

EXPEDITE

DRAINAGE STATEMENT and SAB TECHNICAL NOTE **CARDIFF 6TH FORM COLLEGE**

www.expediteps.com

BRISTOL • CARDIFF • EXETER • LONDON

Proposed Development

Drainage Statement and SAB Technical Note

Issued by: Expedite
35 Southernhay East
Exeter
EX1 1NX

Client: Cardiff 6th Form College

Project Reference: ES21.22

Project Title: Cardiff 6th Form College

Revision: A

Date: 20th July 2022

Prepared by: Paul Graham

Checked by: Kris Tovey

Approved by: Simon Lancaster

1.0 Introduction

- 1.1 This Drainage Statement and SAB Technical Note have been prepared on behalf of Cardiff 6th Form college by Expedite Engineering Services Ltd to describe the proposed drainage strategy and SAB requirements of the proposed education facility at Merchant Place and Cory's Building, Bute Place and Bute Street, Cardiff.

2.0 Proposed Surface Water Drainage Strategy

Wales Government SuDS requirements

- 2.1 The proposed drainage strategy is set out in **Appendix A**.
- 2.2 The proposed scheme meets the requirements laid out in the Welsh Government's document 'Statutory Standards for Sustainable Drainage Systems'.
- 2.3 **S1).** The standards give a five-level priority list for the destination of surface runoff, which is as follows:

1. **Surface water runoff is collected for use;**

The scheme involves the implementation of a blue roof system. A roof terrace for staff and pupils intended on the roof area. The Green Infrastructure Plan demonstrates that some of the captured precipitation will be used within the roof areas. The Green Infrastructure Plan also includes further areas of soft landscaping.

2. **Surface water runoff is infiltrated to the ground;**

The development proposal covers the whole red line boundary except for a very small area which is to be paved at the entrance. There are no spaces which are located a suitable distance from the building which would be suitable for infiltration without having a detrimental effect upon ground stability at the location of the foundations.

3. **Surface water runoff is discharged to a surface water body;**

The closest surface water body is The Flourish to the east of the site. There is a surface water sewer adopted by DCWW which passes in closer proximity to the site that discharges to this location. A direct connection would involve the crossing of third-party land.

4. **Surface water runoff is discharged to a surface water sewer, highway drain, or another drainage system;**

There is a SW sewer located to the east of the application site, where the site will discharge at a controlled rate of 1.6l/s for all events up to the Q100 + 40% Climate Change event. This connection will be subject to a S106 application with DCWW.

5. **Surface water runoff is discharged to a combined sewer.**

Not applicable.

2.4 **S2).** In addition to the above hierarchy, the standard also gives a set of principles for SuDS schemes. For surface water hydraulic control, these are as follows:

- To manage water on or close to the surface and as close to the source of the runoff as possible, a blue roof, and permeable paving will manage surface water as close as practicable.
- Interception of the first 5mm will be met by the provision of a blue roof and permeable paving system.
- Runoff from the site will be limited to 1.6l/s which is the Qbar greenfield rate for all events up to the Q100 + 40% Climate Change event (calculations provided within **Appendix B**). This will provide significant betterment to the existing scenario where precipitation from the hard standing surfaces which cover the existing site, would drain towards the surrounding roads, and would discharge to the existing combined sewers in the vicinity.
- Attenuation will be provided via a 125mm deep Roofbloxx Blue roof system and a lined permeable paving system with a minimum sub base depth of 200mm. Flow control from these systems will be controlled by a series of orifices as the flows descend the podium levels on the roof and within the separate permeable paving system. Calculations are provided within **Appendix B** and layout and details are provided within **Appendix A**.

2.5 **S3).** Water quality will be managed on site as follows:

- Interception of the first 5mm will be met by the provision of a blue roof and permeable paving system.
- The pollution hazard level on the site does not exceed “Very Low” under the Simple Index Approach set out below due to the lack of opportunities for traffic.

Runoff Area Land Use Description	Hazard Level	Suspended Solids	Metals	Hydrocarbons
Commercial/Industrial roofing: Inert materials	Very low	0.3	0.2	0.05
Landuse Pollution Hazard Index	Very low	0.3	0.2	0.05
SuDS Component Description		Suspended Solids	Metals	Hydrocarbons
Pervious pavement (where the pavement is not designed as an infiltration component)		0.7	0.6	0.7

- The system will drain through the permeable paving and blue roof system, where “the SuDs management train” requirements are met and all mitigation indices are met.

2.6 **S4)** Amenity value will be added to the site as follows:

- The blue roof system offers will accommodate an area of roof terrace for use by pupils and staff at the educational facility and provide areas of soft landscaping to provide amenity value.
- The permeable paving system offers an external gathering space associated with the development as well as soft landscaping proposed in the Green Infrastructure Plan.

2.7 **S5)** A Green Infrastructure Plan is being prepared which will allow for soft landscaping within the blue roof area and adjacent to the permeable paved areas. The blue roof system has the potential to be converted to a green roof system in the future and further opportunities for biodiversity net gains are possible. The current scheme includes biodiversity enhancement which are demonstrated through the Green Infrastructure Plan.

2.8 **S6)** Operation and maintenance is further considered in Section 4.0 of the report.

3.0 Proposed Foul Water Drainage Strategy

3.1 Foul drainage shall be conveyed via gravity to the south-eastern corner of the site and connected to an existing combined sewers in Docks Lane. DCWW have provided confirmation that a peak foul flow from the site of 4.3l/s can be accommodated within

the combined network. Foul flow calculations are provided within **Appendix B** and correspondence from DCWW is included within **Appendix C**.

4.0 Operation and Maintenance

- 4.1 Maintenance of SuDS features is essential to ensure that the surface water drainage system operates effectively and that flooding of the site and surrounding areas is prevented.
- 4.2 The maintenance and operation of the onsite SuDS features will fall within the maintenance operations of the college.
- 4.3 A full maintenance regime should be carried out to ensure that the drainage system remains operational over its lifetime. Table 1 summarises an initial maintenance plan for the drainage components proposed within this development. The SuDS Manual (CIRIA C753) and manufacturer's guidelines should be referred to for further information.

Drainage Component	Required Action	Typical Frequency
Pipework, manholes, chambers, catch pits and silt traps	Stabilise adjacent areas	As required
	Remove weeds	As required
	Clear any poor performing structures.	As required
	Inspect all structures for poor operation	Six monthly, 48 hours after large storms in first six months
	Monitor inspection chambers. Inspect silt accumulation rates and determine silt clearance frequencies	Annually
Permeable Paving	Brushing and vacuuming	Once a year or as required
	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the paving	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required.
	Inspect for evidence of poor operation and/or weed growth	3 monthly, 48 hours after large storms in first 6 months

	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually
Blue Roof	Inspection of roof outlets to check for blockages	Twice per year
	Remove any vegetation in gravels	Twice per year
	Inspect silt accumulation rates and establish appropriate brushing frequencies I	Annually

Table 1 - Operation and Maintenance Summary

Appendix A



- NOTES:
- DO NOT SCALE FROM THIS DRAWING. ALL DIMENSIONS ARE IN METRES, UNLESS STATED OTHERWISE.
 - DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS, REPORTS AND SPECIFICATIONS. ANY DISCREPANCIES TO BE REPORTED TO THE ENGINEER 5 WORKING DAYS IN ADVANCE OF UNDERTAKING ANY WORK.
 - RWP AND SVP LOCATIONS ARE SUBJECT TO CONFIRMATION

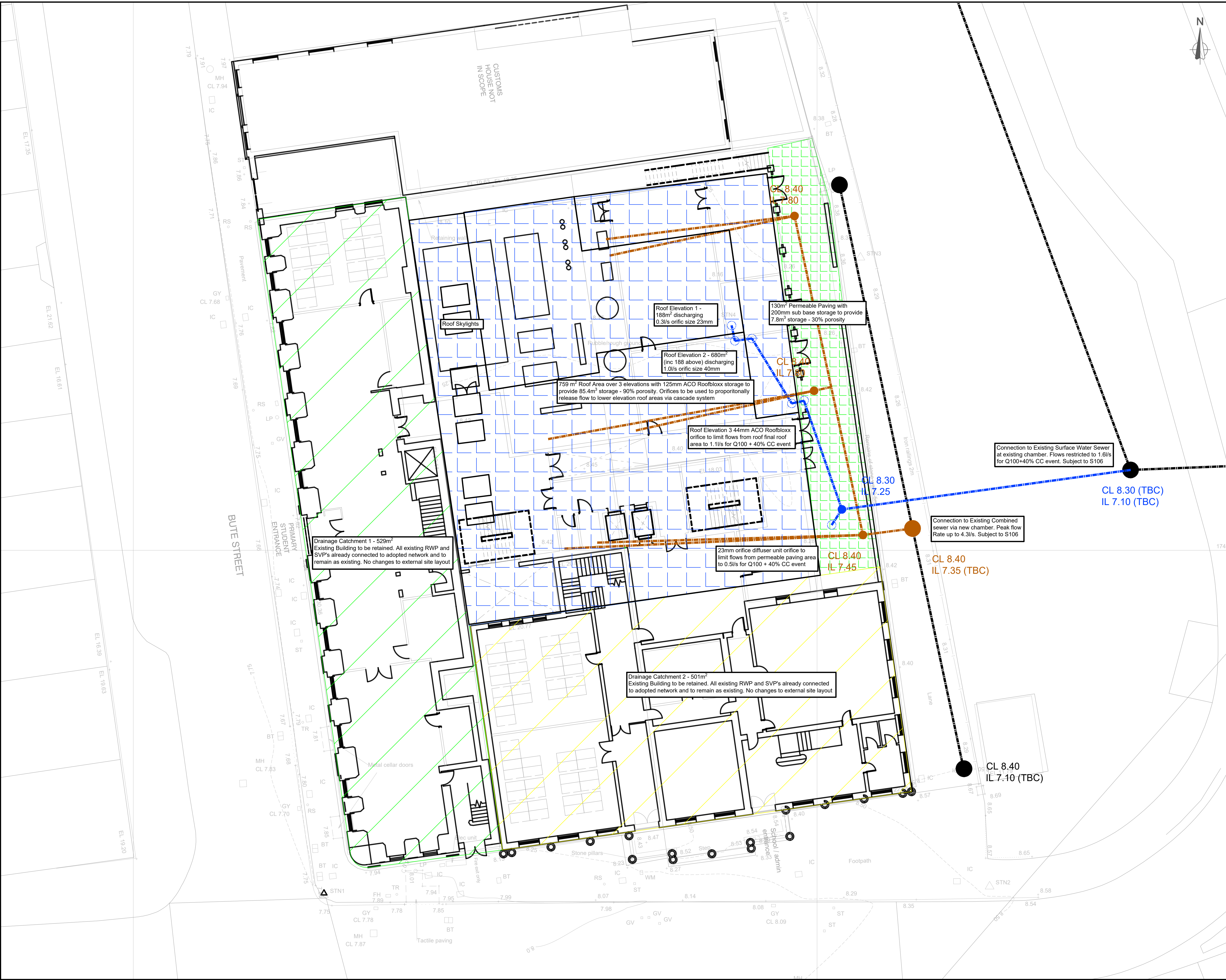
P1	First Issue	PG	07.07.22
REV:	DESCRIPTION:	BY:	DATE:

FOR APPROVAL

EXPEDITE

Exeter
The Design Studio
35 Southernhay East
Exeter
EX1 1NX
t: 01392 691 631
www.expediteps.com

CLIENT: CARDIFF 6TH FORM COLLEGE			
SITE: CARDIFF 6TH FORM ACADEMIC HUB			
TITLE: CATCHMENT PLAN			
SCALE AT A1: 1:125	DATE: JULY 2022	DRAWN: PG	CHECKED: KT
PROJECT NO: ES21.22	DRAWING NO: 10.01	REVISION: P1	



- NOTES:
- DO NOT SCALE FROM THIS DRAWING. ALL DIMENSIONS ARE IN METRES, UNLESS STATED OTHERWISE.
 - DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS, REPORTS AND SPECIFICATIONS. ANY DISCREPANCIES TO BE REPORTED TO THE ENGINEER 5 WORKING DAYS IN ADVANCE OF UNDERTAKING ANY WORK.
 - RWP AND SVP LOCATIONS ARE SUBJECT TO CONFIRMATION

- KEY
- EXISTING DCWW SEWER
 - PROPOSED SW SEWER
 - PROPOSED FOUL SEWER
 - BLUE ROOF AREA
 - PERMEABLE PAVED AREA

P2	Roof Light Areas Omitted	PG	20.07.22
P1	First Issue	PG	07.07.22
REV:	DESCRIPTION:	BY:	DATE:

FOR APPROVAL

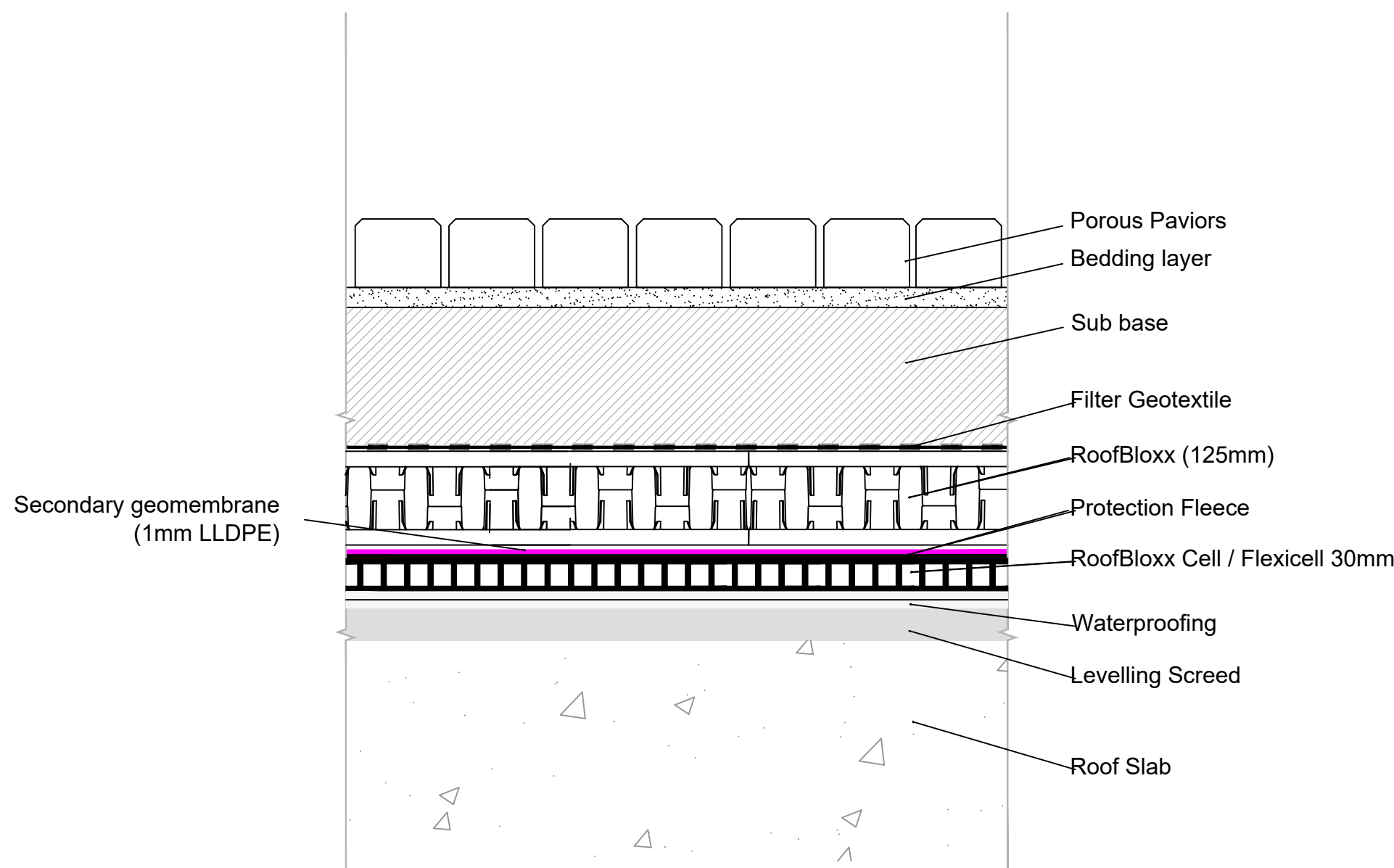
EXPEDITE

Exeter
The Design Studio
35 Southernhay East
Exeter
EX1 1NX
t: 01392 691 631
www.expediteps.com

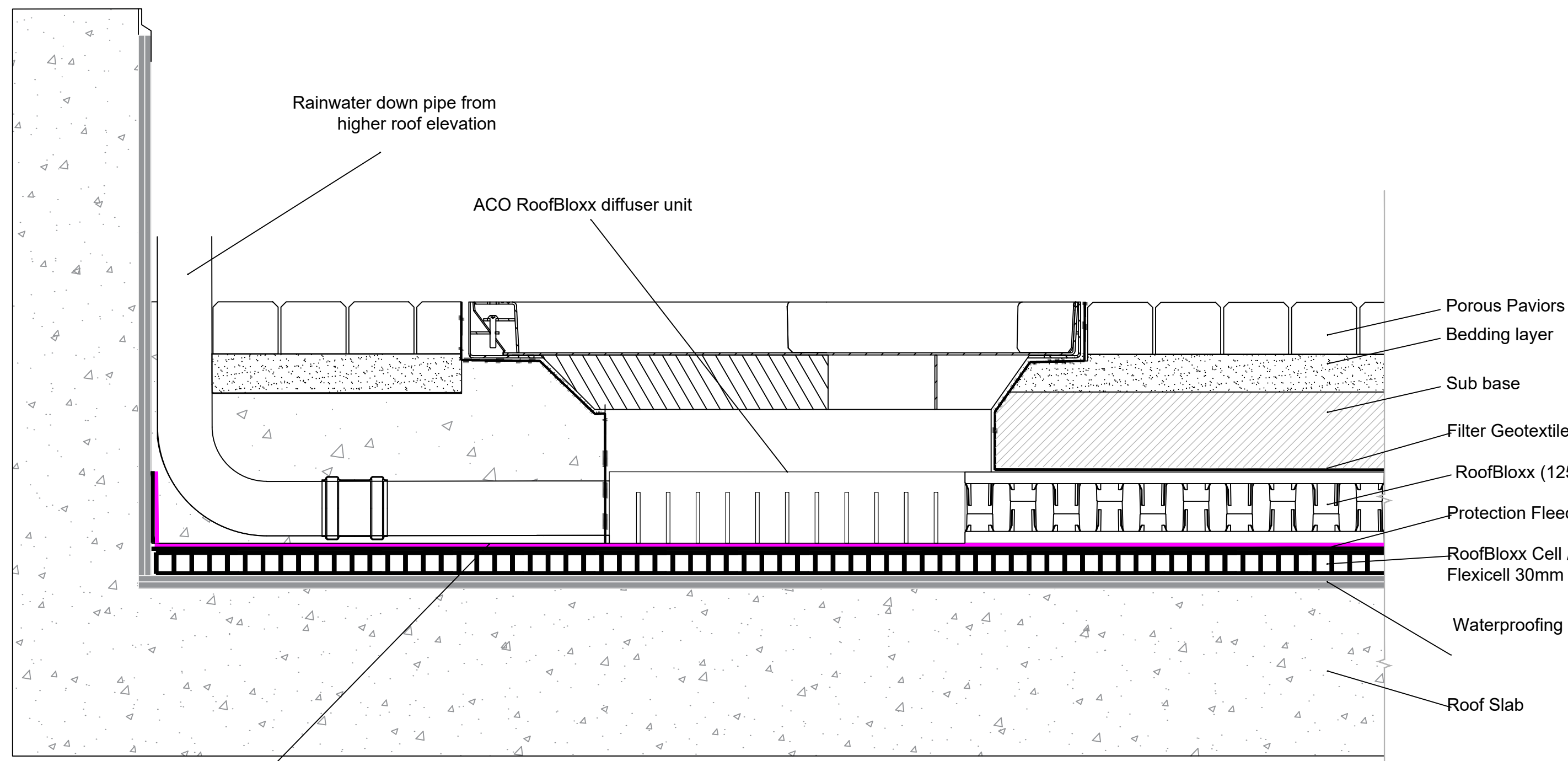
CLIENT:	CARDIFF 6TH FORM COLLEGE		
SITE:	CARDIFF 6TH FORM ACADEMIC HUB		
TITLE:	DRAINAGE PLAN		
SCALE AT A1:	DATE:	DRAWN:	CHECKED:
1:125	JULY 2022	PG	KT
PROJECT NO:	DRAWING NO:	REVISION:	
ES21.22	10.02	P2	

NOTES:

- DO NOT SCALE FROM THIS DRAWING. ALL DIMENSIONS ARE IN METRES, UNLESS STATED OTHERWISE.
- DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS, REPORTS AND SPECIFICATIONS. ANY DISCREPANCIES TO BE REPORTED TO THE ENGINEER 5 WORKING DAYS IN ADVANCE OF UNDERTAKING ANY WORK.

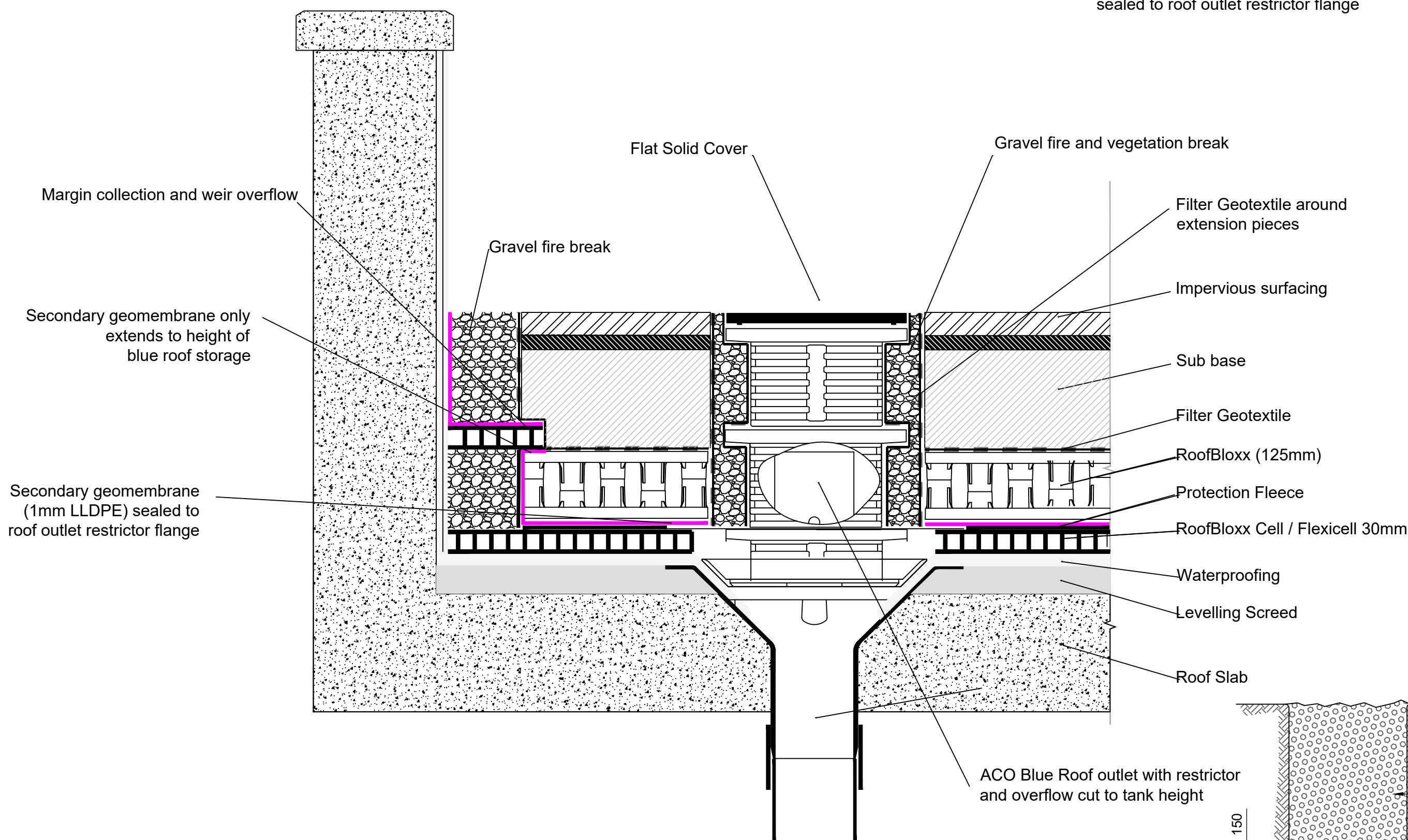


ACO ROOFBLOXX GENERAL DETAIL

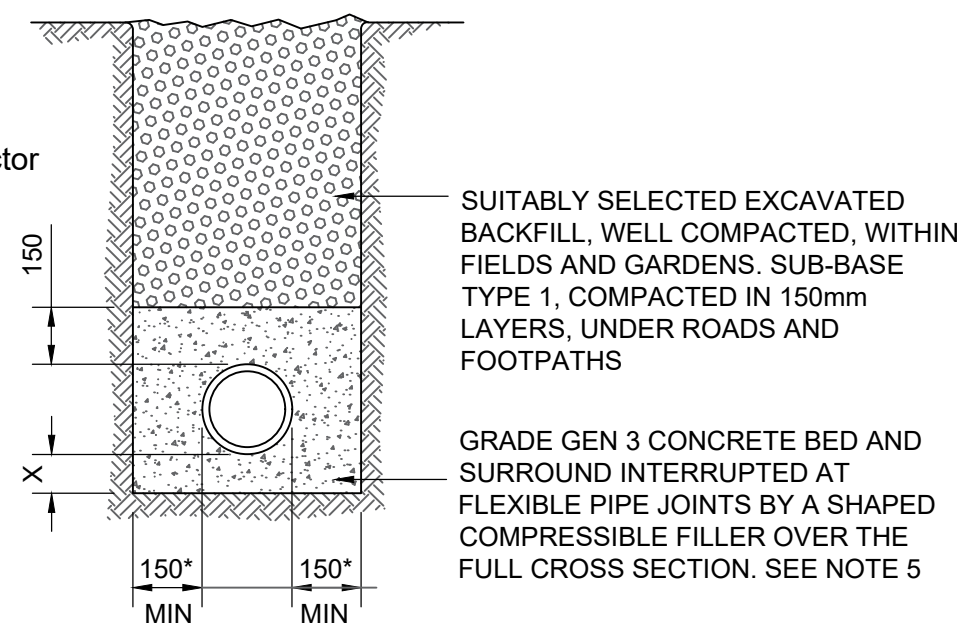


Secondary geomembrane (1mm LLDPE) sealed to roof outlet restrictor flange

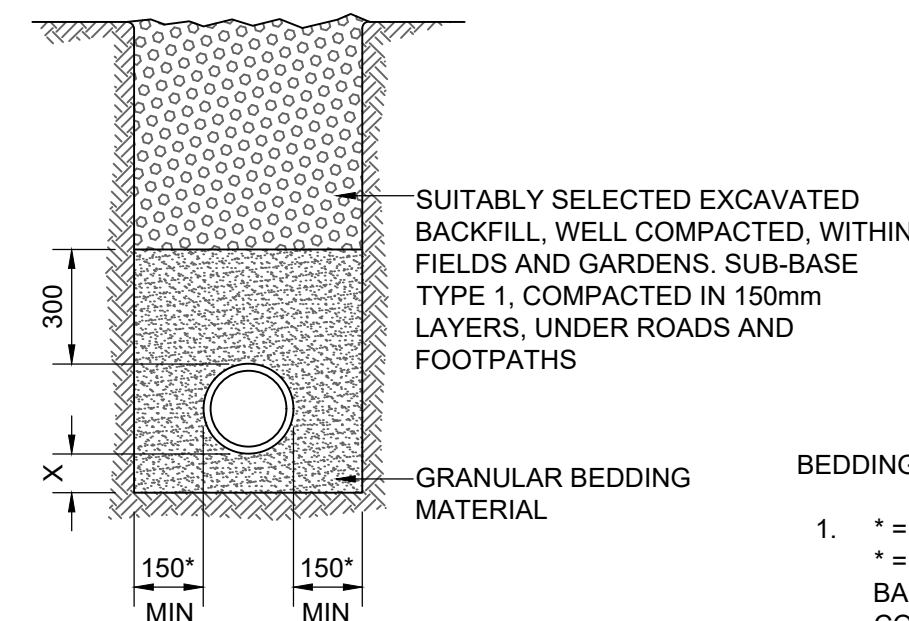
ACO STORMBLOXX DIFFUSER COLLECTOR UNIT



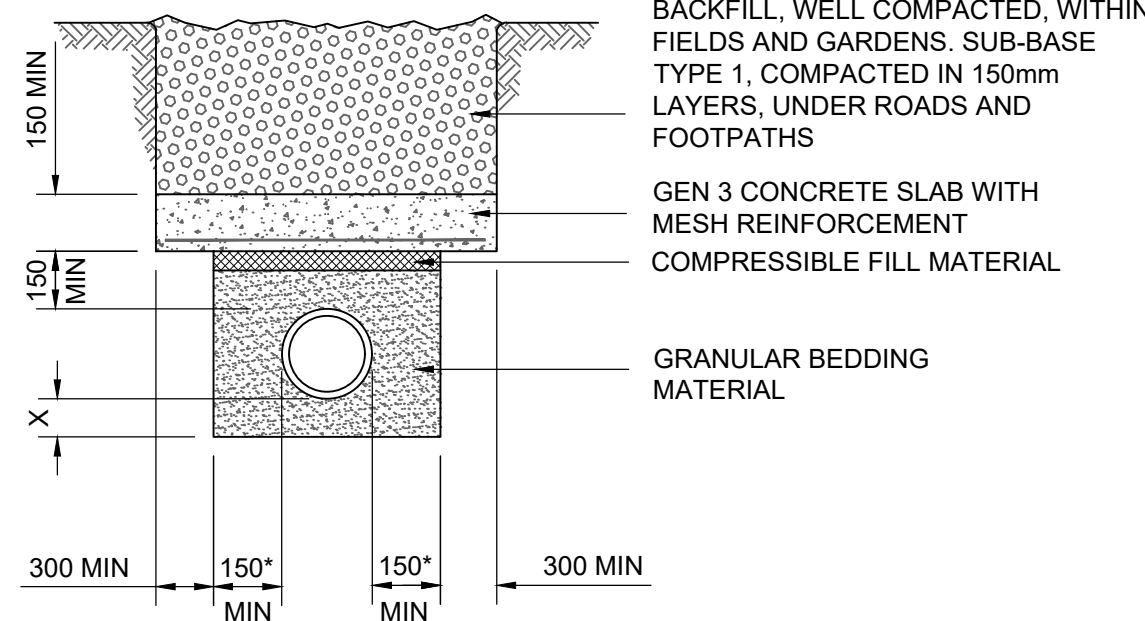
ACO STORMBLOXX ORIFICE OUTLET



CLASS Z BEDDING
FOR USE WHEN DEPTH TO SOFFIT IS
LESS THAN 1.2m



CLASS S BEDDING
FOR USE WHEN DEPTH TO SOFFIT IS
GREATER THAN 1.2m



CONCRETE SLAB PROTECTION
REINFORCEMENT IN SLAB TO SUIT LOADING CONDITION

BEDDING NOTES:

- * = 150 FOR PIPES DIAMETER UP TO 300mm,
* = 200mm FOR PIPE DIAMETERS OVER 300mmØ
BASED ON NARROW TRENCH THEORY: DESIGNER TO
CONFIRM FOR SPECIFIC PIPELINE.
- BACKFILL MATERIAL TO BE SELECTED EXCAVATED
MATERIAL WHERE THIS MATERIAL COMPLIES WITH
CESWL ADDITIONAL MATERIAL TO MAKE UP ANY
DEFICIENCY TO BE GRANULAR SUB-BASE TYPE 1 UNLESS
STATED OTHERWISE.

NOMINAL BORE OF PIPE (min)	AGGREGATE SIZE (mm)	
	SINGLE SIZED	GRADED
100	10	-
150	10 OR 14	14 TO 5
225-300	10,14 OR 20	14 TO 5 OR 20 TO 5
375-525	14 OR 20	14 TO 5 OR 20 TO 5
EXCEEDING 525	14,20 OR 40	14 TO 5 OR 20 TO 5 40 TO 5

DIM X ≥ 100mm FOR PIPES ≤ 100mmØ
DIM X ≥ 150mm FOR PIPES > 100mmØ
DIM X ≥ 200mm FOR PIPES TRENCHES IN ROCK

- IN WET, SOFT, OR SILTY SOILS, WHERE LATERAL
SUPPORT IS NOT OBTAINED OR WHERE FINES MAY
MIGRATE, THE GRANULAR BEDDING MATERIAL SHALL BE
SURROUNDED BY GEOTEXTILE FABRIC WITH MIN 200
OVERLAP.
- TRENCH BACKFILL TO MEET HIGHWAY SPECIFICATION
WHEN LAID IN ROAD OR FOOTPATH.
- COMPRESSIBLE FILLER SHALL BE
BITUMEN-IMPREGNATED INSULATING BOARD TO BS 622-1.
THICKNESS AS TABLE.

NOMINAL DIAMETER OF PIPE (mm)	THICKNESS OF COMPRESSIBLE FILLER (mm)
LESS THAN 450mm	18
450-1200mm	36
EXCEEDING 1200mm	54

TYPICAL PIPE BEDDING FOR PIPES UP TO 800mm DIA

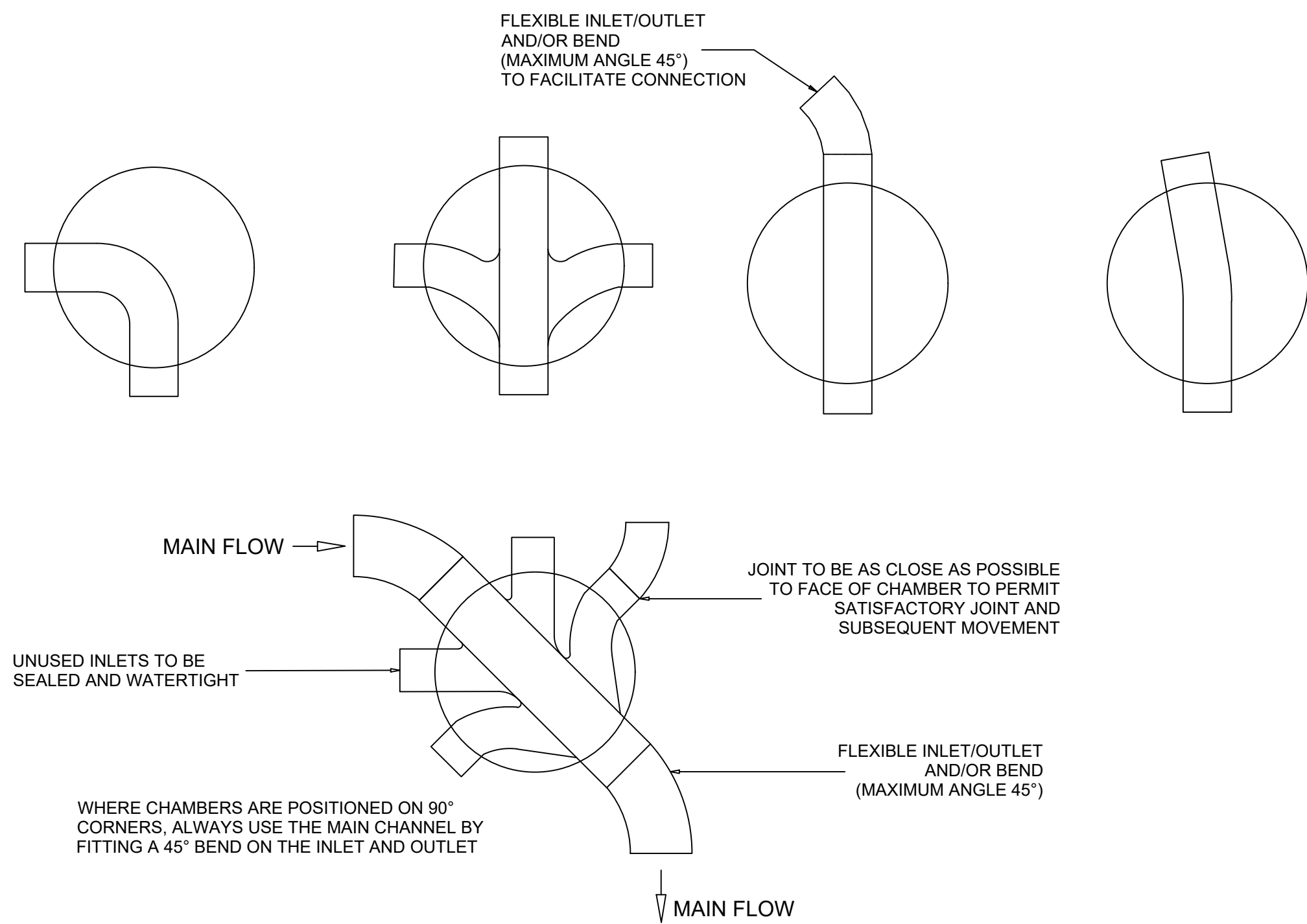
SCALE 1:10

P1	First Issue	PG	07.07.22
REV:	DESCRIPTION:	BY:	DATE:

FOR APPROVAL



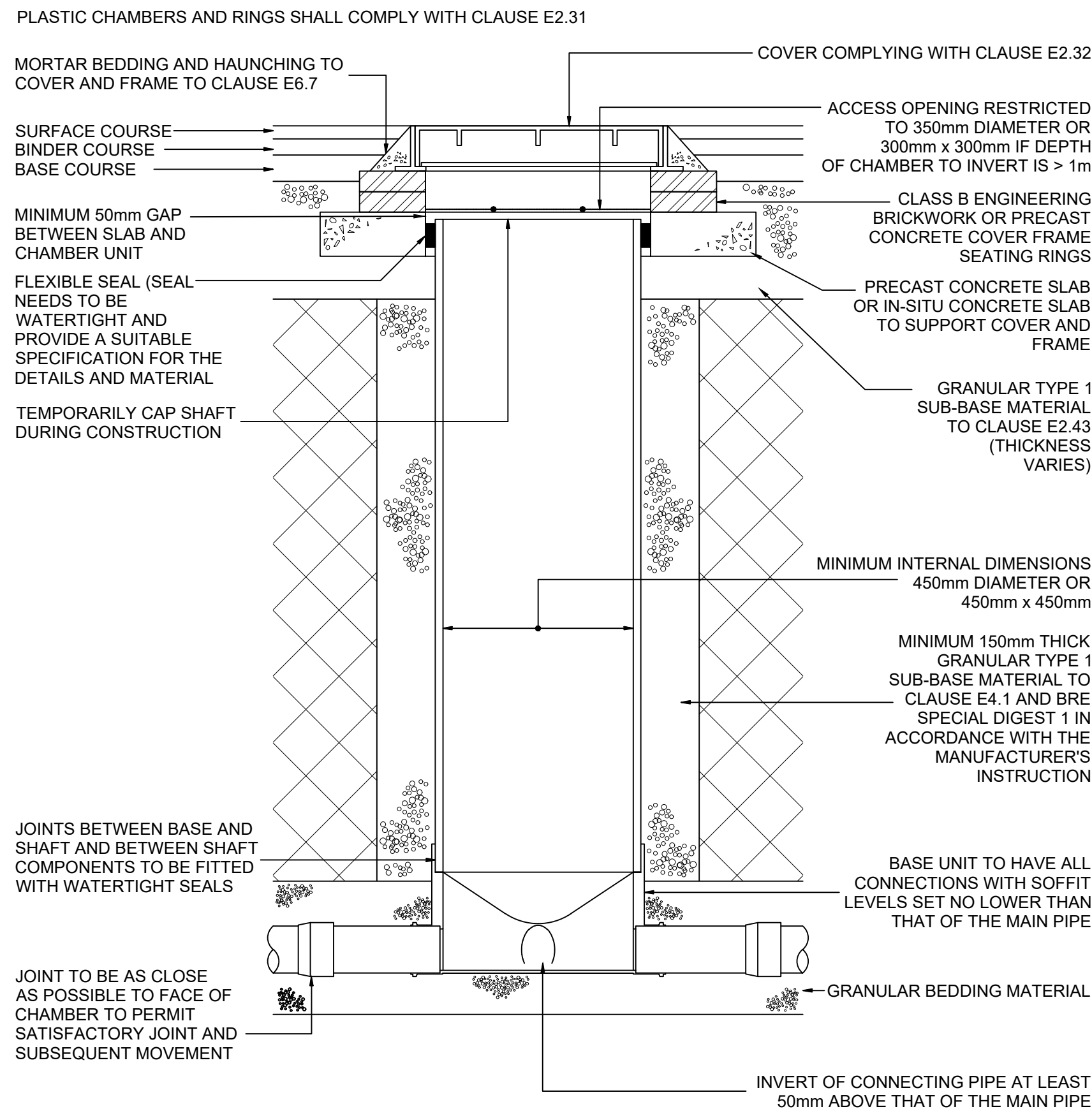
CLIENT:	CARDIFF 6TH FORM COLLEGE						
SITE:	CARDIFF 6TH FORM ACADEMIC HUB						
TITLE:	DETAILS SHEET 1						
SCALE AT A1:	DATE:		DRAWN:		CHECKED:		
AS SHOWN	JULY 2022		PG		KT		
PROJECT NO:	DRAWING NO:				REVISION:		
ES21.22	10.10				P1		



NOTE: WHERE A BEND IS USED IMMEDIATELY OUTSIDE THE MANHOLE, THIS MAY BE USED AS THE ROCKER PIPE

TYPICAL BASE LAYOUTS FOR TYPE D CHAMBERS

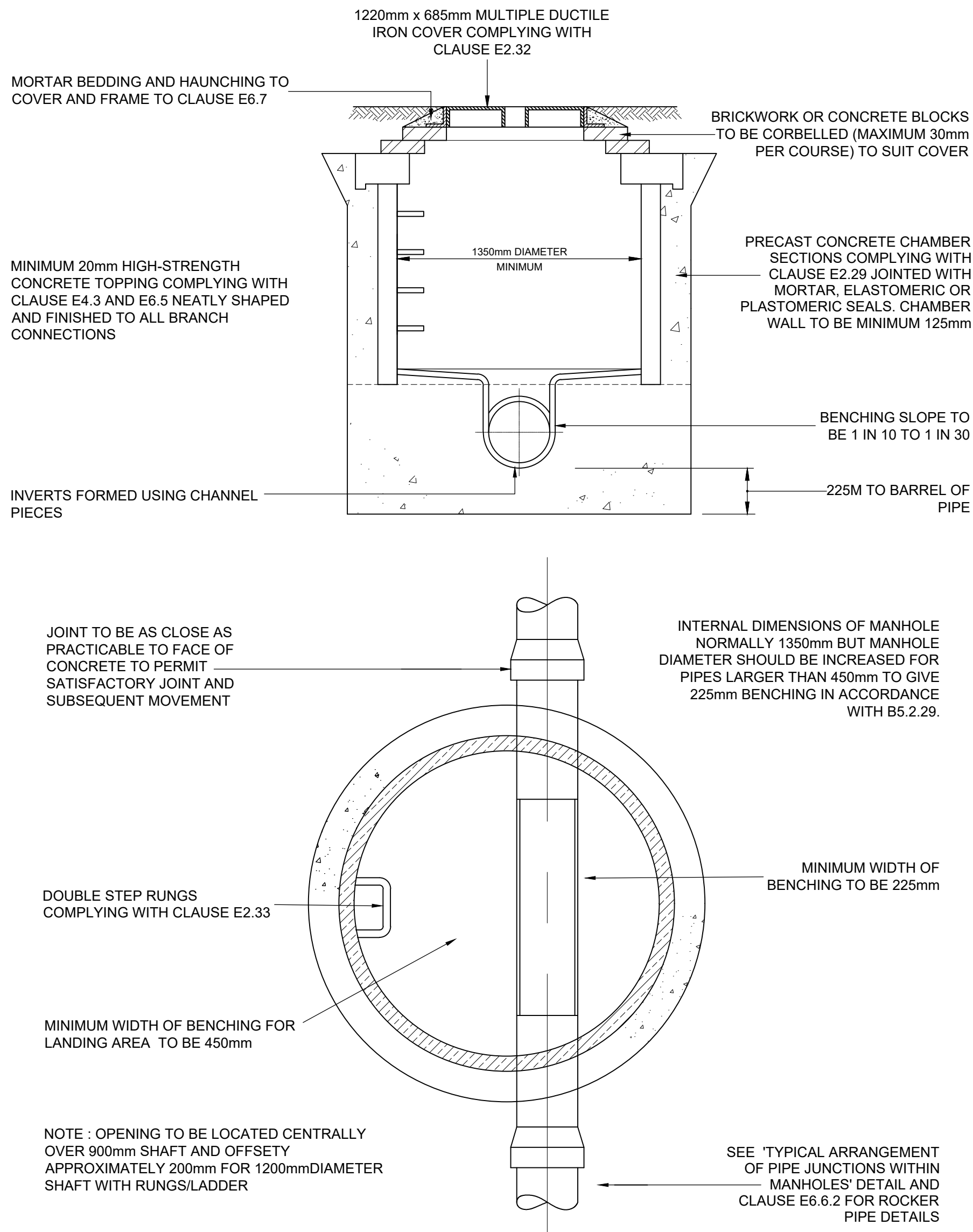
NOT TO SCALE



NOTE: WHERE THE ACCESS CHAMBER IS IN THE HIGHWAY THE HIGHWAY AUTHORITY CAN HAVE SPECIFIC REQUIREMENTS

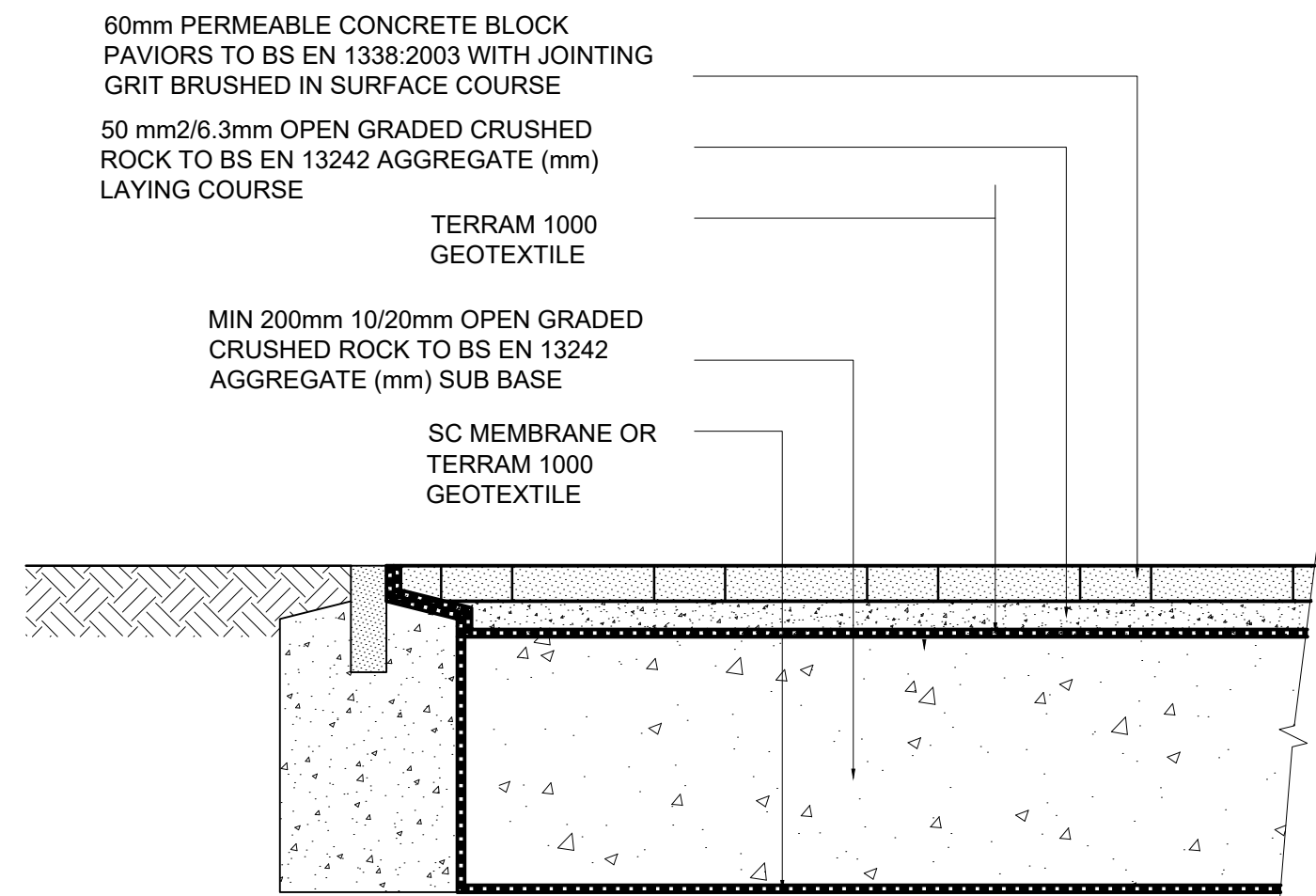
TYPICAL INSPECTION CHAMBER DETAIL - TYPE D

DEPTH FROM COVER LEVEL TO SOFFIT OF PIPE UP TO 2m
FLEXIBLE MATERIAL CONSTRUCTION FOR USE IN AREAS SUBJECT TO VEHICLE LOADING
NOT TO SCALE

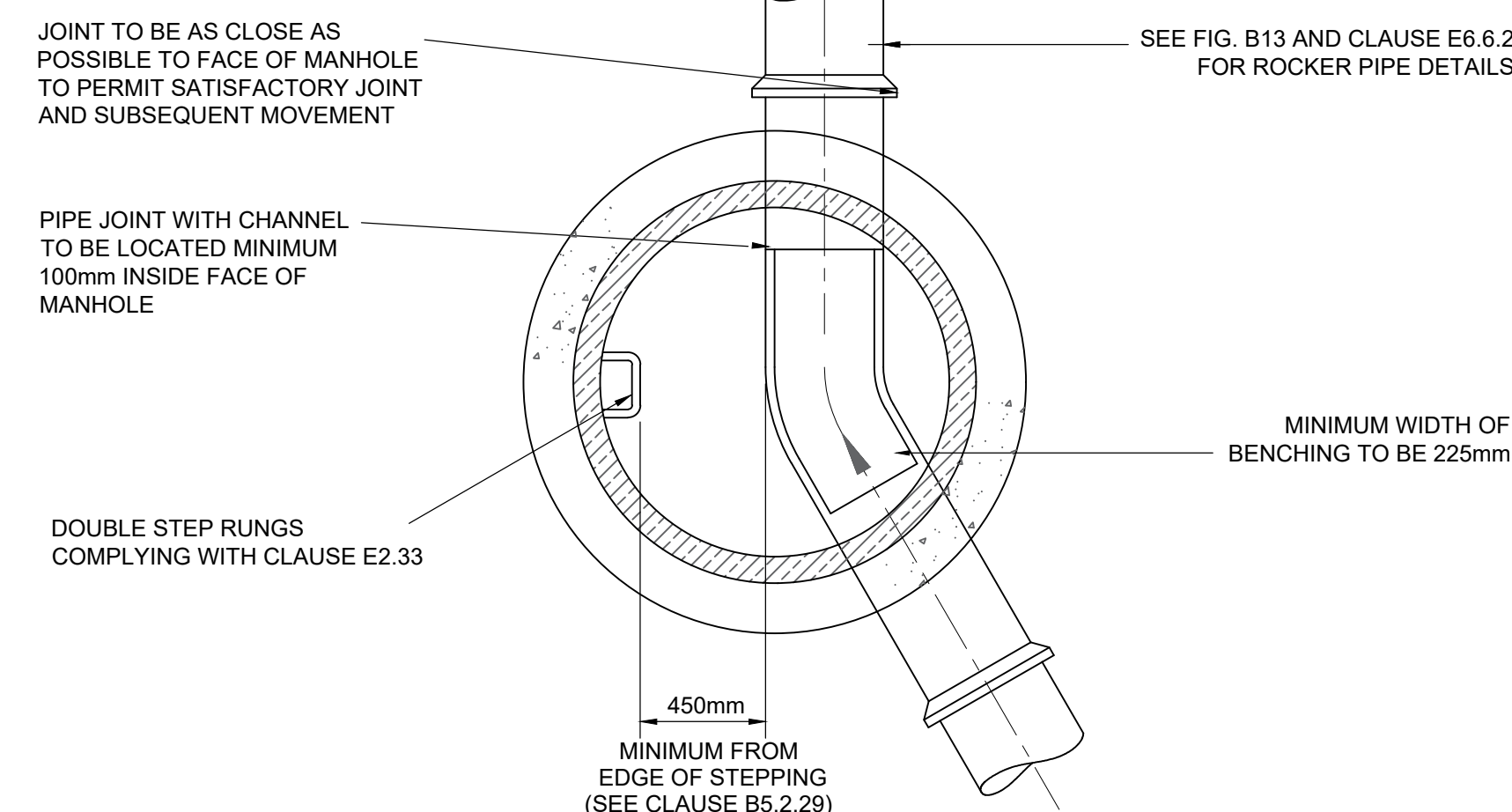
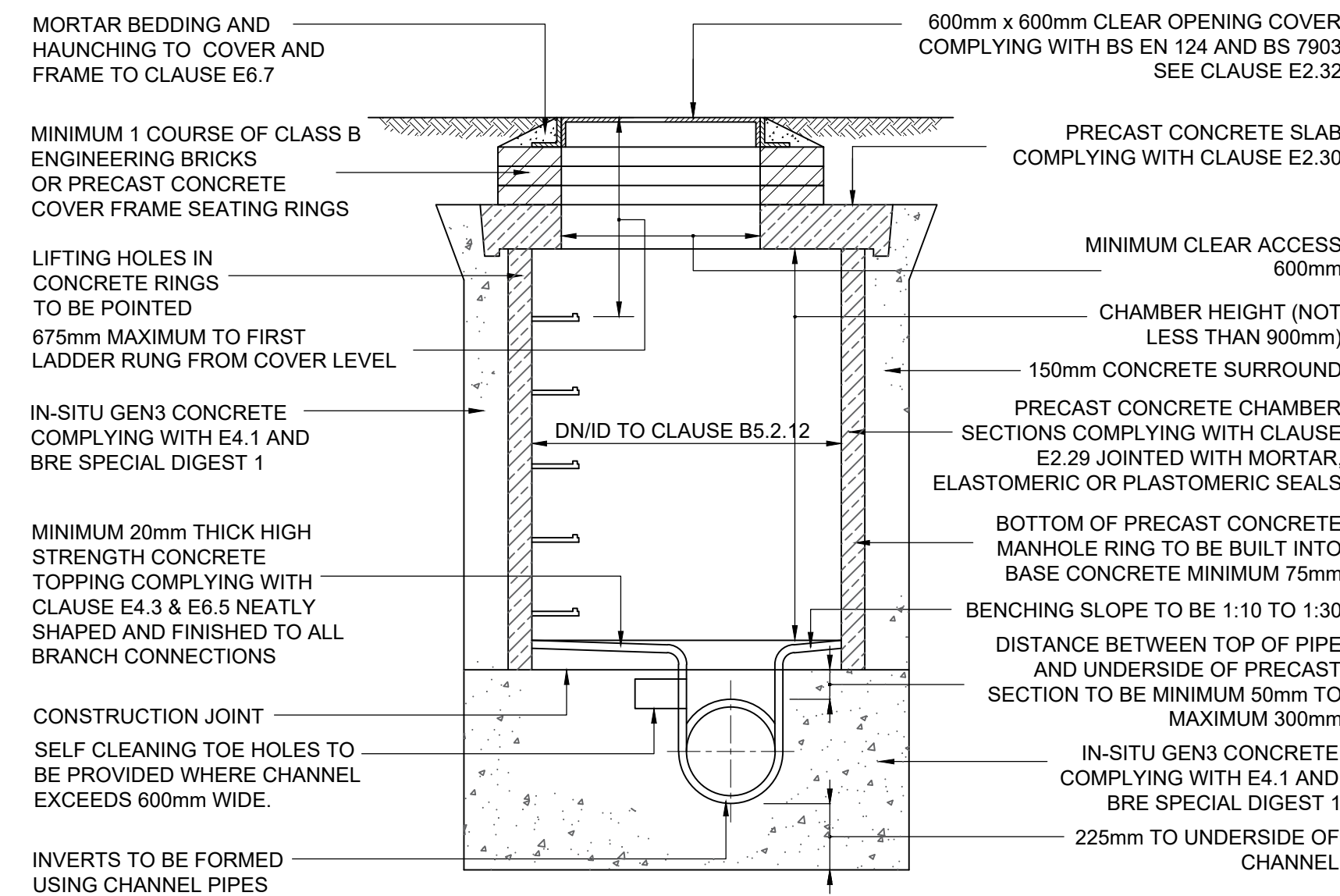


TYPICAL MANHOLE DETAIL - TYPE C

DEPTH FROM COVER TO SOFFIT OF PIPE LESS THAN 1.5m
MINIMUM RIGID PIPE SIZE 450mm DIAMETER. RIGID MATERIAL CONSTRUCTION.
NOT TO SCALE



LINED PERMEABLE PAVING SYSTEM



TYPICAL MANHOLE DETAIL - TYPE B

DEPTH FROM COVER LEVEL TO SOFFIT OF PIPE 1.35 TO 3.0m
RIGID MATERIAL CONSTRUCTION WITH CONCRETE SURROUND
NTS

NOTES:

- DO NOT SCALE FROM THIS DRAWING. ALL DIMENSIONS ARE IN METRES, UNLESS STATED OTHERWISE.
- DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS, REPORTS AND SPECIFICATIONS. ANY DISCREPANCIES TO BE REPORTED TO THE ENGINEER 5 WORKING DAYS IN ADVANCE OF UNDERTAKING ANY WORK.

P1	First Issue	PG	07.07.22
REV:	DESCRIPTION:	BY:	DATE:


FOR APPROVAL

EXPEDITE

Exeter
The Design Studio
35 Southernhay East
Exeter
EX1 1NX
t: 01392 691 631
www.expediteps.com

CLIENT:	CARDIFF 6TH FORM COLLEGE						
SITE:	CARDIFF 6TH FORM ACADEMIC HUB						
TITLE:	DETAILS SHEET 2						
SCALE AT A1:	DATE:		DRAWN:		CHECKED:		
AS SHOWN	JULY 2022		PG		KT		
PROJECT NO:	DRAWING NO:				REVISION:		
ES21.22	10.11				P1		

Appendix B

Cotswold Transport Planning		Page 1
CTP House, Knapp Road Cheltenham Gloucestershire, GL50 3QQ		
Date 08/07/2022 16:36 File	Designed by PaulGraham Checked by	
Innovyze Source Control 2020.1.3		

ICP SUDS Mean Annual Flood


Input


Return Period (years)	1	Soil	0.450
Area (ha)	0.101	Urban	0.750
SAAR (mm)	1020	Region Number	Region 9


Results 1/s

QBAR Rural	0.7
QBAR Urban	1.6
Q1 year	1.4
Q1 year	1.4
Q30 years	2.4
Q100 years	2.7

©1982-2020 Innovyze

Cotswold Transport Planning							Page 1																																																																																																																																																																																																																																																																																	
CTP House, Knapp Road Cheltenham Gloucestershire, GL50 3QQ																																																																																																																																																																																																																																																																																								
Date 20/07/2022 12:44 File BLUE ROOF.SRCX			Designed by PaulGraham Checked by																																																																																																																																																																																																																																																																																					
Innovyze			Source Control 2020.1.3																																																																																																																																																																																																																																																																																					
<p><u>Summary of Results for 100 year Return Period (+40%)</u></p> <p>Half Drain Time : 667 minutes.</p> <table><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Infiltration (l/s)</th><th>Max Control (l/s)</th><th>Max Σ Outflow (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr><tr><td>15 min Summer</td><td>100.034</td><td>0.034</td><td>0.0</td><td>0.3</td><td>0.3</td><td>23.1</td><td>Flood Risk</td></tr><tr><td>30 min Summer</td><td>100.046</td><td>0.046</td><td>0.0</td><td>0.5</td><td>0.5</td><td>31.4</td><td>Flood Risk</td></tr><tr><td>60 min Summer</td><td>100.059</td><td>0.059</td><td>0.0</td><td>0.8</td><td>0.8</td><td>40.5</td><td>Flood Risk</td></tr><tr><td>120 min Summer</td><td>100.073</td><td>0.073</td><td>0.0</td><td>0.9</td><td>0.9</td><td>49.7</td><td>Flood Risk</td></tr><tr><td>180 min Summer</td><td>100.080</td><td>0.080</td><td>0.0</td><td>1.0</td><td>1.0</td><td>54.5</td><td>Flood Risk</td></tr><tr><td>240 min Summer</td><td>100.084</td><td>0.084</td><td>0.0</td><td>1.0</td><td>1.0</td><td>57.2</td><td>Flood Risk</td></tr><tr><td>360 min Summer</td><td>100.088</td><td>0.088</td><td>0.0</td><td>1.0</td><td>1.0</td><td>60.4</td><td>Flood Risk</td></tr><tr><td>480 min Summer</td><td>100.091</td><td>0.091</td><td>0.0</td><td>1.1</td><td>1.1</td><td>62.0</td><td>Flood Risk</td></tr><tr><td>600 min Summer</td><td>100.093</td><td>0.093</td><td>0.0</td><td>1.1</td><td>1.1</td><td>63.2</td><td>Flood Risk</td></tr><tr><td>720 min Summer</td><td>100.094</td><td>0.094</td><td>0.0</td><td>1.1</td><td>1.1</td><td>64.1</td><td>Flood Risk</td></tr><tr><td>960 min Summer</td><td>100.095</td><td>0.095</td><td>0.0</td><td>1.1</td><td>1.1</td><td>65.1</td><td>Flood Risk</td></tr><tr><td>1440 min Summer</td><td>100.096</td><td>0.096</td><td>0.0</td><td>1.1</td><td>1.1</td><td>65.4</td><td>Flood Risk</td></tr><tr><td>2160 min Summer</td><td>100.093</td><td>0.093</td><td>0.0</td><td>1.1</td><td>1.1</td><td>63.8</td><td>Flood Risk</td></tr><tr><td>2880 min Summer</td><td>100.090</td><td>0.090</td><td>0.0</td><td>1.1</td><td>1.1</td><td>61.3</td><td>Flood Risk</td></tr><tr><td>4320 min Summer</td><td>100.082</td><td>0.082</td><td>0.0</td><td>1.0</td><td>1.0</td><td>55.9</td><td>Flood Risk</td></tr><tr><td>5760 min Summer</td><td>100.075</td><td>0.075</td><td>0.0</td><td>0.9</td><td>0.9</td><td>51.2</td><td>Flood Risk</td></tr><tr><td>7200 min Summer</td><td>100.069</td><td>0.069</td><td>0.0</td><td>0.9</td><td>0.9</td><td>47.2</td><td>Flood Risk</td></tr><tr><td>8640 min Summer</td><td>100.065</td><td>0.065</td><td>0.0</td><td>0.8</td><td>0.8</td><td>44.1</td><td>Flood Risk</td></tr><tr><td>10080 min Summer</td><td>100.061</td><td>0.061</td><td>0.0</td><td>0.8</td><td>0.8</td><td>41.7</td><td>Flood Risk</td></tr><tr><td>15 min Winter</td><td>100.034</td><td>0.034</td><td>0.0</td><td>0.3</td><td>0.3</td><td>23.1</td><td>Flood Risk</td></tr></table> <table><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Flooded Volume (m³)</th><th>Discharge Volume (m³)</th><th>Time-Peak (mins)</th></tr><tr><td>15 min Summer</td><td>119.447</td><td>0.0</td><td>13.2</td><td>27</td></tr><tr><td>30 min Summer</td><td>81.977</td><td>0.0</td><td>20.1</td><td>41</td></tr><tr><td>60 min Summer</td><td>53.779</td><td>0.0</td><td>34.4</td><td>70</td></tr><tr><td>120 min Summer</td><td>34.018</td><td>0.0</td><td>44.9</td><td>128</td></tr><tr><td>180 min Summer</td><td>25.580</td><td>0.0</td><td>51.2</td><td>186</td></tr><tr><td>240 min Summer</td><td>20.721</td><td>0.0</td><td>55.7</td><td>244</td></tr><tr><td>360 min Summer</td><td>15.419</td><td>0.0</td><td>62.6</td><td>360</td></tr><tr><td>480 min Summer</td><td>12.479</td><td>0.0</td><td>67.8</td><td>420</td></tr><tr><td>600 min Summer</td><td>10.579</td><td>0.0</td><td>71.9</td><td>480</td></tr><tr><td>720 min Summer</td><td>9.238</td><td>0.0</td><td>75.4</td><td>542</td></tr><tr><td>960 min Summer</td><td>7.450</td><td>0.0</td><td>80.8</td><td>674</td></tr><tr><td>1440 min Summer</td><td>5.489</td><td>0.0</td><td>88.1</td><td>946</td></tr><tr><td>2160 min Summer</td><td>4.034</td><td>0.0</td><td>107.2</td><td>1352</td></tr><tr><td>2880 min Summer</td><td>3.236</td><td>0.0</td><td>114.2</td><td>1756</td></tr><tr><td>4320 min Summer</td><td>2.367</td><td>0.0</td><td>123.1</td><td>2516</td></tr><tr><td>5760 min Summer</td><td>1.898</td><td>0.0</td><td>138.8</td><td>3280</td></tr><tr><td>7200 min Summer</td><td>1.600</td><td>0.0</td><td>145.7</td><td>3976</td></tr><tr><td>8640 min Summer</td><td>1.392</td><td>0.0</td><td>151.1</td><td>4680</td></tr><tr><td>10080 min Summer</td><td>1.237</td><td>0.0</td><td>154.8</td><td>5448</td></tr><tr><td>15 min Winter</td><td>119.447</td><td>0.0</td><td>13.2</td><td>26</td></tr></table>								Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status	15 min Summer	100.034	0.034	0.0	0.3	0.3	23.1	Flood Risk	30 min Summer	100.046	0.046	0.0	0.5	0.5	31.4	Flood Risk	60 min Summer	100.059	0.059	0.0	0.8	0.8	40.5	Flood Risk	120 min Summer	100.073	0.073	0.0	0.9	0.9	49.7	Flood Risk	180 min Summer	100.080	0.080	0.0	1.0	1.0	54.5	Flood Risk	240 min Summer	100.084	0.084	0.0	1.0	1.0	57.2	Flood Risk	360 min Summer	100.088	0.088	0.0	1.0	1.0	60.4	Flood Risk	480 min Summer	100.091	0.091	0.0	1.1	1.1	62.0	Flood Risk	600 min Summer	100.093	0.093	0.0	1.1	1.1	63.2	Flood Risk	720 min Summer	100.094	0.094	0.0	1.1	1.1	64.1	Flood Risk	960 min Summer	100.095	0.095	0.0	1.1	1.1	65.1	Flood Risk	1440 min Summer	100.096	0.096	0.0	1.1	1.1	65.4	Flood Risk	2160 min Summer	100.093	0.093	0.0	1.1	1.1	63.8	Flood Risk	2880 min Summer	100.090	0.090	0.0	1.1	1.1	61.3	Flood Risk	4320 min Summer	100.082	0.082	0.0	1.0	1.0	55.9	Flood Risk	5760 min Summer	100.075	0.075	0.0	0.9	0.9	51.2	Flood Risk	7200 min Summer	100.069	0.069	0.0	0.9	0.9	47.2	Flood Risk	8640 min Summer	100.065	0.065	0.0	0.8	0.8	44.1	Flood Risk	10080 min Summer	100.061	0.061	0.0	0.8	0.8	41.7	Flood Risk	15 min Winter	100.034	0.034	0.0	0.3	0.3	23.1	Flood Risk	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	15 min Summer	119.447	0.0	13.2	27	30 min Summer	81.977	0.0	20.1	41	60 min Summer	53.779	0.0	34.4	70	120 min Summer	34.018	0.0	44.9	128	180 min Summer	25.580	0.0	51.2	186	240 min Summer	20.721	0.0	55.7	244	360 min Summer	15.419	0.0	62.6	360	480 min Summer	12.479	0.0	67.8	420	600 min Summer	10.579	0.0	71.9	480	720 min Summer	9.238	0.0	75.4	542	960 min Summer	7.450	0.0	80.8	674	1440 min Summer	5.489	0.0	88.1	946	2160 min Summer	4.034	0.0	107.2	1352	2880 min Summer	3.236	0.0	114.2	1756	4320 min Summer	2.367	0.0	123.1	2516	5760 min Summer	1.898	0.0	138.8	3280	7200 min Summer	1.600	0.0	145.7	3976	8640 min Summer	1.392	0.0	151.1	4680	10080 min Summer	1.237	0.0	154.8	5448	15 min Winter	119.447	0.0	13.2	26
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status																																																																																																																																																																																																																																																																																	
15 min Summer	100.034	0.034	0.0	0.3	0.3	23.1	Flood Risk																																																																																																																																																																																																																																																																																	
30 min Summer	100.046	0.046	0.0	0.5	0.5	31.4	Flood Risk																																																																																																																																																																																																																																																																																	
60 min Summer	100.059	0.059	0.0	0.8	0.8	40.5	Flood Risk																																																																																																																																																																																																																																																																																	
120 min Summer	100.073	0.073	0.0	0.9	0.9	49.7	Flood Risk																																																																																																																																																																																																																																																																																	
180 min Summer	100.080	0.080	0.0	1.0	1.0	54.5	Flood Risk																																																																																																																																																																																																																																																																																	
240 min Summer	100.084	0.084	0.0	1.0	1.0	57.2	Flood Risk																																																																																																																																																																																																																																																																																	
360 min Summer	100.088	0.088	0.0	1.0	1.0	60.4	Flood Risk																																																																																																																																																																																																																																																																																	
480 min Summer	100.091	0.091	0.0	1.1	1.1	62.0	Flood Risk																																																																																																																																																																																																																																																																																	
600 min Summer	100.093	0.093	0.0	1.1	1.1	63.2	Flood Risk																																																																																																																																																																																																																																																																																	
720 min Summer	100.094	0.094	0.0	1.1	1.1	64.1	Flood Risk																																																																																																																																																																																																																																																																																	
960 min Summer	100.095	0.095	0.0	1.1	1.1	65.1	Flood Risk																																																																																																																																																																																																																																																																																	
1440 min Summer	100.096	0.096	0.0	1.1	1.1	65.4	Flood Risk																																																																																																																																																																																																																																																																																	
2160 min Summer	100.093	0.093	0.0	1.1	1.1	63.8	Flood Risk																																																																																																																																																																																																																																																																																	
2880 min Summer	100.090	0.090	0.0	1.1	1.1	61.3	Flood Risk																																																																																																																																																																																																																																																																																	
4320 min Summer	100.082	0.082	0.0	1.0	1.0	55.9	Flood Risk																																																																																																																																																																																																																																																																																	
5760 min Summer	100.075	0.075	0.0	0.9	0.9	51.2	Flood Risk																																																																																																																																																																																																																																																																																	
7200 min Summer	100.069	0.069	0.0	0.9	0.9	47.2	Flood Risk																																																																																																																																																																																																																																																																																	
8640 min Summer	100.065	0.065	0.0	0.8	0.8	44.1	Flood Risk																																																																																																																																																																																																																																																																																	
10080 min Summer	100.061	0.061	0.0	0.8	0.8	41.7	Flood Risk																																																																																																																																																																																																																																																																																	
15 min Winter	100.034	0.034	0.0	0.3	0.3	23.1	Flood Risk																																																																																																																																																																																																																																																																																	
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)																																																																																																																																																																																																																																																																																				
15 min Summer	119.447	0.0	13.2	27																																																																																																																																																																																																																																																																																				
30 min Summer	81.977	0.0	20.1	41																																																																																																																																																																																																																																																																																				
60 min Summer	53.779	0.0	34.4	70																																																																																																																																																																																																																																																																																				
120 min Summer	34.018	0.0	44.9	128																																																																																																																																																																																																																																																																																				
180 min Summer	25.580	0.0	51.2	186																																																																																																																																																																																																																																																																																				
240 min Summer	20.721	0.0	55.7	244																																																																																																																																																																																																																																																																																				
360 min Summer	15.419	0.0	62.6	360																																																																																																																																																																																																																																																																																				
480 min Summer	12.479	0.0	67.8	420																																																																																																																																																																																																																																																																																				
600 min Summer	10.579	0.0	71.9	480																																																																																																																																																																																																																																																																																				
720 min Summer	9.238	0.0	75.4	542																																																																																																																																																																																																																																																																																				
960 min Summer	7.450	0.0	80.8	674																																																																																																																																																																																																																																																																																				
1440 min Summer	5.489	0.0	88.1	946																																																																																																																																																																																																																																																																																				
2160 min Summer	4.034	0.0	107.2	1352																																																																																																																																																																																																																																																																																				
2880 min Summer	3.236	0.0	114.2	1756																																																																																																																																																																																																																																																																																				
4320 min Summer	2.367	0.0	123.1	2516																																																																																																																																																																																																																																																																																				
5760 min Summer	1.898	0.0	138.8	3280																																																																																																																																																																																																																																																																																				
7200 min Summer	1.600	0.0	145.7	3976																																																																																																																																																																																																																																																																																				
8640 min Summer	1.392	0.0	151.1	4680																																																																																																																																																																																																																																																																																				
10080 min Summer	1.237	0.0	154.8	5448																																																																																																																																																																																																																																																																																				
15 min Winter	119.447	0.0	13.2	26																																																																																																																																																																																																																																																																																				
©1982-2020 Innovyze																																																																																																																																																																																																																																																																																								

Cotswold Transport Planning							Page 1
CTP House, Knapp Road Cheltenham Gloucestershire, GL50 3QQ							
Date 07/07/2022 13:58 File Permeable Paving.SRCX				Designed by PaulGraham Checked by			
Innovyze				Source Control 2020.1.3			
<u>Summary of Results for 100 year Return Period (+40%)</u>							
Half Drain Time : 167 minutes.							
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	7.093	0.093	0.0	0.3	0.3	3.6	O K
30 min Summer	7.124	0.124	0.0	0.4	0.4	4.9	O K
60 min Summer	7.155	0.155	0.0	0.4	0.4	6.0	O K
120 min Summer	7.177	0.177	0.0	0.4	0.4	6.9	O K
180 min Summer	7.184	0.184	0.0	0.5	0.5	7.2	O K
240 min Summer	7.186	0.186	0.0	0.5	0.5	7.2	O K
360 min Summer	7.186	0.186	0.0	0.5	0.5	7.2	O K
480 min Summer	7.182	0.182	0.0	0.5	0.5	7.1	O K
600 min Summer	7.177	0.177	0.0	0.4	0.4	6.9	O K
720 min Summer	7.171	0.171	0.0	0.4	0.4	6.7	O K
960 min Summer	7.159	0.159	0.0	0.4	0.4	6.2	O K
1440 min Summer	7.138	0.138	0.0	0.4	0.4	5.4	O K
2160 min Summer	7.113	0.113	0.0	0.4	0.4	4.4	O K
2880 min Summer	7.095	0.095	0.0	0.3	0.3	3.7	O K
4320 min Summer	7.070	0.070	0.0	0.3	0.3	2.7	O K
5760 min Summer	7.056	0.056	0.0	0.2	0.2	2.2	O K
7200 min Summer	7.046	0.046	0.0	0.2	0.2	1.8	O K
8640 min Summer	7.040	0.040	0.0	0.2	0.2	1.5	O K
10080 min Summer	7.035	0.035	0.0	0.2	0.2	1.4	O K
15 min Winter	7.093	0.093	0.0	0.3	0.3	3.6	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)			
15 min Summer	119.447	0.0	3.8	25			
30 min Summer	81.977	0.0	5.2	38			
60 min Summer	53.779	0.0	7.0	64			
120 min Summer	34.018	0.0	8.8	116			
180 min Summer	25.580	0.0	9.9	146			
240 min Summer	20.721	0.0	10.7	178			
360 min Summer	15.419	0.0	12.0	246			
480 min Summer	12.479	0.0	12.9	314			
600 min Summer	10.579	0.0	13.7	384			
720 min Summer	9.238	0.0	14.4	450			
960 min Summer	7.450	0.0	15.4	584			
1440 min Summer	5.489	0.0	17.1	842			
2160 min Summer	4.034	0.0	18.8	1216			
2880 min Summer	3.236	0.0	20.2	1584			
4320 min Summer	2.367	0.0	22.1	2296			
5760 min Summer	1.898	0.0	23.7	3008			
7200 min Summer	1.600	0.0	24.9	3744			
8640 min Summer	1.392	0.0	26.0	4416			
10080 min Summer	1.237	0.0	27.0	5144			
15 min Winter	119.447	0.0	3.8	25			
©1982-2020 Innovyze							

Cotswold Transport Planning		Page 3
CTP House, Knapp Road Cheltenham Gloucestershire, GL50 3QQ		
Date 07/07/2022 13:58 File Permeable Paving.SRCX	Designed by PaulGraham Checked by	
Innovyze Source Control 2020.1.3		

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	1.000
Region	England and Wales	Cv (Winter)	1.000
M5-60 (mm)	19.000	Shortest Storm (mins)	15
Ratio R	0.310	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.013

Time (mins)	Area	Time (mins)	Area	Time (mins)	Area
From: To:	(ha)	From: To:	(ha)	From: To:	(ha)
0 4	0.004	4 8	0.004	8 12	0.004

©1982-2020 Innovyze

Cory's Building & Merchant Place Development, off Bute Street, Cardiff - Peak FW Flow Rate Calculation

No. of people:	620	Students + Staff
Flow (l/person/day):	90	Taken from Flows and Loads - 4; <i>Schools - Non-residential with canteen cooking on site</i>
Infiltration:	1.1	10%
Peaking Factor:	6	
Peak FW Flow Rate (l/day):	368280.0	$6 \times ((620 \times 90) \times 1.1)$
Peak FW Flow Rate (l/s):	4.3	

Appendix C



Dŵr Cymru
Welsh Water

PPA0006628



LEGEND(Representative of most common features)

Waste networks:		
Foul chamber	Surface water chamber	Outfall
Combined chamber	Combined sewer overflow	Storm Overflow
Special purpose chamber	Treatment works	Rising main
Pumping station	Private sewer subject to Sect. 104 adoption agreement	Gravity sewer
NB: Sewer symbol colour indicates the type.	Private Sewer Transfer	Lateral Drain
RED - Combined	Inspection Chamber	
GREEN - Surface Water		
BROWN - Foul		
Purple - Former S24 sewers (for indicative purposes only)		

Notes:

Whilst every reasonable effort has been taken to correctly record the pipe material of DCWW assets, there is a possibility that in some cases pipe material (other than Asbestos Cement or Pitch Fibre) may be found to be asbestos cement (AC) or Pitch Fibre (PF). It is therefore advisable that the possible presence of AC or PF pipes be anticipated and considered as part of any risk assessment prior to excavation.

Dŵr Cymru Cylfngedig (the Company) gives this information as to the position of its underground apparatus by way of general guidance only and on the understanding that it is based on the best information available and is not warranted as to its correctness in the event of excavations or other works made in the vicinity of the company's apparatus. The error of location of apparatus is liable to vary and any excavation made entirely at the user's risk. The information is supplied to the user as a guide only and is not to be used as a basis for any claim. The user is advised to consult the relevant legislation and to take appropriate precautions when excavating. The user is advised to consult the relevant legislation and to take appropriate precautions when excavating. The user is advised to consult the relevant legislation and to take appropriate precautions when excavating.

Service pipes are not generally shown but their presence should be anticipated.

**EXACT LOCATIONS OF ALL APPARATUS
TO BE DETERMINED ON SITE.**

Reproduced by permission of the Ordnance Survey on behalf of
HMSSO. © Crown copyright and database right 2017.
All rights reserved.
Ordnance Survey Licence number 100019534

Map Ref: 319144,174654
Map scale: 1:750
Printed by: Sara Edwards
Printed on: 28 Apr 2022



Mr Gavin Swift
Expedite Engineering Services Ltd
35, Southernhay East
Exeter
Devon
EX1 1NX

Date: 27/04/2022
Our Ref: PPA0006628

Dear Mr Swift

Grid Ref: 319133 174653

Site Address: Cory's Building, Bute Street Cardiff

Development: Cory's Building & Merchant Place Re-development

I refer to your pre-planning enquiry received relating to the above site, seeking our views on the capacity of our network of assets and infrastructure to accommodate your proposed development. Having reviewed the details submitted I can provide the following comments which should be taken into account within any future planning application for the development.

APPRAISAL

Firstly, we note that the proposal relates to re-development of existing Cory's and Merchant place buildings on Bute Street and acknowledge that the site comprises of a potential windfall development with no allocated status in the Local Development Plan (LDP). Accordingly, whilst it does not appear an assessment has been previously undertaken of the public sewerage system, we offer the following comments as part of our appraisal of this development.

Please note, notwithstanding the following assessment, we would advise there is also a mandatory requirement to undertake pre-application consultation with all 'Specialist Consultees', including Dwr Cymru Welsh Water as the statutory water and sewerage undertaker, in accordance with Schedule 4 of Town & Country Planning (Development Management Procedure) (Wales) (Amendment) Order 2016. As a major development, amounting to more than 1000 sqm, you will be statutorily required to consult Welsh Water and a substantive response will be issued within 28 days from the date of the notice as per the requirements of Article 2E.

Public Sewerage Network

The proposed development site is located in the immediate vicinity of a combined public sewerage system which drains to Cardiff Bay Wastewater Treatment Works (WwTW).

You are also advised that some public sewers and lateral drains may not be recorded on our maps of public sewers because they were originally privately owned and were transferred into public ownership by nature of the Water Industry (Schemes for Adoption of Private Sewers) Regulations 2011. The presence of such assets may affect the proposal. In order to assist you may contact Dwr Cymru Welsh Water on 0800 085 3968 to establish the location and status of the apparatus in and around your site. Please be mindful that under the Water Industry Act 1991 Dwr Cymru Welsh Water has rights of access to its apparatus at all times.

Surface Water Drainage

As of 7th January 2019, this proposed development is subject to Schedule 3 of the Flood and Water Management Act 2010. The development therefore requires approval of Sustainable Drainage Systems (SuDS) features, in accordance with the 'Statutory standards for sustainable drainage systems – designing, constructing, operating and maintaining surface water drainage systems'. As highlighted in these standards, the developer is required to explore and fully exhaust all surface water drainage options in accordance with a hierarchy which states that discharge to a combined sewer shall only be made as a last resort. Disposal should be made through the hierarchical approach, preferring infiltration and, where infiltration is not possible, disposal to a surface water drainage body in liaison with the Land Drainage Authority and/or Natural Resources Wales.

It is therefore recommended that the developer consult with Cardiff Council, as the determining SuDS Approval Body (SAB), in relation to their proposals for SuDS features. Please note, DCWW is a statutory consultee to the SAB application process and will provide comments to any SuDS proposals by response to SAB consultation. Please refer to further detailed advice relating to surface water management included in our attached Advice & Guidance note.

In addition, please note that no highway or land drainage run-off will be permitted to discharge directly or indirectly into the public sewerage system.

Foul Water Drainage – Sewerage Network

We have considered the impact of foul flows generated by the proposed development and concluded that flows can be accommodated within the public sewerage system. We advise that the flows should be connected to the combined sewer between manholes ST19741602 and ST19741607.

Should a planning application be submitted for this development we will seek to control these points of communication via appropriate planning conditions and therefore recommend that any drainage layout or strategy submitted as part of your application takes this into account. However, should you wish for an alternative connection point to be considered please provide further information to us in the form of a drainage strategy, preferably in advance of a planning application being submitted.



Welsh Water is owned by Glas Cymru – a 'not-for-profit' company.
Mae Dŵr Cymru yn eiddo i Glas Cymru – cwmni 'nid-er-elw'.

We welcome correspondence in
Welsh and English

Dŵr Cymru Cyf, a limited company registered in
Wales no 2366777. Registered office: Pentwyn Road,
Nelson, Treharris, Mid Glamorgan CF46 6LY

Rydym yn croesawu gohebiaeth yn y
Gymraeg neu yn Saesneg

Dŵr Cymru Cyf, cwmni cyfyngedig wedi'i gofrestru yng
Nghymru rhif 2366777. Swyddfa gofrestredig: Heol Pentwyn
Nelson, Treharris, Morgannwg Ganol CF46 6LY.

You may need to apply to Dwr Cymru Welsh Water for any connection to the public sewer under Section 106 of the Water Industry Act 1991. However, if the connection to the public sewer network is either via a lateral drain (i.e. a drain which extends beyond the connecting property boundary) or via a new sewer (i.e. serves more than one property), it is now a mandatory requirement to first enter into a Section 104 Adoption Agreement (Water Industry Act 1991). The design of the sewers and lateral drains must also conform to the Welsh Ministers Standards for Foul Sewers and Lateral Drains, and conform with the publication "Sewers for Adoption"- 7th Edition. Further information can be obtained via the Developer Services pages of www.dwrcymru.com.

Foul Water Drainage – Sewage Treatment

No problems are envisaged with the Wastewater Treatment Works for the treatment of domestic discharges from this site.

Water Supply

The proposed development is in an area where there are water supply problems for which there are no improvements planned within our current Capital Investment Programme AMP7 (years 2020 to 2025). In order to establish what would be required to serve the site with an adequate water supply, it will be necessary for the developer to fund the undertaking of a hydraulic modelling assessment on the water supply network. For the developer to obtain a quotation for the hydraulic modelling assessment, we will require a fee of £250 + VAT.

I trust the above information is helpful and will assist you in forming water and drainage strategies that should accompany any future planning application. I also attach copies of our water and sewer extract plans for the area, and a copy of our Planning Guidance Note which provides further information on our approach to the planning process, making connections to our systems and ensuring any existing public assets or infrastructure located within new development sites are protected.

Please note that our response is based on the information provided in your enquiry and should the information change we reserve the right to make a new representation. Should you have any queries or wish to discuss any aspect of our response please do not hesitate to contact our dedicated team of planning officers, either on 0800 917 2652 or via email at developer.services@dwrcymru.com. Please quote our reference number in all communications and correspondence.

Yours faithfully,



Owain George
Planning Liaison Manager
Developer Services

Please Note that demands upon the water and sewerage systems change continually; consequently, the information given above should be regarded as reliable for a maximum period of 12 months from the date of this letter.



Welsh Water is owned by Glas Cymru – a 'not-for-profit' company.
Mae Dŵr Cymru yn eiddo i Glas Cymru – cwmni 'nid-er-elw'.

We welcome correspondence in
Welsh and English

Dŵr Cymru Cyf, a limited company registered in
Wales no 2366777. Registered office: Pentwyn Road,
Nelson, Treharris, Mid Glamorgan CF46 6LY

Rydym yn croesawu gohebiaeth yn y
Gymraeg neu yn Saesneg

Dŵr Cymru Cyf, cwmni cyfyngedig wedi'i gofrestru yng
Nghymru rhif 2366777. Swyddfa gofrestredig: Heol Pentwyn
Nelson, Treharris, Morgannwg Ganol CF46 6LY.