

Mr Jacob Sorkin

# 44 Dartmouth Park Road, London

Basement Impact Assessment – Screening Stage 1

January, 2015



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#### 1. INTRODUCTION

It is proposed to develop 44 Dartmouth Park Road in the London Borough of Camden (LBC). This will include the construction of a basement beneath part of the existing building footprint, and the construction of infill extensions on the ground floor and first floor at the rear of the building. The new basement floor slab will be formed at a depth of generally 2.6m below existing ground floor level (mbgl). Card Geotechnics Limited (CGL) has been instructed to undertake a *Screening Assessment* for the proposed development to determine its potential effect on nearby structures and services, surface water runoff and groundwater flow.

The London Borough of Camden's guidance document *"CPG4, Basements and Lightwells*<sup>1</sup>", requires a BIA to be undertaken for new basements in the Borough and sets out 5 stages for a BIA to "enable the Borough to assess whether any predicted damage to neighbouring properties and the water environment is acceptable or can be satisfactorily ameliorated by the developer". The five stages are set out below:

- 1. Screening
- 2. Scoping
- 3. Site investigation
- 4. Impact assessment
- 5. Review and decision making

This report is intended to address the screening stage of the BIA. It identifies key issues relating to land stability, hydrogeology and hydrology as part of the screening process (Stage 1).

<sup>&</sup>lt;sup>1</sup> Camden Planning Guidance, CPG4, Basements and Lightwells, September 2013.



#### 2. SITE CONTEXT

#### 2.1 Site location

The site is located at 44 Dartmouth Park Road, London NW5 1SN. The National Grid Reference for the approximate centre of the site is 528764E, 186099N.

The site location is shown in Figure 1.

#### 2.2 Site layout

The site is broadly rectangular in plan with dimensions some 26m in length and 11m in width, with the length orientated in the north-west to south-east orientation. The existing building comprises a part two storey part single storey detached property with a rear single storey extension. The building is broadly rectangular in shape, with dimensions 13.5m in length and 11m in width. A paved garden area exists to the front of the building and is separated from the pavement by a landscaped hedge. A garden area exists to the rear of the property and is separated from York Rise to the west by a brick wall. Street level is approximately 0.40m below ground floor and garden level.

The building fronts onto Dartmouth Park Road to the south-east of the site, with a pavement approximately 3m in width separating the site from the carriageway of Dartmouth Park Road. The north-east of the site is bounded a narrow alleyway approximately 1m in width, beyond which is 46 Dartmouth Park Road. To the north-west, a single storey structure of No. 24A York Rise is located adjacent to the north-western boundary wall of the site beyond the garden. To the south-west the site is bounded by York Rise.

A brief review of local planning applications suggests that the nearest neighbouring structure, No. 46 Dartmouth Park Road, has not recently developed an existing lower ground level or basement level. Lower ground floor levels are present on the lower side of Dartmouth Park Road including Nos. 40 and 42 Dartmouth Park Road.

The site lies approximately 115m east of the *River Fleet*, one of London's historical 'lost' rivers<sup>2</sup>, and some 260m north of a major sewer. The *River Fleet* is recorded to have flowed

<sup>&</sup>lt;sup>2</sup> Barton, N. (1983) The Lost Rivers of London Hertfordshire Historical Publications



in a north to south orientation, originating from the *Highgate Ponds* area some 1.5km north-west of the site. Tufnell Park Underground Station and the London Underground Northern Line are located approximately 440m south-east of the site; the Northern Line runs in a north-east to south-west direction.

A site layout plan is presented in Figure 2.

#### 2.3 Topography

Ordnance Survey topographical mapping records a spot height elevation of 53.4 metres above Ordnance Datum (mOD) approximately 70m north-east of the site, located within the centre of Laurier Road in front of No. 36 Laurier Road. An elevation of 47.8mOD is recorded at the junction of York Rise and Chetwynd Road approximately 100m to the south of the site.

Locally the highest point is 98mOD recorded at Parliament Hill approximately 1.1km to the west, with local ground levels increasing towards this point. The topography reduces in level to the south-east of the site. The site is situated on a downwards gradient sloping towards the east.

Figure 16 of the Camden Geological, Hydrogeological and Hydrological Study<sup>3</sup> (CGHHS) records that the site is not located on a slope of greater than 7 degrees. Figure 17 of the CGHHS records the site as not being located within an area of significant landslide potential.

Shallow valleys are recorded some 320m west, representing relict river channels of the *River Fleet*.

#### 2.4 Proposed development

It is proposed to excavate predominantly beneath the footprint of the property to form a new basement level at approximately 2.6mbgl, with the overall basement excavation being 3.2m from ground floor level. The basement will be constructed using traditional underpinning techniques with concrete underpins constructed in sequence typically 3m high. The underpin walls are likely to be between 300mm and 600mm thick and would be

<sup>&</sup>lt;sup>3</sup> Ove Arup and Partners. (2010) Camden Geological, Hydrogeological and Hydrological Study: Guidance for subterranean development. London Borough of Camden.



supported during construction by the provision of temporary propping at top, centre, and bottom of the underpin to restrict movement and provide temporary support.

The basement will be approximately 1m offset from the No. 46 Dartmouth Park Road and will infill an existing section of garden over an area of some 2.7m x 4.3m in plan. A Conceptual Site Model for the proposed development is presented in Figure 3.

Plans of the proposed development are provided in Appendix A.

#### 2.5 Site History

A brief review of the site's historical development has been undertaken using available literature and CGL's in-house resources. The findings are summarised as follows:

Mapping dated c.1870 records the site as unoccupied and part of agricultural land. Residential housing is present to the south and west of the site; Dartmouth Park Road and Grove Road are indicated to the south-west of the site but Dartmouth Park Road does not extend as far as the site. The *Tottenham and Hampstead Junction Railway* is recorded some 250m south of the site. A *Reservoir* is recorded approximately 250m north east of the site.

Mapping dated c.1890 shows the building of No. 44 Dartmouth Park Road to be in the present day layout with a large rear garden area. This garden area is shown to have been reduced in size c.1970 and three small buildings are recorded adjacent to the rear garden of No. 23 Laurier Road. An additional structure was constructed adjacent to the rear garden of No. 44 Dartmouth Park Road between this period and the present day.

No. 44 Dartmouth Park Road is not recorded as having sustained damage during Second World War bombings<sup>4</sup>. The nearest V1 flying bomb is recorded on Dartmouth Park Avenue some 250m north-east of the site, however the area has since been redeveloped into residential housing. The risk of unexploded ordnance (UXO) on site is considered to be low.

<sup>&</sup>lt;sup>4</sup> London Topographical Society (2005). *Bomb Damage Maps 1939-1945*. The London City Council.



#### 2.6 Published geology

The British Geological Survey (BGS) sheet<sup>5</sup> of the area indicates the site to be underlain by the London Clay Formation with no record of superficial deposits.

The London Clay Formation is an over-consolidated firm to very stiff, becoming hard with depth, fissured, blue to grey silty clay of low to very high plasticity. The upper and lower parts may contain silty or fine grained sand partings. The stratum may also contain laminated, structured, nodular claystone and rare sand partings. Crystals of gypsum (Selenite) are often present within the weathered London Clay Formation. The stratum is generally horizontally bedded.

BGS basal contour mapping demonstrates the base of the London Clay Formation is present below the site to an elevation of approximately -10.0mOD, suggesting an overall thickness of approximately 60.0m.

#### 2.7 Unpublished geology

A number of historical British Geological Survey (BGS) borehole records exist between 350m and 500m of the site boundary. Selected records and an indicative location plan are provided in Appendix B. The strata encountered within the boreholes are summarised in Table 1:

Stratum	Level at top of stratum (mbgl) <sup>a</sup>	Typical thickness (m)
Made Ground	0.0	0.3 to 4.1
London Clay Formation	0.0 to 4.1	71.9 <sup>b</sup>
Lambeth Group	71.9	18.7
Thanet Formation	93.7	5.2
Upper Chalk	135.3	Proven to 164.3

#### Table 1. Summary of BGS Borehole Records

a. mbgl = metres below ground level

b. Thickness determined in TQ28NE14 only, located 500m west of the site.

Borehole records indicate the geology of the surrounding area to consist of the London Clay Formation, underlain by the Lambeth Formation, Thanet Sand and Upper Chalk at depth.

<sup>&</sup>lt;sup>5</sup> British Geological Survey Sheet 256 (1993) North London – Solid and Drift Geology 1:50,000. Keyworth, BGS.



The Made Ground was generally found to comprise concrete and hard-core over soft to firm brown silty clay with occasional organic material, brick fragments and ash over the London Clay Formation. The London Clay was described as firm to stiff brown fissured silty clay with partings of silty fine sand and crystals of gypsum.

Groundwater was recorded in BGS borehole *TQ28NE14* at a depth of 64mbgl towards the base of the London Clay.

#### 2.8 Hydrogeology and hydrology

The Environment Agency<sup>6</sup> (EA) has produced an aquifer designation system consistent with the requirements of the Water Framework Directive. The designations have been set for superficial and bedrock geology and are based on the importance of aquifers for potable water supply, and their role in supporting surface water bodies and wetland ecosystems.

The site does not overlie a designated superficial or bedrock aquifer and is noted as being underlain by The London Clay Formation, designated a 'non-productive stratum' by the Environment Agency.

The site does not fall within a Groundwater Vulnerability Zone as indicated by EA mapping. The site is not located within a groundwater protection zone (SPZ).

The closest significant bodies of surface water are the *Highgate Ponds* located 790m to the north-west. Environment Agency mapping indicates the site is within a zone at of risk of flooding from reservoirs, and that York Rise and streets to the south-west of the site are at risk from surface water flooding.

The site lies approximately 115m east the historical *River Fleet*. Reference to Barton's 'Lost Rivers of London' indicates that the historical *River Fleet* previously flowed south and south-east from Hampstead Heath into the River Thames at Blackfriars. The former watercourse of the *River Fleet* is no longer open, having been culverted and constrained, however, owing to local topography it is considered that surface waters will drain towards the line of watercourse in a general southeast trend. This is illustrated in Figure 11 of the Guidance for Subterranean Development<sup>3</sup>.

<sup>&</sup>lt;sup>6</sup> <u>http://www.environment-agency.gov.uk</u> (accessed October 2014)



As the London Clay Formation is identified below the site, it is assumed this forms an impermeable boundary and will form the base of an overlying groundwater table where any permeable superficial deposits permit the transit of groundwater.

Figure 15 of the Guidance for Subterranean Development<sup>3</sup> indicates Dartmouth Park Road was not flooded during extreme rainfall events in 1975 and 2002, however, York Rise, directly adjacent to No. 44 Dartmouth Part Road was subject to flooding in 1975.



#### 3. STAGE 1 - SCREENING

#### 3.1 Introduction

A screening assessment has been undertaken based on structured guidance presented in Camden Borough Council's CPG4. Responses to the questions posed by the flowcharts are presented below and where 'yes' or 'unknown' may be simply answered with no analysis required, these answers have been provided.

#### 3.2 Subterranean (Groundwater) Screening Assessment

This section answers questions posed by Figure 1 in CPG4:

Question	Response	Action required
<i>1a</i> . Is the site located directly above an aquifer?	No. The site is underlain by the London Clay Formation, designated an unproductive stratum.	None
<i>1b.</i> Will the proposed basement extend beneath the water table surface?	No.	None
2. Is the site within 100m of a watercourse, well or potential spring line?	No.	None
<i>3.</i> Is the site within the catchment of the pond chains on Hampstead Heath?	No.	None
4. Will the proposed basement development result in a change in the proportion of hard surfaced/paved areas?	Yes. A minor increase is proposed in the proportion of hard-standing.	None (see below)
5. As part of site drainage, will more surface water than at present be discharged to ground (e.g. via soakaways and/or SUDS)?	No. Soakaways are not likely to prove effective in the London Clay due to low infiltration rates.	None

Table 2.	Responses	to	Figure	1,	CPG4
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Question	Response	Action required
6. Is the lowest point of the proposed excavation close to or lower than, the mean water level in any local pond or spring-line?	No.	None

The proposed development is underlain by the London Clay Formation, designated an 'unproductive stratum' by the EA. A review of available data has been conducted to determine groundwater conditions on site and suggests that groundwater is present at the base of the London Clay. Shallow perched groundwater may be encountered within Made Ground or resting above the surface of the London Clay Formation, however, this is not expected to be laterally pervasive. A minor increase in the proportion of hard-standing is proposed to the rear of the property where an infill extension is to be constructed, which will not extend beyond the rear wall of the existing extension. This minor increase in hardstanding is not considered to significantly affect run-off/surface attenuation characteristics.

#### 3.3 Slope/Land Stability Screening Assessment

This section answers questions posed by Figure 2 in CPG4.

Question	Response	Action required
<ol> <li>Does the site include slopes, natural or man-made, greater than about 1 in 8?</li> </ol>	No.	None
2. Will the proposed re-profiling of the landscaping at site change slopes at the property boundary to greater than about 1 in 8?	No.	None
3. Does the development neighbour land including railway cuttings and the like with a slope greater than about 1 in 8?	No.	None

Table 3. Responses to Figure 2, CPG4



Question	Response	Action required
4. Is the site within a wider hillside setting in which the general slope is greater than about 1 in 8?	No.	None
<i>5.</i> Is the London Clay the shallowest stratum on site?	Yes. The site is directly underlain by the London Clay Formation; however, the basement will not share a party wall and heave/settlement will be negligible assuming good workmanship and a well-constructed scheme are carried out.	None
6. 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?	No.	None
7. Is there a history of shrink/swell subsidence in the local area and/or evidence of such at the site?	Unknown. The London Clay is shallow so there may be shrink/swell, however the basement will not be affected by or be influenced by this.	None
8. Is the site within 100m of a watercourse or a potential spring line?	No.	None
<i>9.</i> Is the site within an area of previously worked ground?	No.	None
10. Is the site within an aquifer?	No.	None
<i>11.</i> Is the site within 50m of the Hampstead Heath ponds?	No.	None
<i>12.</i> Is the site within 5m of a highway or pedestrian right of way?	Yes. Dartmouth Park Road and York Rise are present immediately to the south-east and south-west of the site; however construction works are unlikely to impact the highway assuming good workmanship and well- constructed scheme are carried out.	None (see comments below)
13. Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring	Yes. It is understood that the nearest neighbouring property, No. 46 Dartmouth Park Road, does not currently have basement	None (see comments below)



Question	Response	Action required
properties?	levels; however, the basement will not share a party wall and heave/settlement will be negligible assuming good workmanship and well-constructed scheme are carried out.	
<i>14.</i> Is the site over (or within the exclusion zone of) any tunnels?	No.	None

A review of local topography and reference to Figure 16 of CGHHS<sup>3</sup> suggests that local and wider hillslopes do not exceed a gradient of 1 in 8 (approximately 7°).

Figure 17 of the Study indicates the site is not located in an area of landslide potential. No trees are to be felled as part of the proposed works.

The construction of the basement will significantly increase the differential depth of foundations between No. 46 and No. 44, however it is noted that the foundations of No. 46 are offset by approximately 1m and therefore will not be directly underpinned. Given the depth of the new basement (approximately 3m) and the thickness of the underpin walls (typically 300mm to 600mm), deflections of the underpin walls are likely to be negligible and would not contribute to ground movements adjacent to the construction. Similarly, heave displacements over the short and long term would be expected not to exceed between 2mm to 5mm around the basement perimeter and would therefore not affect the structure of No. 46.

#### 3.4 Surface Flow and Flooding Screening Assessment

This section covers the main surface flow and flooding issues as set out in Figure 3, CPG4.

Question	Response	Action required
<ol> <li>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?</li> </ol>	No. Existing drainage routes are unchanged.	None

Table 4. Responses to Figure 3, CPG4



2. Will the proposed development result in a change in the proportion of hard surfaced/paved external areas?	Yes. A minor increase is proposed in the proportion of hard-standing.	None (see below)
3. Will the proposed basement result in a change to the profile of the inflows of surface water being received by adjacent properties or downstream watercourses?	No.	None
4. Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?	No. The proposed excavation would remove the majority of any Made Ground that may be present on site and as such will not impact on water quality.	None
5. Is the site in an area known to be at risk from surface flooding, or is it at risk from flooding because the proposed basement is below the static water level of a nearby surface water feature?	No. Site is not within an area at risk from flooding, however, Flood Risk Assessment to be undertaken by others as York Rise (directly to the west of the site) was subjected to flooding in 1975	Flood Risk Assessment (undertaken by others).

The proposed development will remain a residential property, therefore no significant change of use is anticipated that may increase discharge loads to the existing sewer and drainage systems. A minor increase in the proportion of hard-standing is proposed to the rear of the property where an infill extension is to be constructed, which will not extend beyond the rear wall of the existing extension. This minor increase in hard-standing is not considered to significantly affect run-off/surface attenuation characteristics. The site is not recorded to be within an area at risk from surface water flooding, however, York Rise which is located adjacent to No. 44 Dartmouth Park Road is recorded to have flooding during 1975 and a Flood Risk Assessment is to be undertaken by others.



#### 4. CONCLUSIONS

The findings of the screening assessment are summarised below:

Table 5. Summary of Basement Impact Assessment requirements

Item	Description
1.	Groundwater flow None – The basement will be constructed entirely within London Clay and therefore groundwater is not expected to be encountered. Given the relatively impermeable nature of the London Clay, infiltration will be negligible.
2.	Slope (land stability) None – The basement is partial, will be constructed within the stable London Clay and does not directly underpin party walls. No impact is associated to neighbouring structures assuming good workmanship and well-constructed scheme are carried out.
3.	Surface flow and flooding The basement will be constructed predominantly beneath the existing building. Therefore run-off/surface attenuation characteristics are not significantly affected. Dartmouth Park Road is not located within an area at risk from surface water; however, York Rise directly to the south-west of the site is within an area at risk from surface water. Therefore a Flood Risk Assessment may be deemed necessary by the Local Authority.
4.	Cumulative impacts There are no recorded basements directly adjacent to the proposed basement, and as groundwater flow would not be expected within the London Clay, it is expected that cumulative impacts from the construction of the basement may be negligible.

**FIGURES** 







## **APPENDIX A**

Proposed development plans and sections



FRONT ELEVATION as existing



# FLANK ELEVATION to York Rise....as existing



## REAR ELEVATION as existing





### FLANK ELEVATION as existing





FIRST FLOOR existing GIA 56m2



FIRST FLOOR ex GIA 82m2



#### 44 dartmouth park road nw5





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#### 44 dartmouth park road nw5





peter stern architect & designer

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FIRST FLOOR proposed GIA 97m2







FRONT ELEVATION proposed













## **APPENDIX B**

BGS historical borehole records



Not to scale. Modified from www.bgs.ac.uk

Client Mr Jacob Sorkin	44 Dartmouth Park Road, London	Job No CG/18249
CGL	BGS historical borehole location plan	Appendix B

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				(For	Survey use	only)	
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