Drawing Index

Name	Doc.No	Document Description
2000244.001C.pdf	2000244.001	STANDARD WASTEWATER MANHOLES TYPE C S R REINFORCEMENT CONSTRUCTION DETAIL DIMENSION
2000244.002A.pdf	2000244.002	STANDARD WASTEWATER MANHOLE DETAIL ON LINE AND DROP JUNCTION GRADE CONNECTION
2000244.005.pdf	2000244.005	STANDARD WASTEWATER MANHOLE PRECAST RISER AND LID DETAIL AND REINFORCEMENT
2000244.009A.pdf	2000244.009	STANDARD WASTEWATER LAMPHOLE FRAME AND COVER CASTING DETAIL
2000244.010.pdf	2000244.010	STANDARD WASTEWATER CAST IRON DROP PLATE CASTING DETAIL
2000244.011A.pdf	2000244.011	STANDARD WASTEWATER CIRCULAR MANHOLE FOR LINES 375 NB TO 900 NB GEOMETRY AND DESIGN NOTES
2000244.012D.pdf	2000244.012	STANDARD WASTEWATER CIRCULAR MANHOLE FOR LINES 375 NB TO 900 NB DIMENSIONS FOR CONSTRUCTION
2000244.013G.pdf	2000244.013	STANDARD WASTEWATER CIRCULAR MANHOLE FOR LINES 375 NB TO 900 NB REINFORCEMENT
2000244.014B.pdf	2000244.014	STANDARD WASTEWATER CIRCULAR MANHOLE FOR LINES 375 NB TO 900 NB DETAIL OF PIPE CONNECTION INTERNAL DROP EXTERNAL DROP CONNECTION

2000244.017A.pdf	2000244.017	STANDARD WASTEWATER 500 DIA MANHOLE FRAME AND COVER FLAP INSERT CARRIER ASSEMBLY
2000244.019.pdf	2000244.019	STANDARD WASTEWATER CIRCULAR MANHOLE FOR LINES 375 NB TO 900 NB ALTERNATIVE PRECAST BASE TYPE NO2
2000244.025.pdf	2000244.025	STANDARD WASTEWATER CIRCULAR MANHOLE POLYETHYLENE PIPE DN355 TO DN1000 GEOMETRY AND DESIGN CALCULATIONS
2000244.026.pdf	2000244.026	STANDARD WASTEWATER CIRCULAR MANHOLE POLYETHYLENE PIPE DN355 TO DN1000 MANHOLE BASE DIMENSIONS
2000244.027.pdf	2000244.027	STANDARD WASTEWATER CIRCULAR MANHOLES POLYETHYLENE PIPE DN355 TO DN1000 REINFORCING AND STEELWORK
2000244.028.pdf	2000244.028	STANDARD WASTEWATER CIRCULAR MANHOLE POLYETHYLENE PIPE DN355 TO DN1000 DETAIL OF BRANCH PIPE CONNECTIONS
2000244.036.pdf	2000244.036	STANDARD WASTEWATER CIRCULAR MANHOLES FOR POLYETHYLENE PIPES DN355 TO DN1000 PLAN VIEW OF BRANCH PIPE CONNECTIONS WITH INTERNAL P.E. DROPPERS
2000244.037.pdf	2000244.037	STANDARD WASTEWATER CIRCULAR MANHOLES FOR POLYETHYLENE PIPES DN355 TO DN1000 SECTIONS OF BRANCH PIPE CONNECTIONS WITH INTERNAL P.E. DROPPERS
2000244.038.pdf	2000244.038	STANDARD WASTEWATER CIRCULAR MANHOLES FOR POLYETHYLENE PIPES DN355 TO DN1000 P.E. CONNECTION & INTERNAL DROPPERS FOR HUMES TITAN PIPELINES
2000244.039.pdf	2000244.039	STANDARD WASTEWATER CIRCULAR MANHOLES FOR POLYETHYLENE PIPES DN355 TO DN1000 P.E. CONNECTION & INTERNAL DROPPERS FOR HYNDES PIPELINES

2000244.040.pdf	2000244.040	STANDARD WASTEWATER CIRCULAR MANHOLES FOR POLYETHYLENE PIPES DN355 TO DN1000 P.E. CONNECTIONS & INTERNAL DROPPERS FOR A.M.B.D. THICK WALL PIPELINES
2000244.041.pdf	2000244.041	STANDARD WASTEWATER CIRCULAR MANHOLES FOR POLYETHYLENE PIPES DN355 TO DN1000 END CAP SEATS AND RESTRAINTS DETAILS

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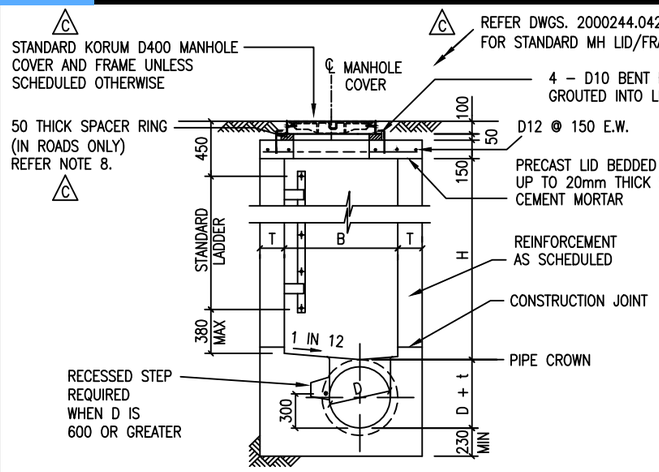
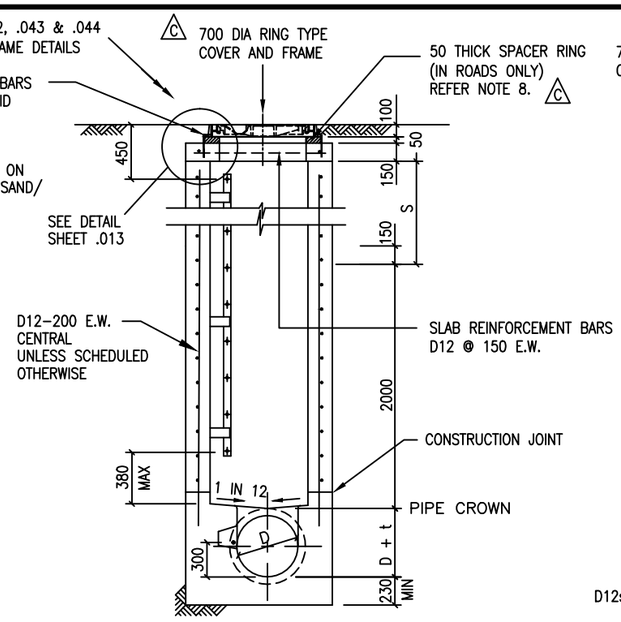


SECTIONAL ELEVATION – TYPE C



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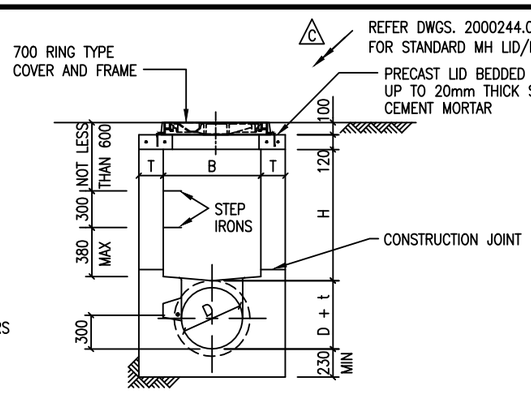

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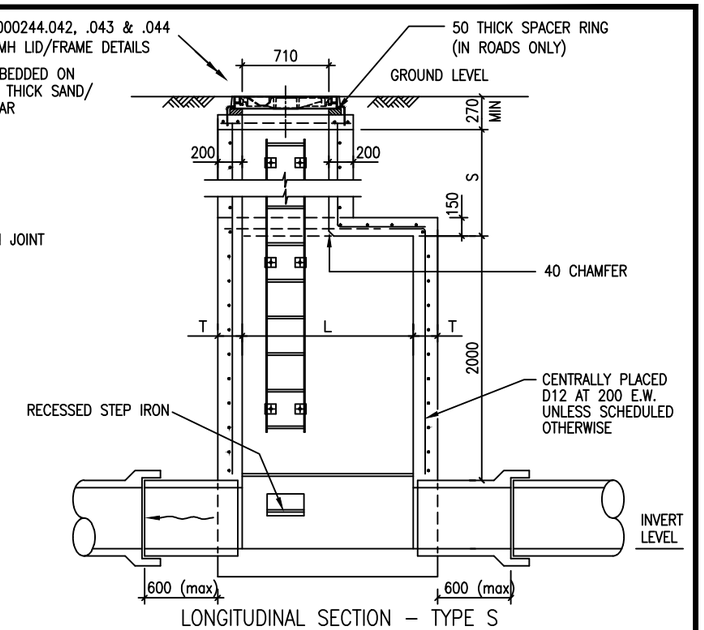
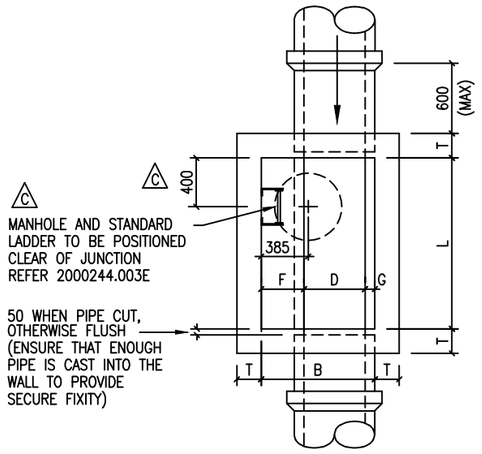
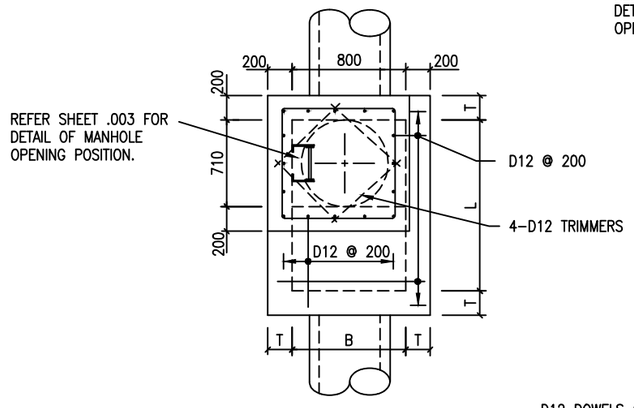


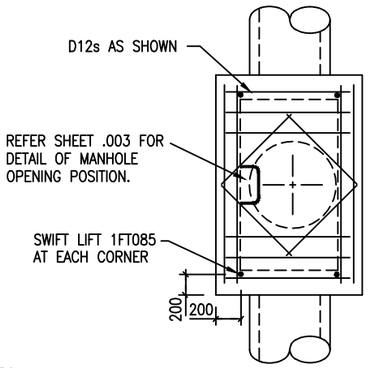
LONGITUDINAL SECTION – TYPE S



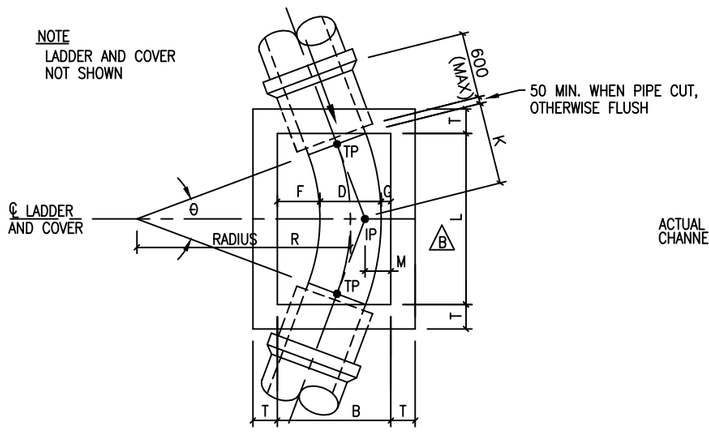
TYPICAL SECTIONAL PLAN – 'STRAIGHT'



SECTIONAL PLAN



REINFORCEMENT – TYPE R
PRECAST TOP



TYPICAL SECTIONAL PLAN – 'ANGLE'

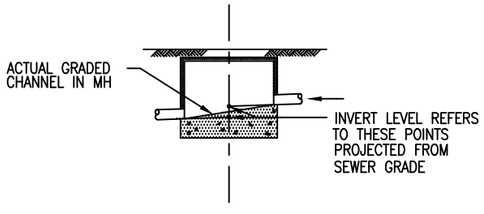
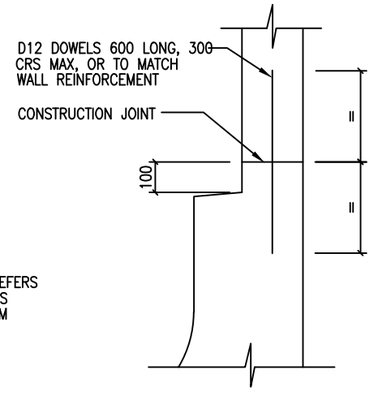


DIAGRAM OF MANHOLE INVERT LEVELS
DIAGRAMMATIC



CONSTRUCTION JOINT DETAIL
SCALE 1 : 10

MANHOLE TYPES

CHAMBER TYPE C
CHAMBER & SHAFT TYPE S
REMOVABLE LID TYPE R

MANHOLE DIMENSIONS

UNLESS DETAILED OR SCHEDULED OTHERWISE THE MINIMUM DIMENSIONS SHALL BE
L=1400 F=350 B=800 G=80 T=200 R=3D
B D = INTERNAL DIAMETER OF PIPE, t = PIPE WALL THICKNESS, K = TANGENT LENGTH
M = IP TO INTERNAL WALL

H DIMENSION

R TYPE, H WILL BE UP TO 1300
C TYPE, H WILL BE GREATER THAN 1300 AND NOT GREATER THAN 2700
S TYPE, H WILL BE 2000

S DIMENSION

S TYPE, S WILL BE NOT LESS THAN 700 AND NOT GREATER THAN 3700
CHAMBER DEPTHS GREATER THAN THE STANDARD RANGE WILL BE SPECIALLY DESIGNED

ASSOCIATED DETAILS

FOR JUNCTIONS SEE SHEET .002.
FOR LADDERS, STEP IRONS AND COVER POSITION SEE SHEET No. .003
FOR GUARD RAIL, HANDRAIL, SAFETY CHAIN AND BAR SEE SHEET No. .004

NOTES

1) CONCRETE SHALL BE SPECIAL GRADE WITH 28 DAY STRENGTH OF 25MPa
2) CONCRETE FINISH FOR EXTERIOR SURFACE EXPOSED TO VIEW AND INTERIOR SURFACES EXCLUDING CHANNELS AND BENCHING SHALL BE F3 OR U3. OTHER EXTERIOR SURFACES SHALL HAVE F1 OR U1 FINISH. CHANNELS SHALL HAVE F4 AND BENCHING SHALL HAVE U3 FINISH (NZS 3114)
3) MINIMUM COVER TO REINFORCEMENT SHALL BE 50 FROM INTERNAL SLAB FACE AND 40 FROM INTERNAL WALL FACE.
4) 700 STANDARD RING TYPE FRAMES AND COVERS SHALL BE USED ON R AND S MANHOLES. 700 STANDARD RING TYPE FRAMES AND COVERS SHALL ALSO BE USED ON C TYPE MANHOLES WHEN THE SEWER DIAMETER IS 525 OR GREATER OR WHEN SPECIAL ACCESS IS REQUIRED, THE COVER RING RECESSES SHALL BE FILLED WITH CONCRETE.
5) WATERCARE SERVICES WILL SUPPLY FREE OF CHARGE ALL MANHOLE FRAMES AND COVER SETS, STAINLESS STEEL STEPS AND DROP PLATES. THE CONTRACTOR SHALL SUPPLY LADDERS, LAMPHOLE FRAME AND COVER SETS,AND ALL OTHER ITEMS.
6) MANHOLE BASE AND CHANNEL IS TO BE CONSTRUCTED AS ONE UNIT. ALL INTERNAL AND EXTERNAL CONCRETE ANGLES SHALL HAVE 25mm CHAMFER UNLESS OTHERWISE DELINEATED.
7) TOP RECESSED STEP SHALL BE 300mm FROM THE TOP OF BENCHING. BOTTOM STEP SHALL BE NOT MORE THAN 300mm ABOVE I.L. OF CHANNEL.
8) A 50mm SPACER RING IS TO BE INSERTED BETWEEN MANHOLE FRAME AND TOP SURFACE OF CONCRETE LID WHEREVER MANHOLE IS LOCATED IN ROADS. THIS IS TO ALLOW FOR EASE OF FUTURE LOWERING (AND RAISING) OF LID/FRAME

ISSUE	DATE	AMENDMENT	BY	APPD.
C	7–12	KORUM FRAME & LIDS & POSITIONS.	I.M.	C.R.
		50mm SPACERS ADDED UNDER C.I. FRAME		
B	9–99	M DIMENSION CORRECTED AND NOTE ADDED	I.M.M	
A	6–95	WSL PLAN FORM AND GENERAL UPDATE	I.M.M	

		DATE
DESIGNED		
DES. CHECKED	B.MILLER/R.JADURAM	4/92
DRAWN	I.M.M	1/92
DWG. CHECKED	I M MOSES	7/92
PROJECT LEADER	D.L. McCANN	7/92

C HARBOUR OPERATIONS INFRASTRUCTURE

water Care services limited

STANDARD WASTEWATER MANHOLES
MANHOLE TYPE C, S AND R

CAD FILE 2000244.001C	DATE 05–07–12
ORIGINAL SCALE A1 1 : 10 1 : 25	CONTRACT No.
DRAWING No. 2000244 001	ISSUE C

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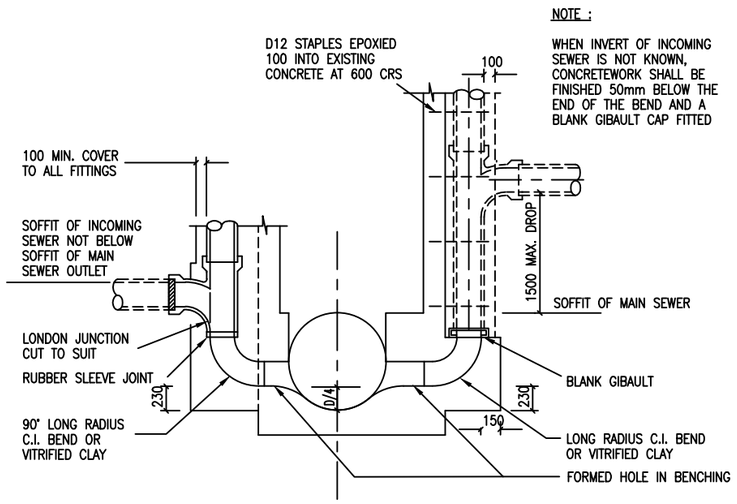
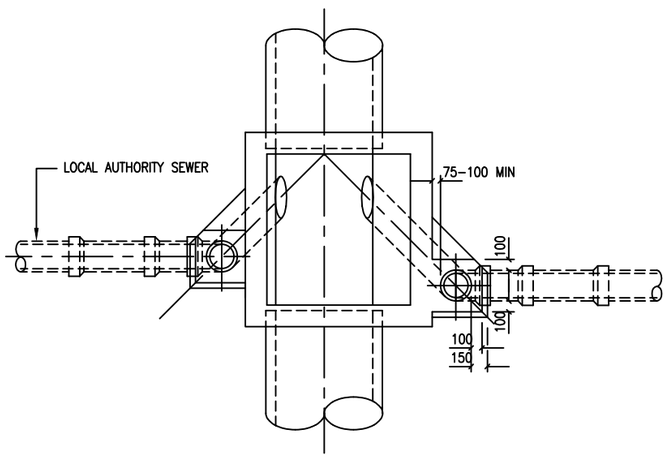
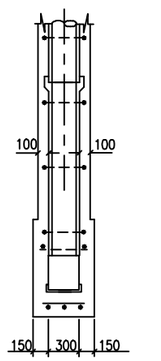


ON GRADE JUNCTION ON PIPE GREATER THAN 750 DIA.

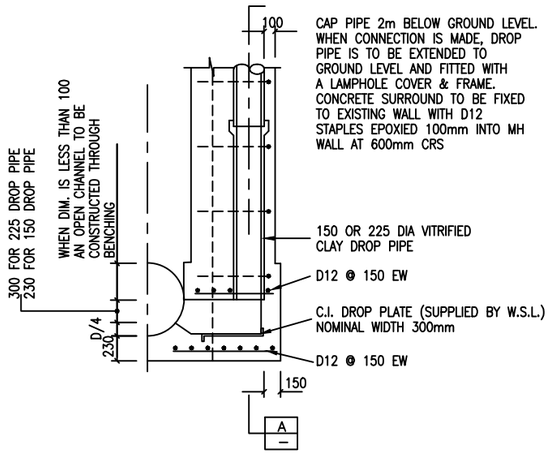
SHORT DROP JUNCTION TO SEWER GREATER THAN 750 DIA.



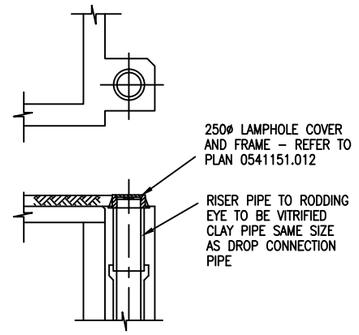
JUNCTIONS ON SEWERS GREATER THAN 750 DIA.



SECTION A – A



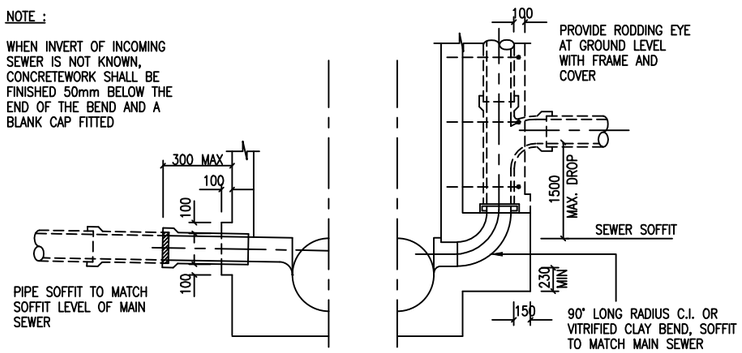
DEEP DROP CONNECTION & WATER CUSHION FOR ALL SIZES OF PIPE



LAMPHOLE COVER & FRAME

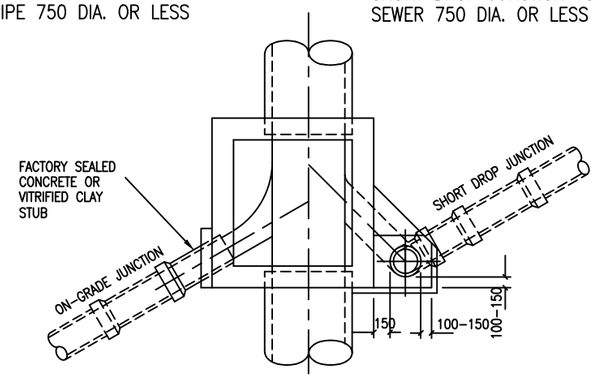
NOTE :

WHEN INVERT OF INCOMING SEWER IS NOT KNOWN, CONCRETEWORK SHALL BE FINISHED 50mm BELOW THE END OF THE BEND AND A BLANK CAP FITTED



ON–GRADE JUNCTION ON PIPE 750 DIA. OR LESS

SHORT DROP JUNCTION TO SEWER 750 DIA. OR LESS



JUNCTIONS ON SEWERS 750 DIA. OR LESS

NOTES

NEW SEWERS

1) INCOMING ON–GRADE AND SHORT DROP CONNECTIONS TO WATERCARE SERVICES SEWERS LESS THAN 750mm DIA., SHALL BE CONSTRUCTED WITH SOFFITS MATCHING OR HIGHER THAN THE MAIN OUTLET PIPE SOFFIT.
2) INCOMING SEWER TO BE ANGLED AT 45° DOWNSTREAM UNLESS INDICATED OTHERWISE ON THE MANHOLE SCHEDULE.
3) ALL CONNECTIONS UTILISING A BEND INTO THE MAIN CHANNEL SHALL BE PROVIDED WITH RODDING ACCESS AT GROUND LEVEL.
4) CONNECTIONS WHICH DROP MORE THAN 1500mm SHALL INCORPORATE A CAST IRON DROP PLATE AND WATER CUSHION.
5) DROP CONNECTIONS AND RODDING ACCESS SHALL BE CAST IN MONOLITHICALLY WITH THE MANHOLE STRUCTURE.

EXISTING SEWERS

1) NOTES FOR NEW SEWERS APPLY EXCEPT FOR THE FOLLOWING:
2) THE INVERT OF THE CHANNEL DISCHARGING INTO THE MAIN FLOW MAY BE ADJUSTED TO MINIMISE UNDERWATER WORK.
3) CONCRETE SUPPORT TO BENDS, DROP PIPES AND RODDING ACCESS SHALL BE REINFORCED WITH D12 STAPLES EPOXIED 100mm MIN. INTO THE EXISTING MANHOLE WALL. STAPLES SPACED AT 600mm CENTRES.

MISCELLANEOUS

1) ALL CONNECTIONS TO WATERCARE SERVICES MANHOLES SHALL BE PUBLIC SEWERS AND SHALL CONNECT FROM A LOCAL AUTHORITY MANHOLE SITUATED NOT LESS THAN 2m AND NOT MORE THAN 15m FROM THE WATERCARE SERVICES MANHOLE. A MIN. OF TWO FLEXIBLE COUPLINGS AT 600mm MIN. SPACING SHALL BE PROVIDED WITHIN 1.5m OF THE WATERCARE SERVICES MANHOLE.
2) GRADE OF CONNECTION FROM LOCAL AUTHORITY MANHOLE TO WATERCARE SERVICES MANHOLE SHALL NOT EXCEED 1 IN 60.
3) THE INCOMING SEWER, DROP PIPE AND RODDING EYE SHALL BE CONSIDERED AS PART OF THE INCOMING LOCAL AUTHORITY SEWER.

ISSUE	DATE	AMENDMENT	BY	APPD.
A	6–95	WSL PLAN FORM AND GENERAL CHANGES	I.M.M.	

DESIGNED		
DES. CHECKED	B.MILLER/R.JADURAM	7/92
DRAWN	I MOSES	7/92
DWG. CHECKED	I MOSES	8/92
PROJECT LEADER	D L McCANN	8/92
BY		DATE

OPERATIONS MANAGER WASTEWATER

water Care services limited

STANDARD WASTEWATER MANHOLES JUNCTIONS

CAD FILE	EG1001195/0492	DATE	2–8–95
ORIGINAL SCALE A1		CONTRACT No.	
1 : 25			
DRAWING No.		ISSUE	
2000244	002	A	

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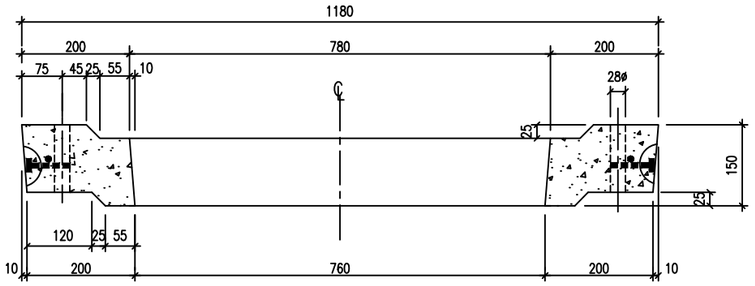
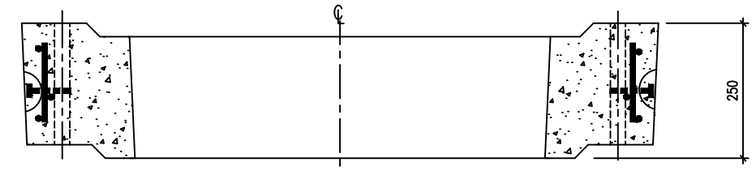
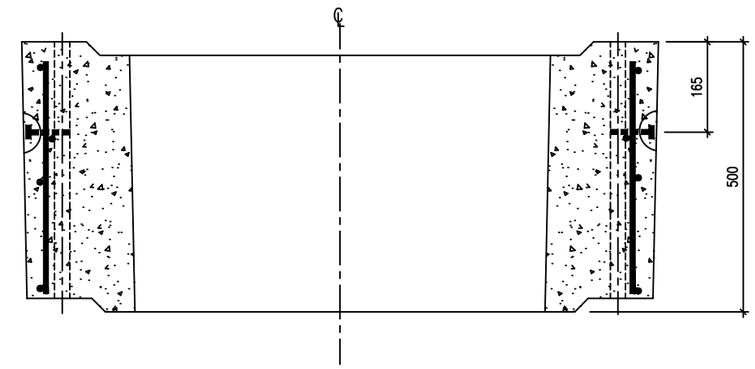


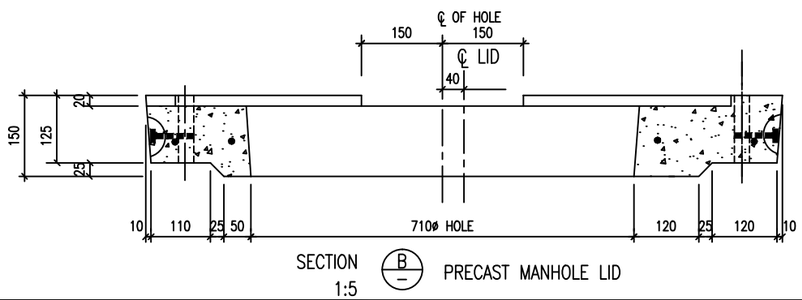
SECTION 1:5 (A) 150mm RISER COMPONENT



SECTION 1:5 (A) 250mm RISER COMPONENT



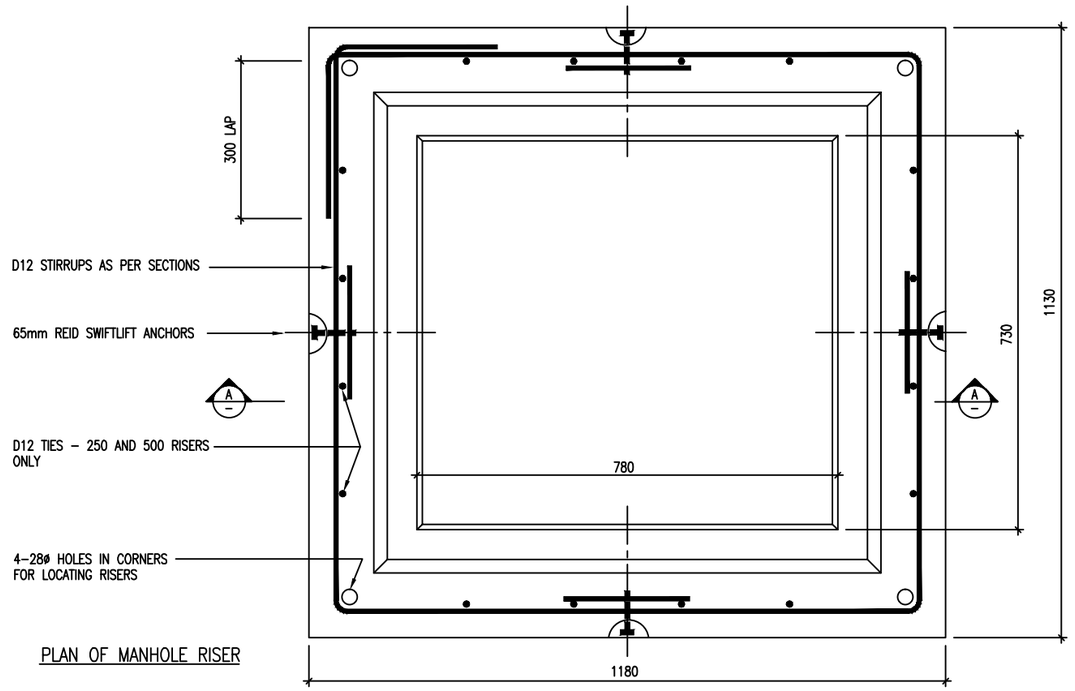
SECTION 1:5 (A) 500mm RISER COMPONENT



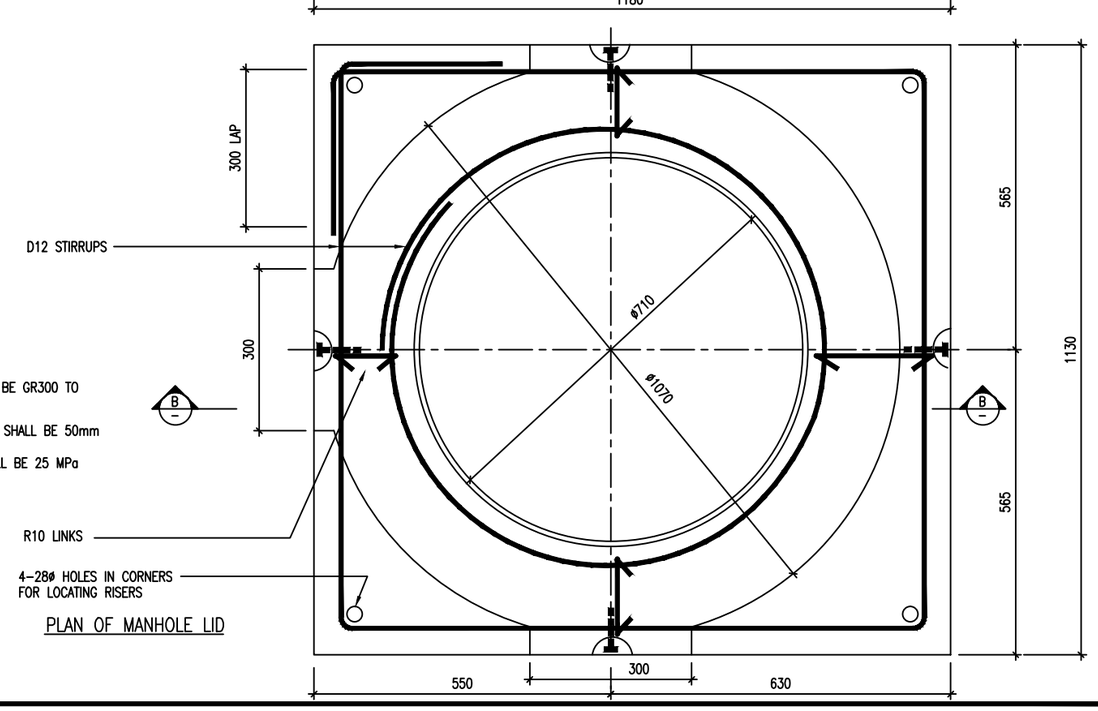
SECTION 1:5 (B) PRECAST MANHOLE LID

NOTES

1. REINFORCING BARS SHALL BE GR300 TO CONFORM WITH NZS 3402
2. MINIMUM COVER TO STEEL SHALL BE 50mm
3. CONCRETE STRENGTH SHALL BE 25 MPa



PLAN OF MANHOLE RISER



PLAN OF MANHOLE LID

ISSUE	DATE	AMENDMENT	BY	APPD.

DESIGNED	M. JONES	12/94
DES. CHECKED		
DRAWN	L MOSES	1/95
DWG. CHECKED		
PROJECT LEADER		
	BY	DATE

MANAGER REGIONAL OPERATIONS

MANAGER ASSET MANAGEMENT GROUP

water Care services limited

STANDARD WASTEWATER MANHOLES
PRECAST RISERS AND LID
DETAILS

CAD FILE EG1003013/0992	DATE 27-01-95
ORIGINAL SCALE A1 1:5	CONTRACT No. –
DRAWING No. 2000244 .005	ISSUE –

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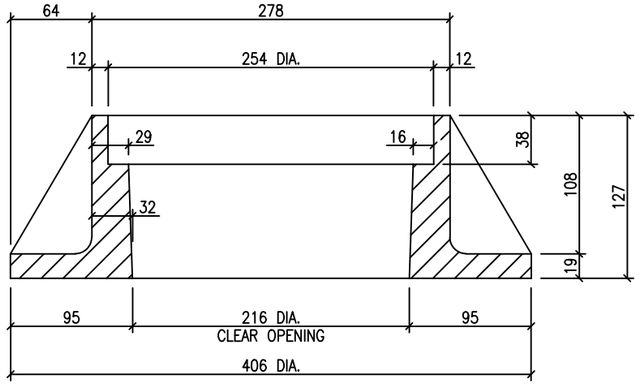
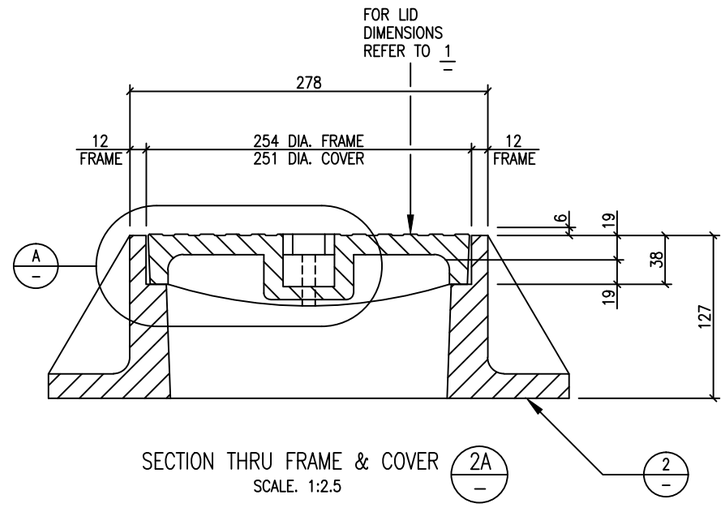
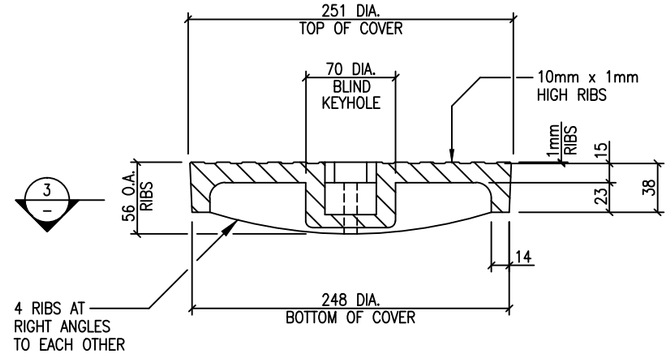


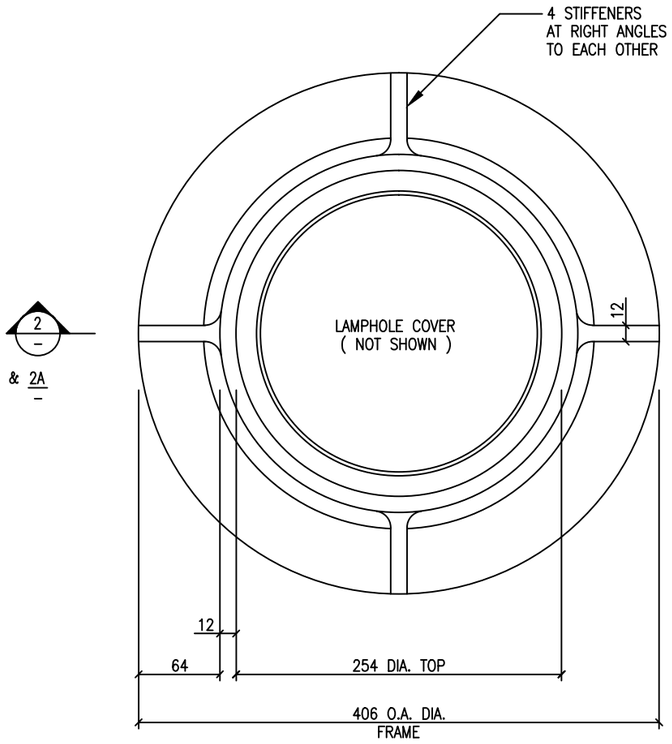
SECTION THRU FRAME (2)
SCALE. 1:2.5



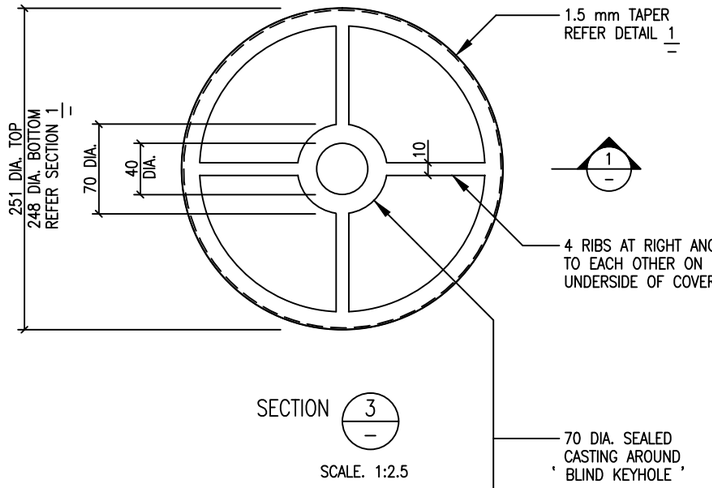
SECTION THRU FRAME & COVER (2A)
SCALE. 1:2.5



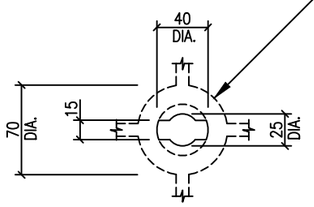
SECTION THRU COVER (1)
SCALE. 1:2.5



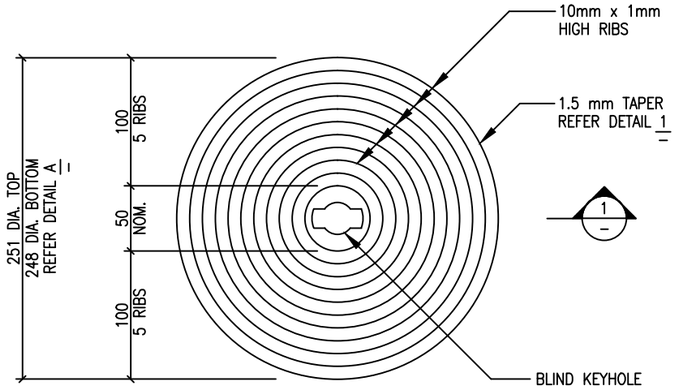
PLAN ON 220 DIA. LAMPHOLE FRAME
SCALE. 1:2.5



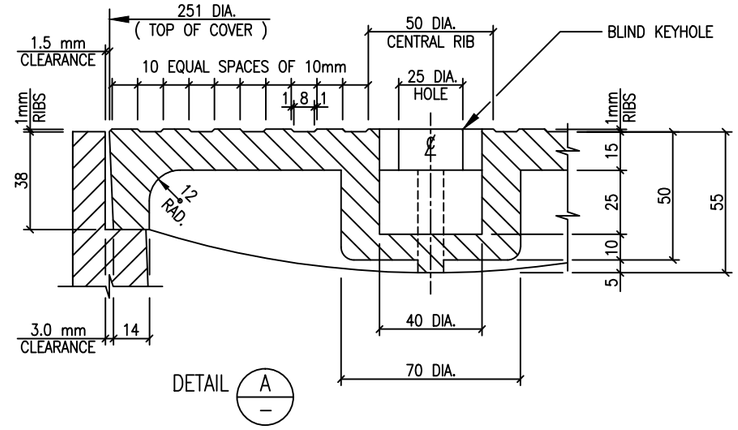
SECTION (3)
SCALE. 1:2.5



DETAIL OF KEY HOLE
SCALE. 1:2.5



PLAN ON TOP OF COVER
SCALE. 1:2.5



DETAIL (A)
SCALE. 1:1.25

					DESIGNED			WASTEWATER OPERATIONS
					DES. CHECKED	B. MILLER.	1/01	
					DRAWN	L.A.C.	1/01	
					DWG. CHECKED	I. MOSES.	1/01	WASTEWATER PLANNING
					PROJECT LEADER	B. MILLER.	1/01	
A	10–01	DRAWING RENUMBERED	L.A.C.	B.M.	SECTION HEAD	A. KENNARD	1/01	
ISSUE	DATE	AMENDMENT	BY	APPD.		BY	DATE	

water Care services limited

STANDARD WASTEWATER STRUCTURES
LAMPHOLE FRAME & COVER
CASTING DETAILS

CAD FILE EG 2000244.009	DATE 23–10–01
ORIGINAL SCALE A1 AS SHOWN	CONTRACT No. –
DRAWING No. 2000244 009	ISSUE A

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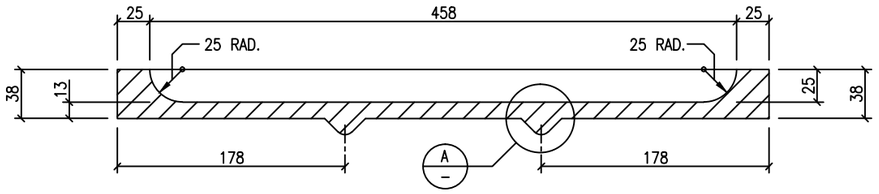
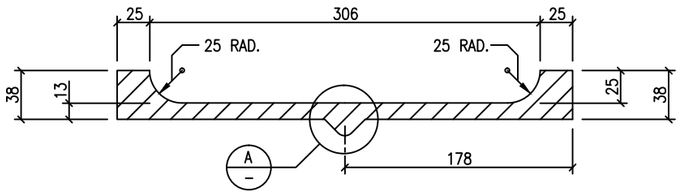
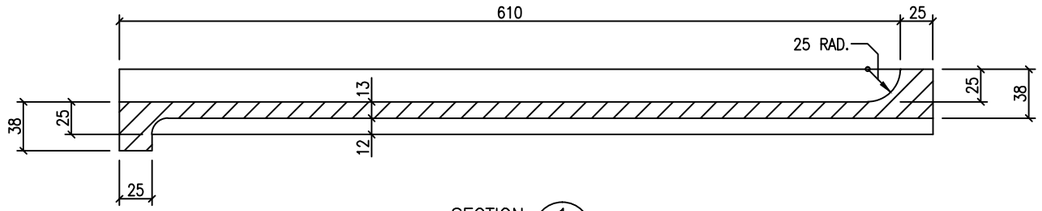


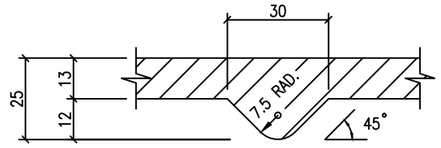
SECTION 2
1:2.5



SECTION 3
1:2.5

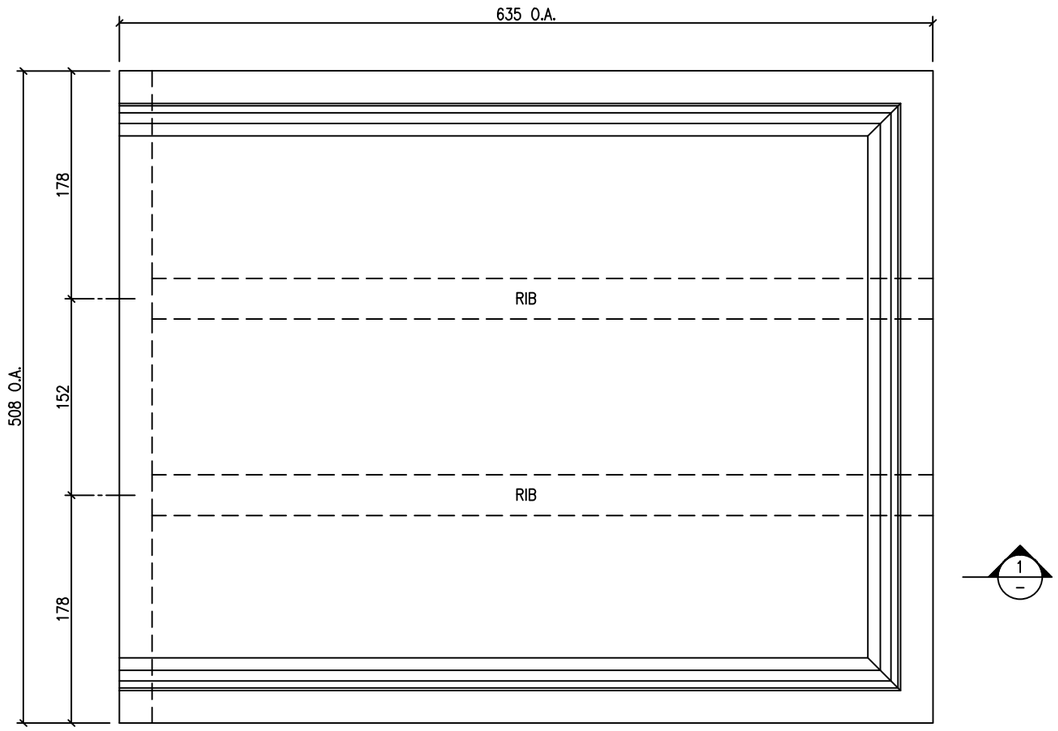


SECTION 1
1:2.5

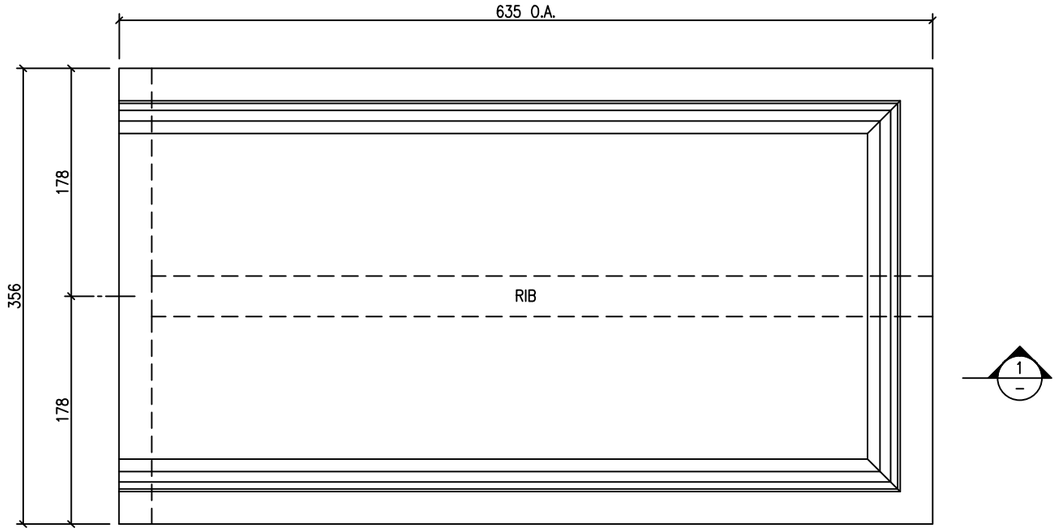


TYPICAL RIB DETAIL A
SCALE. 1:1

NOTE
PROVIDE A DRAW ANGLE OF 5°



PLAN ON 508mm WIDE DROP PLATE
(DIMENSIONED ON TOP OF PLATE)
SCALE. 1:2.5



PLAN ON 356mm WIDE DROP PLATE
(DIMENSIONED ON TOP OF PLATE)
SCALE. 1:2.5

ISSUE	DATE	AMENDMENT	BY	APPD.

DESIGNED		
DES. CHECKED	B. MILLER.	1/01
DRAWN	L.A.C.	1/01
DWG. CHECKED	I. MOSES.	1/01
PROJECT LEADER	B. MILLER.	1/01
SECTION HEAD	A. KENNARD	1/01
	BY	DATE

WASTEWATER OPERATIONS

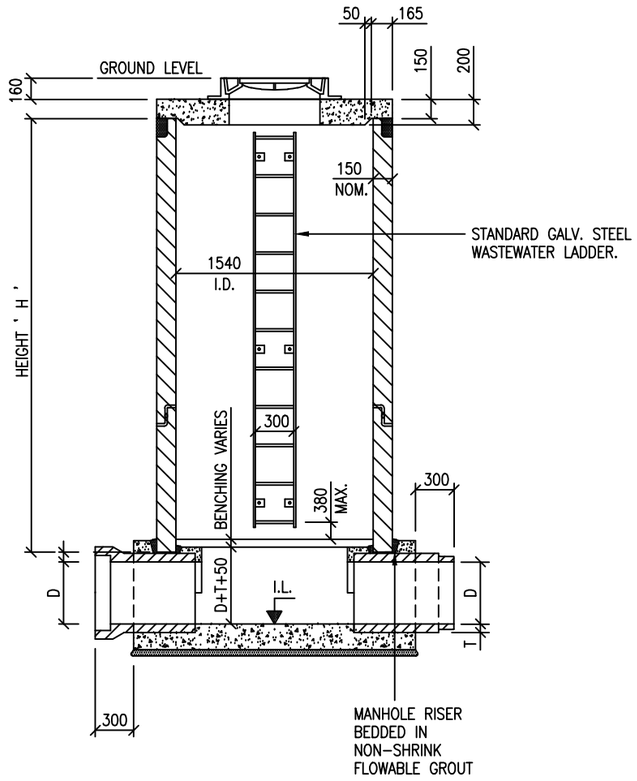
WASTEWATER PLANNING

water Care services limited

STANDARD WASTEWATER STRUCTURES
CAST IRON DROP PLATES
CASTING DETAILS

CAD FILE EG 2000244.010 DATE 12-07-01
ORIGINAL SCALE A1: AS SHOWN
CONTRACT No.: –
DRAWING No.: 2000244 010
ISSUE:

Return to Index



TYPICAL SECTION

SCALE. 1:50

THIS SHEET IS FOR DESIGN PURPOSES ONLY. FOR CONSTRUCTION USE SHEET 2000244.012, 013, 014

SHALLOW MANHOLES (H < 1200) USE TYPE R RECTANGULAR MANHOLE – SEE 2000244.001

MANHOLE PLATFORMS TO BE INSTALLED WHERE H > 5000 – SEE 2000244.015

DESIGN PROCEDURES FOR CIRCULAR MANHOLES

1. GET B, D AND θ (B IS USUALLY 1540)
2. IF SIN $\frac{\theta}{2} > 0.1333 \frac{B}{D}$ OR IF $\theta > \theta_c$ IN TABLE, USE TYPE A2 MANHOLE , ELSE USE TYPE A1
3. TYPE A1 : CALCULATE J, K, R, THEN A AND C
4. TYPE A2 : CALCULATE R, K

   USE TABLE TO GET C OR CALCULATE γ, E AND C

   CALCULATE A

NOTES

1. MINIMUM CURVE RADIUS = 3 x D
2. DIMENSIONS A, J AND C ARE DERIVED EMPIRICALLY TO GIVE REASONABLE PROPORTIONS.
   THEY MAY BE VARIED FOR SPECIFIC DESIGN
   OTHER DIMENSIONS FOLLOW FROM GEOMETRY.
3. AS ANGLE OF DEFLECTION INCREASES, THE DESIGN PROCEDURE ADJUSTS THE RADIUS SO THE CURVE FITS BETWEEN TWO POINTS, DISTANCE 2 x J APART (TYPE A1 MANHOLES)
   WHEN THE RADIUS IS DOWN TO A MINIMUM OF 3 x D, THE RADIUS AND CENTRE OF CURVATURE ARE KEPT FIXED AND THE LENGTH OF CURVE ALLOWED TO INCREASE (TYPE A2 MANHOLES)
4. JUNCTION MANHOLES, CHANGES OF PIPE SIZE ETC, SHOULD BE SPECIFICALLY DESIGNED AND DRAWN.
   THE DESIGN PROCEDURE ABOVE NEED NOT APPLY BUT A MINIMUM RADIUS OF 3 x D IS STILL REQUIRED.

MANHOLE DIMENSIONS

TYPE A1 MANHOLES (USE WHERE SIN $\frac{\theta}{2} < 0.1333 \frac{B}{D}$)

B = MANHOLE I.D. D = PIPE I.D. (ACTUAL) θ = PIPE DEFLECTION ANGLE

J = 0.4B $K = \frac{J}{\cos \frac{\theta}{2}}$ $R = \frac{K}{\tan \frac{\theta}{2}}$ $A + C = \sqrt{(K^2 + R^2)}$

DIMENSION A TO BE CHOSEN BY DESIGNER

$A = (0.25B - 0.4D + 0.25B \times \tan \frac{\theta}{2})$ IS SUITABLE IN MOST CASES.

TYPE A2 MANHOLES (USE WHERE SIN $\frac{\theta}{2} > 0.1333 \frac{B}{D}$)

R = 3D $K = R \times \tan \frac{\theta}{2}$ $A + C = \sqrt{(K^2 + R^2)}$

DIMENSION C TO BE CHOSEN BY DESIGNER, OR USE TABLE BELOW FOR C.

C IS DERIVED AS FOLLOWS:

$\gamma = \text{SIN}^{-1}(0.1333 \frac{B}{D})$

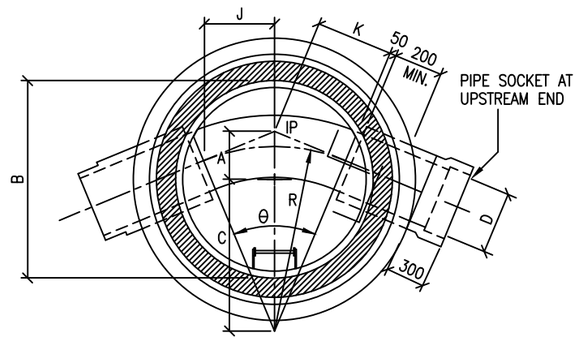
$E = (0.25B - 0.4D + 0.25B \times \tan\gamma)$

$C = (\frac{R}{\cos \gamma}) - E$

TABLE FOR 1540 TYPE A2 MANHOLES (B =1540mm)

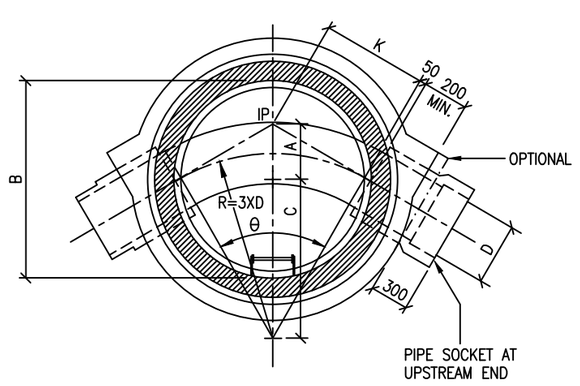
D	R = 3D	θ_c	C
331	993	76° 40'	709
381	1143	65° 12'	877
407	1221	60° 30'	967
483	1449	50° 20'	1228
636	1908	37° 40'	1754
712	2136	33° 30'	2015
788	2364	30° 12'	2275
864	2592	27° 30'	2535

NOTE: IF PIPE DEFLECTION ANGLE IS LESS THAN θ_c USE THE TYPE A1 MANHOLE



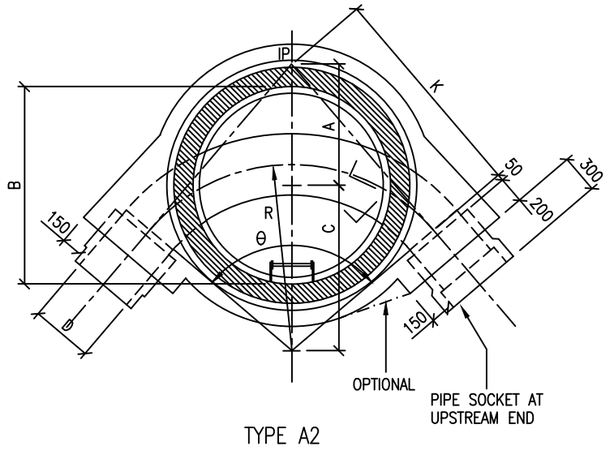
TYPE A1

SCALE. 1:50 & N.T.S.



TYPE A2

SCALE. 1:50 & N.T.S.



TYPE A2
WITH BASE EXTENSIONS

SCALE. 1:50 & N.T.S.

					DESIGNED	C. RODLIFFE	11-01	OPERATIONS
					DES. CHECKED	D. McCANN	11-01	
					DRAWN	L. A. COLLINGE	11-01	
					DWG. CHECKED	I. MOSES.	11-01	ASSET MANAGEMENT
					PROJECT LEADER	C. RODLIFFE	11-01	
A	11-09	MANHOLE LID DIMENSION RAISED	G.B.	B.M.	A.D. APPROVED	A. KENNARD	11-01	
ISSUE	DATE	AMENDMENT	BY	APPD.		BY	DATE	

water Care services limited

STANDARD CIRCULAR WASTEWATER MANHOLES FOR LINES 375 N.B. TO 900 N.B.

GEOMETRY AND DESIGN NOTES

CAD FILE 2000244.011A DATE 13-11-09

ORIGINAL SCALE A3 AS SHOWN

CONTRACT No. –

DRAWING No. 2000244 .011

ISSUE A

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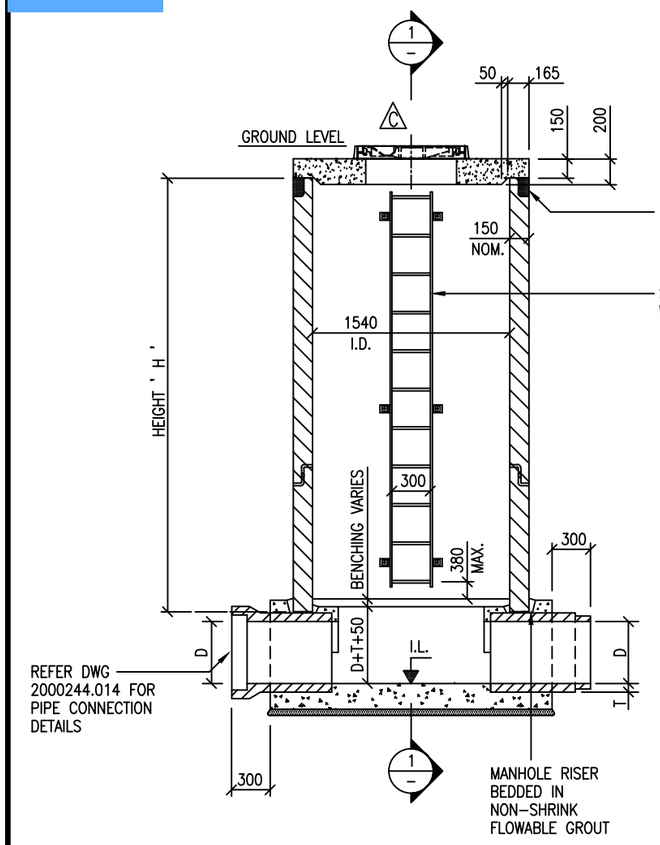
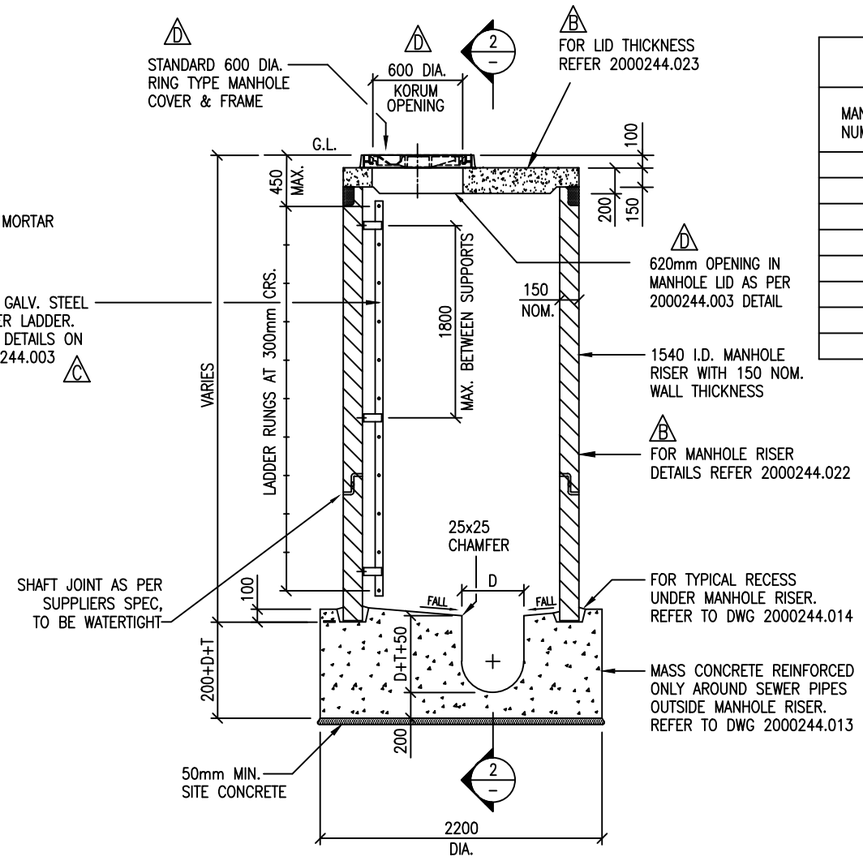




DIMENSIONS FOR MANHOLE CONSTRUCTION														
MANHOLE NUMBER	TYPE	PIPE I.D.	θ	R	K	A	B	C	L	M	F	G	T	H

NOTE: FOR CHAMBER AND LID COMPONENTS SEE DRAWING 2000244.022, 023
θ, R, K, A, B, C AND H APPLY TO CIRCULAR MANHOLES,
θ, R, K, B, L, M, F, G, T, AND H APPLY TO RECTANGULAR MANHOLES – SEE DWG. 2000244.001B

(INDIVIDUAL MANHOLE DIAGRAMS TO BE DRAWN HERE OR ALTERNATELY ON A SEPARATE SHEET)

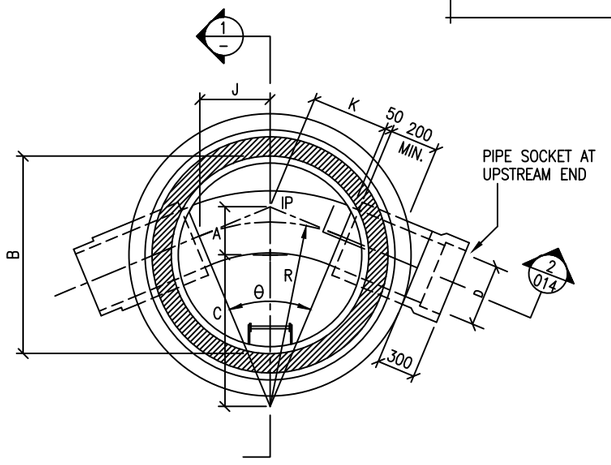
EXAMPLE:

SECTION 2 – SCALE. 1:50

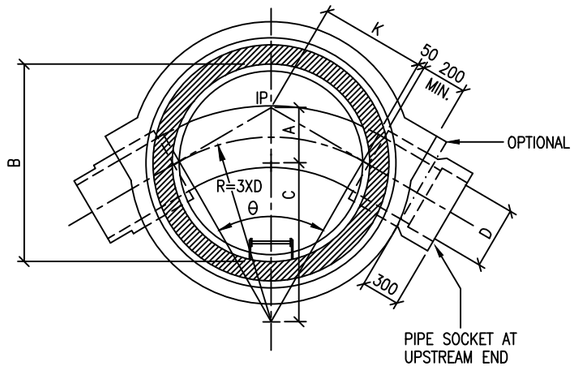
SECTION 1 – SCALE. 1:50

NOTE

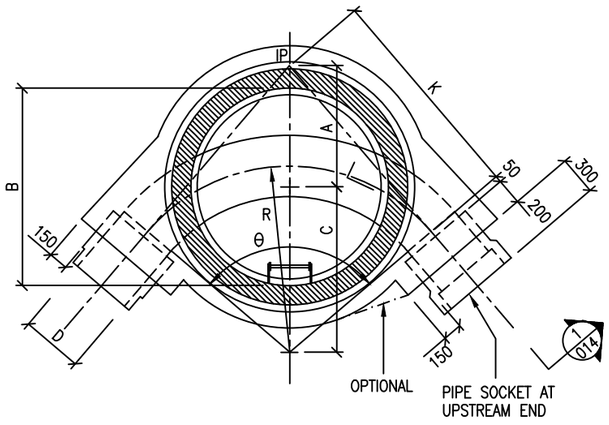
MANHOLE PLATFORMS TO BE INSTALLED WHERE H > 5m
REFER 2000244.015 FOR DETAILS



TYPE A1
SCALE. 1:50 & N.TS.



TYPE A2
SCALE. 1:50 & N.TS.



TYPE A2
WITH BASE EXTENSIONS
SCALE. 1:50 & N.TS.

ISSUE	DATE	AMENDMENT	BY	APPD.
D	03:14	KORUM LID CHANGED TO HAVE 600ø OPENING	L.C.	C.H.
C	07:12	KORUM LID ADDED & REFERENCE CORRECTED	I.M.	C.H.
B	05:12	LID & RISER REFERENCES ADDED	I.M.	C.H.
A	11:09	MH LID RAISED. BACKFILL NOTE REMOVED	G.B.	B.M.

DESIGNED	C. RODLIFFE	11-01
DES. CHECKED	D. McCANN	11-01
DRAWN	L. A. COLLINGE	11-01
DWG. CHECKED	I. MOSES.	11-01
PROJECT LEADER	C. RODLIFFE	11-01
A.D. APPROVED	A. KENNARD	11-01
	BY	DATE

C HARBOUR
OPERATIONS
ASSET MANAGEMENT

water Care services limited

STANDARD CIRCULAR WASTEWATER MANHOLES FOR LINES 375 N.B. TO 900 N.B.

DIMENSIONS FOR CONSTRUCTION

CAD FILE 2000244.012D — DATE 24-03-14
ORIGINAL SCALE A3 — AS SHOWN
CONTRACT No. — –
DRAWING No. — 2000244 .012
ISSUE — D

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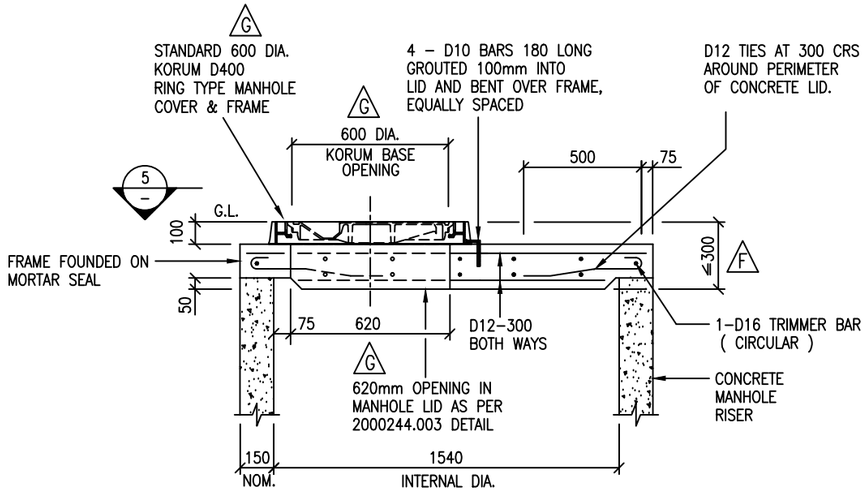
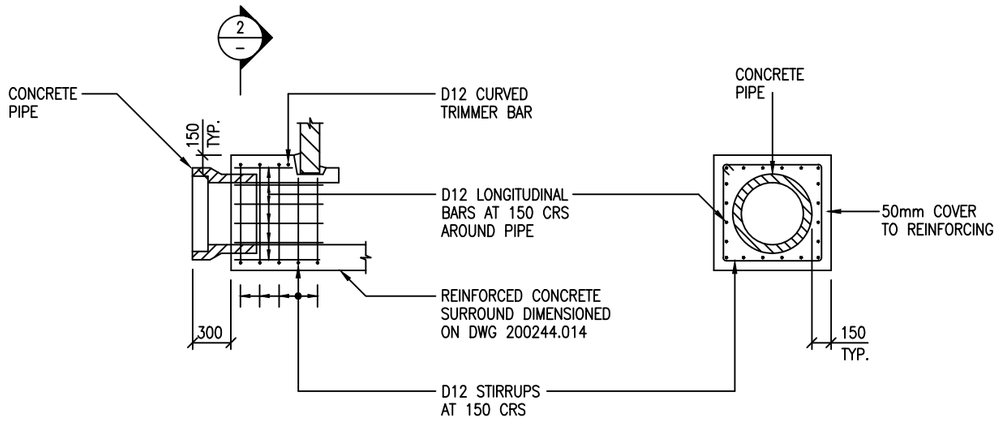
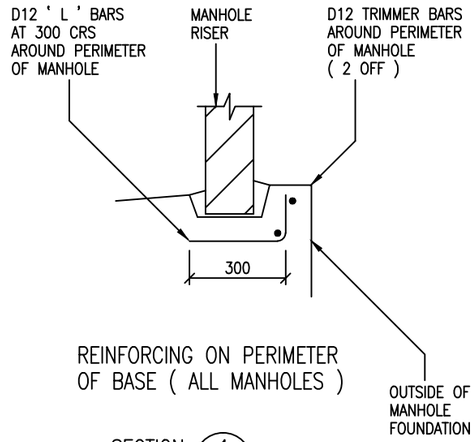


SECTION 6 THRU MH LID
N.T.S.



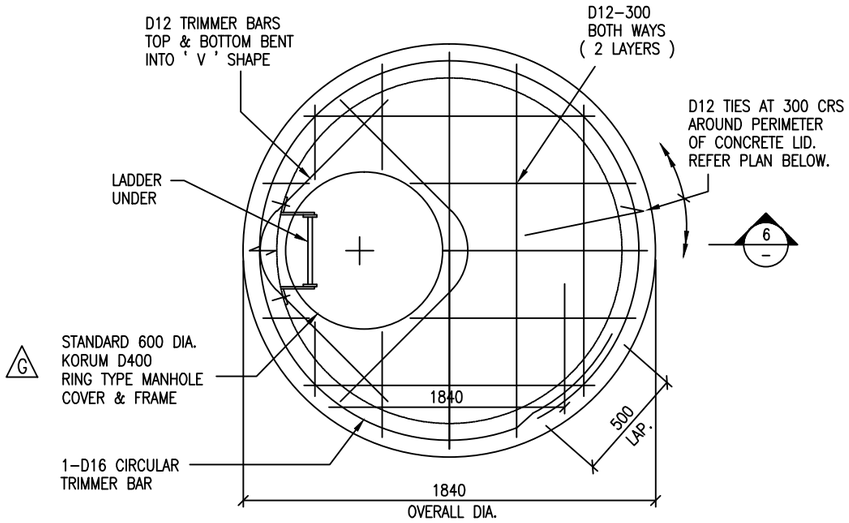
SECTION 3
SCALE. 1:50

SECTION 2
SCALE. 1:50

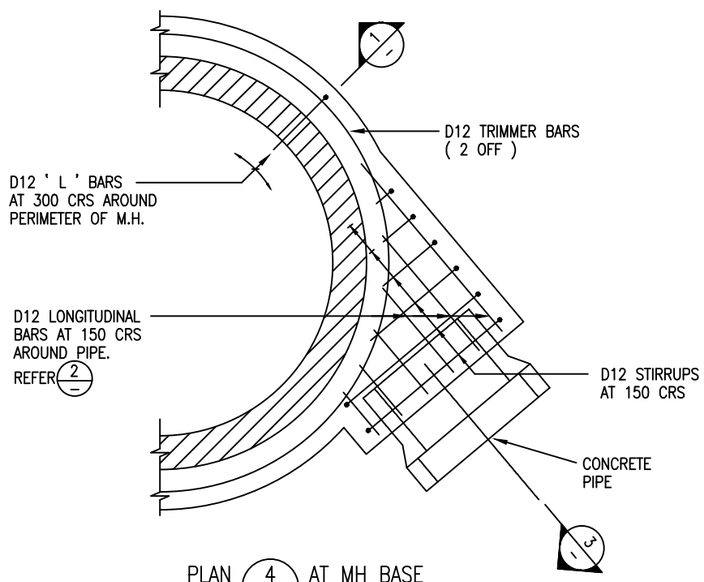


SECTION 1
SCALE. 1:20

REINFORCING FOR BASE EXTENSIONS



PLAN 5 ON MH LID
N.T.S.



PLAN 4 AT MH BASE
N.T.S.

STEELWORK NOTES

1. ALL SHARP EDGES ON STEELWORK TO BE GROUND OFF.
2. ALL STEELWORK TO BE HOT DIPPED GALVANISED AFTER FABRICATION.
3. TOP RUNG TO BE AT FLOOR LEVEL WHEN STEPPING OFF FLOORS OR PLATFORMS.
4. PLEASE REFER DRAWING 2000244.024 FOR MANHOLE LADDER & STEP IRON DETAILS
5. ALL STEP IRONS, CAST IRON FRAMES AND COVERS WILL BE SUPPLIED BY WATERCARE SERVICES.

ISSUE	DATE	AMENDMENT	BY	APPD.
F	07:12	KORUM LID AND OPENING SIZES ADDED	I.M.	C.H.
E	04:12	MANHOLE OPENING MOVED 75mm INWARD	I.M.	C.H.
D	11:09	REINF. NOTES REMOVED & MH LID DIMENSION	GB	B.M.
C	02:06	FRAME FIXING DETAIL AMENDED	I.M.M.	I.W.
B	04:05	LADDER FIXING DETAILS CORRECTED	I.M.M.	I.W.
G	03:14	620ø OPENING THROUGH R.C. MANHOLE LID	L.C.	C.H.

DESIGNED	C. RODLIFFE	11–01	C. HARBOUR OPERATIONS
DES. CHECKED	D. McCANN	11–01	
DRAWN	L. A. COLLINGE	11–01	
DWG. CHECKED	I. MOSES.	11–01	ASSET MANAGEMENT
PROJECT LEADER	C. RODLIFFE	11–01	
A.D. APPROVED	A. KENNARD	11–01	
	BY	DATE	

water Care services limited

STANDARD CIRCULAR WASTEWATER MANHOLES FOR LINES 375 N.B. TO 900 N.B.

REINFORCING AND STEELWORK

CAD FILE 2000244.013G | DATE 24–03–14
ORIGINAL SCALE A3 AS SHOWN | CONTRACT No. –
DRAWING No. 2000244 .013 | ISSUE G

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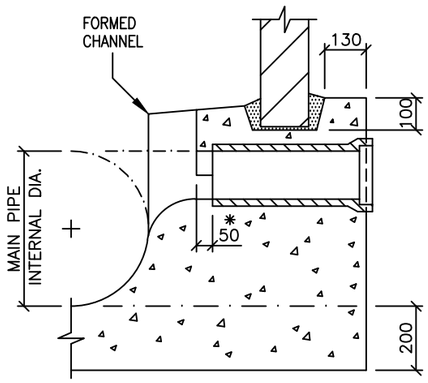
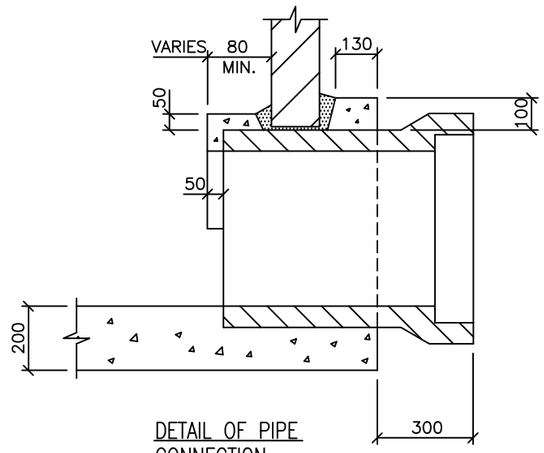


BRANCH CONNECTION

* COVER TO END OF PIPE IS REQUIRED ONLY WHERE CUT REINFORCING IS EXPOSED.

SCALE. 1:20



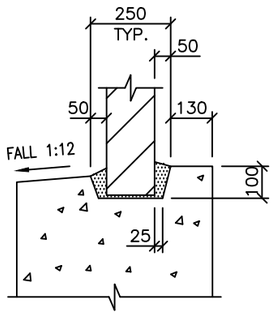
DETAIL OF PIPE CONNECTION

SCALE. 1:20

2/012

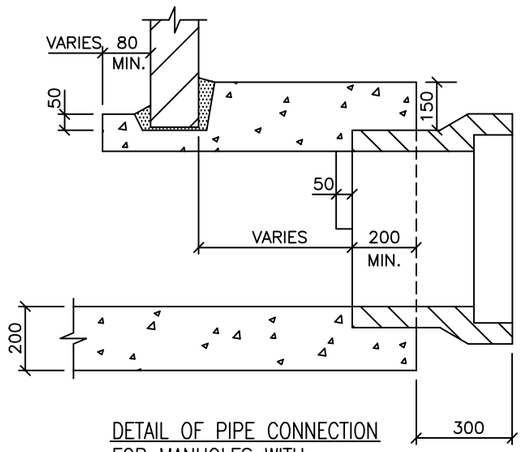
NOTE

SECTIONS SHOWN ON THIS DRAWING DO NOT NECESSARILY SHOW THE TRUE THICKNESS OF MANHOLE RISER & RECESS FOR IT



DETAIL OF RECESS FOR MANHOLE RISER

SCALE. 1:20



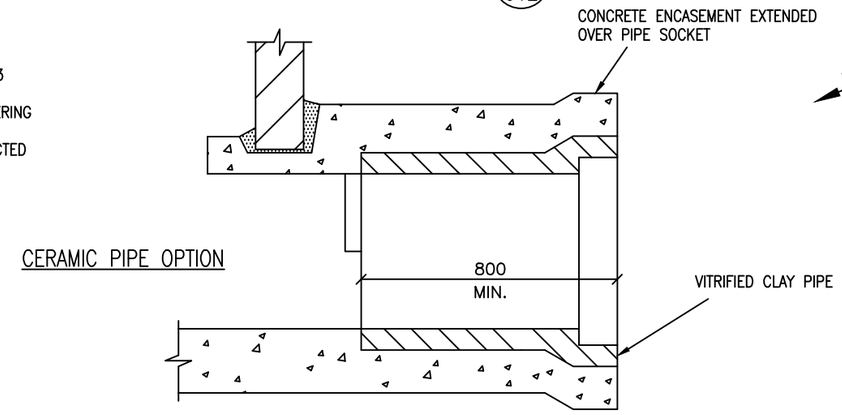
DETAIL OF PIPE CONNECTION FOR MANHOLES WITH BASE EXTENSION (TYPE A2)

SCALE. 1:20

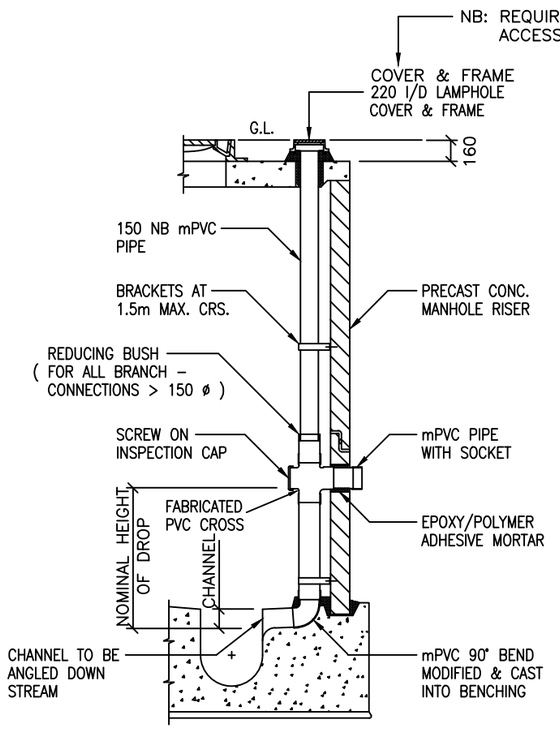
1/012

CONCRETE AND REINFORCEMENT NOTE

1. MINIMUM 28 DAY STRENGTH FOR CONCRETE IN BASE, SHAFT AND LID TO BE 25MPa
2. ALL REINFORCEMENT TO BE GRADE 500E
3. MINIMUM COVER TO REINFORCEMENT TO BE 50mm ON UNDERSIDE OF ROOF, 40mm ELSEWHERE
4. SURFACE FINISH TO NZS 3114
   INTERNAL SURFACES EXCEPT CHANNELS – F3 OR U3
   CHANNELS – F4
   SURFACE FINISHES TO BE ACHIEVED WITHOUT PLASTERING
5. MANHOLE BASE AND CHANNEL ARE TO BE CONSTRUCTED AS ONE UNIT



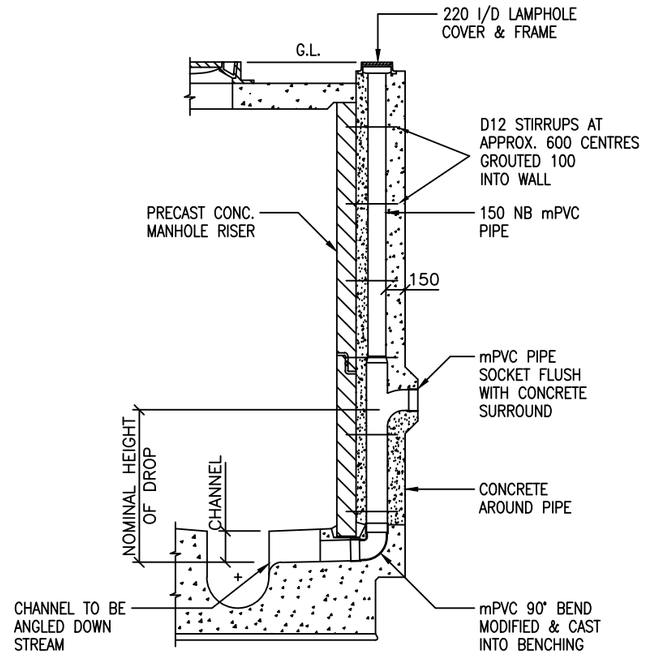
CERAMIC PIPE OPTION



INTERNAL DROP CONNECTION (TYPICAL)

SCALE. 1:50

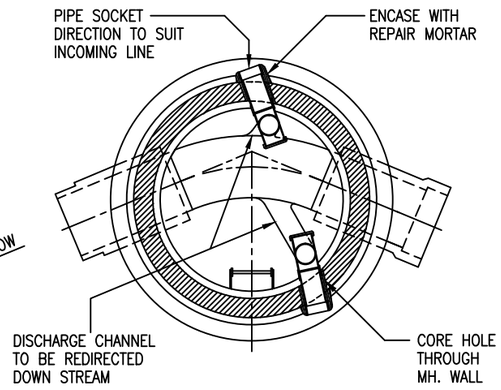
NB: PREFERRED OPTION FOR NEW MANHOLE CONSTRUCTION B



EXTERNAL DROP CONNECTION (TYPICAL)

SCALE. 1:50

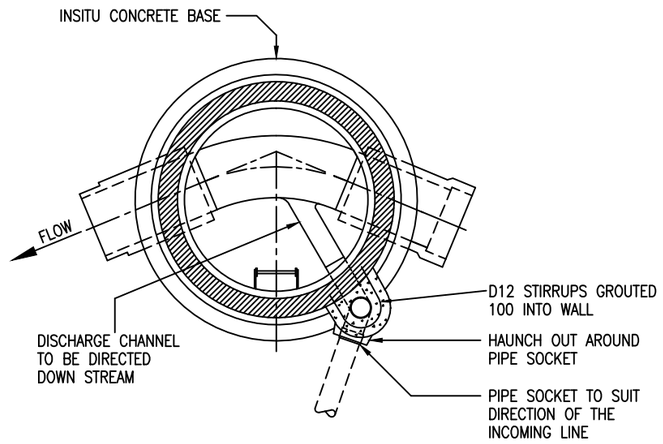
NB: NOT APPLICABLE FOR NEW MANHOLE CONSTRUCTION. ONLY AN OPTION IF THERE IS AN EXISTING PIPE STUB. B



INTERNAL DROP CONNECTIONS (TYPICAL)

NOTE: INTERNAL DROP PREFERRED.
EXTERNAL DROP TO BE USED ONLY WHERE MANHOLE GEOMETRY, SIZE OR DIRECTION OF CONNECTION RENDERS INTERNAL DROP IMPRACTICAL

SCALE. 1:50



EXTERNAL DROP CONNECTION (TYPICAL)

SCALE. 1:50

ISSUE	DATE	AMENDMENT	BY	APPD.
B	03:14	DROP PIPE NOTES ADDED	L.C.	C.H.
A	11:09	MH LID DIMENSION. CONC/REINF NOTE ADDED	G.B.	B.M.
		GROUT ADDED AND CERAMIC PIPE OPTION		

	BY	DATE
DESIGNED	C. RODLIFFE	11-01
DES. CHECKED	D. McCANN	11-01
DRAWN	L. A. COLLINGE	11-01
DWG. CHECKED	I. MOSES.	11-01
PROJECT LEADER	C. RODLIFFE	11-01
A.D. APPROVED	A. KENNARD	11-01

OPERATIONS

ASSET MANAGEMENT

water Care services limited

STANDARD CIRCULAR WASTEWATER MANHOLES FOR LINES 375 N.B. TO 900 N.B.

DETAILS OF PIPE CONNECTIONS

CAD FILE 2000244.014B | DATE 24-03-14
ORIGINAL SCALE A3 AS SHOWN | CONTRACT No. –
DRAWING No. 2000244 .014 | ISSUE B

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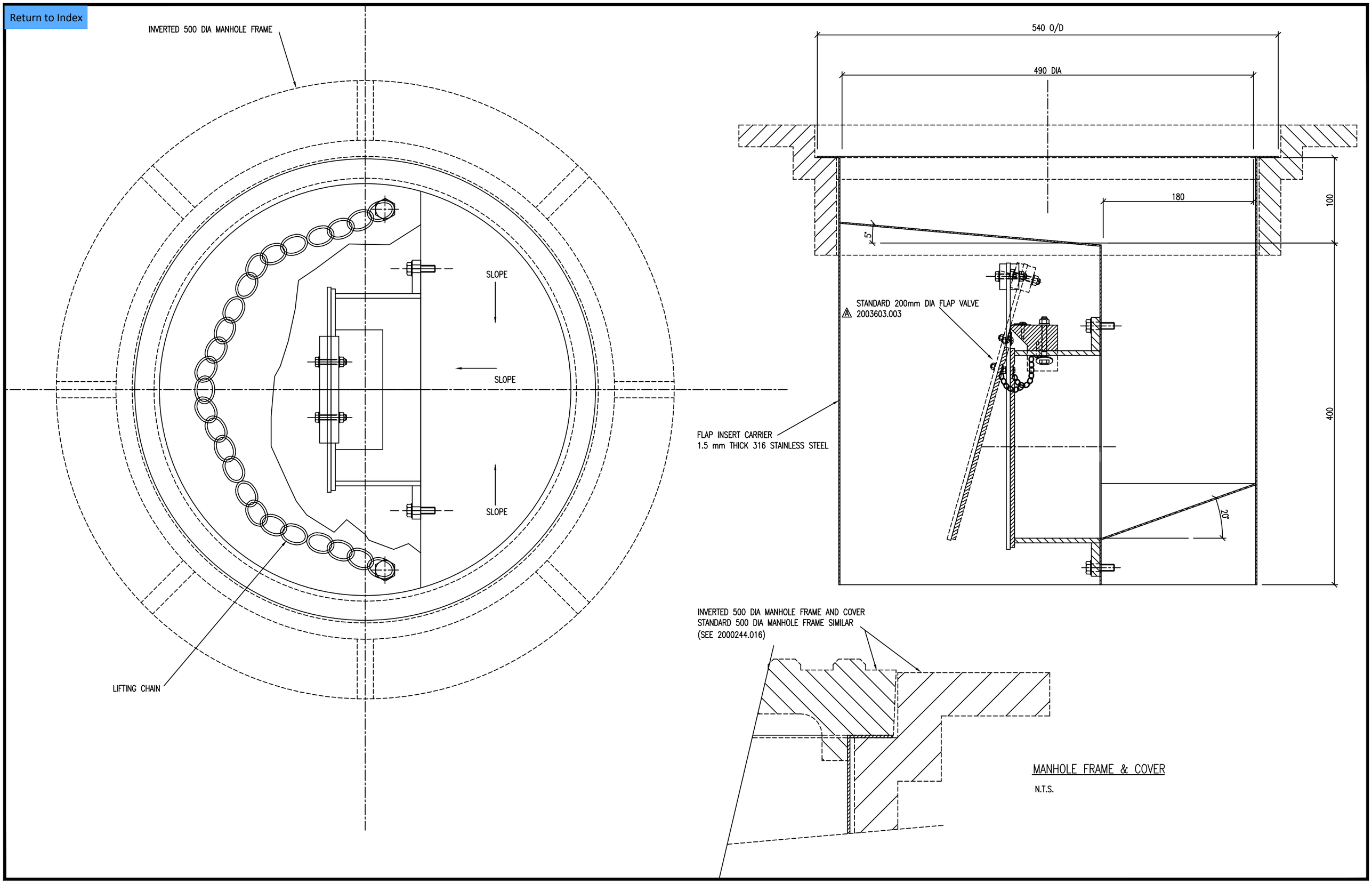

MANHOLE FRAME & COVER

N.T.S.

ISSUE	DATE	AMENDMENT	BY	APPD.
A	4-10	CROSS REFERENCES CORRECTED	I.M.	

DESIGNED	H.H.	01-04
DES. CHECKED		
DRAWN	A.D.B.	01-03
DWG. CHECKED		
PROJECT LEADER	A.B.	01-04
DS APPROVED		
	BY	DATE

OPERATIONS

ASSET MANAGEMENT

water Care services limited

STANDARD WASTEWATER STRUCTURES
500 DIA. MANHOLE FRAMES & COVERS
200 mm DIA MAHOLE INLET FLAP

CAD FILE 2000244.017A	DATE 09-04-10
ORIGINAL SCALE A1 1:2	CONTRACT No. –
DRAWING No. 2000244 .017	ISSUE A

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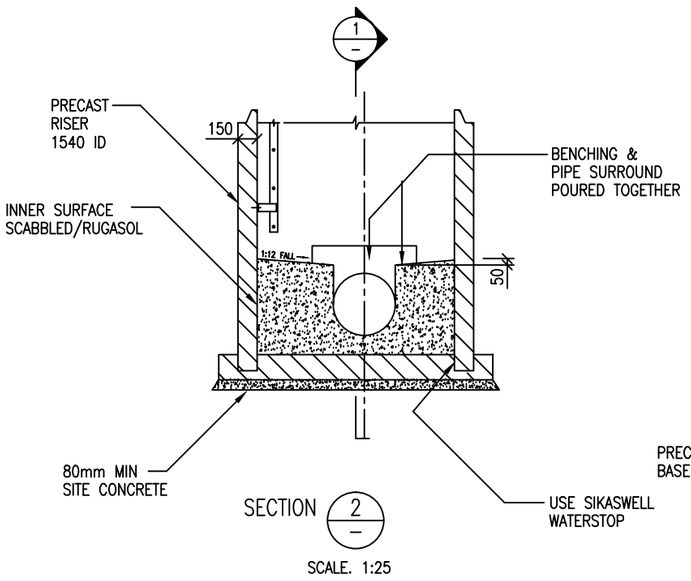
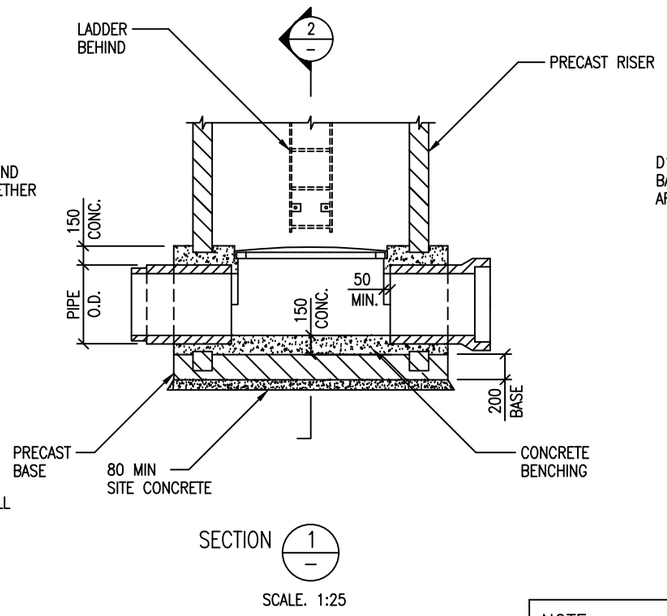
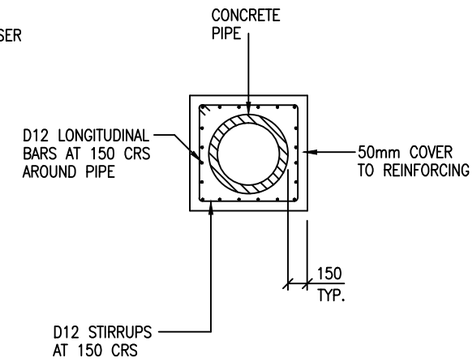


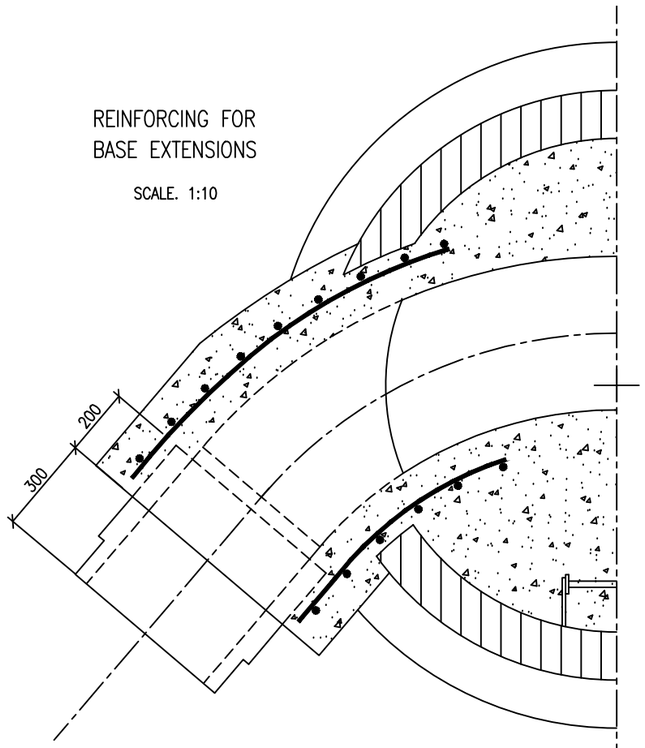
SECTION 2
SCALE. 1:25



SECTION 1
SCALE. 1:25

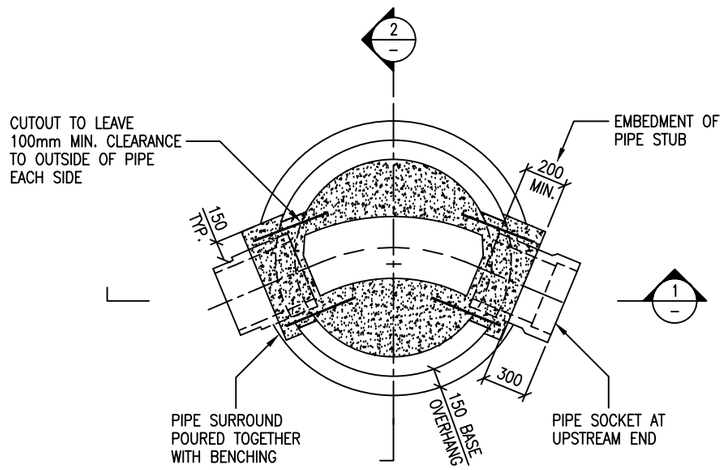


REINFORCING FOR BASE EXTENSIONS SCALE. 1:25

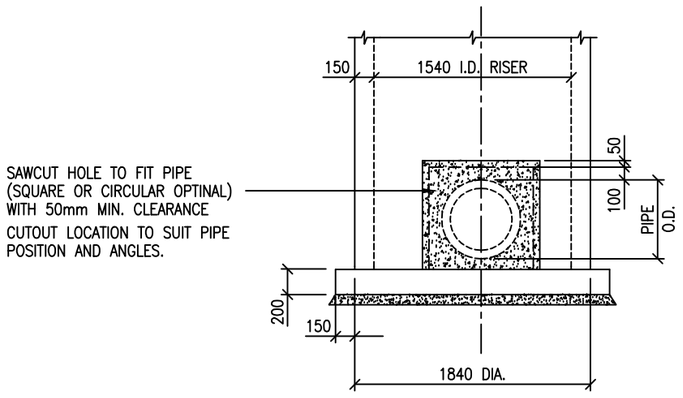


NOTE :–

PRECAST COMPONENTS TO INCORPORATE LIFTING FITMENTS TO MANUFACTURER'S DESIGN

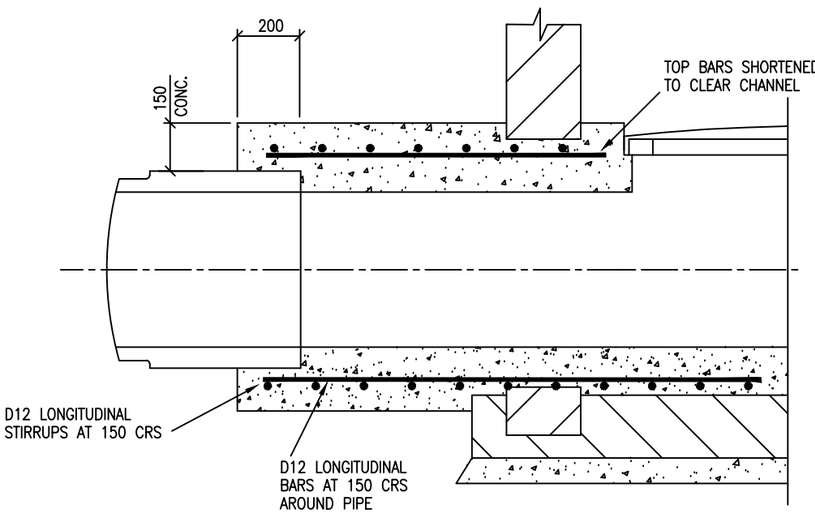


PRECAST BASE SHOWING CONCRETE BENCHING
SCALE. 1:25 & N.TS.



PRECAST BASE SHOWING CUTOUTS
SCALE. 1:25 & N.TS.

EXTERNAL ELEVATION



REINFORCING FOR BASE EXTENSIONS SCALE. 1:10

ISSUE	DATE	AMENDMENT	BY	APPD.

DESIGNED	C. RODLIFFE	8/03
DES. CHECKED	T.C.	8/03
DRAWN	A.D.B.	8/03
DWG. CHECKED	I.M.	8/03
PROJECT LEADER	C.R.	8/03
D.S. APPROVED		8/03
	BY	DATE

WASTEWATER OPERATIONS

WASTEWATER PLANNING

water Care services limited

STANDARD CIRCULAR WASTEWATER MANHOLES FOR LINES 375 N.B. TO 900 N.B.

ALTERNATIVE PRECAST BASE TYPE 2

CAD FILE 2000244.019 | DATE 17-6-04

ORIGINAL SCALE A1: AS SHOWN | CONTRACT No.: –

DRAWING No.: 2000244 .019 | ISSUE

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COINCIDENT MANHOLES

CHECK WHETHER DESIGN CALLS FOR TYPE A1 OR A2 MANHOLE.

CALCULATE Θm (LIMITING INCLUDED ANGLE FOR PIPE BEND TO FIT INSIDE MANHOLE)

$$\Theta m = 2\ ATAN\left[\frac{\sqrt{B^2 - D^2}}{6\ D}\right]$$

IF $\Theta_p =< \Theta_m$ **TYPE A1 MANHOLE**

CALCULATE BEND RADIUS 'R'

$$R = \frac{\sqrt{B^2 - D^2}}{2\ TAN\left(\frac{\Theta_p}{2}\right)}$$

FIND BEND RADIUS CENTRE POINT.

IN THIS CASE THE MANHOLE CENTRE (IPm) IS COINCIDENT WITH THE PIPE INTERSECTON POINT (IPp) THEREFORE Hp = Hm.

$$H_p = H_m = \frac{R}{COS\left(\frac{\Theta_p}{2}\right)}$$

IF $\Theta_p =< \Theta_m$ **TYPE A2 MANHOLE**

BEND RADIUS 'R' = 3 x D

FIND BEND RADIUS CENTRE POINT

$$H_p = \frac{R}{COS\left(\frac{\Theta_p}{2}\right)}$$

FIND MANHOLE CENTRE POINT.

$$H_m = \sqrt{\frac{B^2}{4} + (3D)^2}$$

MANHOLE OFFSET 'A' = $H_p - H_m$

PRELIMINARY DESIGN PROCEDURE FOR CIRCULAR MANHOLES

DETERMINE VALUES FOR:
B – INSIDE DIAMETER OF MANHOLE RISER (NORMALLY 1540)
D – INSIDE DIAMETER OF POLYETHYLENE PIPE
Θ_p – DIVERT ANGLE OF PIPELINE (DEGREES)

CALCULATE '$D_{critical}$'

$$Dcritical = \sqrt{\frac{B^2}{7}}$$

IF $D > D_{critical}$ GO TO "COINCIDENT" MANHOLE.

IF $D < D_{critical}$ GO TO "TRANSLATED" MANHOLE.

FOR A STANDARD 1540 MANHOLE Dcritical = 582
WHICH IS EQUIVALENT TO A HDPE100 630-SDR26 PIPE.

TRANSLATED MANHOLES

CHECK WHETHER DESIGN CALLS FOR TYPE A1 OR A2 MANHOLE.

CALCULATE Øm (LIMITING INCLUDED ANGLE FOR PIPE BEND TO FIT INSIDE MANHOLE)

$$\Theta m = 2\ ASIN\left[\frac{B}{7\ D}\right]$$

IF $\Theta_p =< \Theta_m$ **TYPE A1 MANHOLE**

CALCULATE BEND RADIUS 'R'

$$R = \left[\frac{B}{2\ SIN\left(\frac{\Theta_p}{2}\right)}\right] - \frac{D}{2}$$

FIND BEND RADIUS CENTRE POINT.

$$H_p = \frac{R}{COS\left(\frac{\Theta_p}{2}\right)}$$

FIND MANHOLE CENTRE POINT.

$$H_m = \frac{B}{2\ TAN\left(\frac{\Theta_p}{2}\right)}$$

MANHOLE OFFSET 'A' = $H_p - H_m$

IF $\Theta > \Theta_m$ **TYPE A2 MANHOLE**

BEND RADIUS 'R' = 3 x D

FIND BEND RADIUS CENTRE POINT

$$H_m = \frac{7\ D}{2\ COS\left(\frac{\Theta_p}{2}\right)}$$

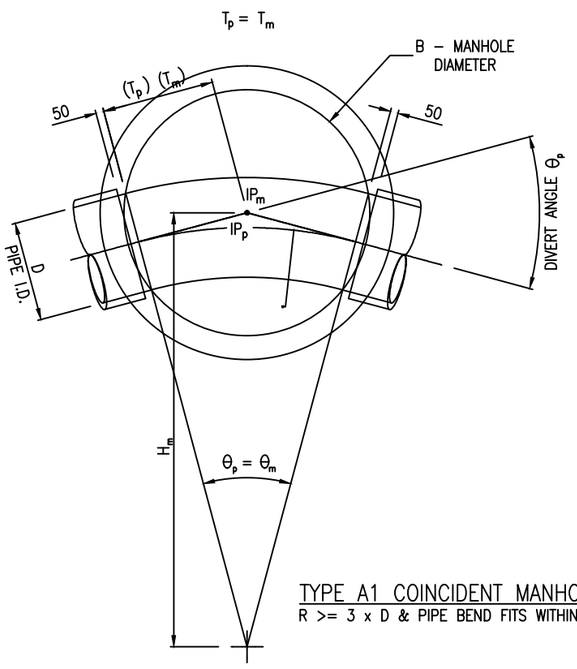
FIND MANHOLE CENTRE POINT.

$$H_m = \frac{B}{2\ TAN\left(\frac{\Theta_m}{2}\right)}$$

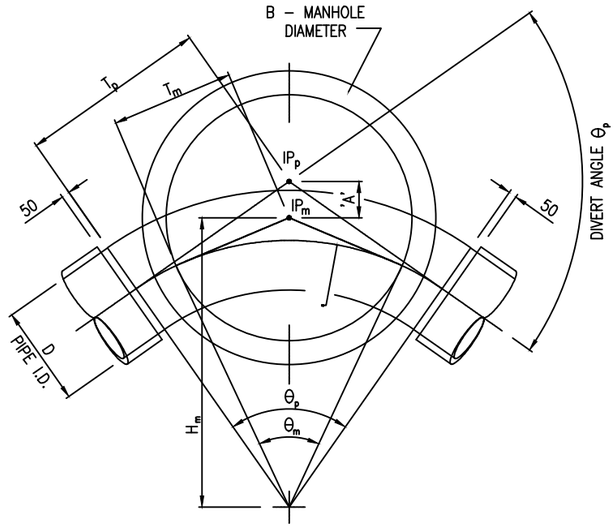
MANHOLE OFFSET 'A' = $H_p - H_m$

TABLE SHOWING DIMENSIONS FOR MANHOLE CONSTRUCTION

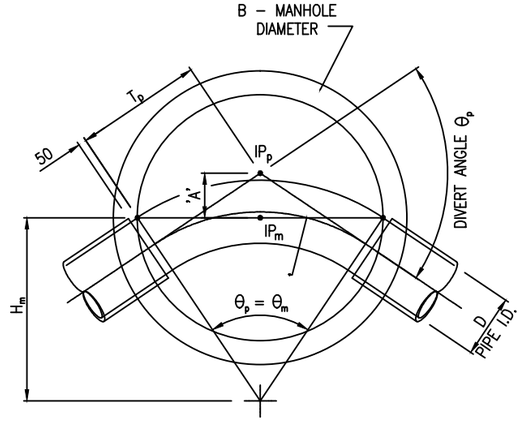
MANHOLE NUMBER	TYPE	B	D	Θ_p	Θ_m	R	T_p	T_m	H_p	H_m	A



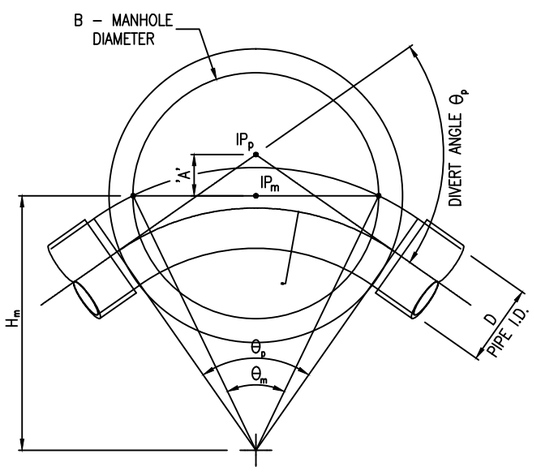
TYPE A1 COINCIDENT MANHOLE (CA1)
R >= 3 x D & PIPE BEND FITS WITHIN MANHOLE DIAMETER



TYPE A2 COINCIDENT MANHOLE (CA2)
R = 3 x D
PIPE BEND EXTENDS BEYOND MANHOLE INSIDE DIAMETER



TYPE A1 TRANSLATED MANHOLE (TA1)
R >= 3 x D & PIPE BEND FITS WITHIN MANHOLE DIAMETER



TYPE A2 TRANSLATED MANHOLE (TA2)
R = 3 x D
PIPE BEND EXTENDS BEYOND MANHOLE INSIDE DIAMETER

NOTE :– TRANSLATED MANHOLES DO NOT REQUIRE T_m FOR SET OUT.

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DRAWN	N. SMITH	09/11
DWG. CHECKED	J. GRAHAM	09/11
PROJECT LEADER		
INFRAST'R APP'D		

OPERATIONS

INFRASTRUCTURE

water Care services limited

WASTEWATER TRANSMISSION STANDARD – CIRCULAR MANHOLES FOR POLYETHYLENE PIPES DN355 TO DN1000

GEOMETRY AND DESIGN CALCULATIONS

CAD FILE 2000244.025	DATE 01/09/11
ORIGINAL SCALE A3 1:40	CONTRACT No. –
REF No.	ISSUE
DWG No. 2000244 .025	–

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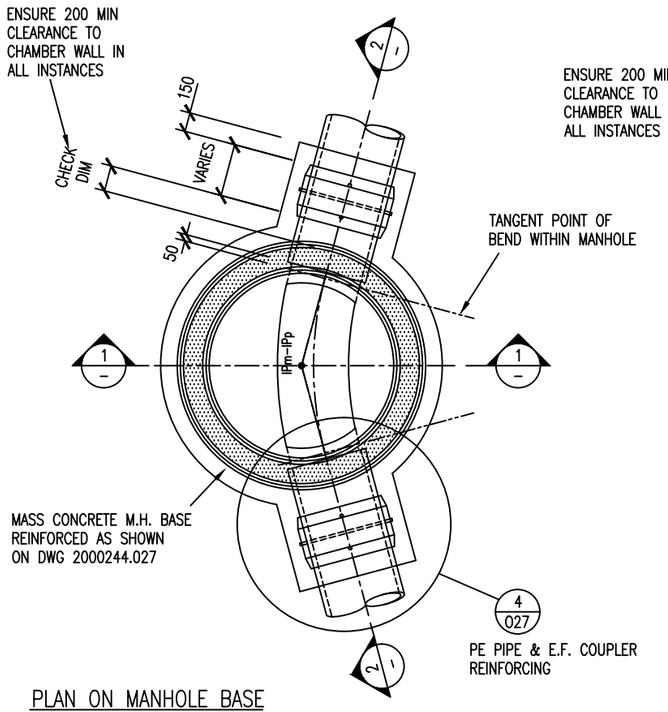
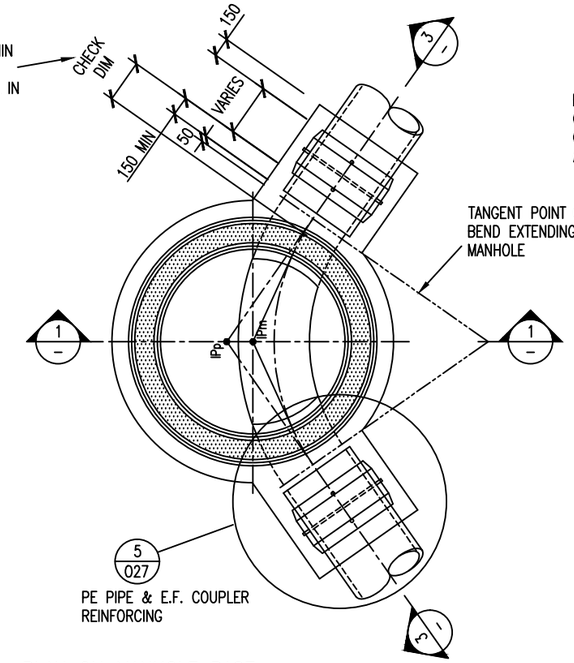


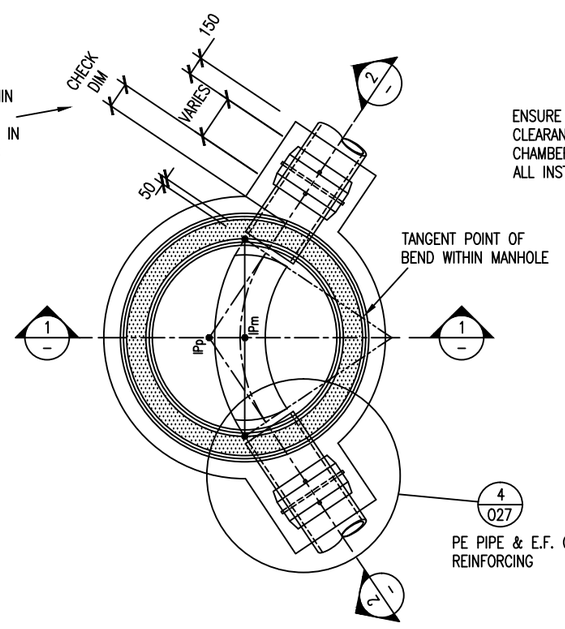
PLAN ON MANHOLE BASE
TYP A1 – COINCIDENT MANHOLE

SCALE 1:50



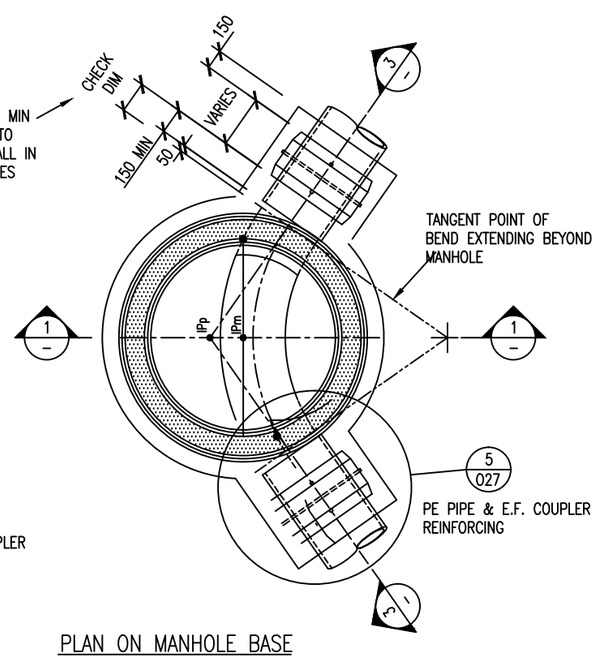
PLAN ON MANHOLE BASE
TYP A2 – COINCIDENT MANHOLE

SCALE 1:50



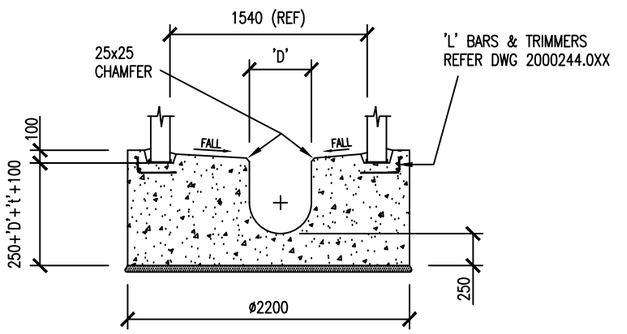
PLAN ON MANHOLE BASE
TYP A1 – TRANSLATED MANHOLE

SCALE 1:50



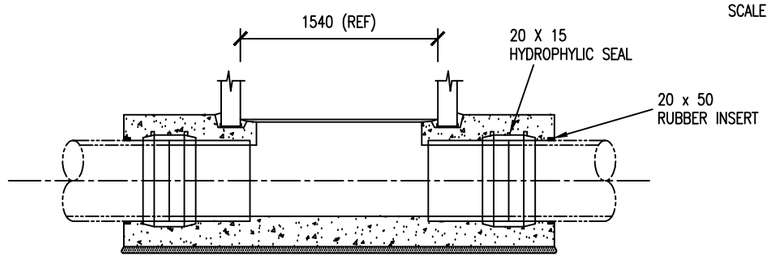
PLAN ON MANHOLE BASE
TYP A2 – TRANSLATED MANHOLE

SCALE 1:50



SECTION 1 –

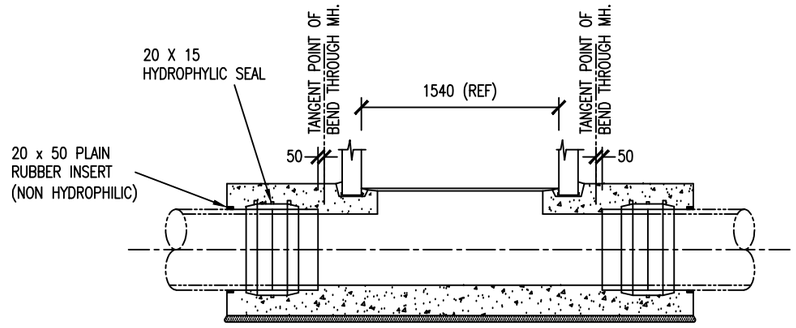
SCALE 1:50



SECTION 2 –

TYP A1 MANHOLE

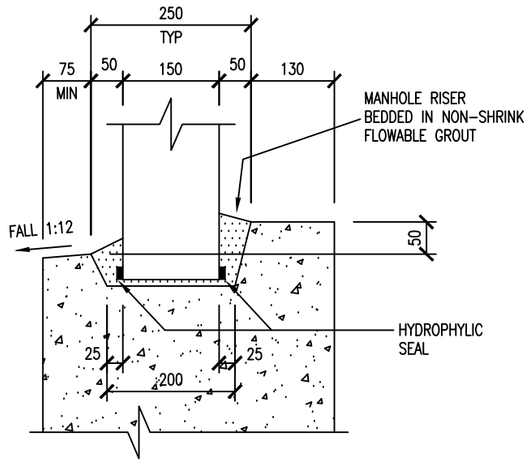
SCALE 1:50



SECTION 3 –

TYP A2 MANHOLE

SCALE 1:50



DETAILS OF RECESS FOR MANHOLE RISER

SCALE 1:20

ISSUE	DATE	AMENDMENT	BY	APPD.
–	09–11	APPROVED FOR ISSUE	G.S.	J.G.

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DWG. CHECKED	J. GRAHAM	09/11
PROJECT LEADER		
INFRAST'R APP'D		

OPERATIONS

INFRASTRUCTURE

waterCare services limited

WASTEWATER TRANSMISSION STANDARD – CIRCULAR MANHOLES FOR POLYETHYLENE PIPES DN355 TO DN1000

MANHOLE BASE DIMENSIONS

CAD FILE 2000244.026	DATE 01/09/11
ORIGINAL SCALE A3 AS SHOWN	CONTRACT No. –
REF No.	ISSUE
DWG No. 2000244 .026	–

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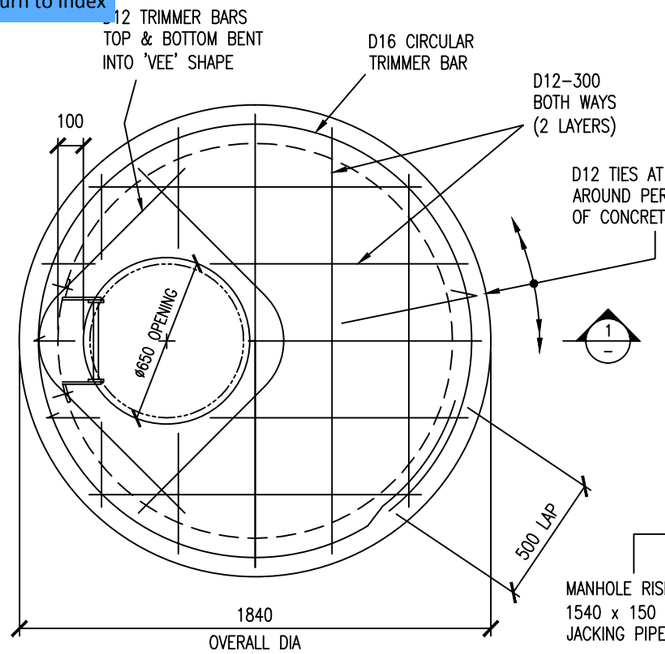
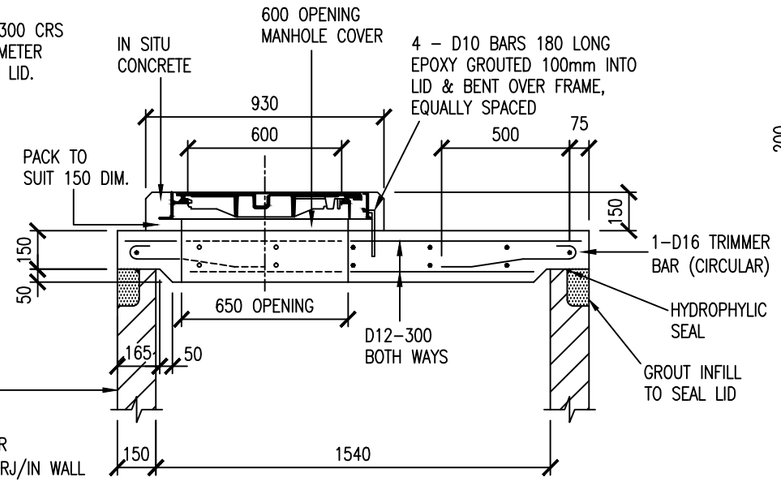


PLAN ON MH LID SCALE 1:25

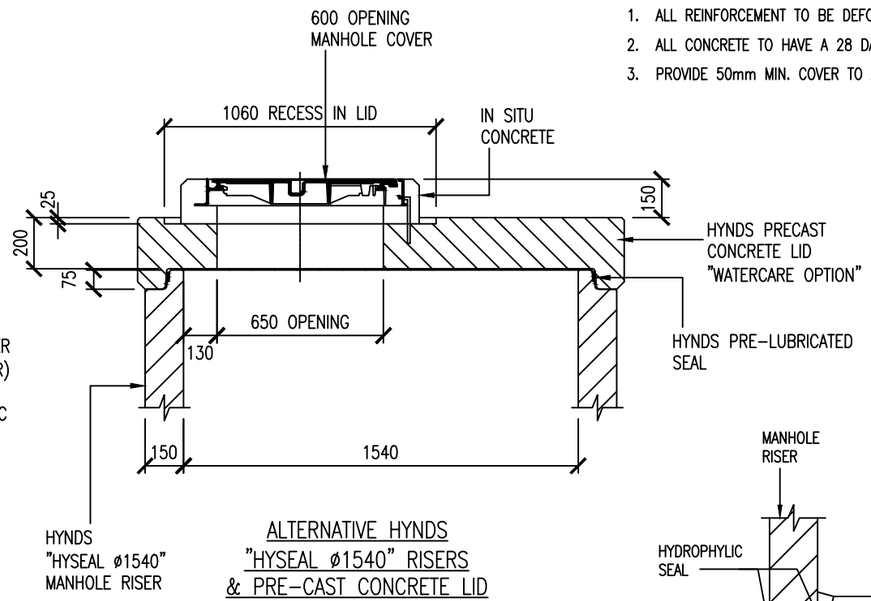


SECTION 1/– SCALE 1:25

LID CONSTRUCTION FOR HUMES
SRJ IN WALL JACKING PIPE RISERS

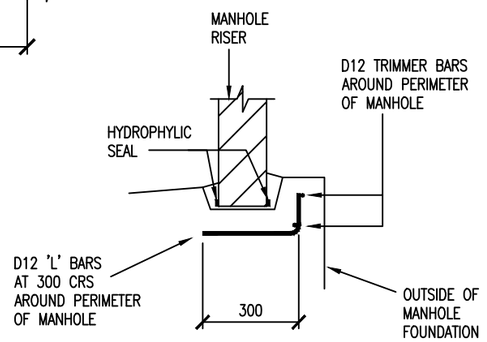
REINFORCING NOTES

1. ALL REINFORCEMENT TO BE DEFORMED MILD STEEL
2. ALL CONCRETE TO HAVE A 28 DAY STRENGTH OF 30 MPa
3. PROVIDE 50mm MIN. COVER TO ALL REINFORCEMENT



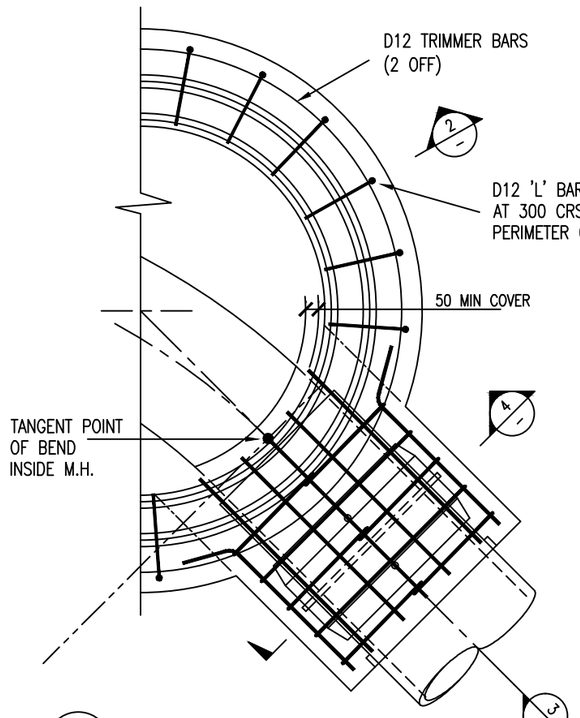
ALTERNATIVE HYNDS
"HYSEAL ø1540" RISERS
& PRE–CAST CONCRETE LID

SCALE 1:25



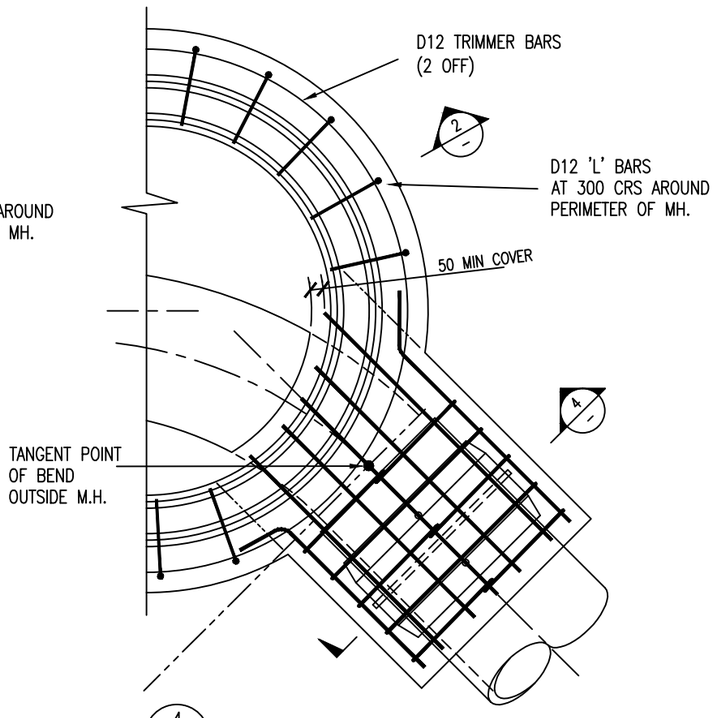
REINFORCING ON PERIMETER
OF BASE (ALL MANHOLES)

SECTION 2/– SCALE. 1:20



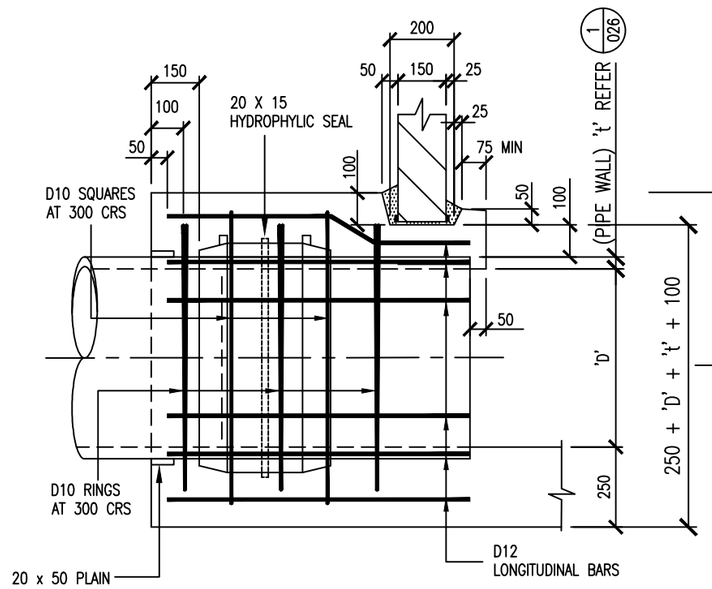
4/026 PE PIPE REINFORCING TYPE A1

SCALE 1:25



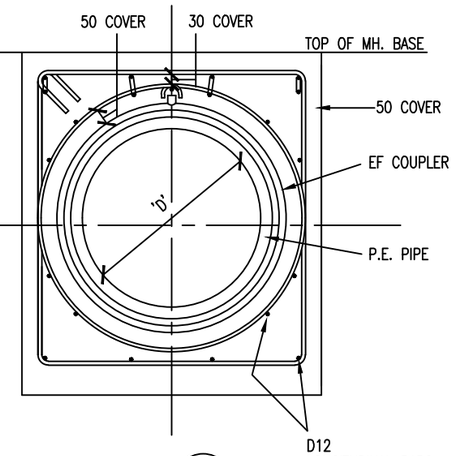
4/026 PE PIPE REINFORCING TYPE A2

SCALE 1:25



SECTION 3/– SCALE. 1:20

REINFORCING FOR BASE
EXTENSION – TYP TYPE A1 & A2



SECTION 4/– SCALE. 1:20

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–	09–11	APPROVED FOR ISSUE	G.S.	J.G.

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PROJECT LEADER		
INFRAST'R APP'D		

OPERATIONS

INFRASTRUCTURE

water Care services limited

WASTEWATER TRANSMISSION STANDARD – CIRCULAR MANHOLES FOR POLYETHYLENE PIPES DN355 TO DN1000

REINFORCING & STEELWORK

CAD FILE 2000244.027	DATE 01/09/11
ORIGINAL SCALE A3 AS SHOWN	CONTRACT No. –
REF No.	ISSUE
DWG No. 2000244 .027	–

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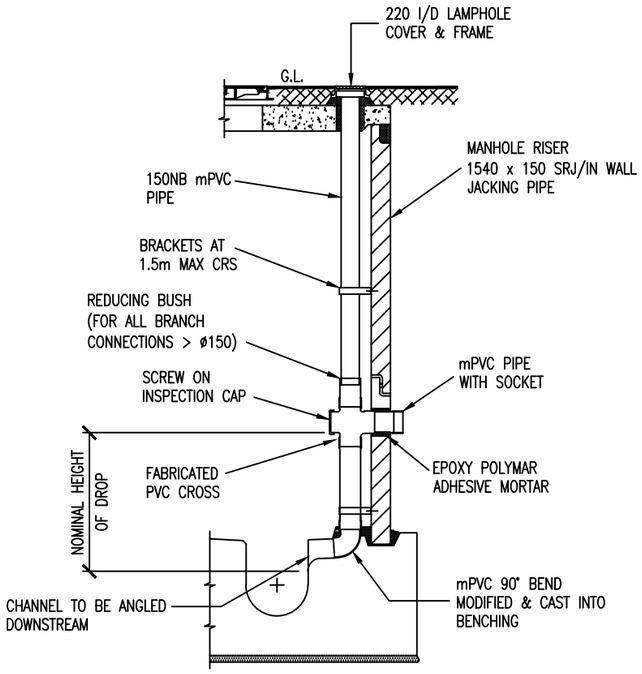
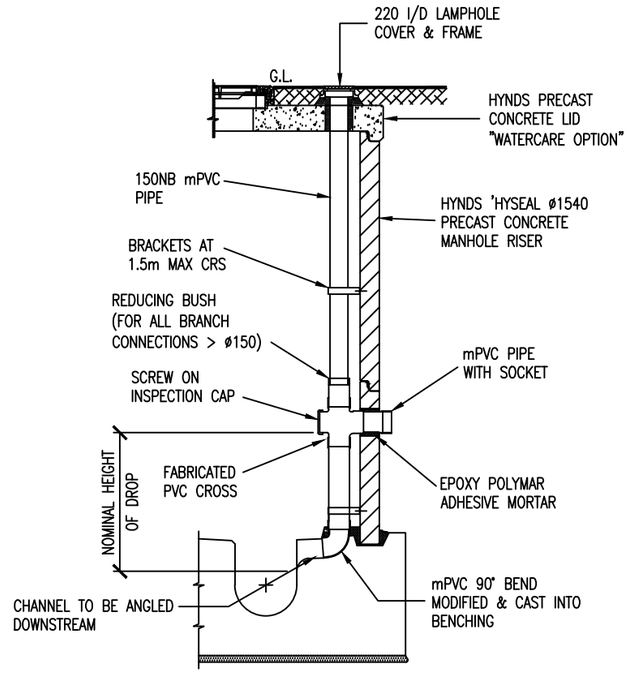


INTERNAL DROP CONNECTION

SCALE 1:50

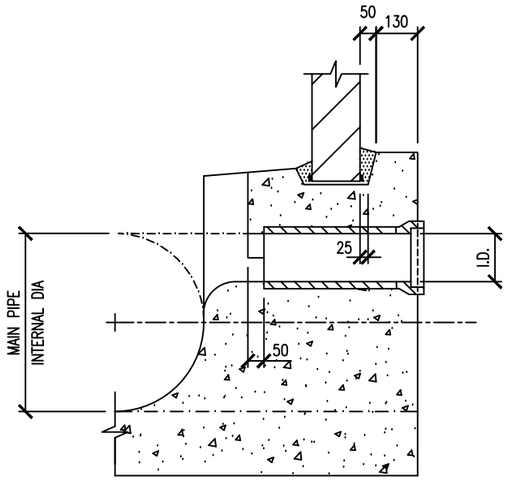
TYPICAL FOR HUMES SRJ IN WALL JACKING PIPE RISERS



INTERNAL DROP CONNECTION

SCALE 1:50

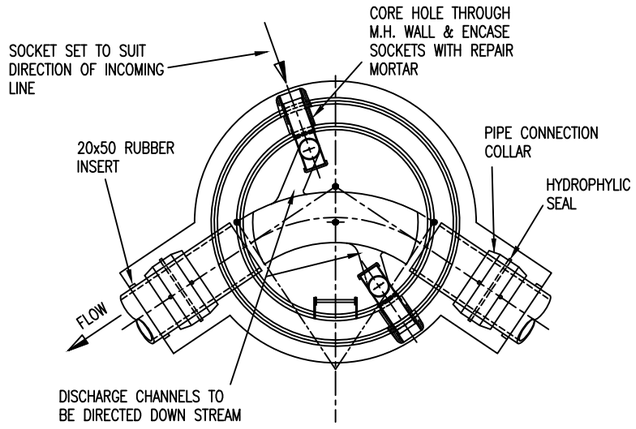
TYPICAL FOR HYNDS "HYSEAL ø1540" RISERS



BRANCH CONNECTION BELOW CHAMBER WALL

SCALE 1:20

NOTE
COVER TO END OF PIPE IS REQUIRED ONLY WHERE CUT REINFOCEMENT IS EXPOSED



INTERNAL DROP CONNECTION PLAN (TYPICAL)

SCALE 1:50

ISSUE	DATE	AMENDMENT	BY	APPD.
–	09–11	APPROVED FOR ISSUE	G.S.	J.C.

DESIGNED	J. GRAHAM	09/11
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DRAWN	N. SMITH	09/11
DWG. CHECKED	J. GRAHAM	09/11
PROJECT LEADER		
INFRAST'R APP'D		

OPERATIONS

INFRASTRUCTURE

water Care services limited

WASTEWATER TRANSMISSION STANDARD – CIRCULAR MANHOLES FOR POLYETHYLENE PIPES DN355 TO DN1000

DETAILS OF BRANCH PIPE CONNECTIONS

CAD FILE 2000244.028	DATE 01/09/11
ORIGINAL SCALE A3 AS SHOWN	CONTRACT No. –
REF No.	ISSUE
DWG No. 2000244 .028	–

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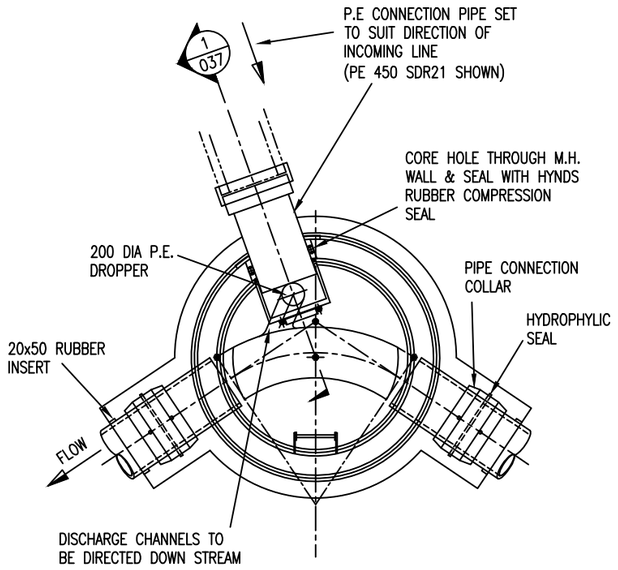
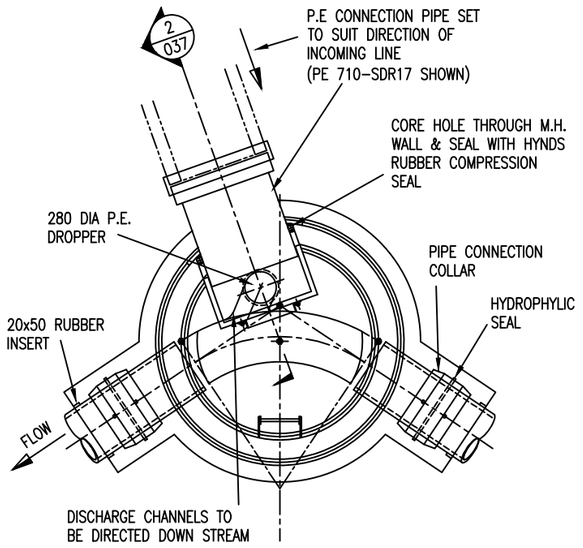
MANHOLE BRANCH PIPE P.E. CONNECTORS/DROPPERS

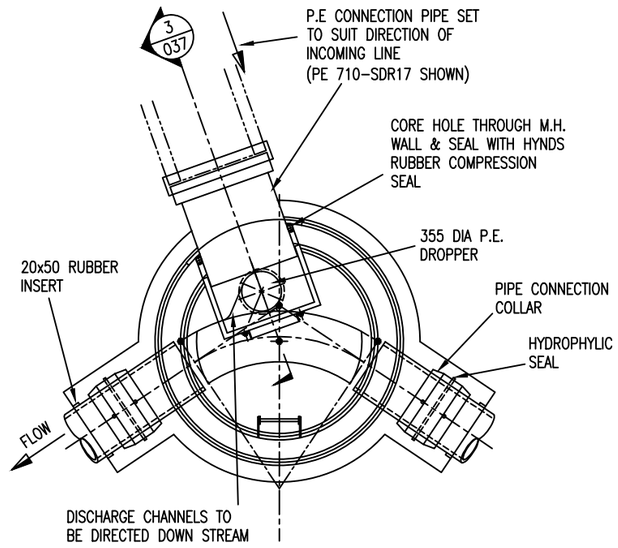
MANHOLE RISER	1540 I/D	1980 I/D	2300 I/D	2550 I/D
END CAP SEAT BRACKET	M.H. P.E. DROPPER PIPES			
DET 'C' SHEET 41	200–SDR17	200–SDR17	200–SDR17	200–SDR17
DET 'C' SHEET 41	280–SDR17	280–SDR17	280–SDR17	280–SDR17
DET 'A' SHEET 41	355–SDR17	355–SDR17	355–SDR17	355–SDR17
DET 'A' SHEET 41	N/A	400–SDR17	400–SDR17	400–SDR17
DET 'A' SHEET 41	N/A	450–SDR17	450–SDR17	450–SDR17
	INCOMING P.E. CONNECTION PIPES (SUITABLE ALL M.H. RISERS & P.E. DROPPERS)			
FOR SELECTION REFER DWGS 2000244.038 2000244.039 2000244.040	225–SDR13.6 280–SDR17 315–SDR13.6 400–SDR13.6 450–SDR17 500–SDR17 560–SDR13.6 630–SDR13.6 710–SDR21	400–SDR17 450–SDR21 560–SDR17 630–SDR21	630–SDR26	



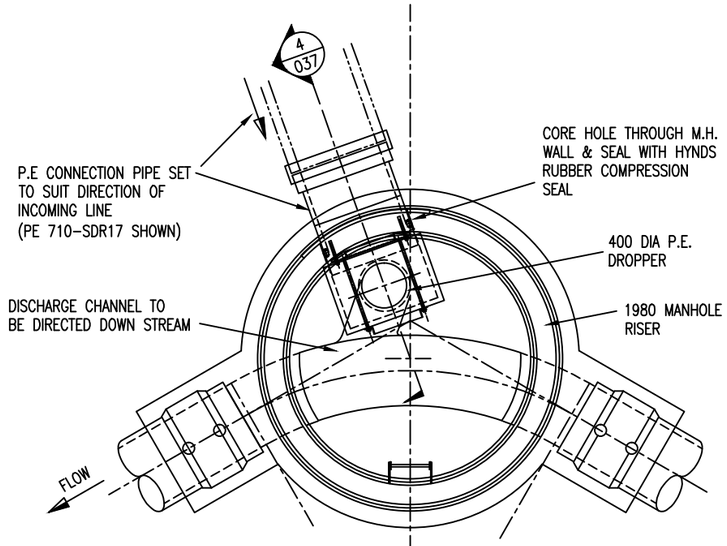
INTERNAL DROP CONNECTION PLAN
TYPICAL FOR 1540–2550 DIA RISERS WITH
P.E. 200–SDR17 (MINIMUM) DROPPER
(1540 DIA RISER SHOWN)



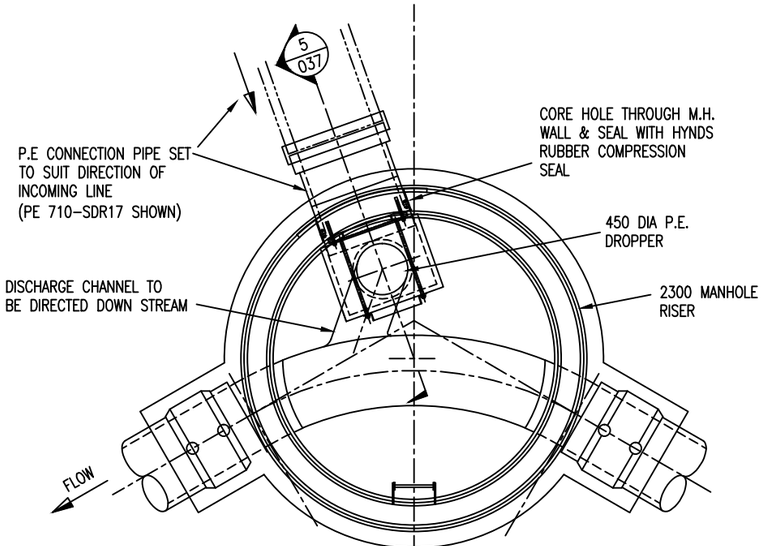
INTERNAL DROP CONNECTION PLAN
TYPICAL FOR 1540–2550 DIA RISERS
P.E. 280–SDR17 DROPPER
(1540 DIA RISER SHOWN)



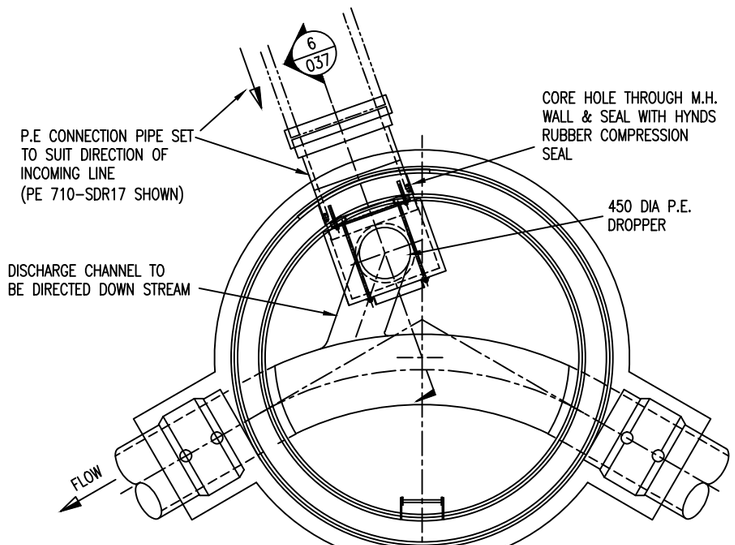
INTERNAL DROP CONNECTION PLAN
TYPICAL FOR 1540–2550 DIA RISERS WITH
P.E. 355–SDR17 DROPPER
(MAXUMUM DROPPER FOR 1540 DIA RISER SHOWN)



PLAN – INTERNAL DROP CONNECTION
TYPICAL FOR 1980 DIA RISER
P.E. 400–SDR17 DROPPER SHOWN



PLAN – INTERNAL DROP CONNECTION
TYPICAL FOR 2300 DIA RISER
P.E. 450–SDR17 (MAXIMUM) DROPPER SHOWN



PLAN – INTERNAL DROP CONNECTION
TYPICAL FOR 2550 DIA RISER
P.E. 450–SDR17 (MAXIMUM) DROPPER SHOWN

ISSUE	DATE	AMENDMENT	BY	APPD.
–	09–11	APPROVED FOR ISSUE	G.S.	J.G.

DESIGNED	J. GRAHAM	09/11
DES. CHECKED	P. GOWANS	
DRAWN	N. SMITH	09/11
DWG. CHECKED	J. GRAHAM	09/11
PROJECT LEADER		
INFRAST'R APP'D		

OPERATIONS

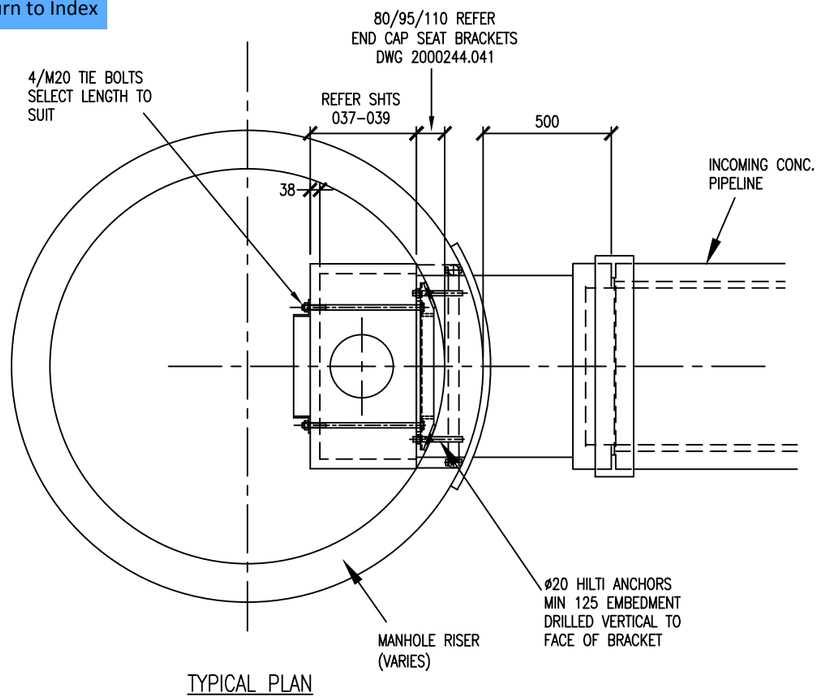
INFRASTRUCTURE

WASTEWATER TRANSMISSION STANDARD – CIRCULAR MANHOLES FOR POLYETHYLENE PIPES DN355 TO DN1000

PLAN VIEW – BRANCH PIPE CONNECTIONS WITH INTERNAL P.E. DROPPERS

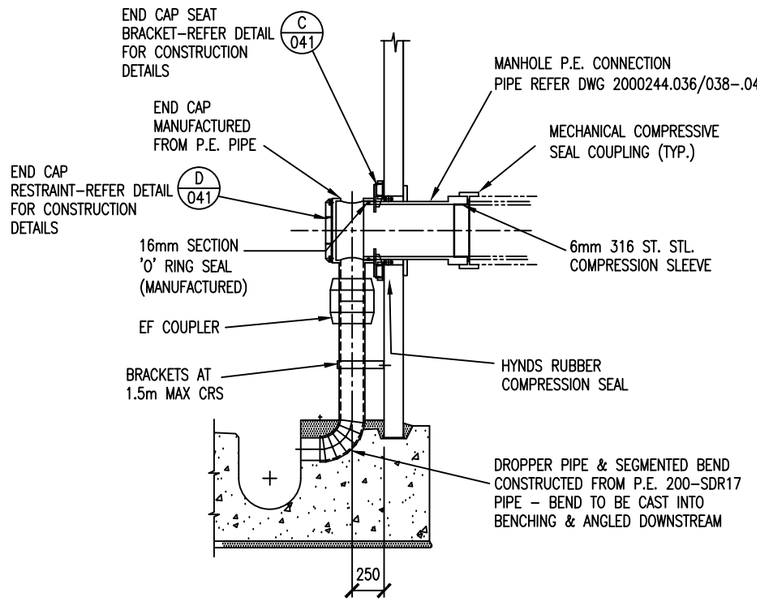
CAD FILE 2000244.036	DATE 01/09/11
ORIGINAL SCALE A3 1:50	CONTRACT No. –
REF No.	ISSUE
DWG No. 2000244 .036	–

Return to Index



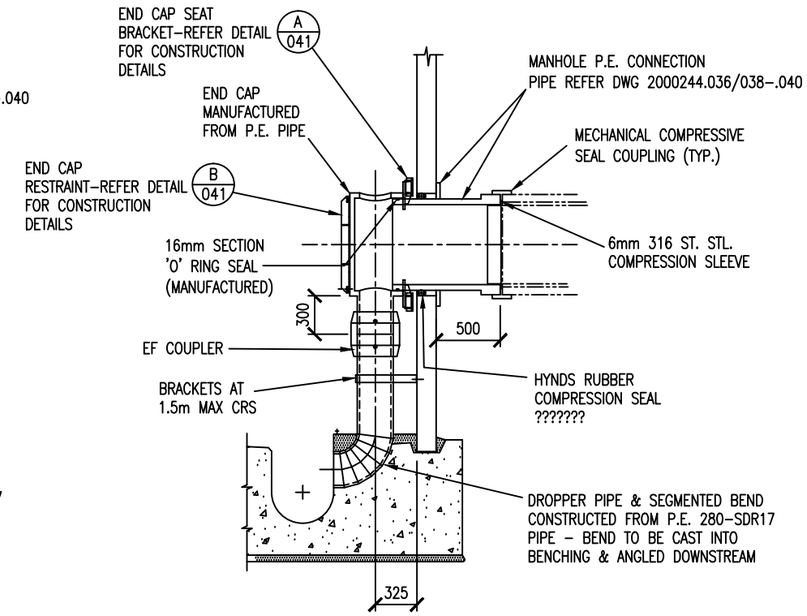
TYPICAL PLAN
ON INCOMING LINE

SCALE 1:25



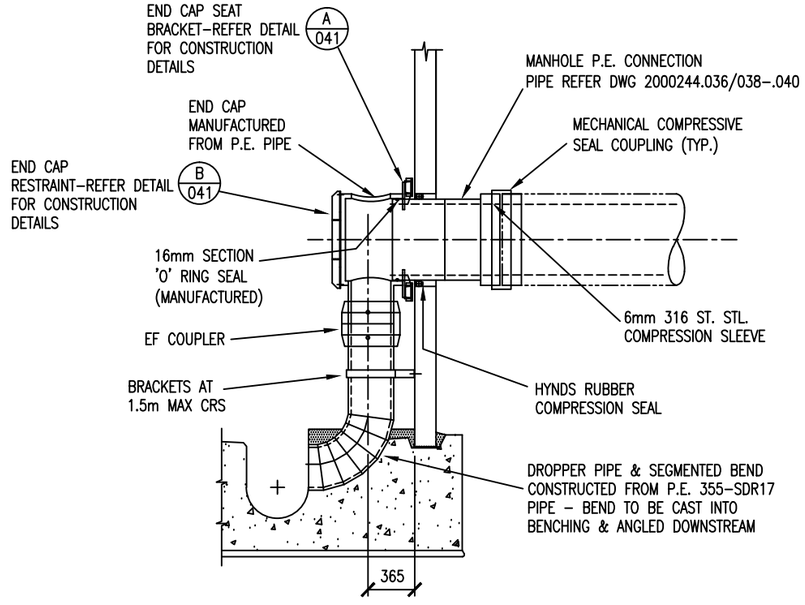
SECTION 1/036 SCALE 1:50

P.E. 200–SDR17 INTERNAL DROPPER
(TYPICAL SECTION)



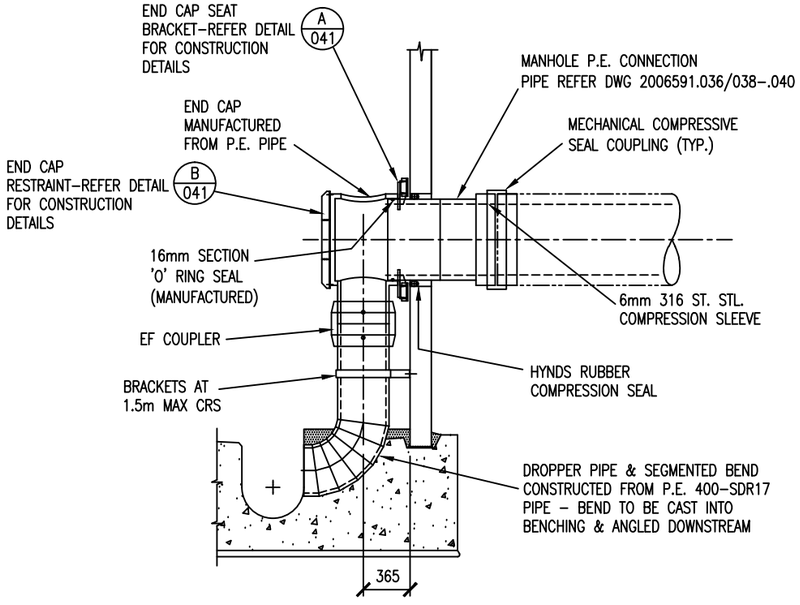
SECTION 2/036 SCALE 1:50

P.E. 280–SDR17 INTERNAL DROPPER
(TYPICAL SECTION)



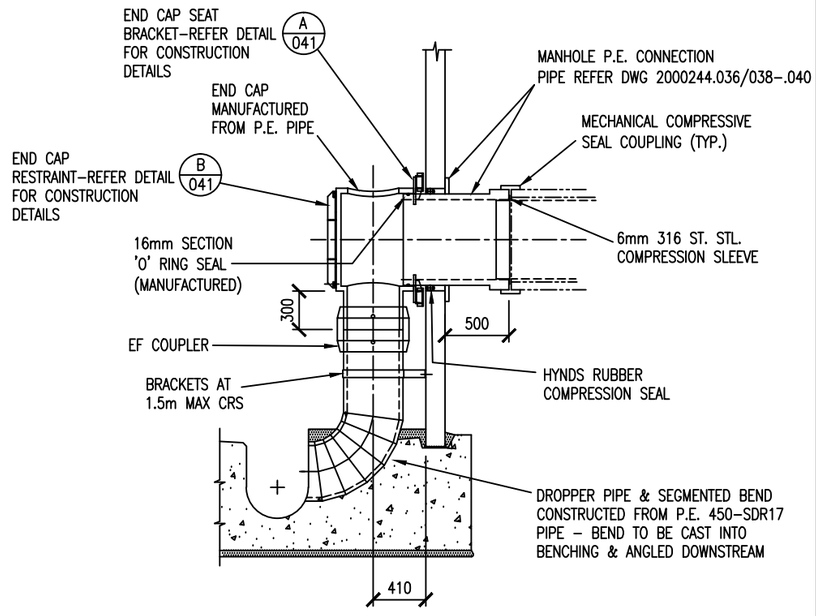
SECTION 5/036 SCALE 1:50

P.E. 355–SDR17 INTERNAL DROPPER
(TYPICAL SECTION)



SECTION 6/036 SCALE 1:50

P.E. 400–SDR17 INTERNAL DROPPER
(TYPICAL SECTION)



SECTION 6/036 & 7/036 SCALE 1:50

P.E. 450–SDR17 INTERNAL DROPPER
(TYPICAL SECTION)

ISSUE	DATE	AMENDMENT	BY	APPD.
–	09–11	APPROVED FOR ISSUE	G.S.	J.C.

DESIGNED	J. GRAHAM	09/11
DES. CHECKED	P. GOWANS	
DRAWN	N. SMITH	09/11
DWG. CHECKED	J. GRAHAM	09/11
PROJECT LEADER		
INFRAST'R APP'D		

OPERATIONS

INFRASTRUCTURE

water Care services limited

WASTEWATER TRANSMISSION STANDARD – CIRCULAR MANHOLES FOR POLYETHYLENE DROPPER PIPES DN355 TO DN1000

SECTIONS – BRANCH PIPE CONNECTIONS WITH INTERNAL P.E. DROPPERS

CAD FILE 2000244.037	DATE 01/09/11
ORIGINAL SCALE A3 AS SHOWN	CONTRACT No. –
REF No.	ISSUE
DWG No. 2000244 .037	–

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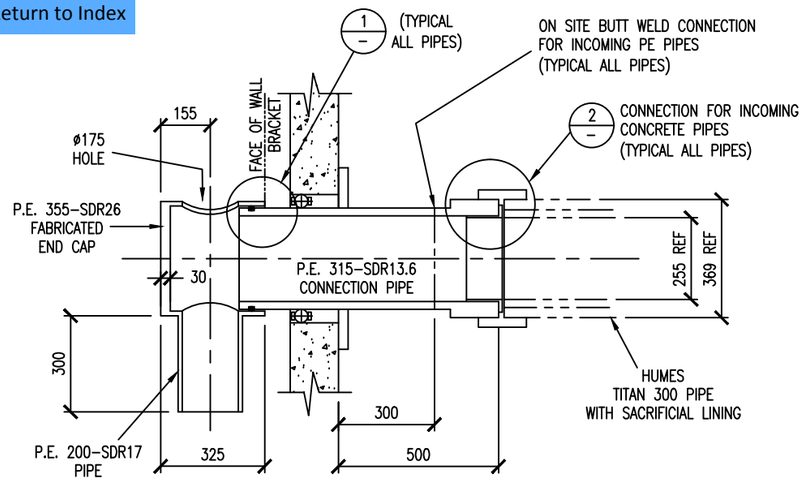
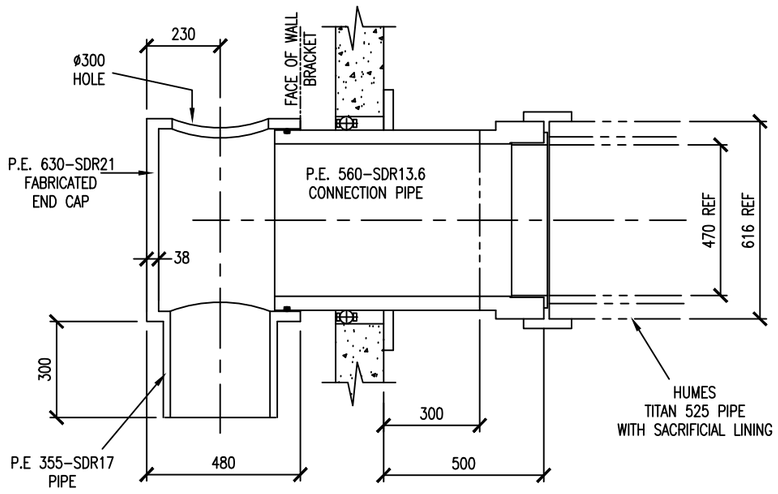
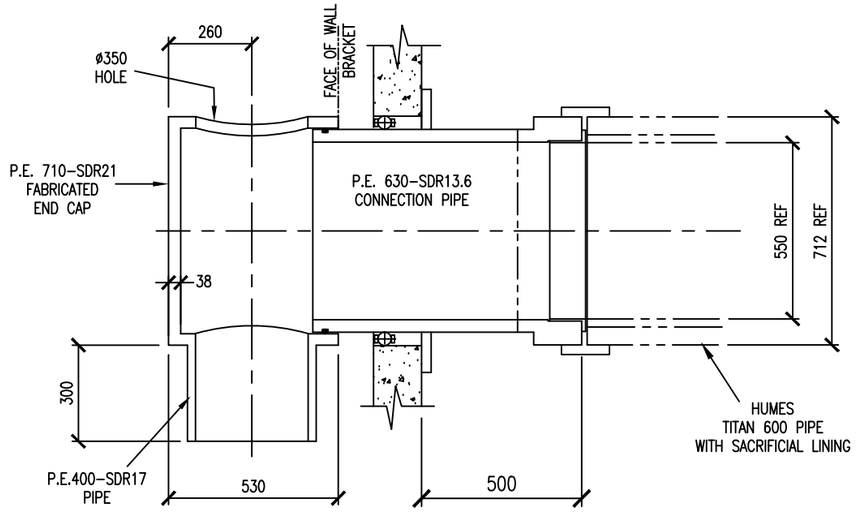
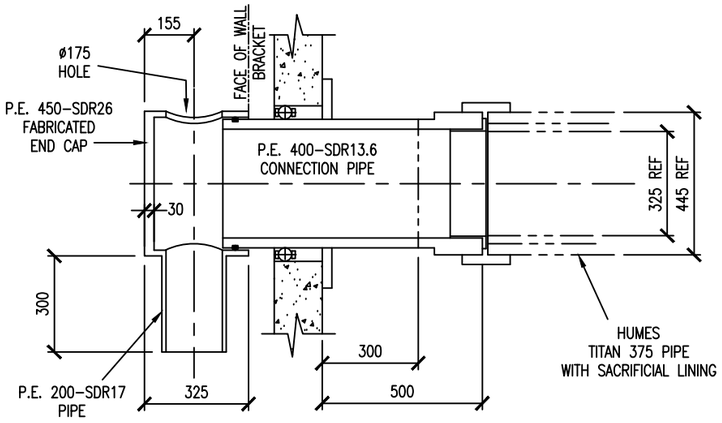


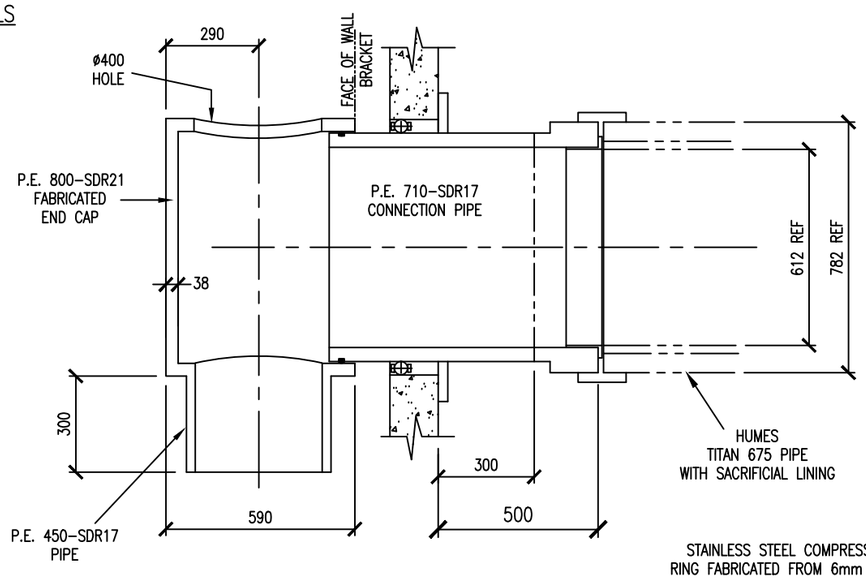


CONNECTION & END CAP DETAILS
FOR P.E. 355–SDR17
M.H. DROPPER PIPE
SCALE 1:20

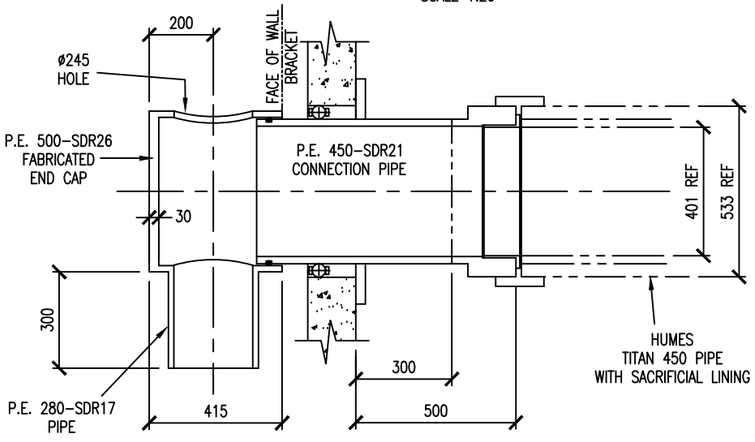




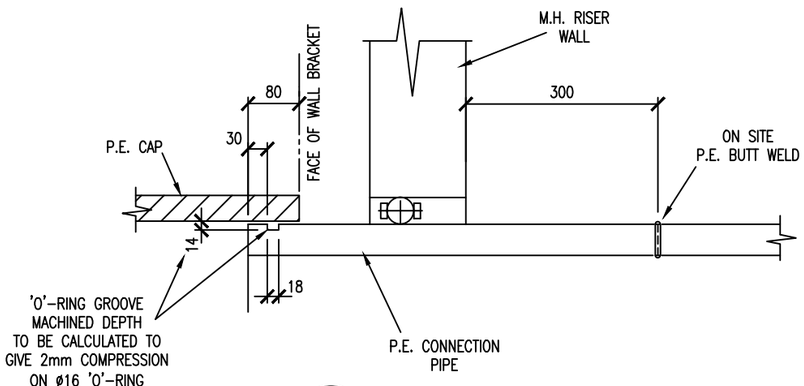
CONNECTION & END CAP DETAILS
FOR P.E. 200–SDR17
M.H. DROPPER PIPE
SCALE 1:20



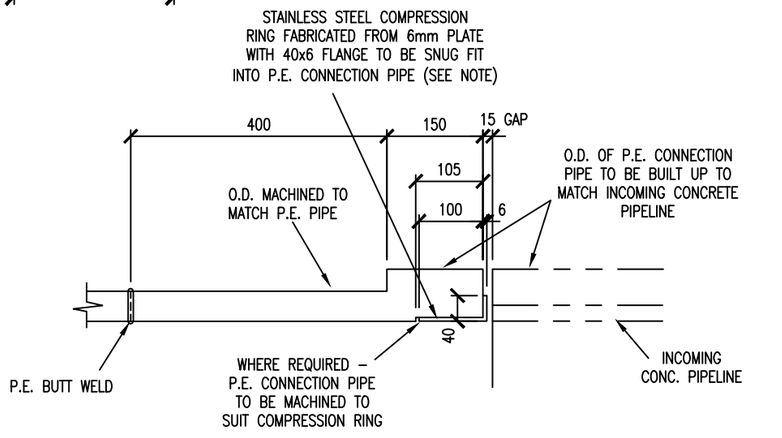
CONNECTION & END CAP DETAILS
FOR P.E. 450–SDR17
M.H. DROPPER PIPE
SCALE 1:20



CONNECTION & END CAP DETAILS
FOR P.E. 280–SDR17
M.H. DROPPER PIPES
SCALE 1:20



1 – 'O'–RING MACHINING
SCALE 1:10



2 – COMPRESSION RING
SCALE 1:10

NOTE:– I.D OF COMPRESSION RING MUST BE EQUAL TO OR LARGER THAN I.D. OF INCOMING PIPELINE

ISSUE	DATE	AMENDMENT	BY	APPD.
–	09–11	APPROVED FOR ISSUE	G.S.	J.G.

DESIGNED	J. GRAHAM	09/11
DES. CHECKED	P. GOWANS	
DRAWN	N. SMITH	09/11
DWG. CHECKED	J. GRAHAM	09/11
PROJECT LEADER		
INFRAST'R APP'D		

OPERATIONS

INFRASTRUCTURE

waterCare services limited

WASTEWATER TRANSMISSION STANDARD – CIRCULAR MANHOLES FOR POLYETHYLENE PIPES DN355 TO DN1000

P.E. CONNECTION & INTERNAL DROPPERS FOR HUMES "TITAN" PIPELINES

CAD FILE 2000244.038	DATE 01/09/11
ORIGINAL SCALE A3 AS SHOWN	CONTRACT No. –
REF No.	ISSUE
DWG No. 2000244 .038	–

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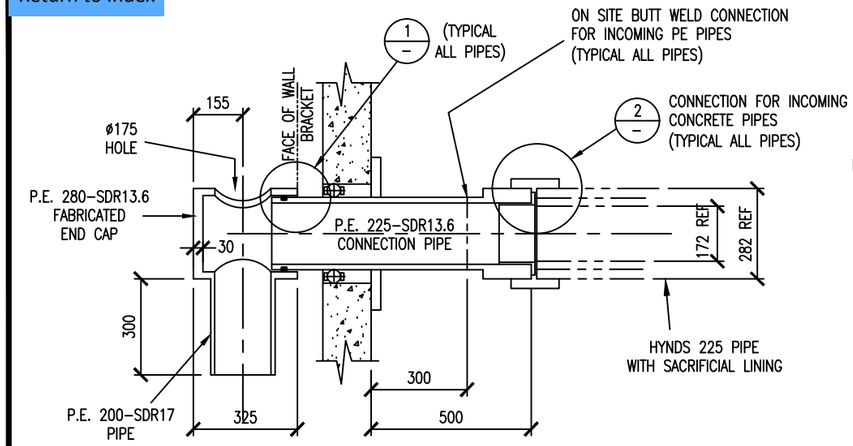
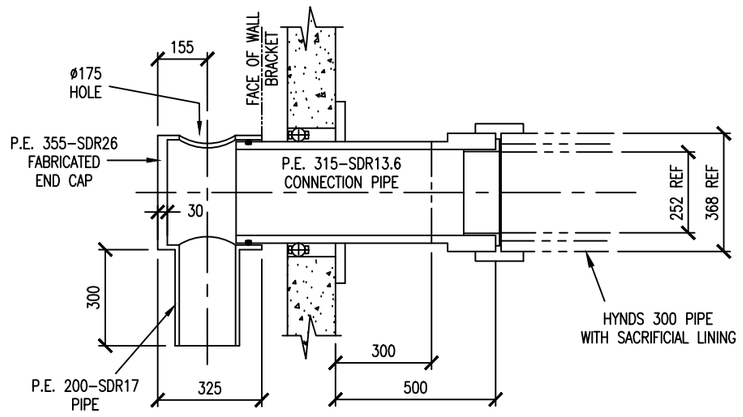
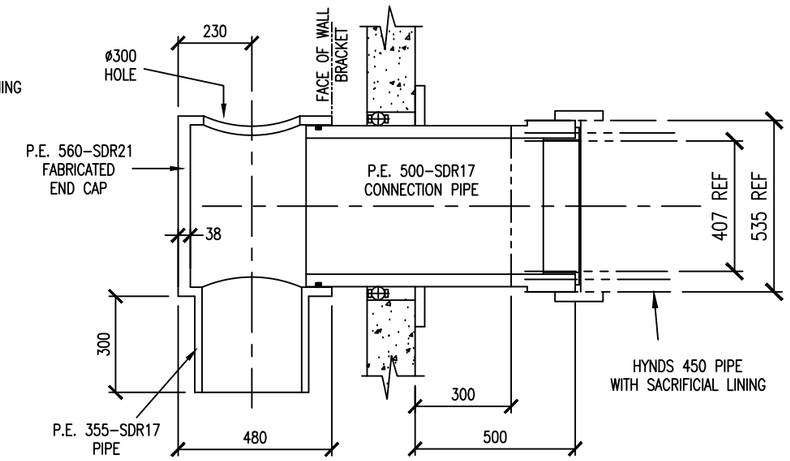
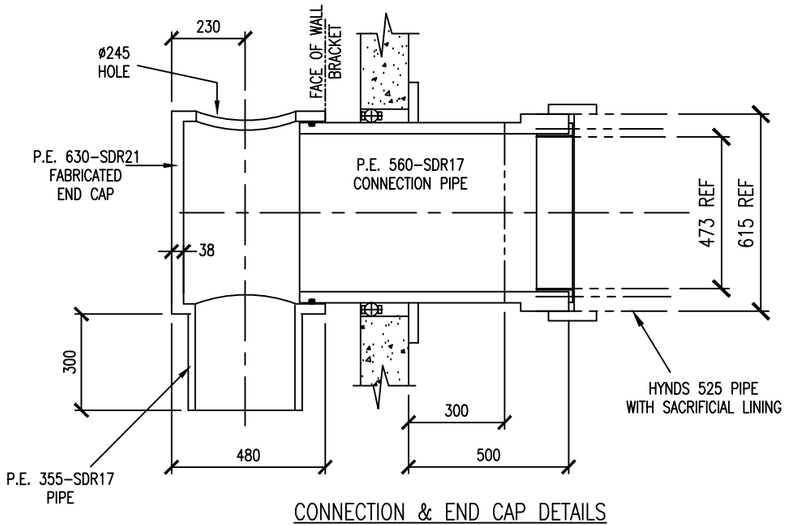


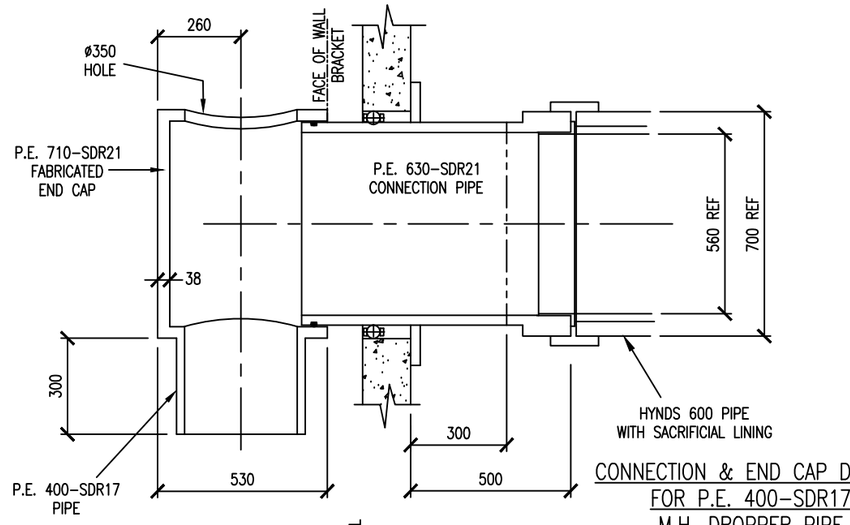


CONNECTION & END CAP DETAILS
FOR P.E. 200–SDR17
M.H. DROPPER PIPE
SCALE 1:20

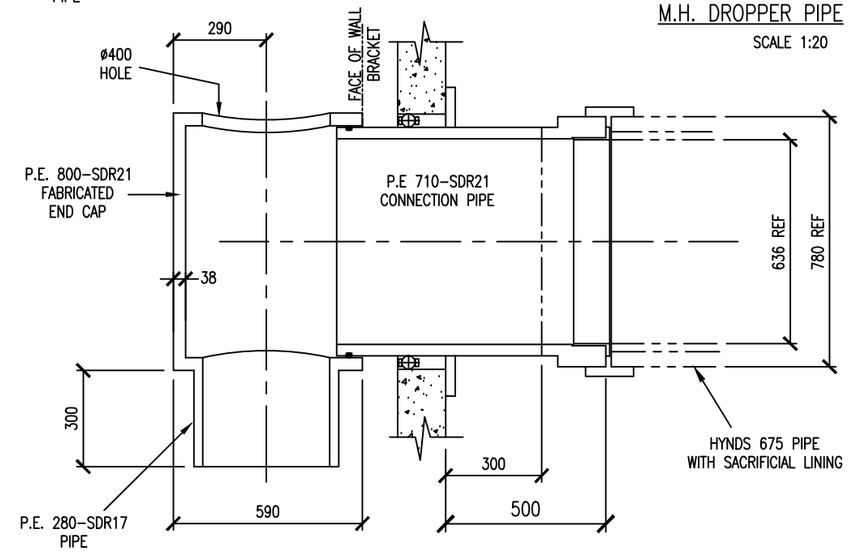




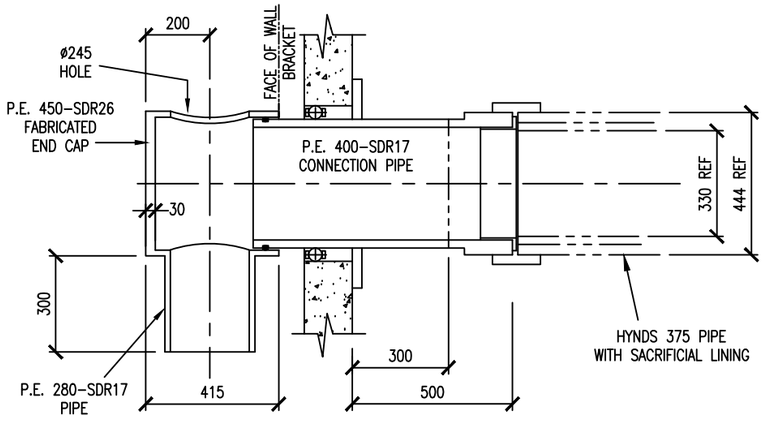
CONNECTION & END CAP DETAILS
FOR P.E. 355–SDR17
M.H. DROPPER PIPE
SCALE 1:20



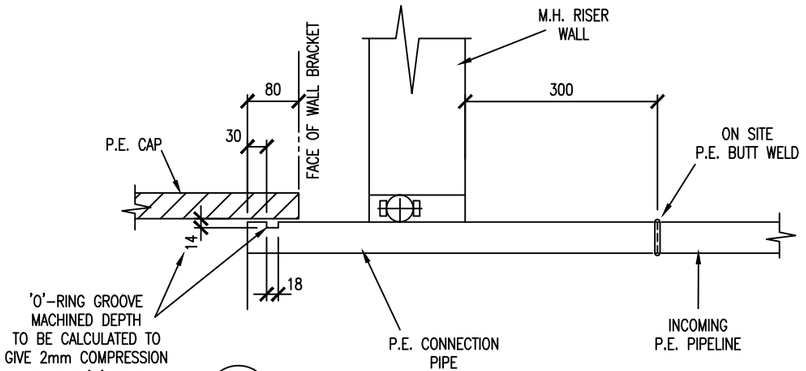
CONNECTION & END CAP DETAILS
FOR P.E. 400–SDR17
M.H. DROPPER PIPE
SCALE 1:20



CONNECTION & END CAP DETAILS
FOR P.E. 450–SDR17
M.H. DROPPER PIPE
SCALE 1:20

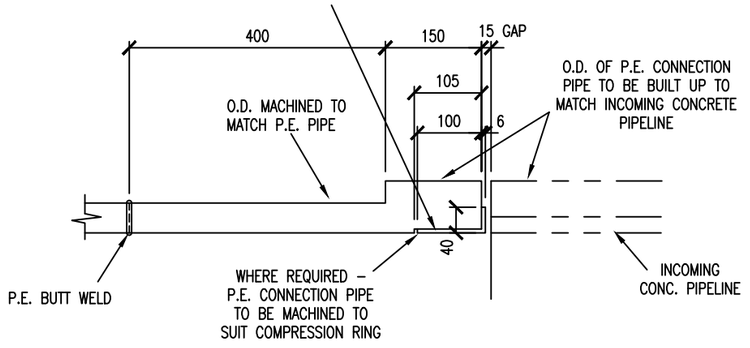


CONNECTION & END CAP DETAILS
FOR P.E. 280–SDR17
M.H. DROPPER PIPE
SCALE 1:20



1 – '0'–RING MACHINING
SCALE 1:10

STAINLESS STEEL COMPRESSION RING FABRICATED FROM 6mm PLATE WITH 40x6 FLANGE TO BE SNUG FIT INTO P.E. CONNECTION PIPE (SEE NOTE)



2 – COMPRESSION RING
SCALE 1:10

NOTE:– I.D OF COMPRESSION RING MUST BE EQUAL TO OR LARGER THAN I.D. OF INCOMING PIPELINE

					DESIGNED	J. GRAHAM	09/11
					DES. CHECKED	P. GOWANS	
					DRAWN	N. SMITH	09/11
					DWG. CHECKED	J. GRAHAM	09/11
					PROJECT LEADER		
–	09–11	APPROVED FOR ISSUE	G.S.	J.G.	INFRAST'R APP'D		
ISSUE	DATE	AMENDMENT	BY	APPD.			

OPERATIONS

INFRASTRUCTURE

water Care services limited

WASTEWATER TRANSMISSION STANDARD – CIRCULAR MANHOLES FOR POLYETHYLENE PIPES DN355 TO DN1000

P.E. CONNECTIONS & INTERNAL DROPPERS FOR HYNDS PIPELINES

CAD FILE 2000244.039	DATE 01/09/11
ORIGINAL SCALE A3 AS SHOWN	CONTRACT No. –
REF No.	ISSUE
DWG No. 2000244 .039	–

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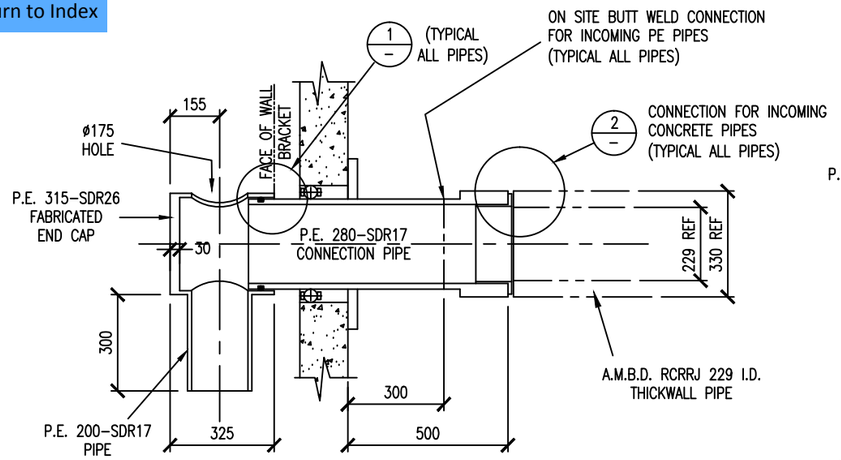
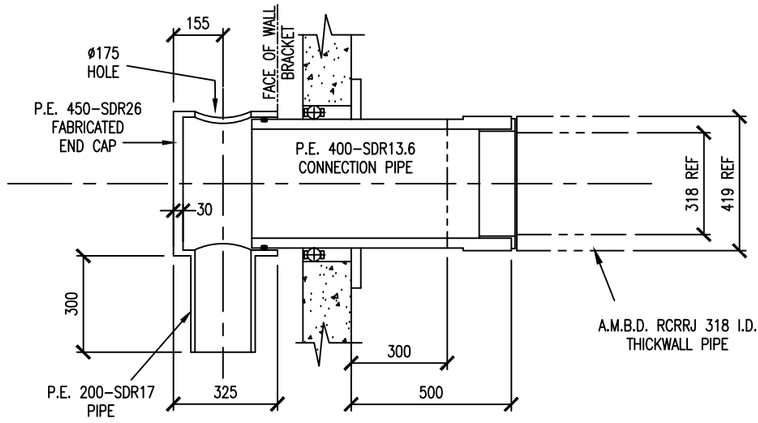
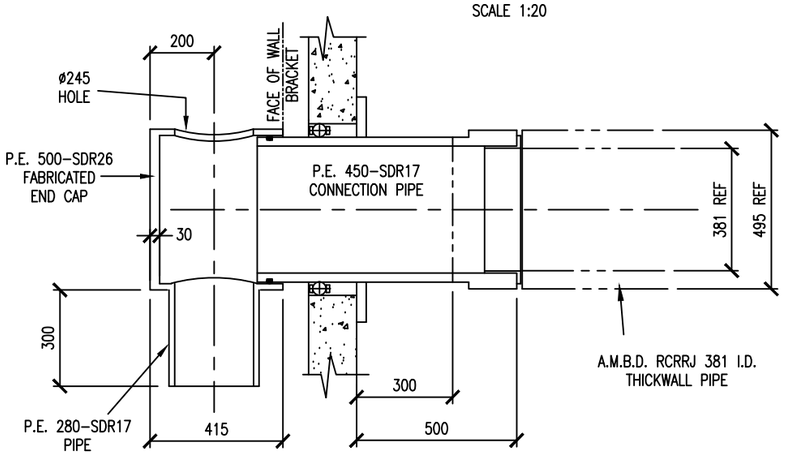
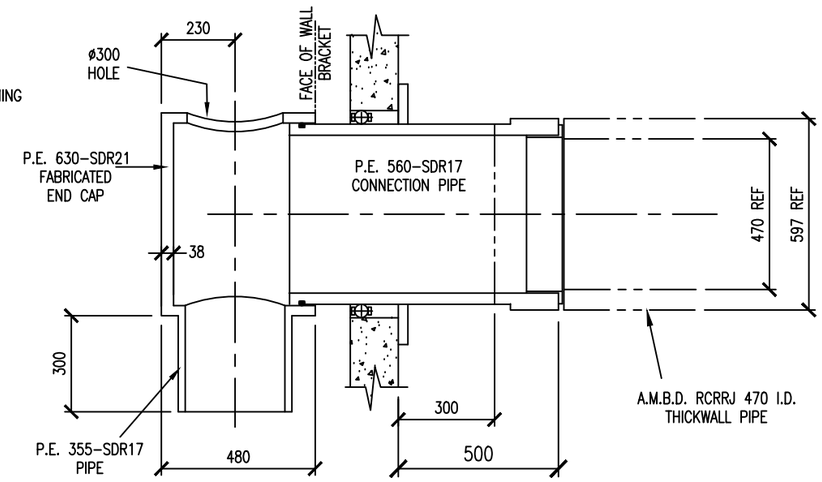




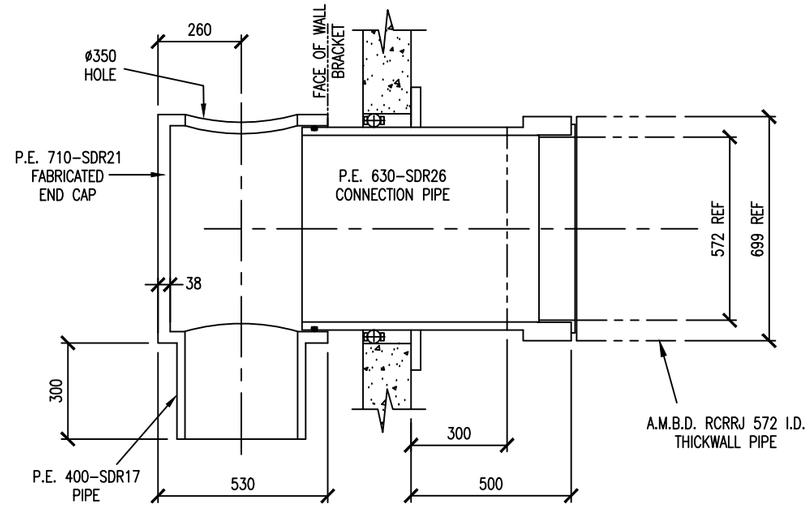
CONNECTION & END CAP DETAILS
FOR P.E. 200–SDR17
M.H. DROPPER PIPE
SCALE 1:20



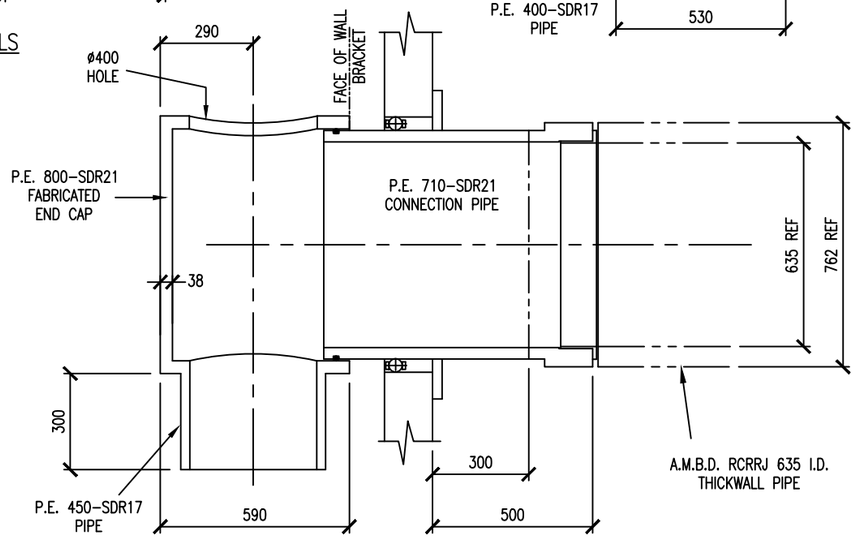
CONNECTION & END CAP DETAILS
FOR P.E. 280–SDR17
M.H. DROPPER PIPES
SCALE 1:20



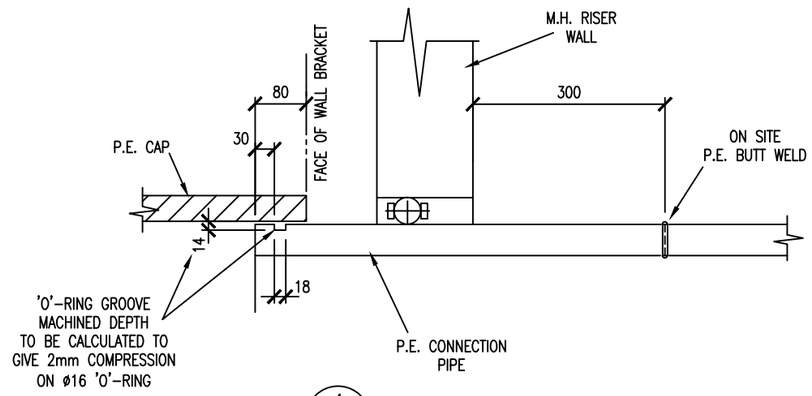
CONNECTION & END CAP DETAILS
FOR P.E. 355–SDR17
M.H. DROPPER PIPE
SCALE 1:20



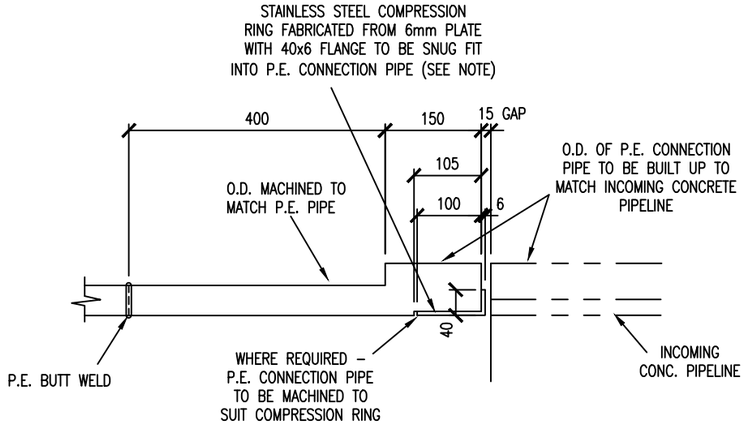
CONNECTION & END CAP DETAILS
FOR P.E. 400–SDR17
M.H. DROPPER PIPE
SCALE 1:20



CONNECTION & END CAP DETAILS
FOR P.E. 450–SDR17
M.H. DROPPER PIPE
SCALE 1:20



1 – 'O'–RING MACHINING
SCALE 1:10



2 – COMPRESSION RING
SCALE 1:10

NOTE:– I.D OF COMPRESSION RING MUST BE EQUAL TO OR LARGER THAN I.D. OF INCOMING PIPELINE

ISSUE	DATE	AMENDMENT	BY	APPD.
–	09–11	APPROVED FOR ISSUE	G.S.	J.G.

DESIGNED	J. GRAHAM	09/11
DES. CHECKED	P. GOWANS	
DRAWN	N. SMITH	09/11
DWG. CHECKED	J. GRAHAM	09/11
PROJECT LEADER		
INFRAST'R APP'D		

OPERATIONS

INFRASTRUCTURE

water Care services limited

WASTEWATER TRANSMISSION STANDARD – CIRCULAR MANHOLES FOR POLYETHYLENE PIPES DN355 TO DN1000

P.E. CONNECTIONS & INTERNAL DROPPERS FOR A.M.B.D. THICKWALL PIPELINES

CAD FILE 2000244.040	DATE 01/09/11
ORIGINAL SCALE A3 AS SHOWN	CONTRACT No. –
REF No.	ISSUE
DWG No. 2000244 .040	–

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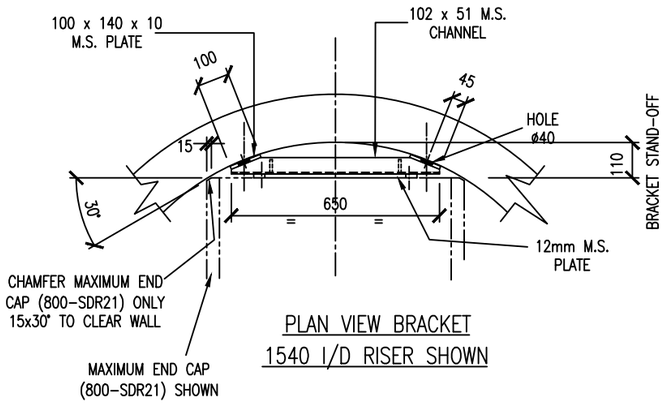
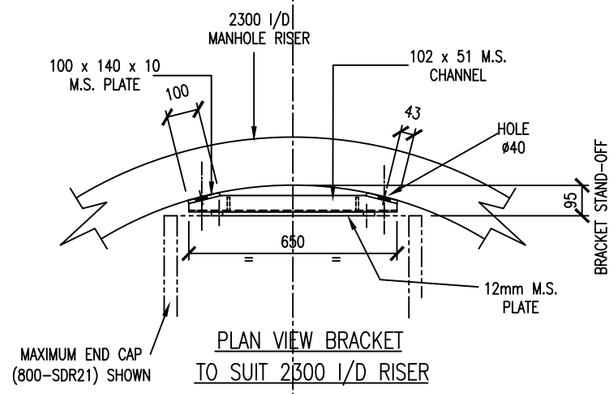
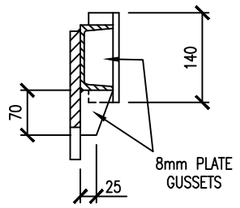


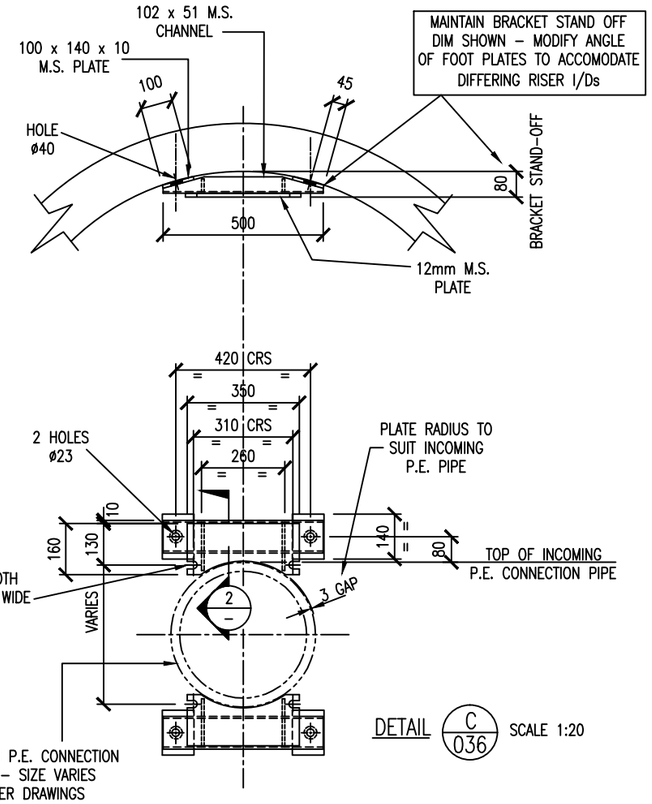
PLAN VIEW BRACKET
1540 I/D RISER SHOWN



PLAN VIEW BRACKET
TO SUIT 2300 I/D RISER



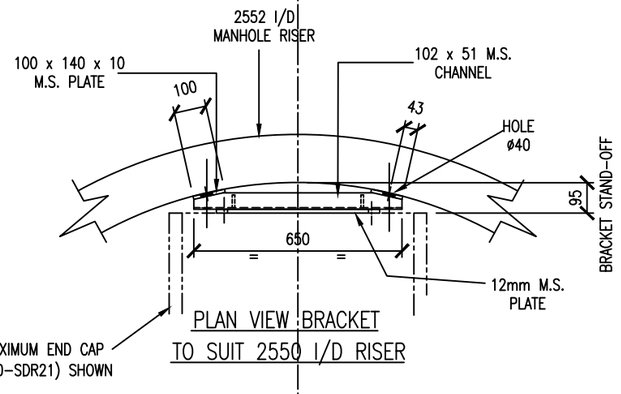
SECTION 1 SCALE. 1:10



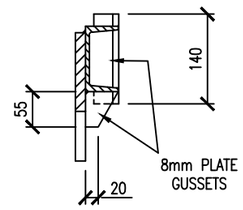
DETAIL C/036 SCALE 1:20

END CAP SEAT BRACKETS – HOT DIP GALVANISE

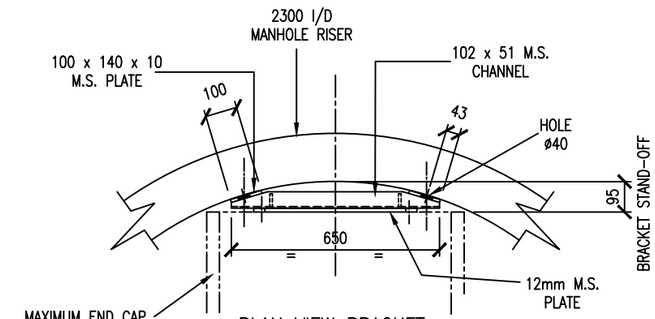
MAXIMUM INCOMING = 450-SDR21
MAXIMUM DROPPER = 280-SDR17



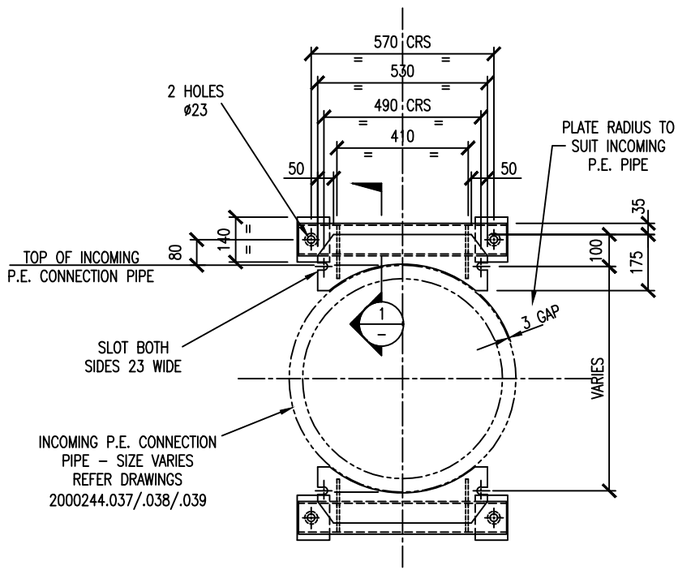
PLAN VIEW BRACKET
TO SUIT 2550 I/D RISER



SECTION 2 SCALE. 1:10



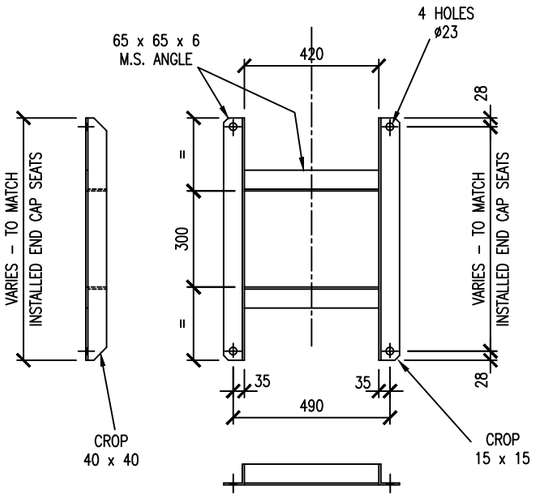
PLAN VIEW BRACKET
TO SUIT 1980 I/D RISER



END CAP SEAT BRACKETS – HOT DIP GALVANISE

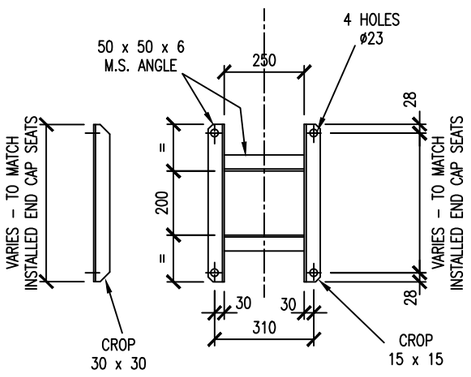
DETAIL A/036 SCALE 1:20

MAXIMUM INCOMING = 710-SDR21
MAXIMUM DROPPER = 450-SDR17



END CAP RESTRAINT – HOT DIP GALVANISE
MAXIMUM DROPPER = 450-SDR17

DETAIL B/036 SCALE 1:20



END CAP RESTRAINT – HOT DIP GALVANISE
MAXIMUM DROPPER = 280-SDR17

DETAIL D/036 SCALE 1:20

ISSUE	DATE	AMENDMENT	BY	APPD.
–	09-11	APPROVED FOR ISSUE	G.S.	J.G.

DESIGNED	J. GRAHAM	09/11
DES. CHECKED	P. GOWANS	
DRAWN	N. SMITH	09/11
DWG. CHECKED	J. GRAHAM	09/11
PROJECT LEADER		
INFRAST'R APP'D		

OPERATIONS

INFRASTRUCTURE

waterCare services limited

WASTEWATER TRANSMISSION STANDARD – CIRCULAR MANHOLES FOR POLYETHYLENE PIPES DN355 TO DN1000

END CAP SEATS & RESTRAINTS DETAILS

CAD FILE 2000244.041	DATE 01/09/11
ORIGINAL SCALE A3 AS SHOWN	CONTRACT No. –
REF No.	ISSUE
DWG No. 2000244 .041	–