

WATERLOO METRO QUARTER – SUPPLEMENTARY DESIGN REPORT

Amending SSDA	
Reference	Description
Applicable SSD Applications	SSD-10437 Southern Precinct SSD-10437 Cope Street Plaza Public Domain SSD-14438 Shared Basement SSD-10439 Central Precinct SSD-10440 Northern Precinct
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Reviewed	Waterloo Developer Pty Ltd Matt Rawlinson
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Acknowledgment of Country

Our Sydney studio is located on Gadigal country. We acknowledge and respect the Gadigal people as the original custodians of the land and water upon which we work. We honour their Elders past, present and emerging whose knowledge and wisdom has, and will, ensure the continuation of cultures and traditional practices.



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1.0 Introduction

This Supplementary Design Report addresses objections to the amending application raised by the City of Sydney in their submission with specific reference to building envelope aspects of items 14.a, 14.b and 18 raised by the City of Sydney in its submission Response to EIS – Waterloo OSD – SSD 10441.

Objection 14.a

Clause 6.45 (2)(d) requires consideration of the Waterloo Metro Design and Amenity Guidelines prior to determining the application.

Regarding SSD-10441 -

- 3A Desired Outcomes - Enable a building form which maintains excellent solar access to public open spaces and nearby residential areas.
- 3K Objective 3 - Minimise overshadowing impacts on Alexandria Park and the wider public domain. Design Criteria 6: Identify opportunities to improve solar access to Alexandria Park through redistribution of floor space and building bulk and scale between the hours of 9am and 10am in midwinter when compared to the shadow cast by the indicative scheme lodged with the Response to Submissions.
- 3M Solar Access and Amenity - Design Criteria 4: New development does not create any additional overshadowing onto a neighbouring dwelling where that dwelling currently receives less than 2 hours direct sunlight to habitable rooms and 50% of the private open space between 9am and 30m on 21 June.

Objection 14.b

- The analysis provided does not demonstrate that Design Criteria 4 of Design Guideline 3M is met and does not respond to the specificity of the criteria, which requires analysis of both 'at grade' areas and living rooms windows (living rooms windows are not addressed). The analysis focuses on the Heritage Conservation Areas to the west of the site, which have a now reduced impact due to the reduction in height of the north tower. The analysis does not acknowledge that properties to the south of the site are impacted to an extent which exceeds the criteria. The Guideline also does not distinguish residential properties by whether they are within a Heritage Conservation Area.
- The overshadowing analysis indicates a very minor reduction only in overshadowing to Alexandria Park between 9am and 10am. The application therefore does not achieve the improvements anticipated in the Guidelines to improve solar access to Alexandria Park. A better urban design strategy would be to reduce the height of that part of the envelope which caused the non-compliant overshadowing.

Objection 18 (quoted in part)

- Solar access – Objective 4A-1 of the Apartment Design Guide (ADG) recommends, as a minimum, 70% of apartments be provided solar access to living rooms and balconies for at least two hours during midwinter. The application states that 57% of apartments achieve the design criteria. The City does not support the applicant's justification for the non-compliance by including solar access after 3pm as this is not reflected in the design guidance or criteria and is of little thermal benefit due to the low altitude of the sun.
- The non-compliance is a symptom of the site planning, locating the commercial office building adjoining the northern boundary and obstructing solar access to the residential apartments to the south. The City therefore raises concerns with the appropriateness of SSD-10441 regarding Objectives 3A-1, 3B-1 and 4A-1 of the ADG.

Introduction

The objections raised by the City centre on the overarching issue of solar access and can be group under the three topics of:

- Overshadowing to adjacent residential
- Overshadowing to Alexandria Park
- Overshadowing of Building 2 by Building 1

Issue 1, Overshadowing on adjacent residential development.

This is raised in Objection 14 noting:

- living room windows are not included in the assessment provided;
- The analysis focuses on the Heritage Conservation area which now have a reduced impact as a result of proposed modifications to the envelope.
- The impact on properties to the south of the site are not addressed; these should be addressed as the design quality and amenity guidelines do not distinguish between residential properties in or outside the heritage precinct when requiring amenity to be properly provided to adjacent residential development.

Issue 2, Overshadowing to Alexandria Park:

This is raised in Objection 14 noting:

- The City of Sydney notes that whilst the analysis provided achieves compliance with the requirements of the design guidelines, the Amending Application has provided only a minor reduction to the projected overshadowing of Alexandria Park between the specified time of 9am-10am on the winter solstice compared to the approved concept design.
- The City of Sydney has interpreted the guidelines as anticipating a greater reduction to overshadowing than that provided under the amended application.
- The City of Sydney has suggested that a better urban design strategy would be to reduce the height of building envelopes where 'non-compliant' overshadowing occurs, being the tower envelopes for buildings 2 and 3.

Issue 3, Overshadowing of Building 2 by Building 1.

This is raised in Objection 18 noting:

- The non-compliance (of solar access to apartments as required under the NSW Apartment Design Guidelines) is a symptom of the site planning, locating the commercial office building adjoining the northern boundary and obstructing solar access to the residential apartments to the south.

This response seeks to address Objections by providing additional analysis to demonstrate the extent to which the impact has changed between the approved and amended concept plan applications and extent of compliance with solar access and overshadowing required under the current endorsed design quality and amenity guidelines.

This response should be read in conjunction with solar access and overshadowing analysis prepared by RWDI.

2.1

Overshadowing to adjacent residential

City of Sydney Objection:

- living room windows of neighbouring developments are not included in the assessment provided of overshadowing impact;
- The analysis focuses on the Heritage Conservation area which now have a reduced impact as a result of proposed modifications to the envelope.
- The impact on properties to the south of the site are not addressed in provided reporting; these should be addressed as the design quality and amenity guidelines do not distinguish between residential properties in or outside the heritage precinct when requiring amenity to be properly provided to adjacent residential development.

Waterloo Metro Quarter Design Quality and Amenity Guidelines extract:

3A Desired Outcomes

- Enable a building form which maintains excellent solar access to public open spaces and nearby residential areas. Minimise overshadowing on Alexandria Park and the wider public domain

3K. Solar Access and Amenity

4. Proposed apartments in a development and neighbouring developments must achieve a minimum of 2 hours direct sunlight between 9am and 3pm on 21 June onto at least 1m² of living room windows and a minimum 50% of the required minimum area of private open space area

Note: This applies to at least 70% of the apartments in a development in accordance with the NSW Apartment Design Guide

4. New development does not create any additional overshadowing onto a neighbouring dwelling where that dwelling currently receives less than 2 hours direct sunlight to habitable rooms and 50% of the private open space between 9am and 3pm on 21 June.

Response

The amending concept application, SSD-10441, seeks modifications specifically to:

- the envelope of Building 01 to enable a low-mid rise envelope that supports the proposed commercial uses in line with the strategic purpose of the Camperdown-Ultimo place strategy and City of Sydney Local Strategic Planning Statement.
- the envelope of Building 01 to reduce the maximum permitted tower height commensurate with a reallocation of floorspace from residential to commercial uses
- the envelope of Building 02 to adjust the podium and tower relationship facing Cope Street Plaza to the East.

As a result, the analysis of impact for the amended concept application was restricted to those areas where the impact previously assessed under SSD-9393 has changed.

Figures 2.1.1-2.1.7 following demonstrate that overall, potential overshadowing to surrounding residential dwellings has been reduced throughout the day where the amendments to the concept application are proposed.

This changed impact does not remove the requirement for any building application within the amended envelope to ensure compliance with the provisions of 3A and 3M of the design quality guidelines.

The impact of individual building designs within the metro quarter to ensure amenity to adjacent dwellings is still required as per the Design Quality and Amenity Guidelines. Refer to separate report by RWDI for confirmation of proposed buildings within the metro quarter in providing the required amenity.

Figure 2.1.1. Plan showing change in extent of potential shadow impact to adjacent developments on 21 June at 9am.

LEGEND

- Approved Shadow Boundaries
- Unchanged Shadow Boundaries
- Reduced Shadow Boundaries
- Increased Shadow Boundaries

Schedule of properties affected by amended envelope:

Reference	Address	Land Use	Impact
1	72-84 Gerard St, Alexandria (7 individual properties)	Residential	Overshadowing removed
2	39-55 Buckland St, Alexandria (9 individual properties)	Residential	Overshadowing removed
3	115 Garden St, Alexandria (1 property)	Residential	Overshadowing reduced
4	108-114 Garden St, Alexandria (4 individual properties)	Residential	Overshadowing increased
5	101-111 Wyndham St, Alexandria (7 individual properties)	Residential	Overshadowing increased
6	110-126 Waterloo Rd, Alexandria (1 property)	Commercial - bulky goods	Overshadowing increased

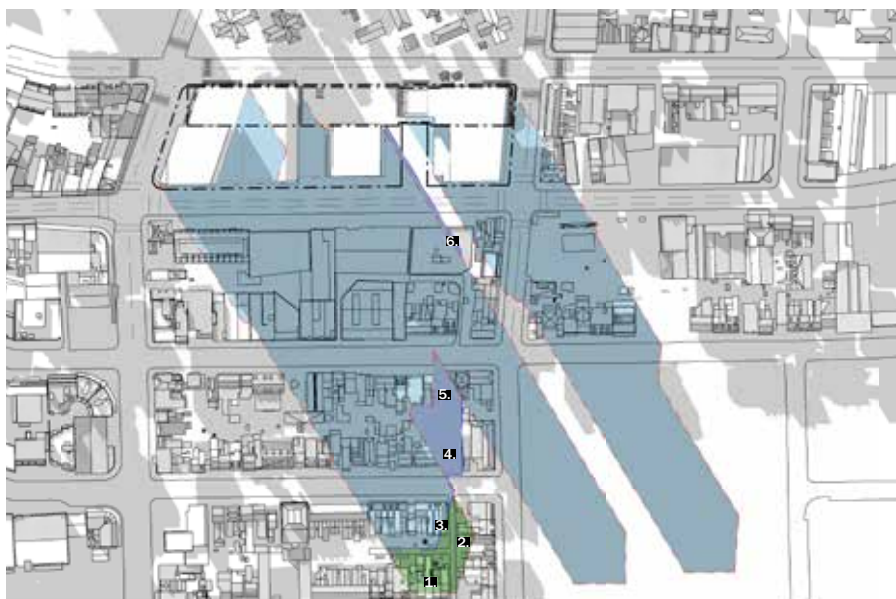


Figure 2.1.2. Plan showing change in extent of potential shadow impact to adjacent developments on 21 June at 10am.

LEGEND

- Approved Shadow Boundaries
- Unchanged Shadow Boundaries
- Reduced Shadow Boundaries
- Increased Shadow Boundaries

Schedule of properties affected by amended envelope:

Reference	Address	Land Use	Impact
1	89-109 Wyndham St, Alexandria (11 individual properties)	Residential	Overshadowing reduced
2	74-82 Wyndham St, Alexandria (2 individual properties)	Commercial	Overshadowing reduced
3	102-116 Wyndham St, Alexandria (8 individual properties)	Residential	Overshadowing increased
4	62-72 Botany Rd, Alexandria (apartment building)	Residential	Overshadowing reduced

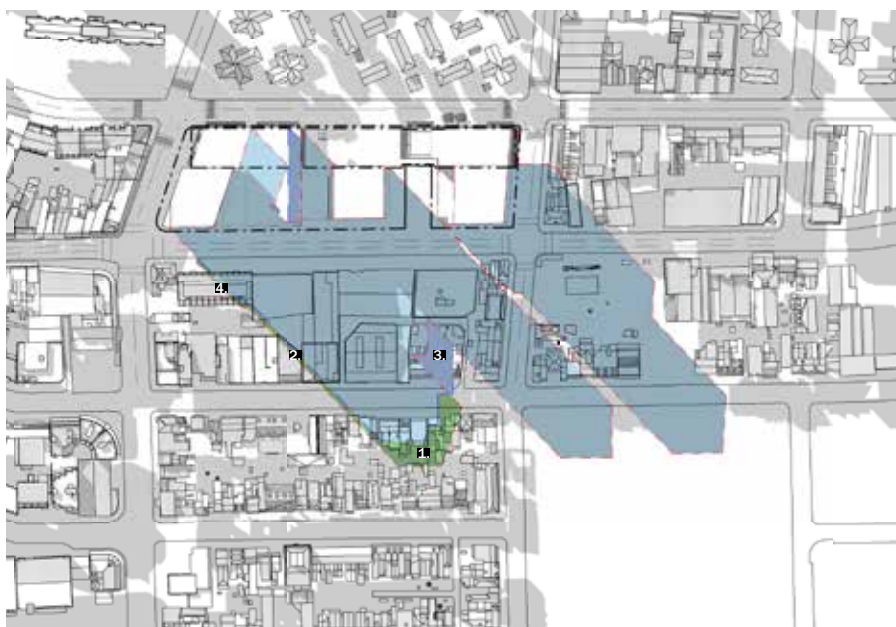


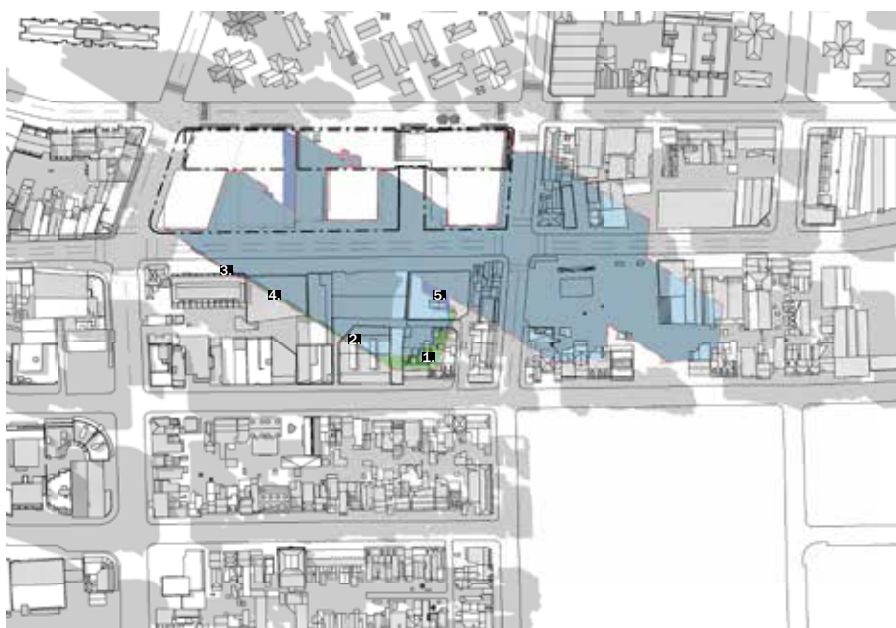
Figure 2.1.3. Plan showing change in extent of potential shadow impact to adjacent developments on 21 June at 11am.

LEGEND

- Approved Shadow Boundaries
- Unchanged Shadow Boundaries
- Reduced Shadow Boundaries
- Increased Shadow Boundaries

Schedule of properties affected by amended envelope:

Reference	Address	Land Use	Impact
1	102-112 Wyndham St, Alexandria (6 individual properties)	Residential	Overshadowing reduced
2	86-100 Wyndham St, Alexandria (2 individual properties)	Commercial	Overshadowing reduced
3	62-72 Botany Rd, Alexandria (apartment building)	Residential	Overshadowing reduced
4	74-88 Botany Rd, Alexandria (2 individual properties)	Commercial	Overshadowing reduced
5	110-126 Botany Rd, Alexandria (1 property)	Commercial	Overshadowing increased



Section 2 Solar Impact Analysis

Figure 2.1.4. Plan showing change in extent of potential shadow impact to adjacent developments on 21 June at 12pm.

LEGEND

- Approved Shadow Boundaries
- Unchanged Shadow Boundaries
- Reduced Shadow Boundaries
- Increased Shadow Boundaries

Schedule of properties affected by amended envelope:

Reference	Address	Land Use	Impact
1	106-126 Botany Rd, Alexandria (2 individual properties)	Commercial	Overshadowing reduced

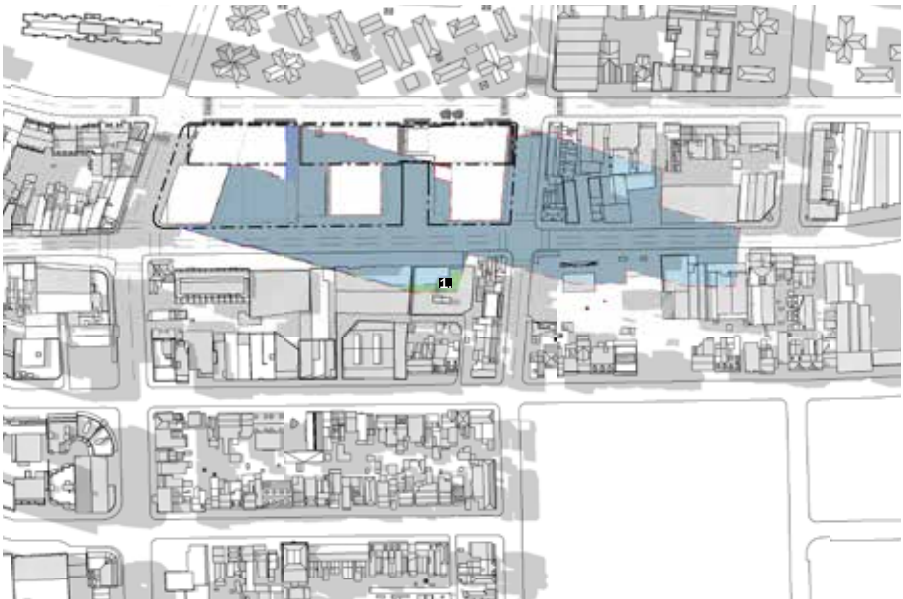


Figure 2.1.5. Plan showing change in extent of potential shadow impact to adjacent developments on 21 June at 1pm.

LEGEND

- Approved Shadow Boundaries
- Unchanged Shadow Boundaries
- Reduced Shadow Boundaries
- Increased Shadow Boundaries

Schedule of properties affected by amended envelope:

Reference	Address	Land Use	Impact
NOTE: No change to impact on adjacent properties			



Figure 2.1.6. Plan showing change in extent of potential shadow impact to adjacent developments on 21 June at 2pm.

LEGEND

- Approved Shadow Boundaries
- Unchanged Shadow Boundaries
- Reduced Shadow Boundaries
- Increased Shadow Boundaries

Schedule of properties affected by amended envelope:

Reference	Address	Land Use	Impact
1	221-223 Cope St, Waterloo (1 property)	Commercial	Overshadowing reduced
2	213 Cope St, Alexandria (apartment building)	Residential	Overshadowing increased



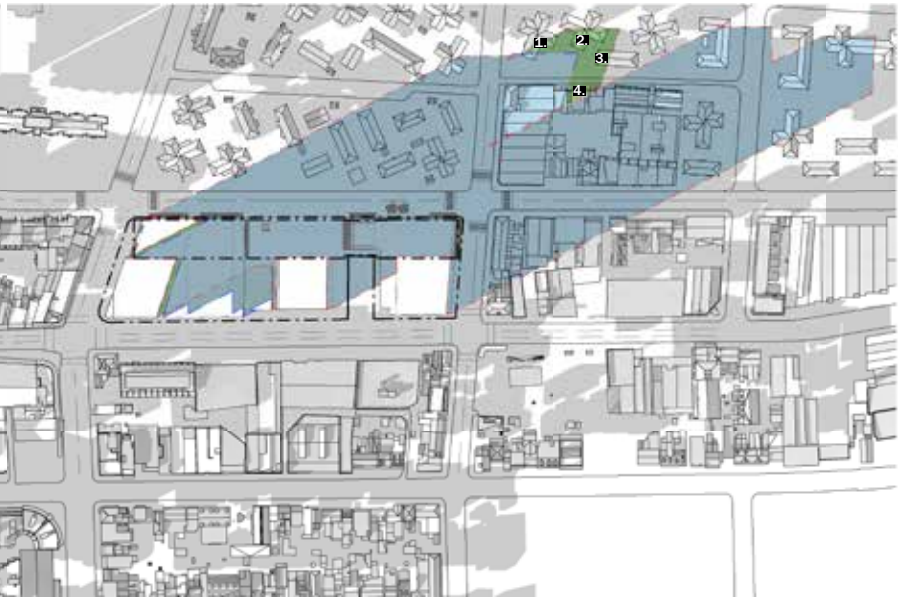
Figure 2.1.7. Plan showing change in extent of potential shadow impact to adjacent developments on 21 June at 3pm.

LEGEND

- Approved Shadow Boundaries
- Unchanged Shadow Boundaries
- Reduced Shadow Boundaries
- Increased Shadow Boundaries

Schedule of properties affected by amended envelope:

Reference	Address	Land Use	Impact
1	118 Wellington St, Alexandria (apartment building)	Residential	Overshadowing reduced
2	248 George St, Waterloo (apartment building)	Residential	Overshadowing removed
3	250 George St, Waterloo (apartment building)	Residential	Overshadowing removed
4	97-109 Cooper Street, Waterloo (apartment building)	Residential	Overshadowing Reduced



2.2

Overshadowing to Alexandria Park

City of Sydney Objection:

- The City of Sydney notes that whilst the analysis provided achieves compliance with the requirements of the design guidelines, the Amending Application has provided only a minor reduction to the projected overshadowing of Alexandria Park between the specified time of 9am-10am on the winter solstice compared to the approved concept design.
- The City of Sydney has interpreted the guidelines as anticipating a greater reduction to overshadowing than that provided under the amended application.
- The City of Sydney has suggested that a better urban design strategy would be to reduce the height of building envelopes where 'non-compliant' overshadowing occurs, being the tower envelopes for buildings 2 and 3.

Waterloo Metro Quarter Design Quality and Amenity Guidelines extract:

3A Desired Outcomes

- Enable a building form which maintains excellent solar access to public open spaces and nearby residential areas. Minimise overshadowing on Alexandria Park and the wider public domain

3K. Solar Access and Amenity Objectives:

2. Minimise overshadowing on Alexandria Park and the wider public domain

Criteria:

1. Development does not result in any additional overshadowing of Alexandria Park after 10am on 21 June
2. No more than 30% of Alexandria Park excluding the oval (as shown in Figure 21) is overshadowed by the development as measured at any time after 9am on 21 June



Figure 22 Solar access to Alexandria Park, Source: Turner Studio

Response

The amending concept application, SSD-10441, seeks modifications specifically to:

- the envelope of Building 01 to enable a low-mid rise envelope that supports the proposed commercial uses in line with the strategic purpose of the Camperdown-Ultimo place strategy and City of Sydney Local Strategic Planning Statement.
- the envelope of Building 01 to reduce the maximum permitted tower height commensurate with a reallocation of floorspace from residential to commercial uses
- the envelope of Building 02 to adjust the podium and tower relationship facing Cope Street Plaza to the East.

As a result, the analysis of impact for the amended concept application was restricted to those areas where the impact previously assessed under SSD-9393 has changed.

As no changes are proposed to the approved building 2 and 3 envelopes, the requirement to further reduce potential overshadowing to Alexandria Park through amendments to building envelopes is not necessary. Adequate protection for Alexandria Park for specific building designs within the defined envelope is clearly dictated under the WMQ Design Quality and Amenity Guidelines with Criteria 3A.1 and 3A.2.

A compliant scheme was provided as part of the amended application with regards to overshadowing of Alexandria park.

A review of the approved envelope and reference design submitted under SSD 9393 has highlighted errors in the previous assessment of compliance which has greater overshadowing to Alexandria Park than reported. An explanation of the analysis process and outputs is provided in this supplementary report. The amended proposals improvement in overshadowing in this context aligns with the City's aspirations for a substantially improved outcome for overshadowing to Alexandria Park as envisaged in their interpretation of the guidelines.

Baseline data informing the shadow analysis:

In order to ensure consistency in reporting and analysis, the following steps were followed in preparing a solar analysis model of Alexandria Park.

1. Positioning of Waterloo Metro Quarter Site and Alexandria Park is based upon the cadastre contained in "Survey Accurate Cadastre Plan" issued by Sydney Metro titled 06.05.02 NWRLSRT-JRH-SRT-ST-DWG-000026.E.01.INF.dwg
2. Area of Alexandria Park to be protected in accordance with Section 3M of the Waterloo Metro Quarter Design Quality Guidelines as follows:
 - North/south dimension is 155.83m as measured from the survey accurate cadastre plan noted in "1" above.
 - East/west dimension of 93.85m is required to achieve 1.46 ha noted in Figure 22 of the Waterloo Metro Quarter Design Quality Guidelines.
3. Waterloo Metro Quarter Site heights at ground are as per topography from the City of Sydney 3D city model.
4. Heights at ground level for Alexandria Park are as per level survey provide by Veris Land Surveyors dated 30 April 2019
5. Positioning of individual building models by Bates Smart and Hassell is based upon aligning the site boundary contained within each 3D file to the "survey accurate cadastre plan" noted under "1" above.
6. Approved SSD reference design and building envelopes as modelled by Hassell from approved SSD 9393 drawings.
7. The true north positioning of the analysis within the model space is based upon 1.00 clockwise rotation from MGA "Survey Accurate Cadastre Plan" as per advice from Veris Land Surveyors.

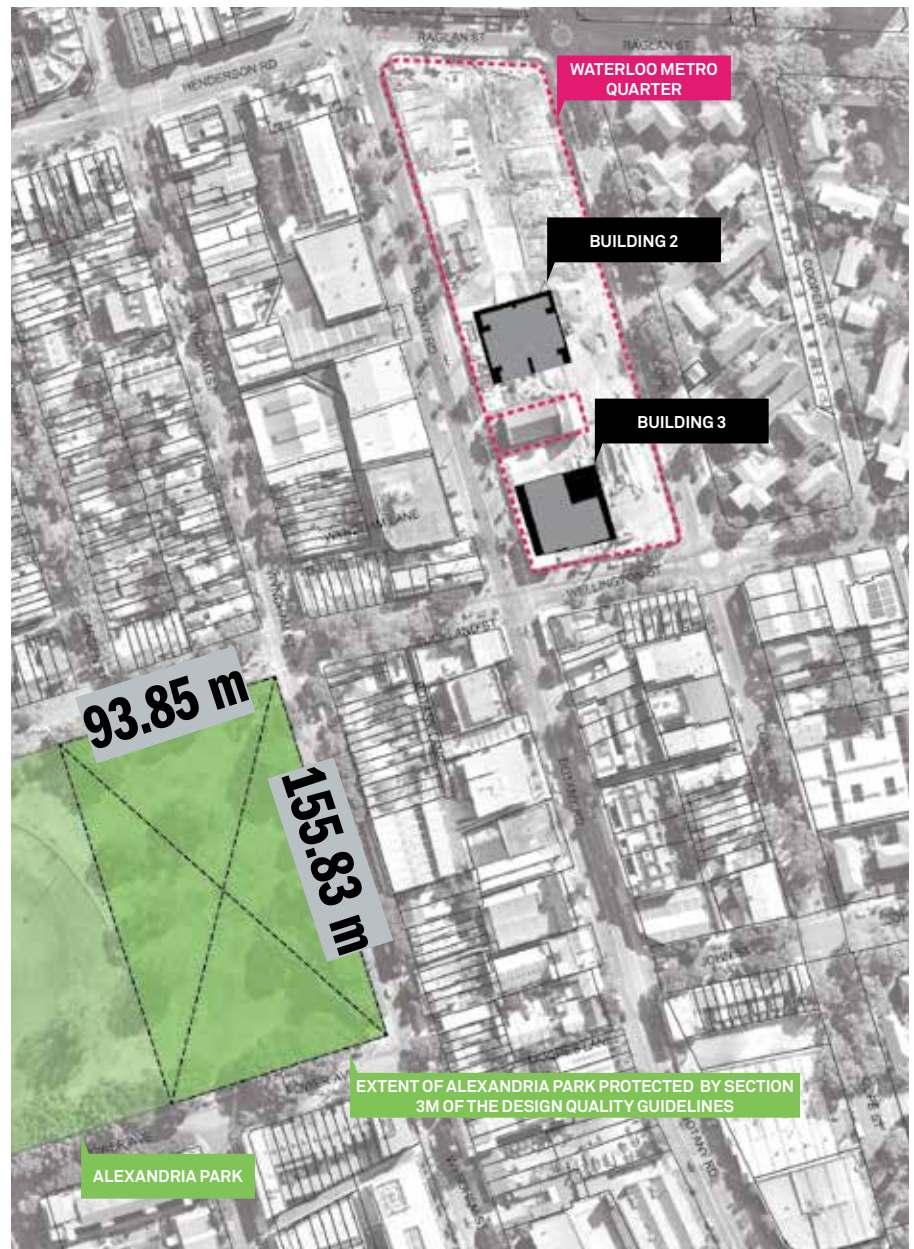
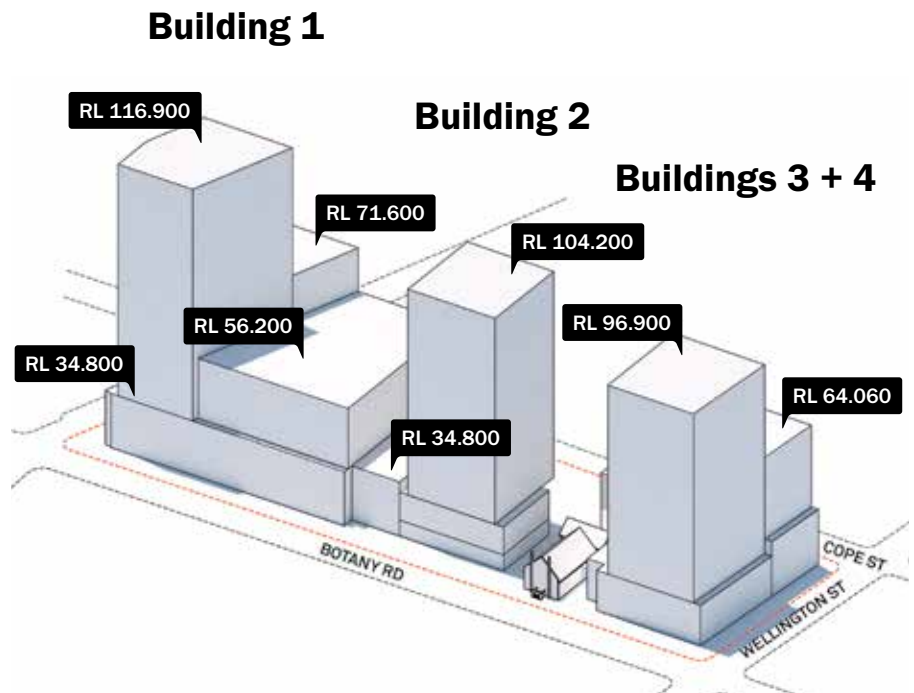


Figure 2.2.1. Plan showing location of key elements under the shadow analysis.

SSD-9393

Approved envelope, view from south-west

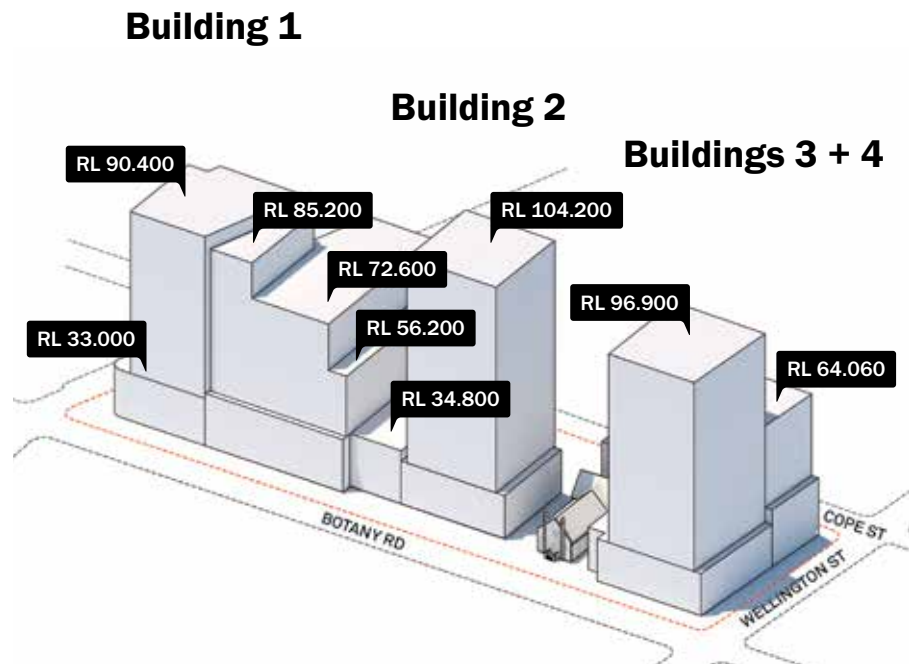
WMQ OSD Concept Application SSD-9393-
Approved Building Envelope.



SSD-10441

Amended envelope, view from south-west

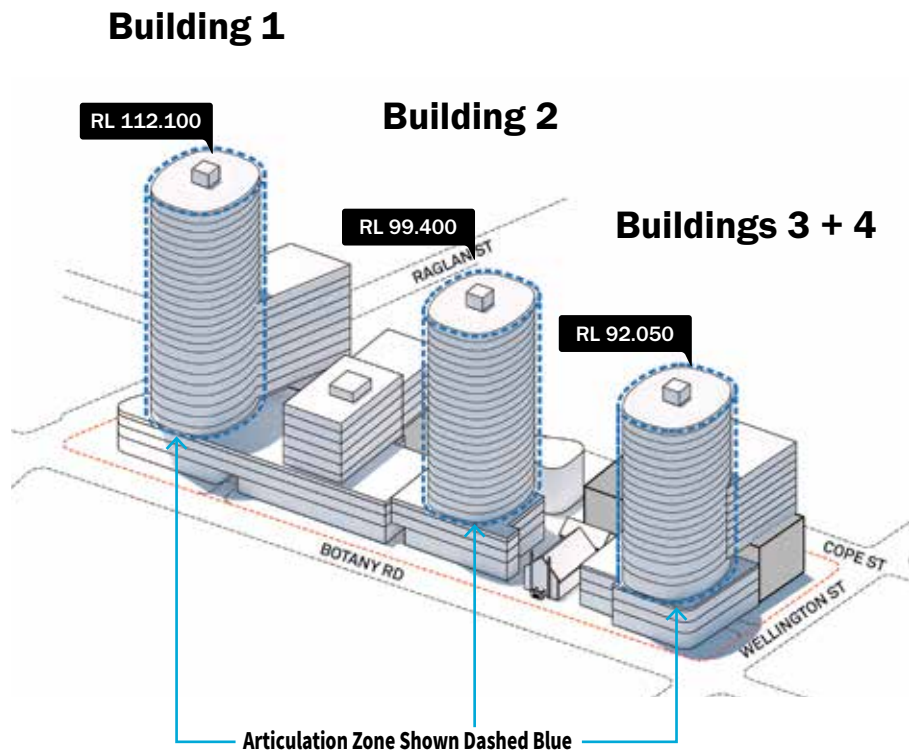
WMQ OSD Concept Application SSD-9393-
Amended Building Envelope.



SSD-9393

Submitted Reference Design including articulation zone

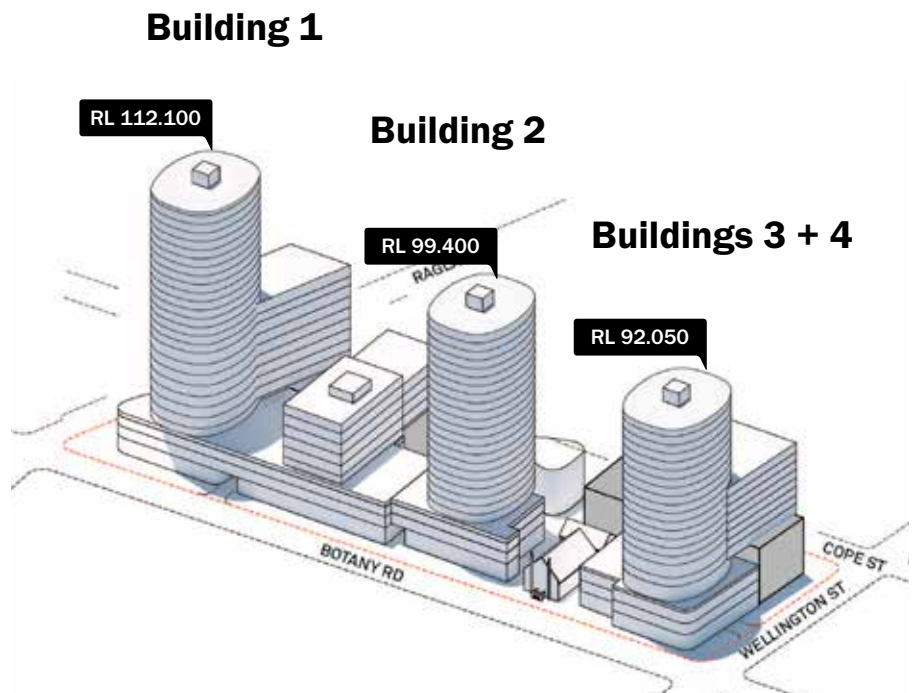
WMQ OSD Concept Application SSD-9393
Submitted Reference Design Inclusive of
Articulation Zone.



SSD-9393

Submitted Reference Design excluding articulation zone

WMQ OSD Concept Application SSD-9393
Submitted Reference Design exclusive of
Articulation Zone.



Baseline Solar Analysis 01:
WMQ OSD Concept Application SSD-9393-
Approved Building Envelope - North aligned
to MGA embedded within Survey Accurate
Cadastre Plan.

The purpose of the proposed envelope is to maximise the potential for future designs of specific buildings which must ensure that amenity is provided to Alexandria Park in accordance with the Design Quality and Amenity Guidelines. It is not a requirement of the concept design that the envelope itself achieves the required maximum overshadowing specified under the Design Quality and Amenity Guidelines.

An analysis of projected overshadowing by the approved envelope was not provided as part of the assessment process for SSD 9393.

The overall development envelope has been modelled by Hassell as per the following approved drawings under SSD 9393:

- MP-100-003 Revision 7
- MP-250-101 Revision 9
- MP-250-201 Revision 9
- MP-250-301 Revision 8

Analysis of this model has identified that the areas of concern for overshadowing of any building is restricted to buildings 2 and 3 between 9am-9:30am and at 10am on 21 June.

The baseline boundary survey information provided as part of the competitive tender process by Sydney Metro was oriented to MGA North which does not provide an accurate representation of shadows cast by the approved envelopes or potential buildings within the envelope.

Reliance on the embedded North within the cad file provides a false assessment of impact with extent of impact increasing once the north orientation is corrected as provided under 'Baseline Solar Analysis 02'.



June 21st 9:00am

1.46 ha	Alexandria Park	BLD 1	0.0 ha	0%
0.6974 ha	Overshadowed	BLD 2	0.26 ha	17.80%
47.76%	Overshadowed	BLD 3	0.43 ha	29.96%



June 21st 9:15am

1.46 ha	Alexandria Park	BLD 1	0.0 ha	0%
0.5483 ha	Overshadowed	BLD 2	0.23 ha	16.32%
37.55%	Overshadowed	BLD 3	0.31 ha	21.23%



June 21st 9:30am

1.46 ha	Alexandria Park	BLD 1	0.0 ha	0%
0.3690 ha	Overshadowed	BLD 2	0.18 ha	12.88%
25.27%	Overshadowed	BLD 3	0.18 ha	12.39%



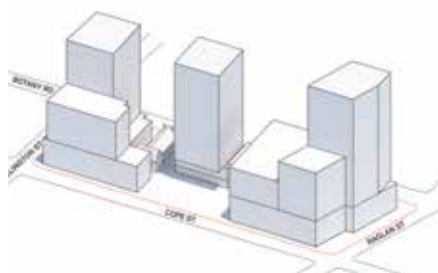
June 21st 9:45am

1.46 ha	Alexandria Park	BLD 1	0.0 ha	0%
0.1907 ha	Overshadowed	BLD 2	0.11 ha	7.47%
13.06%	Overshadowed	BLD 3	0.08 ha	5.59%



June 21st 10:00am

1.46 ha	Alexandria Park	BLD 1	0.0 ha	0%
0.0553 ha	Overshadowed	BLD 2	0.04 ha	2.85%
3.78%	Overshadowed	BLD 3	0.01 ha	0.93%



Alexandria Park SSD9393 Shadow
 Analysis Baseline June 21st 9am-10am

Section 2 Solar Impact Analysis

Baseline Solar Analysis 02:

**WMQ OSD Concept Application SSD-9393-
Approved Building Envelope - North aligned to
true north as advised by RWDI and Veris Land
Surveyors.**

As per 'Baseline Solar Analysis 01', the overall
development envelope has been modelled
by Hassell as per the following approved
drawings under SSD 9393:

- MP-100-003 Revision 7
- MP-250-101 Revision 9
- MP-250-201 Revision 9
- MP-250-301 Revision 8

The orientation of North has been corrected
by rotating the digital model 1.00 degrees
clockwise rotation from MGA "Survey Accurate
Cadastre Plan" as per advice from Veris Land
Surveyors.

Whilst analysis with a corrected north
orientation has identified that the same areas
and times of concern identified under 'Baseline
Solar Analysis 01', the extent of impact
has increased within the identified times of
9am-9:30am. The impact at 10am is slightly
improved.

The identified increase is between 0.4% and
1.89% of additional area impacted by the
envelope approved envelope overall.



June 21st 9:00am

1.46 ha	Alexandria Park	BLD 1	0.0 ha	0%
0.7250 ha	Overshadowed	BLD 2	0.29 ha	19.98%
49.65%	Overshadowed	BLD 3	0.43 ha	29.67%

Previous 47.76%



June 21st 9:30am

1.46 ha	Alexandria Park	BLD 1	0.0 ha	0%
0.3626 ha	Overshadowed	BLD 2	0.19 ha	13.23%
24.83%	Overshadowed	BLD 3	0.17 ha	11.60%

Previous 25.27%



June 21st 10:00am

1.46 ha	Alexandria Park	BLD 1	0.0 ha	0%
0.0380 ha	Overshadowed	BLD 2	0.03 ha	2.05%
2.6%	Overshadowed	BLD 3	0.01 ha	0.55%

Previous 3.78%



June 21st 9:15am

1.46 ha	Alexandria Park	BLD 1	0.0 ha	0%
0.5541 ha	Overshadowed	BLD 2	0.25 ha	17.30%
37.95%	Overshadowed	BLD 3	0.30 ha	20.65%

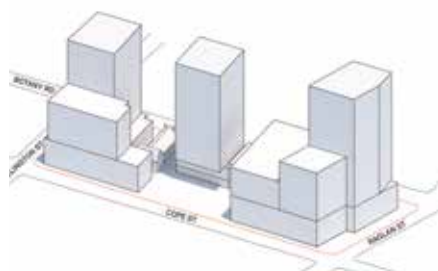
Previous 37.55%



June 21st 9:45am

1.46 ha	Alexandria Park	BLD 1	0.0 ha	0%
0.1803 ha	Overshadowed	BLD 2	0.11 ha	7.32%
12.34%	Overshadowed	BLD 3	0.07 ha	5.02%

Previous 13.06%



**Alexandria Park SSD9393 Shadow
Analysis Baseline June 21st 9am-10am**

Baseline Solar Analysis 03:
WMQ OSD Concept Application SSD-9393
Submitted Reference Design Inclusive of
Articulation Zone - North aligned to MGA
embedded within Survey Accurate Cadaster
Plan.

The purpose of the reference design is to demonstrate the viability of the proposed development envelope to enable a design which complies with relevant development controls, the NSW Apartment Design Guidelines and the Waterloo Metro Quarter Design Quality and Amenity Guidelines.

The reference design identifies a core built area which will be occupied by built form as well as an 'articulation zone' which will be partially occupied to enable variation within the architectural design and create a positive experience of the building within the urban landscape.

An analysis of projected overshadowing by the reference design of approved SSD-9393, inclusive of the articulation zone, was provided as part of the assessment process for SSD 9393 under Appendix H "Waterloo Metro Quarter Solar Access Report" dated November 2018.

The analysis provided hourly projected shadow diagrams by the reference design at 9am and 10am however no calculation of the area of Alexandria Park was provided.

The reference design mass has been modelled by Hassell inclusive of the articulation zone as per the following approved drawings under SSD 9393:

- MP-100-003 Revision 7
- MP-250-101 Revision 9
- MP-250-201 Revision 9
- MP-250-301 Revision 8

Analysis of this model using the embedded MGA north origin of the baseline survey has identified that the submitted reference design does not meet the requirements of the Design Quality and Amenity Guidelines for overshadowing to Alexandria Park during the identified areas of concern between 9am-9:30am and at 10am on 21 June.

Reliance on the embedded North within the cad file provides a false assessment of impact with extent of impact increasing once the north orientation is corrected as provided under 'Baseline Solar Analysis 04'.

Alexandria Park SSD9393 Shadow
 Analysis Baseline June 21st 9am-10am



June 21st 9:00am

1.46 ha	Alexandria Park	BLD 1	0.0 ha	0%
0.5044 ha	Overshadowed	BLD 2	0.20 ha	14.18%
34.54%	Overshadowed	BLD 3	0.30 ha	20.36%



June 21st 9:05am

1.46 ha	Alexandria Park	BLD 1	0.0 ha	0%
0.4590 ha	Overshadowed	BLD 2	0.19 ha	13.41%
31.43%	Overshadowed	BLD 3	0.26 ha	18.02%



June 21st 10:00am

1.46 ha	Alexandria Park	BLD 1	0.0 ha	0%
0.0098 ha	Overshadowed	BLD 2	0.0098 ha	0.67%
0.67%	Overshadowed	BLD 3	0.0 ha	0%

Baseline Solar Analysis 04:
WMQ OSD Concept Application SSD-9393
Submitted Reference Design Inclusive of
Articulation Zone - North aligned to true north
as advised by RWDI and Veris Land Surveyors.

As per 'Baseline Solar Analysis 03', the overall development envelope has been modelled by Hassell inclusive of the 'articulation zone' as per the following approved drawings under SSD 9393:

- MP-100-003 Revision 7
- MP-250-101 Revision 9
- MP-250-201 Revision 9
- MP-250-301 Revision 8

The orientation of North has been corrected by rotating the digital model 1.00 degrees clockwise rotation from MGA "Survey Accurate Cadastre Plan" as per advice from Veris Land Surveyors.

Analysis with a corrected north orientation has shown that the level of impact of the reference design provided under SSD-9393 does not meet the requirements of the Design Quality and Amenity Guidelines with extent of overshadowing to Alexandria Park within the identified hours increasing.



June 21st 9:00am

1.46 ha	Alexandria Park	BLD 1	0.0 ha	0%
0.5153 ha	Overshadowed	BLD 2	0.22 ha	15.42%
35.29%	Overshadowed	BLD 3	0.29 ha	19.87%

Previous 34.54%



June 21st 9:05am

1.46 ha	Alexandria Park	BLD 1	0.0 ha	0%
0.4664 ha	Overshadowed	BLD 2	0.21 ha	14.46%
31.94%	Overshadowed	BLD 3	0.25 ha	17.48%

Previous 31.43%



June 21st 10:00am

1.46 ha	Alexandria Park	BLD 1	0.0 ha	0%
0.0057 ha	Overshadowed	BLD 2	0.0057 ha	0.39%
0.39%	Overshadowed	BLD 3	0.00 ha	0%

Previous 0.67%

Alexandria Park SSD9393 Shadow
 Analysis Baseline June 21st 9am-10am

Baseline Solar Analysis 05:
WMQ OSD Concept Application SSD-9393
Submitted Reference Design exclusive of
Articulation Zone - North aligned to MGA
embedded within Survey Accurate Cadaster
Plan.

The purpose of the reference design is to demonstrate the viability of the proposed development envelope to enable a design which complies with relevant development controls, the NSW Apartment Design Guidelines and the Waterloo Metro Quarter Design Quality and Amenity Guidelines.

The reference design identifies a core built area which will be occupied by built form as well as an 'articulation zone' which will be partially occupied to enable variation within the architectural design and create a positive experience of the building within the urban landscape.

An analysis of projected overshadowing by the reference design of approved SSD-9393, without the articulation zone, was not provided as part of the assessment process for SSD 9393.

The reference design mass has been modelled by Hassell exclusive of the articulation zone as per the following approved drawings under SSD 9393:

- MP-100-003 Revision 7
- MP-250-101 Revision 9
- MP-250-201 Revision 9
- MP-250-301 Revision 8

Analysis of this model using the embedded MGA north origin of the baseline survey has identified that the submitted reference design does not meet the requirements of the Design Quality and Amenity Guidelines for overshadowing to Alexandria Park during the identified areas of concern between 9am-9:30am and at 10am on 21 June.

Reliance on the embedded North within the cad file provides a false assessment of impact with extent of impact increasing once the north orientation is corrected as provided under 'Baseline Solar Analysis 06'.



June 21st 9:00am

1.46 ha	Alexandria Park	BLD 1	0.0 ha	0%
0.4582 ha	Overshadowed	BLD 2	0.18 ha	12.92%
31.38%	Overshadowed	BLD 3	0.27 ha	18.46%



June 21st 9:05am

1.46 ha	Alexandria Park	BLD 1	0.0 ha	0%
0.4204 ha	Overshadowed	BLD 2	0.19 ha	12.42%
28.79%	Overshadowed	BLD 3	0.23 ha	16.37%



June 21st 10:00am

1.46 ha	Alexandria Park	BLD 1	0.0 ha	0%
0.0029 ha	Overshadowed	BLD 2	0.0029 ha	0.19%
0.19%	Overshadowed	BLD 3	0.0 ha	0%

Alexandria Park SSD9393 Shadow
 Analysis Baseline June 21st 9am-10am

Baseline Solar Analysis 06:
WMQ OSD Concept Application SSD-9393
Submitted Reference Design exclusive of
Articulation Zone - North aligned to true north
as advised by RWDI and Veris Land Surveyors.

As per 'Baseline Solar Analysis 05', the overall development envelope has been modelled by Hassell inclusive of the 'articulation zone' as per the following approved drawings under SSD 9393:

- MP-100-003 Revision 7
- MP-250-101 Revision 9
- MP-250-201 Revision 9
- MP-250-301 Revision 8

The orientation of North has been corrected by rotating the digital model 1.00 degrees clockwise rotation from MGA "Survey Accurate Cadastre Plan" as per advice from Veris Land Surveyors.

Analysis with a corrected north orientation has shown that the level of impact of the reference design provided under SSD-9393 does not meet the requirements of the Design Quality and Amenity Guidelines with extent of overshadowing to Alexandria Park within the identified hours increasing.



June 21st 9:00am

1.46 ha	Alexandria Park	BLD 1	0.0 ha	0%
0.4670 ha	Overshadowed	BLD 2	0.20 ha	13.97%
31.98%	Overshadowed	BLD 3	0.26 ha	18.01%

Previous 31.38%



June 21st 9:05am

1.46 ha	Alexandria Park	BLD 1	0.0 ha	0%
0.4224 ha	Overshadowed	BLD 2	0.20 ha	13.26%
28.93%	Overshadowed	BLD 3	0.22 ha	15.67%

Previous 28.79%



June 21st 10:00am

1.46 ha	Alexandria Park	BLD 1	0.0 ha	0%
0.0026 ha	Overshadowed	BLD 2	0.0026 ha	0.17%
0.17%	Overshadowed	BLD 3	0.00 ha	0%

Previous 0.19%

Alexandria Park SSD9393 Shadow
 Analysis Baseline June 21st 9am-10am

2.3

Internal Overshadowing

City of Sydney Objection:

- Solar access – Objective 4A-1 of the Apartment Design Guide (ADG) recommends, as a minimum, 70% of apartments be provided solar access to living rooms and balconies for at least two hours during midwinter. The application states that 57% of apartments achieve the design criteria. The City does not support the applicant's justification for the non-compliance by including solar access after 3pm as this is not reflected in the design guidance or criteria and is of little thermal benefit due to the low altitude of the sun.
- The non-compliance is a symptom of the site planning, locating the commercial office building adjoining the northern boundary and obstructing solar access to the residential apartments to the south. The City therefore raises concerns with the appropriateness of SSD-10441 regarding Objectives 3A-1, 3B-1 and 4A-1 of the ADG.

Waterloo Metro Quarter Design Quality and Amenity Guidelines extract:

- 3K. Solar Access and Amenity
4. Proposed apartments in a development and neighbouring developments must achieve a minimum of 2 hours direct sunlight between 9am and 3pm on 21 June onto at least 1m² of living room windows and a minimum 50% of the required minimum area of private open space area

Note: This applies to at least 70% of the apartments in a development in accordance with the NSW Apartment Design Guide

Response

Response

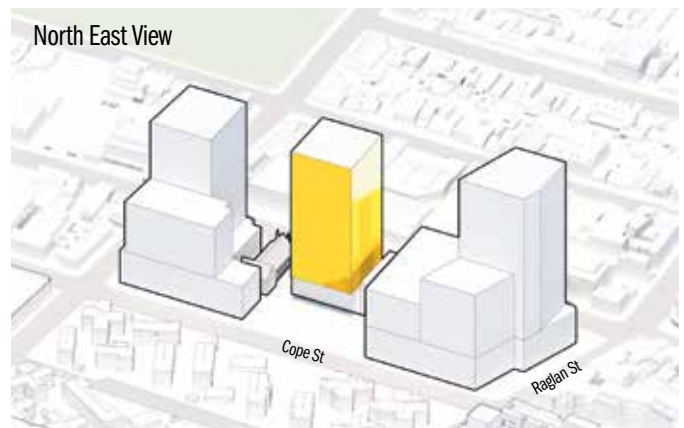
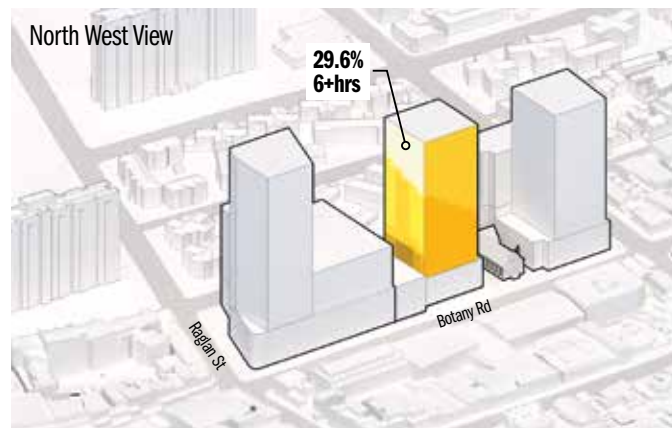
In raising objections with the compliance of the proposed Building 02 design under SSD-10439 with solar access requirements, the City of Sydney identifies the changes in envelope under the amended proposal as being a cause for non-compliance.

The analysis provided on the adjacent page demonstrates that on the winter solstice, the amended envelope results in a significant decrease in overshadowing of Building 2 by Building 1.

As such, the City of Sydney's suggestion that non-compliance of the Building 02 design as a result of the primary building envelope changes proposed under SSD 10441 is not deemed accurate.

Approved Envelope SSD-9393

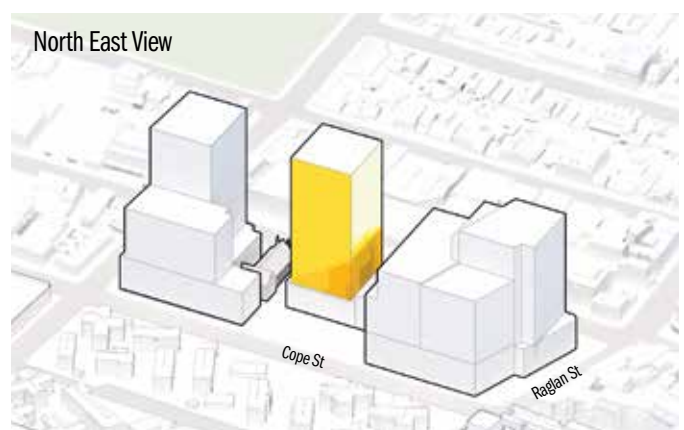
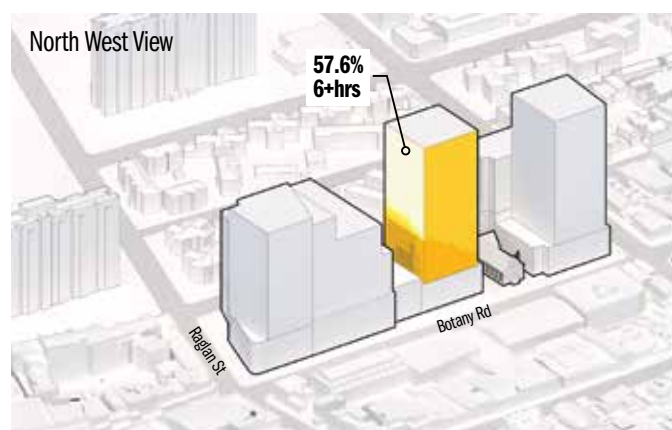
Analysis of number of hours sunlight to the facade of Building 02 on 21 June, 9am-3pm



Central Precinct		Eastern facade Approved SSD-9393	Northern facade Approved SSD-9393	Western facade Approved SSD-9393
Total facade area		2,338 sqm	2,358 sqm	2,324 sqm
Facade area receiving solar access	6 hrs+	0%	29.6%	0%
	5-6 hrs	0%	4.4%	0%
	4-5 hrs	0%	28.3%	0%
	3-4 hrs	95.6%	20.2%	0%
	2-3 hrs	0.7%	1.4%	51.5%
	1-2 hrs	2.6%	1.4%	48.5%
	0-1 hr	1.1%	7.2%	0%
	0 hrs	0%	7.1%	0%

Amended Envelope SSD-10441

Analysis of number of hours sunlight to the facade of Building 02 on 21 June, 9am-3pm



Central Precinct		Eastern facade Amended SSD-9393	Northern facade Amended SSD-9393	Western facade Amended SSD-9393
Total facade area		2,338 sqm	2,358 sqm	2,324 sqm
Facade area receiving solar access	6 hrs+	0%	57.6%	0%
	5-6 hrs	0%	4.3%	0%
	4-5 hrs	0%	3.6%	0%
	3-4 hrs	82.7%	2.5%	0%
	2-3 hrs	7.8%	0%	77.7%
	1-2 hrs	8.4%	5.5%	22.3%
	0-1 hr	1.1%	18.4%	0%
	0 hrs	0%	8.0%	0%

3.0

Conclusion

The objections raised by the City centre on the overarching issue of solar access and grouped under the three topics of:

- Overshadowing to adjacent residential
- Overshadowing to Alexandria Park
- Overshadowing of Building 2 by Building 1

Have been reviewed by the design team in greater detail with the following outcomes:

Issue 1, Overshadowing on adjacent residential development.

To the extent that the approved envelope under SSD 9393 has been proposed to be amended, The impact on adjacent properties has generally been improved as a result of the reduction in overall building height for Building 01 with increased overshadowing occurring largely on commercial and industrial properties.

Issue 2, Overshadowing to Alexandria Park:

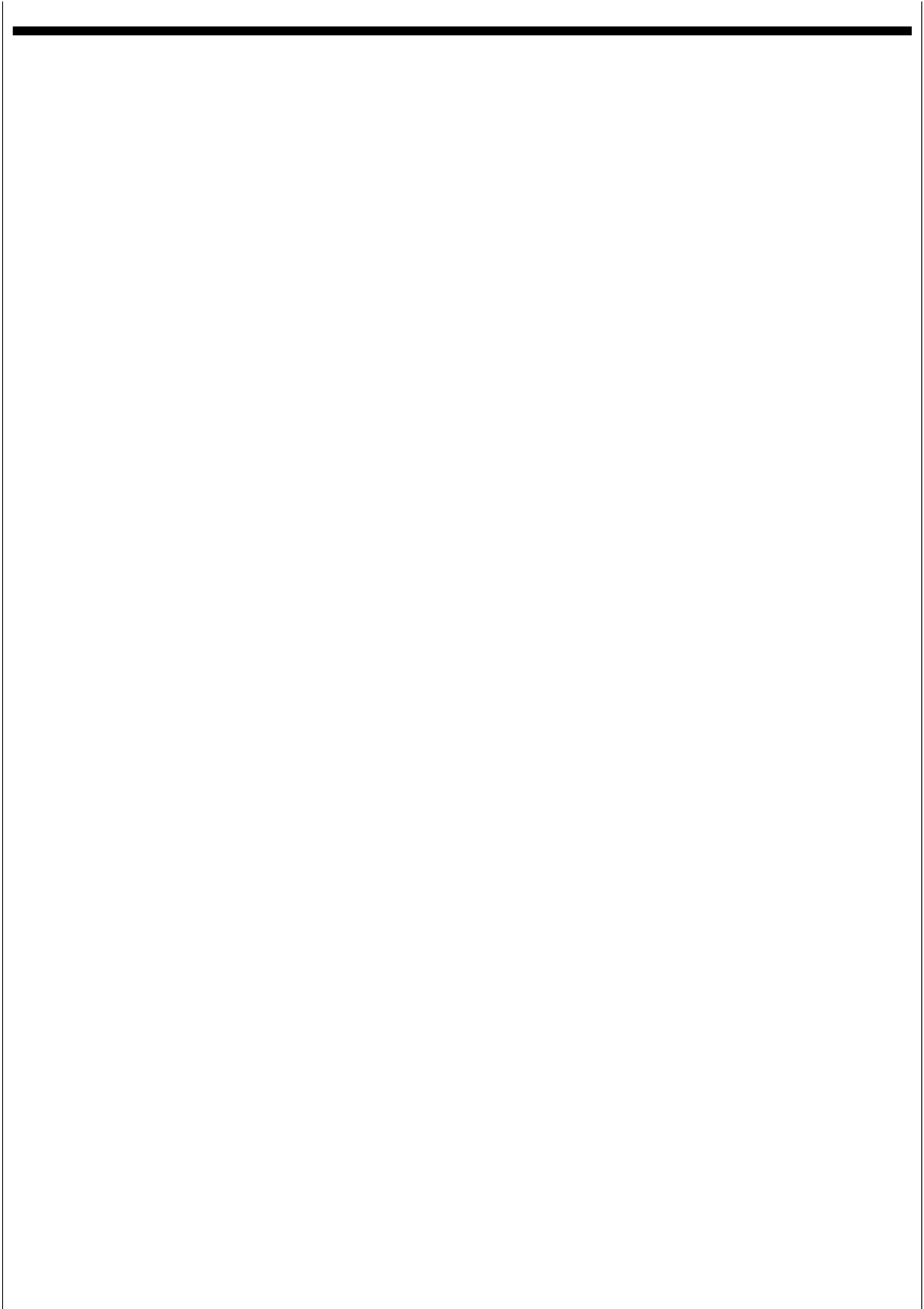
No changes are proposed to the approved enveloped under SSD 9393 that would affect the previously assessed impact which at the time was deemed appropriate for a complex urban centre.

As such, the cities objections in this instance are not considered appropriate when assessing the merits of the proposed envelope changes under SSD 10441.

Additional analysis undertaken by Hassell to understand the extent of improvement between SSD-9393 and the specific development proposals for the North, Central and South Precinct Buildings has demonstrated that previous expectations of compliance under the approved SSD 9393 were inaccurate with the improved overshadowing provided under SSD-10439 (Central Precinct) and SSD-10437 (Southern Precinct) by the proponent to Alexandria Park in the context of a complex urban environment, delivery of significant public realm and a new metro station worthy of applause.

Issue 3, Overshadowing of Building 2 by Building 1.

Detailed analysis of the changes to internal overshadowing as a result of the proposed envelope amendments has demonstrated that the City of Sydney's assumption that non-compliance with ADG by SSD-10439 as a result of the amended envelope is not correct.



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