

WE LISTEN, WE PLAN, WE DELIVER

Geotechnical Engineering and Environmental Services across the UK.

DESK STUDY & BASEMENT IMPACT ASSESSMENT REPORT

METHUEN PARK
LAND AND GARAGES ADJACENT TO ROWAN
MUSWELL ROAD
HORNSEY
LONDON
N10 2JR



Report Title: Desk Study & Basement Impact Assessment for Methuen Park, Land And Garages
Adjacent To Rowan, Muswell Road, Hornsey, London N10 2JR

Report Status: Final

Job No: P4875J2709/CLP

Date: 25 November 2022

Quality Control – Revisions

Version	Date	Issued By

Prepared by: JOMAS ASSOCIATES LTD **For:** TONY KETERMAN

Prepared by

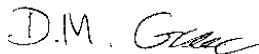
Clare Prosser BSc (Hons), MSc,
FGS



Geo-environmental Engineer

Reviewed by

Derek Grange BSc (Hons), MSc,
CGeol, FGS, RoGEP – Specialist



Senior Principal - Geotechnics

Approved by

Tom Elbourne BSc (Hons) CGeol
CSci FGS, RoGEP - Professional



Senior Geo-environmental
Engineer

Should you have any queries relating to this report, please contact

JOMAS ASSOCIATES LTD

www.jomasassociates.com

0843 289 2187

info@jomasassociates.com

CONTENTS

	Page
EXECUTIVE SUMMARY	V
1 INTRODUCTION	1
1.1 Terms of Reference	1
1.2 Proposed Development	1
1.3 Objectives	1
1.4 Scope of Works	2
1.5 Scope of Basement Impact Assessment	2
1.6 Supplied Documentation	3
1.7 Limitations	3
2 SITE SETTING & HISTORICAL INFORMATION	4
2.1 Site Information	4
2.2 Walkover Survey	4
2.3 Historical Mapping Information	5
2.4 Past Land Use	7
2.5 Landfill, Waste and Potentially Infilled Surface Ground Workings	8
2.6 Current Industrial Land Use	8
2.7 Tunnels and Railways	10
2.8 Previous Site Investigations	10
2.9 Local Authority Information	10
2.10 Planning Information	10
2.11 Sensitive Land Uses	10
2.12 Radon	11
3 GEOLOGICAL SETTING & HAZARD REVIEW	12
3.2 Solid and Drift Geology	12

3.3	British Geological Survey (BGS) Borehole Data	12
3.4	Geological Hazards	13
4	HYDROGEOLOGY, HYDROLOGY AND FLOOD RISK REVIEW	15
4.1	Hydrogeology & Hydrology	15
4.2	Flood Risk Review.....	18
4.3	Sequential and Exception Tests	22
4.4	Flood Resilience	22
5	SCREENING AND SCOPING ASSESSMENT.....	24
5.1	Screening Assessment	24
5.2	Scoping.....	27
6	PRELIMINARY BASEMENT IMPACT ASSESSMENT	29
6.1	Proposed Changes to Areas of External Hardstanding	29
6.2	Past Flooding.....	29
6.3	Geological Impact.....	29
6.4	Hydrology and Hydrogeology Impact	30
6.5	Impacts of Basement on Adjacent Properties and Pavement	30
6.6	Cumulative Impacts.....	31
6.7	Summary	32
6.8	Ground Movement.....	32
7	QUALITATIVE RISK ASSESSMENT.....	34
7.1	Legislative Framework.....	34
7.2	Conceptual Site Model	35
7.3	Qualitative Risk Estimation	37
7.4	Outcome of Risk Assessment.....	40
7.5	List of Key Contaminants	40

8 REFERENCES	42
---------------------------	-----------

APPENDICES

APPENDIX 1 – FIGURES

APPENDIX 2 – GROUNDSURE REPORTS

APPENDIX 3 – OS HISTORICAL MAPS

APPENDIX 4 – QUALITATIVE RISK ASSESSMENT METHODOLOGY

APPENDIX 5 – BGS BOREHOLE RECORDS

EXECUTIVE SUMMARY

Tony Ketterman ("The Client") has commissioned Jomas Associates Ltd ('Jomas'), to prepare a Basement Impact Assessment for a site referred to as Land and garages on Methuen Park, adjacent to Rowan, Muswell Road, Hornsey, London N10 2JR.

The aim of this report is to assess whether the ground conditions within the local area represent an impediment to the proposed development. A preliminary risk assessment is also undertaken to establish if possible contaminant linkages exist, which require further investigation in accordance with the Environment Agency (EA) report LCRM and relevant guidance within the National Planning Policy Framework (NPPF).

It should be noted that the table below is an executive summary of the findings of this report and is for briefing purposes only. Reference should be made to the main report for detailed information and analysis.

Desk Study	
Current Site Use	The site currently comprises 3No rows of domestic garages, a sub-station and external hardstanding.
Proposed Site Use	The proposed development for this site is understood to comprise the demolition of the existing garages and the construction of a new 3-storey plus basement residential dwelling.
Site History	On the earliest available map (1865), the site is shown as part of a field and devoid of any features. By the map dated 1913, the site is still devoid of any features, however, it lies within the boundaries of land associated with 2No buildings to the north west. By the map dated 1975, the site is occupied by a sub-station and 3No rows of small buildings, assumed to be the domestic garages in place today. It must be noted that the large-scale maps dated from 1970 to 1986 are incomplete and the precise construction date of the garages is unknown. Historically, the surrounding area comprised fields with a small cluster of buildings from 70m south west and by the map dated 1913, the area had been highly developed with rows of terraced, residential style buildings surrounding the site.
Site Setting	Information provided by the British Geological Survey (BGS) indicates that no superficial deposits lie beneath the majority of the site; however, superficial deposits of the Dollis Hill Gravel Member are reported to just encroach within the south-west of the site. Given the scale and accuracy of mapping, it is possible that these deposits may extend beneath none of the site, or the entire site. The Dollis Hill Gravel Member is identified as a Secondary (A) aquifer with the London Clay Formation identified as Unproductive. A review of the EnviroInsight Report indicates that there are no Environment Agency Zone 2 or Zone 3 flood zones within 250m of the site. There are no source protection zones within 500m of the site. There are 9No groundwater and 8No potable water abstractions reported within 2km of the site. The nearest entry is reported as an active groundwater abstraction located 861m north of the site for spray irrigation.

Desk Study	
	There are no surface water abstractions reported within 2km of the site. There are no detailed river entries or surface water features reported within 250m of the site.
Potential Sources	• Potential for Made Ground associated with previous development operations – on site (S1) • Potential for contamination from numerous garages on site (S2) • Potential Polychlorinated Biphenyl contamination from the sub-station - on site (S3)
Potential Receptors	• Construction workers (R1) • Maintenance workers (R2) • Neighbouring site users (R3) • Future site users (R4) • Building foundations and on site buried services (water mains, electricity and sewer) (R5) • Secondary (A) Aquifer (R6)
Preliminary Risk Assessment	The risk estimation matrix indicates a low to moderate risk. It is recommended that an intrusive investigation is undertaken to clarify potential risks to the identified receptors and assess the extent of Made Ground soils present at the site. It is recommended that an intrusive investigation is carried out to verify the underlying ground conditions and assist with foundation design and waste disposal options. To facilitate this, samples should be obtained for chemical and geotechnical testing.
Potential Geological Hazards	The Groundsure data identifies a moderate risk for shrink swell clays beneath the site. The remaining geological hazards assessed have been assessed as negligible to low risks. The presence of Made Ground and London Clay Formation may be a source of elevated sulphate. If such levels are noted then sulphate resistant concrete may be required. Given that the BGS has identified the area to have the 'potential' for groundwater flooding based on underlying geological conditions, a relatively shallow groundwater table should be anticipated. It is recommended that a geotechnical ground investigation is undertaken to inform foundation design.

Screening and Scoping (Basement Impact Assessment)	
Subterranean (Groundwater) Flow	A ground investigation is recommended to confirm the ground conditions and groundwater levels (if any) beneath the site. This can then confirm the relative depths of the basement to the groundwater levels.
Land Stability	The site, as with the surrounding area, is generally flat. The Groundsure report has noted that there is a “very low” risk of land instability issues for the site. The investigation should also determine the possibility of encountering groundwater and the possibility of Made Ground and/or clay. Atterberg Limits of the underlying clay should be determined by the ground investigation to establish shrink/swell potential.
Surface Flow and Flooding	The proposed basement will underlie the existing hardstanding presently on site, there will be no significant change in surface water run-off.

Basement Impact Assessment	
Impact Assessment	The overall assessment of the site is that the creation of a basement for the existing development will not adversely impact the site or its immediate environs, providing measures are taken to protect surrounding land and properties during construction. The proposed basement excavation will be within 5m of a public pavement. It will not be laterally within 5m of neighbouring properties. Unavoidable lateral ground movements associated with the basement excavations must be controlled during temporary and permanent works so as not to impact adversely on the stability of the surrounding ground and any associated services. During the construction phase careful and regular monitoring will need to be undertaken to ensure that the property above is not adversely affected. This may mean that the property needs to be suitably propped and supported. From the studies that have been undertaken so far, and subject to the findings of an intrusive investigation, it is concluded that the construction of the building will not present a problem for groundwater. The proposed development is not expected to cause significant problems to the subterranean drainage. However, should be confirmed by a ground investigation and a subsequently updated Basement Impact Assessment.

Recommended Further Work	
Works	An intrusive ground investigation is recommended to confirm the ground conditions and groundwater levels (if any) beneath the site, as well as to inform foundation design. A preliminary investigation could comprise windowless sampling boreholes across the site and a cable percussive borehole drilled to at least 5m below the proposed depth of the basement. We assume that intrusive works will be undertaken following consent of the proposed scheme to discharge the relevant conditions, where present.

1 INTRODUCTION

1.1 Terms of Reference

- 1.1.1 Tony Keterman ("The Client") has commissioned Jomas Associates Ltd ('Jomas'), to prepare a Desk Study and a Basement Impact Assessment (Screening & Scoping) at a site referred to as 'Methuen Park', which currently comprises the land and garages adjacent to Rowan, Muswell Road, Hornsey, London, N10 2JR.
- 1.1.2 Jomas' work has been undertaken in accordance with email proposal dated 14th November 2022.

1.2 Proposed Development

- 1.2.1 The proposed development for this site is understood to comprise the demolition of the existing garages and the construction of a new 3-storey residential dwelling including a basement.
- 1.2.2 Private soft landscaping is anticipated.
- 1.2.3 A plan of the proposed development is included in Appendix 1.
- 1.2.4 For the purposes of the contamination risk assessment, the proposed development is classified as 'residential with plant uptake'.
- 1.2.5 For the purpose of geotechnical assessment, it is considered that the project could be classified as a Geotechnical Category (GC) 2 site in accordance with BS EN 1997 Part 1.
- 1.2.6 This will be reviewed at each stage of the project.

1.3 Objectives

- 1.3.1 The objectives of Jomas' investigation was as follows:
- To present a description of the present site status, based upon the published geology, hydrogeology and hydrology of the site and surrounding area, with respect to potentially contaminative land uses;
 - To provide an assessment of the environmental sensitivity at the site and the surrounding area, in relation to any suspected or known contamination which may significantly affect the site and the proposed development;
 - To review readily available historical information (i.e., Ordnance Survey maps and database search information) for the site and surrounding areas;
 - To assess the potential impacts that the proposal may have on ground stability, the hydrogeology and hydrology on the site and its environs.
 - To identify and assess geotechnical issues that may affect the site.

1.4 Scope of Works

1.4.1 The following tasks were undertaken to achieve the objectives listed above:

- A walkover survey of the site;
- A desk study, which included the review of a database search report (GeoInsight Report, attached in Appendix 2) and historical Ordnance Survey maps (attached in Appendix 3);
- A Basement Impact Assessment (BIA);
- The compilation of this report, which collects and discusses the above data, and presents an assessment of the site conditions, conclusions and recommendations.

1.5 Scope of Basement Impact Assessment

1.5.1 The site lies within the remit of the London Borough of Haringey. The council has published a document "Haringey Council Planning Regeneration & Economy, draft basement development guidance note (June 2012). This gives a lot of detail on the issues relevant to basements within the London Borough of Haringey, but does not go into detail as to how these issues should be assessed.

1.5.2 Consequently, Jomas has based the methodology of the BIA on the guidance given in the London Borough of Camden document "Camden Planning Guidance Basements" (CPGB) (January 2021). This document has been used as it is generally accepted that this gives the best available guidance on the practicalities regarding how to the undertake a BIA.

1.5.3 Jomas' BIA covers most items required under CPGB, with the exception of;

- Plans and sections to show foundation details of adjacent structures – no access to adjacent properties was possible.
- Programme for enabling works, construction and restoration.
- Evidence of consultation with neighbours.
- Ground Movement Assessment (GMA), to include assessment of significant adverse impacts and specific mitigation measures required, as well as confirmatory and reasoned statement identifying likely damage to nearby properties according to the Burland Scale.
- Construction Sequence Methodology.
- Proposals for monitoring during construction.
- Drainage assessment.

- 1.5.4 This Jomas BIA also takes into account the Campbell Reith pro forma BIA produced on behalf of and published by the London Borough of Camden as guidance for applicants to ensure that all of the required information is provided.
- 1.5.5 A number of the requirements set out in the London Borough of Camden document CPGB will need to be addressed in a construction management plan, this stage is not within the scope of work that Jomas Associates have been commissioned.
- 1.6 Supplied Documentation**
- 1.6.1 Jomas Associates have not been supplied with any previously produced reports at the time of writing this report.
- 1.7 Limitations**
- 1.7.1 Jomas Associates Ltd has prepared this report for the sole use of Tony Ketterman in accordance with the generally accepted consulting practices and for the intended purposes as stated in the agreement under which this work was completed. This report may not be relied upon by any other party without the explicit written agreement of Jomas. No other third party warranty, expressed or implied, is made as to the professional advice included in this report. This report must be used in its entirety.
- 1.7.2 The records search was limited to information available from public sources; this information is changing continually and frequently incomplete. Unless Jomas has actual knowledge to the contrary, information obtained from public sources or provided to Jomas by site personnel and other information sources, have been assumed to be correct. Jomas does not assume any liability for the misinterpretation of information or for items not visible, accessible or present on the subject property at the time of this study.
- 1.7.3 Whilst every effort has been made to ensure the accuracy of the data supplied, and any analysis derived from it, there may be conditions at the site that have not been disclosed by the investigation, and could not therefore be taken into account. As with any site, there may be differences in soil conditions between exploratory hole positions. Furthermore, it should be noted that groundwater conditions may vary due to seasonal and other effects and may at times be significantly different from those measured by the investigation. No liability can be accepted for any such variations in these conditions.
- 1.7.4 ***This report is not an engineering design and the figures and calculations contained in the report should be used by the Structural Engineer, taking note that variations may apply, depending on variations in design loading, in techniques used, and in site conditions. Our recommendations should therefore not supersede the Engineer's design.***

SECTION 2

SITE SETTING & HISTORICAL INFORMATION

2 SITE SETTING & HISTORICAL INFORMATION

2.1 Site Information

2.1.1 The site location plan is appended to this report in Appendix 1.

Table 2.1: Site Information

Name of Site	Land and garages adjacent to 48 Muswell Road
Address of Site	Methuen Park London N10 2JY
Approx. National Grid Ref.	528919, 190024
Site Area (Approx)	0.06 hectares
Site Occupation	Domestic garages
Local Authority	London Borough of Haringey
Proposed Site Use	Demolition of existing garages, construction of residential property with a basement.

2.2 Walkover Survey

2.2.1 The site was visited by a Jomas Engineer on 22nd November 2022. The following information was noted while on site.

Table 2.2: Site Description

Area	Item	Details
On-site:	Current Uses:	Site consists of domestic garages, external hardstanding and a sub-station. A retaining wall separates the site from the adjacent building to the north.
	Evidence of historic uses:	No evidence of historic uses observed on site.
	Surfaces:	Site is hardstanding underfoot made up of the footprint of the garages and external areas comprising of asphalt.
	Vegetation:	Extremely limited vegetation is present on site in the form of weeds and grass at the western boundary of the site. 7No trees are present across the western boundary, between approximately 15m and 20m in height.
	Topography / Slope Stability:	The site has a very minor downslope from west to east. The road itself is slightly hummocky but generally flat, however the south eastern end of Methuen Park Road slopes downwards to the south east.

SECTION 2

SITE SETTING & HISTORICAL INFORMATION

Area	Item	Details
	Drainage:	Site appears to be connected to normal drainage facilities with no issues noted.
	Services:	Services noted in the surrounding residential developments and therefore services should be expected.
	Controlled waters:	No controlled waters were observed on site.
	Tanks:	No tanks were observed on site.
Neighbouring land:	North:	Residential.
	East:	Residential.
	South:	Residential, recreational park.
	West:	Residential and care home.

- 2.2.2 Photos taken during the site walkover are provided in Appendix 1, alongside a constraints plan of observations made on site.

2.3 Historical Mapping Information

- 2.3.1 The historical development of the site and its surrounding areas was evaluated following the review of a number of Ordnance Survey historic maps, procured from GroundSure, and these are provided in Appendix 3 of this report.
- 2.3.2 A summary produced from the review of the historical map is given in Table 2.3 below. Distances are taken from the site boundary.

Table 2.3: Historical Development

Dates and Scale of Map	Relevant Historical Information	
	On Site	Off Site
1865 - 1879 1:2,500 1:10,560	Site appears to be located in a field within an area marked as Alexandra Park, and is devoid of any features.	Surrounding area is predominantly fields with few buildings present from 240m SW, identified as 'wellfield'. Circular feature 275m SW. Ponds located 175m SE, 255m SE and 400m SW. Gravel pit wood located from 1km SW. Coldfall Wood present from 740m W. Stream identified 300m E. Well (Mus Well) located 60m W.

SECTION 2

SITE SETTING & HISTORICAL INFORMATION

Dates and Scale of Map	Relevant Historical Information	
	On Site	Off Site
1894 1896 1:1,056 1:2,500 1:10,560	No significant changes.	Muswell Road has been constructed 30m NW. Terraced style residential dwellings have been constructed from 70m SW, adjacent to Mus Well. Railway line constructed 240m SE, pond 255m no longer present. Stream 300m E, now appears to comprise 3No interconnected lakes from 250m E. Lake located 550m NE. Alexandra Palace building constructed 500m E. Old clay pit 1.2km NE. Fish pond 750m SW. Pond 255m S no longer present, possibly infilled . Large pond/lake within Alexandra Park 550m NE.
1913 - 1935 1:2,500 1:10,560	Site is still devoid of any features, however it lies within the boundaries of land associated with 2No buildings to the NW.	Site is surrounded by rows of terraced style residential buildings. Extensive residential development has occurred across surrounding areas. Methuen Park Road has been constructed to the west of the site. Tennis ground located 80m SE. Drinking fountain present 300m SE. Pond 175m SE and 400m SW no longer present, possibly infilled . Lakes from 250m E no longer present, possibly infilled . Reservoir with tanks present 1.2km SW.
1950 – 1968 1:1,250 1:2,500 1:10,560	No significant changes.	Post office identified 250m SW.
1975 –1986 1:1,250 1:10,000	Structure shown across centre of site. Incomplete mapping at large scale.	No significant changes.

SECTION 2

SITE SETTING & HISTORICAL INFORMATION

Dates and Scale of Map	Relevant Historical Information	
	On Site	Off Site
1991 – 2003 1:1,250/10,000	The site is occupied by 3No rows of small buildings, likely domestic garages associated with the building to the north. Site appears to be in its current configuration. A sub-station has been identified on site.	Donovan Court is present adjacent to the E. 2No semi-detached buildings are present 10m SE. No other significant changes.
2010 – 2022 1:10,000	No significant changes.	No significant changes.

Potentially polluting/contaminating uses/activities shown in **bold**

2.3.4 Although the sub-station is first noted on the historical map dated 1991, the previous large-scale maps dating back to 1970 are incomplete, therefore, it is unknown whether the sub-station was present during these years.

2.3.5 Aerial photographs supplied as part of the GroundSure Enviro+GeoInsight report range from 1999 to 2021. These show the site occupied by rows of domestic garages and open hardstanding, accessed from Methuen Park Road. The area is dominated by rows of terraced style residential dwellings with a main road to the north of the site.

2.4 Past Land Use

2.4.1 Groundsure provide some information on past land use on and in the vicinity of the site. Table 2.4 below summarises the information provided, which is presented in further detail in the Enviro+Geoinsight in Appendix 2. Where the identified features have appeared on more than one map they have been counted multiple times and therefore the reported numbers may be higher than the actual count.

Table 2.4: Past Land Use

Type of Use	On site	Off-site (within 500m of site, unless stated otherwise)	Potential to Impact Site*
Historical Industrial Land Uses	None reported	58No reported; nearest entry is cuttings, 220m SE.	X
Historical Tanks	None reported	None reported	X
Historical Energy Features	None reported	17No reported; nearest entry is an electrical substation 148m W.	X
Historical Petrol Stations	None reported	None reported	X
Historical Garages	None reported	2No reported; nearest entry is a garage 334m W.	X
Historical Military Land	None reported	None reported	X

* From a land contamination/site development perspective

SECTION 2

SITE SETTING & HISTORICAL INFORMATION

2.5 Landfill, Waste and Potentially Infilled Surface Ground Workings

- 2.5.1 The Groundsure Enviro+Geoinsight Report provides information on active and historical landfills and waste sites. It also provides information on historical land uses identified from Ordnance Survey mapping that involved ground excavation at the surface; these features may or may not have been subsequently infilled. The following section summarises the information collected from the available sources.

Table 2.5: Landfill, Waste and Potentially Infilled Ground Surface Workings

Type of Consent/Authorisation	On site	Off-site (within 500m of site, unless stated otherwise)	Potential to Impact Site*
Active or Recent Landfill	None reported	None reported	X
Historical Landfill	None reported	None reported	X
Historical Waste Sites	None reported	None reported	X
Licensed Waste Sites	None reported	None reported	X
Waste Exemptions	None reported	5No reported; nearest entry is reported 313m S for the sorting and de-naturing of controlled drugs for disposal.	X
Potentially Infilled Surface Ground Workings	None reported	Ponds – 255m S (1894), 175m SE and 400m SW (1913) Lakes 250m E (1913)	X

* From a land contamination/site development perspective

- 2.5.2 Ponds identified during the historical map review were no longer present on the maps dated 1894 and 1913, however due to their distance to the site (between 175m to 400m), and age of likely infill, these are not considered to present a significant risk to the site.
- 2.5.3 The lakes reported 250m east of the site, potentially infilled by 1913, were subsequently redeveloped into residential land use. Consequently, due to their distance from the site, age of likely infill and overlying redevelopment, these are not considered to pose a significant risk to the site.

2.6 Current Industrial Land Use

- 2.6.1 The Groundsure Enviro+Geoinsight Report also provides information on various records relating to current industrial land use on and in the vicinity of the site. The following section summarises the information collected from the available sources.

Table 2.6: Current Industrial Land Use

Type of Consent/Authorisation	On site	Off-site (within 500m of site, unless stated otherwise)	Potential to Impact Site*
Recent Industrial Land Uses	1No reported; an electricity	3No reported; nearest entry is an electricity sub-station 152m W.	✓

SECTION 2

SITE SETTING & HISTORICAL INFORMATION

Type of Consent/Authorisation	On site	Off-site (within 500m of site, unless stated otherwise)	Potential to Impact Site*
	sub-station.		
Current or Recent Petrol Stations	None reported	1No reported, a Shell garage located 343m W.	X
High Voltage Electricity Cables	None reported	None reported	X
High Pressure Gas Pipelines	None reported	None reported	X
Sites Determined as Contaminated Land	None reported	None reported	X
Control of Major Accident Hazards (COMAH) and Notification of Installations Handling Hazardous Substances (NIHHS) Sites	None reported	None reported	X
Regulated Explosive Sites	None reported	None reported	X
Hazardous Substance Storage/Usage	None reported	None reported	X
Historical Licensed Industrial Activities	None reported	None reported	X
Licensed Industrial Activities	None reported	None reported	X
Licensed Pollutant Release	None reported	4No reported; nearest entry is a dry cleaner, 240m SW.	X
Radioactive Substance Authorisations	None reported	None reported	X
Licensed Discharge to Controlled Waters	None reported	None reported	X
Pollutant Release to Surface Waters (Red List)	None reported	None reported	X
Pollutant Release to Public Sewer	None reported	None reported	X
List 1 and List 2 Dangerous Substances	None reported	None reported	X
Pollution Incidents	None reported	1No reported 435m NW for inert materials and wastes - soils and clay, with no impact to air and water and minor impact to land.	X
Pollution Inventory Substances	None reported	None reported	X
Pollution Inventory Waste Transfers	None reported	None reported	X
Pollution Inventory Radioactive Waste	None reported	None reported	X

* From a land contamination/site development perspective

SECTION 2

SITE SETTING & HISTORICAL INFORMATION

2.7 Tunnels and Railways

2.7.1 The Groundsure Enviro+Geoinsight Report provides information on railway tunnels and railways on and within the vicinity of the site, as summarised in the table below.

Table 2.7: Tunnels and Railways

Feature	On site	Off-site (within 250m of site, unless stated otherwise)	Potential to Impact Site*
Underground Railways (London)	None reported	None reported	X
Underground Railways (Non-London)	None reported	None reported	X
Railway Tunnels	None reported	None reported	X
Historical Railway and Tunnel Features	None reported	13No reported; nearest entry is 202m SE for railway sidings.	X
Royal Mail Tunnels	None reported	1No reported as an abandoned railway, 248m SE.	X
Railways, Crossrail and HS2	None reported	None reported	X

* From a land contamination/site development perspective

2.8 Previous Site Investigations

2.8.1 No previous site investigation reports were provided at the time of writing.

2.9 Local Authority Information

2.9.1 Jomas have made a request to London Borough of Haringey for information relating to contamination on the site and surrounding areas. A copy of the correspondence is included in Appendix 6.

2.9.2 A response is pending.

2.10 Planning Information

2.10.1 A review of the local authority's planning portal was undertaken on 29th November 2022 at <https://www.haringey.gov.uk/planning-and-building-control/planning/planning-applications>.

2.10.2 No reports relating to ground conditions or flood risk could be found within the same postcode as the study site.

2.11 Sensitive Land Uses

2.11.1 The site is located within the Muswell Hill, Haringey Conservation Area.

SECTION 2

SITE SETTING & HISTORICAL INFORMATION



- 2.11.2 3No Local Nature Reserves (LNR) are reported within 1km of the site. The nearest is Alexandra Palace & Park, 230m south east of the site.
- 2.11.3 The Codfall Wood Ancient & Semi-Natural Woodland is reported 962m west of the site.
- 2.11.4 Deciduous woodland is reported 230m south east of the site.
- 2.11.5 No other sensitive land use was identified within 1km of the site.

2.12 Radon

- 2.12.1 The site is reported not to lie within a radon affected area, as less than 1% of properties are above the action level.
- 2.12.2 Consequently, no radon protective measures are necessary in the construction of new dwellings or extensions as described in publication BR211 (BRE, 2015).

3 GEOLOGICAL SETTING & HAZARD REVIEW

- 3.1.1 The following section summarises the principal geological resources of the site and its surroundings. The data discussed herein is generally based on the information given within the Groundsure Report (in Appendix 2).

3.2 Solid and Drift Geology

- 3.2.1 Information provided by the British Geological Survey (BGS) indicates that no superficial deposits lie beneath the majority of the site; however, superficial deposits of the Dollis Hill Gravel Member are reported to just encroach within the south-west of the site. Given the scale and accuracy of mapping, it is possible that these deposits may extend beneath none of the site, or the entire site. BGS description of these deposits is provided below:

“Gravel, sandy and clayey in part, with some laminated silty beds. Sand and gravel, locally with lenses of silt, clay or peat and organic material.”

- 3.2.2 The BGS notes superficial deposits of the Lowestoft Formation are present 84m south west of the site, overlying the Dollis Hill Gravel Member. BGS description of these deposits is provided below:

“The Lowestoft Formation forms an extensive sheet of chalky till, together with outwash sands and gravels, silts and clays. The till is characterised by its chalk and flint content. The carbonate content of the till matrix is about 30%, and tills within the underlying Happisburgh Formation have less than 20%.”

- 3.2.3 Information provided by the BGS also indicates that these superficial deposits are directly underlain by solid deposits of the London Clay Formation. An extract of the BGS description is provided below:

“...bioturbated or poorly laminated, blue-grey or grey-brown, slightly calcareous, silty to very silty clay, clayey silt and sometimes silt, with some layers of sandy clay. It commonly contains thin courses of carbonate concretions (‘cementstone nodules’) and disseminated pyrite.”

- 3.2.4 No Made Ground is reported on site, although given the site history a thickness of Made Ground should be expected.

3.3 British Geological Survey (BGS) Borehole Data

- 3.3.1 As part of the assessment, publicly available BGS borehole records were obtained and reviewed from the surrounding area. The local records obtained are presented in Appendix 5.
- 3.3.2 The nearest such record was located approximately 540m east of the site, in 1981.
- 3.3.3 This showed the underlying ground conditions to comprise ‘fill’ to a depth of around 1.75m bgl.

3.3.4 This was underlain by *'firm light brown mottled orange brown clayey silt'* to around 5.25m bgl, considered to represent the Dollis Hill Gravel Member. This was underlain by a *'stiff becoming very stiff slightly fissured brown occasionally mottled grey becoming grey silty clay with occasional selenite crystals'* to the base of the borehole, at approximately 25m bgl. This material is considered by Jomas as likely to represent the London Clay Formation.

3.3.5 No groundwater strikes were reported on the borehole record.

3.3.6 All depths and measurements should be viewed as approximate.

3.4 Geological Hazards

3.4.1 The following are brief findings extracted from the GroundSure Enviro+GeoInsight Report, that relate to factors that may have a potential impact upon the engineering of the proposed development.

Table 3.1: Geological Hazards

Potential Hazard	Site check Hazard Rating	Details	Further Action Required?
Shrink swell clays	Moderate	Ground conditions predominantly high plasticity.	Yes – GI
Running sands	Very low	Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly.	No
Compressible deposits	Negligible	Compressible strata are not thought to occur.	No
Collapsible Deposits	Very low	Deposits with potential to collapse when loaded and saturated are unlikely to be present.	No
Landslides	Very low	Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.	No
Ground dissolution soluble rocks	Negligible	Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.	No
Coal mining	None	The study site is not located within the specified search distance of an identified coal mining area.	No
Non-coal mining	None	The study site is not located within the specified search distance of an identified non-coal mining area.	No

3.4.2 In addition, the Enviro+GeoInsight report notes the following:

- No BritPits (British Pits) are reported within 500m of the site.
- 12No historical surface ground working features are reported within 250m of the site. The nearest entry is a pond 125m east of the site.

- 3No historical underground working features are reported within 1km of the site, all represent an unspecified shaft 980-983m south west of the site.
- 3.4.3 The clearance of the site, including removal of foundations and services is likely to increase the depth of Made Ground on the site.
- 3.4.4 Foundations should not be formed within Made Ground or organic rich materials (i.e. topsoil and potentially may include the Dollis Hill Gravel Member) due to the unacceptable risk of total and differential settlement.
- 3.4.5 The presence of Made Ground derived from demolition material may be a source of elevated sulphate results associated with plaster from the previous structures.
- 3.4.6 The BGS notes disseminated pyrite within the London Clay Formation and as such may be a source of elevated sulphate. If such levels are noted, sulphate resistant concrete may be required.
- 3.4.7 A relatively shallow groundwater table should be anticipated if superficial deposits are present on site.
- 3.4.8 The potential impacts of shallow groundwater should be considered during foundation design. The affects that this may have include (but are not limited to):
- Permanent excavations – i.e. for items such as basements and drainage. This is likely to need waterproofing / tanking and may have flotation issues.
 - Temporary excavations – likely to affect side stability especially where the excavations are formed in granular materials.
 - Soakaways – likely to affect the permeability and therefore the effective use of soak-away drainage.
 - Concrete classification on the site (in accordance with BRE SD-1) due to the potential for a mobile groundwater table.
 - May require dewatering or groundwater exclusion techniques to be used.
 - Foundation design – likely to reduce the allowable bearing capacity that could be achieved in the superficial deposits.
- 3.4.9 Although London Clay is reported beneath the site the possible presence of the superficial Dollis Hill Gravel Member deposits may mean that the London Clay is at sufficient depth to not be affected by shrinking and swelling as a result of water uptake of nearby trees.
- 3.4.10 It is recommended that a geotechnical ground investigation is undertaken to confirm the ground conditions, position of the water table, and inform basement design.

4 HYDROGEOLOGY, HYDROLOGY AND FLOOD RISK REVIEW

4.1 Hydrogeology & Hydrology

4.1.1 General information about the hydrogeology of the site was obtained from the MAGIC website.

Groundwater Vulnerability

4.1.2 Since 1 April 2010, the EA's Groundwater Protection Policy uses aquifer designations that are consistent with the Water Framework Directive. This comprises;

- **Secondary A** – 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;
- **Secondary B** – predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.
- **Secondary Undifferentiated** – has been assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.
- **Principal Aquifer** – this is a formation with a high primary permeability, supplying large quantities of water for public supply abstraction.
- **Unproductive Strata** – These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

Source Protection Zones (SPZ)

4.1.3 In terms of aquifer protection, the EA generally adopts a three-fold classification of SPZs for public water supply abstraction wells.

- Zone I – or 'Inner Protection Zone' is located immediately adjacent to the groundwater source and is based on a 50-day travel time. It is designed to protect against the effects of human activity and biological/chemical contaminants that may have an immediate effect on the source.
- Zone II – or 'Outer Protection Zone' is defined by a 400-day travel time to the source. The travel time is designed to provide delay and attenuation of slowly degrading pollutants.
- Zone III – or 'Total Catchment' is the total area needed to support removal of water from the borehole, and to support any discharge from the borehole.

SECTION 4

HYDROGEOLOGY, HYDROLOGY AND FLOOD RISK REVIEW

Hydrogeology

- 4.1.4 The baseline hydrogeology of the site is based on available hydrogeological mapping, including the BGS online mapping, and generic information obtained from the Groundsure Report.
- 4.1.5 The available data indicates that the geology of the area consists of the Dollis Hill Gravel Member underlain by the London Clay Formation. It would be expected that a groundwater table would be encountered above or at the interface between the two strata.

Hydrology

- 4.1.6 The hydrology of the site and the area covers water abstractions, rivers, streams, other water bodies and flooding.
- 4.1.7 The Environment Agency defines a floodplain as the area that would naturally be affected by flooding if a river rises above its banks, or high tides and stormy seas cause flooding in coastal areas.
- 4.1.8 There are two different kinds of area shown on the Flood Map for Planning. They can be described as follows:

Areas that could be affected by flooding, either from rivers or the sea, if there were no flood defences. This area could be flooded:

- from the sea by a flood that has a 0.5 per cent (1 in 200) or greater chance of happening each year;
- or from a river by a flood that has a 1 per cent (1 in 100) or greater chance of happening each year.

(For planning and development purposes, this is the same as Flood Zone 3, in England only.)

- The additional extent of an extreme flood from rivers or the sea. These outlying areas are likely to be affected by a major flood, with up to a 0.1 per cent (1 in 1000) chance of occurring each year.

(For planning and development purposes, this is the same as Flood Zone 2, in England only.)

- 4.1.9 These two areas show the extent of the natural floodplain if there were no flood defences or certain other manmade structures and channel improvements.
- 4.1.10 Outside of these areas flooding from rivers and the sea is very unlikely. There is less than a 0.1 per cent (1 in 1000) chance of flooding occurring each year. The majority of England and Wales falls within this area. (For planning and development purposes, this is the same as Flood Zone 1, in England only.)

SECTION 4

HYDROGEOLOGY, HYDROLOGY AND FLOOD RISK REVIEW

- 4.1.11 Some areas benefit from flood defences and these are detailed on Environment Agency mapping.
- 4.1.12 Flood defences do not completely remove the chance of flooding, however, and can be overtopped or fail in extreme weather conditions.

Table 4.1: Summary of Hydrogeological & Hydrology

Feature		On Site	Off Site	Potential Receptor?
Aquifer	Superficial:	Secondary (A) Aquifer (Dollis Hill Gravel Member – if present)	Secondary (A) Aquifer (Dollis Hill Gravel Member – where present) Secondary Undifferentiated Aquifer 76m SW (Lowestoft Formation)	✓
	Solid:	Unproductive	Unproductive	X
Source Protection Zone		None	None reported within 500m.	X
Abstractions	Groundwater	None	9No reported within 2km; nearest abstraction is 861m N for spray irrigation.	X
	Surface water	None	None within 2km	X
	Potable water	None	8No reported within 2km; nearest active abstraction is 1594m E for potable water supply.	X
Surface Water Features		None	No surface water features within 250m of site. No detailed river networks within 500m of site. The Moselle Brook is reported 1587m E.	X
Flood Risk	EA Flood Zone 2	No	None within 50m	-
	EA Flood Zone 3	No	None within 50m	-
	RoFRaS	No records within 50m.		-
	Historical Flood Events	None reported within 250m of site.		
	Flood Defences	There are no areas benefiting from Flood Defences within 250m of the study site		
	Surface Water Flooding	Highest risk on site and within 50m is 'Negligible'		
	Groundwater Flooding	High risk on site and within 50m is 'Low'		

SECTION 4

HYDROGEOLOGY, HYDROLOGY AND FLOOD RISK REVIEW

- 4.1.15 Borehole logs obtained from the BGS website for the nearest groundwater abstraction approximately 861m north of the site at Muswell Hill Golf Club (TQ29SE402), show water strikes within the chalk and therefore the borehole was likely installed and abstracting water from the chalk at depth beneath the site. Given the anticipated significant thickness of London Clay anticipated beneath the site, a pollutant linkage to this abstraction is not considered to exist.

4.2 Flood Risk Review

- 4.2.1 In accordance with the NPPF Guidance, below is a review of flood risks posed to and from the development and recommendations for appropriate design mitigation where necessary. Specific areas considered are based on the requirements laid out in the "Camden Guidance for Subterranean Development" as this document is generally considered to be the most comprehensive Local Authority Guidance in the London area.

Table 4.2: Flood Risk Review

Flood Sources	Site Status	Comment on flood risk posed to / from the development
Fluvial / Tidal	Site is not within 250m of an Environment Agency Zone 2 or zone 3 floodplain. Risk of flooding from rivers and the sea (RoFRaS) rating is considered negligible.	Proposed basement development will be formed within existing hardstanding at the site.
Groundwater	The BGS considers there to be a low risk of groundwater flooding within the superficial deposits.	As SUDS will be required by NPPF, PPG and LLFA policy requirements, this is likely to be provided by surface and above ground attenuation before releasing to the existing sewer network. This will ensure that the proposed development will not increase the potential risk of groundwater flooding. Basement will be fully waterproofed as appropriate to industry standard. Low Risk
Artificial Sources	No surface water features within 250m of site.	Low Risk
Surface Water / Sewer Flooding	No surface water features within 250m of site. Condition, depth and location of surrounding infrastructure uncertain.	As SUDS will be required by NPPF, PPG and LLFA policy requirements, these are likely to include attenuation before releasing to the existing sewer network. If permeable paving is used this would likely reduce the risk of surface water flooding. Combined, these are likely to reduce the risk of both surface and sewer flooding to both the site and surrounding properties. Basement will be fully waterproofed as appropriate to industry standard. Low Risk

SECTION 4

HYDROGEOLOGY, HYDROLOGY AND FLOOD RISK REVIEW

Climate Change Included in the flood modelling extents.

Development will not significantly increase the peak flow and volume of discharge from the site

Low risk posed to and from the development

- 4.2.2 Information about the risk to the study site from flooding has been obtained from the following documents produced for London Borough of Haringey: Surface Water Management Plan (Capita Symonds, 2011), Haringey Council: Strategic Flood Risk Assessment Draft report (JBA Consulting, 2015); Haringey Council Draft Basement Development Guidance Note (Haringey Council, 2012); and North London Strategic Flood Risk Assessment (Mouchel, 2008). Potential impacts to the site are discussed below.

Flooding from Fluvial/Tidal Sources

- 4.2.3 The nearest water network is located approximately 1.58km east of the site identified as the Moselle Brook. A lake is located within Alexandra Park, approximately 550m north east of the site.
- 4.2.4 Figures 2.1 and 2.2 of the London Borough of Haringey Strategic Flood Risk Assessment (SFRA) are provided as Figures 5 and 6 within the appendices of this report. The figures indicate that the culverted Muswell Stream may run in close proximity to the site, although no evidence of a culverted stream was identified during the historical map review.
- 4.2.5 Figure 7 of the LB Haringey SWMP, shown as Figure 7 within the appendices of this report, shows historical flood outlines from fluvial flooding incidents. There are no historical flood outlines within 2km of the site. The nearest fluvial flood incident is reported just over 2km south east of the site.
- 4.2.6 According to the Groundsure Enviro+GeoInsight report, there are no RoFRAS records within 50m of the site.

Groundwater Flooding

- 4.2.7 The North London Strategic Flood Risk Assessment (SFRA) reports that Haringey is not at risk of groundwater or tidal flooding.
- 4.2.8 According to the Groundsure Enviro+GeoInsight report, the risk of groundwater flooding at the site as 'low'.
- 4.2.9 Figure 10 of the LB Haringey SWMP, shown as Figure 8 within the appendices of this report, does not show the site within an area of permeable superficial deposits, however 2 No EA groundwater flooding incidents are reported 100m north west of the site.

SECTION 4

HYDROGEOLOGY, HYDROLOGY AND FLOOD RISK REVIEW

- 4.2.10 The site is possibly directly underlain (either entirely or in part) by superficial deposits of the Dollis Hill Gravel Member, a Secondary A Aquifer, which is indicated by the EA as permeable layers capable of supporting water supplies at a local rather than strategic scale.

Surface Water Flooding

- 4.2.11 Figure 4 of the LB Haringey SWMP, shown as Figure 9 within the appendices of this report, shows the site within 250m of a 200yr surface water flooding event (deep).
- 4.2.12 Figure 5 of the LB Haringey SWMP, shown as Figure 10 within the appendices of this report shows the site within an area of 0.1m-0.25m depth of surface water flowing, this is the 2nd lowest depth band. No surface water flooding incidents are shown within 2km of the site.
- 4.2.13 A low risk is reported by the Environment Agency on Methuen Park Road with <300mm flood depth and a low to medium risk is reported on Dukes Avenue to the south of the site with a flood depth of <900mm.
- 4.2.14 In addition to this, the site lies within an EA Flood Zone 1. Based on EA mapping, the site and highways surrounding the site are not within an area identified as a high risk for surface water flooding potential; site itself not likely to be inundated.

Sewer/Artificial Flooding

- 4.2.15 The SFRA shows the site located within an area supported by surface water sewer systems.
- 4.2.16 The North London SFRA shows the Thames Water flooding records of highlighted areas; the London Borough of Haringey highlights flooding in the Stonebridge Brook Area in South Tottenham.
- 4.2.17 Although there are a few, small, covered reservoirs located within the London Borough of Haringey, the risk to the borough itself from the failure of the dams originate from outside the borough.
- 4.2.18 The site is located within the postcode N10 2.
- 4.2.19 Figure 9 of the LB Haringey SWMP, shown as Figure 11 within the appendices of this report, shows the number of sewer flooding records for the postcode N10 2 as, 6No to 10No.
- 4.2.20 This number is relatively low for the London Borough of Haringey, with the highest reported as 21No to 50No.
- 4.2.21 However, Figure 9 does not show any sewer flooding incidents within the borough.
- 4.2.22 The site is not shown within the maximum extent of flooding of reservoirs.

SECTION 4

HYDROGEOLOGY, HYDROLOGY AND FLOOD RISK REVIEW

Critical Drainage Areas (CDAs)

- 4.2.23 A Critical Drainage Area is defined in the Town and Country Planning (General Development Procedure) (Amendment) (No. 2) (England) Order 2006 as “an area within Flood Zone 1 which has critical drainage problems and which has been notified... [to]...the local planning authority by the Environment Agency”.
- 4.2.24 They are where man made drainage infrastructure has been identified as at critical risk of failure, resulting in flooding. Such areas can be completely different or similar, to the areas identified by the Environment Agency as at risk of natural watercourse, river and sea flooding.
- 4.2.25 8No Critical Drainage Areas (CDA) are located wholly within the London Borough of Haringey Surface Water Management Plan (SWMP). The site is located within Group4_073 CDA.
- 4.2.26 Table 3.7 of the LB of Haringey SWMP notes 1No report of a basement at risk in a “non-deprived” area, none with >0.5m deep risk, no records of risk for basements in “deprived” areas and none for commercial/industrial basements.
- 4.2.27 However, the SWMP notes that the majority of the Group4_073 is located within a Flood Zone 1, including the study site.
- 4.2.28 The Surface water management plan (SWMP) indicates that the vicinity of the site reports a 0.10m to 0.15m depth of flooding.

Sustainable Drainage Systems (SuDS)

- 4.2.29 The basement is proposed within the existing hardstanding at the site, the existing domestic garages will be demolished; it is unlikely to significantly change the impermeable areas on site.
- 4.2.30 In accordance with the NPPF, PPG and LLFA policy requirements, sustainable drainage systems (SUDS) should be incorporated wherever possible to reduce positive surface water run-off and flood risk to other areas.
- 4.2.31 Figure 11 of the LB Haringey SWMP, shown as Figure 12 within the appendices of this report, shows the site within an area where infiltration SuDS are potentially unsuitable.
- 4.2.32 Given the expected underlying ground and hydrogeological conditions it is considered that infiltration drainage would likely be impracticable. However, if superficial deposits of the Dollis Hill Gravel Member are present, they may be practicable. This should be confirmed by a ground investigation.

SECTION 4

HYDROGEOLOGY, HYDROLOGY AND FLOOD RISK REVIEW

- 4.2.33 If infiltration drainage is possible, this may include the replacement of hard cover with permeable hardstanding and surface/above-ground attenuation prior to discharge to storm sewers.

Conclusion

- 4.2.34 Based on the available data, the site is considered to be at low risk from identified potential sources of flooding. The basement can be constructed and operated safely in flood risk terms without increasing flood risk elsewhere and is therefore considered NPPF compliant.

4.3 Sequential and Exception Tests

- 4.3.1 The Sequential Test aims to ensure that development does not take place in areas at high risk of flooding when appropriate areas of lower risk are reasonably available.

Sequential Test: within FZ1, hence pass by default.

- 4.3.2 Paragraph 19 of PPS25 recognizes the fact that wider sustainable development criteria may require the development of some land that cannot be delivered through the sequential test. In these circumstances, the Exception Test can be applied to some developments depending on their vulnerability classification (Table D.2 of PPS25). The Exception Test provides a method of managing flood risk while still allowing necessary development to occur.

Exception Test: FZ1 hence pass by default and low risk posed to and from other sources.

4.4 Flood Resilience

- 4.4.1 In accordance with general basement flood policy and basement design, the proposed development will utilize the flood resilient techniques recommended in the NPPF Technical Guidance where appropriate and also the recommendations that have previously been issued by various councils.

- 4.4.2 These include:

- Basement to be fully waterproofed (tanked) and waterproofing to be tied in to the ground floor slab as appropriate: to reduce the turnaround time for returning the property to full operation after a flood event.
- Plasterboards will be installed in horizontal sheets rather than conventional vertical installation methods to minimise the amount of plasterboard that could be damaged in a flood event
- Wall sockets will be raised to as high as is feasible and practicable in order to minimise damage if flood waters inundate the property

SECTION 4

HYDROGEOLOGY, HYDROLOGY AND FLOOD RISK REVIEW

- Any wood fixings on basement / ground floor will be robust and/or protected by suitable coatings in order to minimise damage during a flood event
- The basement waterproofing where feasible will be extended to an appropriate level above existing ground levels.
- The concrete sub floor as standard will likely be laid to fall to drains or gullies which will remove any build-up of ground water to a sump pump where it will be pumped into the mains sewer. This pump will be fitted with a non-return valve to prevent water backing up into the property should the mains sewer become full.
- Insulation to the external walls will be specified as rigid board which has impermeable foil facings that are resistant to the passage of water vapour and double the thermal resistance of the cavity.

5 SCREENING AND SCOPING ASSESSMENT

5.1 Screening Assessment

- 5.1.1 Screening is the process of determining whether or not there are areas of concern which require a BIA for a particular project. This was undertaken in previous sections by the site characterisation. 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.
- 5.1.2 The scoping stage highlights areas of concern where further investigation, intrusive soil and water testing and groundwater monitoring may be required.
- 5.1.3 This Jomas BIA also takes into account the Campbell Reith pro forma BIA produced on behalf of and published by the London Borough of Camden as guidance for applicants to ensure that all of the required information is provided. Within the pro forma a series of tables have been used to identify what issues are relevant to the site.
- 5.1.4 Each question posed in the tables 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.
- 5.1.5 The results of the screening process for the site are provided in Table 5.1 below. Where further discussion is required the items have been carried forward to scoping.
- 5.1.6 The numbering within the questions refers the reader to the appropriate question / section in the London Borough of Camden BIA pro forma.
- 5.1.7 It should also be noted that the London Borough of Haringey not place the same importance on the issues identified in the London Borough of Camden’s guidance documents. It should be noted that the pro forma is mainly concerned with the pond chain on Hampstead Heath, if other ponds / waterbodies may similarly affect the development Jomas will indicate this.
- 5.1.8 A ground investigation is undertaken where necessary to establish base conditions and the impact assessment determines the impact of the proposed basement on the baseline conditions, taking into account any mitigating measures proposed.

Table 5.1: Screening Assessment

Query	Y / N	Comment
Subterranean (Groundwater) Flow (see London Borough of Camden BIA Pro Forma Section 4.1.1)		
1a) Is the site located directly above an aquifer?	Unknown	The site is anticipated to be predominantly directly underlain by solid deposits of the London Clay Formation, however, some or all of the site may be underlain by superficial deposits of the Dollis Hill Gravel Member, a Secondary (A) aquifer. This should be confirmed by a ground investigation.
1b) Will the proposed basement extend below the surface of the water table?	Unknown	The basement may potentially extend below a water table within the superficial deposits. This should be confirmed by a ground investigation.
2) Is the site within 100m of a watercourse, well (disused or used) or a potential spring line?	No	No surface water features within 250m of site. No detailed river networks within 500m of site.
3) Is the site within the catchment of any surface water features?	No	No surface water features within 250m of site. No detailed river networks within 500m of site.
4) Will the proposed basement development result in a change in the proportion of hard surfaced/paved areas?	No	The proposed development will comprise a basement within the existing hardstanding at the site.
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	The proposed development will comprise a basement within the existing hardstanding at the site.
6) Is the lowest point of the proposed excavation (allowing of 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	No surface water features within 250m of site.
Slope Stability ((see London Borough of Camden BIA Pro Forma Section 4.2)		
1) Does the existing site include slopes, natural or manmade, greater than 7 degrees? (approximately 1 in 8)	No	The site is flat and level with the main road.
2) Will the proposed re-profiling of landscaping change slopes at the property to more than 7 degrees? (approximately 1 in 8)	Unknown	Re-profiling of change of slopes is not anticipated as part of the proposed development.
3) Does the developments' neighbouring land include railway cuttings and the like, with a slope greater than 7 degrees? (approximately 1 in 8)	No	Nearest railway feature is sidings reported 202m south east of the site. Other land uses neighbouring site are residential.

SECTION 5
SCREENING AND SCOPING ASSESSMENT

Query	Y / N	Comment
4) Is the site within a wider hillside setting in which the general slope is greater than 7 degrees? (approximately 1 in 8)	No	Methuen Park Road slopes downwards from the north west to the south east. Estimated <7 degrees.
5) Is the London Clay the shallowest strata at the site?	Unknown	The site is anticipated to be directly underlain by solid deposits of the London Clay Formation, however, it may be partially or entirely underlain by superficial deposits of the Dollis Hill Gravel Member.
6) 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	Trees were noted at the south western site boundary but are not located within the proposed footprint of the building. Trees along the south western site boundary are shown on the proposed development plans.
7) Is there a history of seasonal shrink-swell subsidence in the local area, and/or evidence of such effects at the site?	Yes	The site is reported to be in area at moderate risk from shrink-swell clays. No evidence of structural distress caused by seasonal shrink/swell was noted during the external walkover.
8) Is the site within 100m of a watercourse or a spring line?	No	No surface water features within 250m of site. No detailed river networks within 500m of site.
9) Is the site within an area of previously worked ground?	No	Site has only had the current development in place.
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?	Unknown	The site is anticipated to be directly underlain by solid deposits of the London Clay Formation, however, it may be partially or entirely underlain by superficial deposits of the Dollis Hill Gravel Member. Groundwater level should be assessed by a ground investigation prior to construction to confirm its presence.
11) Is the site within 50m of the Hampstead Heath ponds (or other waterbody)?	No	-
12) Is the site within 5m of a highway or pedestrian 'right of way'?	Yes	The site faces onto a pavement and road on the south west side.
13) Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?	Unknown	Neighbouring foundations are unknown, however unlikely as the proposed building will be a standalone detached building.
14) Is the site over (or within the exclusion of) any tunnels e.g. railway lines?	No	Nearest railway or tunnel feature is sidings reported 202m south east of the site.

Query	Y / N	Comment
Surface Flow and Flooding (see London Borough of Camden BIA Pro Forma Section 4.3)		
1) Is the site within the catchment of the pond chains on Hampstead Heath?	No	No surface water features within 250m of site.
2) As part of the site drainage, will surface water flows (e.g. volume of rainfall and peak run-off) be materially different from the existing route?	No	The proposed development will comprise a basement within the existing hardstanding at the site and therefore surface water flow is unlikely to be affected. The site is currently covered by hardstanding. Consequently, replacement of the hardstanding with permeable paving as part of the likely required SUDs would increase the amount of water that would be discharged to the ground.
3) Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas?	No	The proposed development will comprise a basement within the existing hardstanding at the site. Replacement of the remaining hardstanding with permeable paving as part of the likely required SUDs would reduce the amount of hardstanding / impermeable paved areas.
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	No surface waters in the area to be impacted.
5) Will the proposed basement result in changes to the quality of surface waters being received by adjacent properties or downstream watercourses?	No	No surface waters in the area to be impacted.
6) Is the site in an area identified to have surface water flood risk according to either the Local Flood Risk Management Strategy or Strategic Flood Risk Assessment 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	No nearby surface water features and not within an EA flood zone.

5.2 Scoping

5.2.1 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.

5.2.2 The potential impacts for each of the matters highlighted in Table 5.1 above are discussed in further detail below together with the requirements for further

investigations. Detailed assessment of the potential impacts and recommendations are provided where possible.

Subterranean (Groundwater) Flow

5.2.3 A ground investigation is recommended to confirm the ground conditions and groundwater levels (if any) beneath the site. This can then be used to confirm the relative depths of the basement to the groundwater levels.

5.2.4 We assume that this can be undertaken following consent on the proposed scheme.

Land Stability

5.2.5 The site, as with the surrounding area, is generally flat. The Groundsure report has noted that there is a “very low” to “negligible” risk of land instability issues for the site with a “moderate” risk of shrink swell clays beneath the site.

5.2.6 The recommended ground investigation should also determine the possibility of encountering groundwater and the possibility of Made Ground and/or clay. Atterberg Limits of the underlying clay should be determined by the ground investigation to assess shrink/swell potential of the soils.

5.2.7 Methuen Park Road gradually downslopes from the north west to the south east.

5.2.8 It is noted that the London Borough of Camden’s guidance documents requires a Ground Movement Assessment to be undertaken as part of the Basement Impact Assessment. Such an assessment uses a ground model based on a zone of influence equivalent to four times the proposed depth of excavation. Consequently, such a study is deemed not necessary.

Surface Flow and Flooding

5.2.9 The proposed basement will underlie the existing hardstanding on site; there will be no significant change in surface water run-off.

5.2.10 As SUDS will be required by NPPF, PPG and LLFA policy requirements, this will be provided by surface and above ground attenuation before releasing to the existing sewer network. This will ensure that the proposed development will not increase the potential risk of groundwater flooding.

5.2.11 Plans and maps showing the topography of the site and surrounding area are included as part of Appendix 3.

6 PRELIMINARY BASEMENT IMPACT ASSESSMENT

6.1 Proposed Changes to Areas of External Hardstanding

6.1.1 Existing areas of hardstanding cover the entire site. The proposed development will comprise a basement within the existing hardstanding. As a result, there are unlikely to be changes in hardstanding areas, and so it is not considered necessary to undertake any further investigations, studies or impact assessment in relation to the proposed changes to areas of external hardstanding.

6.1.2 As SUDS will be required by NPPF, PPG and LLFA policy requirements, where practicable, the remaining hard surfaces will likely be replaced with permeable paving.

6.1.3 As a result, there is unlikely to be an increase in the proportion of hardstanding areas and it is not considered necessary to undertake further assessment in relation to the proposed changes to areas of external hardstanding.

6.2 Past Flooding

6.2.1 The National Planning Policy Framework sets strict tests to protect people and property from flooding which all local planning authorities are expected to follow.

6.2.2 When assessing the site-specific flood risk and the potential for historic flooding to reoccur, the above guidance recommends that historic flooding records and any other relevant and available information including flood datasets (e.g. flood levels, depths and/or velocities) and any other relevant data which can be acquired, are assessed.

6.2.3 Figure 9 of the LB Haringey SWMP shows the number of sewer flooding records for the postcode N10 2 as, 6No to 10No.

6.2.4 This number is relatively low for the London Borough of Haringey, with the highest reported as 21No to 50No.

6.2.5 The site is therefore considered to be at low risk of flooding based on historic flooding.

6.3 Geological Impact

6.3.1 The published geological maps indicate that the site could be directly underlain by superficial deposits of the Dollis Hill Gravel Member. These superficial deposits are underlain by solid deposits of the London Clay Formation. This will be confirmed by the intrusive investigation.

6.3.2 If superficial deposits are present at the site, the London Clay may be at sufficient depth that it is unlikely to be prone to seasonal shrinkage and swelling that arises due to changing water content in the soil. This would be due to a lack of significant vegetation capable of removing water within the zone of influence; the extensive hard cover

minimising the amount of water entering the ground and the likely groundwater at the interface of the Dollis Hill Gravel Member and the London Clay Formation.

6.3.3 If no superficial deposits are present the shallow London Clay Formation soils may be prone to significant shrink-swell volume changes.

6.3.4 The groundwater table is considered likely to be at the interface of the two strata (if superficial deposits are present) due to the overlying granular materials being likely to have a relatively high permeability compared to the very low permeability London Clay Formation.

6.4 Hydrology and Hydrogeology Impact

6.4.1 Based on the information available at the time of writing, the risk of flooding from groundwater is considered to be low. The proposed basement is unlikely to have a detectable impact on the local groundwater regime.

6.4.2 Appropriate water proofing measures should be included within the whole of the proposed basement wall/floor design as a precaution.

6.4.3 The proposed development will lie outside of flood risk zones and is therefore assessed as being at a low probability of fluvial flooding.

6.4.4 There are no surface water features on or within 250m of the site. It is therefore not anticipated that the site will have an impact upon the hydrology of the area.

6.4.5 8No Critical Drainage Areas (CDA) are located within the LB Haringey Surface Water Management Plan.

6.4.6 Figure 9 of the LB Haringey SWMP shows the number of sewer flooding records for the postcode N10 2 as, 6No to 10No.

6.4.7 As these are related to man-made drainage (i.e. sewers), the installation of attenuation to reduce the rate of peak flow into the sewers (i.e. as part of SUDS requirements) would reduce the chance of sewer flooding to occur.

6.4.8 The information available suggests that the site lies in an area that is at low risk of surface water flooding.

6.4.9 The proposed basement construction is considered unlikely to create a reduction of impermeable area in the post development scenario.

6.4.10 No risk of flooding to the site from artificial sources has been identified.

6.5 Impacts of Basement on Adjacent Properties and Pavement

6.5.1 The proposed basement excavation will be within 5m of a public pavement. It is not anticipated within 5m of neighbouring properties.

- 6.5.2 Unavoidable lateral ground movements associated with the basement excavations must be controlled during temporary and permanent works so as not to impact adversely on the stability of the surrounding ground, any associated services and structures.
- 6.5.3 It is recommended that the site is supported by suitably designed temporary support with a basement box construction. This will ensure that the adjacent land is adequately supported in the temporary and permanent construction. Alternatively, the excavation should proceed in a manner that maintains the integrity of the ground on all sides.
- 6.5.4 Careful and regular monitoring of the structure will need to be undertaken during the construction phase to ensure that vertical movements do not adversely affect the above property. If necessary, the works may have to be carried out in stages with the above structure suitably propped and supported.
- 6.5.5 It will be necessary to ensure that the basements are designed in accordance with the NHBC Standards and take due cognisance of the potential impacts highlighted above. This may be achieved by ensuring best practice engineering and design of the proposed scheme by competent persons and in full accordance with the Construction (Design and Management) Regulations. This will include:
- Establishment of the likely ground movements arising from the temporary and permanent works and the mitigation of excessive movements;
 - Assessment of the impact on any adjacent structures (including adjacent properties and the adjacent pavement with potential services);
 - Determination of the most appropriate methods of construction of the proposed basements;
 - Undertake pre-condition surveys of adjacent structures;
 - Monitor any movements and pre-existing cracks during construction;
 - Establishment of contingencies to deal with adverse performance;
 - Ensuring quality of workmanship by competent persons.
- 6.5.6 Full details of the suitable engineering design of the scheme in addition to an appropriate construction method statement should be submitted by the Developer to the London Borough of Haringey.
- 6.6 Cumulative Impacts**
- 6.6.1 The above individual effects could interact to form a greater issue.

- 6.6.2 The site has been identified as being directly underlain by very low permeability London Clay Formation.
- 6.6.3 Such materials would prevent the movement of groundwater and the ingress of surface water into the ground.
- 6.6.4 The development of the basement would not significantly affect the groundwater flow through the ground due to the very low permeability London Clay Formation.
- 6.6.5 However, superficial deposits of the Dollis Hill Gravel Member are reported in close proximity to the south west and may encroach onto the site overlying the London Clay Formation.
- 6.6.6 Assuming that the adjacent properties also have basements, the construction of the proposed basement would not reduce the groundwater flow through the general area due to the low permeability of the natural materials.

6.7 Summary

- 6.7.1 The overall assessment of the site is that the creation of a basement for the existing development will not adversely impact the site or its immediate environs, providing measures are taken to protect surrounding land and properties during construction.

6.8 Ground Movement

- 6.8.1 CIRIA C580 Table 2.5 uses information on the damage to walls of buildings based on Burland et al (1977), Boscardin and Cording (1989) and Burland (2001) to categorise damage into 5 categories. A summary of Table 2.5 from CIRIA C580 is provided below.
- 6.8.2 It would be generally good practise to ensure that the design and construction should aim to limit damage to all buildings to a maximum of Category 2 (Slight) as set out in CIRIA Report 580.

Table 6.1: Summary of CIRIA C580 Table 2.5 (after Burland et al (1977), Boscardin and Cording (1989) and Burland (2001))

Category of damage		Description of Typical Damage	Approximate crack width (mm)	Limiting tensile strain (%)
0	Negligible	Hairline cracks of less than about 0.1mm are classes as negligible.	< 0.1	0.0-0.05
1	Very Slight	Fine cracks that can easily be treated during normal decoration. Perhaps isolated slight fracture in building. Cracks in external brickwork visible on inspection.	<1	0.05-0.075
2	Slight	Cracks easily filled. Redecoration probably required. Several slight fractures showing inside of building. Cracks are visible externally and	<5	0.075-0.15

SECTION 6
PRELIMINARY BASEMENT IMPACT
ASSESSMENT

Category of damage		Description of Typical Damage	Approximate crack width (mm)	Limiting tensile strain (%)
		some repointing may be required externally to ensure weather tightness. Doors and windows may stick slightly		
3	Moderate	The cracks require some opening up and can be patched by a mason. Recurrent cracks can be masked by suitable linings. Repointing of external brickwork and possibly a small amount of brickwork to be replaced. Doors and windows sticking. Service pipes may fracture. Weather-tightness often impaired.	5-15 or a number of cracks >3	0.15 – 0.3
4	Severe	Extensive repair work involving breaking-out and replacing sections of walls, especially over doors and windows. Windows and frames distorted, floors sloping noticeably. Walls leaning or bulging noticeably, some loss of bearing in beams. Service pipes disrupted.	15-25 but also depends on number of cracks	>0.3
5	Very Severe	This requires a major repair involving partial or complete rebuilding. Beams lose bearings, walls lean badly and require shoring. Windows broken with distortion. Danger of instability.	Usually >25 but depends on number of cracks	

- 6.8.3 The first three categories (namely Negligible, Very Slight and Slight categories) are generally regarded as acceptable for buildings where no structural damage is permissible.
- 6.8.4 Assuming cantilever retaining walls are formed in short sections, it is considered that in the short term maintaining the category of damage to Category 1 could be relatively easily achieved. It would be recommended that a full inspection of the neighbouring properties should be undertaken prior to starting work and a watching brief of the structure, the excavations and the adjacent properties is maintained during the works.
- 6.8.5 In the long term a suitably designed and constructed retaining wall should provide sufficient support to ensure that post construction movement is minimal and the damage classification post construction of any cracks caused in the short term should not get worse. It is considered unlikely that new cracks would occur post construction.
- 6.8.6 This advice is provided based on the limited ground investigation undertaken and is not a full Ground Movement Assessment.

7 QUALITATIVE RISK ASSESSMENT

7.1 Legislative Framework

7.1.1 A qualitative risk assessment has been prepared for the site, based on the information collated. This highlights the potential sources, pathways and receptors. Intrusive investigations will be required to confirm the actual site conditions and risks.

7.1.2 Under Part IIA of the Environmental Protection Act 1990, the statutory definition of contaminated land is:

“land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that:

(a) significant harm is being caused or there is a significant possibility of such harm being caused; or

(b) pollution of controlled waters is being, or is likely to be, caused.”

7.1.3 The Statutory Guidance provided in the DEFRA Circular 01/2006 lists the following categories of significant harm:

- death, disease, serious injury, genetic mutation, birth defects or the impairment of reproduction functions in human beings;
- irreversible adverse change, or threat to endangered species, affecting an ecosystem in a protected area (i.e. site of special scientific interest);
- death, serious disease or serious physical damage to pets, livestock, game animals or fish;
- a substantial loss in yield or value of crops, timber or produce; and
- structural failure, substantial damage or substantial interference with right of occupation to any building.

7.1.4 Contaminated land will only be identified when a ‘pollutant linkage’ has been established.

7.1.5 A ‘pollutant linkage’ is defined in Part IIA as:

“A linkage between a contaminant Source and a Receptor by means of a Pathway”.

7.1.6 Therefore, this report presents an assessment of the potential pollutant linkages that may be associated with the site, in order to determine whether additional investigations are required to assess their significance.

7.1.7 In accordance with the National Planning Policy Framework, where development is proposed, the developer is responsible for ensuring that the development is safe and suitable for use for the purpose for which it is intended, or can be made so by remedial action. In particular, the developer should carry out an adequate investigation to inform a risk assessment to determine:

- whether the land in question is already affected by contamination through source – pathway – receptor pollutant linkages and how those linkages are represented in a conceptual model;

- whether the development proposed will create new linkages, e.g. new pathways by which existing contaminants might reach existing or proposed receptors and whether it will introduce new vulnerable receptors; and
- what action is needed to break those linkages and avoid new ones, deal with any unacceptable risks and enable development and future occupancy of the site and neighbouring land.

7.1.8 A potential developer will need to satisfy the Local Authority that unacceptable risk from contamination will be successfully addressed through remediation without undue environmental impact during and following the development.

7.2 Conceptual Site Model

7.2.1 On the basis of the information summarised above, a conceptual site model (CSM) has been developed for the site. The CSM is used to guide the investigation activities at the site and identifies potential contamination sources, receptors (both on and off-site) and exposure pathways that may be present. The identification of such potential “pollutant linkages” is a key aspect of the evaluation of potentially contaminated land.

7.2.2 The site investigation is then undertaken in order to prove or disprove the presence of these potential source-pathway-receptor linkages. Under current legislation an environmental risk is only deemed to exist if there are proven linkages between all three elements (source, pathway and receptor).

7.2.3 This part of the report lists the potential sources, pathways and receptors at the site, and assesses based on current and future land use, whether pollution linkages are possible.

7.2.4 Potential pollutant linkages identified at the site are detailed below:

Table 7.1: Potential Sources, Pathways and Receptors

Source(s)	Pathway(s)	Receptor(s)
- Potential for Made Ground associated with previous development operations – on site (S1) - Potential for contamination from numerous garages on site (S2) - Potential Polychlorinated Biphenyl contamination from the sub-station - on site (S3)	- Ingestion and dermal contact with contaminated soil (P1) - Inhalation or contact with potentially contaminated dust and vapours (P2) - Leaching through permeable soils, migration within the vadose zone (i.e., unsaturated soil above the water table) and/or lateral migration within surface water, as a result of cracked hard standing or via service pipe/corridors and surface water runoff. (P3) - Horizontal and vertical migration of contaminants within groundwater (P4) - Accumulation and Migration of Soil Gases (P5) - Permeation of water pipes and attack on concrete foundations by aggressive soil conditions (P6)	- Construction workers (R1) - Maintenance workers (R2) - Neighbouring site users (R3) - Future site users (R4) - Building foundations and on site buried services (water mains, electricity and sewer) (R5) - Controlled Waters; Secondary (A) aquifer (R6)

7.3 Qualitative Risk Estimation

7.3.1 Based on information previously presented in this report, a qualitative risk estimation was undertaken.

7.3.2 For each potential pollutant linkage identified in the conceptual model, the potential risk can be evaluated, based on the following principle:

Overall contamination risk = Probability of event occurring x Consequence of event occurring

7.3.3 In accordance with CIRIA C552, the consequence of a risk occurring has been classified into the following categories:

- Severe
- Medium
- Mild
- Minor

7.3.4 The probability of a risk occurring has been classified into the following categories:

- High Likelihood
- Likely
- Low Likelihood
- Unlikely

7.3.5 This relationship can be represented graphically as a matrix (Table 7.2).

Table 7.2: Overall Contamination Risk Matrix

		Consequence			
		Severe	Medium	Mild	Minor
Probability	High Likelihood	Very High Risk	High Risk	Moderate Risk	Low Risk
	Likely	High Risk	Moderate Risk	Moderate Risk	Low Risk
	Low Likelihood	Moderate Risk	Moderate Risk	Low Risk	Very Low Risk
	Unlikely	Low Risk	Low Risk	Very Low Risk	Very Low Risk

7.3.6 The risk assessment process is based on guidance provided in CIRIA C552 (2001) *Contaminated Land Risk Assessment – A Guide to Good Practice*. Further information including definitions of descriptive terms used in the risk assessment process is included in Appendix 4.

7.3.7 The degree of risk is based on a combination of the potential sources and the sensitivity of the environment. The risk classifications can be cross checked with reference to Table A4.4 in Appendix 4.

7.3.8 Hazard assessment was also carried out, the outcome of which could be:

- Urgent Action (UA) required to break existing source-pathway-receptor link.
- Ground Investigation (GI) required to gather more information.

- Watching Brief there is no evidence of potential contamination but the possibility of it exists and so the site should be monitored for local and olfactory evidence of contamination.
- No action required (NA).

7.3.9 The preliminary risk assessment for the site is presented in Table 7.3 overleaf.

SECTION 7

QUALITATIVE RISK ASSESSMENT

Table 7.3: Preliminary Risk Assessment for the Site

Sources	Pathways (P)	Receptors	Consequence of Impact	Probability of Impact	Risk Estimation	Hazard Assessment
- Potential for Made Ground associated with previous development operations – on site (S1) - Potential for contamination from numerous garages on site (S2) - Potential Polychlorinated Biphenyl contamination from the sub-station - on site (S3)	- Ingestion and dermal contact with contaminated soil (P1) - Inhalation or contact with potentially contaminated dust and vapours (P2) - Permeation of water pipes and attack on concrete foundations by aggressive soil conditions (P6)	- Construction workers (R1) - Maintenance workers (R2) - Neighbouring site users (R3) - Future site users (R4) - Building foundations and on site buried services (water mains, electricity and sewer) (R5)	Medium	Low likelihood	Moderate	GI – Ground Investigation
	Accumulation and migration of soil gases (P5)		Severe	Unlikely	Low	
	- Leaching through permeable soils, migration within the vadose zone (i.e., unsaturated soil above the water table) and/or lateral migration within surface water, as a result of cracked hardstanding or via service pipe/corridors and surface water runoff. (P3) - Horizontal and vertical migration of contaminants within groundwater (P4)	- Neighbouring site users (R3) - Building foundations and on site buried services (water mains, electricity and sewer) (R5) - Controlled Waters; SPZ, Secondary (A) aquifer (R6)	Medium	Unlikely	Low	

SECTION 7

QUALITATIVE RISK ASSESSMENT

- 7.3.10 It should be noted that the identification of potential pollutant linkages does not necessarily signify that the site is unsuitable for its current or proposed land use. It does however act as a way of focussing data collection at the site in accordance with regulatory guidance in LCRM.

7.4 Outcome of Risk Assessment

- 7.4.1 It is understood that the proposed development comprises the demolition of the existing garages and the construction of a new 3-storey plus basement residential dwelling with a private garden.
- 7.4.2 The risk estimation matrix indicates a low to moderate risk as defined above.
- 7.4.3 On the earliest available map (1865), the site is shown as part of a field and devoid of any features. By the map dated 1913, the site is still devoid of any features, however, it lies within the boundaries of land associated with 2No buildings to the north west. By the map dated 1975, the site is occupied by a sub-station and 3No rows of small buildings, assumed to be the domestic garages in place today. It must be noted that the large-scale maps dated from 1970 to 1986 are incomplete and the precise construction date of the garages is unknown.
- 7.4.4 Historically, the surrounding area comprised fields with a small cluster of buildings from 70m south west and by the map dated 1913, the area had been highly developed with rows of terraced, residential style buildings surrounding the site.
- 7.4.1 It is recommended that an intrusive investigation is undertaken to clarify potential risks to the identified receptors and assess the extent of Made Ground soils present at the site. The ground investigation should also confirm ground conditions and the position of the water table (if any) to aid basement design. We assume that this can be undertaken to discharge the relevant planning conditions, once provided.
- 7.4.2 No significant sources of ground gas have been identified and therefore ground gas monitoring is not considered necessary. If a significant thickness of made ground is encountered at the site, ground gas monitoring may be required.

7.5 List of Key Contaminants

- 7.5.1 The possible contamination implications for both on-site and off-site sources have been assessed based on the information presented in the report. This has been achieved using guidance publications by the Environment Agency, together with other sources.
- 7.5.2 It is recommended that samples are taken and analysed for a broad suite of determinants to confirm the low risk determination for the site.
- 7.5.3 In the case of the site uses identified as part of the desk study research, reference to DoE industry profiles would not indicate a specific use reference, although reference has been made to the miscellaneous industries profile.

SECTION 7

QUALITATIVE RISK ASSESSMENT

- 7.5.4 Based on recommendations within the guidance publications, an initial soil and water chemical testing suite would need to consider a range of contaminants as follows:
- *Metals*: cadmium, chromium, copper, lead, mercury, nickel, zinc;
 - *Semi-metals and non-metals*: arsenic, boron, sulphur;
 - *Inorganic chemicals*: cyanide, nitrate, sulphate and sulphide;
 - *Organic chemicals*: aromatic hydrocarbons, aliphatic hydrocarbons, petroleum hydrocarbons, phenol, polyaromatic hydrocarbons;
 - *Others*: pH, Asbestos.
 - Polychlorinated biphenyls (PCBs)
- 7.5.5 It is also recommended that testing is undertaken to help categorise the material that will be excavated for waste disposal purposes.

8 REFERENCES

Groundsure Enviro+GeoInsight Report Ref JOMAS-9201158 November 2022

Environment Agency (2020); *Land Contamination Risk Management (LCRM)*.
<https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>

Ministry of Housing, Communities & Local Government: *National Planning Policy Framework*. February 2019

Investigation of Potentially Contaminated Sites – Code of Practice BS10175: 2011

BRE Report BR211; Radon: Protective measures for new dwellings, 2015

British Standards Institution (2015) BS 5930:2015 *Code of practice for ground investigations*. Milton Keynes: BSI

CIRIA C580, Embedded retaining walls – guidance for economic design

Department of Environment Industry Profiles (1996) - Miscellaneous Land ISBN 1 85112 313 X

Department of Environment Industry Profiles (1996) – Power Stations (excluding nuclear power stations) ISBN 1 85112 281 8

London Borough of Camden (January 2021) *“Camden Planning Guidance Basements”*

Campbell Reith (March 2018) *“Pro Forma Basement Impact Assessment”*, London Borough of Camden

APPENDICES

APPENDIX 1 – FIGURES

APPENDIX 2 – GROUNDSURE REPORTS

APPENDIX 3 – OS HISTORICAL MAPS

APPENDIX 4 – QUALITATIVE RISK ASSESSMENT METHODOLOGY

APPENDIX 5 – BGS BOREHOLE RECORDS

WE LISTEN, WE PLAN, WE DELIVER

Geotechnical Engineering and Environmental Services across the UK.



JOMAS ASSOCIATES LTD

24 Sarum Complex

Salisbury Road

Uxbridge

UB8 2RZ

CONTACT US

Website: www.jomasassociates.com

Tel: 0333 305 9054

Email: info@jomasassociates.com