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Land South of the Forty, Cricklade

Hannick Homes and Developments Ltd

Flood Risk Assessment

November 2023





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Executive Summary

This Flood Risk Assessment (FRA) is compliant with the requirements set out in the National Planning Policy Framework (NPPF) and the associated Planning Practice Guidance. It has been produced on behalf of Hannick Homes and Developments Ltd in respect of a planning application for a proposed residential development at land south of the Forty, Cricklade.

This report demonstrates that the proposed development not at significant flood risk, subject to the recommended flood mitigation strategies being implemented.

The site is located within Flood Zone 1 on the Environment Agency Flood Map for Planning. This is the area at low risk of fluvial flooding.

The site is shown to be at high to low risk of pluvial flooding, this being due to previous ridge and furrow agricultural practices. Areas at risk of pluvial flooding are shown to be located within the depressions in the topography associated with this, as well as at the ditches in the north and east of the site. Profiling of ground levels shall remove this risk, and direct surface water runoff to the proposed attenuation basin in the southeast of the site.

The drainage strategy utilises proposed surface water sewers to direct runoff from the proposed development to an attenuation basin located in the southeast of the site. A pump station is proposed to control the flow of discharge to the northern ditch within the site, directed via a proposed storm rising main. This is subject to land drainage consent.

In compliance with the requirements of National Planning Policy Framework, and subject to the mitigation measures proposed, the development could proceed without being subject to significant flood risk. Moreover, the development will not increase flood risk to the wider catchment area as a result of suitable management of surface water runoff discharging from the site.



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1 Introduction

Background

- 1.1 The purpose of this FRA is to assess the risk of flooding to the proposed development and where possible provide sufficient mitigation to demonstrate that the future users of the development would remain safe throughout its lifetime, that the development would not increase flood risk on site and elsewhere and, where practicable, that the development would reduce flood risk overall.

Site Proposals

- 1.2 The proposed development forms an outline planning application for the construction of up to 49 dwellings with associated access, parking, and landscaping.
- 1.3 A copy of the proposed development drawings is included within **Appendix A**.

National & Local Planning Policy

- 1.4 The National Planning Policy Framework (NPPF)¹ sets out the Government's national policies on different aspects of land use planning in England in relation to flood risk. Planning Practice Guidance (PPG) is also available online².
- 1.5 The PPG sets out the vulnerability to flooding of different land uses. It encourages development to be located in areas of lower flood risk where possible and stresses the importance of preventing increases in flood risk off site to the wider catchment area.
- 1.6 The NPPF states that a site-specific Flood Risk Assessment will be required for proposals:
- a) that are greater than 1 hectare in area within Flood Zone 1
 - b) for all proposals for new development (including minor development and change of use) in Flood Zones 2 and 3
 - c) in an area within Flood Zone 1 which has critical drainage problems; and where proposed development or a change of use to a more vulnerable class may be subject to other sources of flooding
 - d) in an area within Flood Zone 1 identified in a Strategic Flood Risk Assessment as being at increased flood risk in the future
 - e) in an area in Flood Zone 1 that may be subject to other sources of flooding, where its development would introduce a more vulnerable use
- 1.7 This FRA aims to provide sufficient flood risk information to satisfy the requirements of the NPPF, PPG and regional/local government plans and policies.
- 1.8 This assessment considers the risks of all types of flooding to the site including tidal, fluvial, surface, groundwater, sewer and artificial sources and provides mitigation measures to ensure that the flood risk to the site is minimised and that flood risk off-site is not increased.

¹ <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

² <https://www.gov.uk/guidance/flood-risk-and-coastal-change>



Sources of Information

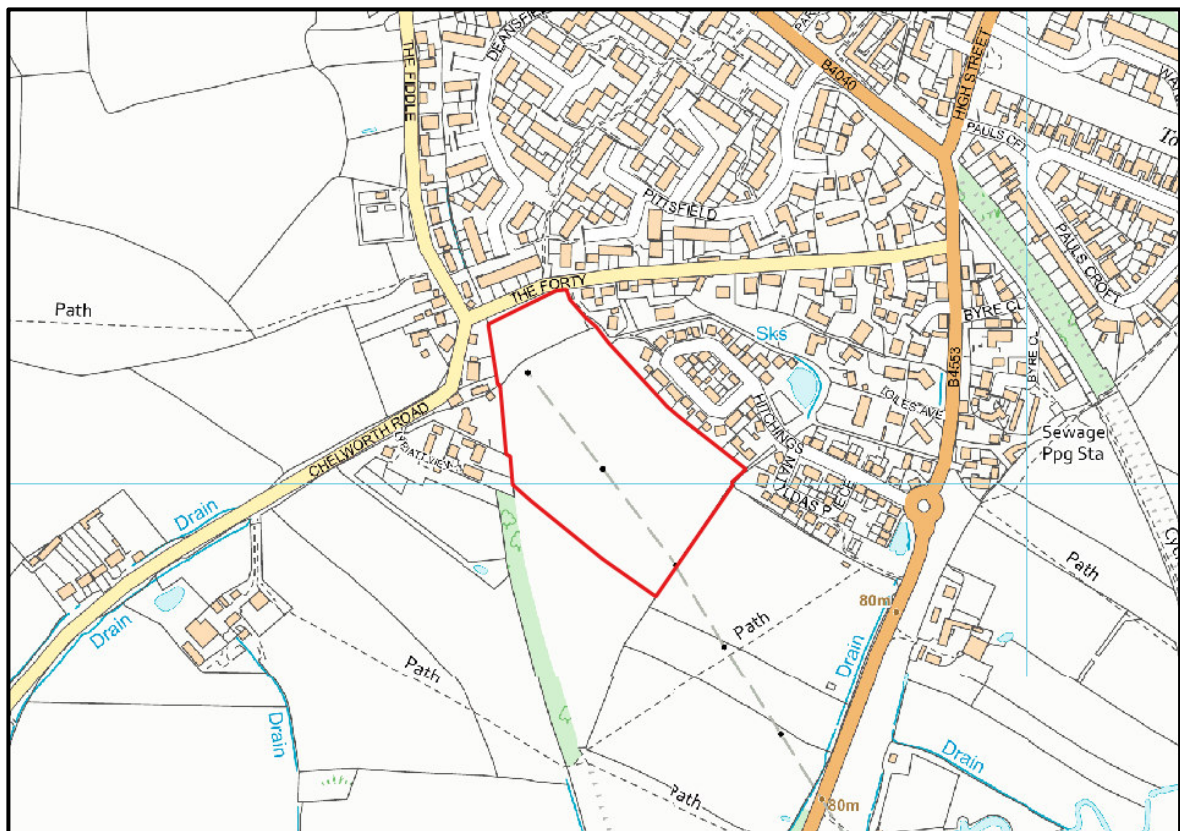
1.9 This FRA has been based on the following sources of information:

- a) NPPF
- b) NPPF-PPG
- c) Site Layout Plan
- d) Ordnance Survey mapping
- e) Site Topographical Survey
- f) DEFRA Magic mapping
- g) Environment Agency mapping
- h) Wiltshire Council Strategic Flood Risk Assessment (2019)
- i) Site visit undertaken by Rappor
- j) Web Based Soil Mapping
- k) British Geological Survey Drift & Geology Maps
- l) Infiltration Testing undertaken by Earth, Environmental, and Geotechnical Ltd
- m) Thames Water Sewer Records
- n) Local Press Flood Reports / Anecdotal Evidence

2 Existing Site & Hydrology Characteristics

Site Location & Composition

- 2.1 The site is located off The Forty, on the southwestern extent of Cricklade. The approximate co-ordinates for the centre of the site are E: 409621; N: 193033, with the nearest post code of SN6 6FD. The site location is approximately shown outlined in red in **Figure 2.1**.
- 2.2 The current site comprises of greenfield pasture land with hedgerows located on all boundaries. The Forty bounds the north of the site, and dwellings are located to the west and east. Greenfield land is present to the south and south east of the site.



(Source: Promap)

Figure 2.1 Site Location

Topography

- 2.3 A detailed topographic survey was carried out during July 2022, a copy of which is included within **Appendix B**. Ground levels on the site are shown to be relatively flat but fall slightly in an easterly direction from 81.40 metres Above Ordnance Datum (mAOD) to 80.70mAOD located in the east of the site.

Ground Conditions

- 2.4 Geological data held by the British Geological Survey (BGS)³ shows that the bedrock geology underlying the site is Oxford Clay Formation (mudstone). No superficial deposits are recorded at the site.
- 2.5 The nearest borehole log with freely available information is located approximately 200m west of the site and was recorded to a depth of 2.0m, obtained via online BGS maps⁴. The borehole log reference number is SU09SE23. The log identifies presence of silt and clay.
- 2.6 Soils mapping⁵ indicates the underlying soil as slowly permeable, seasonally wet, slightly acidic but base-rich loamy and clayey soils with impeded drainage.
- 2.7 Soakaway testing was undertaken June 2022 (see **Appendix C**). A total of 3 soakaway test pits were established and testing was undertaken in accordance with BRE 365 'Soakaway Design' methodology guidance.
- 2.8 The test pits were excavated to a depth of 1.45 – 1.90 metres below ground level (mbgl). The borehole logs confirm the soils and geology as depicted by the soils and geology mapping.
- 2.9 The test pits did not drain sufficiently to obtain infiltration rates, thus soakaway testing demonstrated low infiltration potential. Slight seepage of groundwater was encountered at 0.80mbgl in Test Pit 03.
- 2.10 Department for Environment, Food & Rural Affairs (DEFRA) Magic Service Mapping⁶ shows the site is located in a groundwater Source Protection Zone (SPZ). The site is located within the 'Total Catchment' (Zone 3) and is close to the 400-day travel time 'Outer Zone' (Zone 2).

Existing Drainage & Hydrology

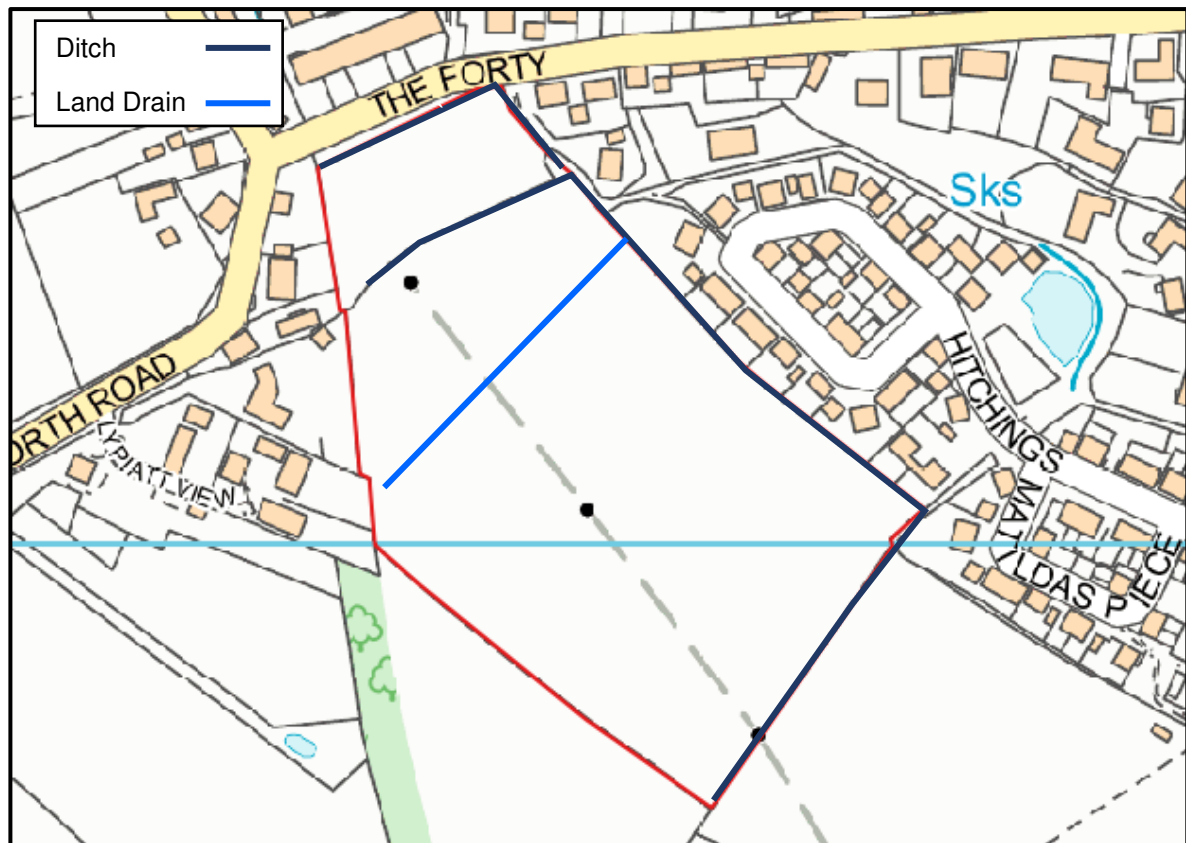
- 2.11 Ditches are present along the northern, eastern, and southern boundaries of the site. A ditch is also present through the north of the site, as illustrated by **Figure 2.2**. A site visit confirmed that a land drain is also located through the centre of the site, the route of which is indicated within **Figure 2.2**. This drains northeast into the eastern ditch.

³ <https://geologyviewer.bgs.ac.uk/>

⁴ https://mapapps2.bgs.ac.uk/geoindex/home.html?layer=BGSBoreholes&_ga

⁵ <http://www.landis.org.uk/soilsmap/>

⁶ <https://magic.defra.gov.uk/MagicMap.aspx>



(Source: Promap)

Figure 2.2 Location of Ditches at the Site

- 2.12 A disused canal is located to the southwest of the site. A visit to the site confirmed that this is filled in and does not aid any flow or storage of water.
- 2.13 The site is believed to currently drain naturally via existing rates of runoff to the ditches located on the site boundaries and the northern ditch located within the site.
- 2.14 Thames Water asset plans show that there is a 225mm diameter public foul sewer located within The Forty to the north of the site. A 225mm public foul sewer is located north of the site, within Deansfield. This drains east before connecting into the public foul asset within The Forty (see **Appendix D**).
- 2.15 A public surface water sewer is also located in Deansfield, to the north of the site. This drains east onto Pittsfield, before draining north.
- 2.16 Thames Water sewer records are contained in **Appendix D**.
- 2.17 The DEFRA Magic Map (England and Wales) shows there are no designated sites (SSSIs) in or close to the site including downstream (from a flood risk and drainage perspective).

3 Development Vulnerability & Flood Zone Classification

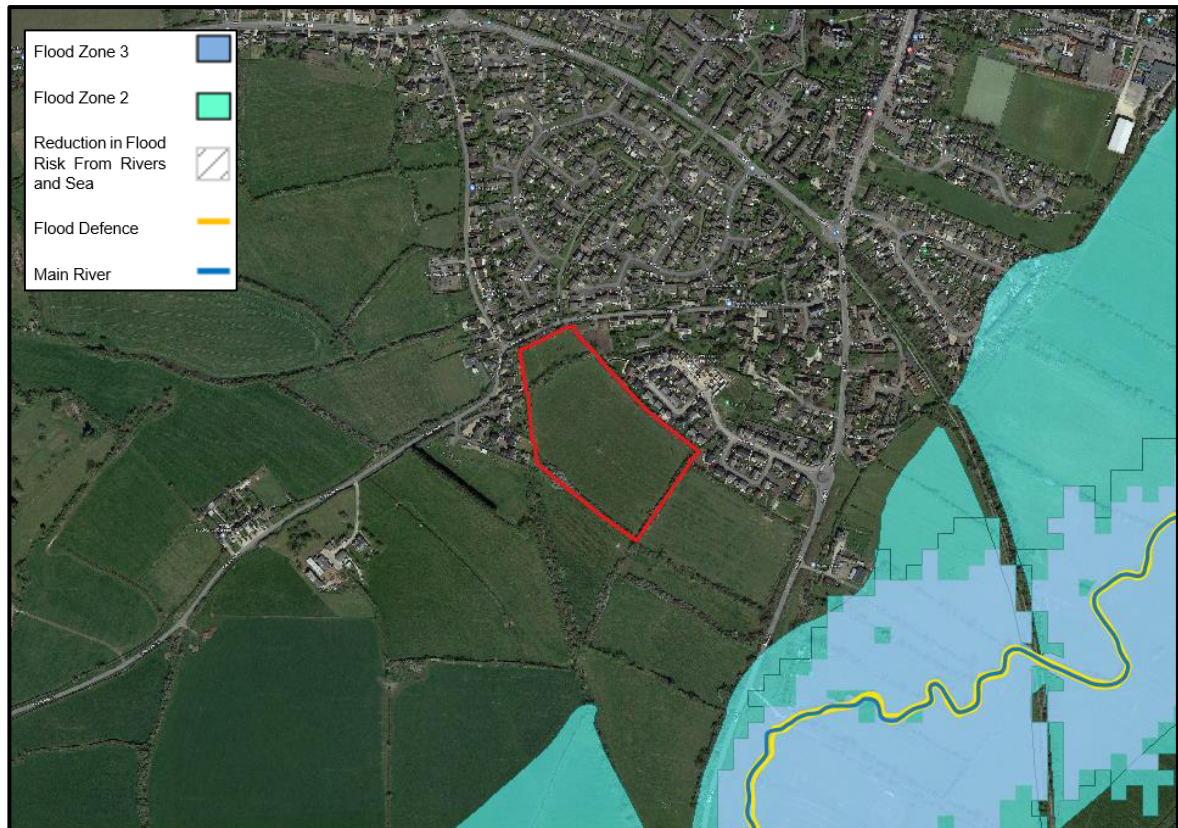
National Planning Policy Framework

- 3.1 Local Planning Authorities (LPA), have a statutory obligation to consult the Environment Agency (EA), on all applications in flood risk zones. The EA will consider the effects of flood risk in accordance with the NPPF.
- 3.2 NPPF requires that, as part of the planning process:
- a) A 'site specific' Flood Risk Assessment will be undertaken for any site that has a flood risk potential.
 - b) Flood risk potential is minimised by applying a 'sequential approach' to locating 'vulnerable' land uses.
 - c) Sustainable drainage systems are used for surface water disposal where practical.
 - d) Flood risk is managed through the use of flood resilient and resistant techniques.
 - e) Residual risk is identified and safely managed.
- 3.3 Table 1 of NPPF, categorises flood zones into:
- a) Zone 1- Low risk, less than 0.1% Annual Event Probability (AEP) (< 1 in 1000 years)
 - b) Zone 2- Medium risk, 0.1% AEP (1 in 1000 - 1 in 100 years)
 - c) Zone 3a- High risk, 1% AEP (> 1 in 100 years)
 - d) Zone 3b- High risk - Functional Floodplain, 3.33% AEP (>1 in 30 years)

Environment Agency Flood Map for Planning

- 3.4 The Environment Agency Flood Zones are the current best information on the extent of the extremes of flooding from rivers or the sea that would occur without the presence of flood defences, since these can be breached, overtopped and may not be in existence for the lifetime of a development.
- 3.5 The site is located within Flood Zone 1 as shown on the Environment Agency Flood Map for Planning⁷ and **Figure 3.1**. This is the area shown to be at low risk of river flooding.

⁷ <https://flood-map-for-planning.service.gov.uk/>



(Source: Environment Agency)

Figure 3.1 Environment Agency Flood Map for Planning

Flood Risk Vulnerability

- 3.6 The proposed development is considered to be 'more vulnerable' in terms of its land use type flood risk vulnerability as shown in Annex 3 of the PPG⁸.
- 3.7 The NPPF sets out a matrix indicating the flood risk vulnerability types of development that are acceptable in different flood zones based upon the Flood Map for Planning as shown in Table 2 of the PPG. All forms of development are considered acceptable in Flood Zone 1. An exception test is not required.

⁸ <https://www.gov.uk/guidance/flood-risk-and-coastal-change#flood-zone-and-flood-risk-tables>

4 Site Specific Flooding

National Planning Policy Framework (NPPF)

- 4.1 In accordance with the National Planning Policy Framework, this Flood Risk Assessment considers all sources of flooding including:
- a) Tidal flooding – from sea;
 - b) Fluvial flooding – from rivers and streams;
 - c) Pluvial flooding – overland surface water flow and exceedance;
 - d) Groundwater flooding – from elevated groundwater levels or springs;
 - e) Flooding from sewers – exceedance flows from existing sewer systems; and
 - f) Artificial sources – reservoirs, canals etc.

Historic Flooding

- 4.2 The Wiltshire Council SFRA⁹ (2019) states that Cricklade is the main location that has experienced fluvial flooding associated with the River Thames, with notable events occurring in 1947, 1992, and the most recent being in 1993. However, these flood events did not affect the site or surrounding land. The SFRA also indicates that surface water flooding has been recorded in Cricklade, with the most recent incident of this being in 1992. Little further information on the severity of this is available.
- 4.3 Anecdotal references describing surface water flooding in gardens to the east of the site along Giles Avenue have been recorded, as well as descriptions of surface water flowing along The Forty. The presence of the ditch at the north of the site means that these surface water flows are intercepted before reaching the site. There is little additional information regarding these issues, however during a visit to the site, a separate source indicated that that there have been no incidents of flooding on The Forty.
- 4.4 The EA recorded flood outlines mapping shows that the nearest historic flood to the site was due to the River Key exceeding its channel capacity in 1947, where flood extents reached approximately 230m southeast of the site.
- 4.5 Thames Water information as denoted by the SFRA indicates that the site has not been subject to any historic sewer flooding.

Tidal Flooding

- 4.6 Inundation of low lying coastal areas by the sea may be caused by seasonal high tides, storm surges and storm driven wave action. Tidal flooding is most commonly a result of a combination of two or more of these mechanisms, which can result in the overtopping or breaching of sea defences. River systems may also be subject to tidal influences.
- 4.7 There are no watercourses/waterbodies in the vicinity of the site that pose a tidal risk to the site. The risk of tidal flooding is therefore negligible.

⁹https://www.wiltshire.gov.uk/media/5691/Strategic-Flood-Risk-Assessment-Level-1/pdf/Wiltshire_Council_Level_1_SFRA_v5.0.pdf?m=637459765054370000



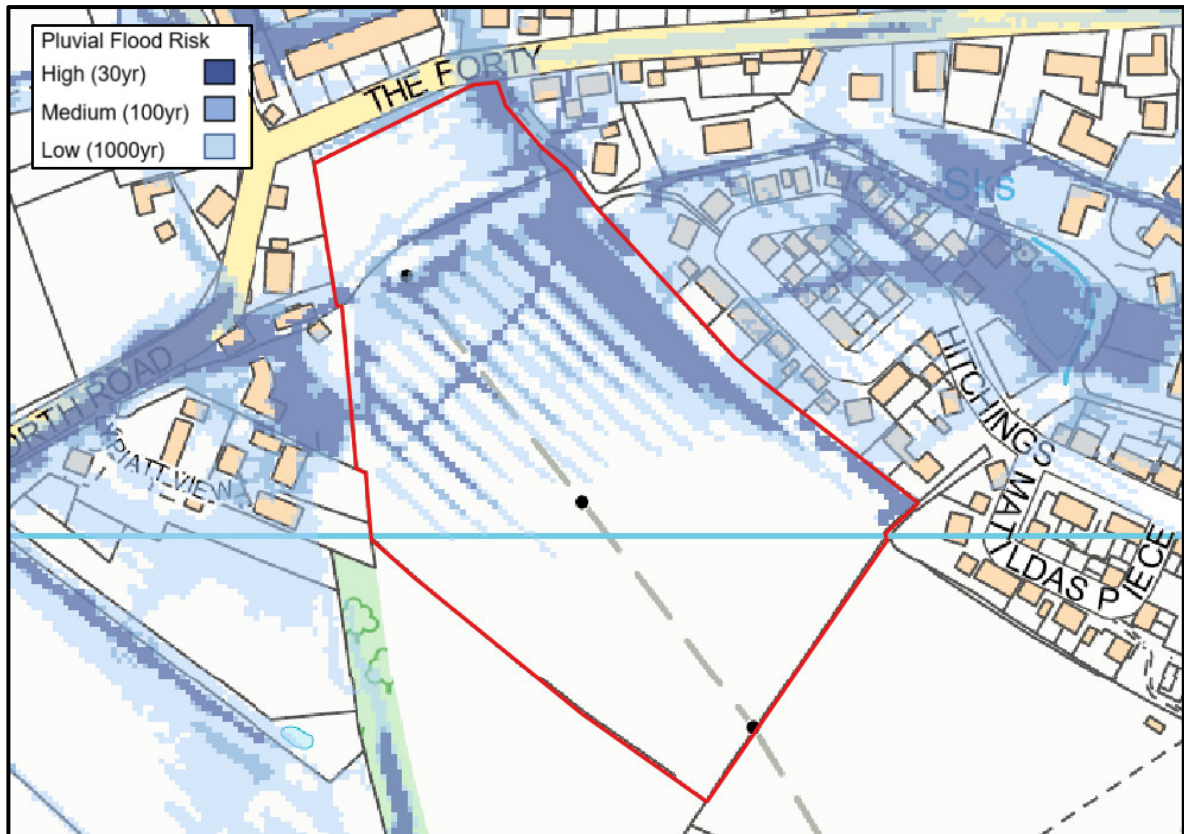
Fluvial Flooding

- 4.8 Flooding from watercourses occurs when flows exceed the capacity of the channel, or where a restrictive structure is encountered, which leads to water overtopping the banks into the floodplain. This process can be exacerbated when debris is mobilised by high flows and accumulates at structures.
- 4.9 The site is located within Flood Zone 1 as shown on **Figure 3.1**. This is the area shown to be at low risk of river flooding.

Pluvial Flooding

- 4.10 Pluvial flooding can occur during prolonged or intense storm events when the infiltration potential of soils, or the capacity of drainage infrastructure is overwhelmed leading to the accumulation of surface water and the generation of overland flow routes.
- 4.11 Risk of flooding from surface water mapping has been prepared¹⁰, this shows the potential flooding which could occur when rainwater does not drain away through the normal drainage systems or soak into the ground but lies on or flows over the ground instead.
- 4.12 The Surface Water (Pluvial) Flood map provided by the Environment Agency (**Figure 4.1**) indicates that the site is at high to low risk of pluvial flooding. Areas of higher pluvial flood risk are shown to be located within depressions of the topography associated with 'ridge and furrow' agricultural practices, which was confirmed following a site visit. These depressions shall be removed, and the ground re-profiled prior to construction of the proposed development. This will remove the pluvial flood risk to the site and surface water runoff shall be directed to the proposed attenuation basin.
- 4.13 The northern and eastern ditches are also shown to be at high risk of pluvial flooding, due to the depressions in topography that are present here. The site walkover conducted in August 2023 found that no apparent flow route was evident at these locations. This is contrary to the EA mapping, which is based off the topography and ground levels present.

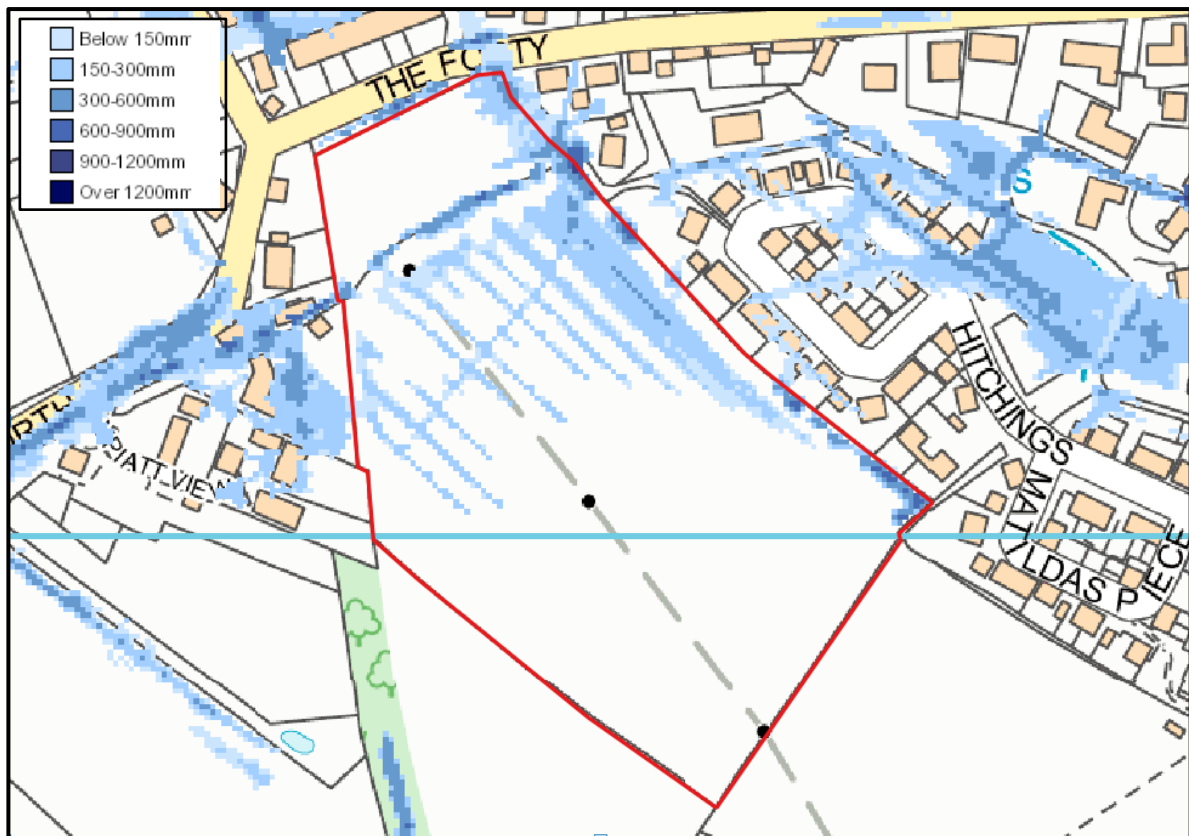
¹⁰ <https://flood-warning-information.service.gov.uk/long-term-flood-risk/map>



(Source: Environment Agency)

Figure 4.1 Pluvial Flood Map

- 4.14 The pluvial maps do not fully represent any underground drainage systems and therefore any flooding entering the site from existing roads is likely to be intercepted by road gullies and discharged into the local drainage network.
- 4.15 **Figure 4.2** illustrates the fluvial flood depths that could be experienced at the site in the design pluvial event, the 1 in 100-year storm. This demonstrates flood depths in this event would mostly reach 150-300mm in the furrows, land-drain and eastern ditch. Depths at the northern ditch are shown to also reach 300-600mm, with minor areas of 600-900mm depths.



(Source: Environment Agency)

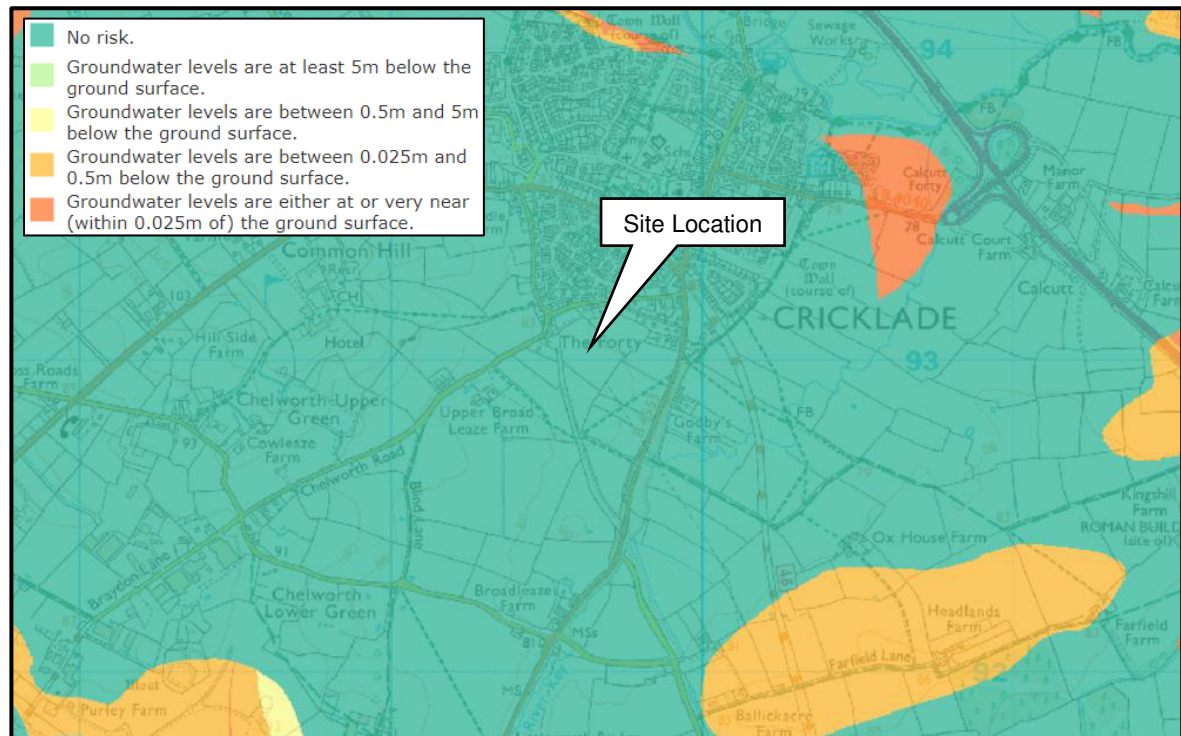
Figure 4.2 Design Event Pluvial Flood Depth

- 4.16 Reprofilng of ground at the site prior to construction shall remove pluvial flood risk due to ridge and furrow farming, thus reducing risk to the proposed development. Remaining areas that the EA mapping indicates as being at risk of pluvial flooding are associated with the ditches within the site. This is due to the depressions in topography present here. There are no dwellings proposed in the area at risk associated with the northern ditch.
- 4.17 While some dwellings are proposed within the east of the site, the finished floor levels (FFLs) of these shall be raised 450mm above the proposed ground levels. This will mitigate against any pluvial flood risk at this location, which is shown to reach depths of 150-300mm and less than 150mm (**Figure 4.2**) and provide an additional 150mm freeboard to account for design exceedance events. Furthermore, the proposed drainage strategy for the development will introduce a means to formally intercept and control surface water runoff from the site. This is discussed further in Section 6.

Groundwater Flooding

- 4.18 Groundwater flooding occurs when the water table rises above ground elevations. It is most likely to happen in low lying areas underlain by permeable geology. This may be regional scale chalk or sandstone aquifers, or localised deposits of sands and gravels underlain by less permeable strata such as that in a river valley.
- 4.19 The Wiltshire Council SFRA states that Cricklade has been subject to historic groundwater flooding events due to the presence of sand and gravel superficial deposits. However, such deposits are not present at the site or its immediate vicinity, and the Wiltshire Council SFRA

Data Explore Susceptibility to Groundwater Flooding map locates the site within an area at 'no risk' of groundwater flooding (**Figure 4.3**).



(Source: Wiltshire Council SFRA)

Figure 4.3 Risk of Groundwater Flooding

4.20 The risk of flooding from groundwater at this stage is considered to be low.

Sewer Flooding

4.21 Sewer flooding can occur when the capacity of the infrastructure is exceeded by excessive flows, or as a result of a reduction in capacity due to collapse or blockage, or if the downstream system becomes surcharged. This can lead to the sewers flooding onto the surrounding ground via manholes and gullies, which can generate overland flows.

4.22 Thames Water asset plans show that there is a 225mm diameter public foul sewer located within The Forty to the north of the site. A 225mm public foul sewer is located north of this in Deansfield, where it drains southeast to connecting to the northeast of the site (see **Appendix D**).

4.23 Thames Water information as denoted by the Wiltshire Council SFRA indicates that there are no records of sewer flooding within the site or its direct vicinity.

4.24 Thames Water have confirmed that there is sufficient capacity in their sewer network to accept flows directed to it from the proposed development.

4.25 The risk of sewer flooding to the site is therefore considered to be low.



Flooding from Artificial Sources

Reservoirs

- 4.26 Flooding can occur from large waterbodies or reservoirs if they are impounded above the surrounding ground levels or are used to retain water in times of flood. Although unlikely, reservoirs and large waterbodies could overtop or breach leading to rapid inundation of the downstream floodplain.
- 4.27 To help identify this risk, reservoir failure flood risk mapping has been prepared¹¹, this shows the largest area that might be flooded if a reservoir were to fail and release the water it holds. The map displays a worst-case scenario and is only intended as a guide. This identifies the site isn't at risk from this source.
- 4.28 The development is considered to be at negligible risk of flooding from reservoirs.

¹¹ <https://flood-warning-information.service.gov.uk/long-term-flood-risk/map>

5 Flood Mitigation Measures

Introduction

- 5.1 It is important to demonstrate that future users will not be at risk from flood hazards during the lifetime of the development, as well as ensuring that flood risk is not increased elsewhere.

Assessment Findings & Implications

- 5.2 The assessment undertaken has confirmed that the site is located within Flood Zone 1 and is at low risk of fluvial flooding. The site is shown to be at high to low risk of pluvial flooding due to the ridge and furrow formations present. This risk will be removed when the ground is re-profiled prior to development. Surface water runoff can then be directed to the proposed attenuation basin in the southeast of the site.
- 5.3 The site is at low risk of all other sources of flooding.

Finished Floor Levels (FFLs)

- 5.4 It is recommended that FFLs be set a minimum of 150-300mm above the proposed ground levels to provide protection against flooding from surface water runoff.
- 5.5 FFLs of dwellings in the east of the site shall be raised 450mm above the proposed ground levels. This will mitigate against any pluvial flood risk at this location and provide an additional 150mm freeboard to account for design exceedance events.

Ground Levels

- 5.6 Ground levels should be profiled to remove hollows/depressions within the site topography and the area of potential risk of pluvial flooding.
- 5.7 Ground levels should be finished so that overland runoff is encouraged to flow away from the proposed new buildings and be directed to the nearest on-site drainage system runoff collection point.

Access & Egress

- 5.8 Safe pedestrian access/egress is available onto The Forty in order to access the wider road/street network to the north of the site and land outside the floodplain.

Groundwater

- 5.9 The potential for shallow groundwater should also be considered during the construction phase of the development, particularly during the excavations. It is recommended that groundwater levels are monitored during the construction phase, and where groundwater is encountered appropriate dewatering should be employed.



Drainage

- 5.10 To mitigate the proposed developments impact on the current runoff regime through the increased rate of runoff that would result due to the impermeable areas to be introduced; it is proposed to incorporate surface water attenuation and storage as part of the development proposals. The proposed drainage strategy is discussed in Section 6.

6 Proposed Drainage Strategy

Introduction

- 6.1 Consideration of flood issues is not confined to the floodplain. This is recognised in the NPPF and associated guidance. The alteration of natural surface water flow patterns through developments can lead to problems elsewhere in a catchment, particularly flooding downstream; and replacing permeable vegetated areas with low permeability roofs, roads and other paved areas will increase the speed, volume and peak flow of surface water runoff.
- 6.2 A surface water management strategy for the development is proposed to manage and reduce the flood risk posed by surface water runoff from the site. The surface water drainage arrangements for any development site should be such that the volume and peak flow rates of surface water leaving a developed site are no greater than the rates prior to the proposed development, unless specific off-site arrangements are made and result in the same net effect.
- 6.3 An assessment of the surface water runoff rates was undertaken to determine the surface water options and attenuation requirements for the site and is discussed below.

Existing Drainage

- 6.4 The current site is a greenfield plot of land, considered to drain at existing greenfield rates of runoff to the ditches in the north and east of the site.
- 6.5 The existing greenfield runoff rates have been calculated using the MicroDrainage and the Interim Code of Practice (ICP) SuDs method. The resulting calculations are included within **Appendix E**. The runoff rates were calculated as follows in **Table 6.1**:

Return Period (Yrs)	Runoff Rate (l/s)
1	4.4
30	10.4
100	13.6
QBAR	5.3

Table 6.1 QBAR

Surface Water Management

- 6.6 Sustainable drainage system measures (SuDS) should be used to control the surface water runoff from the proposed development site, thereby managing the flood risk to the site and surrounding areas from surface water runoff. These measures will also improve the quality of water discharged from the site.



- 6.7 The SuDS hierarchy demands that surface water run off should be disposed of as high up the following list as practically possible:
- a) Into the ground (infiltration) and re-use, or then;
 - b) To a surface water body, or then;
 - c) To a surface water sewer, highway drain or another drainage system, or then;
 - d) To a combined sewer.

Infiltration Testing

- 6.8 Based on the geology shown to be underlying the site in the BGS online mapping, it is assumed that infiltration would not provide viable means of surface water discharge. Infiltration testing has been undertaken at this stage (see **Appendix C**).
- 6.9 The test pits did not drain sufficiently to obtain infiltration rates, thus soakaway testing demonstrated low infiltration potential. Slight seepage of groundwater was encountered at 0.80mbgl in Test Pit 03.

Proposed Drainage

- 6.10 The drainage strategy has been designed to account for infiltration being deemed unsuitable. The drainage hierarchy demands that discharging to a surface water body must be considered next. The ditch in the north of the site provides a suitable option to do so.
- 6.11 The introduction of hardstanding associated with the proposed development will introduce an impermeable area, which will increase the amount of runoff generated and could increase flood risk elsewhere unless managed to LLFA/IDB drainage requirements. The impermeable area increases to approximately 1.264ha when an additional 10% of impermeable area is included to account for urban creep.
- 6.12 The drainage strategy utilises proposed surface water sewers to direct runoff from the proposed development to an attenuation basin located in the southeast of the site. A pump station is proposed to control the flow of discharge to the northern ditch within the site, directed via a proposed storm rising main. This is subject to land drainage consent.
- 6.13 It is proposed to introduce a new gravity stormwater system with attenuation and a controlled discharge for up to a 1 in 100-year event plus 40% climate change allowance, which will reduce risk of flooding downstream.
- 6.14 The overall discharge rate from site will be restricted to the QBAR rate for all return period storms at 5.3l/s.
- 6.15 To demonstrate that the necessary storage volumes can be accommodated on the site an illustrative drainage layout has been prepared and has been included as **Appendix F**. Supporting drainage calculations are included in **Appendix E**.
- 6.16 The final layout and design of the surface water drainage network will be determined at the detailed design stage as the development masterplan evolves.

Exceedance Events

- 6.17 The attenuation basin will be designed with a capacity up to a 1 in 100-year (plus 40% climate change) event, with a +300mm freeboard allowance, based on the 5.3l/s restricted

discharge rate. This provides a betterment (reduction) in runoff when compared to existing undeveloped conditions, where runoff is uncontrolled across all return periods.

- 6.18 A storm event in excess of this design standard would be extreme and would cause the attenuation basin to overtop (with no sudden deluge) and would then shed overland following the topography of the site, as per existing conditions.
- 6.19 Finished floor levels of new dwellings will be set above external levels, which will mitigate the residual risk of overtopping.

Water Quality

- 6.20 The SuDS Manual (CIRIA C753) states that the design of surface water drainage should consider minimising contaminants in surface water runoff discharged from the site. The level of treatment required depends on the proposed land use, according to the pollution hazard indices. For this site contaminant risks come from the residential roofing and parking.
- 6.21 To ensure that adequate treatment is provided the SuDS mitigation indices for the development must be equal to, or exceed, the pollution hazard indices. Surface water runoff from residential roofs is considered to present a **very low** hazard to water quality, whilst general residential parking presents a **low** hazard.
- 6.22 To ensure a suitable mitigation index is achieved the affected stormwater system has been assessed. **Table 6.2** indicates satisfactory water quality is achieved.
- 6.23 It is also recommended, as good practice, that gullies and chambers have suitable silt traps/catchpits to reduce sediments entering the system.

		Pollution Hazard Level	Total suspended solids	Metals	Hydro-carbons
Land Use	Residential Parking	Low	0.5	0.4	0.4
Total			0.5	0.4	0.4
SuDS Component	Attenuation Basin		0.5	0.5	0.6
Total			0.5	0.5	0.6
Total SuDS Mitigation Indices ≥ Pollution Hazard Indices			Yes	Yes	Yes

(As per C753 The SuDS Manual)

Table 6.2 Water Quality Indices

Water Reuse

- 6.24 The proposed development provides an opportunity to reuse surface water throughout the provision of rainwater harvesting products.
- 6.25 Rainwater butts should be provided at suitable locations where feasible, to reduce the volume of water entering the underground drainage system and the demand on the water supply network.



- 6.26 Harvested rainwater may be used for garden watering and other applications where a pressurised hose connection is not required. Stored rainwater also provides a source of clean water when hosepipe bans are in effect.

Foul Water Management

- 6.27 All foul sewerage should be designed in accordance with Building Regulations Part H. In areas where sewers are to be adopted by Thames Water, sewerage should be designed in accordance with Sewers for Adoption (7th Edition) and supplemented with additional standards provided by Thames Water. An application to enter into an agreement for sewer adoption must be made in writing to Thames Water prior to any works commencing on site. A connection point should be agreed with Thames Water.
- 6.28 Foul water from the proposed dwellings shall be collected through a traditional gravity drainage system and directed to a pump station located in the southeast of the site. This will direct flow via a proposed foul rising main to the existing public foul sewer located in The Forty, to the north of the site. A Section 106 application is required for this connection.
- 6.29 Thames Water have provided confirmation that there is sufficient capacity for the proposed development to discharge into the public foul sewer located in The Forty (see **Appendix D**).

Maintenance Regime

- 6.30 Maintenance of SuDS features are essential to ensure that the surface water drainage system operates effectively and that flooding of the site and surrounding areas is prevented.
- 6.31 The responsibility of maintaining the private surface water and foul water drainage components would lie with the landowner of the site, who may delegate responsibility to an appointed external private management company.
- 6.32 A full maintenance regime should be carried out to ensure that the drainage system remains operational over its lifetime. **Table 6.3** summarises an initial maintenance plan for the drainage components proposed within the development. The SuDS Manual (CIRIA C753) and manufacturer's guidelines should be referred to for further maintenance information.



Drainage Component	Required Action	Typical Frequency
Pipework, manholes, flow control chambers, catch pits and silt traps	Stabilise adjacent areas	As required
	Remove weeds	As required
	Clear any poor performing structures.	As required
	Inspect all structures for poor operation	Three monthly, 48 hours after large storms in first six months
	Monitor inspection chambers. Inspect silt accumulation rates and determine silt clearance frequencies	Annually
Attenuation Basin	Remove litter and debris	Monthly (or as required)
	Cut the grass – public area	Monthly (during growing season)
	Inspect marginal and bankside vegetation and remove nuisance plants (for first three years)	Monthly (at start then as required)
	Inspect inlets, outlets, banksides, structures, pipework etc evidence of blockage and/or physical damage	Monthly
	Inspect water body for signs of poor water quality	Monthly (May – October)
	Inspect silt accumulation rates in any forebay and in the main body of the pond and establish appropriate removal frequencies; undertake contamination testing once some build up has occurred to inform management and disposal options	Half yearly
	Check any mechanical devices e.g., penstocks	Half yearly
	Hand cut submerged and emergent aquatic plants (at a minimum of 0.1m above the pond base; include max 25% of pond surface)	Annually
	Remove sediment from any forebay	Every 1-5 years (or as required)
	Remove sediment and planting from one quadrant of the main body of ponds without sediment forebays	Every 1-5 years (or as required)
	Repair erosion or other damage	As required
	Replant where necessary	As required
	Aerate pond when signs of eutrophication are detected	As required
	Realign rip-rap or repair other damage	As required
	Repair/rehabilitate inlets, outlets and overflows	As required

(As per C753 The SuDS Manual)

Table 6.3 Initial Operation and Maintenance Plan

7 Summary and Conclusions

Summary

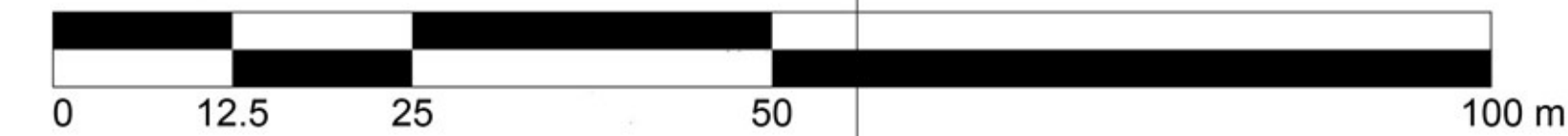
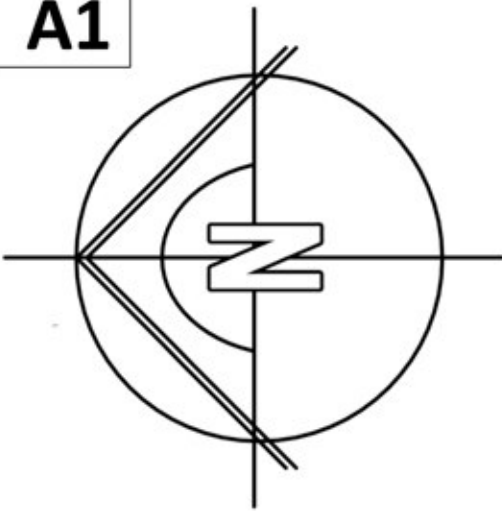
- 7.1 This assessment has considered the risks of all types of flooding to the site including tidal, fluvial, surface, groundwater, sewer and artificial sources and provides mitigation measures to ensure that the flood risk to the site is minimised and that flood risk off-site is not increased.

Conclusions

- 7.2 The site is located within Flood Zone 1 on the Environment Agency Flood Map for Planning and is at low risk of fluvial flooding.
- 7.3 The site is shown to be at high to low risk of pluvial flooding, this being a consequence of topography ridge and furrow farming. Re-profiled ground levels will remove this risk and surface water runoff shall be directed to the proposed attenuation basin in the southeast of the site.
- 7.4 The site is at low risk of all other sources of flooding.
- 7.5 It is recommended that FFLs are set 150-300mm above external ground levels to provide protection against any overland flows which exceed the design event. FFLs of dwellings in the east of the site should be raised 450mm above the proposed ground levels. This will mitigate against any pluvial flood risk at this location and provide an additional 150mm freeboard to account for design exceedance events.
- 7.6 Safe pedestrian access/egress is immediately available onto The Forty in order to access the wider road/street network to the north of the site.
- 7.7 Traditional gravity sewers shall direct surface water runoff to an attenuation basin which has been sized to accommodate the 100-year plus 40% climate change event. A pump station shall control the flow of discharge to the northern ditch within the site, via a storm rising main. The overall discharge rate from site will be restricted to the QBAR rate for all return period storms at 5.3l/s.
- 7.8 Foul water from the proposed development is to be directed via a pump station to the proposed connection point at the existing Thames Water public asset located in The Forty.
- 7.9 In compliance with the requirements of the National Planning Policy Framework, and subject to the mitigation measures proposed, the development will not cause or be subject to significant flood risk issues.



Appendix A – Proposed Development Drawings



Scale 1:500 @ A1

CLIENT

**HANNICK
HOMES**

PROJECT TITLE

PLANNING

DRAWING TITLE

CRICKLADE

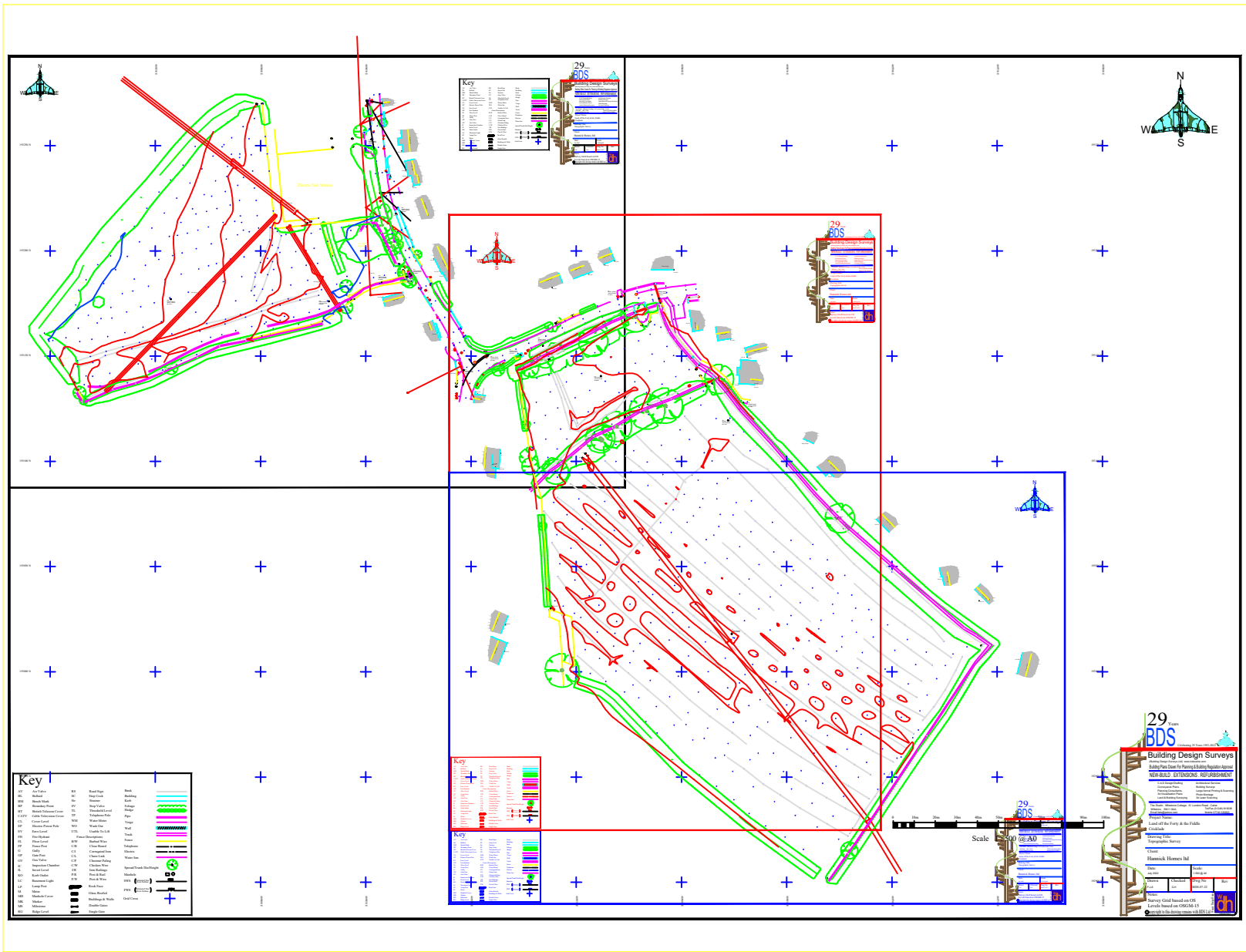
ILLUSTRATIVE LAYOUT

PROJECT NO.	DWG NO.	REVISION	STATUS
01793	40/001	.	
SCALE	DRAWN	CHECKED	DATE
1:500@A1	ST		21/11/2023

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Appendix B – Topographical Survey





Appendix C – Infiltration Testing



OUR REF: B2972

29th June 2023

Hannick Homes & Developments Ltd

Dammas House
Dammas Lane
Old Town
Swindon
Wiltshire
SN1 3EF

By email (samcroft@hannick.com)

Dear Sam,

Land South of The Forty, Cricklade
Soakaway Testing

Further to completion of the soakaway testing at the above site, our letter report is as follows:

1. Introduction

Earth Environmental & Geotechnical (Southern) Ltd (EEGSL) has been commissioned by Hannick Homes & Developments Ltd ('the Client') to assess soil infiltration rates at a site in Cricklade, Wiltshire. These works were completed in accordance with the EEGSL proposal 2972, dated 23rd May 2023.

This letter report presents full factual records of the site work carried out, the ground conditions encountered in the trial pits and the soakaway test results. All information collected has been used to provide an assessment of soil infiltration rates and the suitability of the site for soakaway drainage.

The report is written in the context of an agreed scope of work and budget and should not be used in a different context. New information, improved practices or changes in legislation may require a reinterpretation of the report in whole or in part. EEGSL reserve the right to amend either conclusions or recommendations in light of any further information that may become available. The report is provided for the sole use by the client and is confidential to them.

Recommendations within this report are also based on exploratory records and in situ test results. No liability can be accepted for conditions not revealed by the exploratory hole, particularly at intervening locations. Whilst every effort is made to ensure accuracy of data supplied, all opinions expressed as to the spatial distribution of strata between sampling locations is for guidance only and no responsibility is accepted as to its accuracy.

2. Site Location & Description

The assessment site is located on Land South of the Forty, Cricklade, Wiltshire and is centered on National Grid Reference 409609, 193046 with a nearest postcode of SN6 6HW.

At the time of the investigation, the site was occupied by fields.

3. Published Geology

According to the British Geological Survey (BGS), the site is directly underlain by the Oxford Clay Formation of Jurassic Age. The Oxford Clay Formation is described as silicate-mudstone, grey, generally smooth to slightly silty, with sporadic beds of argillaceous limestone nodules.

**CONSULTING
ENGINEERS**

Geotechnical
Environmental
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Geology
Drainage
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Studio 2
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Toll Bridge Road
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BA1 7DE
Tel: 01225 858823

www.earthenvironmental.co.uk
info@earthenvironmental.co.uk

ALSO, AT:

Stockport Office
Houldsworth Mill Business & Arts
Centre
Houldsworth Street
Stockport
SK5 6DA
Tel: 0161 975 6088

Middlesbrough
Wilton Centre
Redcar
TS10 4RF
Tel: 01642 438125

Reading Office
Suite 18
Wyvols Court
Swallowfield
Reading
RG7 1WY
Tel: 01183 734000

Maidstone Office
19-21 Albion Place
Maidstone
Kent
ME12 5EG
Tel: 0162 296 2434

Cardiff Office
12 Cathedral Road
Cardiff
CF11 9LJ
Tel: 0292 236 2615

Edinburgh Office
Hudson House
8 Albany Street
Edinburgh
EH1 3QB
Tel: 0131 5641789

Earth Environmental & Geotechnical
Ltd
Registered Office:
Mentor House, Ainsworth Street,
Blackburn, Lancashire, BB1 6AY
Registered in England.
No: 8436152

4. Fieldwork

The fieldwork was carried out by EEGSL on Thursday 22nd June 2023 and comprised:

- Three trial pits (designated TP01, TP02 and TP03) excavated to depths of between 1.45m and 1.90m below existing ground level using a tracked excavator. Details of the ground and groundwater conditions were noted and recorded on a Trial Pit Log (appended to this letter).
- Soakaway tests were carried out TP01 and TP02 in the trial pit in accordance with the methods described in BRE Digest 365⁽²⁰¹⁶⁾, the results of which are discussed in Section 5 below and attached to this letter.
- All works were supervised by EEGSL and the trial pits were backfilled after the completion of the soakaway testing.

The logging of soils and rocks has been carried out in accordance with BS5930⁽²⁰¹⁵⁾ except where superseded by the soil and rock description methodology in BS EN14688-1⁽²⁰⁰²⁾, BS EN 14688-2⁽²⁰⁰⁴⁾ and BS EN 14689-1⁽²⁰⁰³⁾.

The trial pit locations are shown in Figure 1 below.

Figure 1 – Soakaway Test Location Plan



5. Ground Conditions Encountered & Results of In Situ Testing

The trial pits encountered the following geological strata:

- Weathered Oxford Clay Formation was encountered below the topsoil and was proven to a maximum depth of 1.90m. The weathered deposits were encountered as:
 - Firm brown mottled grey and orange brown slightly gravelly CLAY with flint gravel.
 - Firm becoming stiff blue grey mottled orange brown slightly sandy silty CLAY.
 - Within TP03 slightly sandy silty clay with bands of yellow brown clayey SAND.

Man-made obstructions were not encountered during the excavation. No groundwater was encountered within TP01 and TP02. Within TP03, a small seepage was encountered at 0.80mbgl.

Soakaway testing was completed as per BRE Digest 365⁽²⁰¹⁶⁾. The tests did not sufficiently drain in order to obtain an infiltration rate.

Based on the results of the soakaway testing it is concluded soakaway drainage will not be suitable at this site.

----- END OF LETTER REPORT -----

Yours Sincerely,

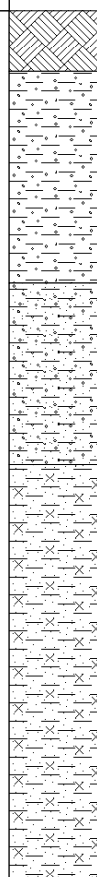
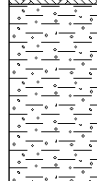
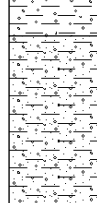
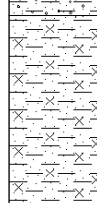
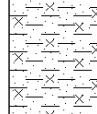
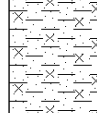
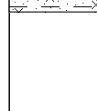


Amelia Samuel
Senior Geotechnical Consultant
For and on behalf of Earth Environmental & Geotechnical (Southern) Ltd
Encl. Trial Pit Log, Soakaway Test Results

ENCLOSURE 1
TRIAL PIT LOGS

Trial Pit Log

Project Name: Land South of The Forty, Cricklade		Client: Hannick Homes		Date: 22/06/2023	
Location: Cricklade		Contractor: MCD Ground Solutions		Co-ords: E409567.00 N193148.00	
Project No. : B2972		Crew Name: SM		Equipment: 8 T tracked excavator	
Location Number TP01	Location Type TP	Level	Logged By CF	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description						
		Depth (m)	Type	Results										
					0.20			TOPSOIL: Grass over firm dark brown slightly sandy CLAY with frequent rootlets.						
								Firm brown mottled grey and orange slightly gravelly CLAY. Gravel is angular to subangular fine to coarse of flint.						
					0.90			<u>...becoming more orange brown and gravelly.</u> Firm grey and orange slightly gravelly sandy CLAY. Gravel is angular to subangular fine to medium of flint.	1					
								Firm becoming stiff blue grey mottled orange brown slightly sandy silty CLAY. Sand is fine to coarse.						
					1.50			<u>...minor to occasional rootlets. Minor mineralisation of calcite (coarse sand size).</u>	2					
								<u>...becoming more blue grey mottled with orange and minor yellow brown.</u>						
								<u>...becoming less orange. Calcite minerals no longer present.</u>						
					2.90			End of Borehole at 2.900m	3					
														4
														5

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks
1.60	0.50						

Remarks Trial pit terminated at 2.9mbgl at target depth. Groundwater not encountered. Trial Pit back filled with arisings.							 EARTH ENVIRONMENTAL & GEOTECHNICAL
--	--	--	--	--	--	--	---

Trial Pit Log

Project Name: Land South of The Forty, Cricklade		Client: Hannick Homes		Date: 22/06/2023	
Location: Cricklade		Contractor: MCD Ground Solutions		Co-ords: E409693.00 N193038.00	
Project No. : B2972		Crew Name: SM		Equipment: 8 T tracked excavator	
Location Number TP02	Location Type TP	Level	Logged By CF	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
		Depth (m)	Type	Results							
					0.20			TOPSOIL: Grass over firm dark brown slightly sandy CLAY with frequent rootlets.	1		
								Firm brown slightly gravelly CLAY. Gravel is angular to subangular fine to coarse of flint.			
							...becoming more blue grey mottled with orange. Becoming sandy. Sand is fine to coarse.	2			
							...veins of calcite mineralisation present.				
							Firm becoming stiff blue grey banded orange brown slightly sandy silty CLAY. Sand is fine.				
							...minor to occasional rootlets. Becoming more grey brown.				
							...becoming more blue grey and slightly sandy.	3			
							End of Borehole at 2.450m				
					2.50						4
								5			

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks
1.40	0.50						

Remarks Trial pit terminated at 2.45mbgl at target depth. Groundwater not encountered. Trial Pit back filled with arisings.							 EARTH ENVIRONMENTAL & GEOTECHNICAL
---	--	--	--	--	--	--	---

Trial Pit Log

Project Name: Land South of The Forty, Cricklade		Client: Hannick Homes		Date: 22/06/2023	
Location: Cricklade		Contractor: MCD Ground Solutions		Co-ords: E409579.00 N193031.00	
Project No. : B2972		Crew Name: SM		Equipment: 8 T tracked excavator	
Location Number TP03	Location Type TP	Level	Logged By CF	Scale 1:25	Page Number Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.20			TOPSOIL: Grass over firm dark brown slightly sandy CLAY with frequent rootlets.	1
								Firm brown mottled minor grey slightly gravelly silty CLAY. Gravel is angular to subangular fine to coarse of flint. Sand is fine to coarse	
								Firm blue grey slightly sandy CLAY banded orange brown slightly gravelly clayey SAND. Gravel is angular to subangular fine to coarse of flint.	
								<i>...becoming predominantly CLAY. Firm to stiff blue grey with minor yellow clay with occasional rootlets present.</i>	
								<i>...band of yellow slightly sandy silty CLAY. Rootlets becoming frequent.</i>	
					2.70			<i>...becoming blue grey mottled brown slightly sandy (calcite mineralisation) silty CLAY.</i> End of Borehole at 2.700m	3
									5

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks
1.70	0.60						

Remarks Trial pit terminated at 2.70mbgl. Seepage of groundwater encountered at 0.80mbgl. Trial Pit back filled with arisings.							 EARTH ENVIRONMENTAL & GEOTECHNICAL
--	--	--	--	--	--	--	---

ENCLOSURE 2
SOAKAWAY TEST RESULTS



SOAKAWAY TEST

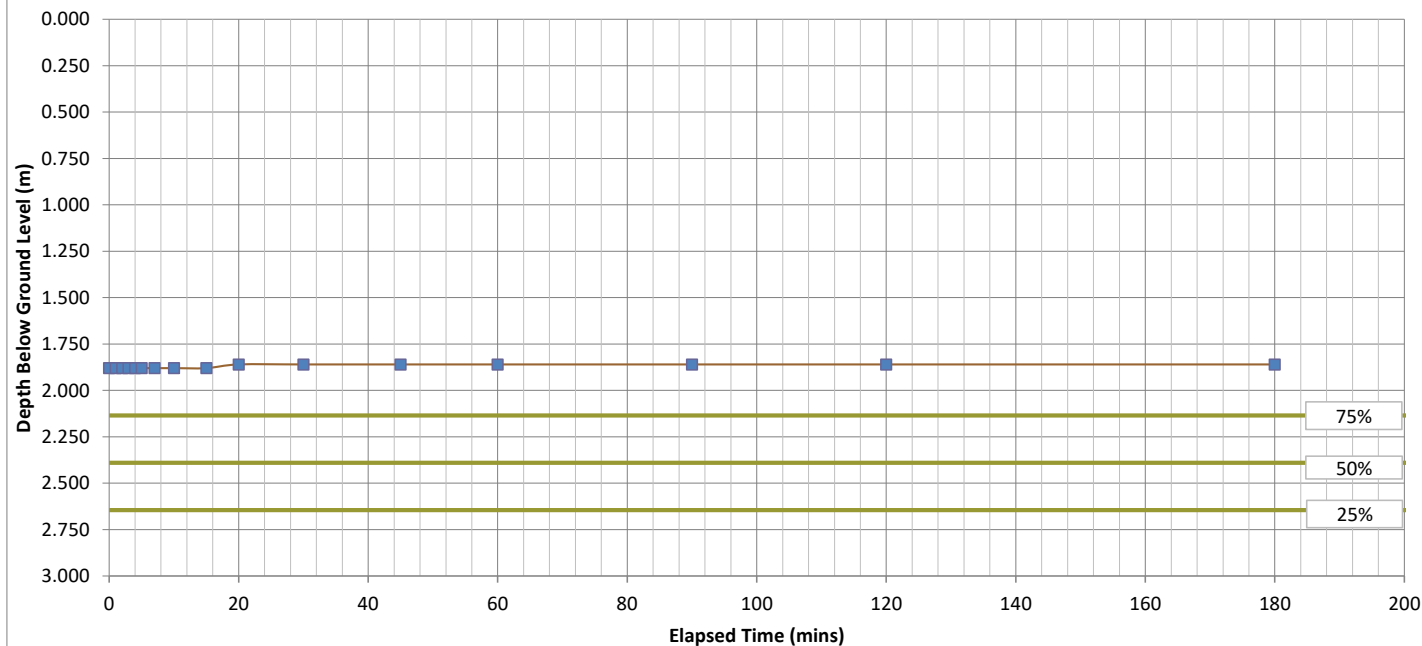
(To: BRE 365 2016)

Tel / Fax: 01225 858823
Web: www.earthenvironmental.co.uk
Email: southwest@earthenvironmental.co.uk

Job No: B2972
Site: Land South of The Forty, Cricklade
Client: Hannick Homes

Location Reference:	SA1	
Date	22/06/2023	
Geology in test section	Clay	
Depth to Base of Hole	2.90	m
Effective Depth	1.02	m
Hole Width	0.50	m
Hole Length	1.70	m
Depth to water at start of test below ground level	1.88	m
Depth to water at end of test below ground level	1.86	m
Effective storage depth to 75% full	0.77	m
(Depth below GL)	2.14	m
Effective storage depth to 50% full	0.51	m
(Depth below GL)	2.39	m
Effective storage depth to 25% full	0.26	m
(Depth below GL)	2.65	m
Height to 50% depth	0.51	m3
Effective Storage Volume Vp75-25	0.87	m3
Time tp25 at which water is 75% of effective depth (minutes)		mins
Time tp25 at which water is 25% of effective depth (minutes)		mins
Time for water level to fall between Vp75 -25		mins
Time for water level to fall between Vp75 -25		secs
Internal surface area of hole up to 50% depth including base	7.23	m2
Soil Infiltration Rate, f	N/A	m/s

Time Elapsed (mins:sec)	Depth of Water below GL (m)	Measured Data
0.00	1.880	
1.00	1.880	
2.00	1.880	
3.00	1.880	
4.00	1.880	
5.00	1.880	
7.00	1.880	
10.00	1.880	
15.00	1.880	
20.00	1.860	
30.00	1.860	
45.00	1.860	
60.00	1.860	
90.00	1.860	
120.00	1.860	
180.00	1.860	





Earth Environmental & Geotechnical Ltd

Tel / Fax: 01225 858823
Web: www.earthenvironmental.co.uk
Email: southwest@earthenvironmental.co.uk

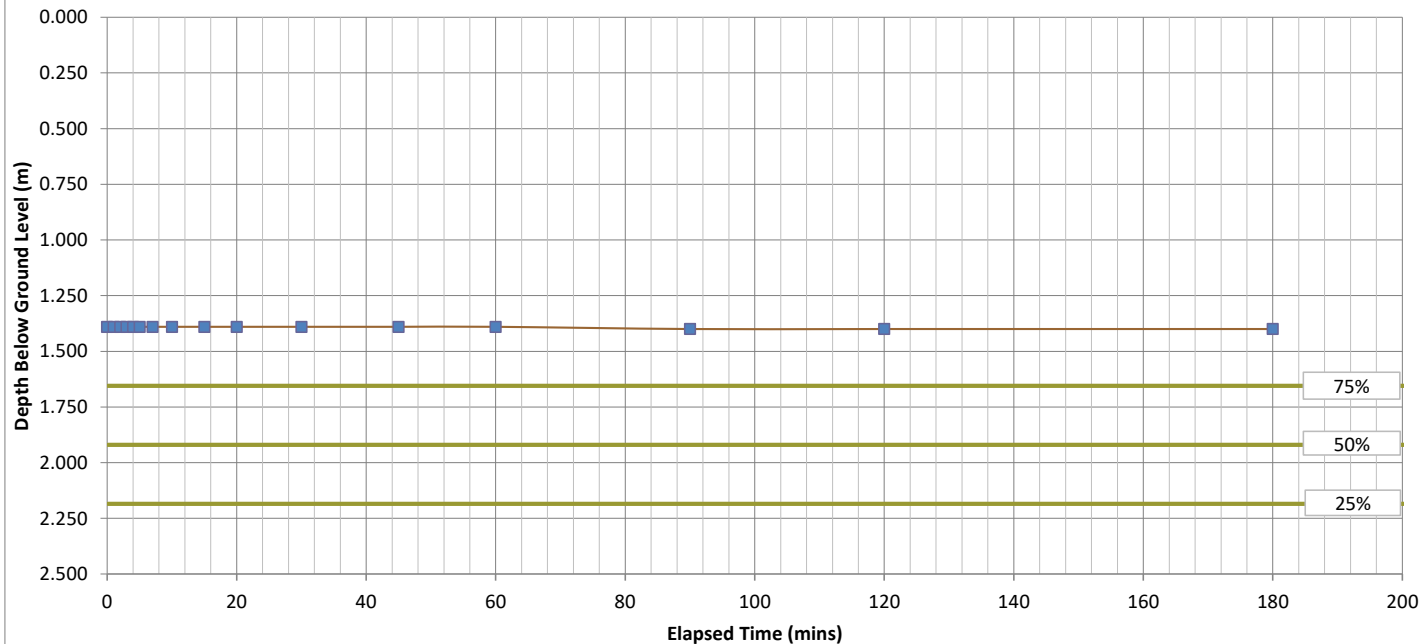
SOAKAWAY TEST

(To: BRE 365 2016)

Job No: B2972
Site: Land South of The Forty, Cricklade
Client: Hannick Homes

Location Reference:	SA02	
Date	22/06/2023	
Geology in test section	Clay	
Depth to Base of Hole	2.45	m
Effective Depth	1.06	m
Hole Width	0.50	m
Hole Length	1.40	m
Depth to water at start of test below ground level	1.39	m
Depth to water at end of test below ground level	1.40	m
Effective storage depth to 75% full	0.80	m
(Depth below GL)	1.66	m
Effective storage depth to 50% full	0.53	m
(Depth below GL)	1.92	m
Effective storage depth to 25% full	0.27	m
(Depth below GL)	2.19	m
Height to 50% depth	0.53	m3
Effective Storage Volume Vp75-25	0.74	m3
Time tp25 at which water is 75% of effective depth (minutes)		mins
Time tp25 at which water is 25% of effective depth (minutes)		mins
Time for water level to fall between Vp75 -25		mins
Time for water level to fall between Vp75 -25		secs
Internal surface area of hole up to 50% depth including base	5.36	m2
Soil Infiltration Rate, f	N/A	m/s

Time Elapsed (mins:sec)	Depth of Water below GL (m)	Measured Data
0.00	1.390	
1.00	1.390	
2.00	1.390	
3.00	1.390	
4.00	1.390	
5.00	1.390	
7.00	1.390	
10.00	1.390	
15.00	1.390	
20.00	1.390	
30.00	1.390	
45.00	1.390	
60.00	1.390	
90.00	1.400	
120.00	1.400	
180.00	1.400	





Appendix D – Thames Water Sewer Records and Information

Asset Location Search



Hannick Homes Ltd
Dammas House Old Town, Dammas House

SWINDON
SN1 3EF

Search address supplied The Forty
Cricklade

Your reference 888 CTF

Our reference ALS/ALS Standard/2016_3296812

Search date 6 April 2016

You are now able to order your Asset Location Search requests online by visiting
www.thameswater-propertysearches.co.uk



Asset Location Search



Search address supplied: The Forty, Cricklade,

Dear Sir / Madam

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

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

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

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

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

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

Contact Us

If you have any further queries regarding this enquiry please feel free to contact a member of the team on 0845 070 9148, or use the address below:

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

Email: searches@thameswater.co.uk

Web: www.thameswater-propertysearches.co.uk

Asset Location Search



Waste Water Services

Please provide a copy extract from the public sewer map.

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

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

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

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

For your guidance:

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

Clean Water Services

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

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

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

Asset Location Search



pressure test to be carried out for a fee.

For your guidance:

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

Payment for this Search

A charge will be added to your suppliers account.

Asset Location Search



Further contacts:

Waste Water queries

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

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

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

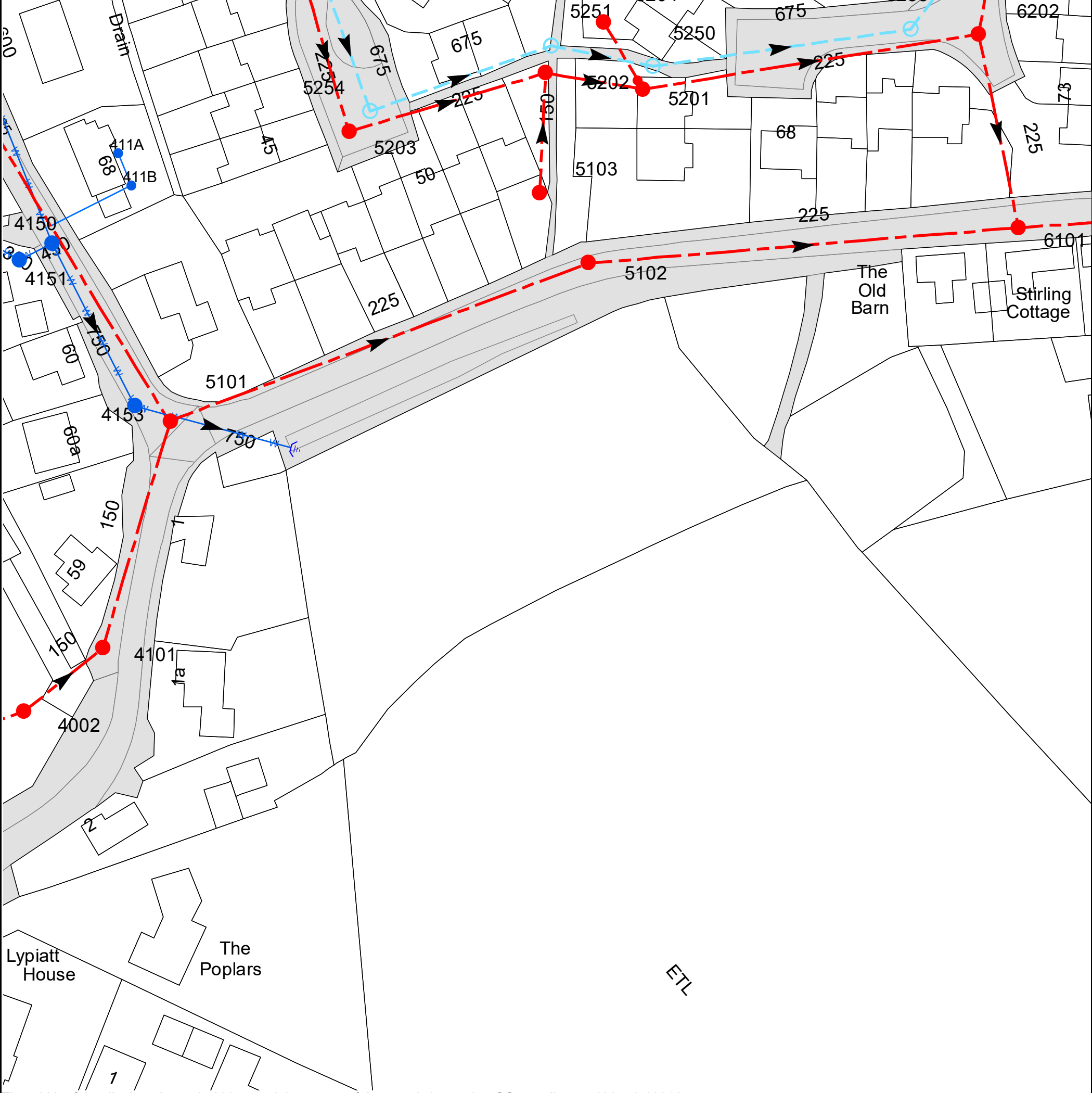
Tel: 0845 850 2777
Email: developer.services@thameswater.co.uk

Clean Water queries

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

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

Tel: 0845 850 2777
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 409570,193127
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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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
6101	81.04	79.8
5103	81.8	80.7
411B	n/a	n/a
411A	n/a	n/a
5203	81.78	80.77
5254	81.78	80.37
5201	81.7	80.3
5202	81.76	80.43
5250	81.74	80.16
5251	81.73	80.27
6202	81.93	80.13
6253	81.85	80.13
5204	81.71	81.04
4002	n/a	n/a
4101	82.23	80.67
5101	82.88	80.36
4153	82.87	80.9
5102	81.52	80.17
4151	82.45	81.3
4150	82.47	81.07
The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.		



ALS Sewer Map Key

Public Sewer Types (Operated & Maintained by Thames Water)

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

Notes:

- 1) All levels associated with the plans are to Ordnance Datum Newlyn.
- 2) All measurements on the plans are metric.
- 3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.
- 4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
- 5) 'na' or '0' on a manhole level indicates that data is unavailable.

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
	Dam Chase
	Fitting
	Meter
	Vent Column

Operational Controls

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

	Control Valve
	Drop Pipe
	Ancillary
	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.

	Outfall
	Undefined End
	Inlet

Other Symbols

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

	Public/Private Pumping Station
	Change of characteristic indicator (C.O.C.I.)
	Invert Level
	Summit

Areas

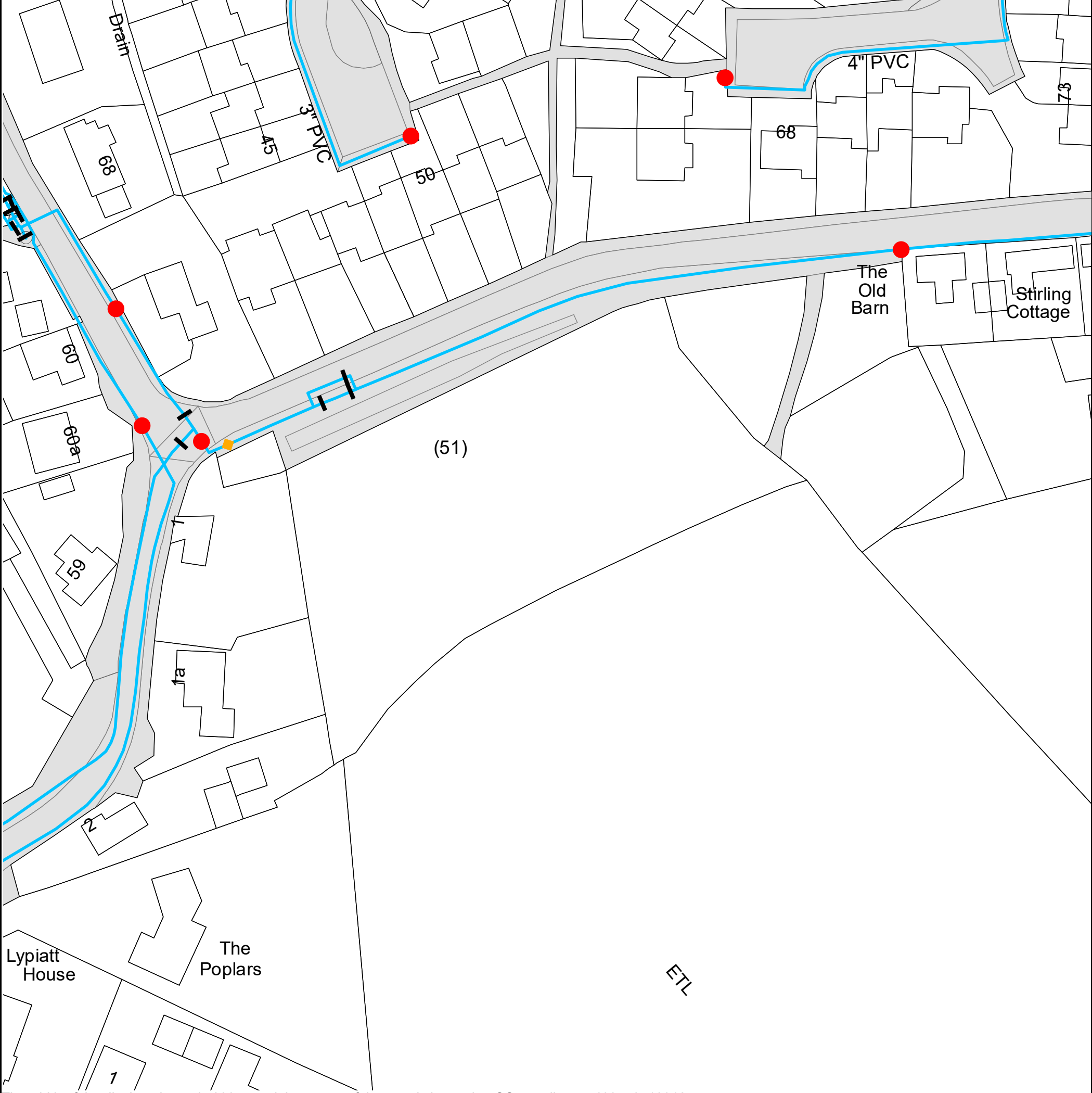
Lines denoting areas of underground surveys, etc.

	Agreement
	Operational Site
	Chamber
	Tunnel
	Conduit Bridge

Other Sewer Types (Not Operated or Maintained by Thames Water)

	Foul Sewer		Surface Water Sewer
	Combined Sewer		Gully
	Culverted Watercourse		Proposed
			Abandoned Sewer

- 6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in millimetres. 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 present on the plan, please contact a member of Property Insight on 0845 070 9148.



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 409570, 193127.
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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ALS Water Map 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

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.

Terms and Conditions

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

1. All goods remain in the property of Thames Water Utilities Ltd until full payment is received.
2. Provision of service will be in accordance with all legal requirements and published TWUL policies.
3. All invoices are strictly due for payment 14 days from due date of the invoice. Any other terms must be accepted/agreed in writing prior to provision of goods or service, or will be held to be invalid.
4. Thames Water does not accept post-dated cheques-any cheques received will be processed for payment on date of receipt.
5. In case of dispute TWUL's terms and conditions shall apply.
6. Penalty interest may be invoked by TWUL in the event of unjustifiable payment delay. Interest charges will be in line with UK Statute Law 'The Late Payment of Commercial Debts (Interest) Act 1998'.
7. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
8. A charge may be made at the discretion of the company for increased administration costs.

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

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

If you are unhappy with our service you can speak to your original goods or customer service provider. If you are not satisfied with the response, your complaint will be reviewed by the Customer Services Director. You can write to him at: Thames Water Utilities Ltd. PO Box 492, Swindon, SN38 8TU.

If the Goods or Services covered by this invoice falls under the regulation of the 1991 Water Industry Act, and you remain dissatisfied you can refer your complaint to Consumer Council for Water on 0121 345 1000 or write to them at Consumer Council for Water, 1st Floor, Victoria Square House, Victoria Square, Birmingham, B2 4AJ.

Ways to pay your bill

Credit Card	BACS Payment	Telephone Banking	Cheque
Call 0845 070 9148 quoting your invoice number starting CBA or ADS.	Account number 90478703 Sort code 60-00-01 A remittance advice must be sent to: Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW. or email ps.billing@thameswater.co.uk	By calling your bank and quoting: Account number 90478703 Sort code 60-00-01 and your invoice number	Made payable to ' Thames Water Utilities Ltd ' Write your Thames Water account number on the back. Send to: Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW or by DX to 151280 Slough 13

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



Search Code

IMPORTANT CONSUMER PROTECTION INFORMATION

This search has been produced by Thames Water Property Searches, Clearwater Court, Vastern Road, Reading RG1 8DB, which is registered with the Property Codes Compliance Board (PCCB) as a subscriber to the Search Code. The PCCB independently monitors how registered search firms maintain compliance with the Code.

The Search Code:

- provides protection for homebuyers, sellers, estate agents, conveyancers and mortgage lenders who rely on the information included in property search reports undertaken by subscribers on residential and commercial property within the United Kingdom
- sets out minimum standards which firms compiling and selling search reports have to meet
- promotes the best practise and quality standards within the industry for the benefit of consumers and property professionals
- enables consumers and property professionals to have confidence in firms which subscribe to the code, their products and services.

By giving you this information, the search firm is confirming that they keep to the principles of the Code. This provides important protection for you.

The Code's core principles

Firms which subscribe to the Search Code will:

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

Complaints

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



Mr Kris Tovey

Rappr Consultants Ltd

CTP House,
Knapp Road,
Cheltenham,
GL50 5FQ

**Wastewater
pre-planning**



Our ref **DS6106870, DTS-75338**

10 August 2023

Pre-planning enquiry: Confirmation of sufficient capacity

Site: LAND SOUTH OF THE FORTY CRICKLADE SN6 6NJ

Dear Mr Tovey,

Thank you for providing information on your proposed development.

Development of 3ha greenfield site to provide 70 dwellings.

Proposed foul water to discharge by pumped flows at 3.25 l/s to 225mm foul water sewer between MHs 5101 and 5102.

Proposed surface water to discharge to onsite SuDS and not discharged to public sewer.

We have completed the assessment of the foul water flows based on the information submitted in your application with the purpose of assessing sewerage capacity within the existing Thames Water sewer network.

We're pleased to confirm that there will be sufficient sewerage capacity in existing foul water sewer network to serve your development.

This confirmation is valid for 12 months or for the life of any planning approval that this information is used to support, to a maximum of three years.

You'll need to keep us informed of any changes to your design – for example, an increase in the number or density of homes. Such changes could mean there is no longer sufficient capacity.

What happens next?

Please make sure you submit your connection application, giving us at least 21 days' notice of the date you wish to make your new connection/s.

If you've any further questions, please contact me on 07747647876.

Yours sincerely,

Kind Regards

p.p

James Kitching

Developer Services – Adoptions Engineer
Pre-planning & Sewer Adoptions Team



Clearwater Court, Vastern Road, Reading, RG1 8DB
Find us online at developers.thameswater.co.uk



Appendix E – Drainage Calculations

Cotswold Transport Planning		Page 1
CTP House, Knapp Road Cheltenham Gloucestershire, GL50 3QQ		
Date 01/07/2023 17:33 File	Designed by Kristovey Checked by	
Innovyze		
Source Control 2020.1.3		
ICP SUDS Mean Annual Flood Input Return Period (years)1Soil0.450 Area (ha) 1.150Urban0.000 SAAR (mm)729Region NumberRegion 4 Results1/s QBAR Rural5.3 QBAR Urban5.3 Q1 year4.4 Q1 year4.4 Q30 years10.4 Q100 years13.6		
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Cotswold Transport Planning					Page 1	
CTP House, Knapp Road Cheltenham Gloucestershire, GL50 3QQ		LAND SOUTH OF THE FORTY CRICKLADE PRELIMINARY BASIN DESIGN				
Date 01/07/2023 File		Designed by KT Checked by KT				
Innovyze		Source Control 2020.1.3				
Summary of Results for 100 year Return Period (+40%)						
Storm Event		Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer 79.963 0.463 5.3 322.6 O K						
30 min Summer 80.088 0.588 5.3 421.8 O K						
60 min Summer 80.208 0.708 5.3 522.8 O K						
120 min Summer 80.320 0.820 5.3 621.0 O K						
180 min Summer 80.377 0.877 5.3 672.7 O K						
240 min Summer 80.411 0.911 5.3 704.3 O K						
360 min Summer 80.453 0.953 5.3 742.9 O K						
480 min Summer 80.476 0.976 5.3 765.0 O K						
600 min Summer 80.488 0.988 5.3 777.0 O K						
720 min Summer 80.494 0.994 5.3 782.4 O K						
960 min Summer 80.493 0.993 5.3 781.1 O K						
1440 min Summer 80.466 0.966 5.3 755.6 O K						
2160 min Summer 80.423 0.923 5.3 714.6 O K						
2880 min Summer 80.380 0.880 5.3 675.4 O K						
4320 min Summer 80.297 0.797 5.3 600.2 O K						
5760 min Summer 80.204 0.704 5.3 519.3 O K						
7200 min Summer 80.116 0.616 5.3 444.8 O K						
8640 min Summer 80.036 0.536 5.3 380.4 O K						
10080 min Summer 79.965 0.465 5.3 324.7 O K						
15 min Winter 80.013 0.513 5.3 361.8 O K						
30 min Winter 80.150 0.650 5.3 473.4 O K						
Storm Event		Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15 min Summer 138.153 0.0 310.0 23						
30 min Summer 90.705 0.0 397.1 37						
60 min Summer 56.713 0.0 529.3 68						
120 min Summer 34.246 0.0 637.1 126						
180 min Summer 25.149 0.0 698.8 186						
240 min Summer 20.078 0.0 739.8 246						
360 min Summer 14.585 0.0 791.9 364						
480 min Summer 11.622 0.0 812.0 484						
600 min Summer 9.738 0.0 809.9 604						
720 min Summer 8.424 0.0 803.5 722						
960 min Summer 6.697 0.0 787.2 962						
1440 min Summer 4.839 0.0 752.8 1284						
2160 min Summer 3.490 0.0 1183.9 1652						
2880 min Summer 2.766 0.0 1248.3 2048						
4320 min Summer 1.989 0.0 1329.0 2892						
5760 min Summer 1.573 0.0 1429.7 3640						
7200 min Summer 1.311 0.0 1488.5 4400						
8640 min Summer 1.129 0.0 1537.1 5104						
10080 min Summer 0.994 0.0 1577.3 5848						
15 min Winter 138.153 0.0 345.4 23						
30 min Winter 90.705 0.0 427.5 37						
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Cotswold Transport Planning					Page 2
CTP House, Knapp Road Cheltenham Gloucestershire, GL50 3QQ		LAND SOUTH OF THE FORTY CRICKLADE PRELIMINARY BASIN DESIGN			
Date 01/07/2023 File		Designed by KT Checked by KT			
Innovyze		Source Control 2020.1.3			
Summary of Results for 100 year Return Period (+40%)					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	80.283	0.783	5.3	587.5	O K
120 min Winter	80.405	0.905	5.3	698.4	O K
180 min Winter	80.468	0.968	5.3	757.6	O K
240 min Winter	80.506	1.006	5.3	794.4	O K
360 min Winter	80.554	1.054	5.3	840.6	O K
480 min Winter	80.582	1.082	5.3	868.3	O K
600 min Winter	80.598	1.098	5.3	884.7	O K
720 min Winter	80.608	1.108	5.3	893.9	O K
960 min Winter	80.612	1.112	5.3	898.5	O K
1440 min Winter	80.592	1.092	5.3	878.4	O K
2160 min Winter	80.538	1.038	5.3	824.9	O K
2880 min Winter	80.486	0.986	5.3	774.7	O K
4320 min Winter	80.375	0.875	5.3	670.2	O K
5760 min Winter	80.249	0.749	5.3	558.2	O K
7200 min Winter	80.106	0.606	5.3	436.5	O K
8640 min Winter	79.986	0.486	5.3	341.0	O K
10080 min Winter	79.885	0.385	5.3	263.7	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
60 min Winter	56.713	0.0	592.0	66	
120 min Winter	34.246	0.0	710.0	124	
180 min Winter	25.149	0.0	773.5	184	
240 min Winter	20.078	0.0	808.7	242	
360 min Winter	14.585	0.0	823.9	358	
480 min Winter	11.622	0.0	818.8	476	
600 min Winter	9.738	0.0	811.5	592	
720 min Winter	8.424	0.0	804.1	706	
960 min Winter	6.697	0.0	790.2	932	
1440 min Winter	4.839	0.0	765.5	1370	
2160 min Winter	3.490	0.0	1324.3	1732	
2880 min Winter	2.766	0.0	1394.0	2192	
4320 min Winter	1.989	0.0	1422.4	3116	
5760 min Winter	1.573	0.0	1601.3	4032	
7200 min Winter	1.311	0.0	1667.4	4752	
8640 min Winter	1.129	0.0	1722.1	5440	
10080 min Winter	0.994	0.0	1767.7	6056	
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Cotswold Transport Planning		Page 3
CTP House, Knapp Road Cheltenham Gloucestershire, GL50 3QQ	LAND SOUTH OF THE FORTY CRICKLADE PRELIMINARY BASIN DESIGN	
Date 01/07/2023 File	Designed by KT Checked by KT	
Innovyze Source Control 2020.1.3		

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 1.264

Time (mins)	Area	Time (mins)	Area
From: To:	(ha)	From: To:	(ha)
0 4	0.632	4 8	0.632

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Cotswold Transport Planning			Page 4																																																																																																
CTP House, Knapp Road Cheltenham Gloucestershire, GL50 3QQ		LAND SOUTH OF THE FORTY CRICKLADE PRELIMINARY BASIN DESIGN																																																																																																	
Date 01/07/2023 File		Designed by KT Checked by KT																																																																																																	
Innovyze		Source Control 2020.1.3																																																																																																	
Model Details Storage is Online Cover Level (m) 81.000 Tank or Pond Structure Invert Level (m) 79.500 <table><thead><tr><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th></tr></thead><tbody><tr><td>0.000</td><td>625.0</td><td>1.500</td><td>1160.0</td></tr></tbody></table> Hydro-Brake® Optimum Outflow Control Unit Reference MD-SHE-0106-5300-1200-5300 Design Head (m) 1.200 Design Flow (l/s) 5.3 Flush-Flo™ Calculated Objective Minimise upstream storage Application Surface Sump Available Yes Diameter (mm) 106 Invert Level (m) 79.500 Minimum Outlet Pipe Diameter (mm) 150 Suggested Manhole Diameter (mm) 1200 Control Points <table><thead><tr><th></th><th>Head (m)</th><th>Flow (l/s)</th></tr></thead><tbody><tr><td>Design Point (Calculated)</td><td>1.200</td><td>5.3</td></tr><tr><td>Flush-Flo™</td><td>0.356</td><td>5.3</td></tr><tr><td>Kick-Flo®</td><td>0.749</td><td>4.3</td></tr><tr><td>Mean Flow over Head Range</td><td>-</td><td>4.6</td></tr></tbody></table> The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated <table><thead><tr><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th></tr></thead><tbody><tr><td>0.100</td><td>3.6</td><td>1.200</td><td>5.3</td><td>3.000</td><td>8.1</td><td>7.000</td><td>12.2</td></tr><tr><td>0.200</td><td>5.0</td><td>1.400</td><td>5.7</td><td>3.500</td><td>8.8</td><td>7.500</td><td>12.6</td></tr><tr><td>0.300</td><td>5.3</td><td>1.600</td><td>6.1</td><td>4.000</td><td>9.3</td><td>8.000</td><td>13.0</td></tr><tr><td>0.400</td><td>5.3</td><td>1.800</td><td>6.4</td><td>4.500</td><td>9.9</td><td>8.500</td><td>13.4</td></tr><tr><td>0.500</td><td>5.2</td><td>2.000</td><td>6.7</td><td>5.000</td><td>10.4</td><td>9.000</td><td>13.7</td></tr><tr><td>0.600</td><td>5.0</td><td>2.200</td><td>7.0</td><td>5.500</td><td>10.8</td><td>9.500</td><td>14.1</td></tr><tr><td>0.800</td><td>4.4</td><td>2.400</td><td>7.3</td><td>6.000</td><td>11.3</td><td></td><td></td></tr><tr><td>1.000</td><td>4.9</td><td>2.600</td><td>7.6</td><td>6.500</td><td>11.7</td><td></td><td></td></tr></tbody></table>					Depth (m)	Area (m²)	Depth (m)	Area (m²)	0.000	625.0	1.500	1160.0		Head (m)	Flow (l/s)	Design Point (Calculated)	1.200	5.3	Flush-Flo™	0.356	5.3	Kick-Flo®	0.749	4.3	Mean Flow over Head Range	-	4.6	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	3.6	1.200	5.3	3.000	8.1	7.000	12.2	0.200	5.0	1.400	5.7	3.500	8.8	7.500	12.6	0.300	5.3	1.600	6.1	4.000	9.3	8.000	13.0	0.400	5.3	1.800	6.4	4.500	9.9	8.500	13.4	0.500	5.2	2.000	6.7	5.000	10.4	9.000	13.7	0.600	5.0	2.200	7.0	5.500	10.8	9.500	14.1	0.800	4.4	2.400	7.3	6.000	11.3			1.000	4.9	2.600	7.6	6.500	11.7		
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Appendix F – Drainage Strategy



- Notes:**
1. Do not scale from this drawing. All dimensions are in metres, unless stated otherwise.
 2. This drawing is based on the Hannick Homes Sketch Layout 001
 3. Ordnance Survey, (c) Crown Copyright 2020. All rights reserved. Licence number 100022432.
 4. Drawing to be read in conjunction with all other drawings. Any discrepancies are to be reported to the engineer 5 working days in advance of undertaking any work.

- Key:**
- EXISTING PUBLIC FOUL SEWER
 - EXISTING PUBLIC STORM SEWER
 - - - PROPOSED FOUL DRAINAGE
 - - - PROPOSED STORM DRAINAGE
 - PROPOSED FOUL RISING MAIN
 - PROPOSED STORM RISING MAIN
 - - - PROPOSED EASEMENT

P4	27.11.23	REVISED LAYOUT	AS	BF
P3	13.11.23	REVISED FOLLOWING CLIENT COMMENT	AS	DP
P2	02.11.23	REVISED LAYOUT	AS	CE
P1	01.07.23	ISSUED FOR COMMENT	KT	KT
Rev	Date	Details	By	Chkd

rappor



CLIENT: HANNICK HOMES

PROJECT: LAND SOUTH OF THE FORTY CRICKLADE

TITLE: DRAINAGE STRATEGY AND CONSTRAINTS PLAN

SCALE @ A1: 1:500	DATE: 30.06.23	DRAWN: AS	CHECKED: CE	APPROVED: RS
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STATUS: PLANNING

DRAWING NO: 220400-RAP-XX-XX-DR-C-3500	REVISION: P4
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