



LAND ADJACENT TO 4 BROOKFIELD, PROVIDENCE HILL, BURSLEDON

FLOOD RISK ASSESSMENT & DRAINAGE STRATEGY

March 2025

Colten Care

CARE HOME
LAND ADJACENT TO 4 BROOKFIELD
PROVIDENCE HILL, BURSLEDON

FLOOD RISK ASSESSMENT & DRAINAGE STRATEGY

CONTROLLED DOCUMENT

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Colten Care
Colten House
Wellworth Way
Ringwood
Hampshire
BH24 3FE



Paul Basham Associates Ltd
The Bothy
Cams Hall Estate
PO16 8UT

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Contents

1.	EXECUTIVE SUMMARY	3
2.	INTRODUCTION.....	4
3.	SITE DESCRIPTION	6
4.	PLANNING POLICY	11
5.	CLIMATE CHANGE	13
6.	FLOOD RISK	15
7.	RESIDUAL FLOOD RISK	22
8.	DRAINAGE STRATEGY	23
9.	WATER QUALITY	26
10.	MANAGEMENT AND MAINTENANCE STRATEGY	28
11.	SUMMARY AND CONCLUSION	32

Figures

Figure 1: Site Location Plan (Source: Google Maps).....	4
Figure 2: Existing Site Access.....	5
Figure 3: BGS bedrock mapping	6
Figure 4: SuDS GeoReport Drainage Potential Extract	7
Figure 5: SuDS GeoReport Ground Instability Extract	7
Figure 6: SuDS GeoReport Groundwater Susceptibility Extract	8
Figure 7: DEFRA Source Protection Zone Mapping	9
Figure 8: Greenfield Runoff Rates	10
Figure 9: NPPF Planning Practice Guidance Table – Flood Risk Vulnerability and Flood Zone Compatibility.....	14
Figure 10: Flood Map for planning (Flood Zones)	16
Figure 11: Long-term flood risk from rivers and seas map.....	17
Figure 12: Long term flood risk from reservoirs map	18
Figure 13: Long term flood risk from surface water.....	19
Figure 14: SFRA Groundwater Flooding & Bedrock Permeability.....	20
Figure 15: BGS GeoReport Persistent Shallow Groundwater	20
Figure 16: BGS GeoReport Depth to Groundwater Table.....	21
Figure 17: Southern Water Observed Sewer Flooding.....	21
Figure 18: Table 26.2 of the SuDS Manual	26
Figure 19: Table 26.3 of the SuDS Manual	26

Tables

Table 1: Peak Rainfall Intensity allowance in small and urban catchments. 3.3%AEP Events (Source link)	13
Table 2: Peak Rainfall Intensity allowance in small and urban catchments. 1%AEP Events (Source link)	13
Table 3: Peak River Flow Allowances (Source link)	13
Table 4: Summary of Existing and Residual Flood Risk	22
Table 5: Run-off volumes	23
Table 6: MicroDrainage Modelling Parameters.....	24
Table 7: Water Quality Summary	27
Table 8: Maintenance schedule for pervious pavements.....	28
Table 9: Maintenance schedule for an attenuation storage system	29
Table 10: Proposed maintenance regime for a flow control device.....	29
Table 11: Proposed Maintenance Regime for a Swale	30
Table 12: Maintenance schedule for a filter strip.	31

Appendices

Appendix A: Site Layout
Appendix B: Topographic Survey
Appendix C: BGS SuDS Infiltration Geo-report
Appendix D: Southern Water Sewer Mapping
Appendix E: Drainage Layout
Appendix F: Site 3D Hydraulic Calculations
Appendix G: UK SuDS Water Quality Toolkit results

1. EXECUTIVE SUMMARY

- 1.1 This FRA has been prepared by Paul Basham Associates to help assess the suitability of the site for a care home development.
- 1.2 The site is entirely located within Flood Zone 1 and is considered appropriate in accordance with the NPPF.
- 1.3 Summary of residual flood risk:
 - Fluvial and tidal flooding is considered to be low
 - Surface water flooding is considered to be very low
 - Groundwater flooding is considered to be very low
 - Sewers flooding is considered to be very low
- 1.4 Infiltration is not considered to be a viable drainage solution for the site due to soil impermeability and the potential for soil instability cause by infiltration, based on information provided by the BGS SuDS Infiltration Report. (Please refer to Section 3)
- 1.5 The surface water drainage proposals are to attenuate on-site using geo-cellular crates and discharging at a limited rate of 2 l/s via a HydroBrake into the existing watercourse near the northern boundary.
- 1.6 Permeable paving has been proposed for parking spaces to provide at-source control and increase water quality. Additionally, a Vortex Separator has been proposed to sufficiently treat pollutants from road and roof runoff, prior to discharging into the watercourse. UK SuDS Water Quality Toolkit has been used to assess the water quality uplift for the site and is included in Appendix H.
- 1.7 Secondary and tertiary stages of water treatment have been provided by a series of Bio-retention filter stir and swale further downstream in the network.
- 1.8 Hydraulic Calculations have been undertaken using Site 3D (Included in Appendix G) and ensure that no flooding occurs in the 100% AEP, 10%AEP, 3.3%AEP (40% Climate Change (CC)) +the 1% AEP (+45% CC).
- 1.9 Foul water is proposed to be drained via gravity to a private package pump, which will pump the sewage via. a rising main towards the site's access, where it will eventually connect into the existing Southern Water Manhole 3502.

2. INTRODUCTION

- 2.1 This Flood Risk Assessment (FRA) and Drainage Strategy has been prepared by Paul Basham Associates on behalf of Colten Care to support a Full planning application for a care home development in Bursledon. The land is located to the west of 4 Brookfield, Providence Hill. The nearest postcode is SO31 8AU.
- 2.2 The site is situated on the outskirts of Bursledon, Southampton, is approximately 300m south of the M27 and 1.3km west of the river Hamble. See **Figure 1** below for site location.
- 2.3 The plot size is approximately 1.08ha and the land is currently open field with a small number of outhouses.



Figure 1: Site Location Plan (Source: Google Maps)

- 2.4 The site is currently accessed via a gravel driveway adjacent to the property at 4 Brookfield, Providence Hill. See **Figure 2** below.



Figure 2: Existing Site Access

- 2.5 The development aspirations are for a residential care development comprising of a 73-bed care home in addition to 4 residential cottages with private back gardens. The proposal also includes parking spaces and communal open spaces. See **Appendix A** for the site layout plan.

3.3 A BGS 'Infiltration SuDS GeoReport' has been obtained (Included in **Appendix C**) and shows the below;

Drainage Potential

The report found that the site sat between “may be compatible for infiltration SuDS” and “opportunities for infiltration SuDS”. Further investigation will be required to gain a better understanding of the properties of the soil. See **Figure 4** below.

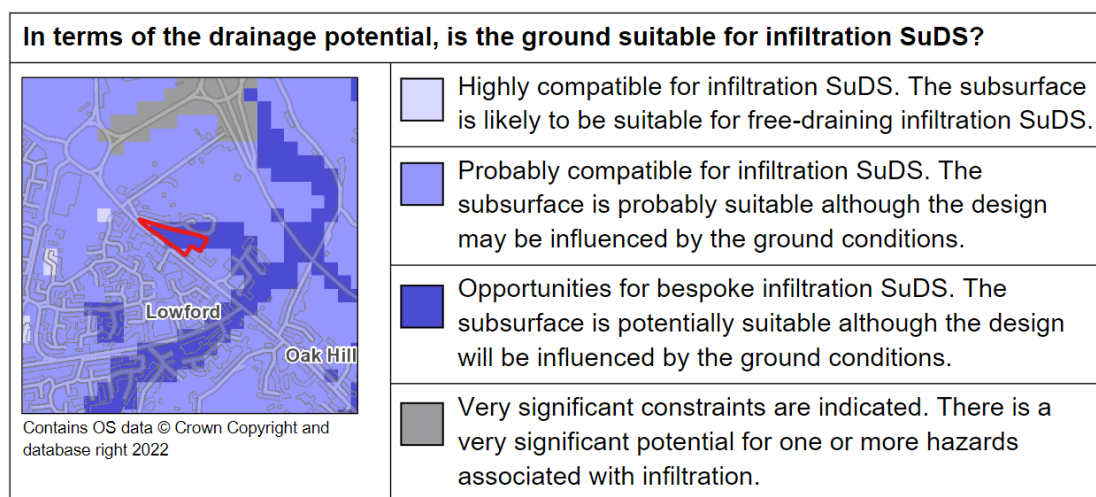


Figure 4: SuDS GeoReport Drainage Potential Extract

Ground Instability

3.4 The report found that “ground instability problems are probably present. Increased infiltration may result in ground instability”. As a result, although drainage potential may be present, ground instability concerns make infiltration not viable for this site. See **Figure 5** below.

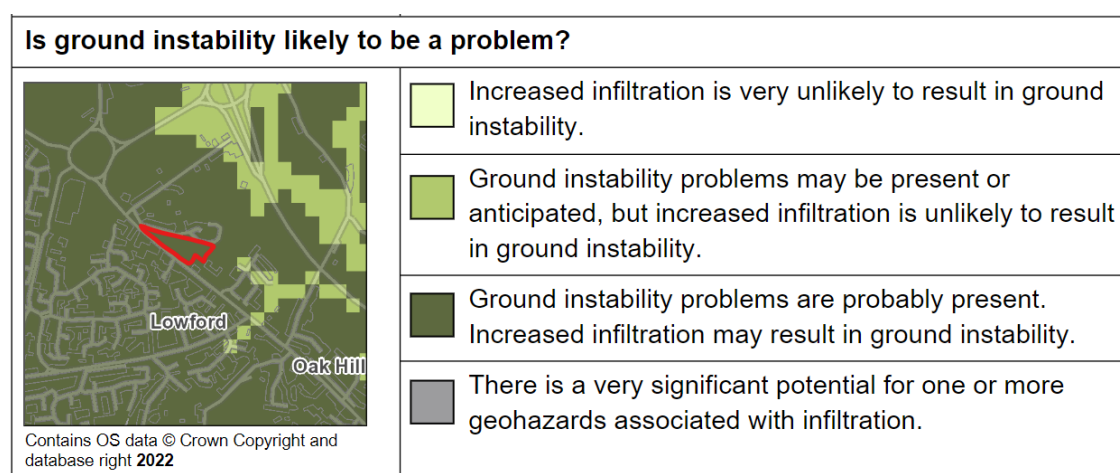


Figure 5: SuDS GeoReport Ground Instability Extract

Groundwater Susceptibility

- 3.5 The report found that “the groundwater is not expected to be especially vulnerable to contamination. See **Figure 6** below.

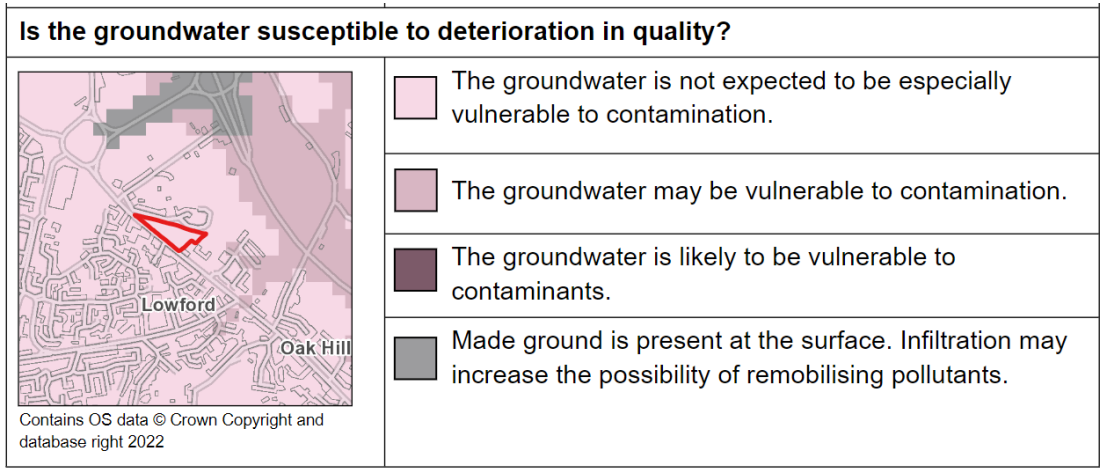


Figure 6: SuDS GeoReport Groundwater Susceptibility Extract

Hydrology

- 3.6 There is an existing unnamed watercourse which runs adjacent to the northern boundary of the site.



Hydrogeology

- 3.7 The EA "Magic Map" was employed to assess the site's proximity to source protection zones. Figure 7, extracted from the Magic Map, confirms that the site is situated outside of any source protection zones. (The site's postcode is marked by a blue hatch)

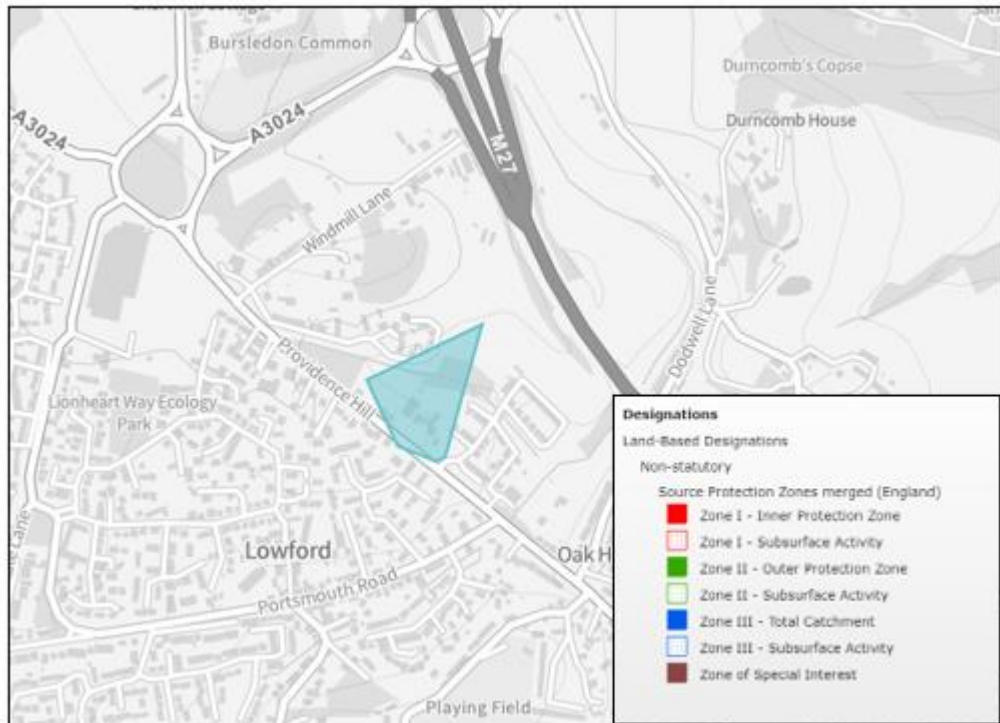


Figure 7: DEFRA Source Protection Zone Mapping

Public Sewer

- 3.8 The site is currently an open, undeveloped field and drains naturally. There is no apparent connection to a southern water public sewer.

Existing Foul Water Drainage

- 3.9 The site does not currently produce any foul flows. No connections to existing Southern Water sewers are evident. There is a Southern Water foul water public sewer running in Providence Hill A27 to the south of the site. Southern Water sewer records can be found in **Appendix D**.

Greenfield rates and volumes

- 3.10 The greenfield run-off rates for the site have been estimated using the HR Wallingford online calculator on the UK SuDS website. The run-off rate for the full site area of 1.08 hectares is 5.95 l/s while the rate for the proposed developed area of 0.33 hectares for the existing site is 1.82 l/s and is shown in **Figure 8** below. The soil type has been edited to type 5, to reflect the impermeability of the underlying soil, which results in higher runoff rates as summarised in **Figure 8** below.
- 3.11 Whilst the Qbar rate is estimated to be 2.36l/s using the HR Wallingford calculations, the proposal is to limit the discharge to 2 l/s to provide an additional margin of safety.

Greenfield rate	Soil Type 4 (default)	Soil Type 5 (edited)
Qbar (l/s)	1.82	2.36
1in1 year (l/s)	2	2
1in30 year (l/s)	4.2	5.4
1in100 year (l/s)	5.8	7.5

Figure 8: Greenfield Runoff Rates

4. PLANNING POLICY

- 4.1 The planning policies and guidance that are relevant to the proposed Development with regard to flood risk and surface water management are outlined below.

National Planning policy

- 2024 updated National Planning Policy Framework (NPPF) and the associated continuously updated Planning Practice Guidance (PPG) by the Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government
- Environment Agency Standing Advice
- EA National Strategy for Flood and Coastal Erosion Risk Management 2020
- DEFRA Sustainable Drainage System: Non-Statutory Technical Standards 2015
- CIRIA C753 The SuDS Manual 2015
- Flood and Water Management Act 2010
- Flood Risk Regulations 2009
- Flood risk assessments: climate change allowances (latest update 2023)Regional and Local Planning policy

Regional Planning policy

- 4.2 Hampshire County Council as the Lead Local Flood Authority provides the following planning strategies and policies:

- Hampshire Local flood and water management strategy
- Hampshire County Council Preliminary Flood Risk Assessment

Local Planning Policy

- 4.3 The Eastleigh Borough Council (EBC) local plan contains the following policies relating to flooding, drainage, and surface water:

- Policy DM3, Adaption to climate change.
- Policy DM5, Managing Flood Risk.
- Policy DM6, Sustainable Surface Water Management and Watercourse Management.

4.4 Based on the above policies, the key requirements in relation to the surface water management and flood risk for the proposed Development are considered as to be follows:

- National Planning Policy Framework (2024): "A site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use."
- Environment Agency Standing Advice: "You should follow the requirements set out in your local authority's Surface Water Management Plan (SWMP), Strategic Flood Risk Assessment (SFRA) and local planning policies when designing surface water management measures. Your development must also comply with Building Regulations Part H. For developments in flood risk areas, you must include emergency escape plans for any parts of the building that are below the estimated flood level."
- CIRIA C753 The SuDS manual 2015: "Control the quantity of runoff to support the management of flood risk and maintain and protect the natural water cycle. To ensure that the surface water runoff from a developed site does not have a detrimental impact on people, property, and the environment, it is important to control how fast runoff is discharged from the site (i.e., the peak runoff rate) and how much runoff is discharged from the site (i.e., the runoff volume). Suds that are designed to manage water quantity in this way reduce the likelihood of flooding caused by the development. They can help protect natural water cycles by promoting the recharge of soil moisture levels, by maintaining stream and river baseflows and by replenishing groundwater."

5. CLIMATE CHANGE

Peak Rainfall Intensity Allowance

- 5.1 The “Flood Risk Assessments: Climate Change Allowances Guidance” 2016 (updated in 2021) published by the EA indicates that climate change is currently expected to result in increased peak rainfall and rising sea and river levels.
- 5.2 Table 1 and Table 2 show anticipated changes in peak rainfall intensity in small and urban catchments within the East Hampshire Management Catchment. The development is classed as more vulnerable, and the design life is approximately 75 years.
- 5.3 The peak rainfall intensity allowance during the 3.3% Annual Exceedance Probability (AEP) event is 40%

Epoch	Central Allowance	Upper End Allowance
2050s	20%	35%
2070s	25%	40%

Table 1: Peak Rainfall Intensity allowance in small and urban catchments. 3.3%AEP Events ([Source link](#))

- 5.4 The peak rainfall intensity allowance during the 1% Annual Exceedance Probability (AEP) event is 45%

Epoch	Central Allowance	Upper End Allowance
2050s	20%	40%
2070s	25%	45%

Table 2: Peak Rainfall Intensity allowance in small and urban catchments. 1%AEP Events ([Source link](#))

Peak River Flow Allowances

- 5.5 Table 3 shows the anticipated changes in the peak river flow allowances

Epoch	Central Allowance	Upper End Allowance
2050s	19%	37%
2070s	22%	51%
2080s	37%	88%

Table 3: Peak River Flow Allowances ([Source link](#))

- 5.6 Considering the development is in Flood Zone 1, is classed as “more vulnerable”, and the design life is approximately 75 years, the peak river flows allowance is 37% (based on the Central Allowance).

National Planning Policy Framework (NPPF)

- 5.7 This report has been prepared considering the National Planning Policy Framework (NPPF) Technical Guidance and the Environment Agency's (EA) flood risk standing advice.
- 5.8 Table 2 from the Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government Flood risk and coastal change guidance has been included as **Figure 9** below. This provides the classes of development (based on flood risk vulnerability) that are permitted within each of the flood zones. The Flood Risk Vulnerability Classification for the site is 'More Vulnerable' as it is a residential care home development, which is defined in Annexxe 3 of the NPPF.
- 5.9 The development is in Flood Zone 1; therefore no sequential test or exception test is required.

Flood Zones	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	X	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	X	X	X	✓*

Table 2 - Flood risk vulnerability and flood zone 'compatibility'

Key: ✓ Exception test not required X Development should not be permitted.

Notes to table 2:

- This table does not show the application of the [Sequential Test](#) which should be applied first to guide development to Flood Zone 1, then Zone 2, and then Zone 3; nor does it reflect the need to avoid flood risk from sources other than rivers and the sea;
- The Sequential and [Exception Tests](#) do not need to be applied to [minor developments](#) and changes of use, except for a change of use to a caravan, camping or chalet site, or to a mobile home or park home site;
- Some developments may contain different elements of vulnerability and the highest vulnerability category should be used, unless the development is considered in its component parts.

† In Flood Zone 3a essential infrastructure should be designed and constructed to remain operational and safe in times of flood.

* "In Flood Zone 3b (functional floodplain) essential infrastructure that has passed the Exception Test, and water-compatible uses, should be designed and constructed to:

- remain operational and safe for users in times of flood;
- result in no net loss of floodplain storage;
- not impede water flows and not increase flood risk elsewhere.

Figure 9: NPPF Planning Practice Guidance Table – Flood Risk Vulnerability and Flood Zone Compatibility

6. FLOOD RISK

6.1 In line with the EA Standing Advice, the estimated flood level is considered to be the higher of:

- A river flood level with a 1 in 100 or greater annual probability plus an allowance for climate change; and
- A tidal flood level with a 1 in 200 or greater annual probability plus an allowance for climate change.

6.2 The following Flood Zone definitions ignoring flood defence, are set out in the Planning Practice Guidance:

- Zone 1 Low Probability - Land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%);
- Zone 2 Medium Probability - Land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5%– 0.1%) in any year; and
- Zone 3 High Probability - Land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.

Fluvial / Tidal Flood Risk

- 6.3 Flood mapping obtained from the government's 'flood map for planning' website has identified that the site falls within Flood Zone 1. See **Figure 10** below.

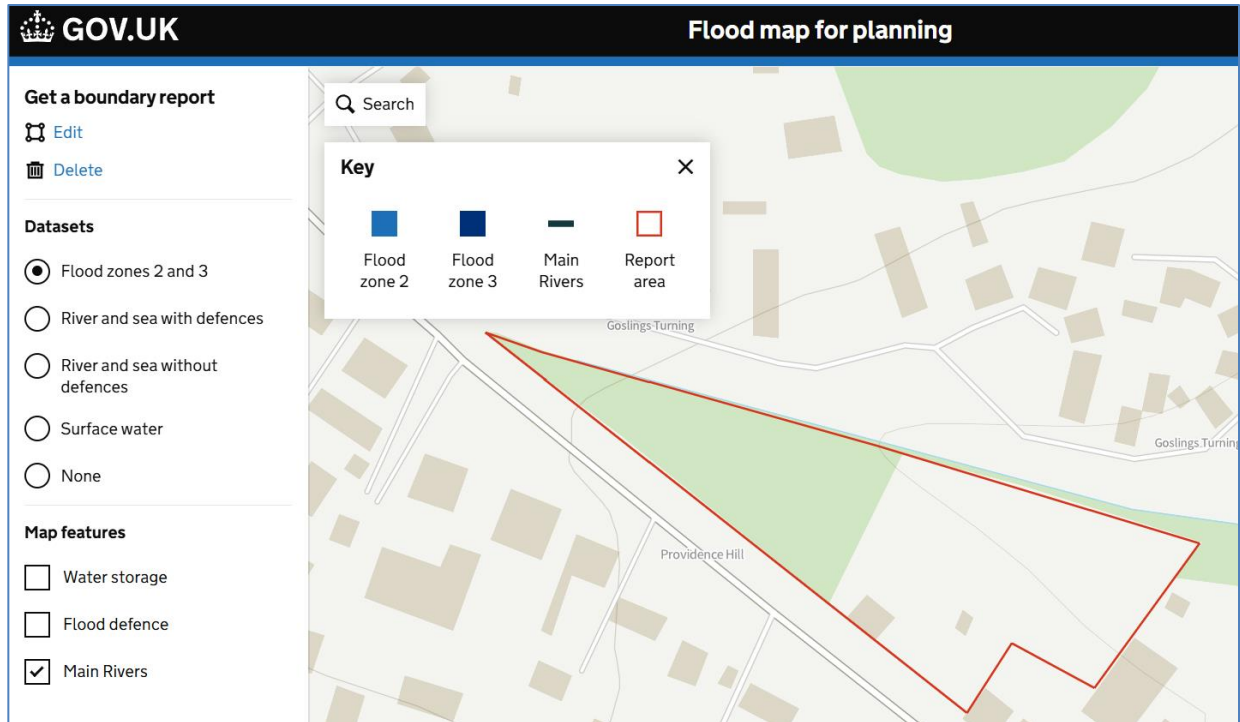


Figure 10: Flood Map for planning (Flood Zones)

Long term flood risk from rivers and seas

- 6.4 The long-term flood risk and from rivers and seas mapping shows the site is not considered to be at risk from river or sea flooding. See **Figure 11** below.

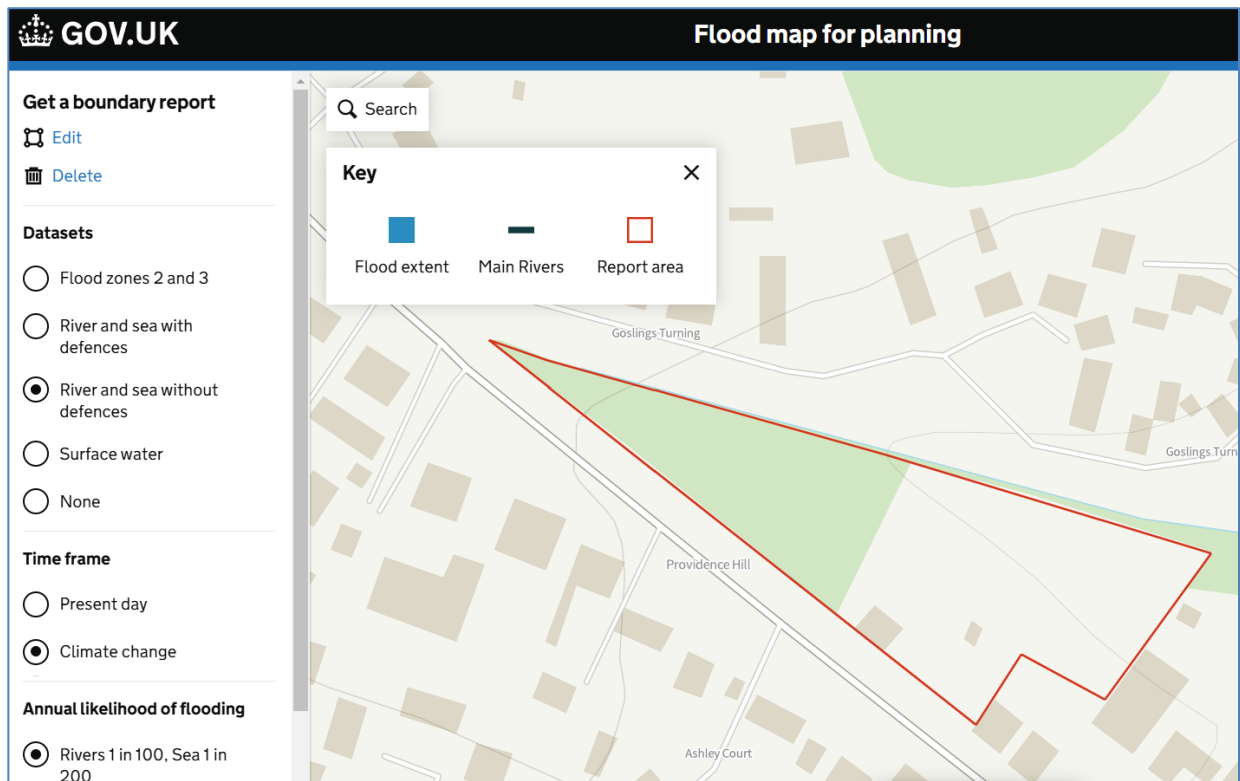


Figure 11: Long-term flood risk from rivers and seas map

Fluvial flooding – Residual Risk

- 6.5 Based on the above, it can be concluded that residual risk from fluvial flooding is low for the proposed site.

Long-term Flood Risk from Reservoirs

- 6.6 The long-term flood risk from reservoirs shows that the site is not considered to be at risk of long-term flooding from reservoirs.

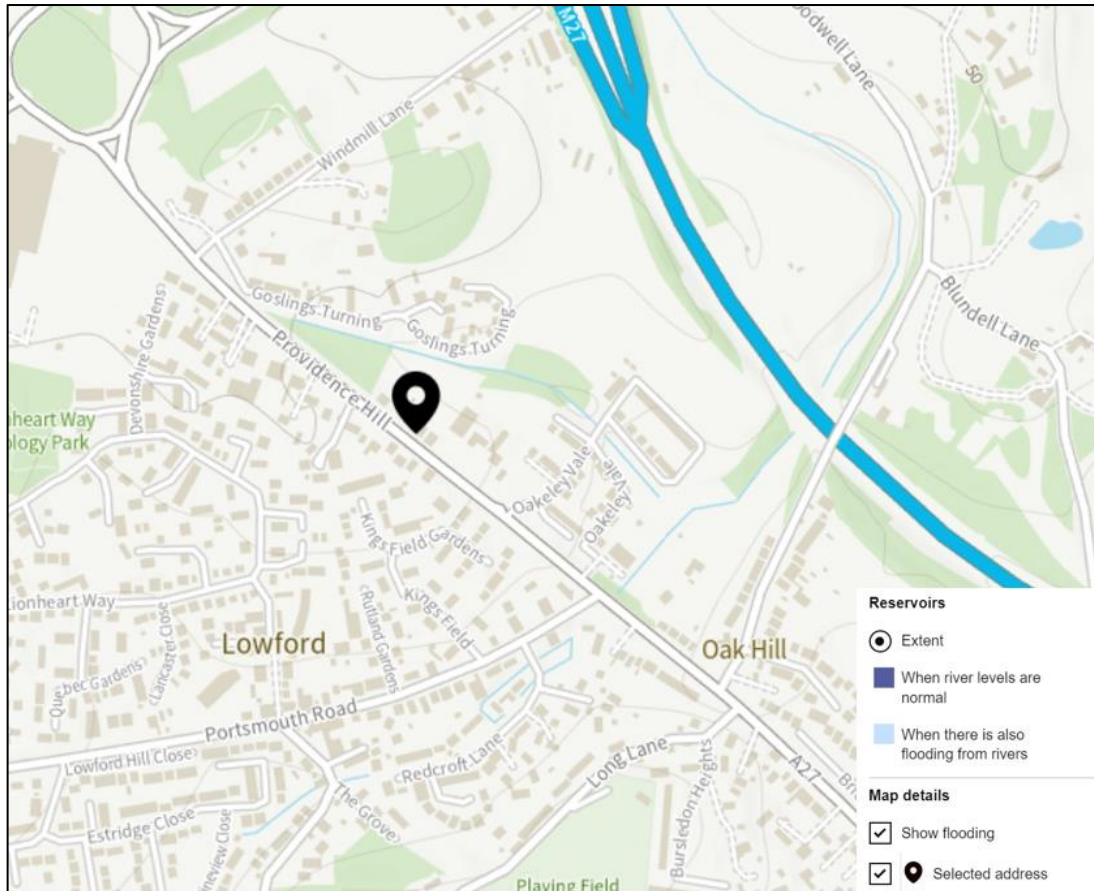


Figure 12: Long term flood risk from reservoirs map

Reservoirs – Residual Risk

- 6.7 Based on the above map (Figure 12), there is no residual risk considered from reservoir flooding.

Surface Water Flood Risk

- 6.8 Surface water or 'pluvial' flooding results from rainfall running over ground before eventually entering a watercourse or sewer. It is usually associated with high intensity rainfall events but can also occur with lower intensity rainfall or melting snow where the ground is already saturated, frozen, developed (for example in an urban setting), or otherwise has low permeability.
- 6.9 The surface water flood risk map is shown in **Figure 13** and indicates that the majority of the site is at a very low risk of pluvial flooding, with the existing watercourse along the northern boundary providing a small area of high to low risk.

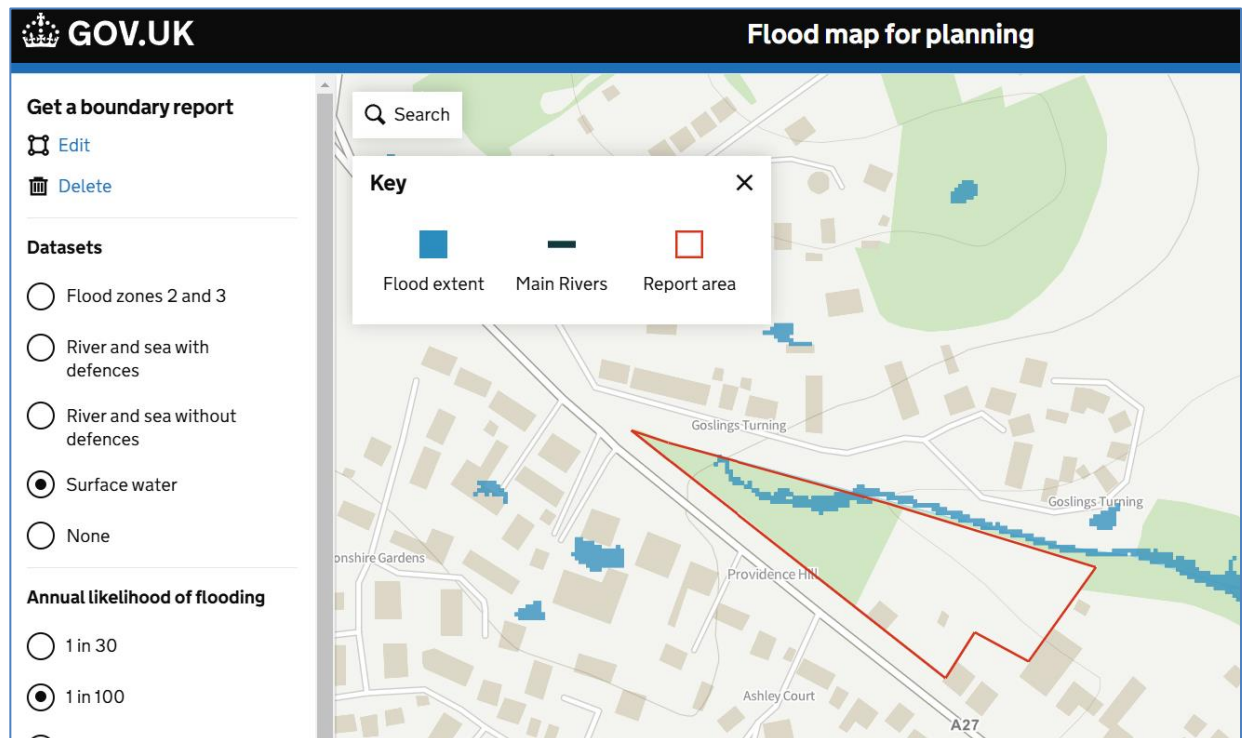


Figure 13: Long term flood risk from surface water

Surface Water – Residual Risk

- 6.10 Accordingly, residual risk from surface water flooding is considered to be very low.

Surface Water – Mitigation Measures and Considerations

- 6.11 The drainage strategy will incorporate SuDS features which will reduce surface water runoff. Furthermore, the proposed cottages in the western portion of the site are at grade with the existing ground levels, and the ground falls away from the cottages, hence imposing very little risk of flows impacting the houses.

Groundwater Flood Risk

- 6.12 Groundwater flooding occurs when groundwater levels increase sufficiently for the water table to intersect the ground surface. Groundwater flooding can occur in a variety of geological settings including valleys and in areas underlain by chalk, and in river valleys with thick deposits of alluvium and river gravels.
- 6.13 There are no groundwater flooding incidents recorded in the proximity of the site as shown in the SFRA map set 1E data as seen in **Figure 14** below (site boundary in white).



Figure 14: SFRA Groundwater Flooding & Bedrock Permeability

- 6.14 The BGS Geo-report (**Appendix C**) suggests that the site does not have persistent shallow groundwater, as shown in **Figure 15** below. However, the report does also suggest that the majority of the site groundwater are likely to be less than 3m below the existing ground surface for at least part of the year. See **Figure 16** below.

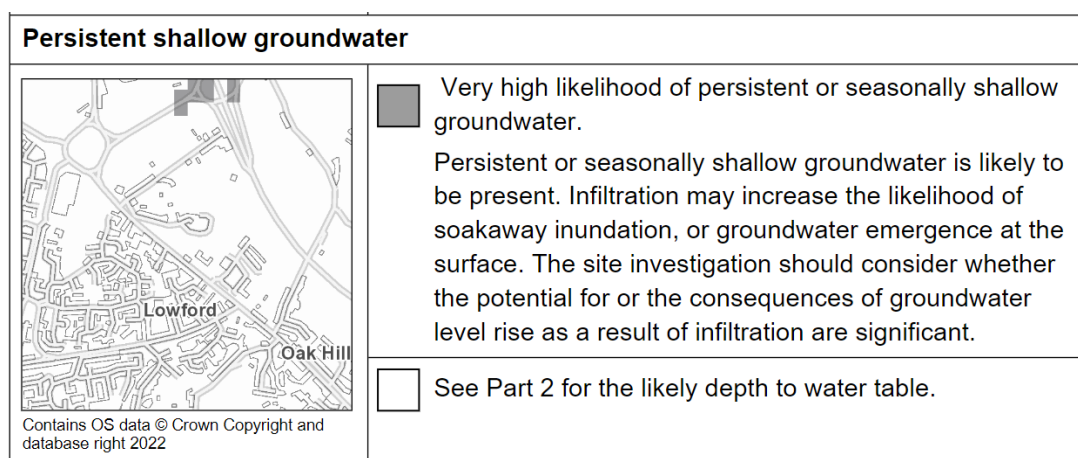


Figure 15: BGS GeoReport Persistent Shallow Groundwater

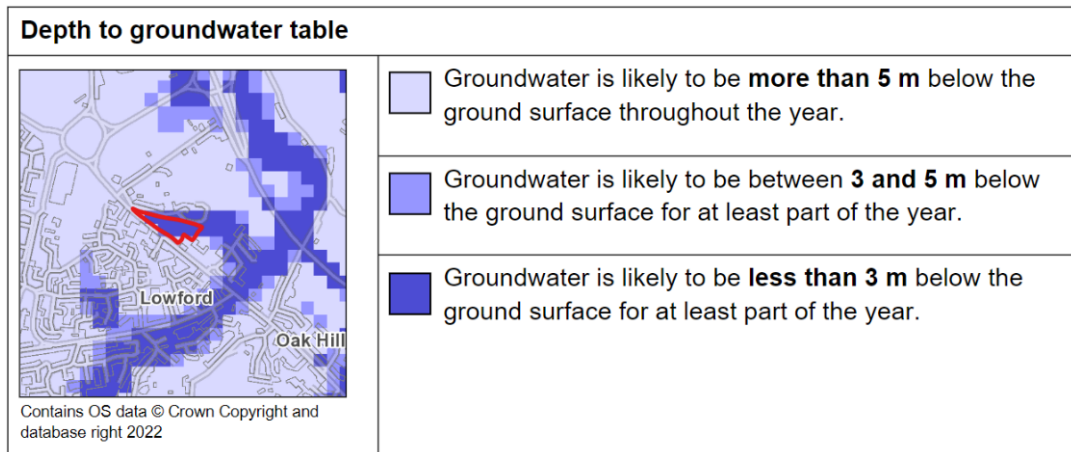


Figure 16: BGS GeoReport Depth to Groundwater Table

- 6.15 As a result of this depth to groundwater table, alongside the ground instability issues as highlighted in Paragraph 3.4, infiltration is not deemed to be suitable for the site as a feasible method for discharging surface water. Instead, a discharge to the existing watercourse to the north of the site shall be pursued.

Groundwater – Residual Risk

- 6.16 Given the above, the site is considered to have very low residual risk of groundwater flooding.

Surface Water and Foul Water Sewers Flood Risk

- 6.17 Sewer flooding occurs when sewers are overwhelmed by intense rainfall or when they become blocked. The probability of this type of flooding occurring depends on the capacity of the local sewerage system and the amount of rain that falls. Land and property can be flooded with sewer water, and rivers may also be polluted by sewers that overflow.
- 6.18 Flooding due to existing foul or sewer drainage infrastructure failing has not been observed in the area by Southern Water, as shown in the SFRA map set 1F data shown in Figure 17.



Figure 17: Southern Water Observed Sewer Flooding

Sewer – Residual Risk

6.19 Based on this, the site is considered to be at low risk of sewer flooding.

7. RESIDUAL FLOOD RISK

7.1 Table 4 outlines the initial qualitative assessment of risk posed by the potential sources of flooding, the mechanisms for flooding and the likely consequences. It also includes a review of possible mitigation measures and the effect that the proposed mitigation measures are likely to have on the residual risk posed by the potential flood source.

Flood Risk	Flood Mechanism and Possible Consequences	Existing Assessment of Risk	Mitigation Measures	Residual Risk
Fluvial / Tidal	Flooding driven by rise in water levels in ditch.	Low	EA flood mapping shows the site is in Flood Zone 1 with low risk of Fluvial flooding. Additionally, ditch levels are lower than the proposed levels on site.	Low
Reservoirs	N/A	Very Low	N/A	Very Low
Surface Water (Pluvial)	Surface Water Flooding during heavy rainfall. Existing surface water flood risk.	Very Low	The proposed drainage system will capture and attenuate surface water run-off. Existing run-off will not affect the proposed cottages as they are at grade with the existing ground levels and the surrounding ground falls away from the houses.	Very Low
Groundwater	Ground Water Exceedance events	Very Low	Soil permeability is very low which would not allow ground water to rise to the surface and cause flood risk.	Very Low
Sewers	Sewer Surcharging	Low	The surface water drainage strategy shall attenuate runoff onsite and discharge into the watercourse, which will reduce the discharged load into the existing sewers. Hence, reducing sewer overload.	Very Low

Table 4: Summary of Existing and Residual Flood Risk

8. DRAINAGE STRATEGY

Potential Surface Water Drainage Strategy

- 8.1 In line with the Building Regulations Part H3, surface water shall discharge to one of the following, listed in order of priority:
- An adequate infiltration system: or, where not reasonably practicable,
 - A watercourse; or, where not reasonably practicable,
 - A sewer.
- 8.2 As per paragraphs 3.4 and 6.15, infiltration is not considered viable for this site, therefore the proposals for the surface water drainage are to attenuate runoff on site and discharge at a controlled rate of 2l/s via a HydroBrake into the existing watercourse running along the northern boundary of the site.
- 8.3 The pre- and post-development volumes have been calculated for the site for the 6-hour storm event as shown in **Table 5**

Rainfall Event	Net Area	Greenfield Rate	Greenfield Volume	Post Development Rate	Post Development Volume
	Ha.	l/s	m ³	l/s	m ³
Qbar	0.33	2.36	50.98	Restricted to 2 l/s	43.2
1:1 yr		2.00	43.20		43.2
1:30 Yr		5.40	116.64		43.2
1:100 Yr		7.50	162.00		43.2

Table 5: Run-off volumes

- 8.4 The drainage strategy proposes restricting discharge to 2 l/s rate, which is lower than the estimated Qbar of 2.36l/s. This significantly reduces the pre-development greenfield volumes, specifically during the 1 in 30 and 1in 100 year storms (see **Table 5**).
- 8.5 Per the statutory process, an Ordinary Watercourse Consent will need to be sought post planning for discharging into the ditch.
- 8.6 Runoff from roofs and roads shall be collected and temporarily stored in attenuation crates prior to discharging. The cates shall be installed underneath the parking spaces, whilst the largest crate shall be located in the northeastern corner, upstream of the HydroBrake.
- 8.7 Type C permeable paving is proposed for parking spaces to collect surface runoff at source and to provide water treatment.
- 8.8 A vortex separator (Downstream Defender – or similar approved) has been proposed downstream of the network in order to uplift water quality and remove oils and floatables, in line with CIRIA C375 pollution mitigation indices.

8.9 Further to the permeable paving and the vortex separator, a train of open SuDS has been proposed to provide secondary and tertiary stages of natural water filtration for the site (in accordance with Eastleigh Borough Council's planning policy DM6). The additional filtration will be achieved through a bio-retention filter strip (located downstream of the vortex separator) and a swale proposed immediately upstream of the outfall headwall.

8.10 The proposed drainage layout is included in **Appendix E**.

Hydraulic Calculations

8.11 Hydraulic calculations have been undertaken using Site3D software and show that in the 1 in 100 year storm event (including 45% Climate change) there is no flooding in the drainage system. The full network calculations are included in **Appendix F**.

8.12 The below table contains the parameters used in the supporting hydraulic network modelling.

Parameter	Input	Guidance/notes
Rainfall Data	FSR	HCC Surface Water Checklist: FSR or FEH acceptable.
Urban Creep	0%	HCC Surface Water Checklist: 10% Urban Creep is only applicable for residential developments and excludes flats or apartments.
CV (Summer and Winter)	1.0	SFA 7
Climate Change 3.3% AEP 1% AEP	40% 45%	EA Climate change allowances for peak rainfall in England https://environment.data.gov.uk/hydrology/climate-change-allowances/rainfall

Table 6: MicroDrainage Modelling Parameters

8.13 Whilst the network is designed to ensure no flooding occurs during all storm events, including the 1 in 100 year (+ 45% climate change), exceedance flow arrows have been shown on the drainage layout in **Appendix F** (Ref:197.5005.0002) to indicate the water flow in the event of a network failure or in extreme storm events.

Potential Foul Water Drainage Strategy

- 8.14 Southern Water mapping shows there is an existing sewer within Providence Hill, where the nearest manhole available for connection is Manhole 3502 (IL: 43.41m AOD).
- 8.15 The proposals for the foul drainage are to drain foul water generated from the site via gravity towards a private package pump located near the northwestern corner of the care-home. The proposed pump will pump the foul water through a rising main running towards the site's access where it will eventually connect into a break chamber upstream of existing manhole 3502.
- 8.16 Based the site layout plan (**Appendix A**) the foul flows from the 5 residential cottages (with 5 residents) are estimated to be approximately 3,750 l/day. This figure is derived from an assumption of 150 l/day per person as per Flows & Loads 4 guidance, where each cottage is assumed to house 5 people.
- 8.17 Whilst the British Flows and Loads 4 guidance, estimates the foul flows from the residential cottages to be 150 l/day per person, it should be noted that the water consumption for the site has been improved to be 110 l/day per person (according to the Nutrient Neutrality Report prepared by Ecosupport, April 2024). Based on this, it is estimated that 85% of the total water consumption generates foul flow, which provides an estimated foul flow of 2,338 l/day generated by the 5 cottages.
- 8.18 British Flows and Loads 4 guidance estimates that a residential care home would have approximately 350 l/day per activity. Based on this, the flows from the 73-bed care home are estimated to be around 25,550 l/day.
- 8.19 To provide for up to 24-hours storage in the event of a pump failure, a minimum of 29.3m³ is required for the pump. The proposed pump allows for up to 44m³. The 24-hour storage volume has been based on the higher estimate of foul flow, derived from the British Flows & Loads 4 as noted in paragraphs 8.17 and 8.19, where the total estimated flow from the site is 29,300 l/day. This provides an additional margin of safety in the event of an emergency.
- 8.20 See **Appendix F** for full details of the proposed foul drainage strategy.

9. WATER QUALITY

9.1 Figure 18 to 19 are extracted from the SuDS Manual and demonstrate the pollution risks associated with various discharge situations.

TABLE 26.2 Pollution hazard indices for different land use classifications				
Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydrocarbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways ¹	Medium	0.7	0.6	0.7
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways ¹	High	0.8 ²	0.8 ²	0.9 ²

Figure 18: Table 26.2 of the SuDS Manual

TABLE 26.3 Indicative SuDS mitigation indices for discharges to surface waters			
Type of SuDS component	Mitigation indices ¹		
	TSS	Metals	Hydrocarbons
Filter strip	0.4	0.4	0.5
Filter drain	0.4 ²	0.4	0.4
Swale	0.5	0.6	0.6
Bioretention system	0.8	0.8	0.8
Permeable pavement	0.7	0.6	0.7
Detention basin	0.5	0.5	0.6
Pond ⁴	0.7 ³	0.7	0.5
Wetland	0.8 ³	0.8	0.8
Proprietary treatment systems ^{5,6}	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.		

Figure 19: Table 26.3 of the SuDS Manual

- 9.2 The most acute source of pollution on the site is the roads throughout the development. As the roads are not through routes, they are considered low traffic roads and the pollution hazard level for the development is considered to be low.
- 9.3 The UKSuDS Water Quality toolkits (based on the Simple Index Assessment method) has been used to assess water quality improvement for the site for the first stages of pollution treatment. It can be seen that the first stages of treatment provide sufficient water quality uplift, which indicates that the secondary and tertiary stages provided by the bio-retention filter strip followed by the swale will provide further treatment benefits. **Table 7** below summarises the results of the toolkit, and a full copy of the toolkit can be found in **Appendix H**.

Land Use			SuDS Component			Water Treatment
Low Traffic Roads			Vortex Separator			Sufficient
Pollution Indices			Mitigation Indices			
TSS	Metals	Hydrocarbons	TSS	Metals	Hydrocarbons	
0.5	0.4	0.4	0.5	0.4	0.8	
Low Traffic Roads			Permeable Pavement			Sufficient
Pollution Indices			Mitigation Indices			
TSS	Metals	Hydrocarbons	TSS	Metals	Hydrocarbons	
0.5	0.4	0.4	0.7	0.6	0.7	
Residential Roofs			Vortex Separator			Sufficient
Pollution Indices			Mitigation Indices			
TSS	Metals	Hydrocarbons	TSS	Metals	Hydrocarbons	
0.5	0.4	0.4	0.5	0.5	0.6	

Table 7: Water Quality Summary

10. MANAGEMENT AND MAINTENANCE STRATEGY

- 10.1 The management and maintenance of any SuDS features would be the responsibility of the homeowner if within the curtilage of the property, or the estate management company, if in a communal area.

Pervious Pavements

- 10.2 The proposed maintenance schedule for the permeable paving is shown in **Table 8**.

Maintenance Category	Required Action	Frequency
Regular Maintenance	Brushing and vacuuming (standard cosmetic sweep over the whole surface)	Once a year (after autumnal leaf fall) or based on manufacturer's recommendations
Occasional Maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or manage using glyphosphate applied directly on to the weeds by an applicator rather than spray	As required
Remedial Actions	Remediate any landscaping which, through vegetation maintenance and soil slip, has been raised 50mm from the level of paving	As required
	Remedial work to any depressions, rutting, cracked or broken blocks considered detrimental to the structural performance or hazard to users, replace jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 – 15 years or as required
Monitoring	Initial inspection	Monthly for the first 3 months after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 48hr after large storm events in the first 6 months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

Table 8: Maintenance schedule for pervious pavements

Attenuation Crates

10.3 The proposed maintenance schedule for an attenuation crate is shown in **Table 9**.

Maintenance Category	Required Action	Frequency
Regular Inspections	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 a risk to the performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockages by sediment, algae, or other matter, remove and replace surface infiltration medium if necessary	Annually
	Remove sediment from pre-treatment structures and/or internal forebays	Annually, or as required
Regular Maintenance	Repair/ rehabilitate inlets, outlets, overflows, and vents	As required
Occasional Maintenance	Inspect/ check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of the tank for sediment build-up and remove if necessary	Every 5 years or as required.

Table 9: Maintenance schedule for an attenuation storage system

Flow Control Device (HydroBrake)

10.4 The proposed maintenance schedule for a flow control device is shown in **Table 10**.

Maintenance Category	Maintenance Activity	Frequency
Routine Maintenance	Inspect and identify any areas that are not operating correctly	Monthly (for the first 3 months), then six monthly
	Remove sediment from upstream silt trap (sump)	Six monthly, or as required
	Hose down unit/chamber	Six monthly, or as required

Table 10: Proposed maintenance regime for a flow control device

Vortex Separator

- 10.5 Hydro-dynamic or vortex separators are vault structures that remove medium to large sized sediments by creating a vertical vortex. This allows the suspended solids to settle down in a sludge chamber, whilst floatable are collected at the surface.
- 10.6 The proposed Vortex filters require a regular maintenance regime. The unit should be inspected every 6 months, and the oil and floatables chamber and sludge trap emptied between 6 months and 3 years depending on pollution load.
- 10.7 The design life for the proposed hydro-dynamic separator is 50 years.

Swales

- 10.8 The proposed maintenance schedule for the swales is shown in **Table 11**.

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Remove litter and debris	Monthly (Or as required)
	Cut the grass – to retain grass height within specified design range	Monthly (during growing season), or as required
	Manage other vegetation and remove nuisance plants	Monthly (at start, then as required)
	Inspect inlets, outlets and overflows for blockages, and clear if required	Monthly
	Inspect infiltration surfaces for ponding, compaction, silt accumulation, record areas where water is ponding for > 48 hours	Monthly, or as required
	Inspect vegetation coverage	Monthly for 6 months, quarterly for 2 years, then half yearly
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies.	Monthly (for first year), then annually or as required.
Occasional Maintenance	Reseed areas of poor vegetation growth, alter plant types to better suit conditions, if required	As required or if bare soil is exposed over 10% or more of the swale treatment area
Remedial Actions	Repair erosion or other damage by reseeded or re-turfing	As required
	Relevel uneven surfaces and reinstate design levels	As required
	Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits and prevent compaction of the soil surface	As required
	Remove and dispose of oils or petrol residues using safe standard practices	As required

Table 11: Proposed Maintenance Regime for a Swale

Bio-retention Filter Strip

10.9 The proposed maintenance schedule for a filter strip is shown in **Table 12**.

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Remove litter and debris	Monthly (or as required)
	Cut the grass – to retain grass height within specified design range	Monthly (during growing season) or as required
	Manage other vegetation and remove nuisance plants	Monthly (at start, then as required)
	Inspect filter strip surface to identify evidence of erosion, poor vegetation growth, compaction, ponding, sedimentation, and contamination (e.g., oils)	Monthly (at start, then half yearly)
	Check flow spreader and filter strip surface for even gradients	Monthly (at start, then half yearly)
	Inspect gravel flow spreader upstream of filter strip for clogging	Monthly (at start, then half yearly)
	Inspect silt accumulation rates and establish appropriate removal frequencies	Monthly (at start, then half yearly)
Occasional Maintenance	Reseed areas of poor vegetation growth; alter plant types to better suit conditions (if required)	As required or if bare soil is exposed over >10% of the filter strip
Remedial Actions	Repair erosion or other damage by re-turfing or re-seeding	As required
	Relevel uneven surfaces and reinstate design levels	As required
	Scarify and spike topsoil layer to improve filtration performance, break up silt deposits and prevent compaction of the soil surface	As required
	Remove build-up of upstream sediment, flow spreader or at of a filter strip	As required
	Remove and dispose of oils or petrol residues using safe standard practices	As required

Table 12: Maintenance schedule for a filter strip.

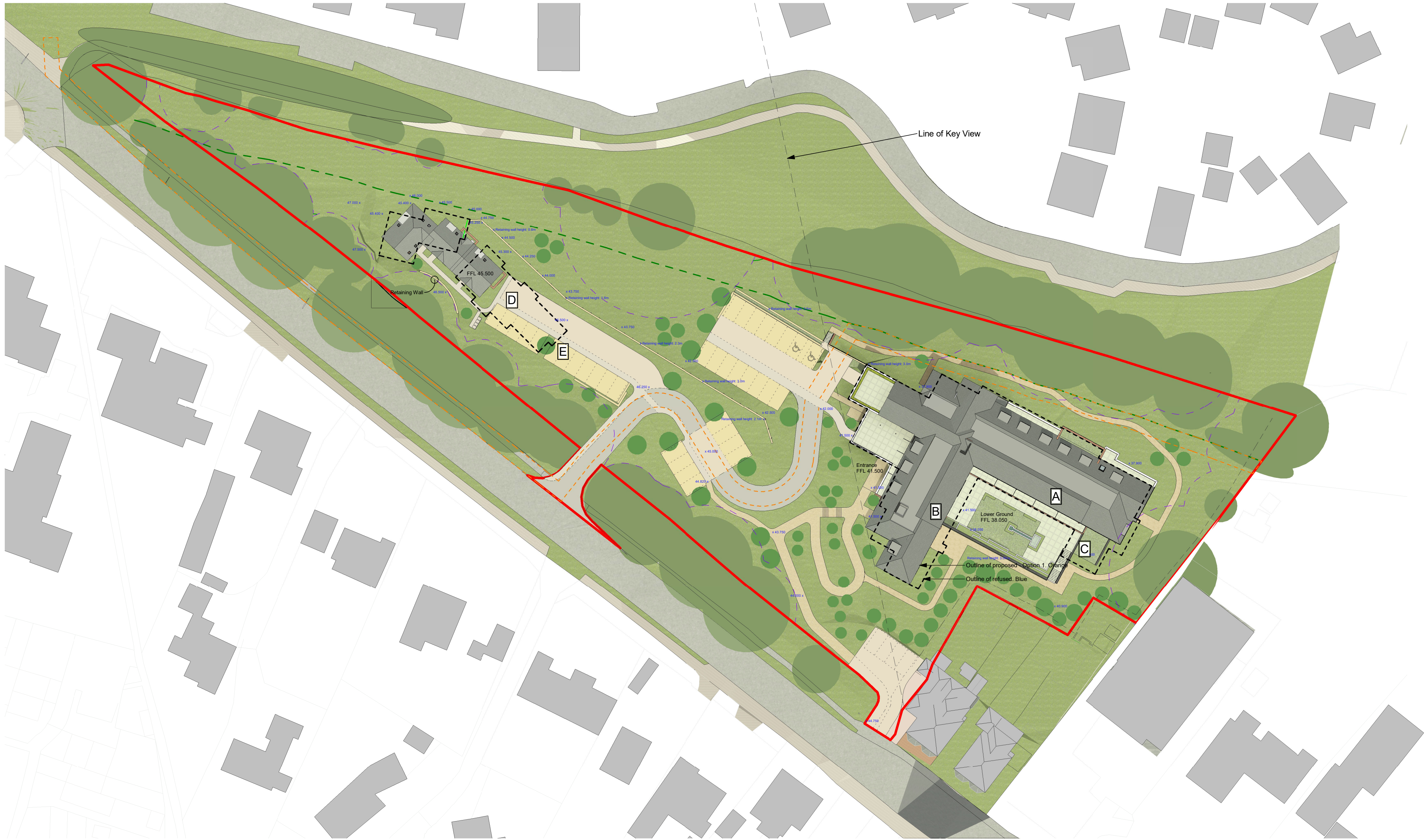
11. SUMMARY AND CONCLUSION

- 11.1 This FRA has been prepared by Paul Basham Associates to help assess the suitability of the site for a care home development.
- 11.2 The site is entirely located within Flood Zone 1 and is considered appropriate in accordance with the NPFF.
- 11.3 Summary of residual flood risk:
- Fluvial and tidal flooding is considered to be low
 - Surface water flooding is considered to be very low
 - Groundwater flooding is considered to be very low
 - Sewers flooding is considered to be very low
- 11.4 Infiltration is not considered to be a viable drainage solution for the site due to soil impermeability and the potential for soil instability caused by infiltration, based on information provided by the BGS SuDS Infiltration Report. (Please refer to Section 3)
- 11.5 The surface water drainage proposals are to attenuate on-site using geo-cellular crates and discharging at a limited rate of 2 l/s via a HydroBrake into the existing watercourse near the northern boundary.
- 11.6 Permeable paving has been proposed for parking spaces to provide at-source control and increase water quality. Additionally, a Vortex Separator has been proposed to sufficiently treat pollutants from road and roof runoff, prior to discharging into the watercourse. UK SuDS Water Quality Toolkit has been used to assess the water quality uplift for the site and is included in Appendix H.
- 11.7 Secondary and tertiary stages of water treatment have been provided by a series of Bio-retention filter strip and swale further downstream in the network.
- 11.8 Hydraulic Calculations have been undertaken using Site 3D (Included in Appendix G) and ensure that no flooding occurs in the 100% AEP, 10%AEP, 3.3%AEP (40% Climate Change (CC)) +the 1% AEP (+45% CC).
- 11.9 Foul water is proposed to be drained via gravity to a private package pump, which will pump the sewage via a rising main towards the site's access, where it will eventually connect into the existing Southern Water Manhole 3502.

Appendix A

REVISION NOTES

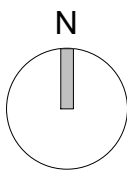
Rev	Date	Description	Drw	Chk
A	06/03/2024	Initial issue for comment	HJ	LS
B	12/03/2024	Parking amended	HJ	LS
C	22/03/2024	For coordination	HJ	LS
D	26/03/2024	For coordination	LS	LS
E	27/03/2024	For coordination	LS	LS
F	13/04/2024	Red Line amended to include Highways changes	LS	LS
G	16/04/2024	Detail amendments	LS	LS
H	13/05/2024	M4(2 and 3) updates	LC	LS
I	18/06/2024	Path and retaining walls amended	LS	LS
J	03/07/2024	Planning Amendments	LS	LS
K	09/07/2024	Client amendments	LS	LS
L	28/08/2024	Landscape amendments	LS	LS
M	27/01/2025	Response to Refusal	LS	LS
N	14/03/2025	Site Amendments		LS



- A** Building moved 1.8m further away from nos 1-4 Brookfield
- B** Building moved 2m further away from boundary to no. 4 Brookfield
- C** Projecting wing omitted above ground
- D** 1 cottages omitted, reducing number to 4
- E** 6 additional parking spaces added, giving 40 spaces in total

- Refused building
- Proposed building
- Existing Trees to be retained
- Line of ecological buffer zone based upon 10m offset from top of stream bank
- Site Boundary
- Root Protection Zone
- SSEN No Build Zone

1 Proposed Site Plan 500
1 : 500



0m 10m 20m 30m 40m 50m
1:500

Project
Providence Hill
Bursledon

Client



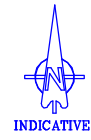
WLAWilliamsLester.

1 Star Lane, Ringwood, BH24 1AL
www.williamslester.com 01425 485234 mail@williamslester.com

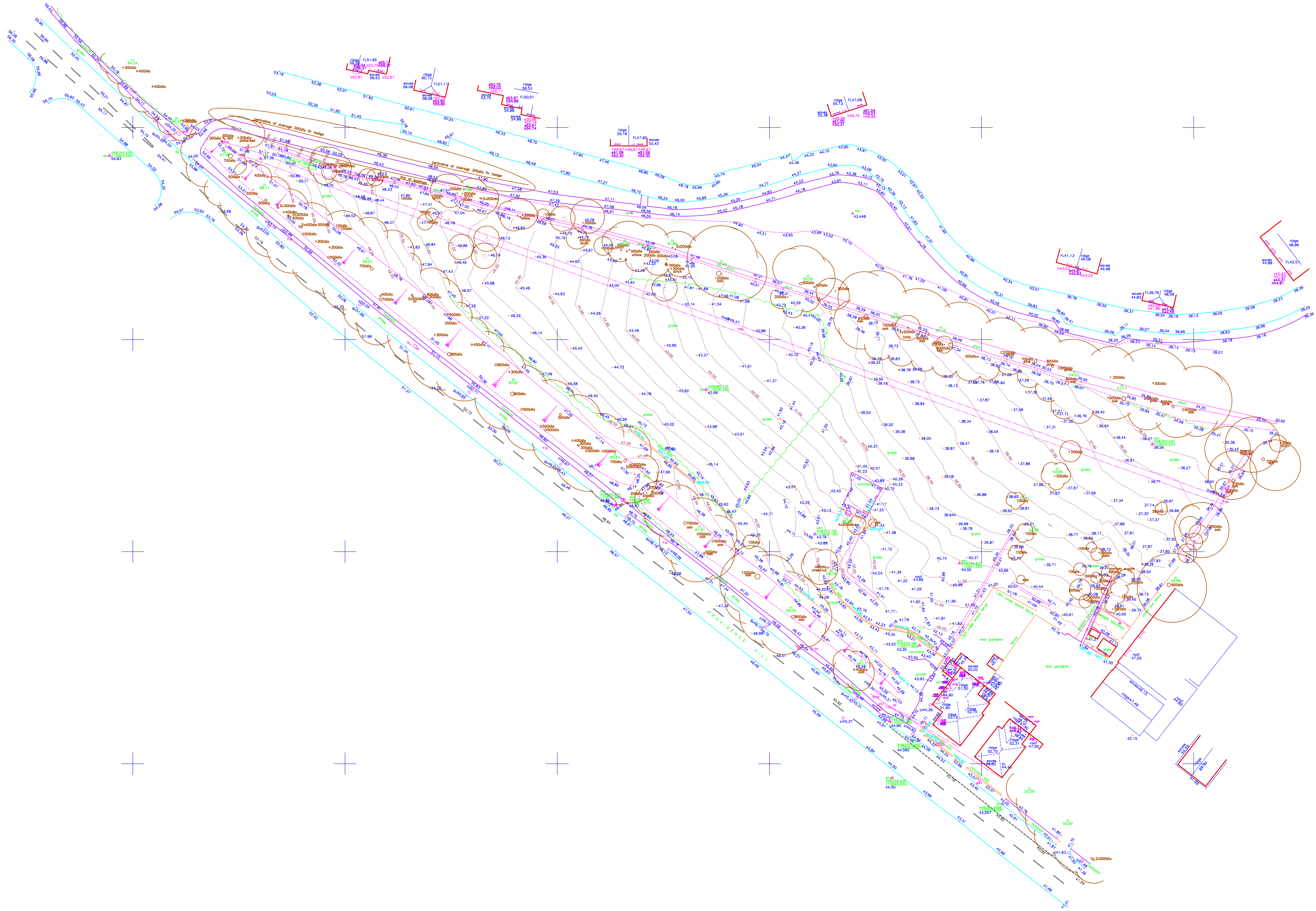
Title
Proposed Site Plan

Scale A1 @ 1 : 500
Revision **N** Drawing Status
S2 **Spatial Coordination**
Suitability Description
For Information
Drawing No.
6185-WLA-ZZ-XX-DR-A-0010

Appendix B



KEY:	
bt	British Telecom
cb	Control Box
cl	Cover Level
ctv	Cable Television
dk	Drop Kerb
el	Electric
ep	Electricity Pole
fh	Fire Hydrant
gu	Gully
gsv	Gas Stop Valve
ht	Height
ic	Inspection Cover
il	Invert Level
lp	Lamp Post
mk	Marker
o/n	Overhead
ob	Post Box
pxg	Prom Crossing
np	None Place
sv	Stop Valve
rs	Road Sign
tb	Telephone Box
tl	Traffic Light
tt	Top of Tree
th	Threshold
tw	Top of Wall
utl	Unable to Lift
vp	Vent Pipe
vm	Water Meter
wsv	Water Stop Valve



NOTES:
LEVELS RELATE TO O.S. DATUM
TREE SPECIES SHOULD BE VERIFIED WHERE OF
CRITICAL IMPORTANCE
THE ARCHITECT SHOULD SATISFY HIMSELF THAT ALL TREES
LIKELY TO AFFECT HIS DESIGN HAVE BEEN SHOWN
INTER CONNECTION OF MANHOLES SHOULD BE VERIFIED
WHERE OF CRITICAL IMPORTANCE USING CCTV
PIPE SIZES & INVERTS DETERMINED WITHOUT
ENTRY INTO MANHOLE

P. STUBBINGTON LAND SURVEYS LTD

THE MEAD
DURLEY BROOK ROAD
DURLEY
SOUTHAMPTON
HAMPSHIRE
SO9E 2AR

TEL : 023 8060 1876
MOBILE :
07973 348165
EMAIL :
PAUL@PSLANDSURVEYS.COM

CLIENT: - COLTEN
CONTRACT: - 4 BROOKFIELD,
PROVIDENCE HILL,
BURSLEDON
TITLE: - TOPOGRAPHIC SURVEY
SCALE: - 1:500 @A1
DRAWING NO. 10880/01/B
DATE: - DECEMBER 2023
SURVEYOR: - PS

Appendix C

Paul Basham Associates
The Bothy
Cams Hall Estate
Fareham
PO16 8UT

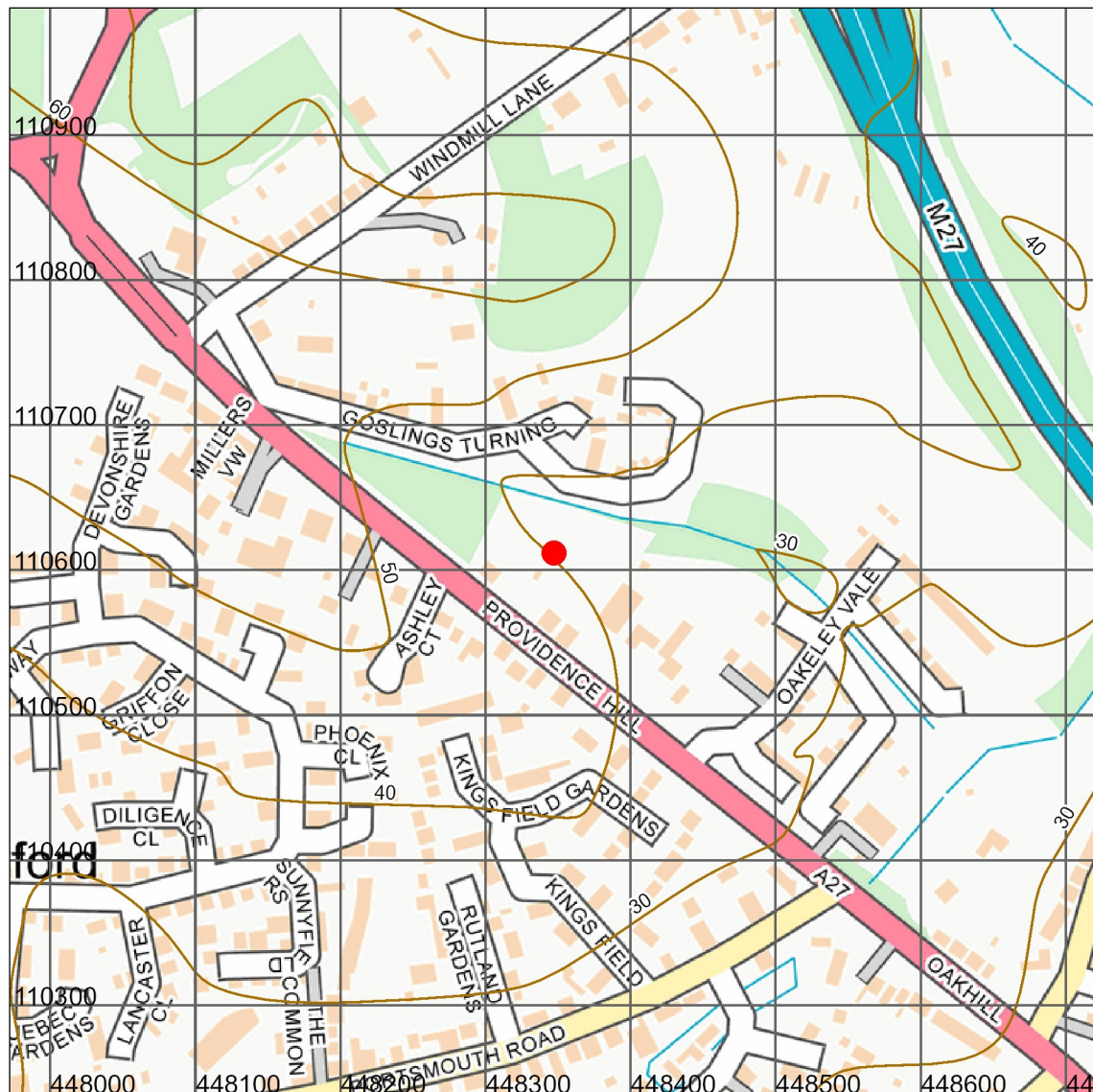
Infiltration SuDS GeoReport:

This report provides information on the suitability of the subsurface for the installation of infiltration sustainable drainage systems (SuDS). It provides information on the properties of the subsurface with respect to significant constraints, drainage, ground stability and groundwater quality protection.

Report Id: *BGS_325123/32696*

Client reference: Providence PO8502

Search location



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Search location indicated in red

Point centred at: 448347,110612

Assessment for an infiltration sustainable drainage system

Introduction

Sustainable drainage systems (SuDS) are drainage solutions that manage the volume and quality of surface water close to where it falls as rain. They aim to reduce flow rates to rivers, increase local water storage capacity and reduce the transport of pollutants to the water environment. There are four main types of SuDS, which are often designed to be used in sequence. They comprise:

- **source control:** systems that control the rate of runoff
- **pre-treatment:** systems that remove sediments and pollutants
- **retention:** systems that delay the discharge of water by providing surface storage
- **infiltration:** systems that mimic natural recharge to the ground.

This report focuses on infiltration SuDS. It provides subsurface information on the properties of the ground with respect to drainage, ground stability and groundwater quality protection. It is intended principally for those involved in the preliminary assessment of the suitability of the ground for infiltration SuDS, and those involved in assessing proposals from others for sustainable drainage, but it may also be useful to help house-holders judge whether or not further professional advice should be sought. If in doubt, users should consult a suitably-qualified professional about the results in this report before making any decisions based upon it.

This GeoReport is structured in two parts:

- **Part 1. Summary data.**

Comprises three maps that summarise the data contained within Part 2.

- **Part 2. Detailed data.**

Comprises a further 24 maps in four thematic sections:

- **Very significant constraints.** Maps highlight areas where infiltration may result in adverse impacts due to factors including: ground instability (soluble rocks, non-coal shallow mining and landslide hazards); persistent shallow groundwater, or the presence of made ground, which may represent a ground stability or contamination hazard.
- **Drainage potential.** Maps indicate the drainage potential of the ground, by considering subsurface permeability, depth to groundwater and the presence of floodplain deposits.
- **Ground stability.** Maps indicate the presence of hazards that have the potential to cause ground instability resulting in damage to some buildings and structures, if water is infiltrated to the ground.
- **Groundwater protection.** Maps provide key indicators to help determine whether the groundwater may be susceptible to deterioration in quality as a result of infiltration.

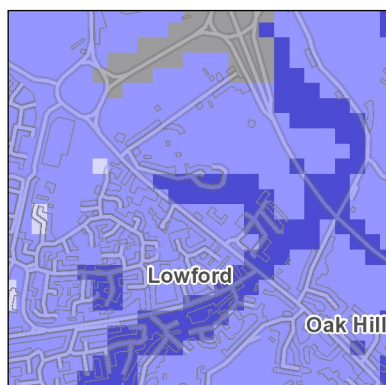
This report considers the suitability of the subsurface for the installation of infiltration SuDS, such as soakaways, infiltration basins or permeable pavements. It provides subsurface data to indicate whether, and which type of infiltration system may be appropriate. It does not state that infiltration SuDS are, or are not, appropriate as this is highly dependent on the design of the individual system. This report therefore describes the subsurface conditions at the site, allowing the reader to determine the suitability of the site for infiltration SuDS.

The map and text data in this report is similar to that provided in the '*Infiltration SuDS Map: Detailed*' national map product. For further information about the data, consult the '*User Guide for the Infiltration SuDS Map: Detailed*', available from <http://nora.nerc.ac.uk/16618/>.

PART 1: SUMMARY DATA

This section provides a summary of the data.

In terms of the drainage potential, is the ground suitable for infiltration SuDS?



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-  Highly compatible for infiltration SuDS. The subsurface is likely to be suitable for free-draining infiltration SuDS.
-  Probably compatible for infiltration SuDS. The subsurface is probably suitable although the design may be influenced by the ground conditions.
-  Opportunities for bespoke infiltration SuDS. The subsurface is potentially suitable although the design will be influenced by the ground conditions.
-  Very significant constraints are indicated. There is a very significant potential for one or more hazards associated with infiltration.

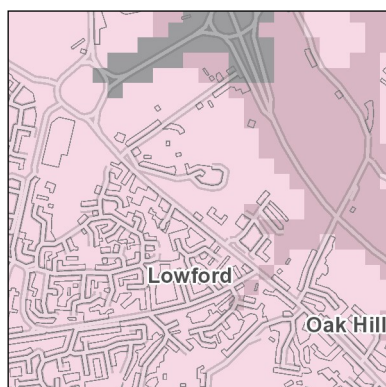
Is ground instability likely to be a problem?



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-  Increased infiltration is very unlikely to result in ground instability.
-  Ground instability problems may be present or anticipated, but increased infiltration is unlikely to result in ground instability.
-  Ground instability problems are probably present. Increased infiltration may result in ground instability.
-  There is a very significant potential for one or more geohazards associated with infiltration.

Is the groundwater susceptible to deterioration in quality?



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-  The groundwater is not expected to be especially vulnerable to contamination.
-  The groundwater may be vulnerable to contamination.
-  The groundwater is likely to be vulnerable to contaminants.
-  Made ground is present at the surface. Infiltration may increase the possibility of remobilising pollutants.

PART 2: DETAILED DATA

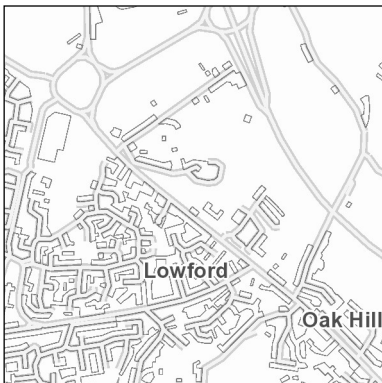
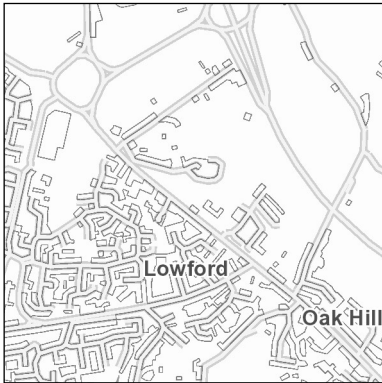
This section provides further information about the properties of the ground and will help assess the suitability of the ground for infiltration SuDS.

Section 1. Very significant constraints

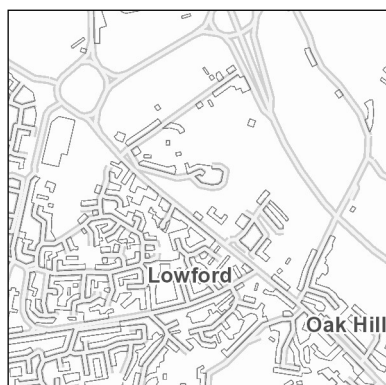
Where maps are overlain by grey polygons, geological or hydrogeological hazards may exist that could be made worse by infiltration. The following hazards are considered:

- soluble rocks
- landslides
- shallow mining
- shallow groundwater
- made ground

For more information read 'Explanation of terms' at the end of this report.

Soluble rock hazard	
	 Very significant soluble rock hazard. Soluble rocks are present with a very significant possibility of localised subsidence that could be initiated or made worse by infiltration. The site investigation should consider whether the potential for or the consequences of subsidence as a result of infiltration are significant.
	 Very significant soluble rock hazards are not present; however this hazard may still need to be considered. See Part 3.
Landslide hazard	
	 Very significant landslide hazard. Slope instability problems are almost certainly present and may be active. An increase in moisture content as a result of infiltration may cause the slope to fail. The site investigation should consider whether the potential for or the consequences of landslide as a result of infiltration are significant.
	 Very significant landslide hazards are not present; however this hazard may still need to be considered. See Part 3.

Shallow mining hazard

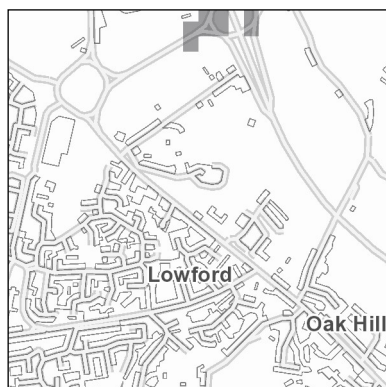


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☒ Very significant mining hazard.
Shallow mining is likely to be present with a very significant possibility of localised subsidence that could be initiated or made worse by increased infiltration. Also, infiltration may increase the possibility of remobilising pollutants. The site investigation should consider whether the potential for or consequences of subsidence and/or remobilisation of pollutants as a result of infiltration are significant.

☐ Very significant mining hazards are not present; however this hazard may still need to be considered. See Part 3.

Persistent shallow groundwater



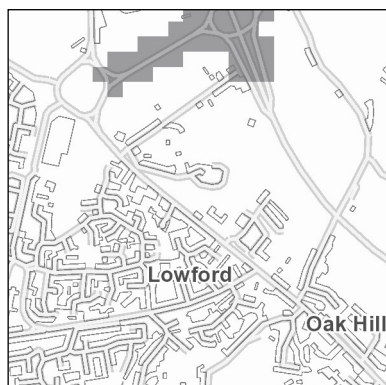
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☒ Very high likelihood of persistent or seasonally shallow groundwater.

Persistent or seasonally shallow groundwater is likely to be present. Infiltration may increase the likelihood of soakaway inundation, or groundwater emergence at the surface. The site investigation should consider whether the potential for or the consequences of groundwater level rise as a result of infiltration are significant.

☐ See Part 2 for the likely depth to water table.

Made ground



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☒ Made ground present.
Made ground is present at the surface. Infiltration may affect ground stability or increase the possibility of remobilising pollutants. The site investigation should consider whether the potential for or consequences of ground instability and/or pollutant leaching as a result of infiltration are significant.

☐ None recorded

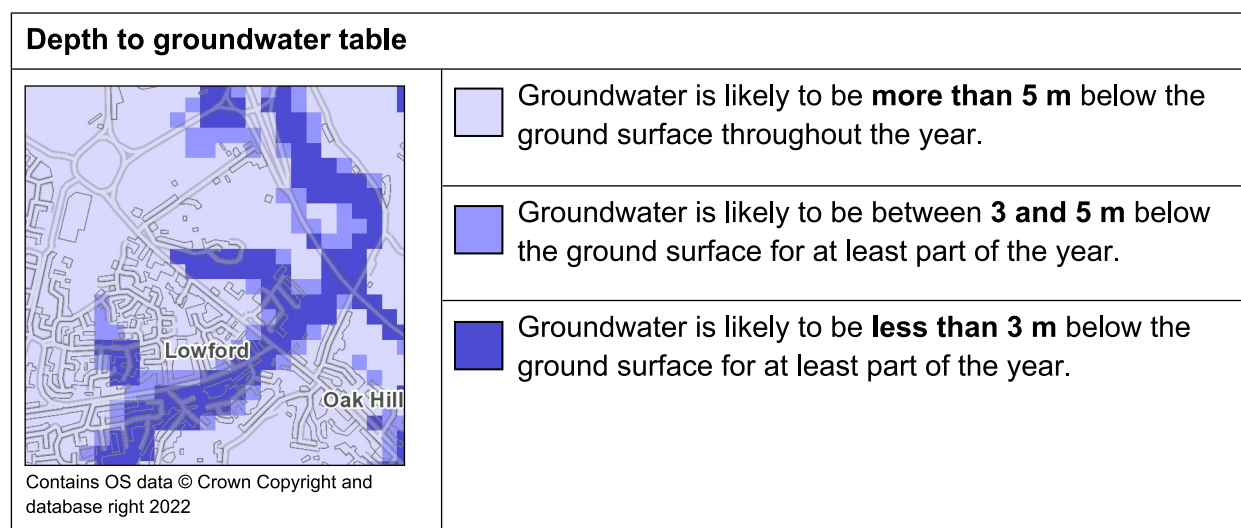
Section 2. Drainage potential

The following pages contain maps that will help you assess the drainage potential of the ground by considering the:

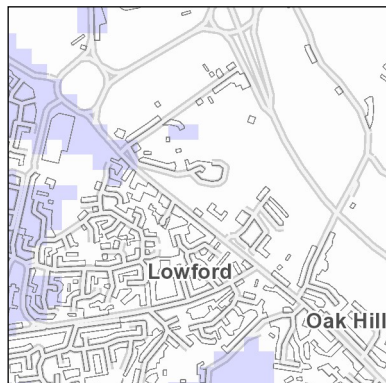
- depth to water table
- permeability of the superficial deposits
- thickness of the superficial deposits
- permeability of the bedrock
- presence of floodplains

Superficial deposits are not present everywhere and therefore some areas of the *superficial deposit permeability* map may not be coloured. Where this is the case, the *bedrock permeability* map shows the likely permeability of the ground. Superficial deposits in some places are very thin and hence in these places you may wish to consider both the permeability of the superficial deposits and the permeability of the bedrock. The *superficial thickness* map will tell you whether the superficial deposits are thin (< 3 m thick) or thick (>3 m). Where they are over 3 m thick, the permeability of the bedrock may not be relevant.

For more information read 'Explanation of terms' at the end of this report.



Superficial deposit permeability



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Superficial deposits are likely to be **free-draining**.



The superficial deposit permeability is **spatially variable**, but likely to permit moderate infiltration.



Superficial deposits are likely to be **poorly draining**.

These maps show the permeability range that is summarised above.

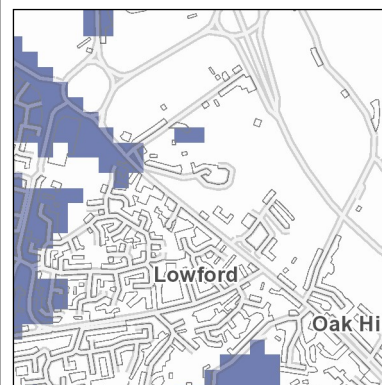
-  Very Low
-  Low
-  Moderate
-  High
-  Very High

Minimum



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Maximum



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Superficial deposit thickness



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The thickness of superficial deposits is **< 3 m** and hence the permeability of the ground may be dependent on both the superficial deposits (where present) and underlying bedrock (see below).



The thickness of superficial deposits is **> 3 m** and hence the permeability of the superficial deposits is likely to determine the permeability of the ground.

Bedrock permeability



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Bedrock deposits are likely to be **free-draining**.



The bedrock permeability is **spatially variable**, but likely to permit moderate infiltration.



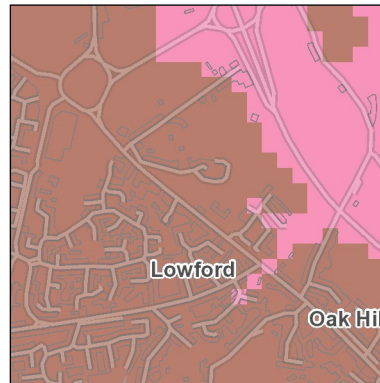
Bedrock deposits are likely to be **poorly draining**.

These maps show the permeability range that is summarised above.

Key

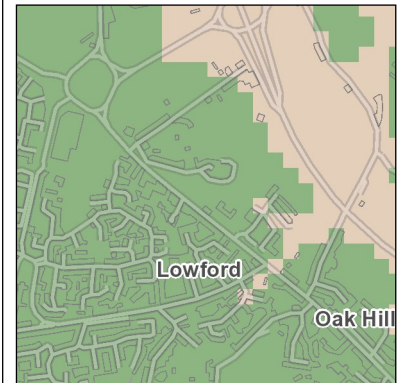
-  Very Low
-  Low
-  Moderate
-  High
-  Very High

Minimum



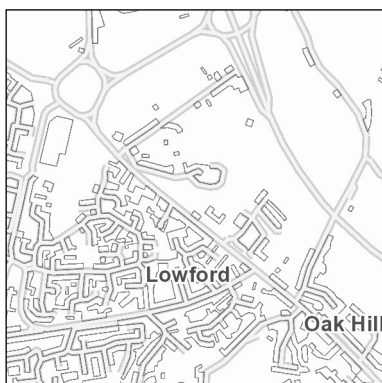
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Maximum



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Geological indicators of flooding



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Superficial floodplain deposits or low-lying coastal areas have been identified. Groundwater levels may rise in response to high river or tide levels, potentially causing inundation of subsurface infiltration SuDS.

Section 3. Ground stability

The following pages contain maps that will help you assess whether infiltration may impact the stability of the ground. They consider hazards associated with:

- soluble rocks
- landslides
- shallow mining
- running sands
- swelling clays
- compressible ground, and
- collapsible ground

In the following maps, geohazards that are identified in green are unlikely to prevent infiltration SuDS from being installed, but they should be considered during design. For more information read 'Explanation of terms' at the end of this report.

Soluble rocks	
 Contains OS data © Crown Copyright and database right 2022	Increased infiltration is unlikely to result in subsidence.
	Increased infiltration is unlikely to cause localised subsidence, but potential impacts should be considered.
	Increased infiltration may result in localised subsidence. The potential for or the consequences of subsidence associated with soluble rocks should be considered.
	Very significant possibility of localised subsidence that could be initiated or made worse by infiltration.

Landslides



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-  Increased infiltration is unlikely to lead to slope instability.
-  Slope instability problems may be present or anticipated, but increased infiltration is unlikely to cause instability
-  Slope instability problems are probably present or have occurred in the past, and increased infiltration may result in slope instability.
-  Slope instability problems are almost certainly present and may be active. An increase in moisture content as a result of infiltration may cause the slope to fail.

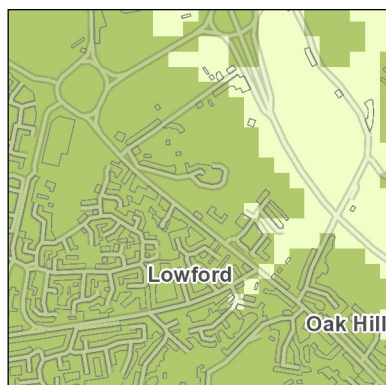
Shallow mining



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-  Increased infiltration is unlikely to lead to subsidence.
-  Shallow mining is possibly present. Increased infiltration is unlikely to cause a geohazard, but potential impacts should be considered.
-  Shallow mining could be present with a significant possibility that localised subsidence could be initiated or made worse by increased infiltration.
-  Shallow mining is likely to be present, with a very significant possibility that localised subsidence may be initiated or made worse by increased infiltration.

Running sand



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-  Increased infiltration is unlikely to cause ground collapse associated with running sands.
-  Running sand is possibly present. Increased infiltration is unlikely to cause a geohazard, but potential impacts should be considered.
-  Significant possibility for running sand problems. Increased infiltration may result in a geohazard.

Swelling clays



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-  Increased infiltration is unlikely to cause shrink-swell ground movement.
-  Ground is susceptible to shrink-swell ground movement. Increased infiltration is unlikely to cause a geohazard, but potential impacts should be considered.
-  Ground is susceptible to shrink-swell ground movement. Increased infiltration may result in a geohazard.

Compressible ground



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-  Increased infiltration is unlikely to lead to ground compression.
-  Compressibility and uneven settlement hazards are probably present. Increased infiltration may result in a geohazard.

Collapsible ground



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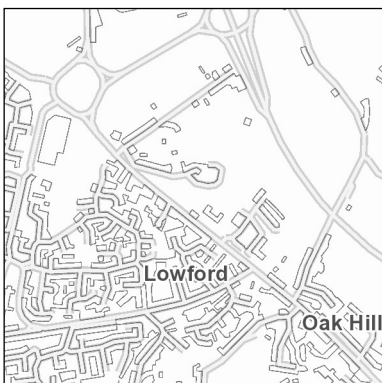
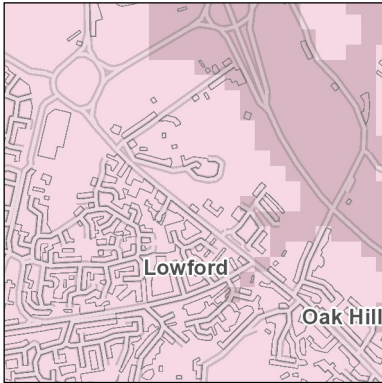
-  Increased infiltration is unlikely to result in subsidence.
-  Deposits with potential to collapse when loaded and saturated are possibly present in places. Increased infiltration is unlikely to cause a geohazard, but potential impacts should be considered.
-  Deposits with potential to collapse when loaded and saturated are probably present in places. Increased infiltration may result in a geohazard.

Section 4. Groundwater quality protection

The following pages contain maps showing some of the information required to ensure the protection of groundwater quality. Data presented includes:

- groundwater source protection zones (Environment Agency data)
- predominant flow mechanism
- made ground

For more information read 'Explanation of terms' at the end of this report.

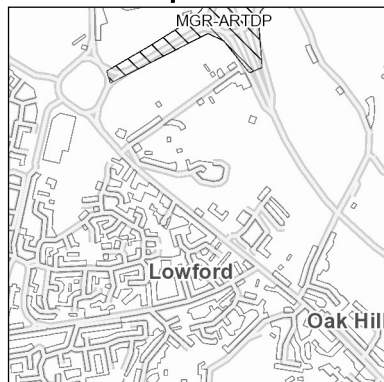
Groundwater source protection zones	
 Contains OS data © Crown Copyright and database right 2022 Derived in part from Source Protection Zone data provided under licence from the Environment Agency © Environment Agency 2022.	 Groundwater is not within a source protection zone.
	 Source protection zone IV
	 Source protection zone III
	 Source protection zone II
	 Source protection zone I
Predominant flow mechanism	
 Contains OS data © Crown Copyright and database right 2022	 Water is likely to percolate through the unsaturated zone to the groundwater through either the pore space in granular media or through porespace and fractures; these processes have some potential for contaminant removal and breakdown.
	 Water is likely to percolate through the unsaturated zone to the groundwater through fractures, a process which has little potential for contaminant removal and breakdown.

Made ground	
 Contains OS data © Crown Copyright and database right 2022	 Made ground is present at the surface. Infiltration may increase the possibility of remobilising pollutants.

Section 5. Geological Maps

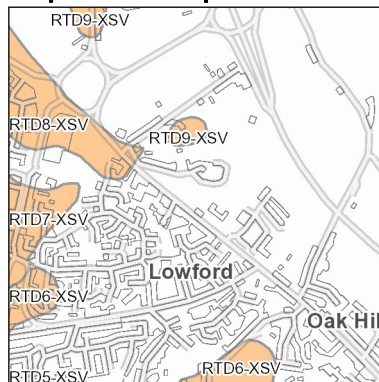
The following maps show the artificial, superficial and bedrock geology within the area of interest.

Artificial deposits



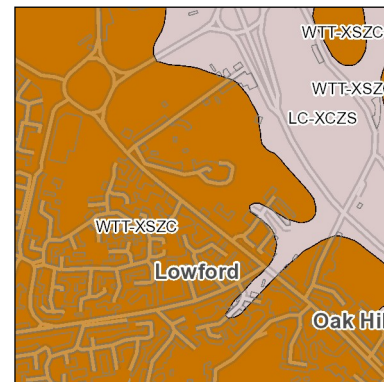
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Superficial deposits

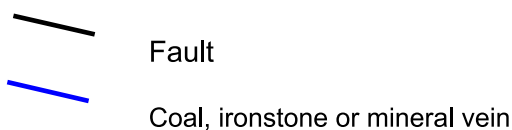


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Bedrock



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Note: Faults and Coals, ironstone & mineral veins are shown for illustration and to aid interpretation of the map. Not all such features are shown and their absence on the map face does not necessarily mean that none are present

Key to Artificial deposits:

Map colour	Computer Code	Rock name	Rock type
	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT

Key to Superficial deposits:

Map colour	Computer Code	Rock name	Rock type
	RTD5-XSV	RIVER TERRACE DEPOSITS, 5	SAND AND GRAVEL
	RTD6-XSV	RIVER TERRACE DEPOSITS, 6	SAND AND GRAVEL
	RTD7-XSV	RIVER TERRACE DEPOSITS, 7	SAND AND GRAVEL
	RTD8-XSV	RIVER TERRACE DEPOSITS, 8	SAND AND GRAVEL
	RTD9-XSV	RIVER TERRACE DEPOSITS, 9	SAND AND GRAVEL

Key to Bedrock geology:

Map colour	Computer Code	Rock name	Rock type
	LC-XCZS	LONDON CLAY FORMATION	CLAY, SILT AND SAND
	WTT-XSZC	WITTERING FORMATION	SAND, SILT AND CLAY

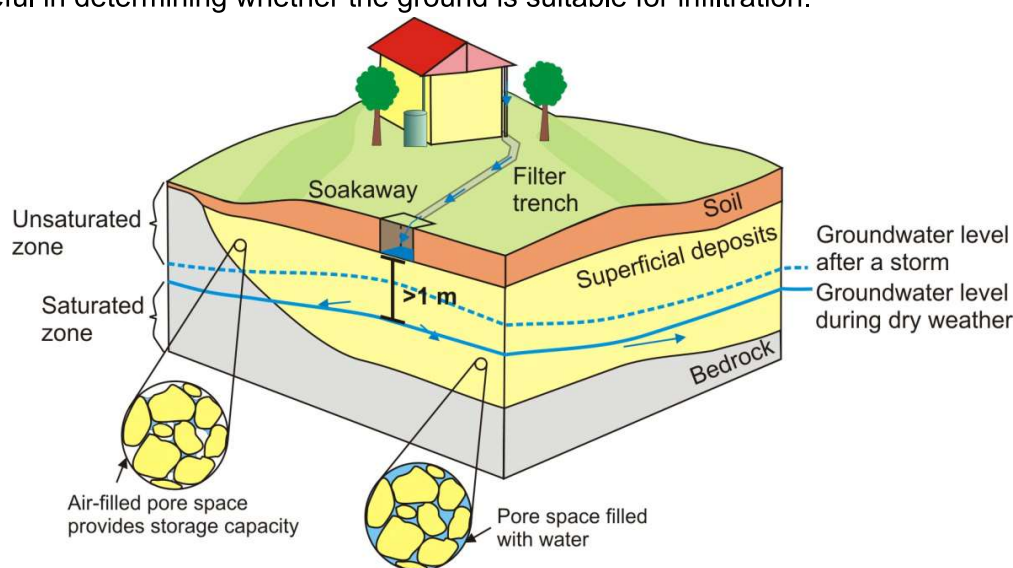
Limitations of this report:

- This report is concerned with the potential for infiltration-to-the-ground to be used as a SuDS technique at the site described. It only considers the subsurface beneath the search area and does NOT consider potential surface or subsurface impacts outside of that area.
- This report is NOT an alternative for an on-site investigation or soakaway test, which might reach a different conclusion.
- This report must NOT be used to justify disposal of foul waste or grey water.
- This report is based on and limited to an interpretation of the records held by the British Geological Survey (BGS) at the time the search is performed. The datasets used (with the exception of that showing depth to water table) are based on 1:50 000 digital geological maps and not site-specific data.
- Other more specific and detailed ground instability information for the site may be held by BGS, and an assessment of this could result in a modified assessment.
- To interpret the maps correctly, the report must be viewed and printed in colour.
- The search does NOT consider the suitability of sites with regard to:
 - previous land use,
 - potential for, or presence of contaminated land
 - presence of perched water tables
 - shallow mining hazards relating to coal mining. Searches of coal mining should be carried out via The Coal Authority Mine Reports Service: www.coalminingreports.co.uk.
 - made ground, where not recorded
 - proximity to landfill sites (searches for landfill sites or contaminated land should be carried out through consultation with local authorities/Environment Agency)
 - zones around private water supply boreholes that are susceptible to groundwater contamination.
- This report is supplied in accordance with the GeoReports Terms & Conditions available separately, and the copyright restrictions described at the end of this report

Explanation of terms

Depth to groundwater

In the shallow subsurface, the ground is commonly unsaturated with respect to water. Air fills the spaces within the soil and the underlying superficial deposits and bedrock. At some depth below the ground surface, there is a level below which these spaces are full of water. This level is known as the groundwater level, and the water below it is termed the groundwater. When water is infiltrated, the groundwater level may rise temporarily. To ensure that there is space in the unsaturated zone to accommodate this, there should be a minimum thickness of 1 m between the base of the infiltration system and the water table. An estimate of the *depth to groundwater* is therefore useful in determining whether the ground is suitable for infiltration.



Groundwater flooding

Groundwater flooding occurs when a rise in groundwater level results in very shallow groundwater or the emergence of groundwater at the surface. If infiltration systems are installed in areas that are susceptible to groundwater flooding, it is possible that the system could become inundated. The susceptibility map seeks to identify areas where the geological conditions and water tables indicate that groundwater level rise could occur under certain circumstances. A high susceptibility to groundwater flooding classification does not mean that groundwater flooding has ever occurred in the past, or will do so in the future as the susceptibility maps do not contain information on how often flooding may occur. The susceptibility maps are designed for planning; identifying areas where groundwater flooding might be an issue that needs to be taken into account.

Geological indicators of flooding

In floodplain deposits, groundwater level can be influenced by the water level in the adjacent river. Groundwater level may increase during periods of fluvial flood and therefore this should be taken into account when designing infiltration systems on such deposits. The *geological indicators of flooding* dataset shows where there is geological evidence (floodplain deposits) that flooding has occurred in the past.

For further information on flood-risk, the likely frequency of its recurrence in relation to any proposed development of the site, and the status of any flood prevention measures in place, you are advised to contact the local office of the Environment Agency (England and Wales) at www.environment-agency.gov.uk/ or the Scottish Environment Protection Agency (Scotland) at www.sepa.org.uk.

Artificial ground

Artificial ground comprises deposits and excavations that have been created or modified by human activity. It includes ground that is worked (quarries and road cuttings), infilled (back-filled quarries), landscaped (surface re-shaping), disturbed (near surface mineral workings) or classified as made ground (embankments and spoil heaps). The composition and properties of artificial ground are often unknown. In particular, the permeability and chemical composition of the artificial ground should be determined to ensure that the ground will drain and that any contaminants present will not be remobilised.

Superficial permeability

Superficial deposits are those geological deposits that were formed during the most recent period of geological time (as old as 2.6 million years before present). They generally comprise relatively thin deposits of gravel, sand, silt and clay and are present beneath the pedological soil in patches or larger spreads over much of Britain. The ease with which water can percolate through these deposits is controlled by their permeability and varies widely depending on their composition. Those deposits comprising clays and silts are less permeable and thus infiltration is likely to be slow, such that water may pool on the surface. In comparison, deposits comprising sands and gravels are more permeable allowing water to percolate freely.

Bedrock permeability

Bedrock forms the main mass of rock forming the Earth. It is present everywhere, commonly beneath superficial deposits. Where the superficial deposits are thin or absent, the ease with which water will percolate into the ground depends on the permeability of the bedrock.

Natural ground instability

Natural ground instability refers to the propensity for upward, lateral or downward movement of the ground that can be caused by a number of natural geological hazards (e.g. ground dissolution/compressible ground). Some movements associated with particular hazards may be gradual and of millimetre or centimetre scale, whilst others may be sudden and of metre or tens of metres scale. Significant natural ground instability has the potential to cause damage to buildings and structures, especially when the drainage characteristics of a site are altered. It should be noted, however, that many buildings, particularly more modern ones, are built to such a standard that they can remain unaffected in areas of significant ground movement.

Shrink-swell

A shrinking and swelling clay changes volume significantly according to how much water it contains. All clay deposits change volume as their water content varies, typically swelling in winter and shrinking in summer, but some do so to a greater extent than others. Contributory circumstances could include drought, leaking service pipes, tree roots drying-out the ground or changes to local drainage patterns, such as the creation of soakaways. Shrinkage may remove support from the foundations of buildings and structures, whereas clay expansion may lead to uplift (heave) or lateral stress on part or all of a structure; any such movements may cause cracking and distortion.

Landslides (slope stability)

A landslide is a relatively rapid outward and downward movement of a mass of ground on a slope, due to the force of gravity. A slope is under stress from gravity but will not move if its strength is greater than this stress. If the balance is altered so that the stress exceeds the strength, then movement will occur. The stability of a slope can be reduced by removing ground at the base of the slope, by placing material on the slope, especially at the top, or by increasing the water content of the materials forming the slope. Increase in subsurface water content beneath a soakaway could increase susceptibility to landslide hazards. The assessment of landslide hazard refers to the stability of the present land surface. It does not encompass a consideration of the stability of excavations.

Soluble rocks (dissolution)

Some rocks are soluble in water and can be progressively removed by the flow of water through the ground. This process tends to create cavities, potentially leading to the collapse of overlying materials and possibly subsidence at the surface. The release of water into the subsurface from infiltration systems may increase the dissolution of rock or destabilise material above or within a cavity. Dissolution cavities may create a pathway for rapid transport of contaminated water to an aquifer or water course.

Compressible ground

Many ground materials contain water-filled pores (the spaces between solid particles). Ground is compressible if a building (or other load) can cause the water in the pore space to be squeezed out, causing the ground to decrease in thickness. If ground is extremely compressible the building may sink. If the ground is not uniformly compressible, different parts of the building may sink by different amounts, possibly causing tilting, cracking or distortion. The compressibility of the ground may alter as a result of changes in subsurface water content caused by the release of water from soakaways.

Collapsible deposits

Collapsible ground comprises certain fine-grained materials with large pore spaces (the spaces between solid particles). It can collapse when it becomes saturated by water and/or a building (or other structure) places too great a load on it. If the material below a building collapses it may cause the building to sink. If the collapsible ground is variable in thickness or distribution, different parts of the building may sink by different amounts, possibly causing tilting, cracking or distortion. The subsurface underlying a soakaway will experience an increase in water content that may affect the stability of the ground. This hazard is most likely to be encountered only in parts of southern England.

Running sand

Running sand conditions occur when loosely-packed sand, saturated with water, flows into an excavation, borehole or other type of void. The pressure of the water filling the spaces between the sand grains reduces the contact between the grains and they are carried along by the flow. This can lead to subsidence of the surrounding ground. Running sand is potentially hazardous during the drainage system installation. During installation, excavation of the ground may create a space into which sand can flow, potentially causing subsidence of surrounding ground.

Shallow mining hazards (non coal)

Current or past underground mining for coal or for other commodities can give rise to cavities at shallow or intermediate depths, which may cause fracturing, general settlement, or the formation of crown-holes in the ground above. Spoil from mineral workings may also present a pollution hazard. The release of water into the subsurface from soakaways may destabilise material above or within a cavity. Cavities arising as a consequence of mining may also create a pathway for rapid transport of contaminated water to an aquifer or watercourse. The mining hazards map is derived from the geological map and considers the potential for subsidence associated with mining on the basis of geology type. Therefore if mining is known to occur within a certain rock, the map will highlight the potential for a hazard within the area covered by that geology.

For more information regarding underground and opencast **coal mining**, the location of mine entries (shafts and adits) and matters relating to subsidence or other ground movement induced by **coal mining** please contact the Coal Authority, Mining Reports, 200 Lichfield Lane, Mansfield, Nottinghamshire, NG18 4RG; telephone 0845 762 6848 or at www.coal.gov.uk. For more information regarding other types of mining (i.e. non-coal), please contact the British Geological Survey.

Groundwater source protection zones

In England and Wales, the Environment Agency has defined areas around wells, boreholes and springs that are used for the abstraction of public drinking water as source protection zones. In conjunction with Groundwater Protection Policy the zones are used to restrict activities that may impact groundwater quality, thereby preventing pollution of underlying aquifers, such that drinking water quality is upheld. The Environment Agency can provide advice on the location and implications of source protection zones in your area (www.environment-agency.gov.uk/)

Contact Details

Keyworth Office

British Geological Survey
Environmental Science Centre
Nicker Hill
Keyworth
Nottingham
NG12 5GG
Tel: 0115 9363143
Email: enquiries@bgs.ac.uk

Wallingford Office

British Geological Survey
Maclean Building
Wallingford
Oxford
OX10 8BB
Email: enquiries@bgs.ac.uk

Edinburgh Office

British Geological Survey
Lyell Centre
Research Avenue South
Edinburgh
EH14 4AP
Tel: 0131 6671000
Email: enquiry@bgs.ac.uk

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- Geological observations and interpretations are made according to the prevailing understanding of the subject at the time. The quality of such observations and interpretations may be affected by the availability of new data, by subsequent advances in knowledge, improved methods of interpretation, and better access to sampling locations.
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- Detail, which is clearly defined and accurately depicted on large-scale maps, may be lost when small-scale maps are derived from them.
- Although samples and records are maintained with all reasonable care, there may be some deterioration in the long term.
- The most appropriate techniques for copying original records are used, but there may be some loss of detail and dimensional distortion when such records are copied.
- Data may be compiled from the disparate sources of information at BGS's disposal, including material donated to BGS by third parties, and may not originally have been subject to any verification or other quality control process.
- Data, information and related records, which have been donated to BGS, have been produced for a specific purpose, and that may affect the type and completeness of the data recorded and any interpretation. The nature and purpose of data collection, and the age of the resultant material may render it unsuitable for certain applications/uses. You must verify the suitability of the material for your intended usage.
- If a report or other output is produced for you on the basis of data you have provided to BGS, or your own data input into a BGS system, please do not rely on it as a source of information about other areas or geological features, as the report may omit important details.
- The topography shown on any map extracts is based on the latest OS mapping and is not necessarily the same as that used in the original compilation of the BGS geological map, and to which the geological linework available at that time was fitted.
- Note that for some sites, the latest available records may be historical in nature, and while every effort is made to place the analysis in a modern geological context, it is possible in some cases that the detailed geology at a site may differ from that described.

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**Report issued by
BGS Enquiry Service**

Appendix D



Foreman Homes Ltd
Unit 1 Station Industrial Park
Duncan Road
Park Gate
SO31 1BX

Your Ref smk
Our Ref 191464
Date 12 March 2015
Contact searches@southernwater.co.uk
Fax 01634 844514
DX:400450 Chatham 5

Attention: Laura Whitaker

Dear Sirs

Provision of Public Sewer and Water Main Record Extracts – VAT Receipt
Misery, Bursledon, Hampshire

Further to your recent enquiry regarding the provision of Southern Water apparatus record extracts for the above location.

Please be aware that there are areas within our region in which there are neither sewers nor water mains. Similarly, whilst the enclosed extract may indicate the approximate location of our apparatus in the area of interest, it should not be relied upon as showing that further infrastructure does not exist and may subsequently be found following site investigation. Therefore actual positions of the disclosed (and any undisclosed) infrastructure should be determined on site, because Southern Water does not accept any responsibility for inaccuracy or omission regarding the enclosed plan and accordingly it should not be considered to be a definitive document.

I confirm payment of the appropriate fee in the sum of £ **48.00**

The breakdown of costs is as follows: -

- Provision of record extracts £ 40.00
- VAT @ 20.0% £ 8.00

VAT Registration Number 813 0378 56

Should you require any additional information regarding this matter please contact this office at the address given at the foot of this letter.

Yours faithfully

Land Search Department

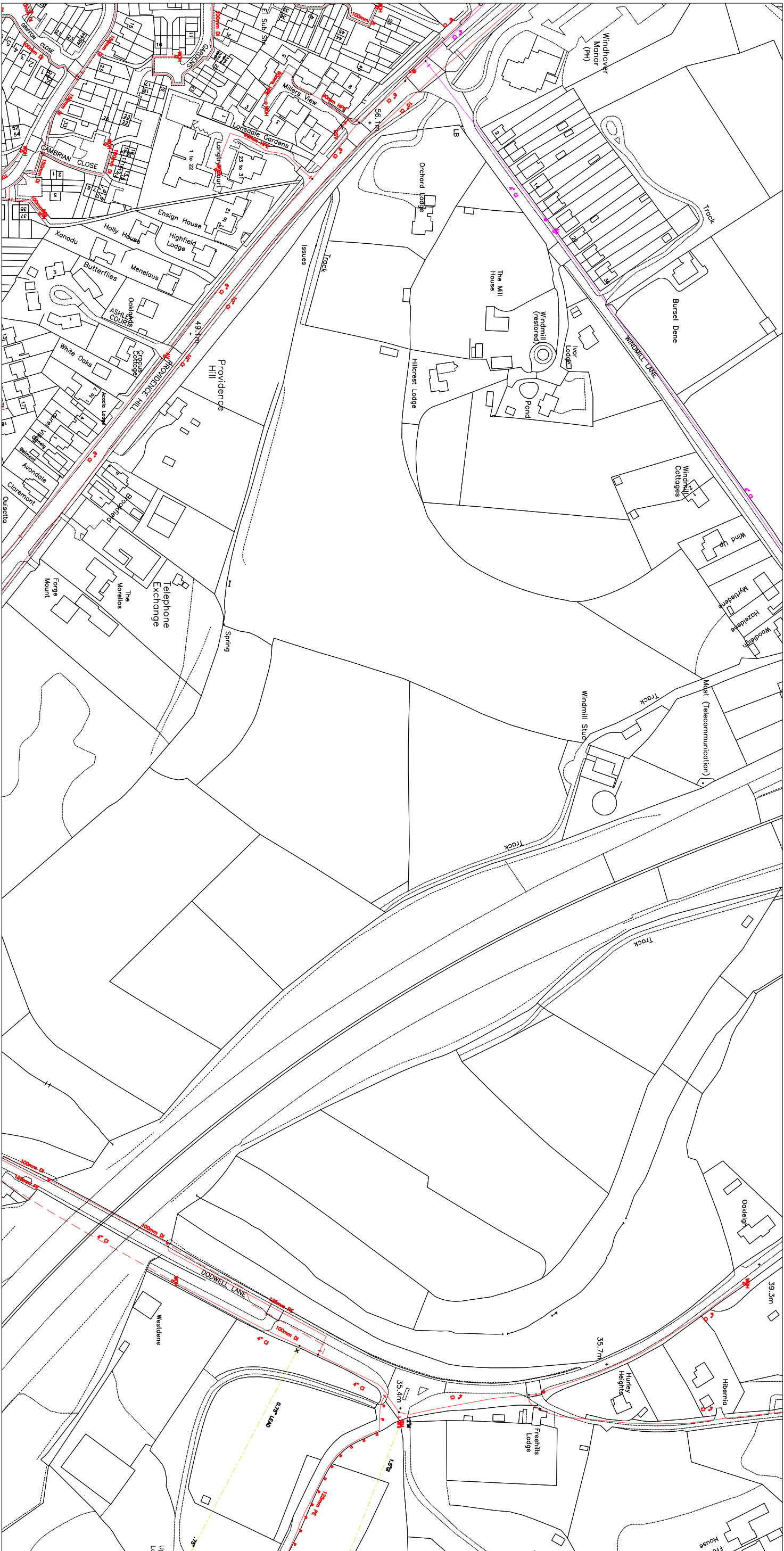
SEWER RECORDS PAGE 2 OF 2

Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape
0453X	37.66	35.77	150	VC	CIRC	7502X	23.64	22.21	150	VC	CIRC
0502X	51.06	48.62	150	VC	CIRC	7601X	24.96	23.45	150	VC	CIRC
0503X	43.9	40.62	150	VC	CIRC	7801X	29.84	28.21	150	VC	CIRC
0551X	51.03	48.98	150	VC	CIRC	7901X	31.41	29.68	150	VC	CIRC
0552X	46.28	44.63	150	VC	CIRC	8401X			150	VC	UNK
0553X	43.42		150	VC	CIRC	8601X	25.55	23.87	150	VC	CIRC
0604X	49.98	47.65	150	VC	CIRC	8602X	34.06		150	VC	CIRC
0605X	51.46	48.44	150	VC	CIRC	8701X	29.05	25.46	150	VC	CIRC
0653X	51.42	48.87	150	VC	CIRC	8702X	27.28	25.04	150	VC	CIRC
0701X	57.3	55.03	150	VC	CIRC	8801X	35.93	34.43	150	VC	CIRC
0704X	53.83		UNK	UNK	CIRC	8802X			150	VC	CIRC
1401X	45.34	42.25	150	VC	CIRC	8803X	35.53	33.85	150	VC	CIRC
1401X	44.19	41.39	150	VC	CIRC	8804X	42.48	38.01	150	VC	CIRC
1402X	44.19		150	VC	CIRC	8804X	28.94	26.35	150	VC	CIRC
1406X	37.55	35.7	150	VC	CIRC	8805X	26.9	27.14	150	VC	CIRC
140DX			UNK	UNK	CIRC	8806X	29.27	26.09	150	VC	CIRC
1450X	45.24	42.4	300	CP	CIRC	8901X	39.1	37.2	150	VC	CIRC
1451X	44.14	41.47	300	CP	CIRC	8902X	35.38	34.83	150	VC	CIRC
1501X	48.8	47.45	150	VC	CIRC	8903X			150	UNK	UNK
1502X	47.08	45.81	150	VC	CIRC	9501X			150	VC	CIRC
1503X	45.04	42.6	150	VC	CIRC	9502X	37.68		150	UNK	UNK
1504X	45.62	42.49	150	VC	CIRC	9801X	34.87		150	VC	UNK

1530X	44.32	46.35	150	VC	CIRC
1511X	44.94	43.08	150	CP	CIRC
1552X	45.59	42.55	300	CP	CIRC
1602X	54.16	51.12	150	VC	CIRC
1603X			150	VC	UNK
1701X	58.86	57.29	150	VC	CIRC
1702X	56.89	54.62	150	VC	CIRC
1801X	61.57	58.41	150	VC	CIRC
1802X	59.76	57.72	150	VC	CIRC
2401X	46.97	45.65	150	VC	CIRC
2402X	43.37	41.92	150	VC	CIRC
2403X	44.8	42.95	150	VC	CIRC
2405X	44.91	42.24	150	VC	CIRC
2450X	45.48	43.73	150	VC	CIRC
2451X	44.91	42.12	150	VC	CIRC
2501X	48.72	47.11	150	VC	CIRC
2502X	48.43	46.81	150	VC	CIRC
2801X	59.21	57.45	150	VC	CIRC
3401X	39.31	37.43	150	VC	CIRC
3402X			150	VC	UNK
3403X			150	VC	UNK
3404X	40.06	38.05	150	VC	CIRC
3406X	43.61	42.16	150	VC	CIRC
3407X			150	VC	UNK
3501X			150	VC	UNK
3502X	45.41	43.41	150	VC	CIRC
3503X			150	VC	UNK
3901X	49.89	48.13	150	VC	CIRC
3902X	54.4	52.7	150	VC	CIRC
4401X			UNK		UNK
4402X	31.33	29.18	150	VC	CIRC
4901X	46.28	43.62	150	VC	CIRC
6401X			150	VC	CIRC
6901X			150	VC	CIRC
7401X			150	VC	CIRC
7501X	24.85	22.48	225	VC	CIRC

[illegible]

Drawn by:	mondalb
Title:	191464_Misery, Bursledon, Hamp
Date:	12/03/2015
	



110492

448049

LEGEND - MAINS

- Distribution Main / Communication pipe
- Trunk Main
- Raw water main
- Non potable
- Abandoned main
- Proposed Main
- Fire main
- Non SWS
- Sluice valve
- Closed valve
- Air valve
- Butterfly valve
- Pressure reducing valve
- Reflux valve
- Motorised valve
- Clockwise closing valve
- Fire Hydrant
- Washout
- Washout hydrant
- Meier
- Capped end
- Emptying plug
- Stopcock
- Leak Noise Correlator Survey Point
- Anode
- Telemetry cable
- Access point / hatchbox

MATERIALS

- Dialysis machine
- Break pressure tank
- Change node
- Pumping station
- Booster station
- Insertion Flow Meter Point
- Water tower
- Service reservoir
- Water Supply Works
- Bore hole / Well
- Intake
- Customer site
- Swab insertion point

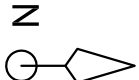
- Alkaline
- Cast iron
- Span (grey) iron
- Concrete
- Ductile iron
- Bonded Asbestos Cement
- Glass reinforced plastic
- Glass reinforced epoxy
- (Unplasticised) Polyvinyl chloride
- Polyethylene
- Steel
- Concrete segments bolted
- Concrete segments unbolted
- Galvanised iron
- Ductile sleeve
- Concrete pre-stressed
- High performance polyethylene
- Unknown

- AK
- CI
- SI
- CO
- DI
- BAC
- GRP
- GRE
- PVC
- PE
- ST
- CSB
- CSU
- GI
- DS
- CPS
- HPE
- ??

Drawn by:	mondalb	O.S.Ref: SU4810NE
Scale:	1:2500	
Date:	12/03/2015	TITLE: 191464_Misery, Bursledon, Hamp

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 of pipes should be determined on site.

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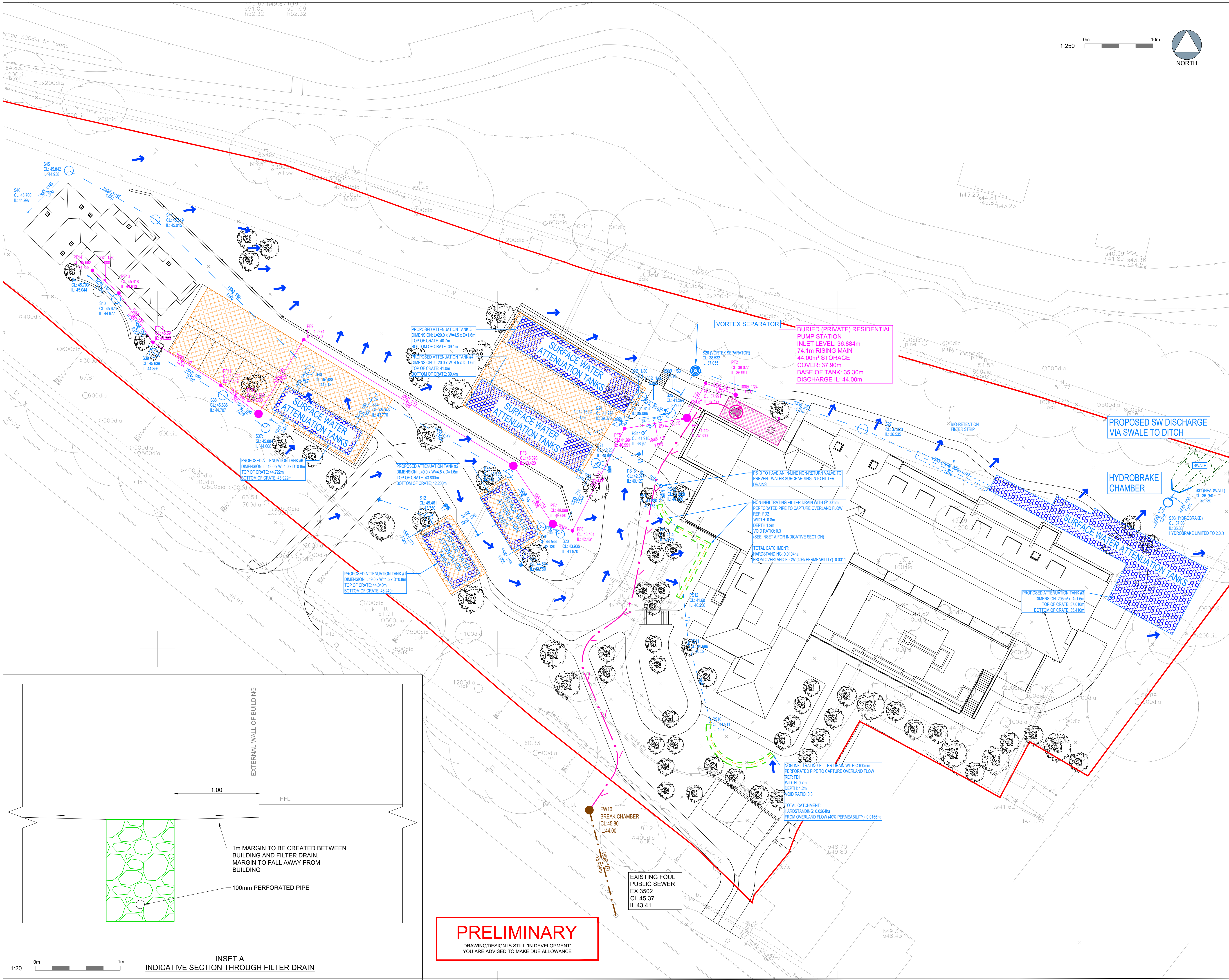
449016

110978

WARNING: BAC pipes are constructed of Bonded Asbestos Cement

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

Appendix E



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- THIS DRAWING IS INTENDED TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS, SERVICES AND SPECIALIST DRAWINGS, DETAILS AND SPECIFICATIONS.
 - ANY VARIATIONS OR DISCREPANCIES BETWEEN THESE DRAWINGS IN TERMS OF DIMENSIONS OR DETAILS SHOULD BE DRAWN TO THE ATTENTION OF THE ARCHITECT AND/OR THE ENGINEER FOR CLARIFICATION.
 - ALL FIGURED DIMENSIONS TO BE TAKEN IN PREFERENCE TO SCALED DIMENSIONS.
 - PAUL BASHAM ASSOCIATES ACCEPTS NO RESPONSIBILITY FOR THE ACCURACY OF BACKGROUND INFORMATION PRODUCED BY THIRD PARTIES - THIS MUST BE TREATED AS INDICATIVE ONLY.
 - THE MAIN CONTRACTOR SHALL BE RESPONSIBLE FOR THE SETTING OUT AND ACCURACY OF ALL DIMENSIONS.
 - THIS DRAWING SHOULD ONLY BE USED FOR CONSTRUCTION IF THE PROJECT PHASE IN THE TITLE FRAME BELOW IS SHOWN AS "CONSTRUCTION". PAUL BASHAM ASSOCIATES TAKE NO RESPONSIBILITY FOR CONSTRUCTION WORKS UNDERTAKEN TO DRAWINGS WHICH ARE NOT MARKED UNDER THIS PHASE.
 - NOTE: PROPOSED TREES ENCROACHING ATTENUATION TANKS WILL REQUIRE ROOT BARRIERS OR TREE PITS
 - PAUL BASHAM ASSOCIATES ACCEPTS NO RESPONSIBILITY FOR THE ACCURACY OF BACKGROUND INFORMATION PRODUCED BY THIRD PARTIES - THIS MUST BE TREATED AS INDICATIVE ONLY.
- ARCHITECTS LAYOUT MASTERPLAN RECEIVED: 18.07.24
-REFER TO DRAWING 6185-WLA-22-00-DR-A-0110-I PROPOSED SITE PLAN

LEGEND:

- SITE BOUNDARY
- ADOPTABLE FOUL WATER SEWER
- ADOPTABLE STORM WATER SEWER
- PRIVATE FOUL WATER DRAIN
- PRIVATE STORM WATER DRAIN (Ø100 U.N.O)
- FOUL WATER RISING MAIN
- ADOPTABLE FOUL WATER MANHOLE
- ADOPTABLE SURFACE WATER MANHOLE
- PRIVATE FOUL WATER CHAMBER
- PRIVATE SURFACE WATER CHAMBER / CATCHPIT
- ROAD GULLY
- FINISHED FLOOR LEVELS
- VORTEX SEPARATOR
- HYDROBRAKE CHAMBER
- HEADWALL
- SURFACE WATER ATTENUATION TANKS
- F.W. PUMPING STATION
- PERMEABLE PAVING
- SWALE
- NON-INFILTRATING FILTER DRAIN WITH PERFORATED PIPE
- PROPOSED EXCEEDANCE FLOW PATH

P06	SITE LAYOUT UPDATED, FILTER DRAIN LOCATION AMENDED AND INSET A ADDED	27.03.2025	RRD	COH
P05	FILTER DRAINS CONNECTED TO NETWORK AND AREAS ADDED	22.01.2025	NOH	DP
P04	FILTER DRAINS INCLUDED FOR OVERLAND FLOW	05.11.2024	NOH	HN
P03	UPDATED TO LATEST ARCHITECT'S LAYOUT	24.07.2024	CDA	NOH
P02	UPDATED TO LATEST ARCHITECT'S LAYOUT	05.04.2024	RL	RW
P01	FIRST ISSUE	25.03.2024	RL	RW
Rev	Description	Date	By	App'd

paulbasham associates

Paul Basham Associates Ltd
The Botley, Cambs Hall Estate, Farnham, PO16 8UT
01250 711 000
info@paulbashamassociates.com www.paulbashamassociates.com

COLTEN CARE
"Elevating Care"

Project Name
CARE HOME, BROOKFIELD PROVIDENCE HILL, BURSLEDON

Title
PROPOSED DRAINAGE STRATEGY LAYOUT

PLANNING			
Date Created	Drawn By	Approved By	Suitability Code
25.03.2024	RL	RW	-
PBA Project Number	Scale	(AT A1)	
197.5004	1:250		
PBA Drawing No:	Revision		
197.5004-0002	P06		

Appendix F

Network Details

Manhole Schedule

Manhole	Catchment Area (ha)	Diameter (m)	Type	CL (m)	IL (m)	Depth To Soffit (m)	Easting (m)	Northing (m)
S46	0.000	0.450	450	45.700	44.997	0.553	448230.920	110664.227
PS18	0.006	0.450	Type E	45.842	44.938	0.754	448236.976	110670.298
S44	0.005	1.350	Type C	45.667	44.837	0.680	448249.700	110663.131
S43	0.000	1.350	Type C	45.483	44.618	0.715	448272.374	110640.949
S42	0.000	0.150	Unknown	45.612	44.572	0.890	448270.538	110637.723
S41	0.008	0.250	250	45.703	45.044	0.509	448239.820	110654.857
S40	0.000	0.600	Type E	45.625	44.977	0.498	448243.917	110651.406
S39	0.000	1.350	Type C	45.639	44.856	0.632	448249.460	110643.506
S38	0.000	1.350	Type C	45.636	44.707	0.779	448259.624	110637.265
S37	0.017	1.350	Type C	45.884	44.608	1.126	448265.892	110632.457
S36	0.018	0.000	Unknown	45.711	44.572	0.989	448267.427	110634.930
S35	0.000	0.150	Unknown	46.117	43.922	2.095	448279.045	110632.581
S34	0.000	1.200	Type B	45.943	43.770	2.073	448281.706	110637.027
S33	0.000	1.200	Type B	45.155	43.110	1.945	448301.676	110625.739
S12	0.025	0.135	Unknown	45.461	43.750	1.561	448289.886	110619.368
S13	0.000	0.150	Unknown	45.319	43.650	1.519	448290.893	110617.720
S16	0.000	0.150	Unknown	45.072	43.240	1.732	448294.811	110615.320
S17	0.000	0.000	Unknown	44.921	43.160	1.661	448299.944	110618.417
S14	0.017	1.350	Type C	44.674	43.750	0.774	448303.982	110613.960
S15	0.000	0.000	Unknown	44.651	43.650	0.851	448303.307	110615.084
S18	0.000	0.150	Unknown	44.585	42.200	2.285	448305.605	110617.414
S19	0.000	1.200	Type B	44.544	42.130	2.314	448306.447	110617.929
S20	0.000	1.200	Type B	43.936	41.970	1.866	448309.254	110616.850
S21	0.000	1.350	Type C	42.231	40.831	1.250	448314.437	110627.315
S22	0.039	0.150	Unknown	42.176	39.500	2.526	448310.100	110627.145
S23	0.000	0.150	Unknown	42.067	39.400	2.517	448312.378	110630.867
S24	0.000	1.200	Type B	41.974	39.320	2.504	448317.551	110633.318
PS17	0.033	0.180	Type E	42.064	40.707	1.256	448332.831	110584.096
FD1	0.000	0.180	Type E	41.952	40.704	1.148	448331.116	110587.001
PS10	0.000	0.180	Type E	41.911	40.700	1.111	448331.298	110589.352
PS11	0.000	0.180	Type E	41.686	40.520	1.066	448328.035	110600.818
PS12	0.010	0.180	Type E	41.600	40.256	1.244	448327.332	110607.518
PS3	0.012	0.180	Type E	41.400	40.221	1.079	448331.604	110615.257
FD2	0.000	0.180	Type E	41.400	40.200	1.100	448327.083	110617.704
PS1	0.000	0.180	Type E	41.830	40.173	1.557	448324.054	110620.484
PS13	0.000	0.450	Type E	41.828	40.150	1.579	448324.029	110623.941
PS16	0.000	0.450	Type E	42.074	40.127	1.847	448321.172	110625.863
PS14	0.000	1.200	Type B	41.918	38.920	2.898	448321.397	110631.728
S47	0.015	0.000	Unknown	41.607	40.550	0.907	448301.470	110645.051
S32	0.000	0.000	Unknown	41.798	39.100	2.598	448320.386	110637.682
S48	0.000	1.200	Type B	41.813	39.086	2.627	448321.318	110637.070
S25	0.124	1.500	Type A	41.564	37.660	3.754	448325.385	110634.660
S26	0.000	1.500	Unknown	38.494	37.055	0.839	448328.204	110639.459
S27	0.053	1.500	Unknown	37.820	36.535	0.685	448353.671	110632.304
S28	0.004	0.000	Unknown	37.578	35.440	0.538	448372.263	110623.490
S29	0.000	0.225	Unknown	36.247	35.410	0.612	448395.960	110616.328
S30	0.000	1.350	Type C	37.000	35.330	1.445	448398.547	110621.513
S31	0.000	0.000	Type C	35.750	35.125	0.400	448403.502	110628.766

Pipe Schedule

Pipe Number	US Manhole	US IL (m)	DS Manhole	DS IL (m)	Shape	Dimension (m)	Length (m)	Gradient (1:x)	Roughness (mm)	US Depth To Soffit (m)	DS Depth To Soffit (m)
1.000	S46	44.997	PS18	44.938	Circ	0.15mØ	8.575	145.0	0.600	0.553	0.754
1.001	PS18	44.938	S44	44.837	Circ	0.15mØ	14.604	145.0	0.600	0.754	0.680
1.002	S44	44.837	S43	44.618	Circ	0.15mØ	31.719	145.0	0.600	0.680	0.715
1.003	S43	44.618	S42	44.572	Circ	0.15mØ	3.711	80.0	0.600	0.715	0.890
1.004	S42	44.572	S35	43.922	Circ	0.15mØ	9.940	15.3	0.600	0.890	2.045
2.000	S41	45.044	S40	44.977	Circ	0.15mØ	5.357	80.0	0.600	0.509	0.498
2.001	S40	44.977	S39	44.856	Circ	0.15mØ	9.651	80.0	0.600	0.498	0.632
2.002	S39	44.856	S38	44.707	Circ	0.15mØ	11.926	80.0	0.600	0.632	0.779
2.003	S38	44.707	S37	44.608	Circ	0.15mØ	7.900	80.0	0.600	0.779	1.126

Pipe Schedule

Pipe Number	US Manhole	US IL (m)	DS Manhole	DS IL (m)	Shape	Dimension (m)	Length (m)	Gradient (1:x)	Roughness (mm)	US Depth To Soffit (m)	DS Depth To Soffit (m)
2.004	S37	44.608	S36	44.572	Circ	0.15mØ	2.911	80.0	0.600	1.126	0.989
2.005	S36	44.572	S35	43.922	Circ	0.15mØ	11.853	18.2	0.600	0.989	2.045
1.005	S35	43.922	S34	43.770	Circ	0.1mØ	5.181	34.1	0.600	2.095	2.073
1.006	S34	43.770	S33	43.110	Circ	0.1mØ	22.940	34.8	0.600	2.073	1.945
1.007	S33	43.110	S19	42.130	Circ	0.15mØ	9.153	9.3	0.600	1.895	2.264
3.000	S12	43.750	S13	43.650	Circ	0.15mØ	1.932	19.3	0.600	1.561	1.519
3.001	S13	43.650	S16	43.240	Circ	0.15mØ	4.595	11.2	0.600	1.519	1.682
3.002	S16	43.240	S17	43.160	Circ	0.1mØ	5.995	74.9	0.600	1.732	1.661
3.003	S17	43.160	S18	42.200	Circ	0.15mØ	5.749	6.0	0.600	1.611	2.235
4.000	S14	43.750	S15	43.650	Circ	0.15mØ	1.311	13.1	0.600	0.774	0.851
4.001	S15	43.650	S18	42.200	Circ	0.15mØ	3.272	2.3	0.600	0.851	2.235
3.004	S18	42.200	S19	42.130	Circ	0.1mØ	0.988	14.1	0.600	2.285	2.314
1.008	S19	42.130	S20	41.970	Circ	0.1mØ	3.007	18.8	0.600	2.314	1.866
1.009	S20	41.970	S21	40.881	Circ	0.1mØ	11.678	10.7	0.600	1.866	1.250
1.010	S21	40.831	S24	39.320	Circ	0.15mØ	6.763	4.5	0.600	1.250	2.504
5.000	S22	39.500	S23	39.400	Circ	0.15mØ	4.364	43.6	0.600	2.526	2.517
5.001	S23	39.400	S24	39.320	Circ	0.15mØ	5.725	71.6	0.600	2.517	2.504
1.011	S24	39.320	S25	38.977	Circ	0.15mØ	7.947	23.2	0.600	2.504	2.437
6.000	PS17	40.707	FD1	40.704	Circ	0.1mØ	3.373	1077.3	0.600	1.256	1.148
6.001	FD1	40.704	PS10	40.700	Circ	0.1mØ	2.358	553.2	0.600	1.148	1.111
6.002	PS10	40.700	PS11	40.520	Circ	0.1mØ	11.922	66.2	0.600	1.111	1.066
6.003	PS11	40.520	PS12	40.256	Circ	0.1mØ	6.737	25.5	0.600	1.066	1.244
6.004	PS12	40.256	PS3	40.221	Circ	0.1mØ	8.839	250.0	0.600	1.244	1.079
6.005	PS3	40.221	FD2	40.200	Circ	0.1mØ	5.141	250.0	0.600	1.079	1.100
6.006	FD2	40.200	PS1	40.173	Circ	0.1mØ	4.111	150.0	0.600	1.100	1.557
6.007	PS1	40.173	PS13	40.150	Circ	0.1mØ	3.457	150.0	0.600	1.557	1.579
6.008	PS13	40.150	PS16	40.127	Circ	0.1mØ	3.443	150.0	0.600	1.579	1.847
6.009	PS16	40.127	PS14	38.920	Circ	0.1mØ	5.869	4.9	0.600	1.847	2.898
6.010	PS14	38.920	S25	37.710	Circ	0.1mØ	4.950	4.1	0.600	2.898	3.754
7.000	S47	40.550	S32	39.100	Circ	0.15mØ	20.300	14.0	0.600	0.907	2.548
7.001	S32	39.100	S48	39.086	Circ	0.1mØ	1.114	80.0	0.600	2.598	2.627
7.002	S48	39.086	S25	39.027	Circ	0.1mØ	4.727	80.0	0.600	2.627	2.437
1.012	S25	37.660	S26	37.555	Circ	0.15mØ	5.565	53.0	0.600	3.754	0.789
1.013	S26	37.055	S27	36.535	Circ	0.6mØ	26.453	50.9	0.600	0.839	0.685
1.014	S27	36.535	S28	36.440	Circ	0.6mØ	20.575	216.6	0.600	0.685	0.538
1.015	S28	35.440	S29	35.410	Circ	1.6mØ	24.756	825.2	0.600	0.538	-0.763
1.016	S29	35.410	S30	35.330	Circ	0.225mØ	5.794	72.4	0.600	0.612	1.445
1.017	S30	35.330	S31	35.125	Circ	0.225mØ	8.783	42.8	0.600	1.445	0.400

Outfall Details

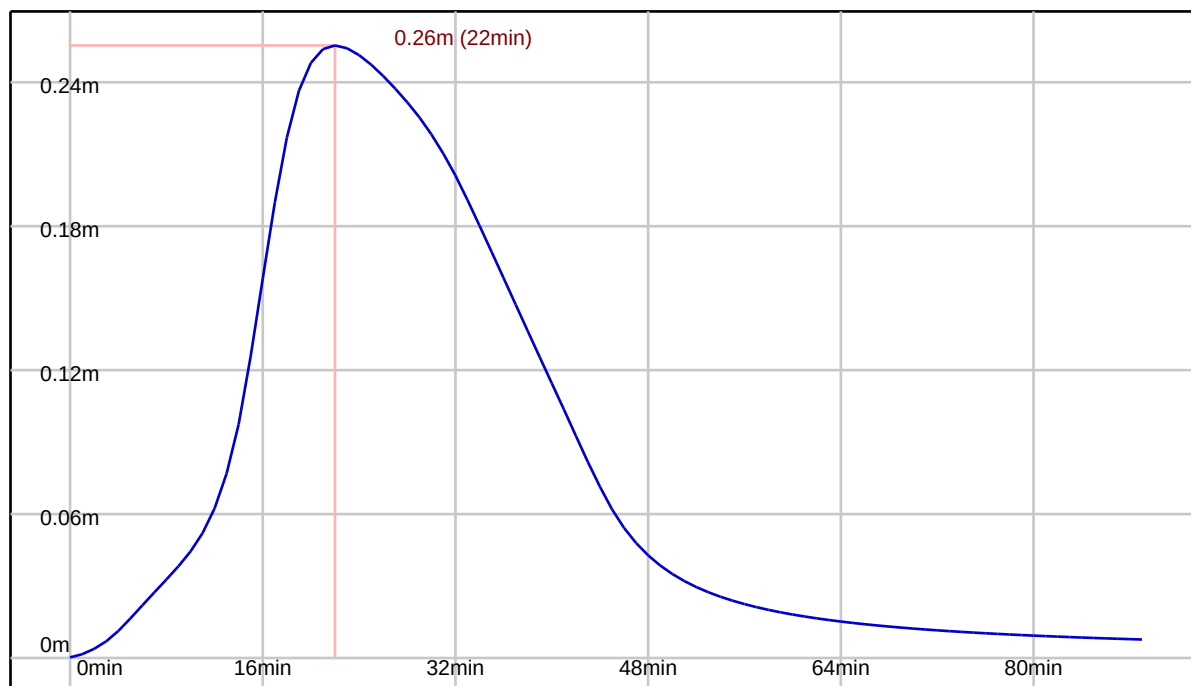
Outfall Manhole S31 : Free Discharge

Flow Control Details

Tank Structure at Manhole S35

Tank Invert (m)	Tank Height (m)	Porosity Ratio (%)	Area (m2)	Effective Area (m2) Area x Porosity Ratio	Max Storage (m3) Effective Area x Height	Infil Base (m/hr)	Infil Side (m/hr)	Safety Factor
43.922	0.800	95.00	52.000	49.400	39.520	0.00000000	0.00000000	2.00

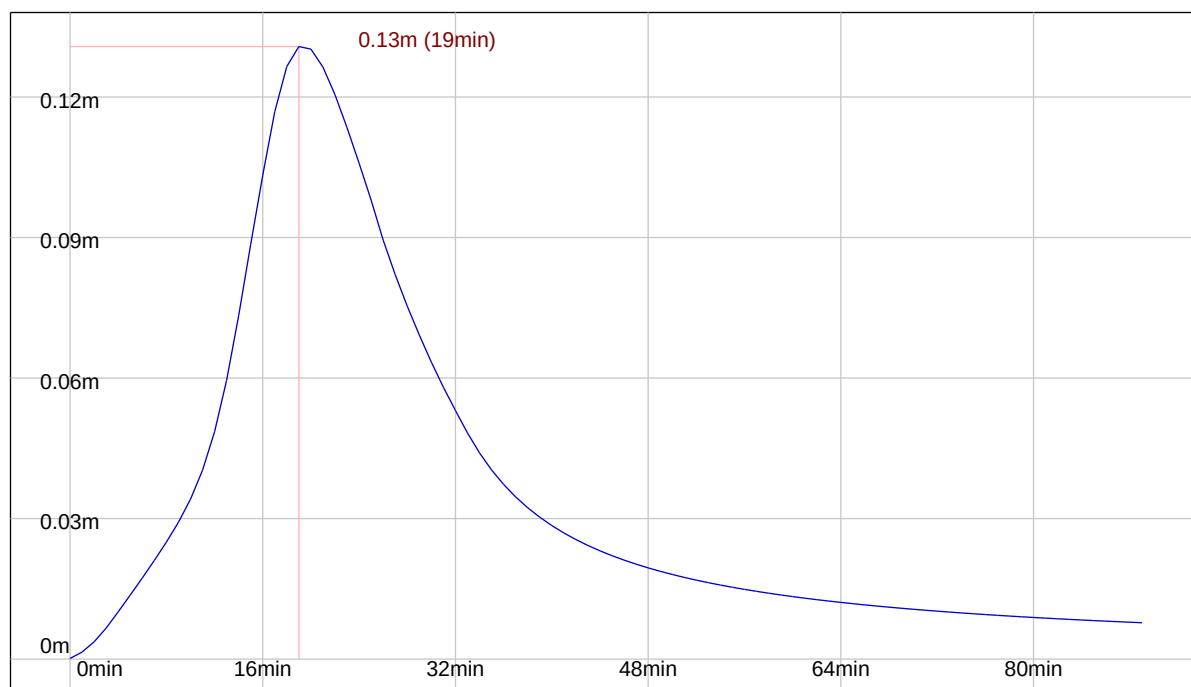
Tank at S35 (100Yr+45% 30Min Summer)



Tank Structure at Manhole S16

Tank Invert (m)	Tank Height (m)	Porosity Ratio (%)	Area (m2)	Effective Area (m2) Area x Porosity Ratio	Max Storage (m3) Effective Area x Height	Infil Base (m/hr)	Infil Side (m/hr)	Safety Factor
43.240	0.800	95.00	40.500	38.475	30.780	0.00000000	0.00000000	2.00

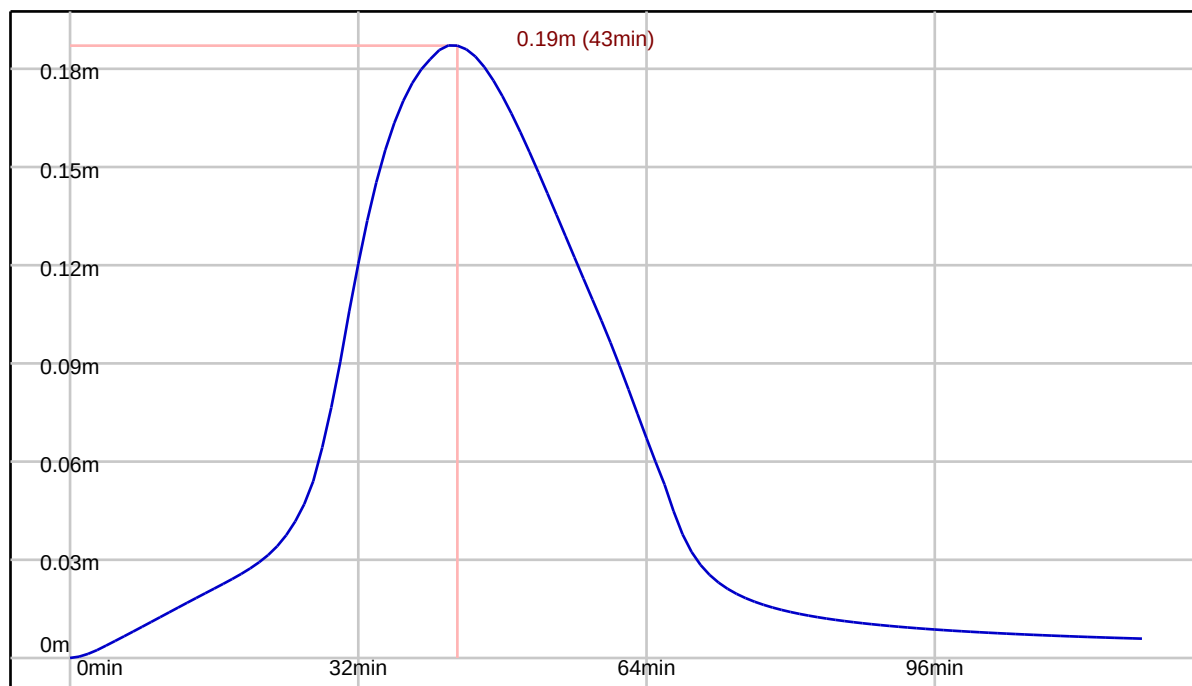
Tank at S16 (100Yr+45% 30Min Summer)



Tank Structure at Manhole S18

Tank Invert (m)	Tank Height (m)	Porosity Ratio (%)	Area (m2)	Effective Area (m2) Area x Porosity Ratio	Max Storage (m3) Effective Area x Height	Infil Base (m/hr)	Infil Side (m/hr)	Safety Factor
42.200	1.600	95.00	40.500	38.475	61.560	0.00000000	0.00000000	2.00

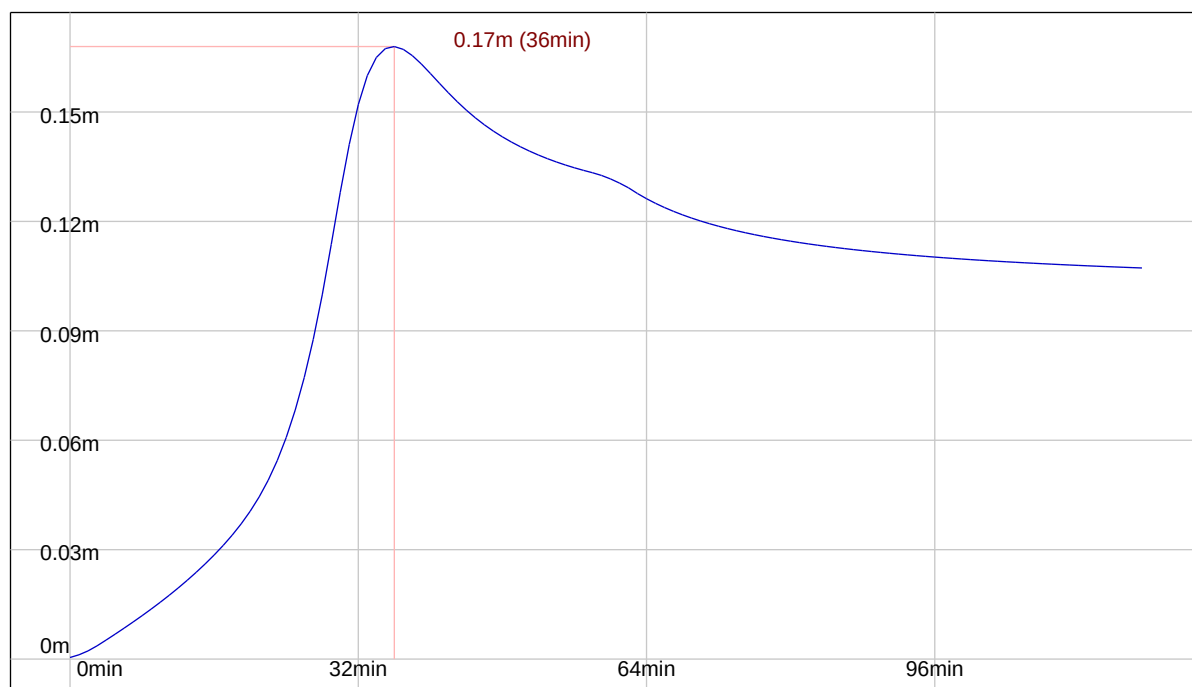
Tank at S18 (100Yr+45% 60Min Summer)



Tank Structure at Manhole S22

Tank Invert (m)	Tank Height (m)	Porosity Ratio (%)	Area (m2)	Effective Area (m2) Area x Porosity Ratio	Max Storage (m3) Effective Area x Height	Infil Base (m/hr)	Infil Side (m/hr)	Safety Factor
39.500	1.600	95.00	85.203	80.943	129.509	0.00000000	0.00000000	2.00

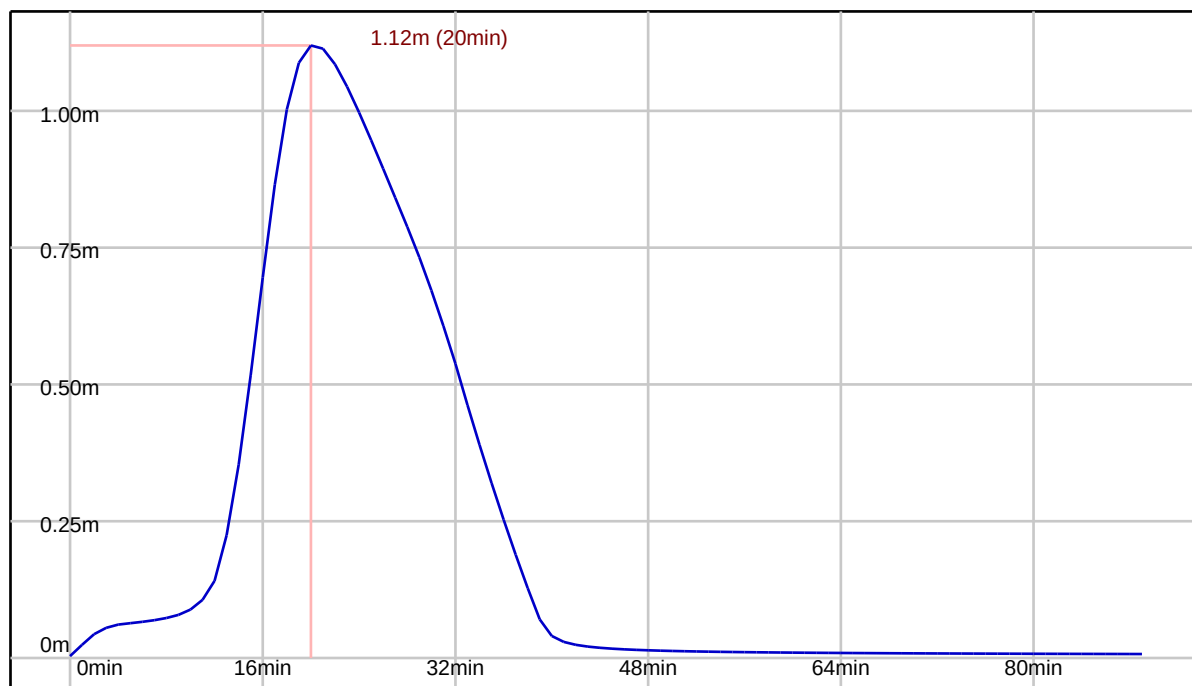
Tank at S22 (100Yr+45% 60Min Summer)



Tank Structure at Manhole FD1

Tank Invert (m)	Tank Height (m)	Porosity Ratio (%)	Area (m2)	Effective Area (m2) Area x Porosity Ratio	Max Storage (m3) Effective Area x Height	Infil Base (m/hr)	Infil Side (m/hr)	Safety Factor
40.704	1.200	30.00	9.322	2.797	3.356	0.00000000	0.00000000	2.00

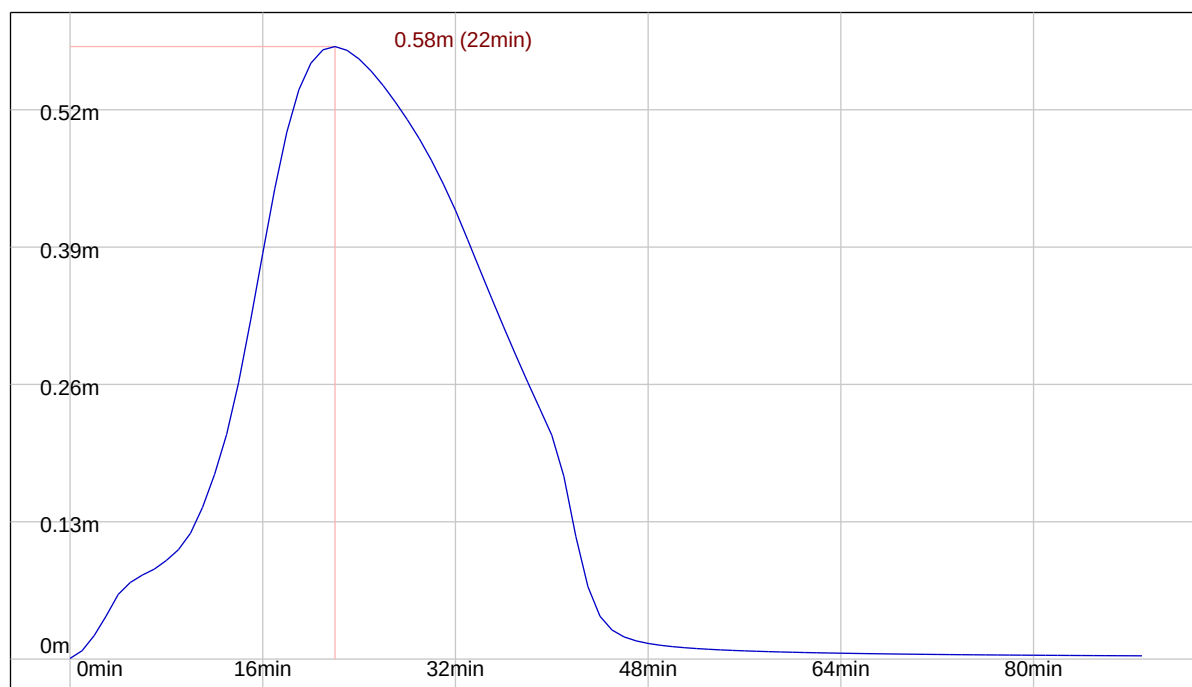
Tank at FD1 (100Yr+45% 30Min Summer)



Tank Structure at Manhole FD2

Tank Invert (m)	Tank Height (m)	Porosity Ratio (%)	Area (m2)	Effective Area (m2) Area x Porosity Ratio	Max Storage (m3) Effective Area x Height	Infil Base (m/hr)	Infil Side (m/hr)	Safety Factor
40.200	1.200	30.00	11.269	3.381	4.057	0.00000000	0.00000000	2.00

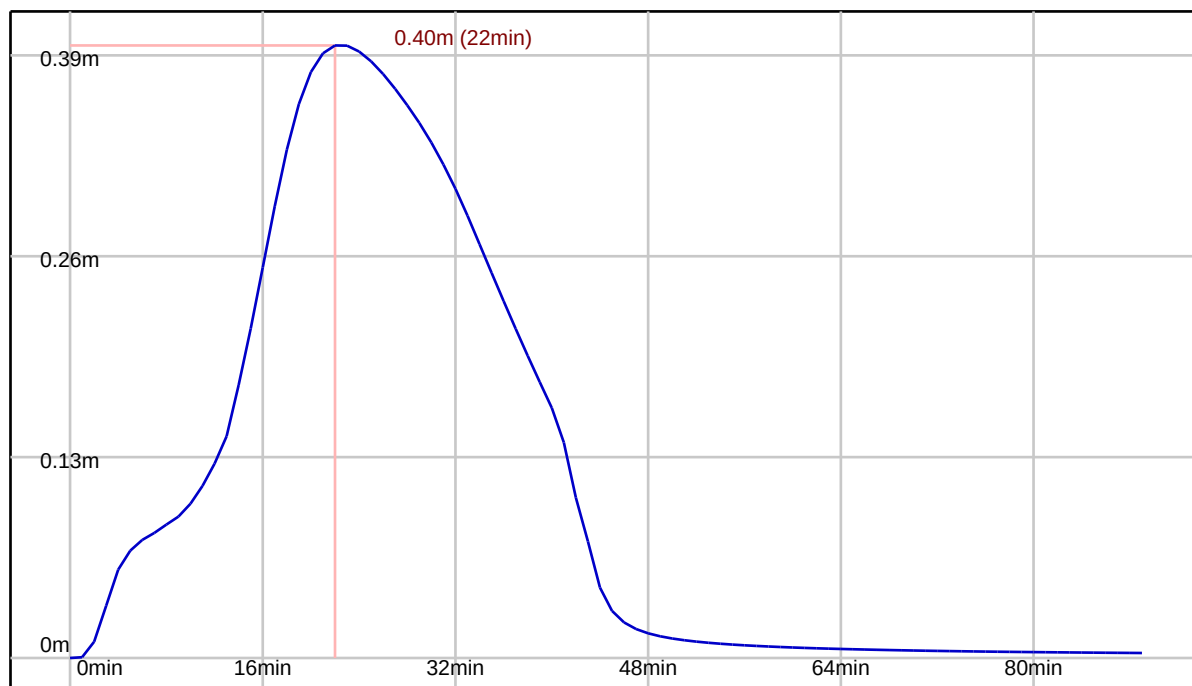
Tank at FD2 (100Yr+45% 30Min Summer)



Tank Structure at Manhole PS1

Tank Invert (m)	Tank Height (m)	Porosity Ratio (%)	Area (m2)	Effective Area (m2) Area x Porosity Ratio	Max Storage (m3) Effective Area x Height	Infil Base (m/hr)	Infil Side (m/hr)	Safety Factor
40.173	1.200	30.00	1.501	0.450	0.540	0.00000000	0.00000000	2.00

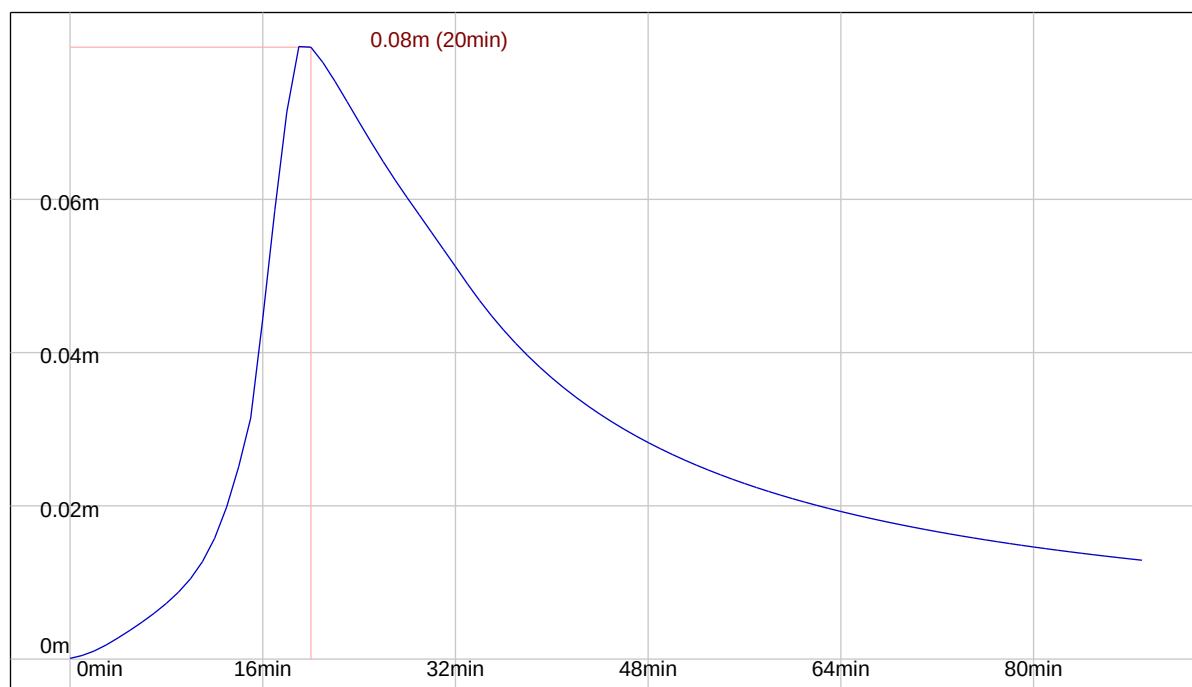
Tank at PS1 (100Yr+45% 30Min Summer)



Tank Structure at Manhole S32

Tank Invert (m)	Tank Height (m)	Porosity Ratio (%)	Area (m2)	Effective Area (m2) Area x Porosity Ratio	Max Storage (m3) Effective Area x Height	Infil Base (m/hr)	Infil Side (m/hr)	Safety Factor
39.100	1.600	95.00	90.000	85.500	136.800	0.00000000	0.00000000	2.00

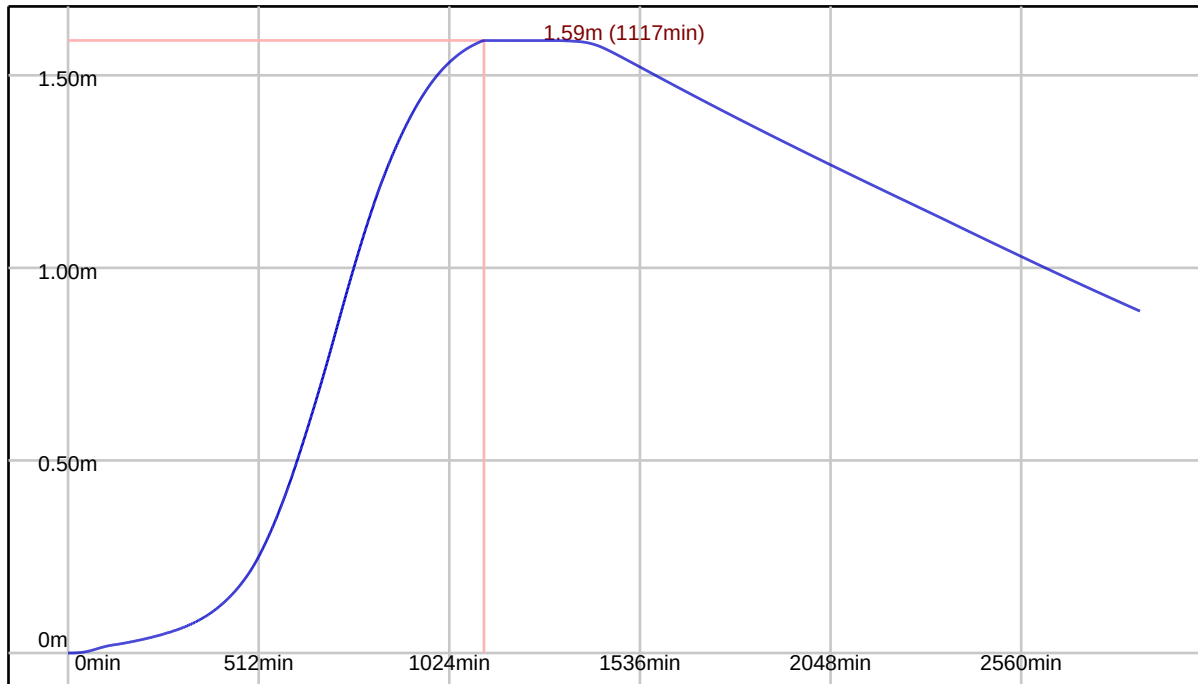
Tank at S32 (100Yr+45% 30Min Summer)



Tank Structure at Manhole S29

Tank Invert (m)	Tank Height (m)	Porosity Ratio (%)	Area (m2)	Effective Area (m2) Area x Porosity Ratio	Max Storage (m3) Effective Area x Height	Infil Base (m/hr)	Infil Side (m/hr)	Safety Factor
35.410	1.600	95.00	187.591	178.211	285.138	0.00000000	0.00000000	2.00

Tank at S29 (100Yr+45% 1440Min Winter)

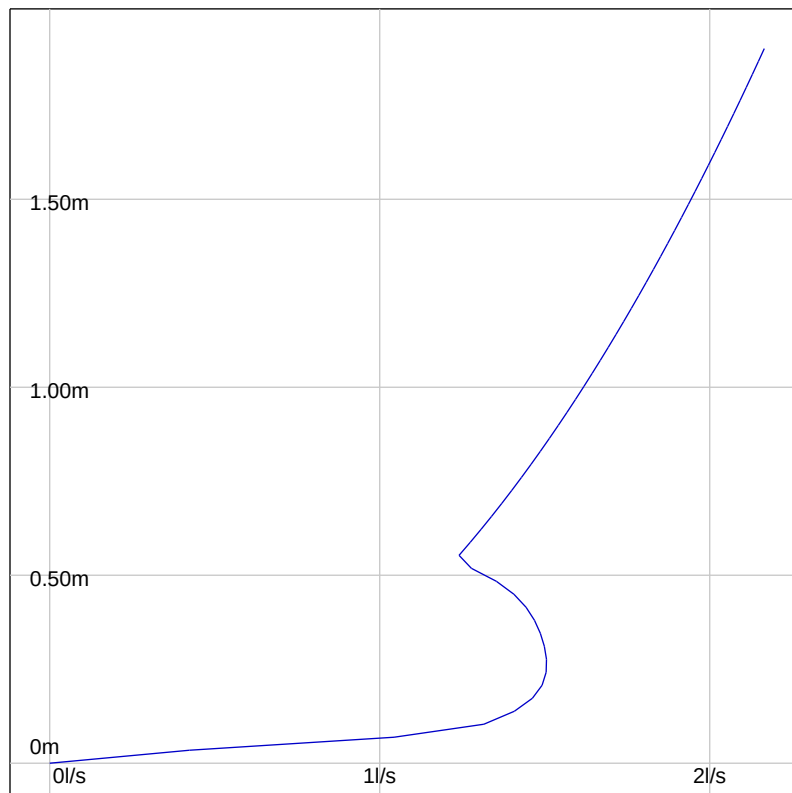


Controls within Manhole S30

Hydro-Brake® Optimum Control at Manhole S30

Model Ref	Design Depth (m)	Design Flow (l/s)	Depth Above Invert (m)	FF Head (m)	FF Flow (l/s)	KF Head (m)	KF Flow (l/s)
SHE-0060-2000-1600-2000 ID:613954	1.600	2.000	0.000	0.263	1.506	0.537	1.224

Hydro-Brake® Optimum Control at S30



Simulation Settings

FSR: M5-60=19.40, R=0.35, Locale=England and Wales

Summer (Cv: 1.00), Winter (Cv: 1.00)

Global Time of Entry: 5.0 mins

Durations (mins): 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760

Return Periods (yrs) + Climate Change: (1, +0%), (30, +40%), (100, +45%)

Simulated Rainfall Events

Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %	Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %
1Yr 15Min Winter	33.957	0.00	-0.09	30Yr+40% 600Min Summer	7.902	0.00	0.11
1Yr 15Min Summer	33.957	0.00	0.00	30Yr+40% 600Min Winter	7.902	0.00	0.11
1Yr 30Min Winter	21.996	0.00	0.00	30Yr+40% 720Min Summer	6.892	0.00	0.10
1Yr 30Min Summer	21.996	0.00	0.00	30Yr+40% 720Min Winter	6.892	0.00	0.10
1Yr 60Min Winter	13.802	0.00	0.00	30Yr+40% 960Min Summer	5.551	0.00	0.08
1Yr 60Min Summer	13.802	0.00	0.00	30Yr+40% 960Min Winter	5.551	0.00	0.08
1Yr 120Min Summer	8.541	0.00	0.00	30Yr+40% 1440Min Summer	4.087	0.00	0.04
1Yr 120Min Winter	8.541	0.00	0.00	30Yr+40% 1440Min Winter	4.087	0.00	0.04
1Yr 180Min Summer	6.444	0.00	0.00	30Yr+40% 2160Min Summer	3.004	0.00	0.00
1Yr 180Min Winter	6.444	0.00	0.00	30Yr+40% 2160Min Winter	3.004	0.00	0.00
1Yr 240Min Summer	5.283	0.00	0.00	30Yr+40% 2880Min Summer	2.413	0.00	0.00
1Yr 240Min Winter	5.283	0.00	0.00	30Yr+40% 2880Min Winter	2.413	0.00	0.00
1Yr 360Min Summer	3.985	0.00	-0.04	30Yr+40% 4320Min Summer	1.770	0.00	0.00
1Yr 360Min Winter	3.985	0.00	-0.04	30Yr+40% 4320Min Winter	1.770	0.00	0.00
1Yr 480Min Summer	3.259	0.00	-0.03	30Yr+40% 5760Min Summer	1.419	0.00	0.00
1Yr 480Min Winter	3.259	0.00	-0.03	30Yr+40% 5760Min Winter	1.419	0.00	0.00
1Yr 600Min Summer	2.789	0.00	0.00	100Yr+45% 15Min Summer	132.071	0.00	0.19
1Yr 600Min Winter	2.789	0.00	0.00	100Yr+45% 15Min Winter	132.071	0.00	0.18
1Yr 720Min Winter	2.455	0.00	0.00	100Yr+45% 30Min Summer	88.761	0.00	0.18
1Yr 720Min Summer	2.455	0.00	0.00	100Yr+45% 30Min Winter	88.761	0.00	0.18
1Yr 960Min Summer	2.008	0.00	0.00	100Yr+45% 60Min Summer	56.919	0.00	0.19
1Yr 960Min Winter	2.008	0.00	0.00	100Yr+45% 60Min Winter	56.919	0.00	0.19
1Yr 1440Min Summer	1.513	0.00	0.00	100Yr+45% 120Min Summer	35.224	0.00	0.16
1Yr 1440Min Winter	1.513	0.00	0.00	100Yr+45% 120Min Winter	35.224	0.00	0.16
1Yr 2160Min Summer	1.141	0.00	0.00	100Yr+45% 180Min Summer	26.199	0.00	0.15
1Yr 2160Min Winter	1.141	0.00	0.00	100Yr+45% 180Min Winter	26.199	0.00	0.15
1Yr 2880Min Summer	0.934	0.00	0.00	100Yr+45% 240Min Summer	21.078	0.00	0.13
1Yr 2880Min Winter	0.934	0.00	0.00	100Yr+45% 240Min Winter	21.078	0.00	0.13
1Yr 4320Min Summer	0.705	0.00	0.00	100Yr+45% 360Min Summer	15.506	0.00	0.12
1Yr 4320Min Winter	0.705	0.00	0.00	100Yr+45% 360Min Winter	15.506	0.00	0.12
1Yr 5760Min Winter	0.578	0.00	0.00	100Yr+45% 480Min Summer	12.458	0.00	0.11
1Yr 5760Min Summer	0.578	0.00	0.00	100Yr+45% 480Min Winter	12.458	0.00	0.11
30Yr+40% 15Min Summer	98.523	0.00	0.14	100Yr+45% 600Min Summer	10.503	0.00	0.10
30Yr+40% 15Min Winter	98.523	0.00	0.13	100Yr+45% 600Min Winter	10.503	0.00	0.11
30Yr+40% 30Min Summer	65.580	0.00	0.15	100Yr+45% 720Min Summer	9.132	0.00	0.10
30Yr+40% 30Min Winter	65.580	0.00	0.14	100Yr+45% 720Min Winter	9.132	0.00	0.10
30Yr+40% 60Min Summer	41.816	0.00	0.16	100Yr+45% 960Min Summer	7.315	0.00	0.09
30Yr+40% 60Min Winter	41.816	0.00	0.16	100Yr+45% 960Min Winter	7.315	0.00	0.09
30Yr+40% 120Min Summer	25.877	0.00	0.16	100Yr+45% 1440Min Summer	5.341	0.00	0.07
30Yr+40% 120Min Winter	25.877	0.00	0.16	100Yr+45% 1440Min Winter	5.341	0.00	0.07
30Yr+40% 180Min Winter	19.319	0.00	0.15	100Yr+45% 2160Min Summer	3.891	0.00	0.03
30Yr+40% 180Min Summer	19.319	0.00	0.15	100Yr+45% 2160Min Winter	3.891	0.00	0.03
30Yr+40% 240Min Summer	15.620	0.00	0.14	100Yr+45% 2880Min Summer	3.104	0.00	-0.01
30Yr+40% 240Min Winter	15.620	0.00	0.14	100Yr+45% 2880Min Winter	3.104	0.00	0.00
30Yr+40% 360Min Summer	11.565	0.00	0.13	100Yr+45% 4320Min Summer	2.253	0.00	0.00
30Yr+40% 360Min Winter	11.565	0.00	0.13	100Yr+45% 4320Min Winter	2.253	0.00	0.00
30Yr+40% 480Min Summer	9.336	0.00	0.12	100Yr+45% 5760Min Winter	1.793	0.00	0.00
30Yr+40% 480Min Winter	9.336	0.00	0.12	100Yr+45% 5760Min Summer	1.793	0.00	0.00

Simulation Results

Return Period Yrs: 1.0

Climate Change %: 0

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S46	-	0	44.997	0.000	0.000		OK
PS18	15 min Summer	8	44.966	0.028	1.185		OK
S44	15 min Summer	9	44.877	0.040	2.170		OK
S43	15 min Summer	9	44.652	0.034	2.198		OK
S42	15 min Summer	9	44.594	0.022	2.162		OK
S41	15 min Summer	8	45.073	0.029	1.696		OK
S40	15 min Summer	8	45.006	0.029	1.684		OK
S39	15 min Summer	9	44.885	0.029	1.649		OK
S38	15 min Summer	9	44.736	0.029	1.671		OK
S37	15 min Summer	9	44.659	0.051	4.913		OK
S36	15 min Summer	8	44.621	0.049	8.515		OK
S35	30 min Summer	19	43.975	0.053	6.231		OK
S34	30 min Summer	20	43.828	0.058	5.703		OK
S33	30 min Summer	20	43.142	0.032	5.740		OK
S12	15 min Summer	8	43.786	0.036	5.104		OK
S13	15 min Summer	7	43.683	0.033	4.817		OK
S16	30 min Summer	19	43.280	0.040	2.504		OK
S17	30 min Summer	20	43.178	0.018	2.178		OK
S14	15 min Summer	8	43.778	0.028	3.379		OK
S15	15 min Summer	7	43.668	0.018	3.169		OK
S18	60 min Summer	36	42.231	0.031	3.309		OK
S19	30 min Summer	20	42.189	0.059	9.061		OK
S20	30 min Summer	20	42.019	0.049	9.062		OK
S21	30 min Summer	20	40.864	0.033	9.055		OK
S22	1440 min Summer	817	39.512	0.112	0.367		OK
S23	1440 min Summer	818	39.414	0.014	0.366		OK
S24	30 min Summer	20	39.370	0.050	9.050		OK
PS17	15 min Summer	8	40.831	0.124	6.601		Surcharged
FD1	15 min Summer	9	40.796	0.096	6.378		OK
PS10	15 min Summer	9	40.771	0.071	6.407		OK
PS11	15 min Summer	10	40.638	0.118	6.106		Surcharged
PS12	15 min Summer	10	40.578	0.322	7.332		Surcharged
PS3	15 min Summer	11	40.464	0.243	8.093		Surcharged
FD2	15 min Summer	11	40.369	0.169	8.298		Surcharged
PS1	15 min Summer	12	40.298	0.125	7.960		Surcharged
PS13	15 min Winter	11	40.242	0.093	7.658		OK
PS16	15 min Winter	12	40.163	0.037	6.886		OK
PS14	15 min Summer	12	38.955	0.035	7.889		OK
S47	15 min Summer	8	40.580	0.030	2.967		OK
S32	120 min Summer	75	39.118	0.018	0.462		OK
S48	120 min Summer	75	39.104	0.018	0.470		OK
S25	15 min Summer	10	37.892	0.232	32.716		Surcharged
S26	15 min Summer	10	37.129	0.074	32.936		OK
S27	15 min Summer	10	36.653	0.118	41.463		OK
S28	600 min Winter	498	35.699	0.259	1.487		OK
S29	600 min Winter	498	35.699	0.289	1.487		Surcharged
S30	600 min Winter	498	35.699	0.369	1.486		Surcharged
S31	2160 min Summer	1581	35.146	0.021	1.505		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	15 min Summer	8	S46	PS18	0.014	0.000	0.000	0.000	OK
1.001	15 min Summer	9	PS18	S44	0.034	0.394	1.168	0.080	OK
1.002	15 min Summer	9	S44	S43	0.037	0.656	2.198	0.150	OK
1.003	15 min Summer	9	S43	S42	0.028	0.955	2.162	0.109	OK

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.004	30 min Summer	19	S42	S35	0.036	0.737	1.901	0.042	OK
2.000	15 min Summer	8	S41	S40	0.029	0.690	1.684	0.085	OK
2.001	15 min Summer	8	S40	S39	0.029	0.690	1.673	0.084	OK
2.002	15 min Summer	9	S39	S38	0.029	0.696	1.671	0.084	OK
2.003	15 min Summer	9	S38	S37	0.040	0.458	1.666	0.084	OK
2.004	15 min Summer	9	S37	S36	0.050	0.990	4.931	0.248	OK
2.005	15 min Summer	10	S36	S35	0.045	2.466	8.522	0.204	OK
1.005	30 min Summer	19	S35	S34	0.056	1.284	5.756	0.553	OK
1.006	30 min Summer	20	S34	S33	0.045	1.678	5.740	0.557	OK
1.007	30 min Summer	20	S33	S19	0.046	1.275	5.750	0.098	OK
3.000	15 min Summer	8	S12	S13	0.034	1.690	5.086	0.125	OK
3.001	30 min Summer	18	S13	S16	0.032	1.984	4.411	0.083	OK
3.002	30 min Summer	20	S16	S17	0.029	1.152	2.178	0.312	OK
3.003	30 min Summer	20	S17	S18	0.024	1.195	2.181	0.030	OK
4.000	15 min Summer	8	S14	S15	0.023	2.019	3.360	0.068	OK
4.001	30 min Summer	18	S15	S18	0.021	2.757	2.921	0.024	OK
3.004	30 min Summer	20	S18	S19	0.045	0.975	3.311	0.204	OK
1.008	30 min Summer	20	S19	S20	0.054	2.080	9.062	0.645	OK
1.009	30 min Summer	20	S20	S21	0.049	2.354	9.055	0.486	OK
1.010	30 min Summer	20	S21	S24	0.042	2.266	9.050	0.107	OK
5.000	1440 min Summer	817	S22	S23	0.013	0.494	0.367	0.014	OK
5.001	30 min Summer	20	S23	S24	0.025	0.000	0.000	0.000	OK
1.011	30 min Summer	20	S24	S25	0.050	1.739	9.029	0.243	OK
6.000	15 min Summer	9	PS17	FD1	0.096	0.840	6.463	3.652	OK
6.001	15 min Summer	9	FD1	PS10	0.082	0.934	6.407	2.558	OK
6.002	15 min Summer	10	PS10	PS11	0.084	1.184	6.409	0.863	OK
6.003	15 min Summer	10	PS11	PS12	0.100	0.856	5.838	0.485	Surcharged
6.004	15 min Summer	10	PS12	PS3	0.100	0.885	6.953	1.843	Surcharged
6.005	15 min Summer	10	PS3	FD2	0.100	1.104	8.674	2.299	Surcharged
6.006	15 min Summer	11	FD2	PS1	0.100	1.019	8.006	1.633	Surcharged
6.007	15 min Winter	12	PS1	PS13	0.096	1.003	7.729	1.577	OK
6.008	15 min Summer	11	PS13	PS16	0.064	1.516	8.051	1.643	OK
6.009	15 min Summer	12	PS16	PS14	0.036	3.137	7.889	0.285	OK
6.010	15 min Summer	12	PS14	S25	0.067	2.541	8.039	0.266	OK
7.000	15 min Summer	9	S47	S32	0.019	2.465	2.966	0.062	OK
7.001	120 min Summer	75	S32	S48	0.018	0.497	0.470	0.070	OK
7.002	120 min Summer	75	S48	S25	0.018	0.497	0.470	0.070	OK
1.012	15 min Summer	10	S25	S26	0.150	1.864	32.936	1.347	Surcharged
1.013	15 min Summer	10	S26	S27	0.096	1.124	32.963	0.034	OK
1.014	15 min Summer	10	S27	S28	0.119	1.064	42.093	0.090	OK
1.015	600 min Winter	498	S28	S29	0.274	0.260	6.395	0.002	OK
1.016	180 min Summer	122	S29	S30	0.225	0.537	12.892	0.211	OK
1.017	2160 min Summer	1581	S30	S31	0.021	0.791	1.505	0.019	OK

Return Period Yrs: 30.0

Climate Change %: 40

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S46	-	0	44.997	0.000	0.000		OK
PS18	15 min Summer	8	44.987	0.049	3.438		OK
S44	15 min Summer	8	44.907	0.070	6.499		OK
S43	15 min Summer	9	44.677	0.058	6.403		OK
S42	15 min Summer	9	44.610	0.038	6.409		OK
S41	15 min Summer	8	45.094	0.051	4.923		OK
S40	15 min Summer	8	45.027	0.050	4.901		OK
S39	15 min Summer	8	44.906	0.050	4.874		OK
S38	15 min Summer	9	44.757	0.050	4.814		OK
S37	15 min Summer	8	44.703	0.094	14.577		OK
S36	15 min Summer	8	44.655	0.083	25.059		OK
S35	30 min Summer	21	44.092	0.170	10.036		Surcharged
S34	30 min Summer	22	43.954	0.184	9.904		Surcharged
S33	120 min Summer	60	43.152	0.042	9.934		OK
S12	15 min Summer	8	43.813	0.063	14.809		OK
S13	15 min Summer	8	43.704	0.054	14.780		OK
S16	30 min Summer	19	43.333	0.093	7.287		OK
S17	30 min Summer	19	43.194	0.034	8.279		OK
S14	15 min Summer	8	43.797	0.047	9.804		OK
S15	15 min Summer	8	43.678	0.028	9.779		OK
S18	60 min Summer	40	42.323	0.123	7.491		Surcharged
S19	60 min Summer	40	42.308	0.178	17.368		Surcharged
S20	60 min Summer	40	42.047	0.077	17.367		OK
S21	60 min Summer	40	40.877	0.046	17.367		OK
S22	120 min Summer	69	39.548	0.148	6.081		OK
S23	120 min Summer	69	39.457	0.057	6.033		OK
S24	60 min Summer	39	39.404	0.084	22.618		OK
PS17	15 min Summer	10	41.519	0.811	15.226		Surcharged
FD1	15 min Summer	12	41.404	0.704	6.623		Surcharged
PS10	15 min Summer	12	41.368	0.668	7.581		Surcharged
PS11	15 min Summer	12	41.174	0.654	7.787		Surcharged
PS12	15 min Summer	11	41.067	0.811	9.782		Surcharged
PS3	30 min Summer	19	40.842	0.622	13.060		Surcharged
FD2	30 min Summer	21	40.626	0.426	11.972		Surcharged
PS1	30 min Summer	22	40.469	0.296	11.802		Surcharged
PS13	30 min Summer	22	40.339	0.189	11.832		Surcharged
PS16	30 min Summer	22	40.173	0.046	11.838		OK
PS14	15 min Summer	10	39.176	0.256	10.414		Surcharged
S47	15 min Summer	7	40.599	0.049	8.227		OK
S32	60 min Summer	37	39.141	0.041	2.639		OK
S48	60 min Summer	38	39.127	0.041	2.440		OK
S25	15 min Summer	9	39.045	1.385	91.340		Surcharged
S26	15 min Summer	10	37.174	0.119	87.845		OK
S27	15 min Summer	9	36.735	0.200	117.479		OK
S28	960 min Winter	919	36.585	1.145	2.457		OK
S29	960 min Winter	919	36.585	1.175	2.403		Surcharged
S30	960 min Winter	919	36.585	1.255	1.781		Surcharged
S31	960 min Winter	919	35.148	0.023	1.777		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	15 min Summer	8	S46	PS18	0.024	0.000	0.000	0.000	OK
1.001	15 min Summer	8	PS18	S44	0.059	0.524	3.405	0.232	OK
1.002	15 min Summer	9	S44	S43	0.064	0.893	6.403	0.436	OK
1.003	15 min Summer	9	S43	S42	0.048	1.313	6.409	0.323	OK
1.004	30 min Summer	18	S42	S35	0.092	0.928	5.695	0.125	OK
2.000	15 min Summer	8	S41	S40	0.050	0.938	4.901	0.247	OK
2.001	15 min Summer	8	S40	S39	0.050	0.937	4.874	0.246	OK
2.002	15 min Summer	9	S39	S38	0.050	0.938	4.824	0.243	OK

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
2.003	15 min Summer	9	S38	S37	0.072	0.586	4.849	0.244	OK
2.004	15 min Summer	8	S37	S36	0.089	1.331	14.431	0.727	OK
2.005	30 min Summer	18	S36	S35	0.109	2.266	22.496	0.537	OK
1.005	30 min Summer	16	S35	S34	0.100	1.442	10.953	1.053	Surcharged
1.006	30 min Summer	22	S34	S33	0.071	1.832	9.912	0.962	OK
1.007	30 min Summer	22	S33	S19	0.096	1.325	9.911	0.169	OK
3.000	15 min Summer	8	S12	S13	0.058	2.333	14.780	0.364	OK
3.001	30 min Summer	17	S13	S16	0.068	2.181	13.152	0.246	OK
3.002	30 min Summer	19	S16	S17	0.063	1.593	8.279	1.186	OK
3.003	60 min Summer	39	S17	S18	0.076	1.359	7.300	0.100	OK
4.000	15 min Summer	8	S14	S15	0.038	2.826	9.779	0.198	OK
4.001	60 min Summer	39	S15	S18	0.068	2.964	6.641	0.056	OK
3.004	60 min Winter	55	S18	S19	0.100	1.379	7.676	0.473	Surcharged
1.008	60 min Summer	40	S19	S20	0.088	2.367	17.367	1.236	OK
1.009	60 min Summer	40	S20	S21	0.077	2.693	17.367	0.932	OK
1.010	60 min Summer	40	S21	S24	0.065	2.637	17.366	0.205	OK
5.000	120 min Summer	69	S22	S23	0.052	1.098	6.033	0.224	OK
5.001	120 min Summer	69	S23	S24	0.070	0.740	6.032	0.287	OK
1.011	60 min Summer	39	S24	S25	0.084	2.211	22.616	0.610	OK
6.000	15 min Winter	8	PS17	FD1	0.100	1.899	14.913	8.427	Surcharged
6.001	15 min Winter	9	FD1	PS10	0.100	1.164	9.142	3.650	Surcharged
6.002	15 min Winter	12	PS10	PS11	0.100	1.166	7.628	1.027	Surcharged
6.003	15 min Winter	14	PS11	PS12	0.100	1.020	8.011	0.665	Surcharged
6.004	30 min Summer	20	PS12	PS3	0.100	1.245	9.780	2.592	Surcharged
6.005	30 min Summer	17	PS3	FD2	0.100	1.740	13.670	3.623	Surcharged
6.006	30 min Summer	20	FD2	PS1	0.100	1.520	11.937	2.436	Surcharged
6.007	30 min Summer	21	PS1	PS13	0.100	1.508	11.846	2.417	Surcharged
6.008	30 min Summer	22	PS13	PS16	0.073	1.923	11.838	2.415	OK
6.009	15 min Summer	14	PS16	PS14	0.072	3.471	11.710	0.422	OK
6.010	15 min Winter	11	PS14	S25	0.100	2.084	12.940	0.428	Surcharged
7.000	30 min Summer	17	S47	S32	0.036	2.611	7.671	0.160	OK
7.001	60 min Summer	38	S32	S48	0.041	0.796	2.441	0.362	OK
7.002	60 min Summer	38	S48	S25	0.041	0.795	2.443	0.362	OK
1.012	30 min Summer	17	S25	S26	0.150	4.838	85.489	3.497	Surcharged
1.013	15 min Summer	10	S26	S27	0.159	1.486	88.068	0.091	OK
1.014	15 min Summer	9	S27	S28	0.199	1.424	116.937	0.251	OK
1.015	960 min Winter	919	S28	S29	1.160	0.272	13.689	0.004	OK
1.016	15 min Winter	13	S29	S30	0.225	0.593	16.265	0.266	OK
1.017	960 min Winter	919	S30	S31	0.023	0.831	1.777	0.022	OK

Return Period Yrs: 100.0

Climate Change %: 45

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S46	-	0	44.997	0.000	0.000		OK
PS18	15 min Summer	8	44.995	0.057	4.608		OK
S44	15 min Summer	8	44.920	0.083	8.716		OK
S43	15 min Summer	9	44.687	0.069	8.580		OK
S42	15 min Summer	9	44.616	0.044	8.604		OK
S41	15 min Summer	8	45.103	0.059	6.600		OK
S40	15 min Summer	8	45.036	0.059	6.572		OK
S39	15 min Summer	8	44.915	0.059	6.540		OK
S38	15 min Summer	9	44.766	0.059	6.444		OK
S37	15 min Summer	8	44.727	0.118	19.576		OK
S36	15 min Summer	8	44.673	0.101	33.583		OK
S35	30 min Summer	22	44.177	0.255	10.423		Surcharged
S34	30 min Summer	23	44.026	0.256	10.376		Surcharged
S33	30 min Summer	23	43.153	0.043	10.379		OK
S12	15 min Summer	8	43.824	0.074	19.852		OK
S13	15 min Summer	8	43.713	0.063	19.816		OK
S16	30 min Summer	19	43.371	0.131	9.818		Surcharged
S17	30 min Summer	19	43.195	0.035	8.837		OK
S14	15 min Summer	8	43.804	0.054	13.143		OK
S15	15 min Summer	8	43.683	0.033	13.113		OK
S18	60 min Summer	42	42.387	0.187	9.211		Surcharged
S19	60 min Summer	42	42.366	0.236	19.247		Surcharged
S20	30 min Summer	22	42.052	0.082	18.630		OK
S21	60 min Summer	43	40.879	0.048	19.237		OK
S22	60 min Summer	36	39.568	0.168	11.059		OK
S23	60 min Summer	36	39.481	0.081	11.325		OK
S24	15 min Summer	10	39.464	0.144	18.097		OK
PS17	15 min Summer	10	41.979	1.271	20.411		Flood Risk
FD1	30 min Summer	20	41.820	1.120	9.766		Surcharged
PS10	30 min Summer	21	41.767	1.067	8.601		Flood Risk
PS11	30 min Summer	21	41.515	0.995	8.852		Flood Risk
PS12	30 min Summer	20	41.377	1.121	11.281		Flood Risk
PS3	30 min Summer	19	41.076	0.856	15.640		Surcharged
FD2	30 min Summer	22	40.780	0.580	13.744		Surcharged
PS1	30 min Summer	22	40.569	0.396	13.783		Surcharged
PS13	30 min Summer	23	40.394	0.245	13.713		Surcharged
PS16	30 min Winter	27	40.176	0.050	13.366		OK
PS14	15 min Summer	10	39.556	0.636	11.574		Surcharged
S47	15 min Summer	7	40.606	0.056	11.028		OK
S32	30 min Summer	19	39.180	0.080	6.992		OK
S48	15 min Summer	9	39.206	0.120	12.685		Surcharged
S25	15 min Summer	9	39.412	1.752	113.696		Surcharged
S26	15 min Summer	9	37.182	0.127	99.451		OK
S27	960 min Winter	814	37.001	0.466	3.291		OK
S28	960 min Winter	815	37.001	1.561	2.826		OK
S29	1440 min Winter	1116	37.000	1.590	3.928		Surcharged
S30	1440 min Winter	1118	37.000	1.670	3.986	5.914	Flood
S31	960 min Summer	905	35.150	0.025	2.027		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	15 min Summer	8	S46	PS18	0.028	0.000	0.000	0.000	OK
1.001	15 min Summer	8	PS18	S44	0.070	0.566	4.567	0.311	OK
1.002	15 min Summer	9	S44	S43	0.076	0.963	8.580	0.584	OK
1.003	15 min Summer	9	S43	S42	0.056	1.420	8.604	0.433	OK
1.004	15 min Summer	9	S42	S35	0.097	1.058	8.607	0.188	OK
2.000	15 min Summer	8	S41	S40	0.059	1.016	6.572	0.331	OK
2.001	15 min Summer	8	S40	S39	0.059	1.016	6.540	0.329	OK
2.002	15 min Summer	9	S39	S38	0.059	1.016	6.477	0.326	OK

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
2.003	15 min Summer	9	S38	S37	0.088	0.622	6.493	0.327	OK
2.004	15 min Summer	8	S37	S36	0.110	1.403	19.336	0.974	OK
2.005	15 min Summer	9	S36	S35	0.125	2.870	33.510	0.801	OK
1.005	30 min Winter	14	S35	S34	0.100	1.436	10.830	1.041	Surcharged
1.006	30 min Summer	23	S34	S33	0.071	1.811	10.379	1.008	OK
1.007	30 min Summer	23	S33	S19	0.096	1.319	10.379	0.177	OK
3.000	15 min Summer	8	S12	S13	0.068	2.529	19.816	0.487	OK
3.001	30 min Summer	18	S13	S16	0.089	2.310	17.801	0.333	OK
3.002	30 min Summer	19	S16	S17	0.068	1.567	8.837	1.266	OK
3.003	30 min Summer	20	S17	S18	0.093	1.445	8.836	0.121	OK
4.000	15 min Summer	8	S14	S15	0.043	3.088	13.113	0.265	OK
4.001	60 min Summer	35	S15	S18	0.086	3.139	9.039	0.076	OK
3.004	60 min Summer	42	S18	S19	0.100	1.234	8.916	0.549	Surcharged
1.008	30 min Summer	27	S19	S20	0.091	2.547	18.977	1.351	OK
1.009	60 min Summer	43	S20	S21	0.091	2.702	19.237	1.032	OK
1.010	15 min Summer	17	S21	S24	0.094	2.568	18.153	0.214	OK
5.000	60 min Summer	36	S22	S23	0.075	1.288	11.325	0.420	OK
5.001	15 min Summer	14	S23	S24	0.106	0.641	4.871	0.232	OK
1.011	15 min Summer	15	S24	S25	0.147	2.216	22.808	0.615	OK
6.000	15 min Winter	9	PS17	FD1	0.100	2.479	19.468	11.001	Surcharged
6.001	30 min Summer	17	FD1	PS10	0.100	1.386	10.887	4.346	Surcharged
6.002	30 min Summer	20	PS10	PS11	0.100	1.154	8.901	1.198	Surcharged
6.003	15 min Winter	15	PS11	PS12	0.100	1.182	9.286	0.771	Surcharged
6.004	30 min Summer	21	PS12	PS3	0.100	1.450	11.392	3.019	Surcharged
6.005	30 min Summer	17	PS3	FD2	0.100	2.065	16.221	4.299	Surcharged
6.006	30 min Summer	21	FD2	PS1	0.100	1.763	13.846	2.825	Surcharged
6.007	30 min Summer	22	PS1	PS13	0.100	1.750	13.741	2.804	Surcharged
6.008	30 min Winter	27	PS13	PS16	0.075	2.174	13.679	2.791	OK
6.009	30 min Summer	23	PS16	PS14	0.075	3.575	13.725	0.495	OK
6.010	15 min Winter	13	PS14	S25	0.100	2.255	17.708	0.586	Surcharged
7.000	30 min Summer	19	S47	S32	0.057	2.712	10.420	0.218	OK
7.001	30 min Summer	20	S32	S48	0.086	0.985	6.632	0.983	OK
7.002	30 min Summer	20	S48	S25	0.100	0.988	6.659	0.987	Surcharged
1.012	30 min Summer	17	S25	S26	0.150	5.516	97.477	3.987	Surcharged
1.013	960 min Winter	814	S26	S27	0.244	0.954	16.724	0.017	OK
1.014	960 min Winter	815	S27	S28	0.513	0.845	19.426	0.042	OK
1.015	960 min Winter	815	S28	S29	1.576	0.315	17.987	0.006	OK
1.016	30 min Winter	17	S29	S30	0.225	0.512	15.563	0.255	OK
1.017	1440 min Winter	1116	S30	S31	0.025	0.861	2.027	0.025	OK

Appendix G

SUMMARY TABLE		DESIGN CONDITIONS			
		1	2	3	4
Land Use Type Pollution Hazard Level Pollution Hazard Indices TSS Metals Hydrocarbons	Low traffic roads (e.g. residential roads and general access roads, < 300 traffic movements/day) Low 0.5 0.4 0.4				
SuDS components proposed		SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B			
Component 1	Filter strip				
Component 2	Swale				
Component 3	None				
SuDS Pollution Mitigation Indices TSS Metals Hydrocarbons	0.65 0.7 0.8				
Groundwater protection type Groundwater protection Pollution Mitigation Indices TSS Metals Hydrocarbons	None 0 0 0				
Combined Pollution Mitigation Indices TSS Metals Hydrocarbons Acceptability of Pollution Mitigation TSS Metals Hydrocarbons	0.65 0.7 0.8 Sufficient Sufficient Sufficient	Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see Chapter 7 The SuDS design process). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies such as Natural England			

SUMMARY TABLE		DESIGN CONDITIONS			
		1	2	3	4
Land Use Type Pollution Hazard Level Pollution Hazard Indices TSS Metals Hydrocarbons	Low traffic roads (e.g. residential roads and general access roads, < 300 traffic movements/day) Low 0.5 0.4 0.4				
SuDS components proposed		Detailed assessment of performance of designed component in reducing inflow concentrations of each pollutant type required as evidence of adopted indices. Enter indices approved by the environmental regulator in appropriate 'User Defined Indices' row below	SEPA only considers proprietary treatment systems as appropriate in exceptional circumstances where other types of SuDS component are not practicable. Proprietary treatment systems may also be considered appropriate for existing sites that are causing pollution where there is a requirement to retrofit treatment. WAT-RM-08 (SEPA, 2014) also provides a flow chart with a summary of checks on suitability of a proprietary system	See Chapter 15 Proprietary treatment systems for approaches to demonstrate product performance. Note: a British Water/Environment Agency assessment Code of Practice is currently under development that will allow manufacturers to complete an agreed test protocol for systems intended to treat contaminated surface water runoff. Full details can be found at: http://www.britishwater.co.uk/Publications/codes-of-practise.aspx .	
Component 1	Vortex Separator				
Component 2	None				
Component 3	None				
SuDS Pollution Mitigation Indices TSS Metals Hydrocarbons	 0.5 0.4 0.8				
Groundwater protection type Groundwater protection Pollution Mitigation Indices TSS Metals Hydrocarbons	None 0 0 0				
Combined Pollution Mitigation Indices TSS Metals Hydrocarbons Acceptability of Pollution Mitigation TSS Metals Hydrocarbons	 0.5 0.4 0.8 Sufficient Sufficient Sufficient	Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see Chapter 7 The SuDS design process). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies such as Natural England			

SUMMARY TABLE		DESIGN CONDITIONS			
		1	2	3	4
Land Use Type	Residential parking				
Pollution Hazard Level	Low				
Pollution Hazard Indices					
TSS	0.5				
Metals	0.4				
Hydrocarbons	0.4				
SuDS components proposed		SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B			
Component 1	Vortex Separator				
Component 2	None				
Component 3	None				
SuDS Pollution Mitigation Indices					
TSS	0.7				
Metals	0.6				
Hydrocarbons	0.7				
Groundwater protection type	None				
Groundwater protection					
Pollution Mitigation Indices					
TSS	0				
Metals	0				
Hydrocarbons	0				
Combined Pollution Mitigation Indices		Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see Chapter 7 The SuDS design process). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies such as Natural England			
TSS	0.7				
Metals	0.6				
Hydrocarbons	0.7				
Acceptability of Pollution Mitigation					
TSS	Sufficient				
Metals	Sufficient				
Hydrocarbons	Sufficient				

SUMMARY TABLE		DESIGN CONDITIONS			
		1	2	3	4
Land Use Type Pollution Hazard Level Pollution Hazard Indices TSS Metals Hydrocarbons	Residential roofing Very low 0.2 0.2 0.05				
SuDS components proposed		Detailed assessment of performance of designed component in reducing inflow concentrations of each pollutant type required as evidence of adopted indices. Enter indices approved by the environmental regulator in appropriate 'User Defined Indices' row below	SEPA only considers proprietary treatment systems as appropriate in exceptional circumstances where other types of SuDS component are not practicable. Proprietary treatment systems may also be considered appropriate for existing sites that are causing pollution where there is a requirement to retrofit treatment. WAT-RM-08 (SEPA, 2014) also provides a flow chart with a summary of checks on suitability of a proprietary system	See Chapter 15 Proprietary treatment systems for approaches to demonstrate product performance. Note: a British Water/Environment Agency assessment Code of Practice is currently under development that will allow manufacturers to complete an agreed test protocol for systems intended to treat contaminated surface water runoff. Full details can be found at: http://www.britishwater.co.uk/Publications/codes-of-practise.aspx .	
Component 1	Vortex Separator				
Component 2	None				
Component 3	None				
SuDS Pollution Mitigation Indices TSS Metals Hydrocarbons	 0.5 0.4 0.8				
Groundwater protection type Groundwater protection Pollution Mitigation Indices TSS Metals Hydrocarbons	None 0 0 0				
Combined Pollution Mitigation Indices TSS Metals Hydrocarbons Acceptability of Pollution Mitigation TSS Metals Hydrocarbons	 0.5 0.4 0.8 Sufficient Sufficient Sufficient	Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see Chapter 7 The SuDS design process). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies such as Natural England			