MULTIPLEX

Multiplex Constructions Pty Ltd
ACN 107 007 527
Level 22, 135 King Street, Sydney NSW 2000
GPO Box 172, Sydney NSW 2001

Tel: +61 2 9322 2400
Fax: +61 2 9322 2001
www.multiplex.global

31st October 2016

Brookfield Office Properties
L22 135 King Street
Sydney NSW 2000

Attention: Mr Stuart Harman

Dear Sir,

SSD 5824 MOD3 – One Carrington Street Redevelopment
Section 96 Modification Application

In reference to provided correspondence from Christopher Corradi (Area Planning Manager) of the City of Sydney, *File No: D/2014/17/F; Ref 2016/551534 dated 18th October 2016*, Multiplex Constructions Pty Ltd provides the below supplementary information with respect to the City of Sydney's noted objections, specifically Note 2: Potential impacts upon Faience Facade , as per email request received on the 24th October 2016.

Note 2 (i): "The proposed means of demolition of the concrete structure needs to be carefully resolved considering the potential vibration impacts upon the Faience façade."

The methodology for demolition of the concrete structure is a significant consideration with respect to the ongoing development and resolution of the proposed Demolition and Construction Methodology for Shell House. Detailed review and analysis has been undertaken by Multiplex Constructions to date, which is to be further developed with additional input from specialist consultants and sub-contractors, to establish and finalise the most appropriate method for the completion of the works with minimal impact to the existing Faience Façade building fabric.

Expert advice has been sought from structural, façade, geotechnical and heritage engineers to understand key design and performance parameters. Further, key inputs from specialist demolition contractors have also been obtained. From this advice, critical items have been understood establishing a 'pathway' to finalise methodologies for the demolition of structures within Shell House. A summary of the critical items are listed below:

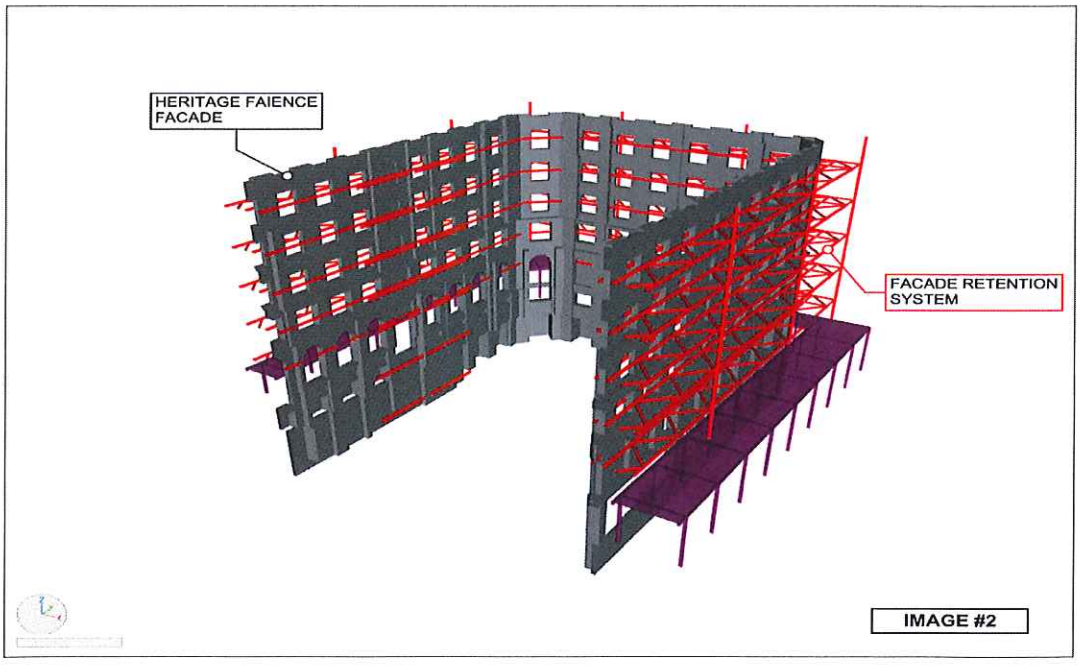
- Review of existing and historic documentation to understand and establish structural design criteria and typical construction techniques which would have likely been implemented for the construction of the primary structure and Faience façade circa 1930 during the interwar period.
- Undertaking of dilapidation surveys and investigative works at varying stages of design to verify and inform proposed design criteria and that associated demolition and construction methodologies are relevant, suitable and representative of site conditions.
- Establishment of monitoring and action plans in conjunction with structural, façade, geotechnical and heritage consultants. Baseline building performance will be undertaken prior to commencement of significant structural demolition works within Shell House.
- Establishment of Inspection and Monitoring Management Plans which are to be agreed by all relevant parties. Management Plans are to identify critical hold points on the project where various inspections are to be undertaken in accordance with approved works procedures.
- Development and agreement of structural design principles which are to be utilised for both the temporary and permanent works and also the establishment and agreement of critical performance

criteria including setting of vibration limits under which demolition and construction works can be undertaken.

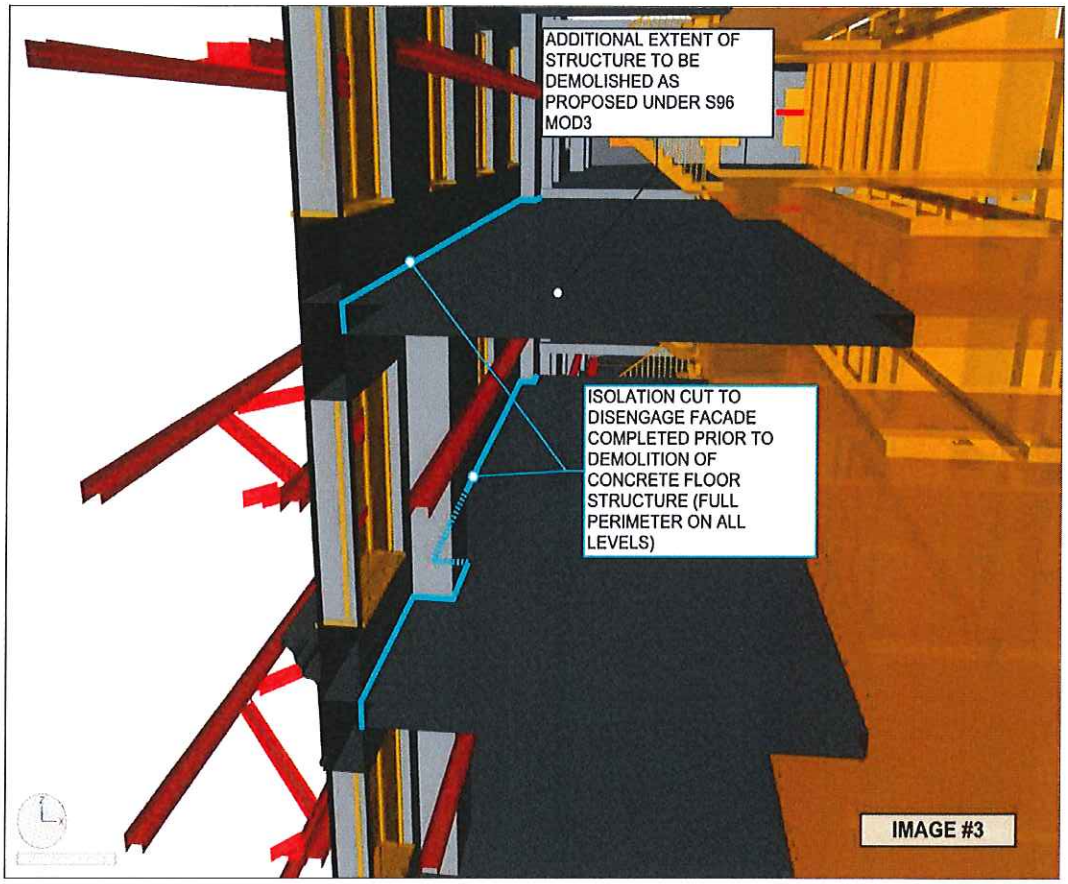
- Utilising the information obtained in above noted items, demolition and construction methodologies are to be finalised which are to be reviewed and approved by all relevant parties prior to the commencement of significant structural demolition works.
- Upon the commencement of works, ongoing structural and vibration monitoring is to be undertaken during the completion of the works. Building monitoring will provide immediate notifications to the Principal Contractor of building and construction work performance allowing immediate action.
- Periodic inspections are to be undertaken by relevant consultants in accordance with the inspection, monitoring and management plan over the duration of the works.

In the undertaking of the above 'pathway', Multiplex with the Principal (Brookfield) and specialist consultant group, has identified key design measures and construction techniques which are to be likely implemented in the demolition methodologies within Shell House. Proposed measures and techniques have been specifically developed to eliminate, mitigate and control, where possible, the transmission of vibration into the Faience façade during the demolition of the concrete structures. These measure are as listed and explained below:

- Isolation of temporary retention system from the existing primary building frame – Vibration transmission through both existing and permanent elements during the completion of the works was of significant consideration in the development of the façade retention system concept design. As the façade is required to be retained prior to the commence of significant structural demolition works it was raised during the design review process that the temporary bracing and strengthening of the existing frame to maintain lateral stability of the structure and facade will likely result in additional vibration transmission via the temporary structure into the existing Faience façade. By implementing an independent system, vibration transmission issues are localised to the 'active' floors of demolition with a reduction in transmission to upper floors where demolition as already occurred. Please refer to image No.2 below which outlines the indicative configuration of temporary perimeter façade retention elements independent from existing internal structure.



- Isolation cuts to full perimeter and junctions of Faience façade – To reduce transmission of vibration into the Faience façade it is proposed that isolation cuts are to be completed in advance of commencement of demolition to existing concrete structures. As the first step in typical structural demolition floor cycle, saw cuts will be completed for the internal length of the Faience façade with the nominated level temporarily supported during demolition via back-propping. The introduction of isolation cuts prevents vibration transmission across cut lines and allows for demolition to remaining section of slab to be undertaken without significant vibration concerns. The below image outlines indicative location and extent of isolation cuts as noted above.



- Reduction in onsite processing of concrete structure and concrete encased structure – To reduce the risk of extensive vibration transmission in the existing Faience façade, Multiplex will implement an approach whereby onsite processing is minimised. That is, where possible, elements such as concrete encased steel members will be locally de-cased in bands and members cut free and removed from site in engineered lengths. Elements will then be processed offsite at the appropriate facility to isolate demolished materials for recycling and disposal. This process reduces the extent of works onsite and therefore the extent and duration of possible vibration transmission into the Faience façade.
- Reduction in 'high impact' Pneumatic Hammering for demolition works – For the demolition of concrete structures which are large in area, such as concrete slab bays, demolition techniques which are to be utilised will primarily be 'munching' versus 'hammering'. The reduction in the quantity of 'hammering' works will reduce vibrations volumes through the existing structure.
- Detailed review and selection of demolition techniques and plant – For all demolition works within Shell house a detailed review and analysis has and will continue to be undertaken to determine the most

appropriate demolition methodologies which are to be implemented. Each methodology will be based on the relevant structural design criteria as well as all other relevant performance criteria. Each methodology will be developed by the demolition contractor, with their third party engineers, in conjunction with the Principal Contractor and is to be reviewed and approved by specialist consultants.

Note 2 (ii): "There is no evidence provided that any specialist consideration has been given to the impact of the proposed demolition on the Faience façade."

Multiplex Constructions, together with the Principal (Brookfield), have received extensive input and specialist consideration from consultants and sub-contractors to inform the Shell House demolition methodology to date.

Please refer to the below table which outlines specialist consultant and contractor groups to be retained and/or engaged for the completion of the Shell House works:

Consultant/Contractor	Project Role	Team Leader
GML	Heritage Architect	Peter Romey
Arup Facades	Heritage Façade Specialist	Felipe Flores
Adriel Consultancy	Faience Materials Specialist	Nicola Ashurst
Douglas Partners	Geotechnical Engineer	Charles Marais
Robert Bird Group	Permanent Structural Engineer	Scott Wheeler
Taylor Thomson Whitting	Temporary Structural Engineer	Kevin Barry
Mahaffey Associates	Testing & Materials Consultant	David Mahaffey
Witt Consulting	Testing & Materials Consultant	Rahsn Witt
Delta Group	Demolition Contractor	Jason Simcocks

Note 2 (iii): "The City strongly recommends, that a façade engineer, experienced in Faience work in the interwar period in Sydney, is engaged to investigate all potential impacts alongside heritage materials specialists"

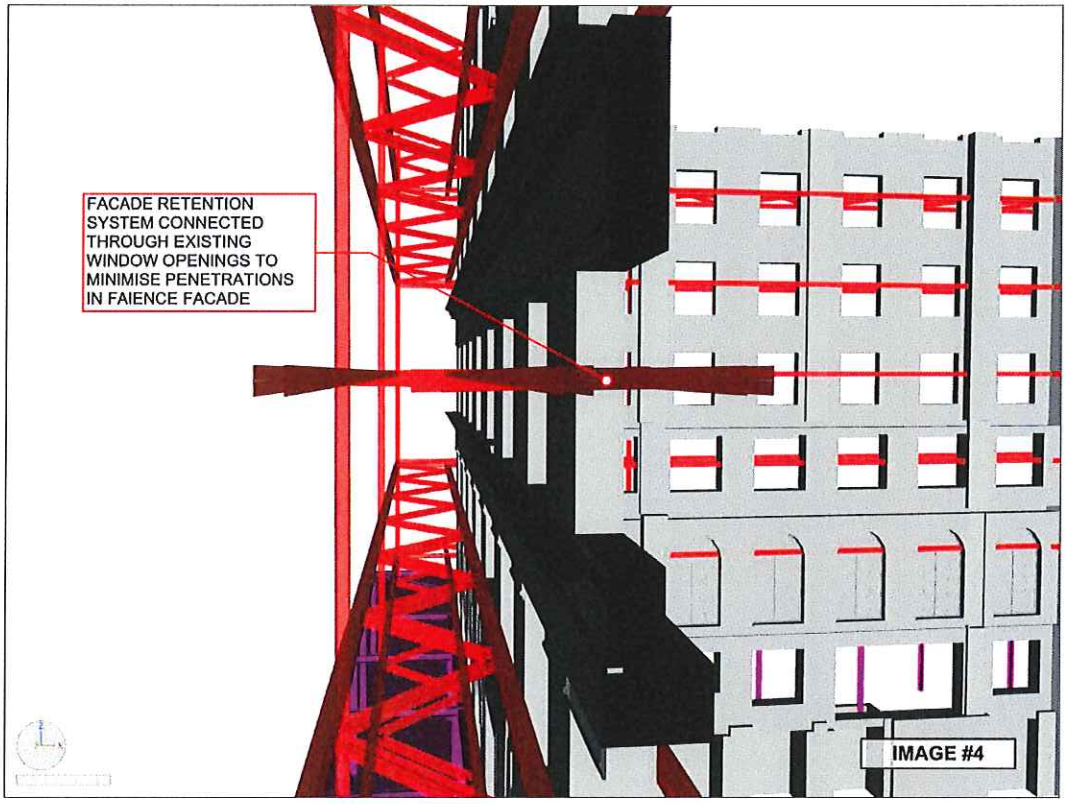
Arup Facades have undertaken condition surveys of the Shell House faience façade over a number of years for both the previous and current owners. Arup have produced the Façade Inspection Report dated 8th January, 2016 which outlines the existing condition of the façade together with recommended repair and conservation methodologies. Arup will be retained as the façade engineer throughout the construction process and will provide ongoing expertise and monitoring during the demolition works in conjunction with other specialist consultants and contractors.

In addition to Arup Facades, a heritage materials specialist, Adriel Consultancy, with specialist expertise in the assessment, documentation, scheduling and procurement of Faience façades will be engaged for the completion of Shell House works providing additional specialist input specific to Faience works.

MULTIPLEX

Note 2 (iv): "Means of laterally supporting the façade whilst minimising penetrations in faience façade needs to be carefully investigated."

Maintaining the integrity of the heritage Faience façade is of the highest importance. Noting this, a key design parameter for the development of the temporary façade retention system is to minimise and where possible eliminate the extent of penetrations through and/or into the Faience façade. The design for the temporary retention system is currently premised on all connections being made through the existing window openings and therefore not requiring any additional penetrations in the Faience. The retention system passively 'captures' the façade via a clamping detail which does not require mechanical connection to the Faience elements.



Should you require any additional information please do not hesitate to contact the undersigned.

Yours sincerely,

Alex Petchell
Project Manager
Multiplex Constructions Pty Ltd