GeoSmart Information

SuDSmart Plus

Sustainable Drainage Assessment

Site Address

Hatchgate End
Hatchgate Lane
Cockpole Green
Wargrave
Reading
RG10 8NE

Grid Reference

479950, 181063

Report Prepared for

Nicholas Hart
Hatchgate End
Hatchgate Lane
Cockpole Green
Reading
RG10 9NE

Date

19/01/2026

Report Status

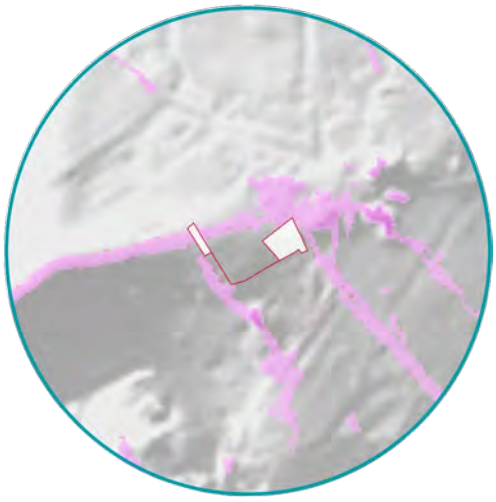
FINAL

Site Area

2,970 m^2

Report Reference

87257R1



Infiltrate to Ground

The proposed Sustainable Drainage Scheme (SuDS) strategy is comprised of rainwater harvesting and a soakaway to attenuate surface water runoff during the 1 in 100 plus 40% climate change event.

An infiltration rate of 5 x 10^{-5} m/s has been confirmed via infiltration testing conducted at the Site by Groundfirst in October 2025. Surface water will discharge via infiltration to the chalk geology, subject to the incorporation of SuDS.

Report Author

Jessica Bryan
Consultant

Report Checker

James Robinson
Senior Consultant

Report Reviewer

Bob Sargent
Associate

GeoSmart Information Ltd
Suite 9-11, 1st Floor, Old Bank Buildings,
Bellstone, Shrewsbury, SY1 1HU
+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
Runoff destination feasibility	Priority 1: rainwater collected for non-potable use	Yes
	Priority 2: infiltration to ground	Low to High*
	Priority 3: discharge to an above ground surface water body	Low
	Priority 4: discharge to surface water sewer	Low
	Priority 5: discharge to combined sewer	Low
Flooding	What is the river (fluvial) and/or tidal flood risk at the Site?	Very Low
	What is the surface water (pluvial) flood risk at the Site?	Very Low to High
	What is the groundwater flood risk at the Site?	Negligible
Pollution	Is the groundwater a protected resource?	Yes
	Is the surface water feature a protected resource?	N/A

*Infiltration rate confirmed as 5 x10^{-5} m/s, which is sufficient for SuDS via infiltration, at the Site in October 2025 (Groundfirst, 2025; see Appendix D)

Summary of existing and proposed development

The Site is currently used within a residential capacity. At present there is a residential building situated in the north west of the Site (two semi-detached properties which have since been merged to form one house) with stone paved areas surrounding it and a gravel driveway. There is also an outbuilding located on the southwest of the Site and an empty agricultural field located to the west of the residential building.

Development proposals comprise the demolition of the existing building and construction of a new five-bedroom residential building and the retention of parking areas and landscaped areas. Additionally, land within the west of the Site (to the rear of the property) is proposed to be used for the erection of solar panels for use of the residential property. Site plans and drawings are provided in Appendix A.

National Standard 1: Runoff Destinations

Priority 1: collection for non-potable use

In line with DEFRA's national guidance, the potential for the collection of rainwater for non-potable use across the proposed development has been considered.

Rainwater harvesting butts are proposed at the base of the downpipes of the development in order to provide rainwater re-use potential at the Site, as well as to provide biodiversity and amenity benefits. Captured water will be used to water vegetation and ensure their long-term viability as sustainable amenity features.

The client has suggested that they may wish to install a rainwater harvesting tank, similar to an existing tank already in place to collect surface water from an outbuilding on the Site, this would be an acceptable alternative to the rainwater harvesting butts if preferred by the Client.

Priority 2: infiltration to ground

GeoSmart's SuDS Infiltration Potential (SD50) map indicates that the Site has a Low to High potential for infiltration, primarily due to the anticipated variable permeability of the underlying geology (Site is partially underlain by clay, silt and sand and partially by chalk).

Site-specific ground investigation (Groundfirst, 2025; report included within Appendix D) has confirmed an infiltration rate of $5x10^{-5}$ m/s within the chalk bedrock geology (present at the location of the second trial pit, TP02, and as such any infiltration features should be located in as close an area as feasible to this trial pit), which would be sufficient to accommodate infiltration SuDS features.

As such, infiltration is considered to be feasible, and is proposed.

Priority 3: discharge to above ground surface water body

Ordnance Survey (OS) mapping indicates that there are no surface water features within 100 m of the Site. Therefore, discharge to surface water feature is not feasible.

Priority 4: discharge to surface water sewer

The asset location plan included in Appendix C confirms that there are no public surface water sewers within the vicinity of the Site that could feasibly be discharged to. As such, discharge to surface water sewer is not considered to be feasible.

Priority 5: discharge to combined sewer

The asset location plan included in Appendix C confirms that there are no public combined sewers within the vicinity of the Site that could feasibly be discharged to. As such, discharge to combined sewer is not considered to be feasible.

Runoff rate and attenuation requirements

Discharging via infiltration requires 14.41 m^3 of attenuation to be provided to ensure there is no flooding 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 and a 10% uplift in impermeable surfacing over the lifetime of the development. This volume has been calculated using Causeway Flow v.10.7 based on an infiltration rate of 5 x 10^{-5} m/s taken from infiltration testing conducted at the Site in October 2025 at trial pit TP02 (Groundfirst, 2025, report included in Appendix D).

Proposed SuDS strategy

SuDS features comprised of rainwater harvesting and a soakaway are proposed to attenuate a minimum of 15.20 m^3 of surface water runoff. The SuDS features would provide some water quality benefits (interception and filtration) prior to infiltrating to ground. Focused infiltration features should be sited at least 10m from building foundations.

The proposed SuDS strategy would ensure surface water runoff is stored on-Site in SuDS features for the 1 in 100 year event including a 40% allowance for climate change and will not cause flooding to the proposed development in accordance with DEFRA's national standards for SuDS (2025).

Amenity and Biodiversity

The inclusion of rainwater harvesting features will provide sufficient biodiversity and amenity benefits to the areas of proposed development as captured water will be used to water vegetation and ensure their long-term viability as amenity features.

SuDS & drainage network maintenance

The management and maintenance of the SuDS features, in line with the details and schedules outlined in Section 10 of this report, will be undertaken by contractors appointed by the owners and occupiers of the new residential building.

Recommendations / Next steps

The ongoing management and maintenance of existing and any proposed drainage networks, under the ownership of the developer, should be undertaken in perpetuity with the development.

2 Proposed SuDS strategy

The most suitable SuDS options are outlined below and a SuDS strategy schematic is shown overleaf. Supporting information is provided in subsequent sections.

Table 1. Proposed SuDS type, features, discharge location and rate restriction

SuDS type	Source control (interception) and infiltration SuDS.
SuDS features	Soakaway.
Discharge location	Infiltration.
Discharge rate	5 x 10^{-5} m/s*.

*Based upon the most conservative measures infiltration rate of 5 x 10^{-5} m/s as confirmed through Site-specific infiltration testing (Groundfirst, 2025).

Table 1. Proposed SuDS sizing (dimensions) and attenuation volumes

Rainwater Harvesting	Rainwater harvesting butts should be established for the dwelling. In terms of attenuation storage within this SuDS scheme, the volume of run-off which could be attenuated by rainwater harvesting has not been considered within the preliminary SuDS schematic. The client has suggested that they may wish to install a rainwater harvesting tank, similar to an existing tank already in place to collect surface water from an outbuilding on the Site, this would be an acceptable alternative to the rainwater harvesting butts if preferred by the Client.
Soakaway	A soakaway should be placed in the location at which TP02 was dug during the course of infiltration testing (Groundfirst, 2025), with a length of 4 m, width of 2 m, depth of 2 m, comprising geocellular crates with a void ratio of 95%, would provide c. 15.20 m^3 of attenuation.
Total attenuation provided	15.20 m^3
Total attenuation required	14.41 m^3
Freeboard storage provided	0.79 m^3

Figure 1. SuDS strategy schematic

GeoSmart Information

Figure 1. Proposed SuDS scheme

- Soakaway
- Rainwater harvesting butt
- Surface water drainage network
- Exceedance flow routes
- Planning application (Site) boundary
- Land ownership boundary

Surface water from the proposed dwelling should be conveyed into the rainwater harvesting feature and soakaway for discharge to the ground.

The soakaway should be located as close to the area in which TP02 was dug, as part of the Site investigation (Groundfirst, 2025; see Appendix D), as feasible.

Exceedance flows are directed towards non-essential, landscaped areas on Site.

For the area of the proposed solar panels, it is assumed that grass cover will be maintained both beneath and around the panels. As this will result in negligible loss of soil cover and consequent any increases in surface water runoff.

Schematic is not to scale

3 National & local policy context

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 (2025)

The Peak rainfall intensity allowances section provides advice on the increased rainfall effects on river levels and land and urban drainage systems. As of September 2025, the applicable

climate change allowance is defined by specific Management Catchment for the 1 in 30 (≥ 3.3% AEP) and 1 in 100 (< 3.3 to 1% AEP) year event.

As the Site is located within the Thames and South Chilterns Management Catchment the following climate change allowances are applicable.

Table 2. Thames and South Chilterns Management Catchment peak rainfall allowances

Thames and South Chilterns Management Catchment	3.3% Annual exceedance rainfall event		1% Annual exceedance rainfall event	
	2050s	2070s	2050s	2070s
Central	20%	20%	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

Wokingham Borough Council – Wokingham SuDS Strategy – Guidance on the use of sustainable drainage systems (January, 2017):

Geological Suitability for SuDS Figure 2.1 shows the infiltration potential of the geology within the Borough of Wokingham. In order for infiltration SuDS to be used, permeable geology must be present to allow water to infiltrate. Developers should use this map to assess whether their site may be suitable for infiltration SuDS.

All of the bedrock within the Borough has been defined as having mixed ability to infiltrate. The British Geological Survey (BGS) study of the physical properties of major aquifers states that although Chalk is characterised by high porosity characteristics it shows significant regional and stratigraphic variation. This variation is due to dissolution on fracture surfaces causing rubbly materials in some areas, and reworking of chalk causing low permeability chalk in other areas.

Wokingham as Lead Local Authority provide seventy local standards which SuDS strategies should adhere to. The full list of these and additional guidance can be found through the link below:

https://www.wokingham.gov.uk/community-and-safety/emergencies/drainage-and-flooding/

Local standards considered to of particular relevance to the Site have been highlighted and are included below:

Local Standards

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-LS12 All design of volume control must be supported by appropriate calculations and drawings that enable the performance of the drainage system to the required standards to be confirmed.

WokBC-LS13 All surface storage features (ponds, wetlands and basins) must provide a 300mm freeboard above the maximum design water level, unless otherwise agreed.

WokBC-LS14 All surface conveyance features (swales and channels) must provide a 150mm freeboard above the maximum design water level, unless otherwise agreed.

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%.

Further information is provided in Chapter 3 and 4 of the SuDS Manual (CIRIA C697).

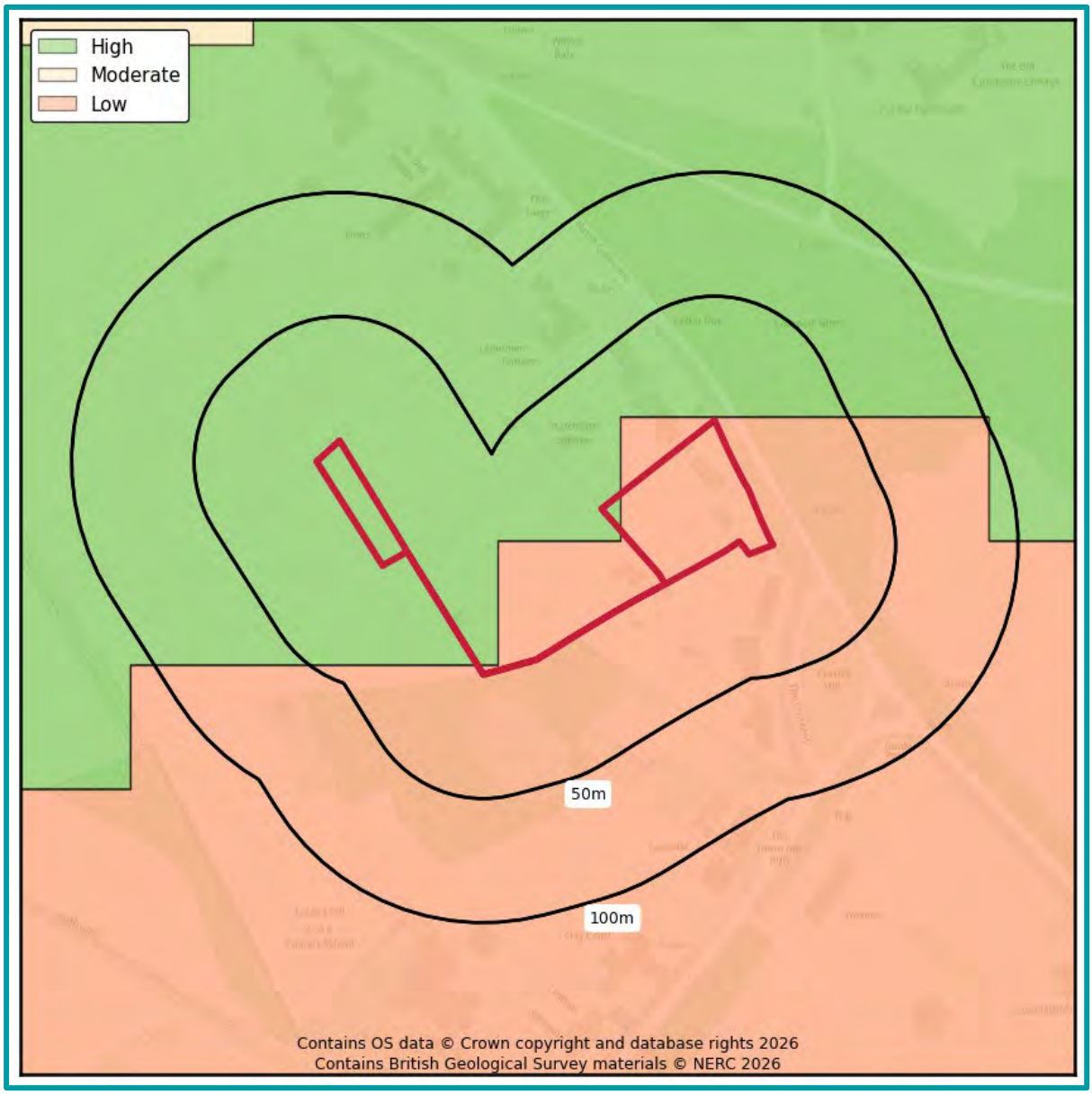
4 Site analysis

Site location

Figure 2. Aerial Imagery (Bluesky, 2026)

Infiltration suitability

Figure 3. SuDS infiltration suitability (SD50) map (GeoSmart, 2026)



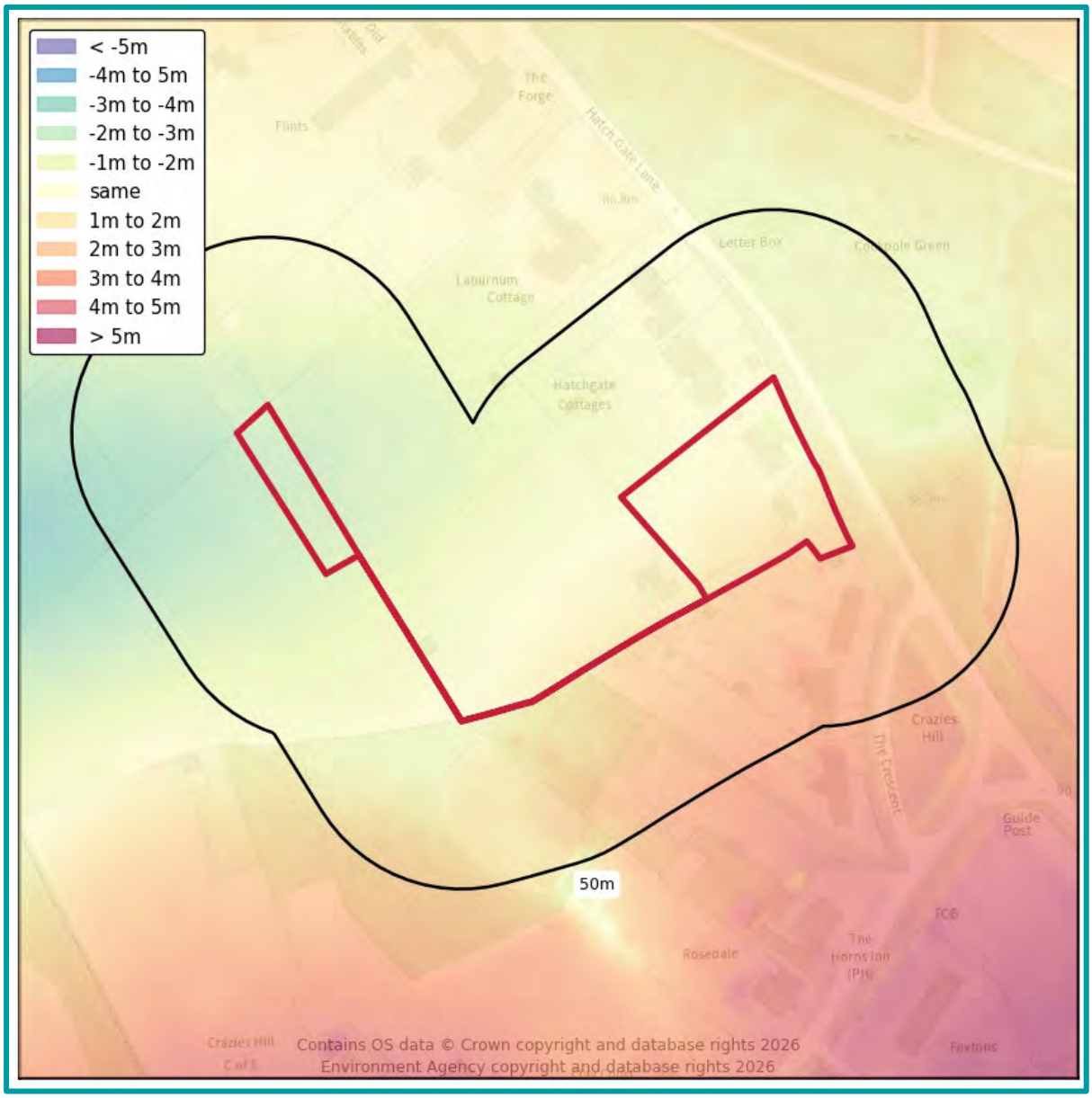
According to GeoSmart's SD50 mapping, there is a variable potential for infiltration SuDS across the Site ranging from Low to High. It is likely that the underlying geology at the Site has variable permeability and an infiltration SuDS scheme may be possible at the Site.

Site-specific ground investigation (Groundfirst, 2026; report included within Appendix D) has confirmed an infiltration rate of $5x10^{-5}$ m/s within the chalk bedrock geology (present at the location of the second trial pit, TP02, and as such any infiltration features should be located in as close an area as feasible to this trial pit), which would be sufficient to accommodate infiltration SuDS features.

As such, infiltration is considered to be feasible, and is proposed.

Topography

Figure 4. Site topography (GeoSmart, 2026)



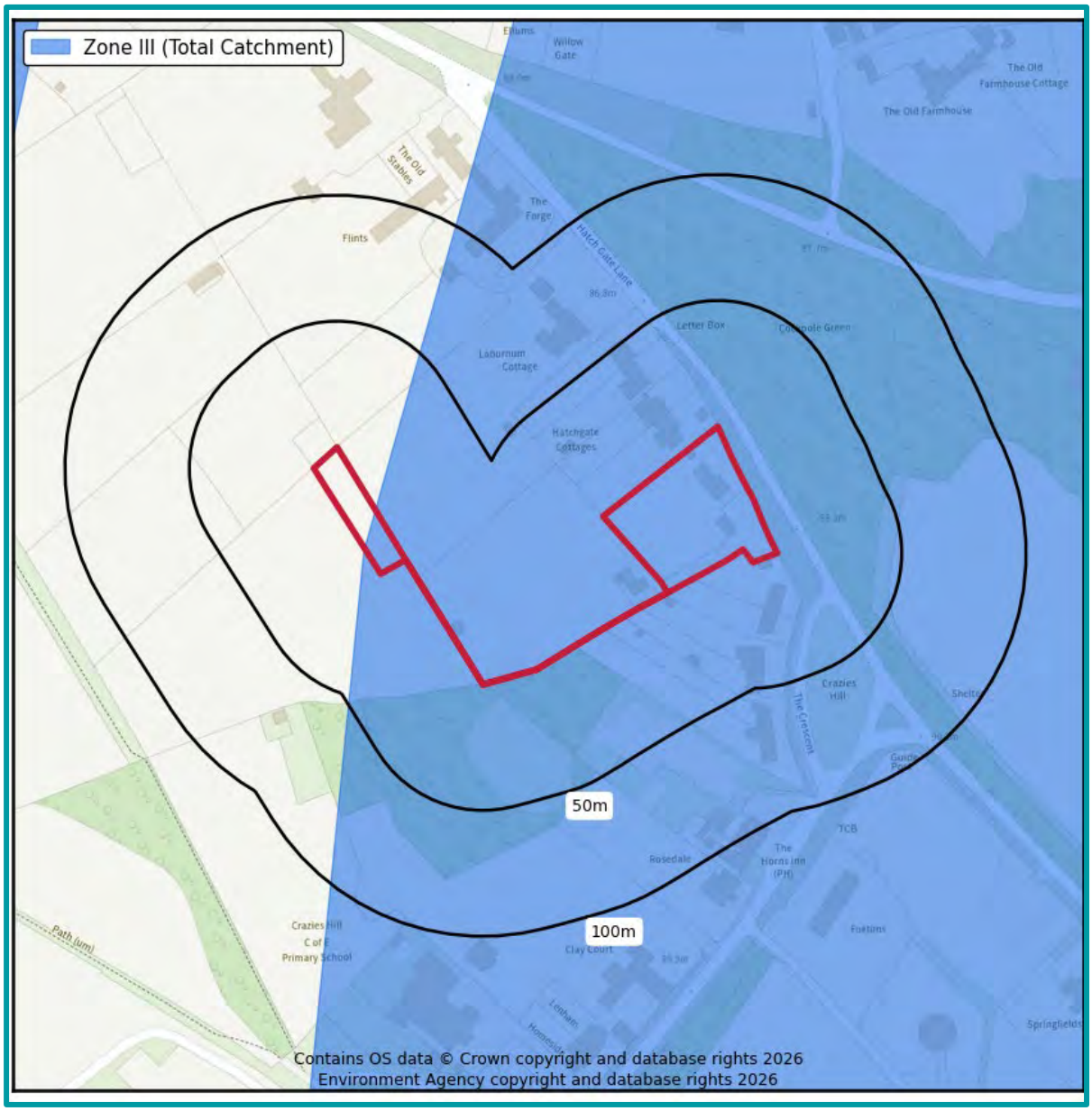
According to a review of the LiDAR DTM5 elevation data for the prevailing area, the ground levels within the vicinity of the Site typically fall to the west/northwest.

The topography on-Site typically falls to the west, with ground levels ranging from 84.71 to 88.89 mAOD. This is based on EA elevation data obtained for the Site to a 1 m resolution with a vertical accuracy of ±150 mm.

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

Land designations

Figure 5. Source protection zone map (EA, 2026)

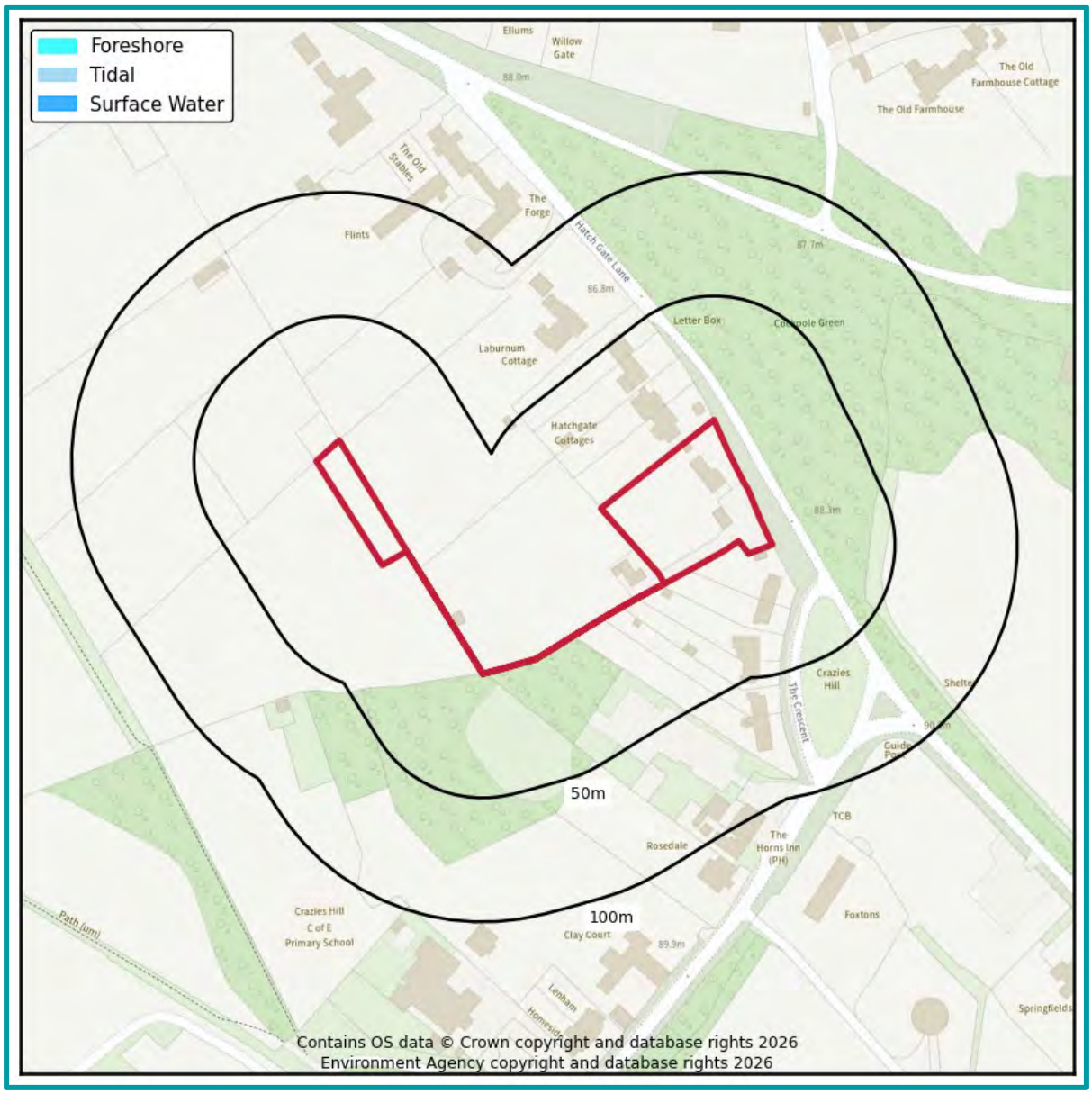


According to DEFRA's Magic Map, the Site lies partially within a total groundwater Source Protection Zone (SPZ III), with the proposed soakaway within this area. The remainder of the Site, comprising approximately 14% of the total area, at the north west, is located outside of any SPZ. The mapping also confirms that the Site is not within 250m of a SSSI or SPA.

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.

Surface water features

Figure 6. Surface water features map (EA, 2026)

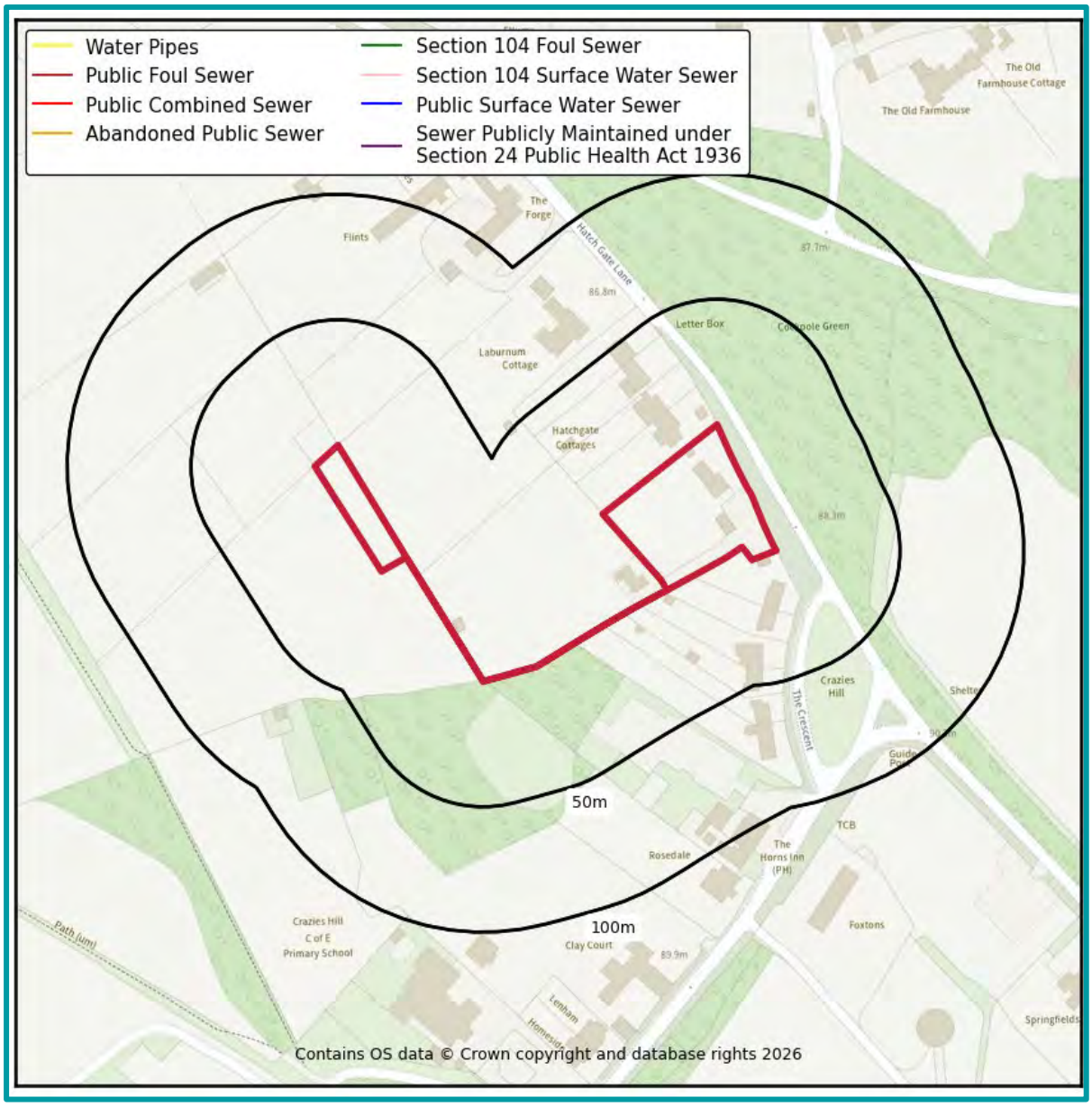


Ordnance Survey (OS) mapping indicates that there are no surface water features within 100 m of the Site. Therefore, discharge to surface water feature is not feasible.

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 potentially unmapped surface water features.

Sewer features

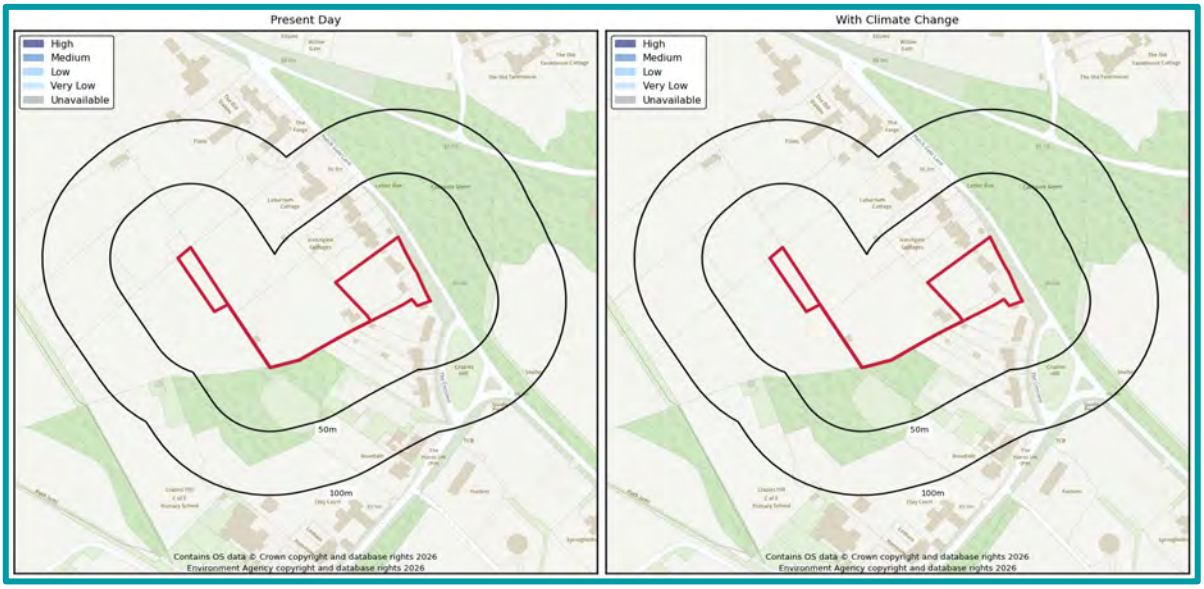
Figure 7. Sewer features map (OS & Thames Water, 2026)



According to the Thames Water asset location plan obtained for the Site (Appendix C), there are no public surface water sewer or combined sewers located within the vicinity of the Site.

Flood risk

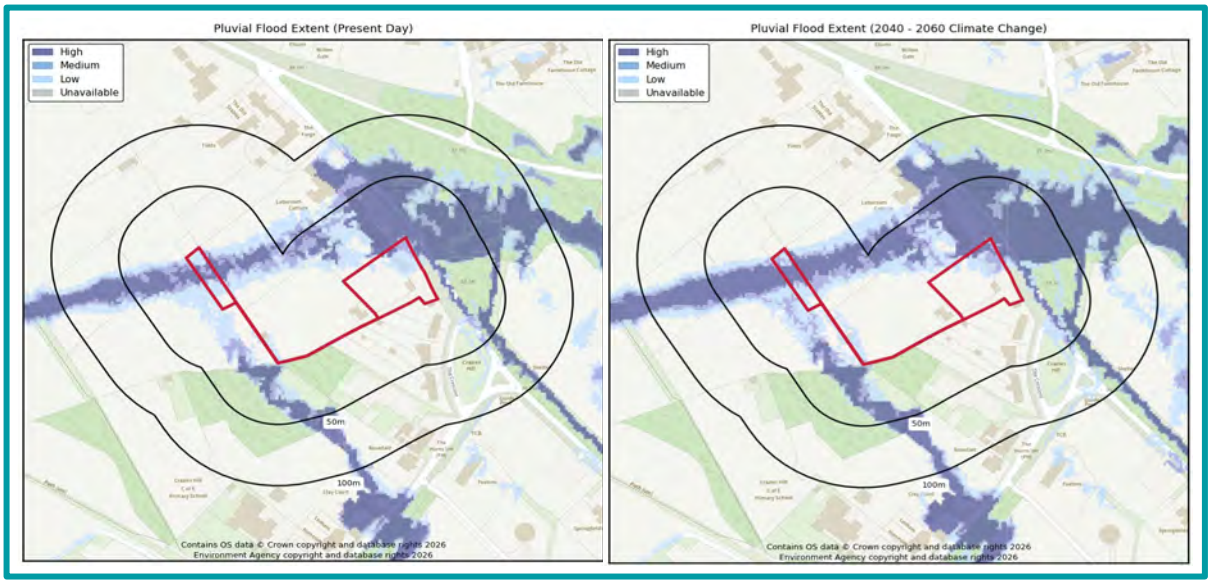
Figure 8. Risk of flooding from rivers & sea map (EA, 2026)



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 during both the present day and climate change (2036 to 2069) scenarios, with less than 0.1% annual probability of flooding. Therefore, the SuDS design is unlikely to be affected.

Further analysis could be undertaken by contacting the Local Council and the EA to confirm the risk and the associated flood depths.

Figure 9. Risk of surface water flooding map (EA, 2026)

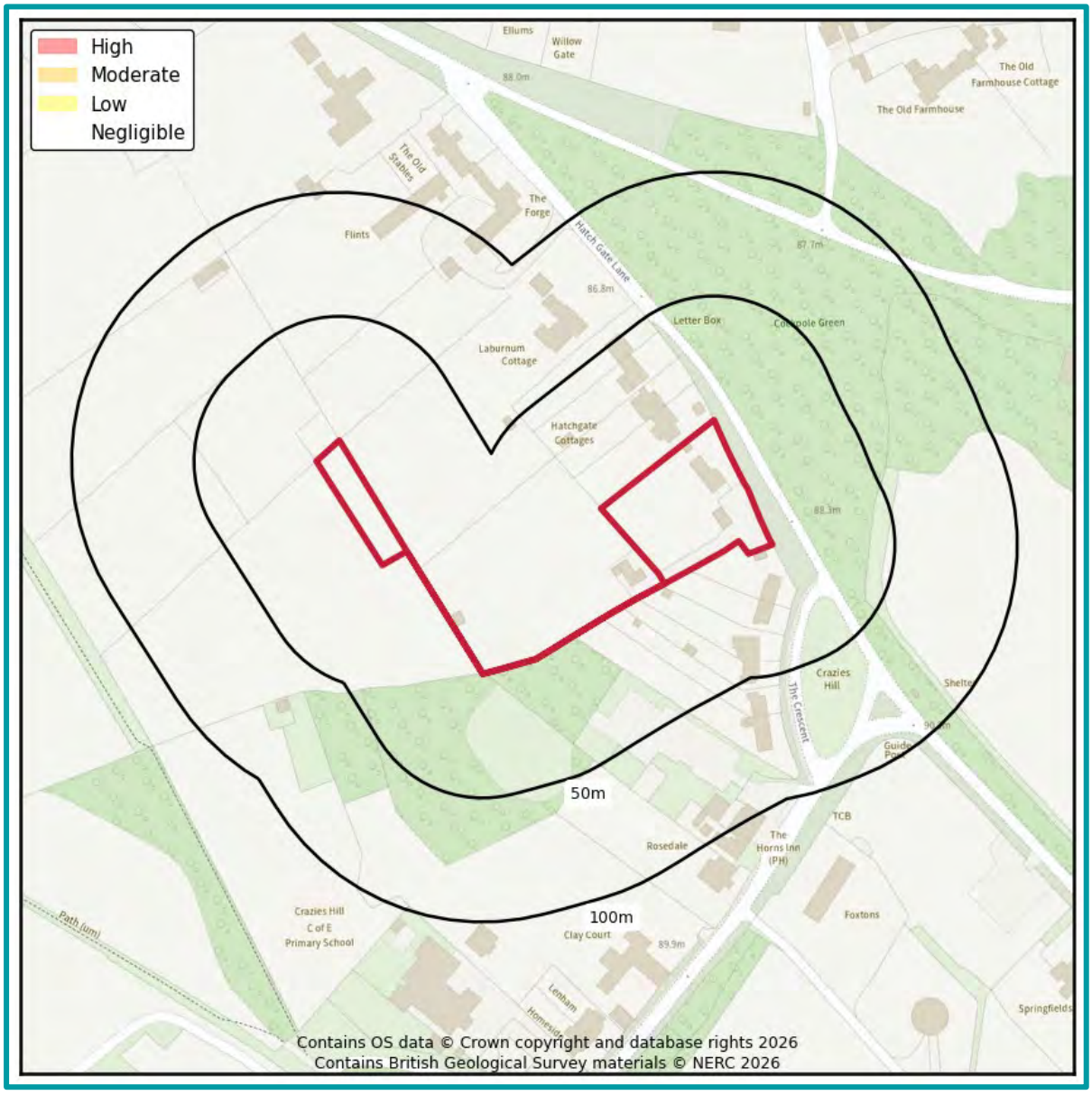


The EA's Risk of Flooding from Surface Water (RoFSW) mapping confirms the Site is considered to be at Very Low to High risk of surface water flooding during both the present day and climate change (2050s) scenarios.

The above map shows the extent 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 there are areas where flooding could occur in the 1 in 30 year, 1 in 100 year and 1 in 1000 year events during the present day and climate change scenarios. Flooding in these areas may constrain certain types of SuDS features being used.

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

Figure 10. Groundwater flood risk (GW5) map (GeoSmart, 2026)



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-specific ground investigation (Groundfirst, 2025; report included in Appendix D) did not encounter groundwater to a proven depth of 2.20 m; as such, the SuDS features are unlikely to be affected by shallow groundwater.

5 Site context

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 Hatchgate End, Hatchgate Lane, Cockpole Green, Wargrave, Reading, RG10 8NE ('the Site'). The Site is located within a setting of predominantly mixed rural and residential land use.

Development

The Site is currently used within a residential capacity. At present there is a residential building situated in the north west of the Site (two semi-detached properties which have since been merged to form one house) with stone paved areas surrounding it and a gravel driveway. There is also an outbuilding located on the southwest of the Site and an empty agricultural field located to the west of the residential building.

It is understood that the Site currently drains surface water runoff from the outbuilding to a 7500 litre rainwater harvesting tank present within the neighbouring field which is below ground level. The overflow from the existing rainwater harvesting tank is piped to a soakaway constructed c. 40 m to the south-west of the Site. The soakaway is understood to have a length of 5 m, width of 2m and a depth of 2 m. No drainage issues associated with the soakaway have been noted (Groundfirst, 2025; Appendix D).

Existing patio areas that surround the existing property drain to the ground (i.e., runoff flows naturally into the surrounding soft standing) and the existing driveway comprised of gravel is assumed to be permeable.

Development proposals comprise the demolition of the existing building and construction of a new five-bedroom residential building and the retention of parking areas and landscaped areas. Additionally, land within the west of the Site (to the rear of the property) is proposed to be used for the erection of solar panels for use of the residential property. Site plans and drawings are provided in Appendix A.

Geology, permeability, and thickness

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

Table 3. Site Geology

Geology present on-Site		Likely to be permeable?
Superficial geology (Figure 11)	No underlying superficial geology.	X
Bedrock geology (Figure 12)	Lewis Nodular Chalk, Seaford Chalk and Newhaven Chalk Formations (LSNCK) – chalk. Covers c. 15% of the Site.	✓
	Lambeth Group (LMBE) – clay, silt and sand. Remaining c. 85% of the Site.	✓

Site-specific ground investigation was undertaken at the Site in October 2025 (Groundfirst; report included within Appendix D), which included 3 trial pit(s) to a maximum depth of 2.20 m bgl. The results of the investigation are summarised within the table below:

Table 4. Summary of Site Investigation

Strata encountered	Trial Pit TP01		Trial Pit TP02		Trial Pit TP03	
	Depth to base of stratum (m bgl)	Strata composition	Depth to base of stratum (m bgl)	Strata composition	Depth to base of stratum (m bgl)	Strata composition
Topsoil/subsoil	0.30	Mid-brown slightly sandy slightly gravelly silt with roots and rootlets.	0.25	Mid-brown slightly sandy slightly gravelly silt with roots and rootlets.	0.25	Mid-brown slightly sandy slightly gravelly silt with roots and rootlets.
Not specified (assumed Lambeth Group)	0.70	Firm tan-brown gravelly clay with occasional cobbles	0.70	Firm tan-brown gravelly clay with occasional cobbles	0.60	Firm tan-brown gravelly clay with occasional cobbles
	1.20	Soft-firm grey-brown very	1.20	Soft-firm grey-brown very	1.10	Soft-firm grey-brown very

Strata encountered	Trial Pit TP01		Trial Pit TP02		Trial Pit TP03	
	Depth to base of stratum (m bgl)	Strata composition	Depth to base of stratum (m bgl)	Strata composition	Depth to base of stratum (m bgl)	Strata composition
		gravelly clay with frequent cobbles		gravelly clay with frequent cobbles		gravelly clay with frequent cobbles
Not specified (assumed to be bedrock chalk formation)	>2.10 (base of trial pit)	Grey-white chalk with flint cobbles	>2.10 (base of trial pit)	Grey-white chalk with flint cobbles	>2.10 (base of trial pit)	Grey-white chalk with flint cobbles

Figure 11. Superficial Geology (BGS, 2026)

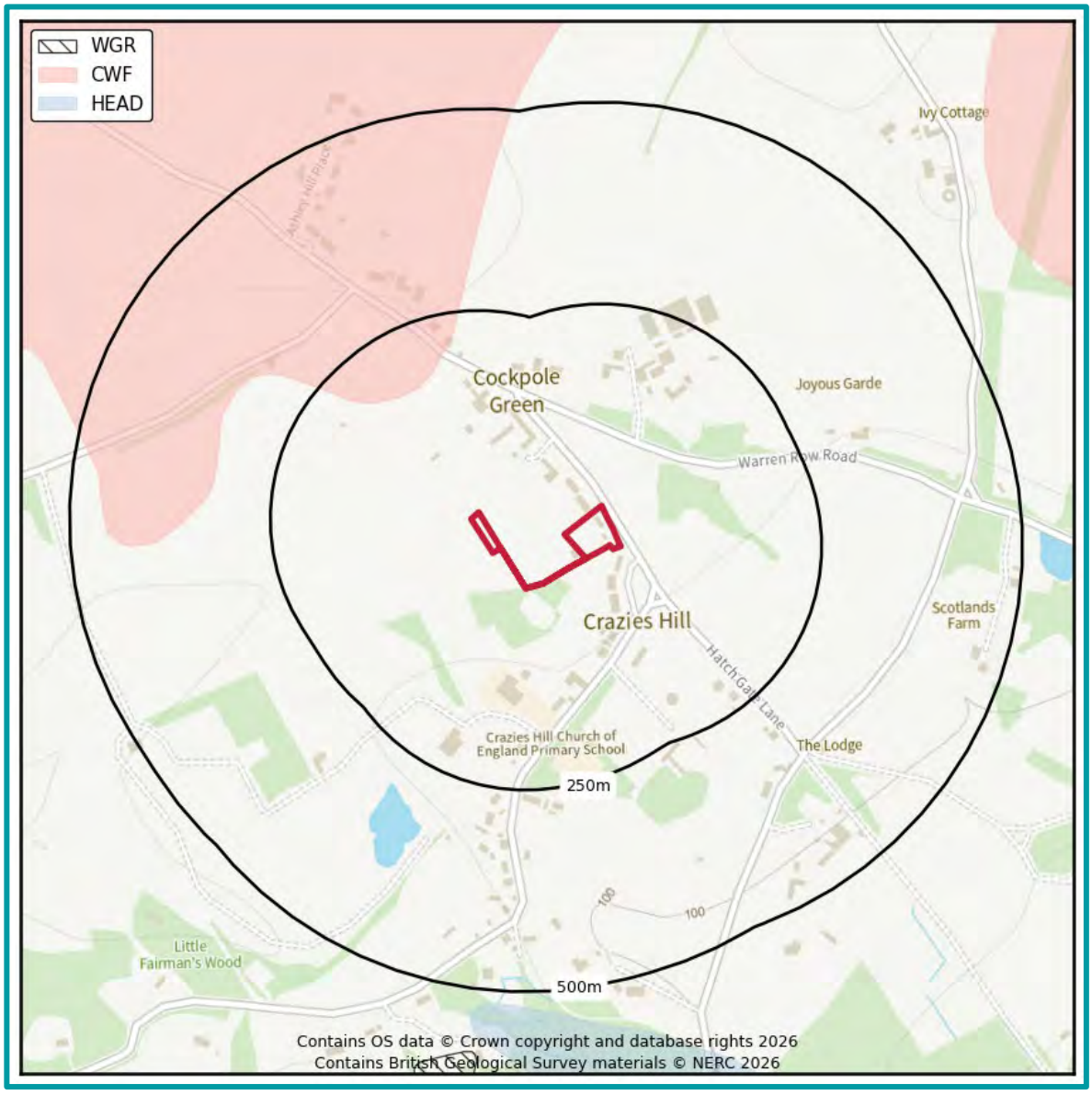
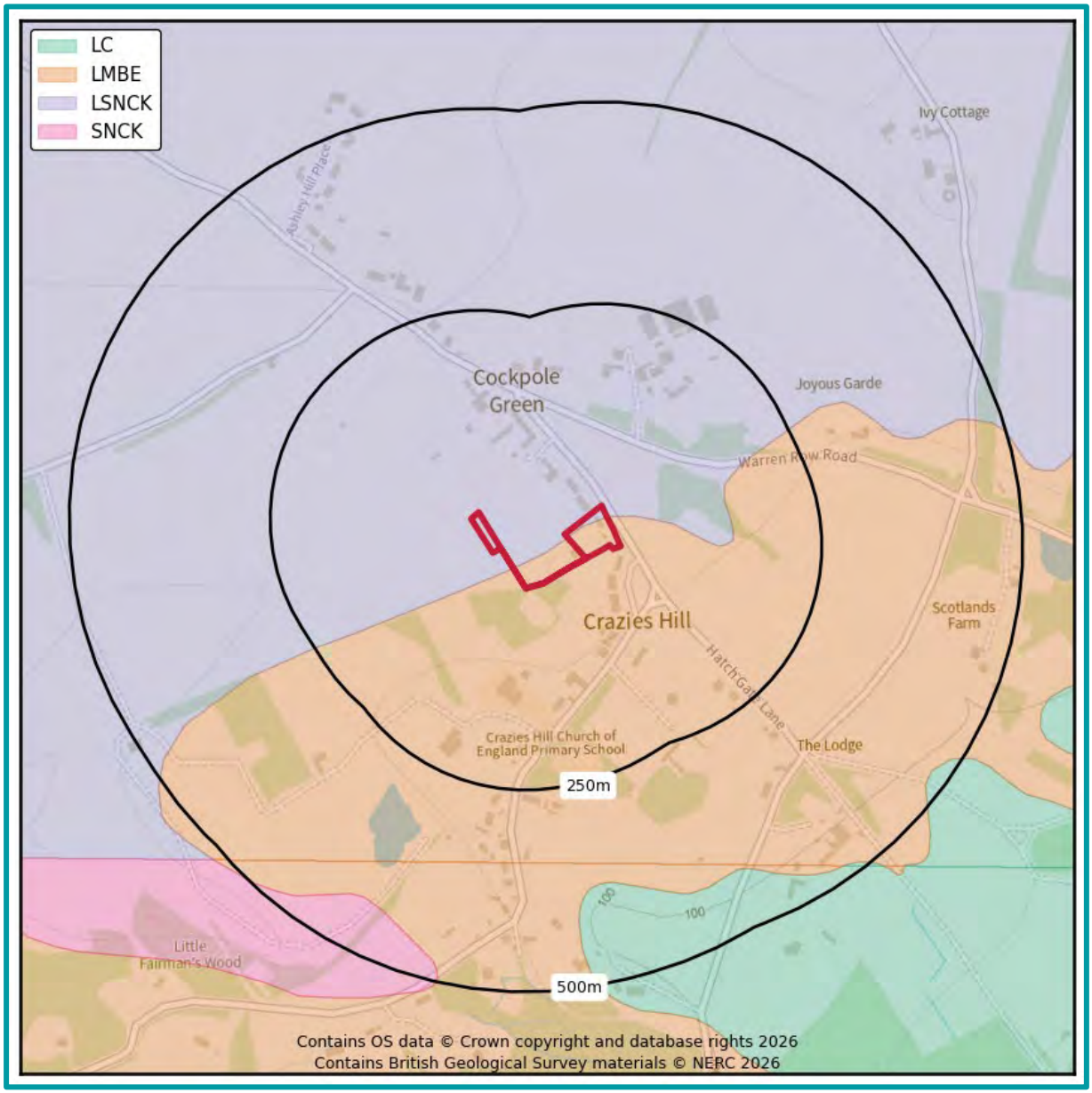


Figure 12. Bedrock Geology (BGS, 2026)



Depth to groundwater

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

On-Site trial pits undertaken as part of Site-specific ground investigation (Groundfirst; 2025; Appendix D), did not encounter groundwater to a maximum depth of 2.2 m bgl.

According to Site-specific ground investigation and GeoSmart's Groundwater Flood Risk (GW5) map, shallow groundwater is unlikely to be an issue at the Site.

Ground conditions

A Site specific 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 dissolution or shallow mining. Hazards that should be considered include soluble rocks, landslides, compressible ground, collapsible ground, shrink-swell clays, running sand and shallow mining.

Soakaways should be a minimum of 5m away from the foundations of a building and local guidance may recommend a greater distance, such as 10m on some areas of the Chalk. A detailed ground assessment is recommended: on steep slopes where infiltrating water would produce saturation and instability downslope; or within layered geology, where infiltrating water would produce springs down gradient.

Infiltration testing undertaken within one of the trial pits (TP02) as part of the ground investigation (Groundfirst, 2025; report included within Appendix D) has confirmed an infiltration rate of $5x10^{-5}$ m/s (0.18 m/hr), which would be sufficient to feasibly accommodate focused infiltration SuDS features. It should be noted that infiltration test results that insufficient infiltration occurs within TP01 and TP03. This suggests the chalk deposits beneath the Site vary locally in their infiltration characteristics.

Infiltration SuDS are proposed directly into a bedrock chalk in a similar location to TP02.

Water quality

The Site lies within an SPZ, therefore consultation with the Local Authority and assessment of historical land uses should be undertaken to confirm the presence of contaminated material; as this could limit the use of infiltration SuDS

Infiltration systems should not be used where there is a risk of contaminating groundwater by infiltrating polluted runoff or where receiving groundwater is particularly sensitive.

The influence of surface runoff on water quality will depend on whether there is a source of contamination on-Site and the sensitivity of the receiving environment, either groundwater or surface water. The intervening pathway from source to receptor including mitigation and natural attenuation will determine the final impact.

The impact of contaminants on the groundwater will be reduced by travel and natural attenuation through the unsaturated soil zone. A greater depth of unsaturated zone and the presence of significant clay and organic material will provide greater protection for the underlying groundwater. Rapid flow through fractures will provide less protection than intergranular flow around soil and rock particles.

6 Runoff destination

National Standard 1: runoff destinations

Options for the destination for the runoff generated on-Site have been assessed in line with the prioritisation set out in DEFRA's national standards for sustainable drainage systems (2025).

Priority 1: Collection for non-potable use

An assessment of the potential for rainwater collection and re-use across the proposed development has been undertaken, which confirms that there is the potential for the provision of rainwater harvesting measures at the Site. Captured water could be used to water vegetation in order to provide additional amenity and biodiversity benefits.

Rainwater harvesting is already implemented at the existing outbuildings. A 7500 litre tank was constructed in the adjacent field to drain surface water runoff and an overflow was provided by a 5 m x 2 m x 2 m soakaway to the south west of the tank.

The client has suggested that they may wish to install a rainwater harvesting tank, similar to an existing tank already in place to collect surface water from an outbuilding on the Site, this would be an acceptable alternative to the rainwater harvesting butts if preferred by the client.

Priority 2: Discharge to ground

According to GeoSmart's SD50 screening data, the Site has Low to High potential for infiltration. Based on the available hydrogeological information (Section 5) the permeability of the underlying strata has been confirmed to be sufficient to accommodate focused infiltration SuDS features, and shallow groundwater is unlikely to be a concern at the Site.

There are no known issues identified relating to Site contamination, but the Site is located within a SPZ.

Infiltration SuDS are proposed directly into a bedrock chalk aquifer identified with sufficient infiltration rates to implement a SuDS feature confirmed at the location of trial pit TP02.

The current overflow for the rainwater harvesting tank at the site is discharge to ground via a soakaway, the client has reported no drainage issues associated with the soakaway which was installed in 2024. Additionally, surface water runoff generated from the existing paving which surrounds the existing residential building currently discharges to the ground.

Priority 3: Discharge to above ground surface water body

Ordnance Survey (OS) mapping indicates that there are no surface water features within 100 m of the Site; therefore, discharge to surface water feature is not feasible.

Priority 4: Discharge to surface water sewer

According to the Thames Water asset location plan obtained for the Site (Appendix C), there are no public surface water sewers within the vicinity of the Site.

Due to the significant distance to the nearest public sewer, discharge of runoff to surface water sewer is not considered to be feasible for the Site and is not proposed.

Runoff from the existing residential building is assumed in the Site investigation (Groundfirst, 2025) to be discharged to a municipal sewer within Hatchgate Lane as excavation uncovered pipework which heads towards the highway. However, records from Thames Water do not indicate the presence of a sewer within this highway.

Priority 5: Discharge to combined sewer

According to the Thames Water asset location plan obtained for the Site (Appendix C), there are no public combined sewers within the vicinity of the Site.

Due to the significant distance to the nearest public combined sewer, discharge of runoff to combined sewer is not considered to be feasible for the Site and is not proposed.

7 Storage, volume and peak flow rate

Urban creep

According to Paragraph 3.3 of the DEFRA National standards for SuDS, urban creep should be taken into account as part of the SuDS design. Urban creep accounts for the potential for impermeable areas to increase over the lifespan of a development, such as extensions to proposed building footprints and increases in patio areas.

Therefore, in accordance with the required allowance for a Site with external private permeable spaces, a 10% urban creep allowance has been applied to the proposed impermeable areas.

Surface water runoff

An increase in impermeable areas on-Site will result in greater rainfall runoff. A reduction in runoff will help mitigate flood risk both on and off-Site.

Table 5. Change in impermeable area associated with the development

Total Site area	2971 m^2
Impermeable area (and as a percentage of the total area of the proposed development footprint of 2831 m^2) †	
Pre-development	Post-development
219 m^2 (8%)	280 m^2 (9%)‡
Impermeable land use: 107 m^2 residential building, 95 m^2 paved areas, 17 m^2 timber sheds Permeable land use: 2244 m^2 landscaped areas, 368 m^2 gravel parking areas	New impermeable land use: 230 m^2 residential building, 24 m^2 paved areas New permeable land use: N/A

‡ An additional 10% Urban Creep uplift factor has been applied to the post-development impermeable area in order to account for the potential for impermeable areas to increase over the lifespan of a development.

† An c. 140 m^2 area consisting of the garage and outbuilding is understood to be unaffected by the development proposals. As such, this area is considered to drain as existing and has been excluded from the drainage calculations.

For the area of the proposed solar panels, it is assumed that grass cover will be maintained both beneath and around the panels. As this will result in negligible loss of soil cover, any increase in surface water runoff is expected to be insignificant and these areas have therefore been excluded from the calculations.

Suggested minimum and aspirational storage requirements for an infiltration SuDS scheme for the development footprint are set out below, with more detail provided in subsequent sections.

Table 6. Storage requirements for the proposed development (discharge of runoff via infiltration)

Attenuation scenario	Attenuation required (m^3)	Explanation
1 in 100 year including 40% CC	14.41	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. Calculations are based on the most conservative measured infiltration rate of $5x10^{-5}$ m/s (0.18 m/hr) as confirmed through Site-specific infiltration testing (Groundfirst, 2025; report included in Appendix D)

Peak discharge rates

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 runoff is disposed of via infiltration, there will be no discharge off-Site.

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.

Table 7. 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	0.05	N/A	N/A	N/A
6 hour 1 in 1 year	0.04	0.58	0.64	0.07
6 hour 1 in 10 year	0.08	0.97	1.08	0.11
6 hour 1 in 30 year	0.11	1.25	1.39	0.14
6 hour 1 in 100 year	0.16	1.57	1.74	0.18
6 hour 1 in 100 year + 20% CC	N/A	N/A	2.09	0.53
6 hour 1 in 100 year + 40% CC	N/A	N/A	2.44	0.87

[1] Assumes 100% runoff from impermeable surfaces. Assumes Greenfield runoff from permeable surfaces calculated using the IoH124 method.

Relevant national, regional and local planning policy has been consulted in Section 3 to determine restrictions on runoff from previously developed and greenfield sites. In some cases, greenfield rates may be requested, but in practice it is difficult to restrict discharge rates at any one control point to less than 1 l/s, without increasing the risk of any potential blockages occurring in the drainage network.

Total discharge volumes

The table overleaf presents discharge volumes for a range of storm events used to assess the impact of the proposed development and calculate the required storage volumes.

Table 8. 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	7.86	N/A	N/A	N/A
6 hour 1 in 1 year	7.33	12.43	13.83	1.41
6 hour 1 in 10 year	12.53	20.95	23.27	2.32
6 hour 1 in 30 year	15.88	26.94	29.99	3.05
6 hour 1 in 100 year	19.95	33.83	37.67	3.83
6 hour 1 in 100 year + 20% CC	N/A	N/A	45.20	11.36
6 hour 1 in 100 year + 40% CC	N/A	N/A	52.73	18.90

[2] Assumes 100% runoff from impermeable surfaces. Assumes Greenfield runoff from permeable surfaces, as calculated using the IoH124 method.

8 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 lies within an SPZ and therefore additional treatment stages may be required.

Table 9. Pollution hazard indices for different land use classifications

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
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 10. 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		

9 Proposed SuDS strategy

Sustainable drainage systems

DEFRA's national standards for SuDS require the below ground drainage systems to have the capacity to accommodate at least the 1 in 30 year event and to manage the 1 in 100 year event without flooding of on-site buildings and substations. All runoff should be managed on-Site though for the 1 in 100 year event, accounting for the maximum impacts of climate change to ensure flood risk is not increased to third-parties.

It is assumed that drainage from areas outside the development footprint will continue to use existing drainage arrangements.

A surface water drainage strategy (summarised in Section 2 of this report) includes the following SuDS features to intercept, attenuate and treat surface water runoff.

SuDS Strategy:

Ground conditions at the Site are conducive to infiltration. Surface water runoff will be managed within SuDS features and infiltrated to ground.

Table 11. Proposed SuDS type, features, discharge location and rate restriction

SuDS type	Source control (interception) and infiltration SuDS.
SuDS features	Soakaway.
Discharge location	Infiltration.
Discharge rate	5 x 10^{-5} m/s*.

*Based upon the most conservative measures infiltration rate of 5 x 10^{-5} m/s as confirmed through Site-specific infiltration testing (Groundfirst, 2025).

Table 12. Proposed SuDS sizing (dimensions) and attenuation volumes

Rainwater Harvesting	Rainwater harvesting butts should be established for the dwelling. In terms of attenuation storage within this SuDS scheme, the volume of run-off which could be attenuated by rainwater harvesting has not been considered within the preliminary SuDS schematic. The client has suggested that they may wish to install a rainwater harvesting tank, similar to an existing tank already in place to collect surface water from an outbuilding on the Site, this would be an acceptable alternative to the rainwater harvesting butts if preferred by the client.

Soakaway	A soakaway should be placed in the location at which TP02 was dug during the course of infiltration testing (Groundfirst, 2025), with a length of 4 m, width of 2 m, depth of 2 m, comprising geocellular crates with a void ratio of 95%, would provide c. 15.20 m^3 of attenuation.
Total attenuation provided	15.20 m^3
Total attenuation required	14.41 m^3
Freeboard storage provided	0.79 m^3

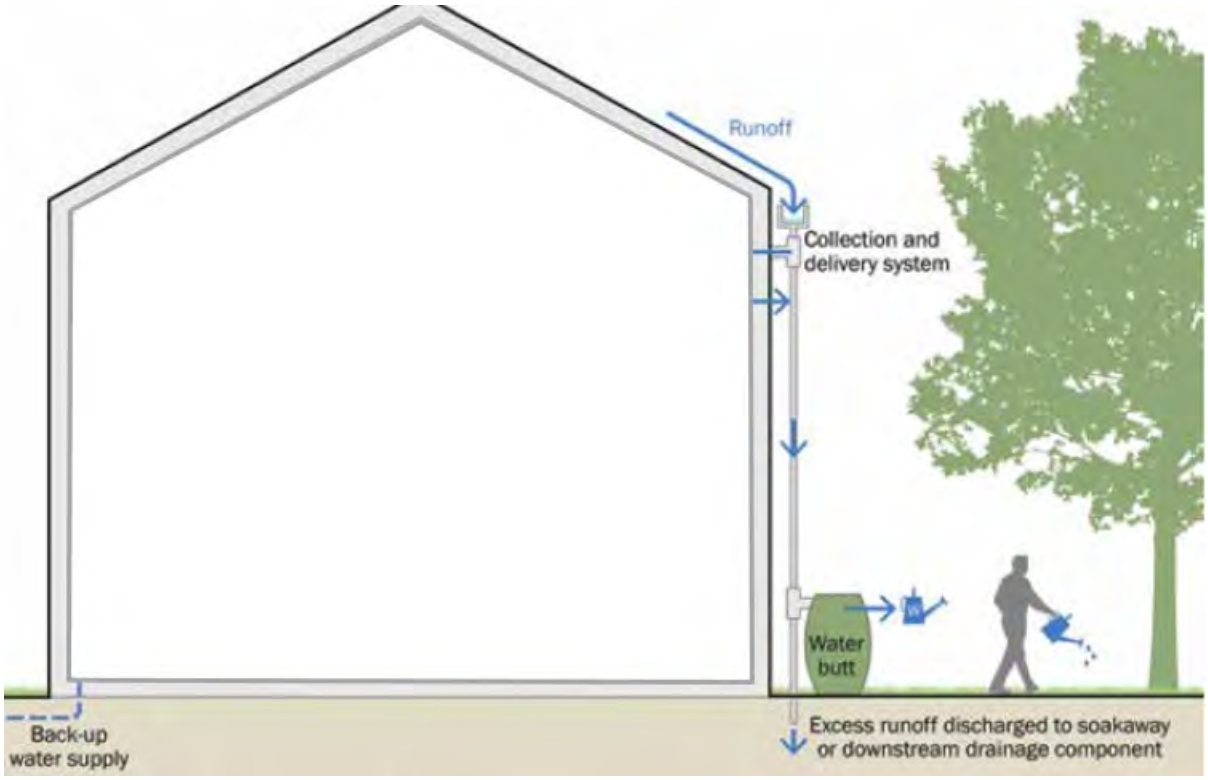
Rainwater harvesting

To comply with London Plan policy, a rainwater harvesting butt is proposed. The run-off from the proposed development roof should be led into rainwater harvesting butts via rainwater downpipes and guttering to catch run-off from the roof.

Due to the relatively insignificant amounts of attenuation provided by rainwater harvesting tanks in this instance and the requirement to retain water for non-potable uses such garden maintenance, the volume of run-off which could be attenuated by rainwater harvesting has not been considered within the report.

As there is an issue with the storage capability of rainwater harvesting tanks, this method should have a fixed attenuation volume and a controlled outlet to discharge into the proposed SuDS feature. An overflow system will be required for implementation on the Site due to exceedance events (where the pumps fail or there is a blockage within the system / or the number of residents and subsequent water usage is reduced).

Roof run-off is generally less polluted than run-off from road surfaces but can still generate pollutants such as sediments. Pollutants would be captured by the collection and filtration system and, by reducing the volume of run-off generated from the Site. Primary screening devices are used to prevent leaves and other debris from entering the butt and first flush devises can be designed to divert the first part of the rainfall away from the main storage tank and can pick up most of the dirt, debris and contaminates that collect on a residential roof.



Modified from Figure 11.3 of the CIRIA SuDS Manual (C753) (2015)

Soakaways

Soakaways are square or circular excavations either filled with rubble or lined with brickwork, pre-cast concrete or polyethylene rings/perforated storage structures surrounded by granular backfill. The supporting structure and backfill can be substituted by modular or geocellular units. The base of the infiltration features should lie at an elevation at least 1 m above the highest winter groundwater levels, to ensure there is sufficient space for surface water to discharge. Soakaway excavation should be outside of the root zone of any protected trees and dimensions will depend on the depth to the sand layer where the soakaway is eventually situated.

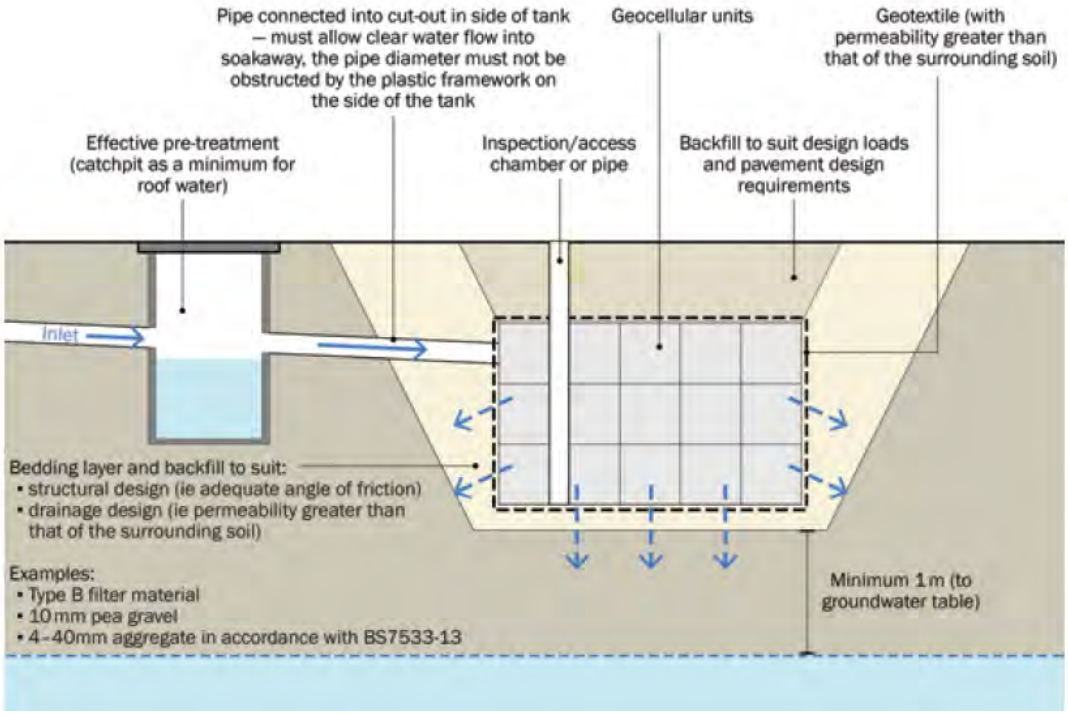


Figure 13.1 of the CIRIA SuDS Manual (C753) (2015)

Exceedance flows

Exceedance flow routes are included within the proposed SuDS drainage layout. Where possible, exceedance flows should be directed into non-essential areas of the Site such as landscaped areas. The SuDS system recommended for the Site should provide enough storage that this method would only be utilised during a worst case scenario.

10 SuDS maintenance

Regular maintenance is essential to ensure effective operation of the SuDS features over the intended lifespan of the proposed development. The SuDS Manual (C753) (CIRIA, 2015) provides a maintenance schedule for SuDS with details of the necessary required actions as shown in the Table below.

Table 13. SuDS operation and recommended maintenance requirements

Asset type	Maintenance schedule (and frequency)
Soakaways	Regular maintenance: • Remove sediment and debris from pretreatment and inspection chamber. Clean gutters, filters, downpipes. Trim roots prevent blockages (annually). • Reconstruct/ clean if performance deteriorates, replace clogged geotextile (as required) Monitoring: • Inspect inlets/outlets, silt traps – note rate of accumulation (monthly). • Check water levels and emptying time (annually).
Underground drainage pipe network	Regular maintenance: • Remove sediment and debris from pre-treatment devices and floor of inspection tube or chamber (annually). • Cleaning of gutters and any filters on downpipes (annually). • Trimming any roots that may be causing blockages (annually or as required). Monitoring: • Inspect silt traps and note rate of sediment accumulation (monthly in the first year and then annually).
Rainwater harvesting	Regular maintenance: • Inspection of tank for debris and sediment build up (annually and following poor performance). • Inspection of inlets, outlets, overflow areas, pumps and filters (annually and following poor performance). • Cleaning of tank, inlets, outlets, gutters, roof drain filters and withdrawal devices (annually or as required). Remedial actions: • Repair or overflow erosion damage or damage to tank and associated components (as required)

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.

11 Background information

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 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, 2024). For the impermeable surfaces, it has been assumed that 100% runoff will occur (calculations provided in Appendix B). 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.

12 Additional Products

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.

13 References and glossary

British Geological Survey [BGS] (2026). GeoIndex Onshore. Accessed from: https://www.bgs.ac.uk/map-viewers/geoindex-onshore/ on 15/01/26.

Building Research Establishment [BRE] (2016). Digest 365, Soakaway design.

CEH (2026). Online FEH web service Depth/duration/frequency modelling using the FEH 2022 model. Accessed from: https://fehweb.ceh.ac.uk/ on 15/01/26.

CIRIA (2015). The SuDS manual (C753).

Department for Environment, Food and Rural Affairs [DEFRA] (2025). National standards for sustainable drainage systems (SuDS).

Environment Agency [EA] (2026). MagicMap. Accessed from: https://magic.defra.gov.uk/MagicMap.html on 15/01/26.

GeoSmart (2026). GeoSmart GW5 Version 2.4.

Groundfirst (2025). Infiltration testing: Hatchgate End, Hatchgate Lane, Wargrave, Reading. Report reference: 4454R1.

HM Government (2010). The building regulations 2010 Part H drainage and waste disposal (2015 edition).

LASOO (2015). Practice Guidance, Local Authority SuDS Officer Organisation.

Ministry of Housing, Communities & Local Government (2025). National Planning Policy Guidance (NPPG).

Ministry of Housing, Communities & Local Government (2024). National Planning Policy Framework (NPPF).

Wokingham Borough Council (2017). Wokingham SuDS Strategy – Guidance on the use of sustainable drainage systems. Accessed from: https://www.wokingham.gov.uk/community/community-and-safety/emergencies/flooding-and-drainage/sustainable-drainage-systems-suds-strategy on 15/01/26.

Thames Water (2025). Asset Location Plan. Ref: ALS/ALS Standard/2025_5267487

GeoSmart Information

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.
Source Protection Zone (SPZ)	Areas where groundwater supplies are at risk from potentially polluting activities and accidental releases of pollutants. They are a policy tool used to control activities close to water supplies intended for human consumption.
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 2026
Topographic Data	OS LiDAR/EA Contains Ordnance Survey data © Crown copyright and database right 2026 Environment Agency copyright and database rights 2026

14 Appendices

GeoSmart Information

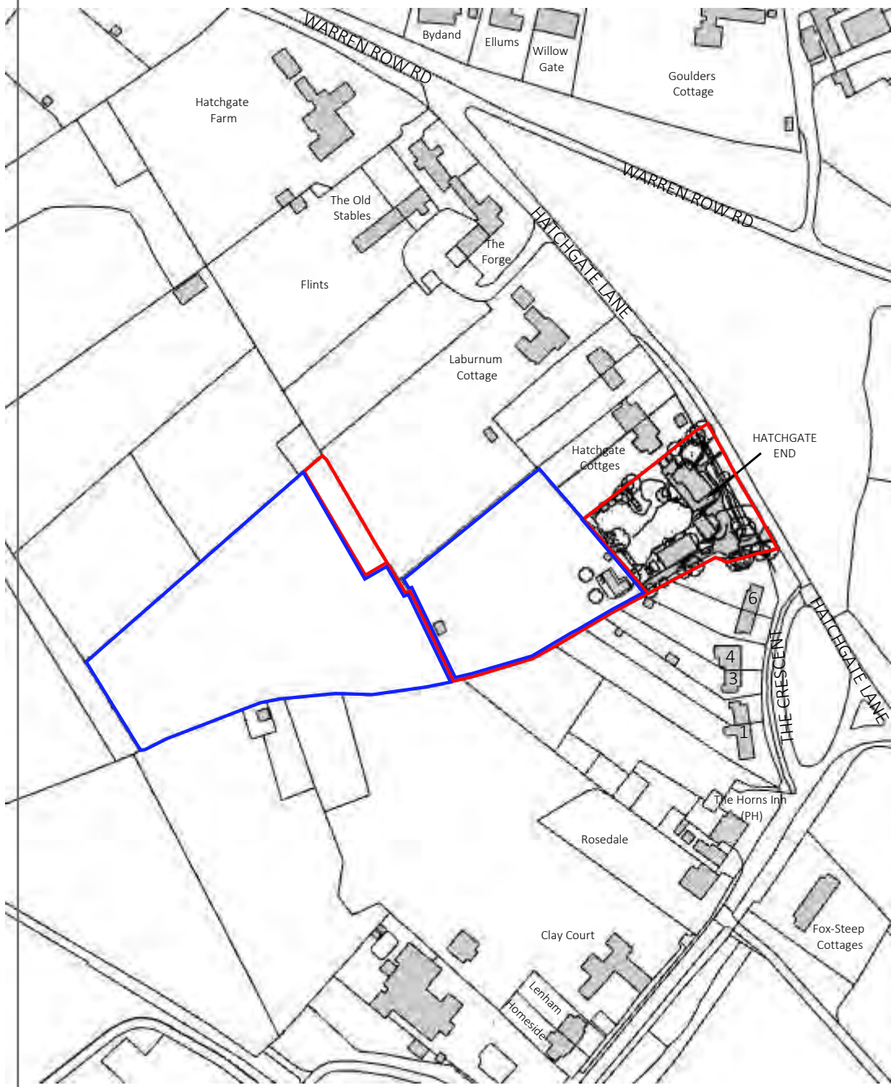
Appendix A

Site plans

KEY

Application boundary

Other land owned by applicant



LOCATION PLAN

Existing

Scale 1:2500

1:2500 / 1:1

0 50 100 150 200 250m

0 0.1m

BLOCK PLAN

Existing

Scale 1:500

1:500 / 1:1

0 10 20 30 40 50m

0 0.1m

N

OAKWRIGHTS®

M	Amends	29.05.25	JL
L	Amends	29.05.25	JL
K	Client Amends	28.05.25	JL
J	Client Amends	28.05.25	JL
I	Client Amends	27.05.25	JL
H	Client Amends	22.05.25	JL
F	Client Amends	20.05.25	JL
E	Client Amends	09.05.25	JL
D	Client Amends	09.05.25	JL
C	Client Amends	08.05.25	JAC
B	Client Amended Floor Plans	17.04.25	JAC
A	Client Amended Floor Plans	02.04.25	JAC
-	Preliminary issue	18.03.25	JAC

DRAWINGS PRODUCED BY

T.J. Crump Oakwrights Ltd
The Lakes, Swainshill,
Hereford, HR4 7PU

+44 (0)1432 353353
enquiries@oakwrights.co.uk

CLIENT
Mr And Mrs Hart

SITE ADDRESS
Hatchgate End,
Hatchgate Lane,
RG10 8NE

PROJECT
Proposed Dwelling

DEPARTMENT
ARCHITECTURE

DRAWING
EXISTING LOCATION PLAN

SCALE
1:2500 and 1:500 @ A3

DATE DRAWN
18.03.25

DATE ISSUED
29.05.25

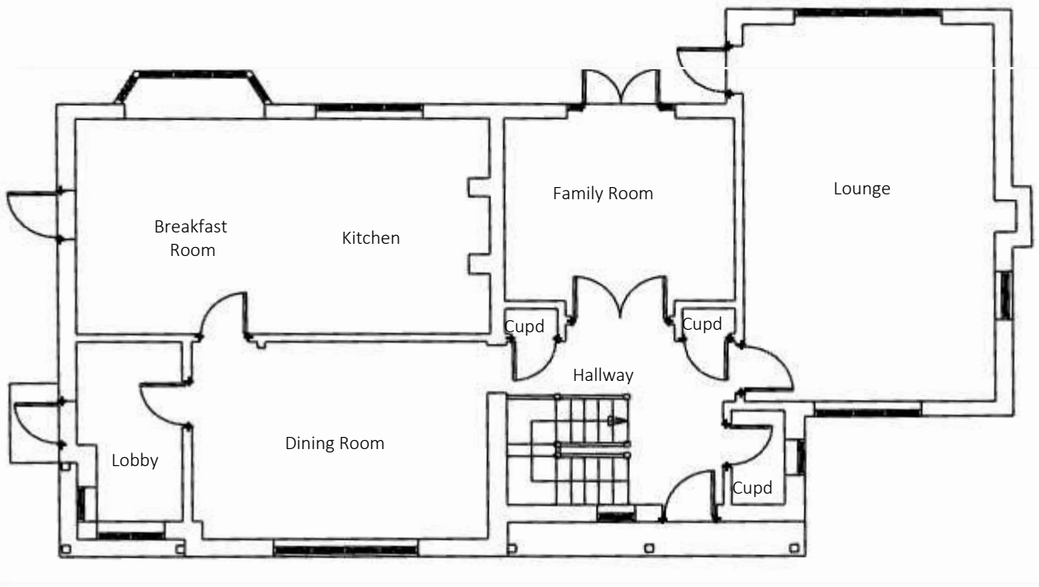
DRAWN
JAC/JL

CHECKED

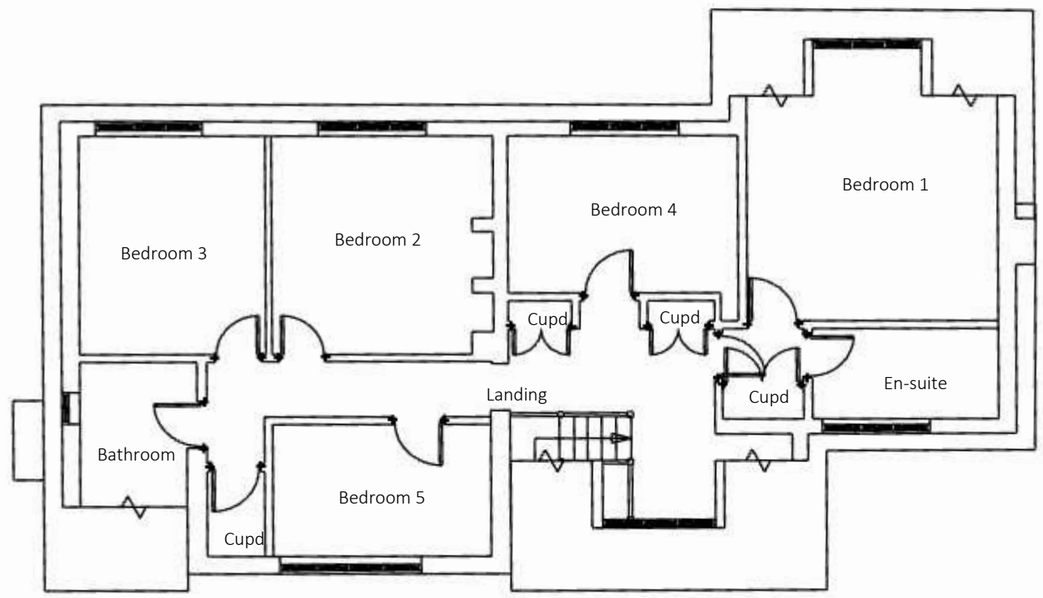
ISSUE STATUS
PLANNING

DRG. NO.
2748.1.2- HAR-01

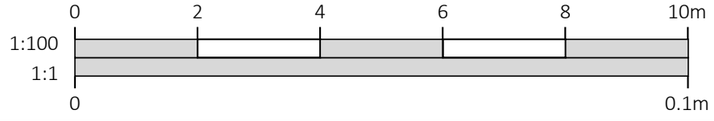
REV.
M



GROUND FLOOR PLAN
Existing
Scale 1:100



FIRST FLOOR PLAN
Existing
Scale 1:100



OAKWRIGHTS®

M	Amends	29.05.25	JL
L	Amends	29.05.25	JL
K	Client Amends	28.05.25	JL
J	Client Amends	28.05.25	JL
I	Client Amends	27.05.25	JL
H	Client Amends	22.05.25	JL
F	Client Amends	20.05.25	JL
E	Client Amends	09.05.25	JL
D	Client Amends	09.05.25	JL
C	Client Amends	08.05.25	JAC
B	Client Amended Floor Plans	17.04.25	JAC
A	Client Amended Floor Plans	02.04.25	JAC
-	Preliminary issue	18.03.25	JAC

DRAWINGS PRODUCED BY

T.J. Crump Oakwrights Ltd
The Lakes, Swainshill,
Hereford, HR4 7PU

+44 (0)1432 353353
enquiries@oakwrights.co.uk

CLIENT
Mr And Mrs Hart

SITE ADDRESS
Hatchgate End,
Hatchgate Lane,
RG10 8NE

PROJECT
Proposed Dwelling

DEPARTMENT
ARCHITECTURE

DRAWING
EXISTING FLOOR PLANS

SCALE
1:100 @ A3

DATE DRAWN
18.03.25

DATE ISSUED
29.05.25

DRAWN
JAC/JL

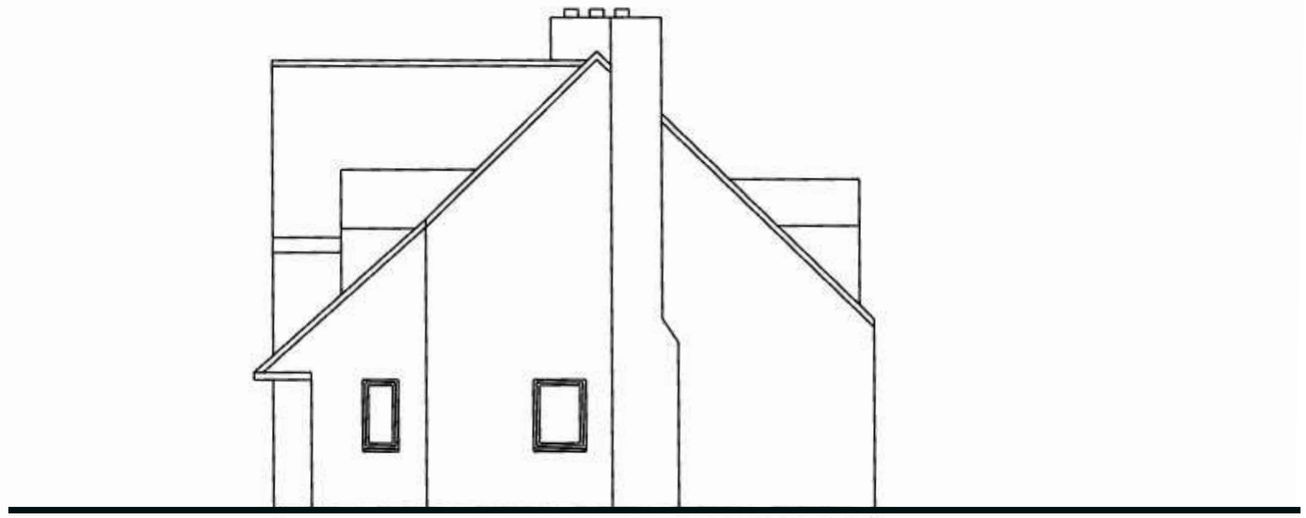
CHECKED

ISSUE STATUS
PLANNING

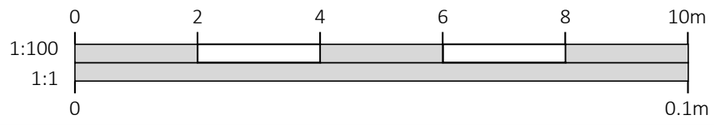
DRG. NO.
2748.1.2- HAR-02

REV.
M

FRONT (EAST) ELEVATION
Existing
Scale 1:100



SIDE (SOUTH) ELEVATION
Existing
Scale 1:100



OAKWRIGHTS®

M	Amends	29.05.25	JL
L	Amends	29.05.25	JL
K	Client Amends	28.05.25	JL
J	Client Amends	28.05.25	JL
I	Client Amends	27.05.25	JL
H	Client Amends	22.05.25	JL
F	Client Amends	20.05.25	JL
E	Client Amends	09.05.25	JL
D	Client Amends	09.05.25	JL
C	Client Amends	08.05.25	JAC
B	Client Amended Floor Plans	17.04.25	JAC
A	Client Amended Floor Plans	02.04.25	JAC
-	Preliminary issue	18.03.25	JAC

DRAWINGS PRODUCED BY

T.J. Crump Oakwrights Ltd
The Lakes, Swainshill,
Hereford, HR4 7PU

+44 (0)1432 353353
enquiries@oakwrights.co.uk

CLIENT
Mr And Mrs Hart

SITE ADDRESS
Hatchgate End,
Hatchgate Lane,
RG10 8NE

PROJECT
Proposed Dwelling

DEPARTMENT
ARCHITECTURE

DRAWING
EXISTING ELEVATIONS

SCALE
1:100 @ A3

DATE DRAWN
18.03.25

DATE ISSUED
29.05.25

DRAWN
JAC/JL

CHECKED

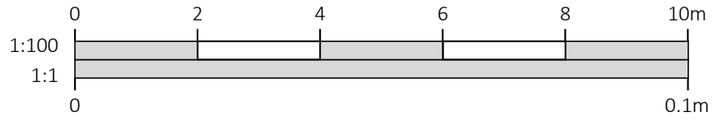
ISSUE STATUS
PLANNING

DRG. NO.
2748.1.2- HAR-03

REV.
M

REAR (WEST) ELEVATION
Existing
Scale 1:100

SIDE (NORTH) ELEVATION
Existing
Scale 1:100



OAKWRIGHTS®

M	Amends	29.05.25	JL
L	Amends	29.05.25	JL
K	Client Amends	28.05.25	JL
J	Client Amends	28.05.25	JL
I	Client Amends	27.05.25	JL
H	Client Amends	22.05.25	JL
F	Client Amends	20.05.25	JL
E	Client Amends	09.05.25	JL
D	Client Amends	09.05.25	JL
C	Client Amends	08.05.25	JAC
B	Client Amended Floor Plans	17.04.25	JAC
A	Client Amended Floor Plans	02.04.25	JAC
-	Preliminary issue	18.03.25	JAC

DRAWINGS PRODUCED BY

T.J. Crump Oakwrights Ltd
The Lakes, Swainshill,
Hereford, HR4 7PU

+44 (0)1432 353353
enquiries@oakwrights.co.uk

CLIENT
Mr And Mrs Hart

SITE ADDRESS
Hatchgate End,
Hatchgate Lane,
RG10 8NE

PROJECT
Proposed Dwelling

DEPARTMENT
ARCHITECTURE

DRAWING
EXISTING ELEVATIONS

SCALE
1:100 @ A3

DATE DRAWN
18.03.25

DATE ISSUED
29.05.25

DRAWN
JAC/JL

CHECKED

ISSUE STATUS
PLANNING

DRG. NO.
2748.1.2- HAR-04

REV.
M

Existing Hardstanding - Excluding the House and Outbuildings

543.09 m2

Proposed Hardstanding - Excluding the House

486.95 m2

Decrease of

10.4 %

KEY

- Application boundary
- Buildings to be removed
- Other land owned by applicant
- Root Protection Areas

OAKWRIGHTS®

M	Amends	29.05.25	JL
L	Amends	29.05.25	JL
K	Client Amends	28.05.25	JL
J	Client Amends	28.05.25	JL
I	Client Amends	27.05.25	JL
H	Client Amends	22.05.25	JL
F	Client Amends	20.05.25	JL
E	Client Amends	09.05.25	JL
D	Client Amends	09.05.25	JL
C	Client Amends	08.05.25	JAC
B	Client Amended Floor Plans	17.04.25	JAC
A	Client Amended Floor Plans	02.04.25	JAC
-	Preliminary issue	18.03.25	JAC

DRAWINGS PRODUCED BY

T.J. Crump Oakwrights Ltd
The Lakes, Swainshill,
Hereford, HR4 7PU

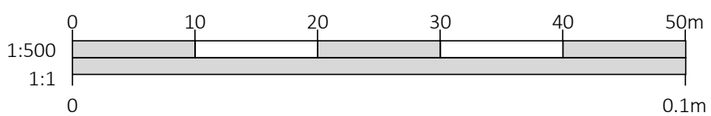
+44 (0)1432 353353
enquiries@oakwrights.co.uk

CLIENT
Mr And Mrs Hart

SITE ADDRESS
Hatchgate End,
Hatchgate Lane,
RG10 8NE

PROJECT
Proposed Dwelling

BLOCK PLAN
Scale 1:500



DEPARTMENT
ARCHITECTURE

DRAWING
PROPOSED BLOCK PLAN

SCALE
1:500 @A3

DATE DRAWN
18.03.25

DATE ISSUED
29.05.25

DRAWN
JAC/JL

CHECKED

ISSUE STATUS
PLANNING

DRG. NO.
2748.1.2- HAR-05

REV.
M

KEY

- Application boundary
- Other land owned by applicant
- Root Protection Areas

SITE PLAN
Scale 1:1000

0 20 40 60 80 100m
1:1000
1:1
0 0.1m

N

OAKWRIGHTS®

M	Amends	29.05.25	JL
L	Amends	29.05.25	JL
K	Client Amends	28.05.25	JL
J	Client Amends	28.05.25	JL
I	Client Amends	27.05.25	JL
H	Client Amends	22.05.25	JL
F	Client Amends	20.05.25	JL
E	Client Amends	09.05.25	JL
D	Client Amends	09.05.25	JL
C	Client Amends	08.05.25	JAC
B	Client Amended Floor Plans	17.04.25	JAC
A	Client Amended Floor Plans	02.04.25	JAC
-	Preliminary issue	18.03.25	JAC

DRAWINGS PRODUCED BY

T.J. Crump Oakwrights Ltd
The Lakes, Swainshill,
Hereford, HR4 7PU

+44 (0)1432 353353
enquiries@oakwrights.co.uk

CLIENT
Mr And Mrs Hart

SITE ADDRESS
Hatchgate End,
Hatchgate Lane,
RG10 8NE

PROJECT
Proposed Dwelling

DEPARTMENT
ARCHITECTURE

DRAWING
PROPOSED SITE PLAN

SCALE
1:1000 @A3

DATE DRAWN	DATE ISSUED
18.03.25	29.05.25

DRAWN	CHECKED
JAC/JL	

ISSUE STATUS
PLANNING

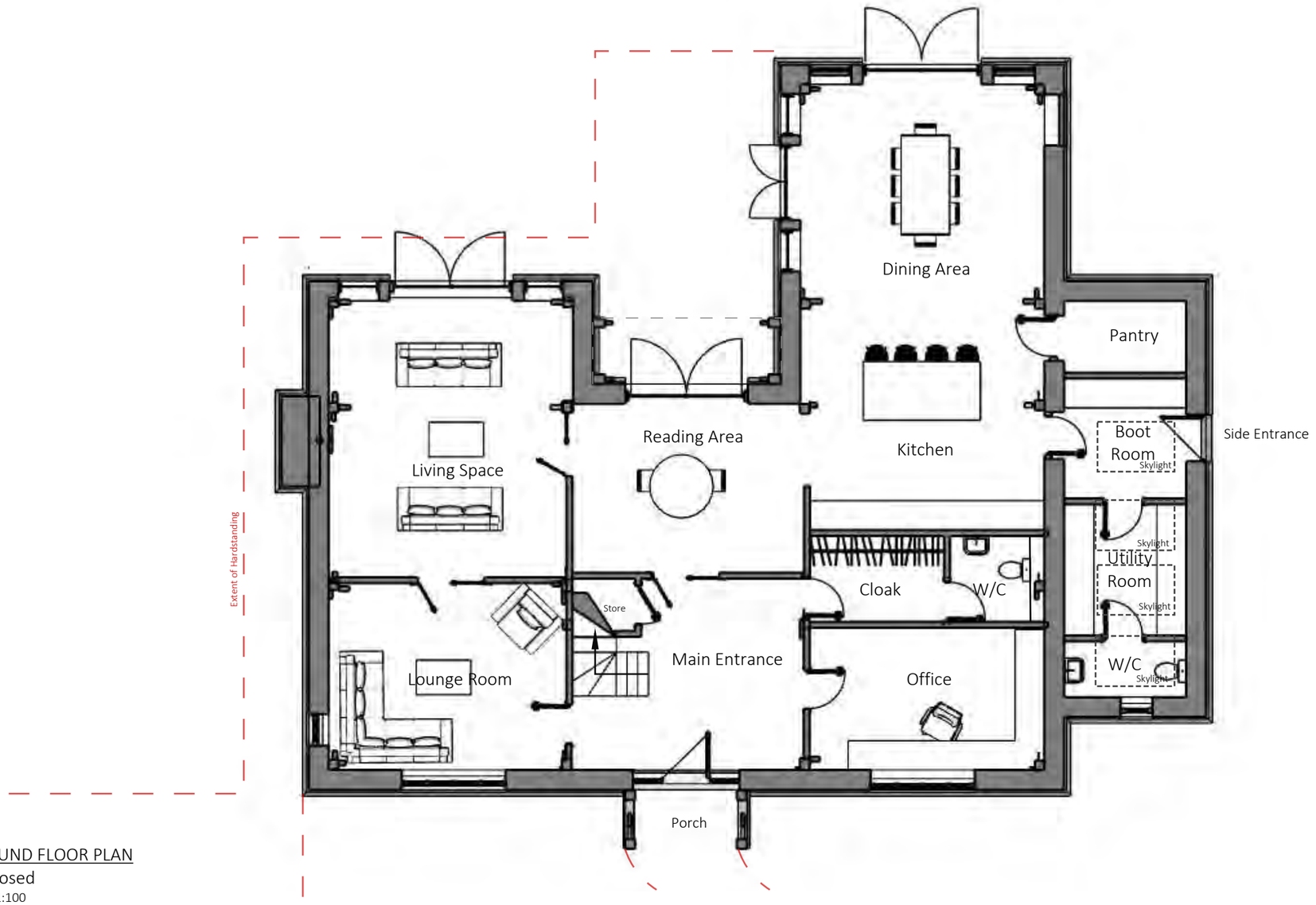
DRG. NO.
2748.1.2- HAR-06

REV.
M

Volume

Existing Volume 779 m³

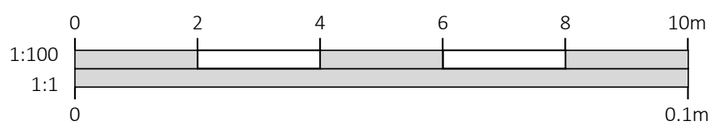
Proposed Volume 1051 m³ (+35%)



GROUND FLOOR PLAN

Proposed

Scale 1:100



OAKWRIGHTS®

M	Amends	29.05.25	JL
L	Amends	29.05.25	JL
K	Client Amends	28.05.25	JL
J	Client Amends	28.05.25	JL
I	Client Amends	27.05.25	JL
H	Client Amends	22.05.25	JL
F	Client Amends	20.05.25	JL
E	Client Amends	09.05.25	JL
D	Client Amends	09.05.25	JL
C	Client Amends	08.05.25	JAC
B	Client Amended Floor Plans	17.04.25	JAC
A	Client Amended Floor Plans	02.04.25	JAC
-	Preliminary issue	18.03.25	JAC

DRAWINGS PRODUCED BY

T.J. Crump Oakwrights Ltd
The Lakes, Swainshill,
Hereford, HR4 7PU

+44 (0)1432 353353
enquiries@oakwrights.co.uk

CLIENT
Mr And Mrs Hart

SITE ADDRESS
Hatchgate End,
Hatchgate Lane,
RG10 8NE

PROJECT
Proposed Dwelling

DEPARTMENT
ARCHITECTURE

DRAWING
PROPOSED FLOOR PLAN

SCALE
1:100 @ A3

DATE DRAWN
18.03.25

DATE ISSUED
29.05.25

DRAWN
JAC/JL

CHECKED

ISSUE STATUS
PLANNING

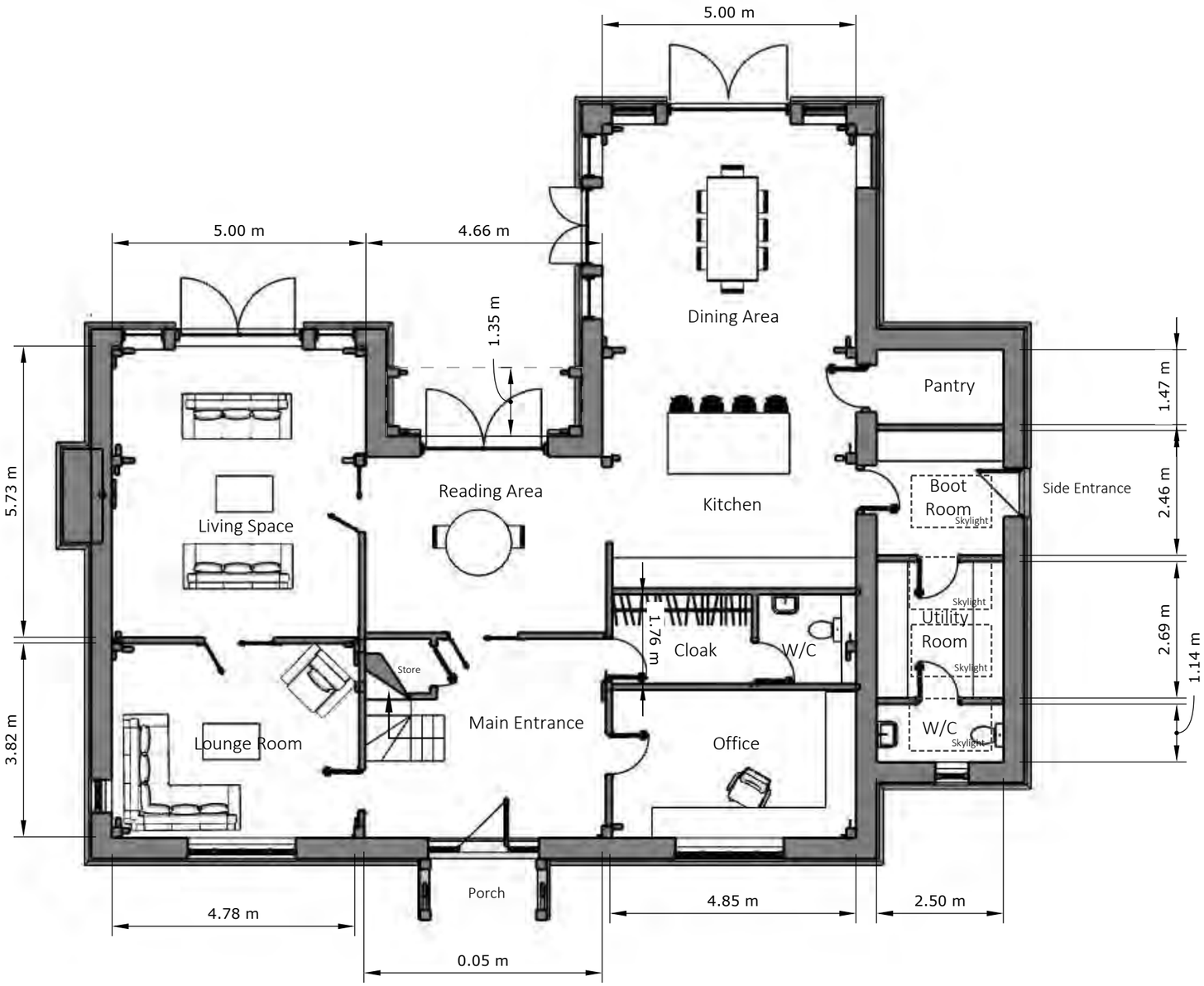
DRG. NO.
2748.1.2- HAR-07

REV.
M

Volume

Existing Volume 779 m³

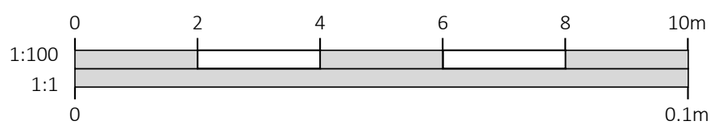
Proposed Volume 1051 m³ (+35%)



GROUND FLOOR PLAN

Proposed

Scale 1:100



OAKWRIGHTS®

M	Amends	29.05.25	JL
L	Amends	29.05.25	JL
K	Client Amends	28.05.25	JL
J	Client Amends	28.05.25	JL
I	Client Amends	27.05.25	JL
H	Client Amends	22.05.25	JL
F	Client Amends	20.05.25	JL
E	Client Amends	09.05.25	JL
D	Client Amends	09.05.25	JL
C	Client Amends	08.05.25	JAC
B	Client Amended Floor Plans	17.04.25	JAC
A	Client Amended Floor Plans	02.04.25	JAC
-	Preliminary issue	18.03.25	JAC

DRAWINGS PRODUCED BY

T.J. Crump Oakwrights Ltd
The Lakes, Swainshill,
Hereford, HR4 7PU

+44 (0)1432 353353
enquiries@oakwrights.co.uk

CLIENT
Mr And Mrs Hart

SITE ADDRESS
Hatchgate End,
Hatchgate Lane,
RG10 8NE

PROJECT
Proposed Dwelling

DEPARTMENT
ARCHITECTURE

DRAWING
PROPOSED FLOOR PLAN

SCALE
1:100 @ A3

DATE DRAWN
18.03.25

DATE ISSUED
29.05.25

DRAWN
JAC/JL

CHECKED

ISSUE STATUS
PLANNING

DRG. NO.
2748.1.2- HAR -07 Dims

REV.
M

Volume

Existing Volume 779 m³

Proposed Volume 1051 m³ (+35%)

FIRST FLOOR PLAN

Proposed

Scale 1:100

0 2 4 6 8 10m

1:100

1:1

0 0.1m

N

OAKWRIGHTS®

M	Amends	29.05.25	JL
L	Amends	29.05.25	JL
K	Client Amends	28.05.25	JL
J	Client Amends	28.05.25	JL
I	Client Amends	27.05.25	JL
H	Client Amends	22.05.25	JL
F	Client Amends	20.05.25	JL
E	Client Amends	09.05.25	JL
D	Client Amends	09.05.25	JL
C	Client Amends	08.05.25	JAC
B	Client Amended Floor Plans	17.04.25	JAC
A	Client Amended Floor Plans	02.04.25	JAC
-	Preliminary issue	18.03.25	JAC

DRAWINGS PRODUCED BY

T.J. Crump Oakwrights Ltd
The Lakes, Swainshill,
Hereford, HR4 7PU

+44 (0)1432 353353
enquiries@oakwrights.co.uk

CLIENT
Mr And Mrs Hart

SITE ADDRESS
Hatchgate End,
Hatchgate Lane,
RG10 8NE

PROJECT
Proposed Dwelling

DEPARTMENT
ARCHITECTURE

DRAWING
PROPOSED FLOOR PLAN

SCALE
1:100 @ A3

DATE DRAWN
18.03.25

DATE ISSUED
29.05.25

DRAWN
JAC/JL

CHECKED

ISSUE STATUS
PLANNING

DRG. NO.
2748.1.2- HAR-08

REV.
M

Volume

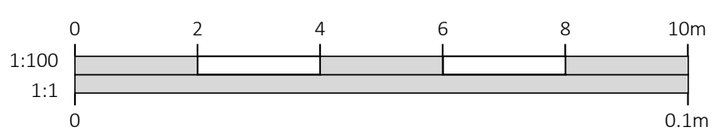
Existing Volume 779 m³

Proposed Volume 1051 m³ (+35%)

FIRST FLOOR PLAN

Proposed

Scale 1:100



OAKWRIGHTS®

M	Amends	29.05.25	JL
L	Amends	29.05.25	JL
K	Client Amends	28.05.25	JL
J	Client Amends	28.05.25	JL
I	Client Amends	27.05.25	JL
H	Client Amends	22.05.25	JL
F	Client Amends	20.05.25	JL
E	Client Amends	09.05.25	JL
D	Client Amends	09.05.25	JL
C	Client Amends	08.05.25	JAC
B	Client Amended Floor Plans	17.04.25	JAC
A	Client Amended Floor Plans	02.04.25	JAC
-	Preliminary issue	18.03.25	JAC

DRAWINGS PRODUCED BY

T.J. Crump Oakwrights Ltd
The Lakes, Swainshill,
Hereford, HR4 7PU

+44 (0)1432 353353
enquiries@oakwrights.co.uk

CLIENT
Mr And Mrs Hart

SITE ADDRESS
Hatchgate End,
Hatchgate Lane,
RG10 8NE

PROJECT
Proposed Dwelling

DEPARTMENT
ARCHITECTURE

DRAWING
PROPOSED FLOOR PLAN

SCALE
1:100 @ A3

DATE DRAWN
18.03.25

DATE ISSUED
29.05.25

DRAWN
JAC/JL

CHECKED

ISSUE STATUS
PLANNING

DRG. NO.
2748.1.2- HAR -08 Dims

REV.
M

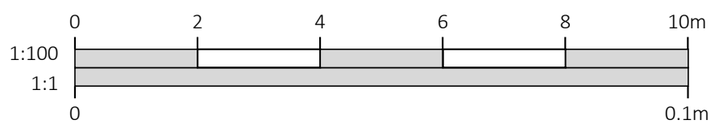
KEY

Area of Existing Dwelling

FRONT (EAST) ELEVATION

Proposed

Scale 1:100



OAKWRIGHTS®

M	Amends	29.05.25	JL
L	Amends	29.05.25	JL
K	Client Amends	28.05.25	JL
J	Client Amends	28.05.25	JL
I	Client Amends	27.05.25	JL
H	Client Amends	22.05.25	JL
F	Client Amends	20.05.25	JL
E	Client Amends	09.05.25	JL
D	Client Amends	09.05.25	JL
C	Client Amends	08.05.25	JAC
B	Client Amended Floor Plans	17.04.25	JAC
A	Client Amended Floor Plans	02.04.25	JAC
-	Preliminary issue	18.03.25	JAC

DRAWINGS PRODUCED BY

T.J. Crump Oakwrights Ltd
The Lakes, Swainshill,
Hereford, HR4 7PU

+44 (0)1432 353353
enquiries@oakwrights.co.uk

CLIENT
Mr And Mrs Hart

SITE ADDRESS
Hatchgate End,
Hatchgate Lane,
RG10 8NE

PROJECT
Proposed Dwelling

DEPARTMENT
ARCHITECTURE

DRAWING
PROPOSED ELEVATIONS

SCALE
1:100 @ A3

DATE DRAWN
18.03.25

DATE ISSUED
29.05.25

DRAWN
JAC/JL

CHECKED

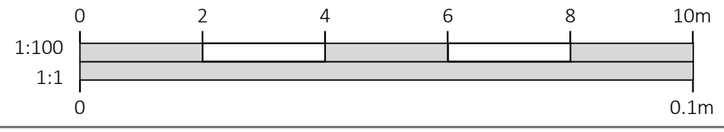
ISSUE STATUS
PLANNING

DRG. NO.
2748.1.2- HAR-09

REV.
M

SIDE (SOUTH) ELEVATION
Proposed
Scale 1:100

SIDE (NORTH) ELEVATION
Proposed
Scale 1:100



OAKWRIGHTS®

M	Amends	29.05.25	JL
L	Amends	29.05.25	JL
K	Client Amends	28.05.25	JL
J	Client Amends	28.05.25	JL
I	Client Amends	27.05.25	JL
H	Client Amends	22.05.25	JL
F	Client Amends	20.05.25	JL
E	Client Amends	09.05.25	JL
D	Client Amends	09.05.25	JL
C	Client Amends	08.05.25	JAC
B	Client Amended Floor Plans	17.04.25	JAC
A	Client Amended Floor Plans	02.04.25	JAC
-	Preliminary issue	18.03.25	JAC

DRAWINGS PRODUCED BY

T.J. Crump Oakwrights Ltd
The Lakes, Swainshill,
Hereford, HR4 7PU

+44 (0)1432 353353
enquiries@oakwrights.co.uk

CLIENT
Mr And Mrs Hart

SITE ADDRESS
Hatchgate End,
Hatchgate Lane,
RG10 8NE

PROJECT
Proposed Dwelling

DEPARTMENT
ARCHITECTURE

DRAWING
PROPOSED ELEVATIONS

SCALE
1:100 @ A3

DATE DRAWN
18.03.25

DATE ISSUED
29.05.25

DRAWN
JAC/JL

CHECKED

ISSUE STATUS
PLANNING

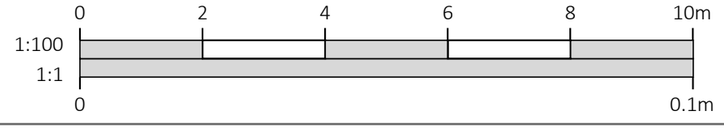
DRG. NO.
2748.1.2- HAR-10

REV.
M

REAR (WEST) ELEVATION

Proposed

Scale 1:100



OAKWRIGHTS®

M	Amends	29.05.25	JL
L	Amends	29.05.25	JL
K	Client Amends	28.05.25	JL
J	Client Amends	28.05.25	JL
I	Client Amends	27.05.25	JL
H	Client Amends	22.05.25	JL
F	Client Amends	20.05.25	JL
E	Client Amends	09.05.25	JL
D	Client Amends	09.05.25	JL
C	Client Amends	08.05.25	JAC
B	Client Amended Floor Plans	17.04.25	JAC
A	Client Amended Floor Plans	02.04.25	JAC
-	Preliminary issue	18.03.25	JAC

DRAWINGS PRODUCED BY

T.J. Crump Oakwrights Ltd
The Lakes, Swainshill,
Hereford, HR4 7PU

+44 (0)1432 353353
enquiries@oakwrights.co.uk

CLIENT
Mr And Mrs Hart

SITE ADDRESS
Hatchgate End,
Hatchgate Lane,
RG10 8NE

PROJECT
Proposed Dwelling

DEPARTMENT
ARCHITECTURE

DRAWING
PROPOSED ELEVATIONS

SCALE
1:100 @ A3

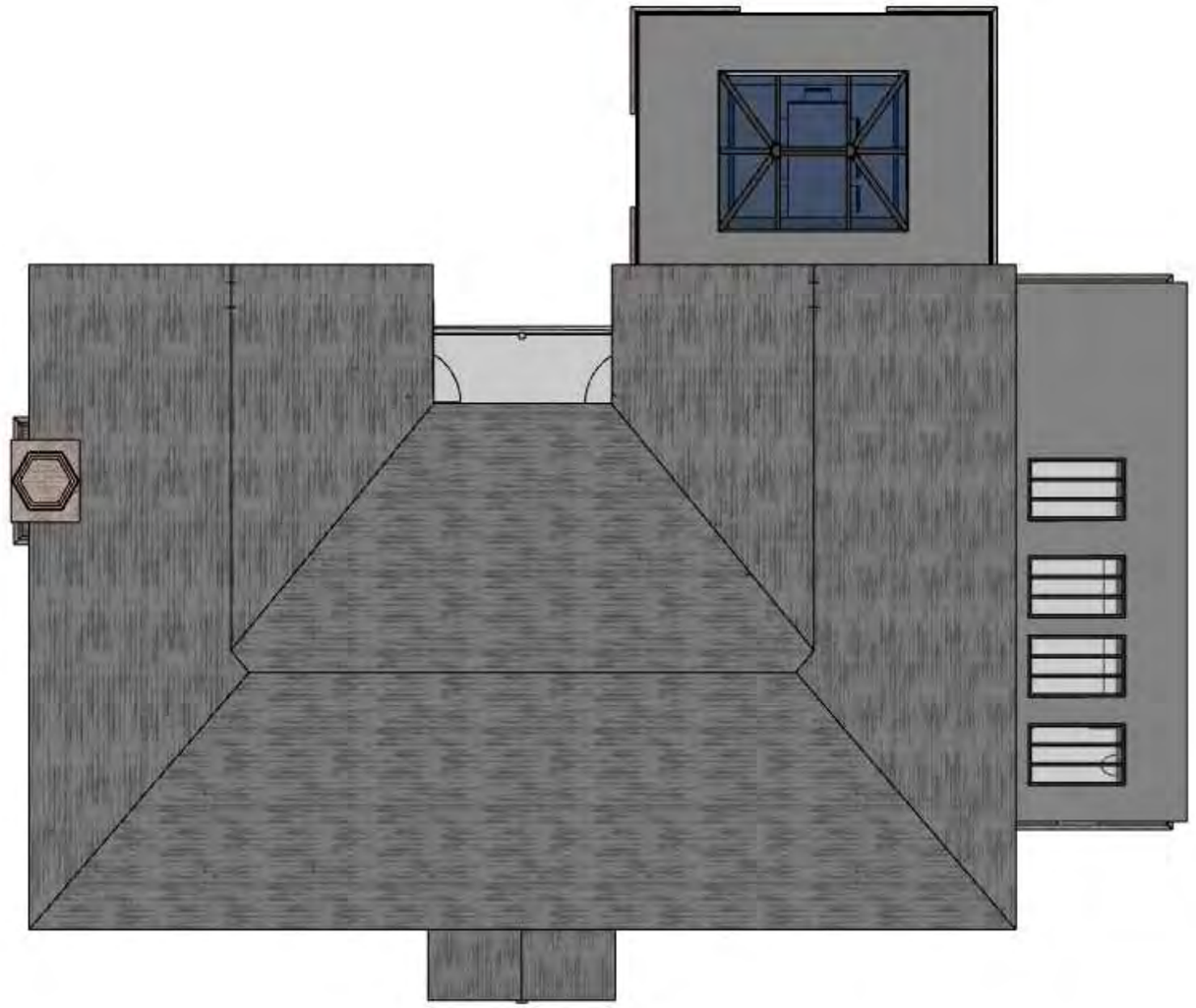
DATE DRAWN	DATE ISSUED
18.03.25	29.05.25

DRAWN	CHECKED
JAC/JL	

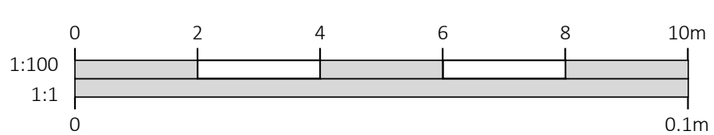
ISSUE STATUS
PLANNING

DRG. NO.
2748.1.2- HAR-11

REV.
M



ROOF PLAN
Proposed
Scale 1:100



OAKWRIGHTS®

M	Amends	29.05.25	JL
L	Amends	29.05.25	JL
K	Client Amends	28.05.25	JL
J	Client Amends	28.05.25	JL
I	Client Amends	27.05.25	JL
H	Client Amends	22.05.25	JL
F	Client Amends	20.05.25	JL
E	Client Amends	09.05.25	JL
D	Client Amends	09.05.25	JL
C	Client Amends	08.05.25	JAC
B	Client Amended Floor Plans	17.04.25	JAC
A	Client Amended Floor Plans	02.04.25	JAC
-	Preliminary issue	18.03.25	JAC

DRAWINGS PRODUCED BY

T.J. Crump Oakwrights Ltd
The Lakes, Swainshill,
Hereford, HR4 7PU

+44 (0)1432 353353
enquiries@oakwrights.co.uk

CLIENT
Mr And Mrs Hart

SITE ADDRESS
Hatchgate End,
Hatchgate Lane,
RG10 8NE

PROJECT
Proposed Dwelling

DEPARTMENT
ARCHITECTURE

DRAWING
PROPOSED ROOF PLAN

SCALE
1:100 @ A3

DATE DRAWN	DATE ISSUED
18.03.25	29.05.25

DRAWN	CHECKED
JAC/JL	

ISSUE STATUS
PLANNING

DRG. NO.
2748.1.2- HAR-12

REV.
M

EXTERNAL PERSPECTIVE
Proposed

OAKWRIGHTS®

M	Amends	29.05.25	JL
L	Amends	29.05.25	JL
K	Client Amends	28.05.25	JL
J	Client Amends	28.05.25	JL
I	Client Amends	27.05.25	JL
H	Client Amends	22.05.25	JL
F	Client Amends	20.05.25	JL
E	Client Amends	09.05.25	JL
D	Client Amends	09.05.25	JL
C	Client Amends	08.05.25	JAC
B	Client Amended Floor Plans	17.04.25	JAC
A	Client Amended Floor Plans	02.04.25	JAC
-	Preliminary issue	18.03.25	JAC

DRAWINGS PRODUCED BY

T.J. Crump Oakwrights Ltd
The Lakes, Swainshill,
Hereford, HR4 7PU

+44 (0)1432 353353
enquiries@oakwrights.co.uk

CLIENT
Mr And Mrs Hart

SITE ADDRESS
Hatchgate End,
Hatchgate Lane,
RG10 8NE

PROJECT
Proposed Dwelling

DEPARTMENT
ARCHITECTURE

DRAWING
EXTERNAL PERSPECTIVE 01

SCALE
N/A

DATE DRAWN	DATE ISSUED
18.03.25	29.05.25

DRAWN	CHECKED
JAC/JL	

ISSUE STATUS
PLANNING

DRG. NO.
2748.1.2- HAR-13

REV.
M

EXTERNAL PERSPECTIVE
Proposed

OAKWRIGHTS®

M	Amends	29.05.25	JL
L	Amends	29.05.25	JL
K	Client Amends	28.05.25	JL
J	Client Amends	28.05.25	JL
I	Client Amends	27.05.25	JL
H	Client Amends	22.05.25	JL
F	Client Amends	20.05.25	JL
E	Client Amends	09.05.25	JL
D	Client Amends	09.05.25	JL
C	Client Amends	08.05.25	JAC
B	Client Amended Floor Plans	17.04.25	JAC
A	Client Amended Floor Plans	02.04.25	JAC
-	Preliminary issue	18.03.25	JAC

DRAWINGS PRODUCED BY

T.J. Crump Oakwrights Ltd
The Lakes, Swainshill,
Hereford, HR4 7PU

+44 (0)1432 353353
enquiries@oakwrights.co.uk

CLIENT
Mr And Mrs Hart

SITE ADDRESS
Hatchgate End,
Hatchgate Lane,
RG10 8NE

PROJECT
Proposed Dwelling

DEPARTMENT
ARCHITECTURE

DRAWING
EXTERNAL PERSPECTIVE 02

SCALE
N/A

DATE DRAWN	DATE ISSUED
18.03.25	29.05.25

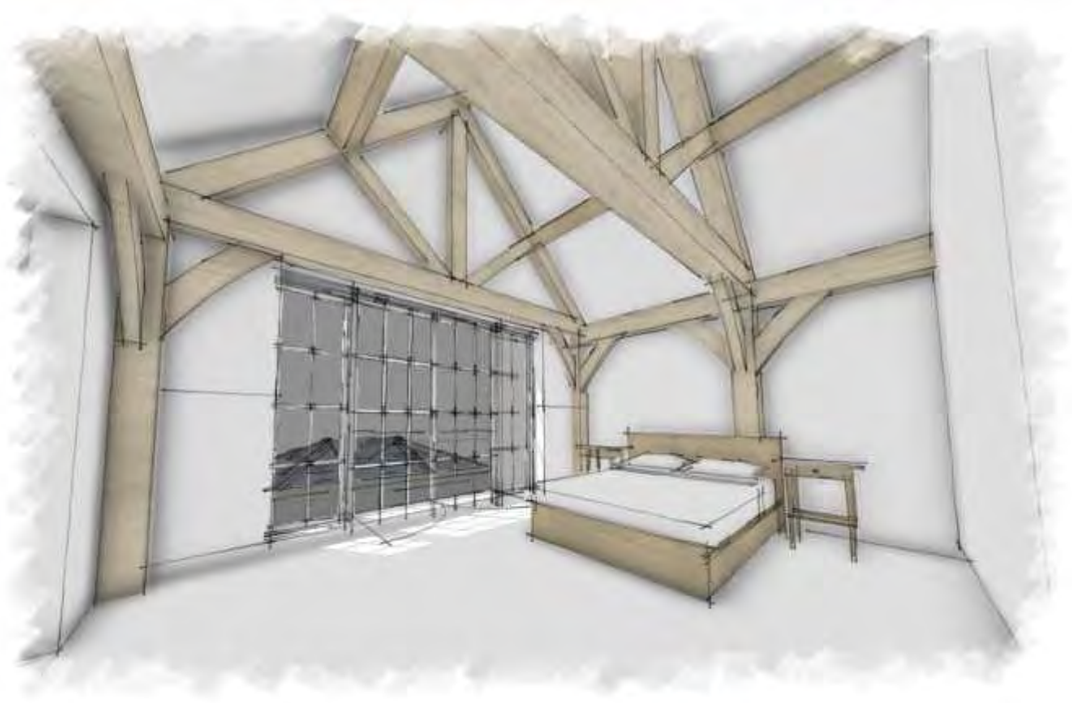
DRAWN	CHECKED
JAC/JL	

ISSUE STATUS
PLANNING

DRG. NO.
2748.1.2- HAR-14

REV.
M

BEDROOM 1
Proposed
Scale 1:100



BEDROOM 2
Proposed
Scale 1:100

OAKWRIGHTS®

M	Amends	29.05.25	JL
L	Amends	29.05.25	JL
K	Client Amends	28.05.25	JL
J	Client Amends	28.05.25	JL
I	Client Amends	27.05.25	JL
H	Client Amends	22.05.25	JL
F	Client Amends	20.05.25	JL
E	Client Amends	09.05.25	JL
D	Client Amends	09.05.25	JL
C	Client Amends	08.05.25	JAC
B	Client Amended Floor Plans	17.04.25	JAC
A	Client Amended Floor Plans	02.04.25	JAC
-	Preliminary issue	18.03.25	JAC

DRAWINGS PRODUCED BY

T.J. Crump Oakwrights Ltd
The Lakes, Swainshill,
Hereford, HR4 7PU

+44 (0)1432 353353
enquiries@oakwrights.co.uk

CLIENT
Mr And Mrs Hart

SITE ADDRESS
Hatchgate End,
Hatchgate Lane,
RG10 8NE

PROJECT
Proposed Dwelling

DEPARTMENT
ARCHITECTURE

DRAWING
PROPOSED INTERNAL VIEWS

SCALE
1:100 @ A3

DATE DRAWN	DATE ISSUED
18.03.25	29.05.25

DRAWN	CHECKED
JAC/JL	

ISSUE STATUS

DRG. NO.
2748.1.2- HAR-15

REV.
M

LIVING SPACE
Proposed
Scale 1:100

LOUNGE ROOM
Proposed
Scale 1:100

OAKWRIGHTS®

M	Amends	29.05.25	JL
L	Amends	29.05.25	JL
K	Client Amends	28.05.25	JL
J	Client Amends	28.05.25	JL
I	Client Amends	27.05.25	JL
H	Client Amends	22.05.25	JL
F	Client Amends	20.05.25	JL
E	Client Amends	09.05.25	JL
D	Client Amends	09.05.25	JL
C	Client Amends	08.05.25	JAC
B	Client Amended Floor Plans	17.04.25	JAC
A	Client Amended Floor Plans	02.04.25	JAC
-	Preliminary issue	18.03.25	JAC

DRAWINGS PRODUCED BY

T.J. Crump Oakwrights Ltd
The Lakes, Swainshill,
Hereford, HR4 7PU

+44 (0)1432 353353
enquiries@oakwrights.co.uk

CLIENT
Mr And Mrs Hart

SITE ADDRESS
Hatchgate End,
Hatchgate Lane,
RG10 8NE

PROJECT
Proposed Dwelling

DEPARTMENT
ARCHITECTURE

DRAWING
PROPOSED INTERNAL VIEWS

SCALE
1:100 @ A3

DATE DRAWN	DATE ISSUED
18.03.25	29.05.25

DRAWN	CHECKED
JAC/JL	

ISSUE STATUS

DRG. NO.
2748.1.2- HAR-16

REV.
M

KITCHEN
Proposed
Scale 1:100

DINING
Proposed
Scale 1:100

OAKWRIGHTS®

M	Amends	29.05.25	JL
L	Amends	29.05.25	JL
K	Client Amends	28.05.25	JL
J	Client Amends	28.05.25	JL
I	Client Amends	27.05.25	JL
H	Client Amends	22.05.25	JL
F	Client Amends	20.05.25	JL
E	Client Amends	09.05.25	JL
D	Client Amends	09.05.25	JL
C	Client Amends	08.05.25	JAC
B	Client Amended Floor Plans	17.04.25	JAC
A	Client Amended Floor Plans	02.04.25	JAC
-	Preliminary issue	18.03.25	JAC

DRAWINGS PRODUCED BY

T.J. Crump Oakwrights Ltd
The Lakes, Swainshill,
Hereford, HR4 7PU

+44 (0)1432 353353
enquiries@oakwrights.co.uk

CLIENT
Mr And Mrs Hart

SITE ADDRESS
Hatchgate End,
Hatchgate Lane,
RG10 8NE

PROJECT
Proposed Dwelling

DEPARTMENT
ARCHITECTURE

DRAWING
PROPOSED INTERNAL VIEWS

SCALE
1:100 @ A3

DATE DRAWN	DATE ISSUED
18.03.25	29.05.25

DRAWN	CHECKED
JAC/JL	

ISSUE STATUS

DRG. NO.
2748.1.2- HAR-17

REV.
M

GeoSmart Information

Appendix B

Rainfall runoff calculations

Input parameters for run-off calculations	
Country	England
Total site area	2971 m^2
Area proposed for development	2831 m^2
Current permeable ground cover	2612 m^2
Current impermeable ground cover	219 m^2
Proposed permeable ground cover	2551.6 m^2
Proposed impermeable ground cover	254 m^2
Urban Creep Allowance	10%
Final impermeable ground cover	279.4 m^2
SPR	0.1
SAAR	744 mm
Region	6
Climate change factor	40%
Discharge Rate (l/s)	1.0
Run-off coefficient	100%

Current impermeable area as % of total	8%
Proposed impermeable area as % of total	10%
Change in permeable area (m2)	-60
Change in impermeable area (m2)	60
Change in impermeable area as % of total	2%

Rainfall event	Greenfield run-off rates (l/s)	Existing run-off rates(l/s)	Potential run-off rates without attenuation (l/s)	Potential minus exisiting (l/s)
QBAR	0.05	N/A	N/A	N/A
6 hour 1 in 1 year	0.04	0.58	0.64	0.07
6 hour 1 in 10 year	0.08	0.97	1.08	0.11
6 hour 1 in 30 year	0.11	1.25	1.39	0.14
6 hour 1 in 100 year	0.16	1.57	1.74	0.18
6 hour 1 in 100 year + 20% CC	N/A	N/A	2.09	0.53
6 hour 1 in 100 year + 40% CC	N/A	N/A	2.44	0.87

Rainfall event	Greenfield run-off volume (m^3)	Existing run-off volume (m^3)	Potential run-off volume without attenuation (m^3)	Potential minus existing (m^3)
QBAR	7.86	N/A	N/A	N/A
6 hour 1 in 1 year	7.33	12.43	13.83	1.41
6 hour 1 in 10 year	12.53	20.95	23.27	2.32
6 hour 1 in 30 year	15.88	26.94	29.99	3.05
6 hour 1 in 100 year	19.95	33.83	37.67	3.83
6 hour 1 in 100 year + 20% CC	N/A	N/A	45.20	11.36
6 hour 1 in 100 year + 40% CC	N/A	N/A	52.73	18.90

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)	1.200
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)	Cover Level (m)	Node Type	Depth (m)
site	0.025	10.000	Manhole	2.400

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	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	10	0
30	0	10	0
100	0	10	0
100	40	10	0

Node site Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.18000	Invert Level (m)	7.600	Depth (m)	2.000
Side Inf Coefficient (m/hr)	0.18000	Time to half empty (mins)	253	Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	2.000	Number Required	1
Porosity	0.95	Pit Length (m)	4.000		

Results for 2 year +10% A Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute winter	site	136	7.937	0.337	1.1	2.6377	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)
180 minute winter	site	Infiltration	0.3

Results for 30 year +10% A Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute winter	site	188	8.568	0.968	2.1	7.5751	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)
240 minute winter	site	Infiltration	0.5

Results for 100 year +10% A Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute winter	site	164	8.863	1.263	3.2	9.8887	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)
180 minute winter	site	Infiltration	0.6

Results for 100 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute winter	site	168	9.441	1.841	4.5	14.4126	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)
180 minute winter	site	Infiltration	0.8

GeoSmart Information

Appendix C

Thames Water Asset Location Plan

Asset Location Search

Property Searches

Geosmart Information Ltd
Suite 9-111st FloorOld Bank Bu
SHREWSBURY
SY1 1HU

Search address supplied Hatchgate End
Hatchgate Lane
Wargrave
Reading
RG10 8NE

Your reference 87257

Our reference ALS/ALS Standard/2025_5267487

Search date 18 December 2025

Keeping you up-to-date

Notification of price changes

We're changing our report prices from 4th June 2025. The price will increase by 3.5% based on Retail Price Index (RPI).

Find our new prices on our website thameswater.co.uk/property-searches

Any Questions? We're happy to talk through the changes with you – give our Property Searches team a call on 0800 009 4540 .

Thames Water Utilities Ltd
Property Searches,
Clearwater Court, Vastern Road, Reading RG1 8DB

property.searches@thameswater.co.uk
thameswater.co.uk/propertysearches

0800 009 4540

Asset Location Search

Property Searches

Search address supplied: Hatchgate End, Hatchgate Lane, Wargrave, Reading, RG10 8NE

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 and 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 contact details below:

Thames Water Utilities Ltd
Property Searches
Clearwater Court
Vastern Road
Reading
RG1 8DB

Email: property.searches@thameswater.co.uk
Web: thameswater.co.uk/propertysearches

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. The public sewer map 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.

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. You can do this by emailing customer.feedback@thameswater.co.uk with the email subject header 'Enquiry – TWOSA', along with details of the request.

If you have any questions regarding sewer connections, budget estimates, diversions or building over 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

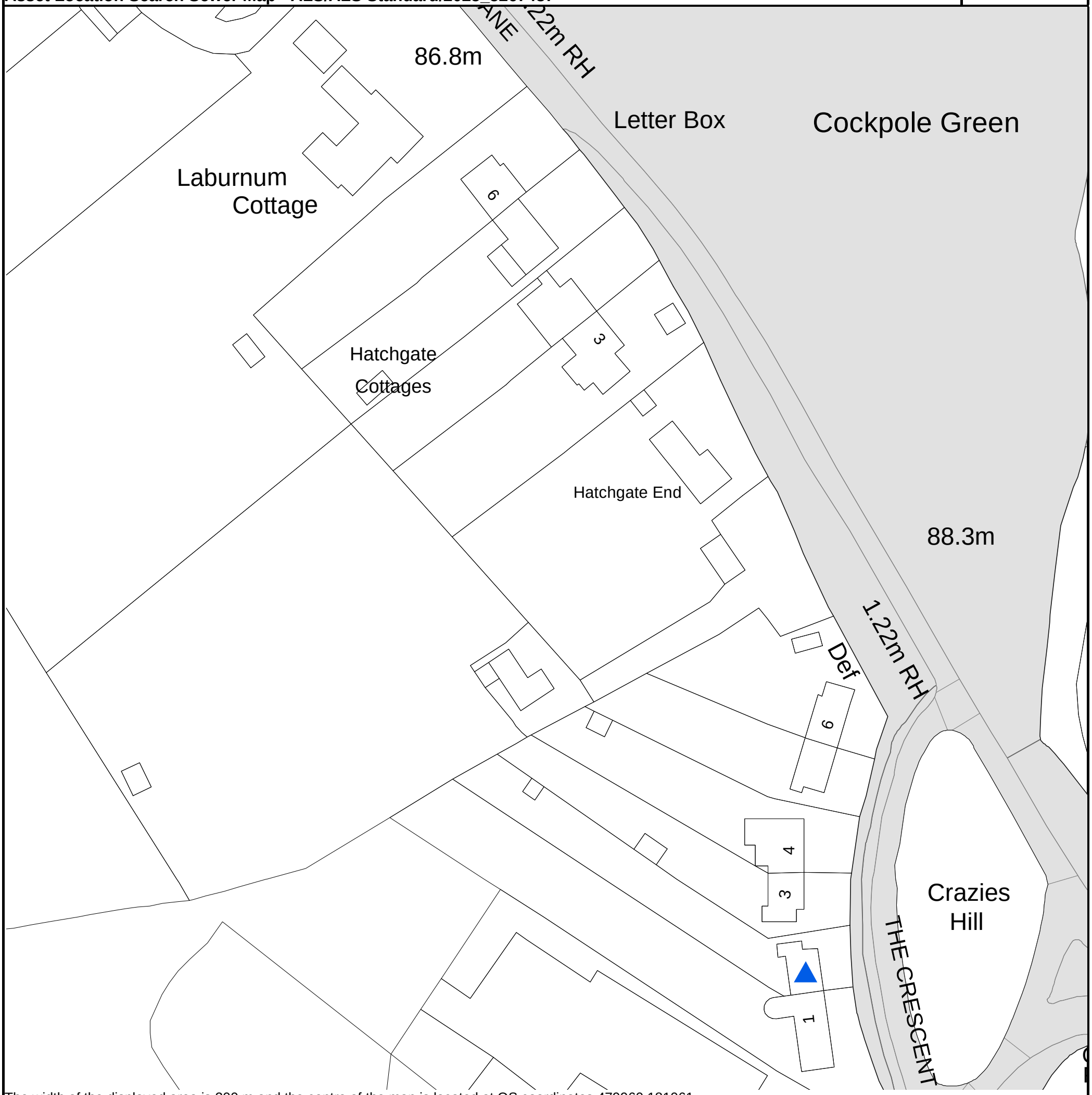
Clean Water queries

Should you require any advice concerning clean water 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

Asset Location Search Sewer Map - ALS/ALS Standard/2025_5267487



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 479960,181061

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Based on the Ordnance Survey Map (2024) with the Sanction of the controller of H.M. Stationery Office, License no. AC0000849556 Crown Copyright Reserved.

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
n/a	n/a	n/a

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

ALS/ALS Standard/2025_5267487

0 45 90 180 270 360
Meters

Scale:	1:7161
Width:	2000m
Printed By:	SEswara1
Print Date:	18/12/2025
Map Centre:	479960,181061
Grid Reference:	SU7981SE

Comments:

ALS/ALS Standard/2025_5267487

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

REFERENCE	COVER LEVEL	INVERT LEVEL

REFERENCE	COVER LEVEL	INVERT LEVEL

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

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 divects the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

- Ancillary
- Drop Pipe
- Control Valve
- Weir

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

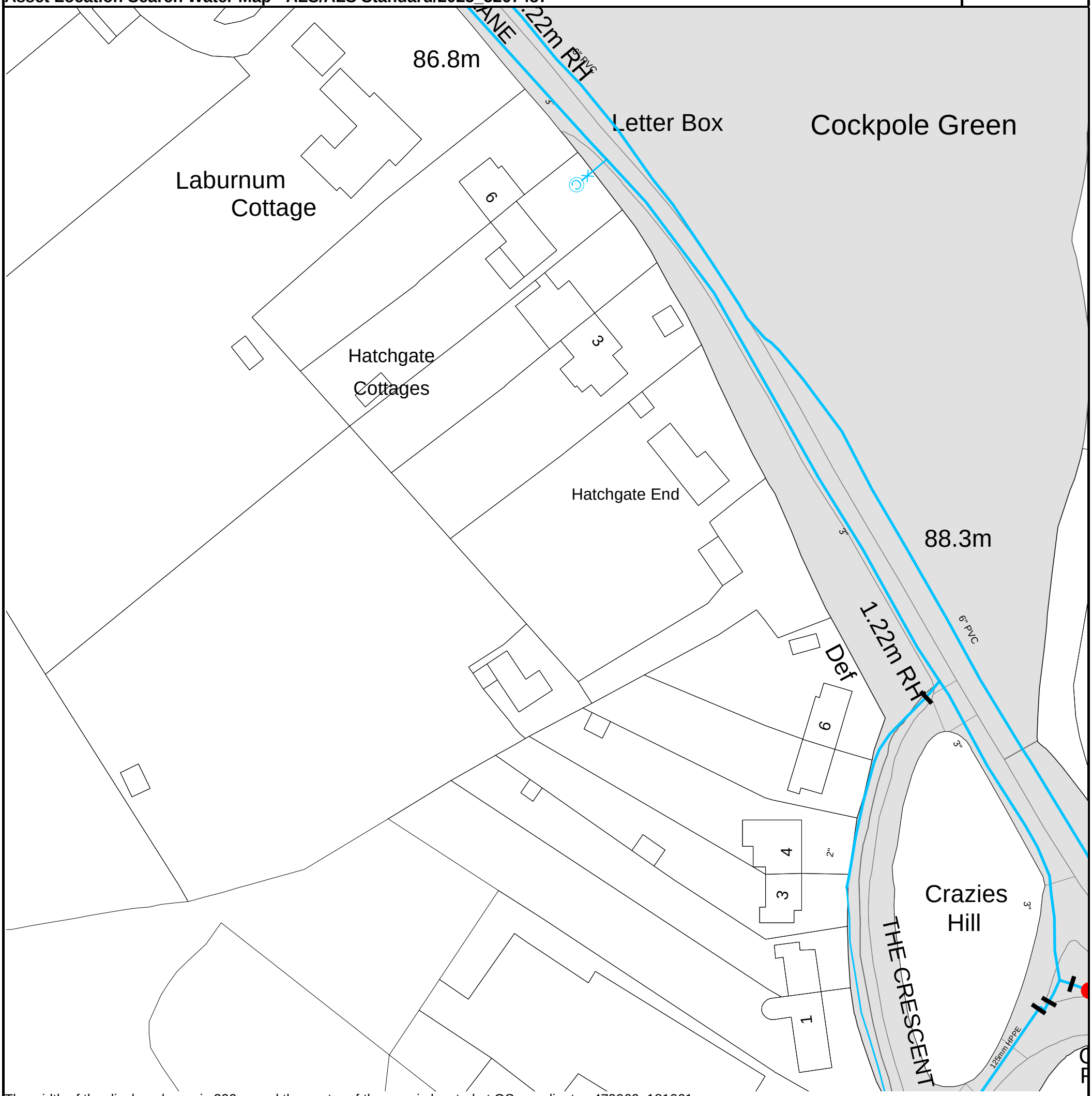
- Casement — Ducts may contain high voltage cables. Please check with Thames Water.
- Conduit Bridge
- Subway
- Tunnel

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.
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 Map - ALS/ALS Standard/2025_5267487



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 479960, 181061.

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Asset Location Search - Water Key

Water Pipes (Operated & Maintained by Thames Water)

4"

Distribution Main: The most common pipe shown on water maps. With few exceptions, domestic connections are only made to distribution mains.

16"

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.

3" SUPPLY

Supply Main: A supply main indicates that the water main is used as a supply for a single property or group of properties.

3" FIRE

Fire Main: Where a pipe is used as a fire supply, the word FIRE will be displayed along the pipe.

3" METERED

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.

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.

PIPE DIAMETER	DEPTH BELOW GROUND
Up to 300mm (12")	900mm (3')
300mm - 600mm (12" - 24")	1100mm (3' 8")
600mm and bigger (24" plus)	1200mm (4')

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: Indiates 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.

GeoSmart Information

Appendix D

Site Investigation Report (Groundfirst, 2025)

Groundfirst

Reliable ground quality advice

Infiltration testing: Hatchgate End, Hatchgate Lane, Wargrave, Reading

Prepared for: Nick Hart
Hatchgate End
Hatchgate Lane
Wargrave
Reading
RG10 8NE

Report reference: 4454R1

Date of reporting: 7th October 2025

Report status: Final report

Prepared by
Ground First Ltd

26 Victoria Street, Castlefields, Shrewsbury, SY1 2HS
Tel: 07484 542827
email: info@groundfirst.com
Registered in England and Wales, number 10418394

Groundfirst

Reliable ground quality advice

Infiltration testing: Hatchgate End, Hatchgate Lane, Wargrave, Reading

Revision record:

Issue	Date	Status	Comment	Author	Recipient
1	7th October 2025	Final		AJS	Nick Hart

Prepared by
Ground First Ltd

26 Victoria Street, Castlefields, Shrewsbury, SY1 2HS
Tel: 07484 542827
email: info@groundfirst.com
Registered in England and Wales, number 10418394

CONTENTS

FIGURES

TABLES

APPENDICES

1 INTRODUCTION

1.1 Background

The study site (herein referred to as the 'Site') is located at the Hatchgate End property on Hatchgate Lane, Wargrave, Reading, RG10 8NE. The Site location is shown on Figure 1.1.

The current Site layout is shown on Figure 1.2; this shows the presence of a detached property and associated outbuildings in the north-east and south-east of the Site, with a soft standing garden in the west. An open field (under the same land ownership) is positioned directly to the south-west of the Site.

Planning permission has been granted by Wokingham Borough Council (further to application ref: 251318) for the *'erection of 1 no. 5 bedroom dwelling and the change of use of agricultural land to a domestic solar array following demolition of the existing dwelling'*.

The planning approval includes a condition (Nr 6) requiring the production of a drainage strategy for the new development.

6. *Drainage strategy - Prior to the commencement of the development hereby permitted a surface water drainage strategy shall be submitted to and approved in writing by the LPA. The strategy should include details of how the site currently drains and will be drained following the development with consideration to SuDS.*

The Client has identified the need for Infiltration testing in order to inform the viability of infiltration SuDS.

1.2 Instruction

Ground First was instructed by Nick Hart (the Client) on 15th September 2025 to undertake infiltration testing as outlined in proposal ref: 4454P1, dated 15th September 2025.

1.3 Objectives

The objective of the work was to undertake an appropriate site investigation designed to determine representative soil infiltration rates in line with the requirements of BRE Digest 365 (Soakaway Design).

It is understood that the infiltration rate information will be used by a third-party consultant to inform a suitable drainage design.

1.4 This report

This report provides background information concerning the development Site, factual records of all relevant fieldwork observations and infiltration test results, as well as indicative soil infiltration rates.

Figure 1.1 Site location plan

Site location – planning application boundary shown in red; land ownership boundary in blue	**October 2025**	**Drawn: AJS**
	4454R1	**Rev 0**

Report Reference: **4454R1**
Report Status: **Final Report**

Figure 1.2 Site setting

Site setting - planning application boundary shown in red; land ownership boundary in blue	**October 2025**	**Drawn: AJS**
	4454R1	**Rev 0**

Figure 1.3 Proposed development plan

Site development plan – planning application boundary shown in red; land ownership boundary shown in blue	**October 2025**	**Drawn: AJS**
	4454R1	**Rev 0**

Report Reference: **4454R1**
Report Status: **Final Report**

2 SITE SETTING AND HISTORY

The following section provides a summary of the Site setting, land use history and local geological and hydrological conditions.

2.1 Basic site information

Information relating to the Site location is summarised in Table 2.1.

Table 2.1 Site details

Site Address	Hatchgate End, Hatchgate Lane, Wargrave, Reading, RG10 8NE
Planning application area	0.24 ha (property boundary) 0.05 ha (solar array boundary)
General setting and ground coverage	The Site is located within a rural setting; domestic properties are located to the east and west of the Site; several grassed fields (under the same land ownership as the application area) are situated directly to the south-west of the Site. A public amenity space / common land is located beyond the public highway to the north / north-east. A level survey was conducted at the Site in 2017 by A D Horner Ltd. The survey results confirm that both the application area and the adjoining field to the south-west slope gently down towards the west / north-west. The application area is currently occupied by a large, detached property situated in the north-east; the property is surrounded by stone paving; a graveled driveway is present in the north-eastern corner of the Site. The rear garden is largely covered by lawn with various flower beds and hedgerows (see Photographs 9 and 10 in Appendix A). An existing outbuilding is located along the south-eastern edge of the Site; runoff from this structure is piped to a sunken rainwater harvesting tank position in the neighbouring field – any outflows from the tank are directed to a soakaway feature constructed c. 40 m beyond the tank (see Figure 3.1). The adjoining land to the south-west of the Site (under the same land ownership) includes an open field; this is covered by grass and other low-lying vegetation (see Photographs 11 and 12 in Appendix A). A further building is positioned in the north-eastern corner of the field. Foul water from both the main property and existing outbuilding is directed into a septic tank positioned in the neighbouring field (see Figure 3.1). Additional photographs showing the current Site condition are included in Appendix A.

2.2 Geological setting

British Geological Survey mapping (BGS, 2025) indicates the absence of any superficial geology underlying the Site or surrounding land.

The bedrock geology mapped beneath the majority of the Site comprises the Lambeth Group (clay, silt and sand). Chalk is also mapped at outcrop in the north-west of the Site (see Figure 2.1).

No significant artificial ground is mapped by the BGS beneath the Site or the surrounding area.

There are no BGS borehole records (BGS, 2025) available within a 250 m radius of the Site, with which to confirm the Site-specific ground conditions.

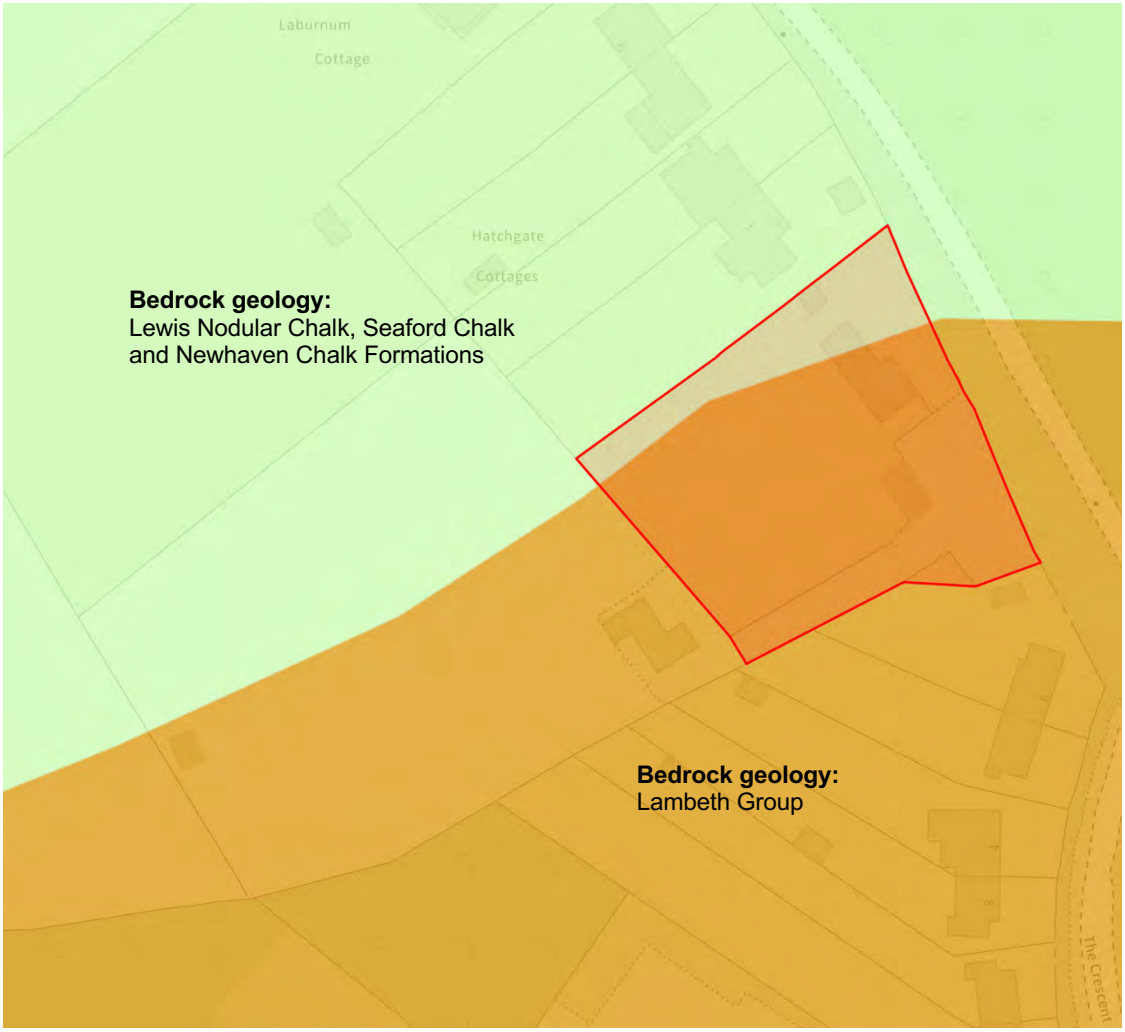
The Site is positioned within a total (Zone 3) groundwater Source Protection Zone (SPZ).

The Site is located in a relatively elevated position; as such, the chalk groundwater level is

anticipated to be in excess of 5 m below the Site (i.e., shallow groundwater conditions are unlikely to inhibit the use of infiltration SuDS).

Note: no active or historical landfill sites are recorded on-Site or within the immediate surrounds.

Figure 2.1 Geological mapping



BGS bedrock geology	October 2025	Drawn: AJS
	4454R1	Rev 0

2.3 Hydrological setting

There are no notable surface water courses mapped within 100 m of the Site.

The Site is located with Flood Zone 1.

3 SITE INVESTIGATION WORKS

3.1 Site investigation programme

Trial pitting and infiltration testing was coordinated by Ground First at the study Site on 2nd October 2025. The purpose of the infiltration testing was to characterise the infiltration / drainage capabilities of the sub surface.

A summary of the site investigation activities undertaken is presented in Table 3.1. The site investigation locations are shown on Figure 3.1. A photographic record of the Site works is provided in Appendix A.

Table 3.1 Site investigation activities

Element of investigation	Details	Comments / rationale
Utilities and service avoidance	Prior to the commencement of the Site works, the Client confirmed the absence of any buried services within the areas proposed for investigation. This was consistent with available gas and electricity service plans.	To minimise the potential for encountering buried services during the intrusive site investigation works.
Trial pitting	Three trial pits (TP01 to TP03) were excavated within the field situated to the rear of the property garden, using a tracked 2.5 tonne excavator. The trial pit locations are shown on Figure 3.1. The pits were excavated to depths of between 2.1 m and 2.2 m bgl. The sides and bases of each excavation were trimmed to make the pits as rectangular as practicably possible. The pits were positioned across the north-eastern end of the field area, working within constraints relating to existing buildings and buried infrastructure. The trial pit positions included an area of slightly lower lying ground in the north of the field (corresponding to TP02). All excavated materials were logged by an experienced site supervisor (see Appendix B).	To assess the extent, thickness and composition of any Made Ground. To assess the composition of the natural superficial geology. To clarify the depth to any shallow groundwater. To make a visual assessment of any ground contamination. To enable infiltration testing.
Infiltration testing	Infiltration testing was carried out in accordance with BRE 365 (2016) at all three trial pits (TP01 to TP03). Water was pumped from the existing rainwater harvesting tank (see Figure 3.1 and also Photograph 14 in Appendix A) into each of the trial excavations; each of the pits was filled to the required level in less than 2 minutes. Water level measurements were taken within each of the excavations using a dip tape at regular intervals following the cessation of infilling.	To assess the infiltration potential of the sub surface material, and where feasible to enable representative infiltration rates to be calculated.

Figure 3.1 Site investigation location plan

Site investigation locations plus existing drainage infrastructure	**October 2025**	**Drawn: AJS**
	4454R1	**Rev 0**

4 SITE INVESTIGATION RESULTS

4.1 Encountered ground conditions

The sequence of strata encountered within each of the trial pits (TP01 to TP03) excavated during the infiltration testing works is described in Appendix B.

The encountered ground conditions are summarised as follows (see also photographs in Appendix A):

- A distinct soil layer was identified within each of the trial pits; this material comprised of mid-brown slightly sandy slightly gravelly silt with roots and rootlets. The soil layer was c. 0.25 m to 0.3 m thick.
- The soil layer was underlain by firm tan-brown gravelly clay, including flint, with occasional rounded to angular flint cobbles. These deposits were around 0.4 m thick.
- A c. 0.5 m thickness of weathered chalk was evident below the clayey deposits. This was recorded as soft to firm grey-brown very gravelly clay, including chalk and flint, with frequent rounded to angular flint cobbles.
- Competent chalk with flint was encountered from depths of between 1.1 m and 1.2 m bgl (to depths in excess of 2.2 m bgl).
- No obvious Made Ground was recorded within any of the trial pits.
- No water seepages were identified within any of the trial pits (to a maximum excavation depth of 2.2 m bgl).

4.2 Other site observations

The Site owner provided the following information during the site visit:

- Foul water associated with the on-Site property and existing outbuilding is directed to a long-standing septic tank situated within the field directly to the south-west of the application area (see Figure 3.1 and also Photograph 13 in Appendix A). The existing septic tank will be replaced as part of the new development.
- All neighbouring properties are understood to include septic tanks for the management of foul effluent.
- A 7500 litre rainwater harvesting tank is present within the neighbouring field (see Figure 3.1 and also Photograph 14 in Appendix A). The tank, which is fully submerged below ground level, receives surface water runoff from the existing outbuilding (located in the south-east of the application area).
- The overflow from the existing rainwater harvesting tank is piped to a soakaway constructed c. 40 m to the south-west (see Figure 3.1). The soakaway was constructed in 2024; a photograph showing the soakaway excavation (taken by the Client) is included in Appendix A. The soakaway construction is understood to comprise a series of permeable crates of approximate combined dimensions: c. 5 m long, c. 2 m wide and c. 2 m deep. The performance of the soakaway is uncertain although no obvious drainage issues have been identified to date.
- Ground conditions encountered during the soakaway excavation included up to c. 1 m of gravelly silt / clay overlying chalk.
- Roof drainage from the existing property is piped to the front of the Site (4 inch plastic drainage pipes have been exposed during recent third-party excavations undertaken at the front of the property – see Photographs 5 and 6 in Appendix A) and is assumed to discharge into municipal drainage within the adjacent public highway.

- The patio areas surrounding the existing property drain to ground (i.e., runoff flows naturally into the surrounding soft standing).
- The existing driveway is predominantly formed from gravel surfacing (assumed permeable); see Photograph 2 in Appendix A.
- The Client has indicated that the land appears to be relatively free draining following heavy rainfall; i.e., no standing water or waterlogging has been observed on-Site.
- The Client has confirmed the absence of any surface water features within the Site locality. This was confirmed during the site investigations / site inspection.

Salient observations made by Ground First during the site investigation works included:

- The Site topography was relatively flat and level; a modest slope is evident across the width of the Site and adjoining field, with a fall from the south-east to the north-west (see Photograph 10 in Appendix A).
- The ground levels along the Site boundaries were broadly consistent with the neighbouring land areas.
- No notable staining, odours or other signs of any significant contamination were observed within the spoil encountered at trial pits TP01 to TP03.
- No standing water was observed at ground surface at the time of the infiltration testing.
- A series of drainage manholes were observed within the highway directly north of the Site (see Photographs 7 and 8 in Appendix A).

4.3 Infiltration test results

Trial pits TP01, TP02 and TP03 were subjected to infiltration testing.

The infiltration test results are presented in Appendix C; these results indicate that insufficient infiltration was observed at trial pits TP01 and TP03 - as such, no representative infiltration rate has been calculated for these positions.

A far greater degree of infiltration was however observed at trial pit TP02. A summary of the infiltration test results for trial pit TP02 is presented in Table 4.1.

Table 4.1 Summary of infiltration test results

Trial pit	Test depth range (effective depth)	Receiving deposits	Infiltration rate (m/s)
TP02 (test Nr 1)	1.09 m to 2.1 m bgl (1.01 m)	*Modest thickness of soft to firm grey-brown very gravelly clay (weathered chalk)*	7.3×10^{-5}
TP02 (test Nr 2)	1.08 m to 2.1 m bgl (1.02 m)	Predominantly grey-white chalk with flint cobbles	5.0×10^{-5}

4.4 Conclusions

The infiltration test results indicate that the encountered chalk deposits display locally variable infiltration characteristics.

The chalk encountered below the slightly lower lying ground observed in and around trial pit TP02 is conducive to the use of infiltration SuDS.

5 REFERENCES

BGS, 2025. Geoindex (onshore) https://mapapps2.bgs.ac.uk/geoindex/home.html?_ga=2.196366383.2091285916.1709986969-1247448206.1709986969. Accessed 30th September 2025.

BRE, 2016. BRE Digest 365. Soakaway design.

APPENDICES

APPENDIX A

Site photographs

Existing rainwater soakaway – excavated during 2024

Photograph 1

Description: Excavation for rainwater soakaway (partially installed)
Date: 2024
Location: Field to rear of property garden – looking to the south-west

Infiltration testing performed during October 2025

Photograph 2

Description: Property driveway
Date: 02/10/2025
Location: North-eastern corner of the Site – looking to the north-west

Photograph 3

Description: Roof drainage downpipes associated with main property
Date: 02/10/2025
Location: Front of Hatchgate End property – north-eastern end of the Site

Photograph 4

Description: Roof drainage downpipes associated with main property
Date: 02/10/2025
Location: Rear of Hatchgate End property – north-eastern part of the Site

Photograph 5

Description: Exposed roof drainage pipework
Date: 02/10/2025
Location: Front of Hatchgate End property – north-eastern end of the Site

Photograph 6

Description: Exposed roof drainage pipework
Date: 02/10/2025
Location: Front of Hatchgate End property – north-eastern end of the Site

Photograph 7

Description: Highway drainage
Date: 02/10/2025
Location: Public highway directly north-east of the Site

Photograph 8

Description: Highway drainage
Date: 02/10/2025
Location: Public highway directly north-east of the Site

Photograph 9

Description: Rear garden area
Date: 02/10/2025
Location: View from rear of property – looking to the south-west

Photograph 10

Description: Rear garden and existing property
Date: 02/10/2025
Location: View from end of garden – looking to the north-east

Photograph 11

Description: View across neighbouring field
Date: 02/10/2025
Location: Field to rear of the property – looking to the south-west

Photograph 12

Description: View across neighbouring field
Date: 02/10/2025
Location: Field to rear of the property – looking to the west

Photograph 13

Description: Existing septic tank cover
Date: 02/10/2025
Location: North-eastern edge of field to rear of the property

Photograph 14

Description: Rainwater harvesting tank
Date: 02/10/2025
Location: North-eastern corner of the field to the rear of the property

Photograph 15

Description: Trial excavation TP01
Date: 02/10/2025
Location: Eastern part of field to rear of property

Photograph 16

Description: Topsoil recovered from trial excavation TP01
Date: 02/10/2025
Location: Eastern part of field to rear of property

Photograph 17

Description: Clayey superficial deposits recovered from trial excavation TP01
Date: 02/10/2025
Location: Eastern part of field to rear of property

Photograph 18

Description: Clayey chalk material recovered from trial excavation TP01
Date: 02/10/2025
Location: Eastern part of field to rear of property

Photograph 19

Description: Chalk recovered from trial excavation TP01
Date: 02/10/2025
Location: Eastern part of field to rear of property

Photograph 20

Description: Infiltration testing performed at trial excavation TP01
Date: 02/10/2025
Location: Eastern part of field to rear of property

Photograph 21

Description: Topsoil recovered from trial excavation TP02
Date: 02/10/2025
Location: Northern part of field to rear of property

Photograph 22

Description: Clayey superficial deposits recovered from trial excavation TP02
Date: 02/10/2025
Location: Northern part of field to rear of property

Photograph 23

Description: Clayey chalk material recovered from trial excavation TP02
Date: 02/10/2025
Location: Northern part of field to rear of property

Photograph 24

Description: Chalk recovered from trial excavation TP02
Date: 02/10/2025
Location: Northern part of field to rear of property

Photograph 25

Description: Excavated spoil recovered from excavation TP02
Date: 02/10/2025
Location: Northern part of field to rear of property

Photograph 26 **Description:** Infiltration testing performed at trial excavation TP02
Date: 02/10/2025
Location: Northern part of field to rear of property

Photograph 27 **Description:** Completion of test Nr 1 performed at trial excavation TP02
Date: 02/10/2025
Location: Northern part of field to rear of property

Photograph 28

Description: Completion of test Nr 2 performed at trial excavation TP02
Date: 02/10/2025
Location: Northern part of field to rear of property

Photograph 29

Description: Trial excavation TP03
Date: 02/10/2025
Location: North-eastern part of field to rear of property

Photograph 30

Description: Topsoil recovered from trial excavation TP03
Date: 02/10/2025
Location: North-eastern part of field to rear of property

Photograph 31

Description: Clayey superficial deposits recovered from trial excavation TP03
Date: 02/10/2025
Location: North-eastern part of field to rear of property

Photograph 32

Description: Chalk recovered from trial excavation TP03
Date: 02/10/2025
Location: North-eastern part of field to rear of property

Photograph 33

Description: Infiltration testing performed at trial excavation TP03
Date: 02/10/2025
Location: North-eastern part of field to rear of property

APPENDIX B

Trial pit soil descriptions

Depth: m bgl	Soil description	Comments
TP01		
0.0 – 0.3	Mid-brown slightly sandy slightly gravelly silt with roots and rootlets. Sand is fine. Gravel is fine to coarse and sub rounded to sub angular. **TOPSOIL / SUBSOIL**	No water seepages were identified during the excavation works. Stable trial pit faces; no notable collapse. No odours or staining recorded.
0.3 – 0.7	Firm tan-brown gravelly clay. Gravel is fine to coarse and rounded to angular, including flint. Occasional rounded to angular flint cobbles.	
0.7 – 1.2	Soft to firm grey-brown very gravelly clay. Gravel is fine to coarse and rounded to angular including chalk and flint. Frequent rounded to angular flint cobbles.	
1.2 – 2.1+	Grey-white chalk with flint cobbles.	
TP02		
0.0 – 0.25	Mid-brown slightly sandy slightly gravelly silt with roots and rootlets. Sand is fine. Gravel is fine to coarse and sub rounded to sub angular. **TOPSOIL / SUBSOIL**	No water seepages were identified during the excavation works. Stable trial pit faces; no notable collapse. No odours or staining recorded.
0.25 – 0.7	Firm tan-brown gravelly clay. Gravel is fine to coarse and rounded to angular, including flint. Occasional rounded to angular flint cobbles.	
0.7 – 1.2	Soft to firm grey-brown very gravelly clay. Gravel is fine to coarse and rounded to angular including chalk and flint. Frequent rounded to angular flint cobbles.	
1.2 – 2.1+	Grey-white chalk with flint cobbles.	
TP03		
0.0 – 0.25	Mid-brown slightly sandy slightly gravelly silt with roots and rootlets. Sand is fine. Gravel is fine to coarse and sub rounded to sub angular. **TOPSOIL / SUBSOIL**	No water seepages were identified during the excavation works. Stable trial pit faces; no notable collapse. No odours or staining recorded.
0.25 – 0.6	Firm tan-brown gravelly clay. Gravel is fine to coarse and rounded to angular, including flint. Occasional rounded to angular flint cobbles.	
0.6 – 1.1	Soft to firm grey-brown very gravelly clay. Gravel is fine to coarse and rounded to angular including chalk and flint. Frequent rounded to angular flint cobbles.	
1.1 – 2.2+	Grey-white chalk with flint cobbles.	

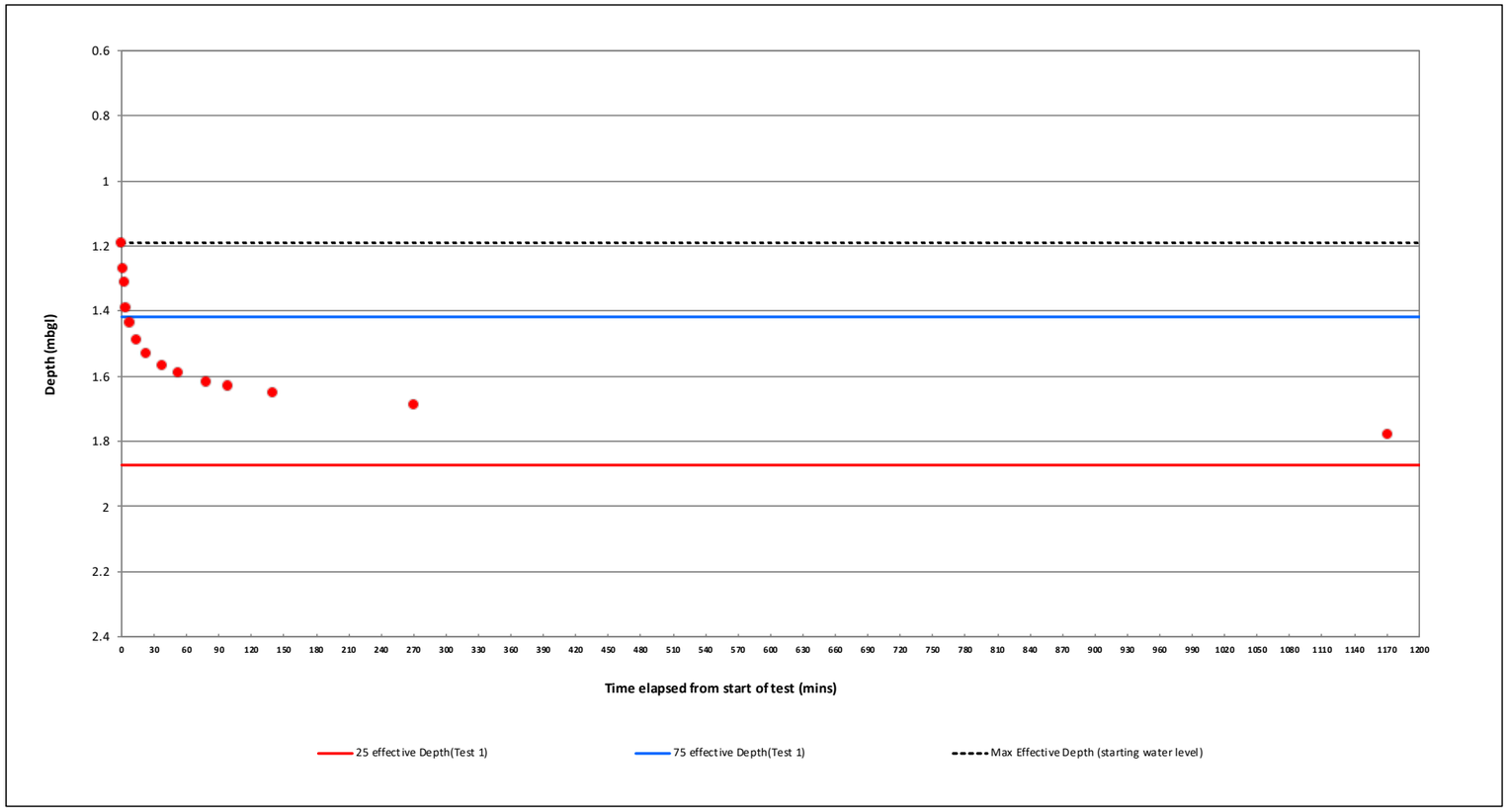
APPENDIX C

Infiltration test results

Pit reference:	TP01	**Parameters:**		
Project:	4454	Trial pit length (m):	1.7	*(L)*
Date of infiltration test:	02/10/2025	Trial pit width (m):	0.33	*(W)*
Method:	BRE365	Trial pit depth (m):	2.1	*(D)*
Date of calculation:	03/10/2025	Depth to groundwater (m):	DRY	
Completed by:	AJS	Datum (mbgl):	0	*(Z)*

TEST 1

Time	Elapsed (min)	Water dip (mbgl)	Depth of water in pit (m)
12:29:00	0.0	1.190	0.910
	1.0	1.270	0.830
	2.0	1.310	0.790
	4.0	1.390	0.710
	8.0	1.435	0.665
	14.0	1.490	0.610
	22.0	1.530	0.570
	37.0	1.570	0.530
	52.0	1.590	0.510
	78.0	1.616	0.484
	98.0	1.630	0.470
	139.0	1.650	0.450
	270.0	1.690	0.410
	1170.0	1.780	0.320



Test effective depth	0.91	m (Water depth at t=0)		
75% effective depth:	0.68	m	*1.42*	*m bgl*
50% effective depth:	0.46	m	*1.65*	*m bgl*
25% effective depth:	0.23	m	*1.87*	*m bgl*
t75	6.0	min		
t50	139.0	min		
t25	N/A	min		
Vp75-25	0.26	m3		
ap50	2.41	m2		
tp75-25	N/A	secs		
Soil infiltration rate (f):	N/A	m/s		

TEST FAILED

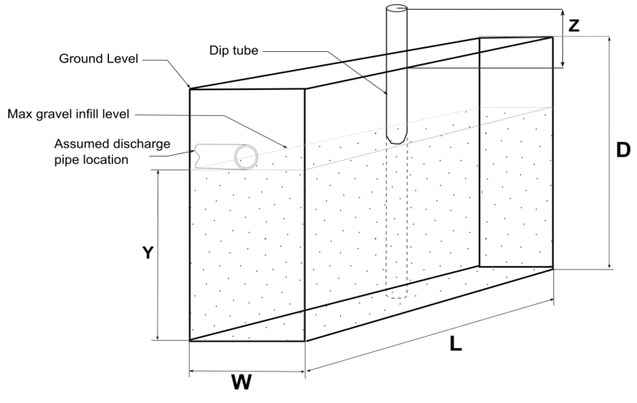
Soil infiltration rate, $f = \dfrac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$

where:

V_{p75-25} = the effective storage volume of water in the trial pit between 75% and 25% effective depth;

a_{p50} = the internal surface area of the trial pit up to 50% effective depth and including the base area;

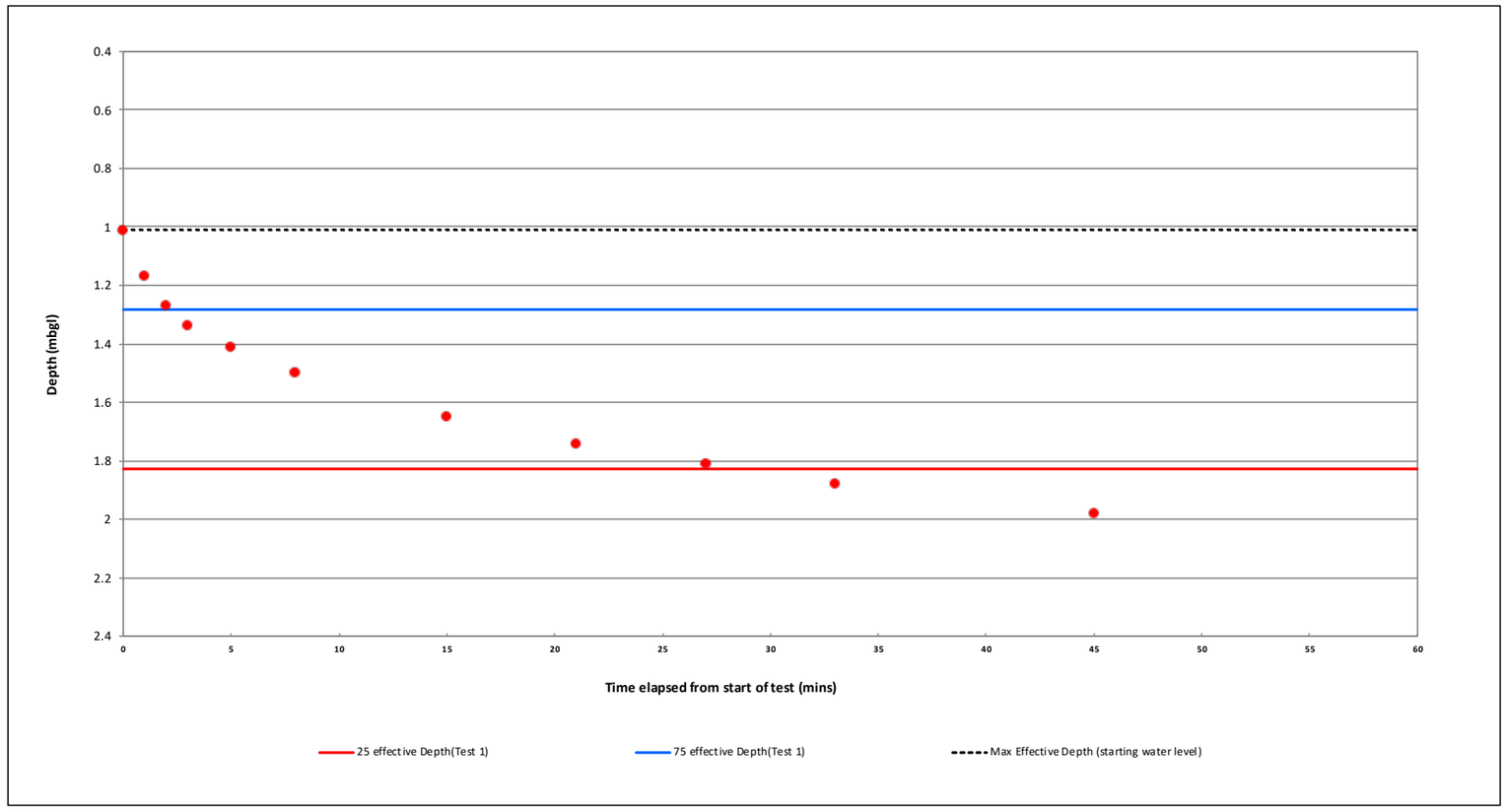
t_{p75-25} = the time for the water level to fall from 75% to 25% effective depth.



Pit reference:	TP02	**Parameters:**		
Project:	4454	Trial pit length (m):	1.8	*(L)*
Date of infiltration test:	02/10/2025	Trial pit width (m):	0.34	*(W)*
Method:	BRE365	Trial pit depth (m):	2.1	*(D)*
Date of calculation:	03/10/2025	Depth to groundwater (m):	DRY	
Completed by:	AJS	Datum (mbgl):	0	*(Z)*

TEST 1

Time	Elapsed (min)	Water dip (mbgl)	Depth of water in pit (m)
13:00:00	0.0	1.010	1.090
	1.0	1.170	0.930
	2.0	1.270	0.830
	3.0	1.340	0.760
	5.0	1.410	0.690
	8.0	1.500	0.600
	15.0	1.650	0.450
	21.0	1.740	0.360
	27.0	1.810	0.290
	33.0	1.880	0.220
	45.0	1.980	0.120



Test effective depth	1.09	m (Water depth at t=0)		
75% effective depth:	0.82	m	*1.28*	*m bgl*
50% effective depth:	0.55	m	*1.56*	*m bgl*
25% effective depth:	0.27	m	*1.83*	*m bgl*
t75	2.0	min		
t50	10.0	min		
t25	28.0	min		
Vp75-25	0.33	m3		
ap50	2.94	m2		
tp75-25	1560	secs		
Soil infiltration rate (f):	0.000073	m/s		

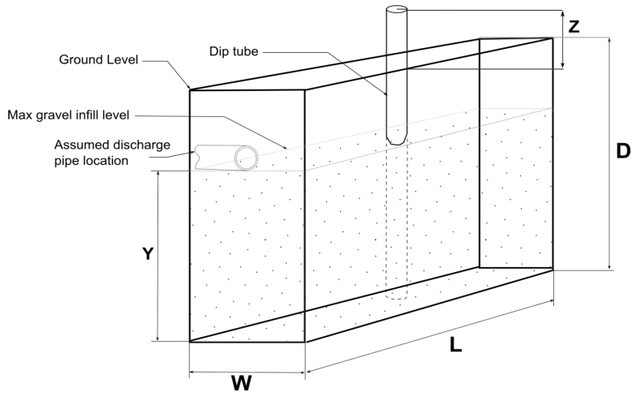
Soil infiltration rate, $f = \dfrac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$

where:

V_{p75-25} = the effective storage volume of water in the trial pit between 75% and 25% effective depth;

a_{p50} = the internal surface area of the trial pit up to 50% effective depth and including the base area;

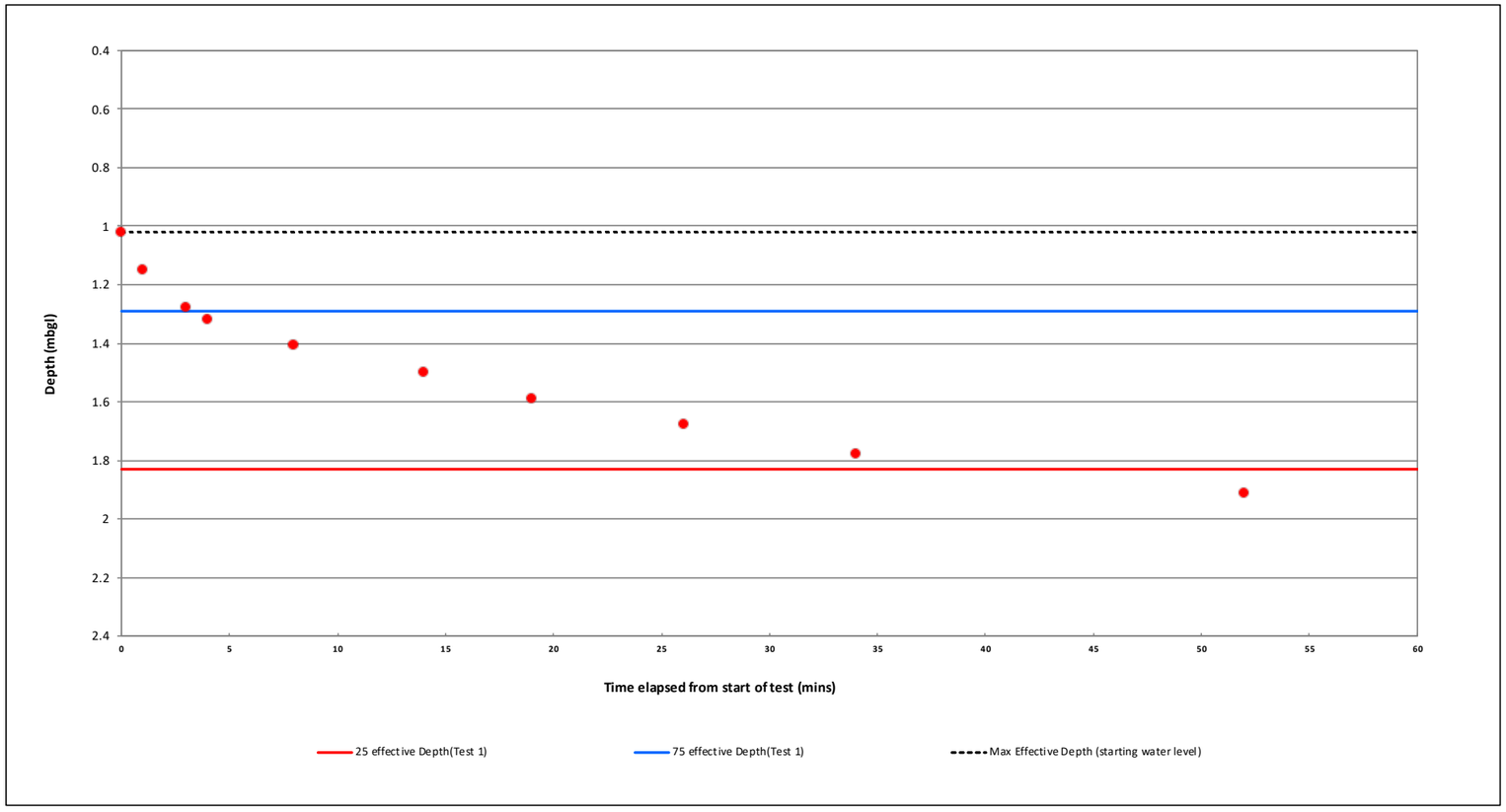
t_{p75-25} = the time for the water level to fall from 75% to 25% effective depth.



Pit reference:	TP02	**Parameters:**		
Project:	4454	Trial pit length (m):	1.8	*(L)*
Date of infiltration test:	02/10/2025	Trial pit width (m):	0.34	*(W)*
Method:	BRE365	Trial pit depth (m):	2.1	*(D)*
Date of calculation:	03/10/2025	Depth to groundwater (m):	DRY	
Completed by:	AJS	Datum (mbgl):	0	*(Z)*

TEST 2

Time	Elapsed (min)	Water dip (mbgl)	Depth of water in pit (m)
13:57:00	0.0	1.020	1.080
	1.0	1.150	0.950
	3.0	1.280	0.820
	4.0	1.320	0.780
	8.0	1.405	0.695
	14.0	1.500	0.600
	19.0	1.590	0.510
	26.0	1.680	0.420
	34.0	1.780	0.320
	52.0	1.910	0.190



Test effective depth	1.08	m (Water depth at t=0)		
75% effective depth:	0.81	m	*1.29*	*m bgl*
50% effective depth:	0.54	m	*1.56*	*m bgl*
25% effective depth:	0.27	m	*1.83*	*m bgl*
t75	3.0	min		
t50	17.0	min		
t25	41.0	min		
Vp75-25	0.33	m3		
ap50	2.92	m2		
tp75-25	2280	secs		
Soil infiltration rate (f):	0.000050	m/s		

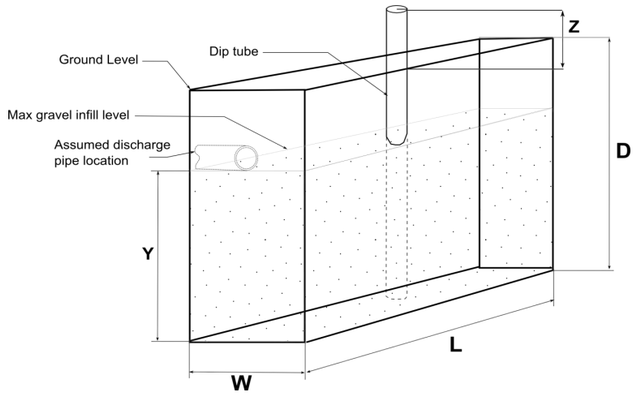
Soil infiltration rate, $f = \dfrac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$

where:

V_{p75-25} = the effective storage volume of water in the trial pit between 75% and 25% effective depth;

a_{p50} = the internal surface area of the trial pit up to 50% effective depth and including the base area;

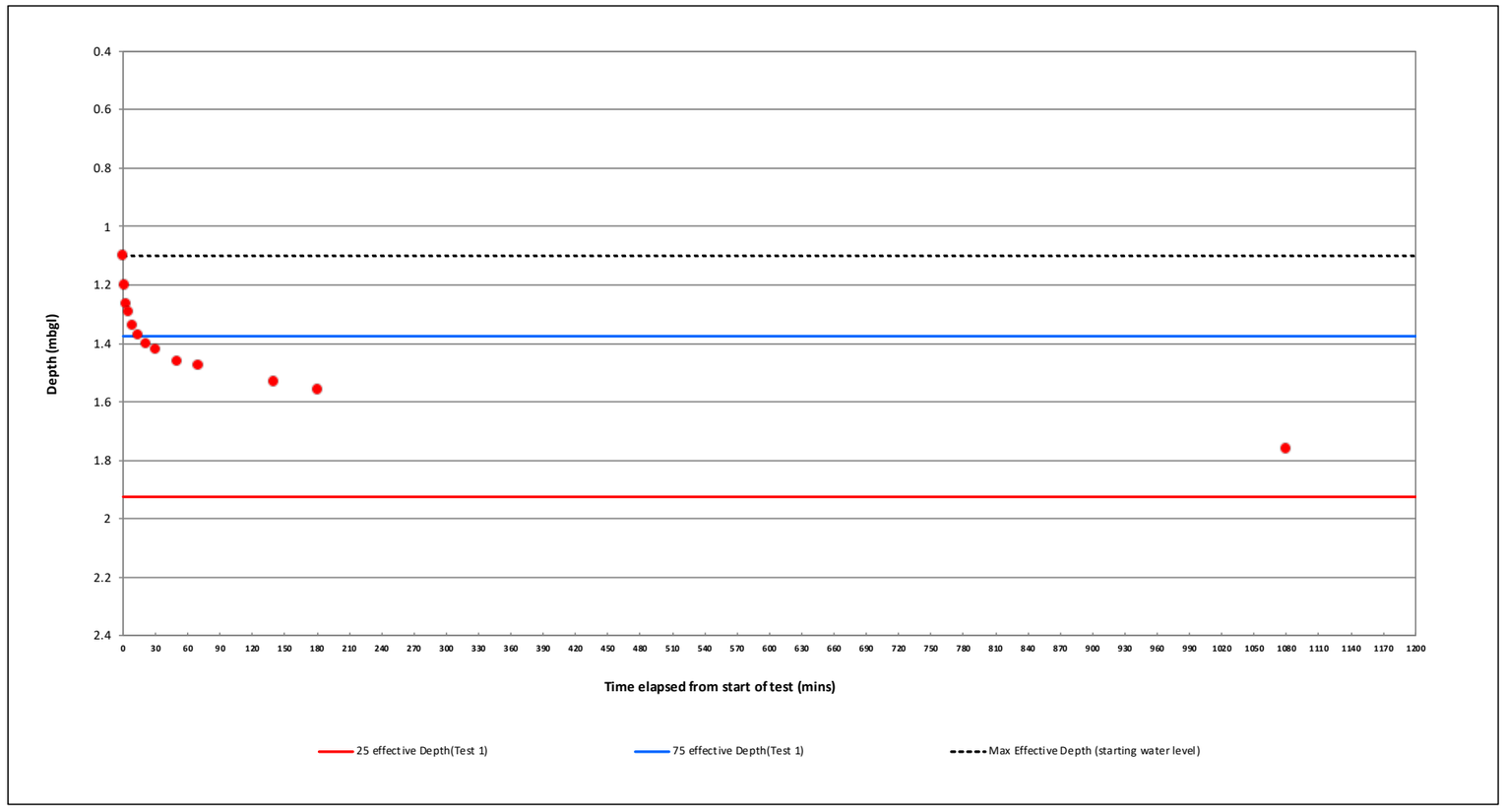
t_{p75-25} = the time for the water level to fall from 75% to 25% effective depth.



Pit reference:	TP03	**Parameters:**		
Project:	4454	Trial pit length (m):	1.7	*(L)*
Date of infiltration test:	02/10/2025	Trial pit width (m):	0.34	*(W)*
Method:	BRE365	Trial pit depth (m):	2.2	*(D)*
Date of calculation:	03/10/2025	Depth to groundwater (m):	DRY	
Completed by:	AJS	Datum (mbgl):	0	*(Z)*

TEST 1

Time	Elapsed (min)	Water dip (mbgl)	Depth of water in pit (m)
14:01:00	0.0	1.100	1.100
	1.0	1.200	1.000
	3.0	1.265	0.935
	5.0	1.290	0.910
	9.0	1.340	0.860
	14.0	1.370	0.830
	21.0	1.400	0.800
	30.0	1.420	0.780
	50.0	1.460	0.740
	70.0	1.475	0.725
	140.0	1.530	0.670
	180.0	1.560	0.640
	1080.0	1.760	0.440



Test effective depth	1.10	m (Water depth at t=0)		
75% effective depth:	0.83	m	*1.38*	*m bgl*
50% effective depth:	0.55	m	*1.65*	*m bgl*
25% effective depth:	0.28	m	*1.93*	*m bgl*
t75	16.0	min		
t50	540.0	min		
t25	N/A	min		
Vp75-25	0.32	m3		
ap50	2.82	m2		
tp75-25	N/A	secs		
Soil infiltration rate (f):	N/A	m/s		

TEST FAILED

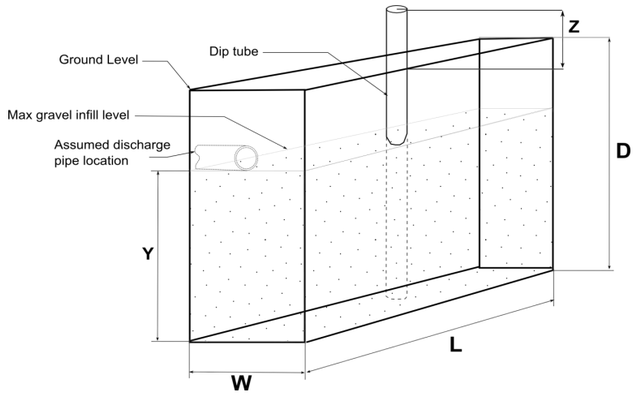
Soil infiltration rate, $f = \dfrac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$

where:

V_{p75-25} = the effective storage volume of water in the trial pit between 75% and 25% effective depth;

a_{p50} = the internal surface area of the trial pit up to 50% effective depth and including the base area;

t_{p75-25} = the time for the water level to fall from 75% to 25% effective depth.



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.

This report is confidential to the client. The client may submit the report to regulatory bodies, where appropriate. Should the client wish to release this report to any other third party for that party's reliance, GeoSmart may, by prior written agreement, agree to such release, provided that it is acknowledged that GeoSmart accepts no responsibility of any nature to any third party to whom this report or any part thereof is made known. GeoSmart accepts no responsibility for any loss or damage incurred as a result, and the third party does not acquire any rights whatsoever, contractual or otherwise, against GeoSmart except as expressly agreed with GeoSmart in writing.

For full T&Cs see http://geosmartinfo.co.uk/terms-conditions

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 9-11, 1st Floor,

Old Bank Buildings,

Bellstone, Shrewsbury, SY1 1HU

Tel: 01743 298 100

support@geosmartinfo.co.uk

15 Terms and conditions, CDM regulations and data limitations

Terms and conditions can be found on our website:

http://geosmartinfo.co.uk/terms-conditions/

CDM regulations can be found on our website:

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

Data use and limitations can be found on our website:

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