DL Shaw Construction Ltd

18 Redington Road, Hampstead, London, NW3 7RG

Code for Sustainable Homes Sur 1 and Sur 2 Assessment

132269 – R1(0) – CSH

APRIL 2014

RSK GENERAL NOTES

Project No.: 132269-R1(0)-CSH

Title: 18 Redington Road, Hampstead, London, NW3 7RG – Code for Sustainable Homes Sur 1 and Sur 2 Assessment

Client: DL Shaw Construction Ltd

Date: April 2014

Office: Hemel Hempstead

Status: Final

Author	R Armstrong	**Technical reviewer**	C Whittingham
Signature		Signature	
Date:	10th April 2014	Date:	10th April 2014
Project manager	M Cheeseman		
Signature			
Date:	10th April 2014		

Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK LDE.

CONTENTS

FIGURES

APPENDICES

1 INTRODUCTION

RSK Land & Development Engineering Ltd has been commissioned by DL Shaw Construction Ltd (the client) to undertake a Code for Sustainable Homes Assessment (CSH) (November 2010) of 18 Redington Road, Hampstead, London, NW3 7RG (the site).

This CSH assessment will comprise the Sur 1 Management of Surface Water Runoff from Developments and the Sur 2 Flood Risk elements.

The assessment has been prepared in accordance with the CSH Technical Guide (November 2010) (Ref. 1), the National Planning Policy Framework (NPPF) (Ref. 2) and its accompanying Technical Guidance document (Ref. 3), the Interim Code of Practice for Sustainable Drainage (Ref. 4) and BS 8533-2011 Assessing and Managing Flood Risk in Development Code of Practice (Ref. 5), with site-specific advice from the Environment Agency (EA), the architect and the client.

NPPF sets out the criteria for development and flood risk by stating that inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere. The key definitions are:

- "Areas at risk of flooding" means land within Flood Zones 2 and 3; or land within Flood Zone 1 which has critical drainage problems and which has been notified to the local planning authority by the EA.
- "Flood risk" means risk from all sources of flooding - including from rivers and the sea, directly from rainfall on the ground surface and rising groundwater, overwhelmed sewers and drainage systems, and from reservoirs, canals and lakes and other artificial sources.

The comments given in this report and opinions expressed are subject to RSK Group Service Constraints provided in **Appendix A**.

2 CONTEXT AND SCOPE OF WORKS

A key element of project planning is to prepare a Flood Risk Assessment (FRA) to establish the flood risk associated with the proposed development and to propose a surface water drainage strategy and suitable mitigation, if required, to reduce the risk to a more acceptable level and to ensure flood risk is not increased to the surrounding properties.

The scope of work relating to this FRA is based on the guidance provided in NPPF [(Ref. 2)] and its accompanying Technical Guidance [(Ref. 3)], and in the context of the CSH assessment comprises the following elements:

- To determine the existing site conditions, including obtaining information on the hydrology and hydrological regime in and around the site;
- To review site surface water drainage based on the proposed layout, and to determine the extent of infrastructure required to meet the requirements of Sur 1 of CSH (November 2010);
- To assess the flood impact on the site from climate change over a 100 year period for residential uses;
- To determine the flood risk to the site and to determine the extent of infrastructure required to meet the requirements of Sur 2 of CSH (November 2010); and
- To prepare a report, including calculations and summaries of the source information and elements reviewed, against Sur 1 and Sur 2 requirements of CSH (November 2010).

3 SITE DESCRIPTION

3.1 Location

The site is located is National Grid Reference TQ 25843 85756 (525843E 185756N) in a largely suburban residential area in the London Borough of Camden (LB Camden). The site is accessed via Redington Road, which forms the south-western boundary of the site. The site is bounded to the northwest and southwest by detached residential properties. The site is bounded to the northeast by residential grounds of an adjacent property. A site location plan is shown as **Figure 1**.

The total site area is approximately 1000m^2. The existing site comprises a three-storey detached residential property (including basement workshop level) and associated driveway, two garages, paving and garden areas.

The proposed redevelopment will involve demolition of the existing house and garages, and construction of a new four-storey house connected to a single-storey garage at the front of the property. The existing and proposed layouts are illustrated as **Figure 2**.

3.2 Topography

A topographic survey was undertaken by Greenhatch Group to metres above site datum (mSD). The ground rises steeply to the northeast from Redington Road to the high grounds of Hampstead Heath. The site is situated in a natural hillslope setting and is set on three levels: the bottom of the driveway off Redington Road (49.9mSD, c.102m AOD); the top of the driveway (52.69mSD); and the ground floor level of the house (55.5mSD). A topographic survey is shown in **Appendix B**.

3.3 Hydrology

There are no watercourses or water features within or adjacent to the site.

A tributary of the subterranean 'lost' River Westbourne is located approximately 170m to the west of the site and flows as a sewer in a southerly direction.

The nearest surface watercourses to the site are a number of linked ponds in Hampstead Heath to the northeast of the site, the nearest of which is Whitestone Pond approximately 610m to the northeast of the site.

The subterranean 'lost' River Fleet originates from two springs in Hampstead Heath and flows south to the River Thames (Ref. 6). The Thames is located approximately 8.5km to the south of the site.

Regent's Canal is located approximately 2.9km to the southeast of the site.

The River Brent is located approximately 3km to the northwest of the site.

3.4 Geology

British Geological Survey (BGS) published records (1:50,000 scale geological map No. 256 'North London' and online maps) indicate that there are no superficial deposits underlying the site. The underlying bedrock geology comprises the Bagshot Formation of fine-grained sand, silt and clay. The Bagshot Formation is underlain by the Claygate Member of the London Clay Formation.

A site investigation by RSK [(Ref. 7)] found the Bagshot Formation present beneath the site to a depth of 5.6m below ground level (bgl) and the Claygate Member extending the remainder of the borehole depth to 17m bgl. No groundwater or water seepages were encountered within the Bagshot Formation. Groundwater was encountered within the Claygate Member at 5.6m bgl. It was concluded that a sloping water table (following the slope of the topography from northeast to southwest) is present within the Claygate Member beneath the site.

3.5 Hydrogeology

According to online EA maps, the Bagshot Formation underlying the site comprises a Secondary (A) aquifer. These are defined as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. This aquifer is located within a Groundwater Vulnerability Zone designated as Minor Aquifer High. The site does not fall within a Groundwater Protection Zone.

4 SUR 1 MANAGEMENT OF SURFACE WATER RUNOFF

4.1 Sur 1 Aim

"To design surface water drainage for housing developments which avoid, reduce and delay the discharge of rainfall run-off to watercourses and public sewers using SuDS techniques. This will protect receiving waters from pollution and minimise the risk of flooding and other environmental damage in watercourses."

4.2 Peak Rate of Runoff (mandatory element)

"If there is no increase in the man-made impermeable area as a result of the new development, then the peak rate of run-off criterion does not apply."

The land use of the existing site is shown as **Figures 3**. The land use of the proposed site is shown as **Figure 4**. A comparison of these drawings, as summarised in Table 4.1 below, indicates that there is a decrease in man-made impermeable area of 98m^2 post-development.

Much of the permeable area within the site boundary comprises garden area above the ground floor garage at the front of the property. Although this garden is ultimately underlain by hard standing, it is believed that: a) there will be sufficient depth to allow surface water to infiltrate into the soil; and b) there will be permeable areas of greater depth either side of the garage at the site boundary that will facilitate further infiltration.

Table 4.1: Comparison of existing and proposed land use areas

Land use	Area (m^2)	
	Existing	Proposed
Permeable area	366	464
Impermeable area	644	546
TOTAL	1,010	1,010

With respect to the above, the peak rate of runoff criterion does not apply, and therefore this element has been met by default.

4.3 Volume of Runoff (mandatory element)

"If there is no increase in the man-made impermeable area as a result of the new development, then the volume of run-off criterion does not apply."

As indicated in Section 4.2 above, there is a decrease in man-made impermeable area post-development, therefore the volume of runoff criterion does not apply, and therefore this element has been met by default.

4.4 Designing for Local Drainage System Failure (mandatory element)

"Demonstrate that the flooding of a property would not occur in the event of local drainage system failure (caused either by extreme rainfall or a lack of maintenance)."

It is proposed to retain and utilise the existing sewer system on-site. Any new/reconfigured drainage pipework will be designed and connected to the existing public drainage system off-site [(Ref. 7)]. The proposed redevelopment of the site will offer a reduction in impermeable area being drained, thus reducing the flood risk from this source. The site drainage and any connections to the public network will be designed and maintained to the latest industry standards. The surface water drainage design will follow the principles listed in the Approved Document Part H of the Building Regulations [(Ref. 8)] and Sewers for Adoption 7th Edition [(Ref. 9)]. Surface water sewers shall be designed to a 1 in 5 year no surcharge and 1 in 30 year no flooding standard in accordance with BS EN 752: 2008 [(Ref. 10)]. There will be no flooding of buildings or off-site areas during a 1 in 100 year storm event including an allowance for climate change. Site flow routes will be determined pre-development and submitted as part of the detailed drainage design. The mandatory drainage system criterion has been met.

4.5 Water Quality Criteria (two credits)

"One credit can be awarded by ensuing there is no discharge from the developed site for rainfall depths up to 5mm."

No SuDS components are proposed for the redevelopment works. The credit cannot be awarded.

"One credit can be awarded by ensuring that the runoff from all hard surfaces shall receive an appropriate level of treatment in accordance with The SuDS Manual to minimise the risk of pollution."

No SuDS components are proposed for the redevelopment works. The credit cannot be awarded.

5.9 Sur 1 Assessment Summary

The above confirms that the site meets the mandatory elements of Sur 1 but does not meet the criteria for water quality credits. No credits can be awarded under Sur 1 of the CSH (November 2010).

5 SUR 2 – FLOOD RISK ASSESSMENT

5.1 SUR 2 Aims

"To promote development in low flood risk areas, or to take measures to reduce the impact of flooding on houses built in areas with a medium or high risk of flooding."

"Two credits are available for developments situated in Zone 1 – low annual probability of flooding (as defined in NPPF) and where the site-specific Flood Risk Assessment indicates that there is low risk of flooding from all sources."

The flood risk elements that need to be considered for any site are defined in NPPF as the "Forms of Flooding" and are listed as:

- Flooding from Rivers (fluvial flood risk);
- Flooding from the Sea (tidal flood risk);
- Flooding from the Land (overland pluvial flood risk);
- Flooding from Groundwater;
- Flooding from Sewers (sewer and drain exceedance, pumping station failure etc); and
- Flooding from Reservoirs, Canals and other Artificial Structures.

The following section reviews each of these in respect of the subject site.

5.3 Fluvial Flood Risk

The EA Flood Map (reproduced as **Figure 5**) shows the site to be located within Flood Zone 1. This comprises land assessed as having less than a 1 in 1000 year (<0.1%) annual probability of fluvial and tidal flooding and, according to the Risk of Flooding from Rivers and Sea map (reproduced as **Figure 6**), places the site in a 'very low' risk area.

No other potential sources of fluvial flood risk have been identified at the site.

The North London SFRA [(Ref. 6)] contains no records of fluvial flooding at the site.

The flood risk from fluvial sources is considered to be **low**.

5.4 Tidal Flood Risk

The site is located in Flood Zone 1, beyond the floodplain of the tidal River Thames.

The flood risk from tidal source is considered to be **low**.

5.5 Overland Pluvial Flood Risk

Intense rainfall that is unable to soak into the ground or enter drainage systems can quickly run overland and result in local flooding. This is exacerbated by highly

impermeable urban development or low permeability soils and geology (such as clayey soils).

Areas of steep ground have the potential to generate runoff, which can present a flood source to immediate lower lying areas. This source of flooding is often exacerbated when steep ground is combined with impermeable sub-soils and/or significant areas of development with associated hard standing areas.

The site slopes downwards from the northeast and is therefore susceptible to surface water runoff from the northeast, based on its topography. The surrounding area includes areas of soft landscaping (i.e. gardens) which will reduce the risk of overland flow impacting on the site. Overland flow on Redington Road will not significantly affect the site given the site's habitable level above the road.

The EA Risk of Flooding from Surface Water map (reproduced as **Figure 7**) shows the site and surrounding area to be located in a 'very low' risk area. This equates to a <0.1% annual probability of surface water flooding.

A study by Arup [(Ref. 11)] indicates that neither the site nor Redington Road is located in an area known to have experienced surface water flooding.

The flood risk from surface water is considered to be **low**.

5.6 Flooding from Groundwater

Groundwater flooding occurs when the water held underground rises to a level where it breaks the surface in areas away from usual channels and drainage pathways. Groundwater flooding typically occurs following long periods of sustained intense rainfall and is typically associated with low-lying areas underlain by permeable aquifers.

The SI encountered groundwater within the Claygate Member at 5.6m bgl and concluded that a sloping water table (following the slope of the topography from northeast to southwest) is present within the Claygate Member beneath the site. Groundwater is therefore anticipated to flow in a south-westerly direction away from the site.

According to RSK's Basement Impact Assessment (BIA) [(Ref. 7)] the groundwater level is approximately 0.4m above the proposed floor level in the northeast of the site. The BIA concludes that the proposed development would not have a significant impact on groundwater levels or flows beneath the site, based on appropriate design methods and materials as outlined in the BIA. The proposed basement car park will be designed to the appropriate grade to reduce the risk of groundwater flooding, as outlined in the BIA.

There are no known springs, wells or abstraction points within 250m of the site [(Ref. 7)].

The SFRA [(Ref. 6)] contains no records of groundwater flooding at the site.

Assuming incorporation of the mitigation measures outlined in the BIA, the risk of groundwater inundation of the proposed dwelling is considered to be **low**.

5.7 Flooding from Sewers

Most adopted surface water drainage networks are designed to the criteria set out in Sewers for Adoption [Ref. 9]. One of the design parameters is that sewer systems be designed such that no flooding of any part of the site occurs in a 1 in 30 year rainfall event. By definition a 1 in 100 year event would exceed the capacity of the surrounding sewer network as well as any proposed drainage. When exceeded, the surcharged pipework will lead to flooding from backed up manholes and gully connections, which will lead to immediate flooding within highways surrounding the site.

Thames Water asset location plan indicates that the public combined gravity sewers on Redington Road and Oak Hill Way, to the northwest of the site, fall topographically away from the site. The site area is not a Highlighted Area based in Thames Water Flooding Records (within the SFRA [Ref. 6]). The flooding records held by Thames Water indicate that there have been no incidents of flooding on the site as a result of surcharging public sewers. Thames Water information is contained in **Appendix C**.

The River Westbourne, no considered a sewer, flows away from the site. There is no known flood risk associated with the Westbourne.

Assuming that new infrastructure is installed in line with current best practice, the flood risk from sewers is considered to be **low**.

5.8 Flooding from Reservoirs, Canals and Other Artificial Structures

Flood events can occur from a sudden release of large volumes of water from reservoirs, canals and artificial structures. The EA Risk of Flooding from Reservoirs map provides a worst case scenario of the maximum extent of flooding that would occur in the event that a reservoir were to fail and release the water it holds. The map (reproduced as **Figure 8**) shows that the site is not in an area at risk of flooding from reservoirs.

Regent's Canal is located >3km away from the site. There are no other known structures in the vicinity of the site that could pose a flood risk to the site.

The flood risk from reservoirs, canals and other artificial structures is considered to be **low**.

5.9 Sur 2 Assessment Summary

The above confirms that the site is located within Flood Zone 1 and that flood risk from all sources is low, therefore the maximum two credits can be awarded under Sur 2 of the CSH (November 2010).

6 CONCLUSIONS AND RECOMMENDATIONS

The man-made impermeable area within the site boundary will decrease post-development, therefore the mandatory elements of Sur 1 of the CSH (November 2010) have been met.

The development proposes to retain and utilise the existing sewer system on-site and discharge surface water to public sewer of-site. No SuDS components are proposed. As a result, the development does not meet the criteria for the award of the two credits available for water quality under Sur 1.

The proposed development site is located within Flood Zone 1 according to the latest EA Flood Map. This report has also concluded that the flood risk from all other sources is low.

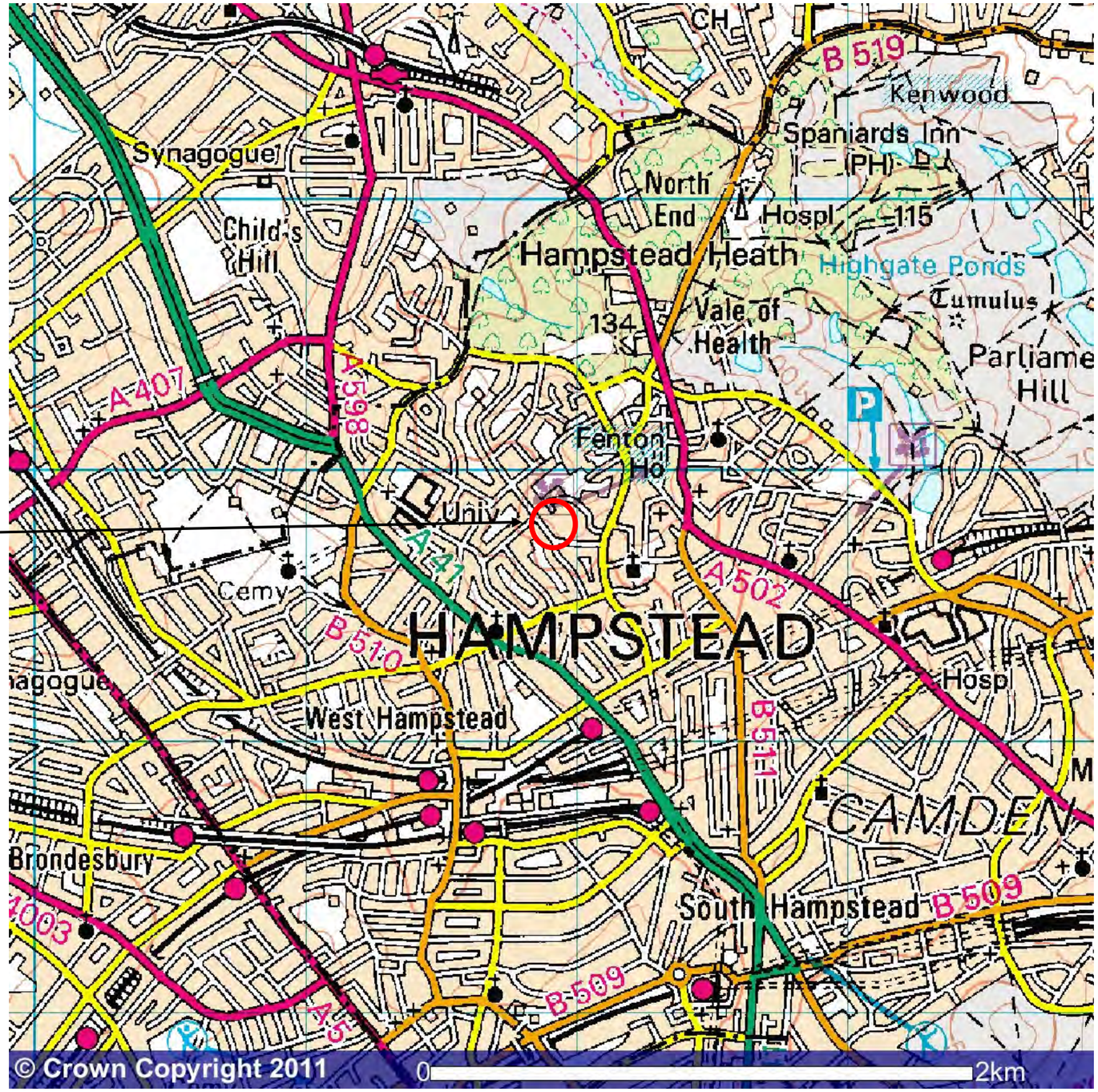
The proposed development is located in a low flood risk area and should be awarded the maximum two credits under Sur 2 of the CSH (November 2010).

REFERENCES

1. Communities and Local Government, “Code for Sustainable Homes Technical Guide”, November 2010.
2. Communities and Local Government, “National Planning Policy Framework”, March 2012.
3. Communities and Local Government, “Technical Guidance to the National Planning Policy Framework”, March 2012.
4. DEFRA, “Interim Code of Practice for Sustainable Drainage Systems” National SUDS Working Group, July 2004.
5. BS 8533-2011 "Assessing and Managing Flood Risk in Development Code of Practice", November 2011.
6. Mouchel, “North London Strategic Flood Risk Assessment, August 2008.
7. RSK Environment Ltd, “Basement Impact Assessment”, ref. 25250-01(01), December 2011.
8. HM Government, "The Building Regulations 2010: Approved Document H – Drainage and Waste Disposal (2002 Edition incorporating 2010 amendments)", December 2010, plus 2013 Amendments to Approved Documents.
9. WRC, “Sewers for Adoption”, 7th Edition, 2012.
10. BS EN 752: 2008, “Drain and Sewer Systems Outside Buildings”, April 2008.
11. Arup, “Camden Geological, Hydrogeological and Hydrological Study: Guidance for Subterranean Development”, November 2010.

FIGURES

Site



RSK	**SITE LOCATION PLAN**	**Client:**	DL Shaw Construction Ltd	**Figure No:**	1
		Site:	18 Redington Road, Hampstead, London, NW3 7RG	**Job No:**	132269
		Scale:	NTS	**Source:**	Ordnance Survey

Proposed House
Total Gross Internal Areas
House = 588m² (6329 sq ft)
Garage Level = 323m² (3476 sq ft)

Proposed Cross Section B-B through Site
Scale 1:100 @A1

Existing House
Total Gross Internal Areas
House = 336m² (3624 sq ft)
Garages+Workshop = 73m² (789 sq ft)

Existing Cross Section A-A through Site
Scale 1:100 @A1

RSK

EXISTING AND PROPOSED SITE PLANS

Client:	DL Shaw Construction Ltd	**Figure No:**	2
Site:	18 Redington Road, Hampstead, London, NW3 7RG	**Job No:**	132157
Scale:	NTS	**Source:**	Client

Total site area = 1010m²

Building footprint = 224 m²
Hard standing = 420 m²
Soft landscaping = 366 m²

CIVIL / STRUCTURAL DESIGN RISK MANAGEMENT

Abnormal or unusual residual risks associated with the design outcomes shown on this drawing are:-

RSK LDE LTD has followed its Design Risk Management process for Hazard Elimination and Risk reduction in developing the designs shown on this drawing.
Abnormal or unusual residual risks may be shown above where it is considered that such risk may not normally be expected by competent persons engaged on work of this nature or type.

Notes:

1. Underlying topographic survey taken from Greenhatch Group drawing no. 11489a_OGL dated August 2007.

Legend:

- SITE BOUNDARY
- BUILDING FOOTPRINT
- HARD STANDING
- SOFT LANDSCAPING

Rev.	Date	Amendment	Drawn	Chkd.	Appd.

RSK

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Client

DL Shaw Construction Ltd

Project Title

18 REDINGTON ROAD,
LONDON, NW3 7RG

Drawing Title

EXISTING SITE LAND USE

Drawn	Date	Checked	Date	Approved	Date
RA	08.04.14	CW	09.04.14	MC	10.04.14

Scale	Orig Size	Dimensions
1:100	A1	m

Project No.	Drawing File
132269	132269\Graph\10-01

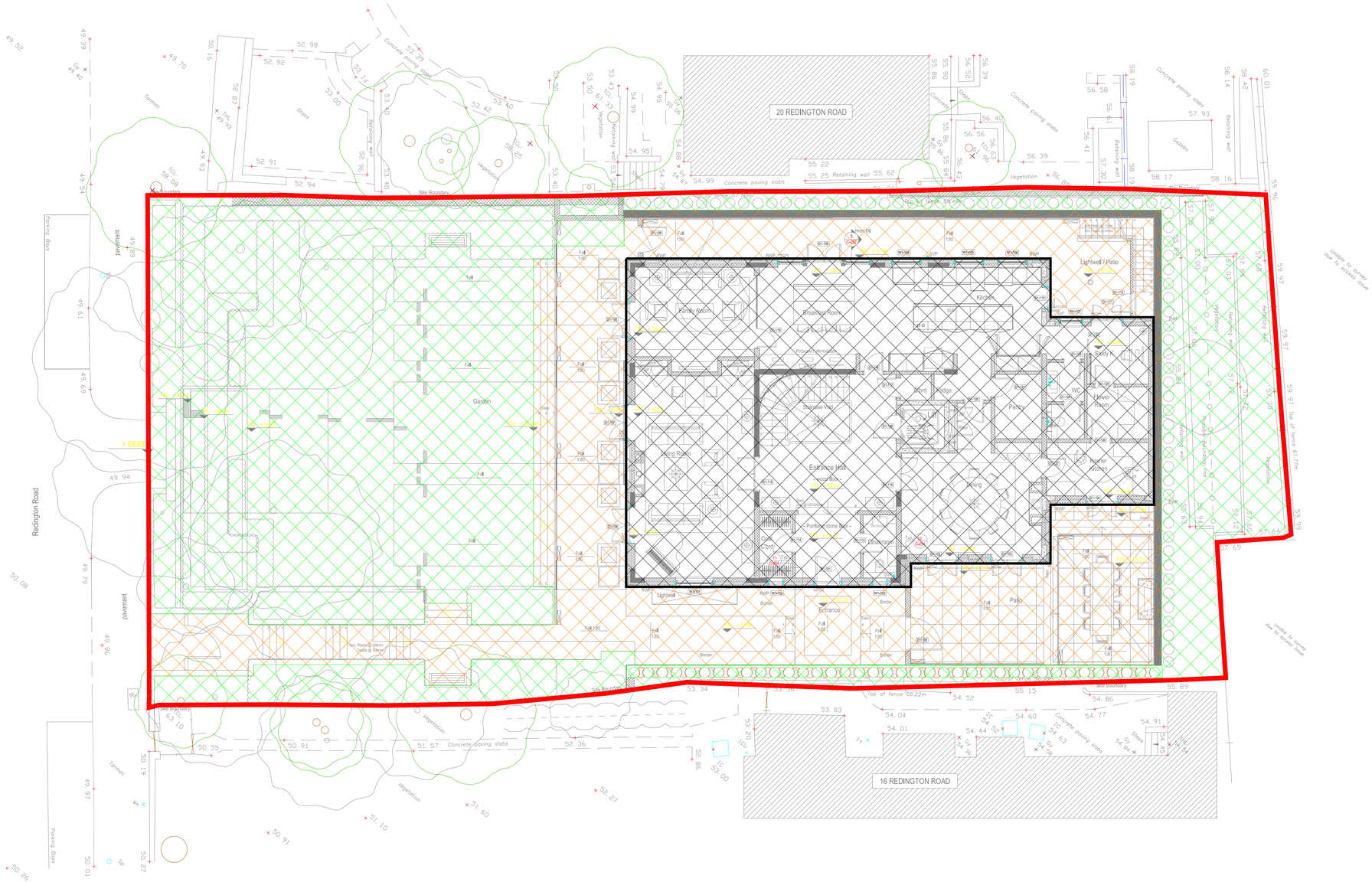
Drawing No.	Rev.
10-01	P1

Scale
0 1 2 3 4 5m

File Location: K:\132269 - 18 REDINGTON ROAD, HAMPSTEAD\GRAPH\FLOOD RISK\10-01 EXISTING.DWG

Total site area = 1010m²

Building footprint = 283 m²
Hard standing = 263 m²
Soft landscaping = 464 m²



CIVIL / STRUCTURAL DESIGN RISK MANAGEMENT

Abnormal or unusual residual risks associated with the design outcomes shown on this drawing are:-

RSK LDE LTD has followed its Design Risk Management process for Hazard Elimination and Risk reduction in developing the designs shown on this drawing.
Abnormal or unusual residual risks may be shown above where it is considered that such risk may not normally be expected by competent persons engaged on work of this nature or type.

Notes:

1. Underlying proposed drawing taken from Design Solutions drawings numbers C-001_00, C-200_01, C-200_02, C-201_01, C-202_01, C-203_01 and C-204_01 dated January 2014.

Legend:

- SITE BOUNDARY
- BUILDING FOOTPRINT
- HARD STANDING
- SOFT LANDSCAPING

Rev.	Date	Amendment	Drawn	Chkd.	Appd.

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Client

DL Shaw Construction Ltd

Project Title

18 REDINGTON ROAD,
LONDON, NW3 7RG

Drawing Title

PROPOSED SITE LAND USE

Drawn	Date	Checked	Date	Approved	Date
RA	07.04.14	CW	09.04.14	MC	10.04.14

Scale	Orig Size	Dimensions
1:100	A1	m

Project No.	Drawing File
132269	132269\Graph\40-01

Drawing No.	Rev.
40-01	P1

Scale
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File Location: K:\132269 - 18 REDINGTON ROAD, HAMPSTEAD\GRAPH\FLOOD RISK\40-01 PROPOSED.DWG

Environment Agency

Enter a postcode or place name: NW3 7RG Go

Other topics for this area... Flood Map for Planning (Rivers and Sea)

Flood Map for Planning (Rivers and Sea)

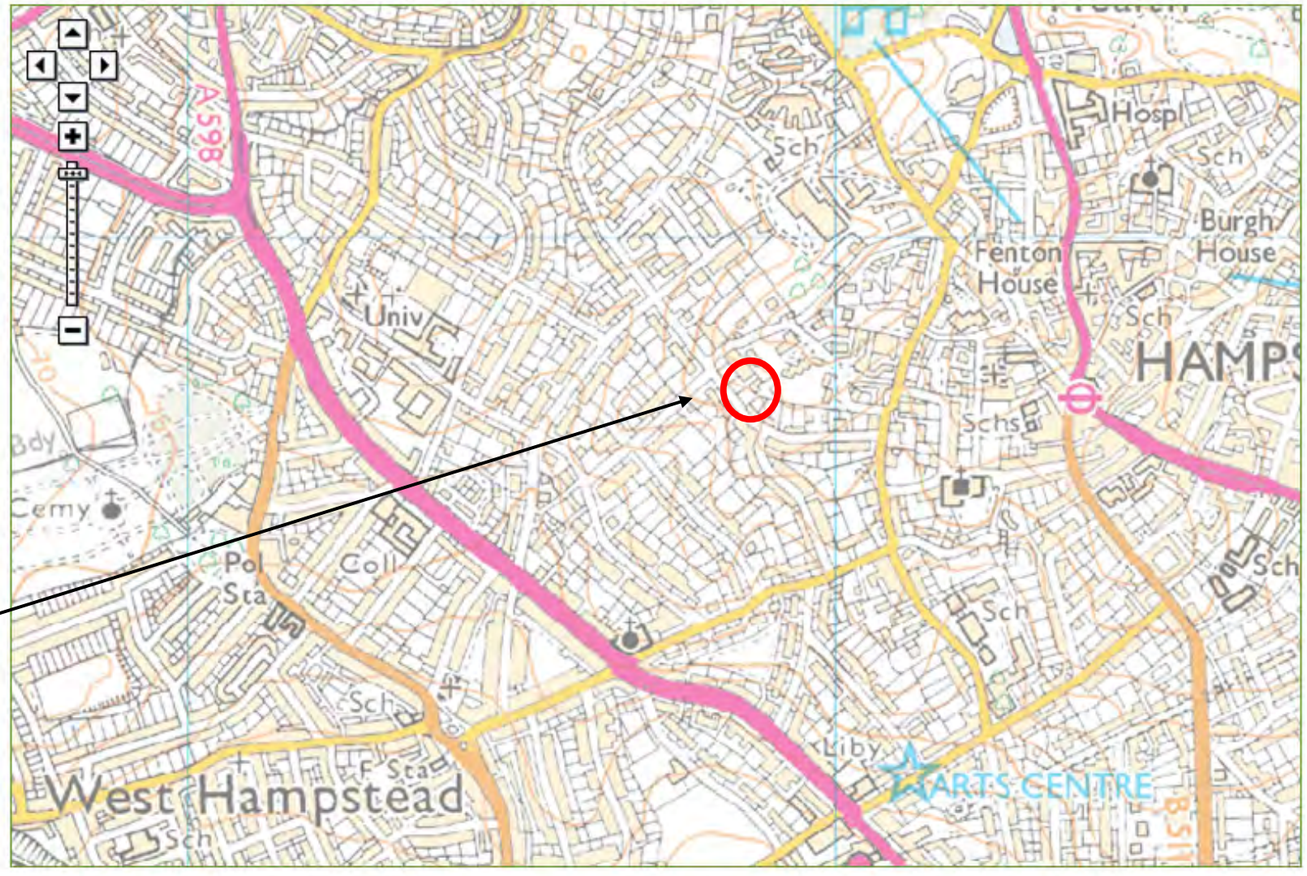
Map legend

Click on the map to see what Flood Zone (National Planning Policy Guidance definitions) the proposed development is in.

- Flood Map for Planning (Rivers and Sea)
- Flood Zone 3
- Flood Zone 2
- Flood defences (Not all may be shown*)
- Areas benefiting from flood defences (Not all may be shown*)
- Main rivers

NW3 7RG at scale 1:10,000

Data search Text only version



Site

RSK

ENVIRONMENT AGENCY RIVER AND SEA FLOOD MAP

Client:	DL Shaw Construction Ltd	**Figure No:**	5
Site:	18 Redington Road, Hampstead, London, NW3 7RG	**Job No:**	132157
Scale:	NTS	**Source:**	Environment Agency

Environment Agency

Enter a postcode or place name: Go

Other topics for this area... Risk of Flooding from Rivers and Sea

View other Interactive Maps

Risk of Flooding from Rivers and Sea

River flooding happens when a river cannot cope with the amount of water draining into it from the surrounding land. Sea flooding happens when there are high tides and stormy conditions.

The shading on the map shows the risk of flooding from rivers and the sea in this particular area.

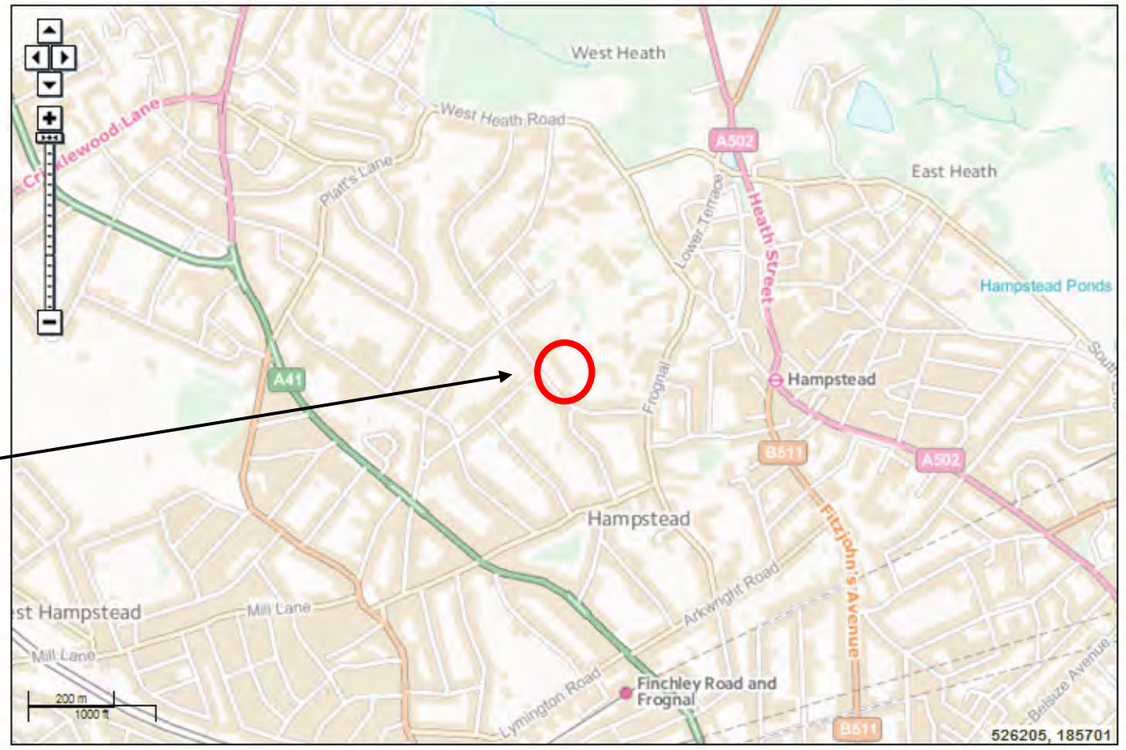
Click on the map for a more detailed explanation.

Map of X: 525,874; Y: 185,783 at scale 1:10,000

Data search

Map legend

- Risk of Flooding from Rivers and Sea
- High
- Medium
- Low
- Very Low



Site

RSK

ENVIRONMENT AGENCY RISK OF FLOODING FROM RIVERS AND SEA

Client:	DL Shaw Construction Ltd	**Figure No:**	6
Site:	18 Redington Road, Hampstead, London, NW3 7RG	**Job No:**	132157
Scale:	NTS	**Source:**	Environment Agency

Environment Agency

Enter a postcode or place name: Go

Other topics for this area... Risk of Flooding from Surface Water View other Interactive Maps

Risk of Flooding from Surface Water

Surface water flooding happens when rainwater does not drain away through the normal drainage systems or soak into the ground, but lies on or flows over the ground instead.

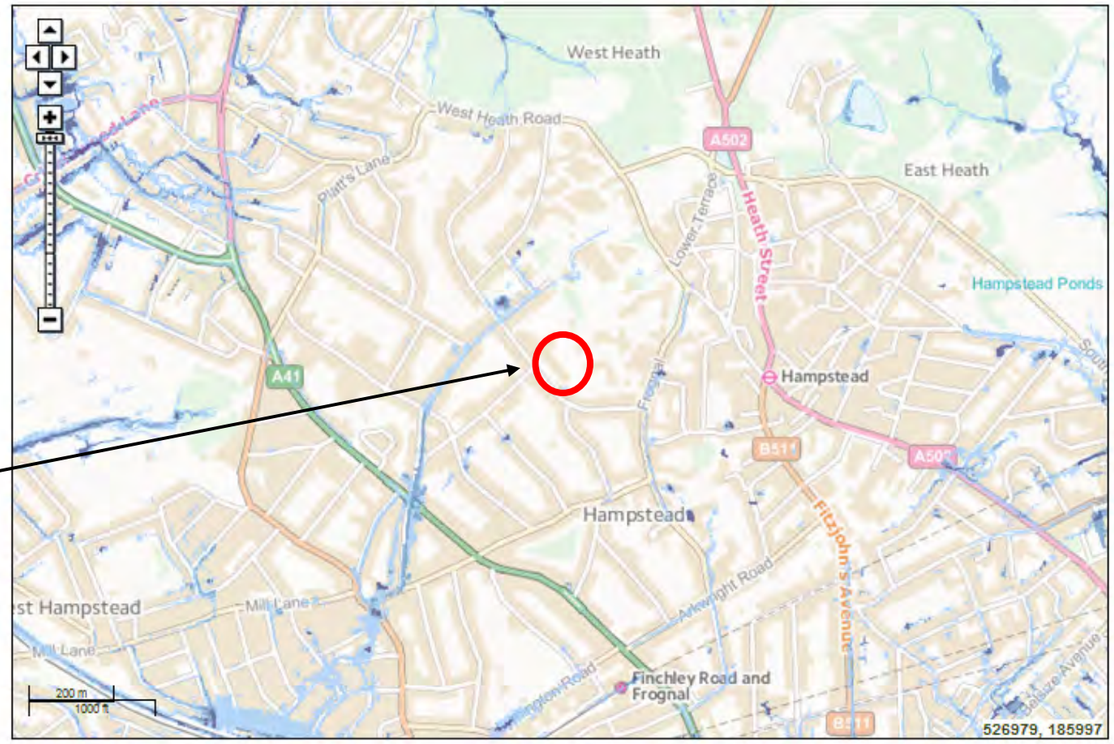
The shading on the map shows the risk of flooding from surface water in this particular area.

Click on the map for a more detailed explanation.

Map of X: 525,874; Y: 185,783 at scale 1:10,000 Data search

Map legend

- Risk of Flooding from Surface Water
- High
- Medium
- Low
- Very Low



Site

RSK	**ENVIRONMENT AGENCY RISK OF FLOODING FROM SURFACE WATER**	**Client:** DL Shaw Construction Ltd	**Figure No:** 7
		Site: 18 Redington Road, Hampstead, London, NW3 7RG	**Job No:** 132157
		Scale: NTS	**Source:** Environment Agency

Environment Agency

Enter a postcode or place name: Go

Other topics for this area... Risk of Flooding from Reservoirs View other Interactive Maps

Risk of Flooding from Reservoirs

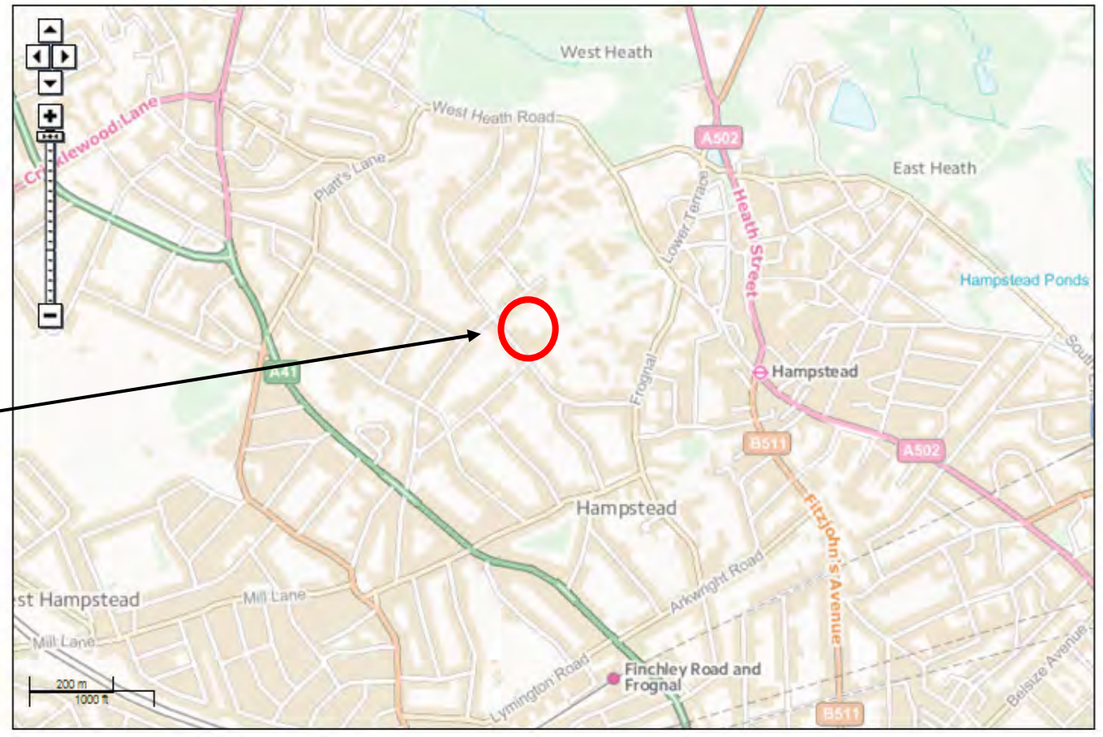
Reservoir flooding is extremely unlikely to happen.

The shading on the map shows the area that could be flooded if a large reservoir were to fail and release the water it holds. A large reservoir is one that holds over 25,000 cubic metres of water, equivalent to approximately 10 Olympic sized swimming pools. Since this is a worst case scenario, it's unlikely that any actual flood would be this large.

Click on the shading to see details of reservoirs that could cause flooding in this area.

Map of X: 525,874; Y: 185,783 at scale 1:10,000 Data search

Map legend
- Risk of Flooding from Reservoirs
- Maximum extent of flooding



Site

RSK	**ENVIRONMENT AGENCY RISK OF FLOODING FROM RESERVOIRS**	**Client:**	DL Shaw Construction Ltd	**Figure No:**	8
		Site:	18 Redington Road, Hampstead, London, NW3 7RG	**Job No:**	132157
		Scale:	NTS	**Source:**	Environment Agency

APPENDIX A

RSK Service Constraints

RSK GROUP
SERVICE CONSTRAINTS

1. This report along with the Code for Sustainable Homes pro-forma (together the "Services") was compiled by RSK LDE Ltd (RSK) for DL Shaw Construction Ltd (the "client") in accordance with the terms of a contract between RSK and the "client" dated October 2013. The Services were performed by RSK with the skill and care ordinarily exercised by a reasonable Civil Engineer at the time the Services were performed. Further, and in particular, the Services were performed by RSK taking into account the limits of the scope of works required by the client, the time scale involved and the resources, including financial and manpower resources, agreed between RSK and the client.

2. Other than that expressly contained in paragraph 1 above, RSK provides no other representation or warranty whether express or implied, in relation to the Services.

3. Unless otherwise agreed the Services were performed by RSK exclusively for the purposes of the client. RSK is not aware of any interest of or reliance by any party other than the client in or on the Services. Unless expressly provided in writing, RSK does not authorise, consent or condone any party other than the client relying upon the Services. Should this report or any part of this report, or otherwise details of the Services or any part of the Services be made known to any such party, and such party relies thereon that party does so wholly at its own and sole risk and RSK disclaims any liability to such parties. Any such party would be well advised to seek independent advice from a competent environmental consultant and/or lawyer.

4. It is RSK's understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was a significant factor in determining the scope and level of the Services. Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances by the client without RSK's review and advice shall be at the client's sole and own risk. Should RSK be requested to review the report after the date hereof, RSK shall be entitled to additional payment at the then existing rates or such other terms as agreed between RSK and the client.

5. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of RSK. In the absence of such written advice of RSK, reliance on the report in the future shall be at the client's own and sole risk. Should RSK be requested to review the report in the future, RSK shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between RSK and the client.

6. The observations and conclusions described in this report are based solely upon the Services, which were provided pursuant to the agreement between the client and RSK. RSK has not performed any observations, investigations, studies or testing not specifically set out or required by the contract between the client and RSK. RSK is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the Services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, RSK did not seek to evaluate the presence on or off the site of asbestos, electromagnetic fields, lead paint, heavy metals, radon gas or other radioactive or hazardous materials.

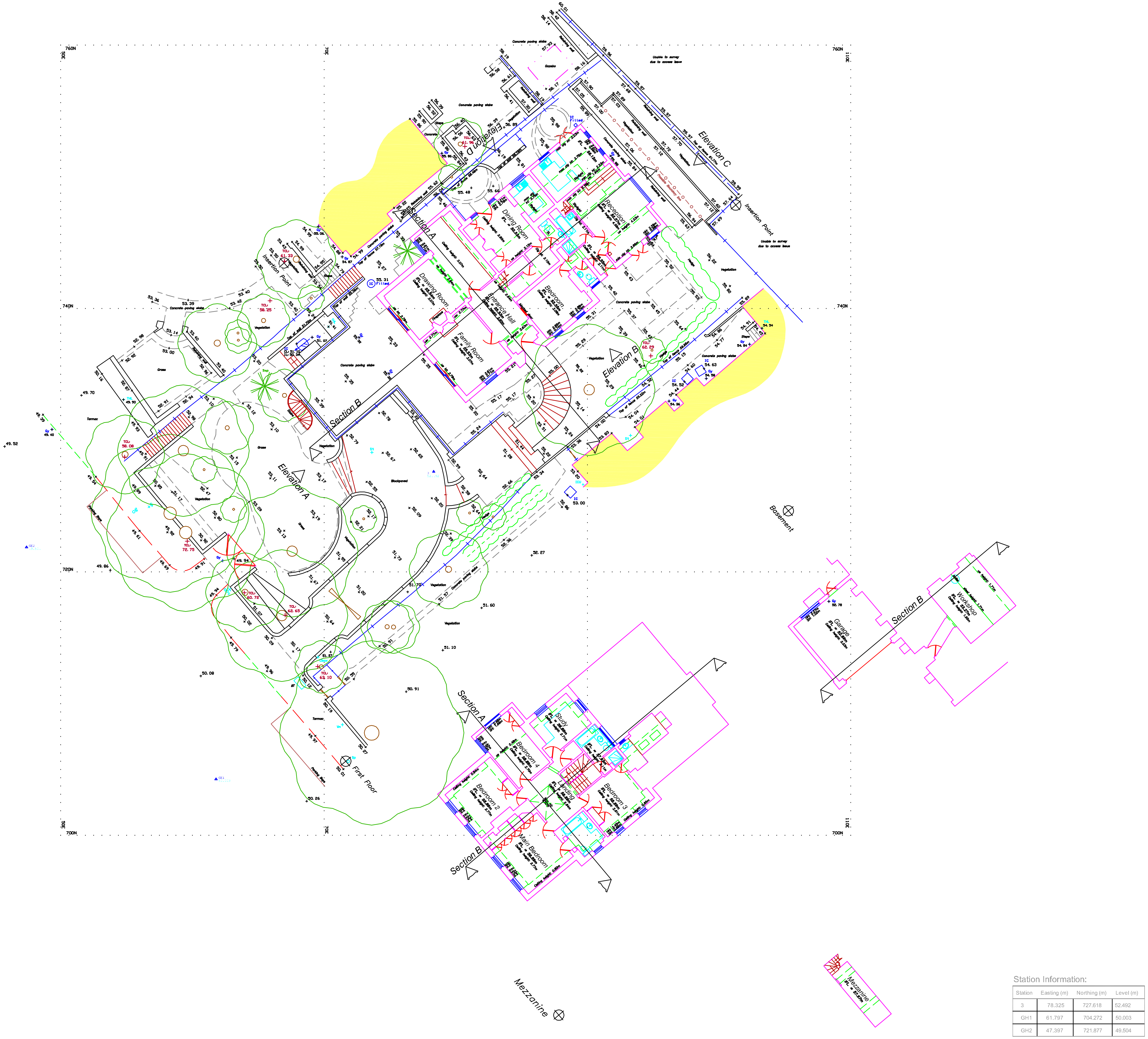
7. The Services are based upon RSK's observations of existing physical conditions at the Site gained from a walk-over survey of the site together with RSK's interpretation of information including documentation, obtained from third parties and from the client on the history and usage of the site. The Services are also based on information and/or analysis provided by independent testing and information services or laboratories upon which RSK was reasonably entitled to rely. The Services clearly are limited by the accuracy of the information, including documentation, reviewed by RSK and the observations possible at the time of the walk-over survey. Further RSK was not authorised and did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the Services. RSK is not liable for any inaccurate information or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to RSK and including the doing of any independent investigation of the information provided to RSK save as otherwise provided in the terms of the contract between the client and RSK.

8. The phase II or intrusive environmental site investigation aspects of the Services is a limited sampling of the site at pre-determined borehole and soil vapour locations based on the operational configuration of the site. The conclusions given in this report are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around those locations. The extent of the limited area depends on the soil and groundwater conditions, together with the position of any current structures and underground facilities and natural and other activities on site. In addition chemical analysis was carried out for a limited number of parameters [as stipulated in the contract between the client and RSK] [based on an understanding of the available operational and historical information,] and it should not be inferred that other chemical species are not present.

9. Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan, but is (are) used to present the general relative locations of features on, and surrounding, the site.

APPENDIX B

Topographic Survey



N

Note:

Some services may have been omitted due to parked vehicles.
The Ordnance Survey tile is to be used as a guide only.

OS Buildings — Surveyed Buildings

This survey has been orientated to the Ordnance Survey (O.S) National Grid (OSGB36) via a Global Position System (GPS) and the O.S. Active Network (OS Net).

A true OSGB36 coordinate has been established near to the site centre via a transformation using the OSTN02 & OSGM02 transformation models.
The survey has been correlated to this point and a further one or more OSGB36 points established to create a true O.S. bearing for angle orientation.

No scale factor has been applied to the survey therefore the coordinates shown are arbitrary & not true O.S. Coordinates which have a scale factor applied.

Please refer to Survey Station Table to enable establishment of the on-site grid.

Legend:

Fence types:

Rev	Date	Description	Drawn	Q. Ref
1	17.07.13	Additional survey	JS	C805

greenhatch group

Topographical Surveys
Site Engineering
Measured Building Surveys
3D Laser Scanning

Rowan House
Duffield Road
Little Eaton
Derby
DE21 5DR
Tel (01332) 830044 Fax (01332) 830055
admin@greenhatch-group.co.uk

CLIENT
BTP Group

PROJECT
18 Redington Road,
Hampstead,
London

TITLE
Detailed Floor Plans
& Topographical

SCALE	DATE	DRAWN	QUALITY REF
1:200	August 07	PG	JO

Level datum	Arbitrary
Grid orientation	Arbitrary
Job number	11489a

Drawing No.	Rev.
11489a_OGL	1

Comments
This plan should only be used for its original purpose. GreenHatch Ltd accepts no responsibility for this plan if supplied to any party other than the original client.

All dimensions should be checked on site prior to design and construction.

Drainage information (where applicable) has been visually inspected from the surface and therefore should be treated as approximate only.

Notes:

DO NOT SCALE

Station Information:

Station	Easting (m)	Northing (m)	Level (m)
3	78.325	727.618	52.492
GH1	61.797	704.272	50.003
GH2	47.397	721.877	49.504

APPENDIX C

Thames Water Sewer Records

Asset Location Search

Thames Water Property Searches
12 Vastern Road
READING
RG1 8DB

Search address supplied
18
Redington Road
London
NW3 7RG

Your reference 25250
Our reference ALS/ALS/24/2011_2132236

Search date 29 November 2011

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

Thames Water Utilities Ltd

Property Searches
PO Box 3189
Slough SL1 4WW

DX 151280 Slough 13

T 0118 925 1504
F 0118 923 6655/57
E searches@thameswater.co.uk
I www.thameswater-propertysearches.co.uk

Asset Location Search

Search address supplied: 18, Redington Road, London, NW3 7RG

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.

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 0118 925 1504, or use the address below:

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

Tel: 0118 925 1504
Fax: 0118 923 6657

Email: searches@thameswater.co.uk
Web: www.thameswater-propertysearches.co.uk

Thames Water Utilities Ltd

Property Searches
PO Box 3189
Slough SL1 4WW

DX 151280 Slough 13

T 0118 925 1504
F 0118 923 6655/57
E searches@thameswater.co.uk
I www.thameswater-propertysearches.co.uk

Registered in England and Wales
No. 2366661, Registered office
Clearwater Court, Vastern Road
Reading RG1 8DB

Asset Location Search

Waste Water Services

Please provide a copy extract from the public sewer map.

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

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

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

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

For your guidance:

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

Clean Water Services

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

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

For your information, there will be a pressure of at least 10m head at the outside stop valve. If you would like to know the static pressure, please contact our Customer Centre on 0845 920 0800. The Customer Centre can

Thames Water Utilities Ltd

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I www.thameswater-propertysearches.co.uk

Registered in England and Wales
No. 2366661, Registered office
Clearwater Court, Vastern Road
Reading RG1 8DB

Asset Location Search

also arrange for a full flow and pressure test to be carried out for a fee.

For your guidance:

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

Payment for this Search

A charge will be added to your suppliers account.

Thames Water Utilities Ltd

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Reading RG1 8DB

Asset Location Search

Further contacts:

Waste Water queries

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

If you have any questions regarding sewer connections, 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
Clear Water Court
Vastern Road
Reading
RG1 8DB

Tel: 0845 850 2777
Fax: 0118 923 6613
Email: developer.services@thameswater.co.uk

Should you require any further information regarding budget estimates, diversions or stopping up notices then please contact:

DevCon Team
Asset Investment
Thames Water
Maple Lodge STW
Denham Way
Rickmansworth
Hertfordshire
WD3 9SQ

Tel: 01923 898 072
Fax: 01923 898 106
Email: devcon.team@thameswater.co.uk

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I www.thameswater-propertysearches.co.uk

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No. 2366661, Registered office
Clearwater Court, Vastern Road
Reading RG1 8DB

Asset Location Search

Clean Water queries

Should you require any advice concerning clean water operational issues or clean water connections, please contact our Kew Service Desk by writing to:

Clean Water Design
Thames Water Utilities
1 Kew Bridge Road
Brentford
Middlesex
TW8 0EF

Tel: 0845 850 2777
Fax: 0208 213 8833
Email: developer.services@thameswater.co.uk

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PO Box 3189
Slough SL1 4WW

DX 151280 Slough 13

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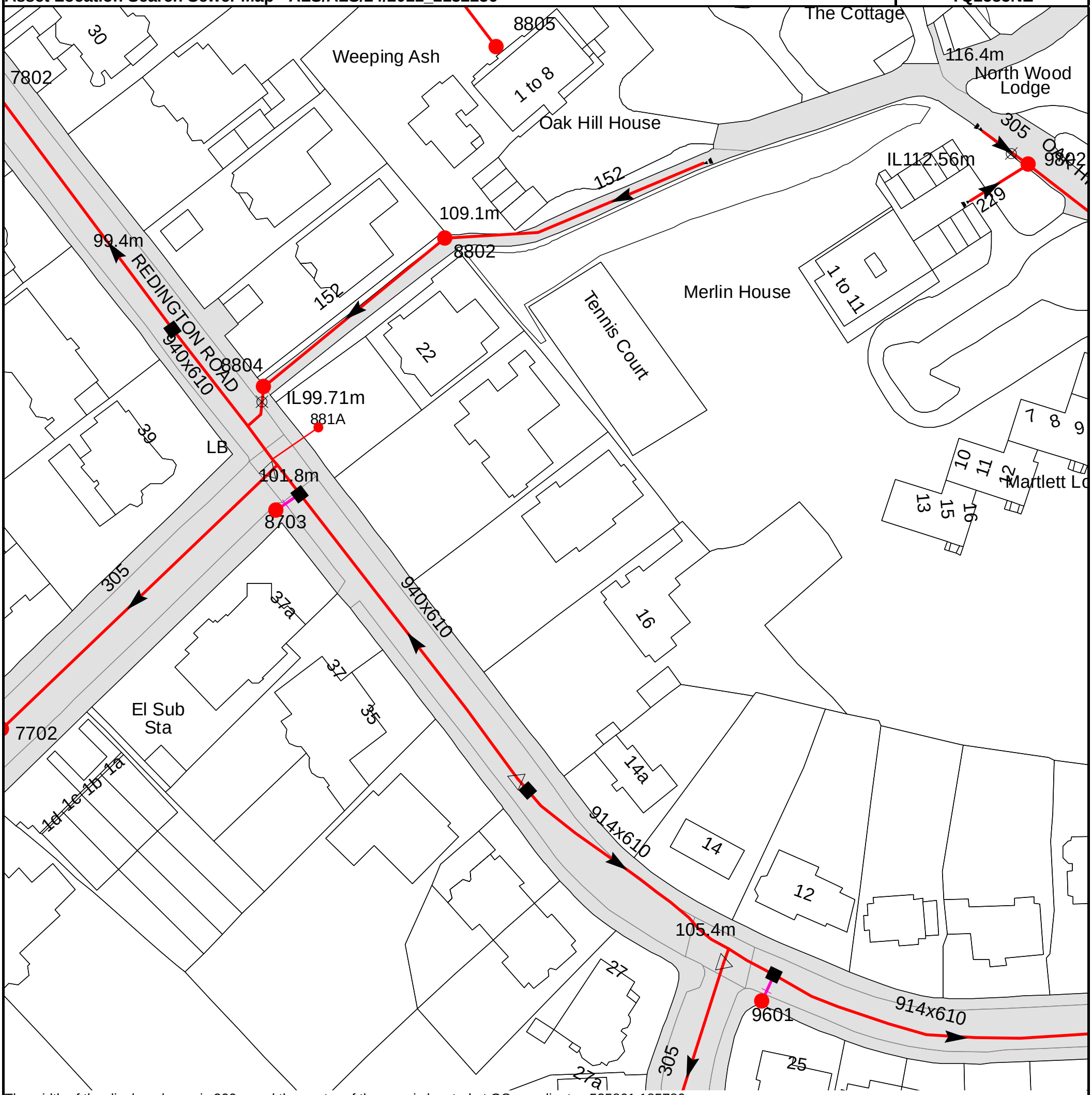
F 0118 923 6655/57
E searches@thameswater.co.uk
I www.thameswater-propertysearches.co.uk

Registered in England and Wales
No. 2366661, Registered office
Clearwater Court, Vastern Road
Reading RG1 8DB

Asset Location Search Sewer Map - ALS/ALS/24/2011_2132236	TQ2585NE



The width of the displayed area is 200m and the centre of the map is located at OS coordinates 525861,185780

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
881A	n/a	n/a
9802	116.4	112.34
8805	n/a	n/a
9601	n/a	n/a
8804	101.54	n/a
8703	n/a	n/a
-	-	-
8802	108.39	108.03

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.

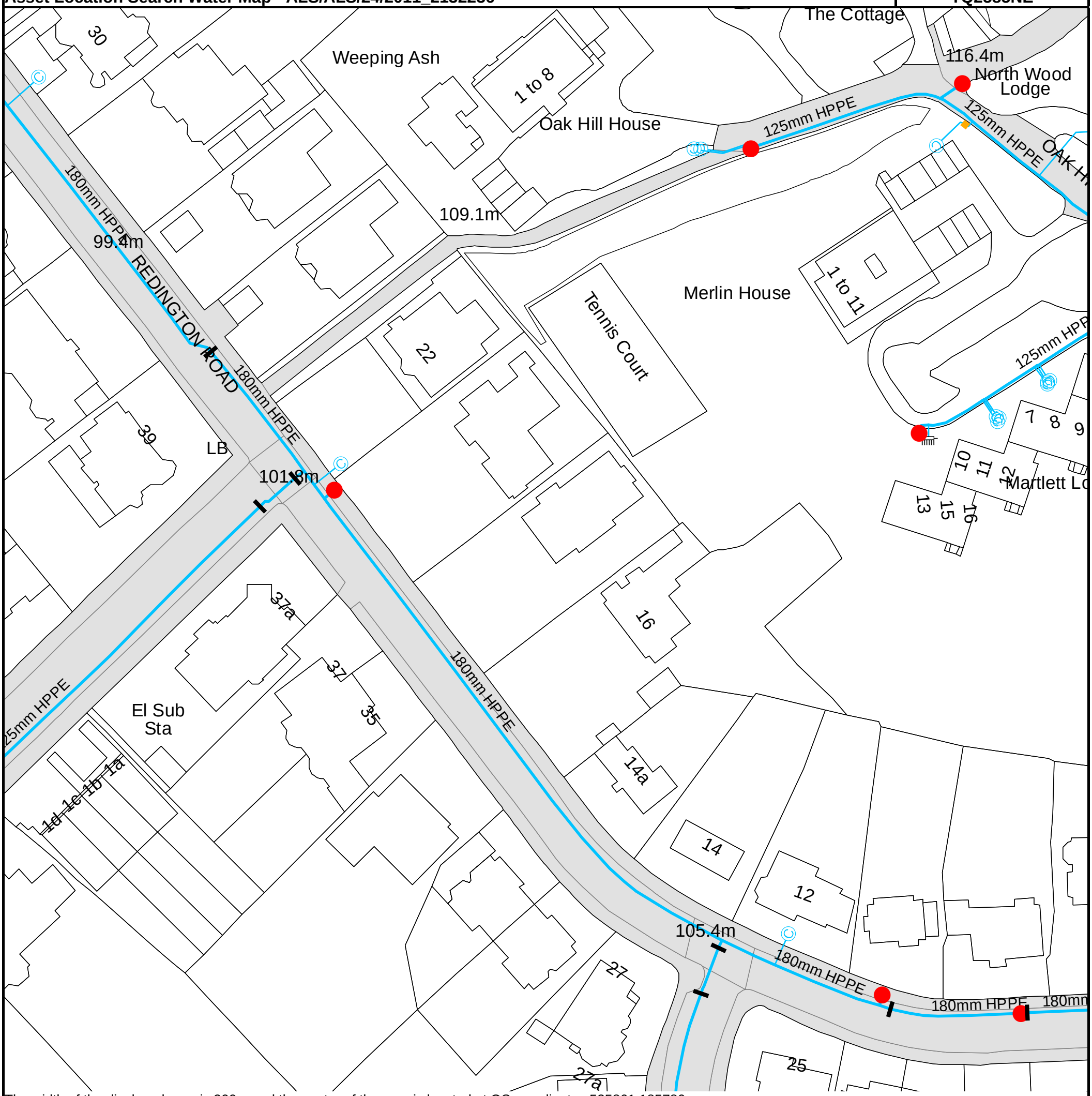
3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.

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 Searches on 0118 925 1504.

Asset Location Search Water Map - ALS/ALS/24/2011_2132236	TQ2585NE



The width of the displayed area is 200m and the centre of the map is located at OS coordinates 525861,185780

ALS Water Map Key

Water Pipes (Operated & Maintained by Thames Water)

4"

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

16"

Trunk Main: A main carrying water from a source of supply to a treatment plant or reservoir, or from one treatment plant or reservoir to another. Also a main transferring water in bulk to smaller water mains used for supplying individual customers.

3" SUPPLY

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

3" FIRE

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

3" METERED

Metered Pipe: A metered main indicates that the pipe in question supplies water for a single property or group of properties and that quantity of water passing through the pipe is metered even though there may be no meter symbol shown.

Transmission Tunnel: A very large diameter water pipe. Most tunnels are buried very deep underground. These pipes are not expected to affect the structural integrity of buildings shown on the map provided.

Proposed Main: A main that is still in the planning stages or in the process of being laid. More details of the proposed main and its reference number are generally included near the main.

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

Valves

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

Hydrants

- Single Hydrant

Meters

- Meter

End Items

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

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

Operational Sites

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

Other Symbols

- Data Logger

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

Other Water Company Main: Occasionally other water company water pipes may overlap the border of our clean water coverage area. These mains are denoted in purple and in most cases have the owner of the pipe displayed along them.

Private Main: Indiates that the water main in question is not owned by Thames Water. These mains normally have text associated with them indicating the diameter and owner of the pipe.

Sewer Flooding

History Enquiry

Thames Water Property Searches
12
Vastern Road
Reading
RG1 8DB

Search address supplied

18
Redington Road
London
NW3 7RG

Your reference 25250

Our reference SFH_SFH_Standard_2011_2132243

Search date **29 November 2011**

Thames Water Utilities Ltd

Property Searches
PO Box 3189
Slough SL1 4WW

DX 151280 Slough 13

T 0118 925 1504
F 0118 923 6655/57
E searches@thameswater.co.uk
I www.thameswater-propertysearches.co.uk

Registered in England and Wales
No. 2366661, Registered office
Clearwater Court, Vastern Road
Reading RG1 8DB

Sewer Flooding

History Enquiry

Search address supplied: 18, Redington Road, London NW3 7RG

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

Thames Water Utilities Ltd

Property Searches
PO Box 3189
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I www.thameswater-propertysearches.co.uk

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Reading RG1 8DB

Sewer Flooding

History Enquiry

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.

Although Thames Water does not have records of public sewer flooding within the vicinity, please be aware that property owners are not legally obliged to report this flooding to Thames Water. In addition flooding from private sewers, watercourses and highways drains are not the responsibility of Thames Water, and such incidents may not be noted in our records. We therefore strongly advise you to contact the current owners and occupiers of the premises and inquire about sewer flooding.

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: 0845 9200 800 or website www.thameswater.co.uk

Thames Water Utilities Ltd

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APPENDIX D

Sur 1 Summary Template Sheet

Category 4: Surface Water Runoff

Sur 1 Summary Template – November 2010 Version

Introduction

This template can be used to demonstrate compliance with the criteria specified in Sur 1 in the Code for Sustainable Homes (for the November 2010 version). The form can be used by the Code Assessor to aid in assessing the Sur 1 issue and can be provided as supporting evidence **in addition** to the items listed in the schedule of evidence for Sur 1. Completing this template is optional.

National policy documents have been used to set the standards for the mandatory element of Sur 1. PPS25 Development and Flood Risk (ODPM, 2006) and the SuDS manual are two of the key documents used. Further reading is listed in the References section of the Technical Guide.

Instructions

Where submitting this template as supporting evidence for a Code assessment please ensure that the **assessor completes the contact details (page 2)** and the **appropriately qualified professional completes the rest of the template**, ensuring that it is signed and dated.
If the form is incomplete and / or unsigned it will not be accepted as evidence supporting a Code assessment.

The Technical Guide states the calculation methodologies to be used to demonstrate compliance with some aspects of the criteria, for example the greenfield runoff rates. Although flexibility in choice of methodology is available for some of the criteria, best practice methodologies should always be used. If required, information regarding applicable calculation methodologies can be found in the SUDS Manual (CIRIA, 2007). Reputable software, such as Microdrainage, can be used for calculation purposes.

BREEAM Office
BRE
Garston
Watford WD25 9XX
Tel: 01923 664462
E-mail: csh@bre.co.uk

Web site: www.breeam.org.uk

The below sections to be completed by the Assessor	
Contact Details	
Consultant/engineer details	
Sur 1 Summary Template completed by:-	
Company Name	RSK Land & Development Engineering Ltd
Company Address	18 Frogmore Road, Hemel Hempstead, Hertfordshire, HP3 9RT
Contact Name	Ross Armstrong
Contact Telephone Number	01442 437548
Developer/client details	
Company Name	DL Shaw Construction Ltd
Company Address	Flat D, 3 Frognal, London, NW3 6AL
Contact Name	Karen Midgen
Contact Telephone Number	07956426675
Development details	
Development Name	18 Redington Road
Development Address	London, NW3 7RG
BRE Reference Number	
Client Reference Number (if applicable)	
Number of dwellings on the site:	1 residential property

All of the following sections of the template to be completed by the Engineer / Consultant		
MANDATORY REQUIREMENTS		
Appropriately Qualified Professional		
1. ☒	I can confirm that I am an appropriately qualified professional in line with the Code definition.[1]	
Assessment Information		
2.	For sites containing a mixture of non-Code and Code assessed dwellings there are several assessment options for Sur 1. The first would be to assess the whole site (including the non-Code dwellings) under the Code criteria. The second would be to demonstrate with several separate reports that each group of Code dwellings (and the associated sub catchments serving those dwellings) on the site have met the criteria individually. Please tick one of the following boxes;	
☐	A. The site contains a mixture of Code and non-Code dwellings and the whole site has been assessed under the Sur 1 criteria including any associated sub catchments serving these dwellings.	
	OR	
☐	B. The site contains a mixture of Code and non-Code dwellings and there is more than one assessed area for Sur 1 within the site boundary. Please write the number of assessed areas within the site in the space provided below (you will need to complete this template for each assessed area)[2]. **Number of assessed areas:**	
	OR	
☒	C. The site only contains Code assessed dwellings and the associated sub catchment serving those dwellings.	
Site Information		
3.	A. Please provide the site area[3] (delete units of measurement as applicable)	**1,010 m²**
	B. Please provide the impermeable area of the site pre-development (delete units of measurement as applicable)	**675 m²**

[1] Refer to the technical guide for details on the definition of an appropriately qualified professional.
[2] It would aid the QA process to provide a site plan highlighting each assessment area and highlighting which area is being assessed in this report.
[3] The site area will include all areas within the boundaries of the site, including both permeable and impermeable areas. If box 2B has been ticked, the 'site area' will be only that for which this template demonstrates compliance.

	C. Please provide the impermeable area of the site post development (delete units of measurement as applicable)	**546 m²**
Special Cases[4]		
4.	Please tick the relevant box below to identify where a special case applies for the site:	
☒	A. The impermeable area has decreased as a result of the development, and the mandatory element of this issue has been met by default.	
☐	B. A minimum flow rate or maximum storage requirement has been set by the sewerage undertaker (or other statutory body).	
☐	C. Planning approval has been granted for the detailed drainage strategy prior to the Code requirement being set for the development.	
☐	D. The assessed dwelling is directly connected to existing infra-structure which pre-dates the Code requirement.	
5.	Tick one or both of the following to confirm if some or all of the highways will be omitted from the impermeable areas in the calculations for one of the following reasons[5]:	
☐	A. The highways are being adopted	
☒	B. The Code dwellings are being built beside existing highways.	
SECTION 1: Peak Rate of Runoff		
6.	A. Pre-development peak rate of runoff for the **1 year return period event** [6]	**l/s**
	B. Post-development peak rate of runoff for the **1 year return period event** [6] (this figure must be less than or equal to A, except where the 5l/s rule has been used)	**l/s**
	C. Pre-development peak rate of runoff for the **100 year return period event** [6]	**l/s**

[4] Refer to the Technical Guide for details on the supporting evidence required to demonstrate compliance with these special cases. This evidence must be provided to demonstrate how the special case is being met.

[5] Refer to the technical guide for details on when an adoptable road can be omitted from the assessment.

[6] Peak rate of runoff calculations should be carried out for the range of storm durations up to and including the 6 hour storm. The peak rate of runoff for the storm event will then be the 'worst case' runoff rate for the range of storm durations. The climate change allowance should be added only to the post development calculations.

	D. Post-development peak rate of runoff for the **100 year return period event** [6] (this figure must be less than or equal to C, except where the 5l/s rule has been used)	**l/s**
7. ☐	Please tick this box to confirm that the 5l/s rule has been applied where the peak rates of runoff have increased post development, but are still equal to or less than 5l/s.	
8.	If, post-development, it was necessary to reduce the peak rate of runoff to meet the Code criteria, please provide a brief explanation below describing how the peak rate was reduced. For example, 'soakaways reduce the peak rate of runoff to pre-development levels'.[7]	
	N/A ☒	
9. ☐	Please tick this box to confirm that the post development peak rate of runoff calculations include an allowance for climate change in accordance with current best practice (PPS25, 2006).	
10.	Please tick one of the following boxes as applicable to this site:	
☐	A. This is a greenfield site and is less than 50 ha therefore runoff rate calculations have been carried out in accordance with the IH Report 124 'Flood estimation for small catchments' (Marshall and Bayliss, 1994). The pro rata method on the size of catchment detailed in table 4.2 of the SuDS manual has been used.	
☐	B. This is a greenfield site of 50 to 200 ha therefore runoff rate calculations have been carried out in accordance with the IH Report 124 'Flood estimation for small catchments' (Marshall and Bayliss, 1994).	
☐	C. This is a greenfield site of more than 200 ha (or where there is a preference to do so and the catchment is considered suitable for its application) therefore runoff rate calculations have been carried out in accordance with the 'Flood estimation handbook' (Centre for Ecology and Hydrology, 1999).	

[7] Note that detailed documentary evidence (as per the schedule of evidence table in the Technical guide) is required to demonstrate how the peak rate of runoff has been reduced.

☐	D. This is a greenfield site of more than 200ha where the Flood Estimation handbook is considered inappropriate for the development therefore the IH Report 124 has been used.
☐	E. This is a brownfield site and runoff rates have been calculated in accordance with current best practice simulation modelling.
☐	F. This is a Brownfield site where the pre development surface water drainage system is not known therefore the runoff rates have been calculated using the Greenfield run-off model ticked above (please tick the relevant methodology), but using soil type 5.

SECTION 2: Volume of Runoff		
Section 2A		
11. ☐	Please tick this box to confirm that the following post development volume of runoff calculations include an allowance for climate change in accordance with current best practice (PPS25, 2006).	
☐	Please tick this box to confirm that the following volume of runoff calculations are for the 100 year event of 6 hour duration.	
12.	A. Pre-development volume of runoff	**m^3**
	B. Volume of runoff caused by the new development **prior to mitigation**	**m^3**
	C. **Additional** predicted volume of rainwater caused by the new development prior to mitigation (= 12B – 12A)	**m^3**
	D. If the answer to 12C is greater than zero, please provide a brief explanation below describing how you have reduced the additional volume discharged from the developed site, for example, 'soakaways will infiltrate all of the additional volume':	
	N/A ☐ (criterion 2A cannot be satisfied, see section 13)	
	Please provide the additional volume of runoff discharged from the site when all (if any) mitigation measures described in 12D are in place.	**m^3**
13.	A. Where there is an increase in the volume of runoff as a result of the development and criteria 2A cannot be satisfied via infiltration or other SuDS techniques (as listed below), please provide an explanation below (evidence to support the reasoning should be provided in the hydrological report):	
	Soakaways: Porous/Pervious paving:	

	Rainwater re-use harvesting: Green Roof: Other surface infiltration techniques: N/A ☐ (all additional volumes of run-off have been dealt with)

Section 2B	
14.	Where it has not been possible to reduce all of the additional volume by infiltration or other SuDS techniques, the volume of runoff should be discharged in accordance with one of the following rates of runoff, whichever is the higher. Please tick one of the boxes below to confirm the level of flow control that has been achieved:
☐	A. The peak discharge rate has been reduced to pre development 1 year peak flow rate
	Please state the pre development 1-year peak flow rate l/s
	OR
☐	B. The peak discharge rate has been reduced to the site's estimated mean annual flood flow rate (Qbar).
	Please state Qbar: l/s
	OR
☐	C. The peak discharge rate has been reduced to 2l/s/ha.
	Please state the peak discharge rate at 2l/s/ha: l/s
	OR
☐	D. The limiting discharge rate requires a flow rate of less than 5l/s at a discharge point, therefore a flow rate of up to 5l/s has been used.

SECTION 3: Designing for Local Drainage System failure	
15. ☒	Tick here to confirm that the consequences of system failure caused by extreme rainfall, lack of maintenance, blockage or other causes, have been considered and evaluated fully and there will be no increased risk to dwellings either on or off site.[8]

AWARDING OF CREDITS: WATER QUALITY CRITERIA[9]	
16. ☐	A. Tick here to confirm that there will be no discharge from the developed site for rainfall depths up to 5 mm. Please provide a brief explanation below describing how the runoff from rainfall depths up to 5 mm will be prevented from leaving the site:
☐	B. Tick here to confirm that the runoff from all hard surfaces shall receive an appropriate level of treatment in accordance with the SuDS Manual to minimise the risk of pollution to the receiving watercourse. Please provide a brief explanation below describing how the hard surfaces will receive an appropriate level of treatment:

[8] Refer to the technical guide for details on the evidence that would be required to demonstrate that this has been considered fully.
[9] Note that where the mandatory element has been met by special cases 3. C and 3.D, no credits can be achieved.

Signature	
The following declaration should be signed by the appropriately qualified professional responsible for ensuring that the development meets the Sur 1 mandatory criteria and the necessary criteria to allow the awarding of credits, where applicable.	
I confirm that the information provided in this document is truthful and accurate at the time of completion.	
Name of Appropriately Qualified Professional:	Ross Armstrong
Signature of Appropriately Qualified Professional:	
Date:	10th April 2014