

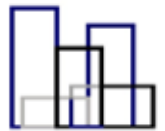


Document: Drainage Assessment

Development: Proposed Extension at Ashwood Care Home
43 Spalding Common, Spalding, PE11 3AU

Ref: 2024.10374

June 2024



Document Control

Revision	Reason For Issue	Author	Checked	Approved	Date
-	First Issue	CJC	NJW	NJW	June 2024

**Drainage Assessment for:
Proposed Extension to Ashwood Care Home, 43 Spalding Common,
Spalding, PE11 3AU.**

This Drainage Assessment Report has been prepared for the exclusive use of Country Court Care and is to be read in conjunction with all CDS drawings and reports prefix 2024.10374. It should not be reproduced in whole or in part, or relied upon by third parties, without the express written authority of Construction Design Solutions.

Matters of flood risk are not included within this report as they are included within the Flood Risk Assessment produced by Roy Loble Consulting (ref RLC/1117/FRA01) issued on the 25th May 2023. This report supersedes all matters of drainage included within the above mentioned report.



1.0 Introduction

CDS has been commissioned to undertake a Drainage Assessment in support of a planning application (ref H16-0437-24) in relation to the construction of a new two-storey rear extension to the existing care home, providing additional bedrooms, day space, nurse stations and assisted bathrooms together with associated car and cycle parking, landscaping and amenity space at Ashwood Care Home, 43 Spalding Common, Spalding, PE11 3AU, hereafter referred to as 'the Site'.

Development proposals are for the extension of the existing carehome along with ancillary works including construction of new car and cycle parking, exterior landscaping and amenity space.

The Site is located within the jurisdiction of South Holland District Council (as planning authority) and Lincolnshire County Council (as LLFA).

The Site is also located within an area under the jurisdiction of the Welland & Deepings Internal Drainage Board.

2.0 Site Description and Existing Conditions

Site Description

The Site is located on land to the east of Ashwood Care Home, 43 Spalding Common, approximately 3.10km to the southwest of Spalding town centre and is bounded by ongoing residential development to the north and east, Spalding Common to the west and an agricultural field to the south.

The Site is currently partially developed with the area proposed for the extension consisting of greenfield land, lightly vegetated with denser vegetation and mature trees around the periphery.

The Site occupies an area of approximately 0.467ha of which 0.224ha or 2240m² is proposed for new development. The site is located at National Grid reference 523385mE, 319903mN as shown in **Figure 1** below.

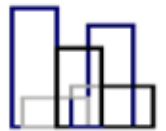


Figure 1: Site Location Plan

Development Proposals

The proposed development comprises the extension of the existing carehome to provide 19 additional bedrooms, additional day space, storage, nurses station and assisted bathrooms along with ancillary works including construction of new car and cycle parking, exterior landscaping and amenity space.

Vehicular access to the Site is to be provided via a new entrance constructed off of the new road, constructed as part of adjacent development, along the eastern boundary of the Site.

A copy of the development proposals is included within **Appendix 1**.

Site Topography

The Site slopes gently from west to east. Site levels currently range between 3.50mAOD at the north-western corner of the Site down to 1.71mAOD within the south-eastern corner of the Site boundary. Levels rise along the northeastern and eastern boundaries to meet the levels of the new road constructed as part of the adjoining development, this new road is located at a level of approximately 3.00mAOD.

An existing culverted watercourse runs along the western boundary of the Site. This serves as the outfall for the existing care home.



Geological Conditions

Soil mapping, provided by the Soilsmap viewer from the Cranfield Soil and AgriFood Institute shows the Site is underlain by 'Loamy and clayey soils of coastal flats with naturally high groundwater'

The British Geological Survey (BGS) online mapping shows the site is underlain superficial deposits – Tidal Flat Deposits (Clay and Silt) and bedrock Oxford Clay Formation – Mudstone.

The nearest BGS borehole log is TF21NW40 located west of the Site. An extract of the borehole log 2A is included below.

Depth (meters)	Material Description
0.00 to 0.40	Topsoil
0.40 to 3.75	Very Soft Silty Clay with traces of organic matter
3.75 to 5.70	Very Soft Grey Silty Clay with lenses of peat.

Table 1: BGS Borehole Log Extract

Groundwater was encountered at a depth of 2.20m below ground level.

A copy of the BGS Borehole records is included within **Appendix 2**.

Flood Risk

Flood risk is considered fully within the RLC Flood Risk Assessment (ref RLC/1117/FRA01).

As part of this assessment, mitigation measures were suggested including:

- Minimum Finished Floor Level of 3.20mAOD
- Water Resistant Air Bricks
- Backwater valves and Non-return valves.
- Electrical Installation to be above 3.50mAOD
- Care Home to be signed up for EA Flood Warning service

These recommendations have been implemented into the proposals.



3.0 Drainage Strategy

Surface Water Management

DEFRA's Non-statutory technical guidance for Sustainable Drainage Systems and CIRIA Guidance C753 "The SuDS Manual" have been used to determine the appropriate SuDS Strategy, taking into account the spatial and environmental constraints of the Site.

Under the National Planning Policy Framework 2023 (NPPF) an allowance of 40% for the effects of climate change will achieve the policy requirements for the proposed development.

Existing Site Drainage

The Site is currently partially developed land with an approximate area of 0.467ha. The Site comprises an existing care home covering approximately half the site area and a lightly vegetated rectangular field with areas of denser vegetation around the perimeter. The area proposed for development consists of an area of 0.224ha or 2240m² within the Site with areas proposed for soft landscaping being discounted as they will not need to be positively drained.

The existing care home benefits from a private drainage network draining to an ordinary watercourse culverted along the western site boundary. The area of the site proposed for development currently drains overland to south into agricultural fields. There are existing private drains within the area of the existing care home, there are no records of existing drainage within the area proposed for extension.

Existing runoff rates from the Site were determined using Infodrainage for the 1 in 1, 1 in 30 and 1 in 100 year return period events. Greenfield runoff rates have been calculated for the developable site area (0.224ha) and are presented along with the proposed discharge rates presented below in **Table 1**.

Return Period Event	Developable Area(0.224ha) Greenfield Rate	Developable Area (0.224ha) Proposed Runoff Rate
Q₁	0.7 l/s	0.8 l/s
Q₃₀	1.8 l/s	0.8 l/s
Q₁₀₀	2.7 l/s	0.8 l/s
Q_{bar}	0.8 l/s	0.8 l/s

Table 1: Existing Runoff Rates



Proposed Surface Water Drainage Strategy

As stated in the NPPF, the aim should be to discharge surface water run-off as high up the drainage hierarchy as reasonably practicable.

The drainage hierarchy is as follows:

1. into the ground (infiltration);
2. to a surface water body;
3. to a surface water sewer, highway drain or drainage system;
4. to a combined sewer.

As discussed in section 2, BGS data indicates that the Site is underlain by bedrock Oxford Clay Formation (Mudstone) with superficial Tidal Flat Deposits (Clay and Silt).

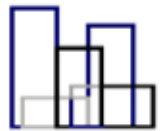
No ground investigation information is available at the time of writing. Ground investigation and BRE 365 soakaway testing will need to be carried out prior to construction. Borehole records indicate that groundwater is located a depth of 2.20mbgl. Based on the locally shallow groundwater levels it is unlikely that infiltration will be viable for the Site.

There is an existing culverted watercourse along the western boundary of the Site, the existing care home utilises a 100mm diameter saddle connection to this culvert. The nearest main river is the River Welland located 0.23km to the east of the site.

There are no surface water sewers within the vicinity of the Site.

Based on the above it is concluded that discharge to the existing culverted watercourse at a restricted discharge rate of 0.8 l/s (QBAR) is the most suitable SuDS solution for the Site.

Detailed calculations have been carried out to determine the volumes of storage required for the modelled storms and are included below in **Table 2**.



Maximum Storage Volume Requirements	Return Period			
	1 in 1 year AEP	1 in 30 year AEP	1 in 100 year AEP	1 in 100 year AEP +40% Climate Change
Discharge restricted to 0.8 l/s	9.80m ³	27.88m ³	38.03m ³	50.45m ³

Table 2: Required Storage Volumes

The proposed storage for the site includes a provision of 51.185m³ through the use of below-ground geocellular storage. Additional storage is available within the permeable paving and site drainage network however this has not been included within calculations at this stage.

Surface water runoff in excess of the designed storm event (up to and including the 1 in 100 year + 40% allowance for climate change) will be retained within the site and will be directed away from the proposed buildings.

Calculations for the proposed drainage strategy have been carried out in Infodrainage, the successor program to Microdrainage and are provided within **Appendix 4**.

As the proposed development comprises of a commercially owned care home with associated parking and landscaping, no allowance for urban creep has been considered in the drainage design. This is in line with LASOO guidance for industrial/commercial developments.

The constraints and opportunities for the use of SuDS techniques are appraised using the management train approach outlined in CIRIA C753, shown below in **Table 3**.



Type	Infiltration Devices (Source Control)
Constraints:	Infiltration SuDS require suitable permeable strata to be viable and must be located a minimum of 5 meters away from buildings.
Opportunities:	There are limited opportunities for shallow Infiltration SuDS within the Site. It is unlikely that infiltration can be utilised as the principle disposal method for the site due to the underlying geology and locally high groundwater levels.
Type	Permeable Paving (Source Control)
Constraints:	It is not possible to provide infiltrating permeable paving adjacent to the structures or within 2.5m of the site boundary.
Opportunities:	The proposed parking area may be suitable for lined permeable paving as a method of source control treatment.
Type	Rainwater Harvesting (Source Control)
Constraints:	The benefits of rainwater harvesting on a specific designed storm event cannot be quantified, due to the seasonal availability of storage within the structure.
Opportunities:	Opportunities within landscaped areas to provide harvesting features such as raised planters and water butts exist. It is difficult to quantify the contribution of these features and they are therefore not included within the calculations as part of this drainage strategy.
Type	Swales, etc (Permeable Conveyance)
Constraints:	In order to provide practicable attenuation benefits, 1:3 side-slope swales tend to require a significant land-take.
Opportunities:	There is limited room within the site to provide this type of feature.
Type	Tree Pits/Rain Gardens
Constraints:	Subject to Landscape Design
Opportunities:	There may be opportunities for tree pits in the landscaped spaces around the car park
Type	Living Roofs
Constraints:	Proposed Building has a pitched roof.
Opportunities:	None.
Type	Attenuation Tanks (end of pipe treatment)
Constraints:	None.
Opportunities:	Should further attenuation be required this could be achieved by the use of geo-cellular storage attenuation.

Table 3: C753 SuDS Management Train Approach

After consideration of the CIRIA 753 SuDS Management Train approach, the most suitable SuDS options for the Site are lined permeable paving to the new car park area in combination with below-ground geo-cellular storage for the new care home building.



This would be in addition to catchpit manholes which are not considered as a SuDS feature for the Site but will provide some limited additional water quality benefits.

CDS drawings 2024.10374-50 & 51 included in **Appendix 3 & Appendix 6** respectively outline the Surface Water and Foul Water strategy for draining the Site and drainage construction details.

It is anticipated that all surface water drainage and SuDS features will remain private and will not be adopted by Anglian Water. This is based on the information available at the time of writing.

Maintenance of SuDS Features

The Site SuDS components will require maintenance to ensure functionality for the life of the development.

It is anticipated that this maintenance work will be carried out by a maintenance company on behalf of the developer.

All maintenance should be carried out in accordance with best practice as outlined in the CIRIA Manual C753.

As part of the design consideration for the Site, 500mm sumps are proposed prior to any inlet to attenuation and flow control structures. These sumps will require inspection every 6 months and should be cleaned out annually with a suction tanker unit.

All gutters are to have leaf guards and all gullies, gutters and linear drains should be cleaned out annually to prevent the build-up of debris.

Permeable paving is to be inspected every 6 months and should be jet washed and cleaned out with a suction unit annually or whenever any surface water ponding begins to appear.

The maintenance of all SuDS components will be in accordance with best practices outlined in CIRIA SuDS Manual C753. A copy of the relevant maintenance requirements for the proposed drainage network is included within **Appendix 5**.



Surface Water Runoff and Treatment

The integration of SuDS features outlined in the above sections will ensure that surface water runoff from the site will be of sufficient quality so as not to cause pollutant-based detriment to the ground below or the surrounding hydrological network.

In determining the necessary SuDS treatment reference is made to Table 26.2 and Table 26.3 of the SuDs Manual (C753). The tables outline the 'simple index approach' which sets out the water treatment criteria in relation to land use and SuDS performance evidence. To ensure that sufficient treatment is provided the total pollution mitigation index must equal or exceed the pollution hazard index for the Site.

Table 26.2 Pollution hazard indices for different land use classifications				
<u>Land Use</u>	<u>Pollution Hazard Level</u>	<u>Total Suspended Solids (TSS)</u>	<u>Metals</u>	<u>Hydrocarbons</u>
Residential Roofs.	Very Low	0.2	0.2	0.05
Individual property driveways, residential car parks, low traffic roads (e.g cul-de-sacs, homezones and general access roads) and non-residential car parking with infrequent change (e.g. schools, offices) i.e <300 traffic movements per day.	Low	0.5	0.4	0.4

Table 4: Pollution Hazard Indices Table Extract



Table 26.3 Indicative SuDS mitigation indices for discharge to surface waters			
Types of SuDS component	Mitigation Indices		
	TSS	Metals	Hydrocarbons
Filter Strip	0.4	0.4	0.5
Filter Drain	0.4	0.4	0.4
Swale	0.5	0.6	0.6
Bio-retention	0.8	0.8	0.8
Permeable Paving	0.7	0.6	0.7
Detention Basin	0.5	0.5	0.6
Pond	0.7	0.7	0.5
Wetland	0.8	0.8	0.8
Proprietary Treatment Systems	These must demonstrate that they can address each of the contaminant types to acceptable levels for frequent events up to approximately the 1 in 1 year return period event, for inflow concentrations relevant to the contributing drainage area.		

Table 5: Indicative SuDS Mitigation Indices

Based on the above, through the use of permeable paving, surface water flows are suitably treated to mitigate the anticipated flows from the Site prior to discharging to the wider hydrological network off-site.

Exceedance Flows

Detailed modelling has been carried out up to the 1 in 100 year (+40% allowance for climate change) event. From these calculations it was determined that all flows are contained within the network up to the 1 in 100 year storm. There is a limited amount of exceedance in the 1 in 100 year (+40%CC) event from manholes S1 and S2 however these flows will be directed away from the building towards the shallow field ditch on the southern site boundary.

These manholes are located at a lower level than the rest of the site due to topographical constraints, a non-return valve has been specified to prevent flows from the upper part of the site surcharging back towards these points.

In the event of exceedance within the upper part of the site, in a storm exceeding the design requirements, flows would be retained within the kerbed parking areas up to 150mm above proposed levels, where possible levels have been designed to direct flows away from the existing/proposed buildings.



Proposed Foul Water Drainage Strategy

Anglian Water sewer asset plans show a foul water rising main within Spalding Common at the western boundary of the Site. The nearest point of connection to the AW foul sewer is located at the foul water pumping station located 150m to the south of the Site along Spalding Common.

No diversions of existing sewers will be required as part of the proposed works.

The existing care home drains via a private pumped drainage network for foul flows.

It is proposed that the sewerage from the extension will drain via the existing foul pump with additional 24 hour storage provided within the area of the proposed development to allow for the increase in volumes through the existing unit.

Based on British Flows and Loads the 19 additional bedrooms for the care home will generate an average 0.73 l/s – Peak Foul Flow.

This represents an increase compared to the Site as existing however this will not translate to an increase in flows offsite as the existing pump rate will remain as existing.

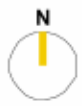
The proposed on-site foul drainage network is not proposed for adoption and will remain private.

Assessment Prepared By C Cant
Senior Engineer - CDS Consulting

June 2024



Appendix 1: Site Layout Information



0 30m 50m

FOR PLANNING PURPOSES ONLY



Key:

- Site Boundary
- Proposed 1000mm height railing
- Proposed 1000mm height railing

Drain

SPALDING COMMON

Ashwood Care Home

Proposed 1000mm height railings

Proposed bin store position

Proposed retaining wall

Proposed staff car parking spaces (parking bay 9-28)

Proposed retaining wall

Proposed 1800mm height railings

Proposed 1800mm height railings

Proposed extension

Proposed Site Plan

1 : 500

19.04.2024
Date

3A
Rev

Planning Issue
Comment

Client: Country Court Care Group
Project Title: Proposed Extension at Ashwood Care Home
43 Spalding Common Spalding, PE11 3AU
Drawing Title: Proposed Site Plan
Status: Stage 2
Date: 19.04.2024

Size: A3

1 : 500

Project No: 0443
Drawing No: 002
Rev: 3A
Series: 10
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Appendix 2: BGS Borehole Records

23202 19882 40 TF21 NW

[illegible]

23202 19882 TF21NW40

Contract Name A16 TRUNK ROAD SPALDING TO SUTTERTON						Borehole No. 2A		
						Sheet 2 of 5		
Method of boring Light cable percussion Ground level Diameter 305 mm diameter Start 25.3.85 Finish 28.3.85.								
Daily progress	Water levels	In-situ tests	Samples	Depth (m)	Reduced level (m O.D.)	Thickness (m)	Description of Strata	Legend
				0.40		0.40	TOPSOIL(Brown silty sandy CLAY)	
25/3						3.35	Very soft silty CLAY with traces of decaying organic matter, generally horizontal, and some decayed stems mainly vertical	
26/3								
				3.75				
27/3						1.95	Very soft grey silty CLAY with numerous pockets and lenses of peat	
18/3				5.70				
							BOTTOM OF BOREHOLE	
Notes p ¹⁰ denotes piston sample 10" diameter (255mm) *denotes no recovery Plate to piston sampler became disconnected at 4.65 m recovered at 5.70 m. Instructed to redrill borehole								
Terresearch Limited				Report No. S35/526		Appendix 1 Sheet 15		

TF 21 NW 40

23202 19882

Contract Name A16 TRUNK ROAD SPALDING TO SUTTERTON						Borehole No. 2(B) and 2(C)	
						Sheet 3 of 5	
Method of boring Light cable percussion Ground level							
Diameter 305 mm diameter 2.75 m case Start 28.3.85. (2B) 16.4.85. (2C)							
to 2.75 m Finish 4.4.85 (2B) 17.4.85. (2C)							
200 mm diameter to 12.55 m cased to 11.80 m							
Daily progress	Water levels	In-situ tests	Samples	Depth (m)	Reduced level (m O.D.)	Thickness (m)	Description of Strata
	3/4			0.40		0.40	TOPSOIL
	3/4 & 4/4			2.10		2.00	Soft to firm brown and grey silty CLAY
29/3	29/3	V		4.00		1.90	Soft to very soft grey silty CLAY with vertical and horizontal pockets of decaying organic matter
		V		4.30		0.30	Black fibrous PEAT
2/4	2/4	V		7.00		2.70	Soft grey silty CLAY with pockets and bands of decaying organic matter
		V		8.30		1.30	Black fibrous PEAT with thin bands of soft grey silty clay
						3.80	Loose grey-brown silty fine SAND with occasional sub-rounded fine gravel and some shells
Notes p₁₀ denotes 255 mm dia piston sample p denotes 105 mm dia piston sample * denotes no recovery Waterstrike at 2.20 m noted as slight seepage Borehole 2C drilled 3 m from borehole 2(B) to install piezometer, borehole depth 5.00 m strata sequence as above							
Terresearch Limited		Report No. S35/526		Appendix 1		Sheet 16	

TF 21NW 40
23202 19882

Contract Name A16 TRUNK ROAD SPALDING TO SUTTON						Borehole No. 2(B)		
						Sheet 4 of 5		
Method of boring Diameter			As Sheet 3			Ground level Start Finish		
						As Sheet 3		
Daily progress	Water levels	In-situ tests	Samples	Depth (m)	Reduced level (m O.D.)	Thickness (m)	Description of Strata	Legend
			↓				SEE ABOVE	
				12.10				
				12.55		0.45	Stiff grey silty CLAY with numerous fine to coarse sub-rounded gravel sized erratics occasional flints (Boulder Clay)	
4/4							BOTTOM OF BOREHOLE	
Notes								
Terresearch Limited			Report No. S35/526			Appendix 1 Sheet 17		



Appendix 3: Drainage Strategy Drawing

Ashwood Care Home

SPALDING COMMON

Proposed retaining wall

Proposed extension

Drainage key

Proposed Surface Water Manhole

Proposed Surface Water Drainage

Proposed Foul Water Manhole

Proposed Foul Water Drainage

Proposed Rising Main (Foul and Surface Water)

Existing Site Drainage Network

Proposed Cellular Storage

Permeable Paving

Externals key

Existing Level

Proposed FFL

Proposed Level

GENERAL NOTES

- Do not scale this drawing. If in any doubt ask.
- This drawing is to be read in conjunction with all relevant engineers and specialists drawings and specifications.
- All setting out is to be checked on site prior to any works commencing.
- Any discrepancies are to be reported to CDS immediately.
- All dimensions are shown in millimetres unless otherwise noted.
- All levels are shown in metres unless otherwise noted.

CDS NOTES

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL CDS DRAWINGS AND CALCULATIONS REF 10374.

THESE DRAWINGS ARE BASED ON THE FOLLOWING INFORMATION;
SITE LAYOUT - LIFESTYLE STUDIOS REF 0443/002_10
REV 3A - PROPOSED SITE PLAN
TOPO SURVEY - RATCLIFF SURVEYS REF 10417UG-01
DATED JUNE 2024

LEVELS ARE SHOWN INDICATIVELY AT THIS STAGE. IT IS ASSUMED THAT THE PROPOSED EXTENSION WILL INCLUDE AN UNDERBUILD DETAIL TO MAKE UP THE RAISED FLOOR LEVEL WHILST RETAINING EXISTING LOWER LEVELS AROUND THE BUILDING TO TIE INTO THE SITE.

SURFACE WATER CONNECTION TO EXISTING CULVERT DOES NOT REQUIRE S106 PERMISSION HOWEVER CONFIRMATION OF THE EXISTING CONDITION OF THE CULVERT AND PLANS FOR ITS MAINTENANCE SHOULD BE ALLOWED FOR WITHIN THE PROPOSED SCHEME.

INVERT LEVEL OF THE EXISTING FOUL PUMP WET WELL IS UNKNOWN AT THIS TIME. ASSUMED REQUIREMENT FOR A SMALL SCALE PACKAGE PUMP SIZED FOR 24 HOUR STORAGE AT A RATE OF 0.74 l/s PEAK FLOW INTO THE EXISTING PUMP CHAMBER.

DRAINAGE CALCULATIONS SPECIFY A VORTEX FLOW CONTROL DEVICE TO ACHIEVE 0.8 l/s FLOW RESTRICTION FOR THE PROPOSED NEW EXTERNAL SURFACE AREAS AND BUILDING EXTENSION.

ADJUSTMENTS TO THE EXISTING HARD SURFACED AREAS TO FORM CAR PARK ARE COLLECTED BY THE PROPOSED NEW SURFACE WATER CONNECTION TO THE CULVERTED WATERCOURSE BUT ARE NOT ATTENUATED AS THESE AREAS ALREADY DRAIN TO THE WATERCOURSE UNRESTRICTED.

Rev	By	Date	Details	Chkd
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Drawing Status For Planning

Construction Design Solutions

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Client Country Court Care

Project Ashwood Care Home,
Spalding Common

Title Drainage Strategy

Scale (A1) 1:250 Date JUN 24	Drawn by. CJC Checked by.	Drg. No. 2024-10374-50
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Appendix 4: Infodrainage Calculations

Project: Ashwood Care Home Extension Spalding Common Surface Water Network Calcs	Date: 18/06/2024		
	Designed by: CC	Checked by:	Approved By:
Report Details: Type: Inflows Storm Phase: Phase	Company Address: 78 Wollaton Road Beeston, Nottingham NG9 2NZ		



Catchment Area

Type : Catchment Area

Area (ha)	0.011
-----------	-------

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100



Catchment Area (1)

Type : Catchment Area

Area (ha)	0.015
-----------	-------

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100



Catchment Area (2)

Type : Catchment Area

Area (ha)	0.02
-----------	------

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Project: Ashwood Care Home Extension Spalding Common Surface Water Network Calcs	Date: 18/06/2024		
	Designed by: CC	Checked by:	Approved By:
Report Details: Type: Inflows Storm Phase: Phase	Company Address: 78 Wollaton Road Beeston, Nottingham NG9 2NZ		



Catchment Area (3)

Type : Catchment Area

Area (ha)	0.02
-----------	------

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100



Catchment Area (4)

Type : Catchment Area

Area (ha)	0.015
-----------	-------

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100



Catchment Area (5)

Type : Catchment Area

Area (ha)	0.028
-----------	-------

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Project: Ashwood Care Home Extension Spalding Common Surface Water Network Calcs	Date: 18/06/2024			
	Designed by: CC	Checked by:	Approved By:	
Report Details: Type: Inflows Storm Phase: Phase	Company Address: 78 Wollaton Road Beeston, Nottingham NG9 2NZ			



Catchment Area (6)

Type : Catchment Area

Area (ha)	0.026
-----------	-------

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100



Catchment Area (7)

Type : Catchment Area

Area (ha)	0.016
-----------	-------

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Project: Ashwood Care Home Extension Spalding Common Surface Water Network Calcs		Date: 18/06/2024			
Report Details: Type: Junctions Storm Phase: Phase		Designed by: CC	Checked by:		Approved By:
		Company Address: 78 Wollaton Road Beeston, Nottingham NG9 2NZ			

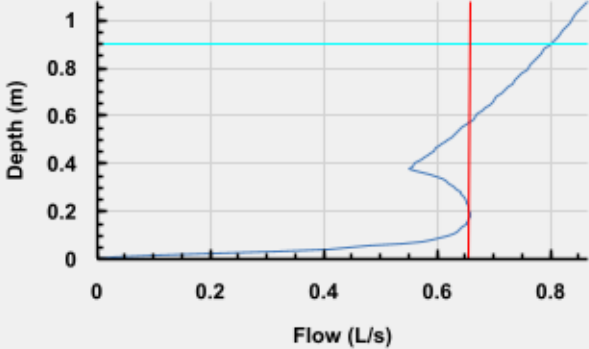
Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)	Invert Level (m)	Chamber Shape	Diameter (m)
S1	Manhole	523369.827	319872.450	2.100	0.500	1.600	Circular	0.600
S2	Manhole	523389.423	319874.271	2.100	0.650	1.450	Circular	0.600
S3	Manhole	523389.423	319892.226	2.400	1.120	1.280	Circular	0.600
S4	Manhole	523389.424	319910.087	2.900	1.740	1.160	Circular	0.600
S5	Manhole	523389.424	319918.559	3.000	1.900	1.100	Circular	0.600
S6	Manhole	523367.543	319918.568	2.800	1.000	1.800	Circular	0.600
S7	Manhole	523382.547	319918.559	3.000	1.945	1.055	Circular	0.600
S8	Manhole	523382.562	319928.618	2.875	1.100	1.775	Circular	0.600
S9	Manhole	523366.910	319924.625	2.700	1.725	0.975	Circular	0.600
S10	Manhole	523354.124	319924.642	2.600	1.680	0.920	Circular	0.600
S11	Manhole	523335.550	319924.660	2.450	1.615	0.835	Circular	0.600
S12	Manhole	523327.674	319925.729	3.200	2.400	0.800	Circular	0.600

Name	Lock
S1	None
S2	None
S3	None
S4	None
S5	None
S6	None
S7	None
S8	None
S9	None
S10	None
S11	None
S12	None

Inlets

Junction	Inlet Name	Incoming Item(s)	Bypass Destination	Capacity Type
S1	Inlet	Catchment Area	(None)	No Restriction
S2	Inlet	1.000	(None)	No Restriction
	Inlet (1)	Catchment Area (1)	(None)	No Restriction
S3	Inlet	1.001	(None)	No Restriction
	Inlet (1)	Catchment Area (2)	(None)	No Restriction
S4	Inlet	1.002	(None)	No Restriction
	Inlet (1)	Catchment Area (3)	(None)	No Restriction
S5	Inlet	1.003	(None)	No Restriction
S6	Inlet	Catchment Area (4)	(None)	No Restriction
S7	Inlet	1.004	(None)	No Restriction
	Inlet (1)	2.000	(None)	No Restriction
S8	Inlet	Catchment Area (5)	(None)	No Restriction
S9	Inlet	1.006	(None)	No Restriction
S10	Inlet	1.007	(None)	No Restriction
	Inlet (1)	Catchment Area (6)	(None)	No Restriction
S11	Inlet	1.008	(None)	No Restriction
	Inlet (1)	Catchment Area (7)	(None)	No Restriction
S12	Inlet	1.009	(None)	No Restriction

Project: Ashwood Care Home Extension Spalding Common Surface Water Network Calcs		Date: 18/06/2024			
Report Details: Type: Junctions Storm Phase: Phase		Designed by: CC	Checked by:		Approved By:
		Company Address: 78 Wollaton Road Beeston, Nottingham NG9 2NZ			

Outlets			
Junction	Outlet Name	Outgoing Connection	Outlet Type
S1	Outlet	1.000	Free Discharge
S2	Outlet	1.001	Free Discharge
S3	Outlet	1.002	Free Discharge
S4	Outlet	1.003	Flap Valve
	Diameter (m)	0.150	
	Coefficient of Discharge	0.600	
	Invert Level (m)	1.160	
S5	Outlet	1.004	Free Discharge
S6	Outlet	2.000	Free Discharge
S7	Outlet	1.005	Free Discharge
S8	Outlet	3.000	Free Discharge
S9	Outlet	1.007	Hydro-Brake®
	Invert Level (m)	0.975	
	Design Depth (m)	0.900	
	Design Flow (L/s)	0.8	
	Objective	Minimise Upstream Storage Requirements	
	Application	Surface Water Only	
	Sump Available	☒	
	Unit Reference	SHE-0042-8000-0900-8000	
			
S10	Outlet	1.008	Free Discharge
S11	Outlet	1.009	Free Discharge

Project: Ashwood Care Home Extension Spalding Common Surface Water Network Calcs	Date: 18/06/2024		
	Designed by: CC	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: 78 Wollaton Road Beeston, Nottingham NG9 2NZ		



CS1

Type : Cellular Storage

Dimensions

Exceedance Level (m)	2.850
Depth (m)	0.800
Base Level (m)	1.025
Number of Crates Long	11
Number of Crates Wide	12
Number of Crates High	2
Porosity (%)	95
Crate Length (m)	1
Crate Width (m)	0.5
Crate Height (m)	0.4
Total Volume (m³)	51.185

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	1.005
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	3.000
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	1.006
Outlet Type	Free Discharge

Project: Ashwood Care Home Extension Spalding Common Surface Water Network Calcs		Date: 18/06/2024			
Report Details: Type: Connections Storm Phase: Phase		Designed by: CC	Checked by:		Approved By:
		Company Address: 78 Wollaton Road Beeston, Nottingham NG9 2NZ			

Name	Length (m)	Connection Type	Slope (1:X)	Manning's n	Colebrook-White Roughness (mm)	Diameter / Base Width (mm)	Upstream Cover Level (m)	Upstream Invert Level (m)
1.000	19.746	Pipe	131.640		0.6	150	2.100	1.600
1.001	17.955	Pipe	105.619		0.6	150	2.100	1.450
1.002	17.860	Pipe	148.835		0.6	150	2.400	1.280
1.003	8.472	Pipe	141.204		0.6	150	2.900	1.160
1.004	6.877	Pipe	152.815		0.6	150	3.000	1.100
2.000	15.004	Pipe	20.139		0.6	150	2.800	1.800
1.005	1.529	Pipe	50.979		0.6	150	3.000	1.055
3.000	2.710	Pipe	13.550		0.6	150	2.875	1.775
1.006	10.140	Pipe	202.805		0.6	225	2.850	1.025
1.007	12.786	Pipe	232.476		0.6	225	2.700	0.975
1.008	18.574	Pipe	218.520		0.6	225	2.600	0.920
1.009	8.148	Pipe	232.810		0.6	225	2.450	0.835

Name	Downstream Cover Level (m)	Downstream Invert Level (m)	Lock	Flow Restriction (L/s)
1.000	2.100	1.450	None	
1.001	2.400	1.280	None	
1.002	2.900	1.160	None	
1.003	3.000	1.100	None	60.6
1.004	3.000	1.055	None	
2.000	3.000	1.055	None	
1.005	2.850	1.025	None	
3.000	2.850	1.575	Levels	
1.006	2.700	0.975	None	
1.007	2.600	0.920	None	0.9
1.008	2.450	0.835	None	
1.009	3.200	0.800	None	

Project: Ashwood Care Home Extension Spalding Common Surface Water Network Calcs		Date: 18/06/2024			
Report Details: Type: Inflow Summary Storm Phase: Phase		Designed by: CC	Checked by:		Approved By:
		Company Address: 78 Wollaton Road Beeston, Nottingham NG9 2NZ			

Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
Catchment Area	S1		Time of Concentration	0.011	100	0	100	0.011
Catchment Area (1)	S2		Time of Concentration	0.015	100	0	100	0.015
Catchment Area (2)	S3		Time of Concentration	0.020	100	0	100	0.020
Catchment Area (3)	S4		Time of Concentration	0.020	100	0	100	0.020
Catchment Area (4)	S6		Time of Concentration	0.015	100	0	100	0.015
Catchment Area (5)	S8		Time of Concentration	0.028	100	0	100	0.028
Catchment Area (6)	S10		Time of Concentration	0.026	100	0	100	0.026
Catchment Area (7)	S11		Time of Concentration	0.016	100	0	100	0.016
TOTAL		0.0		0.152				0.152

Project: Ashwood Care Home Extension Spalding Common Surface Water Network Calcs	Date: 18/06/2024			
	Designed by: CC	Checked by:	Approved By:	
Report Details: Type: Outfall Details Storm Phase: Phase	Company Address: 78 Wollaton Road Beeston, Nottingham NG9 2NZ			

Outfalls

Outfall	Outfall Type	Fixed Surcharged Level (m)	Level Curve
S12	Free Discharge		

Project: Ashwood Care Home Extension Spalding Common Surface Water Network Calcs	Date: 18/06/2024			
	Designed by: CC	Checked by:	Approved By:	
Report Title: Rainfall Analysis Criteria	Company Address: 78 Wollaton Road Beeston, Nottingham NG9 2NZ			

Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Default
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Project: Ashwood Care Home Extension Spalding Common Surface Water Network Calcs		Date: 18/06/2024			
Report Details: Type: Junctions Summary Storm Phase: Phase		Designed by: CC	Checked by:		Approved By:
		Company Address: 78 Wollaton Road Beeston, Nottingham NG9 2NZ			



FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
S1	FSR: 1 years: +0 %: 15 mins: Winter	2.100	1.600	1.631	0.031	1.5	0.009	0.000	1.4	0.670	OK
S2	FSR: 1 years: +0 %: 15 mins: Winter	2.100	1.450	1.494	0.044	3.4	0.012	0.000	3.2	1.591	OK
S3	FSR: 1 years: +0 %: 15 mins: Winter	2.400	1.280	1.344	0.064	5.9	0.018	0.000	5.7	2.841	OK
S4	FSR: 1 years: +0 %: 15 mins: Winter	2.900	1.160	1.294	0.134	8.3	0.038	0.000	8.0	4.078	OK
S5	FSR: 1 years: +0 %: 180 mins: Winter	3.000	1.100	1.181	0.081	2.2	0.023	0.000	2.2	9.416	OK
S6	FSR: 1 years: +0 %: 15 mins: Winter	2.800	1.800	1.822	0.022	2.0	0.006	0.000	2.0	0.913	OK
S7	FSR: 1 years: +0 %: 180 mins: Winter	3.000	1.055	1.181	0.126	2.7	0.036	0.000	2.6	11.507	OK
S8	FSR: 1 years: +0 %: 15 mins: Winter	2.875	1.775	1.806	0.031	3.8	0.009	0.000	3.7	1.732	OK
S9	FSR: 1 years: +0 %: 180 mins: Winter	2.700	0.975	1.181	0.206	0.7	0.058	0.000	0.7	12.041	OK
S10	FSR: 1 years: +0 %: 15 mins: Winter	2.600	0.920	0.969	0.049	3.9	0.014	0.000	3.6	2.354	OK
S11	FSR: 1 years: +0 %: 15 mins: Winter	2.450	0.835	0.899	0.064	5.7	0.018	0.000	5.4	3.294	OK
S12	FSR: 1 years: +0 %: 15 mins: Winter	3.200	0.800	0.860	0.060	5.4	0.000	0.000	5.4	3.294	OK

Project: Ashwood Care Home Extension Spalding Common Surface Water Network Calcs		Date: 18/06/2024			
Report Details: Type: Junctions Summary Storm Phase: Phase		Designed by: CC	Checked by:		Approved By:
		Company Address: 78 Wollaton Road Beeston, Nottingham NG9 2NZ			



FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
S1	FSR: 30 years: +0 %: 15 mins: Winter	2.100	1.600	1.648	0.048	3.6	0.014	0.000	3.5	1.648	OK
S2	FSR: 30 years: +0 %: 15 mins: Winter	2.100	1.450	1.554	0.104	8.4	0.029	0.000	5.6	3.902	OK
S3	FSR: 30 years: +0 %: 15 mins: Winter	2.400	1.280	1.536	0.256	12.3	0.073	0.000	10.8	6.980	Surcharged
S4	FSR: 30 years: +0 %: 240 mins: Winter	2.900	1.160	1.470	0.310	4.1	0.088	0.000	4.0	23.169	Surcharged
S5	FSR: 30 years: +0 %: 240 mins: Winter	3.000	1.100	1.470	0.370	3.7	0.105	0.000	3.6	22.243	Surcharged
S6	FSR: 30 years: +0 %: 15 mins: Winter	2.800	1.800	1.834	0.034	4.9	0.010	0.000	4.8	2.245	OK
S7	FSR: 30 years: +0 %: 240 mins: Winter	3.000	1.055	1.470	0.415	4.5	0.117	0.000	4.4	27.072	Surcharged
S8	FSR: 30 years: +0 %: 15 mins: Winter	2.875	1.775	1.826	0.051	9.2	0.014	0.000	9.1	4.250	OK
S9	FSR: 30 years: +0 %: 240 mins: Winter	2.700	0.975	1.470	0.495	0.8	0.140	0.000	0.7	15.755	Surcharged
S10	FSR: 30 years: +0 %: 15 mins: Winter	2.600	0.920	0.997	0.077	9.2	0.022	0.000	8.8	4.837	OK
S11	FSR: 30 years: +0 %: 15 mins: Winter	2.450	0.835	0.943	0.108	14.0	0.030	0.000	13.5	7.190	OK
S12	FSR: 30 years: +0 %: 15 mins: Winter	3.200	0.800	0.898	0.098	13.5	0.000	0.000	13.5	7.190	OK

Project: Ashwood Care Home Extension Spalding Common Surface Water Network Calcs		Date: 18/06/2024			
Report Details: Type: Junctions Summary Storm Phase: Phase		Designed by: CC	Checked by:		Approved By:
		Company Address: 78 Wollaton Road Beeston, Nottingham NG9 2NZ			



FSR: 100 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
S1	FSR: 100 years: +0 %: 15 mins: Winter	2.100	1.600	1.709	0.109	4.6	0.031	0.000	3.2	2.144	OK
S2	FSR: 100 years: +0 %: 15 mins: Winter	2.100	1.450	1.701	0.251	8.4	0.071	0.000	6.8	5.067	Surcharged
S3	FSR: 100 years: +0 %: 15 mins: Winter	2.400	1.280	1.679	0.399	14.6	0.113	0.000	12.8	8.974	Surcharged
S4	FSR: 100 years: +0 %: 360 mins: Winter	2.900	1.160	1.632	0.472	3.7	0.133	0.000	3.6	33.190	Surcharged
S5	FSR: 100 years: +0 %: 360 mins: Winter	3.000	1.100	1.632	0.532	3.5	0.150	0.000	3.4	31.725	Surcharged
S6	FSR: 100 years: +0 %: 15 mins: Winter	2.800	1.800	1.839	0.039	6.3	0.011	0.000	6.3	2.910	OK
S7	FSR: 100 years: +0 %: 360 mins: Winter	3.000	1.055	1.632	0.577	4.3	0.163	0.000	4.2	38.678	Surcharged
S8	FSR: 100 years: +0 %: 15 mins: Winter	2.875	1.775	1.834	0.059	11.9	0.017	0.000	11.8	5.505	OK
S9	FSR: 100 years: +0 %: 360 mins: Winter	2.700	0.975	1.632	0.657	0.7	0.186	0.000	0.7	26.002	Surcharged
S10	FSR: 100 years: +0 %: 15 mins: Winter	2.600	0.920	1.009	0.089	11.7	0.025	0.000	11.2	6.012	OK
S11	FSR: 100 years: +0 %: 15 mins: Winter	2.450	0.835	0.960	0.125	17.9	0.035	0.000	17.2	9.076	OK
S12	FSR: 100 years: +0 %: 15 mins: Winter	3.200	0.800	0.913	0.113	17.2	0.000	0.000	17.3	9.076	OK

Project: Ashwood Care Home Extension Spalding Common Surface Water Network Calcs		Date: 18/06/2024			
Report Details: Type: Junctions Summary Storm Phase: Phase		Designed by: CC	Checked by:		Approved By:
		Company Address: 78 Wollaton Road Beeston, Nottingham NG9 2NZ			



FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
S1	FSR: 100 years: +40 %: 480 mins: Winter	2.100	1.600	2.101	0.501	0.7	1.463	1.322	0.9	8.924	Flood
S2	FSR: 100 years: +40 %: 480 mins: Winter	2.100	1.450	2.101	0.651	1.7	1.457	1.273	1.6	20.965	Flood
S3	FSR: 100 years: +40 %: 480 mins: Winter	2.400	1.280	2.102	0.822	2.9	0.233	0.000	2.8	35.262	Flood Risk
S4	FSR: 100 years: +40 %: 600 mins: Winter	2.900	1.160	2.103	0.943	3.5	0.267	0.000	3.4	51.492	Surcharged
S5	FSR: 100 years: +40 %: 600 mins: Winter	3.000	1.100	2.104	1.004	3.3	0.284	0.000	3.2	49.844	Surcharged
S6	FSR: 100 years: +40 %: 600 mins: Winter	2.800	1.800	2.104	0.304	0.8	0.086	0.000	0.8	11.789	Surcharged
S7	FSR: 100 years: +40 %: 360 mins: Winter	3.000	1.055	2.104	1.049	5.9	0.297	0.000	5.8	52.634	Surcharged
S8	FSR: 100 years: +40 %: 600 mins: Winter	2.875	1.775	2.104	0.329	1.6	0.093	0.000	1.6	22.274	Surcharged
S9	FSR: 100 years: +40 %: 360 mins: Winter	2.700	0.975	2.103	1.128	1.7	0.319	0.000	0.9	30.804	Surcharged
S10	FSR: 100 years: +40 %: 15 mins: Winter	2.600	0.920	1.031	0.111	16.1	0.031	0.000	15.3	8.082	OK
S11	FSR: 100 years: +40 %: 15 mins: Winter	2.450	0.835	0.990	0.155	24.7	0.044	0.000	23.8	12.383	OK
S12	FSR: 100 years: +40 %: 15 mins: Winter	3.200	0.800	0.938	0.138	23.8	0.000	0.000	23.8	12.383	OK

Project: Ashwood Care Home Extension Spalding Common Surface Water Network Calcs		Date: 18/06/2024			
		Designed by: CC	Checked by:		Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Company Address: 78 Wollaton Road Beeston, Nottingham NG9 2NZ			



FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Resident Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
CS1	FSR: 1 years: +0 %: 180 mins: Winter	1.181	1.181	0.156	0.156	3.5	9.797	0.000	0.000	0.7	12.167	80.860	OK

Project: Ashwood Care Home Extension Spalding Common Surface Water Network Calcs		Date: 18/06/2024			
		Designed by: CC	Checked by:		Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Company Address: 78 Wollaton Road Beeston, Nottingham NG9 2NZ			



FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Resident Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
CS1	FSR: 30 years: +0 %: 240 mins: Winter	1.470	1.470	0.445	0.445	6.1	27.885	0.000	0.000	0.8	16.351	45.522	OK

Project: Ashwood Care Home Extension Spalding Common Surface Water Network Calcs		Date: 18/06/2024			
		Designed by: CC	Checked by:		Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Company Address: 78 Wollaton Road Beeston, Nottingham NG9 2NZ			



FSR: 100 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Resident Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
CS1	FSR: 100 years: +0 %: 360 mins: Winter	1.632	1.632	0.607	0.607	5.8	38.034	0.000	0.000	0.7	26.713	25.694	OK

Project: Ashwood Care Home Extension Spalding Common Surface Water Network Calcs		Date: 18/06/2024			
		Designed by: CC	Checked by:		Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Company Address: 78 Wollaton Road Beeston, Nottingham NG9 2NZ			



FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By:
Max. Resident Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
CS1	FSR: 100 years: +40 %: 600 mins: Winter	2.107	2.107	1.082	1.082	5.4	50.450	0.000	0.000	1.4	51.861	1.435	OK

Project: Ashwood Care Home Extension Spalding Common Surface Water Network Calcs		Date: 18/06/2024			
Report Details: Type: Connections Summary Storm Phase: Phase		Designed by: CC	Checked by:		Approved By:
		Company Address: 78 Wollaton Road Beeston, Nottingham NG9 2NZ			



FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.000	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S1	S2	2.100	1.631	0.037	0.670	0.4	0.09	1.4	OK
1.001	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S2	S3	2.100	1.494	0.054	1.591	0.6	0.19	3.2	OK
1.002	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S3	S4	2.400	1.344	0.099	2.841	0.5	0.39	5.7	OK
1.003	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S4	S5	2.900	1.294	0.081	4.058	0.8	0.49	7.3	OK
1.004	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S5	S7	3.000	1.179	0.074	4.041	0.8	0.5	7.1	OK
2.000	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S6	S7	2.800	1.822	0.045	0.913	0.4	0.05	2.0	OK
1.005	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S7	CS1	3.000	1.123	0.078	4.860	1.7	0.35	8.8	OK
3.000	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S8	CS1	2.875	1.806	0.029	1.732	1.5	0.08	3.7	OK
1.006	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	CS1	S9	2.850	1.118	0.118	0.961	0.2	0.04	1.5	OK
1.007	FSR: 1 years: +0 %: 60 mins: Winter	Pipe	S9	S10	2.700	1.165	0.030	3.823	0.3	0.02	0.7	OK
1.008	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S10	S11	2.600	0.969	0.057	2.354	0.5	0.1	3.6	OK
1.009	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	S11	S12	2.450	0.899	0.062	3.294	0.6	0.16	5.4	OK

Project: Ashwood Care Home Extension Spalding Common Surface Water Network Calcs		Date: 18/06/2024			
Report Details: Type: Connections Summary Storm Phase: Phase		Designed by: CC	Checked by:		Approved By:
		Company Address: 78 Wollaton Road Beeston, Nottingham NG9 2NZ			



FSR: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.000	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S1	S2	2.100	1.648	0.076	1.648	0.4	0.23	3.5	OK
1.001	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S2	S3	2.100	1.554	0.150	3.902	0.5	0.32	5.6	OK
1.002	FSR: 30 years: +0 %: 15 mins: Summer	Pipe	S3	S4	2.400	1.513	0.150	6.234	0.6	0.75	10.9	Surcharged
1.003	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S4	S5	2.900	1.459	0.150	9.574	0.9	1.05	15.7	Surcharged
1.004	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S5	S7	3.000	1.289	0.150	9.377	0.9	1.06	15.1	Surcharged
2.000	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S6	S7	2.800	1.834	0.106	2.245	0.5	0.12	4.8	OK
1.005	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S7	CS1	3.000	1.258	0.150	11.310	1.9	0.78	19.4	Surcharged
3.000	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S8	CS1	2.875	1.826	0.047	4.250	1.9	0.19	9.1	OK
1.006	FSR: 30 years: +0 %: 15 mins: Summer	Pipe	CS1	S9	2.850	1.234	0.225	1.200	0.3	0.03	1.3	OK
1.007	FSR: 30 years: +0 %: 120 mins: Summer	Pipe	S9	S10	2.700	1.389	0.036	7.629	0.3	0.02	0.7	Surcharged
1.008	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S10	S11	2.600	0.997	0.092	4.837	0.6	0.25	8.8	OK
1.009	FSR: 30 years: +0 %: 15 mins: Winter	Pipe	S11	S12	2.450	0.943	0.103	7.190	0.8	0.4	13.5	OK

Project: Ashwood Care Home Extension Spalding Common Surface Water Network Calcs		Date: 18/06/2024			
Report Details: Type: Connections Summary Storm Phase: Phase		Designed by: CC	Checked by:		Approved By:
		Company Address: 78 Wollaton Road Beeston, Nottingham NG9 2NZ			



FSR: 100 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.000	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	S1	S2	2.100	1.709	0.150	2.144	0.4	0.21	3.2	OK
1.001	FSR: 100 years: +0 %: 15 mins: Summer	Pipe	S2	S3	2.100	1.670	0.150	4.522	0.5	0.41	7.0	Surcharged
1.002	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	S3	S4	2.400	1.679	0.150	8.965	0.7	0.88	12.8	Surcharged
1.003	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	S4	S5	2.900	1.576	0.150	12.212	1.0	1.21	18.0	Surcharged
1.004	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	S5	S7	3.000	1.385	0.150	11.936	1.0	1.2	17.2	Surcharged
2.000	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	S6	S7	2.800	1.839	0.140	2.910	0.5	0.16	6.3	OK
1.005	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	S7	CS1	3.000	1.327	0.150	14.448	2.0	0.89	22.3	Surcharged
3.000	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	S8	CS1	2.875	1.834	0.055	5.505	2.0	0.24	11.8	OK
1.006	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	CS1	S9	2.850	1.327	0.225	1.317	0.3	0.04	1.5	Surcharged
1.007	FSR: 100 years: +0 %: 360 mins: Winter	Pipe	S9	S10	2.700	1.632	0.029	25.977	0.3	0.02	0.7	Surcharged
1.008	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	S10	S11	2.600	1.009	0.107	6.012	0.6	0.32	11.2	OK
1.009	FSR: 100 years: +0 %: 15 mins: Winter	Pipe	S11	S12	2.450	0.960	0.119	9.076	0.8	0.51	17.2	OK

Project: Ashwood Care Home Extension Spalding Common Surface Water Network Calcs		Date: 18/06/2024			
Report Details: Type: Connections Summary Storm Phase: Phase		Designed by: CC	Checked by:		Approved By:
		Company Address: 78 Wollaton Road Beeston, Nottingham NG9 2NZ			



FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.000	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S1	S2	2.100	2.100	0.150	3.026	0.5	0.52	8.0	Flood
1.001	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S2	S3	2.100	2.052	0.150	7.135	0.6	0.64	11.0	Flood Risk
1.002	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S3	S4	2.400	1.976	0.150	12.359	0.9	1.04	15.1	Surcharged
1.003	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S4	S5	2.900	1.837	0.150	16.899	1.2	1.44	21.4	Surcharged
1.004	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S5	S7	3.000	1.535	0.150	16.479	1.1	1.4	20.1	Surcharged
2.000	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S6	S7	2.800	1.846	0.150	4.072	0.5	0.22	8.7	OK
1.005	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S7	CS1	3.000	1.450	0.150	20.017	2.1	1.11	27.7	Surcharged
3.000	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S8	CS1	2.875	1.848	0.067	7.713	2.2	0.34	16.5	OK
1.006	FSR: 100 years: +40 %: 480 mins: Winter	Pipe	CS1	S9	2.850	2.104	0.225	41.604	0.2	0.05	1.8	Surcharged
1.007	FSR: 100 years: +40 %: 240 mins: Winter	Pipe	S9	S10	2.700	2.102	0.035	20.407	0.4	0.03	0.9	Surcharged
1.008	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S10	S11	2.600	1.031	0.133	8.082	0.6	0.44	15.3	OK
1.009	FSR: 100 years: +40 %: 15 mins: Winter	Pipe	S11	S12	2.450	0.990	0.146	12.383	0.9	0.7	23.8	OK



Appendix 5: Maintenance Schedule



Document: **Drainage System Maintenance Plan**

Development: **Proposed Extension at Ashwood Care Home**
 43 Spalding Common, Spalding, PE11 3AU

Written by: **CDS Consulting Engineers on behalf of**
 Country Court Care Group.

Written in accordance with CIRIA RP992 & Update Paper RP992/21



Preamble

The purpose of a Maintenance Plan is to ensure all those involved in the maintenance and ongoing operation of the storm & foul drainage systems understand their functionality and maintenance requirements in terms of supporting long-term performance to the design criteria to which they were designed.

A Maintenance Plan delivered as part of a drainage submission:

1. Confirms that the designer has taken maintenance into account within the design
2. Demonstrates the competence of the designer
3. Provides a guide to the operations team as to what the maintenance requirements of the system are and how they can be met most efficiently
4. Provides a basis for costing long term maintenance budgets
5. Provides a working document for use on site

It details procedures for dealing with emergency spillages & vandalism. It should include the local Environment Agency or SEPA Emergency Hotline telephone number which should be called in case of spillages or other pollution incidents.

The Maintenance Plan for the drainage system should be designed in cooperation with the adopting authority and the information therein should be presented and discussed verbally with all those involved in inspecting and maintaining the drainage systems. The maintenance inspections and associated works are the responsibility of the site owner, not CDS Consulting Engineers.

The employed maintenance company/operative should combine the following matters in to their own working plan and safety systems when formulating the site specific plans for each visit.



The Maintenance Plan

Plans of the site - This Maintenance Plan should be stored within the O&M manual alongside CDS drawings reference 2024.10374.100.

All main drainage assets are accessible by vehicle/ride on mowers.

Zones of responsibility - As the whole development will lie within Country Court Care Groups ownership, all on-site maintenance works and inspections will be carried out by/for that owner. There are NO adoptive elements within the scope of this document. The appointed maintenance contractor should have access to all O&M documents and product maintenance data sheets.

Drainage System Elements

Drainage Network Element:	
Collective Drainage Network (Pipes/Manholes/Catchpits)	
Inspection Frequency:	Ongoing
Maintenance Activity:	Frequency:
• Inspect chambers and catchpits and identify incorrect operation	Quarterly
• Removal of silt and debris from linear channels, gullies and guttering (jetting/rodding)	Quarterly
• Debris removal from catchment areas (sweeping/vacuuming)	Bi-annually
• Empty catchpits	Bi-annually
*Drainage network should be fully inspected following a storm event	

Drainage Network Element:	
Below Ground Geo-cellular Storage	
Inspection Frequency:	Bi-annually
Maintenance Activity:	Frequency:
• Inspect and identify incorrect operation	Bi-annually
• Removal of silt and debris crate system (vacuuming/jetting)	Bi-annually
*Attenuation should be fully inspected following a storm event	



Drainage Network Element:	
Permeable Paving	
Inspection Frequency:	Quarterly
Maintenance Activity:	Frequency:
• Brushing and Vacuuming	Quarterly
• Removal of vegetation/weeds	Quarterly
• Inspection for evidence of poor operation (ponding)	Quarterly
• Inspect debris accumulation on surface and adjust sweeping regime if necessary	Annually
• Inspect silt accumulation in inspection chambers and perforated pipes, remove as necessary	Annually
*Drainage network should be fully inspected following a storm event	

See notes in design considerations. PTO.



Notable Design Considerations:

Some drainage network items lie within areas open to the public. As such, covers will be heavy D400 grade to deter errant access.

The drainage system is designed to cope with a 100 year storm (plus allowance for climate change). As such, subject to general maintenance being carried out, no ponding should leave the hardstanding areas.

All rainwater collection points, such as rain water pipes and linear drains should have leaf / silt traps to increase the integrity of the drainage system, subject to routine maintenance being carried out.

Contact Details

In the event of vandalism or any unlikely chemical/oil spillage; the discovering Tenant or Maintenance Operative should immediately contact

Country Court Care: 01733 571951

and the

EA Accident/Incident Hotline 0800 80 70 60.



Objectives

The objective of the inspection log is to:

1. Confirm that appropriate routine maintenance of the system is being undertaken
2. Confirm that the system is continuing to operate effectively
3. Identify any remedial works required
4. Provide a consistent record of the condition and performance of the system.

Inspections should comply with all relevant Health and Safety legislation (Health and Safety at Work Regulations, 1999) including the development of risk assessments for working close to or in water.

General Inspections should ideally be carried out at no less than 6 monthly intervals, at the same time as other routine maintenance activities.

Inspection Documents

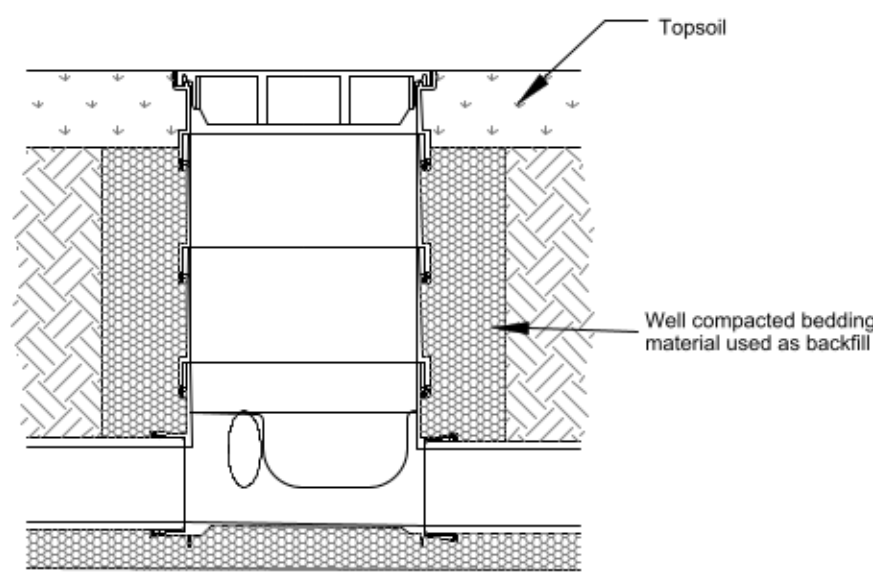
The appointed maintenance contractor should attach their own inspection log documents and adapt their procedures in line with the guidance given in this document.

Complete relevant items and keep within Maintenance Log, alongside site photographs and record of repair/maintenance works

Photographic records of the inspections - Should be kept within the maintenance log, alongside the completed inspection forms, to pick up long-term changes that might not be apparent on a single visit, especially where inspections are carried out by different members of staff.



Appendix 6: Drainage Details

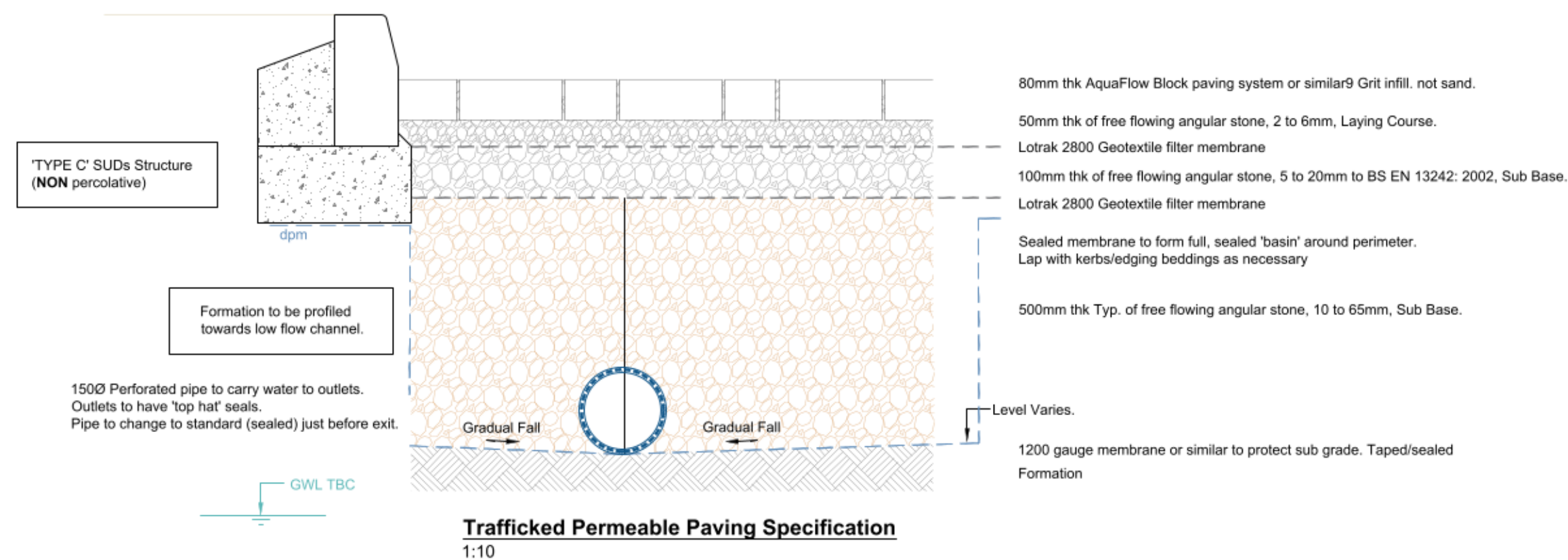


Sited in driveways/ paved areas

sited in landscaped areas

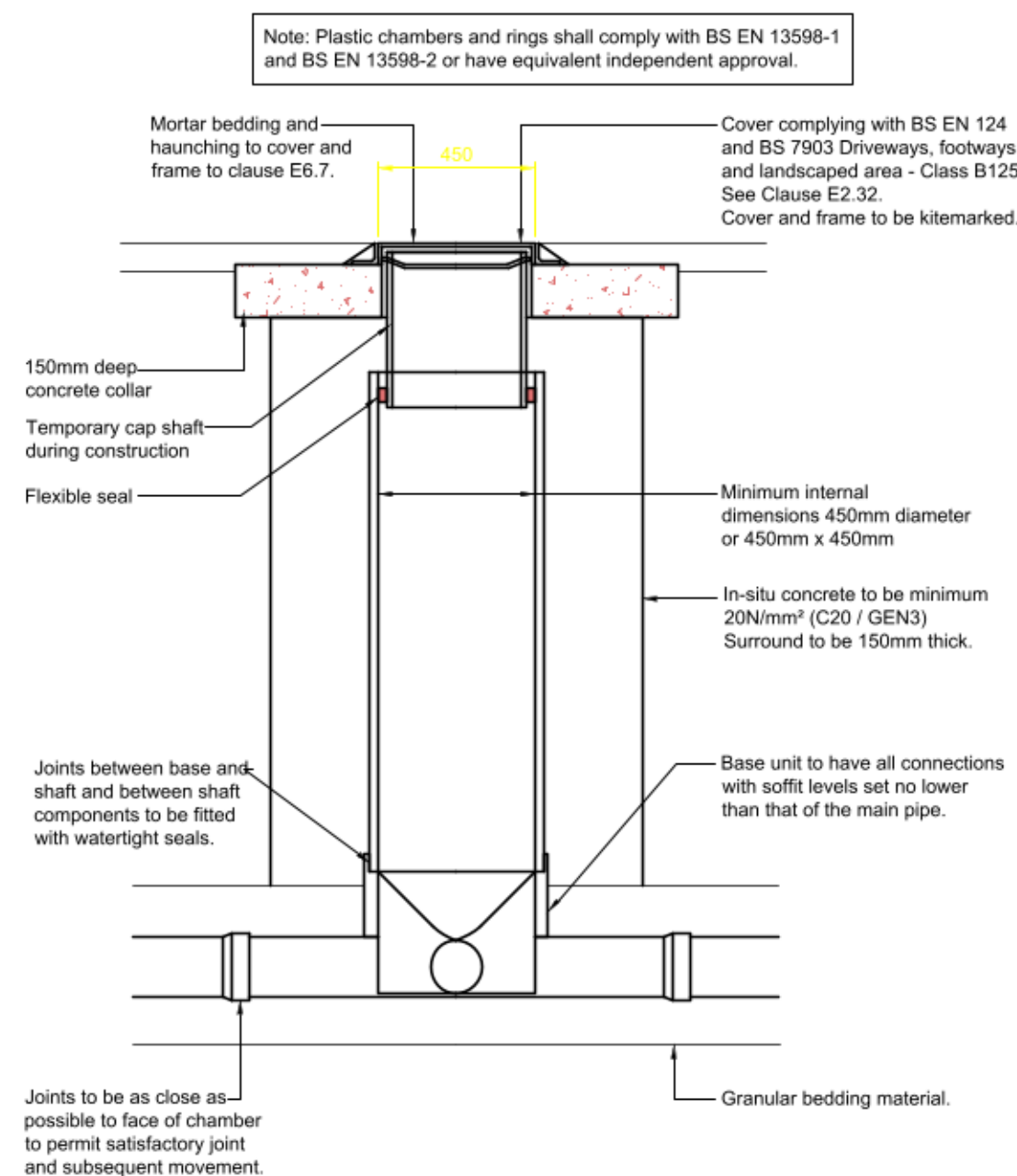
Mini Access Chamber
max 600 mm deep

Mini Access Chamber
max 600 mm deep

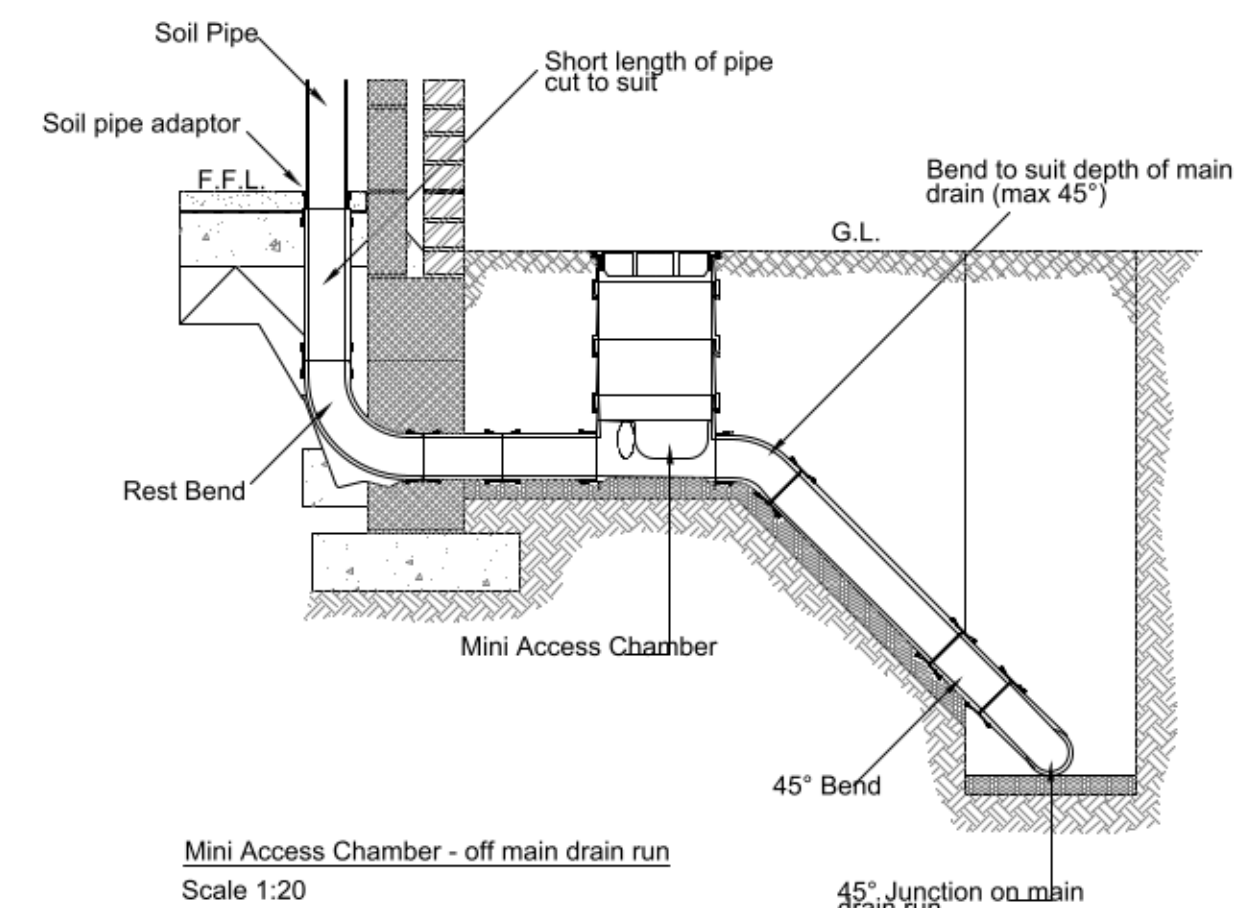


Trafficked Permeable Paving Specification

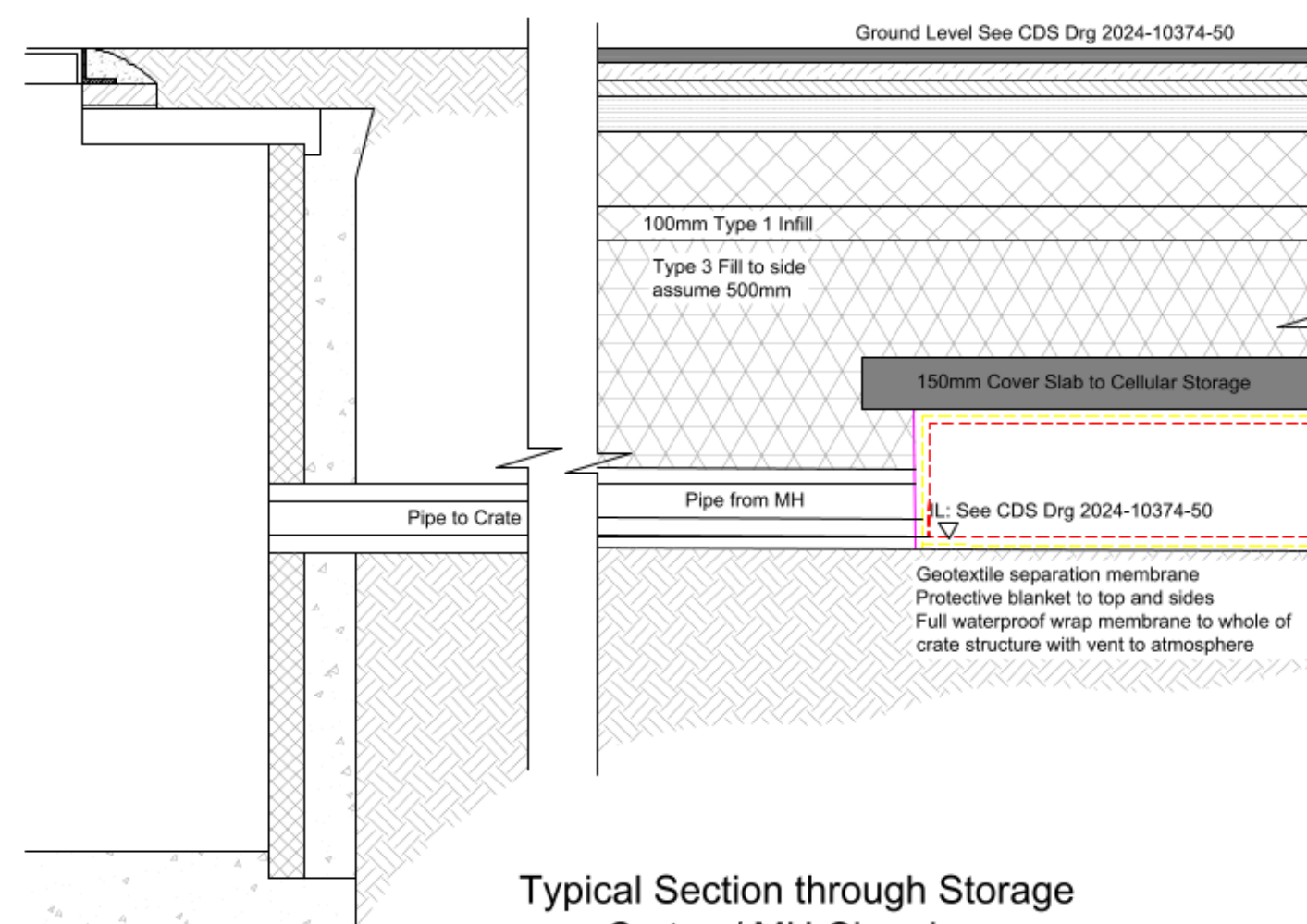
Formation to be profiled towards low flow channel.
whole formation, including excavation sides to be lined with taped and sealed DPM.
Treat whole parking area as a sealed tank.
Outlet pipes must have sealed 'top hat' type connections at perimeter.
Pipes within permeable zone to be perforated. All other pipes to be standard sealed system.



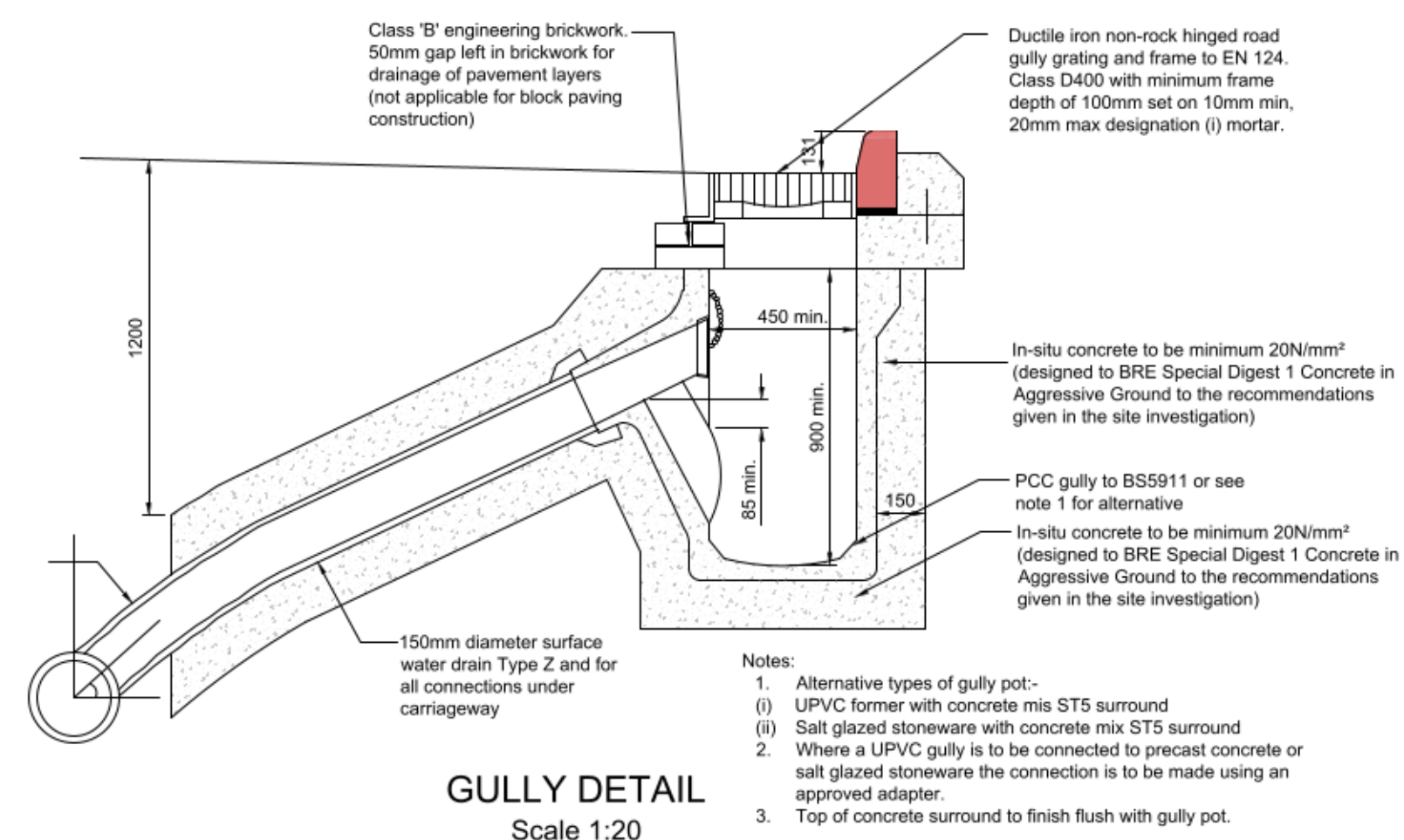
INSPECTION CHAMBER FOR LIGHT VEHICLE LOADING
AND LANDSCAPED AREAS / DEMARCATION CHAMBER
FOR COVER LEVEL TO INVERT LEVEL LESS THAN
1200MM.
Scale 1:20



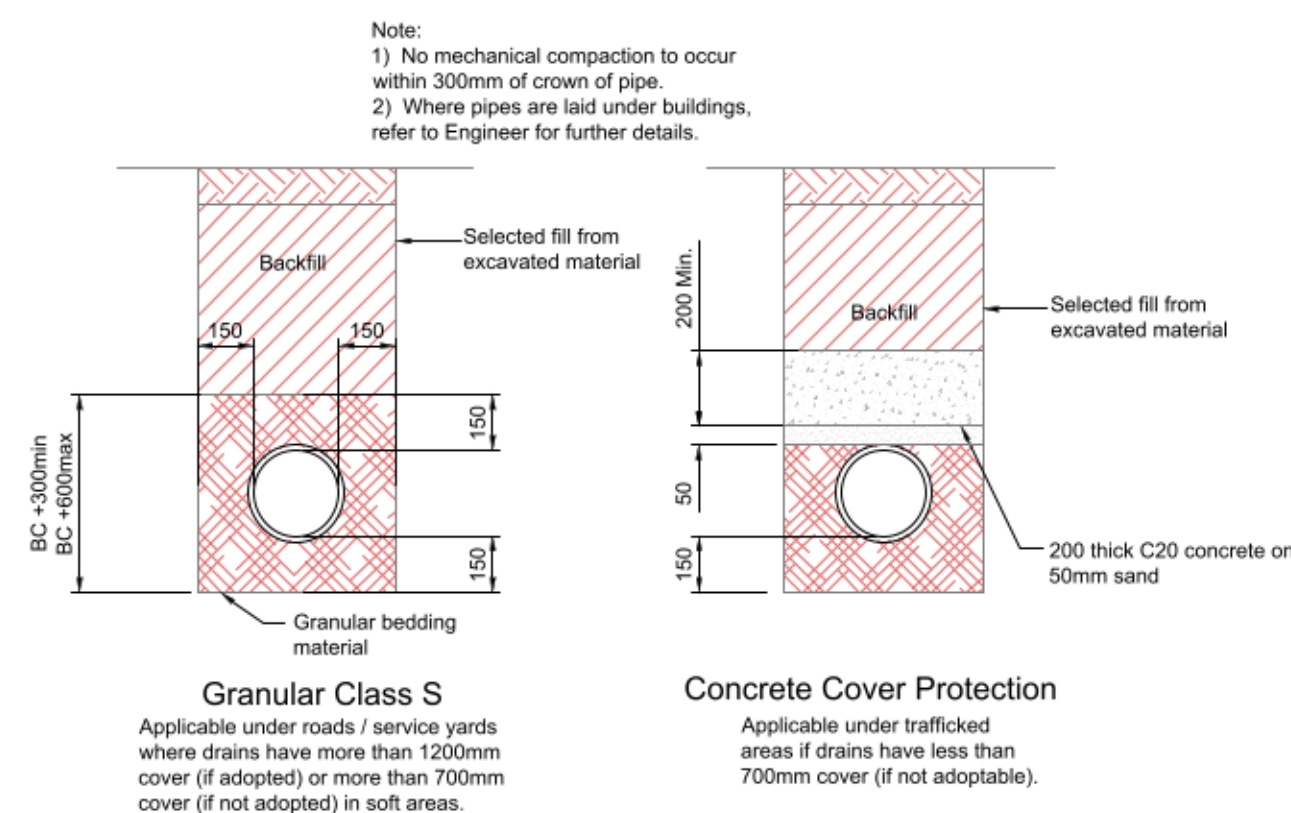
Mini Access Chamber - off main drain run
Scale 1:20



Typical Section through Storage
Crates / MH Chamber
N.T.S

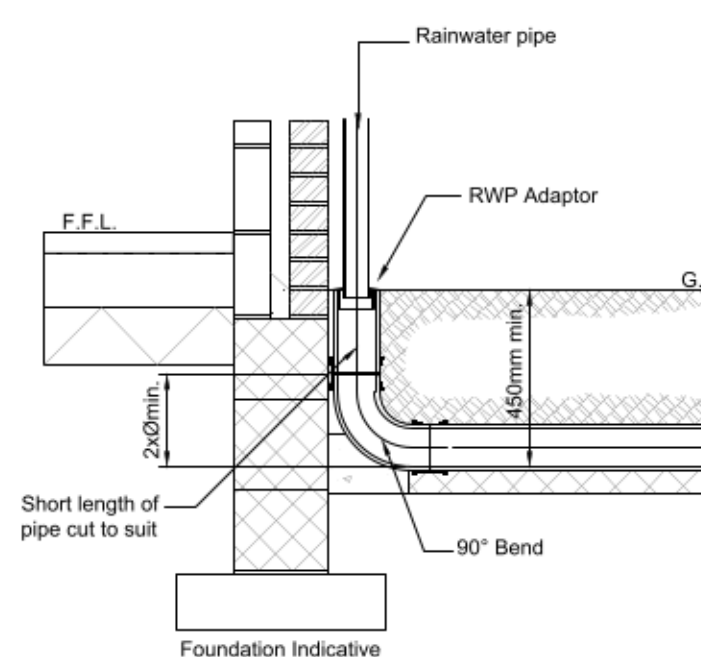


GULLY DETAIL
Scale 1:20

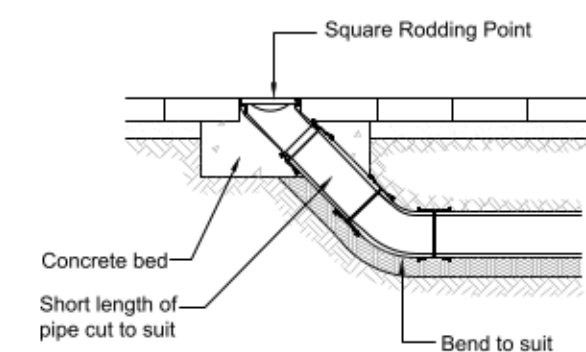


PIPE BEDDING DETAILS

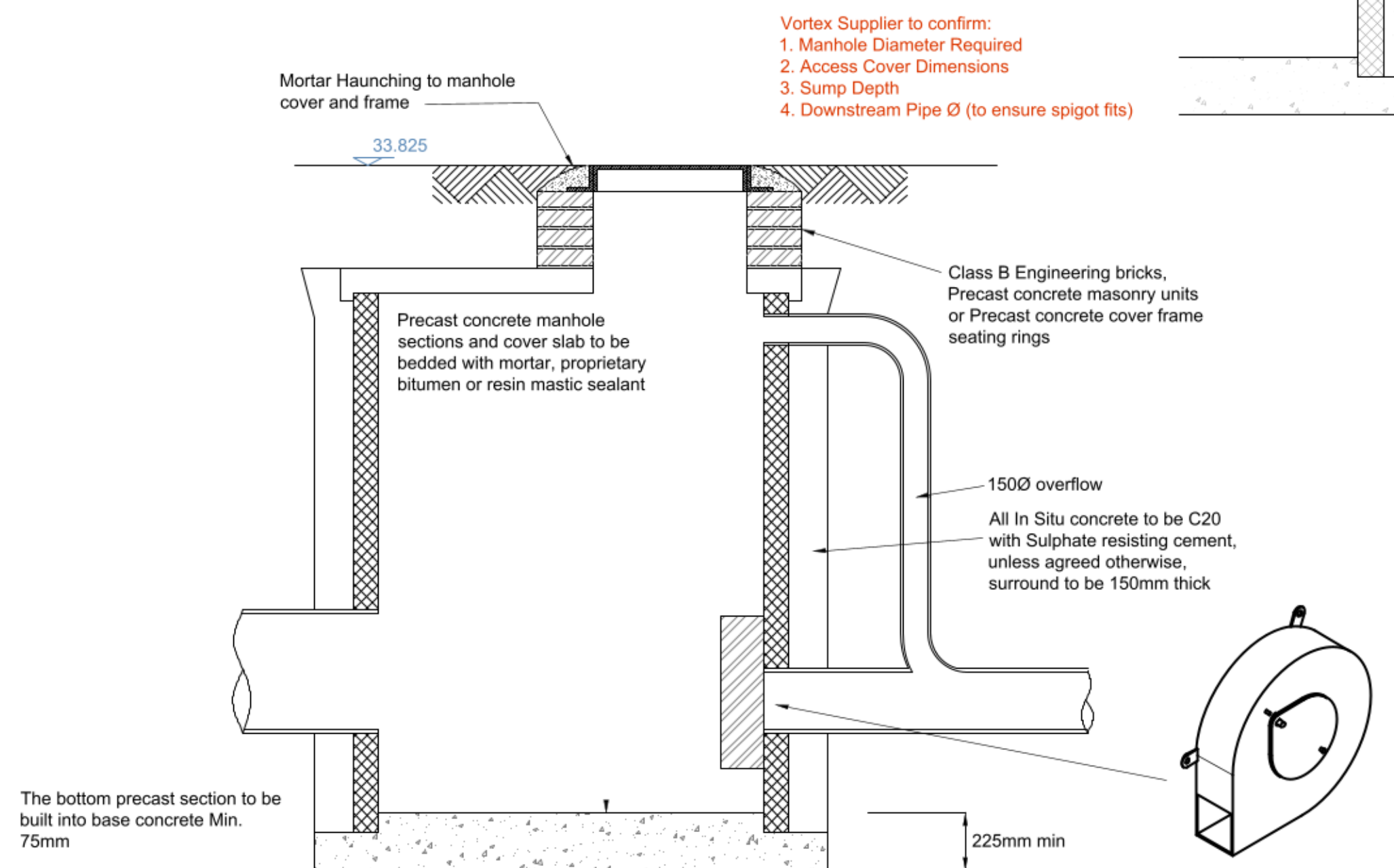
Scale 1:20



Typical Rainwater Pipe Detail
Scale 1:20



Typical Rodding Eye Detail
Scale 1:20



Typical Flow Control Manhole Specification
1/20

BBA Approved Vortex flow control device - Specifications and Installation details by specialist supplier

- ### GENERAL NOTES
1. Do not scale this drawing. If in any doubt ask.
 2. This drawing is to be read in conjunction with all relevant engineers and specialists drawings and specifications.
 3. All setting out is to be checked on site prior to any works commencing.
 4. Any discrepancies are to be reported to CDS immediately.
 5. All dimensions are shown in millimetres unless otherwise noted.
 6. All levels are shown in metres unless otherwise noted.

Rev	By	Date	Details	Chkd
Drawing Status			For Planning	
 Construction Design Solutions Consulting Civil, Structural, Highway & Drainage Engineers 76 Wollaton Road, Beeston, Nottingham. NG9 2NZ. General E-mail : design @ cdsconsulting . co . uk Web Site : www . cdsconsulting . co . uk				
Client				
Country Court Care				
Project				
Ashwood Care Home, Spalding Common				
Title				
Drainage Construction Details				
Scale (A1) As Shown		Drawn by: CJC	Drg. No. 2024-10374-51	
Date: JUN 24		Checked by:		