



Drainage Strategy

173A Findon Road Worthing West Sussex BN14 0BQ

Reference: U0905 -Rev - V2

Date: Sep-26

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- B Site Characteristics
- C Drainage Calculations
- D Drainage System General Arrangement

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Drainage Strategy

173A Findon Road Worthing West Sussex BN14 0BQ

Reference: U0905 -Rev - V2

Report Limitations

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Approval

	Name	Position	Date
Prepared By:	JKC	Engineer	3.8.2026
Reviewed By:	GG	Senior Engineer	3.8.2026
Approved By:	AR	Chartered Engineer	7.8.2026

Revision

Revision Number	Date Issued	Details
V1	7.8.2026	1st Issue
V2	1.9.2026	Second Issue
-	-	-

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Purpose of this report

- 1.1 The purpose of this statement is to accompany the technical drawings and details showing the proposed Surface Water drainage system as part of the planning application for this development.

Scope

- 1.2 This Sustainable Drainage Strategy (SDS) outlines the key drainage principles and requirements for the proposed development at 173A Findon Road Worthing West Sussex BN14 0BQ. It provides a summary of the sustainable drainage system (SuDS) design, based on the specific site conditions and relevant guidelines, including Building Regulations Approved Document Part H and CIRIA C753: The SuDS Manual 2015. As the project progresses and new information becomes available, this strategy will be updated to reflect ongoing changes and the development of the detailed design.

Site Characteristics

- 2.1 The site background is clearly identified through answers to the questions in table 1 below.

Table 1: Site Characteristics . See appendix B for support documentation

TOPIC	QUESTION	ANSWER
Protected species or habitat	Is the site near to designated sites and priority habitats?	No
Flood Plain	Is the site located in the flood plain?	No
Soils and Geology	Soil permeability? - See appendix B for results	No
Space constraints	Space for SuDS components?	No
Topography	Sited on a flat site?	Yes
	Sited on a steep slope (5-15%)	No
	Sited on a very steep slope (>15%)	No
Groundwater	Is the site at groundwater flood risk?	No
Contaminated land	Are there contaminated soils on site?	Unknown
Source Protection Zone	Is the site within a SPZ 3?	Yes
Runoff characteristics	Is the development in a high risk flooding area?	No

Existing and Proposed Site

- 2.2 The distribution of catchment areas for existing and proposed site is as per table 2 below. See appendix A for details

Table 2 : Existing and Proposed catchment areas in hectares

Description	Existing Site	Proposed Site
Impermeable Areas	0.010	0.007
Permeable Areas	Connected to Drainage	0.000
	Self Draining Areas	0.001
Areas Draining Away from drainage System	0.005	0.007
Total Development Area	0.015	0.015

- 2.3 It has been assumed that the positively drained areas will have different runoff coefficients depending on the type of surface as follow:

Impermeable Surface	1.0
Permeable Surfaces	0.5
Grass Areas	0.3

Evaluation of Discharge Point

3.1 The SuDS design takes into account Building Regulations Section H3 and the National standards for sustainable drainage systems (SuDS). The aim is to discharge surface water run-off as high up the drainage hierarchy, as reasonably practicable:

1. collected for non-potable use
2. infiltrated to ground
3. discharged to an above ground surface water body
4. discharged to a surface water sewer, or another piped surface water drainage system
5. discharged to a combined sewer

3.2 The discharge point has been evaluated following the NPPG and Building regulations. The findings are in table 3 below.

Table 3: Drainage Hierarchy evaluation

1	Rain Water Harvesting	For this site, it is recommended that a water butt is installed to collect roof runoff for minor reuse, such as external cleaning or garden watering.
Infiltration Evaluation	Superficial geology classification	The British Geological Society records show that the superficial deposits are Head-Clay, silt, sand and gravel.
	Bedrock geology classification	The British Geological Society records of the site show that it is located within the Newhaven Chalk Formation-Chalk.
	Landis Top Soil Infiltration	The SOILSCAPE's records of the site show that it is located within an area of freely draining soils.
	Groundwater	The British Geological Survey's flood risk susceptibility maps show that the development has limited susceptibility to ground water flooding. The risk from groundwater flood to the site is considered very low.
2	Is infiltration feasible?	Infiltration is not possible due to lack of space for SuDS components. Due to the presence of chalk the minimum safe distance for a soakaway is 15m
3	Is a discharge to a watercourse feasible?	There is no watercourse near the site.
4	Is a discharge to a surface water sewer feasible?	There is a surface water sewer in the proximity to the site. It is possible to connect to the surface water sewer, and it is proposed to discharge into this surface water sewer.
5	Is a discharge to a combined sewer feasible?	There is no combined water sewer in the proximity to the site.

Existing and Proposed Peak Run-off Calculations

- 4.1 The current site is a Brownfield. The peak runoff rate for the existing site was calculated as per table 4 and discharge rates as per table 5.

Table 4: Peak run-off rate calculation method for existing site

Method Used	Calculation Method
	Report 124 Flood Estimation for Small Catchments method has been used to estimate the site peak flow rates
✗	This is a brownfield site, runoff rates are calculated in accordance with best practice simulation modelling and using the modified rational method
	This is a brownfield site where the pre-development drainage isn't known. The runoff rates are calculated using the Greenfield model with soil type 5

- 4.2 The runoff flow produced by the development will be controlled as per table 5.

Table 5: Runoff discharge rate control

Control Used	Description of runoff discharge
	Water will be discharged into the ground via a SuDS as described in table 6 below
	The peak discharge rate has been reduced to Greenfield Qbar flow
	The peak discharge rate has been taken as 0.7 l/s as it is not possible to reduce it to the Greenfield Qbar rate
	The peak discharge rate has been reduced to Brownfield pre-development 1 in 1 flow
✗	The peak discharge rate has been reduced by 60% from the existing Brownfield pre-development 1 in 2 flow rate

Run-off flows

- 4.3 The size of the SuDS has been calculated for all events up to the 1 in 100 including an allowance for climate change of 45%. As per tables above, it is proposed to discharge at a rate of 0.88 l/s. See table 6 for values and appendix C for calculations.

Table 6: Peak discharge rates for SuDS

Return Period Event	Discharge Rate (l/s)			Infiltration Rate (m/hr)
	Existing Greenfield	Existing Brownfield	Proposed	
Qbar	0.01	N/A	N/A	N/A
1 in 1	0.01	1.70	0.88	N/A
1 in 2	0.01	2.20	0.88	N/A
1 in 30	0.01	4.00	0.88	N/A
1 in 30 + CC	N/A	N/A	0.88	N/A
1 in 100	0.01	5.10	0.88	N/A
1 in 100 + CC	N/A	N/A	0.88	N/A

Proposed Sustainable Drainage System

5.1 The following sustainable drainage systems have been used for this site. The drainage design uses these drainage system through out the site. See table 7 for details.

Table 7: Evaluation of SuDS and Proposed Drainage System

<i>Most Sustainable</i>	SuDS Technique	Feasible	Proposed	Flood Reduction	Pollution Reduction	Landscape & Wildlife Benefit
	Living Roofs					
	Green Roof	Yes	Yes	X	X	X
	Green Blue Roof	No	No	X	X	X
	Basins and Ponds					
	Rainwater Gardens	No	No	X	X	X
	Rainwater Planters	No	No	X	X	X
	Constructed Wetlands	No	No	X	X	X
	Balancing Pond	No	No	X	X	X
	Detention Basins	No	No	X	X	X
	Retention Ponds	No	No	X	X	X
	Filters and Swales					
	Filter Strips	No	No	X	X	X
	Swales	No	No	X	X	X
	Infiltration Devices					
	Soakaways Crates	No	No	X	X	X
	Deep Boreholes	No	No	X	X	X
	Infiltration Trenches	No	No	X	X	X
	Infiltration Basin	No	No	X	X	X
	Permeable Surfaces					
	Permeable Surfaces	Yes	Yes	X	X	
	Filter Drains	No	No	X	X	
	Tanked System					
	Storage Crates	Yes	Yes	X		
	Oversized Tanks	No	No	X		
	Oversized Pipes	No	No	X		
	Blue Roof	No	No	X		
	Water Harvesting	Yes	Yes	X		
<i>Least Sustainable</i>						

- 5.2 The location and details of the SuDS can be seen drainage layouts in appendix D. Calculations are in appendix C.
- 5.3 The drainage calculations demonstrate:
 - No flooding occurs for the 1 in 30 storm events.
 - Any flooding for the 1 in 100 year + 45% climate change event can be safely contained on site
- 5.4 The proposed drainage strategy presents one possible solution to demonstrate that the development can be sustainably drained, to comply with the requirements of the NPPF. Other solutions may be feasible and may prove to be better suited to the site. These will become apparent during the detailed design stage. The strategy above should not therefore be interpreted as the definitive scheme solution.

Management of Exceedance Flows

- 5.5 The drainage network has been designed to attenuate surface runoff for all events up to and including the 1% AEP + CC(1 in 100 years). However consideration has been given to what may happen when the design capacity of the surface water drainage network is exceeded. Surface water will flow to the lowest points within the site. The flood risk to the buildings would therefore remain low. See appendix D.

Maintenance and Management plan responsibility

6.1 The SuDS will be maintained by The Owner the property

Maintenance and Management plan for proposed SuDS

6.2 The maintenance and Management Plan Guidance from the SuDS Manual, CIRIA C753 (CIRIA, 2015) is to be followed for the effective maintenance of the proposed SuDS techniques outlined above. The maintenance for SuDS structures are as follow:

INLETS, OUTLETS, CONTROLS AND INSPECTION CHAMBERS	
Regular Maintenance	Frequency
Inlets, outlets and surface control structures	
Inspect surface structures removing obstructions and silt as necessary. Check there is no physical damage.	Monthly
Strim vegetation 1m min. surround to structures and keep hard aprons free from silt and debris	Monthly
Inspection chambers and below ground control chambers	
Remove cover and inspect ensuring water is flowing freely and that the exit route for water is unobstructed. Remove debris and silt.	Annually
Undertake inspection after leaf fall in autumn	
Occasional Maintenance	
Check topsoil levels are 20mm above edges of baskets and chambers to avoid mower damage	As necessary
Remedial work	Frequency
Unpack stone in basket features and unblock or repair and repack stone as design detail as necessary.	As required
Repair physical damage if necessary.	As required

Operation and maintenance requirements for attenuation storage tanks		
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

Operation and maintenance requirements for RWH systems		
Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspection of the tank for debris and sediment build-up, inlets/outlets/withdrawal devices, overflow areas, pumps, filters	Annually (and following poor performance)
	Cleaning of tank, inlets, outlets, gutters, withdrawal devices and roof drain filters of silts and other debris	Annually (and following poor performance)
Occasional maintenance	Cleaning and/or replacement of any filters	Three monthly (or as required)
Remedial actions	Repair of overflow erosion damage or damage to tank	As required
	Pump repairs	As required

Operation and maintenance requirements for green roofs		
Maintenance schedule	Required action	Typical frequency
Regular inspections	Inspect all components including soil substrate, vegetation, drains, irrigation systems (if applicable), membranes and roof structure for proper operation, integrity of waterproofing and structural stability	Annually and after severe storms
	Inspect soil substrate for evidence of erosion channels and identify any sediment sources	Annually and after severe storms
	Inspect drain inlets to ensure unrestricted runoff from the drainage layer to the conveyance or roof drain system	Annually and after severe storms
	Inspect underside of roof for evidence of leakage	Annually and after severe storms
Regular maintenance	Remove debris and litter to prevent clogging of inlet drains and interference with plant growth	Six monthly and annually or as required
	During establishment (ie year one), replace dead plants as required	Monthly (but usually responsibility of manufacturer)
	Post establishment, replace dead plants as required (where > 5% of coverage)	Annually (in autumn)
	Remove fallen leaves and debris from deciduous plant foliage	Six monthly or as required
	Remove nuisance and invasive vegetation, including weeds	Six monthly or as required
	Mow grasses, prune shrubs and manage other planting (if appropriate) as required – clippings should be removed and not allowed to accumulate	Six monthly or as required
Remedial actions	If erosion channels are evident, these should be stabilised with extra soil substrate similar to the original material, and sources of erosion damage should be identified and controlled	As required
	If drain inlet has settled, cracked or moved, investigate and repair as appropriate	As required

Operation and maintenance requirements for pervious pavements		
Maintenance schedule	Required action	Typical frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 48 h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

Appendix A

Drawing Scale Bar			
Drawing scale	Line length	Drawing scale	Line length
1:5	= 0.25 metres	1:200	= 10.0 metres
1:10	= 0.5 metres	1:250	= 12.5 metres
1:20	= 1.0 metres	1:500	= 25.0 metres
1:25	= 1.25 metres	1:1000	= 50.0 metres
1:50	= 2.5 metres	1:1250	= 62.5 metres
1:100	= 5.0 metres	1:2500	= 125 metres
Measure length of line above for checking of scale			

GENERAL NOTES

KEY

- PERMEABLE AREAS
- IMPERMEABLE AREAS
- GREEN ROOF
- STUDY AREA

Rev	Details	Date	By	Chd
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Drawing Status:
PRELIMINARY

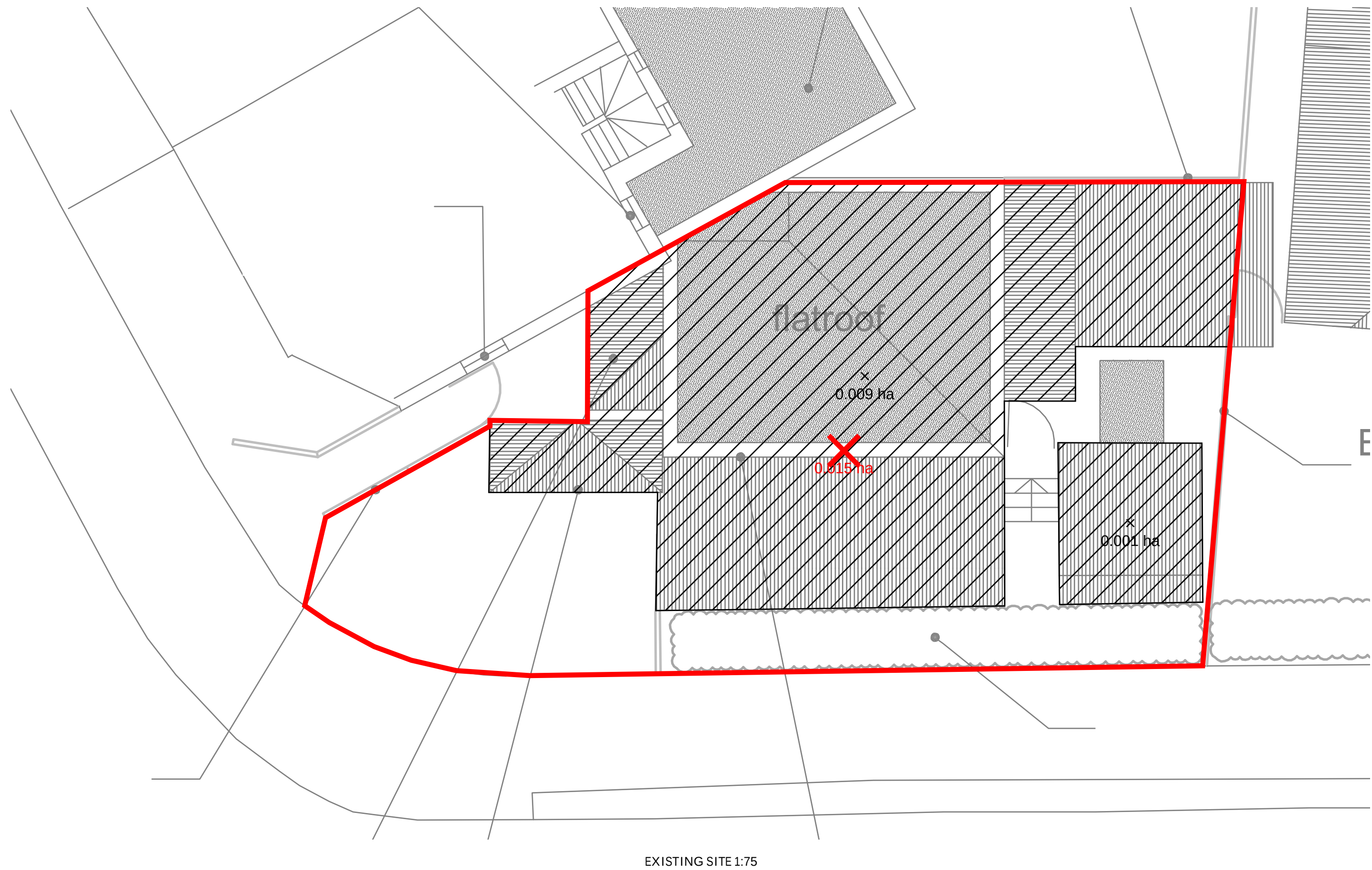


Client:

Project:
173A Findon Road Worthing West Sussex BN14 0BQ

Drawing:
Existing and Proposed Areas
Permeable and Impermeable

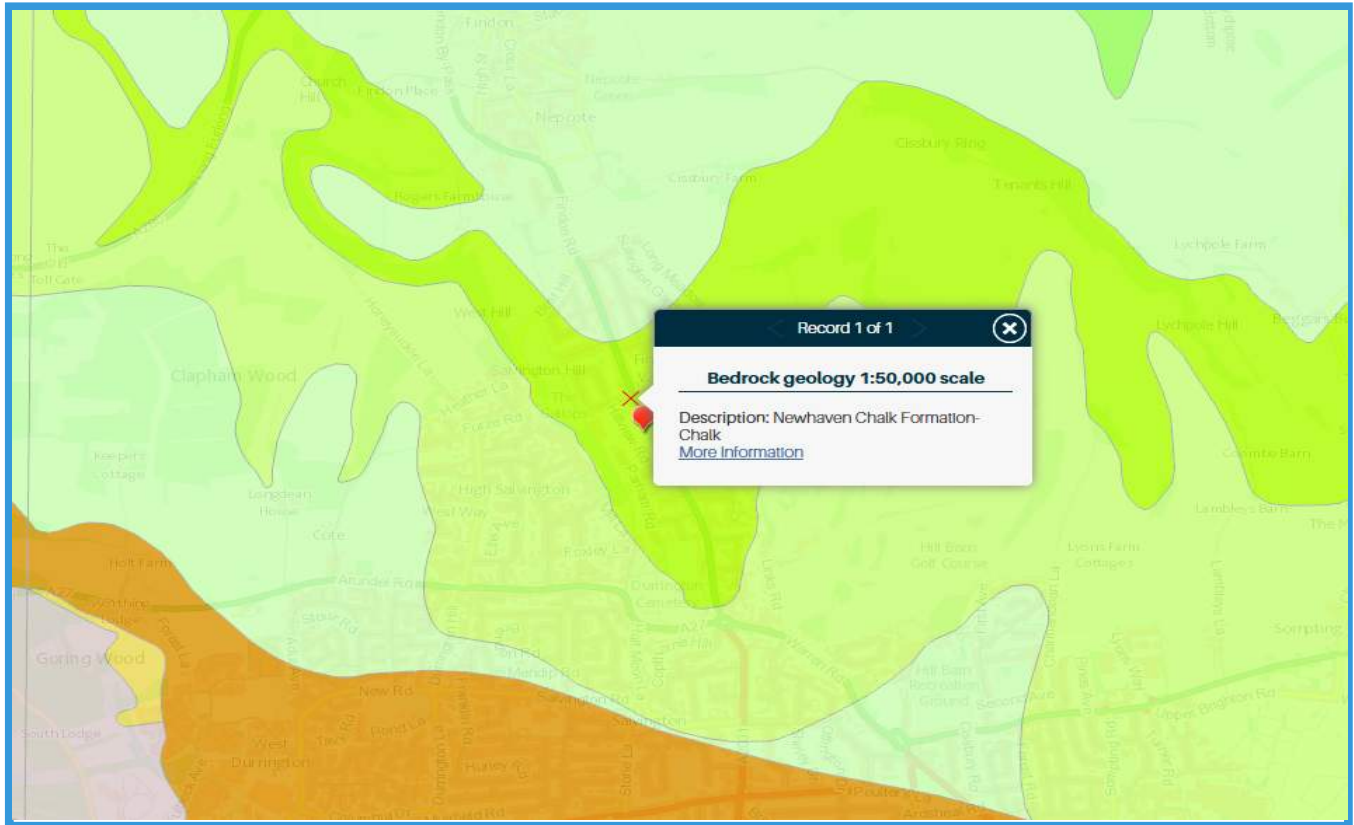
Print Size: Project No: Drawing No: Revision:
A1 U0905 002 P1



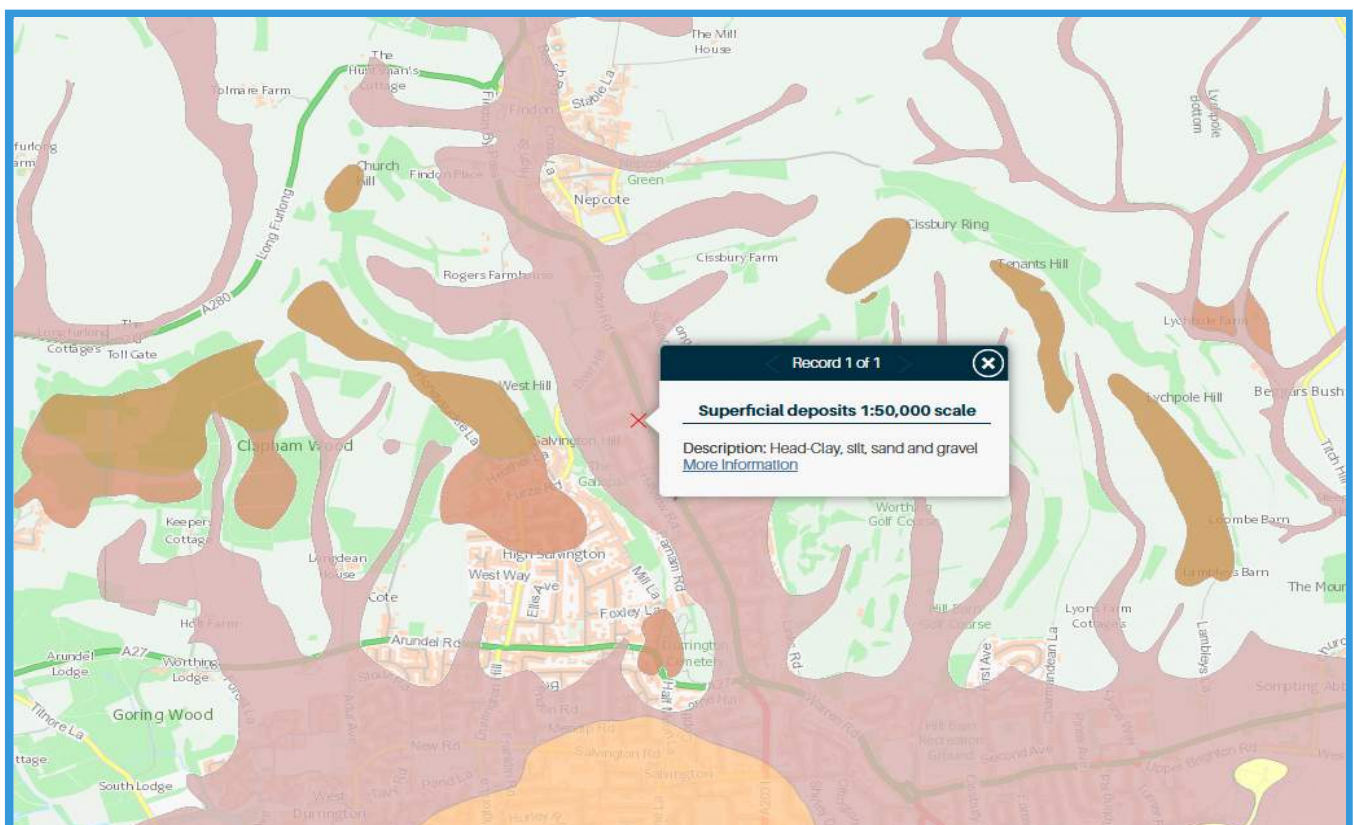
PROPOSED SITE 1:75

Appendix B

GEOLOGY - BEDROCK - Newhaven Chalk Formation-Chalk



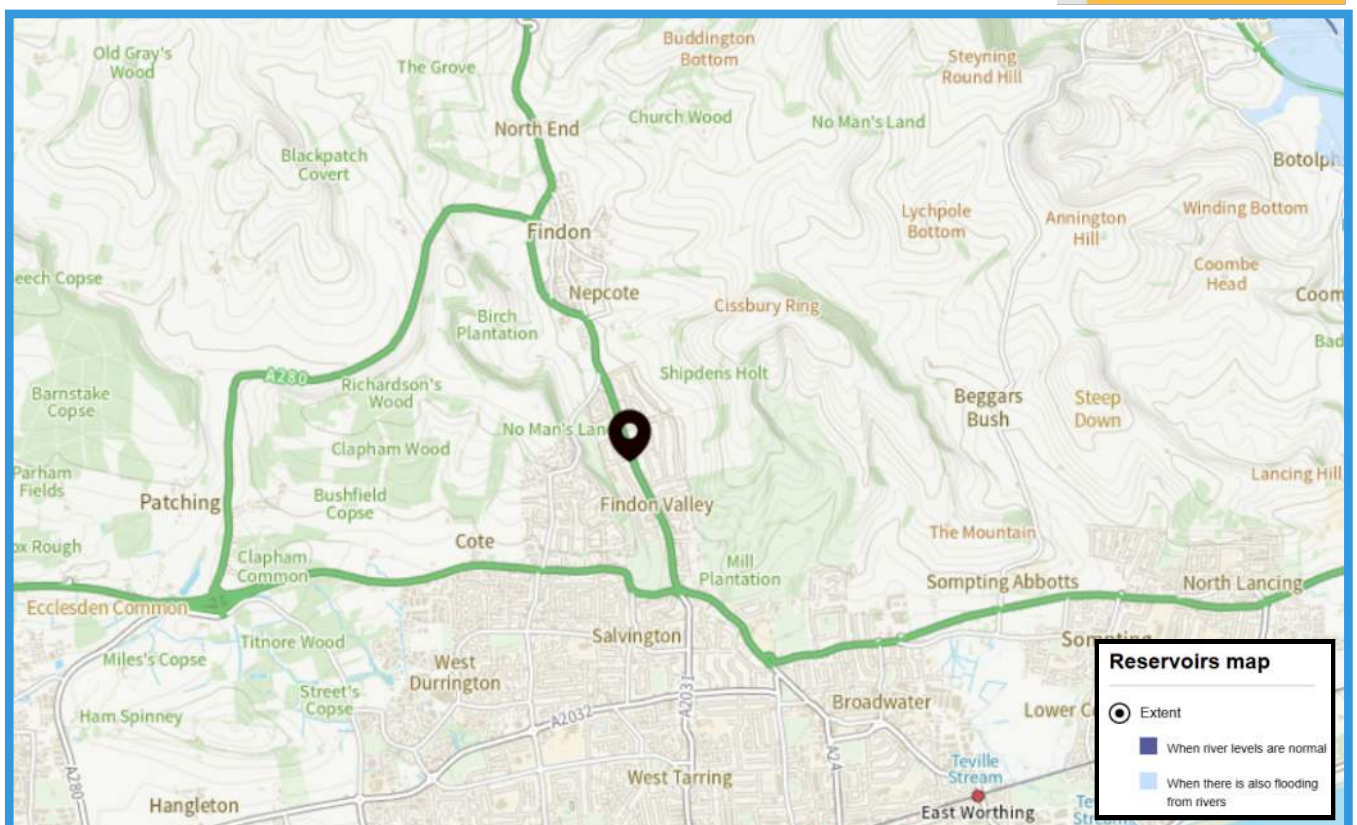
GEOLOGY - SUPERFICIAL DEPOSITS - Head-Clay, silt, sand and gravel



Main River Map



Reservoirs Map

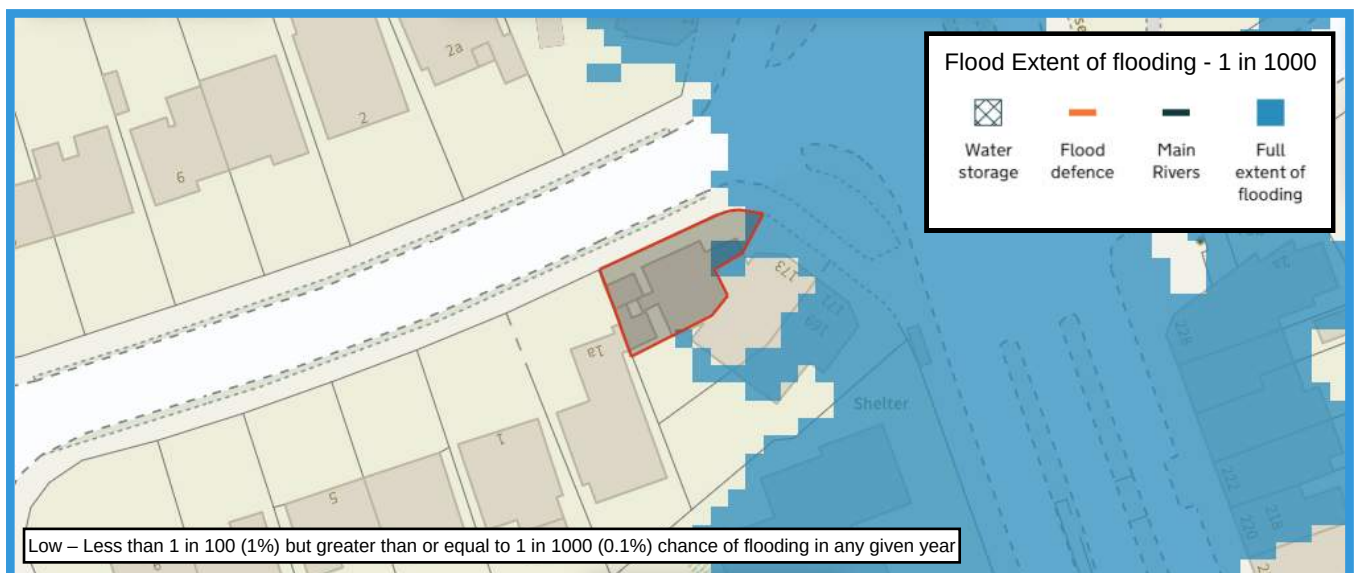
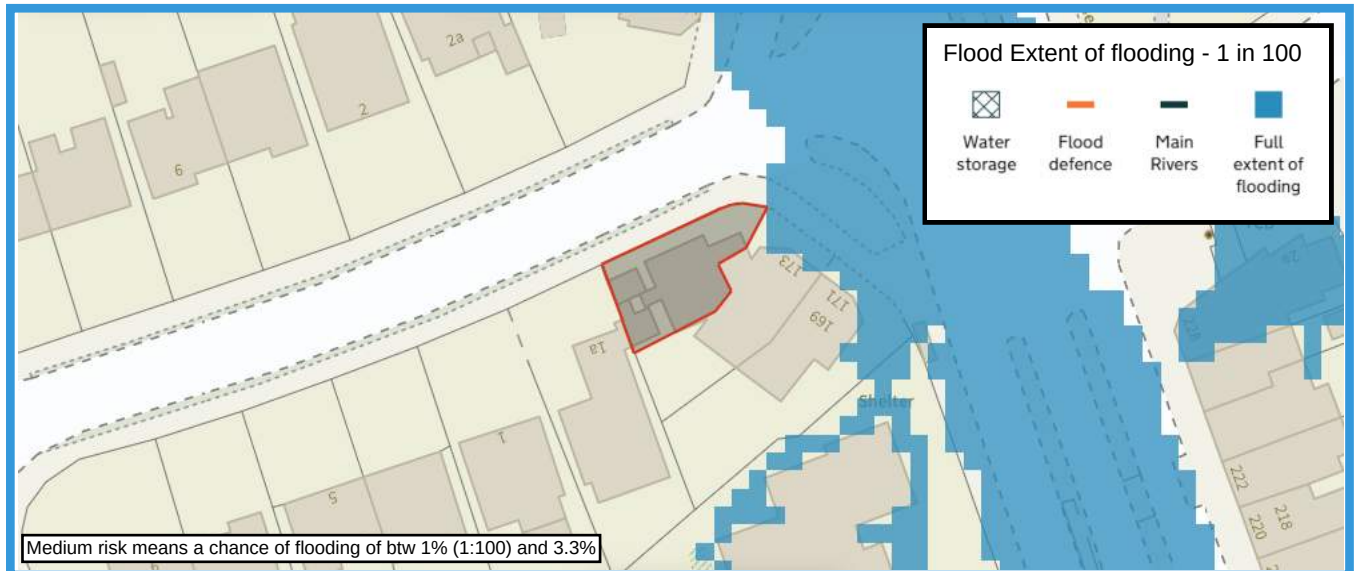
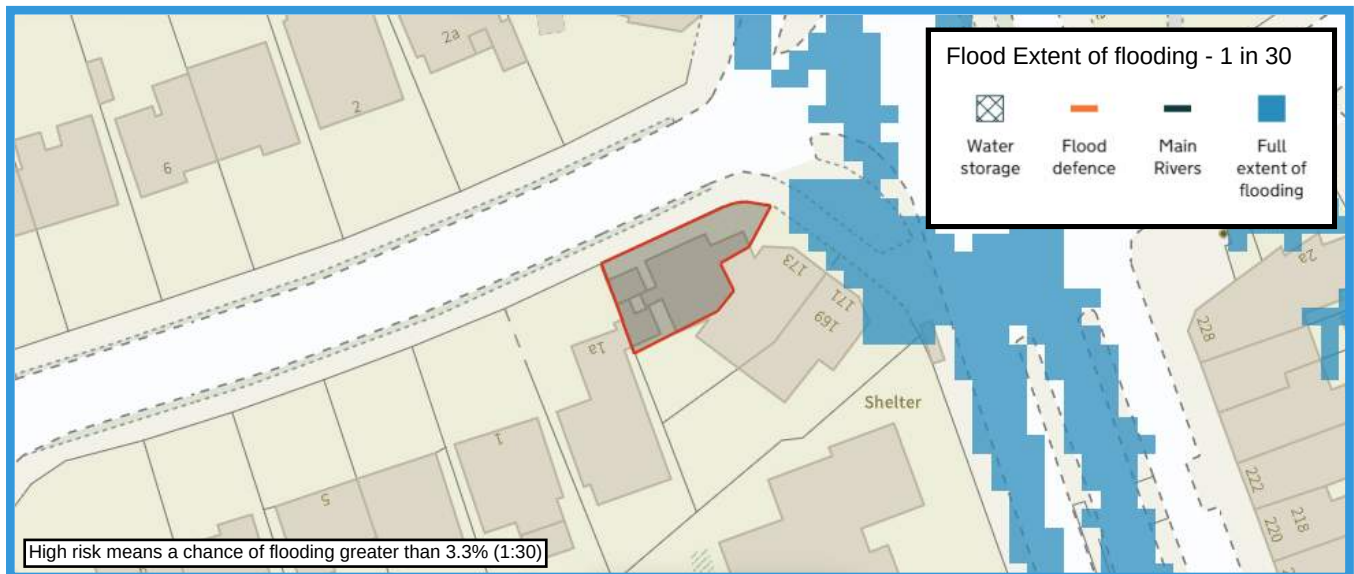


SITE SURFACE WATER FLOOD RISK

This is the EA Climate change scenarios. The climate change allowances are based on the latest UK Climate Projections (UKCP18) from the Met Office, using the Representative Concentration Pathway (RCP) 8.5.

The 'Upper end' (based on the 95th percentile) for the 2070s epoch (2061-2125) has been used for the climate change scenarios. We have chosen long-term epochs appropriate to support long-term planning and development decisions.

EXTENT 2061 to 2125



SITE SURFACE WATER FLOOD RISK



WATER DEPTH 2061 to 2125

Surface water depth in millimetres



150 300 600 900 1200 2300



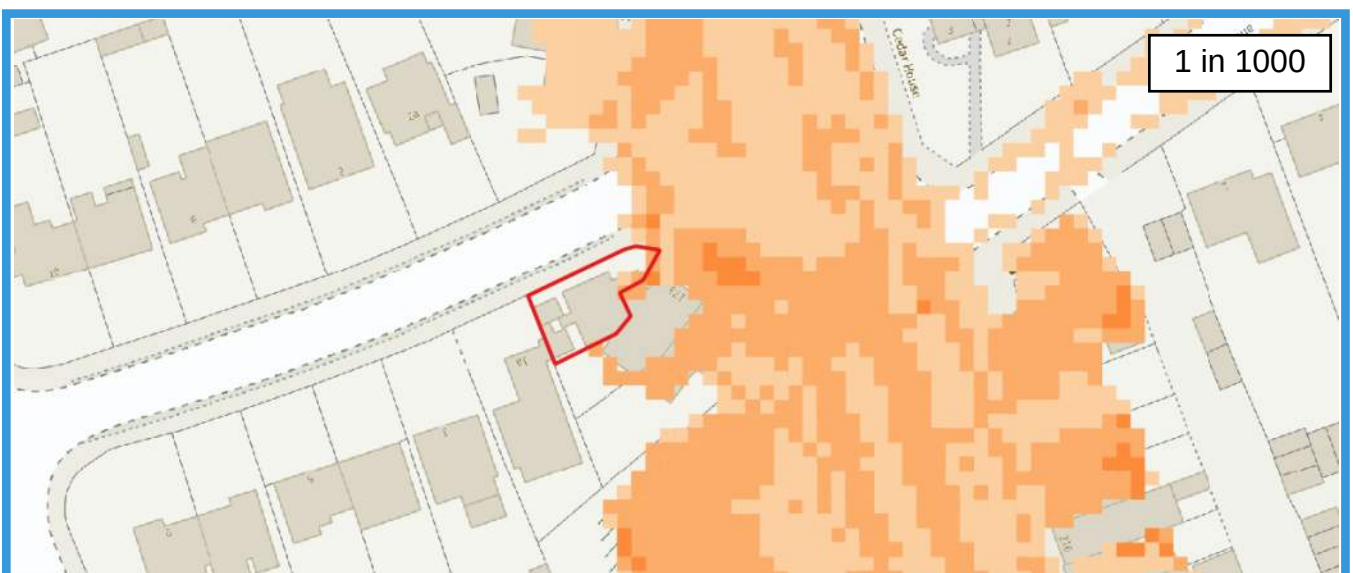
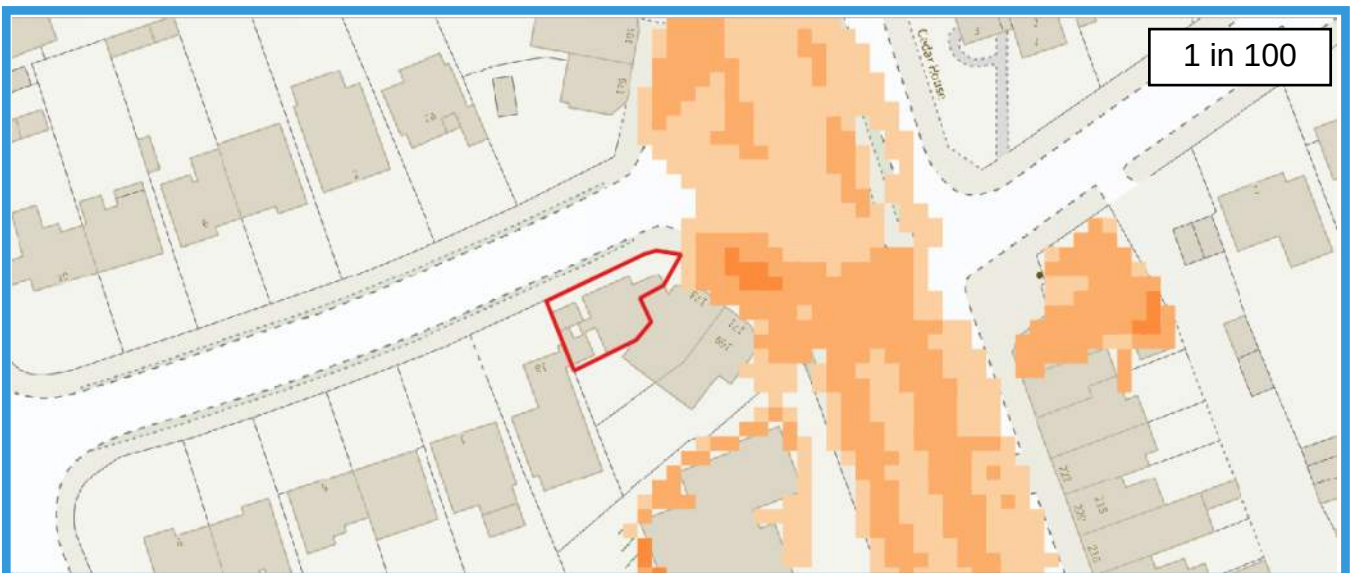
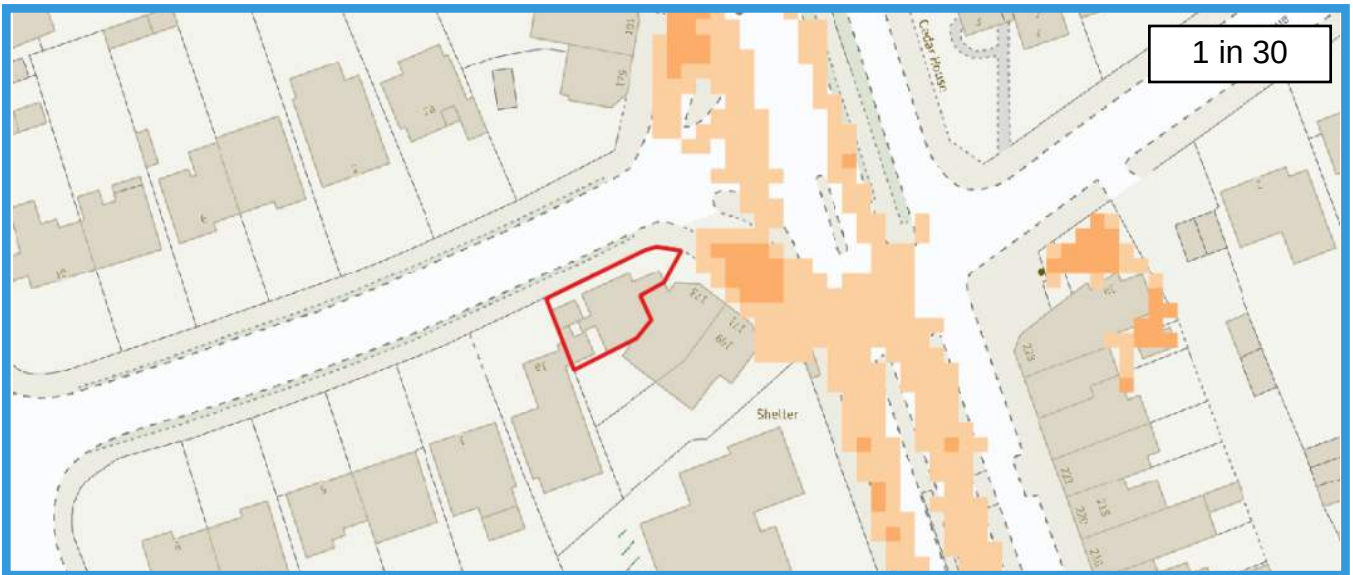
Water storage



Flood defence



Main Rivers



*High risk means a chance of flooding greater than 3.3% (1:30)

*Medium – Less than 1 in 30 (3.3%) but greater than or equal to 1 in 100 (1%) chance of flooding in any given year

*Low – Less than 1 in 100 (1%) but greater than or equal to 1 in 1000 (0.1%) chance of flooding in any given year

*Very low – less than 1 in 1000 (0.1%) chance of flooding in any given year



This shows the RoFRS_CC01_4band.lyr of flooding from rivers and the sea, climate change scenarios. The climate change allowances are based on the latest UK Climate Projections (UKCP18) from the Met Office, using the Representative Concentration Pathway (RCP) 8.5.

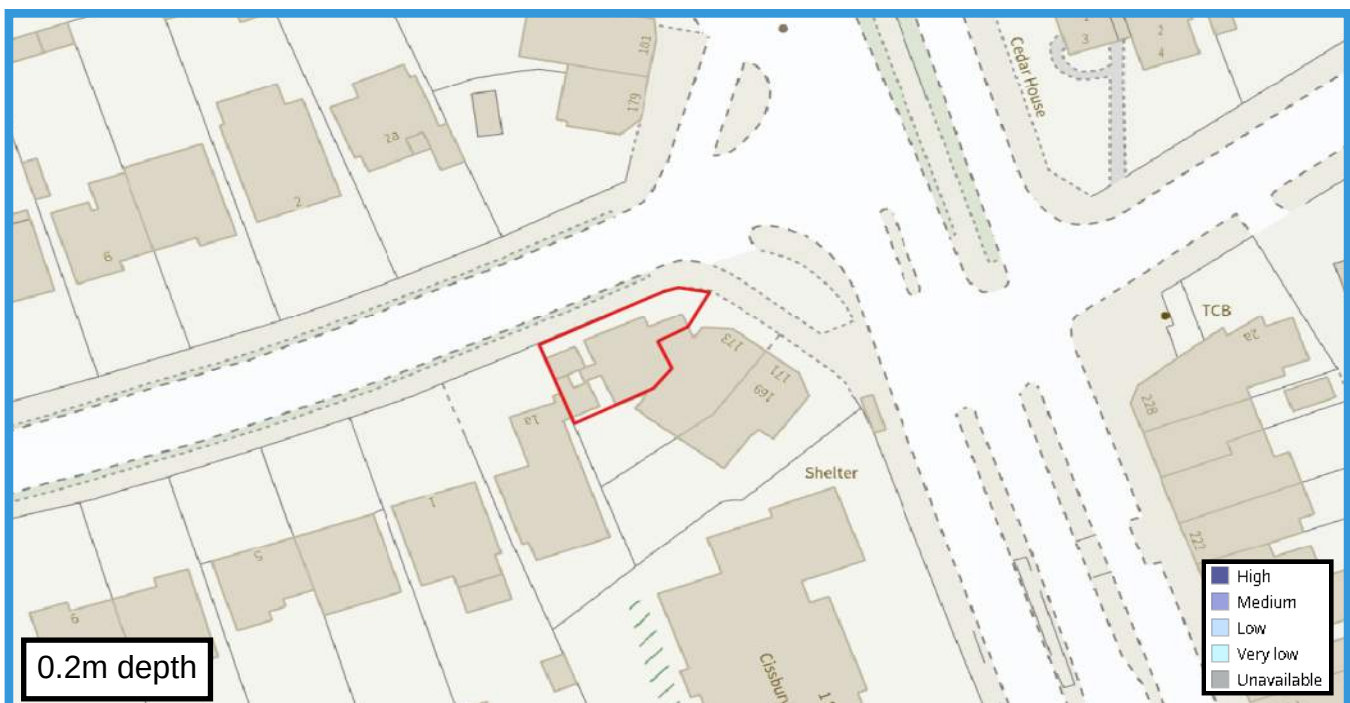
Near-term epochs and central/higher central allowances are being used initially, to support short and medium-term decisions informed by the highest flood likelihood projections:

Fluvial: central allowance - 2040-2069 ("2050s" epoch)

Coastal: higher central allowance - 2036-2065

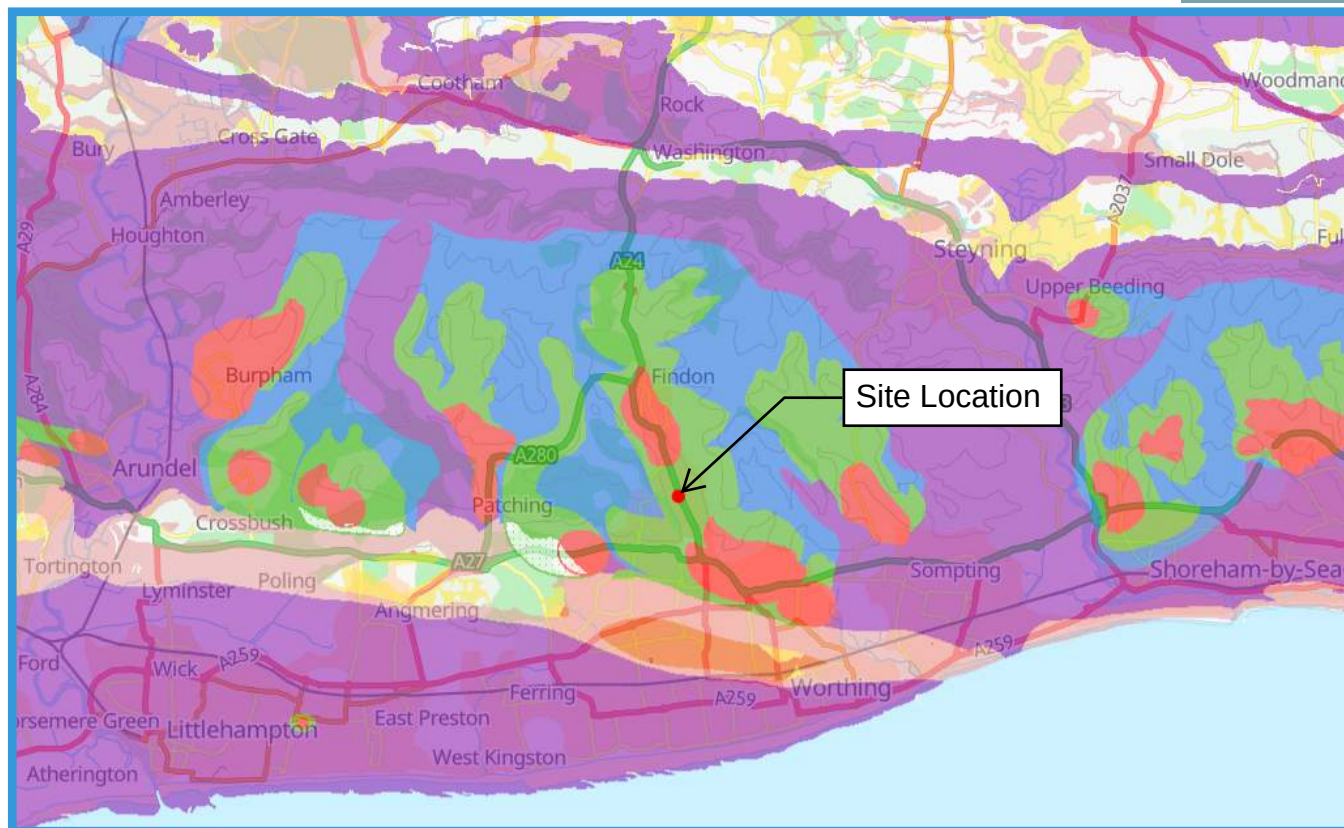
Likelihood of defence failure unsuitable and depth info does not provide the design flood depth needed for planning approval.

DEPTH



MAGIC RESULTS

MAGiC



MAGiC

Site Check Results

Site Check Report generated on Sun Aug 02 2026

The following features have been found in your search area:

You selected the location: Centroid Grid Ref: TQ12810678

Aquifer Designation Map (Superficial Drift) (England)

TYPOLOGY Secondary (undifferentiated)

Aquifer Designation Map (Bedrock) (England)

TYPOLOGY Principal

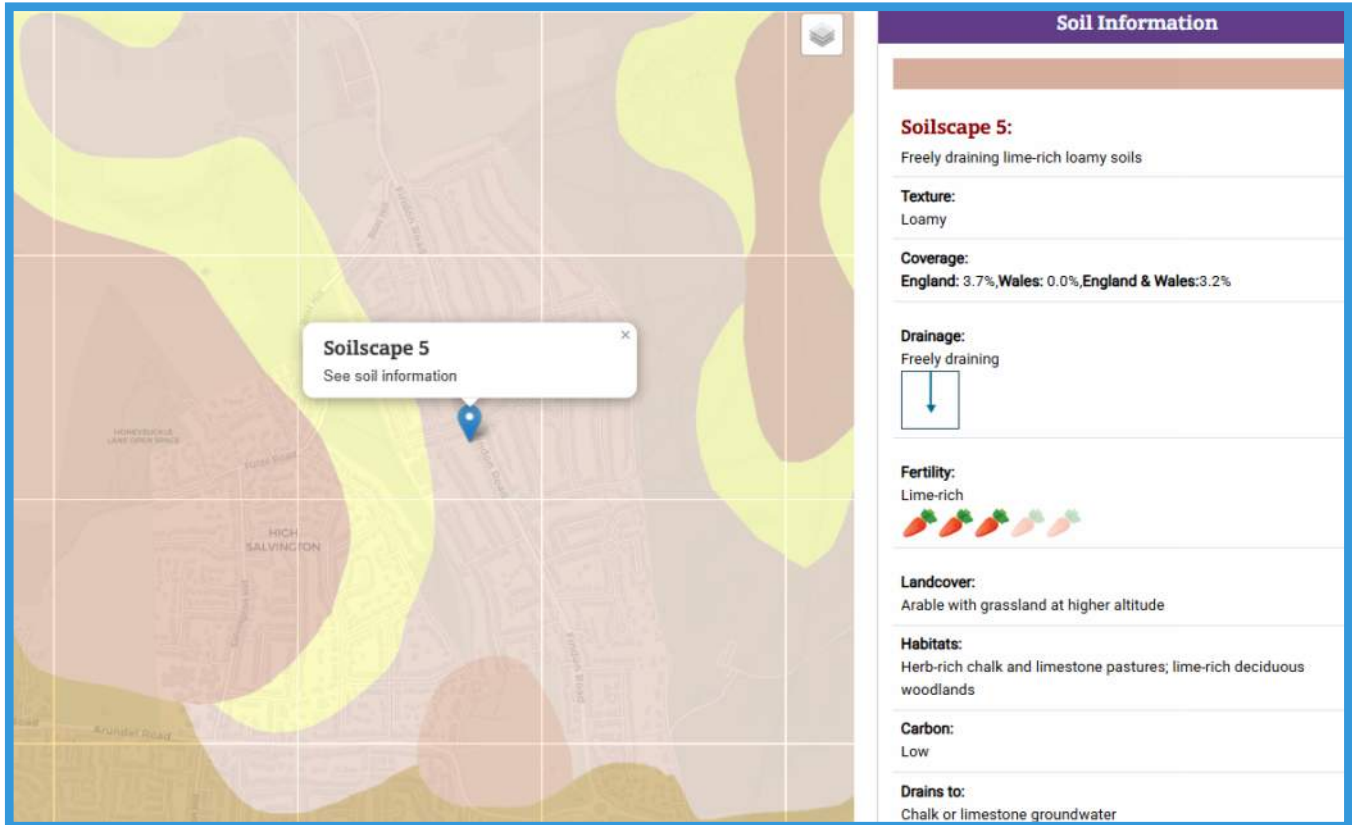
Source Protection Zones merged (England)

NUMBER 3

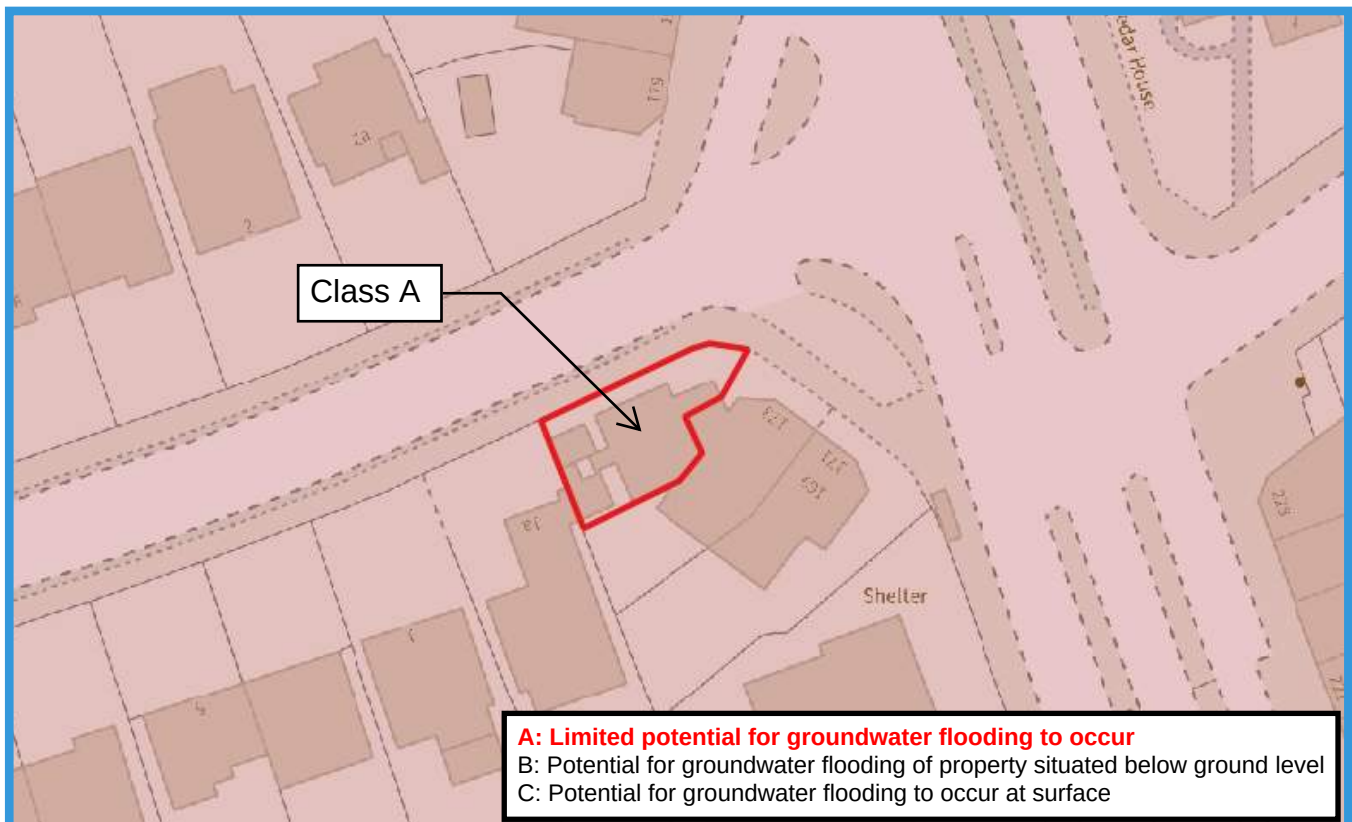
NUMBER 2

SOILSCAPES MAP

LandIS®



GROUND WATER FLOOD RISK



Flood map for planning

Your reference
Unspecified

Location (easting/northing)
512809/106785

Created
31 July 2026 16:36

Your selected location is in flood zone 1, an area with a low probability of flooding.

You will need to do a flood risk assessment if your site is **any of the following**:

- bigger than 1 hectare (ha)
- in an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence which sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3>

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2026 AC0000807064. <https://flood-map-for-planning.service.gov.uk/os-terms>



Flood map for planning

Your reference

Unspecified

Location (easting/northing)
512809/106785

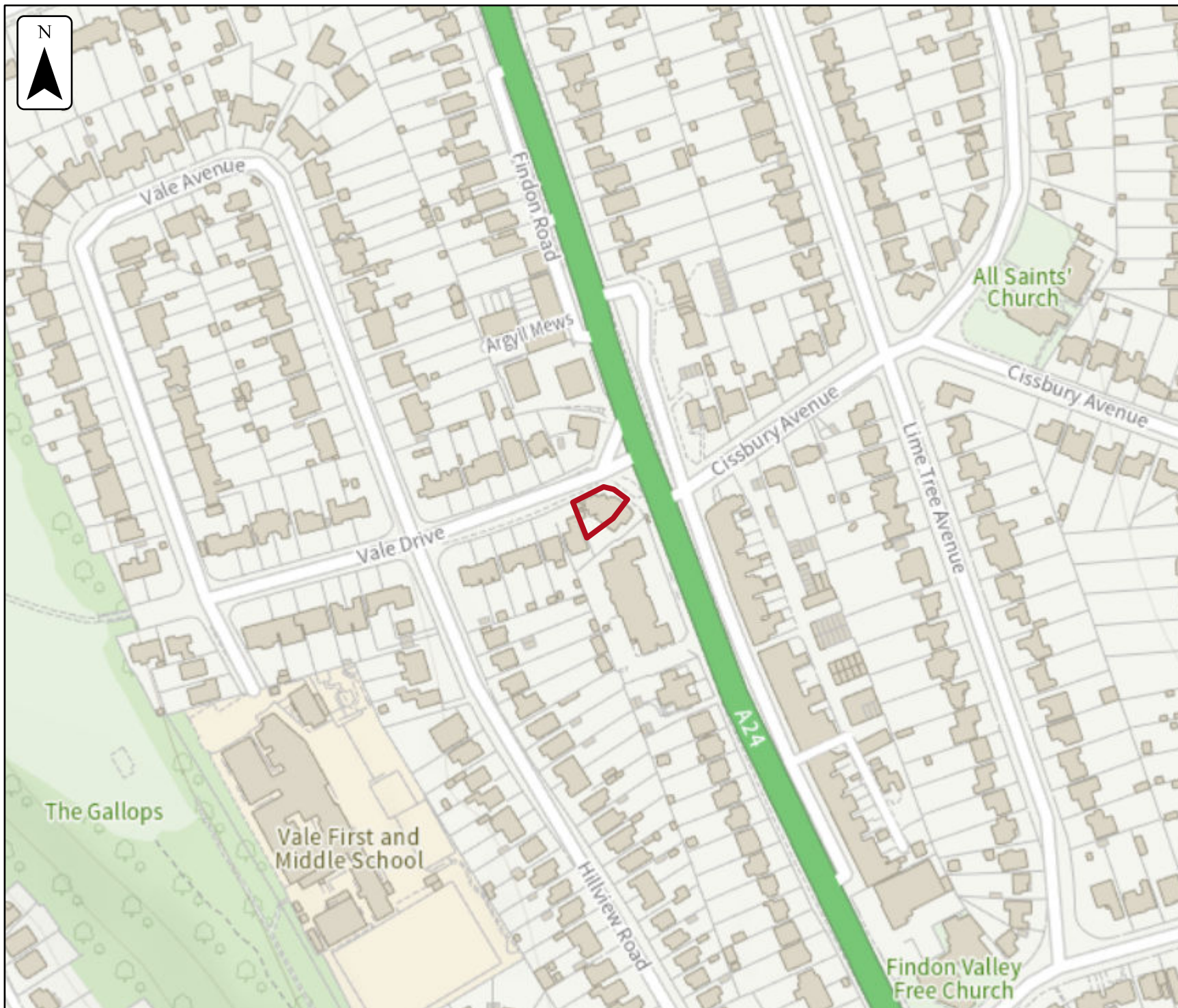
Scale
1:2,500

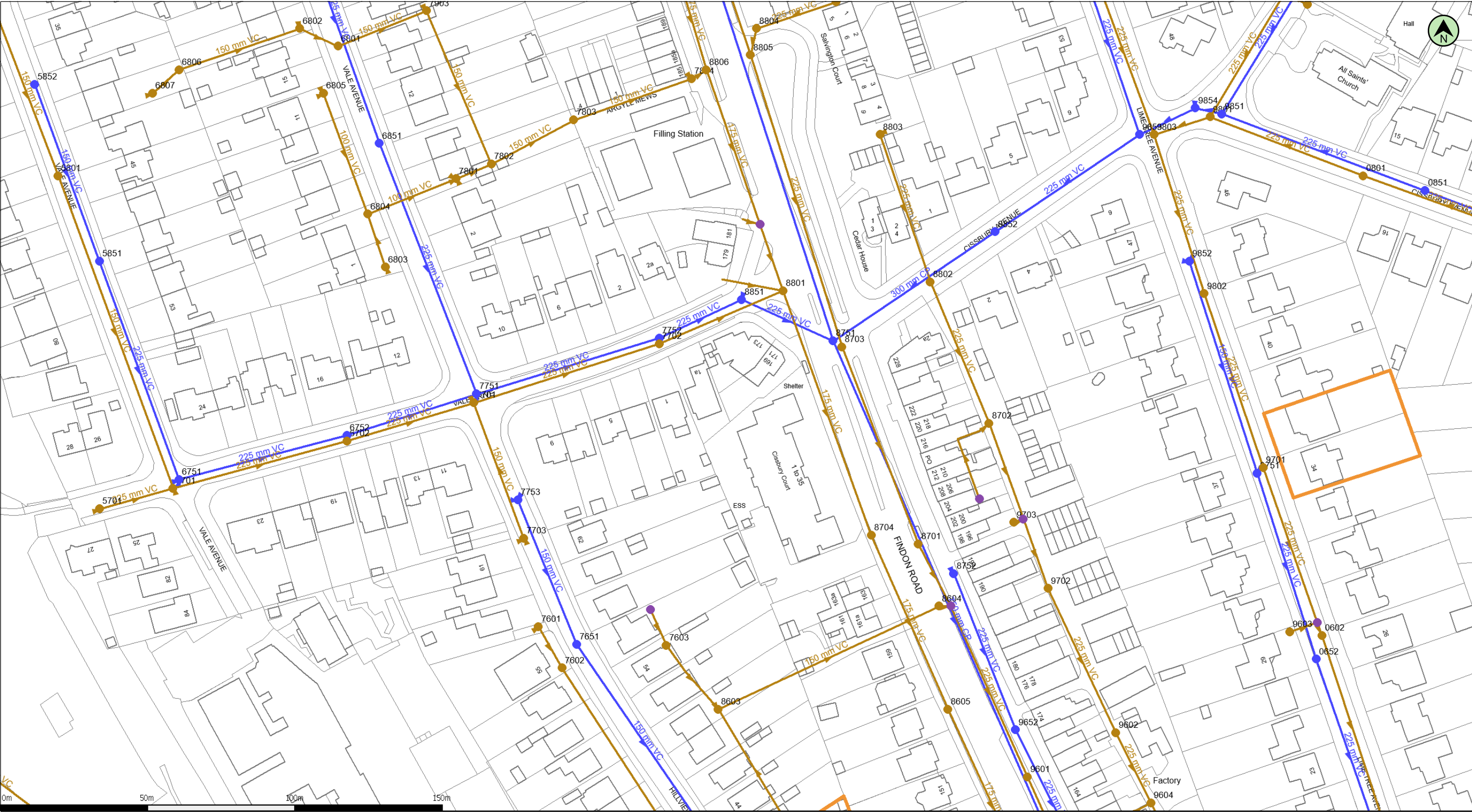
Created
31 Jul 2026 16:36

-  Selected area
-  Flood zone 3
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Water storage area



0 20 40 60m





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Date: 03/08/26

Scale: 1:1250

Map Centre: 512810,106767

Data updated: 16/07/26

Our Ref: 2182987 - 1

Wastewater Plan A3
Powered by digdat

The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. This plan is produced by Southern Water Services Ltd (c) Crown copyright and database rights 2026 Ordnance Survey AC0000808122. This map is to be used for the purposes of viewing the location of Southern Water plant only. Any other uses of the map data or further copies is not permitted.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement.

WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement.

Foul Gravity Sewer	Combined Gravity Sewer	Culverted Water Course or Treated Effluent	Surface Water Gravity Sewer
Rising Main, Vacuum or Syphon	Combined Outfall	Surface Water Outfall	Surface Water Inlet
Combined Pumping Station	Foul Pumping Station	Water Treatment Works	Section 104 Area
Surface Water Pumping Station	Foul Manhole	Side Entry Manhole, Demarcation Chamber, Dummy Manhole or Surface Water Soakaway	Surface Water Manhole
Building Over Agreement Area			

arge@rida-reports.co.uk

[U0905] 173A Findon



Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
0602	F	34.45	0.00	
0801	F	38.25	35.96	
0906	F	0.00	0.00	
5701	F	47.52	45.87	
5801	F	47.57	45.49	
6701	F	46.10	44.13	
6702	F	42.52	40.89	
6801	F	41.19	39.96	
6802	F	42.03	40.79	
6803	F	41.10	0.00	
6804	F	0.00	0.00	
6805	F	41.86	0.00	
6806	F	44.85	43.53	
6807	F	45.80	44.45	
7601	F	39.54	38.80	
7602	F	39.25	37.46	
7603	F	0.00	0.00	
7701	F	39.48	37.31	
7702	F	0.00	0.00	
7703	F	39.20	38.12	
7801	F	38.80	37.73	
7802	F	37.48	35.60	
7803	F	37.33	36.45	
7804	F	33.92	32.25	
7903	F	38.53	37.21	
8603	F	34.74	31.64	
8604	F	31.47	30.18	
8605	F	31.25	29.51	
8701	F	0.00	0.00	
8702	F	32.78	0.00	
8703	F	32.42	0.00	
8704	F	31.83	30.01	
8801	F	32.77	30.68	
8802	F	33.41	31.20	
8803	F	33.97	31.69	
8804	F	33.81	31.68	
8805	F	33.52	31.08	
8806	F	33.77	31.21	
8902	F	34.05	32.10	
9601	F	31.15	28.86	
9602	F	32.47	0.00	
9603	F	0.00	0.00	
9604	F	0.00	0.00	
9701	F	34.94	0.00	
9702	F	32.78	30.52	
9703	F	0.00	0.00	
9801	F	36.45	34.49	
9802	F	35.34	33.34	
9803	F	35.84	33.83	
0652	S	34.38	32.95	

[illegible][illegible]

Appendix C

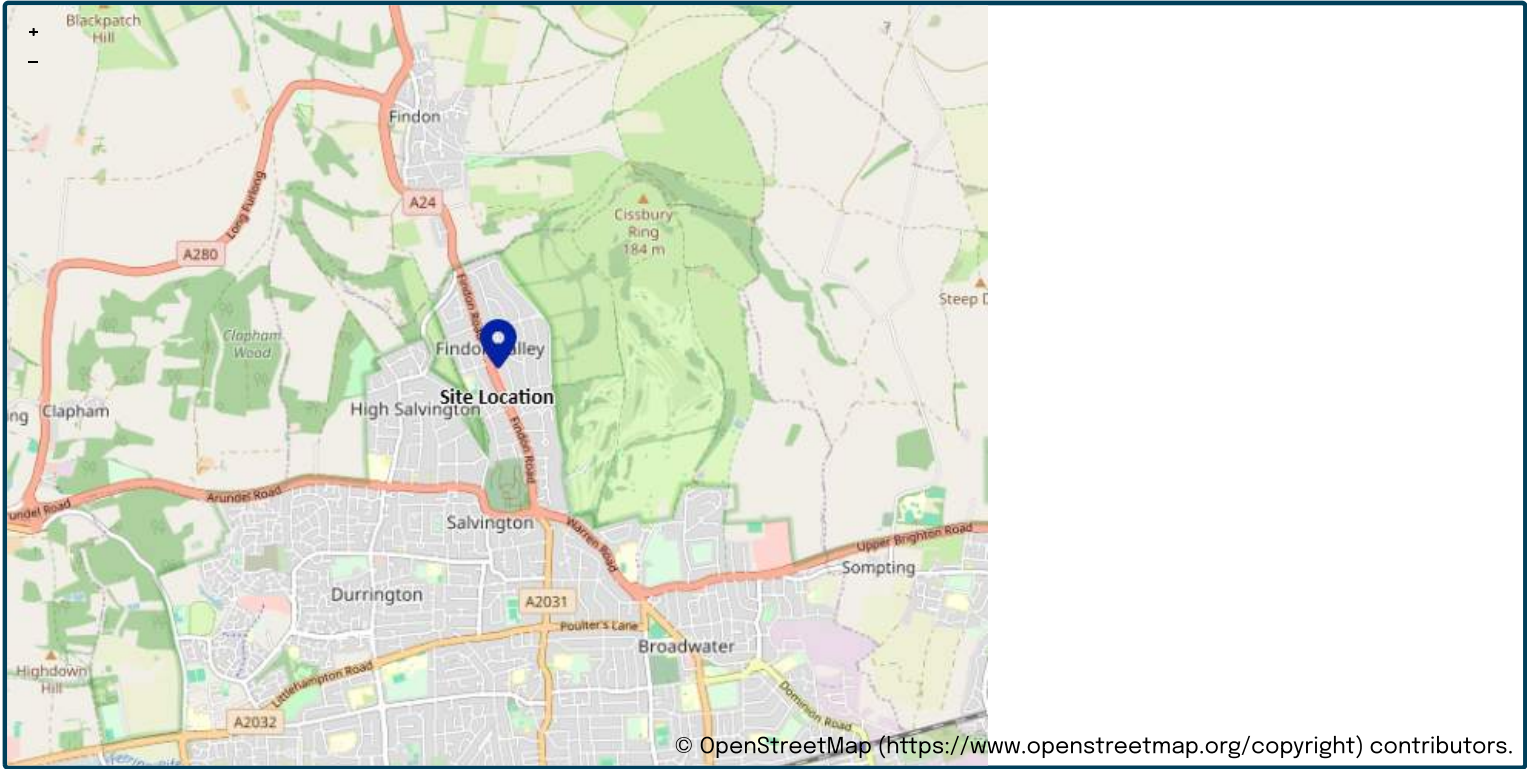
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Project details

Date	01/09/2026
Calculated by	
Reference	
Model version	2.2.3

Location

Site name	[U0905] 173A Findon Road Worthing West Sussex BN14 0BQ
Site location	[U0905] 173A Findon Road Worthing West Sussex BN14 0BQ



Site easting (British National Grid)	512904
Site northing (British National Grid)	106590

Site details

Total site area (ha)	0.015	ha
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Greenfield runoff

Method

Method	IH124
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IH124

	<u>My value</u>		<u>Map value</u>
SAAR (mm)	790	mm	790
How should SPR be derived?	WRAP soil type		
WRAP soil type	1		1
SPR	0.1		
QBar (IH124) (l/s)	0.01	l/s	

Growth curve factors

	<u>My value</u>		<u>Map value</u>
Hydrological region	7		7
1 year growth factor	0.85		
2 year growth factor	0.88		
10 year growth factor	1.62		
30 year growth factor	2.3		
100 year growth factor	3.19		
200 year growth factor	3.74		

Results

Method	IH124	
Flow rate 1 year (l/s)	0.01	l/s
Flow rate 2 year (l/s)	0.01	l/s
Flow rate 10 years (l/s)	0.01	l/s
Flow rate 30 years (l/s)	0.01	l/s
Flow rate 100 years (l/s)	0.01	l/s
Flow rate 200 years (l/s)	0.01	l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent 'zero' figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.2.3) developed by HR Wallingford and available at [uksuds.com](https://www.uksuds.com) (<https://www.uksuds.com/>). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at [uksuds.com/terms-conditions](https://www.uksuds.com/terms-conditions) (<https://www.uksuds.com/terms-conditions>). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

Simulation Settings

Rainfall Methodology	FSR	Drain Down Time (mins)	240
Rainfall Events	Singular	Additional Storage (m ³ /ha)	0.0
FSR Region	England and Wales	Starting Level (m)	
M5-60 (mm)	20.000	Check Discharge Rate(s)	✓
Ratio-R	0.340	1 year (l/s)	1.7
Summer CV	1.000	2 year (l/s)	2.2
Winter CV	1.000	30 year (l/s)	4.0
Analysis Speed	Normal	100 year (l/s)	5.1
Skip Steady State	x	Check Discharge Volume	x

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
2	0	0	0
30	0	0	0
30	40	0	0
100	0	0	0
100	45	0	0

Pre-development Discharge Rate

Site Makeup	Brownfield	Betterment (%)	0
Brownfield Method	MRM	Q 1 year (l/s)	1.7
Contributing Area (ha)	0.010	Q 2 year (l/s)	2.2
PIMP (%)	100	Q 30 year (l/s)	4.0
CV	1.000	Q 100 year (l/s)	5.1
Time of Concentration (mins)	6.00		

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Inverts
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.340	Preferred Cover Depth (m)	0.500
CV	1.000	Include Intermediate Ground	✓
Time of Entry (mins)	6.00	Enforce best practice design rules	x

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
Development	0.008	6.00	33.600	450	-0.554	0.000	0.650	32.950
Tank			32.900		39.785	0.339	1.100	31.800
Outfall			32.500	1200	79.785	0.678	0.800	31.700

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	Development	Tank	25.000	0.600	32.950	31.800	1.150	21.7	150	6.19	50.0
1.001	Tank	Outfall	10.000	0.600	31.800	31.700	0.100	100.0	150	6.36	50.0

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	2.169	38.3	1.4	0.500	0.950	0.008	0.0	20	1.031
1.001	1.005	17.8	1.4	0.950	0.650	0.008	0.0	28	0.599

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	25.000	21.7	150	Circular	33.600	32.950	0.500	32.900	31.800	0.950
1.001	10.000	100.0	150	Circular	32.900	31.800	0.950	32.500	31.700	0.650

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	Development	450	Manhole	Adoptable	Tank		Junction	
1.001	Tank		Junction		Outfall	1200	Manhole	Adoptable

Node Development Time-Area Diagram

Overrides Design Area	x	Depression Storage Area (m²)	60	Evapo-transpiration (mm/day)	2
Overrides Design Additional Inflow	x	Depression Storage Depth (mm)	10		
Applies to All storms					

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.000	20-24	0.000	40-44	0.000	60-64	0.000	80-84	0.000	100-104	0.000
4-8	0.000	24-28	0.000	44-48	0.000	64-68	0.000	84-88	0.000	104-108	0.000
8-12	0.000	28-32	0.000	48-52	0.000	68-72	0.000	88-92	0.000	108-112	0.000
12-16	0.000	32-36	0.000	52-56	0.000	72-76	0.000	92-96	0.000	112-116	0.000
16-20	0.000	36-40	0.000	56-60	0.000	76-80	0.000	96-100	0.000	116-120	0.000

Node Tank Online Orifice Control

Flap Valve	x	Design Depth (m)	1.100	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	0.8		
Invert Level (m)	31.800	Diameter (m)	0.019		

Node Tank Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	3.0	Invert Level (m)	31.800
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	64

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	6.5	6.5	0.400	6.5	10.1	0.401	0.0	10.1

Results for 1 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	Development	11	32.968	0.018	1.2	0.0029	0.0000	OK
120 minute summer	Tank	78	31.886	0.086	0.6	0.5311	0.0000	OK
120 minute summer	Outfall	80	31.711	0.011	0.2	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	Development	1.000	Tank	1.2	0.938	0.031	0.0926	
120 minute summer	Tank	1.001	Outfall	0.2	0.337	0.012	0.0061	1.3

Results for 2 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
15 minute summer	Development	11	32.970	0.020	1.5	0.0032	0.0000	OK
120 minute summer	Tank	80	31.908	0.108	0.8	0.6658	0.0000	OK
120 minute summer	Outfall	80	31.712	0.012	0.2	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m ³)	Discharge Vol (m ³)
15 minute summer	Development	1.000	Tank	1.5	0.939	0.039	0.1250	
120 minute summer	Tank	1.001	Outfall	0.2	0.351	0.013	0.0066	1.6

Results for 30 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	Development	11	32.978	0.028	2.8	0.0044	0.0000	OK
120 minute summer	Tank	84	32.031	0.231	1.5	1.4284	0.0000	SURCHARGED
120 minute summer	Outfall	84	31.715	0.015	0.4	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	Development	1.000	Tank	2.8	1.053	0.073	0.2331	
120 minute summer	Tank	1.001	Outfall	0.4	0.397	0.020	0.0088	2.9

Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	Development	11	32.983	0.033	4.0	0.0052	0.0000	OK
120 minute summer	Tank	86	32.143	0.343	2.1	2.1207	0.0000	SURCHARGED
120 minute summer	Outfall	86	31.716	0.016	0.4	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	Development	1.000	Tank	4.0	1.113	0.104	0.2539	
120 minute summer	Tank	1.001	Outfall	0.4	0.422	0.024	0.0102	4.1

Results for 100 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	Development	11	32.982	0.032	3.7	0.0050	0.0000	OK
120 minute summer	Tank	84	32.118	0.318	1.9	1.9642	0.0000	SURCHARGED
120 minute summer	Outfall	84	31.716	0.016	0.4	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	Development	1.000	Tank	3.7	1.122	0.097	0.2485	
120 minute summer	Tank	1.001	Outfall	0.4	0.417	0.023	0.0099	3.9

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	Development	11	32.988	0.038	5.3	0.0060	0.0000	OK
120 minute summer	Tank	82	32.714	0.914	2.8	2.4731	0.0000	FLOOD RISK
120 minute summer	Outfall	82	31.721	0.021	0.7	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	Development	1.000	Tank	5.3	1.138	0.138	0.2634	
120 minute summer	Tank	1.001	Outfall	0.7	0.491	0.040	0.0145	5.6

Approval Settings

Node Size	x	Crossings	x	Surcharged Depth	x	Discharge Volume	x
Node Losses	x	Cover Depth	x	Flooding	x	First Flush	x
Link Size	x	Backdrops	x	Time to Half Empty	✓	Water Quality	x
Link Length	x	Full Bore Velocity	x	Return Period (years)	10		
Coordinates	x	Proportional Velocity	x	Discharge Rates	x		

Circular Link Type

Template	Freeform Carrier	Auto Increment (mm)	75
Shape	Circular	Follow Ground	x
Barrels	1		

Available Diameters (mm)

100 | 150

Appendix D

Do not scale from this drawing. Refer to figured dimensions only. RIDA Reports Ltd registered in England and Wales No. 10590566. This drawing is copyright of RIDA Reports Ltd.

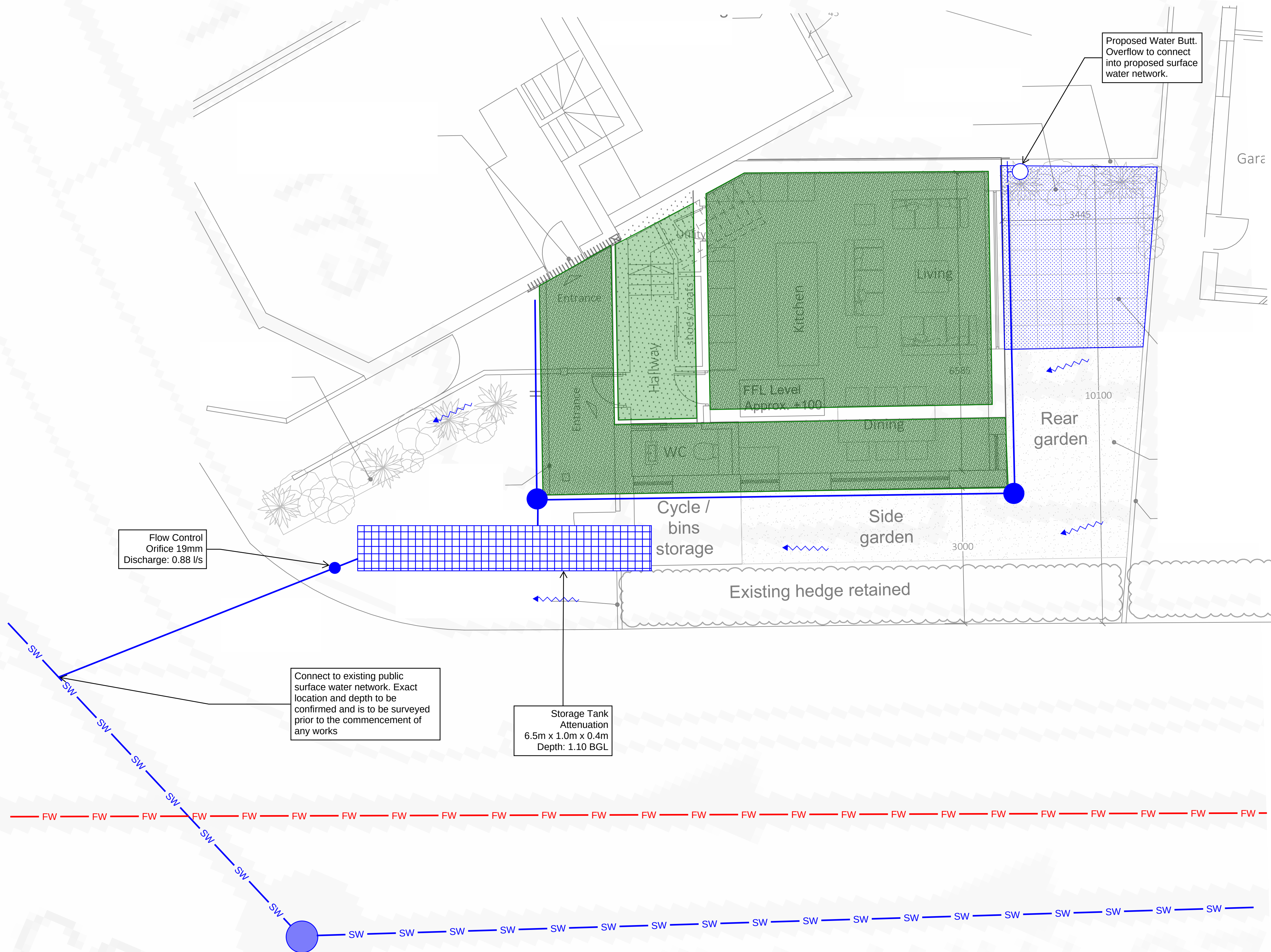
Drawing Scale Bar

Drawing scale	Line length	Drawing scale	Line length
1:5 = 0.25 metres		1:200 = 10.0 metres	
1:10 = 0.5 metres		1:250 = 12.5 metres	
1:20 = 1.0 metres		1:500 = 25.0 metres	
1:25 = 1.25 metres		1:1000 = 50.0 metres	
1:50 = 2.5 metres		1:1250 = 62.5 metres	
1:100 = 5.0 metres		1:2500 = 125 metres	

Measure length of line above for checking of scale

GENERAL NOTES

- All dimensions are in millimetres and levels in m AOD unless stated otherwise.
- Do not scale. If in any doubt, consult Engineer.
- Read in conjunction with the architects and engineers schedule drawings.
- Check inverts and sizes of existing pipes prior to the commencement of any work. Report any discrepancies to the engineer and await instructions.
- The location of services is shown as indicative. This drawing should be read in conjunction with the utilities drawings. No warranty to their accuracy can be given. The contractor must take all necessary measures to satisfy himself as to the location of the existing services and connection points. Excavation should be undertaken in compliance with HSG47.
- The proposed dwelling shall be provided with a rainwater butt with a minimum storage capacity of 260 litres. The water butt shall be connected to a roof downpipe with an appropriate diverter and an overflow (returning to the drainage system) and positioned to allow safe access and routine use by the occupants.



KEY

-
- Proposed Surface Water Sewer Pipe
- Exceedance Flows
- Permeable Surface as per architect's details
Sub-base 350mm Type 3
- Green Roof
- Silt Trap
- Existing Foul Sewer Pipe
- Existing Surface Water Sewer Pipe

Rev	Details	Date	By	Crd
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Drawing Status: **PRELIMINARY**



Client: _____

Project: _____

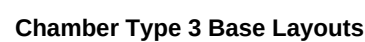
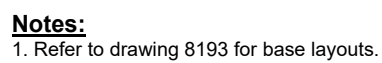
73A Findon Road Worthing West Sussex BN14 0BQ

Drawing: _____

Proposed Drainage Strategy

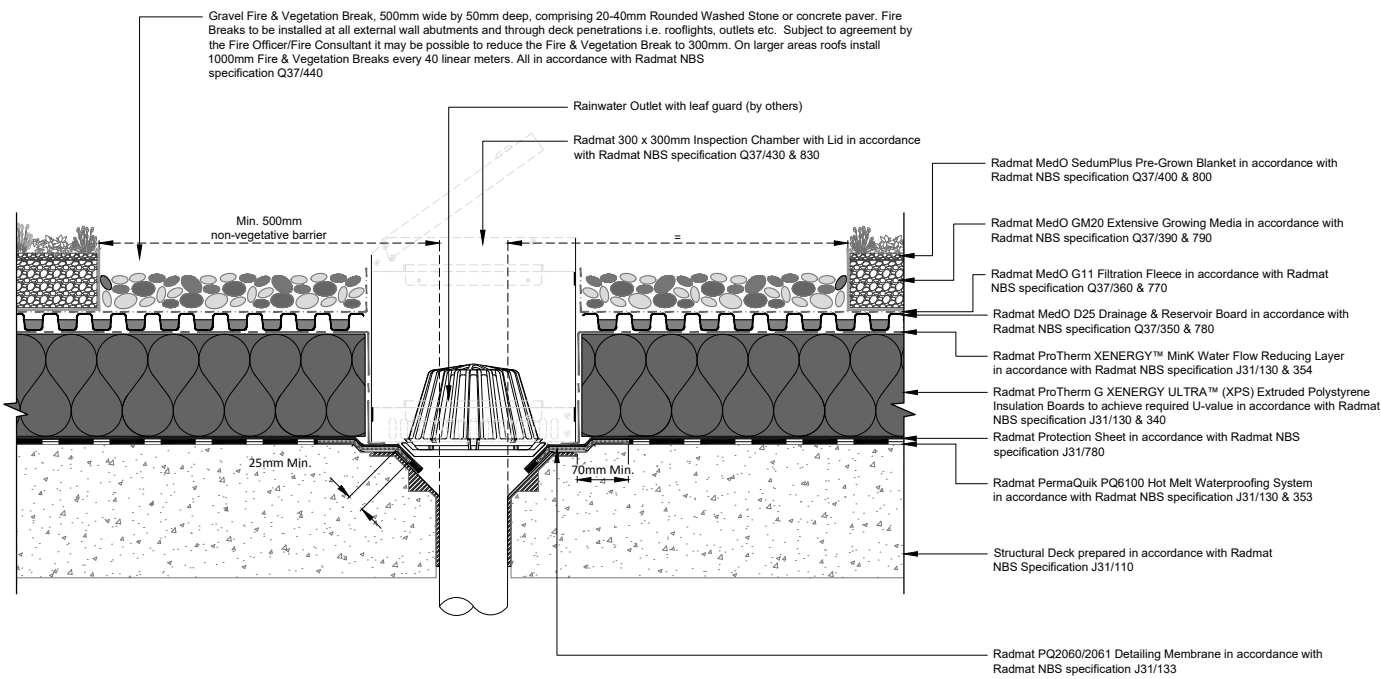
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1:10 = 0.5 metres		1:250 = 12.5 metres	
1:20 = 1.0 metres		1:500 = 25.0 metres	
1:25 = 1.25 metres		1:1000 = 50.0 metres	
1:50 = 2.5 metres		1:1250 = 62.5 metres	
1:100 = 5.0 metres		1:2500 = 125 metres	

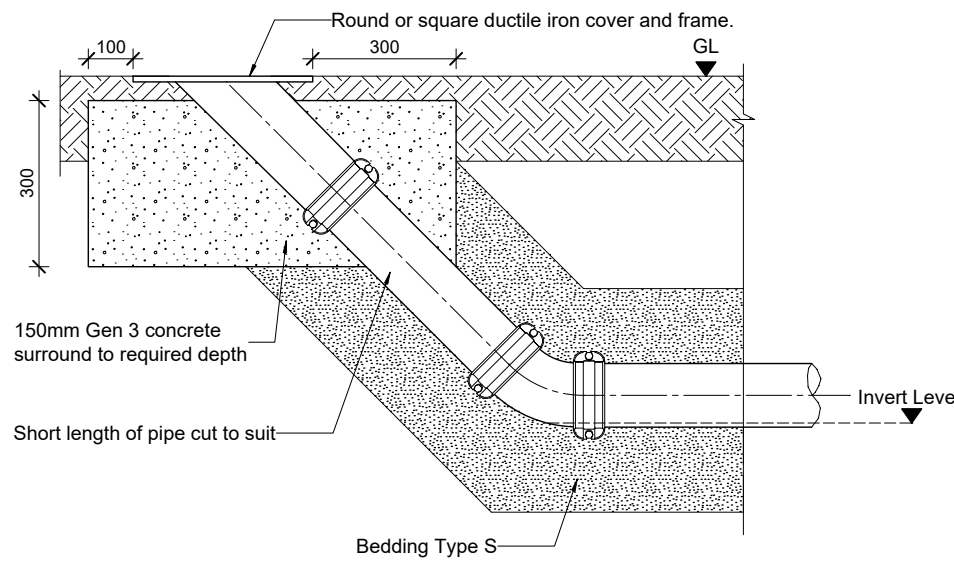


Drawing Scale Bar			
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1:10	= 0.5 metres	1:250	= 12.5 metres
1:20	= 1.0 metres	1:500	= 25.0 metres
1:25	= 1.25 metres	1:1000	= 50.0 metres
1:50	= 2.5 metres	1:1250	= 62.5 metres
1:100	= 5.0 metres	1:2500	= 125 metres
Measure length of line above for checking of scale			

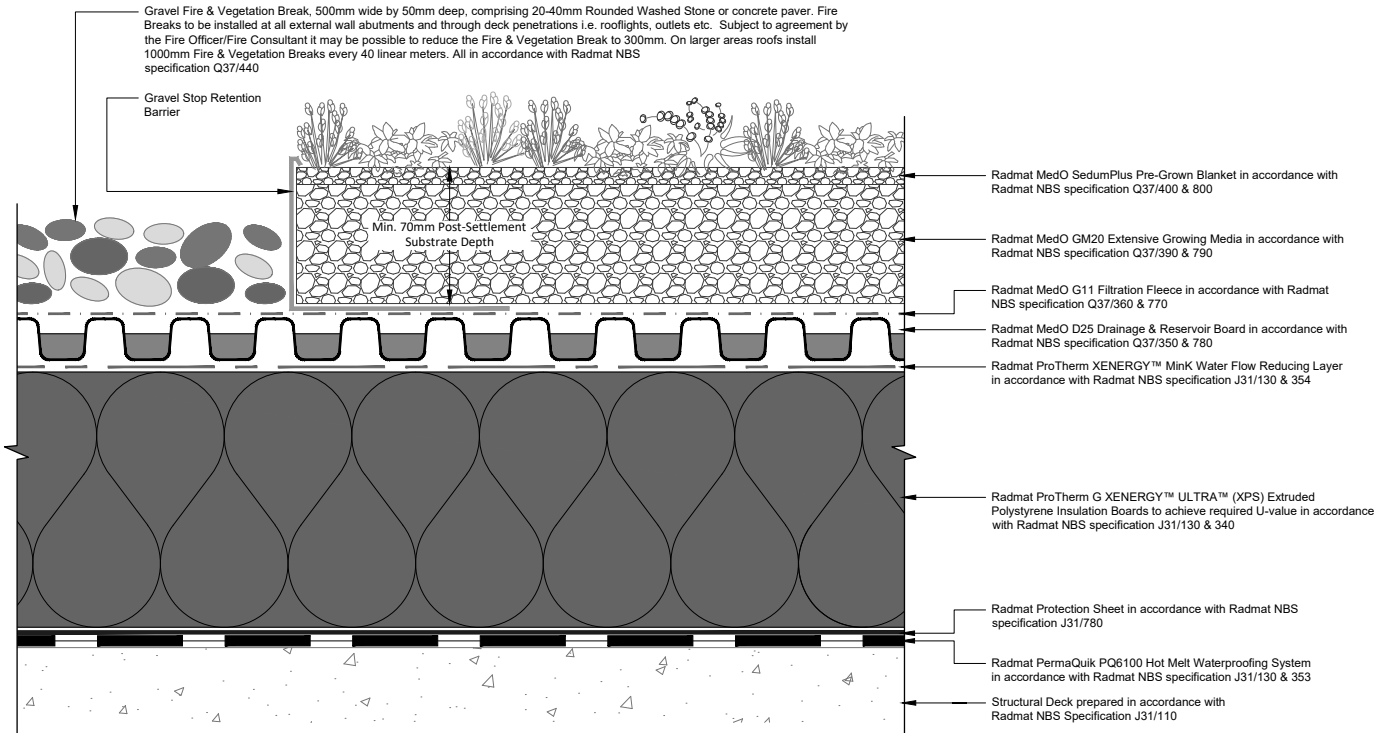
GENERAL NOTES



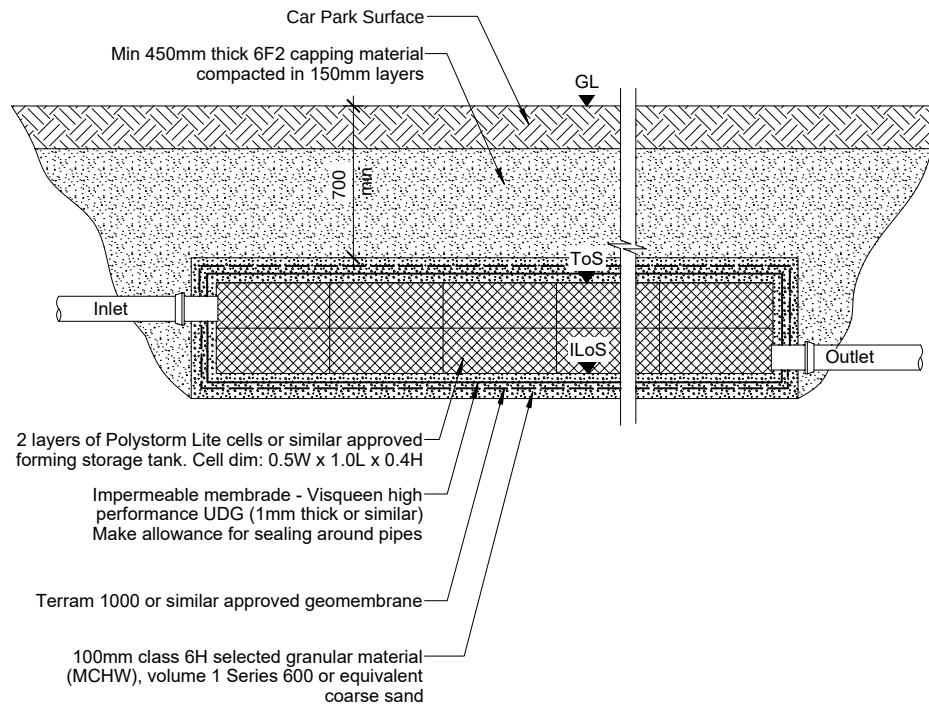
PermaQuik Inverted Extensive Green Roof
Rainwater Outlet Detail



External Rodding Eye Detail



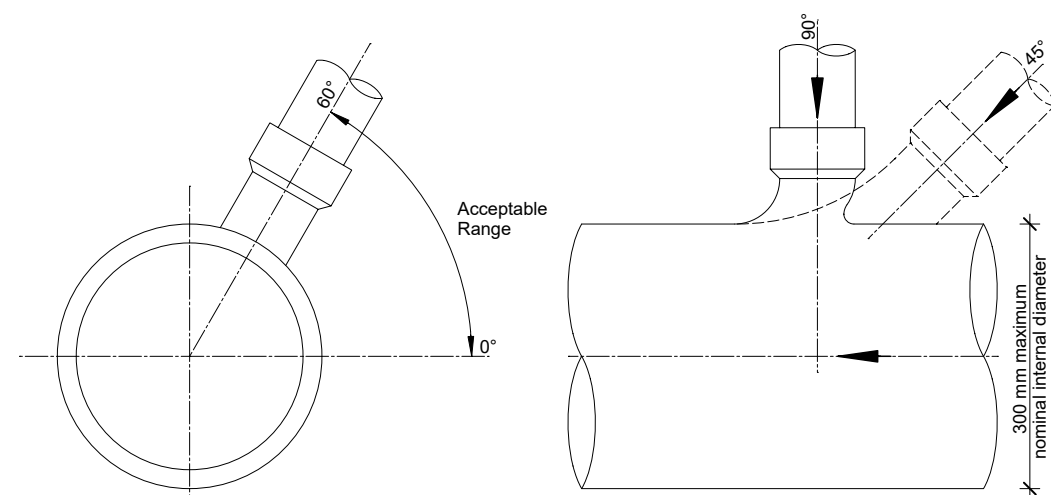
PermaQuik Inverted Extensive Green Roof
Build-up



NOTES

1. Permeable modular storage cell with 95% minimum void ratio. Ultimate compressive strength of 400kN/m² minimum. Resistant to chemicals likely to be found in rain water and durability of a minimum of 40 years.
2. Dimensions as applicable to the manufacturers recommendations for given storage requirement UNO.
3. Air Vents should be provided as per suppliers recommendations
4. See GA drgs for pipe sizes and layout and IL, ILoS, ToS, GL levels.

Cellular Attenuation System - Landscape Area



Cross-Sectional View of Sewer

Plan View of Sewer

NOTES

1. The vertical angle between the connecting pipe and the horizontal should be greater than 0° and not more than 60°.
2. Where the connection is being made to a sewer with a nominal internal diameter of 300 mm or less, connections should be made using 45° angle, or 90° angle, curved square junctions.
3. Connections made with junction fittings should be made by cutting the existing pipe, inserting the junction fitting and joining with flexible repair couplings or slip couplers.
4. Where the connection is being made to a sewer with a nominal internal diameter greater than 300 mm:
 - a) Where the diameter of the connecting pipe is greater than half the diameter of the sewer, the connection of an access point should be constructed;
 - or
 - b) where the diameter of the connecting pipe is less than or equal to half the diameter of the sewer, then the connection should be made using a preformed saddle fitting.

Lateral Connection to public sewer



Rainwater Butt

Rev	Details	Date	By	Chd
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Drawing Status:
PRELIMINARY



Client:

Project:
173A Findon Road Worthing West Sussex BN14 0BQ
Drawing:
Standard Details