BASEMENT IMPACT ASSESSMENT

in connection with the proposed development

at

5 - 7 ADAMSON ROAD
SWISS COTTAGE

LBH4690bia v2.0

FEBRUARY 2024

LBHGEO

CONSULTING ENGINEERS

DOCUMENT CONTROL				
LBH4690bia			AUTHORISED	
Ver	Date	Status	Leszek Biel MEng (Hons) GMICE	Seamus Lefroy-Brooks BSc(hons) MSc CEng MICE CGeol FGS CEnv MIEnvSc FRGS SiLC NQMS SQP DoWCoP QP RoGEP UK Registered Ground Engineering Adviser
1.0	6th June 2023	Issue for Planning		
1.1	3rd July 2023	Revision with FRA section and additional CDA mitigation		
2.0	22nd February 2024	Update for new scheme	LB	SRLB

LBHGEO Ltd.

2A Bakers Lane
Shutlanger
Towcester
Northamptonshire
NN12 7RT

Tel: 01604 212752

email: enquiry@LBHGEO.co.uk

website: www.LBHGEO.co.uk

Company Registered in England No. 4922494

CONTENTS

NON-TECHNICAL SUMMARY

It is proposed to extend the lower ground floor of these two properties rearwards which will require some excavation and lowering of part of the rear garden by up to approximately 1.5m depth.

This report provides an assessment of the potential impacts that the proposed development may have upon the host buildings, the neighbouring structures and the local environment.

GEOLOGY

The excavations will extend into the shallow solifluction deposits which mantle the undisturbed London Clay strata in this area.

HYDROGEOLOGICAL IMPACTS

There is no groundwater table below this site and hence no scope for the basement construction to impact the hydrogeology.

HYDROLOGICAL IMPACTS

The site is noted to be in an area that is at some indicated risk of surface water flooding due to the theoretical presence of an overland flow route associated with the headwaters the river Tyburn. The homeowner reports that there has never been any occurrence of flooding and in practice it is expected that the existing brick boundary walls will have prevented and diverted the suggested overland flow route from entering the site.

Nevertheless the scheme will increase impermeable areas and it is noted that a council-approved SuDS scheme will be included as part of the development.

STABILITY IMPACTS

This basement impact assessment demonstrates that the development will not have any stability impacts upon the neighbouring structures and will not harm or be affected by the nearby trees.

CONCLUSION

The assessment concludes that no adverse residual or cumulative stability, hydrological or hydrogeological impacts can be expected to occur to either neighbouring structures or the wider environment as a result of this development.

DISCLAIMER

This document has been prepared for a specific client and to meet a specific brief.

The preparation of this document may have been affected by limitations of scope, resources or time scale required by the client.

Should any part of this document be relied on in circumstances other than those for which it was originally commissioned LBHGEO disclaims any liability for such use.

LBHGEO disclaims any liability for inaccuracies or omissions in any third-party information used by this document.

LBHGEO disclaims all liability for any reliance on or use of this document by third parties.

1. INTRODUCTION

1.1 BACKGROUND

Nos. 5-7 Adamson Road are a pair of semi-detached Victorian villas with a lower ground floor and rear gardens that rise above the level of the lower ground floor.

It is proposed to extend the lower ground floor of these two properties rearwards will require some excavation and lowering of the rear garden by up to approximately 1.5m depth.

An earlier version of this Basement Impact Assessment (BIA) has been approved by the London Borough Camden for a very similar scheme.

The scheme has been revised to improve the landscaping arrangement and includes lower ground floor level patios to both properties with steps leading to the retained gardens located behind these. The area of soft garden loss associated with the new scheme is marginally less than that associated with the previously consented scheme.

1.2 BRIEF

LBHGEO have been appointed to update the Basement Impact Assessment (BIA) in support of the new scheme.

1.3 PLANNING POLICY

1.3.1 LOCAL PLANNING

The 2017 Camden Local Plan Policy A5 Basements reads as follows:

"The Council will only permit basement development where it is demonstrated to its satisfaction that the proposal would not cause harm to:

a) neighbouring properties;
b) the structural, ground, or water conditions of the area;
c) the character and amenity of the area;
d) the architectural character of the building; and
e) the significance of heritage assets.
In determining proposals for basements and other underground development, the Council will require an assessment of the scheme's impact on drainage, flooding, groundwater conditions and structural stability in the form of a Basement Impact Assessment and where appropriate, a Basement Construction Plan.

The siting, location, scale and design of basements must have minimal impact on, and be subordinate to, the host building and property. Basement development should:

f) not comprise of more than one storey;
g) not be built under an existing basement;
h) not exceed 50% of each garden within the property;
i) be less than 1.5 times the footprint of the host building in area;

j) extend into the garden no further than 50% of the depth of the host building measured from the principal rear elevation;
k) not extend into or underneath the garden further than 50% of the depth of the garden;
l) be set back from neighbouring property boundaries where it extends beyond the footprint of the host building; and
m) avoid the loss of garden space or trees of townscape or amenity value.

Exceptions to f. to k. above may be made on large comprehensively planned sites.

The Council will require applicants to demonstrate that proposals for basements:

n. do not harm neighbouring properties, including requiring the provision of a Basement Impact Assessment which shows that the scheme poses a risk of damage to neighbouring properties no higher than Burland Scale 1 'very slight';
o. avoid adversely affecting drainage and run-off or causing other damage to the water environment;
p. avoid cumulative impacts;
q. do not harm the amenity of neighbours;
r. provide satisfactory landscaping, including adequate soil depth;
s. do not harm the appearance or setting of the property or the established character of the surrounding area;
t. protect important archaeological remains; and
u. do not prejudice the ability of the garden to support trees where they are part of the character of the area.

The Council will not permit basement schemes which include habitable rooms and other sensitive uses in areas prone to flooding.

We will generally require a Construction Management Plan for basement developments.

Given the complex nature of basement development, the Council encourages developers to offer security for expenses for basement development to adjoining neighbours."

The following policies in the Local Plan are also relevant to basement development and will be taken into account when assessing basement schemes:

- "Policy A2 Open space";
- "Policy A3 Biodiversity";
- "Policy D1 Design";
- "Policy D2 Heritage"; and
- "Policy CC3 Water and flooding".

In addition to the Local Plan Policy, in January 2021 Camden published updated Camden Planning Guidance (CPG) on Basements and Lightwells. This document does not carry the same weight as the main Camden Local Plan documents (including the above Policy A5) but is an important supporting document and refers back to the 2010 Camden Geological, Hydrogeological and Hydrological "Study

(CGHHS) by Ove Arup.

1.4 REPORT STRUCTURE

This report commences with a desk study and characterisation of the site, before progressing to BIA screening and scoping assessments, whereby consideration is given to identifying the potential hydrogeological, hydrological and stability impacts that may be associated with the proposed basement development.

A ground model is then developed, which is followed by an outline basement construction methodology and, finally, by an assessment of the potential impacts of the proposed scheme, as identified in the screening and scoping phase.

1.5 DOCUMENTS CONSULTED

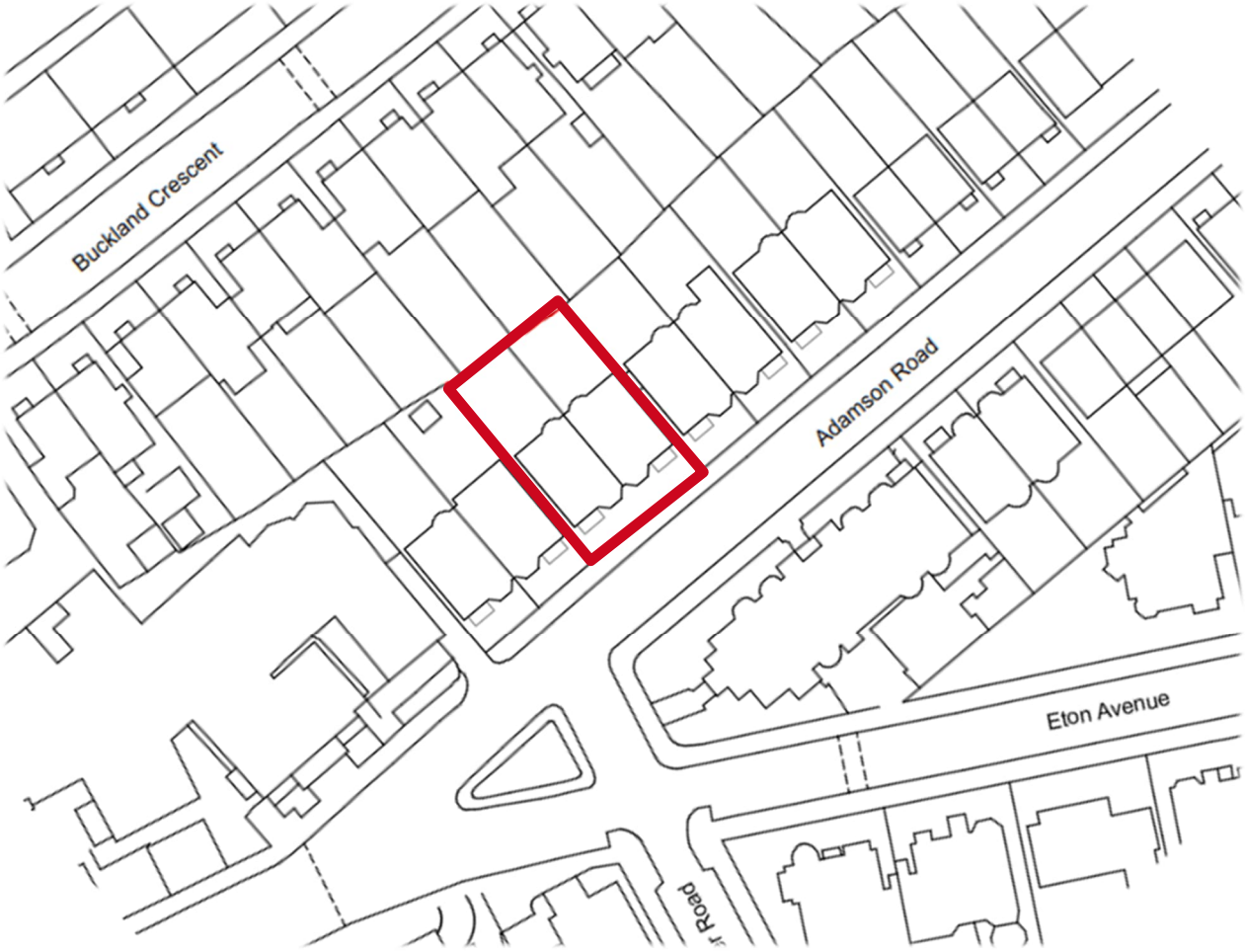
The following drawings of the existing site and the proposed development were used for this assessment.

- 2023 June — Ground Investigation — CDS Group
  Ref: ES0060
- 2023 Oct — Proposed Plans
  Ref: 15.4, 16.4, 26.4, 23.4, 24.4
- 2022 Sept — Existing Plans — Pinzauer
  Ref: 007- 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, 14
- 2010 Apr — Topographical Survey — EDI Surveys Ltd
  Ref: 11822/T/02-02

2. THE SITE

2.1 SITE LOCATION

The site is located some 150m to the north of Swiss Cottage. The site may be approximately located by the postcode NW3 3HX or by National Grid Reference 526750, 184450.

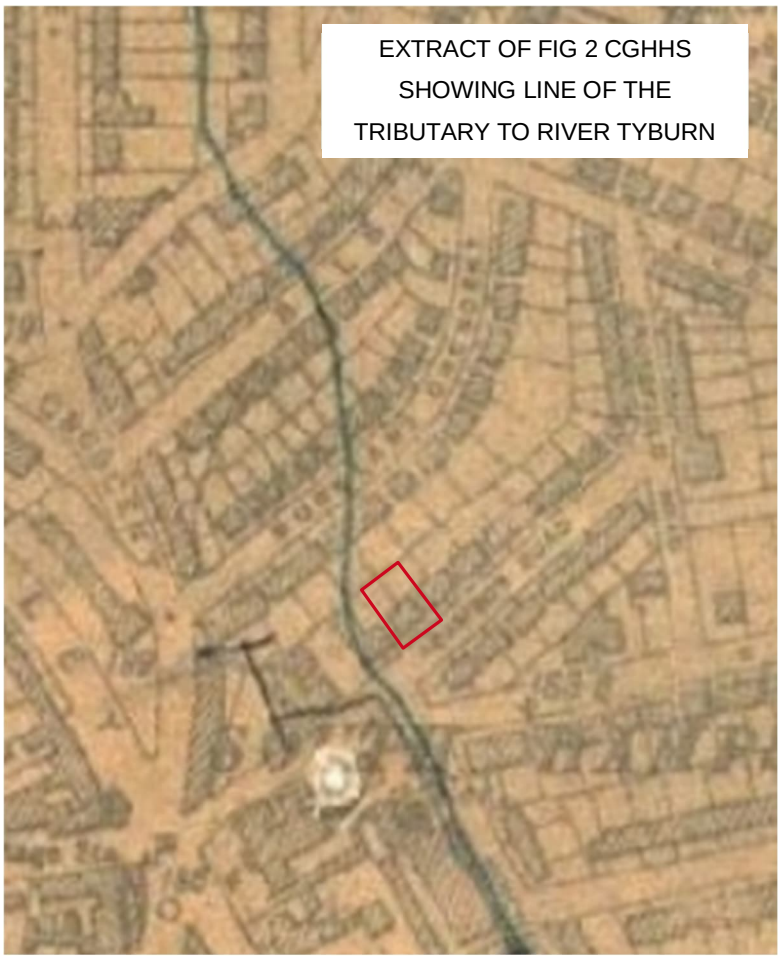


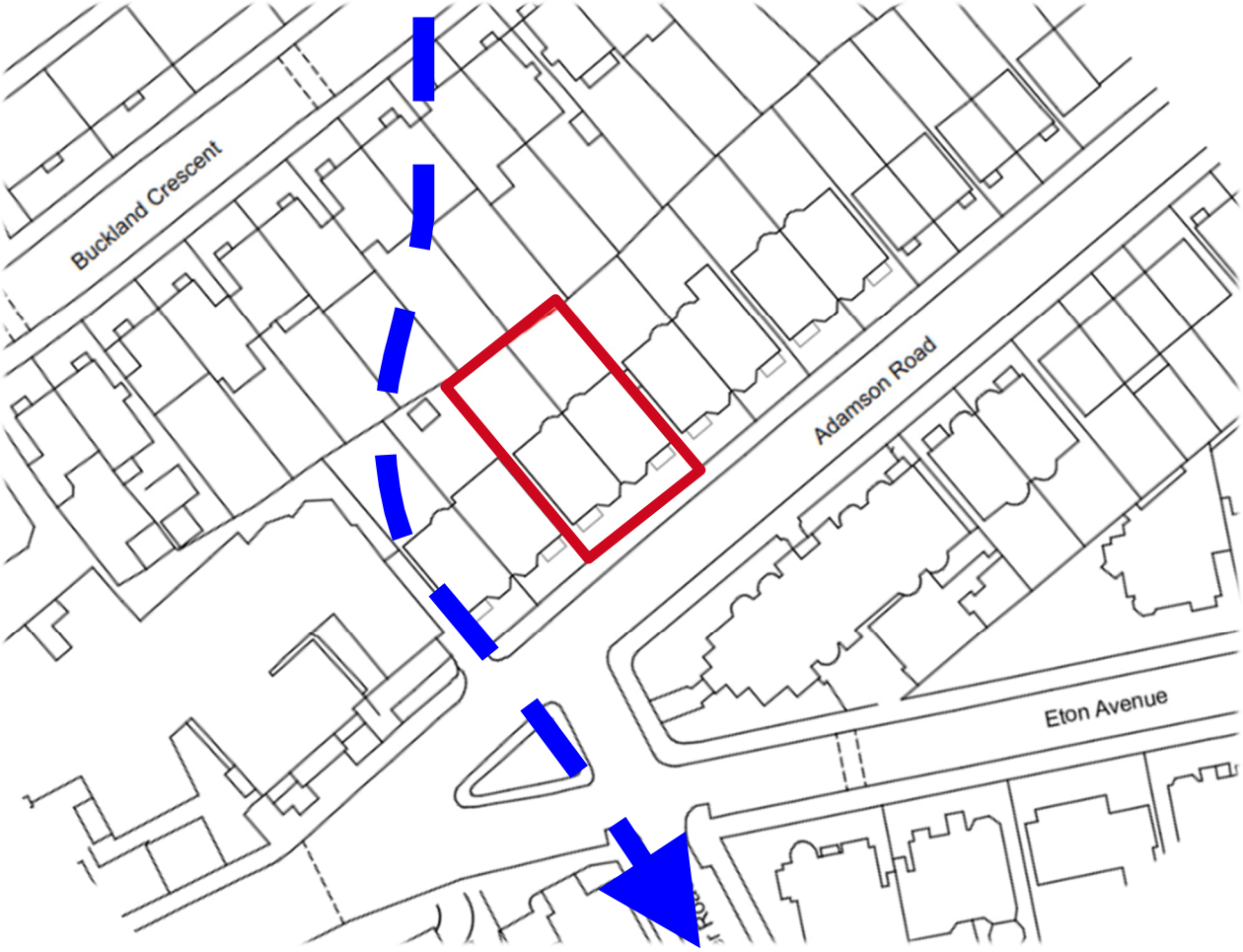
SITE LOCATION PLAN

2.2 TOPOGRAPHICAL SETTING

The site lies on the southern slopes of Hampstead on land locally falling towards the southeast.

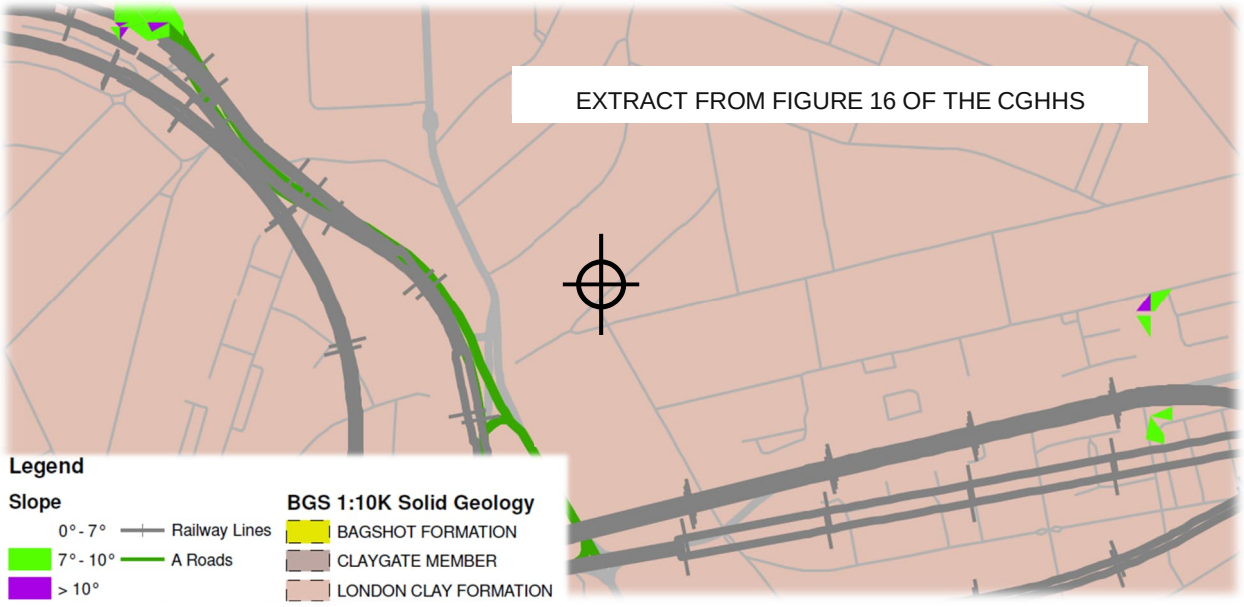
The course of a tributary of the River Tyburn runs through the neighbouring properties at Nos. 1-3 Adamson Road, adjacent to the west of the site, as shown below.





SITE LOCATION PLAN

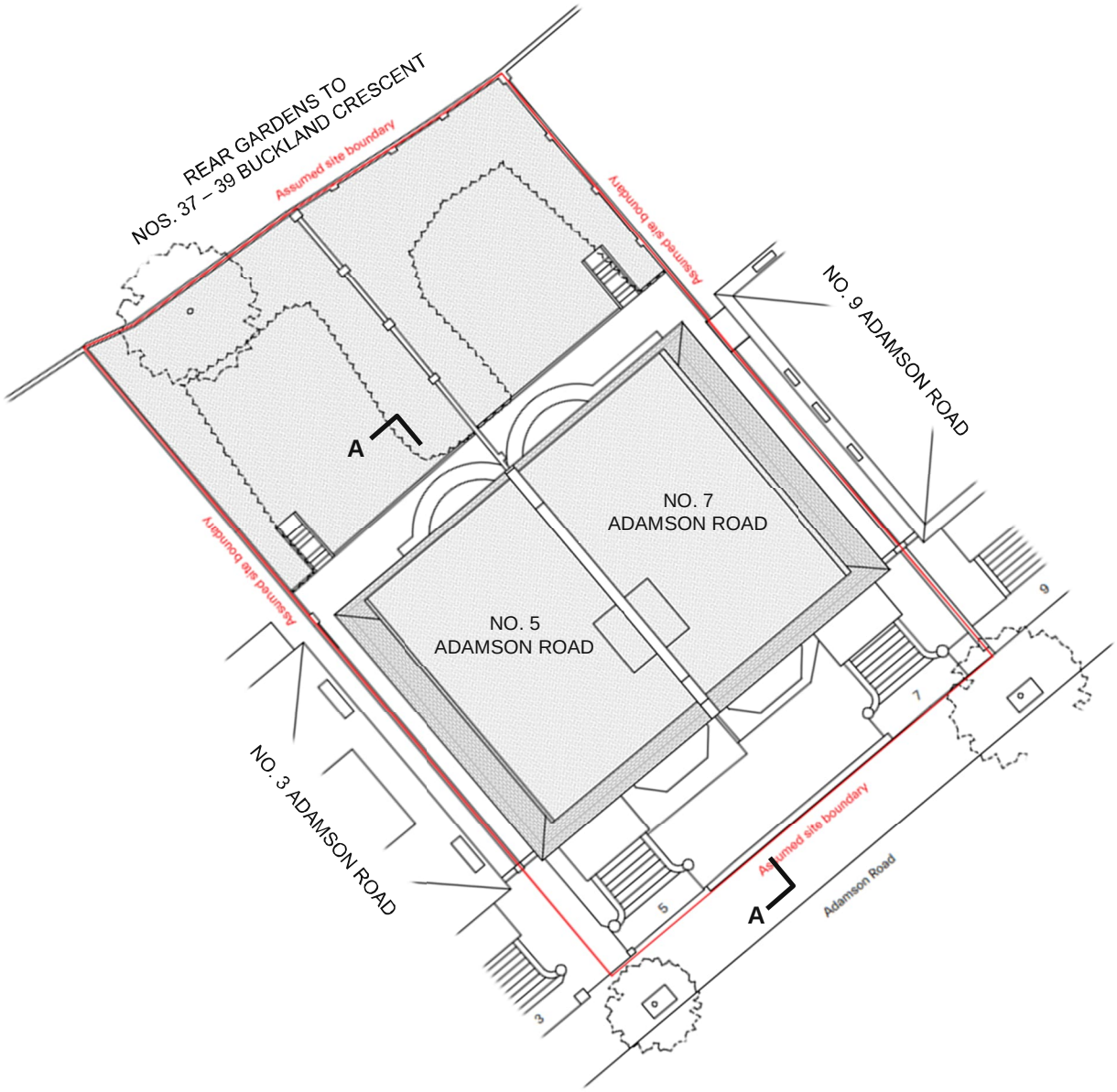
The site is not located on a steep hillside, as indicated on the plan below.



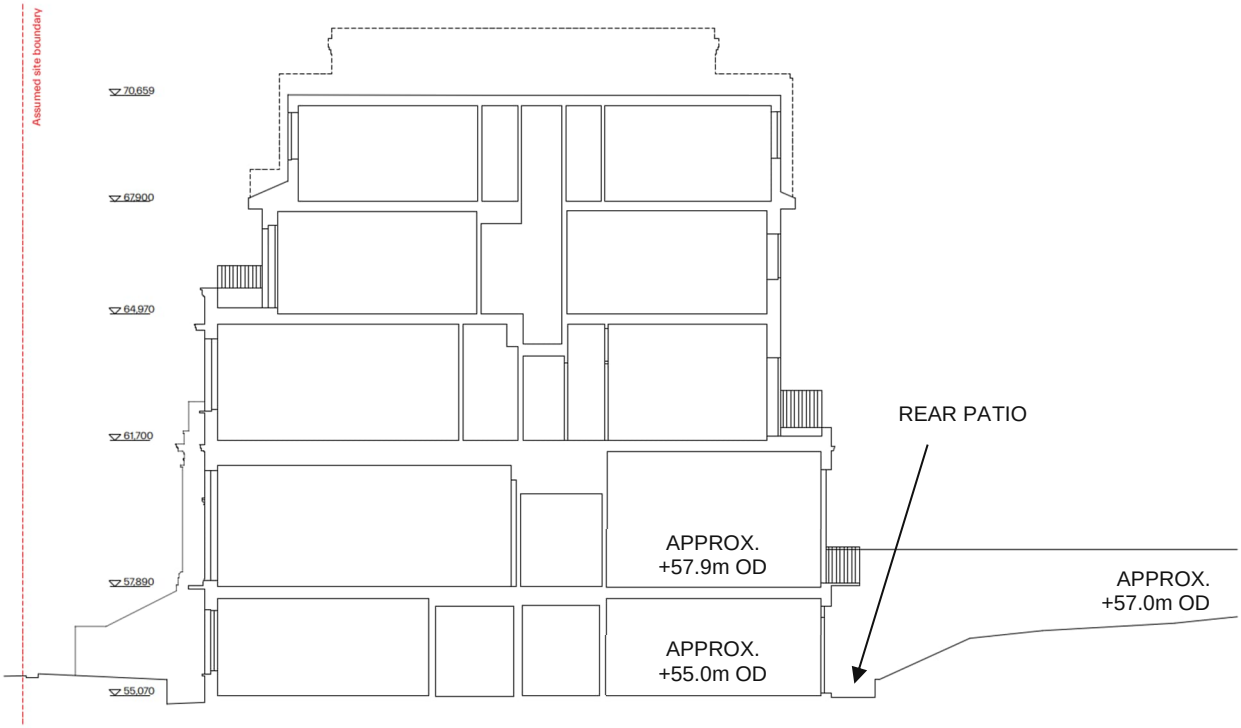
2.3 SITE DESCRIPTION

The site comprises a semi-detached pair of villa properties, The lower ground floor of the buildings is set slightly below the street level, at approximately +55.0m OD, and the raised upper ground floor is set at approximately +58m OD).

The existing buildings are internally subdivided into several flats, with 9 flats at No. 5 and 10 flats at No. 7.



PLAN OF EXISTING SITE FEATURES



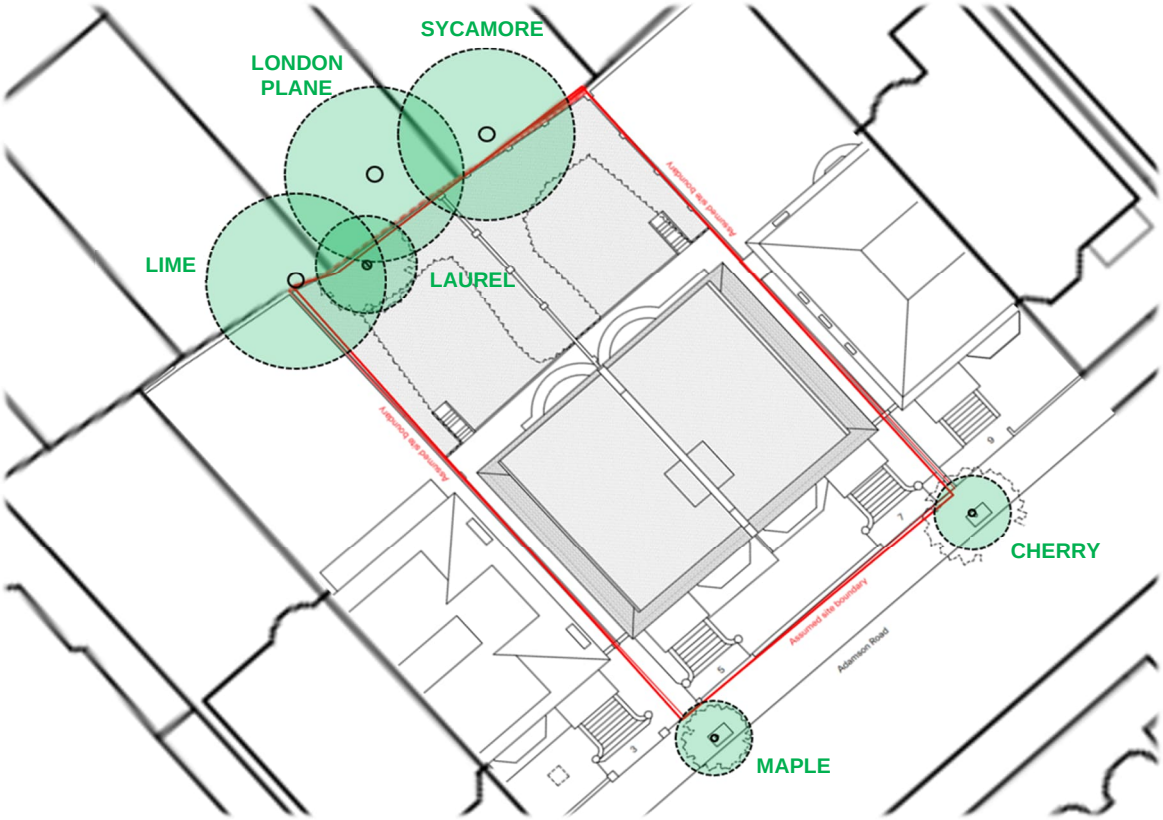
EXISTING SECTION A – A

The existing rear patios extend approximately 2m away from the rear elevation of the building, with steps leading up to the rear gardens, which themselves slopes up to approximately 2.5m above the lower ground floor level (+57.5m OD) at the rear boundary.

The rear garden of both properties is overgrown. A single Laurel tree is present in the rearmost part of the garden to No. 5. Three further trees are present beyond the site towards the rear. These are, as shown below, mature Lime, London Plane and Sycamore trees located in the adjoining rear gardens of No. 41, 39 & 37 Buckland Crescent.

Brick walls form the garden boundaries and separates the two gardens.

The site neighbours No. 3 Adamson Road to the southwest and No. 5 Adamson Road to the northeast, both of similar age and construction to Nos. 5-7, situated at an approximately similar level to Nos. 5-7 and featuring similar lower ground floor level patios, with rising rear gardens.



PLAN OF NEARBY TREES SHOWING APPROXIMATE CANOPIES

EXISTING REAR ELEVATION

3. DESK STUDY

3.1 SITE HISTORY

The area remained undeveloped until the late nineteenth century when the present buildings were constructed.

1890s

It is understood that the dormer roof extensions were added at some point in the post-War period and the two houses were sub-divided into a number of separate residential units.

3.2 GEOLOGICAL INFORMATION

The British Geological Survey (BGS) records indicate that the site is directly underlain by the London Clay Formation.

Fig. 4 of the CGHHS additionally confirms that the area is not noted as worked ground.

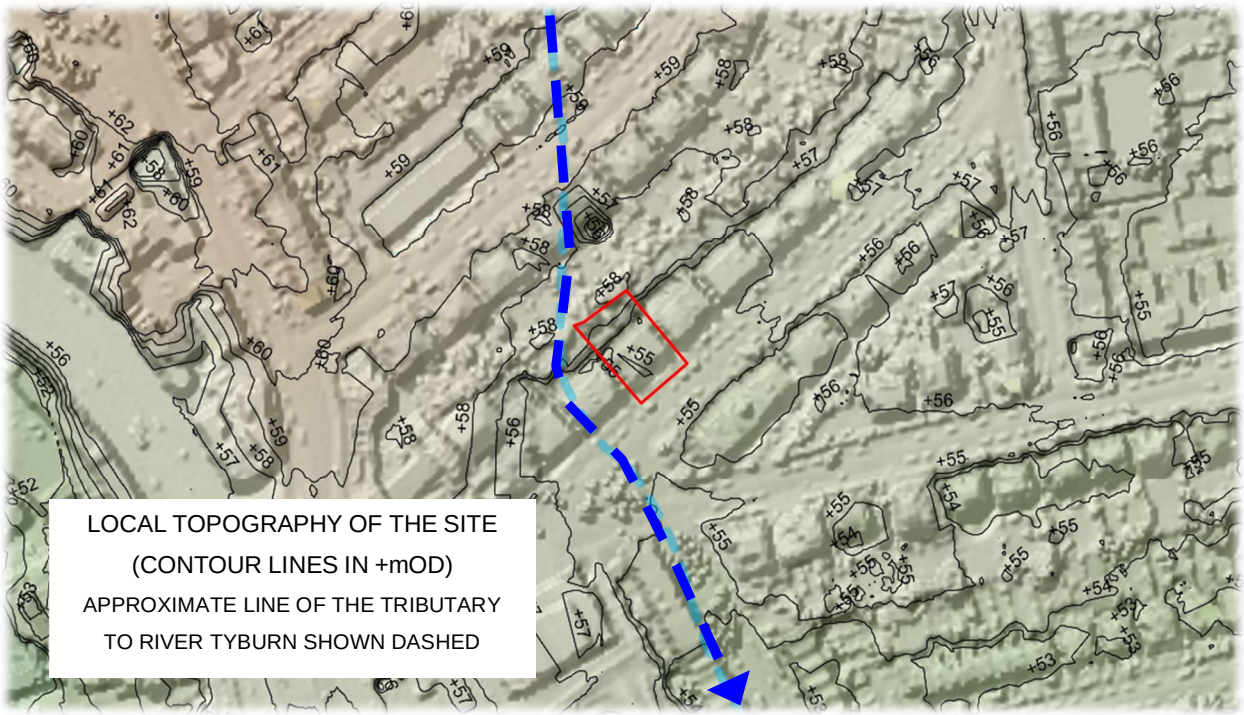
3.3 HYDROGEOLOGICAL INFORMATION

The London Clay formation is virtually impermeable; hence no significant groundwater presence is to be expected beneath this site.

The ground conditions at this site do not allow the presence of any underground streams or spring lines and hence such features do not exist and the proposed basement will not cause any potential diversion of such features.

3.4 HYDROLOGICAL INFORMATION

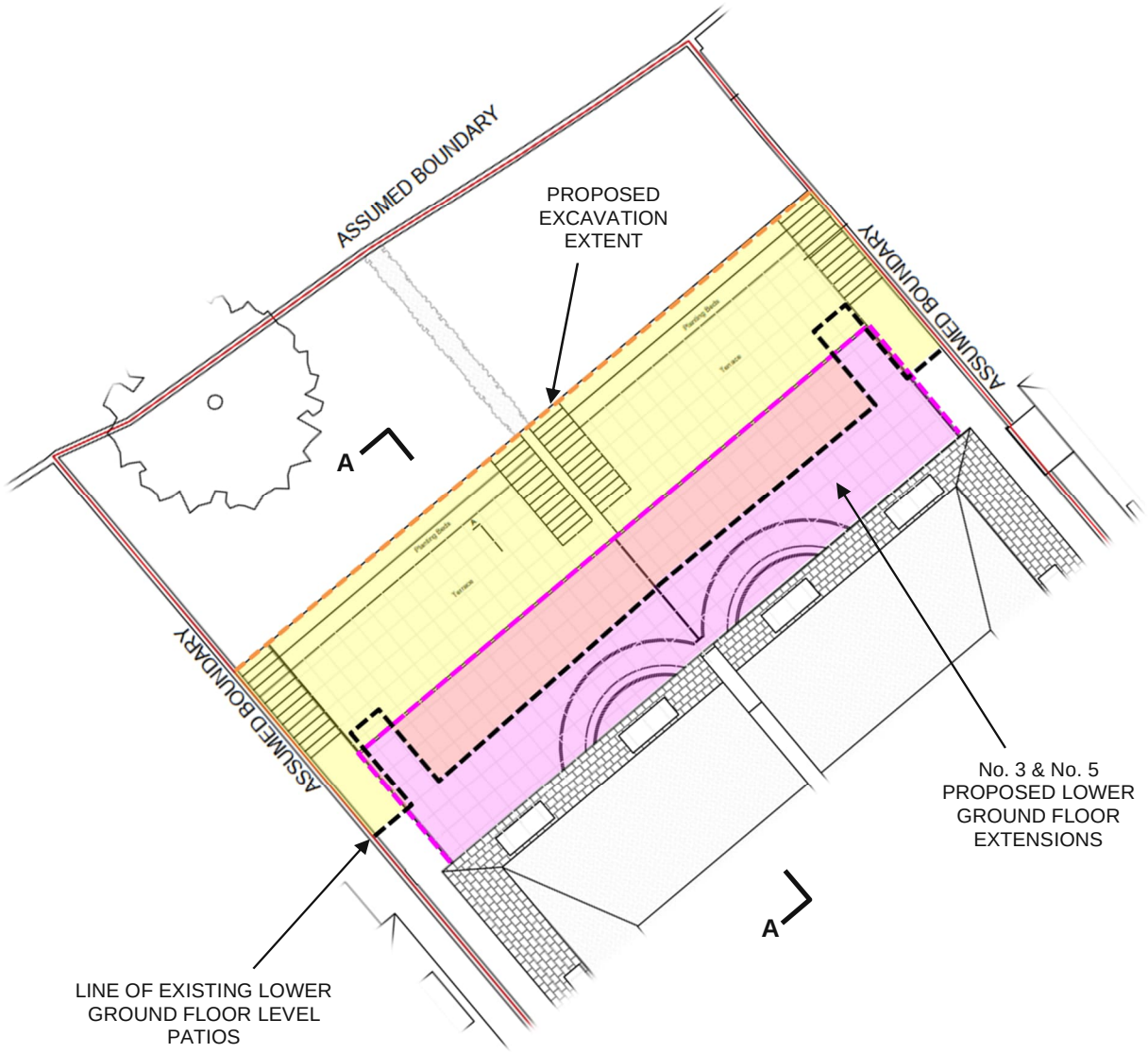
The nearest water course is the now hidden tributary of the River Tyburn running to the west of the site and down Winchester Road. In this case the water course, although it may have been culverted to allow construction of the houses, does not appear to have been replaced by any public sewer until it reached Winchester Road.



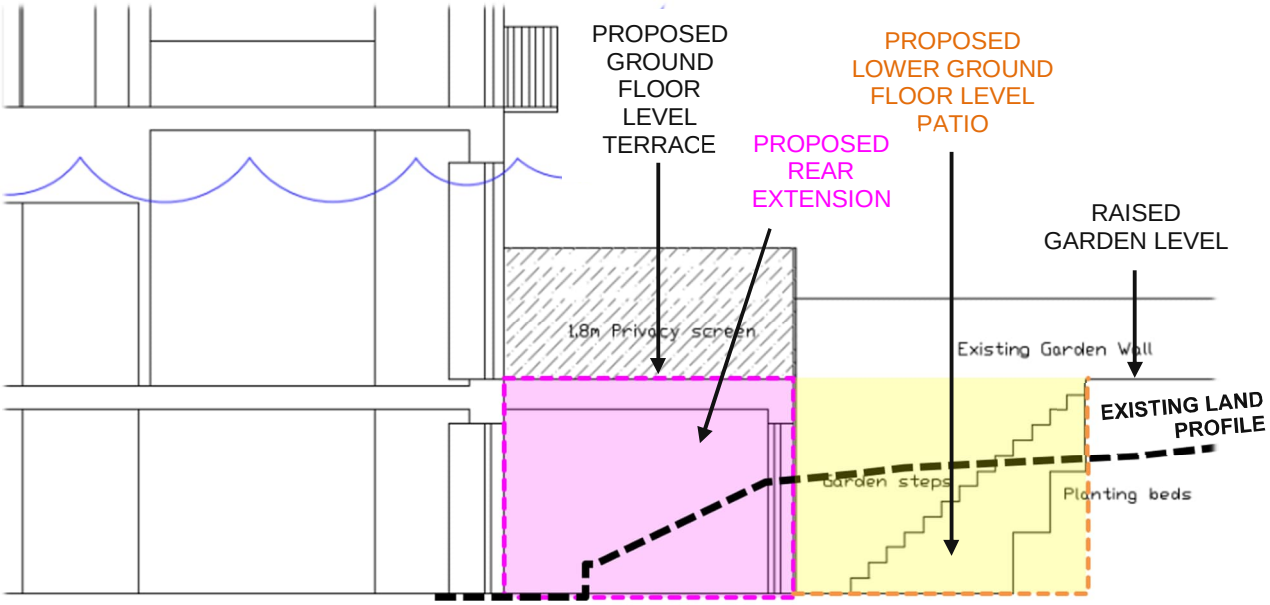
4. PROPOSED BASEMENT DEVELOPMENT

It is proposed to extend the existing lower ground floor level towards the rear of the site, as well as to enlarge the patio area set at lower ground floor level.

The development will introduce a single patio area at lower ground floor level located behind the lower ground floor extension. The rear retaining wall of the patio will include stepped planting beds. New steps will provide access up to the rear gardens from the rear patios and side alleyways.



PROPOSED DEVELOPMENT PLAN



PROPOSED SECTION A – A

The lower ground floor extensions are proposed to reach approximately 6m away from the rear elevation of the main buildings. Accessible upper ground floor level terraces are proposed to be established on the roofs of the extensions.

As indicated below, the proposed excavations for the new extensions and the enlarged patio will not extend below the existing lower ground floor level of the existing building or that of the neighbouring properties.

PROPOSED REAR ELEVATION

5. SCREENING & SCOPING ASSESSMENTS

The Screening & Scoping Assessments have been undertaken with reference to Appendices E and F of the CGHSS, which is a process for determining whether or not a full BIA is required.

5.1 SCREENING ASSESSMENT

The Screening Assessment consists of a series of checklists that identifies any matters of concern relating to the following:

- Subterranean (groundwater) flow
- Surface flow and flooding
- Slope stability

5.1.1 SCREENING CHECKLIST FOR SUBTERRANEAN (GROUNDWATER) FLOW

QUESTION	RESPONSE	JUSTIFICATION
Is the site is located directly above an aquifer?	No	
Will the proposed basement extend beneath the water table surface?	No	
Is the site within 100m of a watercourse, well (used/disused) or potential spring line?	Yes	The approximate line of a tributary to the River Tyburn runs through the neighbouring properties at Nos. 1-3 Adamson Road.
Is the site within the catchment of the pond chains on Hampstead Heath?	No	See CGHHS Fig.14.
Will the proposed development result in a change in the area of hard-surfaced/paved areas?	Yes	The proposed rear extensions and the new steps will replace a part of the existing soft landscaped garden area.
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	There is no infiltration
Is the lowest point of the proposed excavation (allowing for any drainage and foundation space under the basement floor) close to or lower than the mean water level in any local pond?	No	There are no nearby ponds.

5.1.2 SCREENING CHECKLIST FOR SURFACE FLOW AND FLOODING

QUESTION	RESPONSE	JUSTIFICATION
Is the site within the catchment area of the pond chains on Hampstead Heath?	No	See CGHHS Fig.14.
As part of the site drainage, will surface water flows (e.g. rainfall and run-off) be materially changed from the existing route?	No	Rainfall will be collected and discharged to the public sewer as per the existing route
Will the proposed basement development result in a change in the proportion of hard-surfaced/paved areas?	Yes	There will be an increase in hard surfacing as development will replace a part of the existing soft landscaped garden area.
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	
Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?	No	
Is the site in an area known to be at risk from surface water flooding, or is it at risk from flooding for example because the proposed basement is below the static water level of a nearby surface water feature?	Yes	The site is located outside any Local Flood Risk Zones identified by the Camden SFRA. However, the Environment Agency modelling / mapping indicates that the site may be at risk of surface water flooding due to an overland flow route following the approximate line of a former watercourse.

5.1.3 SCREENING CHECKLIST FOR STABILITY

QUESTION	RESPONSE	JUSTIFICATION
Does the existing site include slopes, natural or manmade, greater than 7 degrees?	No	
Does the proposed re-profiling of landscaping at the site change slopes at the property boundary to more than 7 degrees?	No	
Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7 degrees?	No	
Is the site within a wider hillside setting in which the general slope is greater than 7 degrees?	No	See Figure 16 of the CGHHS.
Is London Clay the shallowest strata at the site?	Yes	The site indicated to be directly underlain by the London Clay.
Will trees be felled as part of the proposed development and/or are works proposed within tree protection zones where trees are to be retained?	No	
Is there a history of seasonal shrink-swell subsidence in the local area, and/or evidence of such effects at the site?	No	
Is the site within 100m of a watercourse of a potential spring line?	Yes	The approximate line of a tributary to River Tyburn runs through the neighbouring properties at Nos. 1-3 Adamson Road.
Is the site within an area of previously worked ground?	No	See Fig. 3 of the CGHHS.
Is the site within an aquifer?	No	
Will the proposed basement extend beneath the water table such that dewatering may be required during construction?	No	
Is the site within 50m of the Hampstead Heath ponds?	No	

Is the site within 5m of a highway or pedestrian right of way?	No	The proposed excavations will be undertaken at the rear of the site, away from the pavement at Adamson Road.
Will the proposed basement significantly increase the differential depth of foundations relative to the neighbouring properties?	No	The neighbouring buildings are founded at a similar level and no excavations deeper than this are proposed. The garden boundary walls with the neighbouring properties will require re-configuring to accommodate the extended side alleyways.
Is the site over (or within the exclusion zone of) tunnels, e.g. railway lines?	No	

5.2 SCOPING ASSESSMENT

Where the checklist is answered with a “yes” or “unknown” to any of the questions posed in the flowcharts, these matters are carried forward to the scoping stage of the BIA process. The other potential concerns considered within the screening process have been demonstrated to be not applicable or not significant when applied to the proposed development.

The scoping produces a statement which defines further the matters of concern identified in the screening stage. This defining should be in terms of ground processes, in order that a site-specific BIA can be designed and executed (Section 6.3 of the CGHHS).

5.2.1 SCOPING FOR SUBTERRANEAN (GROUNDWATER) FLOW

- *The site is located within 100m of a watercourse.*

The guidance advises that the flow from a spring, well or watercourse may increase or decrease if the groundwater flow regime which supports that water feature is affected by a proposed basement. If the flow is diverted, it may result in the groundwater flow finding another location to issue from with new springs forming or old springs being reactivated. A secondary impact is on the quality of the water issuing or abstracted from the spring or water well respectively.

- *The proposed basement development will result in a change in the proportion of hard surfaced / paved areas.*

The sealing off of the ground surface by pavements and buildings to rainfall will result in decreased recharge to the underlying ground. In areas of non-aquifer (i.e. on the London Clay), this may mean changes in the degree of wetness which in turn may affect stability.

The site is, however, known to be underlain by the impermeable London Clay Formation and therefore no significant groundwater flow will be present. Stability impacts due to London Clay presence will be dealt

with as part of the respective impact assessment, as scoped in 5.2.3 below.

5.2.2 SCOPING FOR SURFACE WATER FLOW AND FLOODING

- *The proposed basement development will result in a change in the proportion of hard surfaced / paved areas.*

The guidance advises that a change in the proportion of hard surfaced or paved areas of a property will affect the way in which rainfall and surface water are transmitted away from a property. This includes changes to the surface water received by the underlying aquifers, adjacent properties and nearby watercourses. Changes could result in decreased flow, which may affect ecosystems or reduce amenity, or increased flow which may additionally increase the risk of flooding.

- *The site is in an area known to be at risk from surface water flooding, or is it at risk from flooding, for example because the proposed basement is below the static water level of a nearby surface water feature.*

The site is located outside any Local Flood Risk Zones identified by the Camden SFRA but the Environment Agency modelling / mapping indicates that the site may be at risk of surface water flooding due to an overland flow route following the approximate line of a former watercourse.

5.2.3 SCOPING FOR STABILITY

- *London Clay is the shallowest strata at the site.*

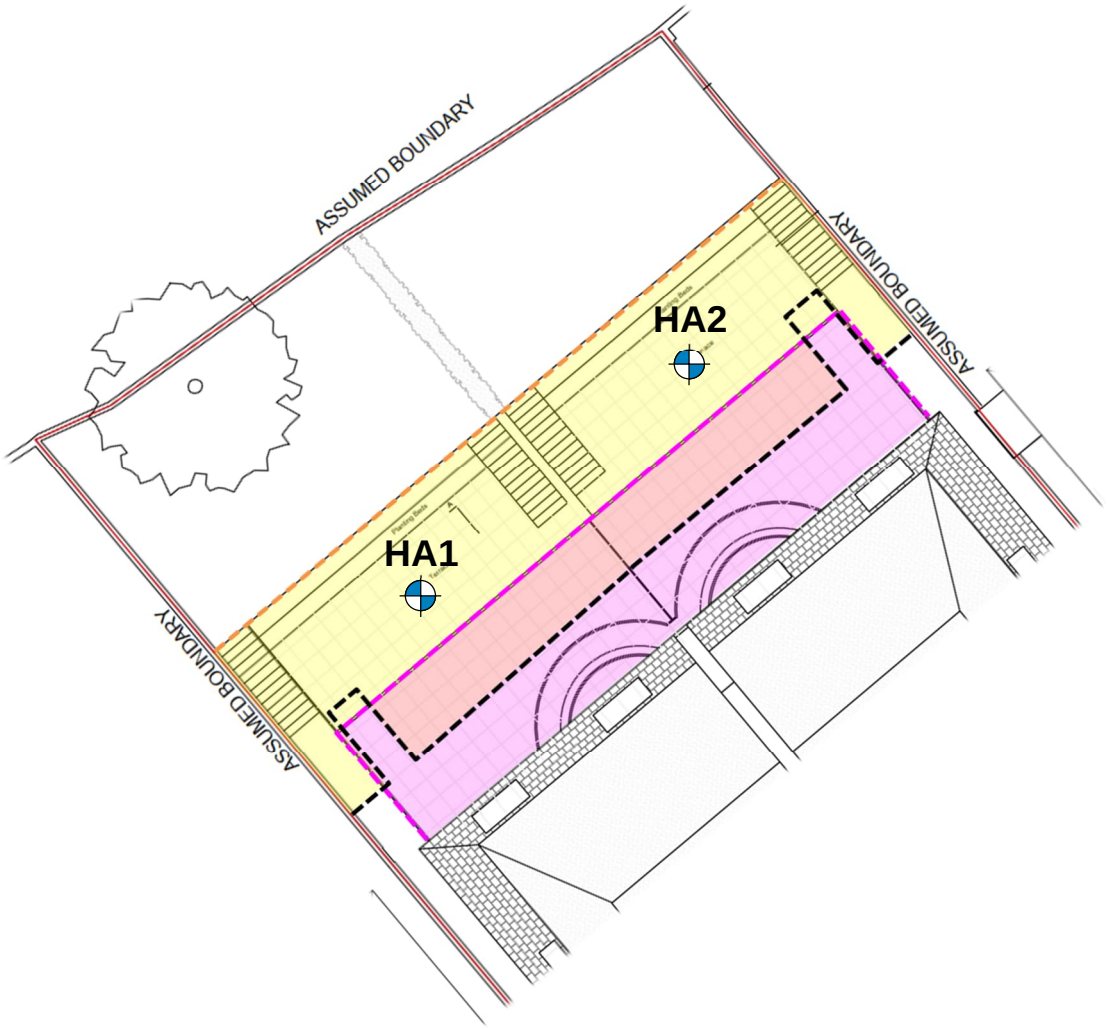
The guidance advises that of the soil strata present in LB Camden, the London Clay is the most prone to seasonal shrink-swell (subsidence and heave).

- *The site is located within 100m of a watercourse.*

The guidance advises that seasonal spring lines and changes to groundwater regimes within slopes can affect slope stability. As set out previously, this concern can be discounted on account of the impermeable clay geology and the resultant lack of groundwater.

6. SITE INVESTIGATION

A site-specific ground investigation was undertaken by the CDS Group in May 2023 and comprised two hand-auger boreholes drilled within the rear gardens of the two properties to a depth of 0.5m below the proposed maximum excavation level at the positions indicated below.



6.1 GROUND CONDITIONS

Beneath a limited cover of made ground, the boreholes have revealed a layer of solifluction deposits to be mantling the undisturbed London Clay strata.

Up to approximately 1m depth of dirty brown and grey silty clay fill containing stones and with brick fragments is present below the raised rear garden. Beneath this, firm to stiff silty clay containing scattered gravel was encountered. The presence of gravel indicates that this material is not undisturbed London Clay, but has rather been formed by natural re-working of the London Clay Formation through downhill

solifluction of the uppermost layers of the natural clay slope, with the incorporation of some granular material that was likely originally glacially deposited upgradient.

6.2 GROUNDWATER

No groundwater is present.

7. GEOTECHNICAL ASSESSMENT

7.1 EXCAVATION AND FOUNDATION CONSTRUCTION

The proposed FFL (Finished floor level) of the lower ground floor extensions and the enlarged patios is to be set as equal to the existing lower ground floor level of approximately +55.0m OD. The proposed development will necessitate up to 1.5m deep excavation into the existing raised garden area. This can generally be achieved with a battered cut, but the garden boundary walls with the neighbouring properties will require re-configuring to accommodate the extended side alleyways and may perhaps most simply be removed and rebuilt.

The rear walls of the patios will be constructed as a cantilever retaining wall. It is expected that these retaining walls can be cast in situ as reinforced concrete structures with subsequent filling undertaken at the rear to level off the remaining rear garden following construction.

The extensions can be constructed on shallow foundations bearing upon the exposed firm to stiff clay and a nominal 150kN/m^2 net allowable bearing pressure has been assessed for the design of these.

No ingress of groundwater is expected into the excavation in view of the London Clay geology at this site. Should any rainwater be permitted to collect in the excavation, this should be removed.

The proposed, relatively shallow excavations, combined with the fact that these will not extend into the London Clay Formation proper, means that there is negligible expectation of any excavation heave movement.

7.2 RETAINING WALLS

The following parameters may be considered in the design of new retaining walls:-

RETAINING WALL DESIGN PARAMETERS			
STRATUM	BULK UNIT WEIGHT	EFFECTIVE COHESION	EFFECTIVE FRICTION ANGLE
	(kN/m^3)	(c' - kN/m^2)	(ϕ'- degrees)
Made Ground	18	Zero	20
Head Deposits	19	Zero	20

7.3 WATERPROOFING

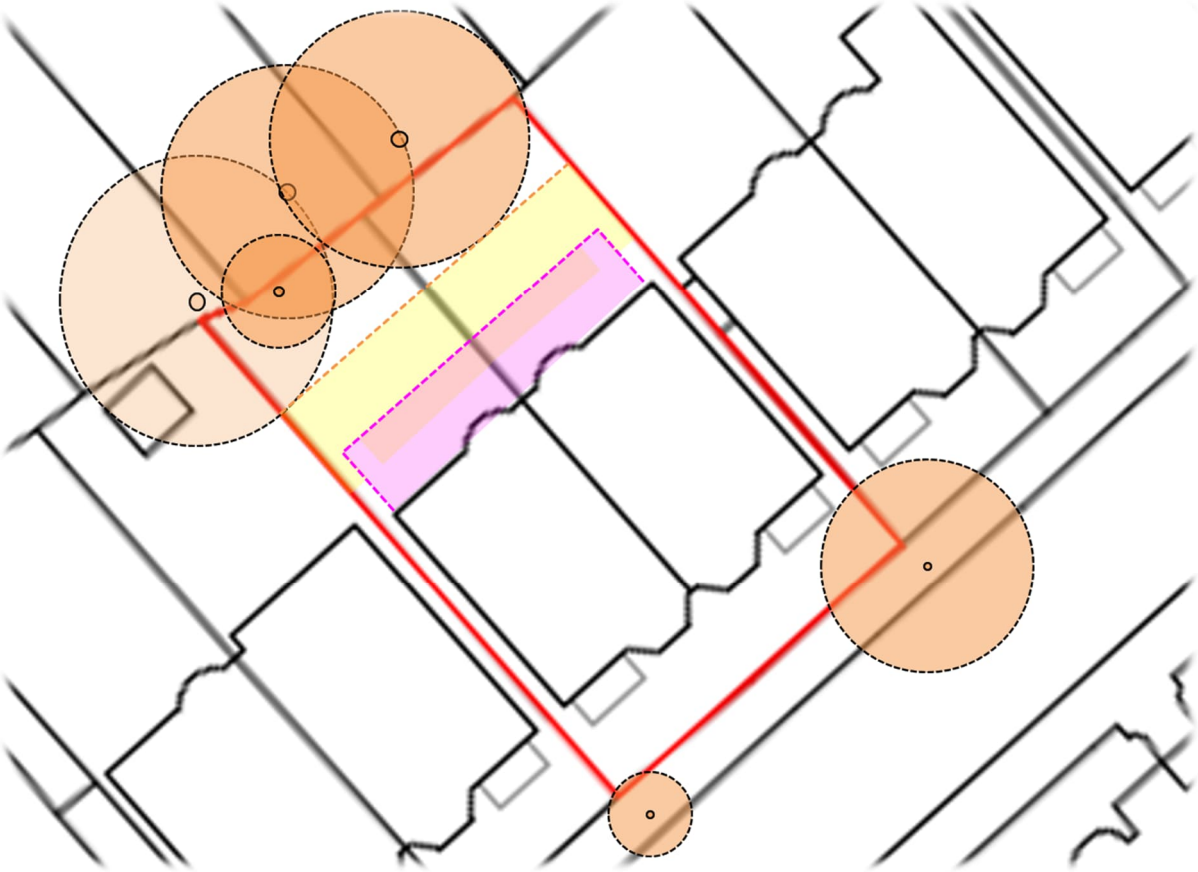
The proposed extensions will not extend below ground and hence BS8102:2009, Code of Practice for the Protection of Below-Ground Structures against Water from the Ground does not apply.

7.4 EFFECT OF TREES

Three mature trees, a Lime, a London Plane, and a Sycamore, as well as a single immature Laurel tree are present near the rear boundary of the site,

The proposed excavations will extend to approximately within 6m of the closest tree, with the proposed lower ground floor extensions within approximately 10m of the immature tree and approximately within 12 – 14m of the mature trees. Using NHBC Chapter 4.2, it can be calculated that approximately 1.5m deep foundations would be recommended in order to protect the proposed extensions. However, as the trees are situated at approximate elevations of +57.5m OD, some 2.5m above the proposed FFL of the extensions, no deepening of the new foundations will be required.

The estimated Root Protection Area (RPA) of each tree is shown below, based upon a circular area with a radius that is twelve times the tree's estimated diameter at 1.5m height. No incursion of the estimated RPAs occurs.



ESTIMATED TREE ROOT PROTECTION AREAS

8. FLOOD RISK ASSESSMENT

The Environment Agency (EA) mapping indicates that the site is not at risk of flooding due to rivers or the sea or reservoirs. However, the EA does indicate a surface water flood risk and, as can be seen below, the EA mapping suggests that an overland flow route passes through the site and adjacent properties to the east.

EXTRACT OF EA SURFACE WATER FLOOD RISK MAP

This apparent flood risk is also shown on the extract of figure 3x of the Camden Strategic Flood Risk Assessment (SFRA) shown overleaf, which has likely used the same data.

EXTRACT OF FIGURE 3x OF THE CAMDEN SFRA

8.1 SURFACE WATER FLOOD RISK

The LIDAR-based analysis tool used by the Environment Agency to produce the flood risk maps does not take account of buildings, structures or known watercourses. This surface water flooding is likely to be associated with the former tributary of the River Tyburn that has been identified to the west of the site in sections 2.2 and 3.4 above.

It would appear that the flood risk due to overland flow on site may have been inadvertently exaggerated by the limitations of the EA modelling. The long-term homeowner reports that there has never been any occurrence of flooding at the property and in practice it is expected that the existing brick boundary walls would have in any case prevented and diverted the suggested overland flow route from entering the site.

8.2 CRITICAL DRAINAGE AREA

Figure 6 of the Camden SFRA indicates that the site lies within a Critical Drainage Area (CDA Group 3_005), but nevertheless outside of any identified Local Flood Risk Zones identified by the Camden SFRA. Run-off from the site could therefore potentially impact known areas of down-gradient flood risk.

8.3 SUMMARY OF FLOOD RISK

The risk of overland flow running through the site appears to have been exaggerated.

Nevertheless, it is noted that the basement level that is to be extended is set slightly below street level and hence would potentially flood if the adjacent street were to flood for some reason.

Additionally, it is apparent that the development will lead to a loss of existing soft landscaped garden area and this will inevitably result in additional run-off.

8.4 FLOOD MITIGATION

A SuDS scheme meeting the 2019 Camden CPG guidance is to be included as part of the development and this will need to be approved by the council. This SuDS will introduce sufficient SuDS features to both counteract the loss of existing permeable garden and meet any run-off reduction targets required by the London Plan.

It will be prudent to include non-return valves within the drainage system to avoid any risk of the site being directly impacted by sewer flooding.

Finally, it can be seen that the proposed development layout will not affect any overland flow routes passing through the property provided that the side alleyways are preserved. These side alleyways are to be designed to deal with any overland flow and will be kept clear for this purpose.

9. IMPACT ASSESSMENT

The screening and scoping stages identified potential aspects of the geological, hydrogeological and hydrological environment that could lead to the development having an unacceptable impact.

This stage is concerned with evaluating the direct and indirect implications of each of these potential impacts.

9.1 HYDROGEOLOGICAL IMPACT ASSESSMENT

The site is underlain by essentially impermeable clay soils and there is consequently no shallow groundwater table at this site. It is therefore considered that the development will not have any impact upon groundwater flow and there is additionally no scope for any cumulative impact.

9.2 HYDROLOGICAL IMPACT ASSESSMENT

The site is deemed to be at a risk of surface water flooding by the EA and the BIA screening has identified that the development will lead to an increase in impermeable surfacing. An assessment of flood risk has therefore been set out in the previous section together with proposals for mitigation. A SuDS scheme will be designed for inclusion as part of the development, and this will require specific approval by council.

9.3 STABILITY IMPACT ASSESSMENT

The proposed basement is at the same level as the existing lower ground floor. The proposed excavation will generally be approximately 1m in depth and this will not be sufficient to generate any concerns in regard to possible ground heave. The excavations will not proceed below the level of the existing foundations to either the host building or the neighbouring buildings. As a result of these factors, there will be negligible impact and no cumulative effects and no ground movement assessment or Burland damage assessment is therefore warranted.

The proposed foundations to the extensions will extend to at least approximately 1m below the upper layer of the solifluction deposits, and it is therefore considered that, although these deposits should be regarded as being of high shrinkage potential, the new foundation will thus be thus protected from seasonal moisture content changes and movement.

The nearby trees will not affect or be affected by the proposed development.

9.4 RESIDUAL IMPACTS

As a result of this assessment, it may be concluded that the proposed development will have no unacceptable residual impacts upon the surrounding structures, infrastructure or the environment.

9.5 MONITORING

As a result of the lack of potential for ground movement, no structural monitoring for ground movement during construction is considered necessary for this development.

10. CONCLUSION

The assessment has demonstrated that no adverse residual or cumulative stability, hydrological or hydrogeological impacts are expected to the host buildings, neighbouring structures or the wider environment as a result of this development.