

**INTERIM BASEMENT IMPACT ASSESSMENT SCREENING REPORT:**  
**'LAND STABILITY'**

**PROPOSED REDEVELOPMENT:**

**10a OAKHILL AVENUE, LONDON NW3 7RE**



**Client:** ESI Ltd  
New Zealand House  
160 Abbey Foregate  
Shrewsbury  
SY2 6FD

**Report ref:** 9374D/MC/AW

**Date:** 27<sup>th</sup> February 2015 [Rev 0]

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### **Plans, drawings & photographs**

-  Site Photographs
-  Proposed Development Plans and Section
-  Slope Angle Map
-  Site Plan
-  Location Maps

## 1.0 INTRODUCTION

The proposed development of No. 10a Oakhill Avenue, London NW3 7RE, is for demolition of the existing house and construction of a three-storey house, with two level basement. The total depth of the completed basement below upper ground floor level [at +95.65mOD] is expected to be approximately 6.5m, with an estimated area of 627m<sup>2</sup>. The new construction will occupy a similar upper ground floor footprint to the existing building, although the lower ground floor and basement will extend some 10m out from the rear and closer to the road at the front.

This interim report presents the potential impact relating to the proposed subterranean development in terms of 'slope stability' as presented in the guidance document published by Arup 2010: 'Camden geological, hydrogeological and hydrological study: Guidance for subterranean development', Issue01 dated November 2010.

The site was the subject of a previous report: Soil Consultants Limited's report, 'Factual Ground Investigation' [Ref 9374A/MC/AW, dated February 2015] which was for an earlier scheme.

## 2.0 SITE DESCRIPTION

The site of our investigation comprises the existing residential buildings, at number 10a Oakhill Avenue, in the Frognal and Fitzjohns district of the London Borough of Camden, at postcode NW3 7RE and approximate National Grid Reference 525690E, 185715N – as shown on the Location Maps in the Appendix.

The site, which is approximately rectangular on plan, extends for some 23m along the northern side of Oakhill Avenue and 60m towards the north-west - covering an area of around 1240m<sup>2</sup>. The existing buildings have a maximum of four above-ground storeys, including the front-aspect lower ground floor and are set amidst hardstanding with peripheral soft landscaping to the front and a garden to the rear. The site is bounded by further residential properties along Oakhill Avenue to the front and side and also to the rear, on Heath Drive.

The site is on ground that slopes gently down, from Parliament Hill 500m to the NE, towards the River Westbourne, some 2.9km to the SW. The site is at an approximate elevation of +93mOD, although there are various elevation changes across the site. Oakhill Avenue descends the hill along the steepest gradient and there is a fall across the length of the property of around 2.0m: that is, a gradient of 1-in-12, or 4.8°. The property is partially cut into the hillside and the southern half has been cut [by some 2.5m] to form an area of level hardstanding, providing access to lower ground floor garages, that are at street level at that end of the site. The northern half of the property is fronted by a terrace garden, which is accessed by stairway; rising from street level to the general 'ground floor' level of +96.2mOD. This general level extends, apart from a western corner of the rear garden which is at a lower elevation, to a point approximately mid-way along the property's length. From here the site slopes down by around 2.0m, at a gradient of 1-in-14, or 4.1°.

Beyond the western site boundary the ground slopes down more steeply, towards a valley of the headwaters of the River Westbourne, down which Heath Drive runs. Although the slope angle there could not be properly assessed, the Camden Slope Angle Map [Figure 16 of the Arup report] shows angles, in that vicinity, of between 7° and 10° and, locally, >10°. These slope angles are, however, outside of the site and some 20m from the existing building footprint, as shown on the annotated plan in the Appendix. There are rows of mature trees within the pavement on both sides of Oakhill Avenue and several mature trees, including oaks, within the gardens of the property and neighbouring properties.

It is understood that the site has been the subject of an arboricultural survey and it is recommended that this be consulted with regard to tree locations, conditions, height and species.

The current site features are shown on the Site Photographs and annotated Site Plan, which are included in the Appendix.

### 3.0 BASEMENT IMPACT ASSESSMENT – LAND STABILITY

As part of the Local Authority planning process for this development we have been asked to provide a 'Land Stability' basement impact assessment for this scheme. The hydrology/hydrogeology aspects of the basement impact assessment is being undertaken by ESI.

The screening stage for slope stability has been considered as set out in Figure 2 of CPG4 Camden Council, 2010 [Slope stability screening flowchart] and the results have been tabulated in Table 1 below.

Table 1: Impact of proposed basement works on SLOPE stability

Impact question	Answer	Justification	Reference
1] Does the existing site include slopes, natural or man-made greater than 7 degrees [approximately 1-in-8]?	No	There is a slope of less-than 5 degrees in and around the site.	Measurement from available survey data both on site and in the local vicinity (reference Kings Site Survey drawing 95274.0001, dated April 2013 and Ordnance Survey data).
2] Will the proposed re-profiling of landscaping at site change slopes at the property boundary to more than 7 degrees?	No	There are no plans to alter these site levels.	Site plans / proposed development plans.
3] Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7 degrees?	Yes	Available reference shows slopes greater than 7 degrees in the properties to the west and north-west. However, from our observations on site, this land is located >20m distance from the building footprint. The site does not lie within the areas of >7° slope highlighted in Figure 16 of the Arup Report, which would otherwise require land stability issues to be considered in detail.	The Arup report: Figure 16, Slope Angle Map and the annotated version in this report Appendix.
4] Is the site within a wider hillside setting in which the general slope is greater than 7 degrees?	Yes	Available reference shows slopes greater than 7 degrees within the valley of the headwaters of the River Westbourne, to the north-west. However, this land is located >20m distance from the building footprint.	The Arup report: Figure 11, Watercourses; and Figure 16, Slope Angle Map and the annotated version in this report Appendix.

Impact question	Answer	Justification	Reference
5] Is the London Clay the shallowest stratum at the site?	No	<p>Available data show the Claygate Member of the London Clay Formation to be the shallowest stratum at the site.</p> <p>This was confirmed by our ground investigation and Head deposits were not encountered.</p> <p>However, it is likely that piled retaining walls will transfer structural loads down into the London Clay, and well below the Claygate Beds, therefore removing any significant risk from slope stability issues.</p>	<p>The Arup report: Figure 4, North Camden Geological Map.</p> <p>SCL Factual GI report 9374/MC/AW, dated May 2013.</p>
6] Will any trees be felled as part of the proposed development and/or any works proposed within any tree protection zones where trees are to be retained?	Yes	<p>Two Cypress trees are to be removed as is one Birch tree graded 'unsuitable'.</p> <p>There will be only minor to slight encroachments onto RPA.</p>	<p>Landmark Trees' Tree Constraints Plan, dated May 2013 and ESI Ltd email of 21 May 2013.</p>
7] Is there a history of seasonal shrinkage/swelling subsidence to the local area, and or evidence of such effects at the site?	Likely	<p>No evidence of structural distress due to soil volume changes was evident at the site.</p> <p>The shrinkage/volume-change potential of the Claygate Member has been shown to be low. The deeper London Clay strata are expected to be of high volume-change potential.</p> <p>A significant number of trees, including mature oaks, are present within the site and close to the site boundaries. These data indicate that soil shrinkage and swelling is likely to occur, but that the effects will not be major as the proposed basement is highly likely to extend below the depth of any volume change.</p>	<p>SCL Factual GI report 9374/MC/AW, dated May 2013.</p>
8] Is the site within 100m of a watercourse or a potential spring line?	Yes	<p>Available reference shows the valley of the headwaters of the River Westbourne a short distance to the north-west.</p>	<p>The Arup report: Figure 11, Watercourses.</p>
9] Is the site within an area of previously worked ground?	No	<p>No areas of backfill have been identified within 1km.</p>	<p>The Arup report: Figure 4, North Camden Geological Map and SCL walkover.</p>
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?	Yes	<p>The Claygate Member is classed as a 'Secondary A' aquifer. The underlying London Clay is classed as an 'Unproductive stratum'.</p> <p>Basement construction will likely encounter groundwater within the Claygate Member and dewatering/groundwater control is likely to be required.</p>	<p>SCL Factual GI report 9374/MC/AW, dated May 2013.</p>

Impact question	Answer	Justification	Reference
11] Is the site within 50m of the Hampstead Heath Ponds?	No	The nearest pond is more than 750m distant.	The Arup Report: Fig 14, Hampstead Heath Surface Water Catchments and Drainage.
12] Is the site within 5m of a highway or pedestrian right of way?	Yes	Oakhill Avenue along the southern boundary.	Site plans.
13] Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?	Yes	<p>Piled basement retaining walls are likely to extend below founding levels to adjacent properties.</p> <p>The basement should be at reasonable distance [approx 3m] from adjacent structures so as not to affect their stability.</p> <p>The movement expected from a properly constructed and supported wall should be relatively small, within tolerable limits.</p>	Proposed development plans
14] Is the site over [or within] the exclusion zone of any tunnels, e.g. railway lines?	No	Nearest tunnels >1km distant.	The Arup Report: Fig 18, Transport Infrastructure






## 4.0 CONCLUSIONS

From the available information we consider that the risk to ground stability from this development should be LOW and no additional work in respect of land stability assessment is necessary. However, this is on the condition that the works are undertaken by reputable specialists and the temporary and permanent works are adequately designed, with due consideration to the geology and hydrogeology of the site and surrounding areas. We conclude that for the proposed basement construction, it should certainly be possible to design the construction methods to ensure that ground movements do not adversely affect any adjacent properties and infrastructure.



## **APPENDIX**

### **Plans, drawings & photographs**

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-  Proposed Development Plans and Sections
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Walkover Survey Photographs – 2 May 2013



General view of the front of the property



N half of the front of the property and No 8



View up along Oakhill Avenue



View down along Oakhill Avenue



View down along Oakhill Avenue



Rear garden – western area at slightly lower elevation



**Walkover Survey Photographs – 2 May 2013**



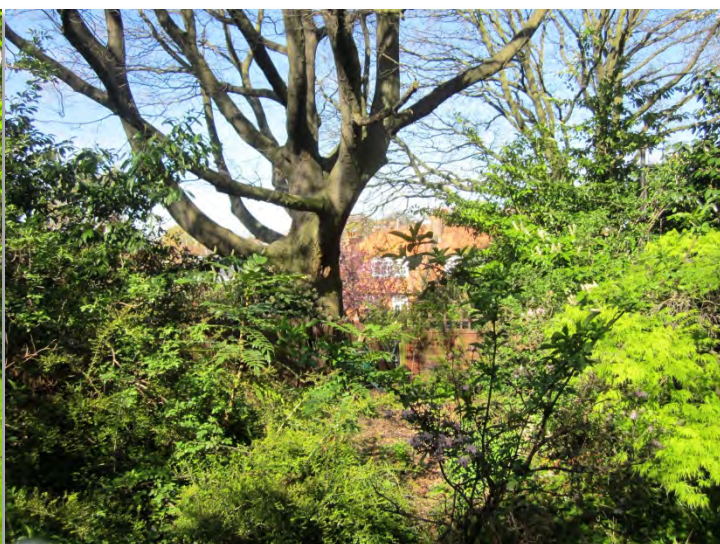
**View to NNE from western edge of house**



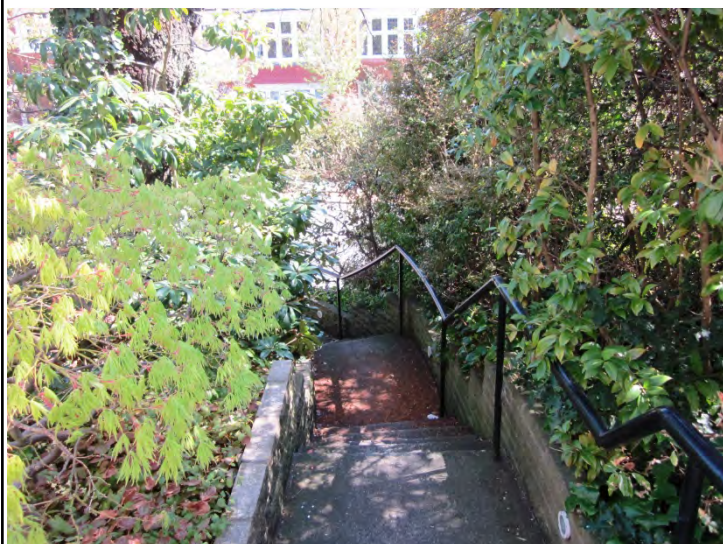
**View to N across rear garden**



**Rear of house**



**View down towards property on Heath Drive - from rear garden**

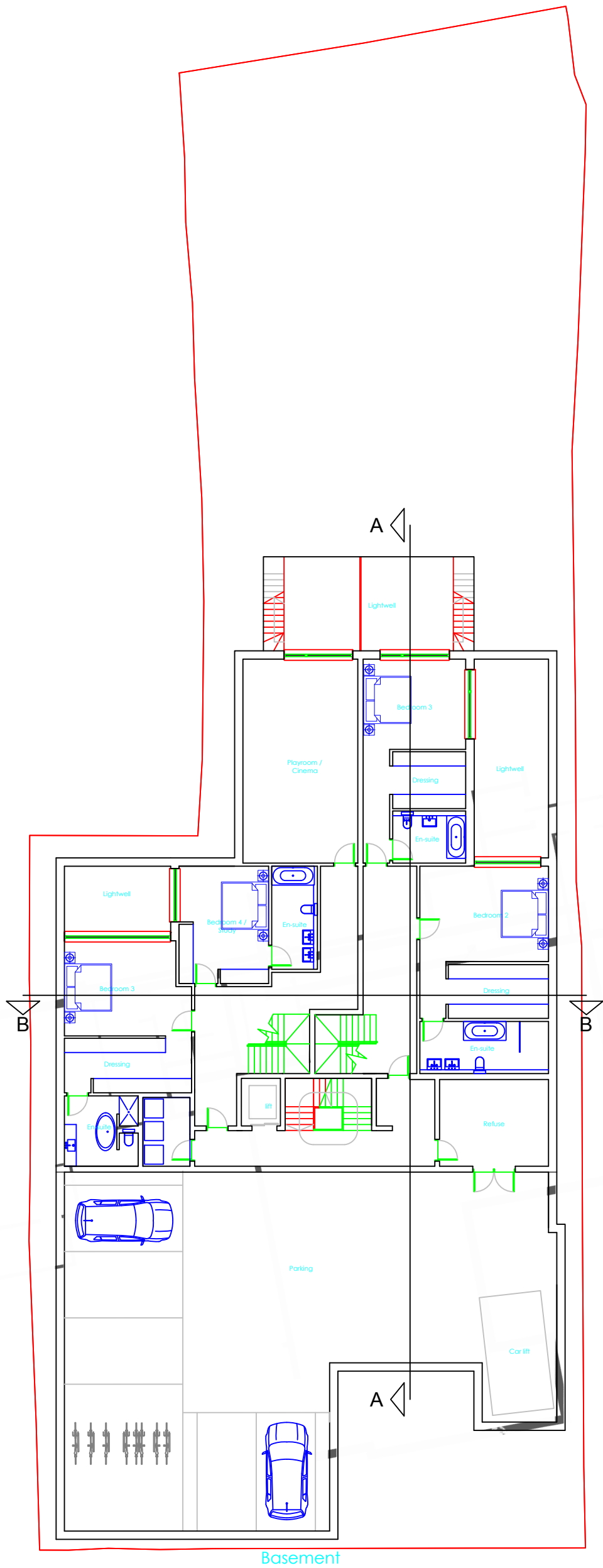


**View from top of stairs – N part of site**



**View across hardstanding from N terrace**

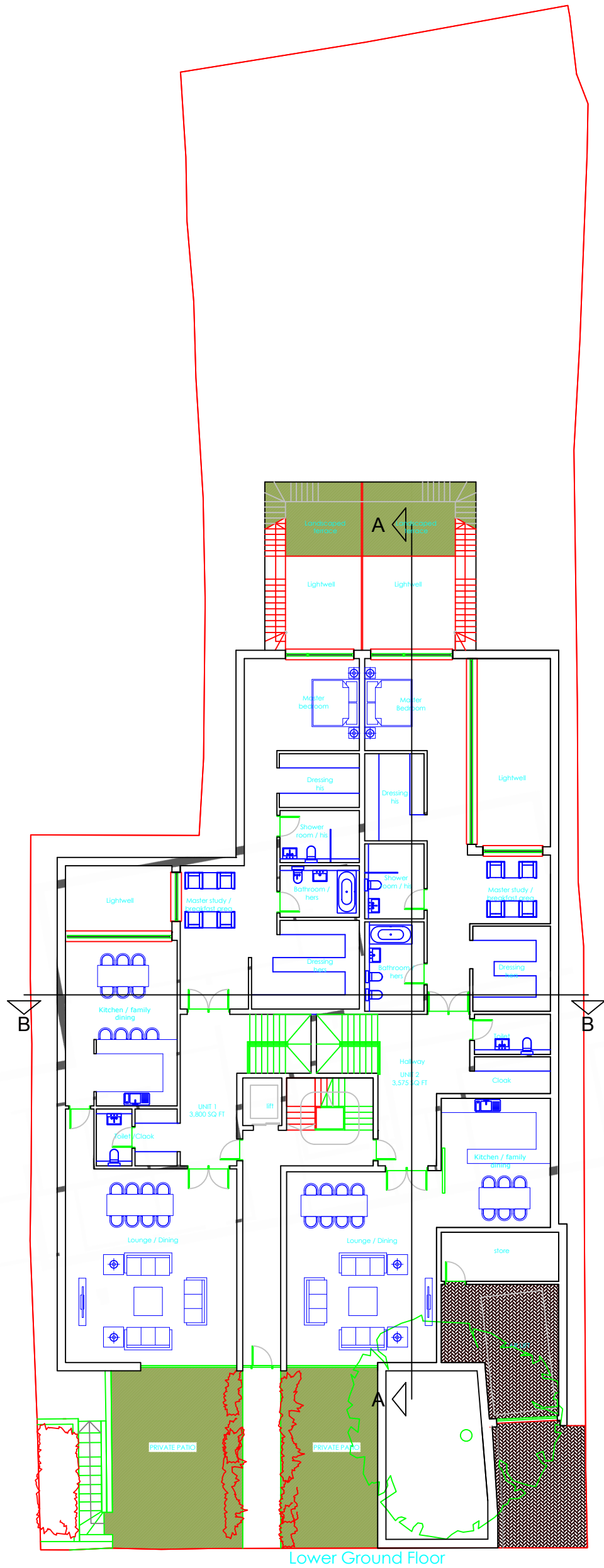




Basement

# Basement floor

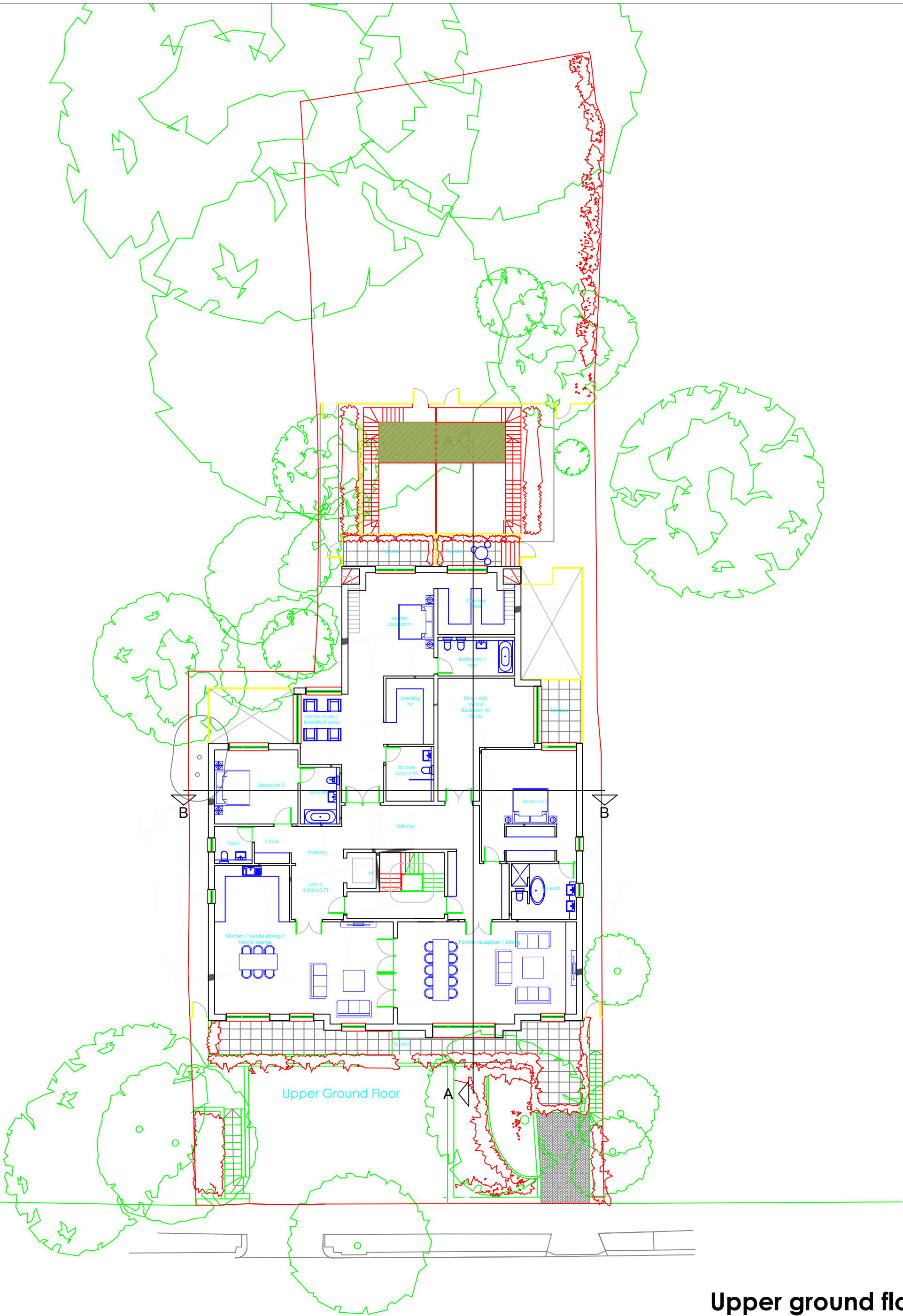
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Issue	For comment	
<b>ad design concepts</b>		
Project		planning - architecture - interiors
Drawing Title:		10a Oakhill Avenue, London NW3
Drawing Number:		Proposed basement plan
Revision:		99-010
Date:		November 2014
Scale:		1:100@A1; 1:200@A3
AD Design Concepts Ltd - 25 Glimpian Gardens, London NW2 1JH - www.addconcepts.co.uk - tel: 0208290343 - fax: 02084531424 - e-mail: info@addconcepts.co.uk		



Lower Ground Floor

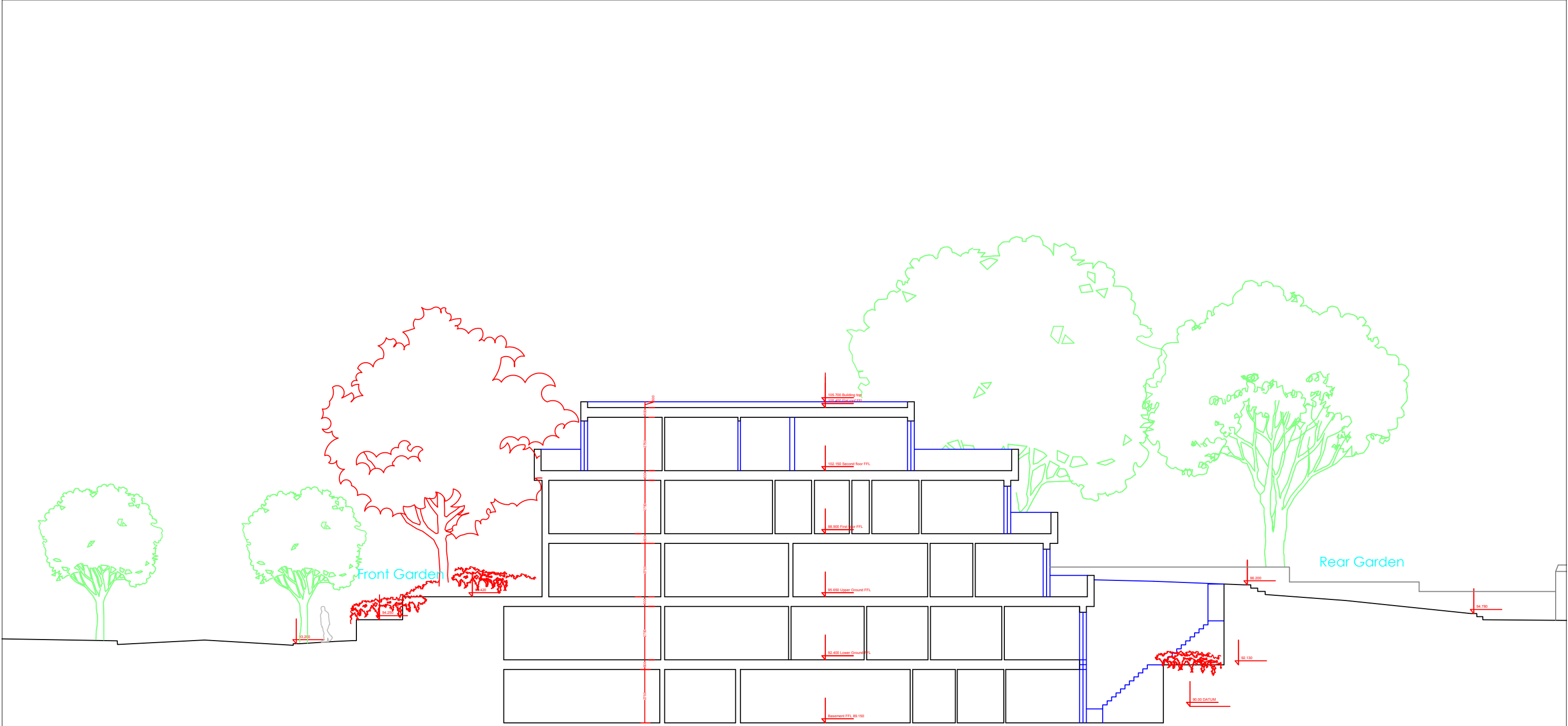
# Lower ground floor

Revision	Date	Comment
Issue	For comment	
ad design concepts		
Project	planning - architecture - interiors	
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Drawing Number:	Proposed lower ground floor plan	
Revision:	99-011	
Date:	November 2014	
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Upper ground floor

-			
Revision	Date	Comment	
Issue			For comment
<b>ad design concepts</b>			
Project			planning • architecture • interiors
Drawing Title:	10a Oakhill Avenue, London NW3		
Drawing Number:	Proposed upper ground floor plan		
Revision:	99-012		
Date:			November 2014
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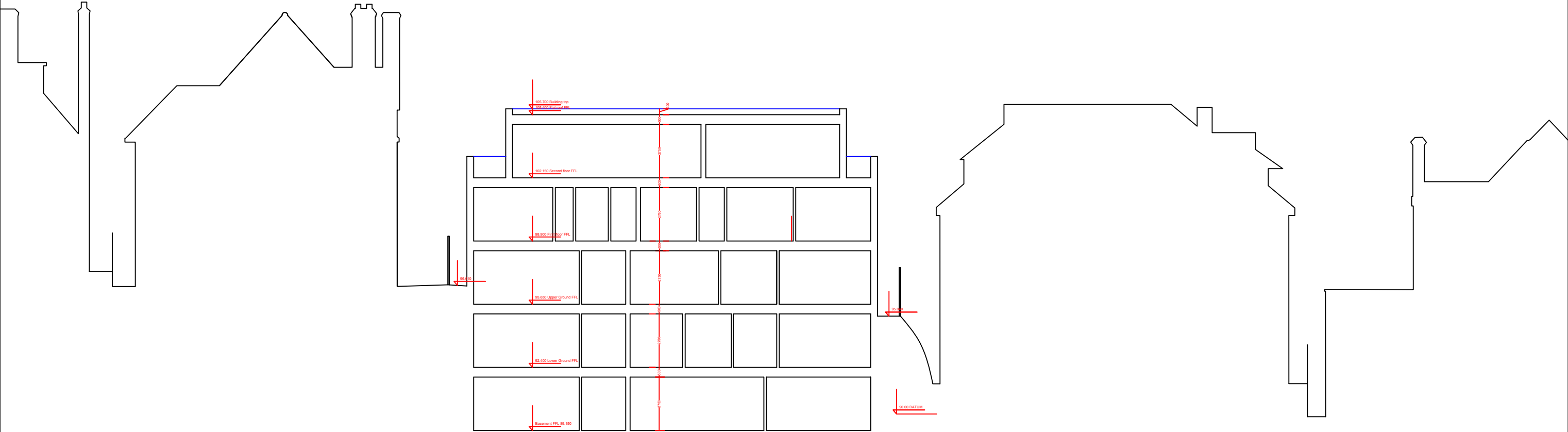


Section A-A

## Section A-A

A	20/02/2015	Levels amended
Revision	Date	Comment
Issue		For comment

ad design concepts		planning - architecture - interiors
Project	10a Oakhill Avenue, London NW3	
Drawing Title:	Proposed section A-A	
Drawing Number:	99-200	
Revision:		
Date:	January 2014	
Scale:	1:100@A1; 1:200@A3	
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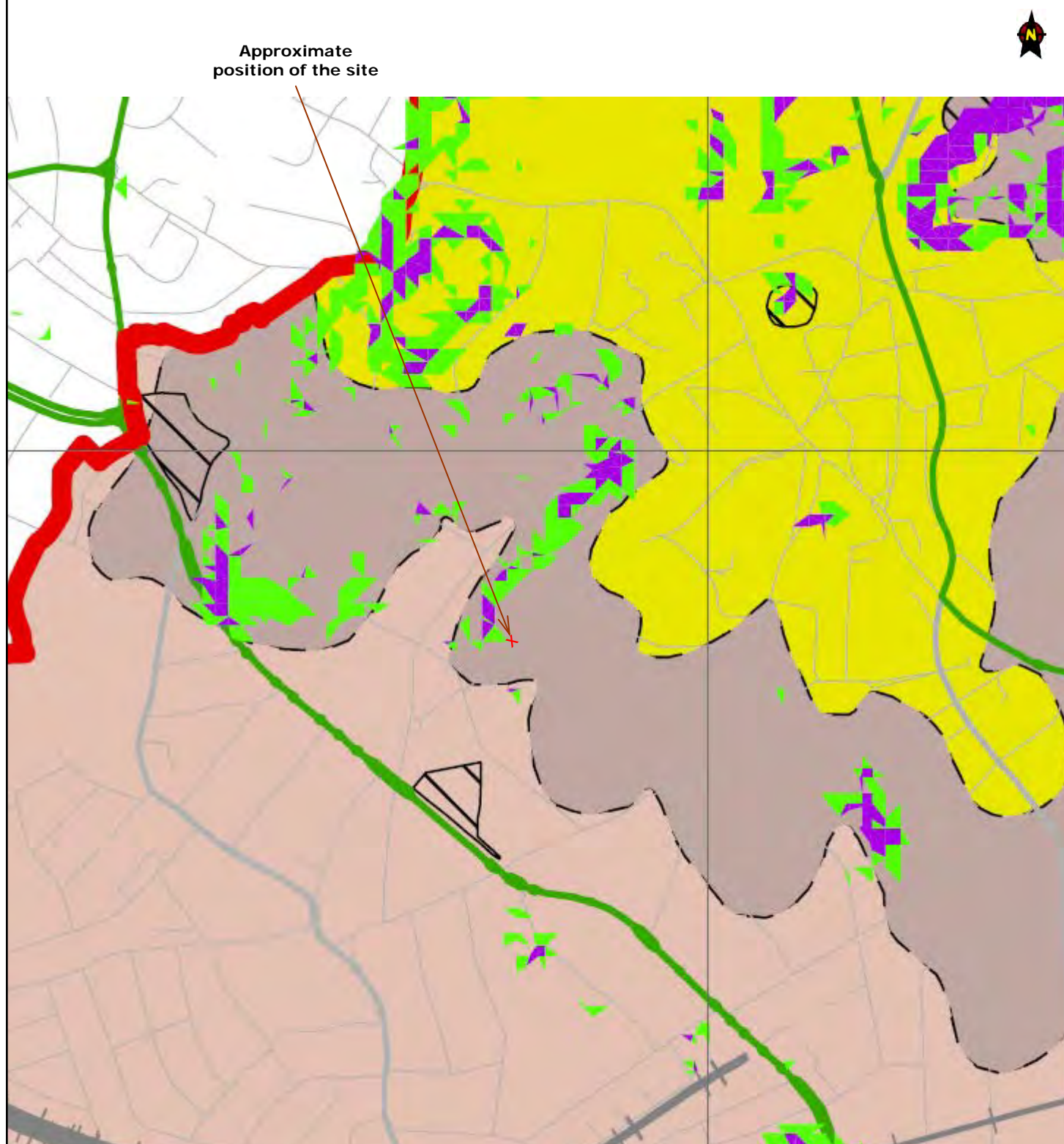
Section B-B

Section B-B

A	20/02/2015	Levels amended	
Revision	Date	Comment	
Issue			For comment
<b>ad design concepts</b>			
Project			planning - architecture - interiors
Drawing Title:			10a Oakhill Avenue, London NW3
Drawing Number:			Proposed section B-B
Revision:			99-201
Date:			A
Scale:			January 2014
1:100@A1; 1:200@A3			
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Annotated Slope Angle Map – showing relative location of the site



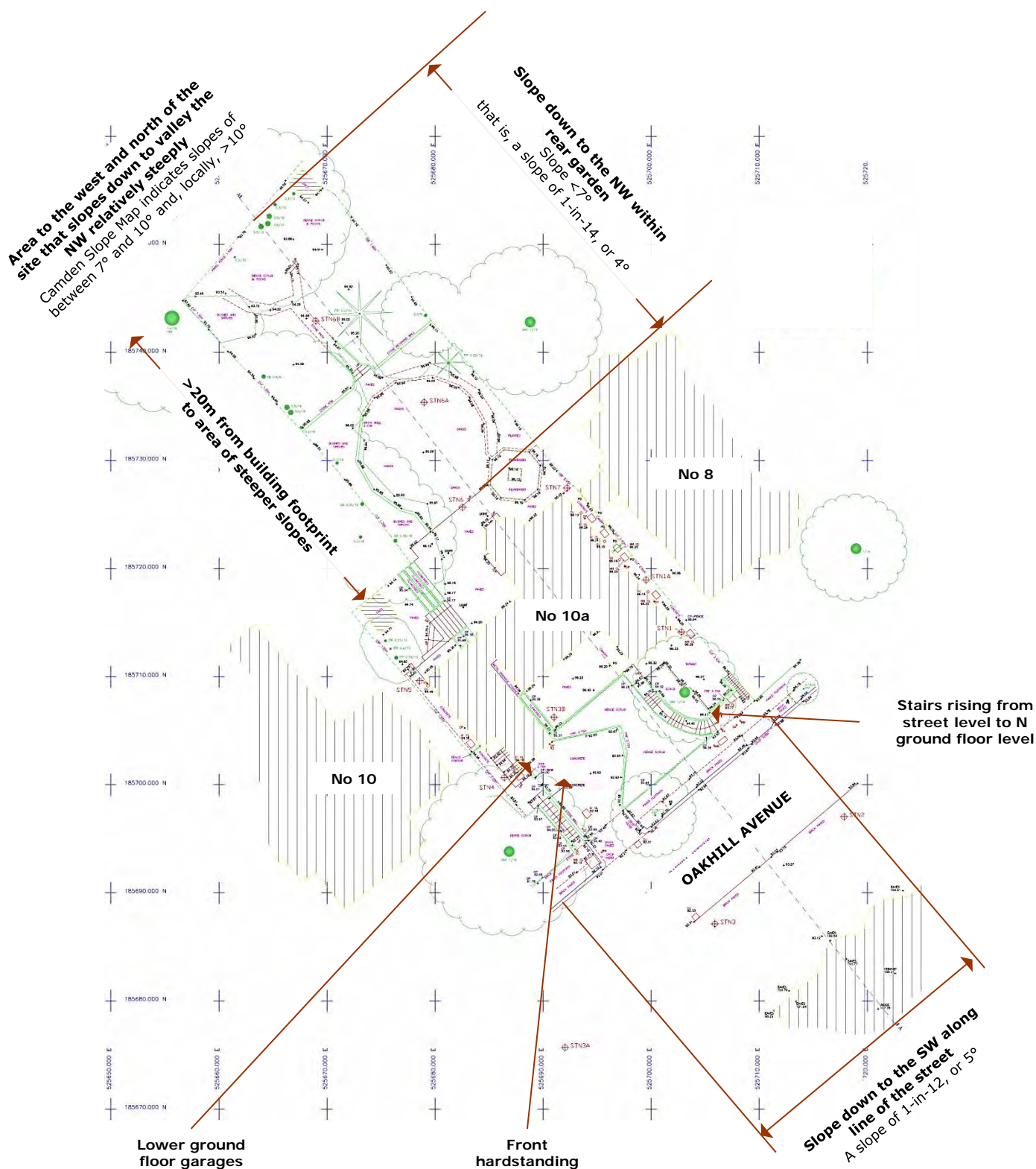
Legend

Slope	London Borough of Camden	BGS 1:10K Artificial Ground	BGS 1:10K Drift Geology	BGS 1:10K Solid Geology
0° - 7°	London Borough of Camden	MADE GROUND	ALLUVIUM	BAGSHOT FORMATION
7° - 10°	Railway Lines	WORKED GROUND	HACKNEY GRAVEL FORMATION	CLAYGATE MEMBER
> 10°	A Roads		LANGLEY SILT FORMATION	LAMBETH GROUP
			LYNCH HILL GRAVEL FORMATION	LONDON CLAY FORMATION
			STANMORE GRAVEL FORMATION	

Based on extract from Arup's 'Camden geological, hydrogeological and hydrological study: Guidance for subterranean development', Issue01 dated November 2010, Figure 16



Annotated Site Plan – showing point of interest from Walkover Survey



0 Scale: 1:50 @A4 50m

Based on extract from Kings Land and Architectural Surveyors' drawing 95274.0001, dated April 2013

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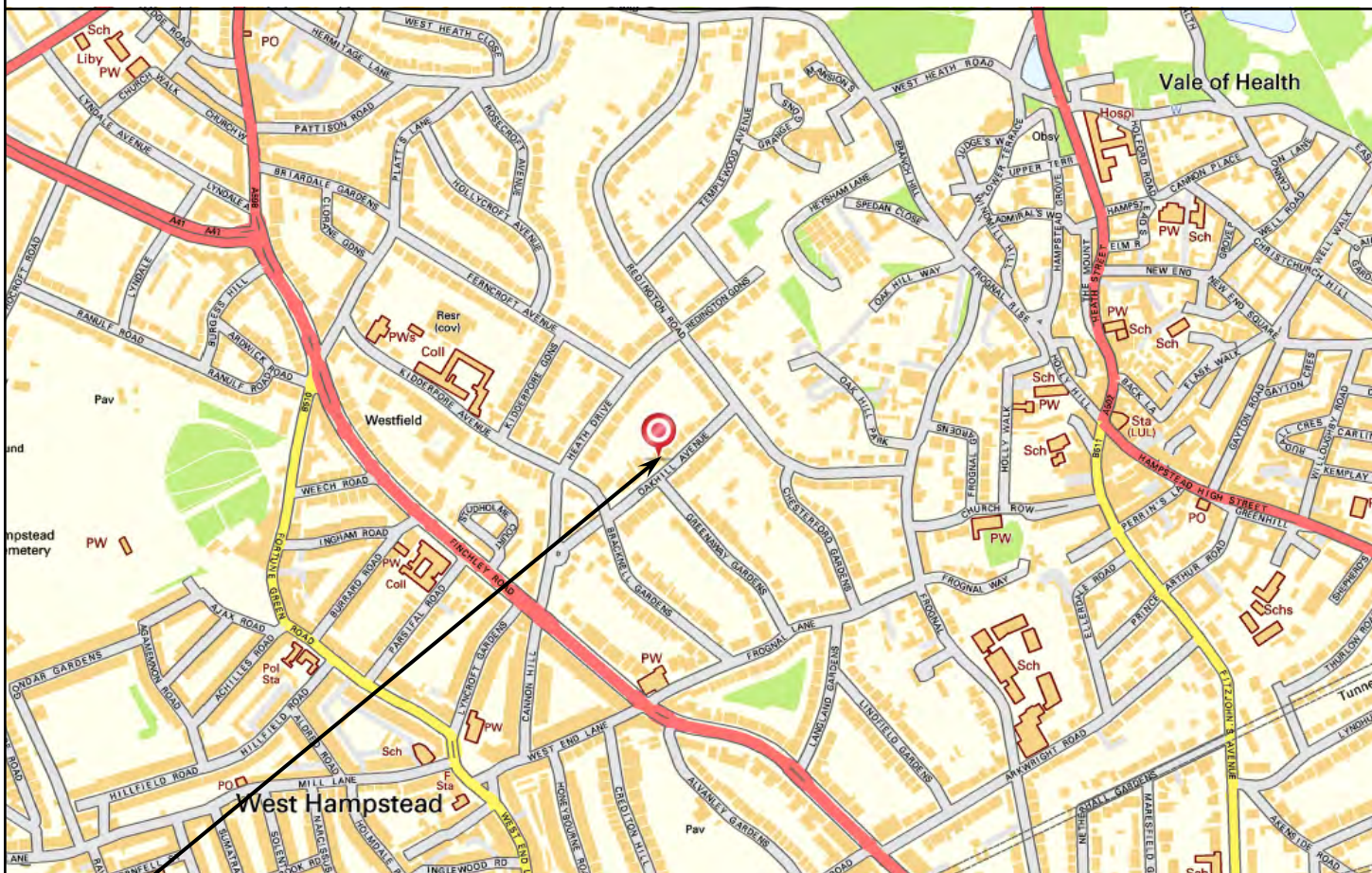
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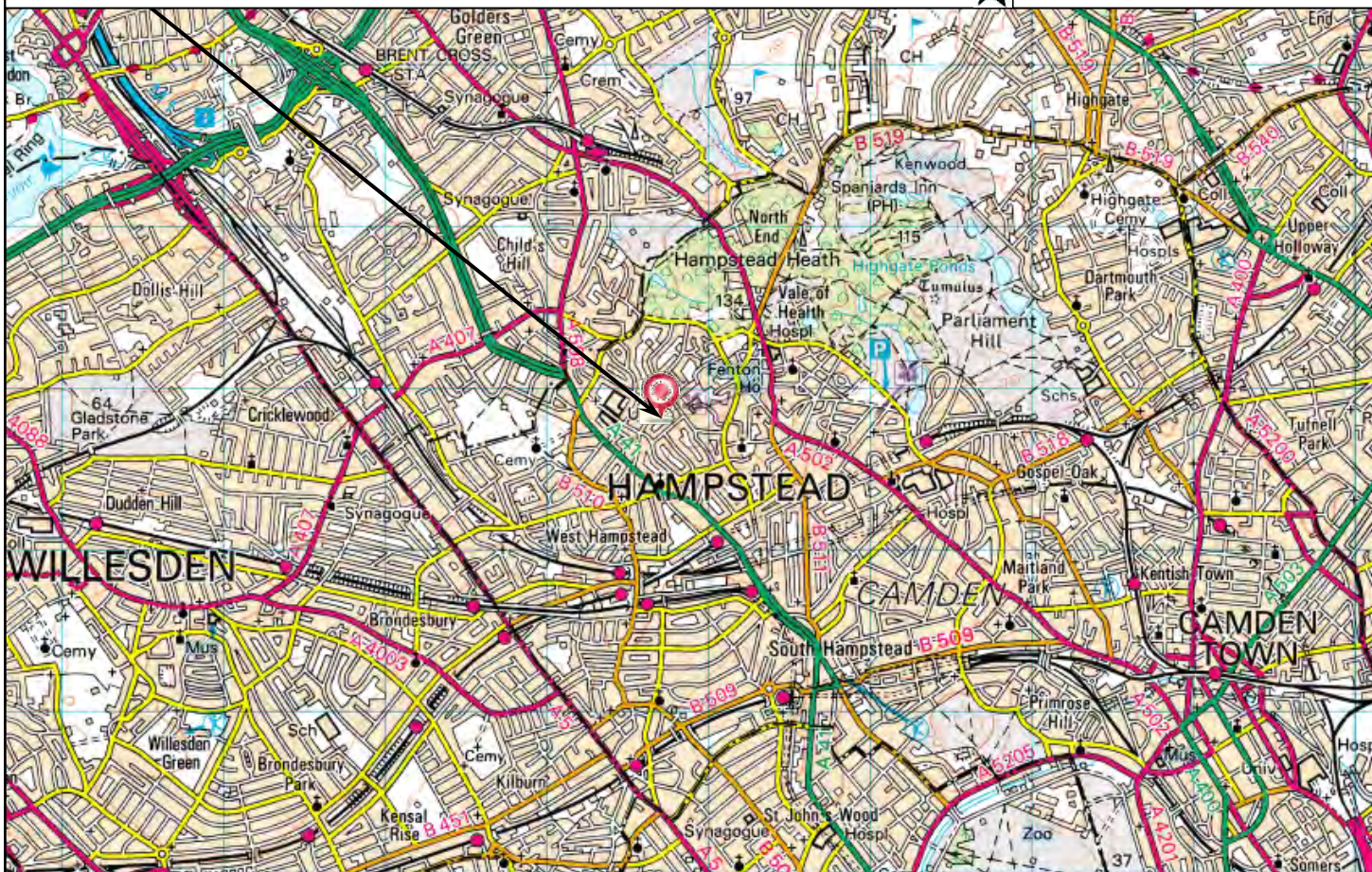
## Location Maps



**SITE LOCATION:** approximate NGR 525690E, 185715N



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