

PRECAST UNIT ASSEMBLY DIAGRAM

LEGEND

PAGE

A - Flat Slab Top with Frame and Grate (T-DI-1)	103.03
B - Drop Inlet Top Unit (T-DI-2)	103.04
C - Throat Face Block (T-DI-3,4)	103.05
D - Curb Drop Inlet Throat Section (T-DI-3,4)	103.05
E - Spacer Unit (T-MH-2)	103.08
F - Flat Slab Top with Hole (T-MH-2)	103.08
G - Drop Inlet Top Unit (T-DI-5)	103.06
I - Drop Inlet Top Unit (T-DI-7)	103.07
J - Flat Slab Top Unit (T-MH-2)	103.08
K - Manhole Frame and Cover (MH-1)	106.02 thru 106.05
L - Spacer Unit (T-MH-2)	103.08
M - Concentric Taper Unit (T-MH-2)	103.08
N - Eccentric Taper Unit (T-MH-2)	103.08
O - Riser Unit (R-1)	103.09
P - Flat Slab Reducer (R-2)	103.09
Q - Taper Reducer (R-3)	103.09
R - Monolithic Base Unit - Over a nominal 1200 mm Pipe Dia. (B-1)	103.10
S - Doghouse Base Unit - Over a nominal 1200 mm Pipe Dia. (B-2)	103.10
T - Footing (B-2)	103.10
U - Tee Section Base Unit (B-3)	103.11
V - Monolithic Base Unit - a nominal 1200 mm Pipe Dia. (B-1)	103.10
W - Doghouse Base Unit - a nominal 1200 mm Pipe Dia. (B-2)	103.10
X - Footing (B-2)	103.10
Alternate Joint Detail	103.03

GENERAL NOTES - PRECAST

PRECAST STRUCTURES WILL CONFORM TO SECTION 105.04 OF THE SPECIFICATIONS. THE MANUFACTURER WILL HAVE THE OPTION OF SELECTING THE COMBINATION OF PRECAST UNITS TO COMPLETE A STRUCTURE UNLESS OTHERWISE NOTED ON THE PLANS.

THE "H" DIMENSION SHOWN ON THE STANDARDS AND SPECIFIED ON THE PLANS WILL BE MEASURED FROM THE INVERT OF THE OUTFALL PIPE TO THE TOP OF THE MASONARY STRUCTURE. PLAN "H" DIMENSIONS ARE APPROXIMATE ONLY FOR ESTIMATING PURPOSES AND THE ACTUAL DIMENSIONS SHALL BE DETERMINED BY THE CONTRACTOR FROM FIELD CONDITIONS.

IN THE EVENT THE INVERT OF THE OUTFALL PIPE IS HIGHER THAN THE BOTTOM OF THE STRUCTURE, THE INVERT OF THE STRUCTURE SHALL BE SHAPED WITH CEMENT MORTAR TO PREVENT STANDING OR PONDING OF WATER IN THE STRUCTURE. THIS WILL APPLY TO ALL STRUCTURES MEETING THIS CONDITION AND IS NOT TO BE CONFUSED WITH STANDARD IS-1. THE COST FOR INVERT SHAPING SHALL BE INCLUDED IN THE PRICE BID FOR THE STRUCTURE.

WHEN SPECIFIED ON THE PLANS THE INVERT IS TO BE SHAPED IN ACCORDANCE WITH STANDARD IS-1. THE COST OF FURNISHING AND PLACING ALL MATERIALS INCIDENTAL TO THE SHAPING IS TO BE INCLUDED IN THE PRICE BID FOR THE STRUCTURE.

ALL PRECAST STRUCTURES TO BE CONSTRUCTED WITH 30 MPa MINIMUM CONCRETE.

STEPS IN ACCORDANCE WITH STANDARD ST-1 ARE TO BE PROVIDED IN ALL MANHOLES AND IN ALL DROP INLETS WITH AN "H" DIMENSION OF 1.2 m OR GREATER.

75 mm DIAMETER WEEP HOLES WILL BE REQUIRED IN PRECAST STRUCTURE LOCATED ADJACENT TO THE PAVEMENT TO DRAIN SUBBASE. PLACEMENT OF WEEP HOLES IN THE PRECAST UNIT WILL BE DETERMINED BY THE PROXIMITY OF THE STRUCTURE TO THE SUBBASE. WEEP HOLES MAY ALSO BE REQUIRED IN OTHER STRUCTURES WHEN CALLED FOR ON THE PLANS OR DIRECTED BY THE ENGINEER.

WEEP HOLES WILL HAVE 300 mm x 300 mm PLASTIC HARDWARE CLOTH, 6 mm MESH OR GALVANIZED STEEL WIRE, MINIMUM WIRE DIAMETER 0.76 mm, NUMBER 4 MESH HARDWARE CLOTH ANCHORED FIRMLY TO OUTSIDE OF STRUCTURE.

PRECAST UNITS LOCATED ADJACENT TO CAST-IN-PLACE CONCRETE ITEMS, SUCH AS FLUMES, DITCHES, GUTTERS, AND SIDEWALKS SHALL BE CONNECTED TO THE ADJACENT UNIT BY MEANS OF 12 mm DIAMETER SMOOTH STEEL DOWELS SPACED ON APPROXIMATELY 300 mm CENTERS THROUGHOUT THE CONTACT LENGTH AND EXTENDING AT LEAST 100 mm INTO BOTH THE PRECAST UNIT AND THE CAST-IN-PLACE ITEM. IF THE HOLES ARE PROVIDED IN THE PRECAST UNIT TO RECEIVE THE DOWELS, THEY SHALL NOT EXCEED 16 mm DIAMETER.

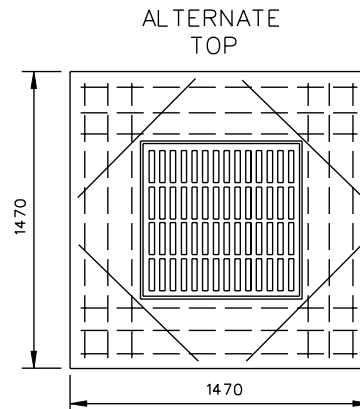
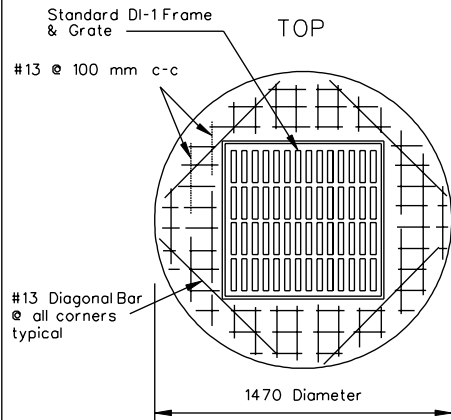
GENERAL NOTES - PRECAST

VIRGINIA DEPARTMENT OF TRANSPORTATION

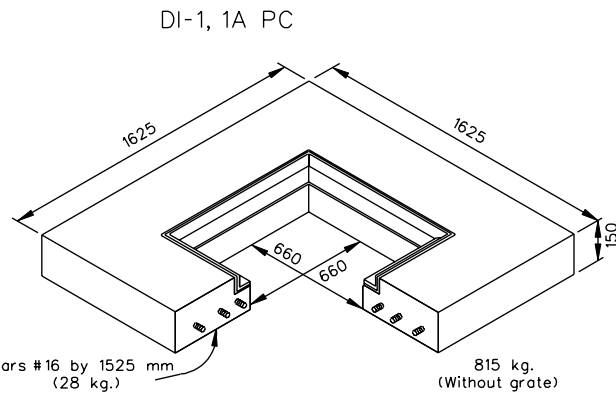
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

103.02

T-DI-1



PIPE SIZE	RECOMMENDED MINIMUM HEIGHT CHART	
	H DIMENSION	
	CONCRETE	CORR. METAL
300	765	740
375	845	815
450	930	890
525	1010	970
600	1095	1045
675	1175	1120
750	1260	1195



See General Notes Precast for additional details.

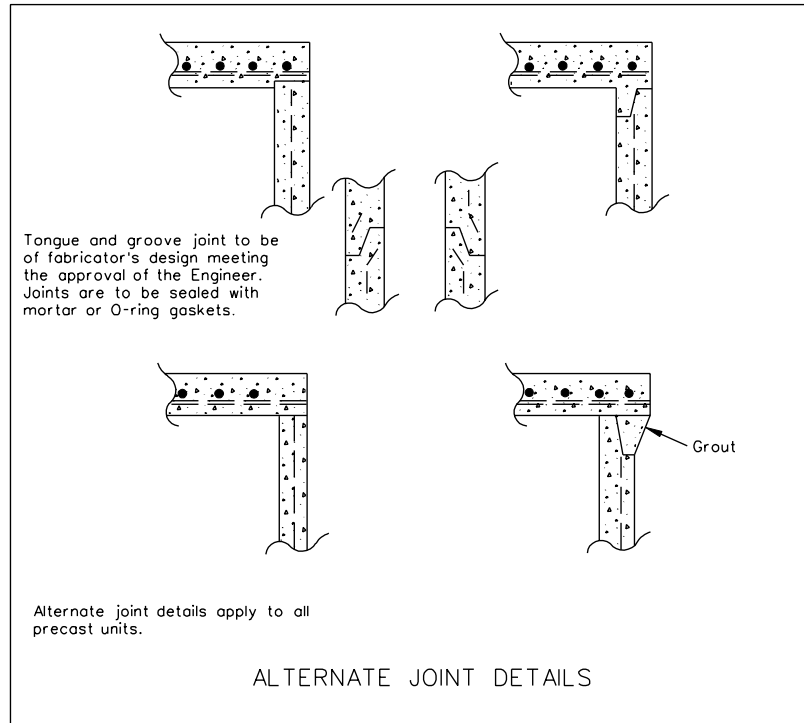
Concrete to be 30 MPa minimum.

Reinforcing steel in accordance with ASTM C-478M, ASTM A-497M (wire fabric) and ASTM A-615M (Reinforcing bars).

Concrete cover and grate are to be furnished as a single unit.

See Standard DI-1, 1A for details of frame & grate.

Dimensions shown are minimum. Actual dimensions may vary with manufacturer.



Tongue and groove joint to be of fabricator's design meeting the approval of the Engineer. Joints are to be sealed with mortar or O-ring gaskets.

Alternate joint details apply to all precast units.

ALTERNATE JOINT DETAILS

STANDARD PRECAST TOP UNITS

VIRGINIA DEPARTMENT OF TRANSPORTATION

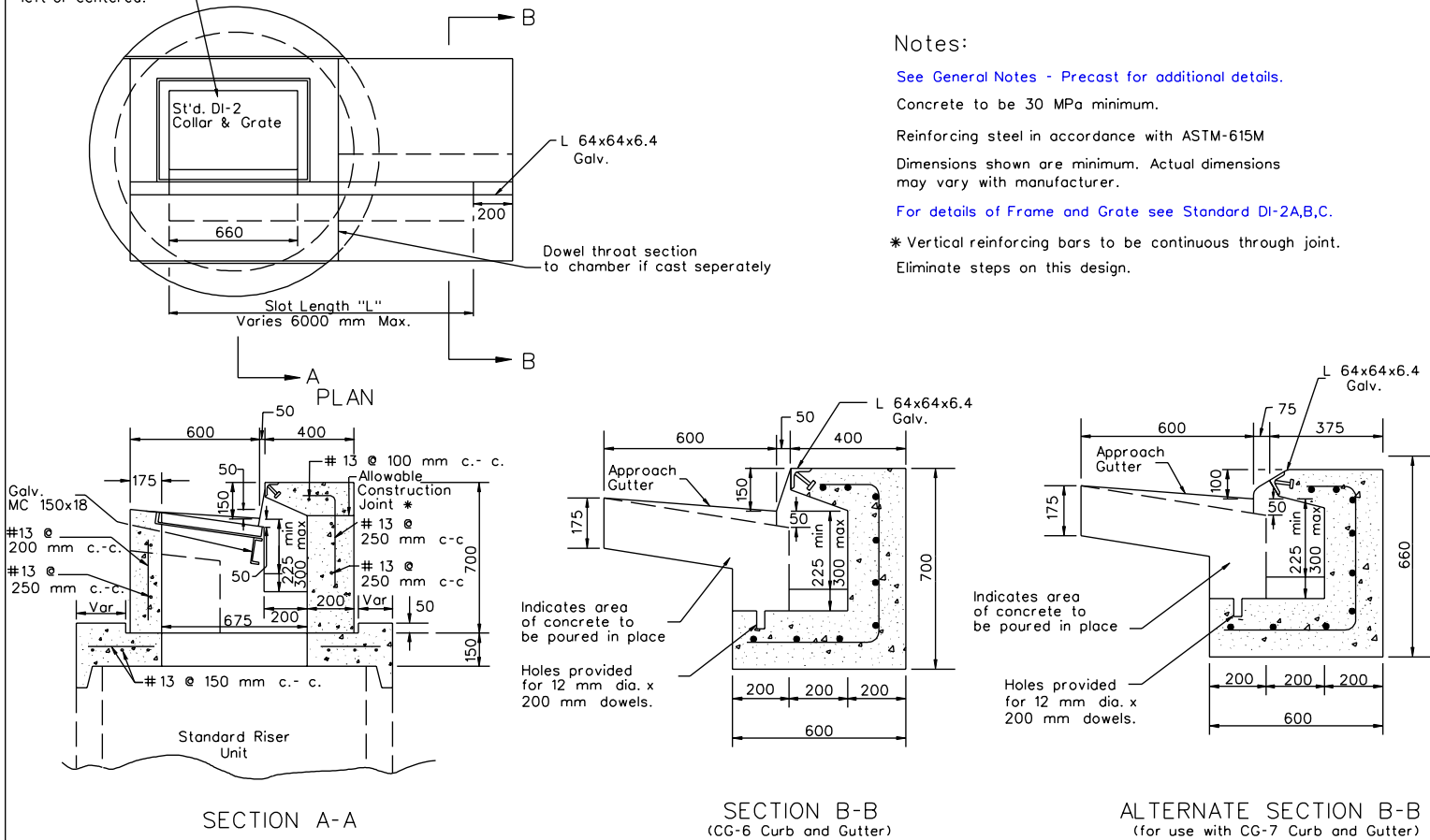
103.03 UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

SPECIFICATION REFERENCE
105
233
302

REVISED ON 3/03

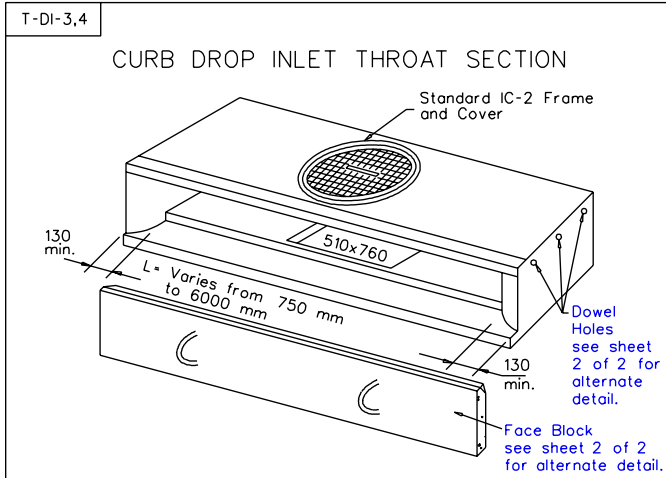
T-DI-2

Location of hole to vary with type of inlet constructed. Hole may be shifted right, left or centered.

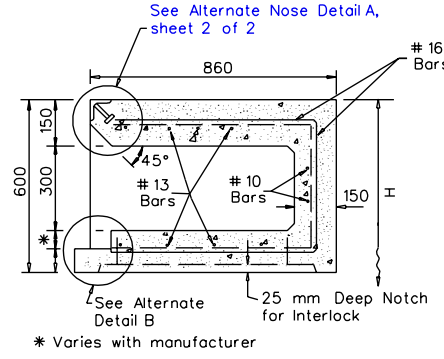
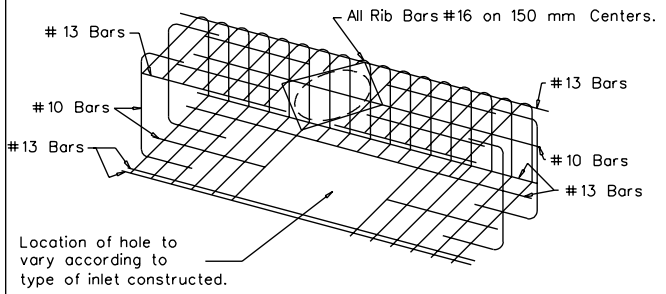


SPECIFICATION REFERENCE	STANDARD PRECAST TOP UNITS		
105 233 302	VIRGINIA DEPARTMENT OF TRANSPORTATION		UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS
			103.04

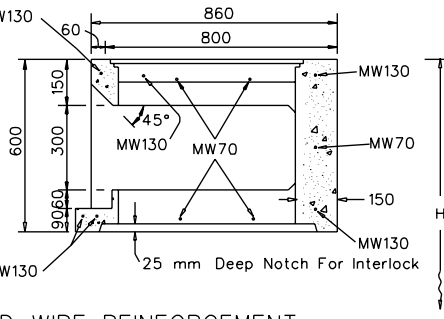
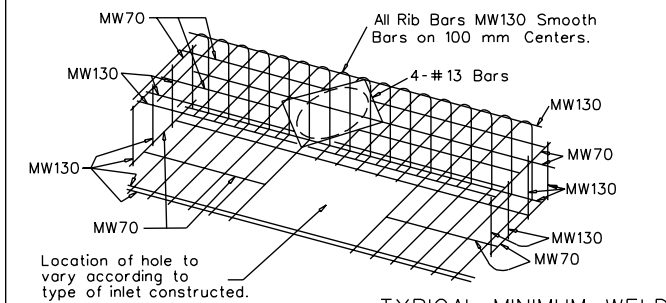
REVISED ON 3/03



Notes:
 See General Notes-Precast for additional details.
 Concrete to be 30 MPa minimum compressive strength.
 Reinforcing steel in accordance with ASTM A-615M (reinforcing bars).
 Reinforcing in accordance with ASTM A-185M for welded wire mesh.
 Dimensions shown are minimum. Actual dimensions may vary with manufacturer.
 This unit may be used with all Standard DI-3 & DI-4 Curb Drop Inlets.
 Each face block shall have 2 or more loops (#10 bars) cast in face as shown. These loops may be used for lifting, and for tying in the poured in place gutter section. Face blocks are to be sealed with grout or polysulfide sealer.



TYPICAL MINIMUM BAR REINFORCEMENT



TYPICAL MINIMUM WELDED WIRE REINFORCEMENT

RECOMMENDED MINIMUM HEIGHT CHART			
DI-3A,B,C FOR 900 mm BASE UNIT	PIPE SIZE	H DIMENSION	
		CONC.	C.M.
	150	890	890
	200	950	940
	250	1000	990
	300	1070	1040
	375	1150	1120
	450	1240	1200
	525	1320	1270
DI-3A,B,C,D,E, & F FOR 1200 mm I.D. BASE UNIT	150	1150	1150
	200	1200	1200
	250	1250	1250
	300	1320	1300
	375	1410	1380
	450	1490	1450
	525	1570	1530
DI-3A,B,C,D,E & F FOR 1500 mm or 1800 mm BASE UNIT AND DI-4A,B,C,D,E & F	300	1400	1380
	375	1480	1450
	450	1570	1530
	525	1650	1600
	600	1730	1680
	675	1810	1760
	750	1900	1830
	825	1980	1910
	900	2060	1990
	1050	2230	2140
1200	2390	2290	

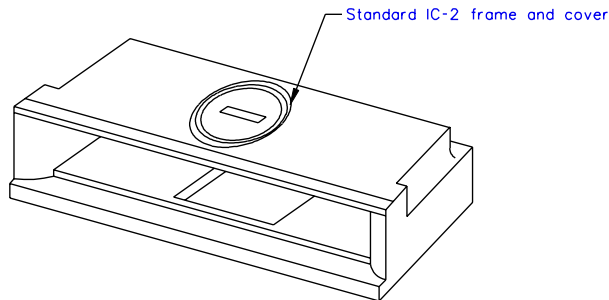
Sheet 1 of 2

STANDARD PRECAST TOP UNITS

VIRGINIA DEPARTMENT OF TRANSPORTATION

103.05 UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

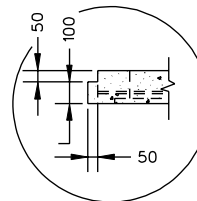
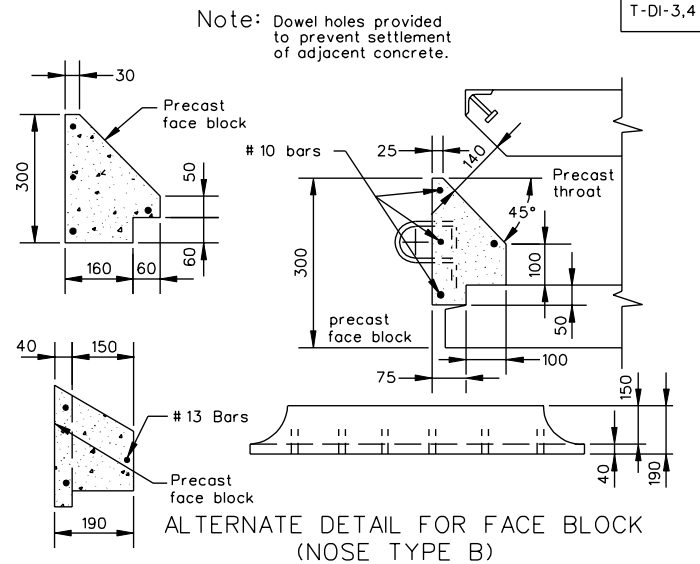
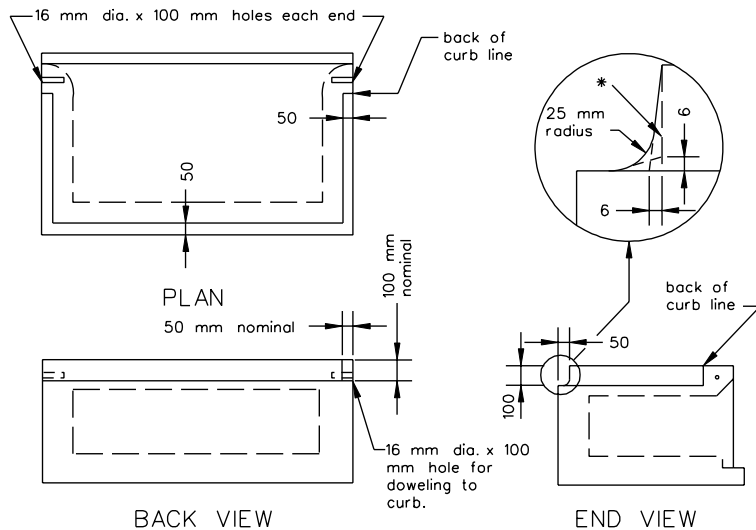
SPECIFICATION REFERENCE
105
233
302



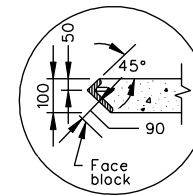
ISOMETRIC
CURB DROP INLET THROAT SECTION
ALTERNATE DESIGN

All details not shown to be in accordance with sheet 1 of 2.

* 50 mm x 100 mm notch may be formed with straight sides, tapered sides, or tapered sides with radius.



ALTERNATE
DETAIL B



ALTERNATE
NOSE
DETAIL A
(For use with
mountable curb)

Sheet 2 of 2

SPECIFICATION
REFERENCE

105
233
302

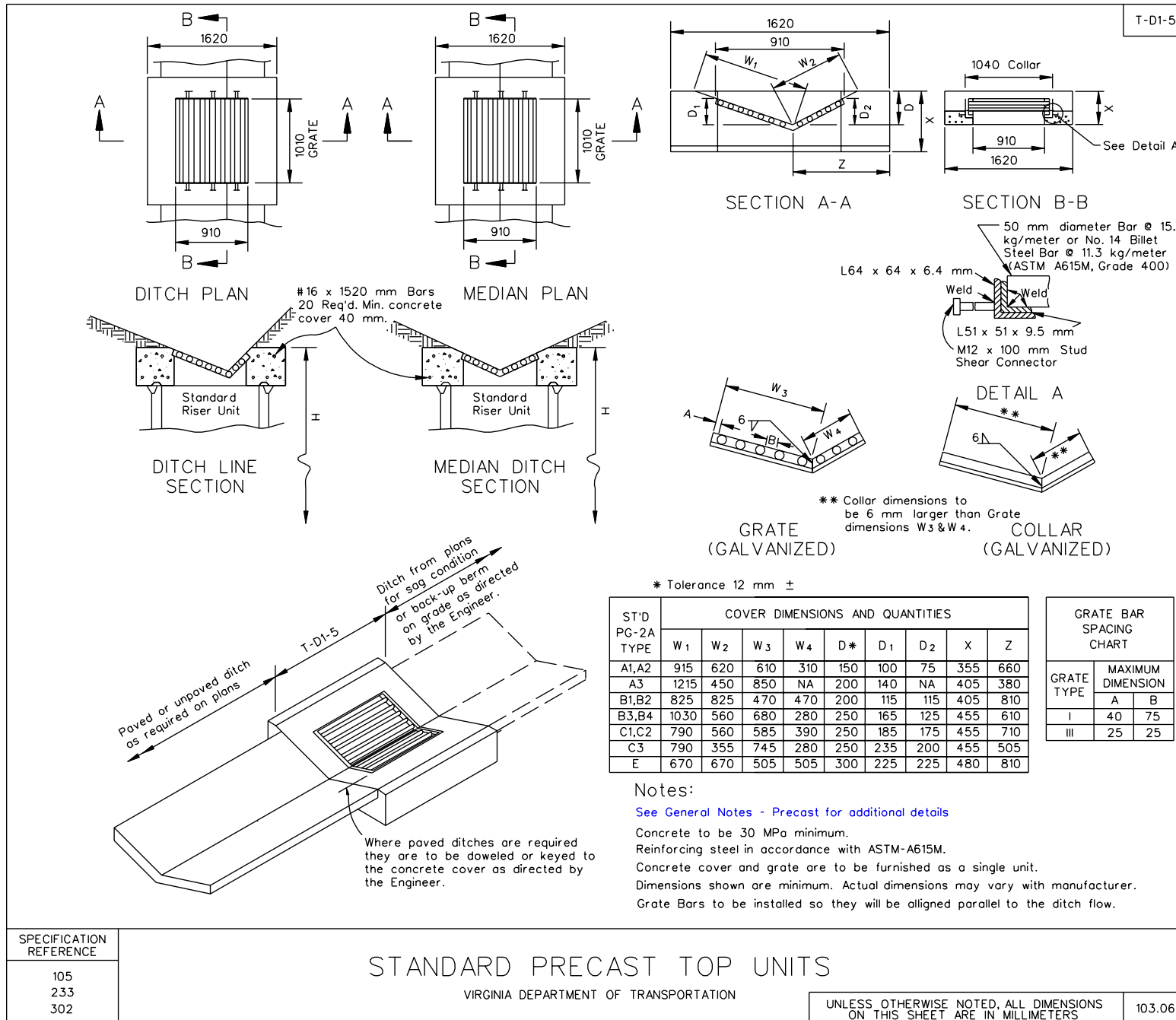
STANDARD PRECAST TOP UNITS

VIRGINIA DEPARTMENT OF TRANSPORTATION

UNLESS OTHERWISE NOTED, ALL DIMENSIONS
ON THIS SHEET ARE IN MILLIMETERS

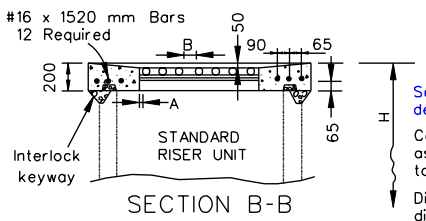
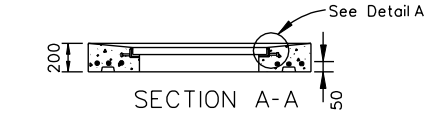
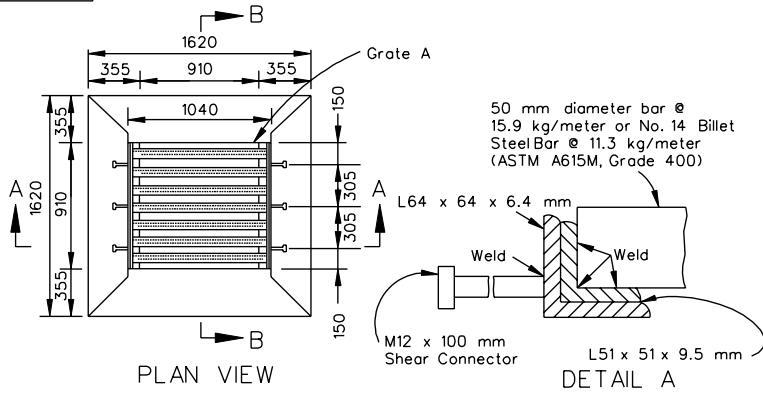
103.05A

REVISED ON 2/01



REVISED ON 8/97

T-DI-7



BAR SPACING CHART		
GRATE TYPE	MAXIMUM DIMENSION	
	A	B
I	40	75
111	25	25

See General Notes-Precast for additional details.

Concrete cover and grate are to be furnished as a single unit. Outside dimensions of grate to be 1010 mm x 900 mm.

Dimensions shown are minimum. Actual dimensions may vary with manufacturer.

Alternate methods of anchoring angle iron will be acceptable if approved by the Engineer.

Grate and collar are to be galvanized.

Joints between concrete cover and gutters (when required) are to be doweled or keyed.

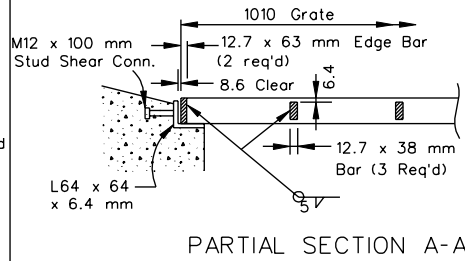
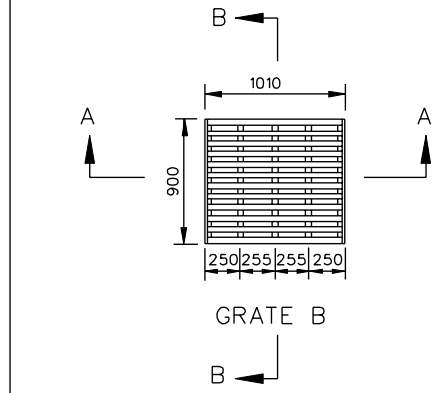
Concrete to be 30 MPa minimum.

Reinforcing steel to be in accordance with ASTM A615M.

Grate bars to be installed so they will be aligned parallel to the ditch flow.

See Standard DI-7,7A,7B for:
 Details of Gutter
 Method of Placement
 Alternate Methods of Construction

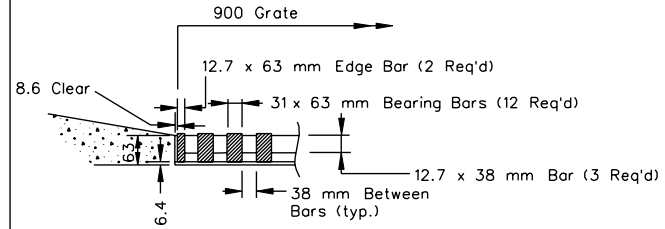
DETAILS OF CONCRETE COVER AND GRATE



Grate A is to be used when inlet is located in median or other areas not normally subject to traffic.

Grate B is to be used when inlet is located on shoulders or other areas subject to traffic.

Grate to be galvanized after fabrication.



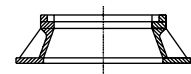
LOAD CARRYING GRATE

STANDARD PRECAST TOP UNITS

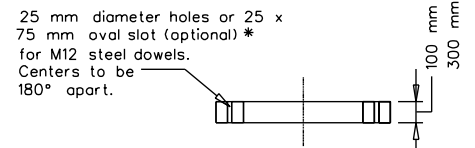
VIRGINIA DEPARTMENT OF TRANSPORTATION

103.07 UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

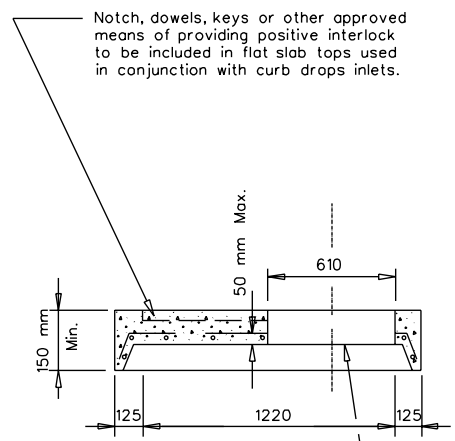
SPECIFICATION REFERENCE
105
233
302



MH-1 FRAME AND COVER

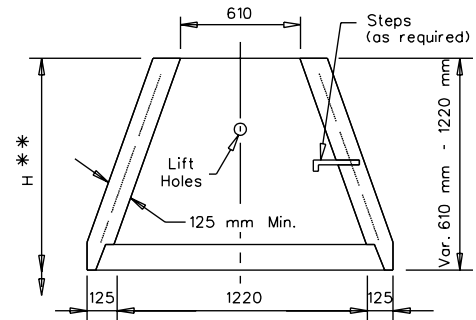


SPACER UNIT (AS REQUIRED)

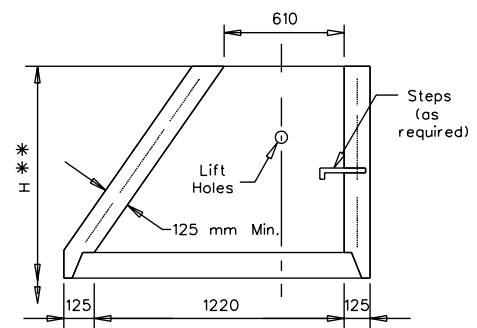


FLAT SLAB TOP UNIT

Location, size, and shape of hole may vary depending on the type of structure.



CONCRETE TAPER UNIT



ECCENTRIC TAPER UNIT

Spacer units shown hereon are also known as "Grade Rings" or "Adjustment Rings."
 ** When Spacer Units are required "H" is to be measured from the top of the uppermost Spacer.
 * Spacer unit to be doweled or mortared to taper unit or flat slab top.

Notes:

- See General Notes for additional information on weep holes, step requirements, "H" dimensions, etc.
- All spacer units, flat slab tops, and taper units are to be in accordance with the requirements of AASHTO M199M.
- Concrete to be 30 MPa.
- Two 50 mm diameter lift holes to be provided in taper unit. Holes are to be located above the center of gravity of each unit with centers 180° apart.
- For step details see standard ST-1.
- Three lift eyes of manufacturer's design per unit may be substituted for lift holes shown hereon.
- Dimensions shown are minimum. Actual dimensions may vary with manufacturer.

SPECIFICATION REFERENCE
105 302

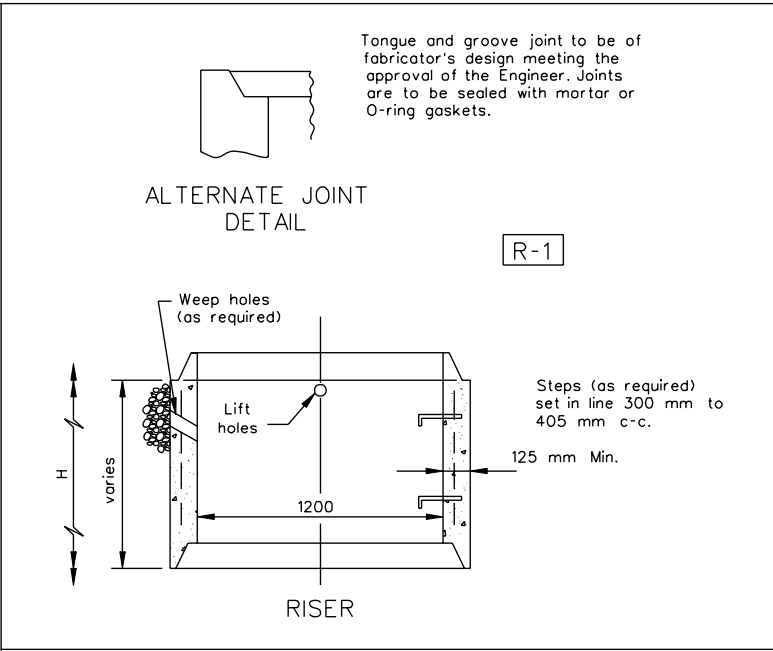
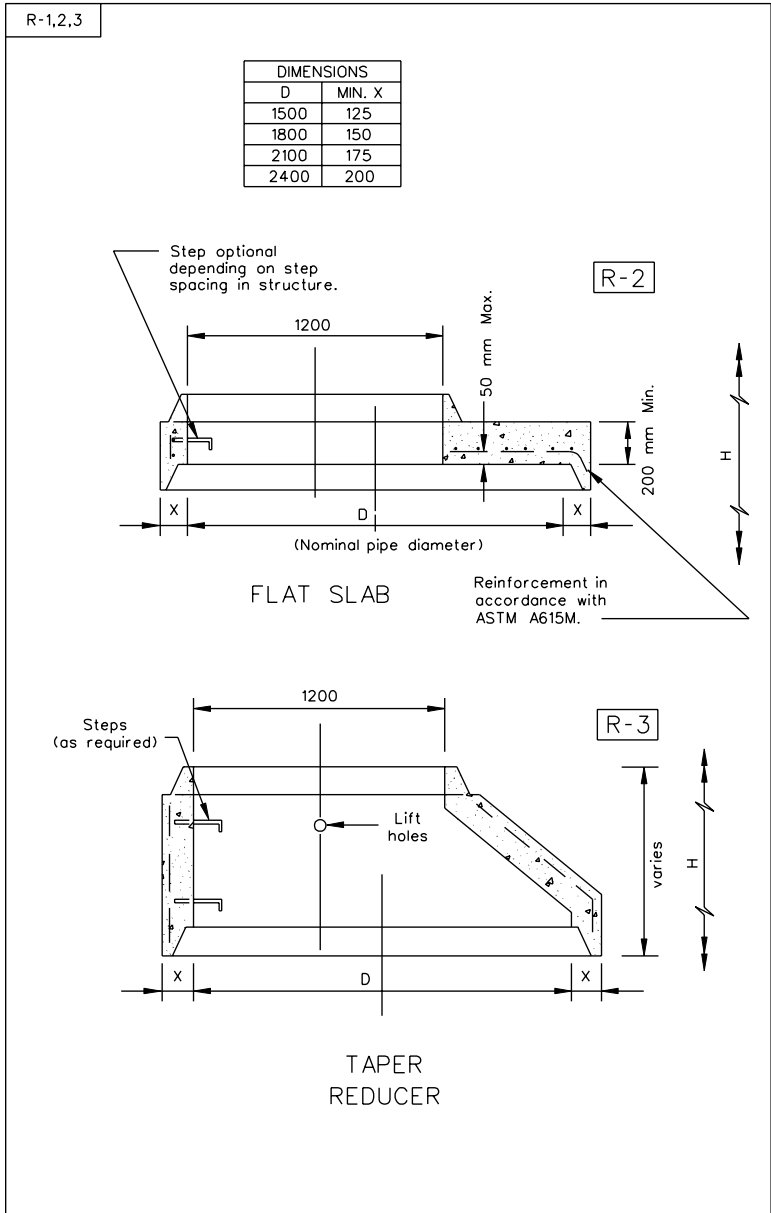
STANDARD PRECAST MANHOLE TOP UNITS

VIRGINIA DEPARTMENT OF TRANSPORTATION

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

103.08

REVISED ON 8/97



Notes:

See General Notes for additional information on weep holes, step requirements, "H" dimension, etc.

All reducer and riser units are to be in accordance with the requirements of AASHTO M199M.

Concrete to be 30 MPa.

Two 50 mm diameter lift holes to be provided in each riser and taper unit. Holes are to be located above the center of gravity of each unit with centers 180° apart.

Where openings are required for pipe, they shall be formed, drilled or neatly cut as approved by the engineer. The contractor will furnish the fabricator with the angles between center lines, the invert elevations, and the size of all pipes to enter the manhole.

For step details see standard ST-1.

Three lift eyes of manufacturer's design per unit may be substituted for lift holes shown hereon.

Dimensions shown are minimum. Actual dimensions may vary with manufacturer.

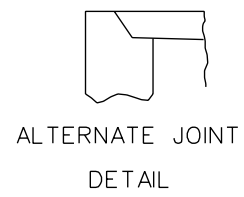
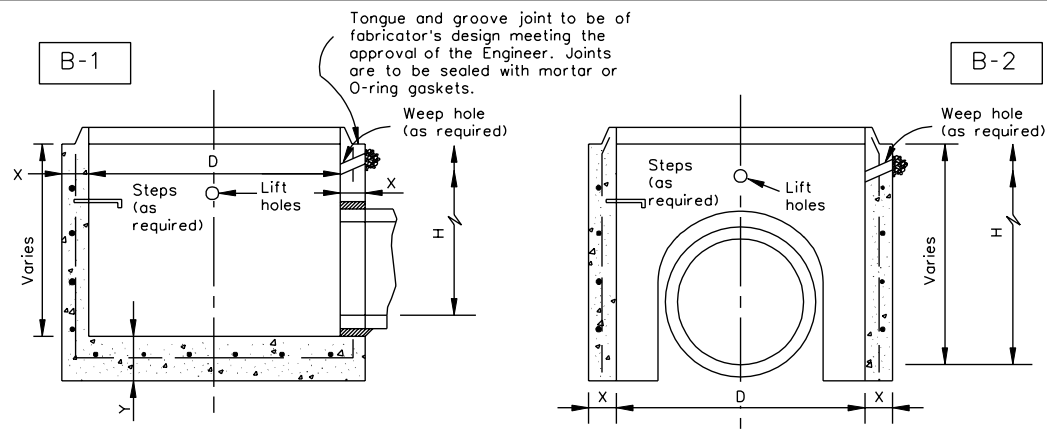
"D" is nominal pipe diameter.

STANDARD PRECAST REDUCER AND RISER UNITS

VIRGINIA DEPARTMENT OF TRANSPORTATION

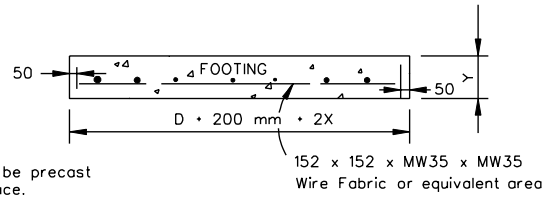
103.09 UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

SPECIFICATION REFERENCE
105 302



MONOLITHIC

D is nominal pipe diameter



Footing may be precast or cast in place.

Three lifting hooks of fabricator's design to be provided in footing.

DOGHOUSE WITH FOOTING

DIMENSIONS				
D	X MINIMUM	Y MINIMUM	SUGGESTED MAX. PIPE SIZE	ABSOLUTE MAXIMUM ☆
* 900	100	150	450	525
1200	125	150	600	675
1500	125	200	900	1050
1800	150	200	1200	1350
2100	175	200	1500	1650
2400	200	200	1650	1800

* Depth of 900 mm diameter base unit restricted to 1220 mm maximum.

☆ One pipe only

See General Notes for additional information on weep holes, step requirements, "H" dimension, etc.

All base units are to be in accordance with the requirements of AASHTO M199M

Concrete to be 30 MPa.

Two 50 mm diameter lift holes to be provided in each base unit. Holes are to be located above the center of gravity of each unit with centers 180° apart.

Where openings are required for pipe, they shall be formed, drilled or neatly cut as approved by the Engineer. The contractor will furnish the fabricator with the angles between center lines, the invert elevations, and the size of all pipes to enter the manhole. Holes are to be a minimum of 100 mm to a maximum of 200 mm larger than the outside diameter of the proposed pipe.

Three lift eyes of manufacturer's design per unit may be substituted for lift holes shown hereon.

In the event the invert of the outfall pipe is higher than the bottom of the structure, the invert of the structure shall be shaped with cement mortar to prevent standing or ponding of water in the structure.

Dimensions shown are minimum. Actual dimensions may vary with manufacturer.

SPECIFICATION REFERENCE
105 302

STANDARD PRECAST BASE UNITS

VIRGINIA DEPARTMENT OF TRANSPORTATION

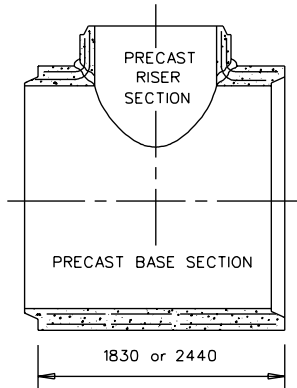
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

REVISED ON 8/97

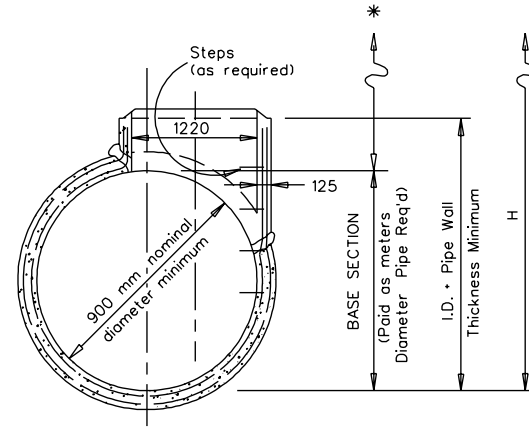
B-3

Weld and splice longitudinal and circumferential steel of riser and base sections to maintain continuity of reinforcement.

Hand or pneumatically place mortar and shape into collar.



LONGITUDINAL SECTION



TRANSVERSE SECTION

* RISER SECTION

(Paid as Standard Drop Inlet or Meters Manhole depending on use of structure)

Notes:

See General Notes for additional information on Weep holes, step requirements, "H" dimension, etc.

The Tee Unit is to be precast for delivery to the construction site as a complete unit. Alternate designs meeting the approval of the Engineer may be substituted for that shown herein.

The precast base section is to conform to the requirements of AASHTO M170M.

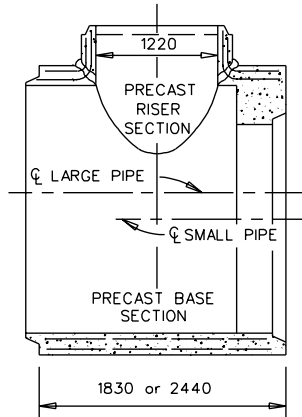
The precast riser section is to conform to the requirements of AASHTO M199M, except that minimum wall thickness is to be 125 mm.

The Base Section is to be the same class and strength as the adjoining pipe culvert and the tongue and groove joints are to be of an identical design.

Concentric riser section may be substituted when approved by the Engineer.

Other manufacturer's designs for Reducer Sections may be substituted when approved by the Engineer.

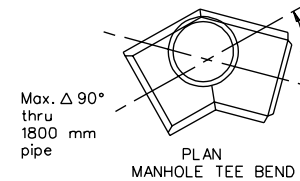
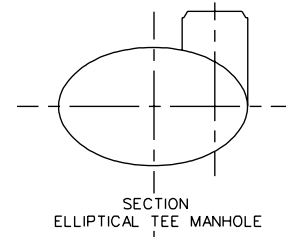
Reducer Sections with pipe crowns or center lines matched are available in addition to the matched inverts shown herein.



REDUCER SECTION

TEE SECTION

OPTIONAL VARIATIONS AVAILABLE WHEN SPECIFIED AS A MODIFIED B-3



Sheet 2 of 2

STANDARD PRECAST BASE UNITS

VIRGINIA DEPARTMENT OF TRANSPORTATION

103.11

UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS

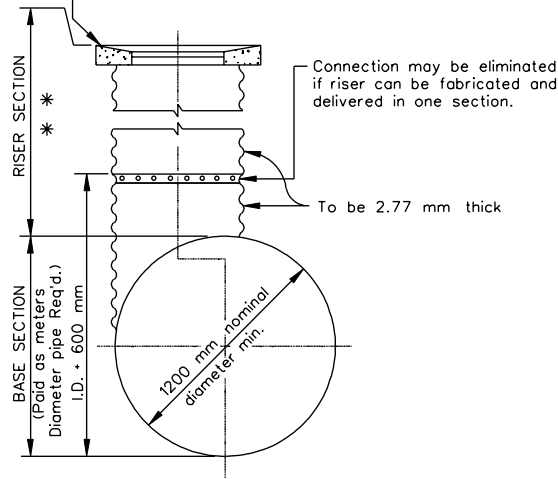
SPECIFICATION REFERENCE

105
302

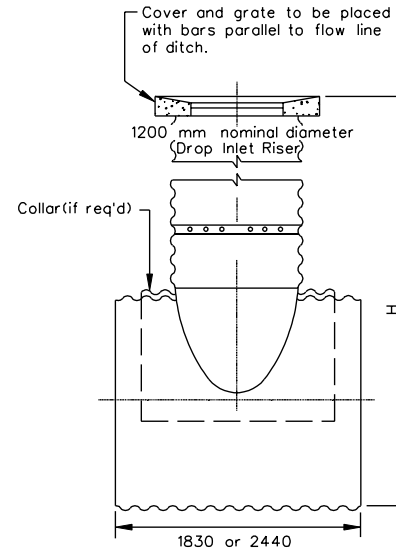
* Other Standard grates or drop inlet throat sections may be substituted when specified on the plans.

* See standard Drawing DI-5,DI-7,7A,7B for details of cover, grate, gutter(s).

* * RISER SECTION (Paid as Standard Drop inlet or meters of Manhole depending on use of structure.)



TRANSVERSE SECTION



LONGITUDINAL SECTION

Notes:

The Tee Unit to be fabricated for delivery to the construction site as a complete unit. Actual design details and methods of construction will be at the option of the fabricator and meeting the approval of the Engineer, except the sheet thickness, corrugation, and Specifications to be met will be the same as those required for the adjoining pipe culvert. If asphalt coating is specified for the culvert, the Tee Unit shall also be coated.

When required, connection between drop inlet Riser and Tee Unit may be bolted or riveted.

SPECIFICATION REFERENCE	CORRUGATED METAL TEE SECTION		UNLESS OTHERWISE NOTED, ALL DIMENSIONS ON THIS SHEET ARE IN MILLIMETERS	103.12
233 302	VIRGINIA DEPARTMENT OF TRANSPORTATION			