



Bonneagar Iompair Éireann
Transport Infrastructure Ireland

TII Publications



Standard Construction Details - Series 500

April 2017

Standard Construction Details (SCDs) – Series 500

TII Publications contains Standard Construction Details (SCDs) for use on National Road schemes in Ireland. This composite document brings together all the Series 500 SCDs from TII Publications current at the date of this document's publication, into a single location for convenience.

Every effort has been made to keep this composite document updated and available from the TII Publications website (<http://www.tiipublications.ie/>). Please note that the SCD drawings available from the TII Publications website (individually linked below) are the controlled versions for all SCDs.

The SCDs contained in this document are as follows:

Series 500 Drainage and Service Ducts

CC-SCD-00501	Drainage - Chamber Types
CC-SCD-00502	Drainage - Chamber Type A (Block or In Situ Concrete Manhole)
CC-SCD-00503	Drainage - Chamber Type B (Block or In Situ Concrete Manhole)
CC-SCD-00504	Drainage - Chamber Type C (Precast Concrete Manhole)
CC-SCD-00505	Drainage - Chamber Type D (Precast Concrete Manhole)
CC-SCD-00506	Drainage - Chamber Type E (Precast Concrete Manhole)
CC-SCD-00507	Drainage - Chamber Type E Typical Hinged Grating Details
CC-SCD-00508	Drainage - Vertical Backdrop in Manholes
CC-SCD-00509	Drainage - Chamber Type F (Precast Catchpit)
CC-SCD-00510	Drainage - Precast Concrete Gully
CC-SCD-00511	Drainage - In Situ Concrete and Blockwork Gullies
CC-SCD-00512	Drainage - Gully Grating
CC-SCD-00513	Drainage - Chamber Fittings - Ladder, Typical Arrangement Handhold and Safety Chain
CC-SCD-00514	Drainage - Typical Chamber Details
CC-SCD-00520	Drainage - Filter Drains Trench and Bedding Details

TRANSPORT INFRASTRUCTURE IRELAND (TII) PUBLICATIONS

CC-SCD-00521	Drainage - Surface Water Drains - Trench and Bedding Details
CC-SCD-00522	Edge of Pavement Details - Cross Section of Concrete Surface Water Channel
CC-SCD-00523	Drainage - Drainage Channel Blocks Types A, B and C
CC-SCD-00524	Drainage - Drainage Channel Blocks Types D, E and F
CC-SCD-00525	Drainage - Typical Swale Detail
CC-SCD-00526	Drainage - In-Line Outlet to Triangular Surface Water Channel
CC-SCD-00527	Drainage - In-Line Outlet to Trapezoidal Surface Water Channel
CC-SCD-00528	Drainage - Weir Outlet to Surface Water Channel
CC-SCD-00529	Drainage - Slope Drainage Herringbone Filter Drains
CC-SCD-00540	Drainage - Edge of Pavement Drains - Fin Drains and Narrow Filter Drains
CC-SCD-00541	Drainage - Edge of Pavement Drains - Installation of Fin Drains
CC-SCD-00542	Drainage - Edge of Pavement Drains - Installation of Narrow Filter Drains
CC-SCD-00543	Drainage - Edge of Pavement Drains - Under Channel Drainage Layers
CC-SCD-00550	Drainage - Rock Armour: Scour Protection
CC-SCD-00551	Drainage - Self Clearing Inlet Grid Detail
CC-SCD-00552	Drainage - Outlet Grid Detail
CC-SCD-00553	Drainage - G.A. of Formed Headwalls 150 - 1800 Diameter Pipes
CC-SCD-00560	Ducts - Transverse Ducts
CC-SCD-00561	Ducts - Trench Cross Sections Under Trafficked Areas
CC-SCD-00562	Ducts - Trench Cross Sections Under Non-Trafficked Areas
CC-SCD-00563	Ducts - Duct Crossing Types

TRANSPORT INFRASTRUCTURE IRELAND (TII) PUBLICATIONS

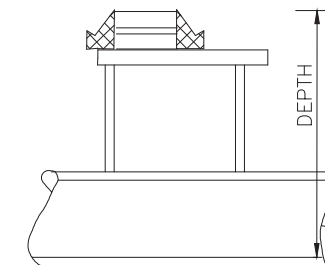
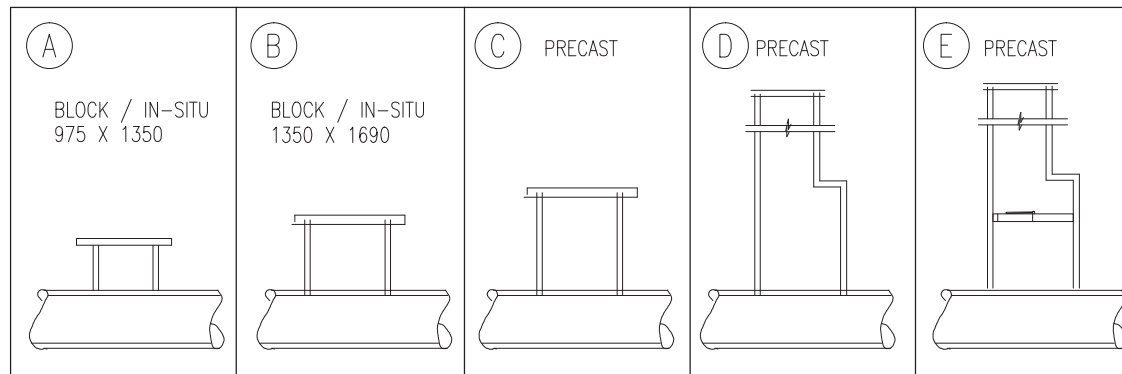
CC-SCD-00564	Ducts - Footway/Verge Draw Pit
CC-SCD-00565	Ducts - Carriageway Draw Pit Type A
CC-SCD-00566	Ducts - Carriageway Draw Pit Type B
CC-SCD-00567	Ducts - Duct Spacer and Strapping for Trenchless Construction

CHAMBER TYPES

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. IN ACCORDANCE WITH IS EN1917 THE MINIMUM DISTANCE BETWEEN THE OUTER SURFACE OF TWO PIPES AT THE CONNECTION TO THE CHAMBER SHALL BE EQUAL TO THE WALL THICKNESS OF THE CHAMBER OR 100mm (WHICHEVER IS SMALLER).
3. A MINIMUM 40% OF THE CHAMBER WALL SHOULD REMAIN IN ANY PLANE.
4. IN LOCATIONS WHERE THE CHAMBER IS COLLECTING SURFACE WATER RUNOFF, TYPE F CHAMBER SHALL BE REQUIRED AS SHOWN ON RCD/500/9.

DEPTH (m)	PIPE DIAMETER								
	225	300	375	450	525	600	675	750	900
0 → 1	A 975x1350	A 975x1350	A 975x1350	A 975x1350	B1350x1690	B1350x1690	B1350x1690	B1350x1690	B1350x1690
1 → 3	C 1050	C 1050	C 1050	C 1050	C 1200	C 1200	C 1350	C 1350	C 1500
3 → 6		D 1050	D 1050	D 1050	D 1200	D 1200	D 1350	D 1500	D 1500
6 → 12		E 1500	E 1500	E 1500	E 1500	E 1500	E 1500	E 1500	E 1500



NOT TO SCALE

TII PUBLICATION NUMBER: CC-SCD-00501

MORTAR BED (10 MIN 25 MAX) AND HAUNCH TO FRAME TO CLAUSE 507.13

300mm WIDE APRON, ST4 CONCRETE

30mm STEP

F.G.L.

SECTION Y-Y

COVER AND FRAME TO IS EN 124
PRECAST LINTEL TO BE USED WHERE PIPE $\phi > 225$

IN-SITU MIX ST4 CONCRETE COVER SLAB WITH A393 MESH REINFORCEMENT TOP & BOTTOM OR PRECAST SLAB WITH CIRCULAR OPENING

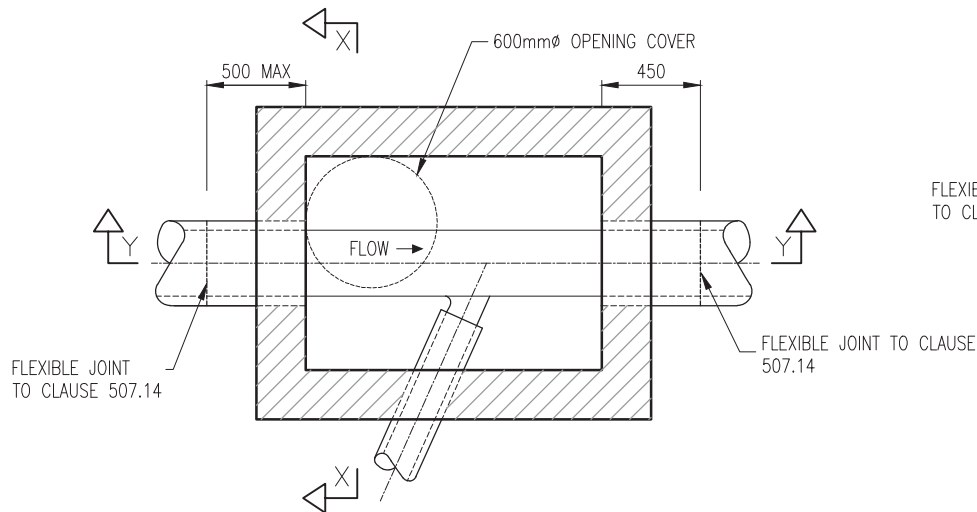
IN-SITU MIX ST2 BENCHING WITH PRECAST CHANNEL AS SHOWN OR IN-SITU FORMED INVERT AS ALTERNATIVE

IN-SITU MIX ST4 CONCRETE BASE WITH A393 MESH REINFORCEMENT TOP & BOTTOM

SECTION X-X

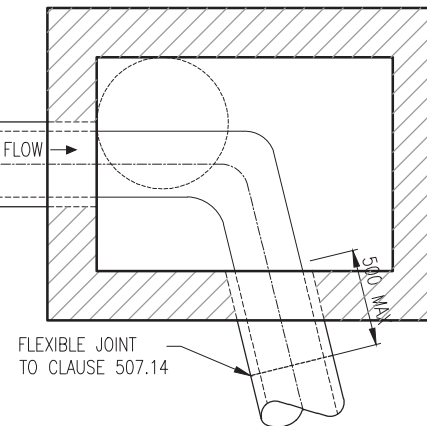
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. MANHOLES TO BE CONSTRUCTED IN 21N CONCRETE BLOCKS TO IS 20 COLOURED BLACK WITH MORTAR TO CLAUSE 507.13 OR IN-SITU MIX ST4 CONCRETE.
3. FOR INVERT DETAILS, NUMBER OF BRANCHES, DETAILS OF PIPES, TYPE OF COVER AND FRAME, SEE APPENDIX 5/1.
4. DIMENSIONS OF CHAMBER VARY ACCORDING TO PIPE SIZE SEE RCD/500/1.
5. MANHOLE COVER ARRANGEMENT IN CARRIAGEWAYS TO BE IN ACCORDANCE WITH RCD/500/14.
6. FLEXIBLE JOINTS TO BE IN ACCORDANCE WITH CLAUSE 507.14 AND RCD/500/14.



PLAN ON STRAIGHT INVERT
SECTION A-A

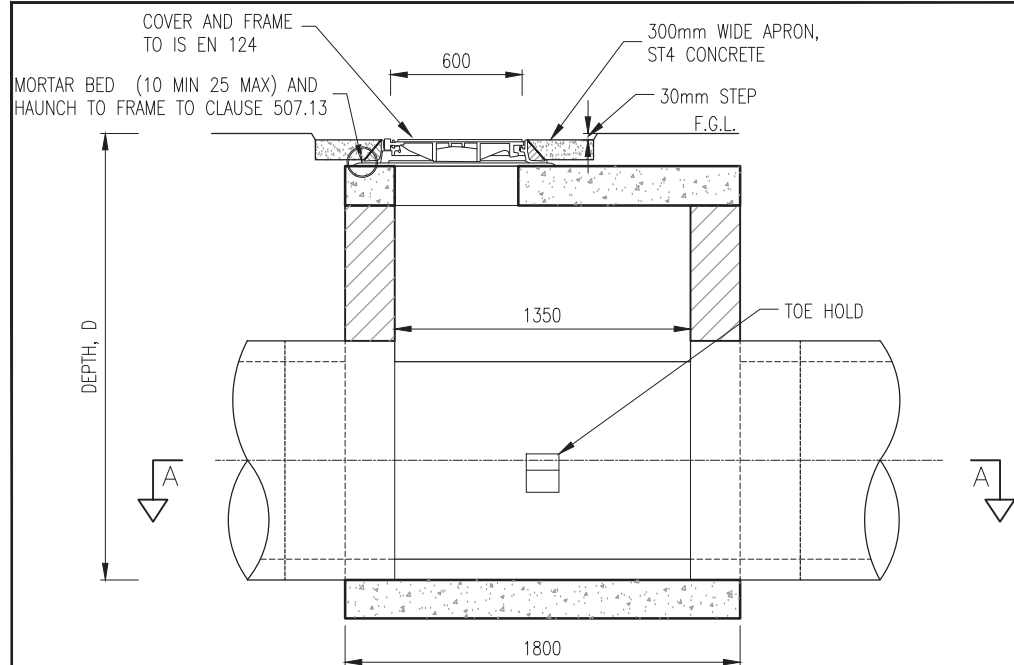
FLEXIBLE JOINT TO CLAUSE 507.14



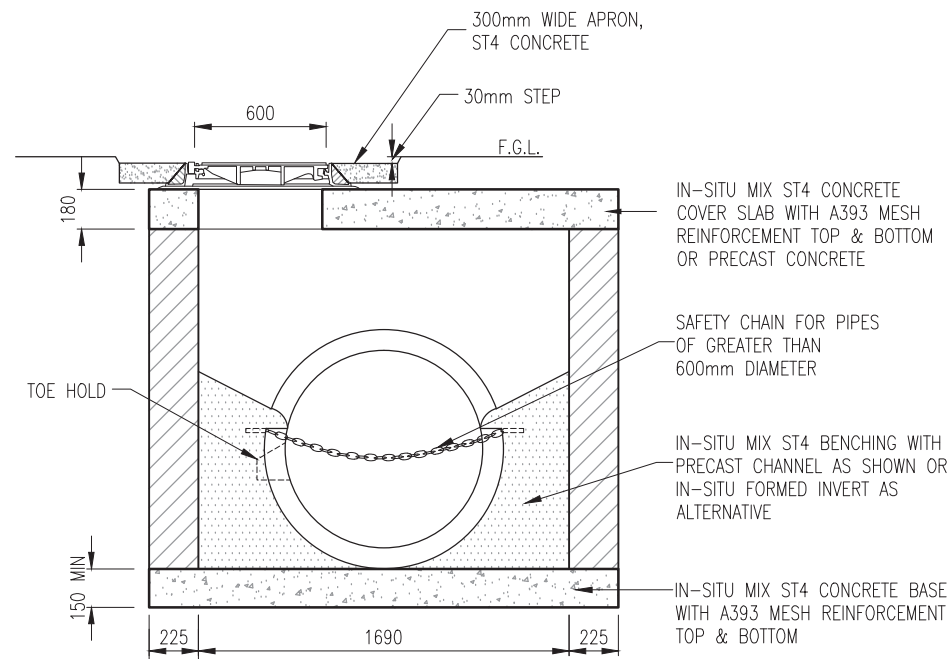
PLAN ON ANGLED INVERT

NOT TO SCALE

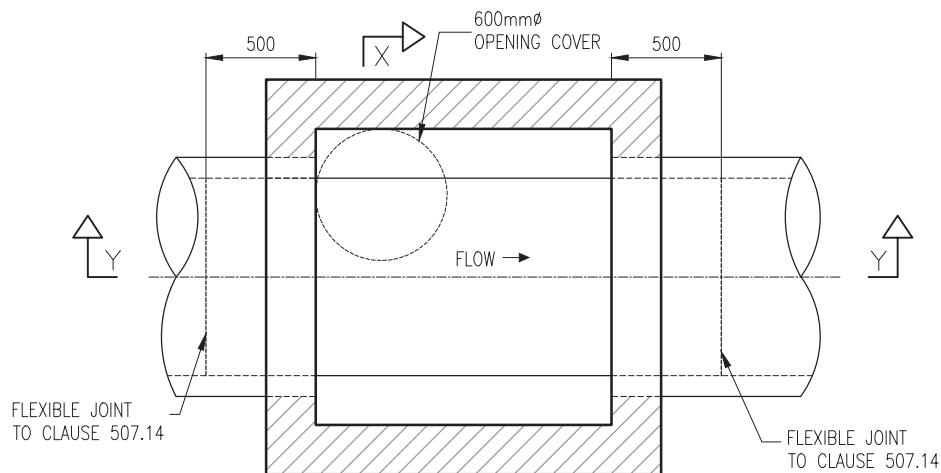
TII PUBLICATION NUMBER: CC-SCD-00502



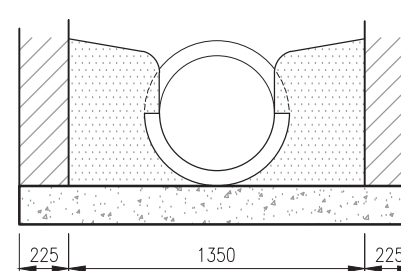
SECTION Y-Y



SECTION X-X



PLAN SECTION A-A

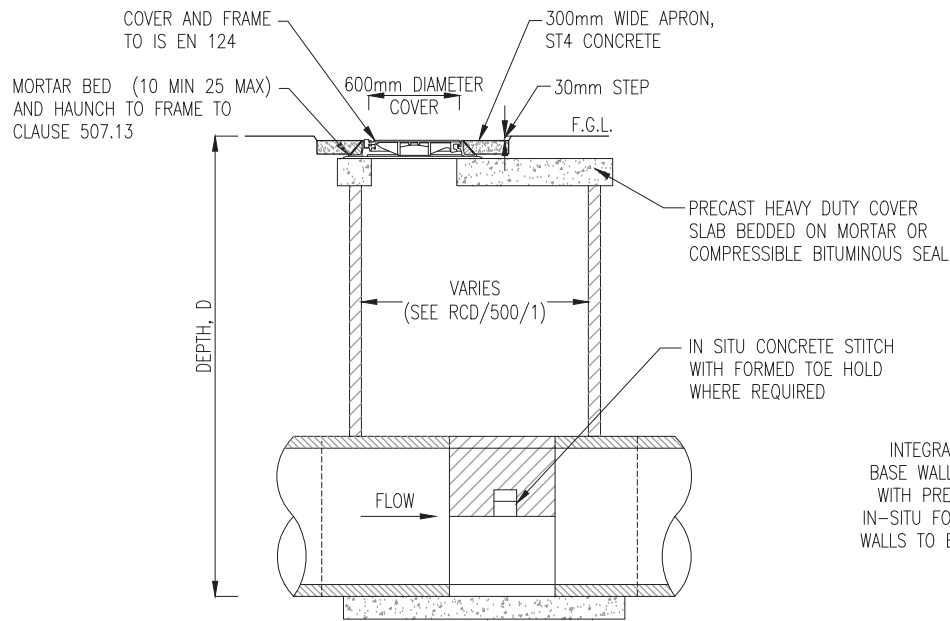


PART SECTION SHOWING BENCHING
(FOR PIPES LESS THAN 600mm DIAMETER)

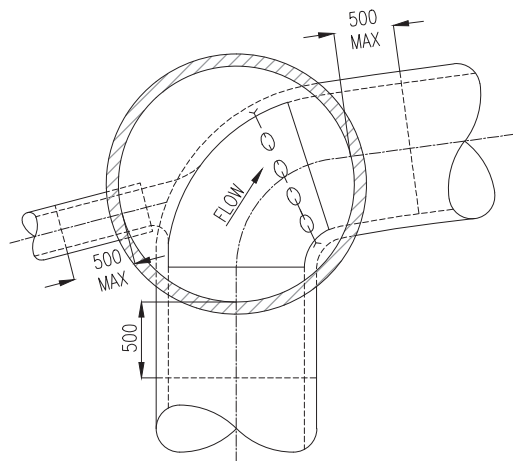
NOTES:

- ALL DIMENSIONS ARE IN MILLIMETRES.
- MANHOLES TO BE CONSTRUCTED IN 21N CONCRETE BLOCKS TO IS 20 COLOURED BLACK WITH MORTAR TO CLAUSE 507.13 OR IN-SITU MIX ST4 CONCRETE.
- FOR INVERT DETAILS, NUMBER OF BRANCHES, DETAILS OF PIPES, TYPE OF COVER AND FRAME, SEE APPENDIX 5/1.
- DIMENSIONS OF CHAMBER VARY ACCORDING TO PIPE SIZE SEE RCD/500/1.
- MANHOLE COVER ARRANGEMENT IN CARRIAGEWAYS TO BE IN ACCORDANCE WITH RCD/500/14.
- FLEXIBLE JOINTS TO BE IN ACCORDANCE WITH CLAUSE 507.14 AND RCD/500/14.

NOT TO SCALE

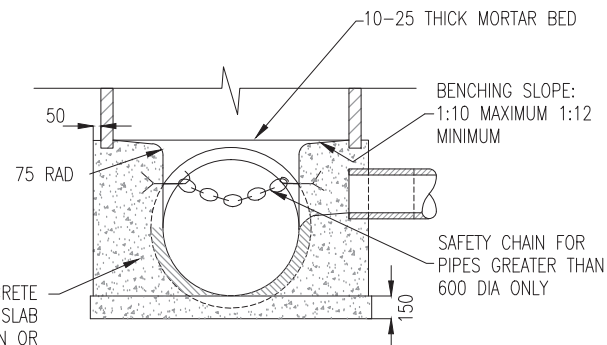


SECTION X-X

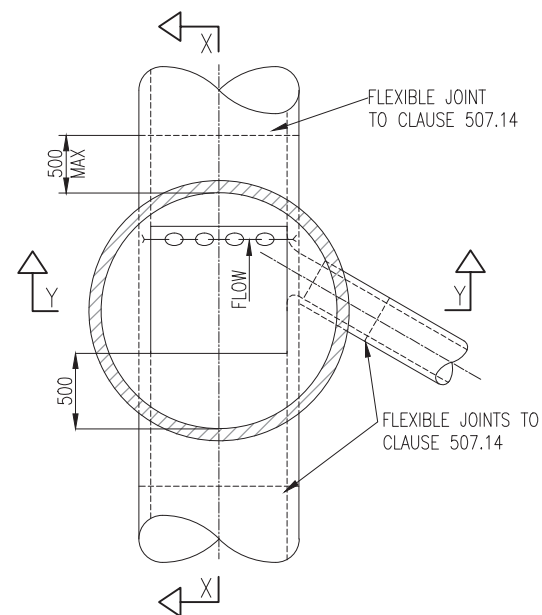


PLAN ON ANGLED INVERT

INTEGRAL IN-SITU MIX ST4 CONCRETE BASE WALLS, BENCHING AND BASE SLAB WITH PRECAST CHANNEL AS SHOWN OR IN-SITU FORMED INVERT AS ALTERNATIVE. WALLS TO EXTEND 50mm BEYOND OUTER FACES OF CHAMBER RING.



SECTION Y-Y

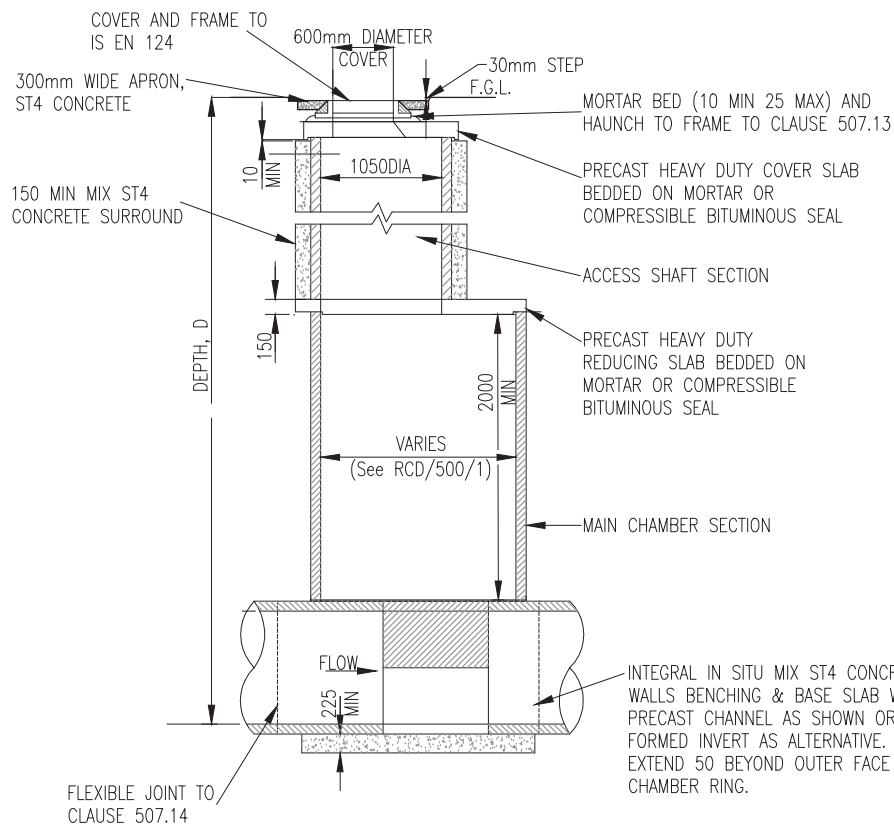


PLAN ON STRAIGHT INVERT

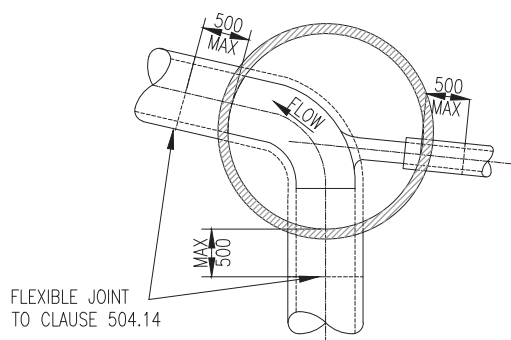
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. CHAMBER WALLS AND COVER SLAB TO BE CONSTRUCTED IN PRECAST CONCRETE TO BS 5911-3 AND IS EN 1917.
3. FOR INVERT DETAILS, NUMBER OF BRANCHES, DETAILS OF PIPES AND TYPE OF COVER AND FRAME SEE APPENDIX 5/1.
4. MORTAR TO BE TO CLAUSE 507.13.
5. SAFETY CHAIN REQUIRED WHERE PIPE IS GREATER THAN 600 DIAMETER. SEE DRAWING No RCD/500/13 FOR DETAILS OF SAFETY CHAIN AND HANDHOLDS.
6. MANHOLE COVER ARRANGEMENT IN CARRIAGEWAYS TO BE IN ACCORDANCE WITH RCD/500/14.
7. FLEXIBLE JOINTS TO BE IN ACCORDANCE WITH CLAUSE 507.14 AND RCD/500/14.

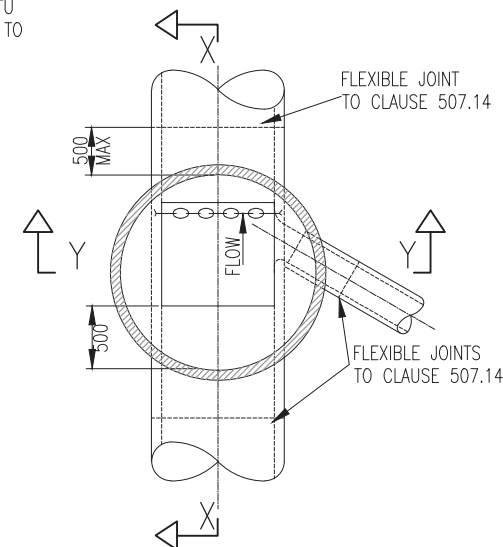
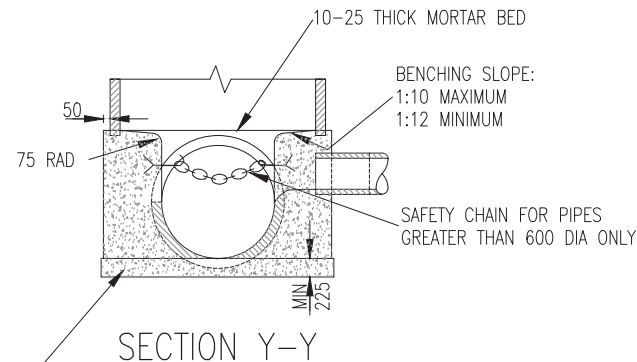
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SECTION X-X



PLAN ON ANGLED INVERT
(BELOW REDUCING SLAB)

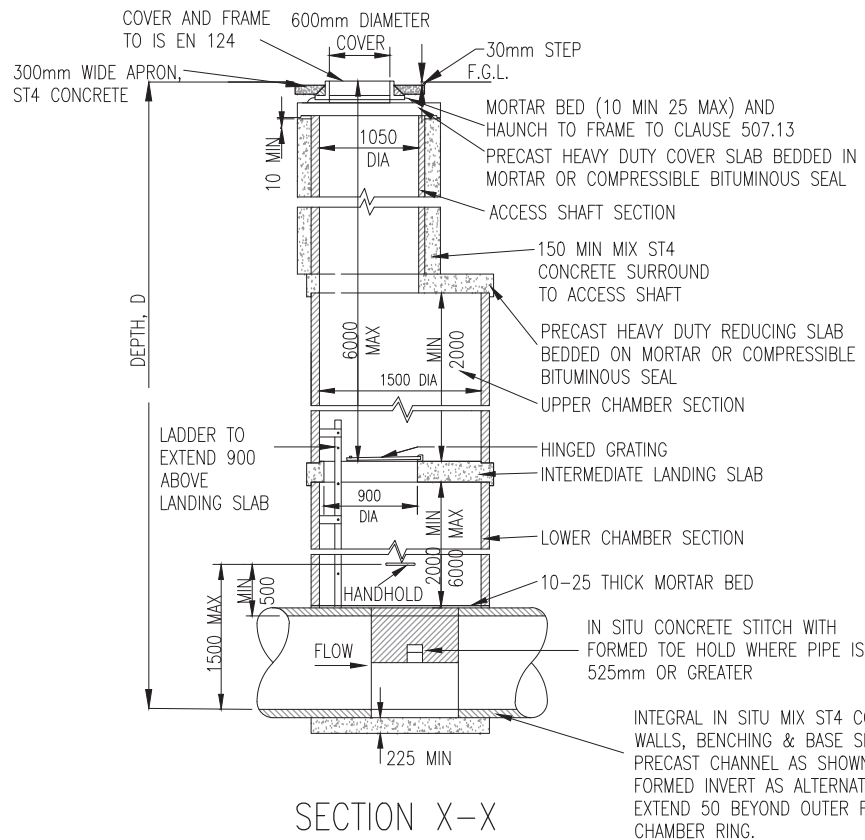


PLAN ON STRAIGHT INVERT
(BELOW REDUCING SLAB)

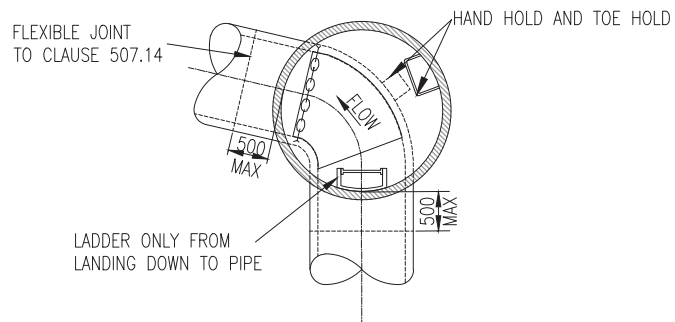
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. CHAMBER WALLS AND COVER SLAB TO BE CONSTRUCTED IN PRECAST CONCRETE TO BS 5911-3 AND IS EN 1917.
3. FOR INVERT DETAILS, NUMBER OF BRANCHES, DETAILS OF PIPES AND TYPE OF COVER AND FRAME SEE APPENDIX 5/1.
4. MORTAR TO BE TO CLAUSE 507.13
5. SAFETY CHAIN REQUIRED WHERE PIPE IS GREATER THAN 600mm DIAMETER. SEE DRAWING No RCD/500/13 FOR DETAILS OF SAFETY CHAIN AND HANDHOLDS.
6. MANHOLE COVER ARRANGEMENT IN CARRIAGEWAYS TO BE IN ACCORDANCE WITH RCD/500/14.
7. FLEXIBLE JOINTS TO BE IN ACCORDANCE WITH CLAUSE 507.14 AND RCD/500/14.

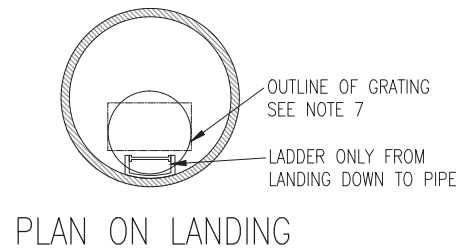
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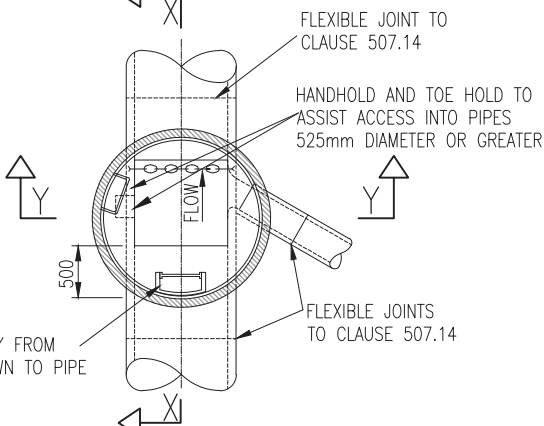
SECTION X-X



PLAN ON ANGLED INVERT
(UNDER LANDING SLAB)



SECTION Y-Y

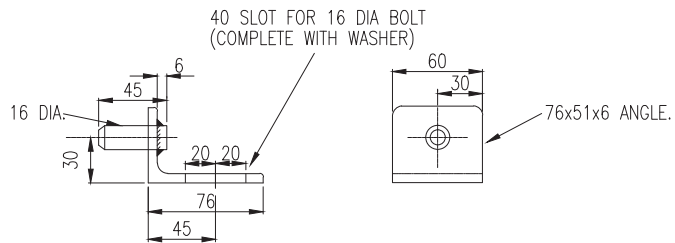


PLAN ON STRAIGHT INVERT
(UNDER LANDING SLAB)

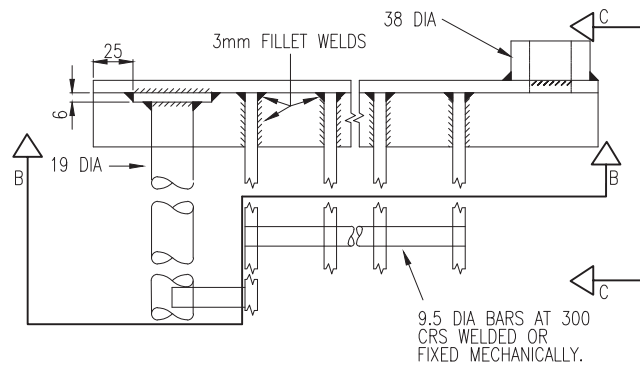
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. CHAMBER WALLS, COVER SLAB AND LANDING SLAB TO BE CONSTRUCTED IN PRECAST CONCRETE TO BS 5911-3 AND IS EN 1917.
3. FOR INVERT DETAILS, NUMBERS OF BRANCHES, DETAILS OF PIPES AND TYPE OF COVER AND FRAME SEE APPENDIX 5/1.
4. MORTAR TO BE TO CLAUSE 507.13.
5. SAFETY CHAIN REQUIRED WHERE PIPE IS GREATER THAN 600 DIAMETER. FOR DETAILS OF SAFETY CHAIN, HANDHOLD AND LADDER SEE DRAWING No RCD/500/13.
6. FOR DETAILS OF HINGED GRATING SEE DRAWING No RCD/500/7.
7. TOE HOLD REQUIRED WHERE PIPE IS 525 DIAMETER OR GREATER SEE DRAWING No RCD/500/13.
8. MANHOLE COVER ARRANGEMENT IN CARRIAGEWAYS TO BE IN ACCORDANCE WITH RCD/500/14.
9. FLEXIBLE JOINTS TO BE IN ACCORDANCE WITH CLAUSE 507.14 AND RCD/500/14.

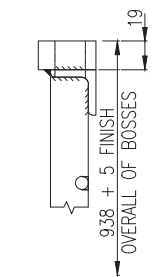
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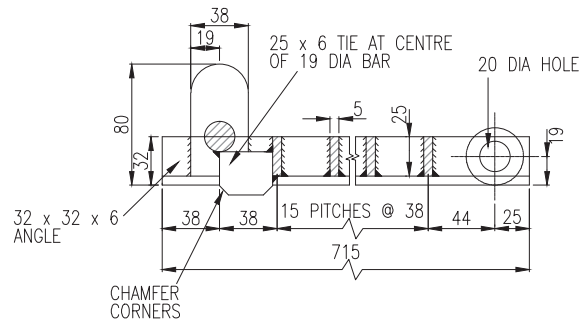
DETAILS OF SWIVEL PIN BRACKET
(SECURED TO PLATFORM WITH 16 DIA BOLT)



PART PLAN

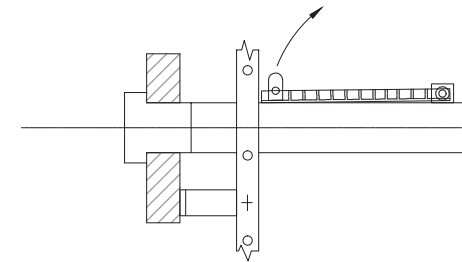


VIEW C-C



SECTION B-B

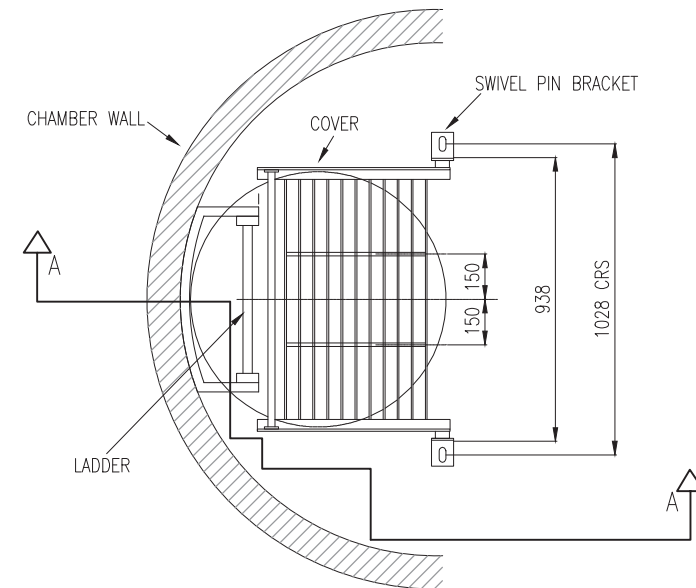
NOT TO SCALE



SECTION A-A

NOTES:

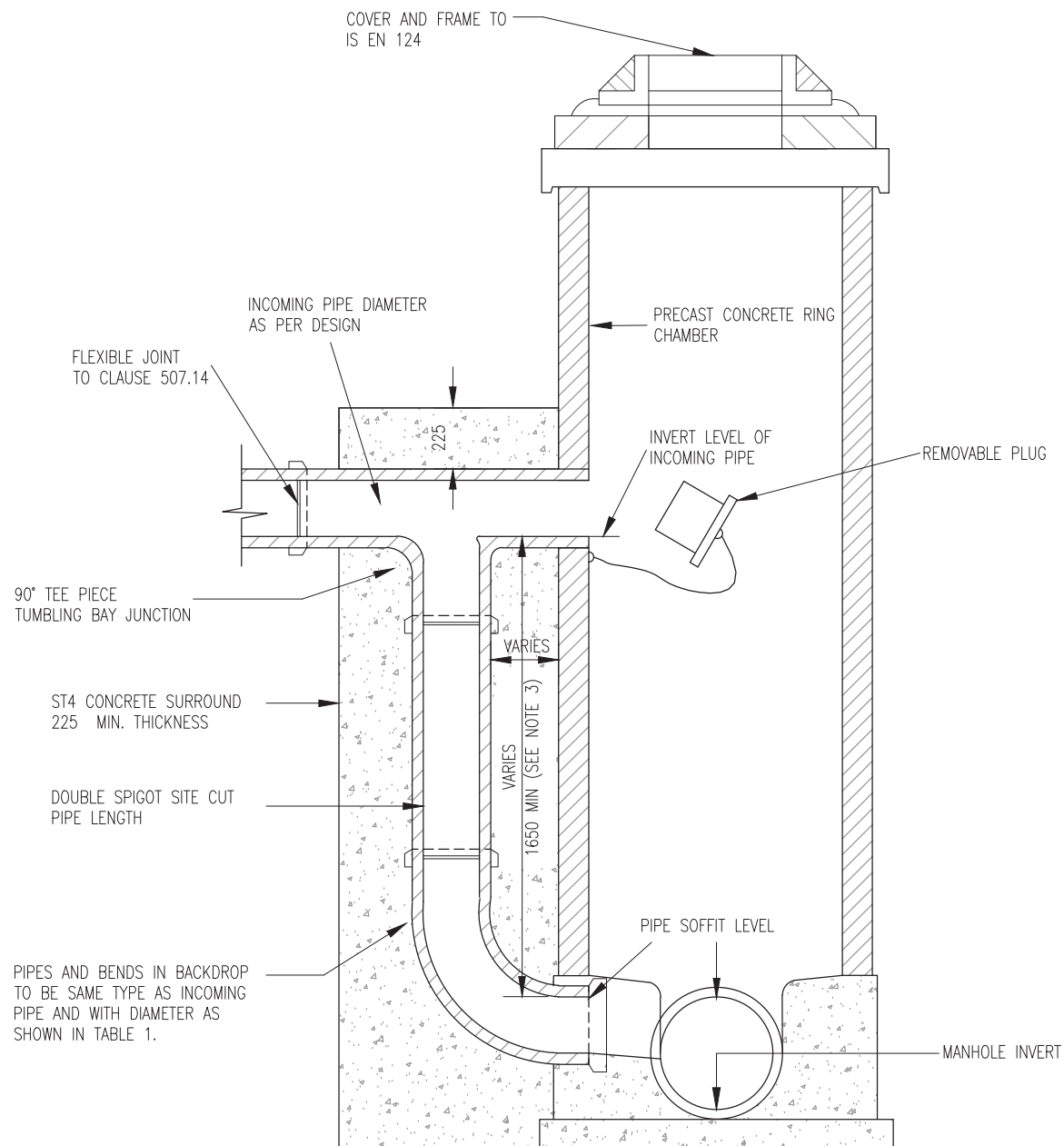
1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. ALL WELDS ARE TO BE 6mm FILLET WELDS EXCEPT WHERE STATED OTHERWISE.
3. THE GRATINGS AND BRACKETS ARE TO BE FABRICATED FROM STEEL TO IS EN 10084 AND TO BE PROTECTED BY HOT DIP GALVANISING.



ASSEMBLY PLAN

(PLAN DETAIL ON GRATING
POSITIONED ON LANDING SLAB.)

TII PUBLICATION NUMBER: CC-SCD-00507



NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. MANHOLE TO DRAWING No RCD/500/5 AND RCD/500/6 ACCORDING TO MANHOLE DEPTH.
3. BACKDROP MANHOLE REQUIREMENTS SHALL BE AS DESCRIBED IN APPENDIX 5/1.

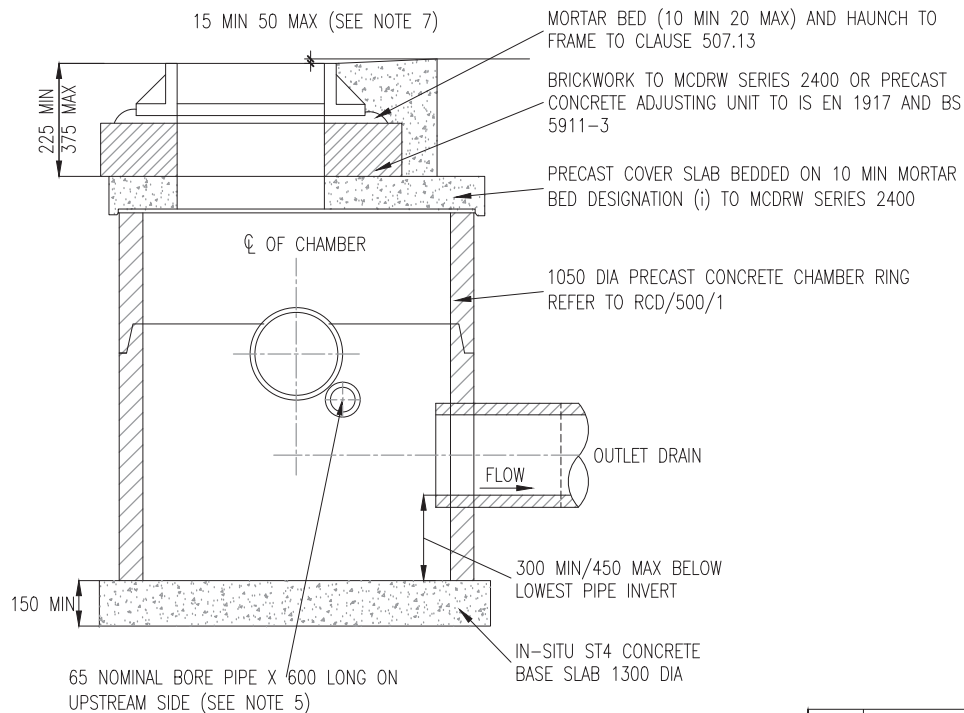
INCOMING PIPE DIA mm	BACK DROP PIPE DIA mm
150	150
225	225
300 – 450	300
525 – 675	450
750 – 900	600
1050 – 1200	750

TABLE 1

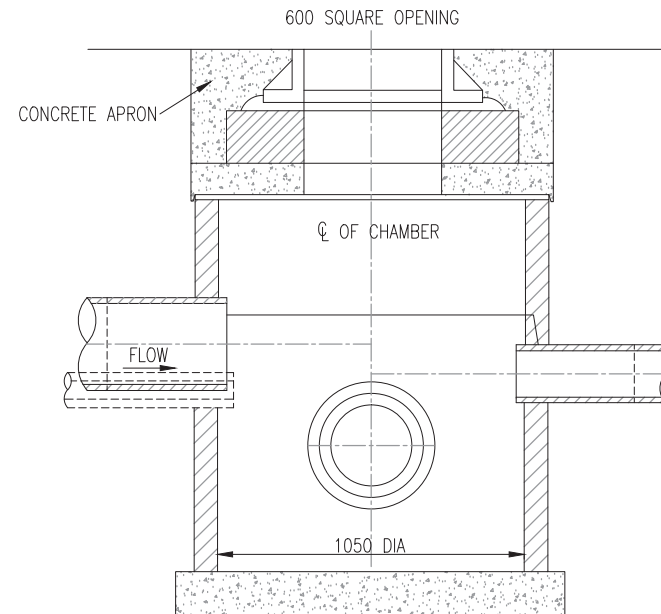
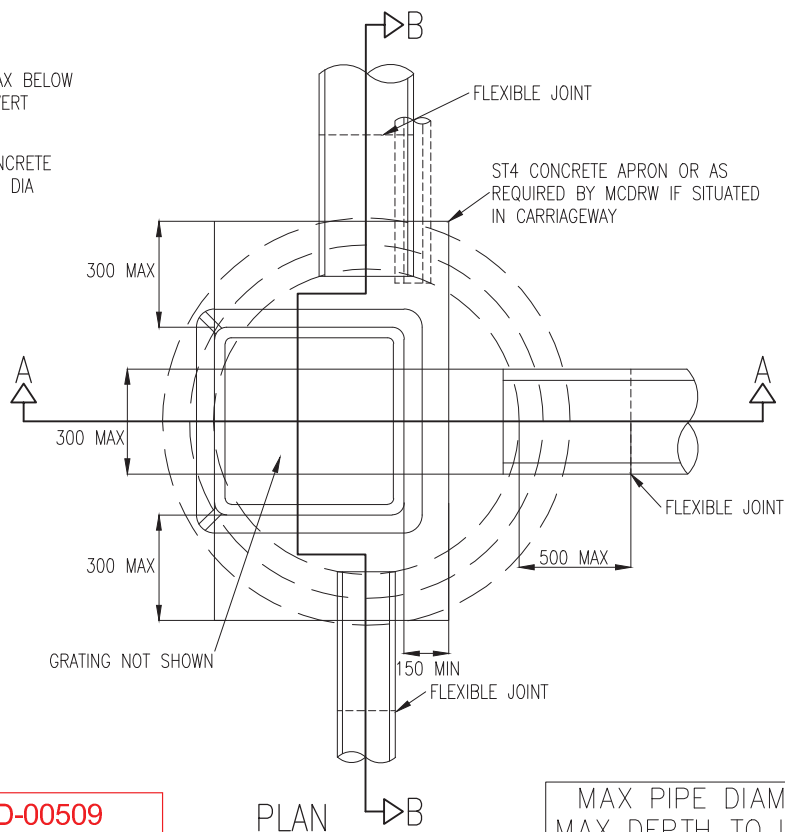
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SECTION THROUGH MANHOLE

TII PUBLICATION NUMBER: CC-SCD-00508



SECTION A-A



SECTION B-B

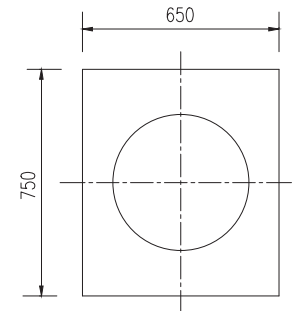
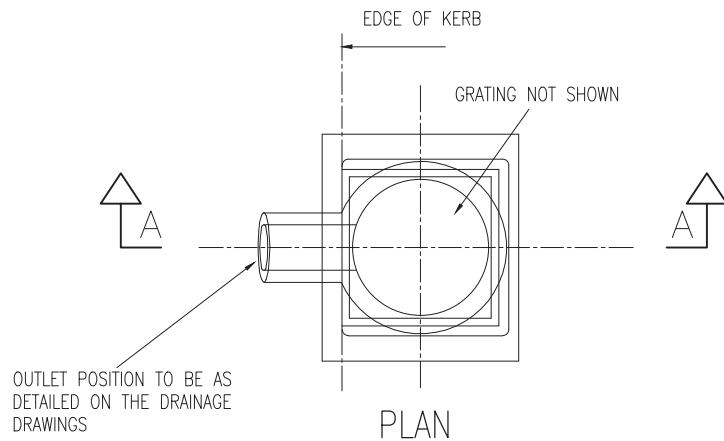
NOTES:

- ALL DIMENSIONS ARE IN MILLIMETRES.
- CATCHPIT TO BE CONSTRUCTED IN PRECAST CONCRETE TO IS EN 1917 AND BS 5911-3.
- INVERT DETAILS, NUMBER OF BRANCHES AND TYPE OF GULLY TOP ARE SHOWN ON THE DRAWINGS AND APPENDIX 5/1.
- MORTAR TO BE TO CLAUSE 507.13.
- PIPES TO BE BUILT INTO THE CATCHPIT WITH MORTAR ARE SHOWN ON THE DRAWINGS AND APPENDIX 5/1.
- PIPE TO BE BUILT INTO CATCHPIT DRAIN LOWER PORTION OF TRENCH. PIPE IS TO BE PLACED ABOVE ANY CONCRETE BED TO FILTER DRAIN.
- THE GULLY TOP IS TO BE SET AS DIMENSIONED BELOW THE ADJACENT:
 - HARD SHOULDER (FOR VERGES)
 - HARD STRIP (FOR DUAL 2 CENTRAL RESERVE)
 - FINISHED LEVEL IN OTHER LOCATIONS.
- SEE MCDRW, SUB-CLAUSE 507.6 REGARDING BACKFILLING/SURROUND TO CHAMBER.
- ALL ST CONCRETE SHALL BE TO MCDRW CLAUSE 2602.
- ALTERNATIVE BLOCKWORK CATCHPIT SHALL HAVE 900X700 INTERNAL DIMENSIONS WITH A MIN 225 WALL THICKNESS AND TO BE CONSTRUCTED IN 21N CONCRETE BLOCKS TO I.S. 20, COLOURED BLACK, WITH DESIGNATION 1 MORTAR AND TO SERIES 2400 OR IN-SITU MIX. ST4 CONCRETE OR PRECAST CONCRETE TO IS EN 1917 & BS 5911-3.

NOT TO SCALE

TII PUBLICATION NUMBER: CC-SCD-00509

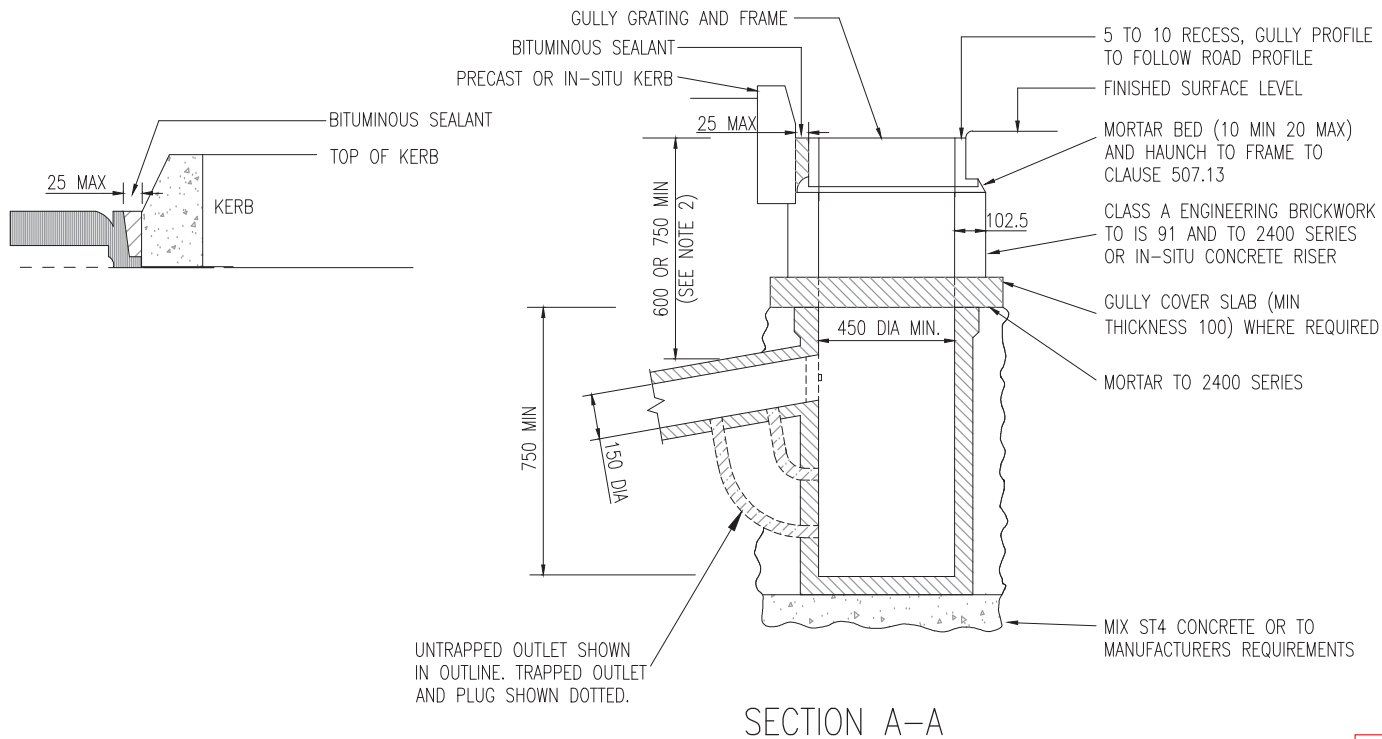
MAX PIPE DIAMETER 450
MAX DEPTH TO INVERT 1.8m



GULLY COVER SLAB

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. THE MINIMUM DEPTH FROM THE TOP OF THE GULLY OUTLET TO THE TOP OF THE CONNECTING PIPE IS UNDER A CARRIAGEWAY OR A HARD SHOULDER AND 600 ELSEWHERE.
3. PRECAST CONCRETE GULLIES AND COVER SLABS SHALL BE TO IS EN 1917 OR BS 5911- 6.
4. FOR DETAILS OF TYPICAL GULLY GRATING SEE DRAWING No RCD/500/12.
5. WHERE A GULLY HAS A TRAP THE STOPPERS SHALL COMPLY WITH THE REQUIREMENTS OF BS 5911-4 AND IS EN 1917.
6. FOR DETAILS OF GULLY GRATINGS REFER TO APPENDIX 5/1.
7. SEE RCD/500/11 FOR IN-SITU CONCRETE AND BLOCKWORK GULLIES.



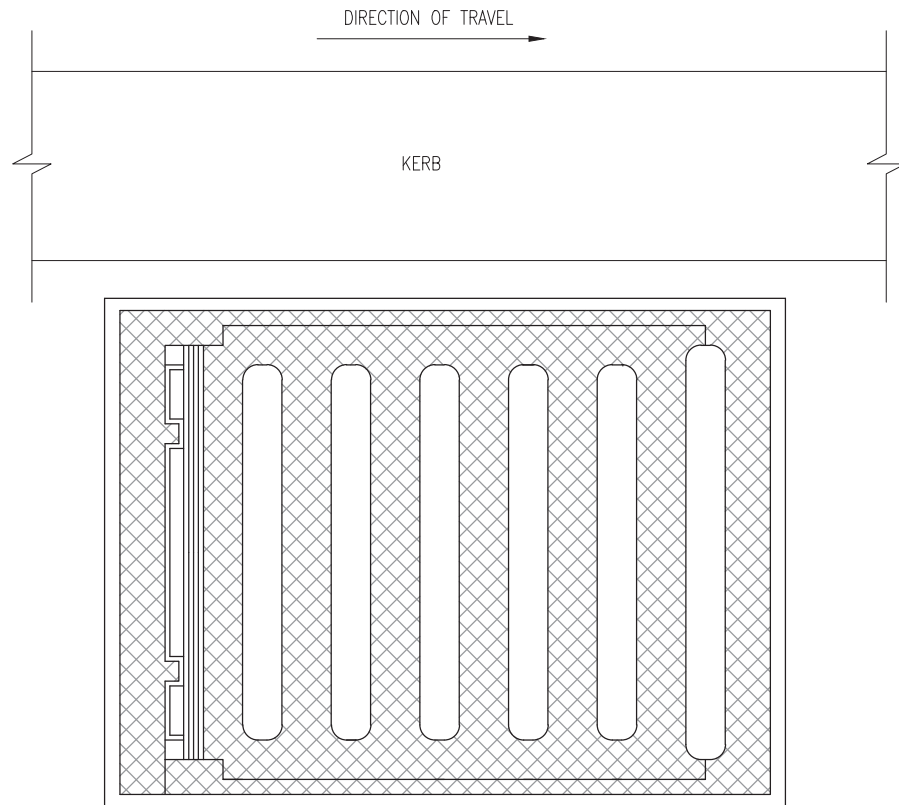
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TII PUBLICATION NUMBER: CC-SCD-00510

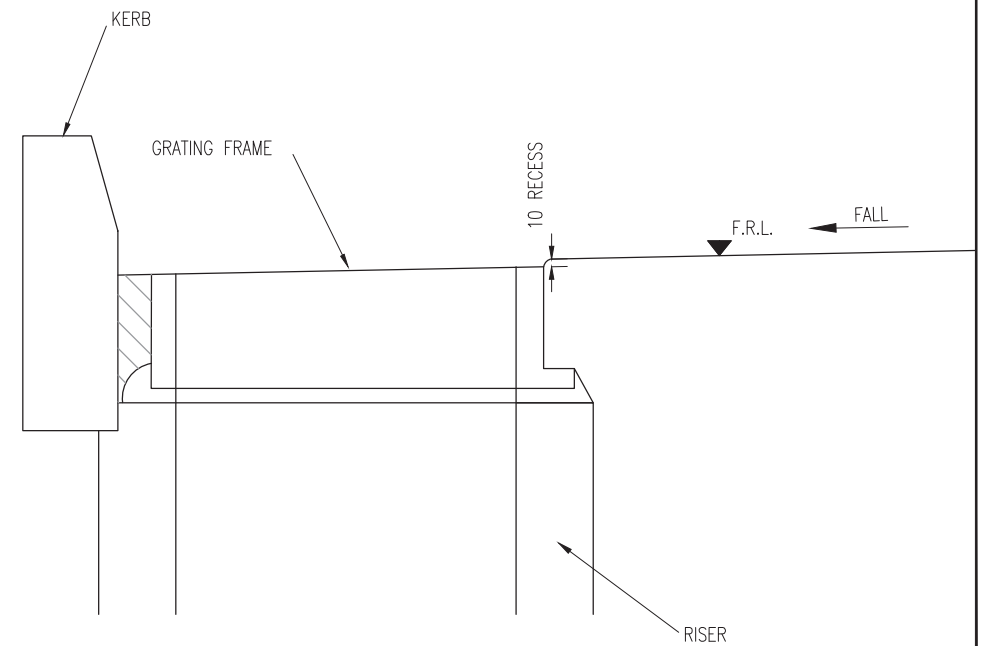


NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. GULLY GRATING TO COMPLY WITH IS EN 124.
3. GULLY GRATING TO BE PROVIDED WITH A LOCKING DEVICE IN ACCORDANCE WITH CLAUSE 508.4.



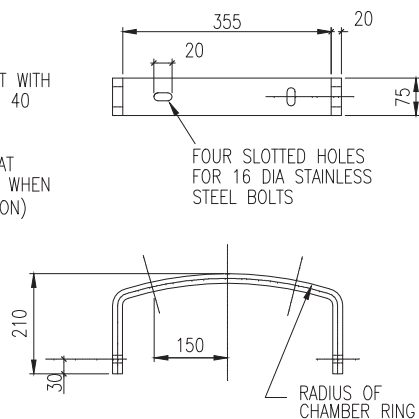
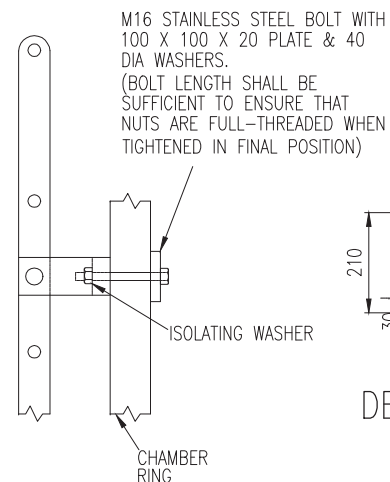
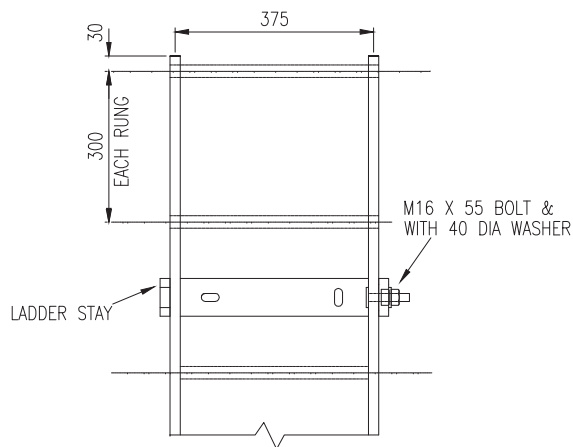
INDICATIVE GULLY GRATING DETAIL



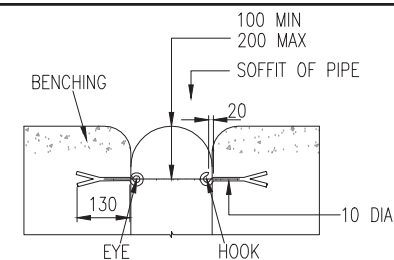
GULLY PROFILE

NOT TO SCALE

TII PUBLICATION NUMBER: CC-SCD-00512

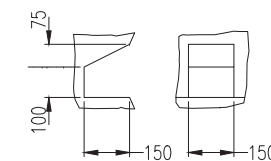


DETAILS OF LADDER STAY

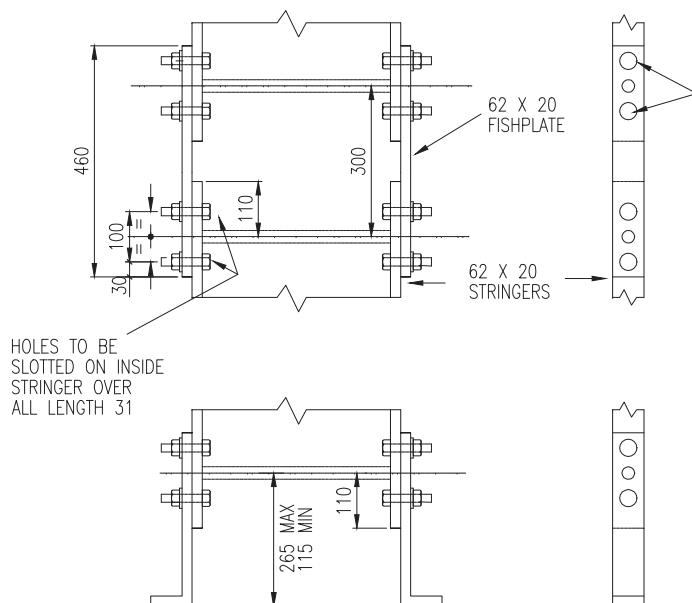


ELEVATION

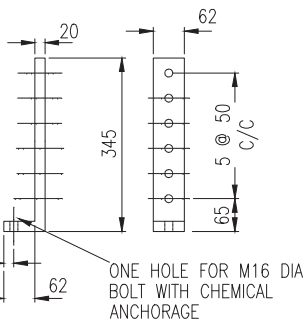
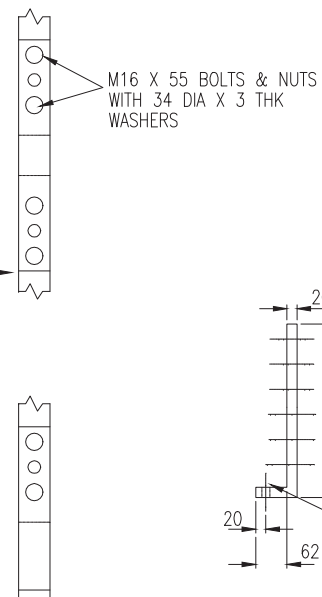
PLAN
DETAILS OF HOOK &
EYE FOR SAFETY CHAIN



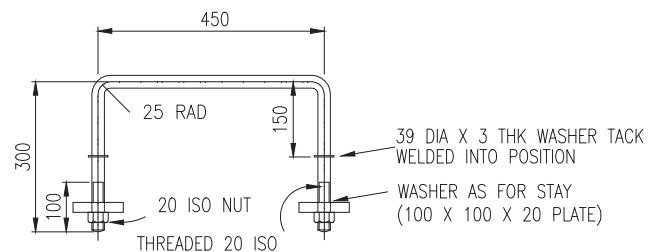
DETAIL OF TOE HOLD



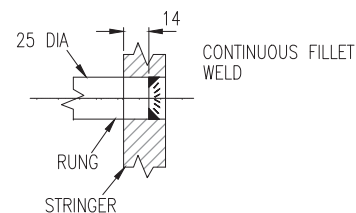
TYPICAL STEEL LADDER



ADJUSTABLE
LADDER FOOT



DETAILS OF HANDHOLD



DETAIL OF FIXING
RUNGS TO STRINGERS

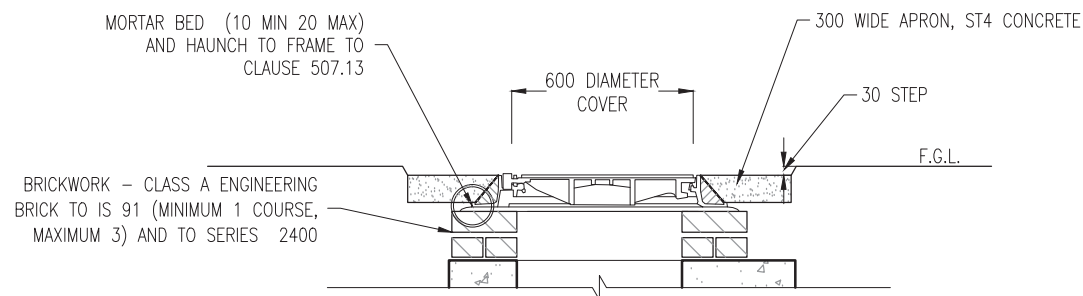
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. LADDERS SHALL BE MANUFACTURED FROM STEEL OR GRP.
3. ALL STEEL FITTINGS TO IS EN 10084 AND TO BE PROTECTED BY HOT DIP GALVANISING.
4. THREADED COMPONENTS TO BE GALVANISED.
5. ALL WELDS ARE TO BE 6mm FILLET WELDS.
6. LADDER MAY BE FABRICATED IN ONE LENGTH OR IN MULTIPLE LENGTHS AND BE JOINTED AS SHOWN.
7. CHAIN HOOK & EYE TO BE SUPPLIED WITH 100 LONG x 10 THK CLOSED LINK CHAIN.
8. HANDHOLD AT HEIGHT 1500 MAX TO INVERT, 500 MIN TO TOP OF BENCHING.
9. STAINLESS STEEL BOLTS, NUTS & WASHERS SHALL BE TO IS EN 10088-1, DESIGNATION 1.4401. ISOLATING WASHERS SHALL BE USED BETWEEN STAINLESS STEEL BOLTS & GALVANISED FITTINGS.

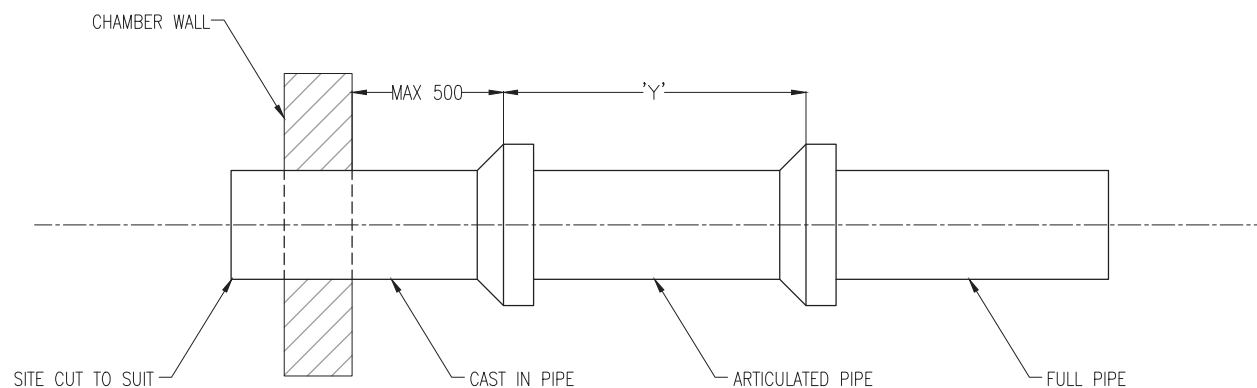
NOT TO SCALE

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. REFER TO MCDRW CLAUSE 507.14 FOR DETAILS OF FLEXIBLE JOINS THROUGH CHAMBER WALLS.



CHAMBER COVER DETAIL IN CARRIAGEWAYS

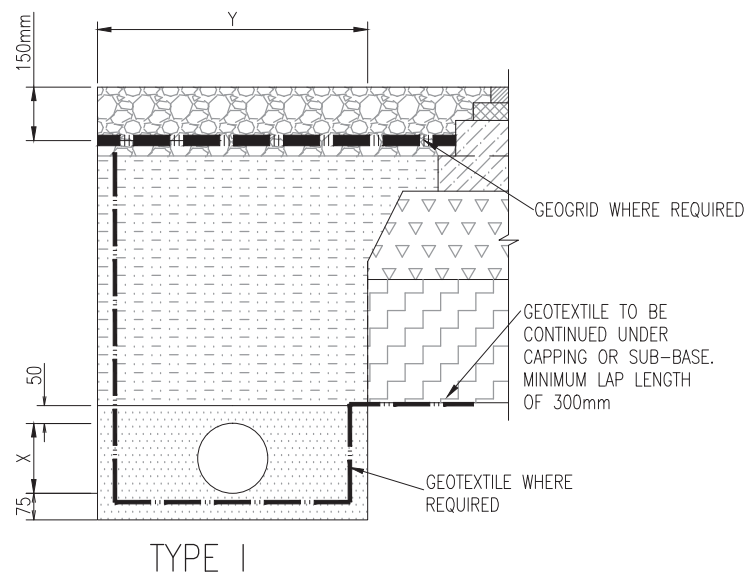
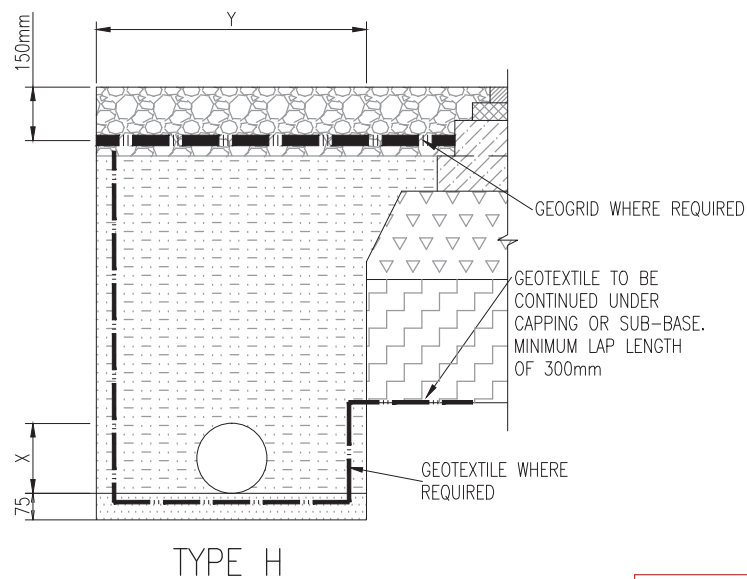
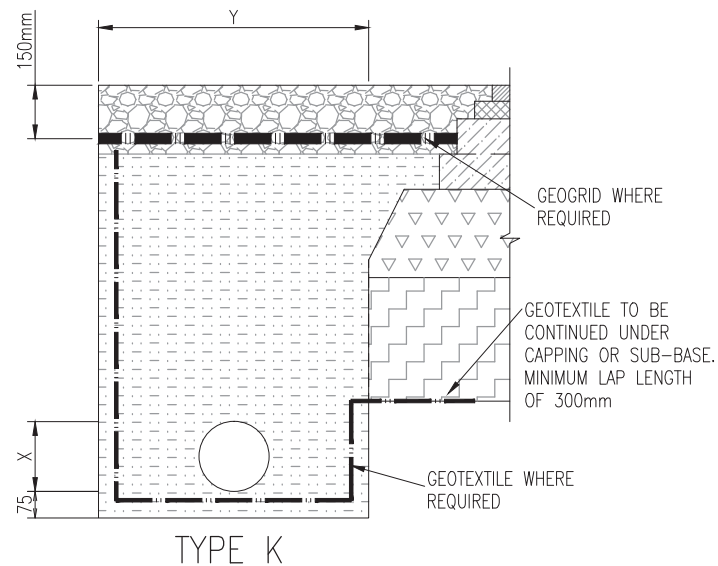
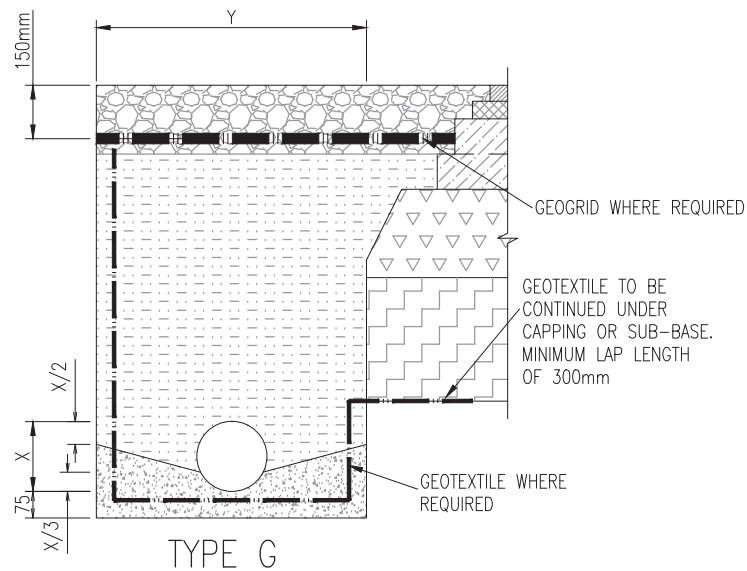


FLEXIBLE JOINT DETAIL THROUGH CHAMBER WALL

NOMINAL PIPE DIAMETER	'Y'
≤ 450	500–750
> 450	750–1000

NOT TO SCALE





TII PUBLICATION NUMBER: CC-SCD-00514



NOTES:

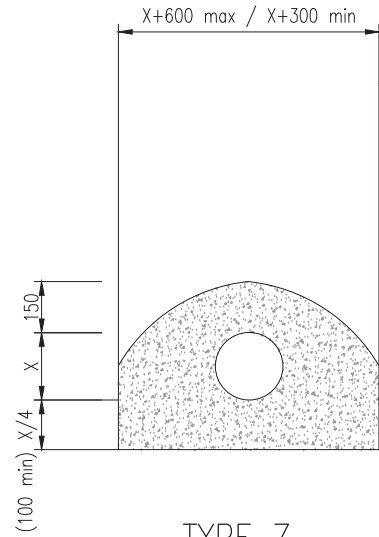
1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. DIMENSION X IS THE EXTERNAL DIAMETER OF THE PIPE.
3. PIPES ARE TO BE LAID WITH SLOTS OR PERFORATIONS UPWARDS WHERE A CONCRETE BED IS USED.
4. MINIMUM DRAIN WIDTH $Y=X+300$ FOR DRAINS NOT EXCEEDING 1.5m COVER BELOW FINISHED LEVEL.
 $Y=X+450$ FOR DRAINS EXCEEDING 1.5m COVER BELOW FINISHED LEVEL.
5. MAXIMUM PIPE DIAMETER TO BE 450mm.
6. LOCATION AND DETAILS OF REQUIRED GEOTEXTILE SHALL BE AS DESCRIBED IN APPENDIX 5/4.
7. REFER TO NRA HD 33 FOR GEOGRID REQUIREMENTS AND SOLUTIONS TO STONE SCATTER.

KEY:

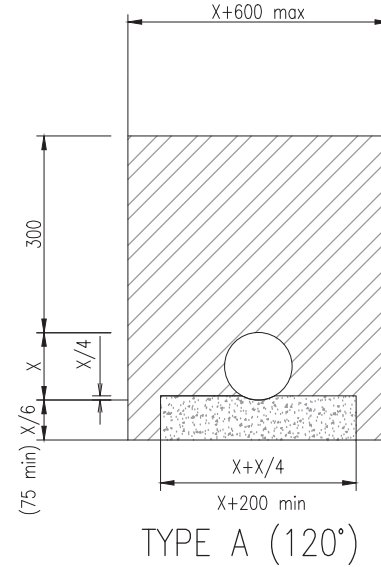
-  GRANULAR MATERIAL TO MCDRW CLAUSE 503.3
-  ST4 CONCRETE TO MCDRW CLAUSE 2602
-  CLAUSE 505 TYPE B COARSE AND LIGHT WEIGHT AGGREGATE TO TABLE 5/5 MCDRW SERIES 500
-  CLAUSE 505 TYPE A FINE AGGREGATE TO TABLE 5/5 OF MCDRW SERIES 500

NOT TO SCALE

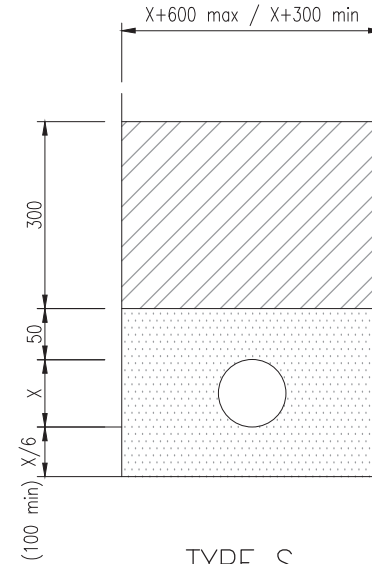
TII PUBLICATION NUMBER: CC-SCD-00520



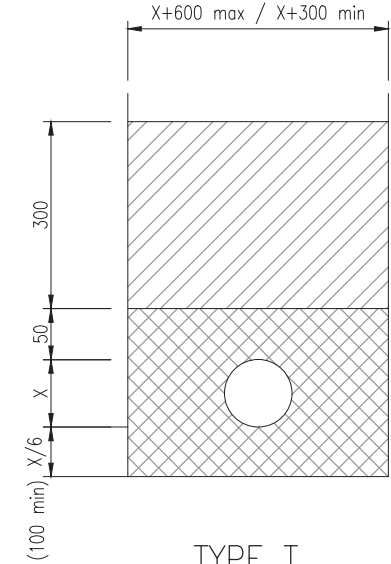
TYPE Z



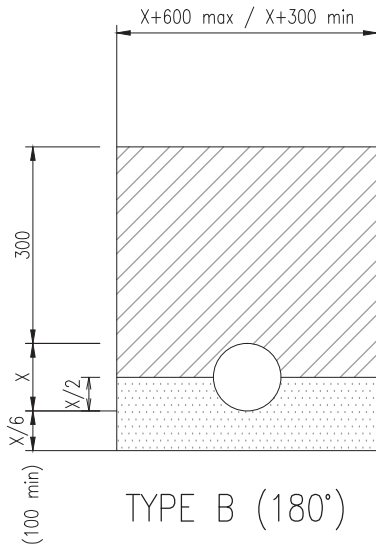
TYPE A (120°)



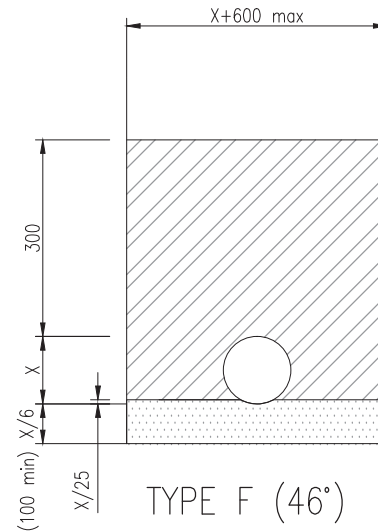
TYPE S



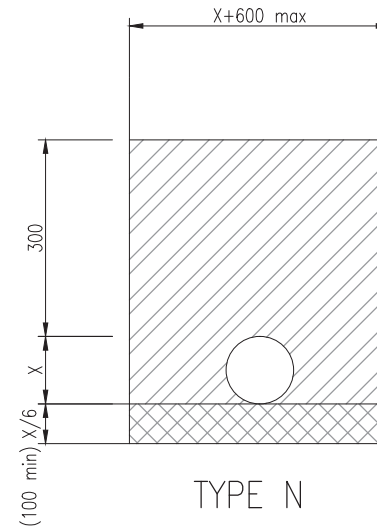
TYPE T



TYPE B (180°)



TYPE F (46°)



TYPE N

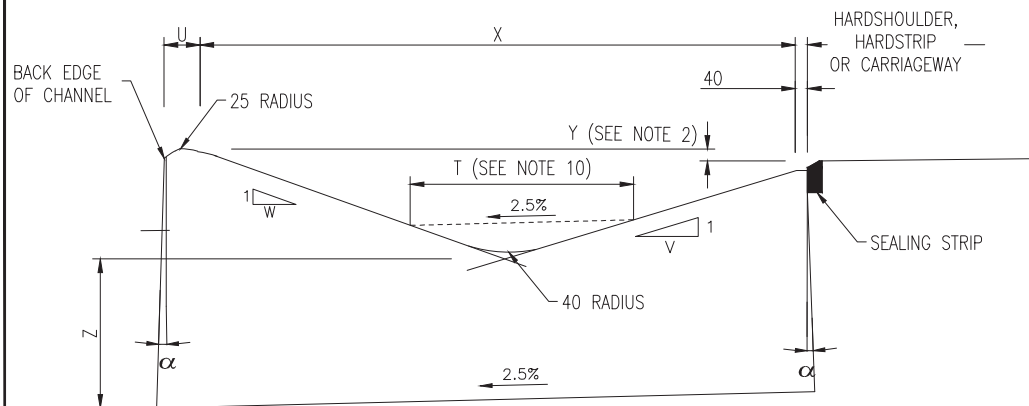
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. DIMENSION X IS THE EXTERNAL DIAMETER OF THE PIPE.
3. THE MINIMUM AND MAXIMUM WIDTH OF THE TRENCH APPLIES ON AND BELOW A LINE 300mm ABOVE THE OUTSIDE TOP OF THE PIPE. ABOVE THE 300mm LINE THE TRENCH BACKFILL MATERIAL SHALL BE AS DESCRIBED IN CLAUSE 505.2 OF MCDRW
4. THE CONCRETE BED OR SURROUND MAY EXTEND TO THE SIDES OF THE TRENCH OR BE OF MINIMUM WIDTH. MATERIAL TO CLAUSE 503.3(iii) IS TO BE USED TO FILL ANY VOIDS SO FORMED.
5. FOR TYPE Z TRENCH THE CONCRETE COVER MAY BE FORMED TO A RADIUS BATTER OR HORIZONTAL SURFACE. MINIMUM COVER OF CONCRETE SHALL BE 150.

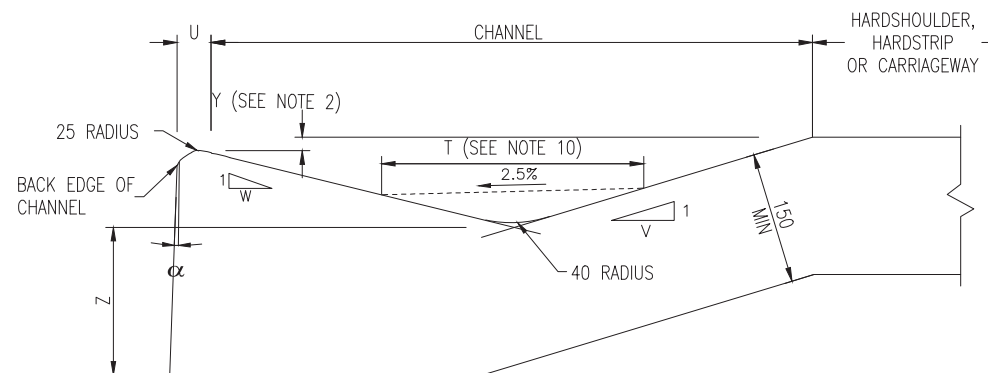
KEY:

- CLAUSE 503 COARSE AND LIGHT WEIGHT AGGREGATE TO TABLE 5/3 OF MCDRW SERIES 500
- ST4 CONCRETE TO MCDRW CLAUSE 2602
- CLAUSE 503 FINE AND ALL-IN AGGREGATE TO TABLE 5/4 MCDRW SERIES 500
- CLASS 1 OR 2 MATERIAL TO MCDRW CLAUSE 503.3 (iii)

NOT TO SCALE



TYPE A
(CHANNEL CAST BEFORE OR AFTER PAVEMENT
CONSTRUCTION) (DRAWN TO SUIT VERGE LOCATION)



TYPE B
(CHANNEL CAST IN ONE WITH THE PAVEMENT)
(DRAWN TO SUIT CENTRAL RESERVE LOCATION)

NOTES:

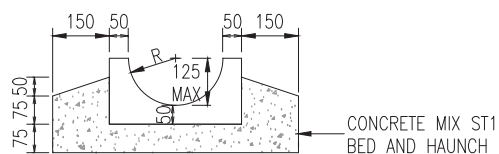
- ALL DIMENSIONS ARE IN MILLIMETRES.
- DIMENSIONS T,U,V,W,X,Y & Z SHALL BE AS DESCRIBED IN APPENDIX 5/3. THE DIMENSION Y IS THE DIFFERENCE IN LEVEL BETWEEN THE BACK EDGE OF THE CHANNEL AND THE LEVEL OF THE CARRIAGEWAY, HARDSHOULDER OR HARDSTRIP ADJACENT TO THE CHANNEL. DIMENSION Y IS +VE WHEN THE CARRIAGEWAY EDGE OF THE CHANNEL IS ABOVE THE VERGE EDGE. DIMENSION Y IS -VE WHEN THE CHANNEL IS BELOW THE VERGE EDGE.
- THE EDGES OF THE CHANNEL SHOULD BE APPROXIMATELY VERTICAL BUT ANGLE α MAY LIE BETWEEN 0° AND 5° FOR EASE OF SLIPFORMING.
- CHANNEL TYPE B SHALL BE USED WHEN THE CARRIAGEWAY AND CHANNEL ARE SLIPFORMED SIMULTANEOUSLY. TYPE B CHANNELS SHALL BE DEEMED A CONTINUATION OF THE CARRIAGEWAY SLAB AND SHALL BE REINFORCED ACCORDINGLY. CONCRETE TO TYPE B CHANNELS SHALL BE AS SPECIFIED FOR THE CARRIAGEWAY SLAB. TYPE B CHANNELS SHALL HAVE TRANSVERSE JOINTS OF THE SAME TYPE AND SPACING AS IN THE CARRIAGEWAY SLAB, SEALED IN ACCORDANCE WITH MCDRW, CLAUSES 1016 AND 1017.
- CONCRETE TO TYPE A CHANNEL SHALL COMPLY WITH MCDRW CLAUSE 1103 AND SHALL BE A DESIGNED MIX, STRENGTH CLASS C28/35 TO IS EN 206-1.
- CONTRACTION JOINTS IN TYPE A CHANNELS SHALL BE SAWN OR WET FORMED. SAWN JOINTS SHALL BE CUT TO A MINIMUM DEPTH OF 25MM BELOW THE CHANNEL INVERT OR TO A MINIMUM DEPTH OF ONE QUARTER OF THE CHANNEL SECTION WHICHEVER IS THE GREATER. WET FORMED JOINTS SHALL BE CUT INTO THE CONCRETE WHILST IT IS STILL PLASTIC WITH A SHARP STEEL TROWEL TO SEPARATE COARSE AGGREGATE PARTICLES OVER NOT LESS THAN TWO THIRDS OF THE CROSS-SECTIONAL AREA AND FINISHED USING A KEELED TROWEL OR EQUIVALENT TOOL, TO FORM A TAPERED SEALING GROOVE, NOT LESS THAN 13mm IN WIDTH AT THE SURFACE, TAPERING TO NOT LESS THAN 5mm AT A DEPTH OF 25mm.
- THE SPACING OF CONTRACTION JOINTS IN TYPE A CHANNELS SHALL BE 5000mm. WHEN REQUIRED BY MCDRW, CLAUSE 1103, EXPANSION JOINTS SHALL BE FORMED AT SPACINGS NOT EXCEEDING 40000mm IN ACCORDANCE WITH MCDRW, CLAUSE 1009. JOINTS SHALL BE SEALED IN ACCORDANCE WITH MCDRW, CLAUSE 1016 AND 1017.
- SEALING STRIP IS REQUIRED WHEN TYPE A CHANNELS ARE USED WITH RIGID CARRIAGEWAY CONSTRUCTION AND SHALL BE IN ACCORDANCE WITH CLAUSE 1014 OF SRW.
- THE 40mm FLAT SHOWN ON THE EDGE OF THE TYPE A CHANNEL IS INTENDED TO MINIMISE DAMAGE WHEN THE ADJACENT PAVEMENT LAYERS ARE BEING COMPACTED.
- TYPE A AND TYPE B CHANNELS INDICATE PROFILES OF TRIANGULAR SURFACE WATER CHANNELS IN SOLID LINES. BROKEN LINES OF WIDTH T AT CROSSFALL 1:40 DENOTE BASE PROFILE OF TRAPEZOIDAL SURFACE WATER CHANNEL.

NOT TO SCALE

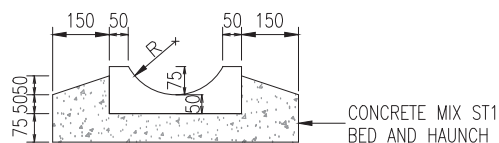
TII PUBLICATION NUMBER: CC-SCD-00522

NOTES:

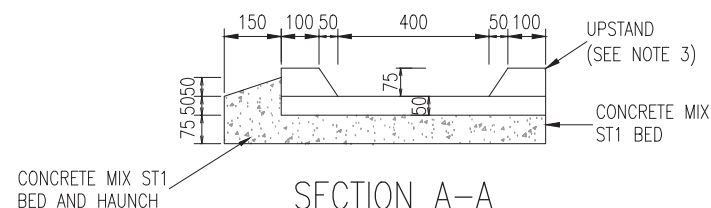
1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. DIMENSIONS R & L SHALL BE AS DESCRIBED IN APPENDIX 5/3.
3. DRAINAGE CHANNEL BLOCKS TO BE MADE OF PRESSED CONCRETE TO IS EN 1340 OR EXTRUDED IN-SITU. FOR BLOCKS TYPE C THE UPSTAND MAY BE IN-SITU CONCRETE OR THE KERB TYPE USED FOR THE CARRIAGEWAY.



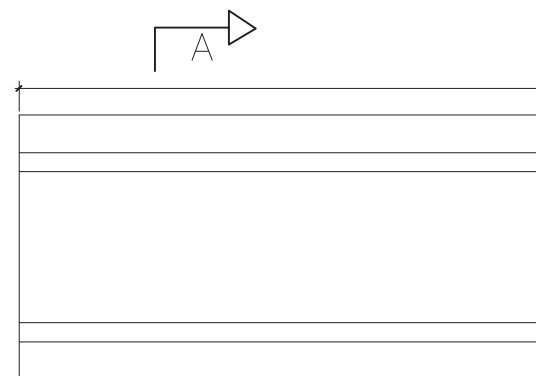
DRAINAGE CHANNEL BLOCK
TYPE A



DRAINAGE CHANNEL BLOCK
TYPE B



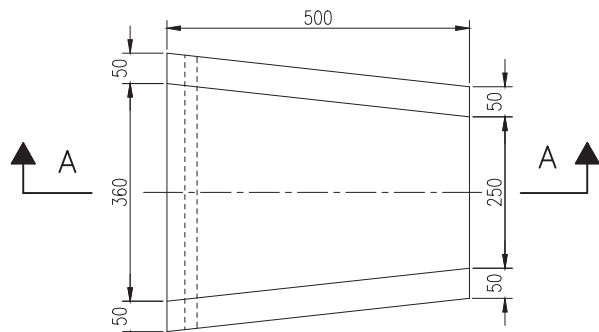
SECTION A-A



DRAINAGE CHANNEL BLOCK
TYPE C

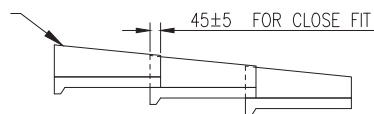
NOT TO SCALE

TII PUBLICATION NUMBER: CC-SCD-00523

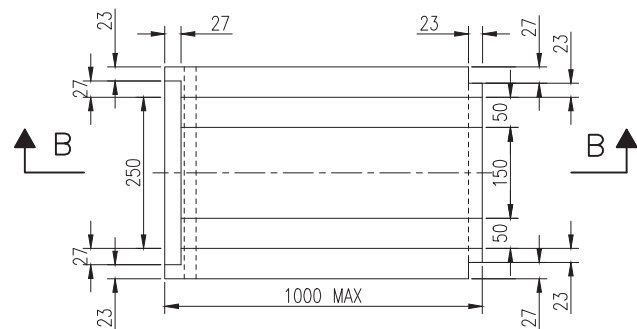


TYPE D BLOCKS – PLAN

TOP OF CHANNEL 50mm ABOVE
FINISHED GROUND LEVEL

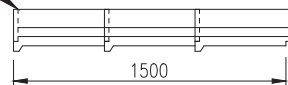


ASSEMBLED TYPE D BLOCKS

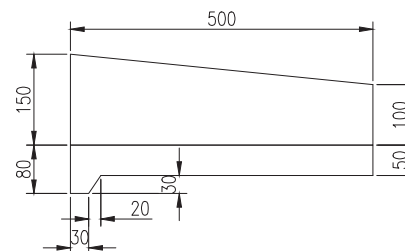


TYPE E & F BLOCKS – PLAN

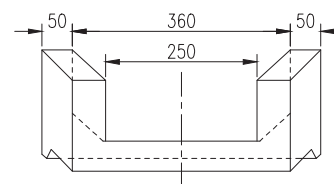
TOP OF CHANNEL 50mm ABOVE
FINISHED GROUND LEVEL



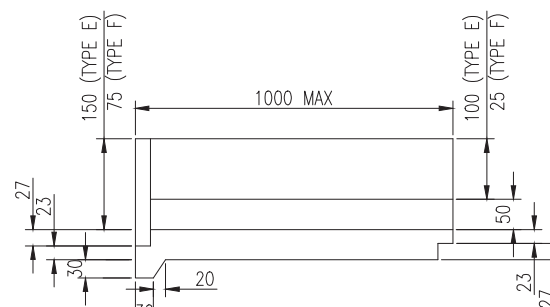
ASSEMBLED TYPE E AND F BLOCKS



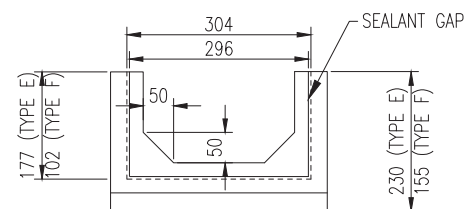
SECTION A-A



END VIEW



SECTION B-B



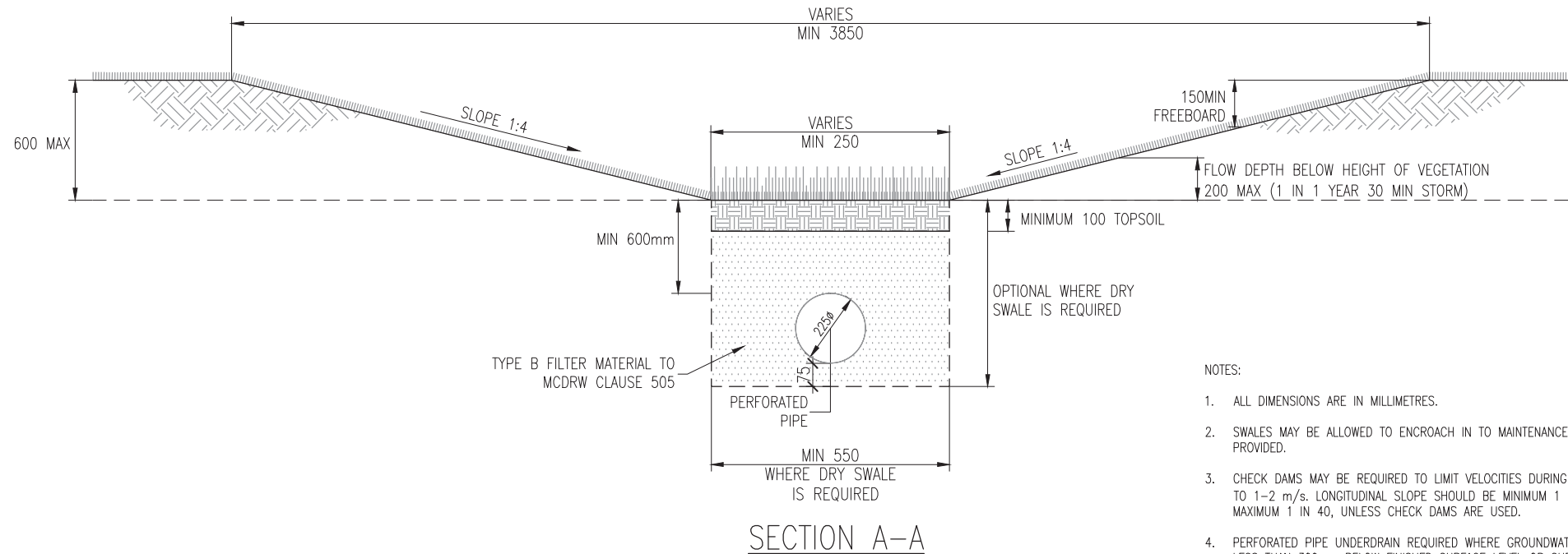
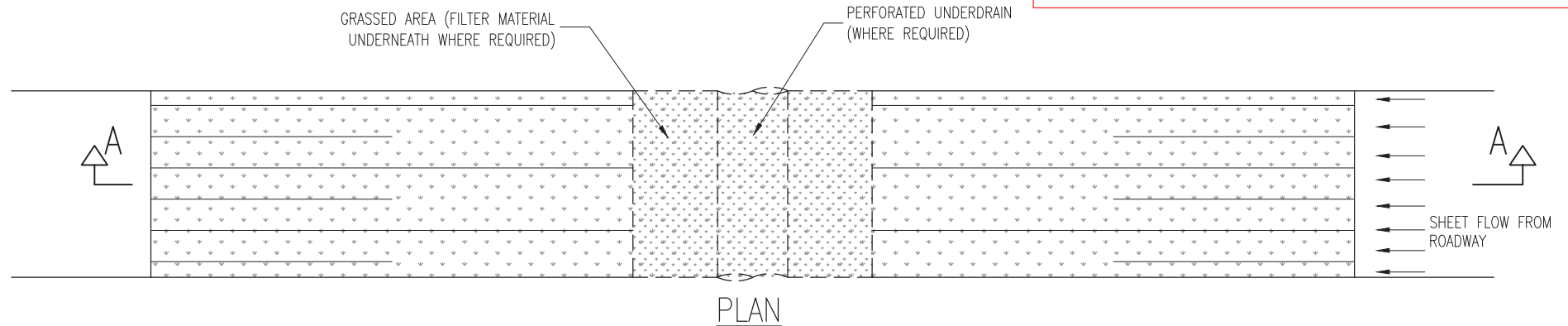
END VIEW

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. BLOCKS TO BE MADE OF PRESSED CONCRETE TO IS EN 1340.

NOT TO SCALE

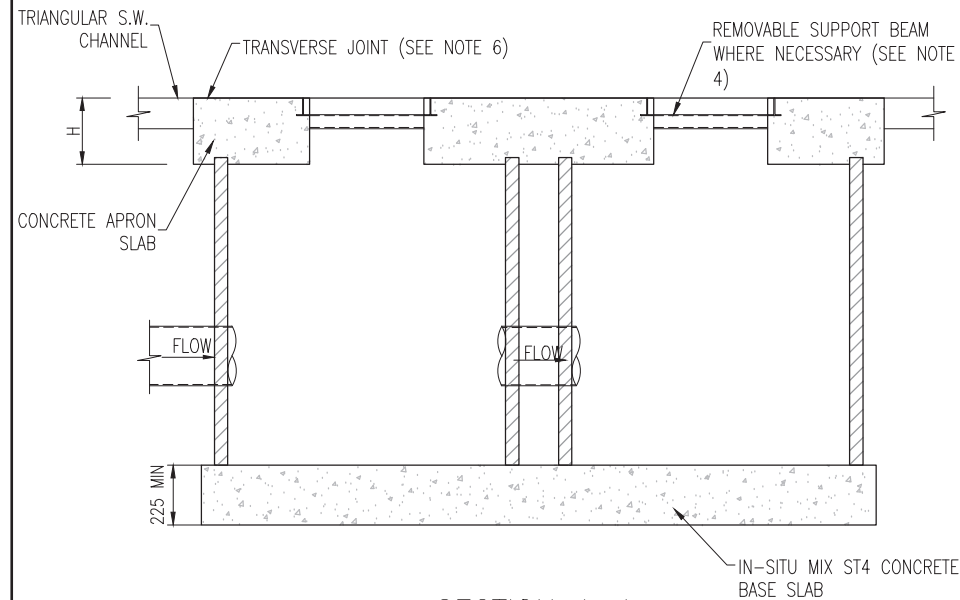
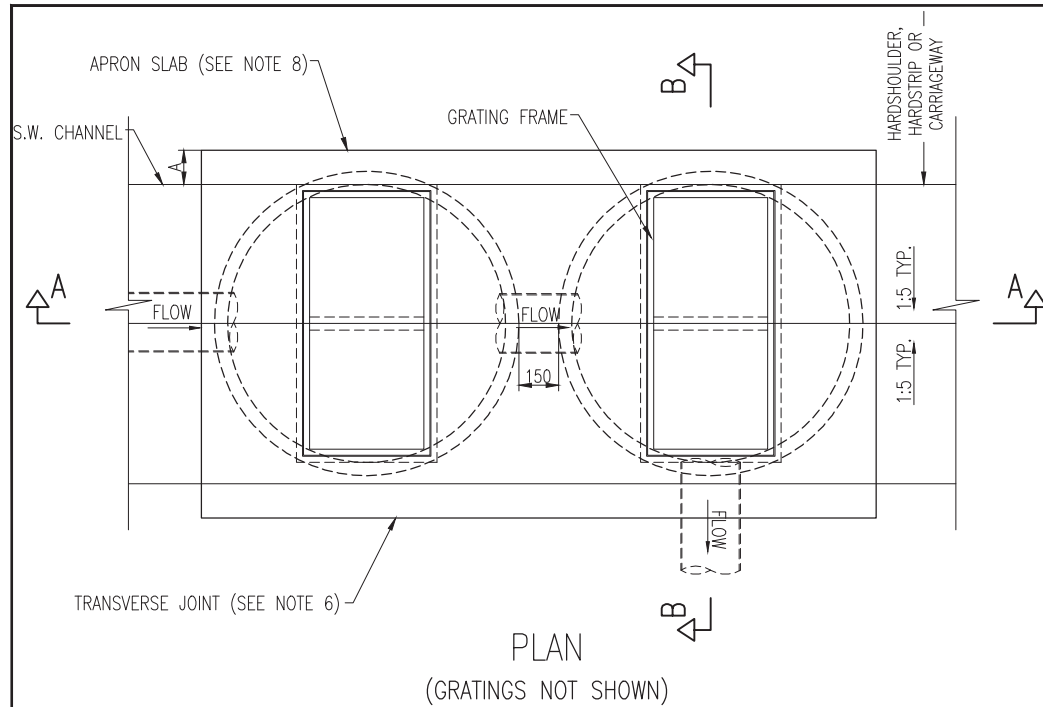
TII PUBLICATION NUMBER: CC-SCD-00524



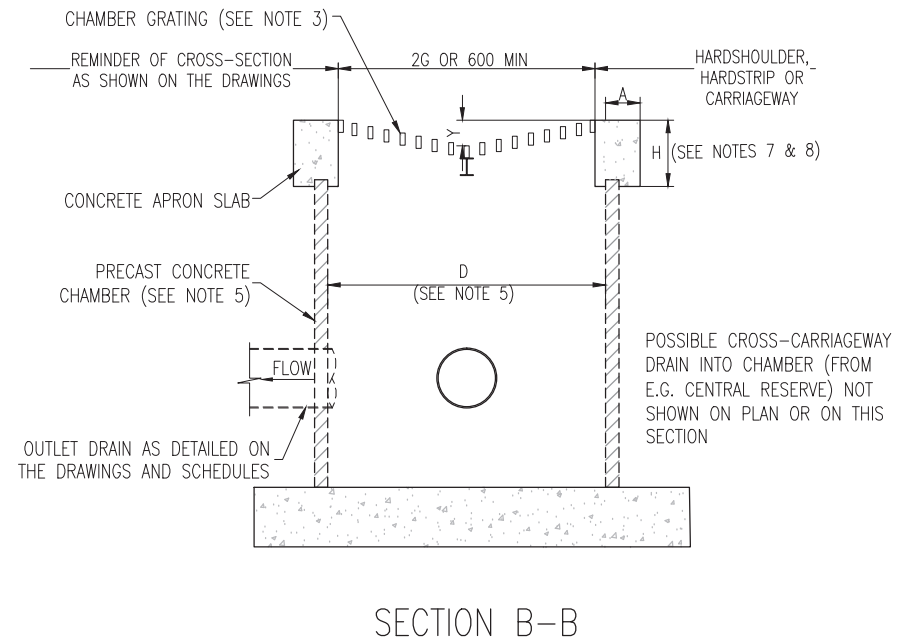
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. SWALES MAY BE ALLOWED TO ENCROACH IN TO MAINTENANCE STRIP WHERE PROVIDED.
3. CHECK DAMS MAY BE REQUIRED TO LIMIT VELOCITIES DURING EXTREME EVENTS TO 1-2 m/s. LONGITUDINAL SLOPE SHOULD BE MINIMUM 1 IN 300 AND MAXIMUM 1 IN 40, UNLESS CHECK DAMS ARE USED.
4. PERFORATED PIPE UNDERDRAIN REQUIRED WHERE GROUNDWATER LEVELS ARE LESS THAN 300mm BELOW FINISHED SURFACE LEVEL OR SUB-FORMATION LEVEL WHERE CAPPING IS PRESENT.
5. THE DEPTH TO THE OBVERT OF THE PERFORATED PIPE MUST BE EITHER THE GREATER OF 100MM MINIMUM BELOW BASE OF CAPPING LAYER OR 600mm BELOW FINISHED SURFACE LEVEL.

NOT TO SCALE



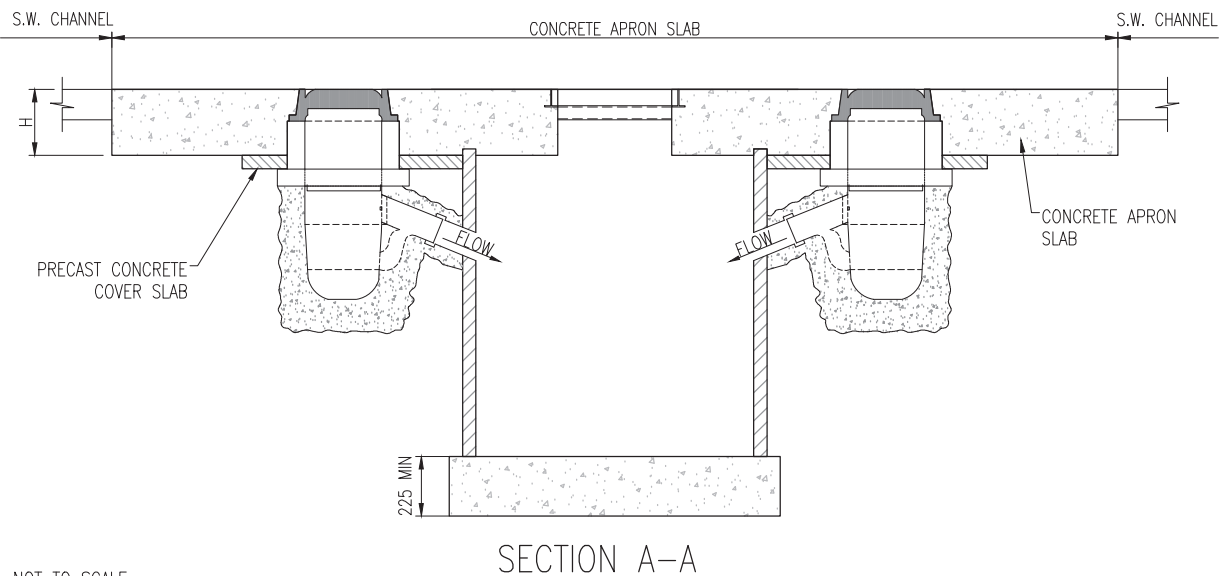
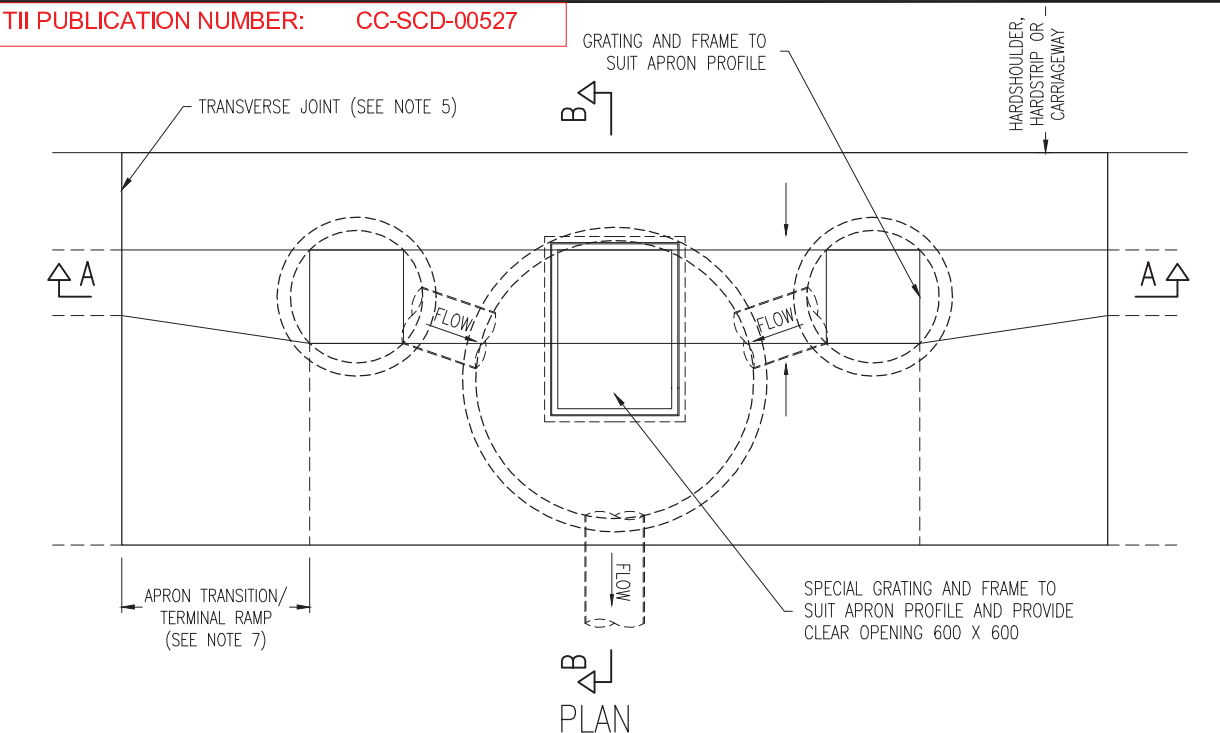
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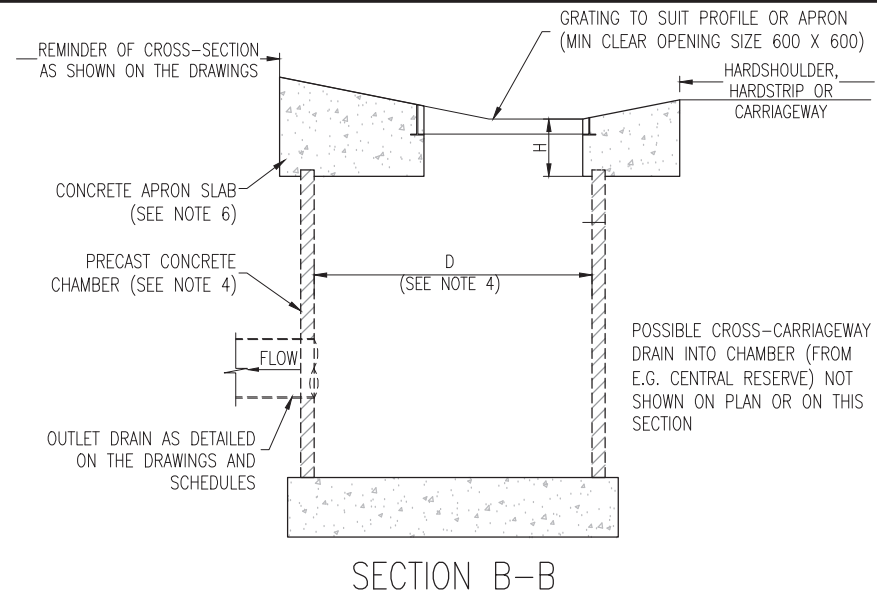
NOTES:

- ALL DIMENSIONS ARE IN MILLIMETRES.
- PLAN AND SECTION A-A INDICATE OUTLET WITH TWIN GRATING INSTALLATION AND ASSOCIATED CHAMBERS. DETAIL CAN BE MODIFIED FOR SINGLE OR TRIPLE CHAMBER INSTALLATION. ASSOCIATED DRAINS AND PIPEWORK SHALL BE AS DETAILED ON THE DRAWINGS AND SCHEDULES. APRON SLAB ON PLAN AND SECTION B-B SHOWN TO SUIT VERGE INSTALLATION. SLAB WIDTH AND PROFILE DIFFERS WHEN USED IN CENTRAL RESERVE LOCATION.
- CHAMBER GRATINGS AS SPECIFIED TO SUIT CROSS-SECTION OF APRON. MINIMUM INTERNAL DIMENSIONS 600 X 600. GRATING FRAMES TO BE BEDDED ON MORTAR AND SECURELY FIXED TO CONCRETE APRON BY APPROVED MECHANICAL MEANS. FRAME TO BE OTHERWISE BEDDED ON EPOXY RESIN MORTAR.
- SUPPORT BEAM PERMISSIBLE BENEATH GRATING WHERE NECESSARY TO WITHSTAND LOADING DEFINED IN NOTE 8. BEAM TO BE REMOVABLE WHERE CLEAR OPENING 600 X 600 NOT OTHERWISE AVAILABLE FOR ACCESS PURPOSES. REMOVABLE BEAMS TO BE SUPPORTED ON PURPOSE MADE STEEL BRACKETS BEARING UPON GRATING FRAME REBATES AND BOLTED TO THE FACES OF THE APRON SLABS WITHIN THE ACCESS OPENINGS. BRACKETS SHALL RESTRAIN THE BEAM FROM SIDEWAYS MOVEMENT. BEAM ROLLING TOLERANCES MAY BE ACCOMMODATED BY USE OF PURPOSE-MADE STEEL SHIMS BETWEEN THE SUPPORTING BRACKETS AND THE BEAMS. ALL STEELWORK TO BE FABRICATED FROM STEEL TO IS EN 10084 AND TO BE PROTECTED BY HOT DIP GALVANISING TO MCDRW CLAUSE 1909.
- CHAMBER BENEATH APRON SLAB TO BE AS RCD/500/9 BUT WITH INTERNAL DIAMETER D AS SPECIFIED TO PROVIDE MINIMUM NECESSARY CLEAR OPENING BENEATH GRATING AND BE NOT LESS THAN 1050.
- A TRANSVERSE JOINT SHALL BE FORMED AT EACH END OF THE APRON SLAB IN ACCORDANCE WITH MCDRW CLAUSE 1009. TRANSVERSE JOINTS SHALL NOT BE PERMITTED WITHIN THE APRON SLAB. NO JOINTS SHALL BE PERMITTED WITHIN ADJACENT LENGTHS OF CONCRETE PAVEMENT SLABS. NECESSARY JOINTS IN SUCH SLABS SHALL BE SPACED ACCORDINGLY.
- DIMENSION H TO PROVIDE NECESSARY SUPPORT/BEDDING TO REMOVABLE SUPPORT BEAM.
- APRON SLAB AND ASSOCIATED DIMENSION H TO BE DESIGNED TO WITHSTAND THE ACCIDENTAL WHEEL LOADING DEFINED IN BD 37. DIMENSION A TO BE MINIMISED. CONCRETE TO APRON SLAB SHALL COMPLY WITH MCDRW CLAUSE 1103. PLAIN CONCRETE SHALL BE A DESIGNED CONCRETE, STRENGTH CLASS C 28/35 TO IS EN 206-1. REINFORCED CONCRETE SHALL BE STRENGTH CLASS C 32/40 TO MCDRW CLAUSE 1001. CONCRETE TO APRON SLAB CAST IN ONE WITH ADJACENT CONCRETE PAVEMENT SHALL BE AS SPECIFIED FOR THE CARRIAGEWAY SLAB.
- DIMENSIONS Y AND G SHALL BE AS DEFINED IN APPENDIX 5/3.

TII PUBLICATION NUMBER: CC-SCD-00526

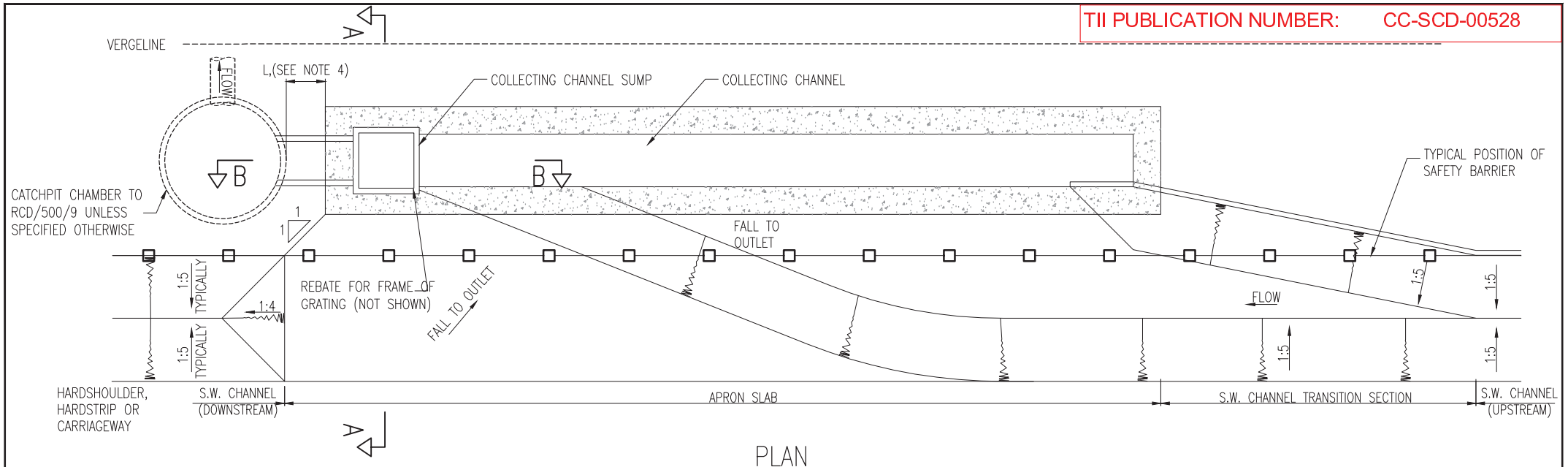


NOT TO SCALE

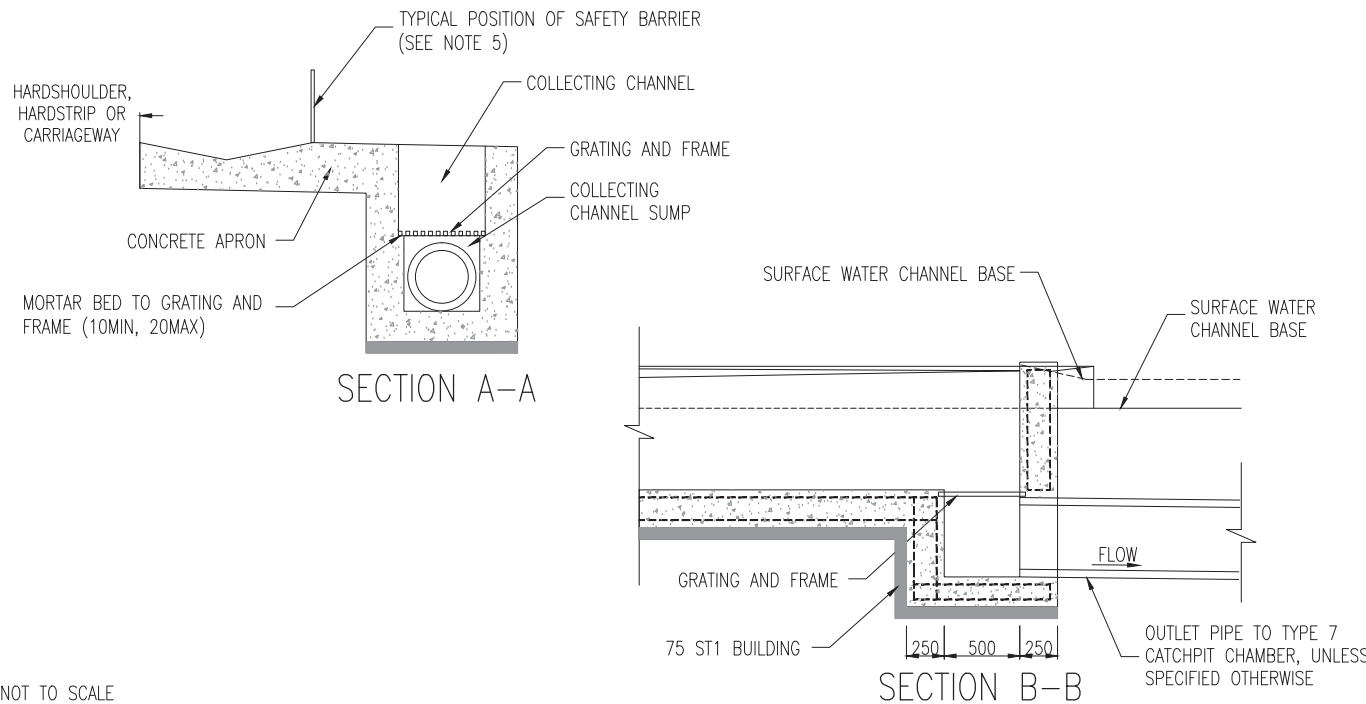


NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. PLAN AND SECTION A-A INDICATE TYPICAL OUTLET IN-LINE WITH TRIPLE GRATING INSTALLATION AND ASSOCIATED CHAMBERS. DETAIL CAN BE MODIFIED FOR TWIN AND SINGLE GRATING INSTALLATION OR FOR OFF-LINE OUTLETS TO TRAPEZOIDAL OR TRIANGULAR S.W. CHANNEL. ASSOCIATED DRAINS AND PIPEWORK SHALL BE AS DETAILED ON THE DRAWINGS AND SCHEDULES. APRON SLAB ON PLAN AND SECTION B-B SHOWN TO SUIT VERGE INSTALLATION. SLAB WIDTH AND PROFILE DIFFERS WHEN USED IN CENTRAL RESERVE LOCATION.
3. CHAMBER GRATINGS AS SPECIFIED IN CHAMBER SCHEDULE TO SUIT CROSS-SECTION OF APRON. GRATING FRAMES TO BE BEDDED ON MORTAR AND SECURELY FIXED TO REBATES FORMED IN CONCRETE APRON BY APPROVED MECHANICAL MEANS. FRAME TO BE OTHERWISE BEDDED ON EPOXY RESIN MORTAR.
4. MAIN CHAMBER BENEATH APRON SLAB TO BE AS RCD/500/9 (1050 CATCHPIT).
5. A TRANSVERSE JOINT SHALL BE FORMED AT EACH END OF THE APRON SLAB IN ACCORDANCE WITH MCDRW, CLAUSE 1009. TRANSVERSE JOINTS SHALL NOT BE PERMITTED WITHIN THE APRON SLAB. NO JOINTS SHALL BE PERMITTED WITHIN ADJACENT LENGTHS OF CONCRETE PAVEMENT SLABS. NECESSARY JOINTS IN SUCH SLABS SHALL BE SPACED ACCORDINGLY.
6. APRON SLAB AND ASSOCIATED DIMENSION H TO BE DESIGNED TO WITHSTAND THE ACCIDENTAL WHEEL LOADING DEFINED IN BD 37. CONCRETE TO APRON SLAB SHALL COMPLY WITH MCDRW, CLAUSE 1103. PLAIN CONCRETE SHALL BE A DESIGNED CONCRETE, STRENGTH CLASS C 28/35 TO IS EN 206-1. REINFORCED CONCRETE SHALL BE STRENGTH CLASS C 32/40 TO MCDRW, CLAUSE 1001.
7. TRANSITION/TERMINAL RAMP TO BE FORMED AS AN INTEGRAL PART OF THE APRON SLAB.
8. OVER-EXCAVATION FOR MAIN CHAMBER BENEATH SUBSIDIARY CHAMBERS TO BE BACKFILLED WITH ST1 CONCRETE TO MCDRW, CLAUSE 2602.



PLAN



SECTION A-A

SECTION B-B

NOTES:

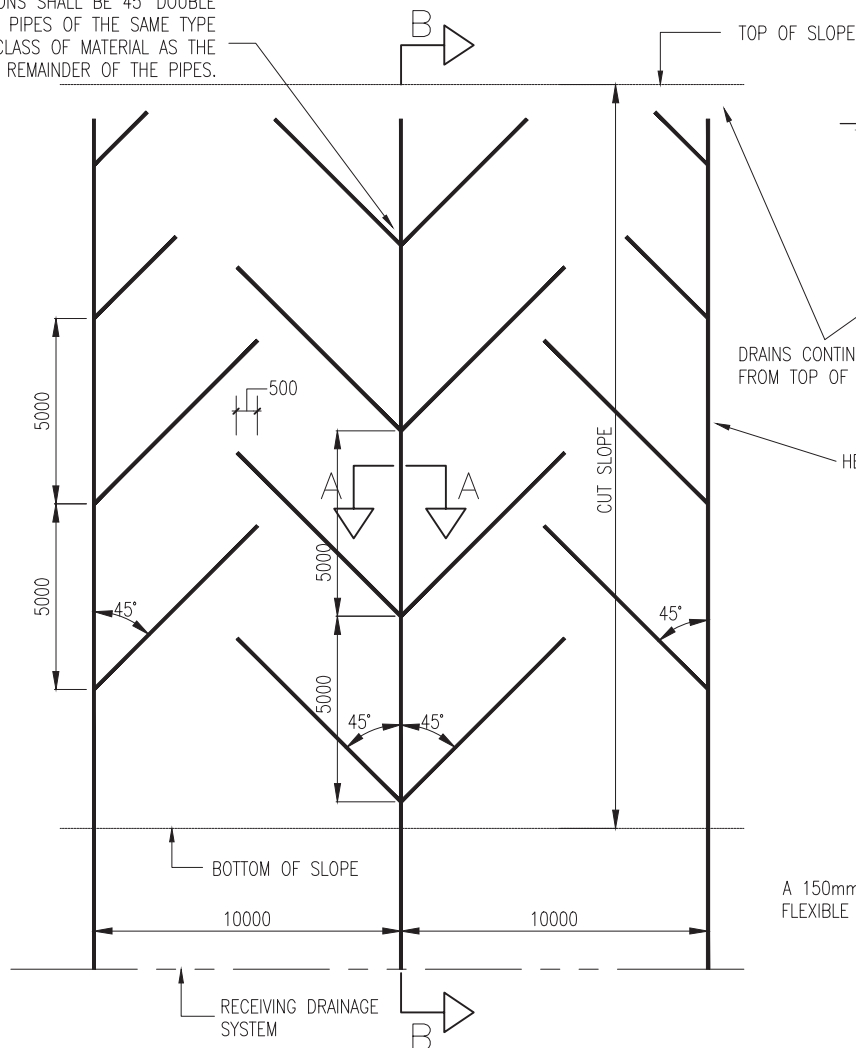
1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. DETAIL SHOWS WEIR OUTLET TO TRIANGULAR S.W.CHANNEL. ALSO APPLICABLE TO TRAPEZOIDAL S.W. CHANNEL WITH NECESSARY MINOR MODIFICATIONS. OVERALL DIMENSIONS, CROSSFALLS ETC. OF APRON SLAB, COLLECTING CHANNEL AND COLLECTING CHANNEL SUMP TO BE DESIGNED AS DEFINED IN APPENDIX 5/3. APRON SLAB, CHANNEL AND SUMP TO BE DESIGNED TO WITHSTAND THE ACCIDENTAL WHEEL LOADING DEFINED IN BD 37.
3. A TRANSVERSE JOINT IN ACCORDANCE WITH MCDRW, CLAUSE 1009 SHALL BE FORMED BETWEEN THE APRON SLAB AND S.W. CHANNELS AT EACH END OF THE SLAB. NO JOINTS SHALL BE PERMITTED WITHIN ADJACENT LENGTHS OF CONCRETE PAVEMENT SLABS. NECESSARY JOINTS IN SUCH SLABS SHALL BE SPACED ACCORDINGLY.
4. DIMENSION L BETWEEN APRON SLAB AND OUTFALL CHAMBER TO BE NOT LESS THAN REQUIRED BY MCDRW, SUB-CLAUSE 507.14.
5. SAFETY BARRIER TO BE AS SHOWN ON THE DRAWINGS AND SCHEDULED IN APPENDIX 4/1.
6. CONCRETE TO APRON SLAB SHALL COMPLY WITH MCDRW, CLAUSE 1103. PLAIN CONCRETE SHALL BE A DESIGNED CONCRETE, STRENGTH CLASS C 28/35 TO IS EN 206-1. REINFORCED CONCRETE SHALL BE STRENGTH CLASS C 32/40 TO MCDRW, CLAUSE 1001.
7. SURFACE WATER CHANNELS BECOME DISCONTINUOUS AT EACH WEIR OUTLET. DETAILS SHOWN ON THIS DRAWING INDICATE RECOMMENCEMENT OF SURFACE WATER CHANNEL DOWN-GRADIENT FROM WEIR OUTLET.
8. THE DISTANCE BETWEEN THE TRAFFIC FACE AND SAFETY BARRIER AND THE NEAREST VERTICAL FACE OF THE COLLECTING CHANNEL SHOULD NOT BE LESS THAN 75% OF THE WORKING WIDTH CLASS AS SPECIFIED IN APPENDIX 4/1.

NOT TO SCALE

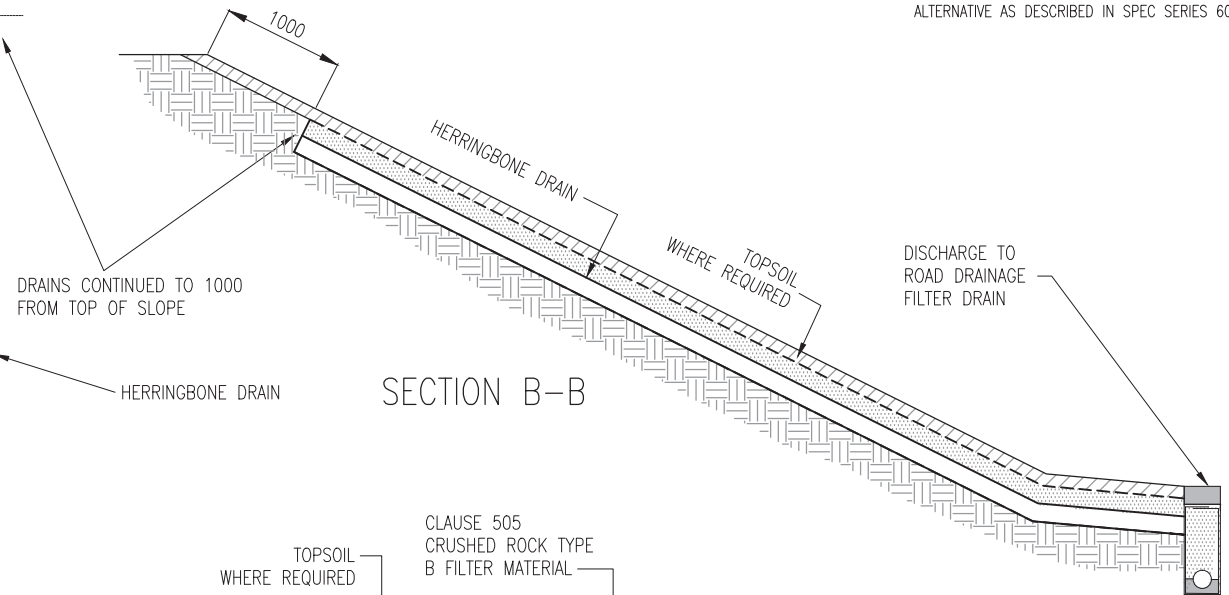
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. THE SECTION THROUGH THE DRAINED SLOPE SHOWS THE MOST COMMON USE OF HERRINGBONE DRAINS IN A CUT SLOPE DISCHARGING INTO A VERGE FILTER DRAIN.
3. DRAINAGE BLANKET MAY BE USED AS AN ALTERNATIVE AS DESCRIBED IN SPEC SERIES 600.

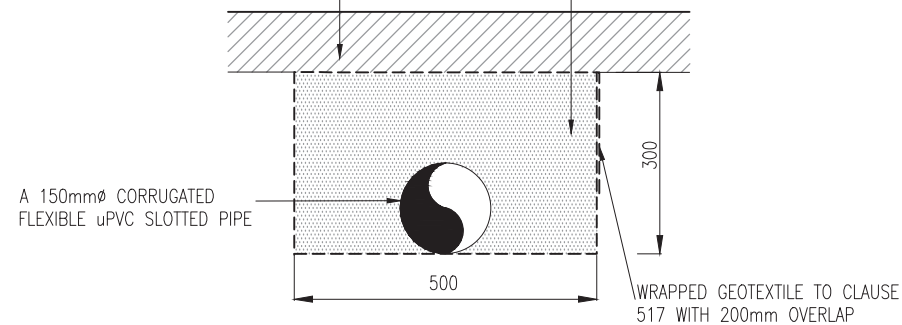
CONNECTIONS SHALL BE 45° DOUBLE JUNCTION PIPES OF THE SAME TYPE AND CLASS OF MATERIAL AS THE REMAINDER OF THE PIPES.



LAYOUT OF HERRINGBONE DRAINS



SECTION B-B

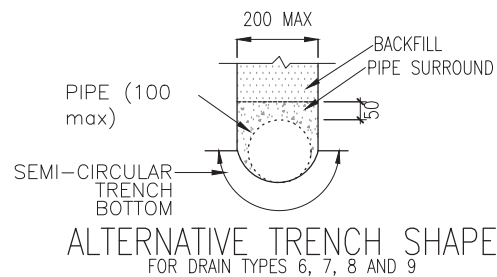
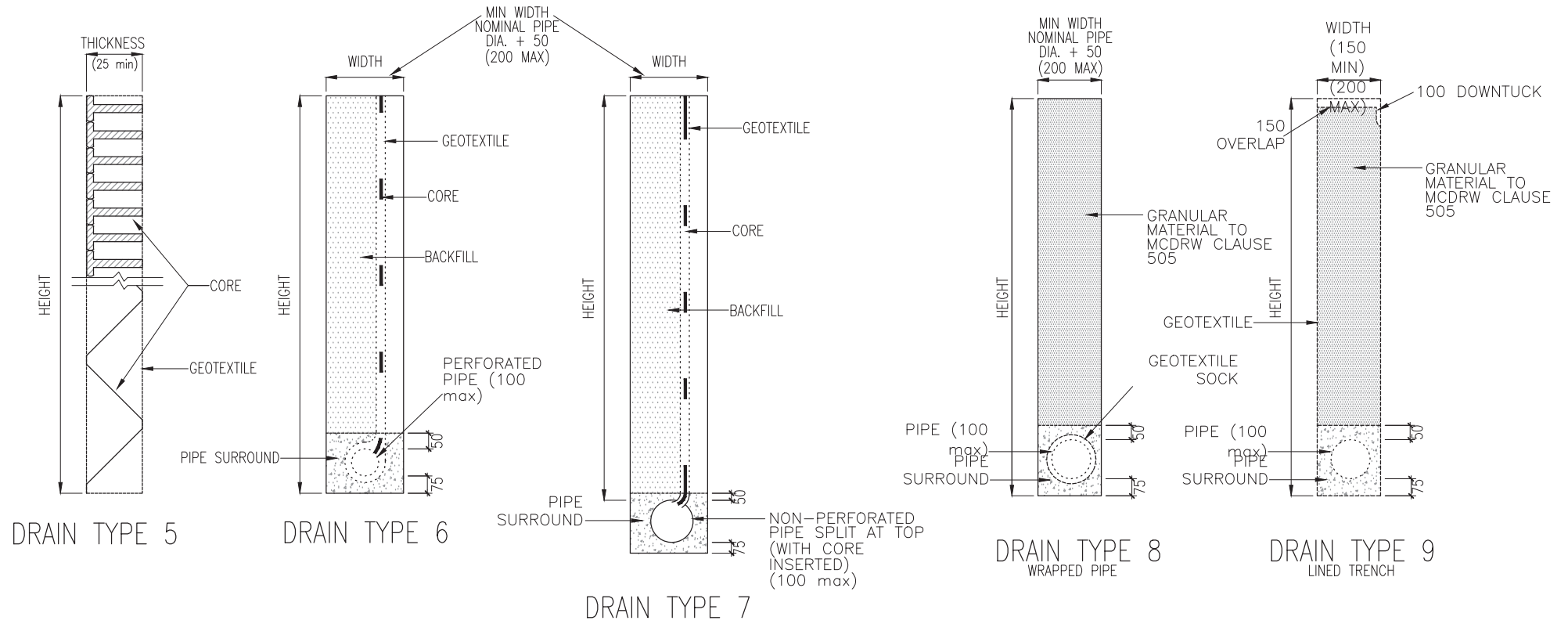


SECTION A-A

SECTION THROUGH HERRINGBONE DRAINS

NOT TO SCALE

TII PUBLICATION NUMBER: CC-SCD-00529

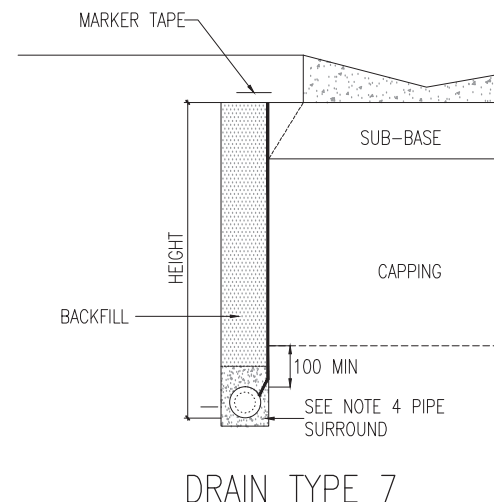
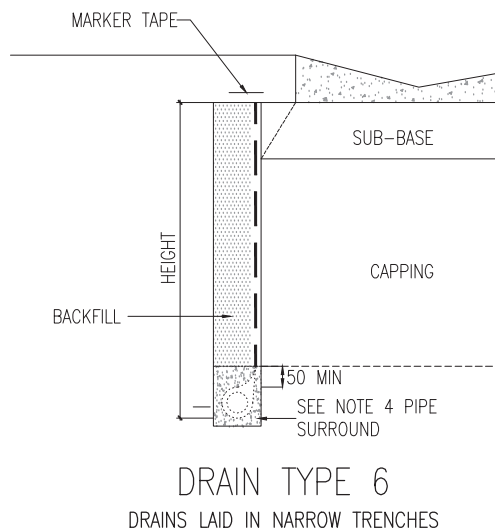
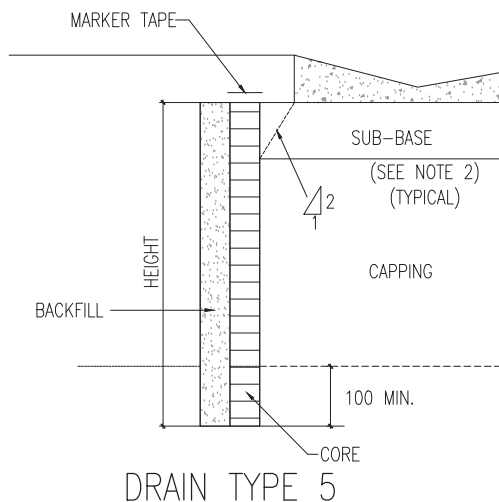


FIN DRAINS
DRAIN TYPES 5, 6 AND 7

NARROW FILTER DRAINS
DRAIN TYPES 8 AND 9

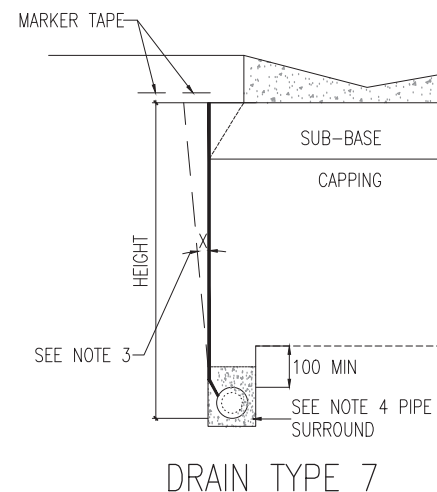
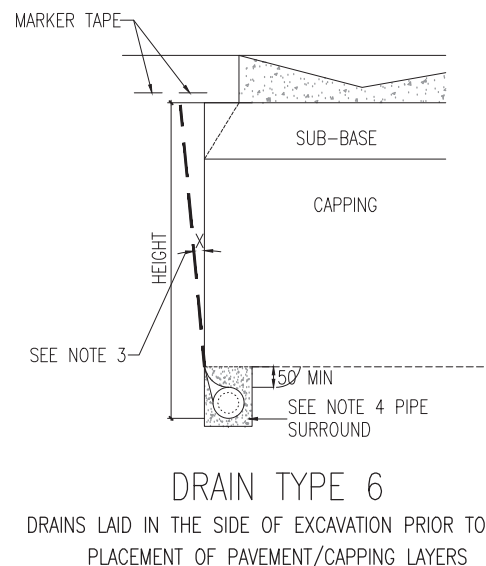
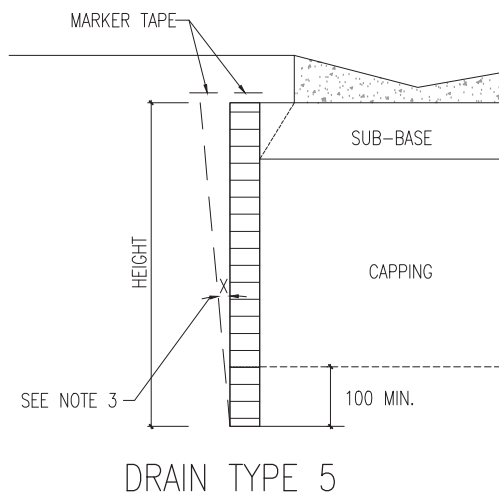
- NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES.
 2. THE SURROUNDING MATERIAL AND BACKFILL TO THE PIPES OF DRAIN TYPES 6 AND 7 SHALL COMPLY WITH MCDRW CLAUSE 514.
 3. THE SURROUNDING MATERIAL TO PIPES OF DRAIN TYPES 8 AND 9 SHALL BE THE GRANULAR MATERIAL USED AS INFILL TO THE DRAIN.

NOT TO SCALE



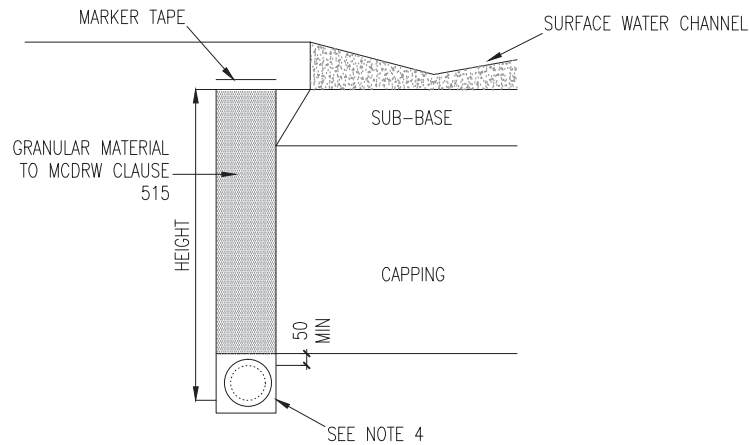
NOTES:

- ALL DIMENSIONS ARE IN MILLIMETRES.
- FIN DRAINS SHALL BE A MINIMUM OF 75 FROM THE EDGE OF THE SURFACE WATER CHANNEL WHERE APPROPRIATE
- MARKER TAPES, SURROUND/ BACKFILL MATERIAL AND MAXIMUM DRAIN SLOPE ANGLE (X) SHALL BE AS DESCRIBED IN MCDRW CLAUSE 514.
- PIPE SURROUND MATERIALS SHALL BE AS SHOWN ON RCD/500/40.
- INSTALLATION OF THE DRAINS SHALL BE MODIFIED ACCORDINGLY WHEN USED IN CONJUNCTION WITH KERB & GULLY OR COMBINED KERB & DRAINAGE CHANNEL UNITS
- THE DRAIN SHALL BE CONSTRUCTED WITH ONE GEOTEXTILE FACE IN CONTACT WITH SIDE OF THE EXCAVATION. THE SIDE HAVING THE GREATER PERMEABILITY SHALL FACING TOWARDS AND BE IN CONTACT WITH THE PAVEMENT CONSTRUCTION WHERE APPROPRIATE.
- SLOTS IN DRAIN TYPE 7 SHALL BE NOT MORE THAN 60° FROM THE CROWN OF THE PIPE

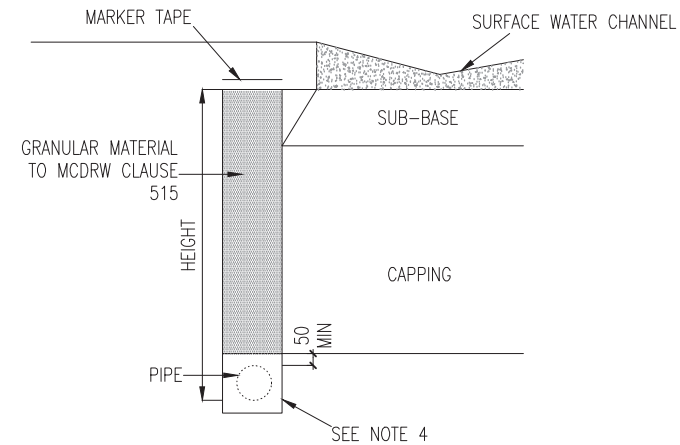


NOT TO SCALE

TII PUBLICATION NUMBER: CC-SCD-00541

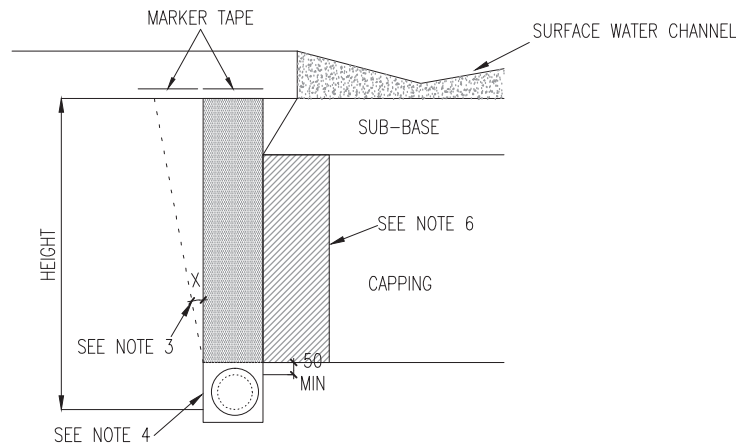


DRAIN TYPE 8

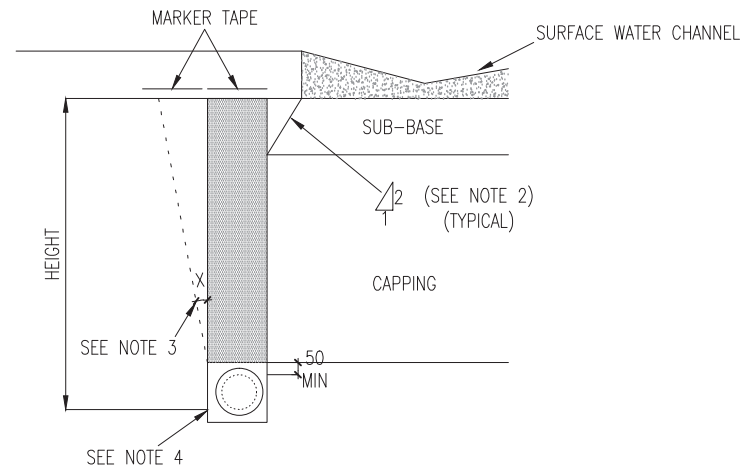


DRAIN TYPE 9

DRAINS LAID IN NARROW TRENCHES



DRAIN TYPE 8



DRAIN TYPE 9

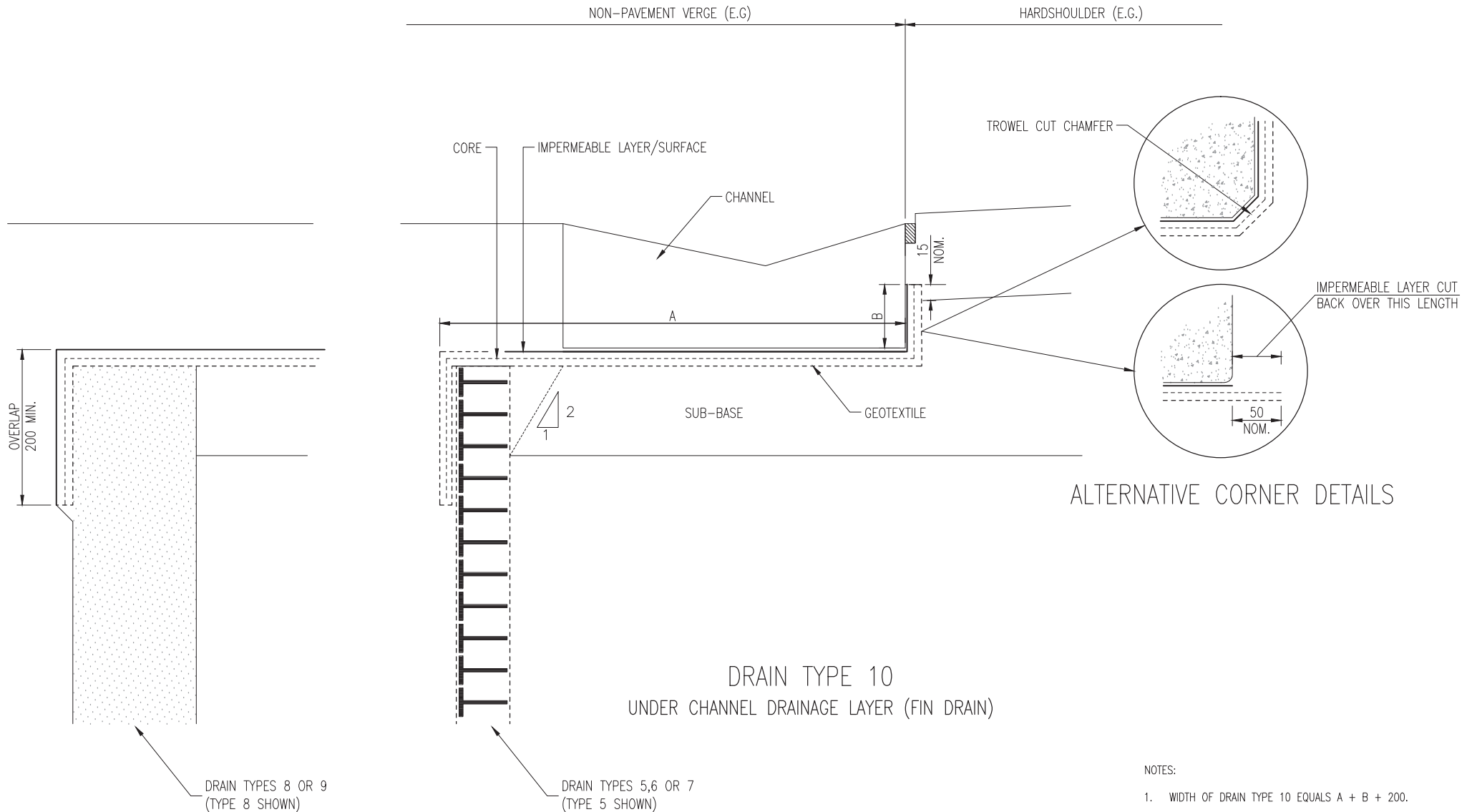
DRAINS LAID IN THE SIDE OF EXCAVATION PRIOR TO THE PLACEMENT OF PAVEMENT/CAPPING LAYERS

NOTES:

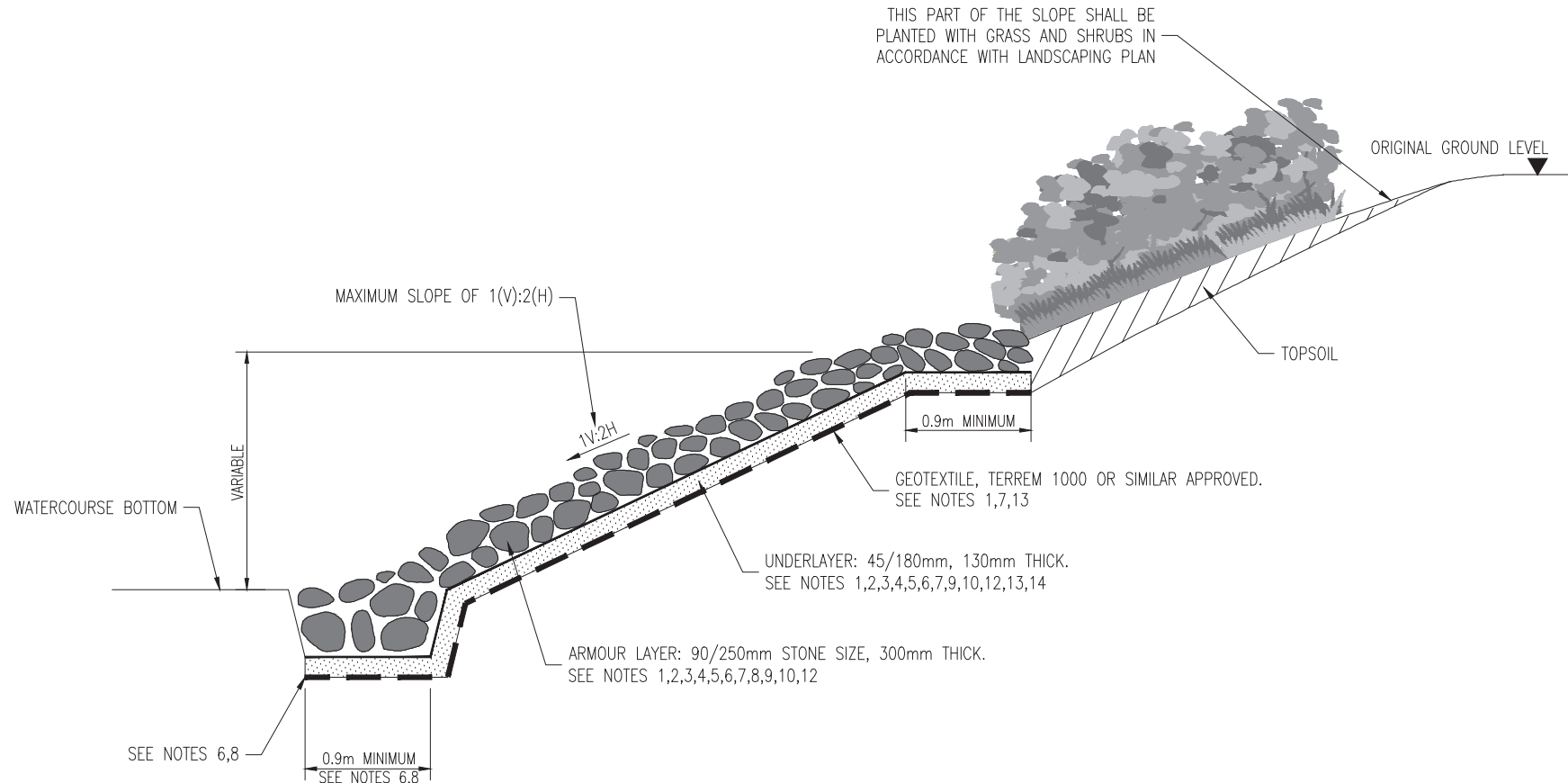
1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. NARROW FILTER DRAINS SHALL BE A MINIMUM OF 75 FROM THE EDGE OF THE SURFACE WATER CHANNEL WHERE APPROPRIATE.
3. MARKER TAPES, AND MAXIMUM DRAIN SLOPE ANGLE (X) SHALL BE AS DESCRIBED IN THE MCDRW CLAUSE 514.
4. PIPE SURROUND MATERIALS SHALL BE AS SHOWN ON DRG NO. RCD/500/41.
5. THE DRAIN SHALL BE CONSTRUCTED WITH ONE FACE IN CONTACT WITH THE PAVEMENT CONSTRUCTION.
6. THE MAXIMUM INCREASED WIDTH OF FILTER MATERIAL SHALL BE 150. IN THIS AREA EITHER FILTER MATERIAL OR CAPPING MATERIAL MAY BE PLACED.

NOT TO SCALE

TII PUBLICATION NUMBER: CC-SCD-00542



NOT TO SCALE

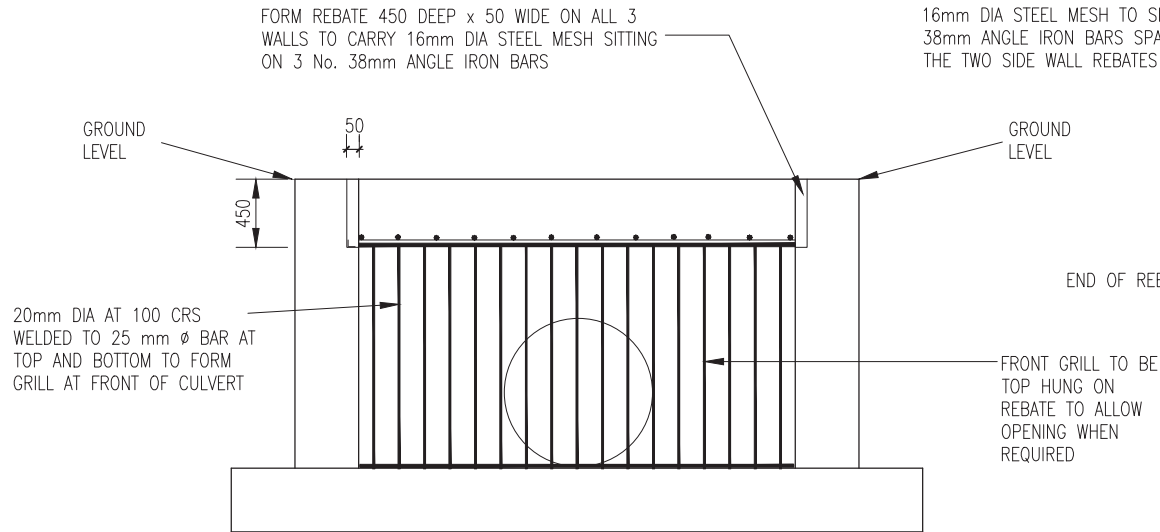


REQUIREMENTS FOR ROCK ARMOUR			
	LOWER	UPPER	STANDARD
GRADINGS	SEE IS EN 13383-1:2002 and IS EN 13383-2:2013		
SHAPE	SEE IS EN 13383-1:2002 and IS EN 13383-2:2013		
PROPORTION OF CRUSHED OR BROKEN SURFACES	SEE IS EN 13383-1:2002 and IS EN 13383-2:2013		
PARTICLE DENSITY	2.5		IS EN 13383-1:2002 and -2:2013
PLASTICITY INDEX	NON PLASTIC		BS 1377:PART2
LOS ANGELES COEFFICIENT		50	CLAUSE 635
SLAKE DURABILITY	95%		CLAUSE 634
RESISTANCE TO WEAR	SEE IS EN 13383-1:2002 and IS EN 13383-2:2013		

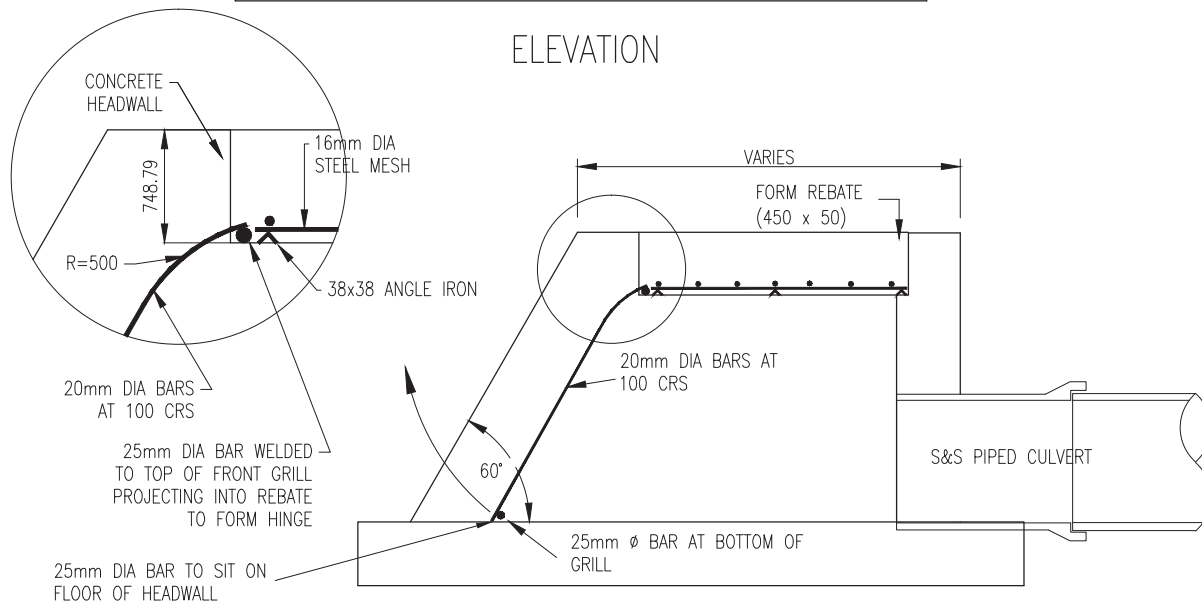
NOT TO SCALE

1. THE DESIGNER SHALL TAKE INTO CONSIDERATION THE SITE SPECIFIC REQUIREMENTS AND MODIFY THIS RCD ACCORDINGLY. REFER TO GUIDANCE PROVIDED IN ESCARAMEIA, M, (1998), RIVER AND CHANNEL REVETMENTS – A DESIGN MANUAL, THOMAS TELFORD LIMITED ISBN 0 7277 2691 9 AND CIRIA, CUR, CETMEF, (2007), THE ROCK MANUAL. THE USE OF ROCK IN HYDRAULIC ENGINEERING, 2nd EDITION, C683, CIRIA, LONDON, MAY, RWP, ACKERS, JC, KIRBY, AM, (2002), MANUAL ON SCOUR AT BRIDGES AND OTHER HYDRAULIC STRUCTURES, C551, CIRIA, LONDON. A RISK ASSESSMENT SHALL BE CARRIED OUT TO ASSESS THE REQUIREMENT FOR ROCK ARMOUR.
2. THE MINIMUM DIMENSIONS AND MAXIMUM SLOPE GRADIENT OUTLINED IN THIS RCD SHALL BE RETAINED BY THE DESIGNER IN THEIR DETAIL. THIS RCD IS SUITABLE FOR MAXIMUM FLOW VELOCITIES OF 2.5M/S. THE DESIGNER IS REQUIRED TO DEMONSTRATE THAT THIS RCD IS SUITABLE FOR USE
3. ROCK ARMOUR SHALL BE HANDLED AND PLACED TO THE FULL LAYER THICKNESS IN ONE OPERATION SO THAT SEGREGATION IS MINIMISED AND THE GEOTEXTILE USED UNDER THE ROCK ARMOUR IS NOT DISTURBED AFTER THE INITIAL ROCK PLACEMENT.
4. ROCK ARMOUR PLACEMENT SHOULD BEGIN AT THE TOE TRENCH AND PROGRESS UP THE SLOPE MAINTAINING THE DESIRED ROCK PLACEMENT THICKNESS AS THE WORK PROCEEDS.
5. IF THIS RCD IS NOT SUITABLE FOR USE, THE DESIGNER IS REQUIRED TO PROVIDE A SOLUTION TAKING IN TO ACCOUNT OF NOTES 7-14.
6. THE DESIGNER SHALL SPECIFY THE GRADING AND STONE SIZE TAKING INTO ACCOUNT THE SPECIFIC SITE CONDITIONS, THE HYDRAULIC CONDITIONS AND WATER LEVELS. A FILTER LAYER IS REQUIRED BETWEEN THE COARSE COVER LAYER AND THE FOUNDATION. GEOTEXTILES ARE TO BE USED AS PART OF THE FILTERING SYSTEM.
7. THE DESIGN OF THE TOE SHALL TAKE INTO CONSIDERATION POTENTIAL SCOUR.
8. DETERMINATION OF THE STABILITY SHALL BE CARRIED OUT FOR THE DIFFERENT DESIGN SITUATIONS SUCH AS HYDRAULIC LOADS INDUCED BY FLOOD OR NAVIGATION OR OTHER TYPES OF LOADS.
9. DIMENSIONING OF COVER LAYERS AND FILTERS SHALL TAKE INTO CONSIDERATION WIND AND SHIP-INDUCED WAVES AND CURRENTS WHERE APPLICABLE.
10. THE DESIGNER SHALL ENSURE THAT THE EARTHWORKS ARE DESIGNED IN ACCORDANCE WITH IS EN 1997:PART 1.
11. THE STONES SHALL PREFERABLY BE ANGULAR AND REGULAR IN SHAPE RATHER THAN ROUNDED.
12. THE DESIGNER SHALL TAKE INTO ACCOUNT SITE SPECIFIC REQUIREMENTS (E.G. SOIL TYPE, GRAIN SIZE, INSTALLATION DAMAGE, ROCK ARMOUR SIZE ETC.) WHEN SPECIFYING THE GEOTEXTILE.
13. THE UNDERLAYER NEEDS TO BE APPROPRIATELY DESIGNED TO PROTECT THE IN-PLACE BANK MATERIAL AND REMAIN BENEATH THE OUTER ROCK ARMOUR.

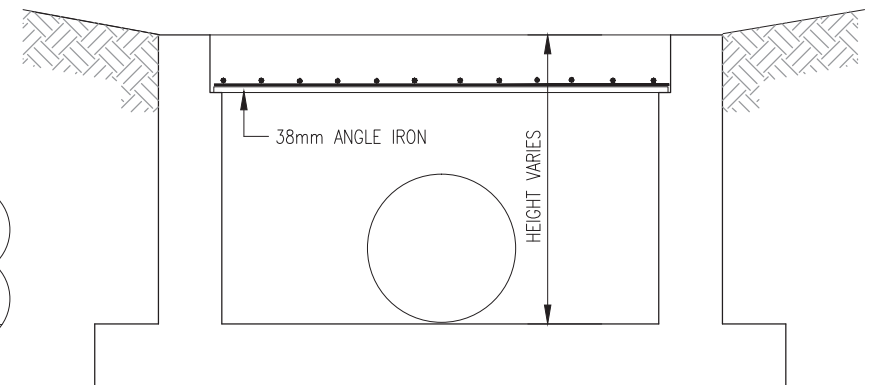
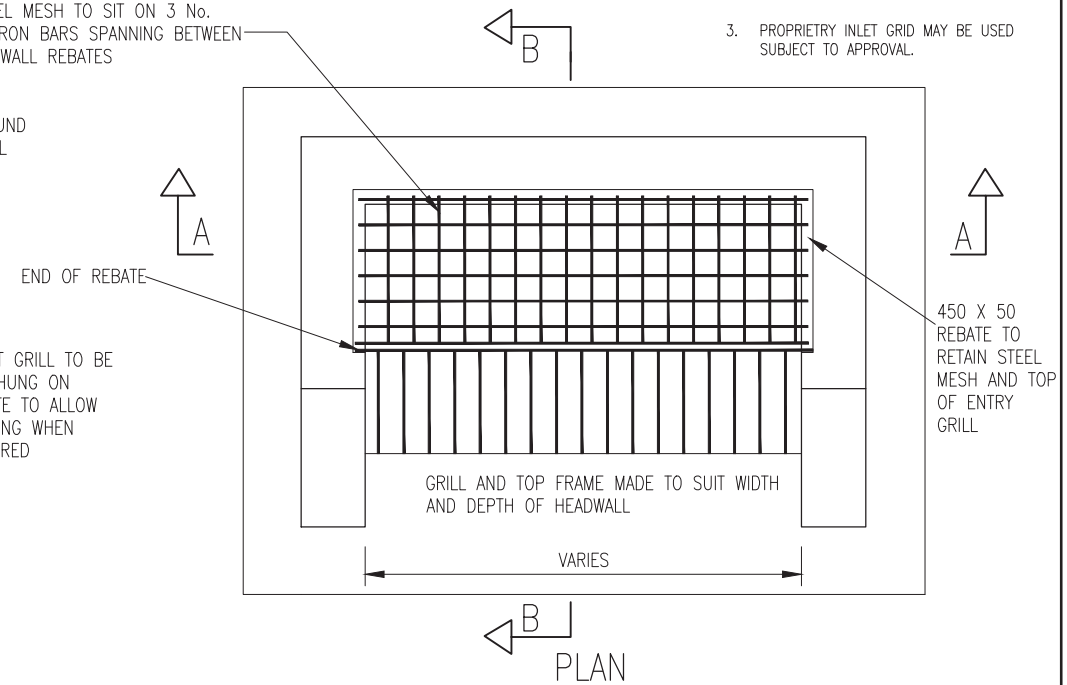
- NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES.
 2. ALL EXPOSED STEEL TO BE GALVANISED TO IS EN ISO 1461.
 3. PROPRIETRY INLET GRID MAY BE USED SUBJECT TO APPROVAL.



ELEVATION



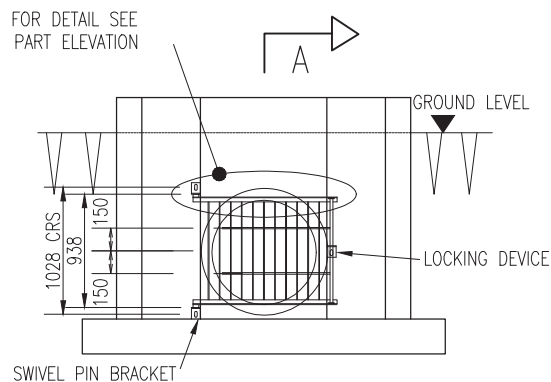
SECTION B - B



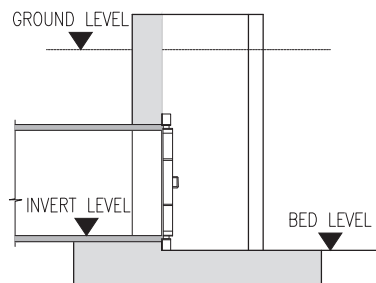
SECTION A - A

NOT TO SCALE

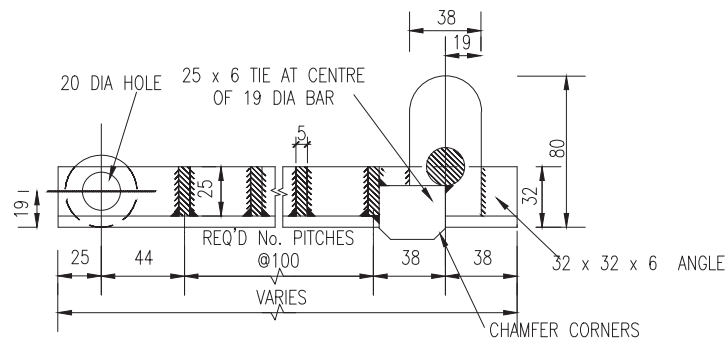
TII PUBLICATION NUMBER: CC-SCD-00551



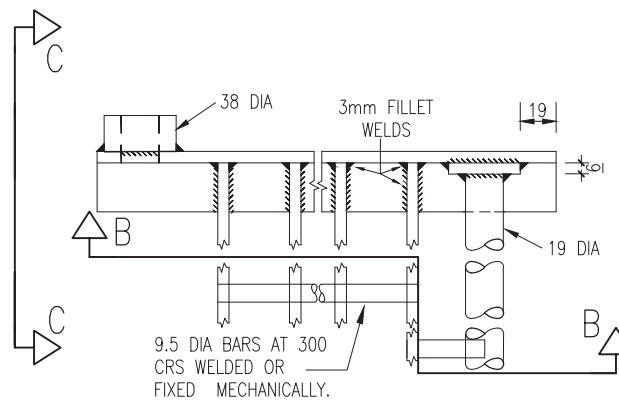
ELEVATION



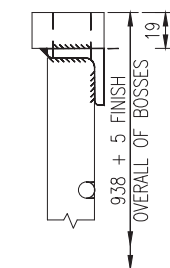
SECTION A-A



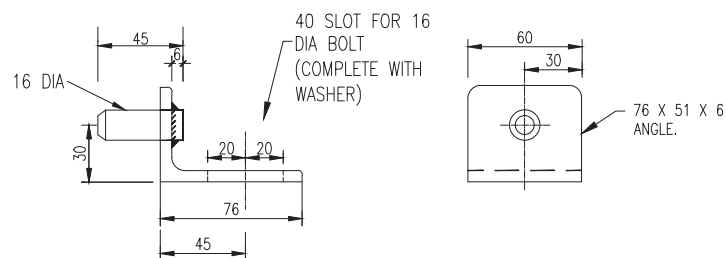
SECTION B-B



PART ELEVATION



VIEW C-C



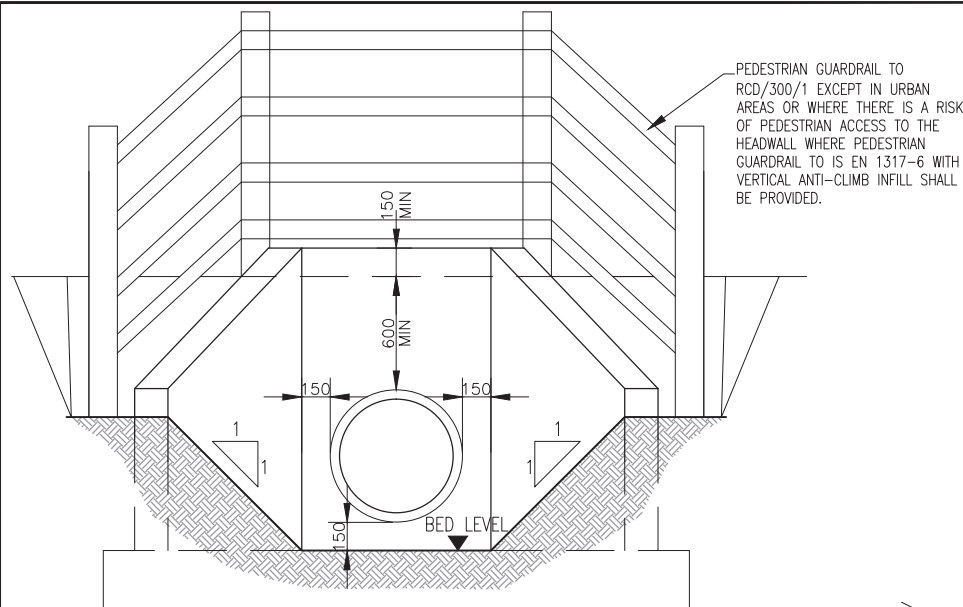
DETAILS OF SWIVEL PIN BRACKET
(SECURED TO HEADWALL WITH 16 DIA BOLT)

NOTES:

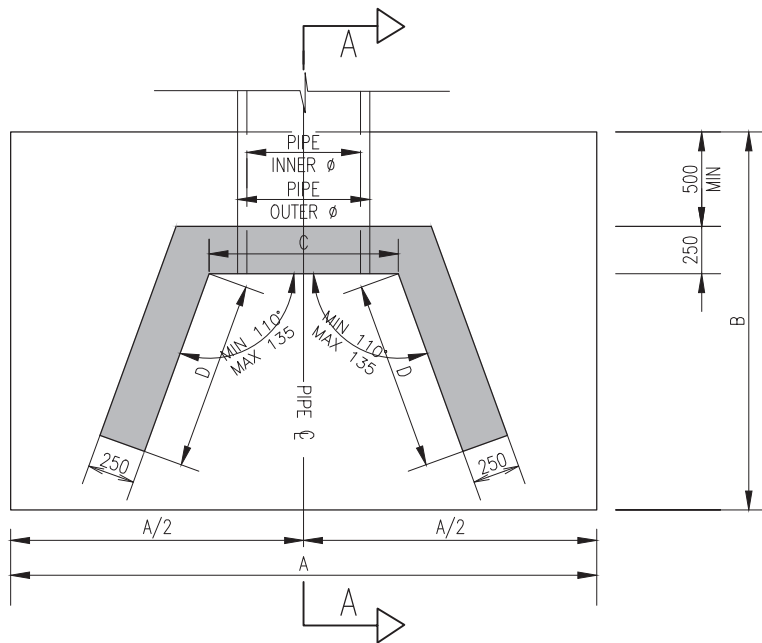
1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. ALL WELDS ARE TO BE 6mm FILLET WELDS EXCEPT WHERE STATED.
3. THE GRATINGS AND BRACKETS ARE TO BE FABRICATED FROM STEEL IS EN 10084 AND TO BE PROTECTED BY HOT DIP GALVANISING.
4. OUTLET GRID IS ONLY TO BE USED WHERE SELF CLEARING INLET GRID DETAILS TO RCD/500/51 IS PROVIDED.
5. PROPRIETRY SYSTEM MAY BE USED SUBJECT TO APPROVAL.

NOT TO SCALE

TII PUBLICATION NUMBER: CC-SCD-00552



ELEVATION



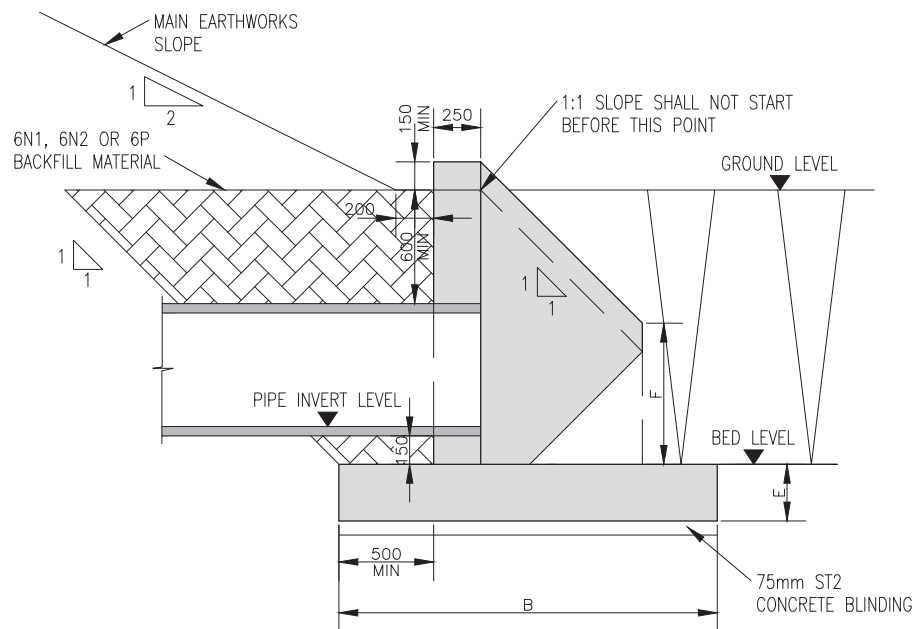
PLAN

NOT TO SCALE

SCHEDULE OF MINIMUM DIMENSIONS						
PIPE INNER ϕ	A	B	C	D	E	F
≤ 300	2000	2000	PIPE OUTER $\phi + 300$	1000	400	500
301–600	2500	2500	PIPE OUTER $\phi + 300$	1250	400	600
601–900	3200	3200	PIPE OUTER $\phi + 300$	1550	500	700
901–1200	3900	3900	PIPE OUTER $\phi + 300$	1850	500	800
1201–1500	4700	4700	PIPE OUTER $\phi + 300$	2150	500	900
1501–1800	5200	5200	PIPE OUTER $\phi + 300$	2350	500	1000

THE DIMENSIONS CONTAINED IN THE TABLE ABOVE ARE MINIMUMS ONLY AND THE DESIGNER SHALL CONFIRM DETAILS FOR SPECIFIC SITE CONDITIONS. THE DIMENSIONS CONTAINED IN THE TABLE ABOVE ARE BASED ON THE FOLLOWING CONSTRAINTS:

- ANGLE BETWEEN HEADWALL AND WINGWALL IS 110° ;
- BACKFILL MATERIAL IS FREE DRAINING;
- THERE ARE NO LIVE LOAD EFFECTS ON THE HEADWALL;
- CHARACTERISTIC VALUE OF INTERNAL FRICTION (ϕ) OF THE BACKFILL MATERIAL = 37.5° ;
- 600mm COVER TO THE PIPE AT THE REAR OF THE HEADWALL, WITH A 200mm WIDE FLAT AREA BEFORE THE COMMENCEMENT OF THE MAIN EARTHWORKS SLOPE;
- SLOPE OF FILL MEASURED FROM THE REAR FACE OF THE WINGWALLS DOWNWARDS AND FROM BED LEVEL UPWARDS ARE BOTH TO BE 1:1

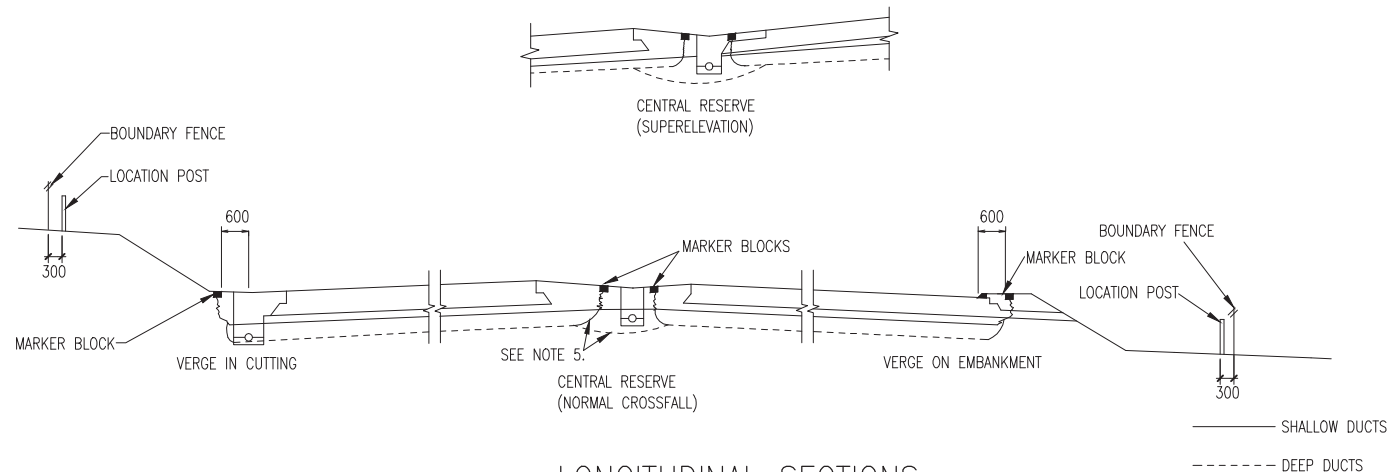


SECTION A-A

NOTES :

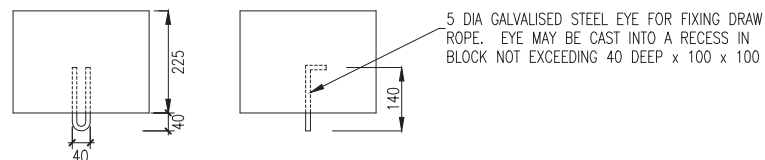
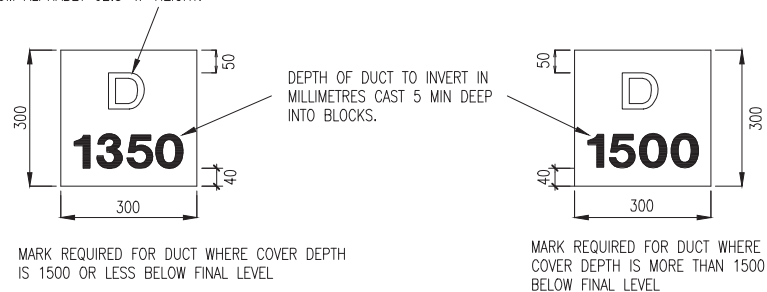
1. ALL DIMENSIONS ARE MILLIMETRES.
2. THIS RCD IS ONLY TO BE USED IN ASSOCIATION WITH A UNIQUE STRUCTURAL DESIGN. THIS DESIGN IS TO BE CARRIED OUT IN ACCORDANCE WITH THE NRA REQUIREMENTS FOR THE USE OF EUROCODES FOR THE DESIGN OF ROAD STRUCTURES.
3. REINFORCED CONCRETE SHALL BE A MINIMUM GRADE OF C32/40. ALL STRUCTURAL CONCRETE SHALL BE SPECIFIED IN ACCORDANCE WITH SERIES 1700 OF THE NRA MCDRW.
4. ALL BLINDING CONCRETE SHALL BE ST2 IN ACCORDANCE WITH IS EN 206.
5. THE MINIMUM COVER TO REINFORCEMENT FOR DURABILITY SHALL BE IN ACCORDANCE WITH NRA BD 57. MINIMUM EXPOSURE CLASS TO BE XC4.
6. ANY RESULTING VOID BETWEEN THE OUTSIDE OF THE PIPE AND THE OPE IN THE HEADWALL SHALL BE FILLED WITH NON-COMPRESSIBLE HIGH STRENGTH GROUT.
7. ALL EXPOSED CONCRETE SURFACES FROM 100mm BELOW GROUND LEVEL TO BE CLASS U4/F4 FINISH. ALL OTHER CONCRETE SURFACES TO BE CLASS U1/F1 FINISH UNLESS OTHERWISE SPECIFIED.
8. HEADWALL WINGWALLS TO BE SLOPED AND SHALL MAINTAIN A MINIMUM HEIGHT OF 150mm ABOVE ADJACENT BACKFILL LEVEL.
9. RENDERED CONCRETE BLOCKWORK MAY BE USED AS AN ALTERNATIVE TO IN-SITU OR PRECAST CONCRETE FOR PIPES UP TO 300mm INNER DIAMETER.
10. ALL HEADWALLS SHALL BE BACKFILLED WITH CLASS 6N1, 6N2 OR 6P BACKFILL MATERIAL. HEADWALLS SHALL BE FOUNDED ON A MINIMUM 75mm LAYER OF ST2 BLINDING CONCRETE. DETAILS OF THE SUB-BASE LAYER TO BE CONFIRMED BASED ON SITE CONDITIONS.
11. ROCK ARMOUR AND/OR GABION HEADWALLS AND WINGWALLS ARE PROHIBITED.

TII PUBLICATION NUMBER: CC-SCD-00553



LONGITUDINAL SECTIONS

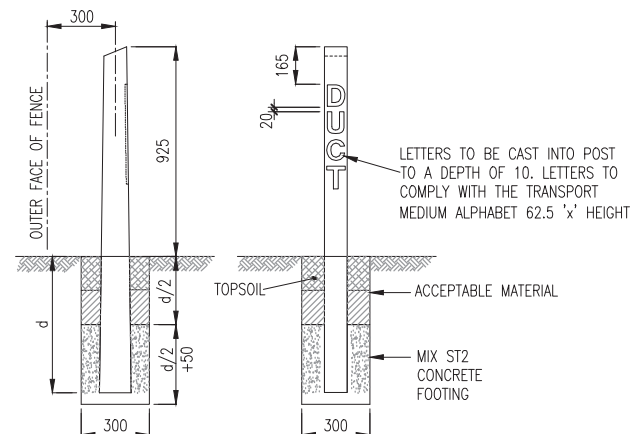
LETTER D TO BE CAST INTO MIX ST5 CONCRETE BLOCK TO A DEPTH OF 10. ALL LETTERS AND FIGURES TO COMPLY WITH THE TRANSPORT MEDIUM ALPHABET 62.5 'x' HEIGHT.



DETAIL OF MARKER BLOCK

TO BE POSITIONED OVER DUCT IN VERGES AND ON CENTRE LINE IN CENTRAL RESERVE. SLACK IN DRAW ROPE (MINIMUM 1m) TO BE COILED UNDER BLOCK

CLOSE BOARDED FENCE POST TO COMPLY WITH BS 1722 PT.5 TYPE PCR. 105 OR SIMILAR WITHOUT RECESS, WITH THE ADDITION OF CAST LETTERING AS DETAILED BELOW.



DUCT LOCATION POST

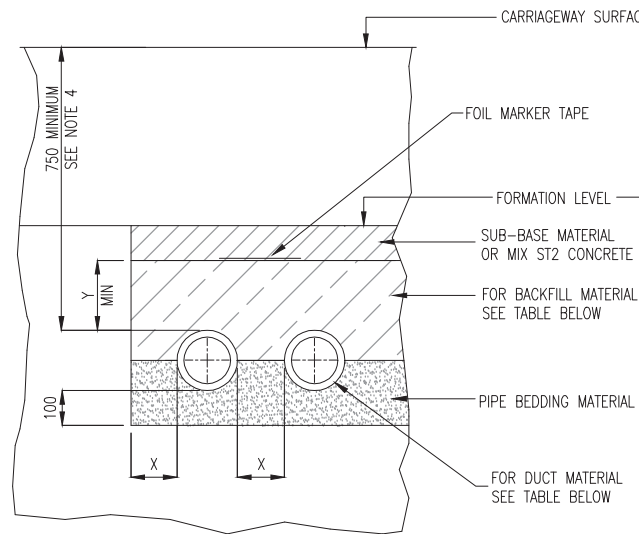
TO BE INSTALLED ON ϕ OF DUCT GROUP

NOTES:

- ALL DIMENSIONS ARE IN MILLIMETRES.
- DUCTS TO BE 100mm INTERNAL DIAMETER UNLESS OTHERWISE STATED IN APPENDIX 5/2.
- FOR DETAILS OF LOCATION OF DUCTS SEE THE LAYOUT PLANS.
- FOR DETAILS OF THE PERMITTED FORMS OF CONSTRUCTION FOR DUCTS SEE DRAWING No RCD/500/61.
- DUCTS ARE TO BE LAID STRAIGHT EXCEPT WHEN THEY HAVE TO CURVE AROUND OBSTACLES AND AT THE END OF DUCTS. NO CHANGE OF DIRECTION TO BE GREATER THAN 1 IN 30. THE MANDREL SHOWN ON DRAWING No RCD/500/62 SHALL BE DRAWN THROUGH THE COMPLETED DUCT.
- ALL DUCTS SHALL EXTEND A MINIMUM OF 600mm BEYOND THE PAVEMENT CONSTRUCTION AND WHERE POSSIBLE THE DRAINAGE TRENCH.
- DUCTS AND MARKERS SHALL NOT BE SITED UNDER SAFETY FENCE POSTS.
- WHERE DESCRIBED IN APPENDIX 5/2, 14/4 OR 15/1 MARKER BLOCK TERMINALS SHALL BE REPLACED WITH DUCT CHAMBERS.
- SEE DRAWING No RCD/500/63 FOR DUCT CROSSING TYPES.

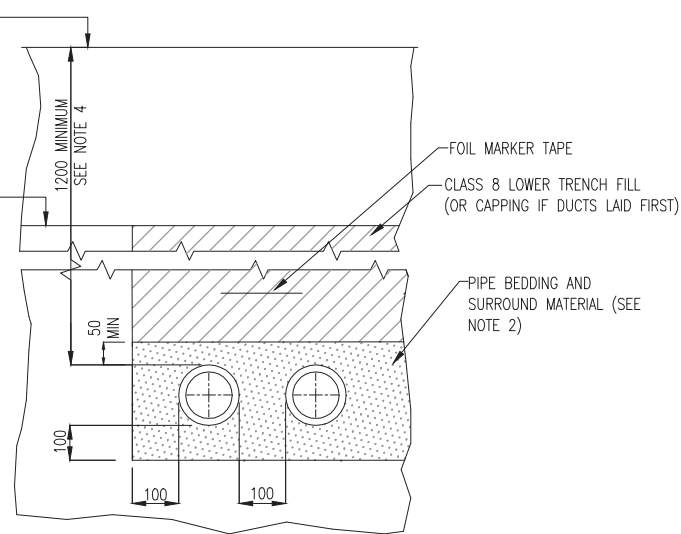
NOT TO SCALE

TII PUBLICATION NUMBER: CC-SCD-00560



TYPE A

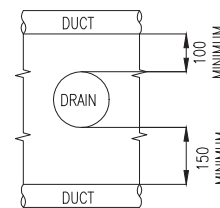
SHALLOW DUCTS (750 TO 1200 COVER)



TYPE B

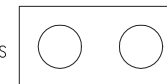
DEEP DUCTS (OVER 1200 COVER)

DUCT MATERIAL	BACKFILL MATERIAL	X	Y
UPVC	MIX ST2 CONCRETE	75	150
DUCTILE IRON	MIX ST2 CONCRETE OR SUB-BASE MATERIAL	AS ABOVE	150

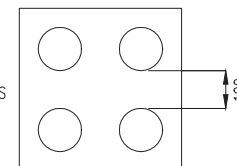


MINIMUM CLEARANCE BETWEEN
DUCT AND DRAIN

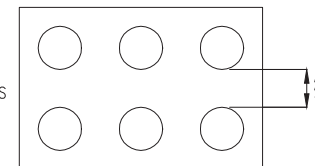
2 WAY = 2 DUCTS



4 WAY = 4 DUCTS



6 WAY = 6 DUCTS



LAYOUT OF DUCTS

NOTES:

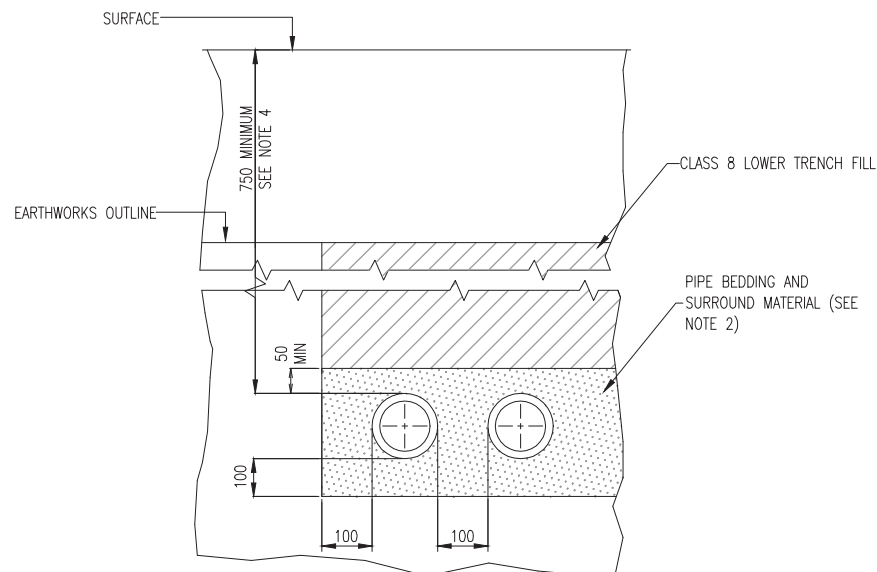
1. ALL DIMENSIONS ARE IN MILLIMETRES EXCEPT WHERE STATED.
2. PIPE BEDDING AND SURROUND MATERIAL SHALL BE SAND COMPLYING WITH TABLE 5/4 OF THE MCDRW.
3. CLASS 8 LOWER TRENCH FILL SHALL COMPLY WITH TABLE 6/1 OF THE MCDRW.
4. ALTERNATIVELY DUCTS SHALL BE LAID TO LIMITS DESCRIBED IN APPENDIX 5/2, 14/4 OR 15/1 OR SHOWN ON THE DRAWINGS.
5. MANDREL DETAIL IS SHOWN ON DRAWING No RCD/500/62.

NOT TO SCALE

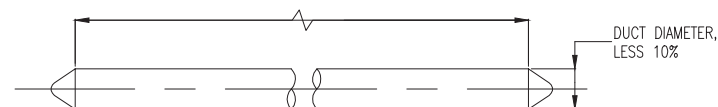
TII PUBLICATION NUMBER: CC-SCD-00561

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. PIPE BEDDING AND SURROUND MATERIAL SHALL BE SAND COMPLYING WITH TABLE 5/4 OF THE MCDRW.
3. CLASS 8 LOWER TRENCH FILL SHALL COMPLY WITH TABLE 6/1 OF THE MCDRW.
4. ALTERNATIVELY DUCTS SHALL BE LAID TO LIMITS DESCRIBED IN APPENDIX 5/2, 14/4 OR 15/1 OR SHOWN ON THE DRAWINGS.



TYPE C
NON-TRAFFICKED DUCTS (MINIMUM 750 COVER)



DETAIL OF MANDREL

(REQUIRED TO PASS THROUGH THE WHOLE LENGTH OF COMPLETED DUCTS WITH CURVED ENDS)

NOT TO SCALE

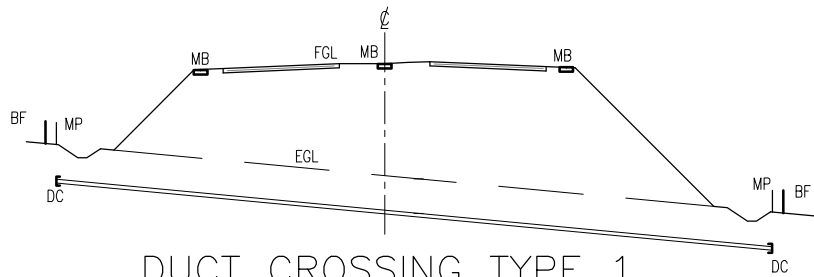
TII PUBLICATION NUMBER: CC-SCD-00562

NOTES:

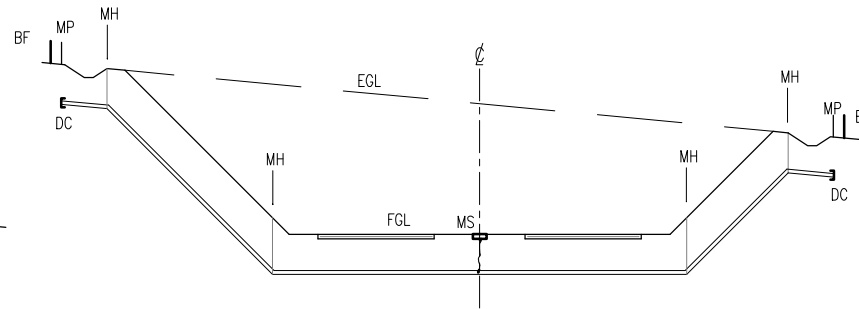
1. ALL DIMENSIONS IN MILLIMETRES EXCEPT WHERE STATED.
2. ALL DUCTS ARE 100mm TO CLAUSE 501 UNLESS OTHERWISE STATED IN APPENDIX 5/2.
3. MANHOLES ARE PLACED AT ALL CHANGES IN DIRECTION, OR AS SHOWN.
4. EACH DUCT TO BE SUPPLIED WITH 1 No. POLYPROPYLENE ROPE TO CLAUSE 501.8
5. DUCTS SHALL BE LAID STRAIGHT. NO CHANGE IN DIRECTION GREATER THAN 1 IN 30 TO CURVE AROUND OBSTACLES.
6. DUCTS AND MARKERS SHALL NOT BE SITED UNDER SAFETY FENCE POSTS.
7. DUCT LOCATION POSTS AND MARKER BLOCKS TO DRAWING No RCD/500/60.

LEGEND:

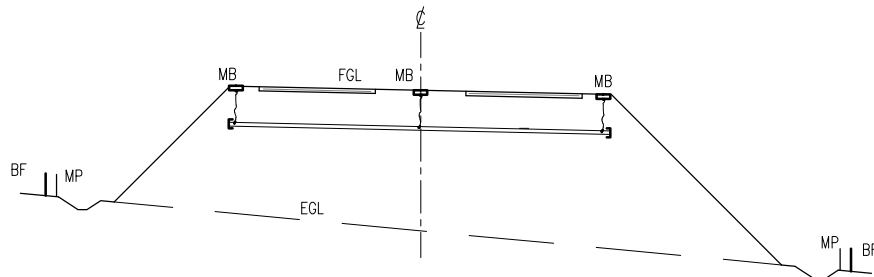
EGL= EXISTING GROUND LEVEL
 FGL = FUTURE GROUND LEVEL
 BF = BOUNDARY FENCE
 MP = MARKER POST
 MB = MARKER BLOCK
 DC = DUCT CAP
 MH = MANHOLE



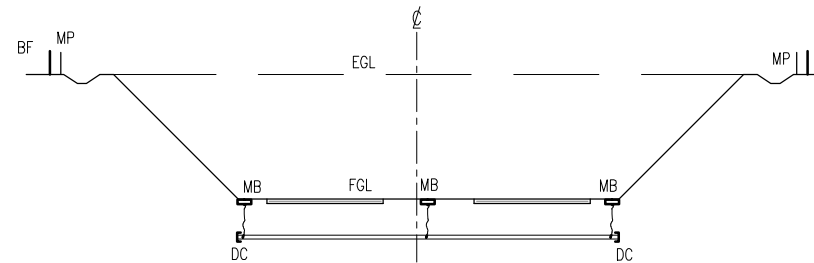
DUCT CROSSING TYPE 1
(FILL AREAS)



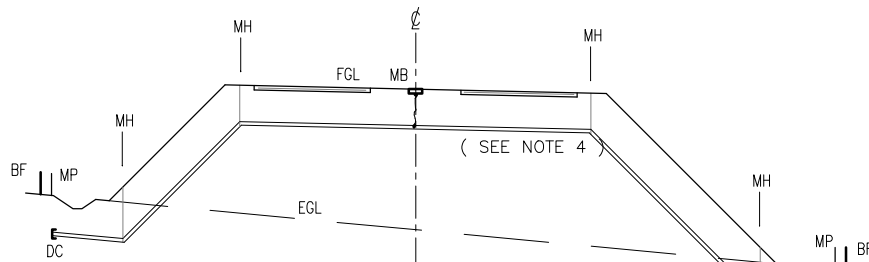
DUCT CROSSING TYPE 4
(FILL AREAS)



DUCT CROSSING TYPE 2
(FILL AREAS)



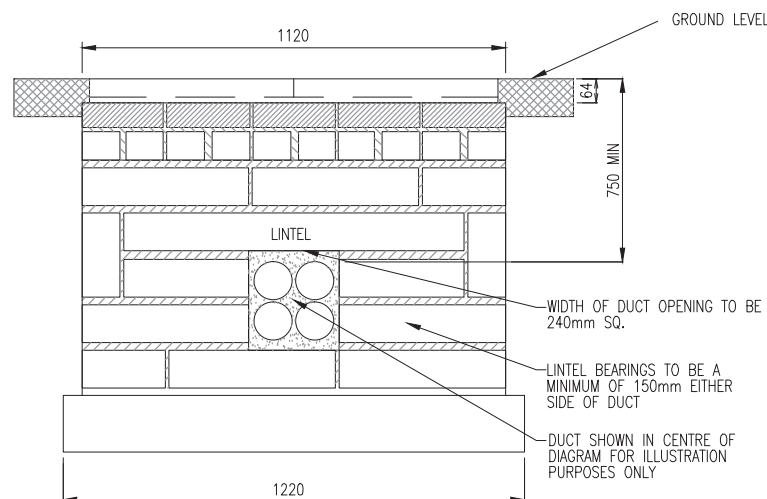
DUCT CROSSING TYPE 5
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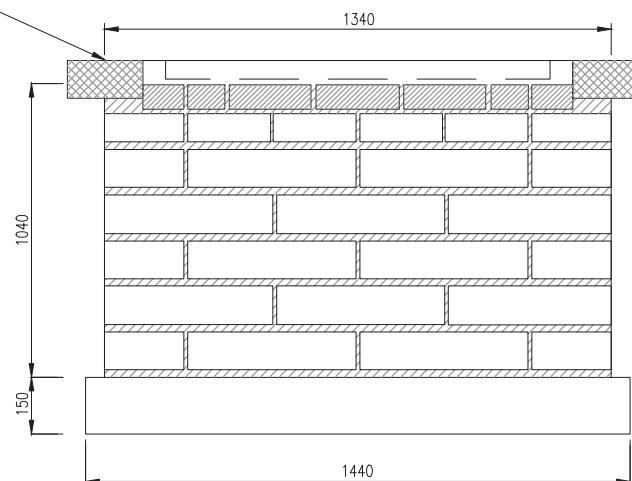
DUCT CROSSING TYPE 3
(FILL AREAS)

NOT TO SCALE

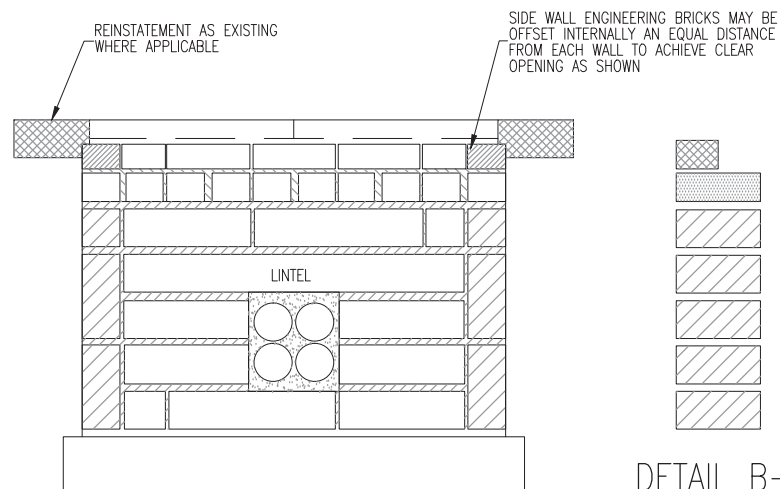
TII PUBLICATION NUMBER: CC-SCD-00563



END ELEVATION

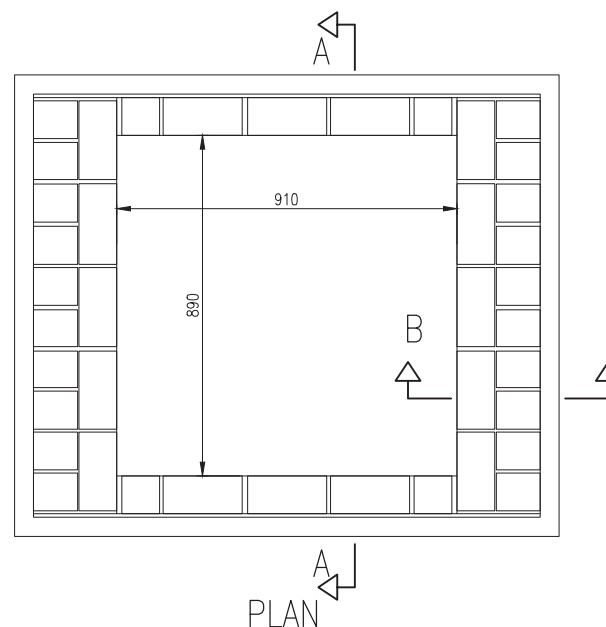


SIDE ELEVATION



SECTION A-A

DETAIL B-B



PLAN

NOTES:

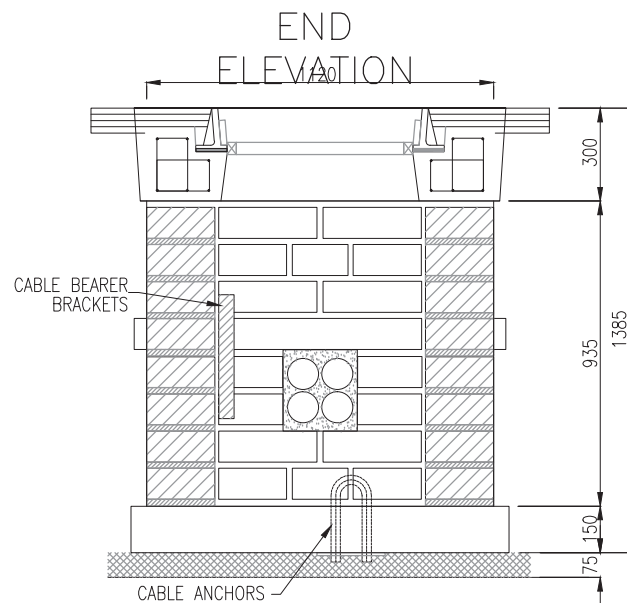
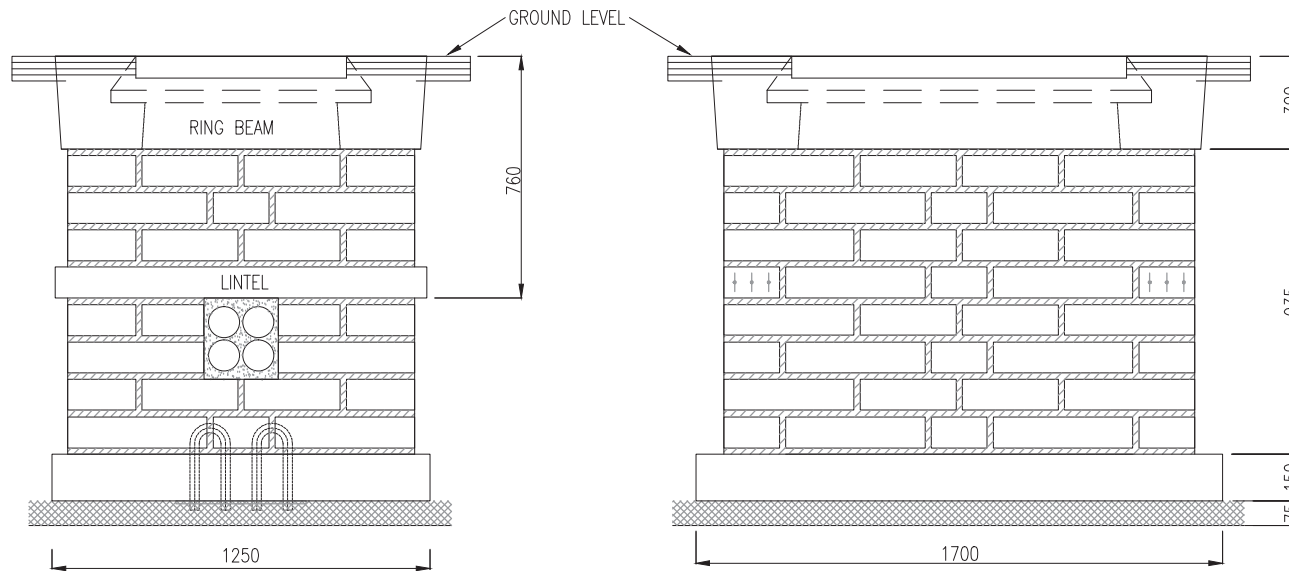
1. ALL DIMENSIONS IN MILLIMETRES.
2. FOUNDATIONS TO BE AS PER SPEC 507.2.
3. CONCRETE MIX SHALL BE ST4 AS PER SPEC 507.2.
4. CHAMBER WALLS TO BE TYPE S10 BLOCKS COLOURED RED WITH 10 N/mm² MINIMUM COMPRESSIVE STRENGTH AND CLASS B ENGINEERING BRICK WITH 50 N/mm² MINIMUM COMPRESSIVE STRENGTH.
5. BLOCK AND BRICK LAYERS TO BE IN ACCORDANCE WITH DETAIL WITH 900x215x100mm REINFORCED CONCRETE LINTEL TO IS 240 ABOVE DUCT OPENINGS. ALLOW 3 DAYS FOR BLOCKWORK MORTAR TO CURE BEFORE BACKFILLING VOIDS OUTSIDE BLOCKWORK WITH LEAN MIX CONCRETE OR SUBBASE TO CLAUSE 804 LAID IN 200mm THICK LAYERS EACH LAYER WELL CONSOLIDATED WITH A MECHANICAL COMPACTOR.
6. OPTIMUM POSITION OF DUCTS TO BE 115mm ABOVE FLOOR OF CHAMBER.
7. MORTAR TO BE 1:3 CEMENT/SAND MIX AS PER SPEC 507.13.
8. SIZE OF BLOCK = 440x215x100mm SIZE OF ENGINEERING BRICK = 215x100x65mm.
9. ALL JOINTS TO BE 8 TO 15mm THICK AS PER SPEC 507.3 AND SERIES 2400.
10. COVER FRAME TO BE FULLY BEDDED ON MINIMUM OF 10 mm DESIGNATION 1 MORTAR AS PER SPEC 507.3.
11. POSITION OF CABLE BEARER BRACKETS AND SUMP TO BE DECIDED ON SITE WHERE REQUIRED.
12. WHERE SUMP IS INSTALLED IT SHOULD BE DISH FORMED AND NOT EXTEND THROUGH PLINTH.
13. LOCKABLE COVERS CAN ONLY BE REMOVED FROM LOCKED END. FRAMES MUST BE LAID TO ALLOW FOR EASY REMOVAL OF COVERS AS PER 507.7.
14. PRECAST CHAMBERS TO IS EN 1917 ARE ALSO PERMITTED AS PER SPEC 507.4.
15. CAST IN-SITU CONCRETE CHAMBERS ARE ALSO PERMITTED AND SMALL BE CONSTRUCTED AS PER SPEC 507.4.

SCALE 1:25

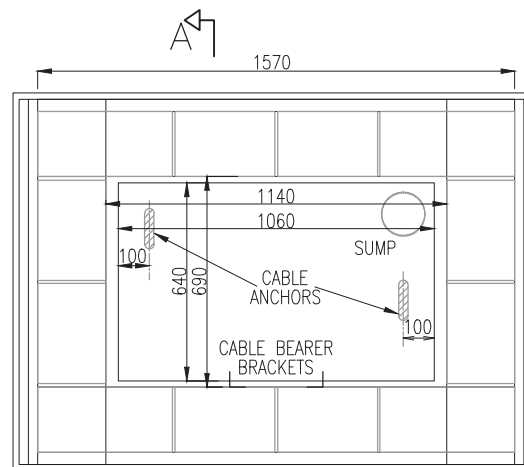
TII PUBLICATION NUMBER: CC-SCD-00564

NOTES:

1. ALL DIMENSIONS IN MILLIMETRES.
2. FOUNDATIONS TO BE AS PER SPEC 507.2.
3. CONCRETE MIX SHALL BE ST4 AS PER SPEC 507.2.
4. VIBRATE USING HYDRAULIC VIBRATOR AND ALLOW TO SET OVERNIGHT.
5. CHAMBER WALLS TO BE SOLID BLOCKS TO IS 20 COLOURED BLACK WITH 21 N/mm² MINIMUM COMPRESSIVE STRENGTH.
6. BLOCK LAYERS TO BE IN ACCORDANCE WITH DETAIL WITH 1200x215x100mm REINFORCED CONCRETE LINTEL TO IS 240 ABOVE DUCT OPENINGS. ALLOW 3 DAYS FOR BLOCKWORK MORTAR TO CURE BEFORE BACKFILLING VOIDS OUTSIDE BLOCKWORK WITH GRADE C20/10 CONCRETE WELL CONSOLIDATED WITH A MECHANICAL COMPACTOR.
7. MORTAR TO BE 1:3 CEMENT/SAND MIX AS PER SPEC 507.13.
8. SIZE OF BLOCK = 440x215x100mm.
9. ALL JOINTS TO BE 8 TO 15mm THICK S PER SPEC 507.3 AND SERIES 2400.
10. COVER FRAME TO BE FULLY BEDDED ON MINIMUM OF 10 mm DESIGNATION 1 MORTAR.
11. POSITION OF CABLE BEARER BRACKETS AND SUMP TO BE DECIDED ON SITE.
12. ANCHOR IRONS TO BE SET IN FLOOR WITH BASE OF IRONS BELOW MESH.
13. PRECAST CHAMBERS TO IS EN 1917 ARE ALSO PERMITTED AS PER SPEC 507.4.
14. CAST IN-SITU CONCRETE CHAMBERS ARE ALSO PERMITTED AND SMALL BE CONSTRUCTED AS PER SPEC 507.4.



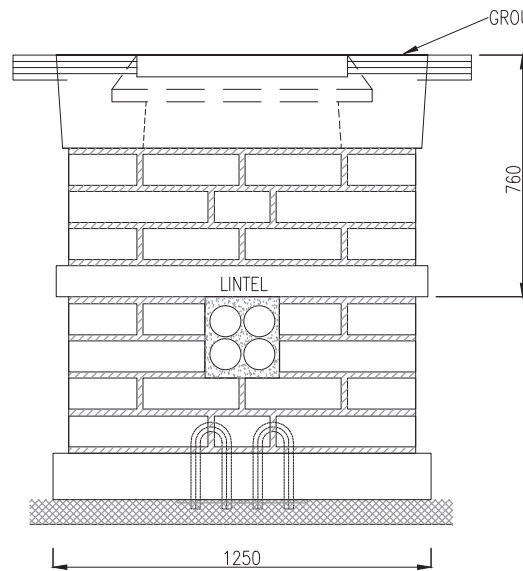
SECTION A-A



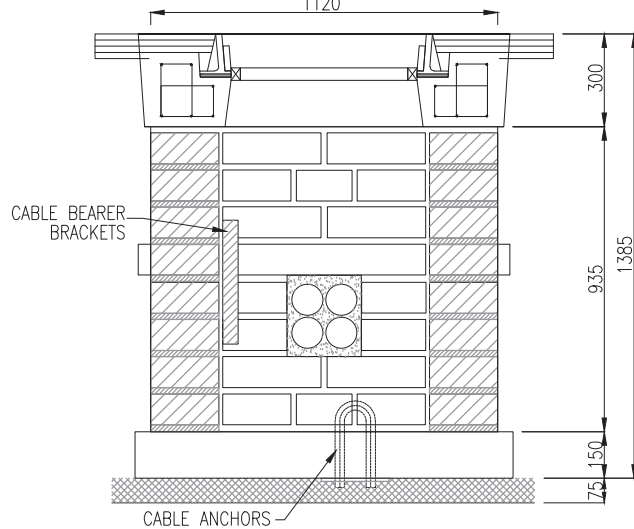
PLAN

SCALE 1:25

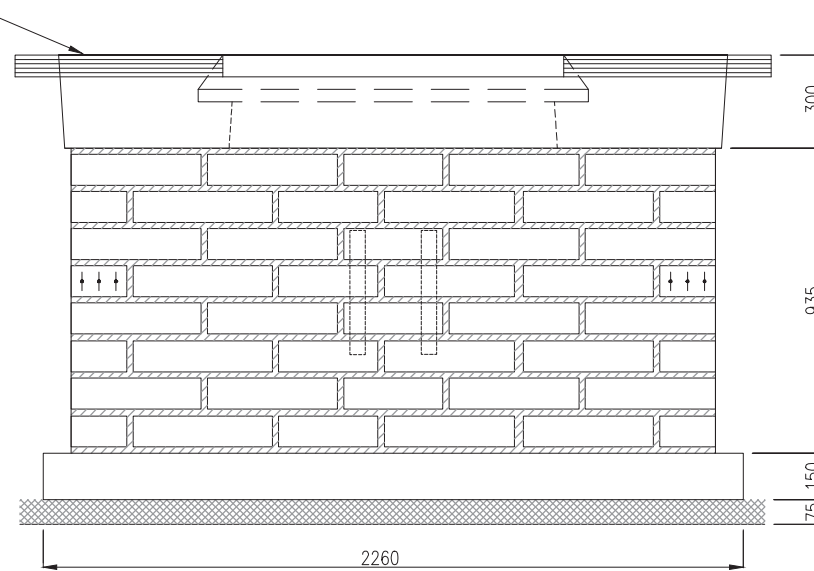
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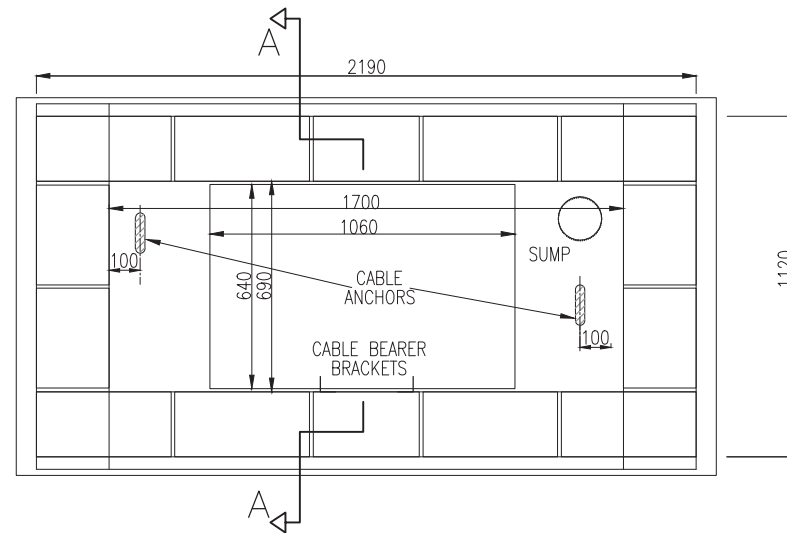
END
ELEVATION



SECTION A-A



SIDE
ELEVATION



PLAN

NOTES:

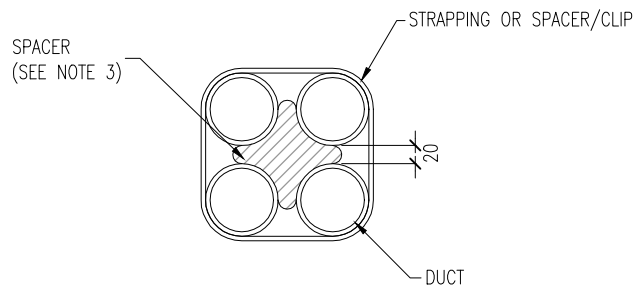
1. ALL DIMENSIONS IN MILLIMETRES.
2. FOUNDATIONS TO BE AS PER SPEC 507.2.
3. CONCRETE MIX SHALL BE ST4 AS PER SPEC 507.2.
4. VIBRATE USING HYDRAULIC VIBRATOR AND ALLOW TO SET OVERNIGHT.
5. CHAMBER WALLS TO BE SOLID BLOCKS TO IS 20 COLOURED BLACK WITH 21N/mm² MINIMUM COMPRESSIVE STRENGTH.
6. BLOCK LAYERS TO BE IN ACCORDANCE WITH DETAIL WITH 1200x215x100mm REINFORCED CONCRETE LINTEL TO IS 240 ABOVE DUCT OPENINGS. ALLOW 3 DAYS FOR BLOCKWORK MORTAR TO CURE BEFORE BACKFILLING VOIDS OUTSIDE BLOCKWORK WITH GRADE C20/10 CONCRETE WELL CONSOLIDATED WITH A MECHANICAL COMPACTOR.
7. MORTAR TO BE 1:3 CEMENT/SAND MIX AS PER SPEC 507.13.
8. SIZE OF BLOCK = 440x215x100mm.
9. ALL JOINTS TO BE 8 TO 15mm THICK AS PER SPEC 507.3 AND SERIES 2400.
10. COVER FRAME TO BE FULLY BEDDED ON MINIMUM OF 10mm DESIGNATION 1 MORTAR AS PER SPEC 507.3.
11. POSITION OF CABLE BEARER BRACKETS AND SUMP TO BE DECIDED ON SITE.
12. ANCHOR IRONS TO BE SET IN FLOOR WITH BASE OF IRONS BELOW MESH.
13. PRECAST CHAMBERS TO IS EN 1917 ARE ALSO PERMITTED AS PER SPEC 507.4.
14. CAST IN-SITU CONCRETE CHAMBERS ARE ALSO PERMITTED AND SHALL BE CONSTRUCTED AS PER SPEC 507.4.

NOT TO SCALE

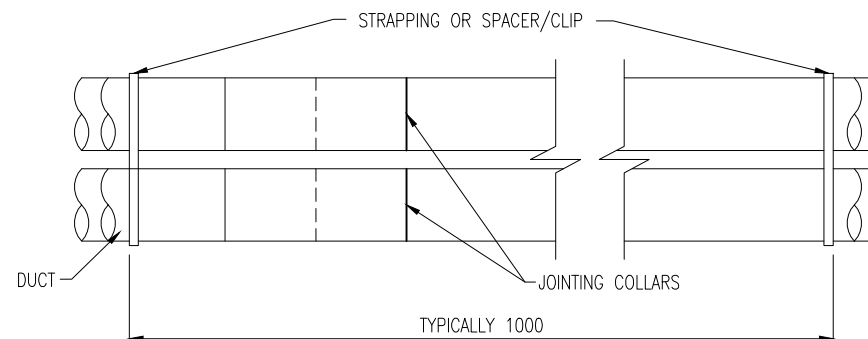
TII PUBLICATION NUMBER: CC-SCD-00566

NOTES:

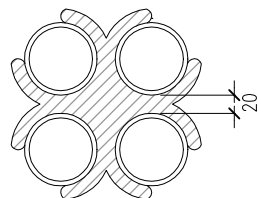
1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. DUCTS SHALL BE SEPARATED BY MEANS OF A PURPOSE MADE SPACER. THE SPACER SHALL ENSURE THAT THERE IS SUFFICIENT ROOM FOR JOINTING COLLARS – NOMINALLY 20mm SEPARATION. SPACERS ARE PROVIDED TO ENSURE THAT THE SEPARATION BETWEEN DUCTS REMAINS CONSTANT ALONG THE LENGTH OF DUCTS DURING INSTALLATION, BACKFILLING AND IN SERVICE. SPACERS SHALL NOT CAUSE DAMAGE TO THE DUCTS EITHER DURING INSTALLATION OR IN SERVICE.
3. THE STRAPPING IS TO BE PURPOSE MADE AND SPACED AT INTERVALS TO ENSURE THAT THE DUCT AND SPACER ARRANGEMENT SHOWN IN THE SECTIONAL DETAIL IS NOT DISTURBED DURING INSTALLATION, BACKFILLING AND IN SERVICE. THAT STRAPPING WOULD TYPICALLY BE INSTALLED AT 1000 INTERVALS.
4. A PURPOSE MADE, COMBINED, SPACER/CLIP ARRANGEMENT MAY BE USED AS AN ALTERNATIVE TO SEPARATE SPACER AND STRAPPING, PROVIDED THAT THE CONTRACTOR CAN DEMONSTRATE THAT THE SPACER/CLIP IS CAPABLE OF RETAINING DUCTS IN PLACE DURING INSTALLATION AND SERVICE.



SECTION THROUGH LONGITUDINAL
DUCT ARRANGMENT



ELEVATION ON LONGITUDINAL DUCT
ARRANGMENT



ALTERNATIVE SPACER/CLIP
ARRANGEMENT

NOT TO SCALE

TII PUBLICATION NUMBER: CC-SCD-00567



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