Bank Station Capacity Upgrade

5 King William Street Heritage Statement

September 2014

MAYOR OF LONDON

TRANSPORT FOR LONDON

EVERY JOURNEY MATTERS

Bank Station Capacity Upgrade

5 King William Street
Heritage Statement

In support of London Underground's
Listed Building Consent Application
for protective works

September 2014

Bank Station Capacity Upgrade Project
5th Floor
10 King William Street
London EC4N 7TW

LUL Document Reference:
LUL-8798-STT-G-002116

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1 Introduction

1.1.1 This Statement has been prepared in support of an application for listed building consent made by London Underground Limited at 5 King William Street, London, EC4N 7DA. The application seeks consent for protective works to mitigate the effects of potential settlement caused by the Bank Station Capacity Upgrade (BSCU) tunnelling works.

1.1.2 The protective works described within this document have been guided by the current concept design stage of the BSCU project; the further details required by the condition suggested in Section 7 will be provided on completion of detailed design.

1.1.3 The works for which this application seeks to gain consent are:

> Adjustment of existing internal façade fixings and insertion of additional ties and brackets to the Sherborne Lane elevation.

1.1.4 The location plan and listed building description for the building are provided in Appendices 1 and 2.

1.1.5 This application (and similar applications) for listed building consent are being submitted concurrently with an application to the Secretary of State under the Transport and Works Act (TWA) 1992 for an Order, to be known as the Bank Station Capacity Upgrade (BSCU) Order, and with a request for a direction (of deemed planning permission) under section 90(2A) of the Town and Country Planning Act 1990. The purpose of this listed building consent application is to seek the necessary approval to enable works that may be necessary to mitigate predicted damage to this listed building caused by ground settlement related to the proposed BSCU tunnelling.

1.1.6 The BSCU project involves a major upgrade of the Bank Monument Station Complex to provide greatly improved passenger access, circulation and interchange. It includes provision of a new passenger entrance with lifts and escalator connections; a new Northern Line passenger concourse using the existing southbound platform tunnel; a new Northern Line southbound running and platform tunnel; and new internal passenger connections between the Northern Line, the Docklands Light Railway (DLR) and the Central Line.

1.1.7 The new Station Entrance will open on to Cannon Street at the junction with Nicholas Lane. An entrance hall will provide circulation space, as well as accommodating staff facilities, plant rooms and associated retail space. New passenger lifts will link the entrance hall directly with the Northern Line and DLR providing step free access. Escalators will also connect the entrance hall with the Northern Line.

1.1.8 The existing southbound platform for the Northern Line will be converted into a new passenger concourse. A new southbound running and platform tunnel will be located to the west of the existing platform. New cross passages will connect the Northern Line concourses and platforms. New walkways and escalators will better connect the Northern Line, the DLR and the Central Line. In particular, a tunnelled passageway fitted with moving walkways and new escalators will greatly improve interchange between the Northern Line and the Central Line.

1.1.9 Works to divert and protect utilities and to protect listed and other buildings from ground settlement, will also be undertaken. The compulsory purchase and temporary use of land, the temporary stopping up of streets, street works and ancillary works will also be required.

1.1.10 Appendix 3 of this document contains plans showing the extent of the proposed BSCU works.

2 Heritage Planning Policy Context

The Planning (Listed Buildings and Conservation Areas) Act 1990

2.1.1 Section 66 of the Act establishes a general duty for a planning authority, in considering whether to grant consent for a development which affects a listed building, to have special regard to the desirability of preserving a listed building or its setting or any features of special architectural or historical interest which it possesses. A building is listed by virtue of its special architectural or historical interest (Section 1(1)).

2.1.2 Section 72 of the Act establishes a duty in the exercise of any function under the Act to pay special attention to the desirability of preserving or enhancing the character or appearance of a conservation area. A conservation area is an area of local interest designated principally by the Local Planning Authority.

The National Planning Policy Framework 2012

2.1.3 Section 12 of the National Planning Policy Framework (NPPF) deals with the consideration of cultural heritage assets and sets out the importance of being able to assess the impact of a development on the significance of heritage assets. Significance is defined in Annex 2 as the value of an asset because of its heritage interest. This interest may be archaeological, architectural, artistic or historic and can extend to its setting. The setting of a heritage asset is defined in Annex 2 as the surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. A designated heritage asset is recognised by the NPPF to be a World Heritage Site, Scheduled Monument, Listed Building, Protected

Wreck Site, Registered Park and Garden, Registered Battlefield or Conservation Area designated under the relevant legislation.

2.1.4 The NPPF recognises that a balance needs to be struck between the preservation of the significance of a heritage asset and delivering public benefit. With regard to designated assets, paragraph 132 states that the more important the asset, the greater the weight should be on its conservation. Distinction is drawn between those assets of highest significance and those of a lesser significance.

2.1.5 The NPPF identifies harm as being either substantial or less than substantial. Paragraph 133 states that where the proposal would lead to substantial harm to the significance of a designated asset consent should be refused unless the harm or loss is necessary to achieve substantial public benefit that outweighs that harm. In cases where less than substantial harm to the significance of a designated asset is anticipated, paragraph 134 requires that this harm should be weighed against the public benefits of the proposal. In respect of non-designated assets, paragraph 135 requires a balanced judgement having regard to the scale of any harm or loss and the significance of the asset.

2.1.6 In accordance with the NPPF, this heritage assessment sets out the significance of buildings likely to be affected by the BSCU works. The information provided in this assessment conforms to paragraph 128 of the NPPF, thus the level of detail provided is proportionate to the significance of the affected heritage assets and no more than is sufficient to understand the potential impact of the proposal on that significance.

2.1.7 Guidance on the application of heritage policy within the NPPF is provided within the PPS 5 Planning Practice Guide (English Heritage, 2010) and the on-line National Planning Policy Guidance (NPPG).

Regional Policy

The London Plan 2011

2.1.8 Policy 7.8 of the London Plan deals with heritage assets and archaeology and identifies the contribution that designated and non-designated heritage assets make to London's world class city status. The policy seeks to ensure the sensitive management and promotion of London's heritage assets through recognition of their positive role in place shaping.

2.1.9 "Draft Further Alterations to the London Plan" were published in July 2014. These proposed changes contain no update to policy 7.8 of the current London Plan.

Local Policy

The Unitary Development Plan 2002

2.1.10 Certain sections of the Unitary Development Plan (UDP) remain in force until the adoption of the Local Plan, which is anticipated to be in 2015, including Policies ENV10 and ENV11 which are of relevance to consideration of the BSCU works.

2.1.11 Policies ENV10 and ENV11 relate to conservation areas and listed buildings and recognise the contribution that historic buildings make to the character and ambience of the City of London. Policy ENV11 states that proposals to demolish buildings that make a positive contribution to the character or appearance of a conservation area will be resisted.

Core Strategy Development Plan 2011

2.1.12 One of the over-arching objectives of the Core Strategy as exemplified by Strategic Objective 3: City Culture and Heritage, is the promotion of a high quality of architecture and street scene appropriate to the City of London's position at the historic core of London.

2.1.13 Policy CS12 directly relates to cultural heritage, and aims to conserve or enhance the significance of the City's heritage assets and their settings, and provide an attractive environment for the City's communities and visitors, and sets out a number of ways in which this is to be achieved.

The City of London Corporation Supplementary Planning Documents (SPDs)

2.1.14 The City of London Corporation has prepared a number of SPDs including those that have been prepared in respect of some of the City of London's conservation areas including that prepared for the *Bank Conservation Area* in 2012.

2.1.15 The document provides detailed analysis of the development and architectural character of the conservation area as well as highlighting significant streets and buildings that contribute to the character of the conservation area and the setting of specific heritage assets.

3 Consultation

3.1.1 Discussions and formal consultations with English Heritage and the City of London Corporation have taken place during the design process of the BSCU project. Both have been consulted as to the scope and process of heritage and Building Damage Assessments, which are relevant to the Listed Building Consent now being sought. The approach is based on established best practice

and both bodies have responded positively to the methodology of assessment of settlement impacts.

3.1.2 The City of London Corporation's Assistant Director (Conservation) and the English Heritage Inspector were consulted on the proposed protective measures and a draft of this Statement. Both were generally content with the proposals subject to receipt of further detail at the appropriate stage. Their comments on the draft Statement were incorporated and the list of proposed conditions refined and agreed.

3.1.3 The project team has been in consultation with the building owner since 2011 regarding the nature of the BSCU project and its potential interface with the building.

4 Summary Description and Statement of Significance

4.1.1 The statutory Listed Building Description is contained at Appendix 2 of this document.

4.1.2 The Grade II listed building is located within the Bank Conservation Area, which encompasses the heart of the City. Its site is framed by King William Street to the north, Abchurch Lane to the east and Sherborne Lane to the west.

4.1.3 The building is arranged over five storeys plus up to three levels of basement. The façade is constructed around a modern steel framed building re-built on a raft or pad foundations. The elevations to King William Street and Abchurch Lane are clad in Portland stone in a Classical Renaissance style. The building is viewed as part of a group including 1 King William Street and 1-6 Lombard Street, all of a similar scale, style and use.

4.1.4 The original building fronting onto King William Street was built in 1915. The building was extended to the south on to the plot of 14 Abchurch Lane in 1932. Between 1983-7 the building structure was rebuilt, retaining the façade and the entrance hall area. Major refurbishment and the additional floors were completed in 1987, and the building extended along Sherborne Lane.

4.1.5 5 King William Street was known as Phoenix House from 1915 until 1983, having been occupied by the Phoenix Assurance Company; when this company moved offices, they took the building name and a new Phoenix House is now located at 18 King William Street. 5 King William Street is currently occupied by the financial company Daiwa Capital Markets. Internally the building functions as a financial institution and the entire building has been renovated to offer a series of large open plan office spaces and smaller meeting rooms.

4.1.6 The ground floor entrance hall and the northern range of rooms to first floor are apparently original, the upper storeys appear to have been completely modernised and altered during the 1980s works. The ground floor entrance hall to King William Street comprises an octagon of tall marble columns and pilasters supporting an arcaded gallery surmounted by a steel framed glass dome. This space is believed to be original.

4.1.7 The structure above ground is constructed of a steel frame and brick masonry with independent Portland stone and brick masonry façades.

4.1.8 According to historical reports the retaining wall structures to the basements and street frontages are of reinforced concrete. The original foundations are believed to have been comprised of steel grillages encased in concrete under the primary steel frame. However Alan Baxter Associate's Gazetteer (2012) suggests that "steel columns to original structure likely to be supported on grillage beams and concrete pad foundations or a raft foundation with thickenings under the columns. The recent structure may be on raft or piled foundations". Three lifts exist in the north-east modernised wing and a separate goods lift. The basement hosts car parking provision with a car lift.

4.1.9 Appendix 4 of this document contains historic plans from the 1930s which give a general layout and section through the building at the time of the extension to 14 Abchurch Lane.

4.1.10 The significance of this building is predominantly architectural, and lies in its Portland stone façade, and retained internal features including the balconied foyer with marble columns and a glass dome. There is also significance attached to the different stages of architectural style and construction, from 1914 to the 1930s. There is no heritage significance attached to the 1980s modernisation works. The setting of the building comprises the streetscape of King William Street, the surrounding buildings of a differing scale, and the entrances to cross streets such as Abchurch Lane and Sherborne Lane which reflect Medieval street patterns.

5 Predicted or possible impacts of proposed BSCU works upon 5 King William Street

5.1.1 It is proposed that the new platform tunnel, cross passages and the new escalators to DLR and Northern Line will be constructed directly beneath 5 King William Street, from south-east to north-west. A plan showing the position of proposed and existing infrastructure in relation to 5 King William Street is included in Appendix 3.

5.1.2 At the current concept design stage, a conservative, reasonable worst case geotechnical assessment ('Stage 2' Building Damage Assessment, included in

Appendix 5) has been made, indicating that there may be a maximum predicted settlement of 77mm to the building with the greatest displacement occurring towards the north-west at the Sherborne Lane elevation shown in photo 1 (location plan of photographs provided in Appendix 6).

5.1.3 The geotechnical assessment has been combined with a heritage and structural assessment, which has highlighted sensitivities in relation to the building, in particular the façades and foyer may be differently founded to the modern elements. The differential settlement of 20mm across the building combined with the possible variable foundations of different parts of the building raises the potential for shear and strain (calculated maximum tensile strain of 0.063%) across the Sherborne Lane and King William Street façades, and distortion within the foyer area.

5.1.4 Further more detailed assessment will be undertaken at a ‘Stage 3’ Building Damage Assessment to be completed in February 2015, which is required to verify the results of previous assessment as the BSCU design develops (detailed design), and further establish protective works design. The Stage 3 Building Damage Assessment will take into account the detailed design and refined tunnel and construction details. The process for the Stage 3 Building Damage Assessment is well established, and will include, as necessary, the following measures:

- desk top review of all available survey and structural information including previously unseen reports and measured survey plans;
- full, detailed visual structural survey to identify weaknesses and to inform detailed modelling and analysis;
- modelling and analysis of soil structure interaction to refine assessment of settlements and building strains;
- non-intrusive and intrusive surveys to better understand the building's sensitivities to predicted settlements and strains;
- material sampling of interior finishes to facilitate informed repair;
- recording of heritage features to facilitate informed repair;
- consideration of the potential pros and cons of physical protective works;
- protective works design; and
- formulation of a Monitoring Response Action Plan, which will detail trigger levels and appropriate actions in the event of a trigger being breached.

5.1.5 Method statements, specifications and full plans of protective works as found to be required will be produced following the Stage 3 Building Damage Assessment.

Photo 1: Building model showing Sherborne Lane elevation (retained façade and modern addition), predicted to be subject to the greatest ground movement

5.1.6 To the façades, which are currently in good condition, there is the possibility of cracking or loss of historic material in the event of settlement. This may damage the material and aesthetic significance of the building. Damage is most likely to occur to historic elements of the elevation to Sherborne Lane, shown in photo 1 (alongside a modern addition), with cracking concentrated at joints and openings with the potential to damage decorative voussoirs and cornices, This is because the greatest settlements and steepest settlement slopes are predicted to occur at this elevation, giving rise to increased strains.

5.1.7 Within the foyer, the effect of settlement may in the worst case undermine the stability of the columned balcony, and subsequently damage fragile heritage finishes such as marble and surrounding plaster detailing. Historic elements within the foyer, which are in good condition, are shown in photos 2 and 3.

5.1.8 It is considered that the impacts of the predicted settlements are such that they could be detrimental to the heritage significance of 5 King William Street. Therefore, proposals for protective works are outlined within the following

section, and the impacts of these protective measures discussed. Further investigation of sensitive elements, including survey and examination of survey plans at Stage 3 Building Damage Assessment, will continue to be undertaken during the detailed design of the BSCU project.

Photo 2: Detail of the upper balcony level and glass dome

Photo 3: Beneath balcony, fine plaster and marble columns

6 Proposed protective works and impacts of those works

6.1.1 The specific interventions requiring listed building consent are described below. The proposed protective works have been designed on the basis of information available at the present concept design stage and the Stage 2 Building Damage Assessment.

6.1.2 Whilst the proposals are currently at concept design stage, the need to protect listed buildings from the impacts of settlement resulting from the works has been recognised. Therefore, as a precautionary measure a 'worst case' approach has been taken in respect of assessment of the impact from the proposed works, based on the current scheme design stage.

6.1.3 The next design stage will include refined geotechnical modelling and building assessment as part of the Stage 3 Building Damage Assessment. This further work may reduce or remove the need for the proposed protective works. If the protective works are required, they will be designed in detail. The detailed information required by the condition in Section 7 will be provided for approval by the Local Planning Authority.

6.1.4 Also described are non-invasive protective works; whilst these works do not require Listed Building Consent, details are included for context and completeness.

Works that require Listed Building Consent

6.1.5 Subject to investigation by intrusive survey, the Sherborne Lane façade may require the adjustment or enhancement of existing fixings in areas where the largest movements are predicted to occur. This would be achieved by opening up of internal finishes at the locations of fixings behind the façade, and adjustment of existing ties or insertion of enhanced ties to the façade and building structure. The external façade to Sherborne Lane, where the greatest settlement is predicted to occur, is shown in photo 4 and illustrated in Appendix 8. Internal areas within this elevation have predominantly modern finishes.

Photo 4: Detail of Sherborne Lane elevation, historic façade with close jointed stone and fine architectural detailing

6.1.6 These protective measures will be a permanent work to the building, to be installed prior to the commencement of the BSCU tunnelling works.

Impact of the works

6.1.7 The level of material impact from the proposed adjustment and insertion of additional façade fixings is dependent on the location of the works. Detailed design will be focused on opening up i.e. localised removal of internal finishes (stone, brick, plaster or floorboards) to expose the structure behind for inspection in areas where there is minimal historic internal fabric, for instance to rooms with modern finishes. Assuming that this can be achieved to integrate a useful pattern of strengthening, the impact on the building will be minimal as the modern fabric will be made good around the fixing areas on a like for like basis.

6.1.8 In the event that it is necessary for the historic fabric to be disturbed, opening up will avoid detailed decorative plaster finishes, and will also not be made to timber finishes such as panelling. Again, making good will be on a like for like basis, reducing the aesthetic impact, so that that the temporary removal of fabric does not have a long term effect on the heritage significance of the building.

6.1.9 The areas likely to be impacted by the protective works are shown on an annotated plan and photographs in Appendices 7 and 8.

6.1.10 The proposed protective works will have no impact on the setting of the listed building, as they relate only to the interior of the building. There will also be no impact on the Bank Conservation Area resulting from the protective works.

6.1.11 In relation to the NPPF, the works will not have a significant effect on the significance of the building, and result in less than substantial harm to the heritage asset. In relation to local policy, the protective works will achieve the objective of conserving the City's heritage assets.

Justification for the works

6.1.12 The BSCU project involves a major upgrade of the Bank Monument Station Complex which is currently one of the most congested on the London Underground network. The overarching aim is that Transport for London continues to provide a fit-for-purpose public transport station complex to support the City of London. It shall do this by:

- increasing the capacity of Bank Underground Station so that it is able to handle present and forecast demand, and thereby support the economic growth of the city;
- minimising passenger journey time through the station, and thereby reduce crowding;
- improving the quality of access, interchange and ambience, including the provision of step-free access routes from street level to Northern Line trains and provide step-free interchange between Northern Line and Dockland Light Railway (DLR) trains; and
- improving emergency fire and evacuation protection measures.

6.1.13 The BSCU project is an important element of works planned as part of Transport for London's 10 year Investment Programme which will contribute to the achievement of the economic growth of London as set out in the Mayor's London Plan and Transport Strategy. The significant public and economic benefit of the BSCU works as described in Section 1 and illustrated in Appendix 3 justifies the impacts outlined in this Statement.

6.1.14 The proposals contained within this document are intended to mitigate adverse impacts of the BSCU works related to settlement at 5 King William Street. The protective works proposals themselves will result in a change to historic building fabric to a small extent. However, the protective works are intended to prevent damage to the listed building, and enable the building to retain its heritage significance.

6.1.15 It is considered that the proposed protective works will constitute less than substantial harm to the listed building. The NPPF states that "where a development proposal will lead to less than substantial harm to the significance of a designated heritage asset, this harm should be weighed against the public benefits of the proposal". The public benefits of the BSCU are significant both locally and in the wider London context.

Works that do not require Listed Building Consent

6.1.16 Works that will not impact the fabric of the listed building are proposed, and details included here to demonstrate that protection has been considered to all identified sensitive elements of 5 King William Street.

Photo 5: Showing columns and balcony of foyer

Photo 6: Detail, top of ground floor column to base of first floor column, foyer balcony

6.1.17 In the event of movements to the balcony structure of the foyer, it is proposed that a contingency support solution is provided (guided by a programme of monitoring). The design of this measure is to be confirmed, but will take the form of temporary non-invasive props placed where appropriate and padded to avoid damage to finishes. The props will be placed in ground floor or basement areas on a short term basis. These will provide additional support to the existing structure in the event of structural movement. The foyer area is illustrated in photos 5 and 6, and a section showing the indicative area which may require support is included at figure 1.

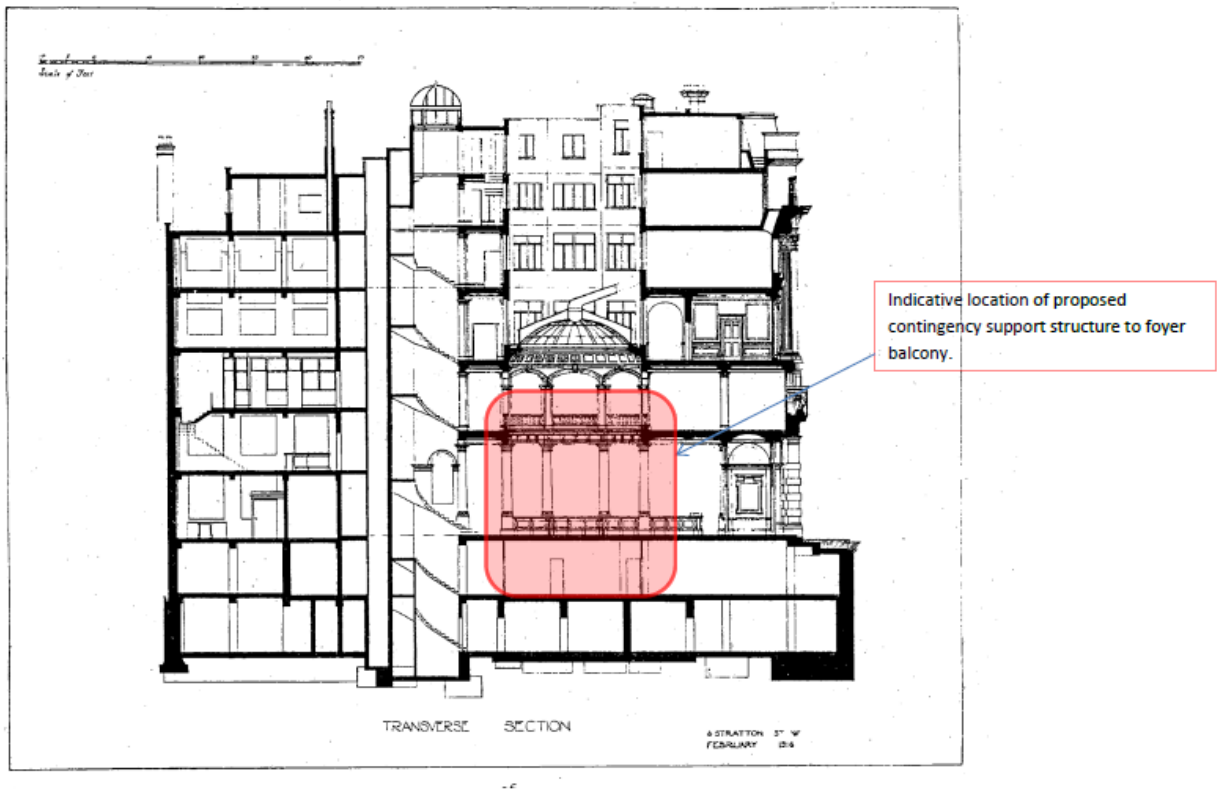


Figure 1: General location where contingency support may be required

6.1.18 Any propping would constitute a temporary measure. Where they have been required, props would be removed on the completion of tunnelling and following the cessation of ground movement to the extent that monitoring readings show no change for three months.

Impact of the works

6.1.19 Any temporary propping within the foyer will have no material impact on the building, but will have a temporary impact on the experience of its use and aesthetic value. Propping would only be utilised if its use is judged to prevent damage to the fabric of the building from settlement. In general, the visual impact will be temporary, and following the completion of works there will be no impact on the heritage significance of the building.

7 Proposed conditions

7.1.1 The following conditions have been agreed with City of London officers and the English Heritage Inspector:

Time Limit for Commencement of Development

1. The works shall commence not later than five years beginning with the date of this consent.

Reason: To comply with the requirements of section 18(1) of the Planning (Listed Buildings and Conservation Areas) Act 1990.

Approval of Details

2. The works shall not commence until the following details have been submitted to and approved in writing by the Local Planning Authority:

   a) A report, including an engineering statement, detailing the results of structural assessment and investigations into the condition of the building to confirm the need for and suitability of the protective works;

   b) Detailed survey drawings and/or photographs showing, by means of hatching and/or annotations, the areas to be affected by the protective works;

   c) Photographic/condition survey of the relevant parts of the building; and

   d) Details of the proposed protective works, including plans of locations and specification of methods.

Reason: To protect the listed structure and retain the aesthetic, architectural or historic significance of the listed building.

Temporary Works

3. Any temporary protective works shall be removed within six months of the monitoring data showing that ground movement has effectively ceased.

Reason: To protect the listed structure and retain the aesthetic, architectural or historic significance of the listed building and its setting.

Monitoring

4. A report summarising the ground movement effects in the vicinity of the building shall to be submitted to the Local Planning Authority within six months of the monitoring data showing that ground movement has effectively ceased.

Reason: To protect the listed structure and retain the aesthetic, architectural or historic significance of the listed building.

Making Good

5. All work of making good shall match the existing adjacent work with regard to the methods used and materials, colour, texture and profile, unless shown otherwise on the drawings or other documentation hereby approved or required by any conditions(s) attached to this permission.

Reason: To ensure a satisfactory appearance and finish to retain the aesthetic, architectural or historic significance of the listed building.

Approved Drawings

6. The works shall not be carried out other than in accordance with the approved drawings and particulars as set out in the Heritage Statement September 2014 including Appendices or as approved under conditions of this Listed Building Consent.

Reason: To ensure that the development is in compliance with details and particulars which have been approved by the Secretary of State for Transport and the Local Planning Authority.

8 Conclusion

8.1.1 Modelling of likely settlement and strains on the basis of the concept design stage to date, combined with heritage and structural assessment of 5 King William Street, predicts potential settlement of up to 77mm and maximum 0.063% tensile strain to the north-west of the building, as a result of the new infrastructure being constructed directly below the building.

8.1.2 It is considered that the Portland stone façade and the marble columned foyer may be sensitive to the predicted settlement, and therefore protective works are proposed to provide additional support to these features.

8.1.3 It is acknowledged that these protective works will lead to a temporary adverse impact on the significance but that this impact will be outweighed by the benefits of the protective works in providing structural support and preventing damage to the fine historic elements of the building. All making good to the external and internal appearance of the building will follow the principle of like for like repair, and there will be no long term impact to the building beyond a small material change to the façade fixings which will not devalue its aesthetic, architectural or historic significance. The impact of the works will constitute ‘less than substantial harm’ as defined by the NPPF.

References

English Heritage National Heritage List

The Buildings of England, London 1: The City of London, Bradley and Pevsner, (1997) p526

Building Damage Assessment Report ‘A12’ (2014)

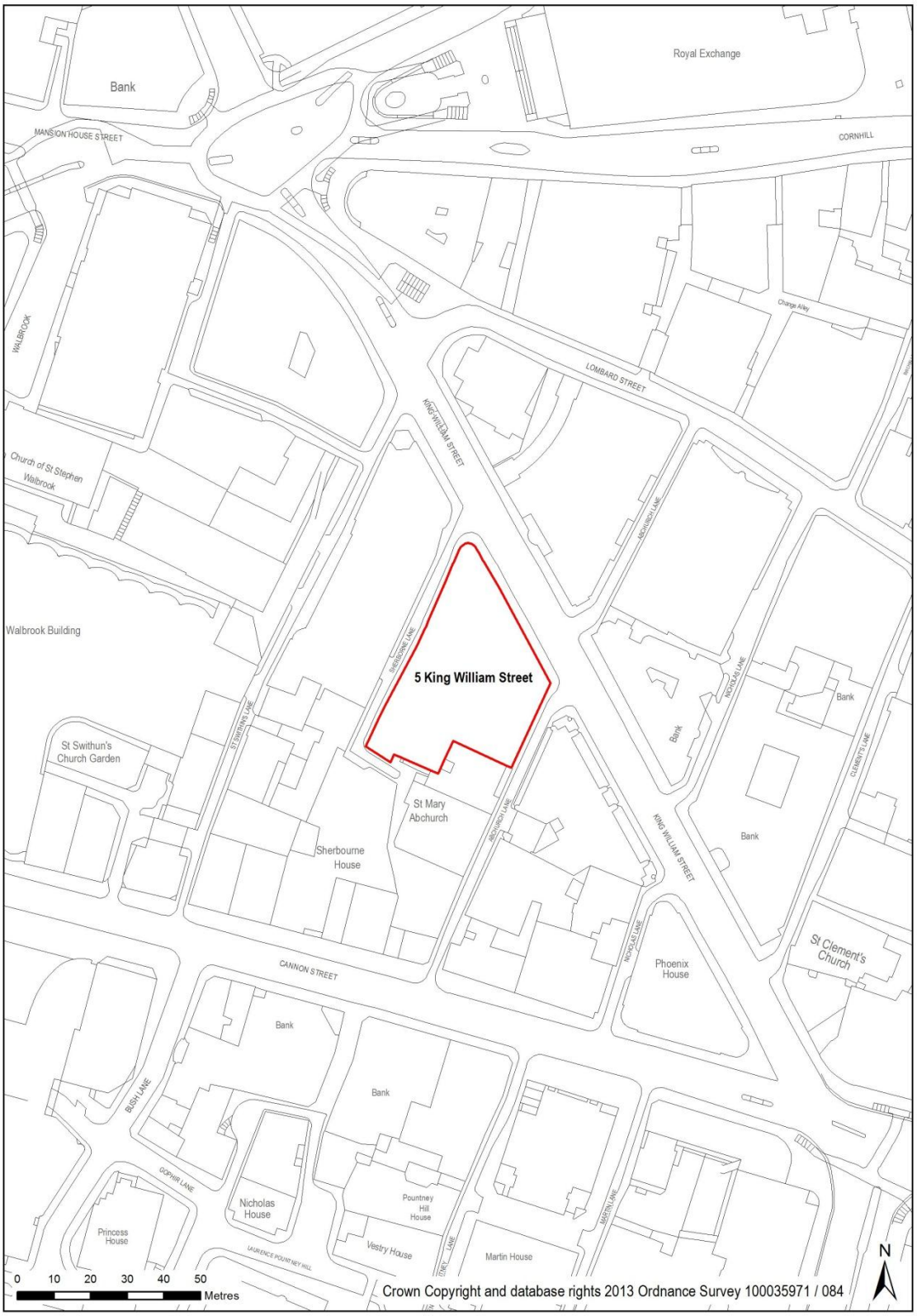
Alan Baxter Associates ‘Gazetteer’ (2012)

Building owner/management drawings/plans

Phoenix Assurance Company (1915): The Phoenix in King William Street, London

Appendices

Appendix 1: Location Plan



Appendix 2: Listed Building Description

Name: PHOENIX HOUSE

List entry Number: 1064622

Location

14, ABCHURCH LANE EC4

PHOENIX HOUSE, 3-7, KING WILLIAM STREET EC4

Greater London Authority City and County of the City of London

Grade: II

Date first listed: 01-Aug-1975

UID: 199562

Details

KING WILLIAM STREET EC4 1. 5002 (West Side) Nos 3 to 7 (consec) (Phoenix House) TQ 3281 SE 10/N/7 TQ 3280 NE 16/N/7 1.8.75.

II

2. Includes No 14 Abchurch Lane. 1915, by H L Anderson, extended 1931-32 by Campbell-Jones and Sons, 4 main storeys; stone; wide classical front of 11 bays (3+5+3) with the centre recessed above 1st floor; ground floor channelled with alternating courses plain and vermiculated forming voussoirs to round headed arches; Vitruvian scroll frieze and mutule cornice at 1st floor level; the lst floor treated as a mezzanine with panelled piers between the windows forming pedestals to the giant order which unites the 2nd and 3rd floors; columns to the recessed centre and pilasters left and right; bracketed and modillioned cornice with attic storeys to left and right and balustraded parapet to centre. The central entrance with doric blocked columns in antis and entablature with broken segmental pediment and bronze phoenix. Iron balconies to 2nd floor windows. Return to Abchurch Lane, including No 14, in simplified manner.

Listing NGR: TQ3276580966

National Grid Reference: TQ 32767 80977

Appendix 3: Extent of BSCU works

CITY OF LONDON

5 King William Street

Key:

- Listed Building
- Existing Infrastructure
- Proposed Infrastructure

Notes:

For clarity, drawing shows existing infrastructure at Northern line level and Central line level affected by the works. Not all existing below ground infrastructure is shown.

Temporary works are not shown.

N

1:1250 @ A3

25m 0 25m 50m 75m 100m 125m

PROJECT	BANK STATION CAPACITY UPGRADE PROJECT
PURPOSE OF ISSUE	FOR INFORMATION
TITLE	5 KING WILLIAM STREET EXISTING AND PROPOSED INFRASTRUCTURE
DRAWING NUMBER	BSCU-DRA-MAC-N133_Z-DR-T-0314

A 3

CITY OF LONDON

TRANSPORT AND WORKS ACT 1992
LONDON UNDERGROUND
(BANK STATION CAPACITY UPGRADE) ORDER

Existing Cruciform Area

Existing Triplication Area

Central Line

Lombard Street Lifts

New Escalator ES2 Up to Whole Block Station Entrance

Existing Northern Line Northbound Platform

Existing Northern Line Northbound Tunnel

Existing Northern Line Southbound Tunnel

New Northern Line Southbound Running Tunnel From Moorgate

New Northern Line Southbound Running Tunnel Towards London Bridge

New Station Entrance

New Escalator ES3 Down to DLR

New Northern Line Southbound Platform

New Central Line Link Moving Walkways

Legend:

- Deemed planning permission boundary
- Existing below ground infrastructure
- Proposed below ground infrastructure
- New station entrance (above ground)

For information

Notes:

For clarity, drawing shows existing infrastructure at Northern Line Level and Central Line Level affected by the works. Not all existing below ground infrastructure is shown.

Temporary works are not shown.

1:1250 @ A1

25m 0 25m 50m 75m 100m 125m

PROJECT
BANK STATION
CAPACITY UPGRADE PROJECT

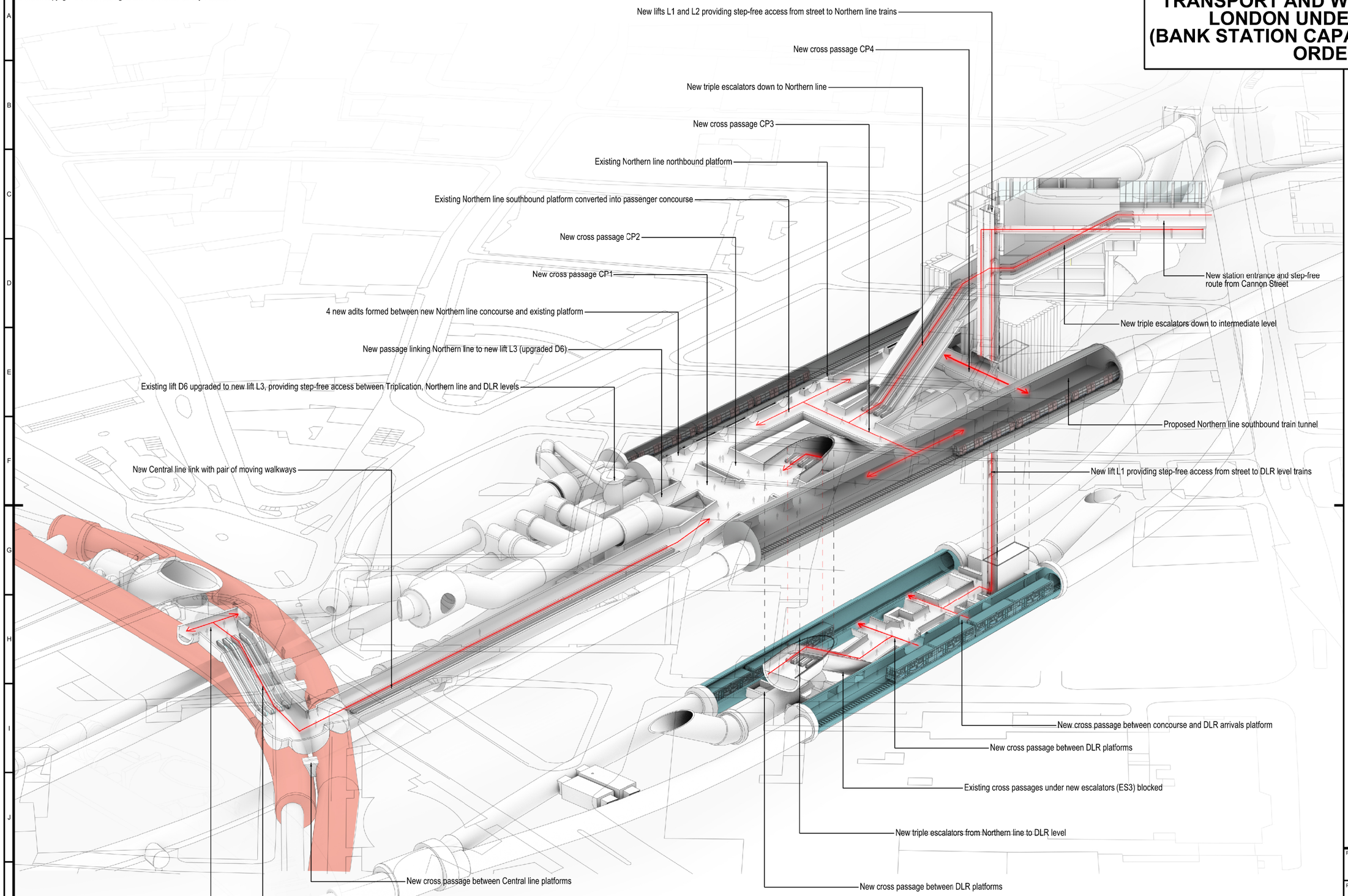
PURPOSE OF ISSUE
PLANNING DIRECTION

TITLE
EXISTING & PROPOSED
INFRASTRUCTURE

DRAWING NUMBER
BSCU-DRA-MAC-N133_Z-DR-T-9001

A 1

TRANSPORT AND WORKS ACT 1992
LONDON UNDERGROUND
(BANK STATION CAPACITY UPGRADE) ORDER



Key:

- Northern line platforms
- Central line platforms
- DLR platforms

For information

Note:

Drawing not to scale

Existing station entrances and District & Circle Lines omitted for clarity.

PROJECT
BANK STATION
CAPACITY UPGRADE PROJECT

PURPOSE OF ISSUE
PLANNING DIRECTION

TITLE
3D VISUALISATION
PROPOSED STATION INFRASTRUCTURE
& CIRCULATION ROUTES

DRAWING NUMBER
BSCU-DRA-MAC-N133_Z-DR-T-9200

A 1

Appendix 4: Historic Plans

1: Ground floor Plan, 1930: Campbell, Jones and Son

2: Section showing differing stages of construction, 1930

PHOENIX ASSURANCE Co LTD

PHOENIX HOUSE KING WILLIAM STREET E.C.4.

EXTENSIONS TO OFFICES

ABCHURCH LANE & SHERBORNE LANE

B.A.C. 20/4/31

REFUSED B.A.C. - 9 FEB 1931

Subsequently approved

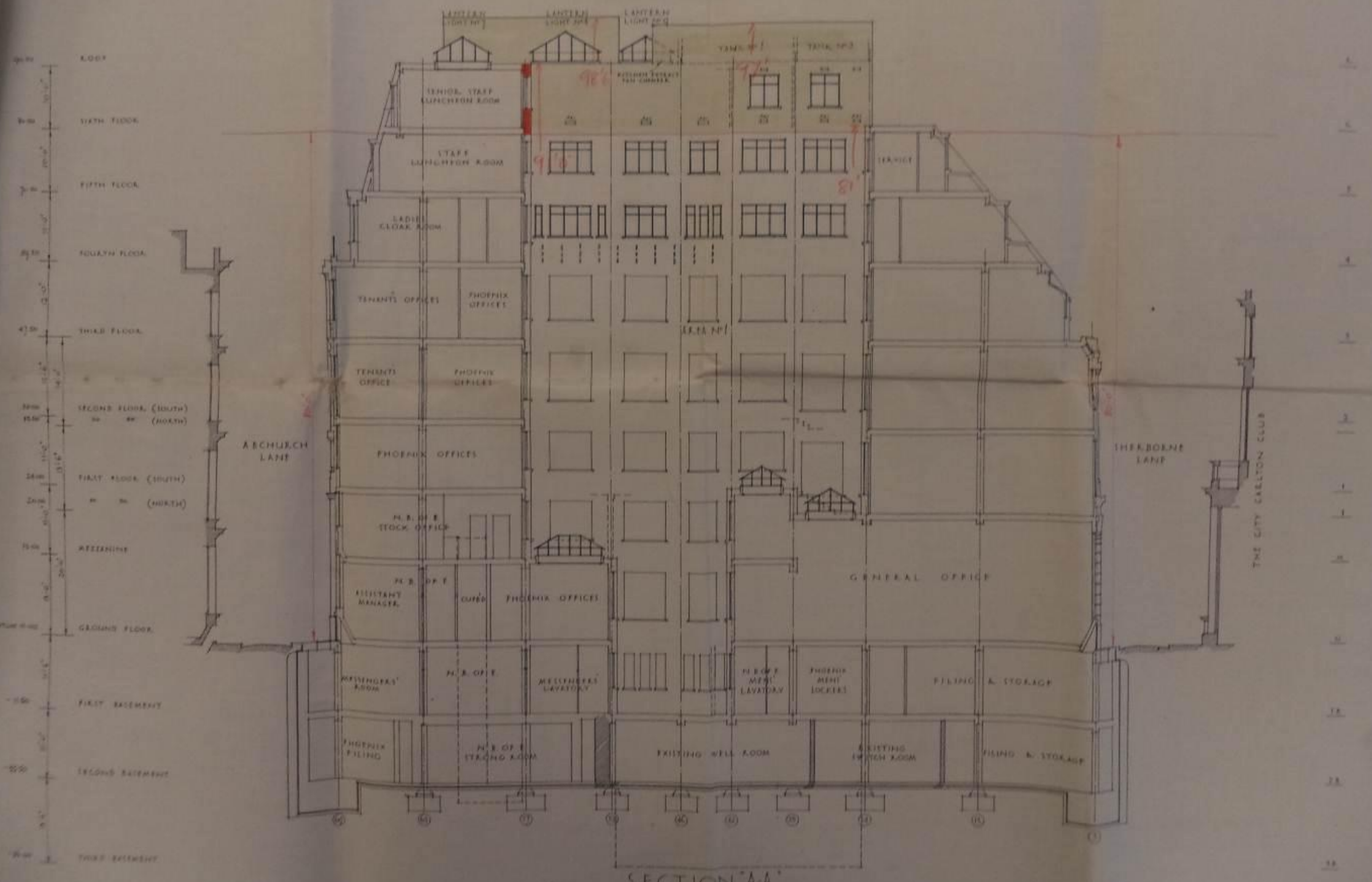
GROUND FLOOR PLAN

PHOENIX ASSURANCE Co Ltd

PHOENIX HOUSE KING WILLIAM STREET E.C.4.

EXTENSIONS TO OFFICES

ABCHURCH LANE & SHERBORNE LANE



SECTION 'A-A'

Scale 1/8 Inch = 1 Foot

DRAWING No 42
DATE MADE 26-9-30
DRAWN BY G.J.F.

CAMPBELL JONES SONS & SMITHERS
3, DOWGATE HILL
CANNON St E.C.4

Appendix 5: Building Damage Assessment Report

LUL Bank Project Office
10 King William Street
London EC4 N7TW

Bank Station Capacity Upgrade

Building Damage Assessment Report

Building A12

5 King William Street

URS-8798-RPT-G-001176

Prepared by:	Lisa Perkins Assistant Geotechnical Engineer		18/07/14
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Approved by:	John Chantler Technical Director		18/07/14

Document Owner	
Company:	URS
Role:	Designer

Document History

Revision	Date	Summary of changes
1.0	March 2014	Issue for Heritage
2.0	April 2014	For Approval
3.0	July 2014	TWAO Issue

For the status of this document, please refer to the Building Damage Assessment Report Register (URS-8798-RGT-001229)

Consultation:

• Ela Palmer	URS Heritage
• Brian Lyons	Dr.Sauer
• Keith Bowers/Neil Moss/Paul Dryden	London Underground
• Olly Newman	Dragados

Contents

FIGURES

TABLES

1 Introduction

This report summarises the results of a Stage 2 damage assessment for 5 King William Street Ref A12.

Stage 2 damage assessments are undertaken for all buildings within the Stage 1 predicted Greenfield ground surface 1mm settlement contour induced by the construction of the Bank Station Capacity Upgrade (BSCU).

The purpose of the assessment is to determine the potential effect the works will have on the building. This report describes the updated engineering and heritage assessments undertaken for the building and concludes whether mitigation is likely to be needed and if a further (Stage 3) assessment is recommended in order to verify this.

2 The Building

2.1 General Information

No. 5 King William Street is bounded by St Swithin's Lane, Abchurch Lane and King William Street. Originally built to designs by J.Macvicar Anderson and H.L Anderson (1915) the building has undergone two further developments. The first development by Campbell-Jones and Sons (1931-32) extended the building south along Abchurch Lane before Fitzroy Robinson Partnership (1983-87) reconstructed the 1930s façade with an extension to the south along Sherborne Lane, including the addition of a new dormer storey. The building is confirmed as a steel framed structure with solid raft foundations. General building information used in the assessment has been acquired as part of the structural desktop appraisal. This information is presented in Table 1.

Category	Building Information
BSCU Reference	A12
Location	King William Street
Address	5 King William Street
Building Type	Steel framed
Construction Age	1915
No. of Storeys	5
Basements	3
Eaves Level (mATD)	137.8
Foundation Type	Raft
Ground Level (mATD)	115.3
Listed Grade	II
Note: Levels given are in metres above Tunnel Datum, mATD. Tunnel Datum is 100m below Ordnance Survey Datum at Newlyn.	

Table 1: General building information

A general view of the building exterior is shown in Plate 1. A location plan showing the building in relation to the proposed BSCU works is presented in Figure 2.

Plate 1: General view

2.2 Building Description

The Grade II listed building located at 5 King William Street is currently occupied by the financial company Daiwa Capital Markets and extends on a plot framed by King William Street to the north, Abchurch Lane to the east and Sherborne lane to the west.

The building is arranged over five storeys plus up to three levels of basement. The façade is arranged around a modern steel framed building re-built on a raft or pad foundations. The elevations to King William Street and Abchurch Lane are clad in Portland stone in a Classical Renaissance style.

The original building frontage was built in 1915. Part of the building was replaced to Abchurch Lane and Sherborne Lane in 1932. Between 1983-7 the building structure was rebuilt, retaining the façade and the entrance hall area. Major refurbishment and the vertical extension were completed in 1987.

Internally the building functions as a financial institution and the entire building has been renovated to offer a series of large open plan office spaces and smaller meeting rooms. The ground floor entrance hall and the northern range rooms to first floor are apparently original, the upper storeys seem to have been completely modernized and altered during the 1980s works. The ground floor entrance hall to King William Street comprises an octagon of tall marble columns and pilasters supporting an arcaded gallery surmounted by a steel framed glass dome. This space, including its marble floor and dado panelling are believed to be original.

The structure above ground is constructed of a steel frame and brick masonry with independent Portland stone and brick masonry facades. The steel frame is believed to extend below ground level, together with reinforced concrete and brick masonry construction.

According to historical reports the retaining wall structure to the basements and street frontages are of reinforced concrete. The original foundations are believed to have been comprised of steel grillages encased in concrete under the primary steel frame. However Alan Baxter Associate's Gazeteer (2012) suggests that "steel columns to original structure likely to be supported on grillage beams and concrete pad foundations or a raft foundation with thickenings under the columns. The recent structure may be on raft or piled foundations". Drawings (Andrews Kent & Stone) subsequently obtained indicate that the foundation is a raft. Three lifts exist in the north-east modernised wing and a separate goods lift. The basement hosts car parking provision with a car lift.

3 Methodology

This building damage assessment is undertaken in accordance with LU Works Information WI2300[1] and LU Civil Engineering - Common Requirements S1050[2].

The analysis methodology applies to ground-bearing buildings which will be affected by ground movements resulting from the construction of the BSCU. The engineering assessment calculates the potential impact of ground movements and assigns a damage category to the building based on a numeric scale. Additionally, for listed buildings, a heritage assessment is carried out which considers the sensitivity of the structure and the sensitivity of its particular features; a heritage sensitivity score is assigned. The heritage sensitivity score is added to the damage category to obtain the total score. If the total score is 3 or more, a more detailed Stage 3 assessment is triggered.

Oasys Xdisp is used to analyse the Greenfield ground movements in terms of settlement and horizontal displacement. Subsurface tunnelling induced ground movement profiles are determined in accordance with the methodology described by Mair et al[3 & 4].

Movements resulting from the Whole Block Scheme (WBS) and shaft excavations have been calculated using LU Guidance Document G0058[5].

An additional displacement line A12 line 2 was drawn to assess movements between this building and the adjacent building A13 (Capital Club), as shown in Figure 3.

The building is modelled as a simple elastic beam which is conservatively assumed to follow the Greenfield ground displacements. The beam is divided into hogging and sagging segments. The tensile strains within each segment are calculated based on the distortion associated with differential settlement (which is characterised by deflection ratio) and the distortion associated with differential horizontal displacement (characterised by horizontal strain).

Xdisp provides a method for calculating the maximum tensile strain within the building superstructure associated with these movements, in accordance with the assessment methodology described by Mair et al[4]. This strain is used to determine the damage category for traditional masonry structures based on the classification system proposed by Burland[6] and in accordance with S1050 Civil Engineering – Common Requirements[2]. The categories are presented in Table 2.

Damage Category	Description of Degree of Damage	Description of Typical Damage and likely forms of Repair for Typical Masonry Buildings.	Approx. Crack Width (mm)	Max. Tensile Strain %
0	Negligible	Hairline cracks.		< 0.05
1	Very slight	Fine cracks easily treated during normal redecoration. Perhaps isolated slight fracture in building. Cracks in exterior visible upon close inspection.	0.1 to 1.0	0.05 to 0.075
2	Slight	Cracks easily filled. Redecoration probably required. Several slight fractures inside building. Exterior cracks visible; some repainting may be required for weather-tightness. Doors and windows may stick slightly.	1 to 5	0.075 to 0.15
3	Moderate	Cracks may require cutting out and patching. Recurrent cracks can be masked by suitable linings. Tuck pointing and possible replacement of a small amount of exterior brickwork may be required. Doors and windows sticking. Utility services may be interrupted. Weather tightness often impaired.	5 to 15 or a number of cracks > 3	0.15 to 0.3
4	Severe	Extensive repair required involving removal and replacement of walls especially over doors and windows. Window and door frames distorted. Floor slopes noticeably. Walls lean or bulge noticeably. Some loss of bearing in beams. Utility services disrupted.	15 to 25 but also depends on number of cracks	> 0.3
5	Very severe	Major repair required involving partial or complete reconstruction. Beams lose bearing, walls lean badly and require shoring. Windows broken by distortion. Danger of instability.	Usually > 25 but depends on number of cracks	
Note: Please refer LU Civil Engineering - Common Requirements S1050[2].				

Table 2: Building damage classification

4 Input Data

The magnitude and distribution of ground movements and degree of building damage is calculated based on the following input data:

- The Xdisp model coordinates and levels are based on the 3D model (20130212DSPITT Scheme R09);
- Four construction stages are considered in accordance with the proposed programme (November 2013) as illustrated in Figure 1;
- Trough width parameter, K=0.5 is used in accordance with WI2300[1].

The input data for the building, tunnels and shaft excavation are summarised in Table 3, Table 4 and Table 5 respectively.

Location	Foundation level (mATD)	Building Height above foundation level (m)	E/G
5 King William	103.4*	34.4	12.5
Note: Where E / G is the ratio of Young's modulus to shear modulus of the deep beam representing the building. * Assumed level, 1.5m thick slab beneath floor level.			

Table 3: Building data

Tunnel Item	Level of axis (mATD)	External diameter (m)	Volume Loss (%)
Running tunnels	83.5	5.4	1.5
Square works adits	75.8 to 95.3	4.1 to 7.8	2.5
Platform enlargement	85.6	9.64*	1.5
Escalator barrels	Inclined	8.3 to 8.4	1.5
NL Interchange tunnel	86.4	8.4	1.5
Central Line Connection	Inclined (87.6 to 89.2)	8.6	1.5
Note: * Cross section of the tunnel is oval in shape. Presented diameter is for equivalent circular area. Low Level Sewer 2 passes beneath the building. The sewer comprises a 3m diameter cast iron pipe with an invert level of ~94.7mATD.			

Table 4: Tunnel data

Excavation	Excavation Base Level (mATD)
Grout Shaft at King William Street	97
Whole Block Scheme Box excavation	73
Arthur Street Shaft	81

Table 5: Excavation data

The Xdisp model filenames used to undertake this assessment are:

- A12 - Stage 4
- A12 - Stage 3
- A12 - Stage 2
- A12 - Stage 1

5 Results

5.1 Engineering Assessment

The sections through the building which have been analysed are shown on plan in Figure 3.

Assessment has been undertaken at three intermediate construction stages and at the end of construction when all major elements of the works including shaft and tunnels have been completed. The damage category assigned to the building is based on the construction stage at which the potential impact on the building is most severe.

The maximum settlement and tensile strain calculated for each of the analysis sections at the most onerous construction stage are presented in Table 6 and Table 7.

Section	Maximum Settlement (mm)		Maximum Tensile Strain (%)
A12 (line 1)	Stage 1	43	0.045
A12 (line 2)	Stage 1	40	0.019
	Stage 2	49	0.043
A12 (line 3)	Stage 1	7	0.004
A12 (line 4)	Stage 1	45	0.050
Note: (Line 2) represents two buildings. The strains are not therefore applicable to building A12			

Table 6: Building response at most onerous intermediate stage (Stage 1 and 2)

Section	Maximum Settlement (mm)	Max Tensile Strain (%)
A12 (line 1)	77	0.063
A12 (line 2)	(Stage 4) 62	0.022
	(Stage 2) 49	0.043
A12 (line 3)	48	0.015
A12 (line 4)	59	0.040
Note: (Line 2) represents two buildings. The strains are not therefore applicable to building A12		

Table 7: Building response at end of construction (stage 4)

The results of the assessment show that construction Stage 4 is critical for this building when A12 line 1 experiences the most onerous combined tensile strain (0.063%). The orientation is shown in Figure 3. The vertical and horizontal Greenfield ground movements along the section line 1 are shown in Figure 4.

The displacement line 2 also shows the relative movements with the adjacent building A13 along Abchurch Lane. Unlike displacement line 1, the displacement line 2 undergoes its most onerous tensile strain (0.043% in hogging) at Stage 2. Figure 5 and Table 8 show that the strain between the two adjacent buildings is in hogging mode. These movements would tend to open a crack between the two buildings at high level. The maximum tensile strains in this area result in a very slight damage category.

The relative position of the building and tunnels along section line 1 is shown in Figure 6. The calculated strains are summarised in Table 8.

Line No (stage)	Strains in section (Curvature)	Position from start (m)	Length (m)	Average* Horizontal Strain (%)	Maximum Tensile Strains (%)	Damage Category
(Line 1) (Stage 4)	Hogging	0.0	16.7	0.028	0.036	Negligible
	Sagging	16.7	42	-0.044	0.063	Very Slight
	Hogging	58.6	2.1	0.008	0.008	Negligible
(Line 2) (Stage 2)	Sagging	0.0	7.6	-0.013	0.004	Negligible
	Hogging	7.6	19.9	0.029	0.043**	Negligible
	Sagging	27.5	11.8	-0.053	0.018	Negligible

Note: * Tensile horizontal strains are +ve. Compressive horizontal strains are –ve.

** This is strain from an extended line which is not applicable to the building

Table 8: Section analysed, results for worst case tensile strain

The Stage 2 engineering assessment has predicted that the maximum tensile strain falls within damage category 1. This corresponds to Very Slight damage in accordance with Table 2.

The maximum settlement of the building at foundation level at the end of construction is 77mm.

5.2 Heritage and Structural Assessment

Following site inspection, assessment has been made using the scoring methodology set out in Table 9.

Score	Structure (Sensitivity of the structure to ground movements and interaction with adjacent buildings)	Heritage features (Sensitivity to calculated movement of particular features within the building)	Condition (Factors which may affect the sensitivity of structural or heritage features)
0	Masonry buildings with lime mortar and regular openings, not abutted by other buildings, and therefore similar to the buildings on which the original Burland assessment was based.	No particular sensitive features	Good/Fair - not affecting the sensitivity of structural or heritage features
1	Buildings not complying with categories 0 or 2, but still with some sensitive structural features in the zone of settlement e.g.: cantilever stone staircases, long walls without joints or openings, existing cracks where further movements are likely to concentrate, mixed foundations	Brittle finishes, e.g. faience or tight-jointed stonework, which are susceptible to small structural movements and difficult to repair invisibly.	Poor - may change the behaviour of a building in cases of movement. Poor condition of heritage features and finishes. Evidence of previous movement.
2	Buildings which, by their structural form, will tend to concentrate all their movements in one location (e.g.: a long wall without joints and with a single opening).	Finishes which if damaged will have a significant effect on the heritage value of the building, e.g. Delicate frescos, ornate plasterwork ceilings.	Very poor – parlous condition of heritage features and finishes, severe existing damage to structure including evidence of ongoing movement. Essentially buildings where even very small movements could lead to significant damage.

Table 9: Heritage and structural scoring methodology

The results of the heritage assessment carried out for the building are summarised in Table 10.

Sensitivity of the structure
Much of the structure of the building is of new steel framed construction with modern concrete floors laid on profiled metal decking. The successive extensions to the building on Abchurch Lane and Sherborne Lane are also steel framed buildings which are believed to be constructed on modern foundations. It is not known whether allowances have been made for differential movement between these interfaces. The recent structure is shown to be supported on a raft foundation. In some cases raft foundations can accommodate localised settlements without causing distortions to the structure and some decorative features. However this is largely dependent on the magnitude of the settlement. Likewise localised distortions are more likely if pad foundations are present. The floor level to the deepest basement (ground floor -3) is approximately 11m (36 ft). The construction of the lower basements is with reinforced concrete; however the extent of this construction is unknown. The original façade on King William Street that returns onto Abchurch Lane and Sherborne Lane is retained from the earlier phases of construction. The available 1930 archive drawings suggest that the existing foundations were comprised of concrete pad foundations. Access to record drawings of the later refurbishments has not been possible, which could provide useful information on the re-modelled substructure (as implied in Alan Baxter Associate's Gazeteer). The relationship between the retained façade and the new structure behind is unknown. However it is believed that the existing façade rests on its original mass concrete footings, which also support the retaining wall set-back from the building perimeter – all as shown on the 1930's drawings. The domed glass roof skylight sited above the decorative ground floor entrance is supported onto the eight double height internal circular pillars. The support to the pillars in currently unknown, and they should thus be considered sensitive structural features. This is due to the risk of differential settlement between the independent pillars and their support to the glass dome which is a brittle element. There is a possibility distortion of the straight flight, entrance staircases between ground floor level and mezzanine level.

Score: 1 The impact of the various phases of the tunnelling works on the building and their connectivity may result in the concentration of strain at certain locations and interfaces.
Sensitivity of the heritage
Despite various alterations, extensions and refurbishments, the character of this building is preserved through its original elevations, surviving internal features such as the richly decorated entrance hall to ground floor, original stair, the dome above the entrance hall and the surviving panelled offices to directors' rooms to first floor. The most sensitive heritage elements are to the exterior, the original elevation with fine jointed stonework, stone balustrades to top floors and to the interior, the marble finishes, cornices and mouldings, ornate plasterwork, marble fireplaces and original windows to both ground floor entrance hall and meeting rooms to first floor. These heritage elements would be highly susceptible to high structural movements of the building, which are predicted to arise in close proximity of the internal features and along the external façade to Sherborne Lane. Damage through Portland stonework and interior marble could be difficult to repair, thus having a permanent aesthetic impact on the building.
Score: 1 The heritage sensitivity is determined by brittle historic finishes located in the proximity of high differential settlement
Sensitivity of the condition
The building is generally in good condition and features contemporary office finishing with carpeted floor, suspended ceilings, and dry lined and painted walls. The surviving original features are in excellent conditions. During the site inspection it was not possible to identify any defects that might be exacerbated by settlement.
Score: 0 The combined structural and heritage condition of the building as visible at time of inspection range from good to excellent. The condition of the building will not contribute to the overall sensitivity of the building to the predicted ground movements.

Table 10: Heritage and structural assessment

5.3 Total Score

The total score is the summation of the damage category, structural sensitivity, heritage sensitivity and condition sensitivity scores:

The damage category is 1

The structural sensitivity score is 1

The heritage sensitivity score is 1

The condition sensitivity score is 0

The total score for this building is 3

6 Conclusion

The Stage 2 engineering assessment has predicted that the maximum tensile strain falls within damage category 1. This corresponds to Very Slight damage in accordance with Table 2.

However, specific heritage and structural assessment taking into account the location and extent of settlement and tensile strains indicates that the building has a high level of structural and heritage sensitivity to movement. This assessment has determined that the building has a total score of 3.

It is recommended that a Stage 3 assessment is undertaken to further consider the potential damage to the structural formand to ascertain the presence of varied foundations.

The BSCU Environmental Statement considers the mitigation that could be needed, however, it is recommended that Stage 3 assessment is undertaken to verify how heritage finishes and features may respond and whether such mitigation is required.

7 References

[1] LU Works Information WI 2300 Ground Movement version 3, 19-07-13.

[2] LU Category 1 Standard: S1050 Civil Engineering - Common Requirements, Issue No. A7, Nov. 2013.

[3] Mair R J, Taylor R N and Bracegirdle A (1993). Subsurface settlement profiles above tunnels in clays. Géotechnique 43, No. 2, pp. 315-320.

[4] Mair R J, Taylor R N and Burland J B (1996). Prediction of ground movements and assessment of risk of building damage due to bored tunnelling. (In: International Conference of Geotechnical Aspects of Underground Construction in Soft Ground, London, pp. 713–718.

[5] LU Guidance Document G0058 Civil Engineering Technical Advice Notes, Issue No. A17, Feb. 2013.

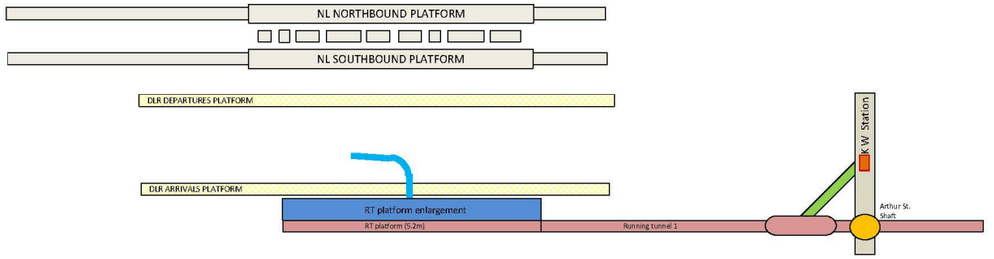
[6] Burland J B (1995). Assessment of risk of damage to buildings due to tunnelling and excavation. Proceedings: 1st International Conference of Earthquake Geotechnical Engineering, IS Tokyo, 1995.

[7] Selemetas.D et al (2005). The response of full scale piles to tunnelling. Geotechnical aspects of underground construction in soft ground (Bakker et al (eds)) pp.763-769.

[8] New B M and Bowers K H (1994). Ground movement model validation at the Heathrow Express trial tunnel. Proc. Tunnelling 1994. IMM, London, pp 301-327

LUL Bank Project Office
10 King William Street
London EC4 N7TW

STAGE 1



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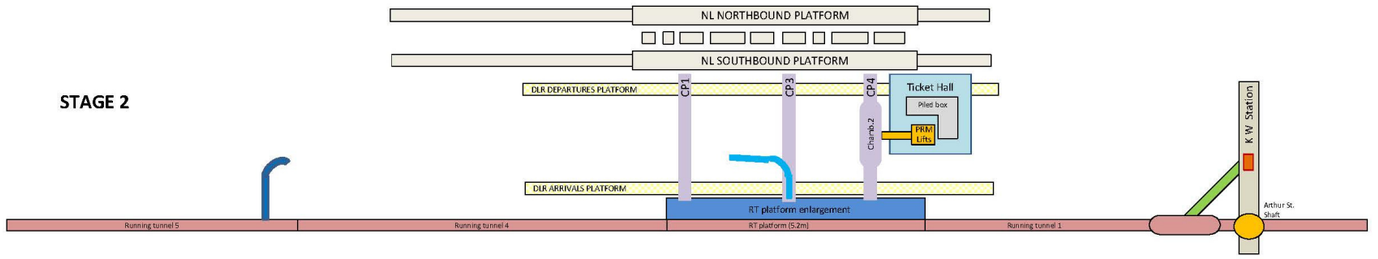

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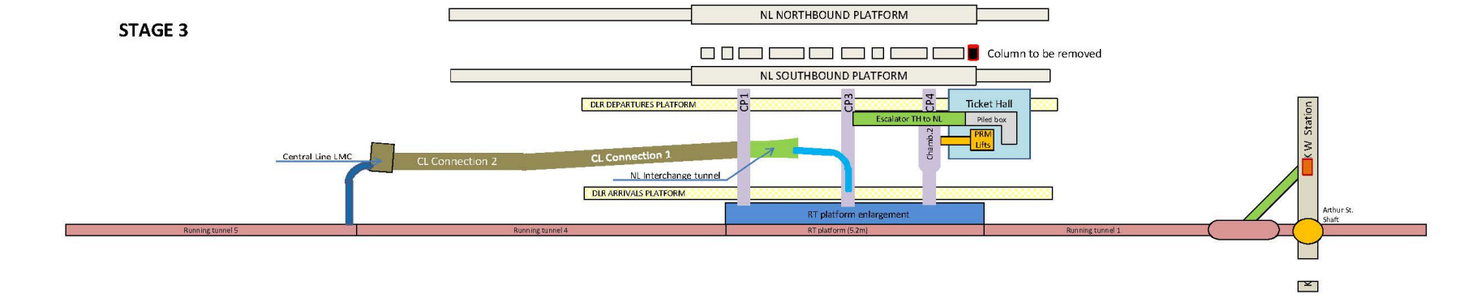

STAGE 4

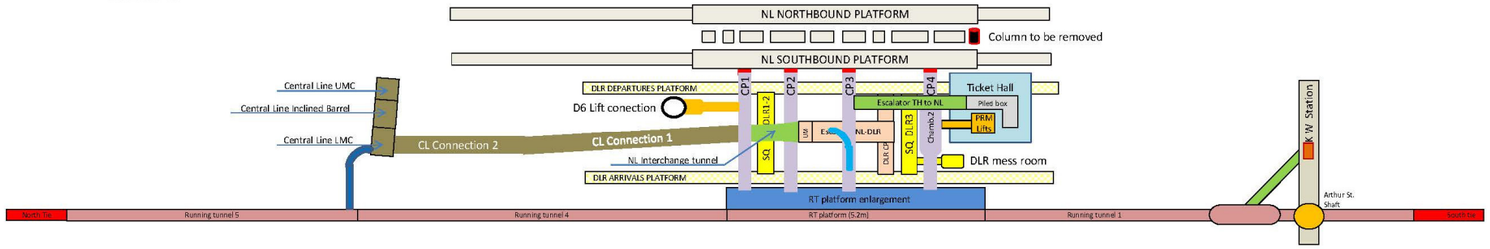

Figure 1: Construction Stage model

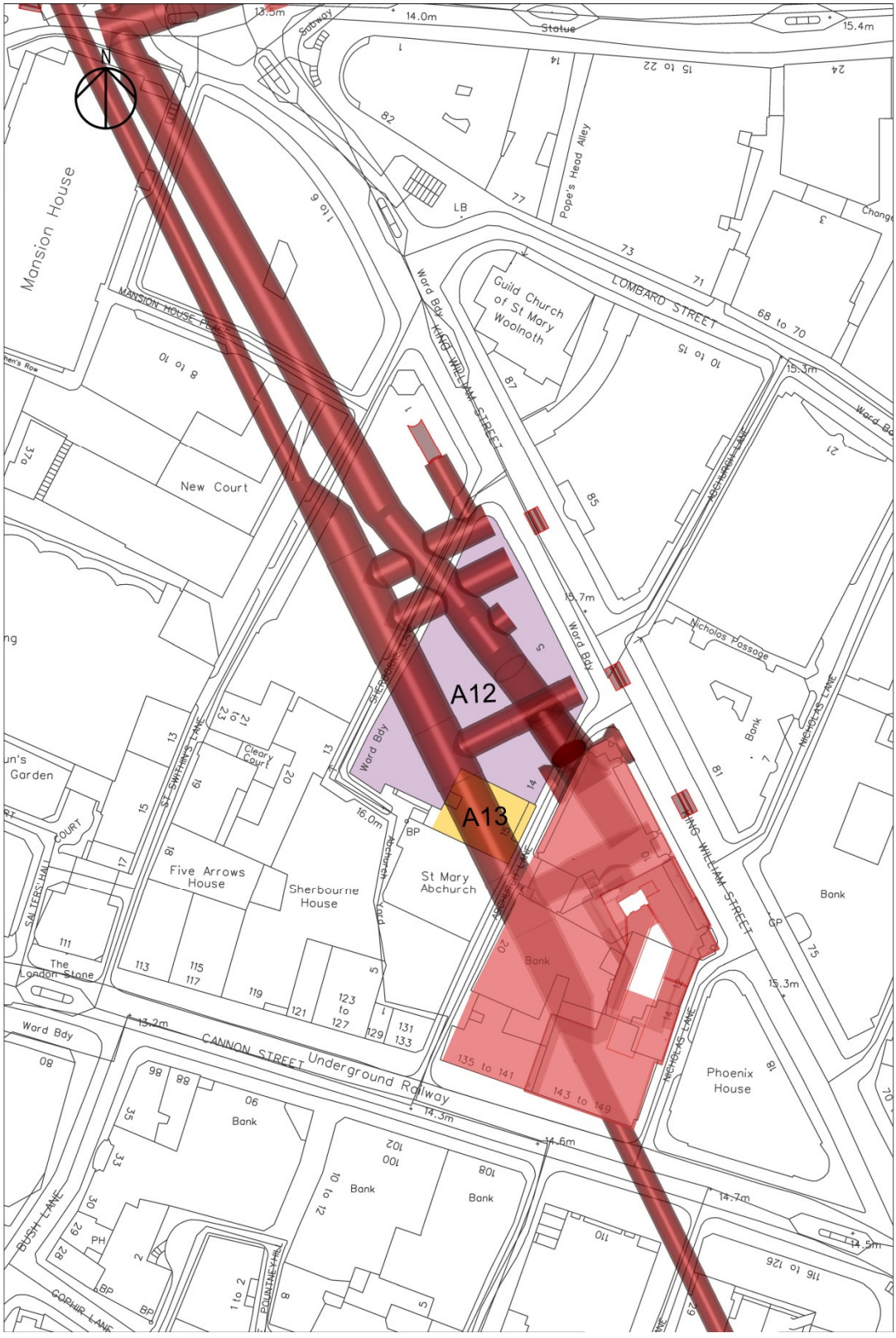

Figure 2: Location plan showing building location in relation to BSCU works

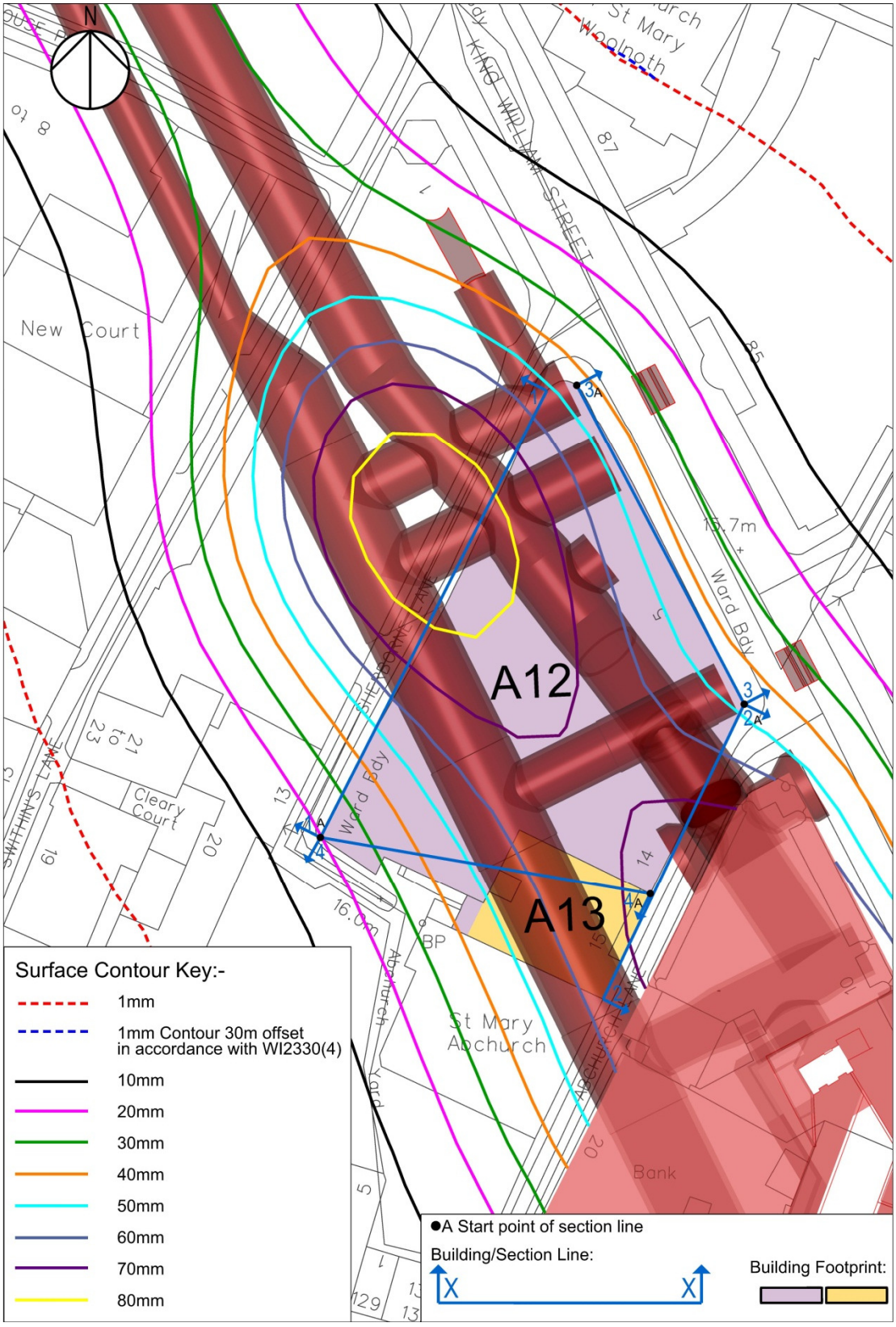

Figure 3: Building location, sections analysed and Settlement Contours at stage of worst case for tensile strains

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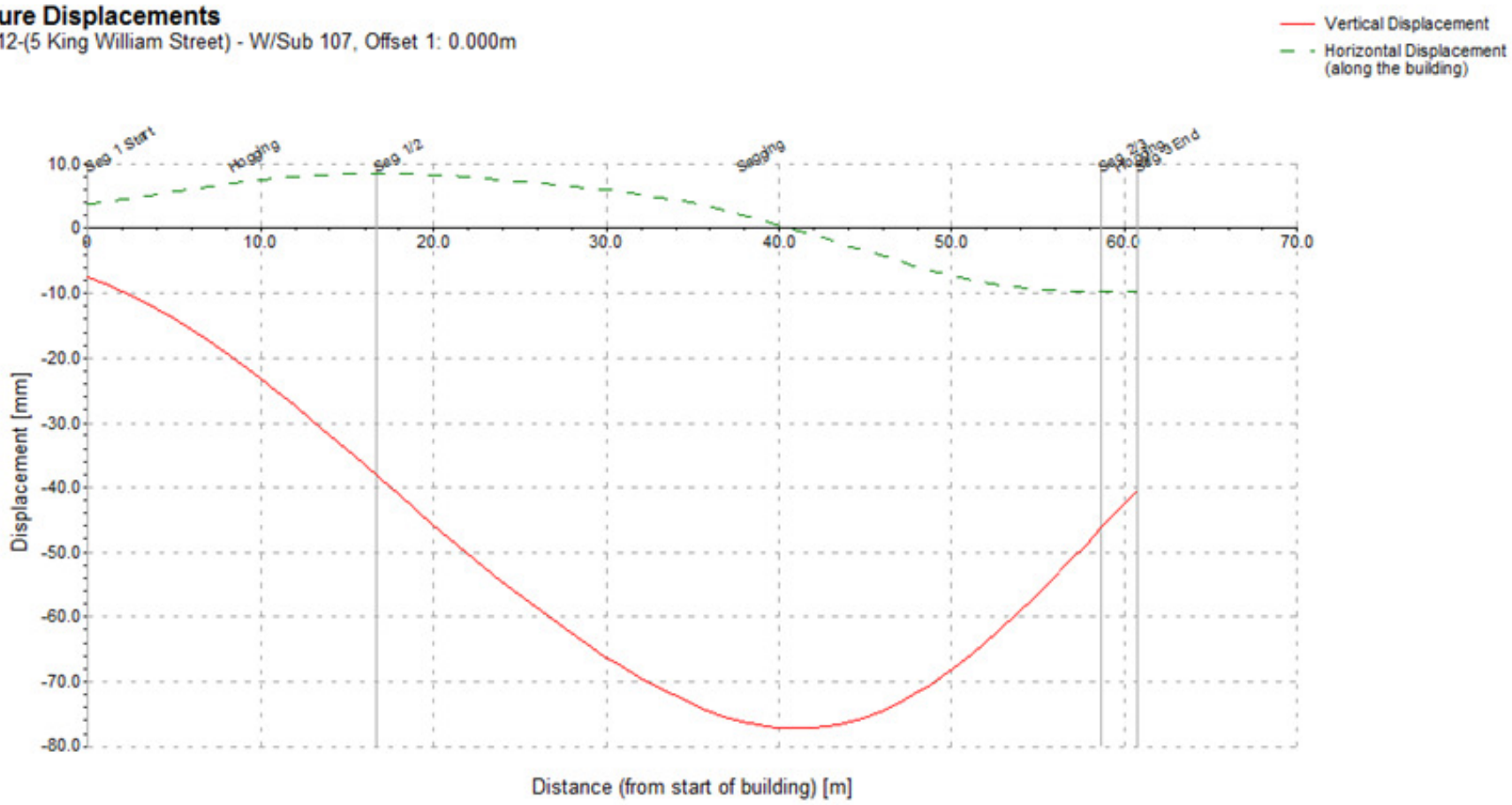

Figure 4: Building displacement at founding level of (line 1) at stage 4 of worst case for tensile strain

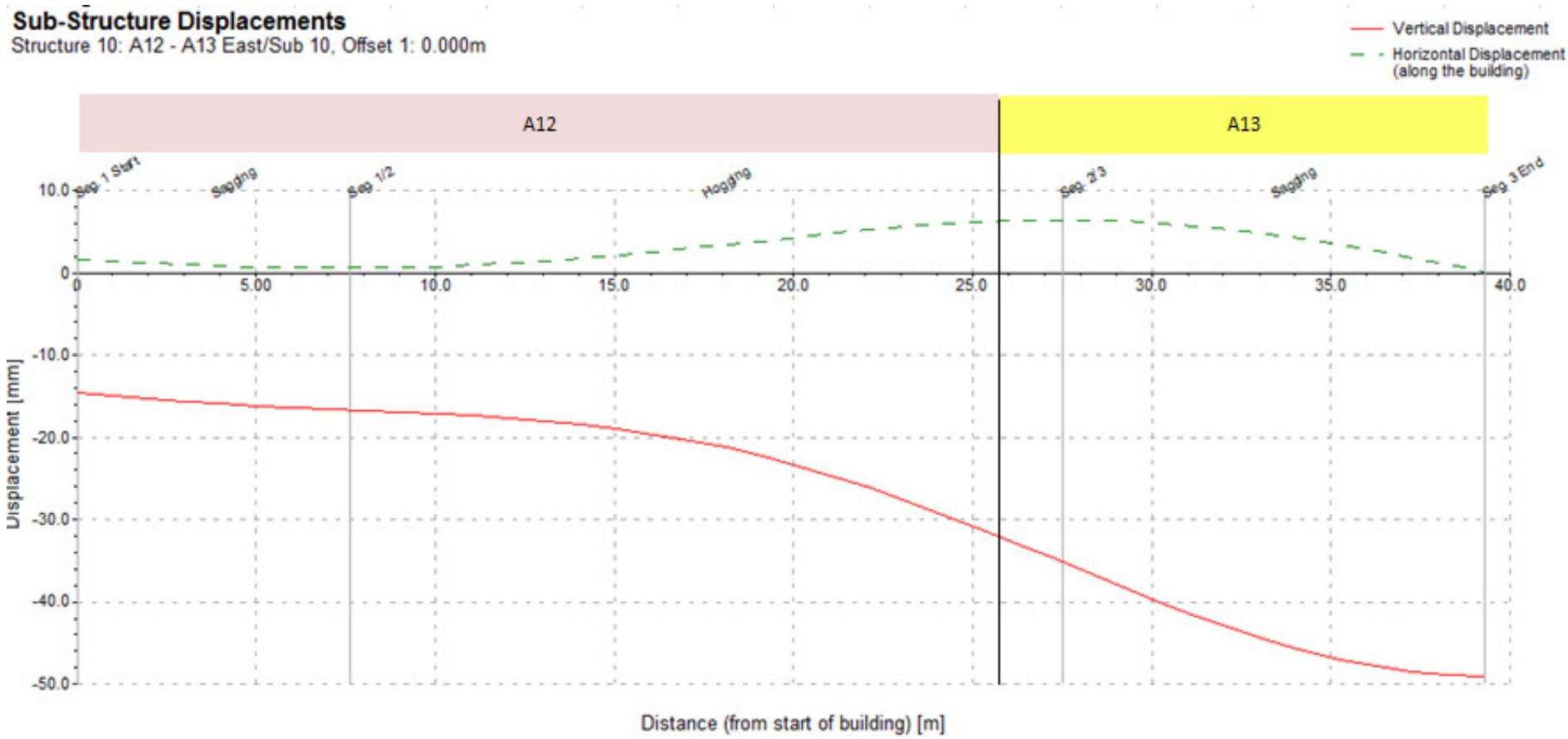

Figure 5: Building displacement at founding level of (line 2) at stage 2 of worst case for tensile strain

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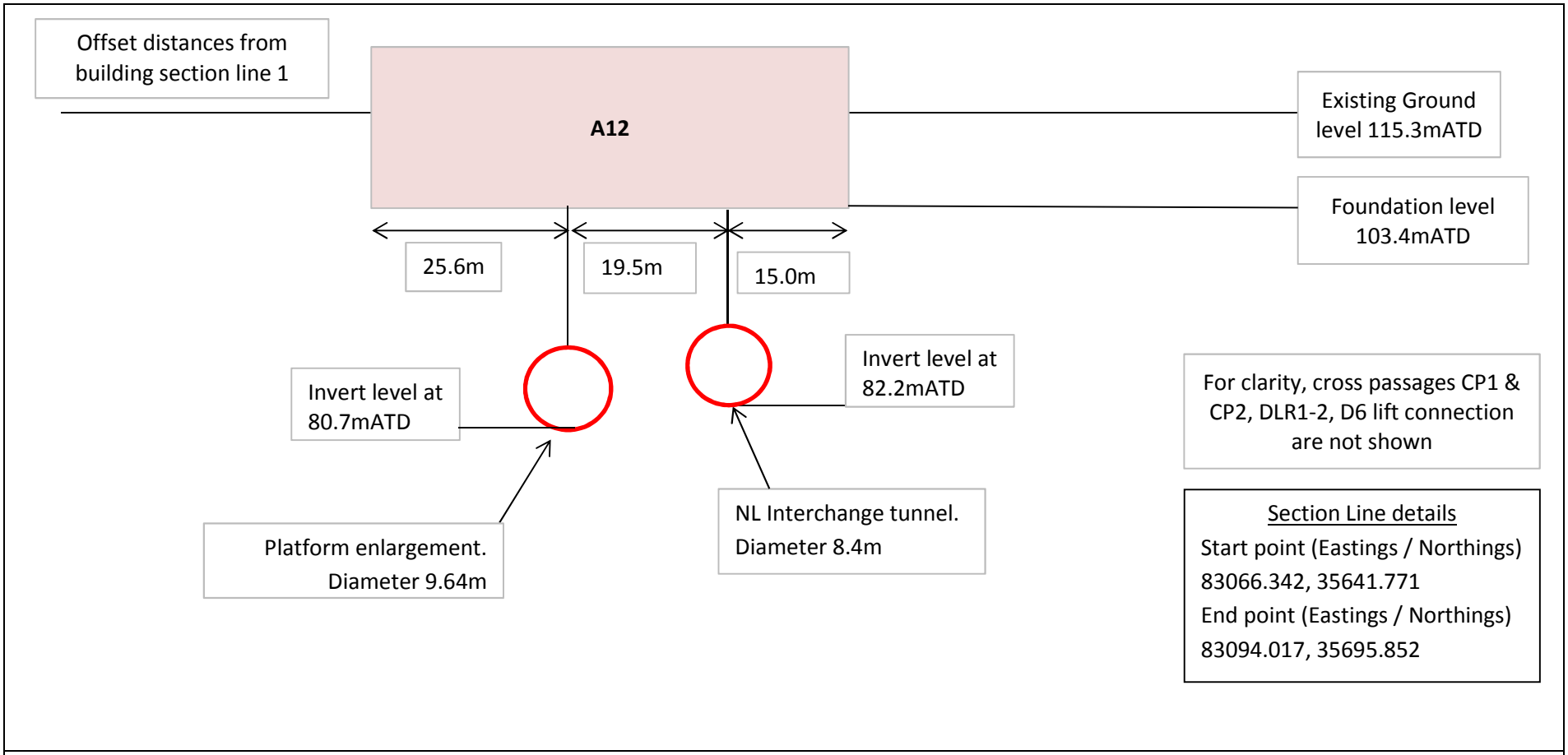


Figure 6: Diagrammatic cross-section of section (line 1) relative to tunnel position

Appendix 6: Photo Locator

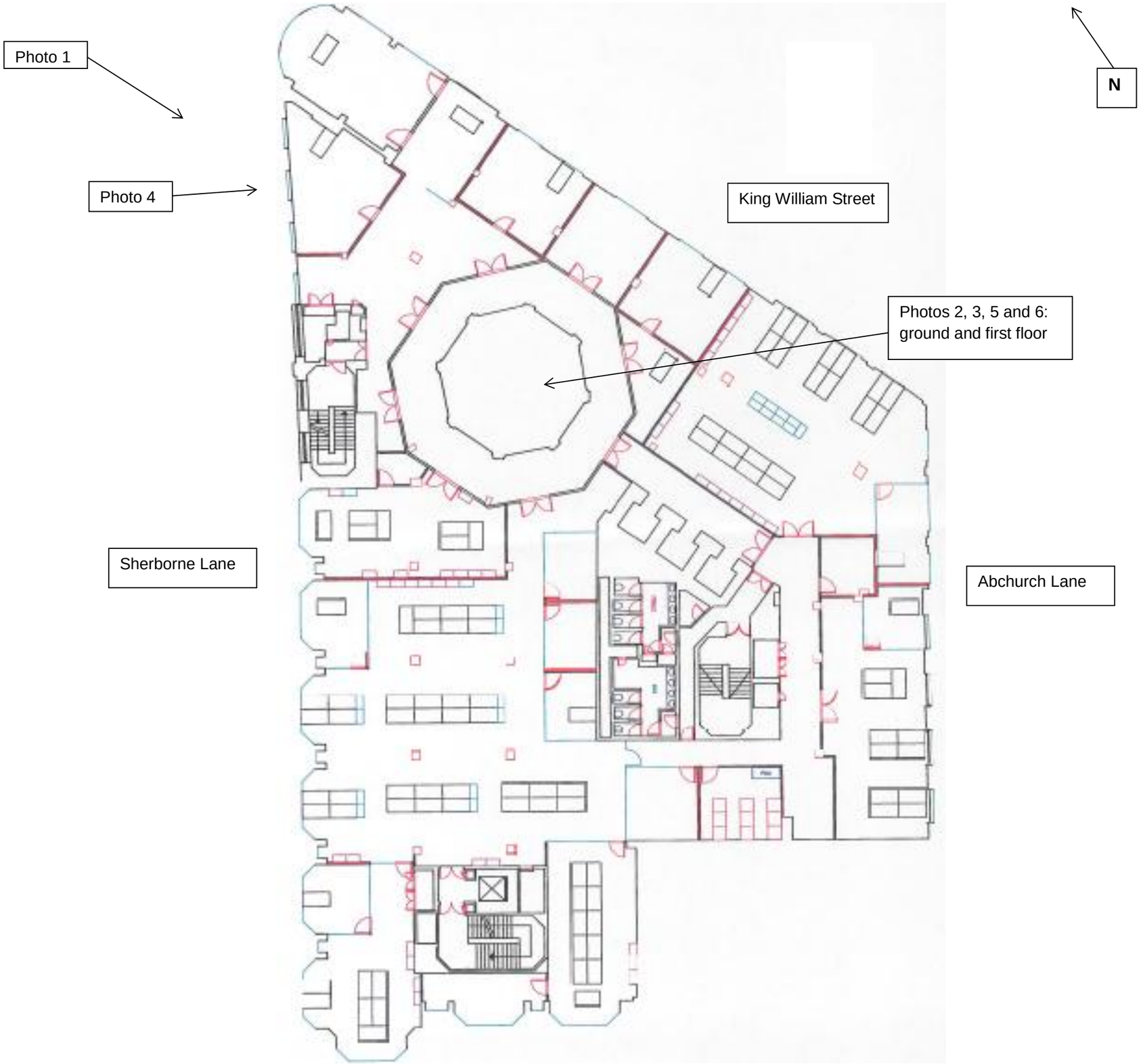


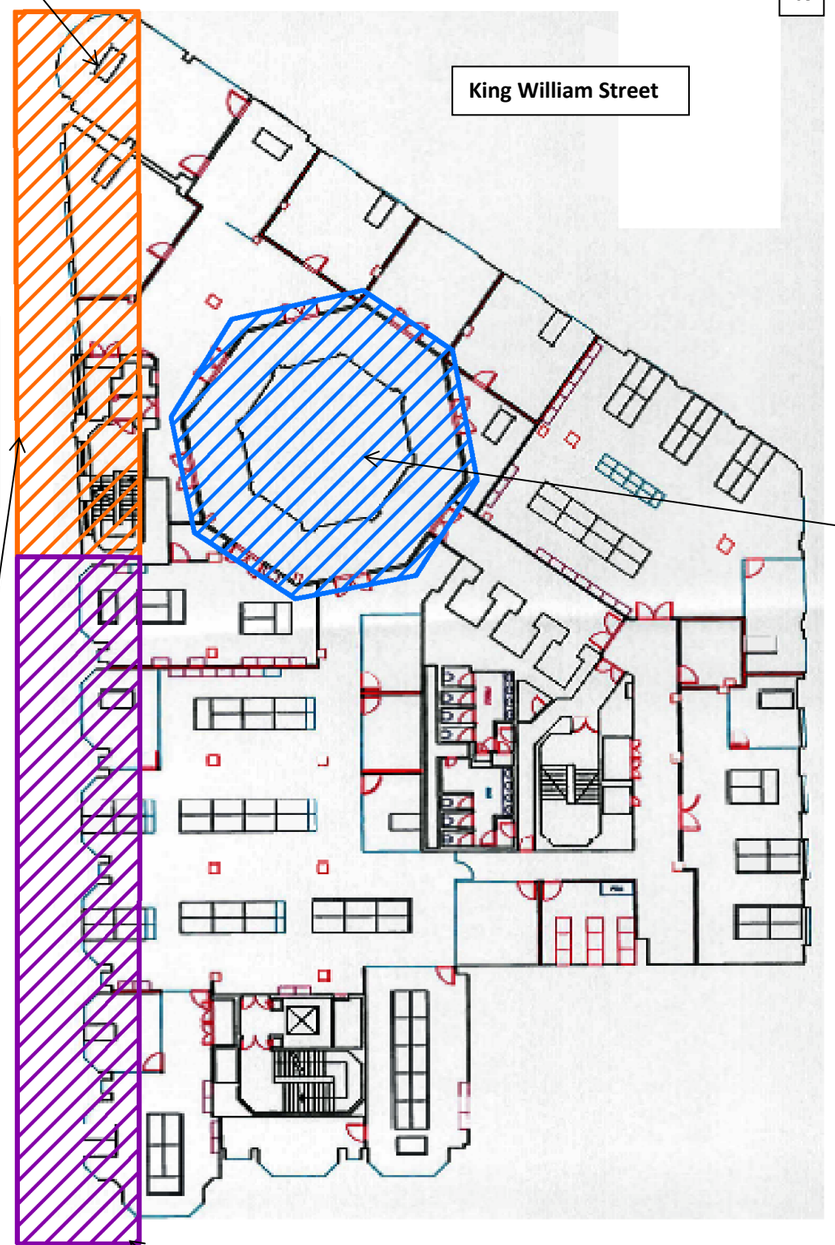
Photo 1
Photo 4
N
King William Street
Photos 2, 3, 5 and 6:
ground and first floor
Sherborne Lane
Abchurch Lane

Appendix 7: Areas of interest

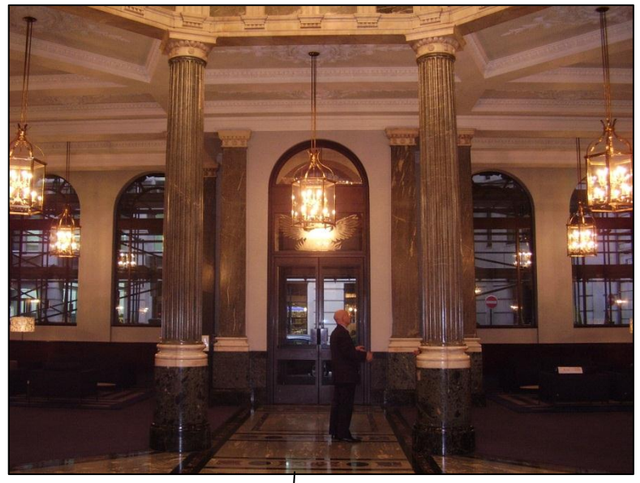
TYPICAL FLOOR PLAN AT FIRST FLOOR LEVEL

Historic interior to first floor only, to be avoided when opening up

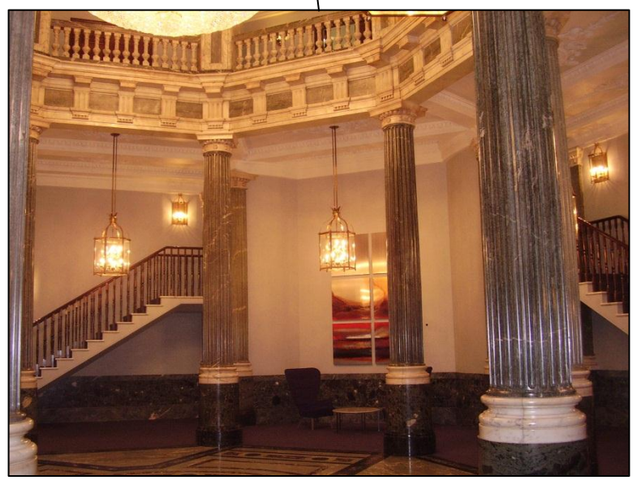
Typical internal finishes to interior of Sherborne Lane historic elevation (second and ground floor shown)



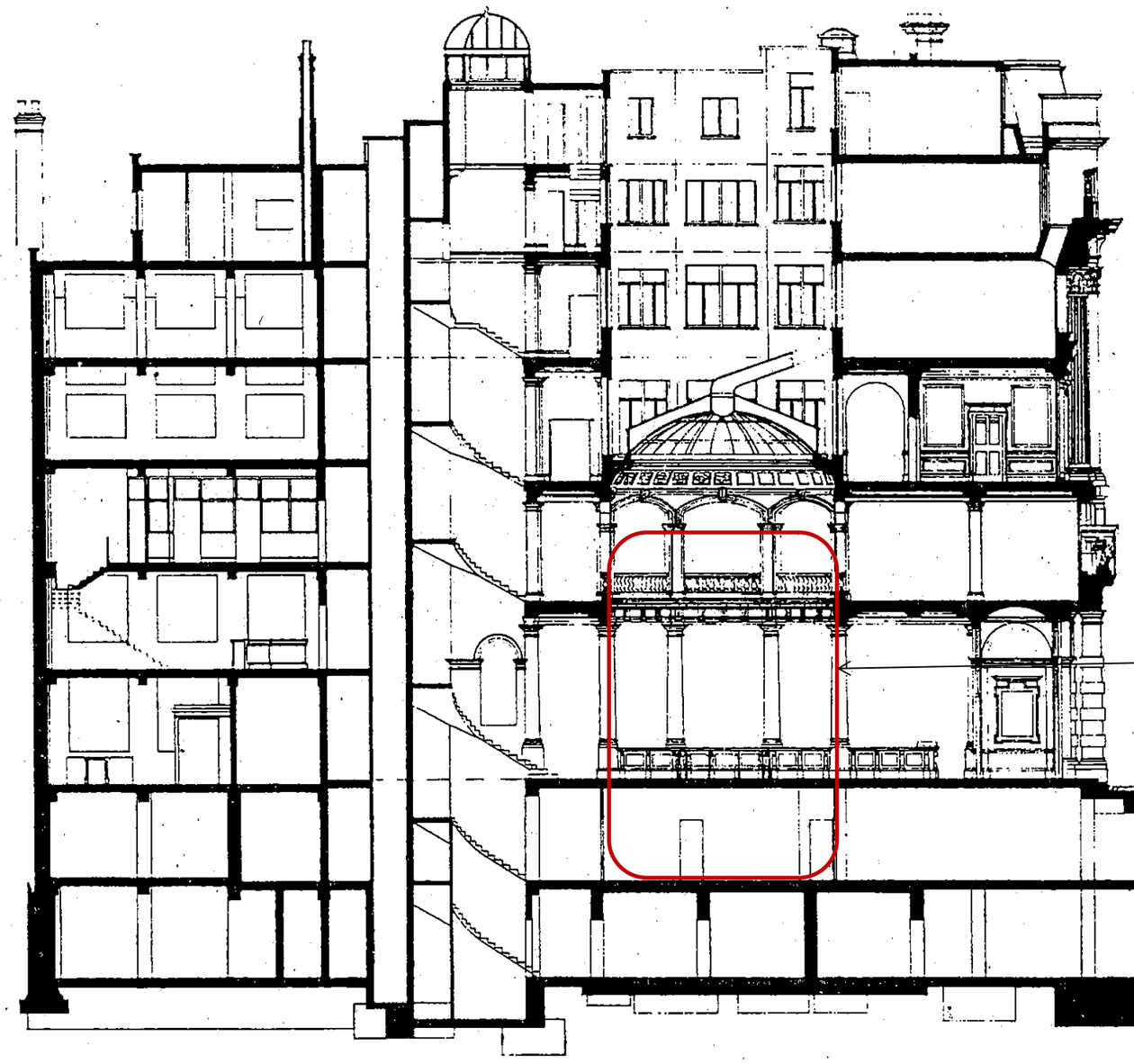
Modern section of Sherborne Lane



Interior at ground floor, foyer area, where it is proposed to locate contingency propping if required



Scale of Feet



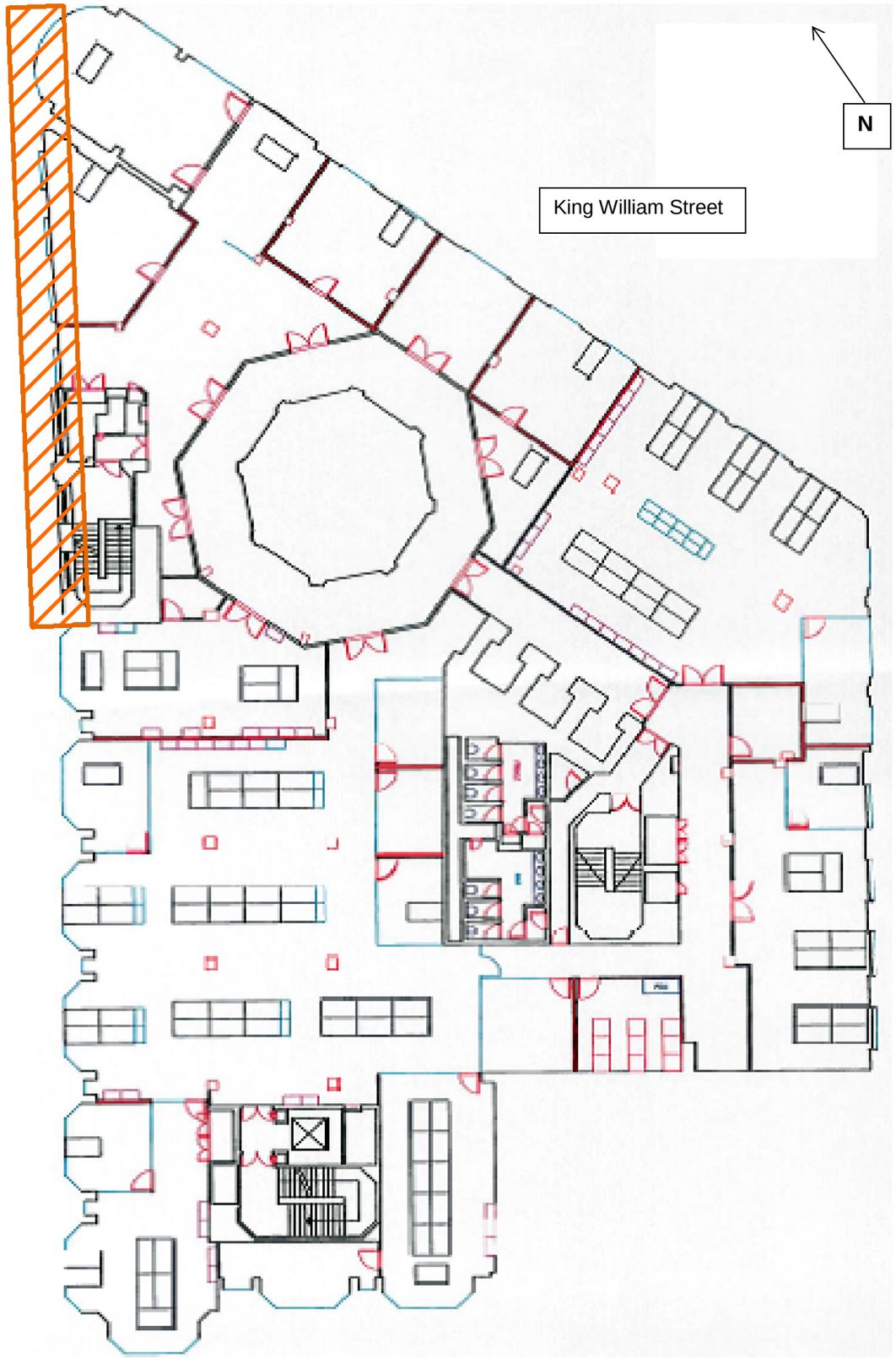
Indicative location of contingency non-intrusive propping to foyer balcony structure

TRANSVERSE SECTION

6 STRATTON ST W
FEBRUARY 1916

Appendix 8: Areas to be affected by protective works

Note: Protective works will only affect internal areas of the building behind the historic elevation



5 King William Street, Sherborne Lane elevation

Note: Protective works will only affect internal areas of the building behind the historic elevation