSTALLED IN MEDIAN.
6. CONCRETE END SECTION OR TEMPORARY IMPACT ATTENUATOR SHALL BE USED AS THE END SECTION OF THE CONCRETE BARRIER DURING CONSTRUCTION.

DESIGN AREA



PUERTO RICO
DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS
HIGHWAY AND TRANSPORTATION AUTHORITY

STANDARD DRAWING APPROVAL

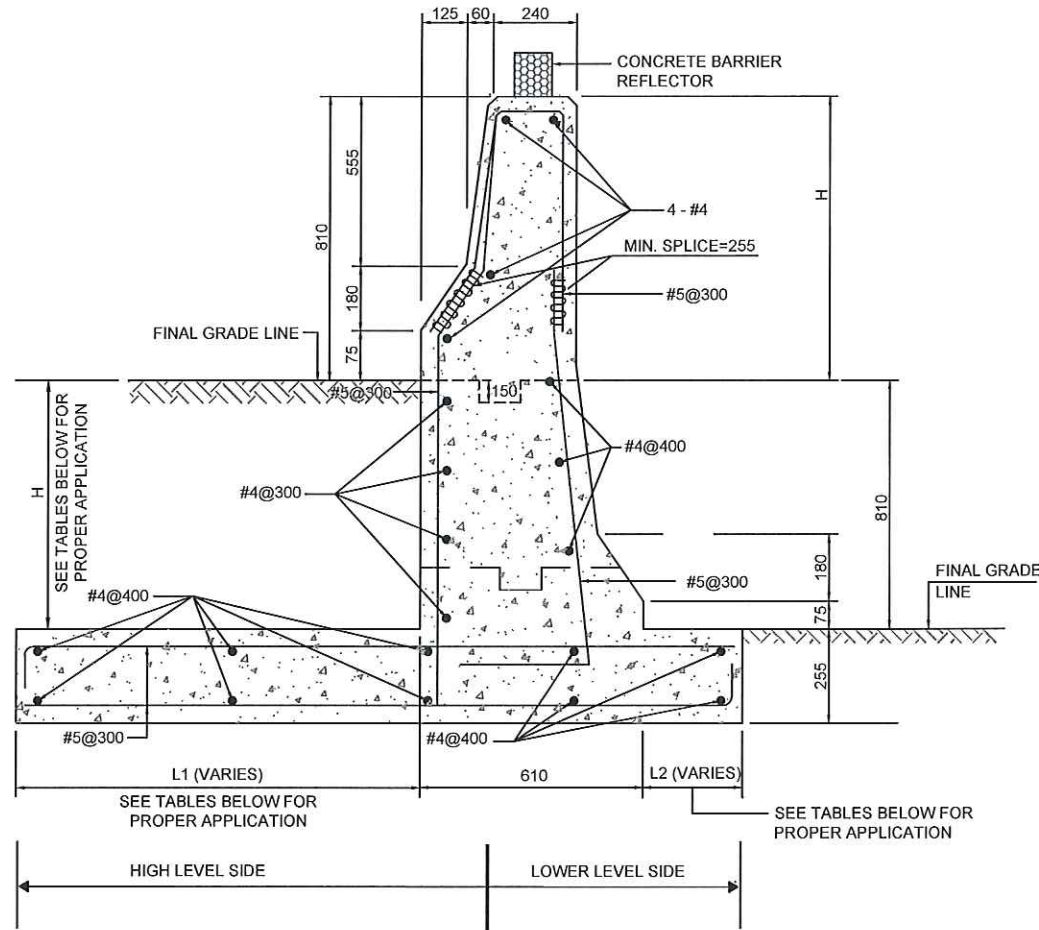
DATE:	RECOMMENDED BY:	DATE:	APPROVED BY:
18/dec/17	[Signature]	19/dec/17	[Signature]
	DESIGN AREA DIRECTOR		EXECUTIVE DIRECTOR

CONCRETE BARRIER
F SHAPE
DETAILS

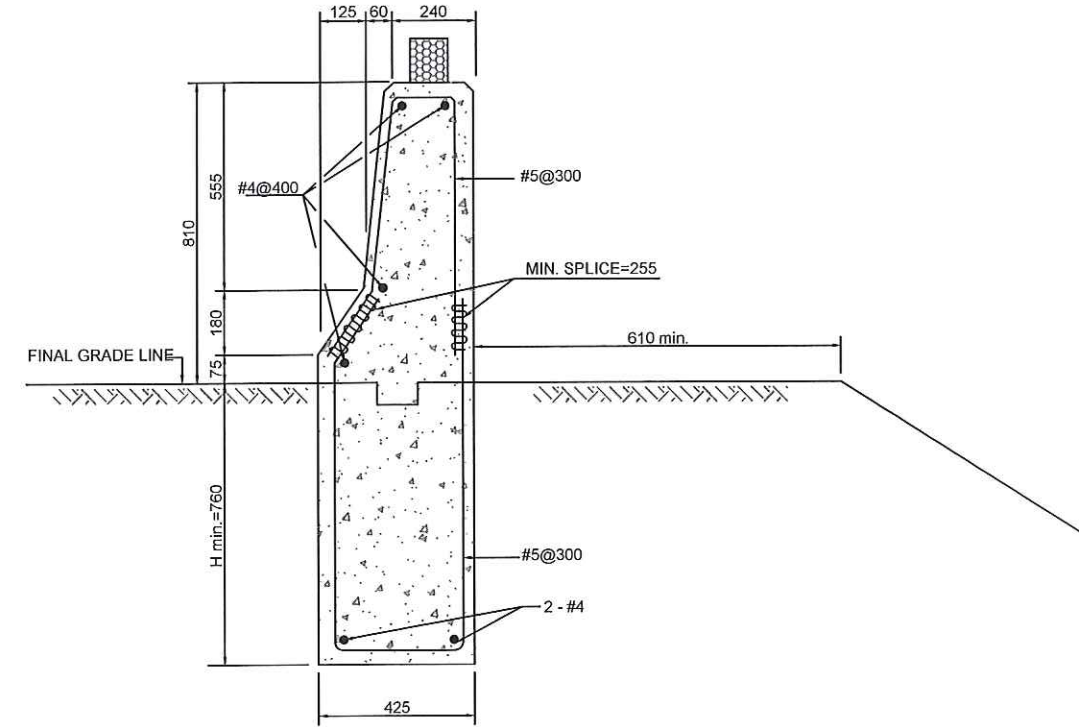
CB-02

DECEMBER 2017

BY	REVISION	BY	REVISION	BY	REVISION	BY	REVISION	BY	REVISION
DATE		DATE		DATE		DATE		DATE	
BY	REVISION	BY	REVISION	BY	REVISION	BY	REVISION	BY	REVISION
DATE		DATE		DATE		DATE		DATE	
BY	REVISION	BY	REVISION	BY	REVISION	BY	REVISION	BY	REVISION
DATE		DATE		DATE		DATE		DATE	
BY	REVISION	BY	REVISION	BY	REVISION	BY	REVISION	BY	REVISION
DATE		DATE		DATE		DATE		DATE	
BY	REVISION	BY	REVISION	BY	REVISION	BY	REVISION	BY	REVISION
DATE		DATE		DATE		DATE		DATE	



TYPE "B"
IN COMBINATION WITH
SLOTTED PIPE



TYPE "C"
IN COMBINATION WITH
SLOTTED PIPE

IF SLOTTED PIPE WILL BE USED ONLY AT HIGH LEVEL THEN:

SLOTTED PIPE DIAMETER (IN)	L1	L2	H
18"	640	270	830
24"	800	270	980
30"	950	270	1140
36"	1100	270	1290

IF SLOTTED PIPE WILL BE USED ON HIGH AND LOWER LEVELS THEN:

SLOTTED PIPE DIAMETER (IN)	L1	L2	H
18"	640	0	830
24"	800	0	980
30"	950	0	1140
36"	1100	0	1290

IF SLOTTED PIPE WILL BE USED ONLY ON LOWER LEVEL
H = 1300 L1 = 1100 L2 = 0

IF NO SLOTTED PIPE WILL BE USED
H = 1300 L1 = 1100 L2 = 270

GENERAL NOTES:

1. THE STEEL REINFORCEMENT OF THE CONCRETE IN CONTACT WITH EARTH SHALL HAVE A MINIMAL COVER OF 75 MM.
2. THE REINFORCEMENT THAT IS NOT IN DIRECT CONTACT WITH THE EARTH SHALL HAVE A MINIMAL COVER OF 37.5 MM.
3. IF H IS HIGHER THAN 1300 THEN A RETAINING WALL SHALL BE DESIGN.
4. ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.



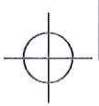
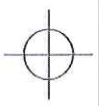
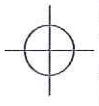
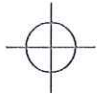
PUERTO RICO
DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS
HIGHWAY AND TRANSPORTATION AUTHORITY

STANDARD DRAWING APPROVAL			
DATE:	RECOMMENDED BY:	DATE:	APPROVED BY:
18/dec/17	<i>J. Lopez</i>	19/dec/17	<i>[Signature]</i>
	DESIGN AREA DIRECTOR		EXECUTIVE DIRECTOR

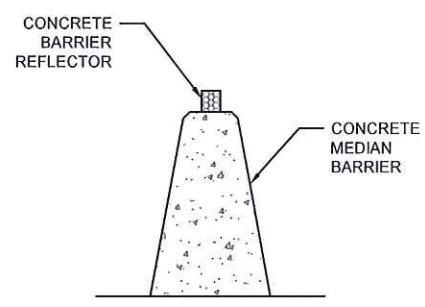
CONCRETE BARRIER
F SHAPE
DETAILS

CB-03
DECEMBER 2017

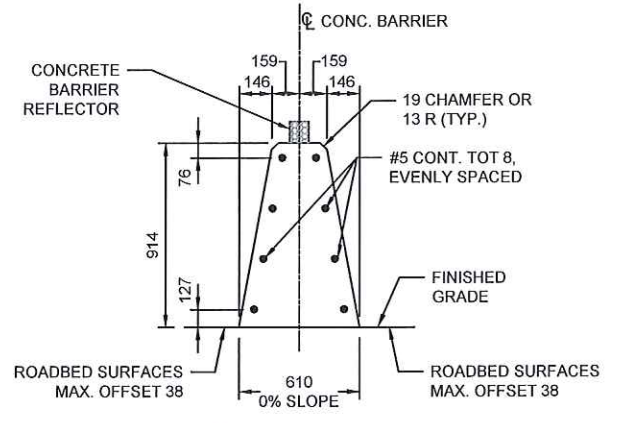
DESIGN AREA



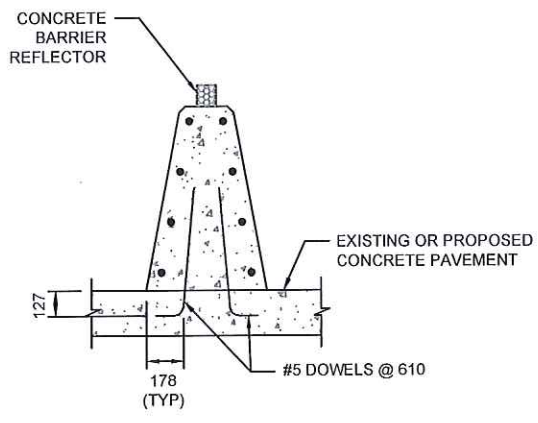
BY	REVISION	DATE	BY	REVISION	DATE	BY	REVISION	DATE	BY	REVISION	DATE



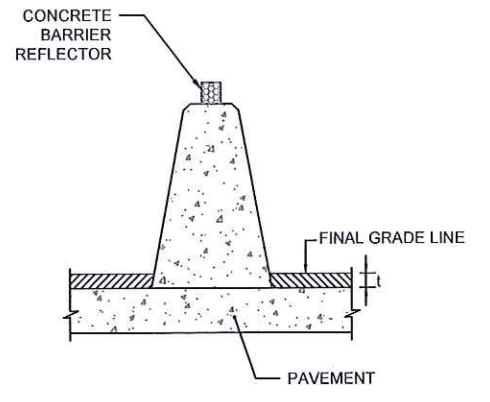
CONCRETE BARRIER DELINEATION DETAIL



CONCRETE BARRIER TYPE I



CONCRETE BARRIER TYPE IA

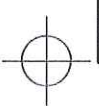
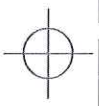
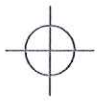


CONCRETE BARRIER TYPE IB
ON EXISTING OR NEW PAVEMENT AND
ANCHORED BY BITUMINOUS OVERLAY

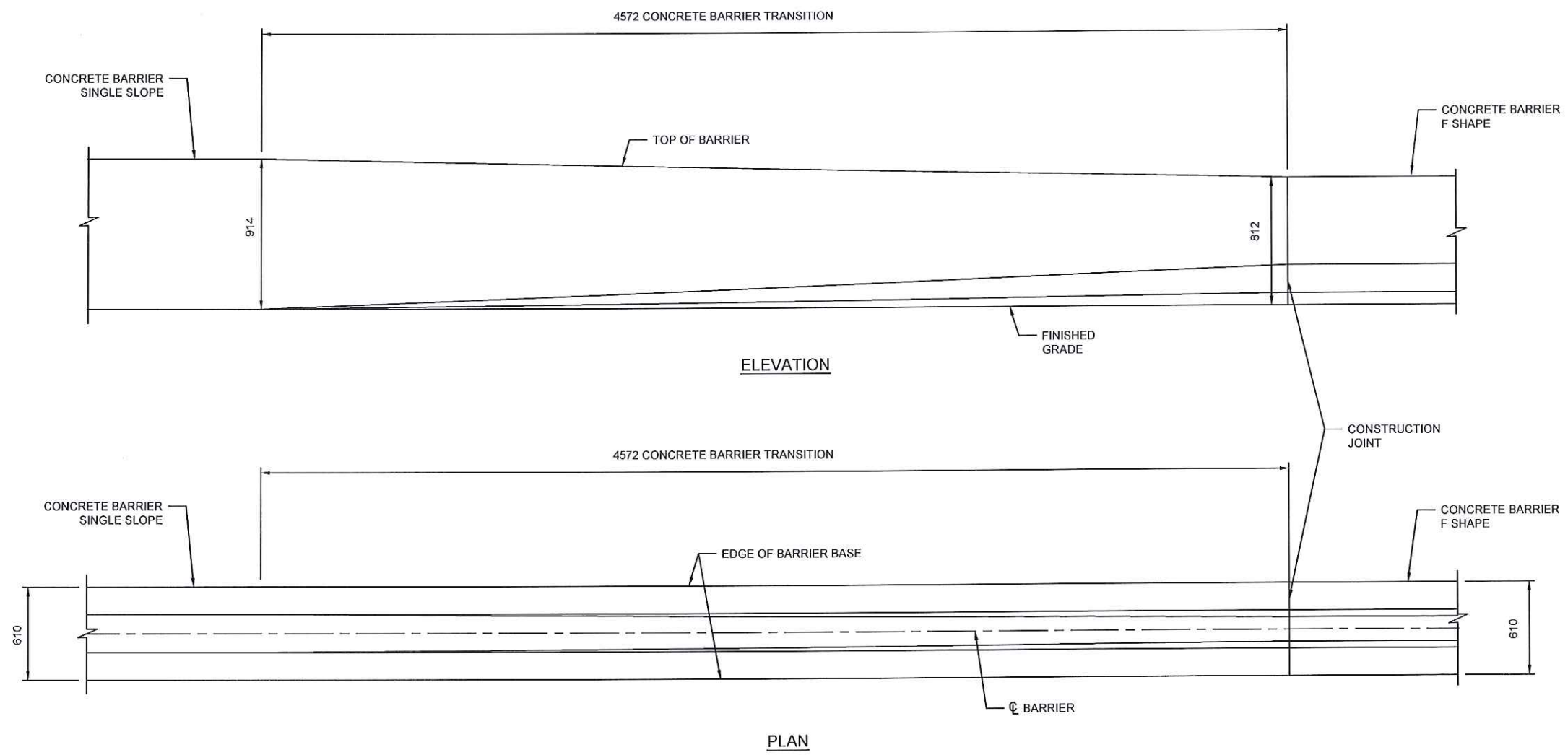
BITUMINOUS PAVEMENT MIX	t
S1	64
S2	25

<p>PUERTO RICO DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS HIGHWAY AND TRANSPORTATION AUTHORITY</p>	STANDARD DRAWING APPROVAL				<p>CONCRETE BARRIER SINGLE SLOPE DETAILS</p>	<p>CB-04 DECEMBER 2017</p>
	DATE: 18/dec/17	RECOMMENDED BY: [Signature]	DATE: 19/dec/17	APPROVED BY: [Signature]		
		DESIGN AREA DIRECTOR		EXECUTIVE DIRECTOR		

DESIGN AREA



DATE	REVISION	BY	DATE	REVISION	BY
DEC. 17	MASH IMPLEMENTATION	JR			



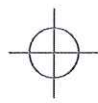
TRANSITION CONCRETE BARRIER SINGLE SLOPE TO CONCRETE BARRIER F SHAPE

NOTES:

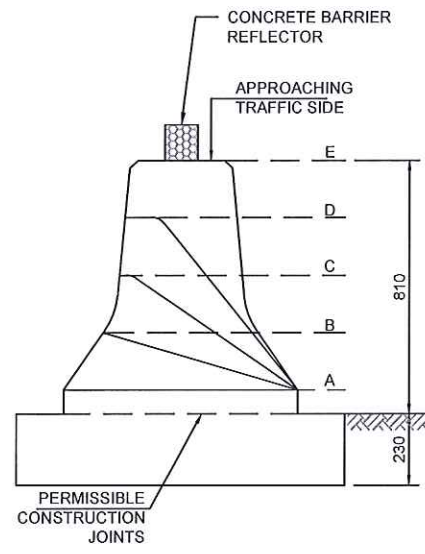
1. ALL WORK, MATERIALS AND EQUIPMENT NEEDED TO COMPLETE THE TRANSITION OF SINGLE SLOPE TO F SHAPE CONCRETE BARRIER SHALL BE A SUBSIDIARY OBLIGATION.

	PUERTO RICO DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS HIGHWAY AND TRANSPORTATION AUTHORITY	STANDARD DRAWING APPROVAL				CONCRETE BARRIER SINGLE SLOPE TRANSITION SINGLE SLOPE TO F SHAPE	CB-05 DECEMBER 2017
		DATE: 18/DEC/17 RECOMMENDED BY: <i>[Signature]</i> DESIGN AREA DIRECTOR	DATE: 19/DEC/17 APPROVED BY: <i>[Signature]</i> EXECUTIVE DIRECTOR				

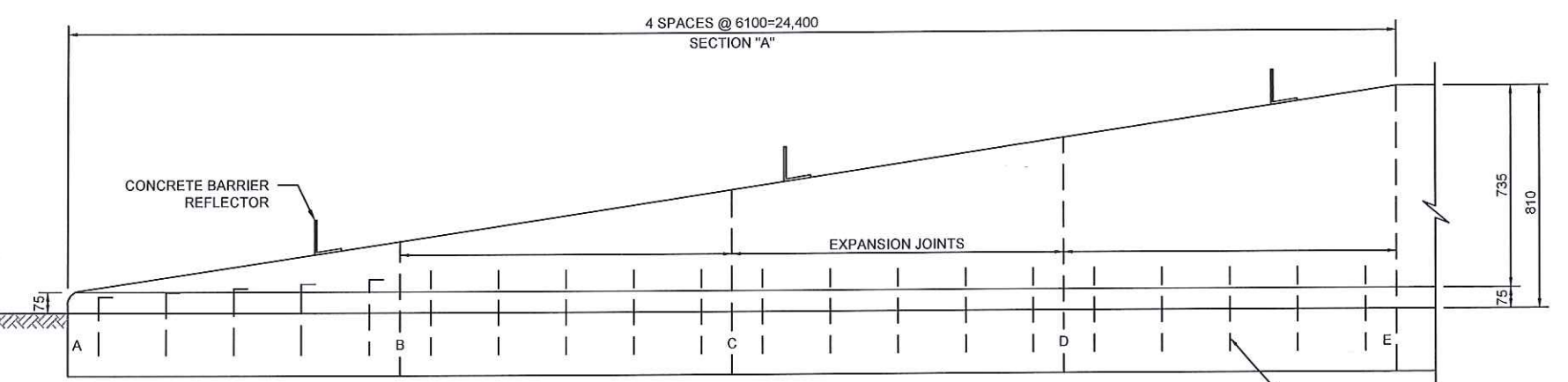
DESIGN AREA



REVISION	BY	DATE	REVISION	BY	DATE	REVISION	BY	DATE

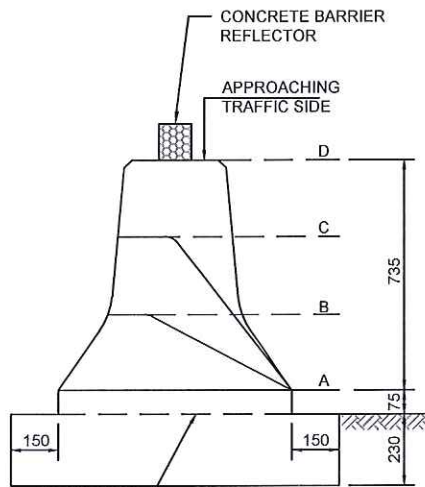


END VIEW

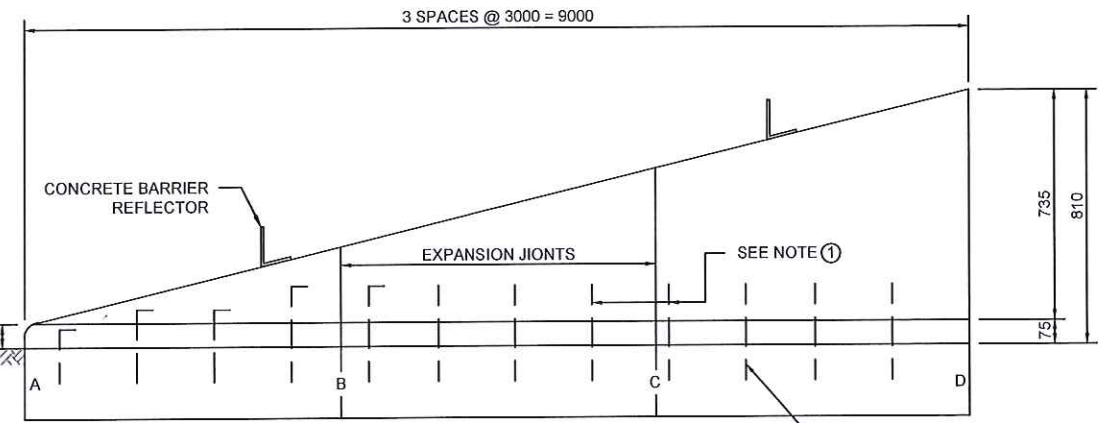


PROFILE VIEW

END SECTION DETAIL CD-MED
APPROACH END SECTION
SPEED LESS THAN 45 MPH



END VIEW



SIDE VIEW

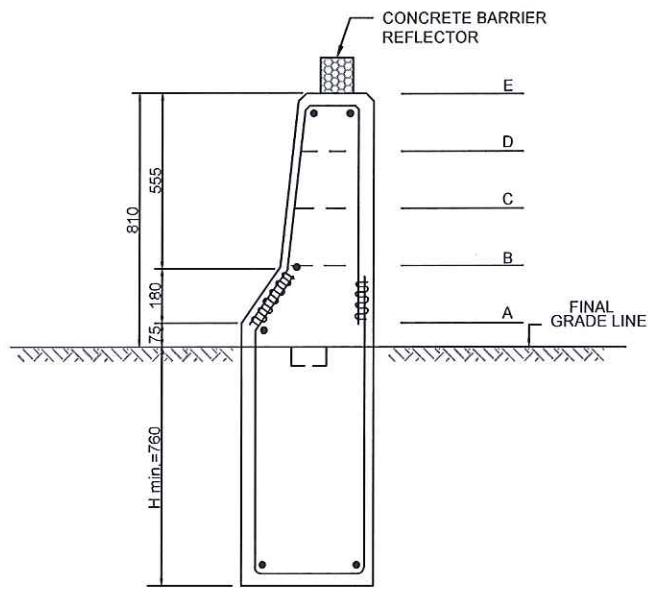
END SECTION DETAIL CE-MED
LEAVING END SECTION

LEGEND:
① #8x12" DOWELS, SPACED AT 1200 C. TO C. OMIT DOWELS WHEN TOP IS CONSTRUCTED INTEGRAL WITH BASE.

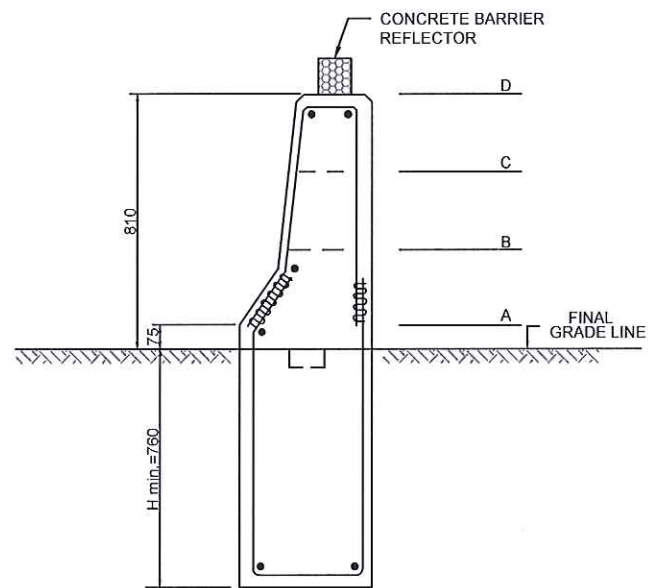
<p>PUERTO RICO DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS HIGHWAY AND TRANSPORTATION AUTHORITY</p>	STANDARD DRAWING APPROVAL				<p>CONCRETE BARRIER END SECTION DETAILS</p>	<p>CB-06 DECEMBER 2017</p>
	DATE: 18/dec/12	RECOMMENDED BY: <i>J. Lopez</i> DESIGN AREA DIRECTOR	DATE: 19/dec/12	APPROVED BY: <i>[Signature]</i> EXECUTIVE DIRECTOR		

DESIGN AREA

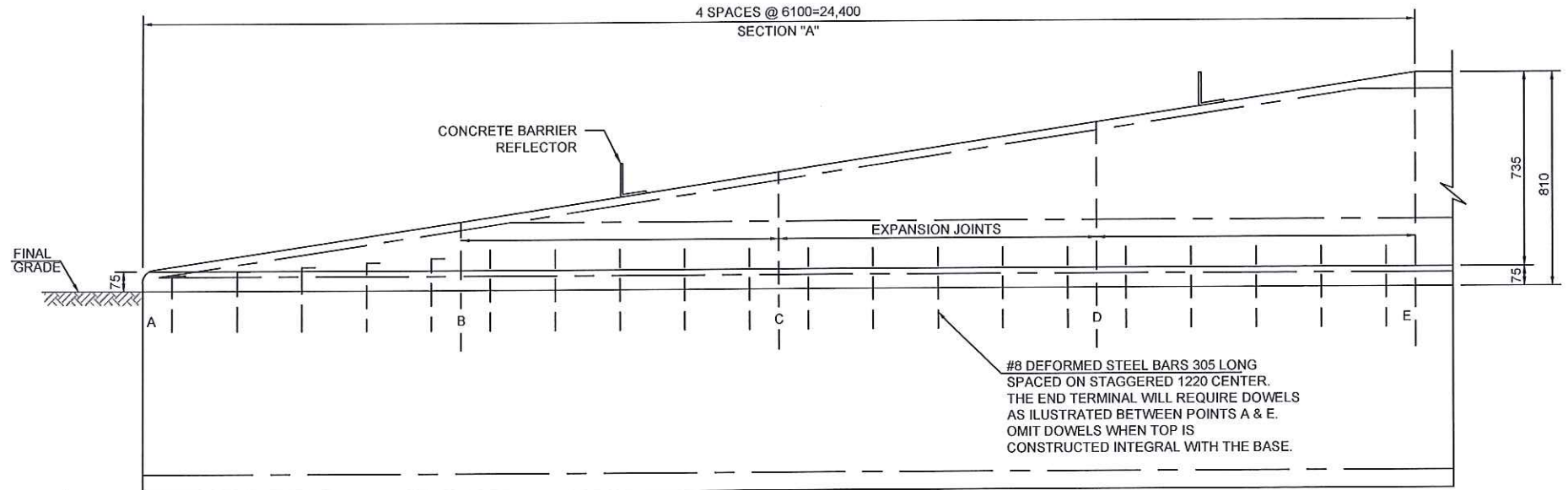
BY	REVISION	DATE	BY	REVISION	DATE	BY	REVISION	DATE	BY	REVISION	DATE
BY	REVISION	DATE	BY	REVISION	DATE	BY	REVISION	DATE	BY	REVISION	DATE
JR	MASH IMPLEMENTATION	DEC.17									



END VIEW

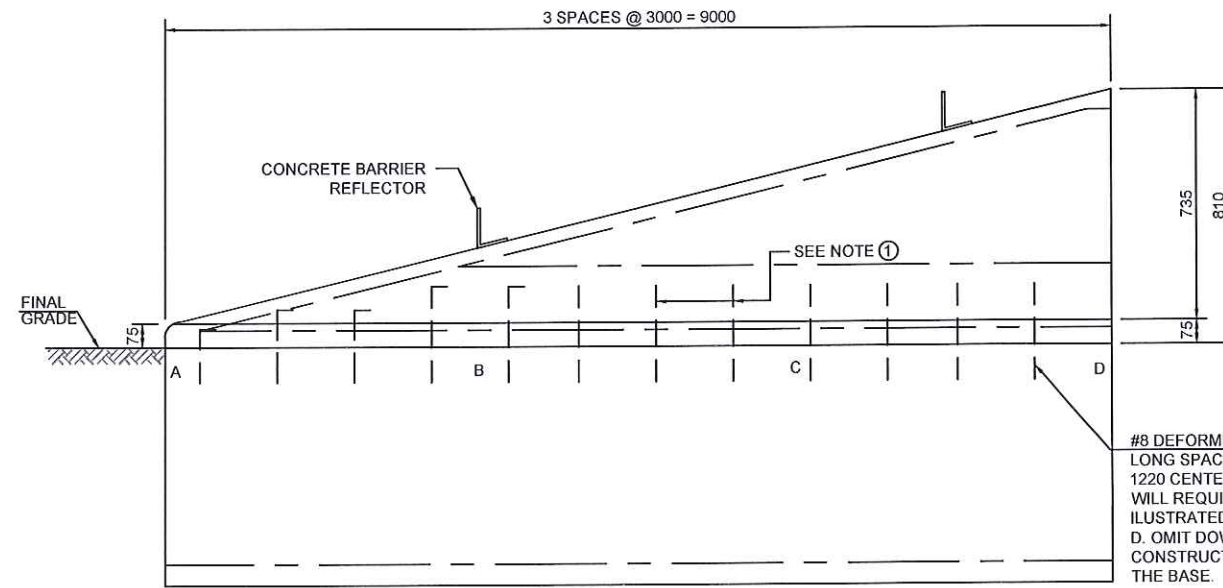


END VIEW



SIDE VIEW

END SECTION DETAIL CD
APPROACH END SECTION
SPEED LESS THAN 45 MPH



SIDE VIEW

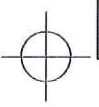
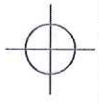
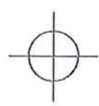
END SECTION DETAIL CE
LEAVING END SECTION

LEGEND:

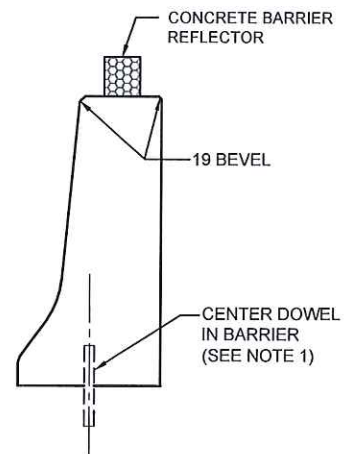
- ① #8x305 DOWELS, SPACED AT 1200 C. TO C. OMIT DOWELS WHEN TOP IS CONSTRUCTED INTEGRAL WITH BASE.

	PUERTO RICO DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS HIGHWAY AND TRANSPORTATION AUTHORITY	STANDARD DRAWING APPROVAL				CONCRETE BARRIER END SECTION DETAILS	CB-07 DECEMBER 2017
		DATE: 10/26/17	RECOMMENDED BY: <i>J. Lopez</i> DESIGN AREA DIRECTOR	DATE: 10/26/17	APPROVED BY: <i>[Signature]</i> EXECUTIVE DIRECTOR		

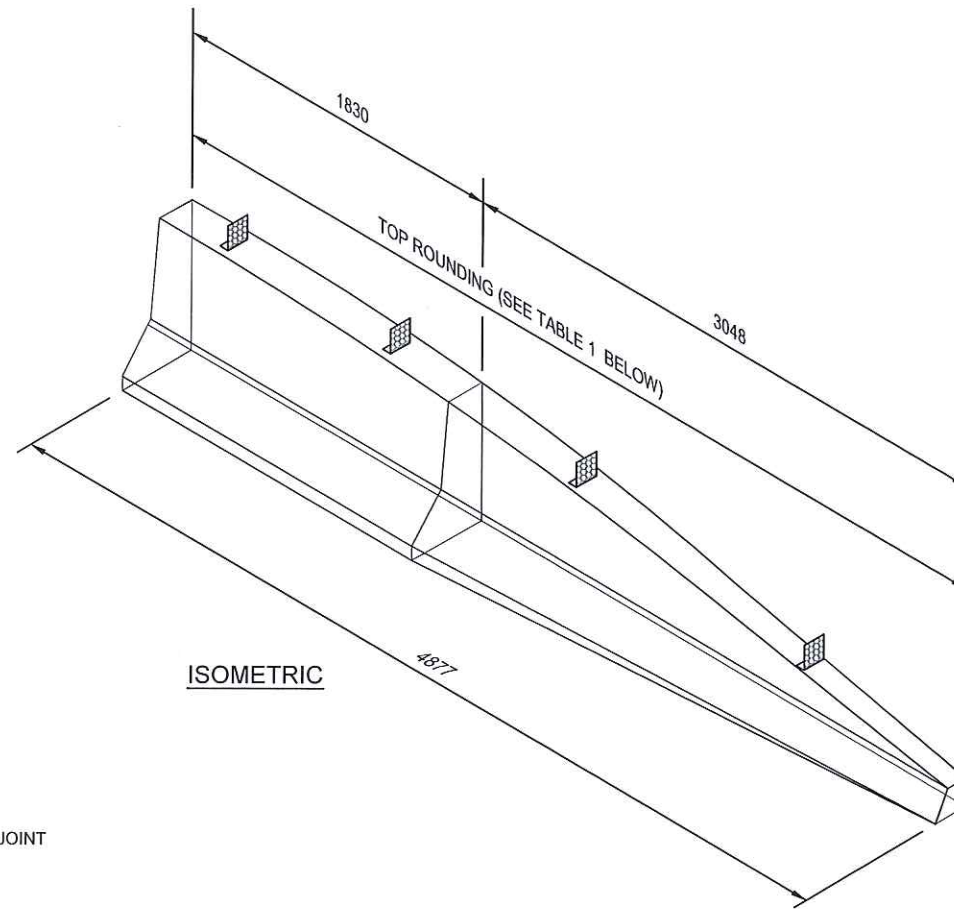
DESIGN AREA



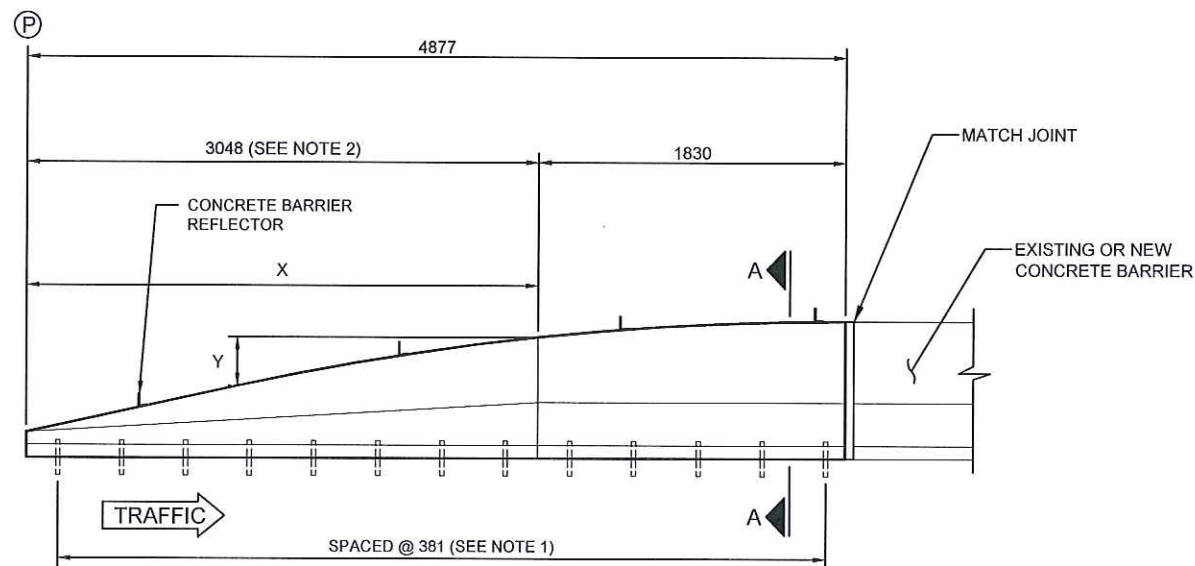
DATE	REVISION	BY	DATE	REVISION	BY
DEC. 17	MASH IMPLEMENTATION	JR			



SECTION A-A



ISOMETRIC



ELEVATION

NOTES:

- #8 x 203 DEFORMED BARS.
- BOTTOM WIDTH OF BARRIER TRANSITIONS FROM 203 TO 432.

TABLE 1

OFFSETS FOR ROUNDED BARRIER TOP																	
X = DISTANCE FROM ①	mm	305	610	915	1220	1525	1830	2135	2440	2745	3050	3355	3660	3965	4270	4575	4877
Y = OFFSET TO ROUNDED TOP	mm	649	582	518	451	384	323	265	213	165	128	91	61	37	18	6.10	0.00



PUERTO RICO
DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS
HIGHWAY AND TRANSPORTATION AUTHORITY

STANDARD DRAWING APPROVAL

DATE 18/Dec/17	RECOMMENDED BY <i>[Signature]</i>	DATE 19/Dec/17	APPROVED BY <i>[Signature]</i>
	DESIGN AREA DIRECTOR		EXECUTIVE DIRECTOR

CONCRETE BARRIER
END SECTION
DETAILS
FOR SPEED 35 MPH OR LESS

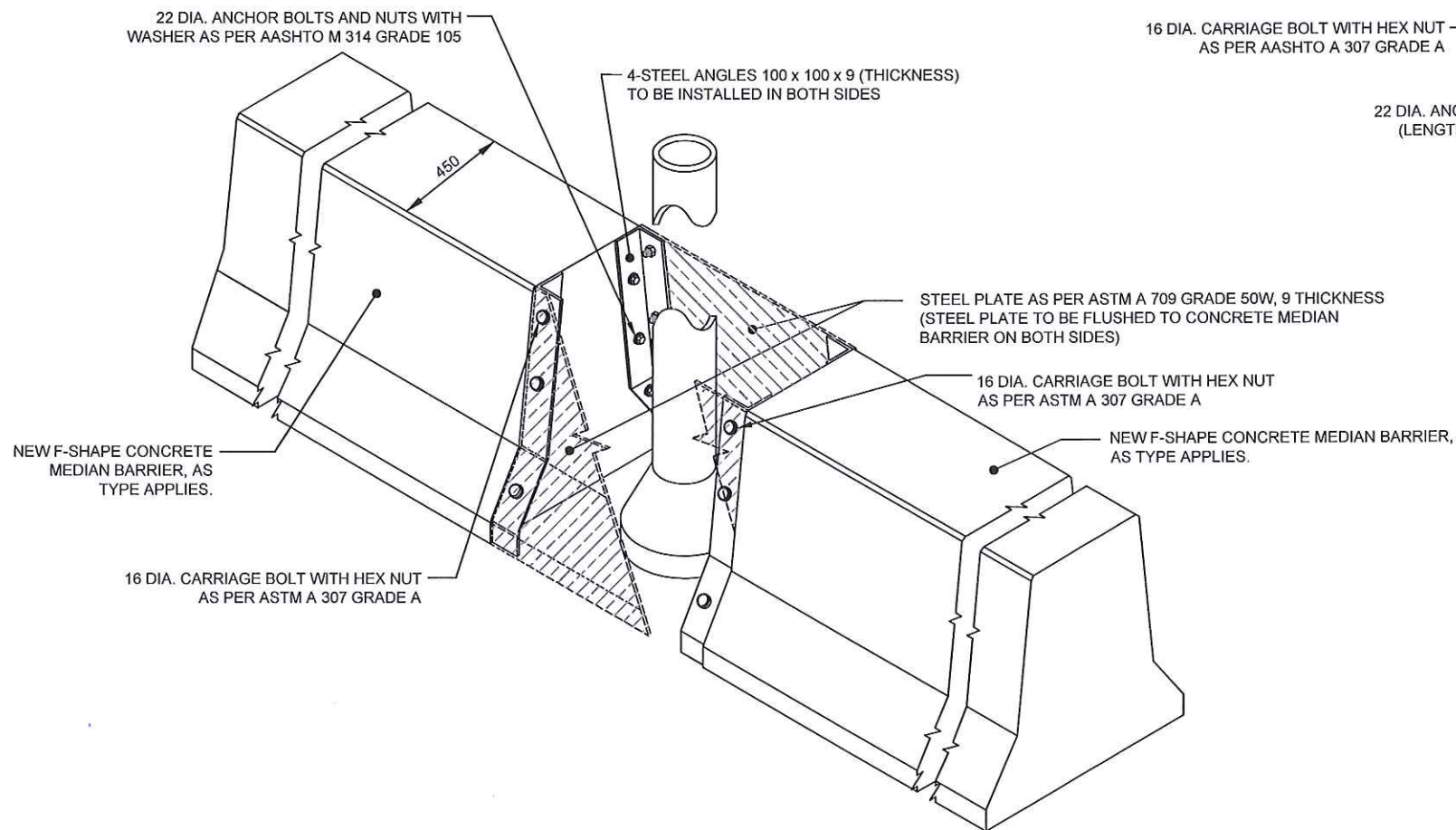
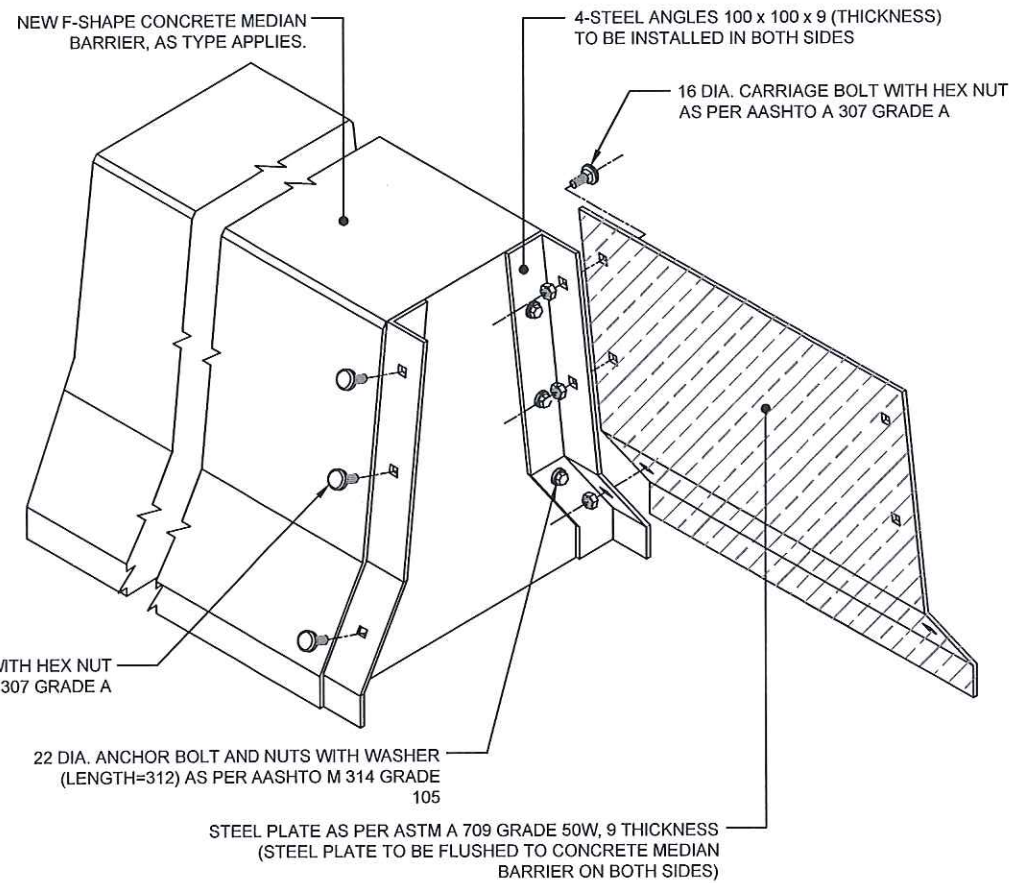
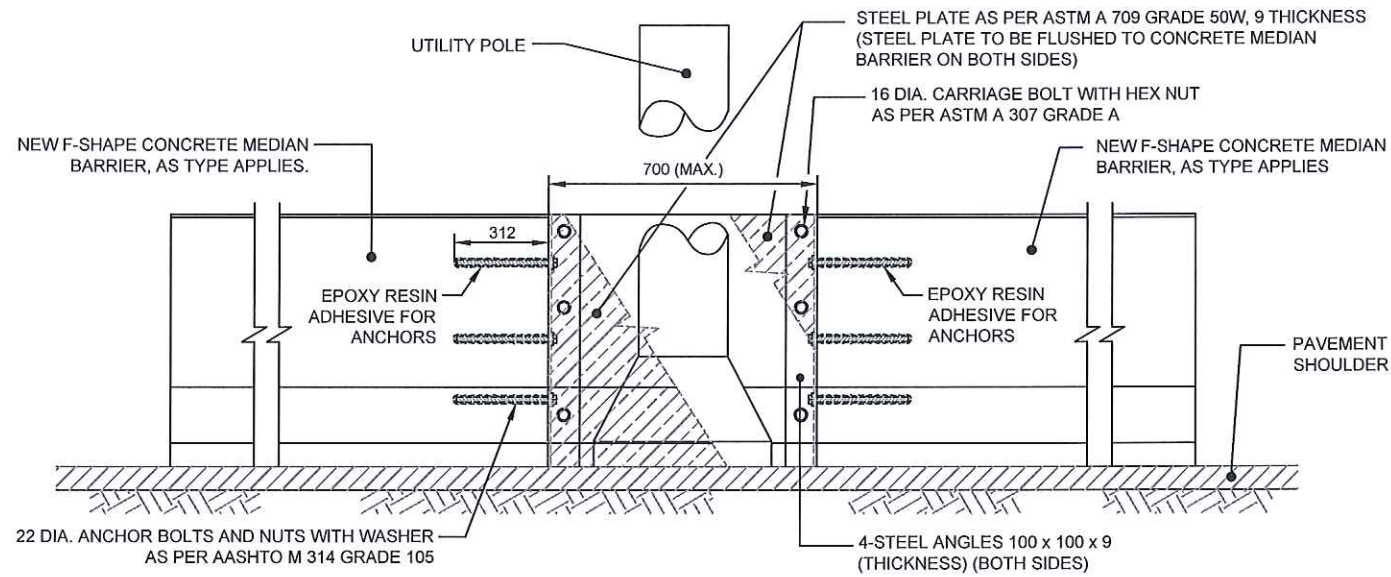
CB-08

DECEMBER 2017

DESIGN AREA



BY	
REVISION	
DATE	
BY	
REVISION	
DATE	
BY	
REVISION	
DATE	
BY	JR
REVISION	IMASH IMPLEMENTATION
DATE	DEC.17



NOTES:

1. THE STRUCTURAL STEEL SHALL BE HOT DIP GALVANIZED (ZINC-COATED) ACCORDING TO AASHTO M111 AND ASTM A123.
2. THE EPOXY RESIN ADHESIVE FOR ANCHORS SHALL MEET THE REQUIREMENTS OF AASHTO M235 AND ASTM C881, TYPES IV AND V, CLASS C.
3. THE HARDWARE (STEEL PLATE, STEEL ANGLES, BOLTS, NUTS, ANCHOR BOLTS AND WASHERS) OF LIGHTING POLE COVER AND EPOXY RESIN ADHESIVE FOR ANCHORS SHALL BE CONSIDERED A SUBSIDIARY OBLIGATION BY THE CONTRACTOR AND ITS COST INCLUDED IN THE CONCRETE BARRIER PAY ITEMS.



PUERTO RICO
DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS
HIGHWAY AND TRANSPORTATION AUTHORITY

STANDARD DRAWING APPROVAL

DATE: 18/Dec/17
RECOMMENDED BY: [Signature]
DESIGN AREA DIRECTOR

DATE: 19/Dec/17
APPROVED BY: [Signature]
EXECUTIVE DIRECTOR

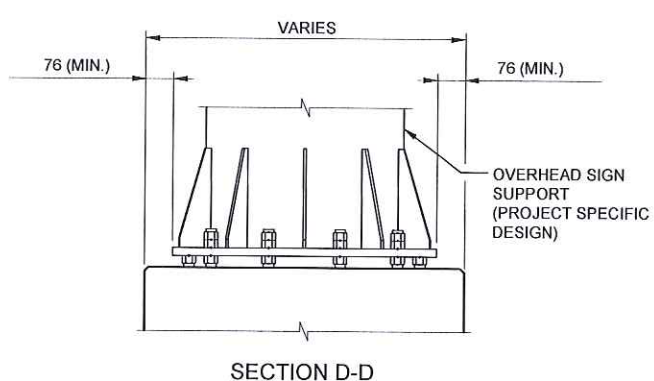
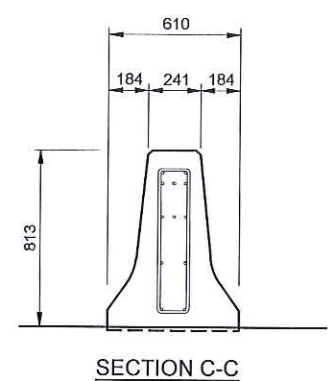
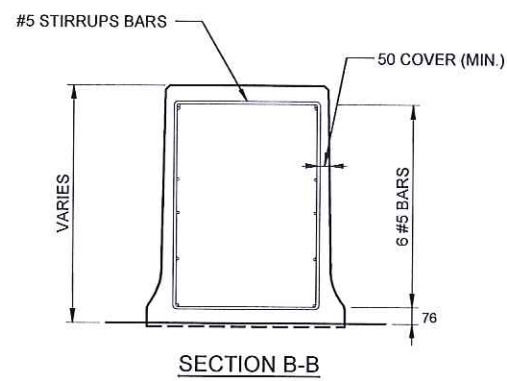
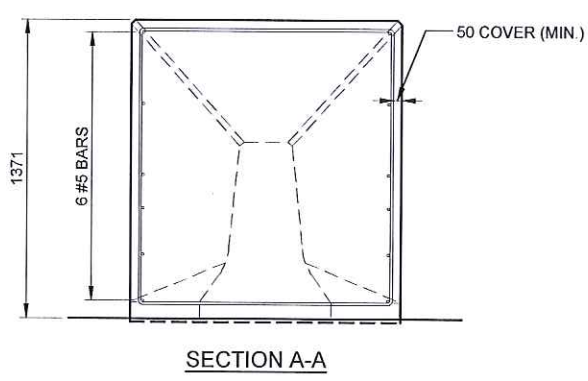
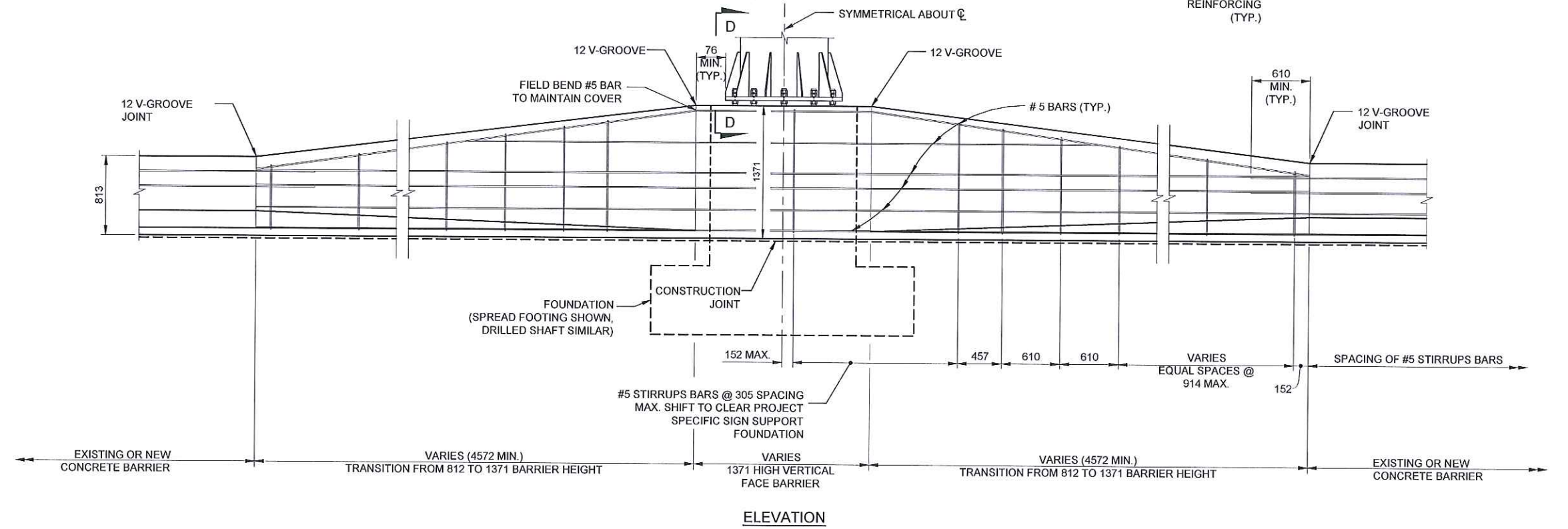
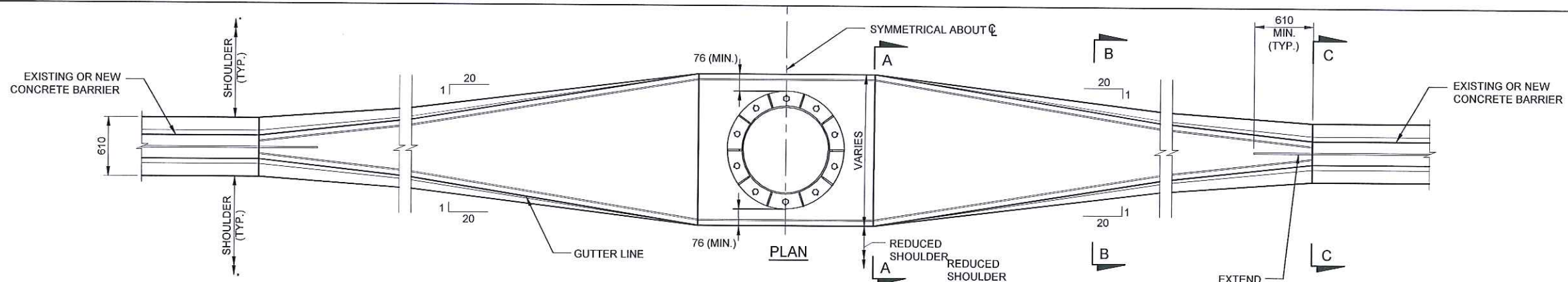
CONCRETE BARRIER
UTILITY POLE COVER

CB-10

DECEMBER 2017

DESIGN AREA

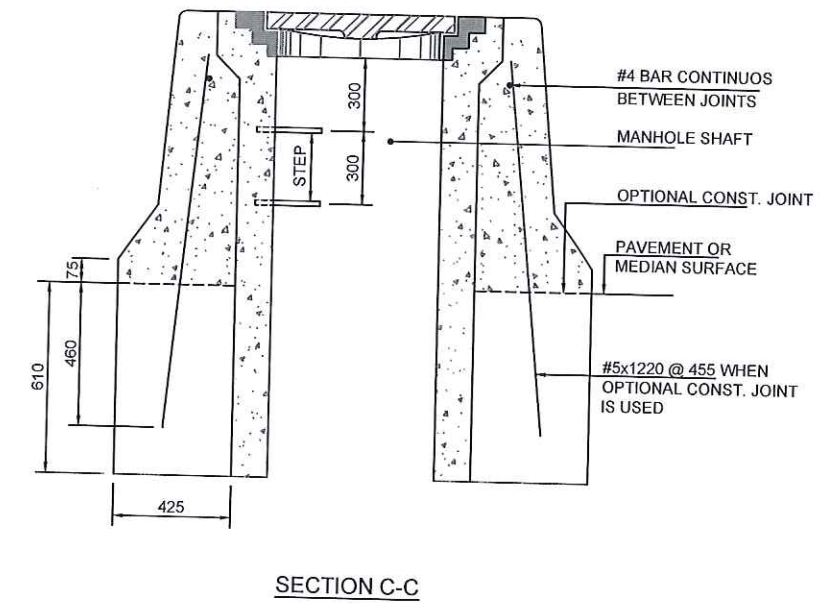
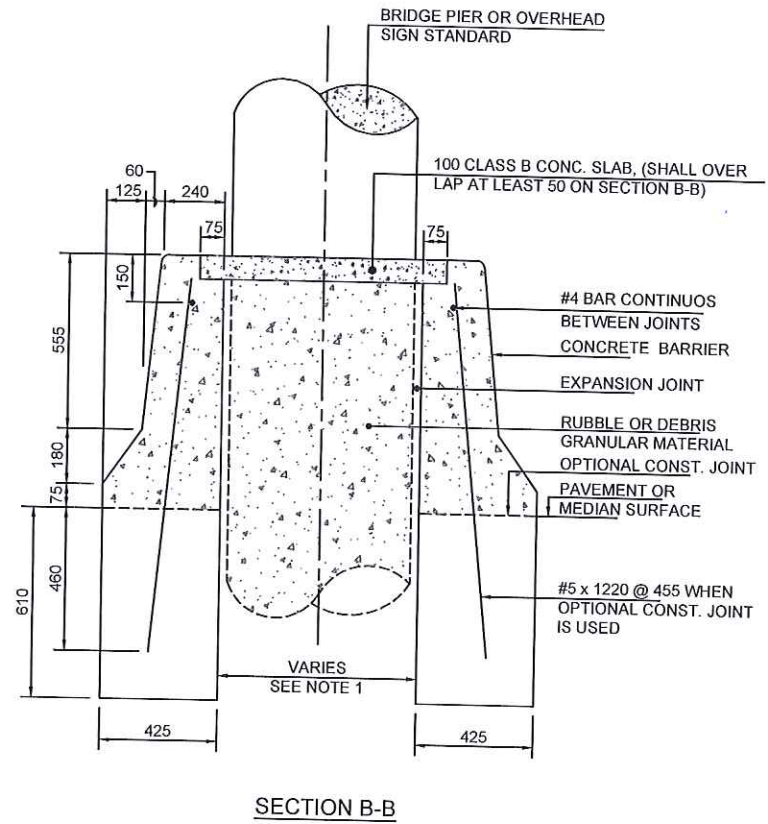
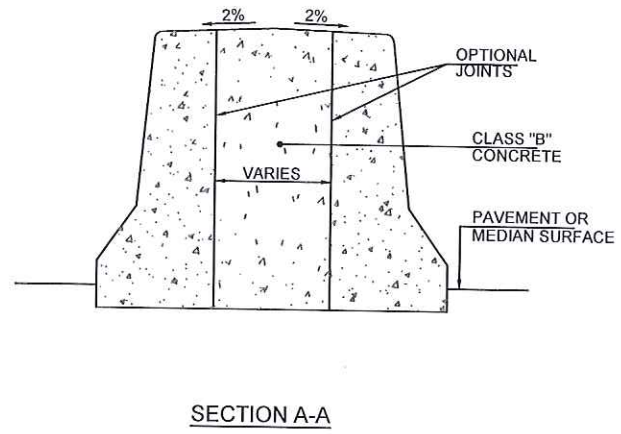
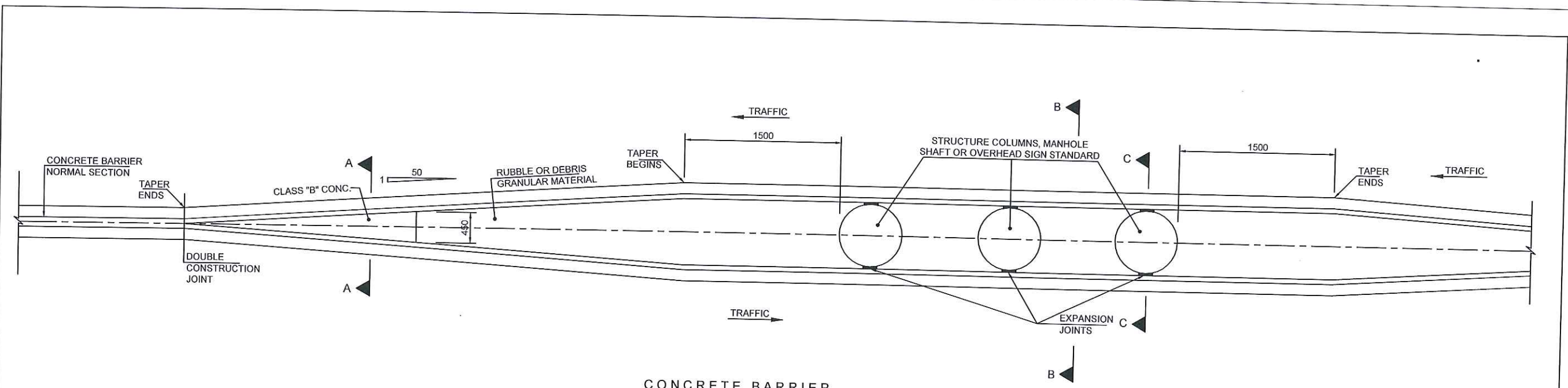
BY	REVISION	DATE	BY	REVISION	DATE	BY	REVISION	DATE	BY	REVISION	DATE	BY	REVISION	DATE
DATE	REVISION	DATE	BY	REVISION	DATE	BY	REVISION	DATE	BY	REVISION	DATE	BY	REVISION	DATE
DEC. 17	WASH. IMPLEMENTATION		JR											



	PUERTO RICO DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS HIGHWAY AND TRANSPORTATION AUTHORITY	STANDARD DRAWING APPROVAL		CONCRETE BARRIER OVERHEAD SIGN SUPPORT PROTECTION	CB-11 DECEMBER 2017
		DATE: 8/28/17 RECOMMENDED BY: [Signature] DESIGN AREA DIRECTOR	DATE: 10/26/17 APPROVED BY: [Signature] EXECUTIVE DIRECTOR		

DESIGN AREA

BY	REVISION	DATE	BY	REVISION	DATE	BY	REVISION	DATE	BY	REVISION	DATE	BY	REVISION	DATE
DATE	REVISION	BY	DATE	REVISION	BY	DATE	REVISION	BY	DATE	REVISION	BY	DATE	REVISION	BY
DEC. 17	MASH IMPLEMENTATION	JR												



- NOTES:
1. TO ACCOMMODATE STRUCTURE COLUMNS, MANHOLE SHAFT, OR OVERHEAD SIGN STANDARDS.
 2. ALL DIMENSIONS IN MILLIMETERS.



PUERTO RICO
 DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS
 HIGHWAY AND TRANSPORTATION AUTHORITY

STANDARD DRAWING APPROVAL			
DATE:	RECOMMENDED BY:	DATE:	APPROVED BY:
18/dec/17	<i>J. Lopez</i> DESIGN AREA DIRECTOR	19/dec/17	<i>[Signature]</i> EXECUTIVE DIRECTOR

CONCRETE BARRIER
 PIER PROTECTION DETAILS

CB-12
 DECEMBER 2017

DESIGN AREA