

Drainage Statement

Angels Nursery, Yapton Road, Barnham

Client

Wates Residential

7033/2.3F

Second Issue: 16 July 2018

Consulting Engineers

Gyoury Self
16/17 Boundary Road
Brighton & Hove
East Sussex, BN3 4EF



1.0 INTRODUCTION

This report has been prepared in relation to the proposed drainage scheme submitted for the development of the site at Angels Nursery, Yapton Road, Barnham with planning ref BN/43/16/PL.

The aim of this report is to explain the detailed site drainage design, including the SuDS components, that are shown on the proposed site drainage layout drawings submitted with this document. The Management and Maintenance Plan is covered separately in another document by GTA Civils Ltd.

This report has been specifically designed to provide information to enable discharge of conditions 3,6 and 8 of the consent:

- (3) *Development shall not commence until full details of the proposed surface water drainage scheme have been submitted to and approved in writing by the Local Planning Authority.*

The design should follow the hierarchy of preference for different types of surface water drainage disposal systems as set out in Approved Document H of the Building Regulations, the recommendations of the SuDS Manual produced by CIRIA.

Winter groundwater monitoring to establish highest annual ground water levels and Percolation testing to BRE 365, or similar approved, will be required to support the design of any Infiltration drainage.

- (5) *The development shall not proceed until formal consent has been approved in writing from the Lead Local Flood Authority (WSSC) or its agent (ADC) for the discharge of any flows to watercourses, or the culverting, diversion, infilling or obstruction of any watercourse on the site.*

Any discharge to a watercourse must be at a rate no greater than the pre-development run off values.

- (6) *Development shall not commence until full details of the maintenance and management of the SuDS system is set out in a site-specific maintenance manual and submitted to, and approved in writing, by the Local Planning Authority. The manual is to include (a) details of financial management of the site including arrangements made in the event that the management company (or any subsequent management company) is no longer able to fulfil its duties; and (b) arrangements for the replacement of major components at the end of the manufacturers recommended design life.*

- (8) *The development layout shall not be agreed until such time that arrangements for the future access and maintenance of any watercourse or culvert (piped watercourse) crossing or abutting the site has been submitted and approved in writing by the Local Planning Authority. No construction is permitted, which will restrict current and future land owners from undertaking their riparian maintenance responsibilities of any watercourse on or adjacent to the site.*

2.0 LIMITATIONS

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This report has been prepared for Wates Residential in relation to the proposed development at Angels Nursery, Yapton Road, Barnham. No responsibility is accepted to any third party for all or part of this study in connection with this or any other development.

3.0 EXISTING DRAINAGE

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The site, whose area is approximately 3.51ha and is relatively undeveloped and unoccupied. Existing levels are relatively flat and vary from 9.2m A.O.D to 8.4m A.O.D.

Southern Water records, in Appendix A, shows an existing 225mm diameter running from east to west through the site. This sewer has recently been upgraded to a 300mm diameter sewer and the alignment has changes slightly. This has been surveyed and is shown on the proposed drainage layouts contained in this report.

There is also an existing Southern Water foul pumping main running through the southern part of the site.

There are a number of on site ditches. The central ditches appear to drain just the site itself. A southern ditch is the main receiving ditch and conveys flows towards the east and then the main watercourse turns south.

There is also a ditch on the east and west boundaries. The west drains land to the west and the eastern ditch drains a small area of land to the east. All connect to the southern ditch.

4.0 PROPOSED DRAINAGE & OVERLAND FLOW ROUTING

Condition 3,5 and 6:

The following drawings contained in Appendix B show the proposed drainage and details:

19377-GS-Z1-XX-DR-C-1061	-	Site Drainage Sheet 1 of 2
19377-GS-Z1-XX-DR-C-1062	-	Site Drainage Sheet 2 of 2
19377-GS-Z1-XX-DR-C-5101	-	Private Drainage details_sheet 1
19377-GS-Z1-XX-DR-C-5102	-	Private Drainage details_sheet 2
19377-GS-Z1-XX-DR-C-1080	-	External Works Sheet 1 of 2
19377-GS-Z1-XX-DR-C-1081	-	External Works Sheet 2 of 2
19377-GS-Z1-XX-DR-C-5103	-	Private External Works details

The flood risk assessment prepared by WSP for the planning application identified a total proposed flow rate of 7.3 litres/second from the site into the existing southern ditch, which has been confirmed as acceptable for the detailed design by Arun DC.

Infiltration has been ruled out for the site as recommended by TEC consultation who carried out testing on site in March 2018. See summary below:

10.7 Drainage

- 10.7.1 Soakage testing has not been undertaken at the site as part of these works. However, monitoring of groundwater levels has been undertaken, with shallow resting levels recorded at depths between 0.67m and 1.08mbgl during monitoring visits for this phase of works. Previous assessments at the site also indicated this shallow groundwater body may be seasonally variable, with groundwater recorded to be locally at the surface during winter months (WSP, 2014) and at depths >2.0mbgl during summer months (Geo-Environmental, 2015).
- 10.7.2 On the basis of the shallow groundwater levels recorded at the site, it is considered unlikely that the use of soakaways will be feasible.

The total site impermeable area has been calculated as 1.238 Ha.

Peak volumes will be stored in a proposed pond and within areas of permeable paving, with flow restrictions to some of these via a control chamber with orifice plate.

The main surface water drainage in the adopted roadways are offered for adoption under a Section 104 agreement, with storage within this system provided for the 1 in 30 year event, but with links to the wider private network to store the 1 in 100 year + 40% storm.

The proposed treatment to existing ditches are as follows:

- Eastern boundary ditch – this is proposed to be shortened where it falls within the rear gardens. A cellular land drain is provided to ensure any possible existing flows may still be conveyed to the ditch which remains. The ditch will remain in public open space to the side of the adoptable turning head so maintenance will be carried out on this ditch by the management company for the development.

- Western Ditch - this will remain in its current location and no works to be carried out. The ditch can be maintained from the adjacent site where it is outside the site boundary. Where it crosses into the site it can be maintained from the adjacent turning head and parking areas. Maintenance will be carried out on this ditch by the management company for the development.
- Central ditches – these will be filled as agreed at FRA stage.
- Southern ditch – this will remain but there will be a small section of culverting required for the turning head in the south west corner. This has been shown with a 600mm pipe. Maintenance will be carried out on this ditch by the management company for the development.

Microdrainage calculations are contained in Appendix C which show no flooding for the 1 in 1, 1 in 30 and up to the 1 in 100 year storm +40%.

Peak storage volumes requirements are as follows:

Storm Event	Peak Storage Volume requirement m.cu
1 in 1year	256.5
1 in 30 year	722
1 in 100 year + 10%	1559

It has been demonstrated above that conditions 3,5 and 6 has been satisfied.

Condition 8:

A drainage maintenance report has been prepared as a separate document which should satisfy this condition.

Prepared by:

Martin Roberts I.Eng ACIWEM MCIHT

GTA Civils Ltd

APPENDIX A – SOUTHERN WATER SEWER RECORDS



GTA Civils Ltd
Gloucester House 66A
Church Walk
Burgess Hill
West Sussex
RH15 9AS

Your ref 7033/MR/cf
Our ref 277840
Date 24 January 2018

Contact [REDACTED]

Attention: Chloe Fagan

Dear Customer

Re: Provision of public sewer record extract

Location: Angels Nursery, Yapton Road, Barnham, PO22 0AY

Thank you for your order regarding the provision of extracts of our sewer and/or water main records. Please find enclosed the extracts from Southern Water's records for the above location.

We confirm payment of your fee in the sum of £49.92 and enclose a VAT receipt for your records.

Customers should be aware that there are areas within our region in which there are neither sewers nor water mains. Similarly, whilst the enclosed extract may indicate the approximate location of our apparatus in the area of interest, it should not be relied upon as showing that further infrastructure does not exist and may subsequently be found following site investigation. Actual positions of the disclosed (and any undisclosed) infrastructure should therefore be determined on site, because Southern Water does not accept any responsibility for inaccuracy or omission regarding the enclosed plan. Accordingly it should not be considered to be a definitive document.

Should you require any further assistance regarding this matter, please contact the LandSearch team.

Yours faithfully

LandSearch

104426



103848

455800

SU9604SW

Title: 277840_Angels Nursery, Yapton

Drawn by: kumaria

Scale: 1:2500

Date: 24/01/2018

The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy.

The actual positions should be determined on site.

WARNING: SAC pipes are constructed of Borated Aramid Composite
WARNING: Unknown (UNK) materials may include Borated Aramid Composite

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**Southern
Water**

http://www.oxfordjournals.org

SEWER RECORDS PAGE 2 OF 2

Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape
0201X	6.9	5.28	225	VC	CIRC	8402X	5.88	3.78	175	UNK	CIRC												
0202X	7.05	5.83	175	VC	CIRC	8901X	5.8	4.14	175	VC	CIRC												
0203X	6.88	5.44	175	VC	CIRC	9001X	6.5	4.77	175	VC	CIRC												
0204X				UNK	CIRC	9002X	6.23	4.49	175	VC	CIRC												
0205X				OTHER	BRC	9101X	6.31	5.04	175	VC	CIRC												
0301X	3.91	2.18	300	VC	CIRC	9102X				UNK	UNK	CIRC											
0302X	3.47	2.15	450	DI	CIRC	9202X	3.15	1.7	350	PF	CIRC												
0305X	5.06		250	DI	CIRC	9203X	2.86	0.86	350	PF	CIRC												
0306X	5.69	4.29	225	VC	CIRC	9204Y	2.58	1.21	300	VC	CIRC	*											
0307X	5.3	1.92	375	CP	CIRC	9204X	2.58	0.97	375	CP	CIRC	*											
0308X	3.25	2.57	450	DI	CIRC	9206X	2.89	1.19	300	VC	CIRC												
0309X	3.25	2.05	600	CP	CIRC	9207X	2.88	2.32	150	VC	CIRC												
0310X	4.2	1.891	525	CP	CIRC	9208X				OTHER	BRC	CIRC											
0311Y	4.61	1.841	525	CP	CIRC	9209X				OTHER	BRC	CIRC											
0311X	4.61	1.841	375	CP	CIRC	920PX	3.5		450	CP	CIRC												
0312X				OTHER	BRC	9210X				OTHER	BRC	CIRC											
0403X	3.58	2.64	150	PF	CIRC	9211X	4.53	1.816	525	CP	CIRC												
0404X	3.79	2.57	150	PF	CIRC	9212Z	3.58	1.82	450	CP	CIRC	*											
0405X	3.8	2.52	150	VC	CIRC	9212Y	3.58	3.58	375	CP	CIRC	*											
1201X	8.38	8.02	225	VC	CIRC	9212X	3.58		350	PF	CIRC	*											
1202X	6.45		225	VC	CIRC	9213X	3.86	1.07	375	CP	CIRC												
1203X	7.54		225	VC	CIRC	9214X	3		350	PF	CIRC												
1204X				UNK	UNK	9215X	3.5	1.879	450	CP	CIRC												
1205X	2.35			UNK	VC	9216X	2.82	1.77	450	CP	CIRC												
1206X				UNK	VC	9301X	4.1	2.85	250	DI	CIRC												
1207X				UNK	VC	9302X	3.45	2.82	300	DI	CIRC												
1208X				UNK	VC	9304X				UNK	UNK	UNK											
1209X			225	VC	CIRC	9305X				UNK	UNK	CIRC											
1210X				UNK		9300X				UNK	UNK	CIRC											
1301X	8.06	6.59	150	VC	CIRC																		
1302X				UNK	UNK																		
1303X	1.4			UNK	VC																		
130DX				UNK	VC																		
1310X				UNK	VC																		
1403X	7.76		150	VC	CIRC																		
2101X	8.82	8.22	225	VC	CIRC																		
2102X	6.83	6.12	225	VC	CIRC																		
210DX			225	VC	CIRC																		
220DX				UNK	UNK																		
2301X	9.05	8.04	150	VC	CIRC																		
2302X	0.8			UNK	PVC																		
2303X				UNK	VC																		
2304X				UNK	VC																		
230DX				UNK	PVC																		
231DX				UNK	PVC																		
232DX				UNK	PVC																		
3001X	8.43	6.56	225	VC	CIRC																		
3101X	8.53	6.39	225	VC	CIRC																		
4001X	8.72	7.19	150	VC	CIRC																		
4002X	8.68	6.91	225	VC	CIRC																		
4003X	8.79	6.95	225	VC	CIRC																		
5001X	8.55	7.22	225	VC	CIRC																		
5002X	8.64		225	VC	CIRC																		
5901X	8.88	7.26	225	VC	CIRC																		
6901X	9.07	7.89	150	VC	CIRC																		
6902X	9.17	7.65	225	VC	CIRC																		
6903X	9.19		175	VC	CIRC																		
7001X	9.99	8.47	150	VC	CIRC																		
7902X	8.88	7.39	150	VC	CIRC																		
8001X	2.14	0.64	375	CP	CIRC																		
800DX	2.07	0.57	375	CP	CIRC																		
8101X	3.07	1.23	390	PVC	CIRC																		
8102X	2.5	0.84	375	CP	CIRC																		
8201X	2.8	0.98	375	CP	CIRC																		
8401X	6.41	4.11	175	VC	CIRC																		

LINE STYLES / COLOURS		MATERIALS		LEGEND - JOINTS		LEGEND - SEWERS		LEGEND - SHAPES (S)		NODE REFERENCE SYSTEM	
Access	 Solid	501	Asphalt	 Solid	501	Asphalt	 Solid	501	Asphalt	 Solid	501
Access	 Dashed	502	Gravel	 Dashed	502	Gravel	 Dashed	502	Gravel	 Dashed	502
Access	 Dotted	503	Concrete	 Dotted	503	Concrete	 Dotted	503	Concrete	 Dotted	503
Access	 Dash-dot	504	Brick	 Dash-dot	504	Brick	 Dash-dot	504	Brick	 Dash-dot	504
Access	 Long Dash	505	Wood	 Long Dash	505	Wood	 Long Dash	505	Wood	 Long Dash	505
Access	 Short Dash	506	Steel	 Short Dash	506	Steel	 Short Dash	506	Steel	 Short Dash	506
Access	 Dash-dot-dot	507	Concrete	 Dash-dot-dot	507	Concrete	 Dash-dot-dot	507	Concrete	 Dash-dot-dot	507
Access	 Solid	508	Gravel	 Solid	508	Gravel	 Solid	508	Gravel	 Solid	508
Access	 Dashed	509	Concrete	 Dashed	509	Concrete	 Dashed	509	Concrete	 Dashed	509
Access	 Dotted	510	Brick	 Dotted	510	Brick	 Dotted	510	Brick	 Dotted	510
Access	 Dash-dot	511	Wood	 Dash-dot	511	Wood	 Dash-dot	511	Wood	 Dash-dot	511
Access	 Long Dash	512	Steel	 Long Dash	512	Steel	 Long Dash	512	Steel	 Long Dash	512
Access	 Short Dash	513	Concrete	 Short Dash	513	Concrete	 Short Dash	513	Concrete	 Short Dash	513
Access	 Dash-dot-dot	514	Gravel	 Dash-dot-dot	514	Gravel	 Dash-dot-dot	514	Gravel	 Dash-dot-dot	514
Access	 Solid	515	Concrete	 Solid	515	Concrete	 Solid	515	Concrete	 Solid	515
Access	 Dashed	516	Brick	 Dashed	516	Brick	 Dashed	516	Brick	 Dashed	516
Access	 Dotted	517	Wood	 Dotted	517	Wood	 Dotted	517	Wood	 Dotted	517
Access	 Dash-dot	518	Steel	 Dash-dot	518	Steel	 Dash-dot	518	Steel	 Dash-dot	518
Access	 Long Dash	519	Concrete	 Long Dash	519	Concrete	 Long Dash	519	Concrete	 Long Dash	519
Access	 Short Dash	520	Gravel	 Short Dash	520	Gravel	 Short Dash	520	Gravel	 Short Dash	520
Access	 Dash-dot-dot	521	Concrete	 Dash-dot-dot	521	Concrete	 Dash-dot-dot	521	Concrete	 Dash-dot-dot	521
Access	 Solid	522	Brick	 Solid	522	Brick	 Solid	522	Brick	 Solid	522
Access	 Dashed	523	Wood	 Dashed	523	Wood	 Dashed	523	Wood	 Dashed	523
Access	 Dotted	524	Steel	 Dotted	524	Steel	 Dotted	524	Steel	 Dotted	524
Access	 Dash-dot	525	Concrete	 Dash-dot	525	Concrete	 Dash-dot	525	Concrete	 Dash-dot	525
Access	 Long Dash	526	Gravel	 Long Dash	526	Gravel	 Long Dash	526	Gravel	 Long Dash	526
Access	 Short Dash	527	Concrete	 Short Dash	527	Concrete	 Short Dash	527	Concrete	 Short Dash	527
Access	 Dash-dot-dot	528	Brick	 Dash-dot-dot	528	Brick	 Dash-dot-dot	528	Brick	 Dash-dot-dot	528
Access	 Solid	529	Wood	 Solid	529	Wood	 Solid	529	Wood	 Solid	529
Access	 Dashed	530	Steel	 Dashed	530	Steel	 Dashed	530	Steel	 Dashed	530
Access	 Dotted	531	Concrete	 Dotted	531	Concrete	 Dotted	531	Concrete	 Dotted	531
Access	 Dash-dot	532	Gravel	 Dash-dot	532	Gravel	 Dash-dot	532	Gravel	 Dash-dot	532
Access	 Long Dash	533	Concrete	 Long Dash	533	Concrete	 Long Dash	533	Concrete	 Long Dash	533
Access	 Short Dash	534	Brick	 Short Dash	534	Brick	 Short Dash	534	Brick	 Short Dash	534
Access	 Dash-dot-dot	535	Wood	 Dash-dot-dot	535	Wood	 Dash-dot-dot	535	Wood	 Dash-dot-dot	535
Access	 Solid	536	Steel	 Solid	536	Steel	 Solid	536	Steel	 Solid	536
Access	 Dashed	537	Concrete	 Dashed	537	Concrete	 Dashed	537	Concrete	 Dashed	53

Drawn by: kumaria

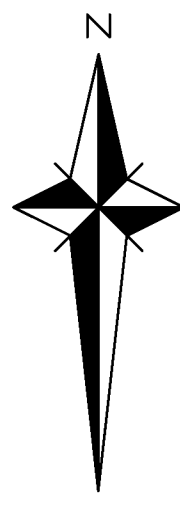
Title: 277840 Angels Nursery, Yapton

Date: 24/01/2018



APPENDIX B – SITE DRAINAGE & EXTERNAL WORKS LAYOUTS & DETAILS

19377-GS-Z1-XX-DR-C-1061	-	Site Drainage Sheet 1 of 2
19377-GS-Z1-XX-DR-C-1062	-	Site Drainage Sheet 2 of 2
19377-GS-Z1-XX-DR-C-5101	-	Private Drainage details_sheet 1
19377-GS-Z1-XX-DR-C-5102	-	Private Drainage details_sheet 2
19377-GS-Z1-XX-DR-C-1080	-	External Works Sheet 1 of 2
19377-GS-Z1-XX-DR-C-1081	-	External Works Sheet 2 of 2
19377-GS-Z1-XX-DR-C-5103	-	Private External Works details



- DESIGN NOTES**
1. STORAGE DESIGN BASED ON 1 IN 100 YR STORM + 40%.
 2. DRAIN POINTS AND LOCATIONS TO BE CONFIRMED BY ARCHITECT.
 3. CONTRACTOR TO ESTABLISH LOCATIONS OF ALL EXISTING SERVICES PRIOR TO COMMENCING.
 4. EXISTING TREES TO BE PROTECTED WHERE EXCAVATIONS RUN CLOSE.
 5. APPROVAL TO BE GAINED FROM FOR CONNECTIONS TO SEWERS

SPECIFICATION NOTES

1. ALL DRAINAGE SHALL BE CONSTRUCTED AND COMMISSIONED IN ACCORDANCE WITH BS EN 205 & BS EN 853, BUILDING REGULATIONS DOCS 4 AND ANY PARTICULAR REQUIREMENTS OF THE BUILDING CONTROL OFFICER.
2. DRAIN BODIES IS TO BE PROVIDED AS D200.0, D200.1 AND D200.2 AS SHOWN ON THE DRAINAGE DETAILS SHEETS.
3. INSPECTIVE COVER IS THE MINIMUM DEPTH OF COVER OVER THE PIPE GOWN AT ANY TIME DURING THE CONSTRUCTION PROCESS.
4. ALL CONCRETE PIPEWORK, MANHOLES AND FITTINGS SHALL BE TO BS 911 (ALL RELEVANT PARTS). ALL CONCRETE PIPEWORK TO BE TO HIGH STRENGTH.
5. WHERE CONNECTIONS ARE TO BE MADE TO EXISTING MANHOLES, SEWERS, INVERT LEVELS, PIPE SIZES & ORIENTATIONS SHALL BE CHECKED PRIOR TO THE COMMENCEMENT OF THE WORKS AND ANY VARIANCE REPORTED TO THE ENGINEER IMMEDIATELY.
6. WHERE PIPELINES CROSS, EACH IS TO BE SURROUNDED WITH GRADE 5/1 MASS CONCRETE FOR A DISTANCE NOT LESS THAN 1m CENTRED ON THE CROSSING POINT. LENGTH OF SURROUND TO BE EXTENDED AS NECESSARY TO WITHIN 150mm OF THE NEXT NEAREST FUSIBLE JOINTS.
7. THE CONTRACTOR IS TO ENSURE THAT PROTECTIVE MEASURES ARE TAKEN TO ENSURE THAT DRAINAGE PIPEWORK AND FITTINGS ARE NOT DAMAGED BY SITE TRAFFIC PRIOR TO OFFSITE PILING OPERATIONS BEING COMPLETED AROUND BUILDINGS.
8. ALL PRIVATE DRAINAGE PREWORK SHALL BE PVC-U. ALL ADOPTED DRAINAGE TO BE VC-U. ALL UNDERBUILDING DRAINS TO BE 140 AT A GRADIENT OF 1:10.
9. WHERE DRAINS PASS THROUGH FOUNDATIONS OR CONNECT TO MANHOLES, FLEXIBLE PIPE JOINTS ARE TO PROVIDED WITHIN 150mm OF THE FACE OF THE STRUCTURE AND WITHIN A FURTHER 600mm TO FORM A ROOTER PIPE.
10. WHERE PIPES PASS THROUGH SCREEN WALLS, FOOTINGS OR RETAINING WALLS, UNITS ARE TO BE PROVIDED.
11. WHERE PIPELINES PASS WITHIN 1m OF BUILDINGS OR WALLS THE FOUNDATIONS ARE TO BE TAKEN DOWN BELOW THE FOUNDATION OF THE TRENCH.
12. 450mm DIA. INSPECTION CHAMBERS (VICIS) MAY BE USED.
- WITH 300mm REDUCED OPENING WHERE THE DEPTH FROM COVER TO INVERT EXCEEDS 1000mm.
13. 300mm DIA. POLYPROPYLENE ACCESS CHAMBERS (PAC) MAY BE USED
- WHERE THE DEPTH FROM COVER TO INVERT DOES NOT EXCEED 600mm AND WHERE THE PIPE SIZE DOES NOT EXCEED 100mm DIA.
13. STEEL COVERS WITH PROPERTY BOUNDARIES SHALL BE:
(UNLESS NOTED ON DRAWING OR MANHOLE SCHEDULE)
- ON PRIVATE DRIVEWAYS: FACTA GRADE 8 (BS EN ISO 1461: 1999)
- ON PRIVATE PATHWAYS, VERGES OR ON GRASSES: FACTA GRADE A (BS EN ISO 1461: 1999)
- ON SHARED PATHWAYS, VERGES: GRADE A15 (BS EN 124:1994)
14. COVER LEVELS SHOWN 'C' AND INVERT LEVELS SHOWN 'I' ARE IN METRES ABOVE ORDNANCE DATUM.
15. ALL DRAINS TO BE 100mm DIAMETER UNLESS NOTED OTHERWISE.
16. ALL DRAINS MARKED 'PVC' OR 'SW' ARE PROPOSED ADOPTED SEWERS AND ARE TO BE CONSTRUCTED IN ACCORDANCE WITH SEWERS FOR ADOPTION, 7TH EDITION.

GENERAL NOTES:

1. DIMENSIONS ON THIS DRAWING SHALL NOT BE SCALED. ALL DIMENSIONS TO BE CHECKED ON SITE. ALL DETAILS AND DIMENSIONING RELATING TO SUB-CONTRACTOR'S OR SUPPLIER'S WORK MUST BE CHECKED AND AGREED BETWEEN THE SUB-CONTRACTOR OR THE SUPPLIER AND THE GENERAL CONTRACTOR.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE MAIN CONTRACT AND SPECIFICATION.
3. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL SITE DIMENSIONS BEFORE COMMENCING WORK.
4. THE MAIN CONTRACT IS RESPONSIBLE FOR ENSURING THE STABILITY OF THE STRUCTURE WHILE THE WORKS ARE IN PROGRESS.
5. DIFFERENCES BETWEEN THIS DRAWING AND THE SITE CONDITIONS ENCOUNTERED MUST BE REPORTED TO THE ENGINEER.

NOTATION:
I.S.L. = FINISH OF STEEL
F.F.L. = FINISH FLOOR LEVEL
T.O.P. = FINISH TOP OF CONCRETE
F.L. = FINISHED FLOOR LEVEL
S.S.L. = STRUCTURAL SLAB LEVEL
F.F.L. = FINISHED FLOOR LEVEL
T.O.P. = FINISH TOP OF CONCRETE
F.L. = FINISHED FLOOR LEVEL

KEY

- Private surface water drain
- Private foul drain
- Adoptable foul sewer
- Adoptable highway drain

- FIC** Foul Plastic Inspection Chamber - D202.6
SIC Surface Water Plastic Inspection Chamber - D202.6
SAC 300mm diameter Surface water Access Chamber - D202.18
PAC 300mm diameter Foul Access Chamber - D202.18

- FWMH** Private Foul Manhole
SWMH Private Surface Water Manhole
FWSMH Adoptable Foul water Sewer Manhole
HWMH Adoptable Highway Manhole

- SWP** Foul drain point D207.0
SWP SW drain point for RWP D202.5
WAP Drainage channel

- ABBREVIATIONS**
- D207.0 DETAIL NUMBER - SEE DRAINAGE DETAIL SHEET
PVC-U POLYURETHANE
SWD SURFACE WATER DRAIN
PWS ADAPTABLE FUL WATER SEWER
SWS ADAPTABLE SURFACE WATER SEWER
MH MANHOLE
VIC INSPECTION CHAMBER
SA SOAKAWAY
FIC 450mm DIA. FOUL INSPECTION CHAMBER - D202.6
SIC 450mm DIA. SURFACE WATER INSPECTION CHAMBER - D202.6
SAC 300mm DIA. FOUL ACCESS CHAMBER - D202.18
PAC 300mm DIA. SURFACE WATER ACCESS CHAMBER - D202.18
CI CAST IRON
VC VENTURATED CAST IRON
CONC CONCRETE
PVC-U POLYURETHANE CHLORIDE - UNPLASTICISED
G GULLY
YD YARD GULLY - D202.0
RG ROAD GULLY - D202.1
CP CAR PARK GULLY - D202.2
DP DOWNHILL GULLY POINT
SWP SOIL VENT PIPE DROP
DT DETAIL NUMBER
FL FINISHED FLOOR LEVEL
SL STRUCTURAL SLAB LEVEL
GL GROUND LEVEL
C COVER LEVEL
I INVERT LEVEL
S SUPP LEVEL
B BASE LEVEL
HL HIGH LEVEL
L LOW LEVEL
B BACKDROP
S/S SURROUND
CLASS 5 GRANULAR RED & SURROUND
CLASS 8 GRANULAR RED

REV	DATE	DESCRIPTION	BY	CHKD
P3	13.07.19	Updated to latest arch. site layout	CH	HL
P2	05.07.19	PRELIMINARY ISSUE	CH	HL
P1	02.05.18	INITIAL ISSUE FOR COMMENT	SL	HL

Gybury Self
CONSULTING ENGINEERS
16/17 BOUNDARY ROAD, HOVE,
EAST SUSSEX BN1 4EF
TELEPHONE 01273 414115
E-MAIL: info@gyburyself.co.uk
Website: www.gyburyself.co.uk
Also at Farnham and St Albans

WATES CONSTRUCTION
RHP

YAPTON ROAD
BARNHAM
WEST SUSSEX

SITE DRAINAGE
SHEET 2 OF 2

H19377 **1/200** **MAY 2018**

MR **CTA**

A1 **STAGE 3 - DEVELOPED DESIGN**

19377-GS-Z1-XX-DR-C-1061

1. DIMENSIONS ON THIS DRAWING SHALL NOT BE SCALED. ALL DIMENSIONS TO BE CHECKED ON SITE. ALL DETAILS AND DIMENSIONING RELATING TO SUB-CONTRACTOR'S OR SUPPLIER'S WORK MUST BE CHECKED AND AGREED BEFORE THE SUB-CONTRACTOR OR THE SUPPLIER AND THE GENERAL CONTRACTOR.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S AND ENGINEERS DRAWINGS AND SPECIFICATION.
3. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL SITE DIMENSIONS BEFORE COMMENCING WORK.
4. THE MAIN CONTRACTOR IS RESPONSIBLE FOR ENSURING THE STABILITY OF THE STRUCTURE WHILST THE WORKS ARE IN PROGRESS.
5. DIFFERENCES BETWEEN THIS DRAWING AND THE SITE CONDITIONS ENCOUNTERED MUST BE REPORTED TO THE ENGINEER.

LEGEND

- | | |
|--|---|
|  | VEHICLE CROSSOVER |
|  | BITUMINOUS CARRIAGEWAY SURFACING
ADOPTED ROADS |
|  | REMEMABLE PARKING COURT SURFACING |
|  | BITUMINOUS DRIVEWAY |
|  | REMEMABLE BLOCK PAVING CONSTRUCTION |
|  | BLOCK PAVING CARRIAGEWAY CONSTRUCTION
ADOPTED ROAD |
|  | BITUMINOUS FOOTWAY CONSTRUCTION |
|  | FLAG PAVING |
|  | PCC BN Kerbs with 125mm Upstand |
|  | PCC BN Kerbs with 25mm Upstand |
|  | Flush PCC Kerbs (0-6mm Upstand) |
|  | PCC Flush Edging |
|  | DK |
| 45.850 | PROPOSED FINISHED LEVELS |
| 45.850(a) | EXISTING LEVELS |

No works shall commence within the existing public highway until the Agreement is signed

No works shall commence within the existing public highway until the Agreement is signed

- o Any soft spots within the proposed highway shall be dug out and the void backfilled in layers up to formation level with selected granular material as directed and to the satisfaction of the Highway Inspector.
- o All fill material up to foundation level of the proposed highway(s) to be approved and compacted in layers as directed and to the satisfaction of the Highway Inspector.
- o Any damage caused to the existing highway during the course of the works to be repaired as directed and to the satisfaction of the Highway Inspector and/or Area Engineer.
- o Continuity of access to occupied areas to be maintained to satisfaction of Highway Inspector, Area Engineer and/or Local Authority.
- o Any unblended/redundant pipes and chambers that fall within the proposed highway shall be grubbed up and the void backfilled in layers up to formation level of the carriageway with selected granular material or permanently filled concrete (or similar) fields.
- o All redundant connections in existing manholes/chambers that are affected by the works shall be sealed and the benching made good as directed and to the satisfaction of the Highway Inspector and/or Local Authority.
- o Any existing live drains, sewers, ducts, cables, etc. that will pass under the proposed highway shall be surveyed, probed, traced, rodged, CCTV, etc. to ascertain their structural condition and suitability to fall within the new highway. If deemed necessary, special protection and/or replacement may be required and to the satisfaction of the Highway Inspector, Area Engineer and/or Local Authority.
- o Any existing live manholes, chambers, boxes, etc. that will be located within the proposed highway shall be surveyed to ascertain their structural condition and suitability to fall within the new highway. If deemed necessary, special protection and/or replacement may be required as directed and to the satisfaction of the Highway Inspector, Area Engineer and/or Local Authority provided.
- o Developer/Contractor to provide suitable and effective wheel washing facilities to prevent mud from being conveyed onto the public highway and to provide a means to clean the highway to the satisfaction of the Highway Inspector, Area Engineer and/or Local Authority.
- o All concrete to be poured or laid at temperatures below 20deg C in a falling mass/min thermometer or before the temperature reaches 20deg C in a rising mass/min thermometer (to be provided by the Contractor and displayed in a position agreed by the Highway Inspector).
- o All road signs and markings to comply with the Traffic Signs Manual.
- o All road markings to be thermoplastic.
- o Contractor to comply with Chapter 8 of the Traffic Signs Manual.
- o Refer to WSSCC 2178 Highway Agreement Standard Details drawings 20-21 and revisions thereof.
- o All adopted highway works to be carried out in accordance with the OTF Specification of Highway Works or as amended by the West Sussex County Council Standard Details (2015) - both available on the Internet."

DESIGN NOTES

1. CONTRACTOR TO ESTABLISH LOCATIONS OF ALL EXISTING SERVICES PRIOR TO COMMENCING. STATS DIVERSIONS TO BE CO-ORDINATED BY OTHERS WHERE NECESSARY.
2. EXISTING TREES TO BE PROTECTED WHERE EXCAVATIONS RUN CLOSE.
3. REFER TO DRAWING 5103 & 5104 FOR EXTERNAL WORKS DETAILS.
4. CBR TESTS TO BE TAKEN ON SITE TO CONFIRM PROPOSED CARRIAGEWAY CONSTRUCTION.
5. RAISED DPC TO BE INSTALLED WHERE PROPOSED EXTERNAL GROUND LEVELS ARE HIGHER THAN 150MM BELOW DPC.
6. ADAPTABLE CARRIAGEWAY CONSTRUCTION SUBJECT TO APPROVAL BY WSCC COUNTY COUNCIL HIGHWAYS.

P3	13.07.18	Treatment of existing ditches shown	MR	SDL
P3	05.07.18	PRELIMINARY ISSUE	MR	SDL
P2	23.05.18	Road levels updated to suit drainage	MR	SDL
P1	04.05.18	INITIAL ISSUE FOR COMMENT	MR	SDL
REV	DATE	DESCRIPTION	BY	CHK/APR

Gyoury Self
CONSULTING ENGINEERS

16/17 BOUNDARY ROAD, HOVE
EAST SUSSEX BN3 4EF
TELEPHONE 01273 414413
E-MAIL: mail@gyosphove.co.uk
Website: www.gyoursself.com
Also at Fareham and St Albans

CURRNT	WATES CONSTRUCTION
--------	--------------------

ARCHITECT RHP

JOB TITLE	YARTON ROAD
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BARNHAM
WEST SUSSEX

WEST SUSSEX

EXTERNAL WORK
SHEET 1 OF 2

SHEET 1 OF 2

JOB No.	SCALE @ 10	DATE
H19377	1/200	M

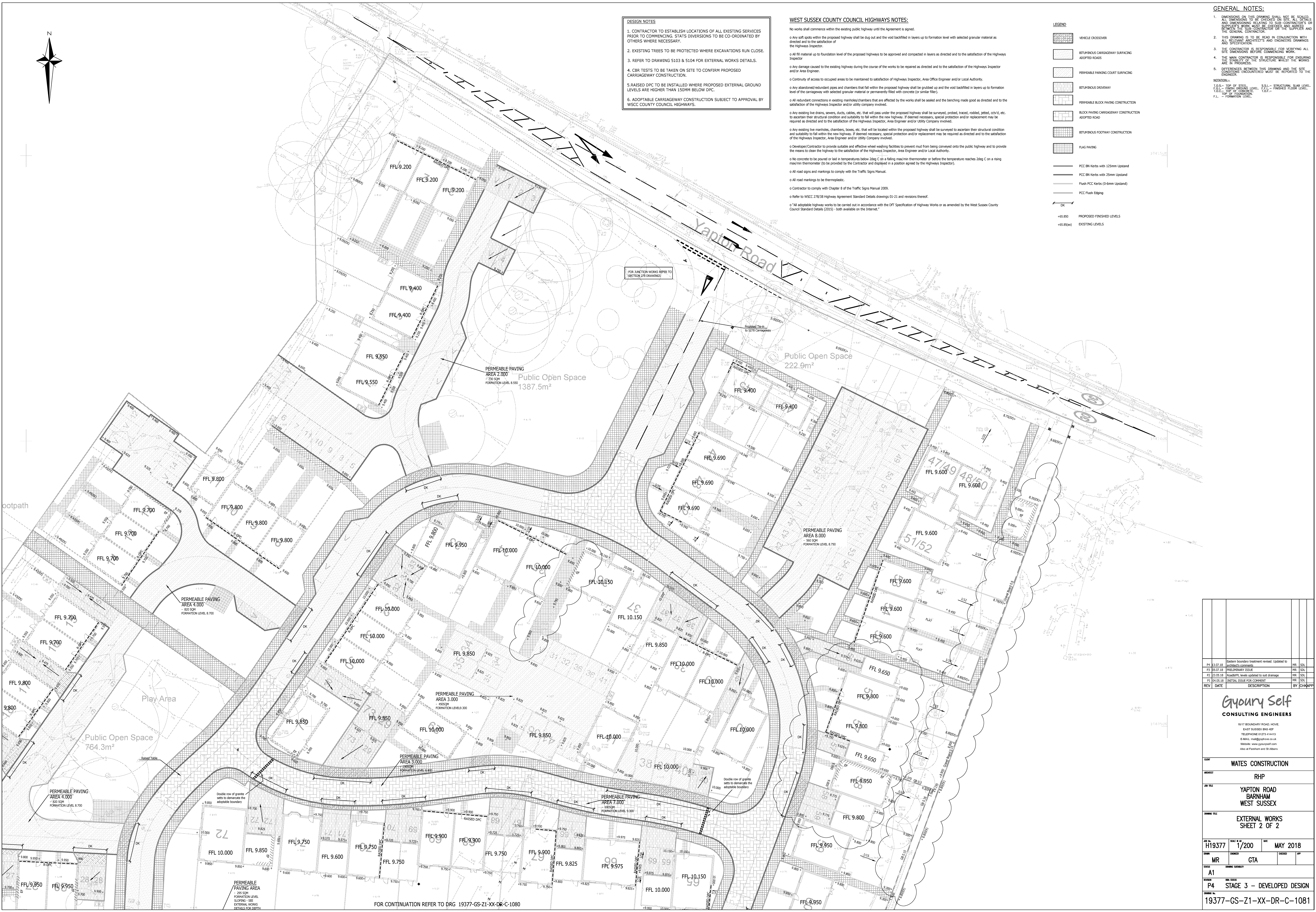
ORIGIN	ENGINEER
MR	CTA

STATUS	DORMING SUSTAINABILITY
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AI	
REASON	REMARKS

P4	STAGE 3 - DEVELOP
FORMING to	

19377-GS-Z1-XX-DR



1. CONTRACTOR TO ESTABLISH LOCATIONS OF ALL EXISTING SERVICES PRIOR TO COMMENCING. STATS DIVERSIONS TO BE CO-ORDINATED BY OTHERS WHERE NECESSARY.
2. EXISTING TREES TO BE PROTECTED WHERE EXCAVATIONS RUN CLOSE.
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6. ADAPTABLE CARRIAGEWAY CONSTRUCTION SUBJECT TO APPROVAL BY WSCC COUNTY COUNCIL HIGHWAYS.

- No works shall commence within the existing public highway until the Agreement is signed.
- Any dry spots within the proposed highway shall be dug out and the void backfilled in layers up to formation level with selected granular material as directed and to the satisfaction of the Highways Inspector.
- A fill material up to foundation level of the proposed highway will be approved and compacted in layers as directed and to the satisfaction of the Highways Inspector.
- Any damage caused to the existing highway during the course of the works to be repaired as directed and to the satisfaction of the Highways Inspector and/or Area Engineer.
- Continuity of access to occupied areas to be maintained to satisfaction of Highways Inspector, Area Office Engineer and/or Local Authority.
- Any abandoned/redundant pipes and chambers that fall within the proposed highway shall be sealed up and the void backfilled in layers up to formation level of the carriageway with selected granular material or permanently filled with concrete (or similar) as directed.
- A dry redundant (concrete) in existing manholes/chambers that are affected by the works shall be sealed and the benching made good as directed and to the satisfaction of the Highways Inspector and/or utility company involved.
- Any existing live drains, sewers, ducts, cables, etc. that will pass under the proposed highway shall be surveyed, probed, traced, noted, etc., as directed, and to the satisfaction of the Highways Inspector, Area Engineer and/or Utility Company involved.
- Any existing live manholes, chambers, boxes, etc. that will be located within the proposed highway shall be surveyed to ascertain their structural condition and suitability for the proposed new highway. If deemed necessary, special protection and/or replacement may be required as directed and to the satisfaction of the Highways Inspector, Area Engineer and/or Utility Company involved.
- Any existing live manholes, chambers, boxes, etc. that will be located within the proposed highway shall be surveyed to ascertain their structural condition and suitability for all new highways. If deemed necessary, special protection and/or replacement may be required as directed and to the satisfaction of the Highways Inspector, Area Engineer and/or Utility Company involved.
- Developers/Contractor to provide suitable and effective wheel washing facilities to prevent mud from being conveyed onto the public highway and to provide the means to clean the highway to the satisfaction of the Highways Inspector, Area Engineer and/or Local Authority.
- No concrete to be poured or laid at temperatures below 20deg C or a falling max/min thermometer or before the temperature reaches 2deg C or a rising max/min thermometer (to be provided by the Contractor and displayed in a position agreed by the Highways Inspector).
- All road signs and markings to comply with the Traffic Signs Manual.
- All road markings to be thermoplastic.
- Contractor to comply with Chapter 8 of the Traffic Signs Manual 2009.
- Refer to WSCC 738/38 Highway Agreement, Standard Details drawings 01-21 and revisions thereof.
- A 740 approved highway works to be carried out in accordance with the DfT Specification of Highway Works or as amended by the West Sussex County Council Standard details (2013) - both available on the internet."

Figure 1 illustrates the proposed road layout and levels. The plan view shows a road layout with various materials and a cross-section view showing levels.

Legend:

- VEHICLE CROSSOVER
- BITUMINOUS CARREGAWAY SURFACING
- PERMEABLE PARKING COURT SURFACING
- BITUMINOUS DRIVEWAY
- PERMEABLE BLOCK PAVING CONSTRUCTION
- BLOCK PAVING CARREGAWAY CONSTRUCTION
- ADOPTED ROAD
- BITUMINOUS FOOTWAY CONSTRUCTION
- FLAG PAVING
- PCC ON Kerbs with 125mm Upstand
- PCC ON Kerbs with 25mm Upstand
- Flush PCC Kerbs (0-6mm Upstand)
- PCC Flush Edging

Levels:

- PROPOSED FINISHED LEVELS
- EXISTING LEVELS

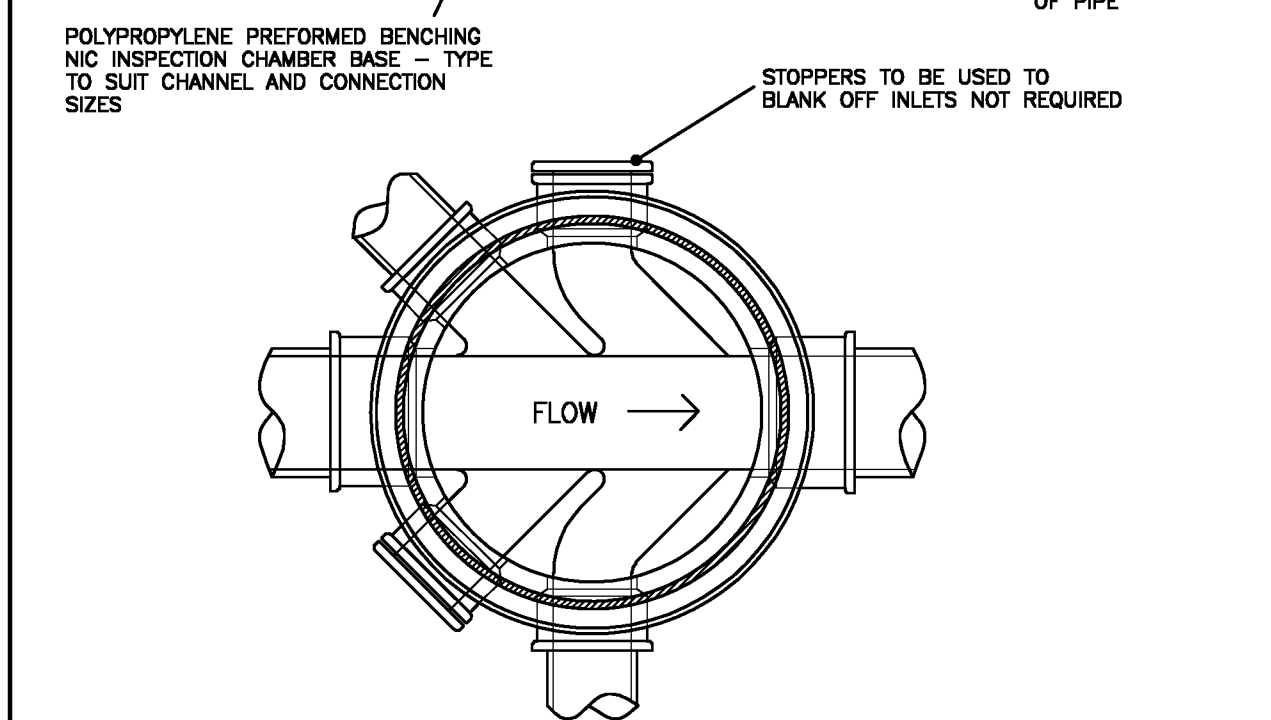
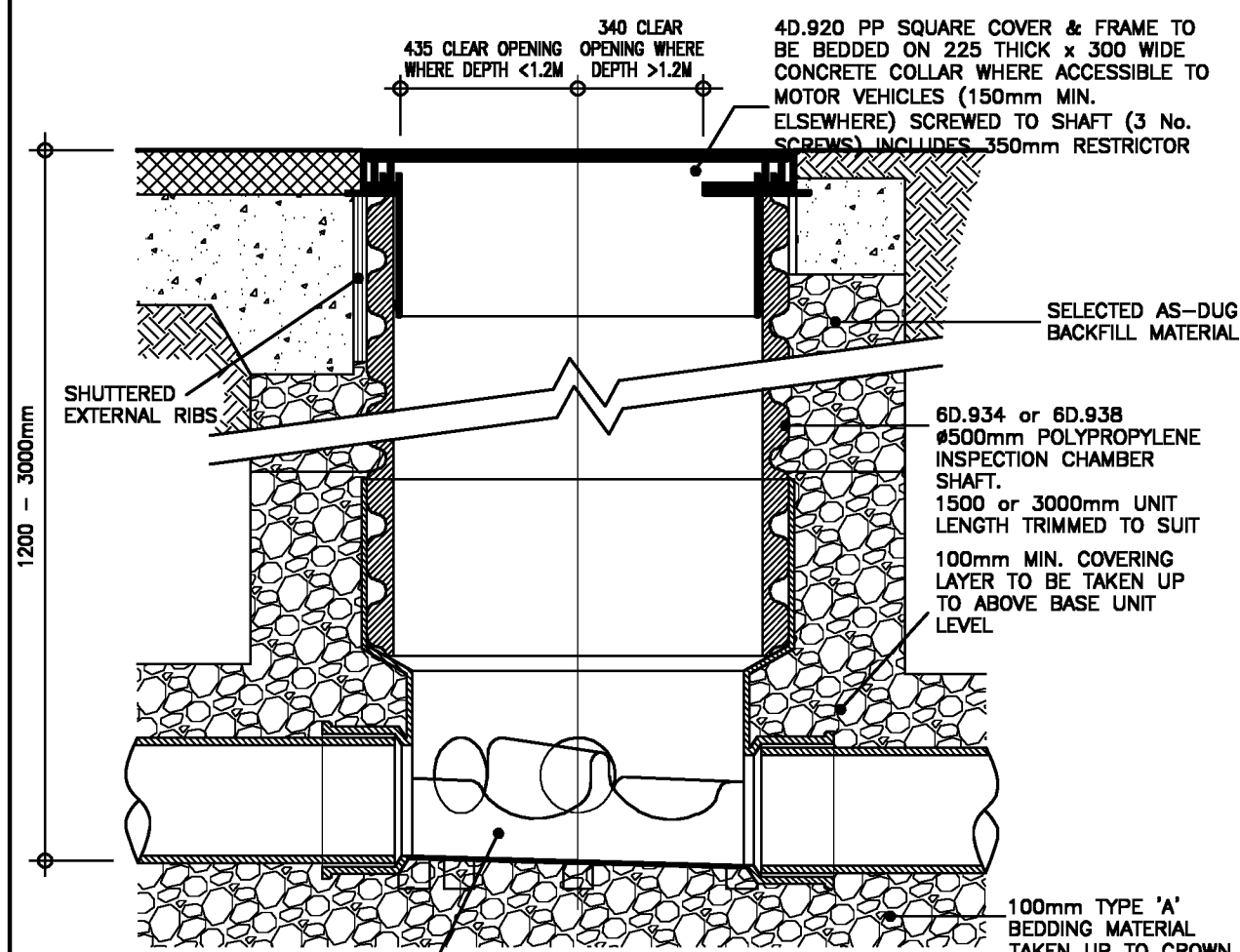
The cross-section view shows the road layout with various materials and levels. The levels are indicated by a vertical scale on the right side of the cross-section, ranging from -65.850 to -66.850m.

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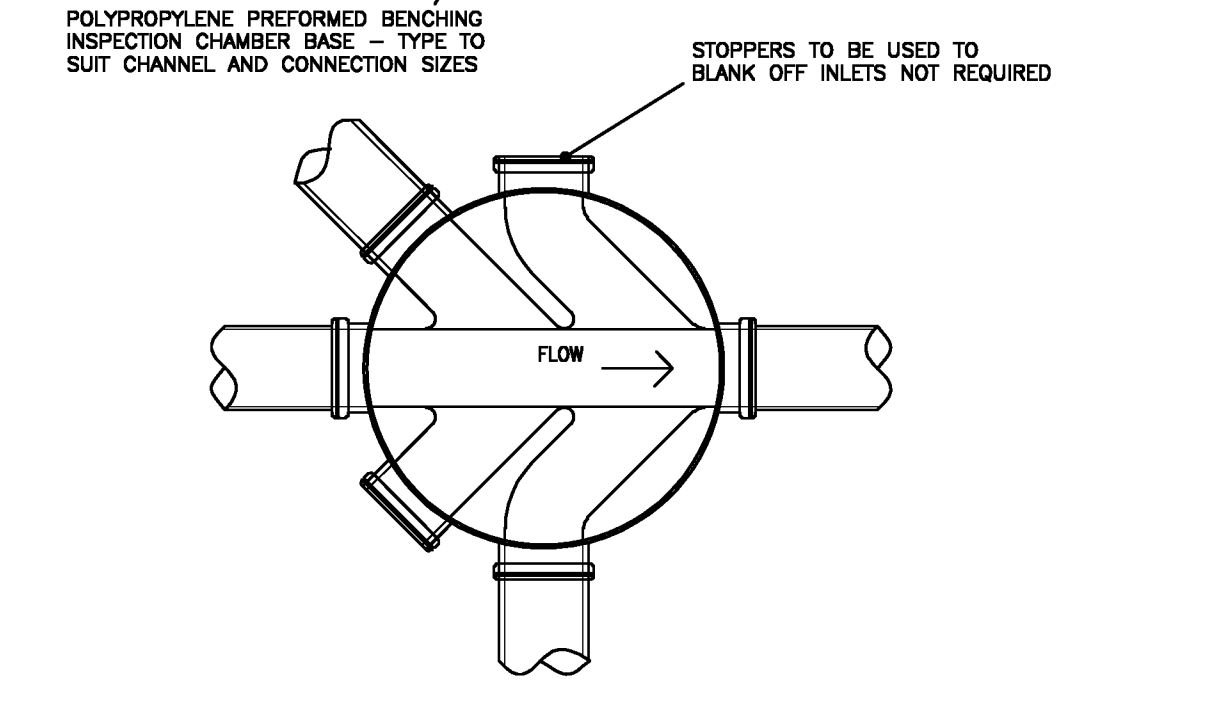
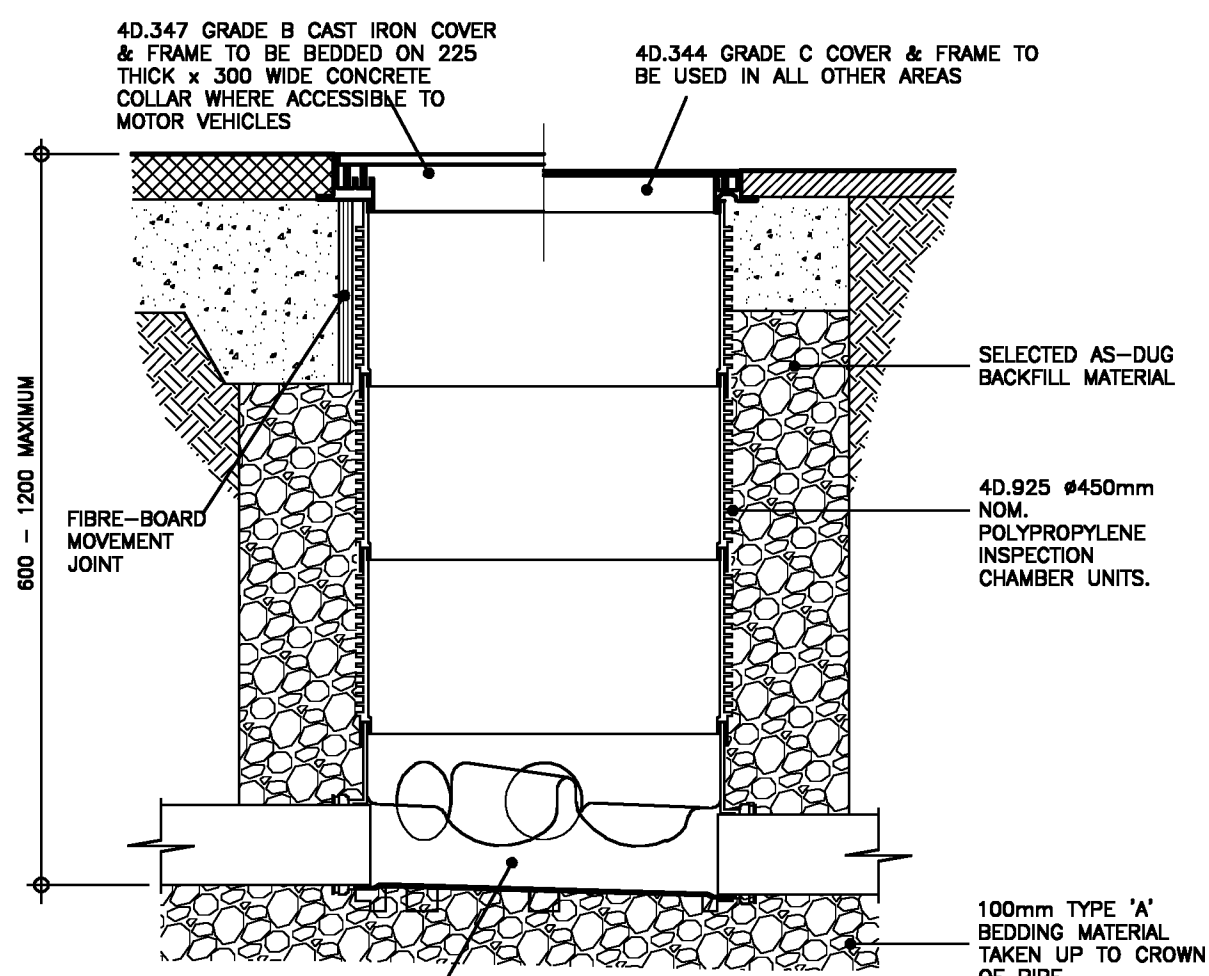
NOTATION:-

T.O.S - TOP OF STEEL	S.S.L - STRUCTURAL SLAB LEVEL
F.F.L - FINISH GRADE LEVEL	F.F.L - FINISHED FLOOR LEVEL
P.L - FORMAL LEVEL	P.L - FORMAL LEVEL
T.P. - TOP OF FOUNDATION	T.P. - TOP OF FOUNDATION

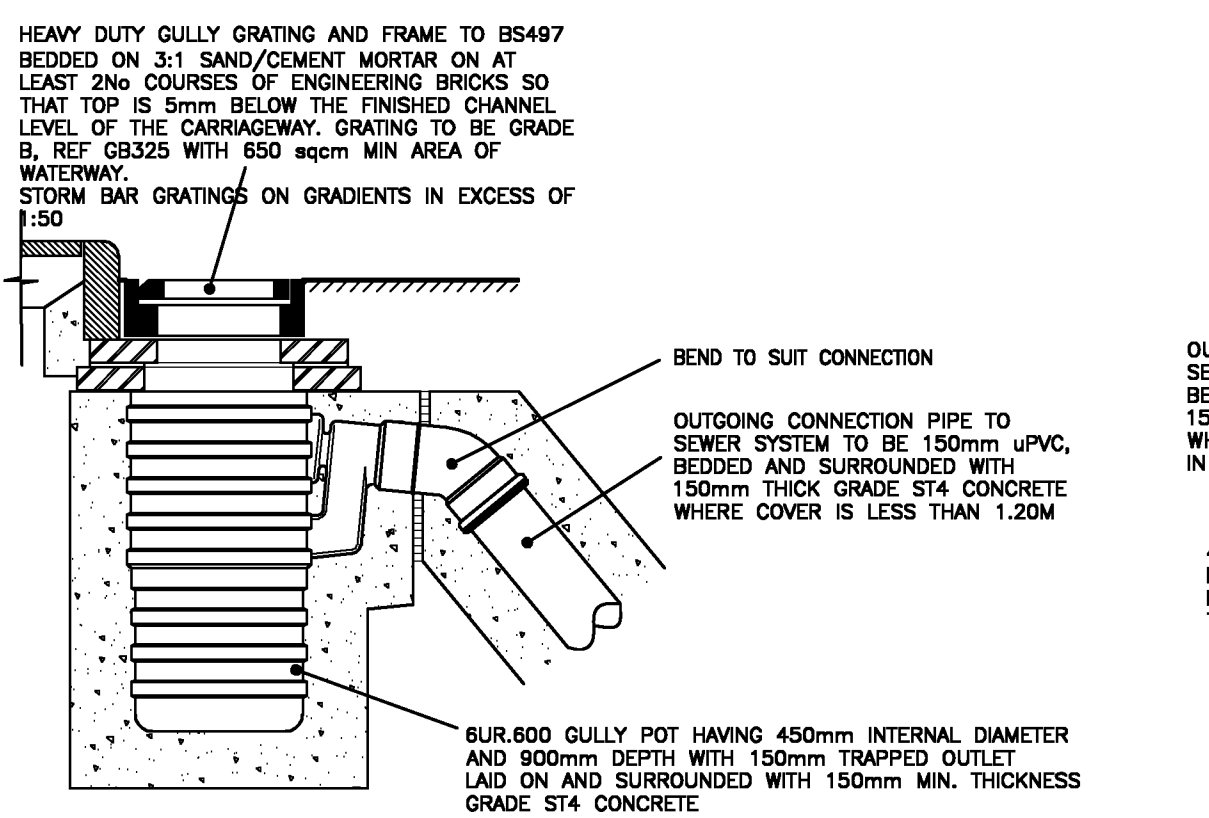
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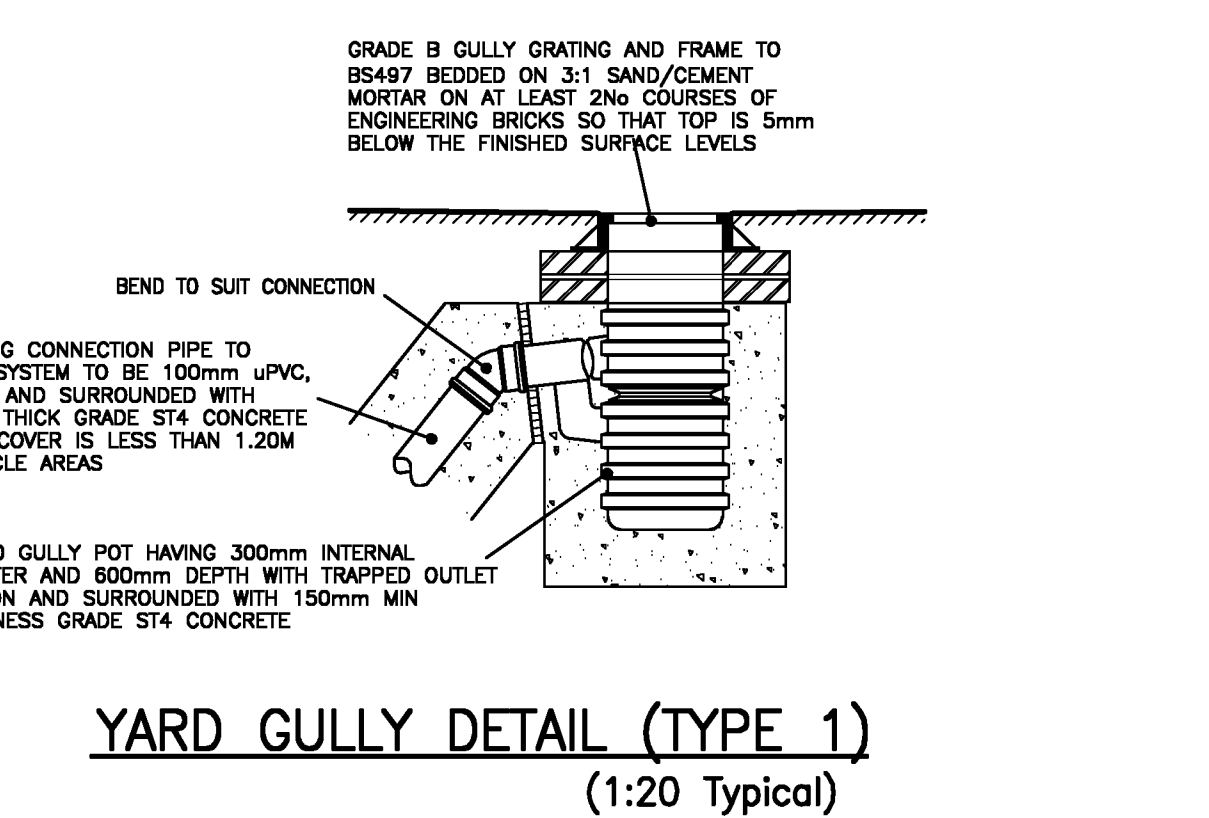
TYPICAL 'NON ENTRY' TYPE INSPECTION CHAMBER (1:10 typical)



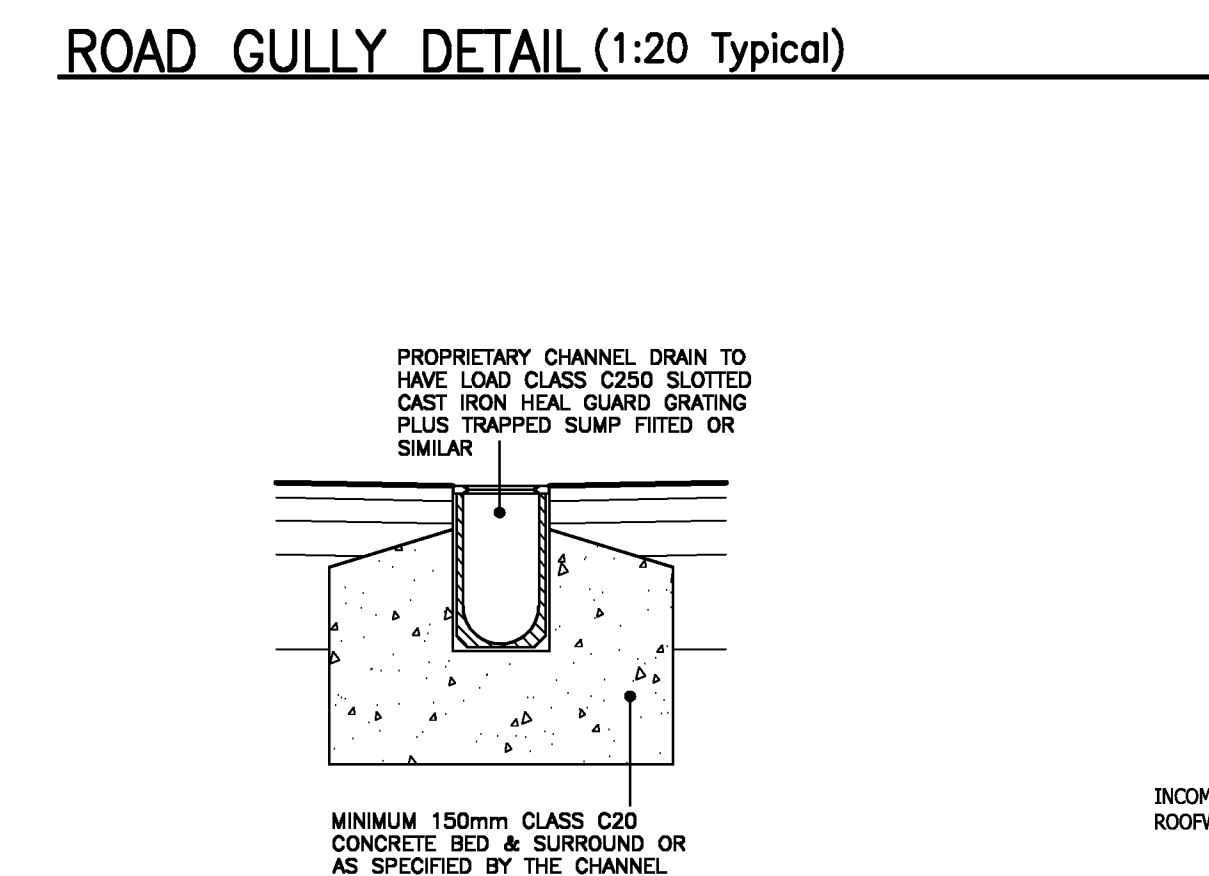
TYPICAL 'BIN' TYPE INSPECTION CHAMBER - TYPE (1:10 typical)



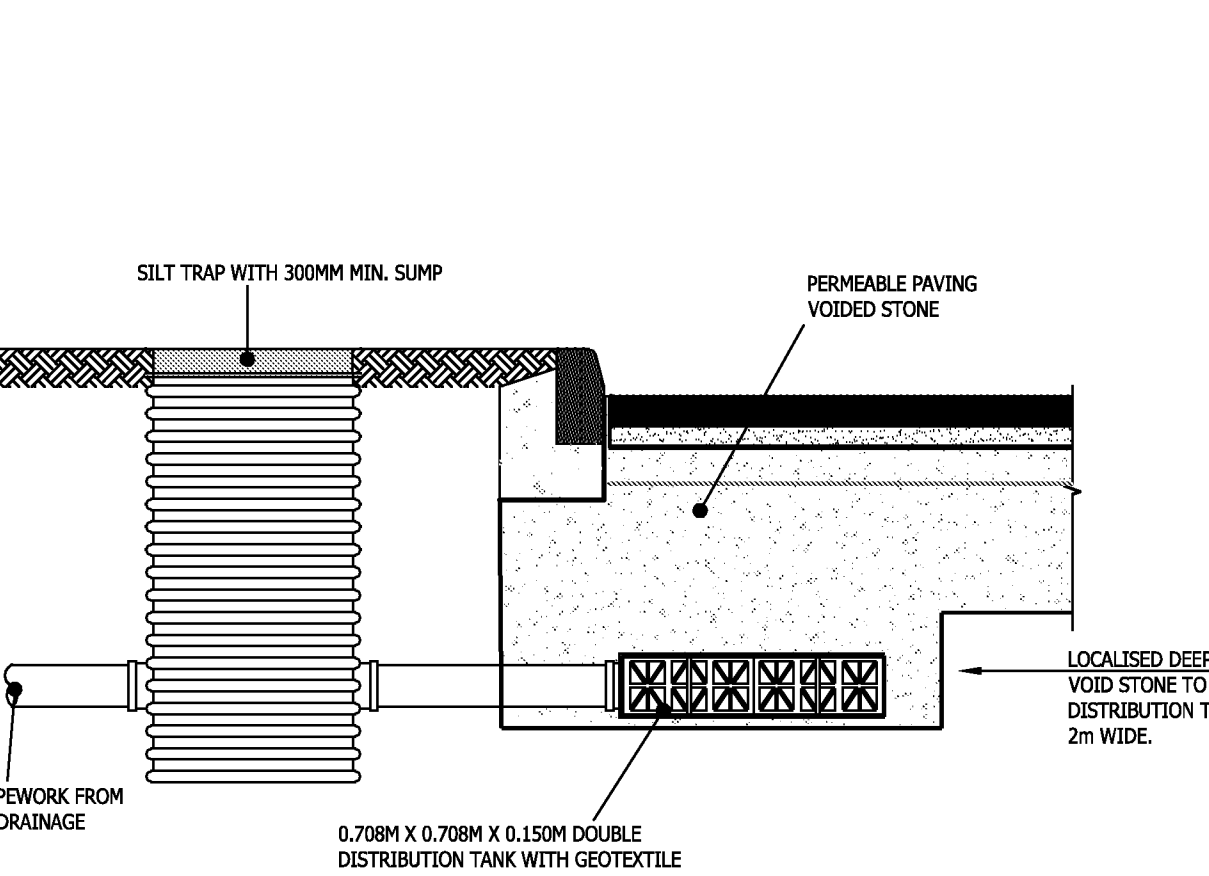
ROAD GULLY DETAIL (1:20 Typical)



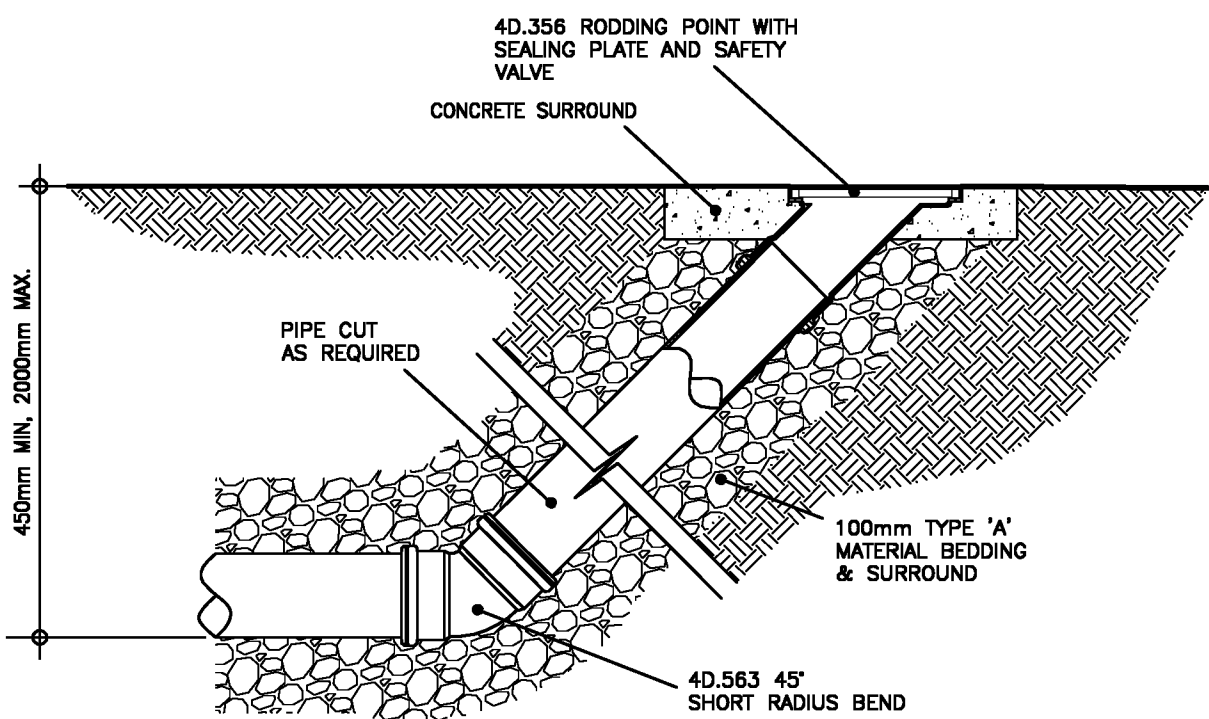
YARD GULLY DETAIL (TYPE 1) (1:20 Typical)



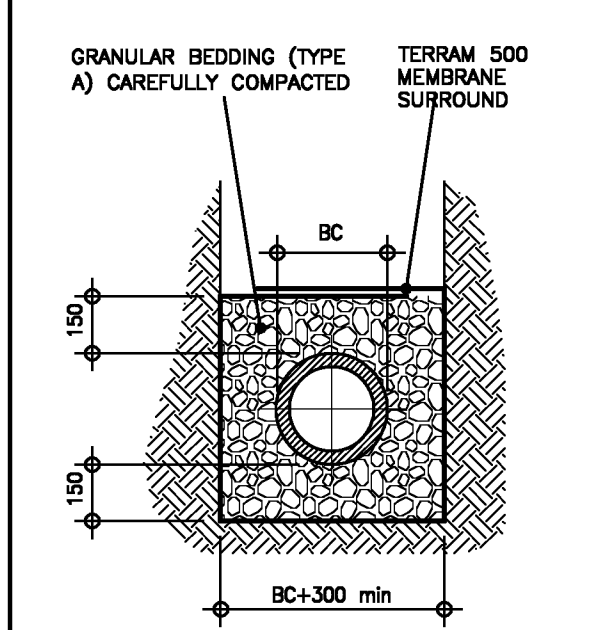
CHANNEL DRAIN DETAIL (1:10 typical)



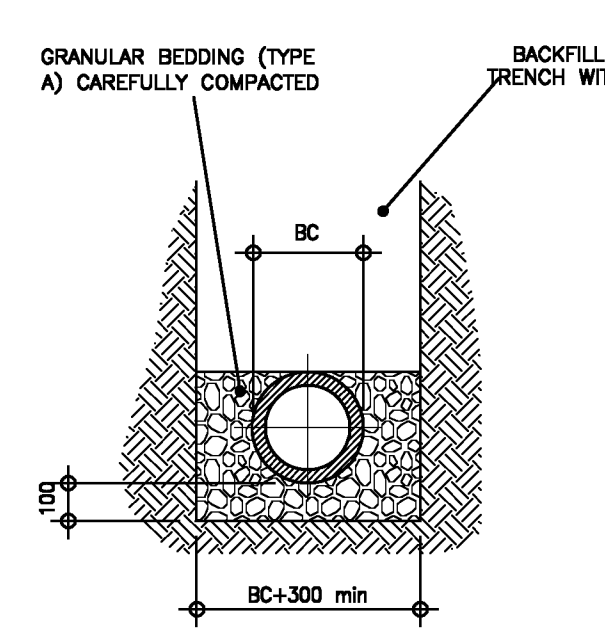
TYPICAL POROUS INLET DETAIL (MARKED DT ON LAYOUT)



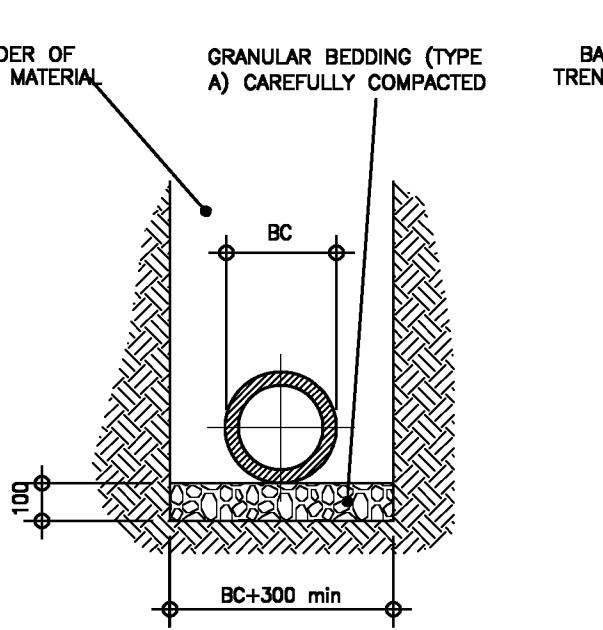
TYPICAL RODDING POINT DETAIL (1:10 typical)



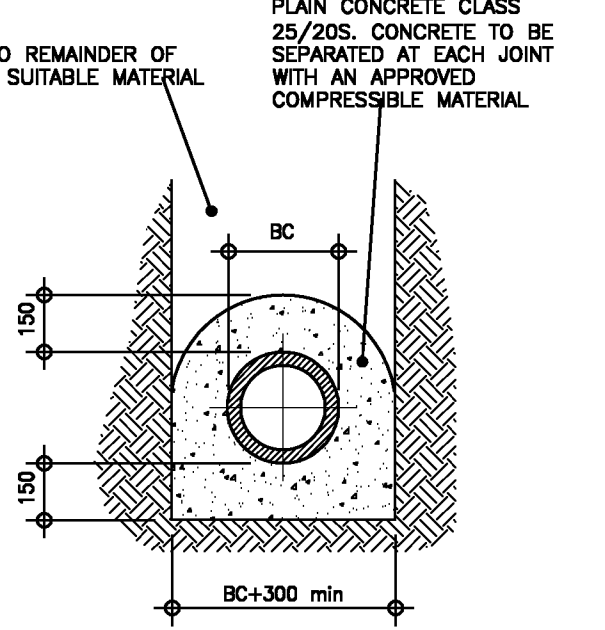
GRANULAR SURROUND



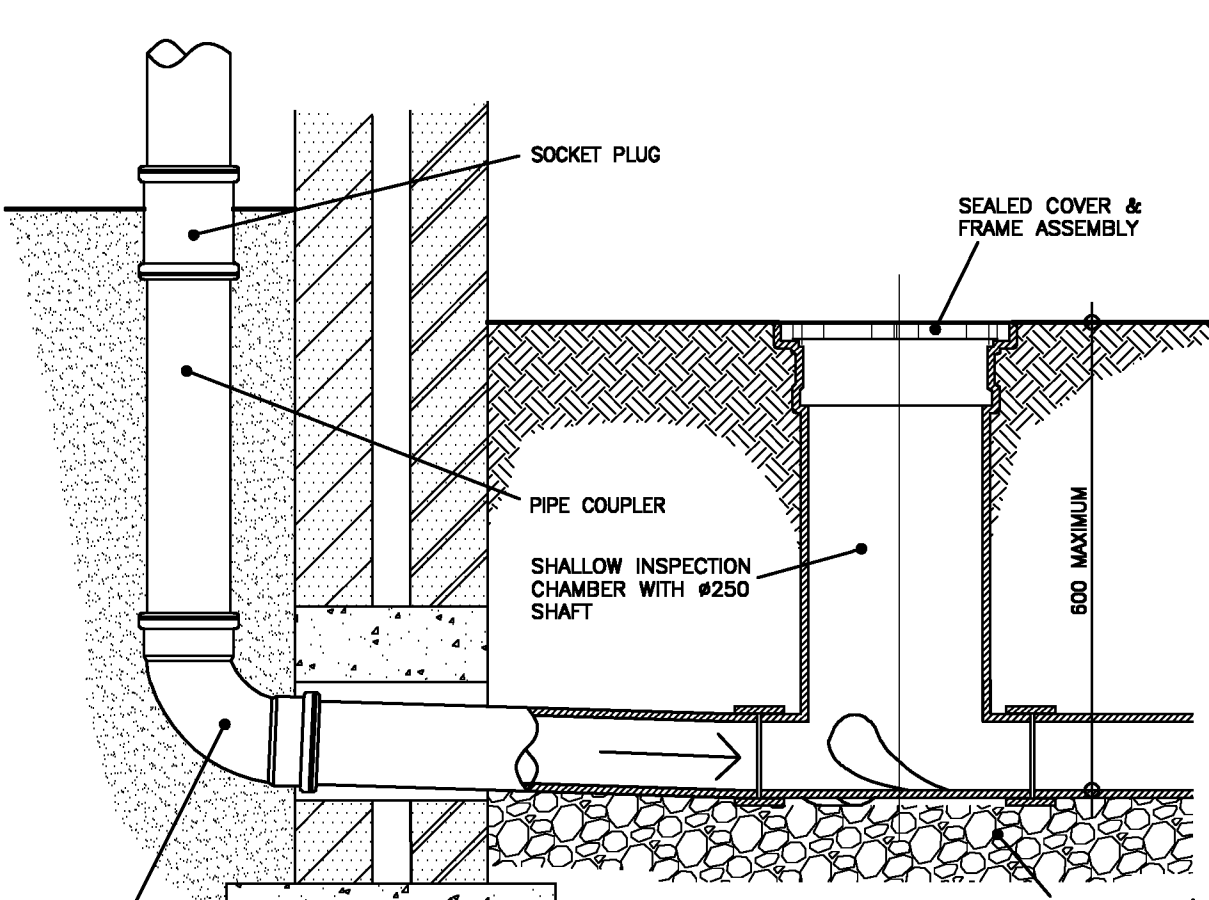
GRANULAR SIDE FILL



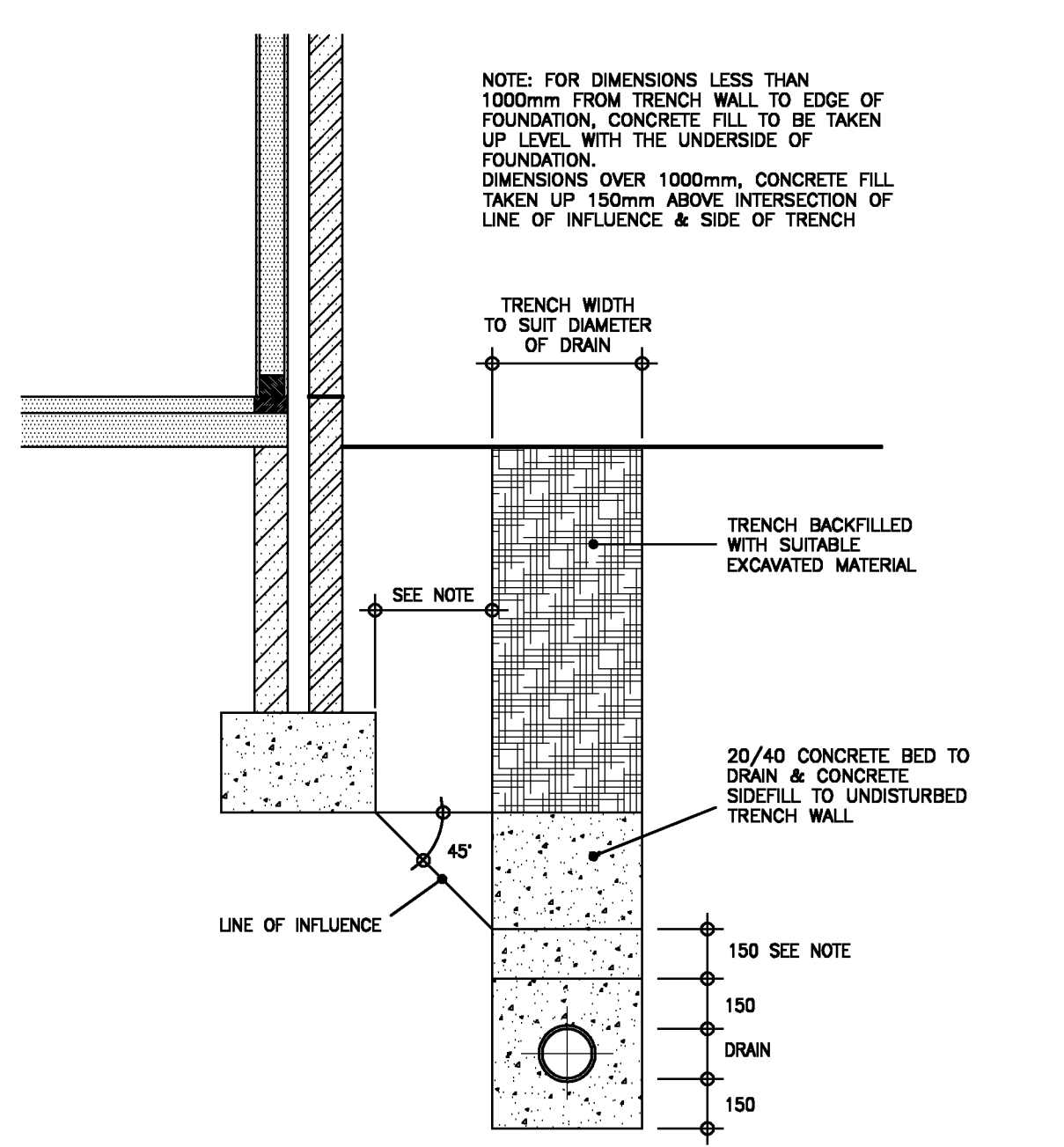
GRANULAR BED



CONCRETE SURROUND



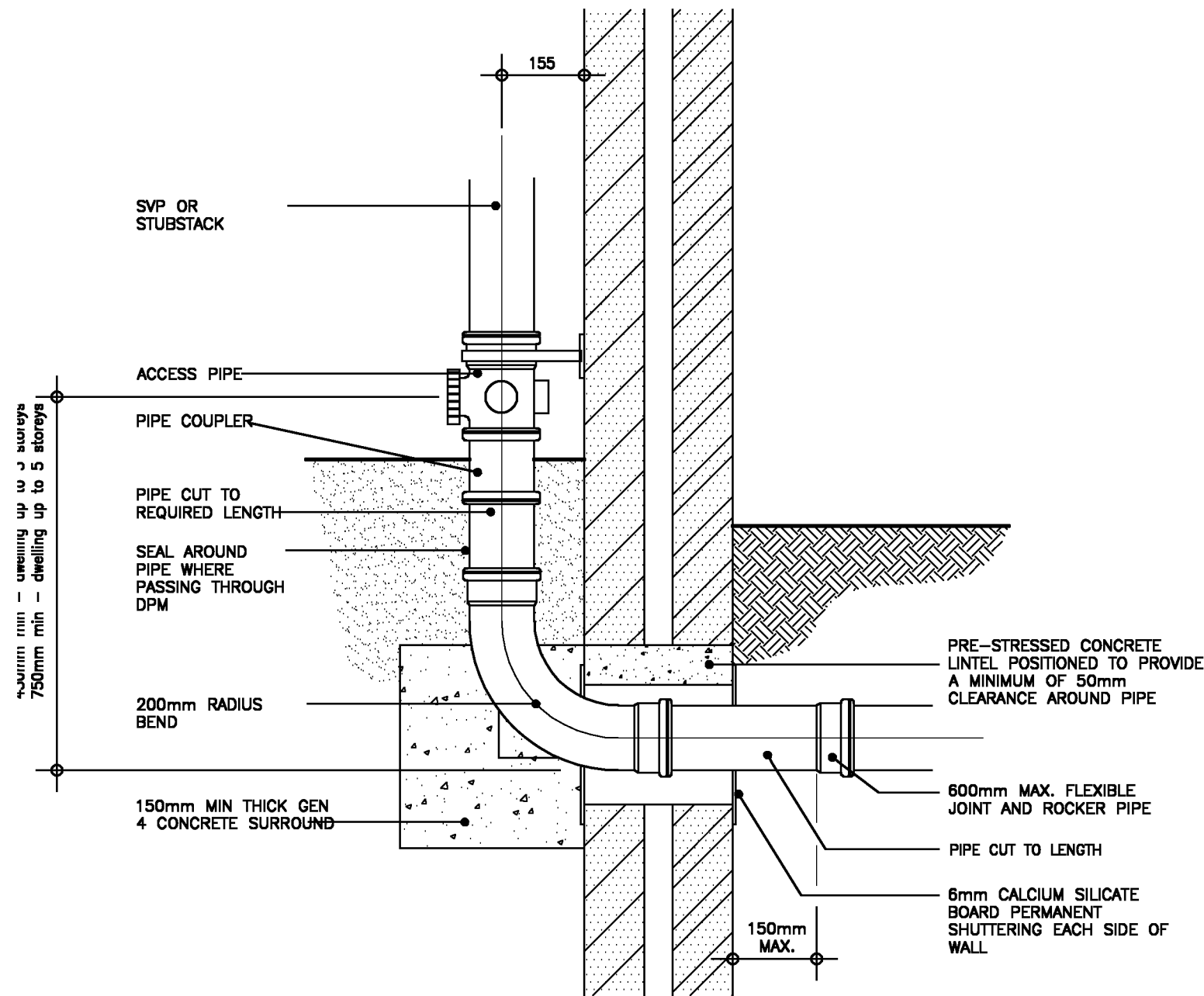
TYPICAL TYPE 'X' SHALLOW ACCESS INSPECTION CHAMBER (1:10 typical)



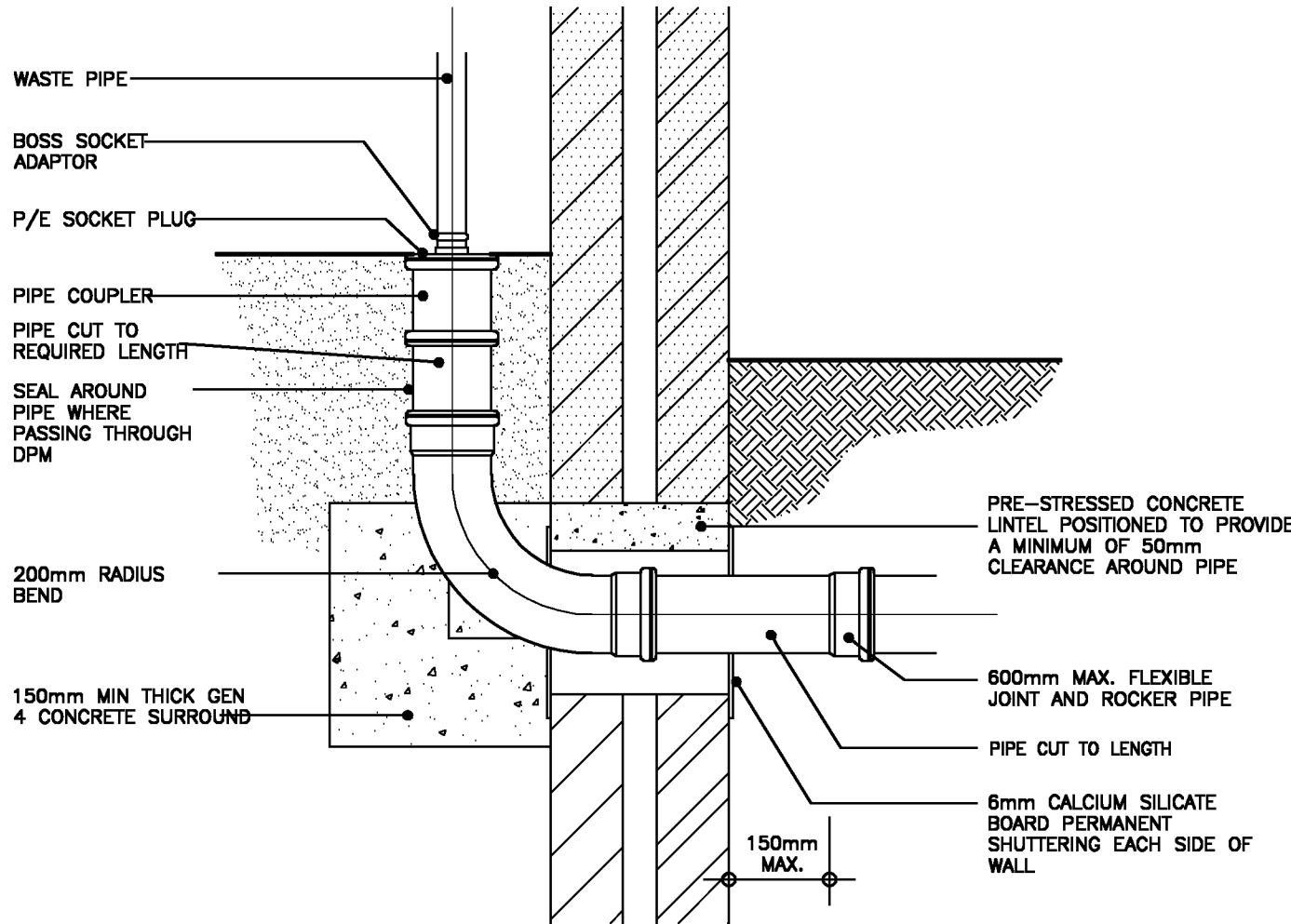
CONCRETE BACKFILL IN TRENCHES ADJACENT TO FOUNDATIONS (1:20 typical)

- GENERAL NOTES:**
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 2. This drawing is to be read in conjunction with all relevant architects, services and engineers drawings and specifications.
 3. The location, size, depth and identification of existing services that may be shown or referred to on this drawing have been assessed from non intrusive observations, record drawings or the like. The contractor shall safely carry out intrusive investigations, trial holes or soundings prior to commencing work to satisfy himself that it is safe to proceed and that the assessments are accurate. Any discrepancies shall be notified to gap prior to works commencing.
 4. Tender or billing drawings shall not be used for construction or the ordering of materials.
 5. Do not scale. All dimensions and levels to be site confirmed.
 6. Copyright : This drawing must not be copied, amended nor reproduced without the prior written agreement of gap.

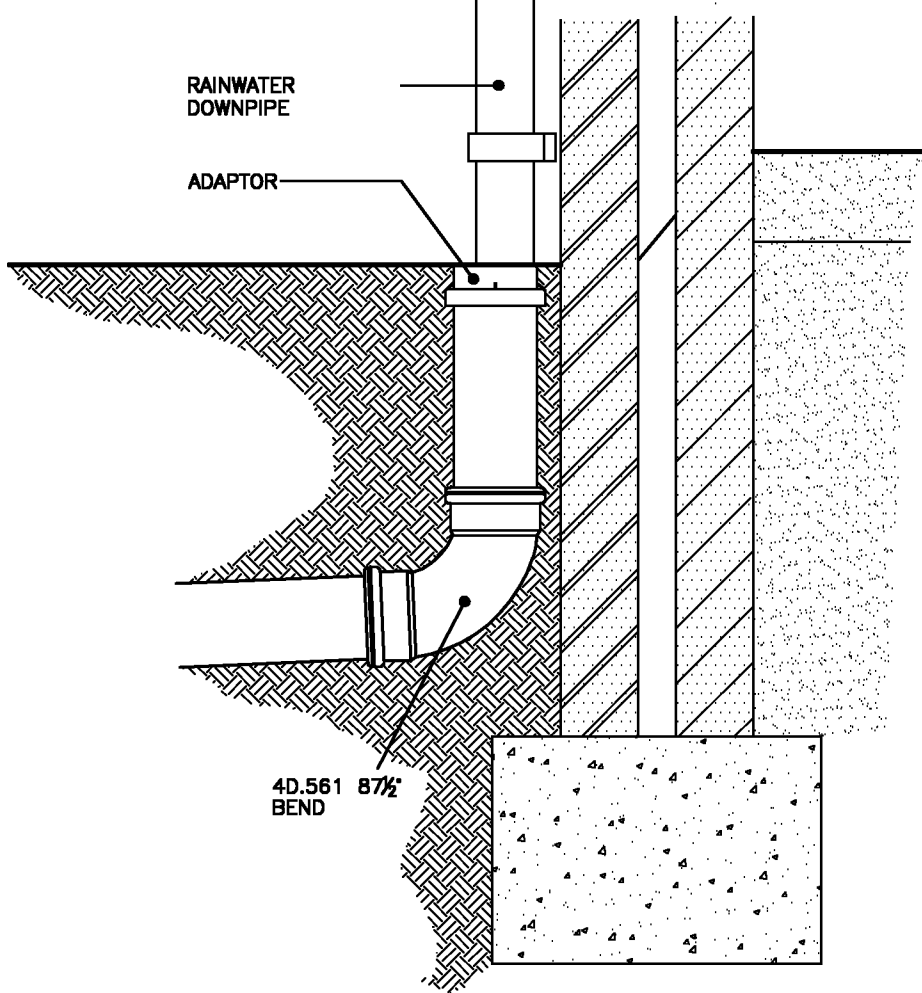
WORK IN PROGRESS			
REV	DATE	DESCRIPTION	BY
Gyoury Self CONSULTING ENGINEERS 18/17 BOUNDARY ROAD, HOVE, EAST SUSSEX BN3 4EF TELEPHONE 01273 414413 E-MAIL: mail@gyouryself.co.uk Website: www.gyouryself.com Also at Fareham and St Albans			
CLIENT: WATES			
ARCHITECT: RH PARTNERSHIP			
JOB TITLE: YAPTON ROAD BARNHAM WEST SUSSEX			
DRAWING TITLE: PRIVATE DRAINAGE CONSTRUCTION DETAILS SHEET 1 OF 2			
JOB No: H19377	SCALE @ A1: NTS	DATE: JULY 2018	
DRAWN: GS	ENGINEER: M ROBERTS	CHECKED: 	APP:
STATUS: WIP			
REVISION: STAGE 3 - DEVELOPED DESIGN			
DRAWING No: 19377-GS-Z1-XX-DR-C-5101			



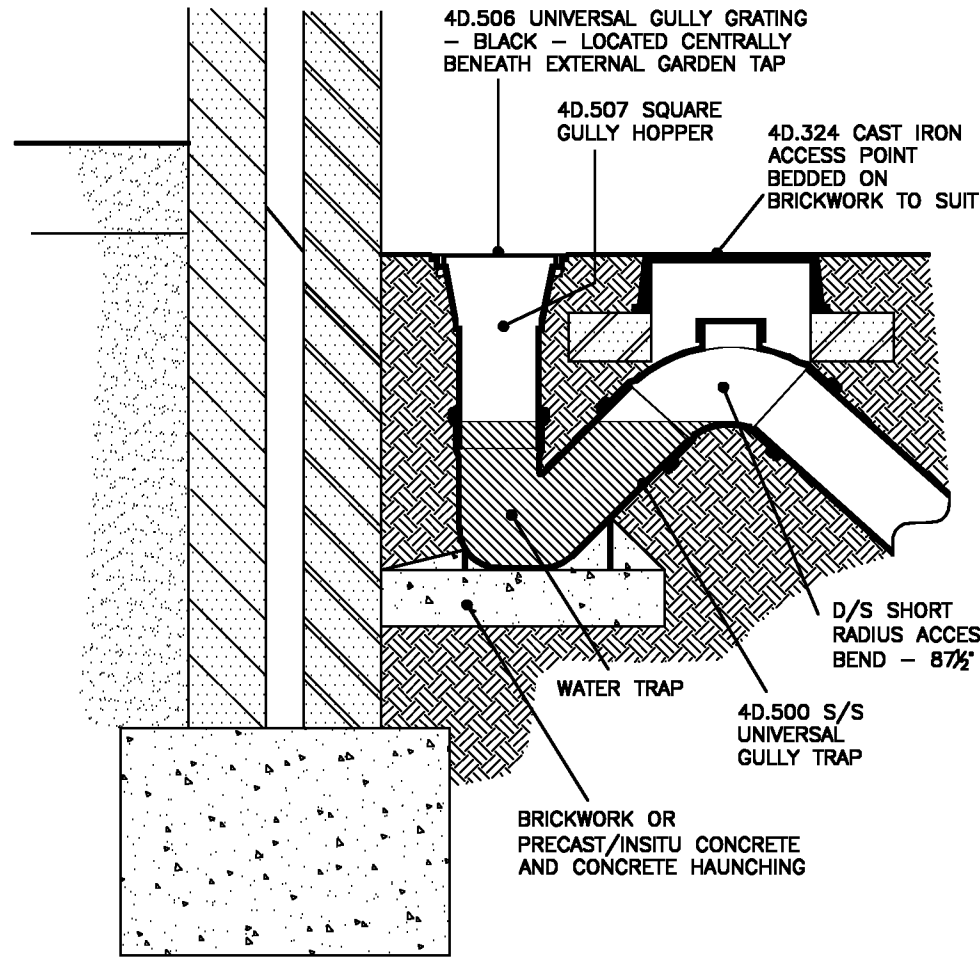
INTERNAL SVP/SS OUTLET
(1:10 typical)



INTERNAL FLOOR OUTLET
(1:10 typical)



EXTERNAL RAINWATER DOWNPIPE
TO DRAIN (1:10 typical)



EXTERNAL TAP GULLY(1:10 typical)

GENERAL NOTES:

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WORK IN PROGRESS

REV	DATE	DESCRIPTION	BY	CHK	APP
-----	------	-------------	----	-----	-----

Gyoury Self
CONSULTING ENGINEERS

18/17 BOUNDARY ROAD, HOVE,
EAST SUSSEX BN2 4EF
TELEPHONE 01273 414413
E-MAIL: mail@gyouryself.co.uk
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CLIENT
WATES

ARCHITECT
RH PARTNERSHIP

JOB TITLE
YAPTON ROAD
BARNHAM
WEST SUSSEX

DRAWING TITLE
PRIVATE DRAINAGE
CONSTRUCTION DETAILS

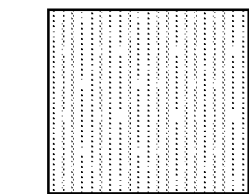
JOB No. H19377 SCALE @ A1 DATE JULY 2018

DRAWN GS ENGINEER M ROBERTS CHECKED APP

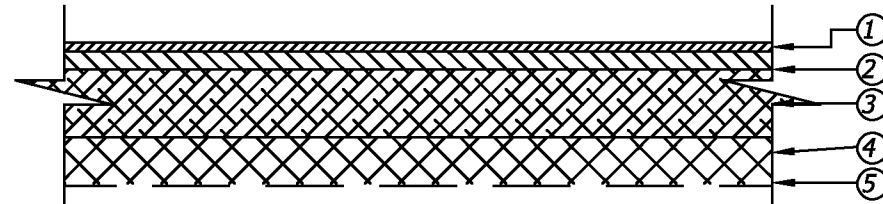
STATUS WIP DRAWING SUSTAINABILITY

REVISION 1 REA STATUS STAGE 3 - DEVELOPED DESIGN

DRAWING No. 19377-GS-Z1-XX-DR-C-5102

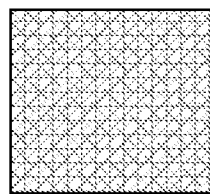


PRIVATE DRIVE

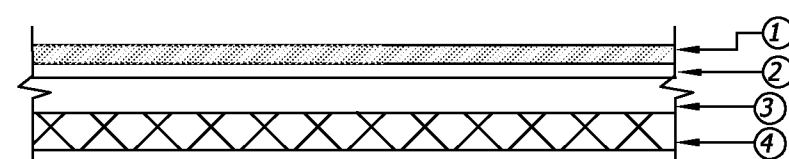


- 30mm Surface course Dense Asphalt Concrete (Aggregate 10mm nominal size) BSEN13108-1. 100-150 Pen
- 70mm Binder course, Dense Asphalt Concrete (Aggregate size nominal 20mm). BSEN13108-1. 40-60 Pen
- Sub-Base D.O.T. Type 1 material to Clause 803. See table opposite.
- Capping 6F2. Crushed concrete to Clause 802. See table opposite.
- Terram 1000 geotextile over formation.

CBR value to be tested on site and capping layer thickness agreed on site with engineer and shall be within the following ranges. Any soft spots or fill areas to be built up in 6F2:	Sub-Base	Capping
CBR <1.5%	Contact engineer for advice	350mm
CBR 1.5 to 2%	200mm	150mm
CBR 2% to 3%	150mm	-
CBR 4% to 5%	200mm	-
CBR >5%	150mm	-

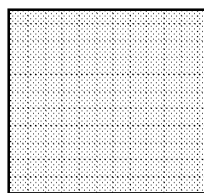


CROSSOVER CONSTRUCTION

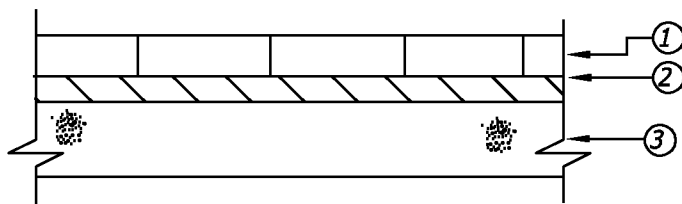


- 30mm Surface course, Dense Asphalt Concrete to BSEN13108-1. 100-150 Pen. PSV 55. AAV 14.
- 70mm Binder course, Dense Asphalt concrete to BSEN13108-1. 40-60 Pen
- 100mm Base, AC32 Dense Base Asphalt to BSEN13108-1. 40-60 Pen
- Sub-base/ capping as per table below

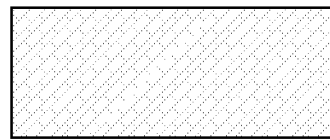
Subgrade CBR	Capping thickness(with 150mm sub-base)(mm) 6F2 Material	Type 1 Sub-base only thickness(mm)
Less than 1.5%	Contact engineer for advice	-
1.5 to 2%	600 (+150 sub-base)	N/A
2% to 5%	400 (+150 sub-base)	350
Greater than 5%	N/A	250



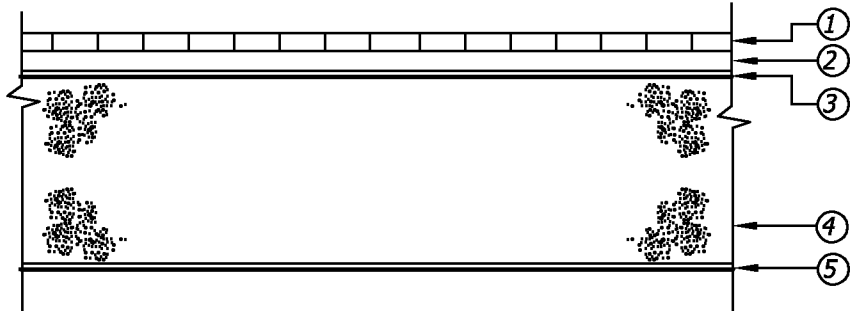
FLAG PAVING CONSTRUCTION



- 50mm thick, 600 x 600 PCC paving slabs as architect's specification
- 25mm Mortar bed, Class 1
- 150mm Sub-Base D.O.T. Type 1 material to Clause 803



CAR PARK PARKING/ PRIVATE ACCESS PERMEABLE BLOCK PAVING

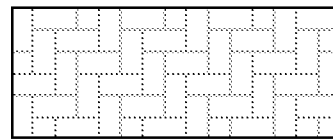


- 60mm thick Marshalls Priora Permeable paving blocks to architects colour spec
- 40mm thick 2-6.3mm laying coarse of clean angular hard stone no fines.
- Terram 1000 geotextile over compacted Sub-base
- Sub-base, 10-63mm clean angular hard stone no fines non-degradable aggregate material with very good compressive value and LA co-efficient (30% voids). Sub-base depth to be sized to 1 in 100 year storm + climate change. Formation level as per layout drawing.
- Marshalls MM380 Tanking Membrane

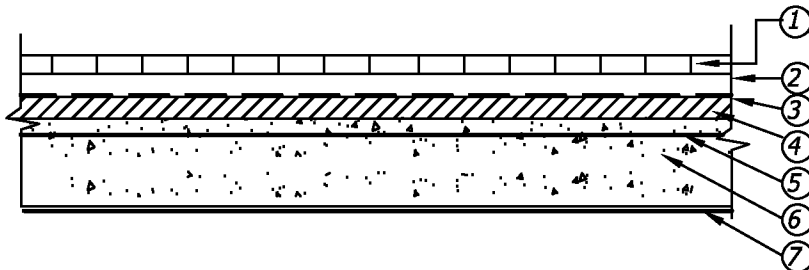
Capping Layer if required subject to confirmation of CBR's

Permeable stone specifications as BS 7533 part 13

Note: Permeable blocks to be laid in Herringbone pattern with double stretcher bond against kerblines.



PRIVATE SHARED SURFACE ACCESS PERMEABLE BLOCK PAVING

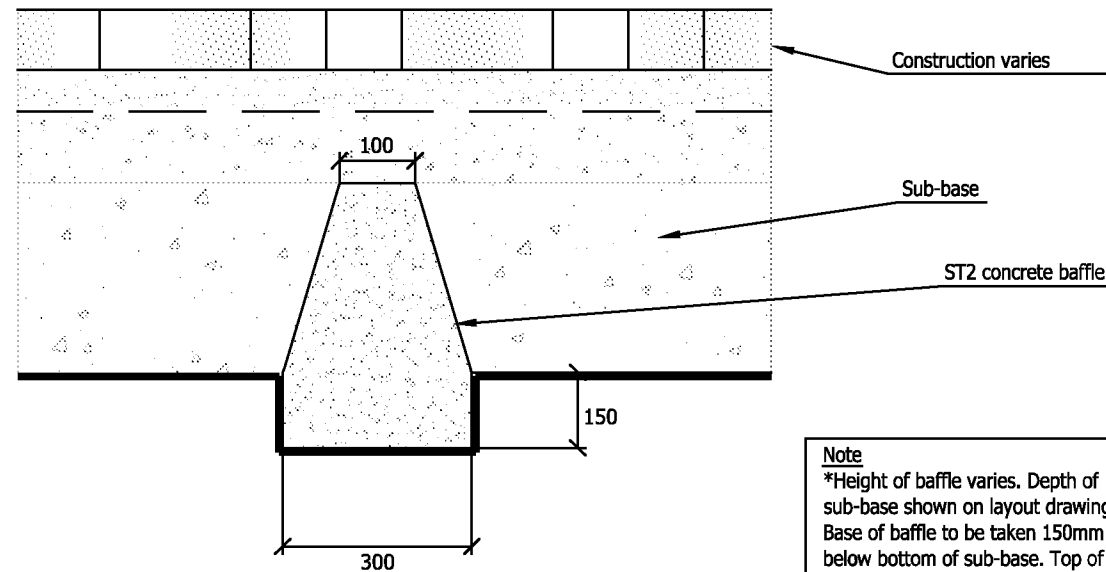


- 80mm thick Marshalls Priora Permeable paving blocks to architects colour spec or similar approved.
- 50mm thick 2-6.3mm laying coarse of clean angular hard stone no fines.
- Layer of Inbitex or similar approved.
- 130mm thick Base, Dense Asphalt Concrete, AC32 Dense Base, 125 Pen to BSEN13108-1. Perforated with 50mm dia. holes at 0.8m centres both ways and filled with 5mm size clean stone
- SC Intargrid or similar approved geotextile within compacted Sub-base. Min 50mm sub-base to be laid over intergrid before laying Base course.
- Sub-base, 10-63mm clean angular hard stone no fines non-degradable aggregate material with very good compressive value and LA co-efficient (30% voids). Sub-base depth to be sized to 1 in 100 year storm + climate change. Formation level as per layout drawing.
- Marshalls MM380 Tanking Membrane

Capping Layer if required subject to confirmation of CBR's

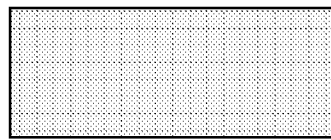
Permeable stone specifications as BS 7533 part 13

Note: Permeable blocks to be laid in Herringbone pattern with double stretcher bond against kerblines.

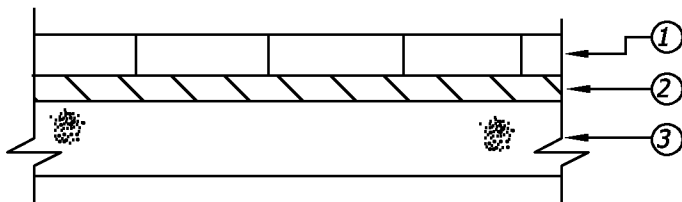


CONCRETE BAFFLE DETAIL

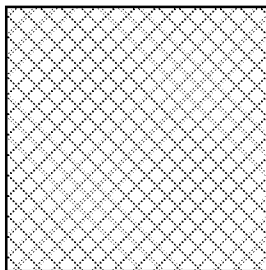
Note: Height of baffle varies. Depth of sub-base shown on layout drawing. Base of baffle to be taken 150mm below bottom of sub-base. Top of baffle to be 200mm below surface level.



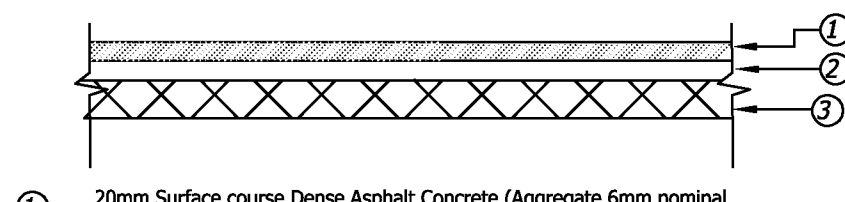
GARDEN CENTRE FRONT PAVING



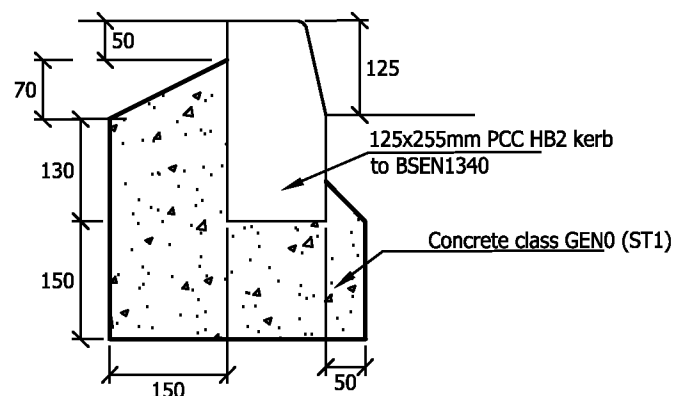
- Marshalls Tegula paving blocks, colour harvest buff to architects spec
- 30mm sand bed
- 150mm Sub-Base D.O.T. Type 1 material to Clause 803



FOOTWAY CONSTRUCTION

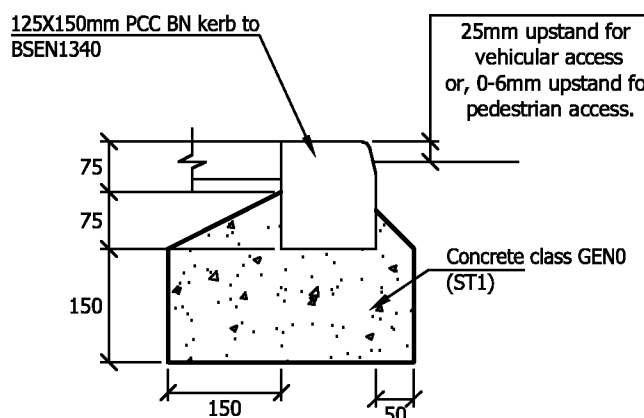


- 20mm Surface course Dense Asphalt Concrete (Aggregate 6mm nominal size) BSEN13108-1. 100-150 Pen
- 50mm Binder course, Dense Asphalt Concrete (Aggregate size nominal 20mm). BSEN13108-1. 40-60 Pen
- 100mm Sub-Base D.O.T. Type 1 material to Clause 803



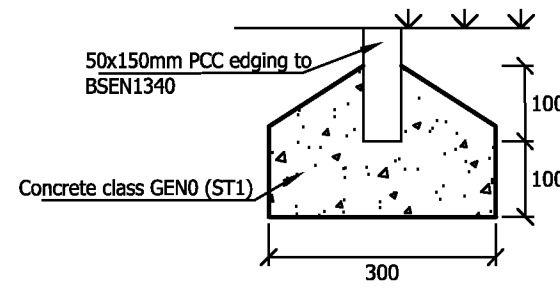
FULL HEIGHT KERB DETAIL

As denoted by



DROPPED BN KERB DETAIL

As denoted by 25mm upstand Flush



PCC EDGING KERB

As denoted by

GENERAL NOTES:

- All dimensions to be checked on site. All details and dimensions relating to sub-contractors or suppliers work must be checked and agreed between the sub-contractor or supplier and the main contractor.
- This drawing is to be read in conjunction with all relevant architects, services and engineers drawings and specifications.
- The location, size, depth and identification of existing services that may be shown or referred to on this drawing have been assessed from non intrusive observations, record drawings or the like. The contractor shall safely carry out intrusive investigations, trial holes or soundings prior to commencing work to satisfy himself that it is safe to proceed and that the assessments are accurate. Any discrepancies shall be notified to gap prior to works commencing.
- Tender or billing drawings shall not be used for construction or the ordering of materials.
- Do not scale. All dimensions and levels to be site confirmed.
- Copyright : This drawing must not be copied, amended nor reproduced without the prior written agreement of gap.

WORK IN PROGRESS

Gyoursy Self
CONSULTING ENGINEERS

18/17 BOUNDARY ROAD, HOVE,
EAST SUSSEX BN3 4EF
TELEPHONE 01273 414413
E-MAIL: mail@gyoursyself.co.uk
Website: www.gyoursyself.com
Also at Fareham and St Albans

CLIENT WATES

ARCHITECT RH PARTNERSHIP

JOB TITLE YAPTON ROAD
BARNHAM
WEST SUSSEX

DRAWING TITLE PRIVATE EXTERNAL WORKS
CONSTRUCTION DETAILS

JOB No. H19377 SCALE @ A1 NTS DATE JULY 2018

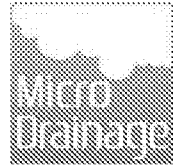
DRAWN GS ENGINEER M ROBERTS CHECKED APP

STATUS WIP DRAWING SUSTAINABILITY

REVISION P1 REA STATUS STAGE 3 - DEVELOPED DESIGN

DRAWING No. 19377-GS-Z1-XX-DR-C-5103

APPENDIX C – MICRO DRAINAGE OUTPUTS

GTA Civils Ltd		Page 0
Gloucester House 66a Church Walk Burgess Hill, BN43 6LB	Angels Nursery Yapton 7033 SW network results	
Date 21/05/2018 File 1805 Site SW.mdx	Designed by MCR Checked by	
XP Solutions	Network 2018.1	

STORM SEWER DESIGN by the Modified Rational Method

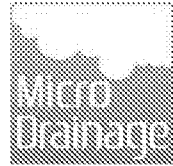
Network Design Table for Surface Network 1

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	23.738	0.158	150.2	0.000	5.00	0.0	0.600	o	225	Pipe/Conduit	⊗
1.001	16.267	0.108	150.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	⊗
2.000	2.121	0.014	151.5	0.000	5.00	0.0	0.600	o	150	Pipe/Conduit	⊗
2.001	9.967	0.066	151.0	0.030	0.00	0.0	0.600	o	150	Pipe/Conduit	⊗
1.002	29.454	0.131	224.8	0.081	0.00	0.0	0.600	o	300	Pipe/Conduit	⊗

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	E I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.37	8.766	0.000	0.0	0.0	0.0	1.06	42.3	0.0
1.001	50.00	5.63	8.698	0.000	0.0	0.0	0.0	1.06	42.3	0.0
2.000	50.00	5.04	8.659	0.000	0.0	0.0	0.0	0.81	14.4	0.0
2.001	50.00	5.25	8.636	0.030	0.0	0.0	0.0	0.82	14.4	4.1
1.002	50.00	6.10	8.500	0.111	0.0	0.0	0.0	1.04	73.8	15.0

GTA Civils Ltd		Page 1
Gloucester House 66a Church Walk Burgess Hill, BN43 6LB	Angels Nursery Yapton 7033 SW network results	
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XP Solutions	Network 2018.1	

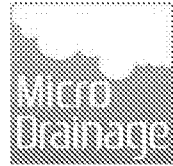
STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Surface Network 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.003	18.012	0.042	428.9	0.036	0.00	0.0	0.600	o	450	Pipe/Conduit	⚙
3.000	2.077	0.045	46.2	0.000	5.00	0.0	0.600	o	150	Pipe/Conduit	⚙
3.001	8.745	0.078	112.1	0.096	0.00	0.0	0.600	o	150	Pipe/Conduit	⚙
1.004	18.084	0.045	401.9	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	⚙
4.000	1.493	0.025	59.7	0.000	5.00	0.0	0.600	o	150	Pipe/Conduit	⚙
4.001	5.547	0.193	28.7	0.156	0.00	0.0	0.600	o	150	Pipe/Conduit	⚙

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.003	50.00	6.40	8.369	0.147	0.0	0.0	0.0	0.98	155.1	19.9
3.000	50.00	5.02	8.800	0.000	0.0	0.0	0.0	1.48	26.2	0.0
3.001	50.00	5.18	8.755	0.096	0.0	0.0	0.0	0.95	16.8	13.0
1.004	50.00	6.70	8.327	0.243	0.0	0.0	0.0	1.01	160.3	32.9
4.000	50.00	5.02	8.405	0.000	0.0	0.0	0.0	1.30	23.0	0.0
4.001	50.00	5.07	8.410	0.156	0.0	0.0	0.0	1.89	33.3	21.1

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XP Solutions	Network 2018.1	

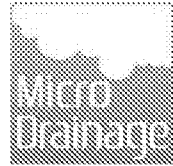
STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Surface Network 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.005	18.849	0.047	401.0	0.018	0.00	0.0	0.600	o	450	Pipe/Conduit	⚙
1.006	48.674	0.123	395.7	0.108	0.00	0.0	0.600	o	450	Pipe/Conduit	⚙
1.007	7.243	0.019	381.2	0.037	0.00	0.0	0.600	o	450	Pipe/Conduit	⚙
5.000	55.320	0.369	149.9	0.074	5.00	0.0	0.600	o	150	Pipe/Conduit	⚙
5.001	14.409	0.085	169.5	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	⚙
6.000	75.012	0.441	170.1	0.056	5.00	0.0	0.600	o	225	Pipe/Conduit	⚙

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.005	50.00	7.01	8.282	0.417	0.0	0.0	0.0	1.01	160.5	56.5
1.006	50.00	7.81	8.235	0.525	0.0	0.0	0.0	1.02	161.6	71.1
1.007	50.00	7.93	8.111	0.562	0.0	0.0	0.0	1.04	164.6	76.1
5.000	50.00	6.13	8.737	0.074	0.0	0.0	0.0	0.82	14.5	10.0
5.001	50.00	6.44	8.368	0.074	0.0	0.0	0.0	0.77	13.6	10.0
6.000	50.00	6.25	8.737	0.056	0.0	0.0	0.0	1.00	39.7	7.6

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Gloucester House 66a Church Walk Burgess Hill, BN43 6LB	Angels Nursery Yapton 7033 SW network results	
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XP Solutions	Network 2018.1	

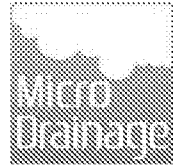
STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Surface Network 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.008	65.131	0.047	1385.8	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.009	18.796	0.123	152.8	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
7.000	2.919	0.100	29.2	0.000	5.00	0.0	0.600	o	150	Pipe/Conduit	
7.001	12.041	0.113	106.6	0.096	0.00	0.0	0.600	o	150	Pipe/Conduit	
8.000	3.756	0.033	113.8	0.000	5.00	0.0	0.600	o	150	Pipe/Conduit	
8.001	9.630	0.066	145.9	0.057	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.008	45.34	9.95	8.092	0.692	0.0	0.0	0.0	0.54	85.5	85.0
1.009	44.89	10.14	8.053	0.692	0.0	0.0	0.0	1.64	261.2	85.0
7.000	50.00	5.03	9.300	0.000	0.0	0.0	0.0	1.87	33.1	0.0
7.001	50.00	5.23	8.820	0.096	0.0	0.0	0.0	0.97	17.2	13.0
8.000	50.00	5.07	8.750	0.000	0.0	0.0	0.0	0.94	16.6	0.0
8.001	50.00	5.26	8.717	0.057	0.0	0.0	0.0	0.83	14.7	7.7

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XP Solutions	Network 2018.1	

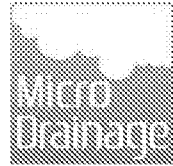
STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Surface Network 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
8.002	9.705	0.065	149.3	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	⚙
8.003	11.219	0.075	150.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	⚙
8.004	10.616	0.071	149.5	0.046	0.00	0.0	0.600	o	150	Pipe/Conduit	⚙
7.002	73.310	0.179	409.6	0.124	0.00	0.0	0.600	o	450	Pipe/Conduit	⚙
7.003	10.108	0.028	361.0	0.082	0.00	0.0	0.600	o	450	Pipe/Conduit	⚙
1.010	20.472	0.070	292.5	0.141	0.00	0.0	0.600	o	150	Pipe/Conduit	⚙

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL E (m)	I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
8.002	50.00	5.46	8.684	0.057	0.0	0.0	0.0	0.82	14.5	7.7
8.003	50.00	5.69	8.619	0.057	0.0	0.0	0.0	0.82	14.5	7.7
8.004	50.00	5.90	8.544	0.103	0.0	0.0	0.0	0.82	14.5	13.9
7.002	50.00	7.13	8.407	0.323	0.0	0.0	0.0	1.00	158.8	43.7
7.003	50.00	7.28	8.228	0.405	0.0	0.0	0.0	1.06	169.2	54.8
1.010	43.59	10.73	7.955	1.238	0.0	0.0	0.0	0.58	10.3	146.1

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Gloucester House 66a Church Walk Burgess Hill, BN43 6LB	Angels Nursery Yapton 7033 SW network results	
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Online Controls for Surface Network 1

Orifice Manhole: 4, DS/PN: 2.001, Volume (m³): 0.2

Diameter (m) 0.030 Discharge Coefficient 0.600 Invert Level (m) 8.636

Orifice Manhole: 6, DS/PN: 3.001, Volume (m³): 0.2

Diameter (m) 0.020 Discharge Coefficient 0.600 Invert Level (m) 8.755

Orifice Manhole: 7, DS/PN: 4.001, Volume (m³): 1.4

Diameter (m) 0.030 Discharge Coefficient 0.600 Invert Level (m) 8.410

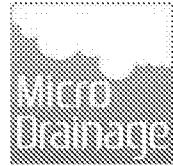
Hydro-Brake® Optimum Manhole: S6, DS/PN: 1.007, Volume (m³): 9.8

Unit Reference	MD-SHE-0067-2500-1630-2500	Sump Available	Yes
Design Head (m)	1.630	Diameter (mm)	67
Design Flow (l/s)	2.5	Invert Level (m)	8.111
Flush-Flo™	Calculated	Minimum Outlet Pipe Diameter (mm)	100
Objective	Minimise upstream storage	Suggested Manhole Diameter (mm)	1200
Application	Surface		

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.630	2.5	Kick-Flo®	0.600	1.6
Flush-Flo™	0.297	2.0	Mean Flow over Head Range	-	1.9

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should

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Gloucester House 66a Church Walk Burgess Hill, BN43 6LB	Angels Nursery Yapton 7033 SW network results	
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XP Solutions	Network 2018.1	

Hydro-Brake® Optimum Manhole: S6, DS/PN: 1.007, Volume (m³): 9.8

another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.6	0.600	1.6	1.600	2.5	2.600	3.1	5.000	4.2	7.500	5.1
0.200	1.9	0.800	1.8	1.800	2.6	3.000	3.3	5.500	4.4	8.000	5.2
0.300	2.0	1.000	2.0	2.000	2.7	3.500	3.5	6.000	4.6	8.500	5.4
0.400	1.9	1.200	2.2	2.200	2.9	4.000	3.8	6.500	4.7	9.000	5.5
0.500	1.8	1.400	2.3	2.400	3.0	4.500	4.0	7.000	4.9	9.500	5.7

Orifice Manhole: 16, DS/PN: 7.001, Volume (m³): 0.2

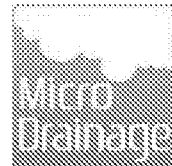
Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 9.200

Orifice Manhole: 20, DS/PN: 8.002, Volume (m³): 0.3

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 8.684

Hydro-Brake® Optimum Manhole: S11, DS/PN: 7.003, Volume (m³): 13.8

Unit Reference	MD-SHE-0067-2500-1600-2500	Sump Available	Yes
Design Head (m)	1.600	Diameter (mm)	67
Design Flow (l/s)	2.5	Invert Level (m)	8.228
Flush-Flo™	Calculated	Minimum Outlet Pipe Diameter (mm)	100
Objective	Minimise upstream storage	Suggested Manhole Diameter (mm)	1200
Application	Surface		

GTA Civils Ltd			Page 7								
Gloucester House 66a Church Walk Burgess Hill, BN43 6LB		Angels Nursery Yapton 7033 SW network results									
Date 21/05/2018 File 1805 Site SW.mdx		Designed by MCR Checked by									
XP Solutions		Network 2018.1									
<u>Hydro-Brake® Optimum Manhole: S11, DS/PN: 7.003, Volume (m³): 13.8</u>											
Control Points		Head (m)	Flow (l/s)	Control Points	Head (m) Flow (l/s)						
Design Point (Calculated)		1.600	2.5	Kick-Flo®	0.601 1.6						
Flush-Flo™		0.297	2.0	Mean Flow over Head Range	- 1.9						
The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated											
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.6	0.600	1.6	1.600	2.5	2.600	3.1	5.000	4.2	7.500	5.1
0.200	1.9	0.800	1.8	1.800	2.6	3.000	3.3	5.500	4.4	8.000	5.3
0.300	2.0	1.000	2.0	2.000	2.8	3.500	3.6	6.000	4.6	8.500	5.4
0.400	1.9	1.200	2.2	2.200	2.9	4.000	3.8	6.500	4.8	9.000	5.6
0.500	1.8	1.400	2.3	2.400	3.0	4.500	4.0	7.000	5.0	9.500	5.7
<u>Hydro-Brake® Optimum Manhole: S12, DS/PN: 1.010, Volume (m³): 5.9</u>											
Unit Reference MD-SHE-0117-7300-1600-7300				Sump Available		Yes					
Design Head (m)				1.600		Diameter (mm)		117			
Design Flow (l/s)				7.3		Invert Level (m)		7.955			
Flush-Flo™				Calculated		Minimum Outlet Pipe Diameter (mm)		150			
Objective				Minimise upstream storage		Suggested Manhole Diameter (mm)		1200			
Application				Surface							
Control Points		Head (m)	Flow (l/s)	Control Points		Head (m)	Flow (l/s)				
Design Point (Calculated)		1.600	7.3	Kick-Flo®		0.982	5.8				
Flush-Flo™		0.479	7.3	Mean Flow over Head Range		-	6.4				
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Hydro-Brake® Optimum Manhole: S12, DS/PN: 1.010, Volume (m³): 5.9

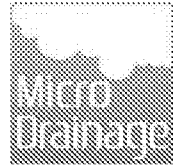
The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.1	0.600	7.2	1.600	7.3	2.600	9.2	5.000	12.5	7.500	15.2
0.200	6.4	0.800	6.8	1.800	7.7	3.000	9.8	5.500	13.1	8.000	15.6
0.300	7.0	1.000	5.9	2.000	8.1	3.500	10.6	6.000	13.6	8.500	16.1
0.400	7.2	1.200	6.4	2.200	8.5	4.000	11.2	6.500	14.2	9.000	16.6
0.500	7.3	1.400	6.9	2.400	8.8	4.500	11.9	7.000	14.7	9.500	17.0

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<u>Storage Structures for Surface Network 1</u>					
<u>Porous Car Park Manhole: 3, DS/PN: 2.000</u>					
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	0.0
Membrane Percolation (mm/hr)	1000	Invert Level (m)	8.550	Depression Storage (mm)	5
Max Percolation (l/s)	202.7	Width (m)	4.8	Evaporation (mm/day)	3
Safety Factor	2.0	Length (m)	152.0	Membrane Depth (mm)	0
<u>Complex Manhole: S2, DS/PN: 1.003</u>					
<u>Porous Car Park</u>					
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	0.0
Membrane Percolation (mm/hr)	1000	Invert Level (m)	8.800	Depression Storage (mm)	5
Max Percolation (l/s)	54.7	Width (m)	4.8	Evaporation (mm/day)	3
Safety Factor	2.0	Length (m)	41.0	Membrane Depth (mm)	0
<u>Porous Car Park</u>					
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	0.0
Membrane Percolation (mm/hr)	1000	Invert Level (m)	8.800	Depression Storage (mm)	5
Max Percolation (l/s)	75.0	Width (m)	10.0	Evaporation (mm/day)	3
Safety Factor	2.0	Length (m)	27.0	Membrane Depth (mm)	0
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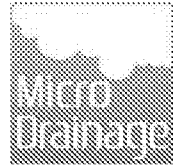
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Gloucester House 66a Church Walk Burgess Hill, BN43 6LB	Angels Nursery Yapton 7033 SW network results																																																																																																	
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XP Solutions	Network 2018.1																																																																																																	
<u>Porous Car Park Manhole: 5, DS/PN: 3.000</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.00000</td><td>Porosity</td><td>0.30</td><td>Slope (1:X)</td><td>0.0</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>1000</td><td>Invert Level (m)</td><td>8.800</td><td>Depression Storage (mm)</td><td>5</td></tr><tr><td>Max Percolation (l/s)</td><td>147.2</td><td>Width (m)</td><td>5.0</td><td>Evaporation (mm/day)</td><td>3</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Length (m)</td><td>106.0</td><td>Membrane Depth (mm)</td><td>0</td></tr></table> <u>Porous Car Park Manhole: 6, DS/PN: 4.000</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.00000</td><td>Porosity</td><td>0.30</td><td>Slope (1:X)</td><td>0.0</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>1000</td><td>Invert Level (m)</td><td>8.700</td><td>Depression Storage (mm)</td><td>5</td></tr><tr><td>Max Percolation (l/s)</td><td>313.8</td><td>Width (m)</td><td>4.2</td><td>Evaporation (mm/day)</td><td>3</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Length (m)</td><td>269.0</td><td>Membrane Depth (mm)</td><td>0</td></tr></table> <u>Porous Car Park Manhole: 15, DS/PN: 5.000</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.00000</td><td>Porosity</td><td>0.30</td><td>Slope (1:X)</td><td>0.0</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>1000</td><td>Invert Level (m)</td><td>9.100</td><td>Depression Storage (mm)</td><td>5</td></tr><tr><td>Max Percolation (l/s)</td><td>9.6</td><td>Width (m)</td><td>4.8</td><td>Evaporation (mm/day)</td><td>3</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Length (m)</td><td>7.2</td><td>Membrane Depth (mm)</td><td>0</td></tr></table> <u>Porous Car Park Manhole: 15, DS/PN: 7.000</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.00000</td><td>Porosity</td><td>0.30</td><td>Slope (1:X)</td><td>0.0</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>1000</td><td>Invert Level (m)</td><td>9.300</td><td>Depression Storage (mm)</td><td>5</td></tr><tr><td>Max Percolation (l/s)</td><td>147.2</td><td>Width (m)</td><td>5.0</td><td>Evaporation (mm/day)</td><td>3</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Length (m)</td><td>106.0</td><td>Membrane Depth (mm)</td><td>0</td></tr></table>			Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	0.0	Membrane Percolation (mm/hr)	1000	Invert Level (m)	8.800	Depression Storage (mm)	5	Max Percolation (l/s)	147.2	Width (m)	5.0	Evaporation (mm/day)	3	Safety Factor	2.0	Length (m)	106.0	Membrane Depth (mm)	0	Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	0.0	Membrane Percolation (mm/hr)	1000	Invert Level (m)	8.700	Depression Storage (mm)	5	Max Percolation (l/s)	313.8	Width (m)	4.2	Evaporation (mm/day)	3	Safety Factor	2.0	Length (m)	269.0	Membrane Depth (mm)	0	Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	0.0	Membrane Percolation (mm/hr)	1000	Invert Level (m)	9.100	Depression Storage (mm)	5	Max Percolation (l/s)	9.6	Width (m)	4.8	Evaporation (mm/day)	3	Safety Factor	2.0	Length (m)	7.2	Membrane Depth (mm)	0	Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	0.0	Membrane Percolation (mm/hr)	1000	Invert Level (m)	9.300	Depression Storage (mm)	5	Max Percolation (l/s)	147.2	Width (m)	5.0	Evaporation (mm/day)	3	Safety Factor	2.0	Length (m)	106.0	Membrane Depth (mm)	0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	0.0																																																																																													
Membrane Percolation (mm/hr)	1000	Invert Level (m)	8.800	Depression Storage (mm)	5																																																																																													
Max Percolation (l/s)	147.2	Width (m)	5.0	Evaporation (mm/day)	3																																																																																													
Safety Factor	2.0	Length (m)	106.0	Membrane Depth (mm)	0																																																																																													
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	0.0																																																																																													
Membrane Percolation (mm/hr)	1000	Invert Level (m)	8.700	Depression Storage (mm)	5																																																																																													
Max Percolation (l/s)	313.8	Width (m)	4.2	Evaporation (mm/day)	3																																																																																													
Safety Factor	2.0	Length (m)	269.0	Membrane Depth (mm)	0																																																																																													
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	0.0																																																																																													
Membrane Percolation (mm/hr)	1000	Invert Level (m)	9.100	Depression Storage (mm)	5																																																																																													
Max Percolation (l/s)	9.6	Width (m)	4.8	Evaporation (mm/day)	3																																																																																													
Safety Factor	2.0	Length (m)	7.2	Membrane Depth (mm)	0																																																																																													
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	0.0																																																																																													
Membrane Percolation (mm/hr)	1000	Invert Level (m)	9.300	Depression Storage (mm)	5																																																																																													
Max Percolation (l/s)	147.2	Width (m)	5.0	Evaporation (mm/day)	3																																																																																													
Safety Factor	2.0	Length (m)	106.0	Membrane Depth (mm)	0																																																																																													
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<u>Porous Car Park Manhole: 19, DS/PN: 8.000</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.00000</td><td>Porosity</td><td>0.30</td><td>Slope (1:X)</td><td>0.0</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>1000</td><td>Invert Level (m)</td><td>8.750</td><td>Depression Storage (mm)</td><td>5</td></tr><tr><td>Max Percolation (l/s)</td><td>156.0</td><td>Width (m)</td><td>15.6</td><td>Evaporation (mm/day)</td><td>3</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Length (m)</td><td>36.0</td><td>Membrane Depth (mm)</td><td>0</td></tr></table> <u>Porous Car Park Manhole: S10, DS/PN: 7.002</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.00000</td><td>Porosity</td><td>0.30</td><td>Slope (1:X)</td><td>0.0</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>1000</td><td>Invert Level (m)</td><td>8.800</td><td>Depression Storage (mm)</td><td>5</td></tr><tr><td>Max Percolation (l/s)</td><td>158.6</td><td>Width (m)</td><td>15.6</td><td>Evaporation (mm/day)</td><td>3</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Length (m)</td><td>36.6</td><td>Membrane Depth (mm)</td><td>0</td></tr></table> <u>Tank or Pond Manhole: S12, DS/PN: 1.010</u> Invert Level (m) 8.000 <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th></tr><tr><td>0.000</td><td>292.0</td><td>1.200</td><td>922.0</td></tr></table>			Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	0.0	Membrane Percolation (mm/hr)	1000	Invert Level (m)	8.750	Depression Storage (mm)	5	Max Percolation (l/s)	156.0	Width (m)	15.6	Evaporation (mm/day)	3	Safety Factor	2.0	Length (m)	36.0	Membrane Depth (mm)	0	Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	0.0	Membrane Percolation (mm/hr)	1000	Invert Level (m)	8.800	Depression Storage (mm)	5	Max Percolation (l/s)	158.6	Width (m)	15.6	Evaporation (mm/day)	3	Safety Factor	2.0	Length (m)	36.6	Membrane Depth (mm)	0	Depth (m)	Area (m²)	Depth (m)	Area (m²)	0.000	292.0	1.200	922.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	0.0																																																					
Membrane Percolation (mm/hr)	1000	Invert Level (m)	8.750	Depression Storage (mm)	5																																																					
Max Percolation (l/s)	156.0	Width (m)	15.6	Evaporation (mm/day)	3																																																					
Safety Factor	2.0	Length (m)	36.0	Membrane Depth (mm)	0																																																					
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	0.0																																																					
Membrane Percolation (mm/hr)	1000	Invert Level (m)	8.800	Depression Storage (mm)	5																																																					
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Safety Factor	2.0	Length (m)	36.6	Membrane Depth (mm)	0																																																					
Depth (m)	Area (m²)	Depth (m)	Area (m²)																																																							
0.000	292.0	1.200	922.0																																																							
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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Event	Water Surcharged Flooded				Flow / Cap.	Infil. Flow (l/s)	Maximum Vol (m³)	Discharge Vol (m³)	Pipe Flow (l/s)	Status
			US/CL (m)	Level (m)	Depth (m)	Volume (m³)						
7.003	S11	480 minute 1 year Summer I+0%	9.865	8.970	0.292	0.000	0.02		12.499	91.361	2.0	SURCHARGED
1.010	S12	480 minute 1 year Summer I+0%	9.200	8.128	0.023	0.000	0.64		41.635	243.757	6.2	SURCHARGED

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

			Water Surcharged Flooded								Pipe	Status
PN	US/MH Name	Event	US/CL (m)	Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Infil. Flow (l/s)	Maximum Vol (m³)	Discharge Vol (m³)	Flow (l/s)	
7.003	S11	120 minute 100 year Summer I+40%	9.865	9.329	0.651	0.000	0.02		13.014	26.914	2.0	SURCHARGED
1.010	S12	1440 minute 100 year Summer I+40%	9.200	9.116	1.011	0.000	0.75		623.727	1016.144	7.3	FLOOD RISK