BASEMENT IMPACT ASSESSMENT

FOR

PROPOSED BASEMENT WORKS

AT

15 RANULF ROAD
LONDON
NW2 2BT

FOR

Mr G Arkus

Project No. P2985

ISSUE 1.2 – ISSUED FOR PLANNING

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DOCUMENT CONTROL SHEET

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1.00 INTRODUCTION

1.01 Michael Alexander Consulting Engineers has been appointed to prepare a Basement Impact Assessment Report to support the Planning Application for the proposed new a basement at 15 Ranulf Road, London NW2 2BT.

1.02 This document has been prepared by Aidan Rivett-Carnac BEng (Hons) CEng MIStructE who is a chartered structural engineer.

1.03 The existing three storey residential property was built circa 1930's in the Arts and Crafts Garden Suburb Style.

1.04 The existing property is not located within a Conservation Area and is not Listed.

1.05 The site is bounded by Ranulf Road to the North, 17 Ranulf Road to the West, 13 Ranulf Road to the East and Hampstead Cemetery to the South.

1.06 The proposed works are for the deepening of an existing single storey basement under the footprint of the existing building extended partially into the rear garden This document will address the specific issues relating to the basement construction, as described in Camden Planning Guidance CPG4 (2013 Revision).

2.00 BASEMENT PROPOSALS

2.01 The details of the existing building and proposals for the basement are shown on the following Archial Norr Architects drawings.

A2-01-01	Proposed Basement Plan
A2-01-02	Proposed Ground Floor Plan
A2-01-03	Proposed First Floor Plan
A2-01-04	Proposed Second Floor Level
A2-01-05	Proposed Mezzanine Level (Loft)
A2-01-06	Proposed Roof Plan
A2-01-07	Proposed Section A-A

Michael Alexander Basement Impact Assessment drawings BIA 01,02,03 and 10 are included in Appendix D.

2.02 The details of the existing structure and site boundaries will be subject to detailed exploratory work prior to and during the works on-site. There are also detailed survey drawings of the existing plans and elevations indicating the levels.

2.03 The design and construction of the building structure shall be in accordance with current Building Regulations, British Standards, Codes of Practice, Health and Safety requirements and good building practice.

3.00 SUBTERRANEAN (GROUND WATER) FLOW

3.01 Stage 1: Screening

The impact of the proposed development on ground water flows is considered here as outlined in Camden Planning Guidance CPG 4 (April 2011). The references are to the screening chart Figure 1 in CPG4.

3.01.1 GW Q1a *Is the site located directly above an aquifer?*

No. With reference to the Environment Agency (Figure (a)) the site is not located above a Secondary aquifer.

3.01.2 GW Q1b *Will the proposed basement extend beneath the water table surface?*

Unknown at time of screening, but considered to be unlikely due to the presence of London Clay beneath the property..

3.01.3 GW Q2 *Is the site within 100m of (i) a watercourse, (ii) a well (used or disused) or (iii) a potential spring line?*

With reference to the Camden Geological, Hydrogeological and Hydrological Study (Figures (b), (c) and (d)),

(i) The nearest surface water feature is an artificial pond located within the grounds of Hampstead School located, approximately 626m to the westst of the site.

a. The Hampstead pond chains are located to the East approximately 1000m from the site.
b. The nearest 'lost' watercourse is the River Westbourne which ran approximately 870m to the South East of the site.

(ii) From the British Geological Society 'Geoindex' the nearest water wells are west of Cricklewood Broadway located approximately 1200m to the West of the site.

(iii) The local geology suggests that the site is located within relatively close proximity of the potential spring line on the interface between the Claygate and Bagshott Members and the London Clay.

3.01.4 GW Q3 *Is the site within the catchment of the pond chains of Hampstead Heath?*

No. With reference to the Camden Geological, Hydrogeological and Hydrological Study (figure (c)), the site is not within the catchment of the pond chains on Hampstead, nor the Golder's Hill Chain.

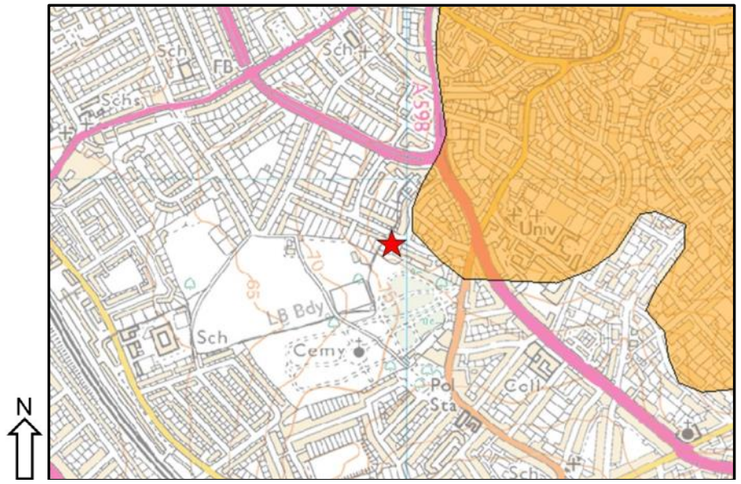


Figure (a)
Aquifer Designation Map
(Extract from Environment Agency maps)

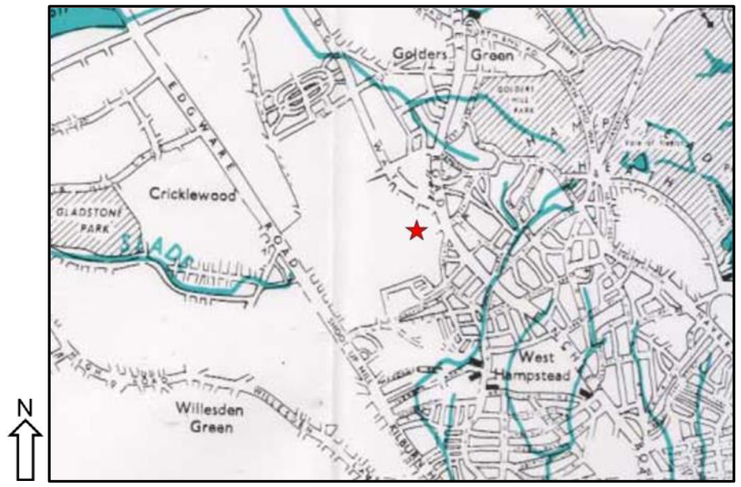


Figure (b)
Watercourses
(Extract from Lost Rivers of London by Barton)

3.01.5 GW Q4 *Will the proposed basement development result in a change in the proportion of hard surface/paved areas?*

Yes, there will be a small increase in the proportion of soft landscaping.

3.01.6 GW Q5 *As part of the site drainage, will more surface water (e.g. rainfall and-runoff) than at present be discharged to the ground (e.g. via soakaways and /or SUDS)?*

No. Currently no surface water from the site is discharged to the ground, and this will also be true after the proposed works.

3.01.7 GW Q6 *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 (not just the pond chains on Hampstead Heath) or spring line?*

No. The nearest ponds in the Hampstead Chain are not in close proximity to the site. However the site is in relatively close proximity to a potential spring line.

3.01.8 On the basis of items 3.01.1 to 3.01.7 above, and in reference to Figure 1 of CPG4, the aspects that should be carried forward to a scoping stage in respect of groundwater are:

- The level of the water table not being known.
- The site being in close proximity to a potential spring line.
- The small increase in hardstanding

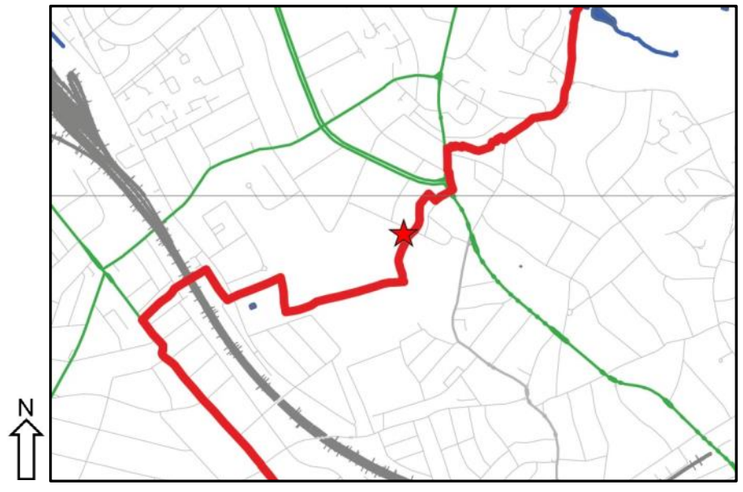


Figure (c)
Surface Water Features
(Extract from Fig 12 of Camden Geological, Hydrogeological and Hydrological Study)

3.02 Stage 2: Scoping

3.02.1 With reference to the Camden Geological, Hydrogeological and Hydrological study Appendix F2, the potential impacts which will need to be considered will include:-

- Whether the basement extends below the water table and whether it will impact on the groundwater flow regime.
- Whether the basement will affect the flow from any spring lines or their water quality
- Whether the change in the proportion of soft landscaped areas will affect ground water levels

3.02.2 In response to the above issues: -

- A site soil investigation will be commissioned including ground water monitoring. The scope of the reporting will include a requirement for a hydrogeological assessment.

Figure (d)
Waterwells (also showing Infrastructure)
(Extract from British Geological Survey)

3.03 Stage 3: Site Investigation and Study

3.03.1 A site investigation was carried out by Geotechnical and Environmental Associates (GEA) in April 2015 which included trial pits and window sampling. Refer to their report J15086 of June 2015.

3.03.2 Groundwater was encountered generally at 3-3.5m depth within the head deposits

3.04 Stage 4: Impact Assessment

3.04.1 A hydrogeological assessment has been carried out by a chartered geologist and is included in section 7.7 of GEA's report. It notes that any water flows within the head deposits are likely to be slow due to the low permeability. In summary it notes that no potential subterranean (groundwater) flow impacts associated with the construction of the proposed development have been identified.

3.04.2 The GEA report notes that since Head Deposits and underlying London Clay are relatively impermeable, the small change in impermeable area is unlikely to have any significant impact on surface water inflow.

3.04.3 It is possible that slow inflows of water could be encountered during the excavation. Provision for this will need to be reflected in the proposed construction method – refer Appendix E.

4.00 **GROUND STABILITY**

4.01 **Stage 1: Screening**

4.01.1 GS Q1 *Does the existing site include slopes, natural or manmade, greater than 7˚?*

No. There are no slopes >7 degrees within the site.

4.01.2 GS Q2 *Will the proposed re-profiling of landscaping at site change slopes at the property boundary to more than 7˚?*

No. The basement construction will not change the profile of the ground at the boundaries of the property.

4.01.3 GS Q3 *Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7˚?*

No. With reference to the Camden Geological, Hydrogeological and Hydrological Study, (refer Figure (f)), the neighbouring areas also have slopes less than 7 degrees.

4.01.4 GS Q4 *Is the site within a wider hillside setting in which the general slope is greater than 7˚?*

No. With reference to the Camden Geological, Hydrogeological and Hydrological Study, (refer Figure (f)), the closest slopes that are greater than 7 degrees are located approximately 250m to the East.

4.01.5 GS Q5 *Is the London Clay the shallowest strata at the site?*

Yes. With reference to Camden Geological, Hydrogeological and Hydrological Study, the underlying soil stratum is indicated as being the London Clay (Figure (e)).

4.01.6 GS Q6 *Will any trees be felled as part of the proposed development and/or are any works proposed within any tree protection zones where trees are to be retained?*

Yes, a dead tree will be felled. Works fall marginally within the tree protection zones. An Arboricultural Report has been commissioned to determine the tree protection measures. Refer 'Development Site Impact Assessment' by Bartlett Consulting, May 2015.

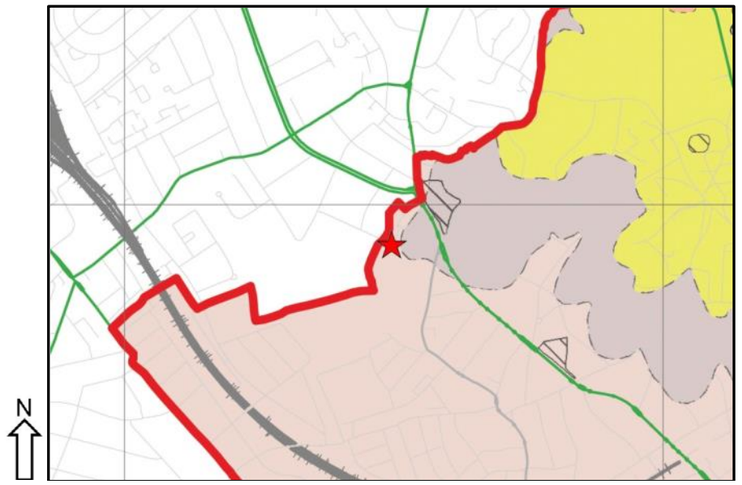
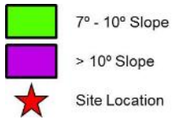


Figure (e)
Geological Map
(Extract from Fig 3 of Camden Geological, Hydrogeological and Hydrological Study)



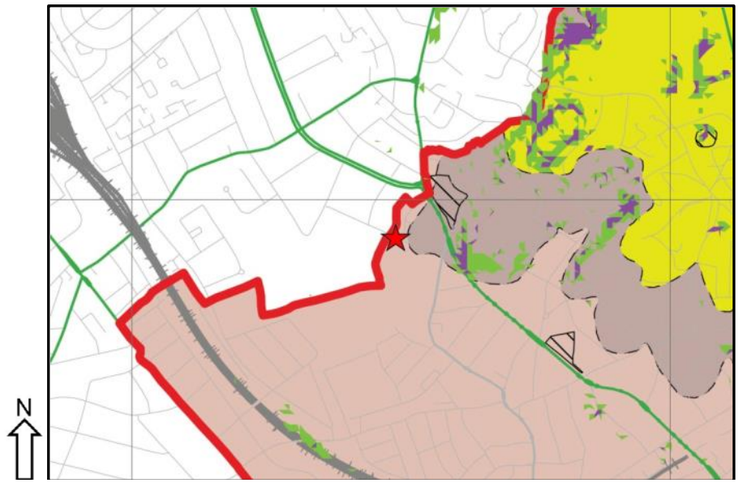


Figure (f)
Slope Angle Map
(Extract from Fig 16 of Camden Geological, Hydrogeological and Hydrological Study)

4.01.7 GS Q7 *Is there a history of seasonal shrink-swell subsidence in the local area, and/or evidence of such effects at the site?*

The London Clay strata is usually classified as having a high volume change potential and hence can lead to seasonal shrink-swell subsidence where buildings are founded in desiccated soils. We have however no specific evidence of subsidence having been experienced on site or in the immediate surrounding area.

4.01.8 GS Q8 *Is the site within 100m of a water course or a potential spring line?*

Yes. With reference to the Camden Geological, Hydrogeological and Hydrological Study (refer Figures (b) and (c)), the site is located within 100 metres of a potential spring line.

4.01.9 GS Q9 *Is the site within an area of previously worked ground?*

No. With reference to the Camden Geological, Hydrogeological and Hydrological Study (refer Figures (e)), the nearest areas of worked ground are located at the junction of Finchley Road and Platt's Lane, located to the north east of the site.

4.01.10 GS Q10 *Is the site within an aquifer?*

No. With reference to the Camden Geological, Hydrogeological and Hydrological Study (Figure (a)) the site is not located above an aquifer.

4.01.11 GS Q11 *Is the site within 50m of the Hampstead Heath ponds?*

No. With reference to the Camden Geological, Hydrogeological and Hydrological Study, the Hampstead pond chains are located to the North approximately 1000m from the site.

4.01.12 GS Q12 *Is the site within 5m of a highway or pedestrian right of way?*

Yes, but only marginally. The proposed basement will be 4.5m from the public footpath and approximately 7m from the highway.

4.01.13 GS Q13 *Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?*

Yes. The existing garages are assumed to have shallow foundations. It is likely that the basement will be deeper than the foundations of adjoining buildings, which we assume do not have basements.

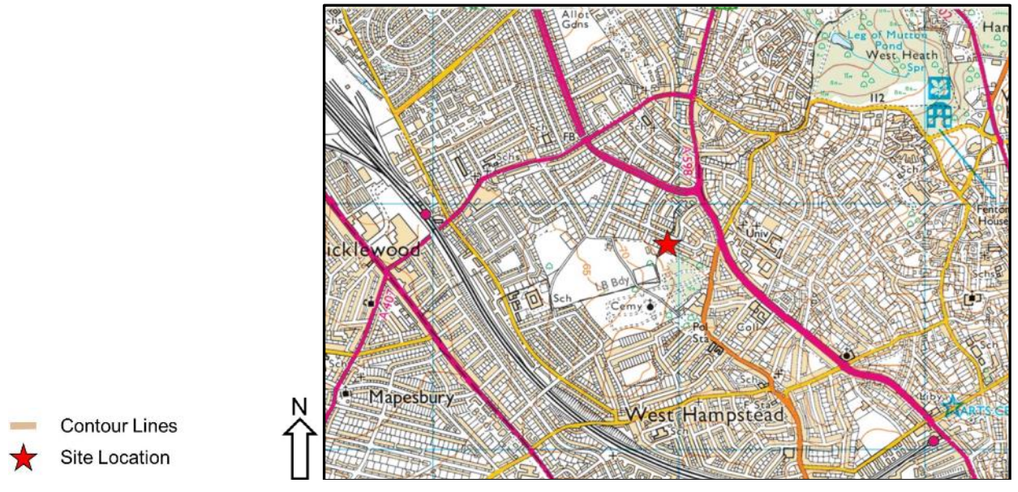


Figure (g)
Topography Map
(Extract from Ordnance Survey Mapping)

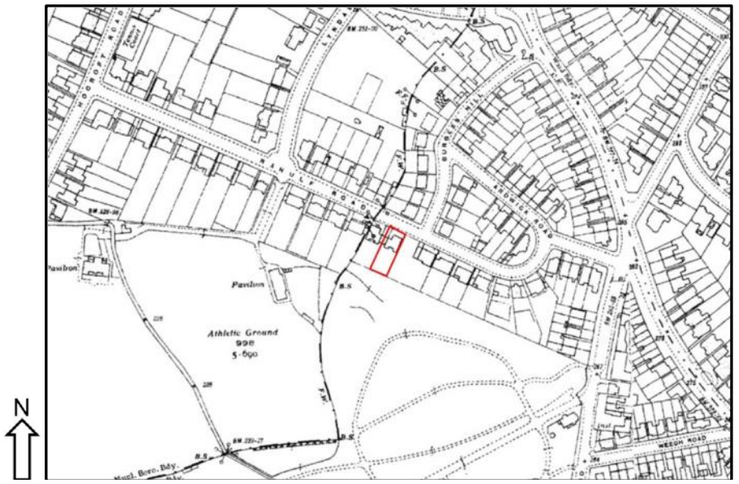


Figure (h)
1934-36 Map

4.01.14 GS Q14 *Is the site over (or within the exclusion zone of) any tunnels, e.g. railway lines?*

No. With reference to Open Street Map (figure (j)) there are no tunnels located below the site. The nearest tunnel is the Northern Line located approximately 1200m to the east of the site. The nearest overground rail is the Thameslink line is located 81000m to the south west of the site.

4.01.15 On the basis of items 4.01.01 to 4.01.14 above and in reference to Figure 2 of CPG4, the aspects that should be carried forward to a scoping stage in respect of land stability are:

- The site being within 100m of a potential spring line.
- The basement being within 5m of a pedestrian highway.
- The works increasing the differential foundation depth with adjoining buildings
- Establishing whether the works will impact any tree root protection zones

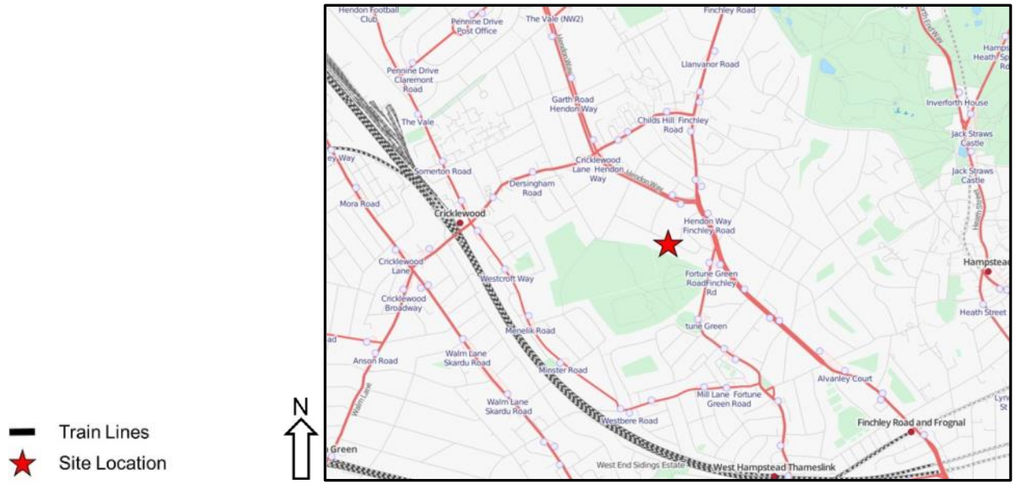


Figure (i)
Map of Underground Infrastructure
(Extract from Open Street Map)

4.02 Stage 2: Scoping

4.02.1 With reference to the Camden Geological, Hydrogeological and Hydrological study Appendix F3, the potential impacts which will need to be considered will include:-

- Whether there will be any impact on the adjacent trees which lead to swelling of the soil and hence an impact on ground stability.
- Whether any changes to the ground water flow regime will be caused which might affect slope stability
- Whether the construction of the basement will result in de-watering of the surrounding aquifer leading to settlement.
- The assessment of any structural damage which could be caused by excavation in proximity of buildings will shallow foundations.
- The risk of damage to the road or pavement, or any underground services buried under.
- Whether removal of trees will affect slope stability.

4.02.2 In response to the above issues: -

- The arboricultural report will be reviewed in terms of the ground stability implications.
- A site walkover will review any subsidence issues on the site.
- The site soil investigation will include ground water monitoring and a hydrogeological assessment.
- An outline construction method statement will be prepared taking on board the proximity of the adjoining buildings and the public highway
- A ground movement and building damage assessment will be prepared by a chartered geologist

4.03 Stage 3: Site Investigation and Study

4.03.1 The GEA Site Investigation of April 2015 is summarised in their report J15086 dated June 2015. In summary of the findings: -

- A varying thickness of made ground and head deposits was encountered over London Clay to the full depth of the investigation.
- The head deposits were deepest in the rear garden.
- The clay subsoils were found to have high plasticity.
- Existing foundations were typically conventional brick spread footings.

4.04 Stage 4: Impact Assessment

4.04.1 The proposed basement will deepen an existing cellar/basement but will remain single storey and will be founded within the head deposits. Provided appropriate construction methods are employed there should be no significant impact in terms of ground stability.

4.04.2 The new basement will be generally constructed by underpinning the existing external and party walls. This is a well-established method and used successfully on numerous single storey basements.

4.04.3 The basement perimeter walls beyond the rear of the building will be constructed with reinforced concrete contiguous piles.

4.04.4 The construction techniques used to construct the front lightwell will be selected to minimise ground movements which might affect nearby tree root protection zones; or services within the pavement. This is likely to comprise reinforced concrete walls cast in hit and miss sections. If the soils are locally loose then temporary works will be employed behind the wall to stabilise the ground during excavation. The services in the pavement will be scanned and marked prior to the commencement of the works.

4.04.5 The unloading of the ground due to the basement excavation may cause some heave of the underlying clay subsoils. Due to the small amount of excavation to achieve the lowered level, the heave expected will be small. To a certain extent, heave forces acting on the basement under the building will be counteracted by the weight of the building over. For the basement within the garden any upward forces will be resisted by the perimeter piles and internal tension piles.

A construction method for the basement has been developed to limit the potential for ground movements and hence potential for damage to adjoining properties. We have set out the principles for this method in Appendix E of this report; this will be developed in detail by the appointed Contractor in due course.

4.04.6 GEA have carried out a ground movement analysis to establish the projected movement of the structure and its effect on the surrounding ground and adjacent buildings. Consideration was also given to the likely movements resulting from heave. Please refer to their report number J15086 of 6 November 2015.

The ground movement analysis has been used to predict potential building damage to the adjoining properties using the classification as defined by Burland et al. Generally the category of predicted damage is Category 0 (negligible), with the exception of the rear wall to no. 17 (Category 1 – Very Slight) and the rear wall to no. 13 (Category 1/2 – Very Slight to Slight).

4.04.7 The new basement will not suffer from seasonal shrink swell subsidence as the depth of the proposed basement will be below the level of any tree root activity. The nearest trees are within the rear garden, and there is no reason to suggest that the construction of the basement will cause adjoining properties to become more susceptible to subsidence, particularly since the adjoining buildings to Ranulf Road have been shown to have deeper foundations due to their part basements.

4.04.8 A monitoring regime will be established and agreed through the Party Wall process. This is likely to include a combination of targets fixed to adjoining buildings, and inclinometers cast within the piles. These will be monitored against target values agreed in advance. If movements exceed ‘Amber’ values then this will be reported and more frequent monitoring agreed, with consideration of mitigating measures. If ‘Red’ values are reached then further excavation will stop to enable implementation of contingency plans such as further propping. Refer to the Construction Method Statement in Appendix E.

5.00 SURFACE FLOW AND FLOODING

5.01 Stage 1: Surface Flow and Flooding Screening

5.01.1 SF Q1 *Is the site within the catchment of the pond 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.

5.01.2 SF Q2 *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 in the same way as the existing condition, with rainwater run-off collected in a surface water drainage system and ultimately discharged to the combined sewer in Ranulf Road.

5.01.3 SF Q3 *Will the proposed basement development result in a change in the proportion of hard surface/paved external areas?*

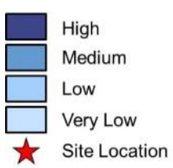
Yes. There will be a small increase in the proportion of hard landscaped areas, as the rear basement area will form a slightly larger hard landscaped terrace than the existing. Soft landscaping will be introduced elsewhere however to mitigate the effects.

5.01.4 SF Q4 *Will the proposed basement result in changes to the profile of inflows (instantaneous and long term) of surface water being received by adjacent properties or downstream watercourses?*

No. There will be no change in the areas of hard landscaping.

5.01.5 SF Q5 *Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream water courses?*

No. The surface water quality will not be affected by the development, as in the permanent condition collected surface water will be generally be from roofs, or external hard landscaping as existing.



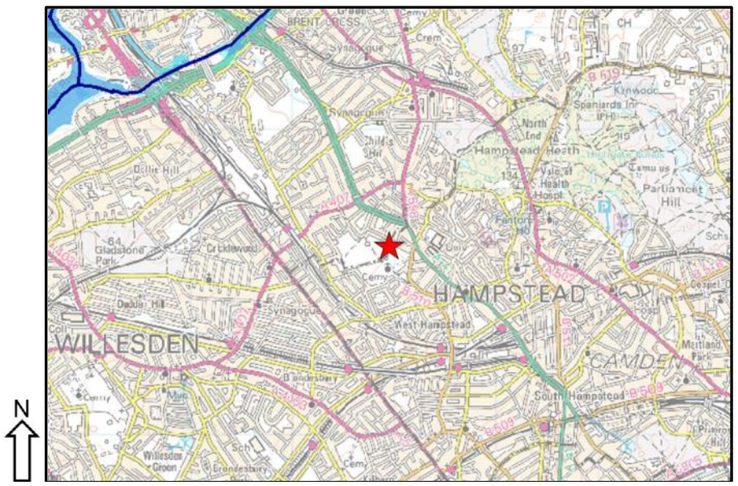
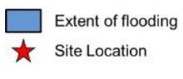


Figure (j)
Areas at Risk of Flooding from Rivers or Sea
(Extract from Environment Agency flood map)



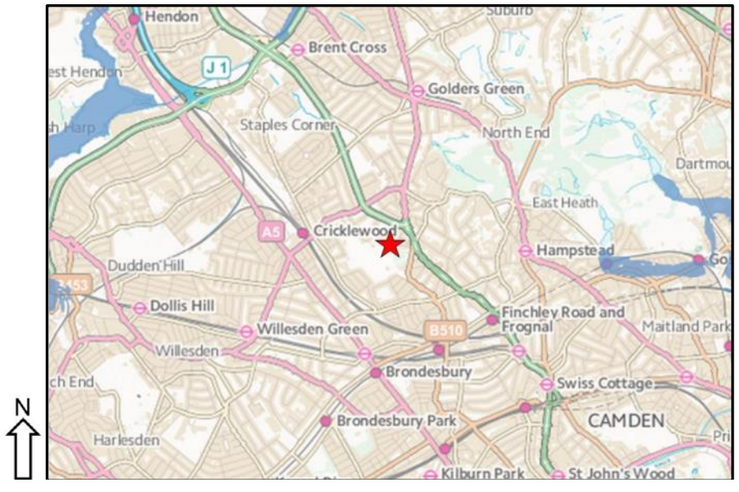


Figure (k)
Areas at Risk of Flooding from Reservoirs
(Extract from Environment Agency flood map)

5.01.6 On the basis of items 5.01.1 to 5.01.5 above and in accordance with the Figure 3 in Camden Planning Guidance CPG 4 (April 2011), there is only one aspects that should be carried forward to a scoping stage in respect of Surface Flow and Flooding.

5.01.7 SF Q6 *Is the site in an area known to be at risk from surface water flooding, such as South Hampstead, West Hampstead, Gospel Oak and King's Cross, or is it at risk from flooding, for example because the proposed basement is below the static water level of a nearby surface water feature?*

No. Ranulf Road is not one of the streets noted within the Camden Planning Guidance CPG 4 (April 2011) as a street "at risk of surface water flooding" (Figure (o)).

A 'Sewer History' enquiry to Thames Water (Appendix A) gave no record of surcharge of sewers having previously affected this particular property.

With reference to the EA Rivers and Sea Flood Maps (Figure (m)), the site is not located within a flood risk zone. The EA Reservoir flood map (Refer figure (n)), shows that the site is not at risk of flooding from reservoirs.

With reference to the EA surface water flooding maps (Figure (p)) the site is at 'very low risk' of flooding.

5.01.8 On the basis of the above and in accordance with the Figure 3 in Camden Planning Guidance CPG 4 (April 2011), a flood risk assessment in accordance with PPS25 is not required.

5.02 **Stage 2: Surface Flow and Flooding Scoping**

5.03 **Stage 2: Surface Flow and Flooding Investigations**

See Impact assessment below

5.04 **Stage 4: Surface Flow and Flooding – Impact Assessment**

5.04 1 Due to the small increase in hard landscaping area, SUDS measures will be employed in the form of attenuation such as lined permeable paving or an enlarged pipe- network to attenuate the surface water flows.

5.04.2 Due to the above measures peak flows to public sewer will not be increased as a result of the works.

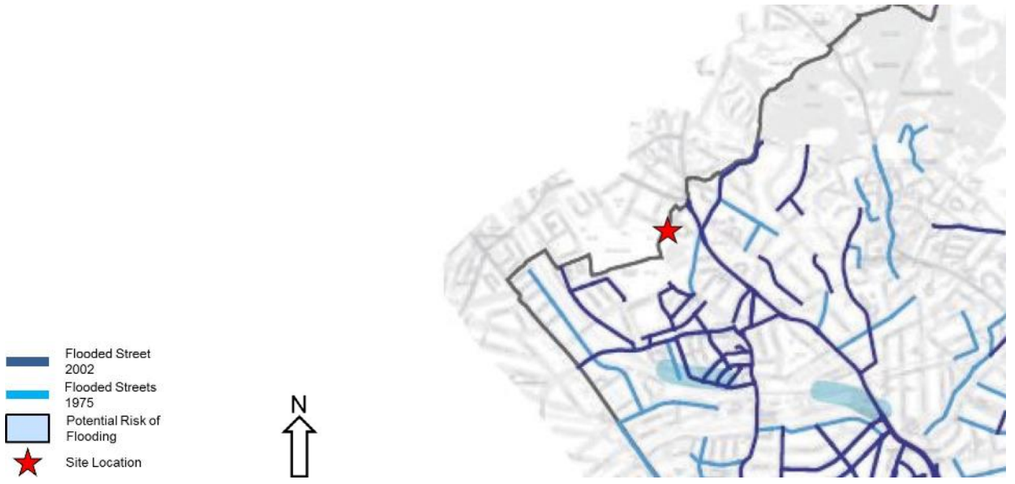


Figure (l)
Flood Map
(Extract from Fig 15 of Camden Geological, Hydrogeological and Hydrological Study)

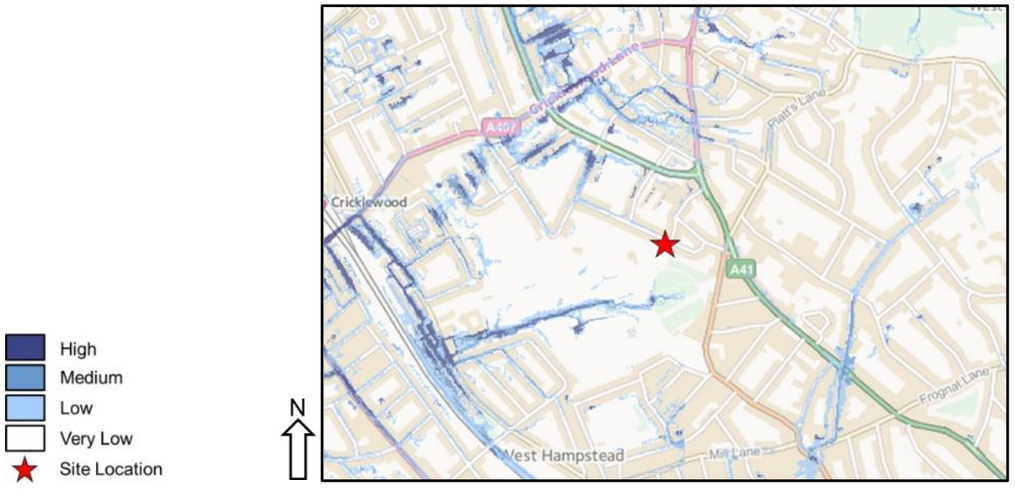


Figure (m)
Flooding from Surface Water
(Extract from Environment Agency flood map)

APPENDIX A

THAMES WATER RECORDS

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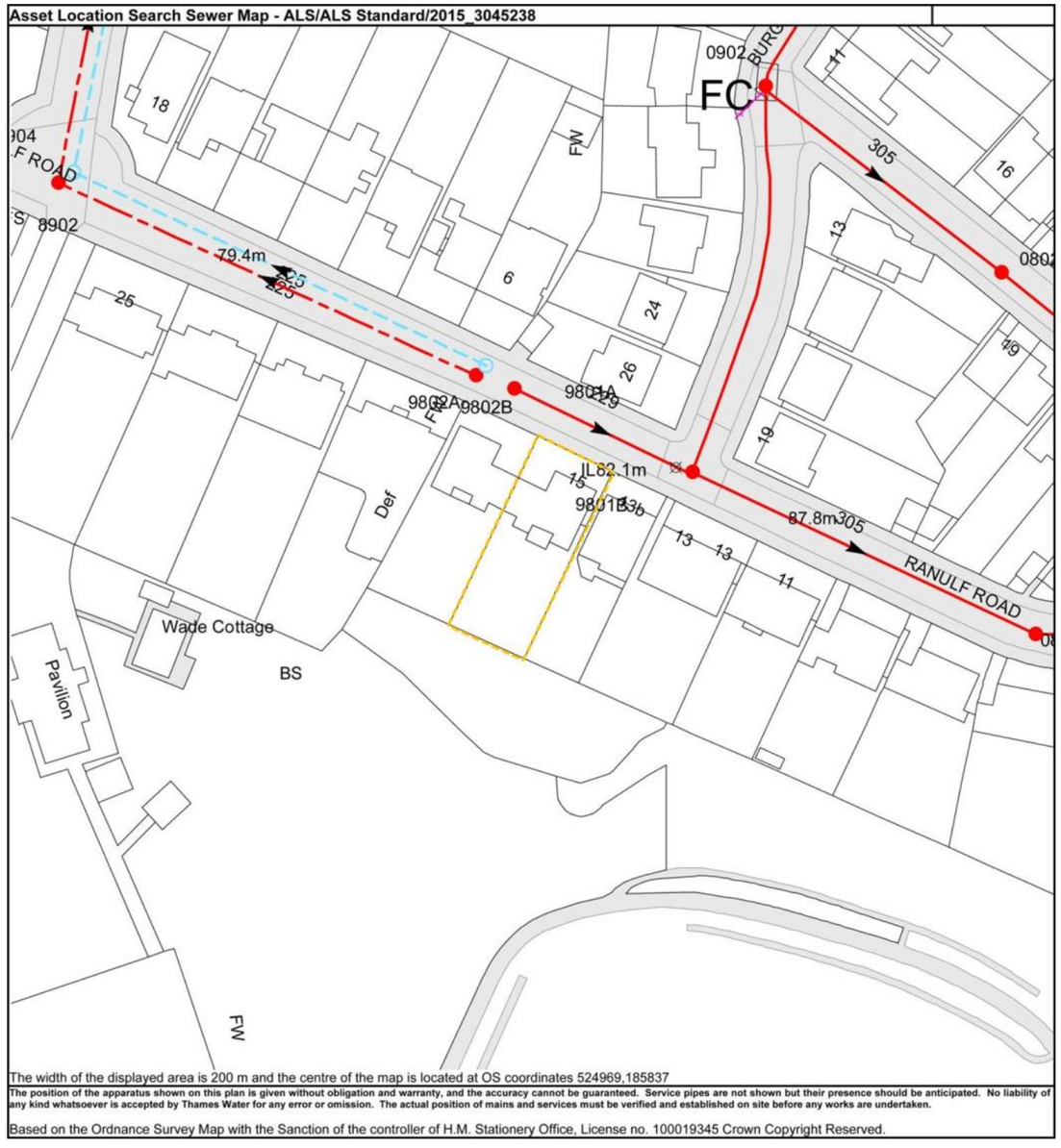

Figure A1 - Extract from Thames Water Asset Search showing a combined sewer

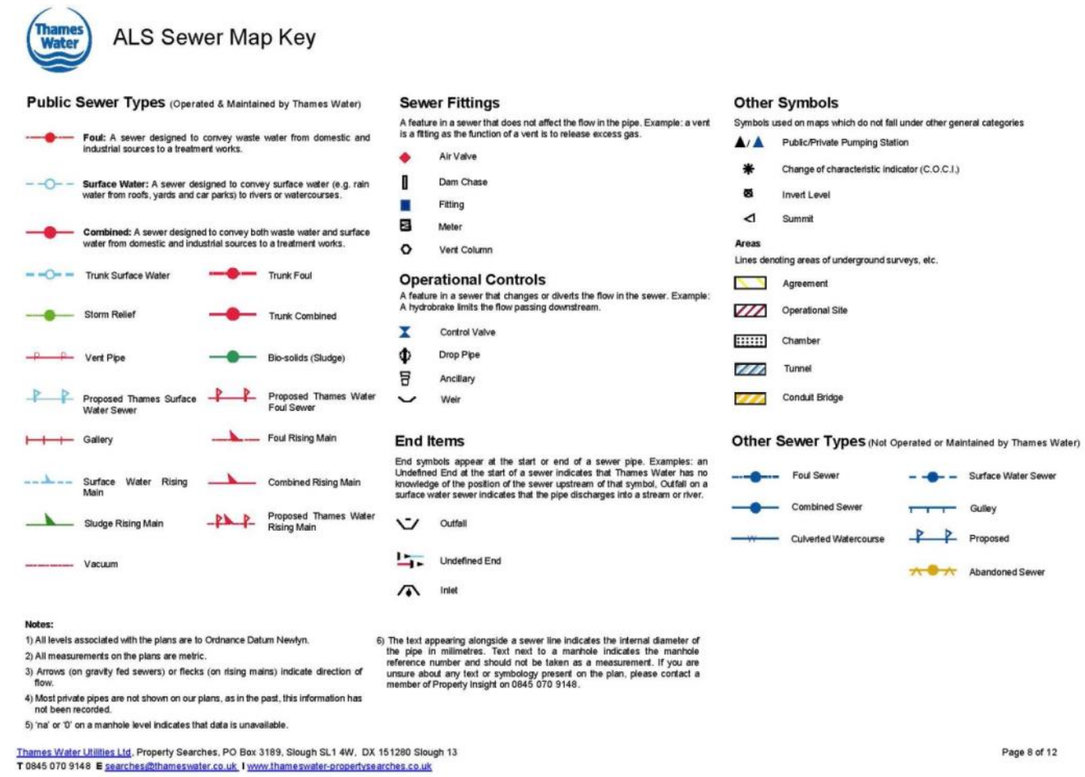

Figure A2 - Key to Thames Water Asset Search

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
0801	88.37	81.2
9801B	86.51	82.02
9802A	84.26	82.44
9801A	83.61	81.3
9802B	83.6	81.9
0802	89.08	82.08
8902	77.17	73.97
8904	77.28	74.63
0902	86.08	n/a

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Figure A3 - Manhole Invert and Cover Levels

Sewer Flooding
History Enquiry

Michael Alexander Consulting Engineers

Search address supplied	15 Ranulf Road London NW2 2BT
Your reference	P2985 15 Ranulf Road
Our reference	SFH/SFH Standard/2015_3045239
Received date	**18 May 2015**
Search date	**18 May 2015**

Thames Water Utilities Ltd

Property Searches
PO Box 3189
Slough SL1 4WW

DX 151280 Slough 13

T 0118 925 1504
E searches@thameswater.co.uk
I www.thameswater-propertysearches.co.uk

Registered in England and Wales
No. 2366661, Registered office
Clearwater Court, Vastern Road
Reading RG1 8DB

Sewer Flooding
History Enquiry

History of Sewer Flooding

Is the requested address or area at risk of flooding due to overloaded public sewers?

The flooding records held by Thames Water indicate that there have been no incidents of flooding in the requested area as a result of surcharging public sewers.

For your guidance:

- A sewer is "overloaded" when the flow from a storm is unable to pass through it due to a permanent problem (e.g. flat gradient, small diameter). Flooding as a result of temporary problems such as blockages, siltation, collapses and equipment or operational failures are excluded.
- "Internal flooding" from public sewers is defined as flooding, which enters a building or passes below a suspended floor. For reporting purposes, buildings are restricted to those normally occupied and used for residential, public, commercial, business or industrial purposes.
- "At Risk" properties are those that the water company is required to include in the Regulatory Register that is presented annually to the Director General of Water Services. These are defined as properties that have suffered, or are likely to suffer, internal flooding from public foul, combined or surface water sewers due to overloading of the sewerage system more frequently than the relevant reference period (either once or twice in ten years) as determined by the Company's reporting procedure.
- Flooding as a result of storm events proven to be exceptional and beyond the reference period of one in ten years are not included on the At Risk Register.
- Properties may be at risk of flooding but not included on the Register where flooding incidents have not been reported to the Company.
- Public Sewers are defined as those for which the Company holds statutory responsibility under the Water Industry Act 1991.
- It should be noted that flooding can occur from private sewers and drains which are not the responsibility of the Company. This report excludes flooding from private sewers and drains and the Company makes no comment upon this matter.
- For further information please contact Thames Water on Tel: 0800 316 9800 or website www.thameswater.co.uk

Thames Water Utilities Ltd

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APPENDIX B

PHOTOGRAPHS

Photograph 1

Photograph 2

Photograph 3

Photograph 4

APPENDIX C

IMPERMEABLE AREA PLANS

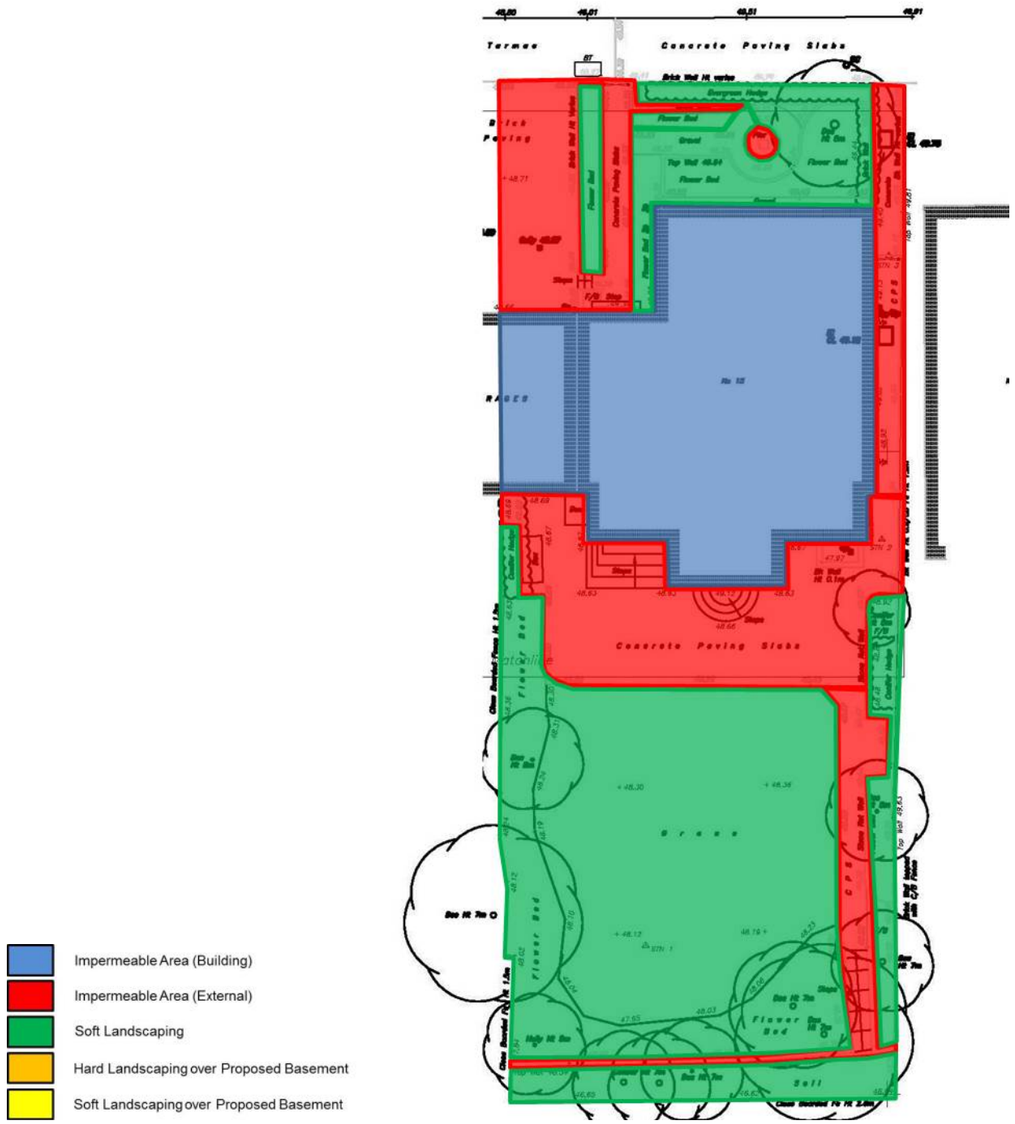
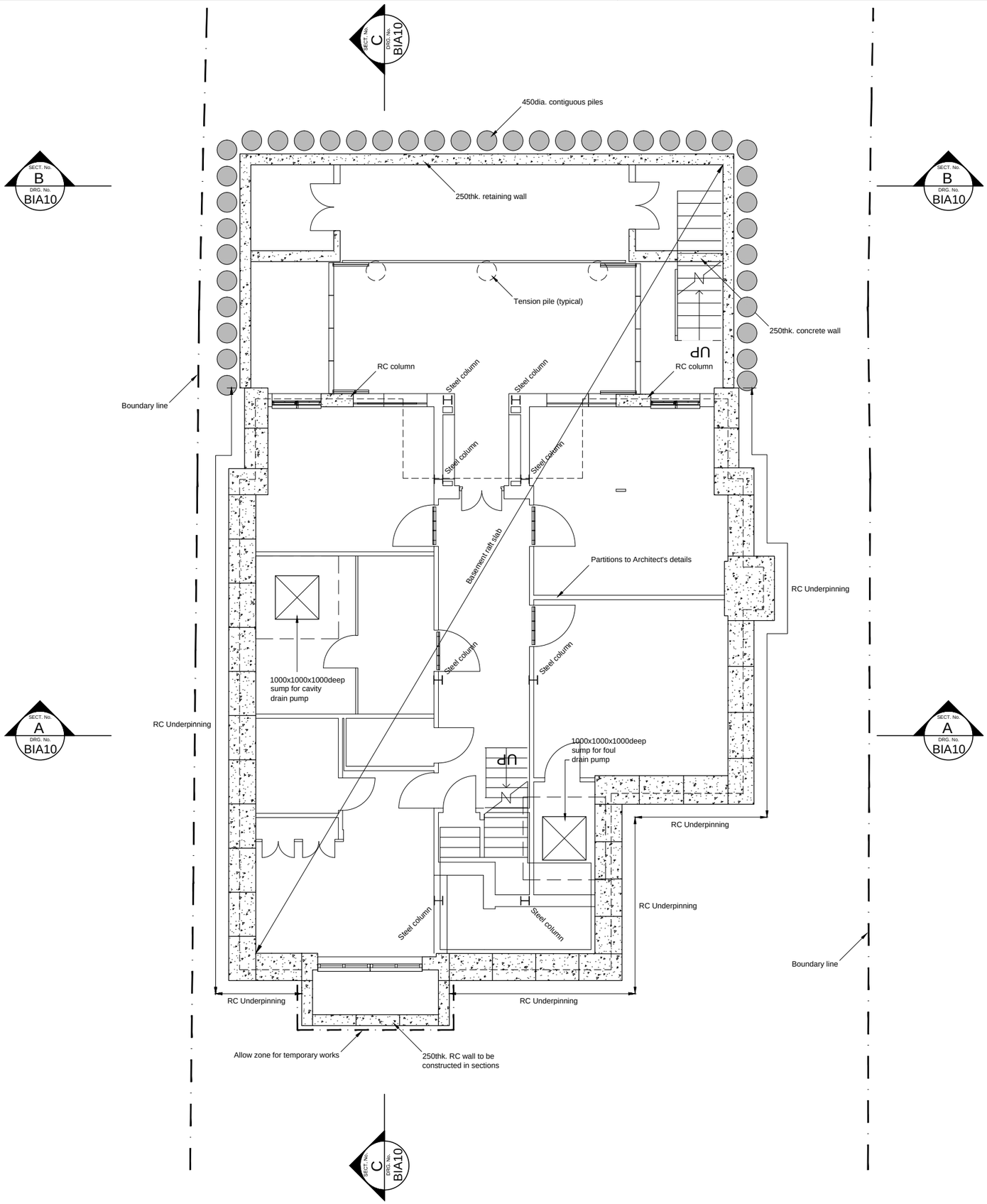


FIGURE C1 – EXISTING PLAN

FIGURE C2 – PROPOSED PLAN

APPENDIX D

OUTLINE STRUCTURAL DRAWINGS



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NOTES

1. This drawing shall be read in conjunction with all relevant Architects & Engineers drawings and specifications.
2. Do not scale any dimensions. All dimensions are in millimetres and to be checked on site.

Rev.	Date	Description	By
B	23.06.15	For basement impact assessment	RJC
A	12.06.15	For basement impact assessment	RJC

FOR BIA

Architect
ARCHIAL NORR

Project Title
15 RANULF ROAD
LONDON NW2

Drawing Title
BASEMENT
GENERAL ARRANGEMENT

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email mail@maengineers.com
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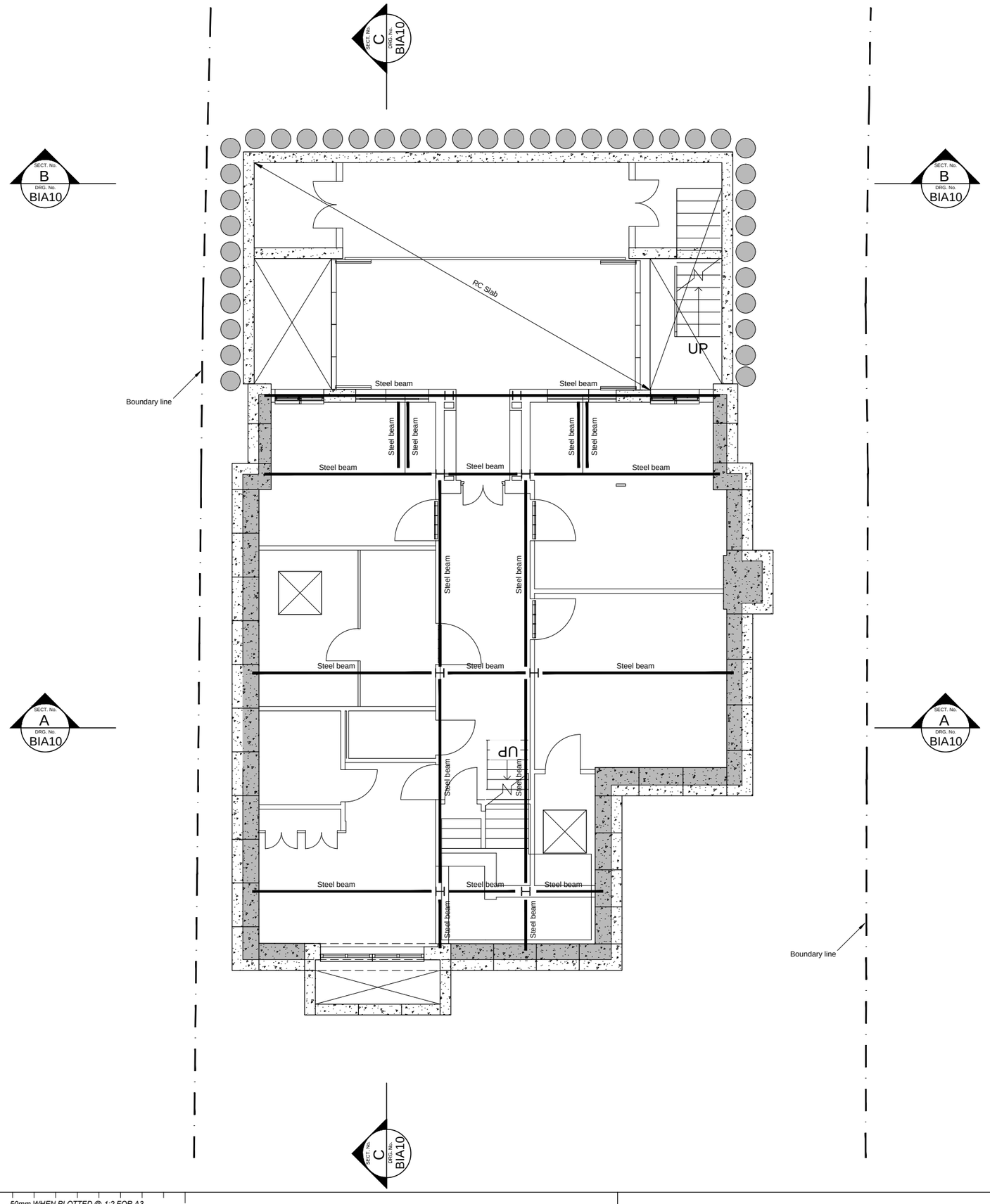
Drawn	RJC June 15
Checked	ARC June 15
Scale	1:50 1:100
Size	A1 A3
Project No.	P2985
Drawing No.	BIA01
Rev.	B



NOTES

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Rev.	Date	Description	By
B	23.06.15	For basement impact assessment	RJC
A	12.06.15	For basement impact assessment	RJC

FOR BIA

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ARCHIAL NORR

Project Title
15 RANULF ROAD
LONDON NW2

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RJC	June 15	ARC	June 15

Scale	Size
1:50	A1
1:100	A3

Project No.	Drawing No.	Rev.
P2985	BIA02	B

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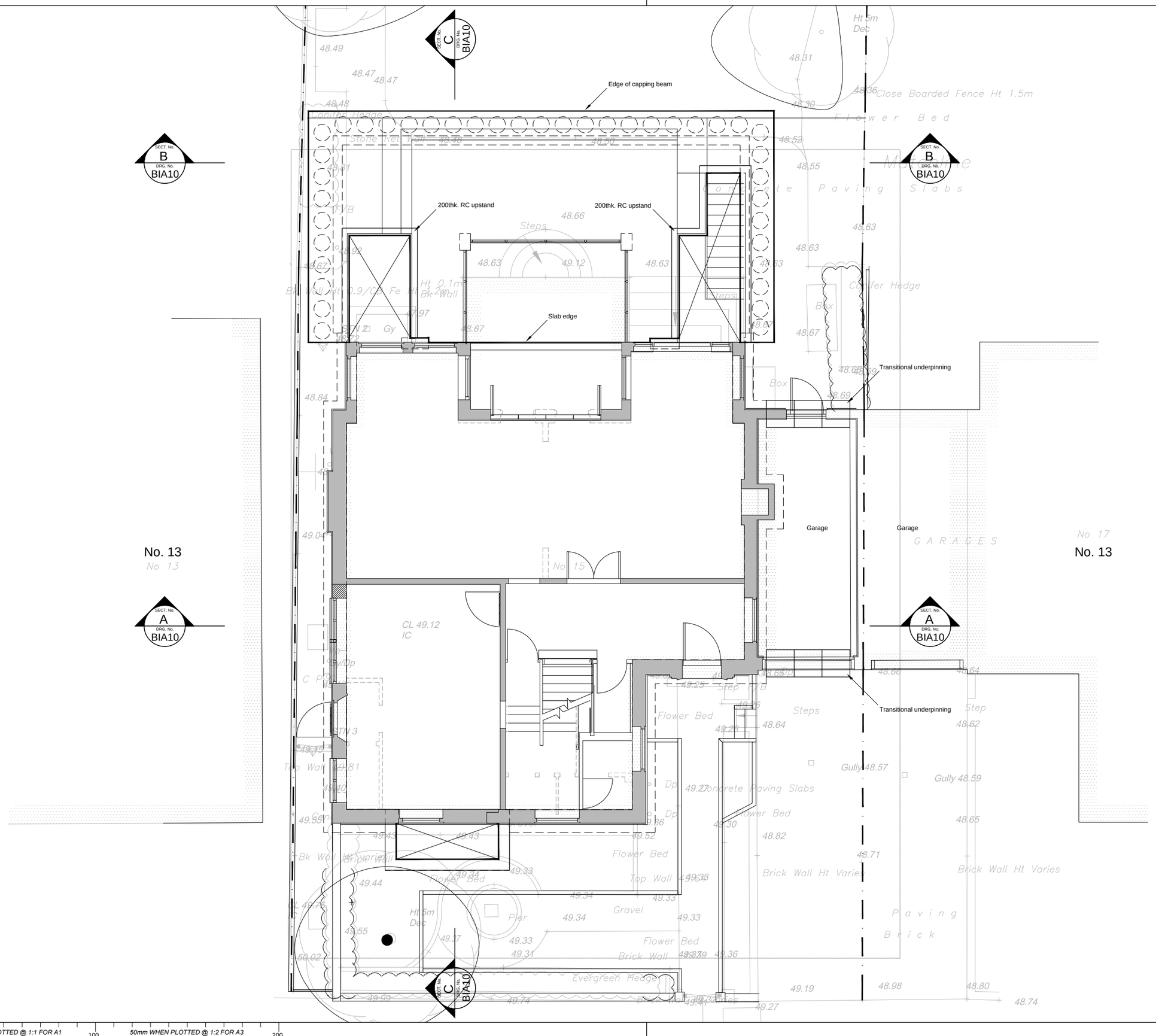

NOTES

1. This drawing shall be read in conjunction with all relevant Architects & Engineers drawings and specifications.
2. Do not scale any dimensions. All dimensions are in millimetres and to be checked on site.

Rev.	Date	Description	By
B	23.06.15	For basement impact assessment	RJC
A	12.06.15	For basement impact assessment	RJC

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Architect
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Project Title
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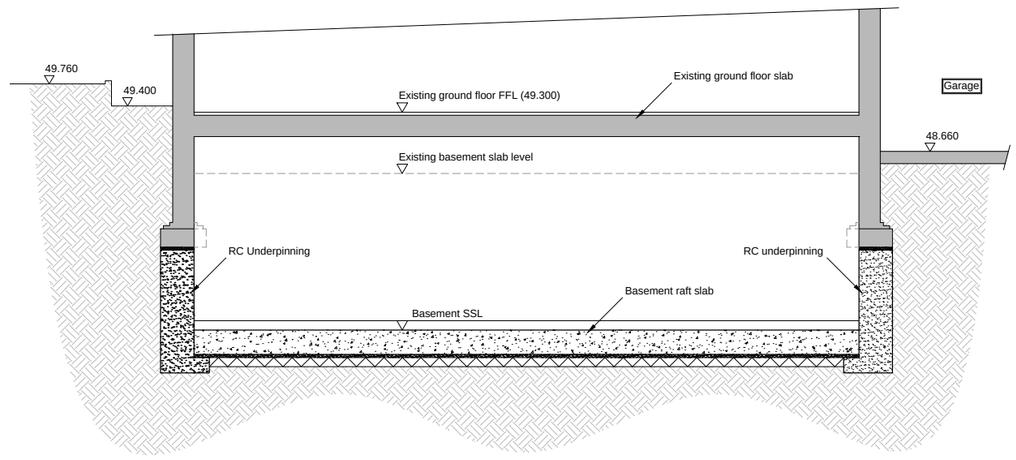
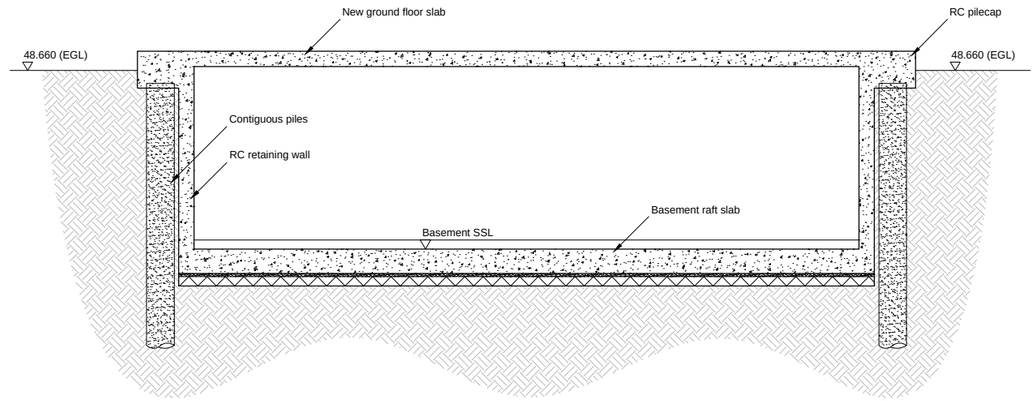
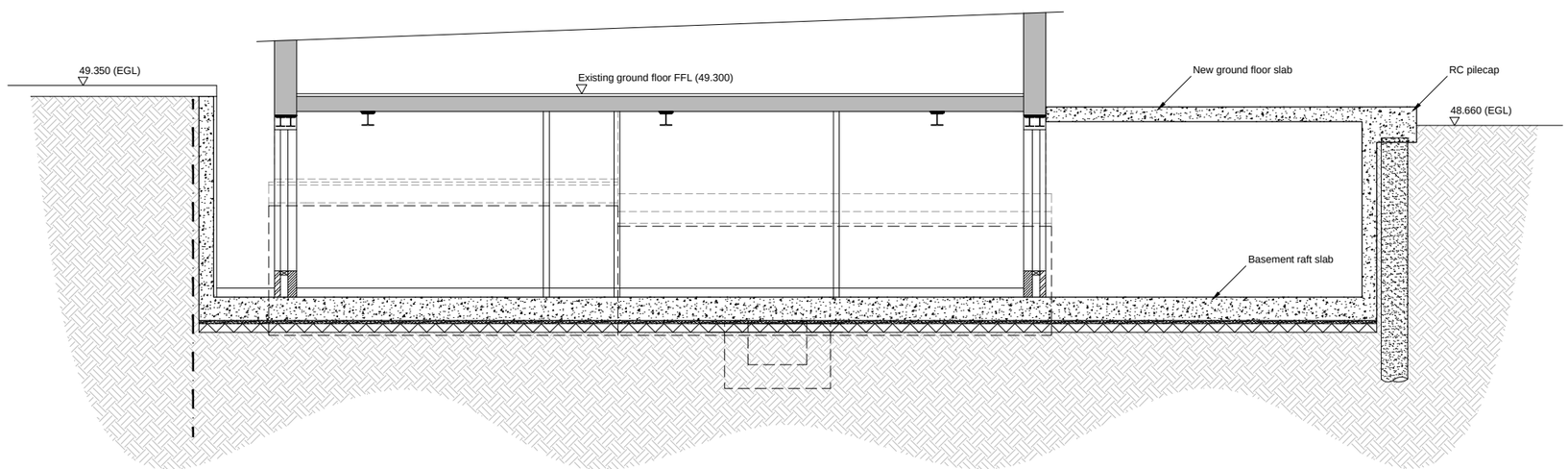
Scale	1:50 / 1:100	Size A1 / A3
Project No.	Drawing No.	Rev.
P2985	BIA03	B



SECTION A-A



SECTION B-B



SECTION C-C

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NOTES

1. This drawing shall be read in conjunction with all relevant Architects & Engineers drawings and specifications.
2. Do not scale any dimensions. All dimensions are in millimetres and to be checked on site.

Rev.	Date	Description	By
B	23.06.15	For basement impact assessment	RJC
A	12.06.15	For basement impact assessment	RJC

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Drawn	RJC	June 15
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Scale	1:50 1:100	Size A1 A3

Project No.	Drawing No.	Rev.
P2985	BIA10	B

APPENDIX E

CONSTRUCTION METHOD STATEMENT

CONSTRUCTION METHOD STATEMENT

E.01 The following provides an outline Method Statement for the construction of the basement. This will be developed and finalised by the appointed Contractor, once the detailed design is complete.

E.02 Prior to works commencing, schedules of condition will be carried out to adjoining properties as part of the party wall process. Schedules of condition will also be carried out to the upper floor flats.

E.03 Monitoring targets will be fixed to the adjacent properties in agreed locations following the Party Wall process. Initial readings will be taken prior to any construction work commencing.

E.04 It is assumed that the construction will commence with the underpinning works to the existing house.

Underpinning

The underpinning to the external and party wall will be constructed to a typical underpinning sequence of 1,4,2,5 and 3. The underpinning is relatively shallow given the existing cellar depth and therefore will be formed in a single stage. Pins are constructed in reinforced concrete with the bars installed on a pin by pin basis but connected to adjacent pins. Once the concrete is cured,(typically after 24 hours) the top is then fully dry packed to the underside of the foundation.
Underpinning will commence from the existing basement level in places where the new floor will only be lowered by approximately 500mm from the existing levels. Elsewhere it will commence from floor level which is approximately 1.0 metres below the general ground floor level at the front.

Lateral earth pressures have also to be considered. The design of the underpinning has resulted in the use of reinforced underpins, which will also be temporarily propped during excavation and permanently propped by the construction of the reinforced basement slab and ground floor structure. The temporary propping will be monitored during excavation and construction works.

Given that the existing cellar is below ground levels, the underpinning is mostly to be constructed in the London Clay and consequently there should not be a need for temporary shuttering to the pins. If loose material is encountered the sides of the excavation for the pins will be temporarily supported and propped on a pin by pin basis in the normal way.

E.05 The sides of the basement in the garden will then be constructed from reinforced concrete piles bored from ground level. A concrete capping beam will be constructed on the piles and will be propped at high level across the corners of the excavation.

E.06 The front lightwell will be constructed with reinforced concrete walls, cast in sections. Temporary works will be used if the soils are found to be locally loose.

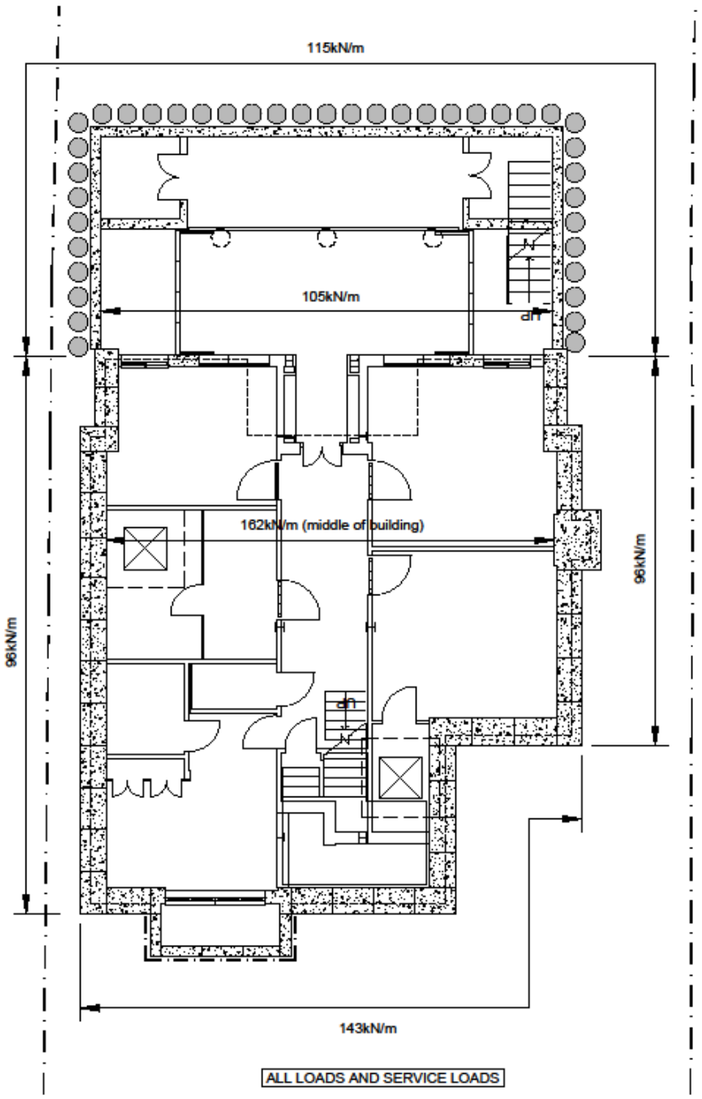

Figure E1 - Wall Loads

Bearing Strata

The GEA report assesses the allowable bearing pressures at the basement depth to be in the region of at least 100kN/$m^{2.}$ in the head deposits Through experience this will increase with depth. With expected typical loads (shown on figure E1) of 96kN/m the underpinning will be designed with a suitable toe to ensure that the bearing pressures are not exceeded.

Temporary Propping

Temporary horizontal props will be installed across the width of the property, just below ground floor level between the underpinned walls. Props are likely to be traditional steel tubes designed for purpose or alternatively proprietary props supplied by one of the numerous temporary works suppliers all depending on the Contractors preference. Propping details will be agreed and "signed off" by the Structural Engineer.

Temporary Horizontal props may be installed between the piled walls in the rear garden. Alternatively and depending on the Contractors preference, the ground floor concrete slab may be cast early and this area constructed top down. The slab thereby providing the permanent and temporary horizontal propping required.

The proposals for temporary propping will mitigate the potential for ground movements and hence damage to adjoining properties.

E07 The internal load bearing structures will be supported on temporary works and permanent steel columns which will be founded on sacrificial pad foundations below the basement slab level. These will be constructed in excavated shafts from within the house. Alternatively reinforced concrete beams could be used, constructed using stools – the 'Pynford' method.

E.08 Bulk excavation will then commence. Any minor water inflows to the basement excavation will be collected in sumps and pumped. Temporary horizontal props will be installed at the tops of the underpins. Permanent propping will be achieved in the form of steel beams spanning across the building.

E.09 Excavation within the rear garden will be carried out within the perimeter formed by the reinforced concrete retaining walls.

Heave

As discussed in 4.04.5 the expected heave will be low due to the existing cellar being at least 1.8m depth. The basement slab beneath the house, however will be designed for heave and hydrostatic forces in the usual way.

The total heave pressure beneath the basement in the rear garden has been assessed by GEA to be a maximum of 60kN/m^2. At least half of the expected heave is due to an initial elastic response immediately following excavation. This basement slab will be designed for the residual long term heave and hydrostatic pressures and the preliminary calculations have resulted in the raft thickness of 400mm on the drawings.

E.10 When bulk excavation is complete to basement level, the bottom surface of the excavation will be immediately blinded.

E.11 The basement raft slab will then be constructed and tied into the concrete underpins.

E.12 Works can then proceed with the construction of the ground floor slab to the basement box within the garden assuming that top down techniques have not already been employed

E.13 Works can then proceed with the construction of the ground floor slab to the basement box within the garden.

E.14 The internal works with the ground floor of the main house can then be completed, using the new basement to support any temporary works required.