The O’Connell Precinct

Prepared for: Lendlease
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Planning Proposal
Sky View Factor Report

PREPARED BY

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Contents

1.0 Introduction

This Sky View Factor (SVF) Report has been prepared by Matthew Pullinger Architect and Stewart Architecture and supports a Request for a Planning Proposal to amend the Sydney Local Environmental Plan 2012 (Sydney LEP) and amendments proposed to the Sydney Development Control Plan 2012 (Sydney DCP 2012) in relation to The O'Connell Precinct. This report is submitted to the City of Sydney Council (Council) on behalf of the Proponent.

This report provides an analysis of the extent of sky observed above a series of points around the site as a proportion of the total possible sky hemisphere above each point. A total of 12,597 were tested to compare the DCP base case envelope with the proposed envelope.

The proposed envelope achieves an average SVF score of 12.832135% compared to the DCP base case envelope score of 12.832058%. This is an increase of 0.000077% which reflects a SVF pass.

The analysis demonstrates that the proposed envelope increases the amount of sky visible compared to the DCP base case envelope.

1.1 PURPOSE OF ANALYSIS

The purpose of the SVF analysis is to demonstrate compliance with Schedule 12 of the Sydney DCP 2012 in regards to varying the minimum street setbacks, side setbacks, permissible street frontage height and tapering provisions.

1.2 THE SITE

The O'Connell Precinct is located within the City of Sydney Local Government Area (LGA). It is irregular in shape and is bounded by Spring Street and Bent Street to the north, O'Connell Street to the south and south-east. The Precinct formally contains the following lots and street addresses:

- Lot 1 DP814858 or 1 O'Connell Street, Sydney
- Lot 2 DP172068, 8 Spring Street, Sydney
- Lot 1 DP74923 and Lot 1 DP176768 or 10-14 Spring Street, Sydney
- Lot 1 DP724946, 16 Spring Street, Sydney
- Lot 2 DP 74923, 17 O'Connell Street, Sydney
- Lot 1 DP131917 or 19 O'Connell Street, Sydney
- Strata DP63932, 23 O'Connell Street, Sydney

Collectively, these lots and addresses are referred to as 'the Precinct' or the 'site' throughout this report. The boundaries of The O'Connell Precinct are illustrated in Figure 1.

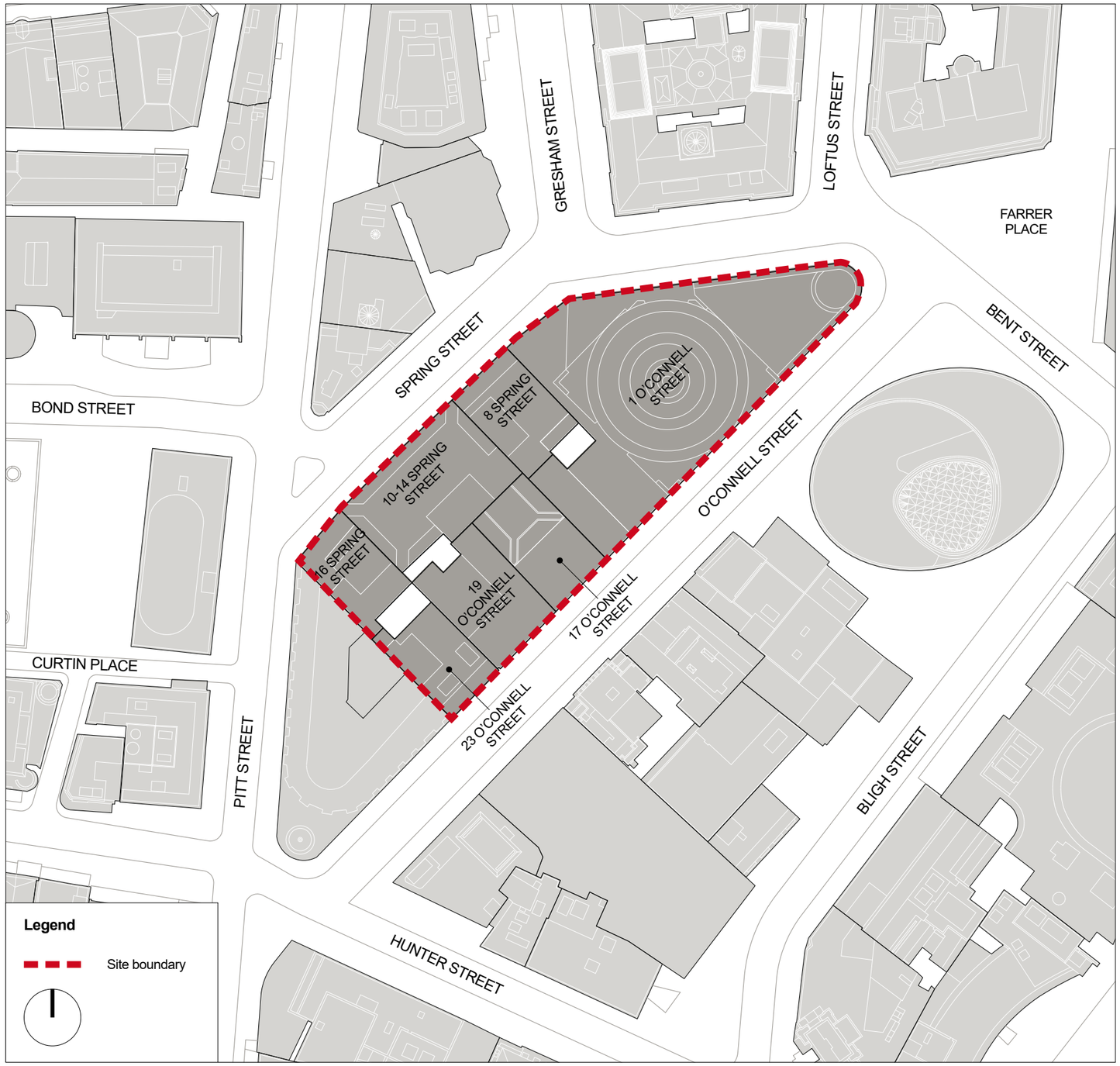


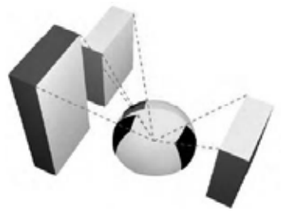
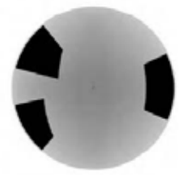
Figure 1: Site Plan

2.0 Planning Context

The Sydney DCP 2012 Schedule 12.2 Procedure B outlines the procedure for demonstrating compliance with DCP Section 5.1.1.1(3)(b) and DCP Section 5.1.1.3(6) in regards to varying Minimum Street Setbacks, Side and Rear Setbacks, Street Wall Height, Building Form Separations and Tapering provisions.

This procedure is summarised in Table 1.

TABLE 1: SUMMARY OF SCHEDULE 12.2

Schedule 12.2 - Procedure B: Equivalent or improved wind comfort and wind safety and daylight levels in adjacent Public Places	
	Procedure B is used for demonstrating compliance with Section 5.1.1.1(3)(b) and Section 5.1.1.3(6) in regards to varying Minimum Street Setbacks, Side and Rear Setbacks, Street Wall Height, Building Form Separations and Tapering provisions. A base case model is prepared which meets all the requirements set out for Procedure B. The base case model is tested to establish the minimum performance benchmarks for daylight levels (or sky view factor) and wind comfort and safety in public places adjacent to the site. The alternative building envelopes are tested for equivalence with these performance benchmarks.
4. Model testing	The wind and daylight testing of the base case model and alternative building envelopes are to include measurements in public places for a distance of at least 50m and no more than 100m from the site boundary. The tests must exclude any elements within a Public Place (e.g. trees and awnings) and must satisfy the following requirements for wind and daylight (or sky view factor): b. Daylight Factor: the average annual daylight level (which may be approximated by the average Sky View Factor) and should be measured on a 1m grid. i. Daylight Factor is the percentage of available daylight, on a daily basis, throughout the year. ii. Sky View Factor (SVF) is the extent of sky observed above a point as a proportion of the total possible sky hemisphere above the point.   SVF is calculated as the proportion of sky visible when viewed from the ground (as an abstract horizontal surface) up. SVF is a dimensionless value that ranges from 0 to 1. A SVF of 1 denotes that the sky is completely visible to the horizon in all directions; for example, in a flat terrain. When a location has topography or buildings blocking view to any part of the sky, it will cause the SVF to decrease proportionally. Because SVF measures the whole sky hemisphere and only a small fraction of the sky will be subject to change as part of a development the SVF must be resolved at a high resolution to detect the change. This is an inherent feature of the SVF measure. This means that the sky must be subdivided into more than 5000 equal areas for final SVF calculations but also that the difference in SVF may appear small particularly when averaged over a large area.
5. Equivalence reporting	All data that is relied on for equivalence testing must form part of the report including individual data points as tables and model geometries for the base case and alternative building envelopes. These must be described with sufficient dimensions to allow for the equivalent model to be created by a third party for checking. b. For daylight (or SVF): the factors are averaged and the single resultant values compared. In this document “equivalent” wind speed and daylight/SVF is to be understood as very slightly “better than” at a high level of accuracy. For example a SVF of 0.10001 is equivalent to a SVF of 0.10000 by being very slightly better than it.

3.0 Methodology

3.1 MODELLING SOURCES

Rhinoceros 3D was used to model the DCP base case and proposed envelopes and to prepare the City of Sydney context model. Figure 2 illustrates the context model used to run the SVF test.

The accuracy of this report is limited to the modelling sources listed below:

- Sydney CBD context buildings and topographic base - Sydney CBD Model from AAM Group (purchased 6 October 2021)
- Sydney CBD context cadastre - SIX Maps
- Immediate context buildings (100m) and SAPs - City of Sydney IDE File
- Site boundary and topographic base - Rygate Survey - aligned with City of Sydney IDE File
- Existing buildings on the site - Sydney CBD Model from AAM Group (purchased 6 October 2021)
- Context buildings that are recently completed, under construction or have received detailed DA approval have been indicatively modelled based on publicly available approved DA drawings
- Pitt Street Mall No Additional Overshadowing plane - modelled from Sydney DCP 2012 map

3.2 SVF TESTING METHODOLOGY

The SVF analysis was conducted using the Ladybug for Grasshopper plug-in for Rhinoceros 3D. The Grasshopper Script used to calculate the scores was provided by the City of Sydney in April 2020 (shown in Figure 3).

The following methodology was used to conduct the test:

- The analysis surface was offset 50m from the site boundary and follows the modelled topography
- A 1m x 1m grid of test points were projected onto the analysis surface, which resulted in a total of 12,597 test points
- The sky was subdivided into 45,000 equal areas for each test point (which is greater than the 5,000 minimum required in Schedule 12.2)
- Elements within a Public Place (including trees, awnings and kiosks) were excluded from the context model

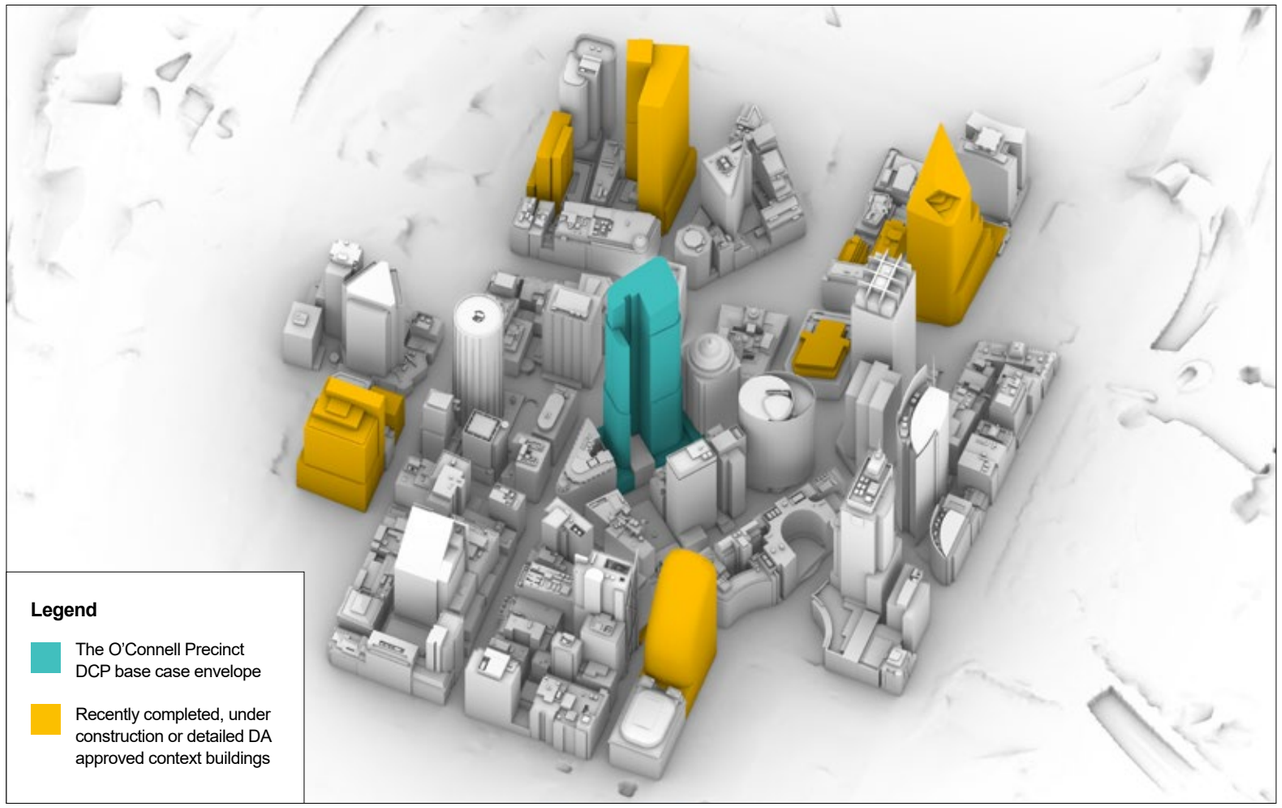


Figure 2: City of Sydney Context Model

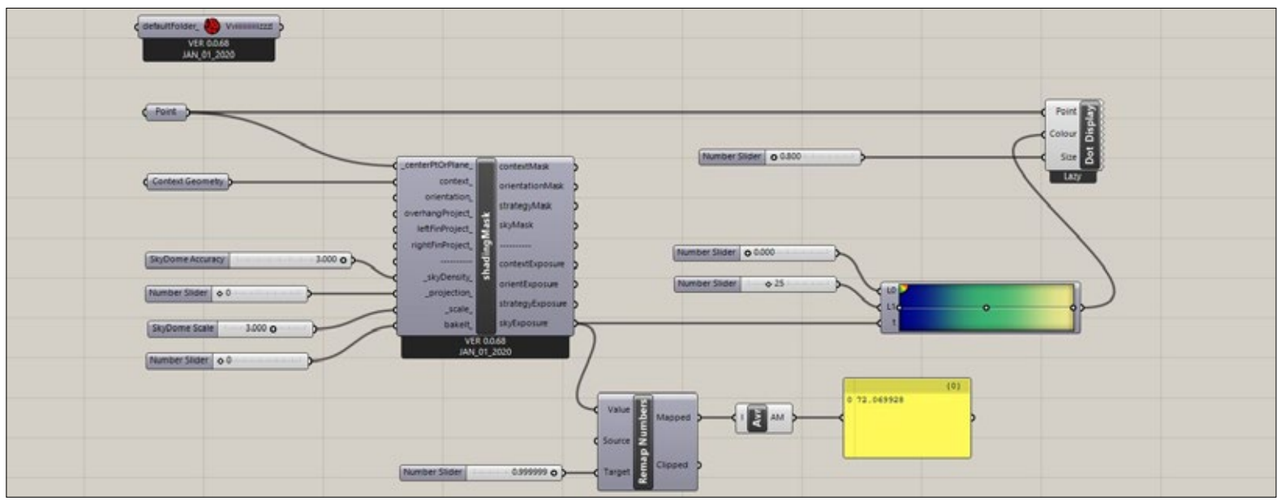


Figure 3: Grasshopper Script

4.0 Building Envelopes

4.1 DCP BASE CASE ENVELOPE

The Sydney DCP 2012 Schedule 12.2 Procedure B outlines the method for modelling a DCP base case envelope for the purposes of equivalency testing.

The DCP base case envelope for The Precinct was modelled according to this procedure and agreed in consultation with the City of Sydney.

The DCP base case envelope is illustrated in Figures 4 and 5.

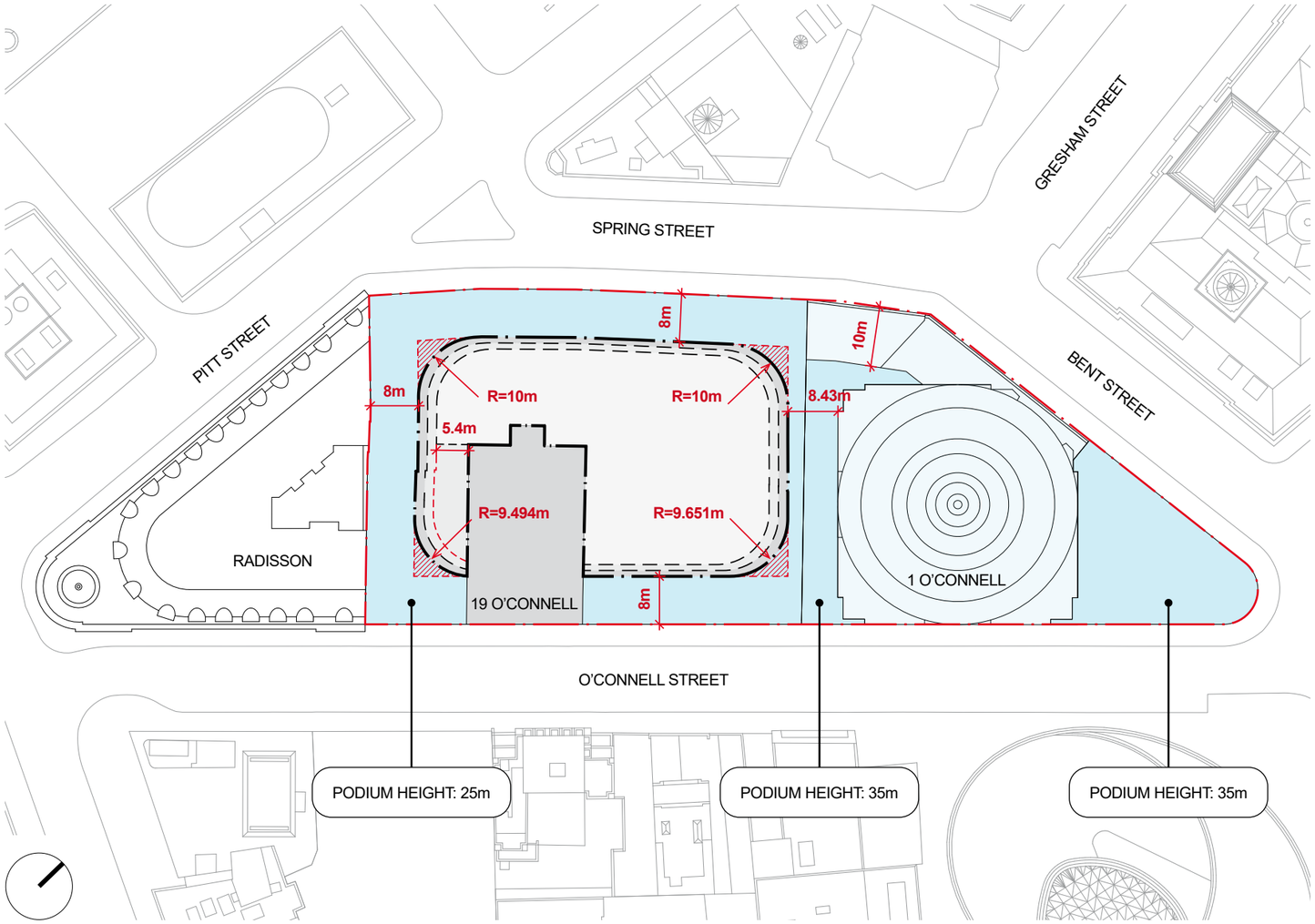


Figure 4: DCP Base Case Envelope Plan

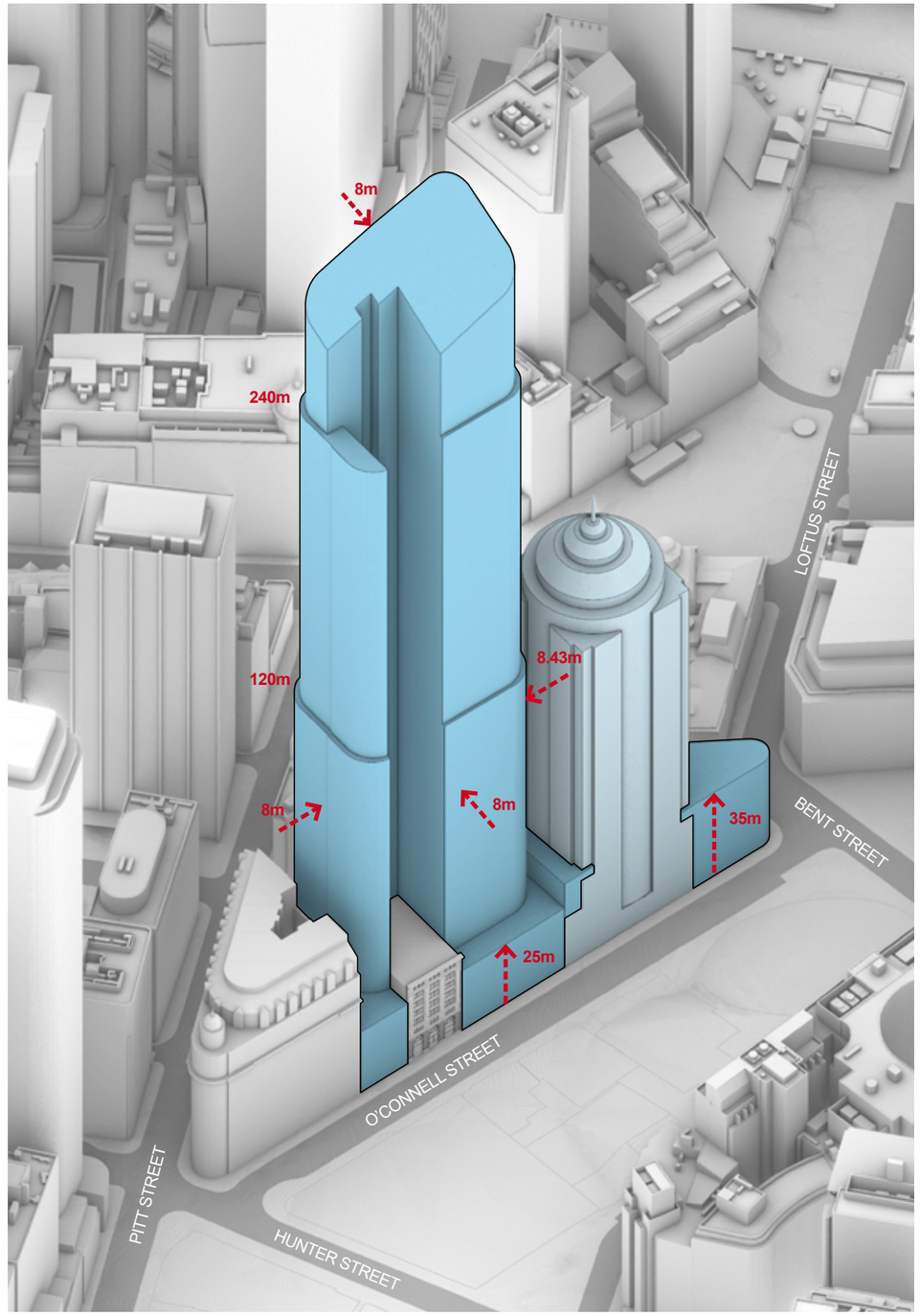


Figure 5: DCP Base Case Envelope 3D

Building Envelopes

4.2 PROPOSED ENVELOPE

The proposed envelope has been prepared in consultation with the City of Sydney and varies from the following DCP built form controls:

- Building separation to 1 O'Connell Street tower
- Street frontage height
- Tapering provisions

The proposed envelope is illustrated in Figures 6 and 7.

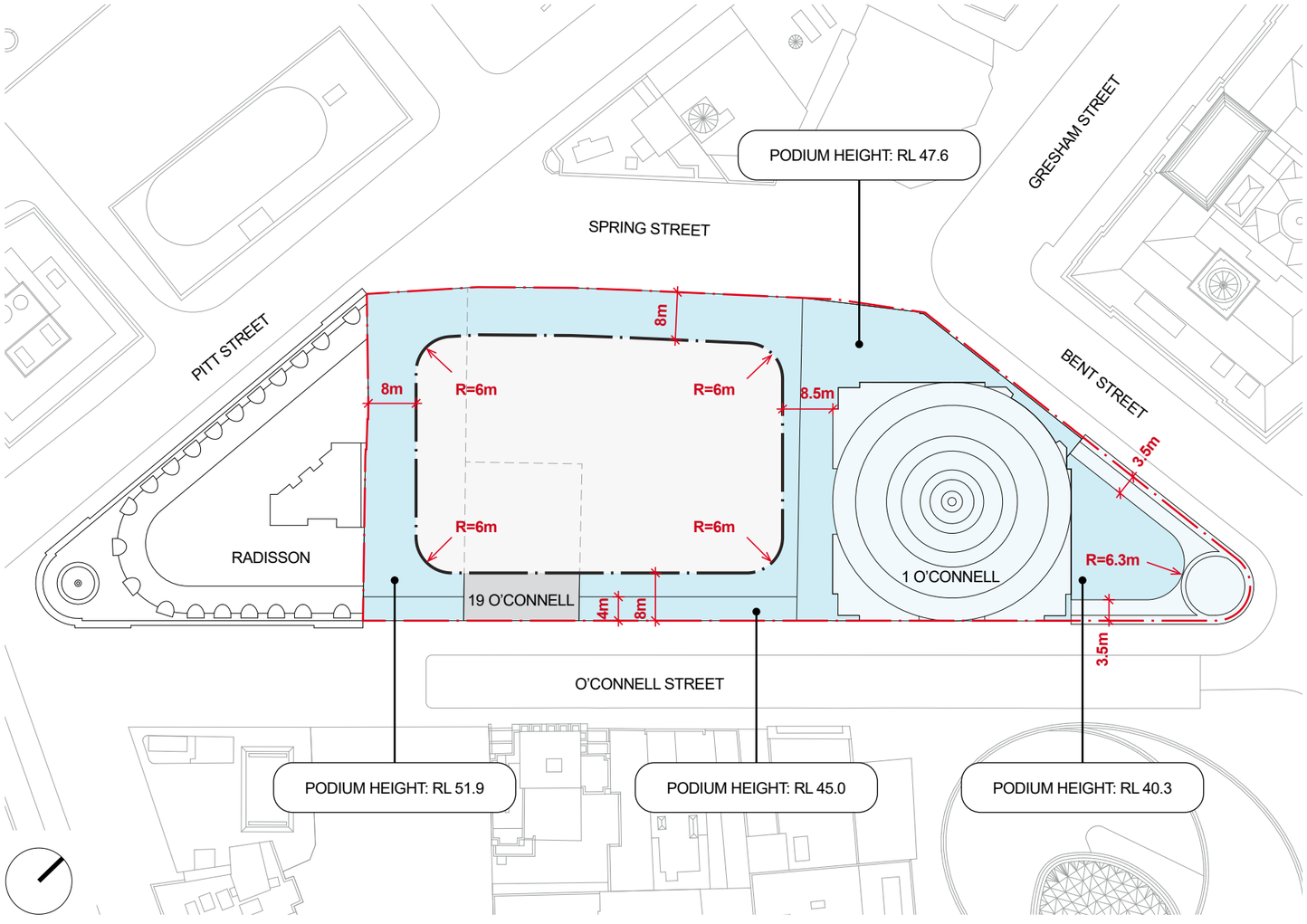


Figure 6: Proposed Envelope Plan

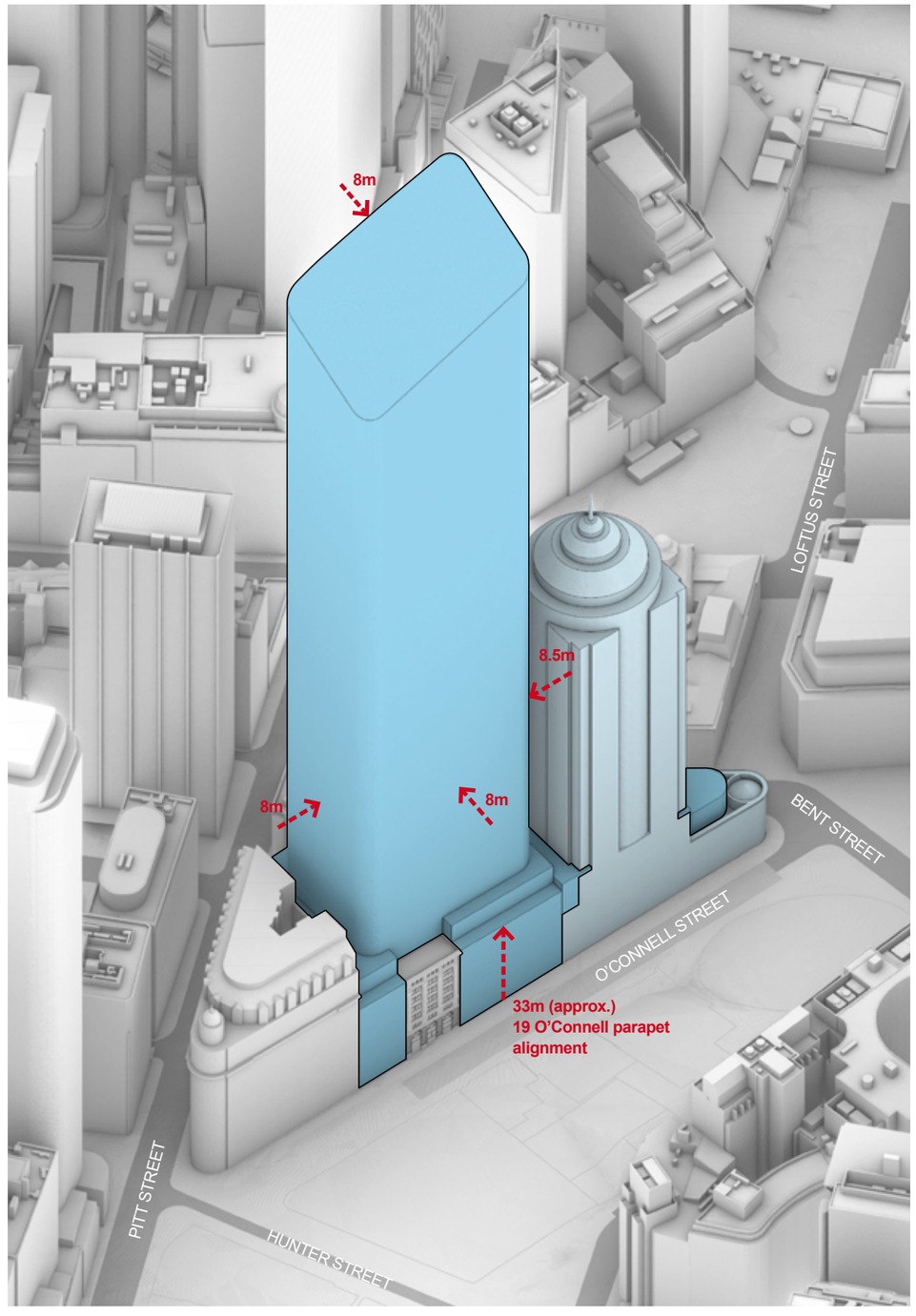


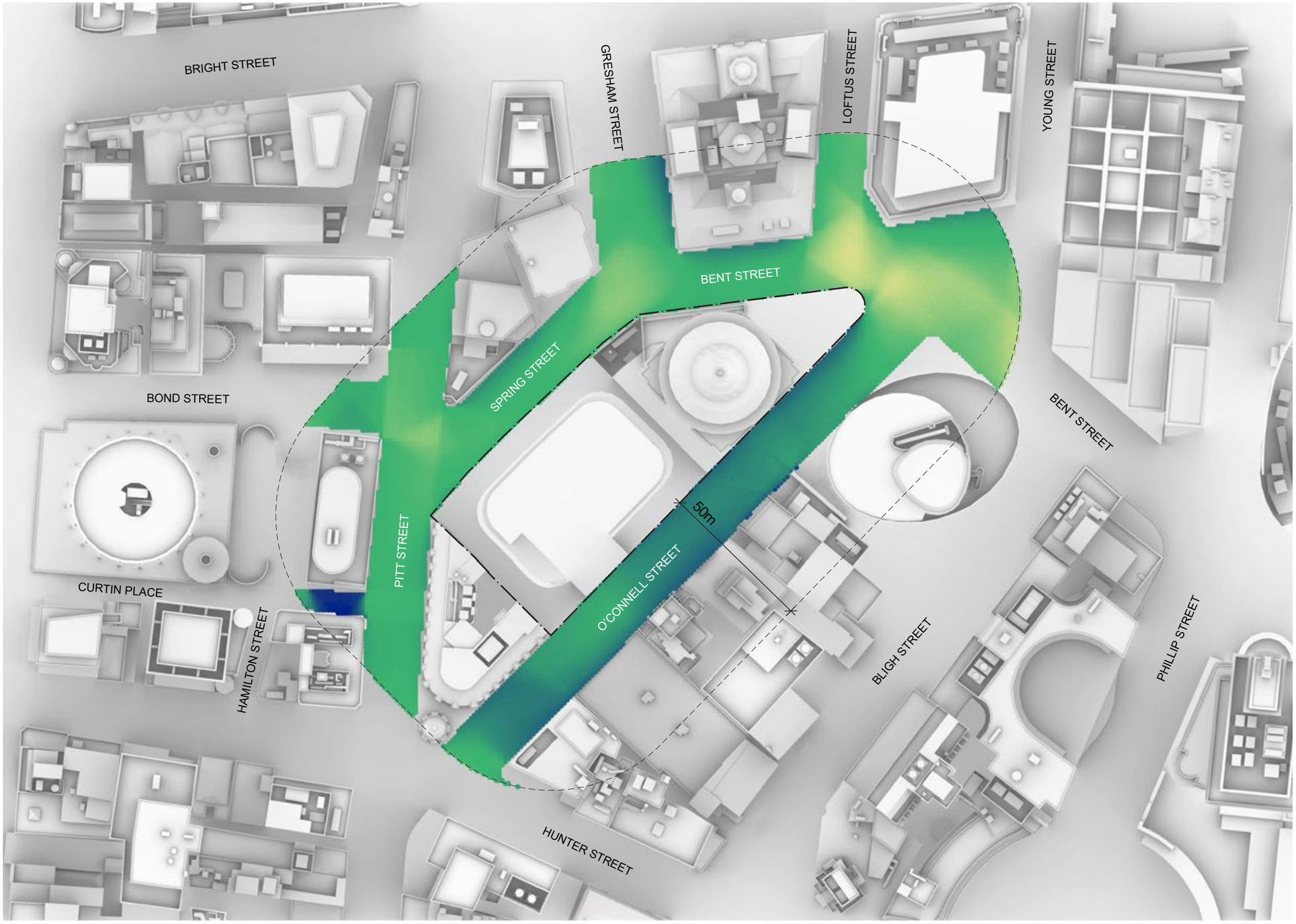
Figure 7: Proposed Envelope 3D

5.0 Sky View Factor Analysis

5.1 DCP BASE CASE SCORE

The DCP base case envelope achieves an average SVF score of 12.832058%.

This result is represented graphically in Figure 8.



Legend - SVF Score

25%
20%
15%
10%
5%
0%

Figure 8: DCP Base Case Envelope SVF Score

Sky View Factor Analysis

5.2 PROPOSED ENVELOPE SCORE

The proposed envelope achieves an average SVF score of 12.832135%.

This result is represented graphically in Figure 9.

The proposed envelope results in an overall increase in SVF value of 0.000077% when compared to the DCP base case envelope, which reflects a SVF pass.

Legend - SVF Score

25%
20%
15%
10%
5%
0%

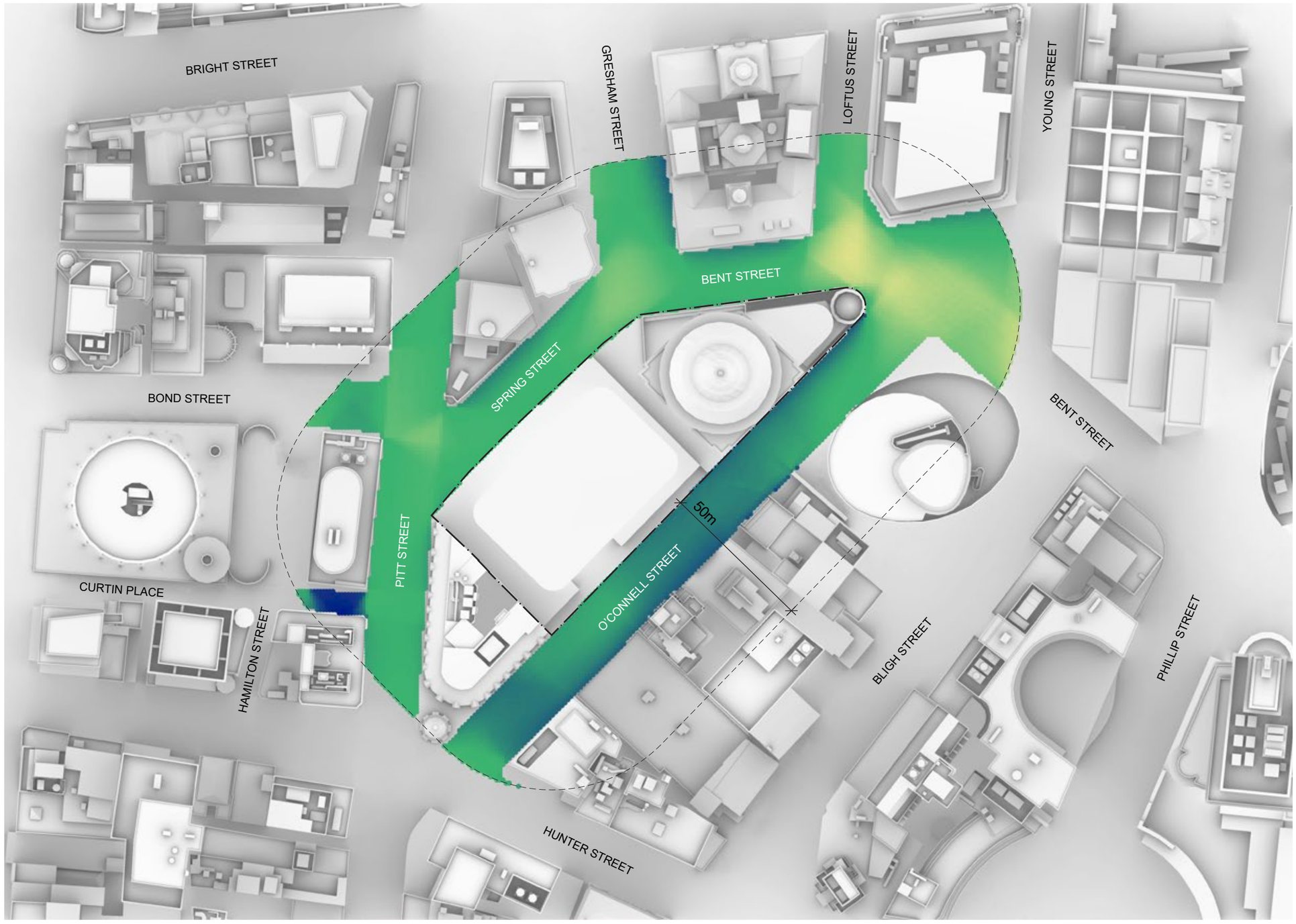


Figure 9: Proposed Envelope SVF Score

6.0 Conclusion

The SVF analysis demonstrates that the proposed envelope increases the amount of sky visible compared to the DCP base case envelope.

The proposed envelope achieves an average SVF score of 12.832135% compared to the DCP base case envelope score of 12.832058%. This is an increase of 0.000077% which reflects a SVF pass.

This result demonstrates compliance of the proposed envelope based on the testing criteria described in the Sydney DCP 2012 Schedule 12.2 Procedure B.

ATTACHMENTS

An Excel spreadsheet compiling SVF and location data for each individual test point is submitted with this report.