



LAND NORTH OF GUILDFORD ROAD, RUDGWICK

FLOOD RISK ASSESSMENT & DRAINAGE STRATEGY

MAY 2025

WELBECK STRATEGIC LAND IV LLP

RESIDENTIAL SCHEME
LAND NORTH OF GUILDFORD ROAD
RUDGWICK

FLOOD RISK ASSESSMENT & DRAINAGE STRATEGY

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RESIDENTIAL SCHEME
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RUDGWICK

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1. EXECUTIVE SUMMARY

- 1.1 This Flood Risk Assessment (FRA) and Drainage Strategy has been prepared by Paul Basham Associates on behalf of Welbeck Strategic Land IV LLP (Welbeck Land) to support an outline planning application for a 90-unit residential site. The land is located to the North of Guildford Road and to the east of Lynwick street. The nearest postcode is RH12 3JP.
- 1.2 The development is located entirely in Flood Zone 1
- 1.3 Residual flood risk from:
- Fluvial and tidal flooding is considered to be **very low**.
 - Reservoir flooding is considered to be **very low**.
 - Surface water flooding is considered to be **very low**.
 - Groundwater flooding is considered to be **very low**.
 - Sewer flooding is considered to be **low**.
- 1.4 BGS mapping, local borehole logs and the BGS infiltration SuDS GeoReport indicate the site is underlain by Weald Clay formation, with minimal potential for infiltration. Additionally, no superficial deposits that may have infiltration potential were recorded on site. Therefore, drainage through infiltration is not considered a viable solution.
- 1.5 The surface water drainage strategy involves capturing runoff at source, retaining it on-site within attenuation basins and attenuation crates, and discharging it into the existing watercourse located approximately 170m west of the site boundary, adjacent to Loxwood Road.
- 1.6 There are isolated areas of low surface water flood risk present on site, a small area located in the southeast corner and a larger area located in the centre of the development. The flood risk will be managed through the use of levels and diverted into the open space areas of the site.
- 1.7 All run-off (up to and including the 1-in-100-year rainfall event (+45% Climate Change)) shall be no greater the proposed impermeable area's Q_{bar} (17.8 l/s), per section 3.3.1 of The CIRIA SuDS manual. The flow rate will be restricted by a Hydrobrake flow control.
- 1.8 Foul water will be directed to an existing Southern Water manhole (Ref: 9901) located on Guildford Road, near the site entrance. The connection will be subject to a Section 106 agreement.

2. INTRODUCTION

- 2.1 This Flood Risk Assessment (FRA) and Drainage Strategy has been prepared by Paul Basham Associates on behalf of Welbeck Strategic Land IV LLP (Welbeck Land) to support an outline planning application for a 90-unit residential site. The land is located to the North of Guildford Road and to the east of Lynwick street. The nearest postcode is RH12 3JP.
- 2.2 The plot size is approximately 4.41ha and the land is currently open greenfield with a row of trees running through the field as shown below in *Figure 1*.



Figure 1: Site Location Plan (Source Google Maps)

Development Proposals

- 2.3 The development proposals for the site include a residential scheme comprising 90 dwellings, parking spaces, community orchard, and public open space including SuDS features. The proposed plan is being submitted as an outline planning application, with the indicative site layout provided in **Appendix A**.

3. SITE DESCRIPTION

Topography

- 3.1 The site's topography generally slopes from north to south with the highest point at 35.2m AOD in the northwest and the lowest point at 27.64m AOD in the southeast. The full topographical survey can be found in **Appendix B**.

Geology

- 3.2 A review of the British Geological Survey (BGS) mapping indicates that the bedrock geology beneath the site is “Weald Clay Formation - Mudstone. Sedimentary bedrock formed between 133.9 and 126.3 million years ago during the Cretaceous period.” Figure 2 below.



Figure 2: BGS bedrock Geology

- 3.3 The DEFRA 'Magic Map' Groundwater Vulnerability Maps show the vulnerability of groundwater to a pollutant discharged at ground level based on hydrological, geological, hydrogeological and soil properties. *Figure 3* Indicates that the site lies within an area of unproductive groundwater vulnerability.

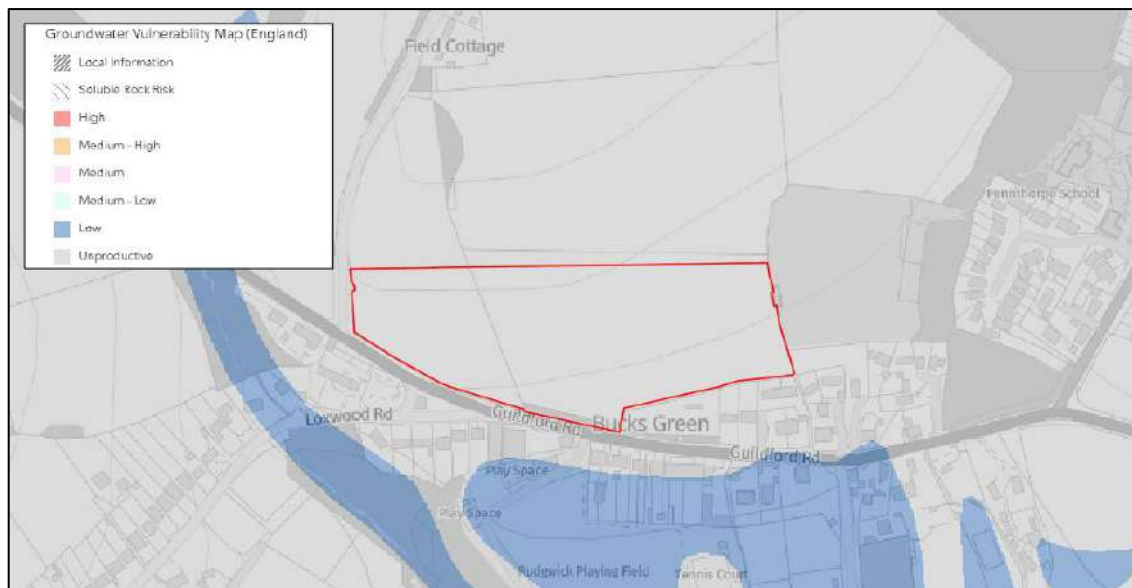


Figure 3: Groundwater vulnerability map (Magic)

- 3.4 Figure 4 from the BGS website indicates the presence of five boreholes located approximately 450m southeast of the site.

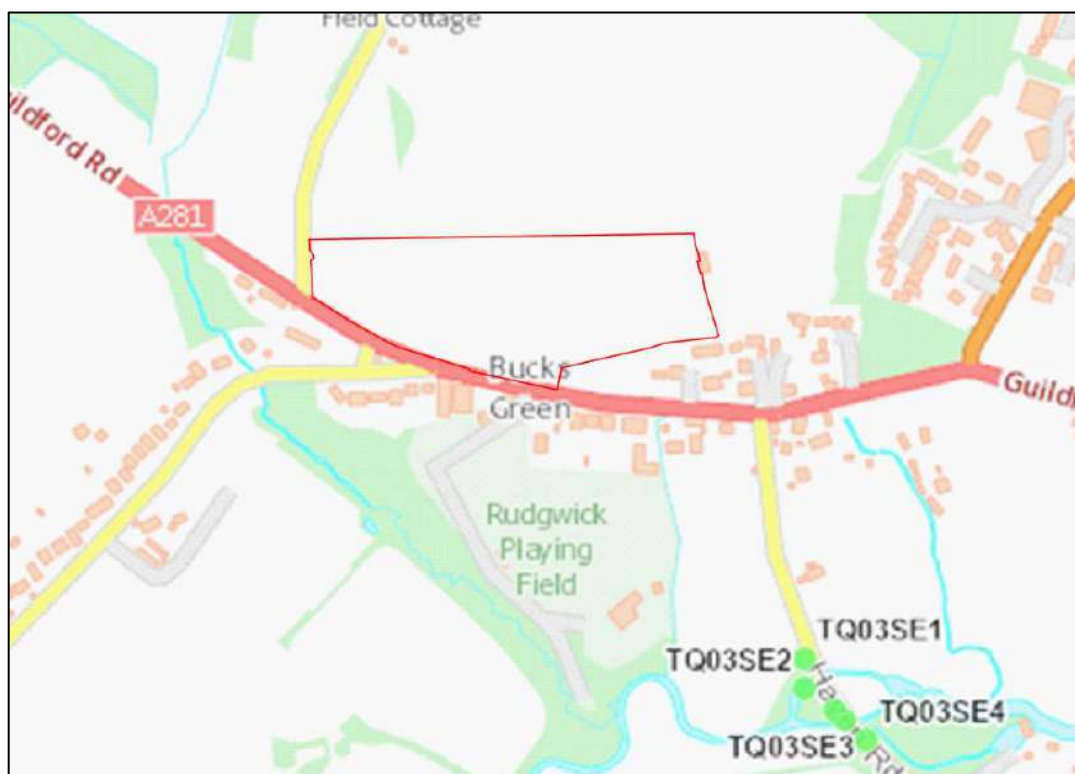


Figure 4: BGS borehole map

- 3.5 The closest of the five boreholes, referenced as TQ03SE2, indicates that the soil consists of soft to firm brown/blue mottled clay (Weald Clay) extending to a depth of 24m BGL, with no groundwater depth recorded. Similarly, the second nearest borehole (Ref: TQ03SE2) also encountered no groundwater and recorded soft to firm brown/blue mottled clay with traces of peat (alluvium) down to 35m BGL, followed by stiff to very stiff blue shaly clay (Weald Clay) extending an additional 10m. The borehole logs are shown in **Appendix C**.
- 3.6 Soakage tests were undertaken by Ground & Water in four locations on the 19th of December, the tests showed a breakdown of Weald Clay Formation. Over the four locations it was not possible to calculate the infiltration rate. The trial pits did not drain to 75% or below over a period of two hours therefore the test did not meet BRE365 soakage test requirements. Given this, infiltration is considered to be unviable on the site. The full report is available in **Appendix D**
- 3.7 The BGS Infiltration SuDS Geo-Report (**Appendix E**) was obtained to review the subsurface conditions proposed for the site. The report indicated that the bedrock permeability is likely to be poorly draining.

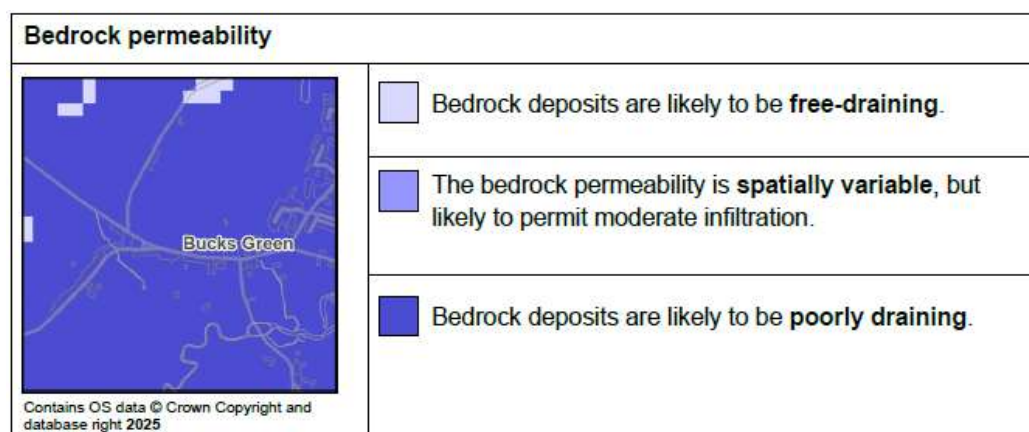


Figure 5 BGS SuDS Infiltration Geo-Report - Bedrock Permeability Extract

- 3.8 Given the ground conditions and considering that the site is entirely underlain by Weald Clay Formation, which is characterised by low permeability, infiltration is not considered a feasible drainage solution, and the proposed strategy is to discharge to a nearby watercourse.

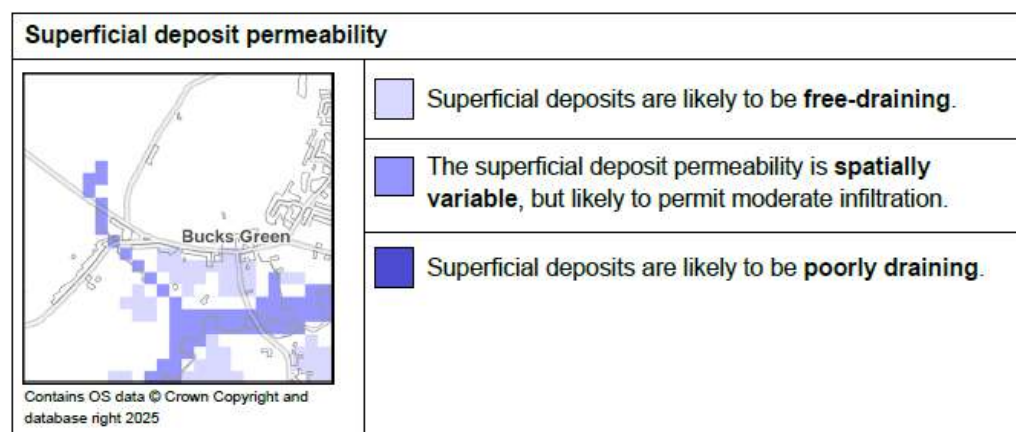


Figure 6: BGS SuDS Infiltration Geo-Report - Superficial Deposit Permeability Extract

Hydrogeology

3.9 The DEFRA (Department for Environment, Food & Rural Affairs) “Magic Map” shows the location and classification of underlying aquifers. From the mapping shown in *Figure 7* it can be considered that no underlying aquifers are present on the site.

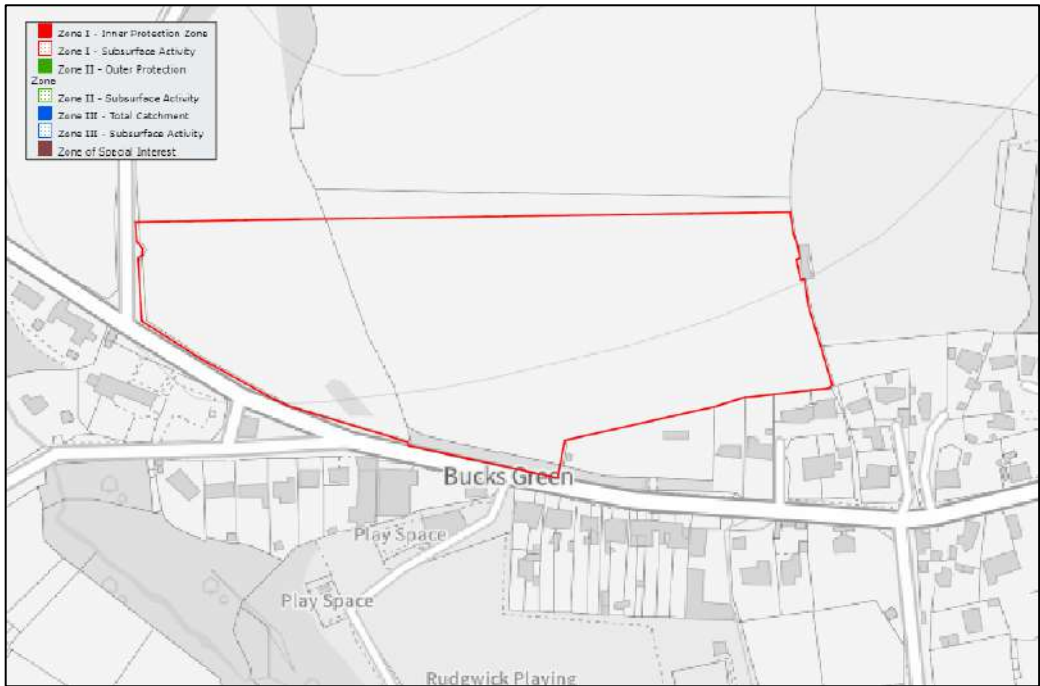


Figure 7: EA Source Protection Zones (Source: Magic map)

3.10 The BGS Infiltration SuDS Geo-Report (**Appendix E**) indicates that the site is split between having groundwater levels deeper than 5m BGL and less than 3m BGL. To inform the detail design of the drainage, further, groundwater monitoring shall be undertaken ahead of detail design stage to inform the drainage design. (*Figure 8*)

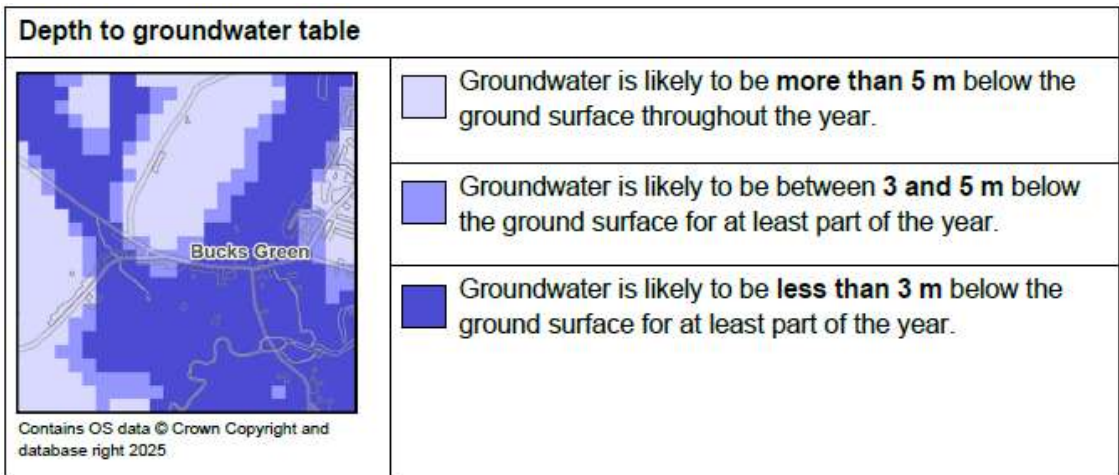


Figure 8: BGS SuDS Infiltration Geo-Report - Depth to Groundwater

Hydrology

- 3.11 There is an existing watercourse located roughly 130m to the southwest of the site. This watercourse is a tributary of the river Arun.

Public Sewer

- 3.12 Based on the sewer mapping provided by Southern Water (**Appendix F**), there are no nearby surface water sewers. There is an existing foul water sewer located within Guildford Road to the south of the site.

Pre-development drainage, greenfield rates

- 3.13 The greenfield run-off rates for the existing site have been estimated using the HR Wallingford online calculator on the UK SuDS website using the FEH statistical method. The Q_{bar} for the 2.72ha developable area of the site is estimated to be 17.8l/s summary of run off rates are shown below. The full report can be found in **Appendix G**.

Q_{bar} (l/s)	17.80
1 in 2 years (l/s)	15.6
1 in 30 years (l/s)	40.8
1 in 100 years (l/s)	56.6

Table 1: Greenfield runoff rates

Existing Foul Water Drainage

- 3.14 There is no existing foul drainage on site, the nearest foul drainage connection is located to the south of the site. Shown on Southern Water sewer mapping (**Appendix F**).

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

- 4.2 2024 updated National Planning Policy Framework (NPPF) and the associated 2022 updated Planning Practice Guidance (PPG) by the Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government

- 2022 updated EA 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 2016 (updated in 2022).

Regional Planning policy

- West Sussex County Council Local Flood Risk Management Strategy 2021-2023
- West Sussex Local Flood Risk Management Strategy (2013-2018)
- West Sussex's LLFA Policy for Management of Surface Water

Local Planning Policy

- 4.3 The Horsham District Council local plan contains the following policies relating to flooding, drainage, and surface water:
- Policy 24 Environmental Protection
 - Policy 31 Green Infrastructure and Biodiversity
 - Policy 35 Climate Change
 - Policy 38 Flooding

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: “The surface water management needs to meet requirements set out in either your local authority’s Surface Water Management Plan (SWMP), Strategic Flood Risk Assessment (SFRA) and Building Regulations Part H. Emergency escape plans for any parts of a building that are below the estimated flood level are required”
- 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”.
- SuDS Policy 2 of WSCC LLFA Policy for management of surface water states: “The drainage system must be designed to operate without any flooding occurring during any rainfall event up to (and including) the critical 1 in 30-year storm (3.33% AEP). The system must also be able to accommodate the rainfall generated by events of varying durations and intensities up to (and including) the critical, climate change adjusted 1 in 100-year storm (1% AEP) without any on-site property flooding and without exacerbating the off-site flood-risk. Sufficient steps are to be taken to ensure that any surface flows between the 1 in 30 and 1 in 100-year events are retained on site. Storage should be based upon analyses of a range of winter and summer storm profiles to determine a critical storm event.”

- Horsham DC *Policy 24- Environmental Protection, Section 3* promotes ensuring developments “Maintain or improve the environmental quality of any watercourses, groundwater and drinking water supplies, and prevents contaminated run-off to surface water sewers”.
- Horsham DC *Policy 35- Climate Change, Section 2* promotes developments being adaptive to climate change through the “Use of green infrastructure and dual use SuDS to help absorb heat, reduce surface water runoff, provide flood storage capacity and assist habitat migration”
- Horsham DC *Policy 38 – Flooding*. An extract of Policy 38 is shown in *Figure 9*.

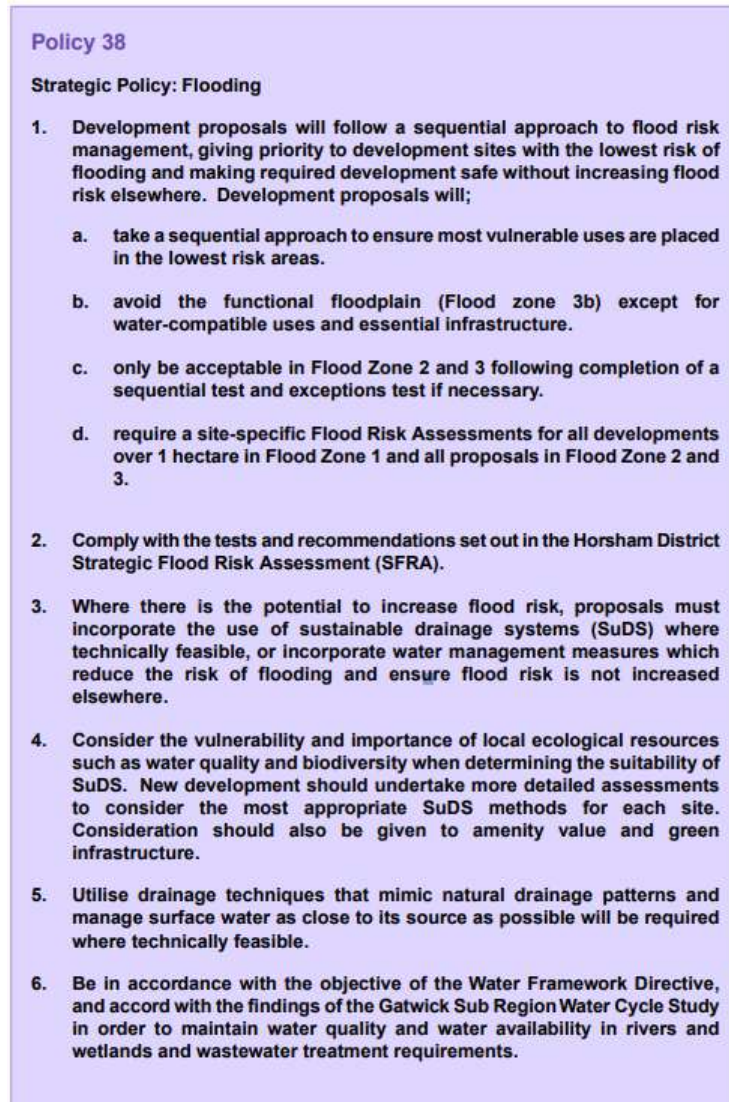


Figure 9: Extract for HDC Planning Framework 2015 - Policy 38

5. CLIMATE CHANGE

Peak Rainfall Intensity Allowance

- 5.1 The “Flood Risk Assessments: Climate Change Allowances Guidance” 2016 (updated in 2022) published by the EA indicates that climate change is currently expected to result in increased peak rainfall and rising sea levels.
- 5.2 **Table 2** & **Table 3** show anticipated changes in peak rainfall intensity in small and urban catchments within England. **Table 2** shows the climate change allowance for 1 in 30-year events (3.3% AEP Events) and **Table 3** shows the climate change allowance for 1 in 100-year events (1% AEP Events)
- 5.3 The development is classed as more vulnerable as it is a housing development, and the design life is approximately 100 years. Accordingly, the upper end allowance has been selected for the climate change.
- 5.4 The peak rainfall intensity based on the upper end allowance is therefore, 40% and 45% for a 3.3% AEP and a 1% AEP respectively.

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

Table 2: Peak Rainfall Intensity allowance in small and urban catchments. 3.3% AEP Events

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

Table 3: Peak Rainfall Intensity allowance in small and urban catchments. 1% AEP Events

Source: <https://environment.data.gov.uk/hydrology/climate-change-allowances/rainfall>

National Planning Policy Framework (NPPF)

- 5.5 This report has been prepared considering the National Planning Policy Framework (NPPF) Technical Guidance and the Environment Agency's (EA) flood risk standing advice.
- 5.6 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 10* 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 housing development, which is defined in Annex 3 of the NPPF. The site lies entirely within Flood Zone 1, therefore it does not trigger a sequential nor exception test.

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 10: 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. (Figure 11)

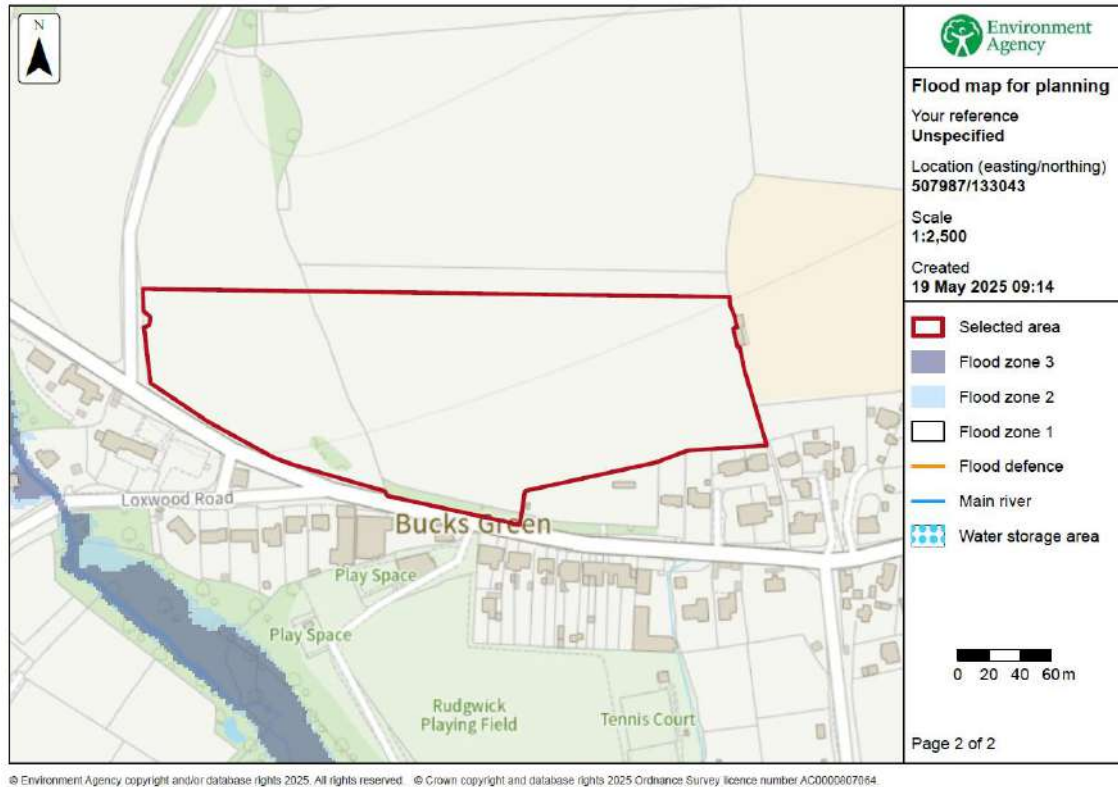


Figure 11: Flood Map for Rivers and Seas

- 6.4 The EA long-term flood risk and from rivers and seas (yearly chance of flooding between 2036-2069) mapping shows that the site is not affected by long-term flood risk from rivers and seas.



Figure 12: Long-term flood risk from rivers and seas map

- 6.5 Horsham district Council strategic flood risk assessment (HDC SFRA1) shows that the site is not affected by long term flood risk from rivers and seas.

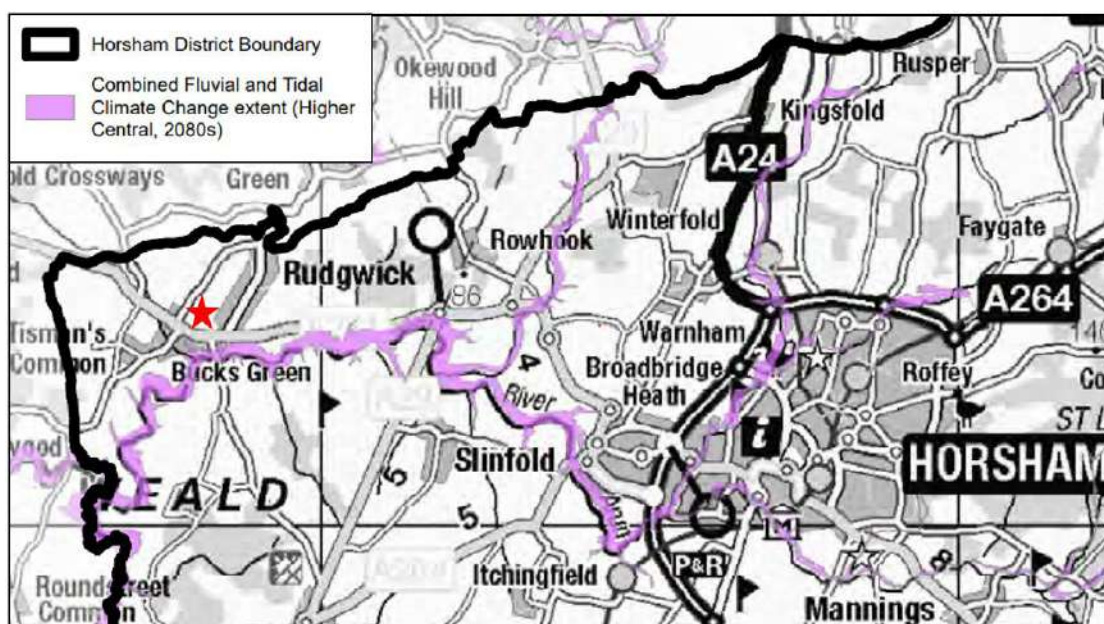


Figure 13: Future Fluvial and tidal Extents (HDC SFRA1, Appendix 1, Figure A7)

Fluvial/tidal flooding – Residual Risk

- 6.6 Based on the information above, the site is considered to be at very low risk of fluvial and tidal flooding.

Reservoirs Flood Risk

- 6.7 The EA long-term flood risk from reservoirs shows that the site is not considered to be at risk of flooding from reservoirs. (Figure 14)

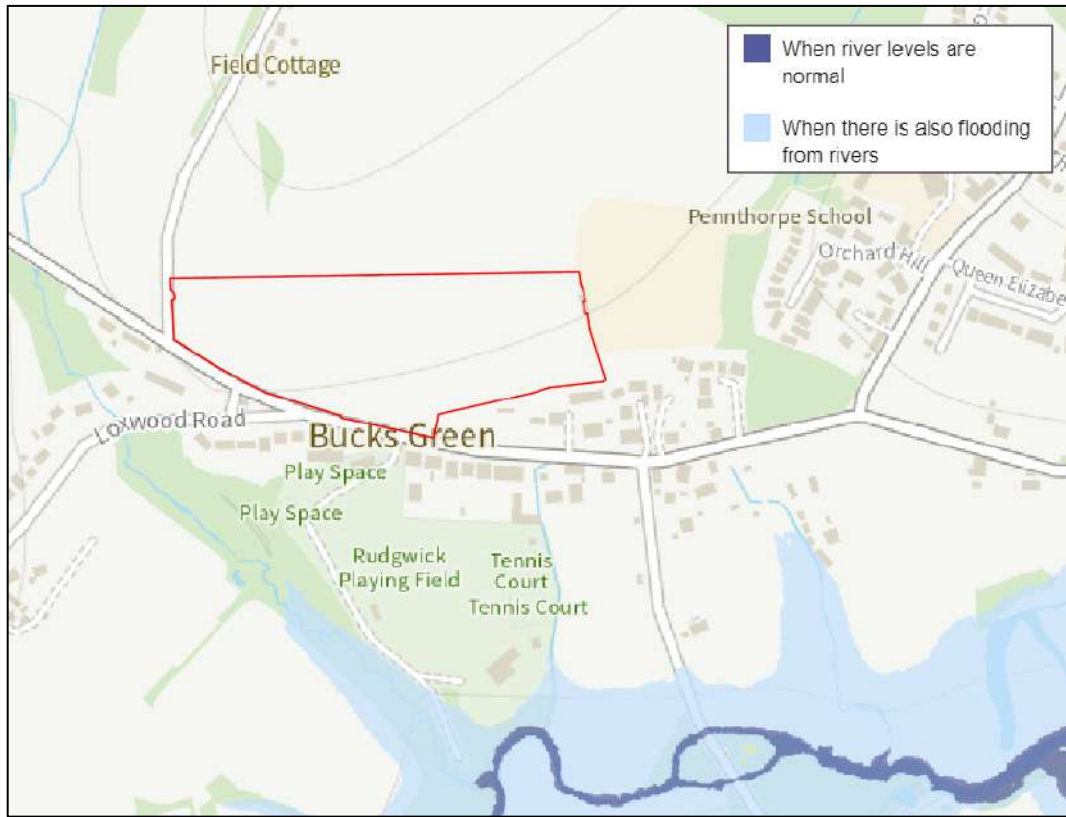


Figure 14: Long term flood risk from reservoirs map

Reservoirs Flooding – Residual Risk

- 6.8 Based on the above mapping, it can be concluded that the site is considered to be at very low risk of flooding from reservoirs.

Surface Water Flood Risk

- 6.9 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.
- 6.10 The EA surface water flood risk map (yearly chance of flooding between 2040 and 2060) is shown in *Figure 15* and indicates that the majority of the site is considered to be very low except for some localised spots which are subject to low risk of surface water flooding. After a review of topographical survey, it can be concluded that the localised flood risk areas are due to depressions in the land.

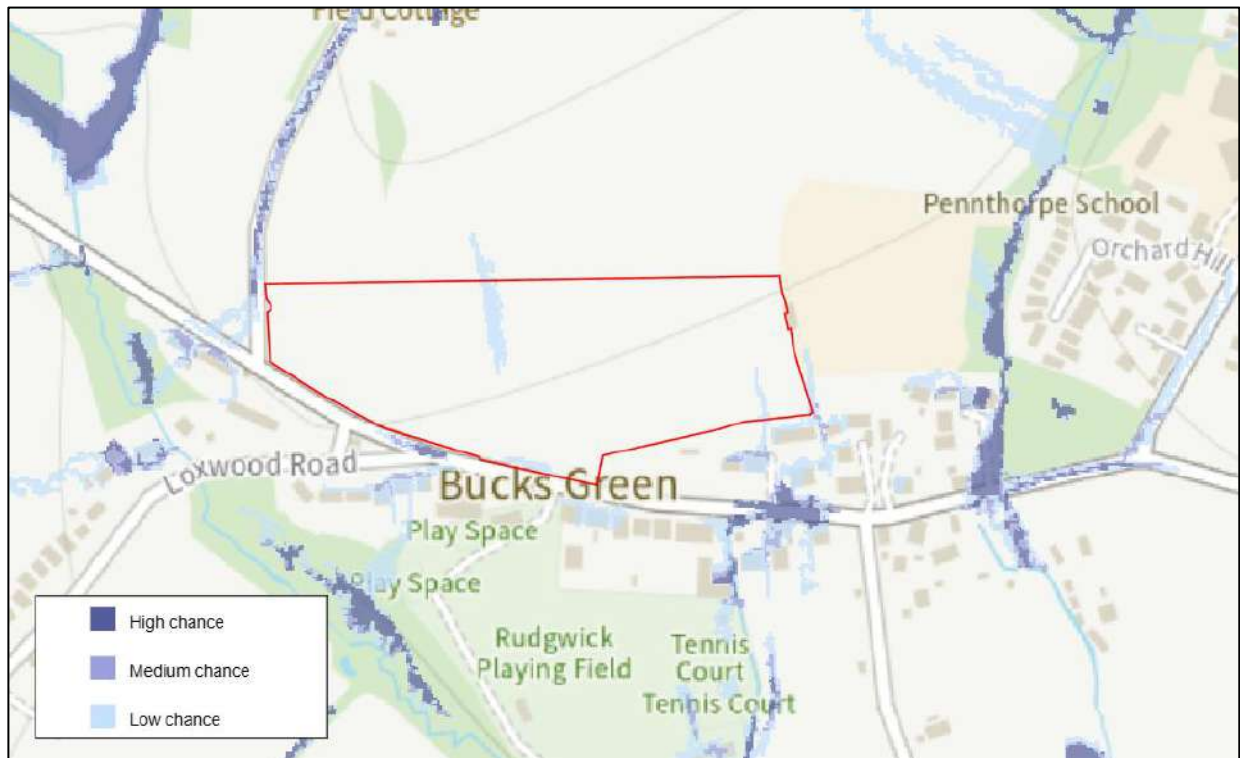


Figure 15: Long term flood risk from surface water

Surface Water Flooding– Mitigation measures

- 6.11 Localised low-risk areas within the site are caused by low spots within the topography that are not properly drained due to poor soil permeability. These low spots shall be re-designed as part of the site's level's strategy. The proposed site levels shall be set to ensure the site is positively drained and surface water runoff within these areas are managed on site and drained through the sustainable drainage network.
- 6.12 There is a localised area which cuts through northern boundary of the site which is subject to low risk of surface water flooding. To mitigate against this exiting flooding a berm shall be proposed to the south of the boundary. The berm shall be designed to intercept any overland flow from the northern boundary and will redirect the surface water flooding that has been displaced by the proposals. The depth of the pluvial floods has been obtained from the EA mapping and is estimated to be less than 200mm, accordingly the displaced flooded volume was calculated based on the area of the displaced flood extents multiplied by the average flood depth of 200mm.

Surface Water Flooding – Residual Risk

- 6.13 Considering the above mitigation measures. The site is considered to have low risk of flooding from surface water.

Groundwater Flood Risk

- 6.14 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.
- 6.15 The EA long term flood Mapping states that groundwater flooding is unlikely in this area.

Groundwater

Flooding from groundwater is unlikely in this area.

What groundwater is

Groundwater is the water that is usually held in rocks and soil underground.

Groundwater flooding happens when this water rises and flows above the surface.

We use flood alert data to check the risk of flooding from groundwater.

Figure 16: EA long term flood mapping extract

- 6.16 The infiltration test carried out by *Ground and Water Limited* identified that groundwater was not encountered when digging 2m below ground level. The report also states “From analysis of hydrogeological and topographical maps the actual groundwater table was anticipated to be encountered below the Weald Clay Formation (Mudstone). Some amounts of groundwater however may be present at shallower depths within granular layers of the Weald Clay Formation.”
- 6.17 The BGS SuDS GeoReport mapping (*Figure 8*) indicates that the eastern portion of the site groundwater could be encountered less than 3m below ground level.
- 6.18 *Figure 17* indicates that the site (marked by a red star) is classed as Class 4 risk in the ground water flood map. The SFRA describes Class 4 as “negligible risk”.

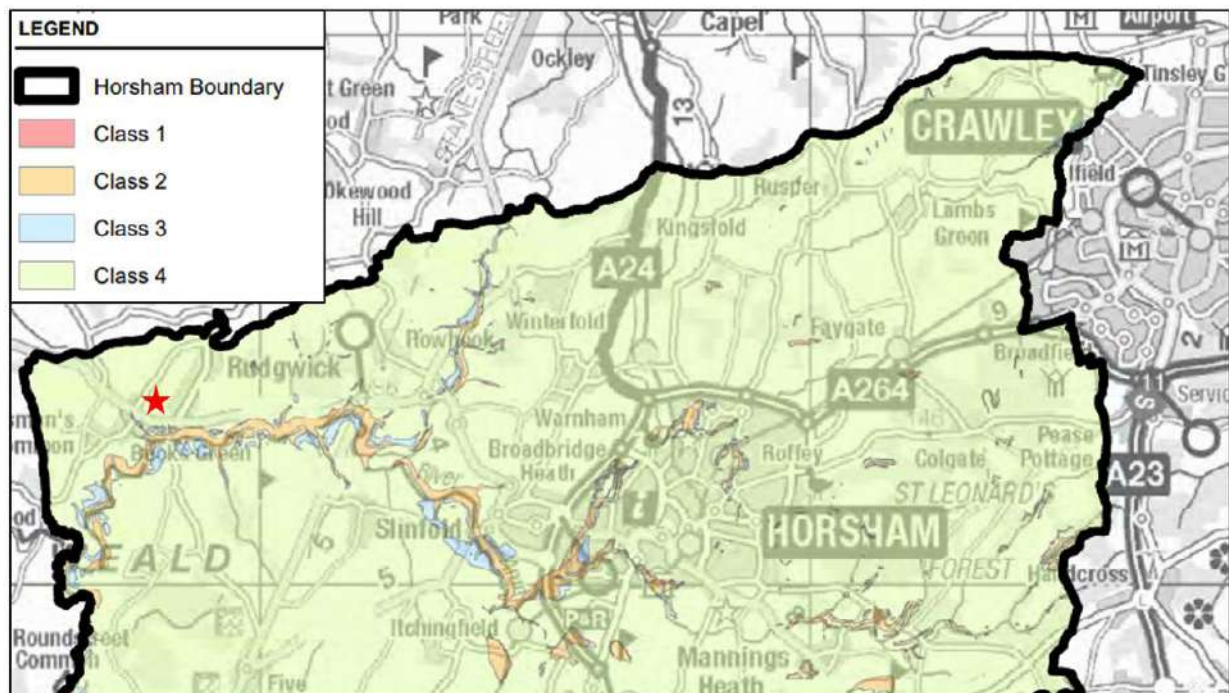


Figure 17: Ground Water Flooding - HDC SFRA1, Appendix A, Figure A8

Groundwater Flooding – Residual Risk

- 6.19 Given the above information, the residual risk from groundwater flooding is considered to be very low.

Public Sewers Flood Risk

- 6.20 There are no existing public sewers located on the site, as shown on southern waters sewer mapping in **Appendix F**. Therefore, sewer flooding is considered to be unlikely to occur on the site
- 6.21 However, based on the HDC SFRA1, Rudgwick has been identified as an area with high sewer flooding records. *Figure A8* from Appendix A of the SFRA (extracted in *Figure 18* below for ease) shows the number of sewer flooding incidents recorded by Southern Water between 2014-2024. The map below shows that the postcode RH12, within which the site is located has experienced between 41-120 sewer flooding incidents in the past 10 years.
- 6.22 Given the lack of existing public sewers on the site itself, and the specific characteristics and topography of the site that offer some resilience to localised flooding, despite the high historical sewer flooding records in the broader postcode area (RH12), the site is considered to be at low risk of flooding from surface water and foul water sewers.

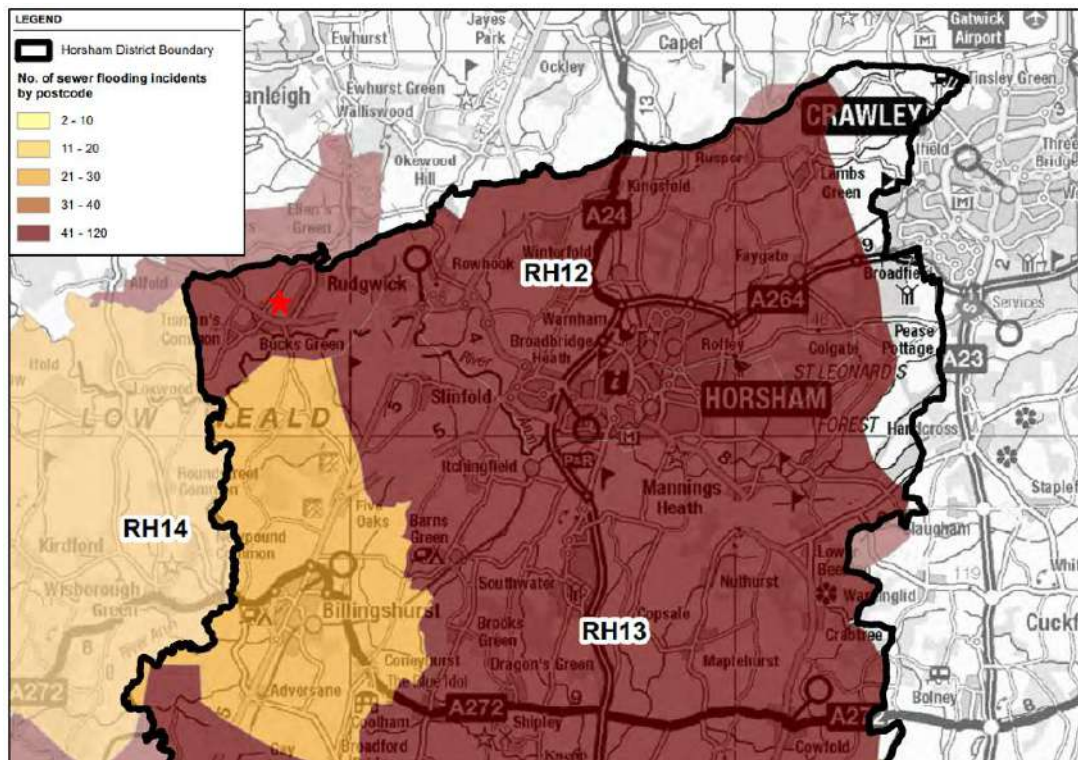


Figure 18: Sewer Flooding Incidents (2014-2024) - HDC SFRA1, Appendix A, Figure A

Public Sewers Flooding – Residual Risk

- 6.23 Based on the above information the site is considered to be low risk of flooding from public sewers.

Public Sewers Flooding – Mitigation Measures and Considerations

- 6.24 Mitigation from sewer flooding can be applied through several methods. Firstly, as the surface water network will be discharging into the nearest watercourse and therefore will not cause an overload on the public network, nor will it be affected by any surcharge events within the public network.
- 6.25 To further protect the site from on-site sewer flooding in the event of the outfall being surcharged; a non-return valve shall be proposed upstream of the proposed connection point to prevent foul water from backflowing into the proposed network and causing flooding within properties.

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 from the river Arun	Very Low	N/A	Very Low
Reservoirs	Flooding from reservoir failure.	Very low	N/A	Very Low
Surface Water (Pluvial)	Flooding from surface water runoff caused by poor drainage	Low	The variety of SuDS utilised on site will capture and store surface water runoff then discharge into the existing water course. Flooding from surface water is unlikely	Low
Groundwater	Flooding from high ground water table.	Very Low	N/A	Very Low
Public Sewers	Flooding caused by overloaded sewers, mainly caused by ground water infiltration	Low	The proposed separated system along with the discharge to an existing water course will decrease the impact of the development on the existing public sewer system. A non-return valve is proposed downstream of the foul network to prevent any on-site flooding during a surcharge event within the public sewers.	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 The soakage testing carried out by Ground&Water in December 2024 confirmed that Infiltration is not a viable option. Therefore, the proposals for the surface water drainage are to be attenuated on site by an attenuation basin, then discharged to the existing watercourse located to the southwest of the site. The Drainage layout is shown **Appendix H**.
- 8.3 The site is separated into two catchments; Catchment A surface water runoff will be stored in an attenuation basin and attenuation crates. Catchment B surface water runoff will be stored in a series of two attenuation basins.
- 8.4 Existing Surface water flood risk will be managed through the utilisation of SuDS features and redirecting open space area. Permeable paving will be used on private drives, parking bays and parking courts to provide pollution mitigation.
- 8.5 A HydroBrake flow control will be used to limit the discharge rate to $Q_{bar}=17.8\text{l/s}$ for the 2.72ha developable area.

Catchment	Area (ha.)	Greenfield Rate (l/s)				Post Development Rate (l/s)		
		Q_{bar}	1 in 2 years	1 in 30 years	1 in 100 years	1 in 2 years	1 in 30 years	1 in 100 years
Whole Site	2.72	17.8	15.6	40.8	56.6	15.7	17.3	17.3
Catchment A	0.66	4.3	3.8	9.9	13.7	3.3	4.0	4.5
Catchment B	2.06	13.4	11.8	30.9	42.9	12.5	12.5	12.5

Table 5: Predevelopment and post development discharge rates

Hydraulic Calculations

8.6 Hydraulic Calculations have been carried out in Site3D. The parcels have been modelled for a 1 in 2-years rainfall event (50% AEP), a 1 in 30-years rainfall event (3.3% AEP) plus 40% climate change and a 1 in 100-years rainfall event (1% AEP) plus 45% climate change. The calculations show that no flooding occurs during any of the simulated storms across all catchments. A summary of the hydraulic calculations can be found within **Appendix I**.

8.7 The below table contains the parameters used in the supporting network modelling

Parameter	Input	Guidance/notes
Rainfall Data	FEH 2022	
Urban Creep	10%	Refer to policy
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: Hydraulic Modelling Parameters

Potential Foul Water Drainage Strategy

8.8 The foul water drainage proposals include for a gravity-led sewer network that connects upstream of the existing foul water manhole MH0901 identified in the southern water mapping. Southern Water have confirmed that there is currently adequate capacity of a 0.95l/s foul discharge rate. The pre - development letter from southern water can be found in **Appendix J**

9. WATER QUALITY

9.1 Figure 19 & Figure 20 are extracted from the SuDS Manual and demonstrate the pollution risks associated with various discharge situations.

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 19: Table 26.2 of the SuDS Manual

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 20: Table 26.3 of the SuDS Manual

9.2 The UKSuDS Water Quality toolkits (based on the Simple Index Assessment method) has been used to assess water quality improvement for the site. **Table 7** below summarises the results of the toolkit, and a full copy of the toolkit can be found in **Appendix K**.

Land Use			SuDS Component			Water Treatment
Low Traffic Roads			Detention Basin			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. SUMMARY AND CONCLUSION

- 10.1 This Flood Risk Assessment (FRA) and Drainage Strategy has been prepared by Paul Basham Associates on behalf of Welbeck Strategic Land IV LLP (Welbeck Land) to support an outline planning application for a 90-unit residential site. The land is located to the North of Guildford Road and to the east of Lynwick street. The nearest postcode is RH12 3JP.
- 10.2 The development is located entirely in Flood Zone 1
- 10.3 Residual flood risk from:
- Fluvial and tidal flooding is considered to be **very low**.
 - Reservoir flooding is considered to be **very low**.
 - Surface water flooding is considered to be **very low**.
 - Groundwater flooding is considered to be **very low**.
 - Sewer flooding is considered to be **low**.
- 10.4 BGS mapping, local borehole logs and the BGS infiltration SuDS GeoReport indicate the site is underlain by Weald Clay formation, with minimal potential for infiltration. Additionally, no superficial deposits that may have infiltration potential were recorded on site. Therefore, drainage through infiltration is not considered a viable solution.
- 10.5 The surface water drainage strategy involves capturing runoff at source, retaining it on-site within attenuation basins and attenuation crates, and discharging it into the existing watercourse located approximately 170m west of the site boundary, adjacent to Loxwood Road.
- 10.6 There are isolated areas of low surface water flood risk present on site, a small area located in the southeast corner and a larger area located in the centre of the development. The flood risk will be managed through the use of levels and diverted into the open space areas of the site.
- 10.7 All run-off (up to and including the 1-in-100-year rainfall event (+45% Climate Change)) shall be no greater the proposed impermeable area's Q_{bar} (17.8 l/s), per section 3.3.1 of The CIRIA SuDS manual. The flow rate will be restricted by a Hydrobrake flow control.
- 10.8 Foul water will be directed to an existing Southern Water manhole (Ref: 9901) located on Guildford Road, near the site entrance. The connection will be subject to a Section 106 agreement.



Romsey T:01794 367703
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Rev	Description
P1	First Issue
P2	Amendments to follow Landscape/BNG/highways comments.
P3	Widened street between plots 50 and 54 to allow for refuse vehicle.
P4	Added buffer planting to existing properties and re-arranged plots 71-77.

Date	Au	Ch
13.05.25	TW/PR	AB
19.05.25	TW/PR	AB
20.05.25	PR	-
21.05.25	PR	-

Rev Description

Date Au Ch

Project Land at Rudgwick
Drawing Site Layout-03

Client	WELBECK LAND	Date	29.04.25
Job no.	WELB190309	Rev.	P4
Dwg no.	SL03	Scale	1:500 at A1
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Status	PRELIMINARY	Office	Romsey
Client ref.			

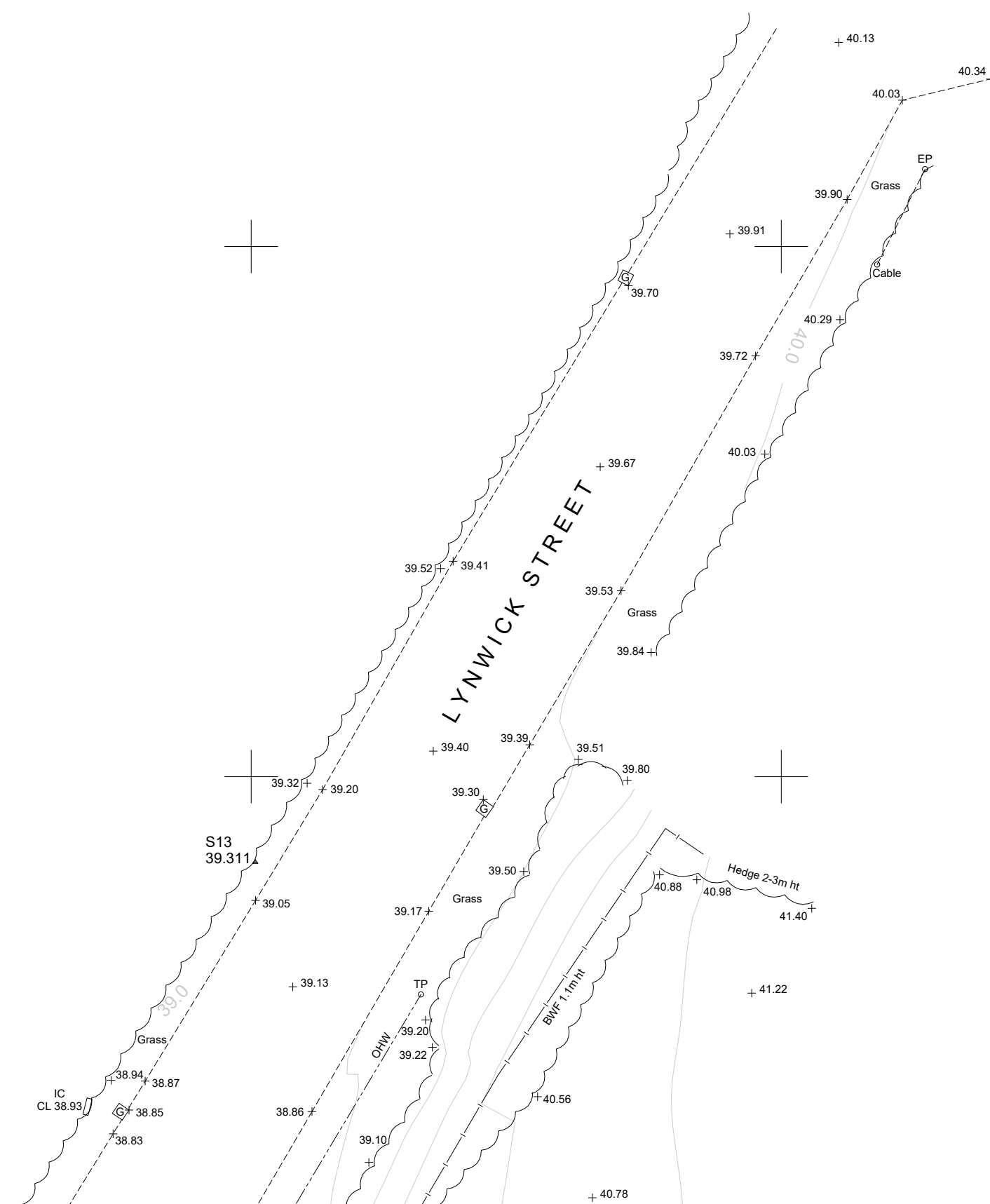


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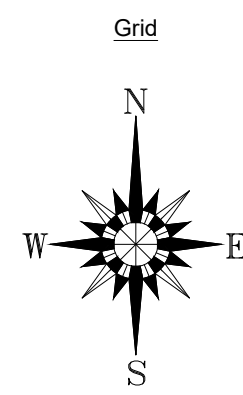
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19192-100-A

19192-100-B	19192-100-C	19192-100-D
19192-100-E	19192-100-F	19192-100-G

STATION	EASTING	NORTHING	LEVEL
S1	907833.752	133067.875	33.683
S2	907776.596	133388.051	34.108
S3	907779.758	133036.484	31.695
S4	907889.190	132976.140	29.376
S5	907994.416	132952.037	27.553
S6	908026.675	133015.012	30.433
S7	907928.162	133080.289	34.538



BANKING

BUSHES & HEDGES

TREES

MT/321/02/6	Height	Diameter
1	1.5m	0.3m
2	2.5m	0.5m
3	3.5m	0.7m
4	4.5m	0.9m
5	5.5m	1.1m
6	6.5m	1.3m

NOTE: SPREADS AND HEIGHTS ARE NEGATIVE ONLY

GATES

WALL

BUILDING

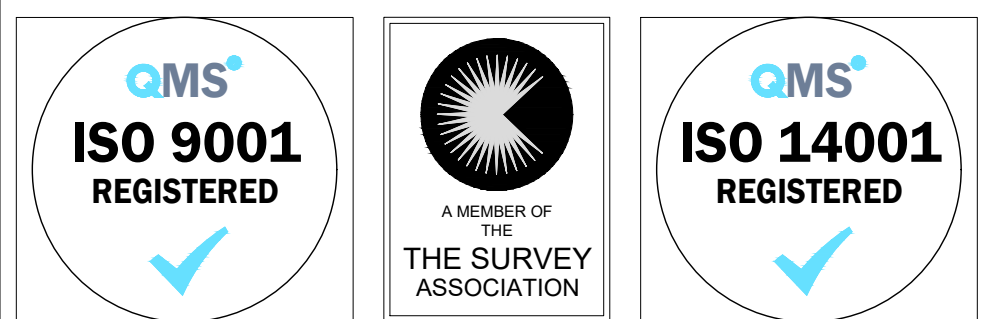
OPEN SIDED BUILDING

GLASS ROOFED

CONTOURS

[illegible]

REV.	NOTES	DWN	DATE
A	Additional road detail added to original drawing (see RevA layer)	JS	05/10/21



Notes:
Grid and levels relate to OS GPS Active Network.
Sheet is North orientated unless stated.



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2 QUEENS ROAD
HAYWARDS HEATH
WEST SUSSEX
RH16 1EB

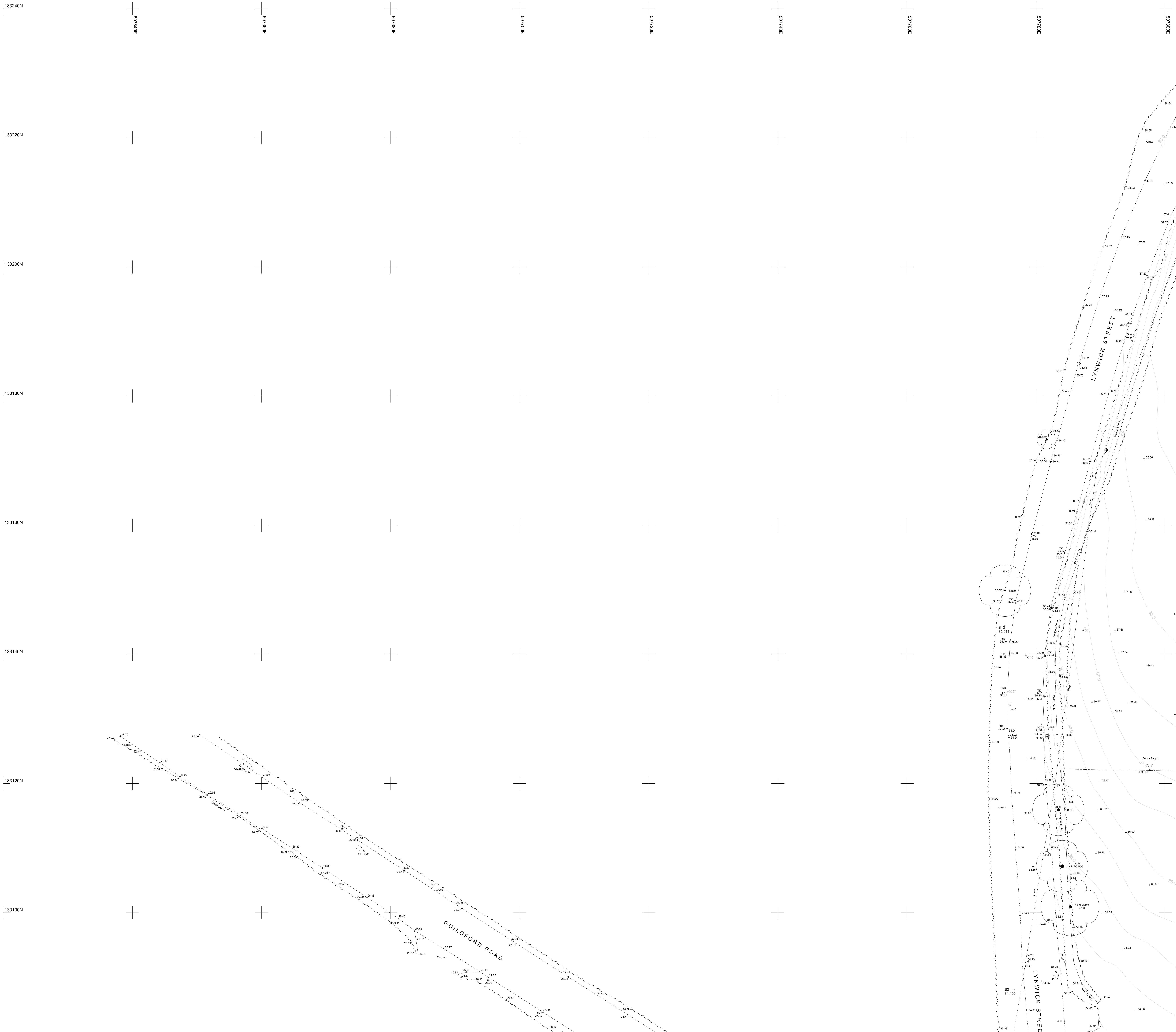
Tel: 01444 416246
Fax: 01444 417697
E-Mail: MLS@maltbysurveys.com
WebSite: <http://www.maltbysurveys.com>

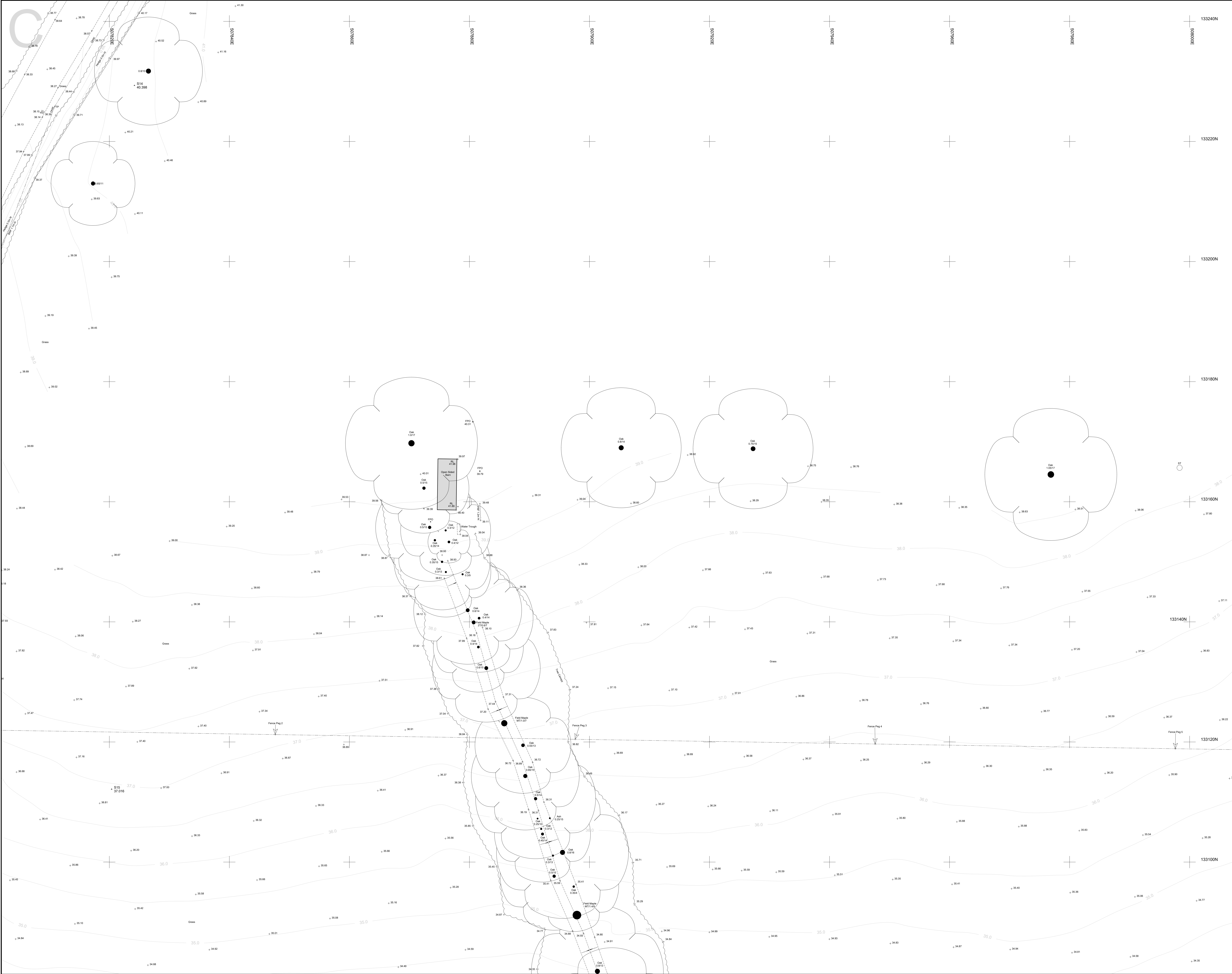
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DRAWN	JS	
CHECKED	AKM	
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GUILDFORD RD, RUDGWICK, RH12 3JJ		

TOPOGRAPHICAL SURVEY

Job No	Rev	Drawing Number
19/192	A	19/192/100/A
Date : October 2021		

B





Sheet Layout

SURVEY STATIONS - SCHEDULE OF COORDINATES			
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2	507770.326	133200.051	34.003
3	507770.326	133200.044	31.006
4	507880.190	133200.100	29.571
5	507880.190	133200.097	27.423
6	507880.190	133200.097	27.423
7	507820.162	133200.289	34.028

Grid

LEGEND

BANKING

BUSHES & HEDGES

TREES

GATES

WALL

BUILDING

OPEN BODED BUILDING

GLASS ROOFED

CONTOURS

ABBREVIATIONS (WHERE APPLICABLE)

ARCH HEAD HEIGHT	AHH	MARKER	MKR
ARCH SPRINGER HEIGHT	AHS	MONITORING WELL	MW
ARCH SPRINGER LEVEL	ASL	NOTICE BOARD	NB
AIR VALVE	AV	NAME PLATE	NP
BELLSIA BEACON	BL	OVERHEAD WIRE	OW
BELL	BL	PARKING METER	PM
BOLLARD	BT	ROOF LEVEL	RL
BRITISH TELECOM BOX	BTB	ROAD SIGN	RS
BRITISH TELECOM MANHOLE	BTMH	ROOFING EYE	RE
BROWWORK	BRW	RETAINING WALL	RTW
BUS STOP	BS	RAIN WATER PIPE	RWP
CABLE TV	CATV	SURFACE VALVE	SV
CABLE WARE	CLW	SOFT LEVEL	SFL
COLUMN	CL	STRUCTURAL SLAB LEVEL	SBL
CONCRETE POST	CP	THRESHOLD LEVEL	TL
EAVES LEVEL	EAV	TELEGRAPH POLE	TEP
ELECTRICAL COVER	ELC	TELEPHONE CALL BOX	TCL
ELECTRICITY CONTROL BOX	ECB	TOP OF KERB	TK
ELECTRICITY POLE	EP	TURNPILE	TP
ER	ER	TOP OF WALL	TOW
FINISHED FLOOR LEVEL	FFL	TRAFFIC LIGHT	TL
FLOOR BED	FB	UNABLE TO SURVEY	UTS
FIRE HYDRANT	FH	UNABLE TO SURVEY	UTS
FLOOR LEVEL	FL	UNABLE TO SURVEY	UTS
FLAG STAFF	FS	UNABLE TO SURVEY	UTS
GAS VALVE	GV	VENT PIPE	VP
GULLY	G	WATER LEVEL	WL
INSPECTION COVER	IC	WATER PIPE	WP
INVERT LEVEL	L	WATER TANK	WT
LAMP POST	LP	WATER VALVE	WV

FENCES

BARBED WIRE FENCE	BWF	LAND LAMP FENCE	LLF
CORRUGATED IRON FENCE	CIF	METAL RAILING FENCE	MLF
CLOSE BOARD FENCE	CBF	POST AND RAIL FENCE	PRF
CHAIN LINK FENCE	CLF	POST AND RAIL FENCE	PRF
CHESTNUT PALING FENCE	CPF	POST AND RAIL FENCE	PRF
FENCE POST	FP	POST AND RAIL FENCE	PRF
INTERLOCKED FENCE	IF	STEEL PALISADE SECURITY FENCE	SPSF
IRON RAILING FENCE	IRF	TUBULAR STEEL RAIL FENCE	TSRF

REV. NOTES

Additional road detail added to original drawing (see Rev A layer)

DWN. DATE

JS 08/10/21

Notes:

Grid and levels relate to OS GPS Active Network.
Sheet is North orientated unless stated.

Maltby Surveys Ltd

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SURVEYED JS

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WELBECK LAND

SCALE

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TOPOGRAPHICAL SURVEY

Job No 19/192

Rev A

Drawing Number 19/192/100/C

Date: October 2021

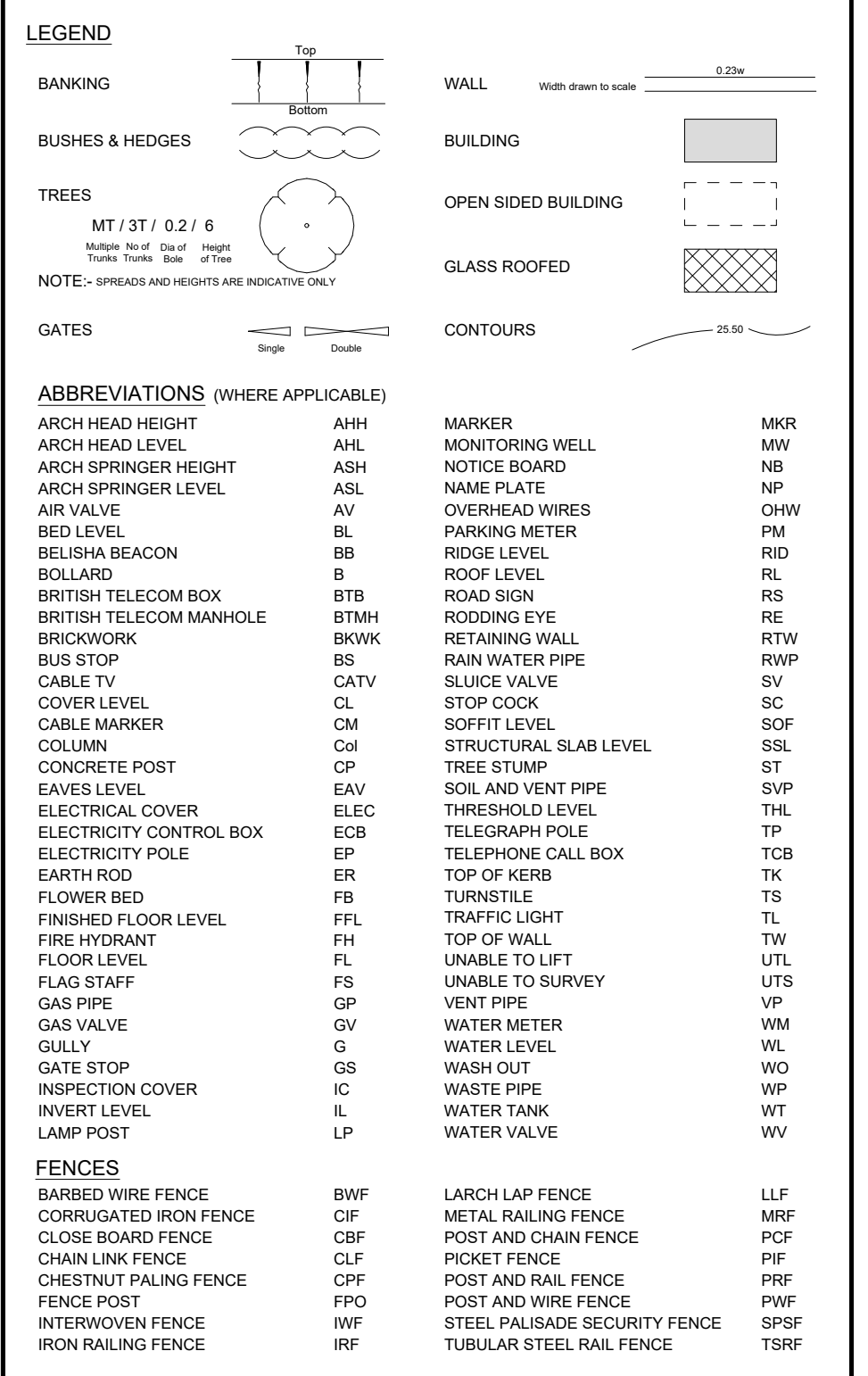
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The stations are arranged in a grid:

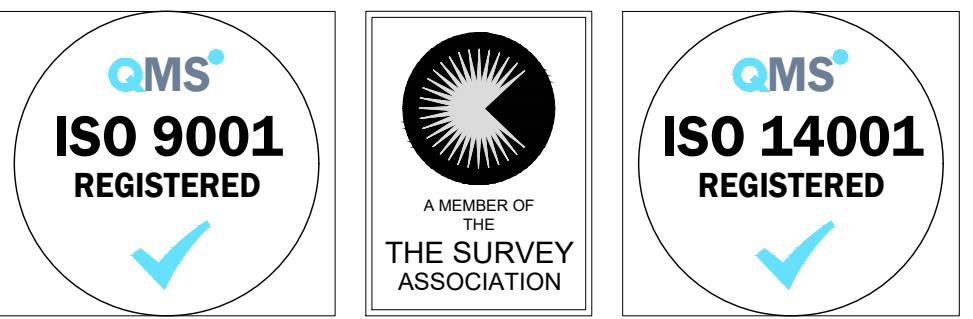
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- 19192-100-F (Bottom Center)
- 19192-100-G (Bottom Right)

SURVEY STATIONS - SCHEDULE OF COORDINATES

STATION	EASTING	NORTHING	LEVEL
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S4	507886.195	132975.140	29.376
S5	507884.435	132961.027	27.433
S6	508084.975	132817.072	29.433
S7	507828.162	133040.289	34.038



REV.	NOTES	DWN	DATE
A	Additional road detail added to original drawing (see RevA layer)	JS	08/10/21



Notes:

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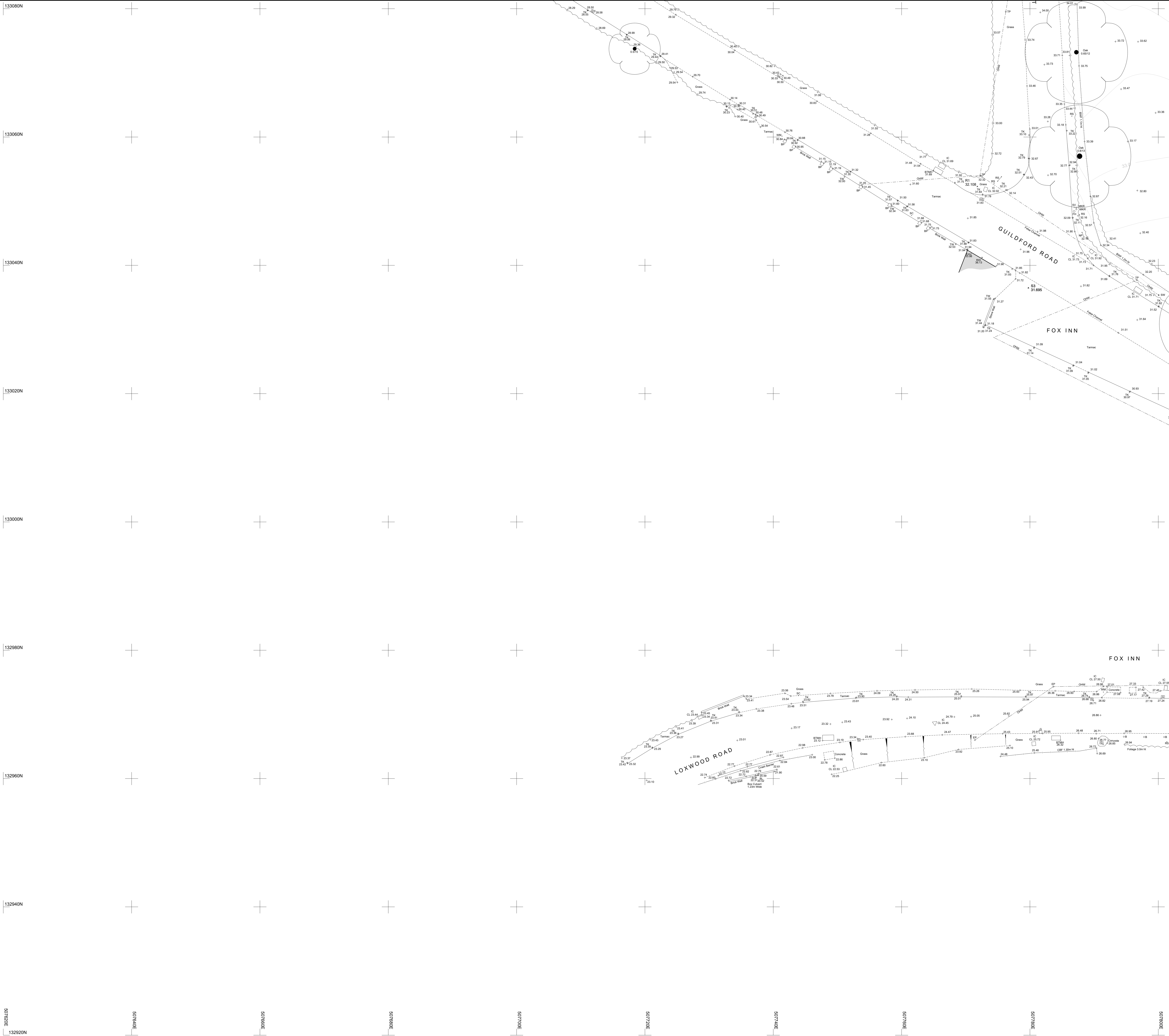
2 QUEEN'S ROAD
HAYWARDS HEATH
WEST SUSSEX
RH16 1EB

Tel: 01444 416246
Fax: 01444 417697
E-Mail: MLS@maltbysurveys.com
WebSite: <http://www.maltbysurveys.com>

SURVEYED	JS	WELBECK LAND
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CHECKED	AKM	
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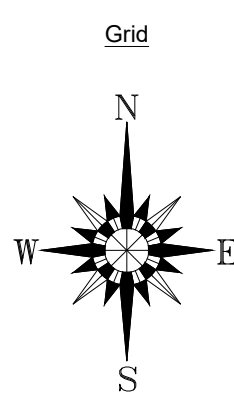
TOPOGRAPHICAL SURVEY

Job No	Rev	Drawing Number
19/192	A	19/192/100/D
Date :	October 2021	



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19192-100-B	19192-100-C	19192-100-D
19192-100-E	19192-100-F	19192-100-G

STATION	EASTING	NORTHING	LEVEL
S1	507833.752	133067.875	33.683
S2	507776.596	133088.051	34.106
S3	507779.758	133036.484	31.695
S4	507868.190	132976.140	29.376
S5	507984.416	133017.037	27.553
S6	508026.675	133015.012	30.433
S7	507928.162	133080.289	34.538



LEGEND

BANKING

BUSINESS

TREES

MT 31 2 2 6

NOTES: SPECIES AND HEIGHTS ARE INDICATED ONLY

GATES

WALL

BUILDING

OPEN ROOF BUILDING

GLASS ROOF

CONTOURS

ABBREVIATIONS (WHERE APPLICABLE)

ARCHHEAD HEIGHT	AHL	MARKER	MAR
ARCH HEAD LEVEL	AHL	MARKING NAME	MM
ARCH SPRINGER HEIGHT	ASH	NOTICE BOARD	NP
ARCH SPRINGER LEVEL	ASL	ON-PAV	OP
ARCH VALVE	AVL	CHANG	CH
BELL	BL	PARKING METER	PM
BELLIGER TEE	BT	ROOF LEVEL	RL
BOLLARD	B	ROOF LEVEL	RL
BRIGHT TELECOM BOX	BTMB	ROAD SIGN	RS
BRIGHT TELECOM MANHOLE	BTMBH	ROCKING EYE	RE
BROCKHAM	B	RETAINING WALL	RW
BUS STOP	BS	RAMP WATER PIPE	RWP
CABLE TV	CAV	SLICE VALVE	SV
CABLE TV	CL	STOP	ST
CABLE MARKER	CM	THREE LANE	TL
COLUMN	C	STRUCTURAL SLAB LEVEL	SLL
CURB	CU	TRUCK STOP	TS
DAVE	DAV	SOIL AND VENT PIPE	SVP
DECEMBER	DE	TELEPHONE	TE
ELECTRICITY CONTROL BOX	ELCB	TELEPHONE CALL BOX	TCB
EMERGENCY	EM	TOP OF KERB	TK
EARTH ROD	ER	TRAIL	TR
EXPOSED FLOOR LEVEL	EFL	TRAFFIC LIGHT	TL
FIRE HAZARD	FH	TRUCK	TR
FLOOR LEVEL	FL	UNABLE TO LIFT	UL
FLOOR	F	UNABLE TO SURVEY	US
GAS PIPE	GP	VENT PIPE	VP
GATE	G	WATER METER	WM
GULLY	G	WATER LEVEL	WL
HATCH	H	WASH LOT	WL
INSPIRATION CURVE	IC	WATER PIPE	WP
LEVEL	L	WATER VALVE	WV
LAMP POST	LP		

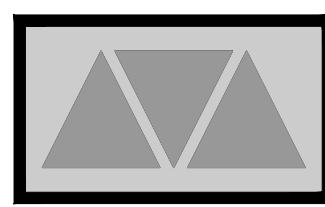
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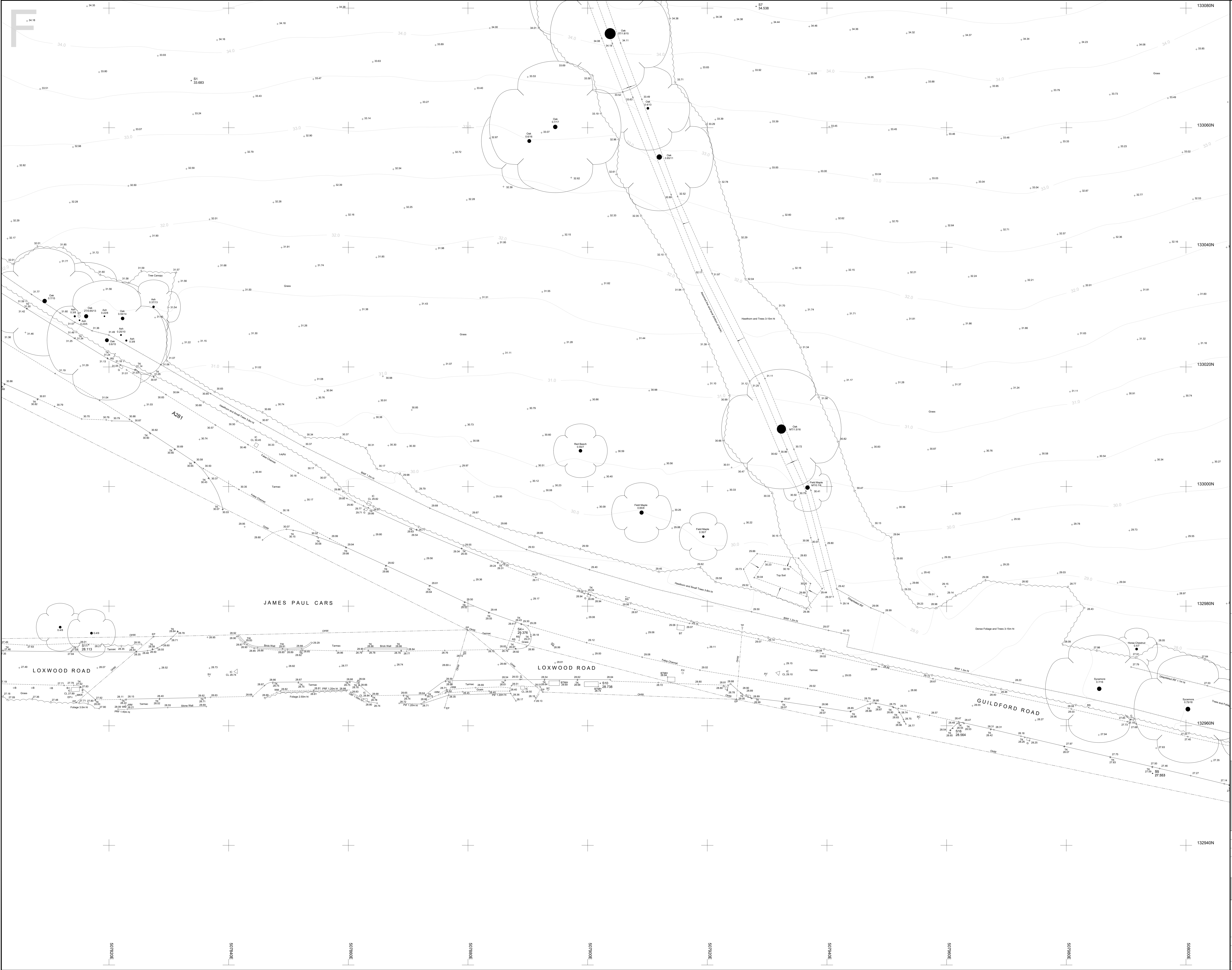
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CHAINED RIVETED FENCE	CRF	PICTET FENCE	PIF
CHAINED WIRE FENCE	CWF	ROCK FENCE	RF
CORR LANK FENCE	CLF	ROCKET FENCE	ROF
CONCRETE RIVETED FENCE	CRF	ROCK FENCE	RF
FENCE POST	FP	ROCK AND WIRE FENCE	RWF
FLYING FENCE	FF	ROCK AND WIRE FENCE	RWF
IRON MANG FENCE	IRF	TUBULAR STEEL RAIL FENCE	TSRF

REV.	NOTES	DWN	DATE
A	Additional road detail added to original drawing (see RevA layer)	JS	05/10/21



Notes:
Grid and levels relate to OS GPS Active Network.
Sheet is North orientated unless stated.

 Maltby Surveys Ltd 2 QUEEN'S ROAD HAYWARDS HEATH WEST SUSSEX RH16 1EB Tel: 01444 410246 Fax: 01444 417697 E-Mail: MLSG@malbysurveys.com WebSite: http://www.malbysurveys.com			
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GUILDFORD RD, RUDGWICK, RH12 3JJ			
TOPOGRAPHICAL SURVEY			
Job No	Rev	Drawing Number	
19/192	A	19/192/100/E	
Date:	October 2021		



Sheet Layout

19192-100-A		
19192-100-B	19192-100-C	19192-100-D
19192-100-E	19192-100-F	19192-100-G

SURVEY STATIONS - SCHEDULE OF COORDINATES

STATION	EASTING	NORTHING	LEVEL
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52	507778.528	133068.511	34.000
53	507775.584	133068.511	34.000
54	507785.190	133068.511	34.000
55	507788.416	133068.511	34.000
56	507788.416	133068.511	34.000
57	507788.162	133068.389	34.028

Grid

LEGEND

BANKING

BURSHES & HEDGES

TREES

GATES

WALL

BUILDING

OPEN BODE BUILDING

GLASS ROOFED

CONTOURS

ABBREVIATIONS (WHERE APPLICABLE)

ARCH HEAD LEVEL	AHL	MARKER	MKR
ARCH SPRINGER HEIGHT	ASH	MONITORING WELL	MW
ARCH SPRINGER LEVEL	ASL	NOTICE BOARD	NB
AIR VALVE	AV	OVERHEAD WIRE	OW
BE LEVEL	BL	PARKING METER	PM
BERLINA BEACON	BB	ROAD SIGN	RS
BOLLARD	B	ROOF LEVEL	RL
BRITISH TELECOM BOX	BTB	ROAD SIGN	RS
BRITISH TELECOM MANHOLE	BTM	ROOFING EYE	RE
BROWWORK	BRW	RETAINING WALL	RW
BUS STOP	BS	RAIN WATER PIPE	RWP
CABLE T.V	CTV	SAUCE VALVE	SV
CABLE & NARROW	CN	SEWER LEVEL	SL
COLUMN	CL	STOP COOK	SC
COP	CP	STRUCTURAL SLAB LEVEL	SBL
CONCRETE POST	CP	THRESHOLD LEVEL	TL
EAVES LEVEL	EAV	SOL AND VENT PIPE	SVP
ELECTRICAL COVER	ELEC	THRESHOLD LEVEL	TL
ELECTRICITY CONTROL BOX	ECB	TELEGRAPH POLE	TP
ELECTRICITY POLE	EP	TELEPHONE CALL BOX	TCL
ER	ER	TOP OF KERB	TK
FINISHED FLOOR LEVEL	FFL	TRAFFIC LIGHT	TL
FLOOR BED	FB	TOP OF WALL	TW
FIRE HYDRANT	FH	UNABLE TO SURVEY	UTS
FLOOR LEVEL	FL	UNABLE TO LIFT	UL
FLAG STAFF	FS	UNABLE TO SURVEY	UTS
GAS PIPE	GP	VENT PIPE	VP
GAS VALVE	GV	WATER METER	WM
GULLY	G	WATER LEVEL	WL
GATE STOP	GS	WATER PIPE	WP
INSPECTION COVER	IC	WATER TANK	WT
INVERT LEVEL	I	WATER VALVE	WV
LAMP POST	LP		

FENCES

BARBED WIRE FENCE	BWF	LAND LAMP FENCE	LLF
CONCRETE RAIL FENCE	CRF	METAL RAILING FENCE	MRF
CLOSE BOARD FENCE	CBF	POST AND CHAIN FENCE	PCF
CHAIN LINK FENCE	CLF	POST AND RAIL FENCE	PRF
CHESTNUT PALING FENCE	CPF	POST AND WIRE FENCE	PWF
FENCE POST	FPS	STEEL PALISADE SECURITY FENCE	SPSF
INTERLOCKED FENCE	IF	TUBULAR STEEL RAIL FENCE	TSRF
IRON RAILING FENCE	IRF		

REV. NOTES

1	Additional detail added to original drawing (see Rev A layer)
---	---

QMS ISO 9001 REGISTERED

QMS ISO 14001 REGISTERED

THE SURVEY ASSOCIATION

Notes:

Grid and levels relate to OS GPS Active Network.

Sheet is North orientated unless stated.

Maltby Surveys Ltd

2 QUEENS ROAD
HAYWARDS HEATH
WEST SUSSEX
RH16 1EB
Tel: 01444 416246
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E-Mail: MLSG@maltbysurveys.com
WebSite: <http://www.maltbysurveys.com>

SURVEYED JS

DRAWN JS

CHECKED AKM

WELBECK LAND

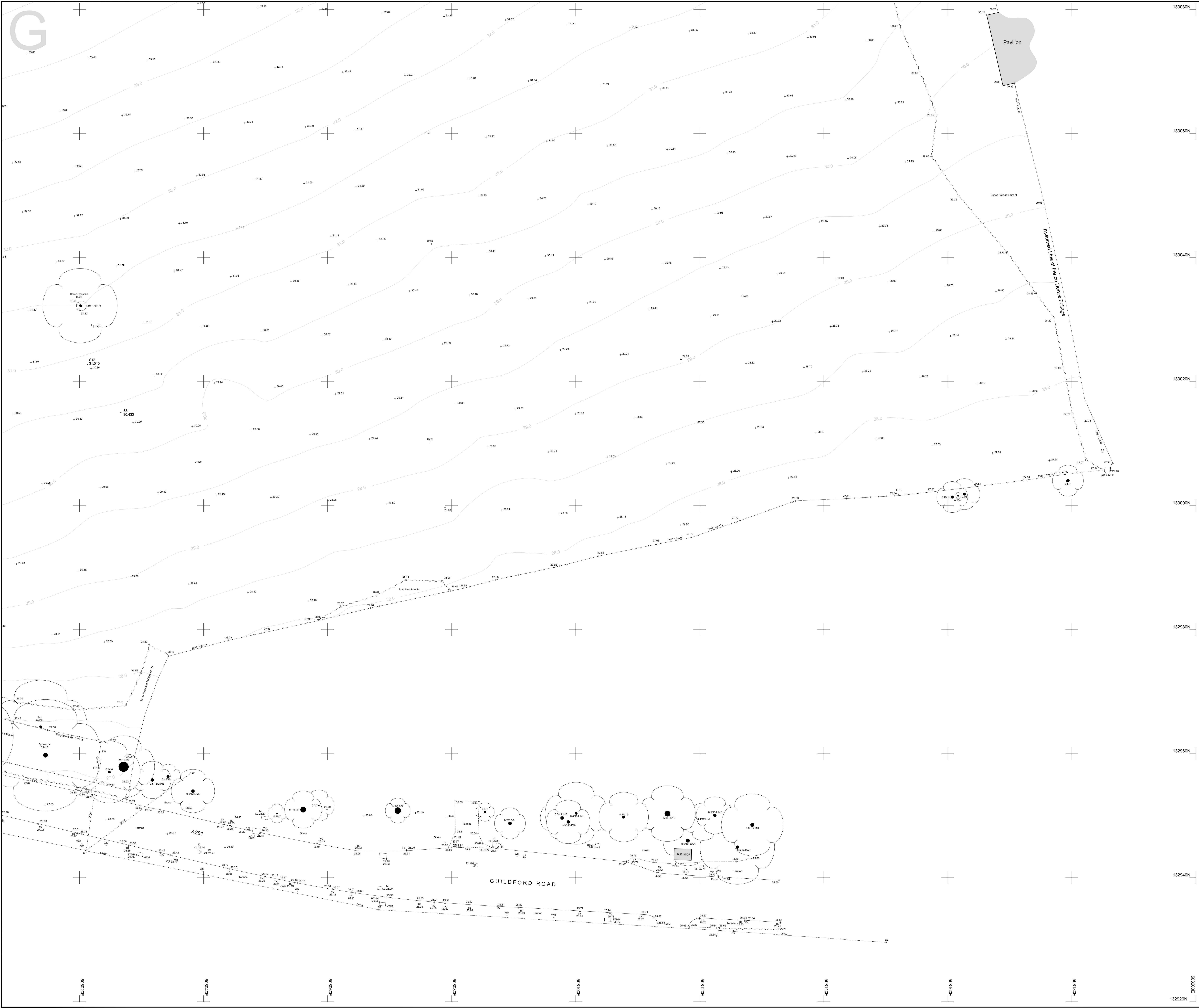
SCALE

1/200 (A0 Sheet)

GUILDFORD RD, RUDGWICK, RH12 3JJ

TOPOGRAPHICAL SURVEY

Job No	Rev	Drawing Number
19/192	A	19/192/100/F
Date	October 2021	



SURVEY STATIONS - SCHEDULE OF COORDINATES			
STATION	EASTING	NORTHING	LEVEL
11	007833.732	133047.877	33.063
12	007776.326	133046.051	34.003
13	007776.326	133046.051	31.006
14	007885.190	133045.100	29.571
15	007885.190	133045.100	27.023
16	007885.190	133045.100	26.023
17	007885.190	133045.100	25.023
18	007885.190	133045.100	24.023

Grid

N

W

E

S

LEGEND

BANKING

BUSHES & HEDGES

TREES

GATES

WALL

BUILDING

OPEN BODED BUILDING

GLASS ROOFED

CONTOURS

ABBREVIATIONS (WHERE APPLICABLE)

ARCH HEAD HEIGHT

ARCH SPRINGER HEIGHT

ARCH SPRINGER LEVEL

AIR VALVE

BEL LEVEL

BELISHA BEACON

BRITISH TELECOM BOX

BRITISH TELECOM MANHOLE

BROWWORK

BUS STOP

CABLE T.V.

CABLE & MANHOLE

COLUMN

CONCRETE POST

EAVES LEVEL

ELECTRICAL COVER

ELECTRICITY CONTROL BOX

ELECTRICITY POLE

FLORWER BED

FINISHED FLOOR LEVEL

FIRE HYDRANT

FLOOR LEVEL

FLAG STAFF

GAS VALVE

GULLY

GATE STOP

INSPECTION COVER

INVERT LEVEL

LAMP POST

MARKER

MONITORING WELL

NOTICE BOARD

OVERHEAD WIRES

PARKING METER

ROOF LEVEL

ROAD SIGN

ROOFING EYE

RETAINING WALL

RAIN WATER PIPE

SURFACE VALVE

STOP COOK

SCOTT LEVEL

STRUCTURAL SLAB LEVEL

THRESHOLD LEVEL

SOL AND VENT PIPE

TELEGRAPHY POLE

TELEPHONE CALL BOX

TOP OF KERB

TURNSTILE

TRAFFIC LIGHT

TOP OF WALL

UNABLE TO LIFT

UNABLE TO SURVEY

VENT PIPE

WATER METER

WATER LEVEL

WASH DUT

WATER PIPE

WATER TANK

WATER VALVE

FENCES

BARBED WIRE FENCE

CORRUGATED IRON FENCE

CLOSE BOARD FENCE

CHAIN LINK FENCE

CHESTNUT PALING FENCE

FENCE POST

INTERLOCKED FENCE

IRON RAILING FENCE

LANCH LAP FENCE

METAL RAILING FENCE

POST AND CHAIN FENCE

POST FENCE

POST AND RAIL FENCE

POST AND WIRE FENCE

STEEL PALISADE SECURITY FENCE

TUBULAR STEEL RAIL FENCE

LLF

MW

NB

NP

CHV

PM

RD

RL

RS

RE

RTV

RWP

SV

SC

SFP

SBL

ST

THL

TCL

TK

TS

REV.	NOTES	DWN	DATE
A	Additional road detail added to original drawing (see Rev A layer)	JS	08/10/21

QMS

ISO 9001

REGISTERED

QMS

ISO 14001

REGISTERED

Notes:

Grid and levels relate to OS GPS Active Network.

Sheet is North orientated unless stated.

Maltby Surveys Ltd

2 QUEENS ROAD
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SURVEYED	JS	WELBECK LAND
DRAWN	JS	
CHECKED	AKM	
SCALE		1/200 (A0 Sheet)
GUILDFORD RD, RUDGWICK, RH12 3JJ		
TOPOGRAPHICAL SURVEY		
Job No	Rev	Drawing Number
19/192	A	19/192/100/G
Date	October 2021	



GROUND EXPLORATIONS LTD.

BOREHOLE No. 2....

TQ 035E/2

Contract Name WANFORD MILL, BUCKS GREEN. Report No. 4312/FEH

Client West Sussex County Council, Site Address

Address County Hall, Wanford Mill,
Chichester, Bucks Green,
Sussex, West Sussex.

0827 3266

Standing Water Level 0'6" Method of Boring Shell/Auger

Water Struck Nil Diameter 6 inches

Ground Level 60.81 O.D. Start 2.3.67 Finish 5.3.67

Remarks Hole left open to check water level after 24 hours.

JARS		CORES		BULK	
3621	1'6"	3622	3'6"		
3623	7'0"	3624	8'6"		
3625	12'0"	3626	13'6"		
3627	17'0"	3628	18'6"		
3629	22'0"	3630	23'6"		
3631	27'0"	3632	28'6"		
3633	32'0"	3634	33'6"		
3635	35'6"	3636	38'6"		
3637	42'0"	3638	43'6"		
Description				Thickness	Depth
Topsoil				1'0"	1'0"
Firm to stiff brown mottled clay with traces of peat				10'0"	11'0"
Soft blue sandy organic clay				2'0"	13'0"
Soft to firm brown/blue mottled clay with traces of peat				22'0"	35'0"
Stiff to very stiff blue shaly clay				10'0"	45'0"
TOTALS				45'0"	45'0"

- Notes
1. Descriptions are in accordance with B.S. Code of Practice C.P. 2001. Clients are requested to compare with samples submitted.
 2. Core samples are nominally 4 ins. diameter and 18 ins. long.



GROUND EXPLORATIONS LTD.

BOREHOLE No. 1....

TQ 03 SE/1

Contract Name WANFORD MILL, BUCKS GREEN Report No. 4312/FEH

Client West Sussex County Council, ... Site Address

Address County Hall, ... Wanford Mill, ...
Chichester, ... Bucks Green, ...
Sussex, ... West Sussex, ...

0827 3269

Standing Water Level 1'0" Method of Boring Shell/Auger

Water Struck 4'0"; 19'0"; 30'0" Diameter 6 inches

Ground Level 63.11.0.D. Start 27.2.68 Finish 28.2.68

Remarks

JARS		CORES		BULK	
866	1'6"	868	3'6"		
867	3'0"	870	8'6"		
869	7'0"	872	13'6"		
871	12'0"	874	18'6"		
873	17'0"	876	24'0"		
875	22'0"	878	28'6"		
877	27'0"	880	33'6"		
879	32'0"	882	38'6"		
881	37'0"				
883	Water				
Description				Thickness	Depth
Made ground (mainly dirty clay, roots, etc.) Soft to firm brown/blue mottled clay, traces of peat and selenite crystals Stiff to very stiff blue shaly clay				2'6"	2'6"
				21'6"	24'0"
				16'0"	40'0"
TOTALS				40'0"	40'0"

- Notes
1. Descriptions are in accordance with B.S. Code of Practice C.P. 2001. Clients are requested to compare with samples submitted.
 2. Core samples are nominally 4 ins. diameter and 18 ins. long. Depths shown are to top of sample.

SOAKAGE LETTER REPORT

CLIENT	Paul Basham Associates
SITE ADDRESS	Land North of Guildford Road, Rudgwick, RH12 3JP
REPORT REFERENCE	GWPR6381/SLR/V1.02. The conditions and limitations of this soakage letter report can be viewed within Appendix A.
ENGINEER	James New, Ground and Water Limited
PREVIOUS SITE WORKS	Ground and Water Limited have not undertaken any previous site investigation at the site at the time of writing.
ANTICIPATED GEOLOGY AND HYDROGEOLOGY	The British Geological Survey Solid and Drift Geology Map for the Basingstoke area (Sheet No. 284) revealed that the site was underlain by bedrock deposits of the Weald Clay Formation (Mudstone). No areas of Made Ground or Reworked Ground were noted within a 250m radius. The closest recorded superficial deposits were located ~50m south of the site in the form of Arun Terrace Deposits comprising sand and gravel. Weald Clay Formation The Weald Clay is predominantly argillaceous; fine grained deposit, mainly clays with a silvery lustre. Sub-ordinate silt, sand, limestone and ironstone units do occur in distinctive rock units. When un-weathered the sediments are pale to dark grey, brownish grey, greenish grey and red. The deposits weather to a yellow and buff brown colour. A number of sub-divisions of the Weald Clay have been mapped and described. The sandstones of group 7 are most fully developed in the western part of the main Weald Clay outcrop, and in the Chiddingfold area form intricate patterns of alternating sandstone and clay beds. Strata 7c is a clay-pellet bed with plant debris associated with sand. A BGS borehole (TQ03SE18) located ~1.25km north-west of the site revealed grey weald clay with bands of sandstone to 68.00m bgl. Water was not noted during the investigation. A study of the aquifer maps on the DEFRA website revealed the site was underlain by an Unproductive Aquifer comprising the bedrock of the Weald Clay Formation (Mudstone). Examination of the Environment Agency records showed that the site did not fall within a Groundwater Source Protection Zone (SPZ) as classified in the Policy and Practice for the Protection of Groundwater. From analysis of hydrogeological and topographical maps the actual groundwater table was anticipated to be encountered below the Weald Clay Formation (Mudstone). Some amounts of groundwater however may be present at shallower depths within granular layers of the Weald Clay Formation. It was considered that groundwater was flowing in a southerly direction toward the River Arun in line with local topography.

SOAKAGE LETTER REPORT

	Examination of the Environment Agency records showed that the site was located within a Flood Zone 1, i.e. an area with a low probability of flooding from rivers and seas.																								
SCOPE OF WORKS	Site works were undertaken between 19th December 2024 and comprised the excavation of 4No. trial pits (TP1 – TP4) to a depth of 2.00m bgl. Soakage testing in accordance with the principals of BRE365 was undertaken within all trial pits on-site. Upon completion of the site works all trial pits were backfilled and made good/reinstated in relation to the surrounding area. A trial hole location plan has been provided within Figure 1.																								
GROUND CONDITIONS ENCOUNTERED	A summary of the ground conditions encountered can be viewed within the following table. The trial hole logs can be seen within Appendix B. <table><tr><th colspan="4">Summary of Strata Encountered (TP1 – TP4)</th></tr><tr><th>Strata</th><th>Top Depth (m bgl)</th><th>Base Depth (m bgl)</th><th>Thickness (m)</th></tr><tr><td>TOPSOIL (TP1 – TP4): Greyish brown sandy CLAY. Sand is fine to medium grained.</td><td>GL</td><td>0.30 – 0.45</td><td>0.30 – 0.45</td></tr><tr><td>WEALD CLAY FORMATION (Cohesive) (TP1 – TP3): Orangish brown to grey sandy clay. Sand is fine to medium grained.</td><td>0.30 – 0.55</td><td>1.80</td><td>1.25 – 1.50</td></tr><tr><td>WEALD CLAY FORMATION (Cohesive) (TP1): Orangish brown to reddish brown sandy CLAY. Sand is fine grained.</td><td>0.45</td><td>0.55</td><td>0.10</td></tr><tr><td>WEALD CLAY FORMATION (Cohesive) (TP1 – TP4): Orangish brown to greyish blue sandy CLAY. Sand is fine to medium grained.</td><td>0.30 – 1.80</td><td>2.0</td><td>>0.20 – >1.70</td></tr></table>	Summary of Strata Encountered (TP1 – TP4)				Strata	Top Depth (m bgl)	Base Depth (m bgl)	Thickness (m)	TOPSOIL (TP1 – TP4): Greyish brown sandy CLAY. Sand is fine to medium grained.	GL	0.30 – 0.45	0.30 – 0.45	WEALD CLAY FORMATION (Cohesive) (TP1 – TP3): Orangish brown to grey sandy clay. Sand is fine to medium grained.	0.30 – 0.55	1.80	1.25 – 1.50	WEALD CLAY FORMATION (Cohesive) (TP1): Orangish brown to reddish brown sandy CLAY. Sand is fine grained.	0.45	0.55	0.10	WEALD CLAY FORMATION (Cohesive) (TP1 – TP4): Orangish brown to greyish blue sandy CLAY. Sand is fine to medium grained.	0.30 – 1.80	2.0	>0.20 – >1.70
Summary of Strata Encountered (TP1 – TP4)																									
Strata	Top Depth (m bgl)	Base Depth (m bgl)	Thickness (m)																						
TOPSOIL (TP1 – TP4): Greyish brown sandy CLAY. Sand is fine to medium grained.	GL	0.30 – 0.45	0.30 – 0.45																						
WEALD CLAY FORMATION (Cohesive) (TP1 – TP3): Orangish brown to grey sandy clay. Sand is fine to medium grained.	0.30 – 0.55	1.80	1.25 – 1.50																						
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WEALD CLAY FORMATION (Cohesive) (TP1 – TP4): Orangish brown to greyish blue sandy CLAY. Sand is fine to medium grained.	0.30 – 1.80	2.0	>0.20 – >1.70																						
GROUNDWATER	Groundwater was not encountered during site works within TP1 – TP4. Changes in groundwater level occur for a number of reasons including seasonal effects and variations in drainage. The investigation was undertaken in December 2024 when groundwater levels are likely to be at their annual maximum (highest elevation). Exact groundwater levels may only be determined through long term measurements from monitoring wells installed on-site.																								
ROOTS	The depths of root penetration can be seen tabulated below. <table><tr><th colspan="2">Summary of Root Penetration</th></tr><tr><th>Trial Hole</th><th>Root Depth (m bgl)</th></tr><tr><td>TP1</td><td>0.40</td></tr><tr><td>TP2</td><td>0.40</td></tr><tr><td>TP3</td><td>0.40</td></tr><tr><td>TP4</td><td>0.40</td></tr></table> The site and its immediate environs were noted to contain a number of existing trees and vegetation; therefore, roots may be found to greater depths at other locations on the site, particularly close to trees and/or trees that have been removed both within the site and its close environs.	Summary of Root Penetration		Trial Hole	Root Depth (m bgl)	TP1	0.40	TP2	0.40	TP3	0.40	TP4	0.40												
Summary of Root Penetration																									
Trial Hole	Root Depth (m bgl)																								
TP1	0.40																								
TP2	0.40																								
TP3	0.40																								
TP4	0.40																								

SOAKAGE LETTER REPORT

SOAKAGE RESULTS

TESTING

Soakage testing in accordance with the principles of BRE365 was undertaken within TP1 – TP4. The trial pits were bottomed out within Weald Clay Formation (Mudstone). Given that no infiltration occurred within the site works day it was not possible to calculate an infiltration rate.

The results recorded are presented within the following table.

Soakage Test Results						
Trial Hole	Test Number	Base of Soakage Pit (m bgl)	Start Depth (m bgl)	Finish Depth (m bgl)	Time Taken (mins)	Infiltration Rate (m/sec)
TP1*	1	2.00	0.81	0.81	240	-
TP2*	1	2.00	0.75	0.75	240	-
TP3*	1	2.00	0.78	0.78	240	-
TP4*	1	2.00	0.82	0.82	240	-
*Given the infiltration rate encountered, only one test could be undertaken within each Trial Pit, and it did not reach the required 75% mark.						

Due to no infiltration having occurred during the site works an infiltration rate cannot be calculated. The tests were therefore not completed in accordance with BRE365.

Figure 1

Trial Hole Location Plan

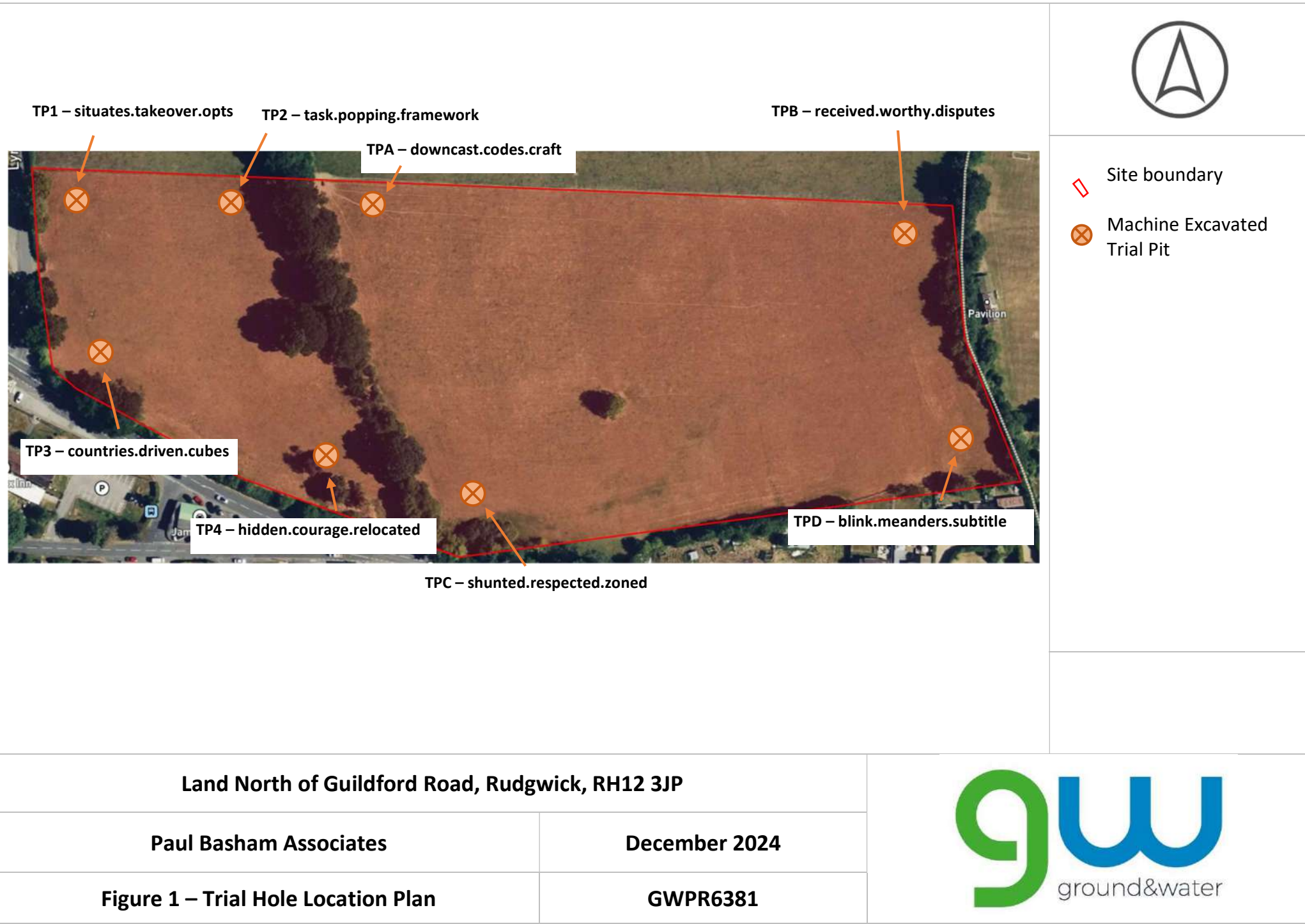
Appendix A

Conditions and Limitations

Appendix B

Trial Hole Logs

FIGURES



APPENDIX A: Conditions and Limitations

The ground is a product of continuing natural and artificial processes. As a result, the ground will exhibit a variety of characteristics that vary from place to place across a site, and also with time. Whilst a ground investigation will mitigate to a greater or lesser degree against the resulting risk from variation, the risks cannot be eliminated.

The report has been prepared on the basis of information, data and materials which were available at the time of writing. Accordingly, any conclusions, opinions or judgements made in the report should not be regarded as definitive or relied upon to the exclusion of other information, opinions and judgements.

The investigation, interpretations, and recommendations given in this report were prepared for the sole benefit of the client in accordance with their brief; as such these do not necessarily address all aspects of ground behaviour at the site. No liability is accepted for any reliance placed on it by others unless specifically agreed in writing.

Any decisions made by you, or by any organisation, agency or person who has read, received or been provided with information contained in the report ("you" or "the Recipient") are decisions of the Recipient and we will not make, or be deemed to make, any decisions on behalf of any Recipient. We will not be liable for the consequences of any such decisions.

Current regulations and good practice were used in the preparation of this report. An appropriately qualified person must review the recommendations given in this report at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.

Any Recipient must take into account any other factors apart from the Report of which they and their experts and advisers are or should be aware. The information, data, conclusions, opinions and judgements set out in the report may relate to certain contexts and may not be suitable in other contexts. It is your responsibility to ensure that you do not use the information we provide in the wrong context.

This report is based on readily available geological records, the recorded physical investigation, the strata observed in the works, together with the results of completed site and laboratory tests. Whilst skill and care has been taken to interpret these conditions likely between or below investigation points, the possibility of other characteristics not revealed cannot be discounted, for which no liability can be accepted. The impact of our assessment on other aspects of the development required evaluation by other involved parties.

The opinions expressed cannot be absolute due to the limitations of time and resources within the context of the agreed brief and the possibility of unrecorded previous in ground activities. The ground conditions have been sampled or monitored in recorded locations and tests for some of the more common chemicals generally expected. Other concentrations of types of chemicals may exist. It was not part of the scope of this report to comment on environment/contaminated land considerations.

The conclusions and recommendations relate to Land North of Guildford Road, Rudgwick, RH12 3JP.

Trial hole is a generic term used to describe a method of direct investigation. The term trial pit, borehole or window sampler borehole implies the specific technique used to produce a trial hole.

The depth to roots and/or of desiccation may vary from that found during the investigation. The client is responsible for establishing the depth to roots and/or of desiccation on a plot-by-plot basis prior to the construction of foundations. Where trees are mentioned in the text this means existing trees, recently removed trees (approximately 15 years to full recovery on cohesive soils) and those planned as part of the site landscaping.

Ownership of copyright of all printed material including reports, laboratory test results, trial pit and borehole log sheets, including drillers log sheets, remain with Ground and Water Limited. Licence is for the sole use of the client and may not be assigned, transferred or given to a third party.

Only our client may rely on this report and should this report or any information contained in it be provided to any third party we accept no responsibility to the third party for the contents of this report save to the extent expressly outlined by us in writing in a reliance letter addressed from us to the third party.

Recipients are not permitted to publish this report outside of their organisation without our express written consent.

APPENDIX B: Trial Hole Logs



Trial Pit Log

Project Name: Land North of Guildford Road		Client: Paul Basham Associates		Date: 19/12/2024	
Location: Rudgwick, RH12 3JP		Contractor:			
Project No. : GWPR6381		Crew Name:		Equipment:	
Location Number TP1	Location Type TP	Level	Logged By JN	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	D		0.45 0.55			TOPSOIL: Greyish brown sandy CLAY. Sand is fine to medium grained.	1
		0.50	D					Orangish brown to reddish brown sandy CLAY. Sand is fine grained. (WEALD CLAY FORMATION). Orangish brown to grey sandy clay. Sand is fine to medium grained. (WEALD CLAY FORMATION).	
		0.80	D						
		1.00	D		1.80 2.00				2
		1.50	D						
		2.00	D					Orangish brown to greyish blue sandy CLAY. Sand is fine to medium grained. (WEALD CLAY FORMATION).	
								End of Borehole at 2.000m	5

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks	
Trial Pit completed to 2.0m bgl. Groundwater not struck. Roots encountered to 0.40m bgl.	



Trial Pit Log

Project Name: Land North of Guildford Road		Client: Paul Basham Associates		Date: 19/12/2024	
Location: Rudgwick, RH12 3JP		Contractor:			
Project No. : GWPR6381		Crew Name:		Equipment:	
Location Number TP2	Location Type TP	Level	Logged By JN	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	D		0.40			TOPSOIL: Greyish brown sandy CLAY. Sand is fine to medium grained.	1
		0.50	D					Orangish brown to grey sandy clay. Sand is fine to medium grained. (WEALD CLAY FORMATION).	
		0.80	D						
		1.00	D		1.80				2
		1.50	D						
		2.00	D					Orangish brown to greyish blue sandy CLAY. Sand is fine to medium grained. (WEALD CLAY FORMATION).	
					2.00			End of Borehole at 2.000m	3
									4
									5

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks Trial Pit completed to 2.0m bgl. Groundwater not struck. Roots encountered to 0.40m bgl.	
---	--



Trial Pit Log

Project Name: Land North of Guildford Road		Client: Paul Basham Associates		Date: 19/12/2024	
Location: Rudgwick, RH12 3JP		Contractor:			
Project No. : GWPR6381		Crew Name:		Equipment:	
Location Number TP3	Location Type TP	Level	Logged By JN	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	D		0.30			TOPSOIL: Greyish brown sandy CLAY. Sand is fine to medium grained.	1
		0.50	D					Orangish brown to grey sandy clay. Sand is fine to medium grained. (WEALD CLAY FORMATION).	
		0.80	D						
		1.00	D		1.80				2
		1.50	D						
		2.00	D					Orangish brown to greyish blue sandy CLAY. Sand is fine to medium grained. (WEALD CLAY FORMATION).	
					2.00			End of Borehole at 2.000m	5

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks

Trial Pit completed to 2.0m bgl.
Groundwater not struck.
Roots encountered to 0.40m bgl.





Trial Pit Log

Project Name: Land North of Guildford Road		Client: Paul Basham Associates		Date: 19/12/2024	
Location: Rudgwick, RH12 3JP		Contractor:			
Project No. : GWPR6381		Crew Name:		Equipment:	
Location Number TP4	Location Type TP	Level	Logged By JN	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	D		0.30			TOPSOIL: Greyish brown sandy CLAY. Sand is fine to medium grained.	1
		0.50	D					Orangish brown to greyish blue sandy CLAY. Sand is fine to medium grained. (WEALD CLAY FORMATION).	
		0.80	D						
		1.00	D		2.00				
		1.50	D						
		2.00	D						
								End of Borehole at 2.000m	2
									3
									4
									5

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks

Remarks

Trial Pit completed to 2.0m bgl.
Groundwater not struck.
Roots encountered to 0.40m bgl.



Oliver Terry
Paul Basham Associates
Burseldene
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Southampton
SO31 8BG

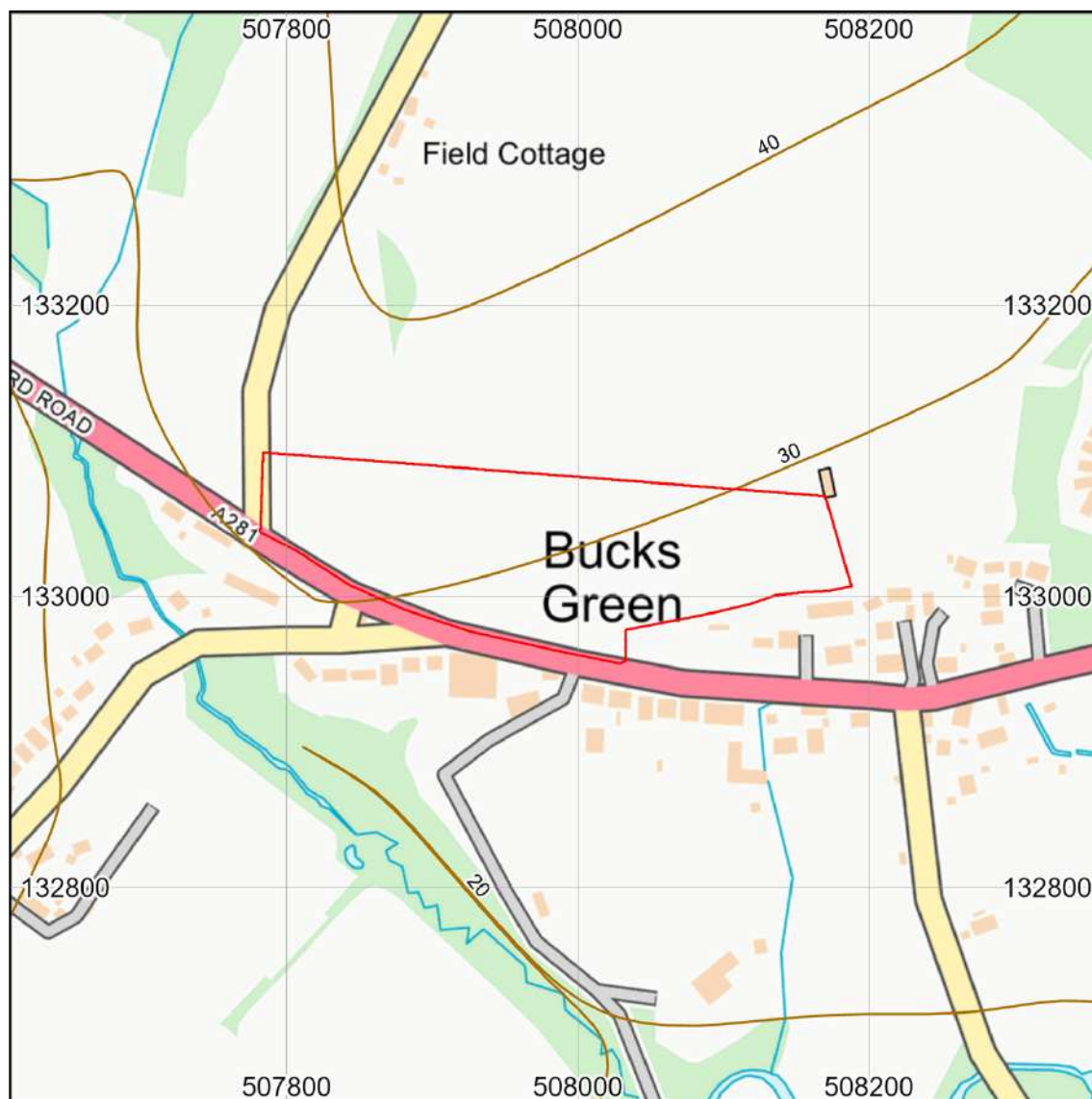
Infiltration SuDS GeoReport:

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_341340/58422*

Client reference:

Search location



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Search location indicated in red

This report describes a site located at National Grid Reference 507985, 133026. Note that for sites of irregular shape, this point may lie outside the site boundary. Where the client has submitted a site plan the assessment will be based on the area given.

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

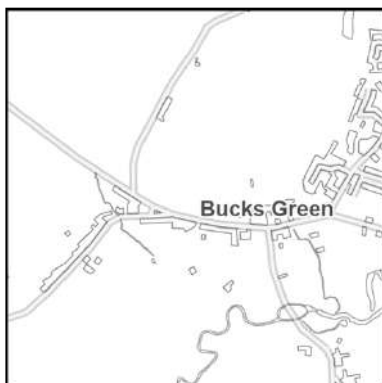
Where maps are overlain by grey polygons, geological or hydrogeological hazards may exist that could be made worse by infiltration. The following hazards are considered:

- soluble rocks
- landslides
- shallow mining (not including coal)
- shallow groundwater
- made ground

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

Soluble rock hazard	
 Contains OS data © Crown Copyright and database right 2025	☒ 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	
 Contains OS data © Crown Copyright and database right 2025	☒ 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.

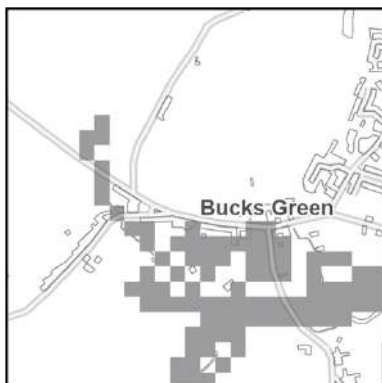
Shallow mining hazard (not including coal)



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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.

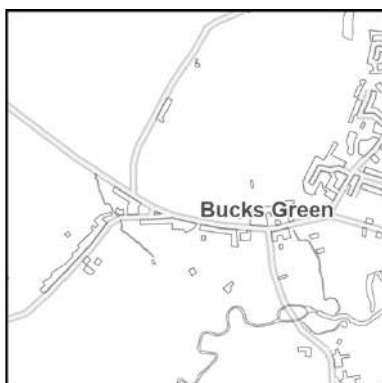
Persistent shallow groundwater



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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

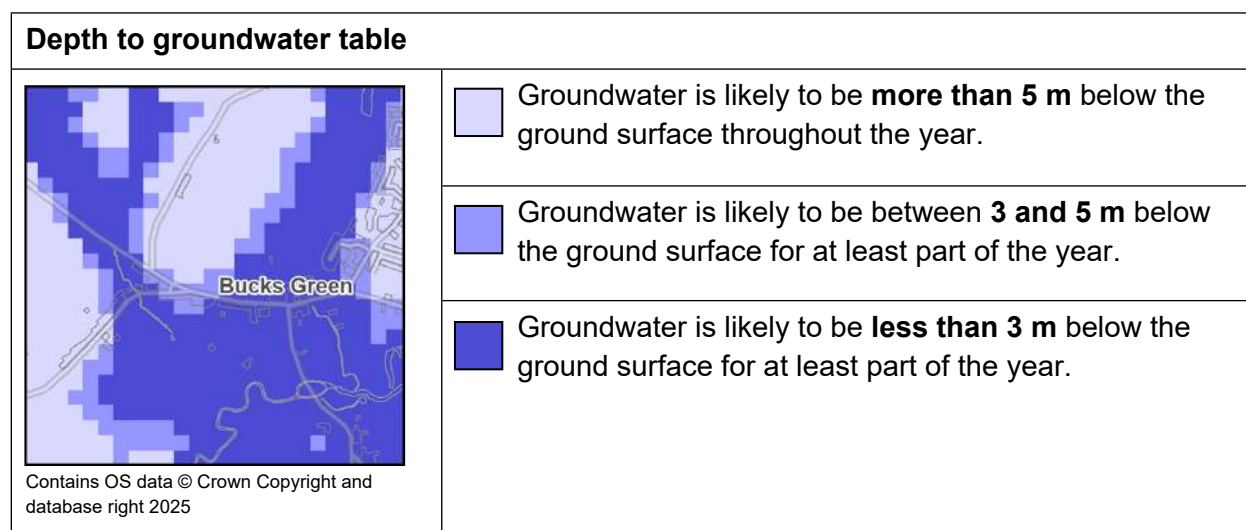
Section 2. Drainage potential

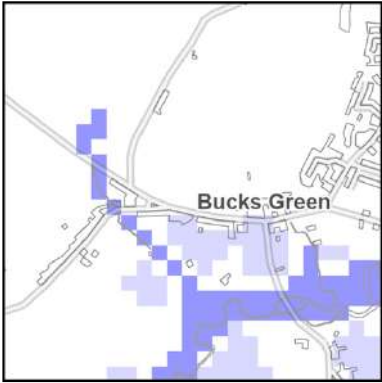
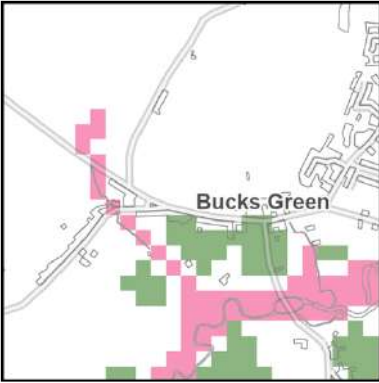
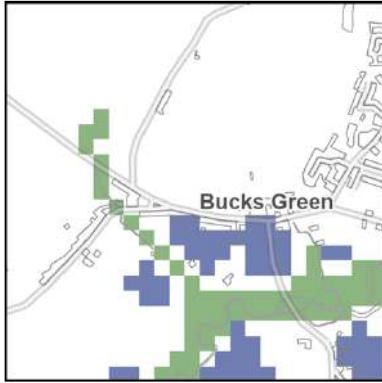
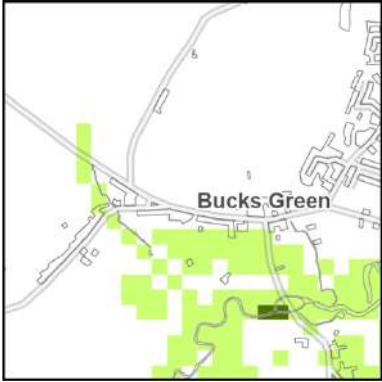
The following pages contain maps that will help you assess the drainage potential of the ground by considering the:

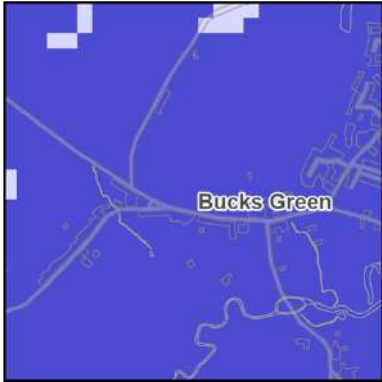
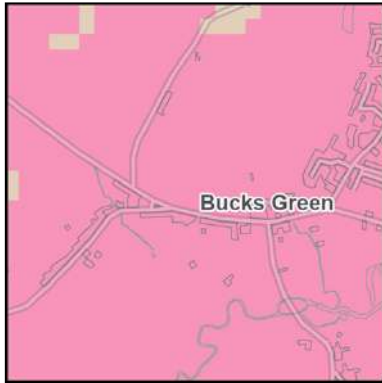
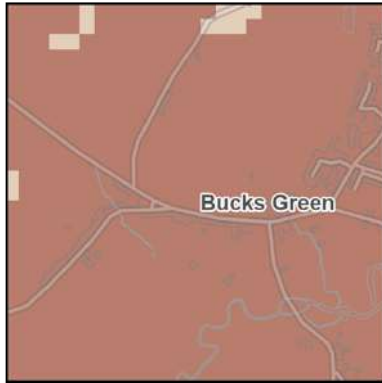
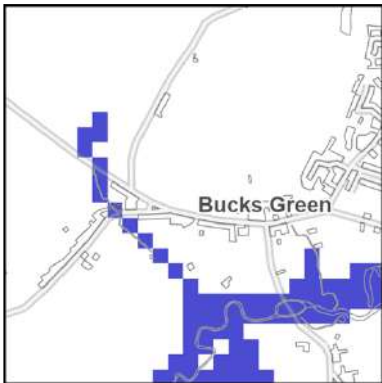
- depth to water table
- permeability of the superficial deposits
- thickness of the superficial deposits
- permeability of the bedrock
- presence of floodplains

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		
 Contains OS data © Crown Copyright and database right 2025	 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  Contains OS data © Crown Copyright and database right 2025	Maximum  Contains OS data © Crown Copyright and database right 2025
Superficial deposit thickness		
 Contains OS data © Crown Copyright and database right 2025	 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.	

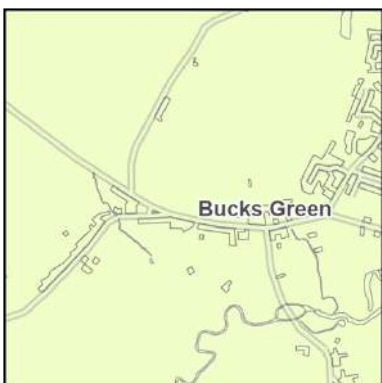
Bedrock permeability		
 Contains OS data © Crown Copyright and database right 2025	 Bedrock deposits are likely to be free-draining .	
	 The bedrock permeability is spatially variable , but likely to permit moderate infiltration.	
	 Bedrock deposits are likely to be poorly draining .	
These maps show the permeability range that is summarised above. Key  Very Low  Low  Moderate  High  Very High	Minimum  Contains OS data © Crown Copyright and database right 2025	Maximum  Contains OS data © Crown Copyright and database right 2025
Geological indicators of flooding		
 Contains OS data © Crown Copyright and database right 2025	 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

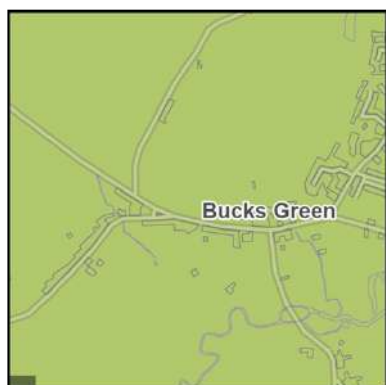
The following pages contain maps that will help you assess whether infiltration may impact the stability of the ground. They consider hazards associated with:

- 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 2025	 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.

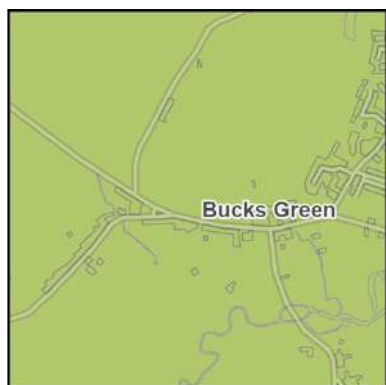
Landslides



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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.

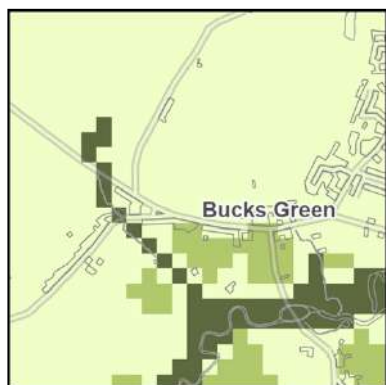
Shallow mining



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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.

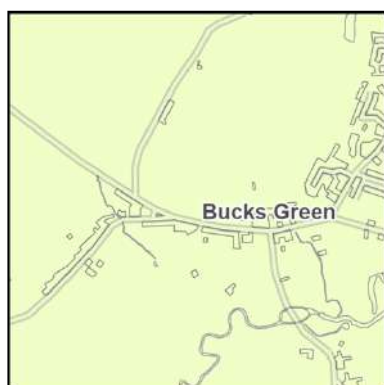
Compressible ground



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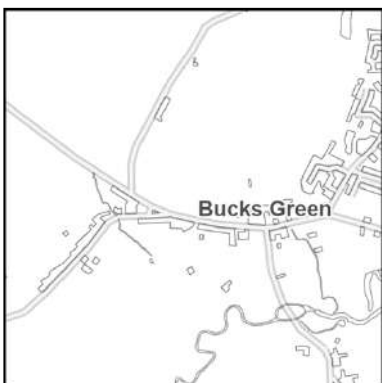
-  Increased infiltration is unlikely to result in subsidence.
-  Deposits with potential to collapse when loaded and saturated are possibly present in places. Increased infiltration is unlikely to cause a geohazard, but potential impacts should be considered.
-  Deposits with potential to collapse when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

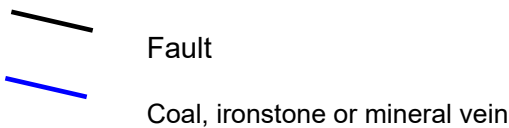
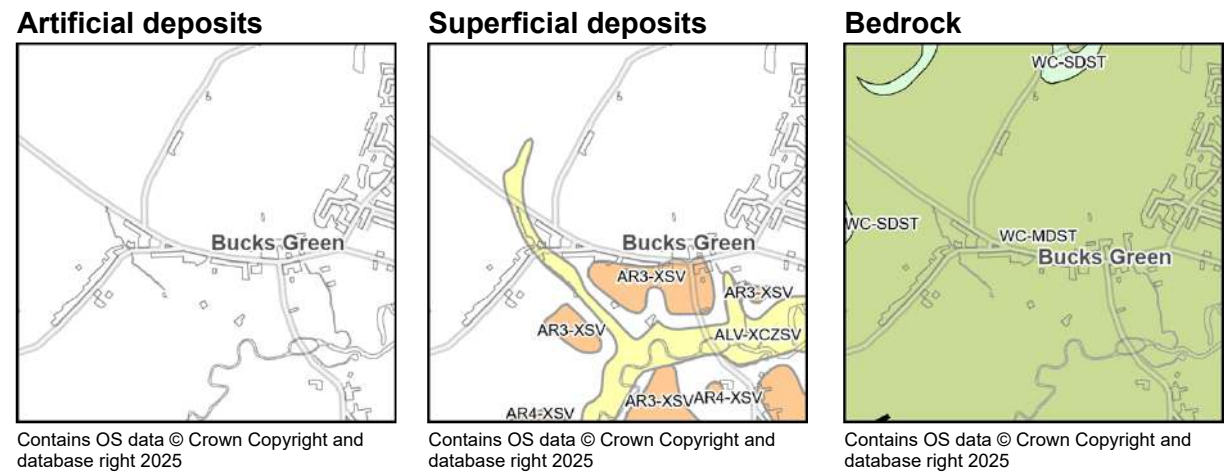
For more information read 'Explanation of terms' at the end of this report.

Groundwater source protection zones	
 Contains OS data © Crown Copyright and database right 2025 Derived in part from Source Protection Zone data provided under licence from the Environment Agency © Environment Agency 2025.	 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 2025	 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 2025	 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.



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:
No deposits recorded by BGS in the search area

Key to Superficial deposits:

Map colour	Computer Code	Rock name	Rock type
	ALV-XCZSV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL
	AR3-XSV	ARUN TERRACE DEPOSITS, 3 MEMBER	SAND AND GRAVEL
	AR4-XSV	ARUN TERRACE DEPOSITS, 4 MEMBER	SAND AND GRAVEL
	AR3T4-XSV	ARUN RIVER TERRACE DEPOSITS, 3 MEMBER AND ARUN RIVER TERRACE DEPOSITS, 4 MEMBER, UNDIFFERENTIATED	SAND AND GRAVEL

Key to Bedrock geology:

Map colour	Computer Code	Rock name	Rock type
	WC-SDST	WEALD CLAY FORMATION	SANDSTONE
	WC-MDST	WEALD CLAY FORMATION	MUDSTONE

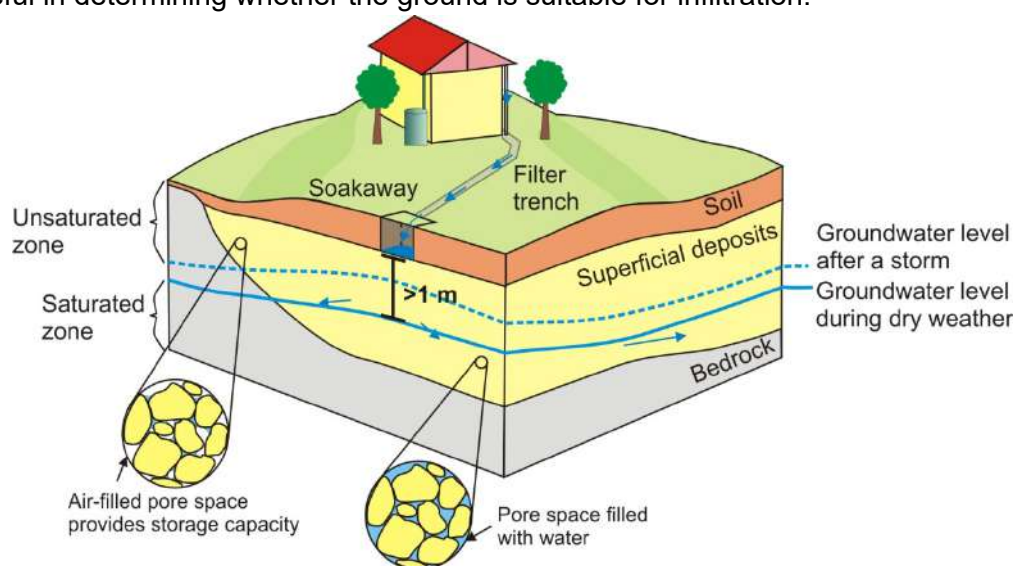
Limitations of this report:

- 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

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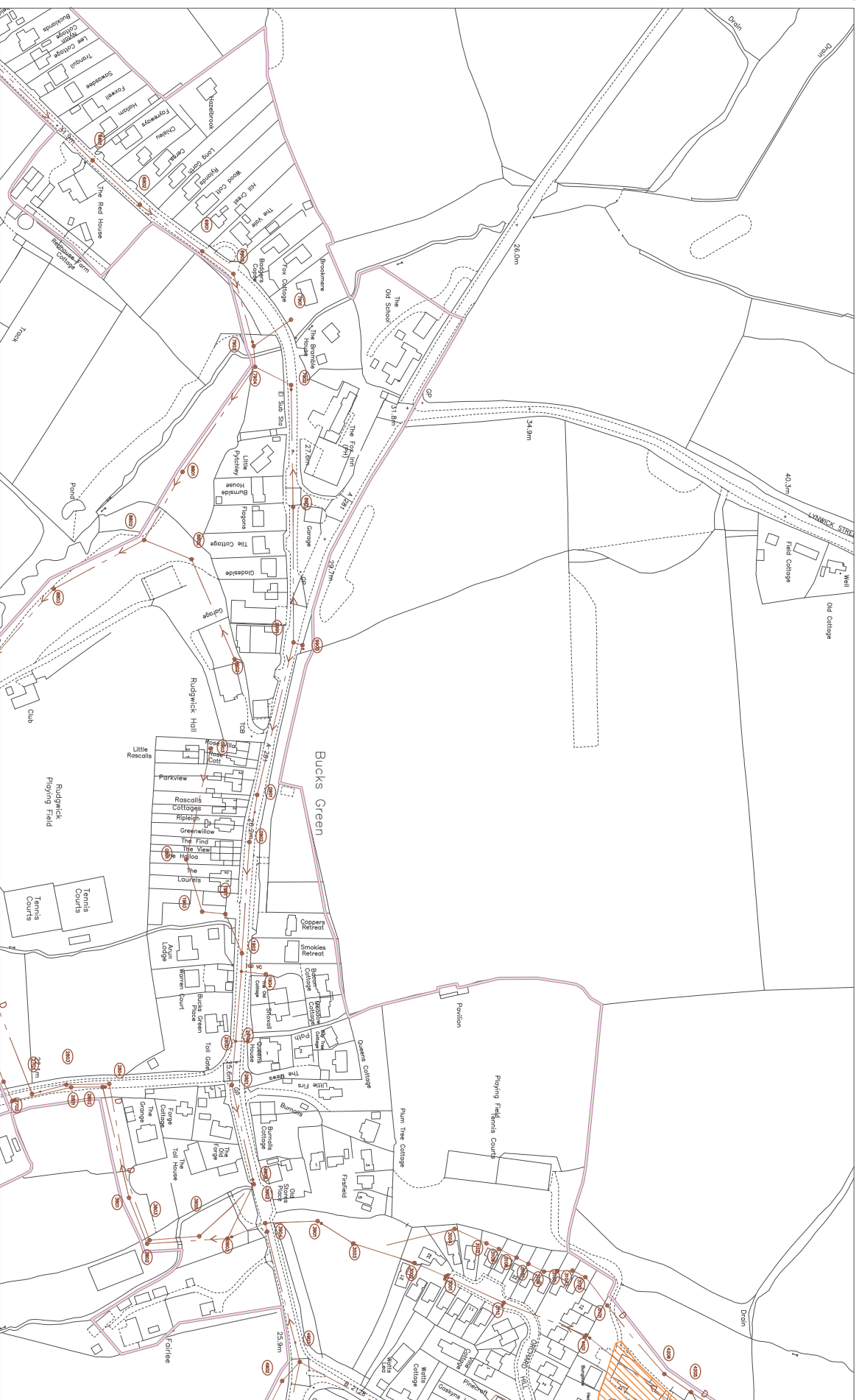
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**Report issued by
BGS Enquiry Service**



132771
507505
O.S. REF.
TQ0733SE

Drawn by: rohandas

Title: 337345_Guildford Road Housing

Date: 10/05/2019

The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy.

The actual positions should be determined on site.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement

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

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SEWER RECORDS PAGE 2 OF 2

Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape
0801X	25.03	24.56	150	CI	ORC	0901X	25.03	24.56	150	CI	ORC	1001X	25.03	24.56	150	CI	ORC	1101X	25.03	24.56	150	CI	ORC
0902X	26.04	24.48	150	WC	ORC	1002X	26.04	24.48	150	WC	ORC	1102X	26.04	24.48	150	WC	ORC	1202X	26.04	24.48	150	WC	ORC
0903X	25.78	24.9	150	ORC	ORC	1003X	25.78	24.9	150	ORC	ORC	1103X	25.78	24.9	150	ORC	ORC	1203X	25.78	24.9	150	ORC	ORC
1901X	25.52	24.2	150	CI	ORC	2001X	25.52	24.2	150	CI	ORC	2101X	25.52	24.2	150	CI	ORC	2201X	25.52	24.2	150	CI	ORC
1903X	25.89	24.1	150	WC	ORC	2003X	25.89	24.1	150	WC	ORC	2103X	25.89	24.1	150	WC	ORC	2203X	25.89	24.1	150	WC	ORC
1904X			100	WC	ORC	2004X			100	WC	ORC	2104X			100	WC	ORC	2204X			100	WC	ORC
1900X			150	ORC	ORC	2000X			150	ORC	ORC	2100X			150	ORC	ORC	2200X			150	ORC	ORC
2701X	23.38	17.82	400	WC	ORC	2801X	23.38	17.82	400	WC	ORC	2901X	23.38	17.82	400	WC	ORC	3001X	23.38	17.82	400	WC	ORC
2702X	21.33	16.04	400	WC	ORC	2802X	21.33	16.04	400	WC	ORC	2902X	21.33	16.04	400	WC	ORC	3002X	21.33	16.04	400	WC	ORC
2801X	22.31		400	WC	ORC	2901X	22.31		400	WC	ORC	3001X	22.31		400	WC	ORC	3101X	22.31		400	WC	ORC
2802X	22.66		400	WC	ORC	2902X	22.66		400	WC	ORC	3002X	22.66		400	WC	ORC	3102X	22.66		400	WC	ORC
2901X	25.72	23.6	150	VC	ORC	3001X	25.72	23.6	150	VC	ORC	3101X	25.72	23.6	150	VC	ORC	3201X	25.72	23.6	150	VC	ORC
3001X			375	CP	ORC	3101X			375	CP	ORC	3201X			375	CP	ORC	3301X			375	CP	ORC
3002X	28.9	24.39	UNK	UNK	ORC	3102X	28.9	24.39	UNK	UNK	ORC	3202X	28.9	24.39	UNK	UNK	ORC	3302X	28.9	24.39	UNK	UNK	ORC
3003X	25.84	22.91	400	SI	ORC	3103X	25.84	22.91	400	SI	ORC	3203X	25.84	22.91	400	SI	ORC	3303X	25.84	22.91	400	SI	ORC
3111X	19.57	16.82	375	CP	ORC	3211X	19.57	16.82	375	CP	ORC	3311X	19.57	16.82	375	CP	ORC	3411X	19.57	16.82	375	CP	ORC
3112X	23.3	18.88	375	CP	ORC	3212X	23.3	18.88	375	CP	ORC	3312X	23.3	18.88	375	CP	ORC	3412X	23.3	18.88	375	CP	ORC
3802X	21.23	18.87	400	WC	ORC	3901X	23.81	21.15	400	SI	ORC	4001X	23.81	21.15	400	SI	ORC	4101X	23.81	21.15	400	SI	ORC
3901X	23.81	21.15	400	SI	ORC	4001X	23.81	21.15	400	SI	ORC	4101X	23.81	21.15	400	SI	ORC	4201X	23.81	21.15	400	SI	ORC
3902X	23.14	20.85	400	SI	ORC	4002X	23.14	20.85	400	SI	ORC	4102X	23.14	20.85	400	SI	ORC	4202X	23.14	20.85	400	SI	OR

LINE STYLES / COLOURS

[illegible]

Drawn by: rohandas	
Title: 337345_Guildford Road Housing	
Date: 10/05/2019	

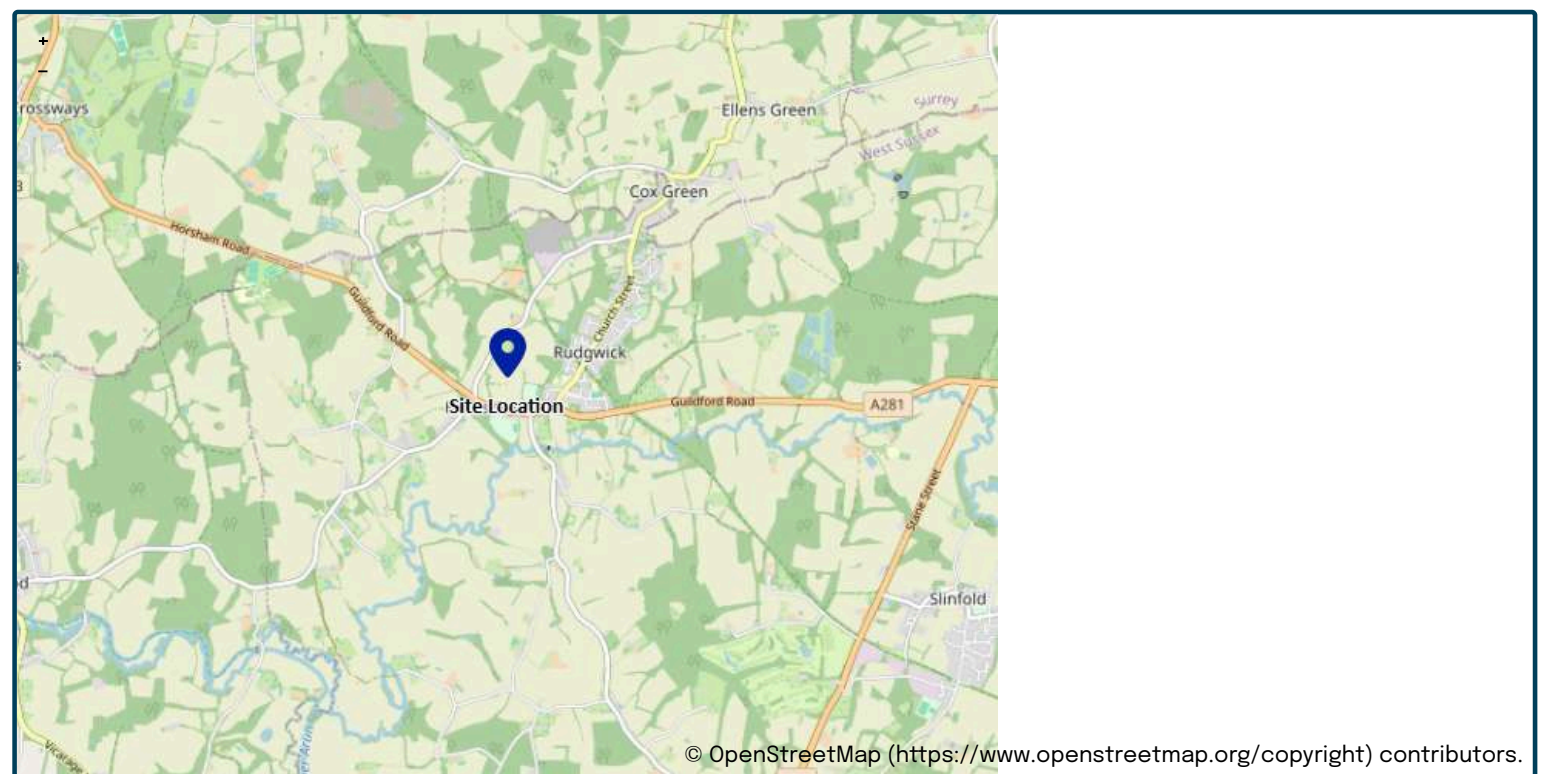
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Project details

Date	21/05/2025
Calculated by	Samuel Flesher
Reference	
Model version	2.0.1

Location

Site name	Land North of Guildford Road
Site location	Rudgwick



Site easting	508037
Site northing	133044

Site details

Total site area (ha)	2.72	ha
----------------------	-----------------------------------	----

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MORE INFO

Greenfield runoff

Method

Method	FEH statistical
--------	-----------------

FEH statistical

	<u>My value</u>		<u>Map value</u>
SAAR (mm)	776	mm	774
BFIHOST	.342		
QMed-QBar conversion	1.136		1.136
QMed (l/s)	15.6	l/s	
QBar (FEH statistical) (l/s)	17.8	l/s	

Growth curve factors

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

Results

Method	FEH statistical	
Flow rate 1 year (l/s)	15.1	l/s
Flow rate 2 year (l/s)	15.6	l/s
Flow rate 10 years (l/s)	28.8	l/s
Flow rate 30 years (l/s)	40.8	l/s
Flow rate 100 years (l/s)	56.6	l/s
Flow rate 200 years (l/s)	66.4	l/s

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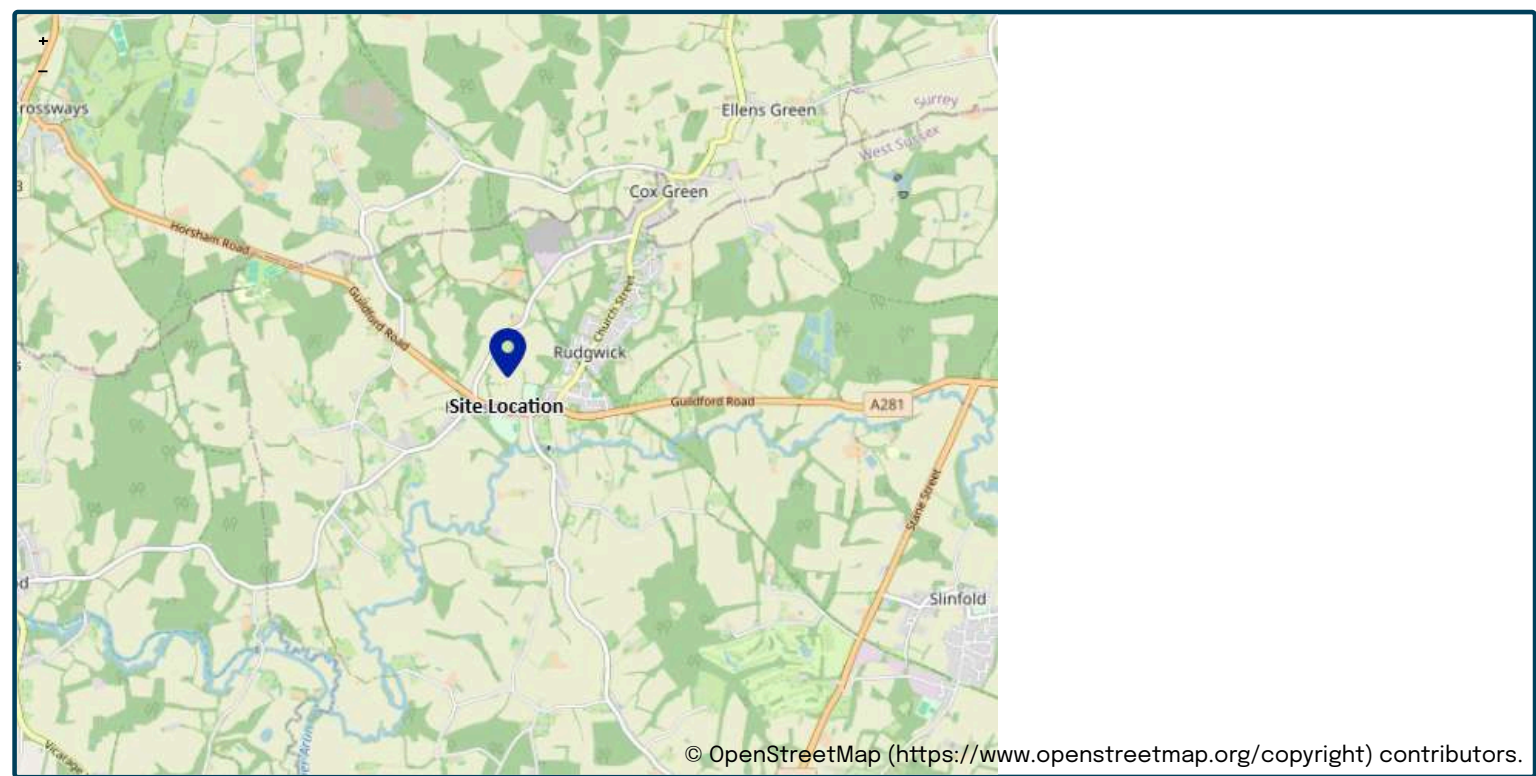
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Project details

Date	21/05/2025
Calculated by	Samuel Flesher
Reference	
Model version	2.0.1

Location

Site name	Land North of Guildford Road
Site location	Rudgwick



Site easting	508037
Site northing	133044

Site details

Total site area (ha)	0.66	ha
----------------------	------	----

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MORE INFO

Greenfield runoff

Method

Method	FEH statistical
--------	-----------------

FEH statistical

	<u>My value</u>		<u>Map value</u>
SAAR (mm)	776	mm	774
BFIHOST	.342		
QMed-QBar conversion	1.136		1.136
QMed (l/s)	3.79	l/s	
QBar (FEH statistical) (l/s)	4.3	l/s	

Growth curve factors

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

Results

Method	FEH statistical	
Flow rate 1 year (l/s)	3.7	l/s
Flow rate 2 year (l/s)	3.8	l/s
Flow rate 10 years (l/s)	7	l/s
Flow rate 30 years (l/s)	9.9	l/s
Flow rate 100 years (l/s)	13.7	l/s
Flow rate 200 years (l/s)	16.1	l/s

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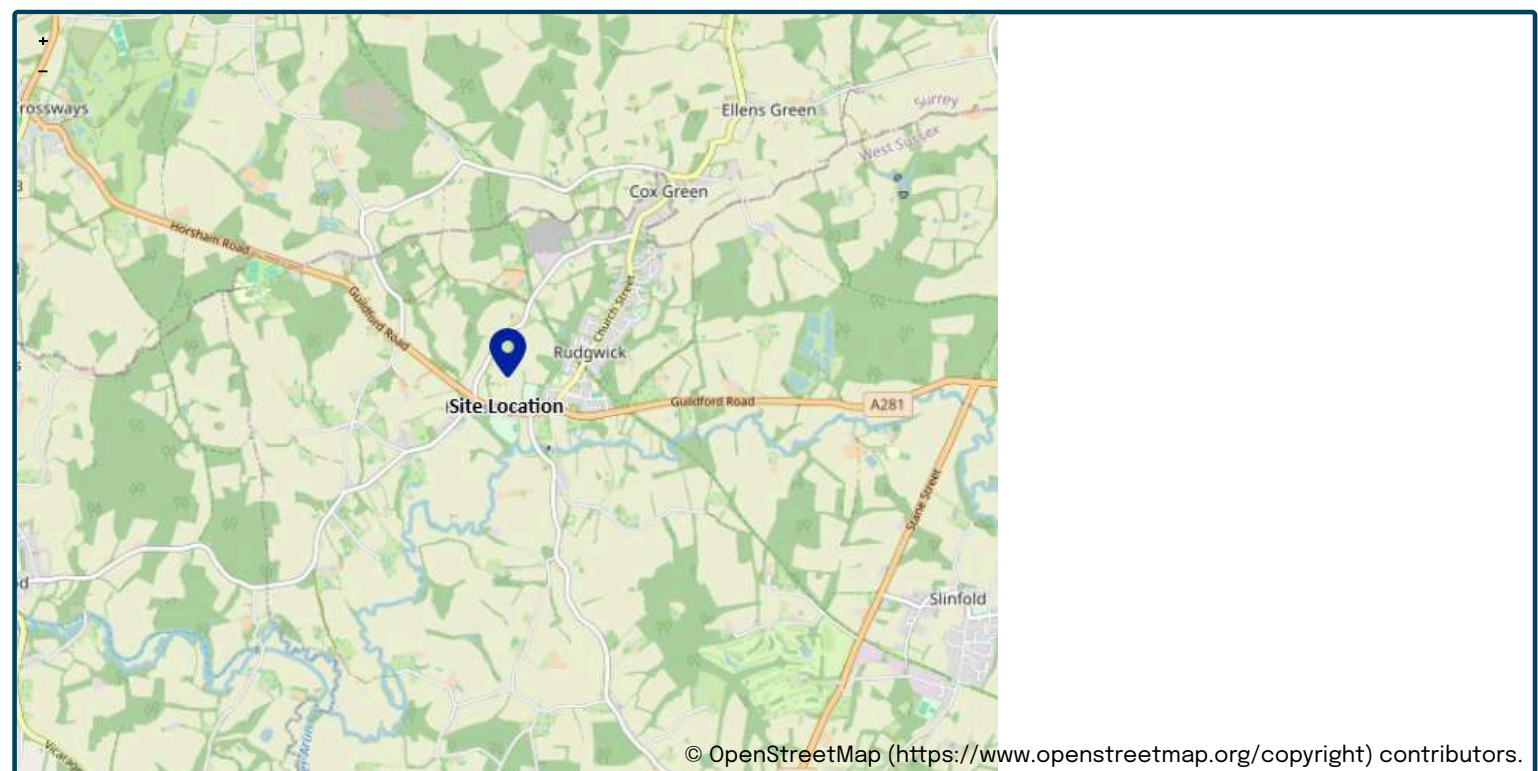
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Project details

Date	21/05/2025
Calculated by	Samuel Flesher
Reference	
Model version	2.0.1

Location

Site name	Land North of Guildford Road
Site location	Rudgwick



Site easting	508037
Site northing	133044

Site details

Total site area (ha)	2.06	ha
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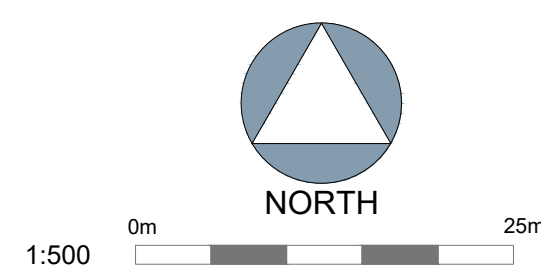
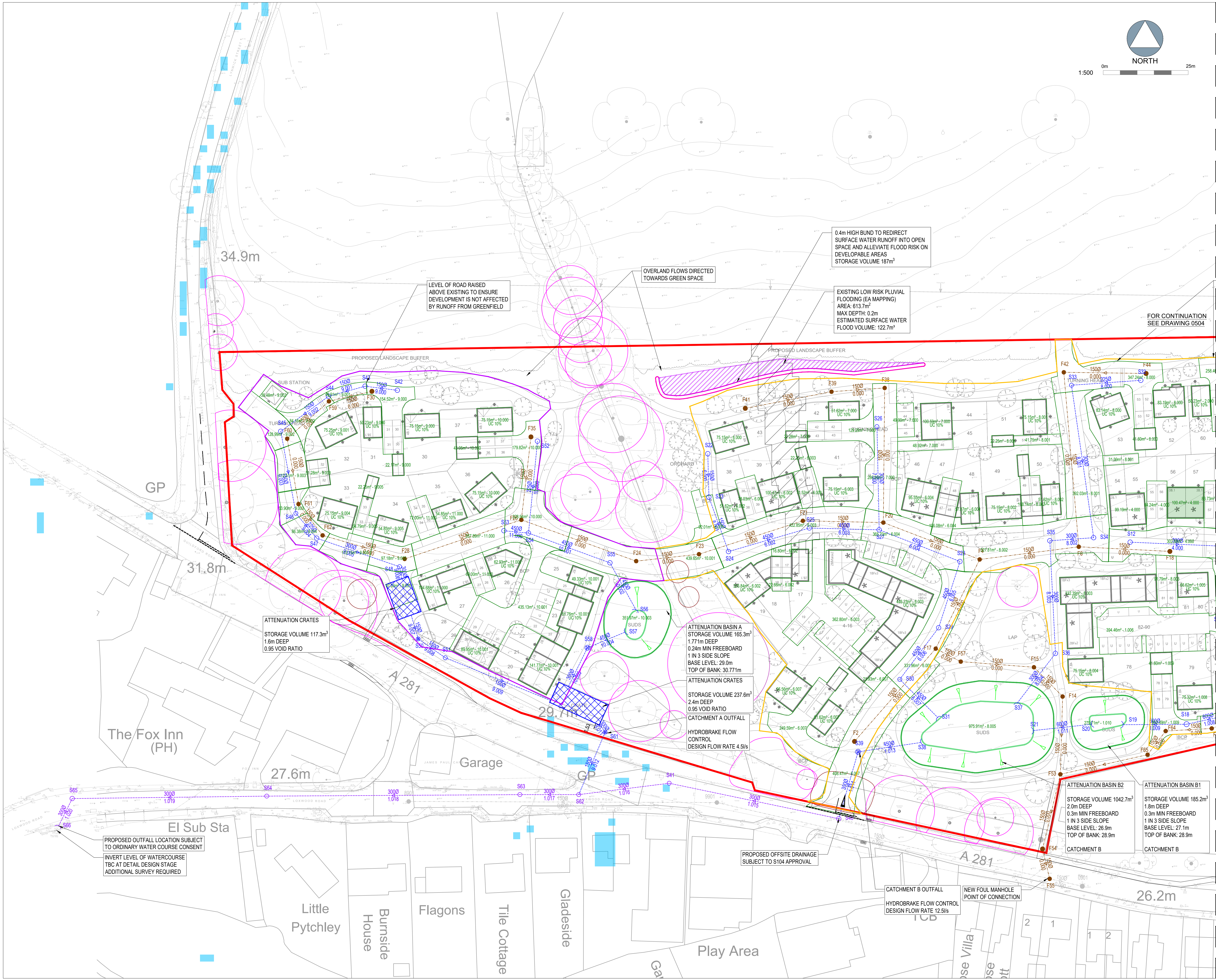
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 - 4.2. TOPOGRAPHICAL SURVEY REF: 19/192/100/A-G
 - 4.3. DEFRA ROF/SW, CC: EA SURFACE WATER PLUS CLIMATE CHANGE FLOOD MAPPING

- LEGEND**
- PLANNING APPLICATION BOUNDARY
 - SURFACE WATER SEWER
 - S104 SURFACE WATER SEWER NETWORK
 - FOUL WATER SEWER
 - SURFACE WATER CHAMBER
 - HYDROBRAKE
 - FOUL WATER CHAMBER
 - HEADWALL
 - ATTENUATION CRATES
 - ROOT PROTECTION AREAS
 - ATTENUATION BASIN
 - RISK OF SURFACE WATER FLOODING (YEARLY CHANCE 2040-2060)
 - SURFACE WATER RETENTION BUND
 - CATCHMENT A
TOTAL AREA: 0.66ha
 - CATCHMENT B
TOTAL AREA: 2.06ha
 - DRAINABLE AREAS
43.12m² - 0.001

PRELIMINARY
DRAWING/DESIGN IS STILL 'IN DEVELOPMENT'
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P04	TREE BY PLOT 28 OMITTED	24.11.2025	SF	MDW
P03	ATTENUATION CRATES ADDED	21.11.2025	SF	MDW
P02	S104 SEWER ADDED	17.10.2025	SF	MDW
P01	FIRST ISSUE	29.05.2025	SF	MDW
Rev	Description	Date	By	App'd

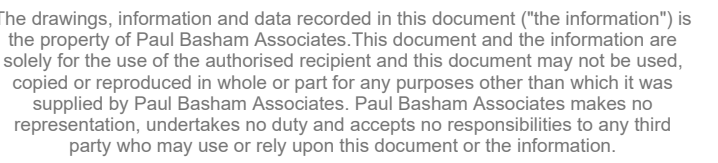
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info@paulbashamassociates.com www.paulbashamassociates.com

WELBECK LAND

Project Name
LAND NORTH OF GUILDFORD ROAD, RUDGWICK

Title
**PRELIMINARY DRAINAGE STRATEGY
SHEET 1 OF 2**

Project Phase			
PRELIMINARY			
Date Created	Drawn By	Approved By	Suitability Code
29.05.2025	SF	MDW	S3
PBA Project Number		Scale	(AT A1)
145.5008		1:500	
PBA Drawing No:			Revision
145.5008.0503			P04



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1. SITE RAVEL REF: WEL19030 SL-03 PA

2. TOPOGRAPHICAL SURVEY: WEL19102/001A-G

3. DEFRA RFSW_C/2: EA SURFACE WATER PLUS CLIMATE CHANGE FLOOD MAPPING

	PLANNING APPLICATION BOUNDARY
	SURFACE WATER SEWER
	S104 SURFACE WATER SEWER NETWORK
	FOUL WATER SEWER
	SURFACE WATER CHAMBER
	HYDROBRAKE
	FOUL WATER CHAMBER
	HEADWALL
	ATTENUATION CRATES
	ROOT PROTECTION AREAS
	ATTENUATION BASIN
	RISK OF SURFACE WATER FLOODING (YEARLY CHANCE 2040-2060)
	SURFACE WATER RETENTION BUND
	CATCHMENT A TOTAL AREA: 0.66ha
	CATCHMENT B TOTAL AREA: 2.06ha
	DRAINABLE AREAS

DRAWING/DESIGN IS STILL 'IN DEVELOPMENT'
YOU ARE ADVISED TO MAKE DUE ALLOWANCE

3	ATTENUATION CRATES ADDED	21.11.2025	SF	MDW
2	S104 SEWER ADDED	17.10.2025	SF	MDW
1	FIRST ISSUE	29.05.2025	SF	MDW
	Description	Date	By	App'd



Object Name
AND NORTH OF GUILDFORD ROAD,
UDGWICK

RELIMINARY DRAINAGE STRATEGY
SHEET 2 OF 2

Project Phase
PRELIMINARY

Issue Created	Drawn By	Approved By	Suitability Code
09.05.2025	SF	MDW	S3
Project Number		Scale	
15.5008		1:500 (AT A1)	

145.5008.0504

6/310723/JM

Network Details

Manhole Schedule

Manhole	Catchment Area (ha)	Diameter (m)	Type	CL (m)	IL (m)	Depth To Soffit (m)	Easting (m)	Northing (m)
S1	0.032	1.350	Type C	30.346	28.787	1.259	508150.984	133064.317
S2	0.010	1.350	Type C	30.056	28.676	1.080	508151.612	133046.710
S3	0.009	1.350	Type C	29.912	28.619	0.993	508149.189	133039.263
S4	0.108	1.350	Type C	29.739	28.539	0.900	508140.660	133031.744
S5	0.000	1.200	Type B	30.863	28.308	2.255	508107.254	133041.271
S6	0.034	1.200	Type B	33.119	31.240	1.654	508079.704	133096.601
S7	0.009	1.200	Type B	32.844	30.970	1.649	508090.599	133096.663
S8	0.032	1.350	Type C	32.186	30.690	1.271	508122.085	133097.034
S9	0.057	1.350	Type B	32.428	30.120	2.008	508104.796	133091.483
S10	0.037	1.350	Type B	31.904	29.620	1.984	508095.105	133072.348
S11	0.007	1.350	Type B	31.238	28.041	2.747	508089.960	133044.341
S12	0.067	1.350	Type B	31.816	29.822	1.694	508053.361	133045.323
S13	0.081	1.500	Type B	31.394	27.830	2.964	508081.194	133044.111
S14	0.035	1.500	Type B	30.543	27.685	2.258	508082.054	133022.464
S15	0.023	1.350	Type C	28.584	27.562	0.721	508145.646	133008.079
S16	0.000	1.350	Type C	28.600	27.384	0.916	508111.122	132998.910
S17	0.023	1.500	Unknown	29.316	27.240	1.776	508082.979	132994.608
S18	0.020	1.500	Unknown	28.775	27.214	0.961	508069.944	132991.785
S19	0.028	0.000	Unknown	28.900	27.145	1.155	508051.252	132991.646
S20	0.000	0.000	Type C	28.900	27.130	1.170	508041.992	132991.762
S21	0.000	0.000	Type B	28.900	26.950	1.350	508024.860	132989.927
S22	0.008	1.350	Type C	34.088	32.797	1.141	507929.191	133071.339
S23	0.009	1.350	Type C	33.385	32.168	1.067	507929.516	133058.569
S24	0.051	1.350	Type C	32.442	31.192	0.799	507935.270	133042.558
S25	0.145	1.350	Type C	32.787	31.119	1.218	507959.053	133049.487
S26	0.070	1.200	Unknown	34.591	33.330	0.961	507978.924	133079.294
S27	0.064	1.350	Type B	33.086	31.040	1.596	507979.574	133048.948
S28	0.000	1.350	Type B	32.387	30.190	1.747	508003.329	133039.639
S29	0.033	1.350	Type B	31.327	29.206	1.671	507997.048	133020.161
S30	0.084	1.200	Type B	30.420	28.410	1.560	507985.621	133004.983
S31	0.000	0.000	Type B	28.900	27.660	0.790	507996.776	132993.780
S32	0.057	1.350	Type C	33.823	32.380	1.218	508056.483	133092.915
S33	0.057	1.200	Type B	34.320	32.100	1.920	508036.097	133091.470
S34	0.078	1.350	Type C	31.952	30.263	1.389	508042.622	133046.635
S35	0.046	1.350	Type B	32.067	29.840	1.927	508029.739	133045.747
S36	0.008	1.350	Type B	30.234	28.390	1.544	508031.392	133012.605
S37	0.098	0.000	Unknown	28.900	27.455	1.070	508020.194	132998.046
S38	0.000	0.000	Type B	28.900	26.920	1.530	507991.844	132986.419
S39	0.000	1.500	Type B	29.301	26.700	2.301	507973.361	132983.662
S40	0.000	1.350	Type C	28.377	26.612	1.465	507967.707	132964.007
S41	0.000	1.200	Type B	29.086	26.398	2.388	507917.843	132974.430
S42	0.031	1.350	Type C	35.134	33.744	1.239	507837.938	133089.978
S43	0.012	1.350	Type C	34.855	33.488	1.217	507828.439	133091.184
S44	0.025	1.350	Type C	34.545	33.221	1.174	507817.698	133088.217
S45	0.023	1.350	Type C	34.071	32.770	1.151	507803.651	133077.925
S46	0.017	1.200	Unknown	33.222	31.850	1.147	507808.109	133053.788
S47	0.045	1.350	Type B	32.901	30.629	1.972	507814.196	133046.501
S48	0.000	1.200	Type B	32.033	30.160	1.573	507838.578	133038.096
S49	0.000	1.200	Type B	31.448	29.410	1.888	507839.764	133031.379
S50	0.000	1.200	Type B	30.889	28.840	1.899	507844.071	133016.878
S51	0.000	1.200	Type B	30.560	27.900	2.510	507852.017	133011.335
S52	0.062	1.350	Type B	33.952	32.123	1.603	507879.127	133075.019
S53	0.065	1.350	Type B	32.643	30.214	1.979	507869.247	133048.690
S54	0.127	1.350	Type B	32.552	30.150	1.952	507876.472	133047.995
S55	0.000	1.350	Type B	32.296	29.480	2.366	507900.423	133039.250
S56	0.035	0.000	Type C	30.771	29.375	0.946	507908.061	133025.447
S57	0.000	0.000	Type C	30.771	29.030	1.291	507904.839	133018.851
S58	0.000	1.500	Type B	30.829	28.450	2.079	507893.808	133014.275
S59	0.000	1.200	Type B	29.856	26.881	2.676	507885.657	132997.685
S60	0.000	1.200	Type B	29.788	26.790	2.698	507896.528	132992.945
S61	0.000	1.200	Type B	29.582	26.740	2.692	507899.016	132989.440
S62	0.000	1.200	Type B	28.773	26.285	2.313	507891.259	132971.090
S63	0.000	1.200	Type B	28.719	26.213	2.206	507873.959	132971.081
S64	0.000	1.200	Type B	27.184	25.320	1.564	507799.532	132970.646

Manhole Schedule

Manhole	Catchment Area (ha)	Diameter (m)	Type	CL (m)	IL (m)	Depth To Soffit (m)	Easting (m)	Northing (m)
S65	0.000	1.350	Type C	23.335	21.750	1.285	507742.354	132969.927
S66	0.000	0.000	Type C	22.824	21.712	0.812	507738.336	132961.886

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	S1	28.787	S2	28.676	Circ	0.3mØ	17.618	158.3	0.600	1.259	1.080
1.001	S2	28.676	S3	28.619	Circ	0.3mØ	7.831	137.8	0.600	1.080	0.993
1.002	S3	28.619	S4	28.539	Circ	0.3mØ	11.370	142.5	0.600	0.993	0.900
1.003	S4	28.539	S5	28.308	Circ	0.3mØ	34.738	150.0	0.600	0.899	2.255
1.004	S5	28.308	S11	28.191	Circ	0.3mØ	17.565	150.0	0.600	2.255	2.747
2.000	S6	31.240	S7	30.970	Circ	0.225mØ	10.896	40.4	0.600	1.654	1.649
2.001	S7	30.970	S9	30.195	Circ	0.225mØ	15.112	19.5	0.600	1.649	2.008
3.000	S8	30.690	S9	30.195	Circ	0.225mØ	18.159	36.7	0.600	1.271	2.008
2.002	S9	30.120	S10	29.620	Circ	0.3mØ	21.449	42.9	0.600	2.008	1.984
2.003	S10	29.620	S11	28.220	Circ	0.3mØ	28.476	20.3	0.600	1.984	2.718
1.005	S11	28.041	S13	27.980	Circ	0.45mØ	8.769	144.3	0.600	2.747	2.964
4.000	S12	29.822	S13	28.130	Circ	0.3mØ	27.859	16.5	0.600	1.694	2.964
1.006	S13	27.830	S14	27.685	Circ	0.6mØ	21.664	149.3	0.600	2.964	2.258
1.007	S14	27.685	S17	27.240	Circ	0.6mØ	27.871	62.6	0.600	2.258	1.476
5.000	S15	27.562	S16	27.384	Circ	0.3mØ	35.721	200.0	0.600	0.721	0.916
5.001	S16	27.384	S17	27.240	Circ	0.3mØ	28.470	198.3	0.600	0.916	1.776
1.008	S17	27.240	S18	27.214	Circ	0.6mØ	13.337	521.0	0.600	1.476	0.961
1.009	S18	27.214	S19	27.145	Circ	0.6mØ	18.693	268.3	0.600	0.961	1.155
1.010	S19	27.145	S20	27.130	Circ	0.6mØ	9.261	629.1	0.600	1.155	1.170
1.011	S20	27.130	S21	26.950	Circ	0.6mØ	17.229	95.7	0.600	1.170	1.350
1.012	S21	26.950	S38	26.920	Circ	0.6mØ	33.202	1106.7	0.600	1.350	1.380
6.000	S22	32.797	S23	32.168	Circ	0.15mØ	12.774	20.3	0.600	1.141	1.067
6.001	S23	32.168	S24	31.492	Circ	0.15mØ	17.014	25.2	0.600	1.067	0.799
6.002	S24	31.192	S25	31.119	Circ	0.45mØ	24.771	338.0	0.600	0.799	1.218
6.003	S25	31.119	S27	31.040	Circ	0.45mØ	20.528	259.6	0.600	1.218	1.596
7.000	S26	33.330	S27	31.190	Circ	0.3mØ	30.353	14.2	0.600	0.961	1.596
6.004	S27	31.040	S28	30.190	Circ	0.45mØ	25.514	30.0	0.600	1.596	1.747
6.005	S28	30.190	S29	29.206	Circ	0.45mØ	20.465	20.8	0.600	1.747	1.671
6.006	S29	29.206	S30	28.410	Circ	0.45mØ	18.999	23.9	0.600	1.671	1.560
6.007	S30	28.410	S31	27.660	Circ	0.45mØ	15.809	21.1	0.600	1.560	0.790
6.008	S31	27.660	S38	26.920	Circ	0.6mØ	8.860	12.0	0.600	0.640	1.380
8.000	S32	32.380	S33	32.175	Circ	0.225mØ	20.437	99.7	0.600	1.218	1.920
8.001	S33	32.100	S34	30.263	Circ	0.3mØ	45.307	24.7	0.600	1.920	1.389
8.002	S34	30.263	S35	29.840	Circ	0.3mØ	12.914	30.5	0.600	1.389	1.927
8.003	S35	29.840	S36	28.390	Circ	0.3mØ	33.183	22.9	0.600	1.927	1.544
8.004	S36	28.390	S37	27.530	Circ	0.3mØ	18.367	21.4	0.600	1.544	1.070
8.005	S37	27.455	S38	26.995	Circ	0.375mØ	30.642	66.6	0.600	1.070	1.530
1.013	S38	26.920	S39	26.700	Circ	0.45mØ	18.687	84.9	0.600	1.530	2.151
1.014	S39	26.700	S40	26.612	Circ	0.3mØ	20.453	232.4	0.600	2.301	1.465
1.015	S40	26.612	S41	26.398	Circ	0.3mØ	50.942	238.0	0.600	1.465	2.388
1.016	S41	26.398	S62	26.285	Circ	0.3mØ	26.793	238.0	0.600	2.388	2.187
9.000	S42	33.744	S43	33.488	Circ	0.15mØ	9.575	37.4	0.600	1.239	1.217
9.001	S43	33.488	S44	33.221	Circ	0.15mØ	11.143	41.7	0.600	1.217	1.174
9.002	S44	33.221	S45	32.770	Circ	0.15mØ	17.413	38.6	0.600	1.174	1.151
9.003	S45	32.770	S46	31.925	Circ	0.15mØ	24.546	29.0	0.600	1.151	1.147
9.004	S46	31.850	S47	30.913	Circ	0.225mØ	9.495	10.1	0.600	1.147	1.763
9.005	S47	30.629	S48	30.160	Circ	0.3mØ	25.790	55.0	0.600	1.972	1.573
9.006	S48	30.160	S49	29.410	Circ	0.3mØ	6.821	9.1	0.600	1.573	1.738
9.007	S49	29.410	S50	28.840	Circ	0.15mØ	15.127	26.5	0.600	1.888	1.899
9.008	S50	28.840	S51	27.900	Circ	0.15mØ	9.689	10.3	0.600	1.899	2.510
9.009	S51	27.900	S59	27.031	Circ	0.15mØ	36.304	41.8	0.600	2.510	2.676
10.000	S52	32.123	S54	30.375	Circ	0.225mØ	27.155	15.5	0.600	1.603	1.952
11.000	S53	30.214	S54	30.150	Circ	0.45mØ	7.258	113.9	0.600	1.979	1.952
10.001	S54	30.150	S55	29.480	Circ	0.45mØ	25.498	38.1	0.600	1.952	2.366
10.002	S55	29.480	S56	29.375	Circ	0.45mØ	15.775	150.0	0.600	2.366	0.946
10.003	S56	29.375	S57	29.030	Circ	0.45mØ	7.341	21.3	0.600	0.946	1.291
10.004	S57	29.030	S58	28.450	Circ	0.45mØ	11.943	20.6	0.600	1.291	1.929
10.005	S58	28.450	S59	26.881	Circ	0.3mØ	18.484	11.8	0.600	2.079	2.676
9.010	S59	26.881	S60	26.790	Circ	0.3mØ	11.859	131.0	0.600	2.676	2.698

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)
9.011	S60	26.790	S61	26.740	Circ	0.3mØ	4.298	86.0	0.600	2.698	2.542
9.012	S61	26.740	S62	26.310	Circ	0.15mØ	19.922	46.3	0.600	2.692	2.313
1.017	S62	26.285	S63	26.213	Circ	0.3mØ	17.300	238.0	0.600	2.187	2.206
1.018	S63	26.213	S64	25.320	Circ	0.3mØ	74.428	83.4	0.600	2.206	1.564
1.019	S64	25.320	S65	21.750	Circ	0.3mØ	57.183	16.0	0.600	1.564	1.285
1.020	S65	21.750	S66	21.712	Circ	0.3mØ	8.989	238.0	0.600	1.285	0.812

Outfall Details

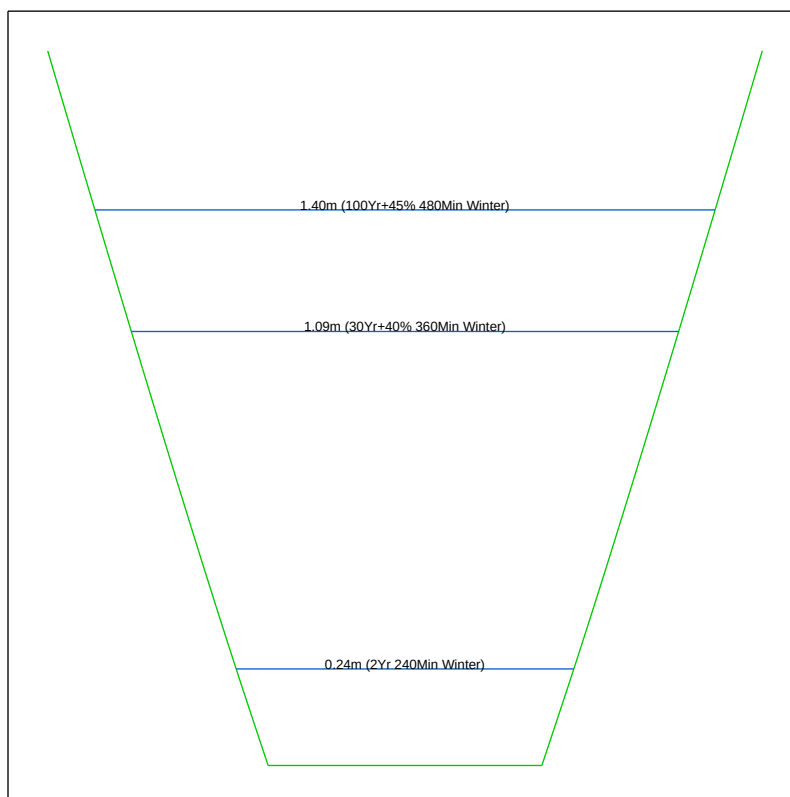
Outfall Manhole S66 : Free Discharge

Flow Control Details

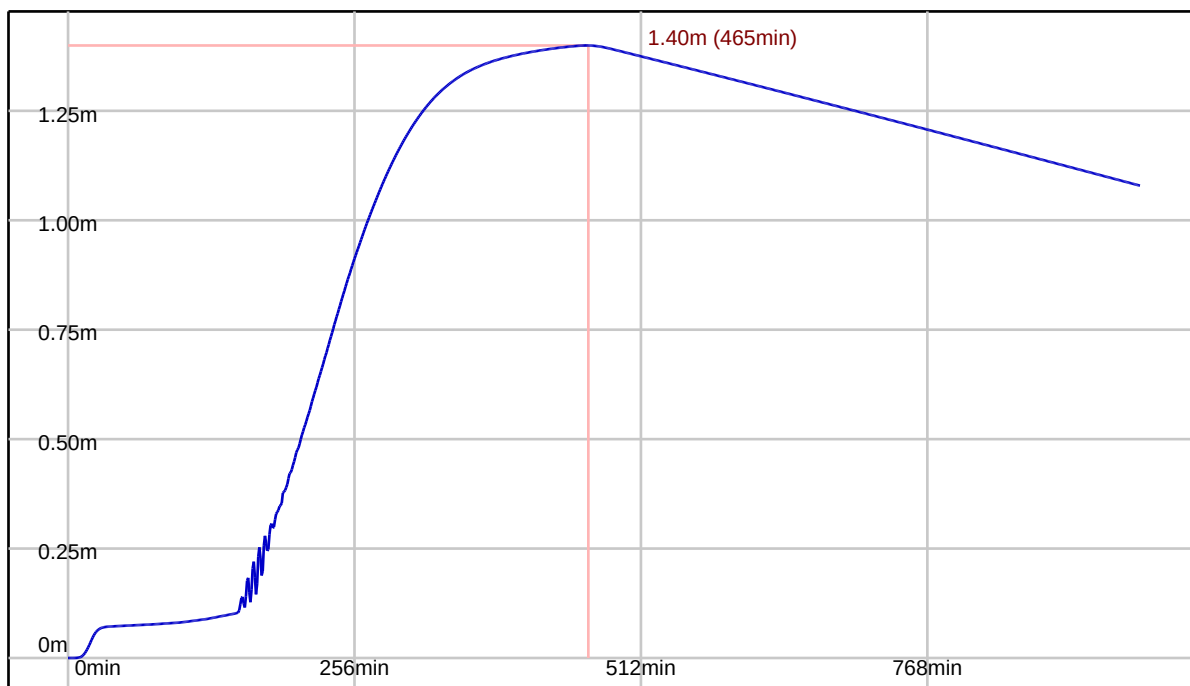
Pond Structure at Manhole S20

Pond Invert (m)	Max Depth (m)	Volume To Water Level (m3)	Water Level (m)	Freeboard (m)	Infil Base (m/hr)	Infil Side (m/hr)	Safety Factor
27.100	1.800	185.205	28.600	0.300	0.00000000	0.00000000	2.00

Pond Depth/Area Diagram at S20



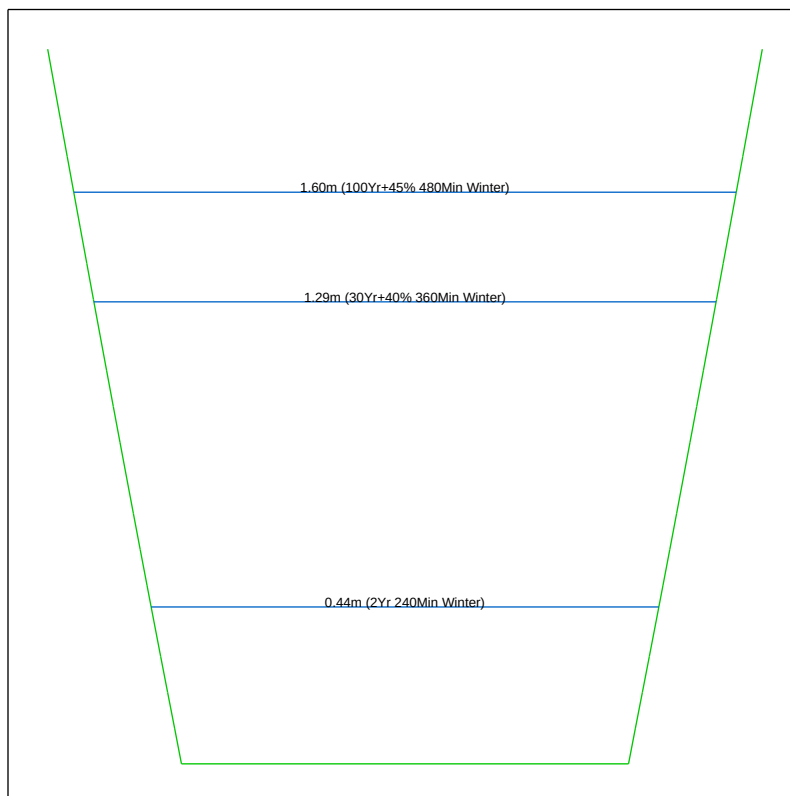
Pond at S20 (100Yr+45% 480Min Winter)



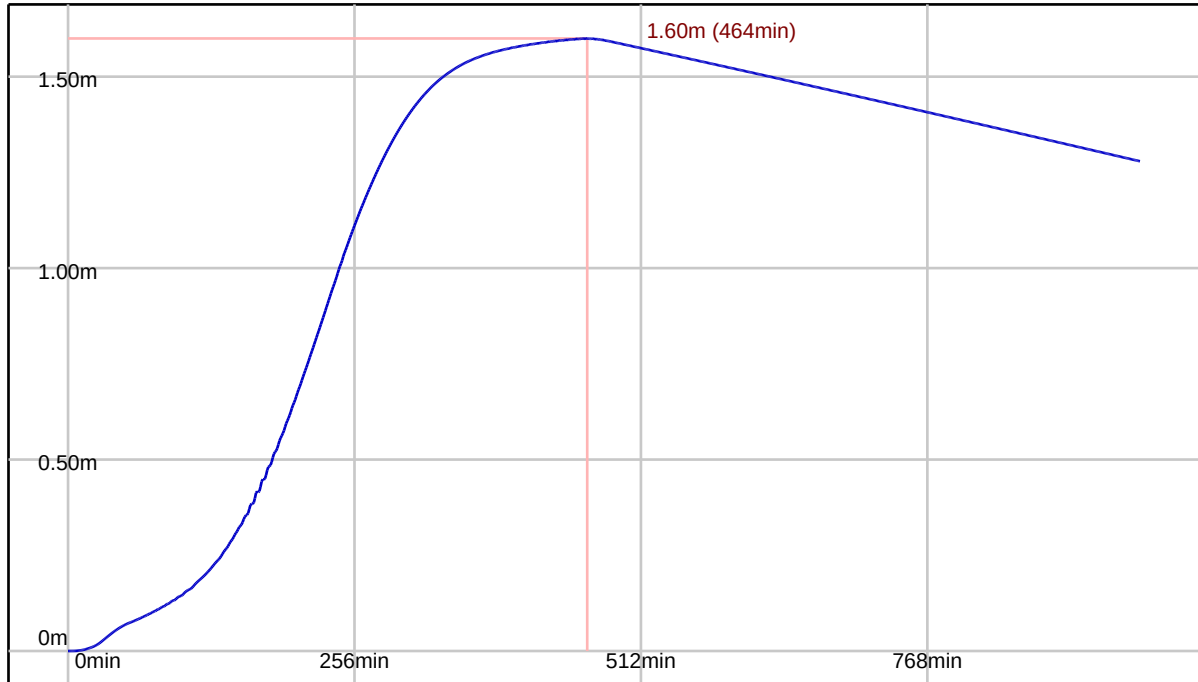
Pond Structure at Manhole S38

Pond Invert (m)	Max Depth (m)	Volume To Water Level (m3)	Water Level (m)	Freeboard (m)	Infil Base (m/hr)	Infil Side (m/hr)	Safety Factor
26.900	2.000	1042.649	28.600	0.300	0.00000000	0.00000000	2.00

Pond Depth/Area Diagram at S38



Pond at S38 (100Yr+45% 480Min Winter)

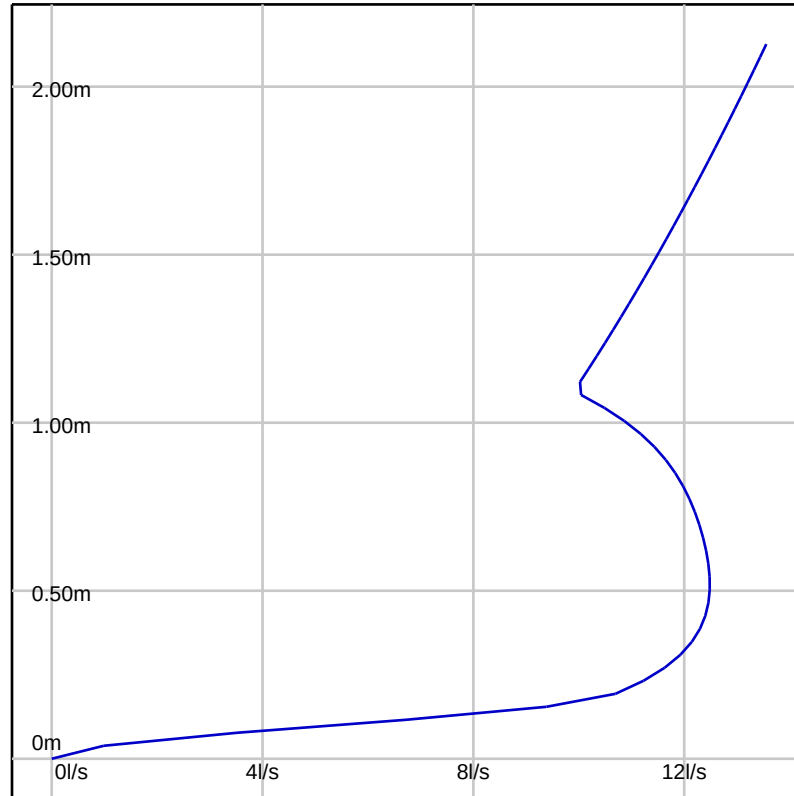


Controls within Manhole S39

Hydro-Brake® Optimum Control at Manhole S39

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-0149-1250-1790-1250	1.790	12.500	0.000	0.518	12.486	1.092	9.900

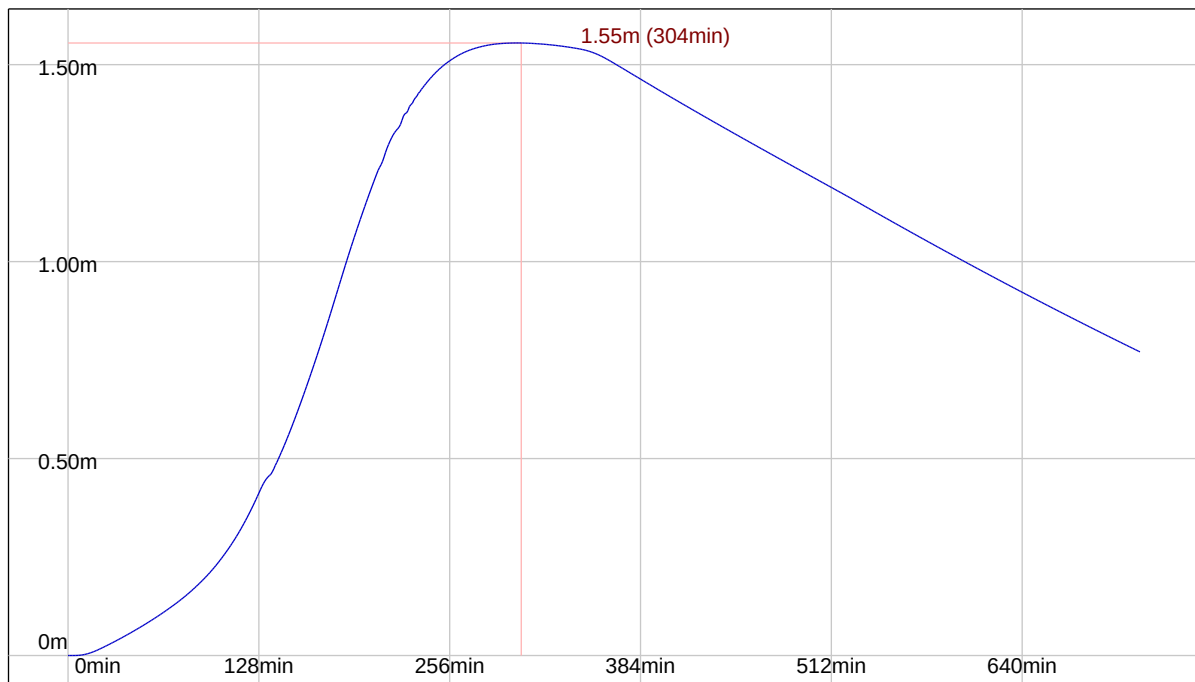
Hydro-Brake® Optimum Control at S39



Tank Structure at Manhole S49

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
29.410	1.600	95.00	77.000	73.150	117.040	0.00000000	0.00000000	2.00

Tank at S49 (100Yr+45% 360Min Winter)

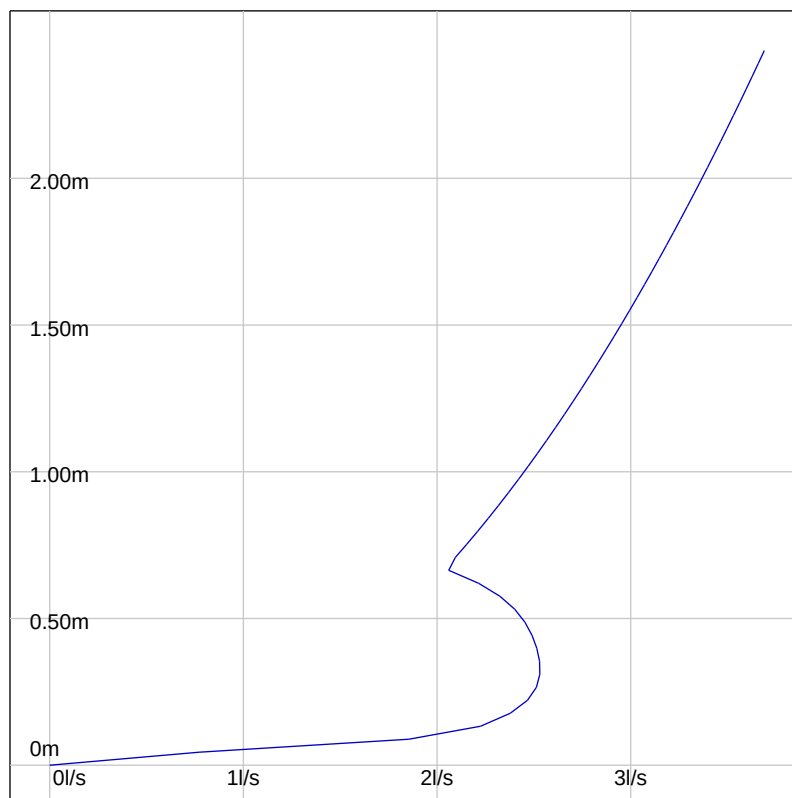


Controls within Manhole S50

Hydro-Brake® Optimum Control at Manhole S50

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-0075-3400-2050-3400	2.050	3.400	0.000	0.327	2.532	0.668	2.040

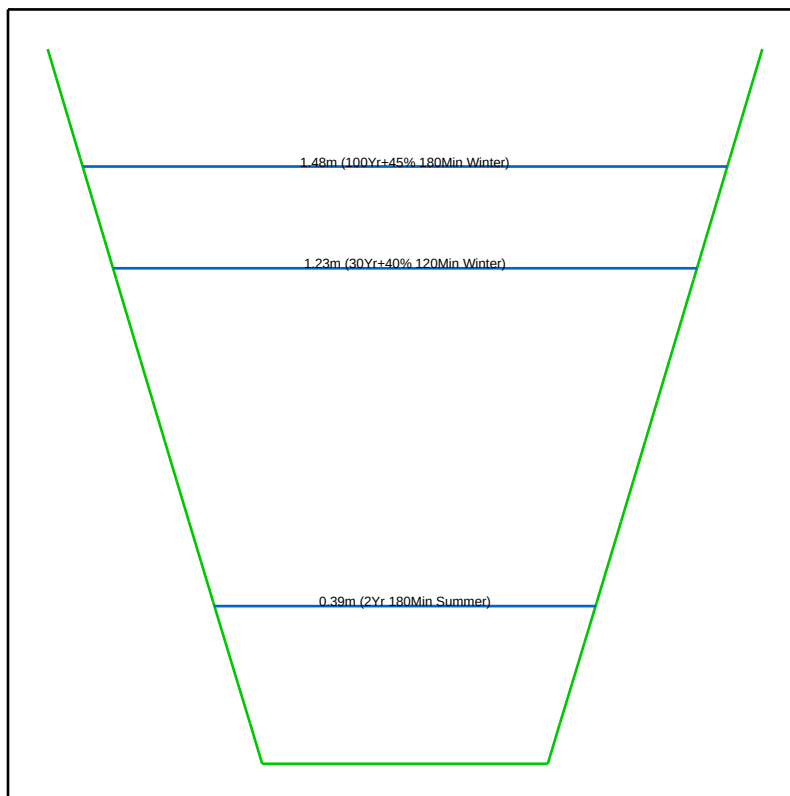
Hydro-Brake® Optimum Control at S50



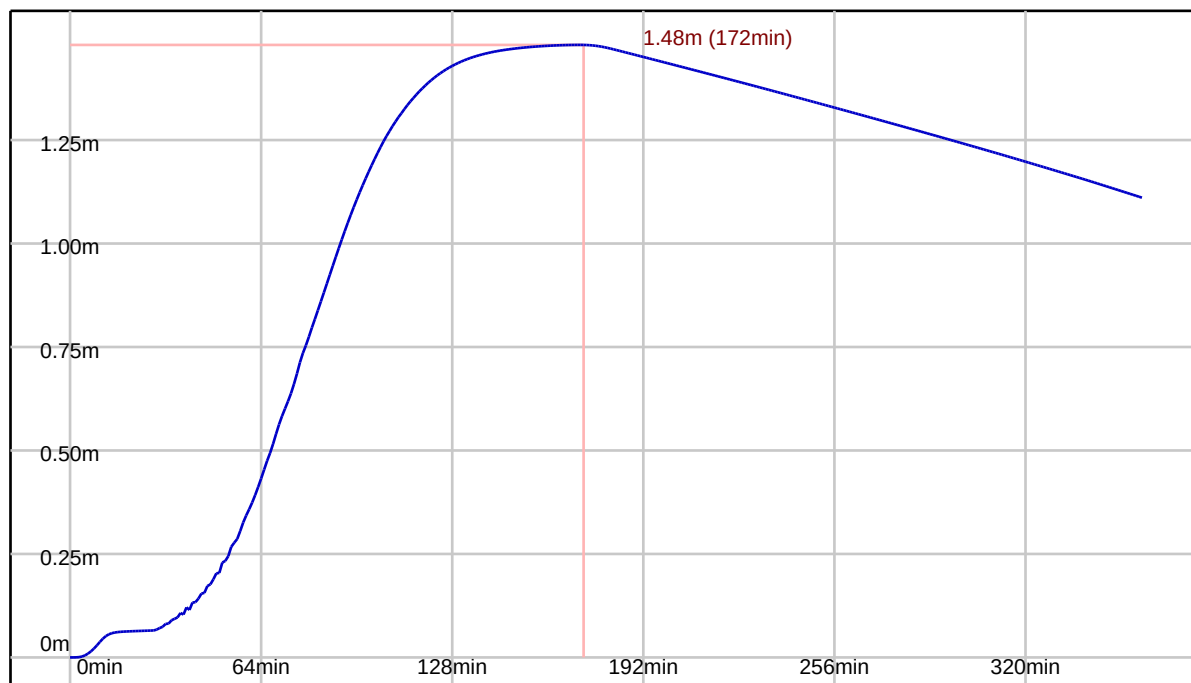
Pond Structure at Manhole S57

Pond Invert (m)	Max Depth (m)	Volume To Water Level (m3)	Water Level (m)	Freeboard (m)	Infil Base (m/hr)	Infil Side (m/hr)	Safety Factor
29.000	1.771	165.250	30.471	0.300	0.00000000	0.00000000	2.00

Pond Depth/Area Diagram at S57



Pond at S57 (100Yr+45% 180Min Winter)

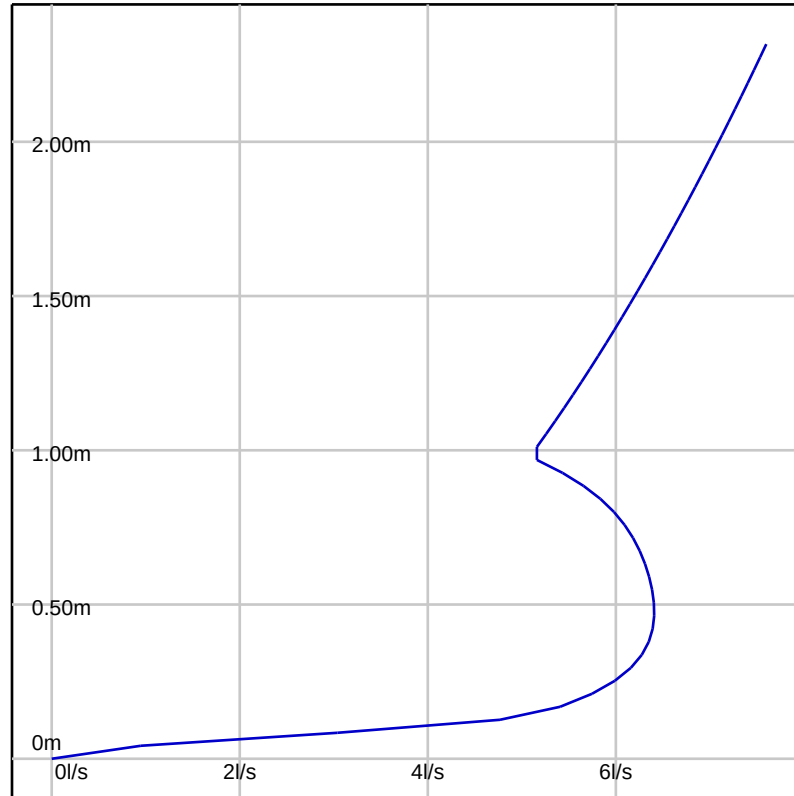


Controls within Manhole S58

Hydro-Brake® Optimum Control at Manhole S58

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-0110-7000-1950-7000	1.950	7.000	0.000	0.476	6.408	0.978	5.082

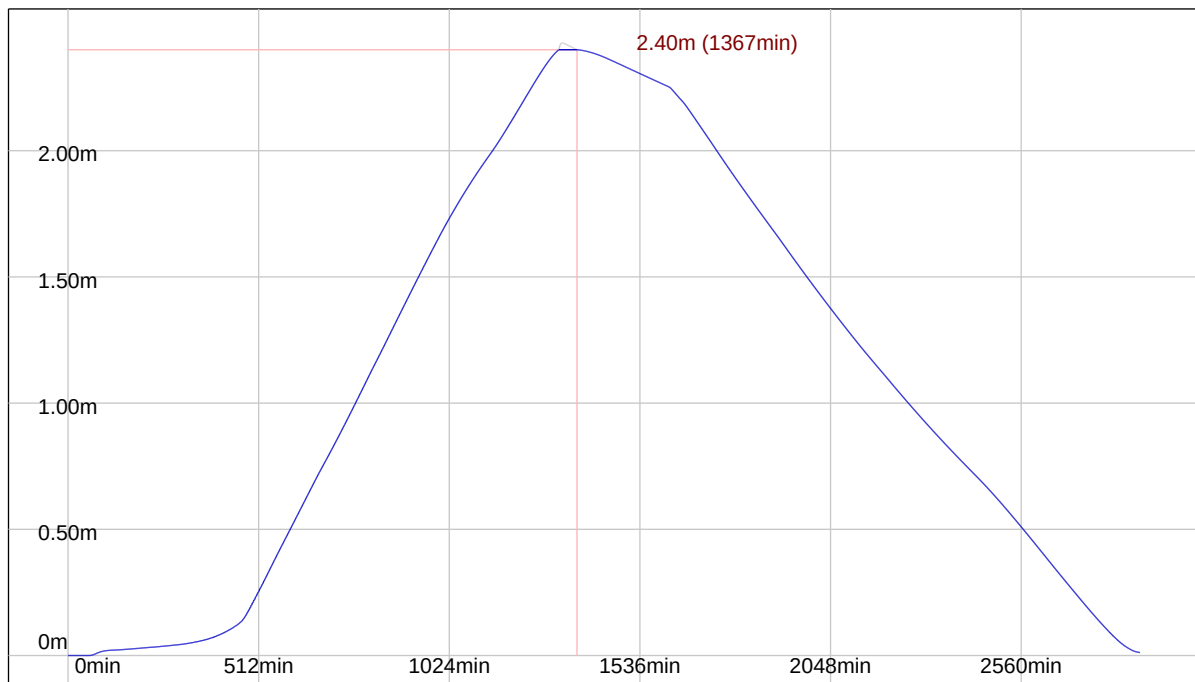
Hydro-Brake® Optimum Control at S58



Tank Structure at Manhole S60

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
26.790	2.400	95.00	104.000	98.800	237.120	0.00000000	0.00000000	2.00

Tank at S60 (100Yr+45% 1440Min Winter)

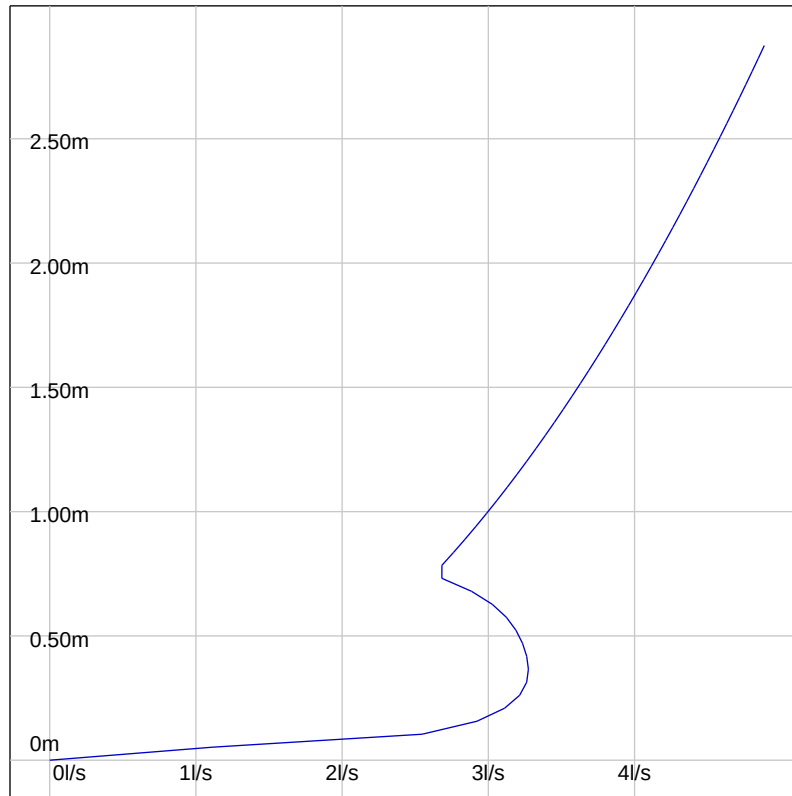


Controls within Manhole S61

Hydro-Brake® Optimum Control at Manhole S61

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-0083-4500-2420-4500	2.420	4.500	0.000	0.362	3.274	0.744	2.619

Hydro-Brake® Optimum Control at S61



Simulation Settings

FEH2022 (point): Filename=FEH_Point_Descriptors_508019_133093_v5_0_1.xml

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, 2880

Return Periods (yrs) + Climate Change: (2, +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 %
2Yr 15Min Winter	31.914	0.00	-0.72	30Yr+40% 360Min Winter	13.235	0.00	1.50
2Yr 15Min Summer	31.914	0.00	-0.73	30Yr+40% 480Min Summer	10.506	0.00	0.98
2Yr 30Min Winter	20.957	0.00	-0.20	30Yr+40% 480Min Winter	10.506	0.00	1.06
2Yr 30Min Summer	20.957	0.00	-0.27	30Yr+40% 600Min Summer	8.761	0.00	0.62
2Yr 60Min Summer	13.279	0.00	-0.09	30Yr+40% 600Min Winter	8.761	0.00	0.66
2Yr 60Min Winter	13.279	0.00	-0.20	30Yr+40% 720Min Summer	7.541	0.00	0.32
2Yr 120Min Summer	9.283	0.00	-0.21	30Yr+40% 720Min Winter	7.541	0.00	0.34
2Yr 120Min Winter	9.283	0.00	-0.14	30Yr+40% 960Min Summer	5.953	0.00	0.00
2Yr 180Min Summer	7.353	0.00	-0.17	30Yr+40% 960Min Winter	5.953	0.00	0.03
2Yr 180Min Winter	7.353	0.00	-0.14	30Yr+40% 1440Min Summer	4.262	0.00	0.04
2Yr 240Min Summer	6.017	0.00	-0.24	30Yr+40% 1440Min Winter	4.262	0.00	0.09
2Yr 240Min Winter	6.017	0.00	-0.24	30Yr+40% 2880Min Summer	2.460	0.00	-0.07
2Yr 360Min Summer	4.529	0.00	-0.18	30Yr+40% 2880Min Winter	2.460	0.00	-0.08
2Yr 360Min Winter	4.529	0.00	-0.19	100Yr+45% 15Min Summer	156.243	0.00	1.28
2Yr 480Min Summer	3.681	0.00	-0.18	100Yr+45% 15Min Winter	156.243	0.00	1.17
2Yr 480Min Winter	3.681	0.00	-0.20	100Yr+45% 30Min Summer	104.495	0.00	1.84
2Yr 600Min Summer	3.106	0.00	-0.17	100Yr+45% 30Min Winter	104.495	0.00	1.86
2Yr 600Min Winter	3.106	0.00	-0.23	100Yr+45% 60Min Summer	67.144	0.00	2.39
2Yr 720Min Summer	2.692	0.00	-0.20	100Yr+45% 60Min Winter	67.144	0.00	2.35
2Yr 720Min Winter	2.692	0.00	-0.25	100Yr+45% 120Min Summer	40.064	0.00	2.43
2Yr 960Min Summer	2.158	0.00	-0.22	100Yr+45% 120Min Winter	40.064	0.00	2.42
2Yr 960Min Winter	2.158	0.00	-0.30	100Yr+45% 180Min Summer	29.318	0.00	2.33
2Yr 1440Min Summer	1.590	0.00	-0.20	100Yr+45% 180Min Winter	29.318	0.00	2.32
2Yr 1440Min Winter	1.590	0.00	-0.50	100Yr+45% 240Min Summer	23.583	0.00	2.19
2Yr 2880Min Winter	0.970	0.00	-0.01	100Yr+45% 240Min Winter	23.583	0.00	2.24
2Yr 2880Min Summer	0.970	0.00	-0.04	100Yr+45% 360Min Summer	17.124	0.00	1.97
30Yr+40% 15Min Winter	119.309	0.00	0.61	100Yr+45% 360Min Winter	17.124	0.00	2.04
30Yr+40% 15Min Summer	119.309	0.00	0.67	100Yr+45% 480Min Summer	13.595	0.00	1.73
30Yr+40% 30Min Summer	79.540	0.00	1.08	100Yr+45% 480Min Winter	13.595	0.00	1.80
30Yr+40% 30Min Winter	79.540	0.00	1.07	100Yr+45% 600Min Summer	11.359	0.00	1.37
30Yr+40% 60Min Summer	50.460	0.00	1.72	100Yr+45% 600Min Winter	11.359	0.00	1.44
30Yr+40% 60Min Winter	50.460	0.00	1.66	100Yr+45% 720Min Summer	9.795	0.00	1.04
30Yr+40% 120Min Summer	30.661	0.00	1.84	100Yr+45% 720Min Winter	9.795	0.00	1.10
30Yr+40% 120Min Winter	30.661	0.00	1.81	100Yr+45% 960Min Summer	7.739	0.00	0.41
30Yr+40% 180Min Summer	22.667	0.00	1.74	100Yr+45% 960Min Winter	7.739	0.00	0.44
30Yr+40% 180Min Winter	22.667	0.00	1.75	100Yr+45% 1440Min Summer	5.554	0.00	-0.06
30Yr+40% 240Min Summer	18.215	0.00	1.70	100Yr+45% 1440Min Winter	5.554	0.00	-0.02
30Yr+40% 240Min Winter	18.215	0.00	1.75	100Yr+45% 2880Min Winter	3.175	0.00	0.07
30Yr+40% 360Min Summer	13.235	0.00	1.43	100Yr+45% 2880Min Summer	3.175	0.00	0.04

Simulation Results

Return Period Yrs: 2.0

Climate Change %: 0

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S1	15 min Summer	8	28.839	0.052	6.022		OK
S2	15 min Summer	8	28.733	0.058	7.809		OK
S3	15 min Summer	9	28.682	0.063	9.320		OK
S4	15 min Summer	8	28.655	0.116	29.618		OK
S5	15 min Summer	9	28.424	0.116	29.180		OK
S6	15 min Summer	8	31.282	0.042	6.342		OK
S7	15 min Summer	8	31.009	0.039	8.038		OK
S8	15 min Summer	8	30.730	0.040	6.104		OK
S9	15 min Summer	8	30.197	0.077	24.839		OK
S10	15 min Summer	8	29.691	0.071	31.621		OK
S11	15 min Summer	9	28.185	0.144	61.965		OK
S12	15 min Summer	8	29.865	0.043	12.653		OK
S13	15 min Summer	9	27.987	0.157	88.989		OK
S14	15 min Summer	9	27.816	0.131	95.853		OK
S15	15 min Summer	8	27.609	0.047	4.373		OK
S16	15 min Summer	9	27.471	0.088	4.267		OK
S17	15 min Summer	9	27.461	0.221	105.522		OK
S18	15 min Summer	10	27.424	0.210	106.542		OK
S19	15 min Summer	10	27.372	0.227	112.819		OK
S20	240 min Winter	184	27.343	0.243	11.928		OK
S21	240 min Winter	199	27.370	0.420	3.999		OK
S22	15 min Summer	8	32.817	0.020	1.560		OK
S23	15 min Summer	8	32.199	0.030	3.281		OK
S24	15 min Summer	8	31.273	0.080	12.873		OK
S25	15 min Summer	8	31.252	0.132	40.070		OK
S26	15 min Summer	8	33.373	0.043	13.302		OK
S27	15 min Summer	8	31.140	0.100	64.640		OK
S28	15 min Summer	9	30.280	0.090	64.071		OK
S29	15 min Summer	9	29.303	0.097	70.316		OK
S30	15 min Summer	9	28.518	0.108	85.769		OK
S31	15 min Summer	9	27.743	0.083	86.002		OK
S32	15 min Summer	8	32.449	0.069	10.793		OK
S33	15 min Summer	8	32.162	0.062	21.409		OK
S34	15 min Summer	8	30.347	0.084	35.889		OK
S35	15 min Summer	8	29.927	0.087	44.190		OK
S36	15 min Summer	9	28.477	0.087	45.236		OK
S37	15 min Summer	9	27.583	0.128	63.182		OK
S38	240 min Winter	187	27.339	0.439	21.710		OK
S39	180 min Summer	127	27.343	0.643	13.657		Surcharged
S40	180 min Winter	216	26.695	0.083	12.484		OK
S41	480 min Summer	399	26.481	0.083	12.483		OK
S42	15 min Summer	8	33.790	0.046	5.939		OK
S43	15 min Summer	8	33.544	0.056	8.238		OK
S44	15 min Summer	8	33.291	0.070	12.885		OK
S45	15 min Summer	9	32.846	0.076	16.765		OK
S46	15 min Summer	9	31.903	0.053	19.996		OK
S47	15 min Summer	8	30.722	0.093	28.305		OK
S48	15 min Summer	9	30.216	0.056	28.225		OK
S49	600 min Summer	348	29.438	0.438	2.695		OK
S50	600 min Summer	358	29.104	0.264	2.492		Surcharged
S51	600 min Summer	359	27.930	0.030	2.488		OK
S52	15 min Summer	8	32.168	0.045	11.650		OK
S53	15 min Summer	8	30.277	0.063	12.337		OK
S54	15 min Summer	8	30.240	0.090	47.865		OK
S55	15 min Summer	8	29.606	0.126	47.626		OK
S56	15 min Summer	8	29.458	0.083	53.771		OK
S57	180 min Summer	117	29.391	0.391	16.753		OK
S58	120 min Summer	73	29.428	0.978	4.941		Surcharged
S59	480 min Summer	351	27.196	0.315	3.356		Surcharged

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S60	480 min Summer	351	27.196	0.396	3.299		Surcharged
S61	480 min Summer	351	27.196	0.456	3.262		Surcharged
S62	240 min Winter	269	26.379	0.094	15.757		OK
S63	240 min Winter	269	26.290	0.077	15.757		OK
S64	240 min Winter	270	25.368	0.048	15.757		OK
S65	240 min Winter	270	21.844	0.094	15.757		OK
S66	240 min Winter	270	21.806	0.094	15.757		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	S1	S2	0.055	0.671	5.956	0.068	OK
1.001	15 min Summer	9	S2	S3	0.061	0.757	7.703	0.082	OK
1.002	15 min Summer	9	S3	S4	0.090	0.529	9.383	0.101	OK
1.003	15 min Summer	9	S4	S5	0.116	1.169	29.216	0.323	OK
1.004	15 min Summer	9	S5	S11	0.116	1.169	29.472	0.326	OK
2.000	15 min Summer	8	S6	S7	0.041	1.281	6.311	0.077	OK
2.001	15 min Summer	8	S7	S9	0.039	1.710	7.972	0.067	OK
3.000	15 min Summer	8	S8	S9	0.040	1.260	6.037	0.070	OK
2.002	15 min Summer	8	S9	S10	0.074	1.810	24.720	0.145	OK
2.003	15 min Summer	8	S10	S11	0.071	2.434	31.308	0.127	OK
1.005	15 min Summer	9	S11	S13	0.144	1.417	62.178	0.232	OK
4.000	15 min Summer	8	S12	S13	0.043	2.005	12.543	0.046	OK
1.006	15 min Summer	9	S13	S14	0.158	1.512	89.584	0.159	OK
1.007	15 min Summer	9	S14	S17	0.176	1.416	96.003	0.110	OK
5.000	15 min Summer	9	S15	S16	0.067	0.639	4.323	0.055	OK
5.001	15 min Summer	10	S16	S17	0.154	0.196	6.393	0.081	OK
1.008	15 min Summer	10	S17	S18	0.215	1.142	103.467	0.346	OK
1.009	15 min Summer	10	S18	S19	0.218	1.166	108.606	0.259	OK
1.010	15 min Summer	10	S19	S20	0.221	1.203	113.930	0.419	OK
1.011	240 min Winter	200	S20	S21	0.310	0.679	75.211	0.107	OK
1.012	240 min Winter	198	S21	S38	0.419	0.489	79.755	0.391	OK
6.000	15 min Summer	8	S22	S23	0.025	0.783	1.545	0.039	OK
6.001	15 min Summer	8	S23	S24	0.030	1.256	3.223	0.091	OK
6.002	15 min Summer	8	S24	S25	0.106	0.440	12.644	0.072	OK
6.003	15 min Summer	8	S25	S27	0.116	1.211	39.358	0.197	OK
7.000	15 min Summer	8	S26	S27	0.043	2.145	13.191	0.044	OK
6.004	15 min Summer	8	S27	S28	0.095	2.632	64.182	0.108	OK
6.005	15 min Summer	9	S28	S29	0.094	2.687	64.309	0.090	OK
6.006	15 min Summer	9	S29	S30	0.103	2.587	70.536	0.106	OK
6.007	15 min Summer	9	S30	S31	0.095	3.493	86.002	0.122	OK
6.008	240 min Winter	181	S31	S38	0.220	1.385	19.443	0.010	OK
8.000	15 min Summer	8	S32	S33	0.068	1.040	10.648	0.205	OK
8.001	15 min Summer	8	S33	S34	0.073	1.598	21.252	0.095	OK
8.002	15 min Summer	8	S34	S35	0.086	2.129	35.557	0.176	OK
8.003	15 min Summer	8	S35	S36	0.087	2.573	43.897	0.188	OK
8.004	15 min Summer	9	S36	S37	0.087	2.665	45.524	0.189	OK
8.005	240 min Winter	181	S37	S38	0.188	1.142	14.333	0.058	OK
1.013	240 min Winter	187	S38	S39	0.435	0.741	80.864	0.231	OK
1.014	180 min Winter	216	S39	S40	0.083	0.788	12.523	0.173	OK
1.015	480 min Summer	398	S40	S41	0.083	0.778	12.483	0.174	OK
1.016	240 min Winter	269	S41	S62	0.089	0.723	12.483	0.174	OK
9.000	15 min Summer	8	S42	S43	0.051	1.124	5.904	0.202	OK
9.001	15 min Summer	8	S43	S44	0.063	1.165	8.172	0.296	OK
9.002	15 min Summer	8	S44	S45	0.073	1.505	12.770	0.445	OK
9.003	15 min Summer	9	S45	S46	0.076	1.894	16.937	0.512	OK
9.004	15 min Summer	9	S46	S47	0.053	2.827	20.039	0.122	OK
9.005	15 min Summer	9	S47	S48	0.074	2.082	28.225	0.188	OK
9.006	15 min Summer	9	S48	S49	0.055	3.147	28.301	0.076	OK
9.007	600 min Summer	348	S49	S50	0.089	0.652	2.708	0.078	OK
9.008	600 min Summer	358	S50	S51	0.026	1.219	2.489	0.045	OK
9.009	600 min Summer	398	S51	S59	0.086	0.971	2.488	0.090	OK
10.000	15 min Summer	8	S52	S54	0.045	2.067	11.548	0.087	OK
11.000	15 min Summer	8	S53	S54	0.076	0.687	12.272	0.041	OK
10.001	15 min Summer	8	S54	S55	0.108	1.621	47.626	0.091	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
10.002	15 min Summer	8	S55	S56	0.104	1.683	47.128	0.179	OK
10.003	180 min Summer	115	S56	S57	0.195	1.735	22.562	0.032	OK
10.004	180 min Summer	117	S57	S58	0.405	0.785	86.538	0.121	OK
10.005	480 min Summer	342	S58	S59	0.164	1.108	6.406	0.020	OK
9.010	480 min Summer	342	S59	S60	0.300	0.770	20.399	0.211	Surcharged
9.011	240 min Summer	219	S60	S61	0.300	0.579	21.606	0.180	Surcharged
9.012	240 min Winter	268	S61	S62	0.053	0.791	3.274	0.125	OK
1.017	240 min Winter	269	S62	S63	0.085	0.949	15.757	0.220	OK
1.018	240 min Winter	269	S63	S64	0.062	1.480	15.757	0.129	OK
1.019	240 min Winter	270	S64	S65	0.071	1.233	15.757	0.056	OK
1.020	240 min Winter	270	S65	S66	0.094	0.831	15.757	0.220	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
S1	15 min Summer	8	28.889	0.102	22.519		OK
S2	15 min Summer	9	28.858	0.182	28.370		OK
S3	15 min Summer	9	28.861	0.242	32.356		OK
S4	15 min Summer	9	28.856	0.317	107.149		Surcharged
S5	15 min Summer	9	28.576	0.268	104.728		OK
S6	15 min Summer	8	31.323	0.083	23.714		OK
S7	15 min Summer	8	31.047	0.077	30.098		OK
S8	15 min Summer	8	30.768	0.078	22.825		OK
S9	15 min Summer	8	30.277	0.157	93.208		OK
S10	15 min Summer	8	29.764	0.144	118.436		OK
S11	15 min Summer	8	28.346	0.306	224.971		OK
S12	15 min Summer	8	29.905	0.083	47.313		OK
S13	360 min Winter	348	28.197	0.367	2.398		OK
S14	360 min Winter	339	28.195	0.510	8.871		OK
S15	360 min Winter	345	28.196	0.633	0.221		Surcharged
S16	360 min Winter	354	28.195	0.811	0.930		Surcharged
S17	360 min Winter	351	28.195	0.955	3.936		Surcharged
S18	360 min Winter	351	28.196	0.981	5.019		Surcharged
S19	360 min Winter	351	28.194	1.049	5.578		Surcharged
S20	360 min Winter	349	28.193	1.093	5.524		Surcharged
S21	360 min Winter	349	28.193	1.243	4.643		Surcharged
S22	15 min Summer	8	32.836	0.039	5.835		OK
S23	15 min Summer	8	32.228	0.060	12.297		OK
S24	15 min Summer	8	31.400	0.207	48.261		OK
S25	15 min Summer	8	31.394	0.275	149.956		OK
S26	15 min Summer	8	33.412	0.082	49.741		OK
S27	15 min Summer	8	31.240	0.200	245.907		OK
S28	15 min Summer	8	30.367	0.177	241.606		OK
S29	15 min Summer	8	29.399	0.193	264.022		OK
S30	15 min Summer	8	28.626	0.216	322.397		OK
S31	360 min Winter	345	28.198	0.538	4.786		OK
S32	15 min Summer	8	32.526	0.146	40.361		OK
S33	15 min Summer	8	32.222	0.122	80.185		OK
S34	15 min Summer	8	30.439	0.176	134.556		OK
S35	15 min Summer	8	30.024	0.184	166.007		OK
S36	15 min Summer	8	28.573	0.183	171.109		OK
S37	360 min Winter	348	28.193	0.738	2.875		Surcharged
S38	360 min Winter	349	28.193	1.293	13.344		Surcharged
S39	360 min Winter	348	28.193	1.493	11.188		Surcharged
S40	15 min Winter	8	26.696	0.084	12.076		OK
S41	2880 min Summer	2760	26.481	0.083	12.484		OK
S42	15 min Summer	10	34.237	0.493	17.693		Surcharged
S43	15 min Summer	10	34.161	0.673	23.085		Surcharged
S44	15 min Summer	10	34.011	0.790	34.869		Surcharged
S45	15 min Summer	11	33.443	0.673	39.785		Surcharged
S46	15 min Summer	9	31.937	0.087	52.442		OK
S47	15 min Summer	9	30.794	0.164	82.478		OK
S48	15 min Summer	9	30.255	0.095	82.487		OK
S49	360 min Summer	279	30.194	1.194	4.906		Surcharged
S50	360 min Summer	282	30.190	1.350	2.767		Surcharged
S51	960 min Winter	986	28.681	0.781	2.247		Surcharged
S52	15 min Summer	8	32.211	0.088	43.561		OK
S53	15 min Summer	8	30.347	0.133	46.133		OK
S54	15 min Summer	8	30.327	0.177	179.189		OK
S55	120 min Winter	116	30.229	0.749	4.355		Surcharged
S56	120 min Winter	116	30.228	0.853	4.720		Surcharged
S57	120 min Winter	115	30.228	1.228	7.314		Surcharged
S58	120 min Winter	114	30.233	1.783	8.049		Surcharged
S59	960 min Winter	986	28.675	1.794	3.780		Surcharged
S60	960 min Winter	986	28.675	1.875	3.802		Surcharged
S61	960 min Winter	986	28.675	1.935	4.022		Surcharged
S62	960 min Winter	398	26.379	0.094	15.750		OK
S63	960 min Winter	399	26.290	0.077	15.749		OK

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S64	960 min Winter	399	25.368	0.048	15.750		OK
S65	960 min Winter	400	21.844	0.094	15.749		OK
S66	960 min Winter	400	21.806	0.094	15.749		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	9	S1	S2	0.141	0.885	22.413	0.255	OK
1.001	15 min Summer	10	S2	S3	0.212	0.852	28.490	0.302	OK
1.002	15 min Summer	10	S3	S4	0.271	0.733	38.547	0.415	OK
1.003	15 min Summer	9	S4	S5	0.284	1.540	104.728	1.158	OK
1.004	15 min Summer	10	S5	S11	0.259	1.607	103.844	1.148	OK
2.000	15 min Summer	8	S6	S7	0.080	1.874	23.640	0.288	OK
2.001	15 min Summer	8	S7	S9	0.080	2.403	29.986	0.253	OK
3.000	15 min Summer	8	S8	S9	0.080	1.793	22.726	0.264	OK
2.002	15 min Summer	8	S9	S10	0.151	2.604	92.630	0.545	OK
2.003	15 min Summer	8	S10	S11	0.144	3.509	117.648	0.475	OK
1.005	15 min Summer	9	S11	S13	0.305	1.957	224.893	0.837	OK
4.000	15 min Summer	8	S12	S13	0.083	2.948	47.036	0.171	OK
1.006	360 min Winter	348	S13	S14	0.436	1.232	44.337	0.079	OK
1.007	360 min Winter	339	S14	S17	0.555	1.039	47.521	0.055	OK
5.000	720 min Summer	437	S15	S16	0.300	0.426	12.133	0.155	Surcharged
5.001	15 min Summer	11	S16	S17	0.300	0.362	25.014	0.318	Surcharged
1.008	60 min Winter	43	S17	S18	0.600	1.325	186.283	0.623	Surcharged
1.009	60 min Winter	41	S18	S19	0.600	1.359	189.428	0.453	Surcharged
1.010	30 min Winter	26	S19	S20	0.600	1.674	307.518	1.131	Surcharged
1.011	30 min Winter	25	S20	S21	0.600	1.482	283.478	0.403	Surcharged
1.012	15 min Summer	13	S21	S38	0.600	1.631	389.530	1.908	Surcharged
6.000	15 min Summer	8	S22	S23	0.050	1.140	5.802	0.146	OK
6.001	15 min Summer	8	S23	S24	0.060	1.830	12.178	0.342	OK
6.002	15 min Summer	9	S24	S25	0.241	0.552	47.476	0.272	OK
6.003	15 min Summer	8	S25	S27	0.238	1.782	151.237	0.757	OK
7.000	15 min Summer	8	S26	S27	0.082	3.155	49.459	0.167	OK
6.004	15 min Summer	8	S27	S28	0.188	3.829	241.606	0.408	OK
6.005	15 min Summer	8	S28	S29	0.185	3.906	240.591	0.338	OK
6.006	15 min Summer	8	S29	S30	0.204	3.757	262.973	0.396	OK
6.007	240 min Winter	174	S30	S31	0.250	3.119	58.894	0.083	OK
6.008	360 min Winter	345	S31	S38	0.569	1.610	177.615	0.089	OK
8.000	15 min Summer	8	S32	S33	0.146	1.462	39.945	0.768	OK
8.001	15 min Summer	8	S33	S34	0.149	2.278	79.825	0.355	OK
8.002	15 min Summer	8	S34	S35	0.180	3.016	133.724	0.663	OK
8.003	15 min Summer	8	S35	S36	0.184	3.639	165.274	0.709	OK
8.004	15 min Summer	8	S36	S37	0.199	3.436	170.317	0.705	OK
8.005	60 min Winter	41	S37	S38	0.375	1.861	115.718	0.472	Surcharged
1.013	360 min Winter	148	S38	S39	0.450	0.840	95.705	0.273	OK
1.014	2880 min Winter	2624	S39	S40	0.083	0.799	12.605	0.174	OK
1.015	2880 min Winter	2624	S40	S41	0.083	0.778	12.483	0.174	OK
1.016	960 min Winter	1837	S41	S62	0.089	0.722	12.483	0.174	OK
9.000	15 min Summer	8	S42	S43	0.150	1.480	19.139	0.656	Surcharged
9.001	15 min Summer	7	S43	S44	0.150	1.397	21.854	0.792	Surcharged
9.002	15 min Summer	10	S44	S45	0.150	1.838	32.481	1.133	Surcharged
9.003	15 min Summer	11	S45	S46	0.150	2.401	42.430	1.281	Surcharged
9.004	15 min Summer	9	S46	S47	0.087	3.705	52.381	0.319	OK
9.005	15 min Summer	9	S47	S48	0.130	2.814	82.487	0.549	OK
9.006	60 min Summer	36	S48	S49	0.187	4.007	65.202	0.176	OK
9.007	60 min Summer	33	S49	S50	0.150	1.423	18.028	0.520	Surcharged
9.008	600 min Winter	568	S50	S51	0.086	1.256	2.749	0.049	OK
9.009	360 min Summer	474	S51	S59	0.150	0.975	2.788	0.101	Surcharged
10.000	15 min Summer	8	S52	S54	0.088	3.010	43.306	0.326	OK
11.000	15 min Summer	8	S53	S54	0.155	0.946	45.968	0.152	OK
10.001	60 min Summer	34	S54	S55	0.287	2.061	121.267	0.231	OK
10.002	30 min Winter	21	S55	S56	0.450	2.170	126.500	0.480	OK
10.003	15 min Summer	12	S56	S57	0.450	2.684	199.511	0.284	OK
10.004	120 min Summer	53	S57	S58	0.450	0.814	84.964	0.119	OK
10.005	960 min Winter	986	S58	S59	0.262	1.061	6.407	0.020	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
9.010	120 min Winter	141	S59	S60	0.300	1.440	24.195	0.250	Surcharged
9.011	180 min Winter	133	S60	S61	0.300	0.576	23.365	0.195	Surcharged
9.012	2880 min Winter	1965	S61	S62	0.053	1.017	3.663	0.140	OK
1.017	960 min Winter	399	S62	S63	0.085	0.949	15.749	0.220	OK
1.018	960 min Winter	399	S63	S64	0.062	1.480	15.750	0.129	OK
1.019	960 min Winter	400	S64	S65	0.071	1.233	15.749	0.056	OK
1.020	960 min Winter	400	S65	S66	0.094	0.831	15.749	0.220	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
S1	15 min Summer	10	29.141	0.354	23.491		Surcharged
S2	15 min Summer	10	29.132	0.456	32.974		Surcharged
S3	15 min Summer	10	29.124	0.505	41.873		Surcharged
S4	15 min Summer	10	29.106	0.567	123.724		Surcharged
S5	15 min Summer	10	28.678	0.371	127.039		Surcharged
S6	15 min Summer	8	31.336	0.096	31.057		OK
S7	15 min Summer	8	31.059	0.089	39.424		OK
S8	15 min Summer	8	30.781	0.091	29.892		OK
S9	15 min Summer	8	30.307	0.187	122.092		OK
S10	15 min Summer	8	29.789	0.169	155.230		OK
S11	480 min Winter	464	28.499	0.459	2.872		Surcharged
S12	15 min Summer	8	29.917	0.096	61.961		OK
S13	480 min Winter	464	28.499	0.669	4.052		Surcharged
S14	480 min Winter	464	28.500	0.815	4.324		Surcharged
S15	480 min Winter	462	28.500	0.937	0.203		Flood Risk
S16	480 min Winter	462	28.499	1.116	0.217		Flood Risk
S17	480 min Winter	464	28.499	1.259	4.659		Surcharged
S18	480 min Winter	464	28.499	1.285	4.808		Flood Risk
S19	480 min Winter	464	28.499	1.355	5.021		Surcharged
S20	480 min Winter	462	28.499	1.399	5.471		Surcharged
S21	480 min Winter	464	28.499	1.549	4.943		Surcharged
S22	15 min Summer	8	32.841	0.044	7.642		OK
S23	15 min Summer	8	32.238	0.070	16.109		OK
S24	15 min Summer	8	31.448	0.256	63.217		OK
S25	15 min Summer	8	31.443	0.324	196.868		OK
S26	15 min Summer	8	33.424	0.094	65.141		OK
S27	15 min Summer	8	31.271	0.231	319.158		OK
S28	15 min Summer	8	30.396	0.206	316.164		OK
S29	15 min Summer	8	29.432	0.226	347.171		OK
S30	15 min Summer	8	28.664	0.254	424.499		OK
S31	480 min Winter	462	28.505	0.845	3.759		Surcharged
S32	15 min Summer	8	32.562	0.182	52.858		OK
S33	15 min Summer	8	32.242	0.142	104.888		OK
S34	15 min Summer	8	30.476	0.213	176.119		OK
S35	15 min Summer	8	30.064	0.224	217.212		OK
S36	15 min Summer	9	28.656	0.266	220.860		OK
S37	480 min Winter	465	28.502	1.047	3.483		Surcharged
S38	480 min Winter	464	28.500	1.600	6.297		Surcharged
S39	480 min Winter	464	28.500	1.800	12.250		Surcharged
S40	15 min Winter	8	26.696	0.084	12.496		OK
S41	1440 min Winter	2647	26.481	0.083	12.484		OK
S42	15 min Summer	11	34.823	1.078	13.702		Surcharged
S43	15 min Summer	11	34.743	1.255	22.142		Flood Risk
S44	15 min Summer	11	34.542	1.321	35.120		Flood Risk
S45	15 min Summer	11	33.826	1.056	46.349		Flood Risk
S46	15 min Summer	9	31.944	0.094	60.313		OK
S47	15 min Summer	9	30.814	0.184	99.636		OK
S48	360 min Winter	301	30.555	0.395	3.126		Surcharged
S49	360 min Winter	301	30.555	1.555	3.126		Surcharged
S50	360 min Winter	301	30.550	1.710	3.113		Surcharged
S51	1440 min Winter	1327	29.232	1.332	2.064		Surcharged
S52	15 min Summer	8	32.226	0.102	57.048		OK
S53	180 min Winter	168	30.482	0.268	1.701		OK
S54	180 min Winter	169	30.481	0.331	6.734		OK
S55	180 min Winter	170	30.480	1.000	6.404		Surcharged
S56	180 min Winter	170	30.480	1.105	7.216		Flood Risk
S57	180 min Winter	170	30.480	1.480	7.201		Flood Risk
S58	180 min Winter	170	30.480	2.030	7.095		Surcharged
S59	1440 min Winter	1327	29.227	2.347	4.541		Surcharged
S60	1440 min Winter	1327	29.227	2.427	4.535		Surcharged
S61	1440 min Winter	1327	29.227	2.487	4.532		Surcharged
S62	1440 min Winter	1325	26.381	0.095	16.196		OK
S63	1440 min Winter	1326	26.291	0.078	16.196		OK

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S64	1440 min Winter	1326	25.369	0.049	16.196		OK
S65	1440 min Winter	1327	21.845	0.095	16.196		OK
S66	1440 min Winter	1327	21.808	0.095	16.196		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	9	S1	S2	0.300	0.903	27.520	0.313	Surcharged
1.001	30 min Summer	19	S2	S3	0.300	0.913	37.001	0.392	Surcharged
1.002	30 min Summer	19	S3	S4	0.300	0.717	48.065	0.518	Surcharged
1.003	15 min Winter	9	S4	S5	0.300	1.675	118.375	1.308	Surcharged
1.004	15 min Summer	10	S5	S11	0.285	1.848	128.111	1.416	OK
2.000	15 min Summer	8	S6	S7	0.092	2.019	30.966	0.377	OK
2.001	15 min Summer	8	S7	S9	0.100	2.374	39.288	0.332	OK
3.000	15 min Summer	8	S8	S9	0.101	1.777	29.771	0.346	OK
2.002	15 min Summer	8	S9	S10	0.178	2.780	121.436	0.714	OK
2.003	15 min Summer	9	S10	S11	0.180	3.657	154.536	0.625	OK
1.005	480 min Summer	476	S11	S13	0.450	1.326	49.530	0.184	OK
4.000	480 min Winter	350	S12	S13	0.159	1.636	6.328	0.023	OK
1.006	360 min Summer	282	S13	S14	0.600	1.501	89.211	0.159	Surcharged
1.007	180 min Summer	126	S14	S17	0.600	1.303	160.476	0.184	Surcharged
5.000	30 min Winter	20	S15	S16	0.300	0.580	15.591	0.199	Surcharged
5.001	15 min Winter	10	S16	S17	0.300	0.334	23.597	0.300	Surcharged
1.008	30 min Winter	20	S17	S18	0.600	1.626	368.239	1.231	Surcharged
1.009	30 min Winter	20	S18	S19	0.600	1.721	380.703	0.910	Surcharged
1.010	15 min Winter	15	S19	S20	0.600	2.054	496.764	1.827	Surcharged
1.011	15 min Winter	14	S20	S21	0.600	1.753	444.194	0.631	Surcharged
1.012	15 min Winter	10	S21	S38	0.600	1.621	431.847	2.116	Surcharged
6.000	15 min Summer	8	S22	S23	0.057	1.224	7.604	0.192	OK
6.001	15 min Summer	8	S23	S24	0.070	1.966	15.962	0.449	OK
6.002	15 min Summer	8	S24	S25	0.290	0.581	62.560	0.358	OK
6.003	15 min Summer	8	S25	S27	0.278	1.894	195.149	0.977	OK
7.000	15 min Summer	8	S26	S27	0.094	3.407	64.799	0.219	OK
6.004	15 min Summer	8	S27	S28	0.219	4.124	316.164	0.534	OK
6.005	15 min Summer	8	S28	S29	0.216	4.194	316.486	0.445	OK
6.006	15 min Summer	8	S29	S30	0.240	4.024	346.677	0.522	OK
6.007	480 min Winter	457	S30	S31	0.288	2.790	44.037	0.062	OK
6.008	180 min Summer	120	S31	S38	0.600	2.079	279.406	0.140	Surcharged
8.000	15 min Summer	8	S32	S33	0.182	1.523	52.190	1.004	OK
8.001	15 min Summer	8	S33	S34	0.177	2.402	104.443	0.465	OK
8.002	15 min Summer	8	S34	S35	0.218	3.174	174.933	0.867	OK
8.003	15 min Summer	9	S35	S36	0.244	3.765	216.210	0.927	OK
8.004	15 min Summer	9	S36	S37	0.283	3.367	221.290	0.916	OK
8.005	15 min Winter	9	S37	S38	0.375	2.582	277.755	1.132	Surcharged
1.013	60 min Summer	27	S38	S39	0.450	0.752	99.345	0.283	OK
1.014	15 min Winter	8	S39	S40	0.084	0.964	12.496	0.172	OK
1.015	2880 min Summer	3474	S40	S41	0.083	0.778	12.483	0.174	OK
1.016	1440 min Winter	2648	S41	S62	0.089	0.729	12.483	0.174	OK
9.000	15 min Winter	7	S42	S43	0.150	1.443	20.081	0.689	Surcharged
9.001	15 min Winter	11	S43	S44	0.150	1.410	22.964	0.832	Surcharged
9.002	30 min Summer	18	S44	S45	0.150	2.017	35.649	1.243	Surcharged
9.003	30 min Summer	19	S45	S46	0.150	2.648	46.802	1.413	Surcharged
9.004	15 min Summer	9	S46	S47	0.094	3.846	60.224	0.366	OK
9.005	360 min Winter	242	S47	S48	0.175	1.831	18.191	0.121	OK
9.006	360 min Summer	227	S48	S49	0.300	2.316	56.846	0.153	Surcharged
9.007	15 min Winter	13	S49	S50	0.150	1.521	20.448	0.590	Surcharged
9.008	480 min Winter	815	S50	S51	0.150	1.301	3.104	0.056	Surcharged
9.009	360 min Winter	422	S51	S59	0.150	0.973	3.113	0.113	Surcharged
10.000	15 min Summer	8	S52	S54	0.102	3.234	56.734	0.428	OK
11.000	180 min Winter	168	S53	S54	0.299	0.702	22.587	0.075	OK
10.001	180 min Winter	169	S54	S55	0.391	1.460	51.700	0.098	OK
10.002	15 min Winter	11	S55	S56	0.450	2.291	214.735	0.815	OK
10.003	15 min Winter	10	S56	S57	0.450	3.022	238.988	0.340	OK
10.004	240 min Summer	99	S57	S58	0.450	0.779	84.204	0.118	OK
10.005	360 min Winter	683	S58	S59	0.300	1.105	7.010	0.022	Surcharged

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
9.010	60 min Winter	118	S59	S60	0.300	1.575	25.060	0.259	Surcharged
9.011	180 min Summer	124	S60	S61	0.300	0.573	23.319	0.195	Surcharged
9.012	1440 min Winter	1327	S61	S62	0.056	0.747	4.531	0.173	OK
1.017	1440 min Winter	1325	S62	S63	0.087	0.956	16.196	0.226	OK
1.018	1440 min Winter	1326	S63	S64	0.063	1.492	16.196	0.133	OK
1.019	1440 min Winter	1327	S64	S65	0.072	1.243	16.196	0.058	OK
1.020	1440 min Winter	1327	S65	S66	0.095	0.838	16.196	0.226	OK



Samuel Flesher
Paul Basham Associates Ltd
The Bothy, Cams Hall Estate
Fareham
Hampshire
PO16 8UT

Your ref
19251

Our ref
DSA000041198

Date
27 February 2025

Contact
Tel 0330 303 0119

Dear Mr Flesher,

Level 1 Capacity Check Enquiry: Land North of Guildford Road, Rudgwick, RH12 3JW.

We have completed the capacity check for the above development site and the results are as follows:

Foul Water

The enquiry has been reassessed to determine the capacity available for 0.95 l/s at manhole reference TQ08320901.

There is currently adequate capacity in the local sewerage network to accommodate a foul flow of 0.95 l/s for the above development at manhole reference TQ08320901. Please note that no surface water flows (existing or proposed) can be accommodated within the existing foul sewerage system unless agreed by the Lead Local Flood Authority in consultation with Southern Water, after the hierarchy Part H3 of Building Regulations has been complied with.

Connecting to our network

It should be noted that this information is only a hydraulic assessment of the existing sewerage network and does not grant approval for a connection to the public sewerage system. A formal Sewer Connection (S106) application is required to be completed and approved by Southern Water Services. To make an application visit: developerservices.southernwater.co.uk

Please note the information provided above does not grant approval for any designs/drawings submitted for the capacity analysis. The results quoted above are only valid for 12 months from the date of issue of this letter.

Please get in touch via the Get Connected customer dashboard if you have any queries.

Yours sincerely,

Future Growth Planning Team
Developer Services

southernwater.co.uk/developing-building/planning-your-development

SUMMARY TABLE		DESIGN CONDITIONS			
		1	2	3	4
Land Use Type	Low traffic roads (e.g. residential roads and general access roads, < 300 traffic movements/day)				
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	Detention basin				
Component 2	None				
Component 3	None				
SuDS Pollution Mitigation Indices					
TSS	0.5				
Metals	0.5				
Hydrocarbons	0.6				
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	0.5				
Metals	0.5				
Hydrocarbons	0.6				
Acceptability of Pollution Mitigation					
TSS	Sufficient				
Metals	Sufficient				
Hydrocarbons	Sufficient				