Central Barangaroo

February 2025

Mod 8 Built Form Study

SYDNEY

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TURNER

TURNER acknowledges First Nations peoples as the Traditional Custodians of the many lands upon which we gather, work and journey across. We recognise their ongoing connections to land, sea and community and pay our respects to their Elders past and present.

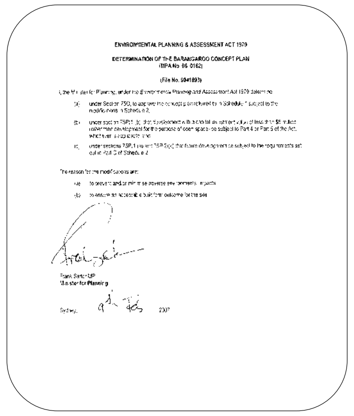
Artwork by Yukupin.

DLCS Quality Endorsed Company ISO 9001:2015, Registration Number 20476
Nominated Architect: Nicholas TURNER 6695, ABN 86 064 084 911

Central Barangaroo
Mod 8 Built Form Study

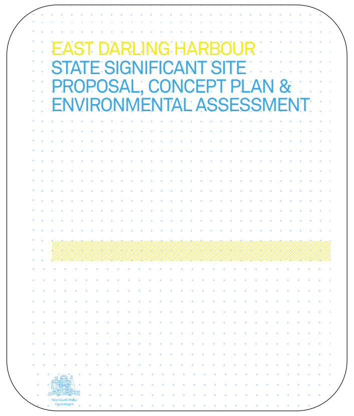
Contents

Planning background



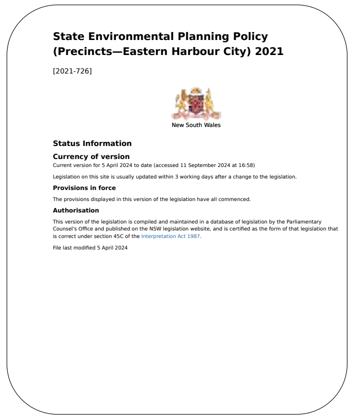
Barangaroo Concept Plan Approval & Modifications

Original Concept Plan approval [February 2007] with conditions, and statement of commitments including references to supporting documents. Subsequent modifications also affect Central Barangaroo including Mod 2, 3 and 8.
Other modifications inform precinct wide criteria that have secondary effects for Central Barangaroo.



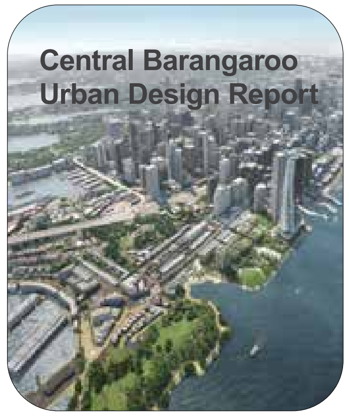
Environmental Assessment Report October 2006 [EAR] objectives.

Outlines GFA, built form principles, block design principles (of original design including northern section of Block 7), Statement of commitments including RFDC apartment amenity objectives.



SEPP Precincts Eastern Harbour City [SEPP Precincts]

(From March 2022), this document maps Density and block heights (including heights to the Mod 8 envelope).



Mod 9 Reports

Recent reports and analysis regarding the proposed changes to Blocks 5 to 7.

East Darling Harbour Concept Plan Heritage Impact Statement September 2006 [HIS].
Identifies key viewpoints and principles including views to and from Millers Point

MG Planning Modification Report October 2008 [MGPMR]
Modification report outlines key criteria relating to the first modification to Development Principles and Block Controls

Conybeare & Morrison August 2009 Headlands Parklands Urban Design Report [CM+UDR]
Urban design report considering urban design changes related to headland park and reduction of northern Block 7 & 8.

Conybeare & Morrison August 2007 GFA Urban Design and Visual Analysis Review [CM+GUVAR]
Visual analysis update related to headland park

JBA Planning Supplementary View Analysis January 2007 [JBA-VA]
Supplementary analysis of key viewpoints. Endorses HIS approach to Millers Point

JBA Planning Response to Department of Planning Revised Statement of Conditions January 2007
Updated conditions and statement of commitments

Barangaroo Concept & Mod 8 Approval Documents

Introduction
This document considers what built form and yield is possible within the Mod 8 height envelope for Central Barangaroo (Blocks 5, 6, and 7) given the various controls, commitments and guidelines that affect the site. This is required as there was no approved building envelope plan.

To understand the site, built form and controls there is a history of the site, an initial concept plan and approval, then a series of modifications that need to be understood.

Following the East Darling Harbour Design competition in 2005, the 2006 concept plan, the concept was approved in February 2007.

The original Concept Plan included Built Form Principles that applied to the whole concept plan area. Each block within the concept was further informed by Block Design Principles.

The Concept Plan Approval then outlined various conditions of consent and a list of project commitments.

The commitments included references to other documents containing evaluation and recommendations.

For example, commitments numbers 57-59 include reference to the Heritage Impact Statement by City Plan Heritage, which assesses the impact of the proposal on views to and from areas around the precinct with an emphasis on the public domain including Observatory Hill, public areas on opposite foreshores and the distinctive terrace roofscape of Millers Point.

The approval includes further evaluation at the detail design stage including additional heritage studies and the input of a Design Review Panel to allow appropriate consideration at detailed design stage.

Understanding the concept plan is made more complex due to the length of the approval document, associated reports, and the elapsed time since the approval. A series of modifications to the concept plan, since 2007 have made a clear understanding of the controls ever more difficult.

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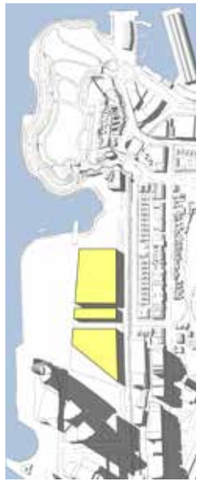
The site

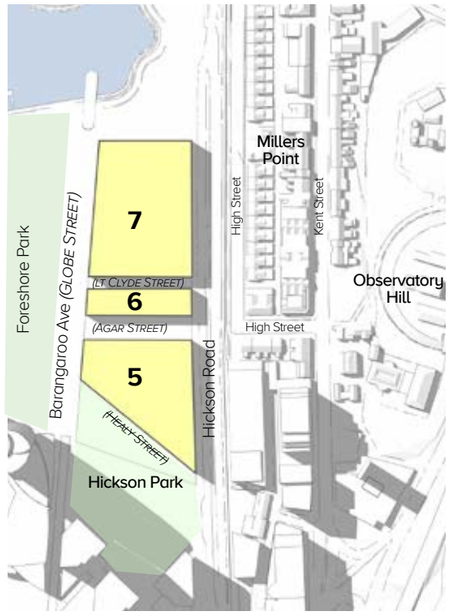
Aerial photography of Sydney City with Barangaroo Precinct highlighted [Nearmap]

Original Structure Plan showing indicative built form [EAR]. Approximate location of Central Barangaroo shown outlined in blue.

Mod 8 illustrative plan [Lend Lease]. Central Barangaroo shown outlined in blue.



Mod 8 model highlighting blocks 5, 6, and 7.



Mod 8 model highlighting blocks 5, 6, and 7.

Central Barangaroo: Blocks 5, 6 and 7

The Precinct
Barangaroo is located on the western edge of the Sydney City Precinct and adjoins Darling Harbour.

Central Barangaroo, also known as blocks 5, 6, and 7 is located in the centre of the precinct (refer to the plans above).

Following the East Darling Harbour Design competition in 2005, the precinct was laid out in the 2006 concept plan, which was then approved in February 2007.

Since the original concept approval there have been a number of modifications including expanding the headland park to include the northern part of Block 7, the creation of Hickson Park to the south of Block 5 which also affected the southern boundary of Block 5, and the naming for Globe Street which formed the eastern boundary to Central Barangaroo was changed to Barangaroo Avenue.

The Central Barangaroo site is approximately 280x75m and around 2.1 hectares. The site is flat with a base at RL 3.5.

As outlined above, Blocks 5 and 7 were modified as part of the creation of new parklands to the north and south. Block 6, in contrast has remained similar to the original concept approval.

To the south of Block 6, a 20m wide street (originally, named Agar Street) aligns with High Street to the east. To the north of Block 6 is a 10m wide street originally named Little Clyde Street. This street forms a northern edge to Block 6 but does not have a contextual alignment like Agar Street.

The width of Agar and Little Clyde Streets are based on the original structure plan.

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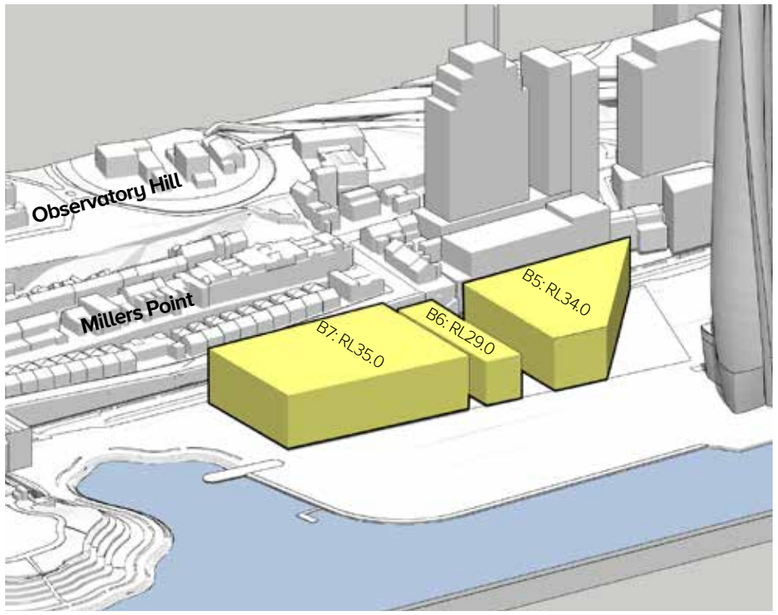
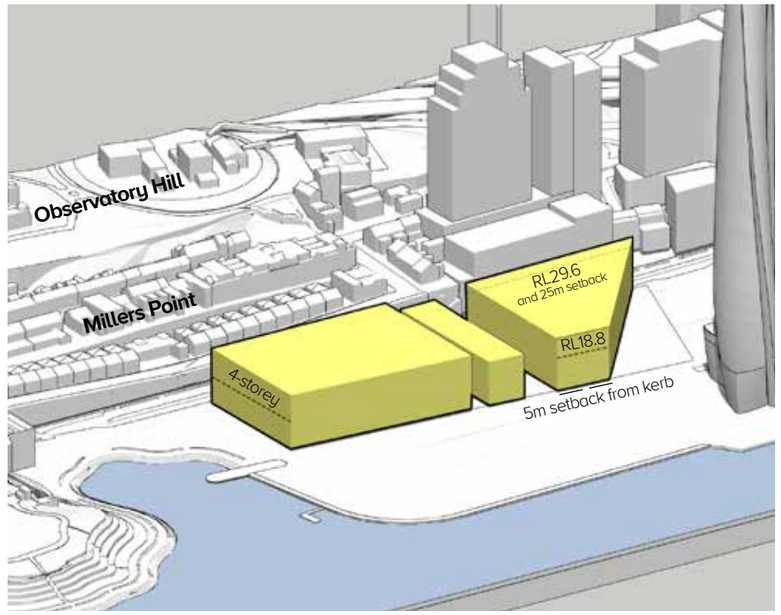
Concept approval



Mod 8 Height Control and Streets: Blocks 5, 6, and 7



Setbacks: Condition B9(1) and Committment 124 & 125, Street wall controls.

Concept Approval
The concept approval outlines the key controls for Central Barangaroo. The concept approval is structured with conditions of consent and statements of commitments. The 2007 approval was based on the original structure plan which assisted to provide guidance for the conditions and commitments. Subsequent modifications have diminished the design principles of the plan and therefore the conditions and commitments need to be considered more independently from the structure plan.

The following list of conditions and commitments outlines the relevant controls to the built form of Blocks 5, 6, and 7.

Concept Approval: Conditions
The key concept approval conditions for the Central Barangaroo Area are:

B3 Overshadowing to Hickson Park [Block 5]
Condition B3(2) outlines an overshadowing control to Hickson Park (located south of Block 5) to achieve solar access to an average of at least 2,500m^2 during mid-winter 12-2pm. The condition also reduces the footprint of Block 5 to reduce overshadowing.

B4 Gross Floor Area and Height [Blocks 5, 6, and 7]
Condition B4(2) specifies maximum GFA controls for Blocks 5, 6, and 7 (29,688m^2, 3,000m^2 and 15,000m^2 respectively).
B4(2) also identifies a maximium residential GFA for Blocks 5 and 7 of 15,000m^2 and 14,000m^2.
B4(2) also specifies a maximum height for each block. Block 5: RL34, Block 6: RL 29, and Block 7: RL35. This condition also notes a base RL of 2.0 which is no longer accurate as the site survey indicates that the base RL will be approximately RL3.5.

The density and height controls are repeated in SEPP (Precincts-Eastern Harbour City) 2021 Appendix 5 clauses 17 and 18 and mapped in the SEPP (State Significant Precincts) 2005 Barangaroo Gross Floor Area and Barangaroo Height of Buildings maps. Note that the SEPP maps include the site area and apply a height control to the north and south streets flanking Block 6.

B7 Community Floor Space [Blocks 6 and 7]
Condition B7(3) specifies a minimum community GFA of 2,000m^2 to be provided in Block 6 or 7.

B9 Block Controls [Block 5]
Condition B9(1) outlines block controls for Block 5 requiring:
- (a) A podium or street wall height to Hickson Road at RL29.6
- (b) A podium or street wall to Globe at RL18.8
- (d) A setback for podium elements of 25m from the Hickson Road podium or street wall
- (e) An appropriate setback to other streets to ensure an appropriate scale to the streets
- (f) A setback from the Globe Street kerb of 5m
- (g) A setback of any above podium forms from the towers of Block 4 by at least 20m

There are no block controls for Blocks 6 and 7.

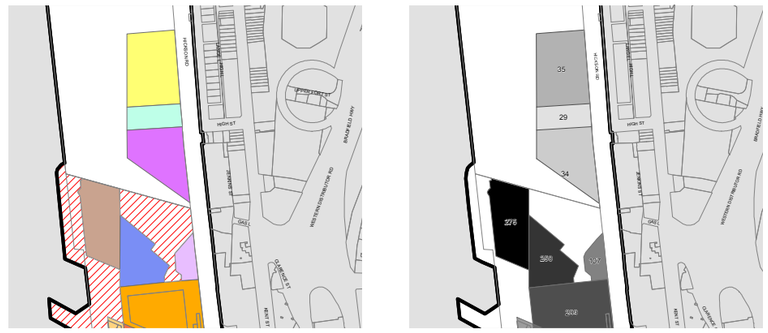
C1 View Retention [Block 5]
Condition C1 outlines view retention in relation to Block 5. Future Block 5 development applications must show that views are retained from Millers Point and Observatory Hill to the western part of Sydney Harbour and, that views are retained from Block Y to the Sydney Harbour Bridge and the Opera House

Other Conditions
Conditions A1 and A2 connect the overall development to original concept plan, supporting reports and various modifications since the 2007 approval. Condition A1(3) notes the Built Form Principles, part of the original concept approval (and noted in several of the supporting documents). The Built Form Principles were general design principles from the whole precinct which were supplemented by Block Controls for each site. These Principles and Block Controls have less effect on the built form of Blocks 5, 6, and 7 due to the various modifications which have eroded the precinct wide Built Form Principles and changed the envelope to the Blocks. As part of the Design Excellence requirements (see below), the Design Panel will review future development in comparison with the Built Form Principles.

One aspect of the original structure plan which still remains relevant is the street widths on either side of Block 6. The northern street is 10m wide and the southern street is 20m wide.

Condition C2 outlines Design Excellence considerations for future development applications on site areas greater than 1,500m^2 which will include Blocks 5, 6, and 7. As part of the assessment process, the Design Review Panel will consider future development in light of the Built Form Principles and Block Controls

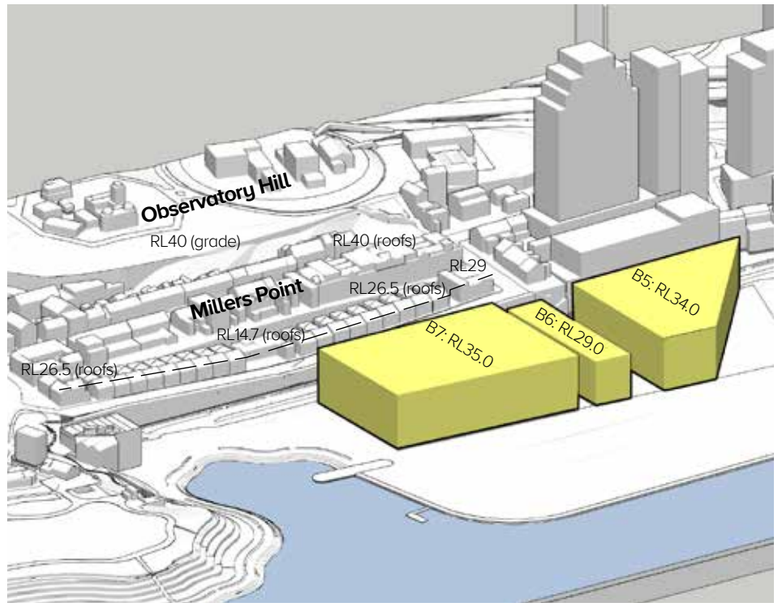
Other conditions include consideration of landscape, parking and enviornmental considerations which will be relevant for future Development Applications but not determinative for the built form study.



SEPP (State Significant Precincts) 2005 Gross Floor Area (left) and Height of Buildings (right) Maps

Concept approval

Aerial image showing Central Barangaroo site (red outline), Millers Point & Observatory Hill (blue tone), and public areas on opposite foreshores (green tone) [Nearmap].



Comparison of heights, Blocks 5, 6, and 7, Millers Point, and Observatory Hill

Concept Approval: Commitments
The concept approval includes a series of commitments for future development. The relevant commitments for the built form study are:

57-60 Significant Heritage Views
An important set of commitments is numbers 57-61 which address significant heritage views both from and to Millers Point and Observatory Hill. These commitments are important as the maximum heights of Blocks 5, 6, and 7 are taller than parts of Millers Point.

Further consideration of a built form within Blocks 5, 6, and 7 is included below in the Heritage Views Section and the Views analysis.

57 Views to Observatory Hill [Blocks 5, 6, and 7]
Commitment 57 requires the retention of view to Observatory Hill Park from public spaces on the opposite foreshores to Barangaroo. Commitment 57 refers to the 2006 Heritage Impact Statement by City Plan Heritage which identified key view points and considered the impact of the original built form. This condition was added as part of the Mod 2 amendment to the concept plan.

58 & 59 Views from Millers Point [Blocks 5, 6, and 7]
Commitment 58 requires future development to provide adequate view corridors over and between new built form to maintain the key attributes of views from Millers Point, including views to significant tracts of water, the opposite foreshores, and panoramic qualities of existing views. The nature of these views is illustrated in the 2006 City Plan Heritage HIS

60 Views to Millers Point [Blocks 5, 6, and 7]
Future development is to retain the ability to appreciate the roofscape of the Millers Point terrace houses when viewed from public spaces on opposite foreshores. The detailed design of future development within Barangaroo should ensure a relationship between new built form and existing structures and design details within Millers Point Conservation Area. Consultation with NSW Heritage is required as part of the detailed design stage.

124 & 125 Headland Park [Block 7]
Commitments 124 and 125 refer to the August 2009 Conybeare Morrison Barangaroo Headland Parklands Urban Design Report which recommends a 4-storey building frontage to the northern edge of Block 7. This recommendation arises from the modification to remove the northern part of Block 7 to extend the headland park.

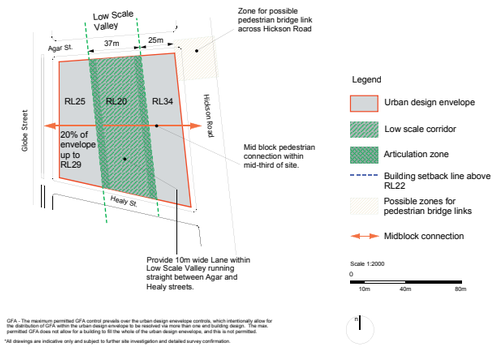
Other Commitments
Commitment 106 requires the built form of Blocks 5, 6, and 7 to follow the Design Principles and Development Controls contained in Part B of the EAR as amended by the June 2008 MG Planning Modification Report and notes the Design Excellence process required for Block 5, 6, and 7 development applications.

Note, page 8 outlines the Part B Block Development Controls in further detail and considers their relevance in light of subsequent modifications to the concept.

Commitment 107 provides guidance for the commercial floor plates of Block 5 contained in the October 2008 MG Planning Report.

As discussed above, regarding Condition C2, an important role of the Design Review Panel is the evaluation of future development application in light of the overall precinct Built Form Principles, Block Development Controls, and commercial floor plate design principles. The Panel will need to compare potential design outcomes against the original controls, modifications to the concept, and form conclusions about the relevance of the original controls.

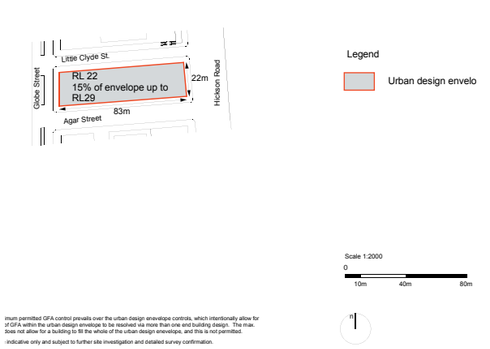
Block development controls



GFA - The maximum permitted GFA control prevails over the urban design envelope controls, which intentionally allow for the distribution of GFA within the urban design envelope to be resolved via more than one and building design. The max. permitted GFA does not allow for a building to fill the whole of the urban design envelope, and this is not permitted.
*All drawings are indicative only and subject to further site investigation and detailed survey confirmation.

Block 5

Original Block Development Controls with additional GFA and low scale valley (both modified) [EAR]



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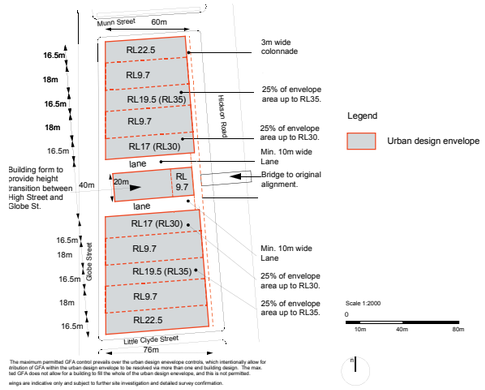
indicative only and subject to further site investigation and detailed survey confirmation.

Block 6 Controls

Original Block Development controls [EAR]



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wings are indicative only and subject to further site investigation and detailed survey confirmation.

Block 7

Original Block Development Controls with additional GFA and including northern section and central bridge transition [EAR] (now removed)

Concept Approval
The original 2007 concept approval included overall Built Form Principles for the whole precinct, Development Controls, and Development Requirements for each of the blocks constituting the East Darling Harbour [Barangaroo] Redevelopment. Note that condition B4(3)(4) of the original Concept Approval stated no consent was granted for the specific forms shown in the Section 13 Controls (i.e. the Block Development Controls). This was done to facilitate design excellence and appropriate street wall heights which would be further considered through the design review process of Conditon C2 and commitment 106.

Block Development Controls
The Built Form Principles were supplemented by Block Development Controls and Design Principles that outlined more detailed strategies and requirements for each block to achieve the Built Form Principles.

Using the GFA:ENV and height assumptions outlined previously, the potential yield of Block Development Controls was assessed. The schedule (right) outlines a potential scheme with Block 5 as a mixed-use retail and commercial building, Block 6 as a community building, and Block 7 as a series of mixed-use retail and residential building. The scheme includes consideration of the Block Development Controls including the different profiles of the blocks and envelope restrictions at high-level.

The schedule demonstrates that the yield was generally quite easy to fit within the design envelopes with GFA:ENV efficiencies as low as 38%. Block 7 is an exception with the tightest envelope (GFA:ENV: 78%). While this is a tighter envelope than is recommended by the ADG, the narrow residential floorplates and the potential for further ground floor efficiency would assist to accommodate the GFA.

Evolution of Central Barangaroo Blocks
Following the original approval, the shapes of the blocks and their relationships with streets and adjacent areas were affected by different modifications. The allowable GFA on Block 5 was increased to 41,255m^2 (Mod 2), Block 7 was reduced by half as part of the Headland Park modification (Mod 3) with a reduction of GFA in Block 7 to 15,000m^2, and Block 5 site area was amended in shape and reduced in size by the creation of Hickson Park to the south (Mod 8).

Assessment of envelope efficiency at different modification points indicates that changes in the concept design may not have appropriately considered accommodating the GFA within the envelope.

For example:
- Block 5 Mod2: GFA:ENV: 99% (GFA not achievable)
- Block 7 Mod3: GFA:ENV: 81% (GFA probably not achievable)

The Block 5 controls are further complicated by controls included in Mod 2, to manage additional floorspace proposed at the time. Refer to Condition B9(1)(a) & (d) concerning setbacks to Hickson Road. The condition requires a maximum street wall height of RL29.6 with 25m setback. However, 25m is the same width as the taller east section of Block 5 as shown in the original Block controls, effectively removing a level.

The original concept plan also presumes RL2.0 ground level RL which does not correspond to actual levels, closer to RL3.5, effectively reducing building heights by 1.5m.

Mod 8 changes the shape of Block 5 so it no longer neatly maps onto the Block Controls requiring reinterpretation of the controls so that they might make sense of the new geometry.

Given the number and effects of the modifications, the relevance of the Block Development Controls is questionable. Fortunately, the methodology outlined in Condition C2 and Commitment 106 allows the Design Review Panel to compare development applications with the Built Form Principles and Block Development Controls to make the necessary interpretations, and evaluation of the relevance of these controls to allow an appropriate development outcome.

EAR Block Controls

Efficiencies	
GFA_Ret/Ground:ENV	50%
GFA_Com/Hotel:ENV	85%
GFA_Residential:ENV	72.5%

Floor-Floor	(m)
Residential	3.3
Hotel	3.3
Commercial	3.8
Retail	5.0

Base RL	3.5

Block 5	FFH	RL	Max RL	ENV (m^3)					
Level 6	3.8	31.3	34					2624	
Level 5	3.8	27.5	30					2624	
Level 4	3.8	23.7	27	2936				2624	
Level 3	3.8	19.9	23	2936		2761		2624	
Level 2	3.8	16.1		2302		2761		2624	
Level 1	3.8	12.3		2302		2761		2624	
Ground	5	8.5		716					

Block 5	ENV (m^3)	GFA (m^3)	Max GFA (m^3)	
Retail_Ground	7116	3558		
Commercial	34503	29328		GFA:ENV
Total	**41619**	**32886**	**29200**	70%

Block 6	FFH	RL	Max RL	ENV (m^3)
Level 5	3.8	27.5	29	278.25
Level 4	3.8	23.7		278.25
Level 3	3.8	19.9		1855
Level 2	3.8	16.1		1855
Level 1	3.8	12.3		1855
Ground	5	8.5		1855

Block 6	ENV (m^3)	GFA (m^3)	Max GFA (m^3)	
Community_Ground	1855	928		
Community_Typical	6121.5	5203		GFA:ENV
Total	**7976.5**	**6131**	**3000**	38%

Block 7	FFH	RL	Max RL	ENV (m^3)								
Level 8	3.3	34.9	35			271					313.25	
Level 7	3.3	31.6				271					313.25	
Level 6	3.3	28.3	30			271	281.75			302	313.25	
Level 5	3.3	25				271	281.75			302	313.25	
Level 4	3.3	21.7	23	1039		271	281.75			302	313.25	1296
Level 3	3.3	18.4	20	1039		271	281.75			302	313.25	1296
Level 2	3.3	15.1	17	1039		1084	281.75			302	1253	1296
Level 1	3.3	11.8		1039		1084	1127			1208	1253	1296
Ground	5	8.5	10			5405		1208			6290	

Block 7	ENV (m^3)	GFA (m^3)	Max GFA (m^3)	
Retail_Ground	12903	6452		
Residential	22773	16511		GFA:ENV
Total	**35676**	**22962**	**28000**	78%

Blocks 5, 6, and 7	ENV (m^3)	GFA (m^3)	Max GFA (m^3)	Mix	
Retail_Ground	20019	10010		16%	
Commercial	34503	29328		47%	
Community	7976.5	6131		10%	
Residential	22773	16511		27%	GFA:ENV
Total	**85271.75**	**61978**	**60200**		71%

Block Study Schedule

The above schedule outlines the assumptions, heights and GFA distribution of each block in the original EAR concept for Blocks 5, 6, and 7.

Built form analysis: options

Analysis of Built Form within Blocks 5, 6, and 7 Height Control and Streets Envelope

A series of built form options were considered in light of the conditions and commitments of the concept approval. Three options are outlined here. Option E, the preferred option, is outlined on page 11.

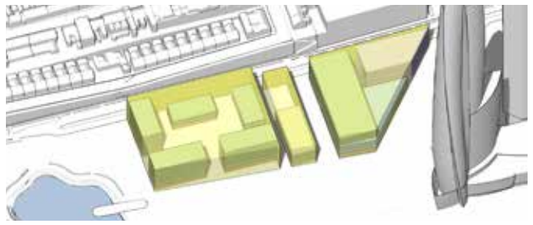
Assumptions

- The built form options utilise the following assumptions regarding Building Envelope [ENV] to Gross Floor Area [GFA] efficiency.
  Residential 72.5%
  Commercial, Hotel and Community: 85%
  Retail and ground floor uses: 50%
- No below ground GFA is considered in these studies
- Floor to Floor heights:
  Ground floor: 5.0m
  Community/Commercial/Retail: 3.8m
  Residential: 3.3m

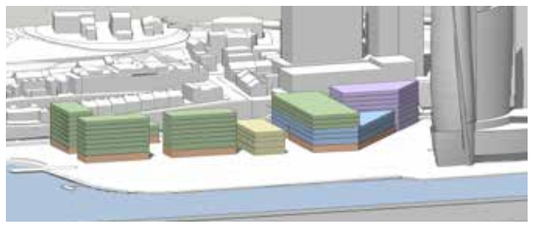
Legend

Each block study is coloured to represent the different uses as per the following:

- Commercial: blue
- Community: yellow
- Hotel: purple
- Residential: green
- Retail: orange



Block study options showing consistency with the overall heights of Mod 8.



Block study options showing different allocations of floorspace and built form across Blocks 5, 6, and 7.

Option A

Option A is based on the indicative massing study prepared as part of the Mod 9 concept plan modification [Refer SJB Indicative Massing Principal 21 May 2024].

Option A does not appear to follow all requirements of the concept approval. Non complying items include:

- Overall GFA,
- B9(1) Block 5 built form controls, and
- 4-storey edge to Block 7 (Commitment 124).

Programme
Block 5 is a mixed-use building comprised of commercial, hotel, and retail uses.

Block 6 is community building. The retail efficiency is applied to the ground floor.

Block 7 is a series of 5 mixed-use buildings with retail on the ground floor and residential apartments above.

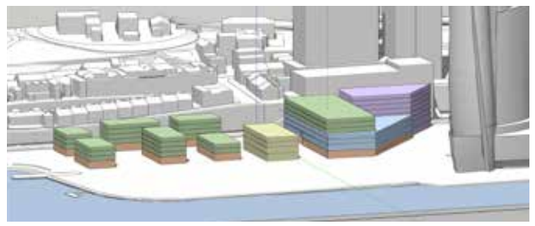
Yield
Option A GFA is estimated at 52,400m^2 which is higher than the maximum 47,688m^2 allowable in Blocks 5, 6, and 7.

Yield allocation:

- Commercial 22%
- Community 7%
- Hotel 18%
- Residential 26%
- Retail 27%

Note: some assumptions differ from those described in the SJB report.

- Building Envelope [ENV] is used rather than Gross Building Area [GBA].
- Hotel GFA:ENV: 85%.



Option B

Option B is based on Option A. Option B is designed to follow the requirements of the concept approval except where noted below.

Programme
Block 5 is a mixed-use building with commercial, hotel and retail uses. Block 5 is modified to include the street wall controls outlined in condition B9(1) but not the 25m Hickson Road setback control of Condition B9(1)(d). Street-wall setbacks to Hickson Road and Barangaroo Avenue are assumed at 3m.

Block 6 remains as a community building.

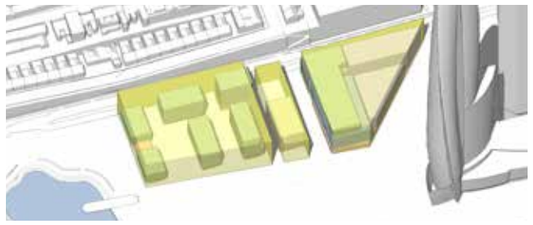
Block 7 is reorganised into 6 mixed-use buildings with ground floor retail and residential apartments above. The 6 blocks include 4-storey blocks to the northern edge of Block 7 [refer Commitments 124 & 125]. A 3m setback is assumed above the 4-storey northern street-wall.

Yield
Option B is calculated to have a total GFA of 47,688m^2 which aligns with the concept approval. The GFA for each block is also consistent with the approval.

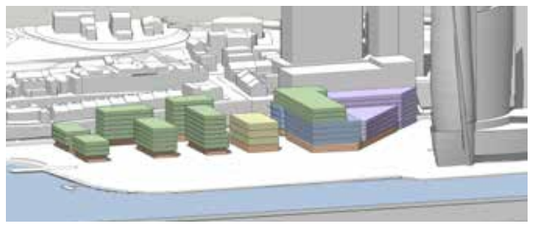
Yield allocation:

- Commercial 24%
- Community 8%
- Hotel 19%
- Residential 21%
- Retail 28%

Built form analysis: options



Block study options showing consistency with the overall heights of Mod 8.



Block study options showing different allocations of floorspace and built form across Blocks 5, 6, and 7.

Assumptions

- The built form options utilise the following assumptions regarding Building Envelope [ENV] to Gross Floor Area [GFA] efficiency.
  Residential 72.5%
  Commercial, Hotel and Community: 85%
  Retail and ground floor uses: 50%
- No below ground GFA is considered in these studies
- Floor to Floor heights:
  Ground floor: 5.0m
  Community/Commercial/Retail: 3.8m
  Residential: 3.3m

Refer to Option E commentary on page 9 for further information regarding assumptions.

Legend

Each block study is coloured to represent the different uses as per the following:

- Commercial: blue
- Community: yellow
- Hotel: purple
- Residential: green
- Retail: orange

Option C

Option C is derived from Option B.

Programme
The programme for each block is the same as Option B.

Option C revises the yield allocation to maximise residential uses and minimise retail and commercial uses. Retail is reduced on all blocks and hotel replaces the triangular section of commercial in Block 5.

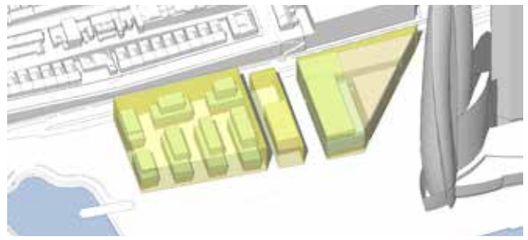
Like Option B, this option responds to the Block 5 built form controls of condition B9(1) and Commitments 124 and 125, except for the 25m Hickson Road setback.

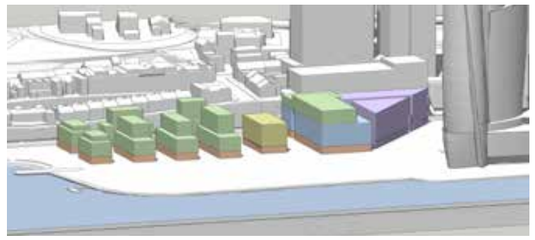
Yield

Option C is calculated to have a total GFA of 47,688m^2 which aligns with the concept approval. The GFA for each block is also consistent with the approval.

Yield allocation:

- Commercial 21%
- Community 6%
- Hotel 32%
- Residential 33%
- Retail 7%





Option D

Option D is based on Option C but revises the layout of Block 7 to create seven narrow residential blocks.

The narrow block widths would favour gallery access apartments which require a larger building envelope as common corridors can be excluded from GFA.

Option D includes all relevant Block 5 built form controls of condition B9(1) including the 25m setback from Hickson Road. This reduces the overall GFA obtainable in Block 5.

Block 5 is amended raising the southern section of the site to 7-storeys. Given the changes in this option to the built form near the southern boundary, preliminary testing, confirms that the 2 hours solar access to Hickson Park is still achieveable (refer to Condition B3).

Yield

Option D is calculated to have a total GFA of 47,258m^{2}which is less than the concept approval. The GFA for each block is consistent with the approval.

Block 5 does not quite achieve the maximum GFA due to the upper storey being removed to comply with the 25m Hickson Road setback Block Control.

Total GFA:
Yield allocation:

- Commercial 21%
- Community 6%
- Hotel 27%
- Residential 38%
- Retail 8%

Built form analysis: Option E

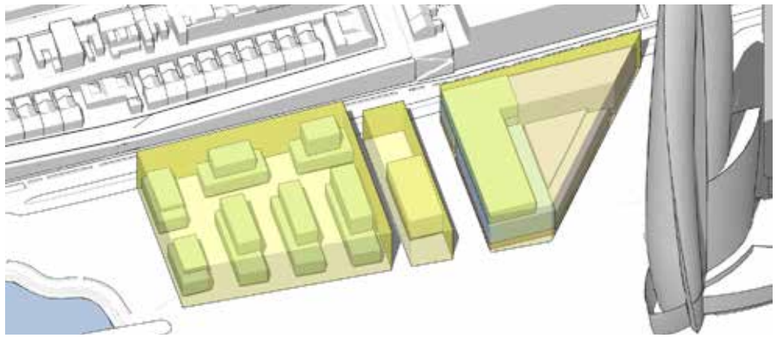
Option E Built Form
Option E is designed to be consistent with the Concept Approval conditions and commitments. Option E is used to demonstrate the worse-case scenario, for the purposes of comparison with the proposal. The design assumptions are outlined below. Note that Option E includes a reinterpretation of the B9(1)(d) Hickson Road Block 5 setback control as 3m rather than 25m.

Building Program
The anticipated building program for Blocks 5, 6, and 7 is for retail uses on the ground floor of Blocks 5 and 7, community uses for Block 6, commercial and hotel in Block 5, and residential apartments in Blocks 5 and 7.

Residential uses are maximised in this study. This reflects both current development trends and provides the largest volume of envelope due to the efficiency of residential floorspace to fill building envelopes. Residential uses also require particular building envelope widths and separation between forms to meet amenity requirements which tend to increase the volume within the design envelope. The maximum residential GFA requirements of Condition B4 are followed in this design option and no below ground GFA is considered in this study.

Envelope Efficiency
An Building Envelope to Gross Floor Area (GFA) efficiency of 85% was used for all non-residential uses above ground level.
Retail and Community areas on the ground floor are based on 50% efficiency to allow for services, entries, vehicle driveways and the like on the ground floor. Residential uses are calculated at 72.5% efficiency. This is consistent with the envelope recommendations of ADG Part 2B and permit flexibility for different arrangements.

Floor to Floor Heights
The built form study assumed the following floor-to-floor heights:
- Retail and Community (ground floor) 5.0m
- Commercial and Community 3.8m
- Hotel and Residential 3.3m



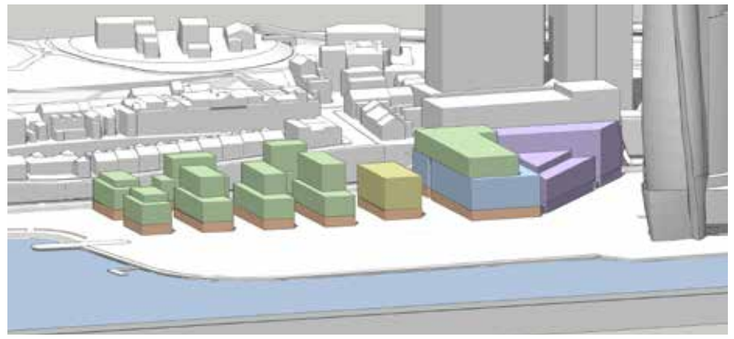
Block Study
Block Study showing consistency with the overall heights of Mod 8.

Arrangement of Built Form: Option E
Block 5
This block is designed as a mixed-use building, with ground floor retail, commercial and hotel on the lower floors, and residential and hotel uses on the upper floors. The tight envelope requires the commercial and hotel uses to be positioned close together in the lower levels. In the lower part of Block 5, the proximity of the different building forms and the proposed density would be unsuitable for residential apartments. In the upper levels, residential can be accommodated as amenity requirements can be achieved (including separation/privacy and solar access). Option E includes consideration of the B9(1) street wall built form controls.

Block 6
Block 6 is designed as a community building. The Block 6 envelope is generous and therefore only 4 levels are required to achieve the maximum GFA. The envelope is also reduced to the western portion of the envelope.

Block 7
Block 7 is designed as a mixed-use building with ground floor retail, and seven narrow-form block buildings. Two blocks are orientated north-south along Hickson Road, one on the northeast corner of Block 7, and the other four perpendicular in east-west orientation. The narrow width blocks (15m wide) offer high amenity and meet ADG building depth recommendations (Part 2E). Within Block 7, the buildings are spaced 15m apart up to four storeys and 18m apart above 4-storeys.
Although the street between Blocks 6 and 7 is 10m wide, the current design avoids difficulties with ADG Part 2F/3F by offsetting the Block 6 and Block 7 forms. Alternatively, apartment orientation or privacy screening could be used to meet ADG objectives. The northern and eastern ends of Block 7 is lowered to 4-storeys with a 3m setback in response to Commitments 124 and 125.

The building envelope for Block 7 is generous, the built form study does not require the full height of the envelope. Greater efficiencies would be possible by combining the forms or using wider floorplates. This would decrease the size of the built form. To consider a worse-case scenario, a larger volume is favoured for this study.



Block Study
Diagram of block study showing ground retail level (orange), community (yellow), commercial (blue), hotel (purple), and residential (green). Residential block forms in Block 7 are 15m wide and are separated by 15m (up to 4-storeys) and 18m (4- to 8-storeys).

Option Study 4b

Efficiencies		Floor-Floor	(m)	Base RL	3.5
GFA_Ret/Ground:ENV	50%	Residential	3.3		
GFA_Com/Hotel:ENV	85%	Hotel	3.3		
GFA_Residential:ENV	72.5%	Commercial	3.8		
		Retail	5.0		

Block 5	FFH	RL	Max RL	ENV (m²)			
Level 7	3.3	33.6	34		2441	1224	
Level 6	3.3	30.3			2441	1424	
Level 5	3.3	27			2441	1424	
Level 4	3.8	23.7		2936		1424	860
Level 3	3.8	19.9		2936		1424	1038
Level 2	3.8	16.1		3036		1424	1038
Level 1	3.8	12.3		3036		1424	1038
Ground	5	8.5		2100	728	1224	1038

Block 5	ENV (m²)	GFA (m²)	Max GFA (m²)
Retail_Ground	5090	2545	
Hotel	13742	11681	
Commercial	11944	10152	
Residential	7323	5309	
Total	**38099**	**29687**	**29688**

Block 6	FFH	RL	Max RL	ENV (m²)
Level 5			29	
Level 4				
Level 3	3.8	19.9		742
Level 2	3.8	16.1		1077
Level 1	3.8	12.3		1077
Ground	5	8.5		1077

Block 6	ENV (m²)	GFA (m²)	Max GFA (m²)
Community_Ground	1077	539	
Community_Typical	2896	2462	
Total	**3973**	**3000**	**3000**

Block 7	FFH	RL	Max RL	ENV (m²)						
Level 7	3.3	31.6	35						300	440
Level 6	3.3	28.3				401	300	445	300	440
Level 5	3.3	25				401	300	445	300	440
Level 4	3.3	21.7		240	260	401	300	445	300	440
Level 3	3.3	18.4		510	419	694	500	730	510	766
Level 2	3.3	15.1		510	419	694	500	730	510	766
Level 1	3.3	11.8		510	419	694	500	730	510	766
Ground	5	8.5		186	197	362	251	384	251	406

Block 7	ENV (m²)	GFA (m²)	Max GFA (m²)
Retail_Ground	2037	1019	
Residential	19285	13982	
Total	**21322**	**15000**	**15000**

Blocks 5, 6, and 7	ENV (m²)	GFA (m²)	Max GFA (m²)
Retail_Ground	7127	3564	
Hotel	13742	11681	
Commercial	11944	10152	
Community	3973	3000	
Residential	26608	19291	
Total	**63394**	**47688**	**47688**

Block Study Schedule
The above schedule outlines the assumptions, heights and GFA distribution of each block. The colour coding is consistent with the model view above.

Built form study envelope

Built form study

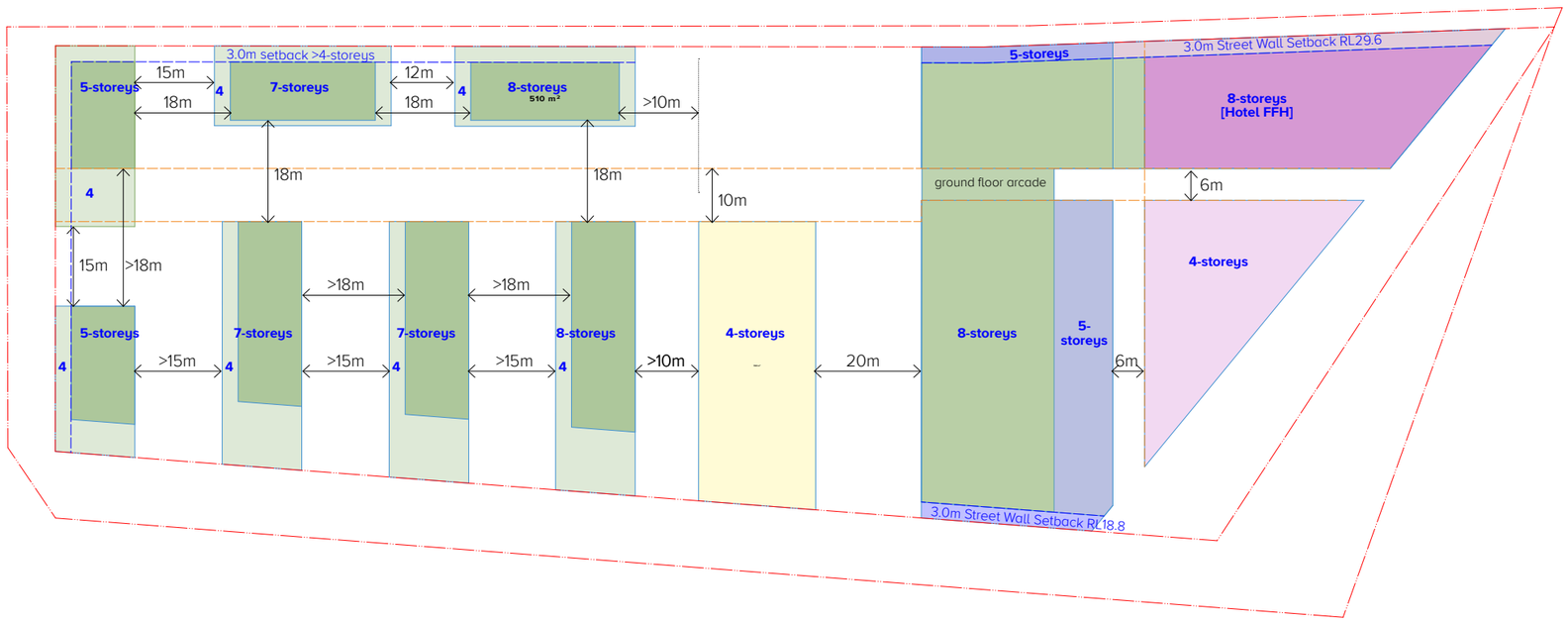
This plan drawing outlines the development envelope for the Option E built form study.

Option E follows elements of the original concept approval Built Form Principles with east-west orientated buildings providing a narrow profile when viewed from the west.

The street wall height and setback control to Hickson Road is reintepreted in this option as a 3m setback above RL29.6. While this varies from the condition B9(1)(d) control, the relevance of such a large setback is questioned when there is no street wall established on Hickson Road and Hickson Park is adjacent to the south rather than built form.

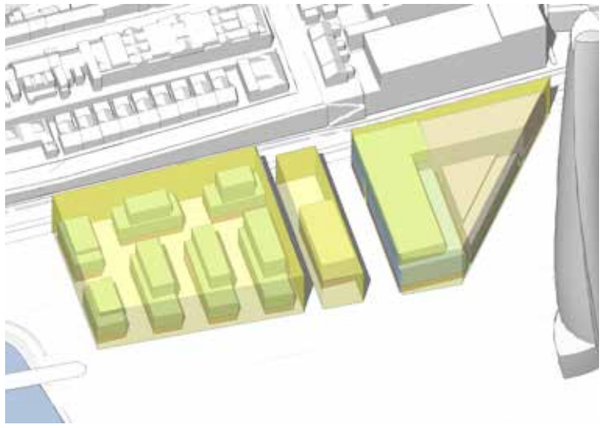
Block 5 also includes a 3m street wall setback control above RL18.8 to the Barangaroo Avenue frontage as per condition B9(1)(b). The 4-storey setback on the northern and eastern edges of Block 7 is also interpreted as a 3m setback as there is no numerical setback guidance defined by Commitment 124 or the associated reports.

Envelope Efficiency
The envelope assumes a residential GFA to Envelope efficiency of 72.5%, a non-residential efficiency of 85%, and a ground level efficiency of 50%.

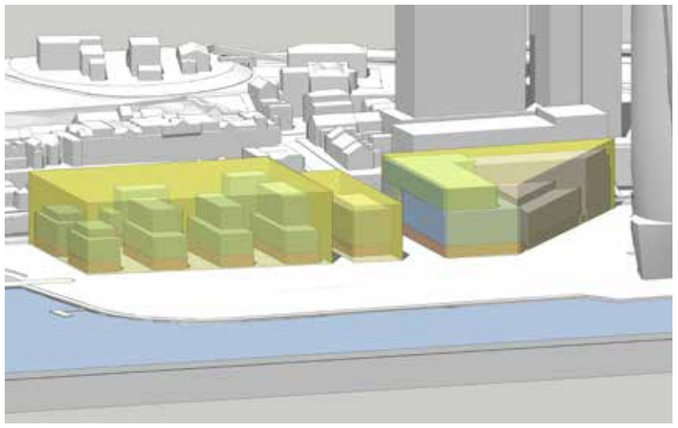


Envelope: Built Form Study

Apartment planning at the southern edge of Block 7 would require attention to building separation and privacy to meet ADG objectives 2F and 3F.



Axonometric view
Built form study within Mod8 height control and street envelopes



Axonometric view
Built form study within Mod8 height control and street envelopes

Envelope efficiency

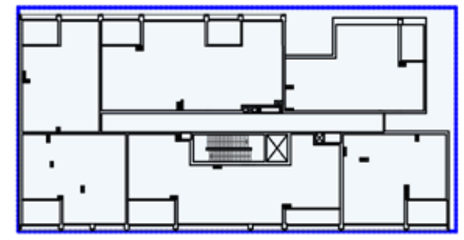
Envelope Efficiency
In order to assess the suitability of the design envelopes and different built form options, this report considers the relation of Gross Floor Area [GFA] to Building Envelope Area [ENV]. This is a consideration of how much floor area is possible within an envelope after making assumptions for floor-to-floor heights, the efficiency of GFA for a particular use, and any other controls that are relevant to the envelope.

GFA Efficiency: Residential
As described in the Apartment Design Guide [ADG], residential building envelopes are a three dimensional volume that defines the outermost part of a site that a building can occupy. The ADG (Part 2B) recommends that a building envelope should be 25-30% greater than the achieveable gross floor area [GFA]. This percentage allows room for areas that do not attract GFA including balconies, stairs, lifts and service ducts. It also allows a degree of space for building articulation and shaping which may assist in achieving articulation, outlook, and other amenity considerations such as natural cross ventilaton or solar access.

Efficiency is affected by the shape and size of the site and requires further verification through more detailed design analysis. However, if appropriate considerations are given to other factors, particularly building width (ADG Part 2E) then a GFA:ENV efficiency of 72.5% is robust for most residential buildings.

GFA Efficiency: Non Residential
Non-residential uses such as community, commercial, hotel, and retail are generally assessed at 85% GFA:ENV. These uses do not have balcony areas and generally have fewer amenity requirements than residential buildings.

Based on our experience, additional consideration of the ground floor condition is warranted as vehicle entries, ramps, loading docks, and building plant can not attract GFA. Therefore a ground floor non-residential GFA:ENV efficiency of 50% is assumed for this report.



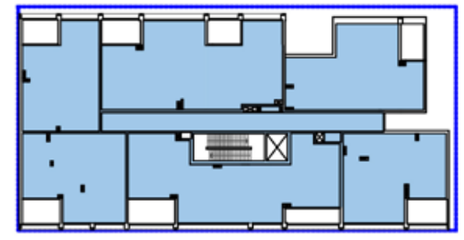
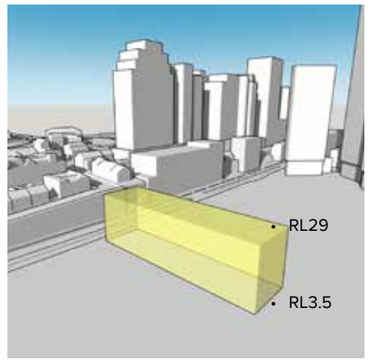
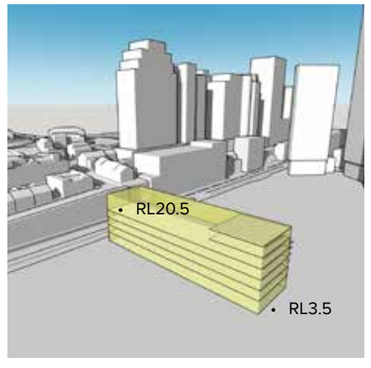


Diagram illustrating Building Envelope Area and Gross Floor Area for a residential floorplate





GFA Efficiency: Example

The Block 6 Mod 8 envelope is a rectangular volume approximately 22m wide, 85m long and 25.5m high.

Block 6 is well suited to accommodate the community floor space requirement for Central Barangaroo. Assuming a ground floor-to-floor height [FFH] of 5m and typical FFH of 3.8m, 6 floors are achievable.

Each floorplate, is measured at 1,855m^2 of area. To arrive at a GFA for a commercial building this area is reduced to 85% to allow for lifts, articulation, and fire stairs, etc (1576.75m^2). For a residential building a reduction to 72.5% would be more appropriate. For the ground floor a lower efficiency of 50% is used to allow for vehicle entries, lobbies and building services.

There is a Block Development Control (in the original approval) for Block 6 of a maximum of 15% floorspace above RL22, so the top two floors are reduced to 278.25m^2. The aggregate floorspace for all levels would be 7,976.5m^2.

The allowable GFA for block 6 is 3,000m^2, so the envelope is quite spacious. The GFA:ENV is calculated at 38%.

A roomy envelope would allow a high degree of freedom within the envelope for different architectural outcomes. The building could look quite different to the envelope and there would be more empty parts of the envelope.

As the GFA:ENV rate becomes higher, the design envelope is limiting the design outcomes. When it is too high, particularly when exceeding the intial assumptions, the GFA is unlikely to fit within the envelope.

Heritage impact

Views to and from Millers Point

The Concept Plan Heritage Impact Study [HIS CityPlan 2006] identifies key views to and from Millers Point. Views H3 to H8 are considered the most relevant to Central Barangaroo. Other view points in the HIS do not show Central Barangaroo or are obstructed by other buildings.

HIS Recommendations (HIS 2006 p.49)

- Retain views to Observatory Hill Park from public spaces on opposite foreshores;
- Retain the panorama from Pyrmont Park around to the Harbour Bridge as seen from Observatory Hill Park;
- Provide adequate view corridors over and between new built forms to maintain the key attributes of views from Millers Point. The key attributes to be retained include: 1) views to significant tracts of the water, 2) the junction of Darling Harbour and the Harbour proper, 3) the opposite foreshores, 4) panoramic qualities of existing views and, 5) the most distinctive views to landmark structures;
- Retain the ability to appreciate Millers Point headland from public spaces on opposite foreshores;
- Retain the ability to appreciate the roofscape of terrace houses throughout Millers Point from public spaces on opposite foreshores.

High Street South [H3]

High Street Central [H5]

Observatory Hill [H4]

Balls Head [H6]

East Balmain Wharf [H7]

Ballaarat Park [H8]

Views from Millers Point / Observatory Hill H3-5

- The HIS identified a number of views from Millers Point and Observatory Hill. The evaluation of the impact of the proposed concept plan includes visibility of water, the opposite foreshore and the junction of Darling Harbour with Sydney Harbour.
- The alignment of the Mod 8 envelope facilitates the views of H3 and H5.
- The height of the envelope allows views from Observatory Hill, but some assessment of views of water and the opposite foreshore are relevant for the consideration of built form within the envelope.
- Although discrete view points are located in Observatory Hill, the nature of the space allows movement within the park which might allow one view to be more obstructed and another view a few metres away less obstructed.

Views to Millers Point H6-8

- The HIS also considered views to Millers Point from various public spaces in proximity to the site including headland parks.
- Some of these view points are important for the potential built form as the envelope has a greater propensity to block views to Millers Point.
- The key aspect for the HIS is the terrace house roofscape character. The HIS understands that some buildings and points on-grade might not be visible as previous wharf structures obstructed these views.
- Views from East Balmain Wharf [H7] and Darling Island Ballaarat Park [H8] are the most important views for the consideration of built form within the Mod 8 envelope.
- The view from Balls Head [H6] was also identified in the HIS but it is quite distant.

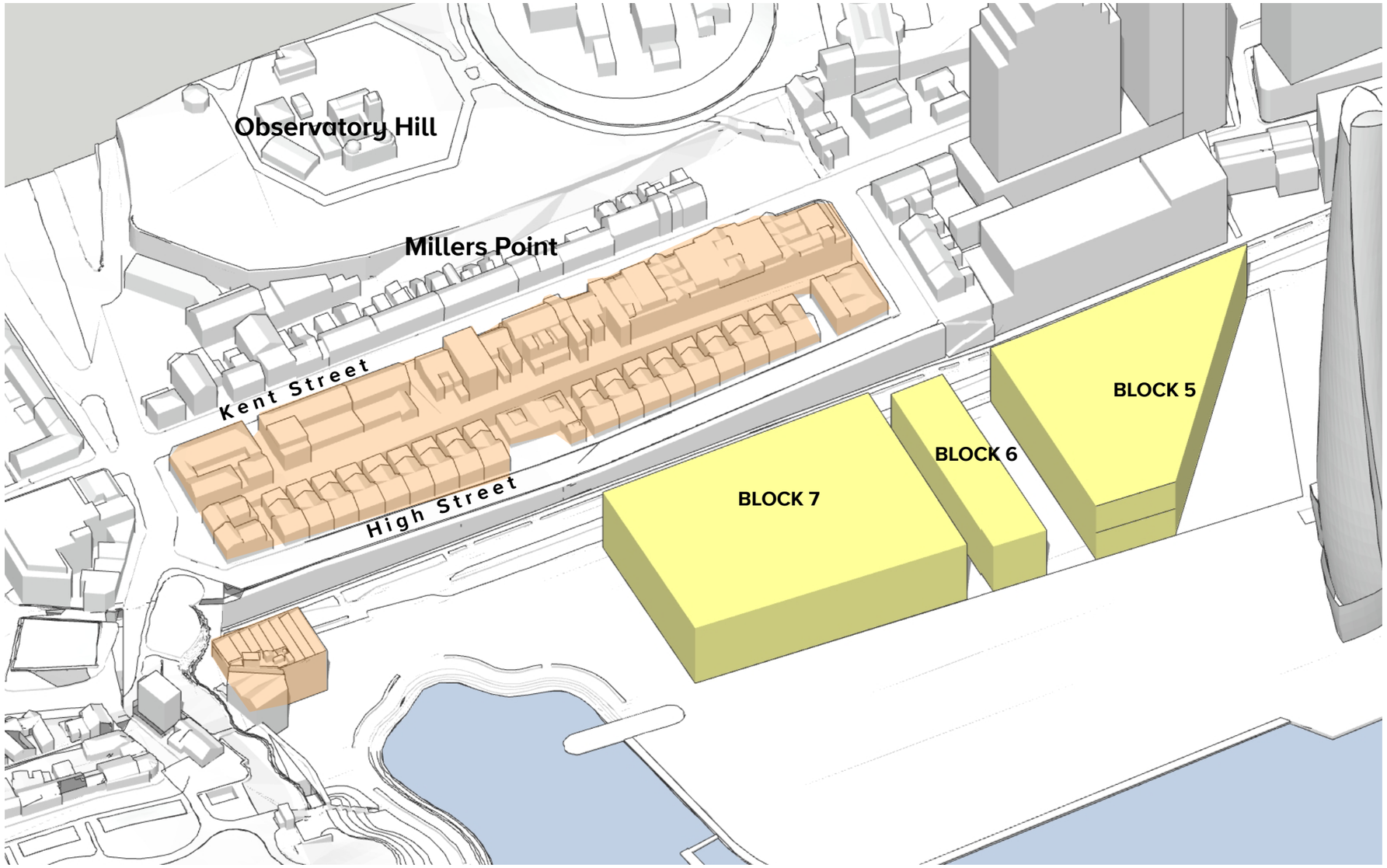
Heritage context

Millers Point Roofscapes

To understand the visual impact of the potential built form within the Mod 8 height envelope, the view analysis identifies the central portion of Millers Point with particular focus on the roofscapes. The HIS identified both views to and from Millers Point as relevant considerations. Based on the HIS the relevant views to Millers Point are H6, H7, and H8.

The target area for Millers Point terraces and roofscape for the visual analysis views to Millers Point is identified with an orange tone in the CAD model.

The HIS also identifies views to and from Observatory Hill as important. These are elevated above the Mod 8 height and include appreciation of the tree canopy of Observatory Hill Park. Due to the distance from the site of view points H6, H7 and H8, the built form study is not anticipated to affect Observatory Hill views signficantly.



Millers Point and Observatory Hill Context

Heritage views

Views from Millers Point & Observatory Hill

These three view points are used to assess the visual connection from Millers Point and Observatory Hill to the site and harbour beyond based on the massing options.

The view points are labelled H3 - H5 corresponding to similar views in the 2006 HIS.

H3 High Street South

Google Street View near view point H3

HIS 2006: Attachment B, p.75

High Street South

This view corresponds to view H3 from the City Plan Heritage Impact Statement [HIS].

This view point is adjacent to the site between Blocks 5 and 6. It looks towards Darling Harbour and the Balmain peninsula.

H4 Observatory Hill

Google Street View near view point H4

HIS 2006: Attachment B, p.76

Observatory Hill

This view corresponds to view H4 in the HIS.

The Observatory Hill viewpoint is approximately 200m from the site, looking over the site from the east.

Note that there are multiple views at location H4 to show the panoramic views at Observatory Hill Park.

H5 High Street Central Position

Google Street View near view point H5

HIS 2006: Attachment B, p.77

High Street: Central Position

This view corresponds to view H5 in the HIS.

This view point is adjacent to the site at the north edge of Block 7. This location is close to the original bridge linking High Street with the bridge to the Wharf Buildings (now removed).

It looks towards Darling Harbour and the Balmain peninsula.

Heritage views

Views to Millers Point

These view points are used to assess the visual connection to Millers Point based on the massing options.

The view points are labelled H6 - H8 corresponding to similar views in the 2006 HIS.

The analysis of this study approximates the view point from the HIS using a 3D CAD model. It is designed to prrvide insight into the built form study in to understand potential impact of the heritage view points. It is not a visual impact study.

H7 Balmain East

Google Street View near view point H7

HIS 2006: Attachment B, p.78

Balmain East Wharf

This view corresponds to view H7 from the HIS.

Illoura Park extends along the east side of East Balmain and includes the East Balmain Wharf. It looks across the water to Millers Point and Observatory Hill.

The Balmain East Wharf is approximately 600m from the site. The southern edge of Illoura Reserve is 450m from the site.

The site is also highly visible from the ferry between East Balmain and Barangaroo Wharves.

H8 Ballaraat Park

Google Street View near view point H8

HIS 2006: Attachment B, p.78

Ballaraat Park

This view corresponds to view H8 in the HIS. Ballaraat Park is located on Darling Island.

The Ballaraat Park viewpoint is approximately 500m southwest of the site.

H6 Balls Head Point

Google Street View near view point H6

HIS 2006: Attachment B, p.77

Balls Head Point

This view corresponds to view H6 in the HIS.

Balls Head Point is 1,460m from the site and the view to Millers Point is across the Headland Park and not as affected by the Central Barangaroo envelope.

While this viewpoint is relevant for the whole Barangaroo plan, it is less relevant for the Central Barangaroo envelope.

View Analysis

Assumptions

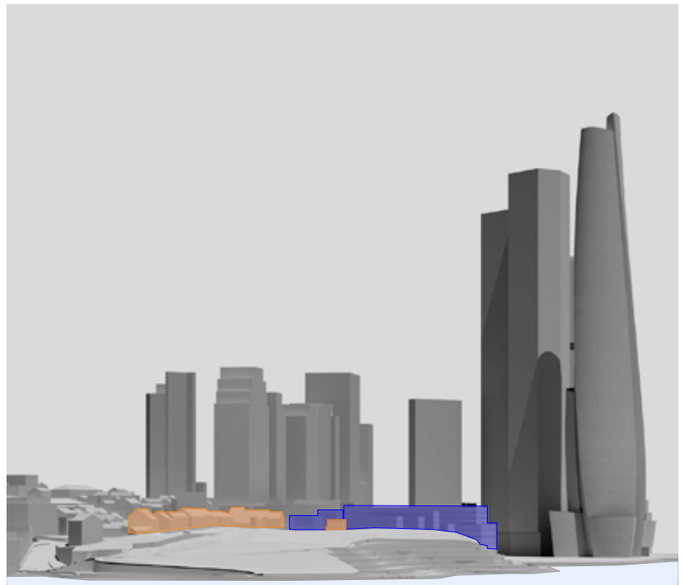
The following analysis of the heritage and additional views is not a formal visual analysis study.

The CAD background model and options modelling have attempted to be accurate enough to compare outcomes with the Heritage Impact Study and to show differences between the built form studies. The CAD background model is limited in size and therefore some elements beyond the view point and site may not appear. For example, Anzac Bridge is not modelled.

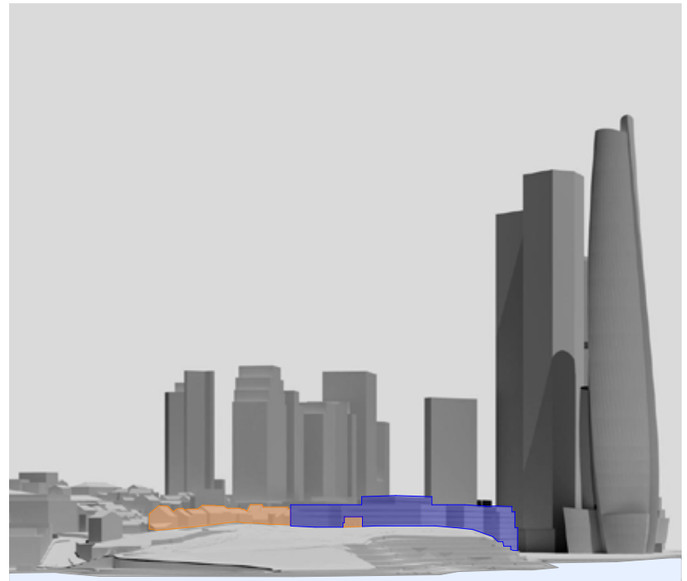
The view analysis includes a model view with the option study shown with a dark blue colour fill and the Millers Point heritage context identified in an orange fill. The water is identified with a light blue fill. Background context is shown in shades of grey.

A key plan is included to show the view point and the camera direction toward the site. The heritage view points H3 to H8 are simulated in the model but are not exact. A Google Street view image is used to approximate a more current view nearby the view from the HIS.

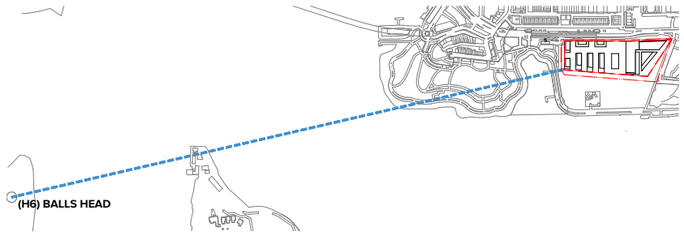
The HIS viewpoint from the original concept plan is included showing the original height envelope and the building form envelope is also visible in some views.



Option E CAD model view of H6 showing built form study in blue, Millers Point heritage area in orange and harbour in light blue.



Mod 9 CAD model view of H6 showing built form study in blue, Millers Point heritage area in orange and harbour in light blue. This view provides comparison with the Option E study in the same CAD environment.



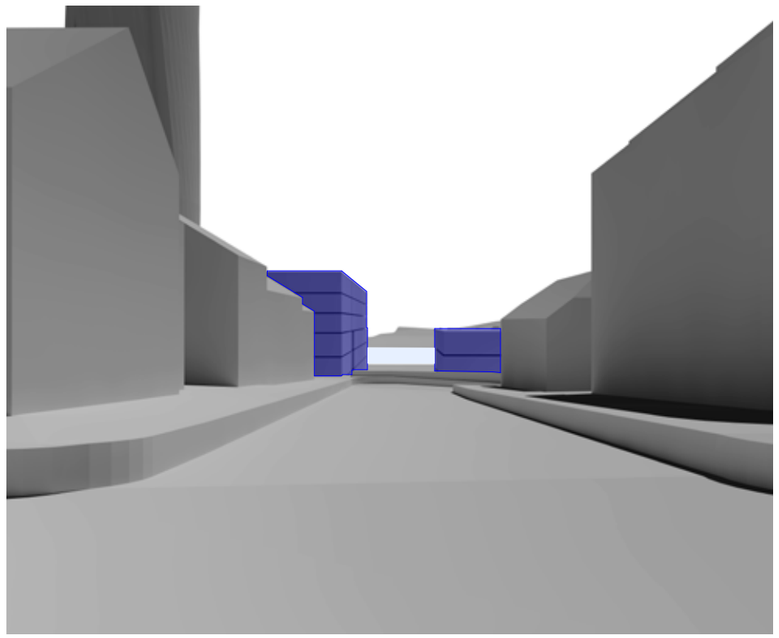
Key plan showing view point of H6 and bearing to the site

Google Street View near view point H6

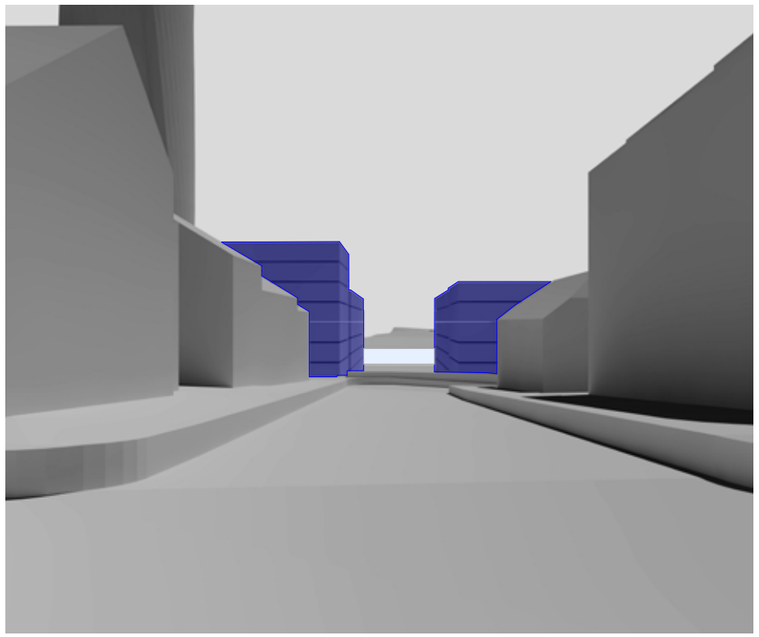
H6 view from HIS

Heritage views

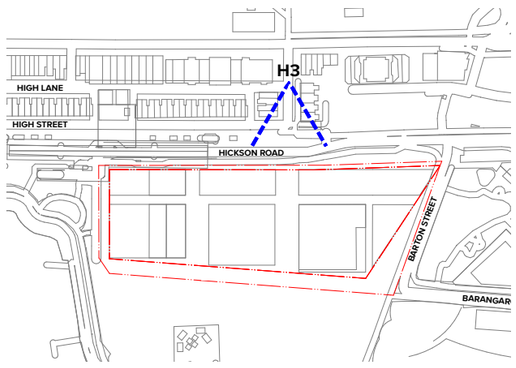
H3 High Street South



Option E: CAD model view of H3



Mod 9: CAD model view of H3



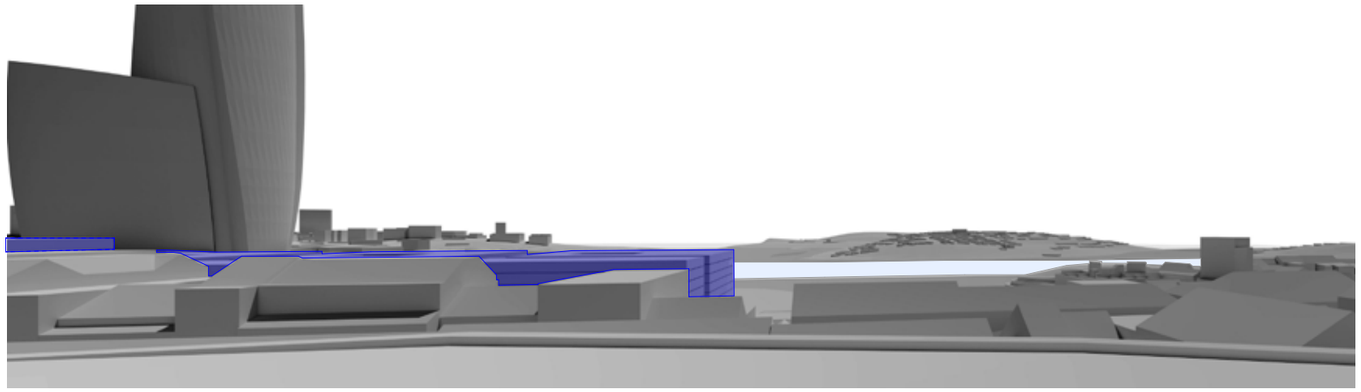
Key plan showing view point of H3

Google Street View near view point H3

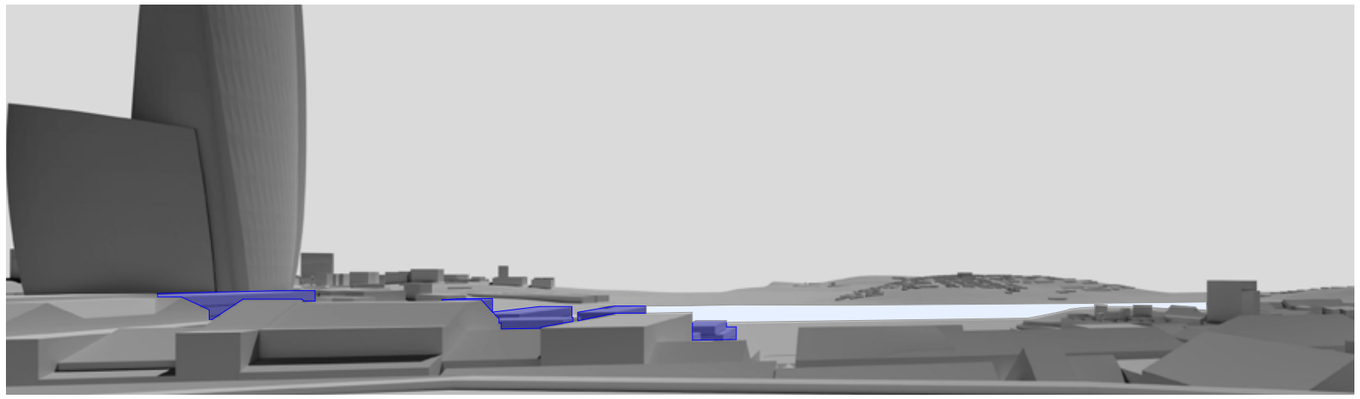
H3 view from HIS

Heritage views

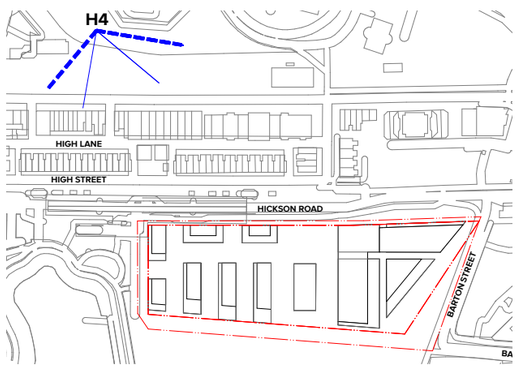
Observatory Hill Combined View



Mod 9: CAD model view of H4



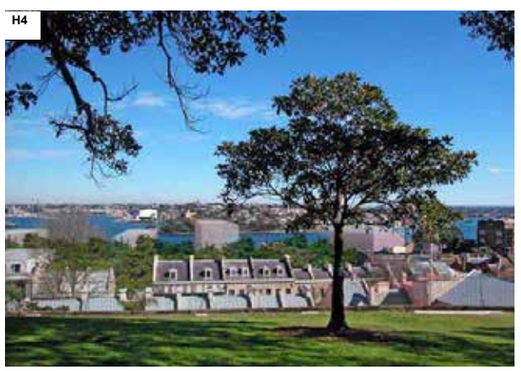
Option E: CAD model view of H4



Key plan showing view point of H4

H4 view from HIS (p.75)

H4 view from HIS (p.76)



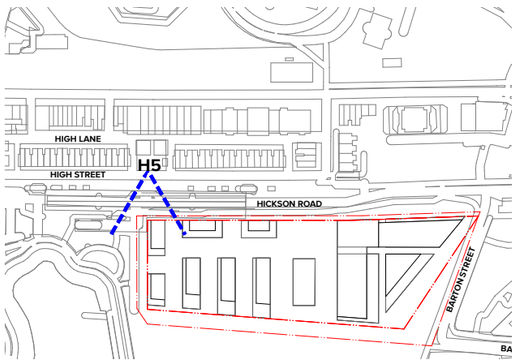
H4 view from HIS (p.76)

Heritage views

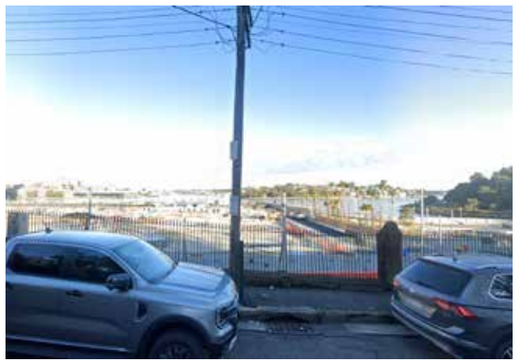
H5 High Street Central Position

Option E: CAD model view of H5

Mod 9: CAD model view of H5



Key plan showing view point of H5

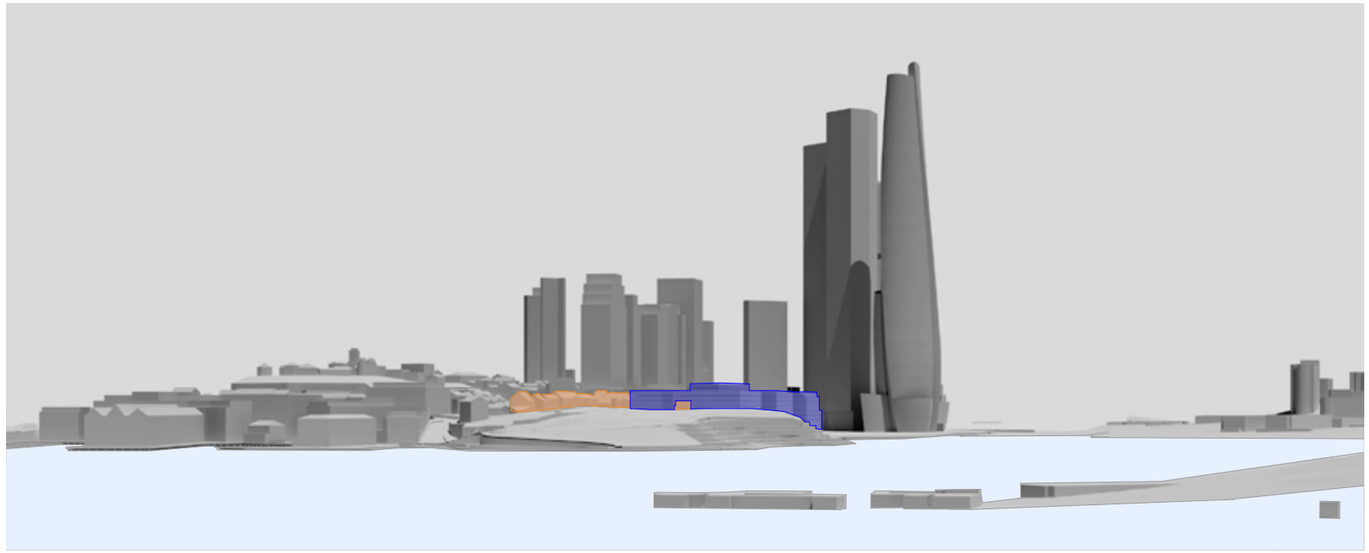


Google Street View near view point H5

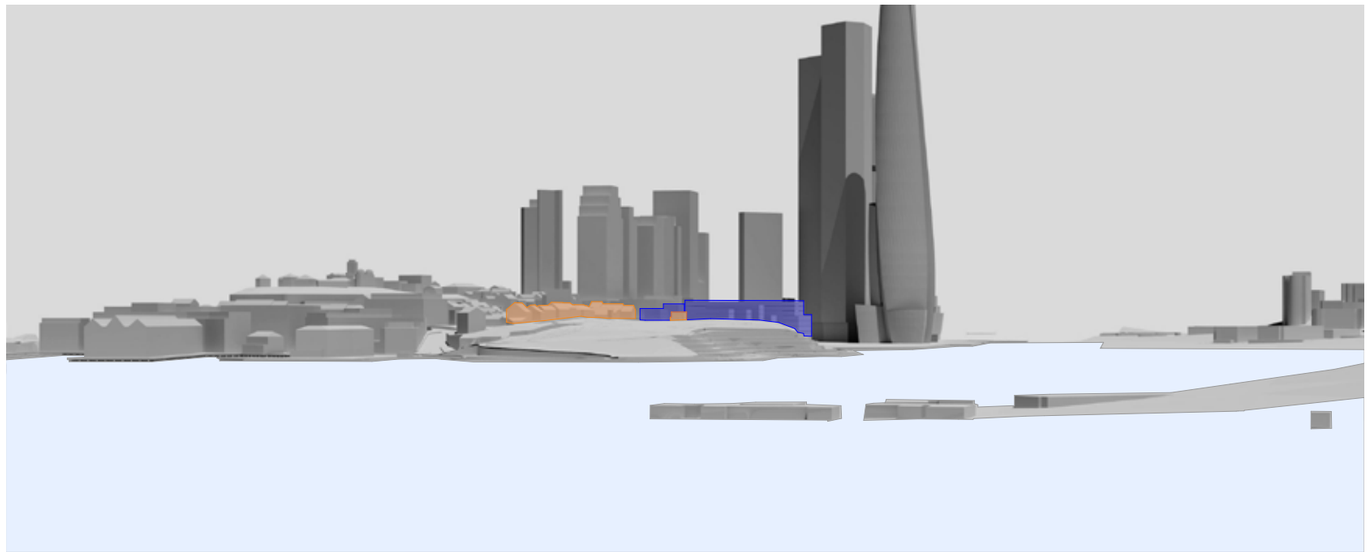
H5 view from HIS

Heritage views

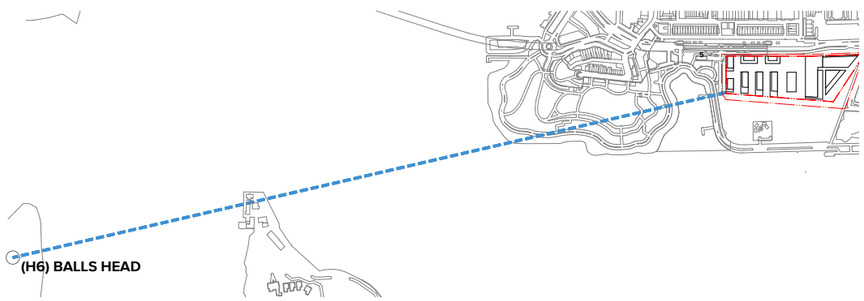
H6 Balls Head



Mod 9: CAD model view of H6



Option E: CAD model view of H6



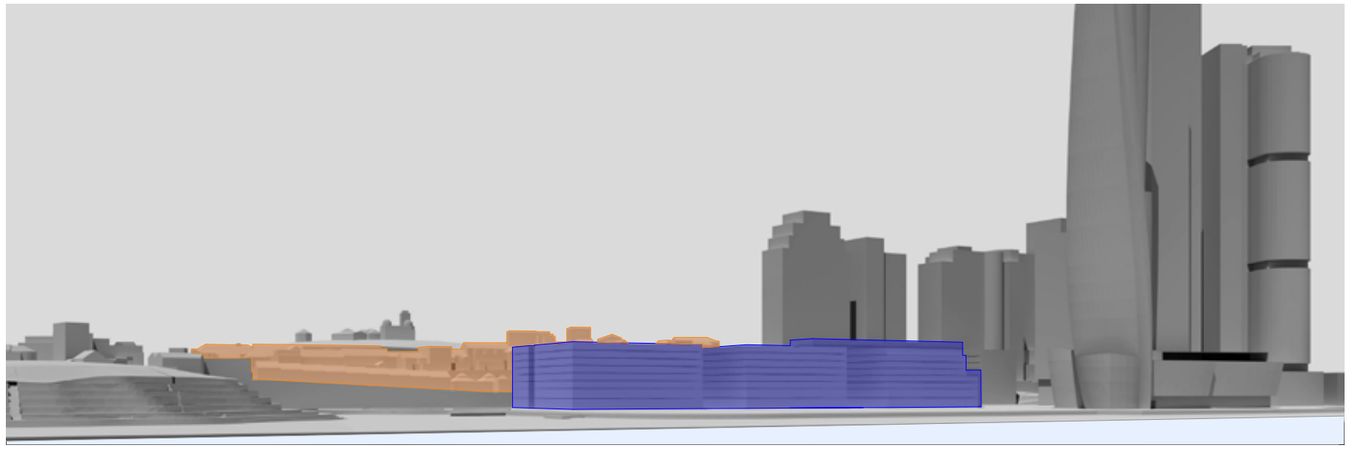
Key plan showing view point of H6

Google Street View near view point H6

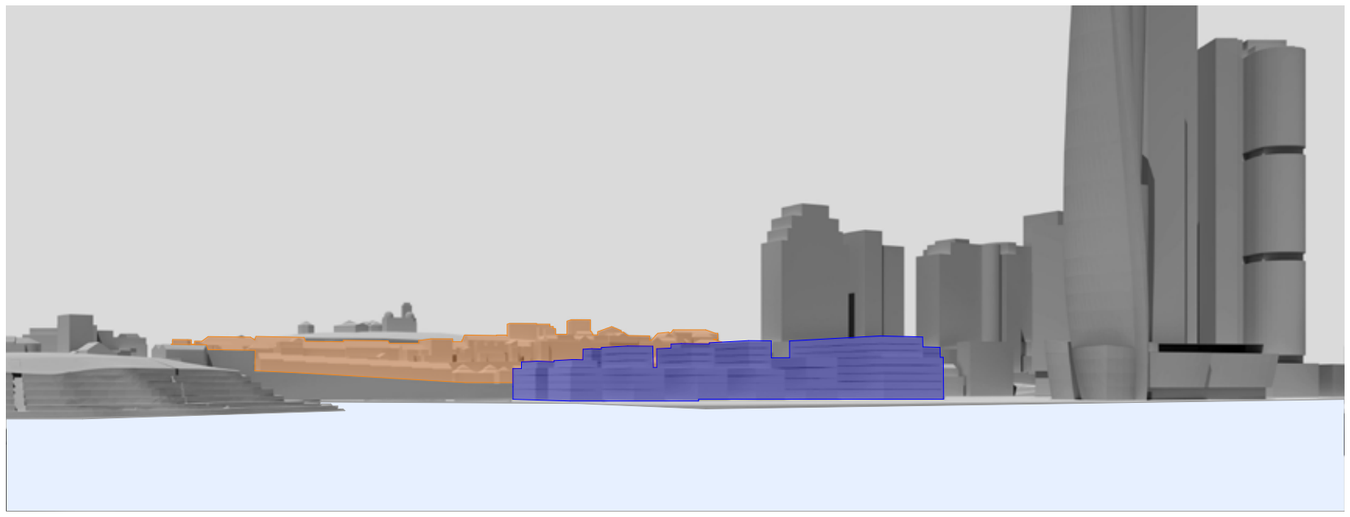
H6 view from HIS

Heritage views

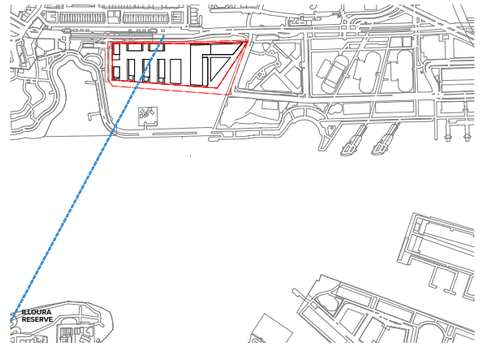
H7 Balmain



Mod 9: CAD model view of H7



Option E: CAD model view of H7



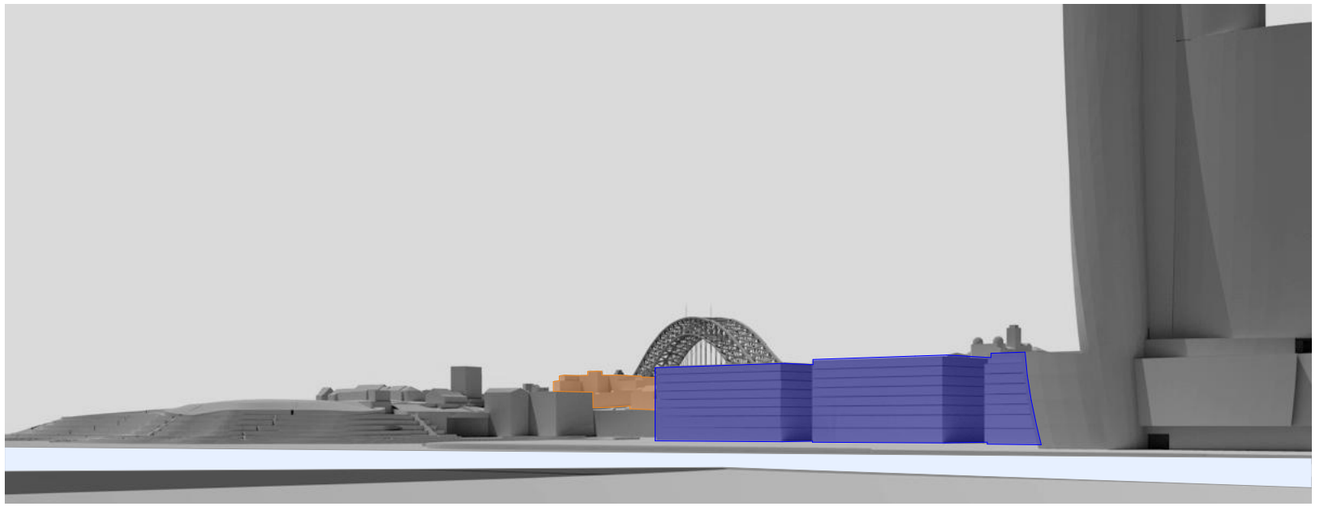
Key plan showing view point of H7

Google Street View near view point H7

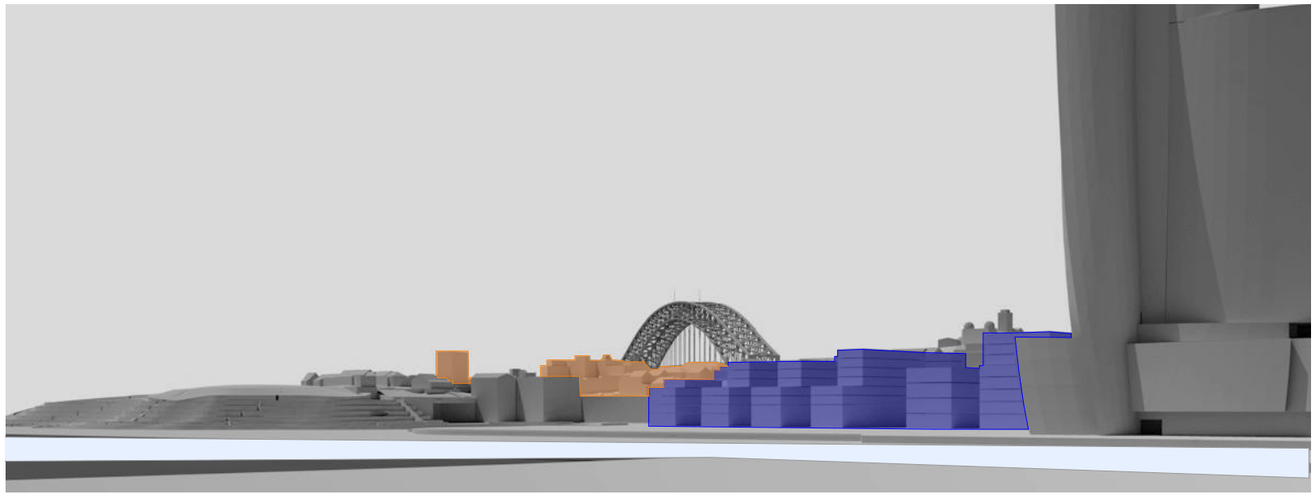
H7 view from HIS

Heritage views

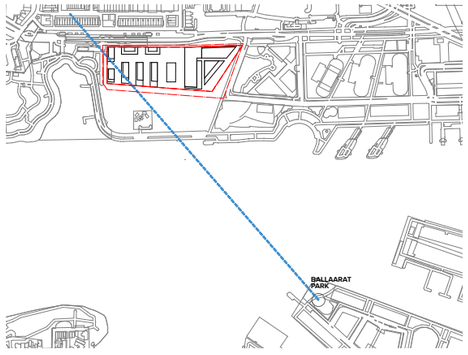
H8 Ballaarat Park



Mod 9: CAD model view of H8



Option E: CAD model view of H8



Key plan showing view point of H8

Google Street View near view point H8

H8 view from HIS

Additional views

Additional View Locations: Note

Additional views from the Mod 9 Supplementary View and Visual Analysis Study (Aecom September 2024) are included here.

As per the heritage views, the CAD model illustrates the built form study within the context but does not reproduce the visual analysis image or exact view point locations.

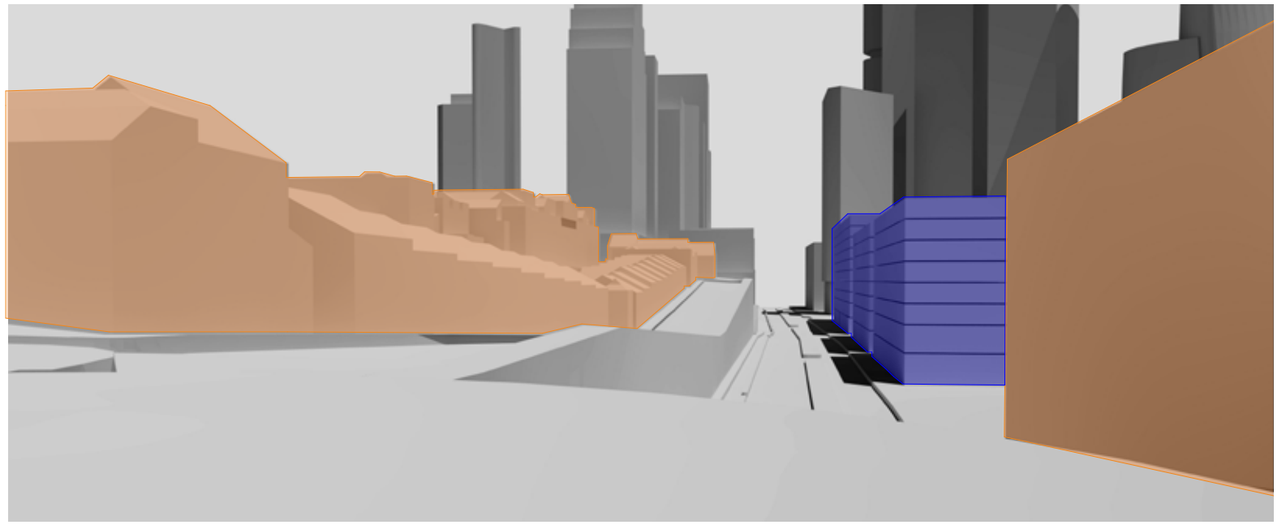
The visual impact study included views with a wide field-of-view which was not able to be replicated in the CAD software. A wide angle view is used from the CAD model to provide a similar view to the visual impact study so that the different built-form options can be compared. However, some views appear more zoomed-in than the visual analysis. There is also the possibility of slight differences in the view point between the CAD model and the visual impact study.

For reference, the Mod 9 CAD model and the visual impact study view describe the same built-form study massing.

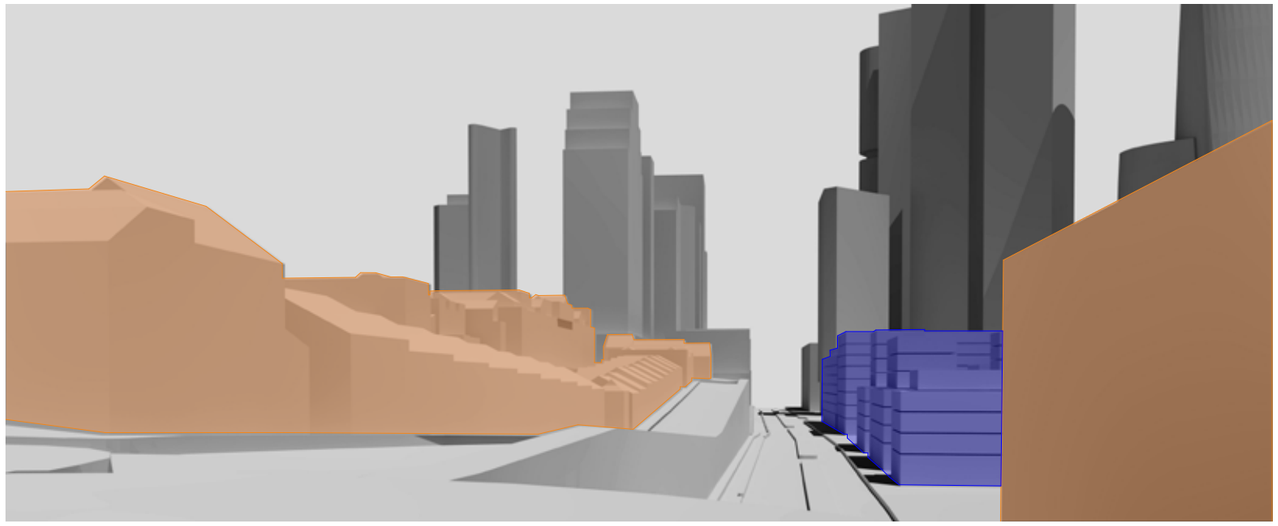
Despite the above, the CAD model views are considered adequate for comparing between built-form options and understanding the potential effects of the massing from the different view points.

Additional views

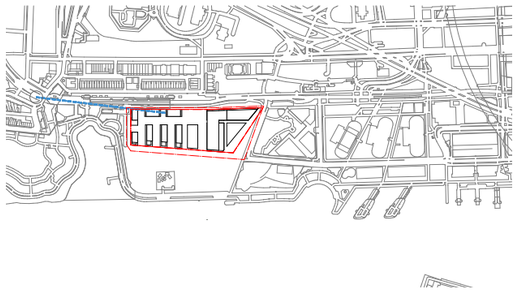
Location 4
Munn St Reserve



Mod 9: CAD model view of Location 4



Option E: CAD model view of Location 4



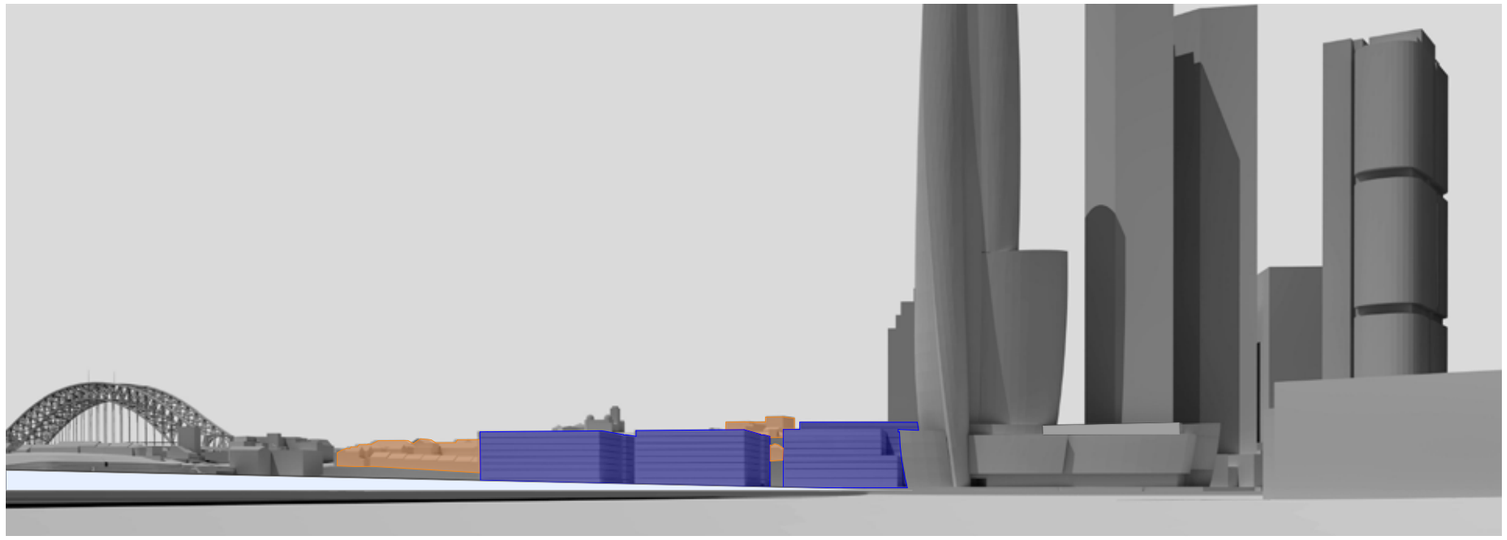
Key plan: Location 4

Google Street View near Location 4

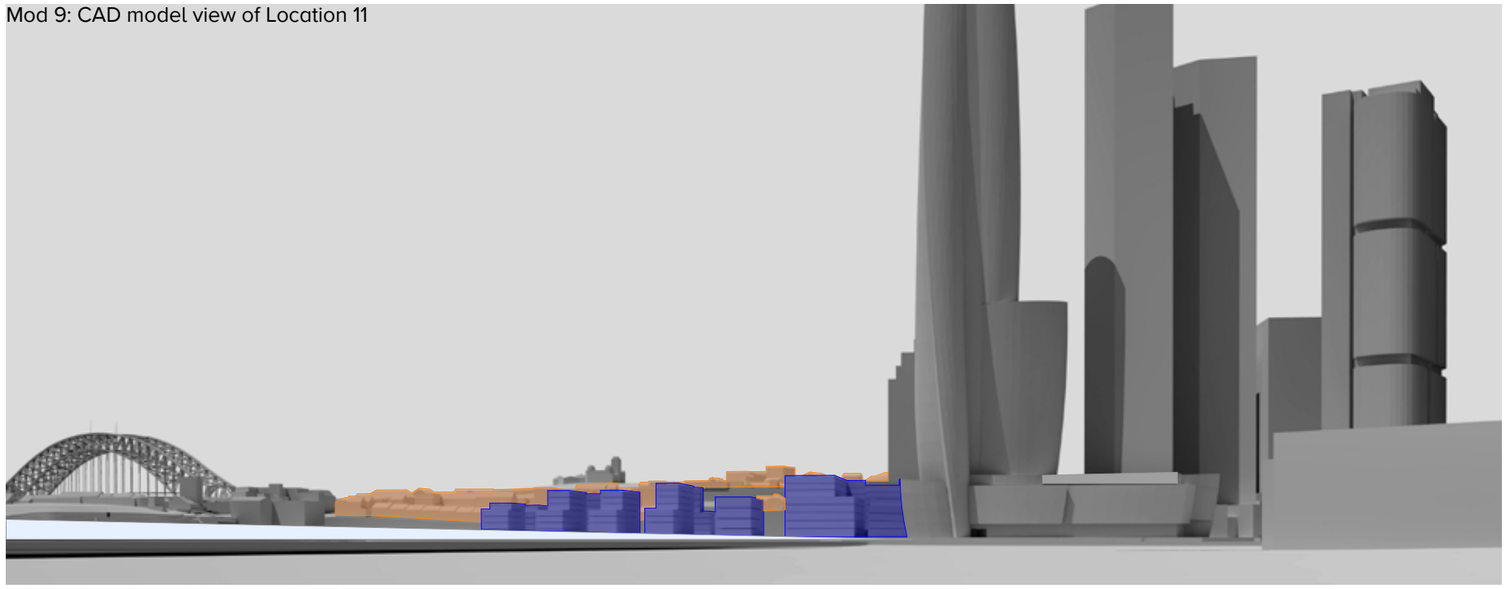
Visual Impact Study: Location 4

Additional views

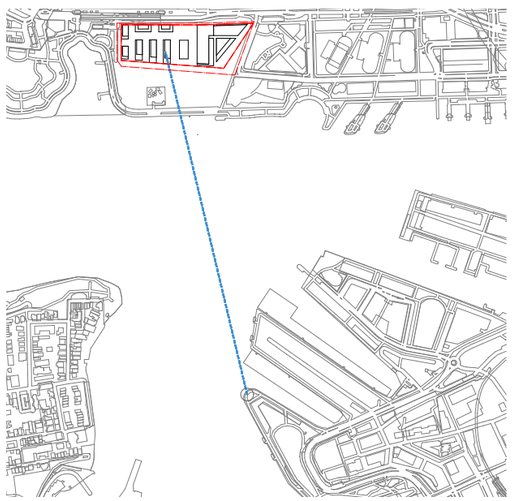
Location 11
Pirrama Park



Mod 9: CAD model view of Location 11



Option E: CAD model view of Location 11



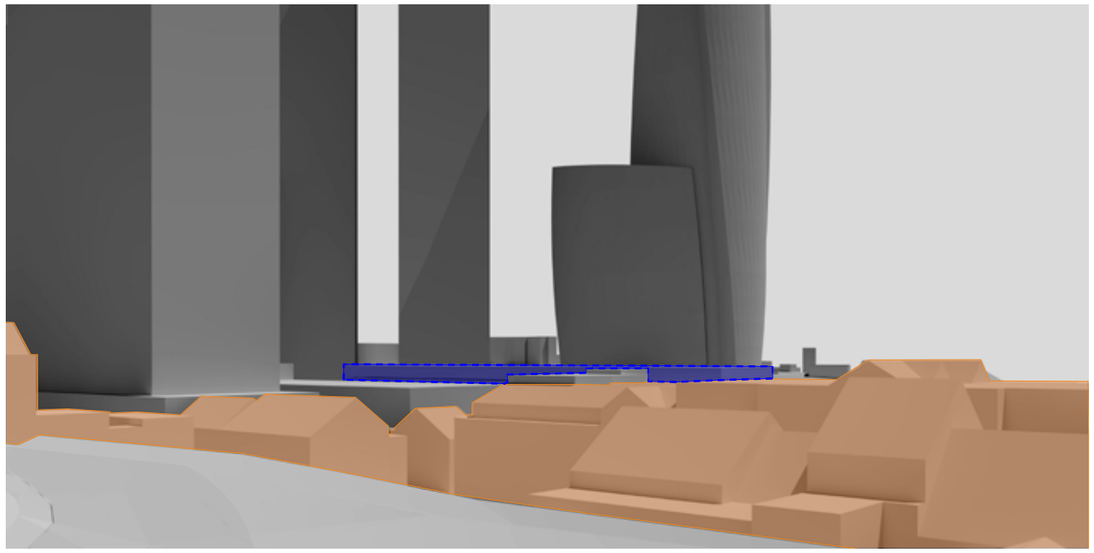
Key plan: Location 11

Google Street View near Location 11

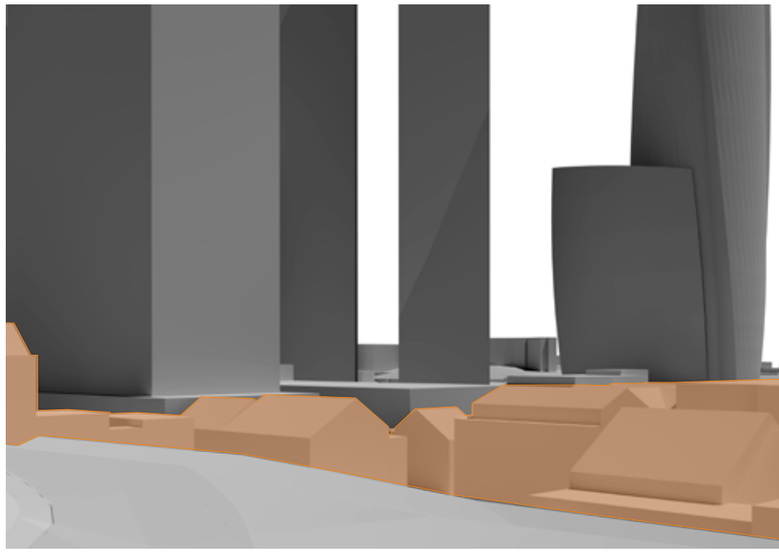
Visual Impact Study: Location 11

Additional views

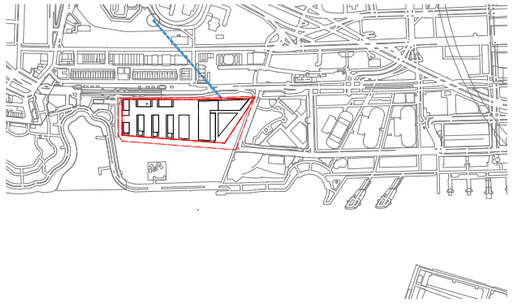
Location 33
Observatory Hill



Mod 9: CAD model view of Location 33

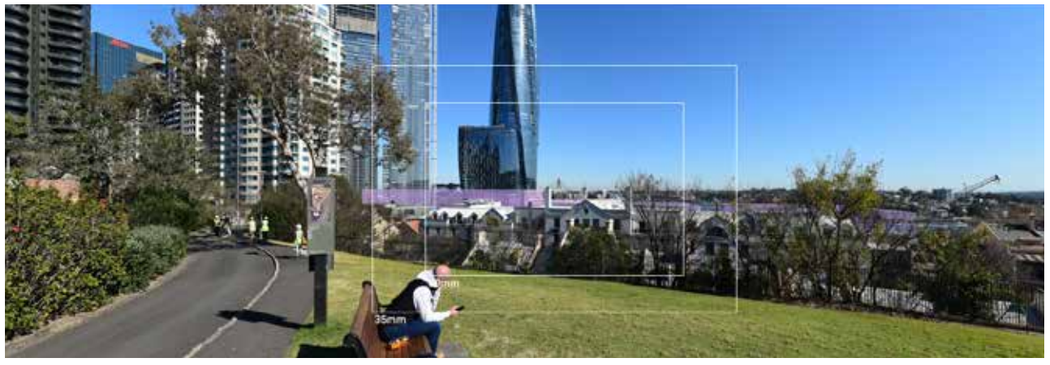


Option E: CAD model view of Location 33



Key plan: Location 33

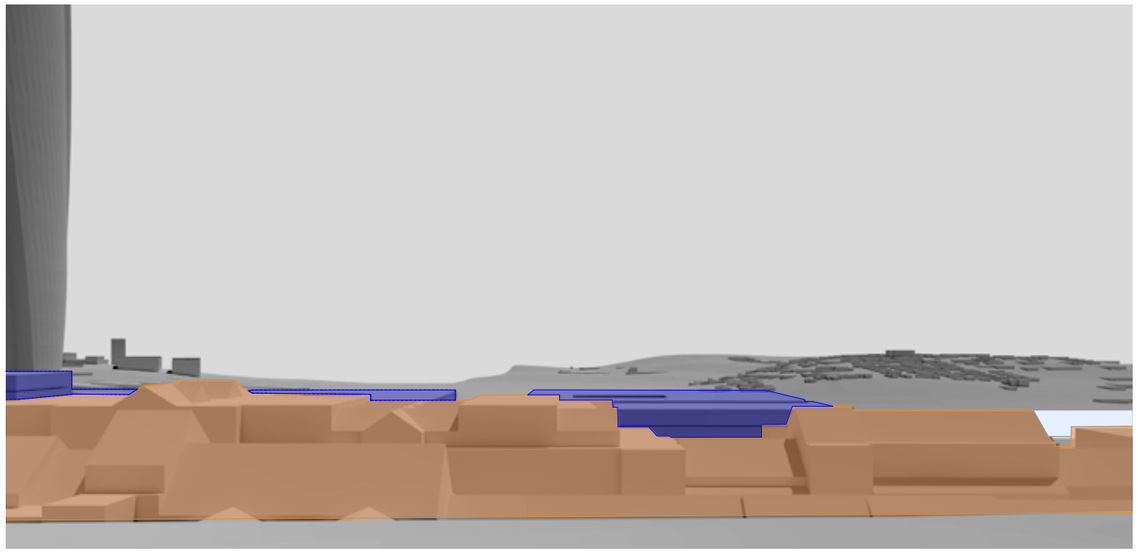
Google Street View near Location 33



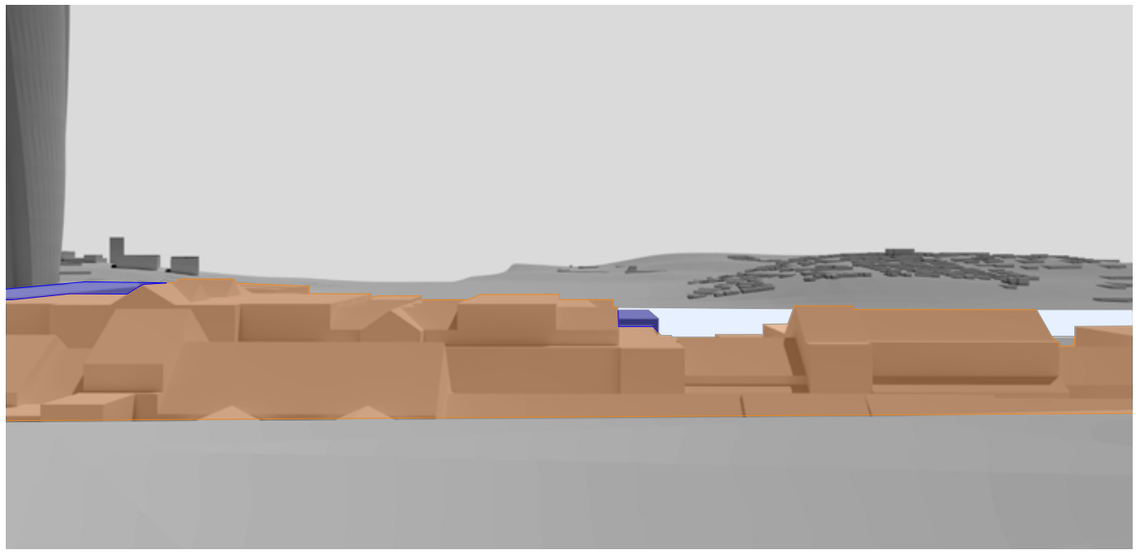
Visual Impact Study: Location 33

Additional views

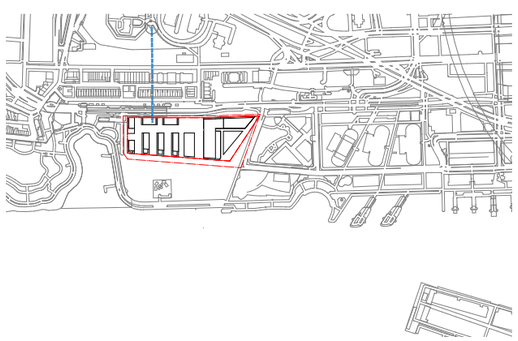
Location 34
Observatory Hill



Mod 9: CAD model view of Location 34



Option E: CAD model view of Location 34



Key plan: Location 34

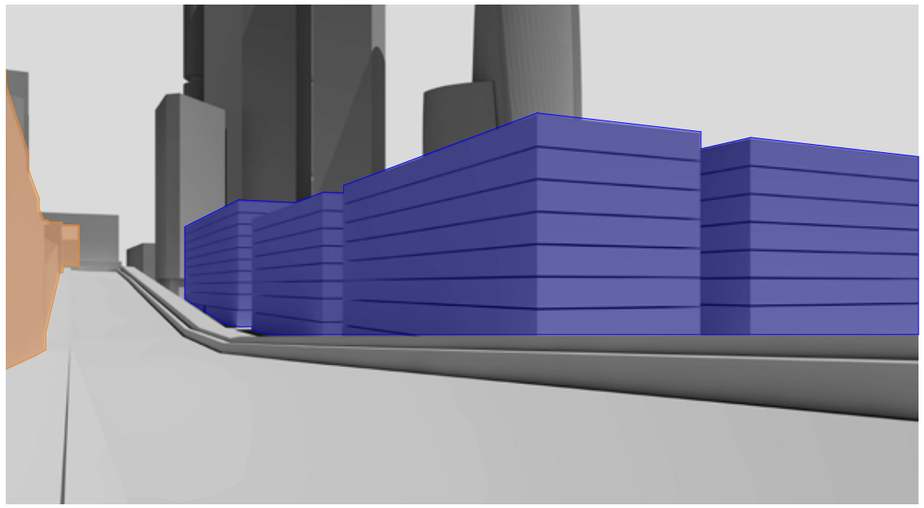
Google Street View near Location 34

Visual Impact Study: Location 34

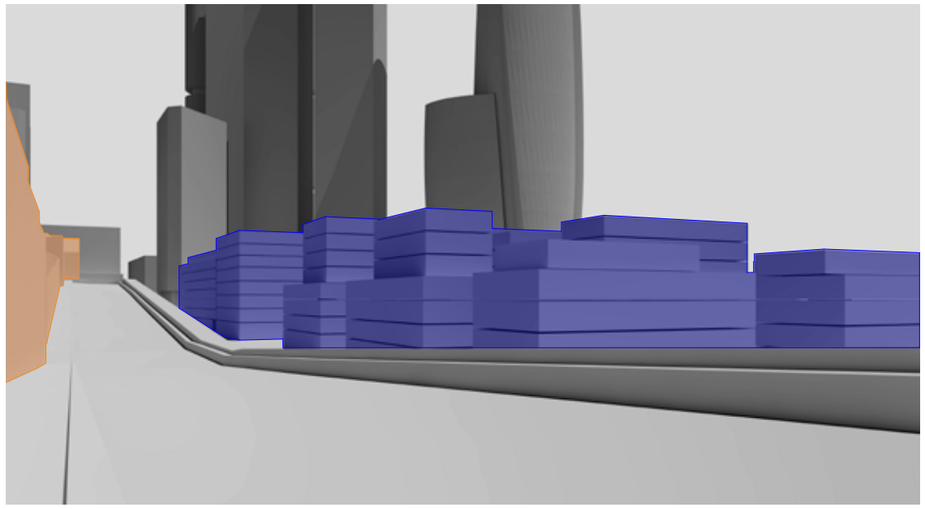
Additional views

Location 36

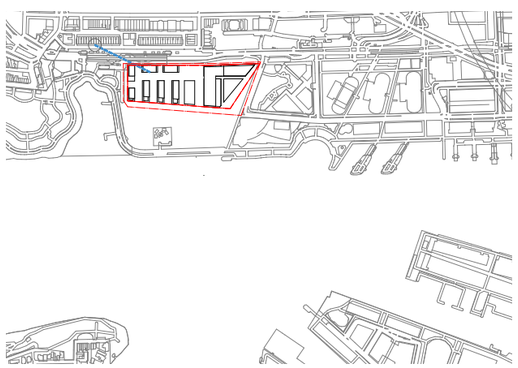
High Street North



Mod 9: CAD model view of Location 36

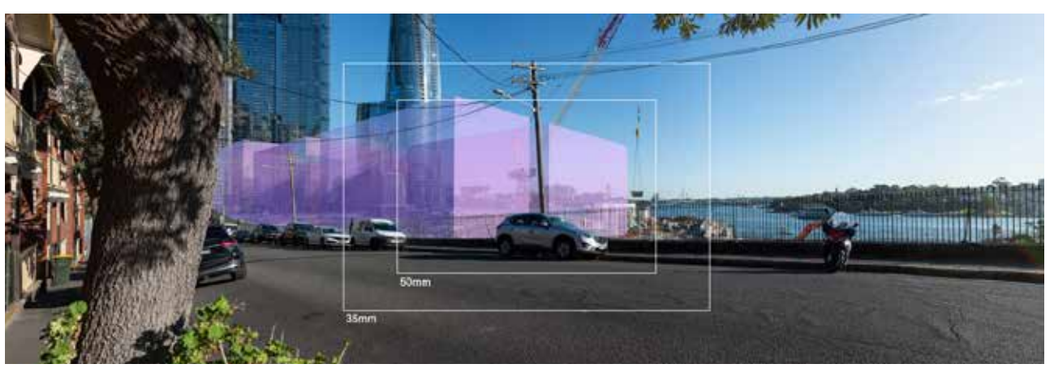


Option E: CAD model view of Location 36



Key plan: Location 36

Google Street View near Location 36

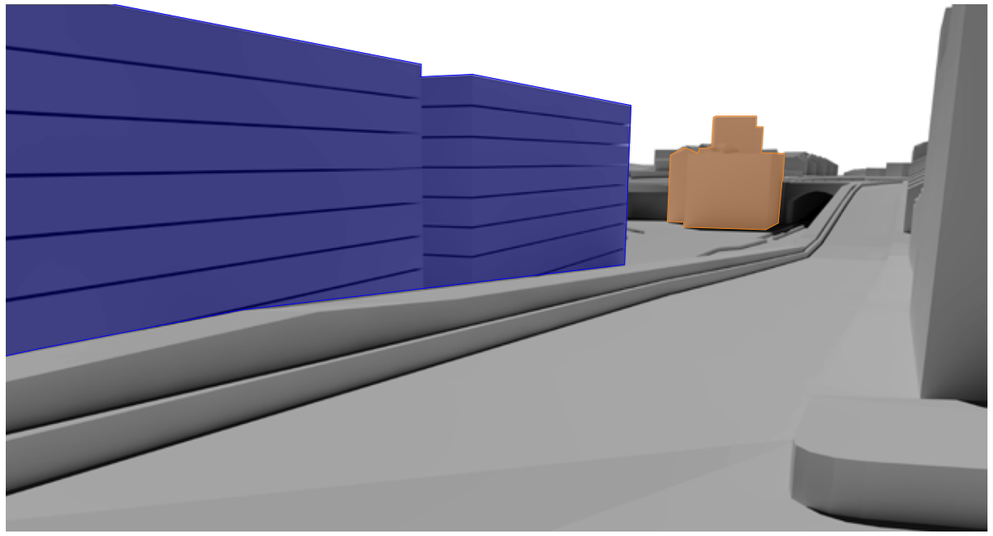


Visual Impact Study: Location 36

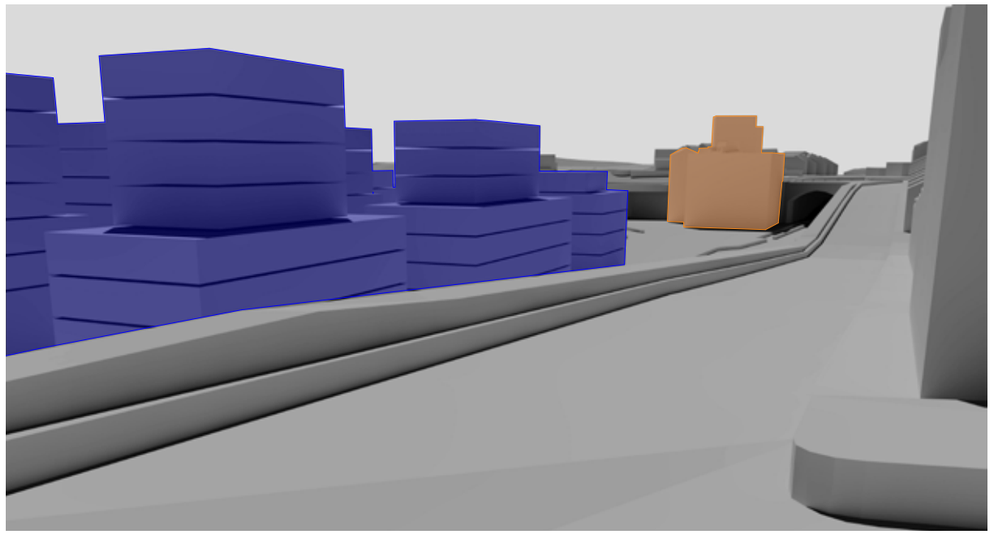
Additional views

Location 37

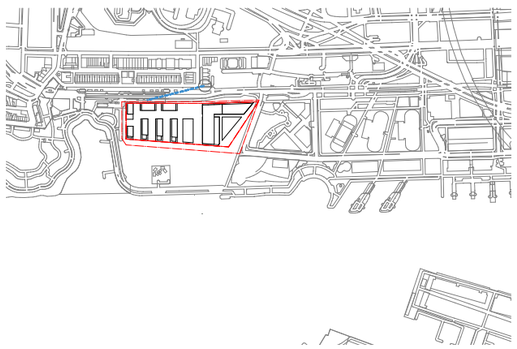
High Street South



Mod 9: CAD model view of Location 37

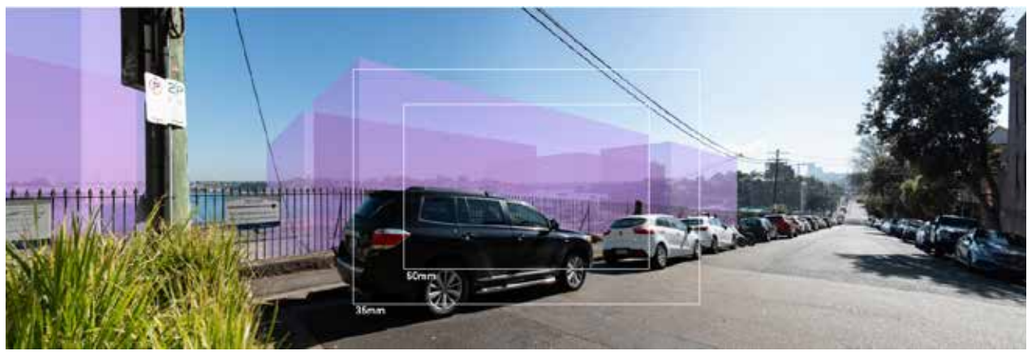


Option E: CAD model view of Location 37



Key plan: Location 37

Google Street View near Location 37

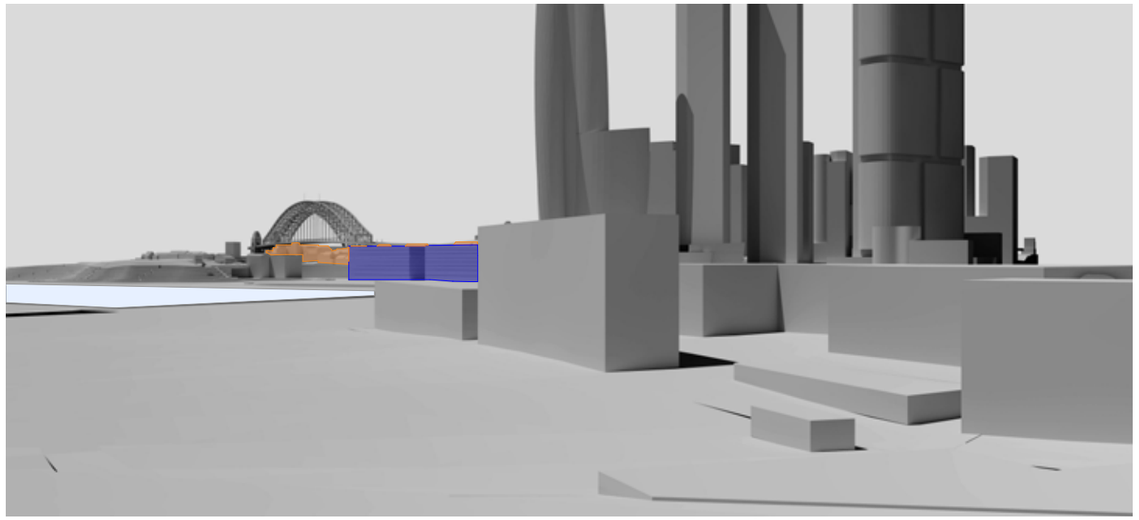


Visual Impact Study: Location 37

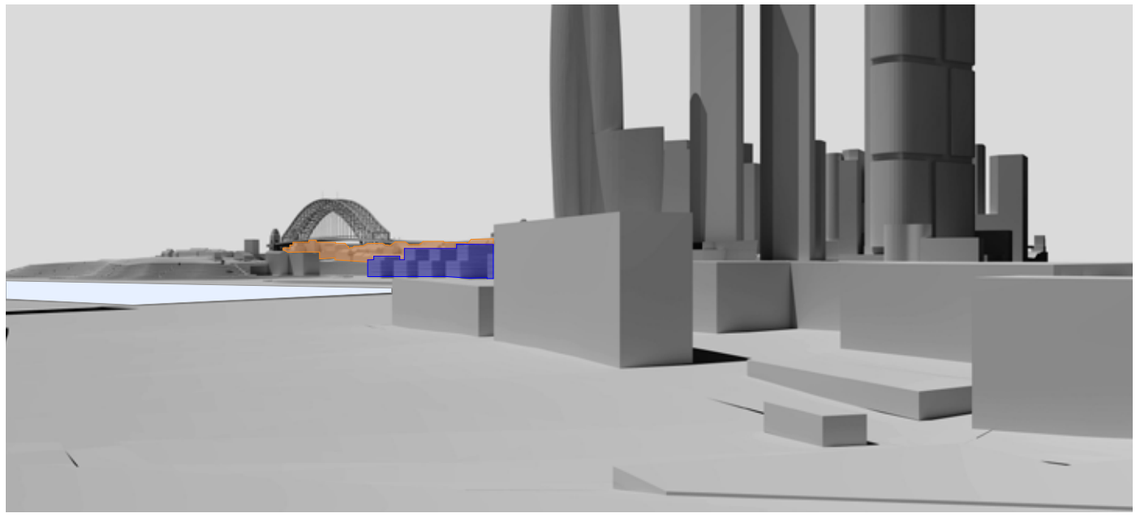
Additional views

Location 39

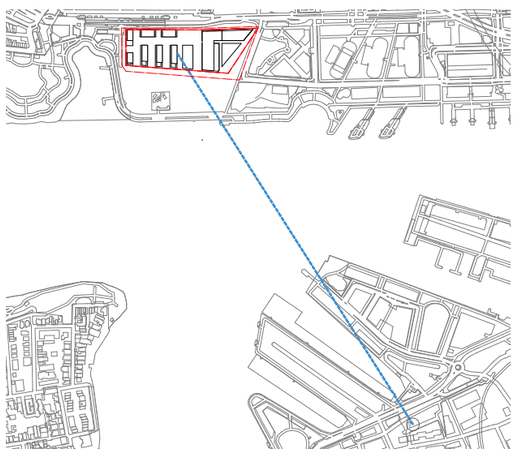
James Watkins



Mod 9: CAD model view of Location 39



Option E: CAD model view of Location 39



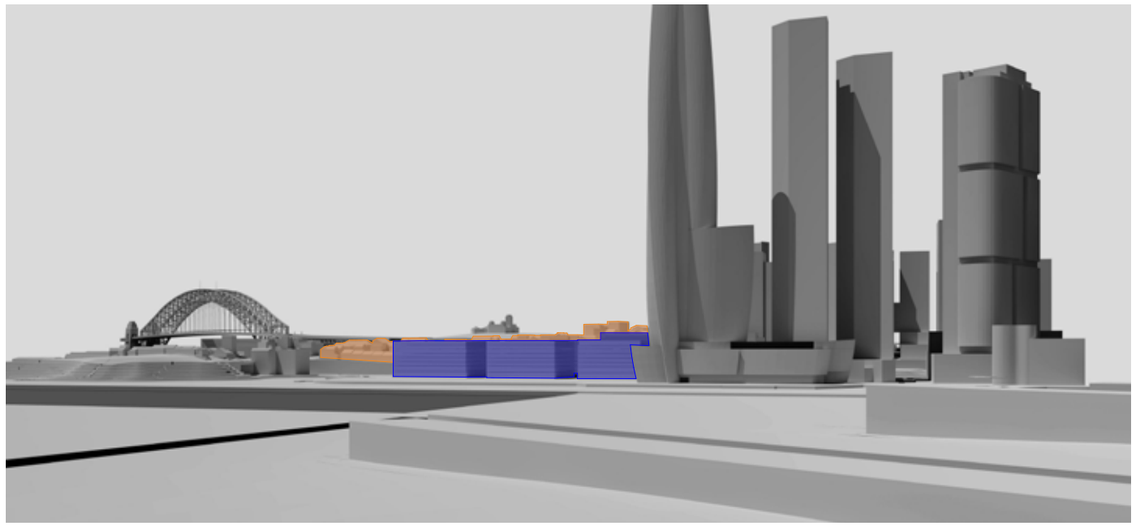
Key plan: Location 39

Google Street View near Location 39

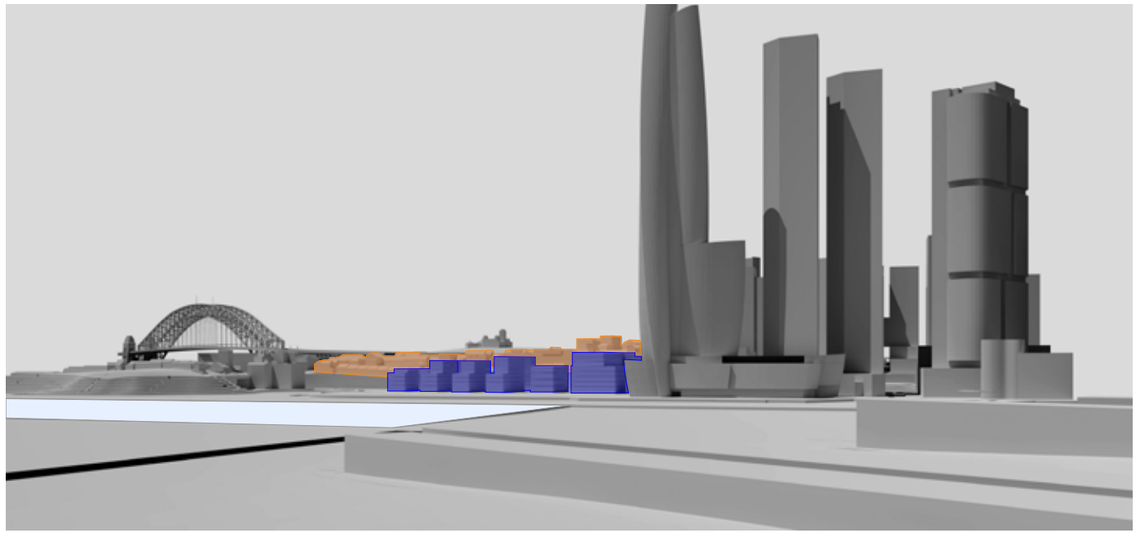
Visual Impact Study: Location 39

Additional views

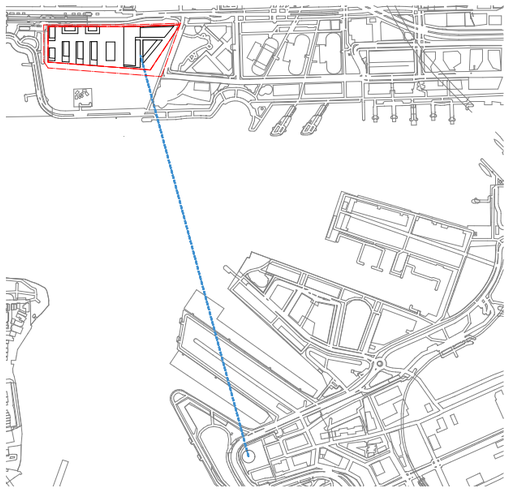
Location 40
Giba Park



Mod 9: CAD model view of Location 40



Option E: CAD model view of Location 40



Key plan: Location 40

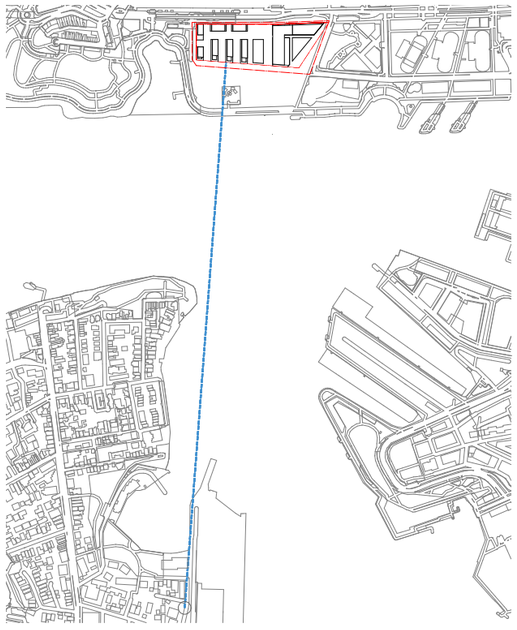
Google Street View near Location 40

Visual Impact Study: Location 40

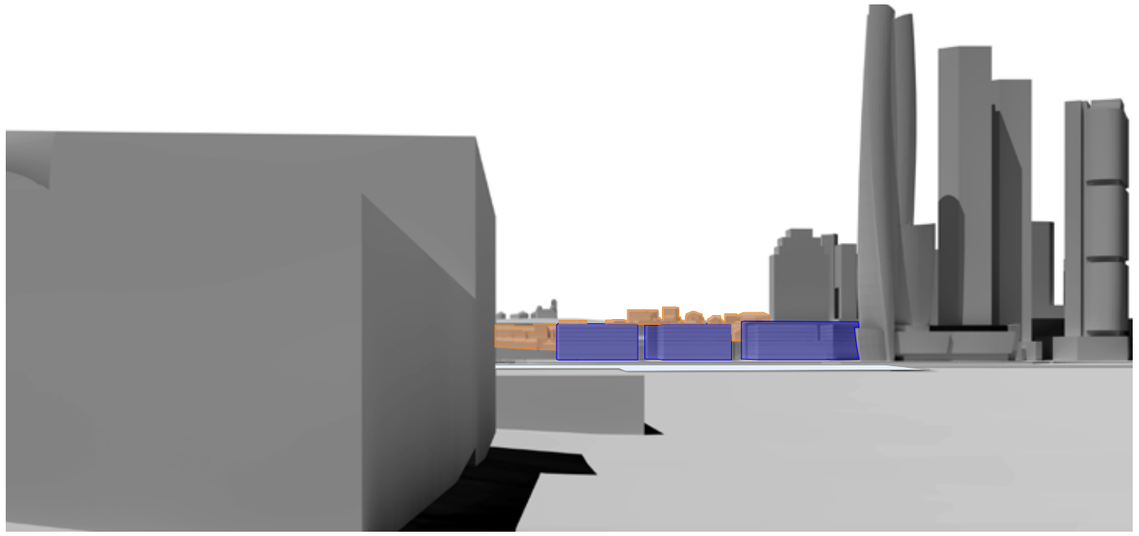
Additional views

Location 41
Grafton Street

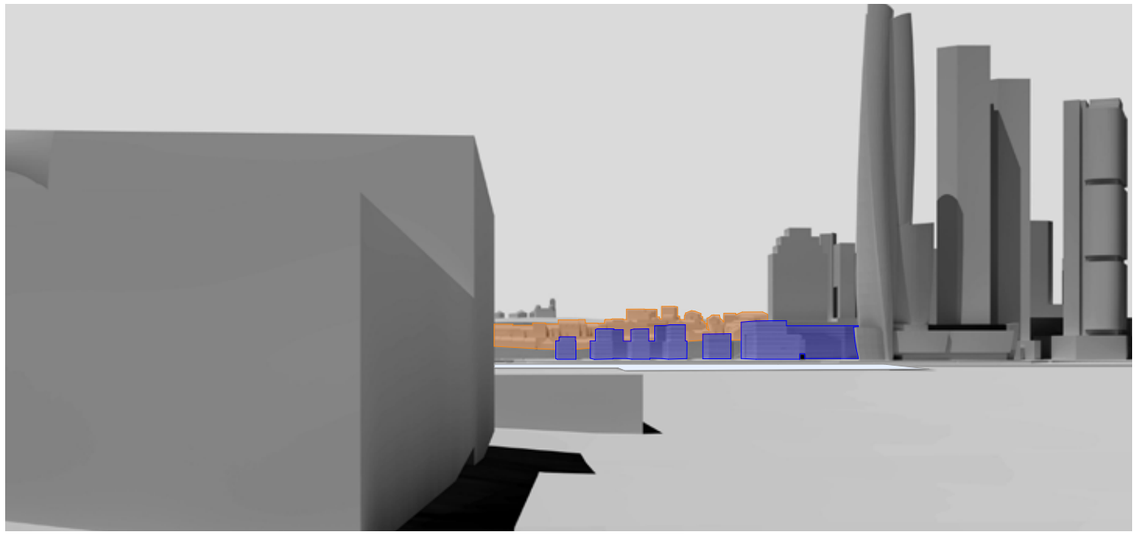
Corner of Grafton Street and Grafton Lane Balmain



Key plan: Location 41



Mod 9: CAD model view of Location 41



Option E: CAD model view of Location 41

Google Street View near Location 41

Visual Impact Study: Location 41