Balcap Re Limited

Land to the rear of 159-163 Kings Cross Road

Basement Impact Assessment

Parmarbrook

Job No: 1676

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Prepared by BP and RSC
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Verified by CP
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Contents

1 Executive Summary

1.1 Project Description

It is proposed to redevelop the site at the Land to the rear of 159-163 Kings Cross Road, which is currently occupied by a 1 and 2 storey commercial building.

The proposal will involve the demolition of the existing building and construction of a 1 to 3 storey commercial and gallery use building plus a single storey basement which is within the proposed building footprint. As the existing building does not have a basement the proposal will involve the excavation of a new single storey basement.

1.2 Report Content

The proposal complies with the Basement Impact Assessment requirements of Camden Planning Guidance *CPG4 – Basements and Lightwells* issued in July 2015. The information in this document and its appendices outlines the engineering and construction challenges specific to the site and proposal, which have been identified, carefully considered, and mitigated. This documents includes:

1. A detailed Desk Study including site history, utilities, and existing buildings and structures.
2. Summary of the site specific Site Investigation including geology, hydrogeology, and hydrology. The full Investigation report can be found in Appendix D.
3. Appraisal of the impact of underground structures with the locality.
4. Appraisal of the existing structure as it relates to the works and the final proposal.
5. Illustrative and quantitative details of the proposed structure to be further developed in the Detailed design phase.
6. Outline construction sequence to be further developed by the Contractor
7. Predicted ground movements, discussion of the implications, proposed monitoring regime, and movement trigger levels.
8. The Proposed Structural Drawings (Appendix A)
9. Results of the Thames Water Asset Search (Appendix B)
10. Below Ground Drainage Drawings (Appendix C)
11. GEA Site Investigation Report (Appendix D)

1.3 Summary Screening Results

A screening exercise was carried out in accordance with recommendation of CPG4 in respect of groundwater flow, land stability, and surface flow/flooding. Reference was made to the Camden Geological, Hydrogeology, and Hydrological Study and other data sources. The full Screening Assessment can be seen in Appendix D – Section 3 and a summary of relevant topics can be seen below.

1.3.1 Groundwater Flow

With respect to the ground water flow, no criteria have been identified as relevant to the proposal.

1.3.2 Ground Stability

With regard to ground stability, criteria Q5, Q7, Q12, and Q13 have been deemed relevant to the proposed scheme:

- Q5. London Clay is the shallowest stratum at the site.
- Q7. There is a history of seasonal shrink-swell subsidence in the local area and / or evidence of such effects at the site.
- Q12. The site is within 5 m of a highway or pedestrian right of way?
- Q13. The proposed basement significantly increase the differential depth of foundations relative to neighbouring properties.

1.3.3 Surface Flow and Flooding

With respect to the surface flow and flooding, criteria Q6 has been deemed relevant to the proposed scheme:

- Q6. The site is in an area identified to have surface water flood risk.

1.4 Summary Scoping Results

The scoping exercise has been carried out in accordance with CPG4 and has identified the primary risks to be mitigated in the design. The full Scoping Assessment can be seen in Appendix D – Section 4 which has been summarised below.

Potential Impact	Consequence
London Clay is the shallowest stratum at the site.	The London Clay is prone to seasonal shrink-swell (subsidence and heave).
Seasonal shrink-swell can result in foundation movements.	Multiple potential impacts depending on the specific setting of the basement development. For example, in terraced properties, the implications of a deepened basement/foundation system on neighbouring properties should be considered.
The site is located within 5 m of a highway or pedestrian right of way	Excavation of a basement may result in structural damage to the road or footway.
Founding depths relative to neighbours.	If not designed and constructed appropriately, the excavation of a basement may result in structural damage to neighbouring buildings and structures.
The site is in an area identified to have surface water flood risk.	The proposed basement may be at risk of flooding.

1.5 Impact Assessment

An assessment of the potential impacts identified during the scoping process has been made with mitigation measures where required. The below information is extracted from Appendix D – Part 4 – Basement Impact Assessment.

"The table below summarises the previously identified potential impacts and the additional information that is now available from the ground investigation in consideration of each impact. The ground investigation has indicated that the site is directly underlain by the London Clay, which is classified as an unproductive stratum

Potential Impact	Site Investigation Conclusions
London Clay is the shallowest stratum at the site.	The London Clay is prone to seasonal shrink-swell (subsidence and heave).
Seasonal shrink-swell can result in foundation movements.	The London Clay is prone to seasonal shrink-swell and can cause structural damage. Desiccation was not noted during the fieldwork.
The site is located within 5 m of a highway or pedestrian right of way	The proposed basement will not extend to within 5 m of Britannia Street in the north.
Founding depths relative to neighbours.	The retention system will ensure the stability of the excavation and neighbouring properties at all times.
The site in an area identified to have surface water flood risk.	The proposed basement is set back behind the buildings that front on to Britannia Street and King's Cross Road, such that the basement is likely to be at a sufficient distance from any such surface water flooding.

The results of the site investigation have been used below to review the remaining potential impacts, to assess the likelihood of them occurring and the scope for reasonable engineering mitigation.

Seasonal Shrink-Swell
The proposed basement is not located close to any existing trees and proposed planting of new trees does not form part of the proposals, such that the effect of shrink-swell of the London Clay is not envisaged.

The Proposed Basement Will Significantly Increase Differential Depth of Foundations to Neighbouring Properties
As part of the investigation, the depth of a number of neighbouring foundations has been determined and has been included in the ground movement assessment. The proposed basement will extend to a significant depth relative to the existing foundations of the neighbouring properties and will need to be designed to ensure the stability of the site and any potentially sensitive structures that are in close proximity to the site.

Appropriate propping and temporary works installed during basement construction should limit the effect of ground movements to the surrounding properties. The results of a ground movement assessment by GMA to predict the likely movements as a result of the proposed development is shown in Part 3 of this report."

The conclusion of this process is that "The BIA has not indicated any concerns with regard to the effects of the proposed basement construction on the site and surrounding area. A flood risk assessment may however need to be carried out. It has been concluded that the impacts identified can be mitigated by appropriate design and standard construction practice." The full Impact Assessment can be seen in Appendix D – Section 10.0.

The site is not at risk of flooding from rivers or sea, and is defined by the Environment Agency as being within an area of low risk of surface water flooding, see section 16 Assessment of Flood Risk of this report for further details

1.6 Further Investigation

Further works are identified within Appendix D – Section 11 and are shown below:

Review of Geological Conditions During Excavation
"The ground is a heterogeneous natural material and variations will inevitably arise between the locations at which it is investigated. This report provides an assessment of the ground conditions based on the discrete points at which the ground was sampled, but the ground conditions should be subject to review as the work proceeds to ensure that any variations from the Ground Model are properly assessed by a suitably qualified person."

Further Water Monitoring
"Monitoring of the standpipe should be continued to determine equilibrium groundwater levels and to establish any seasonal fluctuations. Ideally, trial excavations extending to as close to the full depth of the proposed basement as possible should be carried out to determine likely groundwater inflows into the basement excavation." – To confirm the equilibrium groundwater levels, a trial excavation down to the required depth will be undertaken by GEA for incorporation into the Detail Design.

1.7 Review of Decision Making

The design of the retaining walls has carried out in order to minimise disturbance to the surrounding area.
Measures which have been proposed to minimise disturbance are as follows:
1. Underpinning of Existing Partywalls
2. Propping of the retaining wall during construction to limit deflection and ground disturbance
3. Temporary works to ensure stability of existing structures and prescribed maximum displacements are adhered to.
4. Movement monitoring and trigger levels

GEA's analysis has indicated that the maximum vertical settlements and horizontal movements that will result from the new retaining wall construction are less than 5 mm. Furthermore, the analysis has indicated that the maximum vertical settlements and horizontal movements that will result from the combined effect of the retaining wall installation and excavation are around 15 mm or less, these maximum figures take place at the face of the retaining walls with lesser movements being predicted at distances from this location (see Section 9, 10 and Appendix D). The analysis of the result of these movements on the adjoining structures has been shown to be from Negligible (category zero) to Very Slight (category one) on the majority of walls, with 3 Walls predicting a damage classification of Slight (category two) as measured against the Burland Scale. According to the Burland scale this is likely to result in:

''Cracks easily filled. Redecoration probably required. Several slight fractures showing inside of building. Cracks visible externally and some repointing may be required externally to ensure weather tightness. Doors and window may stick slightly.''

To mitigate these risks and reduce the damage category of these walls to Category 1 – Very Slight, prescribed limitation will be placed on the allowable movement for these structures (see section 9 of Appendix D).

Parmarbrook have undertaken a full Flood Risk Assessment (1676_FRA_16.03.03). In summary, the proposed development site is located in Flood Zone 1 and so is at low risk of flooding due to Tidal/Fluvial sources. This is reinforced by Environment Agency flood maps. High risk surface water flooding is located on adjacent Highways to the site, although, topographical levels show Highway levels falling away from the site. In addition, mitigation measures such as raised thresholds and interception channels reduce the flood risk to the site from surface water sources. In this regard and as developed in the site's flood risk assessment (FRA) the site is safe in terms of flood risk.

2 Introduction

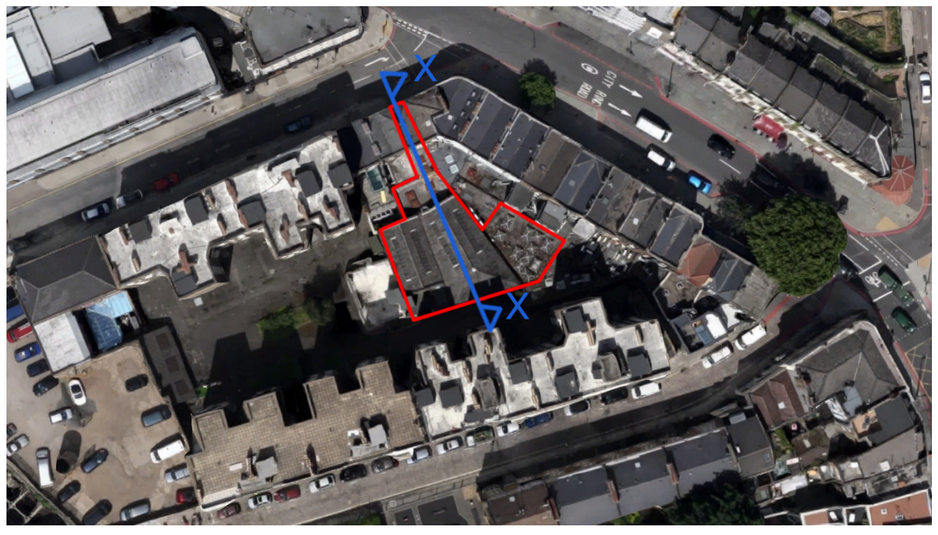
Parmarbrook Ltd. are appointed as the Consulting Civil and Structural Engineers by Balcap Re Ltd. for their proposed redevelopment of the Land to the rear of 159-163 Kings Cross Road, London, WC1X 9BN, with Marek Wojciechowski appointed as the Architects. This report has been prepared by a Chartered Structural Engineer as a supporting document for the main planning application for the redevelopment of the property.

The proposal will involve the demolition of the existing building while retaining the Partywalls, and construction of a 3 storeys commercial office and gallery building plus a single storey basement which is within the proposed building footprint. As the existing building does not have a basement the proposal will involve the excavation of a new single storey basement.

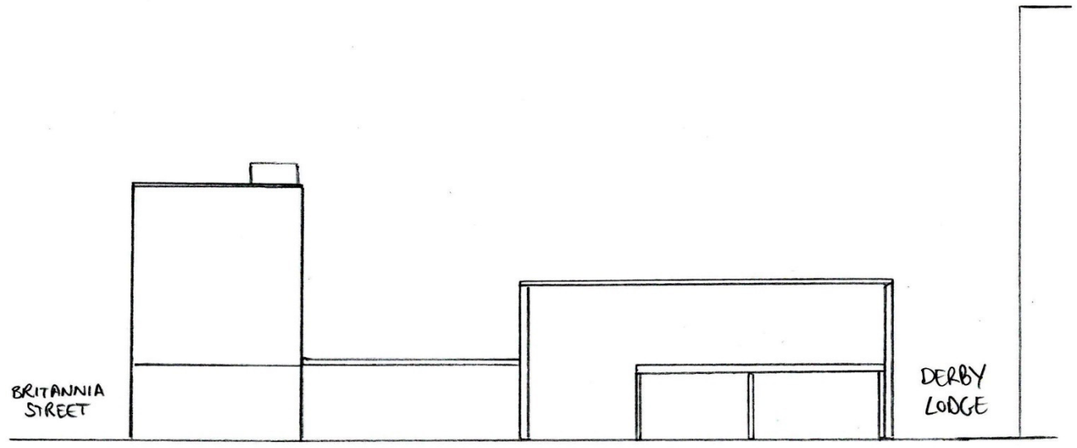
This document states the structural design philosophy for the proposed new buildings. It is intended to be a document to support the planning application, and act as a reference during the development of the project. It will be issued to all relevant parties including the Client, relevant authorities, and design team members. The Quantity Surveyor should also issue this document as part of the contractor's contract documentation.

Various assumptions have been made in the design, these are stated in relevant sections of text and until comments are received it is assumed that they are accepted by all members of the project team as a basis for the detailed design. The philosophy outlined in this document relates to the project as it stands at preplanning status design and should be read in conjunction with the drawings. Changes to the detail of this scheme will be highlighted in future revisions. This philosophy should also be read in conjunction with the architects, services engineers and relevant trade contractor's drawings, specifications and reports.

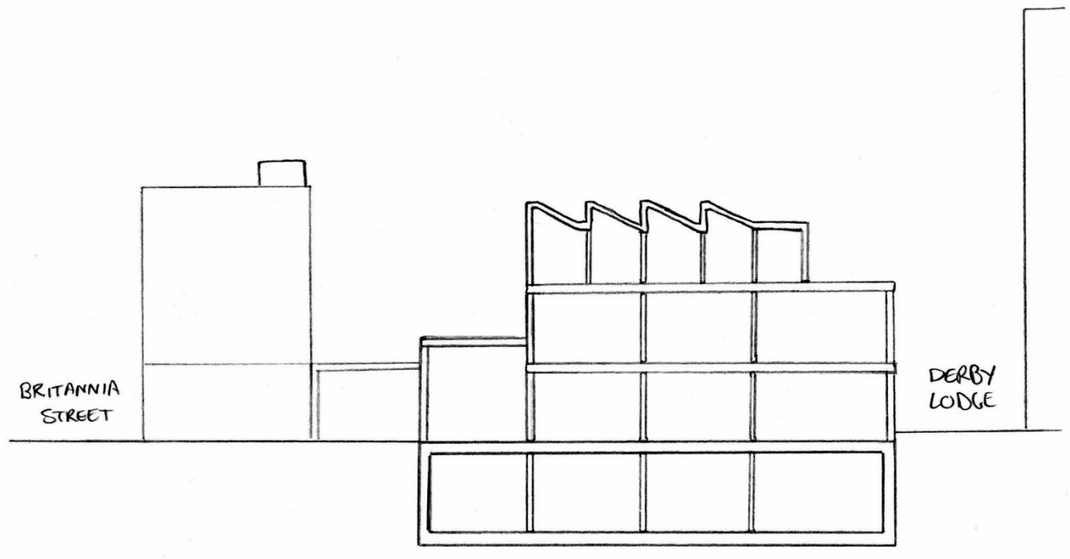
This document addresses the specific key issues in DPG4 as described in Camden Planning Guidance CPG4 (July 2015 edition)



Arial Photo - Site



Existing Section X-X



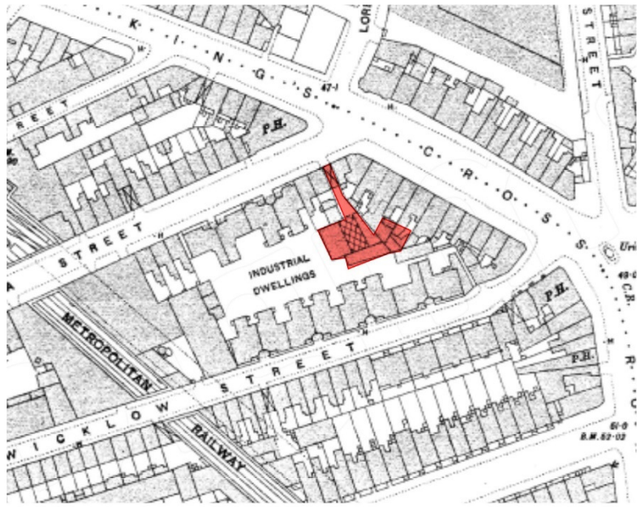
Proposed Section X-X

Existing Buildings with Site Boundary

3 Site Information

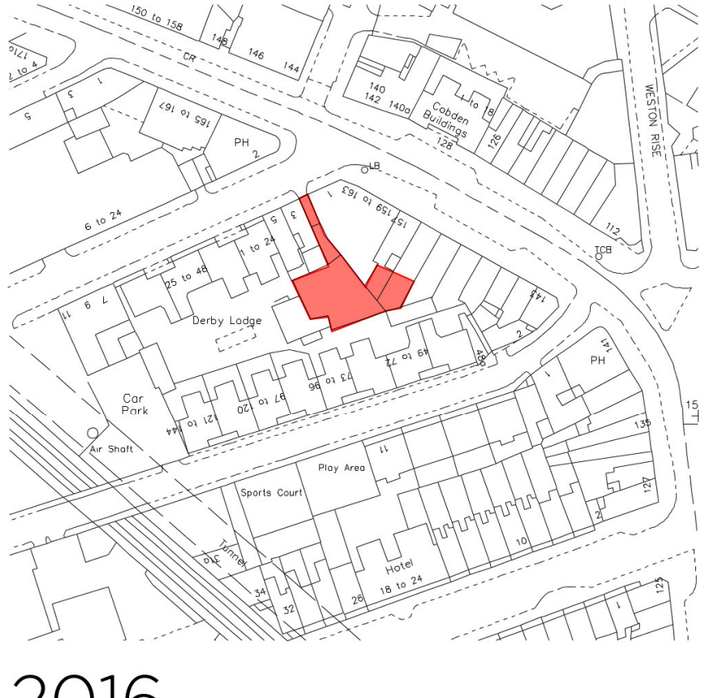
1870s

Ordnance Survey Map
Kings Cross Road & Surroundings
(Current site boundary in red)



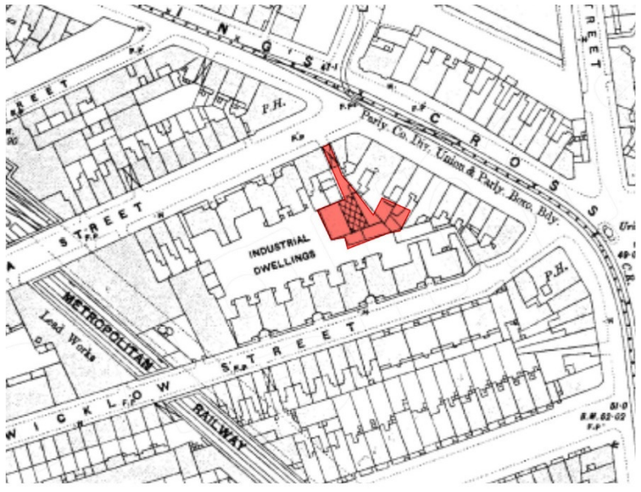
1910s

Ordnance Survey Map
Kings Cross Road & Surroundings
(Current site boundary in red)



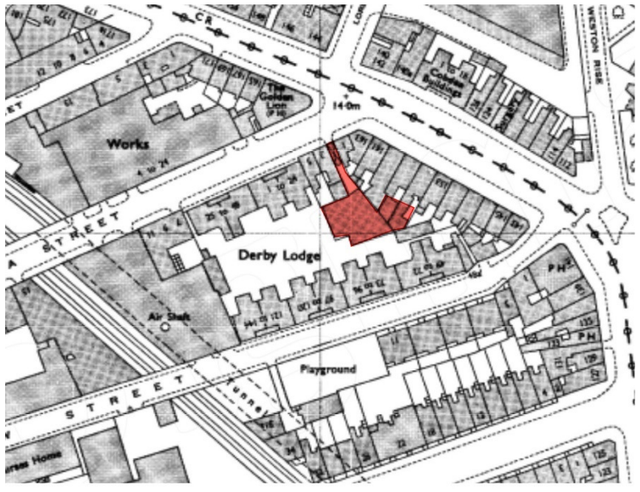
2016

Current Ordnance Survey Map
Kings Cross Road
& Surroundings
(Current site boundary in red)



1890s

Ordnance Survey Map
Kings Cross Road & Surroundings
(Current site boundary in red)



1970s

Ordnance Survey Map
Kings Cross Road & Surroundings
(Current site boundary in red)

3.1 Site History

The maps shown here describe the development of the area over the past 150 years. The plots surrounding the site have remained largely unchanged during this period, while the structures within the site have developed from a collection of buildings organised around a courtyard into a single enclosed warehouse style building with access tunnel.

3.2 Site Location

The site is located at the Land to the rear of 159-163 Kings Cross Road, London, WC1X 9BN in the London Borough of Camden. The area is a mixed urban environment, with both residential and commercial properties in the immediate vicinity. The site is bordered on 3 sides by a mix of commercial and residential buildings, with a lightly trafficked Britannia Street to the North which leads directly to the main road Kings Cross Road. The site falls within the Kings Cross conservation area but is not listed.

3.3 Existing Buildings and Boundary Conditions

3.3.1 Overview

The existing site is reasonably level and does not include a basement, however basements are present in 3 of the surrounding buildings. There are a range of structural materials used on and adjacent to the site including concrete, timber, and masonry.

3.3.2 Derby Lodge (South Boundary)

There is a tarmac path separating our site and the neighbouring buildings of Derby lodge which is over 4m in width, this can be seen in Site Photo 1 overleaf.

3.3.3 Derby Lodge (West Boundary)

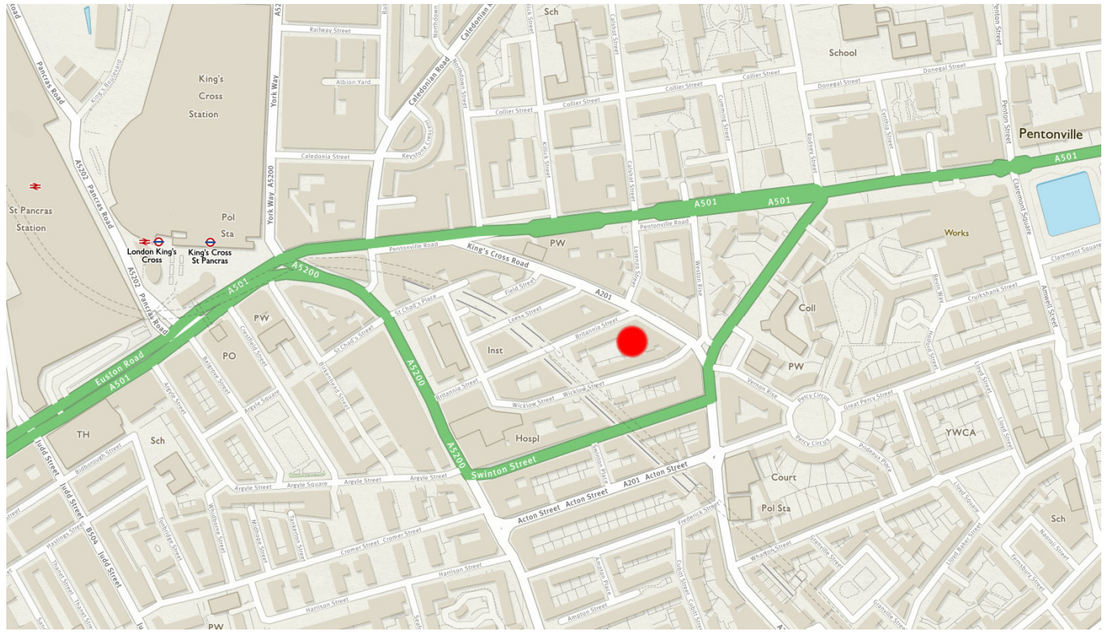
The existing boiler house which serves Derby Lodge can be seen in Site Photo 1 and 2 overleaf. This building is predominantly constructed of masonry and concrete and incorporates a basement which directly boarders our site.

3.3.4 1 and 3 Britannia Street (North Boundary)

The existing buildings are 3 storey Victoria terraces of traditional construction, basements are present in both 1 and 3 Britannia Street, it is believed that the former has been historically extended with underpinning while the latter is in its original Victorian half height basement form. This boundary can be seen in Site Photo 3 overleaf and in the photo below.

3.3.5 155-163 Kings Cross Road (East Boundary)

This row of Victorian terrace is of mixed commercial and residential use. Buildings of the kind were typically constructed of loadbearing masonry on masonry corbel footings and timber floors, however it is common for them to have had a range of historical modifications and renovation. This boundary can be seen in Site Photo 4 overleaf



OS Map showing Site Location

Street level view entrance to site from Britannia Street

3.3.7 Boundary Condition Photos

Site Photo 1
Derby Lodge
(South Boundary)
Photo facing East

Site Photo 2
Derby Lodge
(West Boundary)
Photo facing East

Site Photo 3
Interior of the Land to the rear of 159-163 Kings Cross Road
(North-East and North-West Boundary)
Photo facing North

Site Photo 4
Exterior of the Land to the rear of 159-163 Kings Cross Road
(East Boundary)
Photo facing South