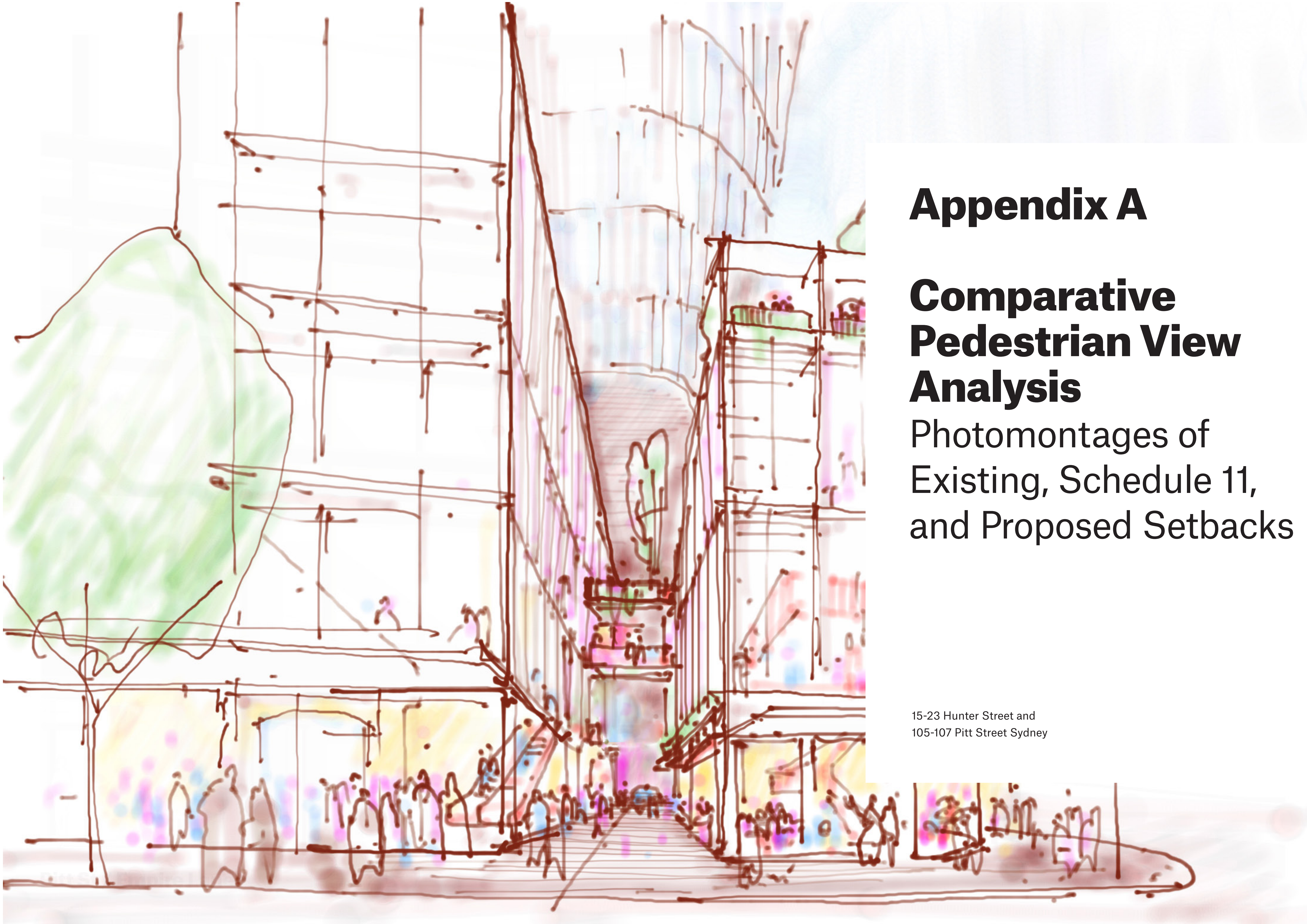
Attachment A5

Urban Design Report – Bates Smart - 15-25 Hunter and 105-107 Pitt Street, Sydney-Part 4

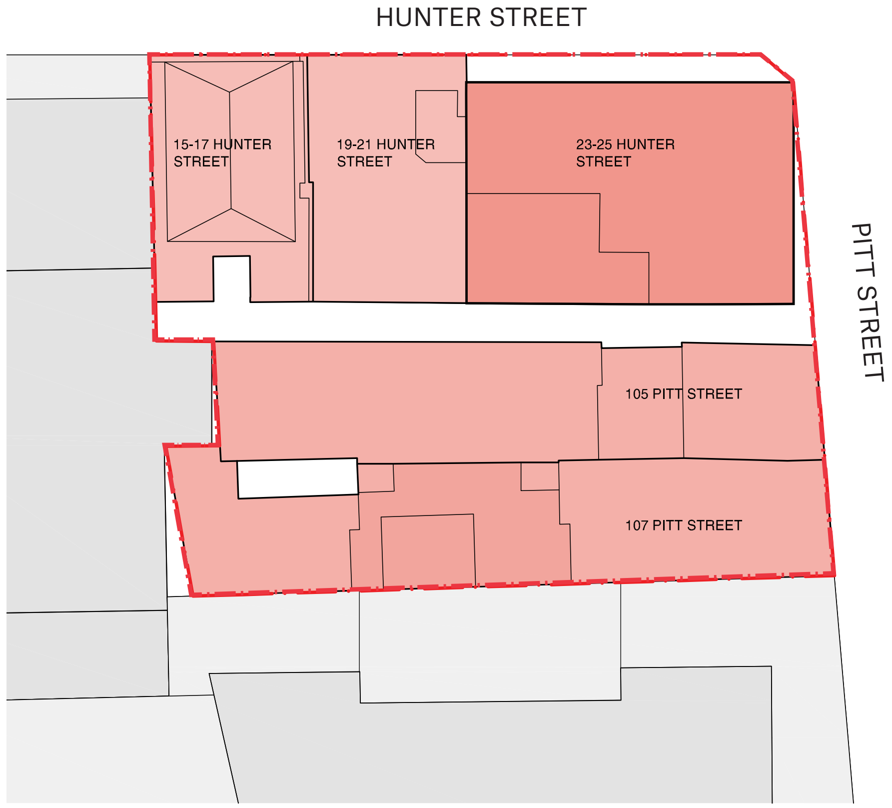


Appendix A

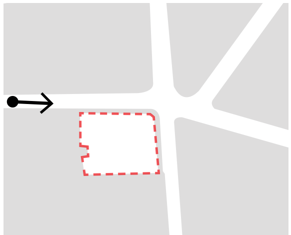
Comparative Pedestrian View Analysis

Photomontages of Existing, Schedule 11, and Proposed Setbacks

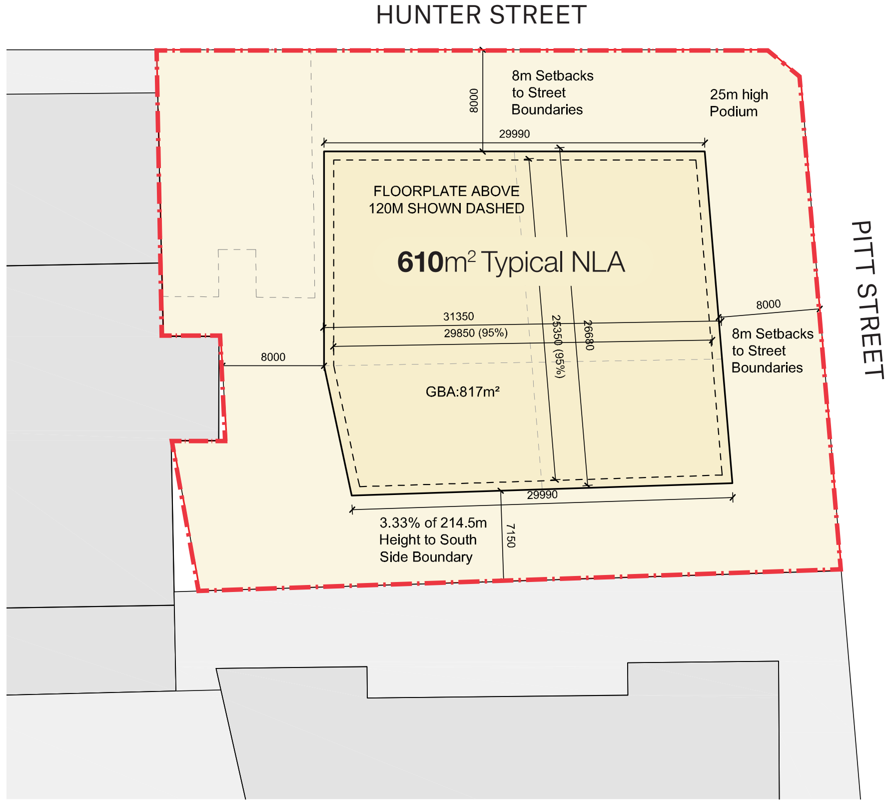
15-23 Hunter Street and
105-107 Pitt Street Sydney



EXISTING SITE CONTEXT

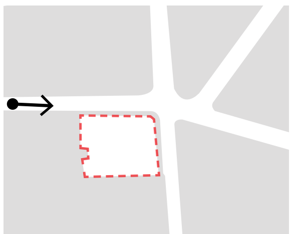


VIEW 1 - Looking east along Hunter Street



SCHEDULE 11 ENVELOPE TOWER SETBACKS

Pitt Street	8m
Hunter Street	8m
Western Boundary	8m
Southern Boundary	7.15m



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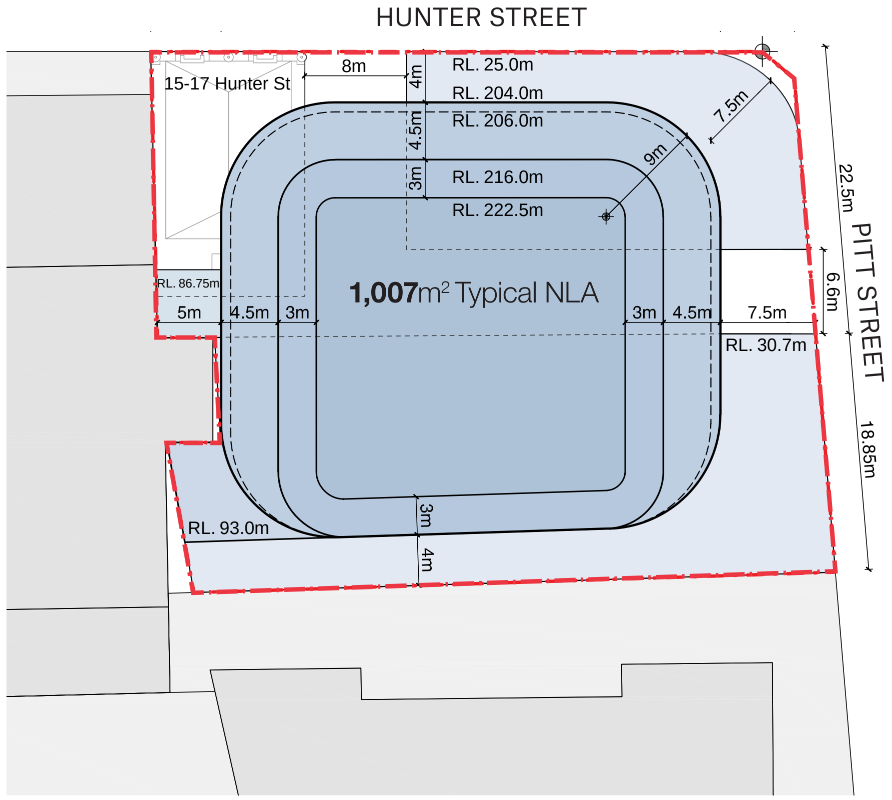

PROPOSED ENVELOPE TOWER SETBACKS

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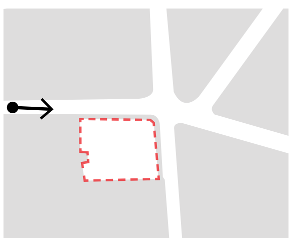

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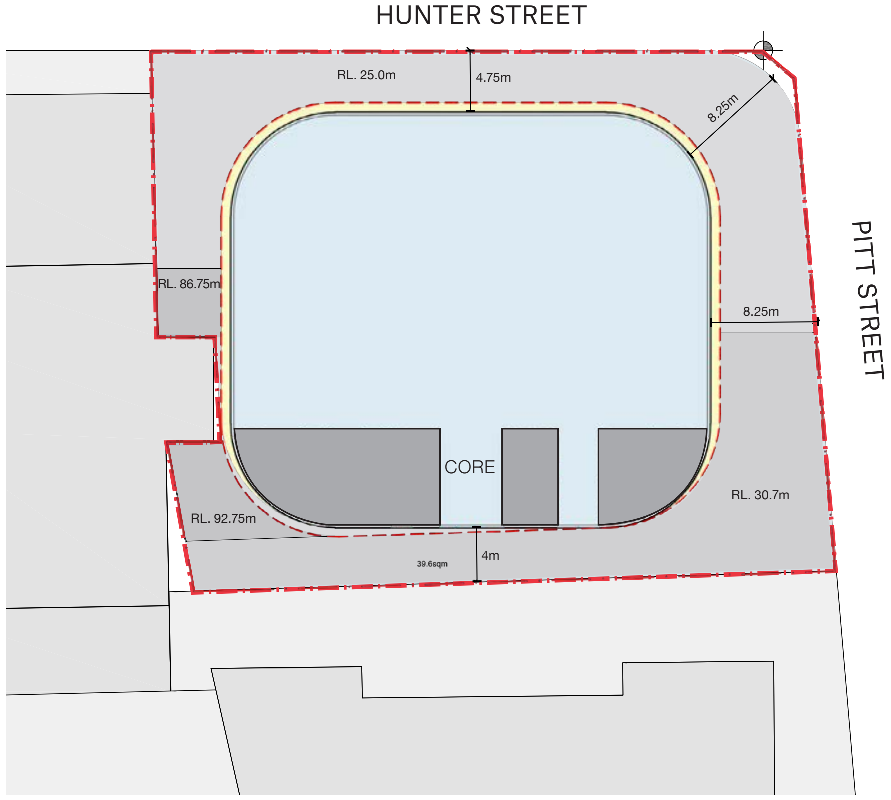

REFERENCE DESIGN TOWER SETBACKS

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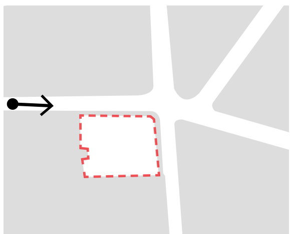

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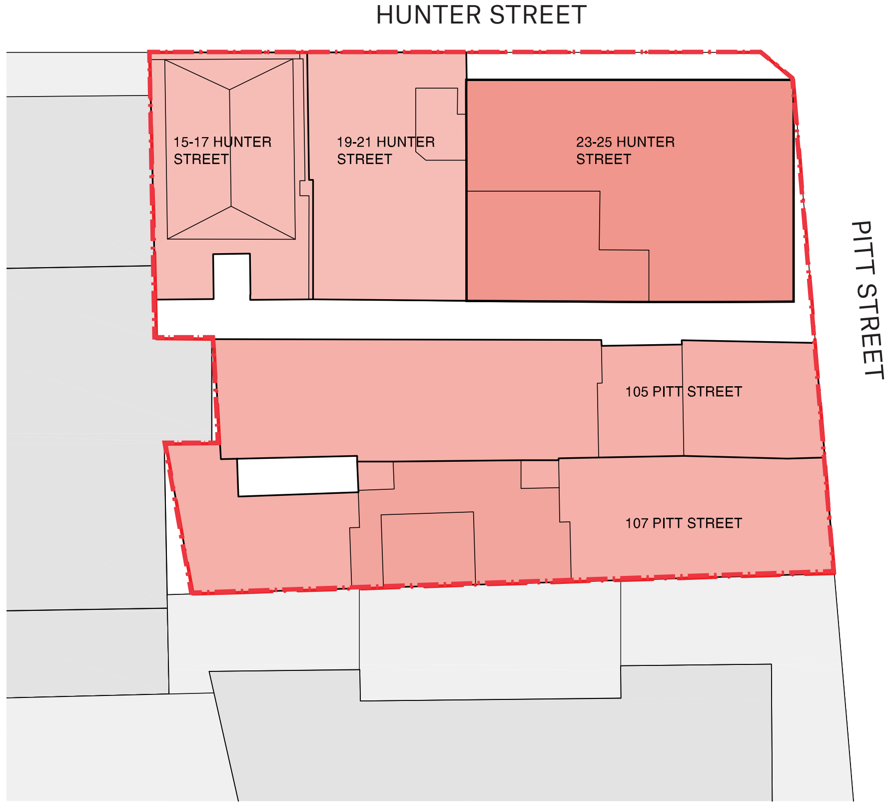

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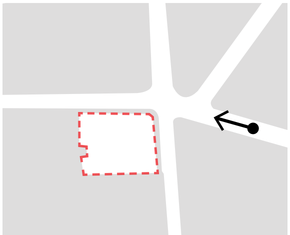
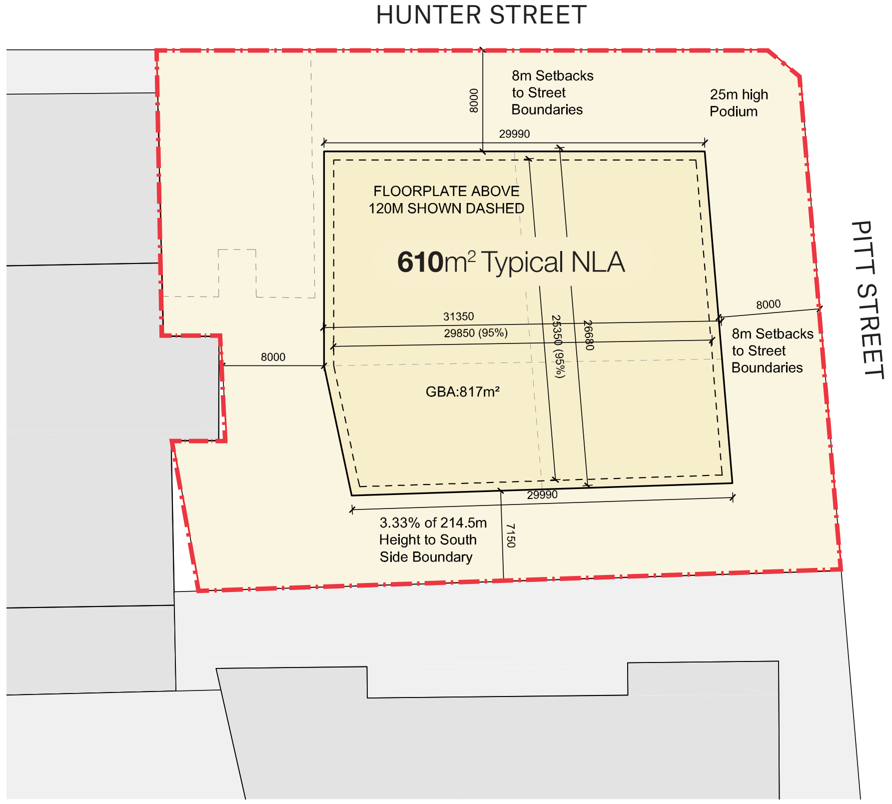


VIEW 2 - Looking west along Hunter Street



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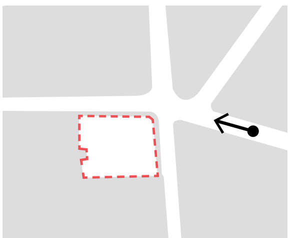

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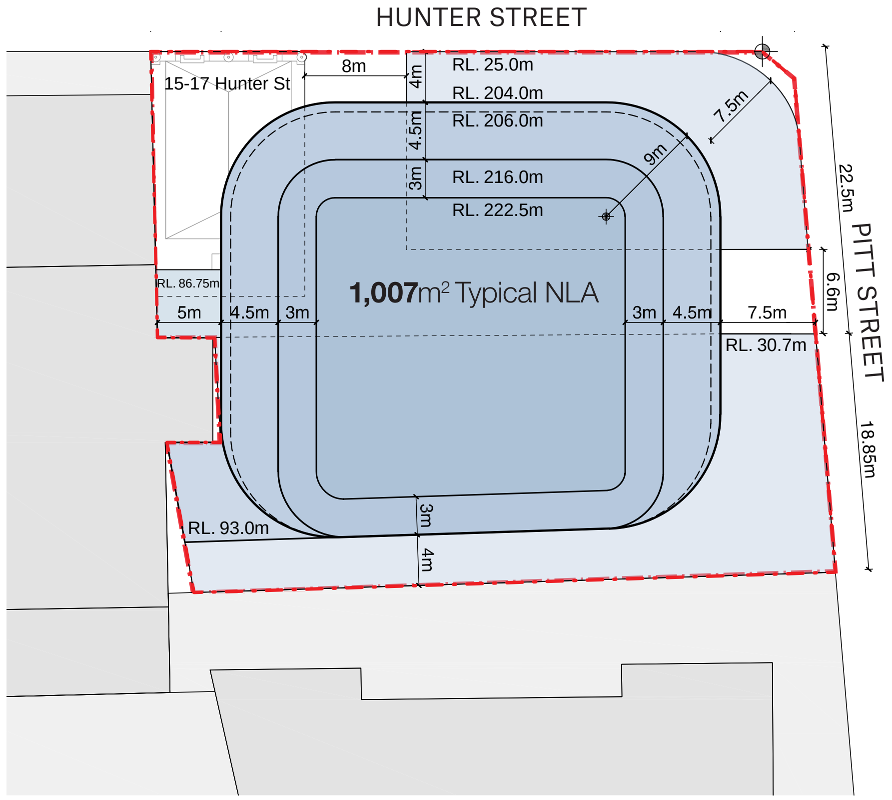

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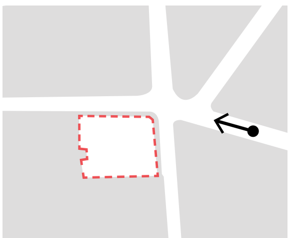

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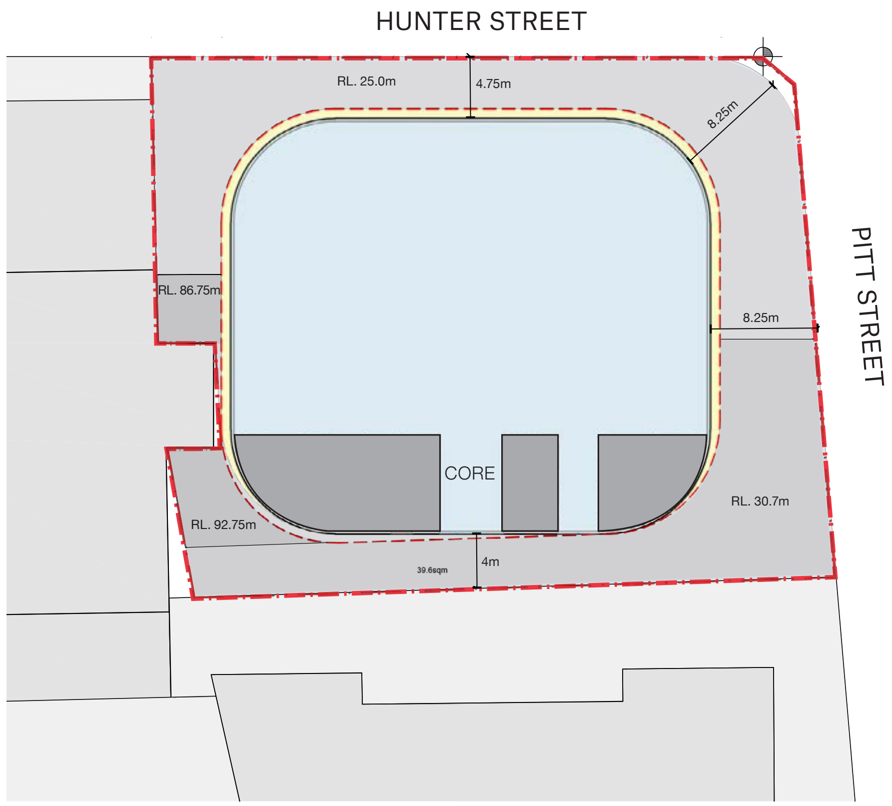

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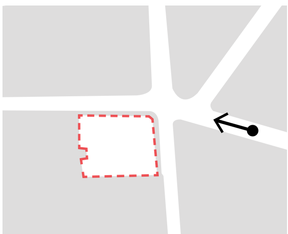

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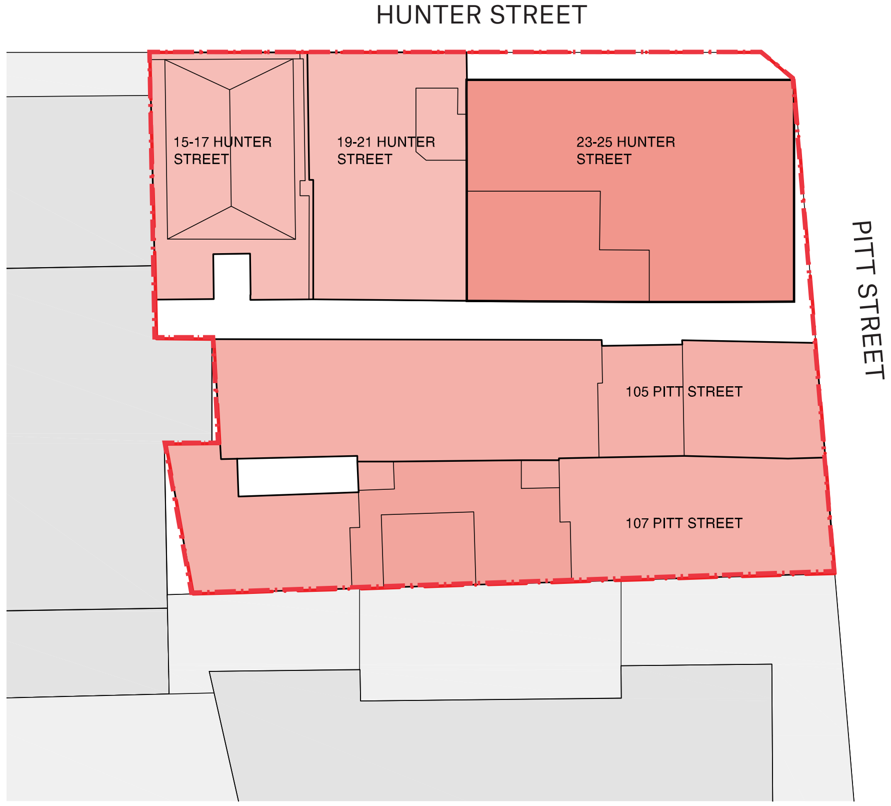

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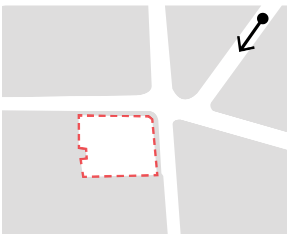
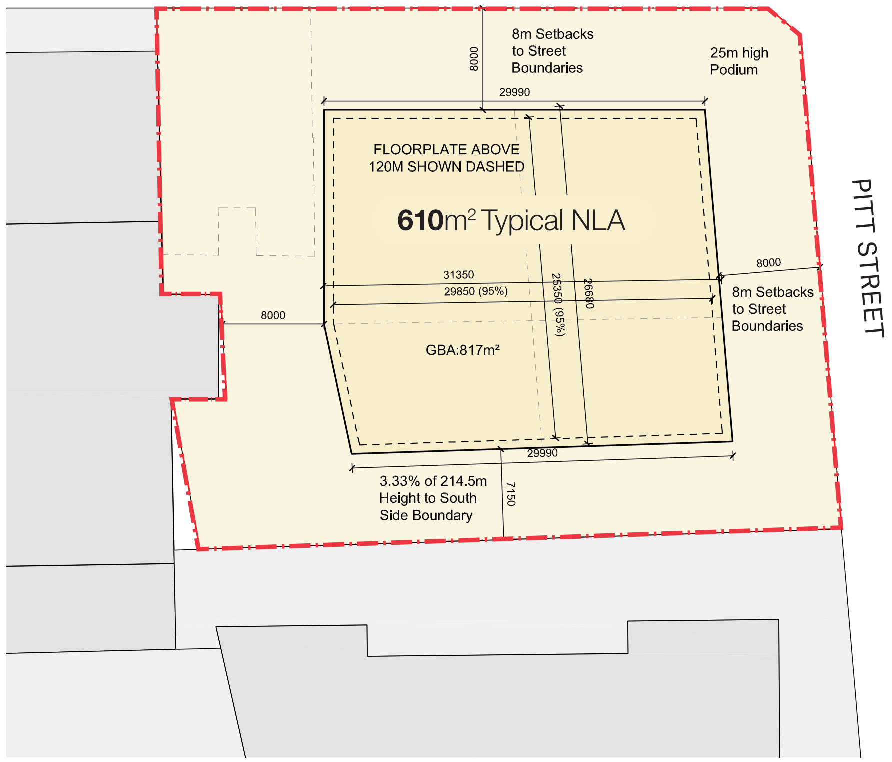


VIEW 3 - Looking south-west along O'Connel Street



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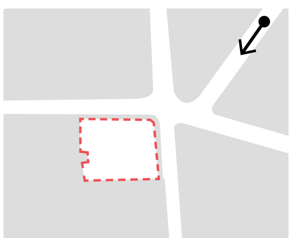

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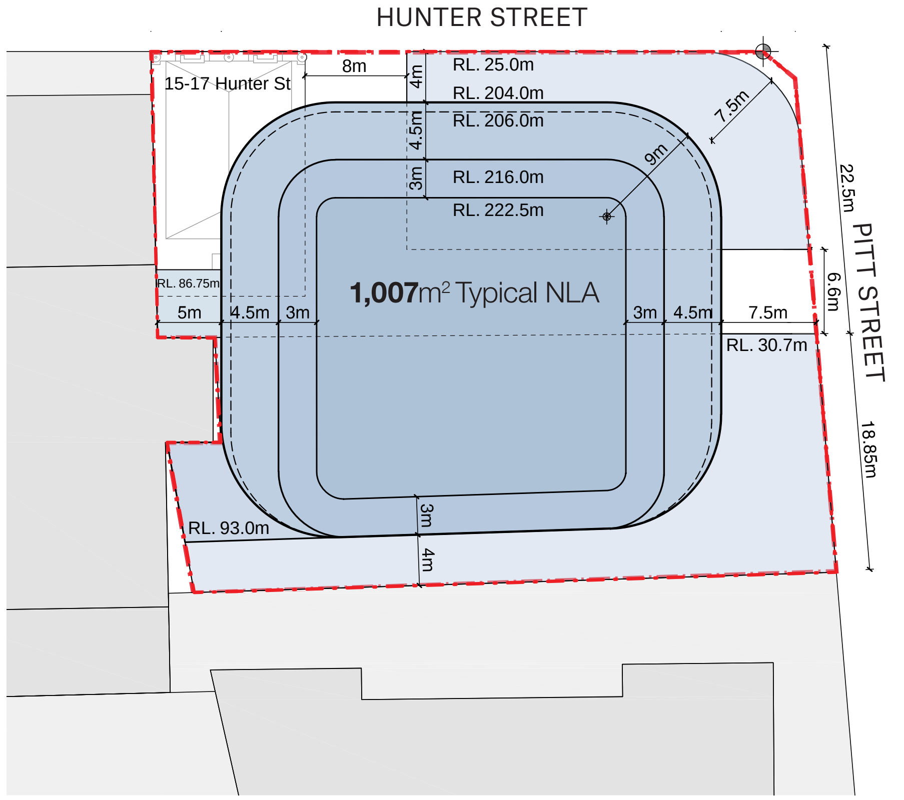

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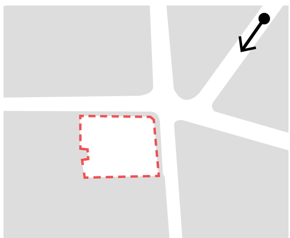

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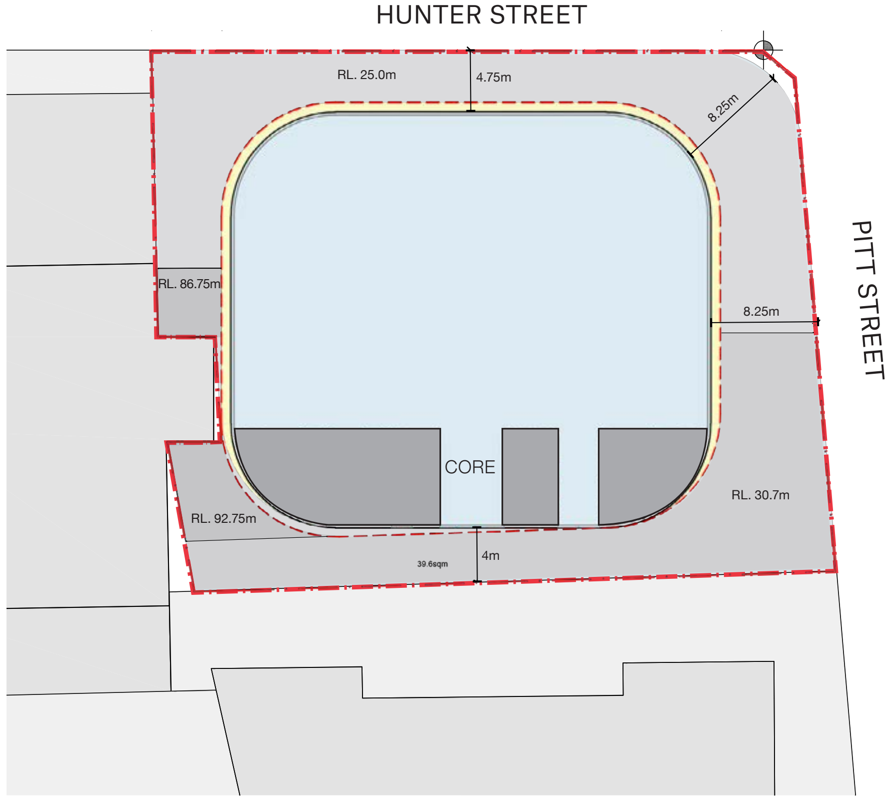

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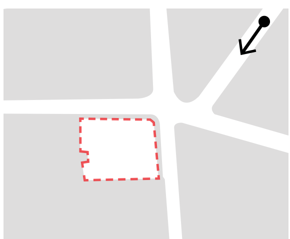

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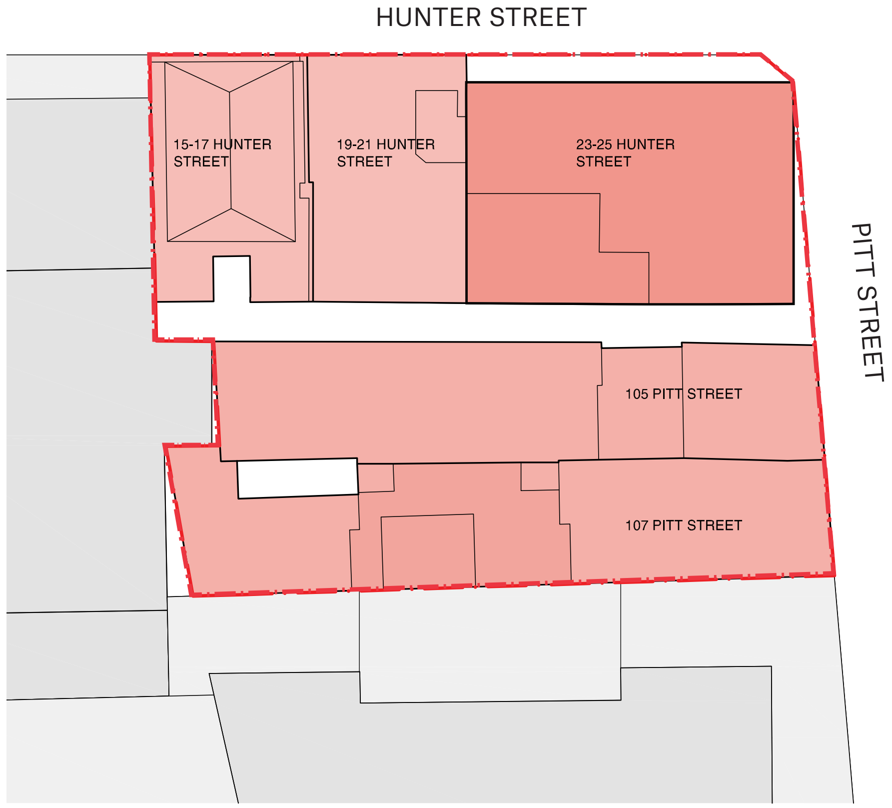

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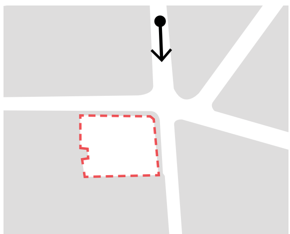
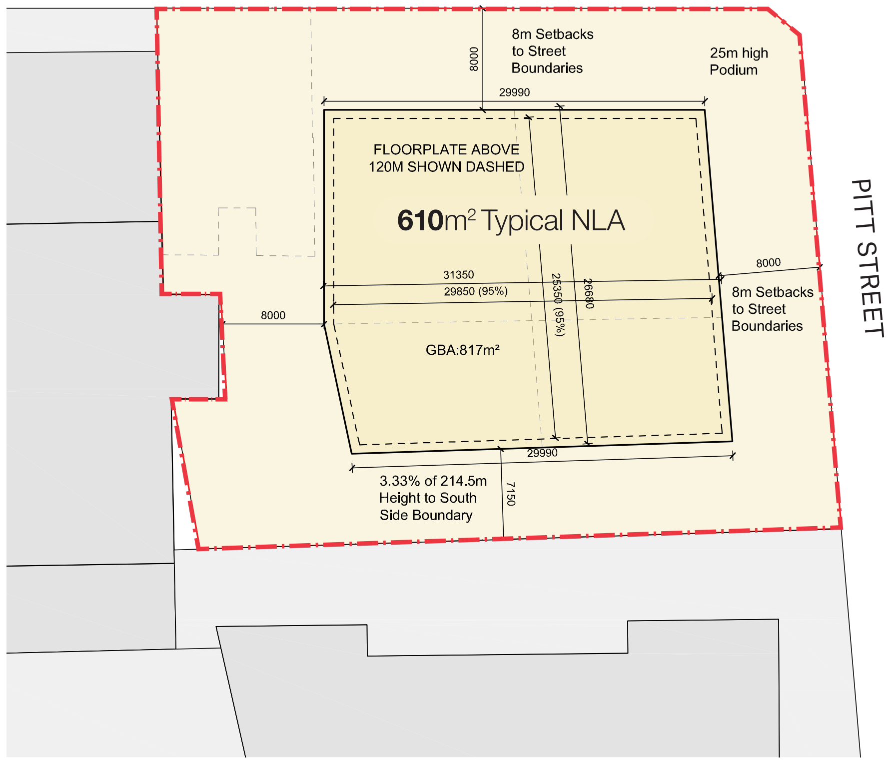


VIEW 4 - Looking south along Pitt Street



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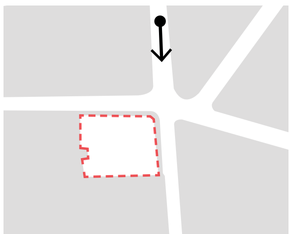

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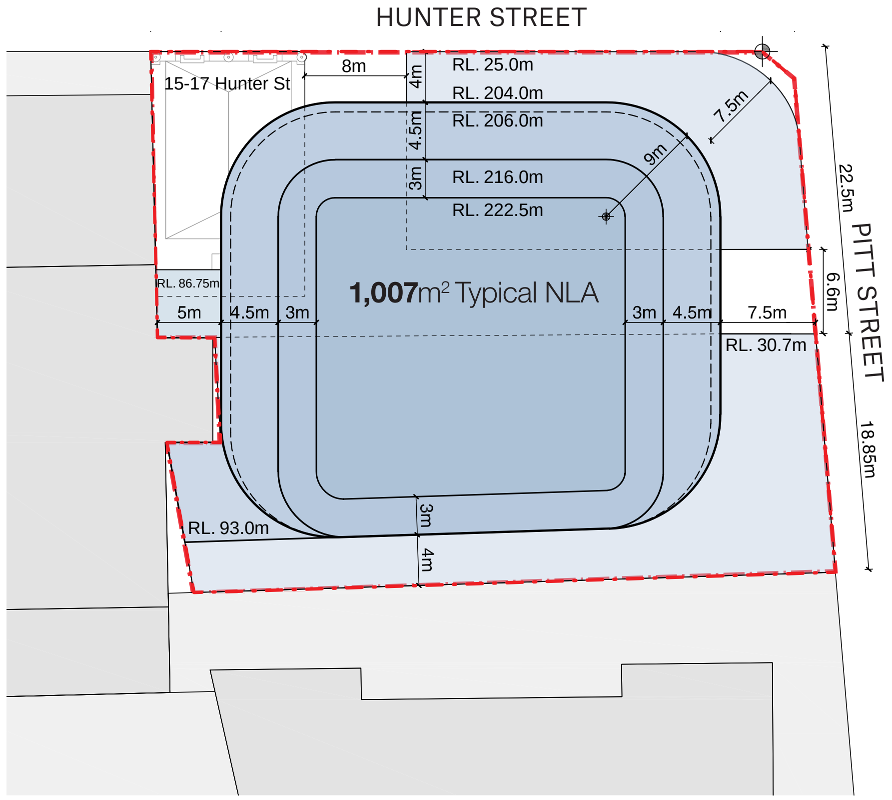

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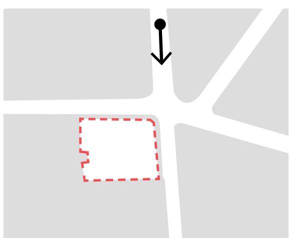

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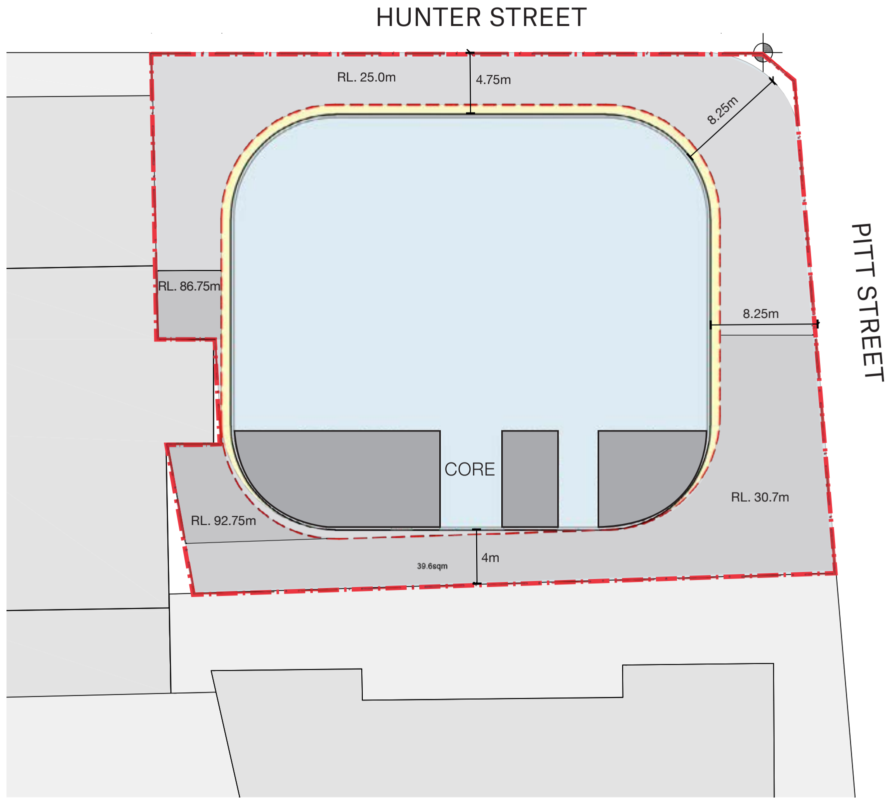

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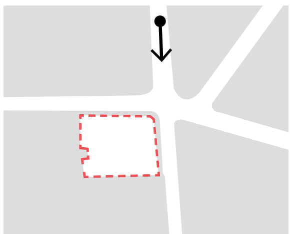

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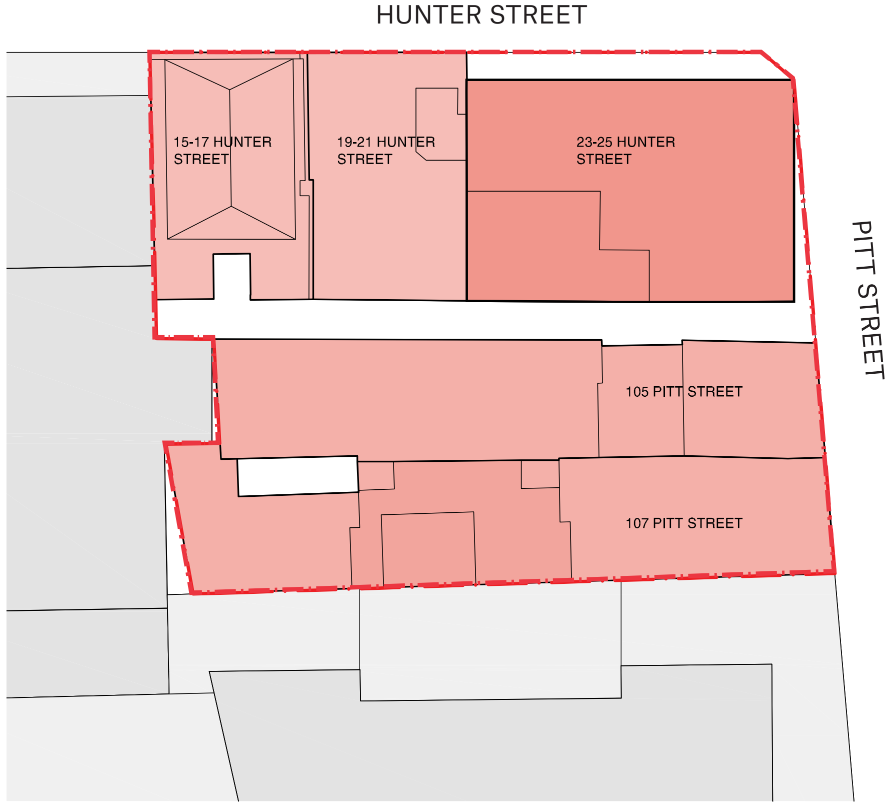

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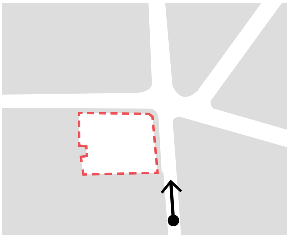
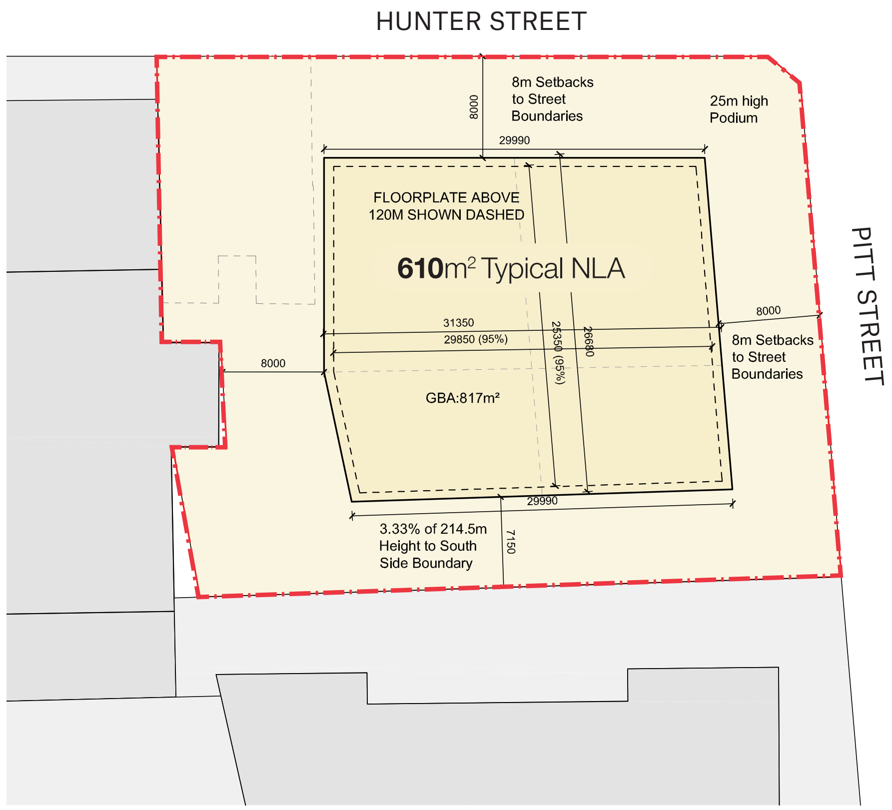


VIEW 5 - Looking north along Pitt Street



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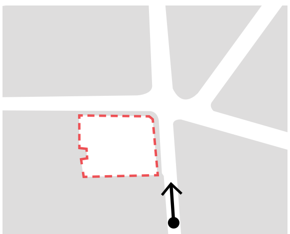

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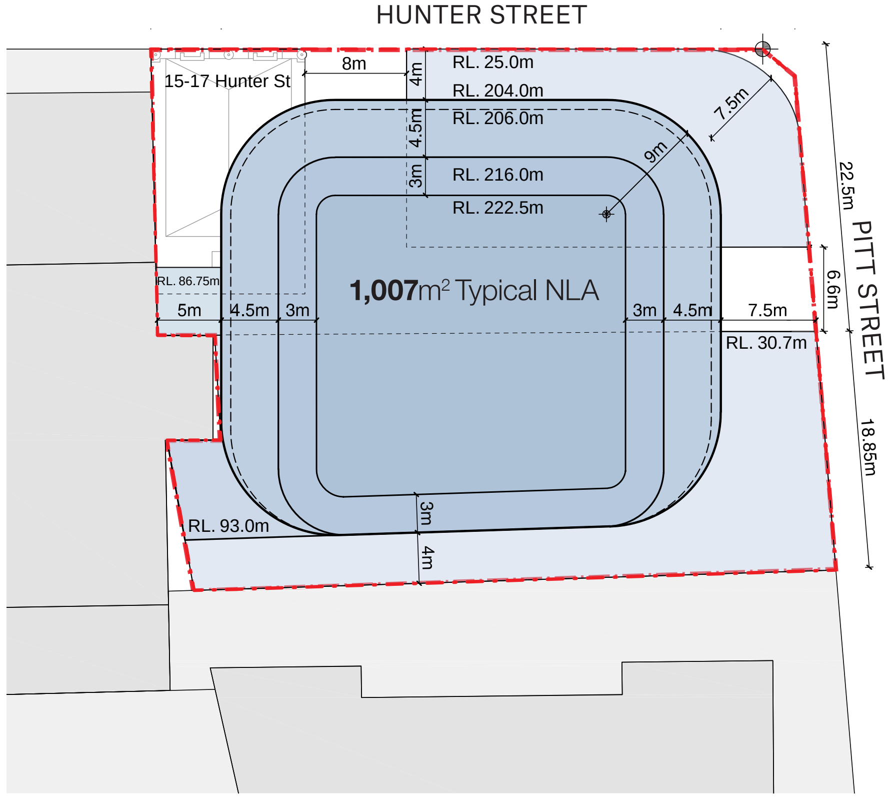

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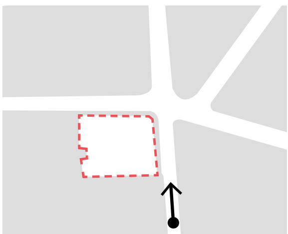
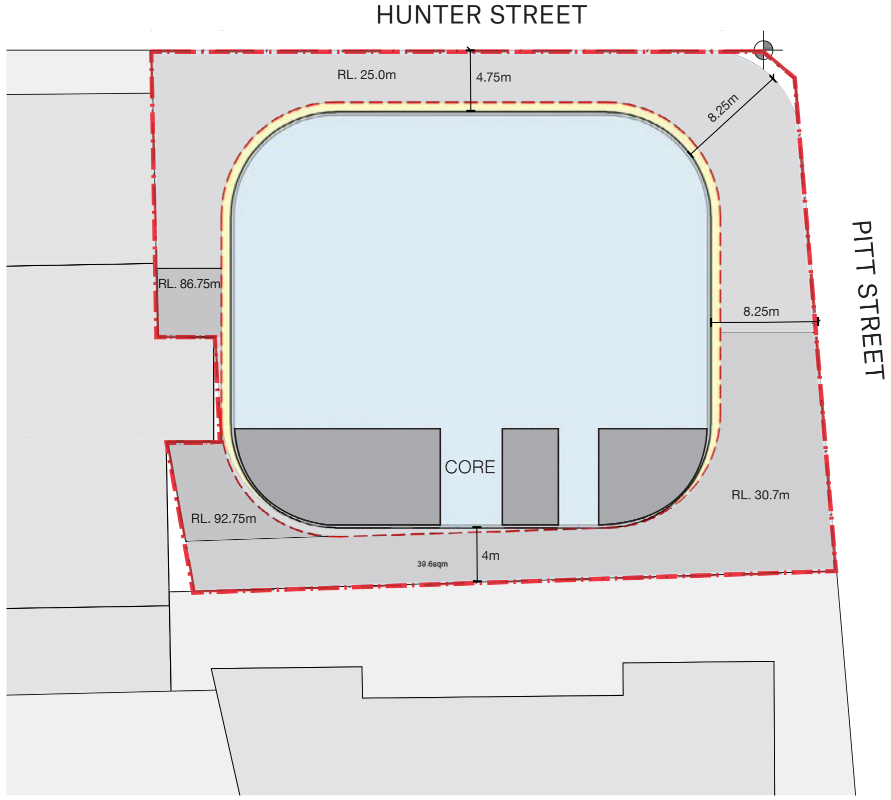


VIEW 5 - Looking north along Pitt Street



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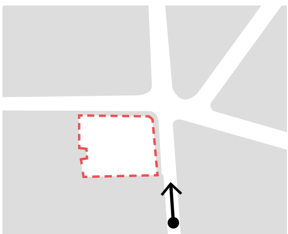
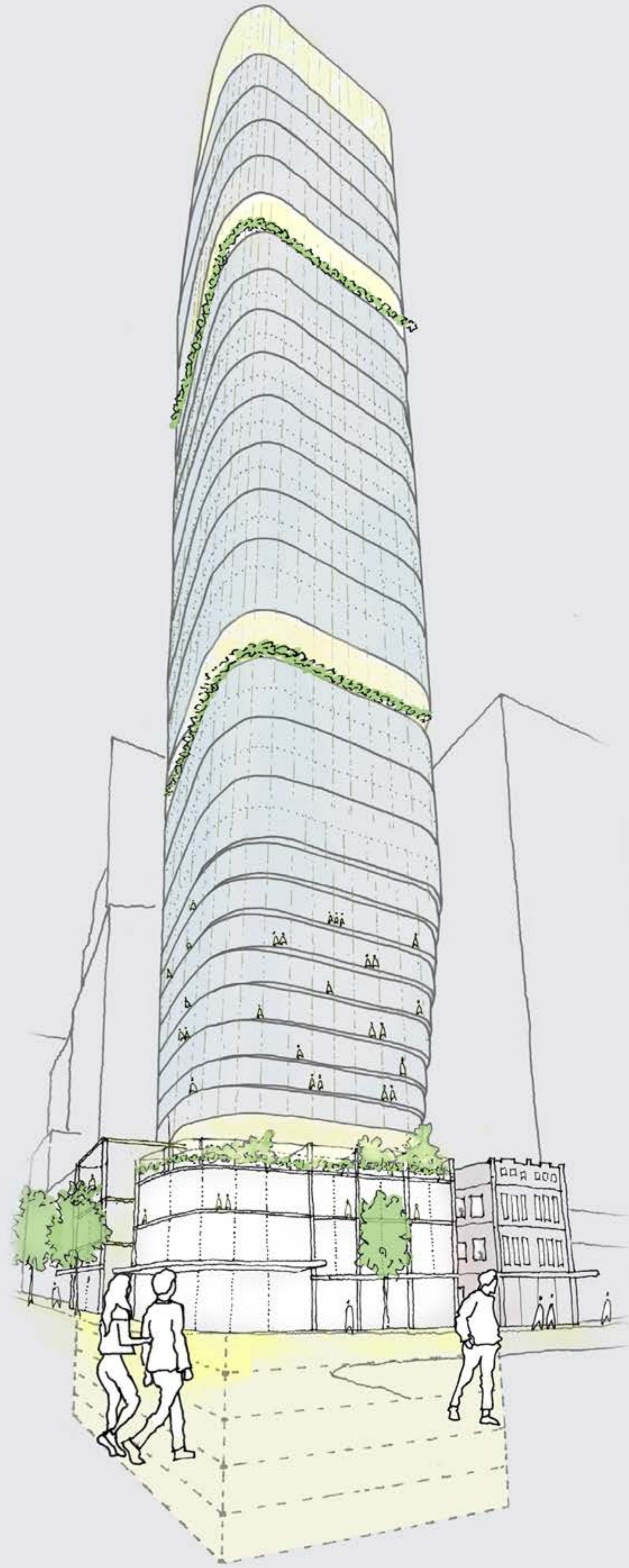


VIEW 5 - Looking north along Pitt Street

Appendix B

Additional Information

15-23 Hunter Street and
105-107 Pitt Street Sydney



10.1 Building Articulation Study

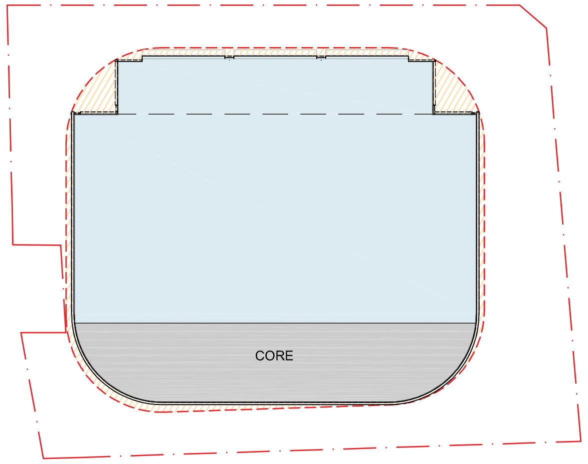
The following images and diagramatic plans have been prepared to aid discussion of the appropriate requirements for facade zone depth & articulation allowance for this particular site. They illustrate possible massing outcomes with a 750mm supplied facade zone in addition to 6% architectural articulation.

OPTION 1:

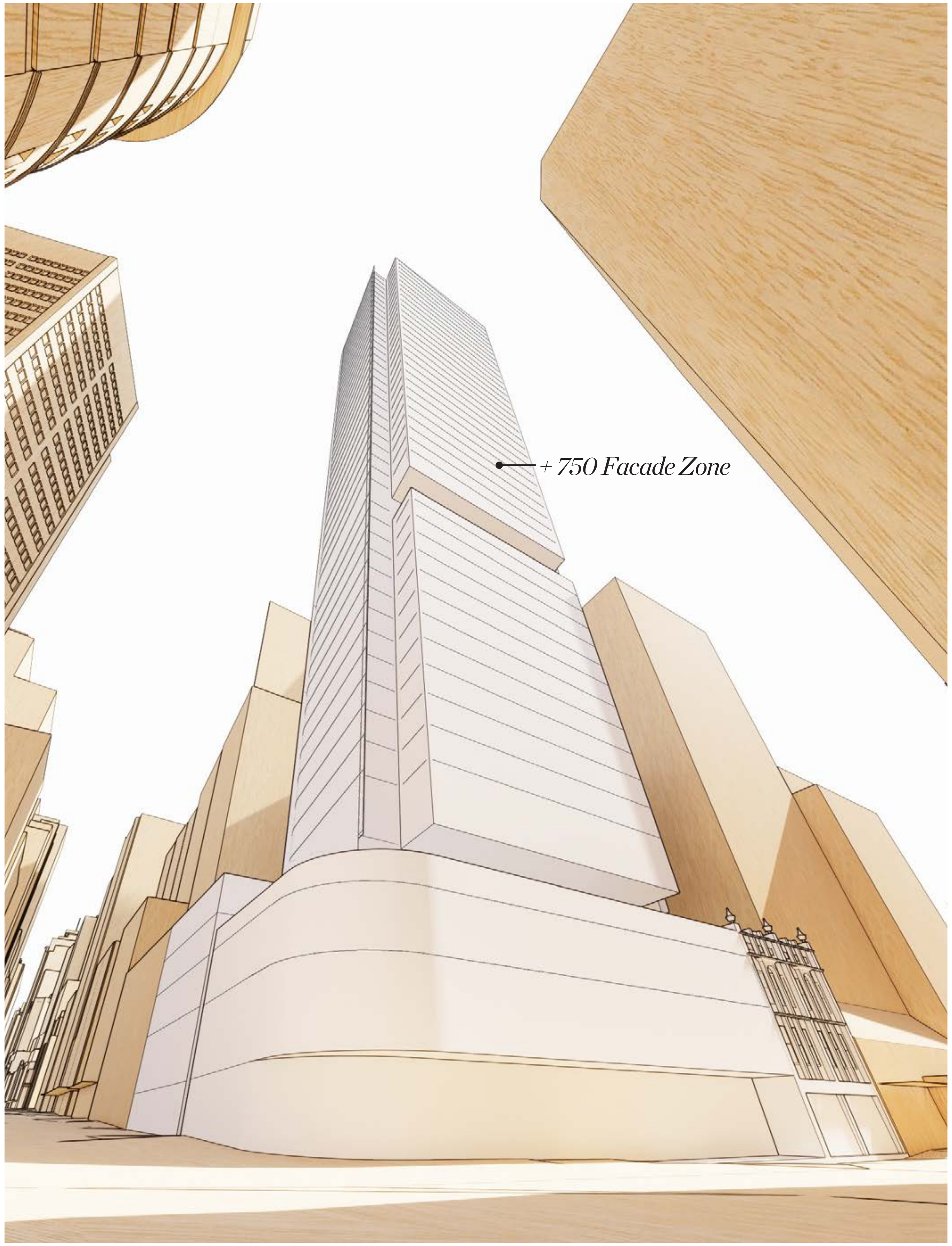
750mm Facade Zone to North

Closed Cavity facade to East, West and South

Balance of Architectural Articulation plus Facade Zone equates to the same overall GFA as other options.



OPTION 1 - TYPICAL PLAN

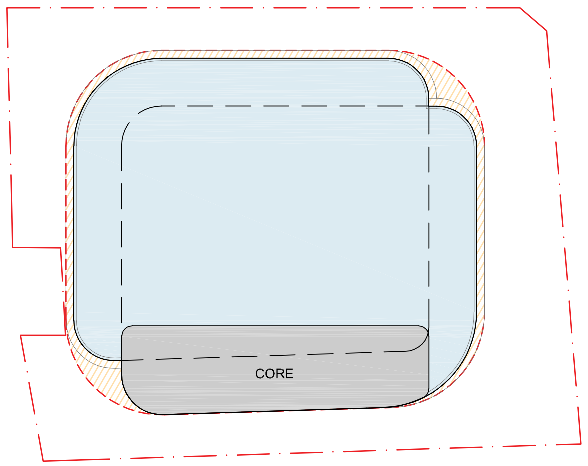


OPTION 1
Orthogonal corners

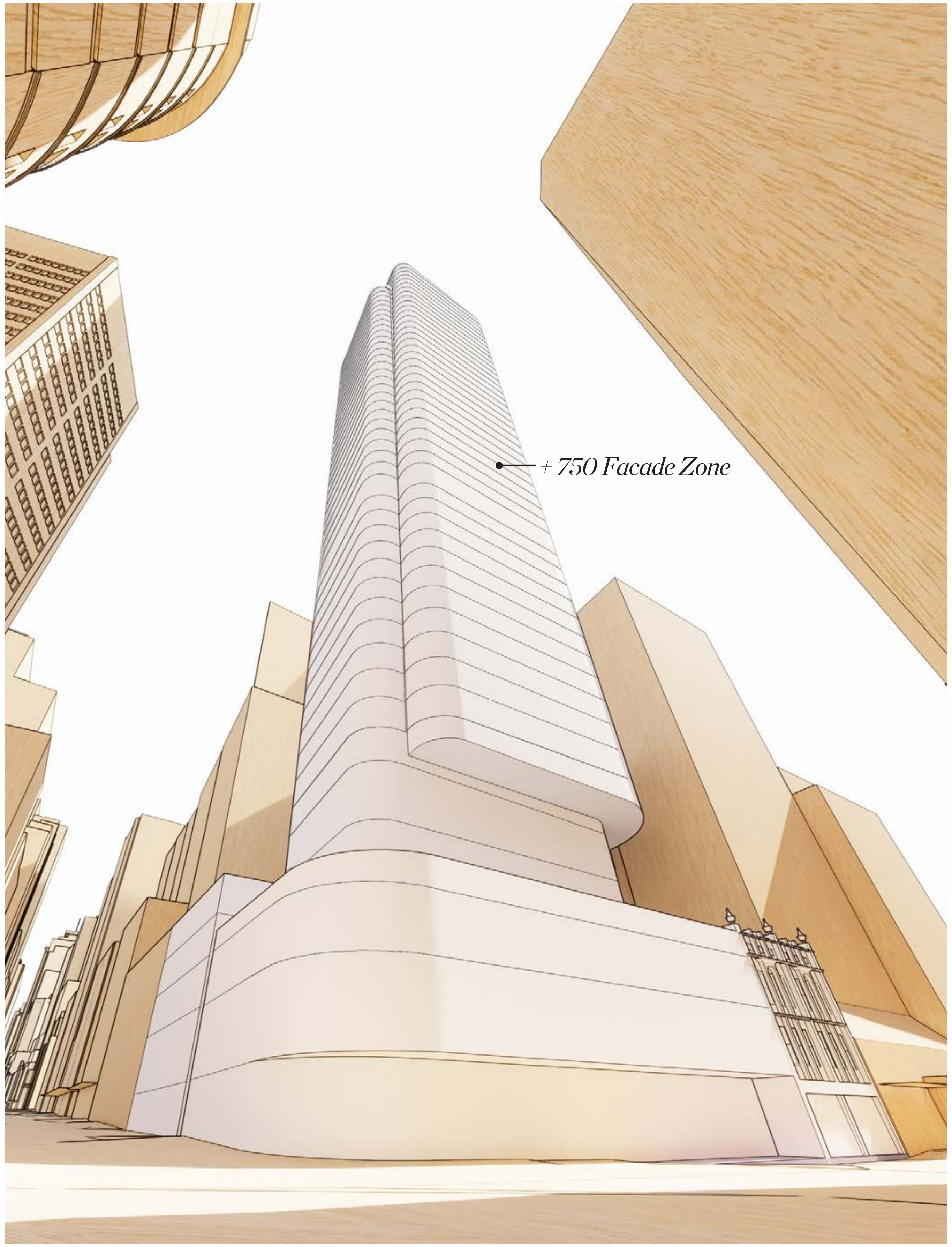
OPTION 2:

750mm Facade Zone to North, East, and West

+ 6% of GEA for Architectural Articulation



OPTION 2 - TYPICAL PLAN

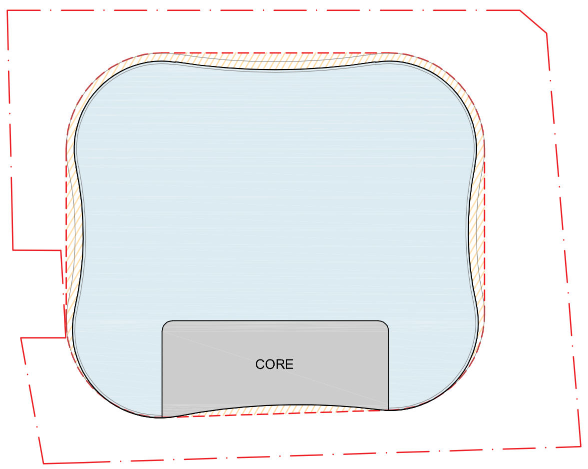


OPTION 2
Interlocking Volumes

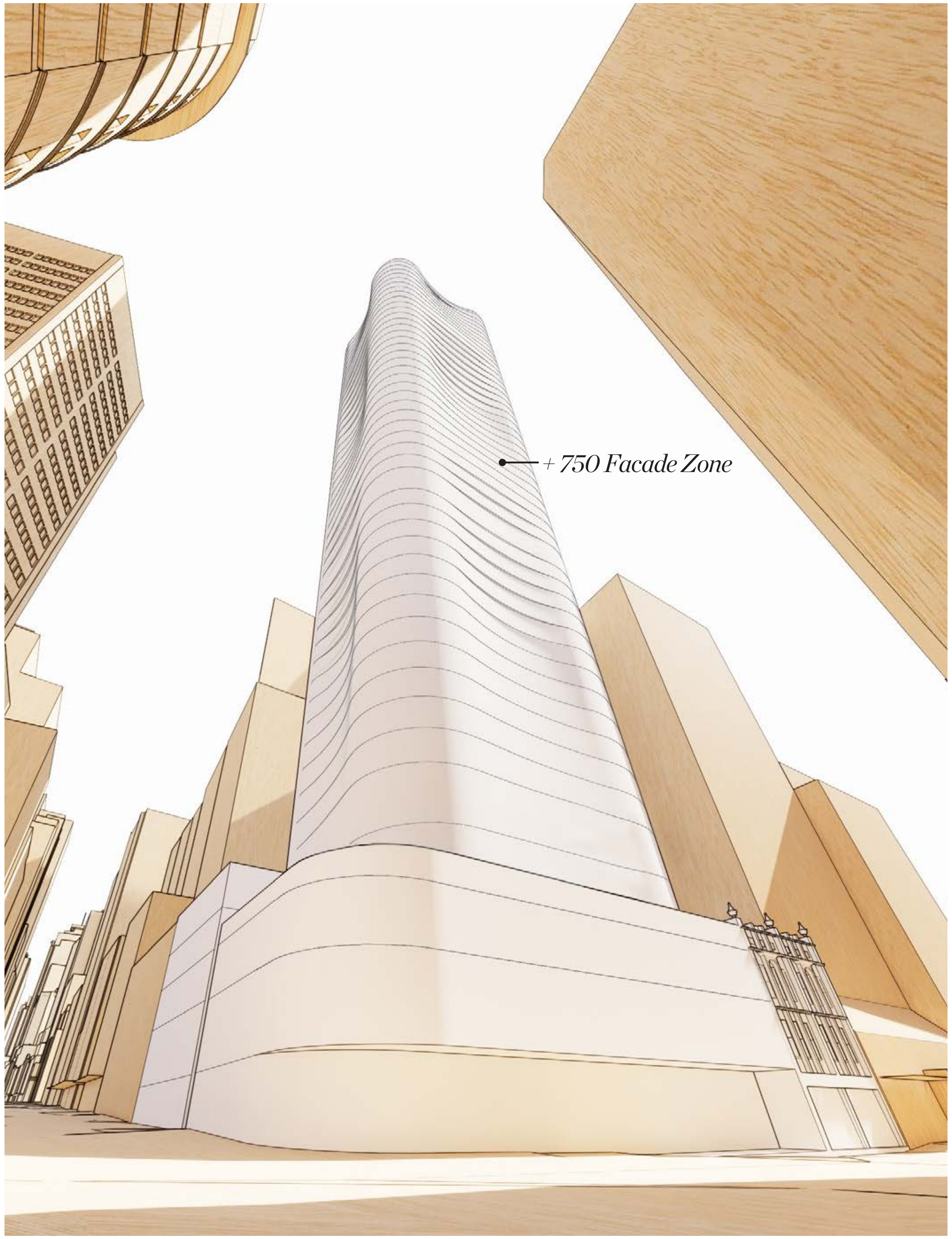
OPTION 3:

750mm Facade Zone to North, East, and West

+ 6% of GEA for Architectural Articulation



OPTION 3 - TYPICAL PLAN

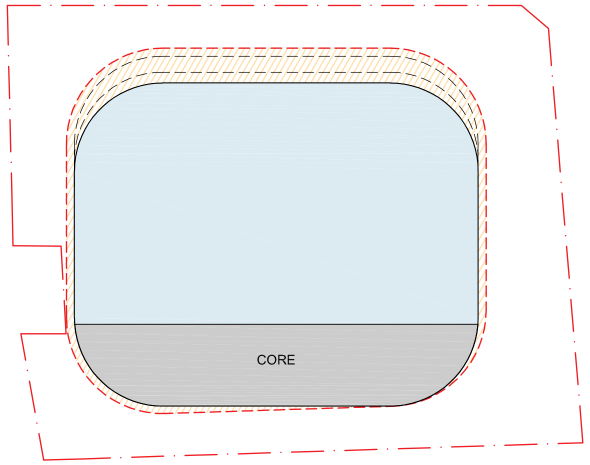


OPTION 3
Undulating

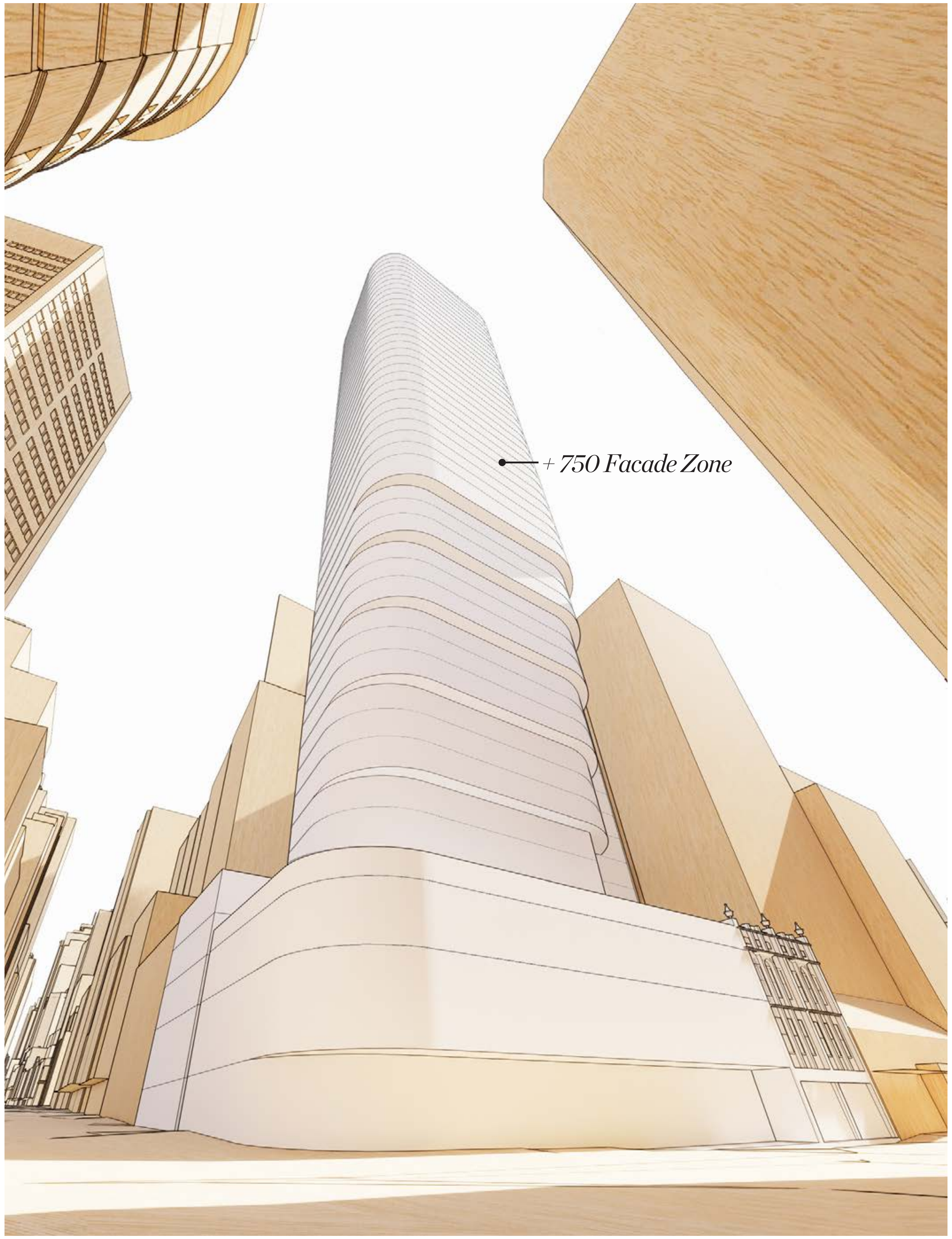
OPTION 4:

750mm Facade Zone to North, East, and West

+ 6% of GEA for Architectural Articulation



OPTION 4 - TYPICAL PLAN

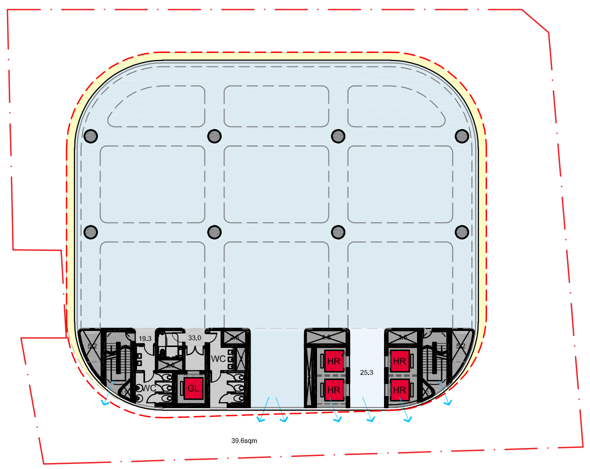


OPTION 4
Tapers at bottom

REFERENCE DESIGN:

750mm Facade Zone to North, East, and West

+ 6% of GEA for Architectural Articulation



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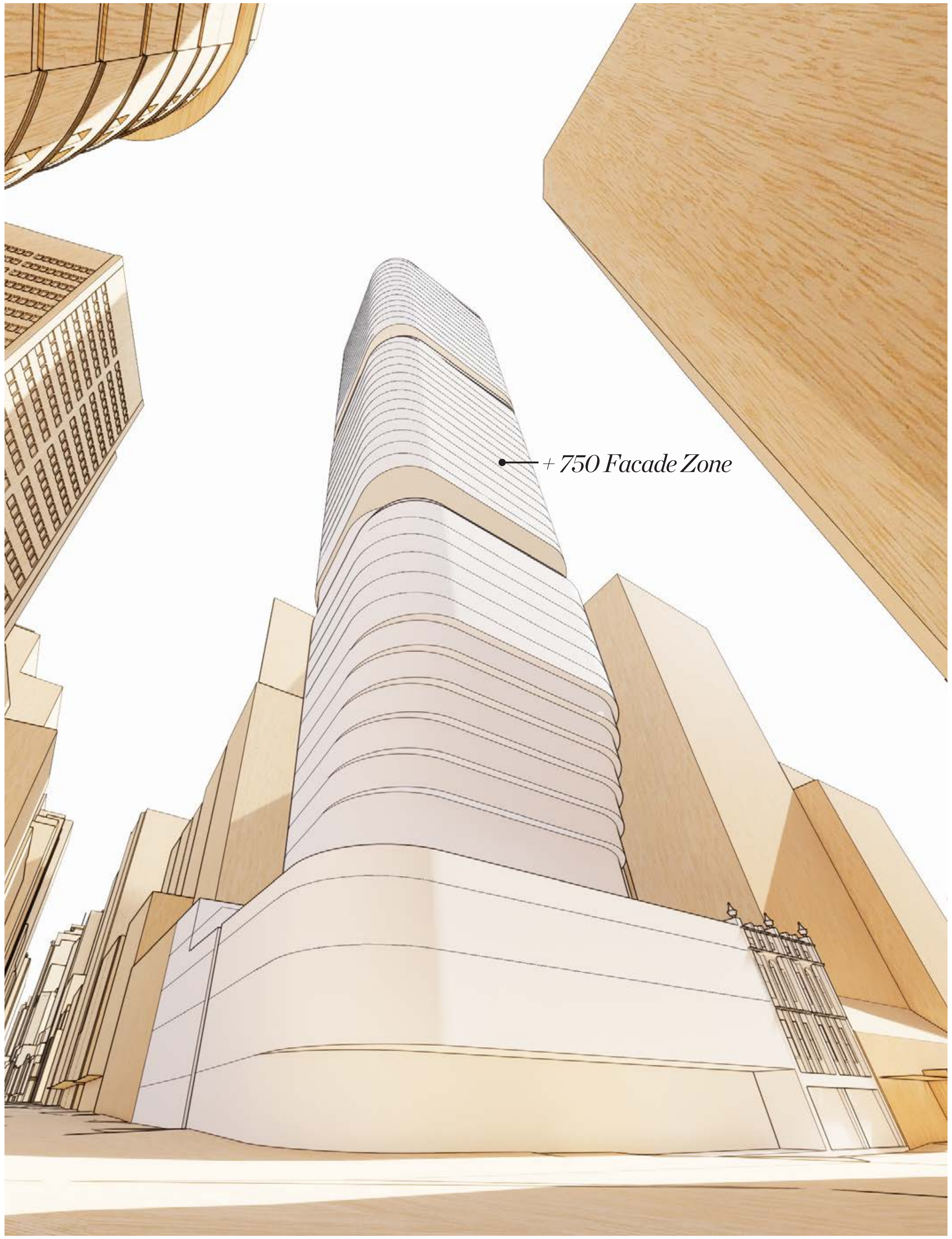


REFERENCE DESIGN
Stacked Volumes

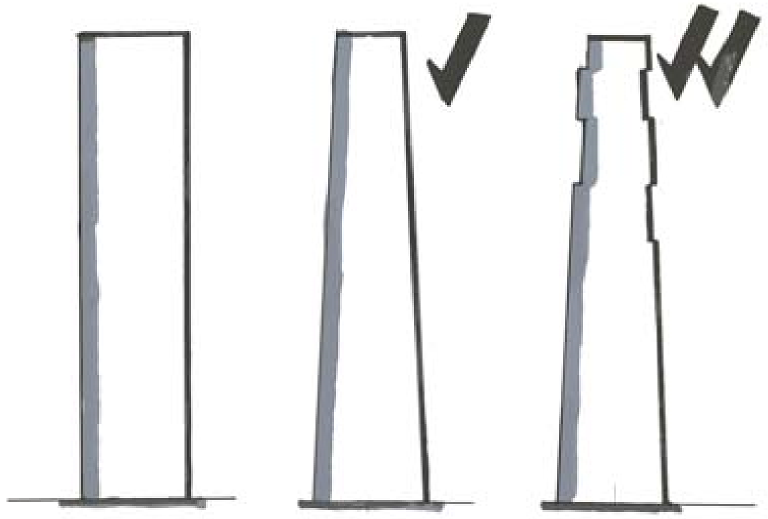
10.2 Tall Towers

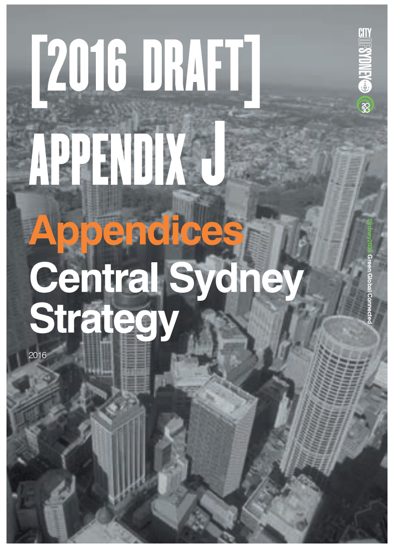
Effect of Tower Shape

The plan shape of a tower will greatly influence the wind loading to be resist well as the dynamic response and accelerations. Below presents in very sim terms the relative 'drag factors' for different shapes. As a general rule:-

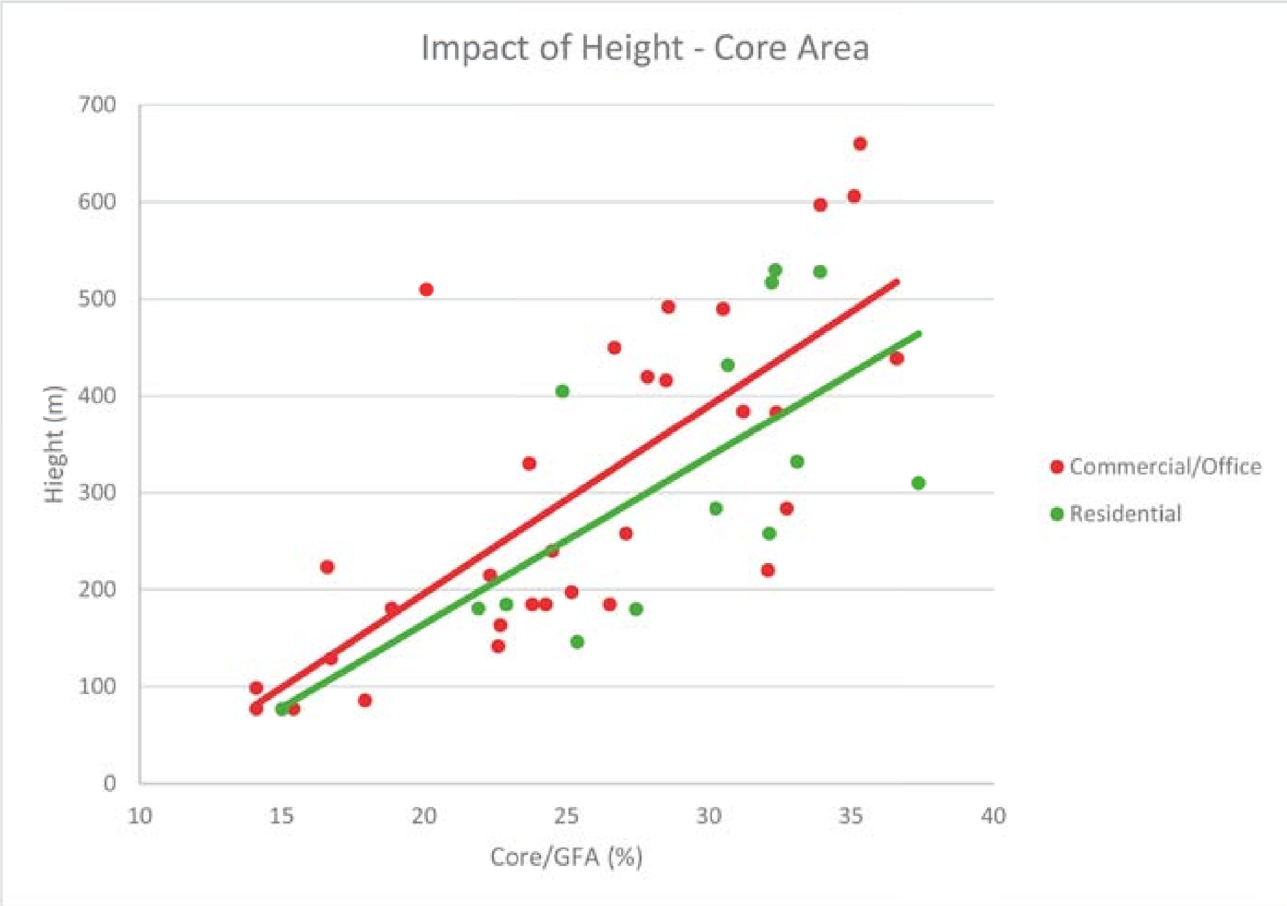
- A square shape is not ideal
- Sharp corners are best avoided.
- Chamfered or rounded corners greatly reduce wind loading.
- Overall rounded forms typically behave better.

The shape of a tower in elevation is also a factor in influencing its performance under wind. In the case of tall towers, or towers with high slenderness, departure from a pure extruded form can greatly improve the dynamic response by 'confusing the wind' and reducing the effects of vortex shedding. A gentle taper over the height of the building is effective in this respect, or as an extreme, a non symmetric elevational profile. The worlds tallest tower, the Burj Khalifa in Duba uses this latter effect to benefit the performance of the tower and the comfort of occupants within.





Source: Central Sydney Palnning Strategy prepared by The City of Sydney



The above data comes from Arups database on towers in Asia. It comprises a range of structural systems (influenced by height) and also includes mixed use towers. The core area shown is that for the low levels of the tower, as opposed to that in the higher levels where the lifts 'drop-off' and core sizes typically reduce.

Cores Sizes

The size of cores for tall buildings vary significantly depending on the approach to vertical transportation, escape stairs and how the building is serviced. While the core will typically make a significant contribution to the strength and stiffness of the tower, invariably its size is dictated by the space requirements of the services and egress provision within. Indicative breakdown of services within the core for high rise commercial tower are as follows:

	Approx Percentage of floor plate area	Approx percentage of core Area
Building Services	3.5%	10.5%
Fire stair	2.0 %	7%
Lifts	10.5 %	35%
Lobbies	8 %	24%
WCs	2.5 %	8%
Total	26.5 %	85%

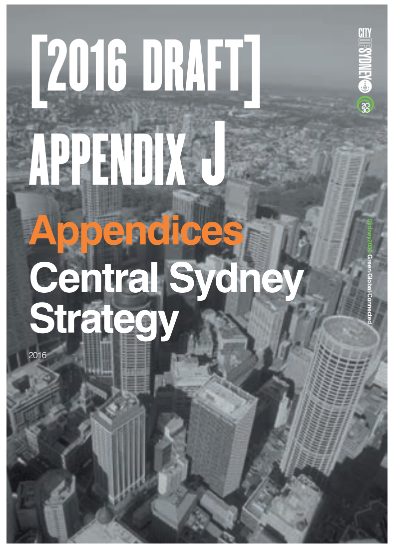
The figures above exclude the 'structure' of the core. It is for this reason that the total is 85%. The residual area making up the core can be considered as stricture and miscellaneous.

Plant floors

Typically there will be a plantroom every twenty (20) to twenty eight (28) floors. Plant floors will typically be between 5.5m and 6.0m floor to floor. Total building services plant requirement will be between 9.5 and 10.0% of gross floor area (GFA). Depending on the specifics of the design, there could be two plant floor levels at 20-28 storey intervals, and it may be that the floor to floor height matches that of the typical floors (for reasons of external aesthetics).

External skin allowances

For typical towers NLA is measured to the inside face of the glazing. Overall glazing thickness is typically 30mm for a high rise tower.



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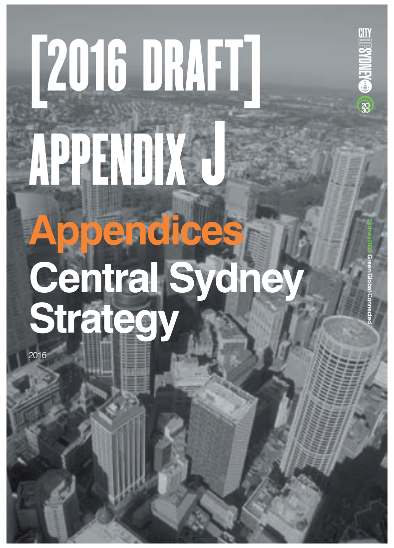


Source: Central Sydney Palnning Strategy prepared by The City of Sydney

Tall Buildings | The Implications of Increasing Height

Impact of height

Typical Building Services Systems

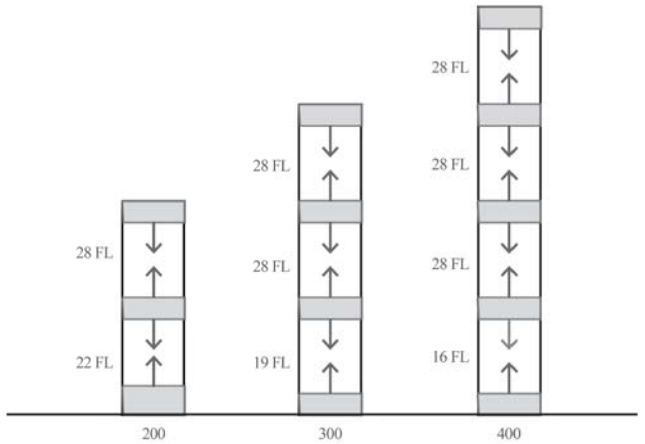
Mechanical

Key issues in the consideration of mechanical systems:

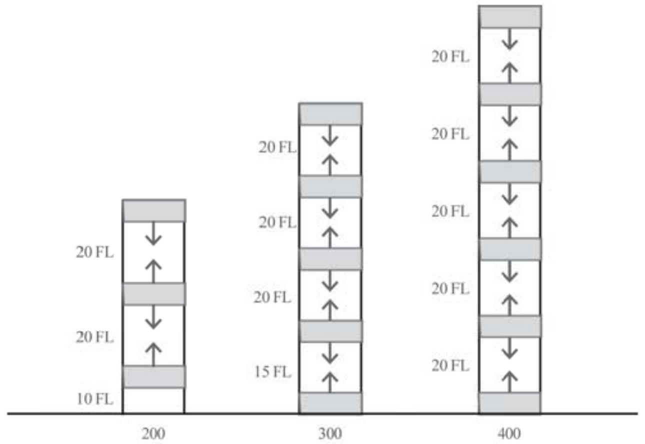
- Air verses chilled water circulation
- Central plant
- Efficiency of risers sizing
- Stack Effect issues.
- Environmental impact on the design.
- Plant replacement and maintenance.
- Tenant plant flexibility.

Mechanical Plant (Commercial Buildings)

Taller buildings are more energy intensive and require more power the taller the building becomes. The graphs on the right show the typical floor area requirements for different mechanical systems. One is all water system (eg. chilled beam approach) where as the other is all air without water on the office floors (eg. Variable Air Volume (VAV) approach).



AHU Distribution (Chilled Beam)
Maximum 14 Floors per AHU Plant

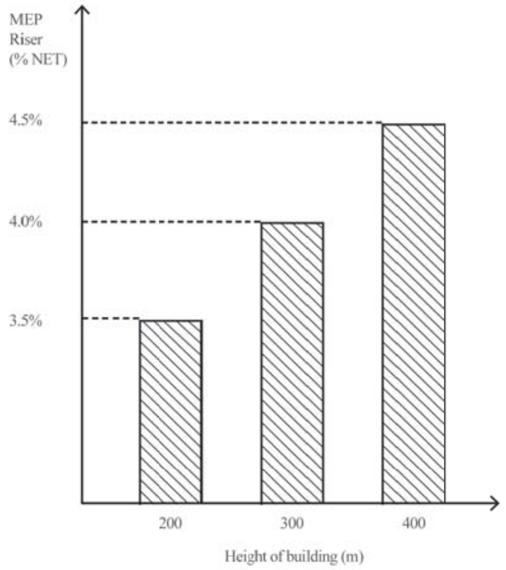


AHU Distribution (VAV)
Maximum 10 floors per AHU Plant

Vertical Risers

Typically as follows:

1. Mechanical Air - No variation with height assuming distributed plant.
2. Mechanical Water - Negligible difference albeit minor penalty due to hydraulic break.
3. Electrical - Penalty with height to reticulate HV up the building and communications.
4. Fire Services and Hydraulics - Penalty with height for multiple rising mains.



Total typical area of risers as a percentage of floor area.

Tall Buildings | The Implications of Increasing Height

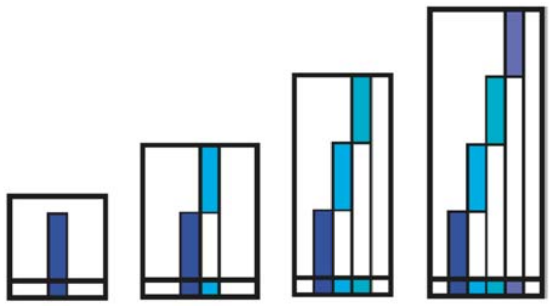
Impact of height

Design Arrangements (Stacking)

As towers increase in height, the vertical transportation design must respond to achieve the required performance and enable the seamless flow of tenants and visitors throughout the building.

While increasing the number, size and speed of elevators is possible, there comes a point where this is no longer an effective design strategy in order to maintain the floor plate efficiencies required to make a development viable. At this point the design of vertical transportation systems must adopt design strategies and equipment technologies different to those the Sydney market may be familiar with.

To maximise floor plate efficiencies elevators are arranged in groups. Subject to the number of elevators in each group (low, mid, high rise etc) the below stacking arrangements are typical.



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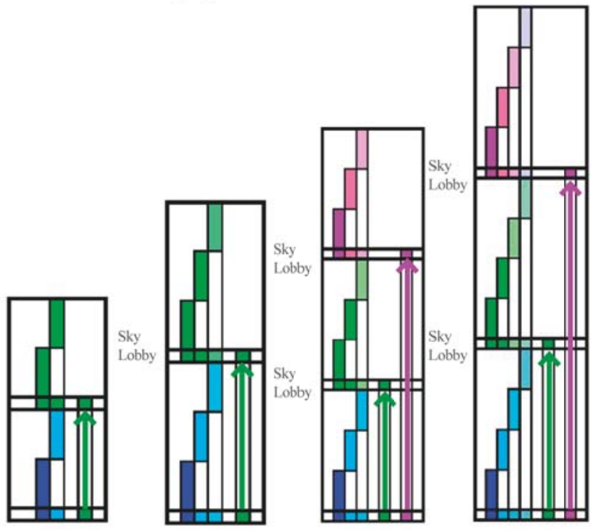
As commercial towers increase in height or where mixed use towers are being developed, sky lobbies can be introduced as depicted below. Sky lobbies require the use of shuttle elevators to transport passengers to the sky lobby where they transfer to local elevator groups.



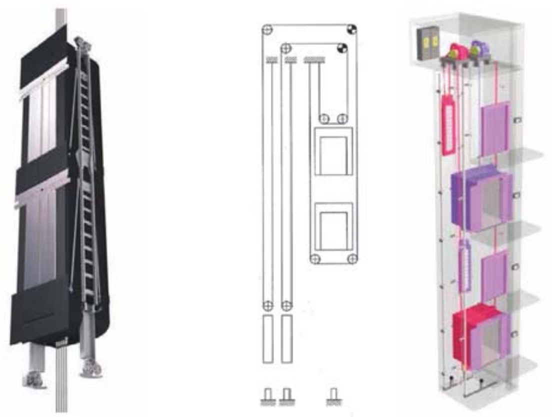
Sky lobbies can provide a number of design benefits to the development such as:

- Increased core efficiency by stacking "local passenger elevators" atop each other.
- Ability to quickly transport a large percentage of the buildings occupants.
- A location for social amenity particularly in residential towers where a local township can be created.
- A line of security between commercial, residential & hotel components of mixed use developments.
- In comparison to a conventional single deck system with all elevators serving from the ground floor, sky lobbies can reduce the core size by up to 25%.

Equiptment Technology

As towers increase in height, it is necessary to consider the use of various equipment technologies to achieve the required performance levels. There are several equipment technologies that have been specifically developed to maximise the handling capacity of each elevator shaft. These include:

- Multi-car systems (Double Deck and TWIN Elevators)
- Destination Control Service



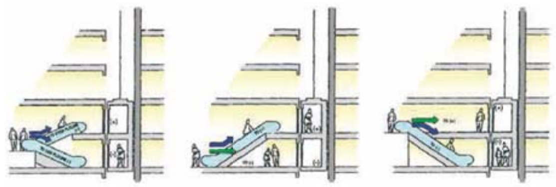
Double Deck elevators comprise two permanently connected passenger cars, positioned one above the other and connected to a common suspension and drive system. The upper and lower decks are therefore limited to serving two adjacent floors simultaneously.

The Twin system is unique to ThyssenKrupp and has 2 elevator cars running independently in the same elevator shaft. Each car has its own ropes, counterweight, safety, control and drive equipment while sharing common guide rails and landing entrance doors.

Multi-car elevator systems have been specifically developed to increase the handling capacity of each elevator shaft. This in turn provides the opportunity to reduce the overall number of elevator shafts while achieving comparable levels of service to a traditional single deck system.

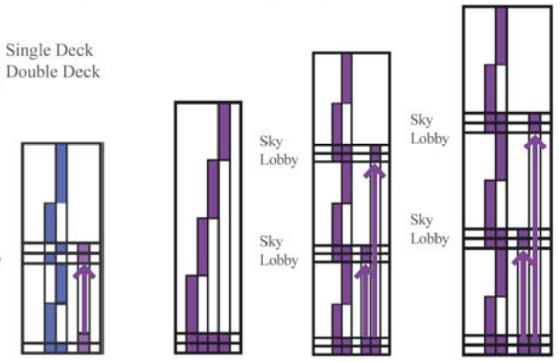
There are a number of similarities between Double Deck and TWIN elevator systems, with the most important being:

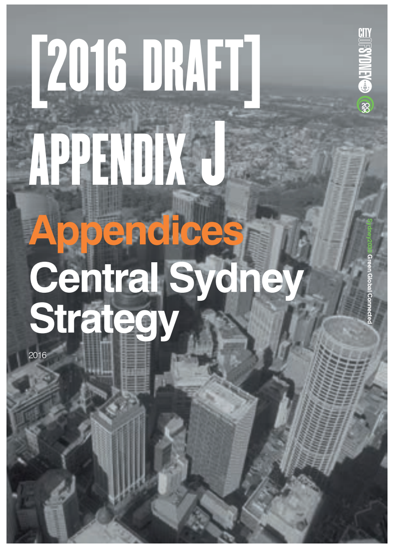
- Both require Destination Control Service to maximise efficiencies. On Double Deck elevators, DCS is used to minimise non-coincidental calls and on Twin to maintain safe operational distances between elevator cars;



- Both require dual lobby loading to allow the upper and lower cars to load simultaneously;
- Increase handling capacity of each elevator shaft;
- Fewer elevator shafts;
- In comparison to a conventional single deck system with all elevators serving from the ground floor, the use of multicar elevator systems combined with sky lobbies can reduce the core size by up to 35%.

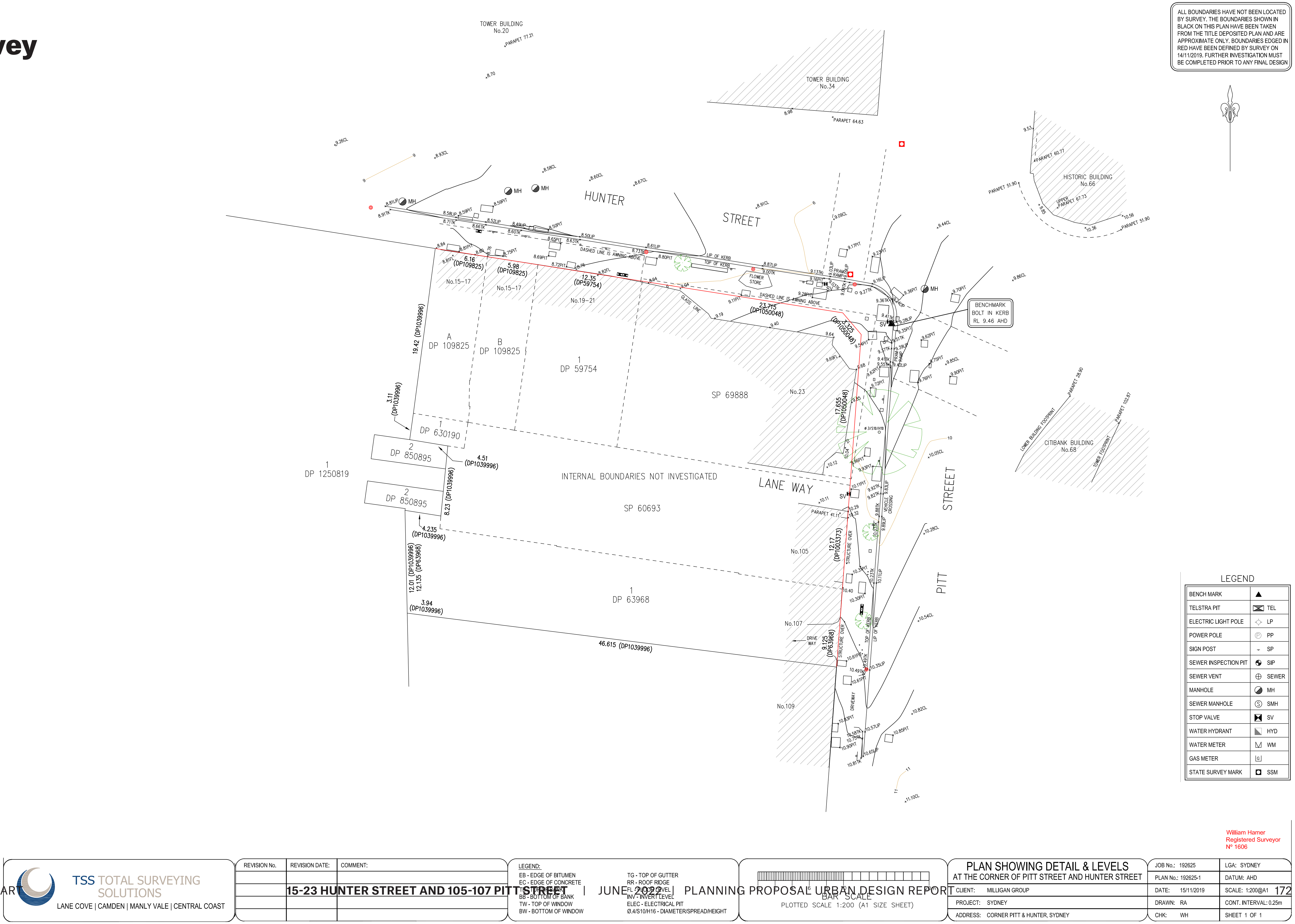
When considering a multi-car vertical transportation system in conjunction with the use of sky lobbies the below stacking arrangements are made possible.





Source: Central Sydney Palnning Strategy prepared by The City of Sydney

10.3 Survey


ALL BOUNDARIES HAVE NOT BEEN LOCATED BY SURVEY. THE BOUNDARIES SHOWN IN BLACK ON THIS PLAN HAVE BEEN TAKEN FROM THE TITLE DEPOSITED PLAN AND ARE APPROXIMATE ONLY. BOUNDARIES EDGED IN RED HAVE BEEN DEFINED BY SURVEY ON 14/11/2019. FURTHER INVESTIGATION MUST BE COMPLETED PRIOR TO ANY FINAL DESIGN
TOWER BUILDING No.20
TOWER BUILDING No.34
HISTORIC BUILDING No.66
CITIBANK BUILDING No.68
HUNTER STREET
PITT STREET
LANE WAY
BENCHMARK BOLT IN KERB RL 9.46 AHD
A DP 109825
B DP 109825
1 DP 59754
SP 69888
1 DP 630190
2 DP 850895
1 DP 1250819
INTERNAL BOUNDARIES NOT INVESTIGATED
SP 60693
1 DP 63968
No.15-17
No.19-21
No.23
No.105
No.107
No.109
46.615 (DP1039996)
LEGEND
BENCH MARK
TELSTRA PIT TEL
ELECTRIC LIGHT POLE LP
POWER POLE PP
SIGN POST SP
SEWER INSPECTION PIT SIP
SEWER VENT SEWER
MANHOLE MH
SEWER MANHOLE SMH
STOP VALVE SV
WATER HYDRANT HYD
WATER METER WM
GAS METER
STATE SURVEY MARK SSM
William Hamer
Registered Surveyor
Nº 1606
TSS TOTAL SURVEYING SOLUTIONS
LANE COVE | CAMDEN | MANLY VALE | CENTRAL COAST
REVISION No.
REVISION DATE:
COMMENT:
LEGEND:
EB - EDGE OF BITUMEN
EC - EDGE OF CONCRETE
BB - BOTTOM OF BANK
TW - TOP OF WINDOW
BW - BOTTOM OF WINDOW
TG - TOP OF GUTTER
RR - ROOF RIDGE
INV - INVERT LEVEL
ELEC - ELECTRICAL PIT
Ø.4/S10/H16 - DIAMETER/SPREAD/HEIGHT
BAR SCALE
PLOTTED SCALE 1:200 (A1 SIZE SHEET)
PLAN SHOWING DETAIL & LEVELS
AT THE CORNER OF PITT STREET AND HUNTER STREET
CLIENT: MILLIGAN GROUP
PROJECT: SYDNEY
ADDRESS: CORNER PITT & HUNTER, SYDNEY
JOB No.: 192625
PLAN No.: 192625-1
DATE: 15/11/2019
DRAWN: RA
CHK: WH
LGA: SYDNEY
DATUM: AHD
SCALE: 1:200@A1
CONT. INTERVAL: 0.25m
SHEET 1 OF 1