

Due Diligence Report

Sutherland Entertainment Centre

Prepared for NBR Architecture / 22 November 2019

182011

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1.0 Executive Summary

Taylor Thomson Whitting (NSW) Pty Ltd were requested to attend site and undertake a due diligence of the existing building structures at the Sutherland Entertainment Centre (SEC) that are to be retained as part of the proposed refurbishment of the centre.

The due diligence indicates that the layout and extent of the existing structural elements, that were visually inspected, are generally consistent with the original drawings. No serious structural defect that may have a significant impact on the structural integrity of the existing buildings has been visible or identified at the time of the site visit.

We suggest that a detailed building condition inspection being undertaken to confirm the overall conditions of the existing building structures with regard to the following aspects in particular:

- Structural properties of the existing concrete slabs which support new storeroom (Ground Floor of Auditorium Building), new terraces (Level 1 of Auditorium Building) and new rehearsal room (Level 1 of Black Box Building).
- Allowable bearing capacity of the existing slabs on ground which support new seating areas (Theatre Hall) and new loading docks (on the NE and SE corners of Auditorium Building).
- Ties between leaves of cavity brickwork walls (along the northern and southern facades of Auditorium Building).
- Fire-rating of steel raker beams and brickwork walls of Stairs 3 and 9.
- Overall qualities of concrete and brickwork materials.

Refer to Appendix C for the critical structural areas where the structural conditions need to be confirmed by the detailed building condition inspection for the purpose of de-risking the project.

2.0 Introduction

The structural assessment for the refurbishment of the SEC has been undertaken based on the original structural drawing set provided by the Sutherland Shire Council. At the request of NBRS Architecture, TTW conducted a due diligence of the existing building structures at the SEC to identify any discrepancies between these structures and the provided drawings in terms of layout and extent of structural elements. The purpose of this exercise is to de-risk the project and to provide sufficient information to enable the Council to make an informed decision on the overall risk management strategy for the project.

All descriptions, references to layouts, conditions and other details are a general guidance only and are given as our opinion but any interested parties should not rely on them as statements or representations of fact and must satisfy themselves as to the correctness, quantity, costs, etc of each of them.

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3.0 Scope of Inspection and Exclusions

The scope of the proposed due diligence includes visual and photographic inspections of the existing structural elements at the areas of the buildings where access was provided and the structural elements are not covered.

The inspected structural elements are listed below:

Auditorium Building

- Brickwork walls of Stairs 2, 3 and 9, inside Basement and Level 2 plantrooms and along Ground Floor, Level 1 and Level 2 corridors.
- Concrete beams along auditorium perimeter, concrete floors of foyers and corridors at Ground Floor,

- Level 1 and Level 2 and concrete roof.
- Level 1 transfer truss and roof trusses over theatre hall.

Black Box Building

- Brickwork perimeter walls.
- Level 1 waffle floor.
- Roof trusses.

The following works have not been undertaken as part of this due diligence:

- Any survey or measurement of structural items
- Any scanning or testing of structural materials

The level of inspection undertaken is limited to what is recorded in the following pages of this report and was not sufficient to certify that the building was constructed in accordance with the design documents or structurally adequate in accordance with design codes at the time of construction nor present codes.

This report does not cover the areas such as façade, drainage, pavement, services, plant, cladding, waterproof membranes, asbestos, fitouts, architectural items etc.

Refer to Appendix A, which shows the areas visually inspected as part of this due diligence exercise.

4.0 Description of Building Structure

The SEC was developed in early 1973 and has been operating as an entertainment theatre since 1976. The building structures consists of structural steel framed system which is encased in brickwork and concrete and load bearing brickwork walls, with reinforced concrete slabs over. The brickwork / concrete encasement would provide the cover for durability of the steel and aid in fire resistance.

The following structural drawings were viewed as part of the due diligence. No detailed analysis or design checks were carried out.

- Drawing Nos. SE1-52
- Structural Engineer: F. S. Hespe
- Architect: Dunphy Bell and Partners
- Approx. Date Constructed: 1973-1976
- Type of Construction: Steel framed structure and load bearing brickwork walls with in-situ slabs. Beams and columns all brickwork / concrete encased for fire resistance
- Roof Construction: Steel framed roof with metal sheeting and load bearing brickwork walls with in-situ concrete slab
- Number of Levels: 4 suspended levels
- Number of Basements: 1 levels of basement
- Approx. Building Footprint:
- Approx. Column Grids: 3-6m
- Type of Façade: Brick
- Type of Footing: Pier footing on rock
- Typical Floor Design Loads: Not noted on original drawings
- Typical Slab Thickness: 125-170mm
- Typical Edge Detail: In-situ concrete slab on internal leave of cavity brickwork wall

5.0 Building Inspection

Hung Duong from the Sydney office of Taylor Thomson Whitting carried out the site visit of the SEC on 15 November 2019. A walk through of the areas of the centre, where access was provided and the structural elements are not covered, was conducted.

In most locations, it was not possible to view the structure directly, due to architectural finishes, floor coverings and ceilings. The facade was not inspected.

In order to assess the structural performance, it is necessary to rely on the following indicators:

- Movement between structural and non-structural elements
- Cracks/spalling, both in structure and attached partitions
- Corrosion staining and/or spalling
- Water leaks/dampness/seepage/ponding (detection subject to prevailing weather conditions at the time of inspection)
- Noticeable visual or perceptible deflections/defects
- Rusting/paint work deteriorated on steelwork

We understand that there was a report issued by Meinhardt regarding the above issues.

During the inspection, a number of photographs (refer Appendix B) were recorded.

6.0 Code and BCA Compliance

Design Loads

Refer to BCA consultant's report.

Design loads are not shown on the original structural drawings.

Earthquake loadings are not stated on the provided drawings. However, due to the age of the building, we are of a view that it would not be designed to accommodate the current Earthquake Code requirements as part of AS1170.4.

The building structures consists of high-risk items such as load bearing and non-load bearing unreinforced brickwork walls. Some of these walls form parts of the stability system of the existing buildings.

The unreinforced brickwork walls in the existing condition are likely to collapse in an earthquake event as specified by AS 1170.4 if not adequately tied to the global building structure or not have sufficient out-of-plane bending capacity. These elements need to be assessed and strengthened for life safety.

As minimum, the building structures need to comply with AS 3826-1998. This standard is currently referenced by AS 1170.0 Supp 1-2002 (R2016) Commentary for 'assessment of existing structures'.

The potential strengthening works would typically involve the following:

- Head restraints (e.g. 75x4 EA) for all non-load bearing walls and for load bearing walls with insufficient friction restraint.
- Ties (e.g. Helifix Dryfix) for cavity walls with insufficient tie between leaves
- Reinforcement (e.g. Helifix HeliBar) for large walls with insufficient out-of-plane bending capacity

Fire resistance requirements

Refer to BCA consultant's report.

It appears that the existing steel raker beams are not fire-rated at the time of the inspection. These structural elements are supporting the upper seating stalls and, therefore, need to be assessed for fire resistance.

The brickwork walls around Stair 3 and 9 (i.e. the fire stairs) will need to be assessed for fire rating as well.

7.0 Conclusion

The due diligence indicates that the layout and extent of the existing structural elements, that were visually inspected, are generally consistent with the original drawings. No serious structural defect that may have a significant impact on the structural integrity of the existing buildings has been visible or identified at the time of the site visit.

We suggest that a detailed building condition inspection being undertaken to confirm the overall conditions of the existing building structures with regard to the following aspects:

- Structural properties of the existing concrete slabs which support new storeroom (Ground Floor of Auditorium Building), new terraces (Level 1 of Auditorium Building) and new rehearsal room (Level 1 of Black Box Building).
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- Ties between leaves of cavity brickwork walls (along the northern and southern facades of Auditorium Building).
- Fire-rating of steel raker beams, BT1 truss and brickwork walls of Stairs 3 and 9.
- Overall qualities of concrete and brickwork materials.

The extent of the structure observed at the time of the inspection may change, making the observations in this report out of date. If the client doesn't act on the recommendations within 12 months then the report cannot be relied upon as an accurate record of the actual layouts of the structure. A new inspection should be undertaken prior to commissioning any works based on this report.

If the client does not act on the advices contained in this report Taylor Thomson Whitting cannot accept responsibility for any liability arising from a failure relating to the advices contained herein.

Prepared by

TAYLOR THOMSON WHITTING (NSW) PTY LTD
in its capacity as trustee for the
TAYLOR THOMSON WHITTING NSW TRUST



Hung Duong
Associate Director

Authorised By

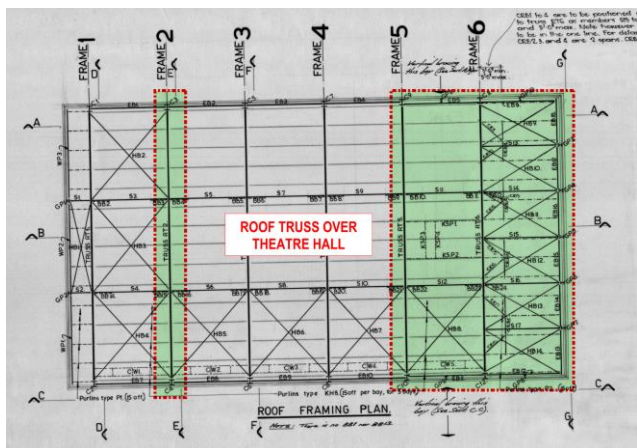
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in its capacity as trustee for the
TAYLOR THOMSON WHITTING NSW TRUST



Glen Fowlie
Director

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Inspected Areas



Appendix B

Photographs

Auditorium Building – Basement



Photo 1 – Load bearing brickwork walls and piers



Photo 2 – Typical brickwork damp-proof courses



Photo 3 – Shoring wall under auditorium perimeter



Photo 4 – Proposed location for new shear wall

Auditorium Building – Stair 9

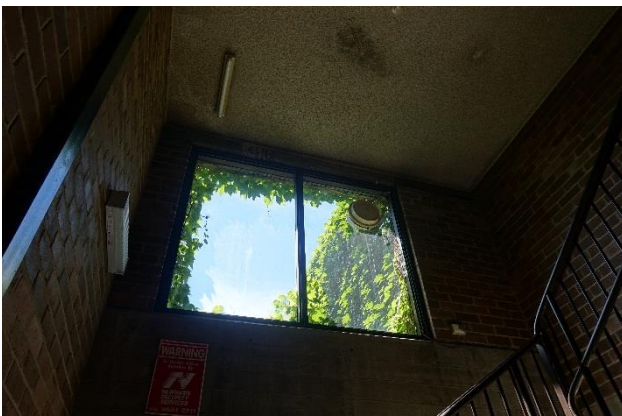


Photo 1 – Brickwork piers on either side of window

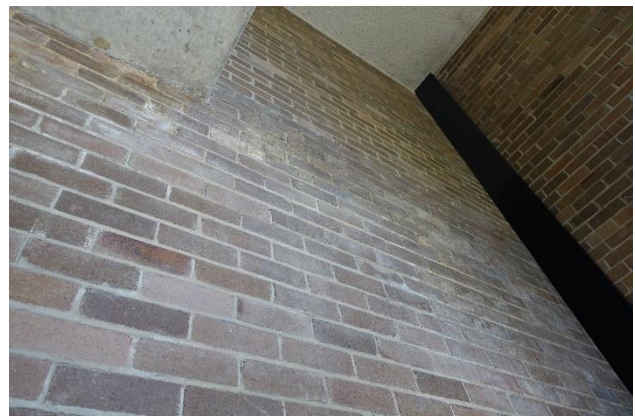


Photo 2 – Load bearing brickwork walls

Auditorium Building – Stair 3



Photo 1 – Load bearing brickwork walls



Photo 2 – RC flight and landing slabs

Auditorium Building – Stair 2

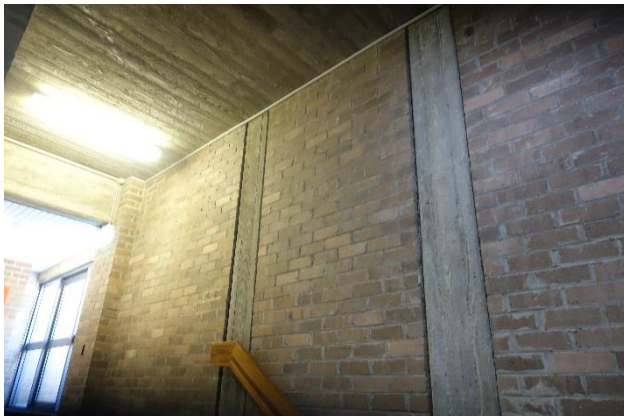


Photo 1 – Load bearing brickwork wall [1]

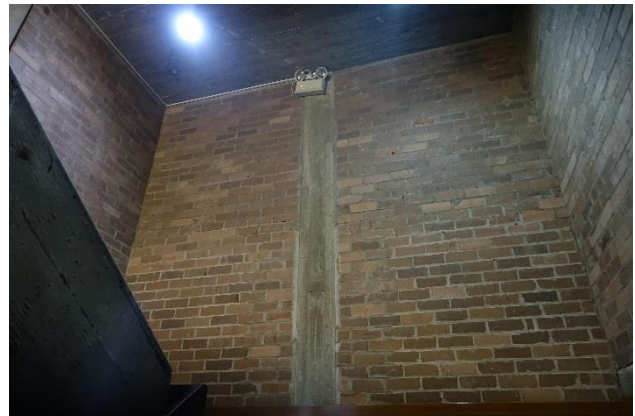


Photo 2 – Load bearing brickwork wall [2]

Auditorium Building – Theatre Hall



Photo 1 – RC perimeter beam and concrete encased steel columns

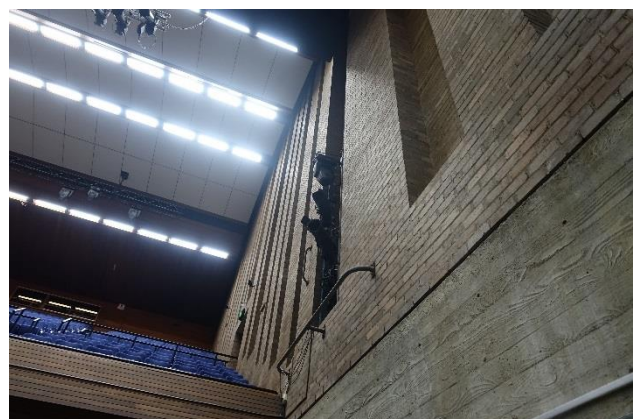


Photo 2 – Brickwork perimeter wall and brickwork encased steel columns

Auditorium Building – Ground Floor

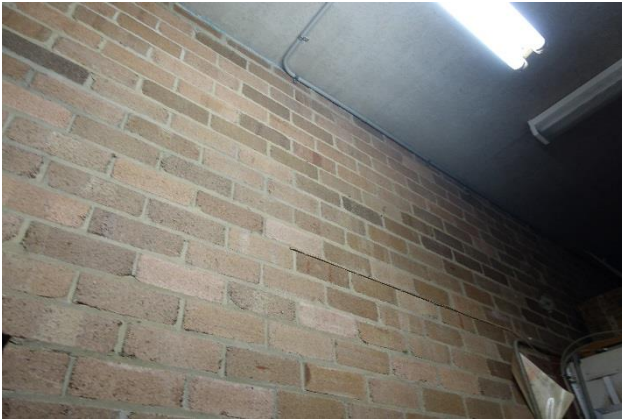


Photo 1 – Typical load bearing brickwork wall



Photo 2 – Typical non-load bearing brickwork wall



Photo 3 – Typical steel column (covered)

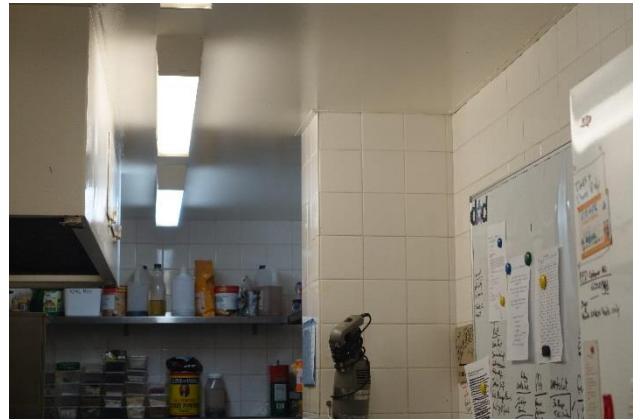


Photo 4 – Typical brickwork pier (covered)

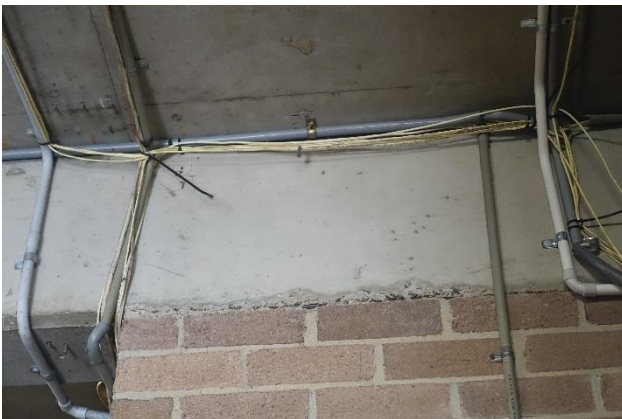


Photo 5 – Typical beam on wall bearing (rectification might be required if reinforcing bars being exposed)



Photo 6 – Blade brickwork pier (covered)

Auditorium Building – Level 1



Photo 1 – Foyer RC floor framing [1]

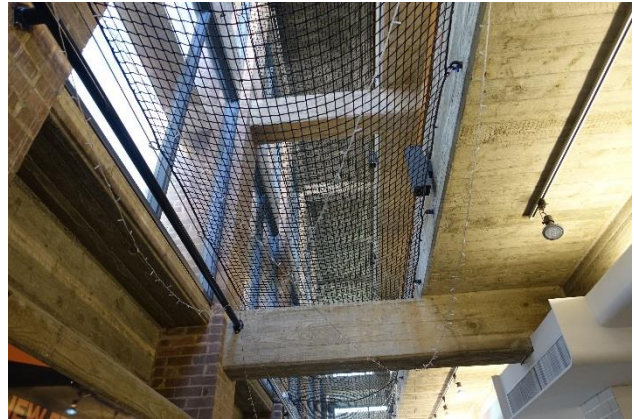


Photo 2 – Foyer RC floor framing [2]



Photo 3 – BT1 truss



Photo 4 – BT1 truss to raker beam connection



Photo 5 – Green Room terrace RC floor framing



Photo 6 – Typical load bearing brickwork pier

Auditorium Building – Level 2 / Roof

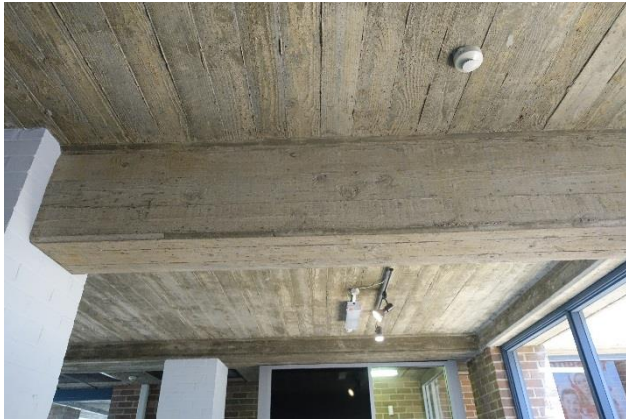


Photo 1 – Foyer RC floor framing [1]

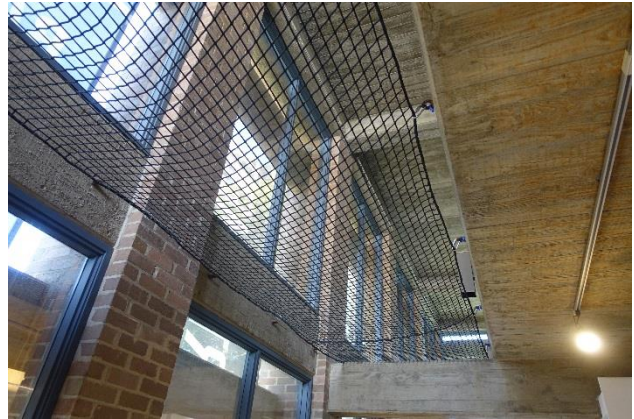


Photo 2 – Foyer RC floor framing [2]



Photo 3 – Raker beam end connection (covered)



Photo 4 – Load bearing brickwork wall

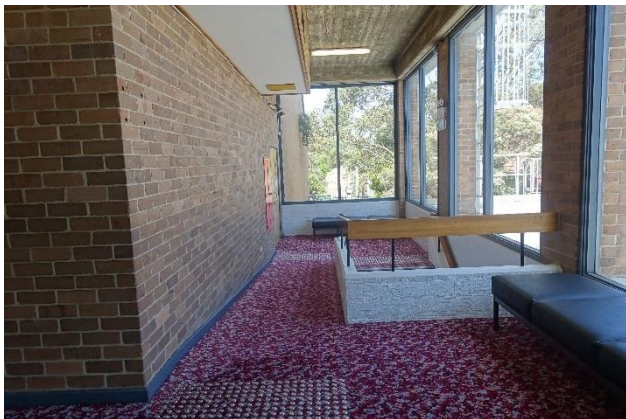


Photo 5 – Load bearing brickwork piers



Photo 6 – SW roof area



Photo 7 – NE roof area

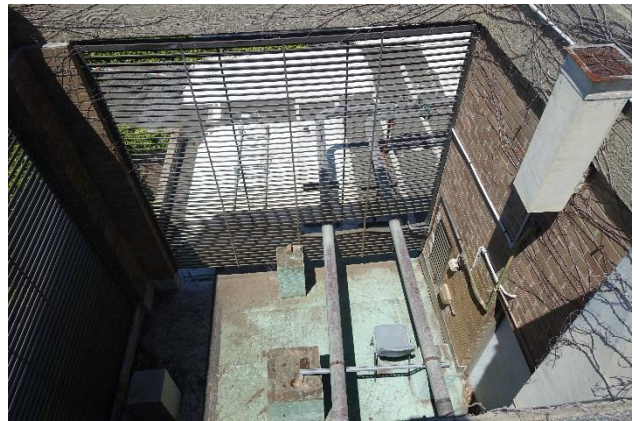


Photo 6 – NE outdoor plant area

Auditorium Building – Roof



Photo 1 – Roof truss



Photo 2 – Roof truss to column connection (covered)



Photo 3 – Roof truss to column top connection



Photo 4 – Roof truss to column bottom connection



Photo 5 – Roof truss top chord



Photo 6 – Roof truss bottom chord



Photo 7 – Roof truss diagonal member



Photo 8 – Roof beam end connection (covered)

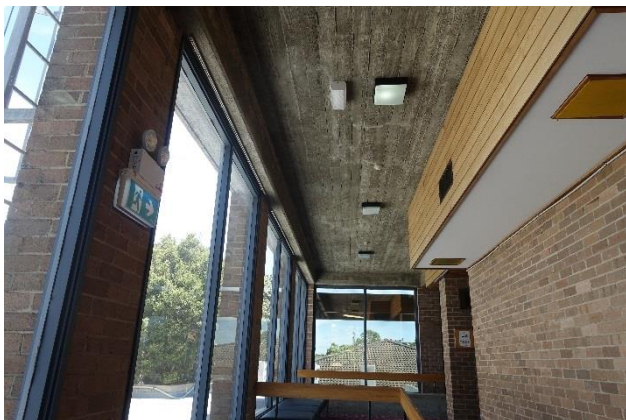


Photo 9 – Eastern RC roof framing



Photo 10 – Northern roof area



Photo 11 – Theatre roof tiles

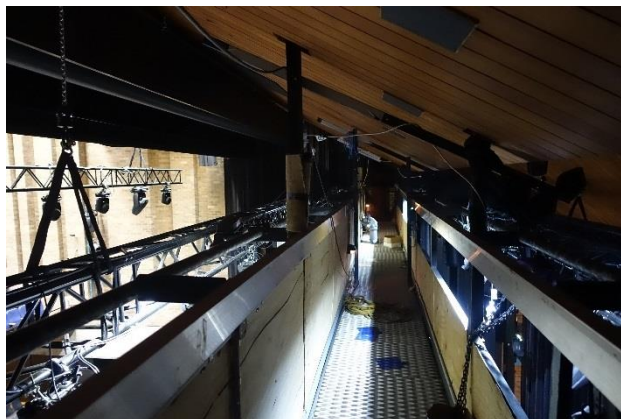


Photo 12 – Theatre gantry

Auditorium Building – Facades and Neighbour Buildings



Photo 1 – Eastern facade



Photo 2 – Southern facade

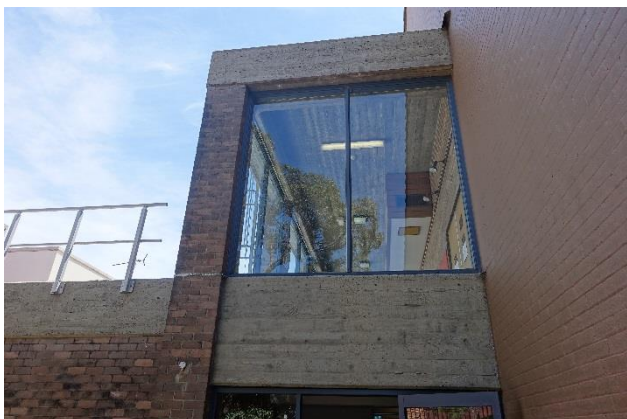


Photo 3 – SW corner facade

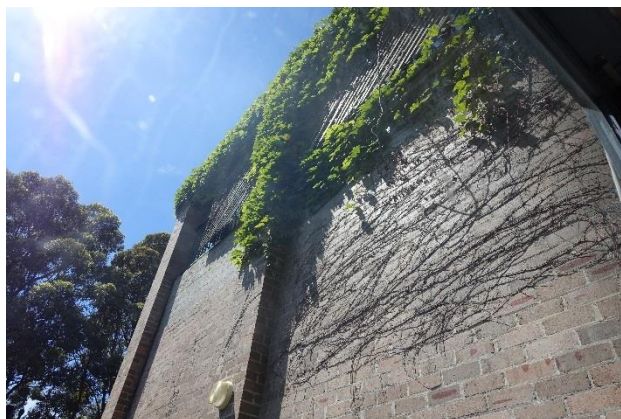


Photo 4 – NE corner facade

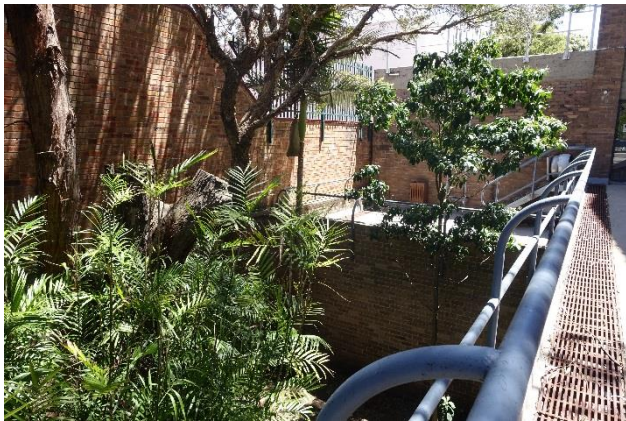


Photo 5 – Neighbour building [1]



Photo 6 – Neighbour building [2]

Black Box Building



Photo 1 – Level 1 RC waffle slab



Photo 2 – RC waffle slab on brickwork wall bearing



Photo 3 – Brickwork ties in cavity wall [1]



Photo 4 – Brickwork ties in cavity wall [2]

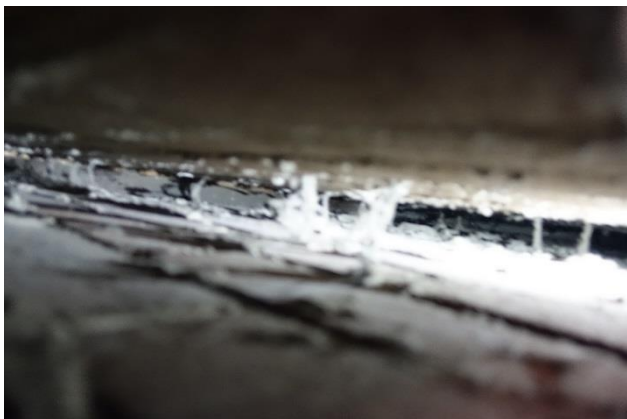


Photo 5 – Brickwork ties in cavity wall [3]



Photo 6 – Roof tiles



Photo 7 – Roof truss

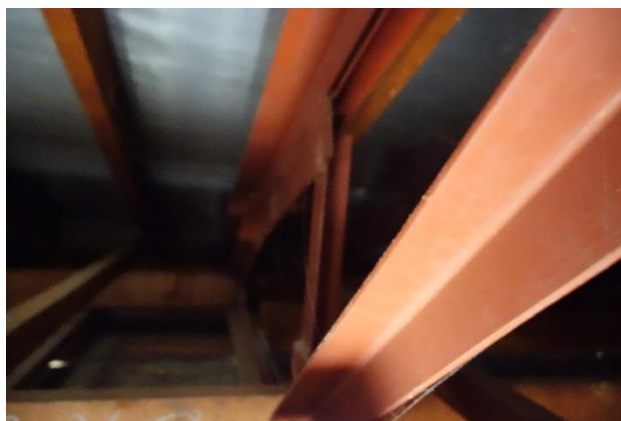


Photo 8 – Roof truss members



Photo 9 – NE corner facade

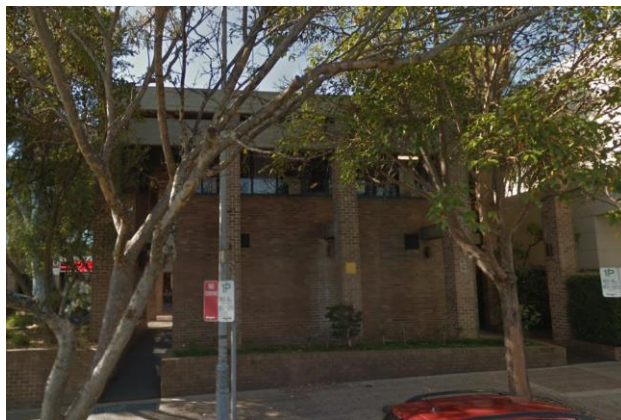


Photo 10 – Eastern facade

Critical Structural Areas

