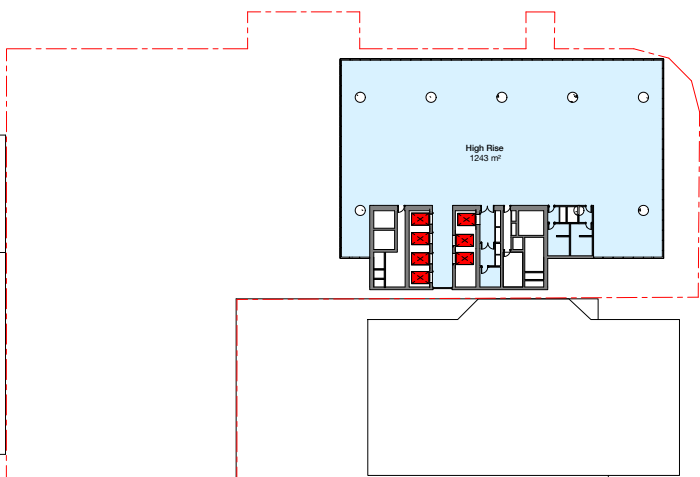


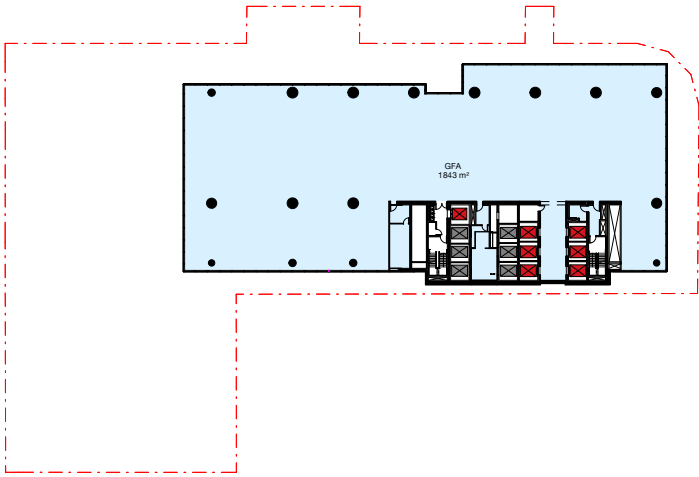
Victoria Cross OSD Indicative Design - Typical High-Rise



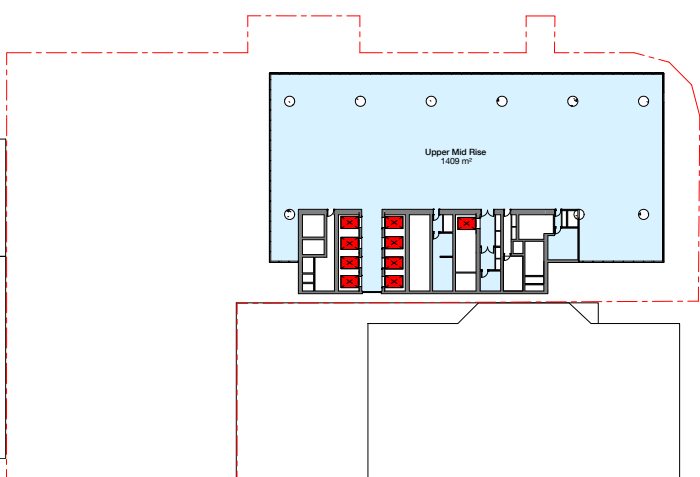
Victoria Cross OSD Reference Design - Typical High-Rise



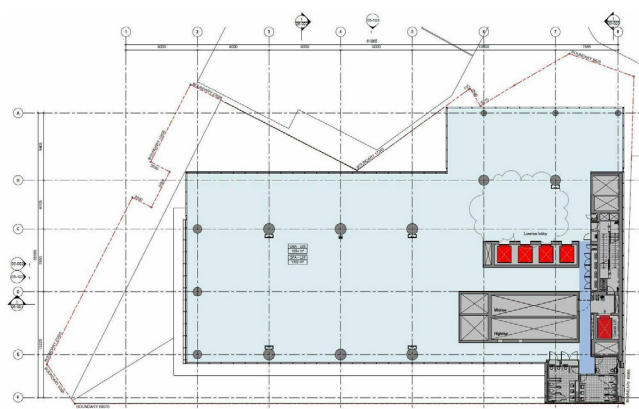
100 Mount St - Typical Low-Rise



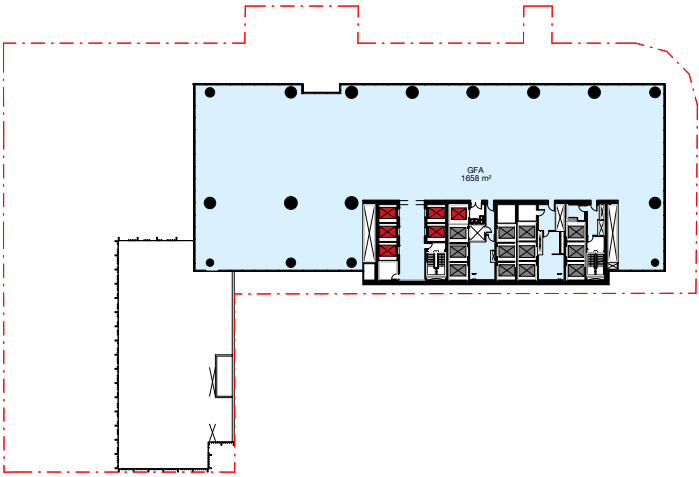
Victoria Cross OSD Indicative Design - Typical Mid-Rise



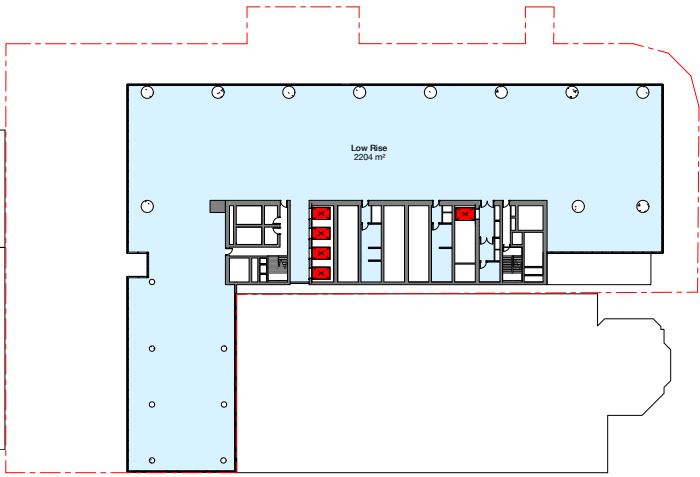
Victoria Cross OSD Reference Design - Typical Mid-Rise



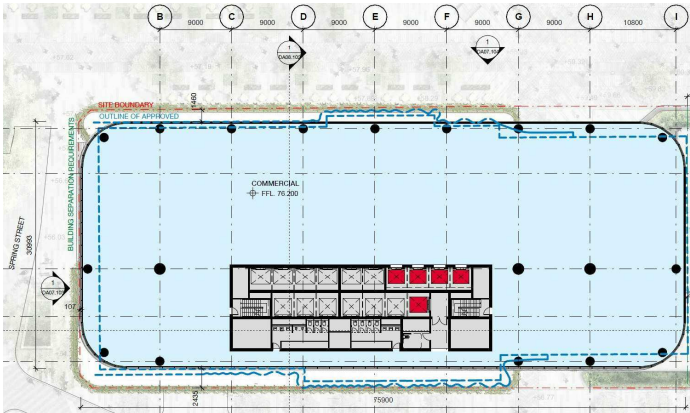
177 Pacific Highway - Typical Low-Rise



Victoria Cross OSD Indicative Design - Typical Low-Rise



Victoria Cross OSD Reference Design - Typical Low-Rise



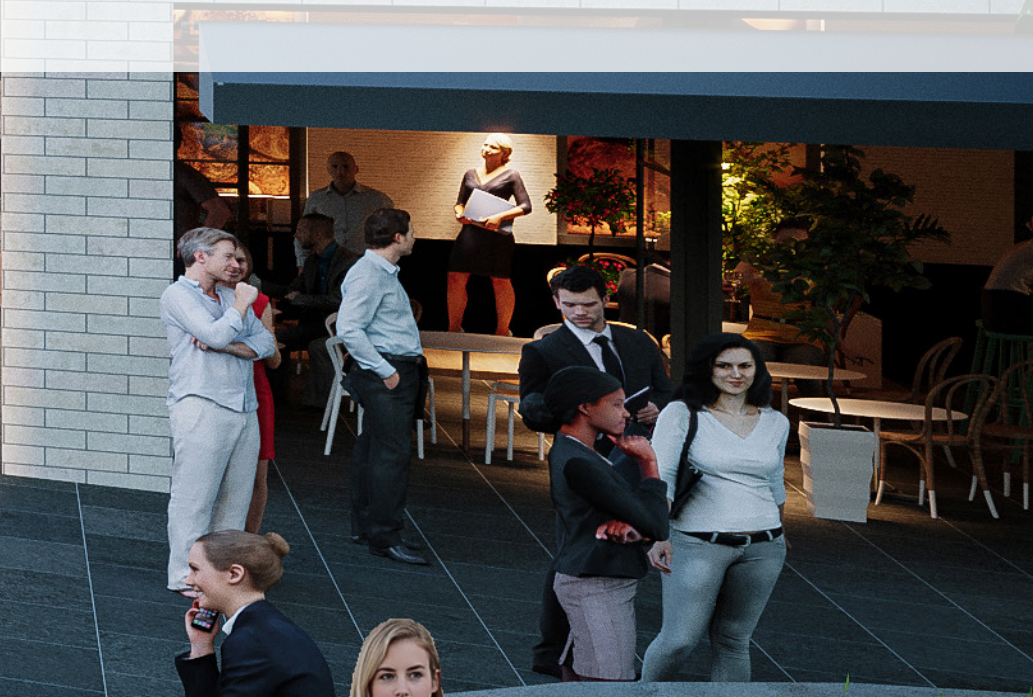
1 Denison Street - Typical Low-Rise





ARTIST'S IMPRESSION OF THE SOUTHERN METRO ENTRY AND LANEWAY FROM MILLER STREET









ARTIST'S IMPRESSION LOOKING TOWARDS THE OSD LOBBY ON THE CORNER OF MILLER AND BERRY STREETS





# APPENDIX A SHADOW ANALYSIS



# A.1.1

## SHADOW ANALYSIS

### SUMMARY

#### AUTUMN EQUINOX MARCH 21ST

##### SPECIAL AREAS OVERVIEW

The adjacent diagrams demonstrate the shadow impact created by both the approved OSD Concept SSD building envelope and the modified building envelope in relation to the Special Areas as identified by the North Sydney Centre Map.

##### MILLER STREET SPECIAL AREA

The Miller St Special Area indicated in turquoise has some minor overshadowing for 15mins between 12:00pm and 12:15pm on the Autumn Equinox which will be discussed in the following sections. This additional shadow does not result in a net overall increase when compared to the previous conditions at the site.

##### GREENWOOD PLAZA

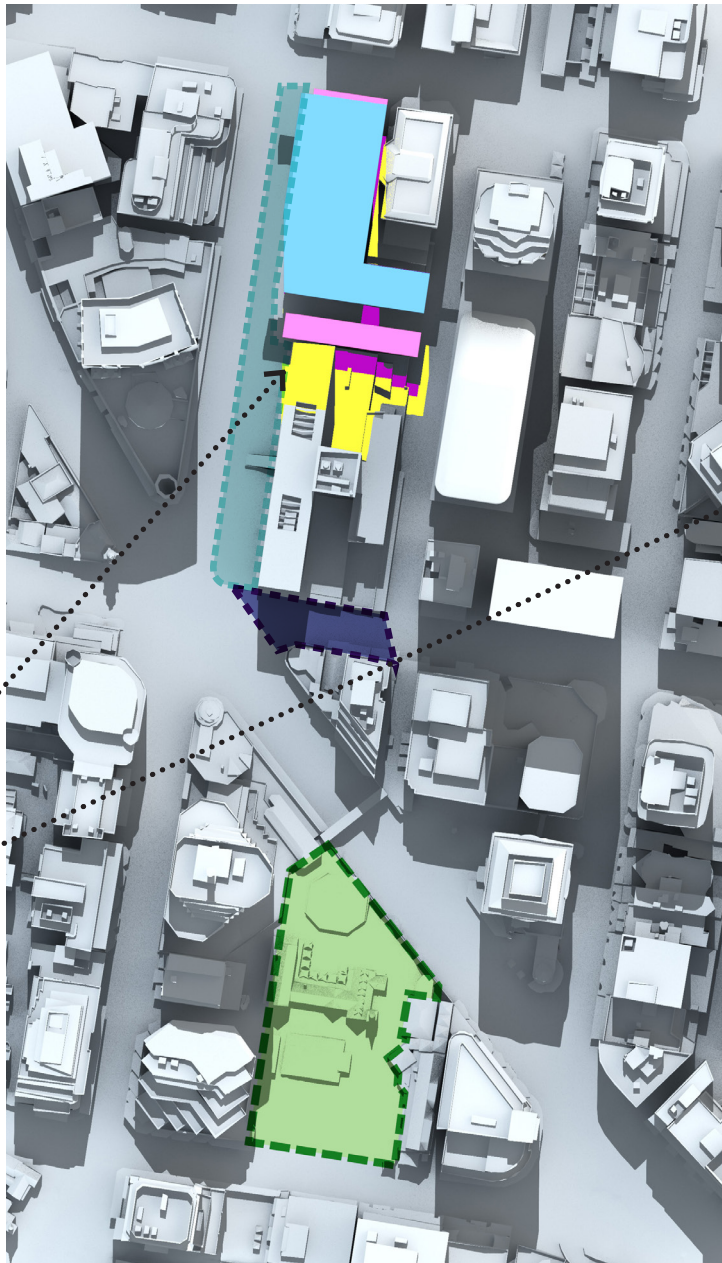
The Greenwood Plaza Special Area indicated in green is not overshadowed by either the approved or modified envelopes.

##### BRETT WHITELEY PLAZA

The Brett Whiteley Special Area indicated in purple is discussed in detail in the following sections.

- KEY:
- OSD BUILDING ENVELOPE
  - VICTORIA CROSS STATION CSSI ENVELOPE
  - SHADOWS CAST BY EXISTING BUILDINGS
  - SHADOWS CAST BY OSD ENVELOPE
  - SHADOW CAST BY CSSI ENVELOPE
  - REDUCTION OF SHADOWS
  - INCREASE IN SHADOWS
  - MILLER STREET SPECIAL AREA
  - GREENWOOD PLAZA
  - BRETT WHITELEY PLAZA

Clause 6.3 (2) of the North Sydney Local Environment Plan 2013 states that:  
“Development consent must not be granted for the erection of a building on land to which the Division applies if:  
(a) The development would result in a net increase in overshadowing between 12 pm and 2 pm from the March Equinox to the September Equinox (inclusive) on land to which this Division applies that is within Zone RE1 Public Recreation or that is identified as ‘Special Area’ on the North Sydney Centre map.



12pm March 21st - Approved Envelope

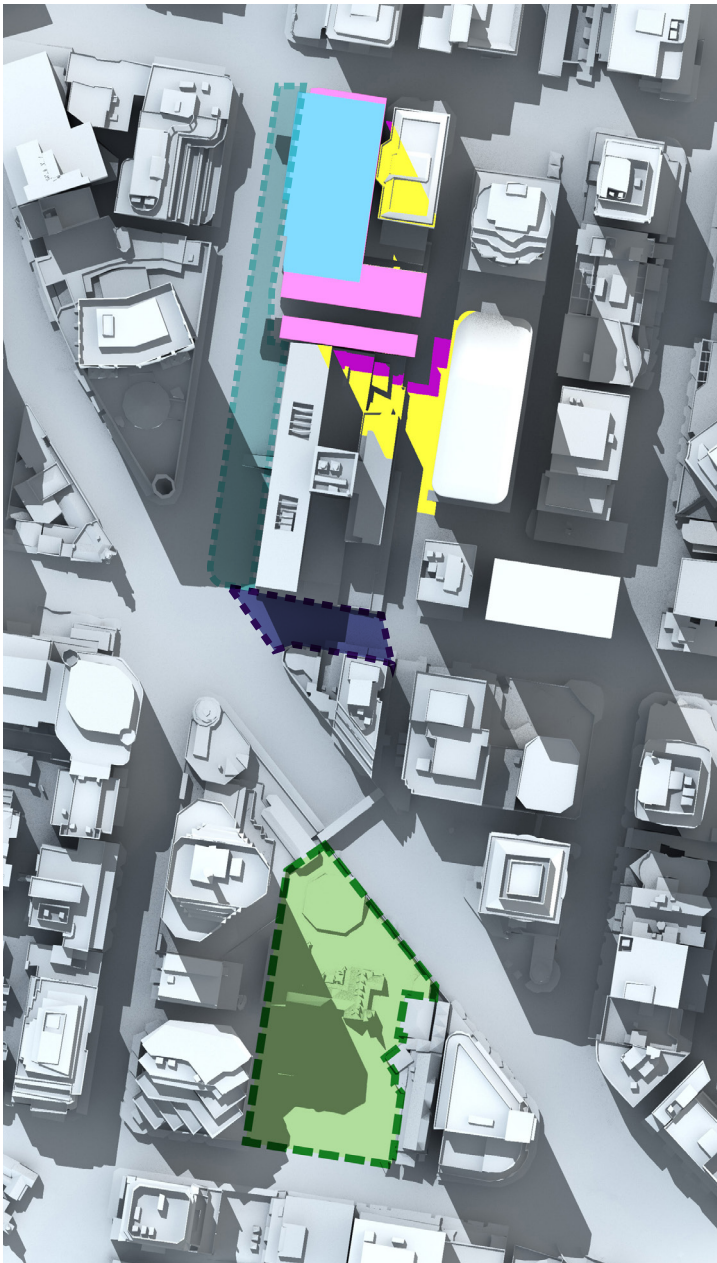


12pm March 21st - Modified Envelope

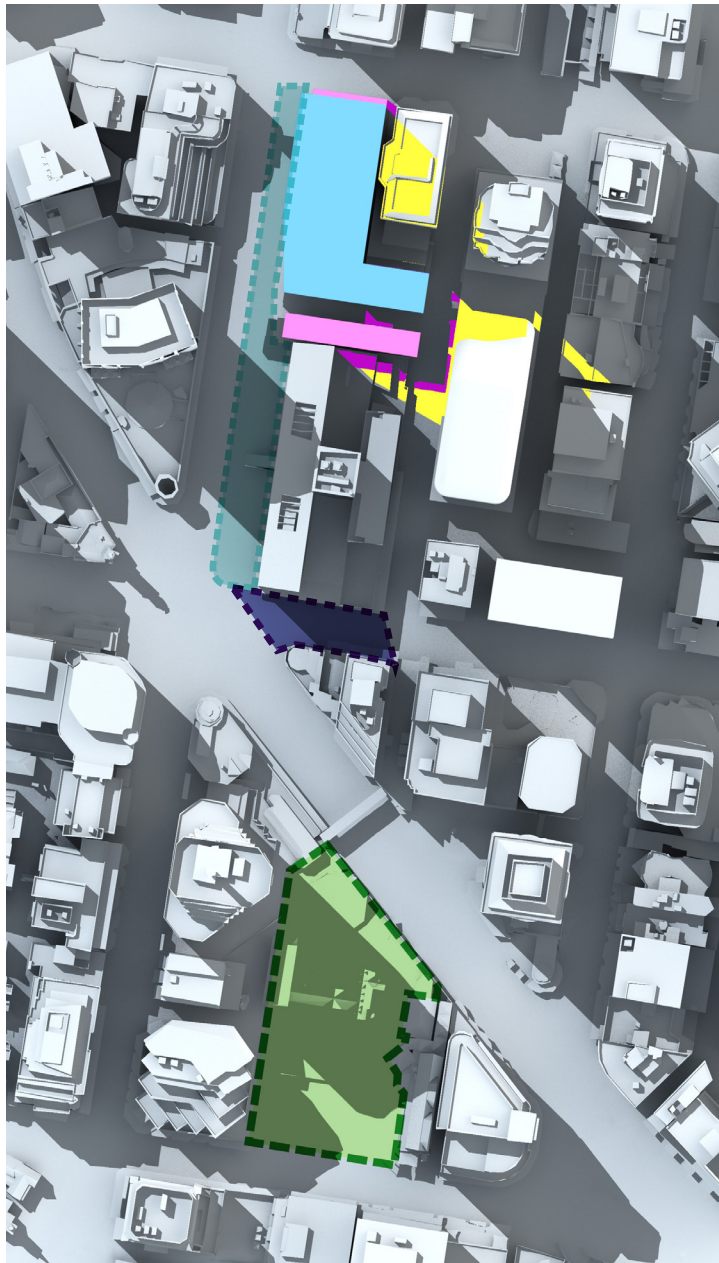




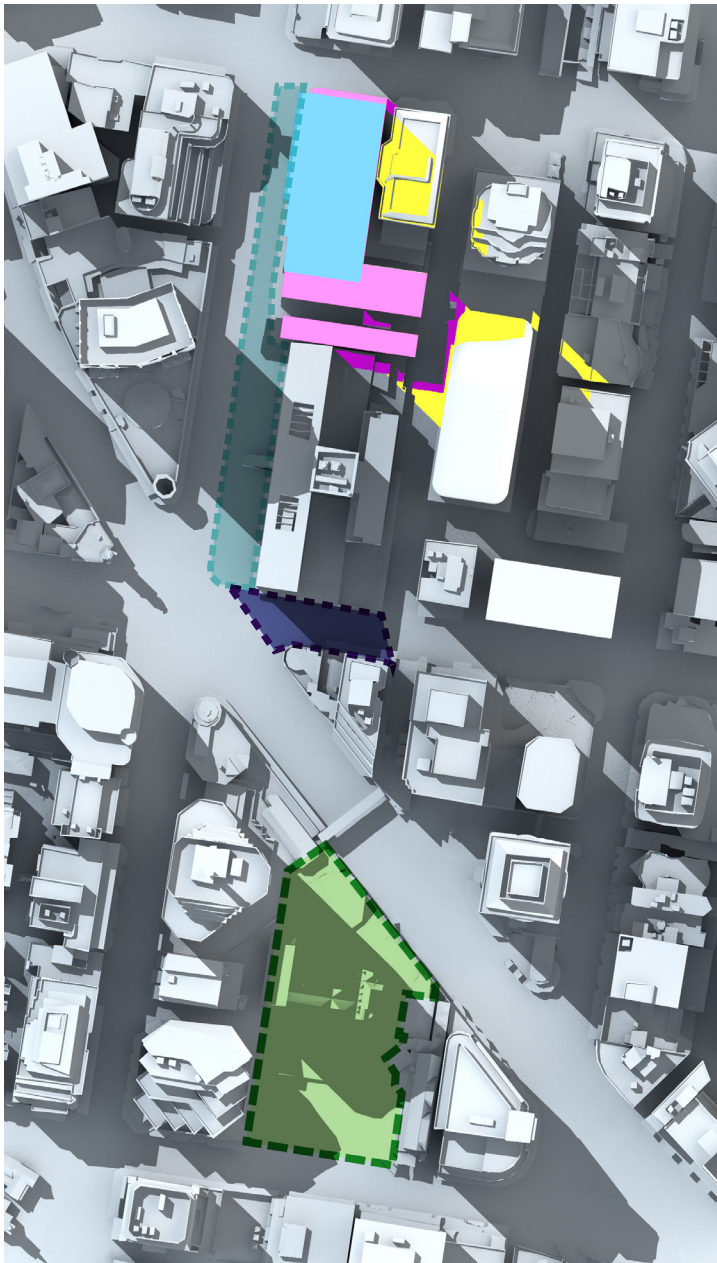
1pm March 21st - Approved Envelope



1pm March 21st - Modified Envelope



2pm March 21st - Approved Envelope



2pm March 21st - Modified Envelope



# A.1.2

## SHADOW ANALYSIS

### SUMMARY

Clause 6.3 (2) of the North Sydney Local Environment Plan 2013 states that:  
“Development consent must not be granted for the erection of a building on land to which the Division applies if:  
(a) The development would result in a net increase in overshadowing between 12pm and 2pm from the March Equinox to the September Equinox (inclusive) on land to which this Division applies that is within Zone RE1 Public Recreation or that is identified as ‘Special Area’ on the North Sydney Centre map.

#### WINTER SOLSTICE JUNE 21ST

**SPECIAL AREAS**  
The adjacent diagrams demonstrate the shadow impact created by both the approved OSD Concept SSD building envelope and the modified building envelope in relation to the Special Areas as identified by the North Sydney Centre Map.

**MILLER STREET SPECIAL AREA**  
The Miller Street Special Area indicated in turquoise is not overshadowed by either the approved or modified OSD building envelopes.

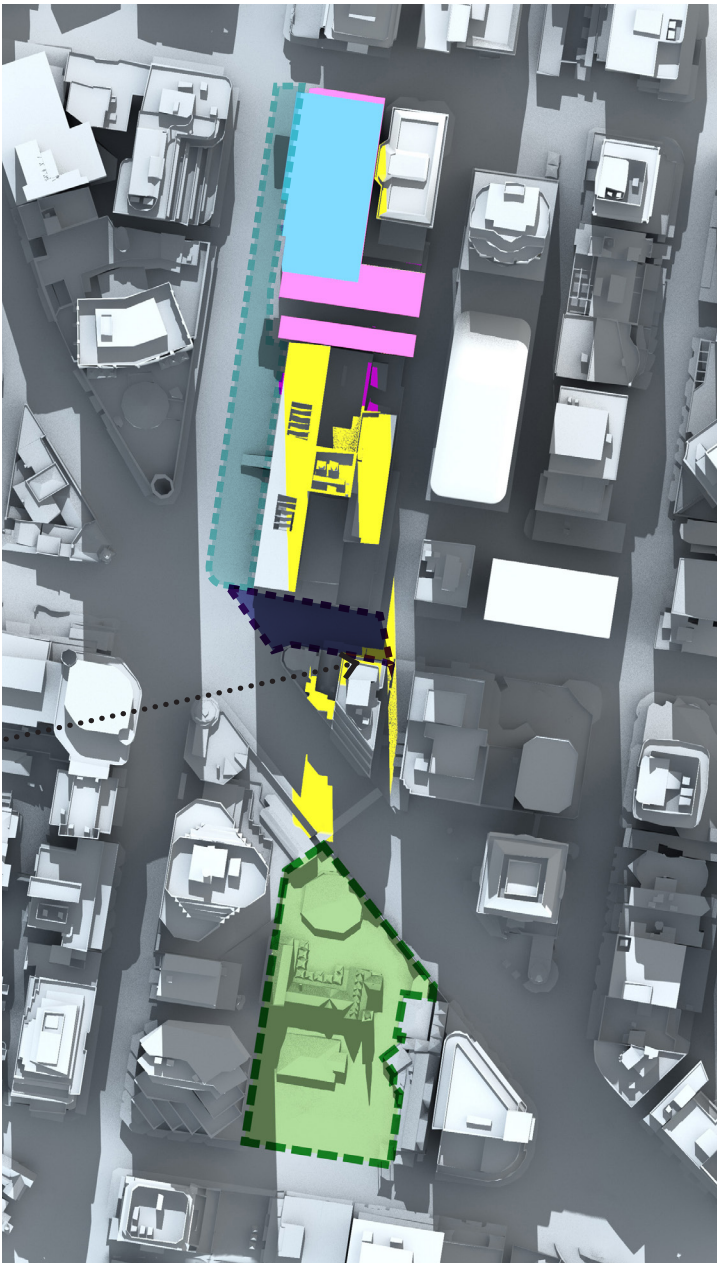
**GREENWOOD PLAZA**  
The Greenwood Plaza Special Area indicated in green is not overshadowed by either the approved or modified envelopes.

**BRETT WHITELEY PLAZA**  
The Brett Whiteley Special Area indicated in purple is discussed in detail in the following sections.

- KEY:
- OSD BUILDING ENVELOPE
  - VICTORIA CROSS STATION CSSI ENVELOPE
  - SHADOWS CAST BY EXISTING BUILDINGS
  - SHADOWS CAST BY OSD ENVELOPE
  - SHADOW CAST BY CSSI ENVELOPE
  - REDUCTION OF SHADOWS
  - INCREASE IN SHADOWS
  - MILLER STREET SPECIAL AREA
  - GREENWOOD PLAZA
  - BRETT WHITELEY PLAZA

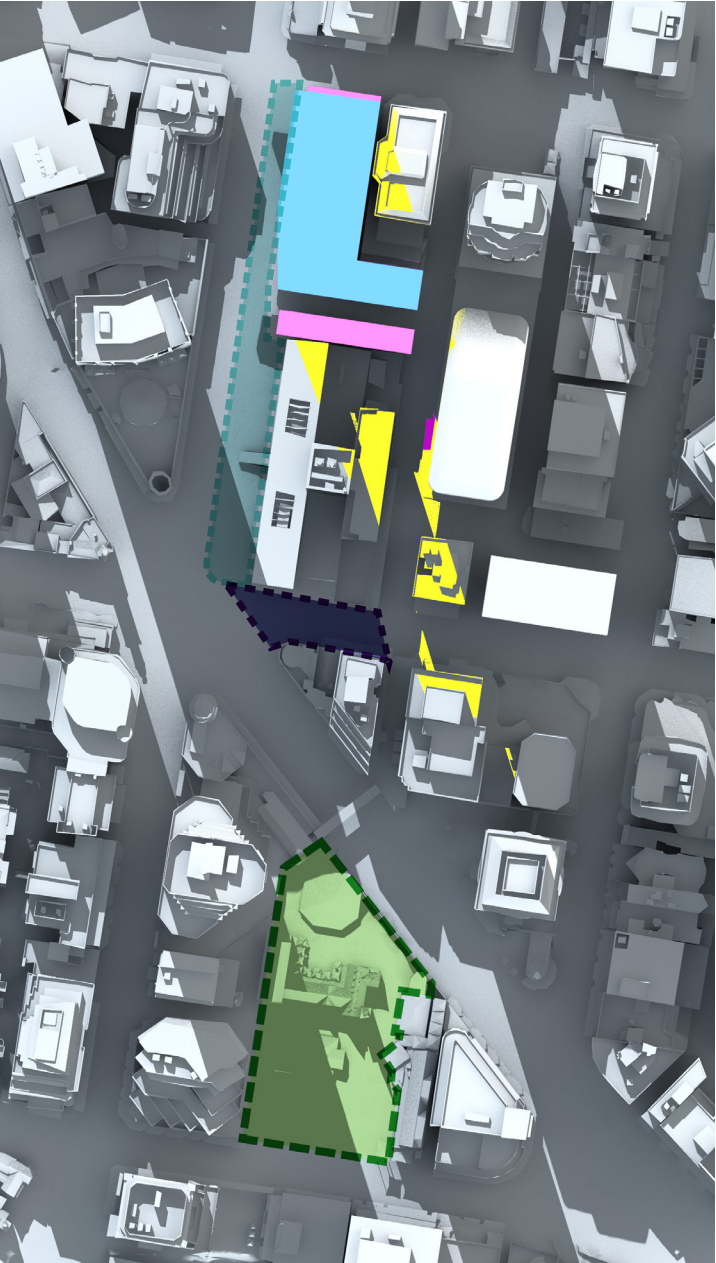


12pm June 21st - Approved Envelope

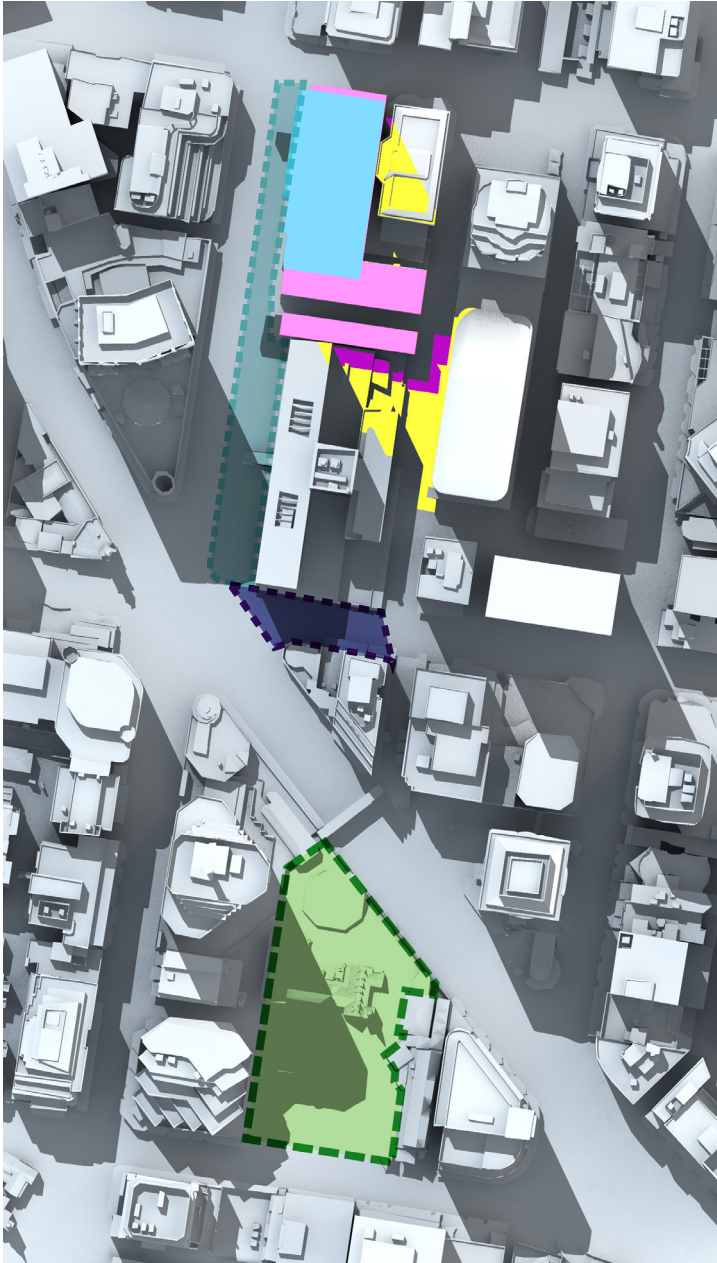


12pm June 21st - Modified Envelope

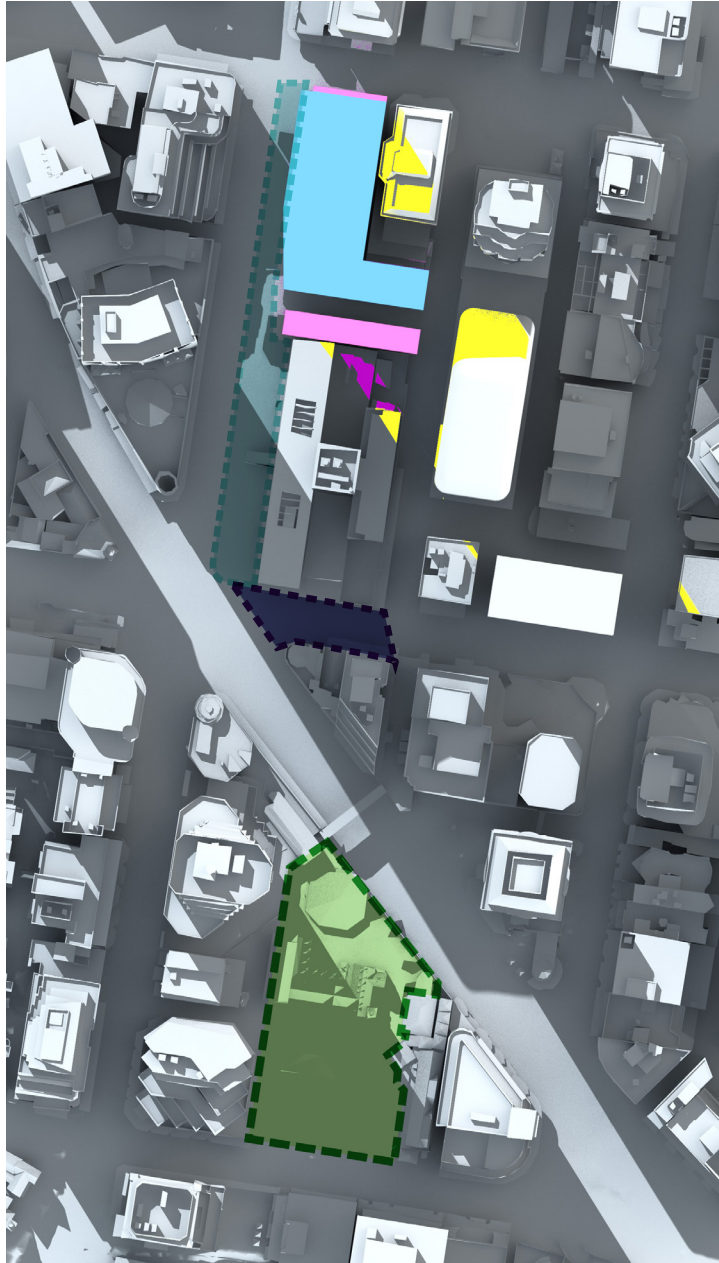




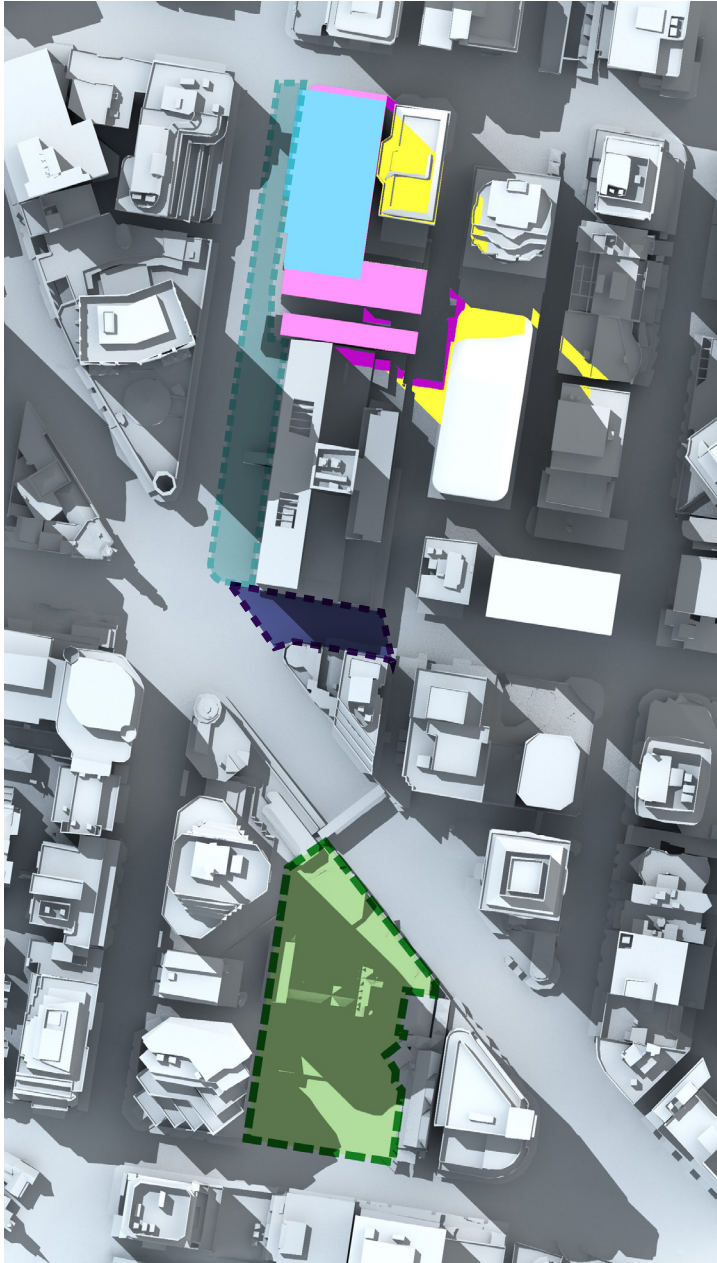
1pm June 21st - Approved Envelope



1pm June 21st - Modified Envelope



2pm June 21st - Approved Envelope



2pm June 21st - Modified Envelope



# A.1.3 SHADOW ANALYSIS SUMMARY

## SPRING EQUINOX SEPTEMBER 21ST

### SPECIAL AREAS

The adjacent diagrams demonstrate the shadow impact created by both the approved OSD Concept SSD building envelope and the modified building envelope in relation to the Special Areas as identified by the North Sydney Centre Map.

### MILLER STREET SPECIAL AREA

The Miller Street Special Area indicated in turquoise is not overshadowed by either the approved or modified envelopes.

### GREENWOOD PLAZA

The Miller Street Special Area indicated in turquoise is not overshadowed by either the approved or modified envelopes.

### BRETT WHITELEY PLAZA

The Brett Whiteley Special Area indicated in purple is discussed in detail in the following sections.

- KEY:
- OSD BUILDING ENVELOPE
  - VICTORIA CROSS STATION CSSI ENVELOPE
  - SHADOWS CAST BY EXISTING BUILDINGS
  - SHADOWS CAST BY OSD ENVELOPE
  - SHADOW CAST BY CSSI ENVELOPE
  - REDUCTION OF SHADOWS
  - INCREASE IN SHADOWS
  - MILLER STREET SPECIAL AREA
  - GREENWOOD PLAZA
  - BRETT WHITELEY PLAZA

Clause 6.3 (2) of the North Sydney Local Environment Plan 2013 states that:  
“Development consent must not be granted for the erection of a building on land to which the Division applies if:  
(a) The development would result in a net increase in overshadowing between 12pm and 2pm from the March Equinox to the September Equinox (inclusive) on land to which this Division applies that is within Zone RE1 Public Recreation or that is identified as ‘Special Area’ on the North Sydney Centre map.

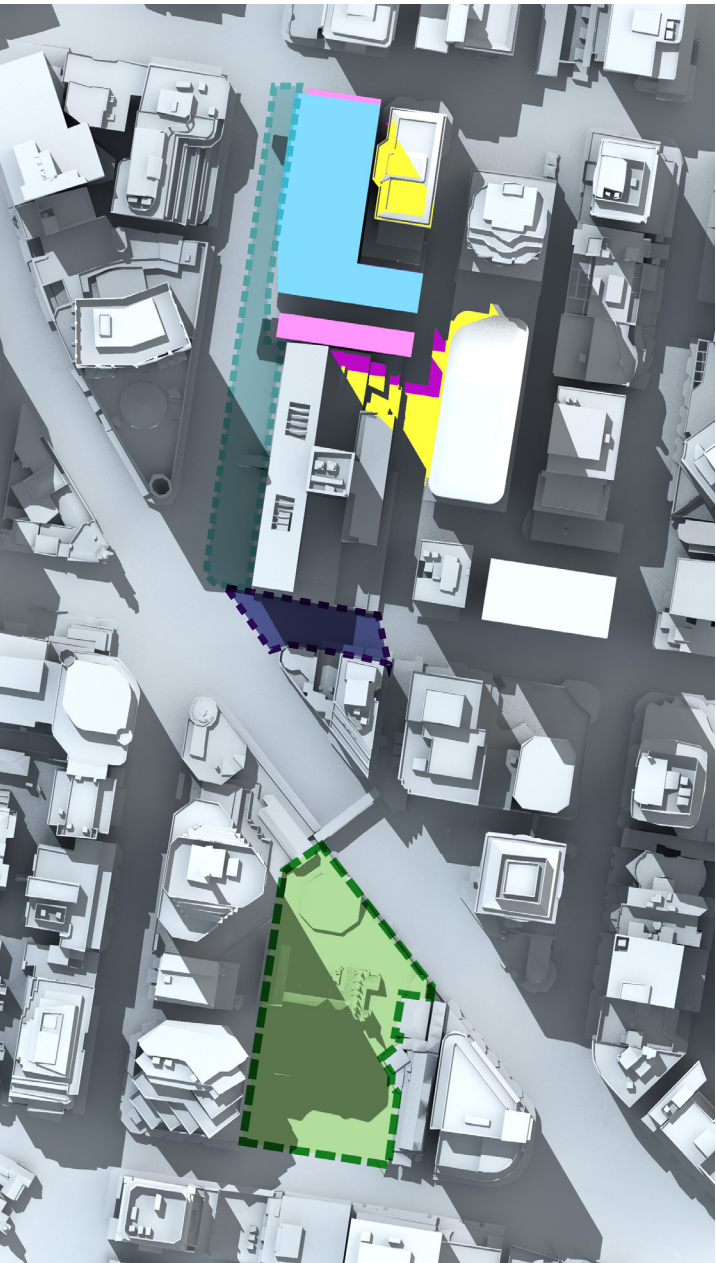


12pm September 21st - Approved Envelope

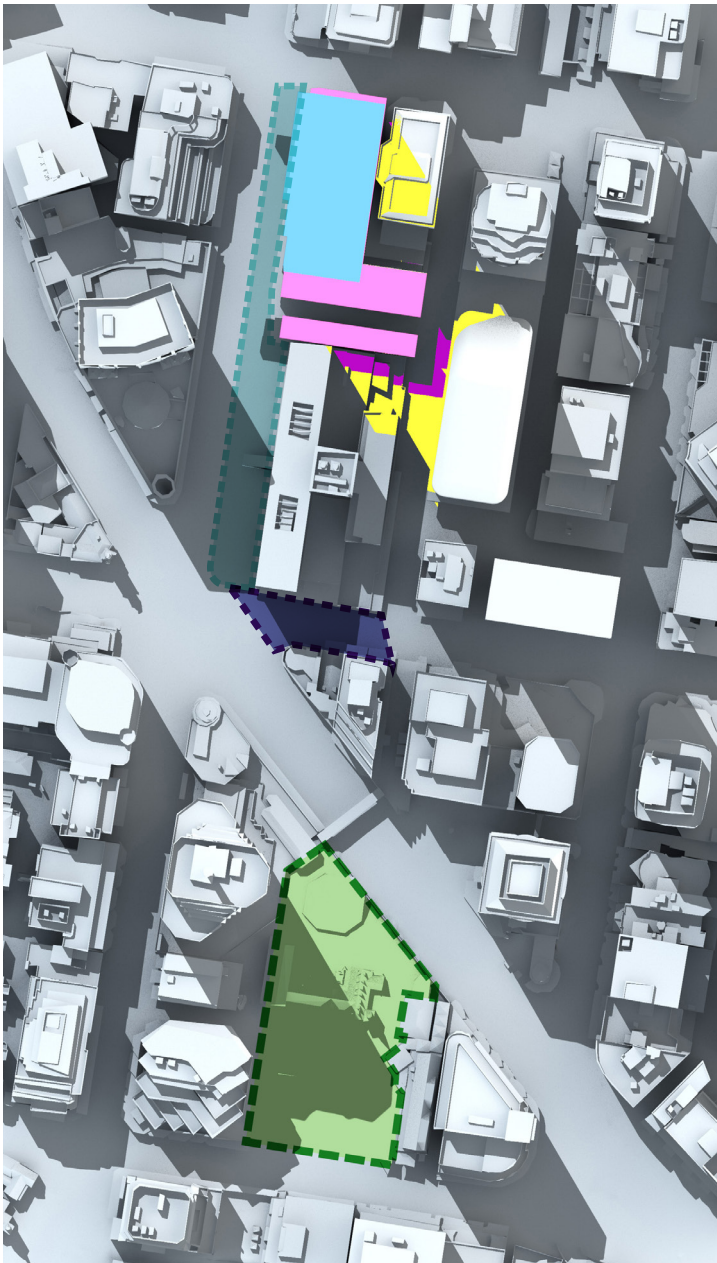


12pm September 21st - Modified Envelope

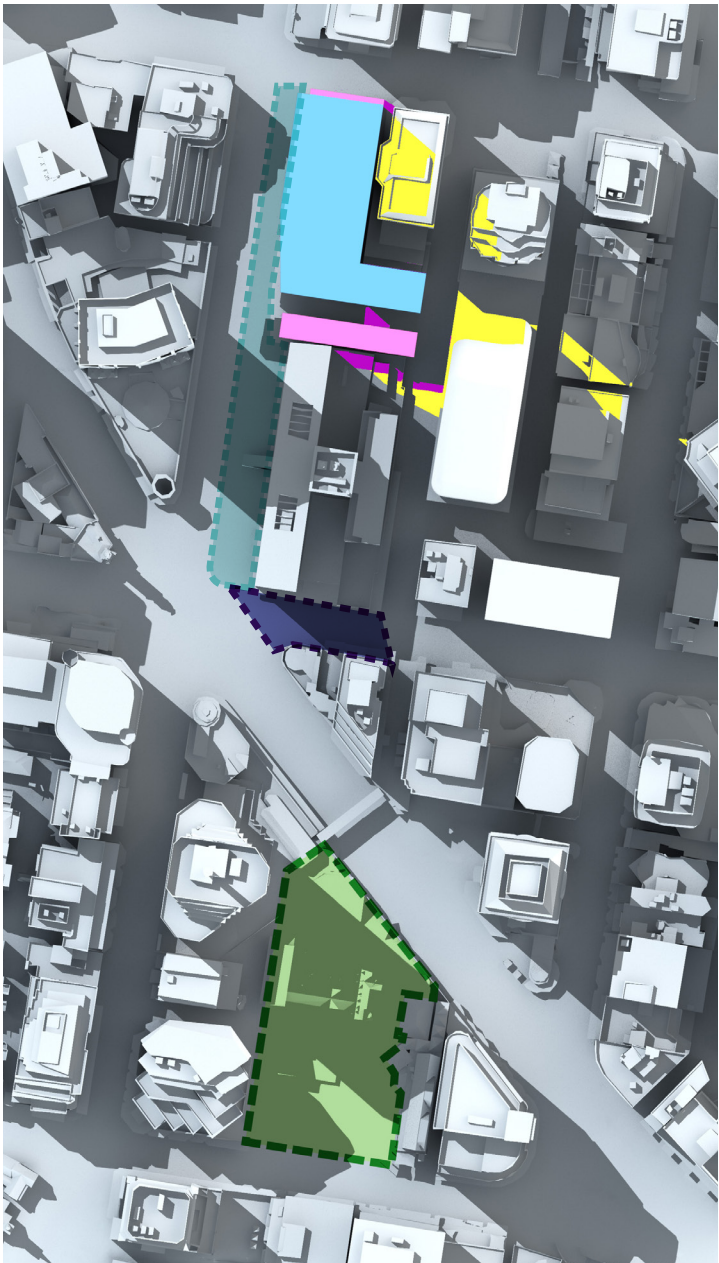




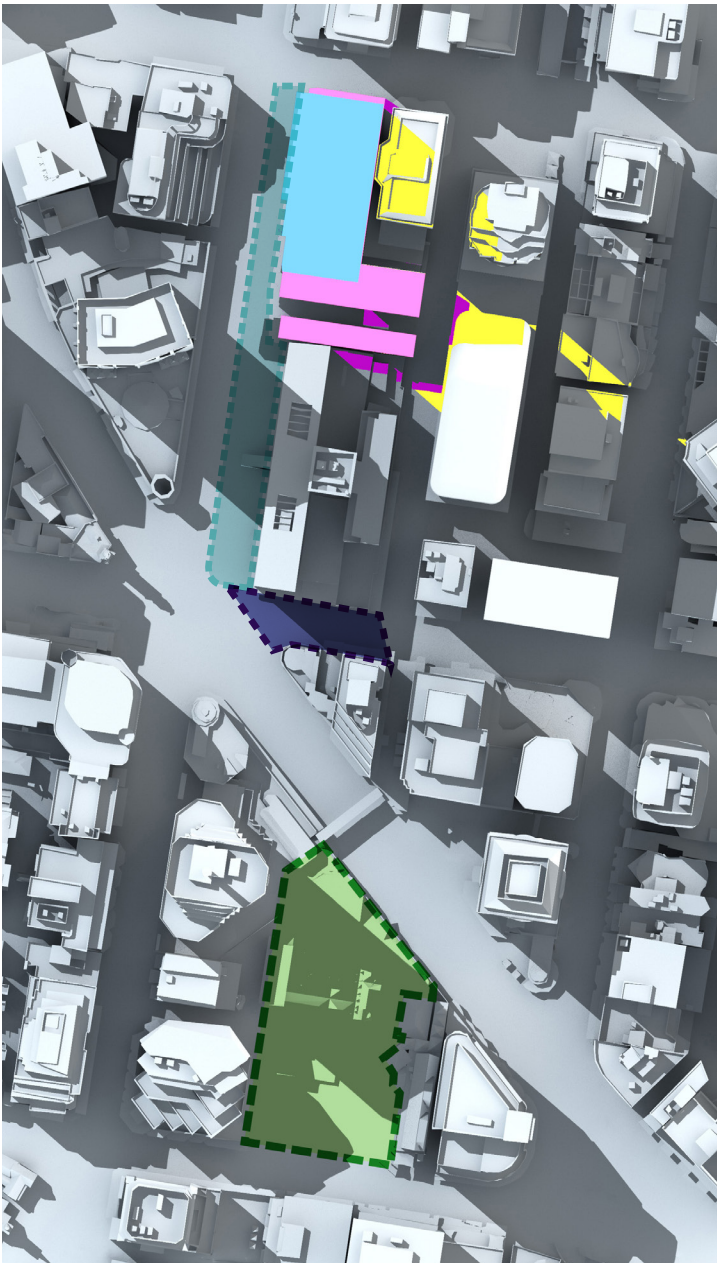
1pm September 21st - Approved Envelope



1pm September 21st - Modified Envelope



2pm September 21st - Approved Envelope



2pm September 21st - Modified Envelope



# A.2.1

## SHADOW ANALYSIS











### MILLER ST SPECIAL AREA

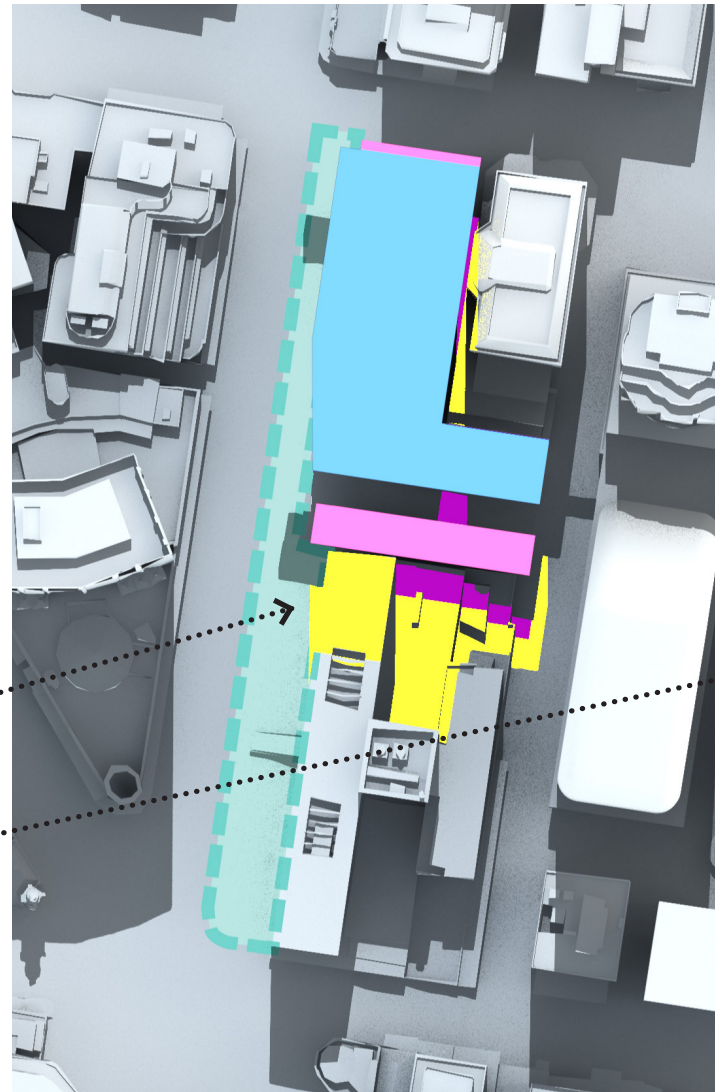
**AUTUMN EQUINOX**  
**MARCH 21ST**

## MILLER STREET SPECIAL AREA

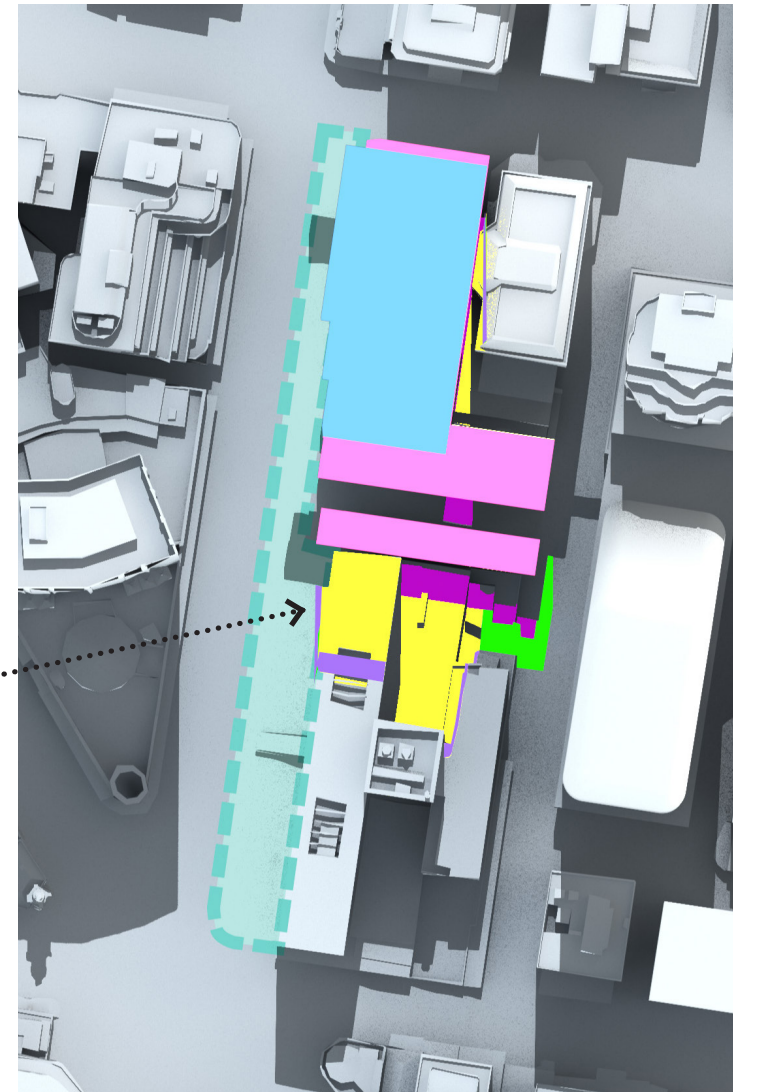
The following diagrams show that there is some minimal overshadowing to the Miller Street Special Area at 12pm. However by 12.15pm there is zero overshadowing. This will be discussed further in the following section.

KEY:

-  OSD BUILDING ENVELOPE
-  VICTORIA CROSS STATION CSSI ENVELOPE
-  SHADOWS CAST BY EXISTING BUILDINGS
-  SHADOWS CAST BY OSD ENVELOPE
-  SHADOW CAST BY CSSI ENVELOPE
-  REDUCTION OF SHADOWS
-  INCREASE IN SHADOWS
-  MILLER STREET SPECIAL AREA
-  GREENWOOD PLAZA
-  BRETT WHITELEY PLAZA

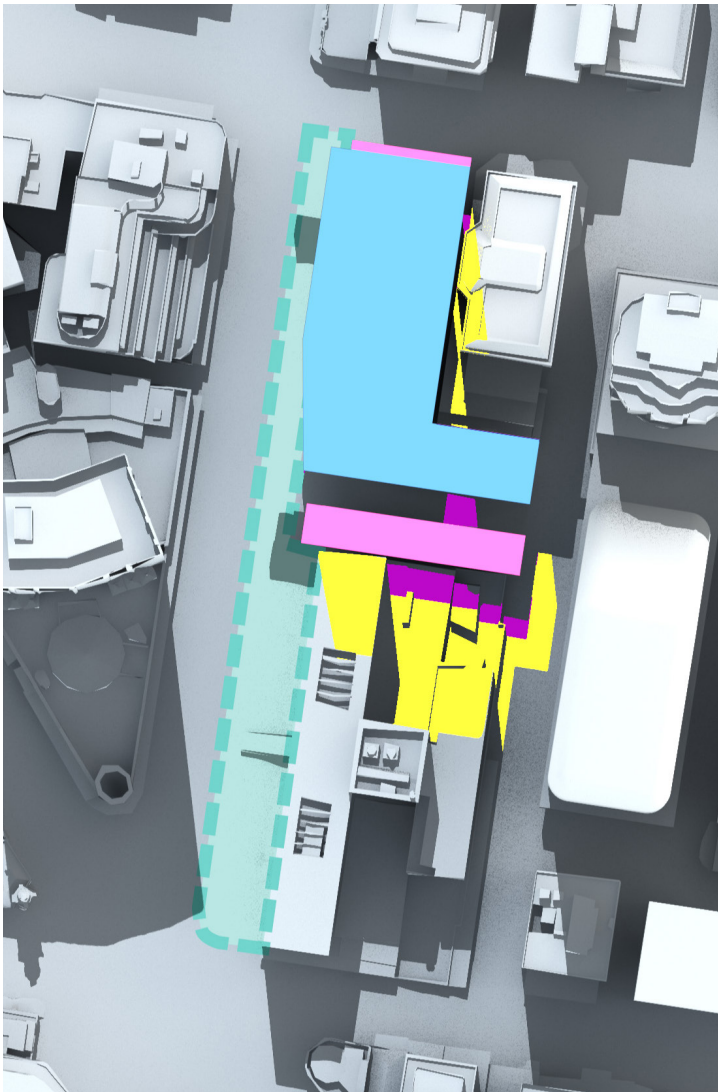


12:00pm March 21st - Approved Envelope

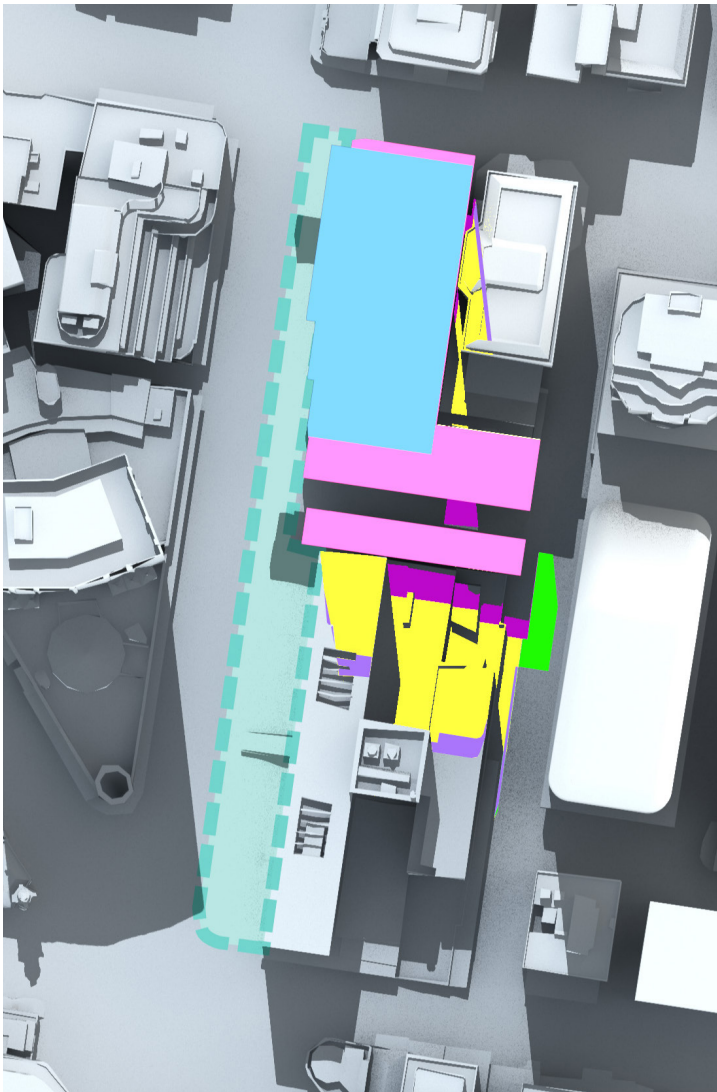


12:00pm March 21st - Modified Envelope with Comparison

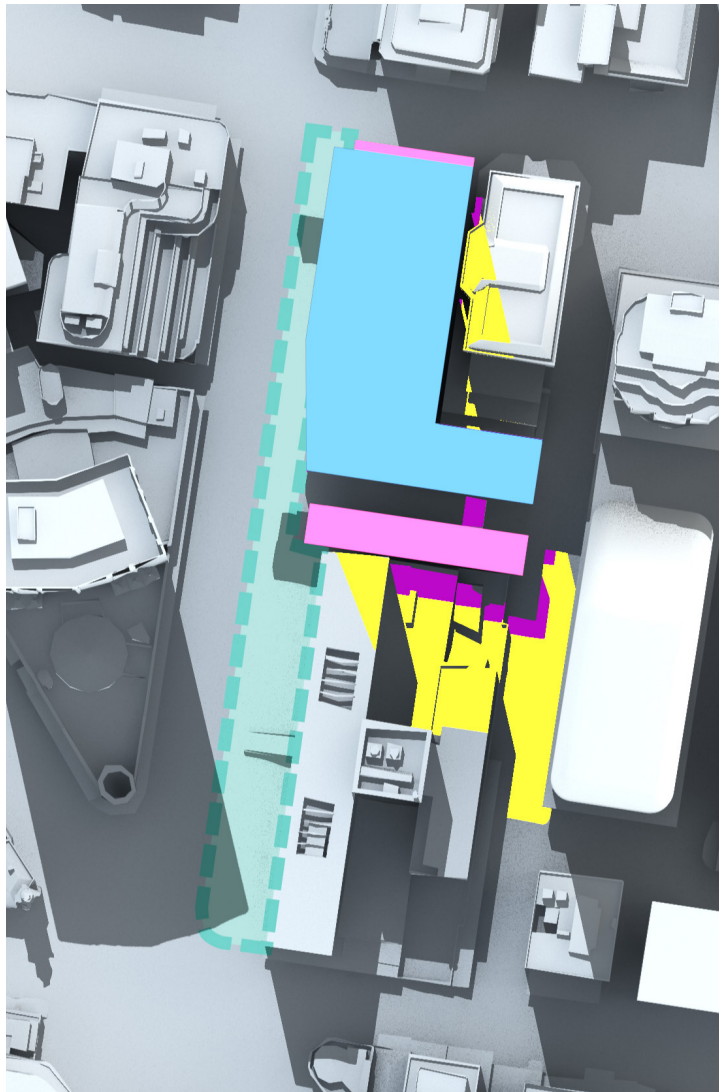




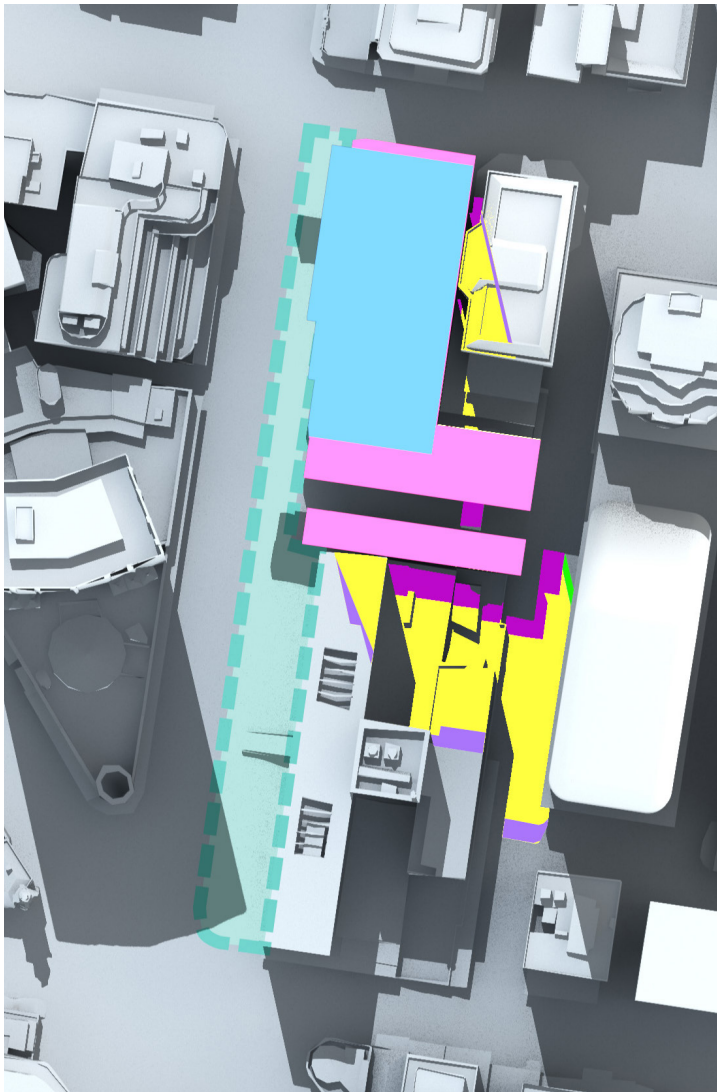
12:15pm March 21st - Approved Envelope



12:15pm March 21st - Modified Envelope with Comparison



12:30pm March 21st - Approved Envelope



12:30pm March 21st - Modified Envelope with Comparison



# A.2.1

## SHADOW ANALYSIS

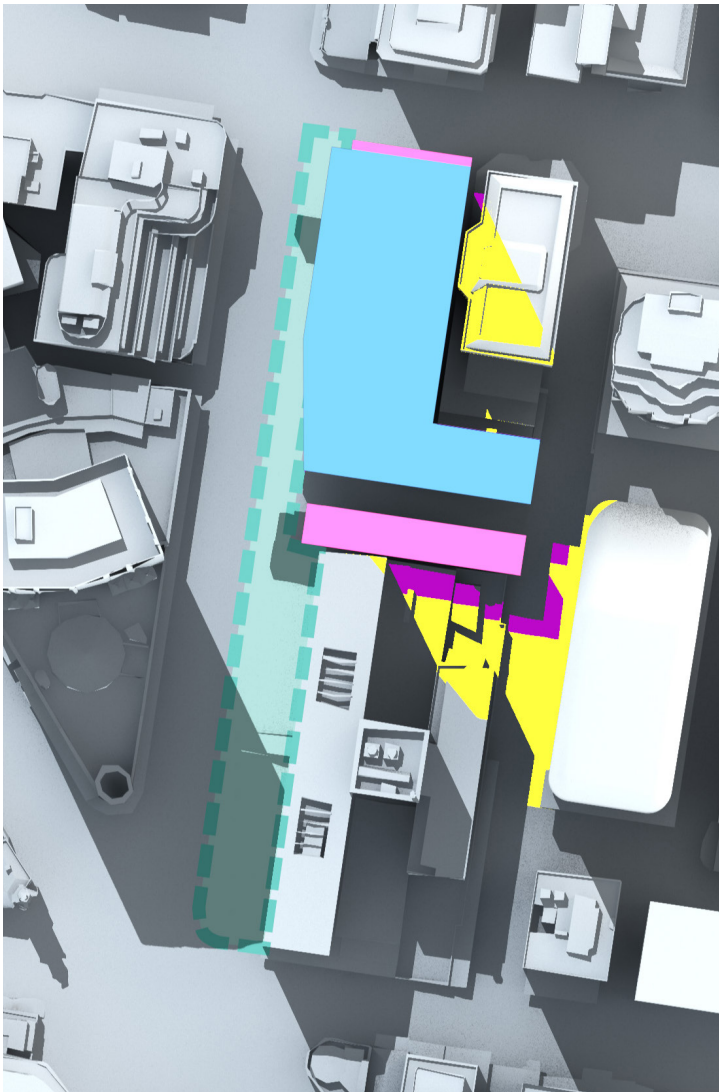
### MILLER ST SPECIAL AREA

#### AUTUMN EQUINOX MARCH 21ST

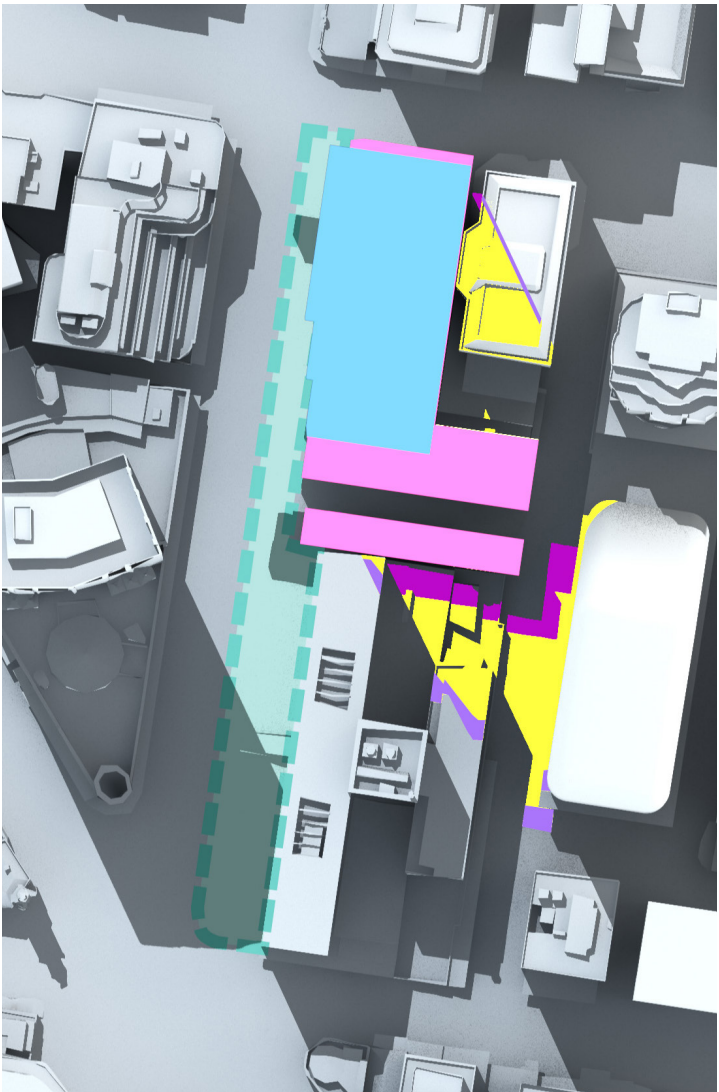
##### MILLER STREET SPECIAL AREA

The following diagrams show that there is some minimal overshadowing to the Miller Street Special Area at 12pm. However by 12.15pm there is zero overshadowing. This will be discussed further in the following section.

- KEY:
- OSD BUILDING ENVELOPE
  - VICTORIA CROSS STATION CSSI ENVELOPE
  - SHADOWS CAST BY EXISTING BUILDINGS
  - SHADOWS CAST BY OSD ENVELOPE
  - SHADOW CAST BY CSSI ENVELOPE
  - REDUCTION OF SHADOWS
  - INCREASE IN SHADOWS
  - MILLER STREET SPECIAL AREA
  - GREENWOOD PLAZA
  - BRETT WHITELEY PLAZA

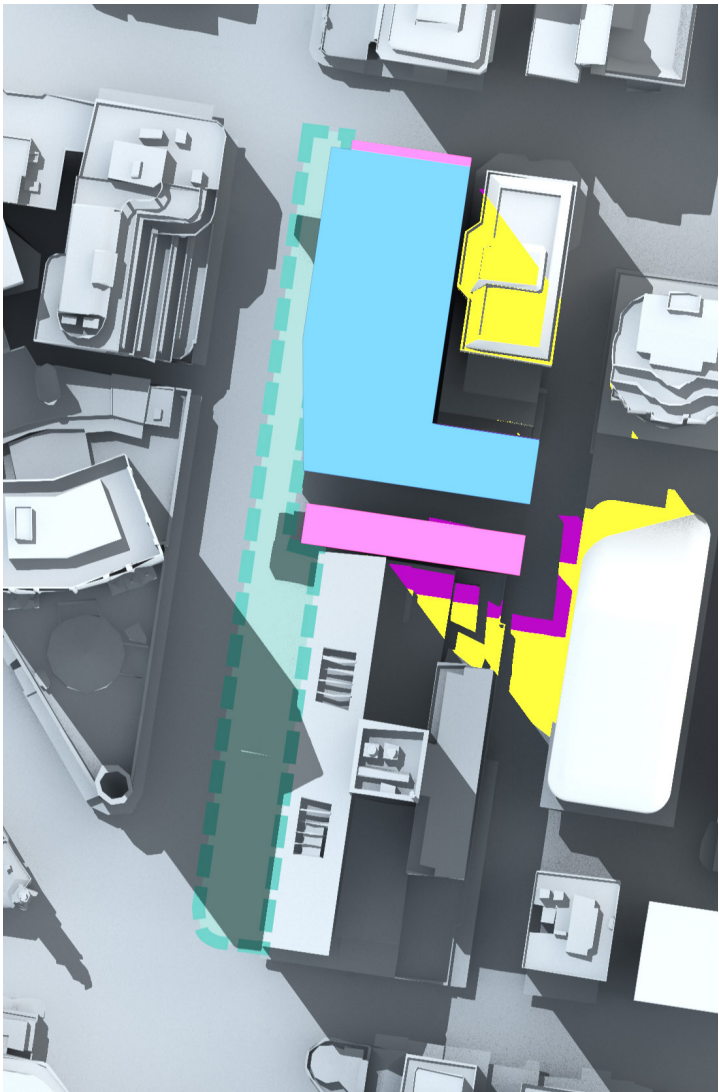


1pm March 21st - Approved Envelope

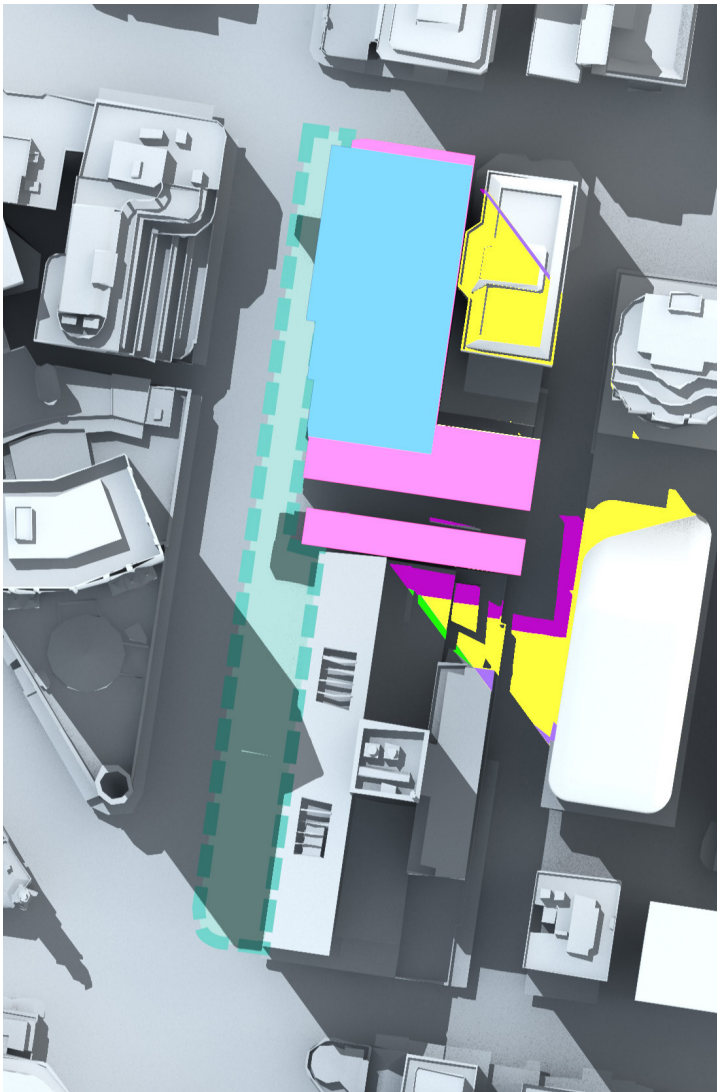


1pm March 21st - Modified Envelope with Comparison

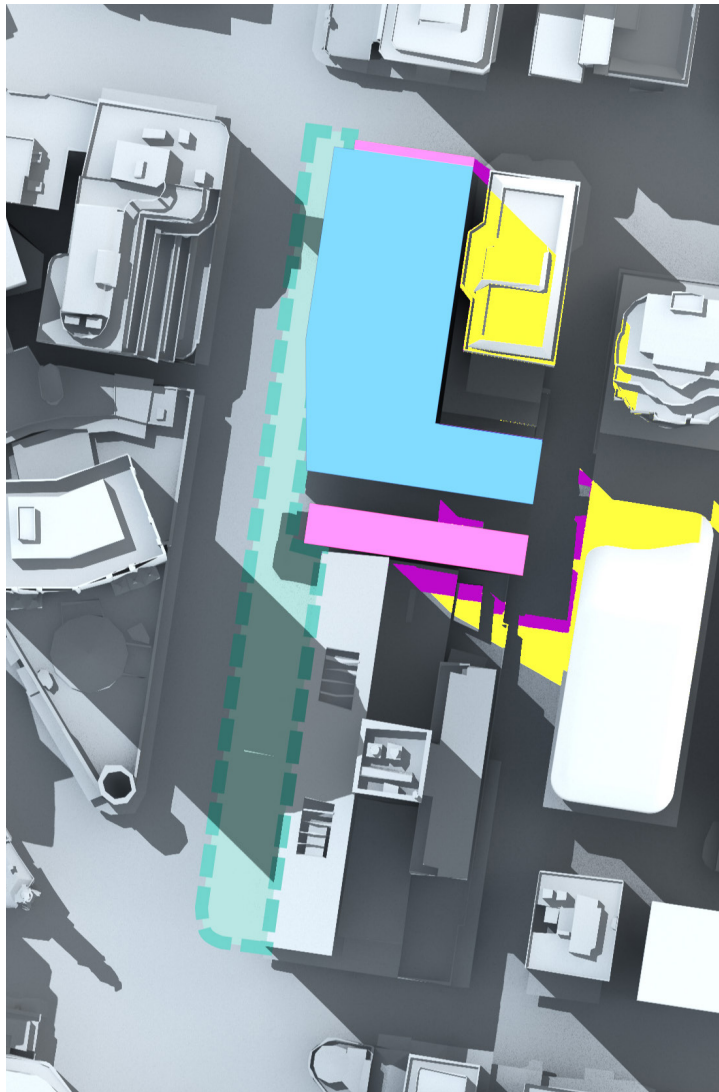




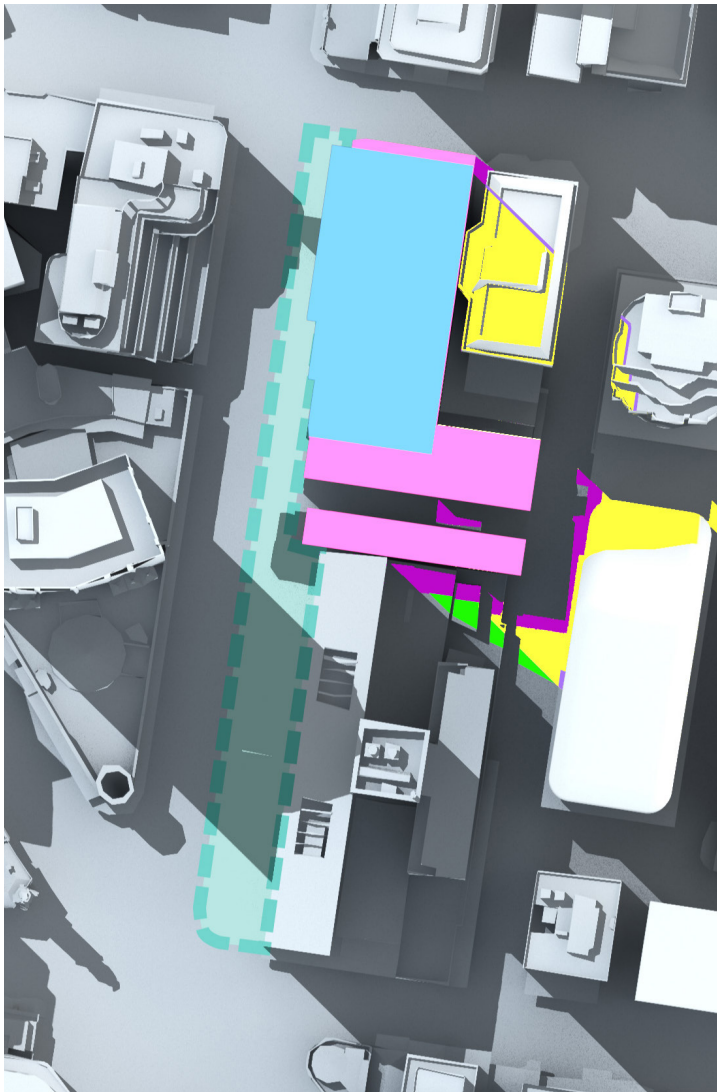
1:30pm March 21st - Approved Envelope



1:30pm March 21st - Modified Envelope with Comparison



2pm March 21st - Approved Envelope



2pm March 21st - Modified Envelope with Comparison



# A.2.1 SHADOW ANALYSIS MILLER ST SPECIAL AREA

## AUTUMN EQUINOX MARCH 21ST

### MILLER STREET SPECIAL AREA

The adjacent diagrams focus on the shadow impact from both the approved OSD Concept SSD building envelope and the modified building envelope in relation to the Miller Street Special Area as identified by North Sydney Centre Map.

The approved OSD Concept SSD building envelope creates overshadowing for approximately 10-12 minutes for an average of 33m<sup>2</sup> at 12pm on the Autumn Equinox.

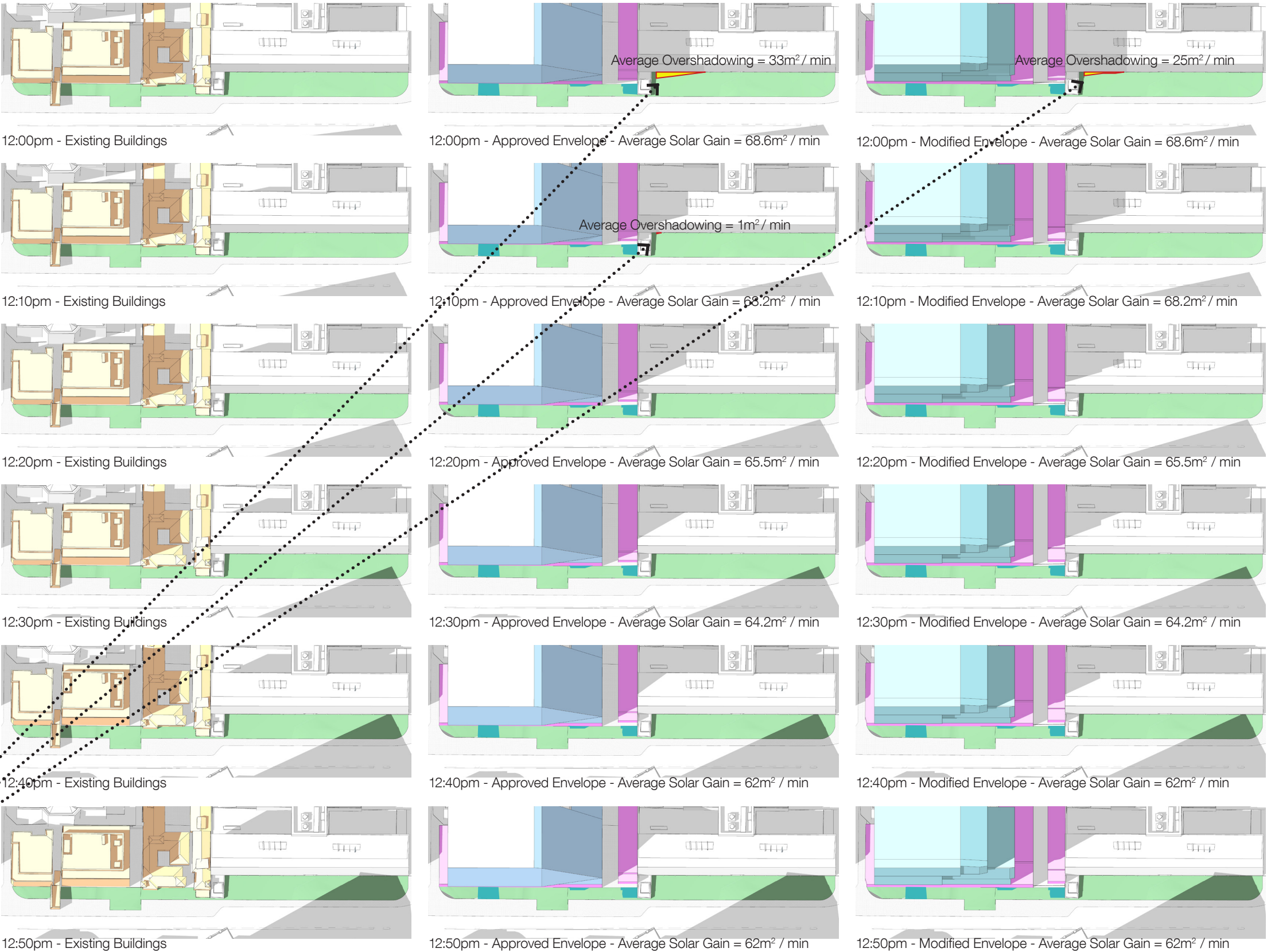
The modified building envelope creates overshadowing for approximately 10 minutes for an average of 25m<sup>2</sup> at 12pm on the Autumn Equinox. This is a reduction from the approved envelope.

By removing the existing buildings, the integrated station development (including the CSSI approved areas) achieves an average area gain in solar access of 60.5m<sup>2</sup> per minute between 12pm and 2pm on the Autumn equinox.

If considering the additional shadows from the OSD envelopes only this net gain in solar is 57.67m<sup>2</sup> per minute for the approved envelope and 58.42m<sup>2</sup> per minute for the modified envelope.

There is a significant increase in solar access to the Miller Street Special Area as a result of the integrated station development.

- KEY: 
-  MILLER STREET SPECIAL AREA
  -  VICTORIA CROSS STATION CSSI APPROVAL
  -  OSD BUILDING ENVELOPES (Approved + MODIFIED)
  -  EXISTING BUILDINGS
  -  EXISTING SHADOW
  -  INCREASE IN SHADOWS FROM OSD
  -  SOLAR ACCESS GAINED





AUTUMN EQUINOX  
MARCH 21ST

SOLAR GAIN CALCULATIONS

The average solar gain per minute is determined for both the approved and the modified envelopes. The average overshadowing per minute is determined for each envelope condition and subtracted from the solar gain to give the net solar gain.






Average area of solar gain per minute:  
 $((69 \times 10) + (68 \times 10) + (66 \times 10) + (64 \times 10) + (62 \times 10) + (60 \times 10) + (59 \times 10) + (59 \times 10) + (58 \times 10) + (41 \times 10)) / 120 = 60.5\text{m}^2$

Average area of overshadowing for by approved envelope per minute:  
 $((33 \times 10) + (1 \times 10)) / 120 = 2.83\text{m}^2$

Average area of overshadowing by modified envelope per minute:  
 $(25 \times 10) / 120 = 2.08\text{m}^2$

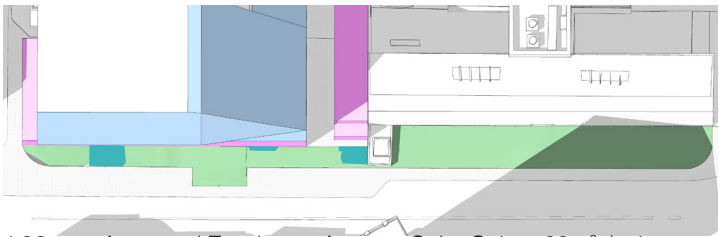
Net solar gain for approved envelope per minute:  
 $60.5 - 2.83 = 57.67\text{m}^2$

Net solar gain for the modified envelope per minute:  
 $60.5 - 2.08 = 58.42\text{m}^2$

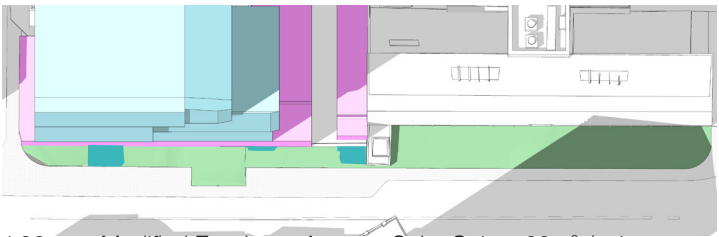
- KEY: 
-  MILLER STREET SPECIAL AREA
  -  VICTORIA CROSS STATION CSSI APPROVAL
  -  OSD BUILDING ENVELOPES (Approved + MODIFIED)
  -  EXISTING BUILDINGS
  -  EXISTING SHADOW
  -  INCREASE IN SHADOWS FROM OSD
  -  SOLAR ACCESS GAINED



1:00pm - Existing Buildings



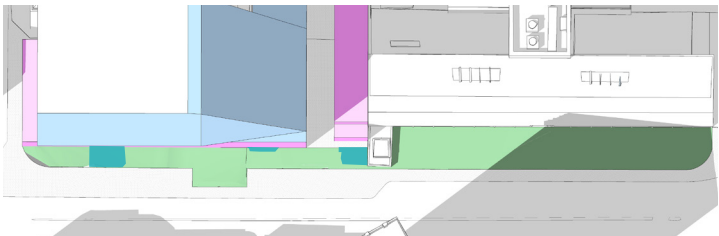
1:00pm - Approved Envelope - Average Solar Gain = 60m<sup>2</sup> / min



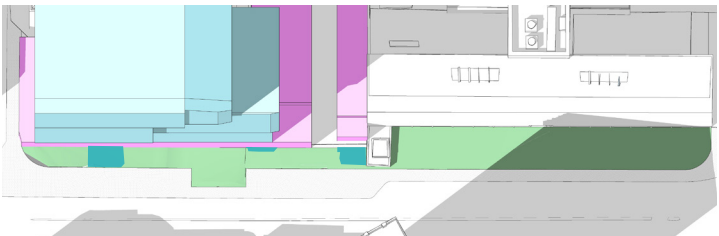
1:00pm - Modified Envelope- Average Solar Gain = 60m<sup>2</sup> / min



1:10pm - Existing Buildings



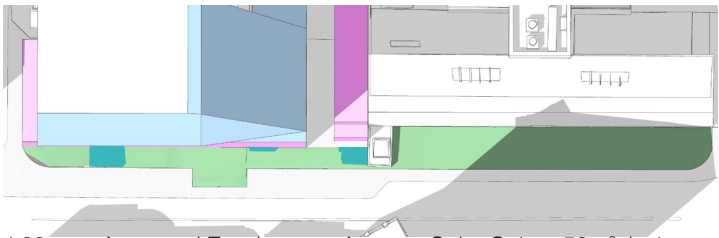
1:10pm - Approved Envelope - Average Solar Gain = 59m<sup>2</sup> / min



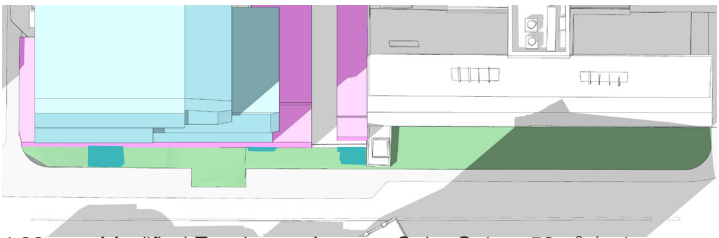
1:10pm - Modified Envelope - Average Solar Gain = 59m<sup>2</sup> / min



1:20pm - Existing Buildings



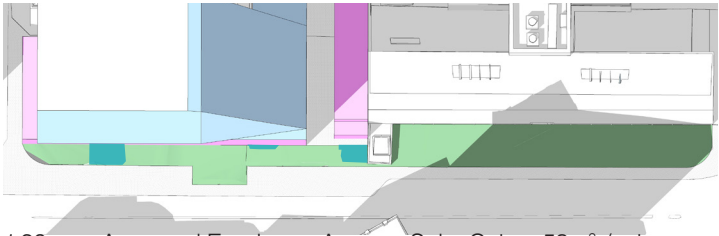
1:20pm - Approved Envelope = - Average Solar Gain = 59m<sup>2</sup> / min



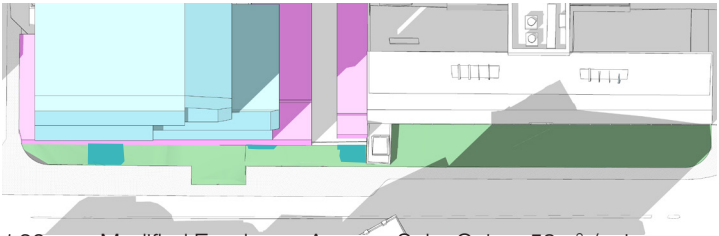
1:20pm - Modified Envelope - Average Solar Gain = 59m<sup>2</sup> / min



1:30pm - Existing Buildings



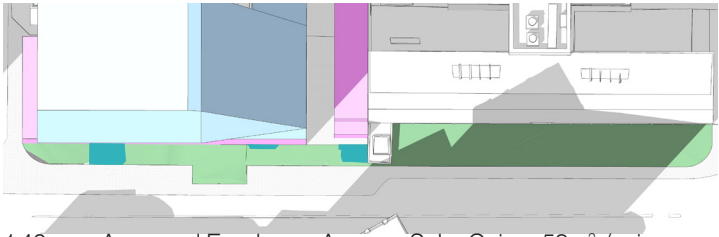
1:30pm - Approved Envelope - Average Solar Gain = 58m<sup>2</sup> / min



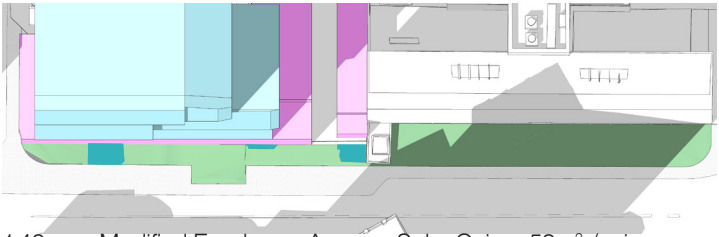
1:30pm - Modified Envelope - Average Solar Gain = 58m<sup>2</sup> / min



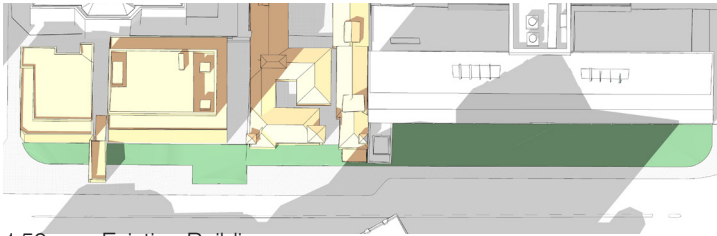
1:40pm - Existing Buildings



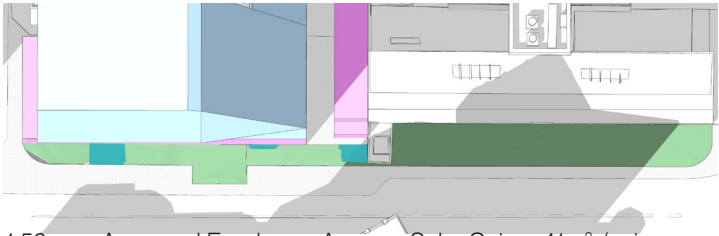
1:40pm - Approved Envelope - Average Solar Gain = 58m<sup>2</sup> / min



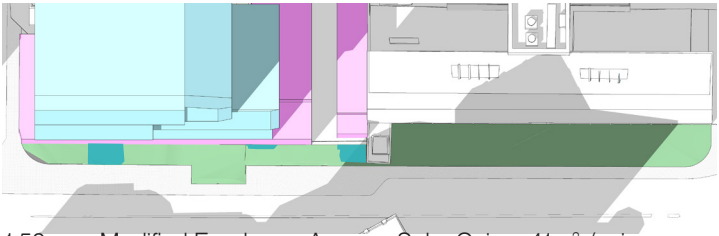
1:40pm - Modified Envelope - Average Solar Gain = 58m<sup>2</sup> / min



1:50pm - Existing Buildings



1:50pm - Approved Envelope - Average Solar Gain = 41m<sup>2</sup> / min



1:50pm - Modified Envelope - Average Solar Gain = 41m<sup>2</sup> / min



# A.2.2

## SHADOW ANALYSIS

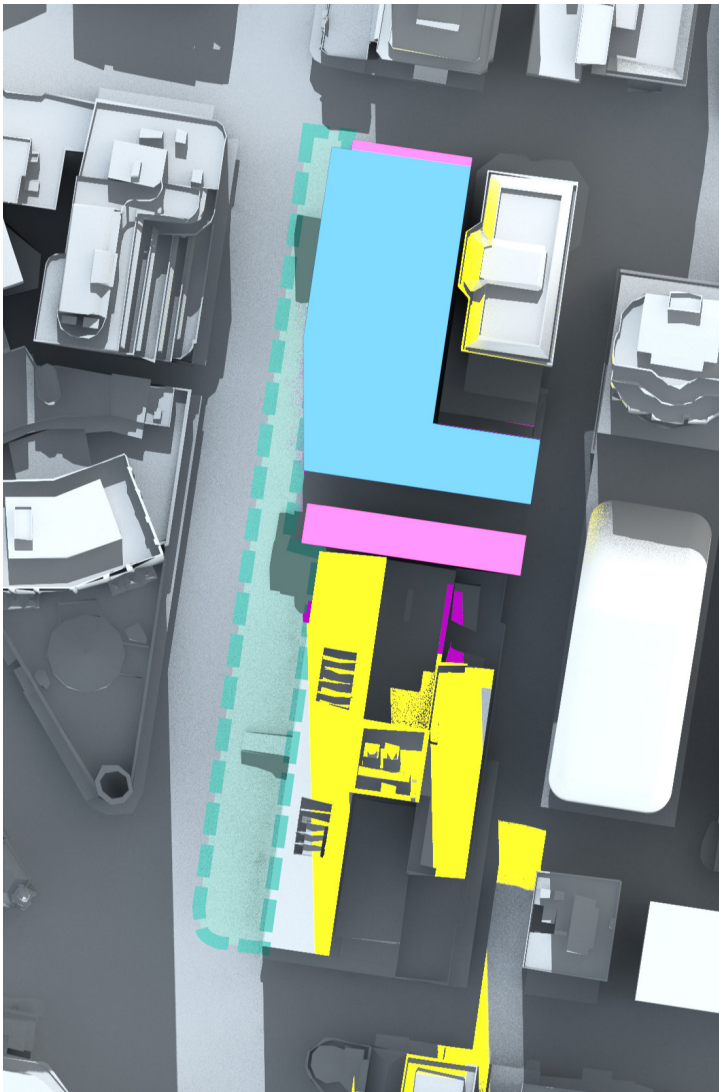
### MILLER ST SPECIAL AREA

WINTER SOLSTICE  
JUNE 21ST

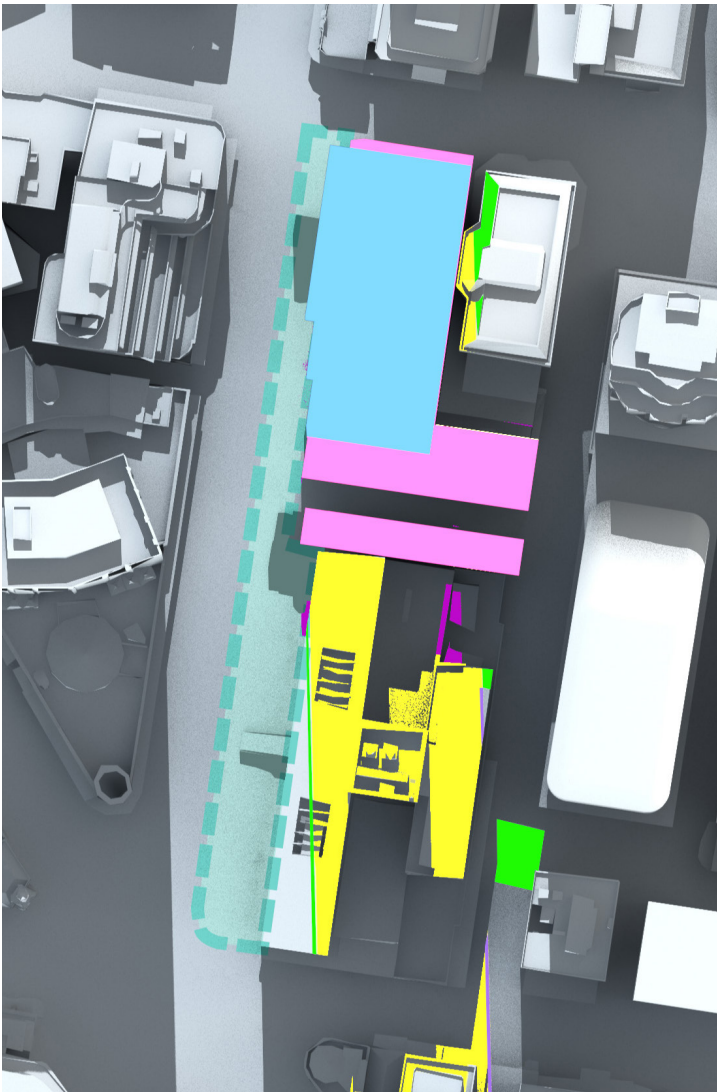
MILLER STREET SPECIAL AREA

The Miller Street Special Area indicated in turquoise slightly overshadowed at 12pm but gone by 12.15pm. This shadow is cast by the CSSI envelope, not by the approved OSD Concept SSD building envelope or the modified building envelope.

- KEY:
- OSD BUILDING ENVELOPE
  - VICTORIA CROSS STATION CSSI ENVELOPE
  - SHADOWS CAST BY EXISTING BUILDINGS
  - SHADOWS CAST BY OSD ENVELOPE
  - SHADOW CAST BY CSSI ENVELOPE
  - REDUCTION OF SHADOWS
  - INCREASE IN SHADOWS
  - MILLER STREET SPECIAL AREA

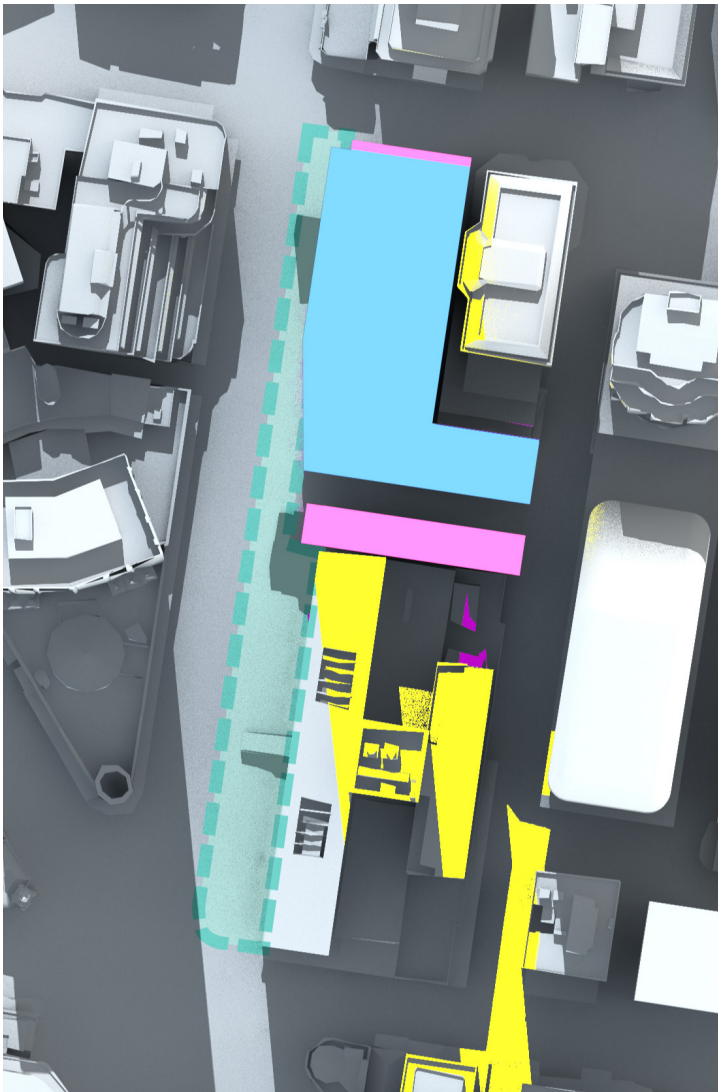


12:00pm June 21st - Approved Envelope

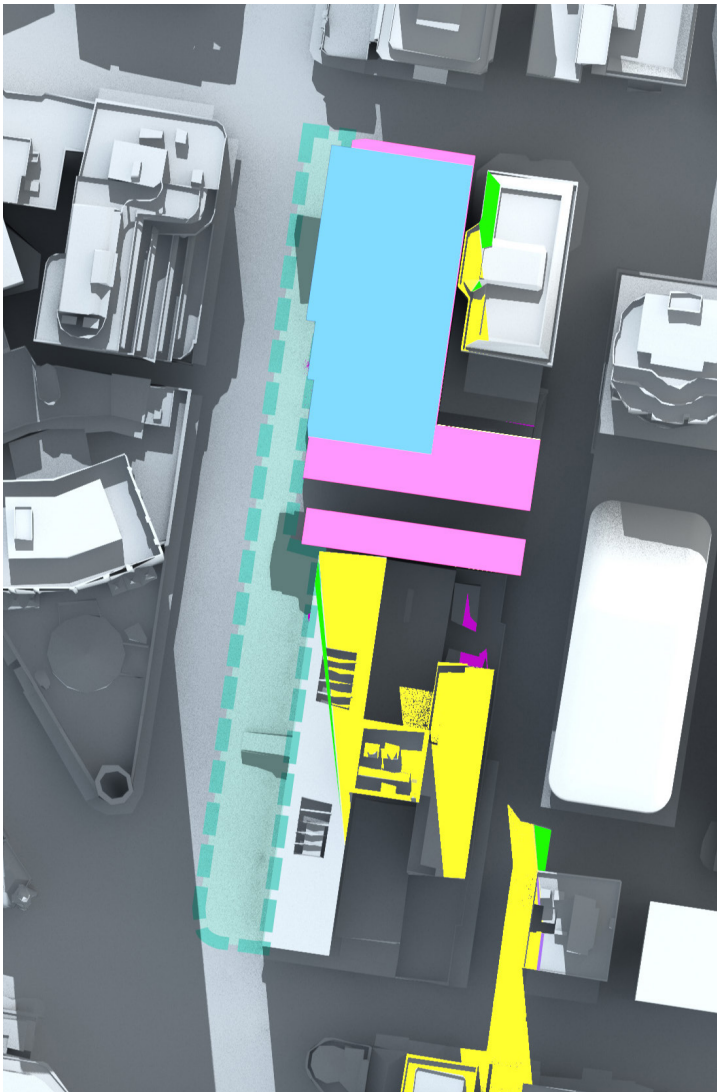


12:00pm June 21st - Modified Envelope with Comparison

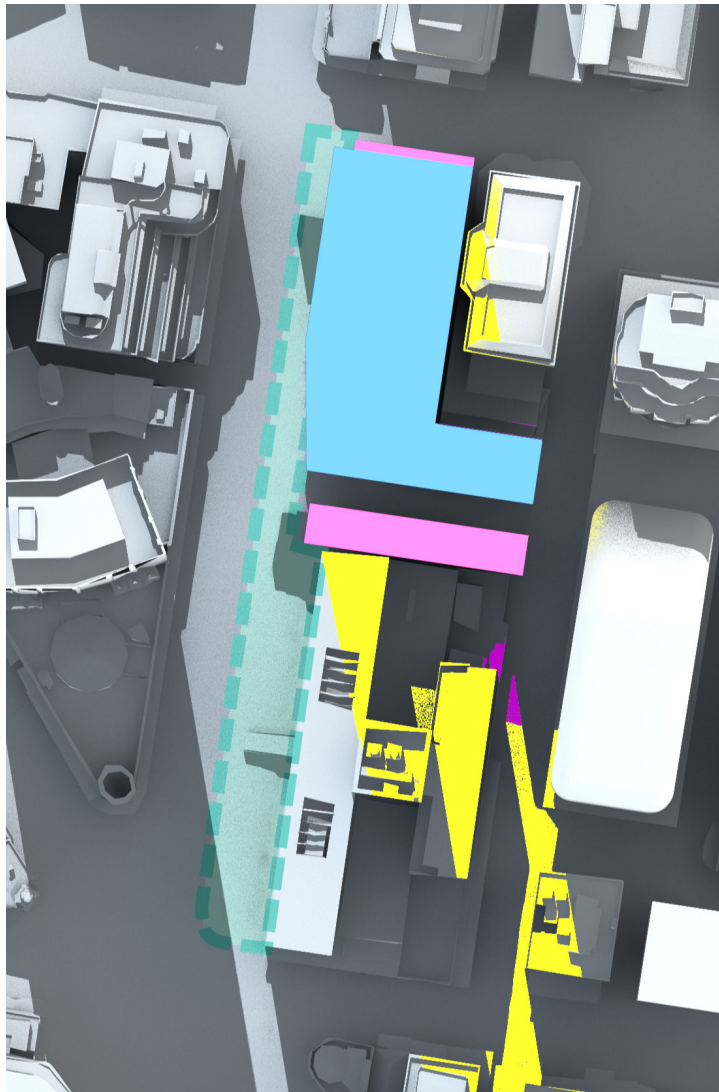




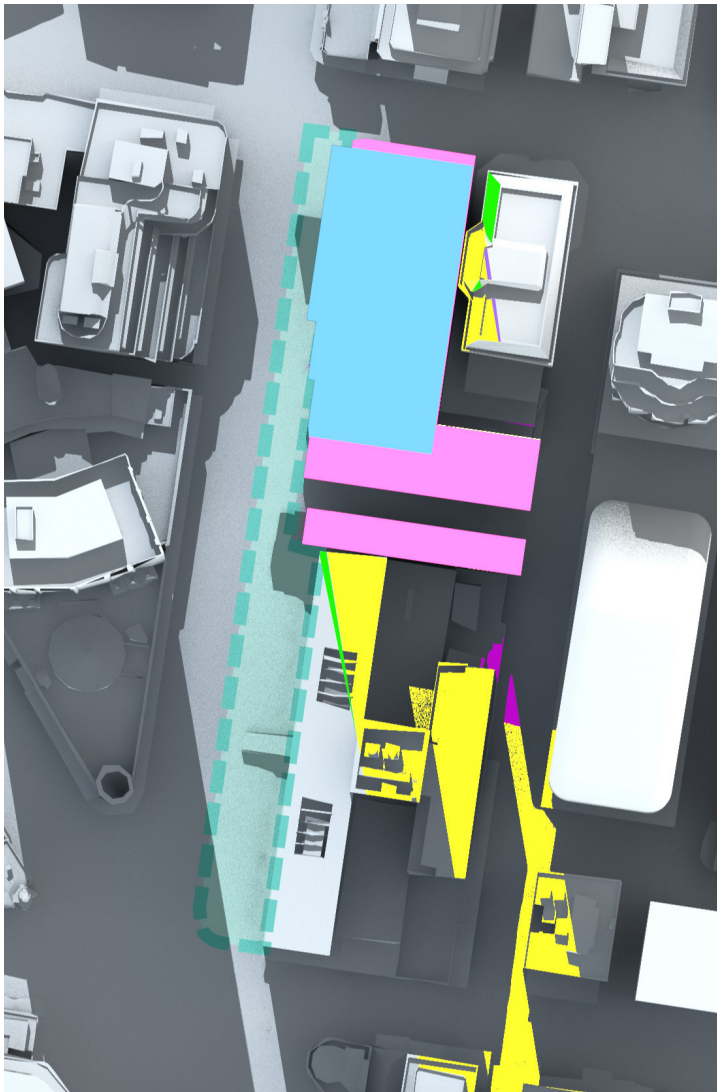
12:15pm June 21st - Approved Envelope



12:15pm June 21st - Modified Envelope with Comparison



12:30pm June 21st - Approved Envelope



12:30pm June 21st - Modified Envelope with Comparison



# A.2.2

## SHADOW ANALYSIS

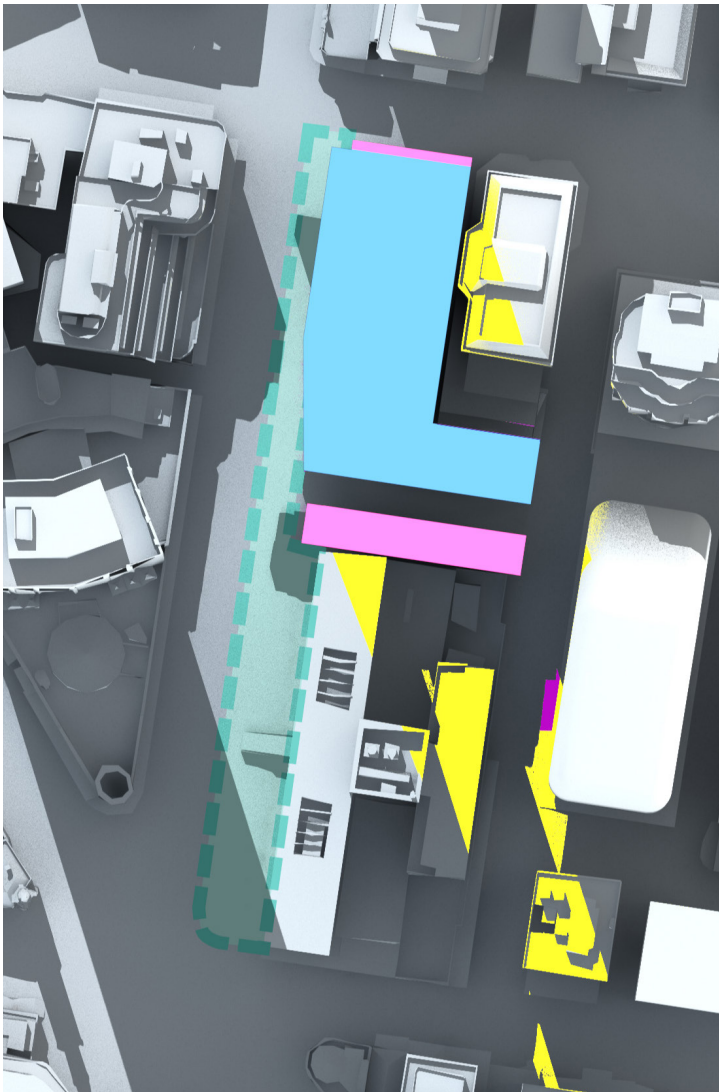
### MILLER ST SPECIAL AREA

WINTER SOLSTICE  
JUNE 21ST

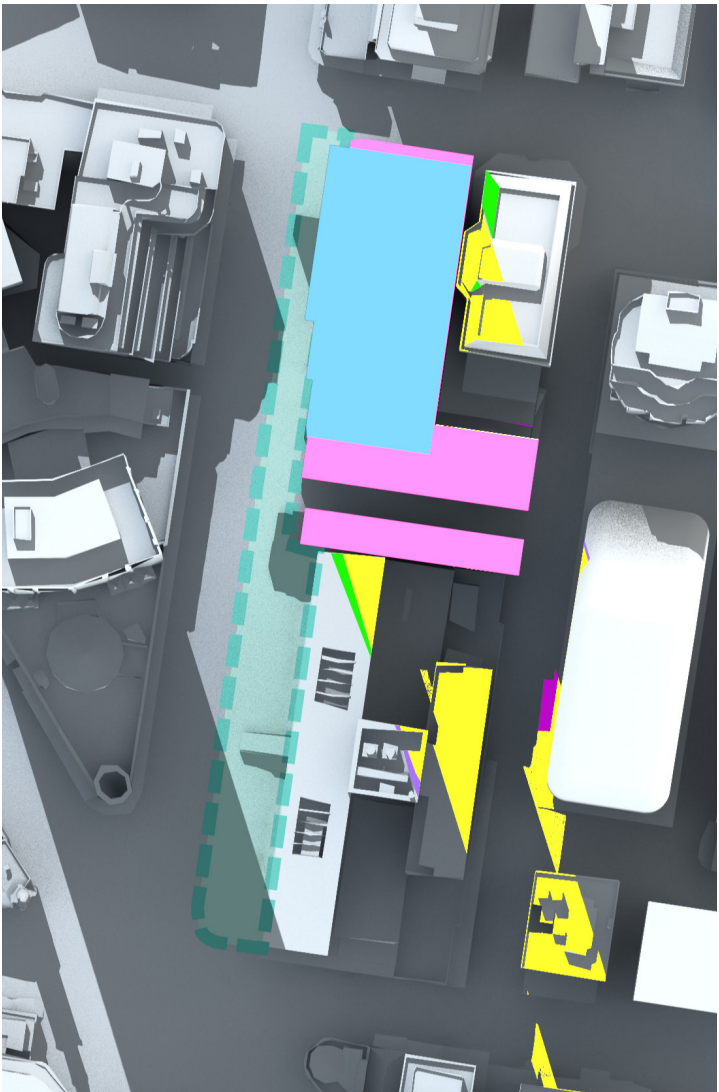
MILLER STREET SPECIAL AREA

The Miller Street Special Area indicated in turquoise slightly overshadowed at 12pm but gone by 12.15pm. This shadow is cast by the CSSI envelope, not by the approved OSD Concept SSD building envelope or the modified building envelope.

- KEY:
- OSD BUILDING ENVELOPE
  - VICTORIA CROSS STATION CSSI ENVELOPE
  - SHADOWS CAST BY EXISTING BUILDINGS
  - SHADOWS CAST BY OSD ENVELOPE
  - SHADOW CAST BY CSSI ENVELOPE
  - REDUCTION OF SHADOWS
  - INCREASE IN SHADOWS
  - MILLER STREET SPECIAL AREA

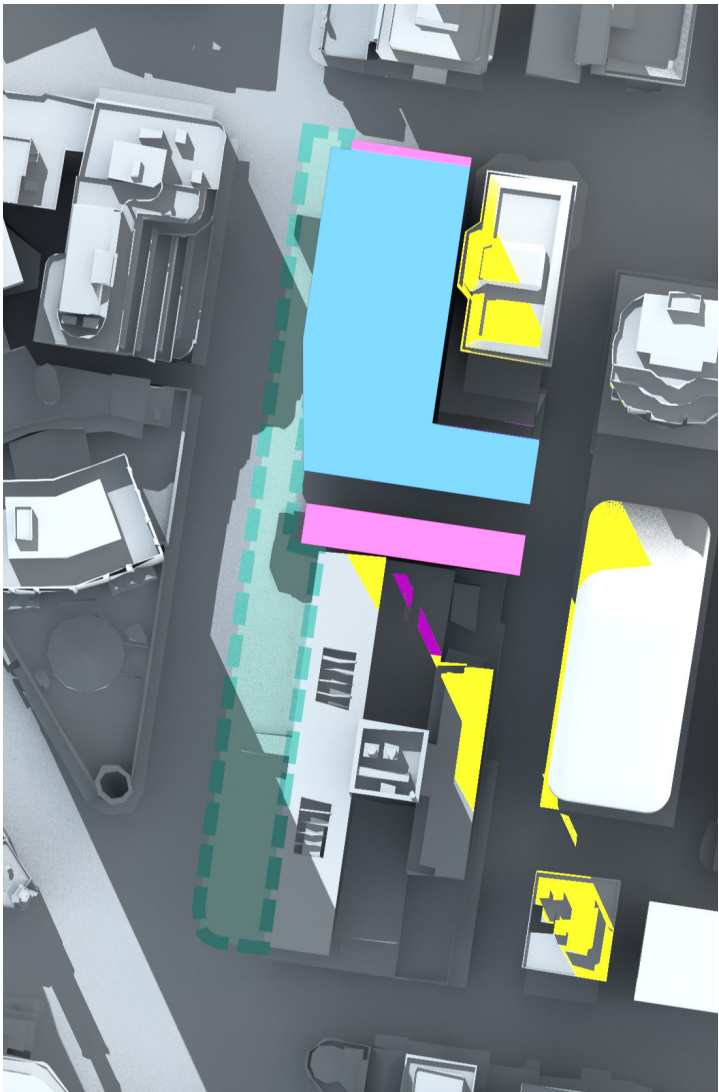


1pm June 21st - Approved Envelope

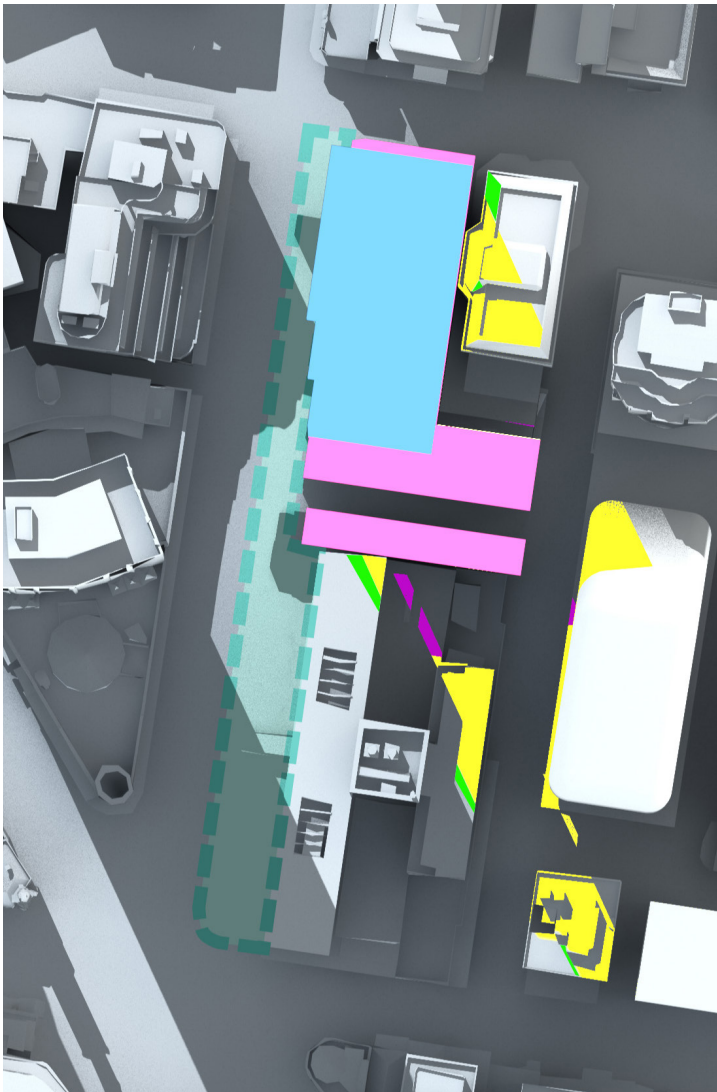


1pm June 21st - Modified with Comparison

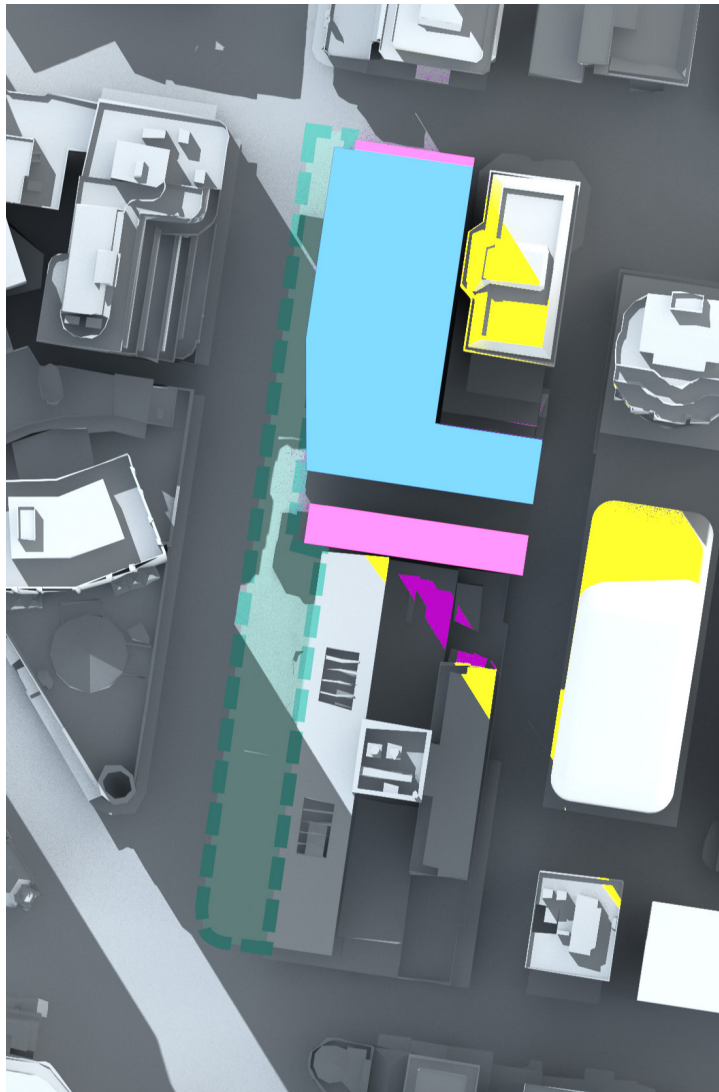




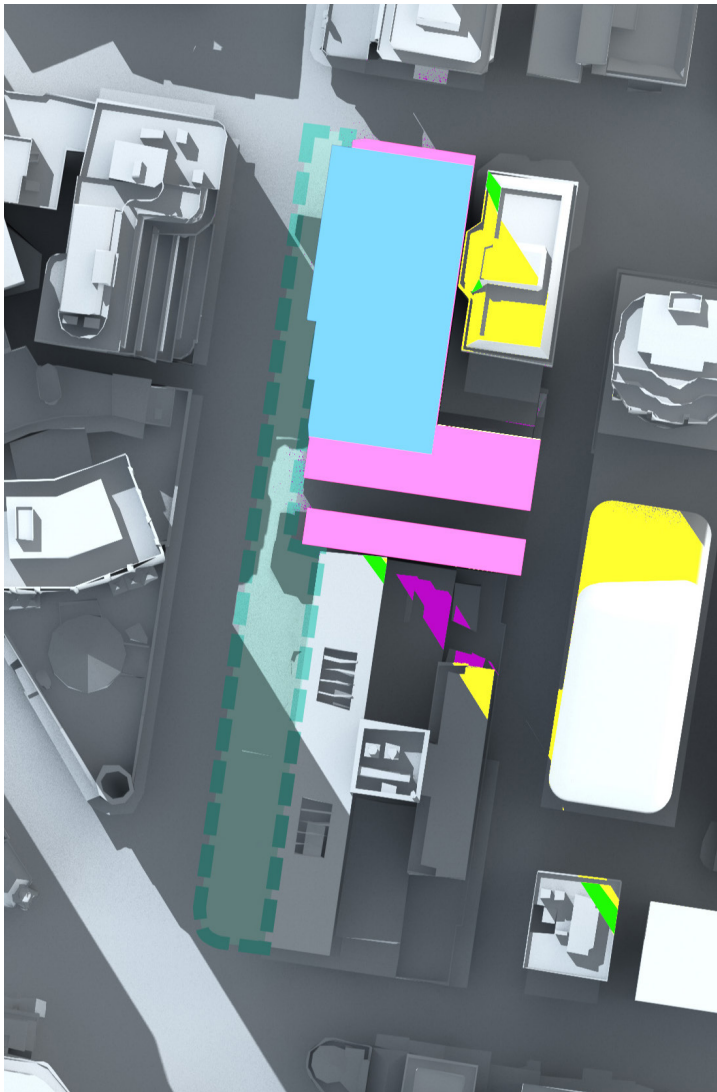
1:30pm June 21st - Approved Envelope



1:30pm June 21st - Modified with Comparison



2pm June 21st - Approved Envelope



2pm June 21st - Modified with Comparison



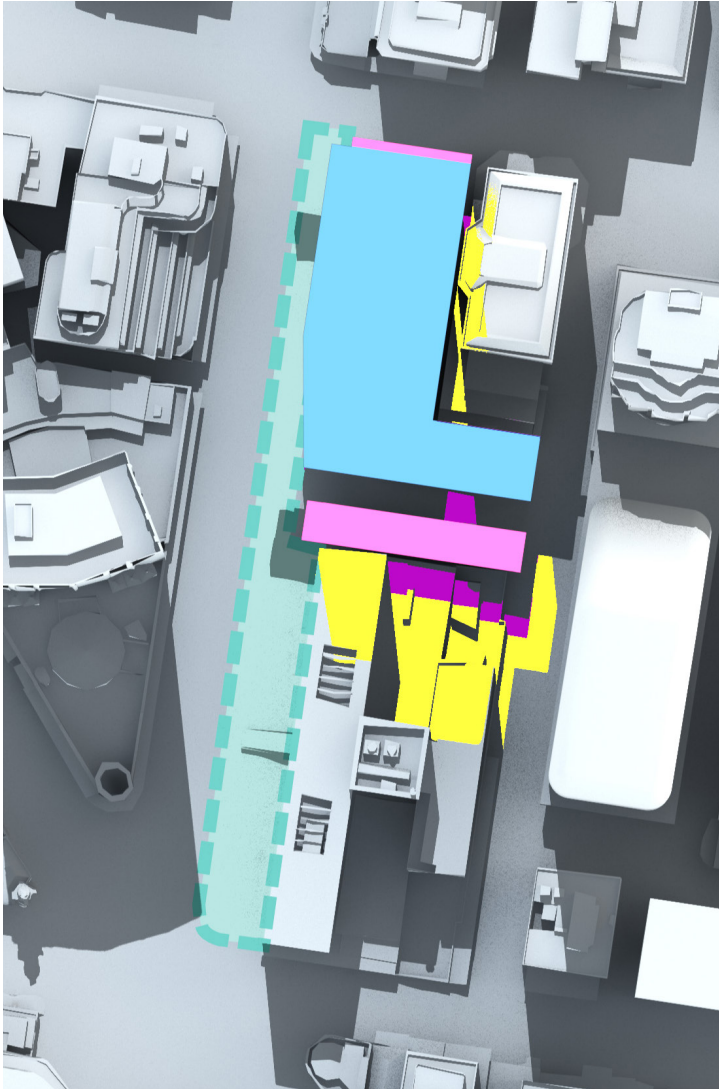
# A.2.3 SHADOW ANALYSIS MILLER ST SPECIAL AREA

SPRING EQUINOX  
SEPTEMBER 21ST

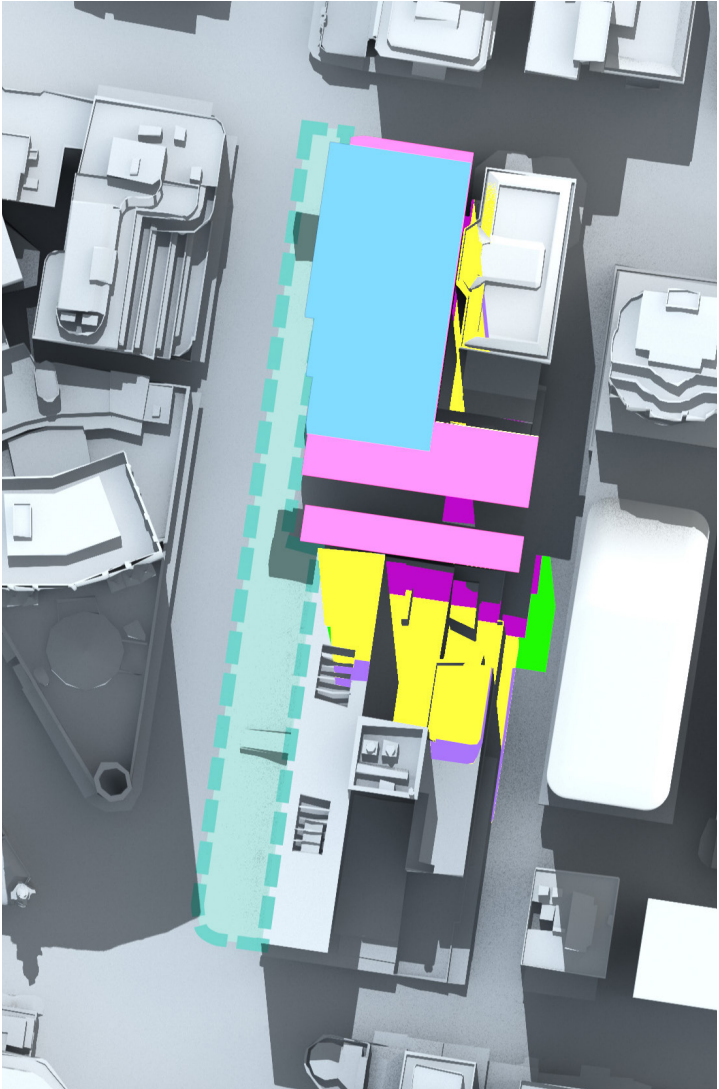
MILLER STREET SPECIAL AREA

The Miller Street Special Area indicated in turquoise is not overshadowed by either the approved OSD Concept SSD building envelope or the modified building envelope.

- KEY:
- OSD BUILDING ENVELOPE
  - VICTORIA CROSS STATION CSSI ENVELOPE
  - SHADOWS CAST BY EXISTING BUILDINGS
  - SHADOWS CAST BY OSD ENVELOPE
  - SHADOW CAST BY CSSI ENVELOPE
  - REDUCTION OF SHADOWS
  - INCREASE IN SHADOWS
  - MILLER STREET SPECIAL AREA

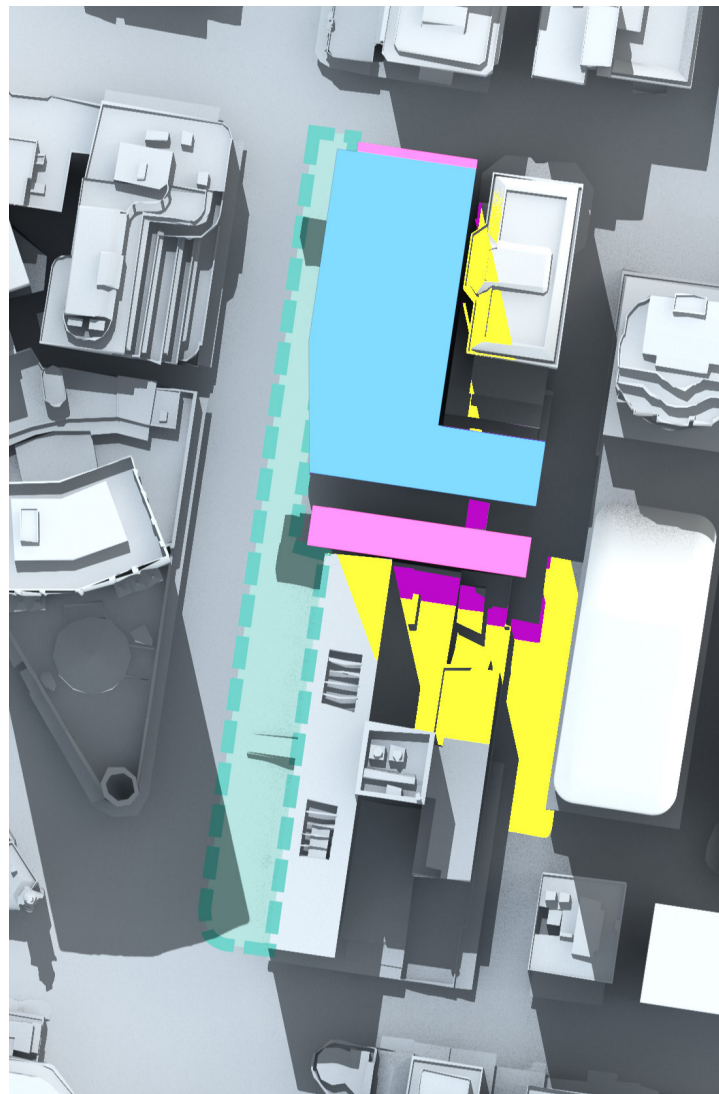


12:00pm June 21st - Approved Envelope

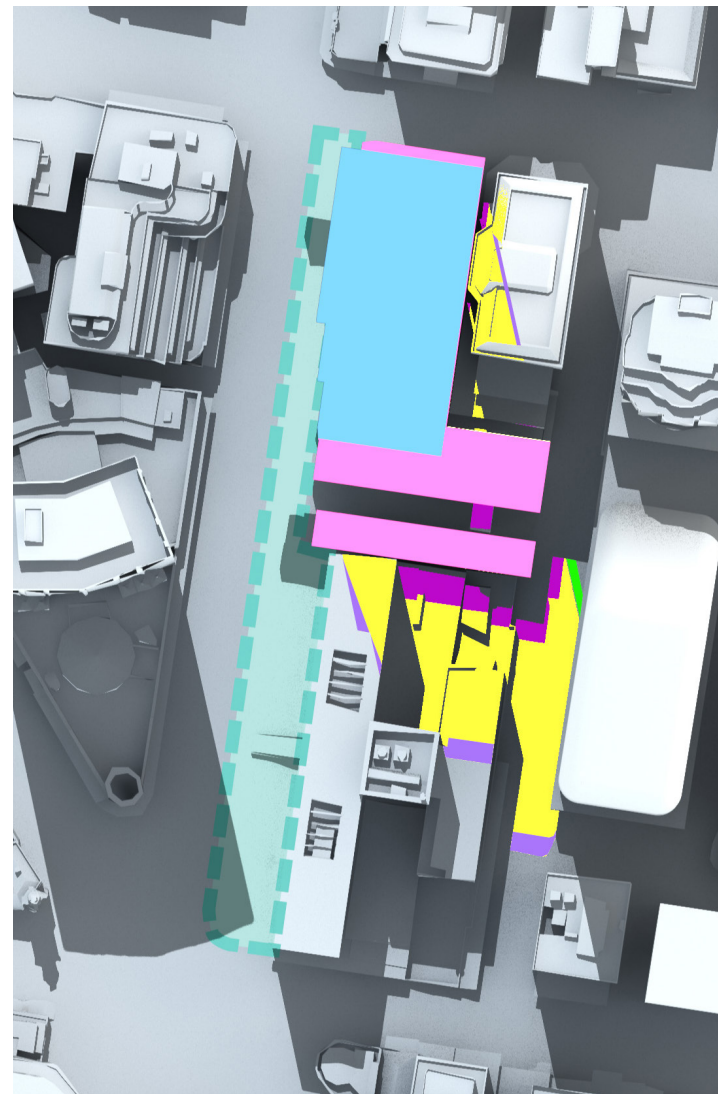


12:00pm June 21st - Modified with Comparison

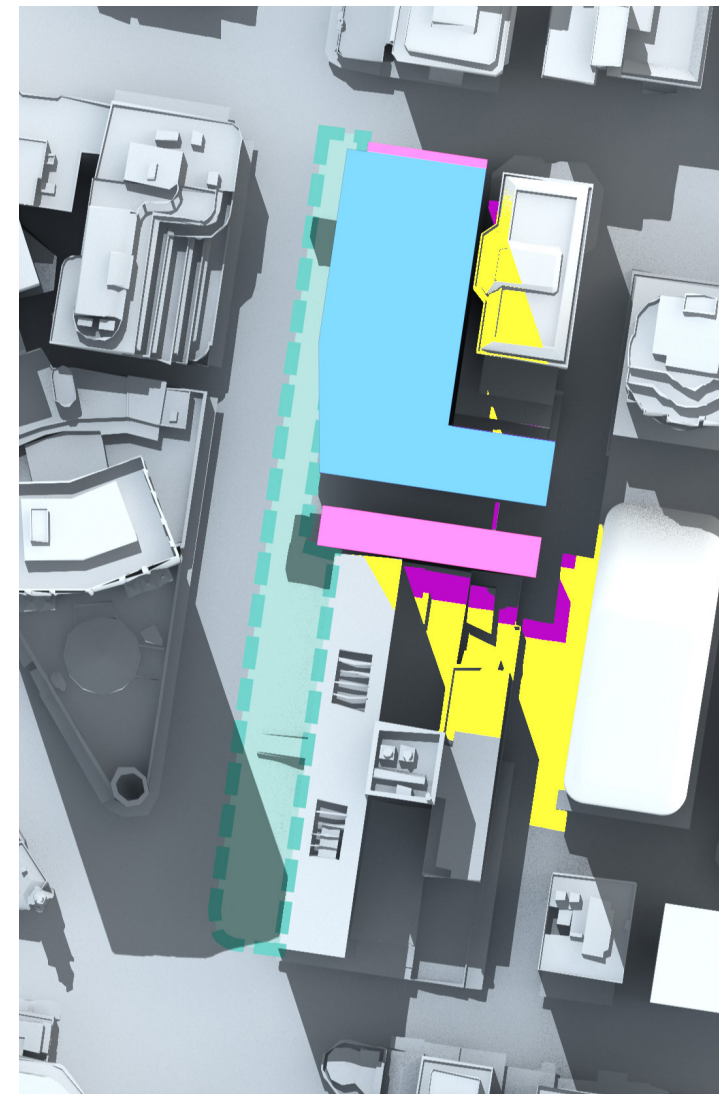




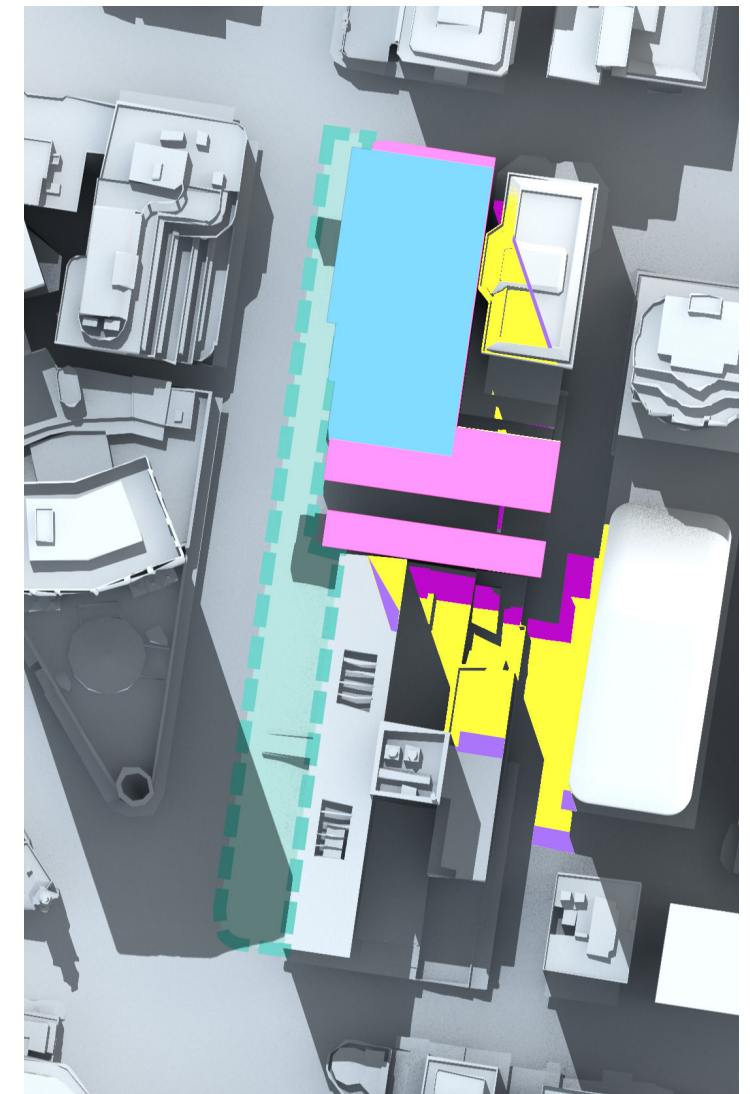
12:15pm June 21st - Approved Envelope



12:15pm June 21st - Modified with Comparison



12:30pm June 21st - Approved Envelope



12:30pm June 21st - Modified with Comparison



# A.2.3

## SHADOW ANALYSIS

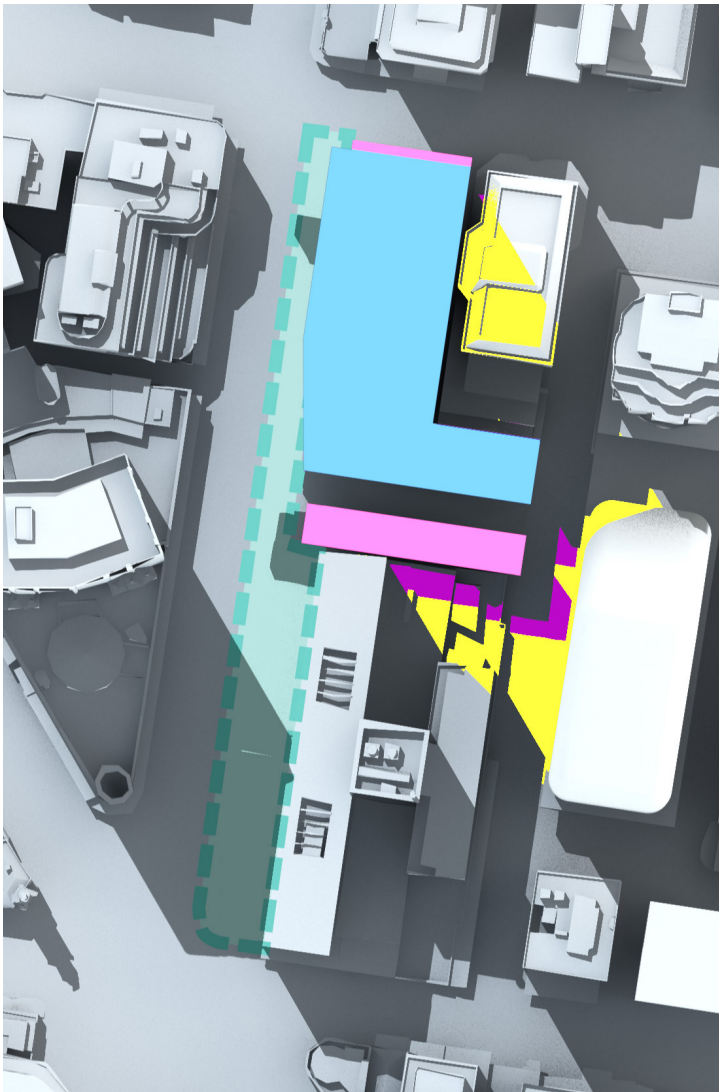
### MILLER ST SPECIAL AREA

SPRING EQUINOX  
SEPTEMBER 21ST

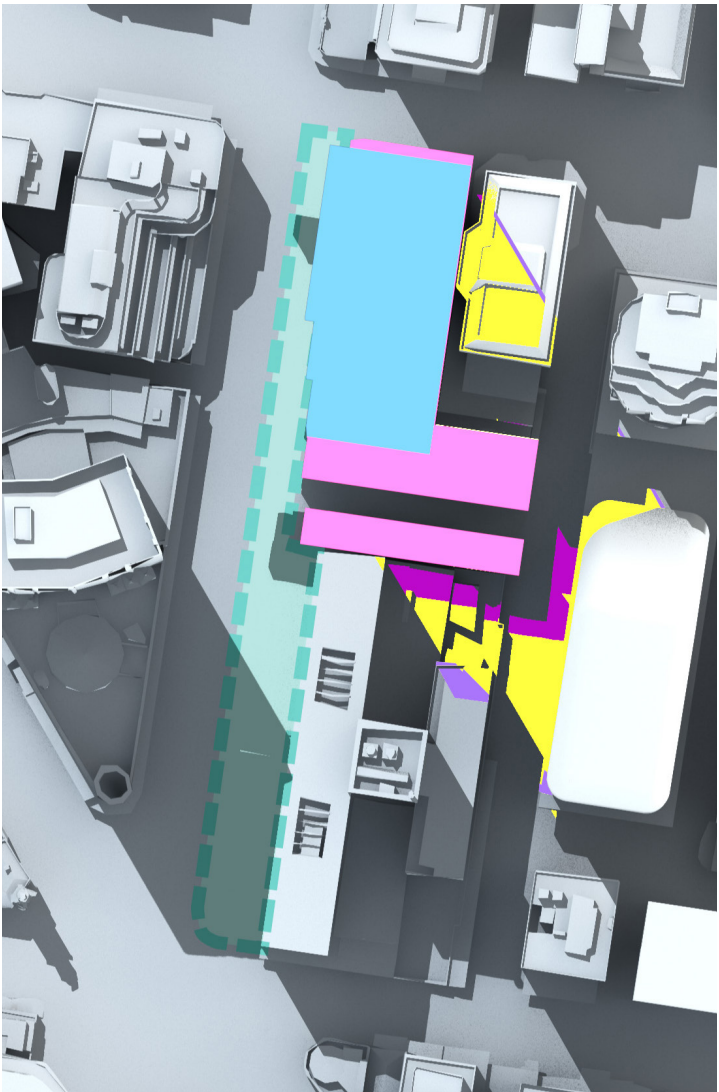
MILLER STREET SPECIAL AREA

The Miller Street Special Area indicated in turquoise is not overshadowed by either the approved OSD Concept SSD building envelope or the modified building envelope.

- KEY:
- OSD BUILDING ENVELOPE
  - VICTORIA CROSS STATION CSSI ENVELOPE
  - SHADOWS CAST BY EXISTING BUILDINGS
  - SHADOWS CAST BY OSD ENVELOPE
  - SHADOW CAST BY CSSI ENVELOPE
  - REDUCTION OF SHADOWS
  - INCREASE IN SHADOWS
  - MILLER STREET SPECIAL AREA

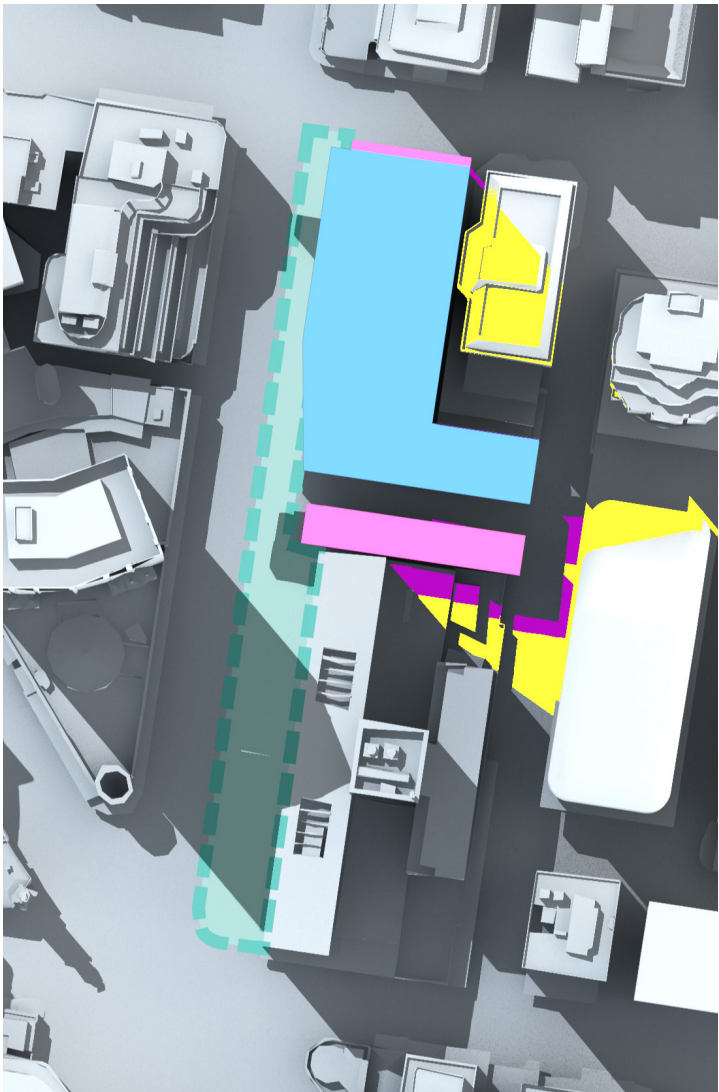


1pm June 21st - Approved Envelope

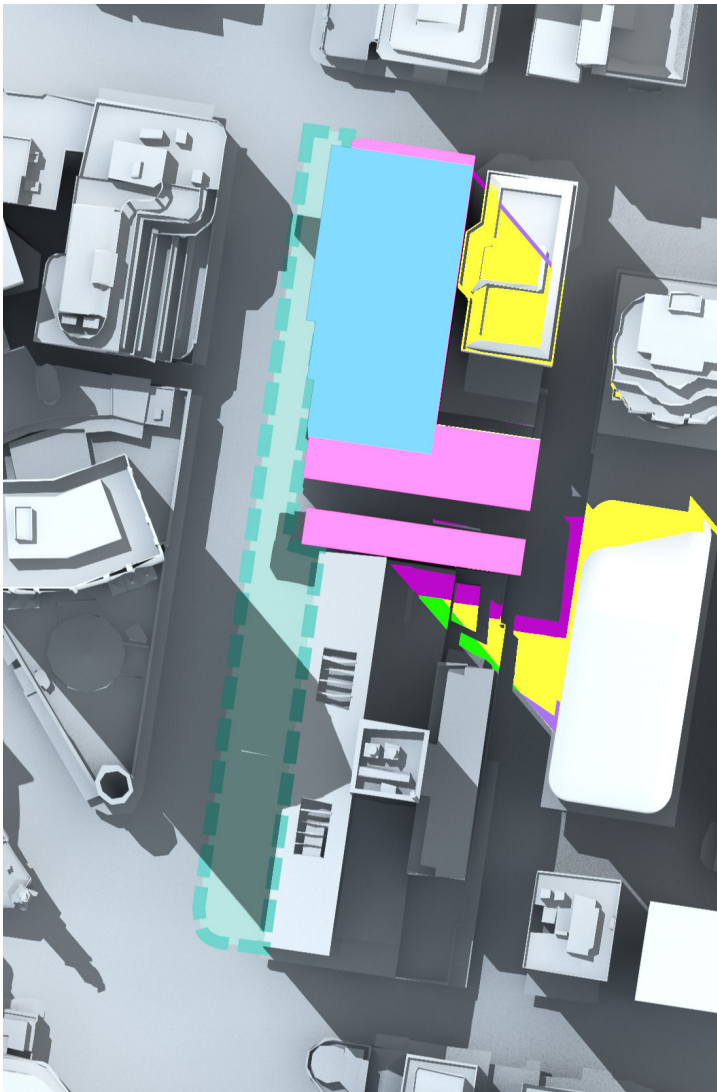


1pm June 21st - Modified with Comparison

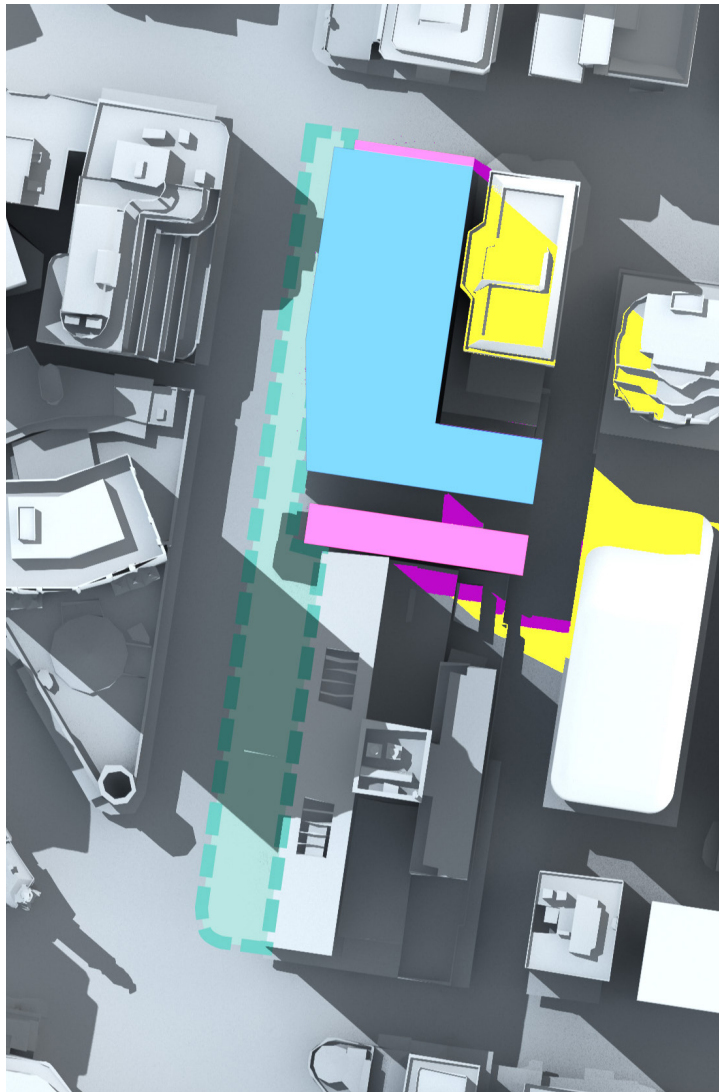




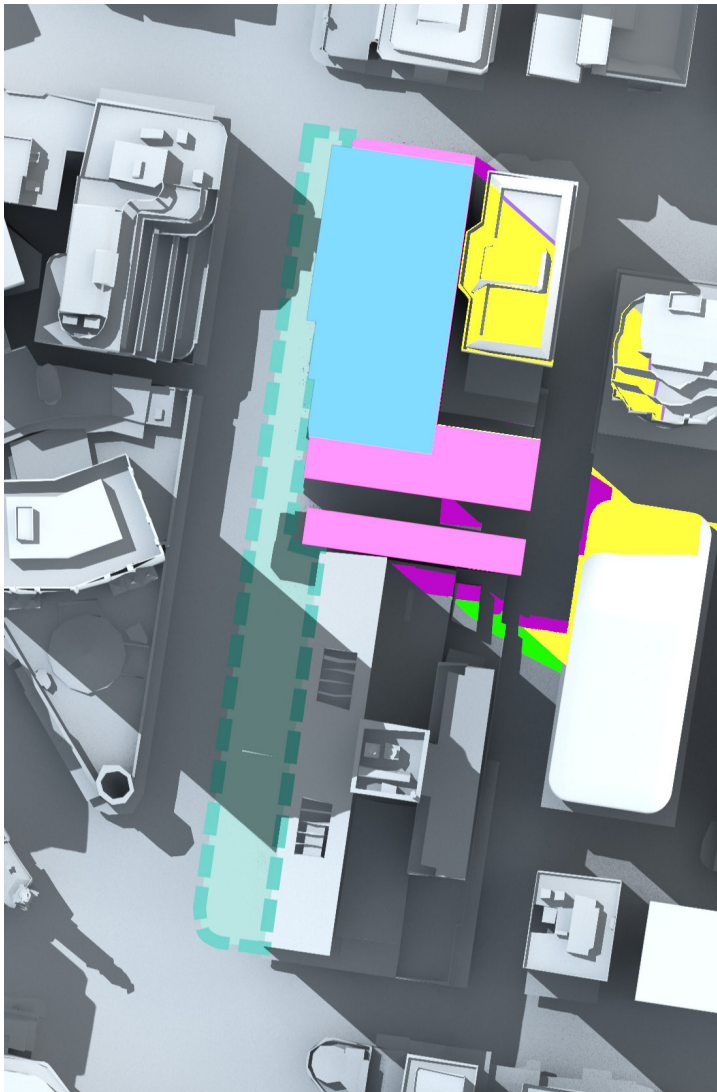
1:30pm June 21st - Approved Envelope



1:30pm June 21st - Modified with Comparison



2pm June 21st - Approved Envelope



2pm June 21st - Modified with Comparison



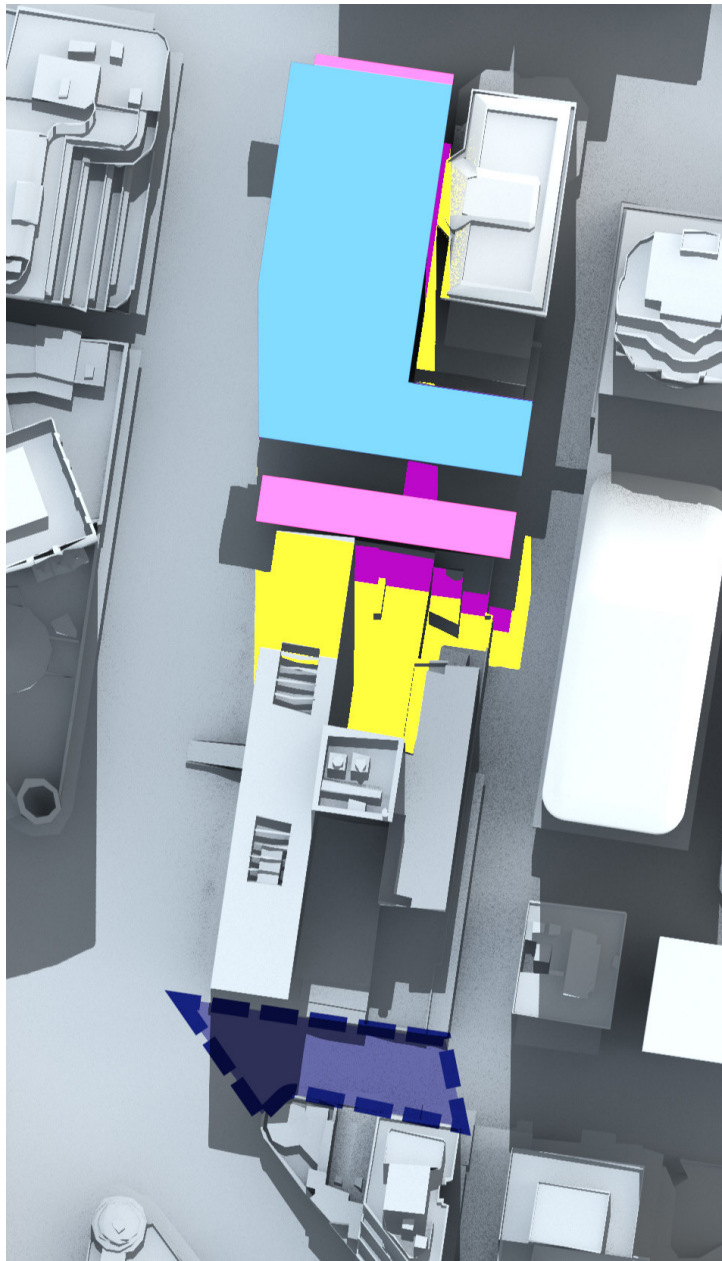
# A.3.1 SHADOW ANALYSIS BRETT WHITELEY SPECIAL AREA

## AUTUMN EQUINOX MARCH 21ST

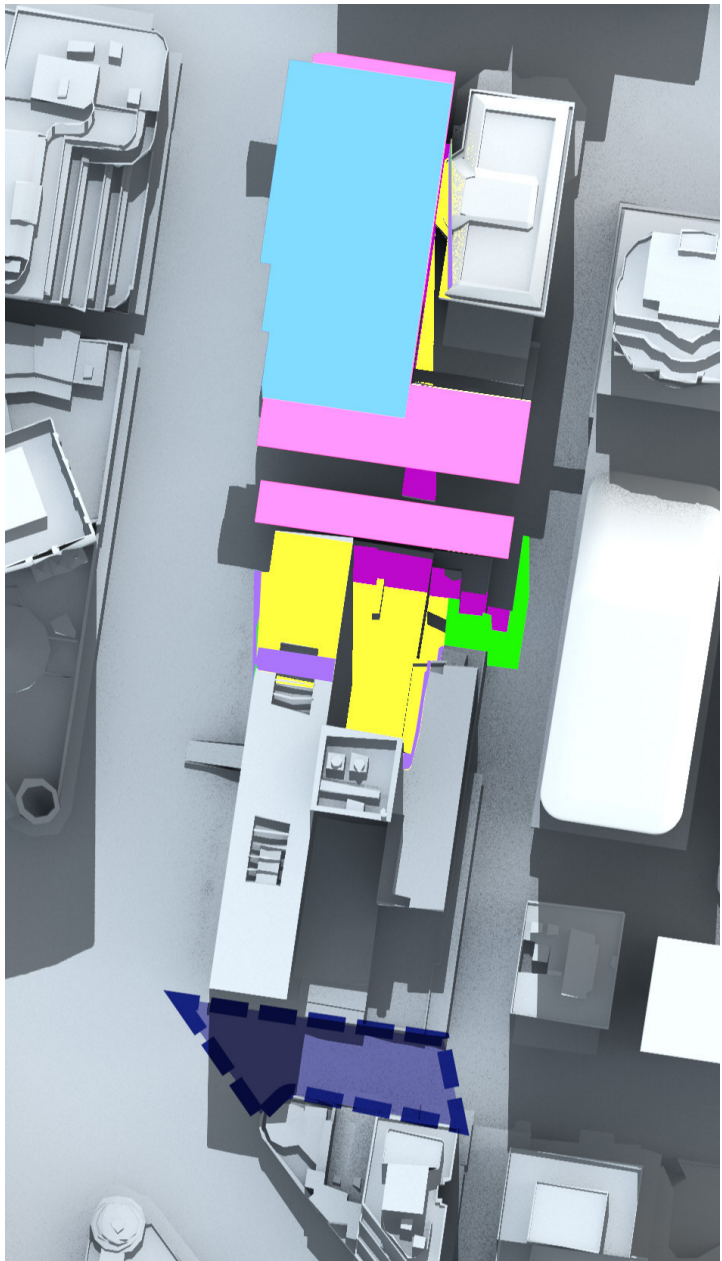
**BRETT WHITELEY SPECIAL AREA**  
The Brett Whiteley Special Area indicated in purple is not overshadowed by either the approved OSD Concept SSD building envelope or the modified building envelope.

Clause 6.3 (2) of the North Sydney Local Environment Plan 2013 states that:  
“development consent must not be granted for the erection of a building on land to which the Division applies if:  
(a) The development would result in a net increase in overshadowing between 12pm and 2pm from the March Equinox to the September Equinox (inclusive) on land to which this Division applies that is within Zone RE1 Public Recreation or that is identified as ‘Special Area’ on the North Sydney Centre map.

- KEY:
- OSD BUILDING ENVELOPE
  - VICTORIA CROSS STATION CSSI ENVELOPE
  - SHADOWS CAST BY EXISTING BUILDINGS
  - SHADOWS CAST BY OSD ENVELOPE
  - SHADOW CAST BY CSSI ENVELOPE
  - REDUCTION OF SHADOWS
  - INCREASE IN SHADOWS
  - BRETT WHITELEY PLAZA

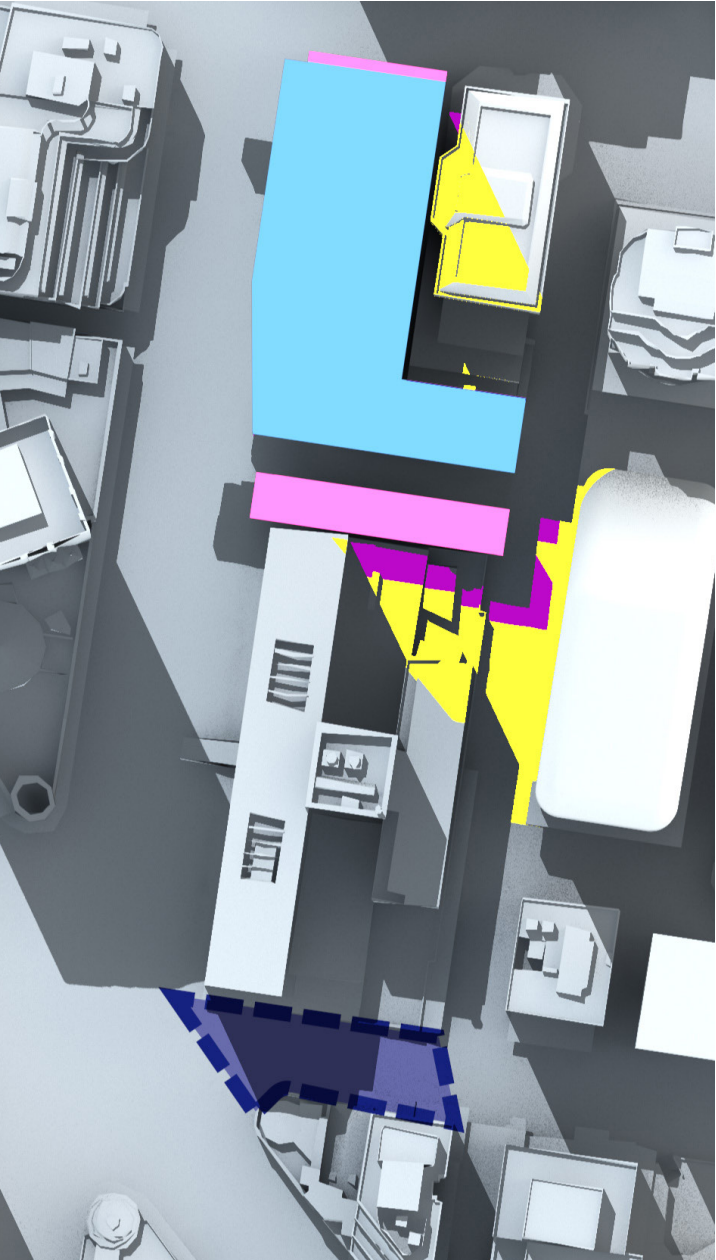


12pm March 21st - Approved Envelope

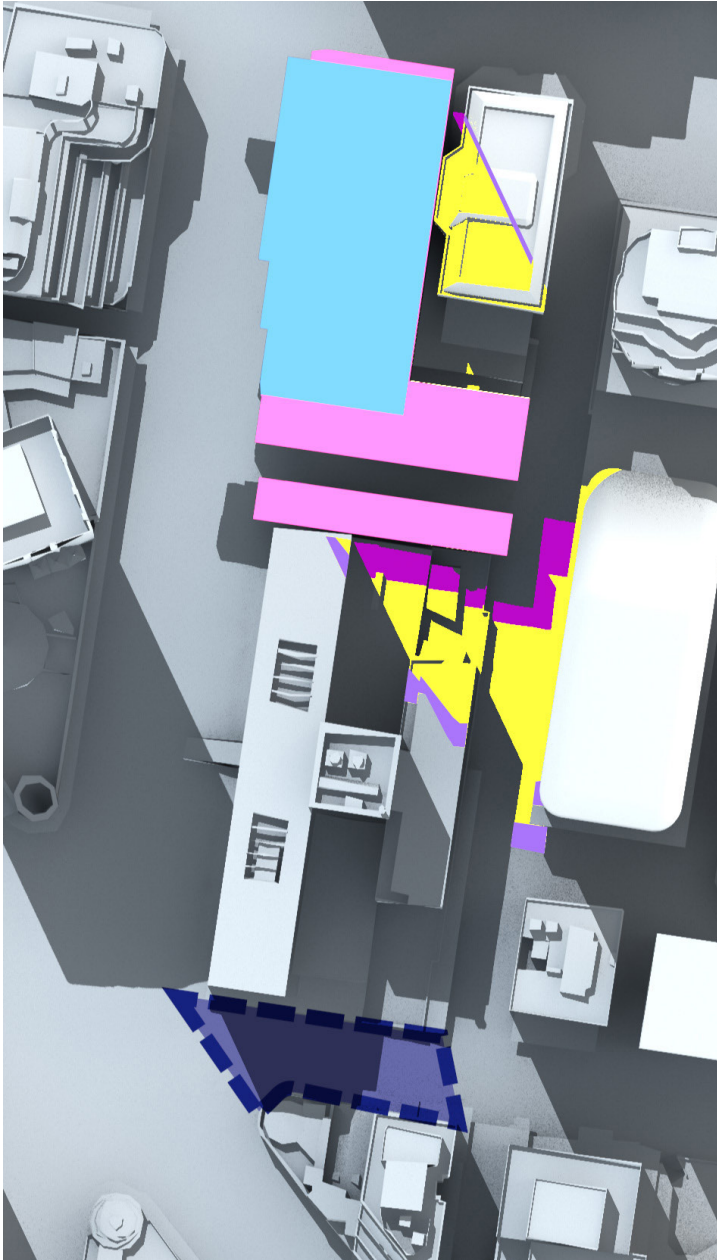


12pm March 21st - Modified Envelope with Comparison

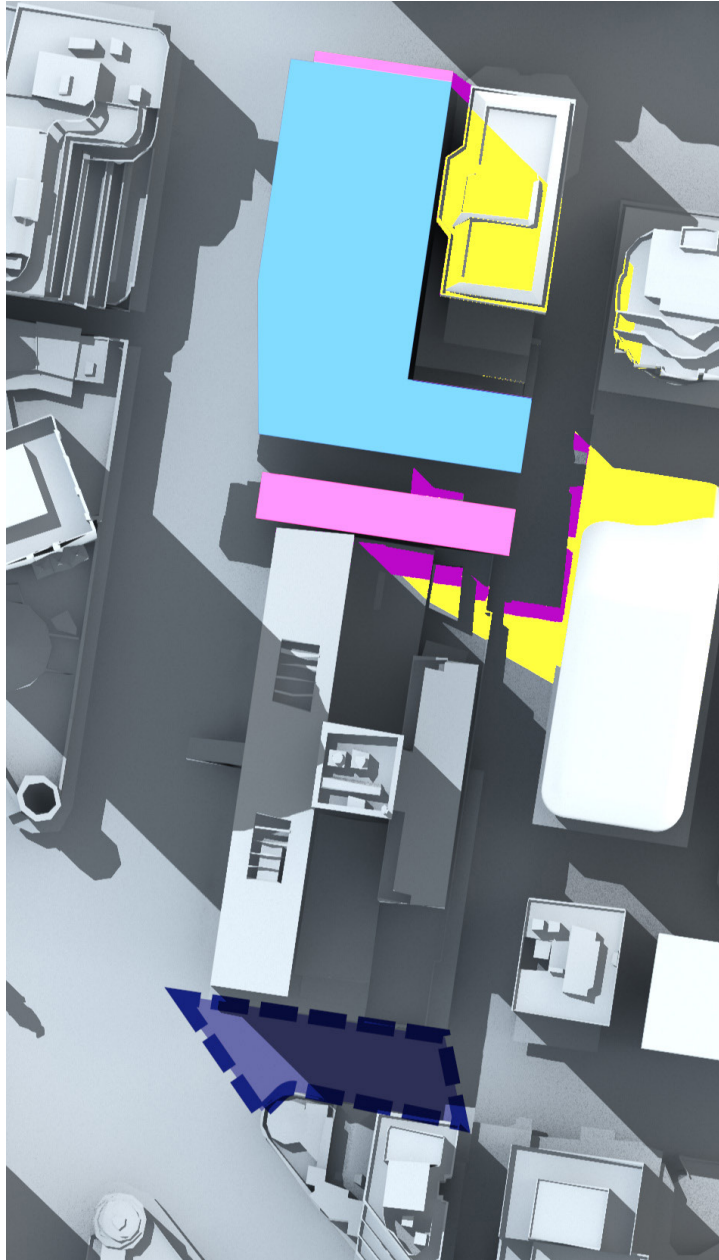




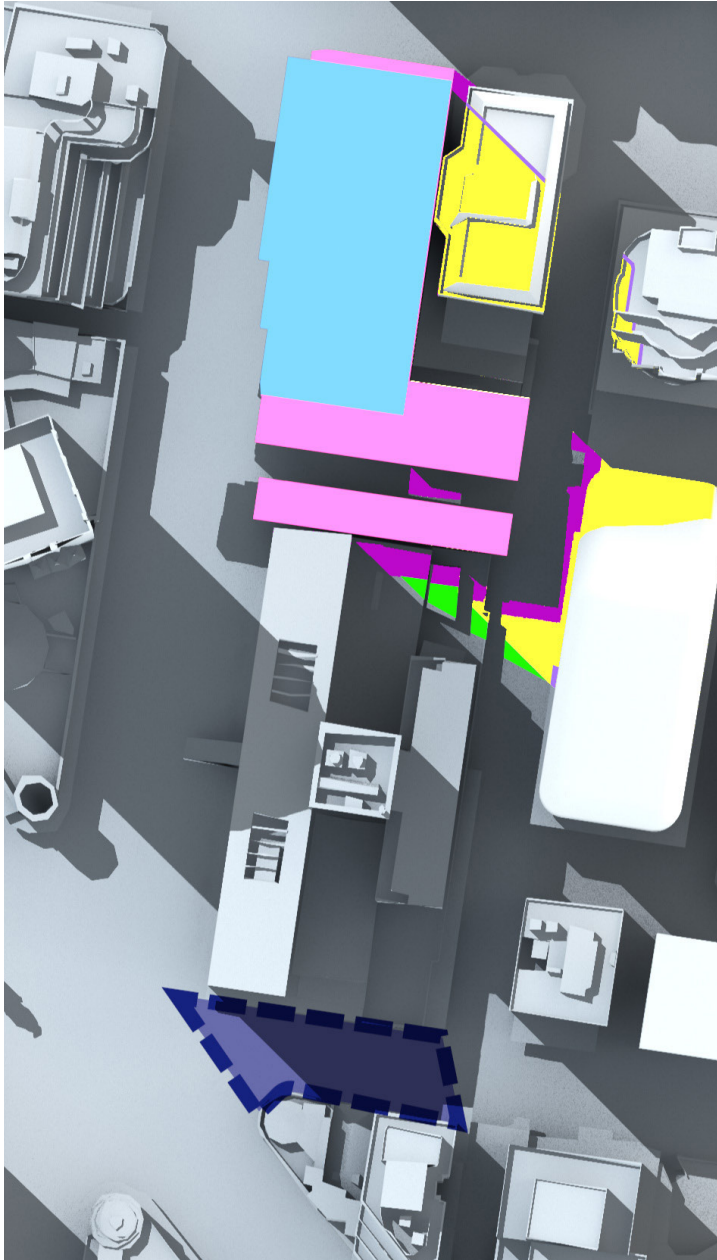
1pm March 21st - Approved Envelope



1pm March 21st - Modified Envelope with Comparison



2pm March 21st - Approved Envelope



2pm March 21st - Modified Envelope with Comparison



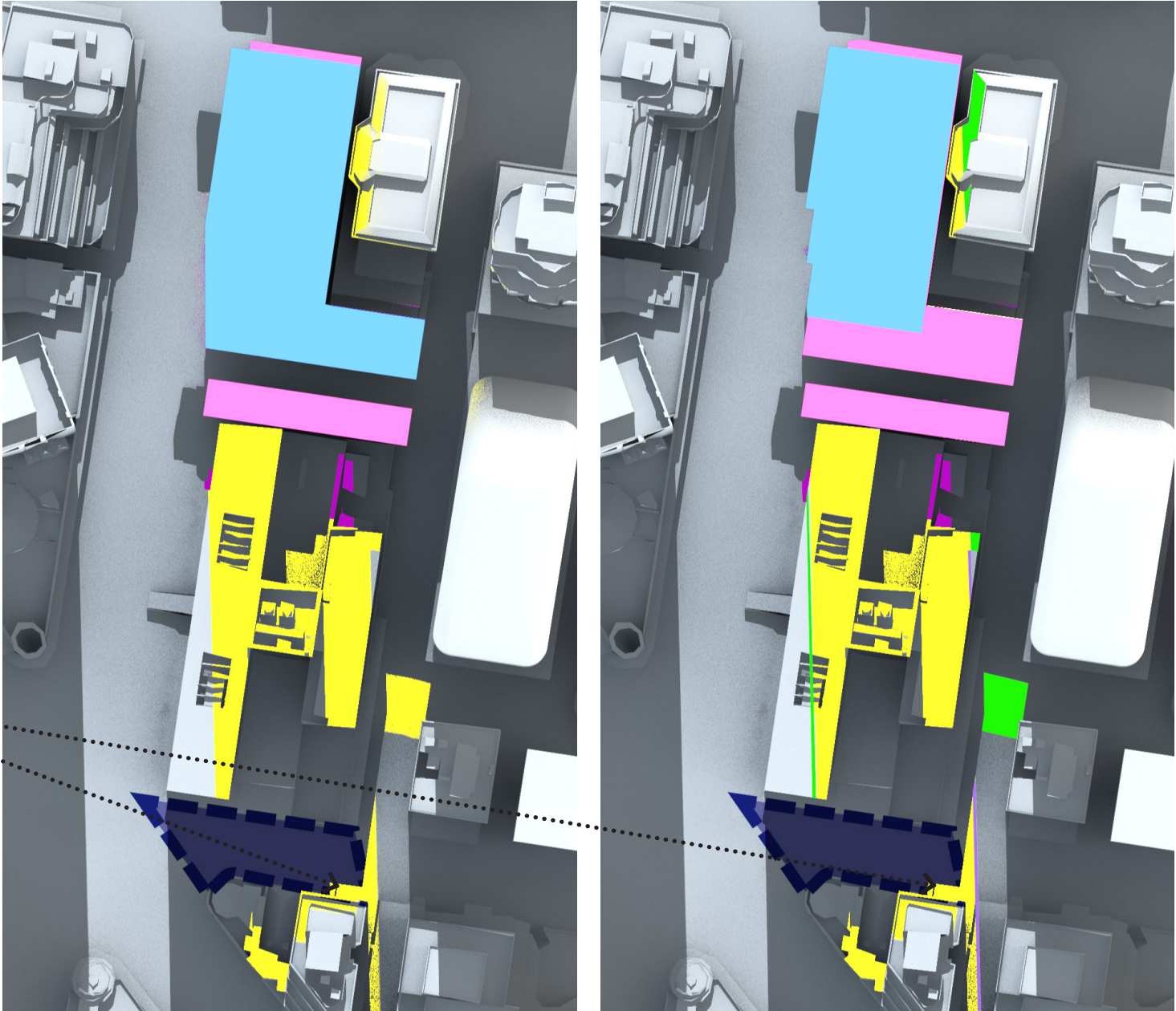
# A.3.2 SHADOW ANALYSIS BRETT WHITELEY SPECIAL AREA

WINTER SOLSTICE  
JUNE 21ST

**BRETT WHITELEY SPECIAL AREA**  
The Brett Whiteley Special Area indicated in purple is overshadowed between 12.00 and 12.15 by both the approved OSD Concept SSD building envelope and the modified building envelope. The extents of overshadowing will be discussed in the following section.

- KEY:
- OSD BUILDING ENVELOPE
  - VICTORIA CROSS STATION CSSI ENVELOPE
  - SHADOWS CAST BY EXISTING BUILDINGS
  - SHADOWS CAST BY OSD ENVELOPE
  - SHADOW CAST BY CSSI ENVELOPE
  - REDUCTION OF SHADOWS
  - INCREASE IN SHADOWS
  - BRETT WHITELEY PLAZA

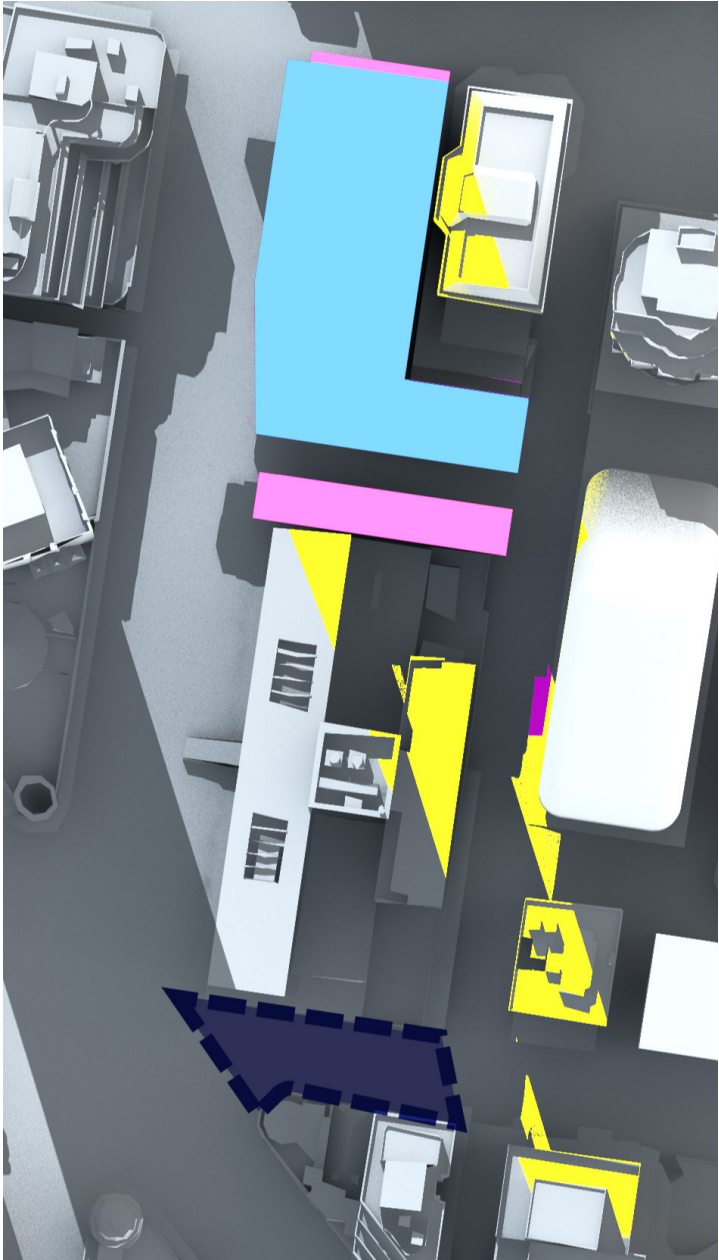
Clause 6.3 (2) of the North Sydney Local Environment Plan 2013 states that:  
“development consent must not be granted for the erection of a building on land to which the Division applies if:  
(a) The development would result in a net increase in overshadowing between 12pm and 2pm from the March Equinox to the September Equinox (inclusive) on land to which this Division applies that is within Zone RE1 Public Recreation or that is identified as ‘Special Area’ on the North Sydney Centre map.



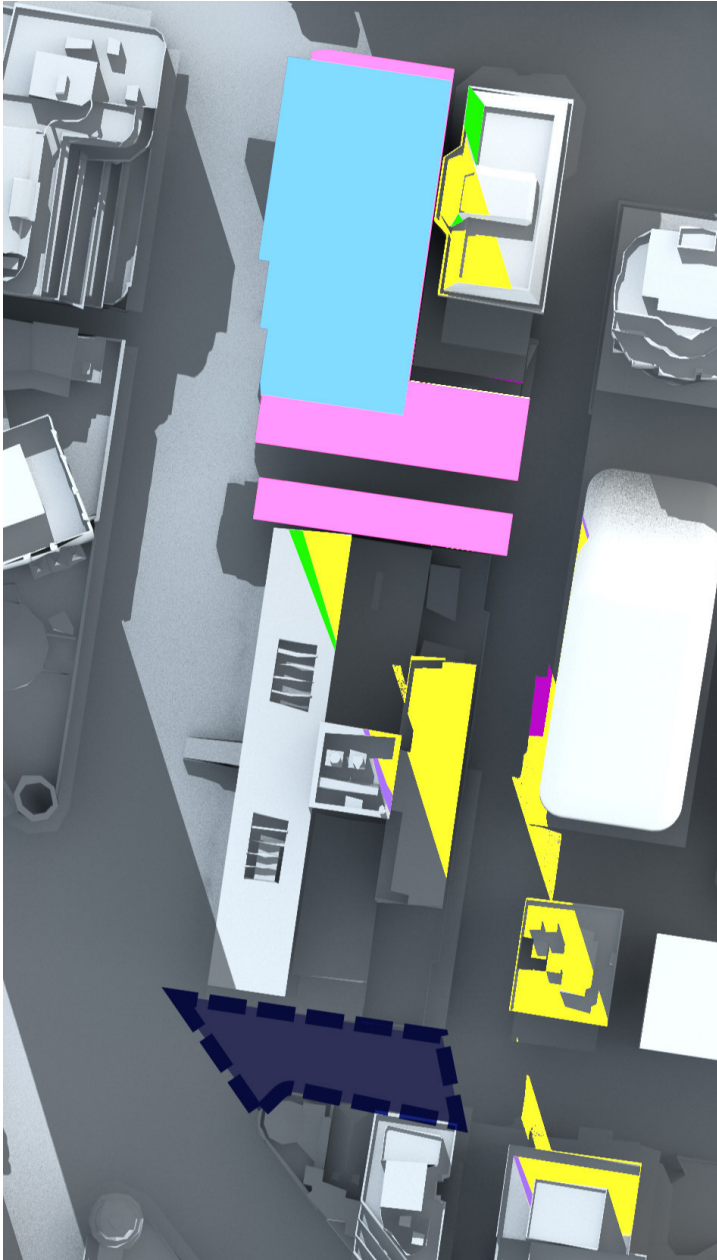
12pm June 21st - Approved Envelope

12pm June 21st - Modified Envelope with Comparison

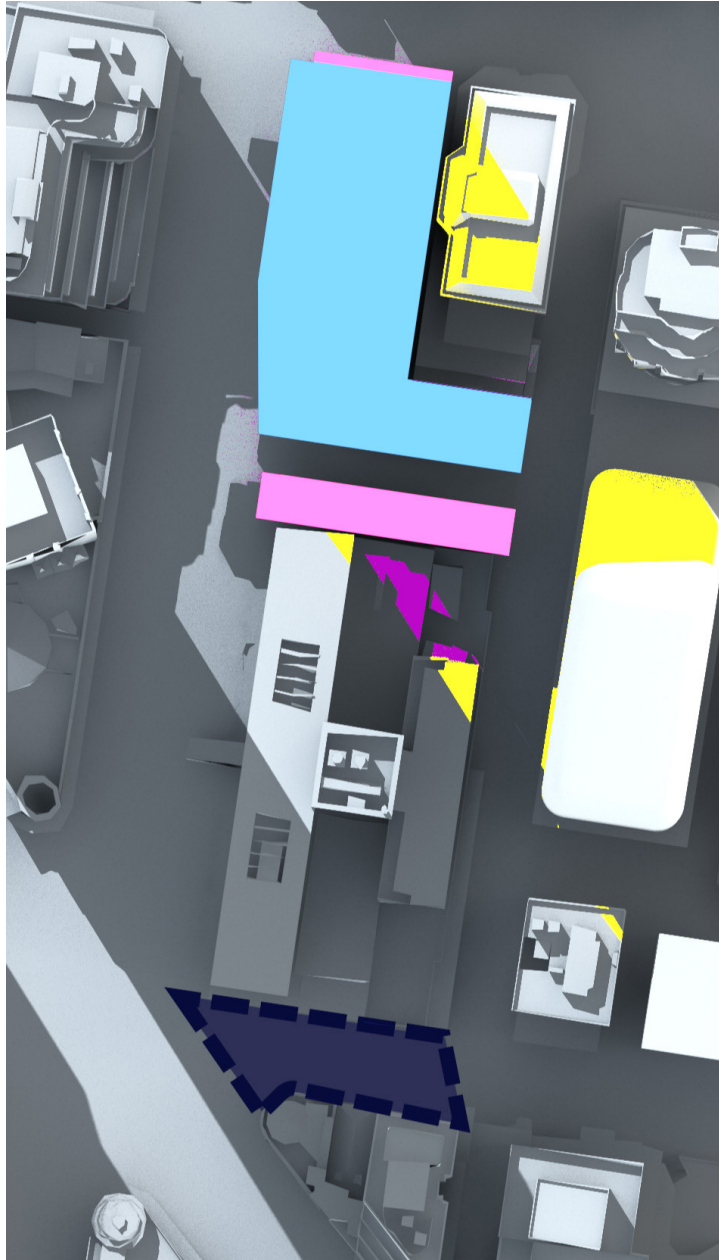




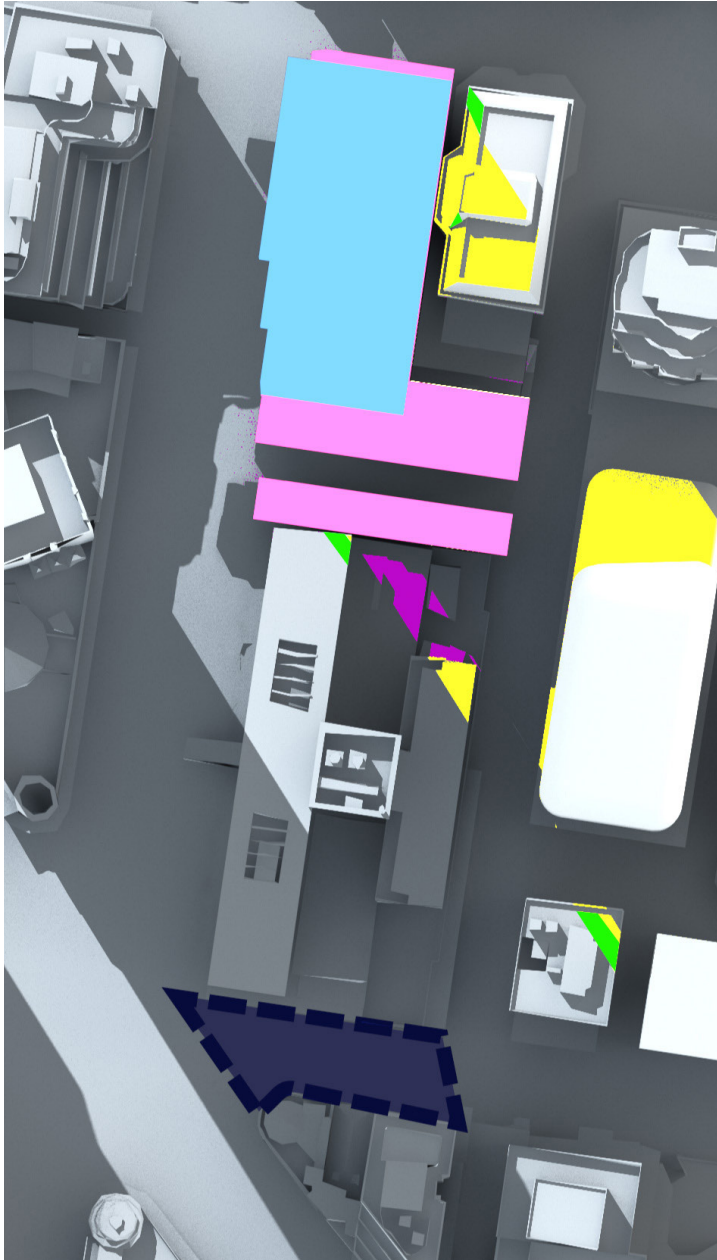
1pm June 21st - Approved Envelope



1pm June 21st - Modified Envelope with Comparison



2pm June 21st - Approved Envelope



2pm June 21st - Modified Envelope with Comparison



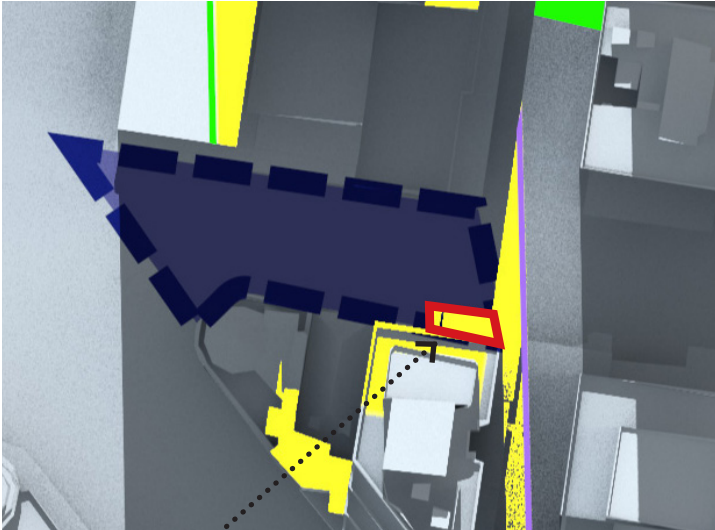
# A.3.2 SHADOW ANALYSIS BRETT WHITELEY SPECIAL AREA

## WINTER SOLSTICE JUNE 21ST

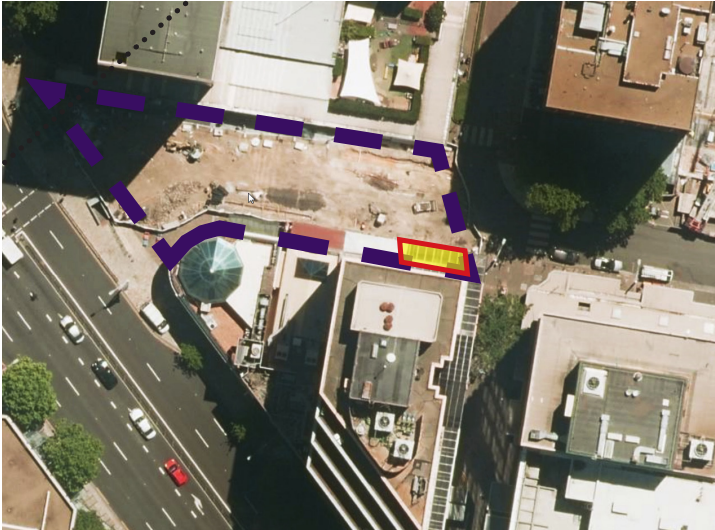
### BRETT WHITELEY SPECIAL AREA

At 12pm on June 21st, there is a minor additional shadow created by both the approved OSD Concept SSD building envelope and the modified building envelope of 37sqm. However as the following diagrams demonstrate the shadow falls on the awning of the building on the south east corner of the plaza and not onto Brett Whiteley Plaza. The modified envelope neither increases nor decreases the overshadowing of this area from that approved.

- KEY:
- OSD BUILDING ENVELOPE
  - VICTORIA CROSS STATION CSSI ENVELOPE
  - SHADOWS CAST BY EXISTING BUILDINGS
  - SHADOWS CAST BY OSD ENVELOPE
  - SHADOW CAST BY CSSI ENVELOPE
  - REDUCTION OF SHADOWS
  - INCREASE IN SHADOWS
  - BRETT WHITELEY PLAZA



Detail View of Overshadowing on Awning 12pm 21st of June



Detail View of Overshadowing on Awning 12pm 21st of June



Brett Whiteley Plaza