

Metro Martin Place South Tower

DRP 12

10 December 2019



-
- 1 Glare mitigation to the north facade
 - 2 East facade alignment with 60 Castlereagh Street
-

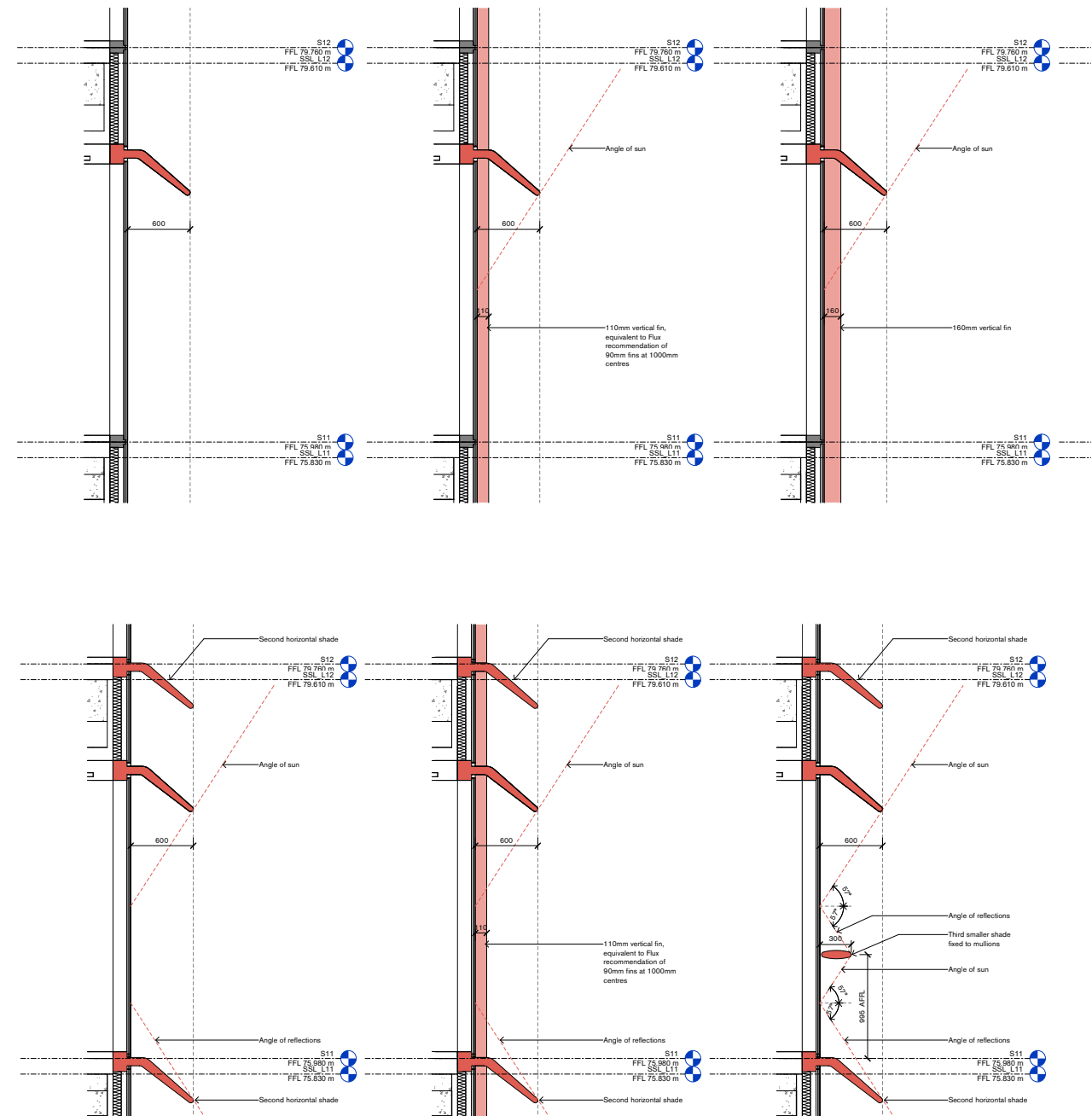
Glare Mitigation to the North Facade

Glare Mitigation to the North Facade - DA Conditions

- Convergent reflections from the façade were addressed through previous DRPs and resolved prior to issue of the DA conditions of consent.
 - The subject of this DRP are the following conditions:
- B13. Vertical fins or other measures must be incorporated into the northern facade to reduce or eliminate glancing glare to the western end of Martin Place.** The design details are to be submitted to the satisfaction of the Planning Secretary, within 6 months of the date of this consent or other timeframe as agreed to by the Planning Secretary.
 - B14.** When developing the glare mitigation measures above, the Applicant shall engage with, and seek the views of, the Martin Place Over Station Development Design Review Panel and provide evidence of how that feedback has been addressed before seeking the Planning Secretary's endorsement.

Process of Assessment

- A review process and assessment criteria were agreed by Che Wall of Flux Consultants and Arup and previously presented to the DRP.
- The Independent Façade Review report prepared by Che Wall made a recommendation for glare mitigation measures.
- Tzannes and Arup have worked collaboratively to develop a number of alternative architectural design options to align with the design intent for the façade.
- These have been evaluated by Arup with regard to the agreed assessment criteria and Che Wall's recommendation.
- Through this process we have collectively developed a design proposal that strengthens the architectural expression of the façade and is supported by engineering analysis.



Proposed Revised Architectural Solution for Endorsement



Proposed Outcome



Current Approved DA Design

Flux Recommendation

Proposed Revised Architectural
Solution for Endorsement

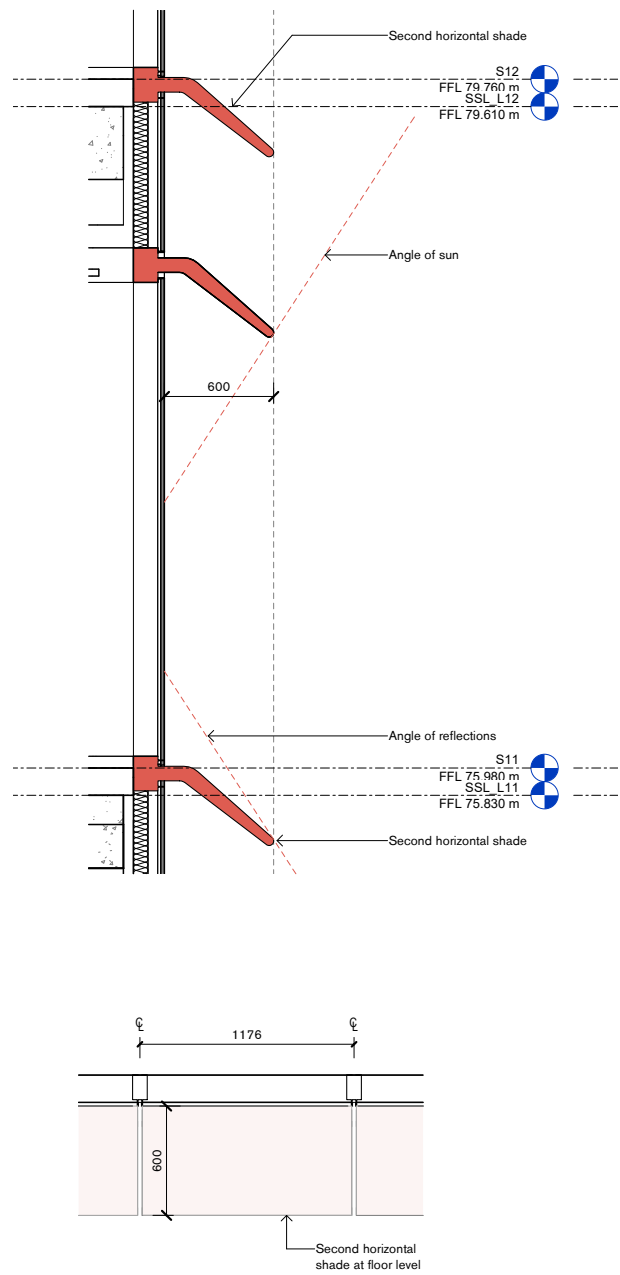
Proposed Revised Architectural Solution for Endorsement



View of North facade
Proposed Revised Architectural Solution for Endorsement -
double 600mm deep horizontal solar shades



Detail View of North facade with Proposed Revised Architectural
Solution for Endorsement



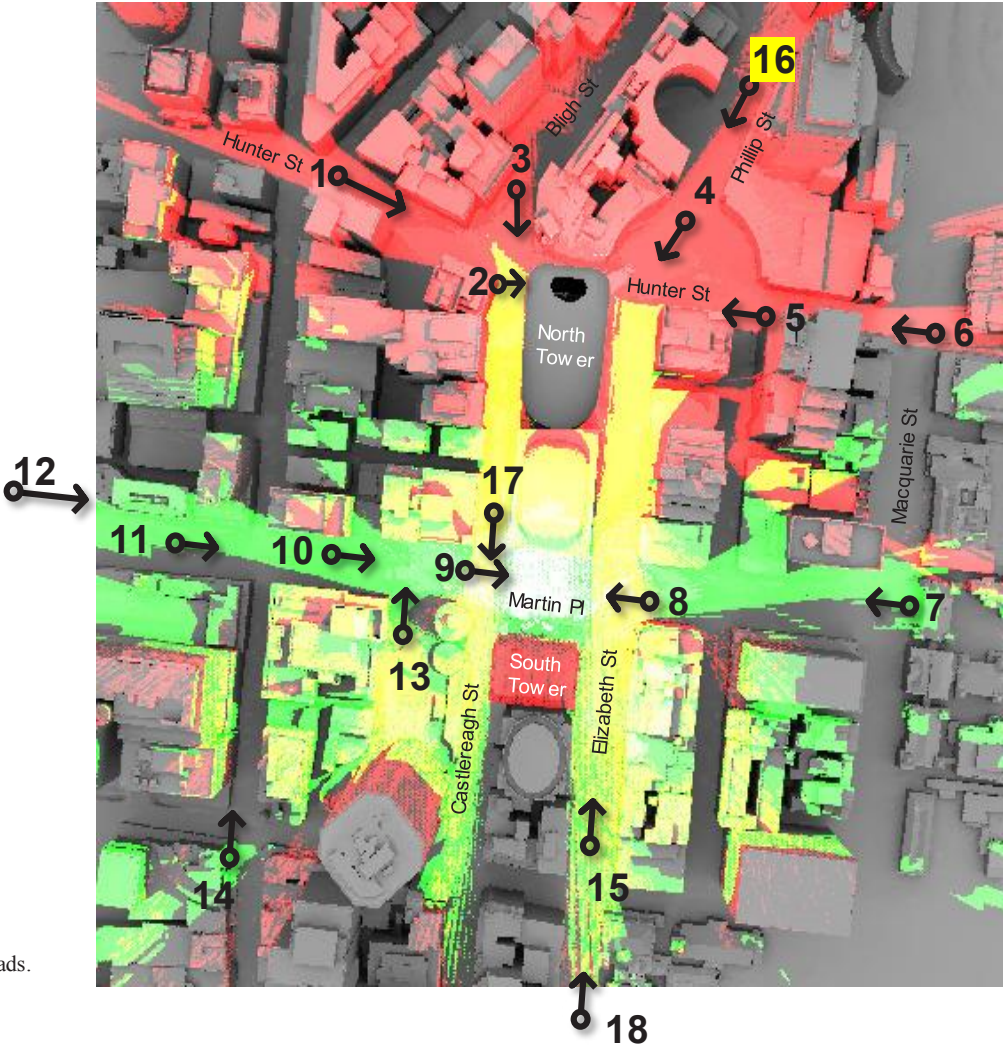
Plan and Section through North Facade with
Proposed Revised Architectural Solution for
Endorsement

How We Assess Glare Intensity

- 1.Reflectivity Properties of Glazing
- 2.View Locations
- 3.Visualisation of Peak Reflection Times
- 4.Benchmark Thresholds of Veiling Luminance (Cd/m2)
- 5.Measuring the percentage of the glazed facade that generates reflections

- 1. Hunter St driving south east
- 2. Pedestrian crossing Castlereagh St
- 3. Bligh St driving south
- 4. Chifley Square driving south/ close to pedestrian plaza
- 5. Pedestrian crossing Phillip St
- 6. Pedestrian crossing Macquarie St at Hunter
- 7. Pedestrian crossing Macquarie St at Martin Place
- 8. Pedestrian crossing Elizabeth St
- 9. Pedestrian crossing Castlereagh St
- 10. Martin Place event space
- 11. Martin Place Cenotaph
- 12. Pedestrian crossing George St
- 13. Pedestrian walking down MLC stairs
- 14. Pedestrian crossing King St
- 15. Elizabeth St driving north
- 16. Phillip St driving south, after Bent St
- 17. Castlereagh St driving south
- 18. Elizabeth St driving north near King

Note: all points are within the Sydney CBD 40 km/h zone for roads.



Proposed Outcome



Current Approved DA Design

View 11 Veiling Luminance =150 Cd/m2
View 12 Veiling Luminance =575 Cd/m2
28% of facade causes reflecting incidence



Flux Recommendation

View 11 Veiling Luminance =0 Cd/m2
View 12 Veiling Luminance =0 Cd/m2
4% of facade causes reflecting incidence



Proposed Revised Architectural Solution for Endorsement

View 11 Veiling Luminance =0 Cd/m2
View 12 Veiling Luminance =269 Cd/m2
7% of facade causes reflecting incidence

View 11

View 12

Current
Approved DA
Design



Date / time	7.50am AEDT, Oct 12
Average luminance [Cd/m2]	1,512
Vertical illuminance [lux]	7,683
Glare source luminance [Cd/m²]	550,000,000
Veiling luminance [Cd/m²]	150 (< 500)



Date / time	7.28am AEDT, Oct 6
Average luminance [Cd/m2]	2,272
Vertical illuminance [lux]	12,185
Glare source luminance [Cd/m²]	400,000,000
Veiling luminance [Cd/m²]	575

Flux
Recommendation

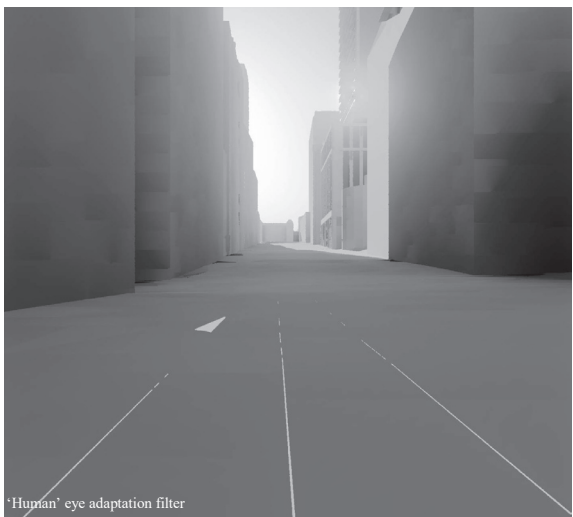


Date / time	7.50am AEDT, Oct 12
Average luminance [Cd/m2]	407
Vertical illuminance [lux]	1,593
Glare source luminance [Cd/m²]	0
Veiling luminance [Cd/m²]	0



Date / time	7.28am AEDT, Oct 6
Average luminance [Cd/m2]	383
Vertical illuminance [lux]	1,320
Glare source luminance [Cd/m²]	0
Veiling luminance [Cd/m²]	0

Proposed
Revised
Architectural
Solution for
Endorsement



Date / time	7.50am AEDT, Oct 12
Average luminance [Cd/m2]	412
Vertical illuminance [lux]	1,605
Glare source luminance [Cd/m²]	0
Veiling luminance [Cd/m²]	0



Date / time	7.28am AEDT, Oct 6
Average luminance [Cd/m2]	1,262
Vertical illuminance [lux]	6,380
Glare source luminance [Cd/m²]	400,000,000
Veiling luminance [Cd/m²]	269

Proposed Revised Architectural Solution for Endorsement



East Facade Alignment

East facade alignment with 60 Castlereagh Street

Approved DA design

- The east facade of approved DA design for 39 Martin Place does not align with the existing street wall of Elizabeth Street.
- The existing adjacent building, 60 Castlereagh Street, is built to the site boundary. Any future development on this site is also likely to build to the site boundary in order to maximise area.
- In the existing condition, and likely future condition, there is a 600mm step in the street wall between the facades of 39 Martin Place (as approved) and 60 Castlereagh Street.

Proposed Revised Design

- The design intent, in accordance with the Consolidated Design Guidelines, is to reinforce the street alignment of Castlereagh street.
- The proposed amendment to the approved design does this by resolving a technical discrepancy through realigning the east facade with the site boundary and the dominant street wall.
- Through consistent alignment with the existing street wall the proposed design will prioritise the pedestrian experience of the public domain over a rectilinear building plan.
- The junction between 60 Castlereagh St and 39 Martin Place will be articulated by a re-entrant.
- The impact to the overall building form is minimal. The additional mass does not cause any additional overshadowing of Hyde Park and sits within the approved Stage 1 DA envelope.



View from north on Elizabeth St

Approved DA design showing step between facade of 39 Martin Place and 60 Castlereagh St



View from south on Elizabeth St

Approved DA design showing step between facade of 39 Martin Place and 60

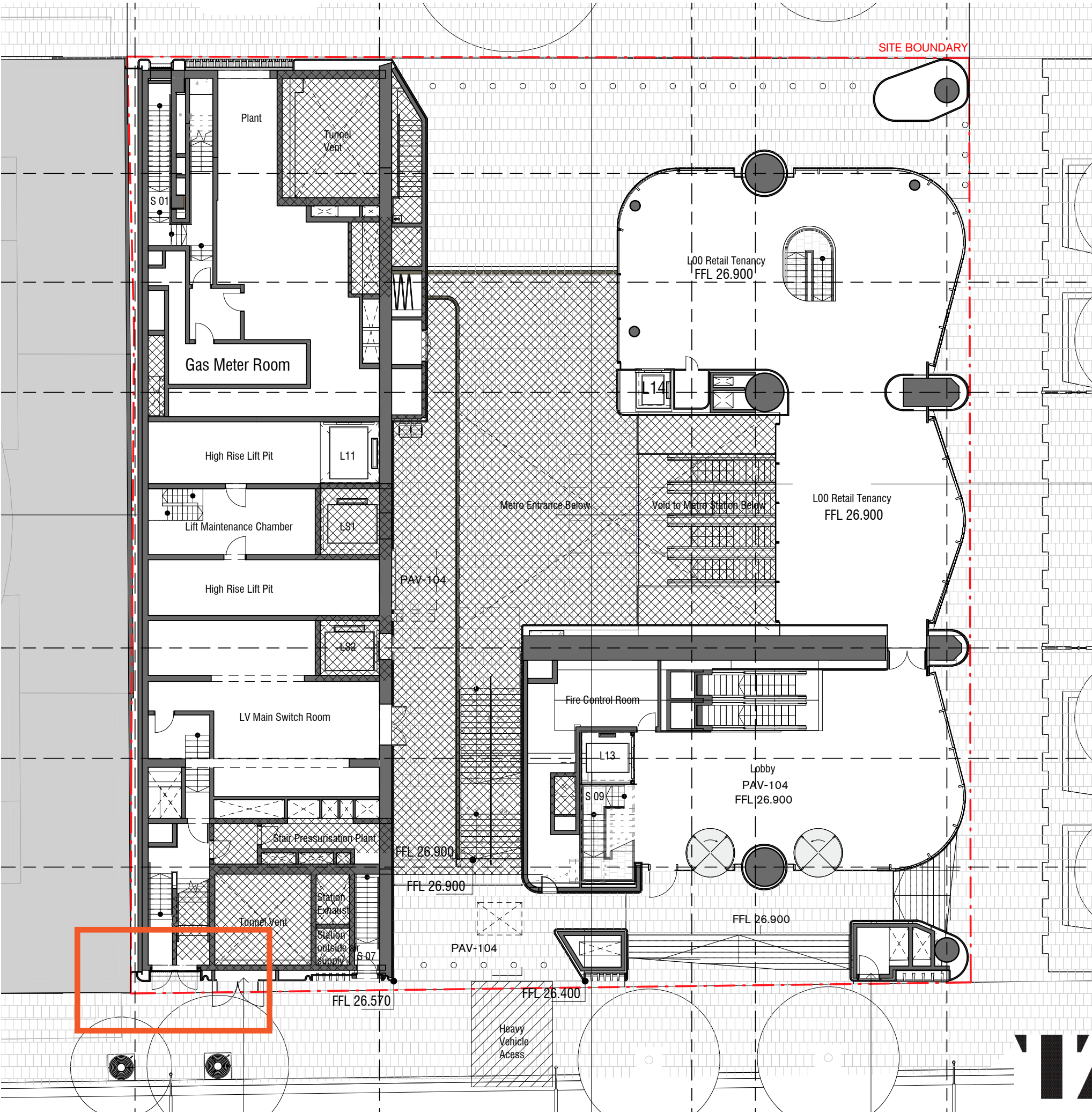


Existing condition



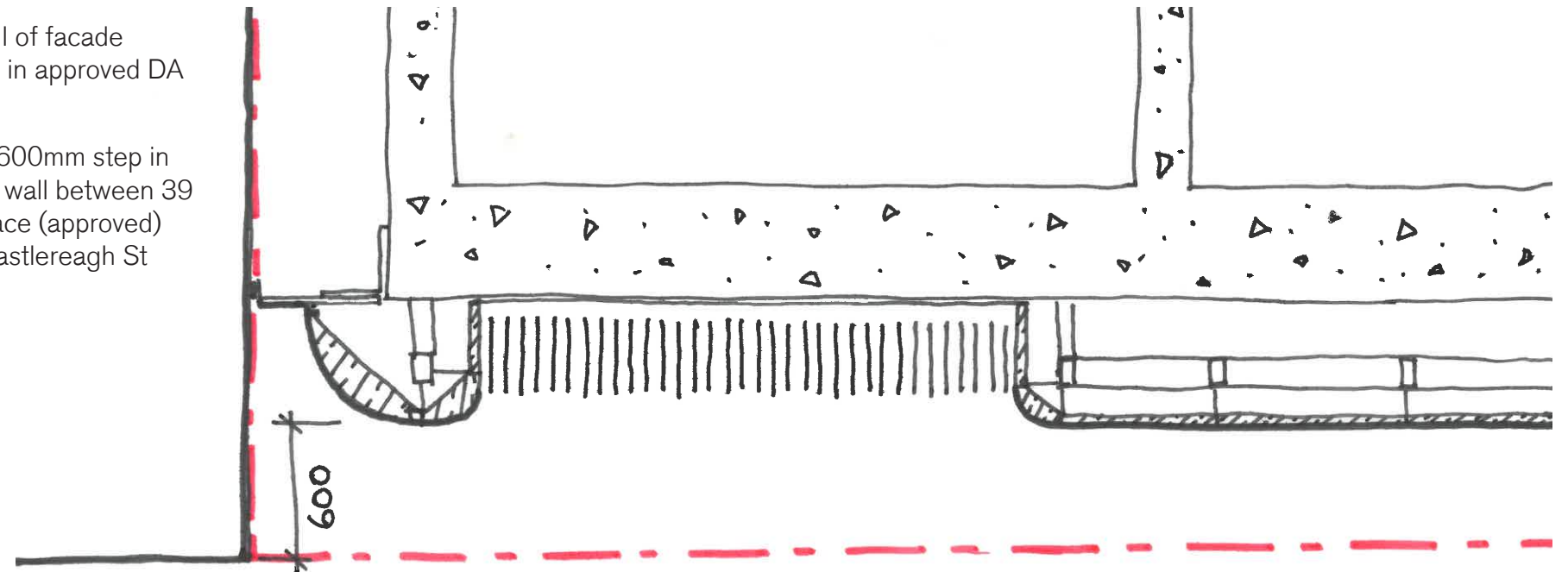
Approved DA design showing step between facade of 39 Martin Place and 60 Castlereagh St

Ground plan
Approved DA design



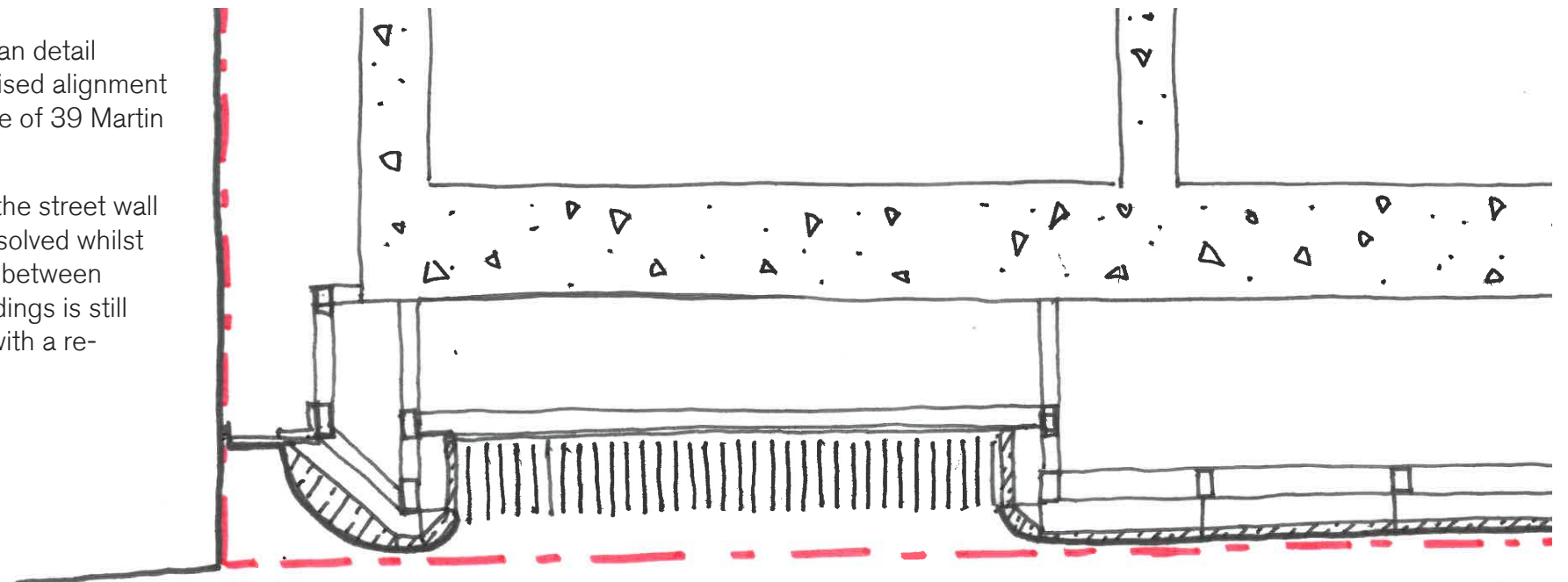
Plan detail of facade alignment in approved DA design

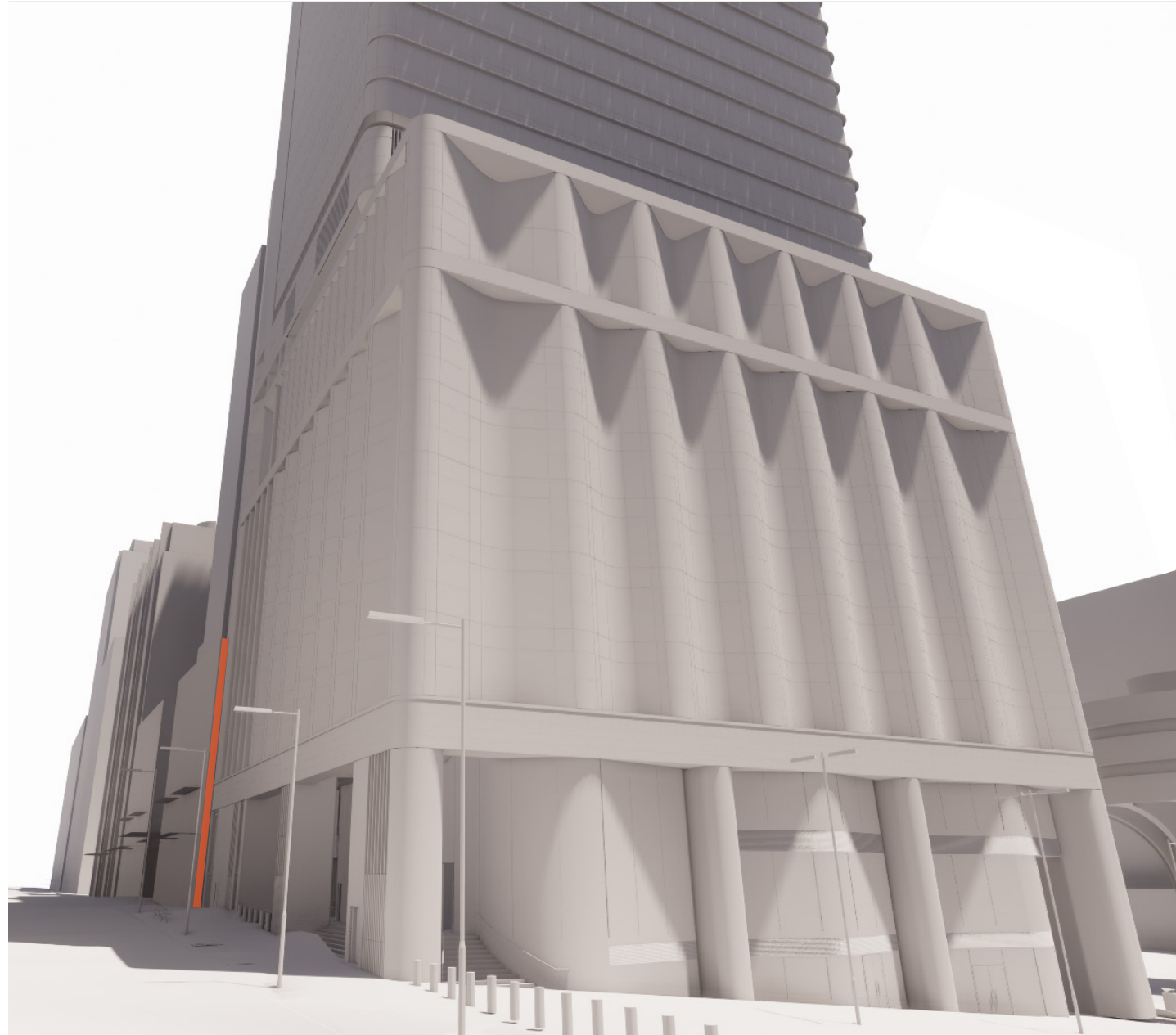
Note the 600mm step in the street wall between 39 Martin Place (approved) and 60 Castlereagh St (existing)



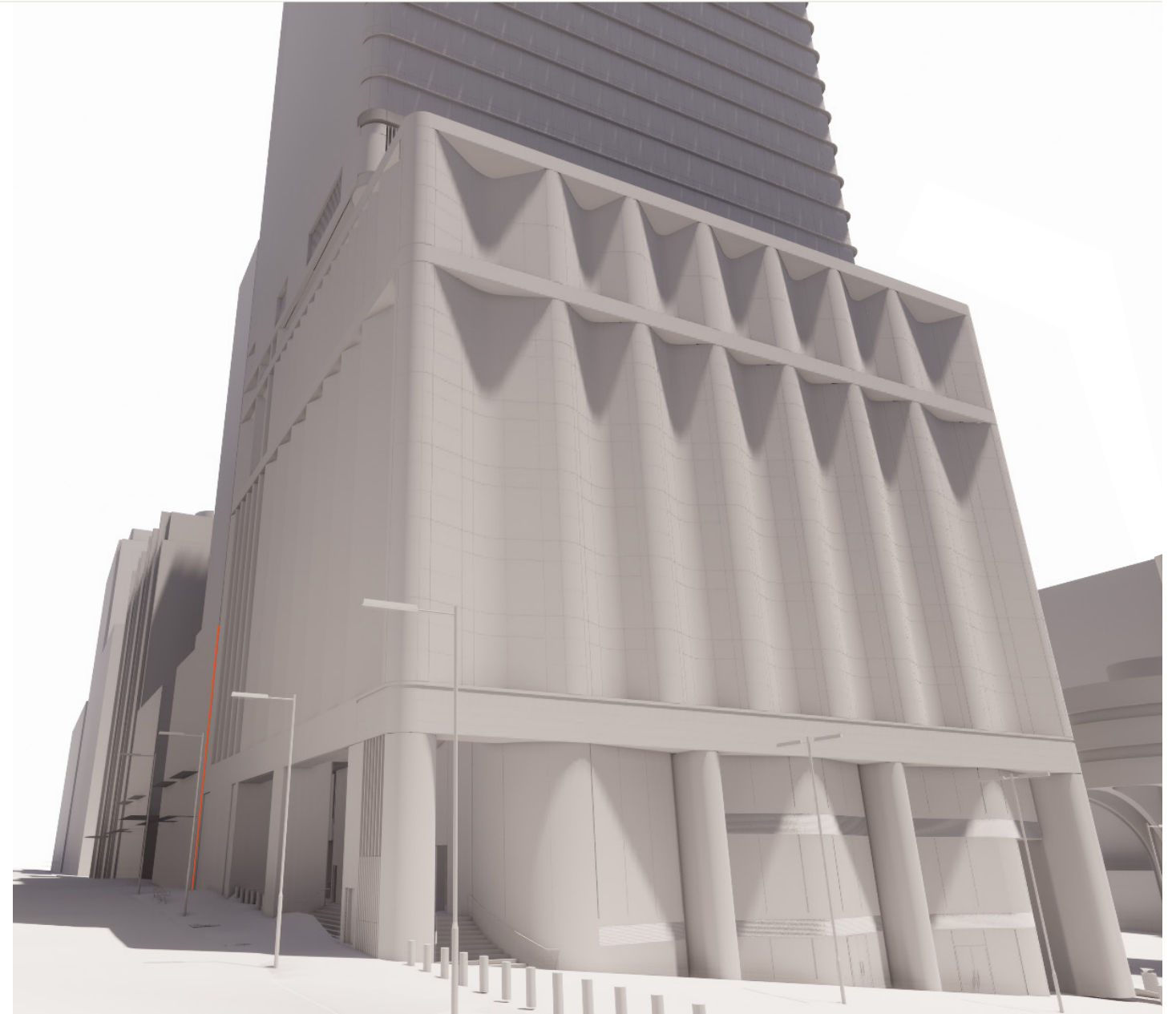
Proposed plan detail showing revised alignment of the facade of 39 Martin Place.

The step in the street wall has been resolved whilst the junction between the two buildings is still articulated with a re-entrant



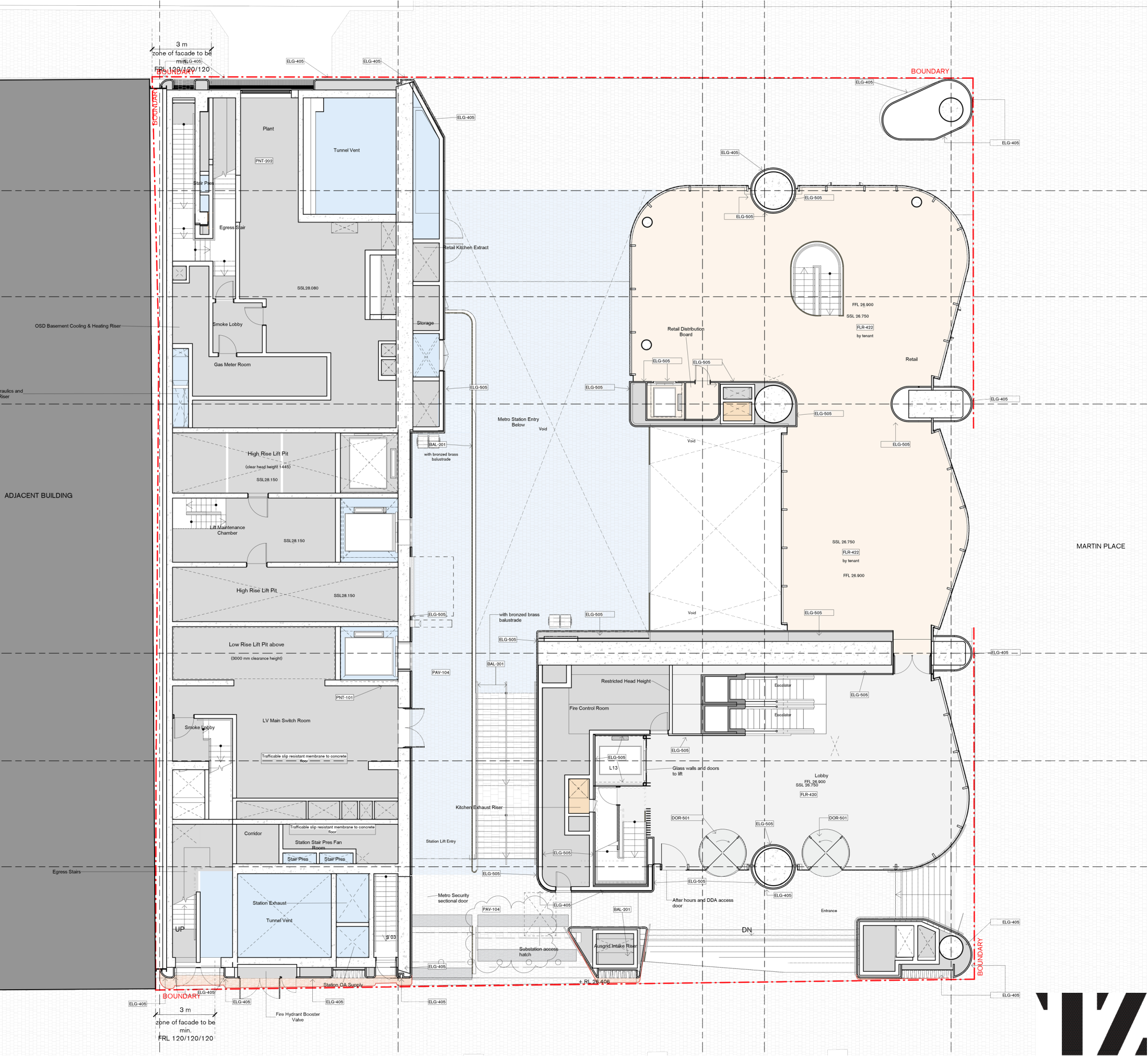


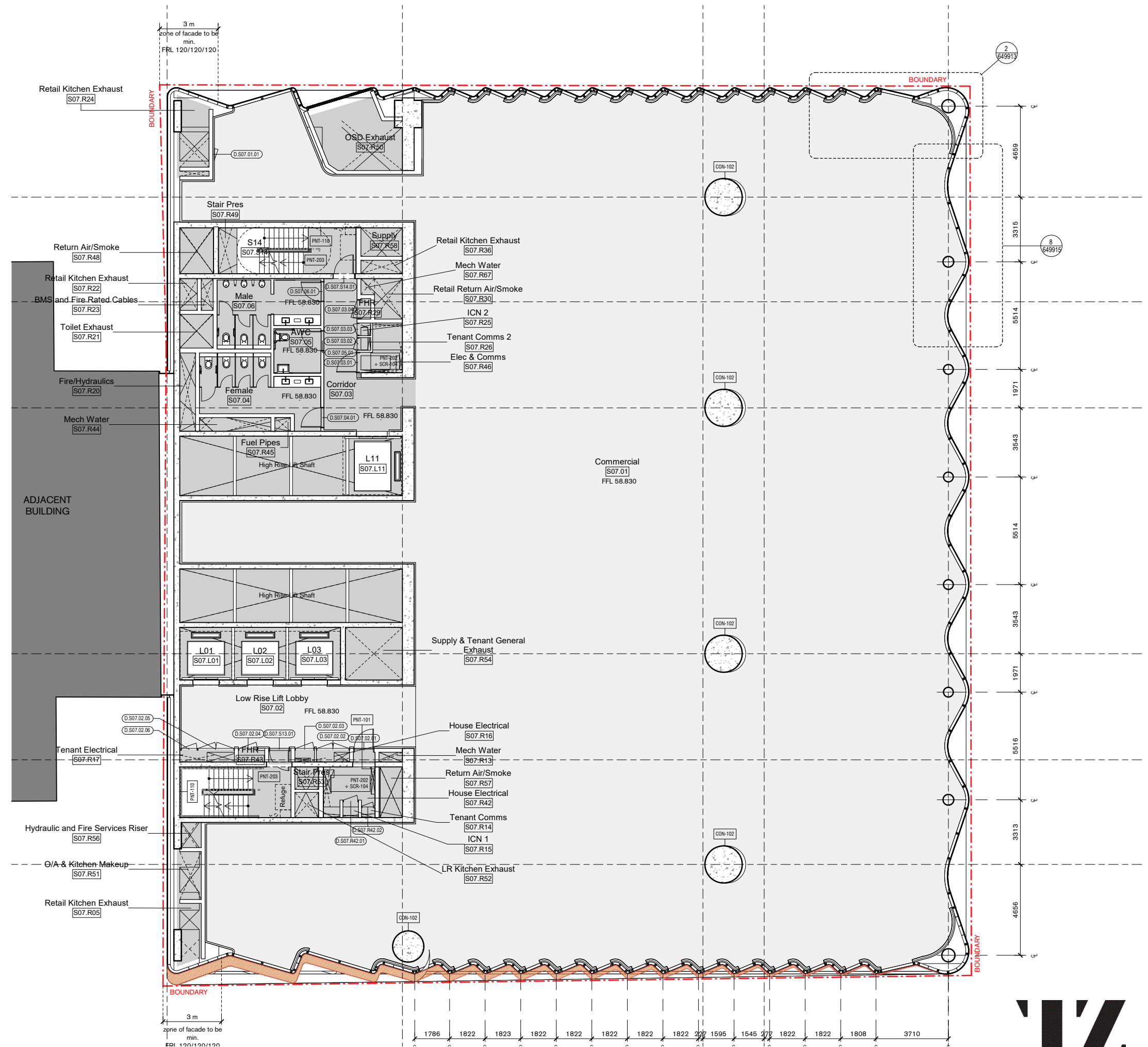
Approved DA design showing 600mm step in street wall



Proposed revised design showing alignment east facade with existing street wall

Ground plan
Proposed alignment of
facade shown in red





Metro Martin Place South Tower

DRP 12

Technical Submission: Appendix A

10 December 2019



Glare Mitigation to the North Facade

How We Assess Glare Intensity

How We Assess Glare Intensity

1. Reflectivity Properties of Glazing
2. View Locations
3. Visualisation of Peak Reflection Times
4. Benchmark Thresholds of Veiling Luminance (Cd/m²)
5. Measuring the percentage of the glazed facade that generates reflections

How We Assess Glare Intensity

The following key criteria were agreed for calculation of Visible Light Reflectivity of Glazing (presented by Flux to DRP on 13.06.19):

1. Reflectivity Properties of Glazing

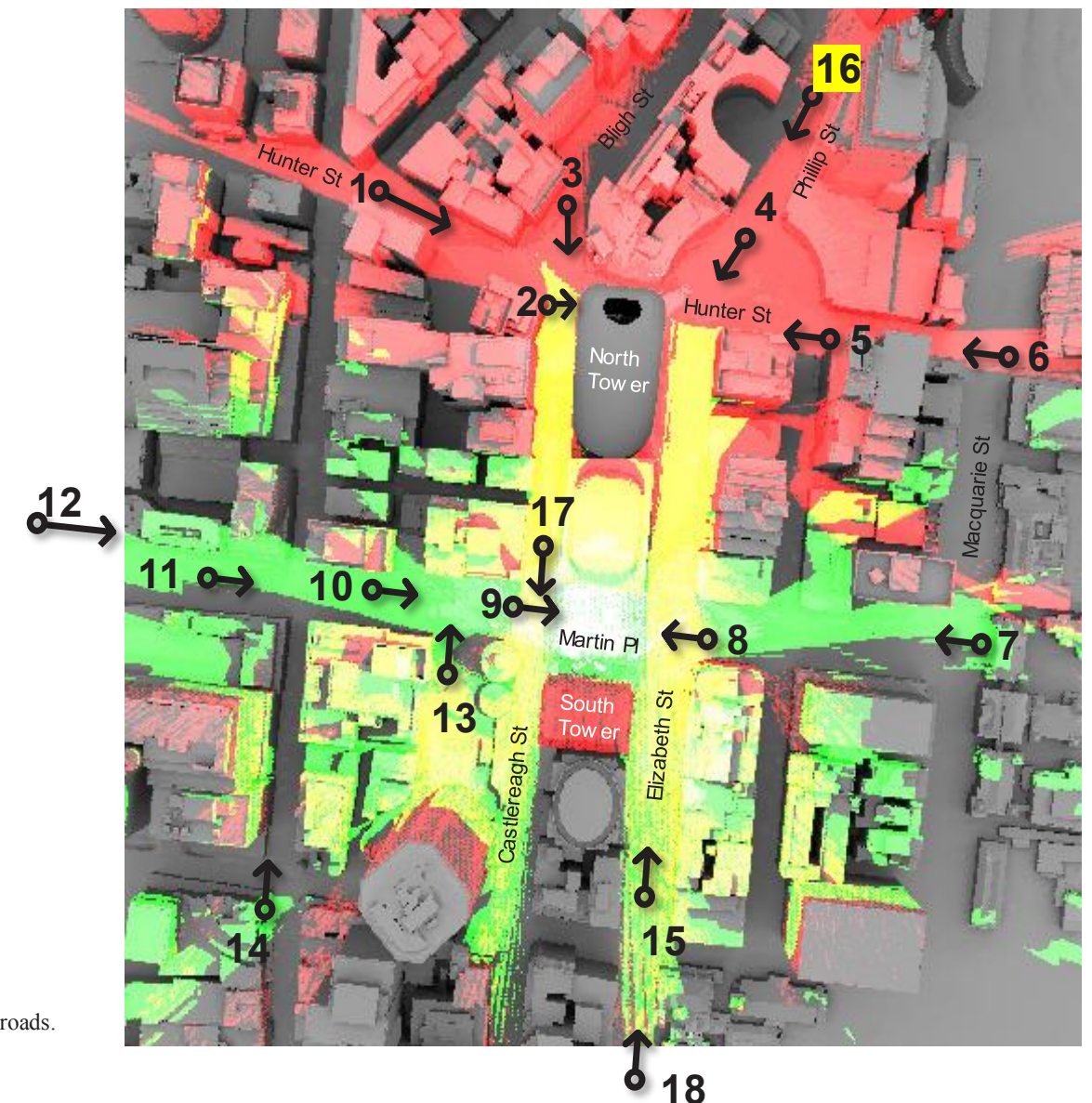
— These have been agreed and not changed.

2. View Locations and Timings

— Simulations were undertaken by Arup and view locations were assessed and agreed with Flux.

1. Hunter St driving south east
2. Pedestrian crossing Castlereagh St
3. Bligh St driving south
4. Chifley Square driving south / close to pedestrian plaza
5. Pedestrian crossing Phillip St
6. Pedestrian crossing Macquarie St at Hunter
7. Pedestrian crossing Macquarie St at Martin Place
8. Pedestrian crossing Elizabeth St
9. Pedestrian crossing Castlereagh St
10. Martin Place event space
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14. Pedestrian crossing King St
15. Elizabeth St driving north
16. Phillip St driving south, after Bent St
17. Castlereagh St driving south
18. Elizabeth St driving north near King

Note: all points are within the Sydney CBD 40 km/h zone for roads.



How We Assess Glare Intensity

3.Visualisation of Peak Reflection Times

- Times for spot check simulations were selected based on when reflections of the full sun disk could affect the selected view points

4. Benchmark thresholds of Veiling Luminance (Cd/m2)

- 500 Cd/m2 is the threshold applied in the standard methodology for Disability Glare.



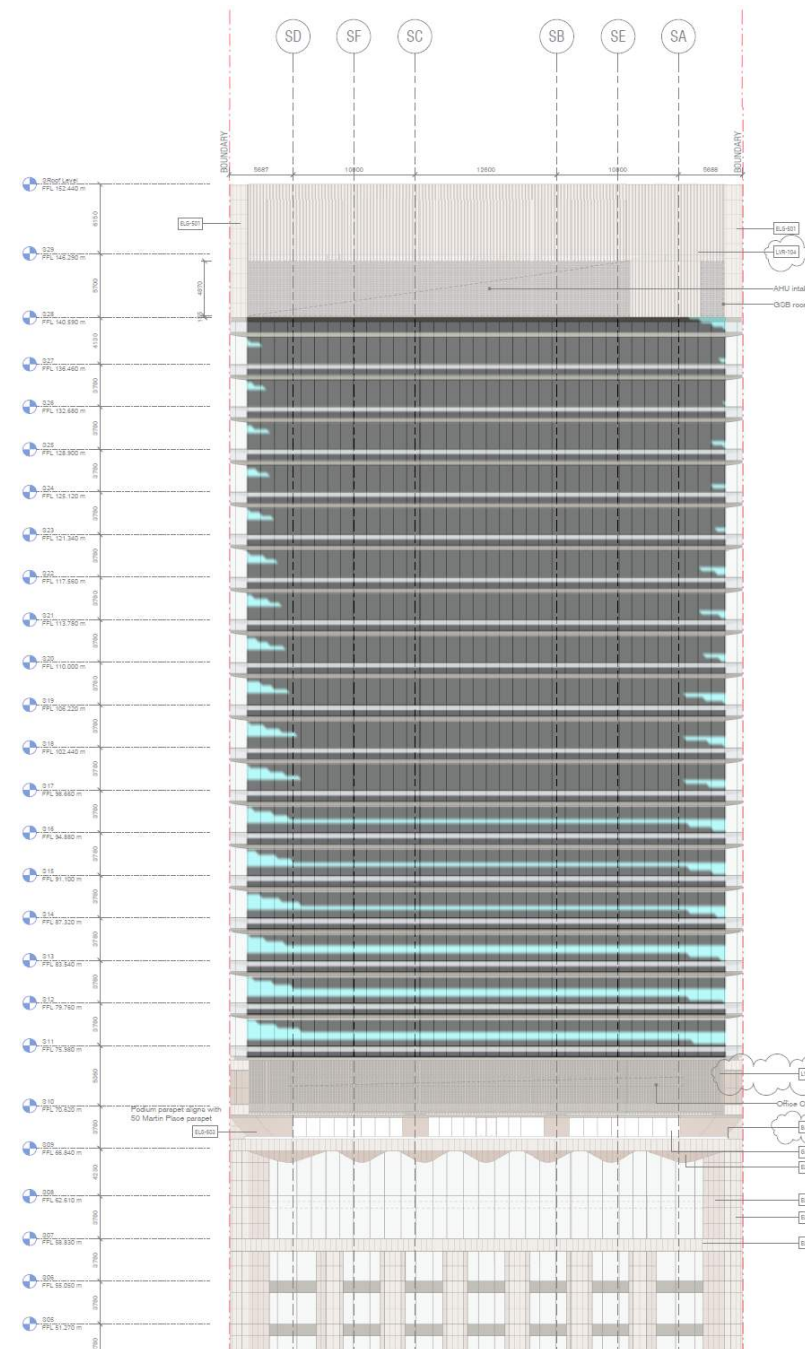
View Point 11

Date / time	7.50am AEDT, Oct 12
Average luminance [Cd/m2]	1,512
Vertical illuminance [lux]	7,683
Glare source luminance [Cd/m²]	550,000,000
Veiling luminance [Cd/m²]	150 (< 500)

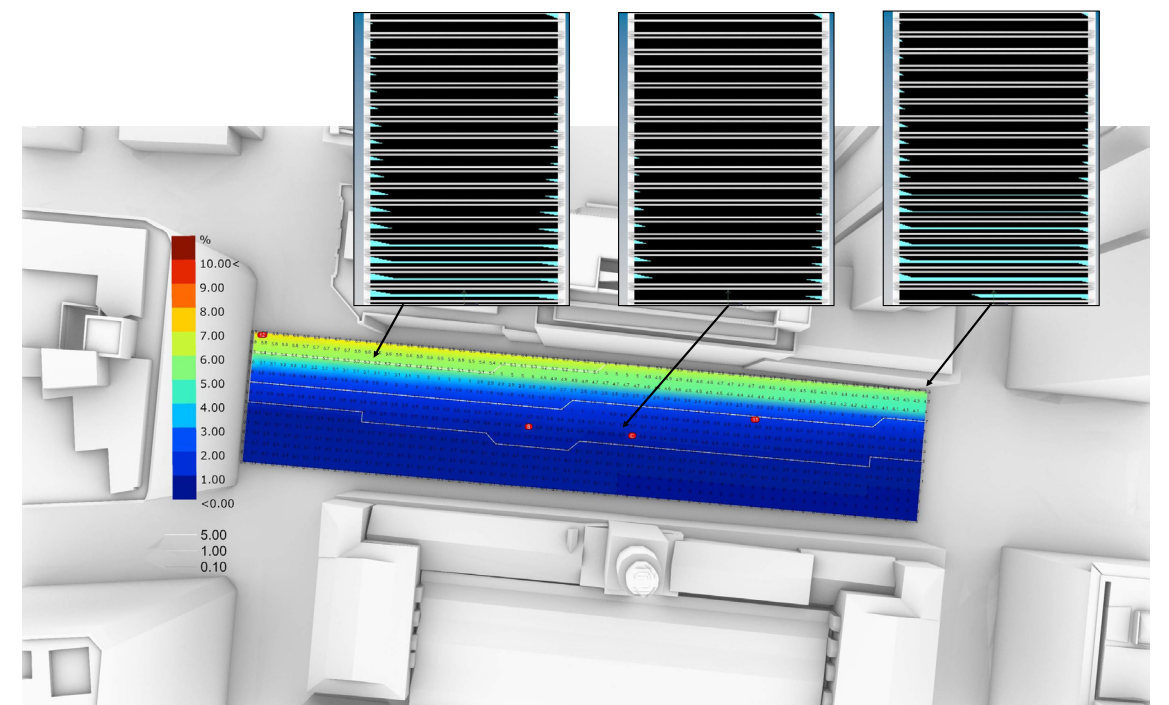
How We Assess Glare Intensity

5. Measuring the percentage of the glazed facade that generates reflection

- This criteria was developed in addition to the previous criteria to measure the overall percentage of the facade that reflects onto Martin Place for each shading option.



Assessment of areas of North elevation that can cast reflections within the Cenotaph area.



Percentage of North facade that can cast sun reflections from selected viewpoints

Viewpoint Assessment

Current Approved DA Design

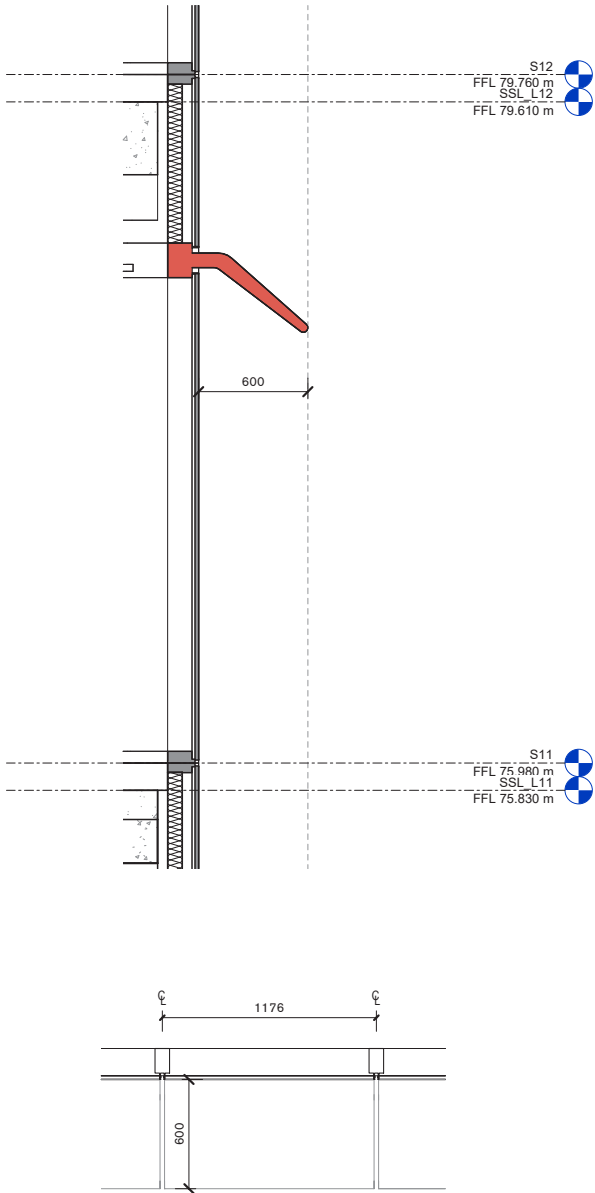


View of North facade

Current Approved DA design - single 600mm deep horizontal solar shade



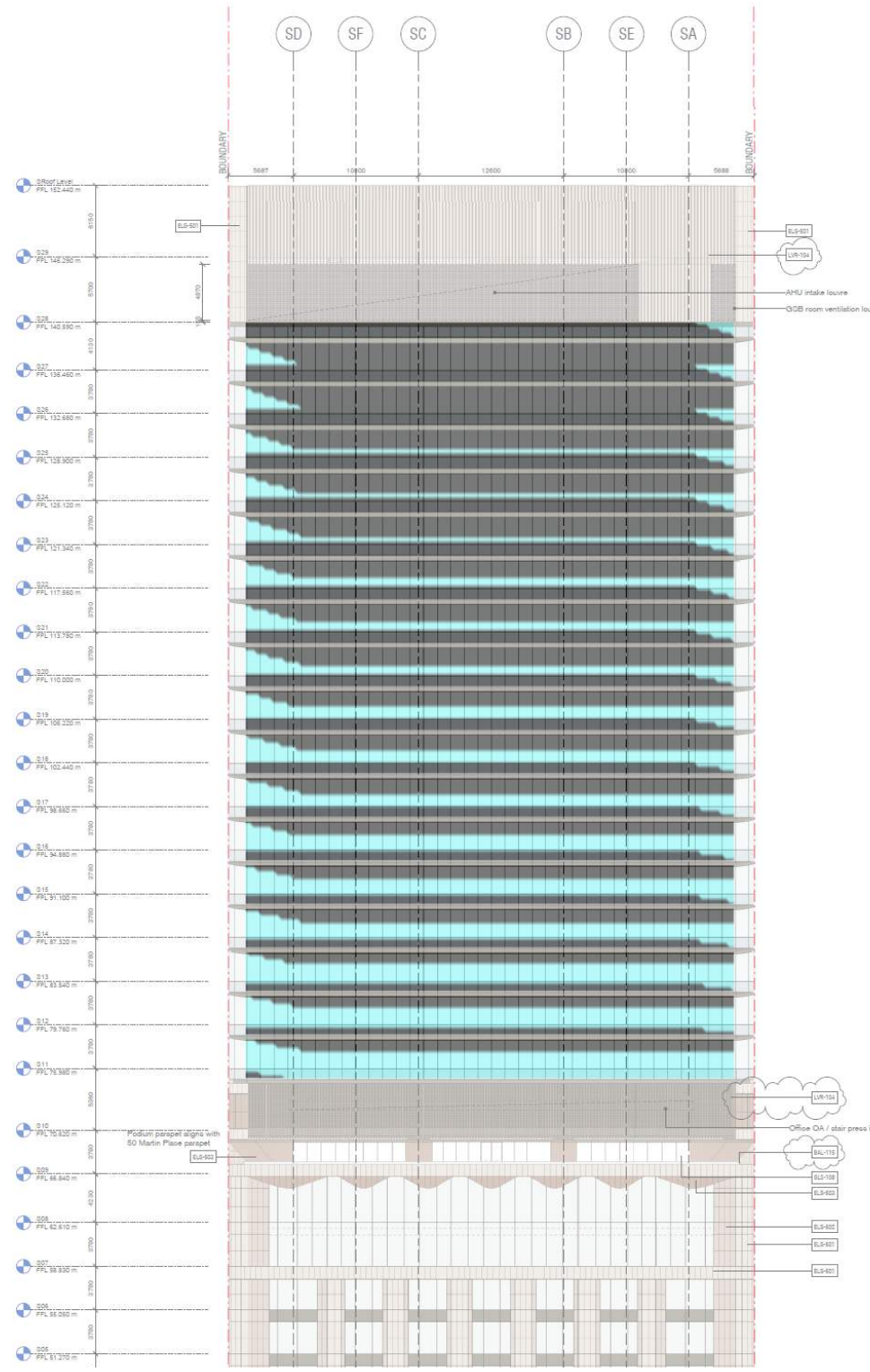
Detail View of North facade with Current Approved DA design



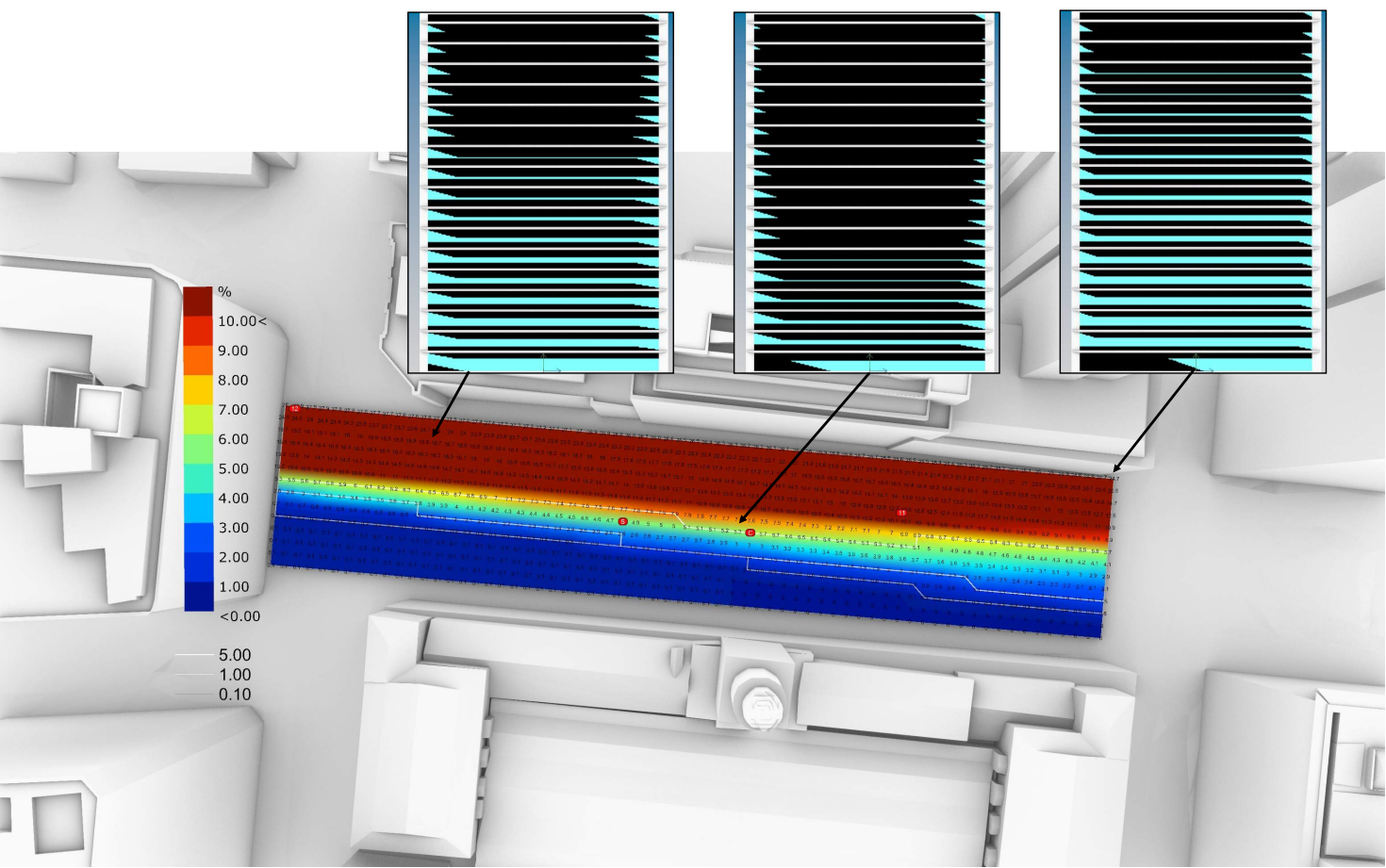
Plan and Section through North Facade with current Approved DA design



Current Approved DA Design

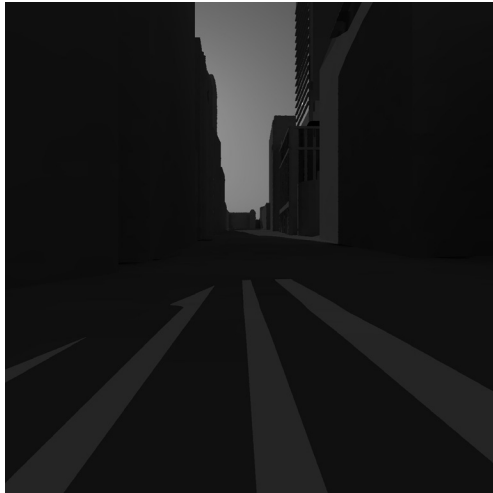
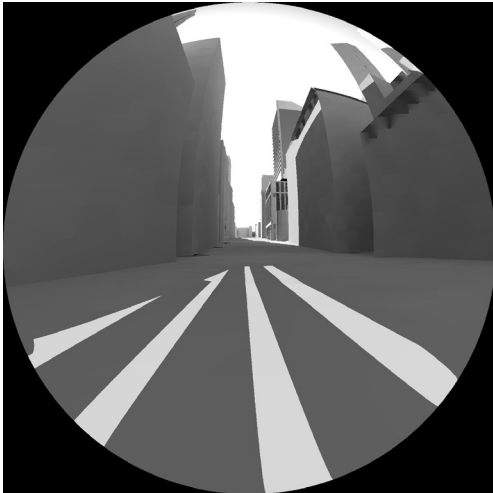
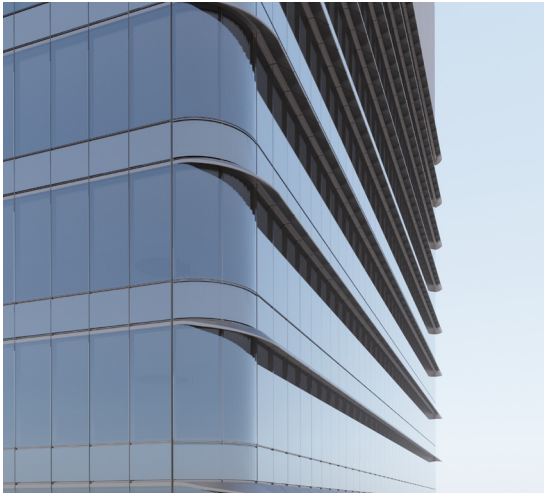


Assessment of areas of North elevation that can cast reflections within the Cenotaph area, with approved DA design



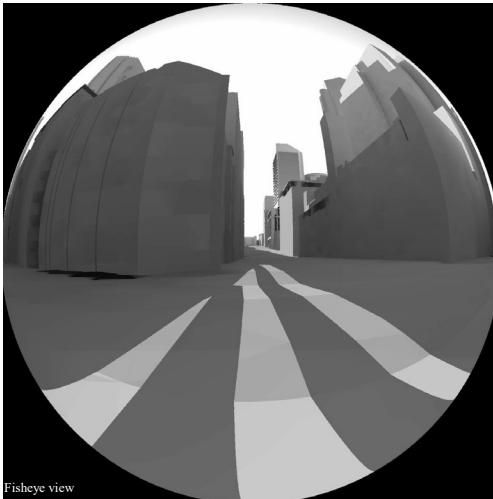
Percentage of the facade that can reflect sun towards the Cenotaph is 28%.

Current Approved DA Design



View Point 11

Date / time	7.50am AEDT, Oct 12
Average luminance [Cd/m2]	1,512
Vertical illuminance [lux]	7,683
Glare source luminance [Cd/m²]	550,000,000
Veiling luminance [Cd/m²]	150 (< 500)



View Point 12

Date / time	7.28am AEDT, Oct 6
Average luminance [Cd/m2]	2,272
Vertical illuminance [lux]	12,185
Glare source luminance [Cd/m²]	400,000,000
Veiling luminance [Cd/m²]	575



View Point S

Date / time	7.40am AEDT, Oct 14
Average luminance [Cd/m2]	1,214
Vertical illuminance [lux]	6,139
Glare source luminance [Cd/m²]	592,000,000
Veiling luminance [Cd/m²]	136

Fish Eye View

'Human' eye adaption filter

Toned down image

Flux Recommendation

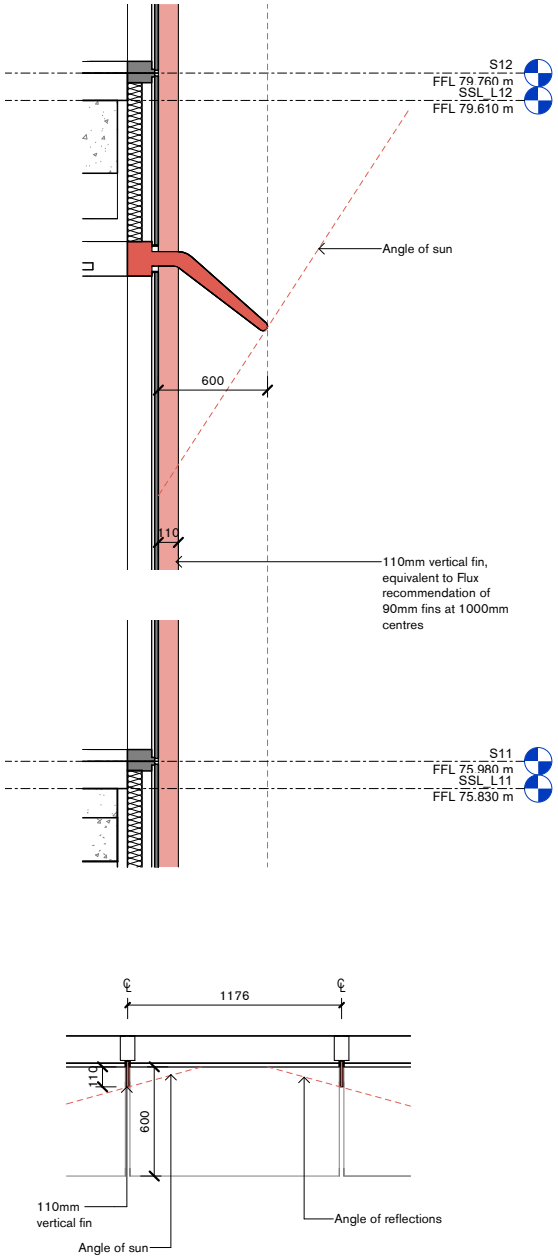


View of North facade

Flux Recommendation - single 600mm deep horizontal solar shade with 110mm vertical fins (equivalent to 90mm fins at 1m centres)

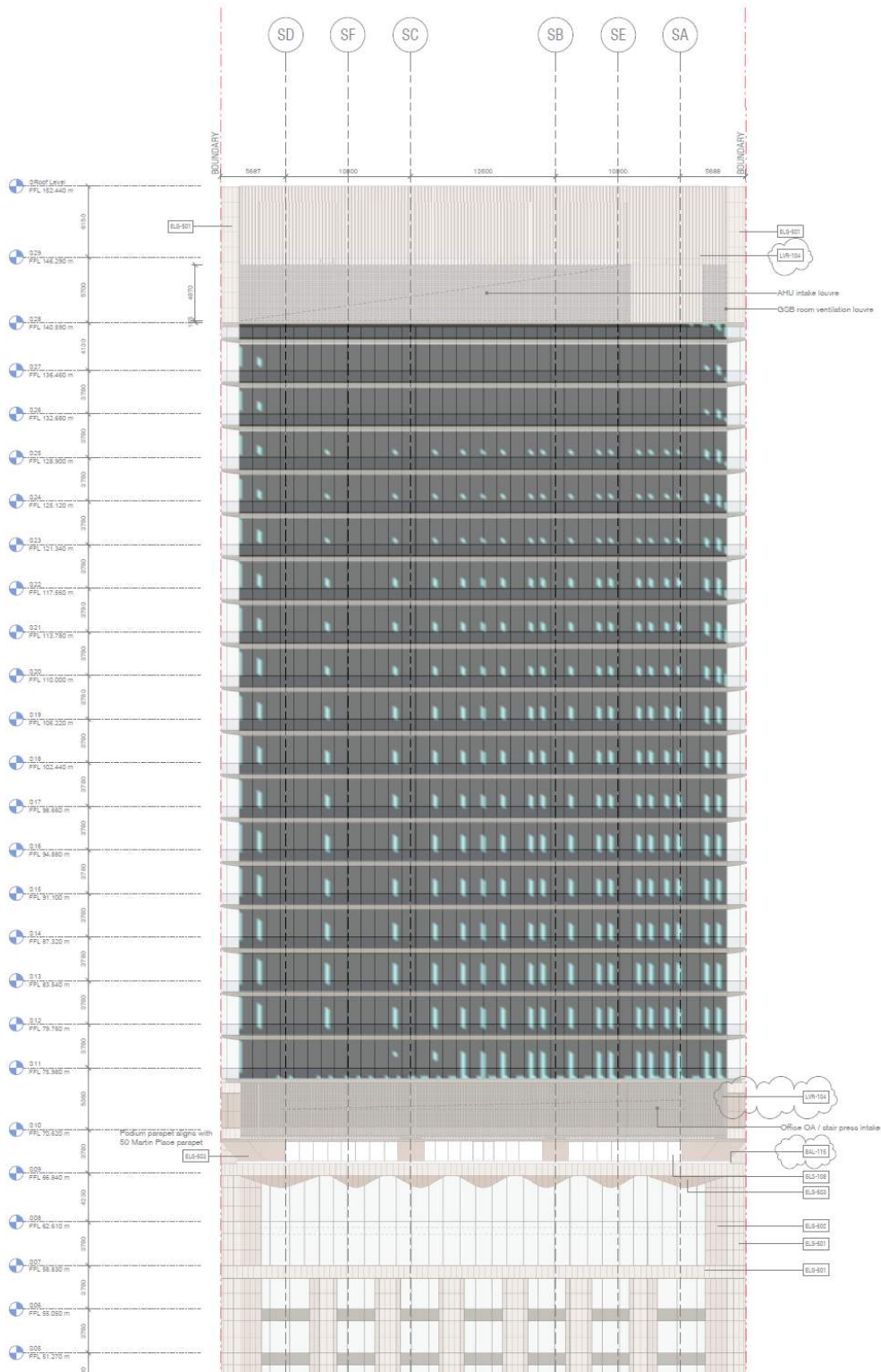


Detail View of North facade with Flux Recommendation

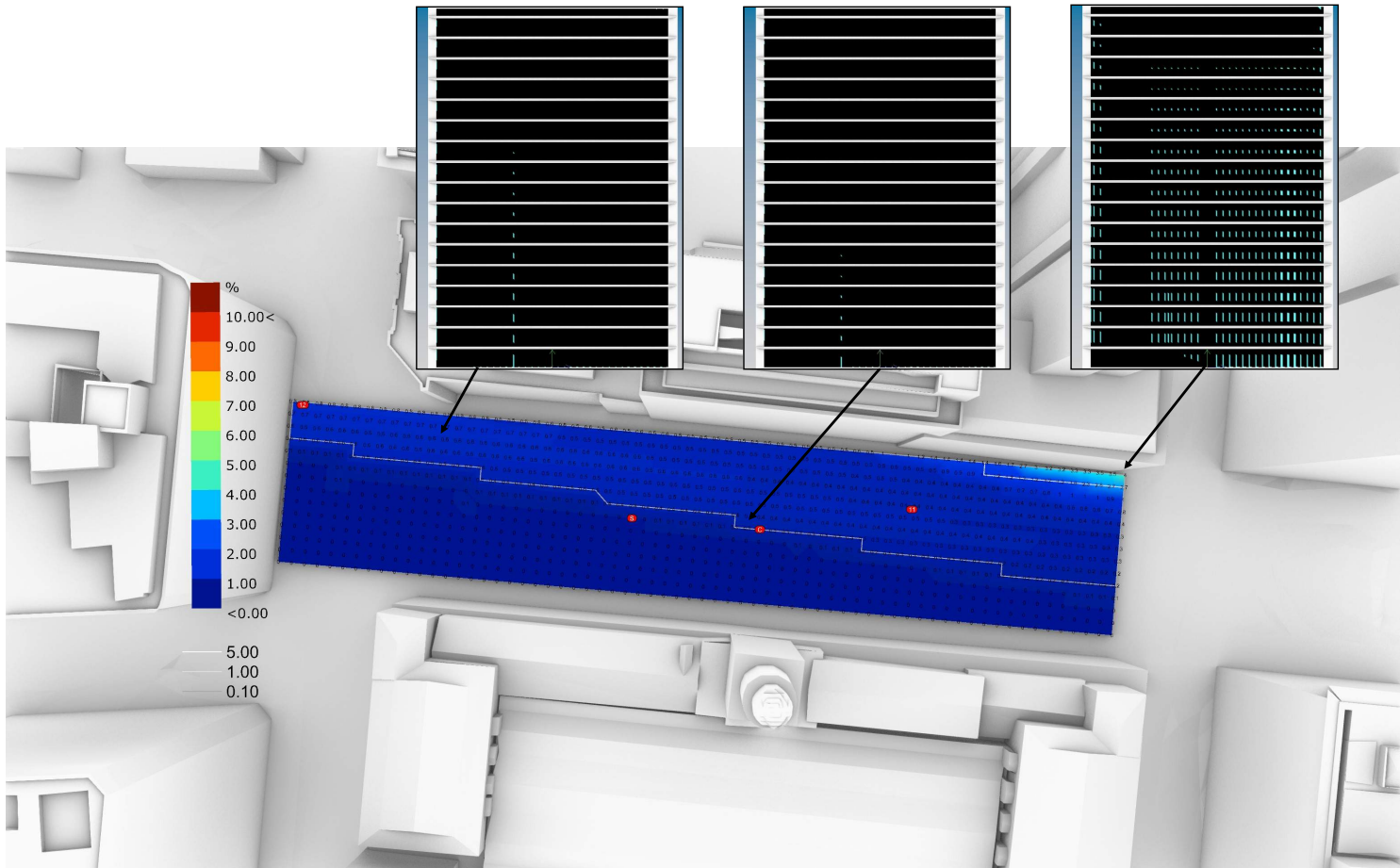


Plan and Section through North Facade with Flux Recommendation

Flux Recommendation

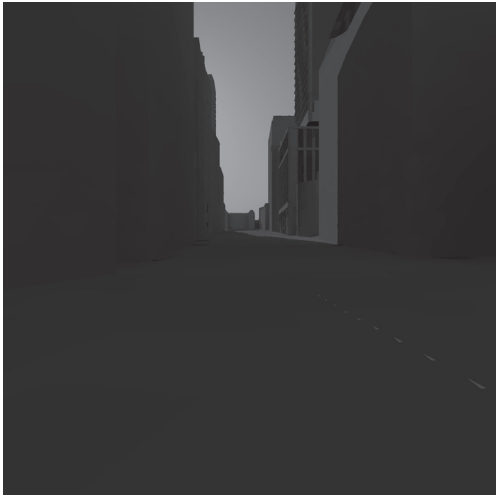
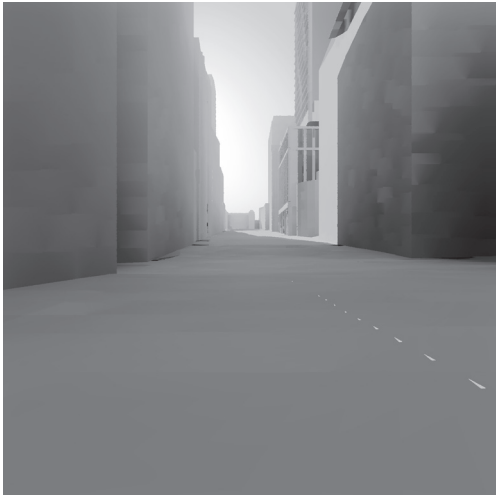
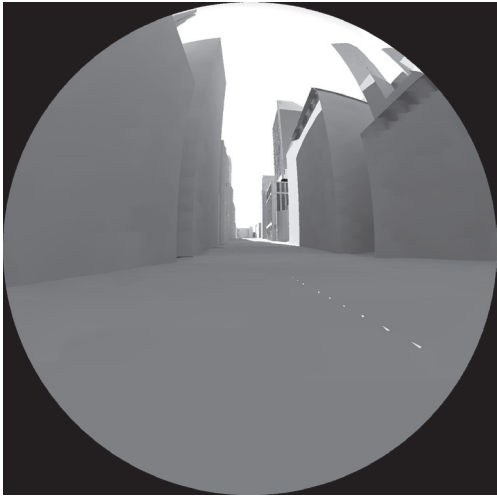
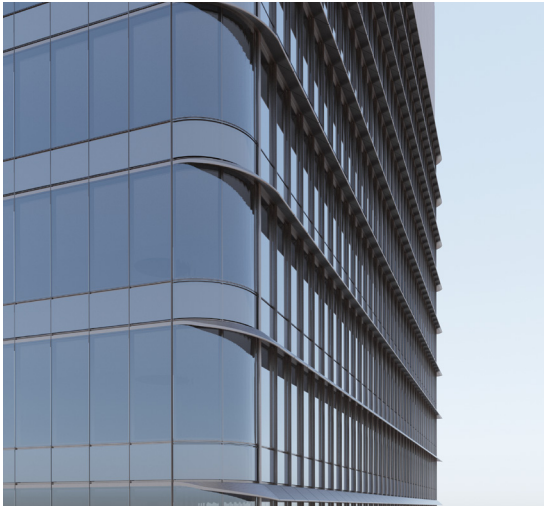


Assessment of areas of North elevation that can cast reflections within the Cenotaph area, with Flux Recommendation



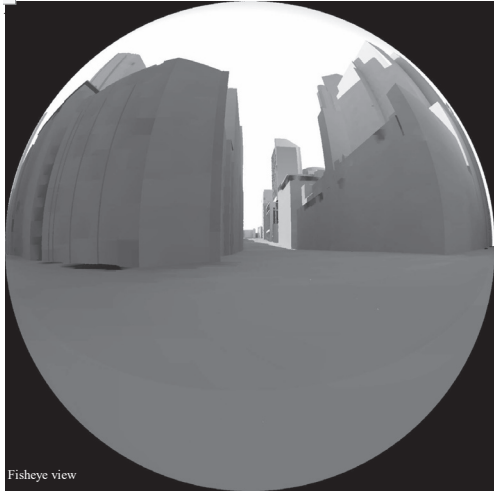
Percentage of the facade that can reflect sun towards the Cenotaph reduced from 28% to 4%

Flux Recommendation



View Point 1 1

Date / time	7.50am AEDT, Oct 12
Average luminance [Cd/m2]	407
Vertical illuminance [lux]	1,593
Glare source luminance [Cd/m²]	0
Veiling luminance [Cd/m²]	0



View Point 12

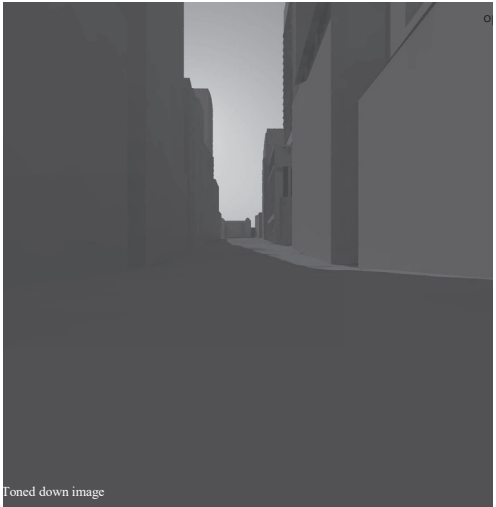
Date / time	7.28am AEDT, Oct 6
Average luminance [Cd/m2]	383
Vertical illuminance [lux]	1,320
Glare source luminance [Cd/m²]	0
Veiling luminance [Cd/m²]	0



Fish Eye View



'Human' eye adaption filter



Toned down image

View Point S

Date / time	7.40am AEDT, Oct 14
Average luminance [Cd/m2]	458
Vertical illuminance [lux]	1,853
Glare source luminance [Cd/m²]	0
Veiling luminance [Cd/m²]	0

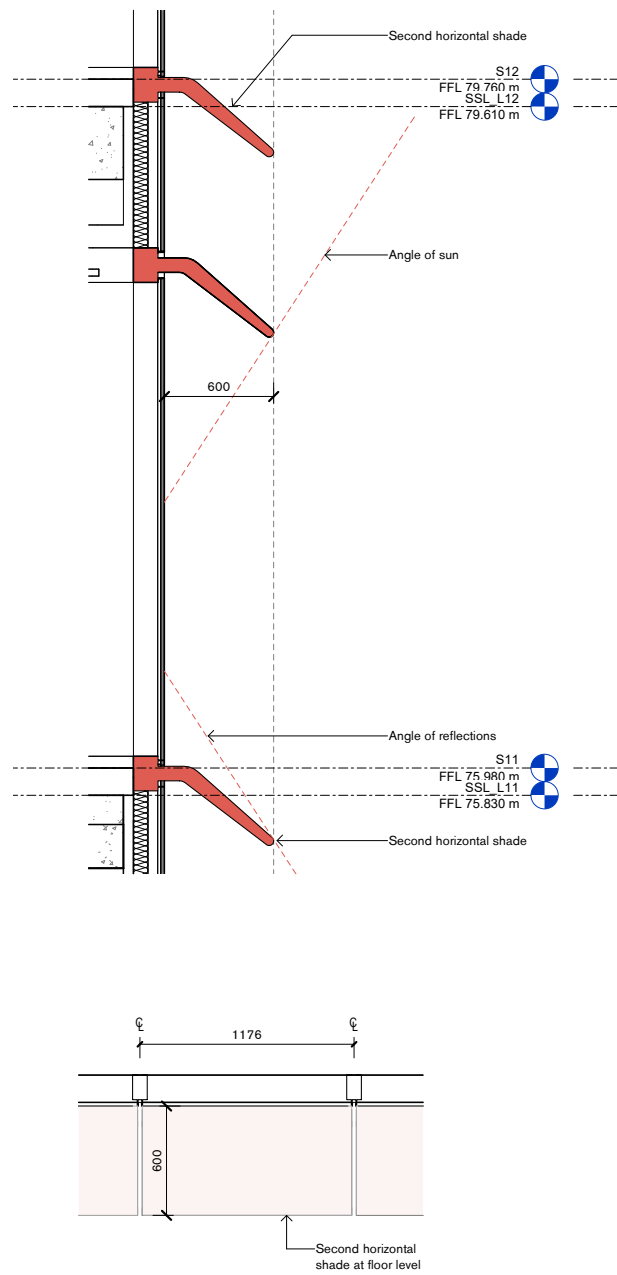
Proposed Revised Architectural Solution for Endorsement



View of North facade
Proposed Revised Architectural Solution for Endorsement -
double 600mm deep horizontal solar shades

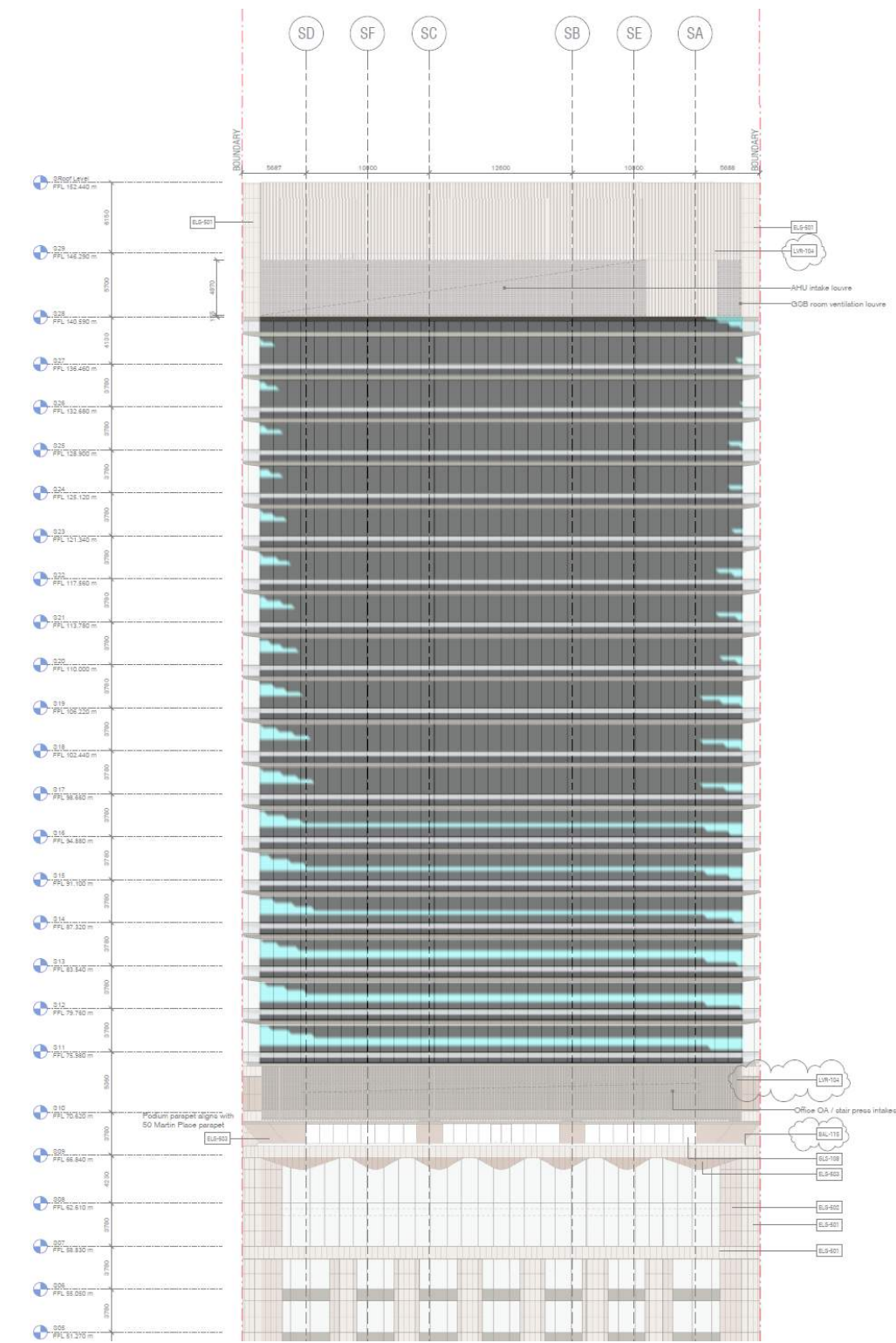


Detail View of North facade with Proposed Revised Architectural
Solution for Endorsement

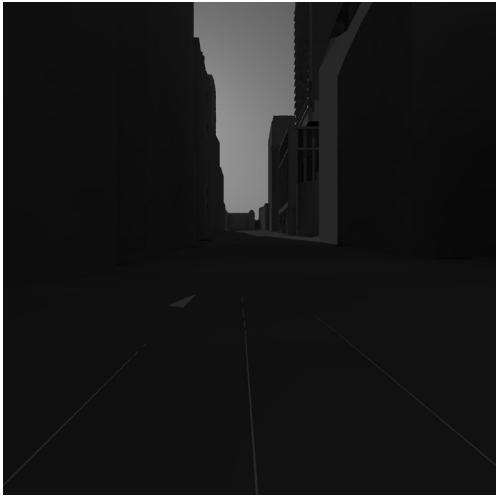
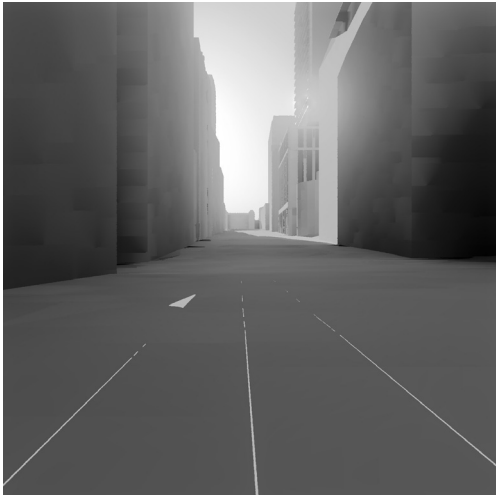
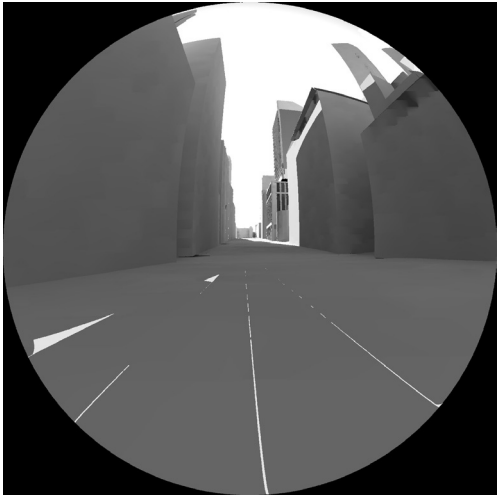


Plan and Section through North Facade with
Proposed Revised Architectural Solution for
Endorsement

Proposed Revised Architectural Solution for Endorsement



Proposed Revised Architectural Solution for Endorsement



View Point 11

Date / time	7.50am AEDT, Oct 12
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Vertical illuminance [lux]	1,605
Glare source luminance [Cd/m²]	0
Veiling luminance [Cd/m²]	0



Fisheye view



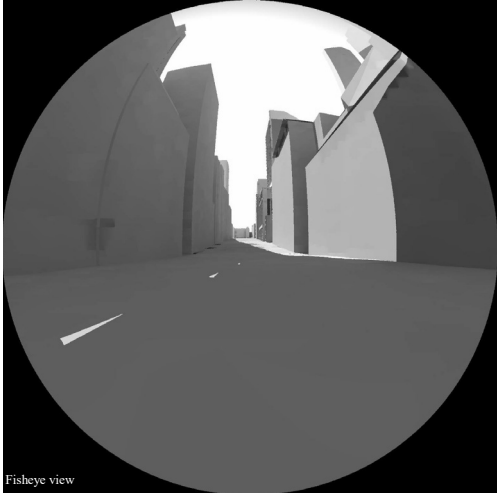
'Human' eye adaptation filter



Toned down image

View Point 12

Date / time	7.28am AEDT, Oct 6
Average luminance [Cd/m2]	1,262
Vertical illuminance [lux]	6,380
Glare source luminance [Cd/m²]	400,000,000
Veiling luminance [Cd/m²]	269



Fisheye view



'Human' eye adaptation filter



Toned down image

View Point S

Date / time	7.40am AEDT, Oct 14
Average luminance [Cd/m2]	459
Vertical illuminance [lux]	1,857
Glare source luminance [Cd/m²]	0
Veiling luminance [Cd/m²]	0

Fish Eye View

'Human' eye adaption filter

Toned down image