BASEMENT IMPACT ASSESSMENT SCREENING REPORT:
'SLOPE STABILITY'

Land to the rear of
1 FROGNAL, LONDON NW3 6AL

Client - **Frognal Property Developments Limited**

Engineer - **JNP Group Consulting Engineers**
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Ref - **9298/SCW/JRCB – REV1**

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- Existing Cross Sections
- Proposed Development Plan

BASEMENT IMPACT ASSESSMENT REPORT- LAND STABILITY
1 NORFOLK ROAD, LONDON, NW8 6AX

1.0 INTRODUCTION

It is proposed to re-develop this site by the demolition of the existing brick garage structures and their replacement with new residential properties. The new properties are to be of two storey height with the ground floor level being cut into the existing ground by approximately 1.5m to 2.0m below existing ground level thus forming a partial basement.

This 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.

This Report has been prepared for the benefit of the Client and no reliance can be assumed by others without written agreement from Soil Consultants Limited. In addition, this report should be read in conjunction with the report presented by ESI Limited ('Basement impact assessment: hydrology and hydrogeology' Ref. 60652R1 dated June 2012) and the Arup guidance document.

2.0 THE SITE

The site comprises a roughly square parcel of land to the rear of No. 1 Frognal in the London Borough of Camden and is bound by a narrow access road (Hampstead Gate) on the south western side and residential properties to the remaining aspects. The area occupies approximately 200m^2 and contains a block of five garages which are situated in the north eastern central part of the site and occupy an area of about 60m^2. The garages are of brick construction and single storey height with concrete hard standing to the front (south east) and soft landscaping to the rear (north west). Beyond the north western boundary, an electrical substation and bin stores are present. Key features of the site are presented on the appended Site Survey Plan and views of the site shown on the photographs on the front cover.

The site survey plan shows a brick wall along the north western boundary with no discernible elevation differences with the ground levels either side of this wall. Similarly ground level differences between adjacent areas to the north east and south east are shown to be minor. Along the south western side of the site, a small concrete retaining wall is evident on the site photographs (presented on the front cover) and the survey plan indicates the ground level difference between the garage floor and the lower-lying road (Hampstead Gate) to be in the order of about 0.3m.

Beyond Hampstead Gate to the west, another retaining wall is present separating the road from a footpath belonging to properties to the west (which front onto Finchley Road). The survey shows a ground level difference between the road and the footpath on the western side of the retaining wall to be in the order of about 0.35m at the southern site boundary increasing to about 0.8m at mid-point which can be projected to be about 1.2m at the northern extremity. Information relating to adjacent structures was unavailable at the time of compilation of this report. However, from on-line imagery, it is not readily apparent that the buildings fronting Finchley contain basements; however, No.1 Frognal is shown to contain a partial basement.

From aerial photography available from on-line sources and photographs present for the site, it is evident that a significant number of trees are present along the south eastern and north eastern boundaries. Although there is no information available for these trees, it appears that some of these trees are of a mature nature and height.

The general topography of the area slopes down from north to south and north east to south west. From available information, the slope along Hampstead Gate is in the order of about 3.5 degrees and the slope along Frognal in the order of about 3.0 degrees.

An investigation to determine the geology and ground conditions at the site has not been undertaken and this report is based on available data presented at the time of compilation. BGS borehole information has been obtained by ESI Limited and this is presented in their report 'Basement impact assessment: hydrology and hydrogeology' Ref. 60652R1 dated June 2012. We have also used our local knowledge of the area, having data on exploratory work undertaken just to the north east of the site (approximately 50m to 60m from the site) which concur with the published geology in that the site is underlain by the London Clay Formation (typically firm to stiff fissured clay of high shrinkage/volume change potential).

3.0 PROPOSED SCHEME

The proposed re-development comprises the demolition of the existing garages and the construction of a pair of new semi-detached residential properties. The new buildings are scheduled to be of three storey height with the lower/ground levels being cut into the ground by a maximum of about 4.20m below existing ground level thus forming a basement. Localised deepening will be undertaken to install an underground tank. The basement drawings (presented in the Appendix) show its construction using piling techniques with toe levels below the level of the basement, the final depth and design of which will be determined by the structural engineers. The basement is to occupy a vast majority of the area. A root protection zone may be a requirement for this development limiting the extent of the basement excavation.

4.0 BASEMENT IMPACT ASSESSMENT – SLOPE STABILITY

As part of the Local Authority planning process for this development we have been asked to provide a basement impact assessment for this scheme.

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 slight slope of between about 3 and 3.5 degrees in and around the site	Measurement from available survey data both on site and in the local vicinity (reference 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?	No	Available survey information shows no slopes greater than 7 degrees within the local vicinity	Section 2
4] Is the site within a wider hillside setting in which the general slope is greater than 7 degrees?	No	Map review and assessment of slope angles form survey data	Section 2
5] Is the London Clay the shallowest strata at the site?	Yes	Available data shows the London Clay to be present at shallow depth although a nominal thickness of made ground should be expected	Section 2 and report by ESI Limited
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	Trees are believed not to be present on site although a number of mature specimens are present within adjacent properties. The south western corner of the site has been designated as a tree root protection zone	Site plans
7] Is there a history of seasonal shrinkage/swelling subsidence to the local area, and or evidence of such effects at the site?	Unknown	No evidence has been presented at the site. However, the London Clay is generally classified as a soil with a high shrinkage/volume change potential and given the presence of trees along the north eastern and south eastern boundaries, soil shrinkage and swelling could occur	Section 2

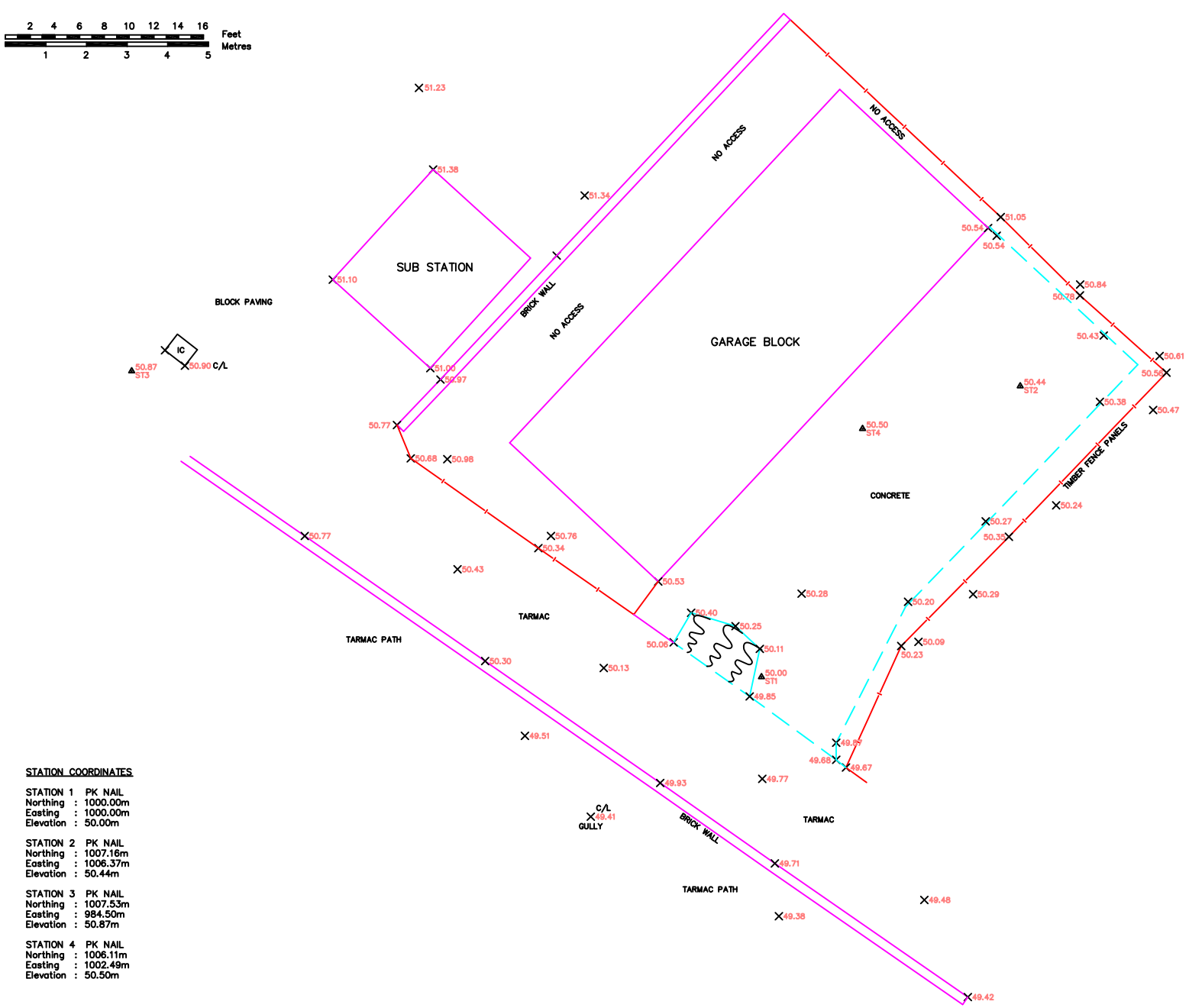
Impact question	Answer	Justification	Reference
8] Is the site within 100m of a watercourse or a potential spring line?	No	See comments in report presented by ESI Limited	ESI Limited report
9] Is the site within an area of previously worked ground?	No	Review of historical maps does not identify any workings	On-line historical map viewing
10] Is the site within an aquifer? If so; will the proposed basement extend beneath the water table such that dewatering may be required during construction?	No	London Clay is classified as 'unproductive strata'. See comments in report presented by ESI Limited	ESI Limited report
11] Is the site within 50m of the Hampstead Heath Ponds?	No	See comments in report presented by ESI Limited	Ref Fig 14 Arup 2010
12] Is the site within 5m of a highway or pedestrian right of way?	Yes	Access road Pedestrian footpath along south western boundary	Site plans
13] Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?	Yes	Basement piled retaining walls are likely to extended below founding levels to adjacent properties. The basement should be at reasonable distance from adjacent structure so as not to affect their stability. The electricity substation on the north western boundary may require consideration, but the movement expected from a properly constructed and supported wall should be relatively small	Proposed development plans
14] Is the site over [or within] the exclusion zone of any tunnels, e.g. railway lines?	No	Nearest tunnels approximately 100m to north (London Over ground) and 100m to the south (main line services). Under normal circumstance this distance is considered to be beyond normal exclusion zones but clarification may need to be gained from the operating companies	Survey and historical maps

5.0 CONCLUSIONS

In our opinion from the available information we consider that the risk to ground stability from this development should be negligible provided the works are undertaken by reputable contractors and the temporary and permanent works are adequately designed.

APPENDIX

- Site Survey Plan
- Existing Cross Sections
- Proposed Development Plans



STATION COORDINATES

STATION 1 PK NAIL
Northing : 1000.00m
Easting : 1000.00m
Elevation : 50.00m

STATION 2 PK NAIL
Northing : 1007.16m
Easting : 1006.37m
Elevation : 50.44m

STATION 3 PK NAIL
Northing : 1007.53m
Easting : 984.50m
Elevation : 50.87m

STATION 4 PK NAIL
Northing : 1006.11m
Easting : 1002.49m
Elevation : 50.50m

ALL LEVELS RELATIVE TO AN ARBITRARY DATUM OF 50M AT STATION 1

Rev.	Date	Comments

LINEPLAN Associates
Cross In Hand
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Telephone-01435 860946
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Client
ETCH DESIGN LTD

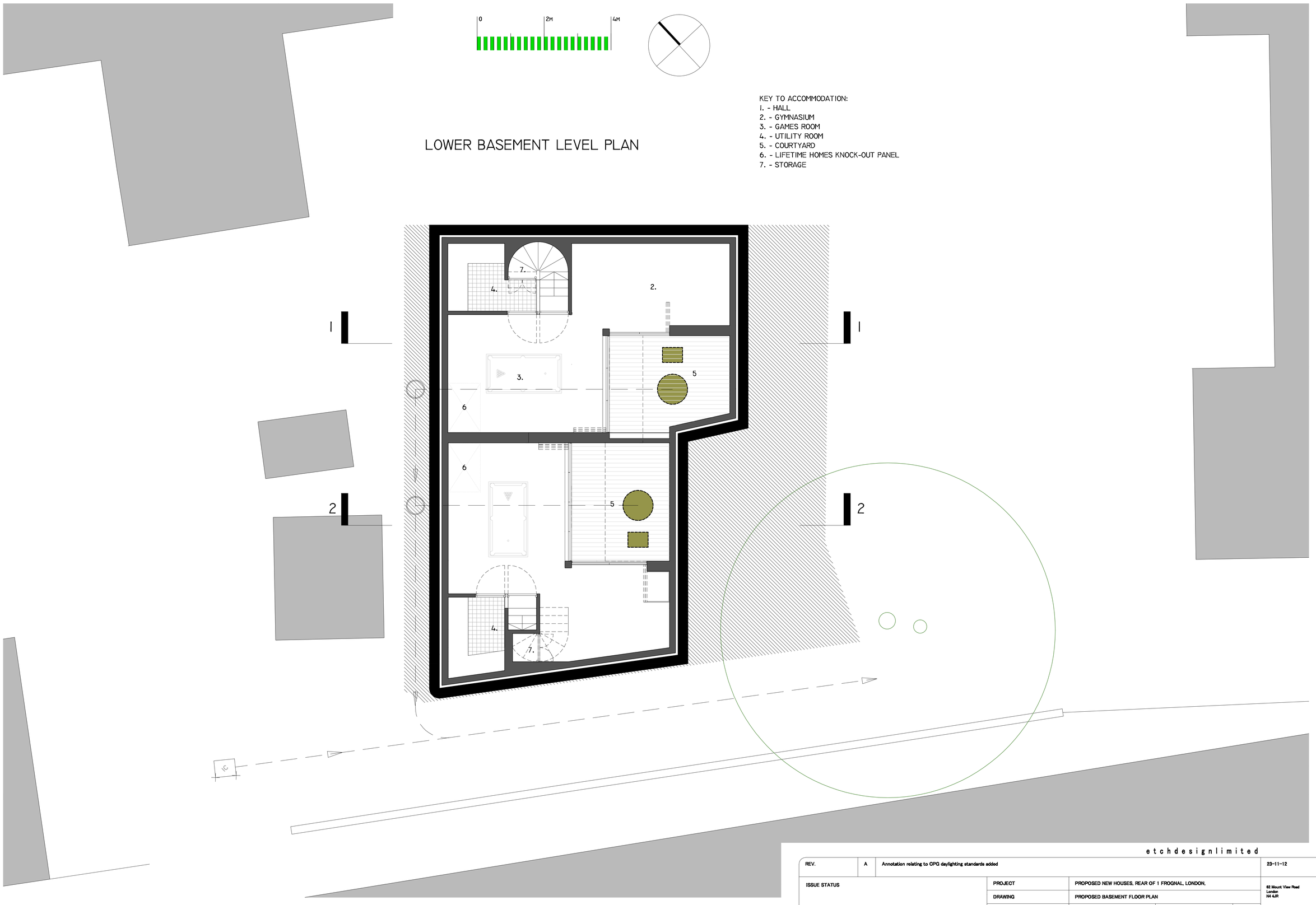
Job Title
LAND TO REAR OF NO 1
FROGNAL LONDON
NW3 6AL

Drawing Title
TOPOGRAPHICAL SURVEY

Scale 1/50 (A1)

Date 25/4/12 | Drawn By KDJ

Drwg. No. LP1581



LOWER BASEMENT LEVEL PLAN

KEY TO ACCOMMODATION:
1. - HALL
2. - GYMNASIUM
3. - GAMES ROOM
4. - UTILITY ROOM
5. - COURTYARD
6. - LIFETIME HOMES KNOCK-OUT PANEL
7. - STORAGE

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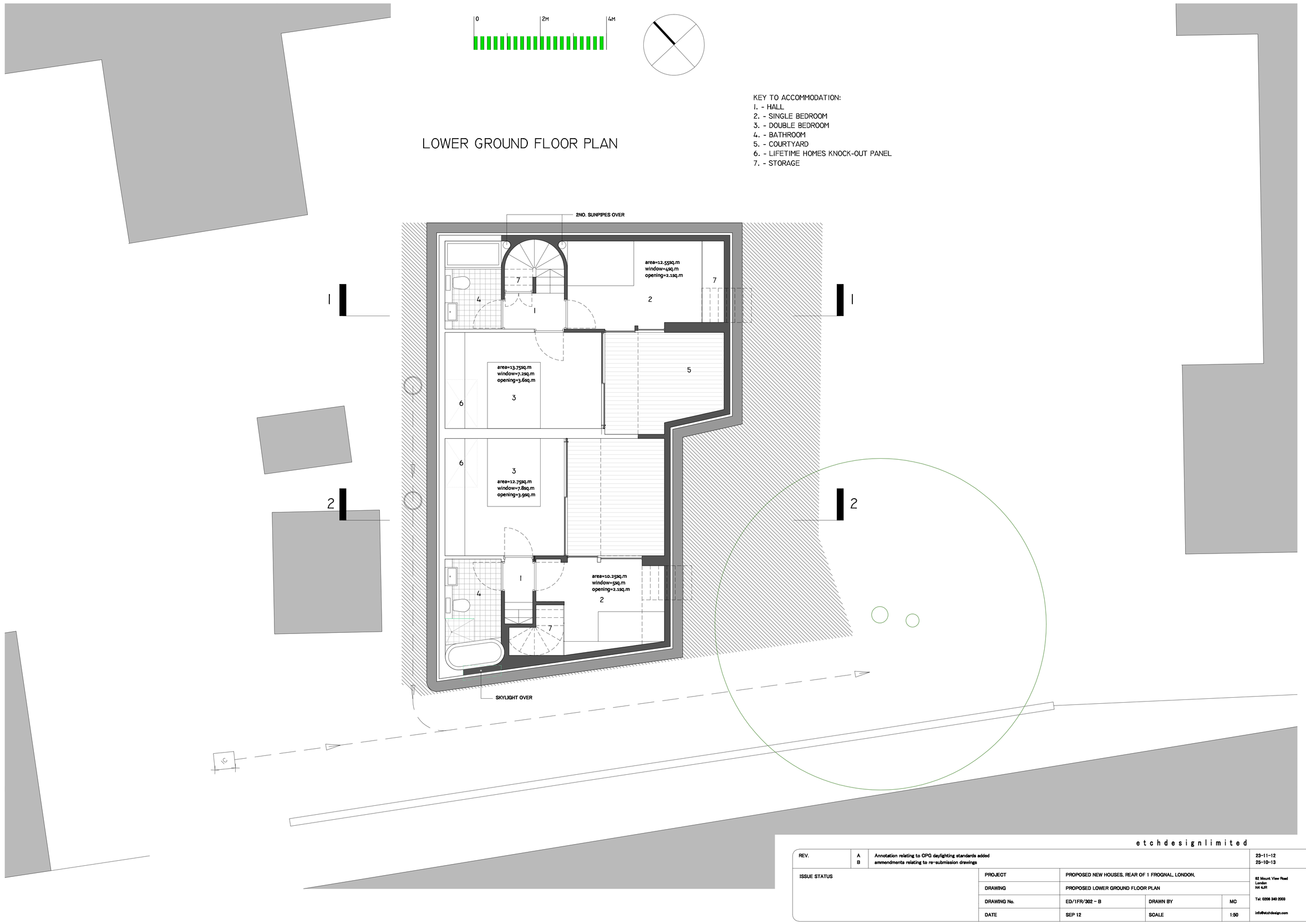
REV.	A	Annotation relating to CPG daylighting standards added			23-11-12
ISSUE STATUS		PROJECT	PROPOSED NEW HOUSES, REAR OF 1 FROGNAL, LONDON,		62 Mount View Road London N4 4JR Tel: 0208 340 2003 info@etchdesign.com
		DRAWING	PROPOSED BASEMENT FLOOR PLAN		
		DRAWING No.	ED/1FR/303	DRAWN BY MC	
		DATE	october 13	SCALE 1:50	

LOWER GROUND FLOOR PLAN

KEY TO ACCOMMODATION:
1. - HALL
2. - SINGLE BEDROOM
3. - DOUBLE BEDROOM
4. - BATHROOM
5. - COURTYARD
6. - LIFETIME HOMES KNOCK-OUT PANEL
7. - STORAGE



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REV.	A B	Annotation relating to CPG daylighting standards added ammendments relating to re-submission drawings			23-11-12 25-10-13
ISSUE STATUS		PROJECT	PROPOSED NEW HOUSES, REAR OF 1 FROGNAL, LONDON,		62 Mount View Road London N4 4JR Tel: 0208 340 2003 info@etchdesign.com
		DRAWING	PROPOSED LOWER GROUND FLOOR PLAN		
		DRAWING No.	ED/1FR/302 - B	DRAWN BY	MC
		DATE	SEP 12	SCALE	1:50

0 2M 4M

RAISED GROUND FLOOR PLAN

KEY TO ACCOMMODATION:
1. - PORCH
2. - BIKE STORE
3. - HALL
4. - W.C. CLOAKROOM
5. - KITCHEN
6. - LIVING AREA
7. - DINING AREA
8. - VOID
9. - BIN STORE
10. - SCREENING PLANTS
11. - LIFETIME HOMES KNOCK-OUT PANEL
12.- RECYCLING STORE

SUNPIPES TO LOWER GROUND FLOOR

skylight

1950

RAISED SLEEPER KERBING

SUB STATION

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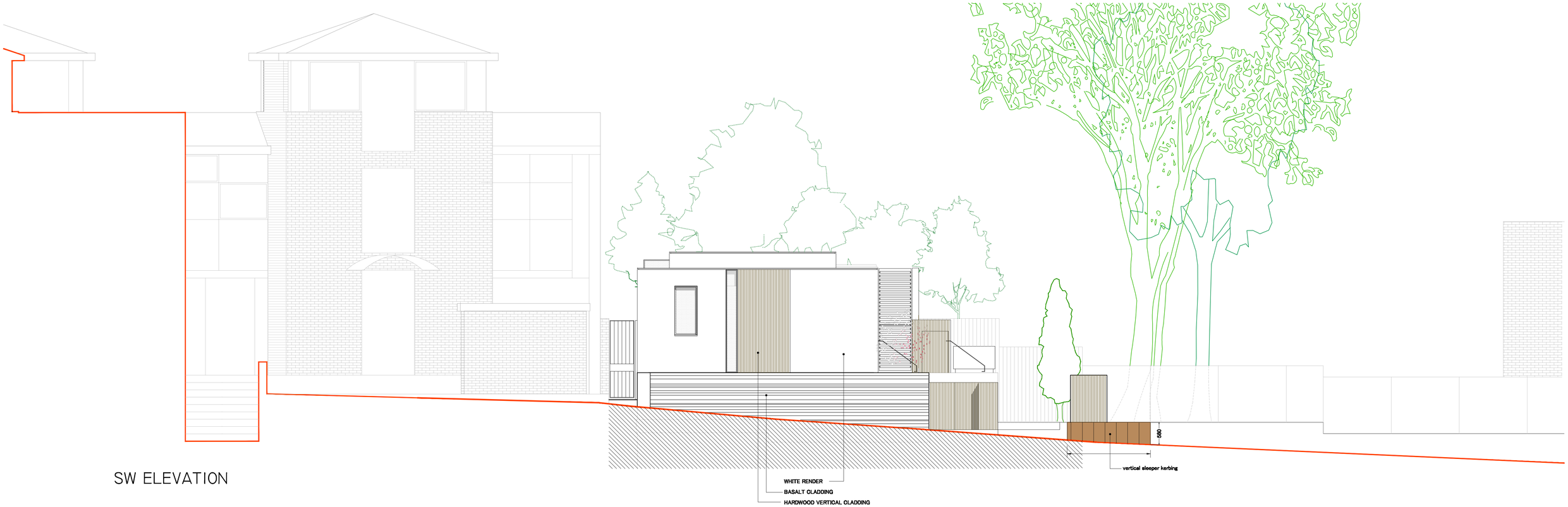
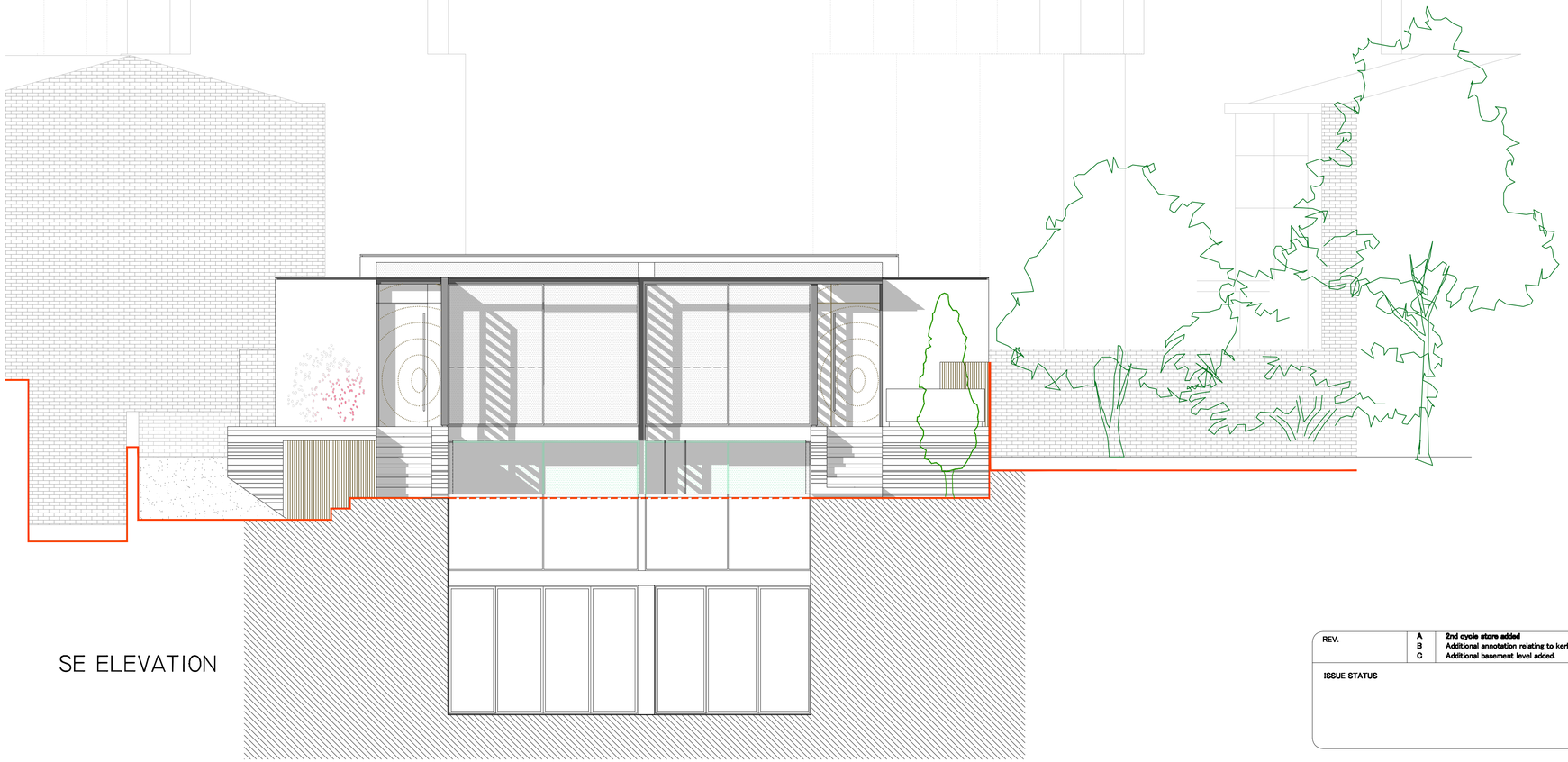
REV.					
	A	Second bicycle store added			23-11-12
	B	Anotation and dimensions added and revised around entrance to site			28-11-12
ISSUE STATUS	PROJECT	PROPOSED NEW HOUSES, REAR OF 1 FROGNAL, LONDON,			62 Mount View Road London N4 4JR
	DRAWING	PROPOSED RAISED GROUND FLOOR PLAN			
	DRAWING No.	ED/1FR/301 - B	DRAWN BY	MC	Tel: 0208 340 2003
	DATE	SEP 12	SCALE	1:50	info@etchdesign.com



SW ELEVATION



SE ELEVATION

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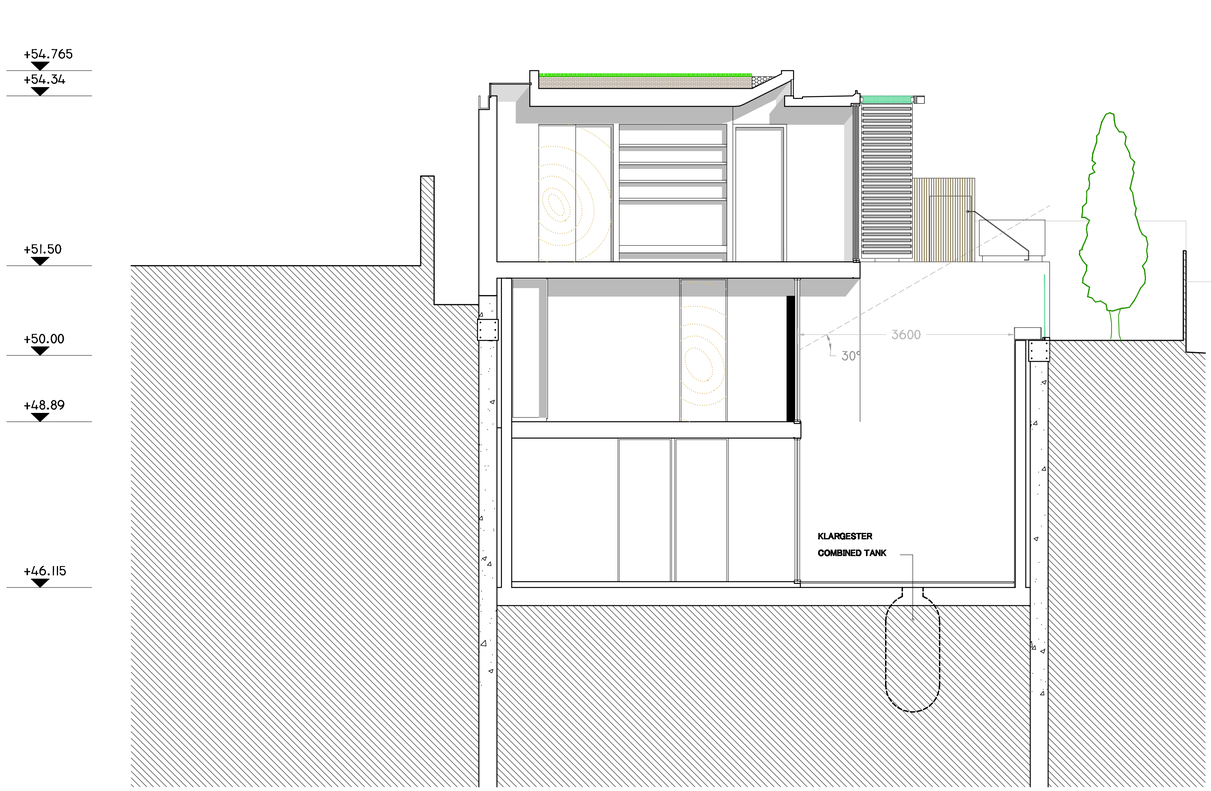
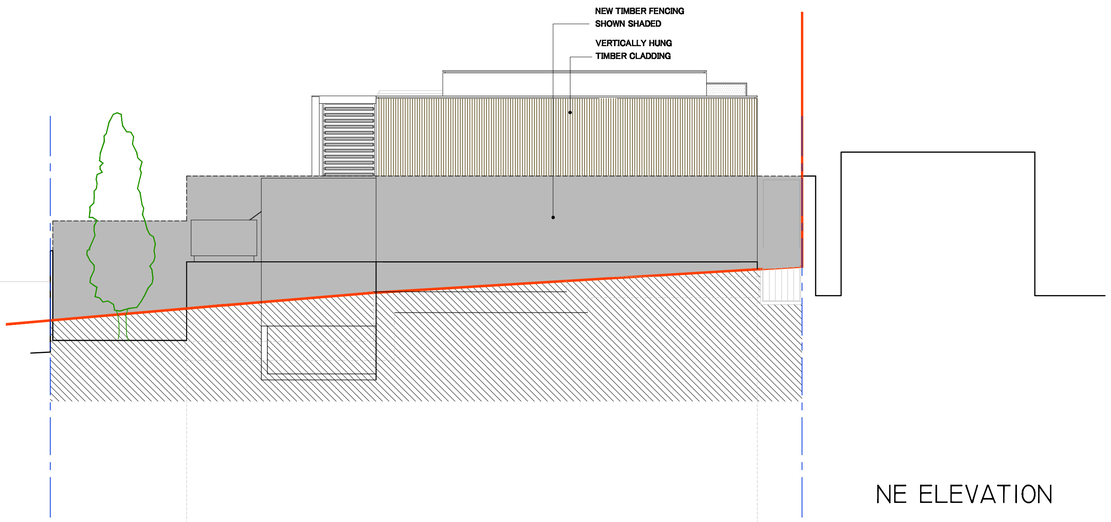
REV.				
	A	2nd cycle store added		23-11-12
	B	Additional annotation relating to kerbing along south east boundary		26-11-12
	C	Additional basement level added.		25-10-13
ISSUE STATUS	PROJECT	PROPOSED NEW HOUSES, REAR OF 1 FROGNAL, LONDON,		
	DRAWING	PROPOSED ELEVATIONS (SE & SW)		
	DRAWING No.	ED/1FR/402 - b	DRAWN BY	MC
	DATE	MAY 12	SCALE	1:50

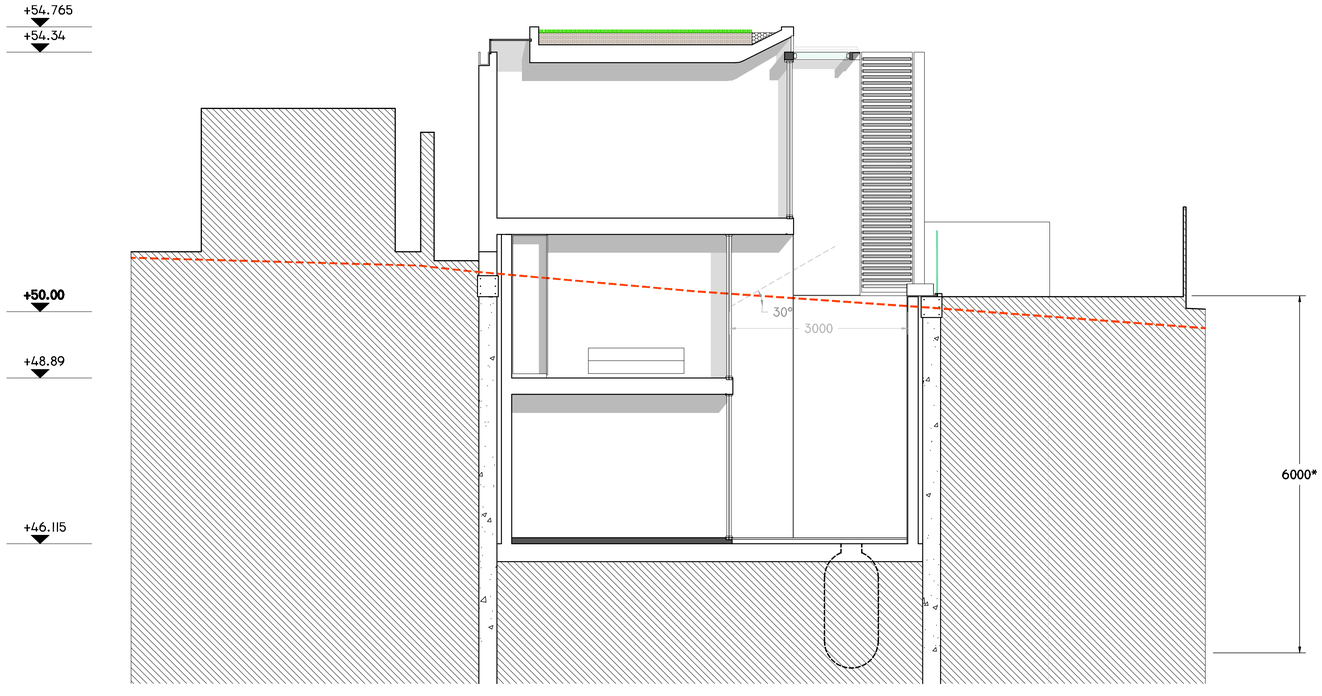
82 Mount View Road
London
N4 4JR
Tel: 0208 340 2003
info@etchdesign.com



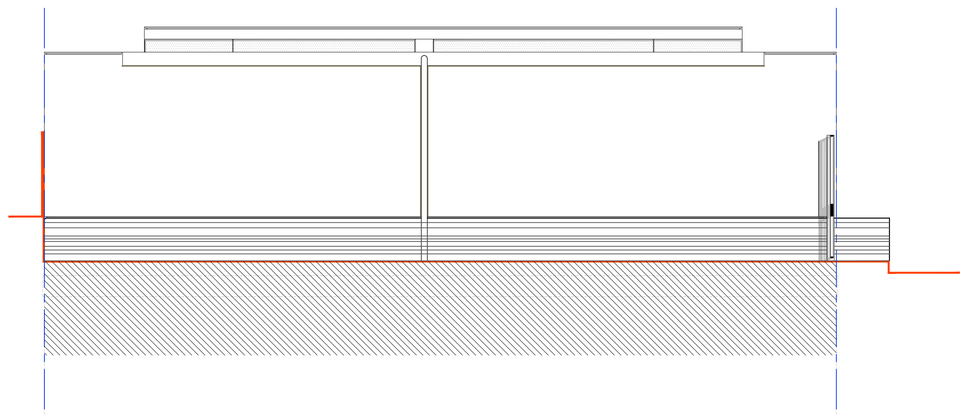
SECTION 1-1



NE ELEVATION



SECTION 2-2



NW ELEVATION

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REV.			
	A	Annotation relating to CPG daylighting standards added	23-11-12
	b	addition of basement level	23-10-13

ISSUE STATUS	PROJECT	PROPOSED NEW HOUSES, REAR OF 1 FROGNAL, LONDON,		62 Mount View Road London N4 4JR
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	DRAWING No.	ED/1FR/401 - b	DRAWN BY MC	Tel: 0208 340 2003
	DATE	SEP 12	SCALE 1:50	info@etchdesign.com