

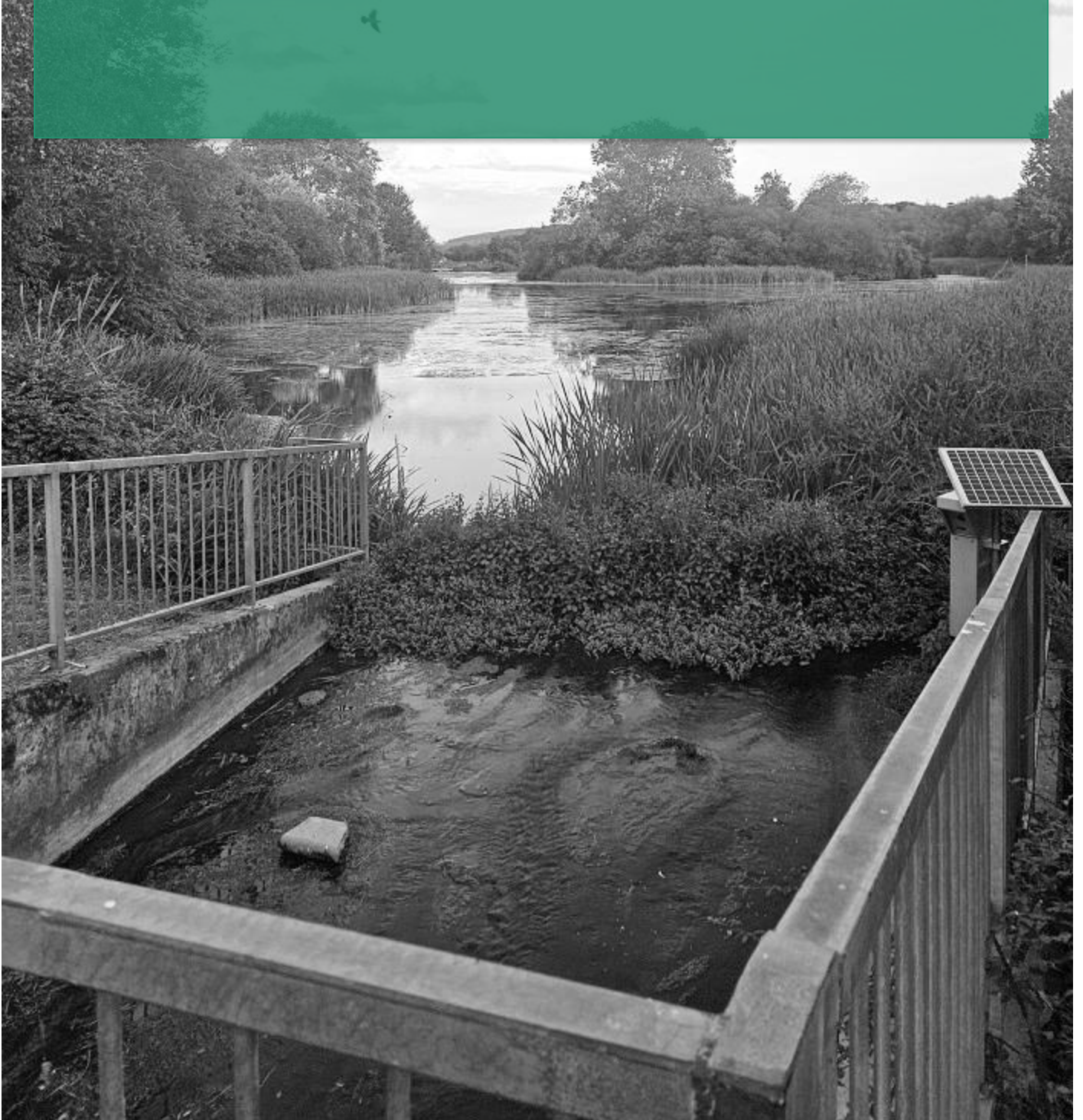
Land at rear of Tinplate, Southwick

Flood Risk Assessment

For: Ashford Homes (South West) Ltd

Date: 17/04/2026

File Ref: 20067-TUM-RP-XXX-0001



Document Control

Issued by	Tumu Consulting Limited Castlemead, Lower Castle Street Bristol BS1 3AG enquiries@tumuconsulting.com www.tumuconsulting.com
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Project name	Land at rear of Tinline, Southwick
Report title	Flood Risk Assessment
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Revision History

Rev	Date	Details	Author	Checked by
A	17/04/26	Draft Issue	RP	BF
B	21/04/26	Planning Issue	RP	BF
C	27/04/26	Updated following comments from design team	RP	BF

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Executive Summary

Tumu Consulting Ltd have been appointed by Ashford Homes (South West) Ltd to undertake a Flood Risk Assessment for a proposed industrial development to support an full planning submission, at Land at rear of Tinline, Southwick.

The drainage strategy considers the National Planning Policy Framework, The National Standards for SuDS, as well as the Wiltshire Council Drainage and Betterment Strategy.

The surface water drainage system proposes to utilise the existing private surface water network serving the original development. The new private surface water system will attenuate and discharge surface water flows at a rate 30% betterment on greenfield Q_{BAR} , before discharging to the existing attenuation tank serving the original development. The eventual discharge receptor is the ditch located to the north east of the site, through the existing private surface water infrastructure.

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1 Introduction

Tumu Consulting Ltd has been appointed by Ashford Homes (South West) Ltd to undertake a Flood Risk Assessment to support a planning permission submission for the extension of an existing industrial unit and yard at the Land at rear of Tinline, Southwick. The industrial unit will form the extension of the previously consented unit, which was approved in 2019 - 19/05839/FUL.

The report considers the National Planning Policy Framework (NPPF), The National Standards for SuDS (NSS), CIRIA753 The SuDS Manual, as well as the Wiltshire Council Drainage and Betterment Policy (2024)

1.1 Site Location

The site is located to the south west of Southwick, accessed by the A361, and is part of the Dunkirk Business Park, Frome Rd, Southwick, Trowbridge BA14 9NL. The co-ordinates for the site are 382720, 154830.



Figure 1-1 Site Location Plan

1.2 Existing Site Usage

The site comprises an existing industrial and office building with a kitchenette and WC facilities. To the north west of this is greenfield land which currently comprises a landscaped bund. To the east of the existing building is an access road and parking facilities.

1.3 Topography

A topographic survey was conducted in June 2025 by Clifton Surveys Ltd with drawing reference 647/6744/1. Existing levels range from 56.50-57.50mAOD, with the top of the bund at a level of approximately 60mAOD. The bank gradients of the bund range from approximately 1:2.5-1:3.5.

The ditch to the south west of the site generally has an invert level of 56-56.20mAOD, and the ditch to the east has an invert level of 55.10mAOD. Refer to Appendix A for the Topographic Survey, and the Existing Drainage Strategy in Appendix B.

1.4 Geology & Hydrogeology

British Geological Survey (BGS) Geology Viewer shows the site is underlain with a Kellaways Formation – Sandy Mudstone. The BGS describe the strata as *'Mudstone, grey, commonly silici-silty or silici-sandy, with (predominantly in the upper part) beds of generally calcareous siltstone and sandstone.'* The BGS Geology Viewer confirmed no superficial deposits are anticipated to be found at the site location.

Based on the ground conditions it is considered that the underlying soils are likely to be of low to negligible permeability and therefore the disposal of surface water by infiltration to ground via soakaways is not feasible, as borne out by the Drainage Strategy for the existing building as approved under ref. 19/05839/FUL.

The Natural England Magic Maps demonstrate that the site is not located within a Source Protection Zone and located within an unproductive aquifer.

1.5 Hydrology

There is a dry ditch located to the south west of the site, which forms the boundary of the development. This flows northwards and joins the Lambrook Stream approximately 0.5km north of the site, which is a tributary of the River Biss, approximately 3.7km north east of the site, within Trowbridge.

The existing development to the south currently discharges into a ditch to the north of the site, which ultimately converges with the southern ditch.

1.6 Existing Drainage

The site where the extension to the industrial unit and yard is proposed, is currently greenfield does not feature any known drainage.

The existing unit currently discharges surface water through a private surface water drainage system. A series of drains convey rainwater, to a geocellular attenuation tank located on existing soft landscape. A flow control chamber restricts the flow to 2.4l/s for all storms up to and including the 1% AEP rainfall event with a 40% allowance for climate change. Following the flow control, a Class 1 Bypass separator provides treatment to surface water, before discharge to the north western ditch. Refer to Appendix B for the Existing Drainage Strategy.

1.7 Existing Discharge Rates

As the site is greenfield, existing greenfield runoff calculations have been undertaken using FLOW software and attached in Appendix C. FEH22 rainfall data has been utilised, with the following parameters:

- BFIHOST 0.328 – Soil index taken from the FEH web service. Correlates with the impermeable underlying strata.
- SAAR6190 760mm – The location specific Standard Average Annual Rainfall for the period 1961-1990.
- Region 8 – The region that the site is located.

All data has been provided by the UK Centre for Ecology and Hydrology. The calculations of greenfield rates have been provided for the developed hard standing area.

Return Period (yr)	Area, A (ha)	Greenfield Discharge Rate (l/s)
Q_2	0.239	1.3
Q_{BAR}	0.239	1.5
Q_{30}	0.239	2.9
Q_{100}	0.239	3.7

Table 1-1 Existing Greenfield Discharge Rates

The Q_{BAR} rate has been calculated as 1.5l/s. Refer to Appendix C for the Causeway FLOW calculations.

2 Development Proposals

2.1 Description of the Proposed Works

It is proposed to develop the underutilised land to the north of the existing building to provide an extension, with associated access and sympathetic landscaping to accommodate the growth needs of a successful local business

2.2 Design Life

As the use of the site is industrial, it is anticipated that the design life of the site will be 60 years.

3 Flood Risk

As the building area exceeds 1,000m² a Flood Risk Assessment is required. A number of desktop sources of information have been consulted including the Environment Agency (EA) Flood Map for Planning, Long term Flood Risk Maps, and the Wiltshire Level 1 Strategic Flood Risk Assessment (SFRA) 2014.

3.1 Fluvial & Tidal Flood Risk

The figure below shows the whole site within Flood Zone 1, according to the Environment Agency (EA) Flood Map for Planning (FMfP). Flood Zone 1 designates an area at the lowest fluvial and tidal flood risk, less than 0.1% Annual Exceedance Probability (AEP). It can therefore be considered that the site is not at risk of fluvial and tidal flooding.



Figure 3-1 Environment Agency Flood Map for Planning – Flood Zones

3.2 Pluvial Flood Risk

The figure below shows the pluvial flood extents for the 0.1% AEP event. The localised flooding is located within the ditch which forms the western boundary of the site. The proposed building and yard/access is located outside of the pluvial flood extents. It can therefore be considered that the site is at very low risk of pluvial flooding.



Figure 3-2 Environment Agency Flood Map for Planning – Pluvial Flood Risk 0.1% AEP

3.3 Groundwater

The figure below from the Wiltshire Level 1 SFRA viewer shows the site at 'negligible risk', which is the lowest classification of groundwater flood risk. The risk of the site flooding from groundwater sources is therefore considered very low.

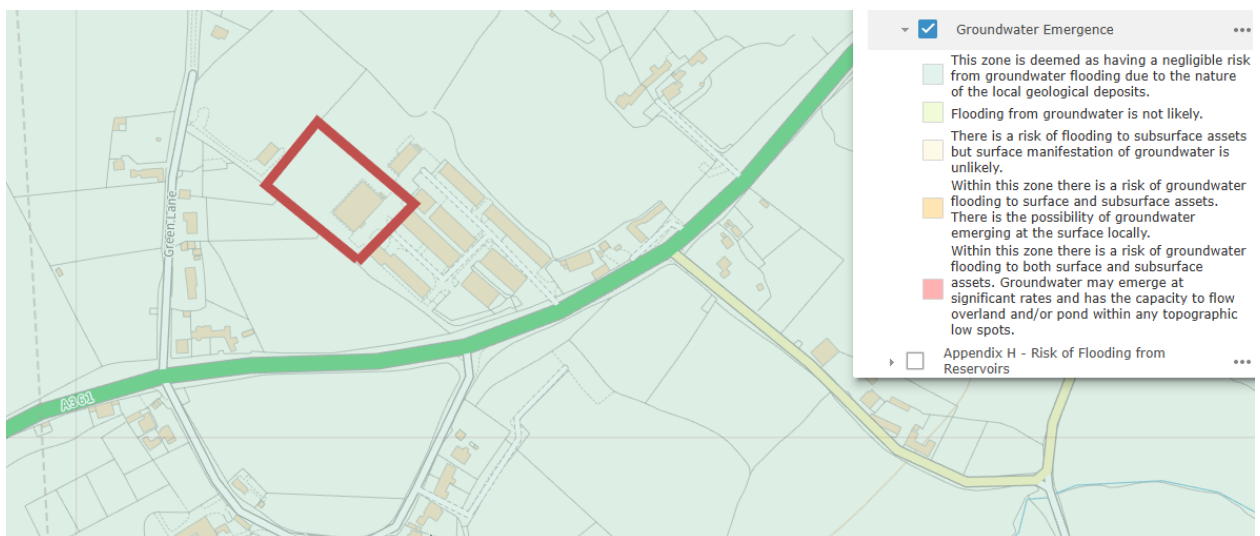


Figure 3-3 Groundwater Emergence – Wiltshire SFRA 2014 Viewer

3.4 Other Sources of Flooding

- The site is at very low risk of reservoir flooding, according to the Wiltsire SFRA 2014 viewer.
- There has been between 1-10 recorded sewer flood incidents for the whole of Southwick according to the Wiltsire SFRA 2014 viewer. However, levels from the industrial estate fall north and south from a high point in the centre of the estate. Therefore, if sewer flooding was to be experienced, discharge would eventually enter the ditch to the north east, or the A361 to the south east, as exceedance flows along the road network. The position of the structure ensures that it will not block these exceedance routes.
- There has been no recorded historic instances of flooding according to the Wiltsire SFRA 2014 viewer.

3.5 Flood Risk Conclusion

From reviewing desktop sources, it is clear that the site is at low risk of flooding from all notable sources, and therefore development can be considered appropriate for this site.

4 Surface Water Drainage Strategy

The surface water drainage strategy has been developed in accordance with the relevant design standard and guidance, including but not limited to; CIRIA C753 The SuDS Manual, The NPPF, The Approved Documents: Building Regulations 2010 Part H: Drainage and Waste Disposal, and the National Standards for SuDS (NSS) and The Wiltshire Surface Water Betterment Policy 2024.

The NSS states that for a previously developed site, the rate of discharge should never exceed the rate pre redevelopment. The NSS also states that flooding should not occur to any part of the site in the 1 in 30 year event, and no flooding to buildings or utility plant should occur in the 1 in 100 year event.

4.1 Surface Water Drainage Hierarchy

In line with National Standards for SuDS – Standard 1: Runoff Destinations, surface water discharge receptors should consider the surface water hierarchy priority to: Rainwater Harvesting; Soakaways/Infiltrating Drainage System; Watercourse; Public Surface Water Sewer; Combined Sewer.

Rainwater harvesting is not suitable for this development type. The nature of these proposals, i.e. an extension to the existing industrial storage area, will not increase the buildings existing water consumption. All foul drainage is limited to the existing building, with no non-potable usage requirement for the proposed building. Therefore, rainwater harvesting has been discounted.

The underlying strata of the site is not suitable to discharge of surface water using infiltration based techniques. This aligns with the previously approved strategy for the original industrial unit, and therefore soakaways have been discounted as a surface water receptor.

The site proposes to ultimately discharge surface water to the watercourse located to the north east of the development, shown on the Existing Drainage Layout in Appendix B.

4.2 Surface Water Drainage System

The surface water drainage system looks to build upon the design for the existing industrial unit and utilise the infrastructure that is currently in place. Rainwater pipes will drain roof areas into a new private surface water network. Gullies located at low points will drain the hardstanding access.

Surface water will be conveyed through the network to a new geocellular storage tank which will attenuate surface water.

A hydrobrake flow control device will limit flows to a 30% betterment on greenfield Q_{BAR} rate, before discharging into the existing attenuation tank serving the existing building. As part of the proposals, the existing hydrobrake will be upsized to account for the additional flow from the proposed development.

An existing Class 1 Bypass oil separator serving the existing development will provide treatment to the flow, removing suspended solids, metals and hydrocarbons from the flow. SPEL, the manufacturer of the separator, has confirmed the existing installed model is appropriate for the additional loading.

New landscaping proposals will increase the biodiversity and amenity of the development, with new trees and brush planting throughout the site.

The existing system discharges to the ditch to the north east of the development.

Refer to Appendix D for the Proposed Drainage Strategy, and Appendix E for the Standard Drainage Details.

4.3 Climate Change

As a lifespan of 60 years is being considered, the end of life can be estimated as 2086. According to government guidance, a development with a lifespan prior to 2100 should use the Central Allowance for a 2070's epoch when considering peak rainfall climate change allowances. For the Avon Bristol and North Somerset Streams Management Catchment, the climate change allowance to consider should be 25% for the 3.3%, and 25% for the 1% AEP events as shown in the figure below.

However, it is noted that the previous application adopted a 40% climate change allowance. Therefore, as a conservative approach, 40% climate change will be adopted for the design of surface water drainage on this project.

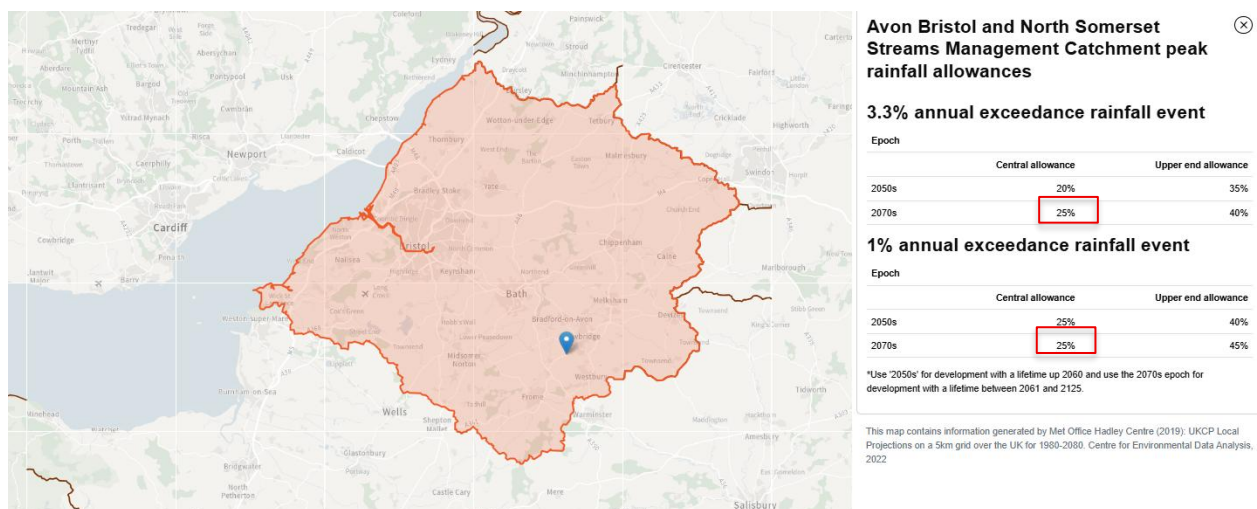


Figure 4-1 Avon Bristol and North Somerset Streams Management Catchment Peak Rainfall Allowances

4.4 Discharge Rates

The existing greenfield Q_{BAR} rate has been calculated as 1.5l/s for the 0.244ha soft landscape area which is to be developed. In accordance with Wiltshire Council's Betterment Policy 2014, greenfield rates adopted as the limiting discharge rate for the development, are required to be reduced by 30%. Therefore, the proposed discharge rate from all storms up to and including the 1% AEP including 40% climate change, is 1.1l/s. The table below demonstrates the betterment provided to greenfield discharge rate, as a result of the development, for the design storm annual return periods.

Return Period (yr)	Area, A (ha)	Greenfield Discharge Rate (l/s)	Proposed Discharge Rate (l/s)	Betterment
Q_2	0.244	1.3	1.1	15%
$Q_{30+25\%}$	0.244	2.9	1.1	62%
$Q_{100+40\%}$	0.244	3.7	1.1	70%

Table 4-1 Surface Water Discharge Rates

The table above shows that in a 1% AEP rainfall event, ie 1 in 100 discharge rate, the rate will be limited to 1.1l/s providing a 70% betterment to pre-development rates for the 1% AEP rainfall event.

The previous development limits flow as existing to 2.4l/s. This flow control will be upsized to 3.5l/s, to account for the additional flow from new development.

4.5 Calculations

Causeway FLOW modelling software has been used to size the geocellular storage structure. The simulation parameters used in the modelling have been outlined in the table below.

Parameter	Input
Rainfall Data	FEH22
Rainfall Event (AEP)	50,3.33,1%
Climate Change (%)	0,25,40%
Summer, Winter Cv	1.0,1.0
Additional Storage (m ³ /ha)	0
Time of Entry (mins)	5

Table 4-2 Causeway FLOW Simulation Parameters

No flooding was experienced in any of the surface water network, up to the 3.3% AEP rainfall event with a 25% allowance for climate change. 4.5m³ of flooding was experienced in nodes S1 and S2, however this will be retained on site until any inundation can be drained away by the gully network post rainfall event. Refer to Appendix C for the Causeway FLOW calculations.

4.6 Flood Exceedance Routing

In the unlikely event the on-site drainage becomes blocked, or the system experiences a storm more intense than current design standards, exceedance routes need to be considered.

Exceedance routes will discharge to the north east of the development, where they will be intercepted by gullies placed intermittently in the hardstanding area. As mentioned in section 4.5, 4.5m³ of surface water flooding is expected in the 1% AEP rainfall event with a 40% allowance for climate change. This will be intercepted by the gully network, or failing this, inundate the north eastern corner of the site where inundation will be retained by a HB2 kerb, and drained away by the double gullies post rainfall event.

In an event greater than the design criteria of a 1% AEP event with a 40% climate change allowance, flows will discharge to the north eastern corner of the site. Here, the kerb will be overtopped at the low point, and flows will discharge to the north eastern ditch, over the landscaped area. No building or utility will be affected.

4.7 Maintenance Arrangements

Drainage serving the development will need to adhere to a maintenance regime, to ensure its performance throughout the lifecycle of the development. As the site is privately owned, it will be the responsibility of the owner/landlord to provide maintenance to the drainage system.

Operation and maintenance will be undertaken in accordance with the recommendations outlined in the SuDS Manual (CIRIA C753), provided in Tables 4-3 and 4-4.

Maintenance schedule	Required action	Typical frequency
Regular Maintenance	Inspect surface structures, removing obstructions and silt as necessary. Check there is no physical damage.	Monthly
	Remove cover and inspect, ensuring water is flowing freely and that the exit route for water is unobstructed. Remove any debris and silt Undertake inspection after leaf fall in autumn.	Annually
	Jet the pipes leading from overflow structures and check water is going through the overflow	Annually
Remedial Actions	Repair physical damage	As required

Table 4-3 Operation and Maintenance Requirements for Chambers, Drains and Inspection Chambers

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae, or other matter; remove and replace surface infiltration medium as necessary	Annually
	Remove sediment from pre-treatment structures and/ or internal forebays	Annually, or as required
Remedial Actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

Table 4-4 Operation and Maintenance Requirements for Geocellular Attenuation

5 Conclusion

- A flood risk assessment confirms the site is at allow risk of flooding from all sources, and therefore development is appropriate at this site.
- Surface water will discharge to the existing ditch to the north east of the site, through the existing private surface water infrastructure serving the original development.
- The underlying strata is not suitable for surface water disposal using soakaways. Disposal of surface water from the proposed extension will be to surface water bodies in line with the previously approved drainage strategy developed when the existing, Building B19-3 was constructed.
- Surface water will discharge at greenfield Q_{BAR} rate, 1.1l/s, limited through a hydrobrake. The downstream hydrobrake serving the original development will be upsized to account for this.
- Geocellular tanks will form attenuation on site, sized for the 1% AEP rainfall event with a 40% allowance for climate change.
- Calculations show no flooding in the 3.3% AEP event with a 25% allowance for climate change. 4.5m³ of surface water flooding is anticipated in the 1% AEP event with a 40% allowance for climate change. This will be retained on site.
- As the system will remain private, the landowner, or management company selected by landowner, are responsible for the maintenance of the drainage system.
- Flood Exceedance flows will be directed to the north east of the development, away from people, utility and structure.

It is concluded that the development can be undertaken in a sustainable manner without increasing the flood risk to the proposed development or to existing properties/systems.

Appendix A – Topographic Survey

154900.00 N

154860.00 N

154820.00 N

154780.00 N

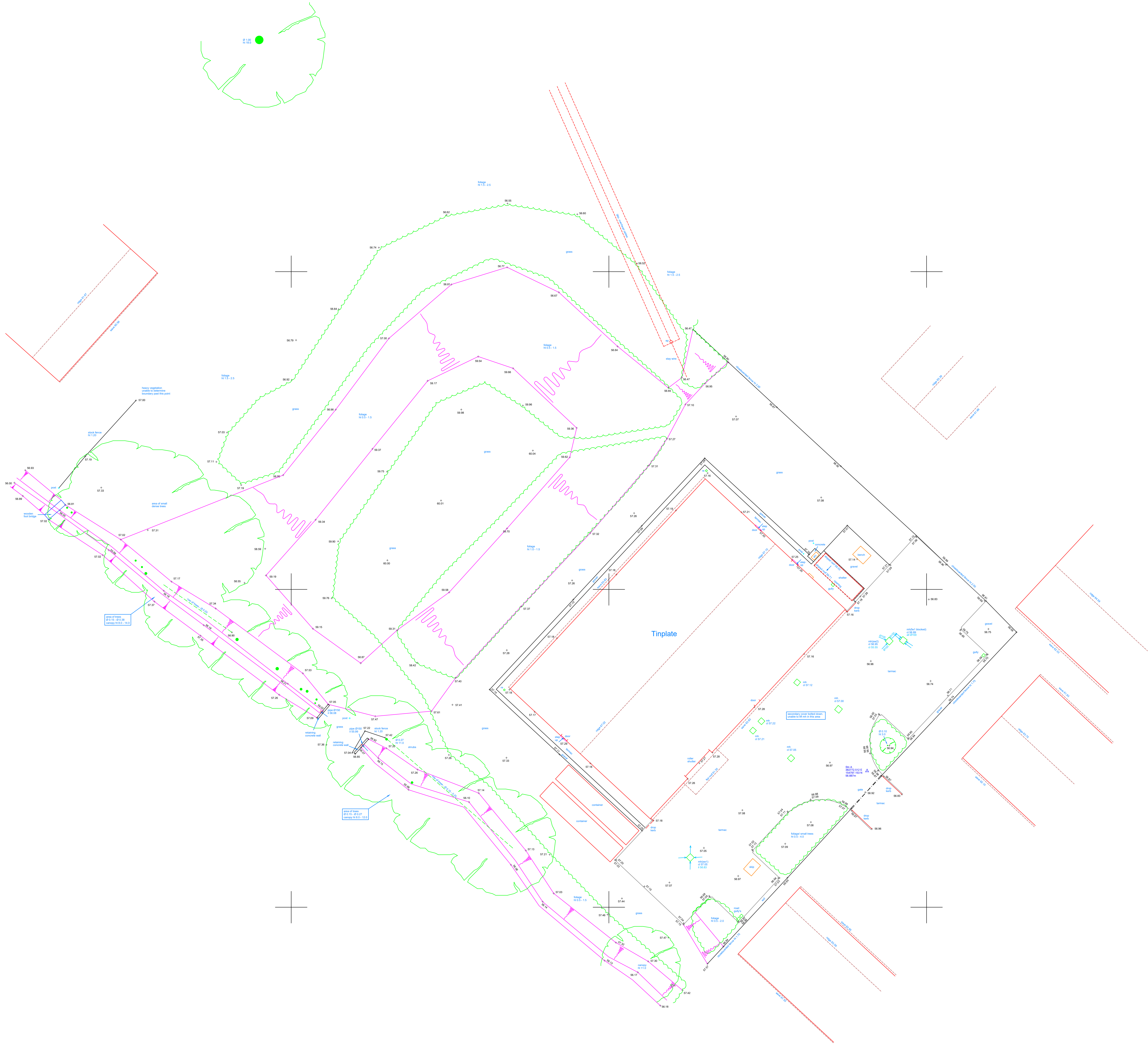
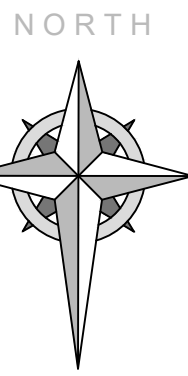
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STANDARD REFERENCES

ABBREVIATIONS	
bl	bollard
bo	bellsh beacon
bs	bus stop
bt	telecoms
catv	cable TV cover
cl	cover level
conc	concrete
csw	combined sewer
dk	drop kerb
elec	electricity
ESS	Electric Sub-Station
ep	electricity pole
fb	flower bed
fh	fire hydrant
fl	floor level
fp	footpath
flp	flagpole
fws	foul water sewer
g	gully
gv	gas valve
ic	inspection cover
il	invert level
irf	iron railing fence
jb	junction box
ko	kerb outlet
lp	lamp post
mk	marker post
mb	manhole
nb	notice board
np	nameplate (road)
p	post
pb	post box
rel	retaining wall
re	roading eye
rg	road gully
rs	road sign
rwp	rainwater pipe
sp	signpost
sv	slop valve
syp	soil vent pipe
sws	storm water sewer
tc	telephone callbox
tp	telegraph pole
tl	traffic light
utr	unable to raise
vp	vent pipe
w/fp	woodpile fence
wm	water tap
wp	wood post
wl	water tap

- Notes
- This survey has been computed and drawn about the Ordnance Survey National Grid.
 - All levels are in metres and relate to the Ordnance Survey active GPS stations.
 - This survey was measured for a scale of 1:200, any subsequent enlargements should be verified on site.

Revisions

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Surveyed	S Davies	Date	June 2025
Drawn	R Cole	Checked	June 2025

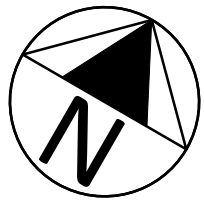
Drawing Title	Topographical Survey Tinplate Unit 19c, Dunkirk Business Park Southwick, BA14 9NL
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Client	Ashford Homes Ltd Doric House, Middleton Drive Bradford-on-Avon BA15 1GB
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Drawing No.	Scale A0 @
647/6744/1	1:200

Appendix B – Existing Drainage Strategy

NOTE: TO THE BEST OF TUMU CONSULTING LTD'S KNOWLEDGE THIS REPRESENTS THE AS CONSTRUCTED ARRANGEMENT



KEY

EXTERNAL WORKS

57.300

FINISHED FLOOR LEVEL

[57.15] +

EXISTING GROUND LEVEL TO BE MAINTAINED

57.15 +

PROPOSED FINISHED GROUND LEVEL

1:41

GRADIENT

EARTHWORKS (1:3 UNLESS STATED OTHERWISE)

EXISTING DITCH

PROPOSED PRIVATE DRAINAGE
(FOR CONSTRUCTION DETAILS REFER TO SD-1501 & SD-1502)

FOUL WATER DRAIN (100Ø UNLESS OTHERWISE STATED).

SURFACE WATER DRAIN (100Ø UNLESS OTHERWISE STATED).

FOUL WATER MANHOLE

SURFACE WATER MANHOLE

FOUL WATER INSPECTION CHAMBER

SURFACE WATER INSPECTION

CONTROL CHAMBER

CELLULAR ATTENUATION

RAINWATER PIPE. EXACT LOCATIONS TO BE CONFIRMED BY THE ARCHITECT

TRAPPED GULLY

RODDING EYE

HEADWALL

FOUL CONNECTION POINT (INDICATIVE)

DRAINAGE CHANNEL (ACO MD100D OR SIMILAR APPROVED)

LAND DRAIN TO INTERCEPT POTENTIAL SURFACE WATER RUNOFF FROM LANDSCAPED BUND

NOTES:

1. ALL BUILDING DRAINAGE WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE CURRENT BRITISH/EUROPEAN STANDARDS BSEN752, THE CURRENT BUILDING REGULATIONS AND THE LOCAL AUTHORITY BUILDING CONTROL SPECIFICATIONS AND REQUIREMENTS.

2. EXACT LOCATION OF RAINWATER DOWNPIPES AND ALL INTERNAL DRAINAGE POINTS TO BE CONFIRMED BY ARCHITECT. RAINWATER PIPE OUTLETS TO BE ROD-ABLE.

3. ALL DRAINAGE WORKS TO BE CONSTRUCTED FROM THE OUTFALL TOWARDS THE HEAD OF RUN TO ENSURE THE OUTFALL CAN BE ACHIEVE

4. CONTRACTOR TO VERIFY LOCATION & LEVEL OF RECEIVING DRAIN AND DITCH PRIOR TO COMMENCEMENT.

5. CONTRACTOR TO VERIFY LOCATIONS OF ALL EXISTING SERVICES PRIOR TO COMMENCEMENT AND ARRANGE FOR ANY NECESSARY PROTECTION, DIVERSION OR LOWERING WORKS AS REQUIRED.

6. ALL FOUL PRIVATE PIPES TO BE 100MM DIAMETER UNLESS OTHERWISE STATED WITH MIN. GRADIENT 1:80 WHERE CONNECTED TO A MINIMUM OF 1WC, OTHERWISE MIN 1:40. ALL SURFACE PRIVATE DRAINAGE PIPES TO BE 100MM DIAMETER UNLESS OTHERWISE STATED WITH A MIN. GRADIENT OF 1:100 UNLESS OTHERWISE STATED.

K	AS CONSTRUCTED DRAWING ISSUE	16/12/19	PS	PS
J	DRAINAGE LEVELS ADJACENT TO UNIT 3 UPDATED	04/10/19	JH	JH
I	ATTENUATION TANK DIM CORRECTED TO 21m	18/07/19	PS	PS
H	ATTENUATION TANK AMENDED	15/07/19	PS	PS
G	ATTENUATION TANK DIMENSIONS AMENDED	11/07/19	PS	PS
F	AMENDED TO COMMENTS FROM PLANNING OFFICER	28/06/19	PS	PS
E	SECTION MARKERS ADDED TO EXISTING DITCH	11/06/19	PS	PS
D	DIMENSIONS ADDED TO CLIENT REQUIREMENTS	31/05/19	PS	PS
C	MINOR CHANGES TO CLIENT COMMENTS.	29/05/19	PS	PS

REV. DESCRIPTION Date BY CHK

DESIGN BY:

tumu

CONSULTING

CLIENT:

DORIC DEVELOPMENTS (BATH)

ARCHITECT:

WHITEBOX ARCHITECTS

DRAWING STATUS:

AS CONSTRUCTED DRAWING

SCALE @ A1:

0

1:200

10

metres

PROJECT:

LAND AT DUNKIRK BUSINESS PARK, SOUTHWICK

TITLE:

PROPOSED DRAINAGE & EXTERNAL WORKS

PROJECT No:

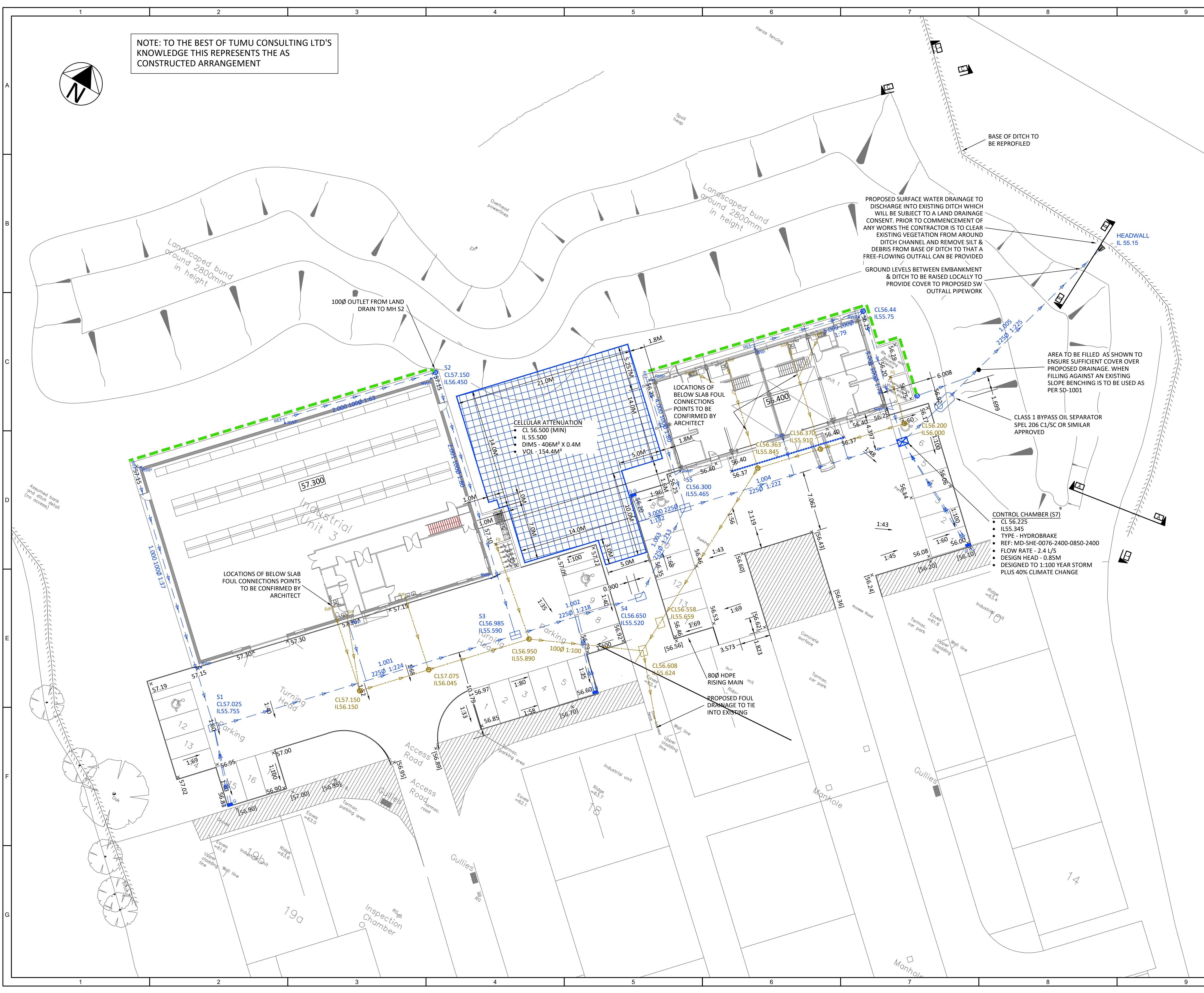
18014

DRAWING No:

18014/GA/01

REV:

K



Appendix C – Causeway FLOW Calculations

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Width (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
1	0.068	5.00	57.150	600		382677.499	154836.673	0.920	56.230
2	0.075	5.00	56.950	1200	675	382720.585	154844.052	0.870	56.080
3	0.010	5.00	56.850	1200	675	382701.266	154862.242	0.970	55.880
4	0.030	5.00	56.750	1200	675	382710.549	154871.562	1.010	55.740
5	0.045	5.00	57.150	450		382729.783	154825.112	1.150	56.000
6	0.016	5.00	56.750	450		382752.381	154848.221	0.750	56.000
7			56.850	1200		382749.709	154845.740	1.200	55.650
8			57.100	1200	675	382758.406	154841.472	1.570	55.530

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	1	3	34.909	0.600	56.230	55.880	0.350	99.7	225	5.44	45.0
1.001	3	4	13.154	0.600	55.880	55.740	0.140	94.0	225	5.61	44.4
2.000	2	3	26.535	0.600	56.080	55.880	0.200	132.7	225	5.39	45.2
1.002	4	7	5.000	0.600	55.740	55.650	0.090	55.6	225	5.65	44.2
3.000	5	7	28.680	0.600	56.000	55.725	0.275	104.3	150	5.49	44.8
4.000	6	7	3.646	0.600	56.000	55.725	0.275	13.3	150	5.02	46.7
1.003	7	8	9.688	0.600	55.650	55.530	0.120	80.7	225	5.77	43.7

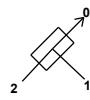
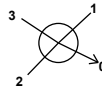
Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.309	52.0	11.1	0.695	0.745	0.068	0.0	70	1.042
1.001	1.349	53.6	24.5	0.745	0.785	0.153	0.0	107	1.320
2.000	1.133	45.1	12.3	0.645	0.745	0.075	0.0	80	0.970
1.002	1.758	69.9	29.2	0.785	0.975	0.183	0.0	102	1.683
3.000	0.983	17.4	7.3	1.000	0.975	0.045	0.0	68	0.940
4.000	2.781	49.1	2.7	0.600	0.975	0.016	0.0	24	1.492
1.003	1.456	57.9	38.6	0.975	1.345	0.244	0.0	134	1.554

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	34.909	99.7	225	Circular	57.150	56.230	0.695	56.850	55.880	0.745
1.001	13.154	94.0	225	Circular	56.850	55.880	0.745	56.750	55.740	0.785
2.000	26.535	132.7	225	Circular	56.950	56.080	0.645	56.850	55.880	0.745
1.002	5.000	55.6	225	Circular	56.750	55.740	0.785	56.850	55.650	0.975
3.000	28.680	104.3	150	Circular	57.150	56.000	1.000	56.850	55.725	0.975
4.000	3.646	13.3	150	Circular	56.750	56.000	0.600	56.850	55.725	0.975
1.003	9.688	80.7	225	Circular	56.850	55.650	0.975	57.100	55.530	1.345

Link	US Node	Dia (mm)	Width (mm)	Node Type	MH Type	DS Node	Dia (mm)	Width (mm)	Node Type	MH Type
1.000	1	600		Manhole	Adoptable	3	1200	675	Manhole	Adoptable
1.001	3	1200	675	Manhole	Adoptable	4	1200	675	Manhole	Adoptable
2.000	2	1200	675	Manhole	Adoptable	3	1200	675	Manhole	Adoptable
1.002	4	1200	675	Manhole	Adoptable	7	1200		Manhole	Adoptable
3.000	5	450		Manhole	Adoptable	7	1200		Manhole	Adoptable
4.000	6	450		Manhole	Adoptable	7	1200		Manhole	Adoptable
1.003	7	1200		Manhole	Adoptable	8	1200	675	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Connections	Link	IL (m)	Dia (mm)
1	382677.499	154836.673	57.150	0.920	600					
							0	1.000	56.230	225
2	382720.585	154844.052	56.950	0.870	1200	675				
							0	2.000	56.080	225
3	382701.266	154862.242	56.850	0.970	1200	675		1	2.000	55.880
							2	1.000	55.880	225
							0	1.001	55.880	225
4	382710.549	154871.562	56.750	1.010	1200	675		1	1.001	55.740
							0	1.002	55.740	225
5	382729.783	154825.112	57.150	1.150	450					
							0	3.000	56.000	150
6	382752.381	154848.221	56.750	0.750	450					
							0	4.000	56.000	150
7	382749.709	154845.740	56.850	1.200	1200			1	4.000	55.725
							2	3.000	55.725	150
							3	1.002	55.650	225
							0	1.003	55.650	225

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Connections	Link	IL (m)	Dia (mm)
8	382758.406	154841.472	57.100	1.570	1200	675	1 	1.003	55.530	225

Simulation Settings

Rainfall Methodology	FEH-22	Skip Steady State	x	2 year (l/s)	1.3
Rainfall Events	Singular	Drain Down Time (mins)	240	30 year (l/s)	2.9
Summer CV	1.000	Additional Storage (m³/ha)	0.0	100 year (l/s)	3.7
Winter CV	1.000	Starting Level (m)		Check Discharge Volume	✓
Analysis Speed	Normal	Check Discharge Rate(s)	✓	100 year 360 minute (m³)	

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440
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Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	25	0	0
100	40	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	1.95
Greenfield Method	FEH	Growth Factor 100 year	2.48
Positively Drained Area (ha)	0.244	Betterment (%)	0
SAAR (mm)	760	QMed	1.4
Host	1	QBar	1.5
BFIHost	0.328	Q 2 year (l/s)	1.3
Region	8	Q 30 year (l/s)	2.9
QBar/QMed conversion factor	1.075	Q 100 year (l/s)	3.7
Growth Factor 2 year	0.88		

Pre-development Discharge Volume

Site Makeup	Greenfield	Return Period (years)	100
Greenfield Method	FSR/FEH	Climate Change (%)	0
Positively Drained Area (ha)	0.244	Storm Duration (mins)	360
Soil Index	1	Betterment (%)	0
SPR	0.10	PR	
CWI		Runoff Volume (m³)	

Node 7 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	55.650	Product Number	CTL-SHE-0053-1100-0744-1100
Design Depth (m)	0.744	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	1.1	Min Node Diameter (mm)	1200

Node 7 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	55.700
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	350.0	350.0	0.694	350.0	396.0	0.695	0.0	396.0

Results for 2 year Critical Storm Duration. Lowest mass balance: 98.61%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	56.297	0.067	10.4	0.0191	0.0000	OK
15 minute summer	2	10	56.156	0.076	11.4	0.0617	0.0000	OK
15 minute summer	3	11	55.991	0.111	23.1	0.0896	0.0000	OK
15 minute summer	4	11	55.854	0.114	27.3	0.0926	0.0000	OK
15 minute summer	5	10	56.066	0.066	6.9	0.0105	0.0000	OK
15 minute summer	6	10	56.024	0.024	2.4	0.0038	0.0000	OK
480 minute summer	7	376	55.832	0.182	12.2	44.2884	0.0000	OK
480 minute summer	8	376	55.551	0.021	1.1	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	3	10.3	0.713	0.197	0.5098	
15 minute summer	2	2.000	3	11.3	0.737	0.250	0.4120	
15 minute summer	3	1.001	4	22.9	1.153	0.426	0.2608	
15 minute summer	4	1.002	7	27.4	1.790	0.392	0.0790	
15 minute summer	5	3.000	7	6.7	0.912	0.386	0.2115	
15 minute summer	6	4.000	7	2.4	1.386	0.049	0.0063	
480 minute summer	7	1.003	8	1.1	0.561	0.018	0.0185	38.3

Results for 30 year +25% CC Critical Storm Duration. Lowest mass balance: 99.80%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	11	56.749	0.519	36.8	0.1469	0.0000	SURCHARGED
15 minute summer	2	11	56.741	0.661	40.6	0.5351	0.0000	FLOOD RISK
15 minute summer	3	11	56.565	0.685	78.4	0.5549	0.0000	FLOOD RISK
15 minute summer	4	11	56.155	0.415	93.6	0.3360	0.0000	SURCHARGED
15 minute summer	5	11	56.401	0.401	24.4	0.0637	0.0000	SURCHARGED
960 minute winter	6	930	56.145	0.145	0.6	0.0231	0.0000	OK
960 minute winter	7	930	56.145	0.495	14.4	148.7488	0.0000	SURCHARGED
30 minute summer	8	28	55.551	0.021	1.1	0.0000	0.0000	OK

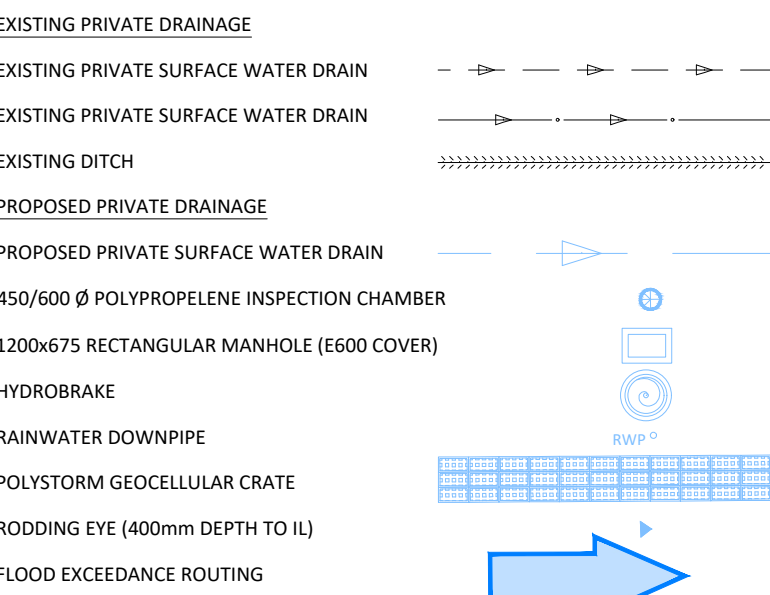
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	3	34.8	0.886	0.668	1.3884	
15 minute summer	2	2.000	3	38.4	0.966	0.853	1.0553	
15 minute summer	3	1.001	4	78.1	1.963	1.456	0.5231	
15 minute summer	4	1.002	7	93.5	2.582	1.338	0.1846	
15 minute summer	5	3.000	7	23.5	1.334	1.350	0.4936	
960 minute winter	6	4.000	7	0.6	0.553	0.012	0.0639	
960 minute winter	7	1.003	8	1.1	0.565	0.019	0.0188	63.8

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.50%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	57.150	0.920	52.5	0.2604	0.5212	FLOOD
15 minute summer	2	9	56.950	0.870	57.9	0.7047	3.9992	FLOOD
15 minute summer	3	10	56.818	0.938	90.9	0.7600	0.0000	FLOOD RISK
1440 minute winter	4	1410	56.390	0.650	6.7	0.5267	0.0000	SURCHARGED
15 minute summer	5	11	56.966	0.966	34.7	0.1535	0.0000	FLOOD RISK
1440 minute winter	6	1410	56.390	0.390	0.6	0.0620	0.0000	SURCHARGED
1440 minute winter	7	1410	56.390	0.740	12.0	230.4958	0.0000	SURCHARGED
15 minute summer	8	16	55.551	0.021	1.1	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	3	47.1	1.186	0.906	1.3884	
15 minute summer	2	2.000	3	42.9	1.079	0.952	1.0553	
15 minute summer	3	1.001	4	88.5	2.225	1.650	0.5231	
1440 minute winter	4	1.002	7	10.8	0.535	0.155	0.1989	
15 minute summer	5	3.000	7	33.0	1.876	1.900	0.5031	
1440 minute winter	6	4.000	7	0.6	0.553	0.012	0.0642	
1440 minute winter	7	1.003	8	1.1	0.564	0.019	0.0188	95.8

Appendix D – Proposed Drainage Strategy



- NOTES:
- ALL DRAINAGE WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE BUILDING REGULATIONS APPROVED DOCUMENT H.
 - ALL DRAINAGE WORKS TO BE CONSTRUCTED FROM THE OUTFALL TOWARDS THE HEAD OF RUN TO ENSURE THE OUTFALL CAN BE ACHIEVE
 - CONTRACTOR TO VERIFY LOCATION & LEVEL OF RECEIVING DRAINAGE PRIOR TO CONSTRUCTION.
 - CONTRACTOR TO CHECK LOCATIONS OF ALL EXISTING SERVICES PRIOR TO COMMENCEMENT AND ARRANGE FOR ANY NECESSARY PROTECTION, DIVERSION OR LOWERING WORKS AS REQUIRED.
 - SETTING OUT OF NEW DRAINAGE BY ARCHITECT.
 - COVER LEVELS SUBJECT TO EXTERNAL LEVELS DESIGN AT DETAILED DESIGN STAGE.
 - SURFACE WATER DRAINAGE 150mm Ø U.N.O

E	PLANNING ISSUE	21.04.26	RP	
D	UPDATED GEOCELLULAR TANK LOCATION	20.04.26	RP	
C	DRAFT PLANNING ISSUE	17.04.26	RP	
B	UPDATED EXISTING DRAINAGE	01.04.26	JJ	
A	FIRST ISSUE	31.03.26	JJ	
REV.	DESCRIPTION	Date	BY	

DESIGN BY:



CLIENT:

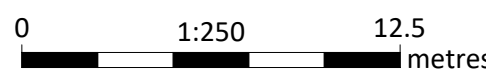


**ASHFURD
HOMES**

DRAWING STATUS:

PLANNING APPLICATION

SCALE @ A1:



PROJECT

LAND TO REAR OF TINPLATE, SOUTHWICK

TITLE:

DRAINAGE STRATEGY

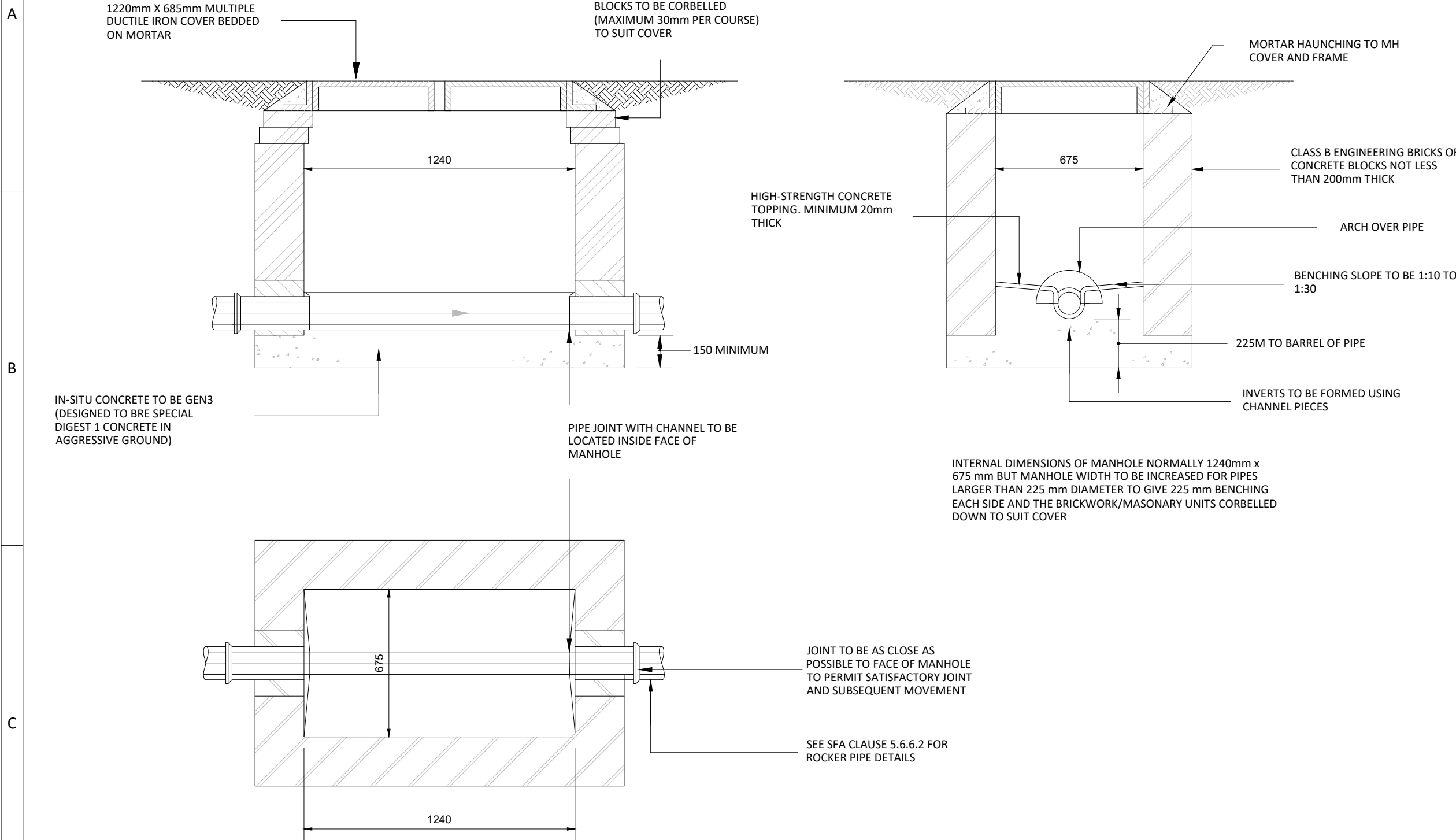
Project Ref: Originator: Stage: Phase: Number:
20067-TUM-PL-XXX-0200

REV:

Appendix E – Standard Drainage Details

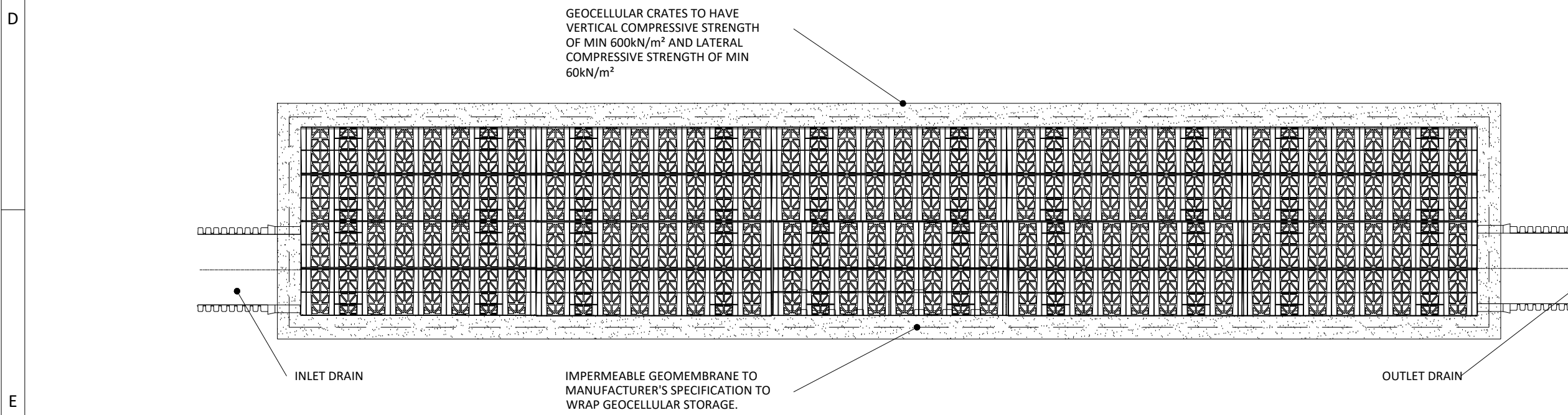
TYPICAL MANHOLE DETAIL - 1240x675

SCALE 1:20



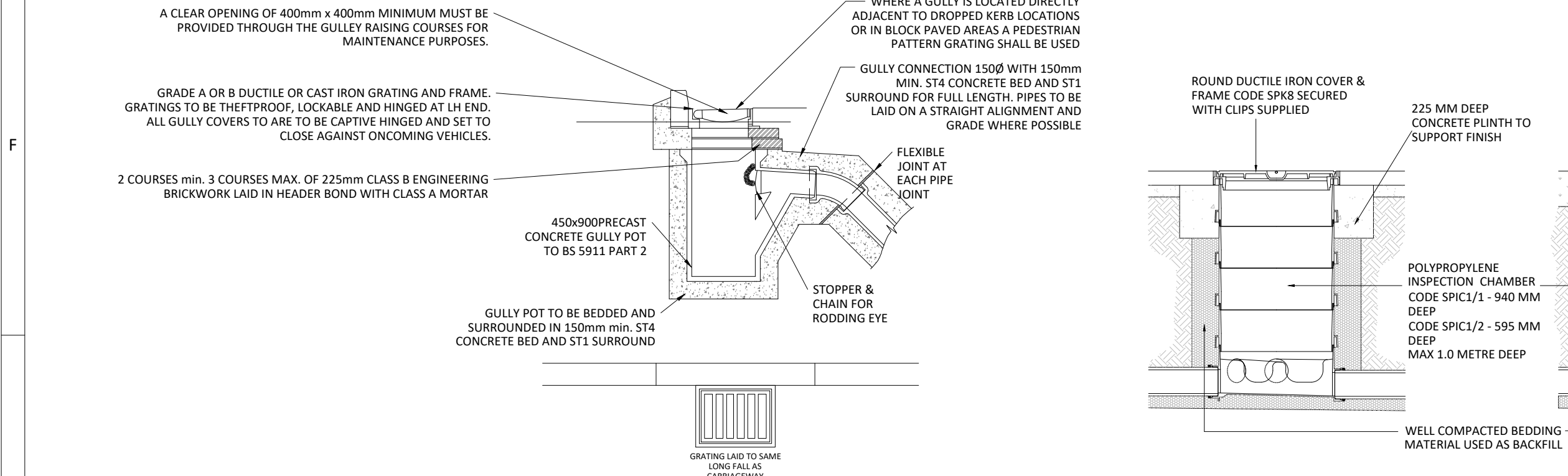
TYPICAL GEOCELLULAR ATTENUATION TANK

NTS



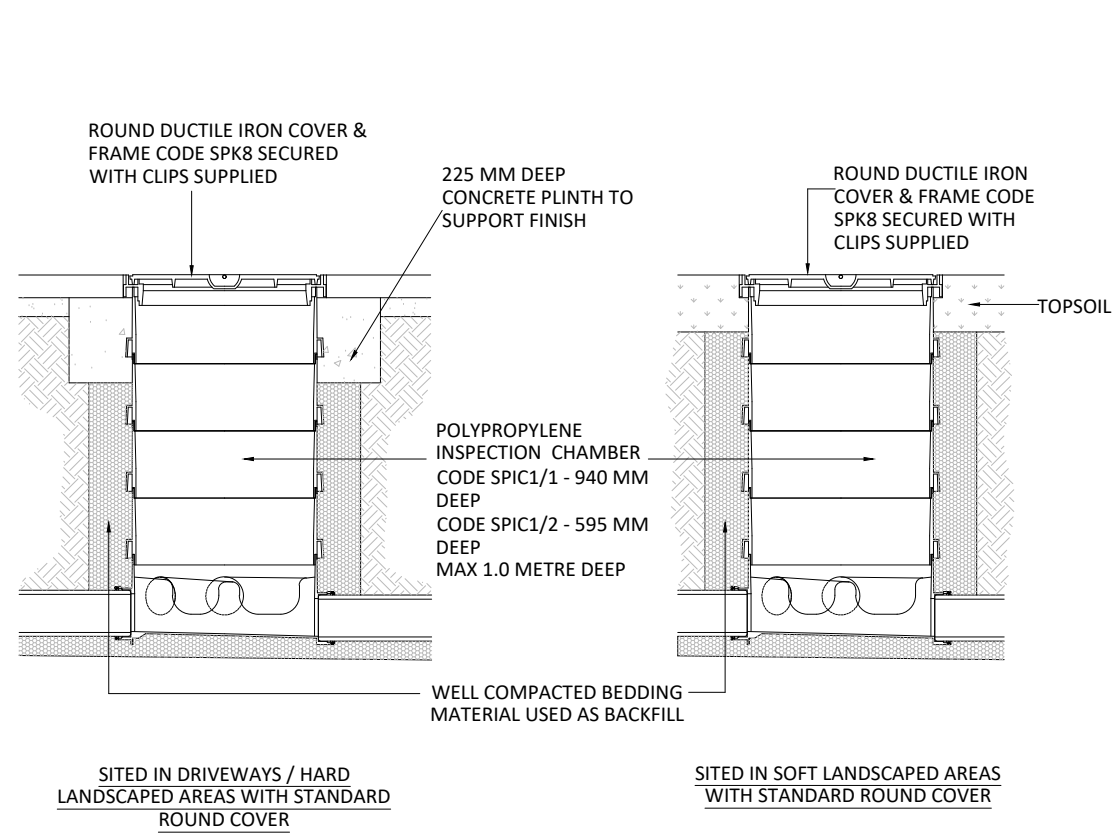
ROAD GULLY

NTS



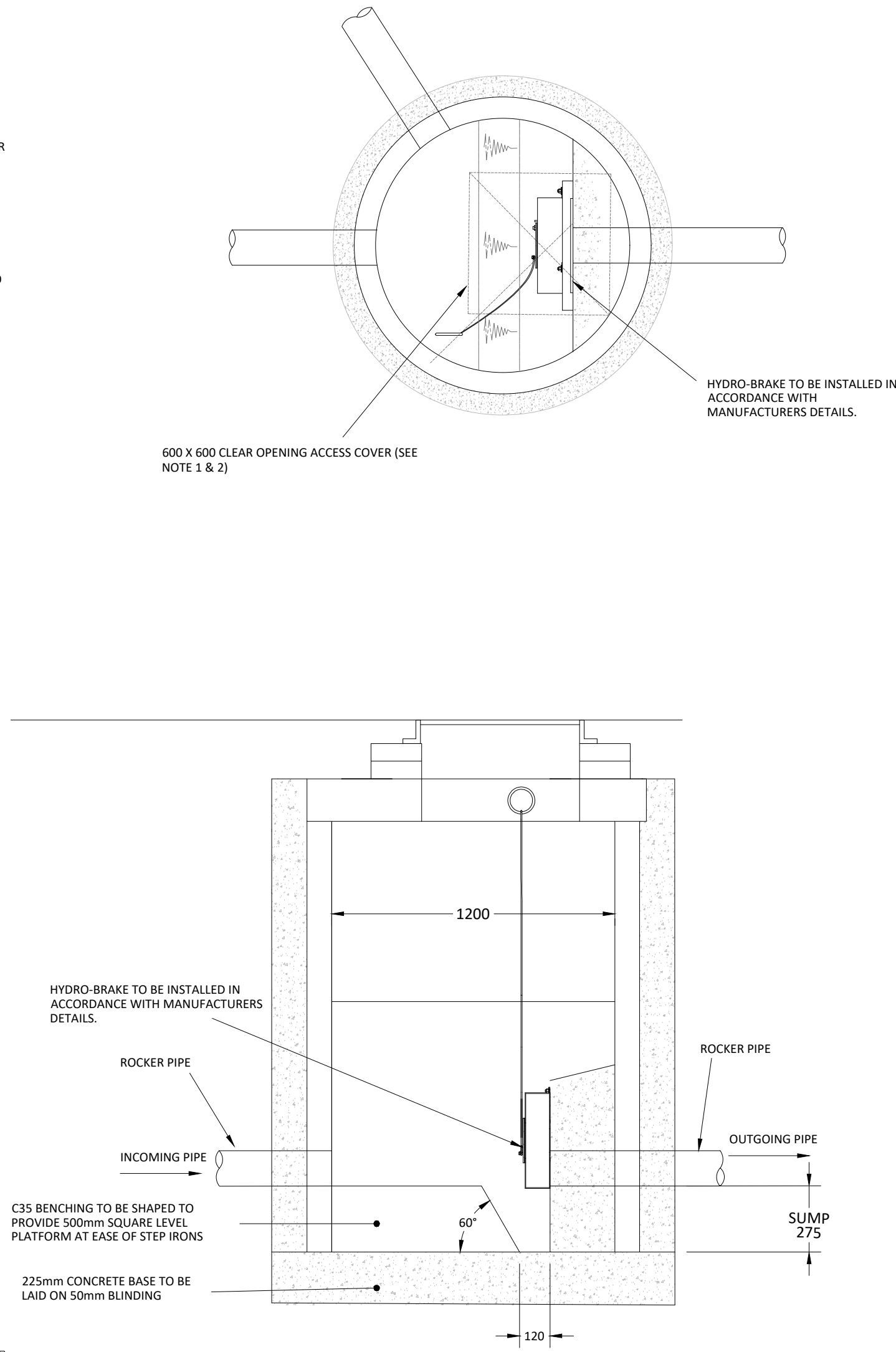
POLYPROPYLENE INSPECTION CHAMBER

SCALE 1:20



FLOW CONTROL MANHOLE

NTS



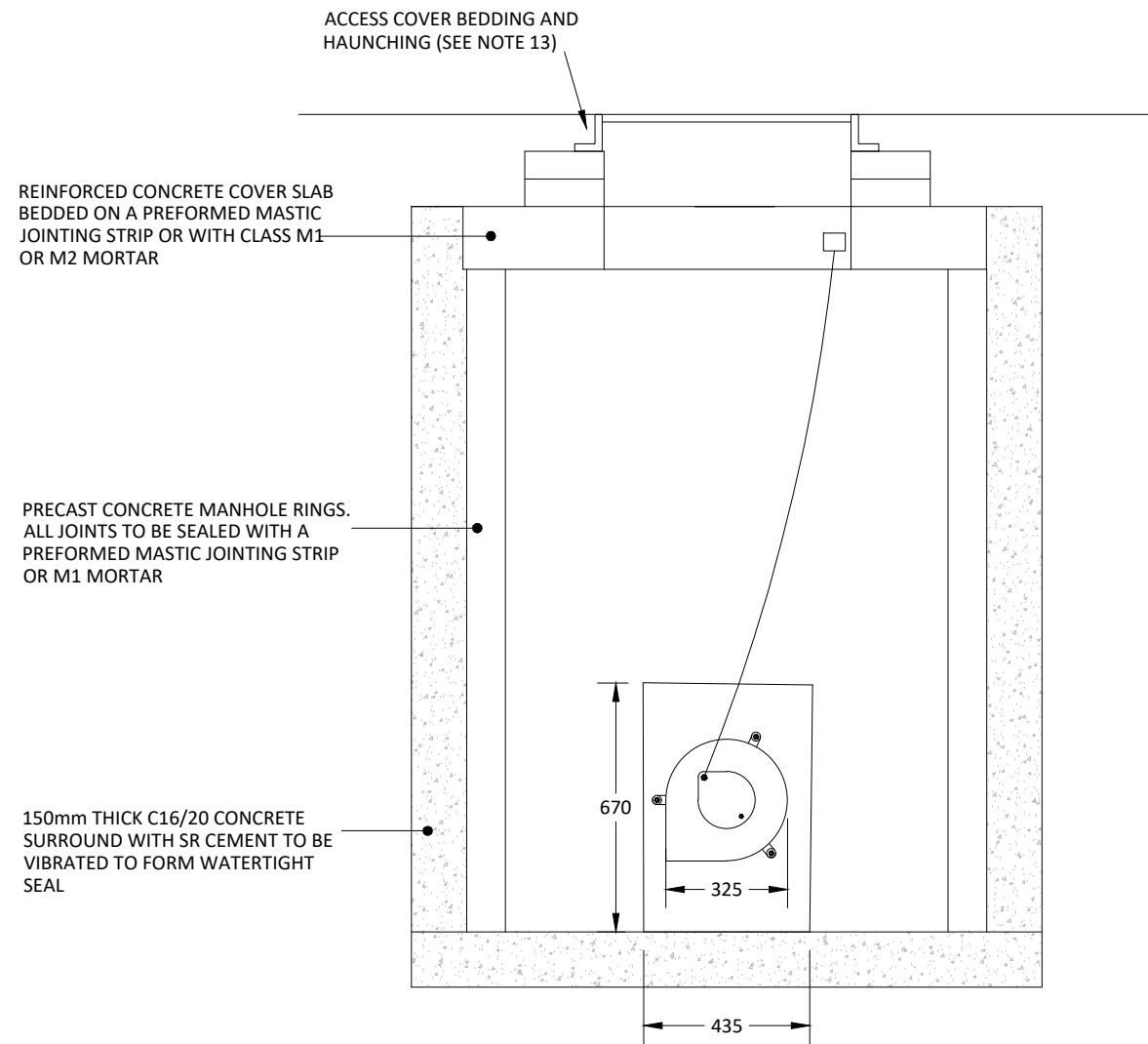
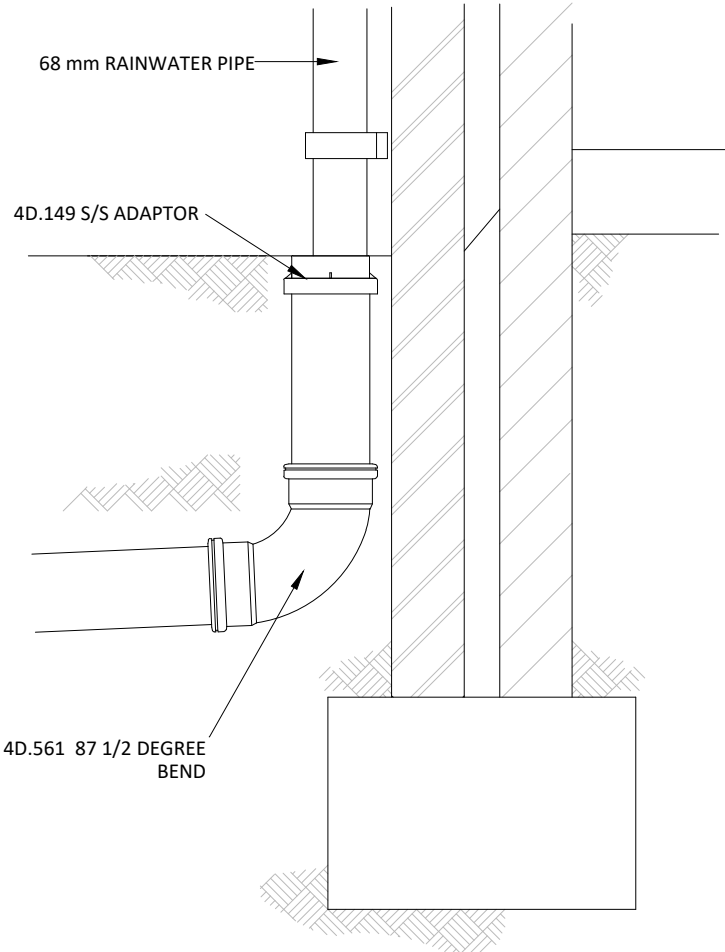
NOTE:

- ACCESS COVER GRADES (DEPTH OF FRAME TO SUIT LOCATION AND HIGHWAY CATEGORY)
BS EN 124
CLASS D400 - CARRIAGEWAY AND PARKING AREAS
CLASS B125 - FOOTWAYS, ETC
 - ACCESS COVERS TO HAVE A MINIMUM CLEAR OPENING OF 600mm SQUARE
 - CHAMBER SHALL BE SIZED APPROPRIATELY IN RELATION TO PIPES, MAN ACCESS AND REQUIREMENTS AND REQUIREMENTS OF CONTROL DEVICES
 - PIPES BUILT INTO MANHOLES SHALL HAVE A FLEXIBLE JOINT AS CLOSE AS FEASIBLE TO THE EXTERNAL FACE OF THE STRUCTURE AND THE LENGTH OF THE NEXT ROCKER PIPE SHALL BE AS SHOWN BELOW
- | NOMINAL DIAMETER (mm) | EFFECTIVE LENGTH (m) |
|-----------------------|----------------------|
| 150 - 600 | 0.60 |
| 601 - 750 | 1.00 |
| OVER 750 | 1.25 |
- EFFECTIVE LENGTH (m)
- STEP RUNGS SHALL BE DOUBLE POLYPROPYLENE ENCAPSULATED
 - ALL IN-SITU CONCRETE TO HAVE 50-75mm SLUMP AND TO BE VIBRATED TO FORM DENSE WATERTIGHT SEAL WITH PRECAST SECTIONS
 - BENCHING TO BE C28/35 OR GRANULITHIC TO FORM DENSE SMOOTH FINISH WITH A 500mm X 500mm FLAT AREA AT BOTTOM OF MAN ENTRY SYSTEM.
 - IN-FILL COVERS OF ANY TYPE SHALL NOT BE USED, WHERE A COVER IS LOCATED IN AN AREA OF CLOCK PAVING THE FRAME SHALL BE 150mm DEEP.
 - FRAME FOR MANHOLE COVERS SHALL BE BEDDED IN A POLYESTER RESIN BEDDING MORTAR IN ALL SITUATIONS WHERE COVERS ARE SITED IN NRSWA ROAD CATEGORIES 1, 2 OR 3.
 - LADDERS SHALL BE EITHER STAINLESS STEEL OR GRP. FIXINGS TO BE STAINLESS STEEL. DOUBLE RUNG STEP IRONS ALSO AVAILABLE
 - WHERE FITTED LADDERS SHALL BE EXTENDABLE TO A HEIGHT OF 1m ABOVE GROUND LEVEL
 - WHERE THE HOLE PROVIDED IN BENCHING, SIZE OF HOLE SHALL BE 150mm HIGH X 150mm (MIN) DEPTH AND WIDTH. VERTICAL SPACING SHALL BE SAME AS STEP RUNGS
 - FRAMES FOR MANHOLE COVERS SHALL BE BEDDED IN A POLYESTER RESIN BEDDING MORTAR IN ALL SITUATIONS WHERE COVERS ARE SITED IN NRSWA ROAD CATEGORIES 1, 2 OR 3.
 - UNLESS NOTED OTHERWISE ALL DIMENSIONS ARE IN MILLIMETERS

Control Point	Head (m)	Flow (l/s)
Primary Design	0.744	1.100
Flush-Flo™	0.234	1.096
Kick-Flo®	0.471	0.902
Mean Flow		0.969

EXTERNAL R.W.P. TO DRAIN

SCALE 1:20



B	PLANNING ISSUE	21.04.26	RP	BF
A	FIRST ISSUE	17.04.26	RP	BF
REV.	DESCRIPTION	Date	BY	CHK

DESIGN BY:



CLIENT:



DRAWING STATUS:

PLANNING APPLICATION

SCALE @ A1:

AS SHOWN

PROJECT:

LAND TO REAR OF TINPLATE, SOUTHWICK

TITLE:

STANDARD DRAINAGE DETAILS

Project Ref: 20067-TUM-PL-XXX-0280

Originator: Stage: Phase: Number:

REV:

B