Basement Impact Assessment

3 Britannia Street
Kings Cross
London
WC1X 9JT

Prepared for:

Harriet Errington
3 Britannia Street
Kings Cross
London
WC1X 9JT

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Project Reference:	UK15.1766	
Title:	Basement Impact Assessment – 3 Britannia Street	
Client:	Harriet Errington	
Date:	15th February 2016	
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Ben Virtue	Steve Bullock	Steve Bullock
Senior Consultant	Director	Director

NOTES:

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Where ground investigations have been conducted, these have been limited to the level of detail required for the site in order to achieve the objectives of the investigation.

The report has been written, reviewed and authorised by the persons listed above. It has also undergone EPS' in house quality management inspection. Should you require any further assistance regarding the information provided within the report, please do not hesitate to contact us.

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1 INTRODUCTION

In January 2015, Environmental Protection Strategies Ltd (EPS) was commissioned by Harriet Errington to complete a Basement Impact Assessment (BIA) at 3 Britannia Street, Kings Cross, London, WC1X 9JT (the 'site'); see Figure 1. Selected photographs are included in Appendix A.

This report presents the findings, conclusions, and recommendations of the initial screening stage of the BIA.

Development proposals for the site include the slight deepening of the current basement at the referenced property with future provisions made to extend this feature to the north (beyond the existing building line) and south (beneath current footprint). A proposed development plan for the site is included within this report as Appendix B.

1.1 Objectives

The objectives of this investigation were as follows:

a) To undertake the screening stage for BIA for the proposed development.

1.2 Scope of Work

To perform the screening stage of BIA to address requirements of Development Policy 27 (DP27) of 'The London Borough of Camden Development Policies Adoption Framework' the following tasks were undertaken:

- Collection of site records.
- Study of existing geological, hydrogeological, hydrological and historic maps of the area.
- Consultation of databases, including reference documents commissioned by the local authority - London Borough of Camden: Guidance for Subterranean Development – November 2010.
- Review of proposed development plans.
- Site walkover survey.

The findings of these investigations and their conclusions form the basis of the scoping stage for the BIA. The local authority will use the information provided to assess if the proposed scheme will impact on drainage, flooding, groundwater conditions and structural stability of existing buildings.

2 GEO-ENVIRONMENTAL SETTING

The following section provides a summary of the information collected in relation to the site location and anticipated ground conditions.

2.1 Site Location and Description

The site is situated in central London, approximately 400m east of Kings Cross Railway Station. The study area is located within Britannia Street and is centred on national grid reference 530701, 182922, (see Figure 1). The immediate surrounding land use is predominantly residential although a commercial property lies adjacent to the east and is used for glass product manufacturing and processing. The area lies at an approximate topographic elevation of 14m Above Ordnance Datum (AOD) with local topography being fairly consistent.

A site walkover was undertaken on 23rd January 2015 and the area was found to comprise a four storey, (including limited semi-basement level), brick built structure with a flat roof, with neighbouring properties being similar. No notable areas of soft landscaping or outdoor spaces were identified with the only exception being a small area of courtyard adjoining the master bedroom, located towards the rear of the property. The building fronts directly onto Britannia Street which is bordered to the north and south by paved public footpaths.

The existing basement is accessed via a small stairwell from the main hallway and underlays a limited section of the ground floor level. The current basement height is roughly 1.6m but development proposals will see a net increase to 2.6m. Furthermore, provisions have also been made to extend the footprint of the basement to the north, and marginally underlying the adjoining pathway to provide a light well as well as to the south, aligning with the existing ground floor footprint. The basement space is currently used for general storage purposes however, it is understood it will be converted to include utility and wet room facilities.

A plan showing the site location is provided as Figure 1 and a current layout plan is included as Figure 2. Selected site photographs are included as Appendix A and a Proposed Development Plan as Appendix B.

2.2 Geology and Geological Hazards

Geological maps of the area, (British Geological Survey 1:50,000 series, Sheet 256-Geological Map of North London-Solid and Drift Edition) report the site to be directly underlain by London Clay Formation materials comprising clay, silt and sand.

However, a local borehole formed within 60m of the western site boundary, does indicate the presence of granular materials comprising sandy gravels to approximately 3.5m below ground level (bgl).

2.3 Regional Hydrogeology

The Environment Agency (EA) groundwater vulnerability map of the area, (Groundwater Vulnerability of West London-Sheet 39-1:100,000) indicates that the London Clay underlying the site is regarded as an unproductive aquifer.

A search of the Environment Agency (EA) public database reveals that the site does not lie within a groundwater source protection zone (SPZ).

Given the likely presence of granular superficial deposits identified within the local borehole record, the potential for perched water is recognised.

2.4 Hydrology

No surface water features have been noted within a 500m radius of the survey site.

3 BASEMENT IMPACT ASSESSMENT

3.1 Screening Process

The first stage in assessing the impact of a proposed basement development is to recognise issues that are relevant to the site. Screening is the process of determining whether or not a fully scoped BIA including site investigation is required for the project. The screening process takes the form of a number of potential obstructive issues relating to surface water flow and flooding, groundwater flow and land stability, that are addressed in the following sections.

3.1.1 Surface Flow and Flooding

This section considers drainage issues, including how surface water flow will be managed on site.

Question 1: Is the site within the catchment of the pond chains on Hampstead Heath?

No	

Question 2: 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	No material change to the drainage is intended.

Question 3: Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas?

No	It is understood that the basement will extend slightly beyond the ground floor level footprint marginally underlying the adjoining pathway to provide a light well. However, this area is currently laid to hard standing and used as a public footpath, therefore the final development shouldn't result in an increase in impermeable area.

Question 4: Will the proposed basement result in changes to the profile of the inflows, (instantaneous and long-term) of surface water being received by adjacent properties or downstream watercourses?

No	As for Q3 (above) no material change to the impermeable area is intended and therefore, no changes to surface water inflows are anticipated.

Question 5: Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?

No	Surface water quality will not be affected by the basement proposals as this will remain as currently collected from roof tops and hardscaped areas of the existing property and will remain unchanged.

Question 6: Is the site in an area known to be at risk from surface water flooding.

Yes	The London Borough of Camden Flood Risk Management Strategy does highlight the site to be in an area considered to be at risk from surface water flooding. However, this area was shown not to be affected during the two most recent surface water flooding events highlighted in 1975 and 2002.

3.1.2 Groundwater Flow

This section considers the groundwater regime beneath the site.

Question 1a: Is the site located directly above an aquifer?

No	London Clay materials are considered unproductive strata in terms of aquifer designation.

Question 1b: Will the proposed basement extend beneath the water table surface?

No	Review of a local historical borehole record sourced from the British Geological Survey (BGS) database, indicates groundwater was not encountered within 30m of surface level. This borehole was formed approximately 60m west of the study site, and at a similar topographic elevation as the development area. Given basement formation level will be approximately 3.0m below ground level (bgl) groundwater is likely to be avoided. However, it is possible that the superficial granular deposits may contain perched or localised pockets of water.

Question 2: Is the site within 100m of a watercourse, well (used / disused) or potential spring line?

No	The London Borough of Camden Surface Water Features map does not identify any surface water features within 100m.

Question 3: Is the site within the catchment of the pond chains on Hampstead Heath?

No	

Question 4: Will the proposed basement development result in a change in the proportion of hard surfaced / paved areas?

No	Basement level won't result in increased area of hard standing, (see 'Surface Flow and Flooding' question 3).

Question 5: As part of the site drainage, will more surface water, (e.g. rainfall and run-off) than at present be discharged to the ground, (e.g. via soakaways and / or SUDS)?

No	It is understood that surface water will be discharged to existing municipal drainage networks.

Question 6: 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 or spring line?

No	No surface water features have been noted within 500m radius of the survey site. Therefore, given the anticipated predominantly cohesive ground conditions, it is not considered plausible that such features could drain to proposed basement excavation.

3.1.3 Land Stability

This section considers if the site may be prone to land stability issues and if the proposed development may be at risk of causing land instability.

Question 1: Does the existing site include slopes, natural or manmade, greater than 7° (approximately 1 in 8)?

No	The site is situated in an area of relatively limited topographical variation with the site and surrounding area founded on slope angle <7° within London Borough of Camden Slope Angle Map.

Question 2: Will the proposed re-profiling of landscaping at site change slopes at the property boundary to more than 7°?

No	Proposed development will not significantly affect existing profiling of the site.

Question 3: Does the developments neighbouring land, including railway cuttings and the like, include a slope greater than 7°?

No	Surrounding land shows limited variation in slope profile. Two isolated areas associated with over ground railway cuttings with slope profiles between 7° - 10° are highlighted approximately 125m south west and 190m north west respectively.

Question 4: Is the site within a wider hillside setting in which the general slope is greater than 7°?

No	See Question 3.

Question 5: Is the London Clay the shallowest strata at the site?

No	The London Borough of Camden Geological Map of South Camden and BGS geological map indicate the site to directly overlie London Clay materials. However, a local borehole formed within 60m of the western site boundary, does indicate the presence of granular materials to approximately 3.5m bgl. Therefore, it is possible that the basement could be formed with similar materials, which may alleviate the effects of shrink-swell within London Clay. However, London Clay materials are still liable to experience heave due to removal of overburden.

Question 6: Will any tree(s) 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	No trees are present within the site boundary or neighbouring land. Therefore, no supplementary heave affects are anticipated due to removal of trees / roots and subsequent increase of moisture to cohesive soils.

Question 7: Is there a history of seasonal shrink-swell subsidence in the local area, and / or evidence of such effects at the site?

No	There is no significant evidence of such at the site or surrounding area, with the local properties appearing to be structurally sound, with no obvious evidence of cracking or failure noted during the site walkover. However, BGS online database does highlight a moderate risk of shrink-swell in the vicinity.

Question 8: Is the site within 100m of a watercourse or a potential spring line?

No	

Question 9: Is the site within an area of previously worked ground?

No	No areas of previously worked ground have been indicated at the site or immediate surrounding area within available mapping, however two notable areas have been noted in excess of 300m to the north west / south west respectively.

Question 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	The Borough of Camden Aquifer Designation Map indicates underlying London Clay is classified as unproductive strata. Furthermore, a local historic borehole record indicates that groundwater is not present within 30m of ground level.

Question 11: Is the site within 50m of the Hampstead Heath ponds?

No	

Question 12: Is the site within 5m of a highway or pedestrian right of way?

Yes	The site fronts onto Britannia Street to the north with pedestrian footpaths present either side. No highways or pedestrian right of ways are present within 5m of remaining site boundaries.

Question 13: Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?

Yes	The existing property is noted to already comprise a limited basement that is approximately 1.6m in height, with development proposals including increasing relative height to approximately 2.6m. It is understood that the neighbouring property to the west comprises a full basement level, which is anticipated to be present adjacent to the proposed basement section for 3 Britannia Street. The commercial premises to the east does not currently appear to include a basement level. The change in differential depth will be limited to those estimated, (approximately 1.0m), which would otherwise have been greater if not for the presence of the existing basement.

Question 14: Is the site over, (or within the exclusion zone of) any tunnels, e.g. railway lines?

No	The site does lie within approximately 75m of Hammersmith and City / Piccadilly lines, however given the relative distance between the site and these features, the proposed development shouldn't be affected.

4 CONCLUSIONS

4.1 Surface Flow and Flooding

Potential impacts that require consideration

- Potential for surface water flooding.

Although Camden Flood Risk Management Strategy does highlight the site to be in an area considered to be at risk from surface water flooding, this area was shown not to be affected during the two most recent surface water flooding events highlighted in 1975 and 2002. Furthermore, no additional surface water discharge is anticipated to the existing surface water system although local drainage operators may dictate the requirement for attenuation measures, such as a hydro brake, which will enable surface water flow to be kept to current levels in the event of unexpected marginal increase in surface water discharge volume. It is however likely that any attenuation measures will need to be maintained in perpetuity of the development.

It is therefore concluded that the development will not have any adverse impact upon the existing surface water disposal system nor will it having any bearing on the likelihood or severity of surface water flooding event in the area.

4.2 Groundwater Flow

Potential impacts that require consideration

- Potential for perched water

Groundwater was not recorded within 30m of ground level within local historic borehole log. Any shallow groundwater ingress identified during initial ground workings is likely to represent perched water. As such, and given the low permeability of the cohesive soils present, groundwater flows will be slow.

Furthermore, this is only a relatively small development and will be constructed with drainage around the perimeter of the structure to deal with the presence of perched water.

In the long term, it is considered that groundwater levels are not likely to be affected significantly by the construction of the basement.

4.3 Land Stability

Potential impacts that require consideration

- The presence of potentially shrinkable cohesive soils.
- The presence of a public highway and pavement within 5m of the site boundary.
- Increase in differential depth between proposed development and neighbouring property foundations.

Given the depth of superficial soils likely to be present, the basement construction is anticipated to be within London Clay formation materials. Due to the removal of overburden during basement excavation there is the potential for heave of the cohesive soils which will be addressed within the basement design to ensure uplift forces can be overcome.

Stability of excavations will need to be maintained during the redevelopment. To this end, it is recommended that a method statement for the construction is prepared, detailing the processes that will take place. Appropriate excavation support should be provided at all times during construction to ensure the stability of the basement, other excavations and neighbouring properties. Monitoring is recommended for adjacent properties during the works.

Any water entering the basement excavation should be collected in temporary sumps and pumped out so as not to adversely affect the construction or neighbouring properties. It is recommended that the contractor should undertake some limited excavations in the area of the proposed basement to investigate the level of groundwater ingress and to ensure that any flows can be dealt with.

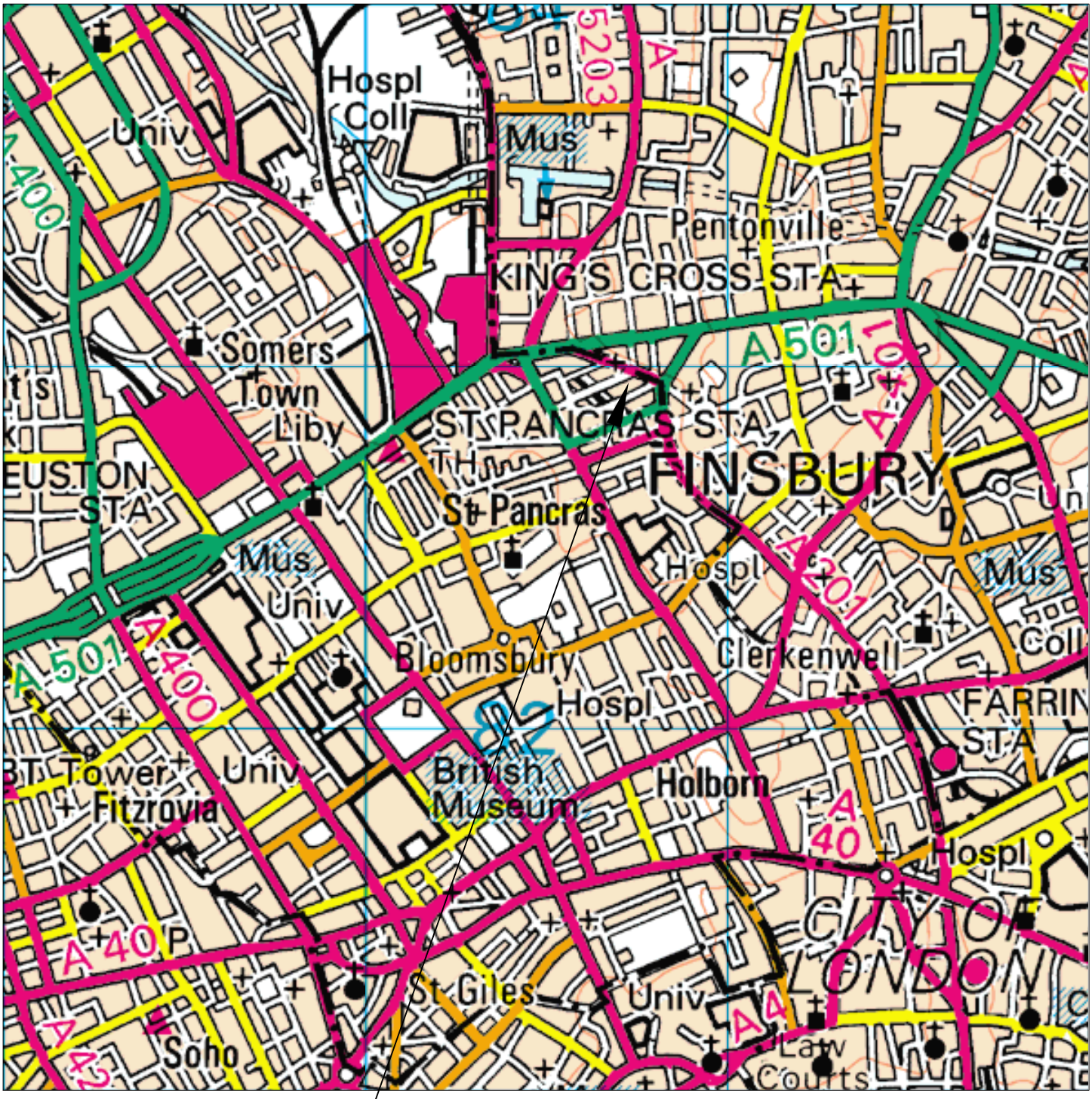
The potential for ground movement will also need to be taken into account. Adjacent properties and adjoining public footpath / roadways are sufficiently close to the site that significant ground movement may cause damage to those properties or infrastructure.

The basement will need to be waterproofed to ensure water ingress does not take place that may lead to dewatering of the general area, leading to consolidation of the cohesive soils and subsequently to foundation movement of on-site and surrounding structures.

There is also the potential for differential foundation movement, between old and new footings. Existing foundations will be underpinned using mass concrete design to suitable depths in the vicinity of the basement to limit these effects and the structure should be monitored so that it does not suffer adverse effects due to the intended construction.

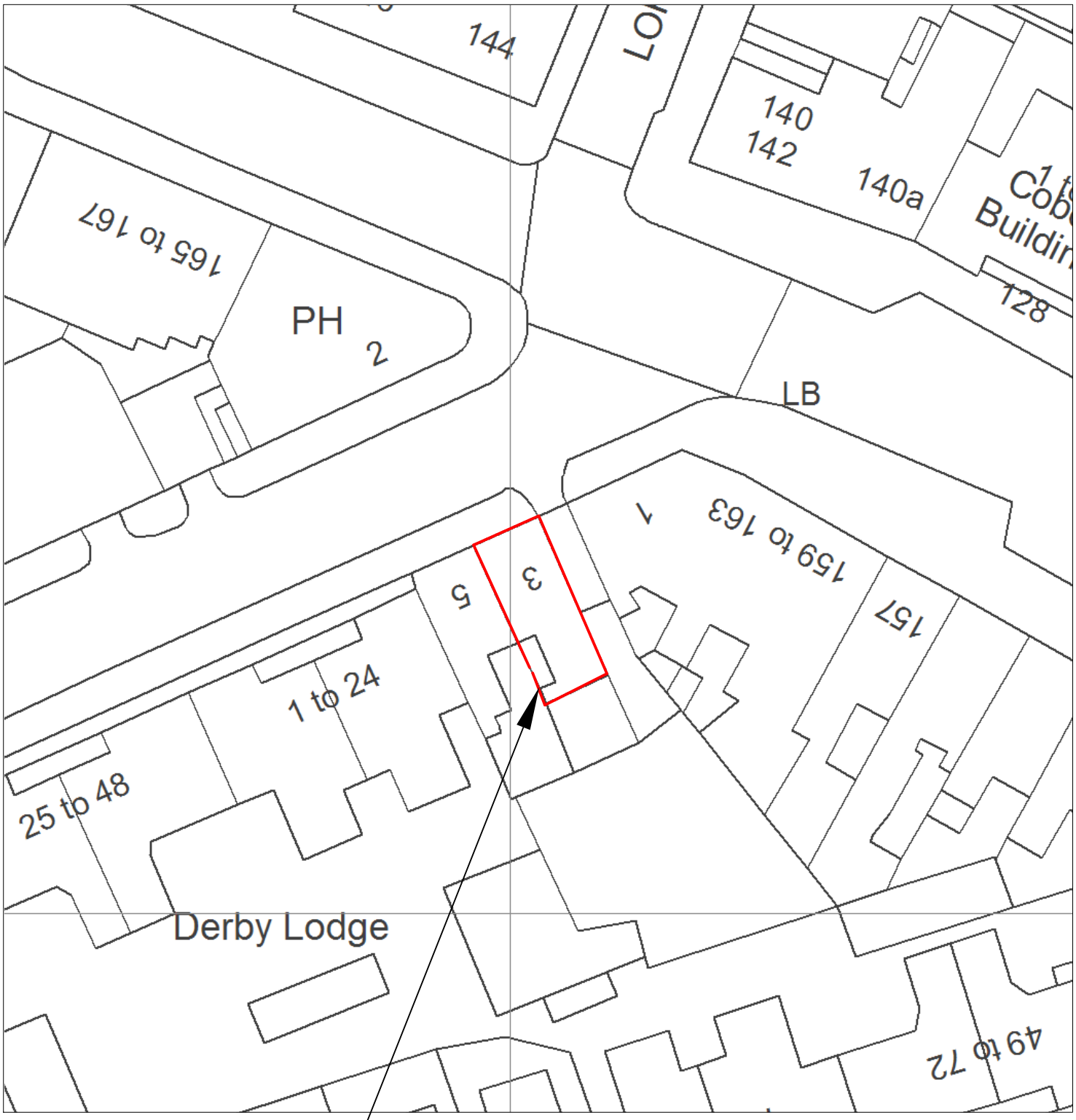
If the above precautions are adhered to and the works designed in an appropriate manner, there is considered to be no particular reason why the stability of the land should be affected.

FIGURES



Approximate Site Location

Title:	**Site Location Plan**		
Project:	3 Britannia Street, London, WC1X 9JT	Scale:	NTS
		Drawn By: KH	Approved By: SB
Client:	Ms Harriet Errington	Job No:	UK15.1766
Fig No:	**1**	Dwg No:	Errington H/BritanniaSt/0216/01
		Date:	February 2016



Title: Current Site Layout Plan

Project: 3 Britannia Street, London, WC1X 9JT

Client: Ms Harriet Errington

Fig No: 2

Scale:	NTS
Drawn By:	KH
Approved By:	SB
Job No:	UK15.1766
Dwg No:	Errington H/BritanniaSt/0216/02
Date:	February 2016

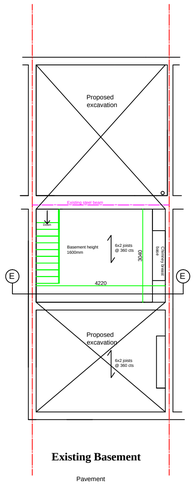
APPENDIX A

Selected Site Photographs

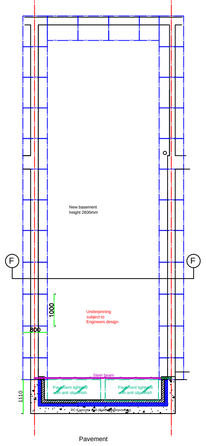
Photo 1: View looking approximately south at the front of the existing property.	Photo 2: View looking at the pathway at the front of the property.
	
Photo 3: View looking at access to the existing basement.	Photo 4: View looking at the northern face of the existing basement.
	

APPENDIX B

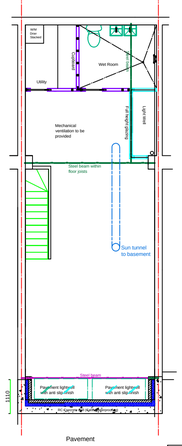
Proposed Development Plan



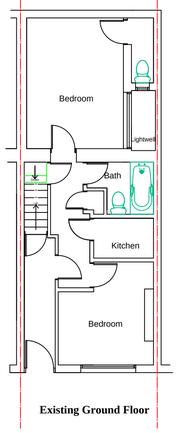
Existing Basement



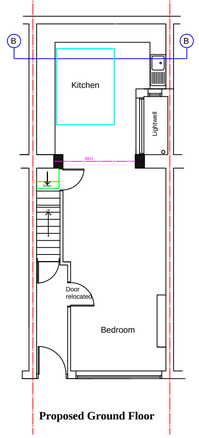
Proposed Basement Under pinning



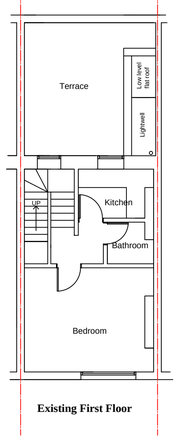
Proposed Basement



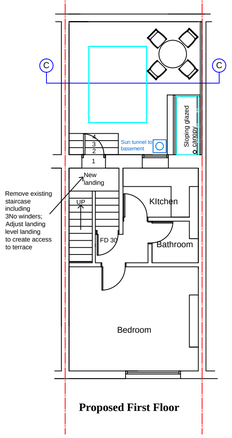
Existing Ground Floor



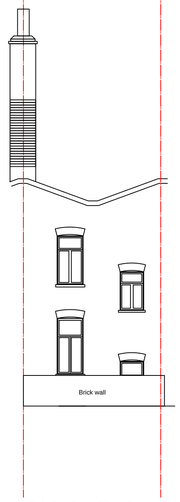
Proposed Ground Floor



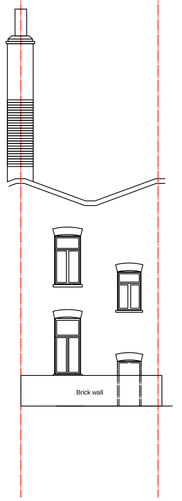
Existing First Floor



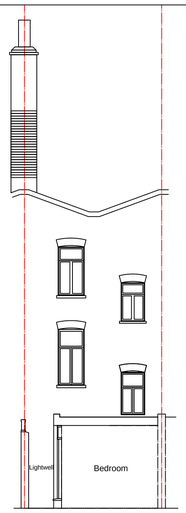
Proposed First Floor



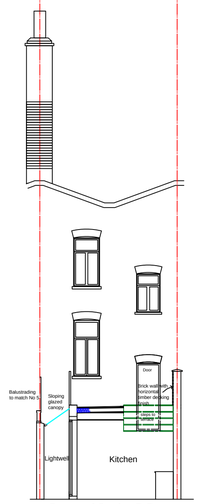
Existing Rear Elevation



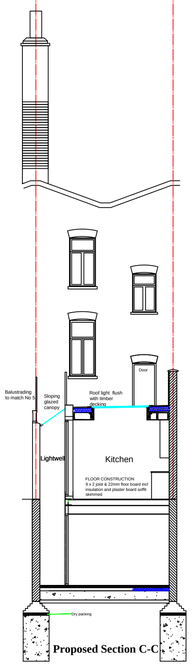
Proposed Rear Elevation



Existing Section A-A



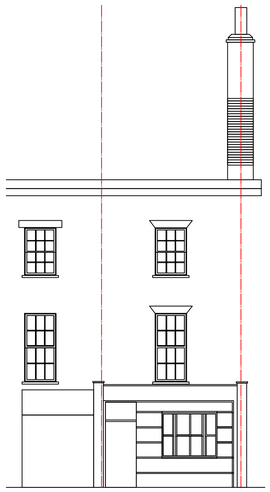
Proposed Section B-B
See Section C-C



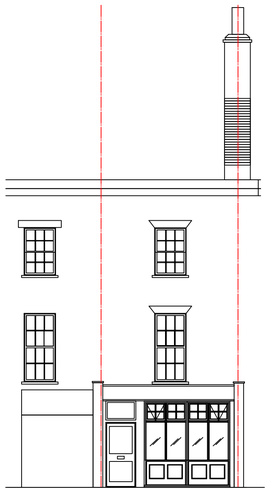
Proposed Section C-C

NOTE A: The proposed pavement lights will be designed to support a point load of 12KN. in accordance with DESIGN MANUAL FOR ROADS AND BRIDGES. VOLUME 1 SECTION 1 PART 1 BD 2/12

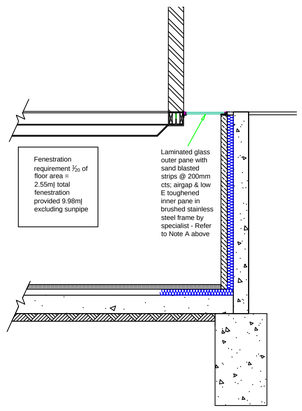
Full structural calculations including model AIP form in Annex A1b will be SUBMITTED after approval of planning



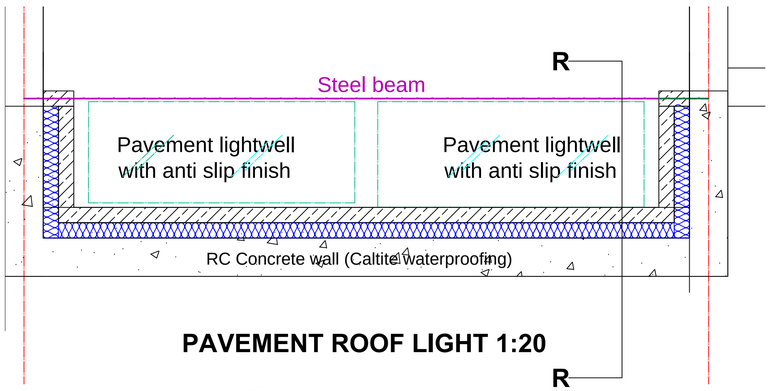
Existing Front Elevation



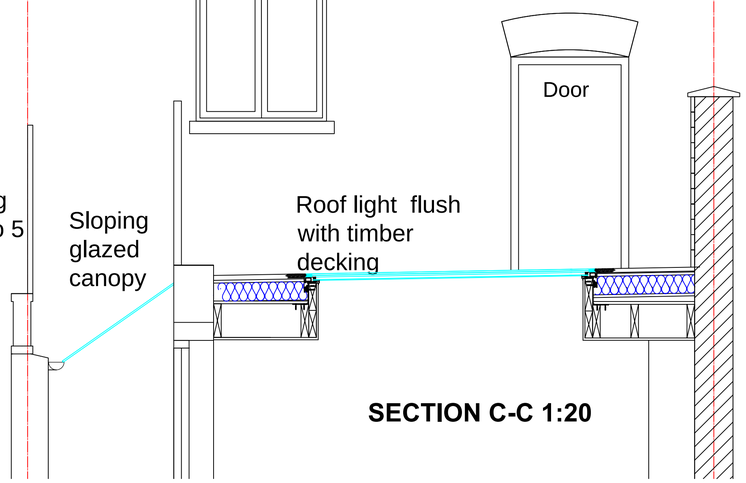
Proposed Front Elevation



ROOF LIGHT SECTION R-R
SCALE 1:20

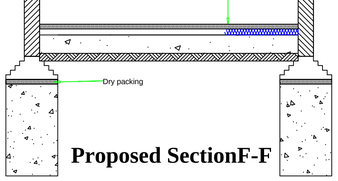


PAVEMENT ROOF LIGHT 1:20



SECTION C-C 1:20

Existing Section E-E



Proposed SectionF-F

NOTES

Mass Concrete Underpinning Mass Concrete Underpinning

1. This stage consists the construction of the mass concrete underpinning.
2. The sequence of construction of the underpinning to be determined by Engineer, depending on the structural environment and access constraints.
3. A record to be kept of the exact sequence of construction, which will should be in strict accordance with the recognised industry procedures. The as-built records will be updated as necessary and issued to involved parties during the course of the works.
4. The access trench (working space) to be excavated, directly underneath the wall to be underpinned. The length of any base to individually assessed on site with due regard to the type and condition of the foundation, and structural geometry above. The maximum length of any underpinning base to be 1000mm.
5. Break off projecting brick or concrete footing back to internal face of brick wall.
6. Excavate using hand and compressed air tools removing spoil until the design depth is reached, and removed to muck away conveyor or by hand.
7. Once the excavation is completed to the design depth and width. The stratum at the proposed founding depth to be confirmed as being appropriate by the structural engineer.
8. A single sided shutter be erected, and concrete poured to form the underpinning stem up to a maximum of 100mm below the underside of the existing foundation.
9. After 24 hours the temporary wall shutters to be struck off. The void between the top of the underpin base and underside of the existing foundation to be dry packed with a mixture of sharp sand and cement (Ratio 3:1 sharp sand:cement).
10. A further 24 hours to be allowed before adjacent sections can be excavated

Supporting existing timber floors Supporting existing timber floors above basement excavation: above basement excavation:

1. The timber floor will remain in situ, and to be supported by a series of steel beams as required and to provide the open areas in the basement.
2. Beams to bear at masonry walls onto concrete padstones (as specified by Structural Engineers details for padstone & beam sizes) Dismantle props and any remove timber plates.

NOTES

Mass Concrete Underpinning Mass Concrete Underpinning (cont)

Water proofing

1. **Generally the waterproofing membrane TO be in accordance with the attached sketch.**
2. **Once the basement slab is complete, DELTA internal waterproofing cavity membrane to be installed as per the architectural layouts and manufacturers technical specification.**
3. **The floor finishes to include 100mm insulation and under floor heating, to be laid as per the final architectural details.**
4. **75mm cement and sand screed to be applied on the slab surface.**

Notes:

Notes:

Revision:

Rev	Date	Revision

Project Title: 3 BRITANNIA STREET WC1X 9JT
Date: Nov 15 Scale: 1:50 :100 Var @A1 Revision:
Drawing Title: Planning Drawings
Drawing No: 03/PL/01

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