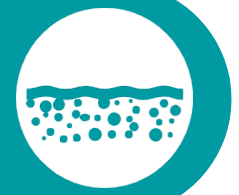


SuDSmart Plus



Sustainable Drainage Assessment

Site Address

Yaffles
Beech Hill
Reading
RG7 1HT

Date

23/06/2025

Report Status

FINAL

Grid Reference

470701, 165420

Site Area

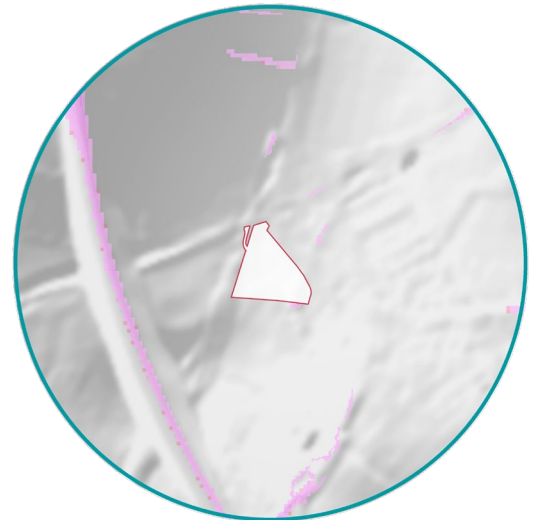
6490 m²

Report Prepared for

Richard Carwana

Report Reference

85974R3



Discharge to watercourse

The proposed Sustainable Drainage Scheme (SuDS) strategy is comprised of rainwater harvesting and an attenuation tank to attenuate surface water runoff during the 1 in 100 plus 40% climate change event. Surface water will discharge to the drainage ditch located to the west of the Site following permission from the LLFA.

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1 Executive summary



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

SuDS suitability

Risk	Issue	Result
Discharge Location	What is the infiltration potential at the Site?	Low*
	What is the potential to discharge to surface water features?	High
	What is the potential to discharge to sewers?	Low
	What is the potential to discharge to highway drains?	Low
Flooding	What is the river (fluvial) 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?	No
	Is the surface water feature a protected resource?	No

*Whilst the SD50 map identifies a Low to High potential, Site investigation undertaken by iGeo (2020) identified low permeability deposits (silt and clay) in on-Site boreholes and thus the infiltration potential has been reduced to Low.

Summary of existing and proposed development

The Site is currently used within a residential capacity as a detached residential dwelling with associated access, landscaping and outbuildings to the north. Development proposals comprise the demolition of the existing dwelling and construction of a new detached dwelling with some minor alterations to access and landscaped areas on-Site, retaining the existing outbuildings.

Summary of discharge routes

GeoSmart's SuDS Infiltration Potential (SD50) map indicates the Site has a Low to High potential for infiltration, primarily due to the variable permeability of the underlying geology (River Terrace Deposits overlying London Clay). Site investigation undertaken by iGeo in 2020 identified low permeability deposits (silt and clay) in the area proposed for development and hence infiltration is unlikely to be feasible.

The development plans identify a private drainage ditch adjacent to the western boundary of the Site, where treated foul water is discharged. Discharge to this feature is considered feasible, following permission from the relevant authorities.

The asset location plan search included in Appendix C confirms there are no public surface water, combined or foul sewers within the vicinity of the Site and hence discharge is considered unfeasible.

Runoff rate and attenuation requirements

Discharging off-Site requires 9.97 m³ of attenuation to be provided to ensure there is no flooding within the development in all storm events up to and including the 1 in 100 year including a 40% allowance for climate change. This volume is subject to the discharge rate being restricted to 2 l/s (as close to the Greenfield 1 in 1 year rate as possible, without increasing the potential for blockages).

Proposed SuDS strategy

SuDS features comprised of rainwater harvesting and an attenuation tank are proposed to attenuate a minimum of 10.26 m³ of surface water runoff. The SuDS features would provide some water quality benefits (interception and filtration) prior to discharging to the nearby drainage ditch.

It should be noted that only the area intended for building development has been considered for the SuDS strategy. Existing outbuildings, driveway areas and associated permeable surfaces have been excluded as they are not part of the current development proposal and will drain as existing

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 non-statutory technical standards (DEFRA, 2015).

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, where payments for the works will form part of the property deeds and / or rental agreements.

Recommendations / Next steps

The condition and capacity of the adjacent surface watercourse should be confirmed, and permission should be obtained from the Environment Agency and Local Council for proposed outfalls and any other permits required.

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 attenuation SuDS.
SuDS features	Rainwater harvesting and attenuation tank.
Discharge location	Surface water feature (drainage ditch).
Discharge rate	2 l/s (lowest possible rate without increasing the risk of blockages)

Table 2. Proposed SuDS sizing (dimensions) and attenuation volumes

Rainwater Harvesting	Rainwater harvesting butts should be established for the proposed development. 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 strategy.
Attenuation Tank	An attenuation tank located in the front driveway of the property with dimensions 3 m x 3 m x 1.20 m, filled with geo-cellular crates with a 95% void ratio, will attenuate a minimum of 10.26 m ³ .
Total Attenuation Provided	10.26 m ³
Total Attenuation Required	9.97 m ³
Freeboard	0.29 m ³

-  Attenuation Tank
-  Rainwater harvesting butt
-  Surface water drainage network
-  Flow control
-  Drainage Ditch
-  Exceedance Routes

It should be noted that only the area intended for building development has been considered for the SuDS strategy. Existing outbuildings, driveway areas and associated permeable surfaces have been excluded as they are not part of the current development proposal and will drain as existing.

[illegible]

3 Site analysis



Site location

Figure 2. Aerial Imagery (Bluesky, 2025)

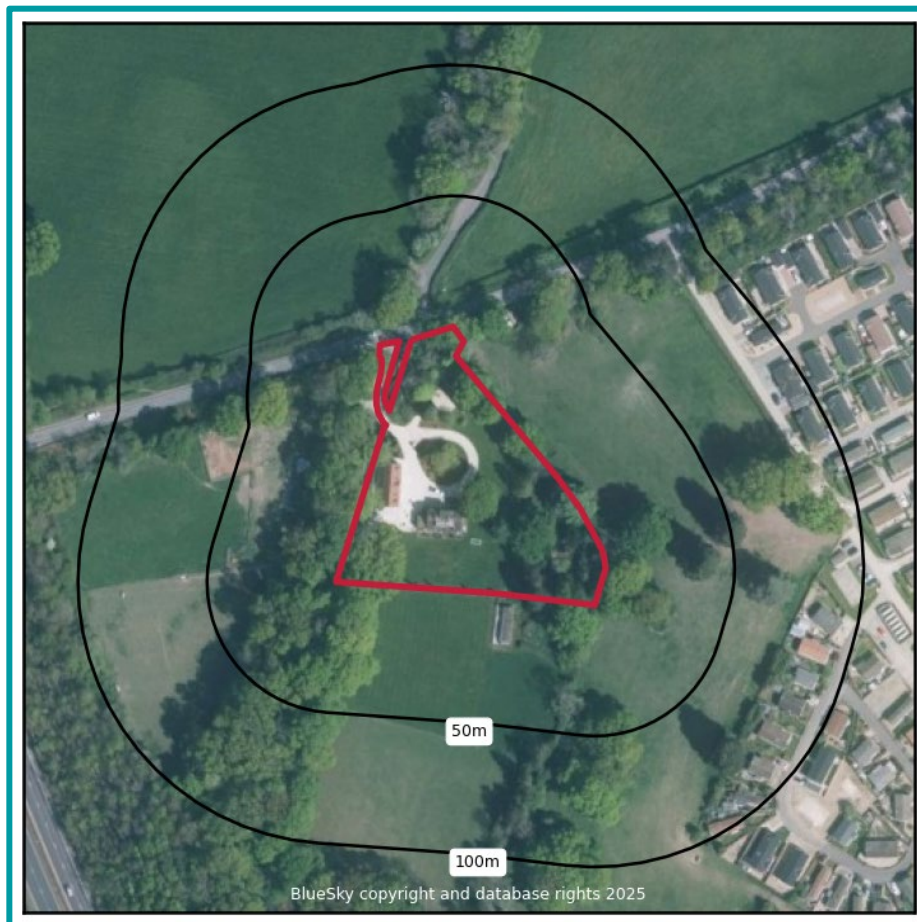
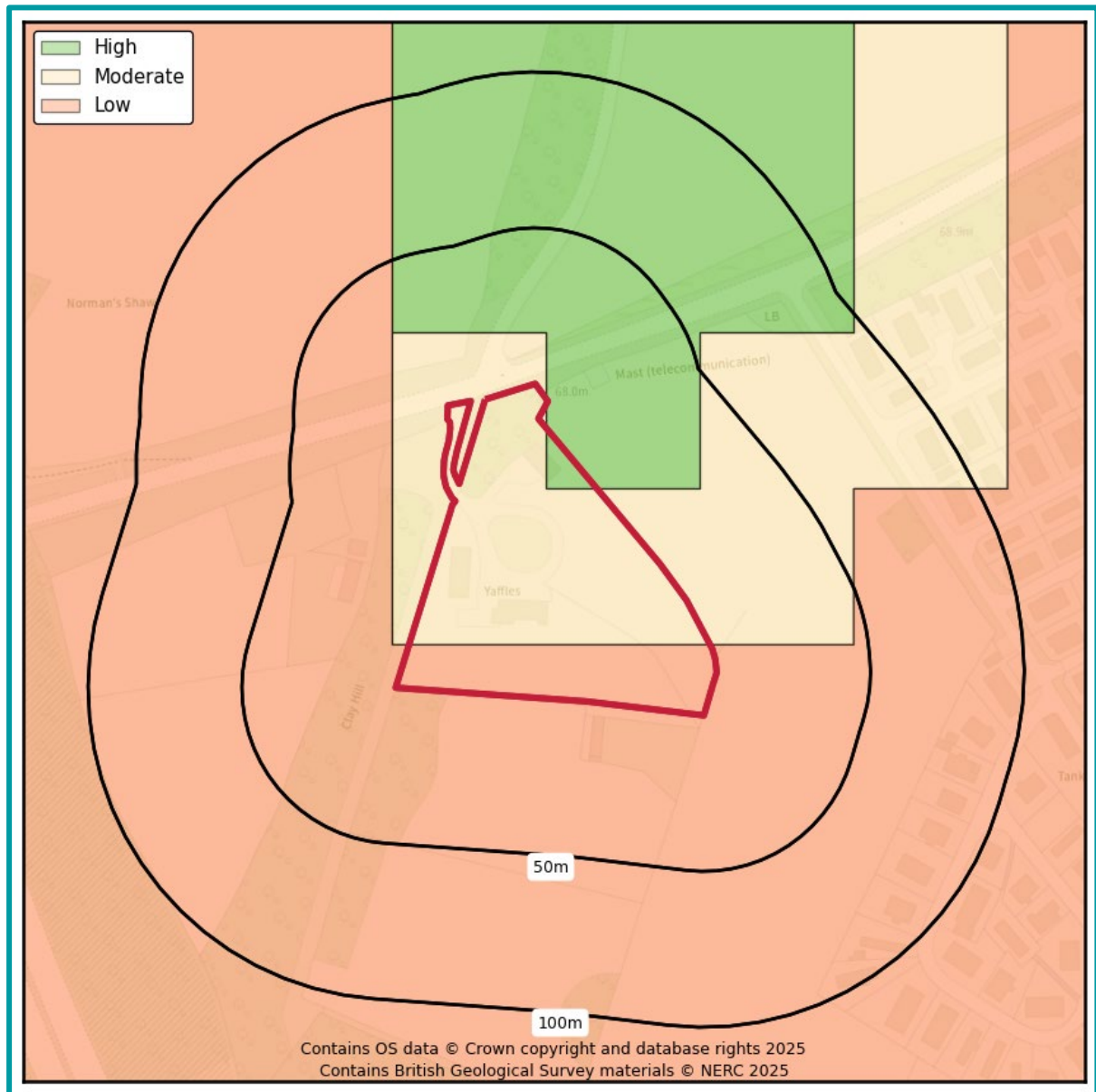


Figure 3. SuDS infiltration suitability (SD50) map (GeoSmart, 2025)

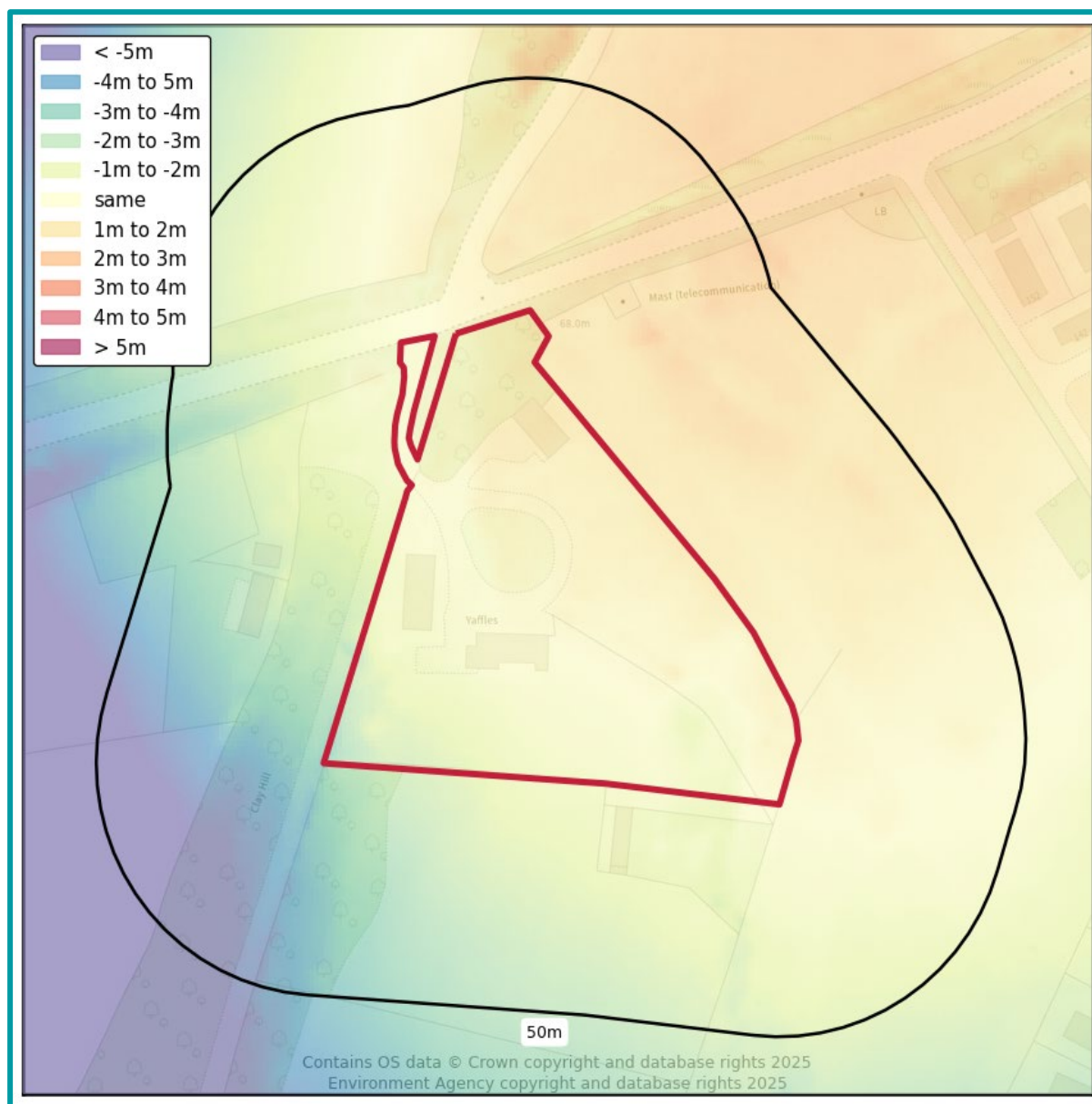


The GeoSmart SuDS Infiltration Suitability Map (SD50) screens the potential for infiltration drainage at the Site and indicates where further assessment is recommended. The map combines information on the thickness and permeability of the underlying material and the depth to the high groundwater table.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

There is a Low to High potential for infiltration SuDS across the Site. It is likely that the underlying geology at the Site has variable permeability which may limit the effectiveness of a proposed infiltration SuDS scheme. It is understood that the Site partially drains via infiltration through several soakaways in addition to discharging to a drainage ditch in the west of the Site.

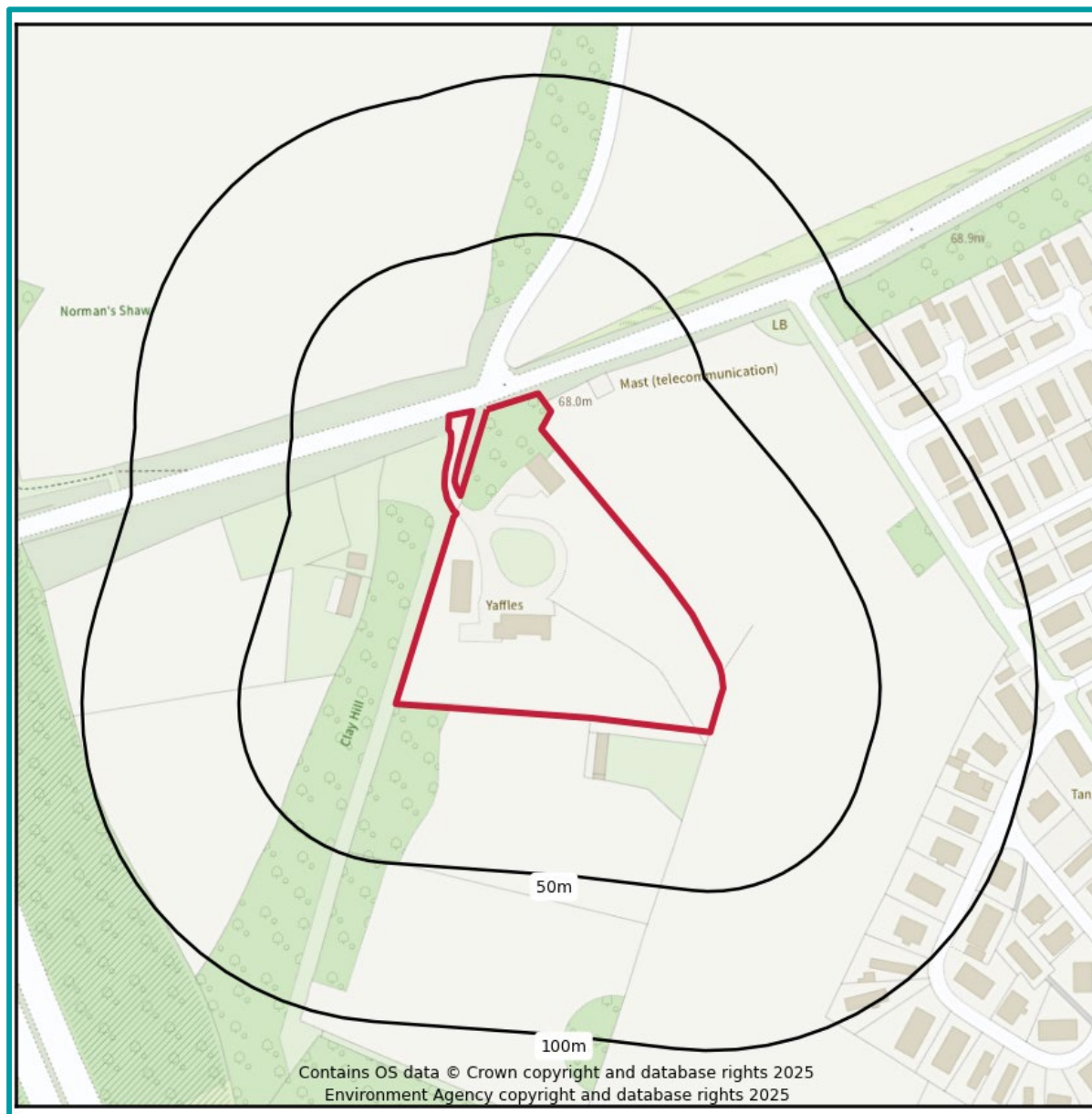
The variation in infiltration potential is controlled by the underlying superficial and bedrock geology, as the Site is partially overlain by permeable superficial deposits (River Terrace Deposits) above low permeability bedrock (London Clay). However, Site investigation (iGeo, 2020) confirms the underlying geology in the area proposed for development is underlain by silty clay and hence infiltration is unlikely to be feasible.

Figure 4. Site topography (GeoSmart, 2025)



An assessment of the topography at the Site has been undertaken using LiDAR DTM5 elevation data to identify the general slope and any localised depressions. The mapping shows a comparison between average ground levels on the Site with ground levels in the surrounding area. The mapping confirms the overall Site is generally falling to the southwest. Further analysis could be undertaken by visiting the Site or by collecting additional topographic survey to provide further confirmation of ground levels.

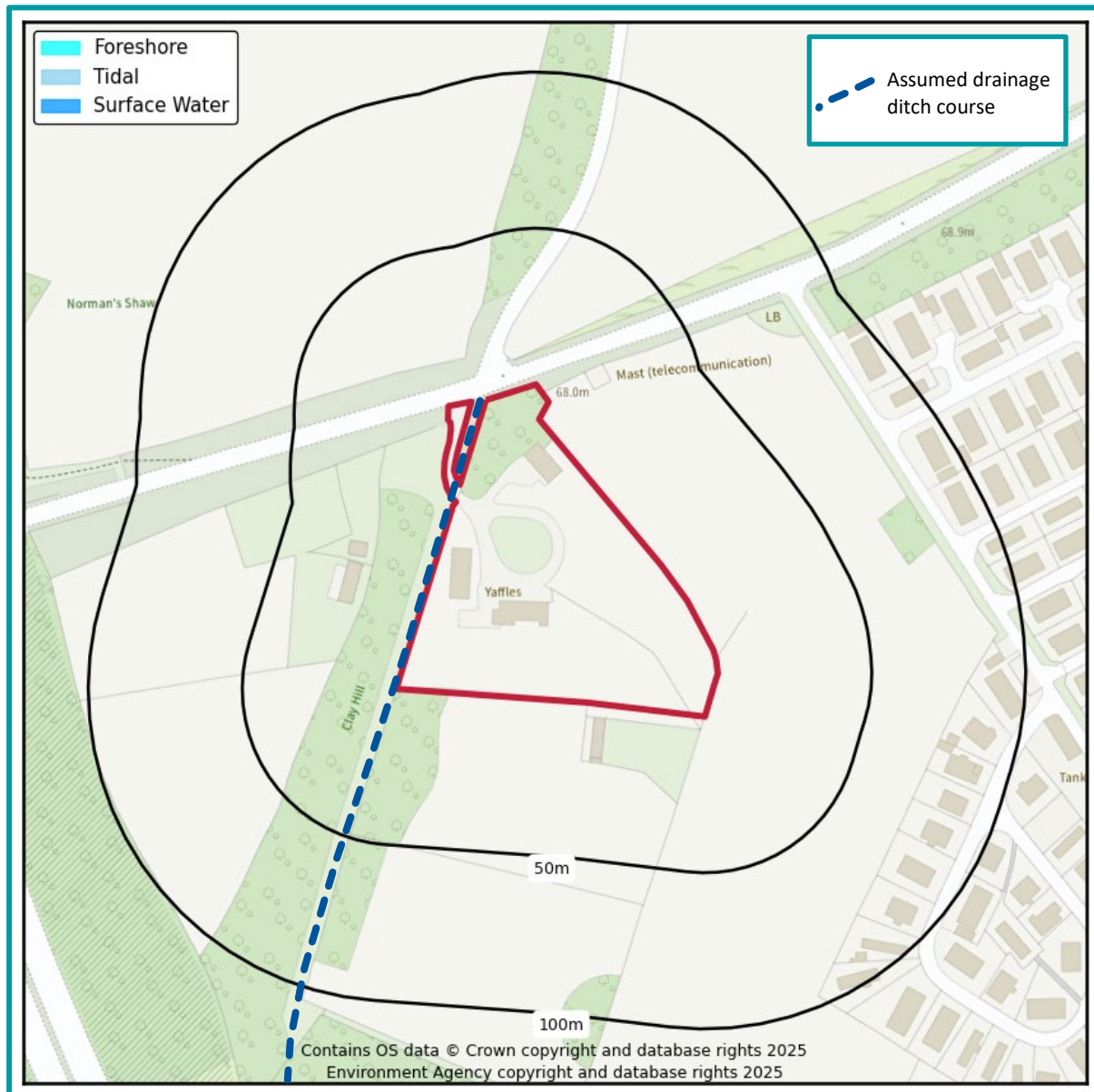
Figure 5. Source protection zone map (EA, 2025)



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

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

Figure 6. Surface water features map (EA, 2025)

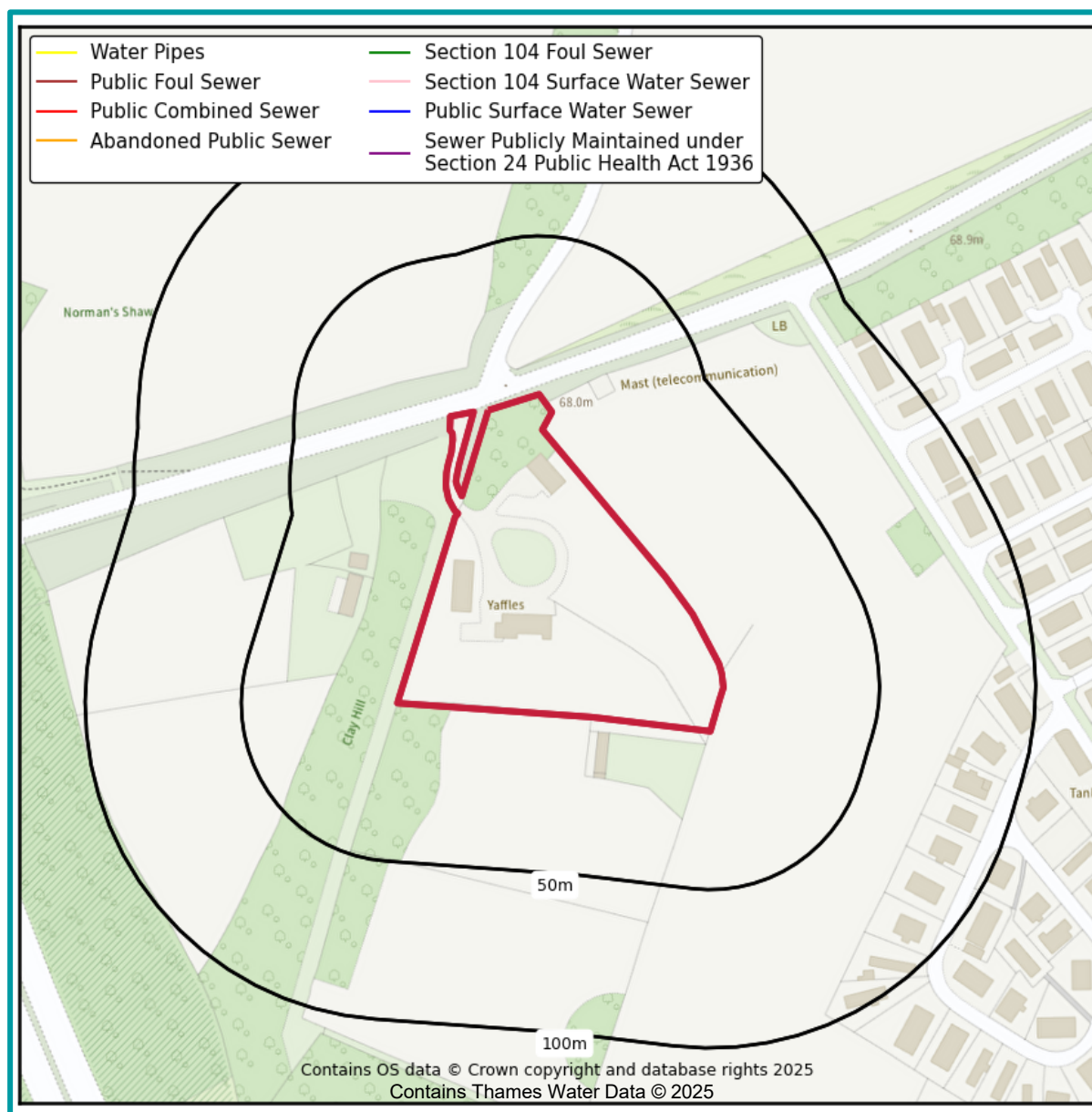


Ordnance Survey (OS) mapping indicates that there are no mapped surface water features within 100 m of the Site. However, it is understood that the Site partially discharges to a drainage ditch to the west of the Site, which eventually discharges to the River Loddon c. 860 m south of the Site.

Further discussions should be held with third party landowners and regulators to agree on a suitable discharge route and any easements required.

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

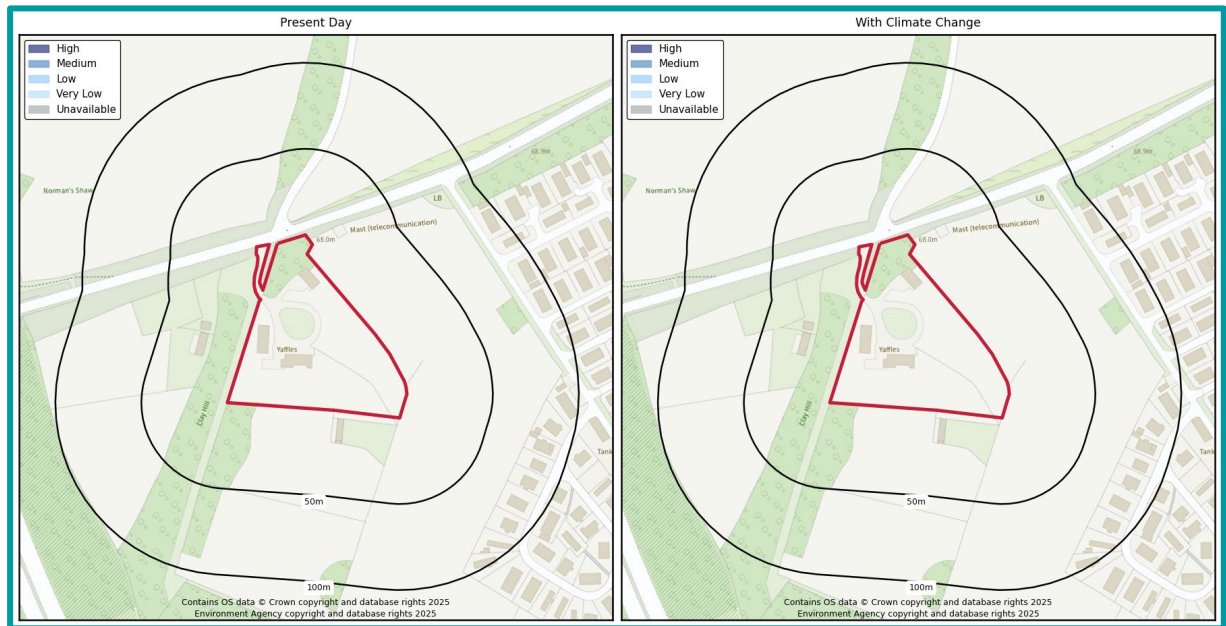
Figure 7. Sewer features map (OS & Thames Water, 2025)



GeoSmart has undertaken an assessment of the location of sewer features within the vicinity of the Site. According to the asset location plan undertaken at the Site (Appendix C), there are no public surface water sewer or combined sewers located within the vicinity of the Site.

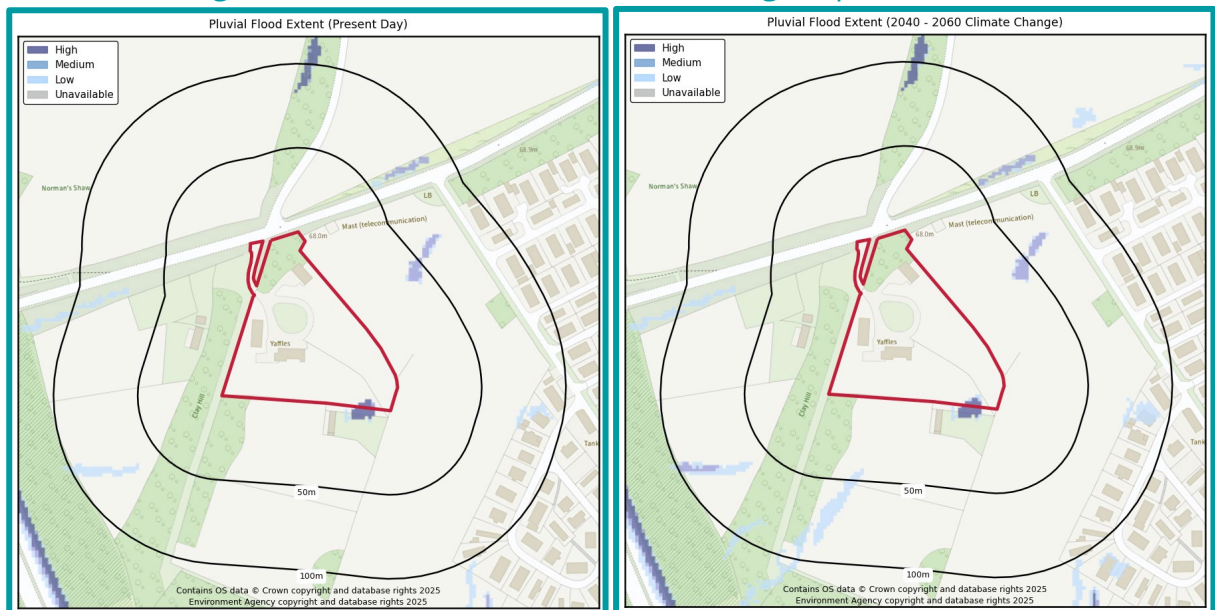
Further analysis of the connections and condition of the public surface water drainage system should be undertaken by carrying out a CCTV survey or by contacting the drainage provider or the Local Council to confirm the presence, location and condition of the sewer. Consultation with the drainage provider would also be required to determine that sufficient capacity is available to accept the proposed discharge, and to gain permission to connect if required.

Figure 8. Risk of flooding from rivers & sea map (EA, 2025)



According to the EA's Risk of Flooding from Rivers and the Sea (RoFRS) map, the Site has a Very Low risk of flooding from fluvial or coastal flooding, with less than 0.1% annual probability of flooding, therefore the SuDs design is unlikely to be affected. The Site remains at Very Low risk during a future climate change (2040 – 2060) event.

Figure 9. Risk of surface water flooding map (EA, 2025)

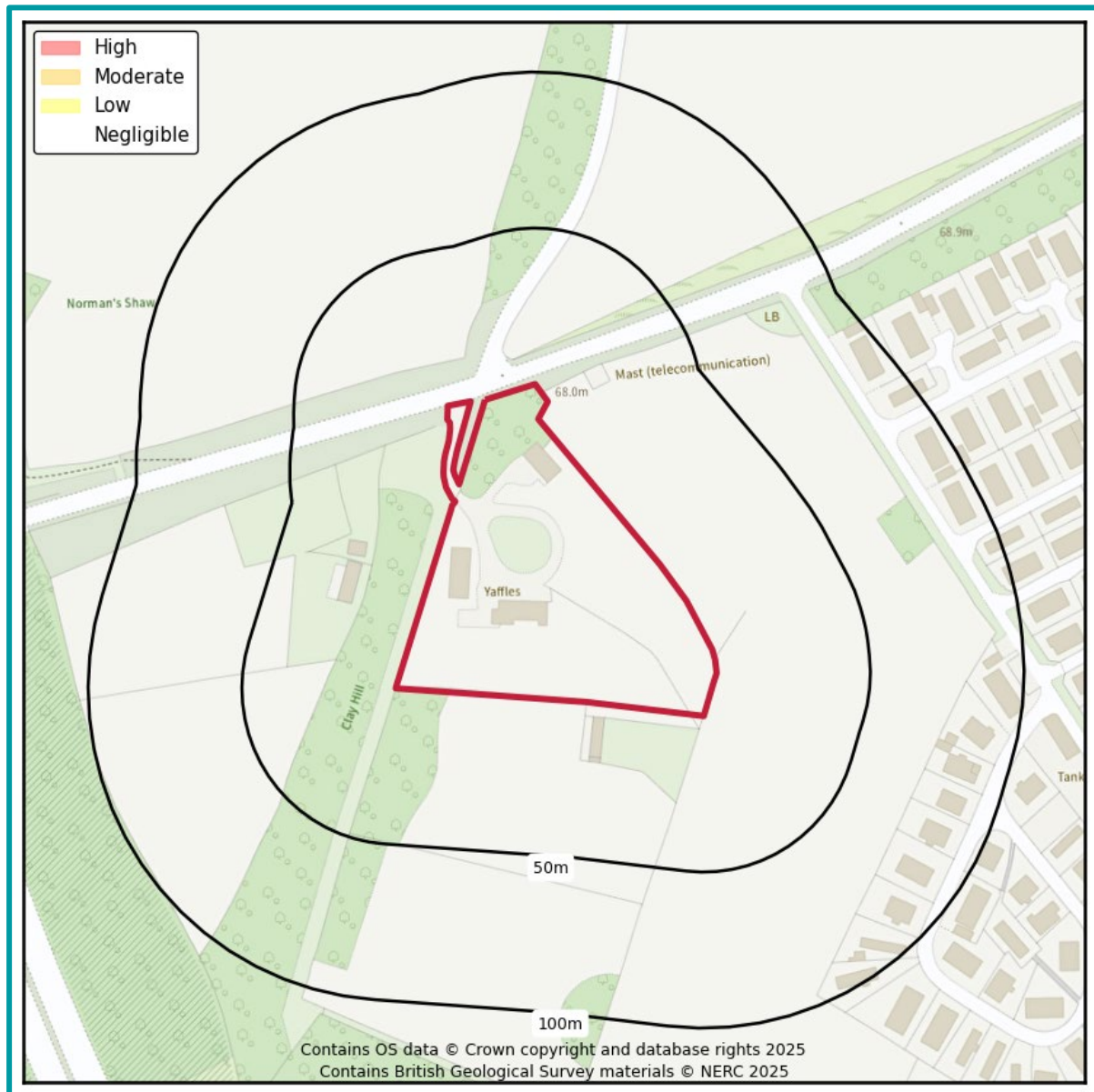


GeoSmart have undertaken an assessment of the risk of flooding from surface water (pluvial) sources within the vicinity of the Site using the EA's Risk of Flooding from Surface Water (RoFSW) mapping. The EA's mapping confirms the Site is considered to be at Very Low to High risk of surface water flooding. The vast majority of the Site (95%) is at Very Low risk of flooding.

The above map shows the extent and depth of flooding during the >3.3% annual probability (AEP) (1 in 30 year – High risk), 3.3 – 1% AEP (1 in 100 year – Medium risk) and 1 – 0.1% AEP (1 in 1000 year – Low risk) events. This confirms there are areas where flooding could occur in a 1 in 30 year event. However, given the minor extent of flooding which is outside the development footprint the use of SuDS features is unlikely to be affected.

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

Figure 10. Groundwater flood risk (GW5) map (GeoSmart, 2025)



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

4 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 Yaffles, Beech Hill Road, RG17 1HT (the Site). The Site is located at the in a setting of agricultural and residential use. The land slopes to the southwest from 68.95 mAOD to 64.59 mAOD. This is based on EA elevation data obtained for the Site to a 1 m resolution with a vertical accuracy of ± 150 mm.

Development

The Site is currently used within a residential capacity as a detached residential dwelling with associated access, landscaping and outbuildings to the north. Development proposals comprise the demolition of the existing dwelling and construction of a new detached dwelling with some minor alterations to access and landscaped areas on-Site, retaining the existing outbuildings. 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 and each formation may have a range of permeability.

Table 3. Site Geology

Geology present on-Site		Potentially permeable?
Superficial geology (Figure 11)	River terrace deposits (RTD) – sand and gravel (70% Site coverage)	✓
Bedrock geology (Figure 12)	London Clay (LC)	X

A Site investigation undertaken by iGeo in 2020 included two small trial pits in the area proposed for development to a maximum depth of 1.30 m below ground level (bgl). The trial pits encountered sandy silty clay with some flint gravel and mottled silty clay. Given the anticipated low permeability of the underlying geology, infiltration is unlikely to be feasible (iGeo, 2020).

The permeability of the underlying material at the Site shown within the BGS mapping and nearby boreholes is low to moderate, however Site investigation confirms the area proposed for development is underlain by low permeability silt and clay and hence further investigation is not considered necessary.

In addition, the BGS website was used to extract ground information from the nearest borehole record to the Site (ref: SU76NW152). This borehole is located approximately 175 m to the northwest of the Site at an elevation of c. 49.23 mAOD. It should be noted that this borehole is located in an area underlain by London Clay only with no superficial deposits present. However, no other nearby boreholes were available at the time of writing.

The borehole record confirms the underlying geology is comprised of topsoil to a depth of 0.2 m below ground level (bgl) underlain by brown clay to a depth 1.20 m bgl, overlying brown gravelly clay to a depth of 1.30 m bgl, overlying brown clay to a depth of 3.20 m bgl, overlying silty clay to a depth of 4.0 m bgl, overlying brown clay to a depth of 5.80 m bgl, where this borehole is terminated.

Figure 11. Superficial Geology (BGS, 2025)

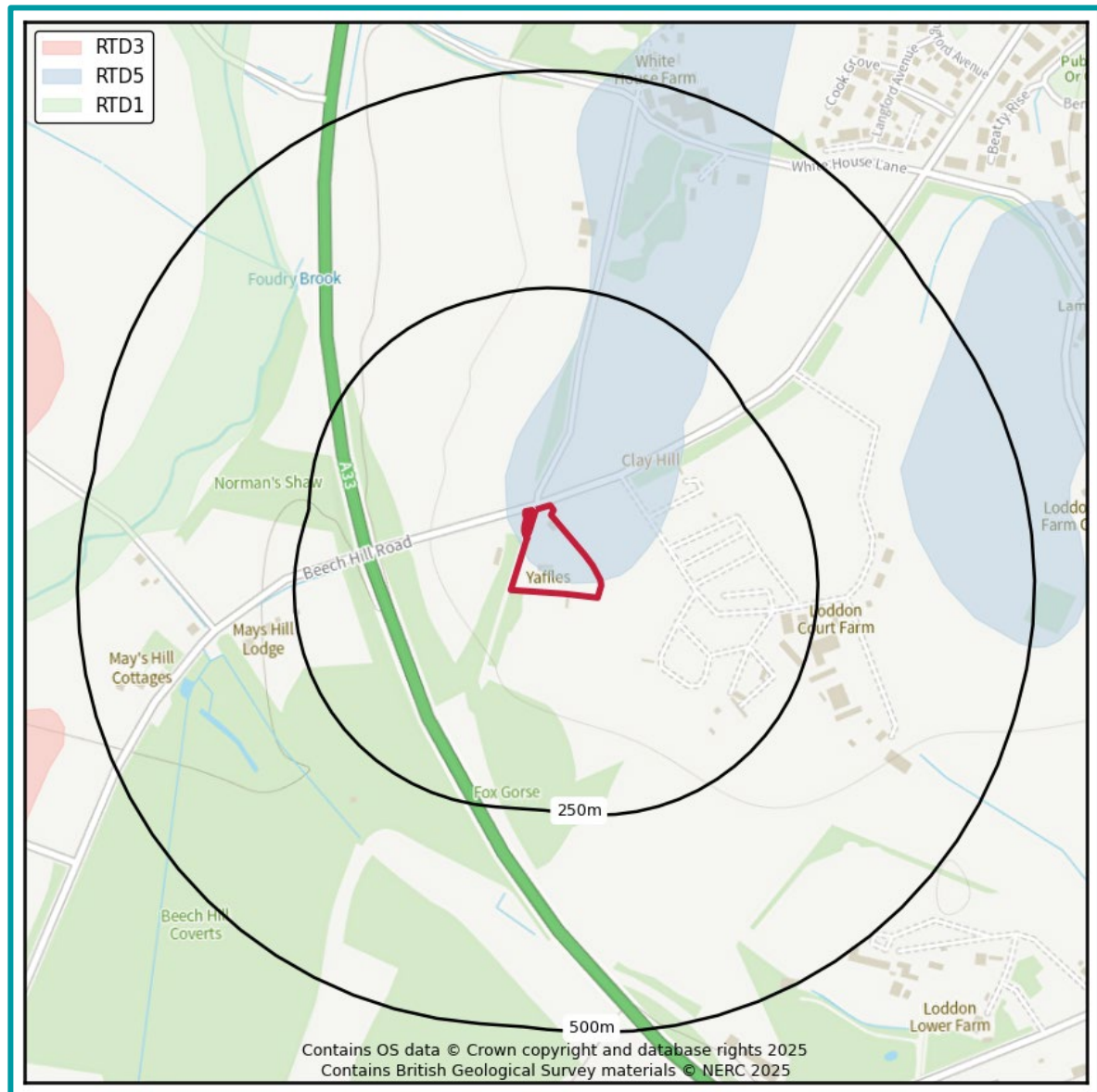
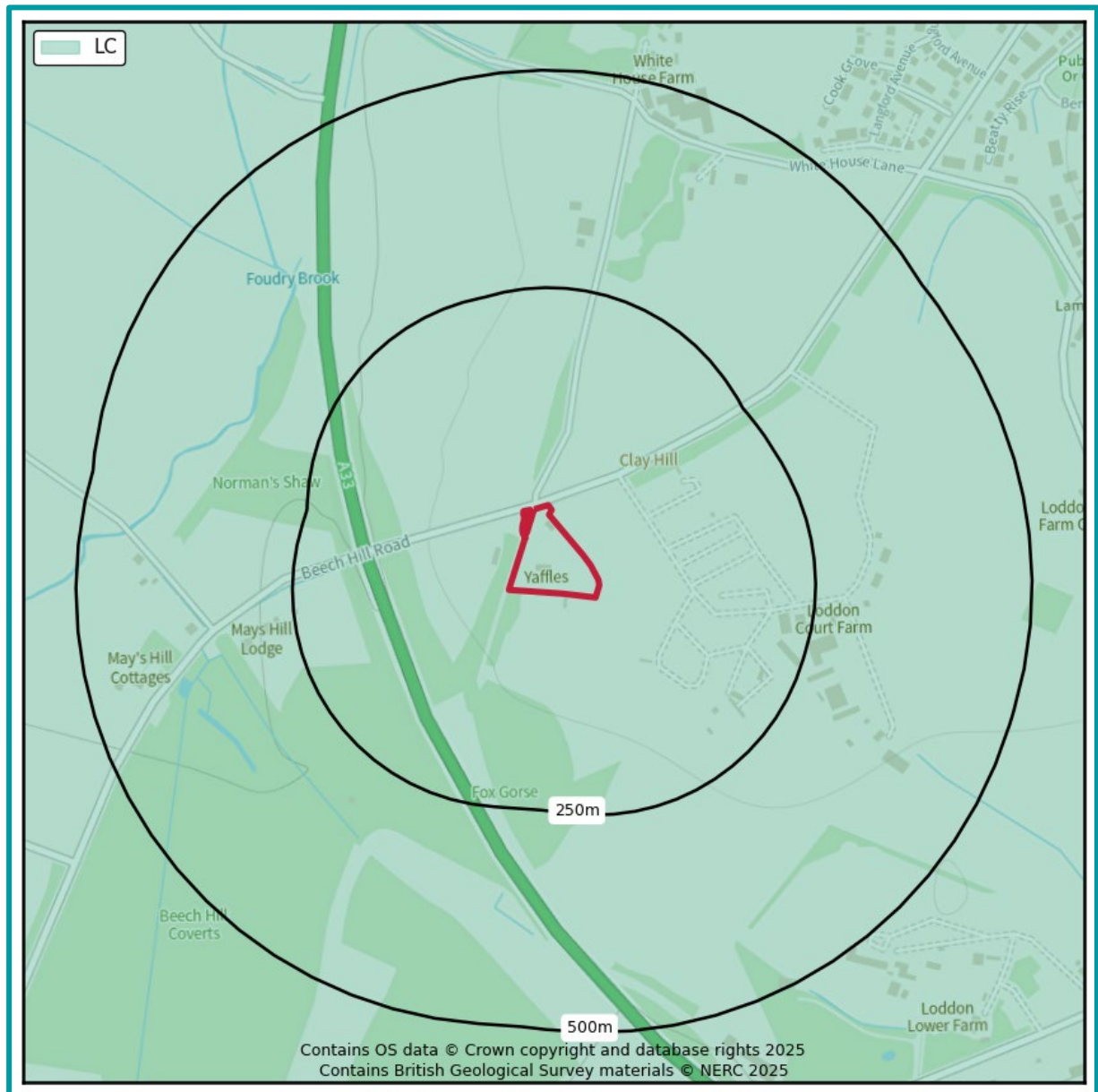


Figure 12. Bedrock Geology (BGS, 2025)



Depth to groundwater

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

Borehole ref: SU76NW152 recorded groundwater standing at 1.75 m bgl after 18 hours. It should be noted that this borehole is at a significantly lower elevation than the Site and therefore the borehole is unlikely to be comparable to ground conditions on-Site. Water levels were not recorded as part of the Site Investigation (iGeo, 2020).

Infiltration features are not proposed at the Site, given the low permeability of the underlying geology.

Ground conditions

Infiltration SuDS are not required hence a detailed review of ground conditions is not considered necessary. A Site investigation has also been undertaken by iGeo in 2020 including some shallow trial pits. The logs can be found in Appendix D.

Water quality

The Site does not lie within an SPZ and infiltration is not proposed. Further consultation with the water company is unlikely to be required.

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.

5 National & local policy context



National Guidance

CIRIA SuDS Manual (C753) (2015)

A development should utilise sustainable drainage systems (SUDS) unless there are practical reasons for not doing so, and should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible in line with the following drainage hierarchy:

1. Use infiltration techniques, such as porous surfaces in non-clay areas,
2. attenuate rainwater in ponds or open water features for gradual release,
3. attenuate rainwater by storing in tanks or sealed water features for gradual release,
4. discharge rainwater direct to a watercourse,
5. discharge rainwater to a surface water sewer / drain,
6. discharge rainwater to the combined sewer.

Defra - Sustainable Drainage Systems: Non-statutory technical standards for sustainable drainage systems (2015)

Peak Flow control

For developments which were previously developed, the peak runoff rate from the development to any drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event must be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event.

For greenfield developments, the peak runoff rate from the development to any highway drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event should never exceed the peak greenfield runoff rate for the same event.

Volume control

Where reasonably practicable, for developments which have been previously developed, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event must be constrained to a value as close as is reasonably practicable to the greenfield runoff volume for the same event, but should never exceed the runoff volume from the development site prior to redevelopment for that event. The runoff volume must be discharged at a rate that does not adversely affect flood risk.

The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur on any part of the Site for a 1 in 30 year rainfall event.

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

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

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

Table 4. Kennet and Tributaries Management Catchment peak rainfall allowances

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

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

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

Local Policy

Wokingham Core Strategy (2010)

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

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

WokBC-LS3 If the SuDS system discharges to a water body, it should be demonstrated that high water levels within the receiving water body for the design storm event of the discharging system would not exacerbate flood risk to neighbouring property or affect the performance of the drainage system and its ability to discharge flow from the site.

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

Peak Flow Control

For greenfield developments, the peak runoff rate from the development to any highway drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100-year rainfall event should never exceed the peak greenfield runoff rate for the same event.

For developments which were previously developed, the peak runoff rate from the development to any drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event must be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event.

Volume Control

Where reasonably practicable, for greenfield development, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100-year, 6 hour rainfall event should never exceed the greenfield runoff volume for the same event.

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

Where it is not reasonably practicable to constrain the volume of runoff to any drain, sewer or surface water body in accordance with S4 or S5 above, the runoff volume must be discharged at a rate that does not adversely affect flood risk.

6 Storage, volume and peak flow rate



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

Table 5. Storage requirements at the proposed development Site (Discharge runoff to watercourse)

Attenuation scenario		Attenuation required (m ³)	Explanation	
Discharge runoff to watercourse	1 in 30 year	3.84	Attenuation required to ensure surface water runoff is attenuated in all storm events up to and including the 1 in 30 year (0.25 hour, Critical Storm Duration) event*. Flooding of the Site of 2.15 m ³ should be contained within permeable landscaped areas within the Site to ensure no flooding of internal areas during the 1 in 100 year storm event.	A further 3.98 m ³ should be managed within overland flow routes to ensure there is no increase in flood risk in all events up to the 1 in 100 year
	1 in 100 year	5.99	Attenuation required to ensure surface water runoff is attenuated in all storm events up to and including the 1 in 100 year (0.50 hour, Critical Storm Duration) event*.	including 40% allowance for climate change.
	1 in 100 year including 40% CC	9.97	Attenuation required to ensure surface water runoff is attenuated in all storm events up to and including the 1 in 100 year (0.75 hour, Critical Storm Duration) event including a 40% allowance for climate change*.	

*See Appendix B for associated runoff and discharge calculations. Discharge rates all restricted as close as possible to greenfield rates in their respective events.

Surface water runoff

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

Guidance

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

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

Table 6. Change in impermeable area associated with the development

Total Site area	6490 m ²
Impermeable area (and as a percentage of the total area of the proposed development footprint of 257 m ²)	
Pre-development	Post-development
120 m ² (47%)	257 m ² (100%)
Impermeable land use: 120 m ² existing dwelling Permeable land use: landscaped areas	New impermeable land use: 257 m ² replacement dwelling and terrace New permeable land use: N/A

Only the area intended for building development has been considered for the calculations. Existing outbuildings, driveway areas and associated permeable surfaces have been excluded as they are not part of the current development proposal and will drain as existing.

Guidance

"The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur on any part of the site for a 1 in 30 year rainfall event' and 'flooding does not occur during a 1 in 100 year rainfall event in any part

of: a building (including a basement); or in any utility plant susceptible to water (e.g. pumping station or electricity substation) within the development"

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

Peak discharge rates

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

Table 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	0.04	N/A	N/A	N/A
6 hour 1 in 1 year	0.04	0.18	0.29	0.11
6 hour 1 in 10 year	0.07	0.31	0.49	0.18
6 hour 1 in 30 year	0.10	0.40	0.65	0.24
6 hour 1 in 100 year	0.14	0.51	0.81	0.30
6 hour 1 in 100 year + 20% CC	N/A	N/A	0.97	0.46
6 hour 1 in 100 year + 40% CC	N/A	N/A	1.13	0.63

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

Relevant national, regional and local planning policy has been consulted in Section 5 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 2 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.

Further information on the calculation of total discharge volumes is provided in Section 11 'Methodology and Limitations'.

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	2.00	N/A	N/A	N/A
6 hour 1 in 1 year	1.86	3.89	6.20	2.31
6 hour 1 in 10 year	3.28	6.71	10.63	3.92
6 hour 1 in 30 year	4.18	8.74	13.94	5.20
6 hour 1 in 100 year	5.25	10.97	17.49	6.53
6 hour 1 in 100 year + 20% CC	N/A	N/A	20.99	10.03
6 hour 1 in 100 year + 40% CC	N/A	N/A	24.49	13.53

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

Critical storm duration and volume requirements

Storage volumes for a range of return periods including the 1 in 30 year, 1 in 100 year and 1 in 100 year plus climate change (40%) events have been calculated to assess the impact of the proposed development. The required storage volumes for attenuation features have been calculated for the critical storm durations, limited to a maximum discharge rate of 2 l/s.

Table 9. Critical Storm Duration and Attenuation volume requirements

Return Period	Runoff rate restriction (l/s)	Critical Storm Duration (hr)	Attenuation volume required (m ³)
1 in 30 year	2.00	0.25	3.84
1 in 100 year	2.00	0.50	5.99
1 in 100 year including a 40% climate change	2.00	0.75	9.97

7 Runoff destination



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

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

Discharge to ground

The SD50 map identifies The Site has High to Low potential for infiltration, with permeable underlying superficial deposits in the northeast of the Site, where infiltration may be feasible. However, a site investigation undertaken (iGeo, 2020) identified the underlying geology to consist of low permeability silt and clay in the area proposed for development and hence infiltration is unlikely to be feasible.

Discharge to surface watercourse

It is understood that the Site currently discharges foul water to an unnamed drainage ditch to the west of the Site and this may be suitable destination for discharge of surface water. Consultation with the LLFA and third-party landowners is likely to be required, and discharge would have to be controlled and on-Site attenuation would be required.

Discharge to sewer

GeoSmart has undertaken an assessment of the location of sewer features within the vicinity of the Site. According to the asset location plan undertaken at the Site (Appendix C), there are no public surface water sewer or combined sewers located within the vicinity of the Site.

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 does not lie within an SPZ and therefore additional treatment stages are not required.

Table 10. Level of hazard

Hazard	Source of hazard
Very Low	Residential roof drainage
Low	Residential, amenity uses including low usage car parking spaces and roads, other roof drainage.
Medium	Commercial, industrial uses including car parking spaces and roads (excluding low usage roads, trunk roads and motorways).
High	Areas used for handling and storage of chemicals and fuels, handling of storage and waste (incl. scrap-yards).

The recommended minimum number treatment stages suggested for the different runoff waters identified for the proposed development is highlighted in the table below.

Table 11. Minimum number of treatment stages for runoff

		Sensitivity of the receiving water body		
		Low	Medium	High
Hazard	Low	1	1	1
	Med	2	2	2
	High	3	3	3

9 Proposed SuDS strategy



Sustainable drainage systems

DEFRA's non-statutory requirements 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:

As infiltration to ground is not achievable at the Site, an attenuation volume of 9.97 m³ should be stored within lined SuDS features to accommodate the calculated 1-hour Critical Storm Duration for surface water discharge runoff, restricted to 2 l/s.

It should be noted that only the area intended for building development has been considered for the SuDS strategy. Existing outbuildings, driveway areas and associated permeable surfaces have been excluded as they are not part of the current development proposal and will drain as existing

Table 12. Proposed SuDS type, features, discharge location and rate restriction

SuDS type	Source control (interception) and attenuation SuDS.
SuDS features	Rainwater harvesting and attenuation tank.
Discharge location	Surface water feature (drainage ditch).
Discharge rate	2 l/s (lowest possible rate without increasing the risk of blockages)

Table 13. Proposed SuDS sizing (dimensions) and attenuation volumes

Rainwater Harvesting	Rainwater harvesting butts should be established for the proposed development. 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 strategy.
----------------------	--

Attenuation Tank	An attenuation tank located in the front driveway of the property with dimensions 3 m x 3 m x 1.20 m, filled with geo-cellular crates with a 95% void ratio, will attenuate a minimum of 10.26 m ³ .
Total Attenuation Provided	10.26 m ³
Total Attenuation Required	9.97 m ³
Freeboard	0.29 m ³

Rainwater harvesting

Rainwater harvesting butts are proposed for the replacement dwelling. 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 extension roof. Overflow from the butts should be discharged into the storage system provided by the attenuation tank.

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 as 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 devices 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 contaminants that collect on a residential roof.

Flow control devices and systems

Hydrobrake Flow control systems can be used to reduce the runoff rate from the Site. These are usually a device used for controlling water flow into a connecting feature, such as a sewer, to a specific attenuation performance. The design consists of an intake, a volute and an outlet and the configuration is critical to ensure discharge control. For drainage areas which are less than 3 ha, outlet throttle diameters would have to be small (<150mm diameter) to achieve outflow rates which could result in blockage. For most SuDS features, a flow control device will comprise a fixed orifice or a throttle such as a short pipe.

A Vortex Control is usually a self-activating vortex flow device which directs water into a volute to form a vortex. For the Site, rainwater down pipes from the development roof should drain directly into the attenuation feature to reduce infill from potential flood water.

Drainage protection devices

A non-return flap valve is recommended for outflow pipes to reduce the risk of backflow from the channel during a large-scale rainfall event.

Attenuation Tanks

An attenuation tank is proposed to provide the storage required. Attenuation tanks provide a below-ground void space for use of temporary storage via controlled release. They can also be modified to suit specific characteristics of a site. DEFRA, 2015 states that the run-off volume from the development to drain to any sewer or surface water body in the 1 in 100 year rainfall event must be constrained to a value as close as is reasonably practical to the greenfield runoff volume for the same event but should never exceed the runoff volume from the development prior to redevelopment from the Site. Issues with attenuation tanks are the level of accessibility, lack of treatment performance and cost in comparison to surface systems.

Exceedance Flows

Exceedance flow routes are included within the proposed SuDS drainage layout. Where possible, exceedance flows should be directed away from buildings and into non-essential areas of the Site such as landscaped areas on-Site. 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 14. SuDS operation and recommended maintenance requirements

Asset type	Maintenance schedule (and frequency)
Attenuation Tanks / Geo-cellular storage	Regular maintenance: - Remove litter and debris from inlets and outlets (monthly). - Trimming any roots and surrounding grass blockages (as required). Monitoring: - Inspect inlets, outlets and overflows for blockages (monthly or after a heavy storm). - Inspect inlets and outlets for silt accumulation (half yearly). - Inspect infiltration surfaces for compaction and ponding (monthly).
Hydro-Brake Flow Control	Low amounts of maintenance required as there are no moving parts within the Hydro-Brake® Flow Control. Initial monthly inspection at the manhole once the construction phase is over. If blockages occur they normally do so at the intake. Hydro-Brake® Flow Controls are fitted with a pivoting by-pass door, which allows the manhole chamber to be drained down should blockages occur. Inspection should be undertaken annually or when a storm event occurs.
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).

Asset type	Maintenance schedule (and frequency)
	- 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)

Client checklist

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

Table 15. Potential SuDS limitations

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

Table 16. SuDS design considerations

Confirm that potential flooding on-Site in excess of the design storm event and exceedance flow routes have been considered.	
Review options for the control of discharge rates (e.g. hydrobrake).	

Confirm the owners/adopters of the drainage system. Consider management options for multiple owners.	
Is there an unacceptable risk of pollution to groundwater?	
Review access and way leave requirements.	
Review maintenance requirements.	

Health and safety considerations for SuDS

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

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

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

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

11 Methodology and limitations of study



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

How was the suitability of SuDS estimated for the Site?

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

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

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

GeoSmart SuDS Infiltration Suitability Map (SD50)

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

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

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

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

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

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

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

What is a Source Protection Zone?

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

How was surface water runoff estimated from the Site?

In accordance with The SuDS Manual (C753) (CIRIA, 2015), the Greenfield runoff from the Site has been calculated using the IoH124 method and is assumed representative of the runoff generated on the undeveloped surfaces that are affected by the proposed development. The method used for calculating the runoff complies with the NPPF (MHCLG, 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 Background SuDS information



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

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

Infiltration SuDS

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

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

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

Types of infiltration SuDS

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

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

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

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

SuDS maintenance and adoption

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

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

13 References and glossary



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Glossary

General terms

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

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

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

Data Sources

Aerial Photography	Contains Ordnance Survey data © Crown copyright and database right 2025 BlueSky copyright and database rights 2025
Bedrock & Superficial Geology	Contains British Geological Survey materials © NERC 2025 Ordnance Survey data © Crown copyright and database right 2025
Flood Risk (RoFRS/Pluvial/Surface Water Features/SPZ)	Environment Agency copyright and database rights 2025 Ordnance Survey data © Crown copyright and database right 2025
Flood Risk (Groundwater) and SuDS infiltration suitability (SD50)	GeoSmart, BGS & OS GW5 (v2.4) Map (GeoSmart, 2025) Contains British Geological Survey materials © NERC 2025 Ordnance Survey data © Crown copyright and database right 2025
Sewer Location	Contains Ordnance Survey data © Crown copyright and database right 2025 Contains Thames Water Search data 2025
Topographic Data	OS LiDAR/EA Contains Ordnance Survey data © Crown copyright and database right 2025 Environment Agency copyright and database rights 2025

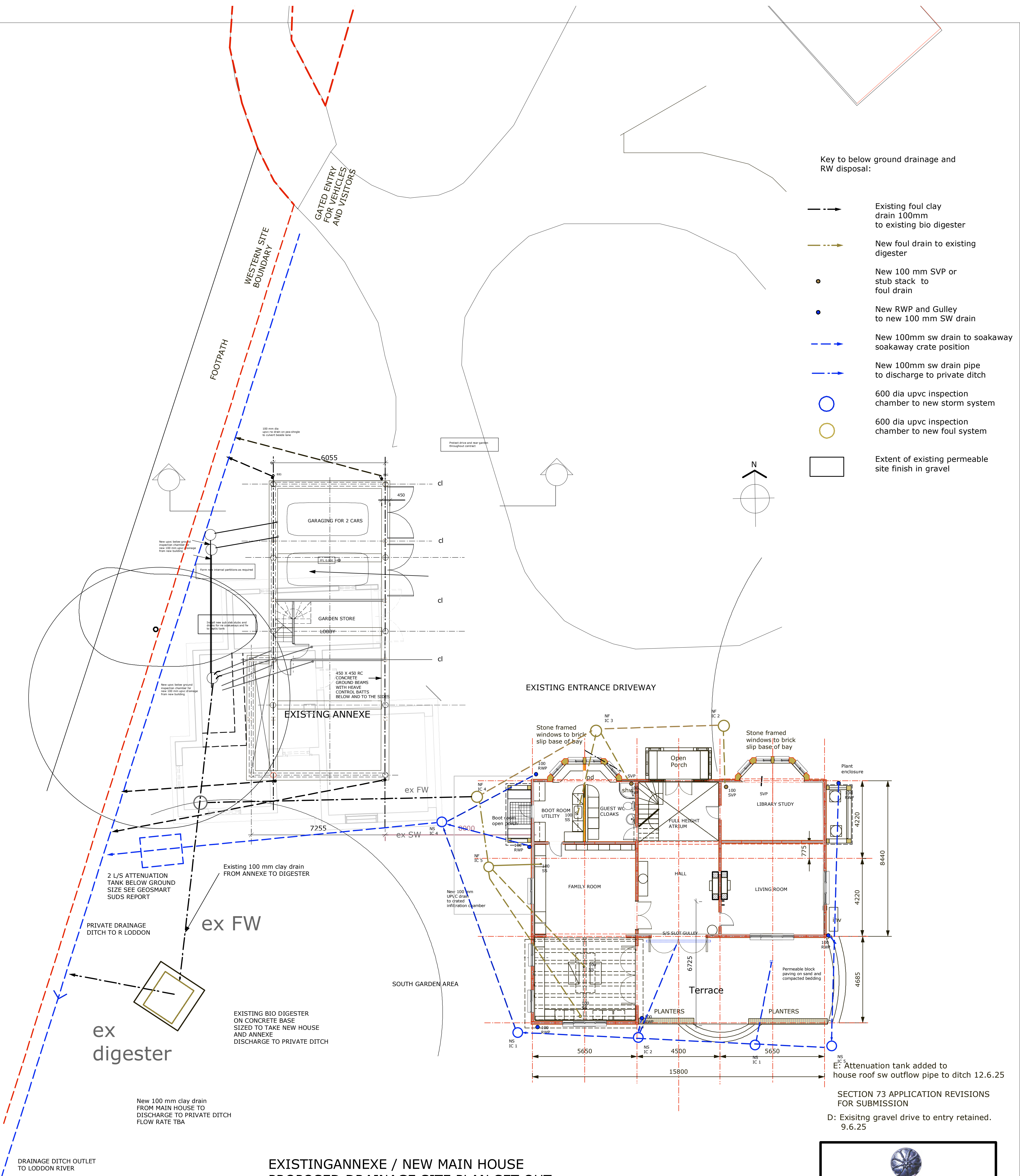
14 Appendices



Appendix A



Site plans



- Key to below ground drainage and RW disposal:
- Existing foul clay drain 100mm to existing bio digester
 - New foul drain to existing digester
 - New 100 mm SVP or stub stack to foul drain
 - New RWP and Gully to new 100 mm SW drain
 - New 100mm sw drain to soakaway soakaway crate position
 - New 100mm sw drain pipe to discharge to private ditch
 - 600 dia upvc inspection chamber to new storm system
 - 600 dia upvc inspection chamber to new foul system
 - Extent of existing permeable site finish in gravel

EXISTING ANNEXE / NEW MAIN HOUSE
PROPOSED DRAINAGE SITE PLAN SET OUT

SECTION 73 APPLICATION REVISIONS
FOR SUBMISSION
D: Existing gravel drive to entry retained.
9.6.25
E: Attenuation tank added to
house roof sw outflow pipe to ditch 12.6.25


FDF ARCHITECTURE
PETRO HOUSE, CRAZIES HILL
BERKSHIRE RG10 8LT
TEL 0118 940 6591 FAX 0118 940 6591

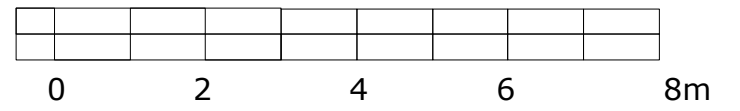
**YAFFLES
SPENCERS WOOD
BERKSHIRE RG7 1HT**

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**SITE BLOCK PLAN
PROPOSED
DRAINAGE SET OUT
STORM AND FOUL**

SCALE	DATE	DRAWN
1:100@ A1	OCT 24	
Project No	Dwg. No.	Rev.
3210	YF DPC 100, DRPROP - 4	E

C: Foul and storm drains repositioned 2.6.25
B: Drainage updated to read with new floor plan 25.5.25
A: Drainage strategy update 4.5.25
PLANNING REDRAW MAY 25
355 M2 S73 app
PLANNING CONSENTED AUG 22



Appendix B



Rainfall runoff calculations

Input parameters for run-off calculations	
Country	England
Total site area	6490 m^2
Area proposed for development	257 m^2
Current permeable ground cover	137 m^2
Current impermeable ground cover	120 m^2
Proposed permeable ground cover	0 m^2
Proposed impermeable ground cover	257 m^2
Urban Creep Allowance	0%
Final impermeable ground cover	257 m^2
SPR	0.3
SAAR	660 mm
Region	6
Climate change factor	40%
Discharge Rate (l/s)	2.0
Run-off coefficient	100%

Current impermeable area as % of total	47%
Proposed impermeable area as % of total	100%
Change in permeable area (m2)	-137
Change in impermeable area (m2)	137
Change in impermeable area as % of total	53%

Rainfall event	Greenfield run-off rates (l/s)	Existing run-off rates(l/s)	Potential run-off rates without attenuation (l/s)	Potential minus existing (l/s)
QBAR	0.04	N/A	N/A	N/A
6 hour 1 in 1 year	0.04	0.18	0.29	0.11
6 hour 1 in 10 year	0.07	0.31	0.49	0.18
6 hour 1 in 30 year	0.10	0.40	0.65	0.24
6 hour 1 in 100 year	0.14	0.51	0.81	0.30
6 hour 1 in 100 year + 20% CC	N/A	N/A	0.97	0.46
6 hour 1 in 100 year + 40% CC	N/A	N/A	1.13	0.63

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	2.00	N/A	N/A	N/A
6 hour 1 in 1 year	1.86	3.89	6.20	2.31
6 hour 1 in 10 year	3.28	6.71	10.63	3.92
6 hour 1 in 30 year	4.18	8.74	13.94	5.20
6 hour 1 in 100 year	5.25	10.97	17.49	6.53
6 hour 1 in 100 year + 20% CC	N/A	N/A	20.99	10.03
6 hour 1 in 100 year + 40% CC	N/A	N/A	24.49	13.53

Return Period	Runoff rate restriction (l/s)	Critical Storm Duration (hr)	Attenuation Volume Required (m ³)	Volume required above previous return period
1 in 30 year	2.00	0.25	3.84	N/A
6 hour 1 in 100 year	2.00	0.50	5.99	2.15
6 hour 1 in 100 year + 40% CC	2.00	0.75	9.97	3.98

Appendix C



Thames Water Asset Location Plan

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

Search address supplied Yaffles
Beech Hill Road
Spencers Wood
Reading
RG7 1HT

Your reference 85974

Our reference ALS/ALS Standard/2025_5167964

Search date 22 May 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

Search address supplied: Yaffles, Beech Hill Road, Spencers Wood, Reading, RG7 1HT

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

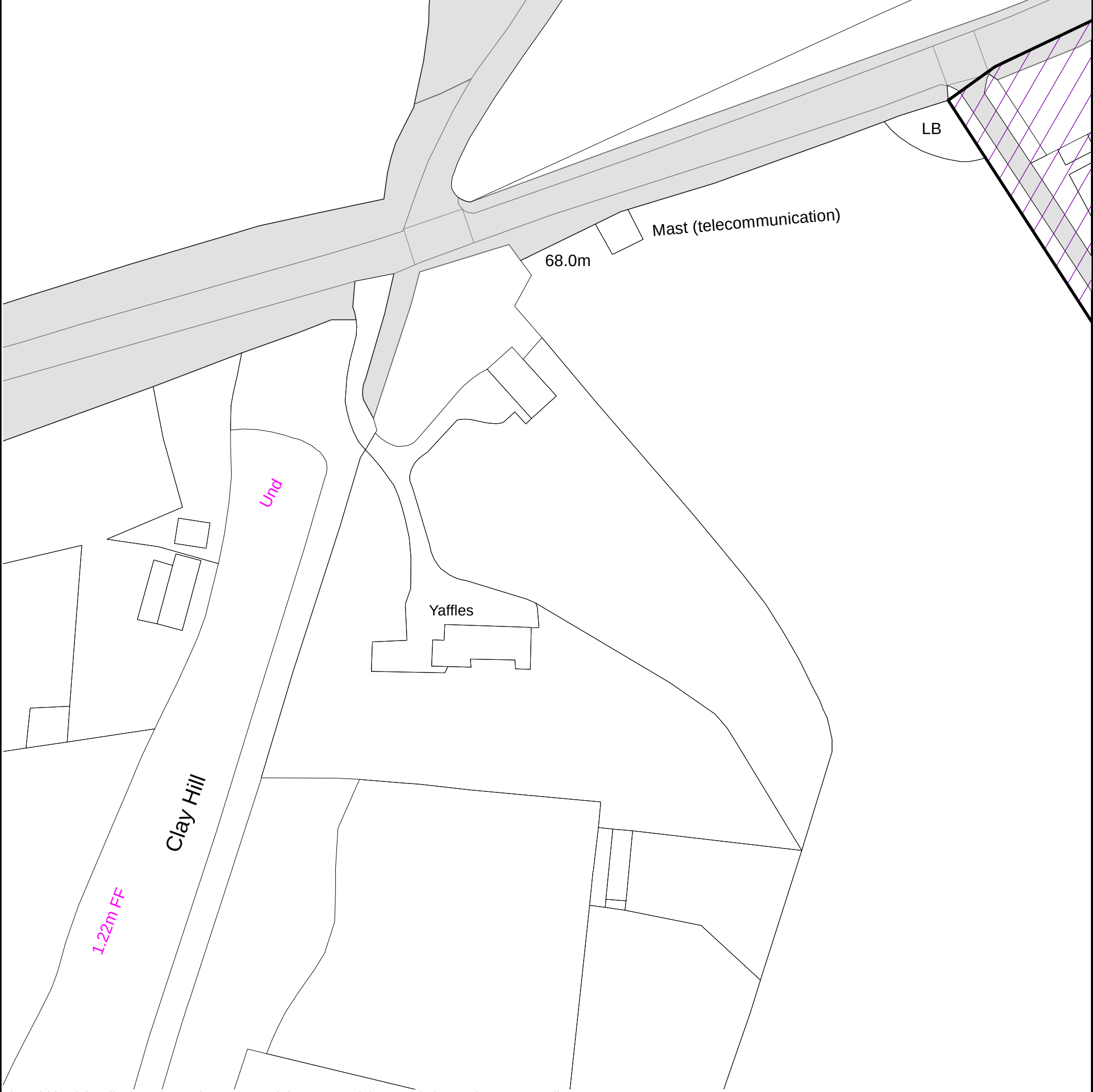
Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

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

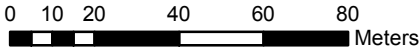
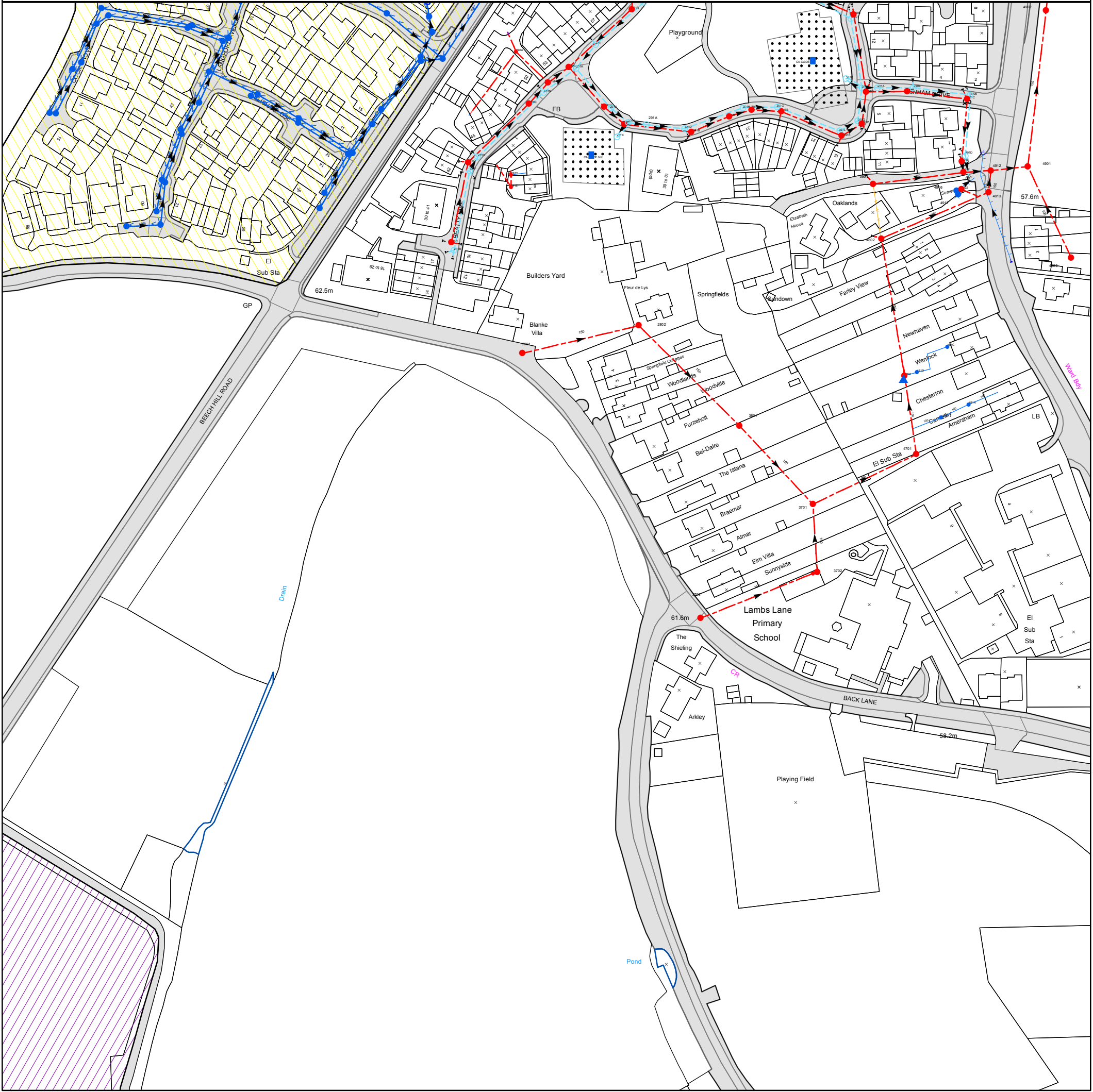


The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 470704,165429
The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. 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.		



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 before any works are undertaken. Crown copyright Reserved

Scale: 1:1789
Width: 500m
Printed By: ASuji
Print Date: 22/05/2025
Map Centre: 471250,165750
Grid Reference: SU7165NW

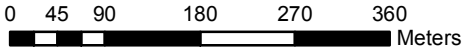
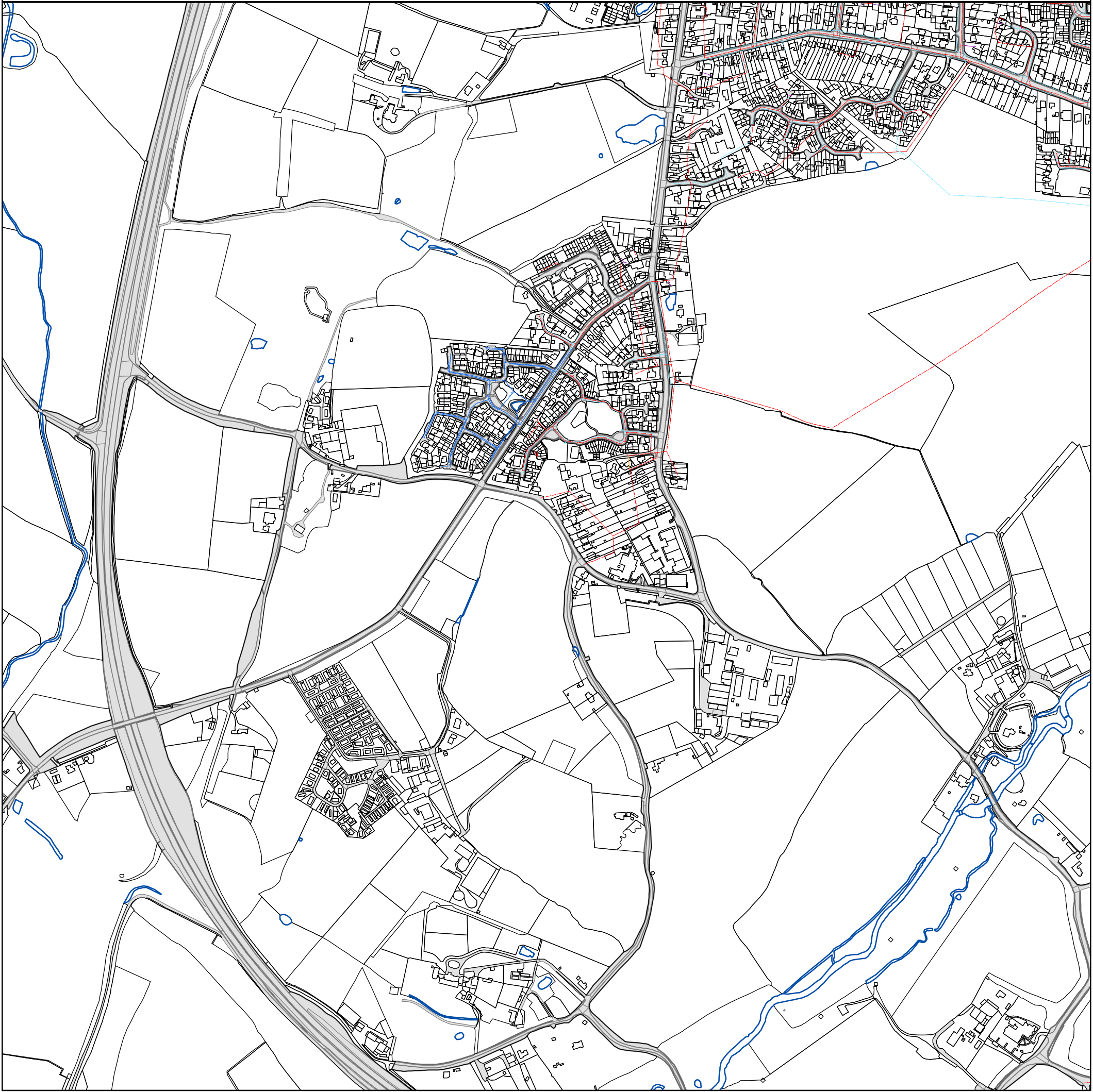
Comments:

ALS/ALS Standard/2025_5167964

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

REFERENCE	COVER LEVEL	INVERT LEVEL
491B	57.84	56.32
3903	58.15	56.98
4802	57.935	56.098
4913	57.695	55.739
291I	60.23	58.37
3701	59.71	57.71
3801	59.94	58.15
4902		
291V	59.53	57.57
391L	58.13	57.14
391Q	58.04	57.09
3914	58.52	56.98
291Q	60.39	58.15
291A	59.02	57.66
391R	58.37	56.63
291S	59.14	57.74
291R	60.16	58.27
391H	58.55	57.39
391I	58.6	57.04
291G	60.78	58.43
391G	58.39	57.28
4905	57.48	56.82
491F	57.9	55.68
291U	59.47	57.88
491C	57.49	56.13
291D	60.7	58.56
3909	58.54	56.72
4904	57.82	56.9
4922	57.8	57.05
2801	60.77	59.2
481B		
481D		
291Y		
292A		

REFERENCE	COVER LEVEL	INVERT LEVEL
3703	61.51	60.02
2802	60.02	58.82
3901	58.11	55.98
4912	57.619	55.629
4916	57.8	57.11
3702	60.41	58.25
4901		
4701	58.64	56.83
4803	57.28	56.15
391K	58.1	56.64
391P	58.02	56.57
391E	58.37	56.87
391D	58.76	57.52
291T	59.21	57.41
291M	60.2	58.04
291X	59.41	57.86
491D	57.85	56.74
391O	58.08	56.47
391J	58.53	57.14
291K	60.15	58.2
291N	60.21	58.33
291F	60.72	58.59
281B	60.39	58.83
491A	58	56.94
391B	58.75	57.16
491E	57.84	55.94
281C	60.39	58.7
291L	60.2	57.95
4917	57.7	57.17
481A		
481C		
4801		
291Z		



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Scale: 1:7161
Width: 2000m
Printed By: ASuji
Print Date: 22/05/2025
Map Centre: 471250,165750
Grid Reference: SU7165NW

Comments:

ALS/ALS Standard/2025_5167964

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

REFERENCE	COVER LEVEL	INVERT LEVEL
301A	60.12	58.46
301M	59.68	58.13
0101		
1451	49.84	48.22
1402	49.84	48.78
5403	60.84	58.79
7602	56.53	54.88
3103	60.67	58.95
9401	53.15	51.75
3001	58.63	57.04
7902		
2802	60.02	58.82
3104		
8503	53.89	52.59
8651	54.51	53.33
1553	50.61	49.82
4201	58.88	57.4
6502	57.31	55.51
1650	50.77	50.17
8501	55	52.8
8453	54.34	52
8401	54.36	52.93
7651	56.56	55.45
7550	55.51	53.94
3901	58.11	55.98
4912	57.619	55.629
2350		
2450	49.23	47.9
2402	49.23	48.48
6554		
6504	58.61	56.74
5706	62.08	60.7
5703	62.47	61.06
5453	59.53	58.51
7652	56.87	55.8
9602		
0752	52.44	51.65
301J	59.16	57.73
9351		
1550	50.12	48.59
291I	60.23	58.37
5454	60	58.8
4057	57.74	56.37
4251	57.94	56.56
4056	57.63	56.2
4152	57.68	56.36
6505	56.71	54.45
8504	53.66	51.78
0601	51.74	49.77
6501	57.59	55.2
4004	57.18	54.6
5502		
1201	50.86	49.25
1603	50.74	49.91
4601	62.75	61.6
4701	63.98	62.66
4151	58.01	56.33
7901	54.92	52.76
7452	54.79	52.44
0701	52.25	50.46
0652	51.89	50.46
4103	58.44	56.84
4253	58.55	56.16
4252	58.48	56.22
4054	57.75	56.45
6001	55.99	53.43
6452	56.74	55.26
9453		
9502	52.29	50.82
5451	59.73	58.04
3101	59.67	58.11
3702	60.41	58.25
3251	59.31	56.98
4002		
4104	58.7	56.97
6601	59.38	57.78
1654	50.49	49.14
1604	50.79	50.07
1350		
7551	55.7	53.42
7552	55.39	53.04

REFERENCE	COVER LEVEL	INVERT LEVEL
491B	57.84	56.32
1652	50.76	49.77
1401	49.92	48.94
1502	49.84	48.16
3703	61.51	60.02
5504	61.85	60.41
3903	58.15	56.98
9504	53.27	51.26
9001	53.33	50.97
7401	55.75	54.33
7601	57.11	55.56
2101		
8502	54.15	52.13
8001		
8652	54.46	53.65
7450	55.19	53.59
6655	58.03	56.93
1750		
1701	50.8	50.35
8550	54.95	53.57
8650	55.3	54.29
7451	54.98	52.62
7403	54.99	53.44
4802	57.935	56.098
4913	57.695	55.739
2550	49.5	47.9
2501	49.46	47.69
2702	47.99	45.81
6652	59.03	58
6453		
6553	58.66	57.24
5707	61.62	60.58
5601	60.9	59.29
8402	53.95	52.24
7402	55.14	53.86
0654	52.11	50.83
0602	51.94	49.94
9501	52.11	50.26
1551		
1450	49.9	48.33
5501	61.84	60.83
5651	60.67	59.76
4055	57.65	56.25
4606	62.88	61.1
4605	62.83	61.25
7554	57.07	55.93
7553	56.62	55.03
8552	53.6	51.92
6404	57.06	55.49
4450	60.86	59.42
5301	58.3	57.11
1653	50.7	49.35
1602	50.78	49.68
1552	50.45	49.54
4604	62.67	61.25
4602	62.67	61.03
4603		
7501	55.38	53.23
7404	54.78	53.26
0653	52.08	50.98
0650	51.8	50.92
4102	58.05	56.55
4058	57.97	56.49
4916	57.8	57.11
6550	57.57	55.73
6405	56.76	55.07
6604	57.88	56.23
9651	52.91	51.92
5505		
8601	54.28	52.59
3701	59.71	57.71
3105	59.31	57.84
3202	59.12	57.73
4059	58.3	56.81
4060	58.28	56.93
1601	50.61	49.08
1651	50.79	49.96
1501	50.56	48.7
0603	51.41	49.58
7502	55.75	53.9
3102	60.33	58.64

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ALS/ALS Standard/2025_5167964

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

REFERENCE	COVER LEVEL	INVERT LEVEL
3801	59.94	58.15
0656	51.11	49.54
4101	57.44	55.42
4901		
8551	54.14	52.32
7654	56.04	54.97
7653	55.84	54.78
5404	60.73	58.83
5402	60.19	58.71
6402	57.78	56.01
6551	58.52	56.44
6403	57.12	55.72
5452	58.99	58.18
8451	53.41	51.15
9601	52.97	51.39
4902		
2102		
6603	58.78	57.07
6654	58.71	57.71
6401	59.52	57.79
6451		
9552	53.4	51.39
9451	52.82	50.97
5654	59.98	59.34
4701	58.64	56.83
5405	60.95	59
7751	57.01	56.15
5705	62.14	60.79
9551	53.26	51.55
3201	59.05	57.55
6651	58.64	57.76
5652	60.99	60.41
301R	58.33	57.25
391K	58.1	56.64
391P	58.02	56.57
3914	58.52	56.98
291Q	60.39	58.15
291A	59.02	57.66
291T	59.21	57.41
391R	58.37	56.63
291M	60.2	58.04
3069	58.67	57.45
291X	59.41	57.86
491D	57.85	56.74
391O	58.08	56.47
291B	60.06	58.66
301T	58.61	57.36
291K	60.15	58.2
301K	59.68	58.43
4905	57.48	56.82
301L	59.26	57.59
281B	60.39	58.83
291U	59.47	57.88
491C	57.49	56.13
291D	60.7	58.56
301O	58.6	57.03
3074	58.7	57.13
4904	57.82	56.9
2105		
2109		
2107		
3107		
4203	58.1	56.27
221B		
4917	57.7	57.17
661B		
861B		
421B		
641A		
061B		
161A		
401A		
481A		
971A		
321A		
061E		
481C		
4801		
661E		
291Y		
292A		

REFERENCE	COVER LEVEL	INVERT LEVEL
0604	50.98	49.2
0750	51.48	50.46
4154	58.07	56.25
5704	62.27	60.94
8555	53.94	52.62
7603	55.92	53.87
7703	56.52	54.5
5503	61.35	59.54
5401	60	58.58
6701	59.81	58.26
6503	58.5	56.45
9503	52.75	51.02
5001		
2103		
4051	58.09	56.08
4003	57.1	54.86
6653	58.89	57.96
6552	58.68	56.67
9550	53	51.83
6602	59.22	57.46
9505	53.29	51.87
9650	53.37	52.12
5653	60.03	59.1
0350		
471A		
291V	59.53	57.57
8602	53.75	52.08
2201	50.03	48.69
8553	53.52	51.96
8554	53.55	51.33
4803	57.28	56.15
1655	50.82	50.04
391L	58.13	57.14
391Q	58.04	57.09
201F	61.08	59.19
391E	58.37	56.87
391D	58.76	57.52
301F	60.62	59.17
201A	60.68	58.88
201J	61.23	59.73
301S	58.34	56.91
291S	59.14	57.74
291R	60.16	58.27
391H	58.55	57.39
391I	58.6	57.04
391J	58.53	57.14
291G	60.78	58.43
391G	58.39	57.28
291N	60.21	58.33
291F	60.72	58.59
491F	57.9	55.68
301N	60.15	58.76
491A	58	56.94
391B	58.75	57.16
491E	57.84	55.94
3909	58.54	56.72
281C	60.39	58.7
291L	60.2	57.95
2110		
2108		
2104		
4922	57.8	57.05
4202	57.99	56.02
661C		
2801	60.77	59.2
861A		
661A		
961A		
061A		
061C		
401B		
161B		
481B		
971B		
061D		
061F		
481D		
661D		
661F		
291Z		
561A		

ALS/ALS Standard/2025_5167964

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

REFERENCE	COVER LEVEL	INVERT LEVEL
561B		
061G		
551B		
171B		
411B		
241C		
241B		
561D		
851A		
141C		
171E	50.39	48.21
261D	50.36	48.53
271K	50.4	47.7
271I	50.23	47.83
271D	50.29	47.02
071B		
661H		
421C		
421E		
871E		

REFERENCE	COVER LEVEL	INVERT LEVEL
071A		
551A		
171A		
411A		
411C		
241A		
561E		
561C		
141B		
141A		
271H	49.99	47.86
261B		48.23
271C	50.16	47.1
271J	50.29	48.2
271B	50.04	47.2
661G		
661I		
421D		
201K		
871D		



Asset Location Search - Sewer Key

Public Sewer Types (Operated and maintained by Thames Water)

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

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

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

Notes:

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

Sewer Fittings

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

	Air Valve		Meter
	Dam Chase		Vent
	Fitting		

Operational Controls

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

	Ancillary		Drop Pipe
	Control Valve		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.

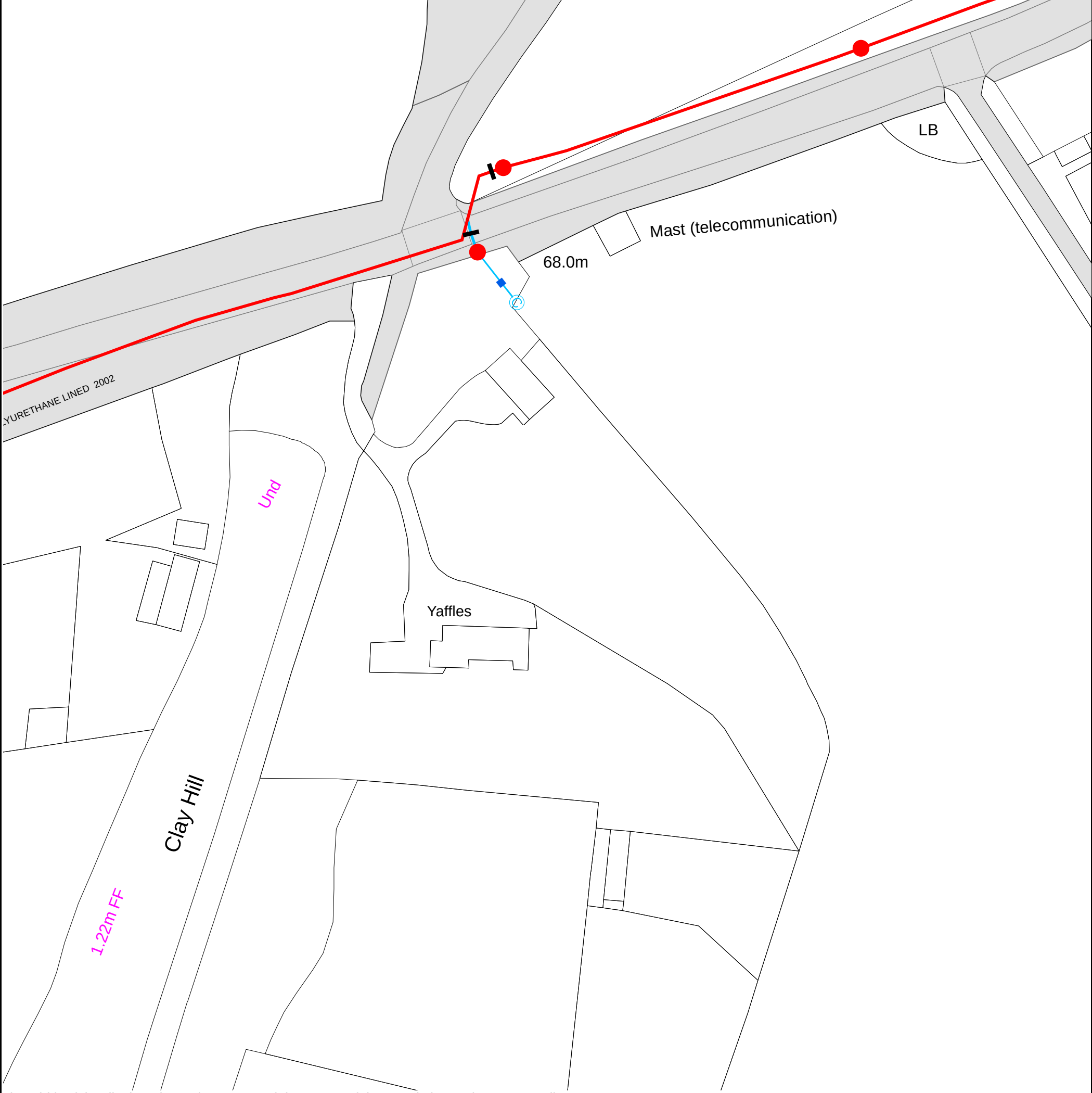
	Agreement
	Chamber
	Operational Site

Ducts or Crossings

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

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

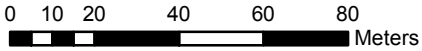
6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in millimeters. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology, please contact Property Searches on 0800 009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



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 470704, 165429.

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.

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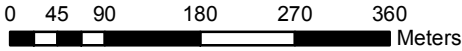
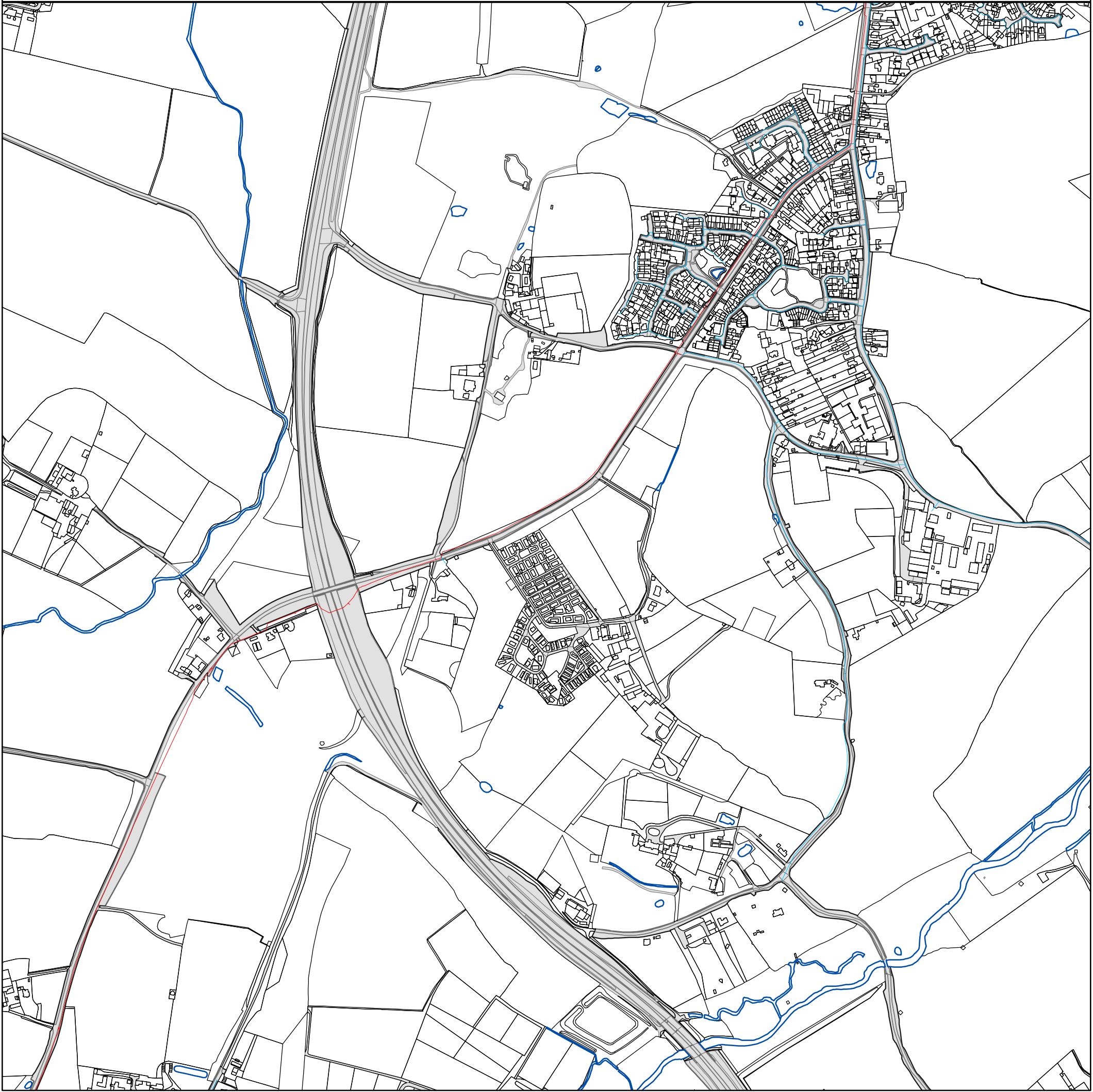
The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual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

Scale: 1:1789
Width: 500m
Printed By: ASuji
Print Date: 22/05/2025
Map Centre: 471250,165250
Grid Reference: SU7165SW

Comments:

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ALS/ALS Standard/2025_5167964



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Scale: 1:7161
Width: 2000m
Printed By: ASuji
Print Date: 22/05/2025
Map Centre: 470882,165506
Grid Reference: SU7065NE

Comments:



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.

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')

Valves

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

Hydrants

- Single Hydrant

Meters

- Meter

End Items

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

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

Operational Sites

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

Other Symbols

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

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

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

Appendix D



Site Investigation (iGeo, 2020)



Project Name

Yaffles Annexe, Beech Hill Road, Spencers Wood

183 Long Lane, Tilehurst, Reading, Berkshire, RG31 6YW
Office: 0118 943 9910 Email: hello@igeo.co.uk Web: www.igeo.co.uk

Disclaimer

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Tel: 01743 298 100

Email: info@geosmartinfo.co.uk

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The Search Code:

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- 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.
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- conduct business in an honest, fair and professional manner.
- handle complaints speedily and fairly.
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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

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