

Appendix C: Ground Movement and Damage Impact Assessment



Museum Street

Building Damage Ground Movement Assessment

May 2023 2633-A2S-XX-XX-RP-Y-0003-00





Project Name	Museum Street
Project Number	2633
Client	Heyne Tillett Steel Ltd on behalf of Lab Selkirk House Ltd
Document Name	Building Damage Ground Movement Assessment

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Document Reference	Status	Revision	Issued by	Date
2633-A2S-XX-XX-RP-Y-0003-00	First Issue	00	HS	05.05.2023



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Appendix C: Building Loading Information

1. Introduction

A-squared Studio Engineers Ltd (A-squared) has been engaged by Heyne Tillett Steel Ltd (HTS) to undertake a ground movement assessment (GMA) in support of the detailed planning application being submitted by Lab Selkirk House Ltd (the Applicant) to the London Borough of Camden (the Council) for the redevelopment of the land at Selkirk House, 1 Museum Street, 10-12 Museum Street, 35-41 New Oxford Street and 16A-18 West Central Street, London, WC1A 1JR (the site).

The scope of this report compromises an assessment of the potential impact of ground movements associated with proposed demolition, excavation and construction works on the neighbouring buildings.

1.1. Study Aims & Objectives

A ground movement and impact assessment has been carried out in order to estimate the potential impact of the proposed development works on the surrounding buildings.

The assessment focuses on the works at the 1 Museum Street and West Central Street sites, comprising the Museum Street, Vine Lane, High Holborn and West Central Street proposed buildings.

The 1 Museum Street site is currently occupied by a 17-storey Travelodge Hotel and a multi-storey podium, which functions as a carpark. A three-storey basement is present beneath the majority of the site. The proposed development works include the demolition of the existing tower and carpark, partial excavation and filling of the site, and construction of the new superstructure elements in the form of a 19-storey office tower with retail space on the ground floor and two additional five- and six-storey buildings.

The West Central Street site is currently occupied by four terraced buildings. The proposed development works include the demolition of selected buildings, partial excavation of the site to install a new raft, and construction of the new superstructure elements. The two listed structures currently present will remain largely unchanged.

This assessment encompasses the neighbouring buildings located within the *zone of influence* of the proposed scheme. The ground movement assessment is based on *greenfield* ground movements, which are unlikely to be exceeded. The adopted assessment methodology provides a robust and conservative assessment, representative of current industry best practice as shown in Section 4.

This report provides a detailed description of the following:

- Site and proposed development.
- Modelling parameters and input.
- Analyses and results.

1.2. Information Sources

The principal sources of information, which have informed the assessment presented herein, include the following:

- Architectural drawings produced by DDSHA, dated October 2019, July and August 2020, and April and June 2022.
- RIBA Stage 2 drawings of proposed 1 Museum Street and West Central Street developments produced by Meinhardt (UK) Ltd, dated April 2022.
- RIBA Stage 2 drawings of proposed West Central Street developments produced by Heyne Tillett Steel Ltd, dated April 2023.
- Drawings of the Museum Street, Vine Lane, and High Holborn loading conditions produced by Meinhardt (UK) Ltd, dated December 2020 and June 2022, included in Appendix C.
- Drawings of the West Central Street loading conditions produced by HTS, dated April 2023, included in Appendix C.
- Museum Street Piled Raft Design Summary prepared by A-squared, dated June 2022 (ref. 1084-A2S-XX-XX-TN-Y-0013-01).
- Ground Investigation Factual Report produced by Jomas Associates Ltd, dated August 2021 (ref. P3094J2084/JWT).



- Ground Investigation and Basement Impact Report for West Central Street produced by Geotechnical & Environmental Associates, dated November 2015 (ref: J15190, Ground Investigation BIA and Ground Movement).
- Ground Movement and Central Line Tunnel Capacity Calculations produced by Ove Arup and Partners Ltd, dated June 2015 (ref: REP/GEO/05).



2. Site Setting

The proposed development site is located in Holborn, Central London, WC1A 1JP and is comprised of the 1 Museum Street and West Central Street plots in the south and north, respectively, shown in Figure 2.1. The site is located approximately 300m west of Holborn Underground Station, and 350mm east of Tottenham Court Road Underground Station. West Central Street runs through the site, separating the two plots. The development sites fall within the administrative boundaries of the London Borough of Camden.



 Approximate site boundary marked in red. Image courtesy of Google.

 Figure 2.1
 Location of the proposed development

The 1 Museum Street site currently houses a seventeen-storey Travelodge hotel tower and a multi-storey podium, which is currently used as a carpark. The existing structure is comprised of reinforced concrete and covers the majority of the plot. The carpark extends three storeys beneath the existing buildings (approximately 8.5m) and the foundation system consists of a ground-bearing raft and shallow footings. Sections and plan views of the existing structures are shown in Figure 2.2 and Figure 2.3, respectively.

The proposed development for 1 Museum Street comprises the construction of three new buildings with a shared basement: Museum Street, Vine Lane and High Holborn. The Museum Street building will comprise a new 19-storey office tower with retail space on the ground floor. The existing ramp will be converted into the five-storey Vine Lane structure with a double height basement. A six-storey building, High Holborn, will be constructed in the southwest corner of the site.

Several different foundation systems will be implemented across the site.

- **Museum Street**: Within the existing basement, new discrete shallow footings at column locations and a new hybrid piled raft foundation system beneath the core will be constructed approximately 2m above the lowest point of the top of the existing raft, with large portions of the existing basement refurbished and reused. Several bearing piles will also be constructed for columns landing outside of the basement to the north and east, and within the basement in the southeast corner.
- Vine Lane: A new raft foundation system will be constructed, replacing any existing substructure elements present in that location. The raft will be tied into a new secant wall toed approximately 4m below the proposed formation level.
- High Holborn: A new raft foundation system will be constructed on the top of the existing raft.



Foundation movement control measures are present in the form of 15no. movement-control piles installed prior to commencing demolition works on either side of the tunnel alignment beneath the core, and 44no. additional settlement-reducing piles throughout the footprint of the proposed Museum Street development to minimise the impact of the proposed building loading. The movement-control piles also act as settlement-reducing piles in the long-term condition.

Plans and sections of the proposed development at the 1 Museum Street site are provided in Figure 2.4 and Figure 2.5. The movement-control and settlement-reducing pile arrangement is shown in Figure 2.6.



Source: DDSHA.

Figure 2.2 3D view (left) and west-east section (right) of the existing Travelodge tower, car park and basement on the 1 Museum Street site



Source: Meinhardt.

Figure 2.3 Existing B2 level plan showing anticipated existing shallow foundation locations





Source: DDSHA.

Figure 2.4 Proposed ground floor (left) and B1 level plans of the proposed Museum Street, Vine Lane and High Holborn developments



Source: DDSHA.

Figure 2.5 East-west (left) and north-south (right) sections of the proposed 1 Museum Street development and basement