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Basement Impact Assessment Report
(Stages 1 & 2 Screening/Scoping Exercise)

Desk Studies | Risk Assessments | Site Investigations | Geotechnical | Contamination Investigations | Remediation Design and Validation

Site: 36 Redington Road, London NW3

Client: Mill Hill Properties Ltd

Report Date: May 2015

Project Reference: J11894 Rev02

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A INTRODUCTION

1 Introduction

The object of this study was to produce an impact assessment for the proposed basement construction on this site in accordance with the requirements of the London Borough of Camden. Their requirements are set out within their Development Policy DP27 – Basements and Lightwells, the LB Camden guidance document entitled "Camden geological, hydrogeological and hydrological study – Guidance for subterranean development" and Camden Planning Guidance document CPG4 – Basements and Lightwells.

This report covers the initial desk study, screening and scoping processes, referred to as Stages 1 and 2 in CPG4.

2 Scope

This report presents our desk study findings and our interpretation of these data.

The findings and opinions conveyed via this report are based on information obtained from a variety of sources as detailed within this report, and which Southern Testing Laboratories Limited believes are reliable. Nevertheless, Southern Testing Laboratories Limited cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

This report was conducted and prepared for the sole internal use and reliance of Mill Hill Properties Ltd and the appointed Engineers. This report shall not be relied upon or transferred to any other parties without the express written authorization of Southern Testing Laboratories Limited. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill.

The recommendations contained in this report may not be appropriate to alternative development schemes.

B THE SITE

3 Site Location

The site is referred to as 36 Redington Road and is located in the Hampstead area of London, to the south and west of Hampstead Heath. It is approximately centred at National Grid Reference TQ 257 859.

The site is a rough rectangular shape with a width of around 10 to 15m and some 40m in depth from the frontage. The existing two-storey semi detached house has a single-storey extension and garage to the side, taking up the entire width of the plot. The rear garden area is set to lawn, the front garden area is again lawn with a concrete driveway and path. There is an established hedge at the front and forming the boundaries to the rear garden. There are a number of mature trees along the eastern boundary. Immediately to the west the other half of the semi-detached house (No. 38 Redington Road) has been redeveloped with a three-storey building with a double level basement extending both to the front and rear of the building. To the east is a two-storey detached house (7 Redington Road), which does not appear to have any basement structures.

In the immediate area around this site the buildings are almost entirely detached residential properties of varying sizes.

A site location plan is presented as Figure 1.

4 Proposed Development

The proposals for this site are to demolish the existing building and redevelop the site with a new three-storey residential property including a single level basement. The footprint of the new building will be slightly bigger than the existing above ground, but extends out below the existing front and rear garden areas.

The appended Figure 2A illustrates the proposals.

C GROUND CONDITIONS

5 Published Geological Data

The British Geological Survey Map No 256 indicates that the site geology consists of Claygate Member overlying London Clay.

The study site is marked on appended Figure 3 based upon the North Camden Geological Map figure taken from "Camden geological, hydrogeological and hydrological study – Guidance for subterranean development", which indicates the same mapped geology.

6 Previous Ground Investigation data

Very few publicly available records of ground investigation or historical boreholes are shown on the BGS website. The borehole information that is available does not disagree with the published information.

D HYDROLOGY & HYDROGEOLOGY

Data from the Environment Agency and other information relating to controlled waters is summarised below. The groundwater vulnerability assessment is based on the current data on the EA website.

Data		Remarks	Possible Hazard to/from Site Y/N
Aquifer Designation	Superficial Deposits	No superficial Deposits present.	N

Data		Remarks	Possible Hazard to/from Site Y/N
	Bedrock	Secondary A aquifer, relating to the Bagshot Formation and Claygate Member. These are 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. These are generally aquifers formerly classified as minor aquifers	Y
Groundwater Vulnerability		Minor Aquifer High.	Y
Abstractions		The site on the website on 8th August 2014 does not show any abstractions within the area.	N
Source Protection Zones		The site on the website on 8th August 2014 is not shown within an area mapped as overlying a SPZ.	N
Surface Water Features		The nearest feature is a pond on Hampstead heath some 550m to the northeast.	N
Marine/Fluvial Flood Risk		The site on the website on 8th August 2014 is not shown within an area mapped as being at risk.	N
Surface Water Flood Risk		The site on the website on 8th August 2014 is shown within an area mapped as being at low to high risk.	Y
Reservoir Flood Risk		The site on the website on 8th August 2014 is not shown within an area mapped as being at risk.	N

7 Shallow Groundwater

Shallow groundwater is contained within the Claygate Member, which forms part of a 'secondary' aquifer in this area. These soils are seen as around 5m thick beneath this site.

Groundwater information obtained from the site indicates that standing levels are around 1.0m BGL. It is believed that the groundwater gradient/flow will be in a southeasterly direction.

8 Surface Water Features

No culvert, rivers and or other water bodies are known within the immediate vicinity of the site.

From information shown on appended Figures 4, 5 & 6 this site is located at or near two historical branches of the headwaters of a tributary of the River Westbourne. A pond on the western side of Hampstead Heath about 550m to the northeast represents the nearest surface water features. The site is also outside the catchment of the Hampstead Heath ponds.

E UNDERGROUND STRUCTURES

9 Basements

From our walkover survey of the local area and from a search of London Borough of Camden online planning applications, it appears that the neighbouring property have just constructed a two level basement. The neighbouring property to the east (7 Redington Gardens) is a two-storey dwelling which does not appear (visually or from planning applications) to have a basement. This is at its nearest point around 5m from the proposed basement construction.

10 Transport & Other Infrastructure

No tunnels are known to be present within the immediate vicinity of the site.

F BASEMENT IMPACT ON STRUCTURAL STABILITY

11 Structural Stability

DP27 "Maintain the structural stability of the building and neighbouring properties".

The proposed development consists of a new basement significantly small in size and depth to the adjacent property at 38 Redington Road. Due to the presence of groundwater at approximately 1.0m below existing ground levels, the new basement will need to be formed using a watertight construction. It is thought at this stage will be formed using secant or contiguous piled walls with suitable waterproofing/drainage measures. The walls would be designed to resist lateral pressures from the water, soil and adjacent party wall.

The walls would be propped during the construction phase using some flying shores/diagonal bracing and in the permanent condition through the new basement floor slabs.

The extent and nature of propping, and the size and detail of the piled wall will be explored during the detailed design phase of the works in order to allow discussions with the party wall surveyor to occur.

Throughout the construction phase the party wall with 38 Redington Road and the property at 7 Redington Gardens would need to be monitored for both movement and vibration to make sure these are within acceptable limits.

G STAGE 1 - SCREENING EXERCISE

Guidance from Camden Borough Council through its Development and Planning documents require that any development proposal which includes a subterranean basement should be screened in order to determine whether there is an requirement for a full BIA to be carried out.

The existing building on the site does not have a basement, but the proposed new building will include a basement. Therefore screening **is required**.

In this section, the screening flowchart questions contained within CPG4 are addressed in turn.

12 Surface Flow and Flooding

Question 1	**Is the site within the catchment of the pond chains on Hampstead Heath?**	**Action Required**
	No. The site is outside the Golders Hill Chain Catchment, which is about 300m to the north (see Figure 5).	None
Question 2	**As part of the proposed site drainage, will surface water flows (e.g. volume of rainfall and peak run-off) be materially changed from the existing route?**	
	Yes. There will be increase in hard surfaced area. The current proposal is to re-use the existing storm water connections to the Thames Water sewer. Subject to a more detailed condition survey of these connections, it is not envisaged that any new connections will be required.	Take to Stage 2 Scoping
Question 3	**Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas?**	
	Yes. There will be an increase in the area of hard surfaced/paved areas as roof areas have increased and part of the footprint of the proposed basement covers an area currently used as garden/soft landscaping.	Take to Stage 2 Scoping
Question 4	**Will the proposed basement result in changes to the profile of the inflows (instantaneous and long-term) of surface water being received by adjacent properties or downstream watercourses?**	
	No. The proposed basement will not alter surface water flows downstream as they will use existing connections to the sewer network.	None
Question 5	**Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?**	
	No. The quality of the surface water should be unaltered that is discharged to the sewer.	None
Question 6	**Is the site in an area known to be at risk from surface water flooding, such as South Hampstead, West Hampstead, Gospel Oak and King's Cross, or is it at risk from flooding, for example because the proposed basement is below the static water level of a nearby surface water feature?**	
	Yes, the site is close to Templewood Avenue and Gardens which are recorded to have flooded in 2002 (see Figure 7) and table in CPG4.	Take to Stage 2

	However just to the east of 36 Redington Road where Redington Gardens and Heath Drive meet, the road is at a significantly lower elevation, lessening the local effect to this site significantly.	Scoping

13 Groundwater Flow

Question 1a	**Is the site located directly above an aquifer?**	**Action Required**
	Yes. The site is located above the northern aquifer, designated a Secondary A Aquifer by the EA which comprises Claygate Member and Bagshot Formation, see Figure 8.	Take to Stage 2 Scoping
Question 1b	**Will the proposed basement extend beneath the water table surface?**	
	Yes. The water table is within the Claygate Member. Proposed retaining walls around the basement cut into the underlying London Clay.	Take to Stage 2 Scoping
Question 2	**Is the site within 100m of a watercourse, well (used/disused) or potential spring line?**	
	Yes. The nearest historical watercourse is within 50m of the site, see Figure 6, any current surface water features are in excess of 100m from the site. We are unaware of any waterwells within the immediate area. Springlines for the adjacent Golders Hill Chain Catchment are greater than 100m to the north of this site. See Figure 5.	Take to Stage 2 Scoping
Question 3	**Is the site within the catchment of the pond chains on Hampstead Heath?**	
	No. The site is outside the Highgate Chain Catchment, around 300m to the south (see Figure 5).	None
Question 4	**Will the proposed basement development result in a change in the proportion of hard surfaced /paved areas?**	
	Yes. The new basement will increase the area of hard surfaced/paved areas as the proposed roof area is larger and footprint of the proposed basement covers an area which is currently garden.	Take to Stage 2 Scoping
Question 5	**As part of the site drainage, will more surface water (e.g. rainfall and run-off) than at present be discharged to the ground (e.g. via soakaways and/or SUDS)?**	
	No. Due to the low permeability of the soils present all surface water will be discharged to the sewer network through existing connections, replicating the existing arrangement. The volume of water will	None

	increase from the existing condition.	
Question 6	**Is the lowest point of the proposed excavation (allowing for any drainage and foundation space under the basement floor) close to, or lower than, the mean water level in any local pond (not just the pond chains on Hampstead Heath) or spring line?**	
	No. There are no known local water features in the immediate vicinity of this site, however the historical watercourse of River Westbourne appears to be located very close to it.	None

14 Slope Stability

Question 1	**Does the existing site include slopes, natural or manmade, greater than 7 degrees? (approximately 1 in 8)**	**Action Required**
	No. The site has shallower slopes than 7 degrees within its boundaries.	None
Question 2	**Will the proposed re-profiling of landscaping at site change slopes at the property boundary to more than 7 degs? (approximately 1 in 8)**	
	No. There is no re-profiling proposed.	None
Question 3	**Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7 degs? (approximately 1 in 8)**	
	No. But around 100m to the east is a shallow valley feature with slopes in excess of 7 degrees, see Figure 9.	None
Question 4	**Is the site within a wider hillside setting in which the general slope is greater than 7 degrees? (approximately 1 in 8)**	
	No. The site is located on a hillside setting sloping towards the southwest, but with slopes in the main at less than 7 degrees, see Figure 9.	None
Question 5	**Is the London Clay the shallowest strata at the site?**	
	No. The Claygate Member underlies the site, see Figure 3.	None
Question 6	**Will any tree/s be felled as part of the proposed development and/or are any works proposed within any tree protection zones where trees are to be retained? (Note that consent is required from LB Camden to undertake work to any tree/s protected by a Tree Protection Order or to tree/s in a Conservation Area if the**	

	tree is over certain dimensions).	
	No trees are to be felled, but the proposals are very close to trees on the eastern boundary.	None
Question 7	**Is there a history of seasonal shrink-swell subsidence in the local area, and/or evidence of such effects at the site?**	
	No. We have no evidence indicating any possible shrink-swell subsidence in the local area.	None
Question 8	**Is the site within 100m of a watercourse or a potential spring line?**	
	No. The nearest watercourse or springline is in excess of 100m from this site, see Figures 4 & 5, but it is within 100m of the historical water course (see Figure 6).	None
Question 9	**Is the site within an area of previously worked ground?**	
	No. The site is not within an area shown as having been worked.	None
Question 10	**Is the site within an aquifer? If so, will the proposed basement extend beneath the water table such that dewatering may be required during construction?**	
	Yes. The site does overlie an area of aquifer (Claygate Member/Bagshot Formation), see Figure 8. The proposed basement will be below the standing water levels recorded on site (around 1m BGL). Limited dewatering would be anticipated during construction, as a secant or contiguous piled wall construction method would be used.	Take to Stage 2 Scoping
Question 11	**Is the site within 50m of the Hampstead Heath ponds?**	
	No. See Figure 4.	None
Question 12	**Is the site within 5m of a highway or pedestrian right of way?**	
	Yes.	Take to Stage 2 Scoping
Question 13	**Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?**	
	No. The proposed lowest point of the proposals are around 3.5m below ground level and it is understood that it will be significantly less than the existing two-level basement recently constructed on the neighbouring property. The other neighbouring property to the east is at its nearest some 5m away from the proposed basement and will	Take to Stage 2 Scoping

	therefore result in a significant change.	
Question 14	**Is the site over (or within the exclusion zone of) any tunnels, e.g. Railway lines?**	
	No there are no known tunnels within the vicinity of this site.	None

H STAGE 2 - SCOPING EXERCISE

On the basis of the above screening exercise, it is concluded that there are a number of items that will need to be investigated further to assess their potential impacts.

These are as follows:

- An assessment of the potential impact of the new basement on groundwater levels within the identified aquifer. The new basement will extend through the Claygate Member and could, potentially, have a 'damming effect' on groundwater flow. The presence of the adjacent basement will also need to be considered.

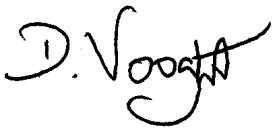
- An assessment of any ground movements resulting from the proposals in relation to the nearby properties at 38 Redington Road and 7 Redington Gardens.

- An assessment of any ground movements in relation to the nearby Highway.

- An assessment of surface water disposal off-site to ensure that any increase can be accommodated by the existing sewer connection. Given the low permeability of the soils present there is no scope for the use of soakaways or other type of SUDS approved disposal.

- An assessment of potential surface water flooding at the site, from the neighbouring highway.

The reader is referred to the Stage 3 & 4 Ground Investigation/Impact Assessment Report which considers some of the above issues.

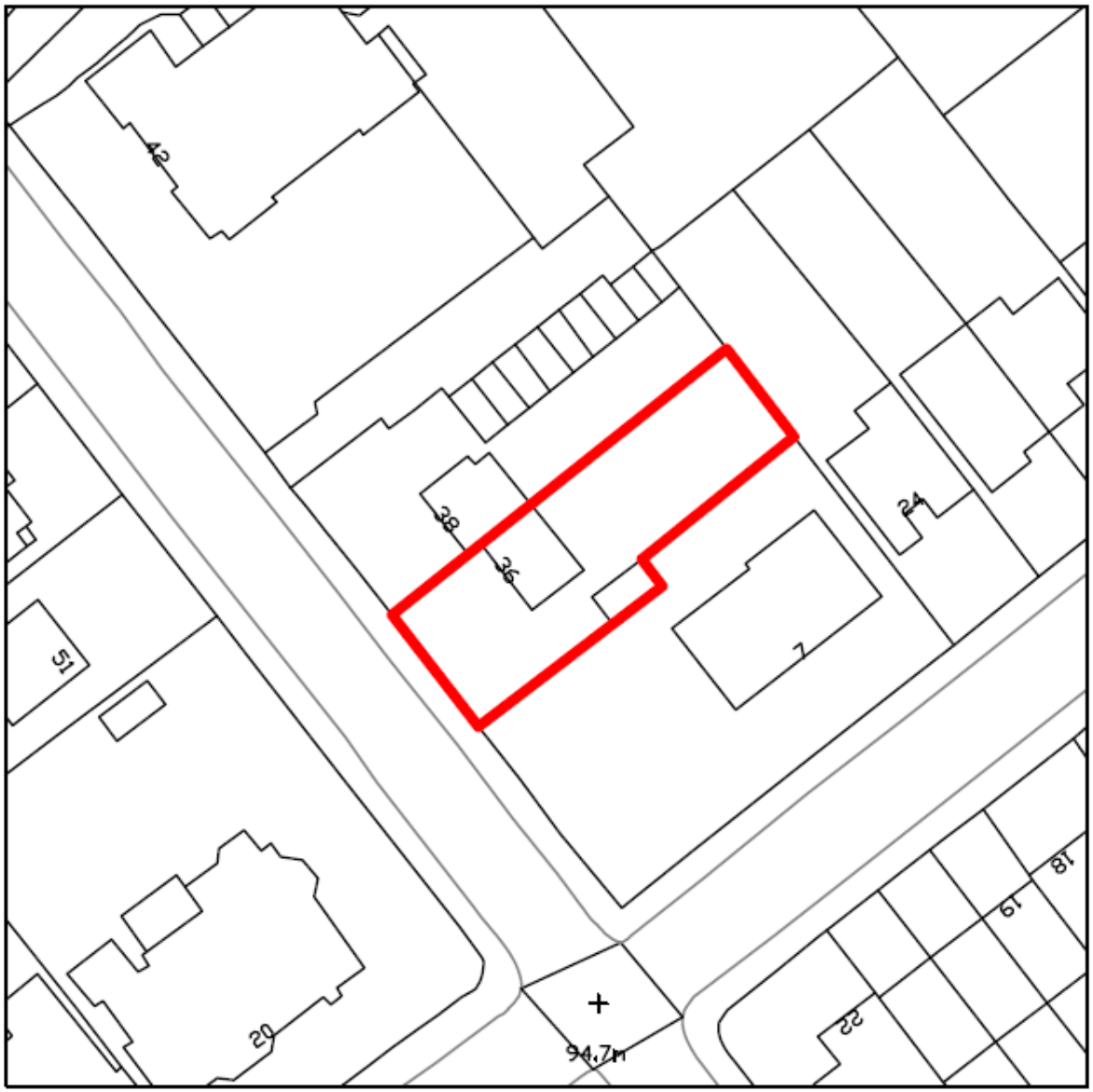




M.W. Stevenson MICE (Countersigned) | D. Vooght MSc (Countersigned) | J.N. Race MSc CGeol (Signed)

For and on behalf of Southern Testing Laboratories Limited

J11894 Rev 02
Date: 18 May 2015

FIGURES

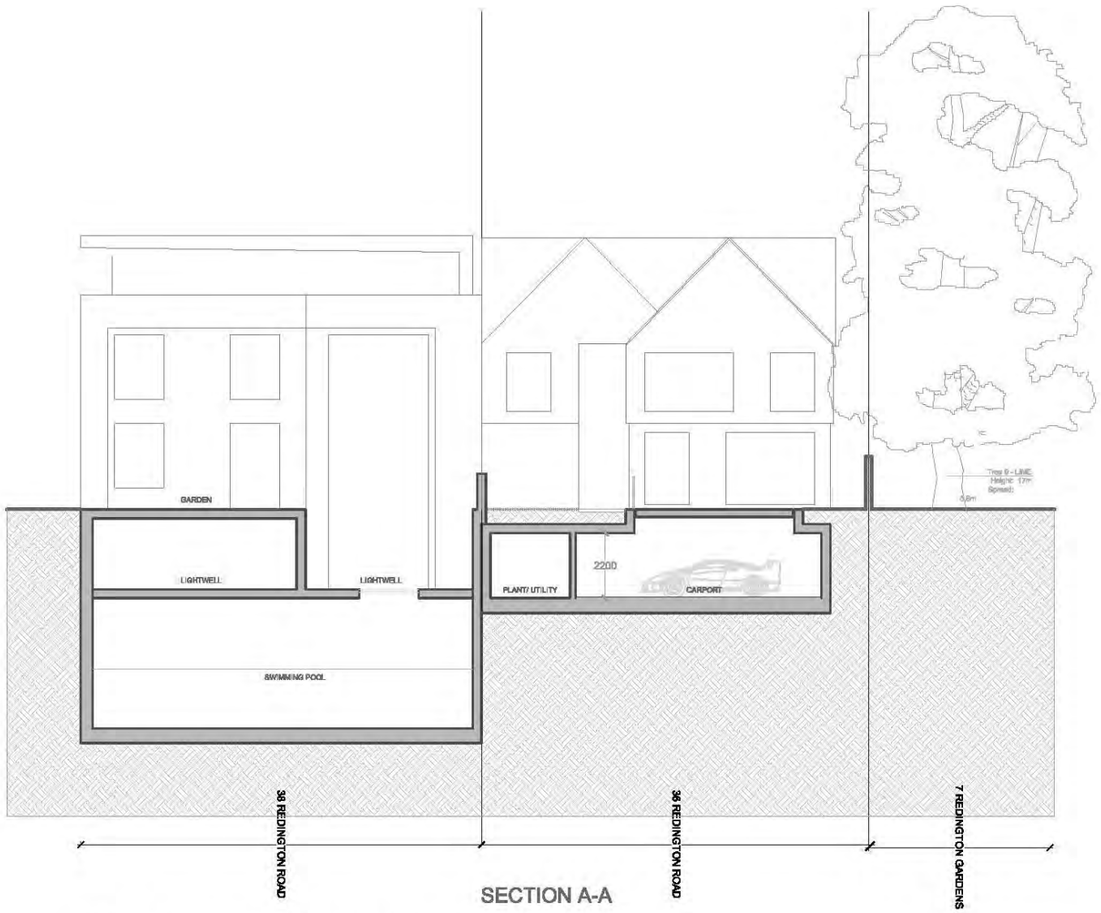


Site: 36 Redington Road, London NW3	STL: J11894	Fig No: 1
Date: 18 August 2014	Site Location Plan	

Southern Testing

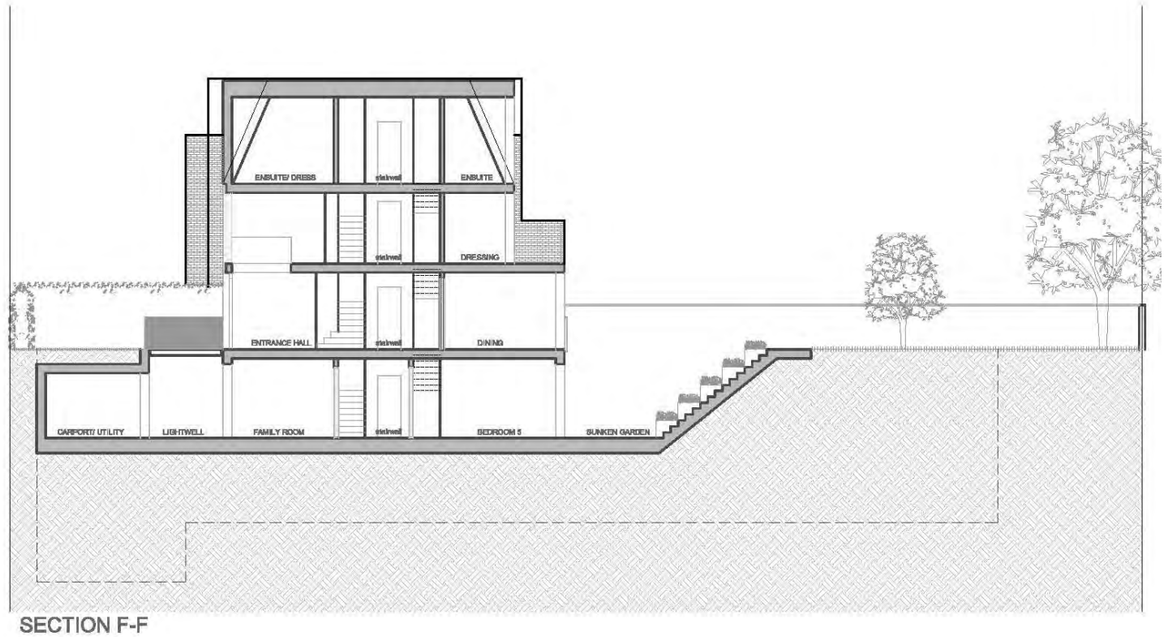
Southern Testing: Keeble House, Stuart Way, East Grinstead, West Sussex RH19 4QA
ST Consult: Twigden Barns, Brixworth Road, Creaton, Northampton NN6 8NN

ST Consult



SECTION A-A

NOTE: Assumed levels for neighbouring property taken from approved planning drawings



SECTION F-F

NOTE: Assumed levels for neighbouring property taken from approved planning drawings (Camden Council Planning Ref: 2009/5829/P)
Refer to Arboricultural report for further details of existing trees

Site: 36 Redington Road, London NW3	STL: J11894	Fig No: 2b
Date: 15th May 2015	Plan showing proposed construction	

Southern Testing
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ST Consult: Twigden Barns, Brixworth Road, Creaton, Northampton NN6 8NN
ST Consult

524000 526000 528000

186000

THE SITE

Data Source: BGS Mapping - Scale 1:10,000

N

Scale at A3: 1:15,000

Coordinate System:
British National Grid
GCS_OSGB_1936

0 0.25 0.5 1 1.5
Kilometers

Legend

- London Borough of Camden
- Railway Lines
- A Roads

BGS 1:10K Artificial Ground

- MADE GROUND
- WORKED GROUND

BGS 1:10K Drift Geology

- ALLUVIUM
- HACKNEY GRAVEL FORMATION
- LANGLEY SILT FORMATION
- LYNCH HILL GRAVEL FORMATION
- STANMORE GRAVEL FORMATION

BGS 1:10K Solid Geology

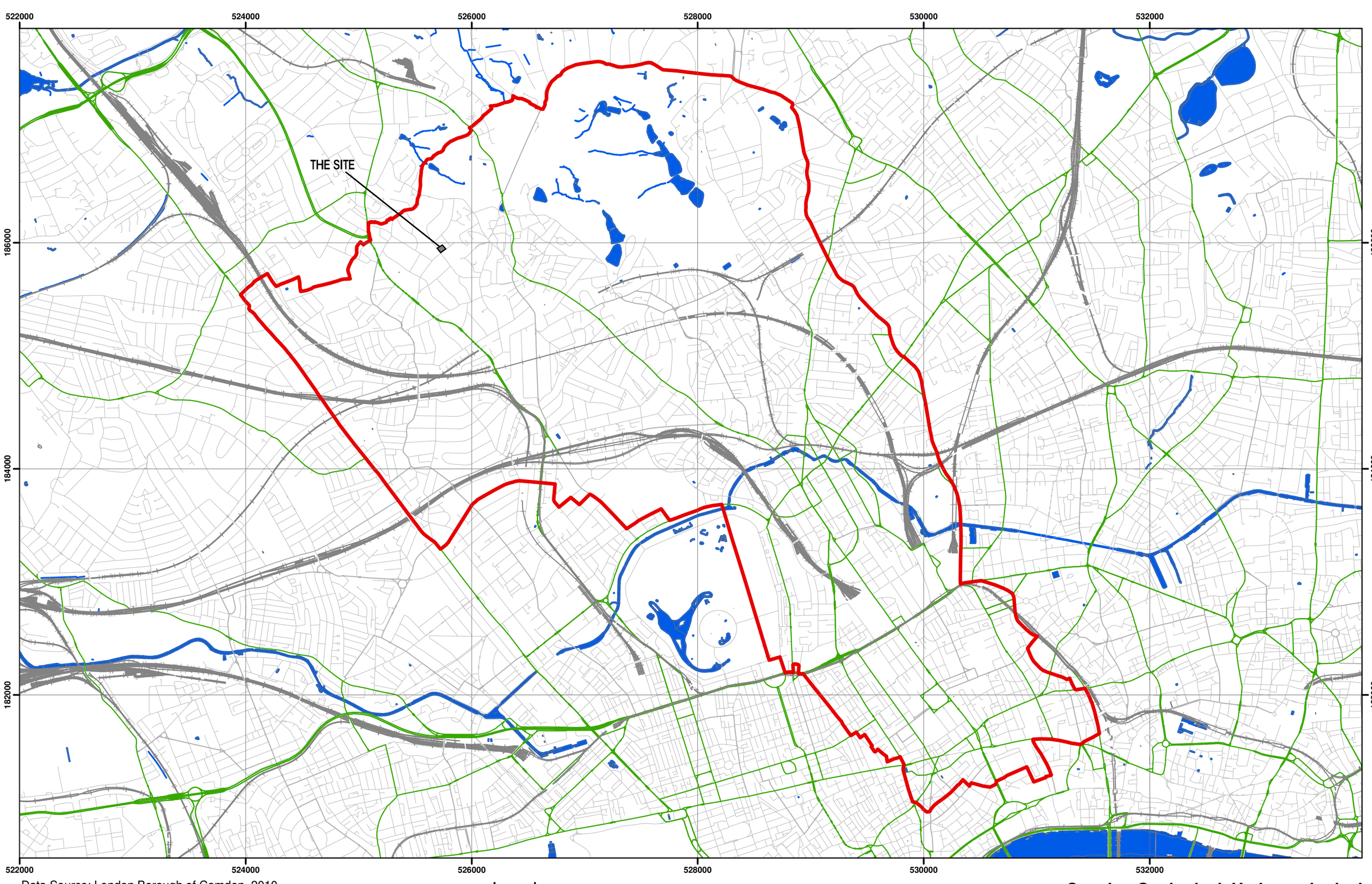
- BAGSHOT FORMATION
- CLAYGATE MEMBER
- LAMBETH GROUP
- LONDON CLAY FORMATION

NB. Geological boundaries are largely indicative based on available geological mapping data

Camden Geological, Hydrogeological and Hydrological Study

North Camden Geological Map

Report: J11894 Site: 36 Redington Road, London NW3 Figure: 3



Data Source: London Borough of Camden, 2010

N

Scale at A3: 1:30,000

Coordinate System:
British National Grid
GCS_OSGB_1936

0 0.5 1 2 3
Kilometers

Legend

- London Borough of Camden
- Surface water
- Railway Lines
- A Roads

Camden Geological, Hydrogeological and Hydrological Study

Camden Surface Water Features

Report: J11894 Site: 36 Redington Road, London NW3 Figure: 4

526000

528000

188000

186000

THE SITE

Catchments and Drainage after Haycock, 2010

N

Scale at A3: 1:10,000

Coordinate System:
British National Grid
GCS_OSGB_1936

0 0.125 0.25 0.5 0.75 1

Kilometers

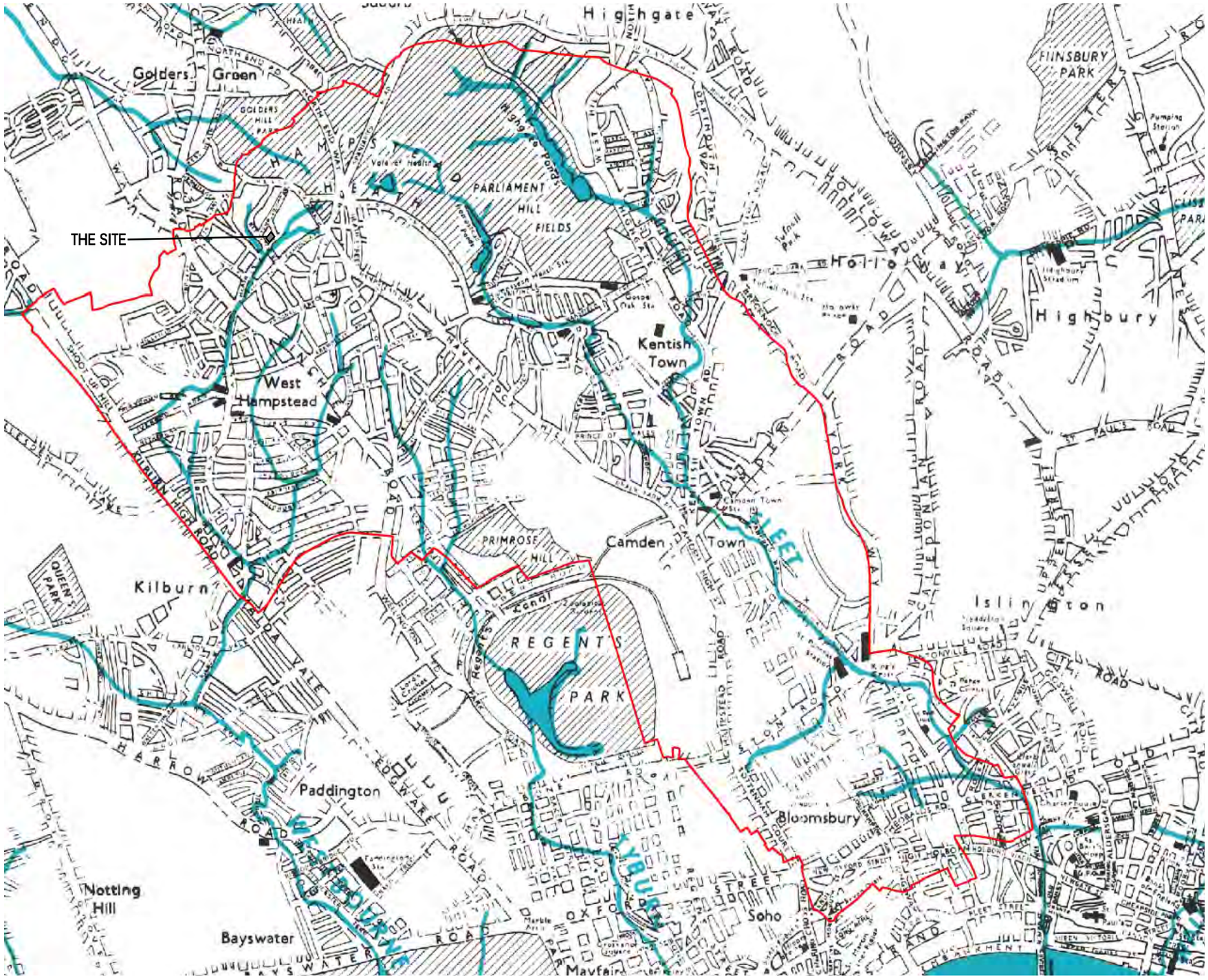
Legend

- London Borough of Camden
- Railway Lines
- A Roads
- Surface Water
- Highgate Chain Catchment
- Golders Hill Chain Catchment
- Hampstead Chain Catchment
- Hampstead Heath Extension Chain Catchment

Camden Geological, Hydrogeological and Hydrological Study

Hampstead Heath Surface Water Catchments and Drainage

Report: J11894 Site: 36 Redington Road, London NW3 Figure: 5



Source – Barton, Lost Rivers of London

Camden Geological, Hydrogeological and Hydrological Study
Watercourses

Figure 5 from Core Strategy, London Borough of Camden

Camden Geological, Hydrogeological and Hydrological Study
Flood Map

524000 526000 528000 530000 532000 534000

188000 186000 184000 182000

THE SITE

Environment Agency Aquifer Designation based on BGS Mapping

N

Scale at A3: 1:30,000

Coordinate System:
British National Grid
GCS_OSGB_1936

0 0.5 1 2 3
Kilometers

Legend

- Borough of Camden
- Railway Lines
- A Roads

Aquifer Designation

- Secondary A Aquifer
- Unproductive Strata

Source Protection Zone

- Outer Source Protection Zone
- Inner Source Protection Zone

NB. Aquifer boundaries are indicative based on available geological mapping data

Camden Geological, Hydrogeological and Hydrological Study

Camden Aquifer Designation Map

Report: J11894 Site: 36 Redington Road, London NW3 Figure: 8

524000 526000 528000 530000 532000 534000

186000

184000

182000

THE SITE

Slope Angles calculated from Digital Terrain Model Provided By Camden Bourough Council

N

Scale at A3: 1:30,000

1:10,000 BGS Mapping
Coordinate System:
British National Grid
GCS_OSGB_1936

0 0.5 1 2 3
Kilometers

Legend

Slope
- 0° - 7°
- 7° - 10°
- > 10°

London Borough of Camden
Railway Lines
A Roads

BGS 1:10K Artificial Ground
- MADE GROUND
- WORKED GROUND

BGS 1:10K Drift Geology
- ALLUVIUM
- HACKNEY GRAVEL FORMATION
- LANGLEY SILT FORMATION
- LYNCH HILL GRAVEL FORMATION
- STANMORE GRAVEL FORMATION

BGS 1:10K Solid Geology
- BAGSHOT FORMATION
- CLAYGATE MEMBER
- LAMBETH GROUP
- LONDON CLAY FORMATION

NB. Geological boundaries are largely indicative based on available geological mapping

Camden Geological, Hydrogeological and Hydrological Study

Slope Angle Map

Report: J11894 Site: 36 Redington Road, London NW3 Figure: 9