Std. Dwg. No.	Descriptions
	ACCESS CHAMBERS
	ACCESS CHAMBER
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D-0011	ROOF SLABS DIA 1050 TO 1500
D-0012	ROOF SLABS DIA 1500 EXTENDED 600 AND 900
D-0013	ROOF SLAB RECTANGULAR
D-0014	CAST IRON COVER AND FRAME CI CONCRETE FILLED COVER
D-0015	CAST IRON COVER AND FRAME BOLT DOWN
	BEDDING AND BACKFILLING
D-0030	EXCAVATION, BEDDING AND BACKFILLING OF CONCRETE/FIBRE REINFORCED DRAINAGE PIPES
D-0031	EXCAVATION, BEDDING AND BACKFILLING OF PRECAST BOX CULVERTS
	FIELD INLET
D-0050	FIELD INLET AND OVERFLOW GULLY TYPE 1 AND TYPE 2
	GULLY
	GULLY – ROADWAY TYPE
D-0061	PRECAST LINTEL DETAILS KERB IN LINE
D-0062	GRATE AND FRAME
D-0063	GULLY – ROADWAY TYPE CHANNEL LIP IN LINE
	DRAINWAY STORMWATER INLET
D-0064	COMPONENTS
D-0065	CAST IRON GRATE COVER AND FRAME
D-0066	TEST LOAD PROCEDURE
D-0067	CONSTRUCTION SETTING OUT BARRIER/MOUNTABLE KERB & CHANNEL
D-0068	GULLY – ANTI-PONDING DEPRESSED 17mm
D-0069	ROCLA/BROPIT SYSTEM
	INLETS AND OUTLETS
D-0080	INLETS AND OUTLETS TO STORMWATER DRAINS (CONCRETE)
	ROOF WATER DRAINAGE
D-0110	ROOFWATER INSPECTION CHAMBER

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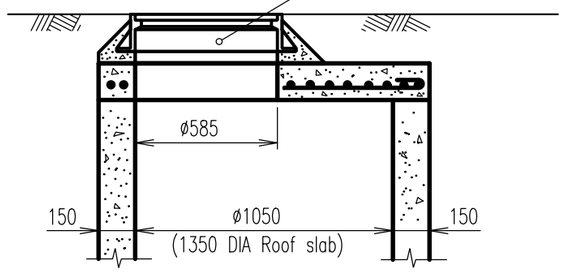
INDEX
STANDARD DRAWINGS
DRAINAGE

DRAINAGE
Standard Drawing
D-0001

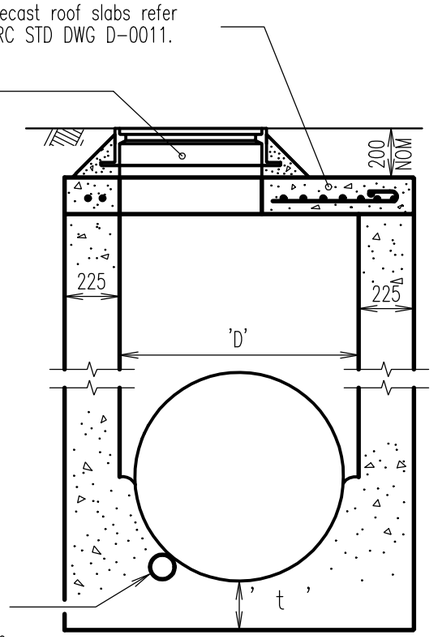
A | B | C | D



SECTION
ALTERNATIVE 1
1050 DIA MH.

INVERT GRADE DIMENSION 't' (MIN)

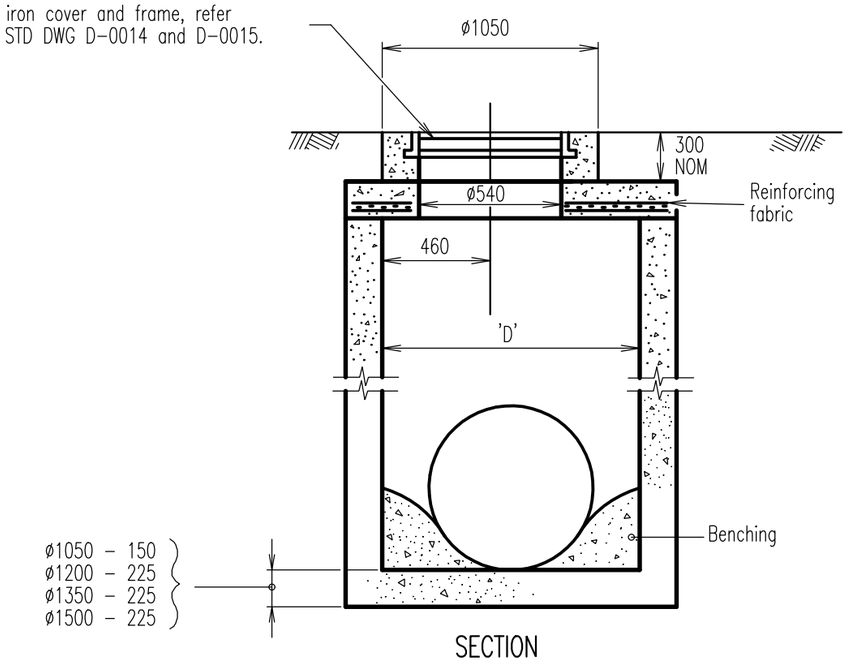
Access chamber DIA	FLOOR THICKNESS 't'	
	INLET	OUTLET
1050	175	150
1200	250	225
1350	250	225
1500	250	225



ø100 uPVC slotted pipe stub, 1000 long with end cap,installed on the upstream side of access chamber (unless directed otherwise) The stub is required to dewater the pipe trench.

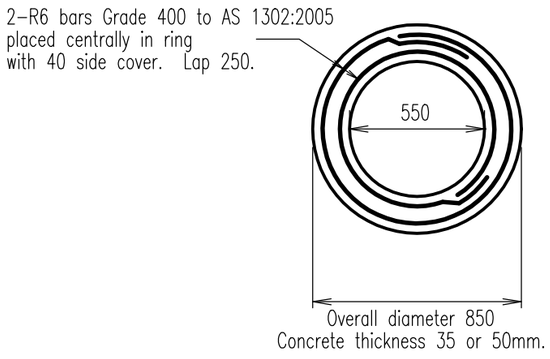
'D' { 1200 (1650 DIA roof slab)
1350 (1800 DIA roof slab)
1500 (1950 DIA roof slab)

TYPICAL SECTION

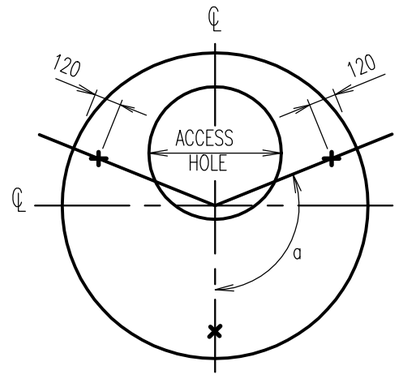


SECTION
ALTERNATIVE 2

ACCESS CHAMBER DETAILS



PLAN
ROOF RING
For use in raising covers and frames of existing access chambers



a =112° For ø1350

a =120° For ø1650–1950

LIFTING ANCHOR LOCATIONS
(Refer Note 5)

NOTES:
1. Structural concrete N25, benching N10 in accordance with AS 1379:2007 and AS 3600:2009.
2. Refer WRC STD DWG D–0011 and D–0012 for roof slab reinforcement details.
3. Alternatives :–
   For access hole location refer Service Authority.
   For turent type refer Service Authority.
4. Refer Project Drawings for size and level of culverts, and chamber cover level.
5. Lifting anchors to be "swiftlift" or equivalent 1.8 tonne, galvanized to AS/NZS 4680:2006 and fitted to manufacturer's specifications.
6. Access chambers deeper than 3.0m to have an access ladder to AS 1657:2013 in lieu of step irons.
7. All dimensions in millimetres.

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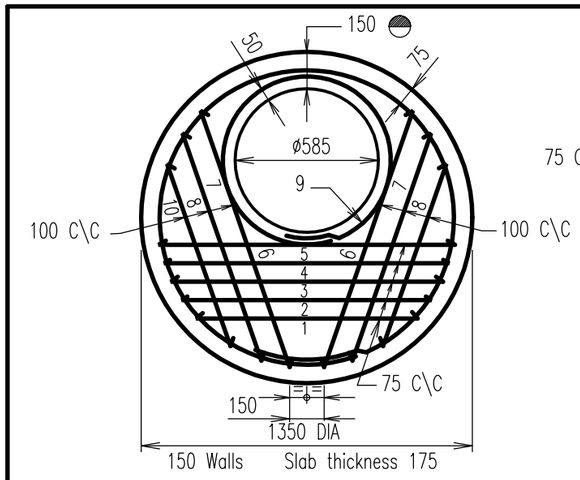
ACCESS CHAMBER DETAILS DIA 1050 TO 1500

DRAINAGE
Standard Drawing
D–0010

A | B | C

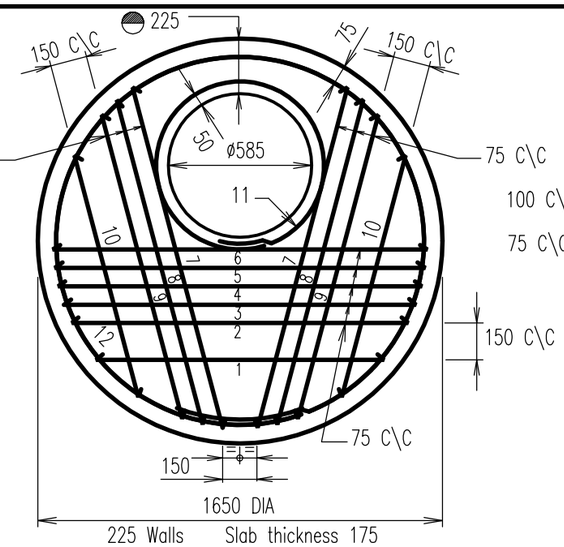


150 Walls Slab thickness 175

BAR No.	SHAPE	'a'/'b'	OVERALL LENGTH	No. OFF	TOTAL LENGTH
1		937	1175	1	1175
2		1030	1255	1	1255
3		1125	1350	1	1350
4	'a'	1175	1400	1	1400
5		1225	1450	1	1450
6		1125	1350	2	2700
7		1000	1225	2	2450
8		812	1050	2	2100
9	'b'	685	2550	1	2550
10		1200	4200	1	4200
			TOTAL		20630

STEEL MASS : 19kg
CONCRETE : 0.20m³
TOTAL MASS : 508kg

1050 DIA ACCESS CHAMBER

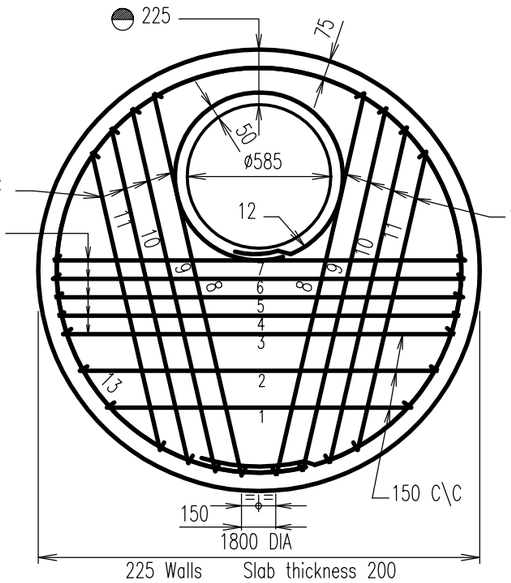


225 Walls Slab thickness 175

BAR No.	SHAPE	'a'/'b'	OVERALL LENGTH	No. OFF	TOTAL LENGTH
1		1200	1425	1	1425
2		1400	1625	1	1625
3		1450	1675	1	1675
4		1500	1725	1	1725
5	'a'	1520	1745	1	1745
6		1537	1775	1	1775
7		1450	1675	2	3350
8		1375	1600	2	3200
9		1300	1525	2	3050
10		1050	1275	2	2550
11	'b'	685	2550	1	2550
12		1500	5150	1	5150
			TOTAL		23200

STEEL MASS : 27kg
CONCRETE : 0.33m³
TOTAL MASS : 818kg

1200 DIA ACCESS CHAMBER

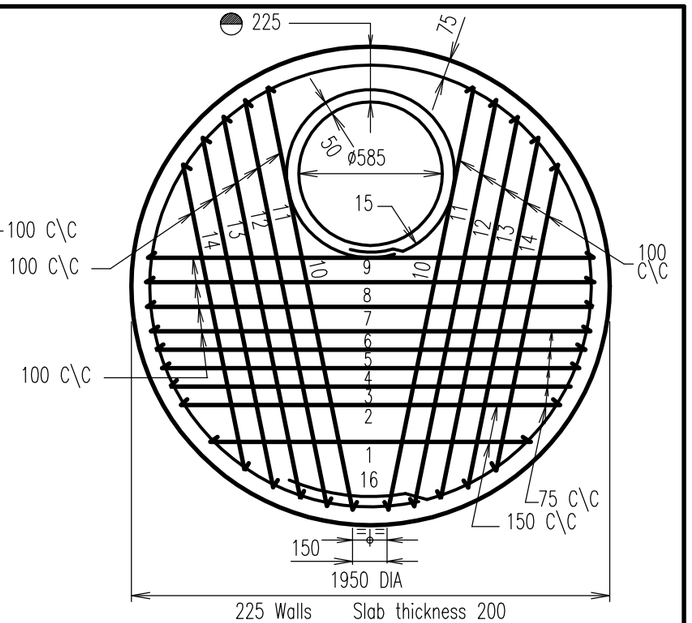


225 Walls Slab thickness 200

BAR No.	SHAPE	'a'/'b'	OVERALL LENGTH	No. OFF	TOTAL LENGTH
1		1275	1500	1	1500
2		1488	1725	1	1725
3		1612	1850	1	1850
4		1645	1870	1	1870
5	'a'	1675	1900	1	1900
6		1675	1900	1	1900
7		1675	1900	1	1900
8		1600	1825	2	3650
9		1525	1750	2	3500
10		1412	1650	2	3300
11		1262	1500	2	3000
12	'b'	685	2550	1	2550
13		1650	5625	1	5625
			TOTAL		34270

STEEL MASS : 31kg
CONCRETE : 0.45m³
TOTAL MASS : 1138kg

1350 DIA ACCESS CHAMBER

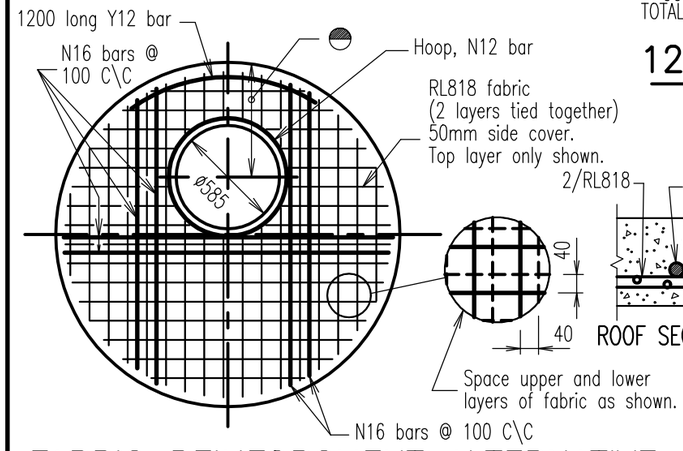


225 Walls Slab thickness 200

BAR No.	SHAPE	'a'/'b'	OVERALL LENGTH	No. OFF	TOTAL LENGTH
1		1337	1575	1	1575
2		1575	1800	1	1800
3		1645	1870	1	1870
4		1712	1950	1	1950
5		1756	1980	1	1980
6	'a'	1800	2025	1	2025
7		1825	2050	1	2050
8		1837	2075	1	2075
9		1825	2050	1	2050
10		1762	2000	2	4000
11		1700	1925	2	3850
12		1600	1825	2	3650
13		1462	1700	2	3400
14		1275	1500	2	3000
15	'b'	685	2550	1	2550
16		1800	6100	1	6100
			TOTAL		43925

STEEL MASS : 39kg
CONCRETE : 0.55m³
TOTAL MASS : 1360kg

1500 DIA ACCESS CHAMBER



FABRIC REINFORCMENT ALTERNATIVE

FABRIC REINFORCED SLAB

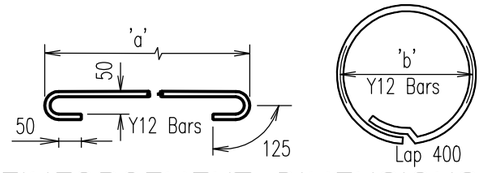
NOM DIA	ROOF THICKNESS
1050	175
1200	175
1350	200
1500	250

LEGEND

Offset to access hole varies :-
a) Hole in line with chamber wall, or
b) Hole offset from wall 460mm
(refer Alternative 2 on WRC STD DWG D-0010).

NOTES:

1. Concrete N40 in accordance with AS 1379:2007 and AS 3600:2009.
2. Reinforcement cover 30 MIN (bottom cover)
3. Reinforcement :- RL818 Fabric to AS/NZS 4671:2001
   Bars N12 and N16, Grade 500 to AS/NZS 4671:2001
4. For lifting anchor locations and details, refer WRC STD DWG D-0010.
5. Roof design based on Austroads bridge code, W7 wheel load, dynamic factor 0.4.
6. All dimensions in millimetres.



REINFORCEMENT DIMENSIONS

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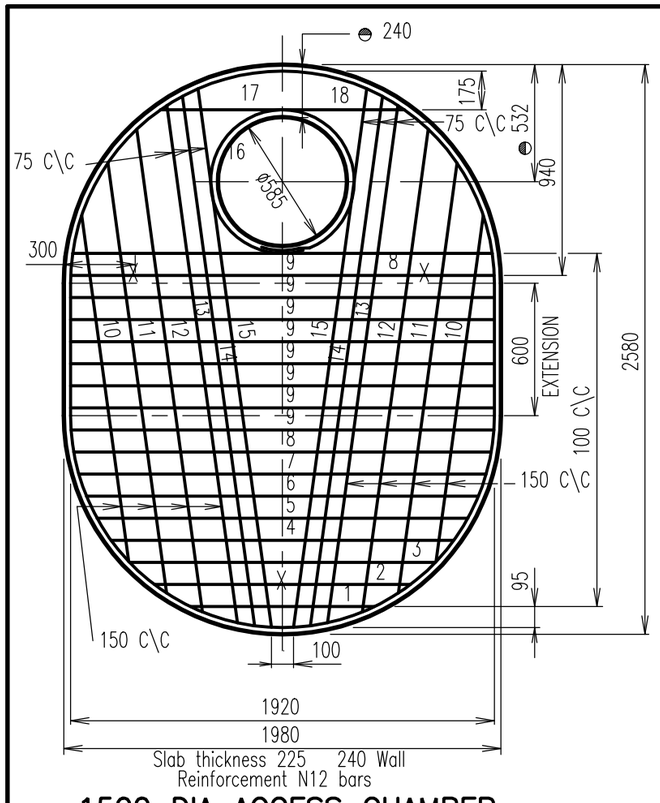
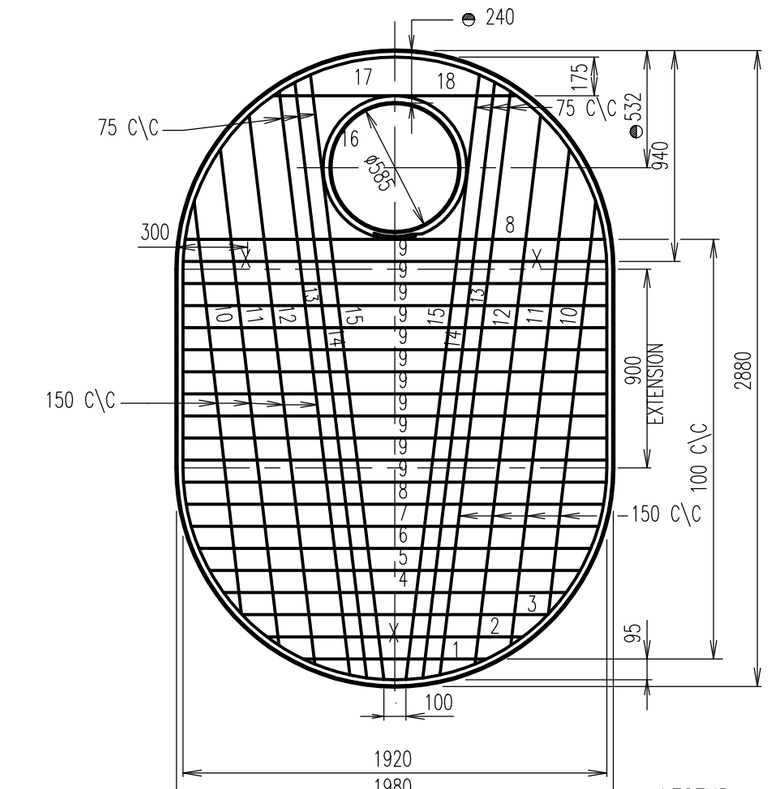
ACCESS CHAMBER ROOF SLABS DIA 1050 - 1500

DRAINAGE
Standard Drawing
D-0011

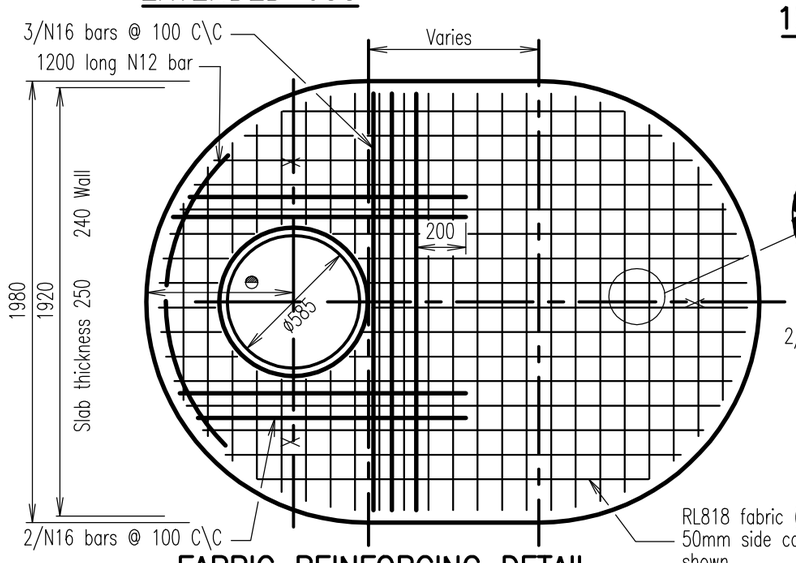
A | B | C



1500 DIA ACCESS CHAMBER EXTENDED 600

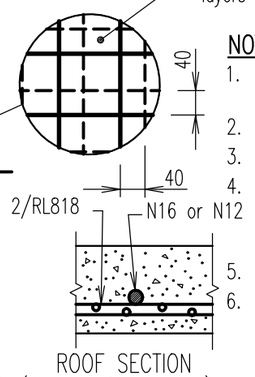


1500 DIA ACCESS CHAMBER EXTENDED 900



FABRIC REINFORCING DETAIL

RL818 fabric (2 layers tied together) 50mm side cover. Top layer only shown.



ROOF SECTION

LEGEND

- Offset to access hole varies :-
  a) Hole in line with chamber wall, or
  b) Hole offset from wall 460mm (refer Alternative 2 on WRC STD DWG D-0010).

NOTES:

1. Roof design based on Austroads Bridge code, W7 wheel load, dynamic factor 0.4.
2. Concrete N40 in accordance with AS 1379:2007 and AS 3600:2009.
3. Reinforcement cover 30 MIN (bottom face).
4. Reinforcement :- RL818 Fabric to AS/NZS 4671:2001
   Bars N12 and N16, Grade 500 to AS/NZS 4671:2001
5. Refer WRC STD DWG D-0011 for 'reinforcement dimensions'.
6. Lifting anchors to be "swiftlift" or equivalent. 1.8 tonne, galvanized to AS/NZS 4680:2006 and fitted to manufacturer's specification at points shown 'X'.
7. Lifting capacity of mechanical devices to be no less than 4 tonnes.
8. All dimensions in millimetres.

1500 DIA ACCESS CHAMBER EXTENDED 600

BAR NO.	SHAPE	LENGTH	NO. OFF	TOTAL
1		835	1	835
2		1160	1	1160
3		1385	1	1385
4		1550	1	1550
5		1680	1	1680
6		1775	1	1775
7		1845	1	1845
8		1890	2	3780
9		1920	8	15360
10		1560	2	3120
11		1920	2	3840
12		2170	2	4340
13		2300	2	4600
14		2375	2	4750
15		2450	2	4900
16		2550	1	2550
17		7195	1	7195
18		1105	1	1105
			TOTAL LENGTH	65770

Steel Mass 59 kg
Concrete Volume 0.90 m³
Total Mass 2250 kg

1500 DIA ACCESS CHAMBER EXTENDED 900

BAR NO.	SHAPE	LENGTH	NO. OFF	TOTAL
1		835	1	835
2		1160	1	1160
3		1385	1	1385
4		1550	1	1550
5		1680	1	1680
6		1775	1	1775
7		1845	1	1845
8		1890	2	3780
9		1920	11	21120
10		1800	2	3600
11		2200	2	4400
12		2470	2	4940
13		2650	2	5300
14		2700	2	5400
15		2750	2	5500
16		2550	1	2550
17		7795	1	7795
18		1105	1	1105
			TOTAL LENGTH	75720

Steel Mass 67 kg
Concrete Volume 1.03 m³
Total Mass 2575 kg

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ACCESS CHAMBER ROOF SLABS DIA. 1500 EXTENDED 600 AND 900

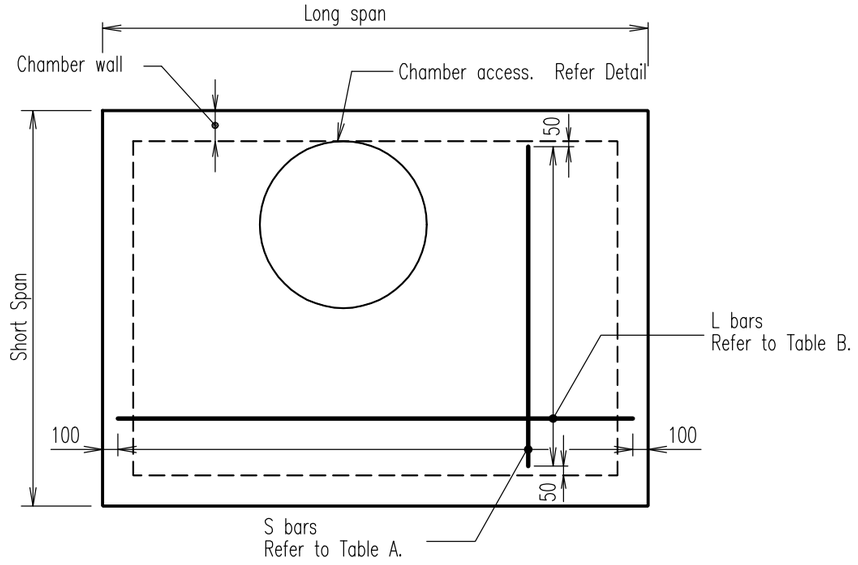
DRAINAGE Standard Drawing
D-0012
A B C

SHORT SPAN \ LONG SPAN	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	SLAB DEPTH
1200	N12 AT 150	N16 AT 200	N16 AT 200	N16 AT 200	N16 AT 175	N16 AT 175	N16 AT 175	N16 AT 150	N16 AT 150	N16 AT 150	200
1400		N12 AT 150	N16 AT 200	N16 AT 200	N16 AT 175	N16 AT 175	N16 AT 150	N16 AT 150	N16 AT 150	N16 AT 150	200
1600			N12 AT 150	N16 AT 200	N16 AT 200	N16 AT 175	N16 AT 150	N16 AT 150	N16 AT 150	N16 AT 150	200
1800				N12 AT 150	N16 AT 200	N16 AT 200	N16 AT 200	N16 AT 175	N16 AT 175	N16 AT 175	225
2000					N12 AT 150	N16 AT 200	N16 AT 200	N16 AT 200	N16 AT 175	N16 AT 175	225
2200						N12 AT 150	N16 AT 200	N16 AT 200	N16 AT 175	N16 AT 175	225
2400							N16 AT 200	N16 AT 200	N16 AT 200	N16 AT 175	225
2600								N16 AT 200	N16 AT 200	N16 AT 175	250
2800									N16 AT 200	N16 AT 175	250
3000										N16 AT 175	250

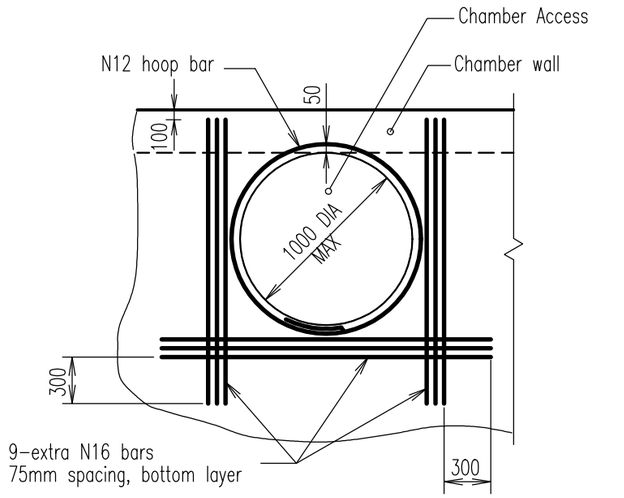
TABLE A : S BARS

SHORT SPAN \ LONG SPAN	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	SLAB DEPTH
1200	N12 AT 150	N12 AT 200	N12 AT 200	N12 AT 200	N12 AT 200	N12 AT 200	N12 AT 200	N12 AT 200	N12 AT 200	N12 AT 200	200
1400		N12 AT 150	N12 AT 200	N12 AT 200	N12 AT 200	N12 AT 200	N12 AT 200	N12 AT 200	N12 AT 200	N12 AT 200	200
1600			N12 AT 150	N12 AT 150	N12 AT 200	N12 AT 200	N12 AT 200	N12 AT 200	N12 AT 200	N12 AT 200	200
1800				N12 AT 150	N12 AT 150	N12 AT 200	N12 AT 200	N12 AT 200	N12 AT 200	N12 AT 200	225
2000					N12 AT 150	N12 AT 150	N12 AT 200	N12 AT 200	N12 AT 200	N12 AT 200	225
2200						N12 AT 150	N12 AT 150	N12 AT 150	N12 AT 200	N12 AT 200	225
2400							N16 AT 200	N12 AT 150	N12 AT 150	N16 AT 150	225
2600								N16 AT 200	N16 AT 200	N16 AT 200	250
2800									N16 AT 200	N16 AT 200	250
3000										N16 AT 175	250

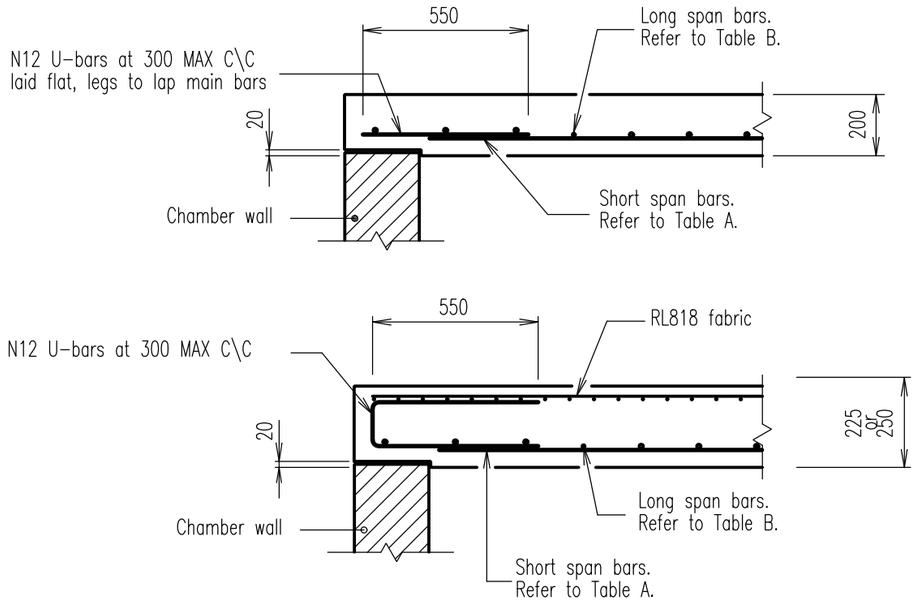
TABLE B : L BARS



TYPICAL SLAB REINFORCEMENT



SLAB REINFORCMENT AROUND CHAMBER ACCESS



TYPICAL SECTIONS

NOTES:

1. Concrete N32/20 in accordance with AS 1379:2007 and AS 3600:2009.
2. Reinforcement :- RL818 Fabric to AS/NZS 4671:2001
   Bars N12 and N16, Grade 500 to AS/NZS 4671:2001.
3. All laps in reinforcment shall be :-
   N12 – 300, N16 – 400
4. Formwork in accordance with AS 3610:1995.
5. Designed to Austroads Bridge Code, W7 wheel load, dynamic factor 0.4.
6. Maximum fill over roof slab shall be 3000mm.
7. Reinforcement cover 45 MIN.
8. Refer Service Authority for access hole alternative to be adopted.
9. Refer project drawings for details of chamber walls and floors.
10. For sections at chamber access refer WRC STD DWG D-0010.
11. All dimensions in millimetres.

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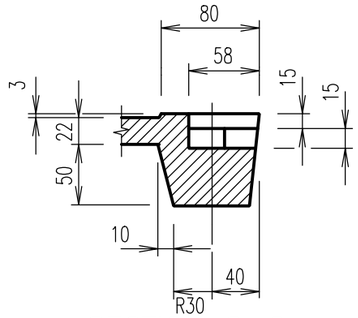
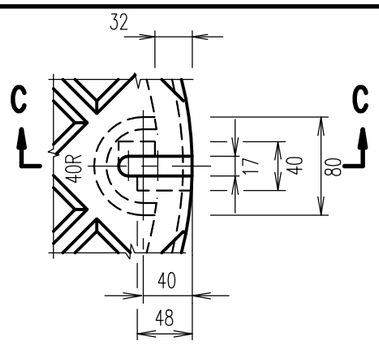
ACCESS CHAMBER ROOF SLAB RECTANGULAR

DRAINAGE
Standard Drawing
D-0013

A B C

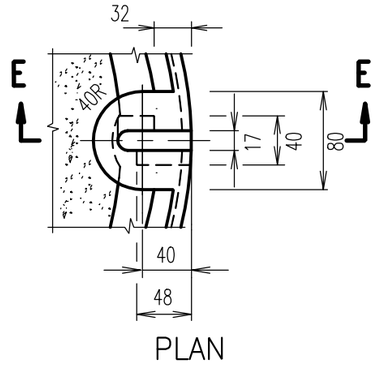


SECTION C–C



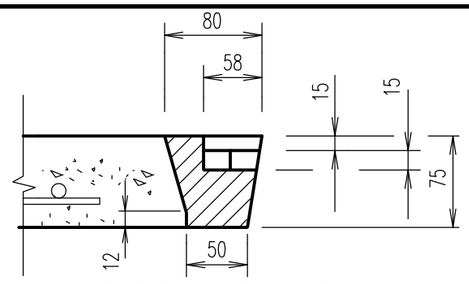
PLAN

LIFTING SLOTS – DETAIL A

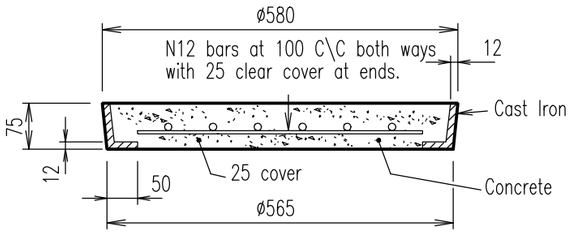


PLAN

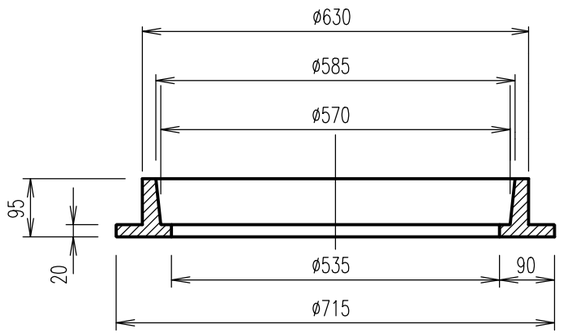
SLOTS – DETAIL B



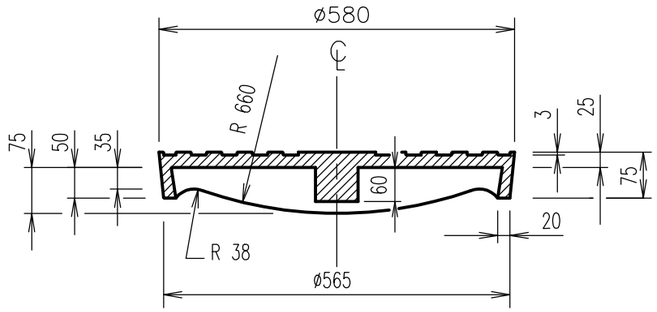
SECTION E – E



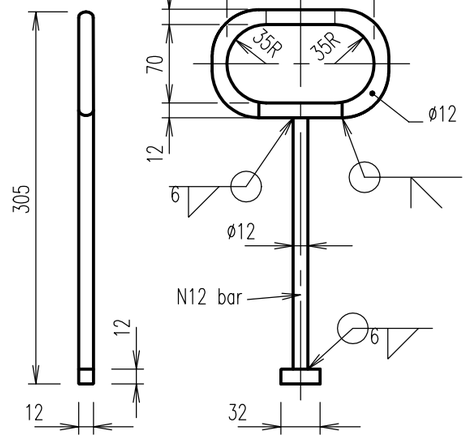
SECTION D–D



SECTION B–B

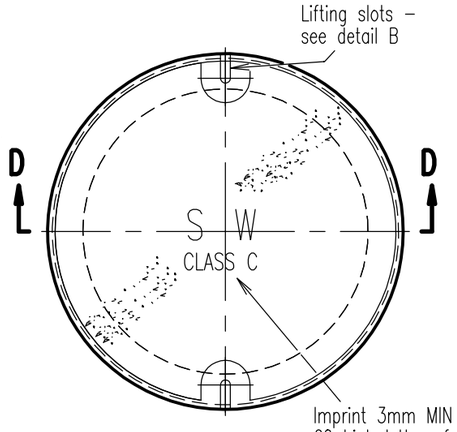


SECTION A–A



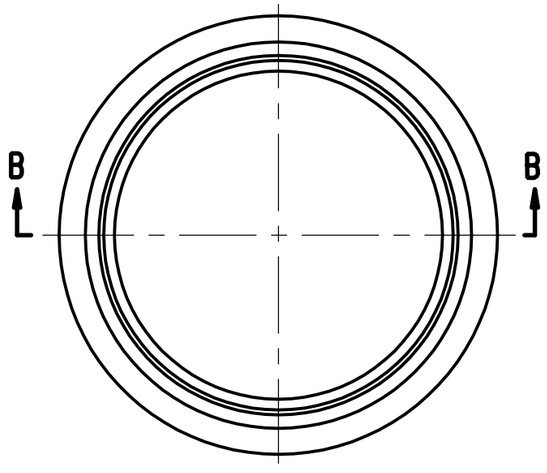
STEEL LIFTING KEY

Hot dip galvanized to AS/NZS 4534:2006

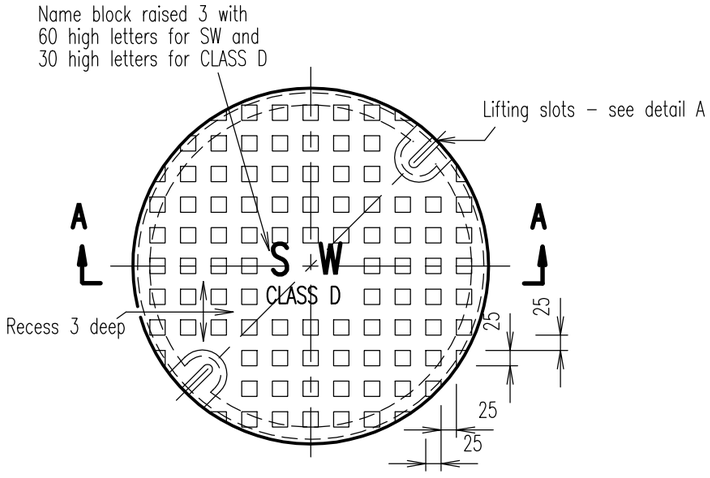


PLAN

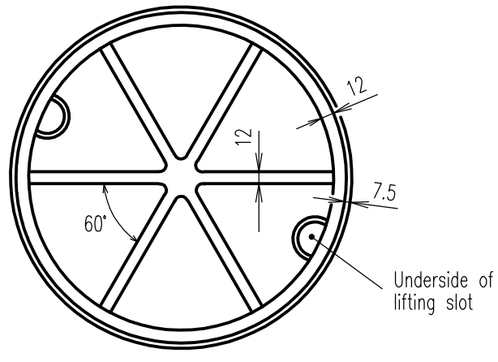
PLAN – C.I. CONCRETE FILLED COVER



PLAN – FRAME



PLAN – C.I. COVER



UNDERSIDE OF C.I. COVER

NOTES:

1. Mass of C.I. frames = 42 kg approx.
2. Mass of C.I. cover = 46 kg approx.
3. Cover and frame, grey cast iron, Grade ≥ T220 to AS 1830:2007
4. All steel Grade 500 to AS 3679.1:2016.
5. Concrete infill N32/10 in accordance with AS 1379:2007 and AS 3600:2009.
6. All welds to AS 1554.1:2014. Welding symbols to AS 1101.3:2005
7. Alternative C.I. covers designed to Austroads bridge code, W7 wheel loads are acceptable if manufactured to fit nominated C.I. frames.
8. Bitumen paint cover & frame to AS/NZS 3750.4:1994.
9. Covers and frames to AS 3996:2006.
10. All dimensions in millimetres.

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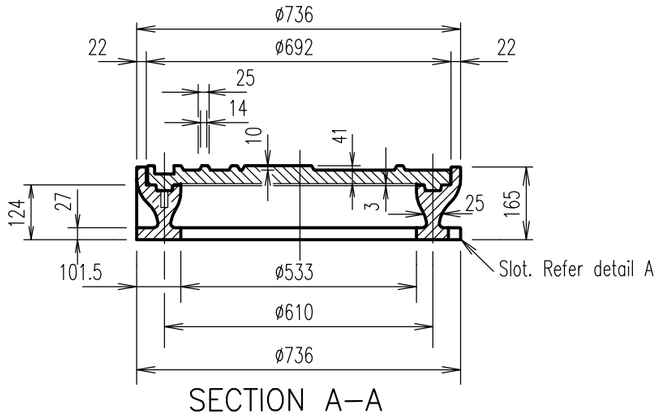
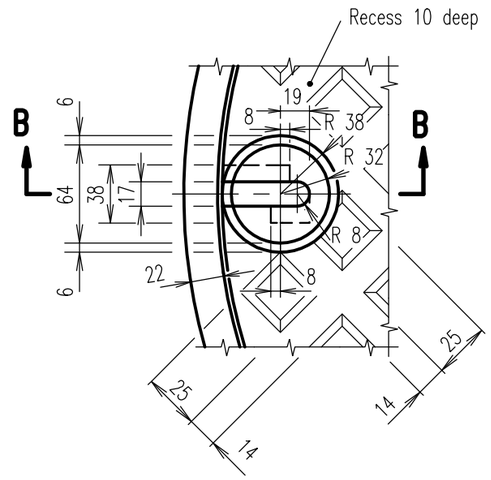
ACCESS CHAMBER
CAST IRON COVER AND FRAME
C.I. CONCRETE FILLED COVER

DRAINAGE
Standard Drawing
D–0014

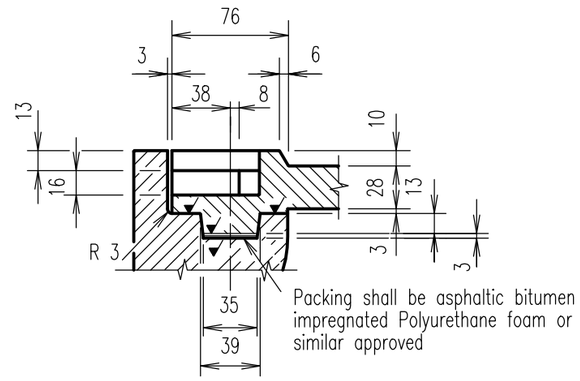
A | B | C



SECTION A–A

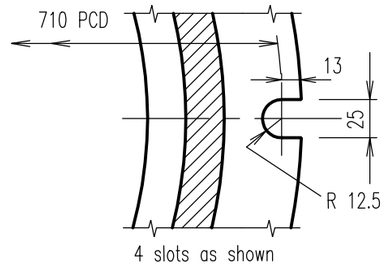


PLAN

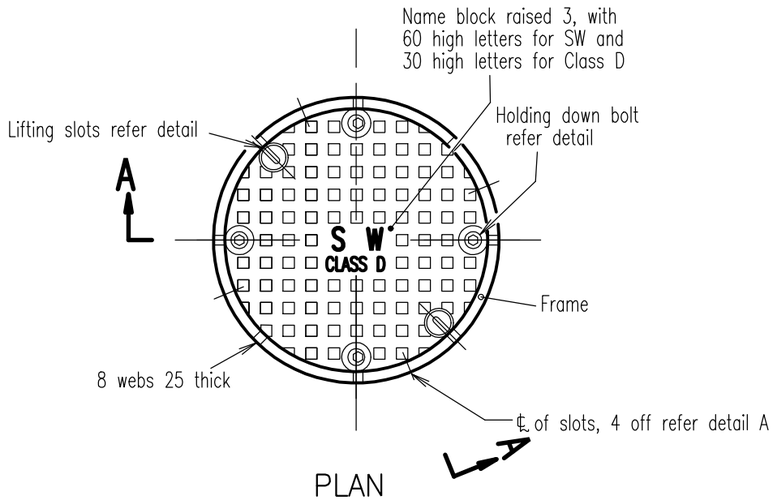


SECTION B–B

DETAIL AT LIFTING SLOTS

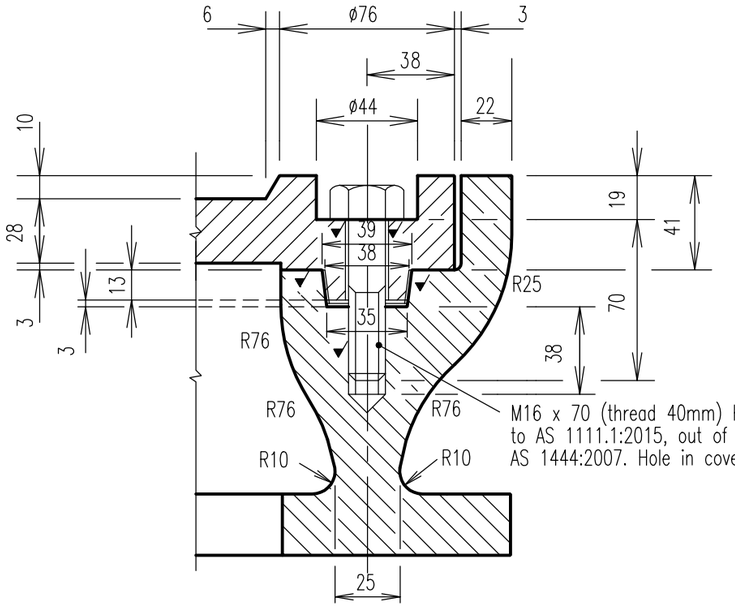


DETAIL A



PLAN

COVER AND FRAME



DETAIL OF HOLDING DOWN BOLTS

LEGEND

✔ Denotes machined surface.

NOTES:

1. Mass of cover = 66 kg approx.
2. Mass of frame = 100 kg approx.
3. Cover and frame, grey cast iron Grade ≥ T220 to AS 1830:2007.
4. Cover design Class D to AS 3996:2006.
5. Alternative C.I. covers designed to Austroads bridge code, W7 wheel loads are acceptable if manufactured to fit nominated C.I. frames.
6. Bitumen paint cover & frame to AS/NZS 3750.4:1994. 7. All dimensions in millimetres.

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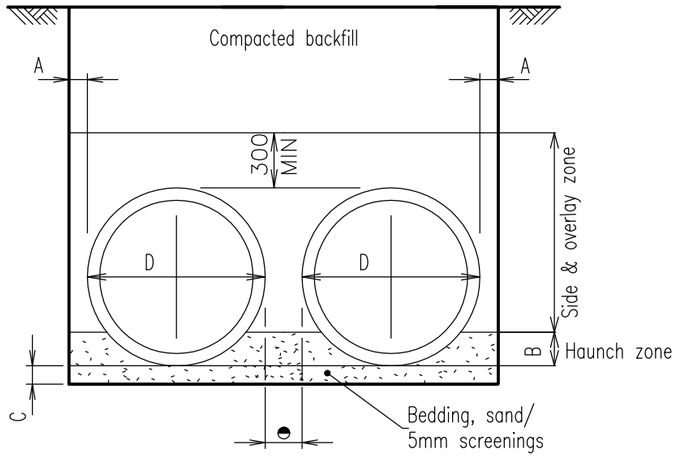
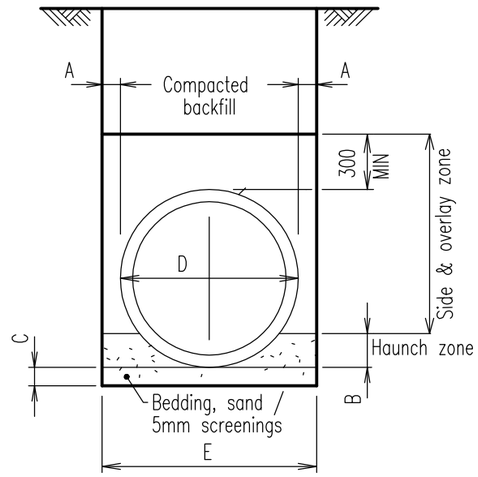
ACCESS CHAMBER
CAST IRON COVER AND FRAME
BOLT DOWN

DRAINAGE
Standard Drawing
D–0015

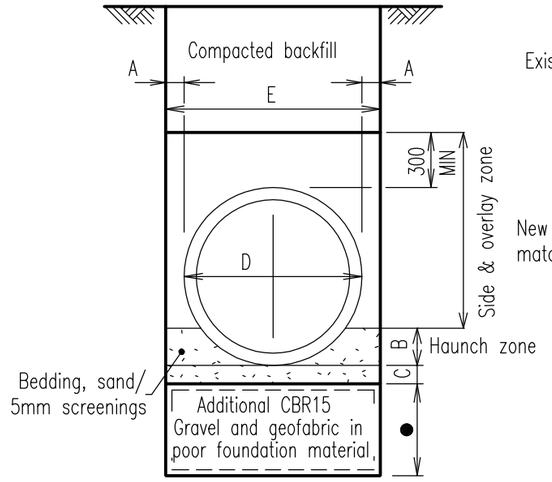
A | B | C



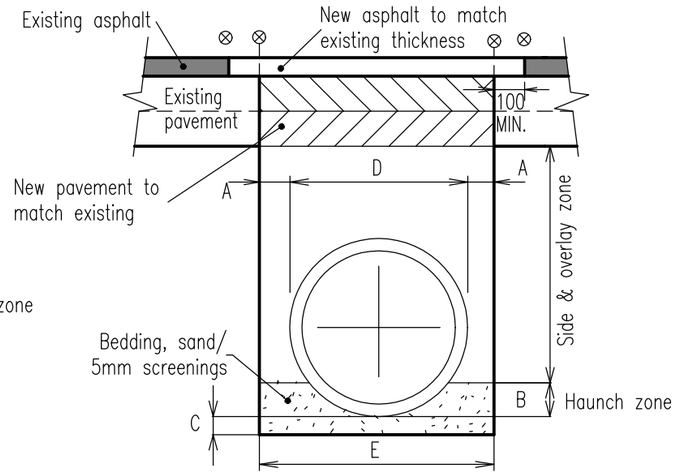
TYPICAL
BEDDING OF MULTIPLE PIPES



TYPICAL BEDDING
Conforms to Support Type H1 AS/NZS 3725:2007



TYPICAL
BEDDING IN POOR GROUND



TYPICAL
BEDDING UNDER EXISTING PAVEMENT

NOTES:

1. Selected backfill in all cases shall be carried through to the wings and continued 300 thick for the length and height of wings.
2. Bedding compaction (Compacted selected fill / sand bedding)
   Cohesive material – 95% standard compaction
   Non-cohesive material – density index of 70 MIN, refer AS 1289.5.5.1:1998.
   Sand – compact by flooding and use of vibrators.
3. Backfill compaction
   Compacted gravel (300mm) layer under road pavement 95% standard compaction.
   Compacted ordinary fill / CBR15 Gravel 90% standard compaction – below 300mm zone.
   Compacted backfill – at footpaths / private property 90% standard compaction.
   MAX. densities determined by standard compaction tests to AS 1289.5.1.1:1998.
4. Refer project drawings for types and/or alternatives to be adopted.
5. Type U & Type H1 to conform to AS/NZS 3725:2007.
6. All dimensions in millimetres.

LEGEND

⊗ Saw cut at existing pavement

◓ Pipes : 300 when NOMINAL D ≤ 600
600 when NOMINAL D 600 – 1800
900 when NOMINAL D ≥ 1800

● Depth to be approved by the Superintendent

Bedding & Haunch material
(Gravel, loam, sand or mixture) grading

AS Sieve Size	% Passing by mass	
	Bedding & haunch zone	Side/overlay zone
19.0	100	–
2.36	40 – 100	30–100
0.425	15 – 70	15–50
0.075	3 – 30	0–25

NOMINAL ø culvert D(mm)	MINIMUM width A (mm)	HAUNCH depth B	Bedding depth C	Allowable width,E(m)	
				DES	MAX
300	300	36	100	1.0	1.1
375	300	45	100	1.1	1.2
450	300	53	100	1.1	1.3
525	300	61	100	1.2	1.5
600	300	69	100	1.3	1.6
750	300	85	100	1.5	1.8
900	300	103	100	1.6	1.9
1050	300	120	100	1.8	2.1
1200	300	135	100	2.0	2.2
1350	300	150	100	2.1	2.4
1500	300	169	100	2.3	2.7
1650	330	184	150	2.6	2.9
1800	360	200	150	2.8	3.1
1950	390	222	150	3.1	3.3
2100	420	239	150	3.4	3.5
2400	480	270	150	3.9	4.2
2700	540	303	150	4.3	4.6
3000	600	335	150	4.9	5.0

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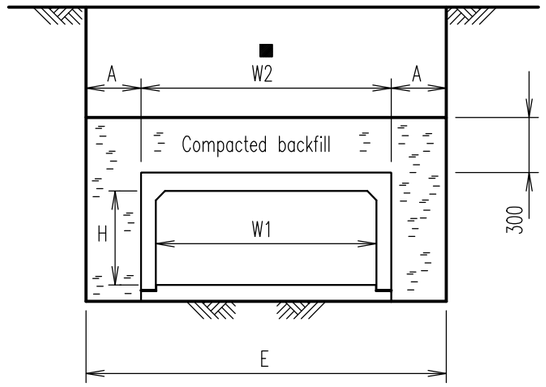
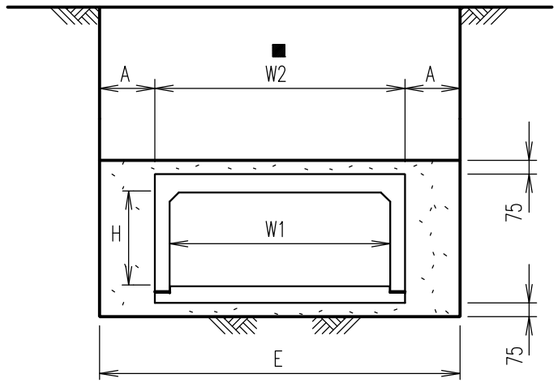
EXCAVATION, BEDDING AND BACKFILLING OF CONCRETE/ FIBRE REINFORCED DRAINAGE PIPES

DRAINAGE
Standard
Drawing
D–0030

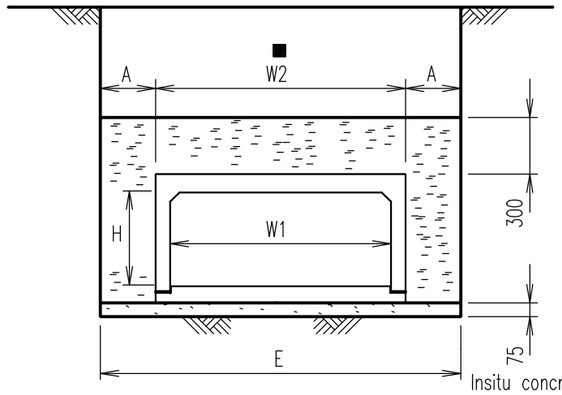
A | B | C



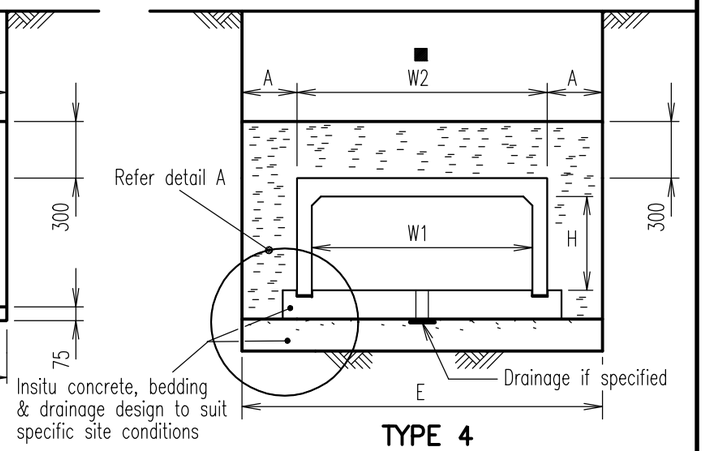
TYPE 1
NATURAL BEDDING



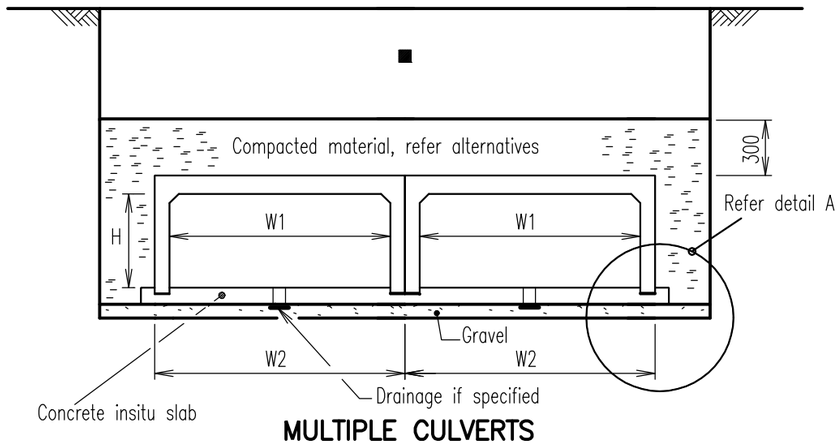
TYPE 2
SAND SURROUND



TYPE 3
SAND BEDDING



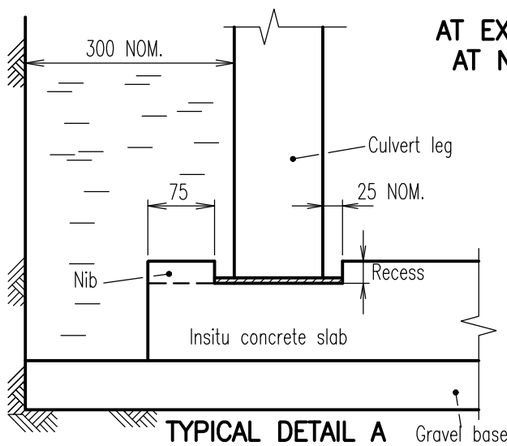
TYPE 4
INSITU BASE SLAB



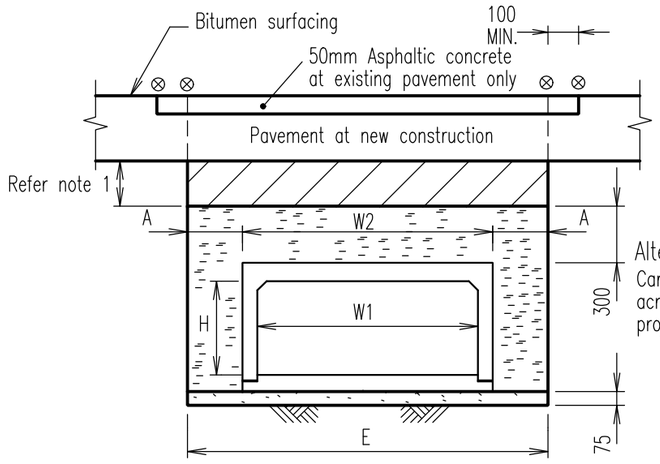
MULTIPLE CULVERTS

W1	W2	E NOM.
300	420	1000
375	500	1100
450	570	1200
600	730	1300
750	890	1500
900	1050	1700
1200	1360	2000
1520	1700	2300
1820	2010	2600
2130	2340	3000
2440	2670	3300

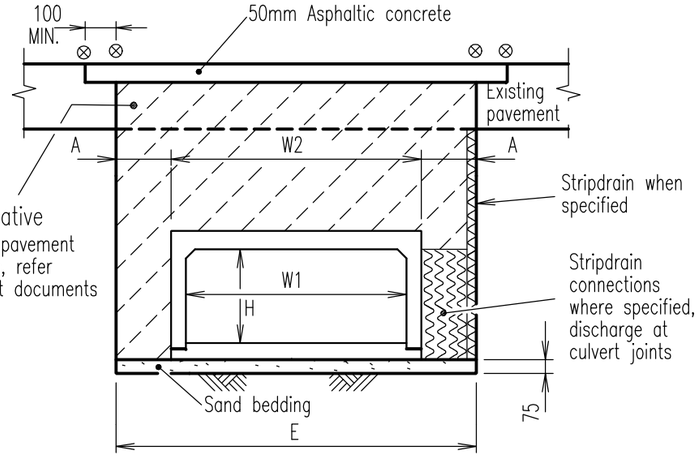
EXCAVATION WIDTH



TYPICAL DETAIL A



ALTERNATIVE A
AT EXISTING SURFACED PAVEMENTS OR AT NEW PAVEMENTS ON RESIDENTIAL STREETS & RURAL ROADS



ALTERNATIVE B
AT EXISTING SURFACED PAVEMENTS ON INDUSTRIAL, TRUNK COLLECTOR, SUB–ARTERIAL & ARTERIAL STREETS / ROADS

LEGEND

- A — 300mm NOMINAL
- ■ — Refer Alternative A for backfill requirements at new pavement
- ⊗ — Saw cut at existing pavement
- Gravel (MIN CBR15) or 75mm crusher run backfill
- Lean mix concrete backfill (1:15 mix)
- 10mm Cement mortar bed, 1:3 mix

NOTES:

1. Backfill compaction Approved fill / approved bedding / compacted backfill / CBR15 Gravel 90%
   Compacted gravel (300mm layer) under road pavement 95%
   Compacted fill – at footpaths / private property 90%
   MAX. densities determined by Standard compaction tests to AS 1289.5.5.1:1998
2. Tape all joints with 75mm wide Denso (600) Tape or equivalent. 3. All dimensions in millimetres.

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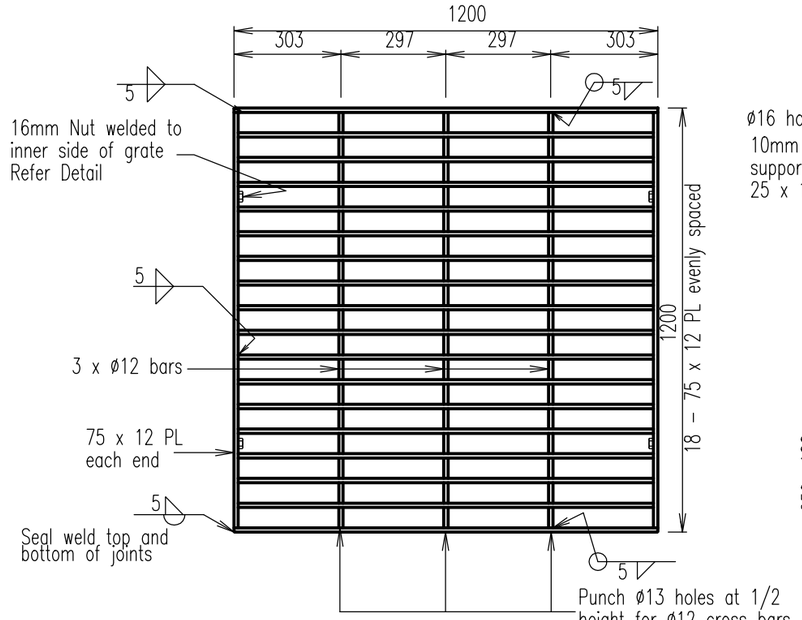
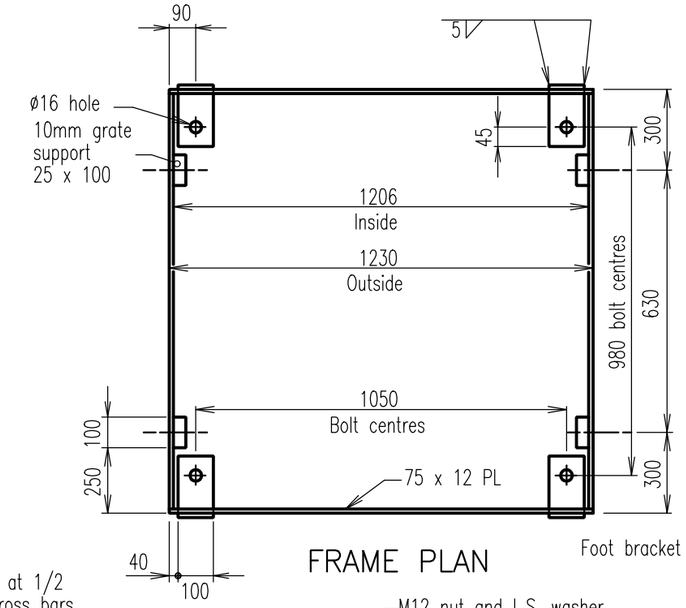
EXCAVATION, BEDDING AND BACKFILLING OF PRECAST BOX CULVERTS

DRAINAGE
Standard Drawing
D–0031

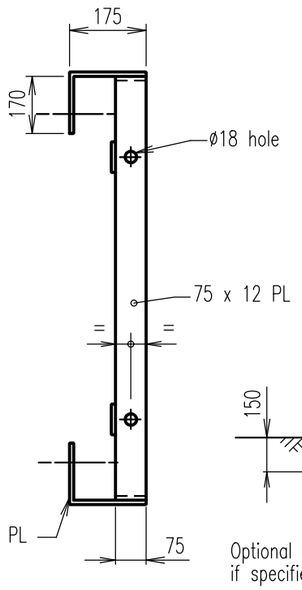
A | B | C

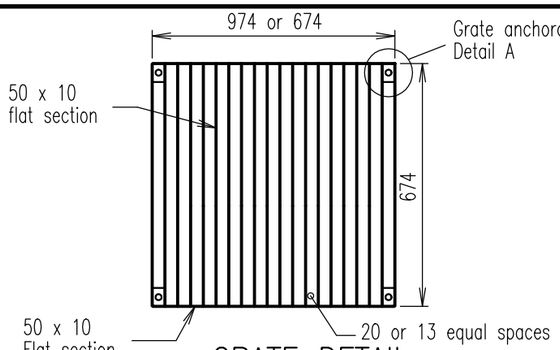


GRATE PLAN

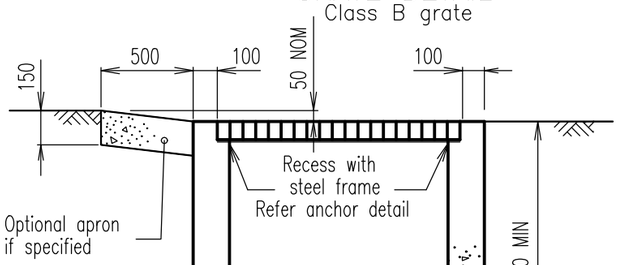


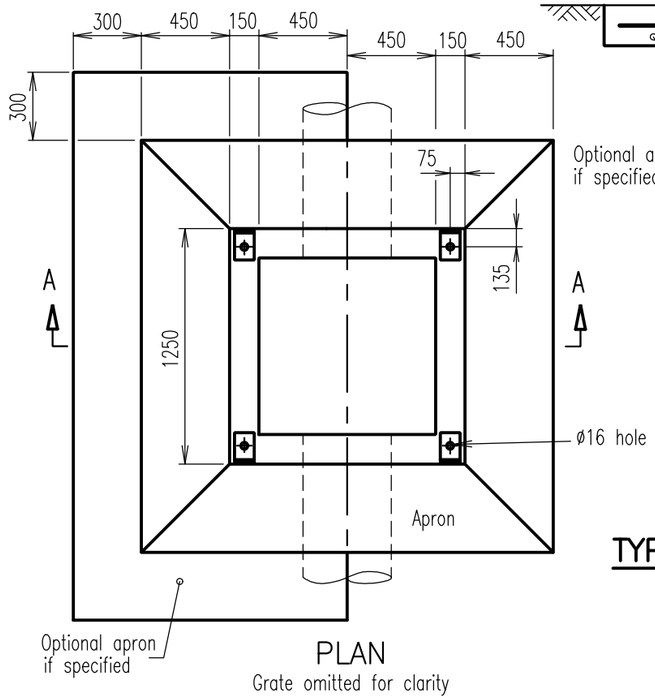
FRAME PLAN





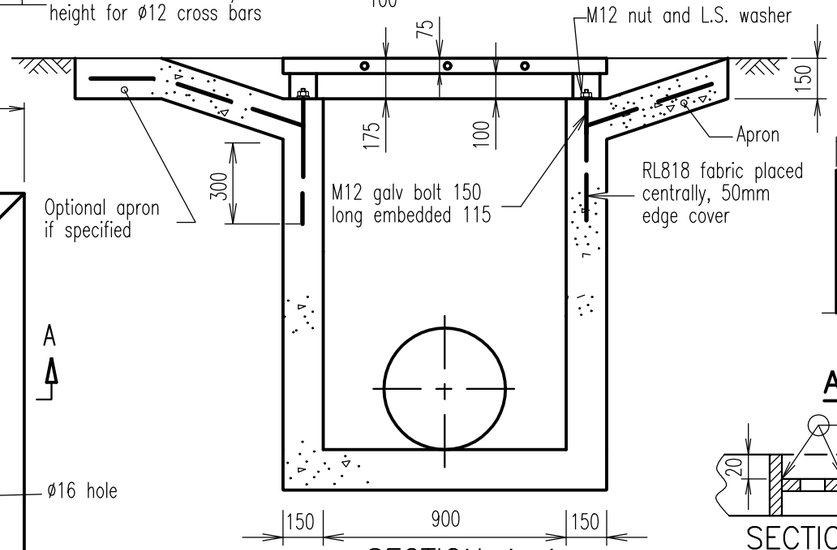
GRATE DETAIL
Class B grate





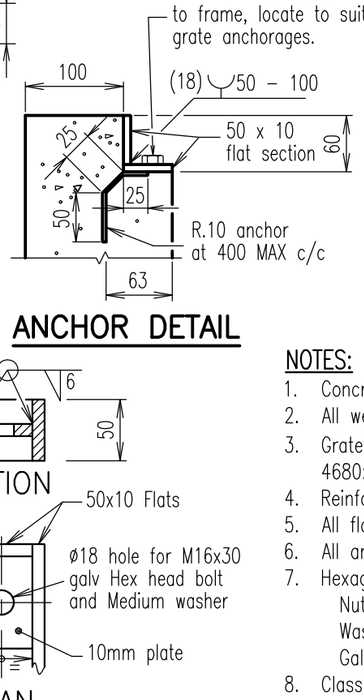
PLAN
Grate omitted for clarity

TYPE 1



SECTION A–A

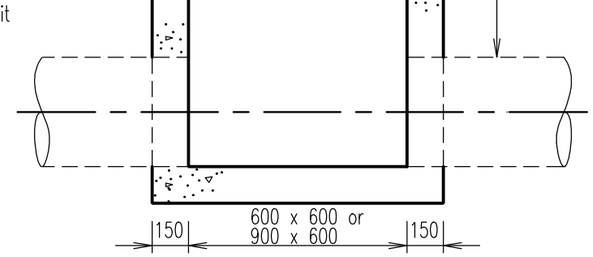
DETAIL OF BOLT



ANCHOR DETAIL

SECTION

PLAN
DETAIL A



SECTION OF FIELD INLET
TYPE 2

NOTES:

1. Concrete N25 in accordance with AS 1379:2007 and AS 3600:2009.
2. All welds to AS 1554.1:2014 All welding symbols to AS 1101.3:2005.
3. Grate and frame to be hot dip galvanized after fabrication to AS/NZS 4680:2006.
4. Reinforcing bars Grade 250 to AS 1302:2005.
5. All flats Grade 250 to AS 3678:2016.
6. All angles Grade 250 to AS 3679.1:2016.
7. Hexagonal head bolts to AS 1111.1:2015.
   Nuts to AS 1112.1:2015.
   Washers to AS 1237.1:2002.
   Galvanizing to AS 1214:1983
8. Class B grate to AS 3996:2006 – grate in direction nominated, refer Project Drawings.
9. All dimensions in millimetres.

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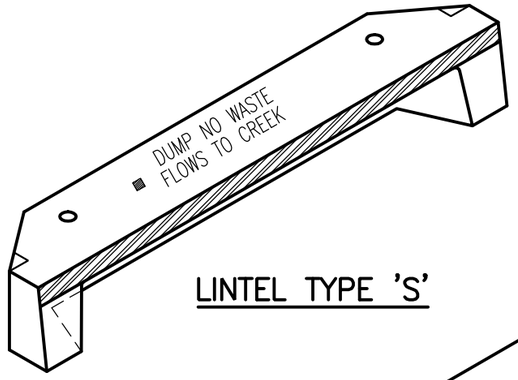
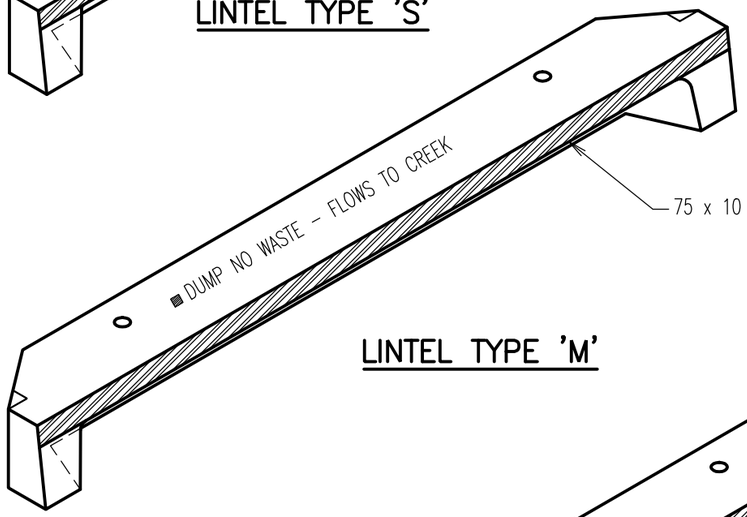
FIELD INLET AND OVERFLOW GULLY TYPE 1 AND TYPE 2

DRAINAGE
Standard Drawing
D–0050

A | B | C

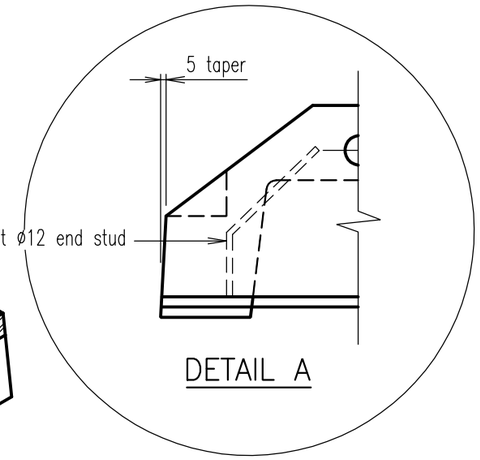


LINTEL TYPE 'S'

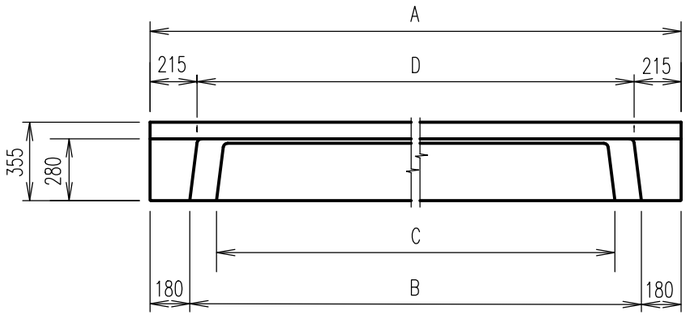


LINTEL TYPE 'M'

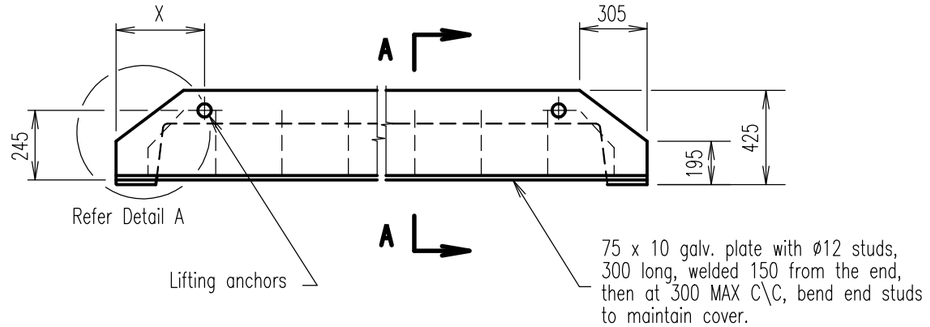
LINTEL TYPE 'L'



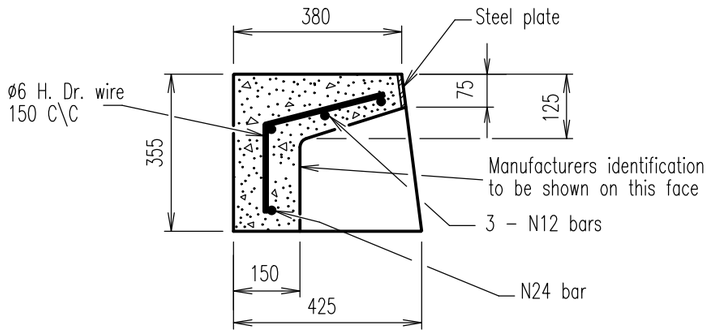
DETAIL A



ELEVATION



PLAN



SECTION A–A

LINTEL	A	B	C	D	X	MASS (kg)
S	2400	2040	1800	1970	400	445
M	3600	3240	3000	3170	690	550
L	4800	4440	4200	4370	1000	725

NOTES:

1. Concrete N32 in accordance with AS 1379:2007 and AS 3600:2009.
2. Each lifting anchor to be "swiftlift" or equivalent 1.3 tonne, galvanized to AS/NZS 4680:2006 and fitted to manufacturers specification.
3. Reinforcing steel Grade 400 to AS 4671:2001. Place centrally, 40 MIN end cover.
4. All steel flats Grade 250 to AS/NZS 3678:2016.
5. All welds to AS/NZS 1554.1:2014
6. H. Dr. wire to AS/NZS:4671:2001.
7. Steel plate hot dip galvanized to AS/NZS 4680:2006.
8. All dimensions in millimeters.

LEGEND

▩ Text 40mm high letters imprinted 5mm into concrete.

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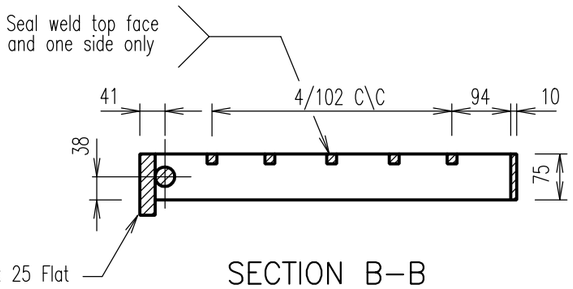
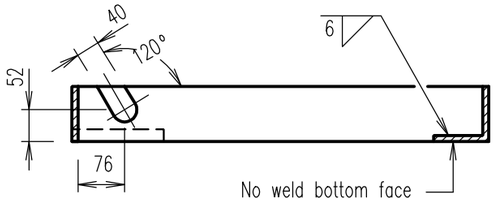
GULLY – ROADWAY TYPE
PRECAST LINTEL DETAILS
KERB IN LINE

DRAINAGE
Standard Drawing
D–0061

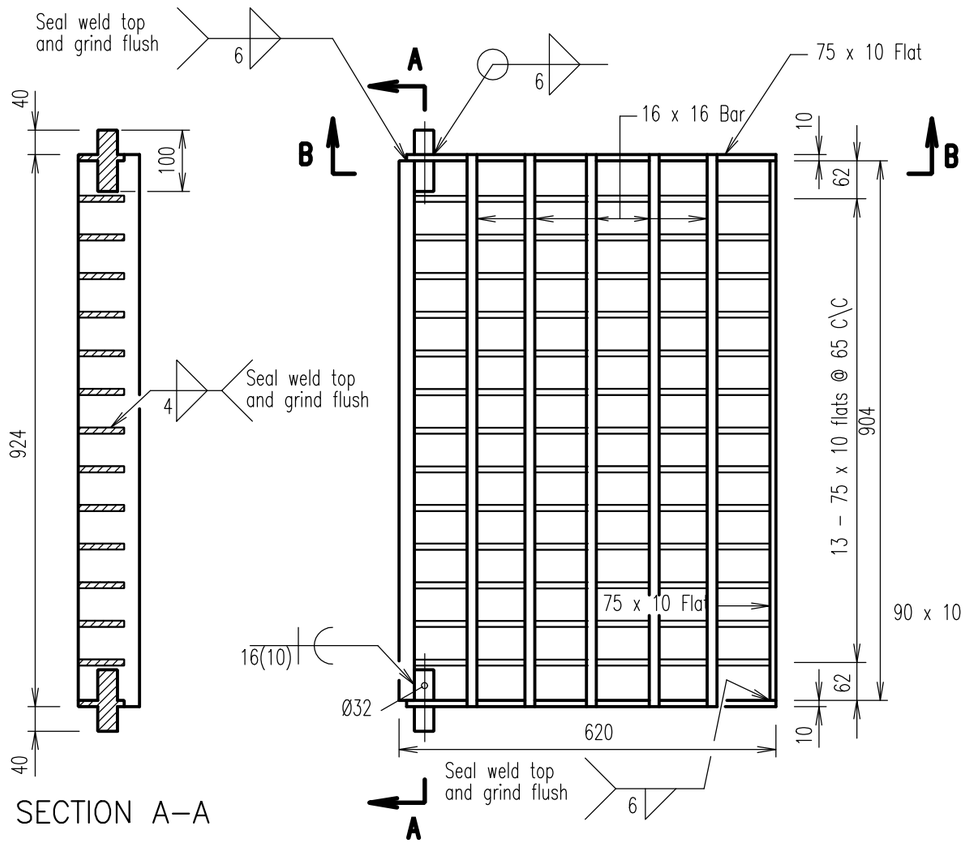
A | B | C



SECTION B–B

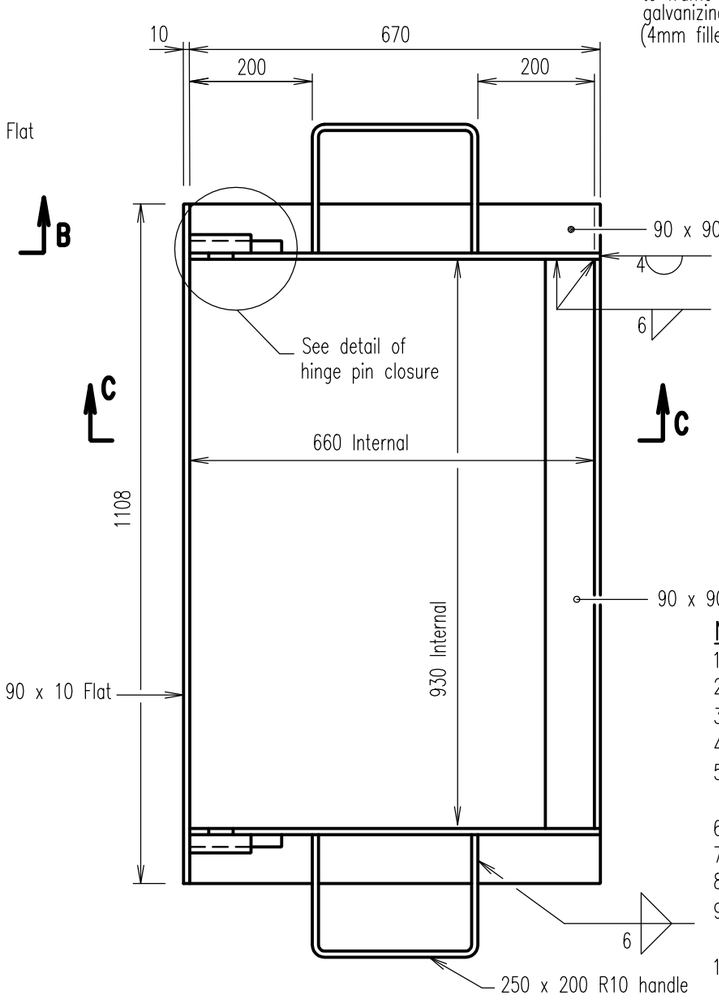


SECTION C–C

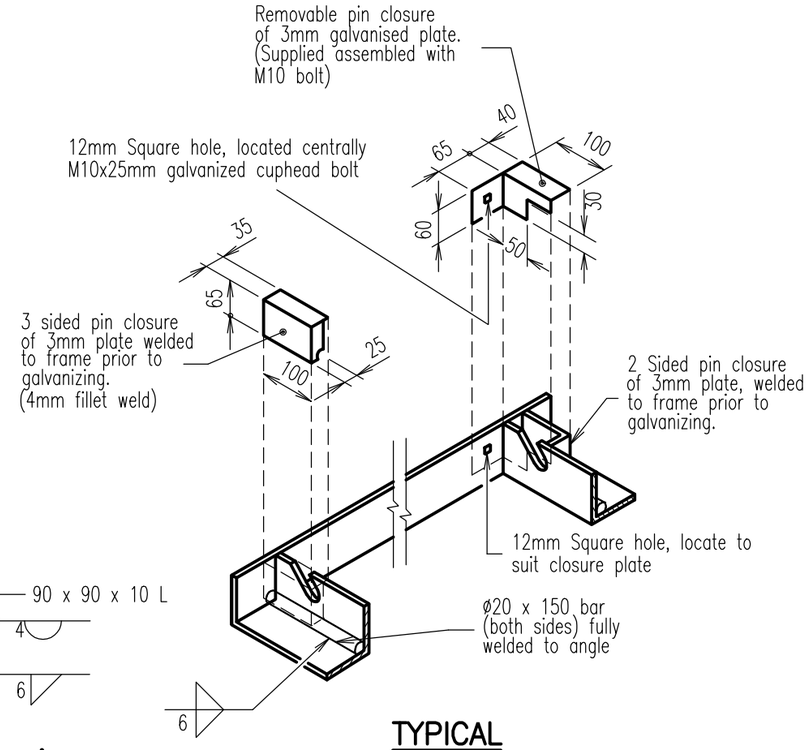


SECTION A–A

PLAN OF GRATE



PLAN OF FRAME



TYPICAL DETAIL OF HINGE PIN CLOSURES

A locking device shall be provided in accordance with clause 3.2.1.4 of AS 3996:2006.

NOTES:

1. Mass of grate = 85 kg.
2. Mass of frame = 39 kg.
3. All steel flats Grade 250 to AS/NZS 3678:2016.
4. All steel bars and angles Grade 250 to AS/NZS 3679.1:2016.
5. Grate and frame to be hot dip galvanized, after fabrication to AS 1650:2005.
6. All welds to AS/NZS 1554.1:2014 Welding symbols to AS 1101.3:2005.
7. Refer WRC STD DWG D–0061 for precast lintel details.
8. Grate and frame Class D to AS 3996:2006.
9. Alternative fabricated steel grate and frame, Grade 250 to AS/NZS 3679.1:2016, may be used when approved.
10. 'Patent Products' have grates and frames incorporating patent No 656469 and 660563 and may grant non exclusive licence agreements to Councils or selected Companies for manufacture and marketing of this product.
11. All dimensions in millimetres.

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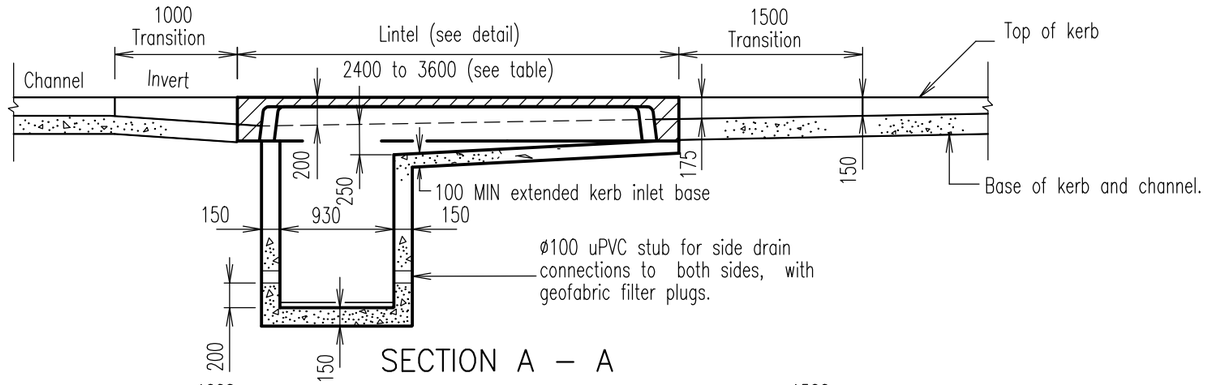
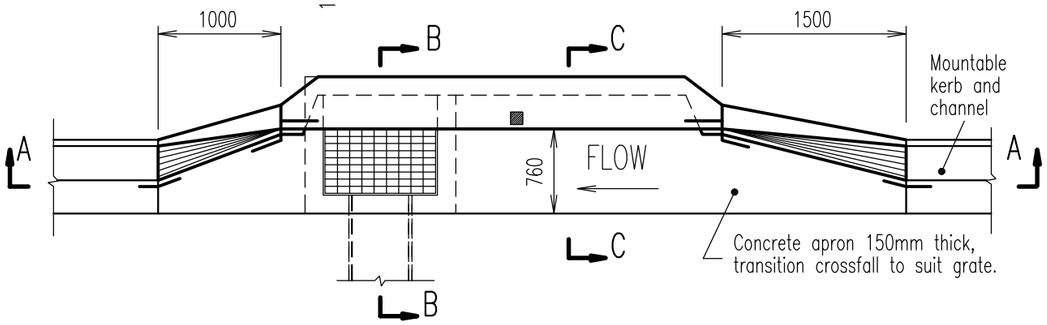
GULLY – ROADWAY TYPE GRATE AND FRAME

DRAINAGE
Standard Drawing
D–0062

A | B | C

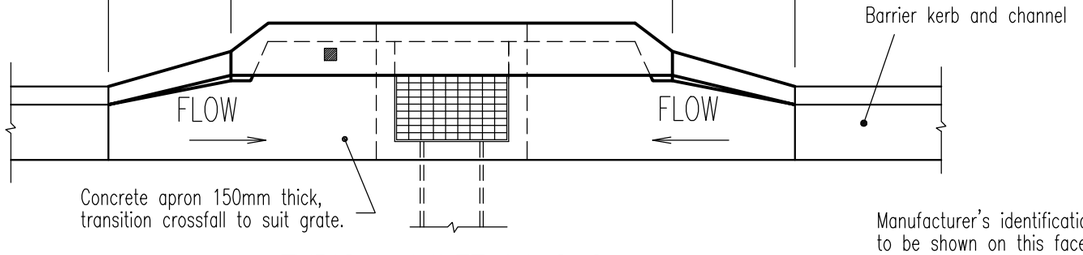


SECTION A – A



TYPICAL INLET ON GRADE

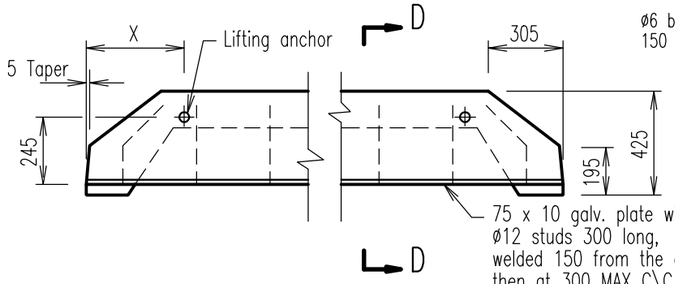
Type R (Flow from right hand side)



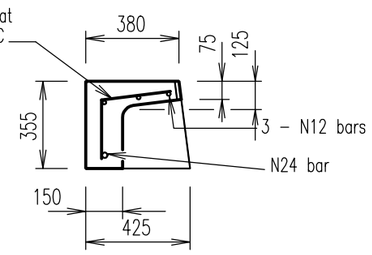
TYPICAL INLET IN SAG

LEGEND

■ Text 'DUMP NO WASTE – FLOWS TO CREEK' (40 high letters, imprinted 5 mm into concrete)

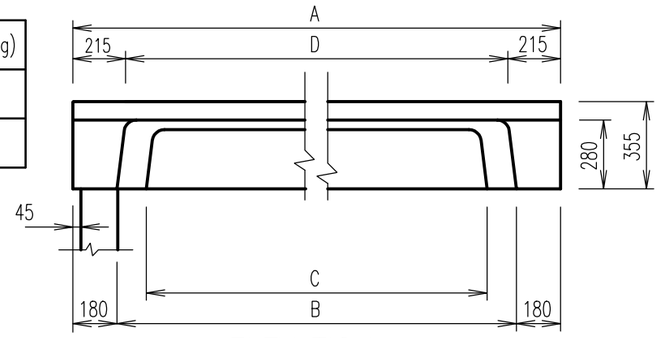


PLAN



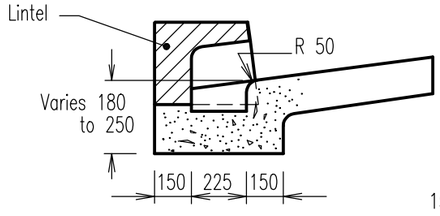
SECTION D – D

TYPE	A	B	C	D	X	MASS(kg)
S	2400	2040	1800	1970	400	445
M	3600	3240	3000	3170	690	550

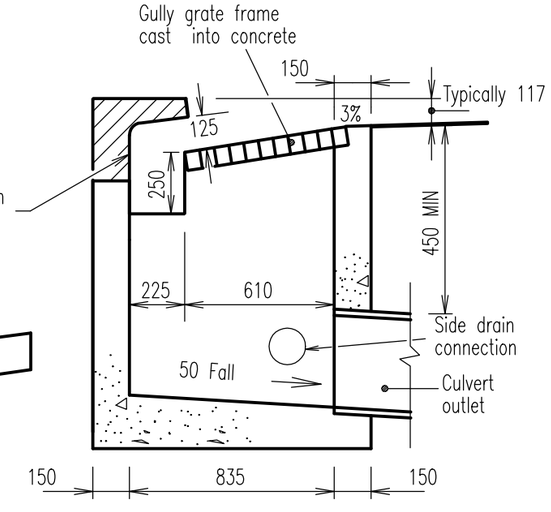


ELEVATION

LINTEL



SECTION C – C



SECTION B – B

NOTES:

1. The catchpit may be cast–in–situ or precast. This drawing indicates a cast–in–situ catchpit with a precast lintel.
2. Precast concrete N32 in accordance with AS 1379:2007 and AS 3600:2009.
3. Cast in–situ concrete N25 in accordance with AS 1379:2007 and AS 3600:2009.
4. Each lifting anchor to be "Swiftlift" or equivalent 1.3 tonne, galvanised to AS/NZS 4680:2006 and fitted to manufacturer's specification.
5. Reinforcing bars Grade 400 to AS ISO 1302:2005, place centrally, 40 MIN end cover.
6. Refer WRC STD DWG D–0062 for grate and frame details.
7. Grate and frame Class D to AS 3996:2006. Patent Products have grates amd frames incorporating Patent No 656469 and 660563 and may grant non exclusive licence agreements to Councils or selected Companies for manufacture and marketing of this product.
8. Steel plate hot dip galvanized to AS/NZS 4680:2006.
9. All dimensions in millimetres.

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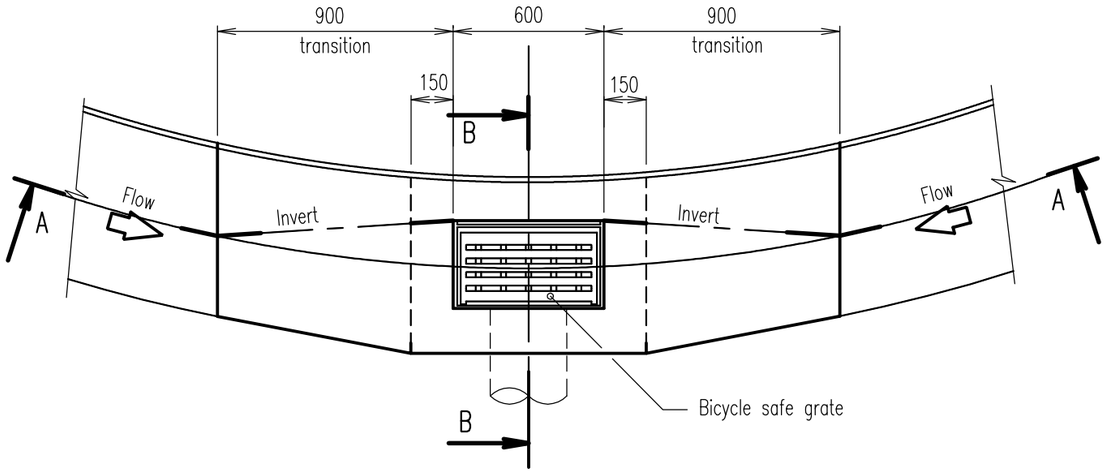
GULLY – ROADWAY TYPE
CHANNEL LIP IN LINE

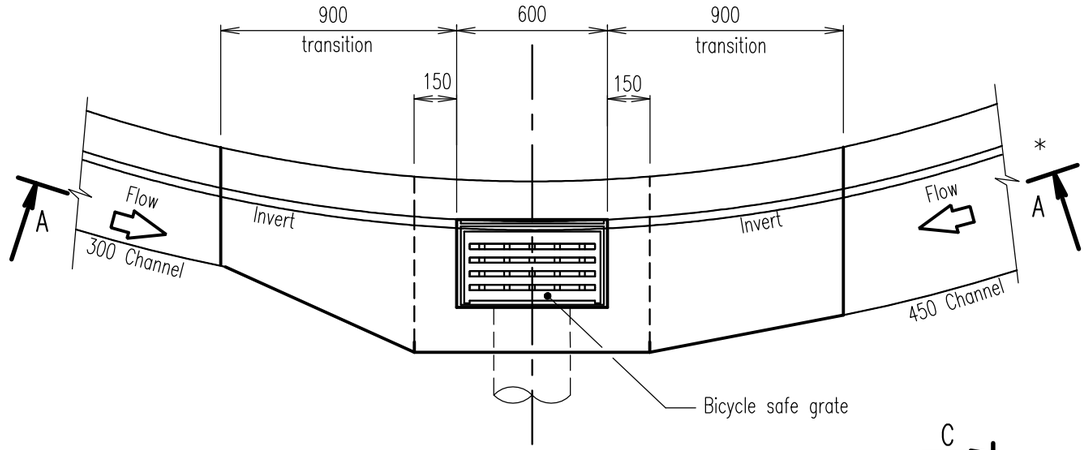
DRAINAGE
Standard Drawing
D–0063

A | B | C



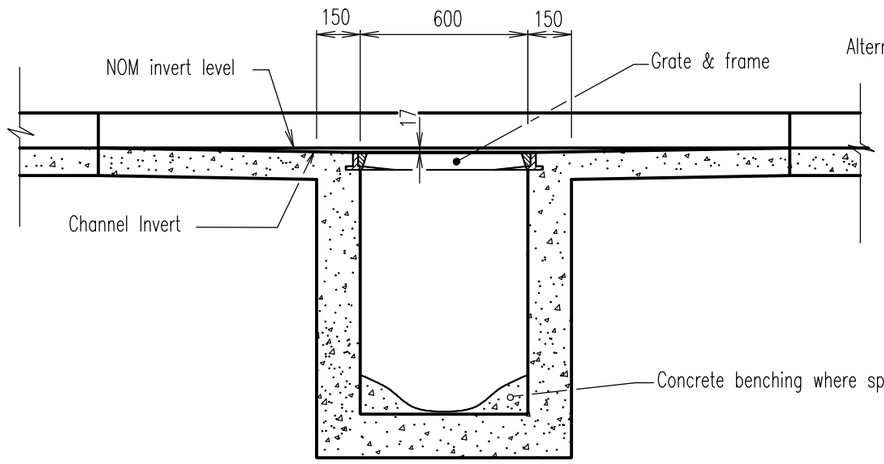
MOUNTABLE KERB AND CHANNEL

PLAN

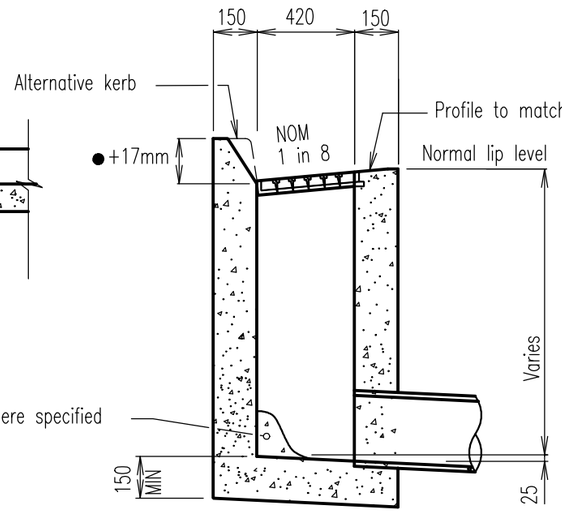


BARRIER KERB AND CHANNEL

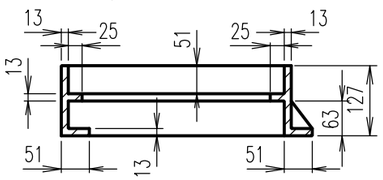
PLAN



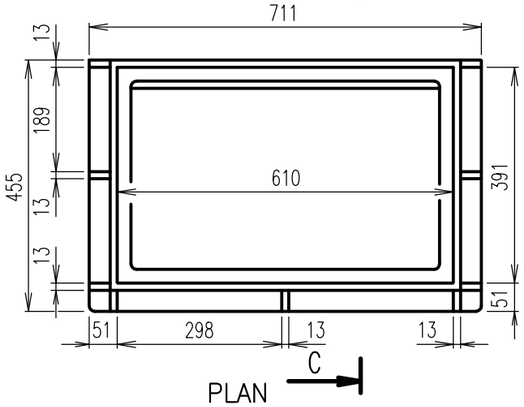
SECTION A – A



SECTION B – B



SECTION C–C



PLAN

C.I. FRAME OR FABRICATED GALV. STEEL

ANTI–PONDING GULLY

LEGEND

- ∗ NOM kerb line
- ● NOMINAL kerb height, see note 6.

NOTES:

1. Dimensions of grate and frame may be varied subject to approval.
2. Design load for grate and frame shall be in accordance with AUSTROADS Bridge Design Specification, W7 wheel load.
3. All grates bicycle safe to AS 3996:2006.
4. Grate and frame, grey cast iron Grade ≥ T220 to AS 1830:2007 or alternatively fabricated steel Grade 250 to AS/NZS 3678:2016 & AS/NZS 3679.1:2016 and hot dip galvanized to AS/NZS 4680:2006 may be used when approved.
5. Concrete : Benching N10, Structural N20 in accordance with AS 1379 and AS 3600.
6. Examples indicates M1 and B1 Kerb and channel types. Refer Standard Drawing R–0080, adjust for other alternatives.
7. Bitumen paint C.I. cover and frame to AS/NZS 3750.4:1994.
8. Grate hinges and locking device must conform to AS 3996:2006. 'Patent Products' have grates and frames incorporating patent No 656469 and 660563 and may grant non exclusive licence agreements to Councils or selected Companies for manufacture and marketing of this product.
9. All dimensions in millimetres.

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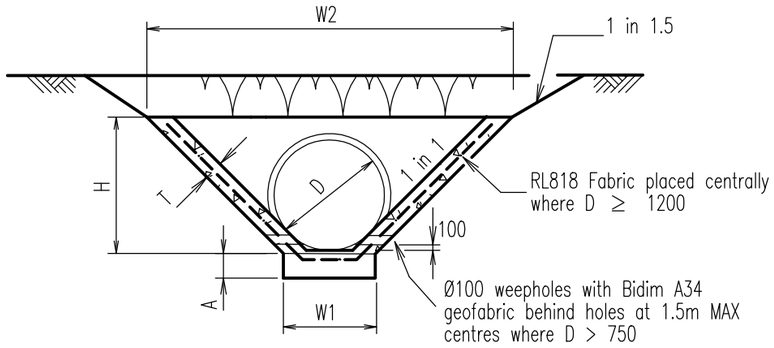
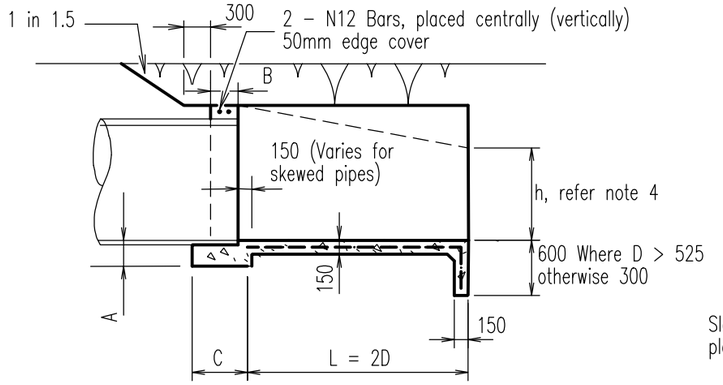
GULLY – ANTI–PONDING DEPRESSED 17mm

DRAINAGE
Standard Drawing
D–0068

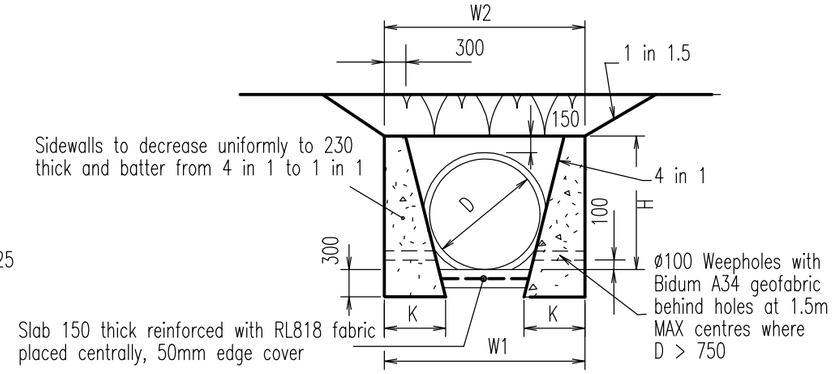
A | B | C



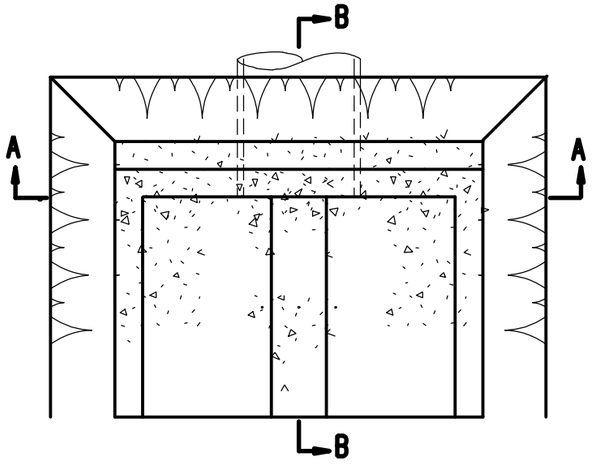
SECTION A–A



SECTION B–B



SECTION C–C



PLAN

TYPE A INLET / OUTLET

Pipe skew	5° – 15°	16° – 25°	26° – 35°	36° –45°
Skew factor	1.02	1.07	1.16	1.32

For multiple pipes – increase W1 and W2 for each additional pipe by the external diameter + : 300 when NOMINAL D < 600
600 when NOMINAL D 600 – 1800
900 when NOMINAL D > 1800

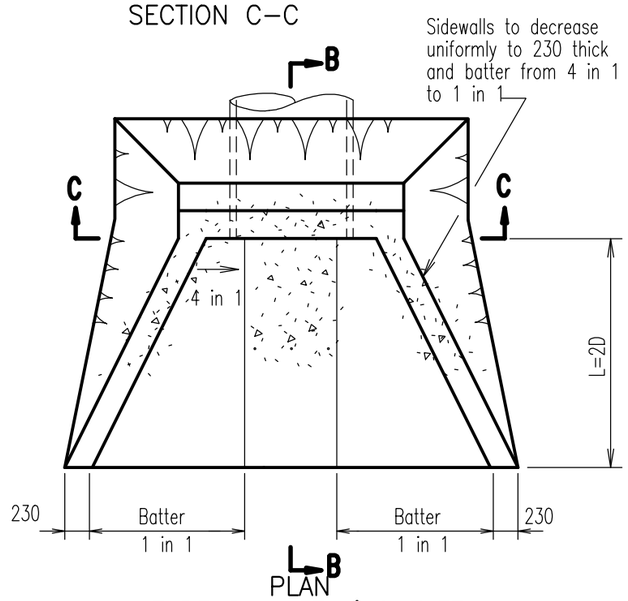
For skewed pipes – multiply W1 and W2 by skew factor

MULTIPLE / SKEW PIPES

DIMENSION	PIPE DIAMETER D				
	1350	1500	1650	1800	1950
K	800	840	875	920	960
H	2000	2160	2300	2460	2640
W1	2060	2250	2440	2630	2840
W2	2060	2250	2440	2630	2840

DIMENSIONS
TYPE B INLET AND OUTLET

DIA. = 1350 to 1950



PLAN

TYPE B INLET / OUTLET

DIMENSION	PIPE DIAMETER D															
	300	375	450	525	600	675	750	825	900	1050	1200	1350	1500	1650	1800	1950
A	150	150	150	200	200	200	250	250	250	250	250	300	300	300	300	300
B	225	225	225	300	300	300	300	300	300	300	300	300	300	300	300	300
C	450	450	450	450	450	450	600	600	600	600	600	600	600	600	600	600
H	580	670	750	830	900	980	1060	1140	1220	1370	1530	1690	1840	2000	2160	2340
T	150	150	150	200	200	200	200	200	200	200	200	200	200	200	200	200
W1	700	730	760	790	820	850	880	920	950	1010	1070	1140	1200	1260	1320	1380
W2	1860	2070	2260	2450	2620	2810	3000	3200	3390	3750	4130	4520	4880	5260	5640	6060

DIMENSIONS

TYPE A INLET DIA. = 300 to 1200
TYPE A OUTLET DIA. = 300 to 1950

NOTES:

1. Design bearing pressure 75 KPa. Where this bearing pressure cannot be obtained, the Superintendent may direct that a wider footing be used.
2. Concrete N20 or Grade S32/10 shotcrete may be used in accordance with AS 1379:2007 and AS 3600:2009.
3. In tidal areas where fabric reinforcement is specified, concrete is to be sulphate resistant Grade S40 to AS 1379:2007 and AS 3600:2009.
4. In embankment situations, the height of the wingwall at the toe should be reduced to "h" so that the slope of the top of the wingwall equals the adjacent embankment batter. Refer project drawings.
5. See project drawings for the following : No. and diameter of pipes; Skew angles of pipes if applicable; Invert levels of pipes; Height of wingwall "h" at toe if applicable.
6. If directed (by the Superintendent), the apron slab to a Type A outlet may be lowered by the pipe wall thickness to allow for future pipe extension.
7. At inlets or outlets, transition uniformly from concrete to open channel over 5m to 10m.
8. Refer project drawings for protection proposed between end of outlet structure and open drain / creek.
9. Reinforcement : Bars Grade 400 to AS ISO 1302:2005. Fabric to AS/NZS 4671:2001.
10. All dimensions in millimetres, unless shown otherwise.

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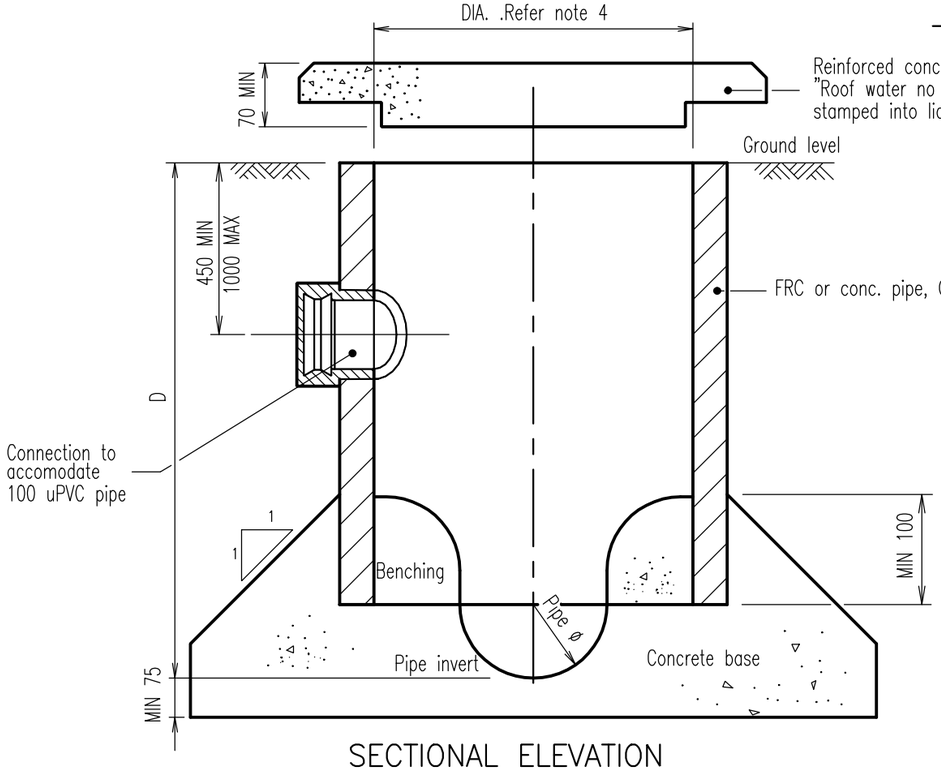
INLETS AND OUTLETS TO STORMWATER DRAINS (CONCRETE)

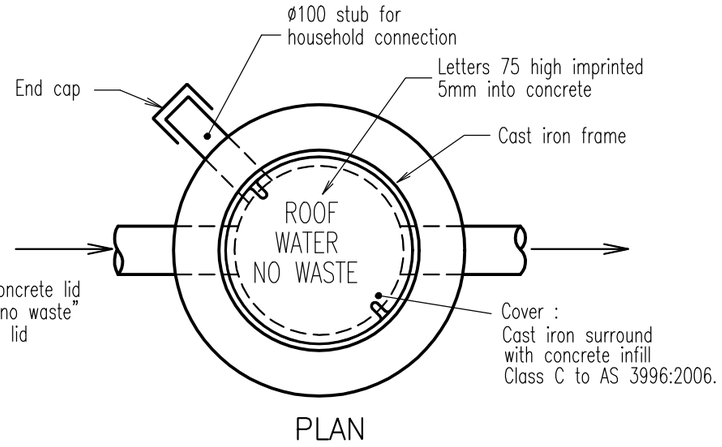
DRAINAGE
Standard Drawing
D–0080

A | B | C

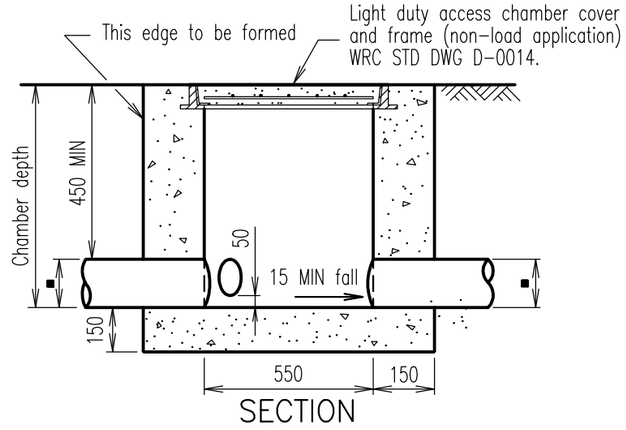


SECTIONAL ELEVATION

TYPE 2
PRECAST / INSITU



PLAN



SECTION

TYPE 1
CAST INSITU

NOTES:

1. Roofwater systems are to be connected to stormwater gullies or access chambers. Where the system is to be connected to kerb and channel one property can be connected via a 100 Class SH uPVC pipe or a 100 x 75 galvanized R.H.S. to a kerb adaptor. A maximum of two properties can be connected via a 200 x 75 galvanized R.H.S.
2. The pipe materials and joint types shall be as follows:

Material	Aust. Std	Joint Type	Restrictions
Fibre reinforced, Class 2	AS 4139:2003	Rubber ring	N/A
Concrete, Class 2	AS/NZS 4058:2007	Rubber ring	N/A
uPVC, sewer Class SH	AS/NZS 1260:2009	Solvent welded	Not to be used in easements

3. Minimum cover to roofwater pipes to be 450mm except where less cover is necessary to discharge to kerb and channel.
4. The access chamber depths and minimum diameters shall be as follows :
   Depth < 600 – MIN ø300, Depth 600 – 750 – MIN ø550, Depth > 750 – MIN ø900●
5. Alternative designs, materials and methods of construction will be considered for approval including precast roofwater chambers available from various manufacturers. Alternative precast units will require to be bedded and encased in 150 thick concrete (Grade N25) up to 150 above crown of the inlet pipe with all subsequent backfill compacted to 95% MDD (modified compaction to AS 1289:2014) to ensure stability and robustness.
6. Alternative covers and frames proposed for approval must be circular, and be designed as Class C to AS 3996:2006.
7. Concrete, base N25, cover infill N32 in accordance with AS 1379:2007 and AS 3600:2009.
8. The roofwater drainage system shall be shown on the stormwater drainage plans for the development.
9. The following 'as constructed' information shall be submitted to Superintendent, refer Sewerage Sample as constructed plan WRC STD DWG S-0010.
   - Offsets of the main line to property boundary
   - The locations of access chambers and Y junctions measured from the property boundary.
10. Where individual lots can directly discharge to the kerb and channel, kerb adaptors shall be used. Refer WRC STD DWG R-0081.
11. All dimensions in millimetres.

LEGEND

- ■ Refer project drawings for pipe diameter and type
- ● At ø900 chambers adopt roof design off WRC STD DWG D-0011.

C	GENERAL UPDATES AND STANDARD REFERENCING AMENDMENTS	5/5/16
B	GENERAL UPDATES	27/2/12
A	ORIGINAL ISSUE	1/3/97
REVISIONS		DATE

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ROOFWATER INPECTION CHAMBER

DRAINAGE Standard Drawing
D-0110

A | B | C