8 St George's Mews, London, NW1 8XE

Basement Impact Assessment

January 2017

FAIRHURST

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CONTROL SHEET

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NON TECHNICAL SUMMARY

Project Objectives	At the request of Site Analytical Services Limited, a Basement Impact Assessment has been carried out at 8 St George's Mews in support of a planning application for a proposed new development which include the excavation of the garden area to the rear of the existing building to achieve a similar level as the existing internal floor level. The existing internal floor level will not be lowered as part of these proposals.
Geology/ **Hydrogeology**	The British Geology Survey (BGS) map of the area (North London, Sheet 256) indicates that the site is underlain the London Clay Formation. The site is also detailed by the BGS to be in an area likely to be covered by Superficial Head Deposits (Head Propensity). These deposits have not been formally mapped by the BGS and have been interpreted from slope analyses and borehole data only. According to Environment Agency Flood maps the site lies within Flood Zone 1, which is defined as areas where flooding from rivers and the sea is very unlikely, with less than a 0.1 per cent (1 in 1000) chance of such flooding occurring each year. The Bedrock geology underlying the site (London Clay Formation) has been classified as Unproductive Strata; rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.
Conclusions and Recommendations	It is concluded that the proposed development is unlikely to result in any specific land or slope stability issues, groundwater or surface water issues. It is however recommended that the chosen contractor should have a contingency plan in place to deal with any unexpected geological or hydrological conditions as a precautionary measure. Trial excavations at the location of the extension could be carried out by the main contractor following planning permission (i.e at detailed design stage) to confirm the composition and stability of the soil and to further investigate the presence of any groundwater inflows and tree roots. Parameters for retaining wall design can also be obtained at this stage.

1.0 INTRODUCTION

The purpose of this assessment is to consider the effects of a proposed development on the local hydrology, geology and hydrogeology at 8 St George's Mews, London, NW1.

The site comprises an end of terrace two storey mews residential property (8 St George's Mews) including an existing ground floor and rear garden area.

Proposals for the site are summarised in Appendix A and include the excavation of the garden area to the rear of the existing building to a maximum depth of 1.92m bgl to achieve a similar level as the existing internal floor level.

The information contained within this BIA has been produced specifically to meet the requirements set out by Camden Planning Guidance – Basements and Lightwells (CPG4) (July 2015) which applies to any excavation which is required at ground or lower ground floor level. This document has been produced in order to assist London Borough of Camden with their decision making process.

2.1 Data Sources

This section provides the baseline data used to complete the BIA in relation to the proposed development. Reference information used for this purpose is outlined below:

Published Data

- Barton N (1992) The Lost Rivers of London. Historical Publications Ltd, London;
- British Geological Survey – 1:50,000 Geological Sheet 256, North London (Solid & Drift), 1990;
- London Borough of Camden. Strategic Flood Risk Assessment. July 2014. URS.
- CIRIA C580 Embedded retaining walls – guidance for economic design (2003)
- LBC Planning Guidance (CPG4) – Basements and Lightwells (July 2015).
- LBC (Nov 2010). Camden geological, hydrogeological and hydrological study. Guidance for subterranean development (produced by Arup Consulting).
- LBC (June 2003). Floods in Camden. Report of the Floods Scrutiny Panel.
- Development Policy (DP) 27 Basements and Lightwells.
- River Basin Management Plan (RBMP). Thames River Basin District (2009);
- M.J. Tomlinson 7th Ed, Foundation Design and Construction (2001);

Drawings and Site Specific Reports

- Collett-Zarzycki Limited Drawings
    - Existing Floor Plans 1606/P/02 & 1606/P/03
    - Proposed Floor Plans 1606/P/04 & 1606/P/04 (included as Appendix A)
    - Concept Proposals
- Tree Projects Letter Report to Collett Zarzycki dated 15th January 2017 (Appendix B)

Websites

- Environment Agency Internet database (www.environment-agency.gov.uk)
- LBC online planning portal (http://planningrecords.camden.gov.uk)

Site Walkover

- Site reconnaissance survey completed by Fairhurst (12th January 2017)

2.2 Guidance and Frameworks

The proposed basement is located in the London Borough of Camden (LBC) and as such will be required to be developed in accordance with the guidance and policies outlined in the following documents:

- LBC (Nov 2010). Camden geological, hydrogeological and hydrological study. Guidance for subterranean development (produced by Arup Consulting).
- LBC. Camden Planning Guidance. Basements and Lightwells (CPG 4) (July 2015).
- Development Policy (DP) 27 Basements and Lightwells.

2.3 BIA Approach

The BIA approach follows current planning procedure for basements and lightwells adopted by LBC and comprises the following elements:

- Screening;
- Scoping;
- Site Investigation and study (divided into desk study, field investigation, monitoring, reporting & interpretation);
- Impact Assessment; and
- Review & Decision Making (completed by Camden Council).

On the basis of the findings from the screening and scoping phases it has been deemed unnecessary to carry out site investigation, impact assessment and review stages in this study.

2.4 Qualifications

The qualifications required by LBC are fulfilled as documented in Table 1 below. All assessors meet the qualification requirements of the Council guidance.

Table 1 – Qualification Summary

Subject	Qualifications Required by CPG4	Relevant person(s) in Fairhurst
Surface flow and flooding	A hydrologist or a Civil Engineer specialising in flood risk management and surface water drainage, with either: The 'CEng' (Chartered Engineer) qualification from the Engineering Council; or a Member of the Institution of Civil Engineers ('MICE') The CWEM (Chartered Water and Environmental Manager) qualification from the Chartered Institution of Water and Environmental Management	Mr Alan Connell BSc (Hons) CEng MICE Mr Andrew Smith BSc(Hons) FGS MCIWEM
Subterranean (groundwater flow)	A hydrogeologist with the 'CGeol' (Chartered Geologist) qualification from the Geological Society of London	Mr Phil Brown BSc (Hons) FGS CGeol
Land Stability	A Civil Engineer with the 'CEng (Chartered Engineer) qualification from the Engineering Council	Mr Alan Connell BSc (Hons) CEng MICE

3.0 BASELINE CONDITIONS

3.1 Site Description

The site was visited on 12th January 2017 for the purposes of carrying out a site walkover. Photographs from this visit are included in Appendix C to this document.

The site is located on the south western side of St George's Mews in Primrose Hill, North London, at approximate postcode NW1 8XE as detailed on Figure 1. The site is under the general authority of the London Borough of Camden.

The site comprises a two storey terraced mews property. The street comprises further terraced mews residential and commercial properties.

The property is bound by No. 9 St George's Mews to the north, No. 7 St George's Mews to the east, the garden of No 11 St George's Terrace to the south and the gardens of 25 and 26 Ainger Road to the west. There is a small garden to the rear of the existing building which steps up approximately 2.00m to the neighbouring rear garden area of No 11 St George's Terrace.

There are two trees within 2m of the proposed extension including a Willow within the garden of No 11 St George's Terrace and an Ash within the garden of No 10 St George's Terrace. According to the Arbiculturalist's report on the site (Tree Projects, 2017, included in this document as Appendix B) the Willow and Ash will both be retained as part of the development.

The existing ground level in the area of the site is estimated from available OS Maps to be at a level of approximately 42.59mOD however available scheme drawings relate levels to a site datum (SD) and therefore this has been adopted for this report. The existing internal floor level is relative to the street level along St George's Mews and is at approximately 10.08mSD. The garden level then steps up from internal floor level to approximately 12.00mSD within the rear garden of No 11 St George's Terrace.

St George's Mews is located on an east facing slope which leads down to the Grand Union Canal located approximately 500m south east of the site. A slope angle of approximately 3-4˚ is estimated from OS mapping. The wider general area slopes to the south towards the River Thames.

3.2 Site History

A brief summary of the site history using publically available historical map information is described below. It should be noted that this report does not purport to be a full Phase One Risk Assessment and should not be treated as much

St George's Mews is detailed on the earliest available Ordnance Survey Map of the area dated 1851 although buildings are not detailed on the plan. Regents Park Road is evident to the east of the site whilst Primrose Hill is detailed to the west.

By 1871 the existing building at 8 St George's Mews is detailed whilst neighbouring properties at No. 7 and 9 are also shown. The rear of 8 St George's Mews is shown to comprises several small trees. A pond is evident approximately 75m north west of the site. The Public House (The Queen's) is evident 75m east of the site.

By 1895 trees are no longer present within the rear garden area of the site. Ainger Road is detailed to the west of the site and terraced residential properties are detailed on both sides of the road. The pond shown on previous maps is shown to have been infilled.

By 1953 a garage is labelled 20m north of the site beyond the mews properties at 9 to 16 St George's Mews.

By 1963 the residential block of flats at 1 to 25 Hill View is now shown whilst the substation at Angier Mews is also detailed. No further significant change is evident.

3.3 Geology

British Geological Survey (BGS) Data

The BGS map of the area (North London, Sheet 256) indicates that the site is underlain by the London Clay Formation. The site is also detailed by the BGS to be in an area likely to be covered by Superficial Head Deposits (Head Propensity). These deposits have not been formally mapped by the BGS and have been interpreted from slope analyses and borehole data only.

Superficial Head Deposits generally comprise clays, silts, sands and gravels and were formed up to 3 million years ago in the Quaternary Period in a local environment previously dominated by subaerial slopes.

The underlying London Clay Formation comprises blue clay which becomes brown when weathered with occasional bands of fine silty sand and nodular lumps of pyrite and selenite. These soils were formed approximately 34 to 56 million years ago in the Palaeogene Period in a local environment previously dominated by deep seas.

The BGS's online records indicate there is one historical boreholes located within 150m of the site located approximately 130m south west of the site (BGS Reference TQ28SE410). The soil conditions from this log are summarised in Table 2 below:

Table 2. Summary of BGS Borehole (130m SW of site)

Stratum	Depth to top		Depth to base	
	m	mOD	m	mOD
Made Ground	GL	38.61	0.46	38.16
London Clay Formation	0.46	38.16	39.62	-1.01m
Lambeth Group	39.62	-1.01m	43.49	-4.94

Groundwater seepage was recorded in the borehole record between 31.39m and 31.69m bgl within the London Clay Formation.

Adjacent Ground Investigation Data

Review of the LBC online planning portal indicates that there is recent ground investigation data at 9 St George's Terrace located approximately 10m south east of the site and 30 Ainger Road, London, NW3 3AT located approximately 50m west of the site. A summary of the findings of the ground investigations are presented in the following section.

9 St George's Terrace, London, NW1 8XH

The ground investigation was undertaken by Chelmer Site Investigations (CSI) in September 2014 in connection with a proposed single storey basement excavation below the existing garden area. The scheme is currently listed as being registered and under review by LBC.

The results are reported on in the Chelmer Consultancy Services Basement Impact Assessment Report Reference BIAREV2/4796B dated November 2015 which is available to view online on the LBC planning portal. It is noted that the formal exploratory hole logs and laboratory test results from CSI's investigation are not contained within the report however a description of the results is included.

The works are reported to have included the following:

- Drilling of two continuous flight auger boreholes to depths of up to 10m bgl;

- Excavation by hand of one trial pit to expose the existing foundations of the neighbouring mews property;
- In-situ geotechnical testing comprising in-situ vane testing only.
- Geotechnical laboratory testing;
- Groundwater monitoring;

The boreholes and trial pit are reported to have revealed ground conditions that were generally consistent with the geological records and known history of the area and comprised the following

- Made Ground comprising a combination of gravelly clayey silt, silty sand and gravel and very silty clay to 2.95m bgl;
- Weathered London Clay Formation comprising stiff brown slightly sandy clay from 8.4m to 8.5m bgl;
- London Clay comprising very stiff silty clay with occasional fine crystals to the full depth of drilling of 10.0m bgl.

No groundwater entries were reported to have been recorded in the boreholes. Groundwater seepage is recorded to have occurred within TP1 at a depth of 2.95m at the boundary between the Made Ground, and the top of the weathered London Clay.

Laboratory tests are reported to have been carried out on samples recovered from the boreholes and comprised classification tests, including moisture content and plasticity, and chemical testing in accordance with BRE Special Digest 1.

All samples are reported to have Very High Plasticity as classified by BS5930 (1999, 2010) and High volume change potential, as defined by the NHBC (NHBC Standards, 2015, Chapter 4.2, Building near Trees).

The chemical tests were undertaken to assess the potential for acid or sulphate attack on buried concrete and recorded water soluble sulphate contents of between 1200-3100mg/l.

30 Ainger Road, London, NW3 3AT

The ground investigation was undertaken by Concept Site Investigations in January 2012 in connection with a proposed single storey basement excavation below the existing property. It is not known whether the scheme has since been undertaken and the basement constructed.

The results are reported in the Concept Site Investigations Factual Report Reference 11/2437 dated January 2012 which is contained as an appendix to a Basement Impact Assessment Report by GTA Civils Limited also dated January 2012. Both documents are available to view online on the LBC planning portal.

The works included the following:

- 1 No. hand held window sample borehole to 5.00m bgl;
- Geotechnical Laboratory testing comprising classification testing;
- Chemical testing comprising determination of pH & Water Soluble Sulphate

The borehole revealed ground conditions that were generally consistent with the geological records and known history of the area and comprised Made Ground up to 1.30m in thickness overlying deposits typical the of London Clay Formation at depth. Superficial deposits were not encountered during the ground investigation.

A groundwater monitoring standpipe was installed at 3.60m bgl within the London Clay Formation. However no records of long term groundwater monitoring are presented in the report.

Although no interpretation of the data is given by Concept Site Investigations, the results are used to complete the Basement Impact Assessment by GTA Civils Limited who concluded the

proposal at No. 30 Ainger Road will not adversely affect the subterranean groundwater flow, surface water flooding or slope stability.

3.4 Hydrology and Drainage

3.4.1 Rainfall and Runoff

According to Mayes and Wheeler (1997) rainfall in the local area averages around 610mm and significantly less than the national average of around 900mm.

Evapotranspiration is typically 450 mm/yr resulting in about 160 mm per year as 'hydrologically effective' rainfall which is available to infiltrate into the ground or runoff as surface water flow.

With reference to Barton (1992) and Figure 2 of this report there are no 'lost rivers' within 100m of the site.

The area located immediately around the site is highly developed with greater 80% of the surface covered with hardstanding. Most of the rainfall in the area will run-off hard surface areas and be collected by the local sewer network.

3.4.2 Flood Risk

River or Tidal flooding

According to Environment Agency Flood maps the site lies within Flood Zone 1, which is defined as areas where flooding from rivers and the sea is very unlikely, with less than a 0.1 per cent (1 in 1000) chance of such flooding occurring each year. The EA's website also shows that this area does not fall within an area at risk of flooding from reservoirs.

Based on the results of the site walkover combined with a study of OS mapping there are no watercourses or surface water features within 100m of the site.

Surface Water Flooding

According to CPG4 (2015) St George's Mews did not flood during either the 1975 or the 2002 flood events. Modelling of surface water flooding has been undertaken by the Environment Agency and a copy for the site area is reproduced as Figure 3 to this report. The site is shown as having a 'Very Low' risk of flooding; the lowest category for the national background level of risk.

As detailed in Table 3 below and following discussions with the Architect, the scheme will result in a slight increase in impermeable areas by approximately 6.9m^2.

Table 3. Existing and Proposed Permeable/Impermeable Areas

Element	Existing (m^2)	Proposed (m^2)
Impermeable (hardstanding - building footprint, concrete areas)	11m2	17.9m2
Permeable (softscaping - grassed areas, (including green roof), permeable and porous paving)	12.5m2	5.6m2

Sewer Flooding

As detailed on Figures 4 and 5 and with reference to Camden's Strategic Flood Risk Assessment (2014) the property lies just outside an area which is at risk of external or internal sewer flooding.

3.5 Hydrogeology

The Environment Agency Groundwater Protection Policy uses aquifer designations that are consistent with the Water Framework Directive. These designations reflect the importance of aquifers in terms of groundwater as a resource (drinking water supply) and also their role in supporting surface water flows and wetland ecosystems.

The Superficial Head as indicated to be below the site by the BGS is not classified in this area by the EA.

The Bedrock geology underlying the site (London Clay Formation) has been classified as Unproductive Strata; rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

Other hydrogeological information obtained from the data sources detailed in Section 2.1 includes:

- The site is not within a source protection zones;
- There are no surface water abstraction licenses within 1km of the site
- There are no water wells within 100m of the site

3.6 Proposed Development

Proposals for the site are summarised in Appendix A and include the excavation of the garden area to the rear of the existing building to a maximum depth of 1.92m bgl to achieve a similar level as the existing internal floor level (10.08mSD).

A retaining wall is proposed adjacent to the rear garden of No. 11 St George's Terrace to retain the ground in this area.

It should be noted that the existing internal floor level will not be lowered as part of these proposals.

3.7 Planning Summary

Reference to LBC planning portal (1987 to present) shows that there have been no basement related work along St George's Mews in the records.

3.8 Results of Basement Impact Assessment Screening

A screening process has been undertaken in accordance with the most recent guidance from Camden Council (CPG 4, 2015) and the findings are described below.

Subterranean (Groundwater) flow

Question	Response	Details
1a. Is the site located directly above an aquifer.	No	The Bedrock geology underlying the site (London Clay Formation) has been classified as Unproductive Strata. The Superficial Head as indicated to be below the site by the BGS is not classified in this area by the EA.
1b. Will the proposed basement extend beneath the water table surface.	No	As the site is above a non-aquifer (London Clay Formation), the groundwater table is unlikely to be affected by the proposals
2. Is the site within 100m of a watercourse, well (used / disused) or potential spring line.	No	There are no surface water features within 100m of the site. According to publications regarding Lost Rivers of London (Barton, 1992), the site is not within 100m of a former river or watercourse.
3. Is the site within the catchment of the pond chains on Hampstead Heath?	No	The site is over 1.5km south of these features
4. Will the proposed basement development result in a change in the proportion of hard surfaced / paved areas.	Yes	The scheme will result in a slight increase in impermeable areas on the site by 6.9m2.
5. As part of site drainage, will more surface water (e.g. rainfall and run-off) than at present be discharged to the ground (e.g. via soakaways and/or SUDS).	No	Soakaways are not considered appropriate to the site due to the sub-soil conditions and therefore no surface water will be discharged to ground as part of the site drainage.
6. Is the lowest point of the proposed excavation (allowing for any drainage and foundation space under the basement floor) close to, or lower than, the mean water level in any local pond or spring line.	No	There are no surface water features within 100m of the site. According to publications regarding Lost Rivers of London (Barton, 1992), the site is not within 100m of a former river or watercourse.

Slope stability

Question	Response	Details
1. Does the existing site include slopes, natural or man-made greater than 7 degrees (approximately 1 in 8).	No	The site contains a step up in ground level in the garden area but this equates to an angle of less than 7 degrees when taken across the entire site.
2. Will the proposed re-profiling of landscaping at the site change slopes at the property boundary to more than 7 degrees (approximately 1 in 8).	No	The proposed rear extension involves the excavation of a section of land to the rear of the site. A retaining wall is proposed to hold back the 1.92m thickness of material at this location therefore removing the slope in this area. Temporary works to address potential instability in the construction of the retaining walls are to be incorporated into detailed design and construction sequence.
3. Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7 degrees (approximately 1 in 8).	No	In the surrounding area there is a slight slope in topographic gradient to the south but this equates to around a 2-3˚ slope angle.
4. Is the site within a wider hillside setting in which the general slope is greater than 7 degrees (approximately 1 in 8).	No	There is a general slope to the south towards the River Thames but this is less than 7 degrees.
5. Is the London Clay the shallowest strata at the site.	Yes	The British Geology Survey (BGS) map of the area (Sheet 256) indicates that the site is underlain by the London Clay Formation.
6. Will any trees be felled as part of the development and/or are any works proposed within any tree protection zones where trees are to be retained.	Yes	According to the Tree Survey Report (Appendix B), whilst no trees will be removed, the existing Ash and Willow trees located close to the development will be retained.

Question	Response	Details
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 London Clay Formation is prone to shrinking and swelling.
8. Is the site within 100m of a watercourse or a potential spring line.	No	There are no surface water features within 100m of the site. According to publications regarding Lost Rivers of London (Barton, 1992), the site is not within 100m of a former river or watercourse.
9. Is the site within an area of previously worked ground.	No	According to information from the BGS the site is not in the vicinity of any recorded areas of worked ground
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.	No	The Bedrock geology underlying the site (London Clay Formation) has been classified as Unproductive Strata.
11. Is the site within 50m of the Hampstead Heath Ponds	No	The site is over 250m from these features
12. Is the site within 5m of a highway or pedestrian right of way.	No	The site is over 5m west from St George's Mews
13. Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties.	No	The existing ground floor level will not be lowered as part of these proposals and therefore the works will not be lower than existing or neighbouring foundations.
14. Is the site over (or within the exclusion zone of) any tunnels, e.g. railway lines.	No	Transport for London has confirmed that they do not have any tunnels below the site (Appendix D). According to the Groundsure Report obtained by Chelmer Consultancy Services for the neighbouring site at 9 St George's Terrace (available online at LBC planning portal) there are no network rail tunnels below the site with the closest network rail land being located 250m north of the site.

Surface Water and Flooding

Question	Response	Details
1. Is the site within the catchment of the ponds chains on Hampstead Heath	No	With reference to the Camden Geological, Hydrogeological and Hydrological Study, the site is not within the catchment of the pond chains on Hampstead, nor the Golder's Hill Chain
2. As part of the proposed site drainage, will surface water flows (e.g. volume of rainfall and peak run-off) be materially changed from the existing route.	No	On completion of the development, the surface water flows will be routed similarly to the existing condition, with rainwater run-off collected in a surface water drainage system and discharged to a combined sewer. Any groundwater flows will not be impeded by the basement.
3. Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas.	Yes	The scheme will result in a slight increase in impermeable areas on the site by 6.9m2.
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	All surface water for the site will be contained within the site boundaries and collected as described above; hence there will be no change from the development on the quantity or quality of surface water being received by adjoining sites.
5. Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses.	No	All surface water for the site will be contained within the site boundaries and collected as described above; hence there will be no change from the development on the quantity or quality of surface water being received by adjoining sites.
6. Is the site in an area identified to have surface water flood risk according to either the Local Flood Risk Management Strategy or the Strategic Flood Risk Assessment or is it at risk from flooding, for example because the proposed basement is below the static water level of nearby surface water feature.	No	With reference to the EA surface water flooding maps, St George's Mews which is classified as having a 'Low' Risk of flooding from surface water. Furthermore according to LBC studies, St George's Mews did not flood during either the 1975 or 2002 flood events. According to LBC SRFA no properties located in the NW1 postcode have previously been affected by external or internal sewer flooding.

3.9 Non-Technical Summary of Chapter 3.0

The site is located on the south western side of St George's Mews in Primrose Hill, North London, at approximate postcode NW1 8XE. The site is under the general authority of the London Borough of Camden. The site and comprises a two storey terraced mews property. The street comprises further terraced mews properties.

Proposals for the site include the excavation of a section of land to the rear of the existing building to a maximum depth of 1.92 m bgl.

The BGS map of the area (North London, Sheet 256) indicates that the site is underlain by the London Clay Formation. The site is also detailed by the BGS to be in an area likely to be covered by Superficial Head Deposits (Head Propensity). These deposits have not been formally mapped by the BGS and have been interpreted from slope analyses and borehole data only.

According to Environment Agency Flood maps the site lies within Flood Zone 1, which is defined as areas where flooding from rivers and the sea is very unlikely, with less than a 0.1 per cent (1 in 1000) chance of such flooding occurring each year.

The following have been identified as being the potential issues which will be carried forward to the Scoping Phase in this report:

Subterranean Groundwater Flow

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

Slope Stability

- Is the London Clay the shallowest strata at the site?
- Are any works proposed within any tree protection zones where trees are to be retained?
- Is there a history of seasonal shrink-swell subsidence in the local area and/or evidence of such effects at the site?

Surface Water and Flooding

- Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas.

4.0 SCOPING PHASE

This purpose of the scoping phase is to assess potential impacts for each of the issues identified in the screening process and provide recommendations/actions. Where no remaining actions exist from the screening stage, the Impact Assessment and Review stages as detailed in Section 2.3 are not deemed necessary.

Subterranean (Groundwater Flow)

Screening Question		Potential Impact	Response	Action(s)
4	Will the proposed basement development result in a change in the proportion of hard surfaced / paved areas.	May increase flow rates to sewer, and thus increase the risk of flooding	As identified in the initial screening and scoping stages the scheme will result in an increase in impermeable areas by approximately 6.9m2. The sealing of the ground surface to rainfall, by increasing the building area, would result in slightly decreased recharge to the underlying ground, although the low permeability of the underlying London Clay would result in a low recharge in any case and consequently there would be little to negligible effect on groundwater. Given the above, SUDS are not considered necessary; however, the scheme could incorporate a French drain / swale area adjacent to the proposed rear extension to increase surface water storage on site.	No further assessment required at this stage

Slope Stability

Screening Question		Potential Impact	Response	Action(s)
5	Is the London Clay the shallowest strata at the site.	The London Clay is prone to seasonal shrink-swell (subsidence and heave).	It is understood that the Willow Tree and Ash Tree located close to the area of the proposed development will be retained. The London Clay Formation proven was recorded as having a high susceptibility to shrinkage and swelling in the historical ground investigation at No. 9 St George's Terrace located 20m south east of the site. However it is understood that the proposed retaining wall and ground floor slab will be designed and engineered to resist the potential forces exerted by the tree roots from the existing Willow and Ash in accordance with guidance from NHBC Standards, Chapter 4.2 and the Tree Survey Report (Appendix B). This will help reduce the risk of potential damage to the proposed extension and existing mews building.	No further assessment required at this stage
6	Will any trees be felled as part of the development and/or are any works proposed within any tree protection zones where trees are to be retained.	Ground movements are likely to occur during and after construction.		
7	Is there a history of seasonal shrink-swell subsidence in the local area and/or evidence of such effects at the site?	Ground movements are likely to occur during and after construction.		

Surface Water and Flooding

Screening Question		Potential Impact	Response	Action(s)
3	Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas.	May increase flow rates to sewer, and thus increase the risk of flooding	Given the limited scope of the scheme and minimal increase in impermeable areas, the scheme is considered compliant with the surface water management and flood risk elements of National Planning Policy Framework (NPPF) and Camden policy.	No further assessment required at this stage

4.1 Non-Technical Summary of Chapter 4.0

Based on the scoping phase it is not considered that the proposed development would result in any detrimental changes to subterranean groundwater flow or slope stability in the areas below and surrounding the site. Also given the limited scope of the scheme, the scheme is considered compliant with the surface water management and flood risk elements of NPPF and Camden policy.

On the basis of these findings, a full Basement Impact Assessment (including ground movement assessment) is not recommended as being necessary for the site.

5.0 CONCLUSIONS

A screening process of a Basement Impact Assessment has been carried out following the information and guidance published by the London Borough of Camden. Information has been used to assess potential impacts identified by the screening process. It is concluded that the proposed development is unlikely to result in any specific land or slope stability issues, groundwater or surface water issues.

Despite the above it is recommended that the chosen contractor should have a contingency plan in place to deal with unexpected geological or hydrological conditions as a precautionary measure. Trial excavations at the location of the extension could be carried out by the main contractor following planning permission (i.e at detailed design stage) to confirm the composition and stability of the soil and to further investigate the presence of any groundwater inflows and tree roots. Parameters for retaining wall design can also be obtained at this stage.

Figure 1 – Site Location Plan

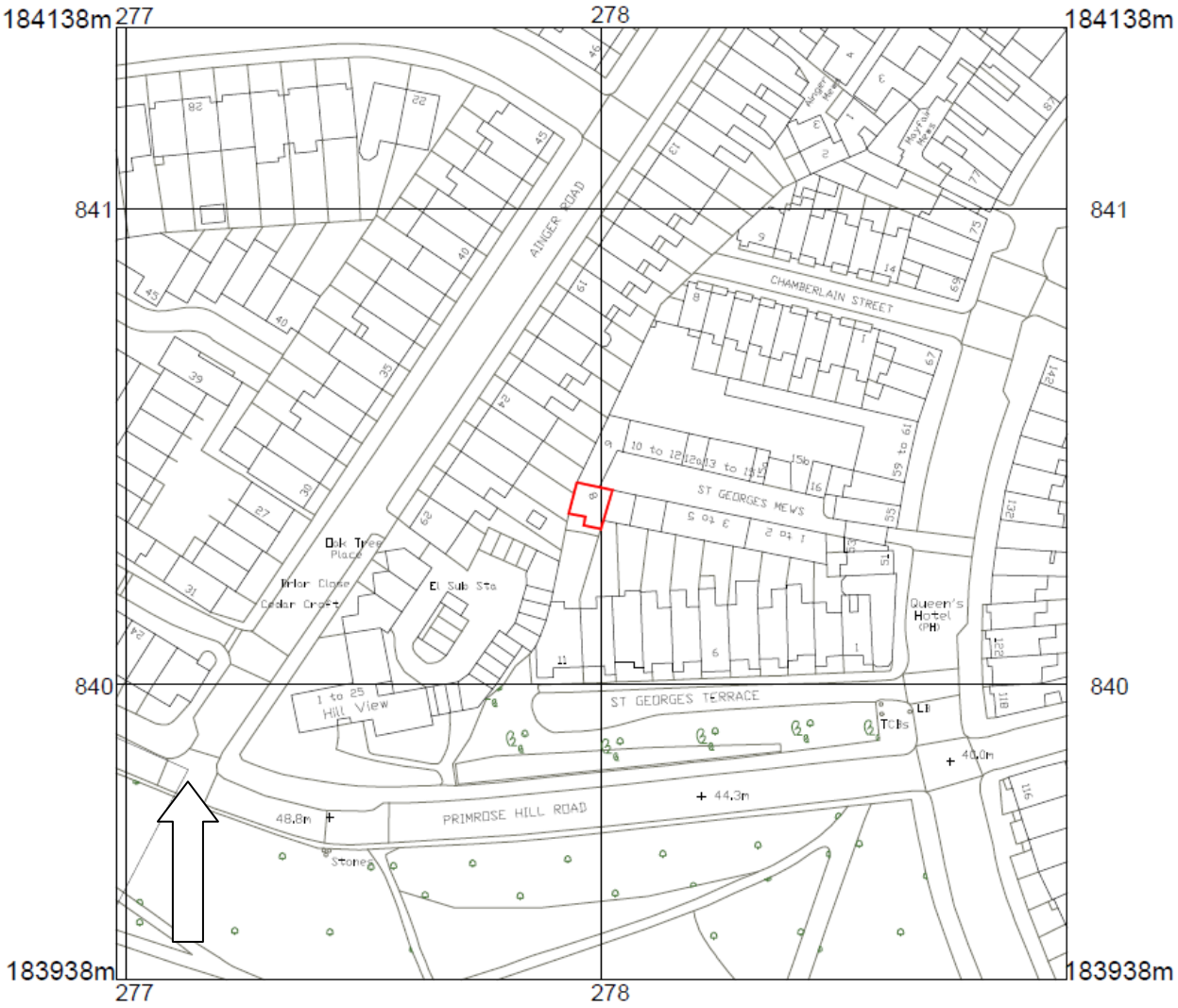


Figure 2 – Location of site relative to the 'Lost Rivers' of London (Source: Barton, 1992)

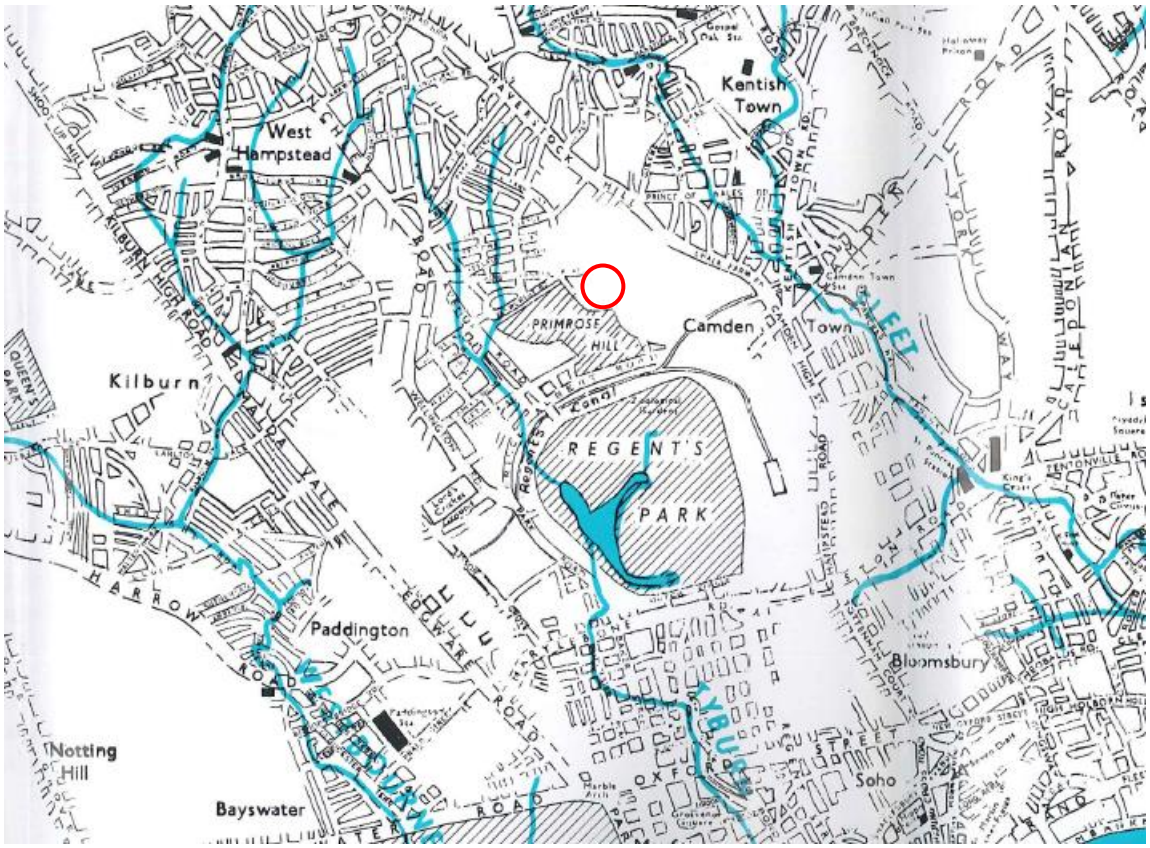


Figure 3 – Risk of Flooding from Surface Water (Source: Environment Agency 2017)

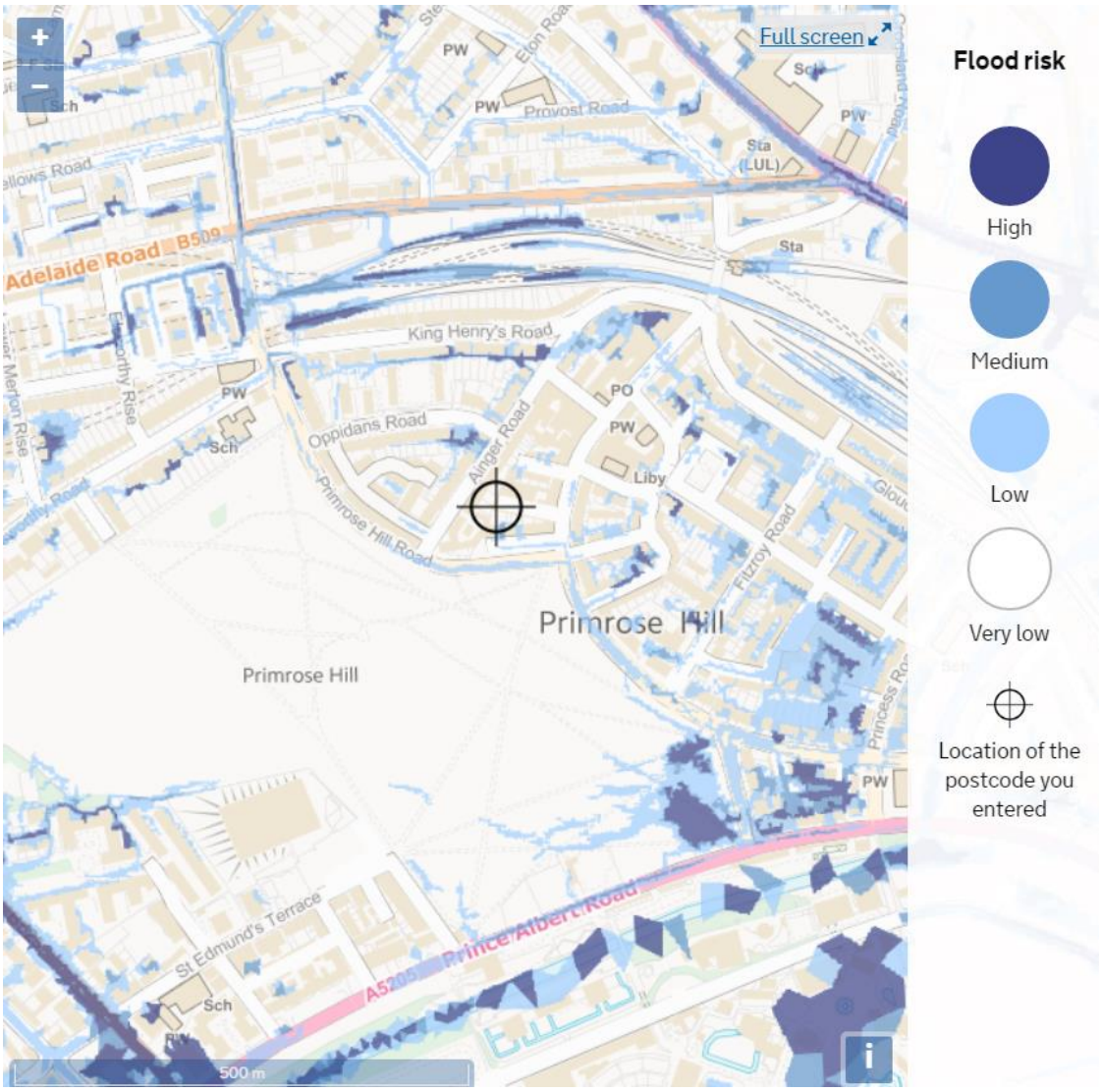


Figure 4 – Risk of Flooding from Internal Sewer Flooding

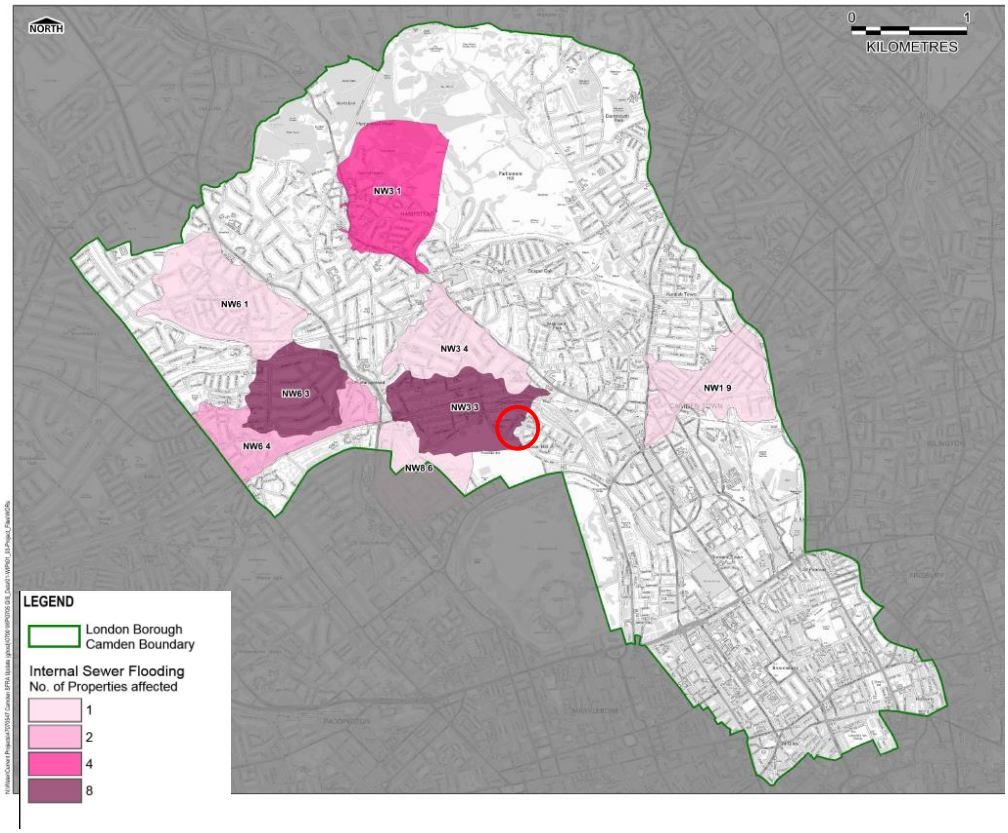
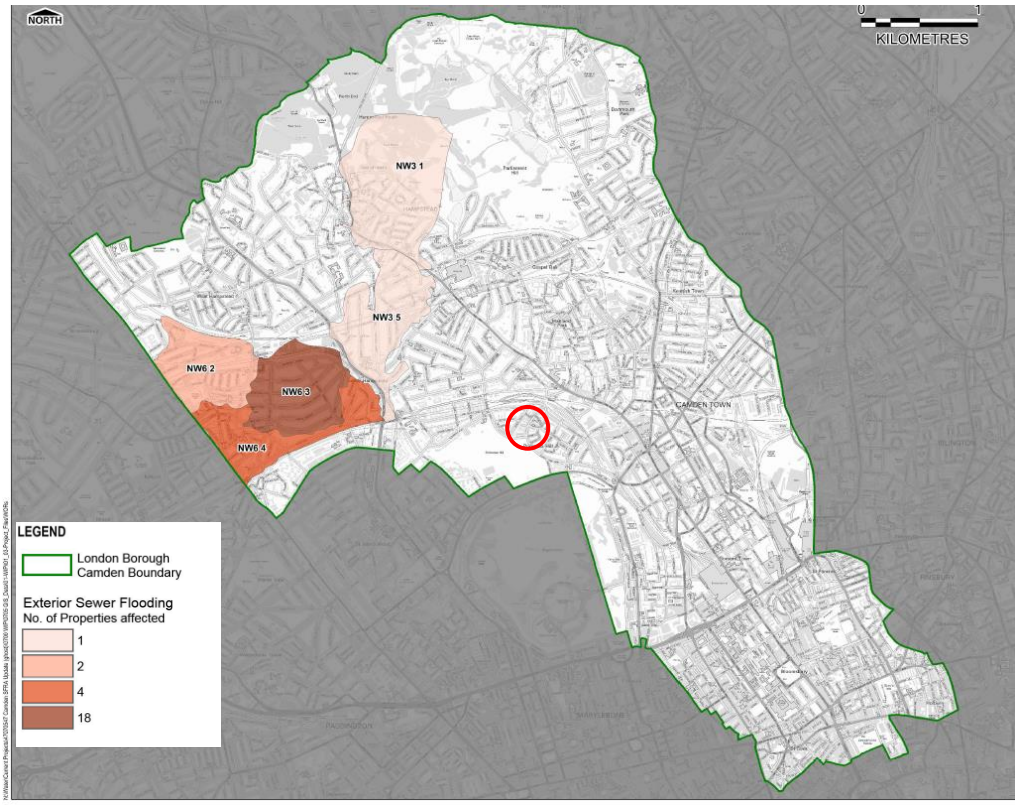


Figure 5 – Risk of Flooding from External Sewer Flooding

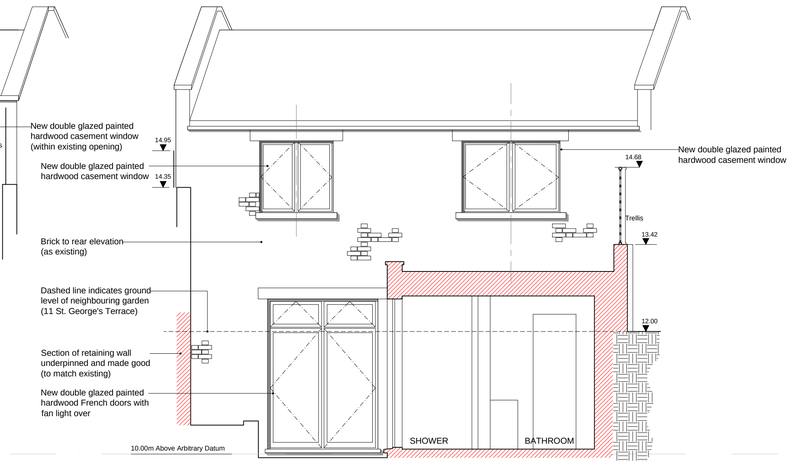


APPENDIX A

DEVELOPMENT PROPOSALS

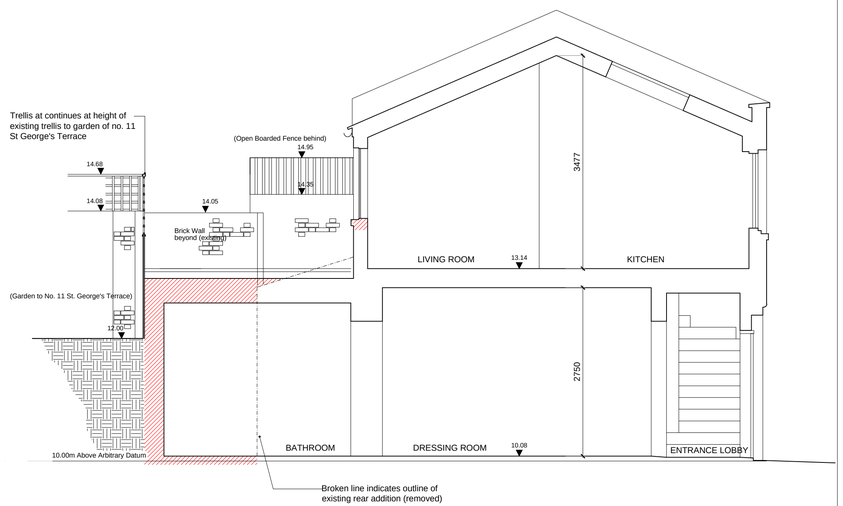
PROPOSED

FRONT ELEVATION



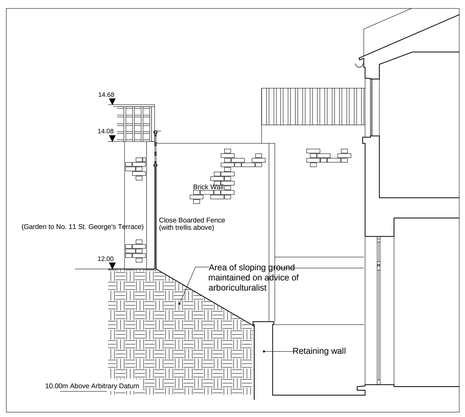
PROPOSED

REAR ELEVATION



PROPOSED

SECTION A-A



PROPOSED

SECTION B-B

HATCH INDICATES NEW WORK

0 1m 2m 3m 4m 5m

SCALE IN METRES

Notes

Do not scale from drawings.
The contractor is to varify dimensions on site prior to the commencement of work. Any discrepancies are to be reported to the Architect / Supervising Officer immediately.

If in doubt - seek clarification.

All work must comply with the current Building Regulations and local Byelaws. No materials are to be used or method of workmanship employed unless conformity with the current Codes of the Practice & British Standards is ensured.

A 16.01.17 Section B-B added

Rev	Date	Notes

COLLETT~ZARZYCKI LIMITED

2B Fernhead Road London W9 3ET
Tel. 020 8969 6967 Fax. 020 8960 6480
E-mail mail@czltd.co.uk

Architecture Interior Design
Furniture Landscaping

Job

8 ST GEORGE'S MEWS

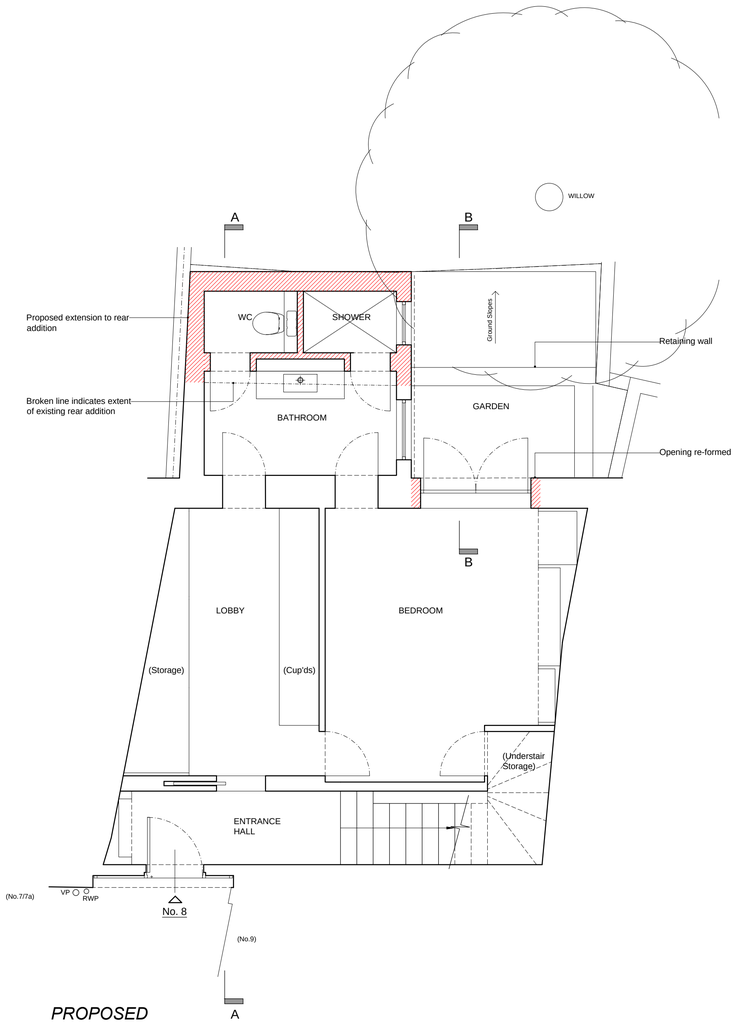
Title

PROPOSED
ELEVATIONS AND SECTION

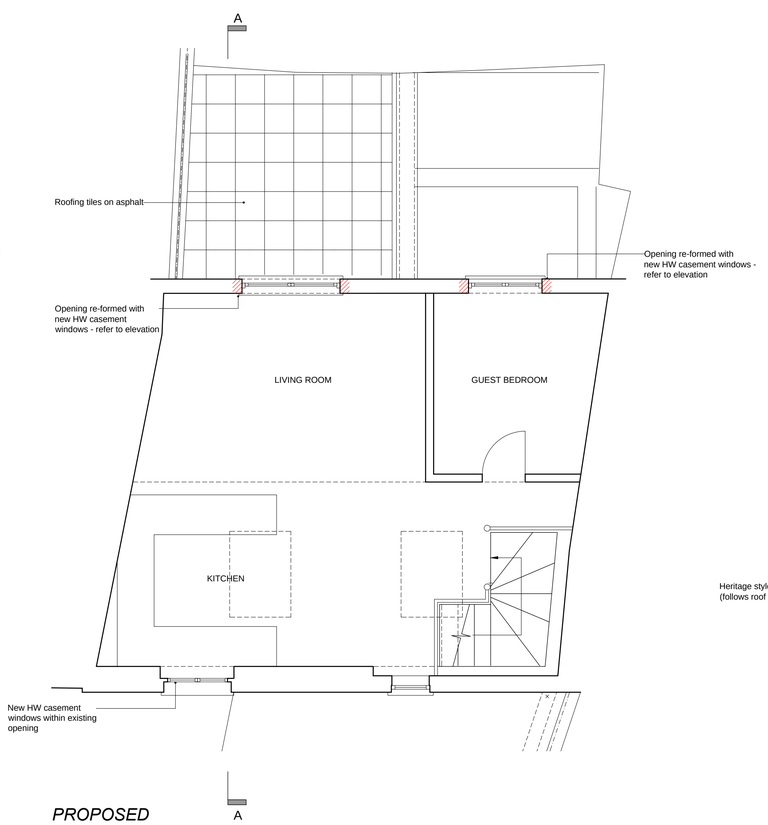
Date	Scale	Number	Rev
21.10.16	1:100 at A3 1:50 at A1	1606/P/05	A

Drawing Status

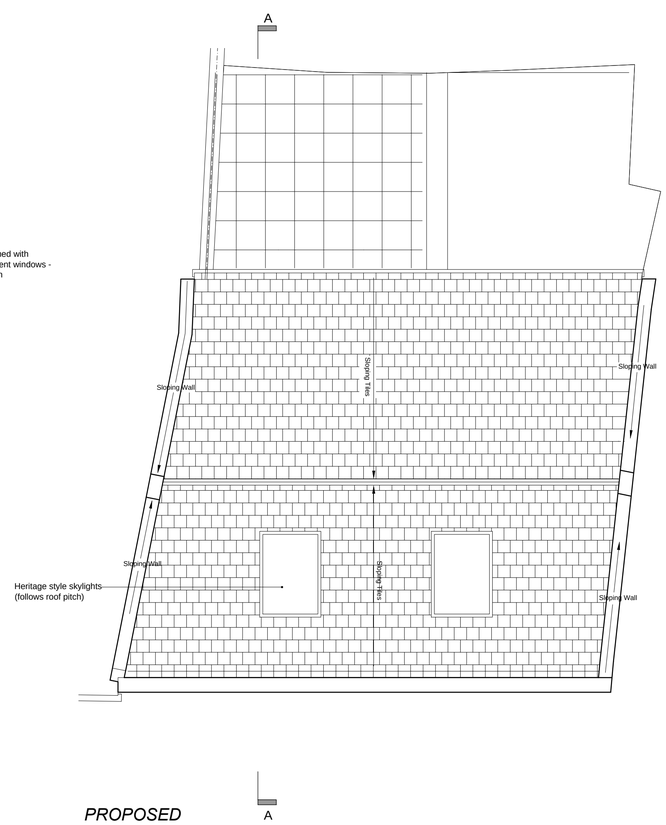
PLANNING



PROPOSED
A
GROUND FLOOR



PROPOSED
A
FIRST FLOOR



PROPOSED
A
ROOF PLAN

HATCH INDICATES NEW WORK

0 1m 2m 3m 4m 5m

SCALE IN METRES

Notes

Do not scale from drawings.
The contractor is to varify dimensions on site prior to the commencement of work. Any discrepancies are to be reported to the Architect / Supervising Officer immediately.

If in doubt - seek clarification.

All work must comply with the current Building Regulations and local Byelaws. No materials are to be used or method of workmanship employed unless conformity with the current Codes of the Practice & British Standards is ensured.

Rev	Date	Notes
A	13.01.17	Revised extent of rear garden retaining wall following arboriculturalist's comments/ in light of tree RPA; subsequent revision of internal layout of bathroom; section B-B added

COLLETT~ZARZYCKI LIMITED

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Architecture Interior Design
Furniture Landscaping

Job

8 ST GEORGE'S MEWS

Title

PROPOSED
FLOOR PLANS

Date	Scale	Number	Rev
21.10.16	1:100 at A3 1:50 at A1	1606/P/04	A

Drawing Status

PLANNING

APPENDIX B

TREE SURVEY REPORT

TREE PROJECTS

PROFESSIONAL & TECHNICAL ARBORICULTURE

15th January 2017

Collett Zarzycki
Fernhead Studios
28 Fernhead Road
London W9 3ET

FAO Barnaby Chapman

Dear Barnaby,

Re: 8 St Georges Mews, London NW1 8XE – Arboricultural Appraisal

Further to meeting with you at the above property to inspect trees, I have undertaken an analysis of proposals with reference to BS 5837:2012 Trees in Relation to Design, Demolition and Construction.

I have prepared a schedule listing three trees: a Corkscrew Willow (*Salix matsudana Tortuosa)* within the garden of 11 St Georges Terrace with the remainder within the adjacent garden of no. 10. The latter comprise self seeded Ash which I judge to be unsustainable and a Goat Willow at sufficient distance not to be a material consideration. My appraisal therefore concentrates on the Willow, however all trees are described and presented within the attached schedule and plan.

This mid-mature Willow tree is managed on a crown reduction basis having previously been reduced at 6m and more recently at 8m. It is located within a Conservation Area and thereby afforded protection by default due to its stem diameter. The tree is relatively small, no more than 8m tall at the time of inspection; it contributes to amenity but as it grows within 'back-land' its visual contribution is correspondingly small and localised. Willow as a species is generally acknowledged to be relatively short lived and vigorous which responds to pruning by producing copious quantities of new shoots that could readily reach 2m in length if not more.

It is not proposed nor is it necessary to remove this tree to implement the proposed scheme. I have not adjusted the Root Protection Area (RPA) to take account of limitations to rooting and have calculated that of an overall RPA of 108m2 that 9.5m2 would be impacted to facilitate the scheme (see attached drawing). A stepped line of retaining walls are proposed and, where engineered to resist the potential forces exerted by tree roots, these will help ensure its continued and sustained retention without risk of concern about damage to the Mews property going forward, whether by the subject tree or a successor.

The proposal is therefore to form a relatively minor extension to the rear of the mews property along with a small garden retaining wall to provide a small seating area external to new patio doors. As indicated, this would entail an incursion into less than 10% of the calculated RPA. This small incursion will not result in material harm to the tree where work is carried out in a controlled manner and where the remainder of the trees root system is protected.

In order to manage the construction process I would advocate careful and controlled excavations for the retaining structures during the course of which, any roots encountered should be cut with sharp hand

TREE PROJECTS . THE MAISONETTE, 22 OLD PARK AVENUE, LONDON SW12 8RH
MOBILE 07788 726 720 * LAND 020 8673 1114 * TREEPROJECTS@HOTMAIL.COM

tools. In order to address any imbalance in root to shoot ratio arising from any roots lost, it may be that the tree will need to be crown reduced however, no further than reductions previously undertaken from which the tree has continued to grow. Much of the RPA within my clients control is already paved however some ground protection will be required in the small sloped area of ground to remain as garden above the sitting out area.

In summary of the above I conclude:

- The proposal will not harm the Willow due to the inherent vigour of the plant coupled to the proven acceptability of crown reduction, if necessary, to maintain root to shoot ratio where roots are cut.
- Excavations to formation levels and extent can be controlled by application of appropriately worded planning condition(s) requiring presentation of a program of work that includes arboricultural oversight and guidance.
- The bulk of the trees remaining RPA is away from the area of proposed works and within the applicant's demise, it is largely paved meaning roots beneath are already protected.
- The retaining structures proposed will need to pass building control and can be engineered to resist the forces exerted by tree roots. Whilst necessarily considering the Willow for the purposes of the application, it is foreseeable that such a retaining structure would provide resilience and enhanced sustainability against damage by successors to the Willow.

I trust that the above meets with your requirements and do let me know of any questions that may arise. If during the course of planning any queries are raised please let me know if I can assist further; I am happy to meet with you and the Council's Planning and Arboricultural officers during their site visits should this be necessary.

Yours sincerely

Nick Bentley

HNDH, RFS Cert Arb

Enc: Tree Schedule,

Tree Schedule notes

Tree Schedule & Appraisal Plan

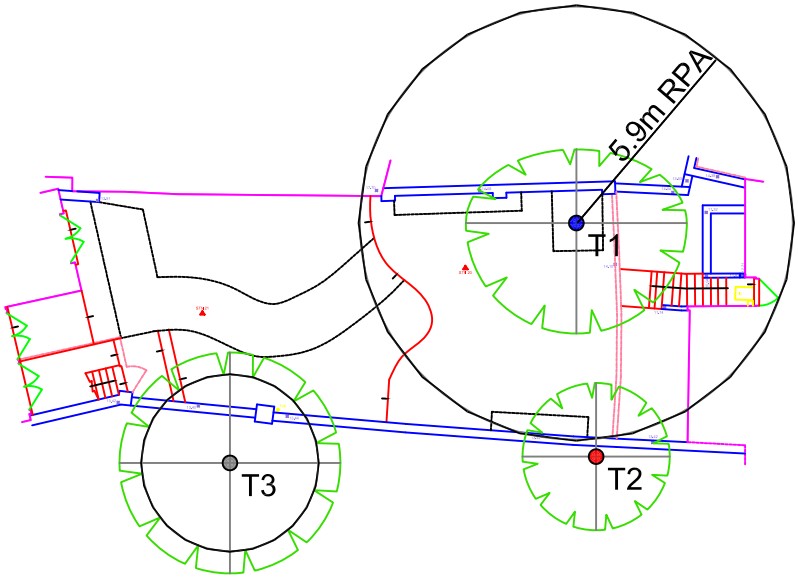
Tree Projects BS 5837 Survey: 8 St Georges Mews																		
Date: Dec 20th 2016																		
Weather: Dry & Bright																		
Tag	Common Name	Latin Name	DBH	Stem Cnt	Height	Low Crown	Nth	East	Sth	West	Age	Life Exp	Condition	BS Cat.	Comments	RPA m2	RPA radius	RPA square
T1	Corrkscrew Willow	Salix matsudana Tortuosa	490	1	8	4	2	3	3	3	M	10+	Fair	B2	Tree within rear garden of 11 St Georges Terrace (full access provided to me) Previously reduced at aprox 6m. Recently repeat reduced at 8m	108.6	5.9	10.4
T2	Ash	Fraxinus excelsior	100,150	2	5	2	2	2	2	2	Y	>10	Fair	U	Diameter estimated, canopy estimated, in neighbouring property 10 St Geroges Terrace. Two stems in close proximity adjacent to party wall. Self seeded and unsustainable. Removal advised	14.7	2.2	3.8
T3	Goat Willow	Salix caprea	200	1	4	2	3	3	3	3	EM	10+	Fair	C2	Diameter estimated, canopy estimated, in neighbouring property 10 St Georges Terrace. Recently reduced, access to view hampered by intervening vegetation.	18.1	2.4	4.3

Explanatory Notes to tree survey schedule

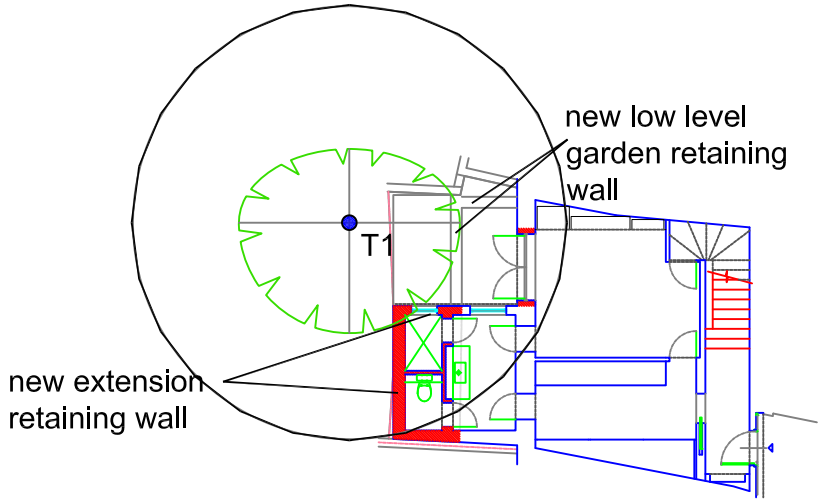
- **Tree reference (tag) number:** Individual trees are referred to by a 'T' prefix to a number, i.e. T1, T2 etc. Collections or distinct groups of trees may be assigned a G prefix to denote presence of a 'group'. Prefixes and 'SB' (shrub) ST (Stump) and 'H' (Hedge) show further arboricultural features
- **Name/ Latin:** Species identification is based on visual observations and the common English name of what the tree appeared to be is listed first, with the botanical name after. The botanical name is followed by the abbreviation spp if only the genus is known.
- **Measurements/estimates:** Stem and Height dimensions are taken by tape or laser unless indicated. (DBH in mm/ Height in m)
- **Tree Stem DBH (Diameter Breast Height) is used to calculate Root Protection Area (RPA):** Measured at 1.5m above adjacent higher ground level using a specially calibrated 'diameter tape' and recorded in millimetres. Low branching trees are measured at the waist if lower than 1.5m. If two or more stems are present breaking from ground level, each stem is measured and relative locations described where possible using cardinal points. If taken lower than 1.5m for practical purposes the reading height is given.
- **Height:** Height given approximately to the nearest 0.5m, May be derived from compensating lines of sight.
- **Stem Cnt = Stem Count:** number of stems observed (informs calculation of RPA taking account of difference between single stem [SS] and multi-stemmed trees [MS])
- **Low crown Height:** the generalised height of the crown above ground level, usually branch ends.
- **First Significant Branch & Bearing:** Height of first significant branch and direction of growth.
- **Branch Spread:** Crown spread is measured and given to the nearest metre or half metre from the face of the trunk to the tips of the live lateral branches, measured towards the cardinal points. Usually measured by pacing. For trees managed by pollard regime crown may be to pollard extent: check tree schedule.
- **Age Class:** Y=young, SM= Semi Mature, EM=Early Mature, M=Mature, OM=Over Mature, V=Veteran. Age is estimated from visual indicators and experience and it should only be taken as a provisional guide. Age estimates often need to be modified based on further information such as historical records or local knowledge.
- **Life Expectancy:** the estimated remaining contribution (to amenity)/ safe useful life expectancy in years. (< 10, 10+, 20+, 40+) a tree with less than 10 years safe useful life will ordinarily need to be felled unless retained for habitat purposes within an excluded area.
- **Physiological condition:** An assessment of the general health of a tree considering vigour, extension growth, crown density and presence of pathogens. G=Good, F=Fair, P=Poor, D=Dead
- **Category Grading:** the grade of the tree utilising the cascade chart for tree assessment within BS 5837:2012 Trees in Relation to Design, Demolition & Construction. Trees are graded on arboricultural, landscape and cultural/ conservation qualities. The assessed quality of a tree is ascribed by this letter whilst numeric sub categories define where the quality lies without conferring additional value. Simplified definitions are:

    - **Category U, Unsuitable for Retention; 'Trees in such a condition that they cannot realistically be retained in the context of the current land use [or their condition] for longer than 10 years'. (Trees would probably be removed for reasons of sound arboricultural management in any event)**
    - Category A: 'Trees of high quality with an estimated remaining life expectancy of at least 10 years.'
    - **Category B: 'Trees of moderate quality with an estimated remaining life expectancy of at least 20 years'**
    - Category C: 'Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150mm'.
    - Sub categories 1, 2 or 3 assign respectively: 1; mainly arboricultural qualities, 2: mainly landscape qualities, 3; mainly cultural values including conservation. Note: for example an A1 tree has the same retention priority as an A2 tree. A Some trees may qualify under more than one criterion.

- **Comments:** observations that may supplement assessments of condition or otherwise be significant.
- **Preliminary Management Recommendation:** Advice regarding tree surgery etc. Key: NW = No work. RP= Reduce to Previous Reduction Points. CR% = Crown Reduce (by % or m). CL = Crown Lift (to specified height AGL). CT = Crown Thin (by %). **Priority** (where specified) Priority 1 = Urgent works ASAP and certainly within 1 Month. Priority 2 = Complete within 12 months. Priority 3 = Non critical works to complete within 2 to 3 years.
- **RPA m2:** The Root Protection Area in square metres required by BS 5837.
- **RPA radius:** the radius of a circle of size equivalent to the RPA m2. The radius is taken from the centre of the tree plot.
- **RPA square:** the length of sides of a square equivalent to the RPA m2. the centre of the trunk of the tree to be positioned in the centre of the square

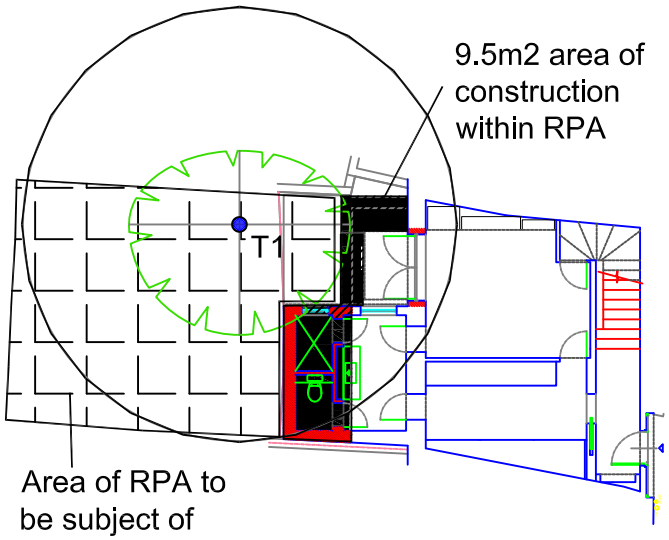


SITE AS EXISTING



SITE AS PROPOSED

SITE AS PROPOSED SHOWING RPA INCURSION & AREA OF PROTECTION



TREE SCHEDULE & DEVELOPMENT APPRAISAL PLAN

8 St Georges Mews

TREE PROJECTS
THE MAISONETTE, 22 OLD PARK AVENUE
LONDON SW12 8TT

15th January 2017- REV A

E: treeprojects@hotmail.com M: 07788 726 720

DO NOT DIRECTLY SCALE- USE PROVIDED MEASUREMENTS / SCALE BAR OR REFER TO ARBORICULTURIST

APPENDIX C

SITE PHOTOGRAPHS

Photograph 1. View looking west towards St George's Mews

Photograph 2. Showing the front of the site

Photograph 3. Detailing the rear of the site at the location of the proposed extension

Photograph 4. View looking north from the garden of No. 11 St George's Terrace towards the site.

APPENDIX D

RESPONSE FROM TRANSPORT FOR LONDON

Transport for London
London Underground

London Underground
Infrastructure Protection

3rd Floor
Albany House
55 Broadway
London SW1H 0BD

www.tfl.gov.uk/tube

Your ref: 118268
Our ref: 20403-SI-18-110117

Andrew Smith
Fairhurst
andrew.smith@fairhurst.co.uk

11 January 2017

Dear Andrew,

8 St George's Mews London NW1 8XE

Thank you for your communication of 11th January 2017.

I can confirm that London Underground has no assets within 50 metres of your site as shown on the plan you provided.

If I can be of further assistance, please contact me.

Yours sincerely

Shahina Inayathusein
Information Manager
Email: locationenquiries@tube.tfl.gov.uk
Direct line: 020 3054 1365

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