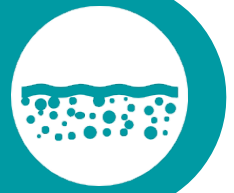


SuDSmart Design



Sustainable Drainage Assessment

Site Address

Fairlands
Church Road, Farley Hill
Wokingham
RG7 1TU

Date

2024-04-17

Date Updated

2026-07-09

Grid Reference

475831, 164277

Report Status

FINAL

Report Prepared for

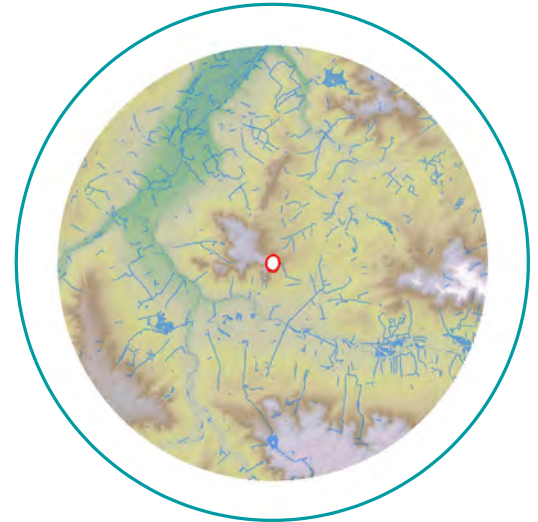
ET Planning Ltd

Site Area

0.19 ha

Report Reference

81444.04R1



Infiltrate to Ground

The proposed Sustainable Drainage Scheme (SuDS) strategy is comprised of permeable paving to infiltrate to ground based on an infiltration rate confirmed by Site investigation conducted by Ashdown Site investigation (2023) adjacent to the Site at a rate of 1.8×10^{-5} m/s (0.0648 m/hr).

Report Author

Toby Kay / Cian Greatorex
Consultant

Report Checker & Reviewer

David South / Nathan Montgomery
Senior Consultant / Project
Consultant

GeoSmart Information Ltd
Suite 1, 1 Bellstone Court,
Bellstone, Shrewsbury, SY1 1JB
+44(0)1743 298 100
info@geosmartinfo.co.uk
www.geosmartinfo.co.uk

1 Executive summary



This report assesses the feasibility of a range of Sustainable Drainage Scheme (SuDS) options in support of the Site development process. A SuDS strategy is proposed to ensure surface water runoff can be managed effectively over the lifetime of the development.

SuDS suitability

Risk	Issue	Result
Discharge Location	What is the infiltration potential at the Site?	High
	What is the potential to discharge to surface water features?	Low
	What is the potential to discharge to sewers?	Low
	What is the potential to discharge to highway drains?	Low
Flooding	What is the fluvial flood risk at the Site?	Very Low
	What is the pluvial flood risk at the Site?	Very Low
	What is the groundwater flood risk at the Site?	Negligible
Pollution	Is the groundwater a protected resource?	No
	Is the surface water feature a protected resource?	N/A

Summary of existing and proposed development

The Site is currently used as a caravan site with associated amenity buildings. At present there are five caravan pitches, an office cabin, toilet block, and bin storage with landscaped areas and access. Development proposals comprise the installation of eighteen static caravans with associated parking and access, and an increase in bin storage areas.

Summary of discharge routes

GeoSmart's SuDS Infiltration Potential (SD50) map indicates the Site has a High potential for infiltration, primarily due to the anticipated high permeability of the underlying geology (River Terrace Deposits and Bagshot Formation).

Site Investigation (Ashdown Site Investigation, 2023) has confirmed that Infiltration to ground is feasible at a rate of 1.8×10^{-5} m/s (0.0648 m/hr).

Ordnance Survey (OS) mapping indicates there are no surface water features within 100m of the Site. Therefore, discharge into surface water should not be considered.

The asset location plan included in Appendix D confirms there are no public surface water sewer or combined sewers located within the vicinity of the Site. Therefore, discharging surface water runoff to the sewer is not feasible.

Runoff rate and attenuation requirements

Discharging surface water runoff via infiltration requires approximately 74.56 m³ of attenuation to be provided. This would ensure there is no increase in runoff above the greenfield scenario as a result of the development, in all storm events up to and including the 1 in 100 year including a 40% allowance for climate change. This volume would ensure runoff is not increased above the greenfield scenario.

Foul drainage

Foul drainage is to collect in the cesspool for periodic emptying and removal by tanker. Frequency as recommended by manufacturer or more frequently, if required. Foul drainage calculations are included in Appendix C.



Site location

Figure 1. Aerial Imagery (Bluesky, 2026)

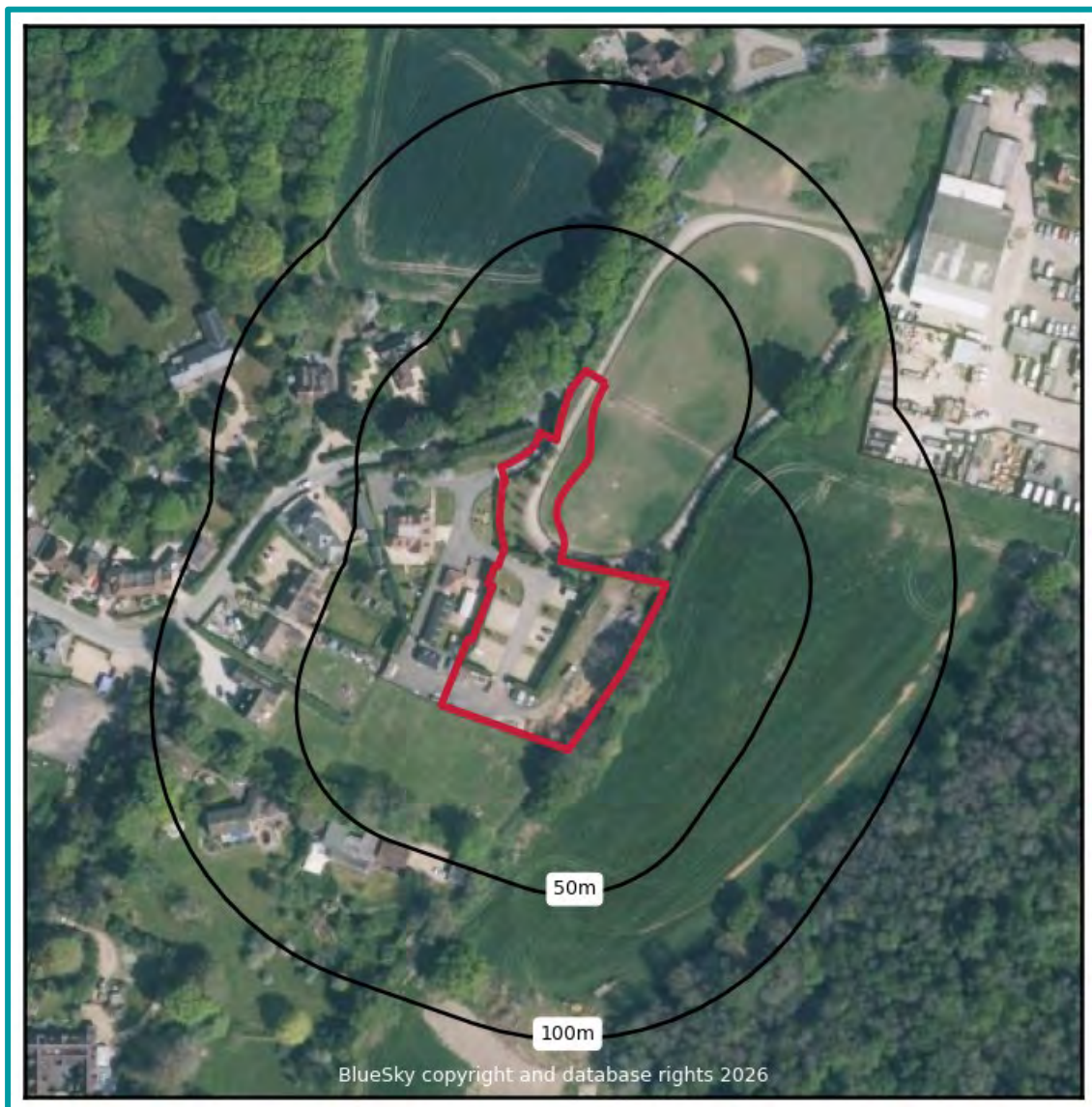
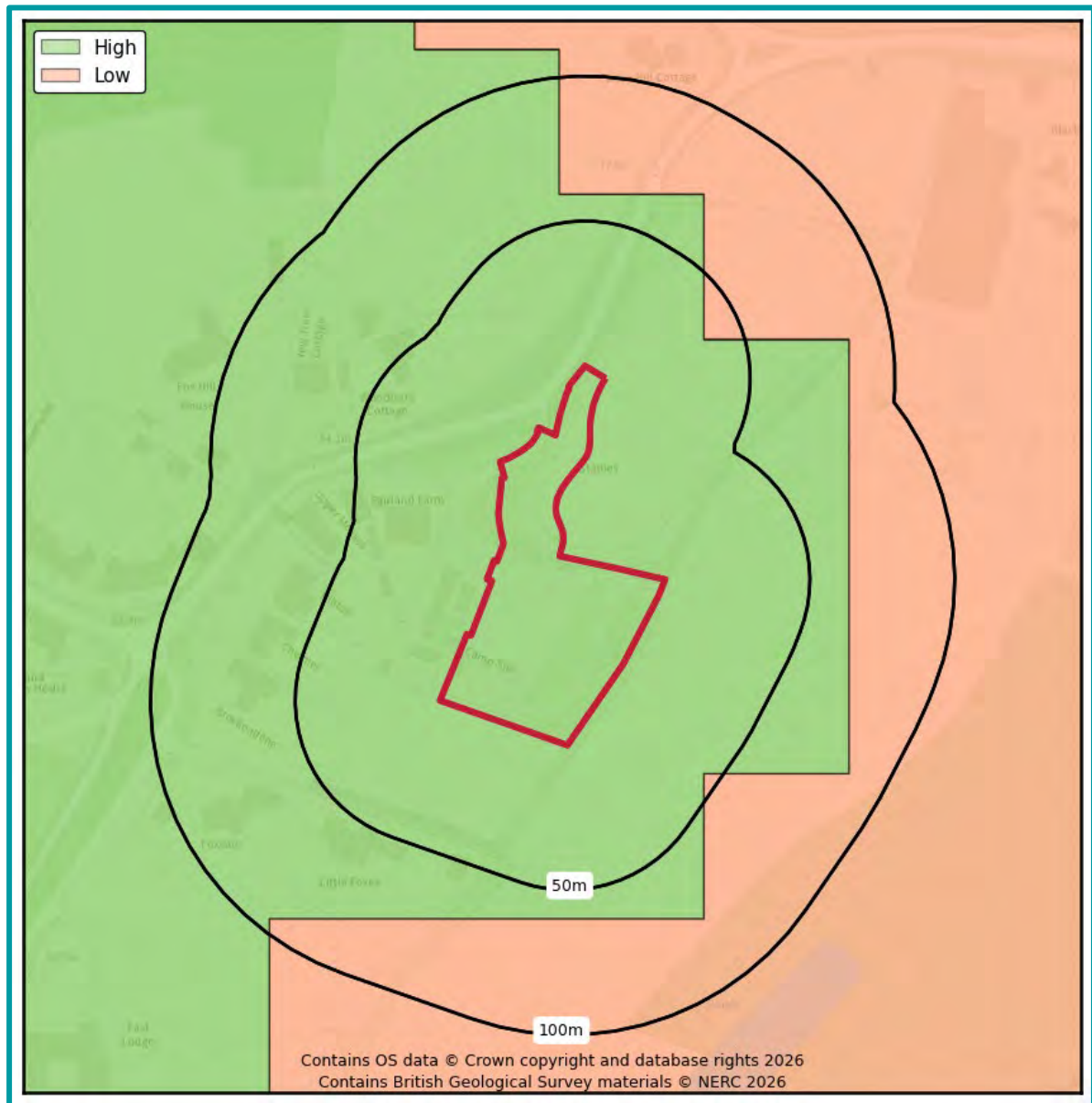


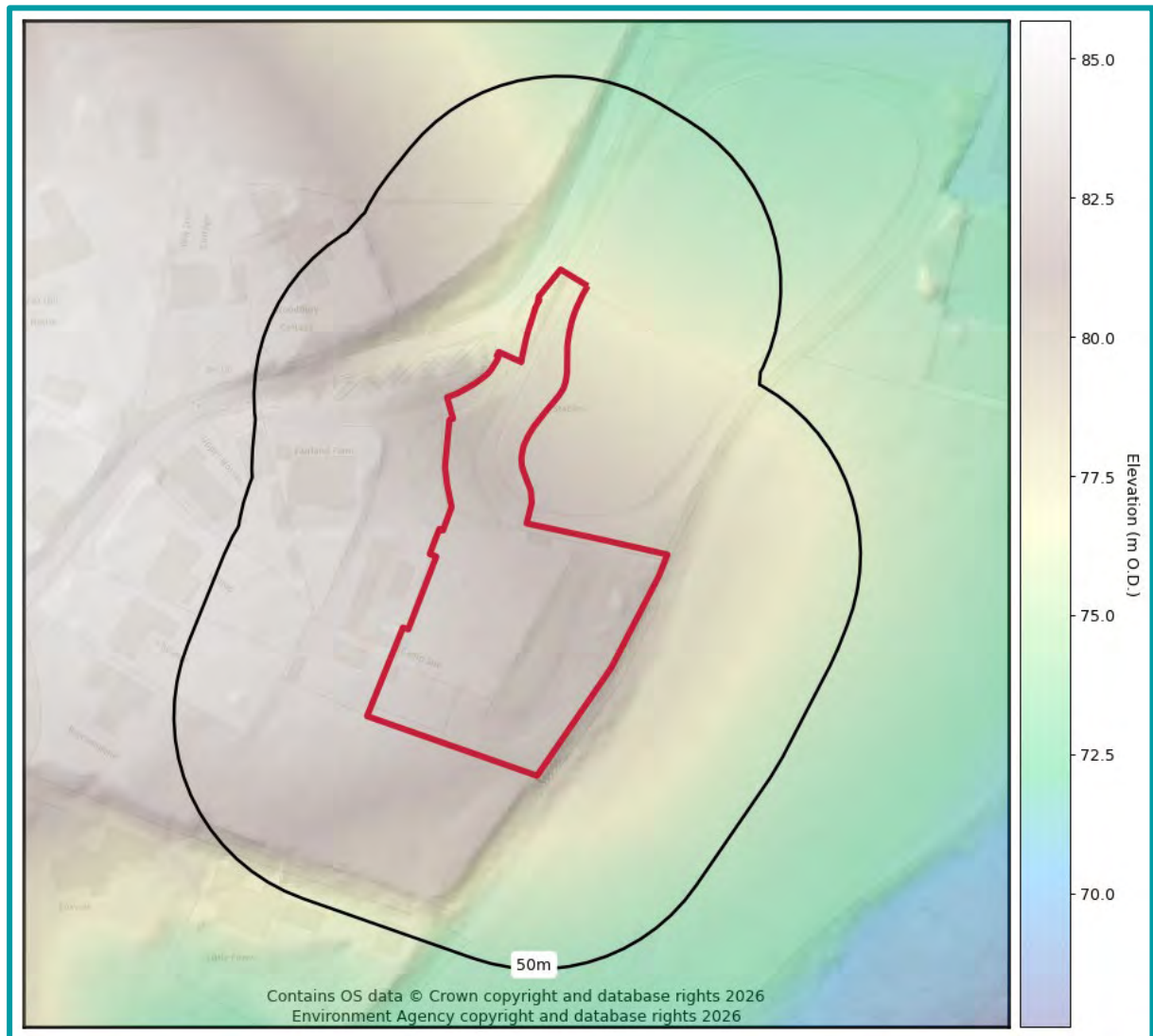
Figure 2. SuDS infiltration suitability (SD50) map (GeoSmart, 2026)



The GeoSmart SuDS Infiltration Suitability Map (SD50) screens the potential for infiltration drainage at the Site and indicates where further assessment is recommended. The map combines information on the thickness and permeability of the underlying material and the depth to the high groundwater table. It supports conceptual Site drainage design and the planning of further Site investigation.

There is a High potential for infiltration SuDS across the Site. It is likely that the underlying geology at the Site has high permeability and an infiltration SuDS scheme should be possible at the Site. Nearby infiltration testing has confirmed an infiltration rate of 1.8×10^{-5} m/s (0.0648 m/hr).

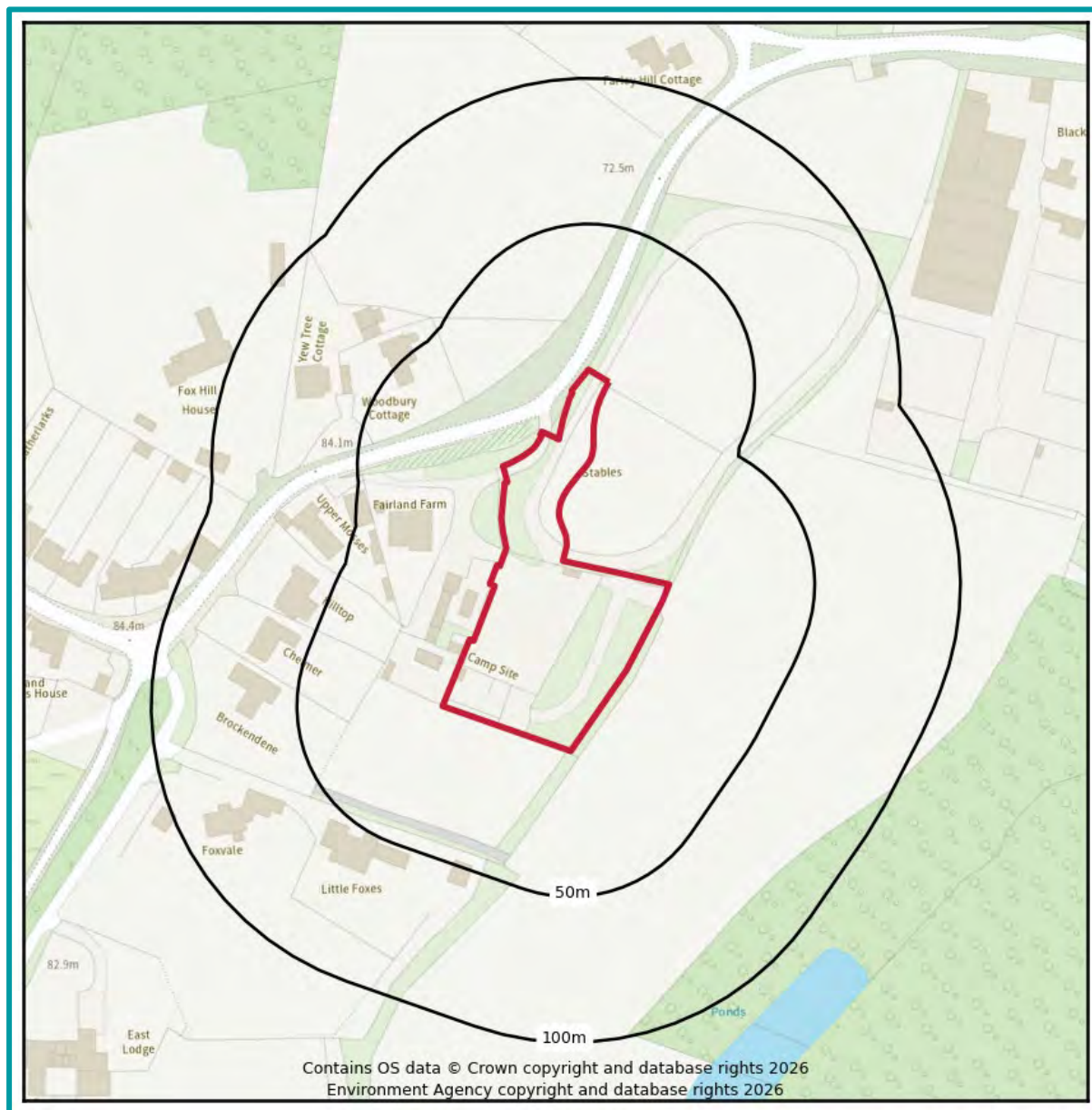
Figure 3. Site topography (GeoSmart, 2026)



An assessment of the topography at the Site has been undertaken using LiDAR DTM5 elevation data to identify the general slope and any localized depressions. The mapping shows a comparison between average ground levels on the Site with ground levels in the surrounding area. The mapping confirms the overall Site is generally on a gradual slope, rising to the west.

Further analysis could be undertaken by visiting the Site or by collecting additional topographic survey to provide further confirmation of ground levels.

Figure 4. Source protection zone map (EA, 2026)

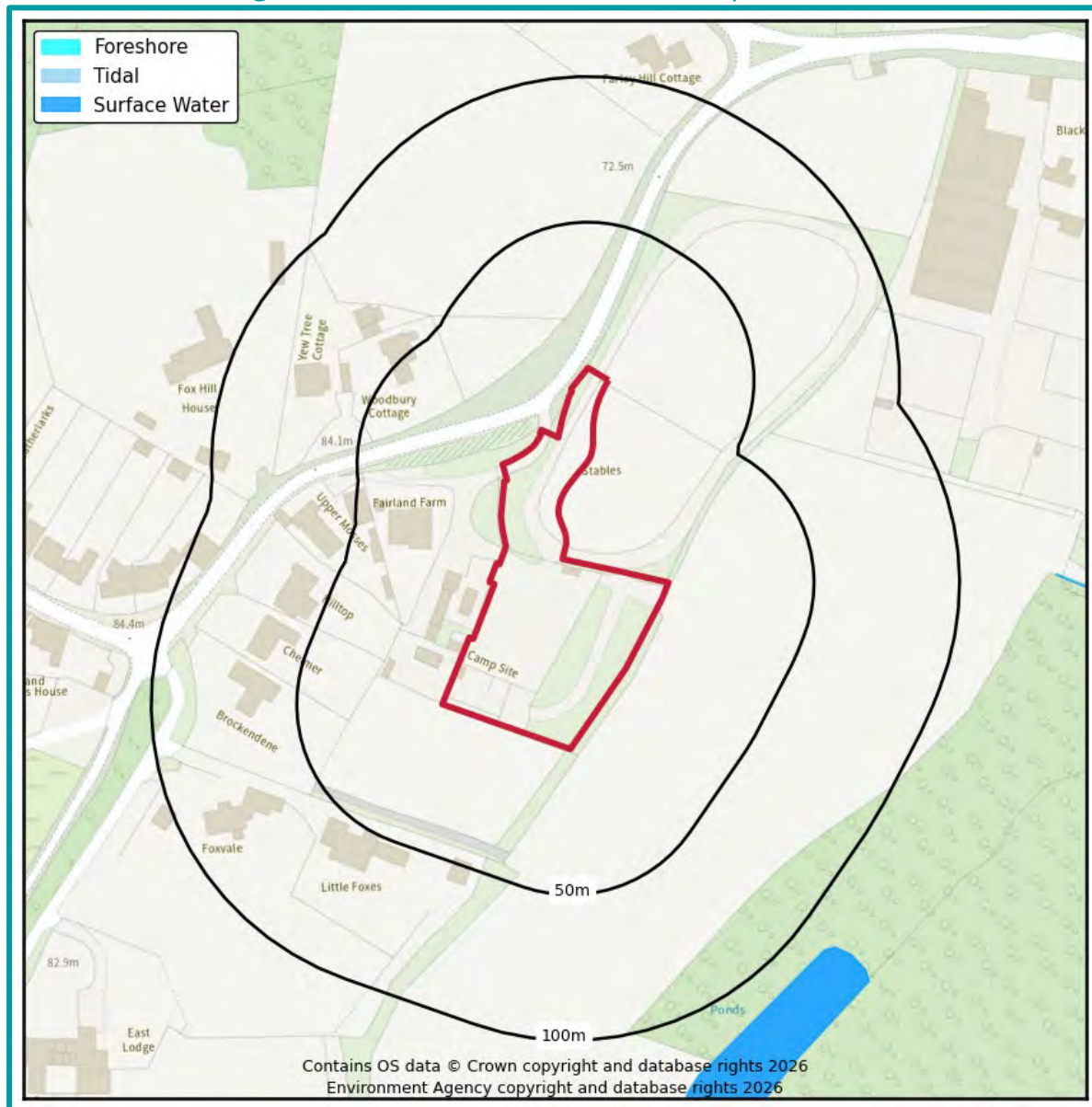


An assessment of the EA's groundwater Source Protection Zones (SPZs) has been undertaken within the vicinity of the Site and confirms the Site is not located within an SPZ.

Infiltration, if possible, is likely to be acceptable providing risk screening identifies suitable mitigation measures, if required, to prevent an impact on water quality from the proposed or historical land use and contaminated land.

If further analysis is required, this would involve a review of Site specific contaminated land data. If hazards are identified, it is recommended that the Local Authority and the Environment Agency are contacted to confirm the susceptibility of any SPZs within the wider area.

Figure 5. Surface water features map (EA, 2026)

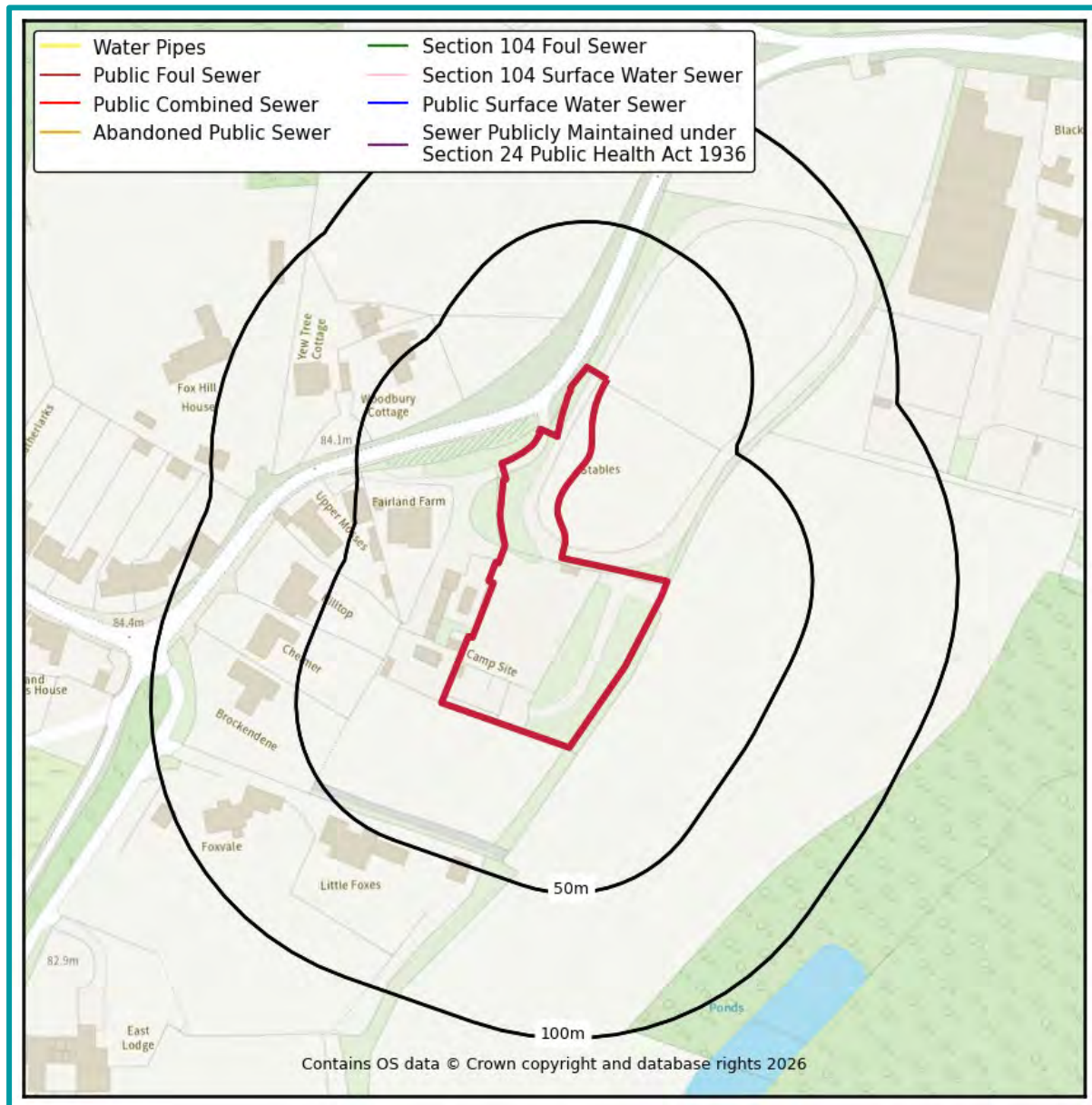


The mapping above confirms that there are no surface water feature within 100 m of the Site. Therefore, discharge to surface water is unlikely to be appropriate.

According to DEFRA's MagicMap, the Site is not within 250m of a SSSI or SPA.

Further analysis could be undertaken by visiting the Site or by contacting the Local Council and the Environment Agency (EA) to confirm the presence, location and condition of any mapped or additional unmapped surface water features.

Figure 6. Sewer features map (Thames Water, 2024)



GeoSmart has undertaken an assessment of the location of sewer features within the vicinity of the Site. According to the Thames Water Asset Location Plan obtained for the Site (Appendix D), there are no public surface water or combined sewers located within the vicinity of the Site.

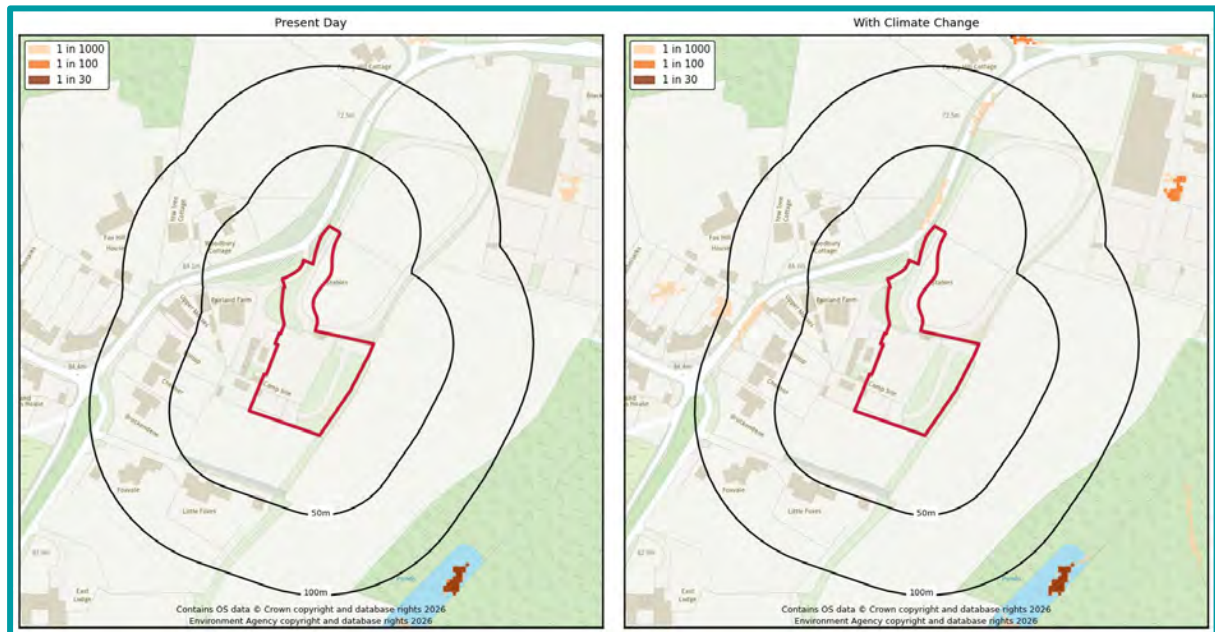
Where development is proposed above or within close proximity to the public sewer network, a build-over agreement or easement may be required with the relevant utility provider.

Figure 7. Risk of flooding from rivers & sea map (EA, 2026)



According to the EA's Risk of Flooding from Rivers and the Sea (RoFRS) map, the Site has a Very Low risk of flooding from fluvial or coastal flooding, with less than 0.1% annual probability of flooding, therefore the SuDs design is unlikely to be affected.

Figure 8. Risk of surface water flooding map (EA,2026)

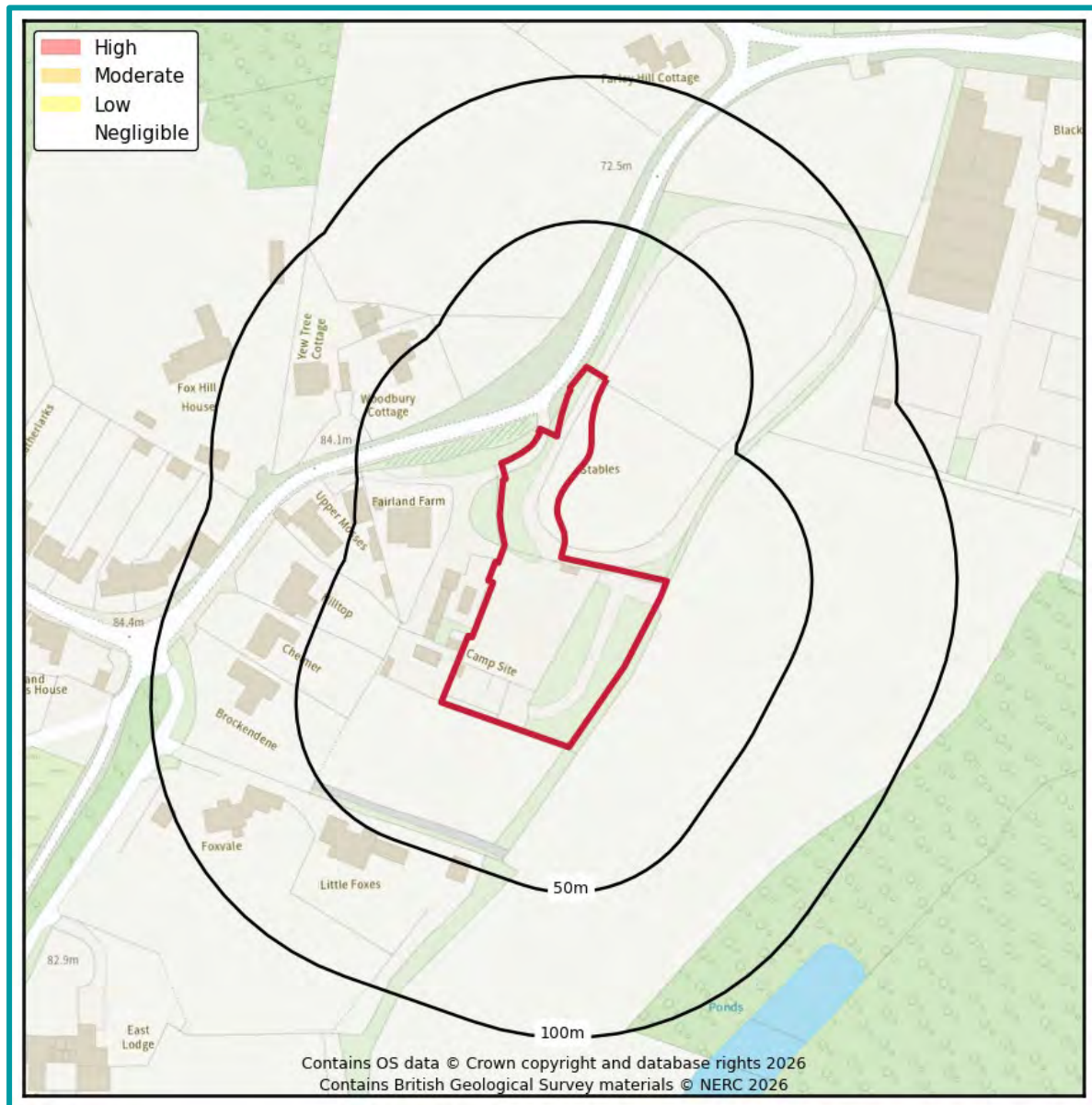


GeoSmart have undertaken an assessment of the risk of flooding from surface water (pluvial) sources within the vicinity of the Site using the EA's Risk of Flooding from Surface Water (RoFSW) mapping.

The above map shows the extent and depth of flooding during the >3.3% annual probability (AEP) (1 in 30 year – High risk), 3.3 – 1% AEP (1 in 100 year – Medium risk) and 1 – 0.1% AEP (1 in 1000 year – Low risk) events. This confirms that there are no areas of the Site which would be affected by surface water flooding.

Further analysis could be undertaken by visiting the Site or by contacting the Local Council and the Environment Agency to confirm the pluvial flood risk, flood depths and velocities where applicable.

Figure 9. Groundwater flood risk (GW5) map (GeoSmart, 2026)



GeoSmart have undertaken an assessment of the risk of flooding from groundwater within the vicinity of the Site. GeoSmart's Groundwater Flood Risk Screening (GW5) map confirms the Site has a Negligible risk of groundwater flooding during a 1% annual probability (1 in 100 year) event.



Site information

The purpose of this report is to assess the potential for disposing of surface water through a Sustainable Drainage System (SuDS) for the site of Fairlands, Church Road, Farley Hill, Wokingham, RG7 1TU (the Site). The Site is located in the village of Farley Hill in a setting of primarily residential use. The land slopes down to the north towards Church Road from 83 mAOD to 77 mAOD along the northern boundary. This is based on EA elevation data obtained for the Site to a 1 m resolution with a vertical accuracy of ± 150 mm. Site plans and drawings are provided in Appendix A.

Development

The Site is currently used as a caravan site with associated amenity buildings. At present there are five caravan pitches, an office cabin, toilet block, and bin storage with landscaped areas and access. Development proposals comprise the installation of eighteen static caravans with associated parking and access, and an increase in bin storage areas.

Geology, permeability and thickness

British Geological Survey (BGS) national superficial and bedrock geology mapping confirms the geological formations underlying the Site and each formation may have a range of permeability.

Table 1. Site Geology

Geology present on-Site		Potentially permeable?
Superficial geology (Figure 10)	River terrace deposits (RTD6)	✓
Bedrock geology (Figure 11)	Bagshot formation (Sand) (BGS)	✓

Site investigation conducted three borehole tests from which the underlying material at the Site can be established (Ashdown Site Investigation, 2023).

Borehole ref: WS01

- Made ground to 0.8m bgl
- River Terrace Deposits to 2m bgl where the borehole terminates.

Borehole ref: WS02

- Made ground to 0.7m bgl
- River Terrace Deposits to 5m bgl where the borehole terminates.

Borehole ref: WS03

- Made ground to 1m bgl
- River Terrace Deposits to 2m bgl where the borehole terminates.

Depth to groundwater

The SuDS system should be designed to operate in periods of extreme groundwater levels.

According to Site-specific ground investigation, shallow groundwater is potentially a problem at the Site.

Relevant boreholes undertaken during Site investigation (Ashdown Site Investigation, 2023) indicate groundwater levels may fluctuate around 1.85m bgl as found within borehole ref: WS02 within the River Terrace Deposits.

Shallow infiltration features such as permeable paving is proposed to account for the potentially shallow groundwater table.

Figure 10. Superficial Geology (BGS, 2026)

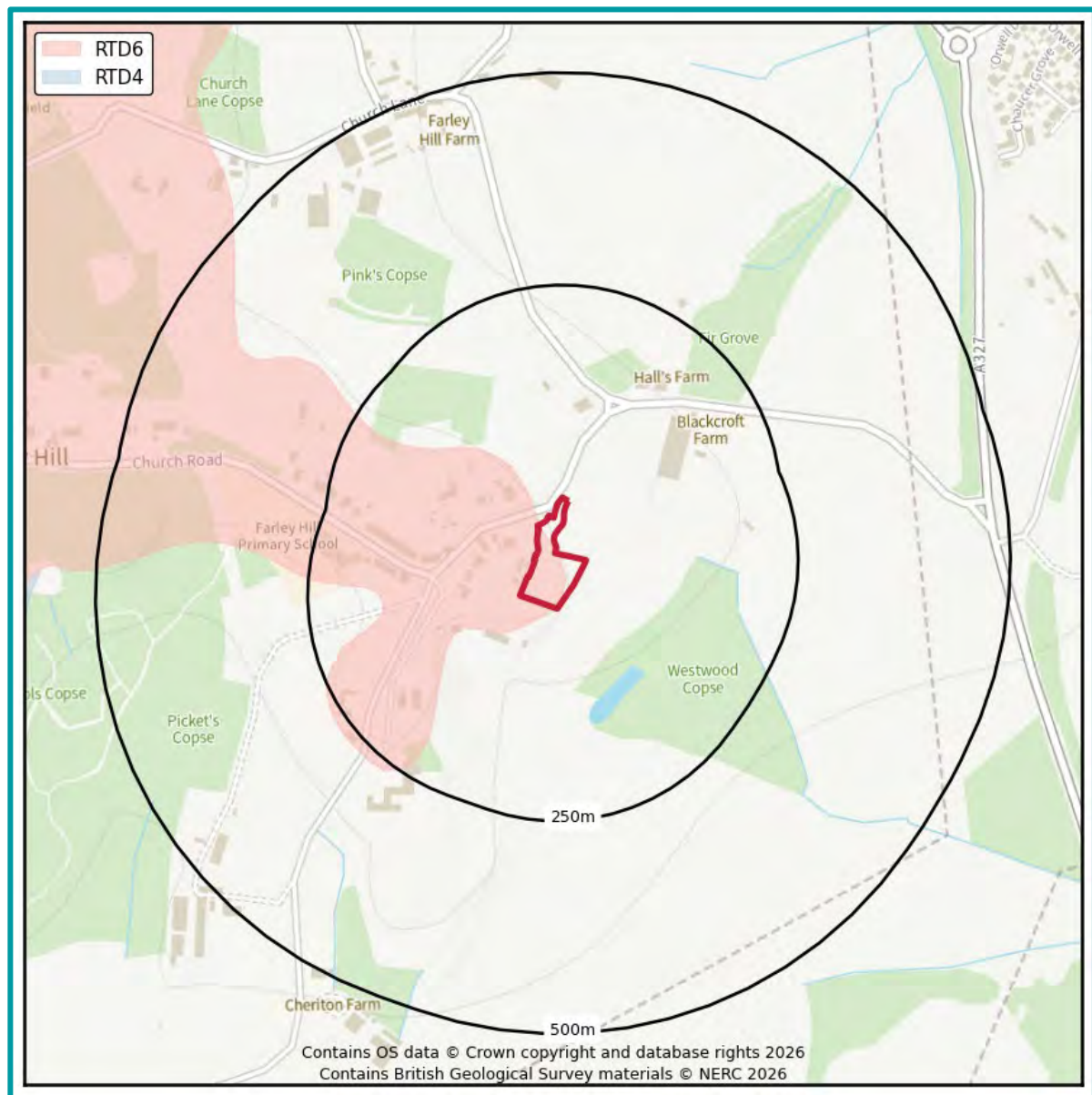
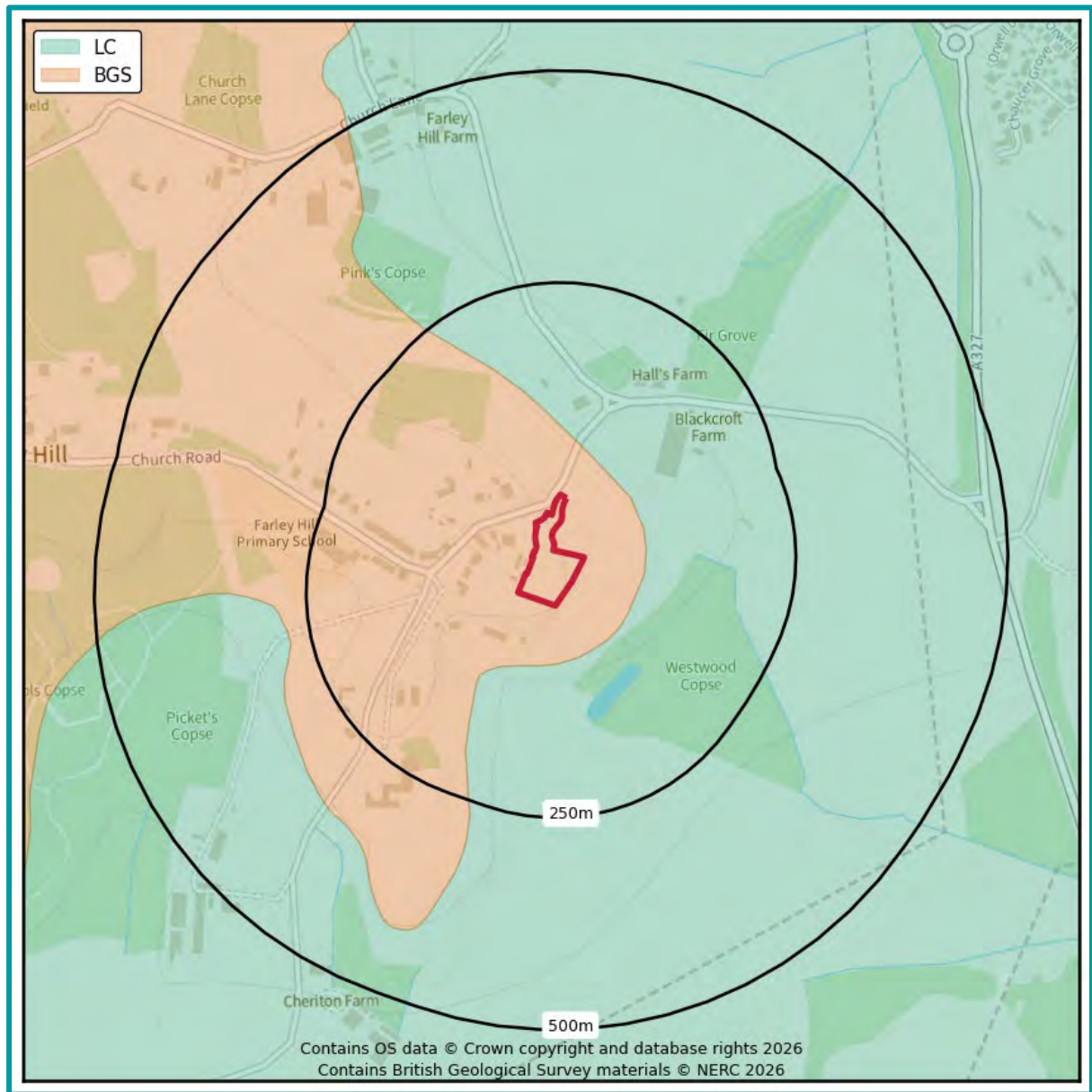


Figure 11. Bedrock Geology (BGS, 2026)



Ground conditions

Infiltration SuDS are proposed within permeable superficial deposits above sandstone bedrock therefore a detailed review of underlying ground conditions is recommended to ensure focused infiltration does not cause ground instability as a result of landslide or collapse associated with running sand.

Water quality

The Site does not lie within an SPZ and infiltration features are not proposed therefore for the purposes of the sustainable drainage assessment further consideration of the historical land uses (and any associated contamination risks) is not considered necessary.



National Guidance

DEFRA - National standards for sustainable drainage systems (SuDS) (2025)

Standard 1: runoff destinations

A 'SuDS approach' shall be adopted to address the management of surface water by the development and where it should be discharged. Runoff shall be treated as a resource and managed in a way that avoids negative impacts of the development on flood risk, the morphology and water quality of receiving waters and the associated ecology.

Runoff from the development shall be discharged to the following final destinations, to the maximum extent practicable, in accordance with the below hierarchy:

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

Note 1: priority 1 is the highest priority and priority 5 is the lowest.

Note 2: for the purposes of this standard, a combined sewer is a sewer intended to receive both foul sewage and surface runoff and does not include a sewer intended to receive only foul sewage, even if it has the capacity to accommodate additional flows or has an element of surface water in it already.

To utilise a lesser priority final destination, appropriate evidence shall be provided that demonstrates all higher priority final destinations have been utilised to the maximum extent practicable. Higher cost alone shall not be a reason to utilise lower priority final destinations.

Where more than one final destination is utilised, each final destination's ability to accept runoff shall be maximised in order of priority.

Standard 2: management of everyday rainfall (interception)

Apply a 'SuDS approach' so that at least the first 5mm of rainfall for the majority of rainfall events does not result in runoff from the site to surface waters or piped drainage systems.

Evidence shall be provided that the approach to managing runoff from 'everyday' rainfall has been developed alongside and in support of the management of runoff quality (standard 4) and the delivery of amenity and biodiversity benefits (standards 5 and 6).

Standard 3: management of extreme rainfall and flooding

A 'SuDS approach' shall be adopted to address the management of development runoff during extreme rainfall, including allowances for climate change and urban creep to:

- protect people and property on the development from flooding of the surface water drainage system
- mitigate any increased flood risk to people and property adjacent to or downstream of the development
- protect the receiving water body from morphological damage or minimise the impact on sewer capacity

When discharging to an infiltration feature, the system shall be appropriately sized to accommodate the design event based on ground conditions and contributing areas.

When discharging to an above ground surface water body, sewer or other piped drainage system, the surface water runoff (rate and volume) for the 1% annual exceedance probability (AEP) event shall be controlled to ensure the runoff from the development does not increase flood risk elsewhere.

When discharging to an above ground surface water body, sewer or other piped drainage system, the surface water runoff rate for the 50% AEP event shall be controlled to ensure development runoff from an event of this magnitude has no negative impact.

Any flooding from the surface water drainage system for events up to the 1% AEP event shall be managed within the development.

Any flooding from off-site sources for the 1% AEP event should be managed on site or safely routed through the site, ensuring any downstream risks are not increased compared to the pre-development scenario.

The risks (both on and off the development) associated with flooding from the surface water drainage system for exceedance events greater than the 1% AEP event shall be appropriately managed.

Standard 4: water quality

Apply a 'SuDS approach' that protects surface waters, groundwater and coastal waters by managing the quality of the surface water runoff to adequately address water quality risks from the development.

The proposed SuDS management train(s) shall be based on a robust water quality risk assessment, appropriate to the pollution hazard and sensitivity of receiving waters, reflecting industry recognised guidance or other quantitative assessment as agreed with the approving body and permitting requirements.

Standard 5: amenity

A 'SuDS approach' shall be adopted that maximises benefits for amenity through the creation of multi-functional places and landscapes.

Standard 6: biodiversity

A 'SuDS approach' shall be adopted to ensure the surface water drainage system maximises biodiversity benefits throughout the development lifecycle.

The surface water drainage system shall add biodiversity value by:

- creating diverse, self-sustaining, resilient local ecosystems which contribute to net gains in biodiversity
- supporting and promoting natural local habitat and species, for example, through local nature recovery strategies (LNRS)
- contributing to the delivery of local biodiversity strategies
- contributing to habitat connectivity

Standard 7: design of drainage for construction, operation, maintenance, decommissioning and structural integrity

A 'SuDS approach' shall be adopted to ensure that surface water drainage systems are designed so they can be easily and safely constructed, operated and maintained taking account of the need to minimise negative impacts on natural resources and the environment.

The designer shall provide a management and maintenance plan that supports the design objectives detailed in standards 1 to 6 and ensures the performance of the surface water drainage system with regards to runoff destinations, everyday and extreme rainfall, water quality, amenity and biodiversity is maintained throughout the lifetime of the development.

Surface water drainage design shall examine for the likelihood and consequences of potential failure scenarios that may occur during the operation phase and safely manage the associated risks.

The surface water drainage system shall be designed to ensure structural integrity of all components under anticipated loading conditions for the design life of the development so that it does not affect the structural integrity of any existing or proposed components within, or adjacent to, the development.

Urban creep

Within developments an urban creep uplift factor shall be applied by adding a percentage increase to the calculated area of the impermeable area within the property curtilages. This shall be 10% for all developments unless there are no external private permeable spaces, for example, flats and apartments, when it shall be 0%.

Ministry of Housing, Communities & Local Government – National Planning Practice Guidance: Flood risk assessments: climate change allowances (2022)

The Peak rainfall intensity allowances section provides advice on the increased rainfall effects on river levels and land and urban drainage systems. As of May 2022, the applicable climate change allowance is defined by specific Management Catchment for the 1 in 30 ($\geq 3.3\%$ AEP) and 1 in 100 (< 3.3 to 1% AEP) year event.

As the Site is located within the Loddon and tributaries Management Catchment the following climate change allowances are applicable.

Table 2. Loddon and tributaries Management Catchment peak rainfall allowances

Loddon and tributaries Management Catchment	3.3% Annual exceedance rainfall event		1% Annual exceedance rainfall event	
	2050s	2070s	2050s	2070s
Central	20%	25%	20%	25%
Upper end	35%	35%	40%	40%

The drainage system should be designed to make sure there is no increase in the rate of runoff discharged from the Site for the upper end allowance.

Where on-Site flooding for the upper end allowance presents a significant flood hazard (for example, depths and velocities of surface water runoff cause a significant danger to people), you will need to take further mitigation measures to protect people and property (for example, raising finished floor levels). As a minimum, there should be no significant flood hazard to people from on-Site flooding for the central allowance.

Local Policy

Adopted Managing Development Delivery Local Plan – Policy CC10: Sustainable Drainage (Wokingham Borough Council, 2014)

1. All development proposals must ensure surface water arising from the proposed development including taking into account climate change is managed in a sustainable manner. This must be demonstrated through
 - a. A Flood Risk Assessment, or
 - b. Through a Surface Water Drainage Strategy.
2. All development proposals must

- a. Reproduce greenfield runoff characteristics and return run-off rates and volumes back to the original greenfield levels, for greenfield sites and for brownfield sites both run-off rates and volumes be reduced to as near greenfield as practicably possible.
- b. Incorporate Sustainable Drainage Systems (SuDS), where practicable, which must be of an appropriate design to meet the long term needs of the development and which achieve wider social and environmental benefits
- c. Provide clear details of proposed SuDS including the adoption arrangements and how they will be maintained to the satisfaction of the Council [as the Lead Local Flood Authority (LLFA)]
- d. Not cause adverse impacts to the public sewerage network serving the development where discharging surface water to a public sewer.

Wokingham SuDS Strategy – Relevant Strategies (Wokingham Borough Council, 2017)

WokBC-LS1 The design of the drainage system must mitigate any potential negative impact of surface runoff from the development on the flood risk outside the development boundary.

WokBC-LS2 The application must include details of catchments and flows discharging into/across the site from all sources (fluvial, surface water and groundwater). The submitted documents (drawings and relevant calculations) shall identify sources of water entering the site predevelopment, how flows will be routed / managed through the development, where flows exited the site predevelopment and where they leave post development, without exacerbating flood risk to neighbouring property.

WokBC-LS4 All proposals to discharge to a water body, public or private sewer shall be accompanied with correspondence confirming acceptance of the proposal from the receiving network owner and that the receiving network has the necessary capacity to receive additional flows and/or that required reinforcement works will be provided.

WokBC-LS5 In addition to the requirements of S2, Wokingham requires demonstration that discharges from the proposed development for all return periods from the 1 in 1 through to the 1 in 100 year (inclusive), do not exceed their corresponding greenfield/previously developed discharge rates. Demonstration of this is required for the 1 in 1 year, 1 in 30 year, 1 in 100 year and 1 in 100 year including allowances for climate change.

WokBC-LS6 All proposed discharges of 5 l/sec or below from a single structure should be reviewed in terms of maintenance and blockage potential.

WokBC-LS10 Attenuation storage must be provided to limit the rates of runoff to the required greenfield / pre development discharge rates.

WokBC-LS11 Long term storage must be provided to limit the volume of runoff from the 1 in 100 year event with an allowance for 40% climate change, unless discharge rates have been restricted to QBar.

WokBC-LS15 The drainage system must be designed so that the capacity of the drainage system takes account of the likely impacts of climate change and likely changes in impermeable area within the development over the design life of the development. To allow for future urban expansion within the development (urban creep), an increase in paved surface area of 10% should be used, unless this would produce a percentage impermeability greater than 100%.

WokBC-LS18 It should be demonstrated that any blockage within the system and extreme rainfall volumes can be accommodated through safe overflow routes. Flow across the site should be diverted away from buildings and main access-egress routes across the site.

WokBC-LS24 All infiltration systems must be sited so that they do not compromise the structural stability of buildings or roads. They must not be situated within 5m of any building or road and if situated on chalk geology they must be sited in accordance with CIRIA C754 – Engineering in Chalk.

WokBC-LS41 The drainage system must be designed so that surface runoff not collected for use must be discharged to one or more of the following, listed in order of priority:

- discharge into the ground (infiltration); or where not reasonably practicable,
- discharge to a surface water body; or where not reasonably practicable,
- discharge to a surface water sewer, highway drain, or another drainage system; or where not reasonably practicable,
- discharge to a combined sewer.

WokBC-LS45 Any proposed discharge to ground shall be supported by appropriate infiltration testing results in accordance with the requirements of Building Regulations Approved Document H – Part H3. Infiltration testing results must be recorded at the same position and depths proposed for infiltration devices.

WokBC LS50 If the proposed development site is contaminated due to previous uses, discussions must be held with Wokingham Borough Council to establish the appropriate level of treatment required for surface water runoff before discharge from the site.

WokBC LS51 If the proposed development site has contaminated ground and the runoff is proposed to discharge to ground, appropriate measures must be taken to ensure infiltration devices do not mobilise pollutants and contaminate groundwater. Agreement to the proposed mitigation proposals shall be sought from the Environment Agency.

5 Storage, volume and peak flow rate



Suggested minimum and aspirational storage requirements for an infiltration or attenuation SuDS scheme for the development footprint are set out below, with more detail provided in subsequent sections. Storage volumes may be reduced (but not below the minimum level) if the design incorporates off-Site discharge.

Table 3. Storage requirements at the proposed development Site (Discharge runoff via infiltration)

Attenuation scenario		Attenuation required (m ³)	Explanation
Discharge runoff via infiltration	1 in 100 year including 40% CC	74.56	Attenuation required to ensure surface water runoff is attenuated in all storm events up to and including the 1 in 100 year event including a 40% allowance for climate change*.

*Confirmed through Site infiltration testing (Ashdown Site Investigation, 2023). Infiltration rate of 1.8×10^{-5} m/s (0.0648 m/hr)

Surface water runoff

An increase in impermeable area on-Site will result in greater rainfall runoff. Reduction in runoff will help mitigate flood risk both on and off-Site. Further information on the surface water runoff calculations is provided in Section 12 'Background Information'.

Guidance

The Non-Statutory Technical Guidance for SuDS (Defra, March 2015) states:

"Where reasonably practicable, for Greenfield development, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event should never exceed the Greenfield runoff volume for the same event. Where reasonably practicable, for developments which have been previously developed, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event must be constrained to a value as close as is reasonably practicable to the Greenfield runoff volume for the same event, but should never exceed the runoff volume from the development site prior to redevelopment for that event."

Table 4. Change in impermeable area associated with the development

Total Site area	4338 m ²
Impermeable area (and as a percentage of the total area of the proposed development footprint of 2884 m ² *)	
Pre-development	Post-development
1311 m ² (45%)	620 m ² (21%)
Impermeable land use: Hardstanding Permeable land use: Landscaped areas	New impermeable land use: 620 m ² static caravans New permeable land use: 1204 m ² of permeable paving and 1060 m ² landscaped areas

*The access road to the Site has been excluded from the proposed development footprint and is assumed to drain as existing.

Guidance

"The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur on any part of the site for a 1 in 30 year rainfall event" and 'flooding does not occur during a 1 in 100 year rainfall event in any part of: a building (including a basement); or in any utility plant susceptible to water (e.g. pumping station or electricity substation) within the development"

(Defra, March 2015, non-statutory guidance).

Peak discharge rates

The table below presents peak discharge rates for a range of storm events used to assess the impact of the proposed development and select the maximum permitted discharge rate. Further information on the calculation and control of peak discharge rates is provided in Section 12 'Background Information'.

Table 5. Peak discharge rates associated with the development

Rainfall event	Greenfield runoff rates (l/s)	Existing runoff rates ¹ (l/s)	Potential runoff rates without attenuation (l/s)	Potential minus existing (l/s)
QBAR	1.38	N/A	N/A	N/A
6 hour 1 in 1 year	1.18	2.34	0.83	-1.51
6 hour 1 in 10 year	2.24	4.00	1.41	-2.59
6 hour 1 in 30 year	3.10	5.17	1.84	-3.33
6 hour 1 in 100 year	4.41	6.48	2.30	-4.18
6 hour 1 in 100 year + 20% CC	N/A	N/A	2.76	-3.72
6 hour 1 in 100 year + 40% CC	N/A	N/A	3.22	-3.26

¹ Assumes 100% runoff from impermeable surfaces. Assumes Greenfield runoff from permeable surfaces calculated using the loH124 method.

Total discharge volumes

The table below presents discharge volumes for a range of storm events used to assess the impact of the proposed development and calculate the required storage volumes. Further information on the calculation of total discharge volumes is provided in Section 11 'Methodology and Limitations'.

Table 6. Total discharge volumes associated with the development

Rainfall event	Greenfield runoff volume (m ³)	Existing runoff volume ² (m ³)	Potential runoff volume without attenuation (m ³)	Potential minus existing (m ³)
QBAR	35.93	N/A	N/A	N/A
6 hour 1 in 1 year	33.44	50.58	17.96	-32.62
6 hour 1 in 10 year	58.07	86.39	30.51	-55.88
6 hour 1 in 30 year	73.81	111.64	39.65	-71.99
6 hour 1 in 100 year	92.54	139.97	49.71	-90.27
6 hour 1 in 100 year + 20% CC	N/A	N/A	59.65	-80.33
6 hour 1 in 100 year + 40% CC	N/A	N/A	69.59	-70.38

² Assumes 100% runoff from impermeable surfaces. Assumes Greenfield runoff from permeable surfaces calculated using the loH124 method.

6 Runoff destination



Options for the destination for the runoff generated on-Site have been assessed in line with the prioritisation set out in the Building Regulations Part H document (HM Government, published in 2010 and updated in 2015) and Defra's Non-statutory Technical Standards for SuDS (2015).

Flow attenuation using infiltration SuDS (discharge to ground) is generally the preferred option. If discharge to ground is not available, runoff discharge to surface water is the other preferred method. Only if these two options are impractical should discharge to the sewer network be considered.

Discharge to ground

Infiltration testing undertaken nearby by Ashdown Site Investigation Ltd in May 2023 confirms the Site has high potential for infiltration with an infiltration rate of 1.8×10^{-5} m/s (0.0648 m/hr) confirmed and no groundwater to 2.0m bgl. Infiltration to ground via permeable paving is therefore feasible.

There are no known issues identified relating to Site contamination or the presence of a SPZ.

Discharge to surface watercourse

There is a possible off-Site discharge route to an unnamed pond across approximately 140m of neighbouring land. Access would need to be arranged and the outfall would be subject to water level and flood conditions. Further investigation would be required for this option. A flow control device would be required to limit peak discharge rates to the maximum selected rate as indicated in Section 6 along with the appropriate attenuation storage volume. Discharge to ground is considered to be a more viable SuDS option in this situation due to the significant distance between the Site and surface water feature.

Discharge to sewer

GeoSmart has undertaken an assessment of the location of sewer features within the vicinity of the Site. According to the asset location plan undertaken at the Site (Appendix D), there are no public surface water sewer or combined sewers located within the vicinity of the Site. Therefore, discharge to sewer is not a feasible SuDS option at the Site.

Foul Drainage Strategy

Similar to surface water drainage, foul water discharge must also demonstrate compliance with a drainage hierarchy. The National Planning Practice Guidance and Building Regulations Approved Document H provide a hierarchy of drainage options that must be considered and discounted in the following order:

- Connection to the public sewer;

- Package sewage treatment plant (which can be offered to the Sewerage Undertaker for adoption);
- Septic tank;
- If none of the above are feasible, a cesspool.

Foul drainage is to collect in the cesspool for periodic emptying and removal by tanker. Frequency as recommended by manufacturer or more frequently, if required. Foul drainage calculations are included in Appendix C.

7 Water quality



A key requirement of any SuDS system is that it protects the receiving water body from the risk of pollution. This can be effectively managed by an appropriate “train” or sequence of SuDS components that are connected in series. The frequent and short duration rainfall events are those that are most loaded with potential contaminants (silts, fines, heavy metals and various organic and inorganic contaminants). Therefore, the first 5-10 mm of rainfall (first flush) should be adequately treated with SuDS.

The minimum number of treatment stages will depend on the sensitivity of the receiving water body and the potential hazard associated with the proposed development SuDS Manual (CIRIA, 2015). The proposed development is a combination of Very Low (roof water) to Low hazard (runoff from car parking and road). The Site does not lie within an SPZ and therefore additional treatment stages are not required.

Table 7. Pollution hazard indices for different land use classifications

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydrocarbons
Residential roofs	Very Low	0.2	0.2	0.05
Other roofs (typically commercial/industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads and non-residential car parking within infrequent change (i.e. less than 300 traffic movements/day)	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (e.g. hospitals, retail), all roads except low traffic roads and trunk roads/motorways	Medium	0.7	0.6	0.7
Sites with heavy pollution (e.g. haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other	High	0.8	0.8	0.9

than domestic fuel oil) are to be delivered, handled, storage, used or manufactured: industrial sites; trunk roads and motorways				
--	--	--	--	--

Table 8. Indicative SuDS mitigation indices for discharges to groundwater

Characteristics of the material overlying the proposed infiltration surface, through which the runoff percolates	TSS	Metals	Hydrocarbons
A layer of dense vegetation underlain by a soil with good contaminant attenuation potential of at least 300 mm in depth	0.6	0.5	0.6
A soil with good contaminant attenuation potential of at least 300 mm in depth	0.4	0.3	0.3
Infiltration trench (where a suitable depth of filtration material is included that provides treatment, i.e. graded gravel with sufficient smaller particles but not single size coarse aggregate such as 20 mm gravel) underlain by a soil with good contaminant attenuation potential of at least 300 mm in depth	0.4	0.4	0.4
Constructed permeable pavement (where a suitable filtration layer is included that provides treatment, and including a geotextile at the base separating the foundation from the subgrade) underlain by a soil with good contaminant attenuation potential of at least 300 mm in depth	0.7	0.6	0.7
Bioretention underlain by a soil with good contaminant attenuation potential of at least 300 mm in depth	0.8	0.8	0.8
Proprietary treatment systems	These must demonstrate that they can address each of the contaminant types to acceptable levels for inflow concentrations relevant to the contributing drainage area		

As indicated within Tables 7 and 8, the proposed permeable paving would provide sufficient mitigation indices to treat the Very Low to Low pollution hazard associated with the Site use.

8 Client checklist



A drainage strategy should now be compiled on the basis of the information provided. Prior to installation of the Site drainage system it is recommended that the client carries out the following checks to confirm the development proposals. GeoSmart would be able to support with any updates required to the drainage scheme, please contact us and we would be happy to provide you with a proposal to undertake the work.

Table 9. Potential SuDS limitations

Conditions in Non-Statutory Technical Standards (Defra, 2015), limitations to infiltration SuDS	Do these conditions arise at the Site?
Is the surface runoff greater than the rate at which water can infiltrate into the ground?	
Is there an unacceptable risk of ground instability?	
Is there an unacceptable risk of mobilising contaminants?	
Is there an unacceptable risk of pollution to groundwater?	
Is there an unacceptable risk of groundwater flooding?	
Is the infiltration system going to create a high risk of groundwater leakage to the combined sewer?	

Table 10. SuDS design considerations

Confirm that potential flooding on-Site in excess of the design storm event and exceedance flow routes have been considered.	
Review options for the control of discharge rates (e.g. hydrobrake).	
Confirm the owners/adopters of the drainage system. Consider management options for multiple owners.	
Is there an unacceptable risk of pollution to groundwater?	
Review access and way leave requirements.	
Review maintenance requirements.	

Health and safety considerations for SuDS

GeoSmart reports may include outline strategies or designs to support with development plans. Any drawings or advice provided do not comprise any form of detailed design. Implementation of any conceptual scheme options may constitute 'Construction Work' as defined by CDM Regulations (2015).

The CDM Regulations place specific Health and Safety duties on those commissioning, planning and undertaking construction works. If you are uncertain what this means you should seek the advice of your architect, builder or other competent professional.

GeoSmart does not provide health and safety advisory services but we are required to advise you of your general responsibilities under CDM (visit <http://geosmartinfo.co.uk/knowledge-hub/cdm-2015/> for more information).

Please remember that detailed design work should be undertaken by a competent professional who might be your engineer, architect, builder or another competent party.

9 Methodology and limitations of study



This report assesses the feasibility of infiltration SuDS and alternative drainage strategies in support of the Site development process. From April 6th 2015 SuDS are regulated by Local Planning Authorities and will be required under law for major developments in all cases unless demonstrated to be inappropriate. What is considered appropriate in terms of costs and benefits by the Planning Authority will vary depending on local planning policy, and Site setting. The Lead Local Flood Authority will require information as a statutory consultee on major planning applications with surface water drainage implications. The National Planning Policy Framework requires that new developments in areas at risk of flooding should give priority to the use of SuDS and demonstrate that the proposed development does not increase flood risk downstream to third parties.

How was the suitability of SuDS estimated for the Site?

There are a range of SuDS options available to provide effective surface water management that intercept and store excess runoff. When considering these options, the destination of the runoff should be assessed using the order of preference outlined in the Building Regulations Part H document (HM Government, 2010) and Defra's National Standards for SuDS (2015):

1. Discharge to the ground;
2. Discharge to a surface water body;
3. Discharge to a surface water sewer;
4. Discharge to a local highway drain; and
5. Discharge to a combined sewer.

Data sets relating to each of the potential discharge options have been analysed to assess the feasibility of each option according to the hierarchy set out above. Hydrogeological characteristics for the Site are assessed in conjunction with the occurrence of SPZ's to assess infiltration suitability. The Site has been screened to determine whether flood risk from groundwater, surface water, fluvial or coastal sources may constrain SuDS. The distance to surface water bodies and sewers has been reviewed gauge whether these provide alternative options.

GeoSmart SuDS Infiltration Suitability Map (SD50)

The GeoSmart SuDS Infiltration Suitability Map (SD50) screens the suitability for infiltration drainage in different parts of the Site and indicates where further assessment is recommended. In producing the SuDS Infiltration Suitability Map (SD50), GeoSmart used data from the British Geological Survey on groundwater levels, geology and permeability to screen

for areas where infiltration SuDS may be suitable. The map classifies areas into 3 categories of High, Medium and Low suitability for infiltration SuDS. This can then be used in conjunction with additional data on Site constraints to give recommendations for SuDS design and further investigation.

The primary constraint on infiltration potential is the minimum permeability of the underlying material and in some cases the range in permeability may be considerable, ranging down to low. The map classifies these areas as moderate infiltration suitability requiring further investigation. In cases where the thickness of the receiving permeable horizon is less than 1.5 meters then additional Site investigation is recommended. If the Site is at risk of groundwater flooding for up to the 1% annual occurrence the map classifies these areas as moderate infiltration suitability requiring further investigation.

The GeoSmart SuDS Infiltration Suitability Map (SD50) is a national screening tool for infiltration SuDS techniques but a Site specific assessment should be used before final detailed design is undertaken. Further information on the GeoSmart SuDS Infiltration Suitability Map (SD50) is available at geosmartinfo.co.uk

How is the suitability to discharge to sewers and watercourses calculated?

The suitability to discharge to discharge to sewers and watercourses has been calculated using the distance from the Site to both. For example, where the Site is within 50 m of a surface water body. Discharge to surface water is potentially appropriate subject to land access arrangements and a feasibility assessment. Where the Site is within 50 m of a sewer, discharge to sewer is potentially appropriate subject to land access arrangements and a feasibility assessment. The utility company should be contacted to agree connection feasibility and sewer capacity.

Further information relating to sewers available in the area can be found in Appendix D.

What is a Source Protection Zone?

The Environment Agency have defined Source Protection Zones (SPZs) for 2000 groundwater sources such as wells, boreholes and springs used for public drinking water supply. These zones show the risk of contamination from any activities that might cause pollution in the area. The closer the activity, the greater the risk. The maps show three main zones (inner, outer and total catchment) and a fourth zone of special interest, which is occasionally applied. The zones are used to set up pollution prevention measures in areas which are at a higher risk. The shape and size of a zone depends on the condition of the ground, how the groundwater is removed, and other environmental factors. Inner zone (Zone 1) is defined as the 50 day travel time from any point below the water table to the source (minimum radius of 50 metres). Outer zone (Zone 2) is defined by a 400 day travel time. Total catchment (Zone 3) is defined as the area around a source within which all groundwater recharge is presumed to be discharged at the source.

How was surface water runoff estimated from the Site?

In accordance with The SuDS Manual (C753) (CIRIA, 2015), the Greenfield runoff from the Site has been calculated using the IoH124 method and is assumed representative of the runoff generated on the undeveloped surfaces that are affected by the proposed development. The method used for calculating the runoff complies with the NPPF (MHCLG, 2023). For the impermeable surfaces, it has been assumed that 100% runoff will occur (calculations provided in Appendix C). Rainfall data is derived from the Flood Estimation Handbook (FEH), developed by NERC (2009). Only areas affected by the proposed development are considered in the flow and volume calculations. Permeable areas that remain unchanged are not included in the calculations as it is assumed these will not be actively drained and attenuated.

What is the peak discharge rate?

An estimation of peak runoff flow rate and volume is required to calculate infiltration, storage and discharge requirements. The peak discharge rate is the maximum flow rate at which surface water runoff leaves the Site during a particular storm event, without considering the impact of any mitigation such as storage, infiltration or flow control. Proposed discharge rates (with mitigation) should be no greater than existing rates for all corresponding storm events. If all drainage is to infiltration there will be no discharge off-Site. Discharging all flow from Site at the existing 1 in 100 event would increase flood risk during smaller events. Flow restriction is generally required to limit the final discharge from Site during all events as a basic minimum to the green field QBAR rate. A more complex flow restriction which varies the final discharge rate from the Site depending on the storm event will reduce the volume of storage required on-Site. Drainage to infiltration SuDS is subtracted from the total discharge off-Site to achieve a beneficial net affect.

What is the total discharge volume?

The total discharge volume is calculated on the basis of the surface water runoff that has the potential to leave the Site as a result of the assumed 6 hour duration design storm event. The runoff is related to the underlying soil conditions, impermeable cover, rainfall intensity and duration of the storm event. The total volume generated by the current Site is compared to the potential total volume from the developed Site (not taking into consideration any mitigation). The difference provides the minimum total volume that will need to be stored and infiltrated on-Site or released at a controlled rate. Guidance indicates that the total discharge volume should never exceed the runoff volume from the development Site prior to redevelopment for that event and should be as close as is reasonably practicable to the Greenfield runoff volume.

10 Background SuDS information



SuDS control surface water runoff close to where it falls. SuDS are designed to replicate, as closely as possible, the natural drainage from the Site before development to ensure that the flood risk downstream does not increase as a result of the Site being developed, and that the Site will have satisfactory drainage under current and likely future climatic conditions. SuDS provide opportunities to reduce the causes and impacts of flooding; remove pollutants from urban runoff at source; and combine water management with green space with benefits for amenity, recreation and wildlife. Government planning policy and planning decisions now include a presumption in favour of SuDS being used for all development Sites, unless they can be shown to be inappropriate.

For general information on SuDS see our website: <http://geosmartinfo.co.uk/>

Infiltration SuDS

Government policy for England is to introduce sustainable drainage systems (SuDS) via conditions in planning approvals. Guidance indicates that capturing rainfall runoff on-Site and infiltrating it into the ground (infiltration SuDS) is the preferred method for managing surface water without increasing flood risk downstream.

The greatest benefit to general flood risk is if all runoff is infiltrated on-Site, however, this may not be feasible due to physical and economic constraints in which case infiltration may be considered as a part of an integrated drainage solution. The final design capacity for an infiltration SuDS system depends on the Site constraints and the requirements of the individual Planning Authority and the Lead Local Flood Authority.

The capacity of the ground to receive infiltration depends on the nature, thickness and permeability of the underlying material and the depth to the high groundwater table. The final proportion of the Site drained by infiltration will depend on topography, outfall levels and a suitable drainage gradient. It is important to note that, even if the whole Site cannot be drained by infiltration, the use of partial infiltration is encouraged, with the remainder of runoff discharged via other SuDS systems.

Types of infiltration SuDS

Infiltration components include infiltration trenches, soakaways, swales and infiltration basins without outlets, rain gardens and permeable pavements. These are used to capture surface water runoff and allow it to infiltrate (soak) and filter through to the subsoil layer, before returning it to the water table below.

An infiltration trench is usually filled with permeable granular material and is designed to promote infiltration of surface water to the ground. An infiltration basin is a dry basin or depression designed to promote infiltration of surface water runoff into the ground. Soakaways are the most common type of infiltration device in the UK where drainage is often connected to over-sized square or rectangular, rubble-filled voids sited beneath lawns.

According to the guidance in Building Research Establishment (BRE) Digest 365 (2016) a soakaway must be able to discharge 50% of the runoff generated during a 1 in 10 year storm event within 24 hours in readiness for subsequent storm flow. This is the basic threshold criteria for a soakaway design and the internal surface area of the proposed soakaway design options should be calculated on this basis by taking into account the soil infiltration rate for the Site.

Developers need to ensure their design takes account of the construction, operation and maintenance requirements of both surface and subsurface components, allowing for any machinery access required.

SuDS maintenance and adoption

Regular maintenance is essential to ensure effective operation of the soakaway(s) over the intended lifespan of the proposed development. A maintenance schedule for SuDs is required. Sewerage undertakers or Local Authorities may adopt SuDS and will require maintenance issues to be dealt with in accordance with their Management Plan. If the SuDS will not be adopted other provision is required with associated financial implications. Maintenance is a long-term obligation requiring the upkeep of all elements of the SuDS, including mechanical components (e.g. pumps), as well as inspections, regular maintenance and repair.

Additional background SuDS information can be found on our website: <http://geosmartinfo.co.uk/>

11 Further information



The following table includes a list of additional products by GeoSmart:

Additional GeoSmart Products			
	Additional assessment: FloodSmart Report		The FloodSmart Report range provides clear and pragmatic advice regarding the nature and potential significance of flood hazards which may be present at a Site. Our consultants assess available data to determine the level of risk based on professional judgement and years of experience. Please contact info@geosmartinfo.co.uk for further information.
	Additional assessment: EnviroSmart Report		Provides a robust desk-based assessment of potential contaminated land issues, taking into account the regulatory perspective. Our EnviroSmart reports are designed to be the most cost effective solution for planning conditions. Each report is individually prepared by a highly experienced consultant conversant with Local Authority requirements. Ideal for pre-planning or for addressing planning conditions for small developments. Can also be used for land transactions. Please contact info@geosmartinfo.co.uk for further information.

12 References and glossary



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Glossary

General terms

Attenuation	Reduction of peak flow and increased duration of a flow event.
Combined sewer	A sewer designed to carry foul sewage and surface water in the same pipe.
Detention basin	A vegetated depression, normally is dry except after storm events, constructed to store water temporarily to attenuate flows. May allow infiltration of water to the ground.
Evapotranspiration	The process by which the Earth's surface or soil loses moisture by evaporation of water and by uptake and then transpiration from plants.
FEH	Flood Estimation Handbook, produced by Centre for Ecology and Hydrology, Wallingford (formerly the Institute of Hydrology).
Filter drain or trench	A linear drain consisting of a trench filled with a permeable material, often with a perforated pipe in the base of the trench to assist drainage, to store and conduct water, but may also be designed to permit infiltration.
First flush	The initial runoff from a site or catchment following the start of a rainfall event. As runoff travels over a catchment it will collect or dissolve pollutants, and the "first flush" portion of the flow may be the most contaminated as a result. This is especially the case for intense storms and in small or more uniform catchments. In larger or more complex catchments pollution.
Flood plain	Land adjacent to a watercourse that would be subject to repeated flooding under natural conditions (see Environment Agency's Policy and practice for the protection of flood plains for a fuller definition).
Greenfield runoff	This is the surface water runoff regime from a site before development, or the existing site conditions for brownfield redevelopment sites.
Impermeable surface	An artificial non-porous surface that generates a surface water runoff after rainfall.
Permeability	A measure of the ease with which a fluid can flow through a porous medium. It depends on the physical properties of the medium, for example grain size, porosity and pore shape.

Runoff	Water flow over the ground surface to the drainage system. This occurs if the ground is impermeable, is saturated or if rainfall is particularly intense.
Sewerage undertaker	This is a collective term relating to the statutory undertaking of water companies that are responsible for sewerage and sewage disposal including surface water from roofs and yards of premises.
Soakaway	A subsurface structure into which surface water is conveyed to allow infiltration into the ground.
Treatment	Improving the quality of water by physical, chemical and/or biological means.

The terms included in this glossary have been taken from CIRIA (2015) guidance.

Data Sources

Aerial Photography	Contains Ordnance Survey data © Crown copyright and database right 2026 BlueSky copyright and database rights 2026
Bedrock & Superficial Geology	Contains British Geological Survey materials © NERC 2026 Ordnance Survey data © Crown copyright and database right 2026
Flood Risk (RoFRS/Pluvial/Surface Water Features/SPZ)	Environment Agency copyright and database rights 2026 Ordnance Survey data © Crown copyright and database right 2026
Flood Risk (Groundwater) and SuDS infiltration suitability (SD50)	GeoSmart, BGS & OS GW5 (v2.4) Map (GeoSmart, 2026) Contains British Geological Survey materials © NERC 2026 Ordnance Survey data © Crown copyright and database right 2026
Sewer Location	Contains Ordnance Survey data © Crown copyright and database right 2026 Contains Thames Water Search data 2024
Topographic Data	OS LiDAR/EA Contains Ordnance Survey data © Crown copyright and database right 2026 Environment Agency copyright and database rights 2026





Site plans



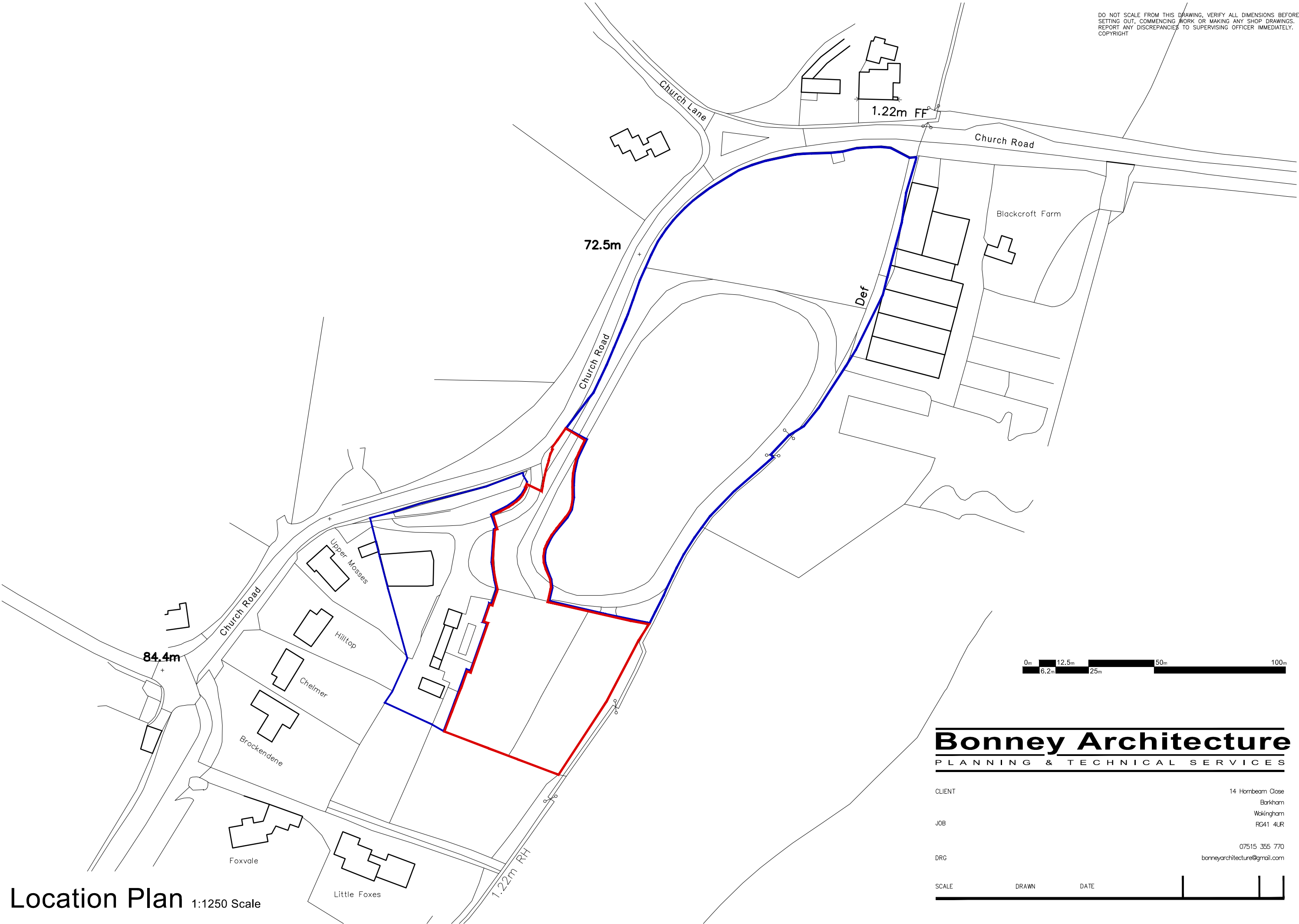
Site Plan 1:200 Scale

Bonney Architecture
PLANNING & TECHNICAL SERVICES

CLIENT 14 Hornbeam Close
Barkham
Wokingham
RG41 4JR
07515 355 770
bonneyarchitecture@gmail.com

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Location Plan 1:1250 Scale

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Site Plan 1:200 Scale



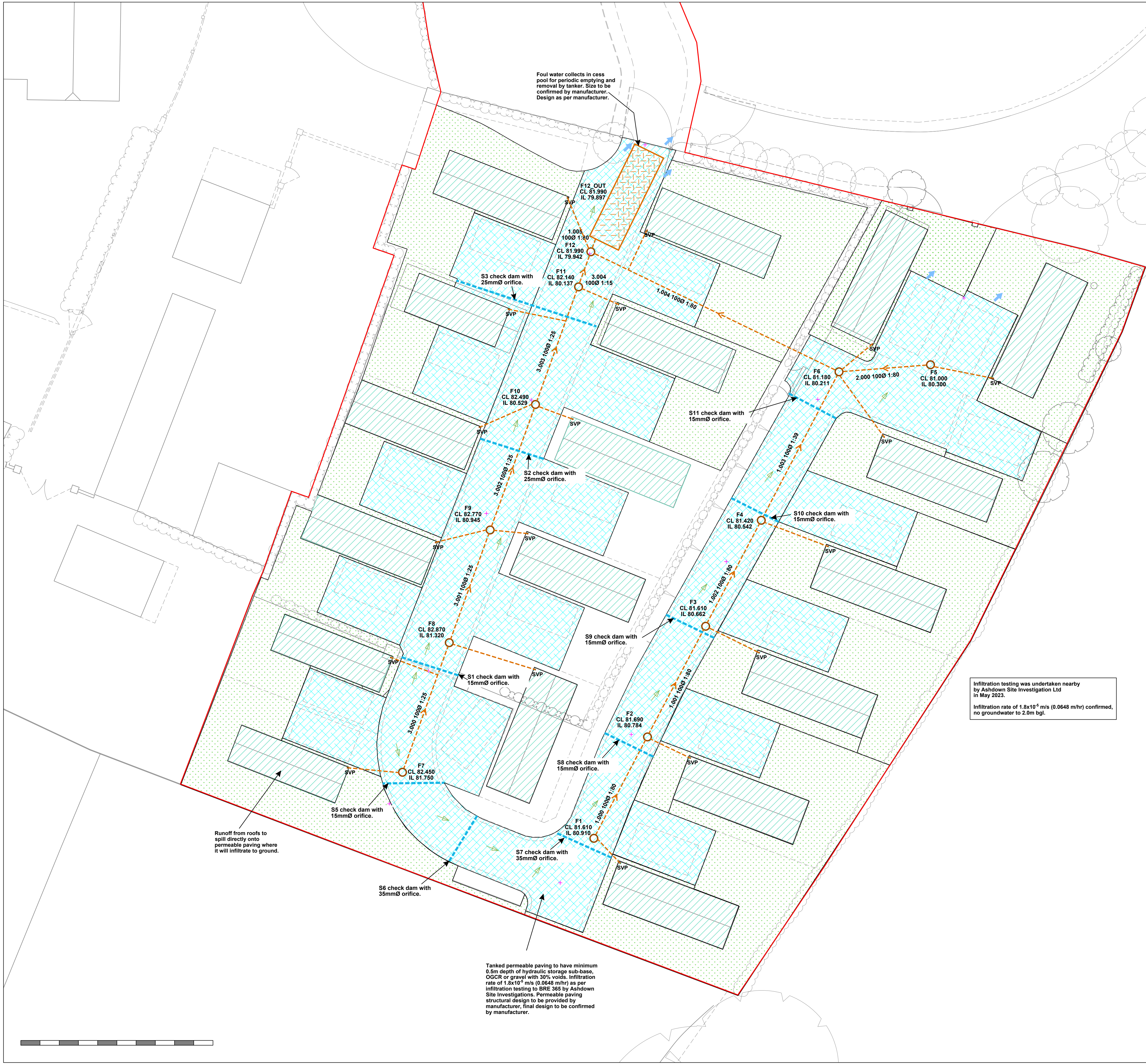
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PLANNING & TECHNICAL SERVICES

CLIENT 14 Harbeam Close
Barkham
Wokingham
RG41 4JR
JOB 07515 355 770
bonneyarchitecture@gmail.com
DRG

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Detailed surface water and foul water drainage layout



Surface Drainage Strategy:

- Drainage strategy consists of permeable paving, which will infiltrate to ground. Check dams are required due to steepness of road.
- Drainage design is based on infiltration rate of 1.8×10^{-5} m/s (0.0648 m/hr) provided by Ashdown Site Investigation Ltd.

Foul Drainage Strategy:

- Foul drainage is to collect in the cesspool for periodic emptying and removal by tanker. Frequency as recommended by manufacturer or more frequently, if required.

Legend:

- Building roof
620m²
- Permeable paving
1204m²
- Landscaped areas
1060m²
- Foul cess pool
- Soil vent pipe
SVP
- Foul drain
- Surface manhole with:
F1
CL 82.300
IL 82.100
Reference number
Cover level
Invert level
- Assumed falls
- Overland flow routes
- Assumed spot levels

Notes:



Causeway Flow surface water and foul drainage calculations

Design Settings

Frequency of use (kDU)	0.50	Minimum Velocity (m/s)	0.75
Flow per dwelling per day (l/day)	4000	Connection Type	Level Soffits
Domestic Flow (l/s/ha)	0.0	Minimum Backdrop Height (m)	0.200
Industrial Flow (l/s/ha)	0.0	Preferred Cover Depth (m)	0.600
Additional Flow (%)	0	Include Intermediate Ground	✓

Nodes

Name	Dwellings	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
1	1	81.610	600	475841.806	164220.412	0.700	80.910
2	1	81.690	600	475846.506	164229.365	0.906	80.784
3	1	81.610	600	475851.052	164238.003	0.948	80.662
4	1	81.420	600	475855.534	164246.503	0.878	80.542
5	2	81.000	600	475868.614	164258.400	0.700	80.300
6	1	81.180	600	475861.476	164257.847	0.969	80.211
7	1	82.450	600	475827.399	164226.591	0.700	81.750
8	2	82.870	600	475831.055	164236.693	1.550	81.320
9	2	82.770	600	475834.251	164245.518	1.825	80.945
10	2	82.490	600	475837.792	164255.298	1.961	80.529
11	2	82.140	600	475841.115	164264.505	2.003	80.137
12	2	81.990	600	475842.100	164267.220	2.048	79.942
12_OUT		81.990	600	475843.354	164270.623	2.093	79.897

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)
1.000	1	2	10.112	1.500	80.910	80.784	0.126	80.0	100
1.001	2	3	9.761	1.500	80.784	80.662	0.122	80.0	100
1.002	3	4	9.609	1.500	80.662	80.542	0.120	80.0	100
1.003	4	6	12.806	1.500	80.542	80.211	0.331	38.7	100
2.000	5	6	7.159	1.500	80.300	80.211	0.089	80.0	100
1.004	6	12	21.524	1.500	80.211	79.942	0.269	80.0	100
3.000	7	8	10.743	1.500	81.750	81.320	0.430	25.0	100
3.001	8	9	9.386	1.500	81.320	80.945	0.375	25.0	100
3.002	9	10	10.401	1.500	80.945	80.529	0.416	25.0	100
3.003	10	11	9.788	1.500	80.529	80.137	0.392	25.0	100
3.004	11	12	2.888	1.500	80.137	79.942	0.195	14.8	100

Name	Pro Vel @ 1/3 Q (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Dwellings (ha)	Σ Units (ha)	Σ Add Inflow (ha)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	0.146	0.744	5.8	0.0	0.600	0.806	0.000		1	0.0	7	0.206
1.001	0.187	0.744	5.8	0.1	0.806	0.848	0.000		2	0.0	9	0.258
1.002	0.206	0.744	5.8	0.1	0.848	0.778	0.000		3	0.0	11	0.304
1.003	0.298	1.072	8.4	0.2	0.778	0.869	0.000		4	0.0	11	0.418
2.000	0.187	0.744	5.8	0.1	0.600	0.869	0.000		2	0.0	9	0.258
1.004	0.274	0.744	5.8	0.3	0.869	1.948	0.000		7	0.0	16	0.386
3.000	0.226	1.335	10.5	0.0	0.600	1.450	0.000		1	0.0	5	0.303
3.001	0.303	1.335	10.5	0.1	1.450	1.725	0.000		3	0.0	8	0.435
3.002	0.372	1.335	10.5	0.2	1.725	1.861	0.000		5	0.0	11	0.521
3.003	0.404	1.335	10.5	0.3	1.861	1.903	0.000		7	0.0	12	0.574
3.004	0.527	1.736	13.6	0.4	1.903	1.948	0.000		9	0.0	12	0.748

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)
1.005	12	12_OUT	3.627	1.500	79.942	79.897	0.045	80.0	100

Name	Pro Vel @ 1/3 Q (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Dwellings (ha)	Σ Units (ha)	Σ Add Inflow (ha)	Pro Depth (mm)	Pro Velocity (m/s)
1.005	0.373	0.744	5.8	0.8	1.948	1.993	0.000	18	0.0	0.0	25	0.518

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	0.750	Preferred Cover Depth (m)	0.600
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
1	0.021	5.00	82.830	600	475829.838	164234.563	0.750	82.080
2	0.020	5.00	82.660	600	475835.406	164250.612	0.750	81.910
3	0.020	5.00	82.310	600	475838.821	164260.523	0.924	81.386
4	0.020		81.450	600	475843.298	164273.385	0.609	80.841
5	0.021	5.00	82.450	600	475827.780	164225.940	0.750	81.700
6	0.003	5.00	82.040	600	475831.840	164221.000	0.660	81.380
7	0.008	5.00	81.610	600	475840.050	164218.700	0.656	80.954
8	0.008	5.00	81.690	600	475845.080	164228.300	0.808	80.882
9	0.012	5.00	81.610	600	475849.960	164237.840	0.799	80.811
10	0.012	5.00	81.420	600	475854.980	164247.300	0.716	80.704
11	0.012	5.00	81.230	600	475859.160	164255.400	0.708	80.522
12	0.024		80.910	600	475870.760	164262.820	0.663	80.247

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	1	2	16.987	0.600	82.080	81.910	0.170	99.9	150	5.28	50.0
1.001	2	3	10.483	0.600	81.910	81.386	0.524	20.0	150	5.36	50.0
1.002	3	4	13.619	0.600	81.386	80.841	0.545	25.0	150	5.47	50.0
2.000	5	6	6.394	0.600	81.700	81.380	0.320	20.0	150	5.05	50.0
2.001	6	7	8.526	0.600	81.380	80.954	0.426	20.0	150	5.11	50.0
2.002	7	8	10.838	0.600	80.954	80.882	0.072	150.0	150	5.33	50.0
2.003	8	9	10.716	0.600	80.882	80.811	0.071	150.0	150	5.55	50.0
2.004	9	10	10.709	0.600	80.811	80.704	0.107	100.0	150	5.73	50.0
2.005	10	11	9.115	0.600	80.704	80.522	0.182	50.0	150	5.83	50.0
2.006	11	12	13.770	0.600	80.522	80.247	0.275	50.0	150	5.99	49.8

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.005	17.8	2.8	0.600	0.600	0.021	0.0	41	0.740
1.001	2.262	40.0	5.6	0.600	0.774	0.041	0.0	38	1.600
1.002	2.022	35.7	8.3	0.774	0.459	0.061	0.0	49	1.648
2.000	2.262	40.0	2.8	0.600	0.510	0.021	0.0	27	1.320
2.001	2.262	40.0	3.3	0.510	0.506	0.024	0.0	29	1.370
2.002	0.818	14.5	4.3	0.506	0.658	0.032	0.0	57	0.717
2.003	0.818	14.5	5.4	0.658	0.649	0.040	0.0	64	0.760
2.004	1.005	17.8	7.0	0.649	0.566	0.052	0.0	66	0.949
2.005	1.426	25.2	8.7	0.566	0.558	0.064	0.0	61	1.296
2.006	1.426	25.2	10.3	0.558	0.513	0.076	0.0	67	1.353

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	✓	Check Discharge Rate(s)	x
Summer CV	0.750	Drain Down Time (mins)	240	Check Discharge Volume	x
Winter CV	0.840	Additional Storage (m³/ha)	20.0		

Storm Durations

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

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

Node 1 Online Orifice Control

Flap Valve	x	Invert Level (m)	82.080	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.015		

Node 2 Online Orifice Control

Flap Valve	x	Invert Level (m)	81.910	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.025		

Node 3 Online Orifice Control

Flap Valve	x	Invert Level (m)	81.386	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.025		

Node 5 Online Orifice Control

Flap Valve	x	Invert Level (m)	81.700	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.015		

Node 6 Online Orifice Control

Flap Valve	x	Invert Level (m)	81.380	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.035		

Node 7 Online Orifice Control

Flap Valve	x	Invert Level (m)	80.954	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.035		

Node 8 Online Orifice Control

Flap Valve	x	Invert Level (m)	80.882	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.015		

Node 9 Online Orifice Control

Flap Valve	x	Invert Level (m)	80.811	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.015		

Node 10 Online Orifice Control

Flap Valve	x	Invert Level (m)	80.704	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.015		

Node 11 Online Orifice Control

Flap Valve	x	Invert Level (m)	80.522	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.015		

Node 1 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.06480	Invert Level (m)	82.180	Slope (1:X)	100.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.500
Safety Factor	2.0	Width (m)	12.000	Inf Depth (m)	
Porosity	0.30	Length (m)	16.000		

Node 2 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.06480	Invert Level (m)	82.010	Slope (1:X)	20.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	59	Depth (m)	0.500
Safety Factor	2.0	Width (m)	12.000	Inf Depth (m)	
Porosity	0.30	Length (m)	16.000		

Node 3 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.06480	Invert Level (m)	81.660	Slope (1:X)	20.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	84	Depth (m)	0.500
Safety Factor	2.0	Width (m)	12.000	Inf Depth (m)	
Porosity	0.30	Length (m)	16.000		

Node 4 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.06480	Invert Level (m)	80.800	Slope (1:X)	25.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	76	Depth (m)	0.500
Safety Factor	2.0	Width (m)	12.000	Inf Depth (m)	
Porosity	0.30	Length (m)	16.000		

Node 5 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.06480	Invert Level (m)	81.700	Slope (1:X)	20.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	51	Depth (m)	0.500
Safety Factor	2.0	Width (m)	15.000	Inf Depth (m)	
Porosity	0.30	Length (m)	9.000		

Node 6 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.06480	Invert Level (m)	81.390	Slope (1:X)	20.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.500
Safety Factor	2.0	Width (m)	4.000	Inf Depth (m)	
Porosity	0.30	Length (m)	5.000		

Node 7 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.06480	Invert Level (m)	80.960	Slope (1:X)	20.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	123	Depth (m)	0.500
Safety Factor	2.0	Width (m)	4.000	Inf Depth (m)	
Porosity	0.30	Length (m)	8.000		

Node 8 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.06480	Invert Level (m)	81.040	Slope (1:X)	150.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	86	Depth (m)	0.500
Safety Factor	2.0	Width (m)	4.000	Inf Depth (m)	
Porosity	0.30	Length (m)	15.000		

Node 9 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.06480	Invert Level (m)	80.960	Slope (1:X)	150.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	51	Depth (m)	0.500
Safety Factor	2.0	Width (m)	4.000	Inf Depth (m)	
Porosity	0.30	Length (m)	15.000		

Node 10 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.06480	Invert Level (m)	80.770	Slope (1:X)	100.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	70	Depth (m)	0.500
Safety Factor	2.0	Width (m)	4.000	Inf Depth (m)	
Porosity	0.30	Length (m)	15.000		

Node 11 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.06480	Invert Level (m)	80.580	Slope (1:X)	50.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	83	Depth (m)	0.500
Safety Factor	2.0	Width (m)	4.000	Inf Depth (m)	
Porosity	0.30	Length (m)	15.000		

Node 12 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.06480	Invert Level (m)	80.260	Slope (1:X)	50.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	94	Depth (m)	0.500
Safety Factor	2.0	Width (m)	9.000	Inf Depth (m)	
Porosity	0.30	Length (m)	11.000		

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.77%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	1	24	82.244	0.164	2.2	0.8738	0.0000	SURCHARGED
30 minute winter	2	24	82.148	0.238	2.1	0.6330	0.0000	SURCHARGED
30 minute winter	3	25	81.816	0.430	2.7	0.8708	0.0000	SURCHARGED
240 minute winter	4	188	81.107	0.266	1.4	3.5967	0.0000	OK
30 minute winter	5	26	81.845	0.145	2.2	1.0750	0.0000	OK
15 minute winter	6	12	81.427	0.047	0.6	0.0380	0.0000	OK
120 minute summer	7	74	81.125	0.171	0.8	0.4316	0.0000	SURCHARGED
180 minute winter	8	120	81.107	0.225	0.6	0.5143	0.0000	SURCHARGED
120 minute winter	9	78	81.021	0.210	0.7	0.4623	0.0000	SURCHARGED
120 minute winter	10	80	80.863	0.159	0.8	0.6225	0.0000	SURCHARGED
120 minute winter	11	82	80.721	0.199	0.8	0.7289	0.0000	SURCHARGED
180 minute winter	12	124	80.416	0.169	1.1	1.8295	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
30 minute winter	1	1.000	2	0.3	0.062	0.017	0.2154
30 minute winter	1	Infiltration		0.7			
30 minute winter	2	1.001	3	0.6	0.090	0.015	0.0962
30 minute winter	2	Infiltration		0.3			
30 minute winter	3	1.002	4	0.8	0.579	0.024	0.1267
30 minute winter	3	Infiltration		0.3			
240 minute winter	4	Infiltration		0.8			
30 minute winter	5	2.000	6	0.2	0.339	0.004	0.0143
30 minute winter	5	Infiltration		0.4			
15 minute winter	6	2.001	7	0.4	0.098	0.011	0.0774
15 minute winter	6	Infiltration		0.0			
120 minute summer	7	2.002	8	0.4	0.071	0.027	0.1907
120 minute summer	7	Infiltration		0.1			
180 minute winter	8	2.003	9	0.2	0.038	0.011	0.1826
180 minute winter	8	Infiltration		0.4			
120 minute winter	9	2.004	10	0.2	0.048	0.011	0.1232
120 minute winter	9	Infiltration		0.3			
120 minute winter	10	2.005	11	0.2	0.054	0.008	0.0851
120 minute winter	10	Infiltration		0.3			
120 minute winter	11	2.006	12	0.2	0.053	0.008	0.1245
120 minute winter	11	Infiltration		0.3			
180 minute winter	12	Infiltration		0.6			

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.62%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	1	46	82.313	0.233	4.3	3.3716	0.0000	SURCHARGED
30 minute winter	2	26	82.331	0.421	6.1	2.6883	0.0000	SURCHARGED
60 minute winter	3	47	82.020	0.634	4.7	3.3980	0.0000	FLOOD RISK
240 minute winter	4	196	81.250	0.409	2.4	7.5411	0.0000	OK
60 minute winter	5	49	81.989	0.289	4.3	4.0224	0.0000	SURCHARGED
15 minute winter	6	13	81.492	0.112	1.4	0.1748	0.0000	OK
60 minute winter	7	46	81.289	0.335	2.2	1.4970	0.0000	SURCHARGED
120 minute winter	8	104	81.206	0.324	1.7	2.2469	0.0000	SURCHARGED
60 minute winter	9	48	81.109	0.298	2.4	1.9523	0.0000	SURCHARGED
60 minute winter	10	49	80.956	0.252	2.5	2.1548	0.0000	SURCHARGED
60 minute winter	11	48	80.837	0.315	2.5	2.1996	0.0000	SURCHARGED
120 minute winter	12	98	80.545	0.298	3.2	5.5043	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
60 minute winter	1	1.000	2	0.3	0.069	0.015	0.2991
60 minute winter	1	Infiltration		1.4			
30 minute winter	2	1.001	3	0.8	0.076	0.020	0.1589
30 minute winter	2	Infiltration		0.7			
60 minute winter	3	1.002	4	1.0	0.574	0.029	0.1277
60 minute winter	3	Infiltration		0.8			
240 minute winter	4	Infiltration		1.2			
60 minute winter	5	2.000	6	0.2	0.328	0.006	0.0347
60 minute winter	5	Infiltration		0.8			
15 minute winter	6	2.001	7	0.8	0.082	0.020	0.0788
15 minute winter	6	Infiltration		0.1			
60 minute winter	7	2.002	8	0.8	0.063	0.054	0.1908
60 minute winter	7	Infiltration		0.2			
120 minute winter	8	2.003	9	0.2	0.028	0.014	0.1887
120 minute winter	8	Infiltration		0.5			
60 minute winter	9	2.004	10	0.2	0.036	0.012	0.1875
60 minute winter	9	Infiltration		0.5			
60 minute winter	10	2.005	11	0.2	0.044	0.008	0.1557
60 minute winter	10	Infiltration		0.5			
60 minute winter	11	2.006	12	0.3	0.049	0.011	0.1307
60 minute winter	11	Infiltration		0.5			
120 minute winter	12	Infiltration		0.9			

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.84%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	1	47	82.338	0.258	5.6	4.7349	0.0000	SURCHARGED
60 minute winter	2	46	82.399	0.489	5.3	3.8423	0.0000	FLOOD RISK
60 minute winter	3	48	82.090	0.704	5.9	4.6886	0.0000	FLOOD RISK
240 minute winter	4	196	81.298	0.457	2.9	9.1671	0.0000	OK
60 minute winter	5	49	82.039	0.339	5.6	5.4894	0.0000	SURCHARGED
15 minute winter	6	14	81.517	0.137	1.7	0.2558	0.0000	OK
60 minute winter	7	48	81.353	0.399	2.8	2.0881	0.0000	FLOOD RISK
120 minute winter	8	110	81.257	0.375	2.0	3.1835	0.0000	SURCHARGED
60 minute winter	9	52	81.155	0.344	3.2	2.8109	0.0000	SURCHARGED
60 minute winter	10	57	81.003	0.299	3.3	3.0444	0.0000	SURCHARGED
60 minute winter	11	51	80.884	0.362	3.2	3.0050	0.0000	SURCHARGED
120 minute winter	12	112	80.610	0.363	4.1	7.5013	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
60 minute winter	1	1.000	2	-0.3	0.071	-0.016	0.2991
60 minute winter	1	Infiltration		1.7			
60 minute winter	2	1.001	3	0.8	0.080	0.019	0.1846
60 minute winter	2	Infiltration		0.8			
60 minute winter	3	1.002	4	1.1	0.594	0.030	0.1280
60 minute winter	3	Infiltration		0.9			
240 minute winter	4	Infiltration		1.3			
60 minute winter	5	2.000	6	0.3	0.198	0.007	0.0465
60 minute winter	5	Infiltration		0.9			
15 minute winter	6	2.001	7	0.9	0.092	0.022	0.0791
15 minute winter	6	Infiltration		0.1			
60 minute winter	7	2.002	8	0.9	0.066	0.059	0.1908
60 minute winter	7	Infiltration		0.3			
120 minute winter	8	2.003	9	0.2	0.031	0.014	0.1887
120 minute winter	8	Infiltration		0.5			
60 minute winter	9	2.004	10	0.2	0.036	0.012	0.1885
60 minute winter	9	Infiltration		0.5			
60 minute winter	10	2.005	11	0.2	0.037	0.008	0.1605
60 minute winter	10	Infiltration		0.5			
60 minute winter	11	2.006	12	0.3	0.045	0.011	0.1870
60 minute winter	11	Infiltration		0.5			
120 minute winter	12	Infiltration		0.9			

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.87%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	1	50	82.383	0.303	7.9	7.3702	0.0000	SURCHARGED
60 minute winter	2	48	82.504	0.594	7.4	6.0037	0.0000	FLOOD RISK
60 minute winter	3	50	82.191	0.805	7.9	6.9630	0.0000	FLOOD RISK
240 minute winter	4	192	81.381	0.540	3.6	12.4056	0.0000	OK
60 minute winter	5	53	82.114	0.414	7.8	8.0995	0.0000	SURCHARGED
15 minute winter	6	14	81.561	0.181	2.3	0.4287	0.0000	SURCHARGED
60 minute winter	7	50	81.447	0.493	3.9	3.0341	0.0000	FLOOD RISK
120 minute winter	8	120	81.355	0.473	2.6	5.0110	0.0000	SURCHARGED
60 minute winter	9	59	81.241	0.430	4.4	4.4151	0.0000	SURCHARGED
60 minute winter	10	60	81.093	0.389	4.4	4.7059	0.0000	SURCHARGED
60 minute winter	11	59	80.969	0.447	4.4	4.5980	0.0000	FLOOD RISK
120 minute winter	12	118	80.741	0.494	5.6	11.5241	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
60 minute winter	1	1.000	2	-0.4	0.081	-0.023	0.2991
60 minute winter	1	Infiltration		1.7			
60 minute winter	2	1.001	3	0.8	0.073	0.019	0.1846
60 minute winter	2	Infiltration		1.1			
60 minute winter	3	1.002	4	1.2	0.578	0.032	0.1284
60 minute winter	3	Infiltration		1.1			
240 minute winter	4	Infiltration		1.6			
60 minute winter	5	2.000	6	0.3	0.200	0.007	0.0577
60 minute winter	5	Infiltration		1.1			
15 minute winter	6	2.001	7	1.0	0.093	0.026	0.0796
15 minute winter	6	Infiltration		0.1			
60 minute winter	7	2.002	8	0.9	0.068	0.065	0.1908
60 minute winter	7	Infiltration		0.3			
120 minute winter	8	2.003	9	0.2	0.027	0.015	0.1887
120 minute winter	8	Infiltration		0.5			
60 minute winter	9	2.004	10	0.2	0.035	0.012	0.1885
60 minute winter	9	Infiltration		0.5			
60 minute winter	10	2.005	11	0.2	0.034	0.008	0.1605
60 minute winter	10	Infiltration		0.5			
60 minute winter	11	2.006	12	0.3	0.042	0.010	0.2424
60 minute winter	11	Infiltration		0.5			
120 minute winter	12	Infiltration		0.9			



Thames Water Asset Location Plan

GeoSmart Information Ltd
1st Floor Old Bank Buildings
Suite 9-11 Bellstone
SHREWSBURY
SY1 1HU

Search address supplied

Fairlands
Church Road
Farley Hill
Reading
RG7 1TU

Your reference81444

Our referenceALS/ALS Standard/2024_4957257

Search date7 March 2024

Notification of Price Changes



Search address supplied: Fairlands, Church Road, Farley Hill, Reading, RG7 1TU

Dear Sir / Madam

An Asset Location Search is recommended when undertaking a site development. It is essential to obtain information on the size and location of clean water and sewerage assets to safeguard against expensive damage and allow cost-effective service design.

The following records were searched in compiling this report: - the map of public sewers & the map of waterworks. Thames Water Utilities Ltd (TWUL) holds all of these.

This search provides maps showing the position, size of Thames Water assets close to the proposed development and also manhole cover and invert levels, where available.

Please note that none of the charges made for this report relate to the provision of Ordnance Survey mapping information. The replies contained in this letter are given following inspection of the public service records available to this company. No responsibility can be accepted for any error or omission in the replies.

You should be aware that the information contained on these plans is current only on the day that the plans are issued. The plans should only be used for the duration of the work that is being carried out at the present time. Under no circumstances should this data be copied or transmitted to parties other than those for whom the current work is being carried out.

Thames Water do update these service plans on a regular basis and failure to observe the above conditions could lead to damage arising to new or diverted services at a later date.

Contact Us

If you have any further queries regarding this enquiry please feel free to contact a member of the team on 0800 009 4540, or use the address below:

Thames Water Utilities Ltd
Property Searches
PO Box 3189
Slough
SL1 4WW

Email: searches@thameswater.co.uk

Web: www.thameswater-propertysearches.co.uk

Waste Water Services

Please provide a copy extract from the public sewer map.

Enclosed is a map showing the approximate lines of our sewers. Our plans do not show sewer connections from individual properties or any sewers not owned by Thames Water unless specifically annotated otherwise. Records such as "private" pipework are in some cases available from the Building Control Department of the relevant Local Authority.

Where the Local Authority does not hold such plans it might be advisable to consult the property deeds for the site or contact neighbouring landowners.

This report relates only to sewerage apparatus of Thames Water Utilities Ltd, it does not disclose details of cables and or communications equipment that may be running through or around such apparatus.

The sewer level information contained in this response represents all of the level data available in our existing records. Should you require any further Information, please refer to the relevant section within the 'Further Contacts' page found later in this document.

For your guidance:

- The Company is not generally responsible for rivers, watercourses, ponds, culverts or highway drains. If any of these are shown on the copy extract they are shown for information only.
- Any private sewers or lateral drains which are indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an 'as constructed' record. It is recommended these details be checked with the developer.

Clean Water Services

Please provide a copy extract from the public water main map.

Enclosed is a map showing the approximate positions of our water mains and associated apparatus. Please note that records are not kept of the positions of individual domestic supplies.

For your information, there will be a pressure of at least 10m head at the outside stop valve. If you would like to know the static pressure, please contact our Customer Centre on 0800 316 9800. The Customer Centre can also arrange for a full flow and pressure test to be carried out for a fee.



For your guidance:

- Assets other than vested water mains may be shown on the plan, for information only.
- If an extract of the public water main record is enclosed, this will show known public water mains in the vicinity of the property. It should be possible to estimate the likely length and route of any private water supply pipe connecting the property to the public water network.

Payment for this Search

A charge will be added to your suppliers account.

Further contacts:

Waste Water queries

Should you require verification of the invert levels of public sewers, by site measurement, you will need to approach the relevant Thames Water Area Network Office for permission to lift the appropriate covers. This permission will usually involve you completing a TWOSA form. For further information please contact our Customer Centre on Tel: 0845 920 0800. Alternatively, a survey can be arranged, for a fee, through our Customer Centre on the above number.

If you have any questions regarding sewer connections, budget estimates, diversions, building over issues or any other questions regarding operational issues please direct them to our service desk. Which can be contacted by writing to:

Developer Services (Waste Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

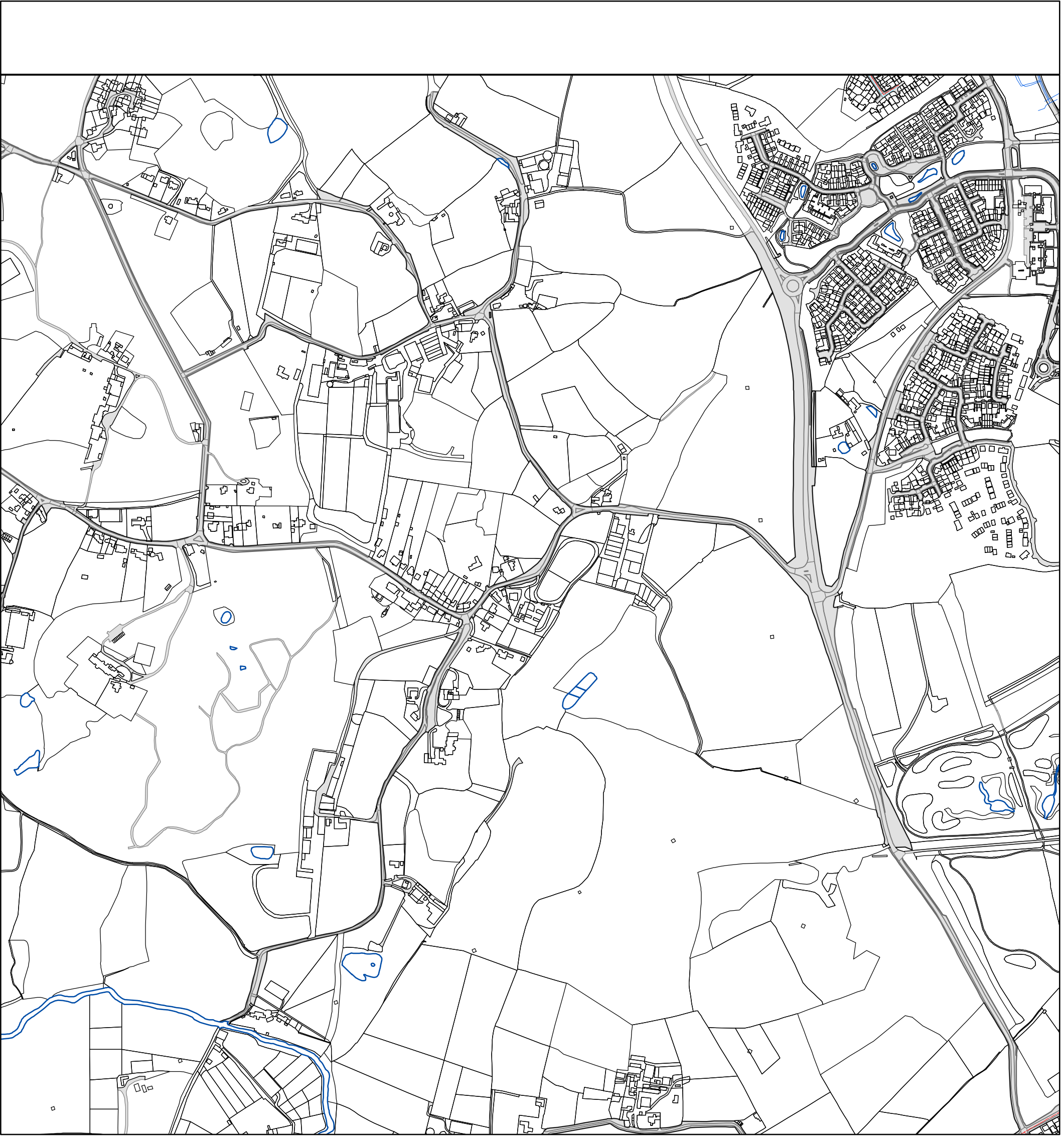
Clean Water queries

Should you require any advice concerning clean water operational issues or clean water connections, please contact:

Developer Services (Clean Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk





ALS/ALS Standard/2024_4957257

NB: Level quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates no Survey information is available.

REFERENCE	COVER LEVEL	INVERT LEVEL
4205	61.77	59.34
5201	61.3	58.92
7201	50.36	47.02

REFERENCE	COVER LEVEL	INVERT LEVEL
4201	61.75	58.69
5203	61.35	59.46



Asset Location Search - Sewer Key

Public Sewer Types (Operated and maintained by Thames Water)

	Foul Sewer: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.
	Surface Water Sewer: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.
	Combined Sewer: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.
	Storm Sewer
	Sludge Sewer
	Foul Trunk Sewer
	Surface Trunk Sewer
	Combined Trunk Sewer
	Foul Rising Main
	Surface Water Rising Main
	Combined Rising Main
	Vacuum
	Thames Water Proposed
	Vent Pipe
	Gallery

Other Sewer Types (Not operated and maintained by Thames Water)

	Sewer
	Culverted Watercourse
	Proposed
	Decommissioned Sewer
	Content of this drainage network is currently unknown
	Ownership of this drainage network is currently unknown

Notes:

- 1) All levels associated with the plans are to Ordnance Datum Newlyn.
- 2) All measurements on the plan are metric.
- 3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate the direction of flow.
- 4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.

Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

	Air Valve
	Meter
	Dam Chase
	Vent
	Fitting

Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

	Ancillary
	Drop Pipe
	Control Valve
	Well

End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol. Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

	Inlet
	Outfall
	Undefined End

Other Symbols

Symbols used on maps which do not fall under other general categories.

	Change of Characteristic Indicator
	Public / Private Pumping Station
	Invert Level
	Summit

Areas

Lines denoting areas of underground surveys, etc.

	Agreement
	Chamber
	Operational Site

Ducts or Crossings

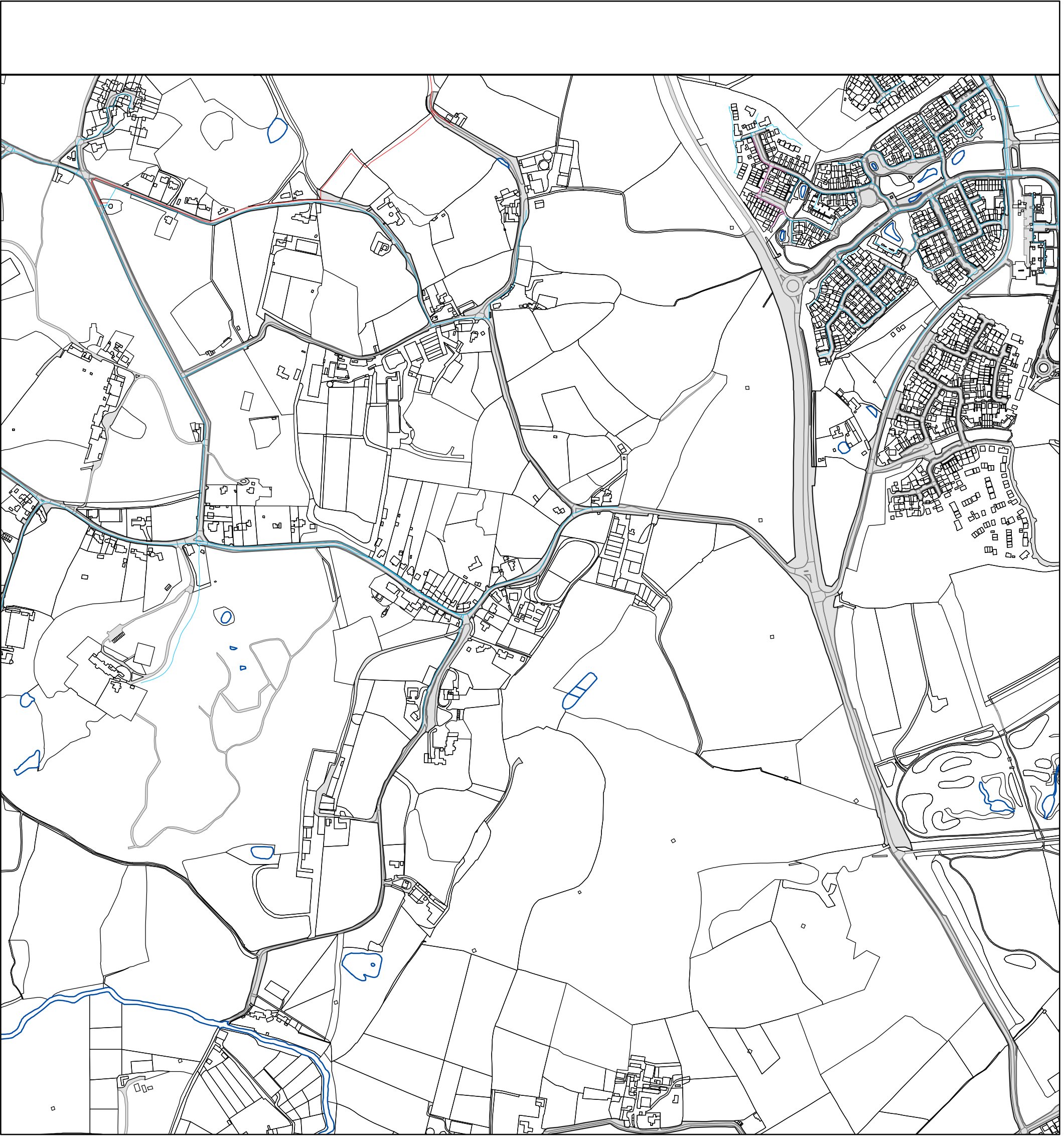
	Cassment
	Conduit Bridge
	Subway
	Tunnel

Ducts may contain high voltage cables. Please check with Thames Water.

5) 'na' or '0' on a manhole indicates that data is unavailable.

6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in millimeters. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology, please contact Property Searches on 0800 009 4540.







Asset Location Search - Water Key

Water Pipes (Operated & Maintained by Thames Water)

-  **Distribution Main:** The most common pipe shown on water maps. With few exceptions, domestic connections are only made to distribution mains.
-  **Trunk Main:** A main carrying water from a source of supply to a treatment plant or reservoir, or from one treatment plant or reservoir to another. Also a main transferring water in bulk to smaller water mains used for supplying individual customers.
-  **Supply Main:** A supply main indicates that the water main is used as a supply for a single property or group of properties.
-  **Fire Main:** Where a pipe is used as a fire supply, the word FIRE will be displayed along the pipe.
-  **Metered Pipe:** A metered main indicates that the pipe in question supplies water for a single property or group of properties and that quantity of water passing through the pipe is metered even though there may be no meter symbol shown.
-  **Transmission Tunnel:** A very large diameter water pipe. Most tunnels are buried very deep underground. These pipes are not expected to affect the structural integrity of buildings shown on the map provided.
-  **Proposed Main:** A main that is still in the planning stages or in the process of being laid. More details of the proposed main and its reference number are generally included near the main.

PIPE DIAMETER	DEPTH BELOW GROUND
Up to 300mm (12")	300mm (3')
300mm - 600mm (12" - 24")	1100mm (3' 6")
600mm and bigger (24" and over)	1000mm (8')

Valves

-  General Purpose Valve
-  Air Valve
-  Pressure Control Valve
-  Customer Valve

Hydrants

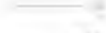
-  Single Hydrant

Meters

-  Meter

End Items

Symbol indicating what happens at the end of a water main.

-  Blank Flange
-  Capped End
-  Emptying Pit
-  Undefined End
-  Manifold
-  Customer Supply
-  Fire Supply

Operational Sites

-  Booster Station
-  Other
-  Other (Proposed)
-  Pumping Station
-  Service Reservoir
-  Shaft Inspection
-  Treatment Works
-  Unknown
-  Water Tower

Other Symbols

-  Data Logger
-  **Casement:** Ducts may contain high voltage cables. Please check with Thames Water.

Other Water Pipes (Not Operated or Maintained by Thames Water)

-  **Other Water Company Main:** Occasionally other water company water pipes may overlap the border of our clean water coverage area. These mains are denoted in purple and in most cases have the owner of the pipe displayed along them.
-  **Private Main:** Indicates that the water main in question is not owned by Thames Water. These mains normally have text associated with them indicating the diameter and owner of the pipe.

Payment Terms and Conditions

All sales are made in accordance with Thames Water Utilities Limited (TWUL) standard terms and conditions unless previously agreed in writing.

1. All goods remain in the property of Thames Water Utilities Ltd until full payment is received.
2. Provision of service will be in accordance with all legal requirements and published TWUL policies.
3. All invoices are strictly due for payment within 14 days of the date of the invoice. Any other terms must be accepted/agreed in writing prior to provision of goods or service or will be held to be invalid.
4. Penalty interest may be invoked by TWUL in the event of unjustifiable payment delay. Interest charges will be in line with UK Statute Law 'The Late Payment of Commercial Debts (Interest) Act 1998'.
5. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
6. A charge may be made at the discretion of the company for increased administration costs.

A copy of Thames Water's standard terms and conditions are available from the Commercial Billing Team (cashoperations@thameswater.co.uk).

We publish several Codes of Practice including a guaranteed standards scheme. You can obtain copies of these leaflets by calling us on 0800 316 9800.

If you are unhappy with our service, you can speak to your original goods or customer service provider. If you are still not satisfied with the outcome provided, we will refer the matter to a Senior Manager for resolution who will provide you with a response.

If you are still dissatisfied with our final response, and in certain circumstances such as you are buying a residential property or commercial property within certain parameters, The Property Ombudsman will investigate your case and give an independent view. The Ombudsman can award compensation of up to £25,000 to you if he finds that you have suffered actual financial loss and/or aggravation, distress, or inconvenience because of your search not keeping to the Code. Further information can be obtained by visiting www.tpos.co.uk or by sending an email to admin@tpos.co.uk.

If the Goods or Services covered by this invoice falls under the regulation of the 1991 Water Industry Act, and you remain dissatisfied you can refer your complaint to Consumer Council for Water on 0300 034 2222 or write to them at Consumer Council for Water, 1st Floor, Victoria Square House, Victoria Square, Birmingham, B2 4AJ.

Ways to pay your bill

Credit Card	BACS Payment	Telephone Banking
Please Call 0800 009 4540 quoting your invoice number starting CBA or ADS	Account number 90478703 Sort code 60-00-01 A remittance advice must be sent to: Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW. or email ps.billing@thameswater.co.uk	By calling your bank and quoting: Account number 90478703 Sort code 60-00-01 and your invoice number

Thames Water Utilities Ltd Registered in England & Wales No. 2366661 Registered Office Clearwater Court, Vastern Rd, Reading, Berks, RG1 8DB.



Site Investigation (Ashdown Site Investigation, 2023)



Fairlands
Church Road
Farley Hill
Wokingham
Reading

In Situ Infiltration Test Report

Report Beneficiary:
Ruben Reed Jr
Fairlands
Church Road
Farley Hill
Wokingham
RG7 1TU

Project Reference: P16064

Report Reference: R15717

Document Control			
Issue No.	Status	Issue Date	Notes
1	Final	19 th May 2023	
Report Section		Prepared By	Approved By
In Situ Infiltration Testing		Sam Prior BSc	Rebecca Webb BSc FGS

Head Office
Unit 3
The Old Grain Store
Ditchling Common Business Park
Ditchling
East Sussex
BN6 8SG
Tel: 01273 483119
www.ashdownsi.co.uk

Limitations

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TABLE OF CONTENTS

1.	INTRODUCTION	1
2.	SITE CONTEXT	2
2.1	Site Location	2
2.2	Expected Geology and Aquifer Designation	2
2.3	Groundwater Source Protection Zones	2
3.	SITE WORKS	3
4.	GROUND CONDITIONS	4
4.1	Stratigraphy	4
4.2	Stability	4
4.3	Groundwater Conditions	4
5.	STORMWATER INFILTRATION SYSTEMS	5

FIGURES & APPENDICES

Figure 1	Site Location Plan
Figure 2	Site Plan
	Proposed Development Layout
	Exploratory Hole Notes
	Exploratory Hole Records
	Borehole Falling Head Soakage Test Results
	Groundwater Monitoring Results

1. INTRODUCTION

Ashdown Site Investigation Ltd was requested to undertake in situ infiltration testing and groundwater monitoring at the site adjacent to Fairlands, Church Road, Farley Hill, Wokingham, Reading, to provide information to assist with the drainage design for the proposed new residential dwelling. A copy of the proposed development layout is presented in the Figures & Appendices.

The specific objectives of the works were to:

- a) Investigate the shallow ground and groundwater conditions prevailing at the borehole positions; and
- b) Undertake in situ infiltration testing and provide calculated infiltration rates to assist other with the drainage design.

The scope of the works covered by this report, and the terms and conditions under which they were undertaken, were set out within the offer letter Q12782, dated 16th February 2023. The instruction to proceed was received on behalf of the client, Ruben Reed Jr.

2. SITE CONTEXT

2.1 Site Location

The site comprises an irregular shaped plot of land located at the corner of Fairlands, Church Road, Farley Hill, Wokingham, Reading, and is centred on the approximate Ordnance Survey national grid reference 475801 164244. A site location plan and site plan are presented as Figure 1 and Figure 2, respectively.

2.2 Expected Geology and Aquifer Designation

The stratigraphic succession that may be expected to underlie the site is presented in the following table.

Table 1. Expected Strata and Aquifer Designation

Type	Stratum	Aquifer Designation
Superficial	River Terrace Deposits	Secondary A Aquifer
Bedrock	Bagshot Formation	Secondary A Aquifer

The River Terrace Deposits generally comprise well graded sandy fine to coarse gravel. Locally sand or gravel strata may predominate. Lenses of clay, silt and localised peat may be present. Gravels normally include a high proportion of subangular flint.

The Bagshot Formation forms part of the Bracklesham Group. The formation is of Ypresian age (47.8 to 56 million years old; Early Eocene). Most of the Bagshot Formation is composed of pale yellow-brown to pale grey or white, locally orange or crimson, fine to coarse-grained sand that is frequently micaceous and locally clayey, with sparse glauconite sand and sparse seams of gravel. The sands are commonly cross-bedded but some are laminated. Thin beds and lenses of laminated pale grey to white sandy or silty clay or clay ('pipe-clay') occur sporadically, becoming thicker towards the top of the formation. A thick clay bed, the Swinley Clay Member, is included at the top. In places, there is a basal bed of gravelly coarse-grained sand. The strata are sparsely fossiliferous.

2.3 Groundwater Source Protection Zones

The site does not lie within an Environment Agency Source Protection Zone.

3. SITE WORKS

The site works comprised the drilling of three dynamic sampler boreholes, designated WS01 to WS03, to depths of between 2.00m and 5.00m below ground level using dynamic sampler techniques. The intrusive work was carried out on 13th April 2023. The exploratory hole locations are shown on Figure 2.

Falling head soakage tests were undertaken in boreholes WS01 and WS03 with the holes at a depth of 2.00m. The tests were carried out in general accordance with Kent County Council guidance¹.

A groundwater monitoring standpipe, details of which are shown on the exploratory hole record, was installed to a depth of 3.90m in borehole WS02. Groundwater readings were taken on two return visits on 27th April 2023 and 11th May 2023.

Descriptions of the strata encountered and comments on groundwater conditions are shown in the exploratory hole records given in the appendices to this report, together with notes to assist in their interpretation. The results of the in situ infiltration testing and groundwater monitoring are also included in the appendices.

¹ The Soakaway Design Guide published by Kent County Council, 2000.

4. GROUND CONDITIONS

4.1 Stratigraphy

4.1.1 *Surface Covering*

Borehole WS01 was excavated through a surface cover of asphalt some 200mm in thickness and boreholes WS02 and WS03 were excavated through a gravel hardcore surface.

4.1.2 *Made Ground*

Made ground, generally comprising slightly gravelly silty sand, was recorded in each borehole to depths of between 0.70m and 1.00m below ground level. The gravel fraction comprised variable quantities of flint, concrete and clinker-like material.

4.1.3 *River Terrace Deposits*

Beneath the made ground soils, the boreholes generally encountered silty sand soils which continued to the full depth of the investigation.

These soils are considered to be representative of the River Terrace Deposits soils indicated to underlie the site on the published geology map.

4.2 Stability

Instability was recorded locally within the coarse-grained soils encountered.

4.3 Groundwater Conditions

Whilst both of the shallow 2.00m deep borehole WS01 and WS03 remained dry, groundwater was recorded at a depth of 1.85m below ground level on completion of the deeper borehole, WS02. The water level within the stand-pipe installed within the latter borehole was recorded to be at around 2.00m depth during each of the subsequent monitoring visits.

It should be noted that water levels within the boreholes may not have equilibrated with the groundwater table at the time the readings were recorded and that groundwater levels should be expected to fluctuate seasonally.

5. STORMWATER INFILTRATION SYSTEMS

In-situ infiltration testing² was undertaken in boreholes WS01 and WS03. From the test results, calculations were made to estimate the infiltration rate that could be expected for soakaways constructed to discharge into the underlying soils within the test zone.

The following infiltration rates were derived from the tests:

Table 2. Calculated Infiltration Rates

Exploratory Hole	Test Response Zone Depth (m)		Stratum	Infiltration Rate (f) (m / sec)	Driving Head of Water (m)
	Top	Bottom			
WS01 – Test 1	1.00	2.00*	River Terrace Deposits	6.49×10^{-5}	0.8
				2.30×10^{-5}	0.5
WS01 – Test 2	1.00	2.00*	River Terrace Deposits	3.98×10^{-5}	0.8
				1.80×10^{-5}	0.5
WS02 – Test 1	1.00	2.00*	River Terrace Deposits	6.44×10^{-6}	0.8
				2.16×10^{-6}	0.5
WS02 – Test 2	1.00	2.00*	River Terrace Deposits	2.13×10^{-6}	0.8
				9.99×10^{-7}	0.7

Notes: * Borehole WS01 collapsed to 1.92m during works and borehole WS02 collapsed to 1.82m.

The value 'f' is equivalent to the soil infiltration coefficient 'q' quoted in the Construction Industry Research and Information Association (CIRIA) Report 156.

The results from the infiltration tests indicate that the River Terrace Deposits soils possess poor to moderate infiltration characteristics. The results from the infiltration tests should be provided to engineers responsible for the design of the drainage system.

To comply with building regulations³, point discharging infiltration systems (conventional ring or trench soakaways) are required to be constructed a minimum of 5.0m away from proposed or existing buildings.

Ashdown Site Investigation Ltd.

² Conducted in accordance with The Soakaway Design Guide, published by Kent County Council, July 2000.

³ The Building Regulations 2010; Part H; Drainage and Waste Disposal

FIGURES & APPENDICES

Figure 1 Site Location Plan

Figure 2 Site Plan

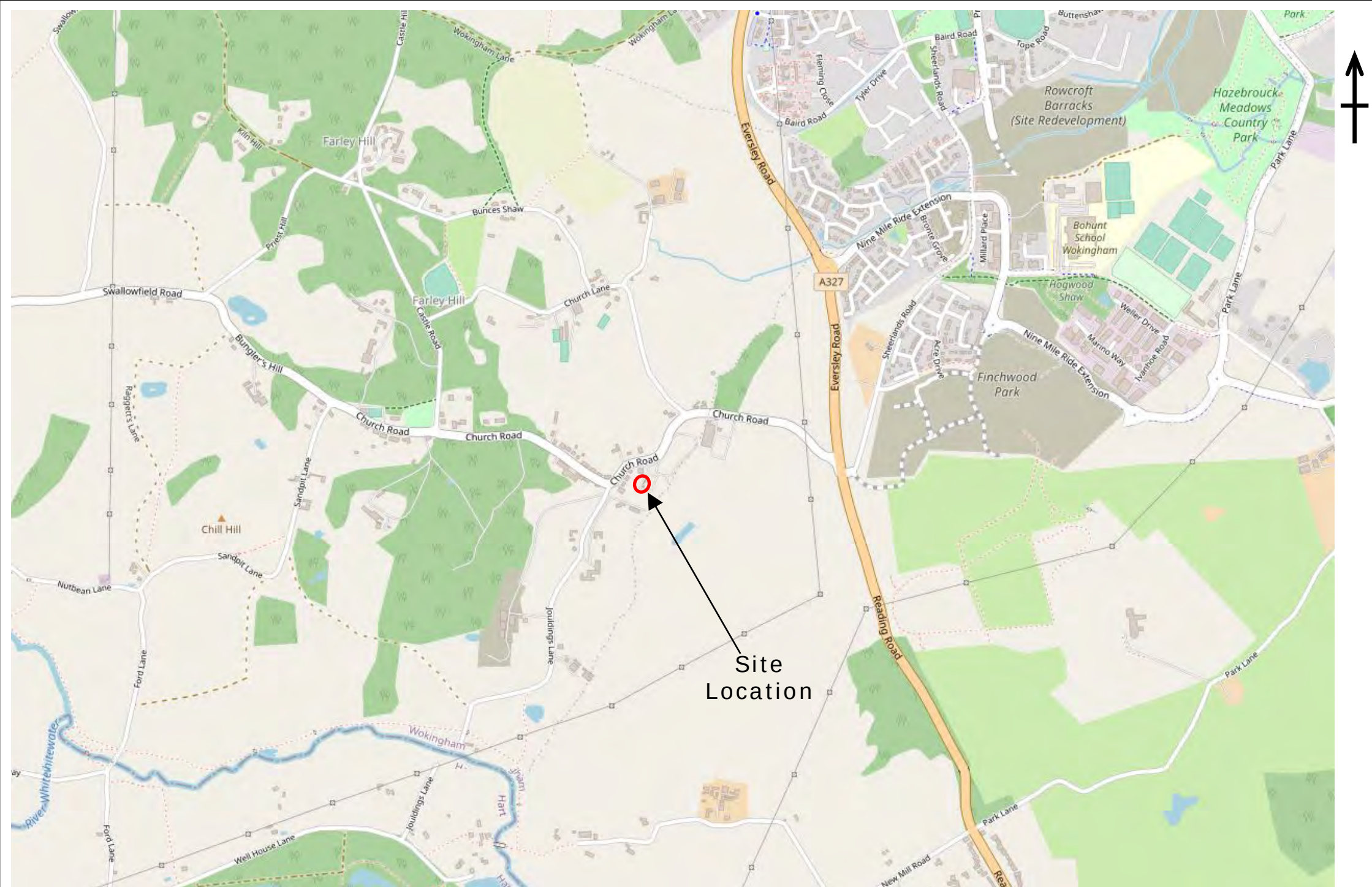
Proposed Development Layout

Exploratory Hole Notes

Exploratory Hole Records

Borehole Falling Head Soakage Test Results

Groundwater Monitoring Results



© OpenStreetMap contributors, CC BY-SA

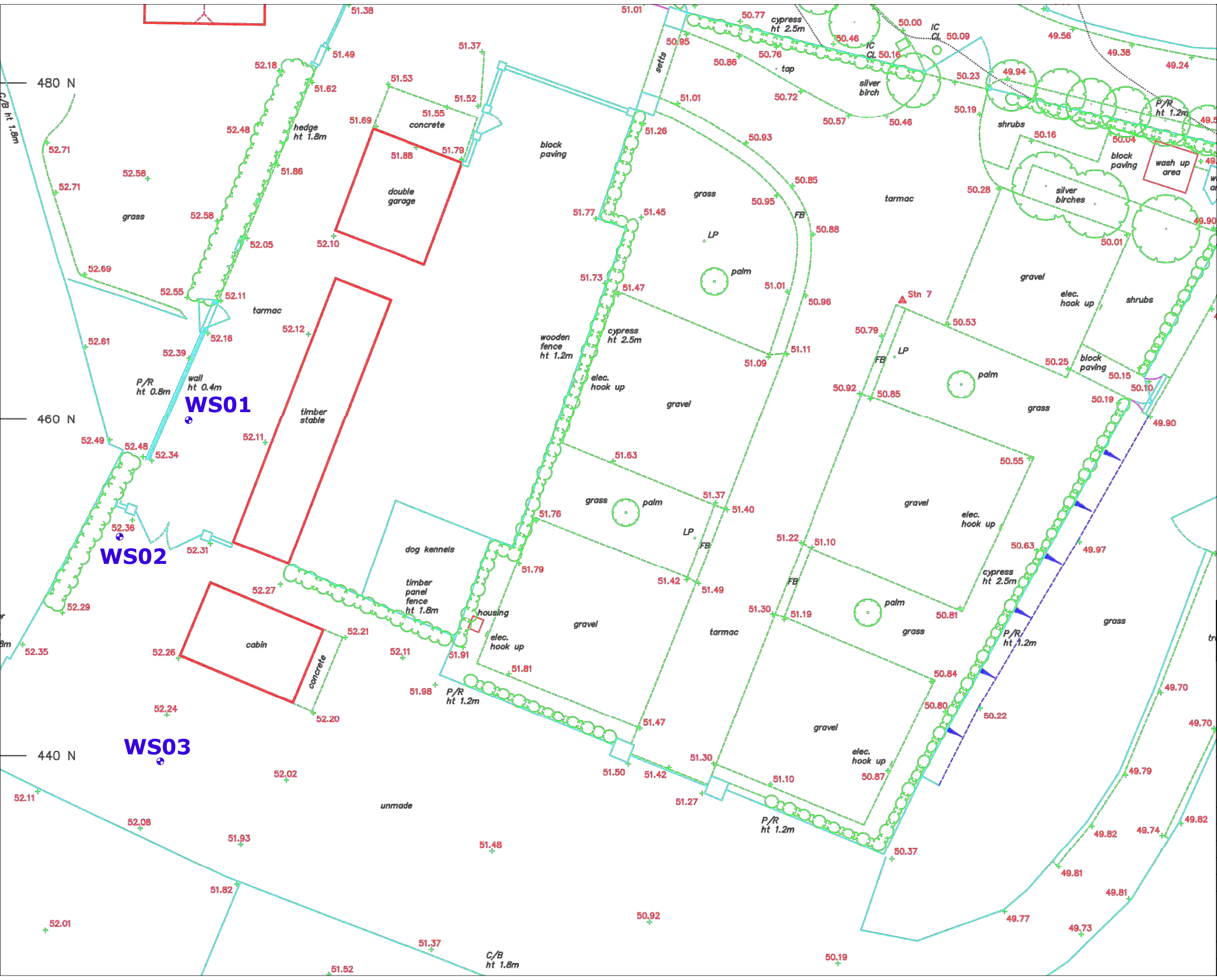


ASHDOWN SITE INVESTIGATION

L · I · M · I · T · E · D

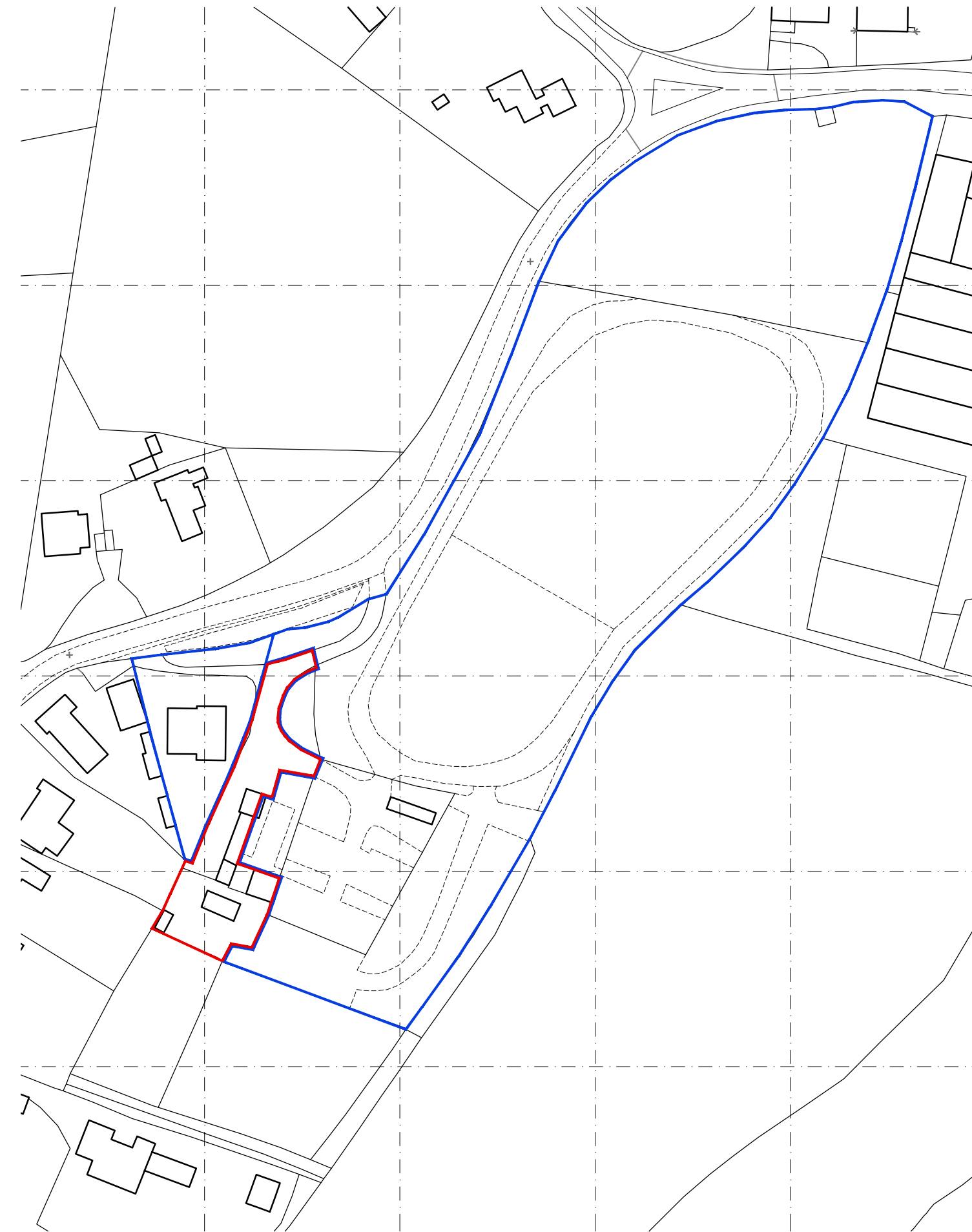
Unit 3
The Old Grain Store
Ditchling Common Business Park
Ditchling
East Sussex
BN6 8SG
01273 483119
contact@ashdownsi.co.uk

Site:
Fairlands Church Road Farley Hill Wokingham Reading
Project Ref:
P16064
Figure No.
2
Drawing Title
Site Plan
Scale
NTS

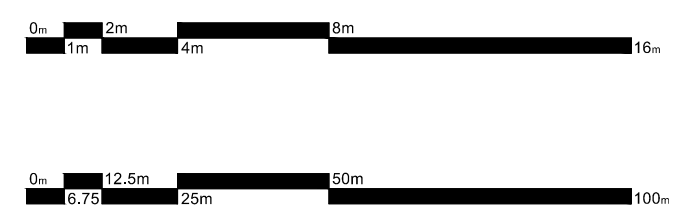




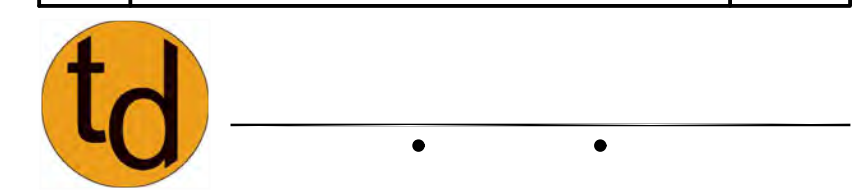
Site Plan 1:200 Scale



Location Plan 1:1250 Scale



B	Red Line and Title Scale Amended	22-11-22
A	Road Names Added	31-8-22



Samples

In situ Testing

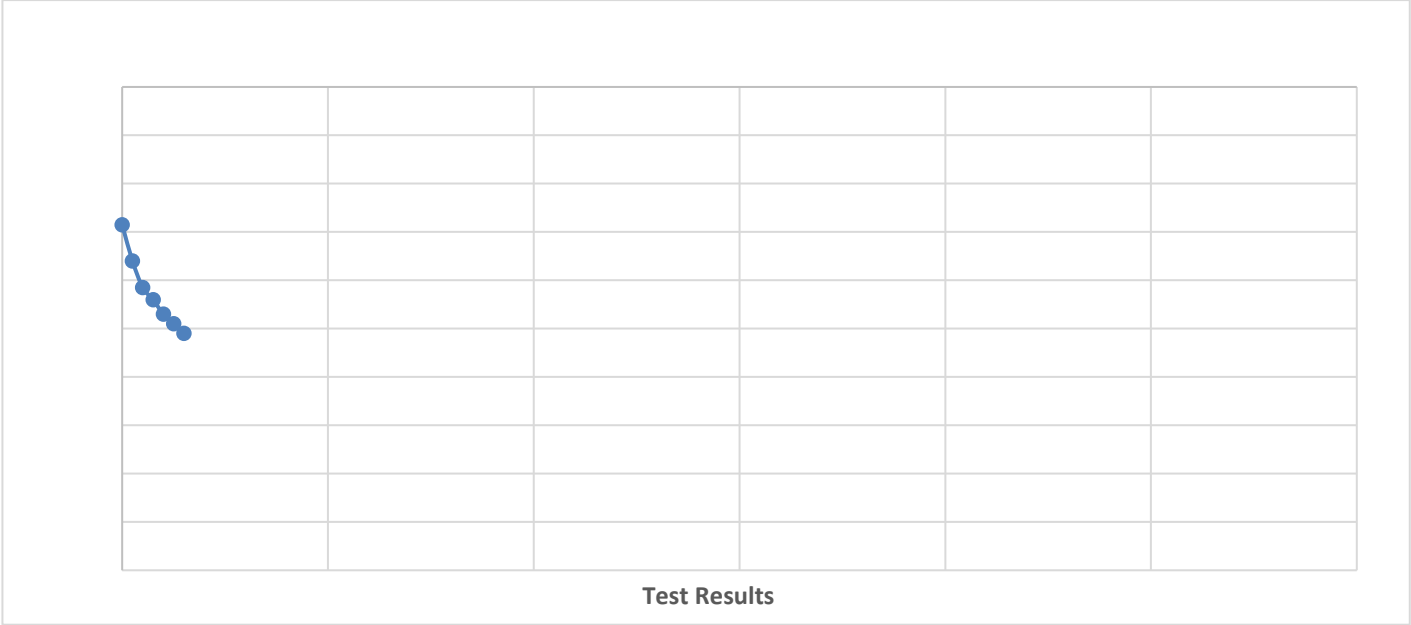
Excavation Method

ASHDOWN SITE INVESTIGATION L · I · M · I · T · E · D E-mail: contact@ashdownsi.co.uk Web: www.ashdownsi.co.uk Tel: 01273 483119		Site Name: Fairlands, Church Road, Farley Hill, Wokingham, Reading				
		Job Number: P16064				
		Start Date: 13/04/2023		Borehole Number: WS01		
End Date: 13/04/2023						
Sheet 1 of 1						
Samples and In Situ Testing Dynamic Probe Legend Depth Stratum Description						
Standpipe	Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result		
	D	0.30				0.00
	D	0.70				0.20
	D	1.20				0.80
	D	1.80				2.00
						End of borehole at 2.00m
Remarks						
Groundwater: Borehole dry on completion.						Excavation Method: WLS
Stability: Borehole cased to 1.00m depth. Borehole collapsing to 1.92m depth on completion.						Borehole Diameter: Various
Notes: n/a						Made By: LB

ASHDOWN SITE INVESTIGATION L · I · M · I · T · E · D E-mail: contact@ashdownsi.co.uk Web: www.ashdownsi.co.uk Tel: 01273 483119		Site Name: Fairlands, Church Road, Farley Hill, Wokingham, Reading						
		Job Number: P16064						
Start Date: 13/04/2023		Borehole Number: WS02						
End Date: 13/04/2023								
Sheet 1 of 1								
Samples and In Situ Testing Dynamic Probe Legend Depth Stratum Description								
Standpipe	Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	051015202530		Depth	Stratum Description
	D	0.15					0.00	Gravel surface over, MADE GROUND: Black and grey slightly gravelly silty fine to medium sand. Gravel is subangular to subrounded fine to coarse flint, concrete and clinker-like material colour changes to orange brown between 0.3m depth and 0.7m depth.
	D	0.60					0.70	Orange brown and grey silty fine to medium SAND. Sand is fine to coarse. (River Terrace Deposits)
	D	1.10						
	D	1.70						
	D	2.20						
	D	2.80						
	D	3.30						
	D	3.90						
	D	4.20						
	D	4.80						
							5.00	End of borehole at 5.00m
Remarks Groundwater: Groundwater recorded at 1.85m depth on completion of borehole. Stability: Borehole collapsing to 3.90m depth on completion. Notes: Standpipe installed to 3.90m depth; 3.90m to 1.90m slotted pipe with gravel surround; 1.90m to ground level plain pipe with bentonite seal; completed with end cap and security cover concreted flush with ground surface.								Excavation Method: WLS Borehole Diameter: Various Made By: LB

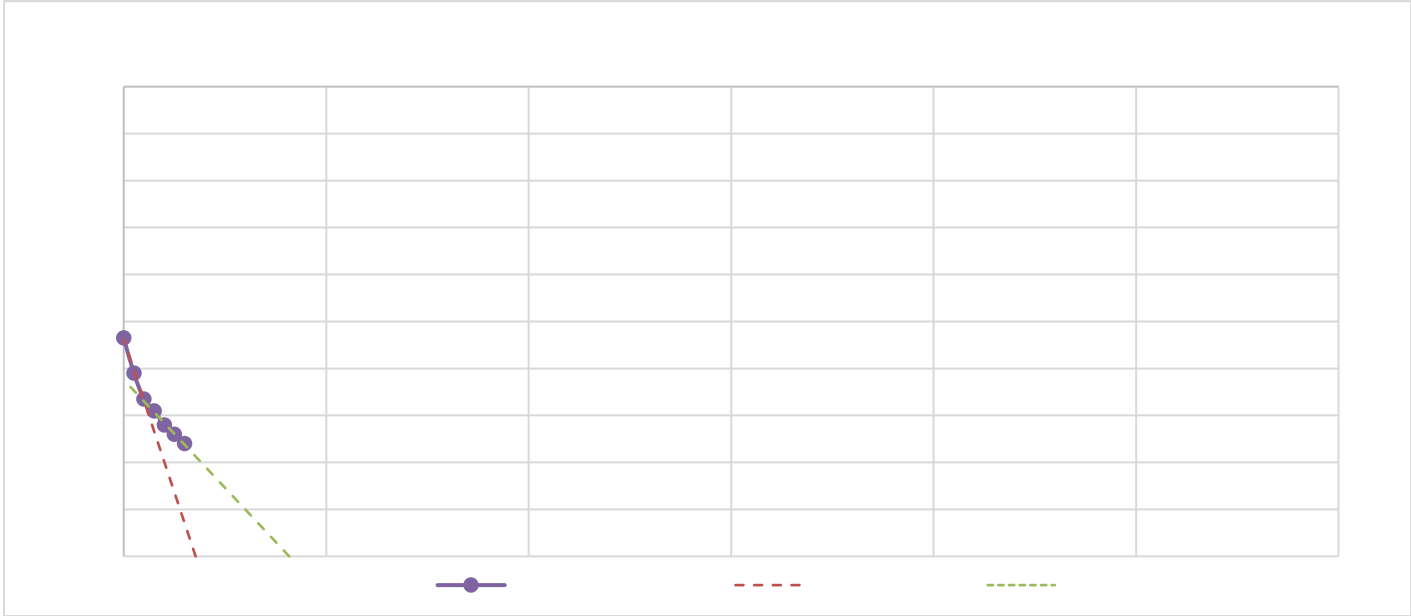
ASHDOWN SITE INVESTIGATION L · I · M · I · T · E · D E-mail: contact@ashdownsi.co.uk Web: www.ashdownsi.co.uk Tel: 01273 483119		Site Name: Fairlands, Church Road, Farley Hill, Wokingham, Reading				
		Job Number: P16064				
		Start Date: 13/04/2023		Borehole Number: WS03		
End Date: 13/04/2023						
Sheet 1 of 1						
Samples and In Situ Testing Dynamic Probe Legend Depth Stratum Description						
Standpipe	Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	051015202530	
	D	0.20				0.00 Gravel surface over, MADE GROUND: Black slightly gravelly silty fine to medium sand. Gravel is subangular to subrounded fine to coarse flint and asphalt/ clinker-like material. colour changes to orange brown between 0.4m depth and 1.0m depth.
	D	0.80				
	D	1.40				1.00 Orange brown and grey silty fine to medium SAND with occasional black staining. (River Terrace Deposits)
	D	1.90				
						2.00 End of borehole at 2.00m
Remarks						
Groundwater: Borehole dry on completion.						Excavation Method: WLS
Stability: Borehole cased to 1.00m depth. Borehole collapsing to 1.82m depth on completion.						Borehole Diameter: Various
Notes: n/a						Made By: LB

Infiltration Test Results



L

Driving Head	0.8	0.5 m
Infiltration rate	6.49E-05	2.30E-05 m/sec



Infiltration Test Results

Test Results

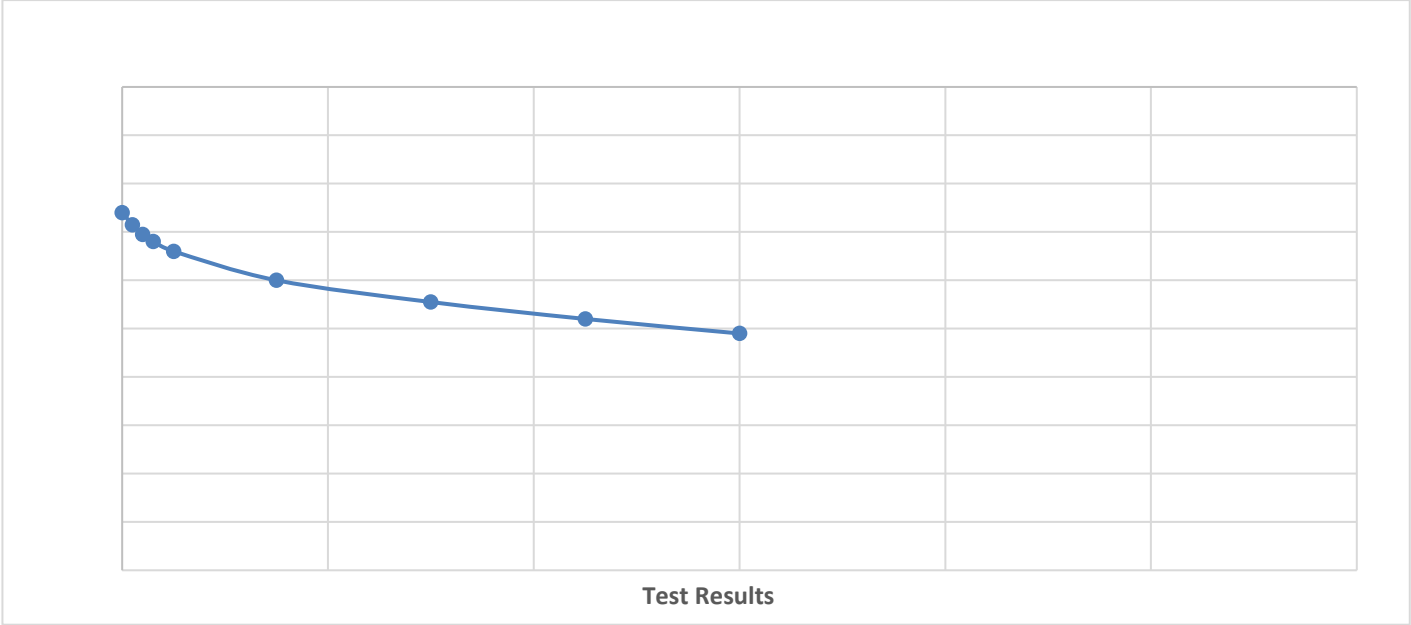
L

Driving Head
Infiltration rate

0.8
3.98E-05

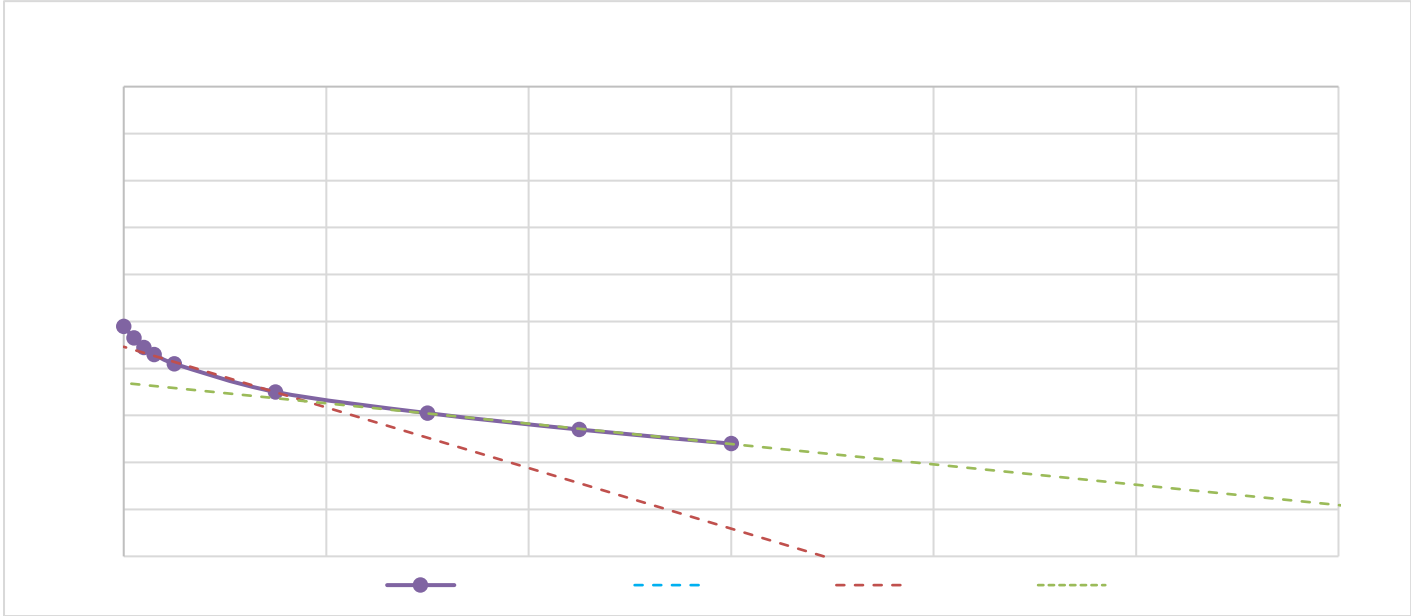
0.6 m
1.80E-05 m/sec

Infiltration Test Results

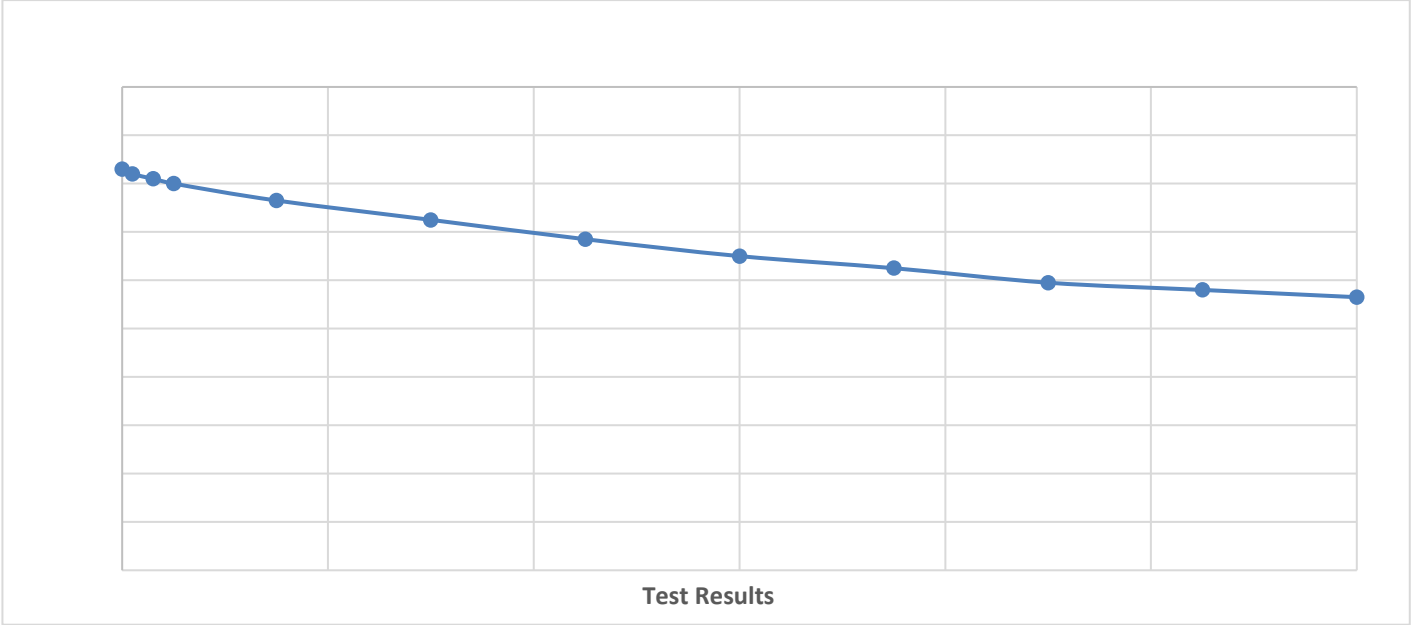


L

Driving Head	0.8	0.5 m
Infiltration rate	6.44E-06	2.16E-06 m/sec



Infiltration Test Results

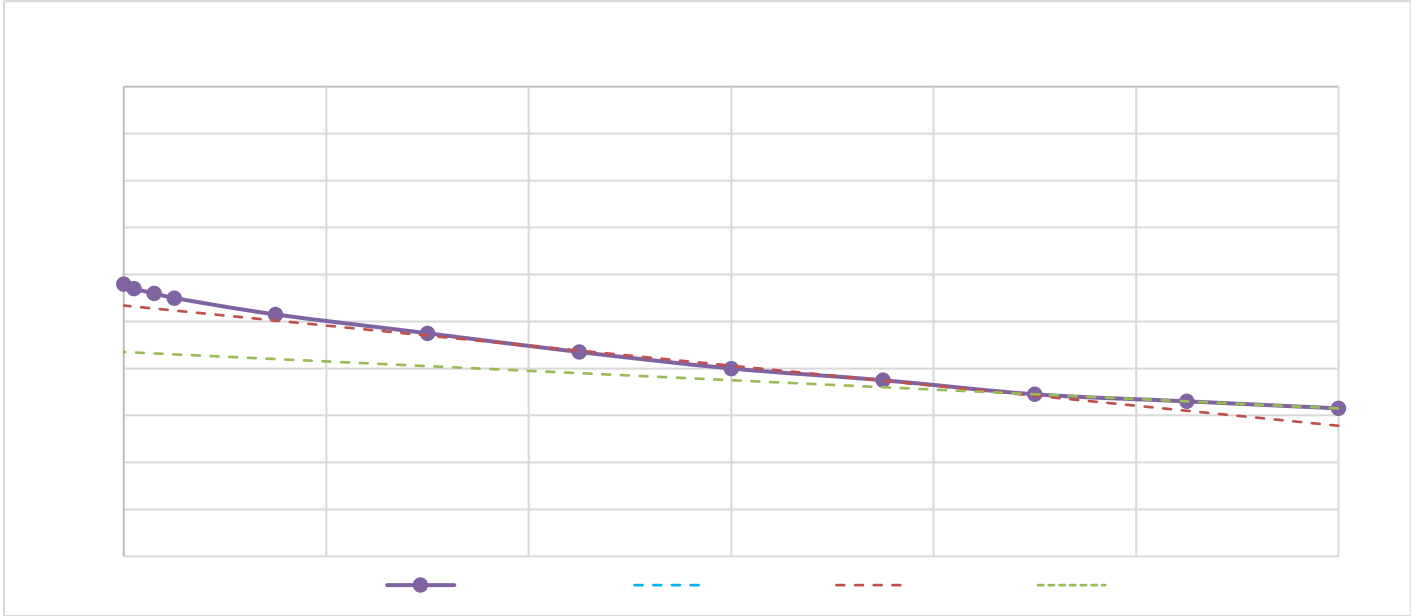


L

Driving Head
Infiltration rate

0.8
2.13E-06

0.7 m
9.99E-07 m/sec



Groundwater Monitoring Results

Site Name:	Fairlands, Church Road, Farley Hill, Wokingham, Reading	
Project Ref:	P16064	
Position	Date	Standing Water Depth (m bgl)
WS02	13/04/23	1.85
WS02	27/04/23	2.08
WS02	11/05/23	2.02

Disclaimer

This report has been prepared by GeoSmart in its professional capacity as soil, groundwater, flood risk and drainage specialists, with reasonable skill, care and diligence within the agreed scope and terms of contract and taking account of the manpower and resources devoted to it by agreement with its client and is provided by GeoSmart solely for the internal use of its client.

The advice and opinions in this report should be read and relied on only in the context of the report as a whole, taking account of the terms of reference agreed with the client. The findings are based on the information made available to GeoSmart at the date of the report (and will have been assumed to be correct) and on current UK standards, codes, technology and practices as at that time. They do not purport to include any manner of legal advice or opinion. New information or changes in conditions and regulatory requirements may occur in future, which will change the conclusions presented here.

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Further information

Information on confidence levels and ways to improve this report can be provided for any location on written request to info@geosmart.co.uk or via our website. Updates to our model are ongoing and additional information is being collated from several sources to improve the database and allow increased confidence in the findings. Further information on groundwater levels and flooding are being incorporated in the model to enable improved accuracy to be achieved in future versions of the map. Please contact us if you would like to join our User Group and help with feedback on infiltration SuDS and mapping suggestion.

Important consumer protection information

This search has been produced by GeoSmart Information Limited, Suite 9-11, 1st Floor, Old Bank Buildings, Bellstone, Shrewsbury, SY1 1HU.

Tel: 01743 298 100

Email: info@geosmartinfo.co.uk

GeoSmart Information Limited is registered with the Property Codes Compliance Board (PCCB) as a subscriber to the Search Code. The PCCB independently monitors how registered search firms maintain compliance with the Code.

The Search Code:

- provides protection for homebuyers, sellers, estate agents, conveyancers and mortgage lenders who rely on the information included in property search reports undertaken by subscribers on residential and commercial property within the United Kingdom.
- sets out minimum standards which firms compiling and selling search reports have to meet.
- promotes the best practice and quality standards within the industry for the benefit of consumers and property professionals.
- enables consumers and property professionals to have confidence in firms which subscribe to the code, their products and services.
- By giving you this information, the search firm is confirming that they keep to the principles of the Code. This provides important protection for you.

The Code's core principles

Firms which subscribe to the Search Code will:

- display the Search Code logo prominently on their search reports.
- act with integrity and carry out work with due skill, care and diligence.
- at all times maintain adequate and appropriate insurance to protect consumers.
- conduct business in an honest, fair and professional manner.
- handle complaints speedily and fairly.
- ensure that products and services comply with industry registration rules and standards and relevant laws.
- monitor their compliance with the Code.

Complaints

If you have a query or complaint about your search, you should raise it directly with the search firm, and if appropriate ask for any complaint to be considered under their formal internal complaints procedure. If you remain dissatisfied with the firm's final response, after your complaint has been formally considered, or if the firm has exceeded the response timescales, you may refer your complaint for consideration under The Property Ombudsman scheme (TPOs). The Ombudsman can award up to £5,000 to you if the Ombudsman finds that you have suffered actual financial loss and/or aggravation, distress or inconvenience as a result of your search provider failing to keep to the Code.

Please note that all queries or complaints regarding your search should be directed to your search provider in the first instance, not to TPOs or to the PCCB.

TPOs contact details:

The Property Ombudsman scheme
Milford House
43-55 Milford Street
Salisbury
Wiltshire SP1 2BP
Tel: 01722 333306
Fax: 01722 332296
Email: admin@tpos.co.uk

You can get more information about the PCCB from www.propertycodes.org.uk.

Please ask your search provider if you would like a copy of the search code

Complaints procedure

GeoSmart Information Limited is registered with the Property Codes Compliance Board as a subscriber to the Search Code. A key commitment under the Code is that firms will handle any complaints both speedily and fairly. If you want to make a complaint, we will:

- Acknowledge it within 5 working days of receipt.
- Normally deal with it fully and provide a final response, in writing, within 20 working days of receipt.
- Keep you informed by letter, telephone or e-mail, as you prefer, if we need more time.
- Provide a final response, in writing, at the latest within 40 working days of receipt.
- Liaise, at your request, with anyone acting formally on your behalf.



If you are not satisfied with our final response, or if we exceed the response timescales, you may refer the complaint to The Property Ombudsman scheme (TPOs): Tel: 01722 333306, E-mail: admin@tpos.co.uk.

We will co-operate fully with the Ombudsman during an investigation and comply with his final decision. Complaints should be sent to:

Liz Lloyd

Finance Manager

GeoSmart Information Limited

Suite 1, 1 Bellstone Court,

Bellstone,

Shrewsbury,

SY1 1JB

Tel: 01743 298 100

support@geosmartinfo.co.uk

14 Terms and conditions, CDM regulations and data limitations



Terms and conditions can be found on our website:

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<http://geosmartinfo.co.uk/knowledge-hub/cdm-2015/>

Data use and limitations can be found on our website:

<http://geosmartinfo.co.uk/data-limitations/>