

FLOOD RISK ASSESSMENT

GRID REF: 505759E, 191614N

HAREFIELD GROVE, RICKMANSWORTH ROAD
HAREFIELD, UB9 6JH

prepared for
COMER HOMES GROUP

JUNE 2025

REFERENCE: ST3783/FRA-2506-REV1
REVISION 1

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1. Introduction

- 1.1.1. Stomor Ltd. have been commissioned by Comer Homes Group to prepare a Flood Risk Assessment (FRA) and Drainage Strategy to support the proposed development at Harefield Grove, Rickmansworth Road, Harefield. A Site Location Plan is provided in **Appendix A**.
- 1.1.2. This document supersedes the previous FRA, dated September 2021, submitted as part of the 2022 proposals.
- 1.1.3. The application site is brownfield currently comprising a manor house and associated outbuildings, associated car parking, landscaping and existing Lodge House, with a total area of 7.48 hectares (ha).
- 1.1.4. Development proposals comprise conversion of the existing manor house and outbuildings into residential apartments, in addition to the demolition and reconstruction of the existing stable block and several new dwellings to provide a total of 38No. residential units.

1.2. Policy Context

- 1.2.1. The FRA has been prepared in accordance with relevant national, regional, and local planning policy and guidance on flooding as follows:
 - The National Planning Policy Framework (NPPF) published by Ministry of Housing, Communities and Local Government (MHCLG), and the accompanying National Planning Practice Guidance (NPPG).
 - The Environment Agency (EA) published advice for Preparing a Flood Risk Assessment: Standing Advice (April 2012, updated April 2025).
 - The EA's Approach to Groundwater Protection (March 2017, updated October 2023).
 - The London Plan (March 2021).
 - London Borough of Hillingdon (LBH) Local Plan Part 1 (November 2012).
 - LBH Local Plan Part 2 (January 2020).
 - LBH Surface Water Management Plan (January 2013).
 - West London Strategic Flood Risk Assessment (SFRA) (March 2018).
- 1.2.2. Furthermore, the FRA follows the methodology prescribed in Construction Industry Research and Information Association (CIRIA) document C624: Development and Flood Risk (2004), Guidance for the Construction Industry.

1.3. Flood Risk Vulnerability and the NPPF Sequential Test

- 1.3.1. The Indicative Floodplain Map obtained from the UK government website is provided in **FIGURE 1.1**. This shows that the application site is located within Flood Zone 1, land assessed to have a low probability of flooding.



FIGURE 1.1: UK Government Flood Map for Planning

- 1.3.2. The differences between Flood Zones 1, 2 and 3 are described in Table 1: Flood Zones from the Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government Flood Risk and Coastal Change guidance (updated August 2022), reproduced below:

Zone 1 Low Probability	Land assessed as having a less than 0.1% annual probability of river or sea flooding.
Zone 2 Medium Probability	Land assessed as having between a 1% and 0.1% annual probability of river flooding, or land having between a 0.5% and 0.1% annual probability of sea flooding.
Zone 3a High Probability	Land assessed as having a 1% or greater annual probability of river flooding, land having a 0.5% or greater annual probability of flooding from the sea.
Zone 3b The Functional Floodplain	Land where water from rivers or the sea has to flow or be stored in times of flood. Normally comprises land having a 3.3% or greater annual probability of flooding, or land designed to flood (such as a flood attenuation scheme).

- 1.3.3. The Flood Risk and Coastal Change Category (ID 7) of the NPPG and associated documents identifies that a Flood Risk Assessment is required areas at risk of flooding.
- 1.3.4. The Flood Risk and Coastal Change Category of the NPPG and associated documents identify that site-specific flood risk assessments should identify and assess the risks of all forms of flooding to and from the development and demonstrate how these flood risks will be managed so that the development remains safe throughout its lifetime, taking climate change into account.
- 1.3.5. The development would have a NPPF flood risk vulnerability classification of More Vulnerable. In accordance with the 2024 NPPG guidance, the sequential test should be followed in areas at risk from any sources of flooding including access routes and areas of land raising.

2. Site Location & Surrounding Area

- 2.1.1. The application site comprises approximately 7.48ha of brownfield land, currently comprising a manor house and associated outbuildings, associated car parking, landscaping and existing Lodge House.
- 2.1.2. The site is located approximately 850m from Harefield town centre. The site boundary is defined by Rickmansworth Road to the west, existing farm buildings to the south and south-east, and Pearsons Wood to the north and east.
- 2.1.3. Inspection of the topographical survey shows that the site generally falls from south-west to north-east. Surveyed ground levels range from approximately 69.52 m AOD to 87.82 m AOD within the site. A copy of the topographical survey is provided in **Appendix B**.
- 2.1.4. The nearest watercourse to the site is an Ordinary Watercourse that runs through the east side of the site, running from south to north. The nearest an EA Designated Main River is the River Colne, which is located approximately 1.6km to the west of the site.
- 2.1.5. EA catchment data identifies that the site is located within the Colne operational catchment area, within the Thames River Basin District.
- 2.1.6. Inspection of the EA's groundwater source protection zone data shows that the site lies within Groundwater Source Protection Zone III (Total Catchment). A small area at the south of the site extends into Zone II (Outer Protection Zone). Therefore, there may be restrictions on the areas discharging via infiltration methods, subject to suitable infiltration rates and levels of water treatment.
- 2.1.7. EA Maps identify that the site is located in a Drinking Water Safeguard Zone (surface water). Inspection of the groundwater vulnerability map identifies that the site is predominantly at Medium risk, with soluble rock risk. A small area extending into the north of the site is at Medium-High risk, and a small area extending into the south of the site is at Low risk.
- 2.1.8. The site is located predominantly within a Secondary (A) Aquifer for the Superficial Drift Designation, with a small area along the northern boundary not within a superficial aquifer. The site is located within a Secondary (A) Aquifer for the Bedrock Designation.

3. Site Background

- 3.1.1. The site is currently brownfield and is the site of a manor house and associated outbuildings, associated car parking, landscaping and existing Lodge House.
- 3.1.2. Historical mapping information indicates that the site has comprised the Harefield Grove manor house and associated grounds since the 1830s.
- 3.1.3. A Level 1 Strategic Flood Risk Assessment (SFRA) for the area was prepared by Metis Consulting, on behalf of the London Borough of Hillingdon, in March 2018. The SFRA is used as a desk-based study to map all forms of flood risk to provide an evidence base to locate new development primarily within low-risk areas. The information allows the planning authority to identify the level of detail required for the site-specific Flood Risk Assessments.
- 3.1.4. Inspection of the British Geological Survey (BGS) website identifies that the underlying ground conditions of the site comprise Lambeth Group (clay, silt and sand) at bedrock with superficial deposits of Gerrards Cross Gravel (sand and gravel). In addition, inspection of the Soilsclapes website indicates that the site lies in a region with impeded drainage.
- 3.1.5. Infiltration test results in accordance with BRE Digest 365 have been provided to Stomor by the Client which identified varying levels of infiltration potential across the site. Infiltration rates in the vicinity of the Main House were recorded at $3.6 \times 10^{-8} \text{ms}^{-1}$ which would suggest infiltration in this area may not be feasible. Copies of the soakage test results are provided in **Appendix C**.

4. Existing Drainage

4.1. Surface Water Drainage

- 4.1.1. As the site is brownfield, there is likely existing surface water drainage infrastructure in place. Runoff from the site is currently believed to discharge to the unnamed Ordinary Watercourse within the east of the site.
- 4.1.2. Thames Water Utilities (TWU) sewer records identify that there are no public surface water sewer located in close proximity of the site. TWU sewer records are provided in **Appendix D**.
- 4.1.3. Greenfield runoff rates have been calculated based upon the IH124 Method, for a development area of 7.48 ha. Geotechnical information from the WRAP map of the Wallingford Procedure indicates that the underlying soil conditions would reflect Winter Rain Acceptance Potential (WRAP) Soil Class 4, which gives flow rates as follows:

Greenfield Runoff (l/s)		
1 in 1 year	Q1	29.3 l/s
1 in 30 years	Q30	79.3 l/s
1 in 100 years	Q100	110 l/s

- 4.1.4. However, the proposed development would result in an area of 0.382ha of impermeable area that would need to be positively drained, which gives greenfield runoff rates as follows:

Greenfield Runoff (l/s)		
1 in 1 year	Q1	1.5 l/s
1 in 30 years	Q30	4.1 l/s
1 in 100 years	Q100	5.6 l/s

- 4.1.5. The existing impermeable area of the site is approximately 0.73 ha. Surface water runoff associated with these impermeable areas would discharge at an unrestricted rate to either a receiving watercourse or public surface water sewer. The existing discharge rate being generated by the current impermeable areas within the site has been calculated based upon the Modified Rational Method as follows:

Existing Brownfield Area – 0.73 ha		
Storm Event	Rainfall Intensity (i)	Peak Runoff Rate
1 in 1 year	50mm/hr	101.47 l/s
1 in 30 years	126mm/hr	255.7 l/s
1 in 100 years	152mm/hr	308.47 l/s

4.1.6. A copy of the runoff calculation sheets is provided in **Appendix E**.

4.2. Foul Water Drainage

4.2.1. TWU sewer records identify no public foul water sewers in the immediate vicinity of the site. The nearest public foul water sewer is located on Rickmansworth Road, approximately 445m south-west of the site access.

5. Proposed Development

- 5.1.1. Development proposals comprise conversion of the existing manor house and outbuildings into residential apartments, in addition to the demolition and reconstruction of the existing stable block and several new dwellings to provide a total of 38No. residential units.
- 5.1.2. The existing impermeable area of the site is 0.73. Based upon the current development proposals, redevelopment of the site is expected to generate an impermeable area of approximately 0.382ha, resulting in a decrease of 0.382ha.

6. Proposed Site Drainage

6.1. Surface Water Drainage

- 6.1.1. The site is currently brownfield. Based upon the proposed layout, the development would be expected to generate a decrease in impermeable area of 0.382ha.
- 6.1.2. In accordance with EA guidance and the London Plan, the order of consideration for the disposal of surface water runoff from a development should be as follows: rainwater reuse, infiltration methods, watercourses, then public sewer network.
1. Store rainwater for later use
 2. Use infiltration techniques, such as porous surfaces in non-clay areas
 3. Attenuate rainwater in ponds or open water features for gradual release
 4. Attenuate rainwater by storing in tanks or sealed water features for gradual release
 5. Discharge rainwater direct to a watercourse
 6. Discharge rainwater to a surface water sewer/drain
 7. Discharge rainwater to the combined sewer
- 6.1.3. Properties will be provided with water butts or SuDS pods to allow for and encourage the storage and reuse of rainwater.
- 6.1.4. Infiltration test results in accordance with BRE Digest 365 have been provided to Stomor by the Client which identified varying levels of infiltration potential across the site. Infiltration rates in the vicinity of the Main House were recorded at $3.6 \times 10^{-8} \text{ms}^{-1}$ which would suggest infiltration in this area is likely to not be feasible.
- 6.1.5. The nearest watercourse to the site is an Ordinary Watercourse that runs through the east side of the site, running from south to north. The nearest, designated as an EA Designated Main River, which is located approximately 1.6km to the west of the site.
- 6.1.6. The existing site is assumed to discharge to the unnamed Ordinary Watercourse within the east of the site, either directly or via existing on-site drainage infrastructure. Therefore, it is considered that this would appear to be the most feasible point of discharge.

- 6.1.7. An Indicative Drainage Strategy is provided in **Appendix F**. The strategy demonstrates how the proposed development can be effectively drained and the amount of storage required to avoid flooding within the site during all storms up to and including the 1 in 100-year storm event plus a 40% allowance for climate change.
- 6.1.8. The proposed drainage strategy has been modelled using Flow. Copies of Flow modelling output files for the development are provided in **Appendix G**, demonstrating that the proposed SuDS features provide sufficient storage to avoid flooding during all storms up to and including the 1 in 100-year storm event plus a 40% allowance for climate change.
- 6.1.9. The indicative drainage strategy incorporates SuDS features which will need to have clear, enforceable maintenance regimes in place so that they provide effective flood protection and water treatment for the long term. See attached the SuDS Maintenance Fact Sheet in **Appendix H**.
- 6.1.10. The CIRIA SuDS Manual C753 promotes the use of the Simple Index Approach as a method of determining water quality risk management and is generally regarded as the accepted method within the industry.
- 6.1.11. Table 26.2 of the SuDS Manual gives pollution hazard indices for different land use classifications. Tables 26.3 and 26.4 of the SuDS Manual provides typical treatments levels from various different SuDS features discharging to surface water and to ground respectively.
- 6.1.12. To deliver adequate treatment, the selected SuDS components should have a total mitigation index that equals or is greater than the pollution hazard index. Where a single SuDS component is insufficient, additional components in a series would be required, where:

Total SuDS mitigation index = mitigation index₁ + 0.5 (mitigation index₂)

- 6.1.13. A factor of 0.5 is used to account for the reduced performance of secondary or tertiary components associated with already reduced inflow concentrations. In a series of multiple subsequent components, each is halved.
- 6.1.14. The SuDS proposed on the development would provide more than the adequate treatment for the potential pollution hazards generated by the land uses. See attached the Simple Index Approach Calculation sheet in **Appendix I**.

6.2. Foul Drainage

- 6.2.1. A strategy for the discharge of foul water flows from the development has been prepared and is shown in principle on the Indicative Drainage Strategy, attached in **Appendix F**. This indicative drawing aims to demonstrate that the site can be drained, based upon the current development proposals.

6.3. Detailed Design and Approvals

- 6.3.1. The proposed drainage strategy is subject to approval by the LLFA, and the Local Planning Authority.
- 6.3.2. Proposed detailed drainage systems will need to be modelled in Micro Drainage to confirm required pipe sizes and storage volumes.
- 6.3.3. Overland flow routes have been shown on the drainage plan through the development, to identify proposed flow paths for surface water runoff during extreme storm events. Final external levels will be designed to prevent overland flow routes from entering buildings.

7. Potential Sources of Flooding

7.1. Flooding from Rivers or Sea

7.1.1. The EA Indicative Floodplain Map (**FIGURE 1.1**) identifies that the application site is located within Flood Zone 1, land assessed to have a low probability of flooding. The EA Risk of Flooding from Rivers and Seas map is shown in **Error! Reference source not found.**, which identifies that that the site is at very low risk.

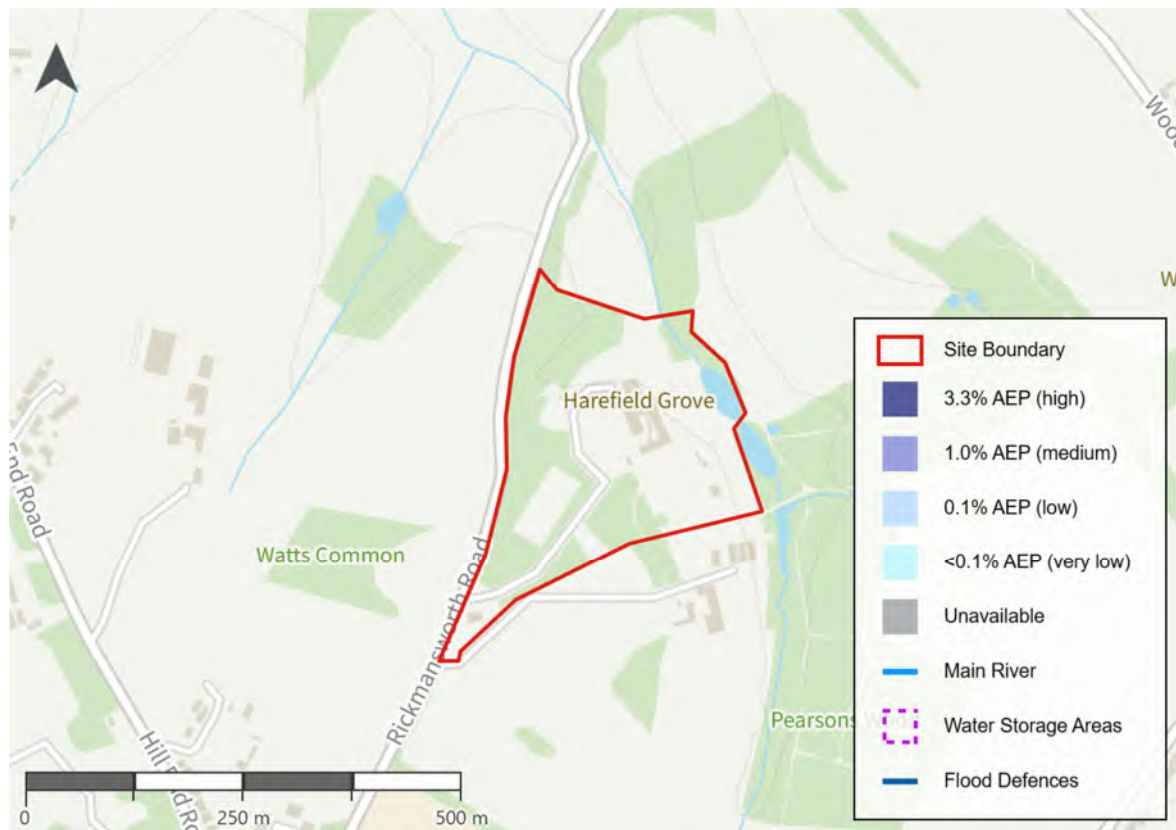


FIGURE 7.1: EA Risk of Flooding from Rivers and Seas Map

7.1.2. Historical fluvial flooding (**FIGURE 7.2**) has not been recorded in the area.



FIGURE 7.2: Historical Flood Extents Map

7.1.3. Based upon the above information, it is considered that the site is at low risk of flooding from fluvial sources.

7.2. Flooding from Land (Surface Water)

7.2.1. Flooding from land occurs when intense rainfall is unable to soak into the ground or enter drainage systems. Local topography and built form can have a strong influence on the direction and depth of flow.

7.2.2. The EA indicative surface water flood map (**FIGURE 7.3**) identifies that the site predominantly has a low risk of surface water flooding. Low risk means that this area has between 0.1% and 1% chance of flooding each year.

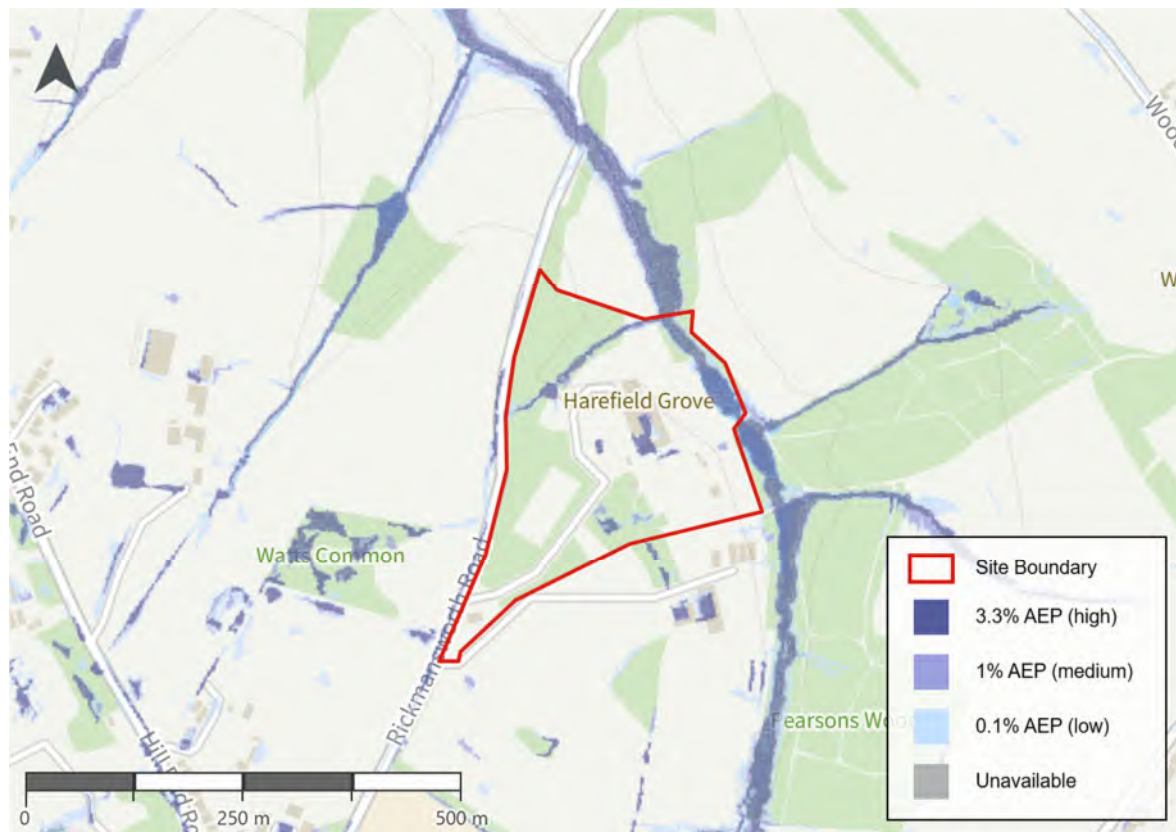


FIGURE 7.3: EA Indicative Surface Water Flood Map

- 7.2.3. There is a low-high surface water flow path extending along the course of the Ordinary Watercourse running with the site boundary to the east and associated with a ditch running through the north of the site. An isolated area associated with the manor house is also considered at high risk of surface water flooding.
- 7.2.4. Overland flow routes will be taken into consideration in the design levels for the proposed development to direct overland flows away from buildings, towards the proposed SuDS features in the lower end of the site.
- 7.2.5. The existing surface water flood risk within the site is primarily confined to the areas within and in the vicinity of watercourses, ponds and water features. There is an area of medium to high risk of surface water flooding within the vicinity of the existing building. Inspection of the topographical survey indicates that this is a local low point, which accumulates within the southern side of the building. Overland flows do not have a route past the building due to its 'U-shaped' design, the proposed development removes the U-shaped building with external levels designed to ensure overland flows would travel away from buildings and towards either the receiving Sustainable Drainage Systems (SuDS) features, or downstream waterbodies.

- 7.2.6. On-site drainage systems have been designed to accommodate runoff volume from a 1 in 100-year storm plus 40% climate change rainfall event, to minimise overland flows except during storms above this event.

7.3. Flooding from Groundwater

- 7.3.1. Groundwater flooding occurs when water levels in the ground rise above surface elevations. Groundwater flooding events are most likely to occur in low lying areas underlain by permeable rocks (aquifers).
- 7.3.2. The SFRA identifies that historical groundwater flooding has not affected the site. The SFRA Susceptibility to Groundwater Flooding map from the West London SFRA identifies that the site is <25% susceptible to groundwater flooding.
- 7.3.3. Based on the SFRA and British Geological Survey (BGS) Groundwater Susceptibility data, it is reasonable to assume that the site is at low risk of groundwater flooding. Overland flow routes will be taken into account in the design of levels for the proposed development to direct overland flows away from buildings.

7.4. Flooding from Sewers

- 7.4.1. A sewer flooding history enquiry has been undertaken with TWU who have identified that they have no historical record of surcharging sewers within the area. A copy of the TWU Sewer Flooding History is provided in **Appendix J**.
- 7.4.2. The SFRA identifies that there is no evidence of historic sewer flooding in the proximity of the site.
- 7.4.3. The development layout will be designed with consideration of flood routing, to ensure that new buildings and occupants of the site will not be subject to detrimental impacts in the event of flooding from infrastructure failure within or upstream of the site.

7.5. Flooding from Reservoirs, Canals and Other Artificial Sources

- 7.5.1. Inspection of the EA flood maps (**FIGURE 7.4**) confirm the site is not at risk of flooding from reservoirs, canals or other artificial sources.

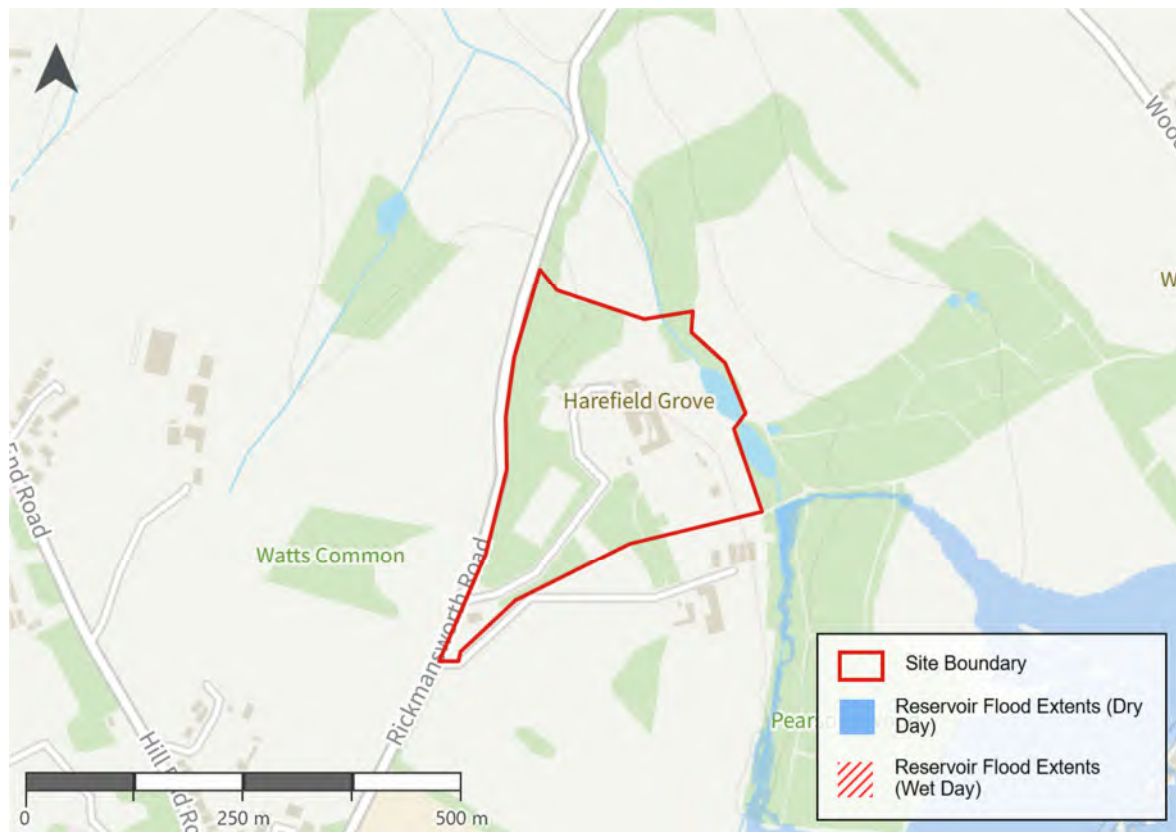


FIGURE 7.4: EA Flooding from Reservoirs, Canals and Other Artificial Sources Map

7.5.2. No other non-natural or artificial sources of flooding where water is retained above natural ground level, operational and redundant industrial processes including mining, quarrying and sand and gravel extraction, would appear to be located in the vicinity of the site which may cause increase floodwater depths or velocities.

8. Summary and Recommendations

- 8.1.1. Stomor Ltd. has been commissioned by Comer Homes Group to prepare a Flood Risk Assessment (FRA) to support the proposed development of Harefield Grove, Rickmansworth Road, Harefield.
- 8.1.2. This document supersedes the previous FRA, dated September 2021, submitted as part of the 2022 proposals.
- 8.1.3. The application site is brownfield, currently comprising an existing manor house, outbuildings with associated access and landscaping, with a total area of 7.48 hectares (ha).
- 8.1.4. Development proposals comprise conversion of the existing manor house and outbuildings into residential apartments, in addition to the demolition and reconstruction of the existing stable block and several new dwellings to provide a total of 41No. residential units.
- 8.1.5. The proposed development would have a NPPF flood risk vulnerability classification of 'More Vulnerable'. The application site is situated within Flood Zone 1, land assessed to have a low probability of flooding.
- 8.1.6. The nearest watercourse to the site is an Ordinary Watercourse that runs through the east side of the site, running from south to north. The nearest, designated as an EA Designated Main River, which is located approximately 1.6km to the west of the site.
- 8.1.7. It is considered that the site would be at predominantly low risk of flooding from surface water, sewers, groundwater, or artificial sources. The Ordinary Watercourse and ditch located within the site are at high risk of flooding from surface water, and isolated areas around the existing manor house are at medium-high risk.
- 8.1.8. The proposed redevelopment results in a reduction of the extent of impermeable area and the surface water drainage strategy demonstrates that the SuDS features provided include sufficient storage to avoid flooding within the site during all storms up to and including the 1 in 100-year storm event + 40% allowance for climate change.
- 8.1.9. Overland flow paths and exceedance routes will be taken into account in design of levels for the proposed development to direct overland flows away from buildings.

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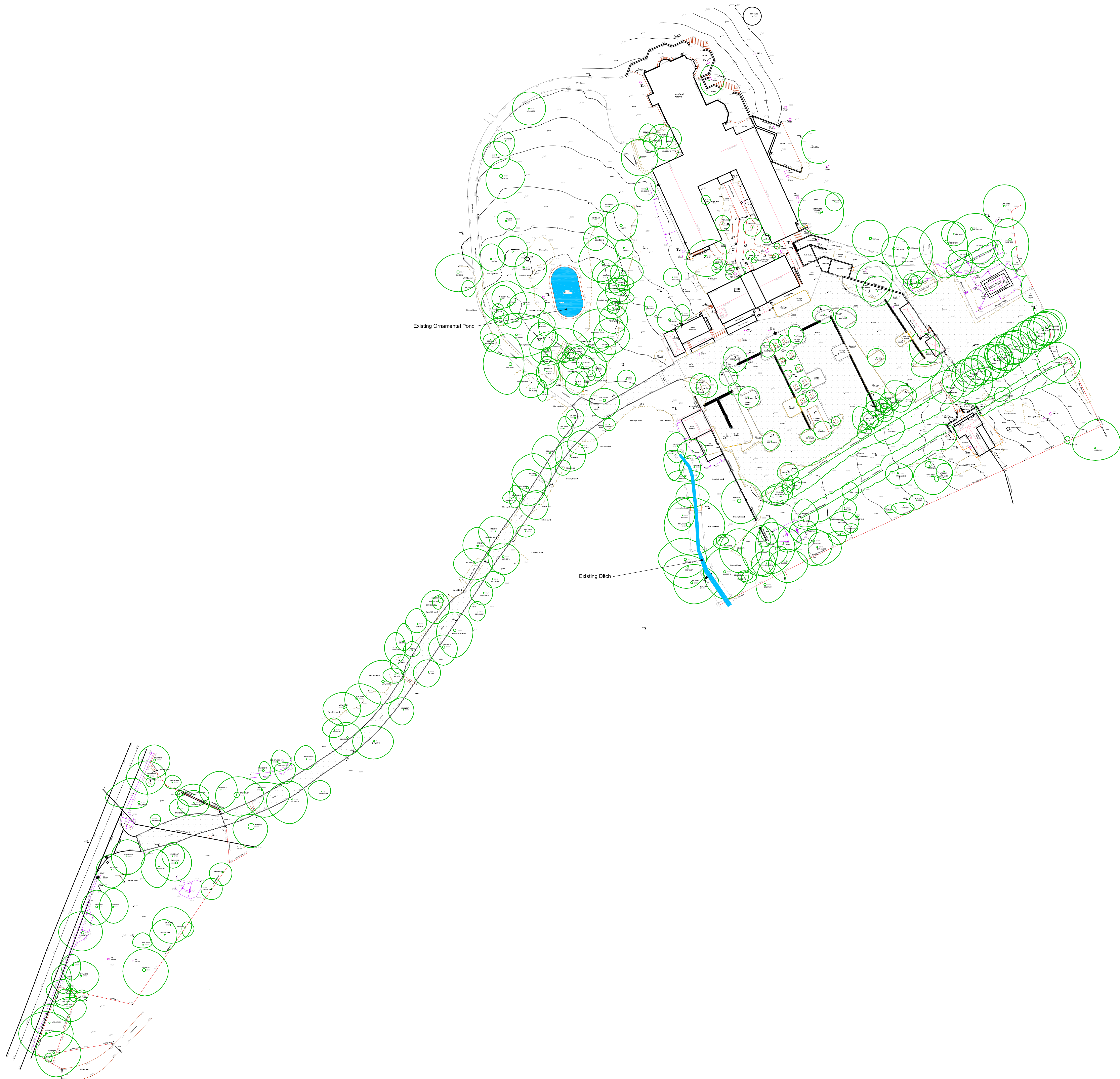
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Existing Impermeable Areas
= 0.40ha
(to be removed as part of
proposed development)

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Client
Comer Homes Ltd

Job Title
Harefield Grove

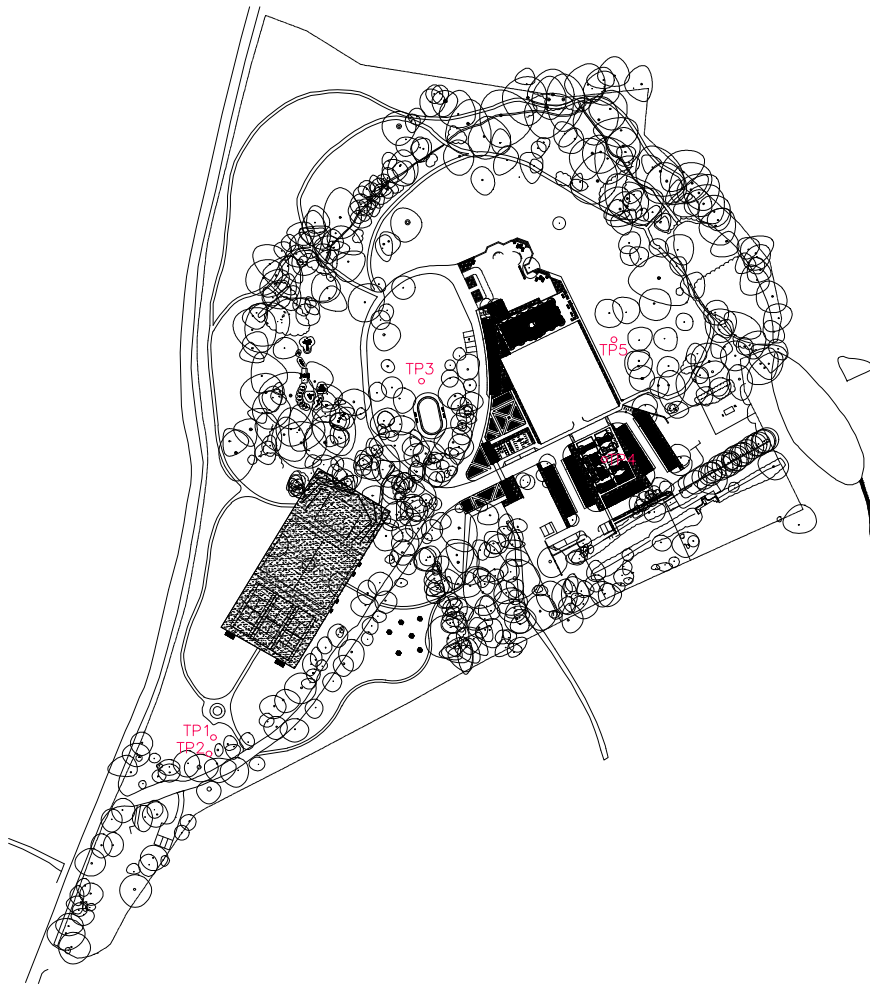
Drawing Title
**Existing Site and
Impermeable Areas**

Designed by: RK	Drawn by: RK	Checked by: DF
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Date 15-06-12	Scale 1:500 @ A0
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Falling Head Permeability Test

Location TP1 – Harefield Grove Infiltration Tests in Accordance with BRE 365

Length of test section 2.0m

Width of test section 2.0m

Depth of test section 2.0m

Test Duration 2mins

Depth of Water at Commencement of Test 0.0m

Permeability $5.41 \times 10^{-3} \text{m/s}$

Time Elapsed (mins)	Depth of Water Top (m)	Time Elapsed (mins)	Depth of Water Top (m)
0.00	0.0	10.00	-
1.00	1.6	15.00	-
2.00	2.0	30.00	-
3.00	-	60.00	-
4.00	-		
5.00	-		

Falling Head Permeability Test

Location TP2 – Harefield Grove Infiltration Tests in Accordance with BRE 365

Length of test section 2.0m

Width of test section 2.0m

Depth of test section 2.0m

Test Duration 2mins

Depth of Water at Commencement of Test 0.0m

Permeability $7.23 \times 10^{-3} \text{m/s}$

Time Elapsed (mins)	Depth of Water Top (m)	Time Elapsed (mins)	Depth of Water Top (m)
0.00	0.0	10.00	-
1.00	1.2	15.00	-
2.00	1.9	30.00	-
3.00	2.0	60.00	-
4.00	-		
5.00	-		

Falling Head Permeability Test

Location TP3 – Harefield Grove Infiltration Tests in Accordance with BRE 365

Length of test section 2.0m

Width of test section 2.0m

Depth of test section 2.0m

Test Duration 2mins

Depth of Water at Commencement of Test 0.0m

Permeability $8.11 \times 10^{-7} \text{m/s}$

Time Elapsed (mins)	Depth of Water Top (m)	Time Elapsed (mins)	Depth of Water Top (m)
0.00	0.0	10.00	0.03
1.00	0.0	15.00	0.09
2.00	0.0	30.00	0.16
3.00	0.0	60.00	0.28
4.00	0.0		
5.00	0.0		

Falling Head Permeability Test

Location TP4 – Harefield Grove Infiltration Tests in Accordance with BRE 365

Length of test section 2.0m

Width of test section 2.0m

Depth of test section 2.0m

Test Duration 2mins

Depth of Water at Commencement of Test 0.0m

Permeability $3.60 \times 10^{-8} \text{m/s}$

Time Elapsed (mins)	Depth of Water Top (m)	Time Elapsed (mins)	Depth of Water Top (m)
0.00	0.0	10.00	0.02
1.00	0.0	15.00	0.03
2.00	0.0	30.00	0.06
3.00	0.0	60.00	0.10
4.00	0.0		
5.00	0.0		

Falling Head Permeability Test

Location TP5 – Harefield Grove Infiltration Tests in Accordance with BRE 365

Length of test section 2.0m

Width of test section 2.0m

Depth of test section 2.0m

Test Duration 60mins

Depth of Water at Commencement of Test 0.0m

Permeability $4.87 \times 10^{-7} \text{m/s}$

Time Elapsed (mins)	Depth of Water Top (m)	Time Elapsed (mins)	Depth of Water Top (m)
0.00	0.0	10.00	0.02
1.00	0.0	15.00	0.02
2.00	0.0	30.00	0.07
3.00	0.0	60.00	0.12
4.00	0.0		
5.00	0.0		



Asset location search



Property Searches

Stomor Ltd
19

HITCHIN
SG4 9SP

Search address supplied Cube Metals Ltd
Harefield Grove
Rickmansworth Road
Harefield
Uxbridge
UB9 6JY

Your reference st-3118

Our reference ALS/ALS Standard/2021_4476564

Search date 28 July 2021

Knowledge of features below the surface is essential for every development

The benefits of this knowledge not only include ensuring due diligence and avoiding risk, but also being able to ascertain the feasibility of any development.

Did you know that Thames Water Property Searches can also provide a variety of utility searches including a more comprehensive view of utility providers' assets (across up to 35-45 different providers), as well as more focused searches relating to specific major utility companies such as National Grid (gas and electric).

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Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13



searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk



0800 009 4540

Search address supplied: Cube Metals Ltd, Harefield Grove, Rickmansworth Road, Harefield, Uxbridge, UB9 6JY

Dear Sir / Madam

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

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

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

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

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

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

Contact Us

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

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

Email: searches@thameswater.co.uk

Web: www.thameswater-propertysearches.co.uk

Waste Water Services

Please provide a copy extract from the public sewer map.

The following quartiles have not been printed as they contain no assets:

TQ0591NE

TQ0591SE

Following examination of our statutory maps, Thames Water has been unable to find any record of public sewerage within this area. However, there may be other sewerage pipework within the area that is not owned by the company. You may be able to obtain records of such pipework from the building control department of your local authority, from property deeds or from neighbouring landowners.

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.

Following examination of our statutory maps, Thames Water has been unable to find any plans of water mains within this area. If you require a connection to the public water supply system, please write to:

New Connections / Diversions
Thames Water
Network Services Business Centre
Brentford
Middlesex
TW8 0EE

Tel: 0845 850 2777

Fax: 0207 713 3858

Email: developer.services@thameswater.co.uk



The following quartiles have not been printed as they are out of Thames' water catchment area. For details of the assets requested please contact the water company indicated below:

TQ0591NE Affinity Water
TQ0591SE Affinity Water

Affinity Water Ltd
Tamblin Way
Hatfield
AL10 9EZ

Tel: 0345 3572401

For your guidance:

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

Payment for this Search

A charge will be added to your suppliers account.

Further contacts:

Waste Water queries

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

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

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

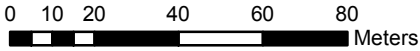
Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

Clean Water queries

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

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

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



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: 1:1792
Width: 500m
Printed By: G1KANAGA
Print Date: 28/07/2021
Map Centre: 505711,191560
Grid Reference: TQ0591NE

Comments:

ALS/ALS Standard/2021_4476564

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

REFERENCE	COVER LEVEL	INVERT LEVEL	REFERENCE	COVER LEVEL	INVERT LEVEL
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[illegible]

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

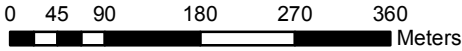
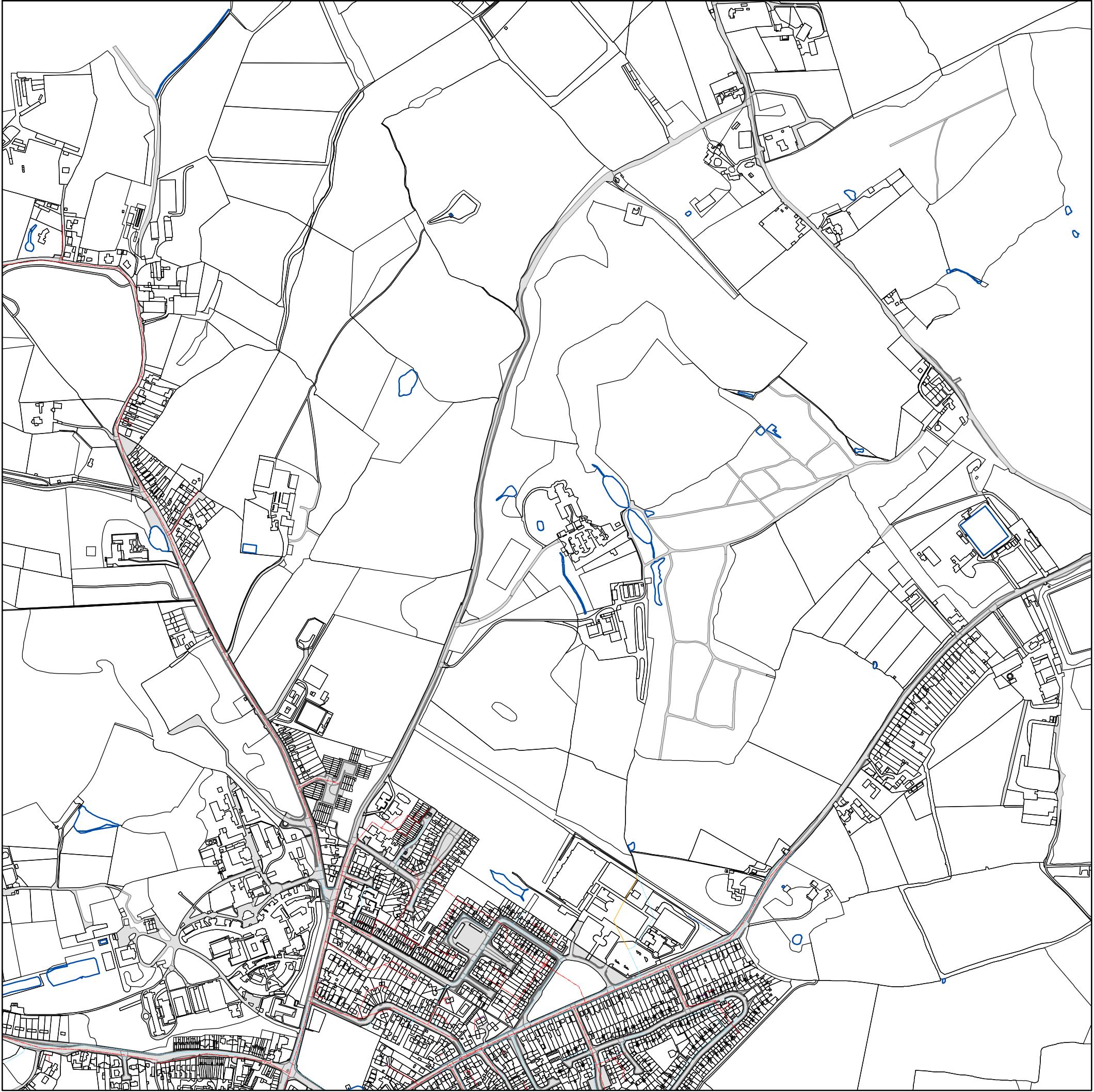
Scale: 1:1792	Comments:
Width: 500m	
Printed By: G1KANAGA	
Print Date: 28/07/2021	
Map Centre: 505250,191250	
Grid Reference: TQ0591SW	

ALS/ALS Standard/2021_4476564

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

REFERENCE	COVER LEVEL	INVERT LEVEL
4006		
401I		
2201	87.2	86.31
3001	88.65	87.28
4004		
4002		
3002		
4003		
2102		
3102		
2104		
401A		
401B		
4001		
401F		

REFERENCE	COVER LEVEL	INVERT LEVEL
4007		
4005		
2103		
0401		
1301	86.87	85.47
1201	87.13	86.03
0402	87.58	85.47
2101	87.63	86.56
3101		
2001	88.04	86.74
401J		
401D		
401C		
401E		
401G		



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Scale: 1:7158
Width: 2000m
Printed By: G1KANAGA
Print Date: 28/07/2021
Map Centre: 505711,191560
Grid Reference: TQ0591NE

Comments:

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 her 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 0800 009 4540 quoting your invoice number starting CBA or ADS / OSS	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.



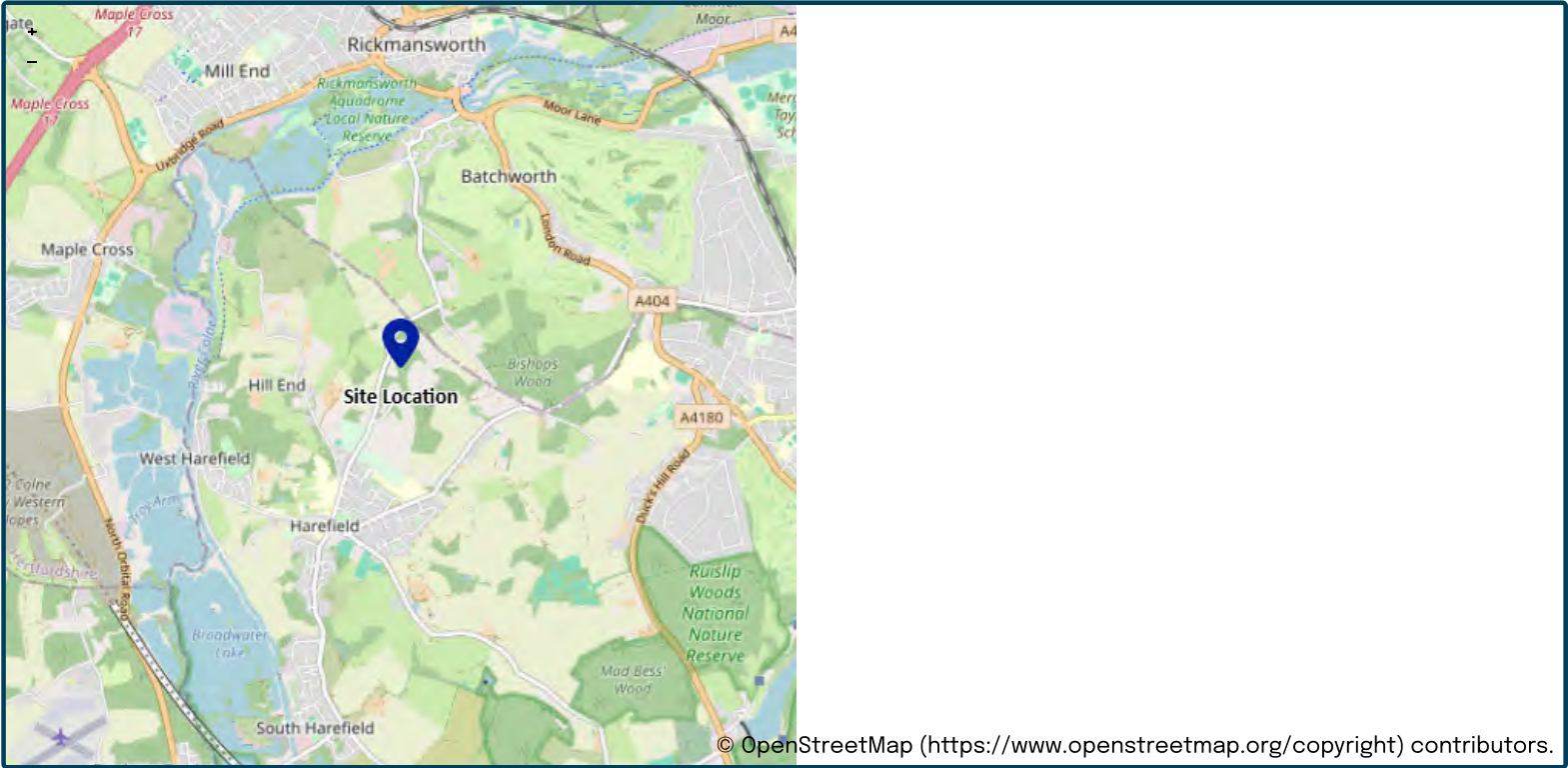
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Project details

Date	29/05/2025
Calculated by	KD
Reference	ST-3783
Model version	2.0.1

Location

Site name	Harefield Grove
Site location	Harefield



Site easting	505774
Site northing	191682

Site details

Total site area (ha)	7.48	ha
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Method By clicking the Accept button, you agree to us doing so.

OK, I AGREE

MORE INFO

Method	IH124		
IH124			
	<u>My value</u>	☐	<u>Map value</u>
SAAR (mm)	673mm		673
How should SPR be derived?	WRAP soil type		
WRAP soil type	4	☐	4
SPR	0.47		
QBar (IH124) (l/s)	34.5l/s		

Growth curve factors

	<u>My value</u>	☐	<u>Map value</u>
Hydrological region	6		6
1 year growth factor	0.85		
2 year growth factor	0.88		
10 year growth factor	1.62		
30 year growth factor	2.3		
100 year growth factor	3.19		
200 year growth factor	3.74		

Results

Method	IH124	
Flow rate 1 year (l/s)	29.3l/s	
Flow rate 2 year (l/s)	30.4l/s	
Flow rate 10 years (l/s)	55.9l/s	
Flow rate 30 years (l/s)	79.3l/s	
Flow rate 100 years (l/s)	110l/s	
Flow rate 200 years (l/s)	129l/s	

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.0.1) developed by HR Wallingford and available at uksuds.com (https://www.uksuds.com/). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at uksuds.com/terms-conditions (https://www.uksuds.com/terms-conditions). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

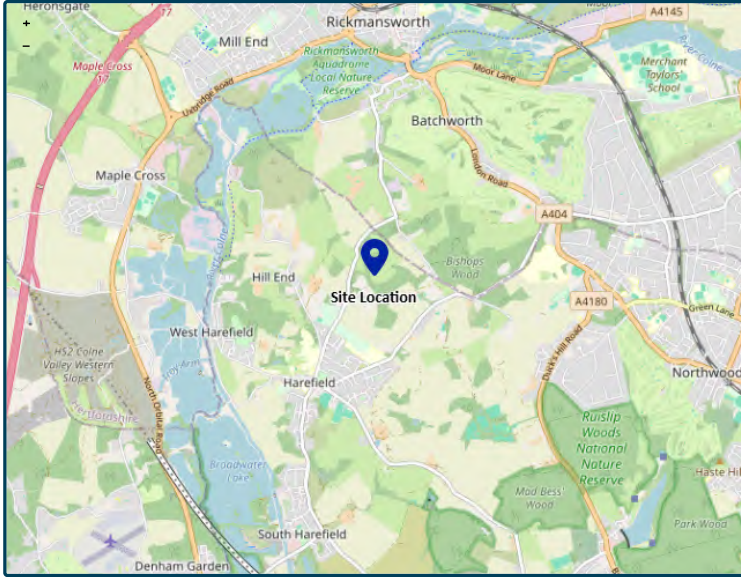
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Project details

Date	30/05/2025
Calculated by	Sam Briscoe
Reference	ST-3783
Model version	2.0.1

Location

Site name	Harefield Grove
Site location	Harefield



© OpenStreetMap (<https://www.openstreetmap.org/copyright>) contributors.

Site easting	505866
Site northing	191559

Site details

Total site area (ha)	.382	ha
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Greenfield runoff

Method

Method	IH124
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IH124

	<u>My value</u>		<u>Map value</u>	
SAAR (mm)	673	mm	☐	673
How should SPR be derived?	WRAP soil type			
WRAP soil type	4		☐	4
SPR	0.47			
QBar (IH124) (l/s)	1.8	l/s		

Growth curve factors

	<u>My value</u>		<u>Map value</u>	
Hydrological region	6		☐	6
1 year growth factor	0.85			
2 year growth factor	0.88			
10 year growth factor	1.62			
30 year growth factor	2.3			
100 year growth factor	3.19			
200 year growth factor	3.74			

Results

Method	IH124	
Flow rate 1 year (l/s)	1.5	l/s
Flow rate 2 year (l/s)	1.6	l/s
Flow rate 10 years (l/s)	2.9	l/s
Flow rate 30 years (l/s)	4.1	l/s
Flow rate 100 years (l/s)	5.6	l/s
Flow rate 200 years (l/s)	6.6	l/s

Disclaimer

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	ST 3783
Project Name	Harefield Grove, Rickmansworth Rd
Date	May-25

Brownfield Runoff Calculation

Based upon the Modified Rational Method

$$Q = C \times A_p \times r$$

Q = Flow Rate in litres/second

C = Dimensionless Runoff Coefficient of 2.78

A_p = Impermeable Drained Area (ha)

r = Rainfall Intensity Rate in mm/hour; Storm Duration 6 minutes

r (1 in 1 year) 50 mm/hr

r (1 in 30 year) 126 mm/hr

r (1 in 100 year) 152 mm/hr

Brownfield Runoff Rate:

1 in 1 year $Q = 101.47$ l/s

1 in 30 year $Q = 255.7$ l/s

1 in 100 year $Q = 308.47$ l/s





Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	0.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Width (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
S8	0.038	5.00	82.637	1200		505781.525	191554.213	1.650	80.987
S9	0.019	5.00	81.523	1350		505806.739	191568.845	1.350	80.173
S10	0.055	5.00	81.596	1200		505791.739	191594.336	1.916	79.680
S2	0.024	5.00	83.157	1200		505737.058	191576.954	1.513	81.644
S3	0.025	5.00	82.338	1200		505756.998	191576.257	1.350	80.988
S4	0.009	5.00	82.135	1200		505752.951	191584.632	1.350	80.785
S6			81.584	1200		505768.113	191591.956	1.500	80.084
S11			81.596	1200		505785.713	191600.342	2.346	79.250
S14	0.142	5.00	78.193	900	675	505767.205	191643.037	1.058	77.135
S16			77.964	1350		505770.581	191653.762	1.488	76.476
S17			76.650	1350		505779.672	191659.250	0.996	75.654
S22	0.009	5.00	80.325	1200		505710.413	191675.104	1.500	78.825
S23	0.040	5.00	79.070	1200		505742.010	191688.240	1.500	77.570
S18			75.921	1350		505774.333	191684.922	1.500	74.421
S21			72.040			505783.779	191722.037	1.850	70.190

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S8	S9	29.152	0.600	80.987	80.177	0.810	36.0	150	5.29	0.0
1.001	S9	S10	29.576	0.600	80.173	79.680	0.493	60.0	150	5.67	0.0
1.002	S10	S11	8.508	0.600	79.680	79.617	0.063	135.0	225	5.79	0.0
2.000	S2	S4	17.651	0.600	81.644	80.785	0.859	20.5	150	5.13	0.0
3.000	S3	S4	9.301	0.600	80.988	80.785	0.203	45.8	150	5.10	0.0
2.001	S4	S6	16.838	0.600	80.785	80.234	0.551	30.6	150	5.29	0.0
2.002	S6	S11	19.496	0.600	80.084	79.467	0.617	31.6	225	5.42	0.0
1.003	S11	S14	46.535	0.600	79.250	77.135	2.115	22.0	300	6.02	0.0
1.004	S14	S16	11.243	0.600	77.135	76.476	0.659	17.1	375	6.07	0.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	1.683	29.7	0.0	1.500	1.196	0.038	0.0
1.001	1.301	23.0	0.0	1.200	1.766	0.057	0.0
1.002	1.123	44.7	0.0	1.691	1.754	0.112	0.0
2.000	2.231	39.4	0.0	1.363	1.200	0.024	0.0
3.000	1.490	26.3	0.0	1.200	1.200	0.025	0.0
2.001	1.827	32.3	0.0	1.200	1.200	0.058	0.0
2.002	2.335	92.9	0.0	1.275	1.904	0.058	0.0
1.003	3.366	237.9	0.0	2.046	0.758	0.170	0.0
1.004	4.404	486.4	0.0	0.683	1.113	0.312	0.0

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.005	S16	S17	10.619	0.600	76.476	75.654	0.822	12.9	375	6.10	0.0
1.006	S17	S18	26.221	0.600	75.654	74.920	0.734	35.7	375	6.25	0.0
4.000	S22	S23	34.218	0.600	78.825	77.570	1.255	27.3	225	5.23	0.0
4.001	S23	S18	32.493	0.600	77.570	74.921	2.649	12.3	300	5.35	0.0
1.007	S18	S21	38.298	0.600	74.421	70.190	4.231	9.1	300	6.37	0.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.005	5.063	559.2	0.0	1.113	0.621	0.312	0.0
1.006	3.040	335.7	0.0	0.621	0.626	0.312	0.0
4.000	2.515	100.0	0.0	1.275	1.275	0.009	0.0
4.001	4.512	319.0	0.0	1.200	0.700	0.049	0.0
1.007	5.255	371.4	0.0	1.200	1.550	0.361	0.0

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	29.152	36.0	150	1 STANDARD	82.637	80.987	1.500	81.523	80.177	1.196
1.001	29.576	60.0	150	1 STANDARD	81.523	80.173	1.200	81.596	79.680	1.766
1.002	8.508	135.0	225	1 STANDARD	81.596	79.680	1.691	81.596	79.617	1.754
2.000	17.651	20.5	150	1 STANDARD	83.157	81.644	1.363	82.135	80.785	1.200
3.000	9.301	45.8	150	1 STANDARD	82.338	80.988	1.200	82.135	80.785	1.200
2.001	16.838	30.6	150	1 STANDARD	82.135	80.785	1.200	81.584	80.234	1.200
2.002	19.496	31.6	225	1 STANDARD	81.584	80.084	1.275	81.596	79.467	1.904
1.003	46.535	22.0	300	1 STANDARD	81.596	79.250	2.046	78.193	77.135	0.758
1.004	11.243	17.1	375	1 STANDARD	78.193	77.135	0.683	77.964	76.476	1.113
1.005	10.619	12.9	375	1 STANDARD	77.964	76.476	1.113	76.650	75.654	0.621
1.006	26.221	35.7	375	1 STANDARD	76.650	75.654	0.621	75.921	74.920	0.626
4.000	34.218	27.3	225	1 STANDARD	80.325	78.825	1.275	79.070	77.570	1.275
4.001	32.493	12.3	300	1 STANDARD	79.070	77.570	1.200	75.921	74.921	0.700
1.007	38.298	9.1	300	1 STANDARD	75.921	74.421	1.200	72.040	70.190	1.550

Link	US Node	Dia (mm)	Width (mm)	Node Type	MH Type	DS Node	Dia (mm)	Width (mm)	Node Type	MH Type
1.000	S8	1200		Manhole	1 STANDARD	S9	1350		Manhole	1 STANDARD
1.001	S9	1350		Manhole	1 STANDARD	S10	1200		Manhole	1 STANDARD
1.002	S10	1200		Manhole	1 STANDARD	S11	1200		Manhole	1 STANDARD
2.000	S2	1200		Manhole	1 STANDARD	S4	1200		Manhole	1 STANDARD
3.000	S3	1200		Manhole	1 STANDARD	S4	1200		Manhole	1 STANDARD
2.001	S4	1200		Manhole	1 STANDARD	S6	1200		Manhole	1 STANDARD
2.002	S6	1200		Manhole	1 STANDARD	S11	1200		Manhole	1 STANDARD
1.003	S11	1200		Manhole	1 STANDARD	S14	900	675	Manhole	1 STANDARD
1.004	S14	900	675	Manhole	1 STANDARD	S16	1350		Manhole	1 STANDARD
1.005	S16	1350		Manhole	1 STANDARD	S17	1350		Manhole	1 STANDARD
1.006	S17	1350		Manhole	1 STANDARD	S18	1350		Manhole	1 STANDARD
4.000	S22	1200		Manhole	1 STANDARD	S23	1200		Manhole	1 STANDARD
4.001	S23	1200		Manhole	1 STANDARD	S18	1350		Manhole	1 STANDARD
1.007	S18	1350		Manhole	1 STANDARD	S21			Manhole	1 STANDARD

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	1500	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		

Storm Durations

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

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

Node S18 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	74.421	Product Number	CTL-SHE-0052-1500-1500-1500
Design Depth (m)	1.500	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	1.5	Min Node Diameter (mm)	1200

Node S18 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	74.421
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	130.0	0.0	1.500	535.0	0.0

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

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	S8	18	81.032	0.045	5.7	0.0504	0.0000	OK
30 minute summer	S9	18	80.236	0.063	8.6	0.0907	0.0000	OK
30 minute summer	S10	18	79.784	0.104	16.9	0.1177	0.0000	OK
30 minute summer	S2	18	81.675	0.031	3.6	0.0347	0.0000	OK
30 minute summer	S3	18	81.027	0.039	3.8	0.0436	0.0000	OK
30 minute summer	S4	18	80.840	0.055	8.8	0.0626	0.0000	OK
30 minute summer	S6	18	80.132	0.048	8.8	0.0541	0.0000	OK
30 minute summer	S11	18	79.316	0.066	25.6	0.0745	0.0000	OK
30 minute summer	S14	18	77.221	0.085	46.9	0.0520	0.0000	OK
30 minute summer	S16	18	76.550	0.074	46.8	0.1065	0.0000	OK
30 minute summer	S17	18	75.752	0.098	46.7	0.1399	0.0000	OK
30 minute summer	S22	18	78.844	0.019	1.4	0.0211	0.0000	OK
30 minute summer	S23	18	77.602	0.032	7.4	0.0360	0.0000	OK
480 minute winter	S18	472	74.842	0.421	8.9	79.1551	0.0000	SURCHARGED
60 minute summer	S21	57	70.202	0.012	1.1	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	S8	1.000	S9	5.7	1.058	0.192	0.1583	
30 minute summer	S9	1.001	S10	8.6	0.849	0.373	0.2975	
30 minute summer	S10	1.002	S11	16.8	0.995	0.377	0.1439	
30 minute summer	S2	2.000	S4	3.6	0.872	0.091	0.0749	
30 minute summer	S3	3.000	S4	3.8	0.812	0.144	0.0441	
30 minute summer	S4	2.001	S6	8.8	1.524	0.272	0.0971	
30 minute summer	S6	2.002	S11	8.8	1.454	0.094	0.1175	
30 minute summer	S11	1.003	S14	25.5	1.839	0.107	0.6504	
30 minute summer	S14	1.004	S16	46.8	2.729	0.096	0.1930	
30 minute summer	S16	1.005	S17	46.7	2.453	0.084	0.2032	
30 minute summer	S17	1.006	S18	46.4	2.105	0.138	0.5780	
30 minute summer	S22	4.000	S23	1.4	0.576	0.014	0.0849	
30 minute summer	S23	4.001	S18	7.4	1.875	0.023	0.1278	
480 minute winter	S18	1.007	S21	1.1	1.181	0.003	0.0352	99.4

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	S8	18	81.067	0.080	16.5	0.0902	0.0000	OK
30 minute summer	S9	19	80.457	0.284	24.7	0.4063	0.0000	SURCHARGED
30 minute summer	S10	18	79.899	0.219	45.4	0.2479	0.0000	OK
30 minute summer	S2	18	81.697	0.053	10.4	0.0595	0.0000	OK
30 minute summer	S3	18	81.058	0.070	10.8	0.0791	0.0000	OK
30 minute summer	S4	18	80.892	0.107	25.1	0.1214	0.0000	OK
30 minute summer	S6	18	80.168	0.084	25.1	0.0945	0.0000	OK
30 minute summer	S11	18	79.361	0.110	70.1	0.1250	0.0000	OK
30 minute summer	S14	18	77.288	0.153	131.4	0.0931	0.0000	OK
30 minute summer	S16	18	76.610	0.134	131.1	0.1913	0.0000	OK
30 minute summer	S17	18	75.829	0.175	131.0	0.2506	0.0000	OK
30 minute summer	S22	18	78.855	0.030	3.9	0.0343	0.0000	OK
30 minute summer	S23	18	77.623	0.053	21.2	0.0601	0.0000	OK
720 minute winter	S18	705	75.221	0.800	13.4	191.4995	0.0000	SURCHARGED
720 minute winter	S21	705	70.202	0.012	1.1	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	S8	1.000	S9	16.5	1.290	0.555	0.3953	
30 minute summer	S9	1.001	S10	22.7	1.287	0.986	0.5207	
30 minute summer	S10	1.002	S11	45.1	1.216	1.009	0.3108	
30 minute summer	S2	2.000	S4	10.4	1.103	0.264	0.1677	
30 minute summer	S3	3.000	S4	10.8	1.005	0.410	0.1001	
30 minute summer	S4	2.001	S6	25.1	1.939	0.777	0.2177	
30 minute summer	S6	2.002	S11	25.1	1.934	0.270	0.2527	
30 minute summer	S11	1.003	S14	69.9	2.378	0.294	1.3889	
30 minute summer	S14	1.004	S16	131.1	3.387	0.270	0.4356	
30 minute summer	S16	1.005	S17	131.0	3.065	0.234	0.4547	
30 minute summer	S17	1.006	S18	130.5	2.741	0.389	1.2493	
30 minute summer	S22	4.000	S23	3.9	0.771	0.039	0.1766	
30 minute summer	S23	4.001	S18	21.2	2.559	0.066	0.2691	
720 minute winter	S18	1.007	S21	1.1	1.193	0.003	0.0361	131.8

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.80%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	S8	19	82.167	1.180	29.9	1.3341	0.0000	SURCHARGED
30 minute summer	S9	20	81.517	1.344	38.9	1.9236	0.0000	FLOOD RISK
30 minute summer	S10	18	80.112	0.432	76.4	0.4885	0.0000	SURCHARGED
30 minute summer	S2	18	81.731	0.087	18.9	0.0982	0.0000	OK
30 minute summer	S3	19	81.552	0.564	19.6	0.6375	0.0000	SURCHARGED
30 minute summer	S4	19	81.429	0.643	42.7	0.7278	0.0000	SURCHARGED
30 minute summer	S6	19	80.195	0.111	40.9	0.1258	0.0000	OK
30 minute summer	S11	19	79.397	0.147	116.2	0.1659	0.0000	OK
30 minute summer	S14	18	77.352	0.217	226.0	0.1320	0.0000	OK
30 minute summer	S16	18	76.666	0.190	225.3	0.2715	0.0000	OK
30 minute summer	S17	18	75.905	0.251	225.0	0.3592	0.0000	OK
30 minute summer	S22	18	78.866	0.040	7.1	0.0458	0.0000	OK
30 minute summer	S23	18	77.642	0.072	38.5	0.0814	0.0000	OK
960 minute winter	S18	945	75.661	1.240	19.1	370.4974	0.0000	FLOOD RISK
960 minute winter	S21	945	70.203	0.013	1.4	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	S8	1.000	S9	24.8	1.411	0.835	0.5132	
30 minute summer	S9	1.001	S10	36.6	2.077	1.591	0.5207	
30 minute summer	S10	1.002	S11	76.0	1.911	1.702	0.3345	
30 minute summer	S2	2.000	S4	18.6	1.206	0.471	0.2486	
30 minute summer	S3	3.000	S4	17.6	1.044	0.667	0.1637	
30 minute summer	S4	2.001	S6	40.9	2.324	1.267	0.2964	
30 minute summer	S6	2.002	S11	40.8	2.181	0.440	0.3649	
30 minute summer	S11	1.003	S14	116.3	2.728	0.489	2.0573	
30 minute summer	S14	1.004	S16	225.3	3.693	0.463	0.6859	
30 minute summer	S16	1.005	S17	225.0	3.342	0.402	0.7131	
30 minute summer	S17	1.006	S18	223.8	3.076	0.667	1.9093	
30 minute summer	S22	4.000	S23	7.1	0.918	0.071	0.2696	
30 minute summer	S23	4.001	S18	38.5	3.033	0.121	1.0355	
960 minute winter	S18	1.007	S21	1.4	1.260	0.004	0.0417	179.4



Fact Sheet:

Maintenance of Drainage Features

The design process should consider the maintenance of the components (access, waste management etc.) including any corrective maintenance to repair defects or improve performance of SuDS. Inlets, outlets, control structures or other below ground features should be as shallow as reasonably possible to allow easy access for maintenance and to reduce safety risks, while ensuring that sufficient depth is maintained for structural stability.

A SuDS Management Plan must be provided prior to the first occupation which will identify the following:

- The function of SuDS;
- How and why it works on the site;
- Impacts on amenity and wildlife, indicating how they can be enhanced;
- Health and safety issues;
- Long-term expectations for the SuDS on site.

Usually, SuDS components are on or near the surface and most can be managed using landscape maintenance techniques. Typical inspection and maintenance requirements for surface SuDS features are identified below:



Activity	Indicative frequency	Typical tasks
Routine/regular maintenance	Monthly (for normal care of SuDS)	• litter picking • grass cutting (cuttings to compost, wildlife piles or removed from site) Height and frequency dependent upon amenity of grass area. • inspection of inlets, outlets and control structures.
Occasional maintenance	Annually (dependent on the design)	• silt control around components • vegetation management around components • suction sweeping of permeable paving in autumn after leaf fall • silt and debris removal from inlets, outlets, gratings, catchpits, control chambers, soakaways and cellular storage. • trim wet swale or pond edges in September to October or 3-year rotation for wildlife value • wetland vegetation to be cut to 30% height annually and to 100mm on a 3-year rotation • remove overhanging trees or growth within SuDS features
Remedial maintenance	As required (tasks to repair problems due to damage or vandalism)	• inlet/outlet repair • erosion repairs • reinstatement of edgings • reinstatement following pollution • removal of silt build-up.

For below-ground SuDS such as permeable paving, the manufacturer or designer should provide maintenance advice. This should include routine and long-term actions that can be incorporated into the SuDS Management Plan.

Funding for the maintenance of SuDS systems on the site should be resolved at the start of the development process.





SUMMARY TABLE		DESIGN CONDITIONS			
		1	2	3	4
Land Use Type Pollution Hazard Level Pollution Hazard Indices TSS Metals Hydrocarbons	Low traffic roads (e.g. residential roads and general access roads, < 300 traffic movements/day) Low 0.5 0.4 0.4				
SuDS components proposed					
Component 1	Pervious pavement (where the pavement is not designed as an infiltration component)	SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B	SuDS components can only be assumed to deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters of the SuDS Manual. See also checklists in Appendix B	Detention basins should be designed to ensure the effective retention and management of sediment, such that the sediment will not be re-suspended and washed out in subsequent events	
Component 2	Detention basin				
Component 3	None				
SuDS Pollution Mitigation Indices TSS Metals Hydrocarbons	0.95 0.85 >0.95				
Groundwater protection type Groundwater protection Pollution Mitigation Indices TSS Metals Hydrocarbons	None 0 0 0				
Combined Pollution Mitigation Indices TSS Metals Hydrocarbons Acceptability of Pollution Mitigation TSS Metals Hydrocarbons	0.95 0.85 >0.95 Sufficient Sufficient Sufficient	Note: In order to meet both Water Quality criteria set out in the SuDS Manual (Chapter 4), Interception should be delivered for all impermeable areas wherever possible. Interception delivery and treatment may be met by the same components, but Interception requires separate evaluation.	Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see Chapter 7 The SuDS design process). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies such as Natural England		



Sewer Flooding

History Enquiry



Property
Searches

Stomor Ltd

Search address supplied Cube Metals Ltd
Harefield Grove
Rickmansworth Road
Harefield
Uxbridge
UB9 6JY

Your reference st-3118

Our reference SFH/SFH Standard/2021_4476565

Received date 28 July 2021

Search date 28 July 2021



Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13



searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk



0800 009 4540

Sewer Flooding

History Enquiry



Property
Searches

Search address supplied: Cube Metals Ltd, Harefield Grove, Rickmansworth Road, Harefield, Uxbridge, UB9 6JY

This search is recommended to check for any sewer flooding in a specific address or area

TWUL, trading as Property Searches, are responsible in respect of the following:-

- (i) any negligent or incorrect entry in the records searched;
- (ii) any negligent or incorrect interpretation of the records searched;
- (iii) and any negligent or incorrect recording of that interpretation in the search report
- (iv) compensation payments



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searches@thameswater.co.uk
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0800 009 4540

History of Sewer Flooding

Is the requested address or area at risk of flooding due to overloaded public sewers?

The flooding records held by Thames Water indicate that there have been no incidents of flooding in the requested area as a result of surcharging public sewers.

For your guidance:

- A sewer is “overloaded” when the flow from a storm is unable to pass through it due to a permanent problem (e.g. flat gradient, small diameter). Flooding as a result of temporary problems such as blockages, siltation, collapses and equipment or operational failures are excluded.
- “Internal flooding” from public sewers is defined as flooding, which enters a building or passes below a suspended floor. For reporting purposes, buildings are restricted to those normally occupied and used for residential, public, commercial, business or industrial purposes.
- “At Risk” properties are those that the water company is required to include in the Regulatory Register that is presented annually to the Director General of Water Services. These are defined as properties that have suffered, or are likely to suffer, internal flooding from public foul, combined or surface water sewers due to overloading of the sewerage system more frequently than the relevant reference period (either once or twice in ten years) as determined by the Company’s reporting procedure.
- Flooding as a result of storm events proven to be exceptional and beyond the reference period of one in ten years are not included on the At Risk Register.
- Properties may be at risk of flooding but not included on the Register where flooding incidents have not been reported to the Company.
- Public Sewers are defined as those for which the Company holds statutory responsibility under the Water Industry Act 1991.
- It should be noted that flooding can occur from private sewers and drains which are not the responsibility of the Company. This report excludes flooding from private sewers and drains and the Company makes no comment upon this matter.
- For further information please contact Thames Water on Tel: 0800 316 9800 or website www.thameswater.co.uk



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