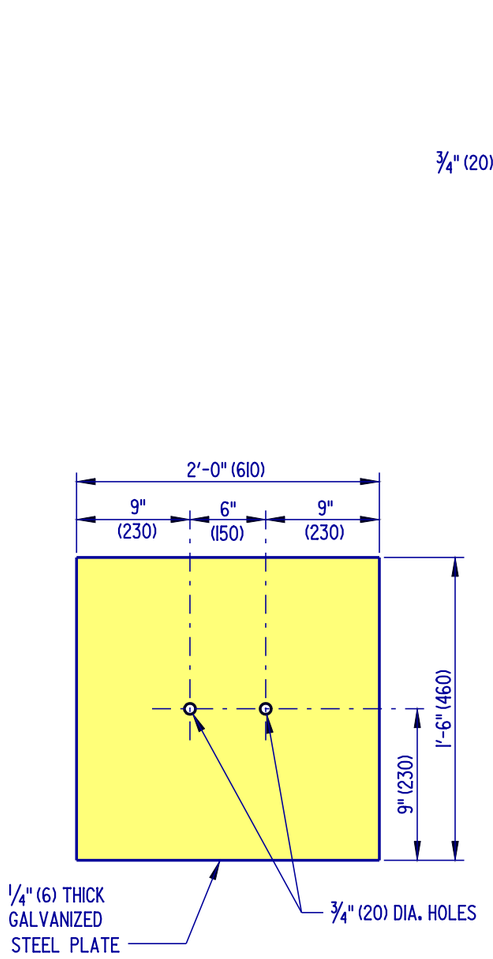
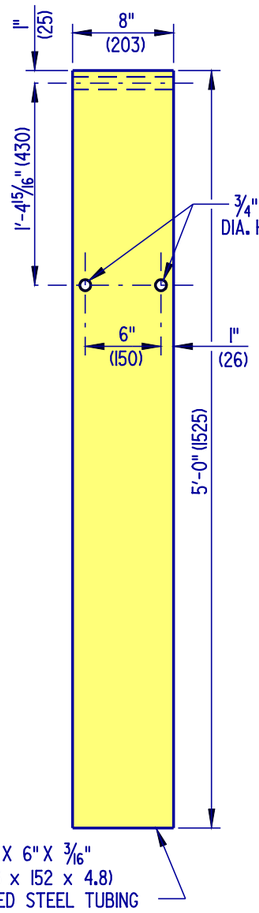
SCALE : N.T.S.

NOTES : 1). ALL HOLES SHALL BE DRILLED PRIOR TO GALVANIZING.

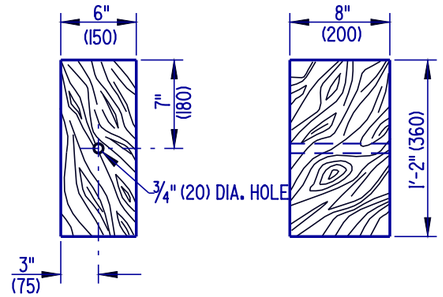
2). ALL WOOD SIZES ARE NOMINAL DIMENSIONS.



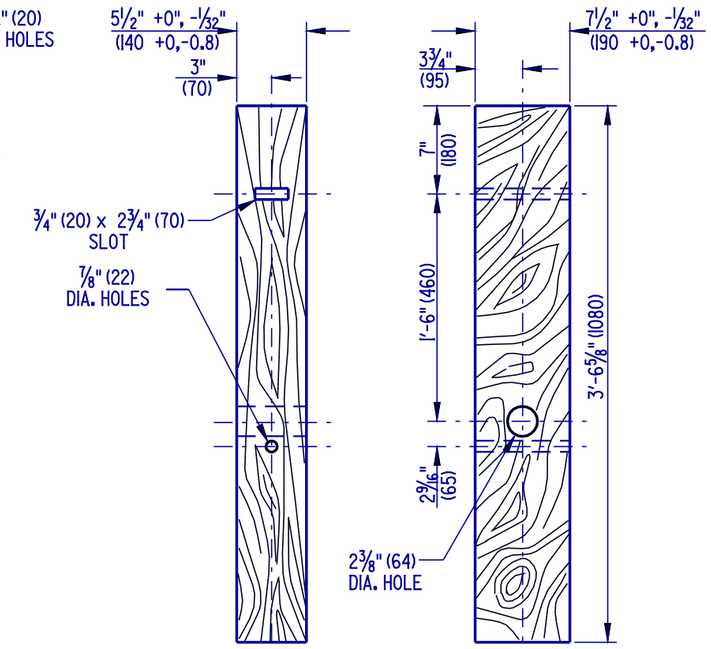
SOIL PLATE



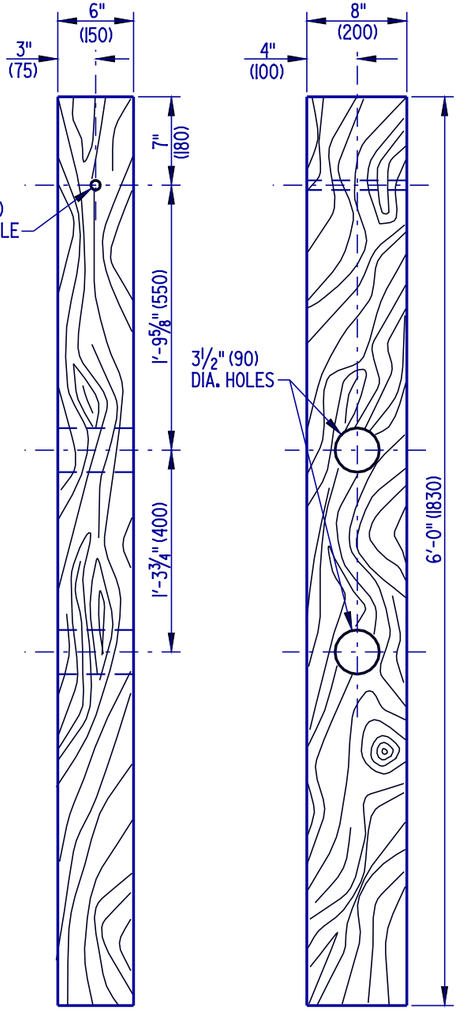
STEEL TUBE



WOOD BLOCK



SHORT WOOD BREAKAWAY POST

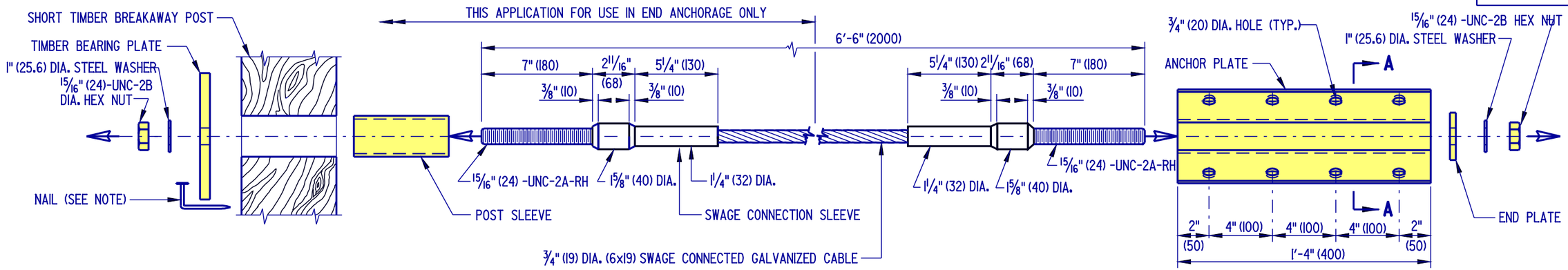


LONG WOOD BREAKAWAY POST

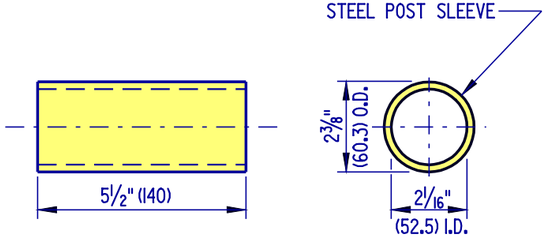
DELAWARE DEPARTMENT OF TRANSPORTATION	HARDWARE		APPROVED Carolann Wicks CHIEF ENGINEER 1/10/05 DATE
	STANDARD NO. B-13 (2004)	SHT. 7 OF 13	RECOMMENDED Dennis M. O'Toole DESIGN ENGINEER 1/3/05 DATE

09/21/2004

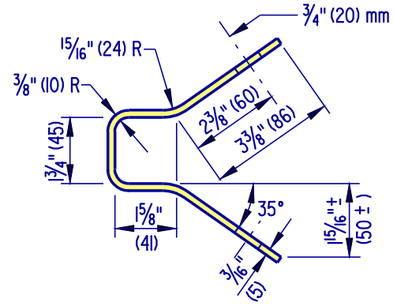
SCALE : N.T.S.



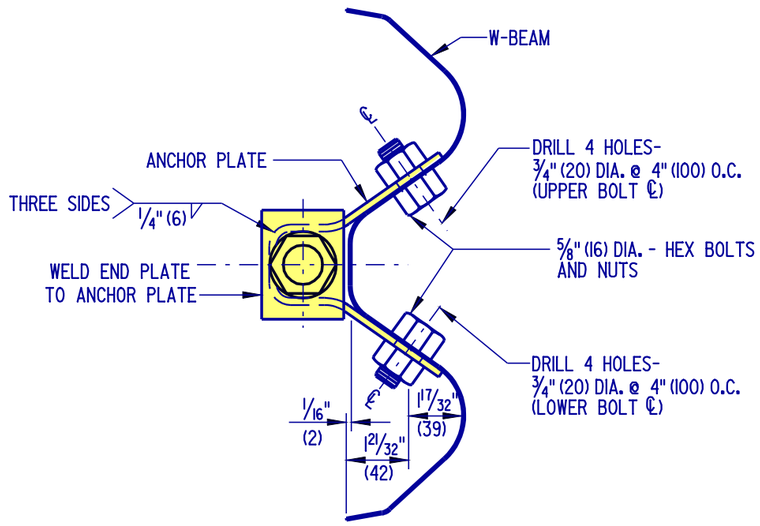
SWAGED CABLE ASSEMBLAGE AND RELATED HARDWARE ASSEMBLY



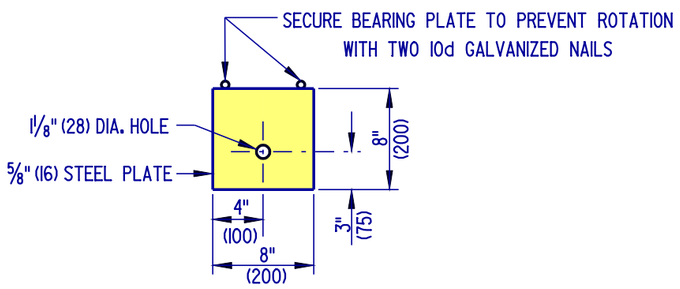
POST SLEEVE



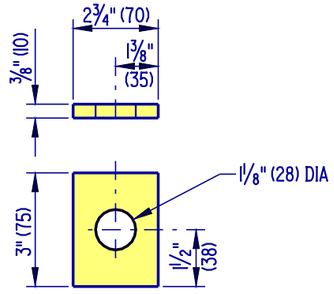
SECTION A-A



ANCHOR PLATE TO W-BEAM CONNECTION DETAIL



TIMBER BEARING PLATE



END PLATE

NOTES: 1). TO ENSURE THAT THE TIMBER BEARING PLATE REMAINS IN POSITION, 2 - 10d GALVANIZED STEEL NAILS SHALL BE DRIVEN IN THE SHORT TIMBER BREAKAWAY POST, AND BENT OVER BEARING PLATE.

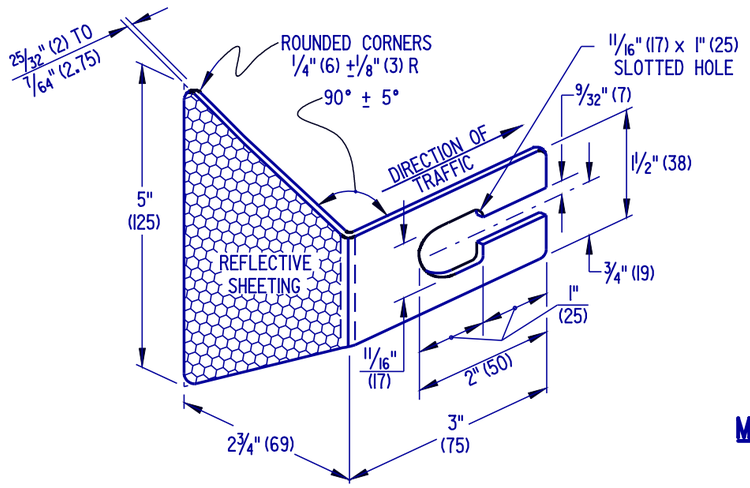
2). TIGHTEN ASSEMBLY UNTIL CABLE IS TAUGHT.

3). ALL HOLES SHALL BE DRILLED PRIOR TO GALVANIZING.

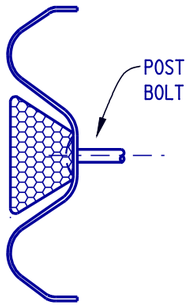
DELAWARE DEPARTMENT OF TRANSPORTATION	HARDWARE			APPROVED Carolann Wicks CHIEF ENGINEER 1/10/05 DATE
	STANDARD NO. B-13 (2004)	SHT. 8	OF 13	RECOMMENDED Dennis M. O'Toole DESIGN ENGINEER 1/3/05 DATE

09/21/2004

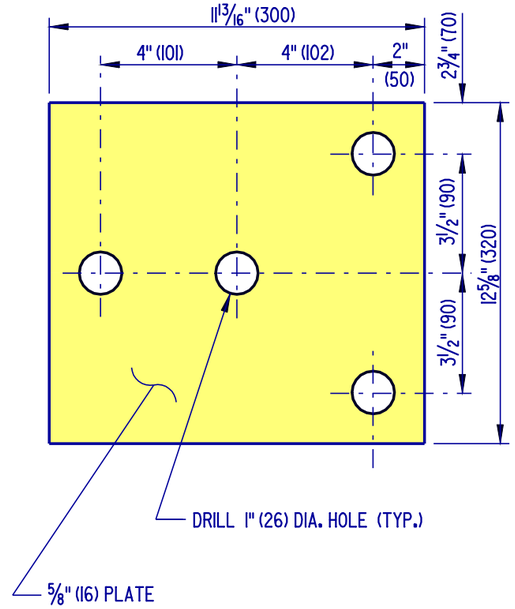
SCALE : N.T.S.



GUARDRAIL REFLECTOR



MOUNTING POSITION

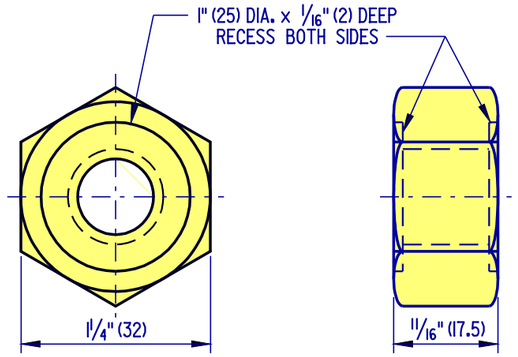


BEARING PLATE DETAIL (II)

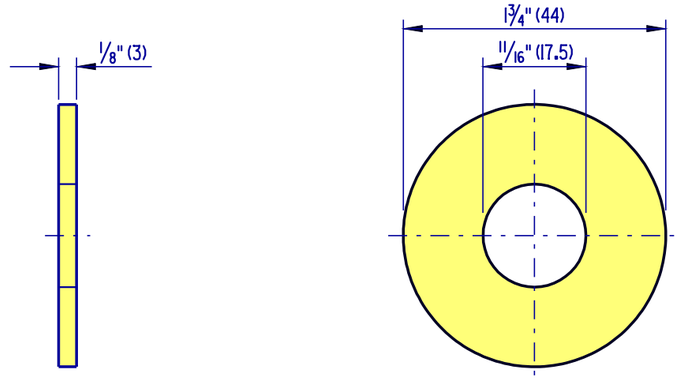
DELAWARE DEPARTMENT OF TRANSPORTATION	HARDWARE		APPROVED Carolann Wicks CHIEF ENGINEER 1/10/05 DATE
	STANDARD NO. B-13 (2004)	SHT. 9 OF 13	RECOMMENDED Dennis M. O'Shea DESIGN ENGINEER 1/3/05 DATE

12/08/2004

SCALE : N.T.S.

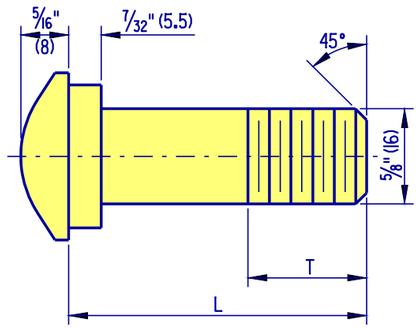


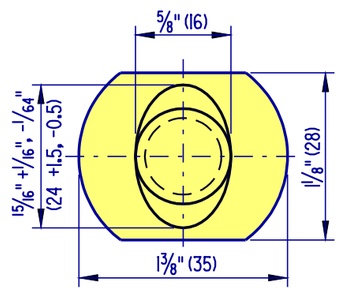
RECESSED NUT (FOR 5/8" (16) GUARDRAIL BOLT)



STEEL WASHER (FOR 5/8" (16) GUARDRAIL BOLT)

NOTE: DIMENSION FOR WASHER THICKNESS IS APPROXIMATE BASED ON METAL THICKNESS.





GUARDRAIL BOLT

L	T (MIN.)
1 1/4" (35)	FULL THREAD LENGTH
2" (50)	FULL THREAD LENGTH
4" (100)	FULL THREAD LENGTH
10" (255)	4" (100) THREAD LENGTH
18" (460)	4" (100) THREAD LENGTH

NOTES : 1. ALL FILLETS SHALL HAVE A MINIMUM RADIUS OF 1/16" (2).
2. IF THE BOLT EXTENDS MORE THAN 1/2" (12) BEYOND THE NUT, THE BOLT SHALL BE TRIMMED BACK AS PER THE DEPARTMENT'S SPECIFICATIONS.

DELAWARE
DEPARTMENT OF TRANSPORTATION

HARDWARE

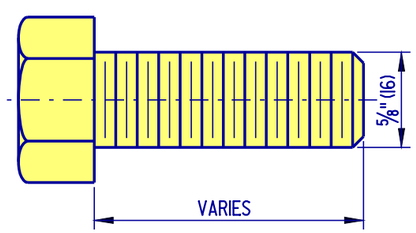
STANDARD NO. B-13 (2004) | SHT. 10 OF 13

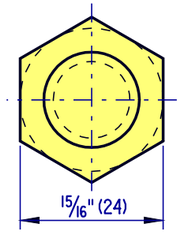
APPROVED Carolann Wicks CHIEF ENGINEER 1/10/05 DATE

RECOMMENDED Dennis M. Office DESIGN ENGINEER 1/3/05 DATE

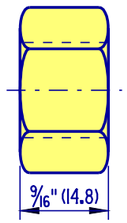
09/23/2004

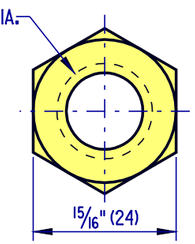
SCALE : N.T.S.



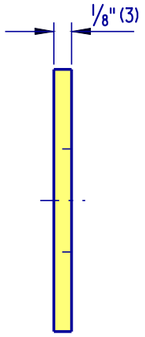


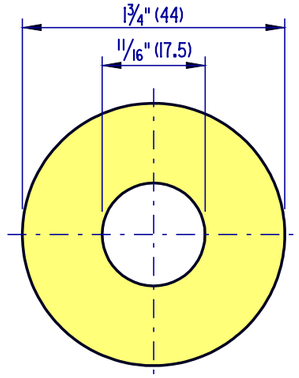
5/8" (16) HEX BOLT





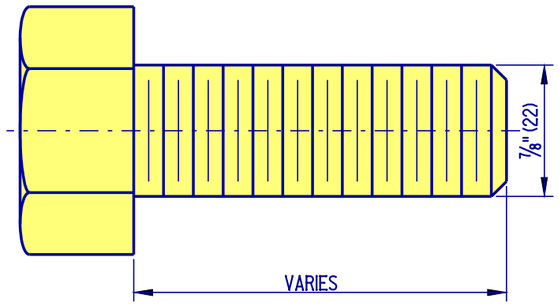
5/8" (16) HEX NUT

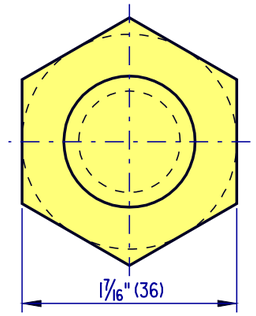




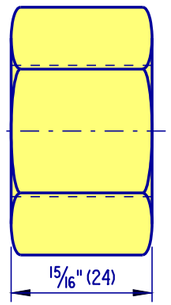
5/8" (16) STEEL WASHER

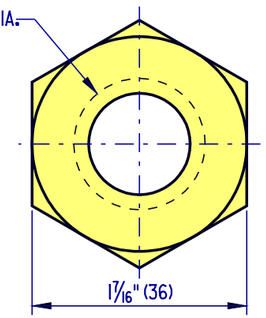
NOTE : DIMENSION FOR WASHER THICKNESS IS APPROXIMATE BASE METAL THICKNESS.





HIGH-STRENGTH STRUCTURAL HEX BOLT



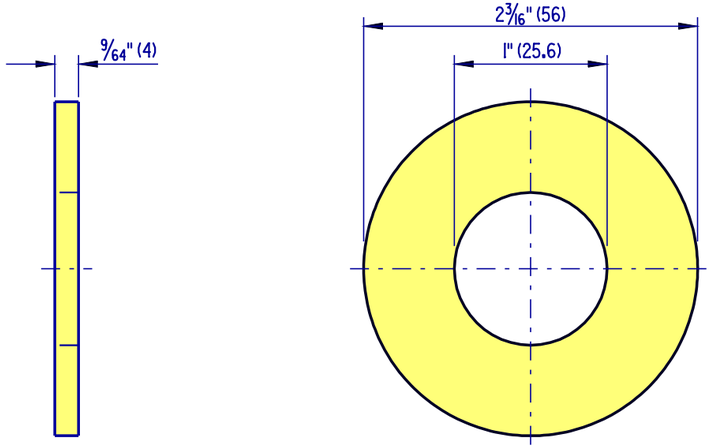


HIGH-STRENGTH STRUCTURAL HEX NUT

DELAWARE DEPARTMENT OF TRANSPORTATION	HARDWARE		APPROVED Carolann Wicks CHIEF ENGINEER 1/10/05 DATE
	STANDARD NO. B-13 (2004)	SHT. 11 OF 13	RECOMMENDED Dennis M. O'Toole DESIGN ENGINEER 1/3/05 DATE

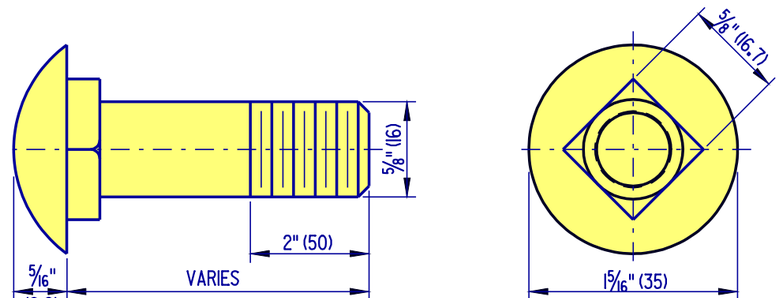
09/21/2004

SCALE : N.T.S.

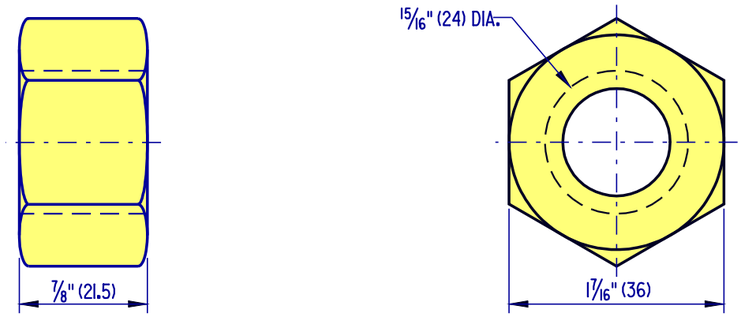


STEEL WASHER

NOTES : 1. FOR USE WITH SWAGED CABLE ASSEMBLAGE.
2. DIMENSION FOR WASHER THICKNESS IS APPROXIMATE BASE METAL THICKNESS.



5/8" (16) CARRIAGE BOLT



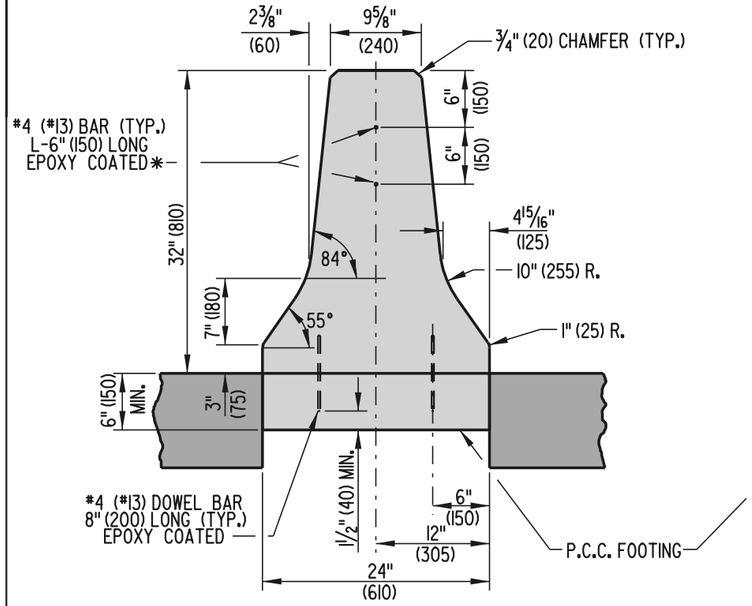
15/16" (24) HEX NUT

NOTE : FOR USE WITH SWAGED CABLE ASSEMBLAGE.

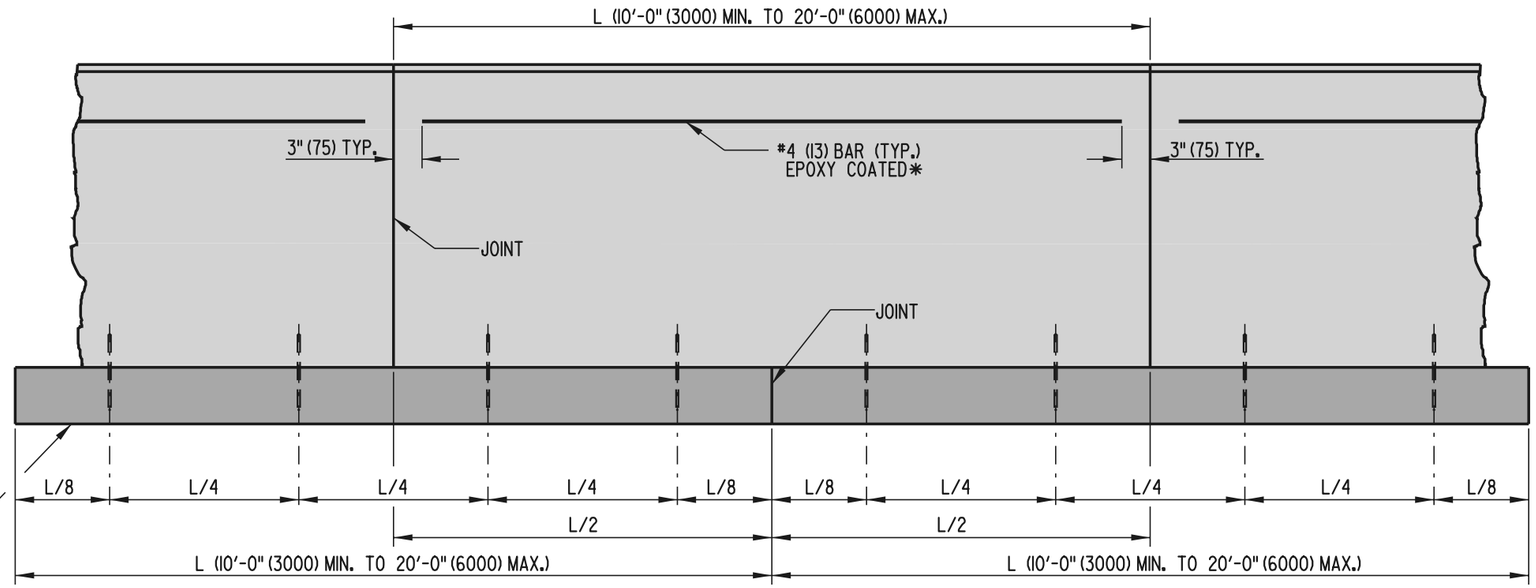
DELAWARE DEPARTMENT OF TRANSPORTATION	HARDWARE		APPROVED Carolann Wicks CHIEF ENGINEER 1/10/05 DATE
	STANDARD NO. B-13 (2004)	SHT. 12 OF 13	RECOMMENDED Dennis M. O'Toole DESIGN ENGINEER 1/3/05 DATE

09/10/2004

SCALE : N.T.S.



SECTION



ELEVATION

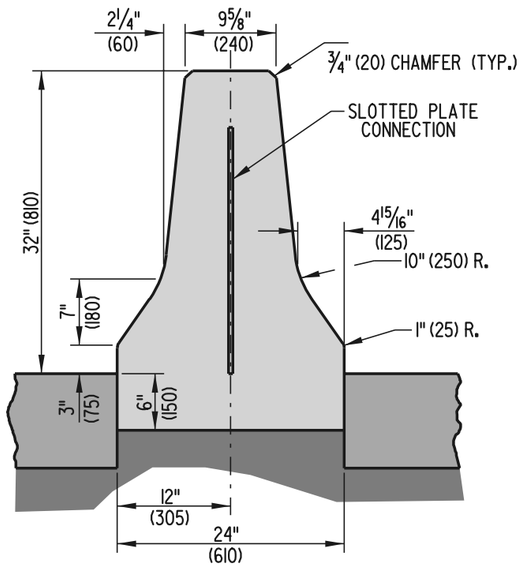
TYPICAL CAST-IN-PLACE OR SLIP-FORM CONSTRUCTION

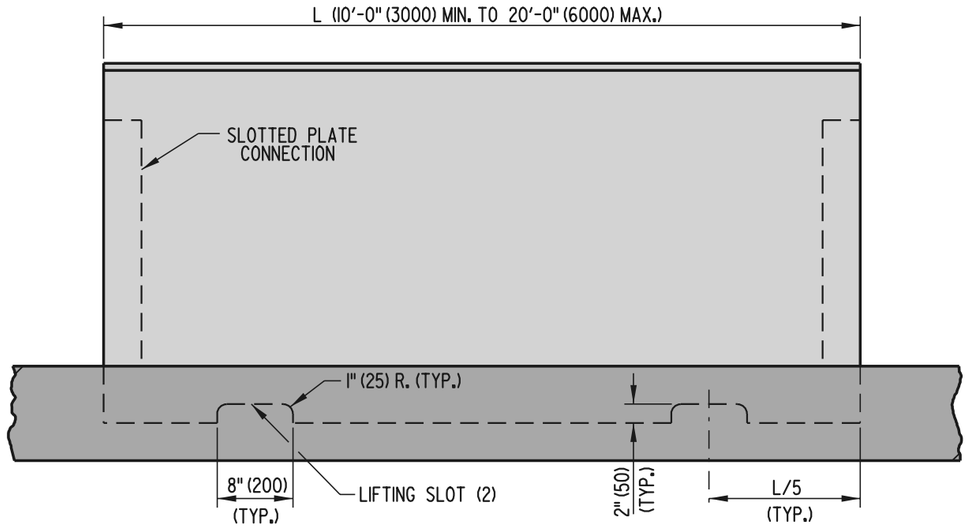
* BAR SHALL BE CUT AT EVERY JOINT IF MADE CONTINUOUS FOR SLIP-FORM CONSTRUCTION

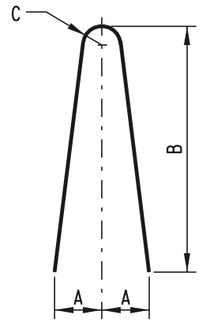
DELAWARE DEPARTMENT OF TRANSPORTATION	CONCRETE SAFETY BARRIER (F SHAPE)	APPROVED Lynne M. Hartnett CHIEF ENGINEER DATE 6/18/01
	STANDARD NO. B-14 (2001) SHT. 1 OF 3	RECOMMENDED Michael A. Ayers DESIGN ENGINEER DATE 6/15/01

05/21/2001

SCALE : N.T.S.



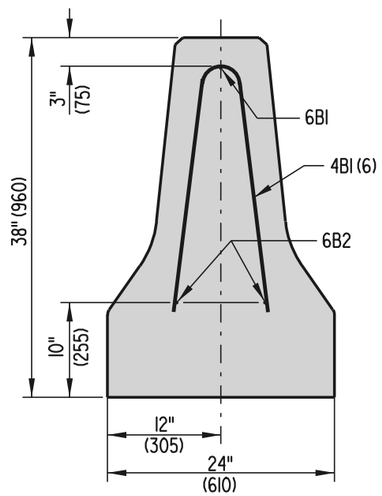




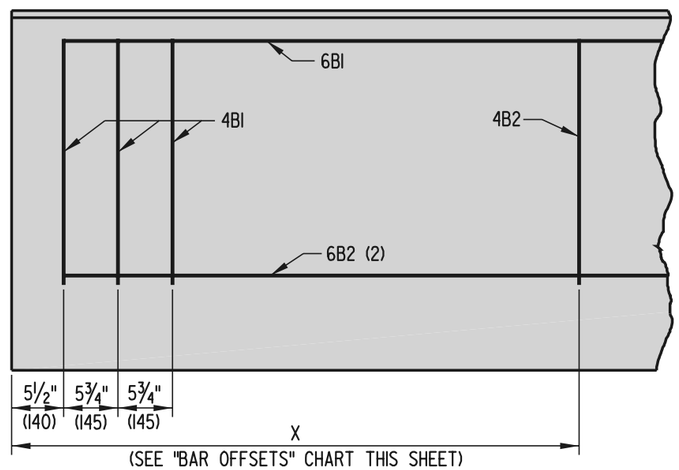
TYPE 'I' BAR

TYPICAL PRE-CAST CONSTRUCTON

BAR OFFSETS		
NOMINAL LENGTH OF BARRIER UNIT	"X"	NO. REQ'D FOR EACH BARRIER UNIT
20' (6000)	6' - 11" (2100)	2
18' (5500)	6' - 5" (1950)	2
16' (5000)	5' - 11" (1800)	2
14' (4500)	7' - 0" (2250)	1
12' (4000)	6' - 0" (2000)	1
10' (3000)	5' - 0" (1500)	1



'F' SHAPE BARRIER SECTION



ELEVATION

BAR LIST							
MARK	SIZE	NUMBER IN EACH SECTION	LENGTH	TYPE	A	B	C
4BI	4 (13)	6	4'-7" (1400)	I	5" (125)	26" (660)	2" (50)
4B2	4 (13)	**	4'-7" (1400)	I	5" (125)	26" (660)	2" (50)
6BI	6 (19)	I	*	STR.			
6B2	6 (19)	2	*	STR.			

* THE LENGTH OF BARS 6BI AND 6B2 SHALL BE 11" (280) SHORTER IN LENGTH THAN THE NOMINAL SIZE OF THE BARRIER IN WHICH IT IS USED.

** SEE "BAR OFFSETS" CHART ON THIS SHEET FOR MORE INFORMATION.

TYPICAL PRE-CAST REINFORCEMENT DETAILS

NOTES: 1). CONCRETE CLEAR COVER FOR REINFORCING BARS SHALL BE 1½" (40) MIN..

DELAWARE
DEPARTMENT OF TRANSPORTATION

CONCRETE SAFETY BARRIER (F SHAPE)

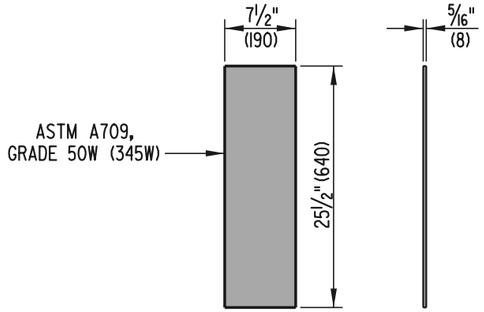
STANDARD NO. B-14 (2001) SHT. 2 OF 3

APPROVED Lynne M. Hudson CHIEF ENGINEER DATE 6/18/01

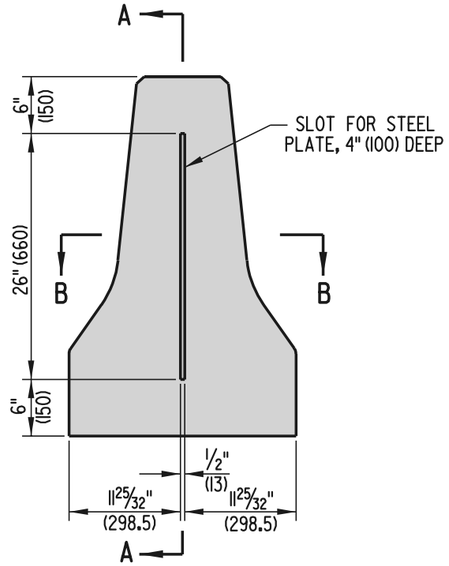
RECOMMENDED [signature] DESIGN ENGINEER DATE 6/15/01

04/17/2001

SCALE : N.T.S.

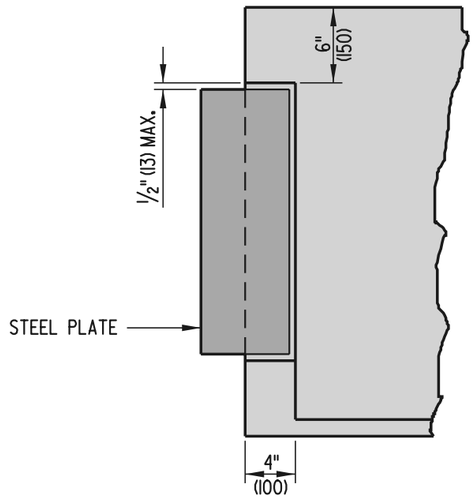


STEEL CONNECTOR PLATE

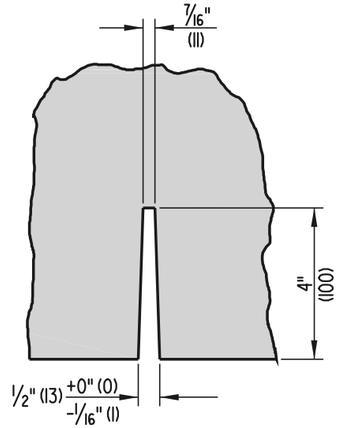


SLOT DIMENSIONS

CONCRETE SAFETY BARRIER, PRECAST CONSTRUCTION
'F' SHAPE BARRIER SECTION



SECTION A-A

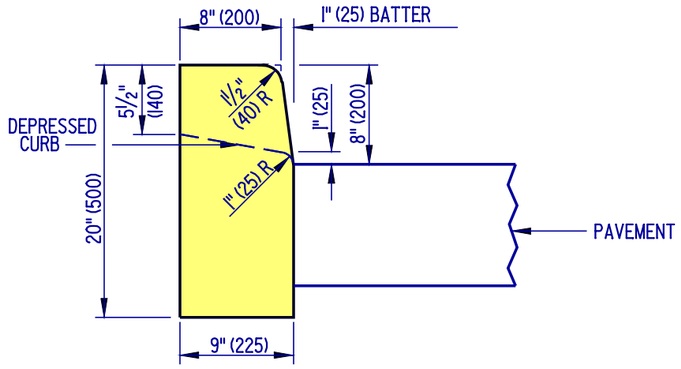


SECTION B-B

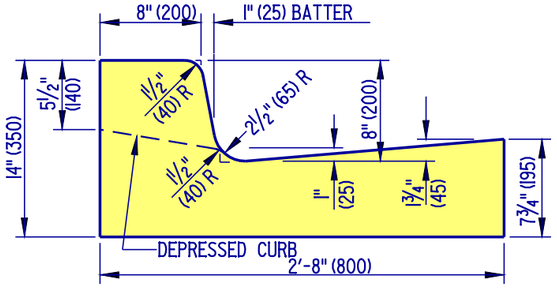
DELAWARE DEPARTMENT OF TRANSPORTATION	SLOTTED PLATE CONNECTION DETAILS			APPROVED Lynne M. Hartnett CHIEF ENGINEER 6/18/01 DATE
	STANDARD NO. B-14 (2001)	SHT. 3	OF 3	RECOMMENDED Michael A. Hughes DESIGN ENGINEER 6/15/01 DATE

04/17/2001

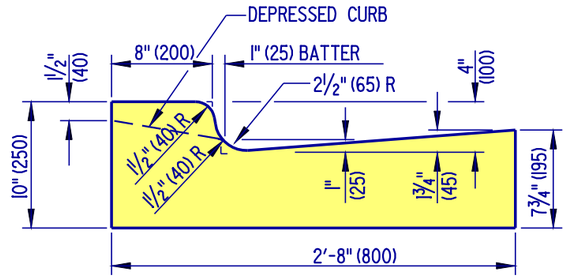
SCALE : N.T.S.



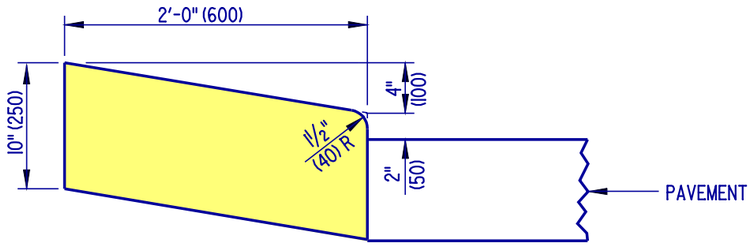
P.C.C. CURB
TYPE 1



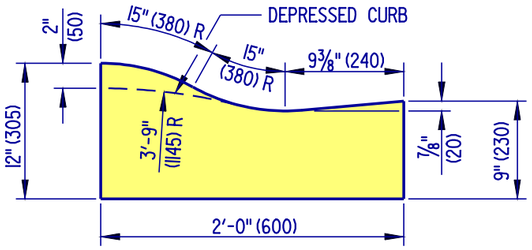
INTEGRAL P.C.C. CURB AND GUTTER
TYPE 1



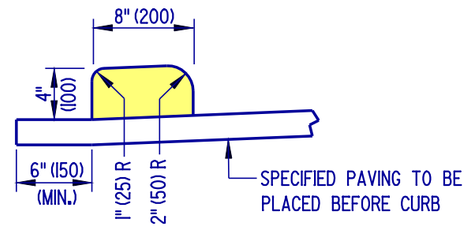
INTEGRAL P.C.C. CURB AND GUTTER
TYPE 4



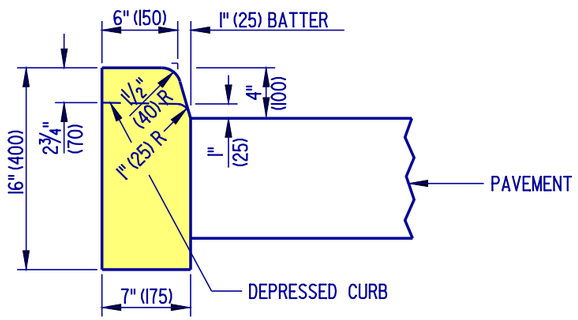
P.C.C. CURB
TYPE 2



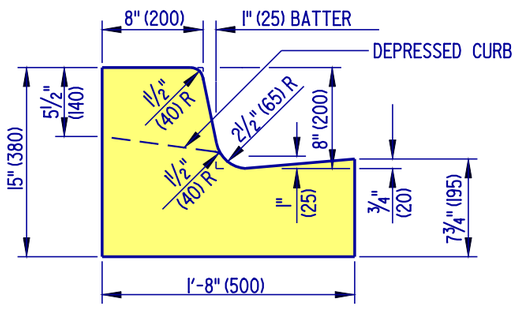
INTEGRAL P.C.C. CURB AND GUTTER
TYPE 2



HOT-MIX, HOT LAID BITUMINOUS CONCRETE CURB



P.C.C. CURB
TYPE 3



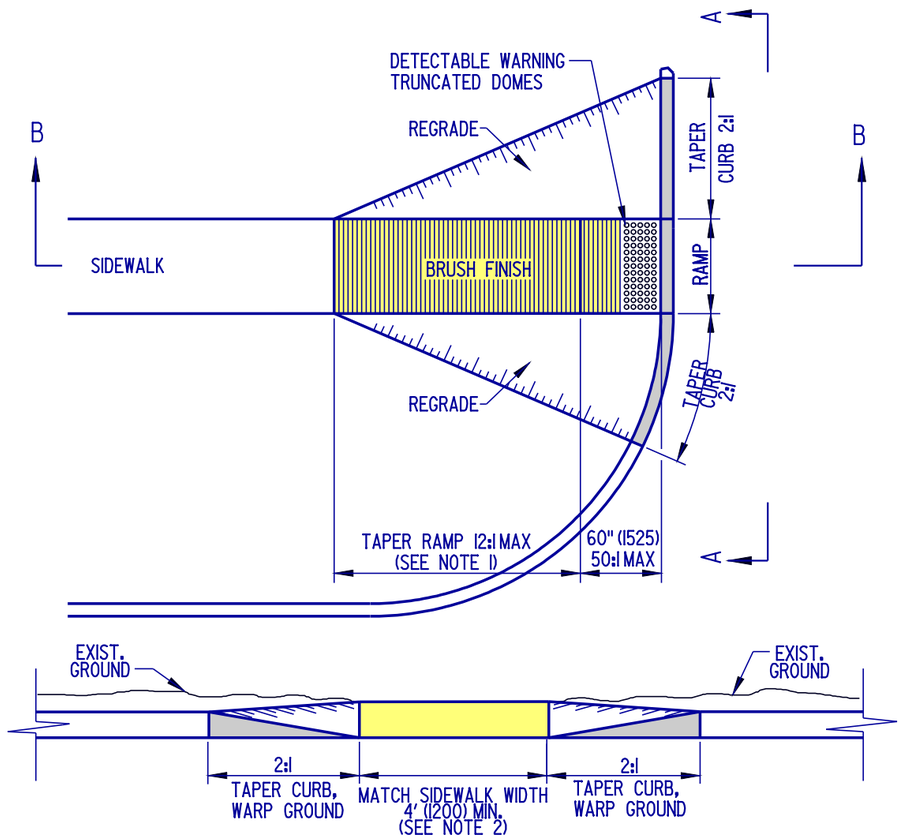
INTEGRAL P.C.C. CURB AND GUTTER
TYPE 3

NOTES:
1. WHEN INTEGRAL P.C.C. CURB AND GUTTER IS PLACED ADJACENT TO PORTLAND CEMENT CONCRETE PAVEMENT, CONSTRUCT THE JOINT AS PER THE LONGITUDINAL JOINT SEALANT DETAIL ON STANDARD P-2, SHEET 3 OF 5. USE APPROVED JOINT FILLER TO SEAL. WORK TO BE PAID UNDER RESPECTIVE CURB AND GUTTER ITEM.
2. DEPRESS CURB AT DRIVEWAYS AS DETAILED.
3. DEPRESS CURB FLUSH WITH PAVEMENT AT CURB RAMPS. MAXIMUM SLOPE OF DEPRESSED CURB IS 12:1.

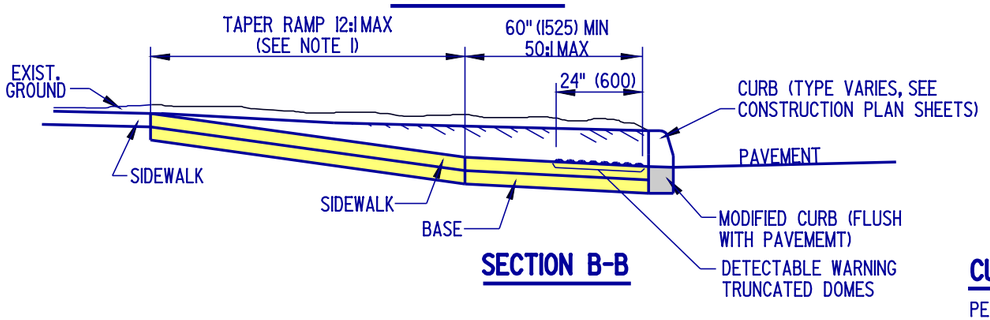
DELAWARE DEPARTMENT OF TRANSPORTATION	P.C.C. CURB, P.C.C. CURB & GUTTER, AND HOT-MIX CURB	APPROVED Carolann Wicks (CHIEF ENGINEER) 1/10/05 (DATE)
	STANDARD NO. C-1 (2004) SHT. 1 OF 1	RECOMMENDED Dennis M. Office (DESIGN ENGINEER) 1/3/05 (DATE)

09/27/2004

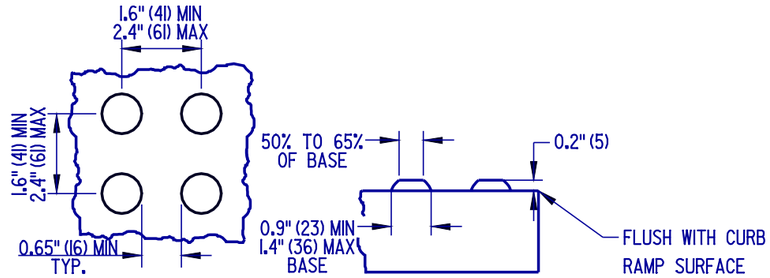
SCALE : N.T.S.



ELEVATION A-A

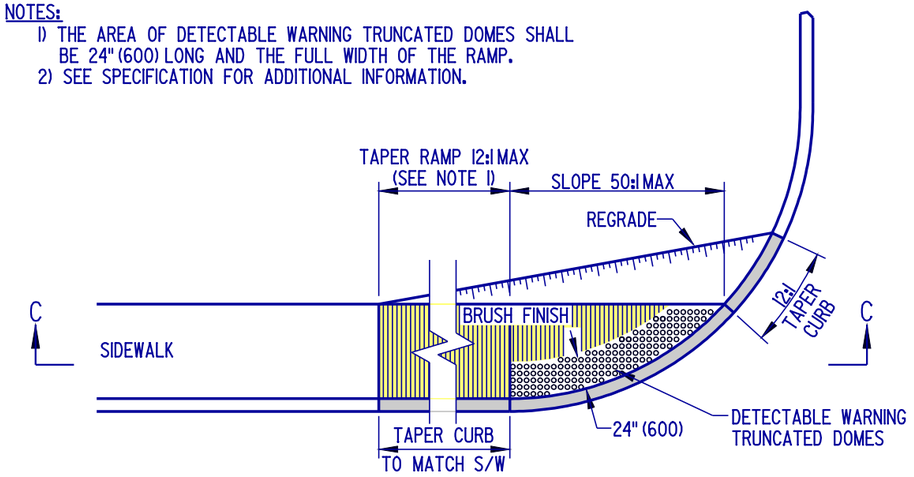


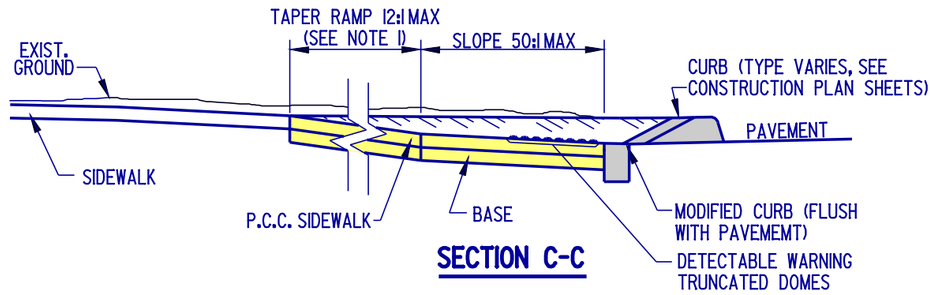
SECTION B-B



DETECTABLE WARNING TRUNCATED DOME DETAILS

NOTES:
1) THE AREA OF DETECTABLE WARNING TRUNCATED DOMES SHALL BE 24" (600) LONG AND THE FULL WIDTH OF THE RAMP.
2) SEE SPECIFICATION FOR ADDITIONAL INFORMATION.





SECTION C-C

NOTES: 1). WHERE A 12:1 MAXIMUM SLOPE RAMP WILL NOT MEET THE SIDEWALK GRADE WITHIN A LENGTH OF 15' (4570) DUE TO STEEP ADJACENT ROADWAY, THE RAMP LENGTH MAY BE LIMITED TO 15' (4570), AND THE RAMP SLOPE ALLOWED TO EXCEED 12:1.

2). RAMP WIDTH SHALL BE 4' (1200) MINIMUM, HOWEVER, 5' (1525) IS PREFERRED.

CURB RAMP, TYPE 1

PERPENDICULAR CURB RAMP

DELAWARE
DEPARTMENT OF TRANSPORTATION

CURB RAMP, TYPE 1 AND SECTIONS

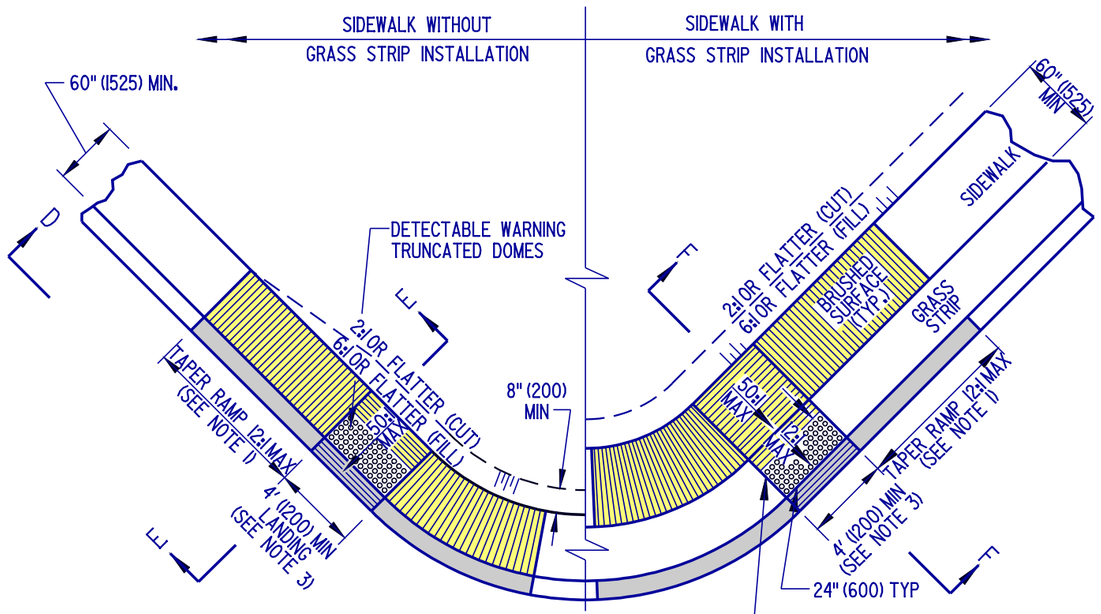
STANDARD NO. C-2 (2004) | SHT. 1 OF 4

APPROVED Carolann Wicks CHIEF ENGINEER 1/10/05 DATE

RECOMMENDED Dennis M. O'Toole DESIGN ENGINEER 1/3/05 DATE

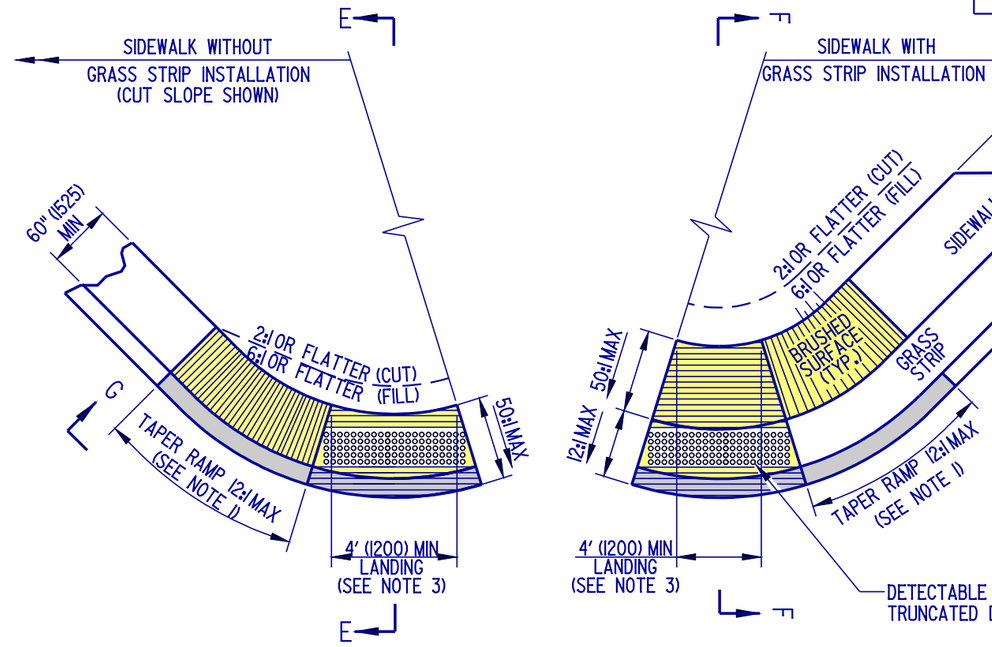
12/08/2004

SCALE : N.T.S.



CURB RAMP, TYPE 2

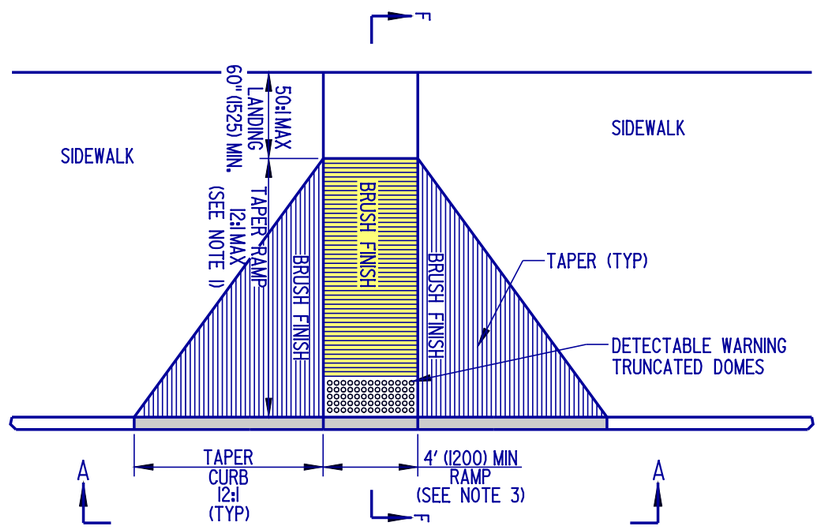
PARALLEL CURB RAMP



CURB RAMP, TYPE 3

DIAGONAL CURB RAMP

NOTE: THE DIAGONAL CURB RAMP IS
NOT THE PREFERRED TREATMENT.



CURB RAMP, TYPE 4

PERPENDICULAR CURB RAMP

NOTES: 1). WHERE A 12:1 MAXIMUM SLOPE RAMP WILL NOT MEET THE SIDEWALK GRADE WITHIN A LENGTH OF 15' (4570) DUE TO STEEP ADJACENT ROADWAY, THE RAMP LENGTH MAY BE LIMITED TO 15' (4570), AND THE RAMP SLOPE ALLOWED TO EXCEED 12:1.

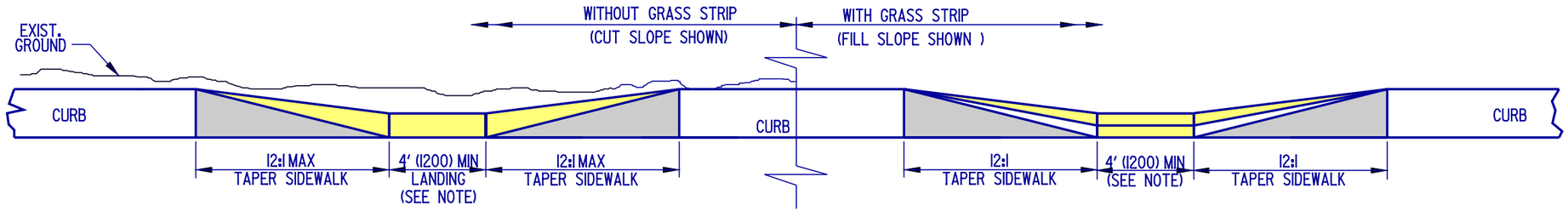
2). TRANSITION TO EXISTING SIDEWALK WIDTH OVER THE LENGTH OF THE RAMP.

3). RAMP WIDTH SHALL BE 4' (1200) MINIMUM, HOWEVER, 5' (1525) IS PREFERRED.

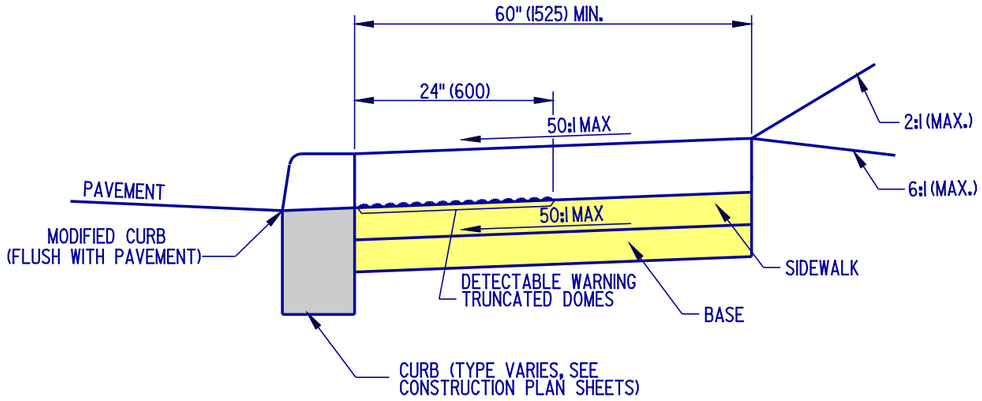
DELAWARE DEPARTMENT OF TRANSPORTATION	CURB RAMPS, TYPES 2, 3, & 4	APPROVED Carolann Wicks CHIEF ENGINEER 1/10/05 DATE
	STANDARD NO. C-2 (2004) SHT. 2 OF 4	RECOMMENDED Dennis M. O'Toole DESIGN ENGINEER 1/3/05 DATE

12/22/2004

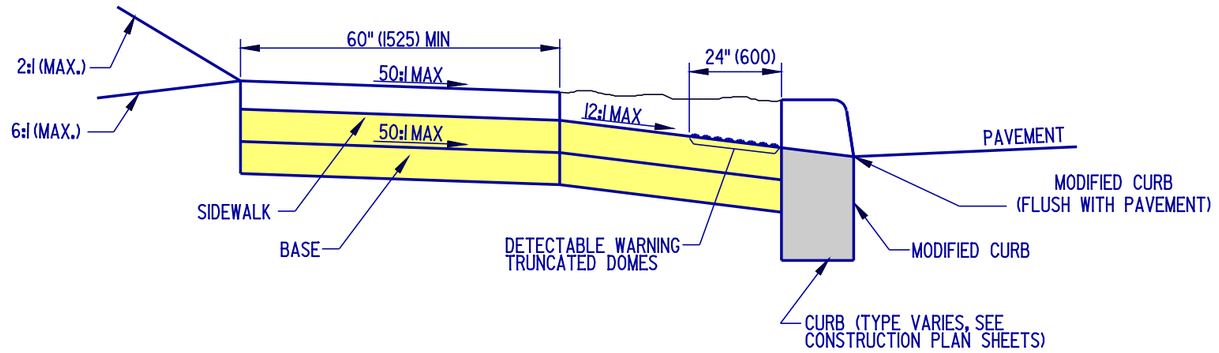
SCALE : N.T.S.



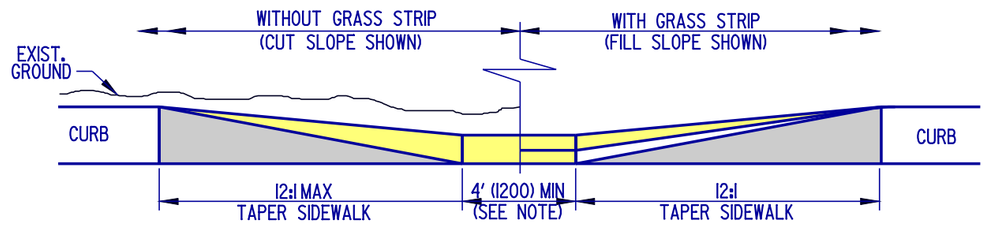
ELEVATION D-D



SECTION E-E



SECTION F-F



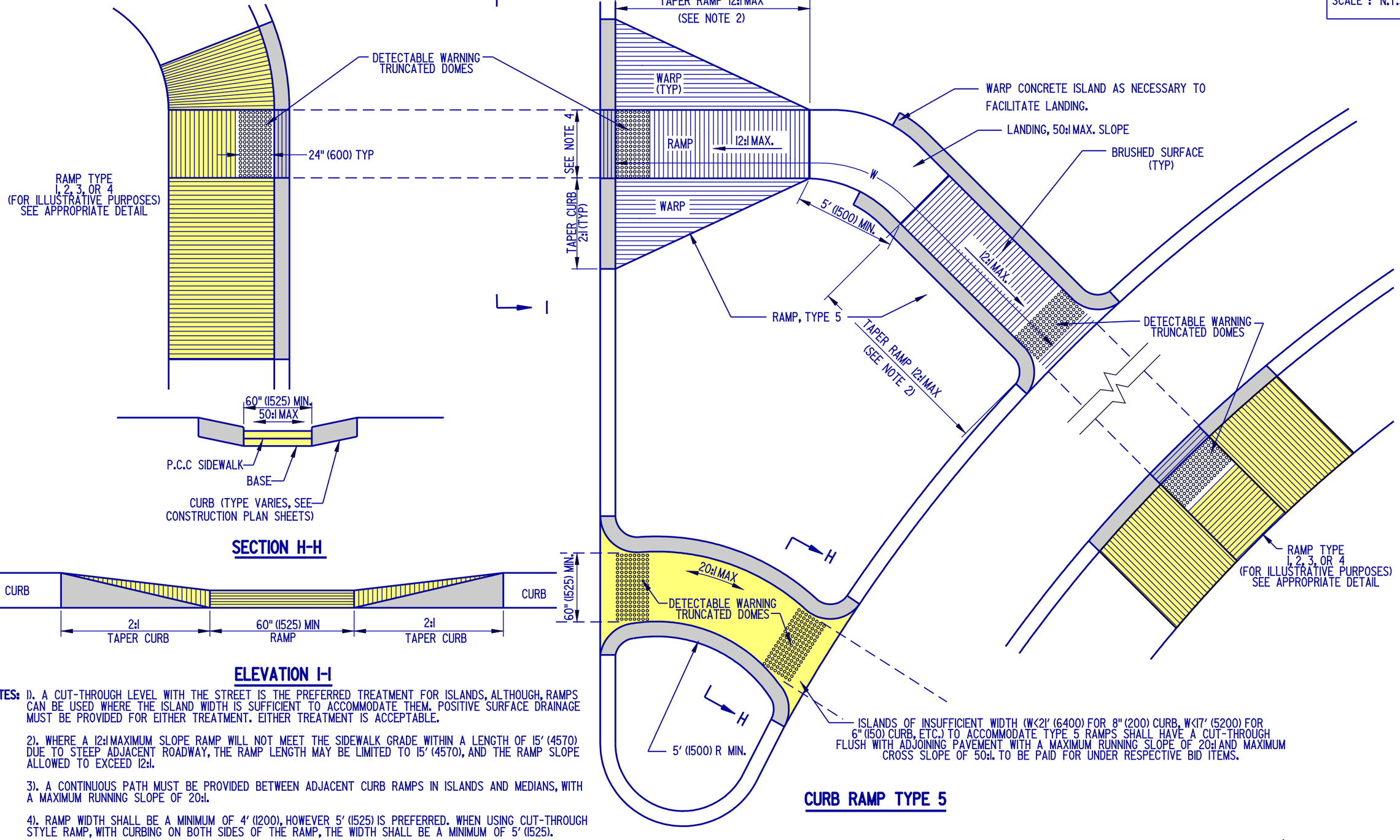
ELEVATION G-G

NOTE: CURB RAMP WIDTH SHALL BE 4' (1200) MINIMUM, HOWEVER, 5' (1525) IS PREFERRED.

DELAWARE DEPARTMENT OF TRANSPORTATION	CURB RAMP SECTIONS FOR TYPES 2 & 3	APPROVED Carolann Wicks CHIEF ENGINEER 1/10/05 DATE
	STANDARD NO. C-2 (2004) SHT. 3 OF 4	RECOMMENDED Dennis M. O'Toole DESIGN ENGINEER 1/3/05 DATE

12/08/2004

SCALE : N.T.S.



ELEVATION I-I

CURB RAMP TYPE 5

NOTES: 1). A CUT-THROUGH LEVEL WITH THE STREET IS THE PREFERRED TREATMENT FOR ISLANDS, ALTHOUGH, RAMPS CAN BE USED WHERE THE ISLAND WIDTH IS SUFFICIENT TO ACCOMMODATE THEM. POSITIVE SURFACE DRAINAGE MUST BE PROVIDED FOR EITHER TREATMENT. EITHER TREATMENT IS ACCEPTABLE.

2). WHERE A 12:1 MAXIMUM SLOPE RAMP WILL NOT MEET THE SIDEWALK GRADE WITHIN A LENGTH OF 15' (4570) DUE TO STEEP ADJACENT ROADWAY, THE RAMP LENGTH MAY BE LIMITED TO 15' (4570), AND THE RAMP SLOPE ALLOWED TO EXCEED 12:1.

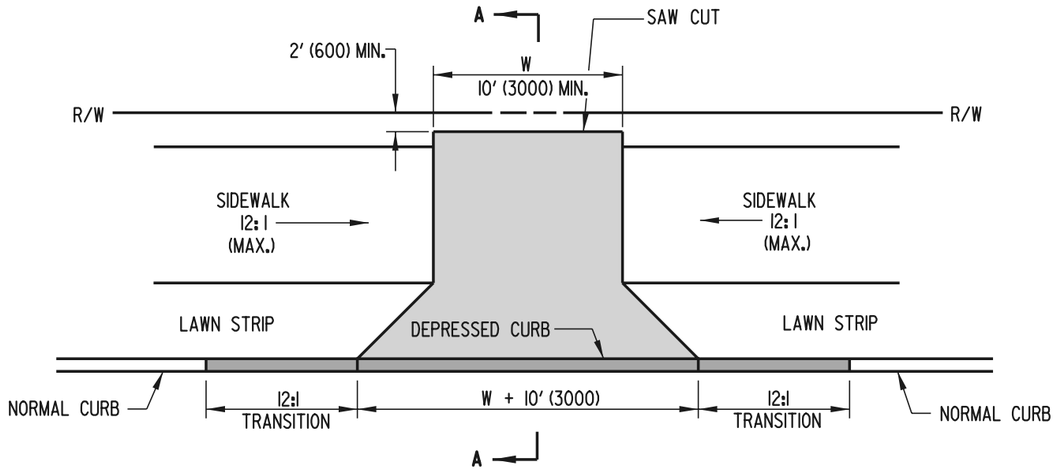
3). A CONTINUOUS PATH MUST BE PROVIDED BETWEEN ADJACENT CURB RAMPS IN ISLANDS AND MEDIANS, WITH A MAXIMUM RUNNING SLOPE OF 20:1.

4). RAMP WIDTH SHALL BE A MINIMUM OF 4' (1200), HOWEVER 5' (1525) IS PREFERRED. WHEN USING CUT-THROUGH STYLE RAMP, WITH CURBING ON BOTH SIDES OF THE RAMP, THE WIDTH SHALL BE A MINIMUM OF 5' (1525).

DELAWARE DEPARTMENT OF TRANSPORTATION	CURB RAMP TYPE 5 & SECTIONS	APPROVED Carolann Wicks 1/10/05 CHIEF ENGINEER DATE
	STANDARD NO. C-2 (2004) SHT. 4 OF 4	RECOMMENDED Dennis M. O'Toole 1/3/05 DESIGN ENGINEER DATE

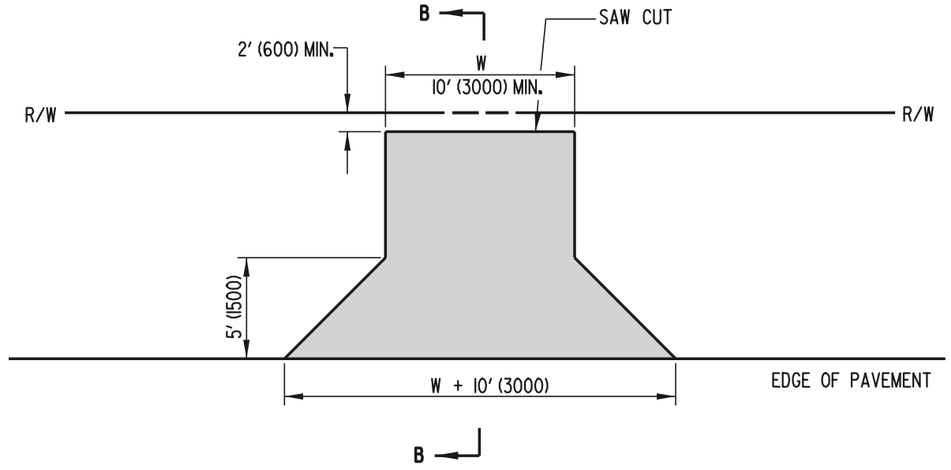
12/08/2004

SCALE : N.T.S.



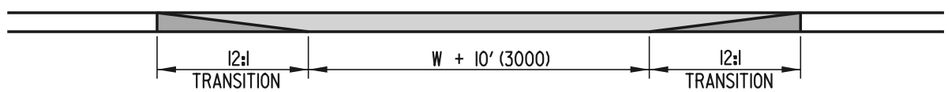
PLAN

URBAN APPLICATION

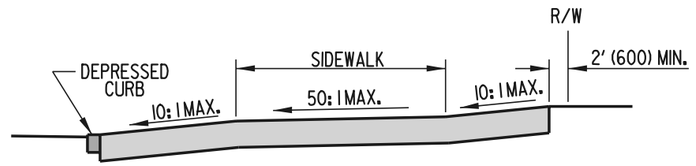


PLAN

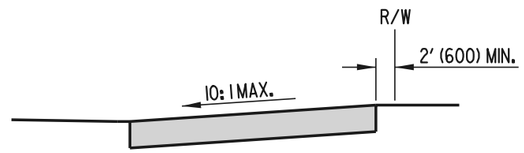
RURAL APPLICATION



ELEVATION



SECTION A-A

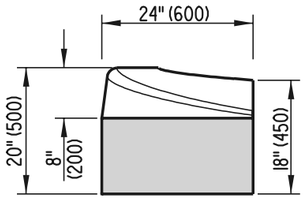


SECTION B-B

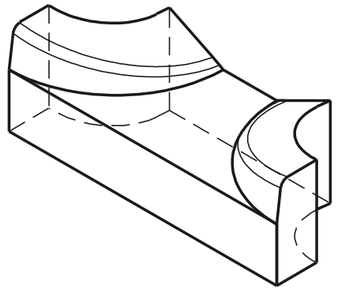
DELAWARE DEPARTMENT OF TRANSPORTATION	ENTRANCES		APPROVED Lynne M. Hastings CHIEF ENGINEER 6/18/01 DATE
	STANDARD NO. C-3 (2001)	SHT. 1 OF 1	RECOMMENDED Michael A. Powell DESIGN ENGINEER 6/15/01 DATE

03/09/2001

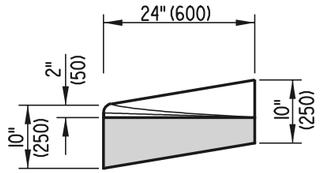
SCALE : N.T.S.



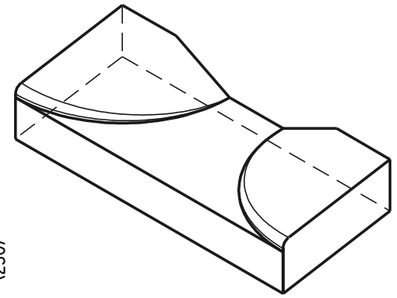
SECTION A-A



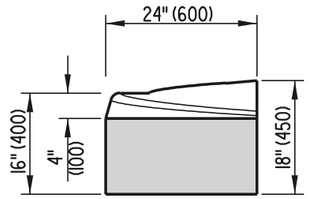
ISOMETRIC VIEW



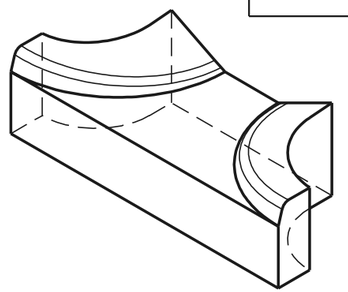
SECTION B-B



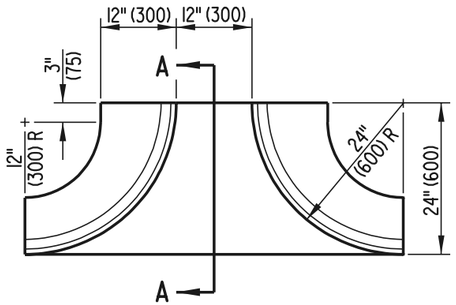
ISOMETRIC VIEW



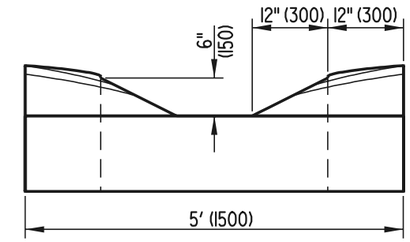
SECTION C-C



ISOMETRIC VIEW



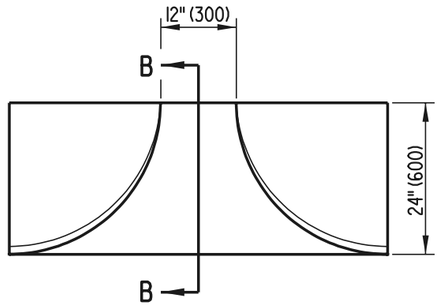
TOP VIEW



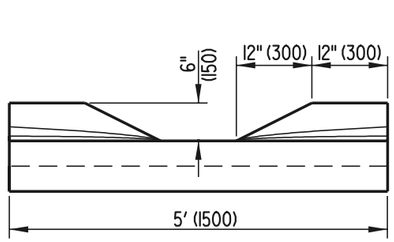
FRONT VIEW

TYPE A

P.C.C. CURB, TYPE 1



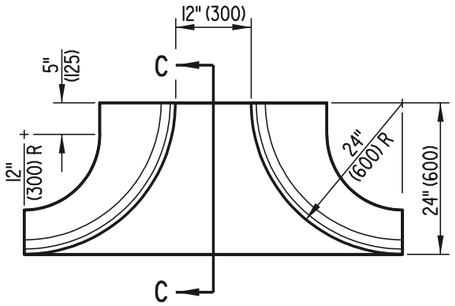
TOP VIEW



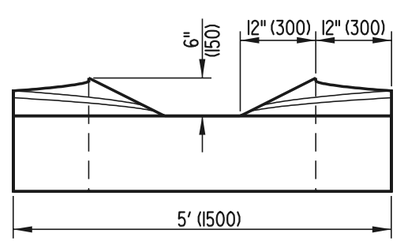
FRONT VIEW

TYPE B

P.C.C. CURB, TYPE 2



TOP VIEW



FRONT VIEW

TYPE C

P.C.C. CURB, TYPE 3

DELAWARE
DEPARTMENT OF TRANSPORTATION

CURB OPENINGS

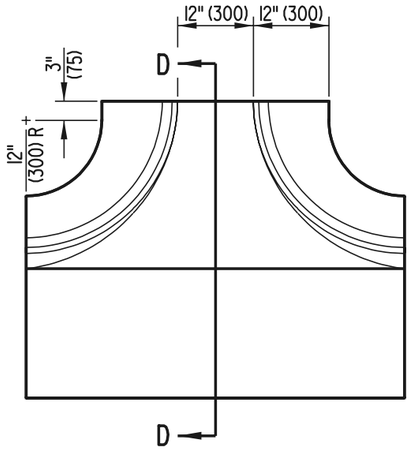
STANDARD NO. C-4 (2001) | SHT. 1 OF 3

APPROVED Lynne M. Hartnett CHIEF ENGINEER 6/18/01 DATE

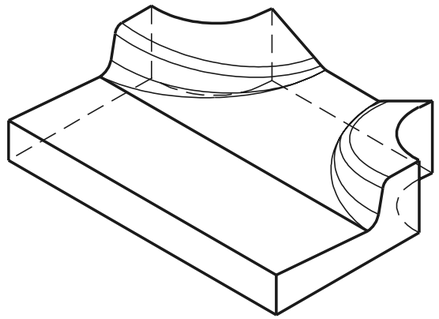
RECOMMENDED [illegible] DESIGN ENGINEER 6/15/01 DATE

04/17/2001

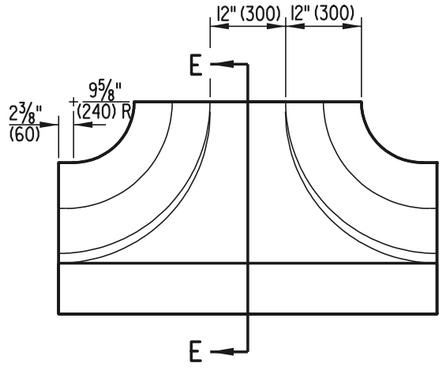
SCALE : N.T.S.



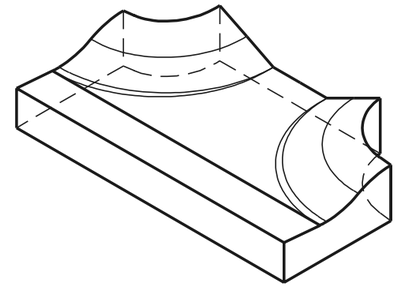
TOP VIEW



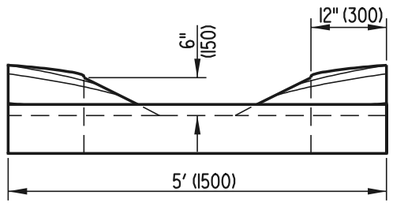
ISOMETRIC VIEW



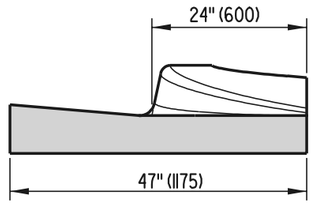
TOP VIEW



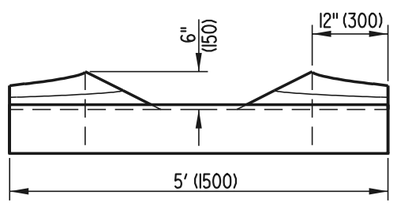
ISOMETRIC VIEW



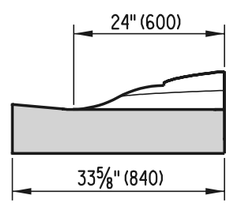
FRONT VIEW



SECTION D-D



FRONT VIEW



SECTION E-E

TYPE D

INTEGRAL P.C.C. CURB AND GUTTER, TYPE 1

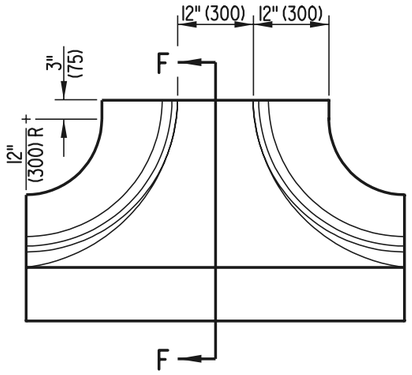
TYPE E

INTEGRAL P.C.C. CURB AND GUTTER, TYPE 2

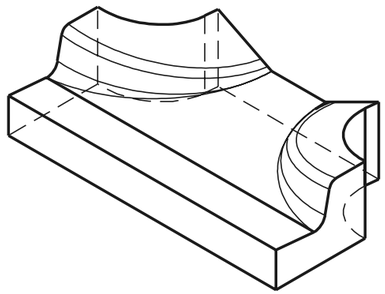
DELAWARE DEPARTMENT OF TRANSPORTATION	CURB OPENINGS	APPROVED Eugene M. Hastings CHIEF ENGINEER 6/18/01 DATE
	STANDARD NO. C-4 (2001) SHT. 2 OF 3	RECOMMENDED Herbert A. Sparks DESIGN ENGINEER 6/15/01 DATE

03/09/2001

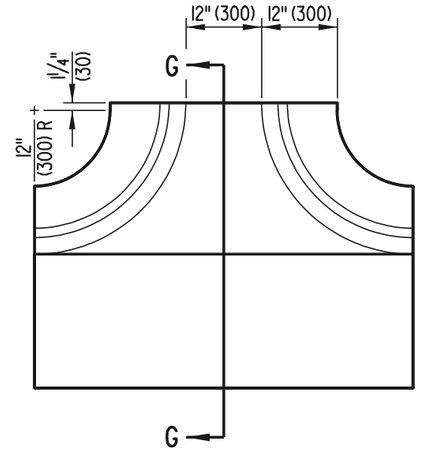
SCALE : N.T.S.



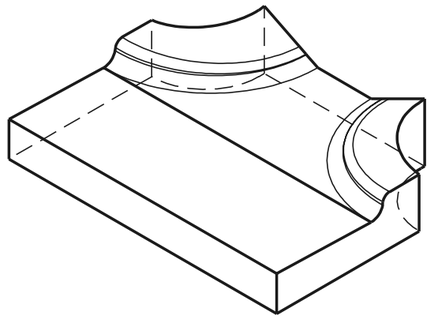
TOP VIEW



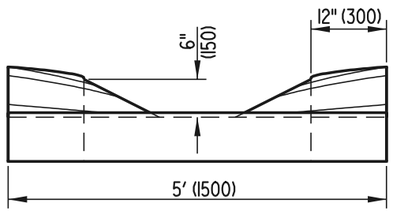
ISOMETRIC VIEW



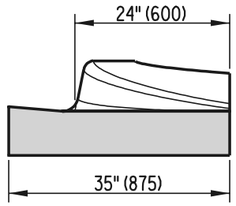
TOP VIEW



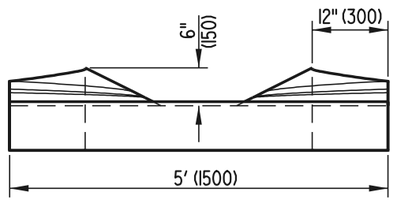
ISOMETRIC VIEW



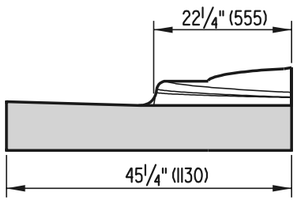
FRONT VIEW



SECTION F-F



FRONT VIEW



SECTION G-G

TYPE F

INTEGRAL P.C.C. CURB AND GUTTER, TYPE 3

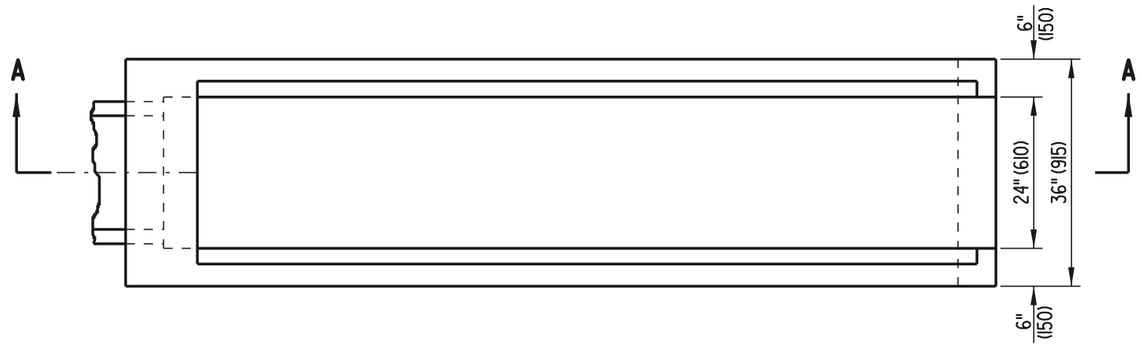
TYPE G

INTEGRAL P.C.C. CURB AND GUTTER, TYPE 4

DELAWARE DEPARTMENT OF TRANSPORTATION	CURB OPENINGS	APPROVED Lynne M. Hartnett CHIEF ENGINEER DATE 6/18/01
	STANDARD NO. C-4 (2001) SHT. 3 OF 3	RECOMMENDED Michael A. Hahn DESIGN ENGINEER DATE 6/15/01

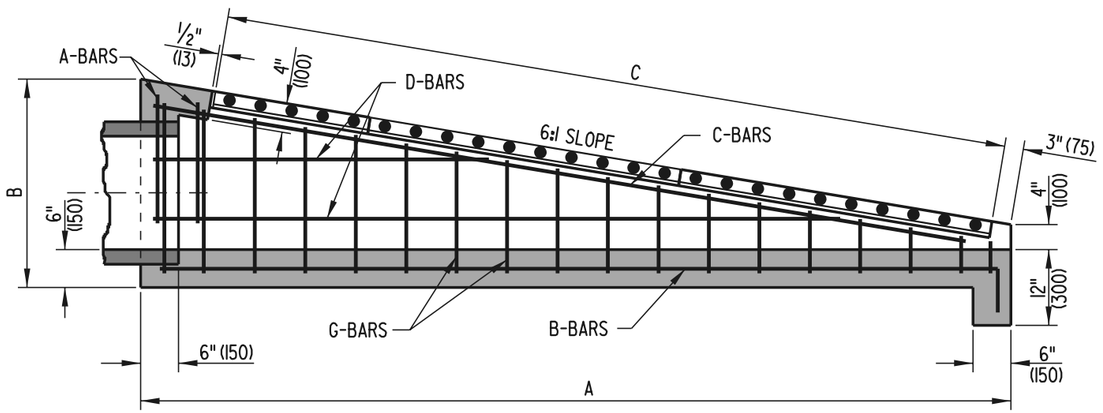
03/09/2001

SCALE : N.T.S.

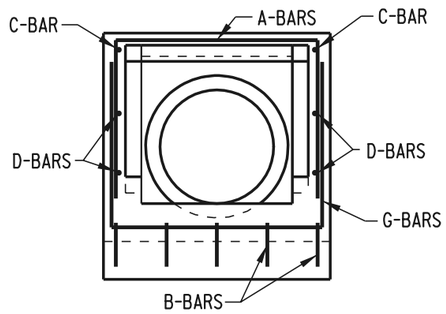


PLAN VIEW
SHOWN WITHOUT GRATE

NOTE: 6:1 SAFETY END STRUCTURE TO BE PRECAST



SECTION A-B



FRONT VIEW

DELAWARE DEPARTMENT OF TRANSPORTATION	6:1 SAFETY END STRUCTURE		APPROVED Lynne M. Hastings CHIEF ENGINEER DATE 6/18/01
	STANDARD NO. D-1 (2001)	SHT. 1 OF 2	RECOMMENDED Michael A. Agro DESIGN ENGINEER DATE 6/15/01

04/17/2001

SCALE : N.T.S.

DIMENSIONS

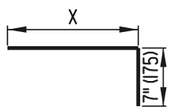
PIPE SIZE	A	B	C
15" (375)	9'-6" (2895)	2'-5" (735)	8'-4" (2540)
18" (450)	11'-6" (3505)	2'-9" (840)	10'-5" (3175)
21" (525) OR 24" (600)	14'-4" (4370)	3'-2⅝" (980)	12'-6" (3810)

APPROXIMATE QUANTITIES

PIPE SIZE	CONCRETE FT³ (m³)		REINF. STEEL LBS. (kg)	NO. OF GRATES	LENGTH TO BE CUT FROM 1 GRATE	WEIGHT OF FULL SIZE GRATE LBS. (kg)	WEIGHT OF CUT GRATE LBS. (kg)
	CONC. PIPE	C.M. PIPE					
15" (375)	25 (0.708)	25.43 (0.720)	121.12 (54.94)	2	--	270.92 (122.89)	--
18" (450)	31.5 (0.892)	32.07 (0.908)	156.7 (71.08)	3	2'-1" (635)	270.92 (122.89)	135.47 (61.45)
21" (525) OR 24" (600)	40.75 (1.154)	39.87 (1.129)	194.0 (88.00)	3	--	270.92 (122.89)	--

BENDING DIAGRAM

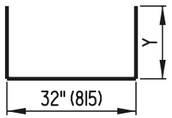
PIPE SIZE	X
15" (375)	9'-2" (2795)
18" (450)	11'-2" (3405)
21" (525) OR 24" (610)	14'-0" (4265)

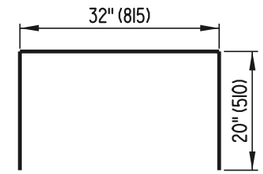


B-BARS

PIPE SIZE	Y
15" (375)	VARIES 25" (635) TO 4" (100)
18" (450)	VARIES 29" (735) TO 4" (100)
21" (525) OR 24" (610)	VARIES 34" (865) TO 4" (100)

G-BARS





A-BARS

SCHEDULE OF REINFORCING STEEL

PIPE SIZE	A-BARS				B-BARS				C-BARS				D-BARS				G-BARS			
	SIZE	NO.	SPA.	LENGTH	SIZE	NO.	SPA.	LENGTH	SIZE	NO.	SPA.	LENGTH	SIZE	NO.	SPA.	LENGTH	SIZE	NO.	SPA.	LENGTH
15" (375)	#4 (#13)	2	8" (200)	72" (1830)	#4 (#13)	5	8" (200)	9'-9" (2970)	#4 (#13)	2	-	9'-3" (2820)	#4 (#13)	4	8" (200)	VARIES 50" (1270) TO 100" (2540)	#4 (#13)	15	8" (200)	VARIES 40" (1015) TO 82" (2085)
18" (450)	#4 (#13)	2	8" (200)	72" (1830)	#4 (#13)	5	8" (200)	11'-9" (3580)	#4 (#13)	2	-	11'-5" (3480)	#4 (#13)	6	8" (200)	VARIES 43½" (1105) TO 130½" (3315)	#4 (#13)	18	8" (200)	VARIES 40" (1015) TO 90" (2285)
21" (525) OR 24" (600)	#4 (#13)	2	8" (200)	72" (1830)	#4 (#13)	5	8" (200)	14'-7" (4445)	#4 (#13)	2	-	14'-3" (4345)	#4 (#13)	6	8" (200)	VARIES 51" (1295) TO 153" (3885)	#4 (#13)	22	8" (200)	VARIES 40" (1015) TO 100" (2540)

DELAWARE
DEPARTMENT OF TRANSPORTATION

6:1 SAFETY END STRUCTURE

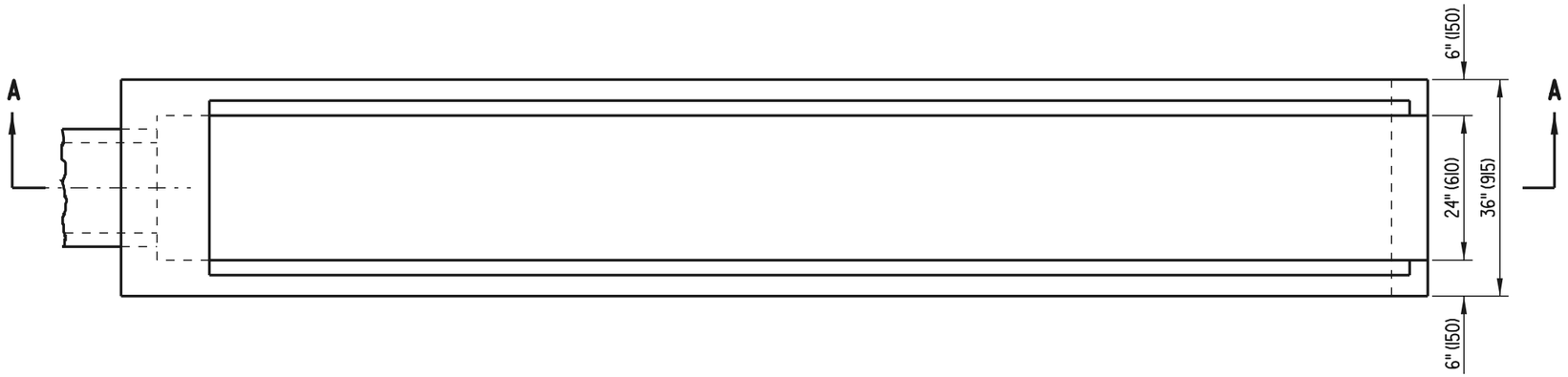
STANDARD NO. D-1 (2001) SHT. 2 OF 2

APPROVED Lynne M. Hastings CHIEF ENGINEER DATE 6/18/01

RECOMMENDED [signature] DESIGN ENGINEER DATE 6/15/01

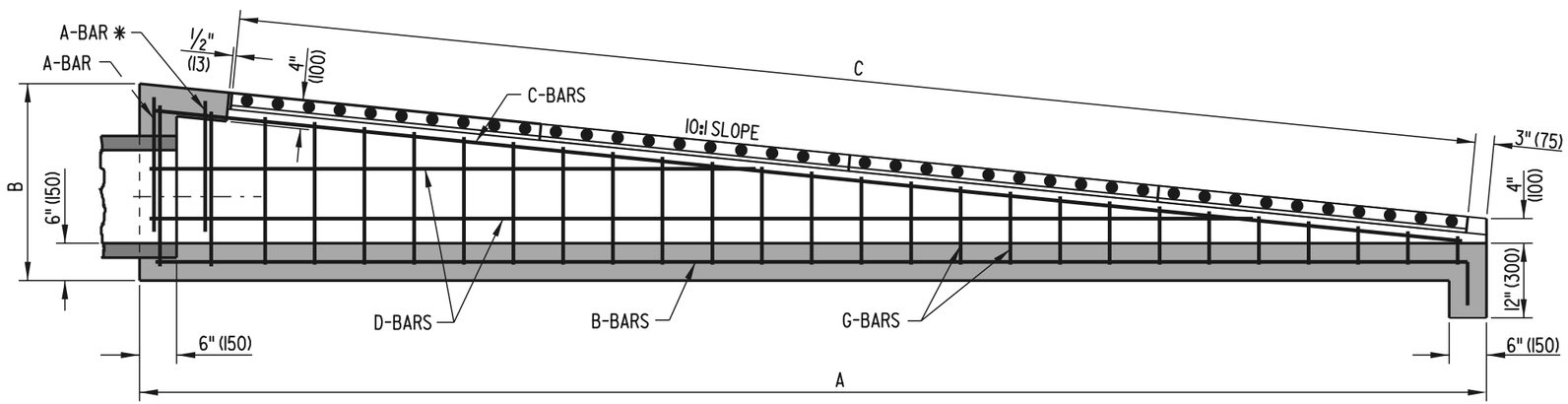
04/17/2001

SCALE : N.T.S.



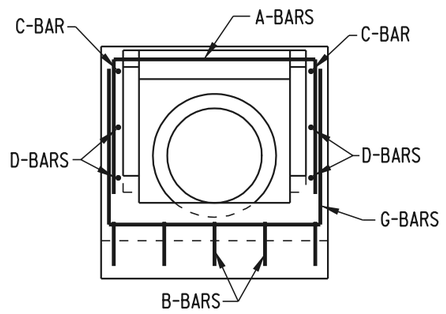
PLAN VIEW
SHOWN WITHOUT GRATE

NOTE: 10:1 SAFETY END STRUCTURE TO BE PRECAST



SECTION A-A

* REQUIRED ONLY FOR PIPE SIZE OF 21" (525) OR 24" (600)



FRONT VIEW

DELAWARE DEPARTMENT OF TRANSPORTATION	10:1 SAFETY END STRUCTURE	APPROVED Lynne M. Hastings CHIEF ENGINEER 6/18/01 DATE
	STANDARD NO. D-2 (2001) SHT. 1 OF 2	RECOMMENDED Herbert A. Sparks DESIGN ENGINEER 6/15/01 DATE

04/17/2001

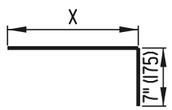
SCALE : N.T.S.

DIMENSIONS

PIPE SIZE	A	B	C
15" (375)	15'-4" (4675)	2'-4 3/8" (720)	14'-7" (4445)
18" (450)	19'-6" (5945)	2'-9 3/8" (850)	18'-9" (5715)
21" (525) OR 24" (600)	24'-0" (7315)	3'-2 13/16" (985)	22'-11" (6985)

BENDING DIAGRAM

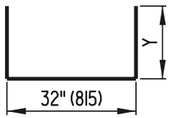
PIPE SIZE	X
15" (375)	15'-0" (4570)
18" (450)	19'-2" (5840)
21" (525) OR 24" (600)	23'-8" (7215)

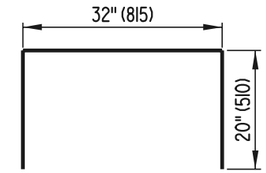


B-BARS

PIPE SIZE	Y
15" (375)	VARIES 21 1/2" (545) TO 4" (100)
18" (450)	VARIES 26 7/16" (670) TO 4" (100)
21" (525) OR 24" (600)	VARIES 31 3/4" (805) TO 4" (100)

G-BARS





A-BARS

APPROXIMATE QUANTITIES

PIPE SIZE	CONCRETE FT³ (m³)		REINF. STEEL LBS. (kg)	NO. OF GRATES	LENGTH TO BE CUT FROM 1 GRATE	WEIGHT OF FULL SIZE GRATE LBS. (kg)	WEIGHT OF CUT GRATE LBS. (kg)
	CONC. PIPE	C.M. PIPE					
15" (375)	41.35 (1.171)	41.78 (1.183)	175.0 (79.38)	4	2'-1" (635)	270.92 (122.89)	135.47 (61.45)
18" (450)	50.11 (1.419)	50.68 (1.435)	227.0 (102.98)	5	2'-1" (635)	270.92 (122.89)	135.47 (61.45)
21" (525) OR 24" (600)	69.43 (1.966)	70.31 (1.991)	310.4 (140.79)	6	2'-1" (635)	270.92 (122.89)	135.47 (61.45)

SCHEDULE OF REINFORCING STEEL

PIPE SIZE	A-BARS				B-BARS				C-BARS				D-BARS				G-BARS			
	SIZE	NO.	SPA.	LENGTH	SIZE	NO.	SPA.	LENGTH	SIZE	NO.	SPA.	LENGTH	SIZE	NO.	SPA.	LENGTH	SIZE	NO.	SPA.	LENGTH
15" (375)	#4 (#13)	1	-	72" (1830)	#4 (#13)	5	8" (200)	15'-7" (4750)	#4 (#13)	2	-	15'-1 1/16" (4600)	#4 (#13)	4	8" (200)	VARIES 72 13/16" (1850) TO 145 5/8" (3700)	#4 (#13)	24	8" (200)	VARIES 40" (1015) TO 75 11/16" (1920)
18" (450)	#4 (#13)	1	-	72" (1830)	#4 (#13)	5	8" (200)	19'-9" (6020)	#4 (#13)	2	-	19'-3 3/8" (5875)	#4 (#13)	4	8" (200)	VARIES 89 5/8" (2275) TO 179 3/16" (4550)	#4 (#13)	30	8" (200)	VARIES 40" (1015) TO 85 3/4" (2180)
21" (525) OR 24" (600)	#4 (#13)	2	-	72" (1830)	#4 (#13)	5	8" (200)	24'-3" (7390)	#4 (#13)	2	-	23'-9 5/8" (7255)	#4 (#13)	6	8" (200)	VARIES 80 3/4" (2050) TO 242 1/8" (6150)	#4 (#13)	37	8" (200)	VARIES 40" (1015) TO 96 5/16" (2455)

DELAWARE
DEPARTMENT OF TRANSPORTATION

10:1 SAFETY END STRUCTURE

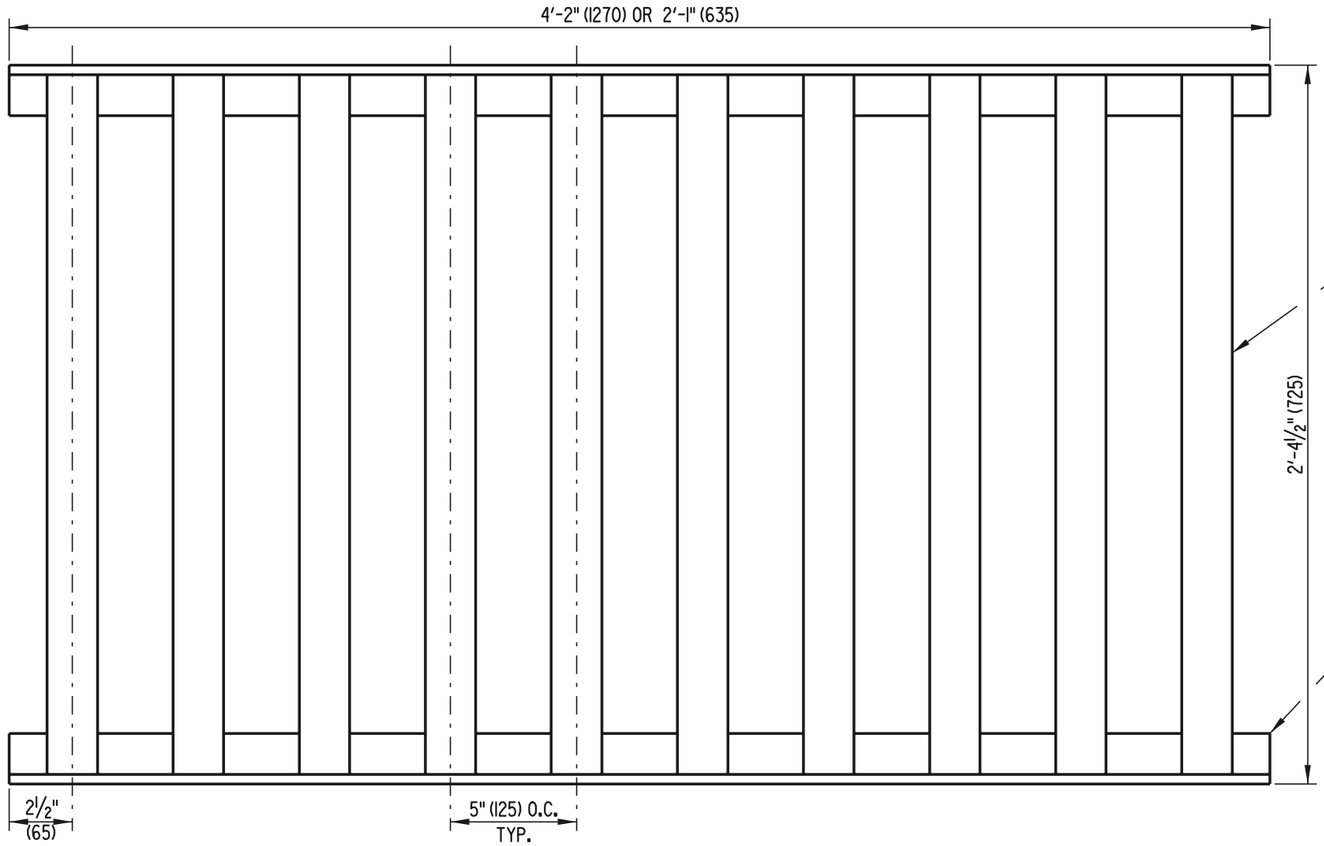
STANDARD NO. D-2 (2001) SHT. 2 OF 2

APPROVED Lynne M. Hartung CHIEF ENGINEER DATE 6/18/01

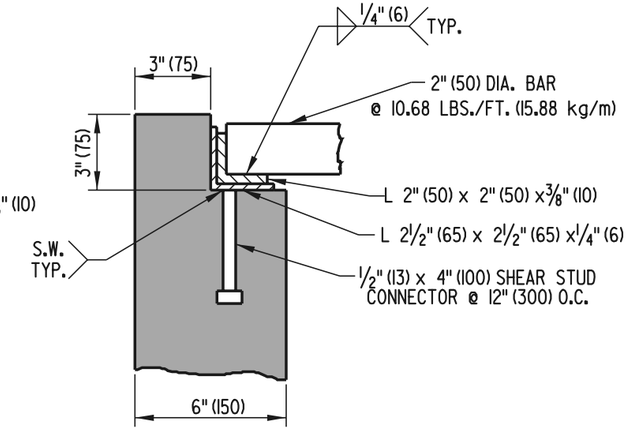
RECOMMENDED Michael A. Pepe DESIGN ENGINEER DATE 6/15/01

04/17/2001

SCALE : N.T.S.



GRATE DETAIL

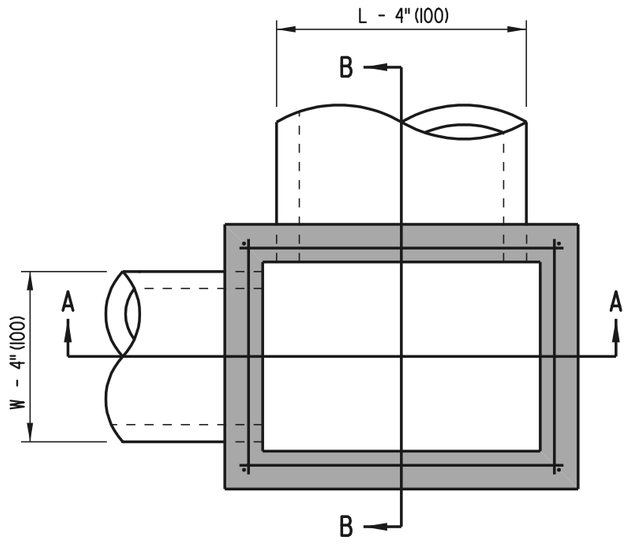


FRAME & GRATE ASSEMBLY DETAIL

DELAWARE DEPARTMENT OF TRANSPORTATION	SAFETY END STRUCTURE GRATE		APPROVED Eugene M. Hardesty CHIEF ENGINEER 6/18/01 DATE
	STANDARD NO. D-3 (2001)	SHT. 1 OF 1	RECOMMENDED Michael A. Hopkins DESIGN ENGINEER 6/15/01 DATE

04/17/2001

SCALE : N.T.S.



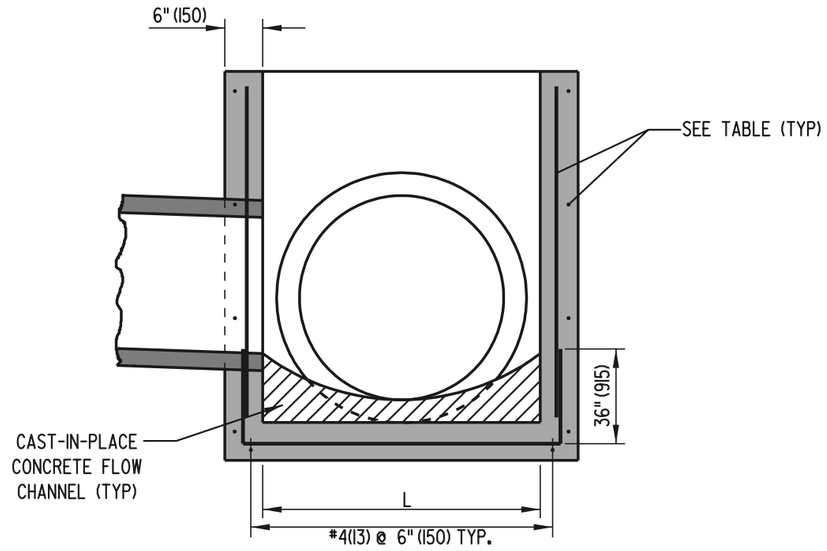
TOP VIEW

WALL REINFORCEMENT SCHEDULE		
INTERIOR WALL DIMENSION	AREA OF HORIZONTAL REINFORCEMENT PER FOOT (mm^2)	AREA OF VERTICAL REINFORCEMENT PER FOOT (mm^2)
	IN^2 (mm^2)	IN^2 (mm^2)
LESS THAN 4' (1220)	0.132 (85)	0.132 (85)
4' (1220) TO 4.5' (1370)	0.163 (105)	0.132 (85)
4.5' (1370) TO 5' (1525)	0.198 (128)	0.132 (85)
5' (1525) TO 5.5' (1675)	0.239 (154)	0.132 (85)
5.5' (1675) TO 6' (1830)	0.284 (183)	0.132 (85)

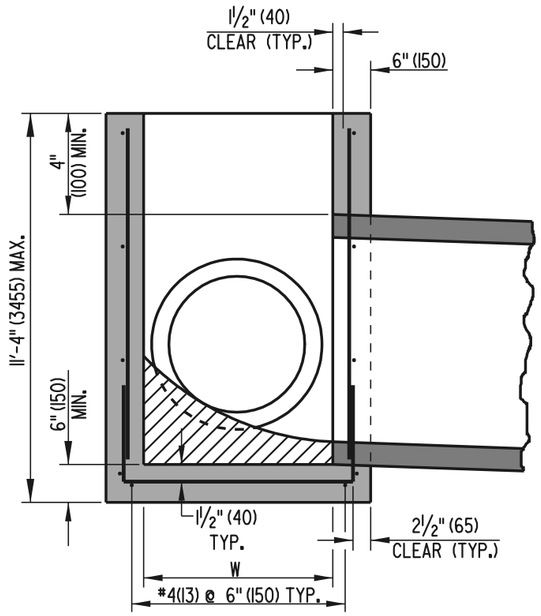
INLET BOX SCHEDULE			
L	W	L MAX	W MAX
34" (865)	18" (455)	34" (865)	18" (455)
34" (865)	24" (610)	34" (865)	24" (610)
48" (1220)	30" (760)	54" (1370)	36" (915)
48" (1220)	48" (1220)	54" (1370)	54" (1370)
66" (1675)	30" (760)	72" (1830)	36" (915)
66" (1675)	48" (1220)	72" (1830)	54" (1370)
66" (1675)	66" (1675)	72" (1830)	72" (1830)
72" (1830)	24" (610)	72" (1830)	30" (760)
72" (1830)	48" (1220)	72" (1830)	54" (1370)
72" (1830)	72" (1830)	72" (1830)	72" (1830)

NOTES:

1. INLET BOXES SHALL BE PRE-CAST OR CAST-IN-PLACE.
2. OUTSIDE OF PIPE MUST FIT INTO THE INTERIOR OF THE BOX.
3. STEPS ARE TO BE INSTALLED IN BACK WALL AS PER SPECIFICATIONS.
4. NO PIPES WITH AN OUTSIDE DIAMETER LARGER THAN 11" (275) WILL BE PERMITTED TO ENTER THE BACK WALL OF A DRAINAGE INLET OR MANHOLE TO ACCOMMODATE STEPS IF REQUIRED. A LARGER BOX MAY BE USED IN ORDER TO FIT THE STEPS AND A LARGER PIPE IN THE BACK WALL, IF NECESSARY.



SECTION A-A



SECTION B-B

DELAWARE
DEPARTMENT OF TRANSPORTATION

INLET BOX DETAILS

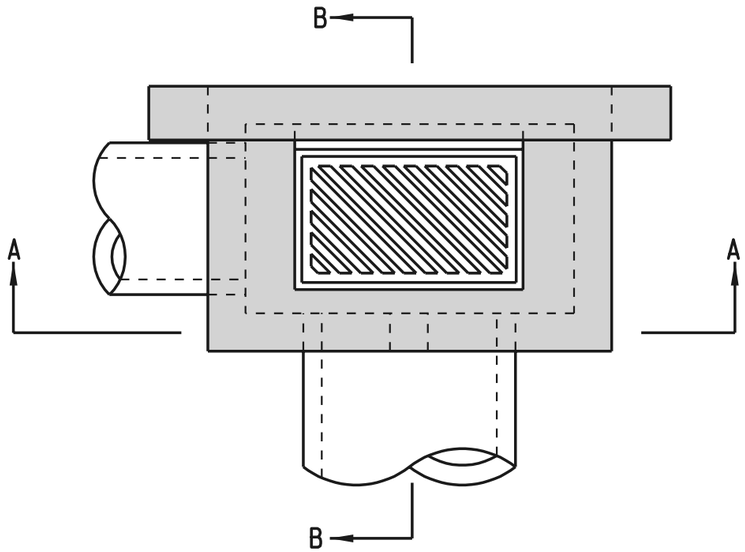
STANDARD NO. D-4 (2002) | SHT. 1 OF 1

APPROVED Carolann Wicks CHIEF ENGINEER 9/6/02 DATE

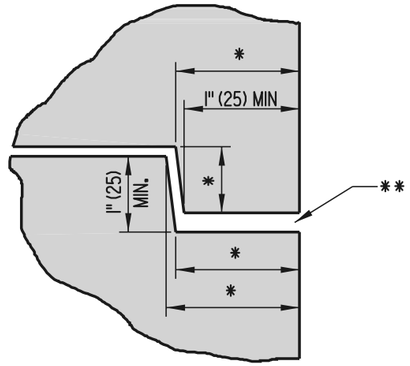
RECOMMENDED [signature] DESIGN ENGINEER 8/19/02 DATE

07/31/2002

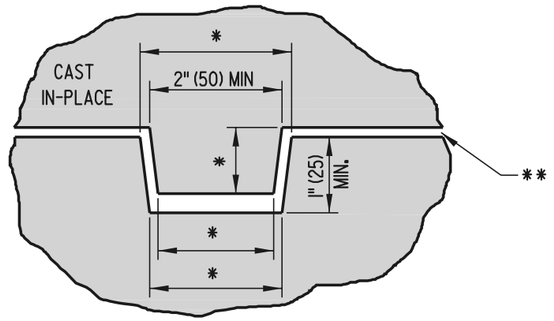
SCALE : N.T.S.



PLAN



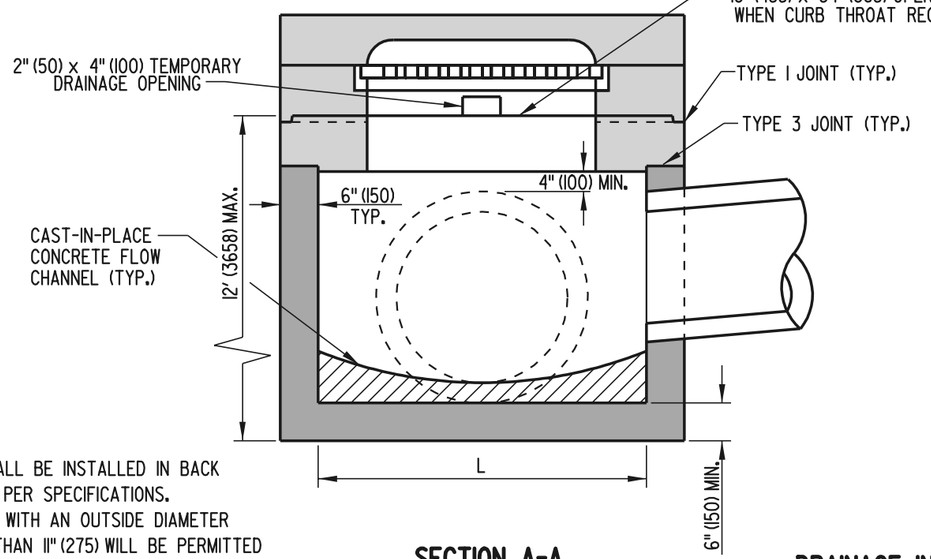
TYPE 1 JOINT DETAIL



TYPE 2 JOINT DETAIL

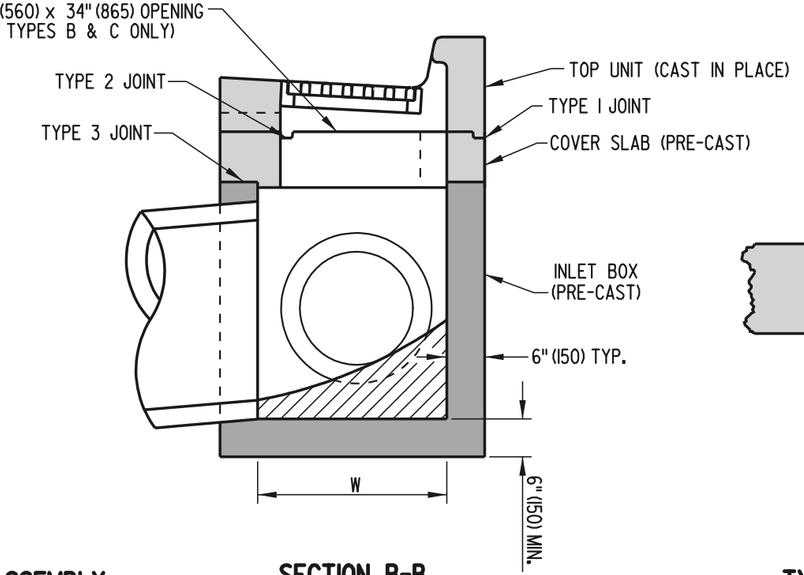
* DIMENSIONS WILL VARY

** JOINT SEALANT AS PER SPECIFICATIONS

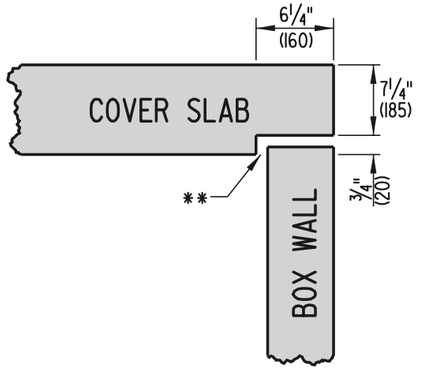


SECTION A-A

DRAINAGE INLET ASSEMBLY



SECTION B-B



TYPE 3 JOINT DETAIL

NOTES:

1.) STEPS SHALL BE INSTALLED IN BACK WALL AS PER SPECIFICATIONS.

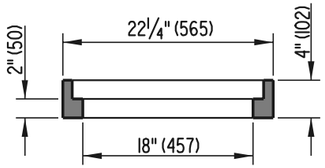
2.) NO PIPES WITH AN OUTSIDE DIAMETER LARGER THAN 11" (275) WILL BE PERMITTED TO ENTER THE BACK WALL OF A DRAINAGE INLET, IF IT IMPEDES THE INSTALLATION OF STEPS IN THE BACK WALL.

3.) IF NECESSARY, A LARGER BOX MAY BE USED IN ORDER TO FIT THE STEPS AND A LARGER PIPE IN THE BACK WALL.

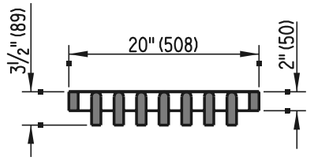
DELAWARE DEPARTMENT OF TRANSPORTATION	DRAINAGE INLET DETAILS	APPROVED Carolann Wicks CHIEF ENGINEER 9/6/02 DATE
	STANDARD NO. D-5 (2002) SHT. 1 OF 8	RECOMMENDED DESIGN ENGINEER 8/19/02 DATE

05/02/2002

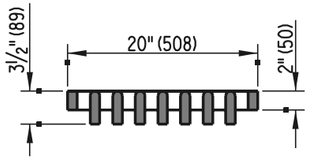
SCALE : N.T.S.



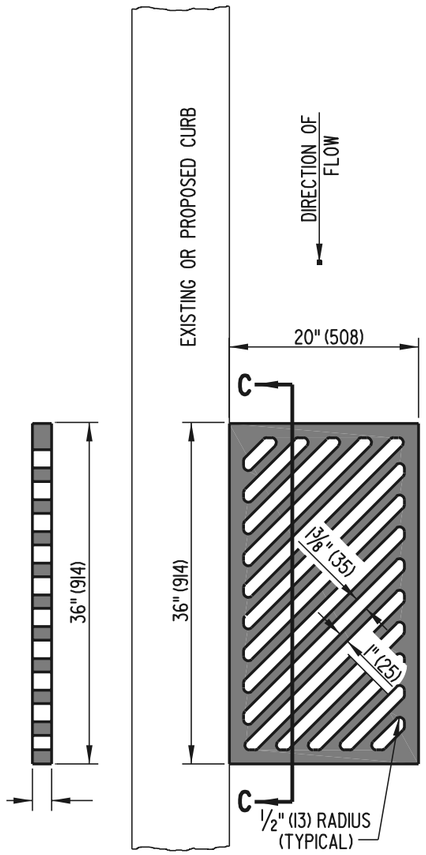
SECTION A-A



SECTION E-E



SECTION G-G

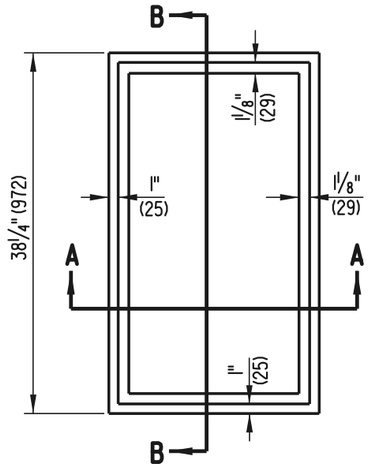


SECTION C-C

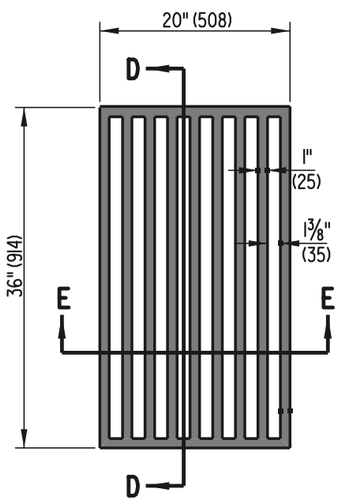
DRAINAGE INLET GRATE TYPE I



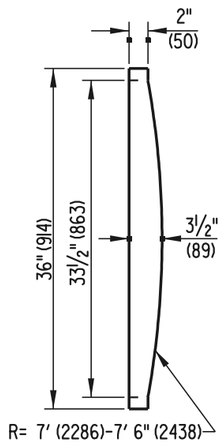
SECTION B-B



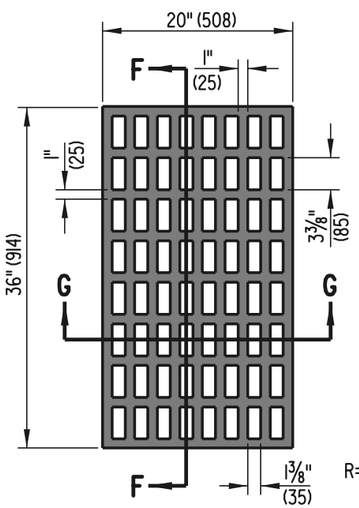
DRAINAGE INLET FRAME



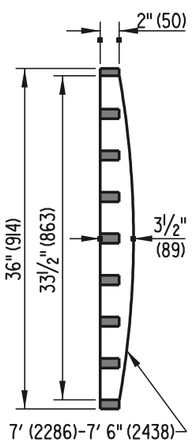
DRAINAGE INLET GRATE TYPE 2



SECTION D-D



DRAINAGE INLET GRATE TYPE 3



SECTION F-F

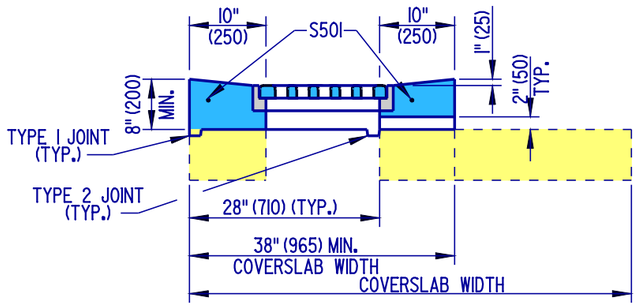
DRAINAGE INLET FRAME AND GRATES

NOTE: 1. BOTTOM OF TYPE I GRATE TO BE FLAT AND TRUE.
2. TYPE 2 GRATE SHALL NOT BE INSTALLED WHERE BICYCLE TRAFFIC MAY BE PRESENT.

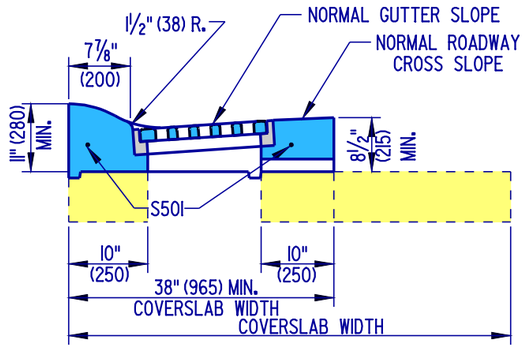
DELAWARE DEPARTMENT OF TRANSPORTATION	DRAINAGE INLET DETAILS		APPROVED Carolann Wicks CHIEF ENGINEER 9/6/02 DATE
	STANDARD NO. D-5 (2002)	SHT. 2 OF 8	RECOMMENDED DESIGN ENGINEER 8/19/02 DATE

04/01/2002

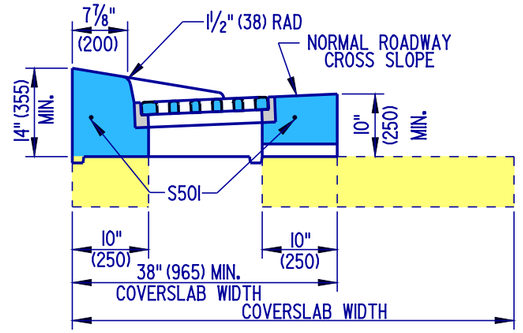
SCALE : N.T.S.



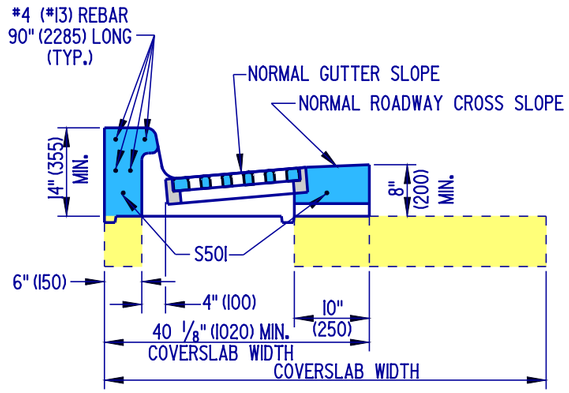
TYPE A



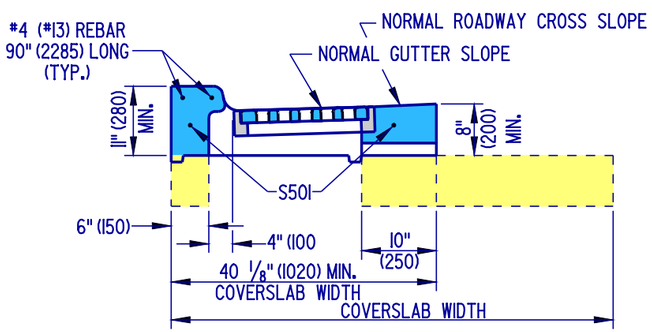
TYPE D



TYPE E



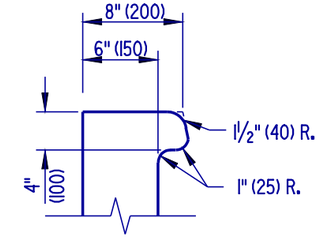
TYPE B



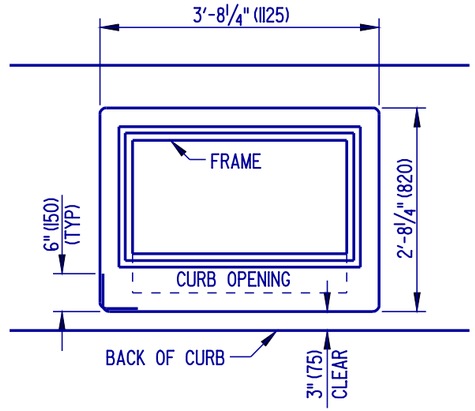
TYPE C

INLET TOP UNIT APPLICATIONS

TOP UNIT	CURB
TYPE A	USE IN DRAINAGE SWALE
TYPE B	INTEGRAL PCC CURB & GUTTER, TYPE 1 & 3, PCC CURB TYPE 1
TYPE C	INTEGRAL PCC CURB & GUTTER, TYPE 4, PCC CURB TYPE 3
TYPE D	INTEGRAL PCC CURB & GUTTER, TYPE 2
TYPE E	PCC CURB TYPE 2



CURB OPENING DETAIL

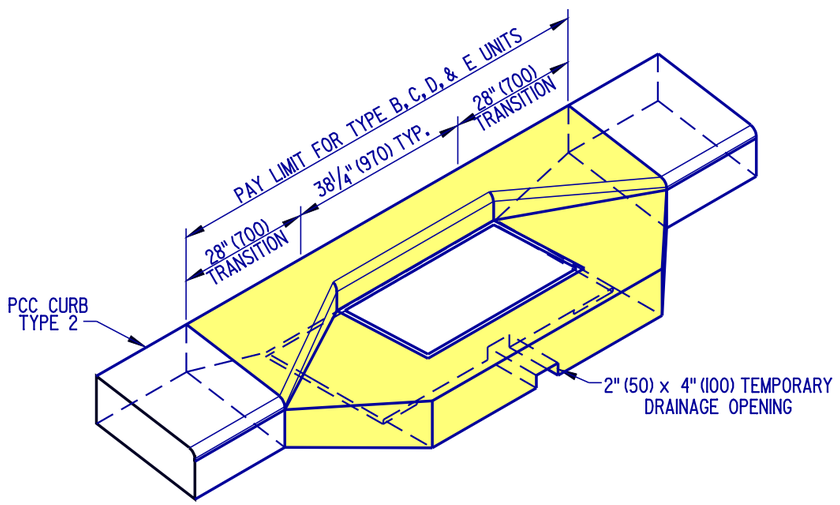


S501 BENDING DIAGRAM

S501 IS NOT REQUIRED TO BE ONE CONTINUOUS BAR. IF MORE THAN ONE BAR IS USED, THERE MUST BE A 12" (300) OVERLAP BETWEEN BARS.

DRAINAGE INLET TOP UNITS

NOTE: TOP UNIT IS TO BE CAST-IN-PLACE TO GRADE AS SPECIFIED ON PLAN SHEETS OR AS DIRECTED BY ENGINEER.



ISOMETRIC VIEW

TYPE E UNIT SHOWN

DELAWARE
DEPARTMENT OF TRANSPORTATION

DRAINAGE INLET DETAILS

STANDARD NO. D-5 (2004) | SHT. 3 OF 8

APPROVED Carolann Wicks CHIEF ENGINEER 1/10/05 DATE

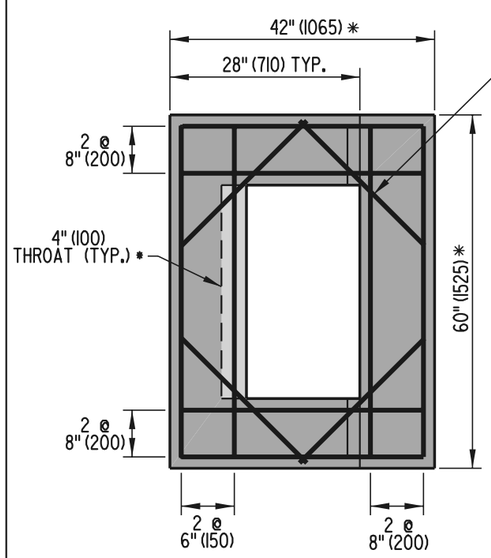
RECOMMENDED Dennis M. O'Toole DESIGN ENGINEER 1/3/05 DATE

09/27/2004

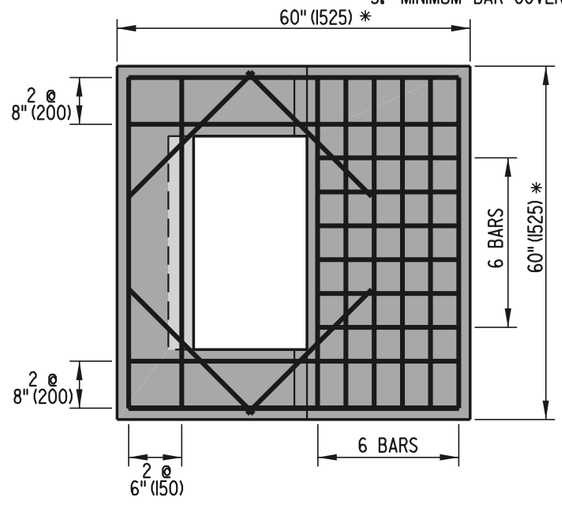
NOTE :
1. 4" (100) THROAT IS FOR TYPES B AND C TOP UNITS ONLY.
2. RELOCATE ENCROACHING REINFORCING BARS WHEN USING TYPES B & C TOP UNITS.
3. COVER SLABS SHALL BE PRE-CAST AND MUST BE SIZED TO FIT INLET BOX DIMENSIONS.
4. ALL BARS ARE TO BE #5 (#16) SPACED @ 6" (150)± UNLESS NOTED OTHERWISE.
5. MINIMUM BAR COVER = 1½" (38).

* - DIMENSIONS TO MATCH OUTSIDE TO OUTSIDE DIMENSIONS OF BOX

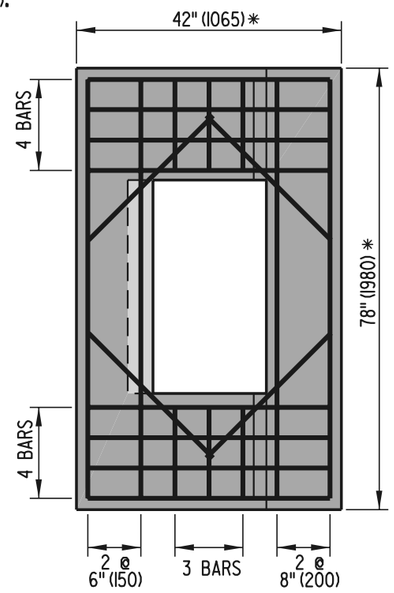
SCALE : N.T.S.



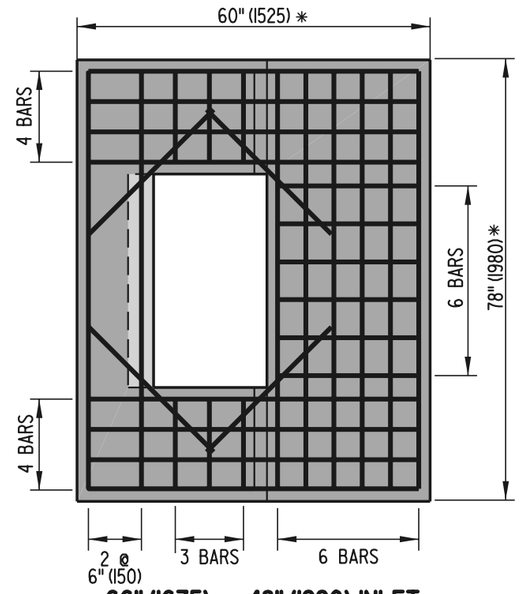
48" (1220) x 30" (760) INLET



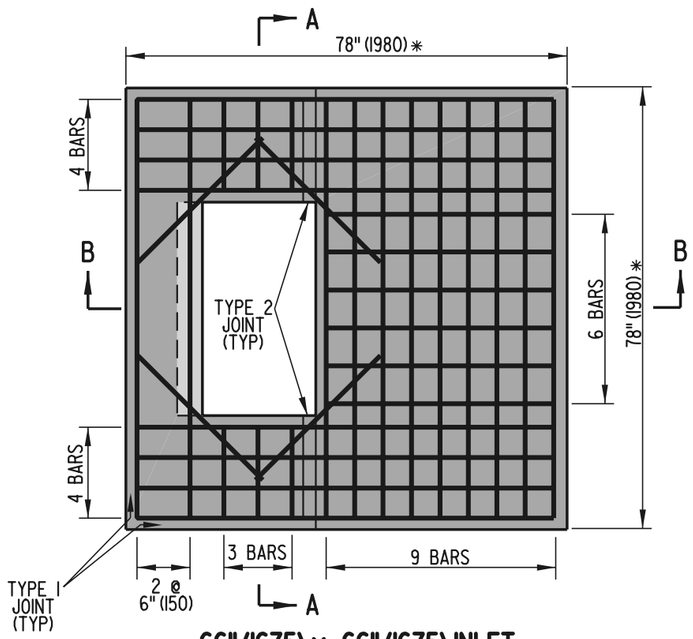
48" (1220) x 48" (1220) INLET



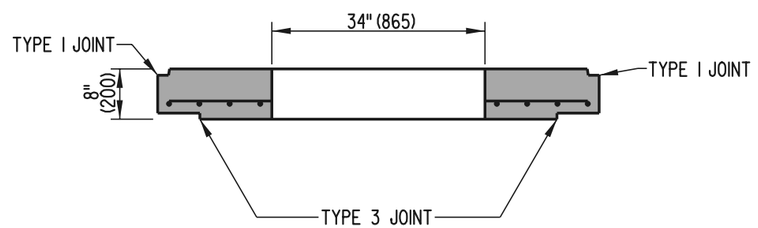
66" (1675) x 30" (760) INLET



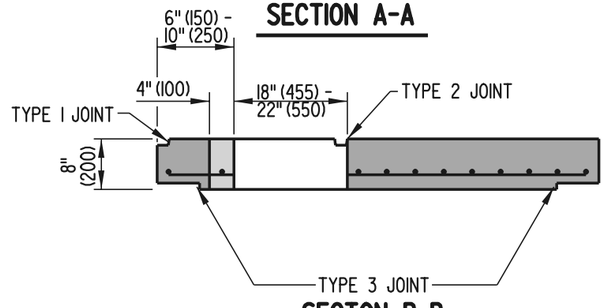
66" (1675) x 48" (1220) INLET



66" (1675) x 66" (1675) INLET



SECTION A-A



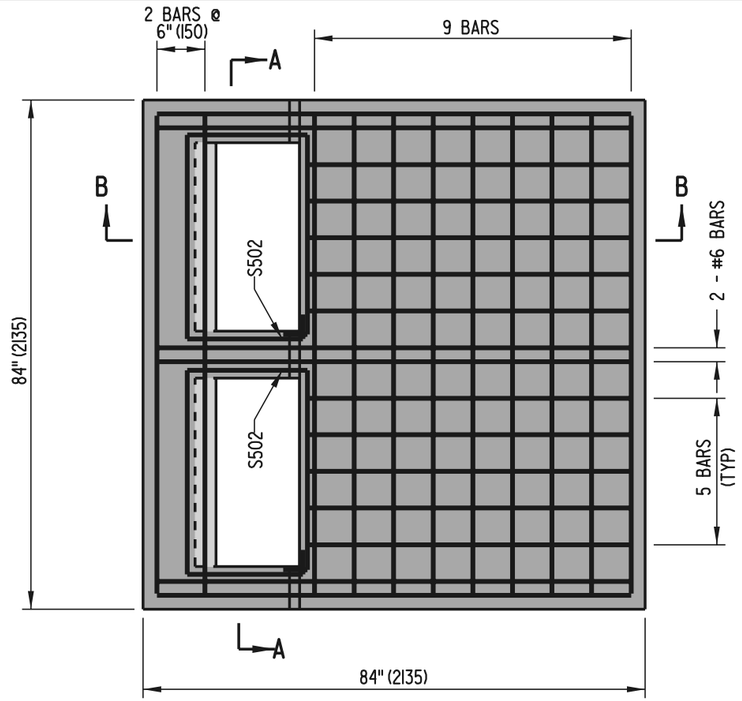
SECTON B-B

DRAINAGE INLET COVER SLAB DETAILS

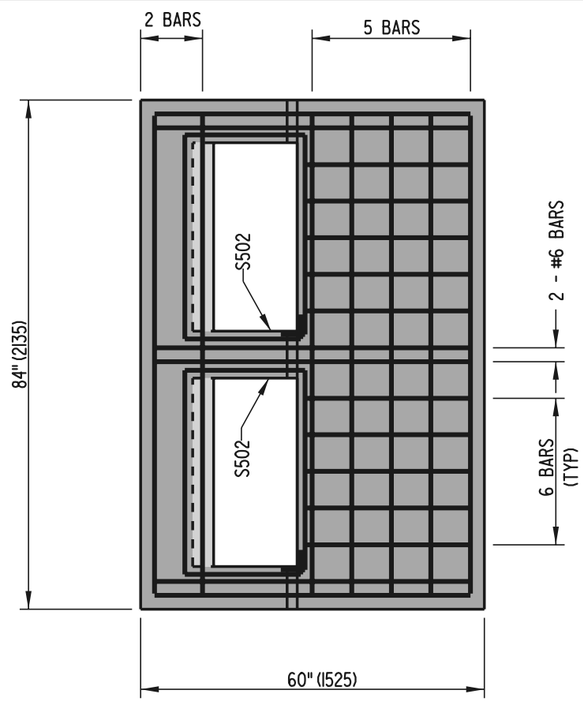
DELAWARE DEPARTMENT OF TRANSPORTATION	DRAINAGE INLET DETAILS		APPROVED Carolann Wicks CHIEF ENGINEER 9/6/02 DATE
	STANDARD NO. D-5 (2002)	SHT. 4 OF 8	RECOMMENDED DESIGN ENGINEER 8/19/02 DATE

04/29/2002

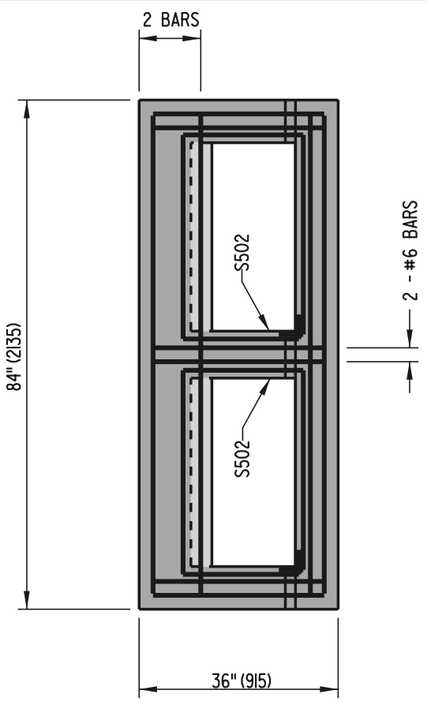
SCALE : N.T.S.



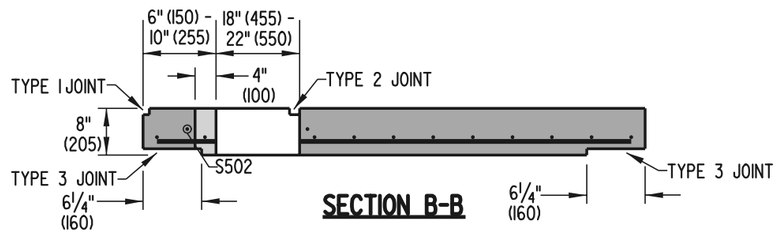
72" (1830) x 72" (1830) INLET



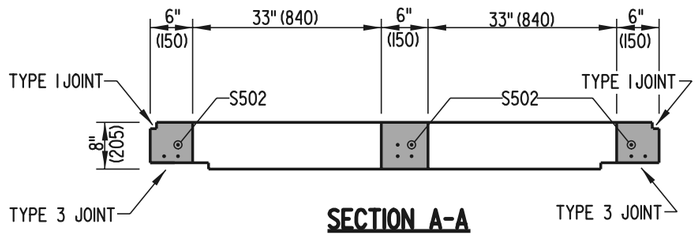
72" (1830) x 48" (1220) INLET



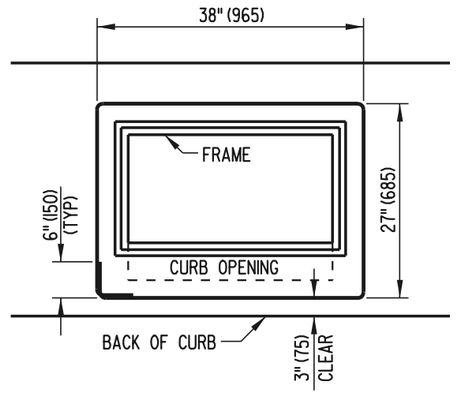
72" (1830) x 24" (610) INLET



SECTION B-B



SECTION A-A



S502 BENDING DIAGRAM

S502 IS NOT REQUIRED TO BE ONE CONTINUOUS BAR. IF MORE THAN ONE BAR IS USED, THERE MUST BE A 12" (300) OVERLAP BETWEEN BARS.

NOTE :
1. 4" (100) THROAT IS FOR TYPES B AND C TOP UNITS ONLY.
2. RELOCATE ENCROACHING REINFORCING BARS WHEN USING TYPES B & C TOP UNITS.
3. COVER SLABS ARE TO BE PRE-CAST AND MUST BE SIZED TO FIT INLET BOX DIMENSIONS.
4. ALL BARS ARE TO BE #5 (#16) SPACED @ 6" (150)± UNLESS NOTED OTHERWISE.
5. MINIMUM BAR COVER = 1½" (38).

DELAWARE
DEPARTMENT OF TRANSPORTATION

DOUBLE INLET COVER SLAB DETAILS

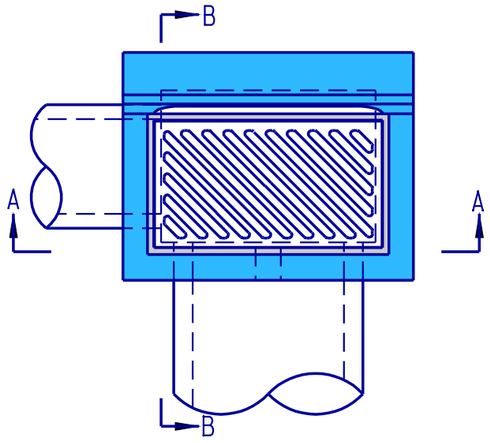
STANDARD NO. D-5 (2002) | SHT. 5 OF 8

APPROVED Carolann Wicks CHIEF ENGINEER 9/6/02 DATE

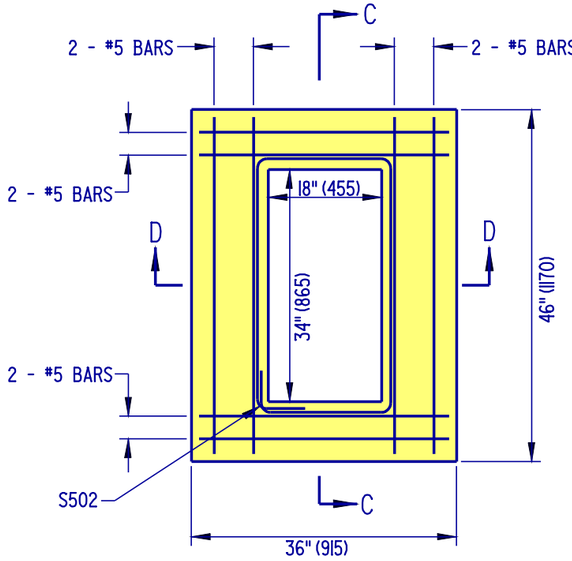
RECOMMENDED DESIGN ENGINEER 8/19/02 DATE

06/11/2002

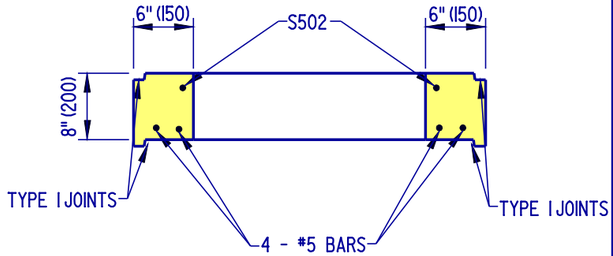
SCALE : N.T.S.



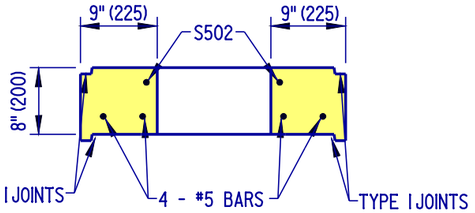
TOP VIEW



PLAN

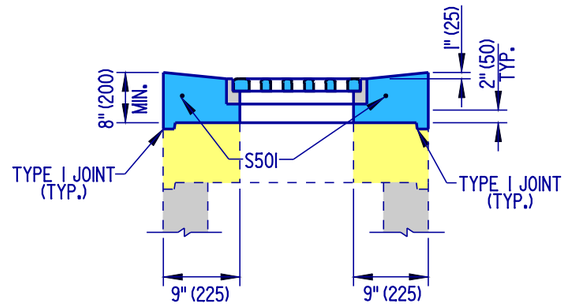


SECTION C-C

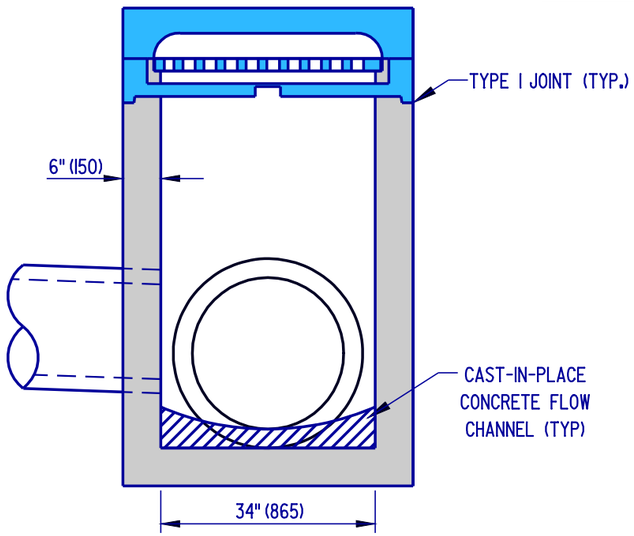


SECTION D-D

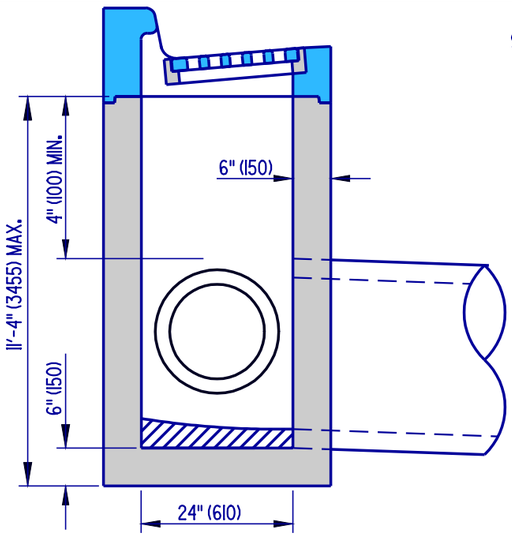
COVER SLAB DETAILS



TYPE A



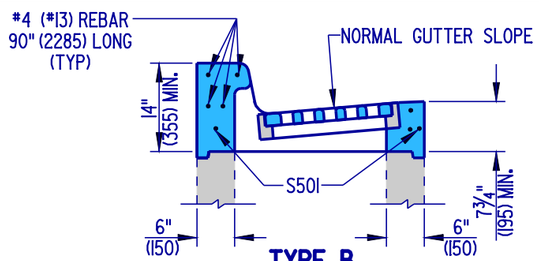
SECTION A-A



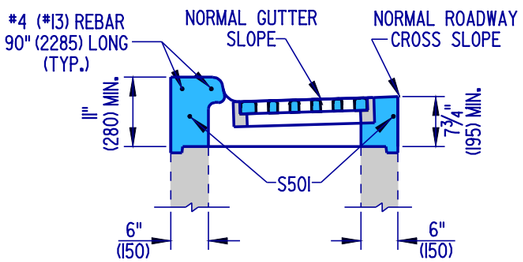
SECTION B-B

34" (865) x 24" (610) DRAINAGE INLET DETAILS

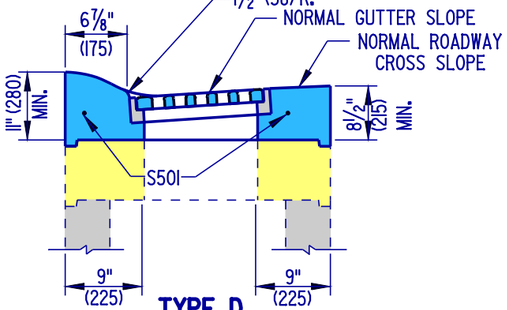
NOTE: REFER TO PREVIOUS SHEETS FOR REINFORCING REQUIREMENTS



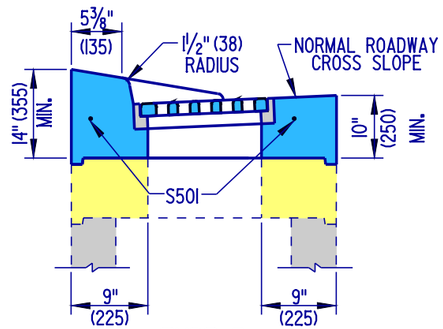
TYPE B



TYPE C



TYPE D



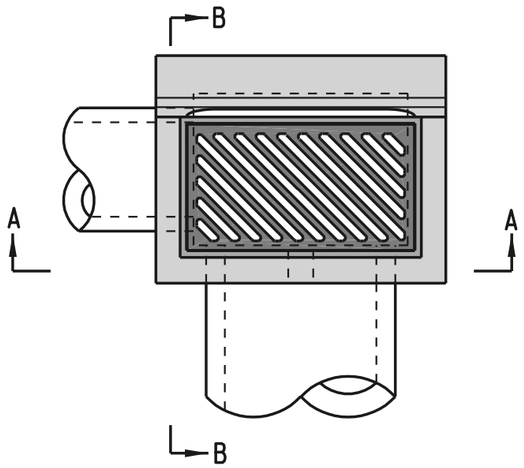
TYPE E

TOP UNIT DETAILS

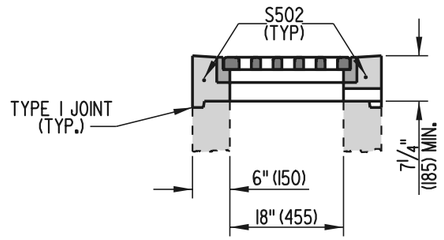
DELAWARE DEPARTMENT OF TRANSPORTATION	DRAINAGE INLET DETAILS		APPROVED Carolann Wicks CHIEF ENGINEER 1/10/05 DATE
	STANDARD NO. D-5 (2004)	SHT. 6 OF 8	RECOMMENDED Dennis M. O'Toole DESIGN ENGINEER 11/3/05 DATE

09/27/2004

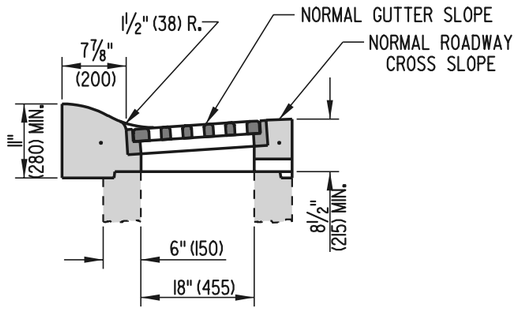
SCALE : N.T.S.



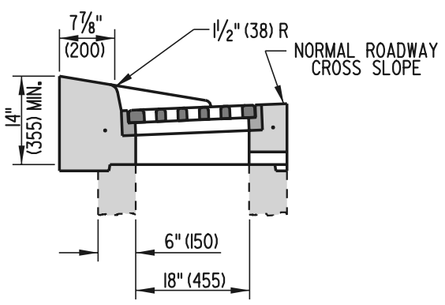
TOP VIEW



TYPE A

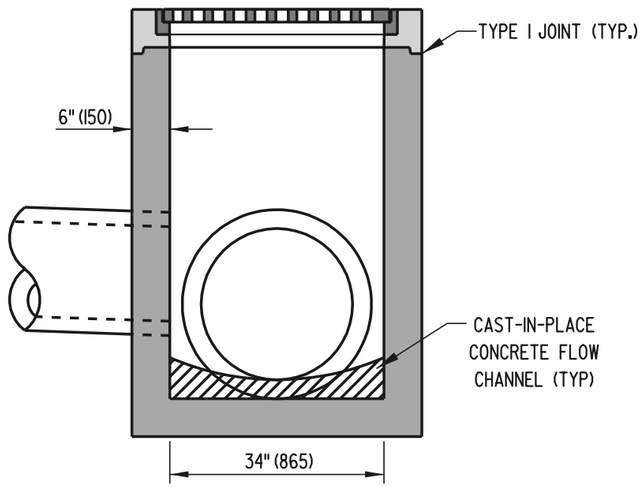


TYPE D

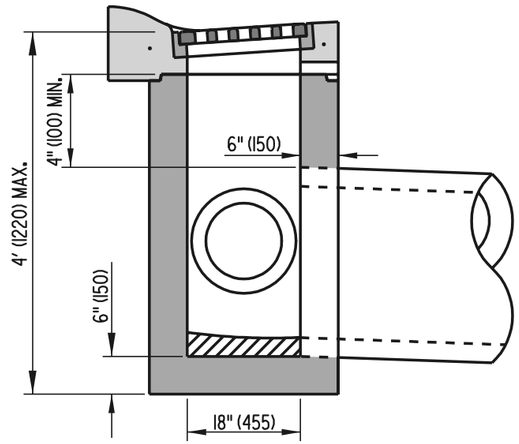


TYPE E

TOP UNIT DETAILS



SECTION A-A



SECTION B-B

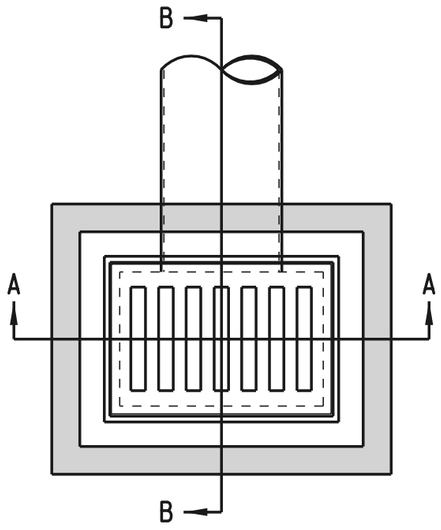
34" (865) x 18" (455) DRAINAGE INLET DETAILS

NOTES:
1.) REFER TO PREVIOUS SHEETS FOR REINFORCEMENT REQUIREMENTS
2.) THE HEIGHT OF THIS INLET IS LIMITED TO 4' (1220) MAXIMUM, THEREFORE STEPS WILL NOT BE REQUIRED AND SHOULD NOT BE INSTALLED ON THIS INLET.

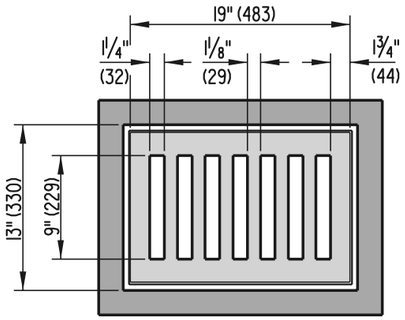
DELAWARE DEPARTMENT OF TRANSPORTATION	DRAINAGE INLET DETAILS	APPROVED Carolann Wicks CHIEF ENGINEER 9/6/02 DATE
	STANDARD NO. D-5 (2002) SHT. 7 OF 8	RECOMMENDED Michael A. Simpkins DESIGN ENGINEER 8/19/02 DATE

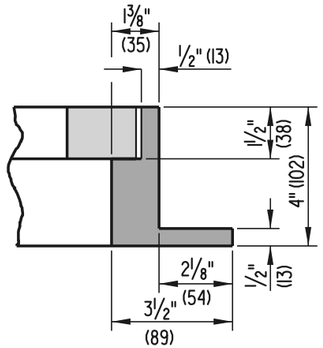
07/31/2002

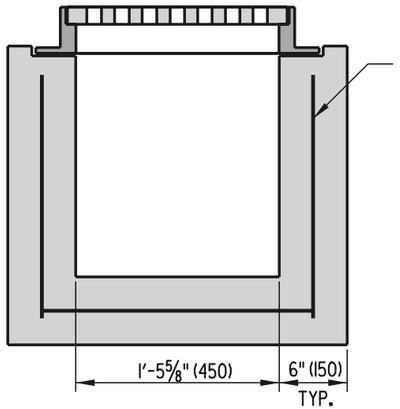
SCALE : N.T.S.



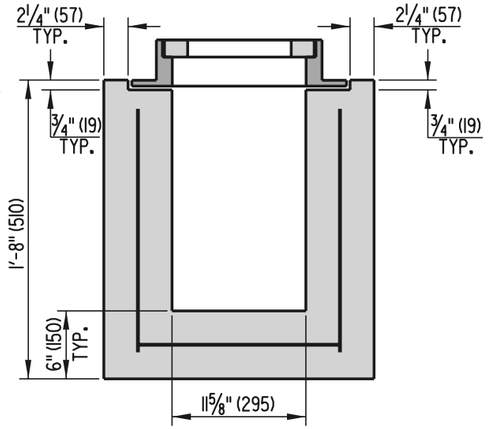
NOTE: 1. REINFORCEMENT SHALL BE 4" (102) X 4" (102) W4 X W4 (W26 X W26)
2. INLET BOXES ARE TO BE PRE-CAST OR CAST-IN-PLACE.



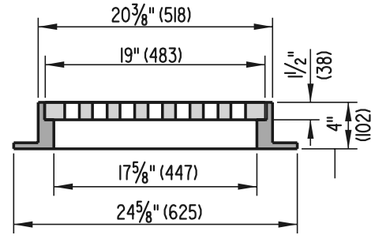


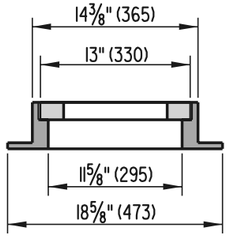


SECTION A-A



SECTION B-B

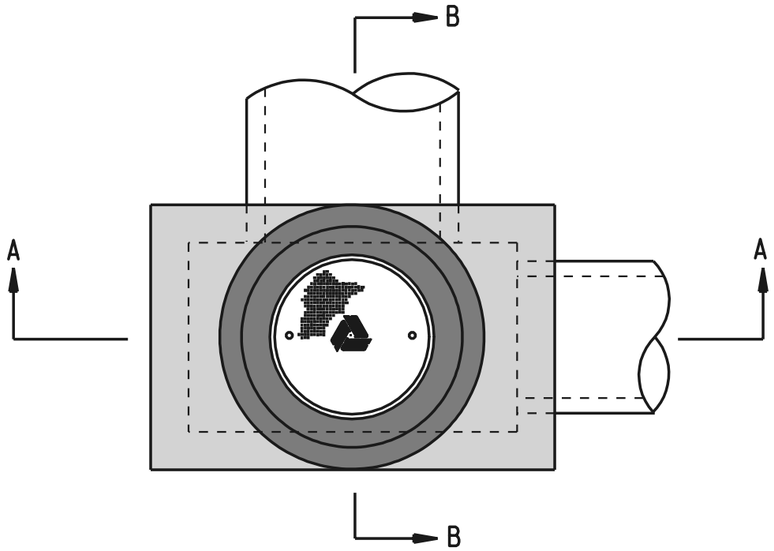




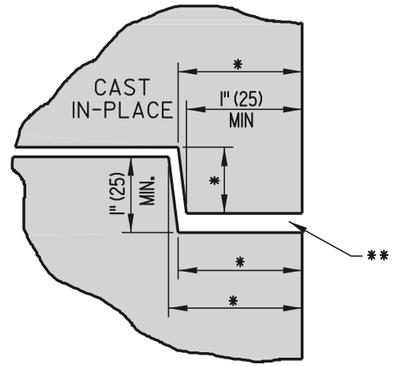
DELAWARE DEPARTMENT OF TRANSPORTATION	LAWN INLET		APPROVED Carolann Wicks CHIEF ENGINEER 9/6/02 DATE
	STANDARD NO. D-5 (2002)	SHT. 8 OF 8	RECOMMENDED DESIGN ENGINEER 8/19/02 DATE

05/02/2002

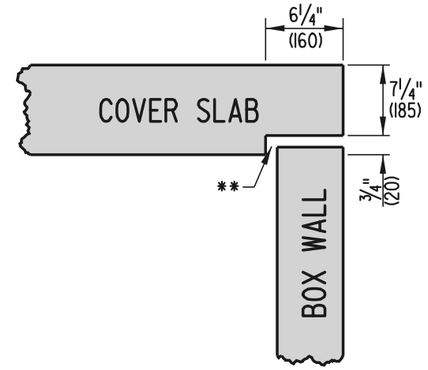
SCALE : N.T.S.



PLAN

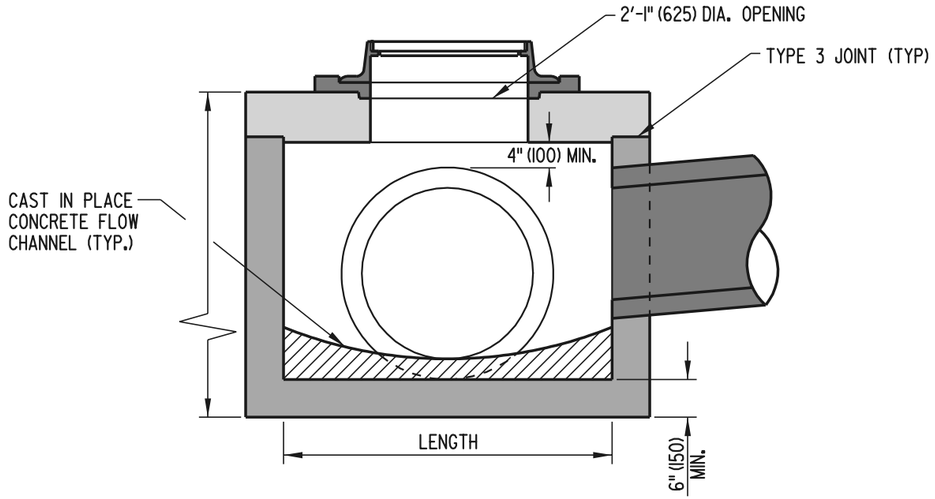


TYPE I JOINT DETAIL

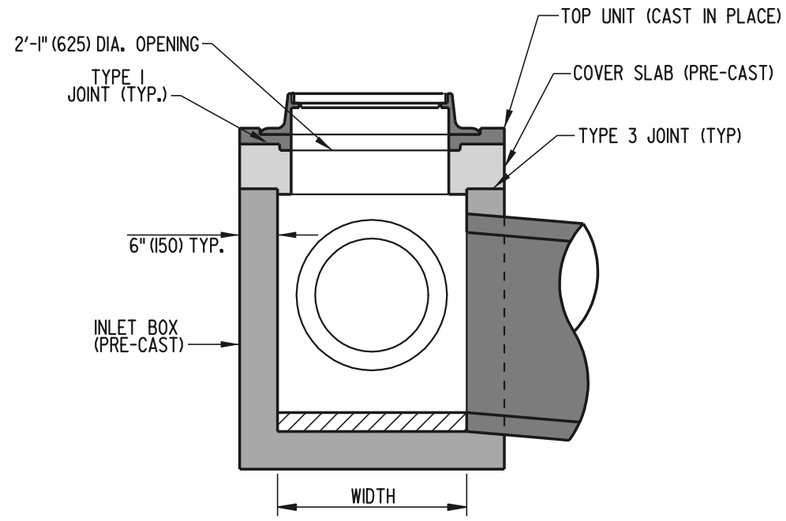


TYPE 3 JOINT DETAIL

* DIMENSIONS WILL VARY
** JOINT SEALANT



SECTION A-A



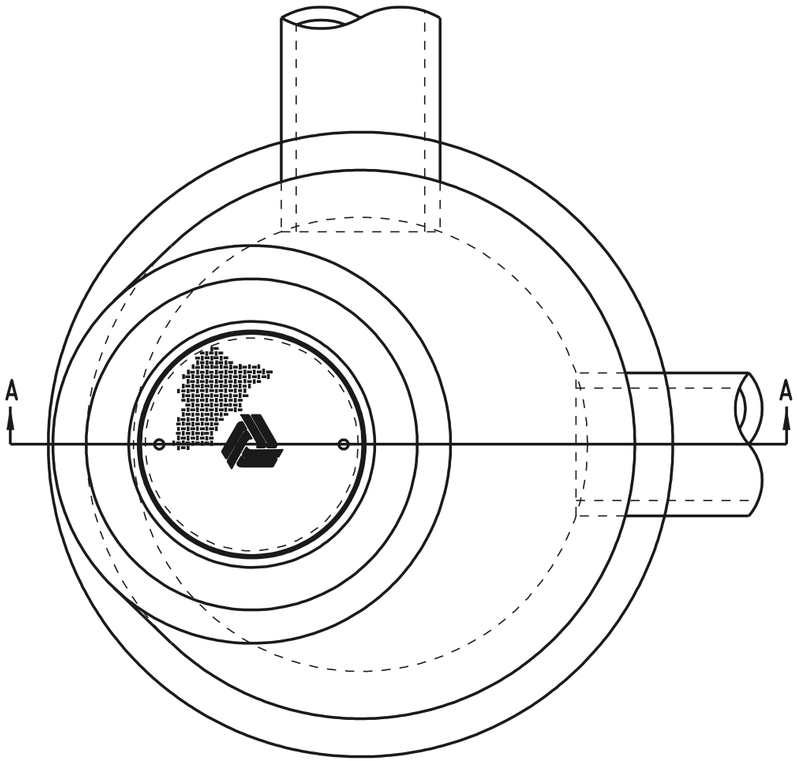
SECTION B-B

BOX MANHOLE ASSEMBLY

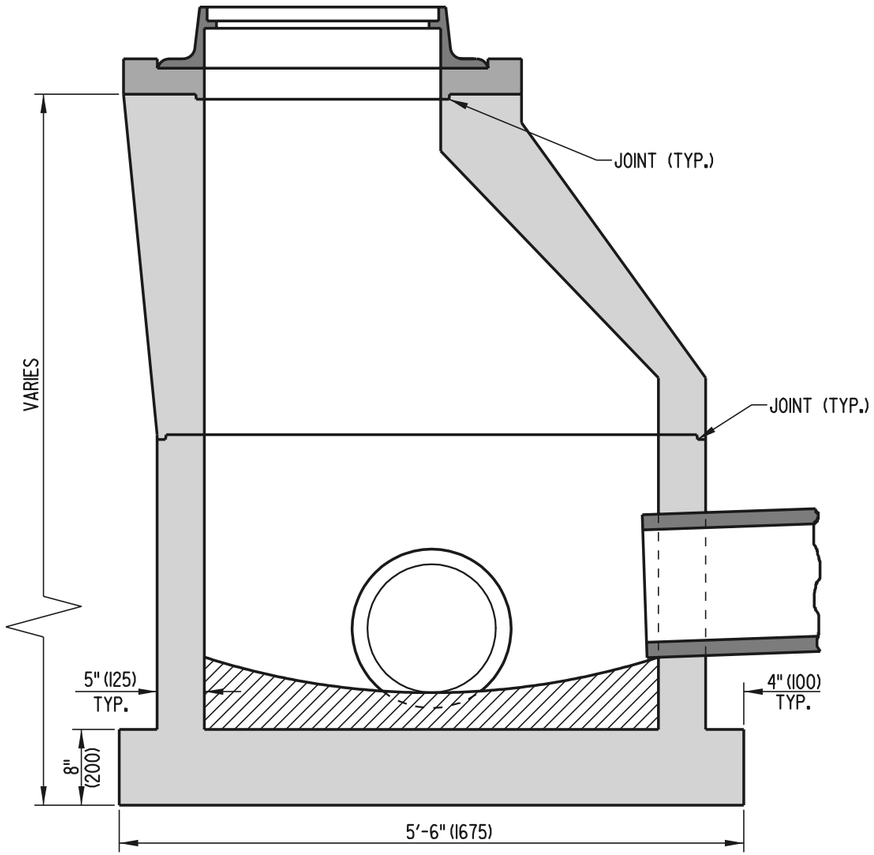
DELAWARE DEPARTMENT OF TRANSPORTATION	MANHOLE DETAILS		APPROVED Lynne M. Hartnett CHIEF ENGINEER 6/18/01 DATE
	STANDARD NO. D-6 (2001)	SHT. 1 OF 4	RECOMMENDED Michael A. Capitano DESIGN ENGINEER 6/15/01 DATE

05/30/2001

SCALE : N.T.S.



PLAN



SECTION A-A

ROUND MANHOLE ASSEMBLY

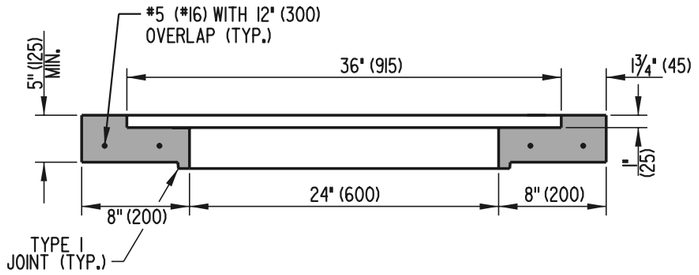
NOTE: ROUND MANHOLES SHALL BE CONSTRUCTED IN ACCORDANCE WITH AASHTO M 199.

DELAWARE DEPARTMENT OF TRANSPORTATION	MANHOLE DETAILS	APPROVED Eugene M. Hurlburt CHIEF ENGINEER 6/18/01 DATE
	STANDARD NO. D-6 (2001) SHT. 2 OF 4	RECOMMENDED Michael A. Hyde DESIGN ENGINEER 6/15/01 DATE

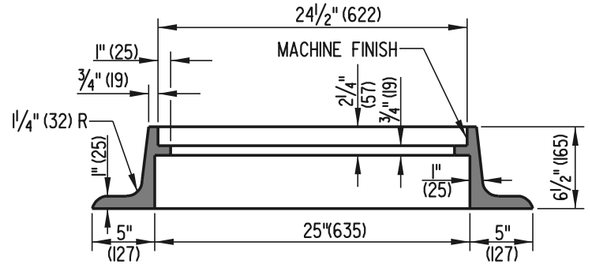
06/06/2001

SCALE : N.T.S.

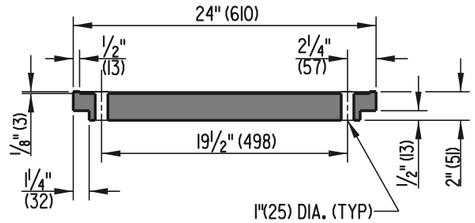
NOTE: TOP UNIT IS TO BE CAST IN PLACE TO GRADE AS SPECIFIED ON PLAN SHEETS OR AS DIRECTED BY ENGINEER.



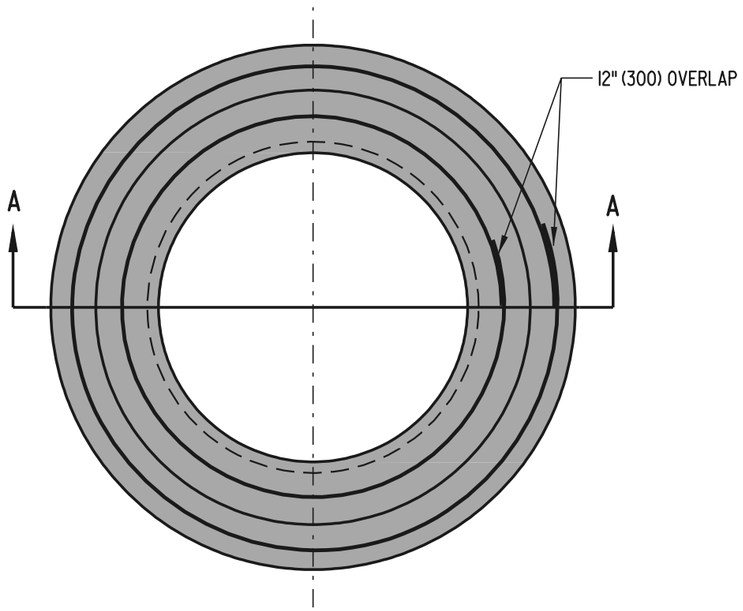
SECTION A-A



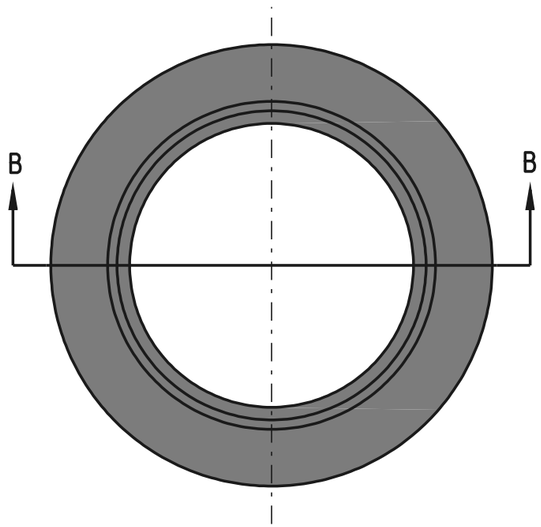
SECTION B-B



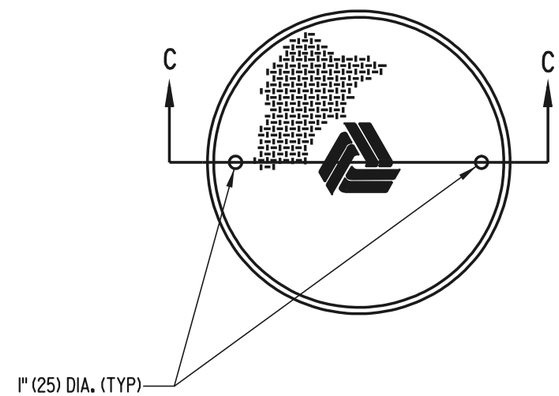
SECTION C-C



TOP UNIT



FRAME



COVER

DELAWARE DEPARTMENT OF TRANSPORTATION	MANHOLE DETAILS		APPROVED Eugene M. Hurlong CHIEF ENGINEER 6/18/01 DATE
	STANDARD NO. D-6 (2001)	SHT. 3 OF 4	RECOMMENDED Michael A. Clyde DESIGN ENGINEER 6/15/01 DATE

05/21/2001