14 Queen’s Grove, City of Westminster

Flood Risk Assessment

For

Mr and Mrs Nayar

Document Control Sheet

Flood Risk Assessment

14 Queen's Grove, City of Westminster

Mr and Mrs Nayar

This document has been issued and amended as follows:

Date	Issue	Prepared by	Checked by	Approved by
29/06/2018	Draft	VBH	GM	NJ
02/08/2018	Final	VBH	NJ	NJ
18/09/2018	Final	VBH	NJ	NJ

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Appendices

Executive Summary

Motion has been commissioned by Mr and Mrs Nayar to undertake a Flood Risk Assessment (FRA) in support of a planning application at 14 Queen's Grove, London, NW8 6EL.

This FRA has been prepared to support a planning application for modifications to the existing residential development. This involves the complete rebuilding of the rear closet wing, lowering of the lower ground floor slab, a new single level basement under the front garden and construction of a basement under part of the rear garden to the existing development.

The site is currently an existing residential unit and is considered brownfield.

The EA Flood Map shows that the site is wholly located within Flood Zone 1 and is considered to be at low risk of fluvial and coastal flooding.

The development site is considered to be at very low risk of flooding from sewers, surface water and artificial sources.

The construction of the two basements could cause groundwater flooding if its location causes water below ground to be altered. BGS data states that the site is underlain by London clay therefore it is unlikely that the construction of the basement will have an impact on groundwater and cause an increase in groundwater flooding.

Practical measures have been taken to reduce the impact of flooding of groundwater flooding even though the risk is considered very low. Both basement dwellings will be drained by a surface water pump and 'dual' pumps are installed as standard and are fitted with a high level alarm.

1.0 Introduction

1.1 Motion has been commissioned by Mr and Mrs Nayar to undertake a Flood Risk Assessment (FRA) in support of a planning application at 14 Queen's Grove, London, NW8 6EL. The existing site is made up of one residential unit. The development proposals are to modify the existing residential unit. This involves the complete rebuilding of the rear closet wing, lowering of the lower ground floor slab, a new single level basement under the front garden and the construction of a basement under part of the rear garden.

1.2 The site is located in St John's Wood in the City of Westminster. The site is bounded to the north, south, east and west by residential development. St Johns Wood tube station is approximately 1km south west of the site.

1.3 The aim of this FRA document is to satisfy the requirements of the Local Planning Authority, Lead Local Flood Authority (LLFA) and Environment Agency (EA) in relation to development and flood risk. Specific objectives of this FRA are to:

- Assess the proposed development against the requirements of the National Planning Policy Framework (NPPF).
- Assess whether the proposed development has taken appropriate consideration of the risk of flooding from all potential flood sources.
- Detail how the proposed development will be safe with respect to flooding during its life time and will not increase the risk of flooding to other sites.

1.4 Throughout this document, flood events are defined according to their likelihood of occurrence. Floods are described according to an 'annual chance', meaning the chance of a particular flood occurring in any one year. This is directly linked to the probability of a flood. For example, a flood with an annual chance of 1 in 100 (a 1 in 100 chance of occurring in any one year), has an annual probability of 1%.

2.0 Site Description

Site Location and Description

2.1 The site is located in St John's Wood in the London Borough of Westminster. Grid reference (E 526716, N 183592). An extract of the site location plan is illustrated in Figure 2.1.

Figure 2.1 Site Location Plan

2.2 The application site is less than a hectare (ha) and is bounded by residential development. The site is currently an existing residential development and is mainly hardstanding.

2.3 We understand that the development proposals are for an extension to an existing development which involves the complete rebuilding of the rear closet wing, lowering of the lower ground floor slab, a new single level basement under the front garden and construction of a basement under part of the rear garden. An extract of the development proposals can be found in Appendix A.

2.4 The nearest watercourse to the site is Regent's Canal which flows in an easterly direction approximately 2km to the south of the site. Regent's Canal provides a link from the Paddington Arm of the Grand Union Canal to Limehouse.

Topography

2.5 A topographical survey of the existing site was undertaken by MJH surveys in November 2016 which is provided in Appendix B of this report. The site generally falls from north to the south with ground levels ranging from approximately 50.77 mAOD to 51.45 mAOD.

Geology

2.6 The British Geological Survey (BGS) online Geoindex Mapping indicates that the site is underlain by London Clay Formation with no superficial deposits recorded.

2.7 Borehole records from the surrounding area have been obtained from the BGS online index, these can be found in Appendix C. These Borehole record support the findings of the BGS mapping.

2.8 It can therefore be concluded that infiltration methods won't be appropriate to use on the development site.

3.0 Legislative and Policy Framework

Flood and Water Management Act

3.1 The Flood and Water Management Act 2010 (FWMA) received Royal Assent on 8th April 2010. The Act was introduced to enforce some of the key proposals set out within UK Government flood and water strategies along with UK Government's response to the Sir Michael Pitt's Review of the summer 2007 floods.

3.2 LLFA's including Westminster City Council have a responsibility under the FWMA to develop, maintain, apply and monitor the application of a strategy for local flood risk in their area. Local flood risk is defined as flood risk arising from surface run-off, groundwater and ordinary watercourses (i.e. non main rivers). The EA plays a role in managing the watercourses designated as 'main rivers'.

3.3 Relevant to the site, the FWMA will encourage the uptake of Sustainable Drainage Systems (SuDS) by removing the automatic right to connect to sewers and providing for LLFA to adopt SuDS for new developments.

3.4 The development proposals will adhere to the Act through the provision of SuDS as a fundamental element of the surface water drainage system. Furthermore, the client is committed to work with the relevant stakeholders, such as the EA and Westminster City Council (the lead local flood authority), in implementing the requirements of the FWMA where necessary.

National Planning Policy Framework

3.5 The NPPF and the online 'Planning Practice Guidance' (PPG) set out the Government's planning policies for England and how these are expected to be applied. This includes ensuring that flood risk is taken into account at all stages of the planning process, avoiding inappropriate development in areas at risk of flooding and directing development away from those areas where risks are highest.

3.6 A site-specific FRA is required for proposals of 1ha or greater in Flood Zone 1, all proposals for development in Flood Zones 2 and 3, or in an area within Flood Zone 1 which has critical drainage problems (as notified to the local planning authority by the EA). The FRA should identify and assess the risks of all forms of flooding to and from the development and demonstrate how these flood risks will be managed so that the development remains safe throughout its lifetime, taking climate change into account.

The Sequential and Exception Tests

3.7 The NPPF Sequential Test classifies proposed development into one of four Flood Zones, detailed in Table 3.1

Flood Zone	Annual Probability of Flooding (%)	Corresponding Annual Chance of Flooding (1 in x)
✓ Low Probability	Fluvial <0.1% Tidal <0.1%	>1,000 >1,000
✓ Medium Probability	Fluvial 0.1 – 1.0% Tidal 0.1 – 0.5%	1,000 – 100 1,000 – 200
✓ a) High Probability	Fluvial >1.0% Tidal >0.5%	<100 <200
✓ b) The Functional Floodplain	Fluvial >5.0%* Tidal >5.0%* *Starting point for consideration. LPAs should identify Functional Floodplain, which should not be defined solely by rigid probability parameters.	<20 <20

Table 3.1 Flood Zones

3.8 The NPPF specifies that the suitability of all new development in relation to flood risk should be assessed by applying the Sequential Test to demonstrate that there are no reasonably available sites in areas with a lower probability of flooding that would be appropriate to the type of development proposed. The NPPF provides guidance on the compatibility of each land use classification in relation to each of the Flood Zones as summarised in Table 3.2.

Flood Zone	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	✓	Exception test required	✓	✓
Zone 3a	Exception test required	✓	×	Exception test required	✓
Zone 3b	Exception test required	✓	×	×	×

Key:
✓ Development is appropriate
× Development should not be permitted

Table 3.2 Flood Risk Vulnerability Classification

Westminster City Council Strategic Flood Risk Assessment

3.9 A Strategic Flood Risk Assessment (SFRA) was completed in 2010 by Halcrow for Westminster City Council. The primary objective of the SFRA is to help local authorities identify the areas that are at risk from all forms of flooding and to allocate development away from vulnerable flood risk areas. The SFRA recognises development on land outside Flood Zones 2 and 3 should be pursued first.

Westminster City Council Preliminary Flood Risk Assessment

3.10 A Preliminary Flood Risk Assessment (PFRA) was completed in 2011 by Halcrow for Westminster City Council. The PFRA provides information on the local flood risk from sources such as main rivers, the sea, surface water, groundwater and large reservoirs.

The London Plan, Greater London Authority

3.11 The London Plan is the overall strategic plan for London, and it sets out a fully integrated economic, environmental, transport and social framework for the development of the capital to 2036. The key London Plan policy regarding flood risk management is Policy 5.12, which seeks:

'To address current and future flood issues and minimise risks in a sustainable and cost effective way.'

3.12 The policy requires planning decisions to:

'Comply with the flood risk assessment and management requirements set out in the NPPF and associated Technical Guidance.'

3.13 Policy 5.12 further states that:

'Development adjacent to flood defences will be required to protect the integrity of existing flood defences and wherever possible should aim to be set back from the banks of watercourses and those defences to allow their management, maintenance and upgrading to be undertaken in a sustainable and cost effective way.'

Thames Estuary 2100 (TE2100)

3.14 The TE2100 Plan sets out the strategic direction for managing flood risk in the Thames Estuary to the end of the century and beyond. The TE2100 Plan recommends what actions the EA and others will need to take to manage flood risk in the short term (next 25 years), medium term (the following 15 years) and long term (to the end of the century).

3.15 According to the TE2100 Plan the development is located in the Wandsworth to Deptford policy unit and the recommended flood risk management policy (P5) is to take further action to reduce flood risk beyond that required to keep pace with climate change.

Lead Local Flood Authority

3.16 As of April 2015, the LLFA became a statutory consultee on all major planning applications. The LLFA is required to assess planning applications in respect of surface water drainage and sustainable drainage systems. Westminster City Council is the LLFA for St Johns wood and surrounding London areas.

Environment Agency Flood Map

3.17 As part of this FRA a 'Flood Product 4' data request was submitted to the EA. The 'Flood Product 4' provided confirmation of the sites flood zone classification, a detailed flood map, information about historical flooding incidents and EA model output data such as predicted fluvial/tidal flood water levels in the vicinity of the site. The response to this Flood Product data request is provided in Appendix D.

3.18 The EA confirmed that the site is wholly located within Flood Zone 1 (less than 1 in 1000 annual probability of flooding from rivers or the sea).

3.19 In accordance with the NPPF, residential development is classed as a 'More Vulnerable' land use and as such the proposed development is appropriately located within in Flood Zone 1.

4.0 Flood Risk

4.1 In this section a number of potential sources of flooding have been considered.

Flooding from Rivers and the Sea

4.2 The EA Flood Map shows that the majority of the site is located within Flood Zone 1 (less than 1 in 1000 annual probability of flooding from rivers or the sea).

4.3 The nearest watercourse to the site is Regent's Canal which flows in an easterly direction approximately 2km to the south of the site. Regent's Canal provides a link from the Paddington Arm of the Grand Union Canal to Limehouse.

4.4 The site is therefore considered to be at very low risk of flooding from Rivers and Sea.

Groundwater Flooding

4.5 Groundwater flooding occurs when water originating in aquifers reaches the surface, typically as a result of high groundwater levels caused by prolonged rainfall. It has been identified using public data provided by the BGS that the site is underlain by London Clay Formation with no superficial deposits.

4.6 The SFRA has no records of the site being affected by groundwater flooding. The site is therefore considered to be at very low risk of flooding from groundwater

4.7 The development proposals include a construction of two basements. The construction of a basement could cause groundwater flooding if its location causes water below ground to be altered. However, the development is not in an area where historic underground steams are known to have been present and is not in a flood risk zone. Therefore it is unlikely that the construction of the basement will have an impact on ground water and cause an increase in ground water flooding. This is discussed further in Chapter 7.

Surface Water Flooding

4.8 Flooding from overland flow occurs when intense rainfall is unable to infiltrate into the ground or enter drainage systems resulting in localised flooding in low spots that provide no means of outfall.

4.9 The surface water flood map in Appendix E provides information concerning the risk of surface water flooding to the site. The Surface Water Flood Map shows that the site is located wholly within 'Very Low' risk of surface water flooding (outside of the modelled 1 in 1000 rainfall event). According to the Westminster City Council SFRA the site is not located within an area designated as a Surface Water Flood Risk Hotspot. The site is therefore considered to be at low risk of flooding from surface Water.

Flooding from Infrastructure Failure

4.10 In order to control and convey surface water runoff from impermeable surfaces in urban areas, underground surface water sewers or combined sewers (foul and surface water) are often utilised in urban areas. Pipes, culverts etc. have a finite capacity and therefore pose a risk of flooding due to the risk of siltation, blockage or collapse.

4.11 Thames Water has been contacted so as to ascertain any historical sewer flood data within the area. This report will be updated once a response has been received. However there are no known reports of sewer flooding within the site and the pre-planning report has not identified any local sewer flooding.

Flooding from Artificial sources

4.12 The EA provides a map showing the maximum potential flood extent, in the event that all reservoirs with a capacity of greater than 25,000 cubic metres were to fail and release the water they hold. The map shows that the site would not experience flooding in this scenario. There are no other significant artificial waterbodies in proximity of the site. It is therefore concluded that the site is not at risk of flooding from artificial sources. The site is therefore considered to be at very low risk of flooding from artificial sources.

5.0 Surface Water Drainage

Surface Water

5.1 Current flood risk and development planning policy specifies that surface water arising from a developed site should, as far as is practicable, be managed in a sustainable manner to mimic the surface water flows arising from the site prior to the proposed development. Opportunities to reduce flood risk to the site itself and elsewhere, taking climate change into account, should be investigated and this should be demonstrated as part of the FRA. Developers should seek opportunities to reduce the overall level of flood risk through appropriate application of Sustainable Drainage Systems (SUDS).

5.2 SuDS will attenuate and treat surface water run-off quantities at source (source control) in line with National Planning Policy Framework (NPPF) and EA policies. This use of SuDS is needed to replicate the pre-developed Greenfield conditions so as not to increase flood risk to the site or surrounding sites by managing excess run-off at the source.

5.3 The key benefits of SuDS are as follows:

- Improving water quality over a conventional piped system by removing pollutants from diffuse pollutant sources (e.g. roads);
- Improving amenity through the provision of open green space and wildlife habitat; and
- Enabling a natural drainage regime which recharges groundwater (where possible).

5.4 SuDS provide a flexible approach to drainage, with a wide range of components from house soakaways to large-scale basins or ponds. The individual techniques should be used where possible in a management train which mimics the natural pre-development pattern of drainage. The Interim Code of Practice for SuDS set out the hierarchy of techniques. These are:

- Prevention – the use of good site design and housekeeping measures on individual sites to prevent runoff and pollution;
- Source control – control of runoff at or very near its source (such as permeable paving or soakaways for individual houses);
- Site control – management of water from several sub-catchments (including routeing water from roofs and car parks to one large soakaway or infiltration basin for the whole site); and
- Regional control – management of runoff from several sites, typically in a detention pond or wetland.

5.5 Figure 5.1 shows the SuDS drainage hierarchy from the Ciria SuDS Manual C753.

The SUDS Hierarchy

	SUDS technique	Flood Reduction	Pollution Reduction	Landscape & Wildlife Benefit
Most Sustainable	Living roofs	✔	✔	✔
	Basins and ponds - Constructed wetlands - Balancing ponds - Detention basins - Retention ponds	✔	✔	✔
	Filter strips and swales	✔	✔	✔
	Infiltration devices - soakaways - infiltration trenches and basins	✔	✔	✔
	Permeable surfaces and filter drains - gravelled areas - solid paving blocks - porous paviors	✔	✔	
Least Sustainable	Tanked systems - over-sized pipes/tanks - storms cells	✔		

Figure 5.1 SuDS Hierarchy - Ciria C753

5.6 Figure 5.1 details the sustainability level of each of the SuDS techniques, as well as the SuDS system suitability within 3 general criterial areas:

- Flood Reduction;
- Pollution Reduction; and
- Landscape and Wildlife Benefit.

5.7 Ideally, any SuDS system should be multi-functioning, fulfilling as many of the criteria areas as possible.

Existing Surface Water Drainage

5.8 Sewer records were requested from Thames Water to determine the existing sewer network available to the existing site. Appendix F contains a plan drawing of the Thames Water sewer records. The plans show that along the north western site boundary there is an existing combined sewer running along Queens Grove which serves the development site.

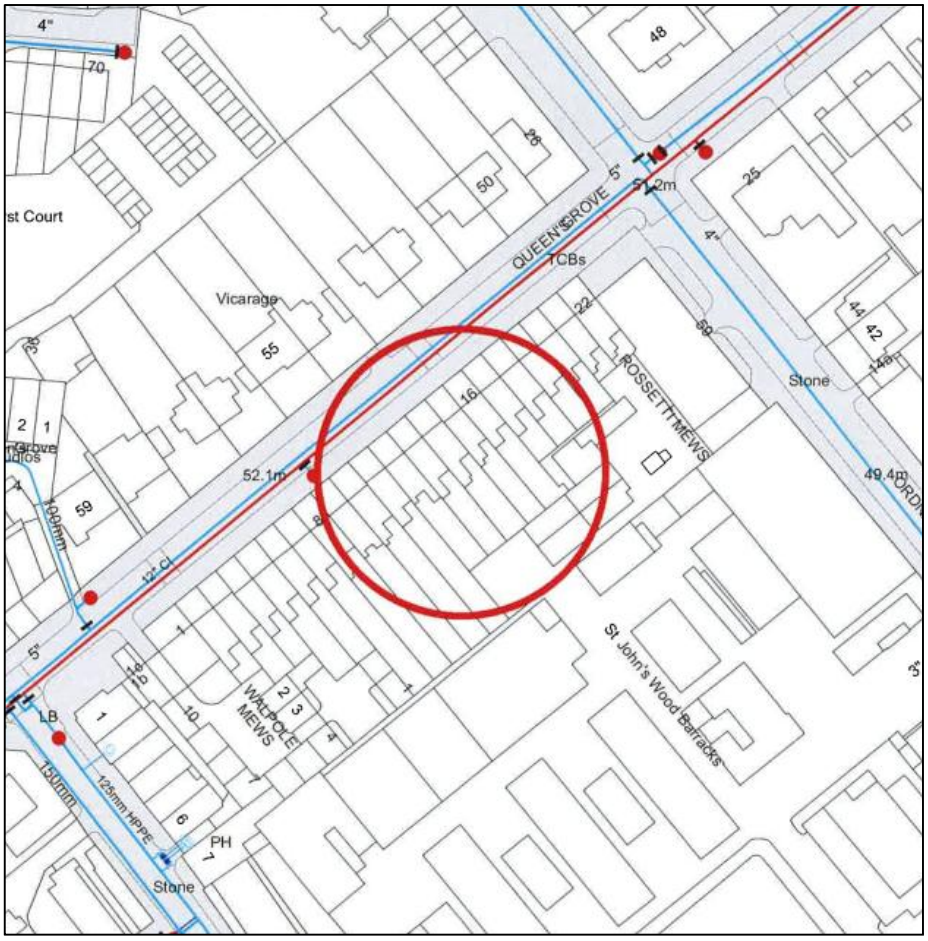

Figure 5.1 Site Location Plan

Greenfield Runoff Rates

5.9 MicroDrainage Source Control has been used to calculate the QBar Greenfield runoff rate for the site showing a result of 1.5 l/s. This output can be seen in Appendix G.

Proposed Drainage

5.10 The proposed development is not thought to increase the amount of hardstanding area on the development site. Therefore the surface water runoff from the development will remain the same. The surface water drainage will connect into the existing combined sewer which runs along Queens Grove and currently serves the development site. It is understood that where possible, subject to listed building approval, SuDs features will be incorporated into the development such as rainwater harvesting and permeable paving.

6.0 Foul Water Drainage

Foul Drainage

6.1 Thames Water's public sewer records show an existing combined sewer running along Queens Grove which serves the development site.

6.2 The peak foul flow rate from the proposed development has been based on the following assumptions as dictated by Sewers for Adoption 7th Edition:

6.3 4000 l Litres per dwelling per day
4000 x 1 = 4, 000
4000/86400 = 0.0463 l/s

6.4 The calculated peak foul flow rate from the site is therefore 0.0463 l/s.

6.5 As currently the site just has one residential unit and it is proposed to still to have just one residential unit the peak foul flow remains unchanged. Therefore Thames Water will have capacity within the network. It is proposed that the alignment of the sewer remains unchanged. It is understood that any changes to the existing drainage will be undertaken in accordance with best practice.

7.0 Basement Drainage

7.1 In line with the City of Westminster Council's Residential Basement Report (section 4.2) (Alan Baxter, 2013), Policy CM28.1 within the Westminster's City Plan (CoW, 2016) and Basement Development in Westminster Supplementary Planning Document (CoW, 2014) basement developments should not increase or exacerbate flood risk on site or beyond. In order to assess the impacts of the proposed development a Basement Impact Assessment (BIA) may be recommended for the site.

7.2 The construction of the two basements could cause groundwater flooding if their location causes water below ground to be altered. However, the development is not in an area where historic underground streams are known to have been present and is not in a flood risk zone. It is therefore unlikely that the construction of the basement will have an impact on groundwater and cause an increase in ground water flooding.

7.3 As detailed in section 4.5 BGS data states that the site is underlain by London Clay Formation with no superficial deposits. London Clay has a relatively low permeability, therefore, the London Clay presents an almost complete barrier to groundwater. This means that the risk of groundwater flooding to the basement dwellings is considered to be very low.

7.4 Practical measures have been taken to reduce the impact of flooding of ground water flooding even though the risk is considered very low. Both basement dwellings will be drained by a surface water pump and 'dual' pumps are installed as standard. These are fitted with a high level alarm with battery backup to warn in the event of pump failure. A further battery backup system is available in high risk areas to ensure the pumps continue to operate in the event of mains failure.

8.0 Summary and Conclusions

8.1 Motion has been commissioned by Mr and Mrs Nayar to undertake a Flood Risk Assessment (FRA) in support of a planning application at 14 Queens Grove, London, NW8 6EL.

8.2 This FRA has been prepared to support a planning application for modifications to the existing residential development. This involves the complete rebuilding of the rear closet wing, lowering of the lower ground floor slab, and a new single level basement under the front garden, construction of a basement under part of the rear garden to the existing development.

8.3 The EA Flood Map shows that the site is wholly located within Flood Zone 1 and is considered to be at low risk of fluvial and coastal flooding.

8.4 The site is currently an existing residential unit and is considered brownfield.

8.5 In accordance with the NPPF, residential development is classed as a 'More Vulnerable' land use and as such the proposed development is appropriately located within in Flood Zone 1.

8.6 The development site is also considered to be at very low risk of flooding from sewers, surface water and artificial sources.

8.7 The construction of the two basements could cause groundwater flooding if its location causes water below ground to be altered. BGS data states that the site is underlain by London Clay Formation with no superficial deposits. London Clay has a relatively low permeability, therefore, the London Clay presents an almost complete barrier to groundwater. The development is not in an area where historic underground steams are known to have been present and is not in a flood risk zone. It is therefore unlikely that the construction of the basement will have an impact on groundwater and cause an increase in ground water flooding.

8.8 Practical measures have been taken to reduce the impact of ground water flooding even though the risk is considered very low. Both basement dwellings will be drained by a surface water pump and 'dual' pumps which are installed as standard and are fitted with a high level alarm.

Appendix A

Development Proposals

All dimensions to be checked onsite.
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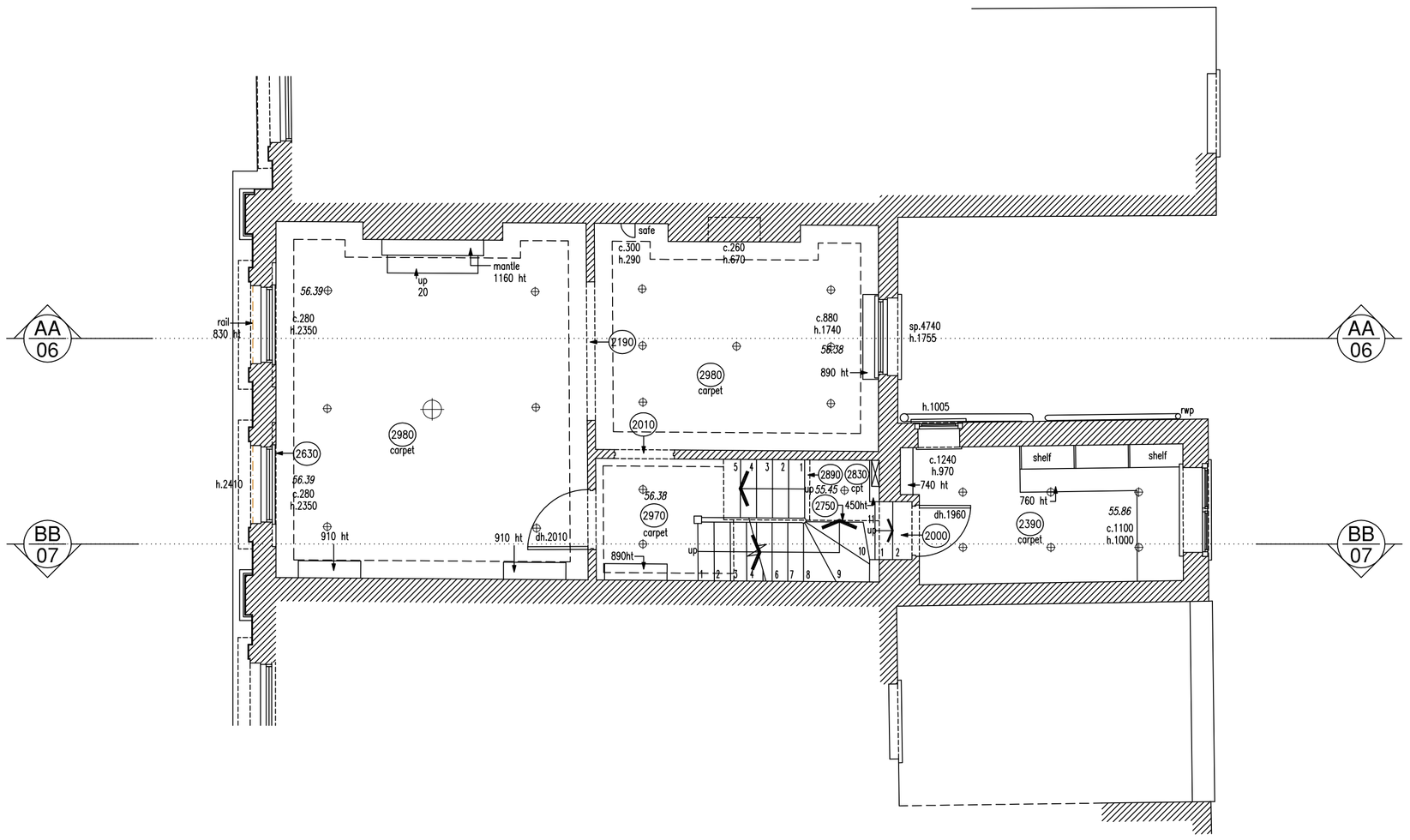
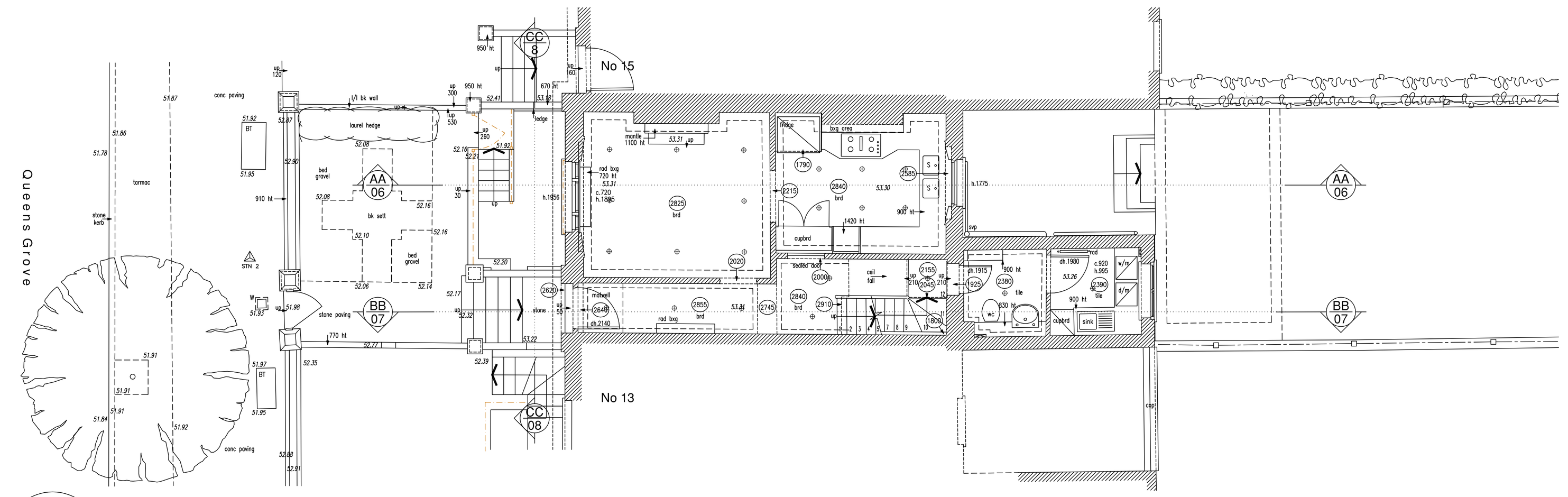
NOTES



FIRST FLOOR PLAN - AS EXISTING



GROUND FLOOR PLAN - AS EXISTING

SCALE 1:100@A3

SCALE 1:50@A1

	REVISIONS	

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Project	14 Queens Grove St. John's Wood London, NW8 6EL
Client	Mr & Mrs Nayar

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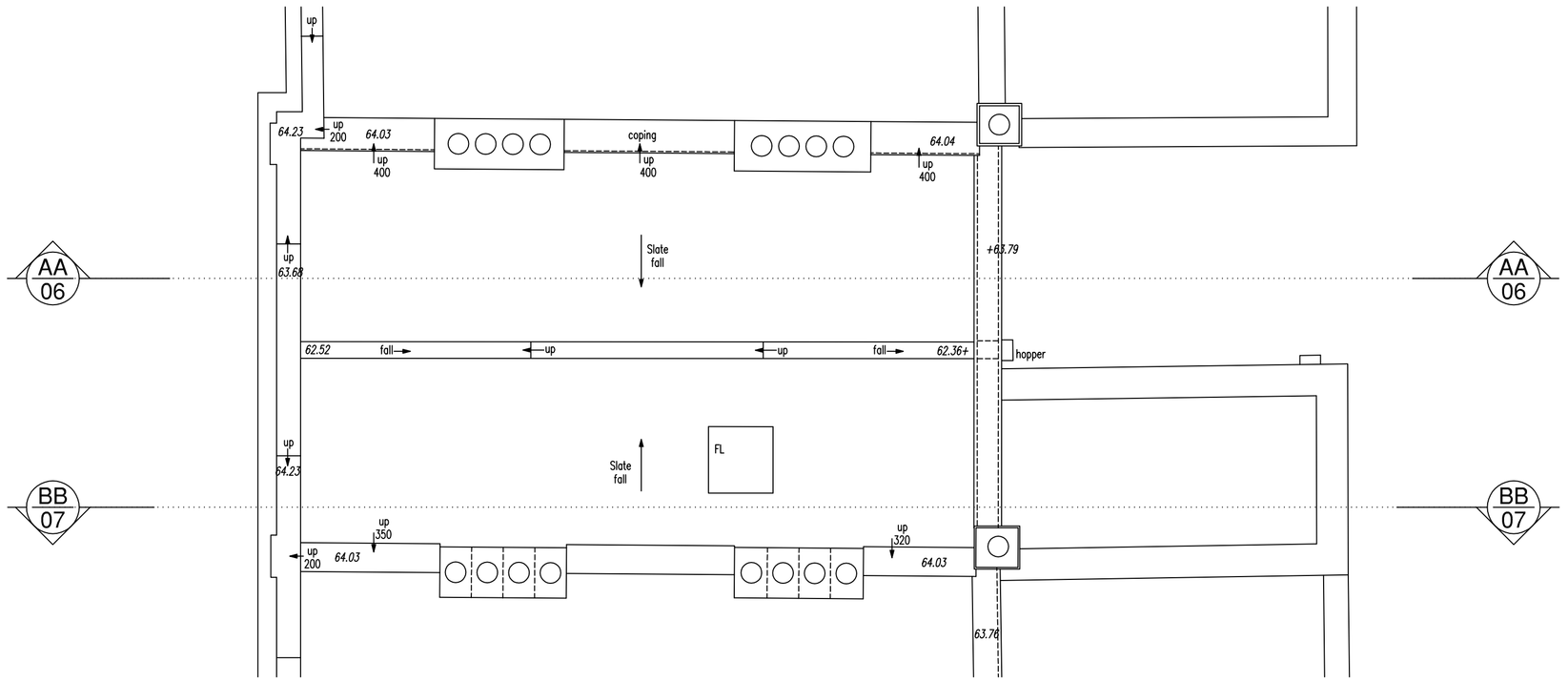

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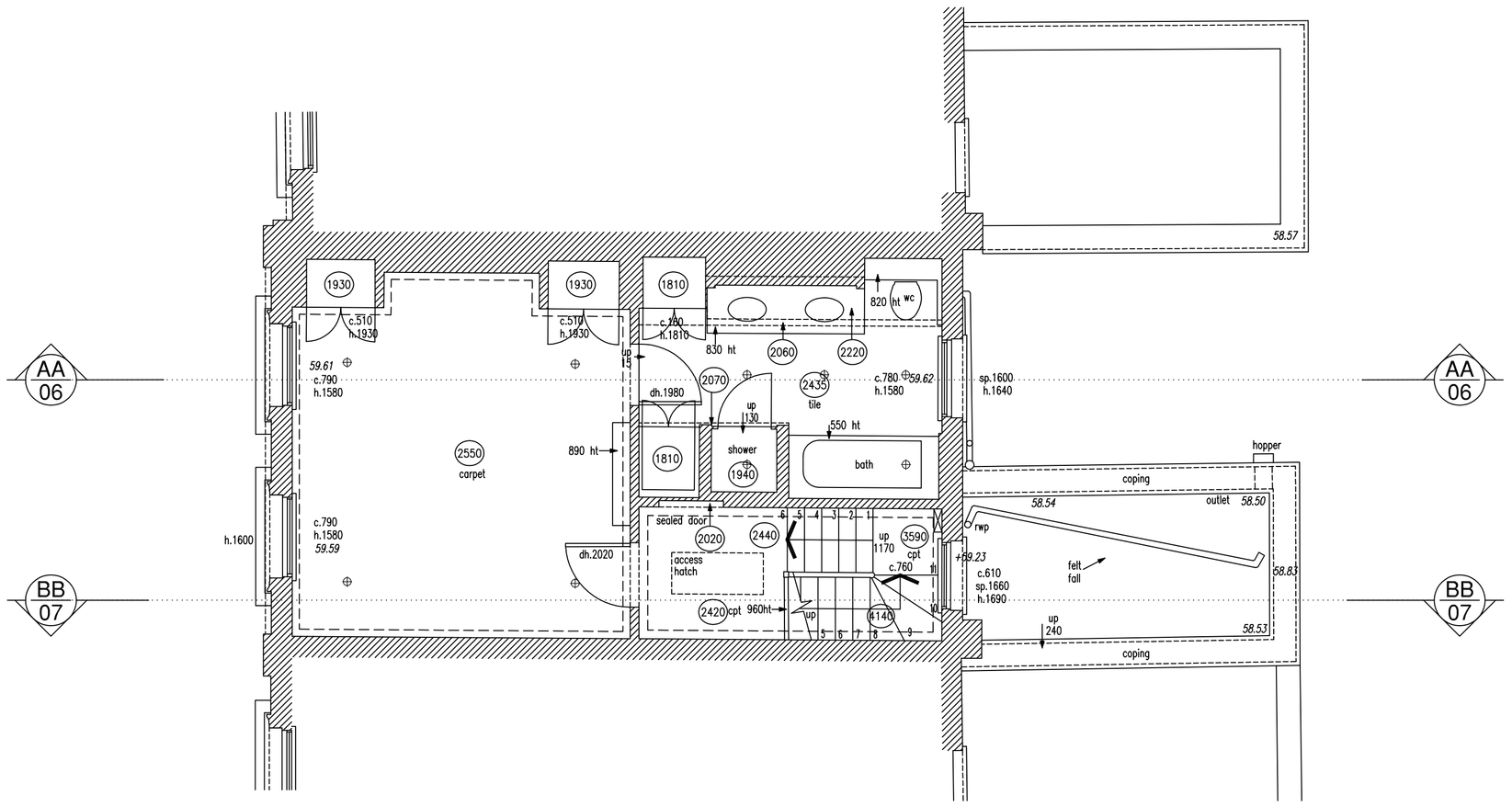

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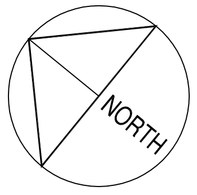

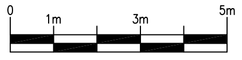

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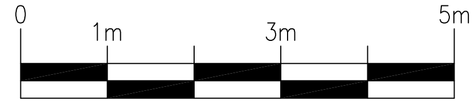

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Title: Second Floor and Roof Plans - As Existing

Project: 14 Queens Grove
St. John's Wood
London, NW8 6EL

Client: Mr & Mrs Nayar

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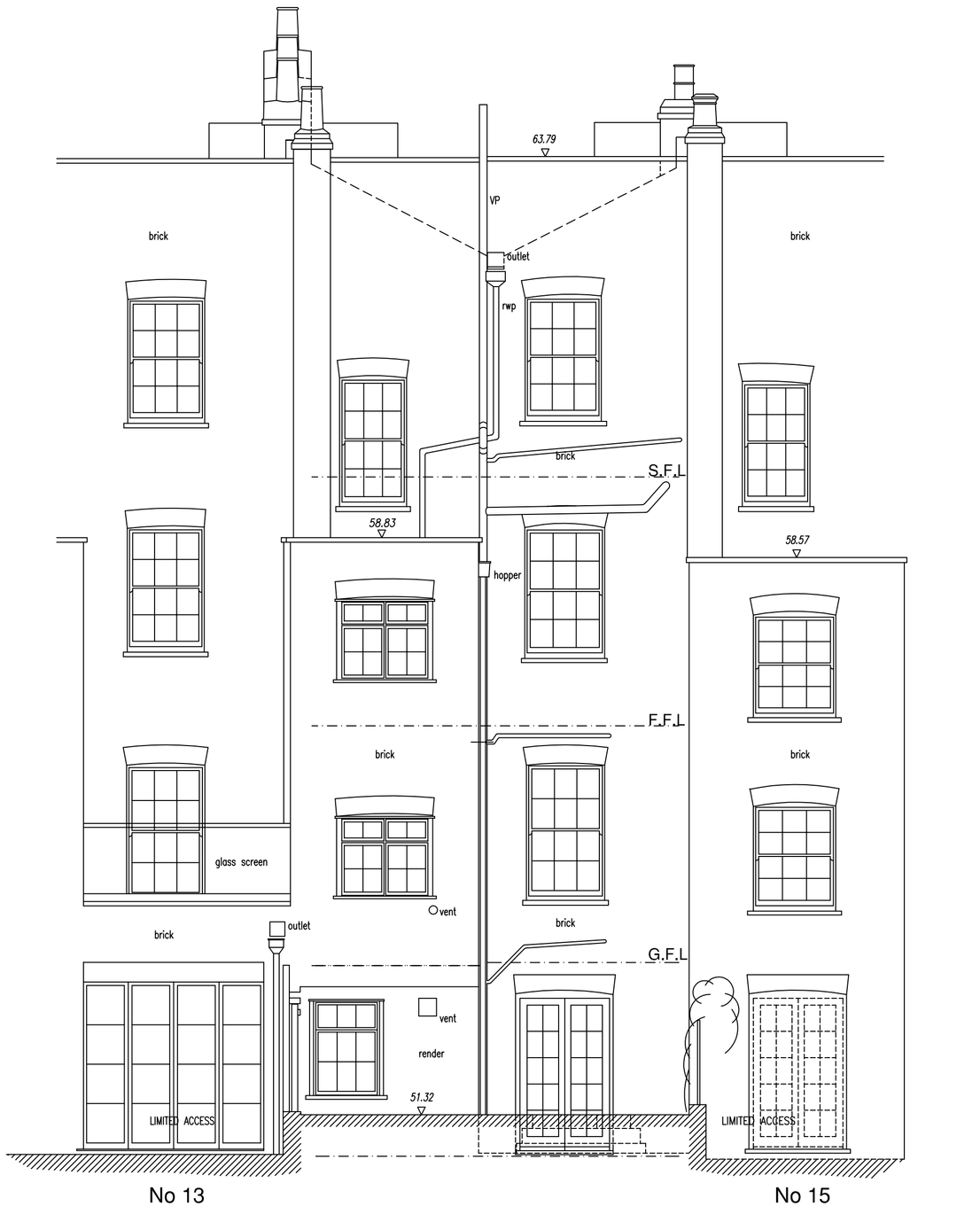

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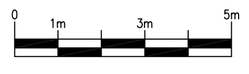

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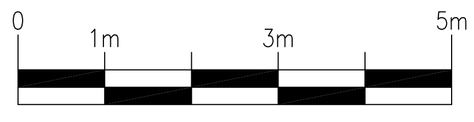

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Title: Front & Rear Elevations - As Existing

Project: 14 Queens Grove, St. John's Wood, London, NW8 6EL

Client: Mr & Mrs Nayar

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SECTION AA - AS EXISTING

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Title: SECTION AA
- As Existing

Project: 14 Queens Grove
St. John's Wood
London, NW8 6EL

Client: Mr & Mrs Nayar

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Job Number	**Drawing Number**	**Revision**
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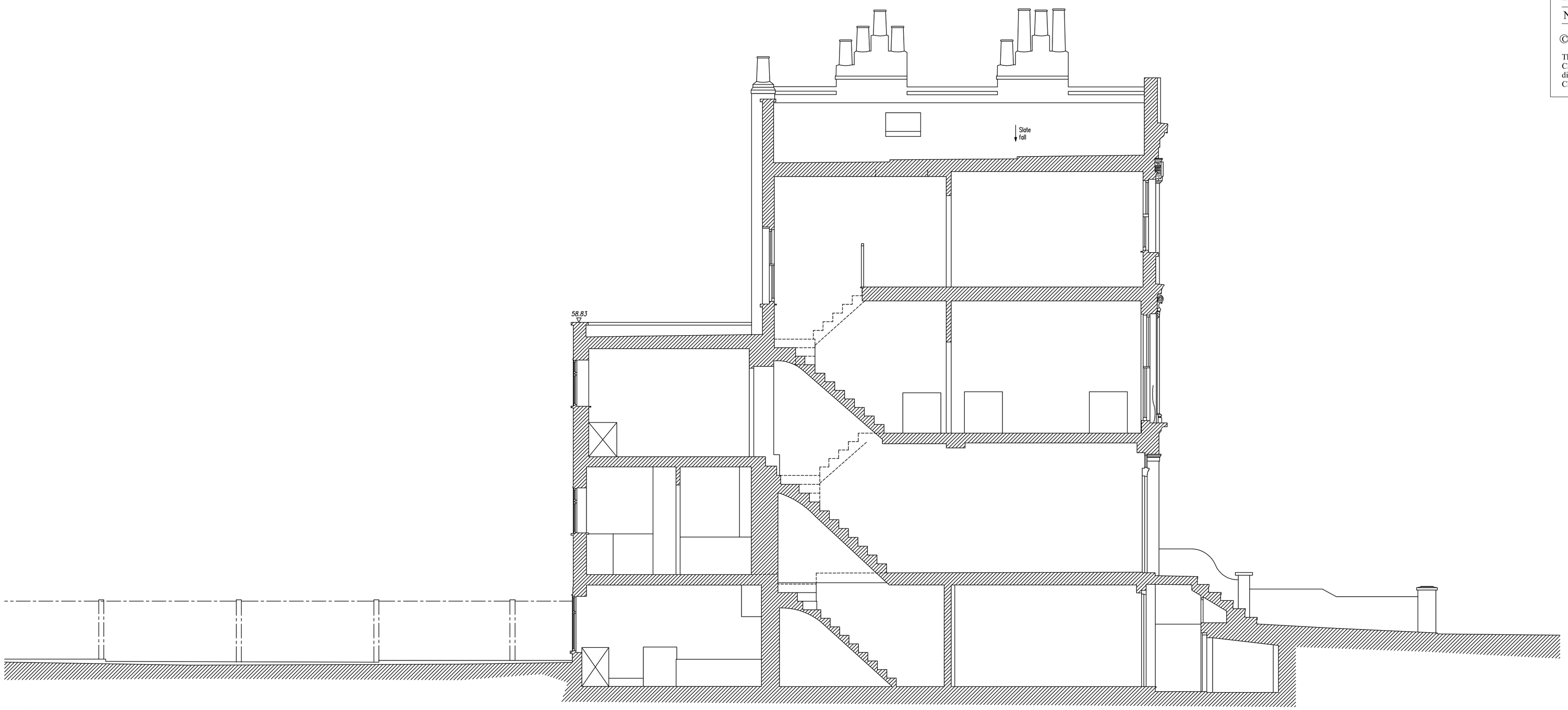
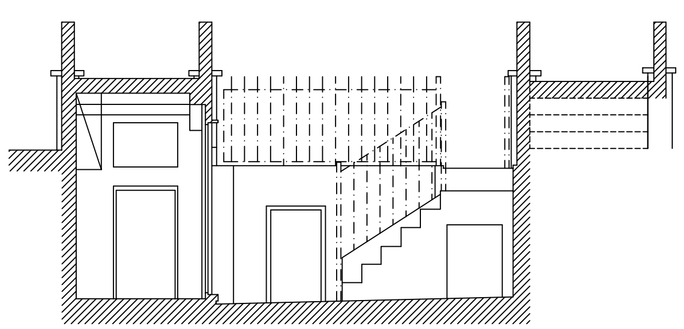
DO NOT SCALE THIS DRAWING

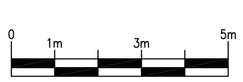
NOTES



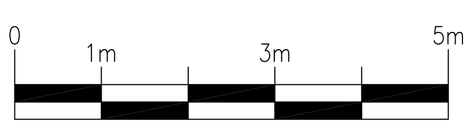
SECTION BB - AS EXISTING



SECTION CC (through Lightwell) - AS EXISTING



SCALE 1:100@A3



SCALE 1:50@A1

REVISIONS

CHARLES BRICE LTD
3 HARCOURT STREET
MARYLEBONE
LONDON W1K 4EY
Tel. 020 7491 1932
Email: office@charlesbrice.co.uk
www.charlesbrice.co.uk

Title: SECTION AA - As Existing

Project: 14 Queens Grove, St. John's Wood, London, NW8 6EL

Client: Mr & Mrs Nayar

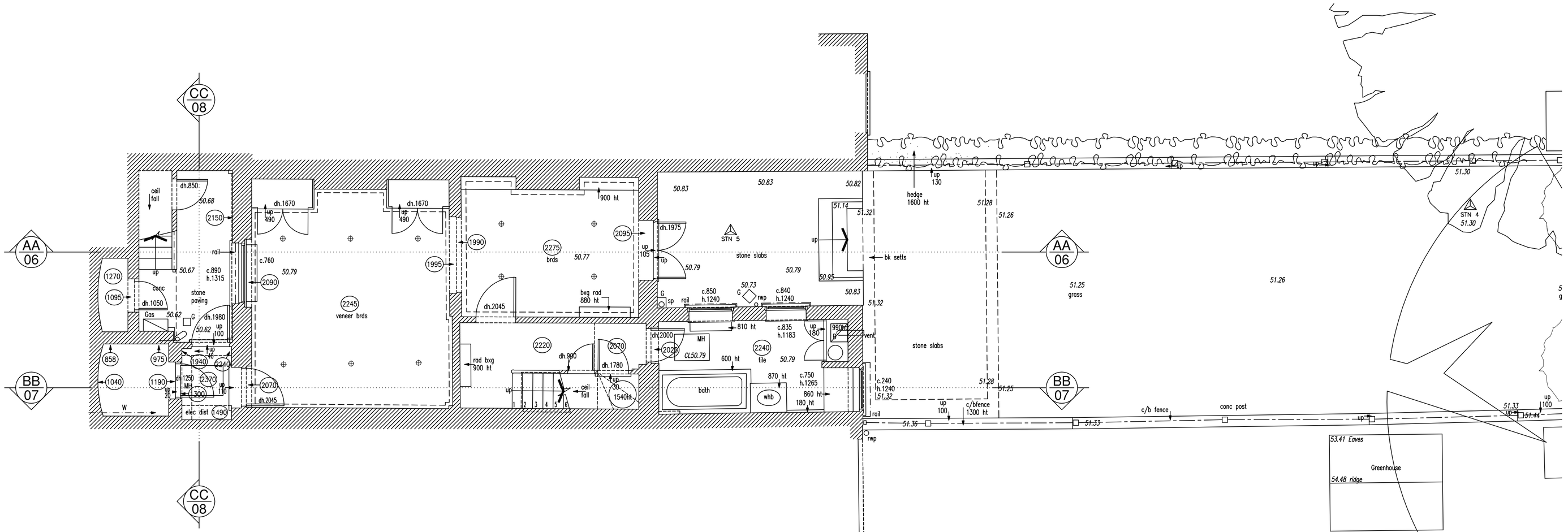
Scale	Date	Drawn By
1:50@A1/ 1:100@A3	Nov 2016	VB
Job Number	**Drawing Number**	**Revision**
904	EX05	*

Appendix B

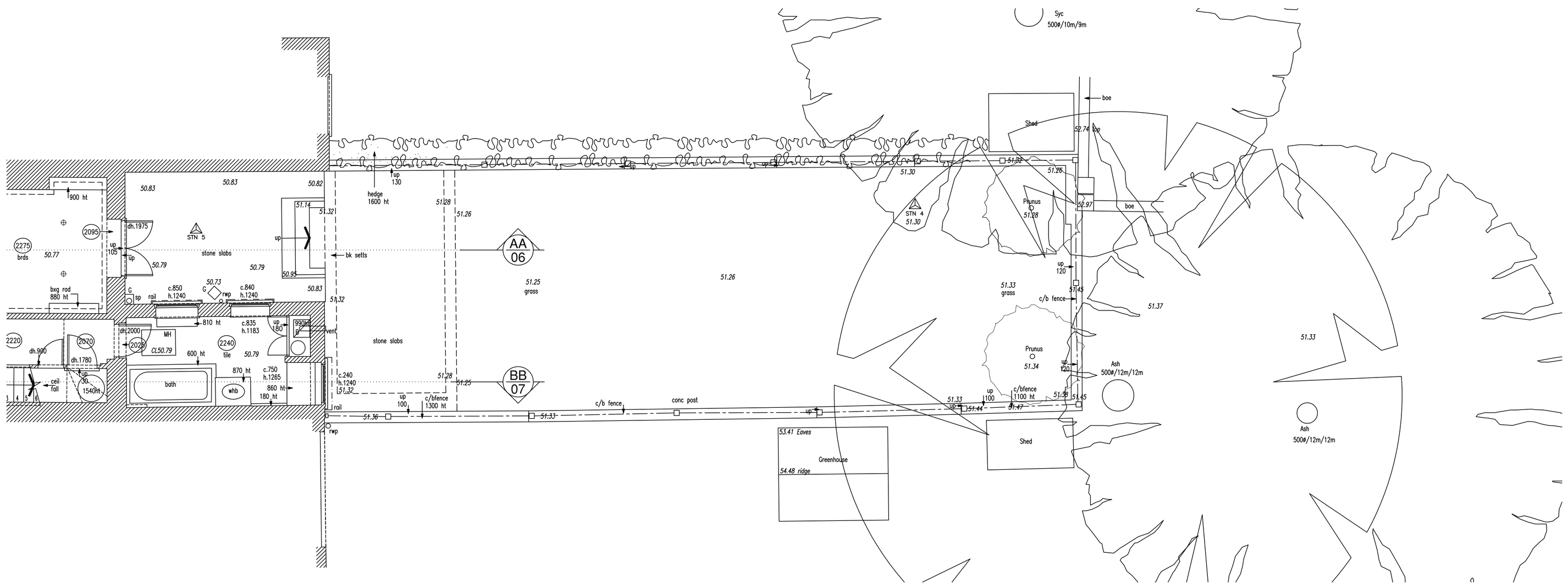
Topographical Survey

All dimensions to be checked onsite.
DO NOT SCALE THIS DRAWING

NOTES



LOWER GROUND FLOOR - AS EXISTING



PART LOWER GROUND FLOOR & GARDEN - AS EXISTING

SCALE
0 1m 3m 5m

REVISIONS

CHARLES BRICE LTD
95 YORK STREET
MARYLEBONE
LONDON W1H 4QG
Tel. 020 7491 1932 Fax. 020 7491 1952
Email: info@charlesbrice.co.uk
www.charlesbrice.co.uk

Title	Lower Ground and Garden Plans - As Existing
Project	14 Queens Grove St. John's Wood London NW8 6EL
Client	Mr & Mrs Nayar

Scale	Date	Drawn By
1:50@A1	Nov 2016	JG
Job Number	**Drawing Number**	**Revision**
904	EX01	*

Appendix C

BGS Borehole Records

Kings Scholars Pond – Diversion of Wellington Road branch – stage II

GEORGE WIMPEY AND COMPANY LTD.
CENTRAL LABORATORY

TQ 28 SE/35
2672.837

BOREHOLE RECORD 256

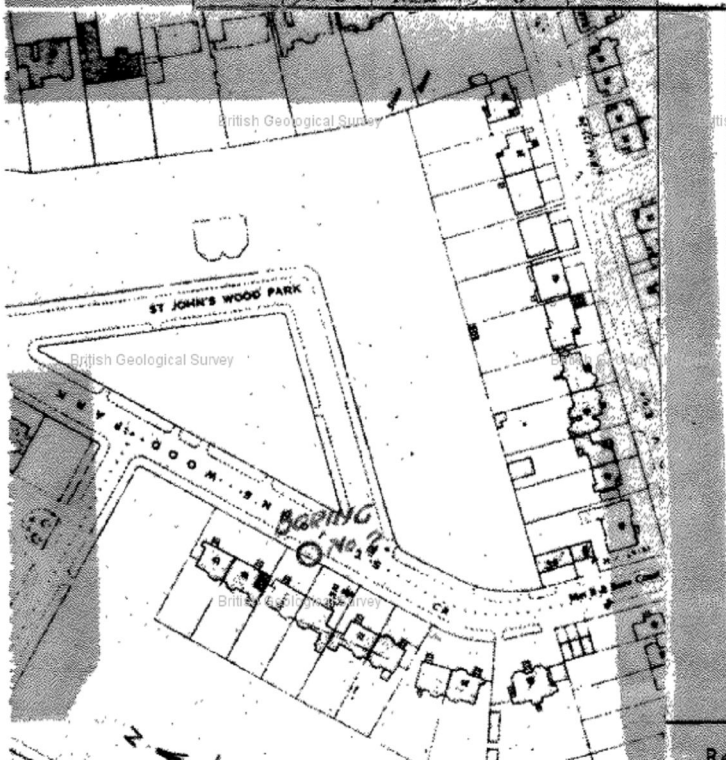
B.H. No. 1

Ground level : +168.6 ft. 51.38m — Date started : 1

Type of boring : Shell and Auger — Date completed : 1

Dia. of boring : 8" — Lining tubes :

Date	Depth of Boring	Water Level	Samples Depth	Samples Type	Change of Strata Legend	Change of Strata Depth	Change of Strata O.D. Level	Description of Strata
12.6.62		Nil				1'0" (0.30m)	+167.6 (51.08m)	Paving stones over fill
			2'6"	D		2'6" (0.76m)	+166.1 (50.62m)	Brown clay with stones
			4'0"	D				Mottled brown and grey c
			9'0"	D				
						12'0" (3.66m)	+156.6 (47.73m)	
			14'0"	D				
			19'0"	D				Dark brown fissured clay
			21'0"	D				a few gypsum crystals
			25'0"–30'0"	BD				
	30'0"	Nil	30'0"			30'0" (9.14m)	+138.6 (42.24m)	

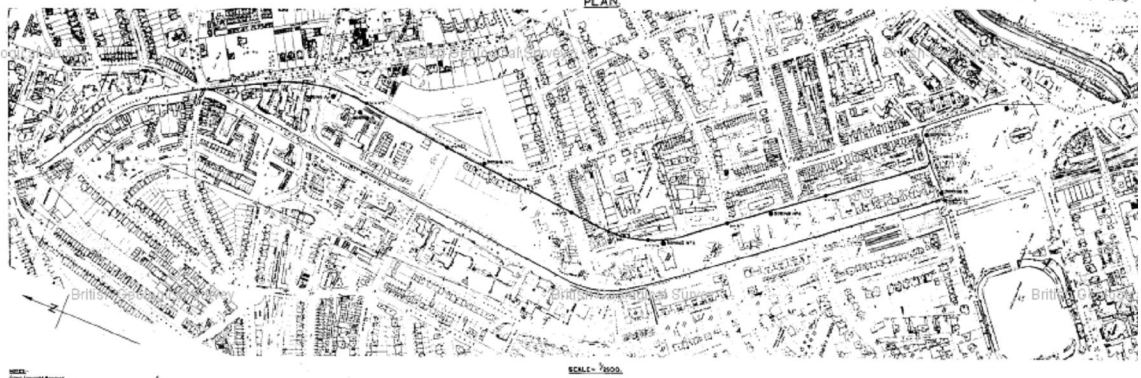


Remarks : Note: Level of borehole determi

LONDON COUNTY COUNCIL — MAIN DRAINAGE

TQ/2856/572-575
621-622.
590, 592.

PLAN.

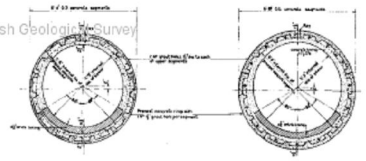


SCALE- 1/2500.

NOTES:
Crown Copyright Reserved
Based on the Ordnance Survey map with the sanction of the Controller of Her Majesty's Stationery Office

4'-9" INTERNAL DIAMETER SEWER.

5'-3" INTERNAL DIAMETER SEWER.



SCALE- 1/2 INCH TO ONE FOOT.

DETAILS OF BORINGS.

TQ/2852/573.
2691. 3422.
BORING NO. 1

TQ/2852/593
2672. 3349
BORING NO. 2

TQ/2856/3074
2668. 2948
BORING NO. 3

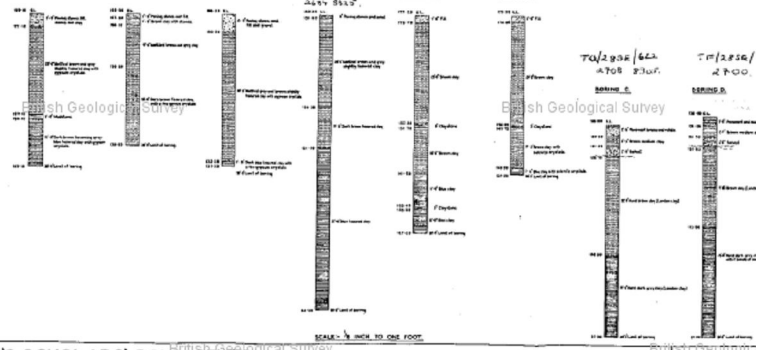
TQ/2856/1330.
2687. 3445.
BORING NO. 4

TQ/2852/590
2696. 3409.
BORING A.

TQ/2856/592.
2696. 2904.
BORING B.

TQ/2856/622.
2708. 2340.
BORING C.

TQ/2856/
2700.
BORING D.



SCALE- 1/2 INCH TO ONE FOOT.

KING'S SCHOLARS' POND SEWER

DIVERSION OF WELLINGTON ROAD BRANCH-STAGE II

SITE PLAN, SECTIONS OF SEWERS, AND BORINGS.

XD 546/65/1

CHIEF ENGINEER'S DEPARTMENT
MAIN DRAINAGE DIVISION

Appendix D

Environment Agency Flood Product Data

Victoria Berg-Holdo

From:	HNL Enquiries <HNLenquiries@environment-agency.gov.uk>
Sent:	25 June 2018 11:46
To:	Victoria Berg-Holdo
Subject:	HNL 89022 BC - 14 Queens Grove London NW8 6EL
Attachments:	Open Government Licence.pdf

Dear Victoria

Enquiry regarding residential development at 14 Queens Grove, London, NW8 6EL

Thank you for your request dated 6 June 2018 to use Product 4 Environment Agency data.

The information on Flood Zones in the area relating to this address is as follows:

The property is in an area located within Flood Zone 1 shown on our Flood Map for Planning (Rivers and Sea).

Note - This information relates to the area that the above named site is in and is not specific to the property/proposed development itself.

Because this site does not fall within an area at risk of flooding from rivers or the sea, we do not hold any detailed flood modelling data. As such we are unable to provide a flood risk product.

We have no record of this site having been affected by flooding in the past. Since this site is classed as being "very low risk" from fluvial or tidal flooding, we have no plans to carry out any works which would reduce flood risk.

If you have requested this information to help inform a development proposal, then you should note the information on GOV.UK on the use of Environment Agency Information for Flood Risk Assessments

https://www.gov.uk/planning-applications-assessing-flood-risk
https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion

You can view and download flood risk maps from our website at:
http://watermaps.environment-agency.gov.uk/wiyby/wiyby.aspx?topic=floodmap#x=357683&y=355134&scale=2

You can also view and print surface water flood maps online at:

http://watermaps.environment-agency.gov.uk/wiyby/wiyby.aspx?topic=ufmfsw#x=357683&y=355134&scale=2

You can then use these maps as part of any flood risk assessment. Please note, surface water flood risk is now managed by Lead Local Flood Authorities, which in this instance is the London Borough of Westminster.

The Sustainable Places Officer for the Westminster area is Demitry Lyons. He is based in our London office and can be contacted on 0208 474 8769 or at HNLSustainablePlaces@environment-agency.gov.uk

This information is provided subject to the Open Government Licence, which you should read.

I hope that we have correctly interpreted your request. Please see the attached Open Government licence for details of permitted use.

We respond to requests for recorded information that we hold under the Freedom of Information Act 2000 (FOIA) and the associated Environmental Information Regulations 2004 (EIR).

If you are not satisfied with our response to your request for information you can contact us within 2 calendar months to ask for our decision to be reviewed.

Kind regards,

Becki Clark
Customers and Engagement Officer
Environment Agency, Hertfordshire and North London
Alchemy, Bessemer Road, Welwyn Garden City, Hertfordshire, AL7 1HE
Direct dial 0203 025 9141
Direct email HNLenquiries@environment-agency.gov.uk

From: Victoria Berg-Holdo [mailto:VHoldo@motion.co.uk]
Sent: 06 June 2018 13:51
To: Enquiries, Unit <enquiries@environment-agency.gov.uk>; Enquiries_THM <enquiries_THM@environment-agency.gov.uk>
Subject: 14 Queens Grove London NW8 6EL

Dear Sir/ Madam,

Residential Development at 14 Queens Grove London NW8 6EL

Motion has been commissioned by to undertake a flood Risk Assessment, in line with NPPF and its practice guide for a development off 14 Queens Grove London NW8 6EL (See Figure 1). Central to this Flood Risk Assessment obtaining up-to-date information and consultation advice from the Environment Agency.

Please could you:

- Provide me with a quotation for 'Flood Product 4' and 'Flood Product 8' data for the application site.
- Provide me with contact details of the relevant Development and Flood Risk and Planning Liaison Officers for this area.

I would also be grateful if you could confirm receipt of this email.

Please do not hesitate to contact me on the details below if I can provide any further information.

Many thanks

Vicki

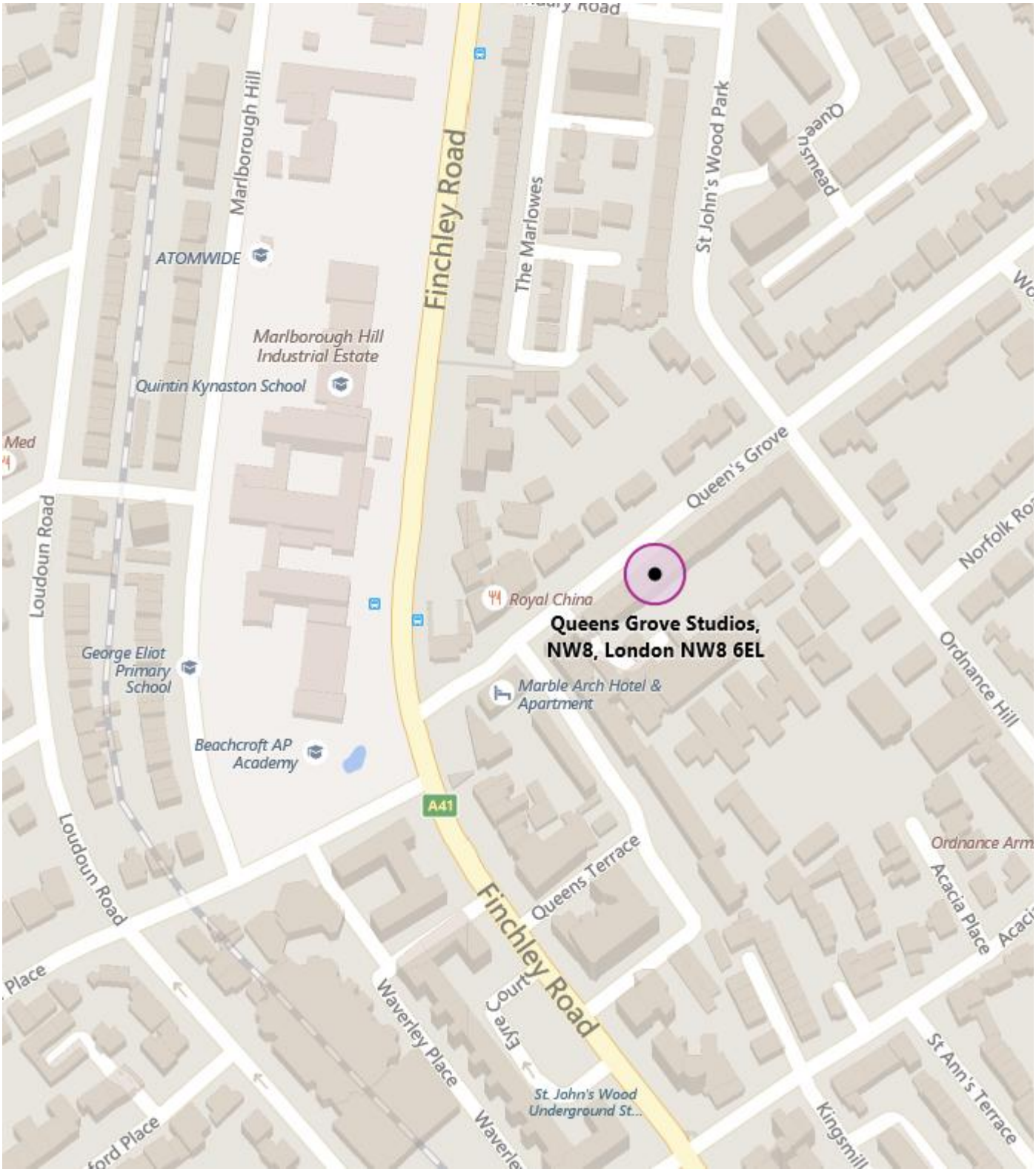


Figure 1

Victoria Berg-Holdo | Senior Engineer
BEng (Hons) MSC

motion | 84 North Street, Guildford, GU1 4AU

t 01483 531300 | e vholdo@motion.co.uk | w www.motion.co.uk
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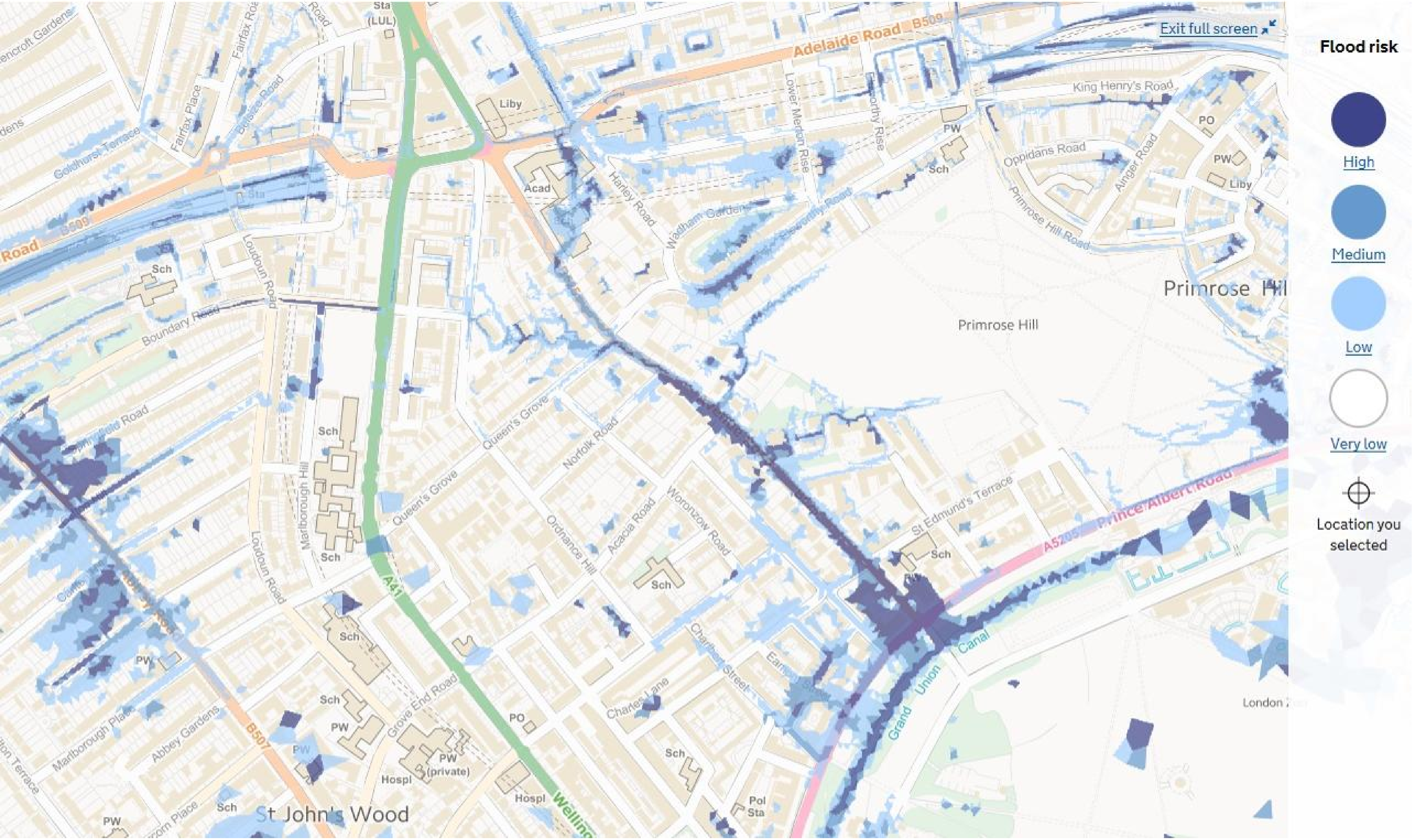
OGL

Appendix E

Surface Water Flood maps



Exit full screen
Flood risk
High
Medium
Low
Very low
Location you selected
Adelaide Road B509
King Henry's Road
Oppidans Road
Primrose Hill Road
Primrose Hill
Lower Merton Rise
Elsworthy Rise
Elsworthy Road
Wadham Gardens
Harley Road
Fairfax Road
Fairfax Place
Goldhurst Terrace
Boundary Road
Loudoun Road
Marlborough Hill
Queen's Grove
Norfolk Road
Ordnance Hill
Acacia Road
Woronzow Road
St Edmund's Terrace
Prince Albert Road
A5205
Charlbert Street
Charles Lane
Grand Union Canal
Grove End Road
Abbey Gardens
Marlborough Place
A41
B507
St John's Wood
London Zoo
Sch
PW
Liby
Acad
PO
Hospl
Pol Sta
PW (private)
Sta (LUL)

Appendix F

Greenfield Runoff Calculations

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.300
Area (ha)	1.000	Urban	0.000
SAAR (mm)	600	Region Number	Region 6

Results l/s

QBAR Rural	1.5
QBAR Urban	1.5
Q100 years	4.9
Q1 year	1.3
Q30 years	3.4
Q100 years	4.9