**Weetwood Services Ltd (London)**
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Weetwood
Development • Planning • Environment

# Proposed Residential Development

## 67 Dartmouth Road, Ruislip

## Technical Note – Discharge of Planning Condition 7

| | |
|---|---|
| **Project ref:** | 3766 |
| **Prepared by:** | Holly Nicholson MEng GMICE *Graduate Engineer* |
| | Geoff Waite BSc CEng C.WEM MICE MCIWEM *Consultant* |
| **Approved by:** | Geoff Waite BSc CEng C.WEM MICE MCIWEM *Consultant* |
| **Date:** | 6 January 2021 |
| **Version:** | Final v2.0 |



### Introduction

1. This Technical Note has been prepared by Weetwood Services Ltd ('Weetwood') on behalf of G. Lisi Developments Ltd.

2. A detailed planning application (reference 30058/APP/2019/2106) for a part first floor, part two storey side/rear extension to allow for conversion of existing two storey dwelling into two 2-bed dwellings with associated parking and amenity space, involving demolition of existing detached garage, was approved by The Council of the London Borough of Hillingdon on 23 August 2019.

3. Planning Condition 7 of the permission states:

   *Within one month of commencement of works, a scheme for the provision of sustainable water management has been submitted to and approved in writing by the Local Planning Authority. The scheme shall clearly demonstrate that sustainable drainage systems (SUDS) have been incorporated into the designs of the development in accordance with the hierarchy set out in accordance with Policy 5.15 of the London Plan and will:*

   *i. provide information on all SuDs features including the method employed to delay and control the surface water discharged from the site and:*

   *ii. provide a management and maintenance plan for the lifetime of the development of arrangements to secure the operation of the scheme throughout its lifetime. Including appropriate details of Inspection regimes, appropriate performance specification. The scheme should also demonstrate the use of methods to minimise the use of potable water through water collection, reuse and recycling and will:*

   *iii. provide details of water collection facilities to capture excess rainwater; and how rain and grey water will be recycled and reused in the development.*

   *Thereafter the development shall be implemented and retained/maintained in accordance with these details for as long as the development remains in existence.*

   *REASON*

   *To ensure the development does not increase the risk of flooding in accordance with Policy OE8 Hillingdon Local Plan: Part Two Saved UDP Policies (November 2012) and London Plan (2016) Policy 5.12.*

4. An application to discharge Condition 7 was rejected by the London Borough of Hillingdon on 29 September 2020. The application was accompanied by a Technical Note from Weetwood[1].

5. The drainage design has subsequently been amended in line with the drainage officer's comments confirming the reasons for objection. This Technical Note (v2.0) presents the updated drainage strategy and has been written to accompany a new application to discharge planning condition 7.

## Site Details

6. The approximately 0.05 ha site is located at the junction of Dartmouth Road and Cottingham Chase, Ruislip (see Error! Reference source not found.). The Ordnance Survey National Grid Reference of the site is TQ 104 861.

7. The development proposals are for the extension of the existing property and conversion into two separate dwellings (see **Annex 1** for the existing and proposed site layouts).

8. There are two waterbodies in the vicinity of the site. The Western Arm of Yeading Brook is located approximately 90m to the south of the site. It flows in a south easterly direction and is classified as a 'main river'.

9. Drain A is located approximately 135m to the west of the site and flows in a southerly direction to outfall into Yeading Brook. Drain A is classified as an 'ordinary watercourse'.

10. According to the Soilscapes maps produced by the National Soils Research Institute[2], soil conditions at the site and within the surrounding area are described as 'Slowly permeable seasonally wet loamy and clayey soils'.

11. The British Geological Survey (BGS) borehole records[3] for boreholes located approximately 600m west, 570m south west and 500m south of the site show the ground conditions to be comprised of an initial layer of made ground followed by a mixture of firm and stiff clays. Ground water level were encountered at 9.70m and 7.0m below ground.

12. BGS surface geology mapping[4] indicates the deposits underlying the site to be clay, silt and sand of the Lambeth Group.

13. A topographic survey of the site was carried out by SESE Ltd in February 2016. Site levels lie between 37.845 m Above Ordnance Datum (m AOD) in the north of the site and reduce to 37.021 m AOD at the south of the site. The topographic survey is provided in **Annex 2**.

14. According to the London Borough of Hillingdon `Flood and Water Information Map', the site does not lie in a Critical Drainage Area.

## Planning Policy

15. The London Borough of Hillingdon Local Plan Part 2 (Development Management Policies) was adopted on 16 January 2020. Policy DMEI 10 refers to Water Management, Efficiency and Quality. There are a number of sub-policies within this category although not all are relevant to conversions, change of use and refurbishment.

16. Sub-policy A relates to new build developments and is not relevant for this site. Sub-policy B relates to critical drainage areas and is also not relevant for this site. Sub-policy C relates to raingardens and non-householder development; as no rain gardens are proposed, and as this is a householder development, this policy is not relevant. In addition sub-policy I relates only to major development. Sub-policies G and H relate to potable water usage. The remaining sub-policies are relevant and are as follows:

*D) Schemes for the use of SuDS must be accompanied by adequate arrangements for the management and maintenance of the measures used, with appropriate contributions made to the Council where necessary.*

1 Weetwood reference 3766/TN/Final/v1.0/2020-07-16

2 Soilscapes www.landis.org.uk/soilscapes/

3 www.bgs.ac.uk/data/boreholescans/home.html, Ref: TQ08NE90, TQ18NW58, TQ18NW135

4 http://mapapps.bgs.ac.uk/geologyofbritain/home.html

*E) Proposals that would fail to make adequate provision for the control and reduction of surface water runoff rates will be refused.*

*F) Developments should be drained by SuDS system and must include appropriate methods to avoid pollution of the water environment. Preference should be given to utilising the drainage options in the SuDS hierarchy which remove the key pollutants that hinder improving water quality in Hillingdon. Major development should adopt a `treatment train' approach where water flows through different SuDS to ensure resilience in the system.*

*J) All new development proposals will be required to demonstrate that there is sufficient capacity in the water and wastewater infrastructure network to support the proposed development. Where there is a capacity constraint the local planning authority will require the developer to provide a detailed water and/or drainage strategy to inform what infrastructure is required, where, when and how it will be delivered.*

17. Policy 5.12 of the London Plan (2016) relates to flood risk management. This policy is not directly relevant to this site which lies in Flood Zone 1. Policy 5.13 relating to sustainable drainage, however, is relevant for the site. The policy states:

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

*1 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.*

*Drainage should be designed and implemented in ways that deliver other policy objectives of this Plan, including water use efficiency and quality, biodiversity, amenity and recreation.*

### Planning History of Condition 7

18. The London Borough of Hillingdon Council (LBHC) rejected the initial application to discharge Condition 7 on 29 September 2020. The drainage officer's report recommended refusing to discharge Condition 7 based on the following reasons:

*"The Council's Flood Risk Officer has raised an objection advising that the proposed discharge rate is not the greenfield run off rate for the site, contrary to Policy DMEI 10 of the Hillingdon Local Plan: Part Two - Development Management Policies (2020) and Policy 5.13 of the London Plan (2016). Also, the Council's Flood Risk Officer has commented that the attenuation storage tank is the least sustainable solution. Instead, the use of rain gardens and/ or permeable paving is encouraged, which would reduce the size of any attenuation tank needed."*

19. Further information was sought from the drainage officer who made the following comments[5]:

- *Storage should be provided in the subbase [of permeable paving] as this is more sustainable (provides water quality improvements)*
- *The proposed runoff rates were also not policy compliant as they were greater than greenfield rates and much higher than would be expected for a development of this size*

[5] Email from Nesha Burnham, Planning Officer, to Weetwood on 5 November 2020, quoting comments from the drainage officer

- *The way to overcome the objection is to reduce runoff rates to more acceptable levels (circa 1l/s as previously suggested) and explore alternative storage options (rain garden and permeable paving subbase) before deciding on tanked storage in line with planning policy and drainage guidance.*

20. Weetwood contacted the LBHC requesting clarification on the discharge rate being 'contrary to Policy DMEI10'. As explained in **Paragraphs 15 and 16**, only sub-policies D, E, F and J are relevant to drainage at the site. None of these relate to greenfield runoff rate. LBHC did not provide a valid reason why the site should adhere to greenfield runoff rates.

21. Nevertheless, it is now proposed to restrict post development runoff rates to 1.6 l/s in all events up to and including the 1 in 100 annual probability event plus climate change. This is in accordance with the 'circa 1 l/s' requested by the drainage officer (see **Paragraph 19**). The reasons why the discharge rate could not be reduced further are provided in the following sections.

### Drainage at the Existing Site

22. According to the topographic survey, the existing site comprises both hard standing (roof, paving and concrete) and grassed areas. The overall site area is 513 $m^2$ of which 337 $m^2$ comprise impermeable surfaces.

23. A copy of Thames Water's sewer records are provided in **Annex 3**. The area surrounding the site is served by public foul sewers and public surface water sewers. The sewer records indicate there is a 375mm diameter surface water sewer running from north to south along Cottingham Chase. The surface water sewer is located close to the eastern boundary of the site. The sewer continues to run in a southerly direction to outfall into Yeading Brook approximately 90m from the site.

24. There are two manholes on the sewer records close to the eastern boundary of the site with reference 4102 and 5001. The cover levels of these manholes (37.98 m AOD and 36.94 m AOD respectively) correspond closely with the ground levels of the topographic survey. This gives confidence in the accuracy of the levels on the sewer records in the vicinity of the site. The invert levels of the surface water sewer in manholes 4102 and 5001 are given as 36.78 m AOD and 36.20 m AOD respectively.

25. There are three manhole covers within the site along with a surface water gully. The site owner has exposed and measured the existing surface water pipe which drains runoff from the site (see **Annex 4**). The pipe is 125 mm diameter and runs from north to south through the single storey extension at the east side of the main house. The invert of the pipe is 0.60 m below ground level at the rear (north side) of the single storey extension and 0.80 m below ground level at the front (south side) of the single storey extension.

26. Ground levels from the topographic survey at the upstream and downstream ends of this pipe are 37.45 m AOD and 37.10 m AOD respectively. The upstream and downstream invert levels of the pipe are therefore 36.85 m AOD and 36.30 m AOD respectively. The pipe between these points is 10.6 m long giving a gradient of 1 in 19.3. The surface water drain turns to run east towards Cottingham Chase where it connects into the 375 mm diameter public surface water sewer.

27. The existing surface water runoff rates for the site have been calculated using the Modified Rational Method and are shown in **Table 1**. The calculations are based upon an impermeable area of 0.034 ha and calculation details are provided in **Annex 5**.

**Table 1: Existing Site Surface Water Runoff Rates**

| Annual probability of rainfall event | Peak discharge for 0.034 ha impermeable area (l/s) |
|---|---|
| 1:1 | 5.4 |
| QBAR | 6.9 |
| 1:30 | 12.7 |
| 1:100 | 16.1 |

### Post Development Runoff Destination

28. The drainage hierarchy has been used to determine the surface water runoff destination as follows. Water butts are proposed to the front and rear of the property to collect roof runoff via downpipes.

29. Infiltration tests were carried out at the site on 2 and 3 June 2020 (see **Annex 6**). The pits drained very slowly and did not drain to 75% of their effective depth in over 13 hours. Soils at the site are not therefore considered suitable for the disposal of surface water runoff by infiltration means.

30. Yeading Brook is located 90 m to the south of the site but a connection to the brook is not directly achievable. It is therefore proposed to direct surface water runoff to the Thames Water public surface water sewer to the east of the site using the existing surface water connection from the site.

### Post Development Runoff Rate and Attenuation

31. According to the development proposals, the extent of grassed area to the rear of the property will be increased to 227 $m^2$. Some of this will be taken up by the cycle store (2 $m^2$) and a 7 m by 3 m patio (21 $m^2$). Post development impermeable areas are estimated as 325 $m^2$, a slight reduction on the present arrangements.

32. It is proposed that post development runoff rates will be controlled using a vortex flow control device, calibrated for a discharge rate of 1.5 l/s when the head is 0.75 m. In extreme events like the 1 in 100 annual probability event plus climate change, the head is greater than 0.75 m and the discharge rate increases to 1.6 l/s. This ensures the upstream system does not flood the property in an exceedance event.

33. The system has been modelled using the Detailed Design module of MicroDrainage; the parameters and results are provided in **Annex 7**. The modelling results indicate that the below-ground drainage system contains all the flows in all rainfall events up to and including the 1:100 annual probability event, plus a 20% increase in flows to allow for climate change (+ 20% CC). A summary of the proposed post development flow rates are provided in **Table 2**.

34. Attenuation storage is provided in a geocellular tank and the sub-base of permeable paving. The geocellular tank shall be installed beneath the patio area to the rear of the property. It is 0.4 m deep and 40 $m^2$ in area. The invert level of the geocellular tank is 36.90 m AOD. An area of hardstanding or decking patio may be installed on the ground above the geocellular tank. Permeable paving will be installed beneath the car parking area at the north end of the site. The paving has an area of 78 $m^2$. The porous sub-base has a depth of 0.3 m and a porosity of 30%. The proposed drainage layout is presented in **Annex 8**.

**Table 2: Proposed Discharge Rates**

| Annual probability of rainfall event | Peak discharge from site (l/s) | Reduction on existing peak discharge rate |
|---|---|---|
| 1:1 | 1.5 | 72% |
| 1:30 | 1.5 | 88% |
| 1:100 + 20% CC | 1.6 | 91% |

35. A developer enquiry was been submitted to Thames Water based on the discharge rates of the previous design. Thames Water confirmed (see **Annex 9**) that that post development flow rates should be restricted to 3.0 l/s, in up to the 1:3 annual probability event. As the proposed flow rates are now below 3.0 l/s, the requirements of Thames Water have been met.

36. In accordance with Environment Agency guidance, a sensitivity analysis has been undertaken, to ensure that there would be no flooding of the drainage system in a 1:100 event plus 40% climate change. The results show that the flows are safely contained within the drainage system in this event (**Annex 10**).

37. In an exceedance event greater than the modelled events, the existing manhole chamber EX2 to the south (front) of the property may flood out, as it is the lowest point in the system. Flows from this manhole chamber would

be towards Dartmouth Road and away from the proposed and existing properties. The flows may enter the surface water drainage system further downstream.

### Surface Water Drainage and SUDS Maintenance

38. The surface water drainage elements shall remain the responsibility of the site owner. These should be maintained according to the maintenance schedule in **Table 3**.

**Table 3: Maintenance Requirements**

| Schedule | Required action | Frequency |
|---|---|---|
| Gullies, Aco channels, manholes, inspection chambers and drains | | |
| Regular maintenance | Remove litter and debris | Monthly |
| Occasional maintenance | Remove sediment from silt traps and sumps | Annually, or as required |
| Geocellular attenuation storage tank | | |
| Regular maintenance | Inspect and identify any areas that are not operating correctly | Monthly for 3 months, then annually |
| | Remove debris from the catchment surface | Monthly |
| | Remove sediment from internal forebays | Annually, or as required |
| Remedial action | Repair inlet/outlet and vents | As required |
| Monitoring | Inspect catchpit manholes and note rate of sediment accumulation | Monthly in the first year and then annually |
| | Inspect inlet/outlet and vents to ensure that they are in good condition and operating as designed | Annually |
| | Survey inside of tank for sediment build-up and remove if necessary | Every 5 years, or as required |
| Permeable paving | | |
| Regular maintenance | Brushing and vacuuming (standard cosmetic sweep over whole surface) | Annually, or based on manufacturer's recommendations. |
| Occasional maintenance | Stabilise and mow contributing and adjacent areas | As required |
| | Removal of weeds | As required |
| Remedial actions | Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the paving | As required |
| | Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material | |
| Monitoring | Inspect for evidence of poor operation and/or weed growth- if required, take remedial action | Three-monthly, 48h after large storms in first six months |
| | Inspect silt accumulation rates and establish appropriate brushing frequencies accumulation rates and establish appropriate removal frequencies | Annually |
| | Monitor inspection chambers | |

## Summary

39. This Technical Note has been prepared for G. Lisi Developments Ltd to accompany a new application to discharge Planning Condition 7 for the site at 67 Dartmouth Road, Ruislip.

40. A previous application to discharge Condition 7 was refused based on the discharge rates being higher than expected by LBHC and limited sustainable drainage components were provided. The design has now been amended to reduce the surface water discharge rate and to include permeable paving.

41. Water butts are proposed to the front and rear of the property to collect roof runoff via downpipes. It is proposed to direct the remaining surface water runoff from the site to the Thames Water public surface water sewer to the east of the site using the existing surface water connection from the site.

42. It is proposed to restrict post development surface water runoff rates to 1.6 l/s in the 1:100 annual probability event +20% CC. This represents a reduction of 88% and 91% respectively in the two events respectively. The proposals will therefore reduce the impact on the receiving sewer. Thames Water have confirmed they have no objection to the proposed runoff rates. The flow rate will be restricted by a vortex flow control device.

43. It is proposed to provide attenuation storage in the form of geocellular storage in the rear garden of the property and permeable paving in the car parking area at the north end of the site.

44. The proposed drainage has been modelled using MicroDrainage and is contained within the drainage system in all durations and events up to an annual probability of 1:100 plus 40% climate change. A drainage layout drawing has been provided.

# FIGURES

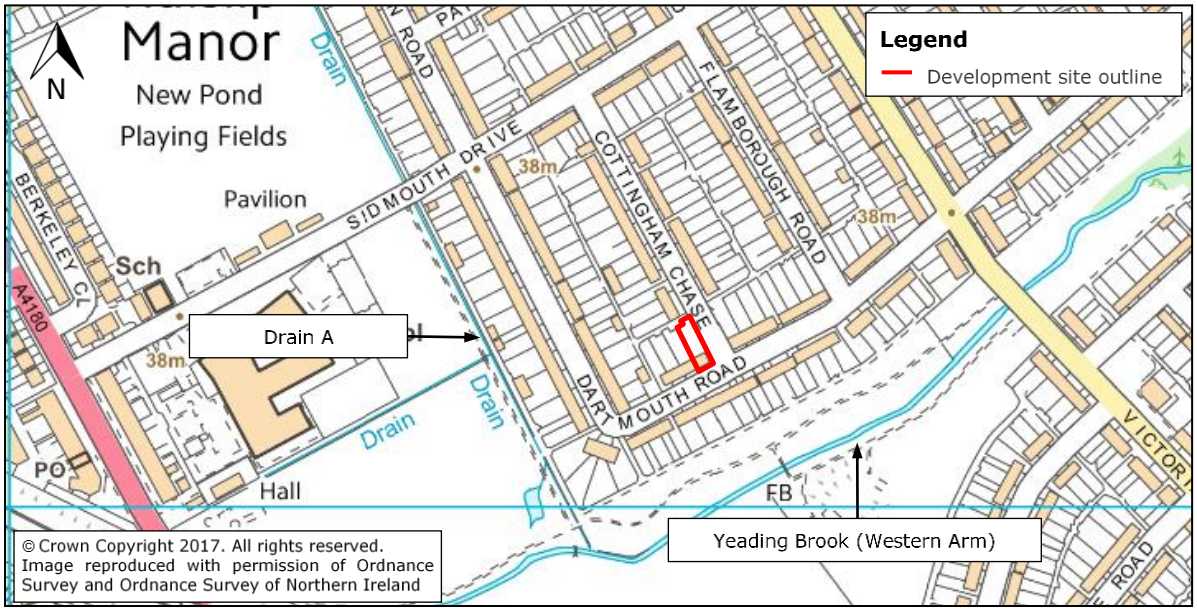
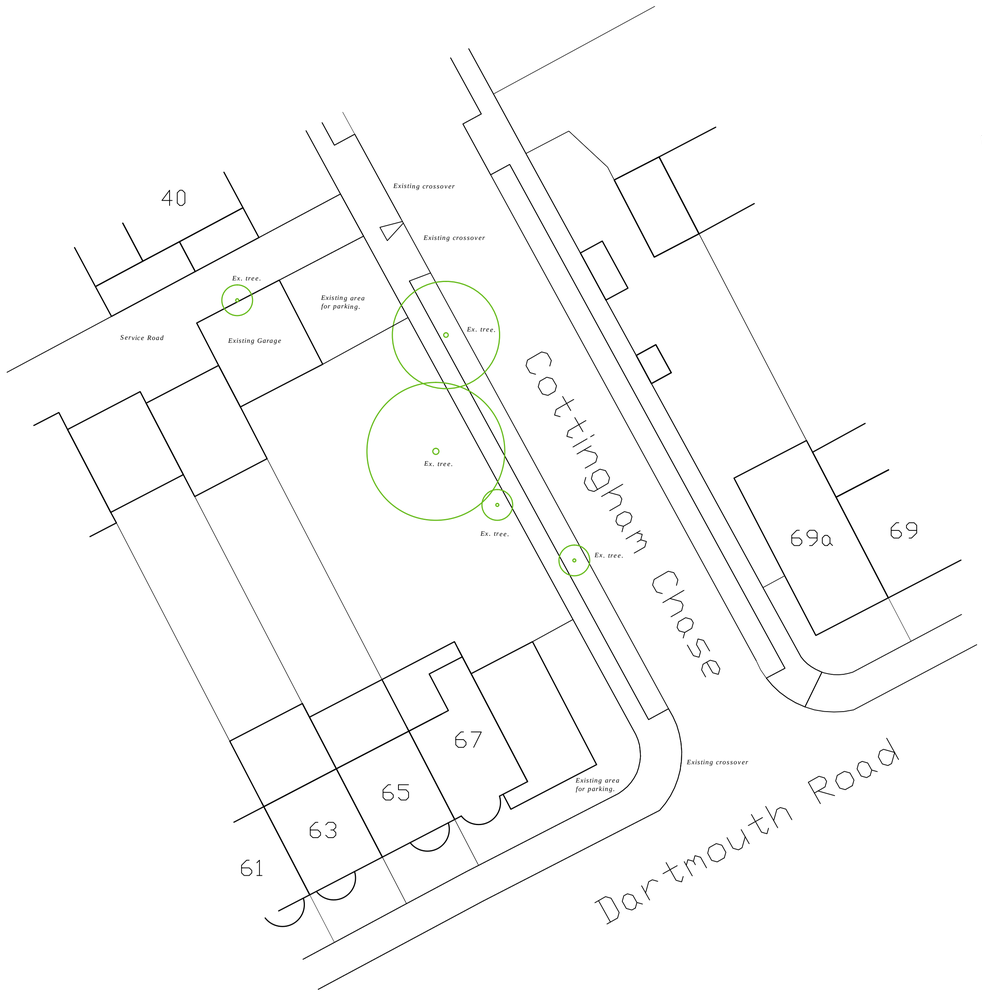
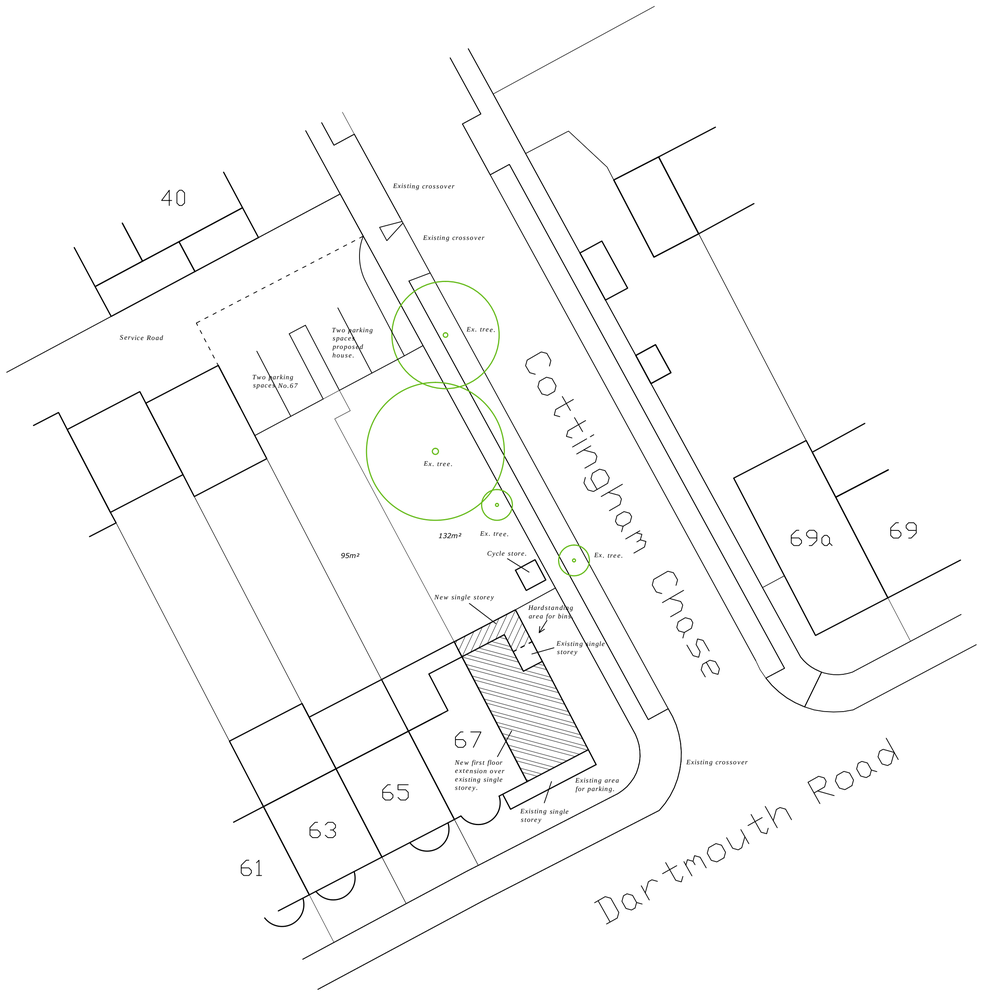



**Figure 1: Site Location**

## ANNEX 1: EXISTING AND PROPOSED DEVELOPMENT LAYOUTS




*Existing Site Plan*




*Proposed Site Plan*

*Existing & Proposed Site Plans*

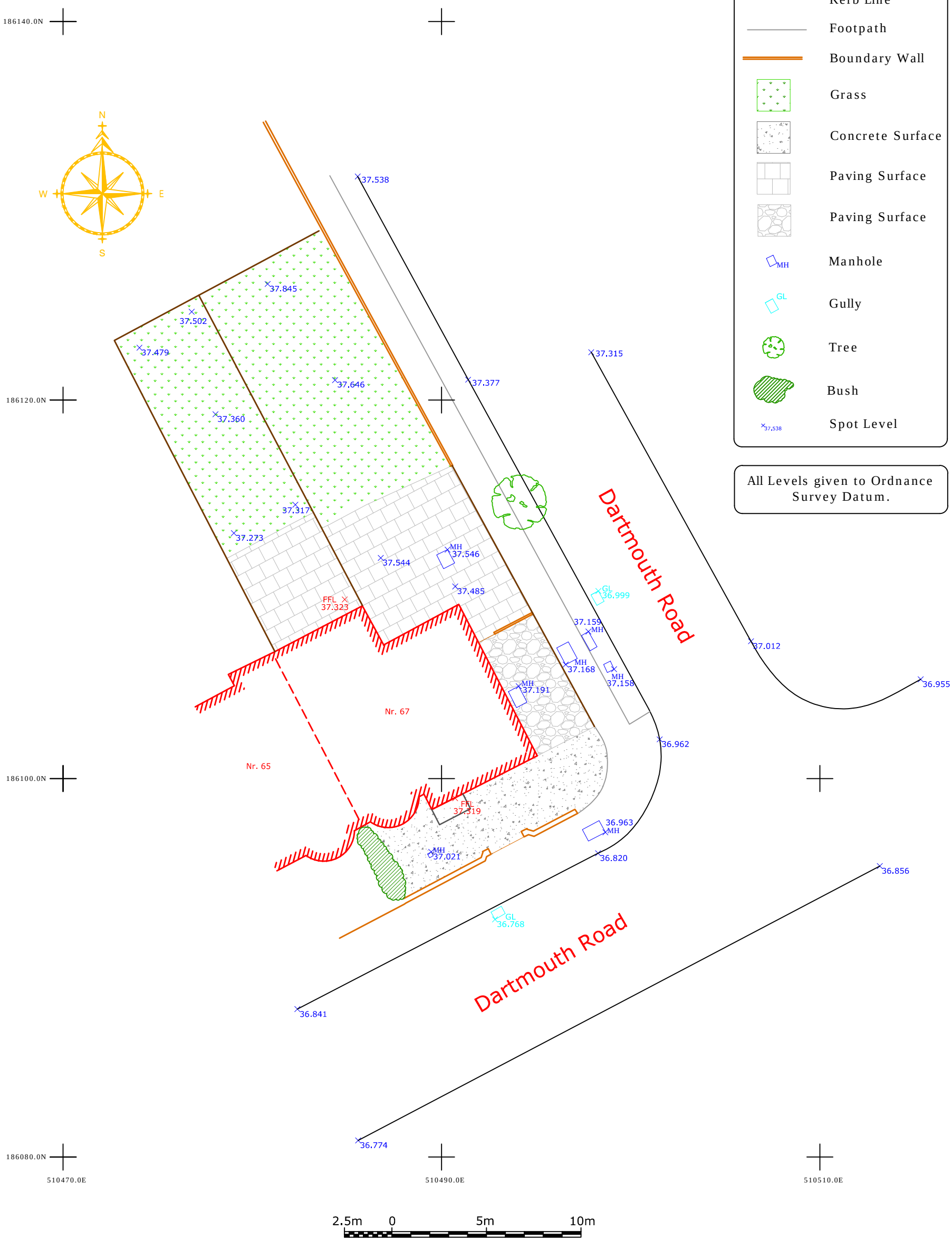
*0* — *20m*

*67 DARTMOUTH ROAD , RUSILIP .*

W J Macleod
ARCHITECT
70b High Street Northwood Middlesex HA6 1BL
phone 01923 840600

| | |
|---|---|
| *Drawing Number* 16 / 3434 / 16 | *Revision* |
| *Date* 6 / 3 / 19 | *Drawn by* |
| *Scale* 1:200 @ A1 | *Draw Ref.* |

# ANNEX 2: TOPOGRAPHIC SURVEY




NOTES:

IF IN DOUBT ASK!

DO NOT SCALE

– 12.02.16 FOR COMMENTS


SESE LIMITED
STRUCTURAL & CIVIL ENGINEERS
174 CALEDONIAN ROAD
London N1 0SQ
Tel : 020 7278 0778
Fax : 020 7278 0765


Project: Graham Lisi
67 Dartmouth Road
Topographic Survey

| Drg No. | Scale | Drawn | Rev. | Date | Checked |
|---|---|---|---|---|---|
| P1094-S150 | - | AL | - | 12/02/16 | AS |

# ANNEX 3: SEWER RECORDS

# Asset location search

Property Searches

Weetwood Services Ltd
Suite 1 Park House
Broncoed Business Park
MOLD
CH7 1HP

**Search address supplied** 67
Dartmouth Road
Ruislip
HA4 0DE

**Your reference** 3766

**Our reference** ALS/ALS Standard/2020_4196630

**Search date** 10 June 2020

**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).

Contact us to find out more.

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

0845 070 9148

# Asset location search

Property Searches

**Search address supplied:** 67, Dartmouth Road, Ruislip, HA4 0DE

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 searchprovides 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

Thames Water Property Searches

## 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.**

With regard to the fresh water supply, this site falls within the boundary of another water company. For more information, please redirect your enquiry to the following address:

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

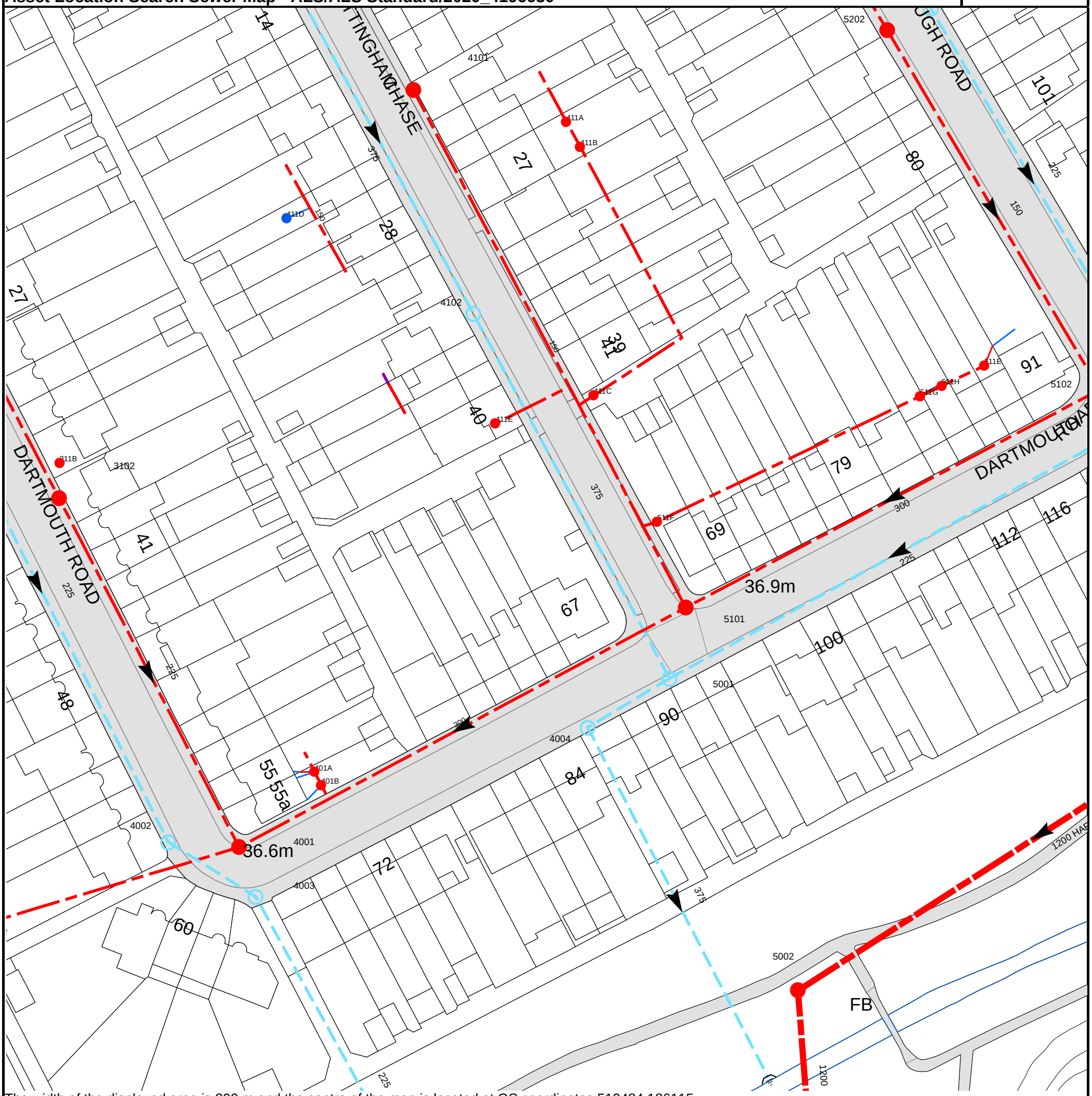
### Clean Water queries

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

**Asset Location Search Sewer Map - ALS/ALS Standard/2020_4196630**




The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 510484,186115

**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.**

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 |
|---|---|---|
| 401B | n/a | n/a |
| 401A | n/a | n/a |
| 4004 | 36.9 | 36.08 |
| 5001 | 36.94 | 36.2 |
| 5101 | 36.96 | 33.72 |
| 511F | n/a | n/a |
| 3102 | 37.41 | 35.24 |
| 311B | n/a | n/a |
| 411E | n/a | n/a |
| 511G | n/a | n/a |
| 411C | n/a | n/a |
| 511H | n/a | n/a |
| 511E | n/a | n/a |
| 4102 | 37.98 | 36.78 |
| 411D | n/a | n/a |
| 411B | n/a | n/a |
| 411A | n/a | n/a |
| 4101 | 38.43 | 36.37 |
| 5202 | 38.26 | 36.21 |
| 5204 | 38.2 | 37.3 |
| 4002 | 36.8 | 36.07 |
| 4001 | 36.58 | 33.41 |
| 4003 | 36.76 | 35.94 |
| 5002 | 36.89 | 32.03 |

**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

## 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

Gulley

Culverted Watercourse

Proposed

Abandoned Sewer

**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.
6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in milimetres. 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.

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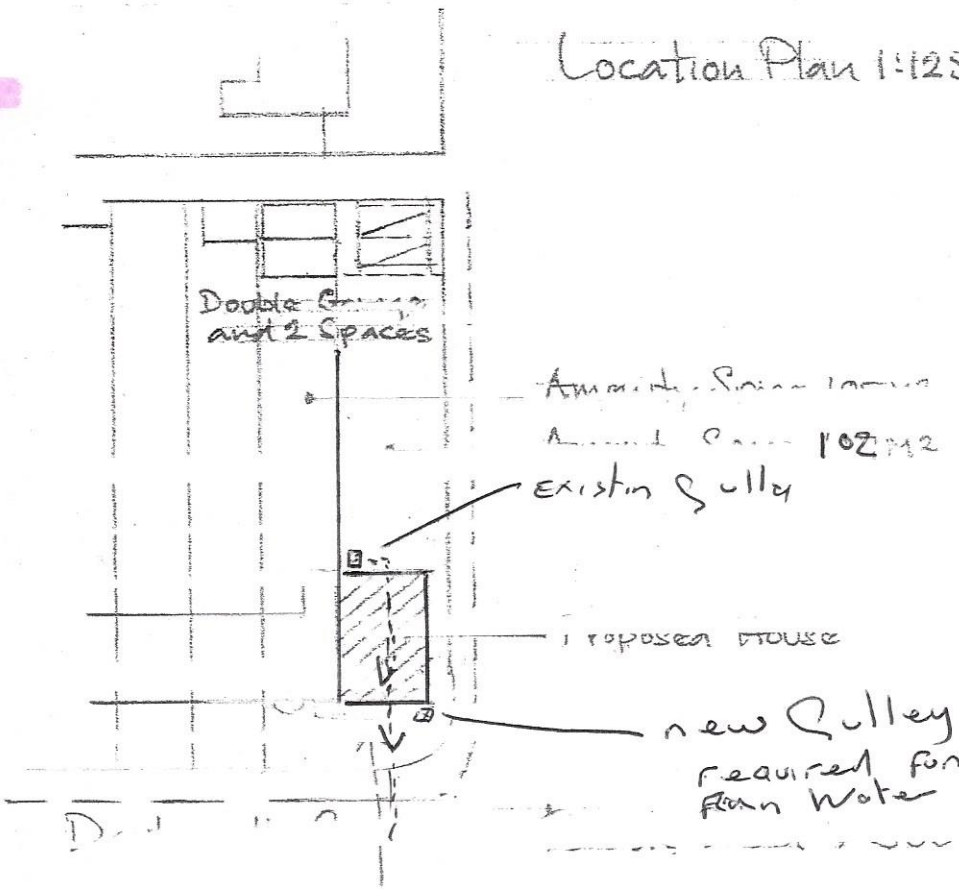
|---|---|---|---|
| Call **0845 070 9148** quoting your invoice number starting CBA or ADS / OSS | Account number **90478703**<br>Sort code **60-00-01**<br>A remittance advice must be sent to:<br>**Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW.**<br>or email **ps.billing@thameswater.co.uk**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

# ANNEX 4: EXISTING DRAINAGE DETAILS

Location Plan 1:1250

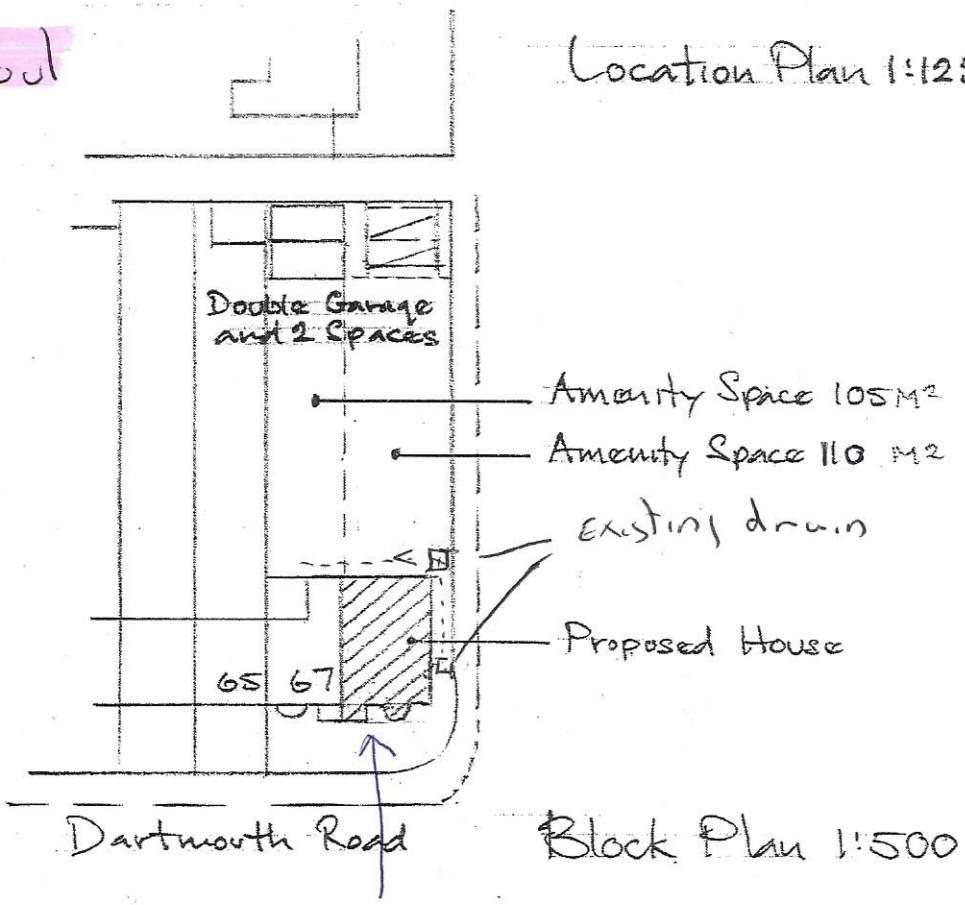
Existing RW Layout




Site Plans


Location Plan 1:1250

Existing foul




Block Plan 1:500

Site Plans

SITE: 67 Dartmouth Road • Ruislip • Middx

BUILDING SERVICES
Architectural Designers & Surveyors
Uxbridge (01895) 811177

| DRAWN: | SCALE: | DATE: |
|---|---|---|
| AMF | — | Sep 08 |

DRAWING No. 08/242/00 A

## ANNEX 5: EXISTING SITE RUNOFF RATES

The peak discharge rates of surface water runoff from the impermeable areas at the site have been calculated based on the Modified Rational Method[6].

The following parameters have been obtained from the maps in Volume 3 of the Wallingford Procedure:

| | |
|---|---|
| M5-60 minute rainfall depth: | 20.0 mm |
| Ratio of M5-60 to M5-2 day rainfall: | 0.42 |
| Average Annual Rainfall: | 750 mm |
| Winter Rain Acceptance Potential/ Soil Type : | 0.45/Type 4 |
| The Urban Catchment Wetness Index (UCWI) value: | 80.0 |

A time of concentration of 5 minutes has been used comprising a time of entry of 4 minutes and a time of flow of 1 minute.

A rainfall estimation calculation has been carried out to convert the M5-60 minute rainfall to the 5-minute duration rainfall for the 1:1, 1:2, 1:30 and 1:100 annual probability rainfall events. The calculated rainfall intensities for these events are 56.3, 72.2, 132.8 and 168.0 mm/hr respectively.

The flow rate as given by the Modified Rational Method is:

**$Q=2.78 \times C_v \times C_r \times$ rainfall intensity x impermeable area**

where:

$C_v$ is the volumetric runoff coefficient = $P_r$/PIMP = 0.78
where $P_r$ is Percentage Runoff and PIMP is Percentage Impermeable Area
$C_r$ is the routing coefficient = 1.3
Impermeable Area = 0.034 ha

The peak discharges of surface runoff from impermeable areas of the existing site are shown in the table below:

**Peak Runoff Rates**

| Annual probability of rainfall event | Peak discharge for 0.034 ha impermeable area (l/s) |
|---|---|
| 1:1 | 5.4 |
| QBAR | 6.9 |
| 1:30 | 12.7 |
| 1:100 | 16.1 |

[6] The Wallingford Procedure, Volume 4, 1981

# ANNEX 6: INFILTRATION TEST RESULTS

The Brownfield Consultancy
Woodstock
Memorial Road
Fenny Compton.
CV47 2XU

Your Ref:

Our Ref: BC519 L.001 / JT

G. Lisi Developments Ltd
6 Howletts Lane
Ruislip
Middlesex
HA4 7RW

4th June 2020

Dear Graham

**NO.67 DARTMOUTH ROAD, RUISLIP. HA4 0DE**
**Soakaway Testing**

The Brownfield Consultancy was commissioned by Lisi Construction to undertake trial pit soakaway testing in accordance with BRE 365 at the above site. The fieldwork was on 2nd and 3rd June 2020.

The site is located approximately 2km south of the centre of Ruislip and currently comprises of a recently constructed 2 storey, 2 bedroom dwelling attached to No. 67 Dartmouth Road. The soakaway tests were undertaken in the rear garden of the new property. Development proposals and an exploratory hole location plan are presented in Appendix A.

## 1. FIELDWORK

Two pits were excavated with a mechanical excavator on the afternoon and evening of the 2nd June 2020 with a mechanical excavator. The pits were denoted SA1 and SA2. The pit dimensions were carefully measured and then filled with clean water. The time for the water to drain was then measured.

An initial depth reading was taken on the evening of the 2nd June. We returned to site on 3rd June and undertook further depth specific readings. Photographs of the trial pits are presented below:-

**SA1 Exploratory Hole**

**SA2 Exploratory Hole**

The Brownfield Consultancy
Woodstock
Memorial Road
Fenny Compton.
CV47 2XU

## 2. GROUND CONDITIONS

Referring to the BGS Geoindex the anticipated geology at the site is Lambeth Group described as:-

*Vertically and laterally variable sequences mainly of clay, some silty or sandy, with some sands and gravels, minor limestones and lignites and occasional sandstone and conglomerate.*

Our findings confirmed the published geology. A summary of the strata encountered during the investigation is described below but for full details reference should be made to the exploratory hole logs presented in Appendix B.

**Made Ground**
Made Ground/Topsoil was encountered in both exploratory holes to depths of 0.20-0.30m. Materials comprised dark brown Topsoil with fragments of red brick.

**Lambeth Group**
The Lambeth Group was encountered in both trial pit locations and comprised brown slightly gravelly CLAY with occasional cobbles and patches of brown sand. Gravel comprised chalk and flint; cobbles comprised flint.

**Groundwater**
Groundwater was not encountered in the trial pits.

## 3. SOAKAWAY DRAINAGE

In test location SA1, the water level drained 0.48m over 1036 minutes (17 hours and 16 minutes). In SA2, the water level drained 0.35m in 796 minutes (13 hours and 16 minutes). The pits did not drain to greater than 75% of their effective depth which is a requirement under BRE 365. The full results of soakaway testing are presented in Appendix C.

In conclusion the soils below the site are not considered suitable for infiltration and alternative drainage methods should be explored.

We trust the above is satisfactory for your purposes. Should you have any queries please do not hesitate to contact me.

Yours sincerely

**Jim Twaddle** CGeol
*Director*

*Encl.*

| | |
|---|---|
| *Appendix A* | *Exploratory Hole Location Plan* |
| *Appendix B* | *Exploratory Hole Logs* |
| *Appendix C* | *Soakaway Test Calculations* |

# APPENDIX A

Exploratory Hole Location Plan

# No. 67 DARTMOUTH ROAD, RUISLIP

EXPLORATORY HOLE LOCATION PLAN

# APPENDIX B

Exploratory Hole Logs

Brownfield Consultancy
The Cottage, Mill Lane
Fenny Compton, CV47 2YF
Phone: 07852881086

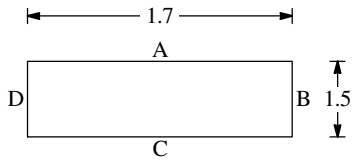
# TRIAL PIT LOG

The Brownfield Consultancy

| Project | | | | TRIAL PIT No |
|---|---|---|---|---|
| No. 67 Dartmouth Road, Ruislip. HA4 0DE | | | | SA1 |
| Job No | Date | Ground Level (m) | Co-Ordinates () | |
| BC519 | 03-06-20 | | | |
| Contractor | | | | Sheet |
| The Brownfield Consultancy Ltd | | | | 1 of 1 |

| STRATA | | | | SAMPLES & TESTS | | |
|---|---|---|---|---|---|---|
| | | | | Depth | No | Remarks/Tests |
| Depth | No | | DESCRIPTION | | | |
| 0.00-0.20 | | | Dark brown TOPSOIL with traces of red brick. Roots and rootlets. (MADE GROUND) | | | |
| 0.20-1.50 | | | Firm fissured brown slightly gravelly CLAY with a low cobble content. Gravel is subangular to rounded fine to coarse flint and chalk. Cobbles are flint. Patches of brown sand. | | | |
| | | | 1.35 Locally gravelly. | | | |
| 1.50 | | | Trial pit terminated. | | | |

Shoring/Support:
Stability: Sides stable





GENERAL REMARKS

Soakaway test undertaken in accordance with BRE 365.

| All dimensions in metres Scale 1:25 | Client G. Lisi Developments Ltd | Method/ Plant Used Mini-excavator | Logged By JT |
|---|---|---|---|

Brownfield Consultancy
The Cottage, Mill Lane
Fenny Compton, CV47 2YF
Phone: 07852881086

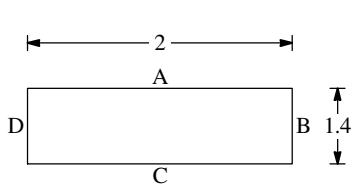
# TRIAL PIT LOG

The Brownfield Consultancy

| Project | | | | TRIAL PIT No |
|---|---|---|---|---|
| No. 67 Dartmouth Road, Ruislip. HA4 0DE | | | | SA2 |
| Job No | Date | Ground Level (m) | Co-Ordinates () | |
| BC519 | 03-06-20 | | | |
| Contractor | | | | Sheet |
| The Brownfield Consultancy Ltd | | | | 1 of 1 |

| STRATA | | | | SAMPLES & TESTS | | |
|---|---|---|---|---|---|---|
| | | | | Depth | No | Remarks/Tests |
| Depth | No | | DESCRIPTION | | | |
| 0.00-0.30 | | | Dark brown TOPSOIL with traces of red brick. Roots and rootlets. (MADE GROUND) | | | |
| 0.30-1.00 | | | Firm fissured brown slightly gravelly CLAY with a low cobble content. Gravel is subangular to rounded fine to coarse flint and chalk. Cobbles are flint. Patches of brown sand. | | | |
| 1.00 | | | Trial pit terminated. | | | |

Shoring/Support:
Stability: Sides stable





GENERAL REMARKS

Soakaway test undertaken in accordance with BRE 365.

| All dimensions in metres Scale 1:25 | Client G. Lisi Developments Ltd | Method/ Plant Used Mini-excavator | Logged By JT |
|---|---|---|---|

# APPENDIX C

Soakaway Calculation Sheets

| The Brownfield Consultancy | **SOIL INFILTRATION TEST** |
|---|---|
| **Woodstock**<br>**Memorial Road**<br>**Fenny Compton**<br>**CV47 2XU**<br>**Tel: 07852881086** | **Project:**<br>67 Dartmouth Road, Ruislip<br><br>**Project No:**<br>BC519 |

Test Location: SA 1 Test No: 1 Date: 03.06.20

Water level during test

| Time mins | Depth m bgl |
|---|---|
| 0 | 0.300 |
| 960 | 0.480 |
| 980 | 0.480 |
| 1015 | 0.480 |
| 1036 | 0.480 |

Trial pit dimensions

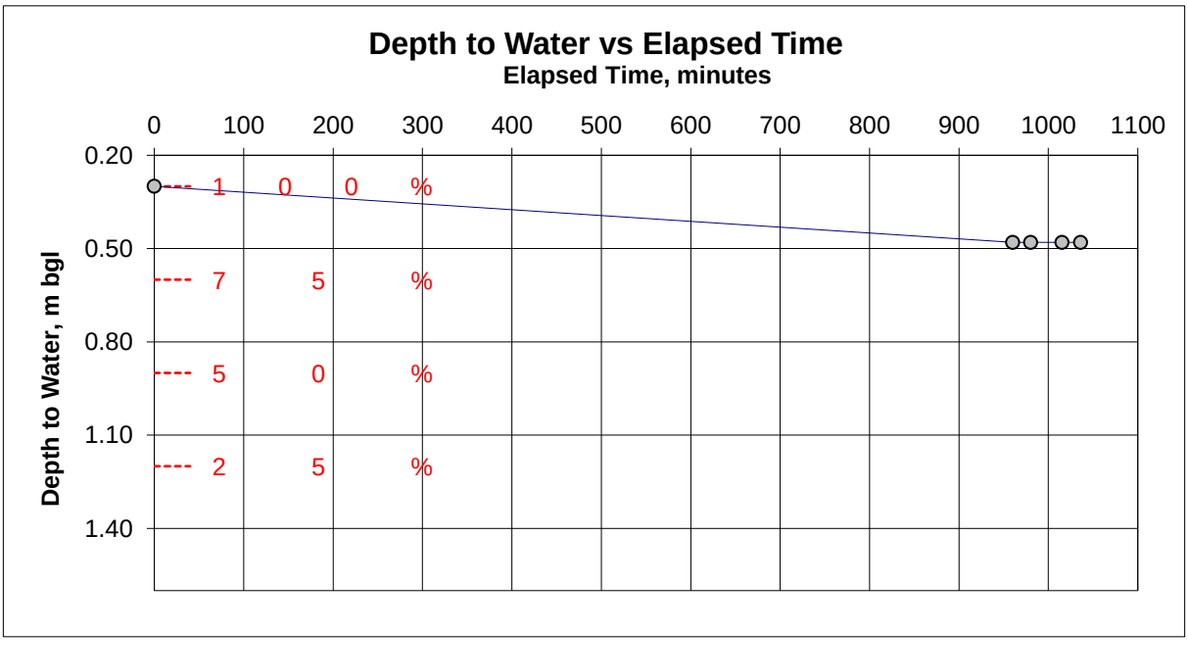
| | |
|---|---|
| depth (m) | 1.50 |
| length (m) | 1.70 |
| width (m) | 1.50 |

$$f = \frac{V_p}{\alpha_p \times t_p}$$

$f$ = soil infiltration rate
Vp = volume of water from 75% to 25% effective depth
$\alpha p$ = Internal surface area at 50% effective depth
tp = time for the water level to fall from 75% to 25% effective depth

time at 75% effective depth (mins) 0
time at 25% effective depth (mins) 0
(from graph)

**Calculated Soil Infiltration Rate = - m/sec**



| The Brownfield Consultancy | **SOIL INFILTRATION TEST** |
|---|---|
| **Woodstock**<br>**Memorial Road**<br>**Fenny Compton**<br>**CV47 2XU**<br>**Tel: 07852881086** | **Project:**<br>67 Dartmouth Road, Ruislip<br><br>**Project No:**<br>BC519 |

Test Location: SA2 Test No: 1 Date: 03.06.20

Water level during test

| Time mins | Depth m bgl |
|---|---|
| 0 | 0.300 |
| 720 | 0.350 |
| 740 | 0.350 |
| 776 | 0.350 |
| 796 | 0.350 |

Trial pit dimensions

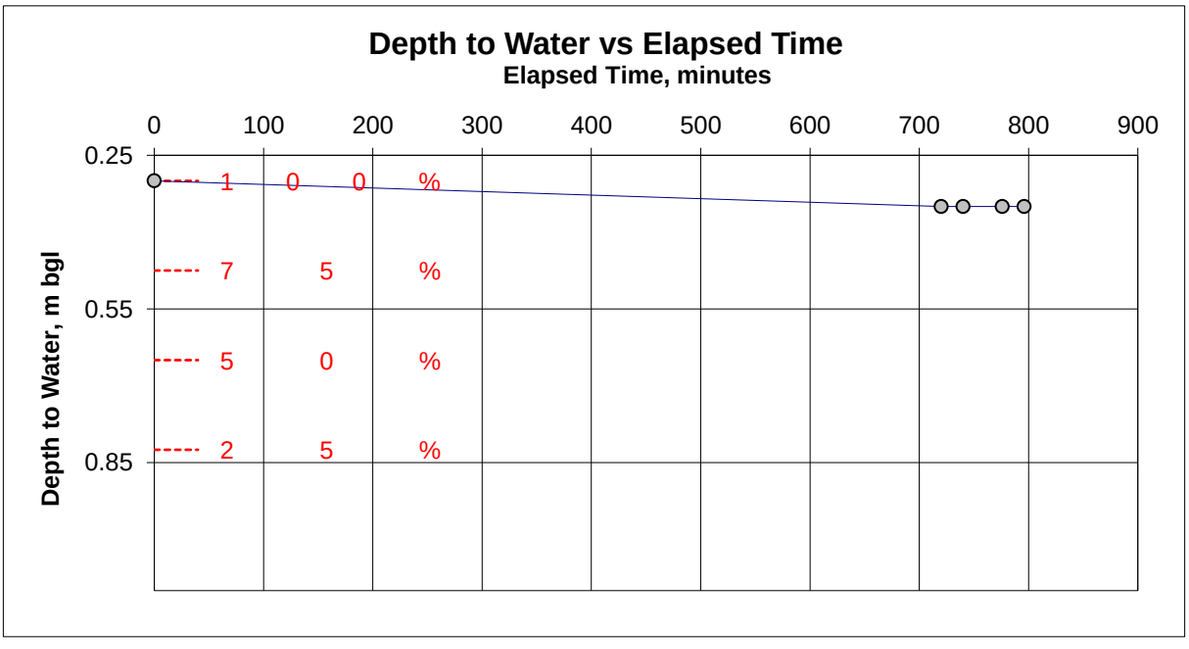
| | |
|---|---|
| depth (m) | 1.00 |
| length (m) | 2.00 |
| width (m) | 1.40 |

$$f = \frac{V_p}{\alpha_p \times t_p}$$

$f$ = soil infiltration rate
Vp = volume of water from 75% to 25% effective depth
$\alpha p$ = Internal surface area at 50% effective depth
tp = time for the water level to fall from 75% to 25% effective depth

time at 75% effective depth (mins) 0
time at 25% effective depth (mins) 0
(from graph)

**Calculated Soil Infiltration Rate = - m/sec**



**Registered Office:-**

The Brownfield Consultancy
Woodstock
Memorial Road
Fenny Compton
CV47 2XU

Company No: 8143932

Jim.twaddle@brownfieldconsultancy.co.uk

Tel: 07852 881086

# ANNEX 7: MICRO DRAINAGE RESULTS

## PIPELINE SCHEDULES for Storm

### Upstream Manhole

| PN | Hyd Sect | Diam (mm) | MH Name | C.Level (m) | I.Level (m) | D.Depth (m) | MH Connection | MH DIAM., L*W (mm) |
|---|---|---|---|---|---|---|---|---|
| 1.000 | o | 150 | MH1 | 37.800 | 37.050 | 0.600 | Open Manhole | 900 |
| 1.001 | o | 150 | MH2 - Tank | 37.540 | 36.900 | 0.490 | Open Manhole | 900 |
| 2.000 | o | 150 | EX1a | 37.550 | 36.950 | 0.450 | Open Manhole | 900 |
| 1.002 | o | 150 | EX1 | 37.450 | 36.850 | 0.450 | Open Manhole | 900 |
| 1.003 | o | 150 | EX2 | 37.100 | 36.300 | 0.650 | Open Manhole | 1200 |
| 1.004 | o | 150 | MH3 - Flow control | 37.150 | 36.180 | 0.820 | Open Manhole | 1200 |

### Downstream Manhole

| PN | Length (m) | Slope (1:X) | MH Name | C.Level (m) | I.Level (m) | D.Depth (m) | MH Connection | MH DIAM., L*W (mm) |
|---|---|---|---|---|---|---|---|---|
| 1.000 | 18.367 | 122.4 | MH2 - Tank | 37.540 | 36.900 | 0.490 | Open Manhole | 900 |
| 1.001 | 3.917 | 78.3 | EX1 | 37.450 | 36.850 | 0.450 | Open Manhole | 900 |
| 2.000 | 3.185 | 31.9 | EX1 | 37.450 | 36.850 | 0.450 | Open Manhole | 900 |
| 1.002 | 10.675 | 19.4 | EX2 | 37.100 | 36.300 | 0.650 | Open Manhole | 1200 |
| 1.003 | 3.499 | 29.2 | MH3 - Flow control | 37.150 | 36.180 | 0.820 | Open Manhole | 1200 |
| 1.004 | 3.499 | 29.2 | | 37.160 | 36.060 | 0.950 | Open Manhole | 0 |

## Area Summary for Storm

| Pipe Number | PIMP Type | PIMP Name | PIMP (%) | Gross Area (ha) | Imp. Area (ha) | Pipe Total (ha) |
|---|---|---|---|---|---|---|
| 1.000 | User | - | 100 | 0.008 | 0.008 | 0.008 |
| 1.001 | User | - | 100 | 0.010 | 0.010 | 0.010 |
| 2.000 | User | - | 100 | 0.011 | 0.011 | 0.011 |
| 1.002 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 1.003 | User | - | 100 | 0.005 | 0.005 | 0.005 |
| 1.004 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| | | | | Total | Total | Total |
| | | | | 0.033 | 0.033 | 0.033 |

## Free Flowing Outfall Details for Storm

| Outfall Pipe Number | Outfall Name | C. Level (m) | I. Level (m) | Min I. Level (m) | D,L (mm) | W (mm) |
|---|---|---|---|---|---|---|
| 1.004 | | 37.160 | 36.060 | 0.000 | 0 | 0 |

## Online Controls for Storm

### Hydro-Brake® Optimum Manhole: MH3 - Flow control, DS/PN: 1.004, Volume (m³): 1.1

| | |
|---|---|
| Unit Reference | MD-SHE-0061-1500-0750-1500 |
| Design Head (m) | 0.750 |
| Design Flow (l/s) | 1.5 |
| Flush-Flo™ | Calculated |
| Objective | Minimise upstream storage |
| Application | Surface |
| Sump Available | Yes |
| Diameter (mm) | 61 |
| Invert Level (m) | 36.180 |
| Minimum Outlet Pipe Diameter (mm) | 75 |
| Suggested Manhole Diameter (mm) | 1200 |

| Control Points | Head (m) | Flow (l/s) | Control Points | Head (m) | Flow (l/s) |
|---|---|---|---|---|---|
| Design Point (Calculated) | 0.750 | 1.5 | Kick-Flo® | 0.479 | 1.2 |
| Flush-Flo™ | 0.231 | 1.5 | Mean Flow over Head Range | - | 1.3 |

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

| Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) |
|---|---|---|---|---|---|---|---|
| 0.100 | 1.3 | 1.200 | 1.9 | 3.000 | 2.8 | 7.000 | 4.2 |
| 0.200 | 1.5 | 1.400 | 2.0 | 3.500 | 3.0 | 7.500 | 4.3 |
| 0.300 | 1.5 | 1.600 | 2.1 | 4.000 | 3.2 | 8.000 | 4.5 |
| 0.400 | 1.4 | 1.800 | 2.2 | 4.500 | 3.4 | 8.500 | 4.6 |
| 0.500 | 1.3 | 2.000 | 2.3 | 5.000 | 3.6 | 9.000 | 4.7 |
| 0.600 | 1.4 | 2.200 | 2.4 | 5.500 | 3.7 | 9.500 | 4.9 |
| 0.800 | 1.5 | 2.400 | 2.5 | 6.000 | 3.9 | | |
| 1.000 | 1.7 | 2.600 | 2.6 | 6.500 | 4.0 | | |

## Storage Structures for Storm

### Porous Car Park Manhole: MH1, DS/PN: 1.000

| | | | |
|---|---|---|---|
| Infiltration Coefficient Base (m/hr) | 0.00000 | Width (m) | 6.0 |
| Membrane Percolation (mm/hr) | 1000 | Length (m) | 13.0 |
| Max Percolation (l/s) | 21.7 | Slope (1:X) | 0.0 |
| Safety Factor | 2.0 | Depression Storage (mm) | 5 |
| Porosity | 0.30 | Evaporation (mm/day) | 3 |
| Invert Level (m) | 37.350 | Cap Volume Depth (m) | 0.300 |

### Cellular Storage Manhole: MH2 - Tank, DS/PN: 1.001

| | | | |
|---|---|---|---|
| Invert Level (m) | 36.900 | Safety Factor | 2.0 |
| Infiltration Coefficient Base (m/hr) | 0.00000 | Porosity | 0.95 |
| Infiltration Coefficient Side (m/hr) | 0.00000 | | |

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 40.0 | 0.0 | 0.401 | 1.0 | 0.0 |
| 0.400 | 40.0 | 0.0 | 0.640 | 1.0 | 0.0 |

## 1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

### Simulation Criteria

| | | | |
|---|---|---|---|
| Areal Reduction Factor | 1.000 | Additional Flow - % of Total Flow | 0.000 |
| Hot Start (mins) | 0 | MADD Factor * 10m³/ha Storage | 2.000 |
| Hot Start Level (mm) | 0 | Inlet Coeffiecient | 0.800 |
| Manhole Headloss Coeff (Global) | 0.500 | Flow per Person per Day (l/per/day) | 0.000 |
| Foul Sewage per hectare (l/s) | 0.000 | | |

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 2 Number of Real Time Controls 0

### Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Ratio R | 0.400 |
| Region | England and Wales | Cv (Summer) | 0.750 |
| M5-60 (mm) | 20.000 | Cv (Winter) | 0.840 |

| | |
|---|---|
| Margin for Flood Risk Warning (mm) | 300.0 |
| Analysis Timestep | 2.5 Second Increment (Extended) |
| DTS Status | OFF |
| DVD Status | ON |
| Inertia Status | ON |

| | |
|---|---|
| Profile(s) | Summer and Winter |
| Duration(s) (mins) | 15, 30, 60, 120, 180, 240, 360, 480 |
| Return Period(s) (years) | 1, 30, 100 |
| Climate Change (%) | 0, 0, 20 |

| PN | US/MH Name | Event | US/CL (m) | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) |
|---|---|---|---|---|---|---|
| 1.000 | MH1 | 30 minute 1 year Winter I+0% | 37.800 | 37.072 | -0.128 | 0.000 |
| 1.001 | MH2 - Tank | 60 minute 1 year Winter I+0% | 37.540 | 36.920 | -0.130 | 0.000 |
| 2.000 | EX1a | 15 minute 1 year Winter I+0% | 37.550 | 36.977 | -0.123 | 0.000 |
| 1.002 | EX1 | 15 minute 1 year Winter I+0% | 37.450 | 36.870 | -0.130 | 0.000 |
| 1.003 | EX2 | 15 minute 1 year Winter I+0% | 37.100 | 36.359 | -0.091 | 0.000 |
| 1.004 | MH3 - Flow control | 15 minute 1 year Winter I+0% | 37.150 | 36.357 | 0.027 | 0.000 |

| PN | US/MH Name | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status |
|---|---|---|---|---|---|
| 1.000 | MH1 | 0.05 | | 0.8 | OK |
| 1.001 | MH2 - Tank | 0.04 | | 0.6 | OK |
| 2.000 | EX1a | 0.08 | | 1.5 | OK |

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

| PN | US/MH Name | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status |
|---|---|---|---|---|---|
| 1.002 | EX1 | 0.04 | | 1.6 | OK |
| 1.003 | EX2 | 0.10 | | 2.1 | OK |
| 1.004 | MH3 - Flow control | 0.07 | | 1.5 | SURCHARGED |

## 30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

### Simulation Criteria

| | | | |
|---|---|---|---|
| Areal Reduction Factor | 1.000 | Additional Flow - % of Total Flow | 0.000 |
| Hot Start (mins) | 0 | MADD Factor * 10m³/ha Storage | 2.000 |
| Hot Start Level (mm) | 0 | Inlet Coeffiecient | 0.800 |
| Manhole Headloss Coeff (Global) | 0.500 | Flow per Person per Day (l/per/day) | 0.000 |
| Foul Sewage per hectare (l/s) | 0.000 | | |

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 2 Number of Real Time Controls 0

### Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Ratio R | 0.400 |
| Region | England and Wales | Cv (Summer) | 0.750 |
| M5-60 (mm) | 20.000 | Cv (Winter) | 0.840 |

| | |
|---|---|
| Margin for Flood Risk Warning (mm) | 300.0 |
| Analysis Timestep | 2.5 Second Increment (Extended) |
| DTS Status | OFF |
| DVD Status | ON |
| Inertia Status | ON |

| | |
|---|---|
| Profile(s) | Summer and Winter |
| Duration(s) (mins) | 15, 30, 60, 120, 180, 240, 360, 480 |
| Return Period(s) (years) | 1, 30, 100 |
| Climate Change (%) | 0, 0, 20 |

| PN | US/MH Name | Event | US/CL (m) | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) |
|---|---|---|---|---|---|---|
| 1.000 | MH1 | 15 minute 30 year Winter I+0% | 37.800 | 37.093 | -0.107 | 0.000 |
| 1.001 | MH2 - Tank | 60 minute 30 year Winter I+0% | 37.540 | 36.963 | -0.087 | 0.000 |
| 2.000 | EX1a | 15 minute 30 year Winter I+0% | 37.550 | 36.994 | -0.106 | 0.000 |
| 1.002 | EX1 | 30 minute 30 year Winter I+0% | 37.450 | 36.971 | -0.029 | 0.000 |
| 1.003 | EX2 | 30 minute 30 year Winter I+0% | 37.100 | 36.967 | 0.517 | 0.000 |
| 1.004 | MH3 - Flow control | 30 minute 30 year Winter I+0% | 37.150 | 36.965 | 0.635 | 0.000 |

| PN | US/MH Name | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status |
|---|---|---|---|---|---|
| 1.000 | MH1 | 0.18 | | 2.7 | OK |
| 1.001 | MH2 - Tank | 0.16 | | 2.2 | OK |
| 2.000 | EX1a | 0.19 | | 3.7 | OK |

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

| PN | US/MH Name | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status |
|---|---|---|---|---|---|
| 1.002 | EX1 | 0.13 | | 4.8 | OK |
| 1.003 | EX2 | 0.15 | | 3.2 | FLOOD RISK |
| 1.004 | MH3 - Flow control | 0.07 | | 1.5 | FLOOD RISK |

## 100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

### Simulation Criteria

| | | | |
|---|---|---|---|
| Areal Reduction Factor | 1.000 | Additional Flow - % of Total Flow | 0.000 |
| Hot Start (mins) | 0 | MADD Factor * 10m³/ha Storage | 2.000 |
| Hot Start Level (mm) | 0 | Inlet Coeffiecient | 0.800 |
| Manhole Headloss Coeff (Global) | 0.500 | Flow per Person per Day (l/per/day) | 0.000 |
| Foul Sewage per hectare (l/s) | 0.000 | | |

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 2 Number of Real Time Controls 0

### Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Ratio R | 0.400 |
| Region | England and Wales | Cv (Summer) | 0.750 |
| M5-60 (mm) | 20.000 | Cv (Winter) | 0.840 |

| | |
|---|---|
| Margin for Flood Risk Warning (mm) | 300.0 |
| Analysis Timestep | 2.5 Second Increment (Extended) |
| DTS Status | OFF |
| DVD Status | ON |
| Inertia Status | ON |

| | |
|---|---|
| Profile(s) | Summer and Winter |
| Duration(s) (mins) | 15, 30, 60, 120, 180, 240, 360, 480 |
| Return Period(s) (years) | 1, 30, 100 |
| Climate Change (%) | 0, 0, 20 |

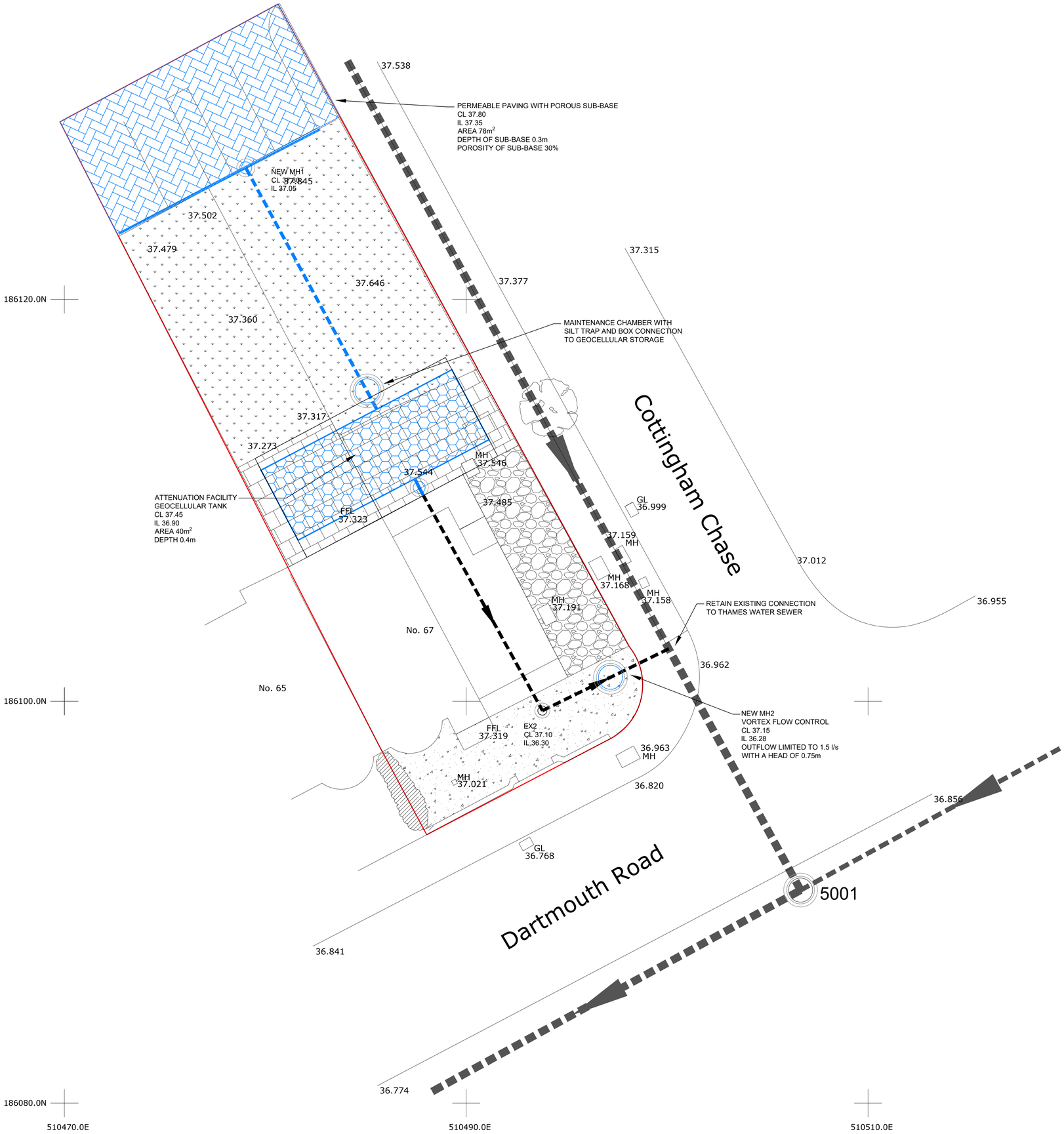
| PN | US/MH Name | Event | US/CL (m) | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) |
|---|---|---|---|---|---|---|
| 1.000 | MH1 | 15 minute 100 year Winter I+20% | 37.800 | 37.104 | -0.096 | 0.000 |
| 1.001 | MH2 - Tank | 60 minute 100 year Winter I+20% | 37.540 | 37.055 | 0.005 | 0.000 |
| 2.000 | EX1a | 15 minute 100 year Winter I+20% | 37.550 | 37.072 | -0.028 | 0.000 |
| 1.002 | EX1 | 15 minute 100 year Winter I+20% | 37.450 | 37.066 | 0.066 | 0.000 |
| 1.003 | EX2 | 15 minute 100 year Winter I+20% | 37.100 | 37.067 | 0.617 | 0.000 |
| 1.004 | MH3 - Flow control | 15 minute 100 year Winter I+20% | 37.150 | 37.065 | 0.735 | 0.000 |

| PN | US/MH Name | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status |
|---|---|---|---|---|---|
| 1.000 | MH1 | 0.28 | | 4.2 | OK |
| 1.001 | MH2 - Tank | 0.18 | | 2.5 | SURCHARGED |
| 2.000 | EX1a | 0.29 | | 5.7 | OK |

## 100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

| PN | US/MH Name | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status |
|---|---|---|---|---|---|
| 1.002 | EX1 | 0.21 | | 7.5 | SURCHARGED |
| 1.003 | EX2 | 0.23 | | 5.1 | FLOOD RISK |
| 1.004 | MH3 - Flow control | 0.07 | | 1.6 | FLOOD RISK |

## ANNEX 8: PROPOSED SURFACE WATER DRAINAGE LAYOUT




## NOTES

1. This drawing to be read in conjunction with all relevant Weetwood drawings.
2. Levels in meters above Ordnance Datum (m AOD) and dimesions in meters (m) unless otherwise stated.

## LEGEND

DRAINAGE KEY

- EXISTING PUBLIC SURFACE WATER SEWER
- EXISTING PRIVATE SURFACE WATER SEWER
- PROPOSED PRIVATE SURFACE WATER SEWER
- EXISTING PUBLIC SURFACE WATER MANHOLE
- EXISTING PRIVATE SURFACE WATER PPIC/MANHOLE
- PROPOSED PRIVATE SURFACE WATER PPIC/MANHOLE
- CHANNEL DRAIN (ACO RAINDRAIN WITH B125 GRATING OR SIMILAR APPROVED)
- SITE BOUNDARY

| Rev | Date | Description | Drawn | Check |
|---|---|---|---|---|
| P3 | 06.01.21 | STORAGE INCREASED, CHANGES TO FINAL MH | HN | GW |
| P2 | 09.07.20 | MAINTENANCE CHAMBER MOVED | HN | GW |
| P1 | 09.07.20 | FIRST ISSUE | HN | GW |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Client
G LISI DEVELOPMENT LTD

| | |
|---|---|
| Drawing Status: PRELIMINARY | Date: JULY 2020 |
| | Scale (A1): 1:100 |
| Project: 67 DARTMOUTH ROAD RUISLIP | Drawn: HN |
| | Checked: GW |
| | Project No: 3766 |
| Title: DRAINAGE LAYOUT | Drawing No: C100 |
| | Revision: P3 |

## ANNEX 9: THAMES WATER CONSULTATION RESPONSE 13 JULY 2020

Miss H Nicholson
Weetwood Services Ltd
70 Cowcross Street
London EC1M 6EJ

Our ref: DS6075665

0800 009 3921
Monday to Friday, 8am to 5pm

13th July 2020

## Pre-planning enquiry: Wastewater Capacity check

Dear Miss Nicholson

Thank you for providing details of your development with the Pre-Planning application dated 8th July 20 for development @ 67 Dartmouth Road Ruislip HA4 0DE

Existing brownfld site ,developed to { One Dwelling } as per your above application.

We have completed the assessment of the foul water flows and surface water run-off based on the information submitted in your application with the purpose of assessing sewerage capacity within the existing Thames Water sewer network, in liaison with TW Asset Planners.

**Foul**

If your proposals progress in line with the details you've provided as above, we're pleased to confirm that there will be sufficient sewerage capacity in the nearest TW foul sewer network to serve your foul discharges from your development, provided it is by gravity.

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 and has to be investigated again.**

**Surface Water**
When developing a site, policy 5.13 of the London Plan and Policy 3.4 of the Supplementary Planning Guidance (Sustainable Design And Construction) states that every attempt should be made to use flow attenuation and SuDS/Storage to reduce the surface water discharge from the site as much as possible.

In accordance with the Building Act 2000 Clause H3.3, positive connection of surface water to a public sewer will only be consented when it can be demonstrated that the hierarchy of disposal methods have been examined and proven to be impracticable. Before we can consider your surface water needs, you'll need written approval from the lead local flood authority that you

have followed the sequential approach to the disposal of surface water and considered all practical means.

The disposal hierarchy being:

1. store rainwater for later use.
2. use infiltration techniques where possible.
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.
8. discharge rainwater to the foul sewer

Where connection to the public sewerage network is still required to manage surface water flows we will accept these flows at a discharge rate in line with CIRIA's best practice guide on SuDS or that stated within the sites planning approval.

If the above surface water hierarchy has been followed and if the flows are restricted to a total of 3 l/s to TW surface water sewer , then Thames Water would not have any objections to the proposal.

Please see the attached 'Planning your wastewater' leaflet for additional information. At the appropriate time, you will have to apply for a S106 connection application to DS Connection team

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.

**Please note that you must 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 sewerage capacity.**

## What happens next?

Please make sure you submit your connection application, when you are ready, 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.

Yours sincerely

Siva Sivarajan

Developer Services- Wastewater Adoptions Engineer
Office:0203 577 7752 Mobile: 07747842608
siva.sivarajan@thameswater.co.uk

Thames Water Utilities Ltd, Clearwater Court, Vastern Road, Reading, Berkshire, RG1 8DB
Find us online at developers.thameswater.co.uk

TW Int ref : DTS 50848

# ANNEX 10: MICRO DRAINAGE RESULTS - SENSITIVITY

## 100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

### Simulation Criteria

| | | | |
|---|---|---|---|
| Areal Reduction Factor | 1.000 | Additional Flow - % of Total Flow | 0.000 |
| Hot Start (mins) | 0 | MADD Factor * 10m³/ha Storage | 2.000 |
| Hot Start Level (mm) | 0 | Inlet Coeffiecient | 0.800 |
| Manhole Headloss Coeff (Global) | 0.500 | Flow per Person per Day (l/per/day) | 0.000 |
| Foul Sewage per hectare (l/s) | 0.000 | | |

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 2 Number of Real Time Controls 0

### Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Ratio R | 0.400 |
| Region | England and Wales | Cv (Summer) | 0.750 |
| M5-60 (mm) | 20.000 | Cv (Winter) | 0.840 |

| | |
|---|---|
| Margin for Flood Risk Warning (mm) | 300.0 |
| Analysis Timestep | 2.5 Second Increment (Extended) |
| DTS Status | OFF |
| DVD Status | ON |
| Inertia Status | ON |

| | |
|---|---|
| Profile(s) | Summer and Winter |
| Duration(s) (mins) | 15, 30, 60, 120, 180, 240, 360, 480 |
| Return Period(s) (years) | 100 |
| Climate Change (%) | 40 |

| PN | US/MH Name | Event | US/CL (m) | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) |
|---|---|---|---|---|---|---|
| 1.000 | MH1 | 15 minute 100 year Winter I+40% | 37.800 | 37.109 | -0.091 | 0.000 |
| 1.001 | MH2 - Tank | 60 minute 100 year Winter I+40% | 37.540 | 37.100 | 0.050 | 0.000 |
| 2.000 | EX1a | 60 minute 100 year Winter I+40% | 37.550 | 37.099 | -0.001 | 0.000 |
| 1.002 | EX1 | 60 minute 100 year Winter I+40% | 37.450 | 37.098 | 0.098 | 0.000 |
| 1.003 | EX2 | 60 minute 100 year Winter I+40% | 37.100 | 37.093 | 0.643 | 0.000 |
| 1.004 | MH3 - Flow control | 60 minute 100 year Winter I+40% | 37.150 | 37.091 | 0.761 | 0.000 |

| PN | US/MH Name | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status |
|---|---|---|---|---|---|
| 1.000 | MH1 | 0.32 | | 4.8 | OK |
| 1.001 | MH2 - Tank | 0.19 | | 2.6 | SURCHARGED |
| 2.000 | EX1a | 0.18 | | 3.5 | OK |

## 100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

| PN | US/MH Name | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status |
|---|---|---|---|---|---|
| 1.002 | EX1 | 0.14 | | 5.1 | SURCHARGED |
| 1.003 | EX2 | 0.16 | | 3.5 | FLOOD RISK |
| 1.004 | MH3 - Flow control | 0.08 | | 1.6 | FLOOD RISK |

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