BASEMENT IMPACT ASSESSMENT SCREENING AND SCOPING

AT

FLAT 1, 5 WESTBERE ROAD
CAMDEN, LONDON, NW2 3SP

FOR

CAROLYN SCARLETT

REPORT REF: MCS 3314

Engineering Geologists and Environmental Scientists

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SEPTEMBER 2017

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Ashton Bennett

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Project	Flat 1, 5 Westbere Road, Camden, London, NW2 3SP		
Client	Carolyn Scarlett		
Date	September 2017		
Version	Issue 1		
Prepared by	Frances A Bennett	BSc (Hons), CGeol, FGS, FIMMM, C.WEM, MCIWEM, CEnv, AIEMA, MIEnvSci	Director Ashton Bennett Ltd
	Tristan T A Bennett	BSc (Hons)	Environmental Engineer

EXECUTIVE SUMMARY

Site Location	Flat 1, 5 Westbere Road, Camden, London
Site Description	Semi detached 3 storey house
Historical Land Use	Open land and House constructed by 1896
Current Land Use	Residential house
Potential Contamination	Low Risk
Archaeological Potential	Site does not lie in an Archaeological Priority Area.
Hydrogeology	Non productive Aquifer
Hydrology and Flooding	No risk of flooding from seas and rivers
Underground rivers	None that could affect the site or be affected by the basement
Critical Drainage Areas	Within a CDA. Not within a Local Flood Risk Zone
Surface Water Flooding	Low Risk
Flooding Incidents	Westbere Road flooded in 2002
Sewer Flooding	Low Risk
Reservoir Flooding	Low Risk
Groundwater Flooding	Low Risk
SUDS	Ground likely to be unsuitable for soakaways, needs investigating.
Geology	London Clay. LC may be highly plastic and tests are required to confirm likelihood of ground heave.
Landfill gas potential	No landfill, but infilled land within 250m, methane gas monitoring recommended. Radon gas protection is not required.
Contamination	Low risk, potential infilled land on/adjacent to site
Geotechnical Properties	London clay can shrink and swell, tests required
Extra hard cover	None
Groundwater	Groundwater lies at >50m bgl in Thanet Sand/Chalk aquifers. Groundwater monitoring required to check perched water within London Clay.
Waste Disposal	Waste is likely to go as inert waste. WACS Tests required.
Tunnels and Services	Recorded railway tunnels within 100m to the south west of the site. Services search will be required. Assessment of stability of railway cutting required.

RECOMMENDATIONS

Recommended	Nature of Investigation	Details of investigation
Intrusive Investigation	Window Sampler drilling	Assessment of strata, collection of soil samples for lab testing, insitu soil testing
Laboratory Testing	Geotechnical Tests Contamination tests	To determine engineering properties of strata for design To check for contamination due to potential infilled land and H and S for workmen
Install Standpipes	Monitoring for Groundwater	Monitoring on at least 3 occasions for groundwater levels and flow
Concrete Design	Sulphate level in soils	BRE sulphate tests to design underground concrete
Services Search	On site and Desk Top Services search	To determine services to allow for drilling and to determine services in pavement
Structural and Construction Method Statement	Report and drawings	For temporary and permanent structural engineering design and method of construction.
Construction Transport Management Plan	Report and drawings	To determine construction transport plan to prevent causing problems to traffic and neighbours

1. INTRODUCTION

This report describes the results of the screening and scoping for a Basement Impact Assessment (Geology, Hydrogeology and Hydrology) undertaken for the development of a residential partial basement extension and replacement rear extension at Flat 1, 5 Westbere Road, Camden, London, NW2 3SP. The work was commissioned by Lacey and Saltykov Architects and undertaken on behalf of their client Carolyn Scarlett and was carried out by the Ashton Bennett Consultancy. Plans of the proposed development are provided in Appendix A.

It is proposed to construct a partial basement extension, lightwell and replacement of rear extension.

The purpose of this Report is to ascertain the potential impacts that the proposed partial basement extension and lightwell may have on the ground stability, the hydrogeology and the hydrology in the vicinity of the site and to determine the requirement for any further desk studies or intrusive ground investigation in order to design any necessary mitigating measures and to design foundations and assess any potential ground movement. The site

lies within the London Borough of Camden. The assessments were carried out in general accordance with the London Borough of Camden Development Policy 27 “Basements and Lightwells” and Camden Planning Guidance 1 “Design Note prepared by London Borough of Camden for New Basement Development and Extensions to Existing Basement Accommodation” (LBC, 2010).

As stated in Camden Development Policy DP27 paragraph 27.1, LB Camden “will only permit (basement and other underground development) that does not cause harm to the built and natural environment and local amenity and does not result in flooding or ground instability”.

The approach followed in this report was initially to undertake screening of the site and provide a full site characterisation by a desk study of available geological, hydrological, hydrogeological, environmental and historical and topographic information. The results of the screening enables scoping for any further reporting and or intrusive investigations required to complete the Basement Impact Assessment. The screening and scoping has been undertaken in general accordance with the recommended methodologies highlighted in Arup document “Guidance for Subterranean Development”, prepared for the London Borough of Camden and the URS Report ‘Strategic Flood Risk Assessment’, (2014) for LBC.

The project brief comprises of:

- Screening – Identification of matters of concern using checklists.
- Scoping – Definition of the matters of concern identified in the screening.

This report comprises the screening and scoping and was prepared by Frances A Bennett an engineering geologist who has a degree in Geology, a postgraduate qualification in Soil Mechanics and is a Chartered Geologist CGeol, Chartered Environmentalist CEnv and Chartered Water and Environmental Manager C.WEM with 43 years of experience in the fields of geology, geotechnical engineering, hydrogeology, contamination, mining and waste disposal.

The client has informed her neighbours of the proposed basement extension, lightwell and rebuilding of the Conservatory, and they have expressed satisfaction with the proposals.

2. THE SITE
2.1 Site Description

The site is located at number 5 Westbere Road which lies within Hampstead and north west of Camden Town in the London Borough of Camden. The site does not lie within a Conservation area. The building has been viewed from the road, and a site walkover will be required to assess the potential areas for the location of the drilling rig.

The site area comprises the house and garden of Flat 1, 5 Westbere Road which is a private terraced residential house on the ground floor, with hard covered front yard and landscaped rear garden totaling 0.03 hectares. The house is attached on the northwest side by house no 7. The rear of the property is accessible via a hard covered footpath between No 5 and No 3 Wesbere Road.

The site fronts onto Westbere Road to the immediate north east.

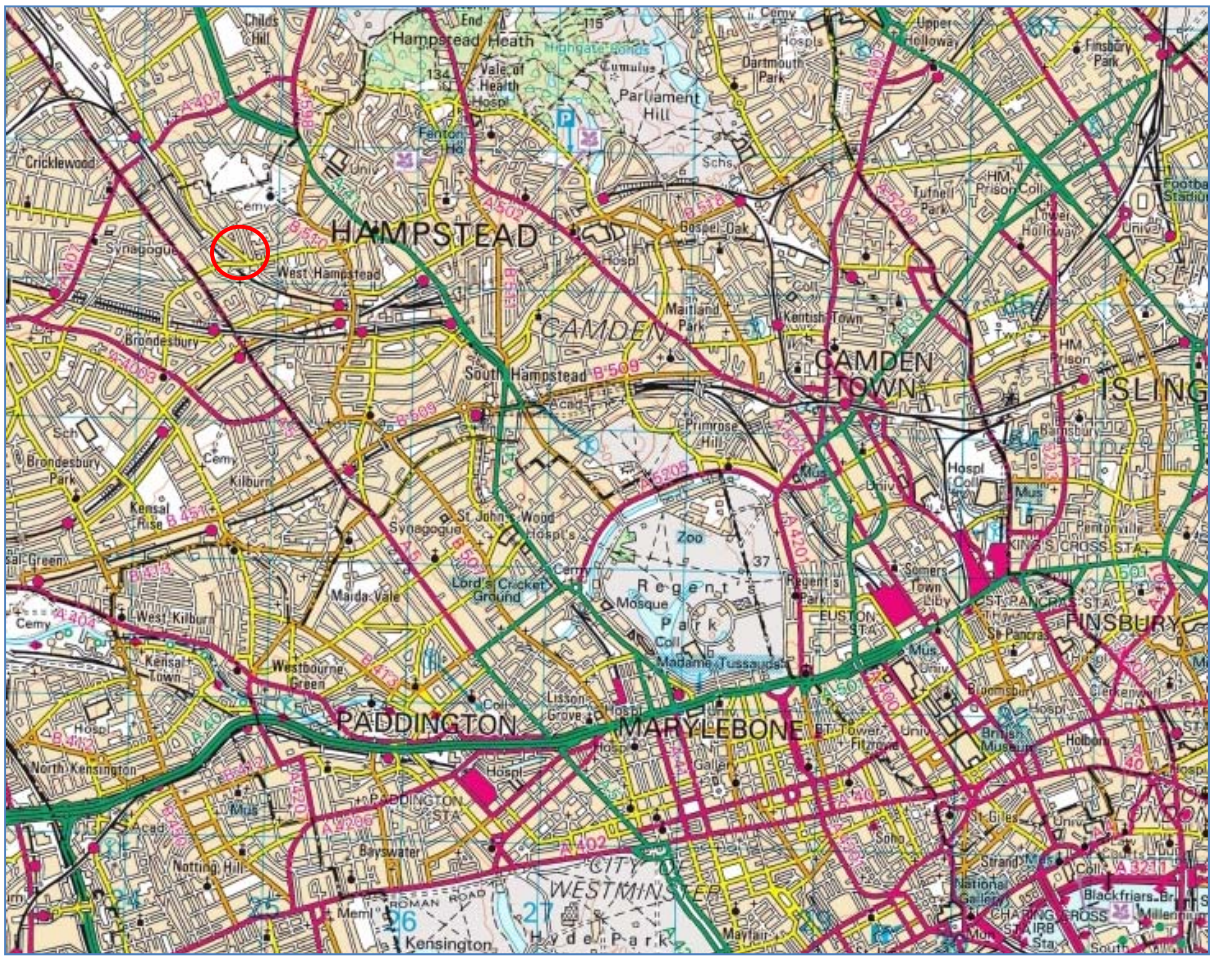


Figure 1A Site Location Plan

The site is bounded to the northwest by No 7 Westbere Road with residential properties beyond. The site is bounded to the northeast by Westbere Road with residential properties beyond. The site is bounded to the south west by fencing with woodland and Mill Lane beyond. The site is bounded to the southeast by tall foliage with 3 Westbere Road beyond.

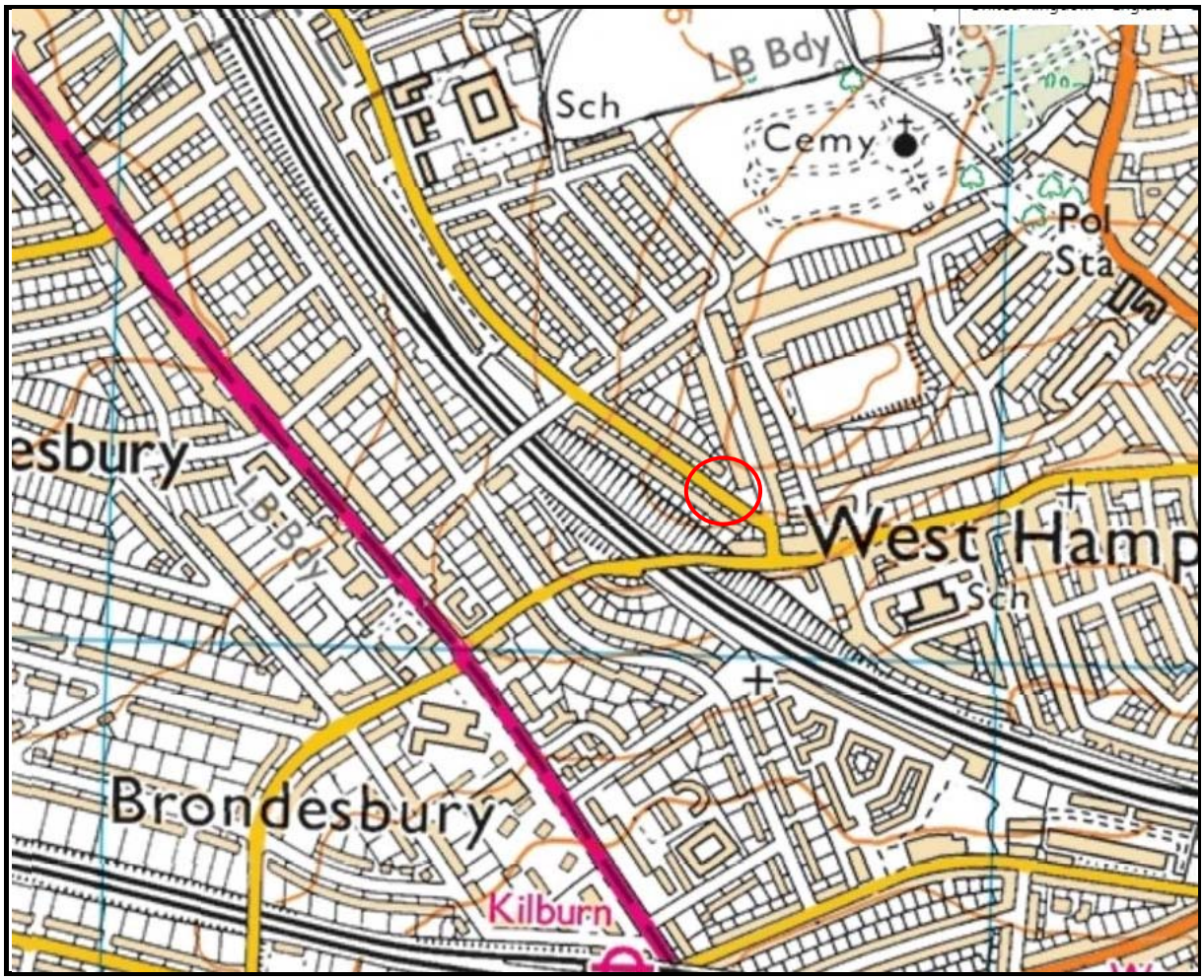


Figure 1B Topography

All land on the site is relatively level. The topography of the local area is a height of 65m above OD to the west of the site rising towards the east, north east to 75m above OD around Gondar Gardens. This equates to a slope of 3 degrees to the horizontal.

A railway line runs in cutting to the immediate south west of the site. If a landslip occurred along the cutting, it would be unlikely to detrimentally affect the house due to the distance between the cutting and the house. This should be confirmed following a site visit and assessment of the risk by a geologist with CGeol and a civil engineer with CEng.

Roof drainage from the existing property is taken via down pipes into a drainage system in the front of the property which is understood to run west to east collecting drainage from the adjoining properties.

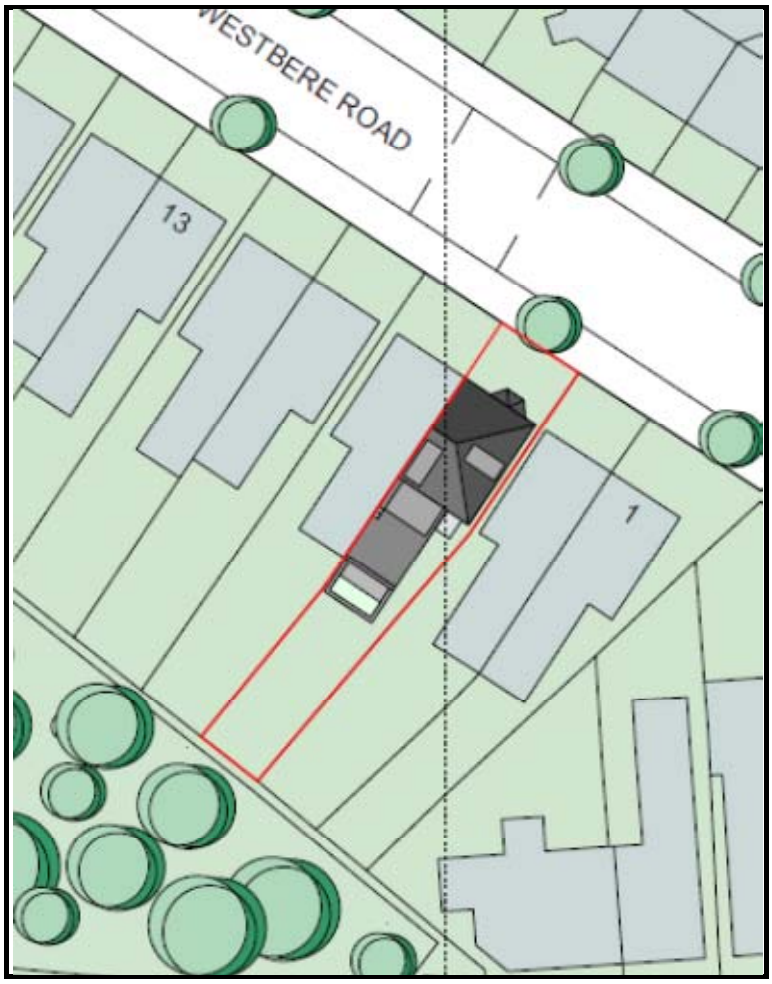


Figure 2 Site Plan

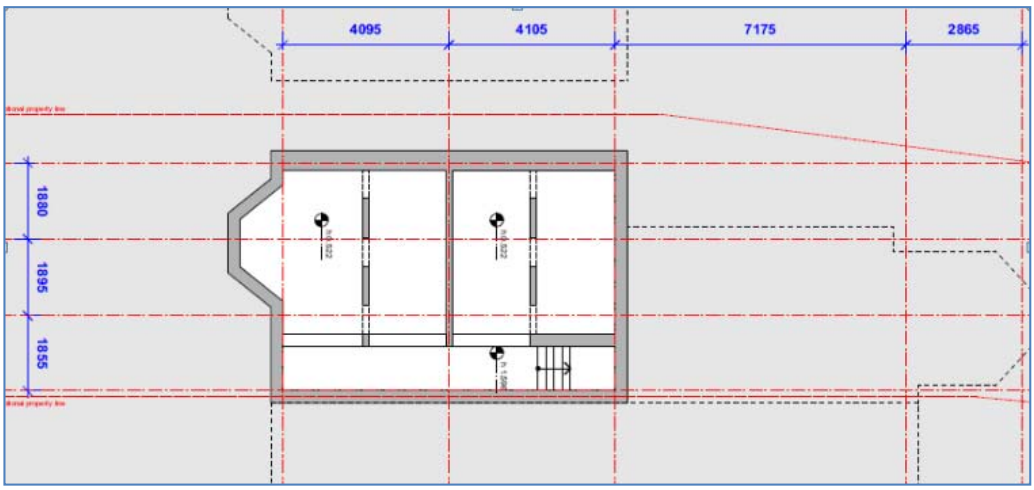


Figure 3 Existing Basement Floor

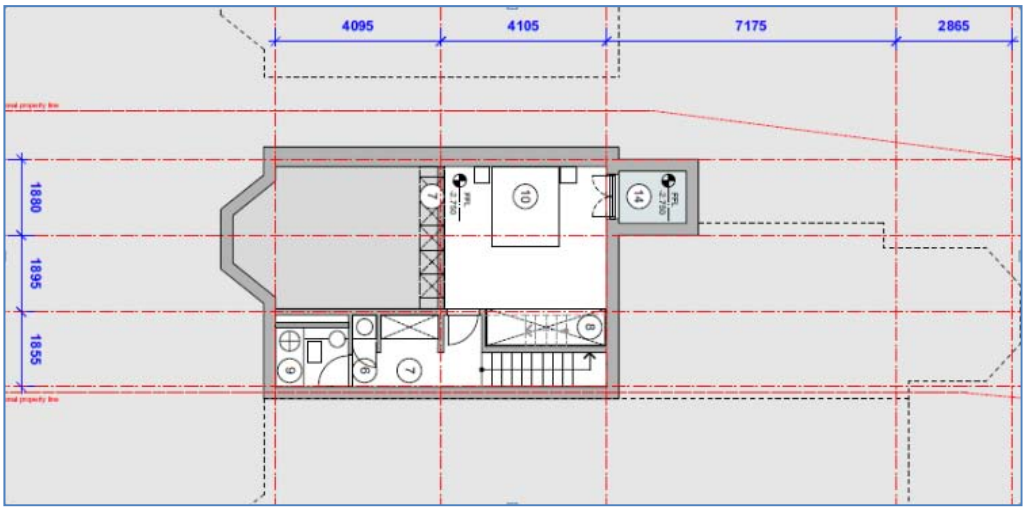


Figure 4 Proposed Basement Floor

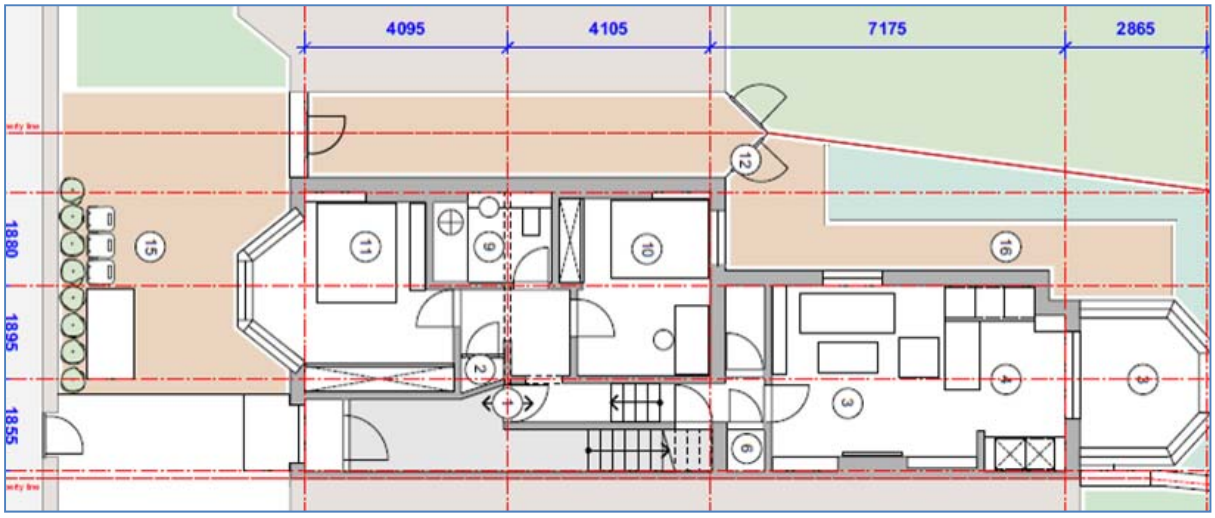


Figure 5 Existing Ground Floor

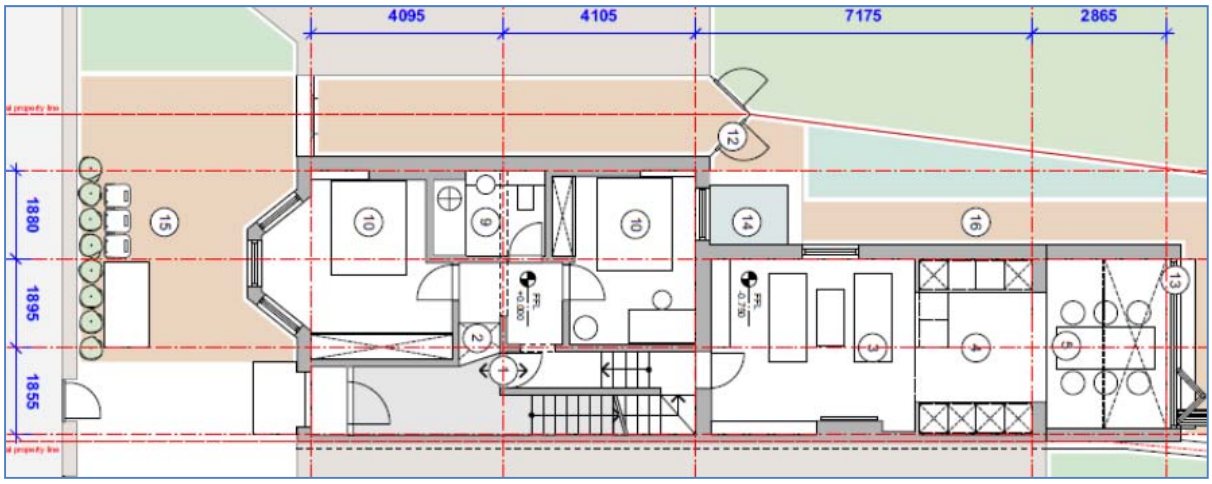


Figure 6 Proposed Ground Floor

The site lies around National Grid Reference 524707^{E} 185155^{N} at a height of around 61m above Ordnance Datum. A Site Location Plan is presented as Figure 1A and Topography as 1B and a Site Plan is presented as Figure 2. The Existing Basement is presented as Figure 3 and Proposed Basement Floor as Figure 4. The existing Ground Floor is presented as Figure 5 and the Proposed Ground Floor is presented as Figure 6.

A Superficial Deposits Geological Plan is presented as Figure 7. A Bedrock Geological Plan is presented as Figure 8. A Risk of Landslips is presented as Figure 9 and a Local Borehole Plan is presented as Figure 10. The Potential for Clay to Shrink and Swell is presented in Figure 11. Hydrogeology Plan of Bedrock is presented as Figure 12. The Potential for SUDS is presented as Figure 13. The Detailed River Network is presented as Figure 14 and Lost Rivers in Camden as Figure 15. The Critical Drainage Areas and Flood Risk Zones are presented as Figure 16. The Camden Flood Risk form Surface Water and Flooded Streets in 1975 and 2002 is presented as Figure 17. A 1 in 1000 Year Flood is presented as Figure 18 and the Risk of Flooding from Rivers and Seas is presented as Figure 19. Flood Risk From Reservoirs is presented as Figure 20. Internal Flooding from Sewers is presented as Figure 21 and External Flooding from Sewers as Figure 22. Historic Land use is presented as Figure 23. Infrastructure is presented as Figure 24.

Drawings of site proposals are presented in Appendix A and archival maps are presented in Appendix B. Ground Movement Calculations Methodology is presented in Appendix C.

2.2 Site History

The following maps and plans were inspected to assess the history of the site and its past environments. The archival Ordnance Survey maps are presented in Appendix B.

TABLE 1
Historical Maps Inspected

DATE	SCALE	DESCRIPTION	
		SITE	SURROUNDING AREA
1871 &	1:2,500 &	The site is unoccupied at this time.	The surrounding area is mostly open land with the exception of the Midland Railway Lines with

DATE	SCALE	DESCRIPTION	
		SITE	SURROUNDING AREA
1873-4	1:10,560		surrounded made ground situated to the immediate south west of site. Mill Lane runs east to west to the south of the site and over the railway lines. Kilburn Flour Mill is annotated to the west of site on Mill Lane.
1894 & 1896	1:10,560 & 1:1,056 & 1:2,500	The site is now shown to be occupied by No 5 Westbere Road, a semi detached property with gardens to the rear.	The surrounding area shows residential development including the construction of Westbere Road and Nos 1, 3, 5, 7, 9 and 11 to the immediate north west and south east of site. Residential development along Mill Lane is also evident. A covered Reservoir annotated to the north east of site. Kilburn Mill no longer evident.
1915 & 1920	1: 2,500 & 1: 10,560	No change to the site area.	Large scale development is evident throughout the surrounding area. Predominantly residential development in immediate area around site including completion of Westbere Road housing and surrounding Sarre Road and Minster Road.
1935-8 & 1938	1:2,500 & 1:10,560	No significant change.	No change to the surrounding area.
1951 & 1953, 1954 & 1953-5	1:10,560 & 1:1,250 & 1:2,500	No significant change.	No change to the surrounding area.
1965-8 & 1970-4 & 1973-6	1:10,560 & 1:1,250 & 1:10,000	No significant change.	No change to the immediate surrounding area. Development is evident in the far surrounding area, mostly residential.
1991 & 1991-2	1:1,250	No change to the site area.	The surrounding area remains largely unchanged.
2002	1:10,000	No significant change.	The surrounding area remains largely unchanged.
2010 & 2014	1:10,000	No significant change.	No significant change to the surrounding area.

In summary, the site has been occupied by open land located next to a railway cutting. No 5 Westbere Road was constructed circa 1895 and still occupies the site area to this date while being surrounded by residential properties immediately to the north west, north, east and south east.

3. POTENTIAL CONTAMINATION

With the exception of made ground that may have been associated with construction of the railway lines, the historical map search has not identified any potential sources of contamination that could be present on the site.

A search of environmental databases via an EnviroInsight report (provided by Centremaps) did not reveal any offsite sources of contamination that are considered likely to pose a risk to the site and the proposed development. It will be prudent to undertake screen tests for contamination for Health and Safety for workmen.

4. ARCHAEOLOGY AND SENSITIVE SITES

4.1 Archaeology

The site does not lie within an Archaeological Priority Area and an Archaeological Report is therefore not recommended.

4.2 Sensitive Sites

The site does not lie within 2000m of a Site of Special Scientific Interest or Ancient Woodland, of a National Nature Reserve, a Special Area of Conservation, a Special Protection Area, a Ramsar Site, a World Heritage Site, an Environmentally Sensitive Area, an Area of Outstanding Natural Beauty, a National Park, Nitrate Sensitive Area or Green Belt.

The site lies within 232m and 240m of a Local Nature Reserve of Westbere Copse to the north west of the site.

The site does not lie within a Nitrate Vulnerable Zone.

The development of the basement will not detrimentally affect any local sensitive sites.

5. SITE GEOLOGY

5.1 Geology

The published 1:50,000 scale British Geological Survey (BGS) geological map of the area (Sheet 256 “South London”) shows the site to be by bedrock of the London Clay Formation (up to 55m thick in this area) of the Eocene geological epoch.

Given the historical development of the site and surrounding areas, there may be made ground present on the site.

There are no superficial deposits underlying the site. Extracts of the BGS Geological Maps are provided in Figures 7 and 8 below.

The London Clay is generally of medium strength silty often sandy with selenite crystals and very thin bands of siltstone.

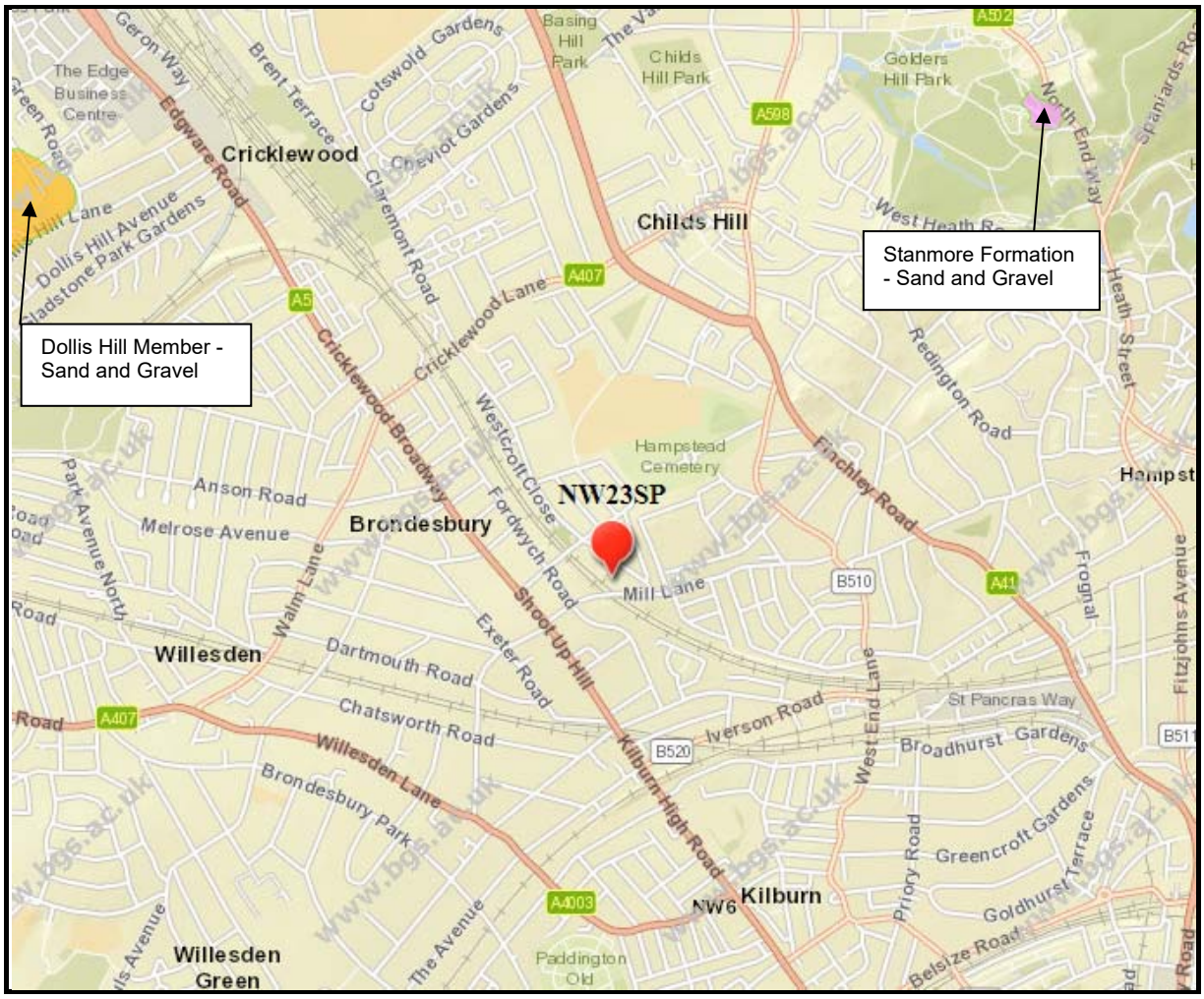


Figure 7 Superficial Deposits Geological Plan

It is recommended that boreholes should be sunk on the site to determine the sequence of strata and the thickness and strength of the strata in order to enable recommendation for allowable bearing capacity and to enable design of depth of foundations and floor slabs for the proposed development.

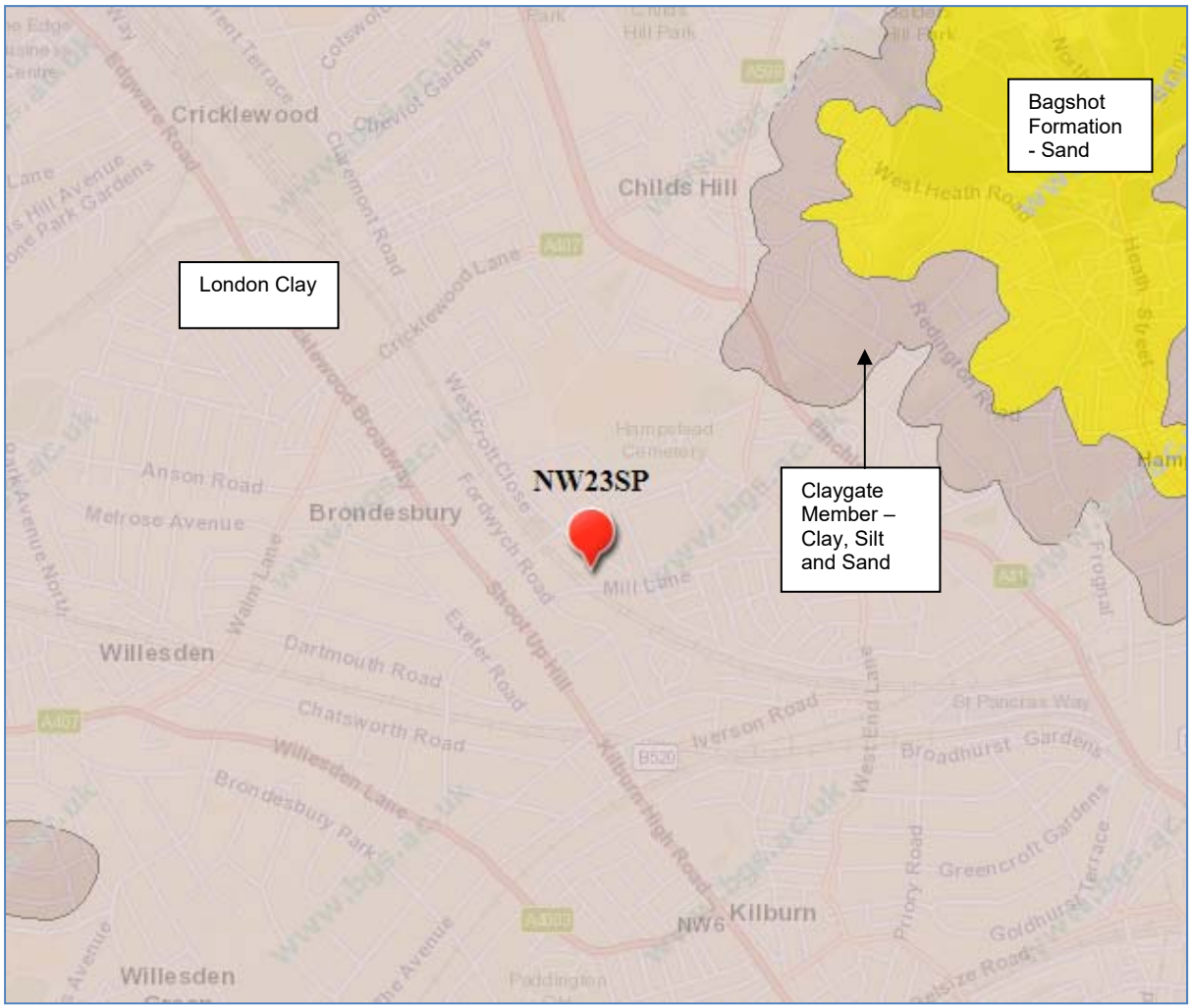


Figure 8 Bedrock Geological Plan

No geological faults are shown to be present within close proximity to the site.

5.2 Mining

There is no evidence of past or present mining or quarrying activity in the vicinity of the site. The site does not lie in a mining area for coal, tin, gypsum, chalk, stone or other recorded mineral works.

5.3 Landslips

The site is designated by the British Geological Survey as at a negligible risk of a landslide as shown in Figure 9. There are railway cuttings to the south west of site which could be subject to a landslip in the future. The ground on site slopes at around 3 degrees to the horizontal to the west and is less than 7degrees to the horizontal. The risk of a landslip in the cutting detrimentally affecting the site should be assessed following a site visit and measurement of the depth of the cutting, its distance from the house and the safe angle of repose of the slope material.

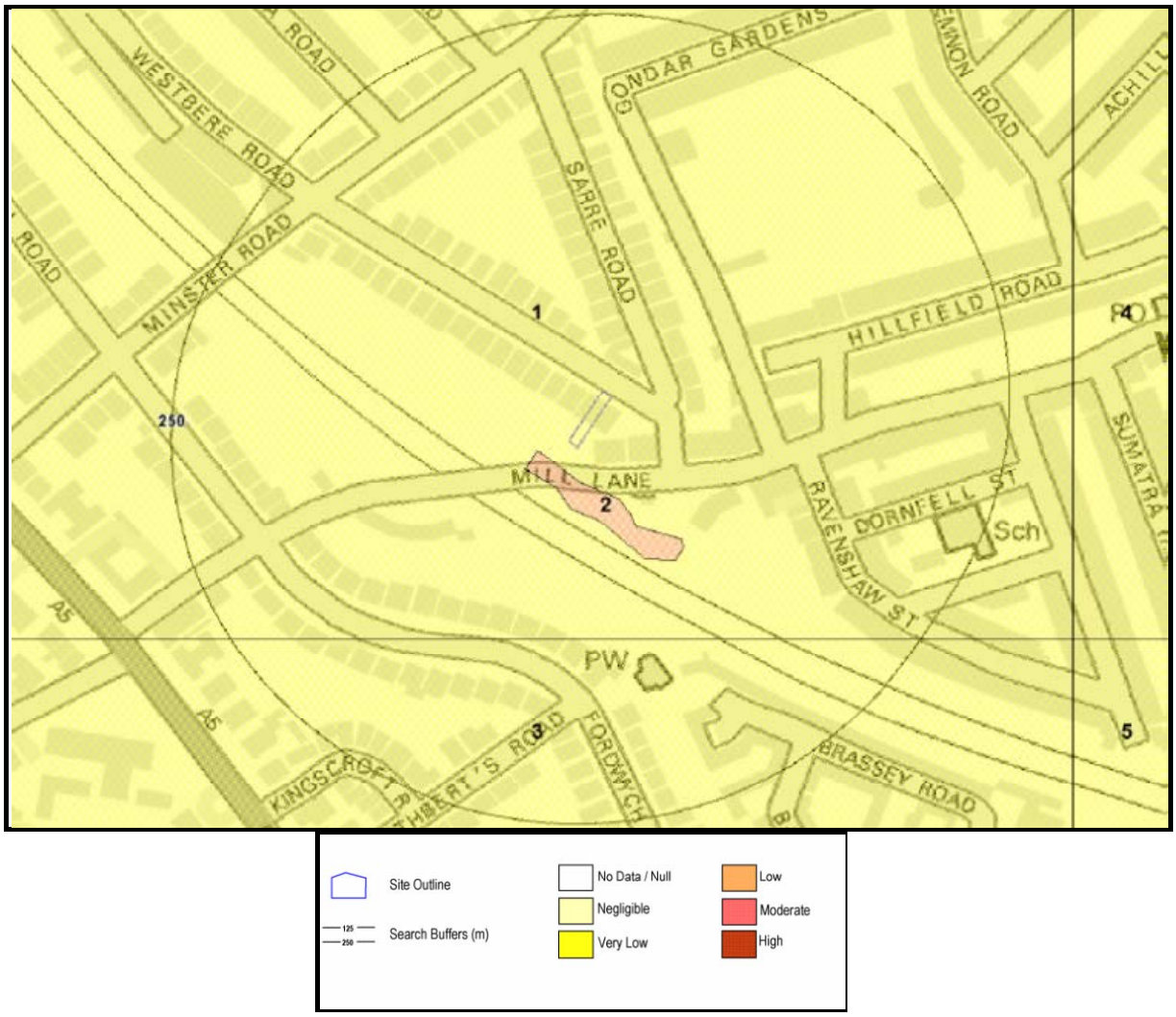


Figure 9 Risk of Landslips

5.4 Local Boreholes

A number of relevant available historic borehole logs have been obtained from the BGS and are summarised in Table 2 below. A plan showing the available local borehole locations is presented in Figure 10.

TABLE 2
Summary of Historical Borehole Logs

BGS Reference	Depth bgl in m	Brief Summary of Ground Conditions	Water Level
TQ22NW2	94.49	GL - 3.96m Loam and Gravel 3.96 - 68.59m London Clay 68.58 - 82.80m Reading Beds 82.80 - 88.70m Thanet Sand 88.70m+ Chalk	Rest water level at 33.53m bgl.
TQ28SW74	45.72	GL – 8.23m Stiff fissured brown silty clay & gypsum crystals 8.23m+ Very stiff fissured blue silty clay with occasional claystone boulders (LONDON CLAY)	DRY

These boreholes confirm the geology of the area surrounding the site.

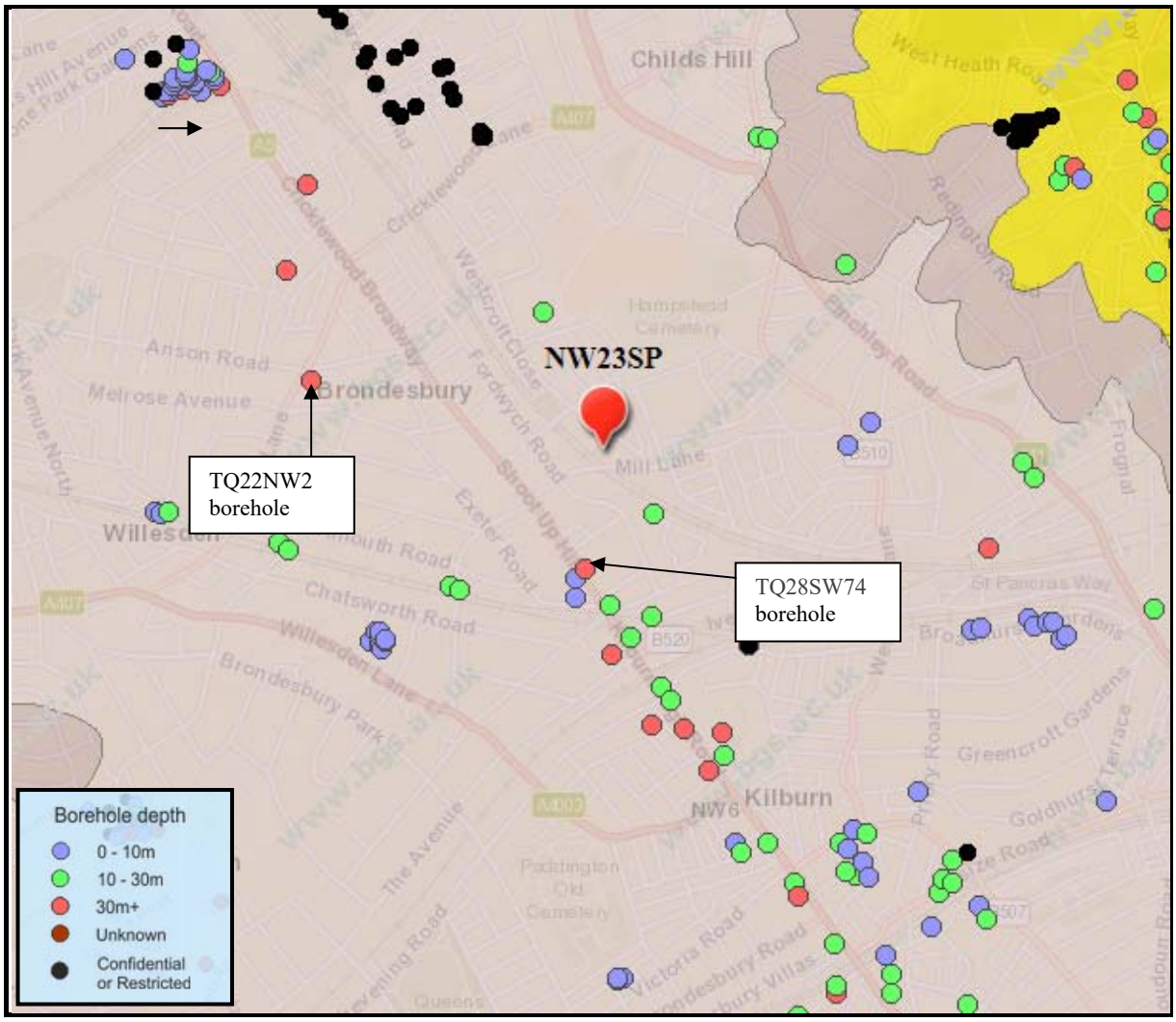


Figure 10 Local Borehole Plan

5.5 Engineering Geology

The London Clay usually provide good bearing strength for low rise housing. For the excavation of a basement it will be necessary to determine the nature of the strata beneath the site and undertake in situ strength tests for design of allowable bearing capacity, type and depth of foundations for the basement extension.

The London Clay may shrink and swell under varying moisture contents. The BGS classify the potential for clays to shrink and swell as moderate, as shown in Figure 11. Plasticity tests should therefore be undertaken to assess this potential on the site.

Figure 11 Potential for Clay to Shrink and Swell

6. HYDROGEOLOGY

6.1 Aquifers

The geological map indicates the site to be underlain by the London Clay. The London Clay is relatively impermeable and classified as unproductive. Superficial deposits do not underlie the site. The Environment Agency have designated the London Clay beneath the site as "Unproductive" which means the strata have a low permeability and negligible significance to water supply or base flow to rivers. Permeability of the London Clay varies from 5 $x10^{-6}$ to 1 $x10^{-10}$m/sec. (BS 8004, 1986). The site does not lie on a Groundwater Vulnerability Zone.

The natural soils underlying the site are likely to comprise a superficial covering of made ground (potentially absent) overlying London Clay (clay soils). The London Clay has very low permeability and does not readily permit the downwards transfer of surface water or percolating groundwater. The thin siltstone bands in the London Clay may hold small volumes of water

It is recommended that standpipes are installed in boreholes in order to determine the water levels beneath the site to determine any groundwater flows and the requirement for sump pumping or dewatering during construction.

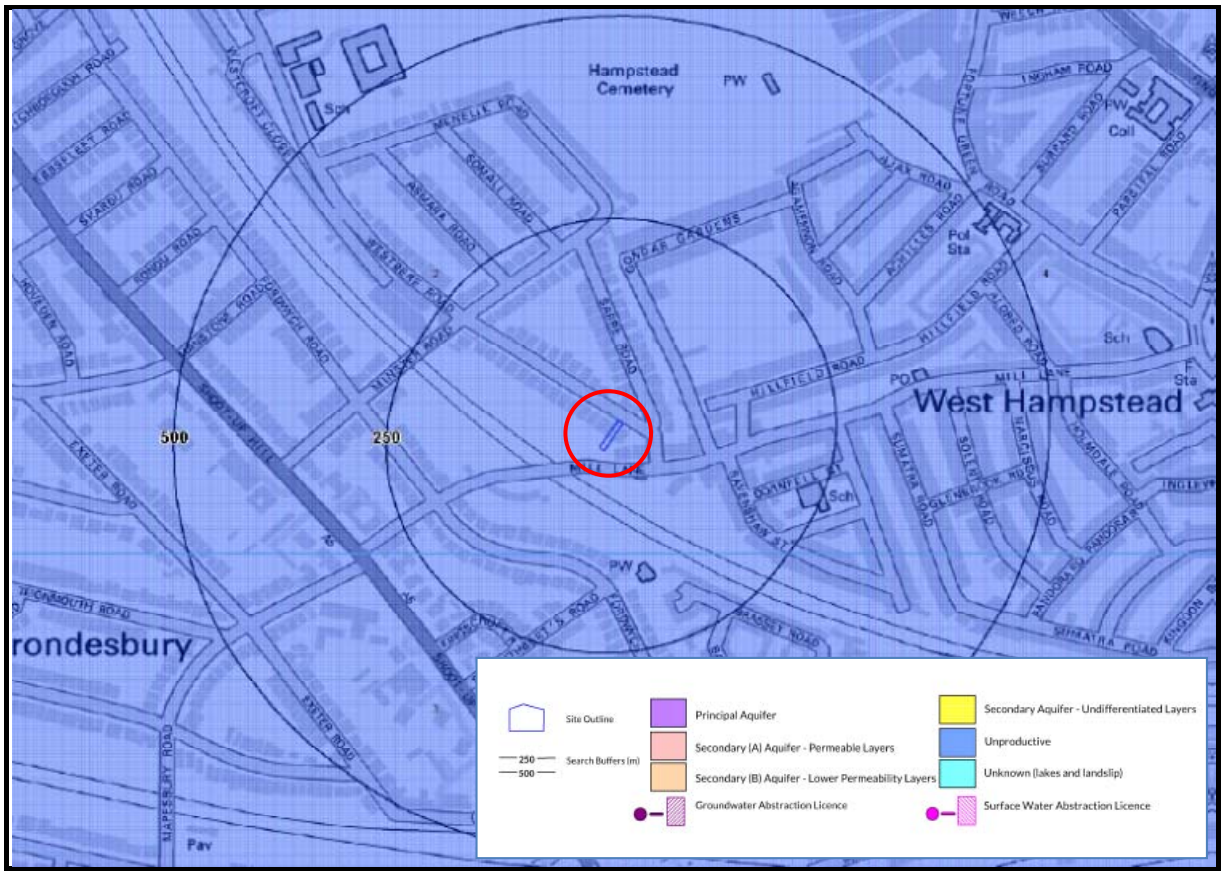


Figure 12 Hydrogeology Plan of Bedrock

6.2 Groundwater Depth and Flow

The development of a basement is unlikely to detrimentally affect any groundwater in bedrock which lies > 50m bgl in the Thanet Sands and Woolwich and Reading Beds or underlying Chalk Aquifer.

Water levels were encountered at 33.53m bgl in local boreholes researched, noting borehole depths at 94.49m and 45.72m bgl. The boreholes were sunk some years ago and water levels now may be different. It is recommended that monitoring of groundwater levels is undertaken in 2no installed standpipes to determine any shallow water levels and flow. It is expected that a higher water level may be encountered during and after heavy rainfall and therefore sump pumping or dewatering may be required for construction. The standpipes should be monitored initially on a weekly basis to determine groundwater levels. Groundwater should be taken as ground level for structural design as recommended by Eurocode 7.

Groundwater within the London Clay is generally contained in isolated thin bands of silt or gravel of limited extent. It would be prudent to waterproof the basement and take into consideration the potential uplift pressures in structural design in case groundwater rises.

6.3 Abstraction Wells, Wells and Springs

There are no groundwater water abstraction licences within 2000m of the site. The site does not lie within or within 500m of a Source Protection Zone for a potable water supply.

There are no springs recorded on the OS maps in the local vicinity.

6.4 Potential for Sustainable Drainage System (SUDS)

Camden's assessment is that the site is probably compatible for infiltration of SUDS and this needs to be investigated during the ground investigation. Based on the geology of London Clay this seems optimistic.

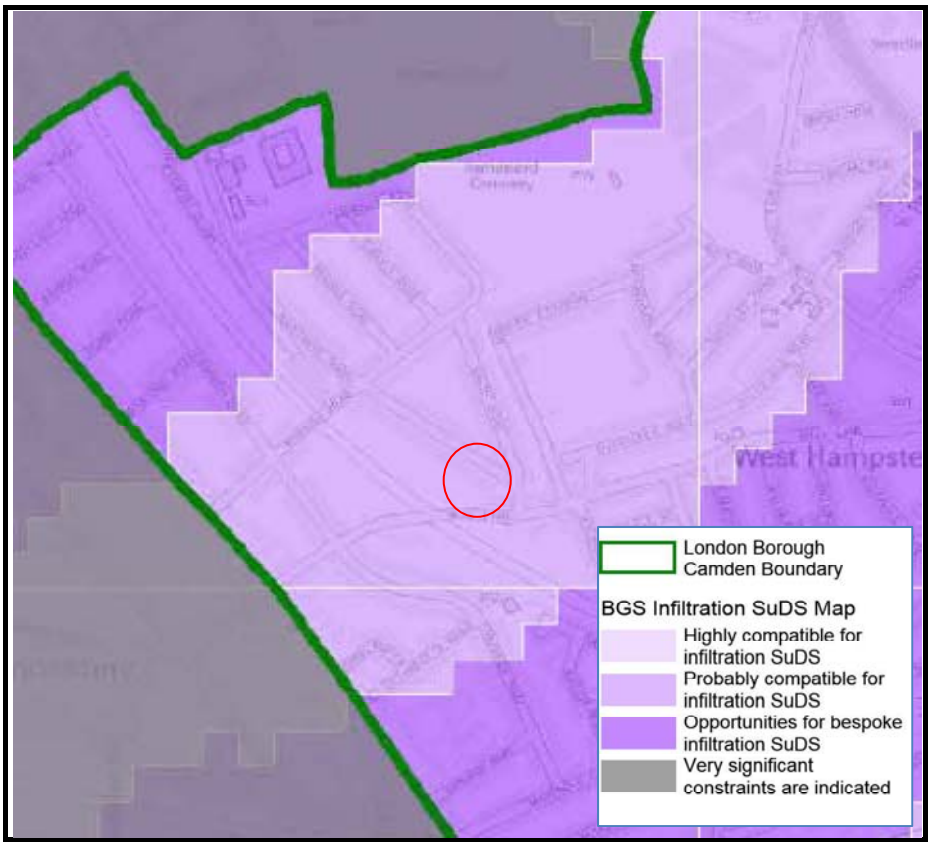


Figure 13 Potential for SUDS

6.5 Summary

Based on the potential for groundwater within small lenses of water with the London Clay, it is recommended that groundwater monitoring should be undertaken during the ground investigation. It is considered unlikely however, based on the evidence provided that the addition of a basement extension and lightwell will detrimentally affect the local hydrogeology.

7. HYDROLOGY

7.1 Surface Water Drainage

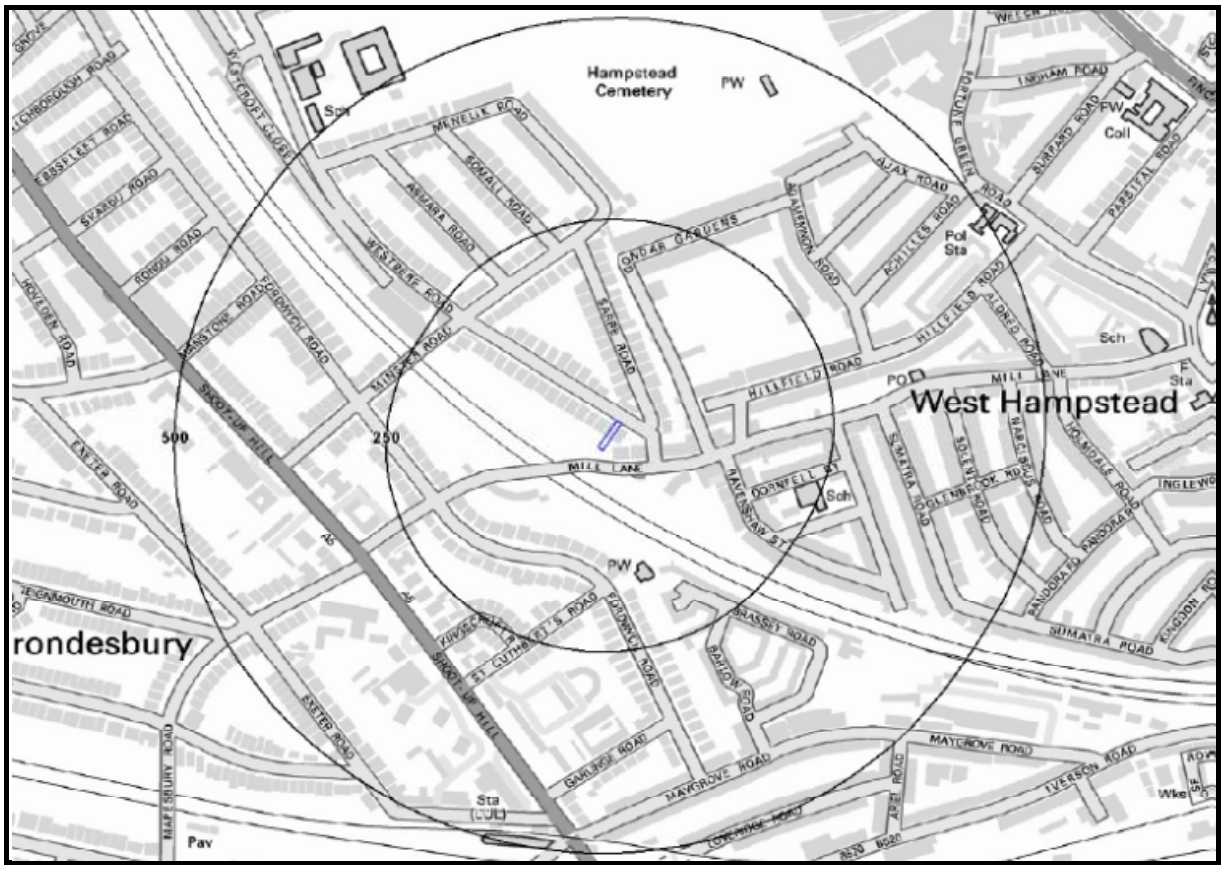
Prior to the commencement of the redevelopment of the site, the rainfall over the area of the site drains in one of the following ways:

Surface water from the rear roof drains into the drainage system via underground pipes leading to the front of the site. Surface water from the front roof drains into the drainage system that runs under the front area and to the east of the site. Surface water on the rear garden drains into the ground and surface water on the front hard covered garden drains into town drains.

On completion of redevelopment the rainfall will drain in the same manner to public drains.

7.2 Local Rivers

There are no river quality assessments by the Environment Agency within 1500m of the site. The site does not lie within 500m of a canal.



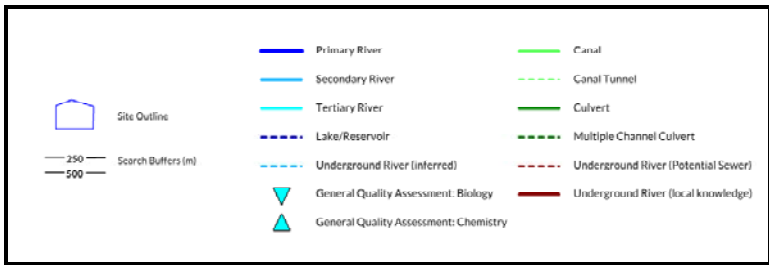


Figure 14 Detailed River Network

The site is unlikely to be affected or to affect any rivers or canals.

7.3 Lost Rivers

The River Westbrook is recorded as flowing to the east of the site in the past and unlikely to affect the site. The basement is unlikely to affect or be affected by any lost/culverted rivers.

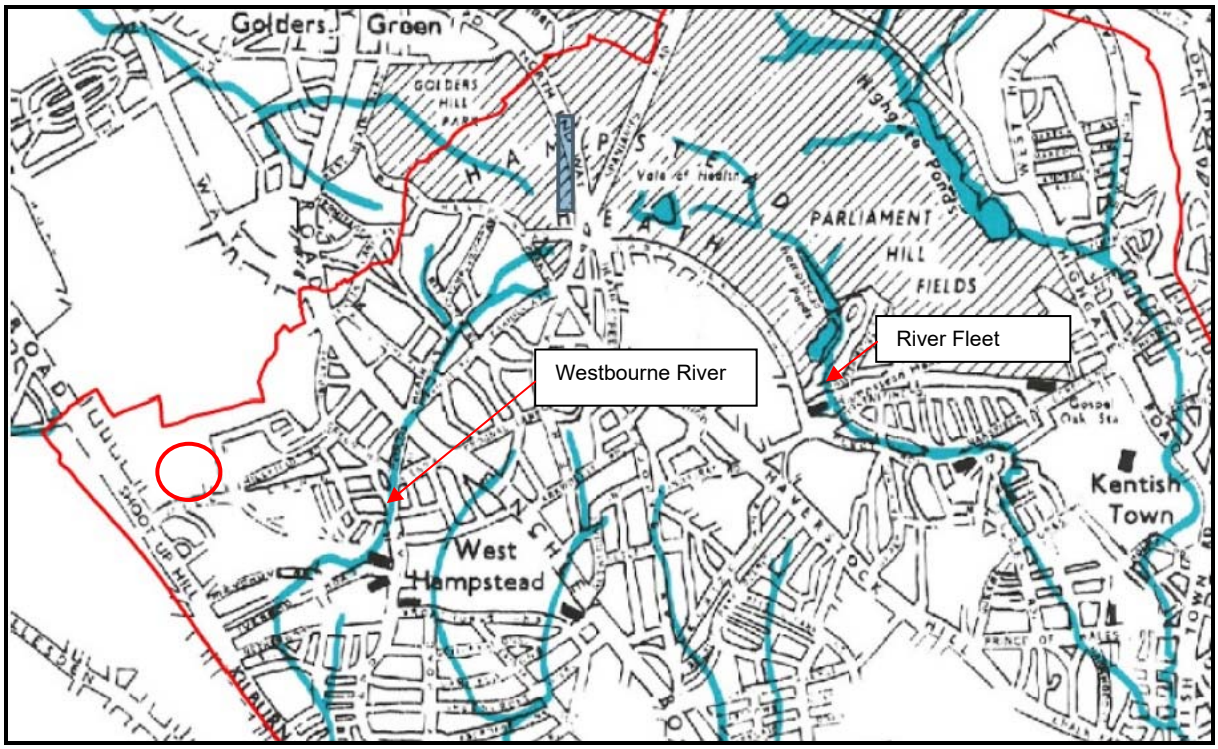


Figure 15 Lost Rivers in Camden

7.4 Surface Water Abstractions

There are no surface water abstraction licenses within 2000m of the site.

8. FLOOD RISK

8.1 Flood Risk from Surface Water

Camden is at risk from surface water runoff (i.e. rainwater that is on the surface of the ground and has not entered a watercourse, drainage system or public sewer), because pipes have burst or gone beyond capacity due to heavy rainfall. These situations are only likely to occur in extreme rainfall events such as in 2002 when floods occurred in Camden.

The site does lie in a Critical Drainage Area 3_010, but does not lie within a Local Flood Risk Zone.

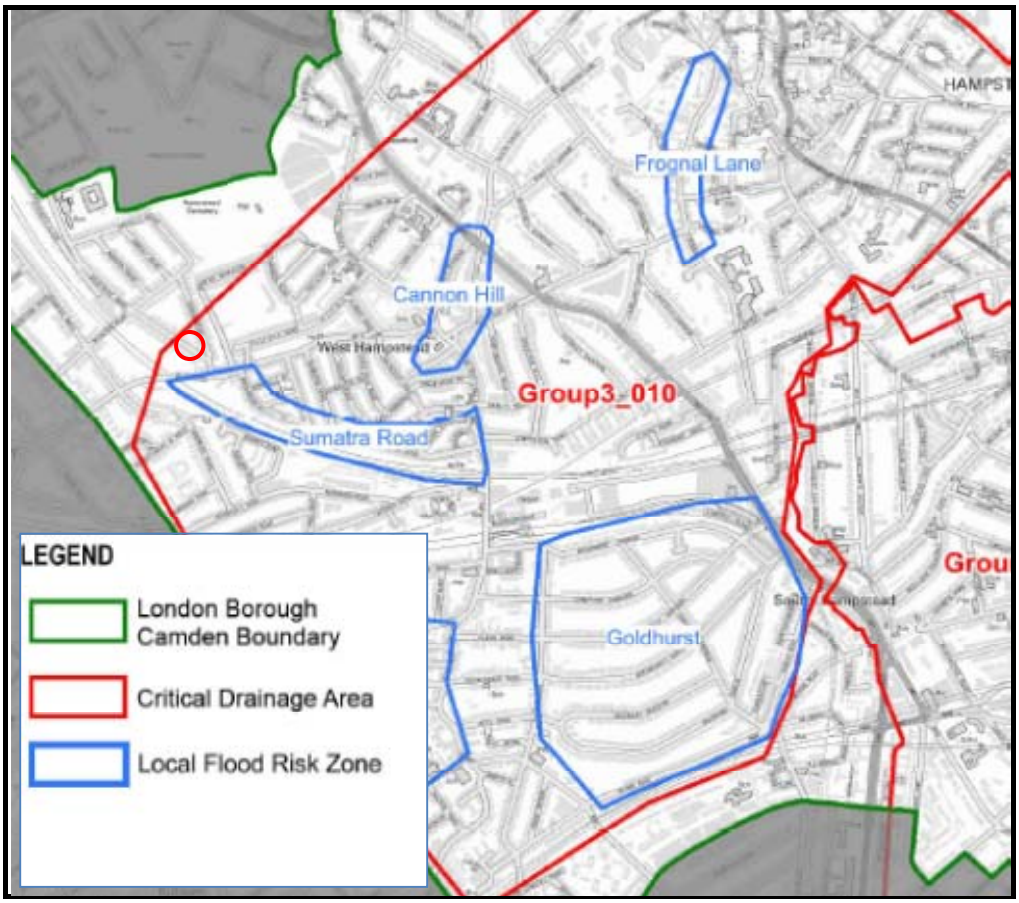


Figure 16 Critical Drainage Areas and Local Flood Risk Zones

Camden are, since publishing the Scrutiny Task Group Report on surface water flooding, aiming to increase clearage of gullies and drains to enable better discharge of water in times of heavy rain fall.

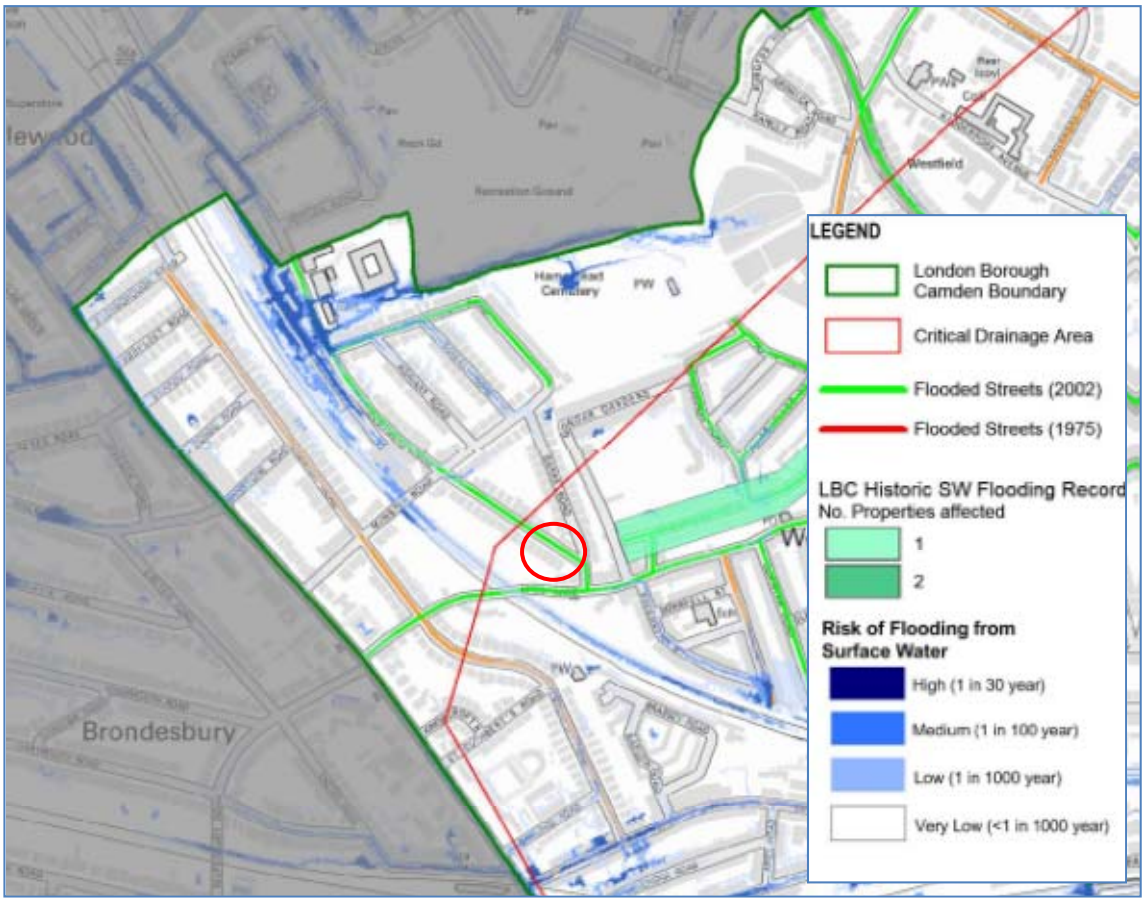


Figure 17 Camden Flood Risk from Surface Water and Flooded Streets 1975 and 2002

The site is recorded as at very low risk of flooding from surface water. Westbere Road was flooded in 2002 but not flooded in 1975 and is at low risk of flooding in a 1 in 1000 year event as shown on Figures 17 and 18.

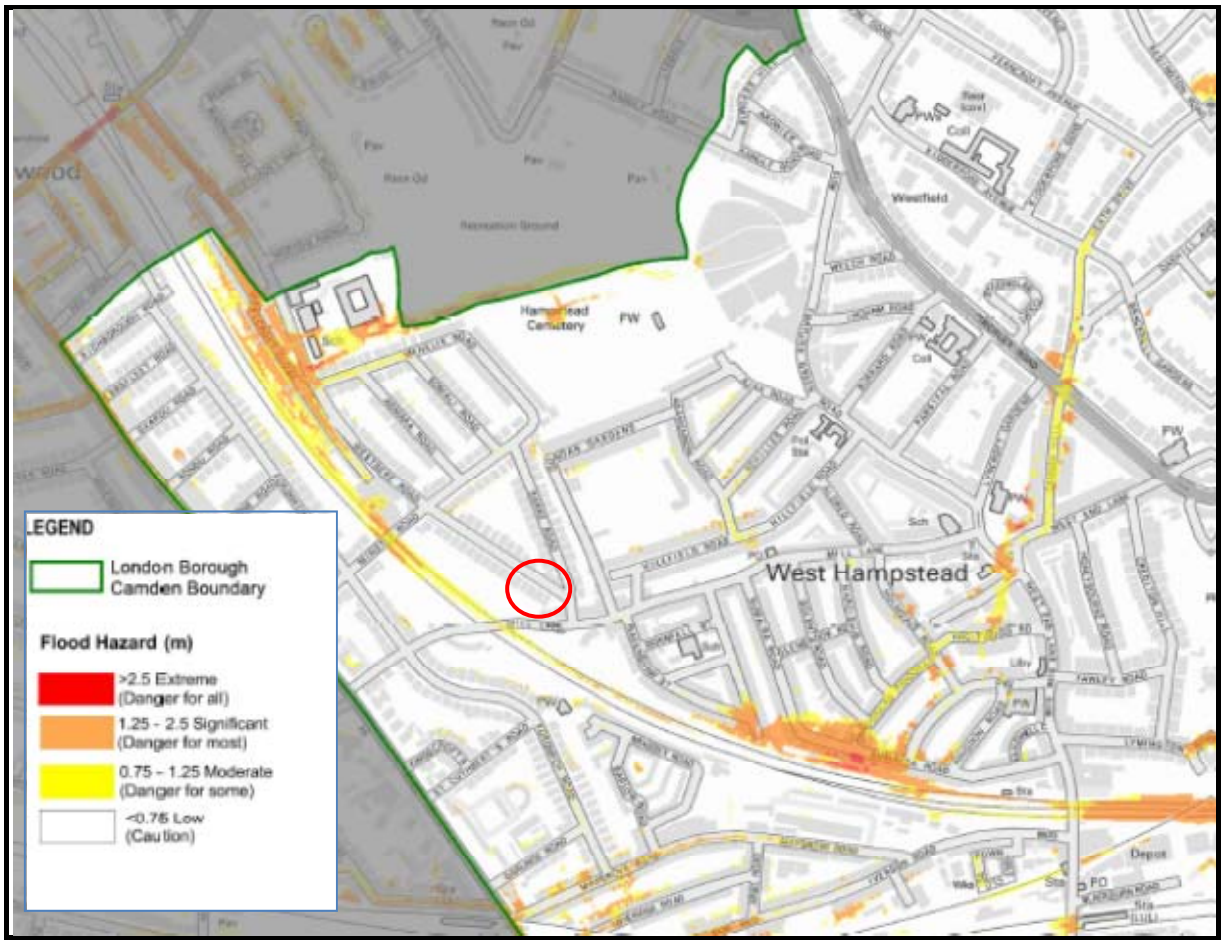


Figure 18 1 in 1000 Year Flood Event

8.2 Flood Risk From Rivers and Seas

The site is shown by the Environment Agency (EA) to not lie within/on the boundary of an area at risk of flooding. The EA indicate a very low risk of flooding from rivers and the sea.

The Flood Zone maps produced by the Environment Agency provide an initial assessment of flood risk. The Flood Zones are divided into four categories of flood probability and do not take into account any flood defences. PPS25 defines the flood zones as:

Zone 1: Low Probability-This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%).

Zone 2: Medium Probability-This zone comprises land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% to 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% to 0.1%) in any year.

Zone 3: High Probability- This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.

Zone 3B 'The Functional Floodplain' – This zone comprises land where water has to flow or be stored in times of flood.

The site does not lie within a Flood Zone.

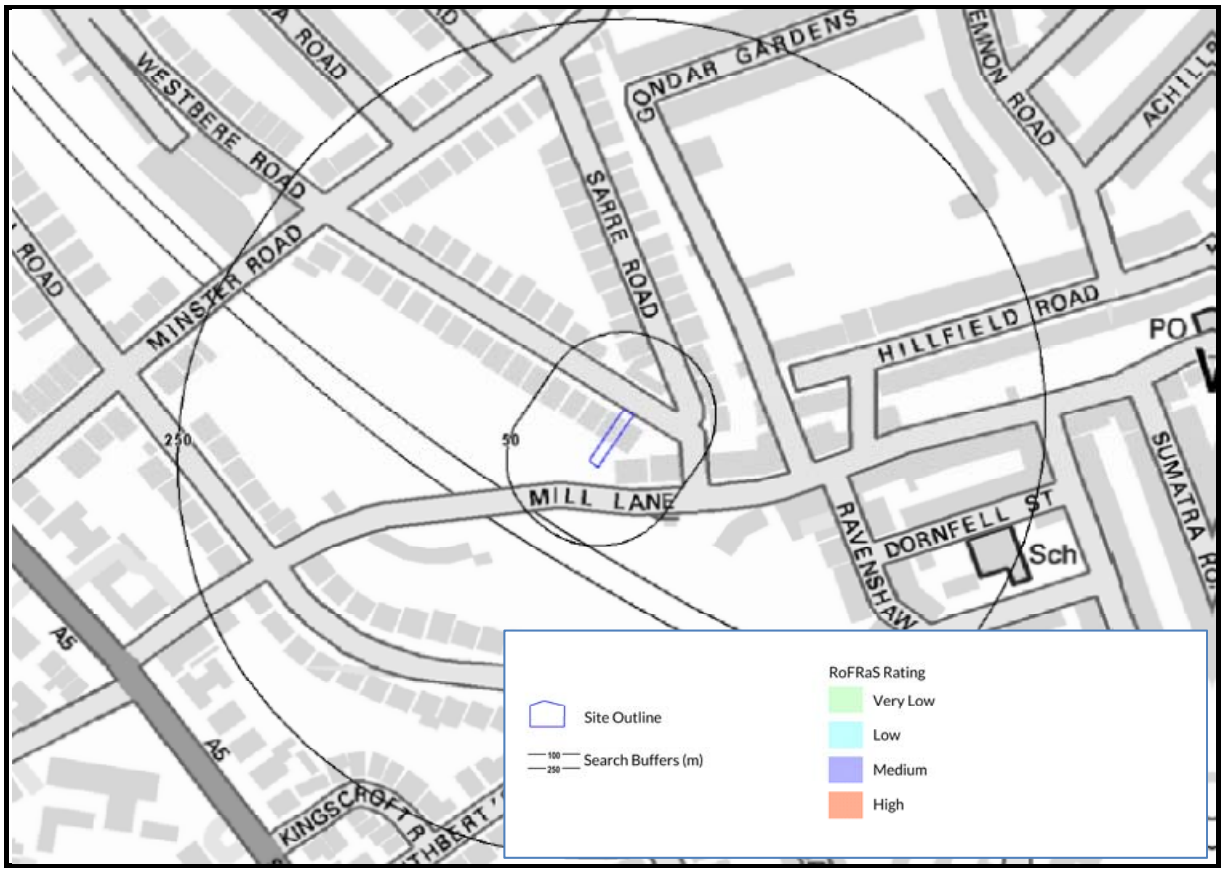


Figure 19 Risk of Flooding from Rivers and Seas

The risk of flooding from rivers and seas (RoFRaS) rating for the site is not a risk as detailed in Figure 19.

8.3 Flood Risk From Reservoirs

The Environment Agency are the enforcement authority for the Reservoirs Act (1975) and all large reservoirs are inspected and monitored by reservoir panel engineers. The risk of flooding from reservoirs is therefore very low. The Environment Agency Reservoir Flood Risk Maps for large reservoirs (>25,000m3) for this area indicate the site is at very low risk of flooding from reservoirs.

Reservoir flooding is extremely unlikely to happen. There has been no loss of life in the UK from reservoir flooding since 1925. All large reservoirs must be inspected and supervised by reservoir panel engineers. As the enforcement authority for the Reservoirs Act 1975 in England, the Environment Agency ensure that reservoirs are inspected regularly and essential safety work is carried out.

Figure 20 indicates the site is not at risk of flooding from reservoirs.

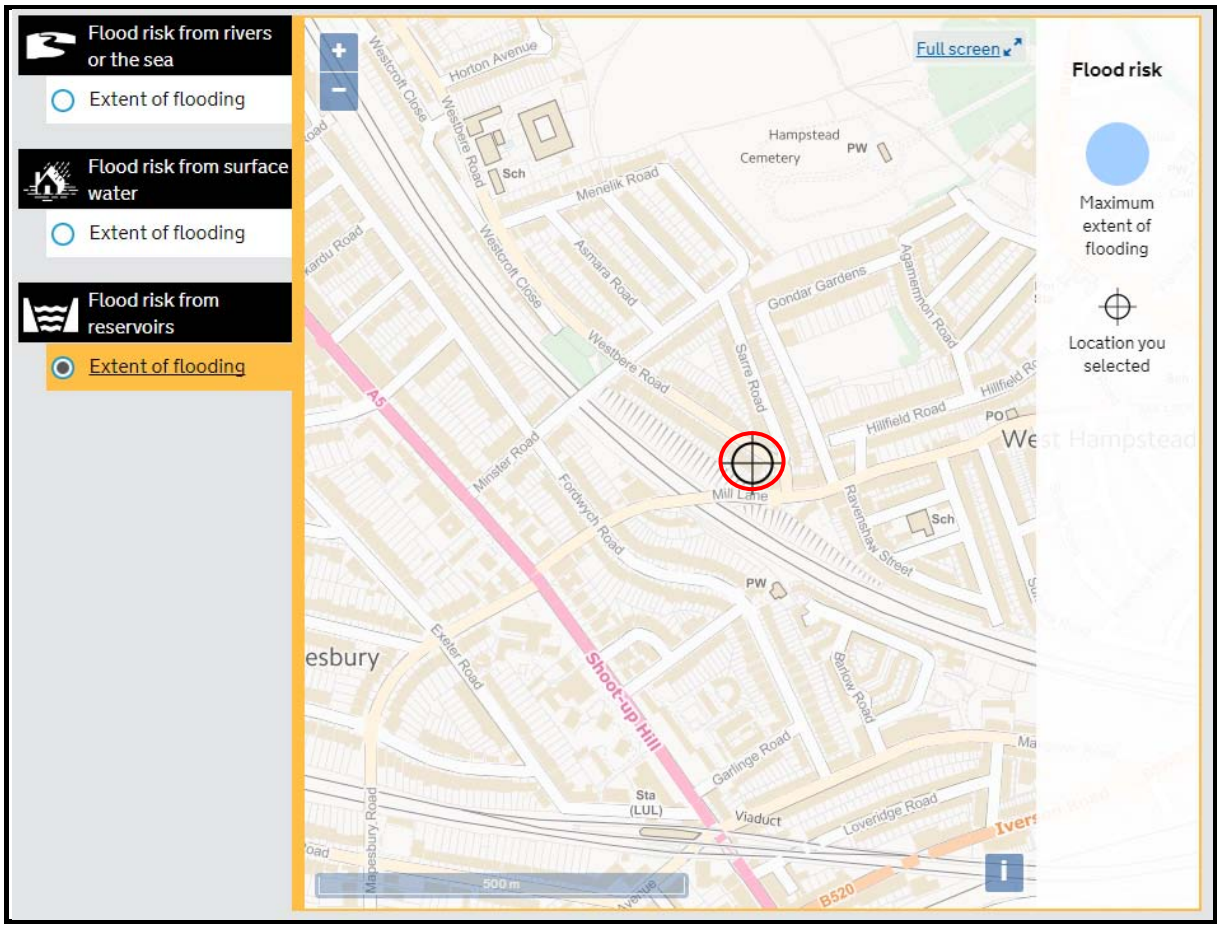


Figure 20 Flood Risk From Reservoirs

8.4 Flood Risk From Groundwater

According to the BGS there are no groundwater flood susceptibility areas within 50m of the site.

8.5 Flooding from Sewers

Figure 21 shows an area where 1 property has been affected by internal sewer flooding and Figure 22 indicates area where no properties have been affected by external sewer flooding. The site is unlikely to be detrimentally affected by flooding sewers.

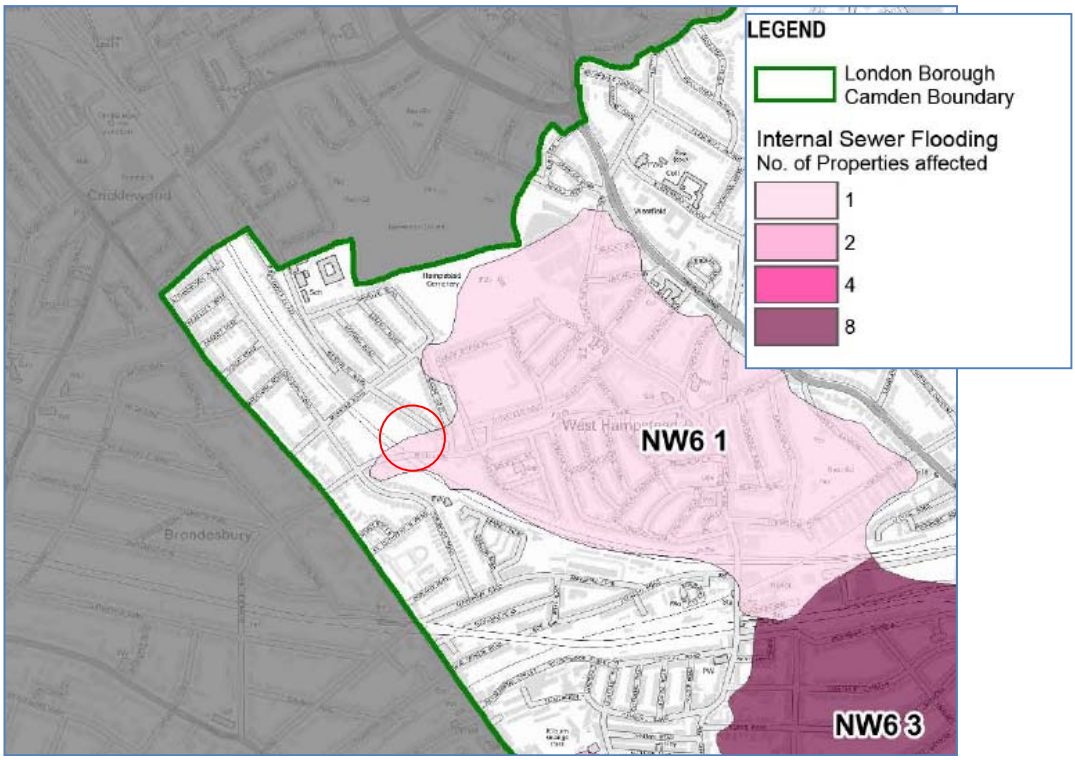


Figure 21 Internal Flooding from Sewers

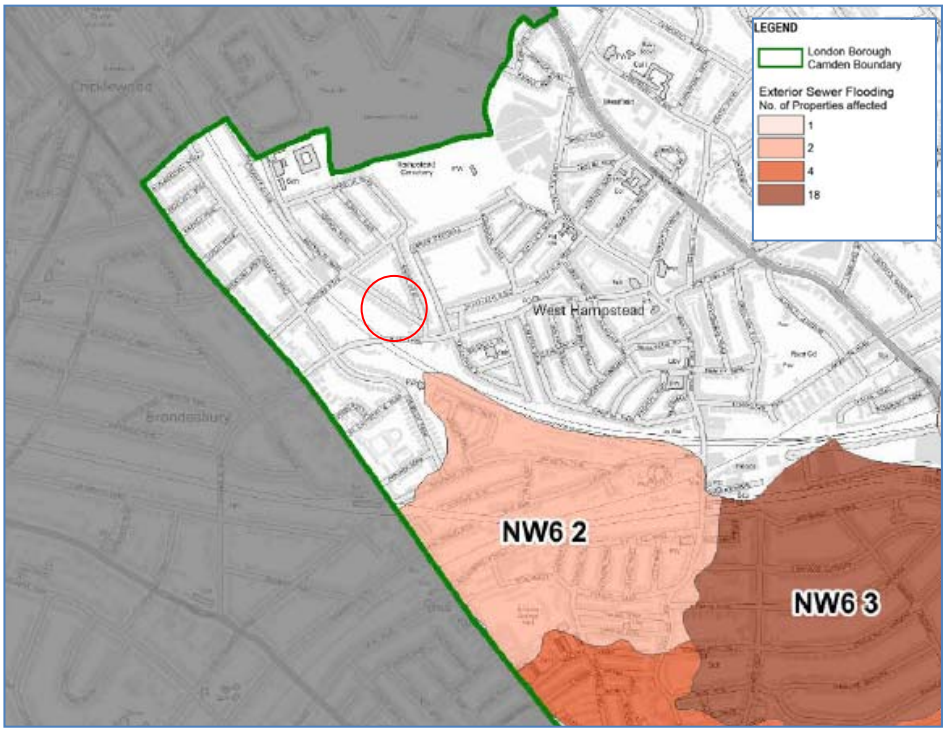


Figure 20 External Flooding from Sewers

8.6 Summary of Flood Risk

Although Westbere Road was flooded in 2002 and lies near the boundary of a Critical Drainage Area, it is considered that a site specific flood risk assessment is not required for this site. This is based on the evidence of the lack of a risk of the site flooding from rivers and seas, and lack of risk of flooding from groundwater, reservoirs and sewers. Miigation measures against flooding as recommended in Section 13 should be incorporated into the construction.

9. LANDFILL, HISTORIC INFILLED LAND AND RADON

9.1 Landfill

According to the Environment Agency there are no landfill sites within 500m of the site. The nearest recorded landfill site is an historic landfill at 1364m east of the site. Gases emitting from landfill sites rarely travel more than 250m in the strata and therefore there is considered a low risk from landfill gases. However Figure 23 indicates areas of infilled ground for covered reservoirs and railway sidings within 250m of the site and therefore it would be prudent to test for toxic gases in the groundwater monitoring boreholes.

9.2 Historic Land Use

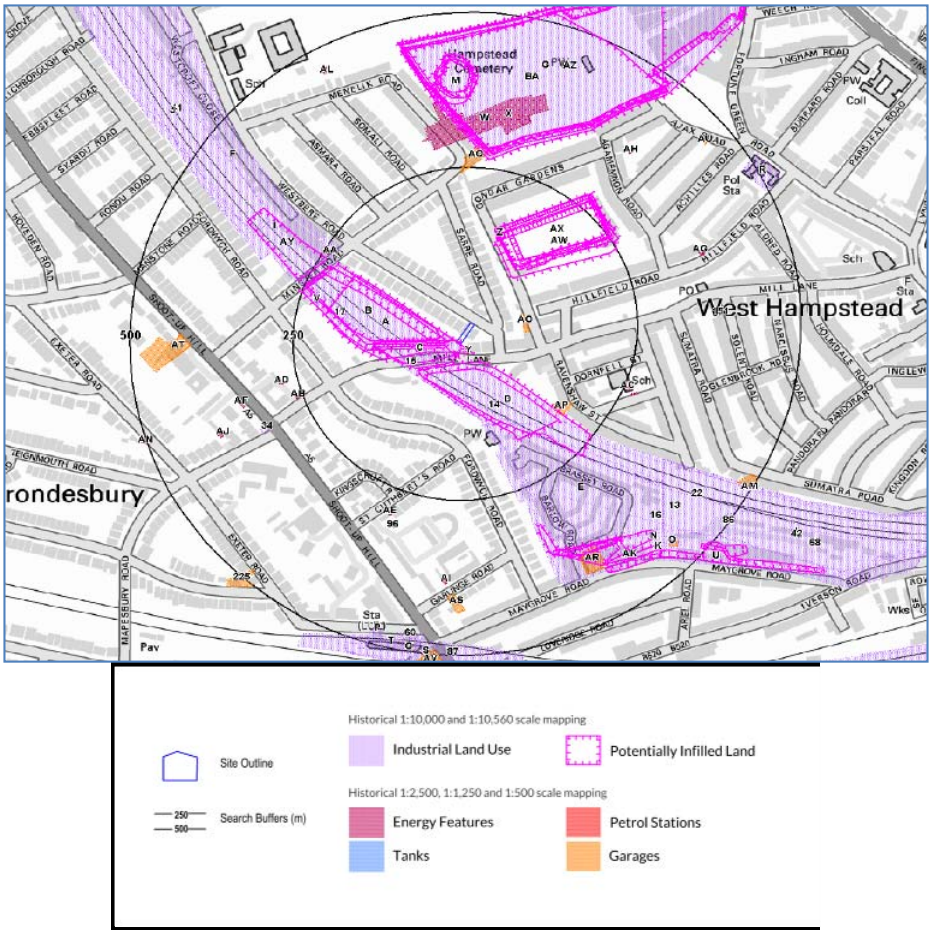


Figure 23 Historic Land Use

9.3 Radon Gas

There is a very low risk that the site is affected by radon gas and as such, radon protection measures will not be required in the basement as part of the proposed development.

10. REGULATED INDUSTRIES AND INFRASTRUCTURE

10.1 Regulated Industries

Results of searches for regulated industries are presented in Table 3.

TABLE 3
Authorisations, Incidents and Registers

Regulated Industry	On SITE	Within 250m	DETAILS
Historic IPC Authorisations	None	None	-
Part A(1) and IPPC Authorised Activities	None	None	-
Water Industry Referrals	None	None	-
Records of Red List Discharge Consents	None	None	-
Records of List 1 Dangerous Substances Inventory Sites	None	None	-
Records of List 2 Dangerous Substances Inventory Sites	None	None	-
Records of Part A(2) and Part B activities and enforcements	None	None	
Records of Category 3 or 4 Radioactive Consents	None	None	-
Records of Licensed Discharge Consents	None	None	-
Records of Planning Hazardous Substance Consents and Enforcements	None	None	-
Records of COMAH and NIHHS sites	None	None	-
Records of National Incidents Recording System List 2	None	None	
Records of National Incidents Recording System List 1	None	None	-
Records of sites determined as contaminated land under Section 78R of EPA 1990	None	None	-
Records of Made Ground	None	None	-
Records from EA landfill Data	None	None	-
Records of Operational Landfill Sites	None	None	-
Records of EA historic landfill sites	None	None	-
Records of non operational landfill sites	None	None	-
Records of local authority landfill sites	None	None	-
Records of operational and non operational waste treatment, transfer or disposal sites	None	1	390m SE of site. Scrap metal yard - 1973
Records of EA licensed waste sites	None	None	-
Current Industrial Land Use	None	6	13m SE, 150m N and 243m NW of site. Electricity Sub station.

			156m E and 214m SW of site. Electrical Equipment, Repair and Servicing 164m E of site. Vehicle Repair, Testing and Servicing
Petrol and Fuel Sites	None	None	-
Underground High Pressure Oil and Gas Pipelines	None	None	-
NG High Voltage underground Electricity Transmission Cables	None	None	
Residential Property (within 250m)	Yes	Yes	Residential to the west, east, north and south
Radon Protection Required	No	-	The property is not in a Radon Affected Area, as <1% of properties lie above action level.

Results of searches for regulated industries, pollution incidents or registered authorisations are presented in Table 3 above and indicate that potentially contaminative land uses are not present on and within close vicinity to the site and there are no records of an environmentally sensitive nature which could be detrimentally affected by the construction of the basement extension and lightwell.

10.2 Infrastructure

There is no known infrastructure beneath the site which could be detrimentally affected by the basement. Underground or partially underground railway lines are located immediately to the south west of site and immediately beyond Mill Lane to the south of site. These will not be detrimentally affected by the basement extension and lightwell.

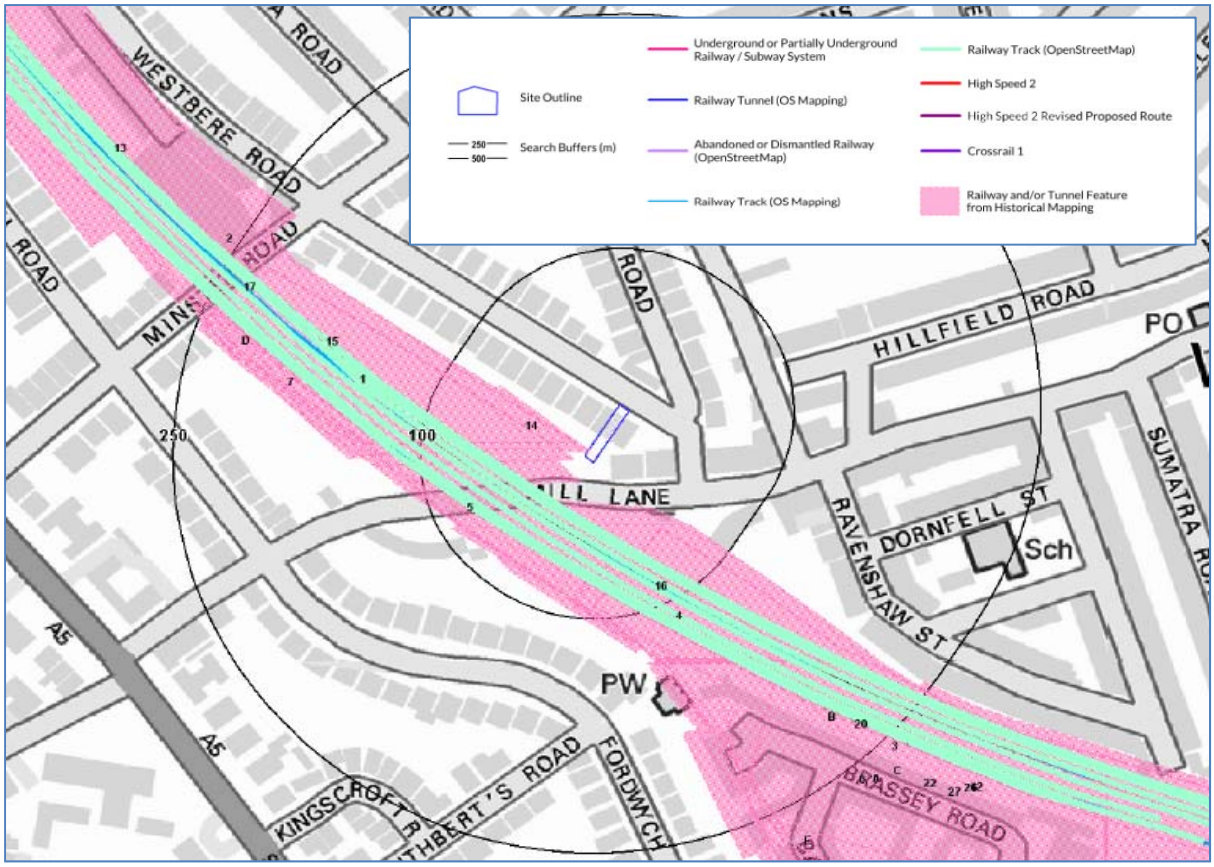


Figure 24 Infrastructure

11. SCREENING AND SCOPING

11.1 Screening

Screening is the process of determining whether or not there are areas of concern which require further consideration and / or investigation for a particular project. In order to undertake screening a site characterisation was undertaken in the previous sections. Scoping is the process of producing a statement which defines further matters of concern identified in the screening stage. This defining is in terms of ground processes in order that a site specific BIA can be designed and executed by deciding what aspects identified in the screening stage require further investigation by desk research or intrusive drilling and monitoring or other work.

The scoping stage highlights areas of concern where further investigation, intrusive soil and water testing and groundwater or gas monitoring may be required.

A series of flowcharts have been used in the screening process to identify what issues are relevant to the site. Each question posed in the flowcharts is completed by answering "Yes", "No" or "Unknown". Any question answered with "Yes" or "Unknown" is then subsequently carried forward to the scoping phase of the assessment.

The results of the screening process for the site are provided in Table 4 below. Where further discussion is required the items have been carried forward to scoping.

Scoping often indicates that a ground investigation is required to establish more fully the base conditions. The Basement Impact Assessment determines the potential impacts of the proposed basement on the baseline conditions, taking into account any mitigating measures proposed.

Table 4
Screening For Basement Impact Assessment

Ref	Question	Response	Details
	Surface Flow and Flooding		
1	Is the site within the catchment of Hampstead Heath Ponds	No	Refer to Maps in Appendix B.
2	As part of the site drainage, will surface water flows (e.g. volume of rainfall and peak run-off) be materially changed from the existing route?	No	Site is hard covered at front and garden infiltration area at rear will not be reduced. Drainage will not alter
3	Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas?	No	Refer to Appendix A drawings and note in No 2.
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	Surface water originating from the site is not received by adjacent properties or downstream watercourses (other than run-off to sewers).

Table 4
Screening For Basement Impact Assessment

Ref	Question	Response	Details
5	Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?	No	Surface water originating from the site is not received by adjacent properties or downstream watercourses (other than run-off to sewers).
6a	Is the site in an area known to be at risk from surface water flooding, 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?	No	The site does not lie below the water level of any surface water feature. The road was not flooded in 1975 and was flooded in 2002.
6b	Does site lie within Critical Drainage Area?	Yes	The site does lie within a CDA, 3-010. Carried forward to scoping
6c	Does the site lie within to a Local Flood Risk Zone	No	The site does not lie within a Local Flood Risk Zone
	Subterranean (groundwater) Flow		
7	Is the site located directly above an aquifer?	No	The site lies on the unproductive London Clay
8	Will the proposed basement extend below the surface of the water table?	No	The water table lies within permeable strata beneath the London Clay.
9	Is the site within 100m of a watercourse, well (disused / used) or a potential spring line?	No	The site lies >100m from lost rivers and existing rivers/canals
10	Is the site within the catchment of any pond chains	No	Refer to Appendix B maps
11	Will the proposed basement development result in a change in the proportion of hard surfaced / paved areas?	No	Refer to Appendix A drawings. Front yard is hard covered. Rear garden unchanged, lightwell within hard covered side path.
12	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	Soakaways unsuitable in London Clay. Likely that discharge will be to public sewer. No increase in level.

Table 4
Screening For Basement Impact Assessment

Ref	Question	Response	Details
13	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 or spring line?	No	No surface water feature or springs within 500m of the site.
	Ground Stability		
14	Does the existing site include slopes, natural or manmade, greater than 7°?	No	Refer to site description.
15	Will the proposed re-profiling of landscaping at site change slopes at the property to more than 7°?	No	Refer to Appendix A and B.
16	Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7°?	Yes	Refer to site description Section 2. Carried forward to Scoping.
17	Is the London Clay the shallowest strata at the site?	Yes	Refer to Geology, Section 5. Carried forward to Scoping.
18	Will any trees 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?	No	No trees to be felled as part of proposed development.
19	Is there a history of seasonal shrink-swell subsidence in the local area, and/or evidence of such effects at the site?	No	No effects evident on site.
20	Is the site within an area of previously worked ground?	No	Unlikely. House constructed before 1900 on site previously occupied by open land.
21	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?	No	Site underlain by relatively impermeable London Clay.
22	Is the site within 50m of any ponds?	No	See maps in Appendix B
23	Is the site within 5m of a pedestrian right of way?	Yes	Westbere Road lies <5m from the basement at the front of the house. Carried forward to Scoping
24	Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?	Unknown	Depth of foundations to be confirmed. Carried forward to scoping
25	Is the site over (or within the exclusion of) any	No	Site is not located

Table 4
Screening For Basement Impact Assessment

Ref	Question	Response	Details
	tunnels, e.g. railway lines?		over any railway tunnels.

In summary the issues carried forward to scoping include those associated with the plasticity of the strata, flooding, groundwater levels, neighbouring railway cutting, the impact of the basement on the ground and on the ground supporting adjacent properties.

11.2 Scoping

Scoping is the activity of defining in further detail the matters to be investigated as part of the BIA process. Scoping comprises of the definition of the required investigation needed in order to determine in detail the nature and significance of the potential impacts identified during screening.

The potential impacts for each of the matters highlighted in Table 4 above are discussed in further detail below in Table 5 together with the requirements for further research and / or investigations. Detailed assessment of the potential impacts and recommendations are provided where possible.

Table 5
Scoping for Basement Impact Assessment

Reference	Issue	Potential Impact and Action
	Surface Water and Flooding	
6b	The site lies within a CDA but not within a Flood Risk Zone. There is not a risk from flooding from rivers and seas, groundwater, sewers or reservoirs.	**Impact:** Flooding **Action:** Waterproofing Basement extension and lightwell. Non return valves on drains and emergency pump.
	Ground Stability	
16	Railway cutting on neighbouring land	**Impact:** Landslip reaching house **Action:** Assess during a site visit and slope measurement.
17	Shrink and swelling of London Clay	**Impact:** Ground Movement **Action:** Undertake Plasticity tests to design foundations for basement construction
23	Site lies within 5m of pedestrian way	**Impact:** Damage to services **Action:** Services search
24	Adjacent properties may have basements. Depth of foundations to be confirmed.	**Impact:** Differential settlement to attached houses. **Action:** Check depth of foundations and Damage Category

13. IMPACT ASSESSMENT

13.1 Introduction

The BIA has been undertaken for the proposed construction of a partial basement extension, lightwell and replacement rear extension. The depth of the basement extension is anticipated to be 2.75m bgl. The anticipated bearing pressure of the new structure has not been provided.

The comprehensive screening and scoping exercise have been sufficient to allow the potential impacts of the issues identified during the screening and scoping stage to be assessed.

This section of the report provides an interpretation of the findings of the screening and scoping, in the form of a conceptual model, and provides advice and recommendations with respect to temporary and permanent works and foundation options.

13.2 Geological and Hydrogeological Setting

The site is underlain by the London Clay which may have high plasticity which needs determination. The report concludes that to the south west and north east of the site there is potentially infilled land. Monitoring should therefore be undertaken for the presence of toxic gases.

Groundwater levels in the area lie >50m bgl in the Thanet Sand or underlying Chalk, therefore the construction of the basement extension is unlikely to have any detrimental effect on groundwater levels or flow as the basement will not extend into the groundwater. There is a low risk of flooding from groundwater. Monitoring should be undertaken to assess the level of any perched water within the siltstone bands of the London Clay.

13.3 Hydrology and Flood Risk

The screening indicated that the site does not lie within a Flood Zone or Local Flood Zone, however, it does lie within a Critical Drainage Area(Group 3_010). Recommendations are that the basement should be waterproofed and tanked, with non return valves on the drains and an emergency pump incorporated, in case of an unexpected flood. There are no local rivers or local lost rivers in the vicinity of the site. There is a low risk of flooding from reservoirs, groundwater, surface water and sewers. It is concluded that a site specific Flood Risk Assessment is not required provided that the mitigating measures described above are incorporated in construction.

13.4 Contamination

Ordnance Survey maps inspected indicated the site lay as open ground with the house and gardens constructed by 1896. There is a low risk of contamination being present on the site, any undetected contamination is unlikely to detrimentally affect groundwater or other controlled waters. As a precaution, all builders should wear PPE and also use gloves when handling soil for Health and Safety at Work in accordance with HSE and CIRIA guidelines.

It would be prudent to screen test for a suite of contamination for Health and Safety of workmen.

13.5 Basement and Lightwell Excavations

The excavation for the basement extension beneath the house will be circa 2.75m below existing ground floor level. The floor formation level will be within the London Clay. Excavation in any made ground and London Clay could be achieved by mechanical excavator. All excavations will require a stiff temporary support mechanism for construction.

13.6 Foundation Design

Topsoil and made ground are unsuitable founding strata and all foundations should be constructed on the unweathered London Clay. The clay, where unweathered, and at 2.75m bgl is anticipated to be of medium to high strength, however this will need to be verified with insitu strength tests in boreholes to prove the clay can provide a suitable bearing stratum for foundations.

Groundwater may be encountered especially during and after heavy rainfall. Temporary works may require sump pumping. If rainwater falls into the excavation it can easily be dealt with by sump pumping. If this occurs the softened surface of any clay strata should be removed prior to any pouring of concrete for the foundations or floors.

In accordance with Eurocode 7 (BSEN 1997-1) groundwater should be taken at ground level for short and long term design. Such design must resist the buoyant uplift pressures generated by groundwater at ground level.

Excavations for the proposed structure will require stiff temporary support in all strata to maintain stability of the surrounding structures and to prevent any excessive horizontal ground movements. A Structural Method Statement (SMS) for Method of Construction will be required.

Excavation should be undertaken in an underpinning sequence with a temporary propping system to support the underpinning sections during the excavation works, until the basement extension is completed. The reinforced concrete underpin wall should support the party walls and be designed to resist lateral soil and water pressures. The underpinning should be constructed in a hit and miss sequence with a maximum width of 1.20m excavated at any time.

Construction of the proposed basement lightwell will need to be supported by new retaining walls. Design of retaining walls should be provided in a Structural Method Statement.

The proposed basement slab must be designed to accommodate heave from long term swelling on removal of overburden and the high volume change of the London Clays.

The support for the temporary and permanent conditions must take account of maintaining the stability of the excavation and the stability of the adjacent properties and surrounding structures. Design of the walls may be decided as to whether the temporary support is also incorporated into the permanent solution.

13.7 Adjacent Structures, Potential Ground Movement and Monitoring

The development of the partial basement extension is unlikely to impact on adjacent properties provided mitigating measures and appropriate temporary and permanent design are undertaken.

It would be prudent to undertake a structural condition survey of adjacent properties which can be undertaken by a Party Wall Surveyor.

Potential ground movement calculations were undertaken to determine the category of damage that may occur to adjacent properties during construction of the basement extension. The methodology follows CIRIA 580 and is presented in detail in Appendix C. The results of calculations, taking into account the length of the semi detached house, indicate very slight to negligible movements will occur to adjacent properties in line with Burlands, 'Classification of visible damage to walls' (Burland et al ,1977 and Boscardin and Cording, 1989, and Burland, 2001), reproduced in Appendix C.

Recommendations for monitoring movement during construction are given in Appendix C.

The proposed basement extension will lie within 5m of the pavement of Westbere Road. Lateral movements associated with the basement excavations must be controlled during temporary and permanent works so as not to impact adversely on the stability of any adjacent structures or services within the pavement/roadway. Service drawings should be acquired before excavation.

13.8 Underground Concrete

Testing for the presence of pH and sulphates in the clay should be undertaken in order to allow for recommendations for design of underground concrete according to Table C2 of BRE Special Digest 1 Part C (2005). Due to the selenite content in London Clay, it is recommended that underground concrete is designed to DS-2. This should be confirmed by tests on soil for sulphate and pH.

13.9 Service Excavations

Shallow excavations for services and the like are unlikely to be stable in the made ground or clay in the short or long term and will require substantial support. Some sump pumping may be required to keep the trenches dry. The excavations for the basement extension will be close to pavements and a full services search is required.

13.10 Waste Disposal

Any spoil arising from excavations or landscaping works will need to be disposed of to a licensed tip. Under the European Waste Directive landfills are classified as accepting inert non-hazardous or hazardous wastes in accordance with the EU Waste Directive. Based on the technical guidance provided by the Environment Agency it is considered likely that the soil from this site would be classified as inert waste. This needs confirming with Waste Acceptance Criteria Tests on the soil.

14. RECOMMENDATIONS

The screening and scoping stage of the BIA indicated the requirement for a ground investigation, groundwater and gas monitoring, slope stability assessment and geotechnical and environmental soil testing. In addition there is a requirement for a Services Search, Structural and Construction Method Statement and Construction Transport Management Plan and Works Programme. There is no requirement for a site specific Flood Risk Assessment.

The ground investigation should comprise:

1. Two boreholes
2. In situ shear strength tests in strata
3. Collection of soil samples
4. Installation of standpipes
5. Monitoring of groundwater levels and toxic gases
6. Contamination testing on soil samples
7. Geotechnical testing of soil samples
8. Excavation of trial pits to establish existing foundation depths.
9. Interpretive Report with geotechnical parameters for design

15. GENERAL REMARKS

This report truly reflects the conditions found during the screening and scoping. Whilst the screening and scoping was undertaken in a professional manner taking due regard of additional information which became available as a result of ongoing research, the results portrayed only pertain to the information attained, and it is possible that other undetected information and undetected ground and gas conditions, undetected mining conditions and undetected contamination may exist. The screening and scoping was only undertaken within the site boundaries and should not be used for interpretation purposes elsewhere. These conclusions are only a brief summary of the report, and it is recommended that the report is read in full to ensure that all recommendations have been understood.

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