Drainage Strategy

14-16 Farncombe Road BN11 2BB

Reference: U0532 -Rev - V4

Date: Feb-25

1 Introduction

2 Site Characteristics

3 Discharge Arrangement

4 Peak Runoff

5 Proposed Sustainable Drainage

6 Maintenance and Management Plan

Appendices

A Distribution Existing and Proposed Areas

B Site Characteristics

C Drainage Calculations

D Drainage System General Arrangement

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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.

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	Yes
Space constraints	Space for SuDS components?	Yes
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?	No
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		0.000	0.019
Permeable Areas	Connected to Drainage	0.078	0.000
	Self Draining Areas	0.000	0.064
Areas Draining Away from drainage System		0.056	0.051
	Total Development Area	0.134	0.134

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 Planning Practice Guidance. The aim is to discharge surface water run-off as high up the drainage hierarchy, as reasonably practicable:

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

Superficial geology classification	The British Geological Society records show that the superficial deposits are River Terrace Deposits (Undifferentiated) - Sand, Silt and Clay.
Bedrock geology classification	The British Geological Society records of the site show that it is located within the Lewes Nodular 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.
Is infiltration feasible?	The site has potential for infiltration. The assumed infiltration rate for the site is 0.000117647058823529m/s or 0.4235m/hr. It is recommended that a soakaway BRE365 is undertaken to confirm the infiltration rate.
Is a discharge to a watercourse possible?	There are no watercourses in the proximity to the site.
Is a discharge to a surface water sewer possible?	There is no surface water sewer in the proximity to the site.
Is a discharge to a combined sewer possible?	There is no combined water sewers 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
X	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
X	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 infiltrate all the flows. 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	0.30	N/A	N/A	0.4235
1 in 2	0.20	1.30	0.0	0.4235
1 in 30	0.60	3.40	0.0	0.4235
1 in 30 + CC	N/A	N/A	0.0	0.4235
1 in 100	0.80	4.20	0.0	0.4235
1 in 100 + CC	N/A	N/A	0.0	0.4235

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: Proposed Drainage System

SuDS Proposed	Feasible	Proposed
Use of green roofs	No	No
Store rainwater for later use	No	No
Use infiltration techniques, for instance soakaways, permeable surfaces	Yes	Yes
Attenuate rainwater in ponds or open water features for gradual release	No	No
Attenuate rainwater by storing in tanks or sealed water features for gradual release	No	No
Discharge Point Proposed		
Discharge rainwater direct to a watercourse	No	No
Discharge rainwater to a surface water sewer/drain	No	No
Discharge rainwater to the combined sewer	No	No

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. Undertake inspection after leaf fall in autumn	Annually
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 soakaways

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect for sediment and debris in pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings	Annually
	Cleaning of gutters and any filters on downpipes	Annually (or as required based on inspections)
	Trimming any roots that may be causing blockages	Annually (or as required)
Occasional maintenance	Remove sediment and debris from pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings	As required, based on inspections
Remedial actions	Reconstruct soakaway and/or replace or clean void fill, if performance deteriorates or failure occurs	As required
	Replacement of clogged geotextile (will require reconstruction of soakaway)	As required
Monitoring	Inspect silt traps and note rate of sediment accumulation	Monthly in the first year and then annually
	Check soakaway to ensure emptying is occurring	Annually

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 glyphospate 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

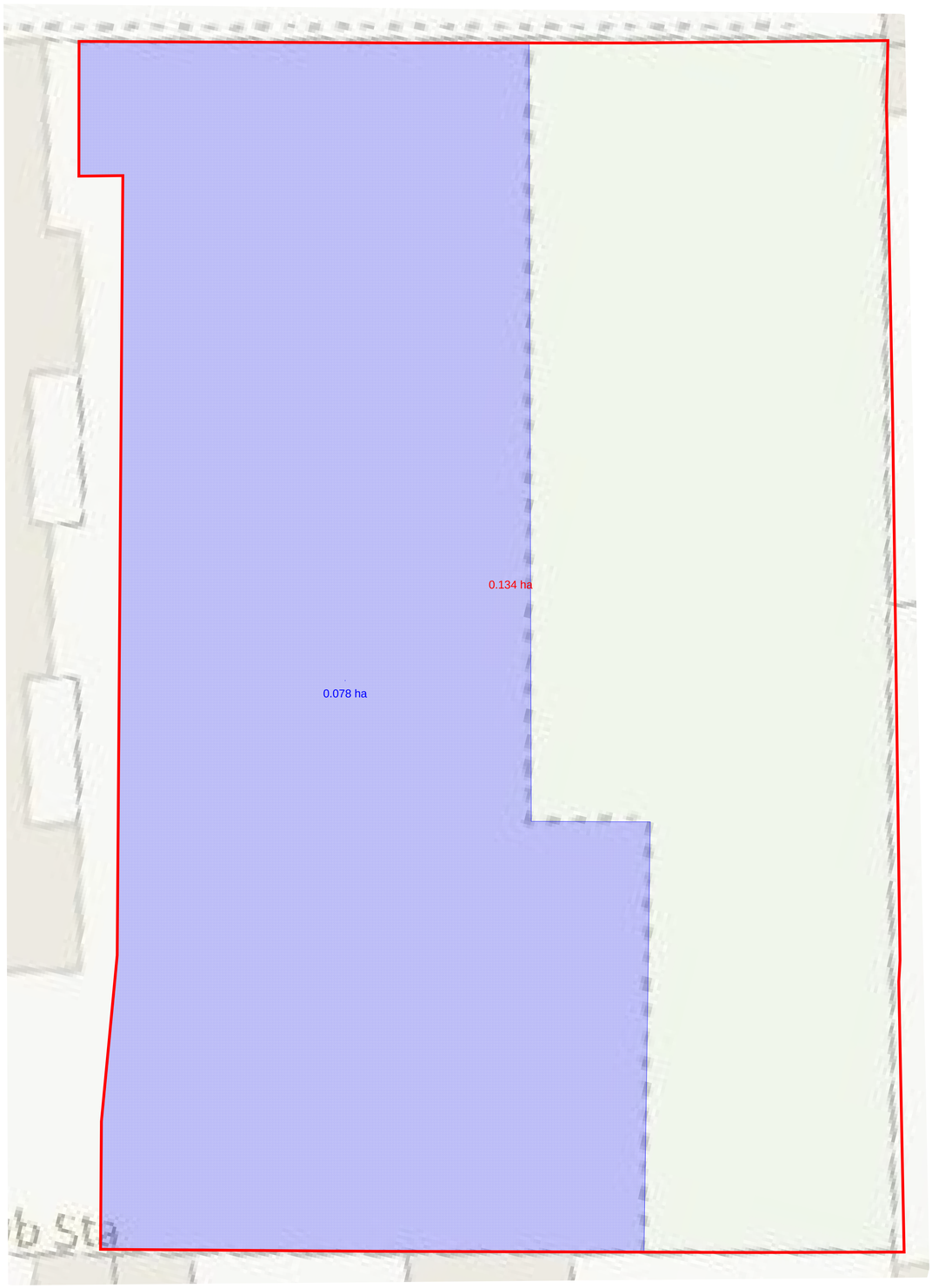
Appendix A

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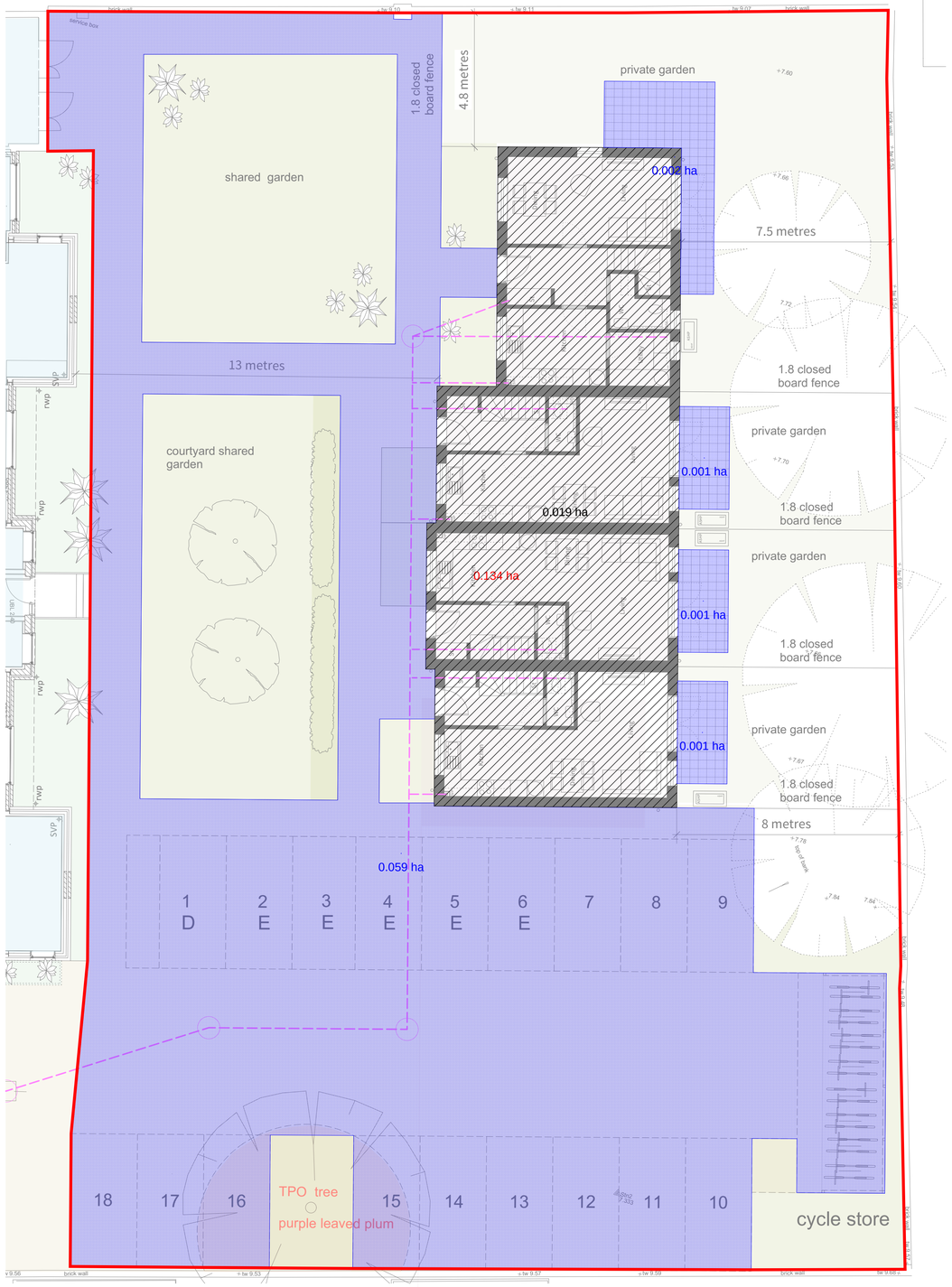
Drawing Scale Bar

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



EXISTING SITE 1:100



PROPOSED SITE 1:100

GENERAL NOTES

KEY

PERMEABLE AREAS

IMPERMEABLE AREAS

STUDY AREA

Rev	Details	Date	By	Ch'd

Drawing Status:

PRELIMINARY

URBANWATER

Client:

Project:

14-16 Farncombe Road BN11 2BB

Drawing:

Existing and Proposed Areas
Permeable and Impermeable

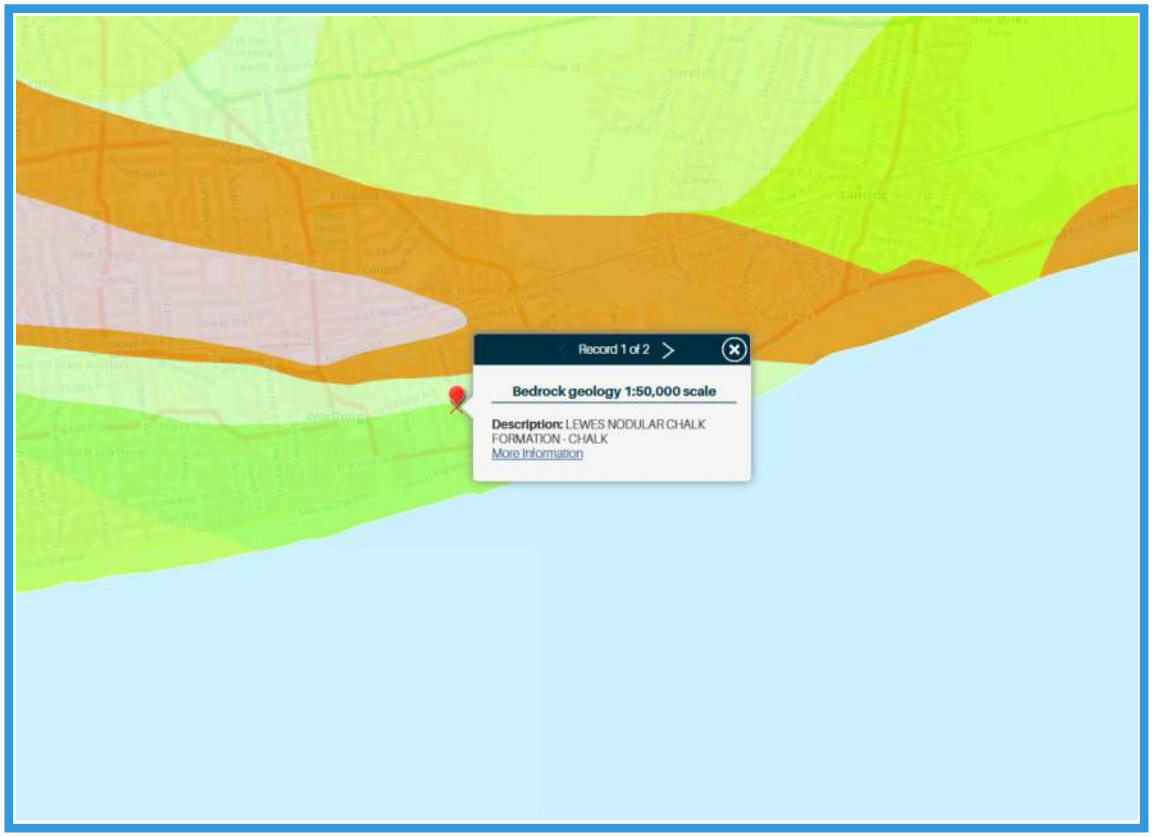
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A1	U0532	002	P1

Appendix B

SITE GEOLOGY

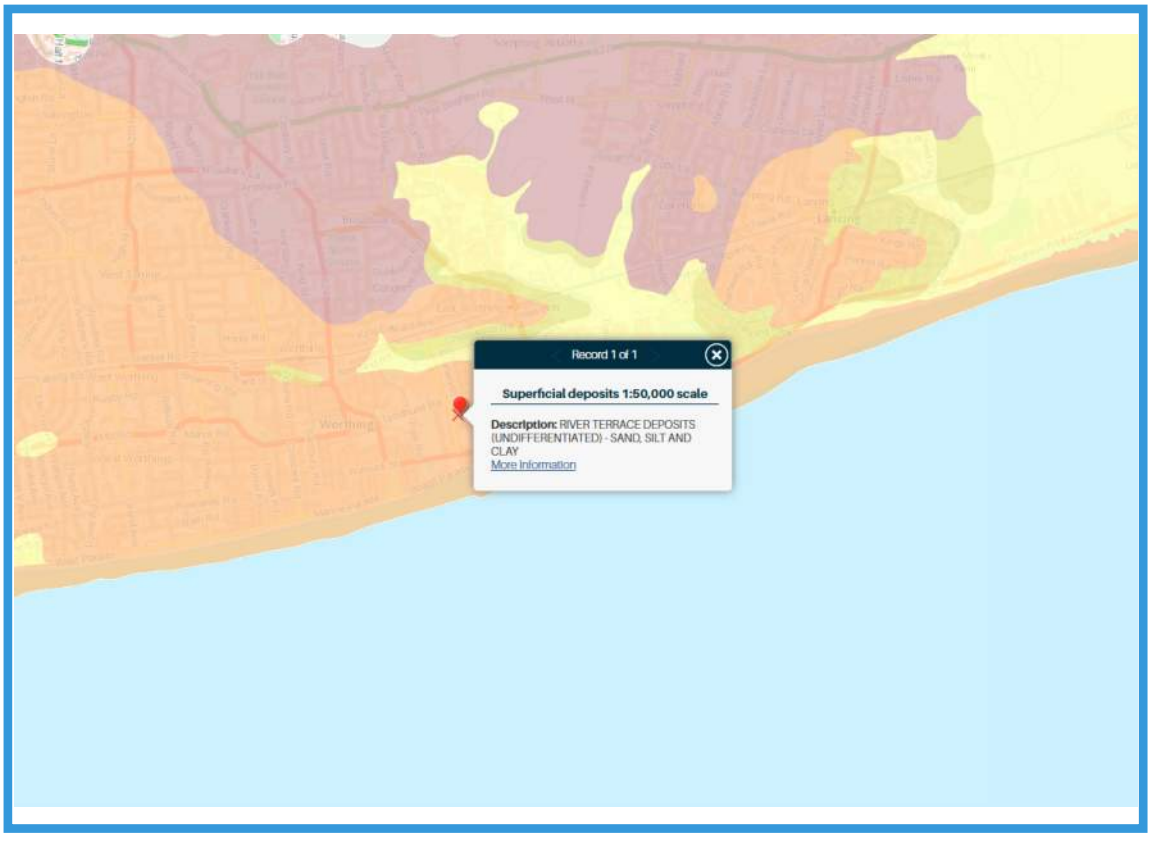
GEOINDEX ONSHORE

GEOLOGY - BEDROCK - LEWES NODULAR CHALK FORMATION - CHALK



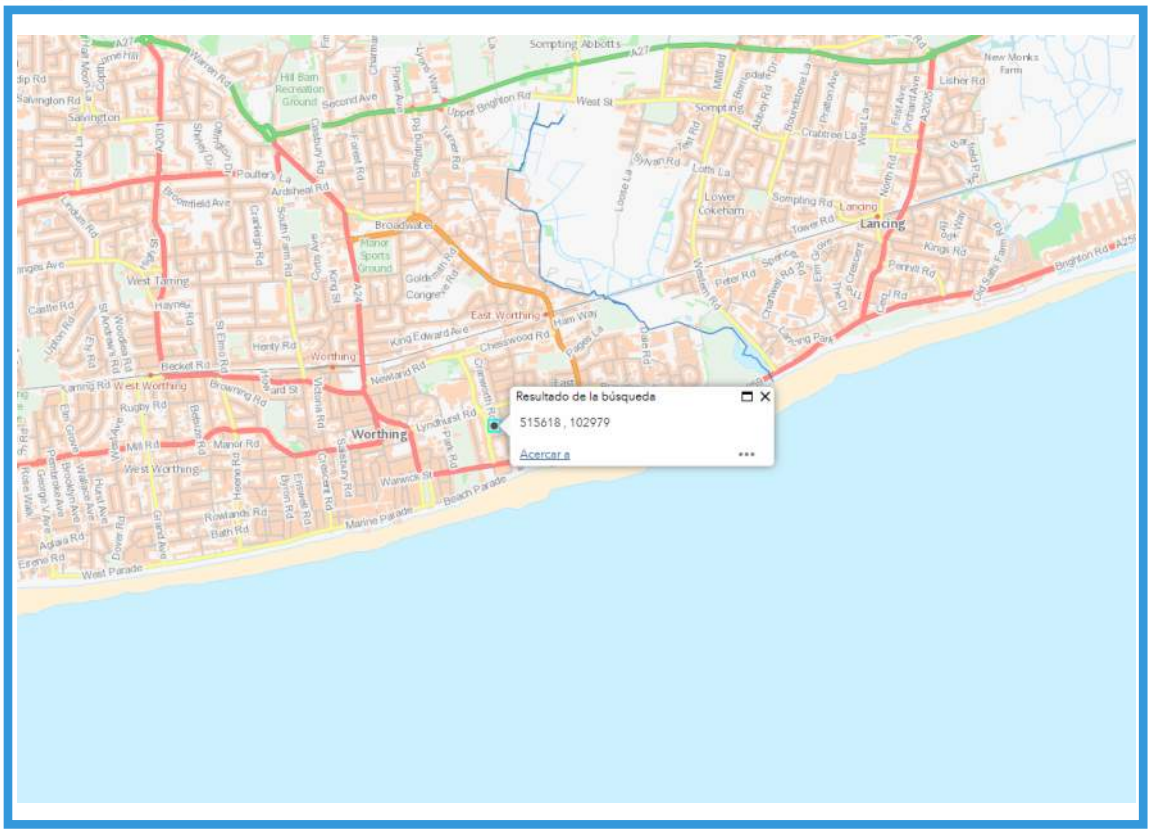
GEOINDEX ONSHORE

GEOLOGY - SUPERFICIAL DEPOSITS - RIVER TERRACE DEPOSITS (UNDIFFERENTIATED) - SAND, SILT AND CLAY



SITE HYDROGEOLOGY

Main River Map





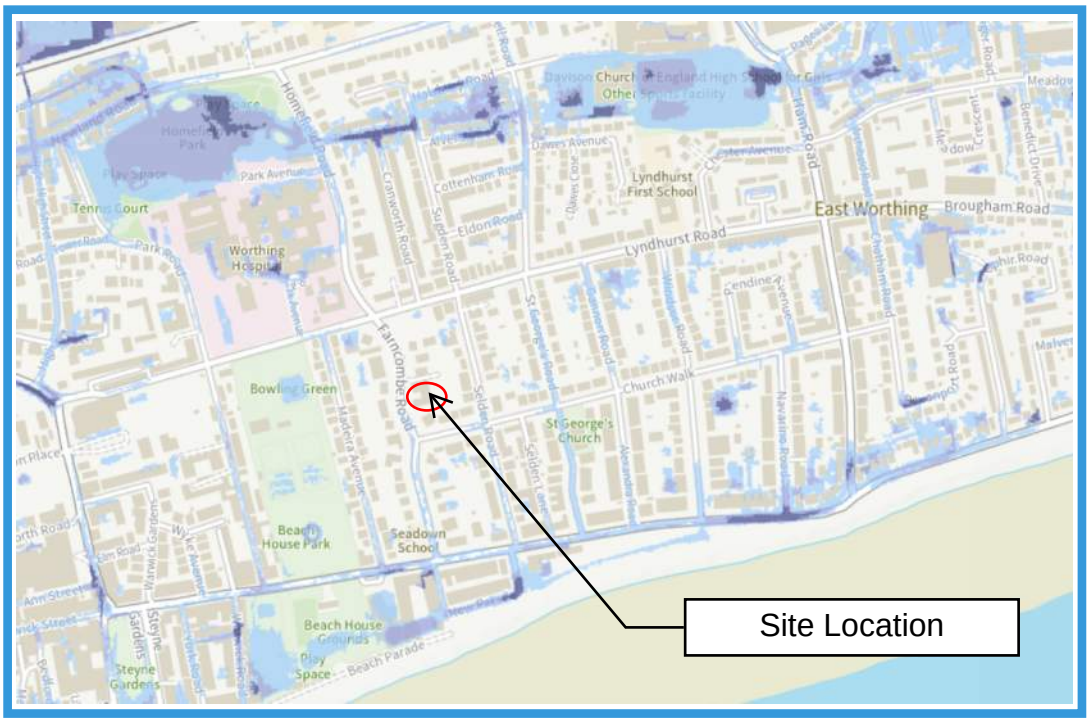


SITE SURFACE WATER FLOOD RISK

Flood risk from surface water

Extent of flooding

High risk means a chance of flooding greater than 3.3% (1:30)
Medium risk means a chance of flooding of btw 1% (1:100) and 3.3%
Low risk means a chance of flooding of btw 0.1% (1:1000) and 1%
Flooding from surface water is difficult to predict as rainfall location and volume are difficult to forecast. In addition, local features can greatly affect the chance and severity of flooding



High risk
More than 3.3% chance each year

Medium risk
Between 1% and 3.3% chance each year

Low risk
Between 0.1% and 1% chance each year



Above 90cm

30cm to 90cm

Below 30cm

MAGIC RESULTS



Site Check Results

Site Check Report Report generated on Tue Oct 08 2024
You selected the location: Centroid Grid Ref: TQ15600297
The following features have been found in your search area:

Aquifer Designation Map (Bedrock) (England)

Typology	Principal

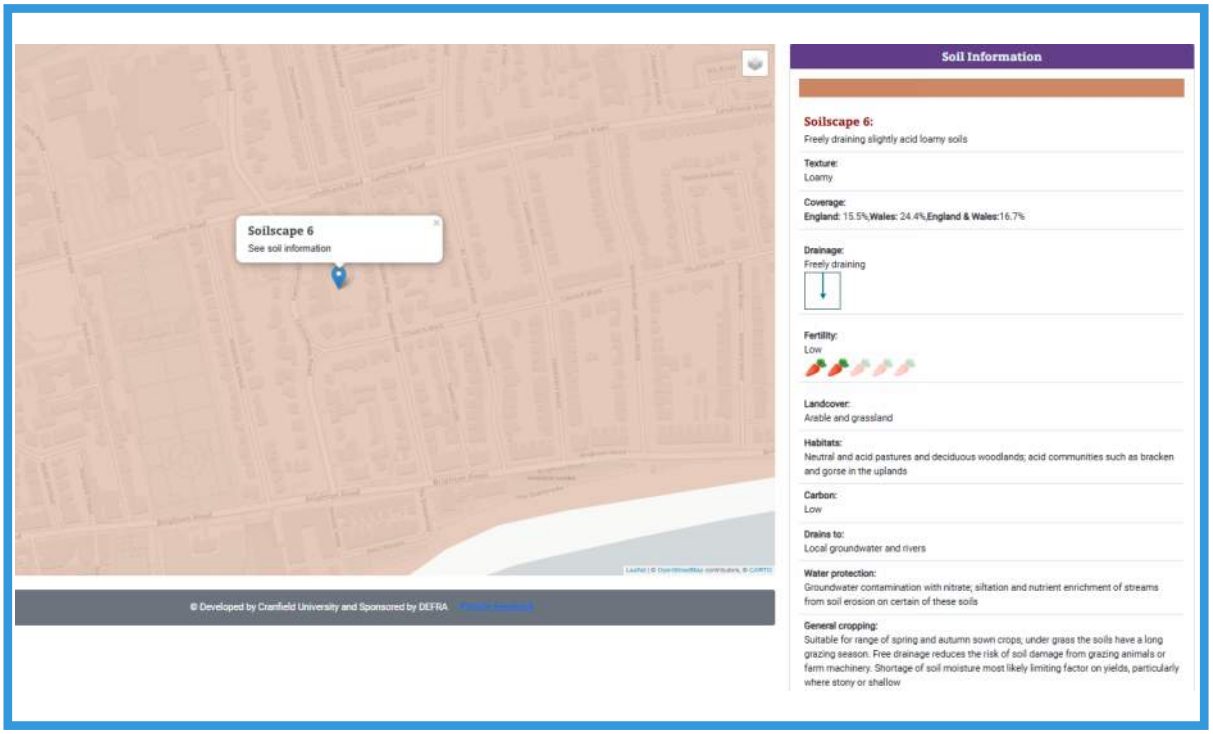
Aquifer Designation Map (Superficial Drift) (England)

Typology	Secondary B

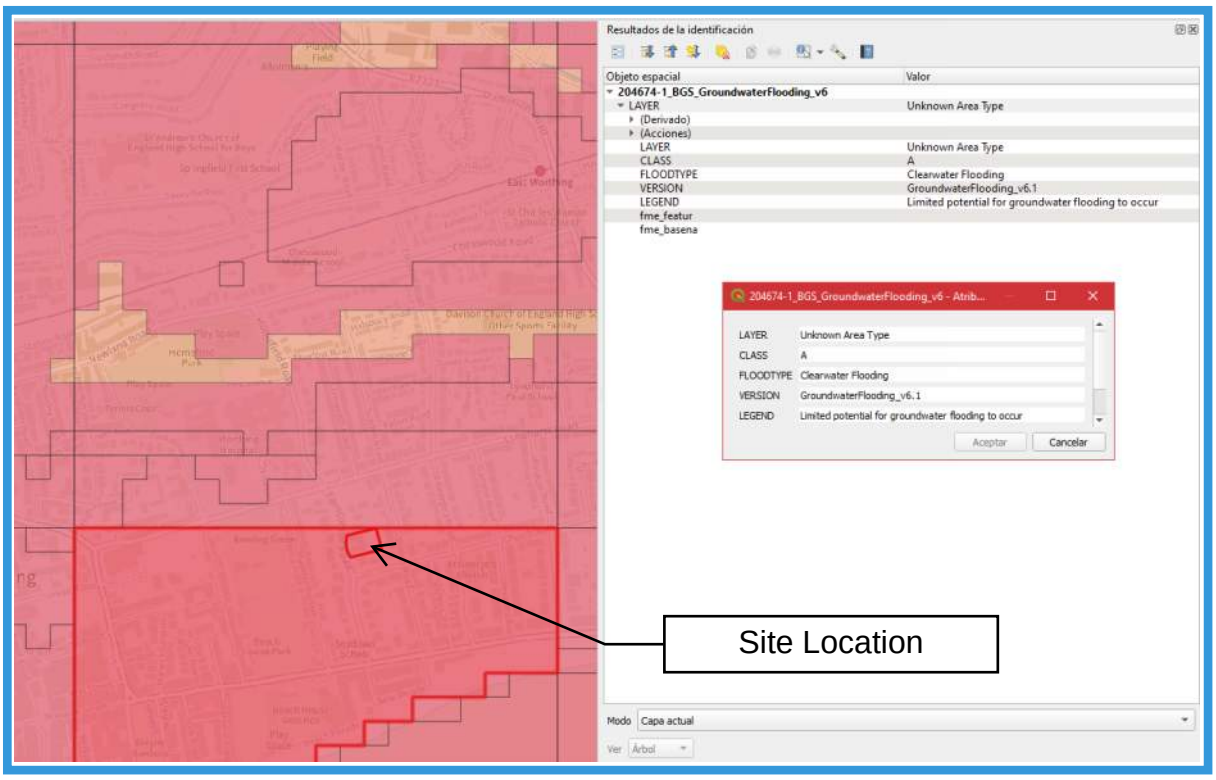
Source Protection Zones merged (England)
No Features found

OK | Cancel | Export to CSV | Print

SOILSCAPES MAP



GROUND WATER FLOOD RISK



Flood map for planning

Your reference	Location (easting/northing)	Created
<Unspecified>	**515599/102969**	**8 Oct 2024 9:16**

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 that 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)

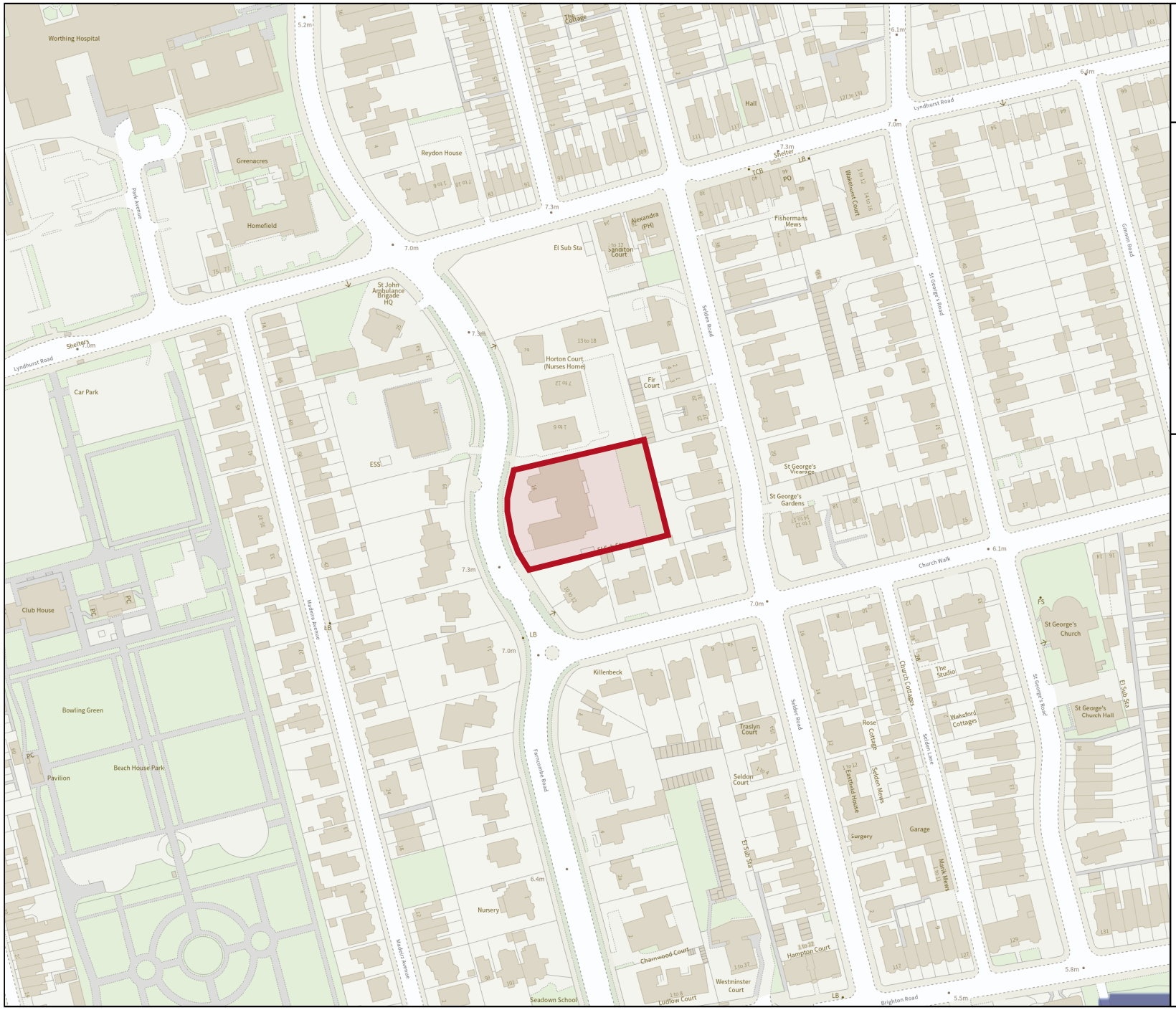
Notes

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/

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Environment Agency

Flood map for planning

Your reference
<Unspecified>

Location (easting/northing)
515599/102969

Scale
1:2500

Created
8 Oct 2024 9:16

- 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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Site Check Report Report generated on Tue Oct 08 2024
You selected the location: Centroid Grid Ref: TQ15600297
The following features have been found in your search area:

SSSI Impact Risk Zones - for LPAs to determine likely impacts on terrestrial SSSIs and when to consult Natural England

GUIDANCE (How to use the Impact Risk Zones)	/Metadata_for_magic/SSSI IRZ User Guidance MAGIC.pdf
HYPERLINK	http://irz.geodata.org.uk/IRZ/step2.html?irzcode=0303000500000¬es=&location=514313,103699 (IRZ polygon centre)

Aquifer Designation Map (Bedrock) (England)

Typology	Principal

Aquifer Designation Map (Superficial Drift) (England)

Typology	Secondary B

Soilscape (England)

Reference	6
Name	FREELY DRAINING SLIGHTLY ACID LOAMY SOILS
Main Surface Texture Class	LOAMY
Natural Drainage Type	FREELY DRAINING
Natural Fertility	LOW
Characteristic Semi-natural Habitats	NEUTRAL AND ACID PASTURES AND DECIDUOUS WOODLANDS; ACID COMMUNITIES SUCH AS BRACKEN AND GORSE IN THE UPLANDS
Main Land Cover	ARABLE AND GRASSLAND
Hyperlink	/Metadata_for_magic/soilscape_summary.pdf

Areas of Outstanding Natural Beauty (England)
No Features found

Limestone Pavement Orders (England)
No Features found

Local Nature Reserves (England) - points
No Features found

Local Nature Reserves (England)
No Features found

Moorland Line (England)
No Features found

National Nature Reserves (England) - points
No Features found

National Nature Reserves (England)
No Features found

National Parks (England)
No Features found

Ramsar Sites (England) - points
No Features found

Ramsar Sites (England)
No Features found

Proposed Ramsar Sites (England) - points
No Features found

Proposed Ramsar Sites (England)
No Features found

Sites of Special Scientific Interest Units (England) - points
No Features found

Sites of Special Scientific Interest Units (England)
No Features found

Sites of Special Scientific Interest (England) - points
No Features found

Sites of Special Scientific Interest (England)
No Features found

Special Areas of Conservation (England) - points
No Features found

Special Areas of Conservation (England)
No Features found

Possible Special Areas of Conservation (England) - points
No Features found

Possible Special Areas of Conservation (England)
No Features found

Special Protection Areas (England) - points
No Features found

Special Protection Areas (England)
No Features found

Potential Special Protection Areas (England) - points
No Features found

Potential Special Protection Areas (England)
No Features found

Biosphere Reserves (England) - points
No Features found

Biosphere Reserves (England)
No Features found

Less Favoured Areas (England)
No Features found

Nitrate Vulnerable Zones 2017 Designations (England)
No Features found

Wild Bird General Licence Protected Sites Condition Zone (England)
No Features found

Source Protection Zones merged (England)
No Features found



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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

1. All dimensions are in millimetres and levels in m AOD unless stated otherwise.

2. Do not scale. If in any doubt, consult Engineer.

3. Read in conjunction with the architects and engineers schedule drawings.

4. Check inverts and sizes of existing pipes prior to the commencement of any work. Report any discrepancies to the engineer and await instructions.

5. 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 shall 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.

Rev	Details	Date	By	Ch'd

Drawing Status:

PRELIMINARY

URBANWATER

Client:

Project:

14-16 Farncombe Road BN11 2BB

Drawing:

Soakaway Test Location

Print Size:	Scale:	Project No:	Drawing No:	Revision:
A1	**1:100**	**U0532**	-	**P1**

www.urban-water.co.uk
Tel: 020 3488 8687
167, 169 Great Portland Street, London, W1W 5PE

SOAKAWAY TEST TO BRE365 STANDARD

PROCESS See video in following link: How to complete a soakaway test BRE365 - YouTube

1. Locate site of proposed soakaway

See enclosed drawing showing location of soakaway

2. Excavate hole to dimensions given

See drawing and figure opposite which shows the dimension of the hole. Excavation should be done using a machine.

3. Record Size

Measure actual size of excavated hole

4. Pour in min 1m3 of water (Instantaneously)

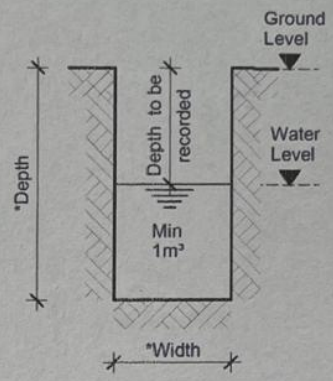
Use Water bowser, with a large outlet pipe, or excavator scoop or large container.

5. Record Time & Depth using the tables below

Give dimension from water level to ground level at regular intervals Keep hole covered when unattended.

6. Repeat test three times

When hole is empty repeat test, on same day or consecutive days depending on flow.



TEST MUST BE COMPLETE THREE TIMES OR IT IS INVALID

RESULTS

Groundwater Level NOT FOUND m (distance from ground level)

Description of excavated soil (circle as required) Sand Gravel Clay Mudstone Cornbrush

Dimension of excavated hole (m) Length: 1.00m Width: 1.00m Depth: 1.50m

Test 1	Minutes	Water Depth
	0	1.20
	15	1.00
	30	0.70
	45	0.30
	50	EMPTY

Test 2	Minutes	Water Depth
	0	1.20
	15	1.05
	30	0.80
	45	0.40
	55	EMPTY

Test 3	Minutes	Water Depth
	0	1.20
	15	1.10
	30	0.90
	45	0.50
	60	EMPTY

Project:	[U0532] 14-16 Farncombe Road BN11 2BB
Calculation By:	SA
Title :	Soakaway Calculation
Date:	03/01/2025

SOAKAWAY TRIAL PIT 1

TEST 1

Pit Dimensions:

L:	1000	mm
W:	1000	mm
D:	1500	mm

Key

	Input
	Calculation

Time Since Start	Water Level from GL	Depth of water
min	mm	mm
0	300	1200
15	500	1000
30	800	700
45	1200	300
50	1500	0

Mean Surface Area	3.40	m2
Depth of water	1200	mm
Time at 25% or at	300	mm of water

Interpolating Values

Time	Water Depth
45	300
50	0

t: 45 min. From interpolating values

Time at 75% or at	900	mm of water

Interpolating Values

Time	Water Depth
15	1000
30	700

t: 20 min. From interpolating values

Volume of test Pit between 25% and 75% of water depth:	0.6	m3	
Time Taken to drain between 25% and 75% of water depth:	25	min or	0.417 hr

Test 1 - Soil Infiltration rate:

1.18E-04	m/s
0.4235	m/hr

SOAKAWAY TRIAL PIT 1

TEST 2

Pit Dimensions:

L:	1000	mm
W:	1000	mm
D:	1500	mm

Key

	Input
	Calculation

Time Since Start	Water Level from GL	Depth of water
min	mm	mm
0	300	1200
15	450	1050
30	700	800
45	1100	400
55	1500	0

Mean Surface Area: 3.40 m2

Depth of water: 1200 mm

Time at 25% or at: 300 mm of water

Interpolating Values

Time	Water Depth
45	400
55	0

t: 47.5 min. From interpolating values

Time at 75% or at: 900 mm of water

Interpolating Values

Time	Water Depth
15	1050
30	800

t: 24 min. From interpolating values

Volume of test Pit between 25% and 75% of water depth: 0.6 m3

Time Taken to drain between 25% and 75% of water depth: 23.5 min or 0.392 hr

Test 2 - Soil Infiltration rate: 1.25E-04 m/s

0.4506 m/hr

SOAKAWAY TRIAL PIT 1

TEST 3

Pit Dimensions:

L:	1000	mm
W:	1000	mm
D:	1500	mm

Key

	Input
	Calculation

Time Since Start	Water Level from GL	Depth of water
min	mm	mm
0	300	1200
15	400	1100
30	500	1000
45	1000	500
60	1500	0

Mean Surface Area	3.40	m2
Depth of water	1200	mm
Time at 25% or at	300	mm of water

Interpolating Values

Time	Water Depth
45	500
60	0

t: 51 min. From interpolating values

Time at 75% or at	900	mm of water

Interpolating Values

Time	Water Depth
30	1000
45	500

t: 33 min. From interpolating values

Volume of test Pit between 25% and 75% of water depth:	0.6	m3	
Time Taken to drain between 25% and 75% of water depth:	18	min or	0.300 hr

Test 3 - Soil Infiltration rate: 1.63E-04 m/s

0.5882 m/hr

SOAKAWAY TRIAL PIT 1 INFILTRATION RATE 1.18E-04 m/s

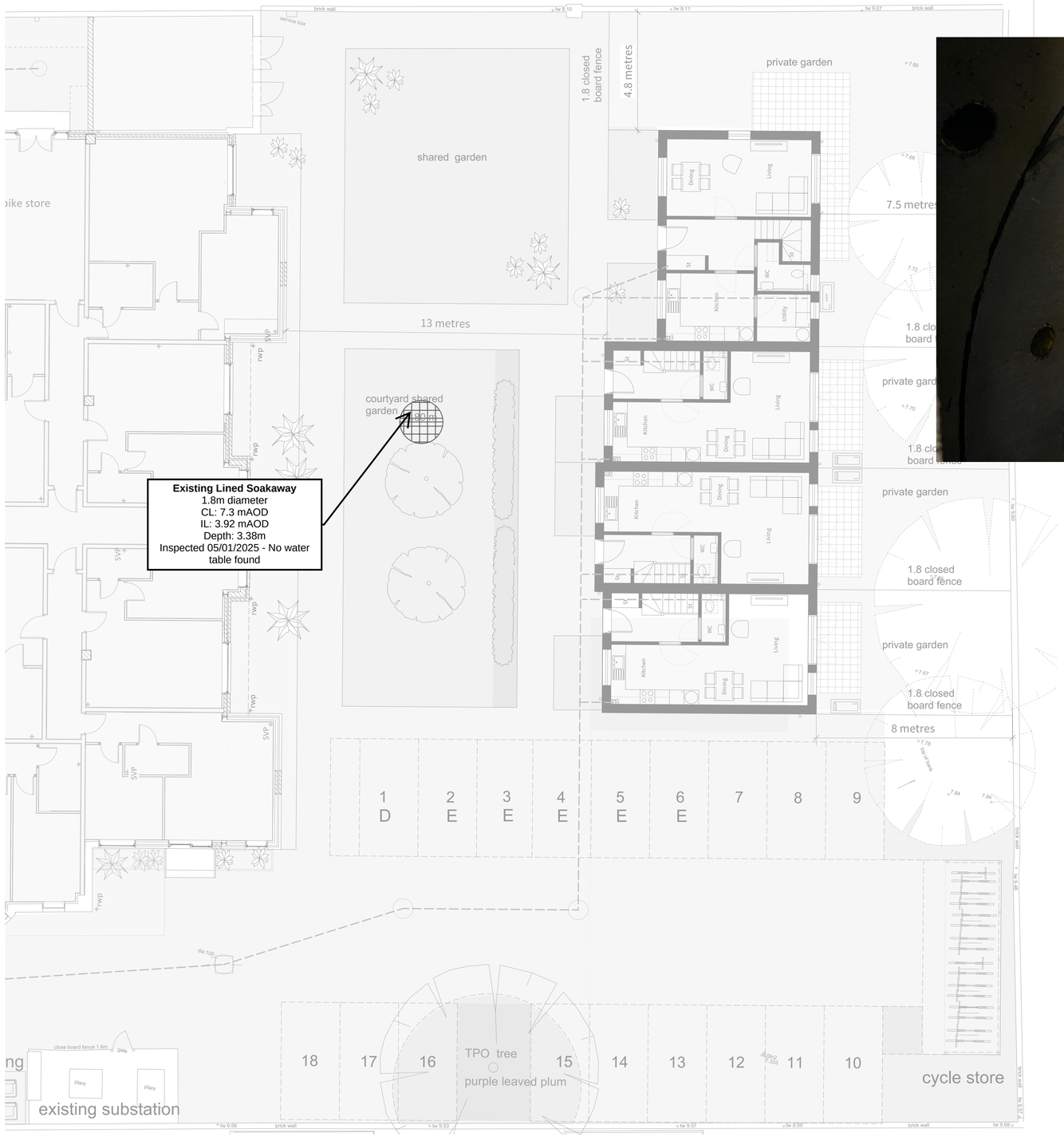
0.4235 m/hr

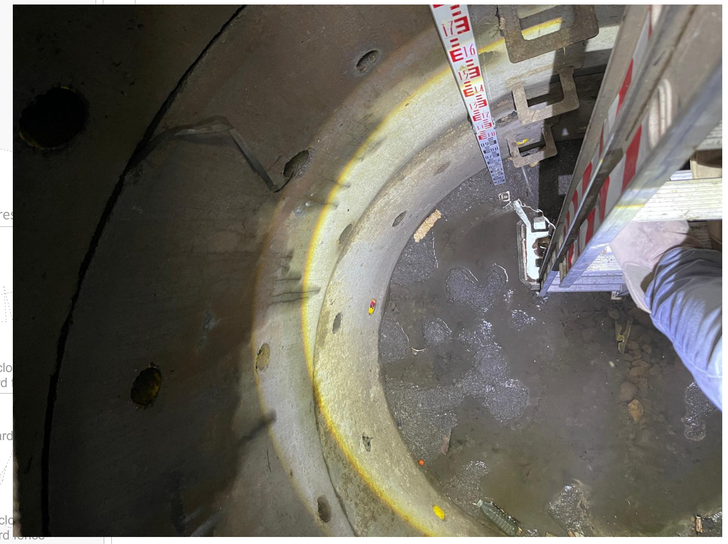
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Drawing Scale Bar

Drawing scale	Line length	Drawing scale	Line length
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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

1. All dimensions are in millimetres and levels in m AOD unless stated otherwise.

2. Do not scale. If in any doubt, consult Engineer.

3. Read in conjunction with the architects and engineers schedule drawings.

4. Check inverts and sizes of existing pipes prior to the commencement of any work. Report any discrepancies to the engineer and await instructions.

5. 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 shall 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.

Rev	Details	Date	By	Ckd

Drawing Status:
PRELIMINARY

URBANWATER

Client:

Project:
14-16 Farncombe Road BN11 2BB

Drawing:
Adjacent Soakaway Inspection

Print Size:	Scale:	Project No:	Drawing No:	Revision:
A1	1:100	U0532	003	P1

Appendix C

Simulation Settings

Rainfall Methodology	FEH-13	Drain Down Time (mins)	240	30 year (l/s)	0.7
Summer CV	1.000	Additional Storage (m³/ha)	0.0	100 year (l/s)	1.0
Analysis Speed	Normal	Check Discharge Rate(s)	✓	Check Discharge Volume	x
Skip Steady State	x	2 year (l/s)	0.3		

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 %)
2	0	0	0
30	0	0	0
30	45	0	0
100	0	0	0
100	45	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	2.30
Greenfield Method	IH124	Growth Factor 100 year	3.19
Positively Drained Area (ha)	0.134	Betterment (%)	0
SAAR (mm)	692	QBar	0.2
Soil Index	2	Q 1 year (l/s)	0.2
SPR	0.30	Q 2 year (l/s)	0.2
Region	7	Q 30 year (l/s)	0.6
Growth Factor 1 year	0.85	Q 100 year (l/s)	0.8
Growth Factor 2 year	0.88		

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Design Settings

Rainfall Methodology	FEH-13	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Inverts
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	6.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
Development	0.021	6.00	7.400	450	-0.094	0.051	1.000
Soawakay			7.300		39.876	0.051	1.500

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	Soawakay	40.000	0.600	6.400	5.800	0.600	66.7	150	6.54	49.9

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.233	21.8	3.8	0.850	1.350	0.021	0.0	42	0.930

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	40.000	66.7	150	Circular	7.400	6.400	0.850	7.300	5.800	1.350

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Node Type
1.000	Development	450	Manhole	Adoptable	Soawakay	Junction

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
Development	-0.094	0.051	7.400	1.000	450	 0	1.000	6.400	150
Soawakay	39.876	0.051	7.300	1.500		1 	1.000	5.800	150

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Simulation Settings

Rainfall Methodology	FEH-13	Drain Down Time (mins)	240	2 year (l/s)	1.3
Summer CV	1.000	Additional Storage (m³/ha)	0.0	30 year (l/s)	3.4
Analysis Speed	Normal	Check Discharge Rate(s)	✓	100 year (l/s)	4.2
Skip Steady State	x	1 year (l/s)	0.0	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 %)
2	0	0	0
30	0	0	0
30	45	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)	
Contributing Area (ha)	0.134	Q 2 year (l/s)	1.3
PIMP (%)	58	Q 30 year (l/s)	3.4
CV	0.750	Q 100 year (l/s)	4.2
Time of Concentration (mins)	8.00		

Node Soawakay Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	5.800	Depth (m)	0.800
Side Inf Coefficient (m/hr)	0.42350	Time to half empty (mins)	757	Inf Depth (m)	0.800
Safety Factor	5.0	Pit Width (m)	4.500	Number Required	1
Porosity	0.95	Pit Length (m)	4.500		

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Results for 2 year Critical Storm Duration. Lowest mass balance: 96.48%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	Development	10	6.443	0.043	3.4	0.0068	0.0000	OK
720 minute summer	Soawakay	720	6.034	0.234	0.6	4.5097	0.0000	OK

Link Event (Velocity)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	Development	1.000	Soawakay	3.5	1.164	0.161	0.1947
720 minute summer	Soawakay	Infiltration		0.1			

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Results for 30 year Critical Storm Duration. Lowest mass balance: 96.48%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	Development	11	6.468	0.068	9.3	0.0109	0.0000	OK
480 minute summer	Soawakay	360	6.280	0.480	1.7	9.2373	0.0000	OK

Link Event (Velocity)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	Development	1.000	Soawakay	9.3	1.295	0.427	0.4861
480 minute summer	Soawakay	Infiltration		0.2			

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Results for 30 year +45% CC Critical Storm Duration. Lowest mass balance: 96.48%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	Development	11	6.485	0.085	13.5	0.0136	0.0000	OK
600 minute summer	Soawakay	480	6.482	0.682	2.0	13.1180	0.0000	OK

Link Event (Velocity)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	Development	1.000	Soawakay	13.5	1.317	0.619	0.5587
600 minute summer	Soawakay	Infiltration		0.3			

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Results for 100 year Critical Storm Duration. Lowest mass balance: 96.48%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	Development	11	6.478	0.078	11.8	0.0125	0.0000	OK
600 minute summer	Soawakay	465	6.391	0.591	1.7	11.3657	0.0000	OK

Link Event (Velocity)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	Development	1.000	Soawakay	11.8	1.311	0.541	0.5318
600 minute summer	Soawakay	Infiltration		0.3			

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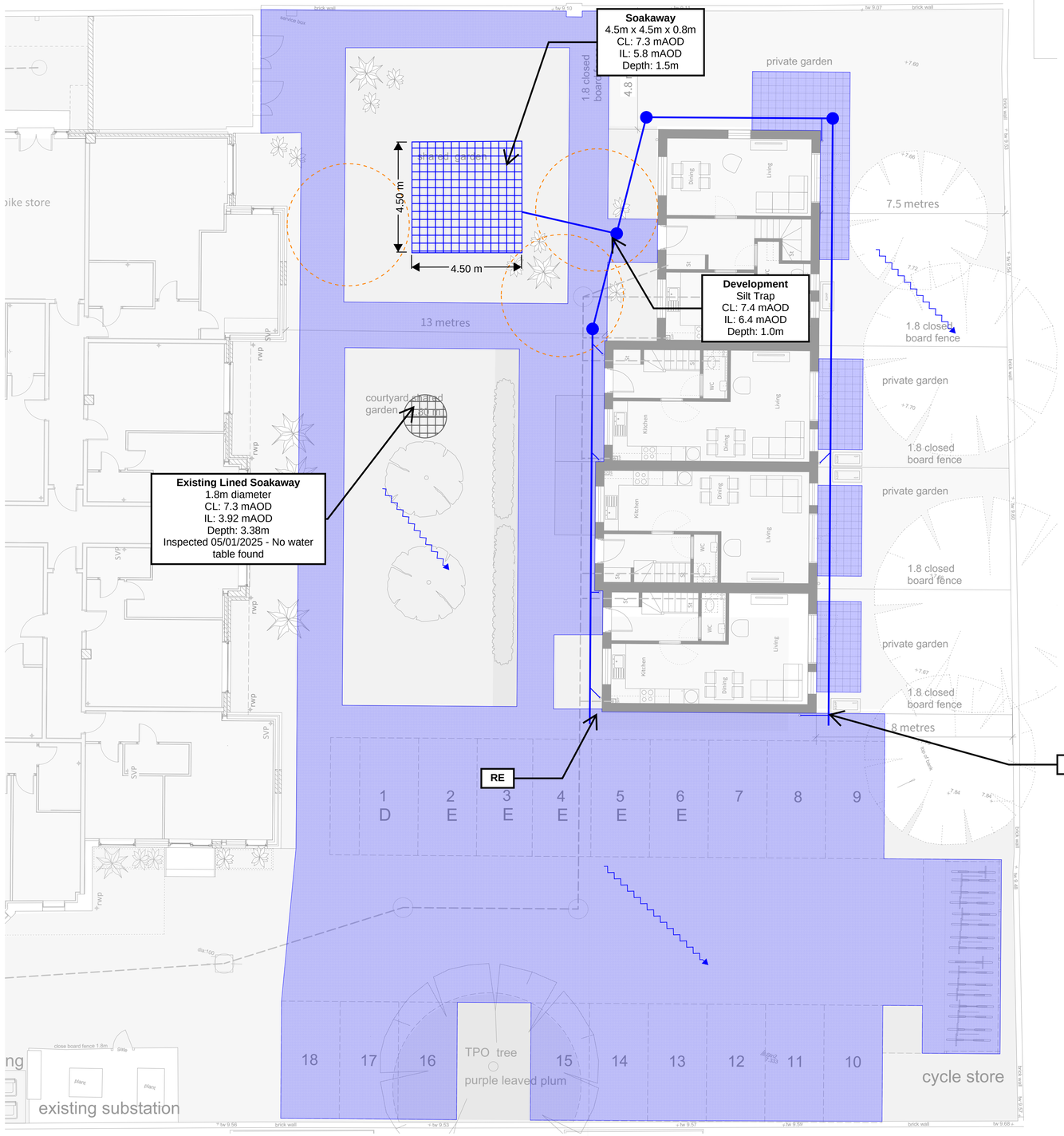
Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 96.48%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute summer	Development	352	7.133	0.733	4.0	0.1165	0.0000	FLOOD RISK
360 minute summer	Soawakay	352	7.133	1.333	4.0	15.4000	0.0000	OK

Link Event (Velocity)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	Development	1.000	Soawakay	17.0	1.331	0.780	0.5998
360 minute summer	Soawakay	Infiltration		0.3			

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Appendix D



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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

1. All dimensions are in millimetres and levels in m AOD unless stated otherwise.

2. Do not scale. If in any doubt, consult Engineer.

3. Read in conjunction with the architects and engineers schedule drawings.

4. Check inverts and sizes of existing pipes prior to the commencement of any work. Report any discrepancies to the engineer and await instructions.

5. 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 shall 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.

Rev	Details	Date	By	Chd

Drawing Status:

PRELIMINARY

URBANWATER

KEY

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

Client:

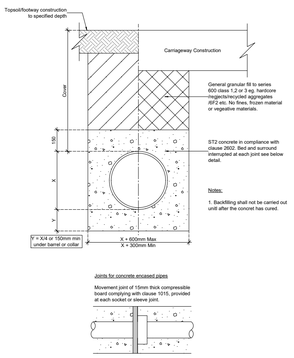
Project:

14-16 Farncombe Road BN11 2BB

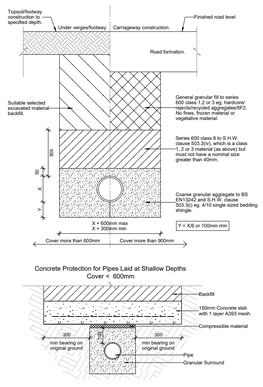
Drawing:

Proposed Drainage Strategy

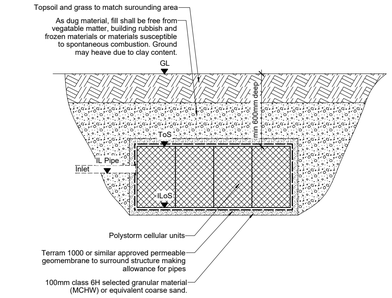
Print Size:	Scale:	Project No:	Drawing No:	Revision:
A1	1:100	U0532	003	P1



Pipe Bedding Detail Type Z



Pipe Bedding Detail Type S



NOTES:

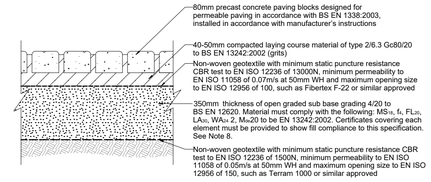
1. Permeable modular storage cell with 95% minimum void ratio. Maximum load 20 tonnes/m².

2. Installation of units as per supplier recommendations.

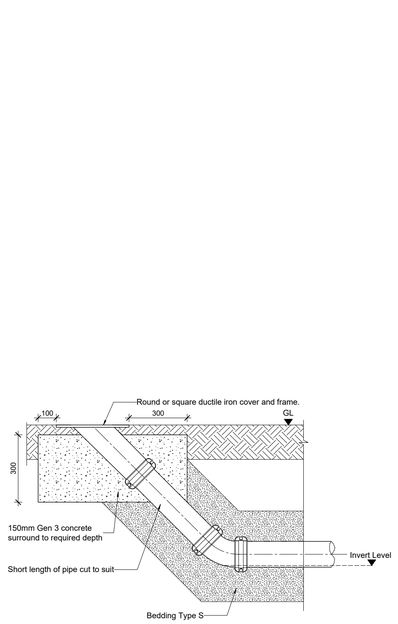
3. Ground may heave due to clay content in the as dug material. Contractor to level ground where required.

4. The area of the infiltration unit and the minimum total storage volume should be as per approved by the local planning authority documents.

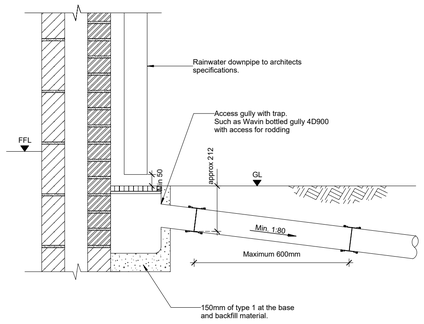
Cellular Infiltration System - Landscape Area



Permeable Paving - Infiltration



External Rodding Eye Detail

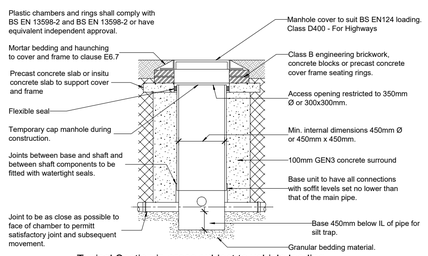


NOTES:

1. This details shows the standard generic arrangement.

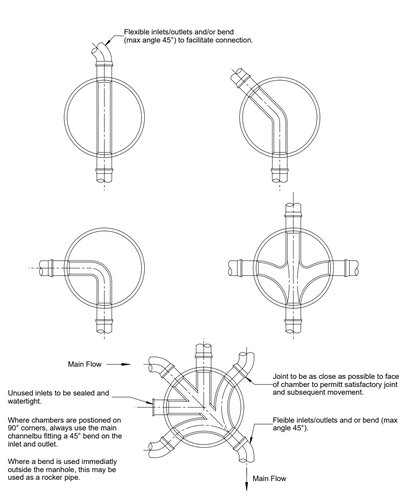
2. The pipe and connector details will be different for each manufacturer of the components. They are to be in installed in accordance with the manufacturers recommendations.

8250 - External Rainwater (High Level)



Notes:
1. Refer to drawing 8193 for base layouts.

Silt Trap Plastic



Chamber Type 3 Base Layouts

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Measure length of line above for checking of scale

GENERAL NOTES

Rev	Details	Date	By	Ctrd

Drawing Status:

PRELIMINARY

URBANWATER

Client:

Project:

14-16 Farncombe Road BN11 2BB

Drawing:

Standard Details

Print Size:	Scale:	Project No:	Drawing No:	Revision:
A1	NTS	U0532	006	P1