Level 28, 200 George Street
Sydney NSW 2000
Australia

T +61 2 9080 8000
www.mirvac.com

25 September 2020

The General Manager
Willoughby City Council
PO Box 57
Chatswood NSW 2057

Attention: Ms Norma Shankie-Williams - Strategic Planning Team Leader

Dear Norma,

RE: Planning Proposal for 45 Victor Street and 410-416 Victoria Avenue, Chatswood (Council reference number: PP-2016/7)

Thank you for the opportunity to submit a revised planning proposal for 45 Victor Street and 410-416 Victoria Avenue, Chatswood (Site).

The revised planning proposal represents the result of a significant amount of market and urban design analysis, in response to feedback and detailed consultation with Council and DPIE, as well as the desired Chatswood CBD Strategy and other supporting studies.

We are pleased to submit a revised planning proposal which will enable the construction of the third-largest commercial building in Chatswood (source: JLL). If endorsed, it will represent the highest delivery of new office space since 1995. Specifically, the revised planning proposal allows for:

- renewal of significant, yet currently redundant and underutilised sites located less than 50m from the entrance to the Chatswood Transport Interchange;
- over 18,000sqm of new commercial and retail GFA, with the potential to provide in excess of 1,500 new permanent jobs in the heart of the Chatswood CBD;
- estimated 550 construction and 85 professional jobs during construction;
- a new, highly activated ground plane with active frontages to Victoria Avenue, Victor Street and Post Office Lane;
- upgrade and embellishment of the existing poor-quality Post Office Lane to improve activation, safety, pedestrian amenity, and accessibility to and from the Chatswood Transport Interchange;
- 4% affordable housing unit contribution in accordance with Council's current requirements; and
- the delivery of new residential accommodation within a highly connected and active area of the Chatswood CBD.

The revised Planning Proposal presents a rare opportunity for Council to secure the renewal of this important Site and enable the delivery of a significant number of permanent jobs in the Chatswood CBD.

As the revised Planning Proposal was completed prior to endorsement of the Chatswood CBD Strategy, we take this opportunity to provide a summary table attached, addressing all key elements of the Chatswood CBD Strategy as endorsed. This document forms part of the revised Planning Proposal submission.

We look forward to working with Council to progress this exciting opportunity.

Yours sincerely,

Adrian Checchin
Development Director

Mirvac Limited
ABN 92 003 280 699

Mirvac Funds Limited
ABN 70 002 561 640
AFSL 233121
Responsible Entity for Mirvac Property Trust
ARSN 086 780 645

Mirvac Real Estate Pty Ltd
ABN 65 003 342 452

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Annexure A to Covering Letter – Updated CBD Strategy Compliance Table

Endorsed Planning and Urban Design Strategy to 2036 (September 2020)

Achieving the Vision and Objectives

3	Item	Measures and Controls	Response
3.1	**CBD boundary** **Land Use**	1. The Chatswood CBD boundary is expanded to the north and south to accommodate future growth of the centre 2. Land uses in the LEP will be amended as shown in Figure 3.1.2, to: a) Protect the CBD core around the interchange as commercial, permitting retail throughout to promote employment opportunities b) Enable other areas to be mixed use permitting commercial and residential 3. The existing DCP limits on office and retail use in parts of the commercial core to be removed 4. Serviced apartments to be removed as a permissible use from the B3 Commercial Core zone	The proposal seeks to deliver 18,736sqm GFA of high quality A-Grade commercial and retail space equating to an FSR of approximately 8:1. In order to be able to provide that quantum of non-residential space, private residential apartments are also proposed to maintain a rich and diverse mix of uses in line with Council's vision. Serviced apartments are not proposed.
	Planning Agreements to Fund Public Domain	5. Planning Agreements will be negotiated to fund public domain improvements. 6. A new planning Agreements Policy will apply and be linked to a contributions scheme that will provide the public and social infrastructure in the Chatswood CBD necessary to support an increased working and residential population. 7. All developments in Chatswood CBD should contribute public art in accordance with Council's Public Art Policy.	Public benefits are proposed to be negotiated with Council as part of the Planning Proposal process in accordance with DPIE guidelines. Section 5.10 of the Planning Proposal Report outlines the items proposed to be entered into by the applicant.
	Design Excellence and Building Sustainability	8. Design excellence is to be required for all developments based on the following process: a) A Design Review Panel for developments up to 35m high b) Competitive designs for development over 35m high 9. Achievement of design excellence will include achievement of higher building sustainability standards 10. The Architects for design excellence schemes should be maintained through the development application process and can only be substituted with written agreement of Council	The proposal is proposed to achieve design excellence. Please refer to the Planning Proposal Report for further details.
	Floor Space Ratio (FSR)	11. Figure 3.1.3 shows the existing FSR controls under WLEP 2012. 12. Minimum site area of: a) 1800sqm for commercial development in the B3 Commercial Core zone b) 1200sqm for mixed use development in the B4 Mixed Use zone To achieve maximum FSR as indicated in Figure 3.1.4. Site amalgamation is encouraged to meet this minimum requirement. In addition sites should not be left isolated. The objective of this Key Element is to enable a site to be redeveloped to achieve an optimum outcome as envisioned under the Strategy and detailed in the other Key Elements. In particular to enable: a) Provision of required setbacks to achieve slender towers and building separation whether on-site or with neighbouring sites. b) Provision of ground level public realm or areas accessible by public on private land. c) Appropriate vehicle entry / exit point. d) Provision of parking and loading in basement with adequate on-site manoeuvrability. e) Maximising commercial floor space and street activation at ground level. f) Maximising landscaping and deep soil planting. 13. The FSRs in Figure 3.1.4 (page 34), should be considered as maximums achievable in the centre subject to minimum site area and appropriate contributions, and are as follows: a) No maximum FSR for commercial development in the B3 zone b) A range of FSR maximums in the B4 zone, surrounding the B3 zone, reflecting context. c) Retention of 2.5:1 FSR along northern side of Victoria Avenue east. 14. Affordable housing is to be provided within the maximum floor space ratio, and throughout a development rather than in a cluster 15. Where the maximum floor space ratio of 6:1 is achieved the minimum commercial floor space ratio sought in development in a mixed use zone is 1:1. The objective of this Key Element is to achieve a satisfactory level of commercial in the B4 mixed Use zone to deliver a reasonable amount of employment floor space, typically to within the podium levels of a development. This will be moderated depending on the overall FSR.	As encouraged, the amalgamation of two sites results in a site area greater than 1800sqm. This helps achieve the following: • A podium with setbacks to a slender tower form • Enhancement of the public realm with the reactivation of Post Office Lane. • Consolidation of appropriate vehicle access. • Provision of parking and loading in the basement with adequate on-site manoeuvrability • Maximisation of commercial floor space and street activation at ground level • Opportunities for landscaping on podium rooftops and green walls. Proposal FSR's are as follows: 8:1 Commercial, Retail 12:1 Residential Any affordable housing will be distributed throughout the development as required.

	Built Form	16. In order to achieve the slender tower forms sought by Council the maximum floor plate at each level of a development should be no more than: a) 2000sqm GFA for office (to achieve this maximum a large site would be required) b) 700sqm GFA for residential towers above Podium within Mixed Use zones 17. In pursuit of the same goal of slender tower forms, the width of each side of any tower should be minimised to satisfactorily address this objective. To the same end, design elements that contribute to building bulk are not supported, and should be minimised. Setbacks are considered an important part of achieving slender tower forms 18. If there is more than one residential tower on a site, sufficient separation is to be provided.	The typical commercial floorplate delivers approximately 1250sqm of GFA or 1100sqm of NLA. The typical residential floor plate will be limited to 870sqm of GFA As per section 6.2 of this report the commercial footprint has aimed to be maximised in size to meet the market's requirements working in the confines of the site. Council's draft strategy for the B4 mixed use zone suggests a maximum floor plate size of 700sqm GFA for residential buildings in order to achieve a slender tower form. The draft strategy for this zone, however, anticipates a maximum height of 90 metres. At approximately 168 metres high with an 870sqm floorplate, the proposal delivers a proportionally more slender outcome. The height and slenderness of the proposed tower is also consistent with the size and scale of the nearby Metro towers to the west. An indicative building envelope is proposed for the residential floor plate to allow design flexibility in the design excellence process. The envelope nominates setbacks and allows the opportunity for a residential floorplate of a maximum of 870sqm GFA to be configured in a range of ways subject to the design objectives of the architect.
	Sun Access to Key Public Spaces	19. No additional overshadowing and protection in mid winter of: a) Victoria Avenue (between interchange and Archer St) 12pm-2pm b) Concourse Open Space 12pm-2pm c) Garden of Remembrance 12pm-2pm d) Tennis and croquet club 12pm-2pm e) Chatswood Oval 11am-2pm (which in turn also protects Chatswood Park) In addition, f) Heights adjoining the South Chatswood Conservation Area will provide for a minimum 3 hours solar access between 9am and 3pm mid winter.	The proposal satisfies all requirements of the endorsed Strategy
	Building Heights	20. Maximum height of buildings in the CBD will be based on Figure 3.1.6, based on context and up to the airspace limits (Pans Ops plane), except as reduced further to meet: a) Sun access protection. Achievement of nominated height maximums will depend on addressing site constraints, surrounding context and other aspects of this Strategy in addition to satisfying SEPP 65 and Apartment Design Guidelines. 21. All structures located at roof top level, including lift over runs and any other architectural features are to be: a) Within the height maximums b) Integrated into the overall building form	The proposal satisfies all suggested building height requirements.
	Links and Open Space	22. The links and open space plan in Figure 3.1.7 will form part of the DCP. All proposals should have regard to the potential on adjacent sites. Pedestrian and cycling linkages will be sought in order to improve existing access within and through the CBD. New linkages may also be sought where these are considered to be of public benefit. All such links should be provided with public rights of access and designed with adequate width, sympathetic landscaping and passive surveillance. 23. Any communal open space, with particular regard to roof top level on towers, should be designed to address issues of quality, safety and usability	The proposal provides and enhances a strong pedestrian link to the station with the reimagination of Post Office Lane. The proposal provides a north-facing sunny green roof on top of the podium overlooking Victoria Avenue and also at the first residential level above the commercial levels where the tower sets back. Soft landscaping opportunities exist on the podium roof, stepped terraces at the top of the building and within the Laneway portal space marking the entry to Post Office Lane. Refer to Section 6.3 for further detail.

	Public Realm or Areas Accessible by Public on Private Land	24. Public realm or areas accessible by public on private land: a) Is expected from all B3 and B4 redeveloped sites. b) Is to be designed to respond to context and nearby public domain. c) Should be visible from the street and easily accessible. d) Depending on context, is to be accompanied by public rights of way or similar to achieve a permanent public benefit.	The proposal facilitates public access through the site with the reactivation and retainment of existing alignment of Post Office Lane.
	Landscaping	25. All roofs up to 30 metres from ground are to be green roofs. These are to provide a green contribution to the street and a balance of passive and active green spaces that maximise solar access. 26. A minimum of 20% of the site is to be provided as soft landscaping, which may be located on Ground, Podium and roof top levels or green walls of buildings	The existing sites are built to their respective boundaries and contain no soft landscaping. The proposal provides the opportunity for improved soft landscaping through provision of a number of roof top terraces which are available for use as accessible green spaces. Refer to Section 6.3 of the Design Report for further detail.
	Setbacks and Street Frontage Heights	27. Setbacks and street frontage heights are to be provided based on Figure 3.1.8, which reflect requirements for different parts of the Chatswood CBD. With setbacks of 3 metres or more, including the Pacific Highway, deep soil planting for street trees is to be provided. a) Victoria Avenue retail frontage i. Maximum of 7 metre street wall height at front boundary ii. Minimum 6 metre setback above street wall to tower b) Urban Core i. Maximum 24 metre wall height at front boundary ii. Minimum 6 metre setback above street wall to tower 28. All towers above podiums in the B3 Commercial core and B4 mixed Use zones are to be setback from all boundaries a minimum of 1:20 ratio of the setback to building height This means if a building is: a) A total height of 30m, a minimum setback from the side boundary of 1.5m is required for the entire tower on any side b) A total height of 60m, a minimum setback from the side boundary of 3m is required for the entire tower on any side. c) A total height of 90m, a minimum setback from the side boundary of 4.5m is required for the entire tower on any side d) A total height of 120m, a minimum setback from the side boundary of 6m is required for the entire tower on any side. e) A total height of 150m, a minimum setback from the side boundary of 7.5m is required for the entire tower on any side f) A total height of 160m, a minimum setback from the side boundary of 8m is required for the entire tower on any side. The required setback will vary depending on height and is not based on setback averages but the full setback. 29. Building separation to neighbouring buildings is to be: a) In accordance with the Apartment Design Guide for residential uses b) A minimum of 6 metres from all boundaries for commercial uses above street wall height	Street frontage heights and setbacks generally align with Councils objectives though some departures are proposed in order to facilitate a commercial component that is more optimal in terms of meeting the markets requirements. The tower is approximately 168 metres high with setbacks ranging from 0 to 12 metres from site boundaries, consistent with site-specific design considerations. Refer to Section 6.2 of the Design Report for further detail
	Active Street Frontages	30. At ground level, to achieve the vibrant CBD Council desires, buildings are to maximise street frontages. Particular emphasis is placed on the B3 Commercial core zone. Blank walls are to be minimised and located away from key street locations	By amalgamating two sites the opportunity exists to minimise the extent of 'non-active' uses such as vehicle entries and building services by consolidating them into one larger site. As such, the proposal delivers active street frontages for the majority of the site curtilage in a way that far exceeds that of the existing buildings on the sites. In addition the proposal reinvigorates Post Office Lane with opportunities for fine grain retail that will create a vibrant environment in what is currently a nondescript rear lane. A high level of activation to all frontages is evident within the proposal.
	Further Built Form Controls	31. Site isolation will be discouraged and where unavoidable joined basements and zero-setback podiums should be provided to encourage future efficient sharing of infrastructure. 32. Controls will be applied to ensure the traditional lot pattern along Victoria Ave east (building widths of between 6-12m) is reflected into the future.	The proposal comprises a zero-setback podium and basement.

		33. Floor space at ground level is to be maximised, with supporting functions such as car parking, loading, garbage rooms, plant and other services located in basement levels. 34. Substations are to be provided within buildings, not within streets, open spaces or setbacks and not facing key active street frontages.	The traditional lot pattern along Victoria Avenue east can be carried through in the ground level retail tenancies and lobbies of the proposal fronting Victoria Avenue. Car Parking, loading, garbage rooms, plant and services are located within the basement and any plant is concealed at ground level behind active uses which form the street frontage.
	Traffic and Transport	35. Site specific traffic and transport issues are to be addressed as follows: a) Vehicle entry points to a site are to be rationalised to minimise street impact, with one entry into and exiting a site. To achieve this objective loading docks, including garbage and residential removal trucks, are to be located within Basement areas. Where possible, cars and service vehicle access should be separated. b) In order to facilitate rationalisation of vehicle entry points on neighbouring sites, all development sites are to provide an opportunity within basement levels to provide vehicle access to adjoining sites when they are developed. c) All vehicles are to enter and exit a site in a forward direction. Physical solutions, rather than mechanical solutions are sought. d) All commercial and residential loading and unloading is required to occur on-site and not in public streets. e) Car parking should be reduced consistent with the objectives of Council's integrated Transport Strategy and in accordance with any future revised car parking rates in Councils DCP. f) Other strategies for car parking reduction include reciprocal arrangements for sharing parking and car share.	Vehicle access is on Victor St at the southern extremity of the site. This minimises potential conflict between vehicles and pedestrians by locating the entry as far as possible from Victoria Avenue. All loading and parking occurs in the basement which occupies the full extent of the site with all vehicles able to enter and exit the site in a forward direction A separate Transport Report has been provided as part of the Planning Proposal. The basement solution is consistent with the endorsed strategy in this regard.

Planning Proposal

45 Victor Street and 410-416 Victoria Avenue, Chatswood

Prepared on behalf of: Mirvac

August 2020

Document control

Authors

Reviewed by	Michael File, Director
Prepared by	Anna Johnston, Associate

Project summary

Applicant	Mirvac
Applicant's address	Level 28, 200 George Street, Sydney
Land to be developed	45 Victor Street and 410-416 Victoria Street, Chatswood
Legal description	Lot 4 DP82303, Lot A and Lot B DP406105, Lot 1 DP569272 and part of Post Office Lane
Project description	Amendment of Willoughby LEP to expand the additional permitted use of shop top housing and allow increased height and FSR

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Executive Summary

Site context

This Planning Proposal seeks to amend the *Willoughby Local Environmental Plan 2012* (Willoughby LEP) and has been prepared by FPD on behalf of Mirvac. The Planning Proposal applies to a 2,297 sqm amalgamated site at the corner of Victor Street and Victoria Avenue, Chatswood comprising 45 Victor Street and 410-416 Victoria Avenue along with intersecting section of Post Office Lane. The amalgamated site provides the potential for a typical floor plate of 1,100sqm net lettable commercial area which whilst acceptable, is at the lower end of the minimum range required to achieve workspace efficiencies for office space required by corporate and government tenants.

The site is located in the B3 Commercial Core zone within the Chatswood CBD and is adjacent to Chatswood Interchange. Shop top housing is currently permissible on the northern part of the site. The site is located on the eastern side of Chatswood Station which has a retail and mixed-use focus, with commercial office uses largely concentrated on the western side of the station. Part of the site and the surrounding area is described by the Willoughby LEP as "Area 5" which allows for shop top housing as an additional permitted use, effectively forming a mixed-use zone to the north, east and west of the site.

Proposal

The Planning Proposal seeks to facilitate renewal of the site for a commercial, retail and residential development. On completion, the commercial office space component would be the first significant development of commercial office space in Chatswood since 1995. It would also be the third largest commercial office development in Chatswood and the largest on the eastern side of the station.

The proposal resides in an iconic location in the heart of the Chatswood retail and commercial precinct. It has been designed to maximise retail activation at the ground floor with generous floor to ceiling heights of minimum 4m on the ground floor, a dramatic minimum 8m high covered portal to Post Office lane and 13 storeys of A-grade commercial office space in the centre of the Victoria Avenue mall.

A concept design scheme comprises a single slender tower and podium which delivers a considered built form response to the location and context, generally consistent with the recommended urban design outcomes from the Chatswood CBD Planning and Urban Design Strategy 2016. The concept design scheme will deliver a total gross floor area (GFA) of 45,940sqm comprising the following:

- 18,376sqm (FSR 8:1) of non-residential GFA (40%) secured through a site specific development control in the Willoughby LEP
- 27,564sqm of residential GFA across the top levels (FSR 12:1) delivering 310 residential apartments with a mix of 1, 2 and 3 bedrooms achieving excellent solar access and outlook.

The proposal has potential to provide for up to up to 1,578 jobs (on completion) based on the commercial and retail floor space delivering up to 25% of the 2036 employment target for the Chatswood Strategic Centre. Further, when combined with other commercial proposals within the Chatswood CBD up to 91% of the jobs target could be achieved should other proposals proceed, within a relatively short timeframe.

The inclusion of the residential component enables Mirvac to put forward the significant 8:1 FSR commercial component enabling the early delivery of the commercial floorspace and will further serve to provide activation of the area across a range of hours adding to the vitality of the surrounding area.

The Planning Proposal is supported by feasibility and market analysis prepared by JLL which indicates that a stand-alone commercial building is not a viable proposition. The proposed mixed use scheme removes the need for a substantial commercial pre-commitment with the residential floor space effectively subsidising the early delivery of the commercial floor space.

This advice is supplemented by CBRE expressing similar views regarding the lack of viability of a significant stand alone commercial development.

Public benefits

The proposal seeks to deliver a number of public benefits including:

- A supply of more employment generating floorspace than that achieved in the last 25 years and a significant opportunity for housing in close proximity to excellent public transport and amenity
- Upgrade of Post Office Lane to deliver improved pedestrian amenity and connectivity to Chatswood Interchange
- Enhanced activation and built form interface to the surrounding streets
- Green walls and rooftop landscaping including accessible open space at the podium level
- Affordable housing at a rate of 4% of the total residential floor space
- Regeneration of two poor quality sites and a service laneway, which without this proposal are likely to remain as is indefinitely.

A competitive design process is also proposed to ensure the extensive design analysis already undertaken is carried through to the development application and delivery stage. A package of sustainability measures will be outlined during the detailed design phases.

Proposed amendments to the planning controls

The Planning Proposal seeks to amend the Willoughby LEP to:

- Allow shop top housing as an additional permitted use across the entire site
- Increase the maximum height to RL262m across the entire site and remove the 7m height limit fronting Victoria Avenue noting that a street wall height control has been included in the draft site specific development controls
- Apply a maximum FSR of 20:1 and include a site specific control requiring a minimum FSR of 8:1 for non-residential uses

Draft site specific development controls are also proposed for inclusion in the Willoughby DCP to guide future development applications.

Environmental assessment

Environmental assessment of the proposal has been considered as summarised below:

- By placing significant employment and housing in such close proximity to Chatswood Station, increased levels of trip containment, opportunities for active transport and a much higher modal spilt to public transport will be achieved thereby reducing vehicle kilometres travelled and community health outcomes.
- Recommendations of the Chatswood CBD Strategy for maintaining solar access in midwinter to key spaces within the public domain at identified times can be achieved including Victoria Avenue, Garden of Remembrance and Chatswood Oval 11am-2pm.
- Solar access will be largely maintained to the residential units surrounding the site and a high level of solar access can be achieved to proposed dwellings within the development

- The streetscape will be enhanced through high quality design and a sensitive street interface and setbacks
- The development of a single slender tower will minimise visual impacts and allow for view sharing with buildings in the surrounding area including the over-station towers and the Sebel tower
- There will be no unacceptable traffic impacts in terms of the performance of existing intersections and the surrounding road network.

Conclusion

The proposed mixed use scheme presents a feasible development option to deliver a significant component of commercial office floor space which meets the objectives of the District Plan, retail uses to complement the wider precinct and enhance street activation along with new housing in a highly accessible location with access to services, facilities and public transport.

The proposal presents a rare opportunity for Council to secure the renewal of this important site within the Chatswood CBD, significantly enhancing the streetscape, public domain and pedestrian accessibility in this area of Chatswood. The opportunity to revitalise the subject site to introduce a material non-residential component is extremely positive and gives the site its best chance for renewal. Failure to support the proposal will likely result in the site remaining as is indefinitely.

The proposal may be suitable to be fast-tracked under either the Council or DPIE acceleration programs, and this will be the subject of ongoing discussions with Council and DPIE. In this regard Mirvac can commit to lodge the DA as soon as possible following rezoning.

Our assessment indicates the proposal has strategic and site specific merit and represents the best option for achieving Councils strategic intent for the Chatswood town centre.

1 Background

This revised Planning Proposal been informed by an extensive design process and consultation with Willoughby Council and Department of Planning, Industry and Environment (DPIE).

A previous Planning Proposal (original Planning Proposal) for the site was lodged with Council on 22 December 2016 and was developed in consultation with Council during the preparation of the *Draft Chatswood CBD Planning and Urban Design Strategy* (Chatswood CBD Strategy).

The original Planning Proposal sought to make the following changes to the planning controls under the *Willoughby Local Environmental Plan 2012* (Willoughby LEP):

- Expand the 'shop top housing' additional permitted use which currently applies 410-416 Victoria Avenue across the entire site
- Apply a maximum height of buildings of RL 262m across the site to reflect the solar access plane to Chatswood Oval
- Apply a minimum non-residential FSR of 5:1.

The original Planning Proposal sought to deliver 11,500sqm of 'A grade' office space, 800sqm of retail and 320 residential apartments.

The Chatswood CBD Strategy which was subsequently released in February 2017 sought to protect Chatswood office core and employment role for the future. The built form recommendations of the CBD Strategy were generally consistent with the Planning Proposal, however Council advised that the proposed mixed use scheme was not consistent with the Strategy and that it was seeking an entirely commercial development on the site.

The Chatswood CBD Strategy was adopted by Council in June 2017 and referred to DPIE for endorsement.

On 9 August 2019 DPIE endorsed the Chatswood CBD Strategy as it relates to the CBD core area, noting that mixed use development can be permitted east of the rail line where it results in significant and assured jobs growth to meet the objectives of the North District Plan.

Council subsequently advised on 2 October 2019 that that it could not support the original Planning Proposal given the allocation of employment uses, and that the Proposal does not meet the DPIE's direction on jobs growth. Council suggested that a revised Planning Proposal be lodged that aligns that with Council's strategic documents as well as the DPIE's letter and recent discussions.

This amended Planning Proposal has been prepared with a view to providing a material and feasible quantity of commercial floor space. In doing so it seeks to deliver a significantly increased component of non-residential floor space of 18,376sqm GFA and residential uses to deliver a viable development outcome and securing the renewal of this important site within the Chatswood CBD.

1.1 Response to Architectus Review (original Planning Proposal)

Willoughby Council sought a review of the original Planning Proposal by Architectus, which provided written advice on 3 March 2017. The advice was generally supportive of the built form envelope however raised the mixed-use nature of the proposal, and quoted input from BIS Shrapnel regarding desirability of commercial uses which has not been released. Other minor urban design items were raised which have been addressed in the revised proposal.

The items raised by Architectus in relation to the proposal are highlighted and addressed in Table 1 below.

Table 1: Response to Architectus review of original proposal

Item	Issue / Recommendation	Response
Land Use	**Issue:** The proposal for a mixed use building of primarily residential space is not consistent with the recommended zoning of B3 Commercial Core. **Recommendation:** The site should be protected for office uses.	The Proposal delivers more than 18,000sqm of non-residential GFA equating to an FSR of 8:1. Residential apartments are also proposed in order to facilitate this quantum of non-residential floorspace. The outcome is a true mixed use development with a significant component of high-quality office space in the heart of the CBD. As evidenced by independent assessments by JLL and CBRE, commercial uses in Chatswood are challenged and not feasible. In addition DPIE in their letter of 9 August 2019 indicate that mixed uses to the east of the train line should be possible.
Post Office Lane and Connectivity	**Issue:** Architectus has concerns about the proposed diversion of Post Office Lane as follows: • it is not direct, which creates legibility issues for this highly used connection within the wider centre. • The proposed link abuts neighbouring blank facades (with neighbouring sites that are likely to not redevelop for some time) and turns a corner which will result in a pedestrian link that is poorly activated particularly at night, without good passive surveillance and therefore has poor safety as well as legibility for pedestrians. **Recommendation:** Architectus' preferred approach is to adopt a direct north-south pedestrian link through the site (for the full width of the existing Post Office Lane) with a high ceiling of 3-4 storeys and an office tower above.	The Proposal has been revised and now retains Post Office Lane in its existing alignment, upgrades and reimagines it as a significant public space, and bridges over it with an office tower and a high ceiling of approximately 10m in height. The revised proposal addresses Architectus's feedback.
Overshadowing of Chatswood Oval	**Issue:** Architectus' testing has shown that the Proposal would cause additional overshadowing of Chatswood Oval at around 11:30am. **Recommendation:** The proposal be reduced in height to protect solar access to the Oval between 11am and 2pm.	The proposal has been revised to ensure no additional overshadowing of the oval between 11am and 2pm. The revised proposal addresses Architectus's feedback.

Item	Issue / Recommendation	Response
Victoria Avenue street wall height	**Issue:** For Victoria Avenue, Architectus has recommended a two storey street wall height. The proposal exceeds this with a three storey wall height. **Recommendation:** The street wall facing Victoria Avenue should be reduced to two storeys to best protect the character of this street.	The revised proposal has a two-storey street wall height to Victoria Avenue. The revised proposal addresses Architectus's feedback.
Relationship to potential tower forms to the west	**Issue:** If the site is allowed to bridge the lane, adjacent sites may also seek to develop similarly across the lane. **Recommendation:** Vehicular access and legibility of pedestrian connectivity needs to be considered in understanding the impacts of the proposal.	The Proposal considers vehicular access and legibility of pedestrian connectivity by retaining Post Office Lane in its existing alignment. The revised proposal addresses Architectus's feedback.

As noted above, the revised proposal has taken into account the feedback provided by Architectus.

2 Site context

The site is located on the corner of Victor Street and Victoria Avenue, Chatswood within the Willoughby local government area (refer to Figure 1). It comprises two parcels of land being 45 Victor Street which fronts Post Office Lane and Victor Street and 410-416 Victoria Avenue which fronts the Victoria Avenue Mall and Victor Street. The two sites are separated by Post Office Lane.

45 Victor Street is a redundant former Australian Postal service building. It is vacant and has been boarded up to prevent access. The tenants occupying the retail and commercial spaces in 410-416 Victoria Avenue all have vacant possession clauses in their leases to enable redevelopment.

The site currently presents an extremely poor urban outcome, particularly as a result of the vacant boarded up former Post Office building. Further, Post Office Lane provides poor pedestrian amenity and safety due to blank façades, poor quality and aging pavement treatments and a lack of lighting.

The existing planning controls under the Willoughby LEP do not represent the potential of the site and the surrounding context, and require updating to reflect the recommendations of the draft Chatswood CBD Strategy including DPIE feedback and endorsement.

The site has significant potential to contribute towards improving the amenity and activation of a key corner of the Chatswood town centre particularly the Victoria Avenue Mall which provides a direct station access route. It also has the potential to make a substantial contribution to employment and housing supply.

2.1 Site description

The Planning Proposal is in relation to a land at Victor Street, Chatswood as described in Table 2 and shown in Figure 1.

Table 2: Land description

Site attribute	Description
Land description	• Former Australia Post site at 45 Victor Street (Lot 1 DP569727) • 410-416 Vitoria Street (Lot A DP406105, Lot B DP406105 and Lot 4 DP82303) • Part of Post Office Lane which bisects the above lots
Site area	2,297sqm
Existing uses	The former Australia Post shop and offices is now vacant. The land fronting Victoria Avenue is occupied by a number of predominantly small retail tenancies.
Existing built form	The Australia Post site is occupied by a three storey commercial building, while the land on the corner of Victoria Street is occupied by a double storey building comprising small retail and commercial tenancies.
Vehicle access	Current vehicle access to the site is from Victor Street to the former Australia Post site and from Post Office Lane to the rear of the building which front Victoria Avenue. Post Office Lane bisects the site and is owned by Council. It also provides rear service access for the six retail tenancies to the west of the site at 420-430 Victoria Avenue and serves as a pedestrian access way to the Chatswood Interchange, including retail tenancies such as Woolworths.

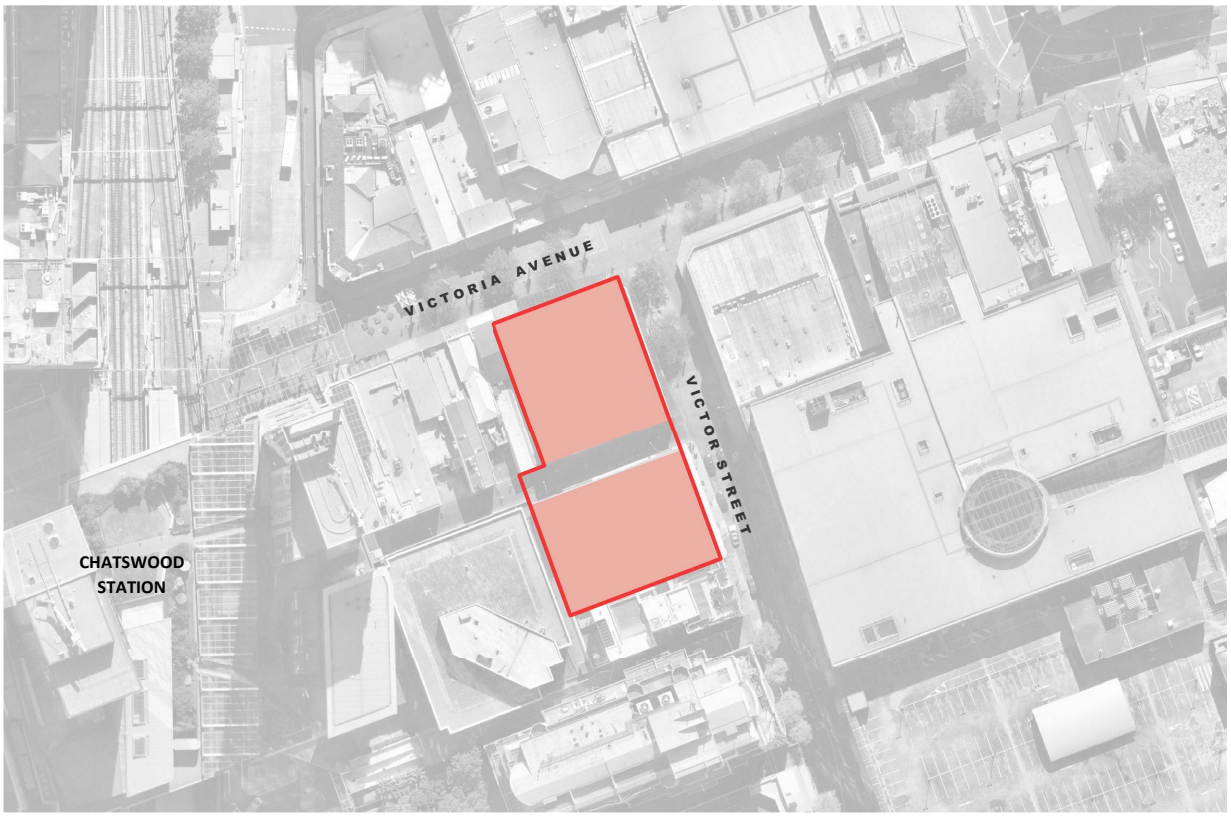


Figure 1: Subject site (Source: Mirvac Design)

Figure 2: Frontage of former Australia Post building to Victor Street, looking south

Figure 3: Post Office Lane looking west towards Chatswood Interchange

Figure 4: Corner of Victoria Avenue and Victor Street, looking south

2.2 Local context

The site within the heart of the Chatswood CBD less than 50 metres from the Chatswood Interchange. The Interchange separates the two components of the Chatswood CBD being the commercial core to the west of the station and mixed use and retail precinct to the east where the site is located. The surrounding area on the eastern side of the station is characterised by predominantly retail uses with a number of residential flat buildings and only one significant office development at 67 Albert Street, located on the edge of the precinct. Chatswood is the largest retail area outside of the Sydney CBD and provides a large variety of retail, service and dining options.

In addition to the major retail and services facilities in the surrounding area including Chatswood Westfield and Chatswood Chase, the site is within close proximity of community facilities and recreational spaces such as The Concourse, Chatswood Library, Dougherty Community Centre, Chatswood Park, and Chatswood Oval.

The site is located at the eastern entrance to the Chatswood Interchange, and as such a multitude of transport options exist to service the site, including access to the North West Metro which connects to major centres at Macquarie Park, Castle Hill and Norwest as well as the North Shore train line which provides access to North Sydney and the Sydney CBD and beyond. By 2024 the Metro rail services will be extended to the Sydney CBD and beyond to Bankstown.

A Planning Proposal is also being progressed for the Mandarin Centre to the south of the site with Council which seeks to facilitate a mixed use proposal comprising a non-residential component of 7.68:1. The Planning Proposal was supported by the Sydney North Planning Panel for a Gateway determination.

Figure 5: Local Context (Source: Mirvac Design)

3 Current planning controls

The principal instrument applying to the site is the Willoughby LEP. The key planning controls apply to the site under the Willoughby LEP are discussed below.

3.1 Zoning and Land Use

The site is located in the B3 Commercial Core zone under the Willoughby LEP. The relevant objectives of the B3 zone are:

- To provide a wide range of retail, business, office, entertainment, community and other suitable land uses that serve the needs of the local and wider community
- To encourage appropriate employment opportunities in accessible locations
- To maximise public transport patronage and encourage walking and cycling
- To strengthen the role of Chatswood as a major centre for the inner north sub-region and to improve its public domain and pedestrian links
- To protect and encourage safe and accessible city blocks by providing active land uses on street and pedestrian frontages.

It is noted that residential flat buildings are not permissible in this zone however Schedule 1 of the Willoughby LEP allows shop top housing as an additional permissible use across the northern portion of the site. This additional permitted use has been used extensively in the Chatswood B3 zone, particularly on the southern edge of the Victoria Avenue mall in the area described by the Willoughby LEP as “Area 5” as shown in Figure 6. This area effectively forms a mixed-use zone to the north, east and west of the site.

3.2 Built form

The following built form controls apply to the site under Willoughby LEP:

- Height:
  - 12 metres on the southern lot
  - 14 metres on the northern lot and a maximum height of 7m applies for the first 1 metre of the building back from the road frontage to Victoria Avenue.
- FSR – 2.5:1 across the site
- Active street frontages – required along the Victoria and Victor Street site frontages

These development controls reflect the existing built form on the site. As shown in Figure 7, the height controls applied to the site are relatively incongruous when considered against the height and density of development permitted (and constructed) on surrounding sites, in particular the residential towers above the Chatswood Interchange.

The existing planning controls under the Willoughby LEP do not reflect the potential of the site, nor the surrounding context, and require updating to reflect the recommendations of the Chatswood CBD Strategy including DPIE feedback and endorsement.

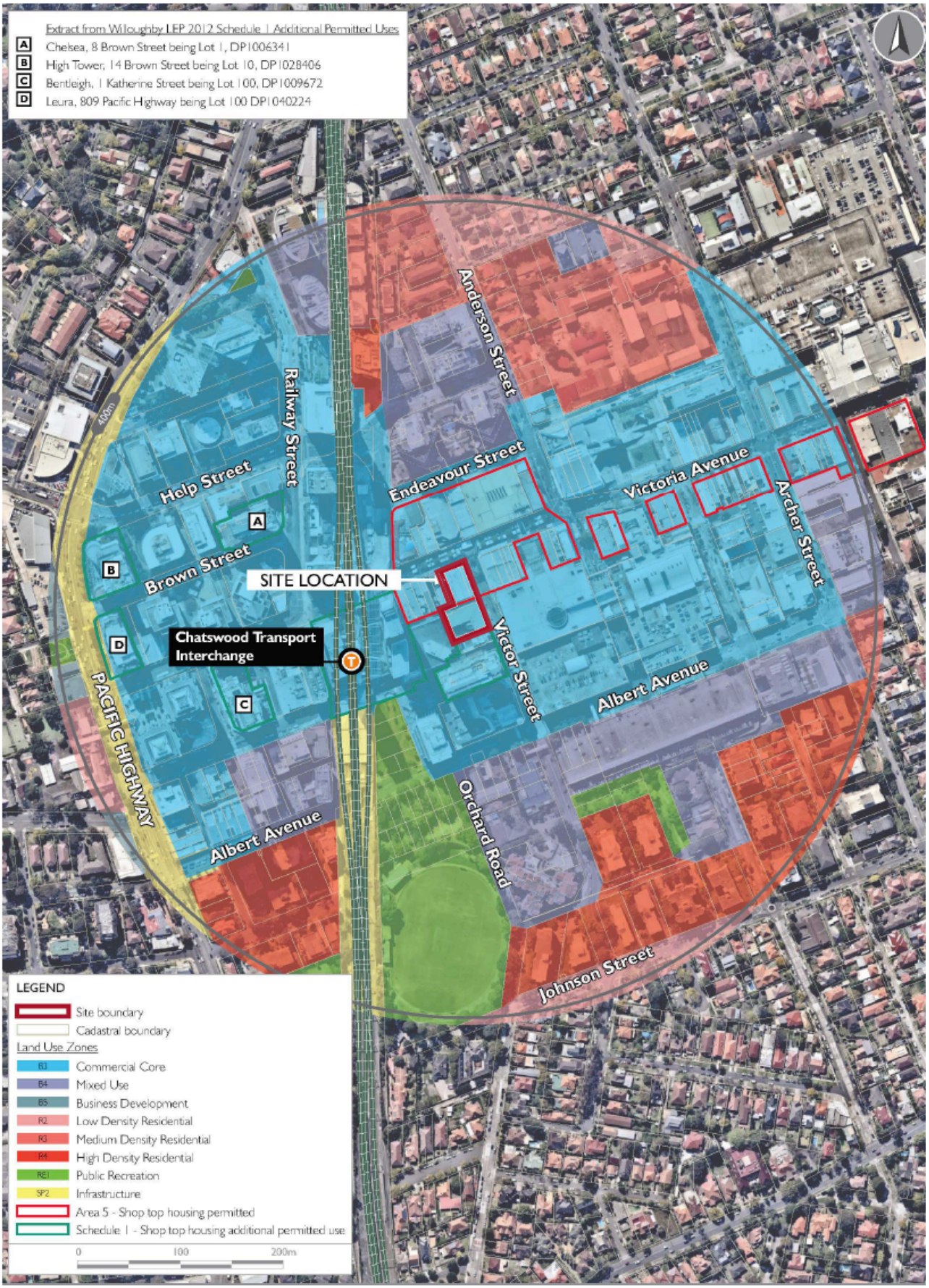


Figure 6: Existing zoning

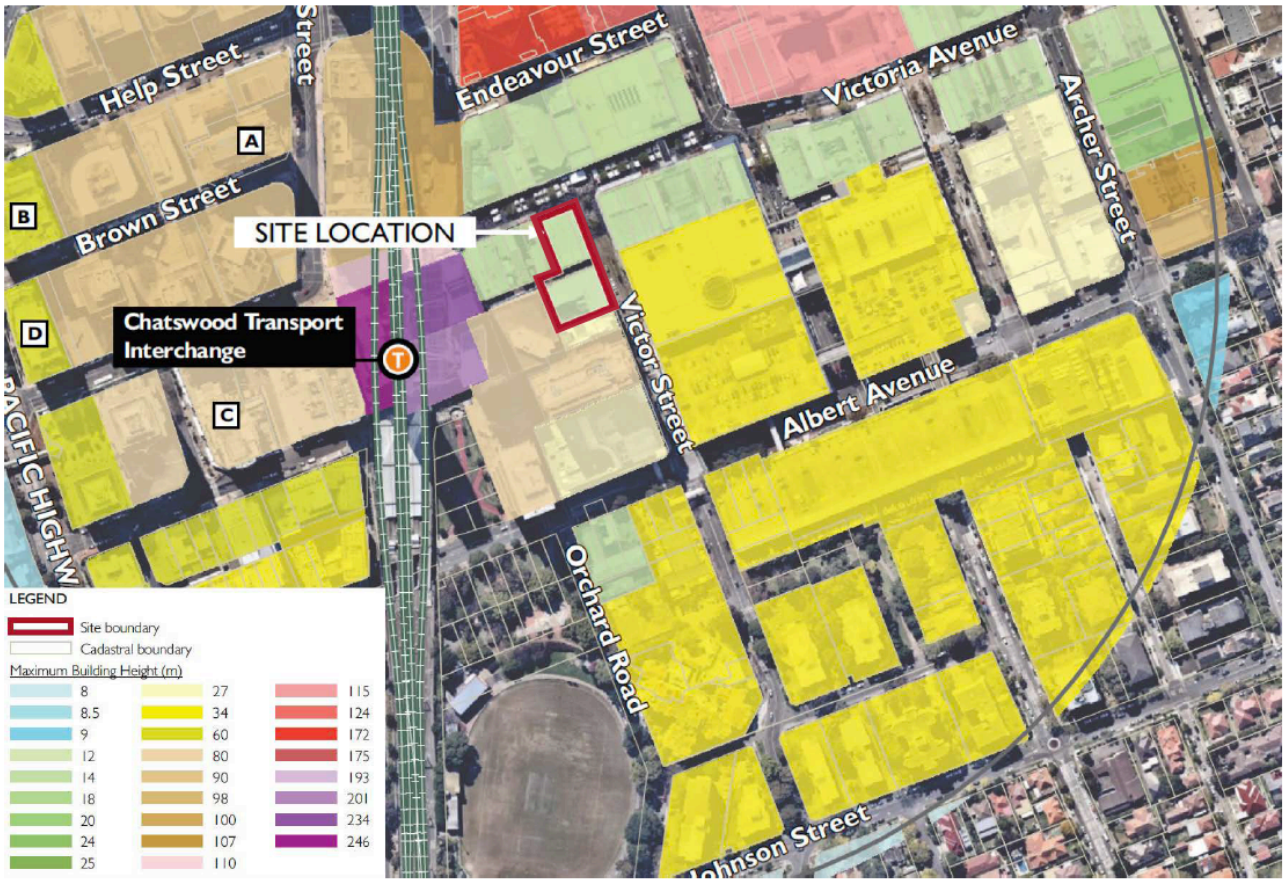


Figure 7: Existing height of buildings

4 Strategic context

4.1 Greater Sydney Region Plan

The final Greater Sydney Region Plan, A Metropolis of Three Cities was released by the Greater Sydney Commission in March 2018. The Plan is built on a vision of three cities where most residents live within 30 minutes of their jobs, education and health facilities. It establishes directions, objectives and actions to achieve the 40-year vision which are focused around infrastructure and collaboration, liveability, productivity and sustainability.

The Greater Sydney Region Plan identifies Chatswood as a Strategic Centre and major commercial office precinct within the Eastern Economic Corridor which extends from Macquarie Park to Sydney Airport and currently provides approximately 775,000 jobs. It also notes that transport infrastructure projects will improve accessibility between the economic agglomerations along and near the corridor and significantly increase the size of the labour market which can access the corridor by public transport including via the Sydney Metro Northwest and Sydney Metro City and South West, boosting productivity.

A number of the objectives of the plan are relevant to the Planning Proposal, in particular:

- Objective 1: Infrastructure supports the three cities
- Objective 10: Greater housing supply
- Objective 11: Housing is more affordable and diverse
- Objective 12: Great places that bring people together
- Objective 14: Integrated land use and transport creates walkable and 30 minute cities
- Objective 15: The Eastern, GPOP, and Western Economic Corridors are better connected and more competitive
- Objective 22: Investment and business activity in centres
- Objective 31: Public open space is accessible, protected and enhanced
- Objective 33: A low-carbon city contributes to net-zero emissions by 2050 and mitigates climate change
- Objective 34: Energy and water flows are captured, used and re-used
- Objective 35: More waste is re-used and recycled to support the development of a circular economy
- Objective 37: Exposure to natural and urban hazards are reduced
- Objective 38: Heatwaves and extreme heat are managed.

The aspirations of the Plan are further considered and expanded in the North District Plan which is discussed in Section 4.2 below.

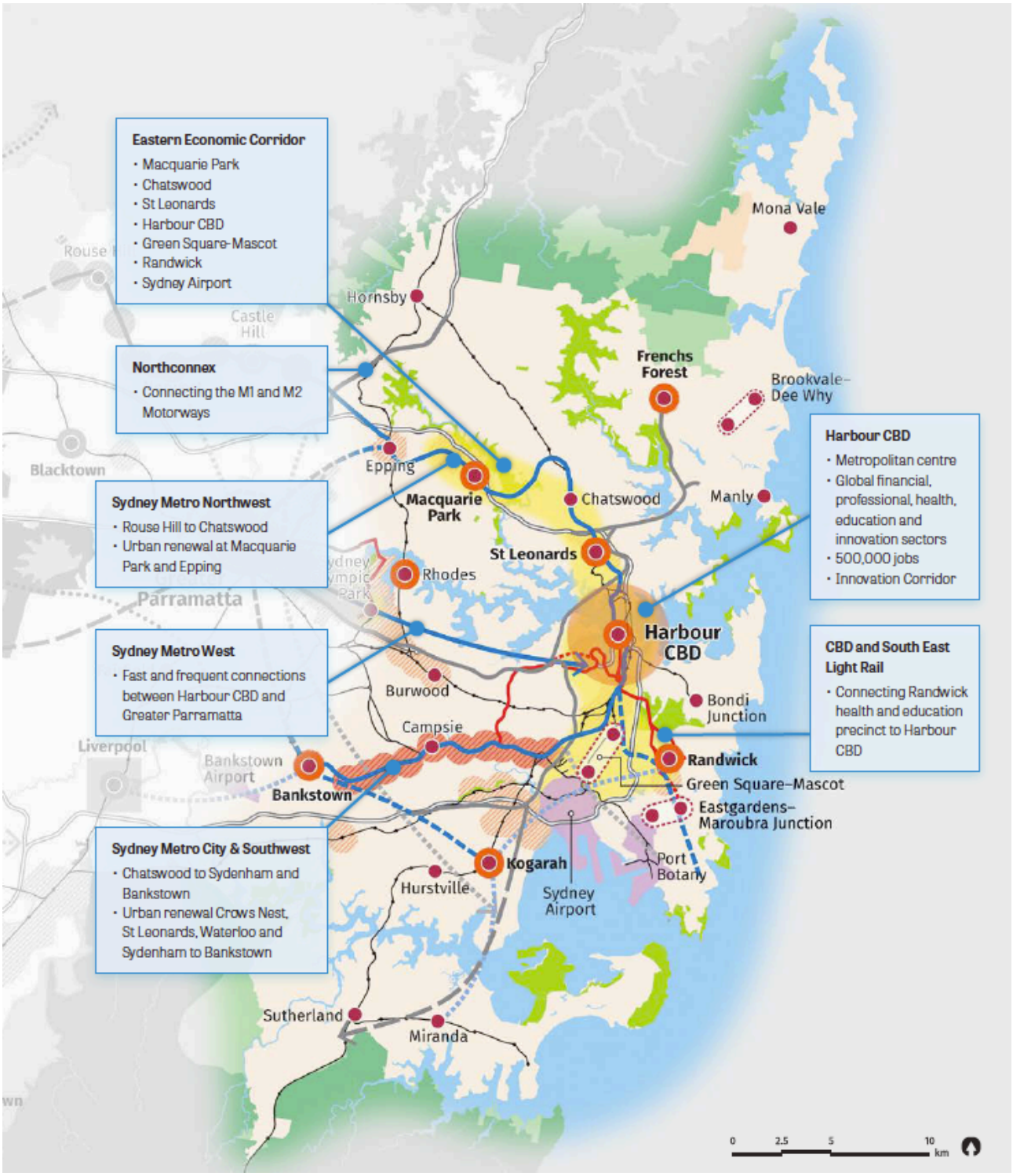


Figure 8: Greater Sydney Region Plan – Eastern Harbour City Vision (Source: GSC)

4.2 North District Plan

The North District Plan has been developed to support the Greater Sydney Region Plan. The 20-year District Plan seeks to manage growth in the context of economic, social and environmental matters to achieve the 40-year vision for Greater Sydney. It contains planning priorities and actions for implementing the Greater Sydney Region Plan at the district level and is a bridge between regional and local planning.

The North District Plan reinforces the role of the Eastern Economic Corridor and the benefits of major transport infrastructure within the corridor, as well as Chatswood's role as a Strategic Centre. Chatswood is highlighted as comprising a mix of uses including retail, office, residential, community and health with the centre having a highly successful retail focus, with a vibrant night-time economy. It also highlights the role Chatswood has played in delivery a large portion of the housing supply for the District through development of multi-unit housing.

The Plan identifies that Chatswood is the seventh largest office precinct in Sydney providing 278,919sqm of office floor space (2017), and highlights the need to maintain and grow a high quality commercial core to facilitate the continued growth of the centre as a major employment hub. The Plan sets a target for jobs growth in the centre of between 6,300 to 8,300 from 2016 to 2036.

To support this proposal, feasibility and market analysis has been prepared by JLL (Appendix B) and CBRE (Appendix C). JLL highlights that the proposal has potential to deliver 1,578 jobs (on completion) which represents a significant component of the jobs target for Chatswood (up to 25%). Further, when combined with other commercial proposals within the Chatswood CBD, being the RSL site (2,518 jobs) and the Mandarin Centre (1,664 jobs) up to 91% of the jobs target could be achieved should other proposals proceed, within the short term.

Accordingly, the proposal supports the objectives of the North District Plan, including the continued growth of Chatswood as a major commercial hub through the delivery of a significant component of commercial floor space.

The proposal is considered to align with the relevant priorities and actions of the Plan in Table 3 below.

Table 3: Consideration of North District Plan

Planning Priority / Action	Consideration
Planning Priority N1: Planning for a city supported by infrastructure	
Action 3: Align forecast growth with infrastructure	The proposal seeks to align housing and jobs growth being located adjacent to the Chatswood Interchange and will support recent and planned infrastructure investment in the Sydney Metro project.
Planning Priority N5: Providing housing supply, choice and affordability with access to jobs, services and public transport	
Action 17: Prepare local or district housing strategies that address the following: • the delivery of five-year housing supply targets (2016-2021) for each local government area • the delivery of 6-10 year (when agreed) housing supply targets for each local government area • capacity to contribute to the longer term 20-year strategic housing target for the District • the housing strategy requirements outlined in Objective 10 of A Metropolis of Three Cities.	The proposal will contribute to the delivery of the 6-10 year housing target through the delivery of over 300 apartments.
Action 18: Prepare Affordable Rental Housing Target Schemes following development of implementation arrangements.	The proposal will deliver affordable housing at a rate of 4% of total residential floor space.

Planning Priority / Action	Consideration
Planning Priority N8: Eastern Economic Corridor is better connected and more competitive	
Action 26: Prioritise public transport investment to deliver the 30-minute city objective for strategic centres along the economic corridor	The proposal will support the 30 minute city by aligning growth with significant transport infrastructure investment within the Chatswood Strategic Centre and within the Eastern Economic Corridor.
Planning Priority N10: Growing investment, business opportunities and jobs in strategic centres	
Action 36: Provide access to jobs, goods and services by: • attracting significant investment and business activity in strategic centres providing jobs growth • diversifying the range of activities in all centres • creating vibrant, safe places and quality public realm • focusing on a human-scale public realm and locally accessible open space • balancing the efficient movement of people and goods with supporting the liveability of places on the road network • improving the walkability within and to the centre • completing and improving a safe and connected cycling network to and within the centre. • improving public transport services to all strategic centres • conserving and interpreting heritage significance • designing parking that can be adapted to future uses • providing for a diverse and vibrant night-time economy in a way that responds to potential negative impacts • creating the conditions for residential development within strategic centres and within walking distance (up to 10 mins), but not as the expense of the attraction and growth of jobs, retailing and services; where appropriate, strategic centres should define commercial cores informed by an assessment of their need.	The proposal satisfies this objective by: • Providing a significant component of commercial floor space. It would be the third largest commercial office building in Chatswood and the first to be developed since 1995. • Accommodating ground floor retail uses to enhance activation and support opportunities for night-time economy • Providing a component of residential, whilst still maintaining retail uses and a large component of commercial floorspace • Improving the walkability within the centre by improving the pedestrian environment along Post Office Lane • Enhancing the public domain through improved built form interfaces and upgrade to Post Office Lane.
• Action 40: Review the planning controls and create capacity to achieve the job targets for each of the District's strategic centres.	The proposal directly aligns with this objective by seeking to amend the planning controls which apply to the site to enable its renewal to deliver a mix of uses including a large component of commercial floor space which will make a significant contribution to the jobs target for Chatswood.
Action 42: Strengthen Chatswood through approaches that: • protect and grow the commercial core • maximise the land use opportunities provided by Sydney Metro • promote the role of the centre as a location for high quality, commercial office buildings and a diverse retail offering	The proposal aligns with this objective by: • providing opportunity for a significant component of commercial floor space within the mixed use / retail precinct of the CBD. **It would be the third largest commercial office building in Chatswood and the first to be developed since 1995**

Planning Priority / Action	Consideration
• enhance the role of the centre as a destination for cultural and leisure activities • promote and encourage connectivity, and upgrade and increase public open spaces • investigate interchange operations on both sides of the railway line to increase capacity and efficiency of modal changes • improve pedestrian connectivity between the eastern and western side of the rail line	• increasing the supply of A grade office space and a mix of retail tenancies • Improving pedestrian connectivity along Post Office Lane to the eastern side of the Chatswood Interchange.
Planning Priority N12: Delivering integrated land use and transport planning and a 30 minute city	
Action 50: Integrate land use and transport plans to deliver the 30-minute city.	The proposal supports the 30 minute city by providing jobs and housing growth accessible to the Chatswood Interchange with excellent access to wider centres via the Sydney Metro network.
Action 53: Plan for urban development, new centres, better places and employment uses that are integrated with, and optimise opportunities of, the public values and use of Sydney Metro City & Southwest, as well as other city-shaping projects.	The proposal plans for new employment and residential uses which will optimise the use of the Sydney Metro City and Southwest project.
Planning Priority N19: Increasing urban tree canopy cover and delivering Green Grid connections	
Action 71: Expand urban tree canopy in the public realm.	The site is currently entirely cleared of vegetation. The proposal includes provision of podium rooftop landscaping and green walls to maximise opportunities for green cover.
Planning Priority N20: Delivering high quality open space	
Action 73: Maximise the use of existing open space and protect, enhance and expand public open space by: • providing opportunities to expand a network of diverse, accessible, high quality open spaces that respond to the needs and values of communities as populations grow. • investigating opportunities to provide new open space so that all residential areas are within 400 metres of open space and all high density residential areas (over 60 dwellings per hectare) are within 200 metres of open space. • requiring large urban renewal initiatives to demonstrate how the quantity of, or access to, high quality and diverse local open space is maintained or improved. • planning new neighbourhoods with a sufficient quantity and quality of new open space. • delivering shared and co-located sports and recreational facilities including shared school grounds and repurposed golf courses. • delivering or complementing the Greater Sydney Green Grid	The subject site is within 200m of a large area of open space being Chatswood Park which comprises local open space, a playground, skate park and sports field. The proposal will provide local infrastructure contributions towards the enhancement of open space in the LGA.

Planning Priority / Action	Consideration
• providing walking and cycling links for transport as well as leisure and recreational trips.	
Planning Priority N21: Reducing carbon emissions and managing energy, water and waste efficiently	
Action 74: Support initiatives that contribute to aspirational objectives of achieving net-zero emissions by 2050, especially through the establishment of low-carbon precincts in Planned Precincts, State Significant Precincts, Urban Transformation projects, Growth Areas and Collaboration Areas.	The proposal is capable of achieving sustainability measures which will be outlined during the detailed design phase.
Planning Priority N22: Adapting to the impacts of urban and natural hazards and climate change	
Action 81: Avoid locating new urban development in areas exposed to natural and urban hazards and consider options to limit the intensification of development in existing urban areas most exposed to hazards.	The proposal is not within an area subject to known hazards.
Action 82: Mitigate the urban heat island effect and reduce vulnerability to extreme heat	The proposal includes provision of podium rooftop landscaping and green walls to maximise opportunities for green cover to reduce the urban heat island effect.

4.3 Willoughby Local Strategic Planning Statement

The Willoughby Local Strategic Planning Statement (LSPS) was finalised in March 2020 and sets a context and direction for land use decisions within Willoughby LGA for the next 20 years.

The LSPS highlights that Chatswood is the LGA's major centre with a diverse mix of employment accommodated in commercial, retail, recreation, education, cultural and civic floor space. It also notes that strong growth of apartments in the centre has supported its cultural, restaurant and night time economy.

The LSPS notes that Council is planning for Chatswood CBD to further develop as the major mixed-use and commercial hub on the north shore, attracting residents from across the North region and beyond, and playing an important role in the continued success of the high value, globally oriented Eastern Economic Corridor.

The proposal directly aligns with the LSPS by seeking to renew the site to accommodate a significant quantity of commercial office floor space along with retail and residential uses to support the growth of the centre as a major mixed-use and commercial hub.

The proposal has been considered against the priorities and actions of the LSPS in Table 4 below.

Table 4: Consideration of Willoughby LSPS

Planning Priority / Action	Consideration
Priority 1: Increasing housing diversity to cater to families, the aging population, diverse household types and key workers.	
Action 1.2: Review planning controls in the Chatswood CBD and in local centres to facilitate delivery of an increased number of medium and high-density dwellings, increasing dwelling diversity in the LGA.	The proposal directly aligns with action by seeking to amend the planning controls for the site to support a mixed use development on the site delivering new dwellings and increasing housing diversity in the LGA.
Action 1.5: Ensure that planning controls create dwellings of universal design that are suitable for the changing needs of the community, including smaller and accessible dwellings for the aging population and family-friendly medium and high-density dwellings for new families moving to the area.	Detailed design of dwellings will occur as part of the detailed design process, with the proposal capable of creating a range of dwelling types to meet market demand.
Action 1.6: Ensure higher sustainability and resilience targets for all new dwellings in Willoughby City in order to lower life cycle costs for new residents.	The proposal is capable of achieving sustainability measures which will be outlined during the detailed design phase.
Priority 7: Developing Willoughby City LGA transport system and Chatswood's role as a true transport hub for Willoughby City and the North Shore	
Action 7.5: Reduce the congestion and impact of car usage in Chatswood by: • advocating for and supporting improved local public transport connected to Chatswood • examining car parking in Chatswood and improving its use and management • improving cycling, walking connections from neighbouring LGAs, residential areas to local centres and to Chatswood • support use of car and bike share • use of technology • introduction of a safe transport system • support targeted improvements to the state road network.	The proposal will reduce congestion and impact of car usage within Chatswood through the location of a mix of uses with excellent access to an wide range of public transport options available from Chatswood Interchange. A traffic and car parking assessment has been prepared to support the proposal which is discussed in further detail in Section 8.3.3.
Priority 9: Developing Chatswood CBD as a key commercial centre and integral part of the Eastern Economic Corridor	
Action 9.1: Promote office growth and a diverse mix of uses beyond this by: • Protecting and growing the commercial core • Allowing residential development in an expanded mixed-use zone beyond the commercial core • Requiring 1:1 non-residential FSR in the mixed-use zone (typically implying ground and first floor retail or commercial uses) • 'Spreading' the uses and activation by: – reinforcing Victoria Avenue as Chatswood's primary pedestrian spine	The proposal is located within the mixed use precinct to the east of Chatswood Station. The proposal seeks to deliver ground floor retail and a substantial quantity of commercial office floor space (total non-residential FSR 8:1) with residential uses above. It would be the third largest commercial office building in Chatswood and the first to be developed since 1995 The proposal will also enhance street activation through retail frontages and enhanced building

Planning Priority / Action	Consideration
– increasing activation of side streets from Victoria Avenue, including circular links – encouraging the growth of activity west over the railway line with a professional focus – developing a pattern of mid-block links along the eastern part of the centre.	address to Victoria Avenue Mall, Victor Street and Post Office Lane.
Action 9.2 Create great spaces and a high level of urban design quality. • Championing improvements to the public domain through upgrades to the streetscape as well as considering how the redevelopment of Council owned sites can contribute to the public domain. • Applying specific urban design principles as outlined in the CBD Strategy • Implement the Changing Lanes project including investigation and a strategy to transform existing service lanes in the Chatswood CBD • In addition to the above, preparing a Public Domain Plan and Technical Manual to be consistently applied, enabling Council to prioritise improvements and determine responsibility for construction and/or payment • Implement the Willoughby Design Excellence Policy and Guidelines for Design Excellence Review and Competitions in the Chatswood CBD, for all developments seeking to erect a new building, with competitive designs where the Height of Building exceeds 35m.	The proposal is consistent with this action as follows: • It seeks to implement the recommendations of the Chatswood CBD Strategy for the site • It proposes a competitive design process which will ensure a high quality design outcome for the site as discussed in Section 5.5 • It will deliver transformation of an existing service lane enhancing activation and connectivity to the station.
Action 9.3 Create a 'green' walkable CBD by: • Landscaping and greening initiatives including: – Green roofs – Soft landscaping (ground podium, roof top, green walls) – Increase tree canopy cover in the CBD consistent with Priority 14 • Developing the centre as a sustainability exemplar contributing towards the NSW government's zero carbon target.	The proposal includes provision of podium rooftop landscaping and green walls to maximise opportunities for green cover. The proposal is capable of achieving sustainability measures which will be outlined during the detailed design phase.
Action 9.4 Develop and promote Chatswood's distinct role in the Eastern Economic Corridor by: • Developing the centre as a strong commercial office market with the additional advantage of being a culture, food, leisure and night time economy hub for the North District • Developing community, health and education uses by planning for: – A 'cluster' of recreation uses around Council owned opportunity sites and open spaces. – The development of Chatswood's 'education precincts' around Chatswood Public School and	The proposal aligns with this action by: • Providing a significant component of commercial floor space within the Chatswood Strategic Centre. It would be the third largest commercial office building in Chatswood and the first to be developed since 1995. • Accommodating ground floor retail uses / restaurant uses and an increased resident population to support Chatswood's role as a culture, food, leisure and night time economy hub.

Planning Priority / Action	Consideration
High School to the west and St Pius X and Mercy College to the east. – Promoting an arts and culture cluster around the Concourse. • Investigate opportunities for public WiFi in the Chatswood CBD. • Investigate opportunities for a high speed, high performance fibre optic data network to service the Chatswood CBD and Eastern Economic Corridor.	
Action 9.5: Seek contributions to public and social infrastructure to improve the amenity and services in the Chatswood CBD by: • Establishing a planning agreement scheme for social infrastructure contributions towards public domain improvements such as public art and the increased provision of affordable housing.	The proposal will deliver a number of public benefits, in particular public domain upgrades and regeneration along Post Office Lane and delivery of affordable housing. The proposal will also provide local infrastructure contributions towards social infrastructure.
Priority 14: Increasing Willoughby's tree canopy coverage	
Action 14.4 Encourage green roofs or green nature walls and green buildings, particularly in the Chatswood CBD and St Leonards.	The proposal includes provision of podium rooftop landscaping and green walls to maximise opportunities for green cover.
Priority 15: Improving the efficiency of Willoughby's built environment	
Action 15.1: Develop Chatswood as a low-energy, low-carbon, low-water use centre, particularly through proposed major developments.	The proposal is capable of achieving sustainability measures which will be outlined during the detailed design phase.
Action 15.2: Facilitate a transition towards a more sustainable transport system through improved mass transit services, active transport corridors and new technology such as electric vehicle charging stations.	The proposal supports sustainable transport through its highly accessible location within the Chatswood CBD and adjacent to the Chatswood Interchange.
Action 15.4: Manage street and off-street parking to encourage public transport use and car sharing and limit growth in travel by private vehicles.	The proposal is capable of achieving sustainability measures which will be outlined during the detailed design phase.
Action 15.6: Advocate for increased energy and water efficiency standards for new buildings including Green Star certification and the BASIX standards.	The proposal is capable of achieving sustainability measures which will be outlined during the detailed design phase.
Action 15.7: Encourage the use of cool building materials in any new development to reduce the urban heat island effect, and where appropriate integrate water features both natural and man-made into urban design.	Specification of building materials will occur at the DA stage including the potential for cool building materials.
Action 15.9: Ensure that local planning controls encourage the minimisation of waste and the re-use and recycling of waste where possible.	Waste minimisation and re-use and recycling will be addressed at the DA stage in accordance with the Willoughby DCP and other relevant policies.
Action 15.10: Require increased energy and water efficiency in major development proposals where increases in density or yield are sought.	The proposal is capable of achieving sustainability measures which will be outlined during the detailed design phase.

4.4 Draft Chatswood CBD Planning and Urban Design Strategy (2016)

The *draft Chatswood CBD Planning and Urban Design Strategy* (Chatswood CBD Strategy) has been prepared by Council to establish a framework to guide development in Chatswood Centre over the next 20 years to achieve exceptional design and a distinctive, resilient and vibrant centre.

The draft Strategy made recommendations on LEP and DCP controls for Chatswood, which includes the following key features:

- Delivery of floorspace which is appropriate to the projected requirements within the future of Chatswood CBD
- Chatswood's future as an employment centre is protected whilst allowing capacity for residential growth
- Good sun access to key public spaces
- Retaining the Chatswood CBD as the focus of Chatswood
- Capturing the value of 'uplift' in development capacity for Council in order to be able to deliver required improvements to the public realm for a major and attractive residential and commercial centre
- High quality built form outcomes are achieved through a design excellence process
- Tower developments are encouraged to be slim and well separated.

The key land use and built form controls recommended for the site in the draft Strategy are listed below:

- Retain the B3 Commercial Core zone and remove serviced apartments as a permissible use from the B3 Zone (as shown at Figure 9)
- Retain existing FSR of 2.5:1 as the maximum base FSR
- No maximum FSR for commercial uses subject to minimum site size of 1,800sqm and appropriate contributions
- Height limits based on Pan-Ops airport restrictions and solar access planes to limit overshadowing of open space (as shown at Figure 11)
- Street frontages heights (shown at Figure 12) as follows:
  - Victoria Avenue: 7m street wall with minimum 6m setback above
  - Victor Street: 24m street wall with minimum 6m setback above.

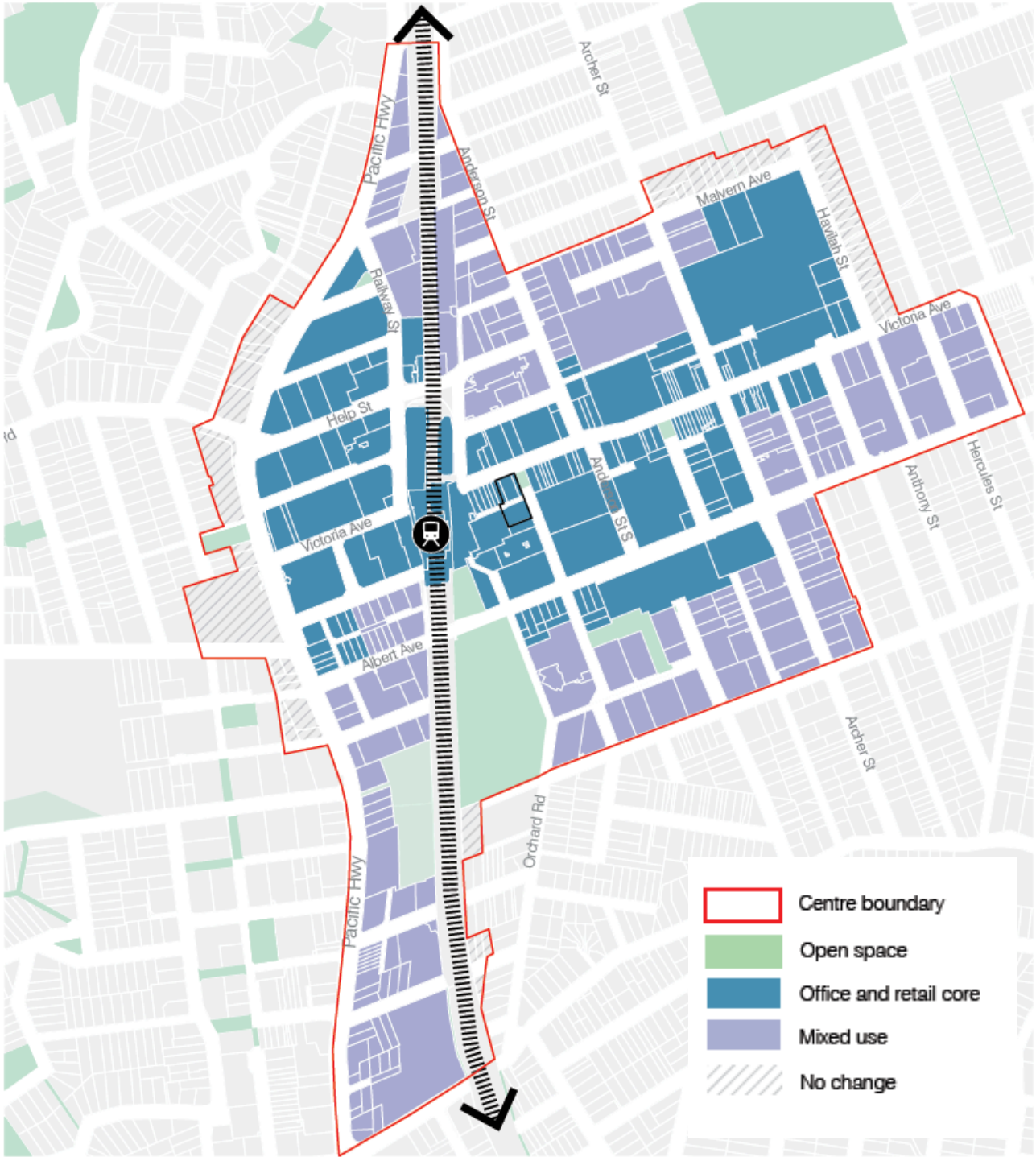


Figure 9: Chatswood CBD Strategy – Land Use (Source: Willoughby Council)

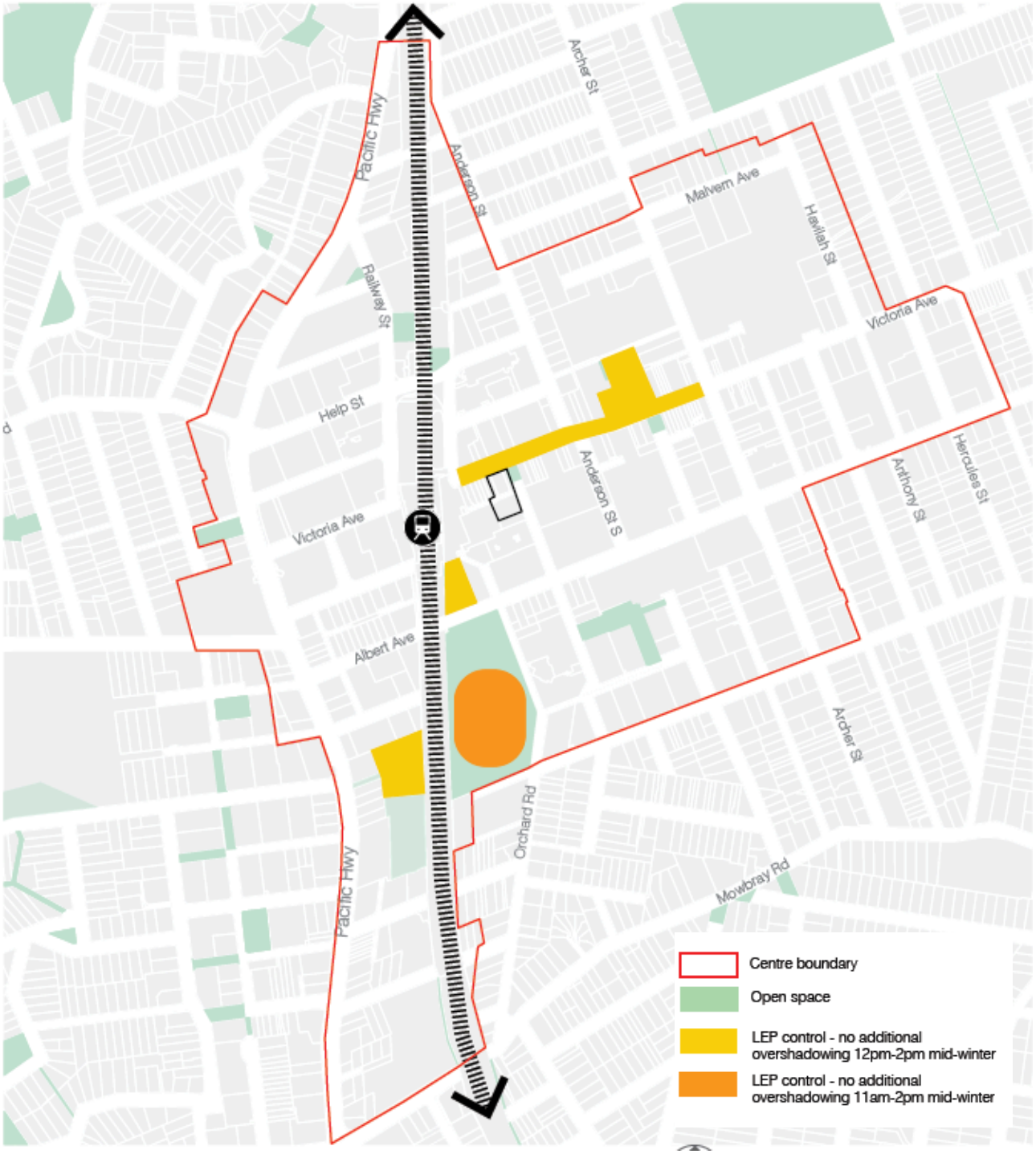


Figure 10: Chatswood CBD Strategy – Sun Access Protection (Source: Willoughby Council)

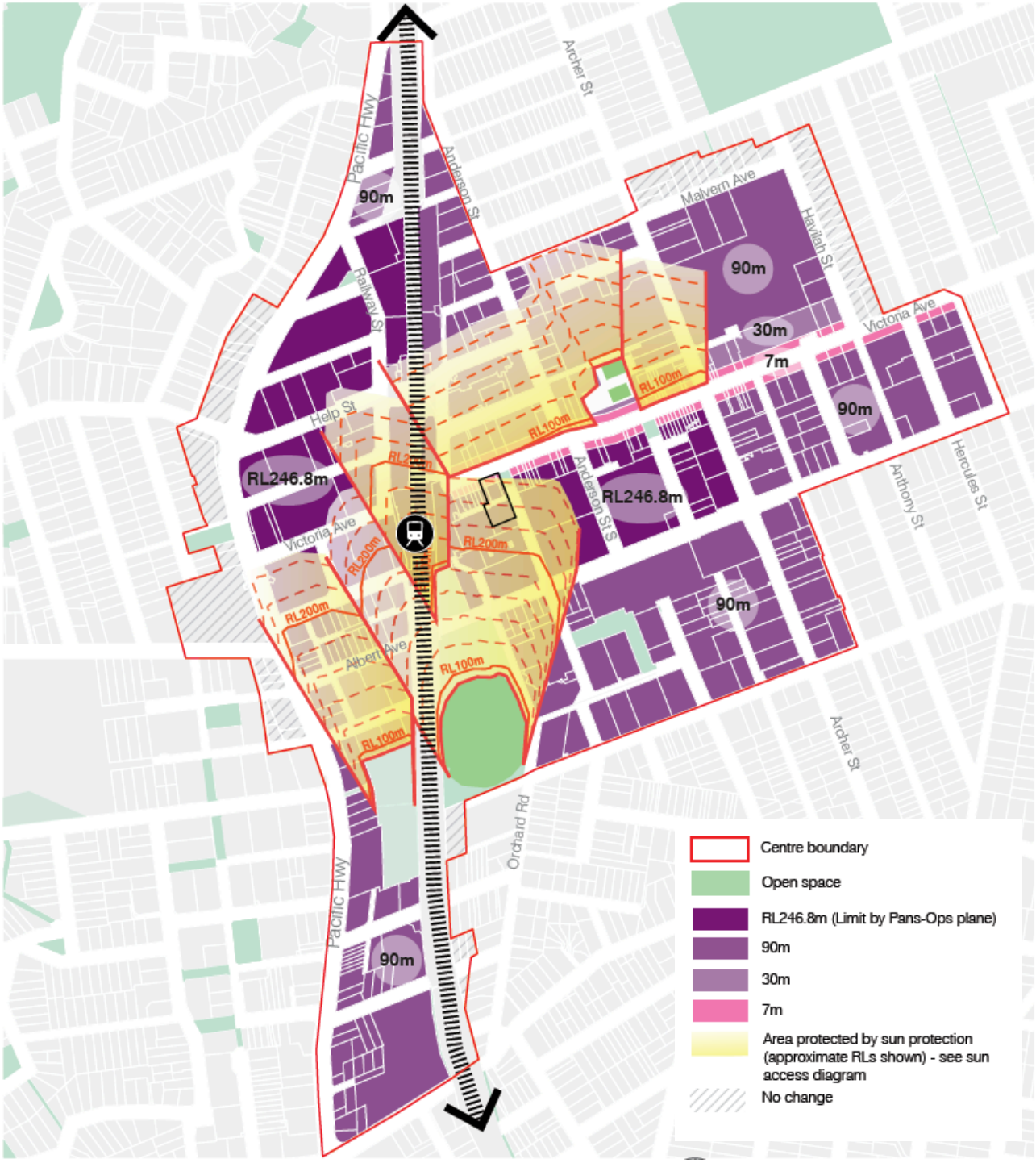


Figure 11: Chatswood CBD Strategy – Recommended Heights (Source: Willoughby Council)

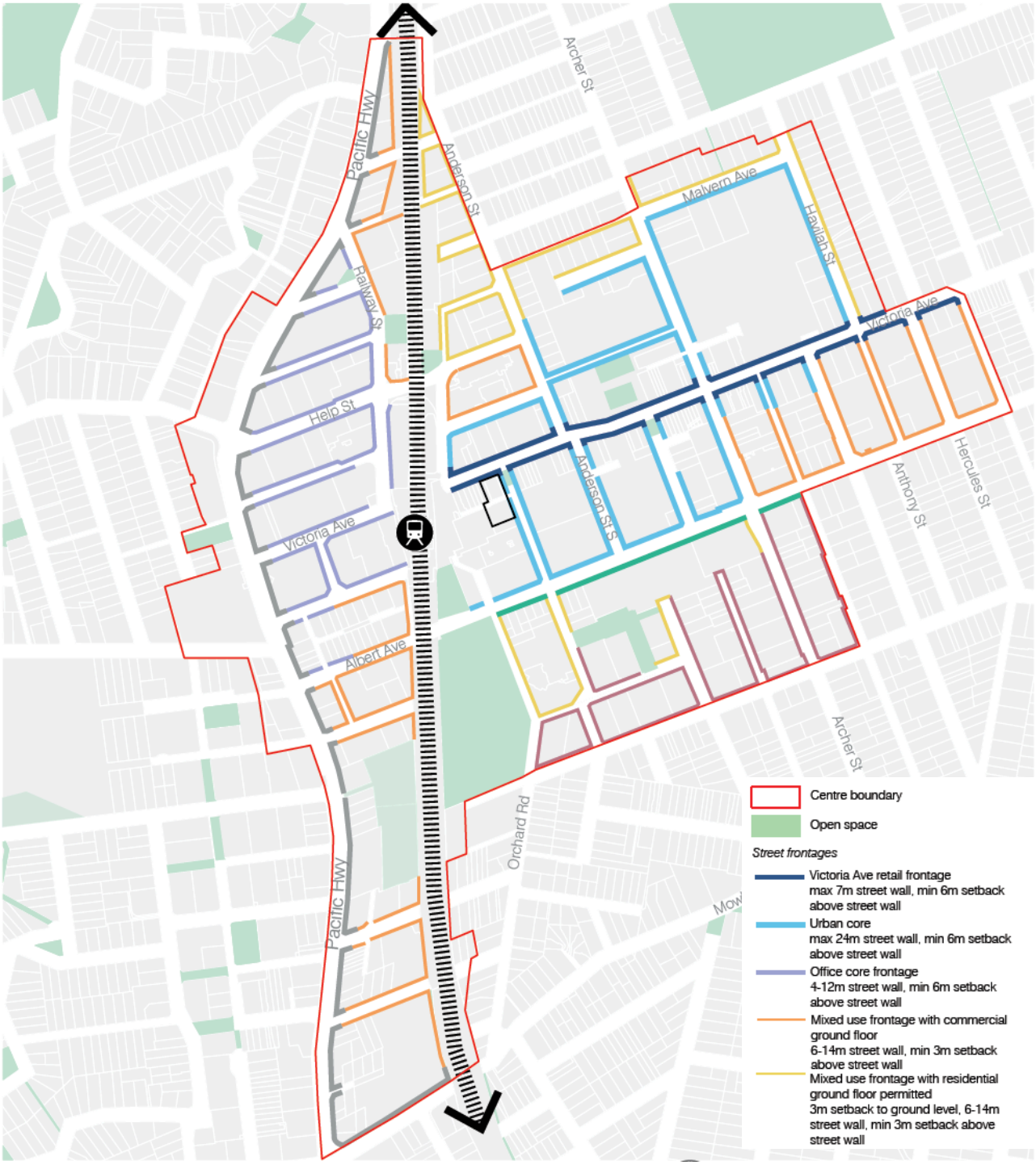


Figure 12: Chatswood CBD Strategy – Street Frontage Heights (Source: Willoughby Council)

The Chatswood CBD Strategy was adopted by Council in June 2017 and referred to DPIE for endorsement.

DPIE wrote to Willoughby Council on 9 August 2019 advising that it endorses the Strategy as it applies to the CBD core area subject to conditions including the following:

- *That no residential development is to be permitted in those areas of the CBD Core area where the land is located west of the North Shore railway line. The reason for this is that this part of the CBD is currently characterised at as commercial core and still has opportunity for office space growth*
- *That mixed use development can be permitted within appropriate parts of the remaining CBD core (i.e. east of the rail line) but only where this results in demonstratable, significant and assured job growth, there by aligning with the key objective of the District Plan to support growth*
- *The any Planning Proposals for the CBD Core area do not result in significant traffic or transport impacts, as sites in the is part of the CBD are highly accessible to Chatswood rail and bus interchange*
- *Council is only able to utilise appropriate mechanisms within the parameters of the Environmental Planning and Assessment Act 1979 for the provision of local infrastructure to support new development such as revisions to its Section 7.12 or Section 7.11 Plans or inserting a new clause in the Willoughby LEP for the delivery of on-site essential infrastructure. No value capture mechanisms or the like will be supported by the Department.*

It is understood that Council subsequently sought full endorsement of an amended Chatswood CBD Strategy. DPIE wrote to Council on 9 July 2020 advising that it is able to provide its full endorsement subject to a number of recommendations including:

- Finalisation of the traffic and transport study and inclusion of any recommendations in the final Chatswood CBD Strategy
- Implementation of the built form recommendations of GMU's Chatswood Precinct Urban Design Study
- Continued progression of Council's public realm strategy and integration within the Chatswood CBD Strategy where practical with focus on improving tress canopy and opportunities for increasing pedestrian and cycle movement.

Table 5: Consideration of Draft Chatswood Planning and Urban Design Strategy

Recommendation	Consideration
CBD boundary	
The Chatswood CBD boundary should expand to the north and south as per Figure 6.2.1 of the Strategy	Not relevant. The site is within the original CBD boundary.
Land use	
The land uses in the LEP should be amended based on the recommended land use figure to: • Protect office core west of railway as commercial-only and permit office towers within existing retail core east of railway • Enable other areas to be mixed use. The existing DCP limits on office and retail use in parts of the commercial core should be removed.	The proposal seeks to develop a mixed use building within the existing retail core east of the railway station. The proposal aligns with the DPIE advice regarding residential uses east of the railway where significant jobs growth can be provided to align with the District Plan.
Serviced apartments should be removed as a permissible use from the B3 commercial core.	Noted. The proposal does not seek to amend the permissibility of uses within the B3 Commercial Core zoning.

Recommendation	Consideration
Value uplift sharing to support public domain	
The existing FSR controls are to be simplified and be retained as a 'base' FSR	The proposal seeks to apply a minimum non-residential FSR of 8:1 to ensure a significant portion of employment uses are delivered on the site.
Increased FSR based on the maximum capacity of the sites resulting from detailed urban design study (between the base FSR and the max FSR) is to be linked to a contributions scheme that will provide the public and social infrastructure in the Chatswood CBD necessary to support an increased residential population. The scheme would: • Apply to residential uses above base FSR • Apply to commercial uses above 10:1 FSR • Operate in addition to the existing Section 94A contributions and Affordable housing contributions. • Contribute to public domain improvements in the centre (including streets and parks) that would increase amenity and support residential and commercial uses.	The proposal seeks to apply a maximum FSR of 20:1.
Design excellence and building sustainability	
Design excellence is to be required for all developments exceeding the base FSR with Competitive designs for developments over 25m high.	A competitive design process is proposed which will ensure a high quality design outcome for the site as discussed in Section 5.5.
To achieve design excellence, developments must achieve higher building sustainability standards.	The proposal is capable of achieving sustainability measures which will be outlined during the detailed design phase.
The Architects for design excellence schemes should be maintained through the DA process and can only be substituted with agreement of Council.	Noted.
Floor space ratio	
The existing FSR should be applied as a base FSR and the maximum FSR for site's where the minimum site area cannot be achieved – 2.5:1	The site achieves the minimum site area of 1,800sqm.
Maximum recommended FSRs should be applied subject to minimum site sizes and appropriate contributions. The strategy applies no maximum FSR to the site.	The proposal seeks to apply a maximum FSR of 20:1.
Sun access to key public spaces	
The sun access protection should be incorporated into LEP controls, to ensure no additional overshadowing and protection mid winter of: • Victoria Avenue (between interchange and Archer St) 12pm-2pm.	Solar analysis has been prepared that demonstrates that the proposed building envelope will not impact on public open space during designated timeframes.

Recommendation	Consideration
• Concourse 12pm-2pm. • Garden of Remembrance 12pm-2pm. • Tennis and croquet club 12pm-2pm. • Chatswood Oval 11am-2pm (which in turn also protects Chatswood Park).	
Height	
Height limits in the centre should be based on airspace limits and sun access protection requirements.	The proposed height has been informed by sun access protection requirements specifically to Chatswood Oval.
Links, open space and landscaping	
The links and open space shown in the draft strategy should be included in the DCP.	Not relevant, no new links or open space apply to the site.
Publicly accessible space and green landscaping to be required by all development, subject to design principles.	The proposal includes accessible landscaped space at podium level.
All roofs up to 30m from ground to be green roofs.	Podium rooftop landscaping and green roofs are proposed within the development.
Street frontage heights	
Street frontage heights should be provided as identified in the draft strategy.	Street frontage heights are generally consistent with the recommendations of the Strategy. The street frontage height to Victor Street ranges from two storeys to six storeys which is consistent with the recommendations. The street frontage height to Victoria Avenue is two storeys but at approximately 10m exceeds the recommended height of 7m in order to deliver a high quality design outcome with generous ceiling heights throughout the ground level retail tenancies and lobbies. The height responds to the surrounding two storey street wall along Victoria Avenue wall which varies in height from lot to lot.
Controls for required active frontages should be developed describing key streets where no blank walls, servicing and non-retail uses are permitted.	The proposal provides for significantly increased street activation with retail uses fronting Victor Street, Victoria Avenue and parts of Post Office Lane.
Further built form controls	
Building separation as per Apartment Design Guide for residential uses and a minimum 6m from all boundaries for commercial uses above street wall height.	Apartment Design Guide building separation distances are able to be achieved. Commercial setbacks are generally in accordance with the recommendations whilst seeking to achieve a viable commercial floor plate.
All buildings should also be set back at minimum in a 1:20 ratio of setback to building height from all	A zero setback to adjoining sites has been adopted for the podium with upper level setbacks provided.

Recommendation	Consideration
boundaries (e.g. 3m setback for a 60m building, and 6m setback for a 120m building).	
Site isolation to be discouraged and where unavoidable joined basements and zero-setback podiums should be provided.	The proposal comprises a zero setback podium which allows the opportunity for joined basements in future should the opportunity present itself.
Fine grain controls to be provided including retention of the traditional lot pattern along Victoria Ave (~6-12m).	The traditional lot pattern along Victoria Avenue can be carried through in the ground level retail tenancies and lobbies of the proposal fronting Victoria Avenue.
Substations to be provided within buildings, not within the streets, open spaces or setbacks.	Subject to the requirements of the relevant authority, the substation can be concealed at ground level behind active uses which form the street frontage.
Minimum site size of 1800sqm for office and 1200sqm for residential to achieve maximum FSR.	The site meets the minimum site area of 1,800sqm.
Maximum tower size of 2000sqm GFA for office and 700sqm GFA for residential.	The typical commercial floorplate delivers approximately 1,250sqm of GFA or 1,100sqm of NLA. The typical residential floorplate delivers a maximum of 870sqm of GFA which exceeds the suggested maximum floor plate size. However the recommended control anticipates a residential tower in the mixed use zone with a maximum height of 90 metres. At 168 metres high the proposal delivers a proportionally more slender outcome than a 90 metre high tower with a 700sqm GFA floorplate would. The height and slenderness of the proposed tower is also consistent with the size and scale of the nearby OSD towers to the west. The residential floorplate delivers a slender, compact, highly efficient tower form that is consistent in size and scale with surrounding residential towers and satisfies the aims and objectives of the ADG.
All developments in Chatswood Centre achieving an FSR uplift through this strategy should contribute public art in accordance with Willoughby's Public Art Policy.	Opportunities for public art are available along Post Office Lane and will be considered at DA stage.

5 The proposal

The Planning Proposal seeks to facilitate renewal of the site for a mixed-use development comprising retail, commercial and residential with a focus on pedestrian permeability and public amenity at the ground level. An urban design study has been prepared by Mirvac Design (Appendix A) which sets out a concept design scheme for the site which has informed the proposed changes to the planning controls.

5.1 Site amalgamation

The concept design scheme has been developed for an amalgamated site comprising the two landholdings as well as the bisecting section of Post Office Lane. Individually the two sites would be unable to deliver a viable commercial outcome when side setbacks, building separation and solar access are taken into consideration, and would also fail to meet the 1,800sqm minimum site area for office development outlined in the Chatswood CBD Strategy. The amalgamated site enables a typical commercial floor plate of approximately 1,100sqm of net lettable area which is at the lower end of the minimum required to achieve workspace efficiencies for office space required by corporate and government tenants. In this regard it is noted the CBRE have advised that floor plates of a minimum of 1,200 to 1,800 are typically required for A Grade office space.

As such the consolidated site unlocks the ability to put forward a major office building component, whilst providing opportunities to enhance the public domain through the upgrade and activation of Post Office Lane improving pedestrian access to Chatswood Interchange.

Figure 13: Comparison of separate and amalgamated site (Source: Mirvac Design)

5.2 Concept design summary

The revised concept design comprises a single slender tower and podium which delivers a high density urban outcome with A-grade commercial, retail and residential floor space and a considered built form response to the location and context.

The concept design would deliver the following:

- Total GFA 45,940sqm of GFA (FSR 20.1:1)
- Total non-residential GFA of 18,376sqm (FSR 8:1) comprising 40% of the total floor space secured through a site specific development control in the Willoughby LEP
- 27,564sqm of residential GFA across the top levels (FSR 12:1)
- 310 residential apartments with a mix of 1, 2 and 3 bedrooms with all apartments achieving excellent solar access and outlook
- 380 car parking spaces including 55 non-residential, 320 residential and 5 car share spaces

The key features of the proposed built form include:

- A single 168m (RL262m excluding a roof feature) tower comprising ground floor retail, 13 levels of commercial office space and residential uses above
- A roof feature zone above RL262 and below the solar access plane to allow for a roof feature to be identified during detailed design process
- A stepped building form to achieve the solar access requirements under the Chatswood CDB Strategy, noting that the solar plane to Chatswood Oval defines the building envelope which steps down towards the south
- Zero podium setbacks on all street frontages
- Street wall heights of:
  - 2 storey street wall along Victoria Street
  - 2 storeys to 6 storeys street wall along Victor Street
- Commercial tower setbacks as follows:
  - Victoria Avenue – 6m above the street wall
  - Victor Street – 3m above the street wall
  - To the south of the site – 6m above the podium
  - To the west of the site – zero to 6m above the podium
- Commercial tower floor plate of 1,250sqm GFA and maximum residential tower floor plate of 870sqm GFA
- Indicative residential tower setbacks of 7.5m from the northern boundary and 9m from the southern boundary, noting the preference for flexibility of design within the maximum residential floor plate
- Basement car parking accessed from the southern extent of the site on Victor Street.

The alignment of Post Office Lane is proposed to be maintained ensuring the direct connection to Chatswood Interchange. Proposed upgrades and active uses will significantly enhance pedestrian amenity and safety whilst maintaining vehicular access for existing retail tenancies to the west of the site.

The proposed built form has been designed to respond to the surrounding context along Victoria Avenue and Victor Street and generally complies with the recommended controls under the Chatswood CBD Strategy.

The street wall to Victoria Avenue is two storeys in height but exceeds the recommended 7m height limit in order to deliver a high quality design outcome with generous ceiling heights throughout the ground level retail tenancies and lobbies. At two storeys and approximately 8-10 metres the street wall is consistent with the neighbouring streetscape which varies in height from lot to lot and includes the Westfield Shopping Centre directly to the east.

The maximum residential floorplate (870sqm) exceeds the suggested floor plate size of 700sqm under the Chatswood CBD Strategy for residential buildings in the mixed use zone. However the Strategy's recommended control anticipates a residential tower with a maximum height of 90 metres. At 168 metres high the proposal delivers a proportionally more slender outcome than a 90 metre high tower with a 700sqm GFA floorplate would. The height and slenderness of the proposed tower is also consistent with the size and scale of the nearby OSD towers to the west.

The proposal delivers a slender, compact, highly efficient tower form that is consistent in size and scale with surrounding residential towers and satisfies the aims and objectives of the ADG.

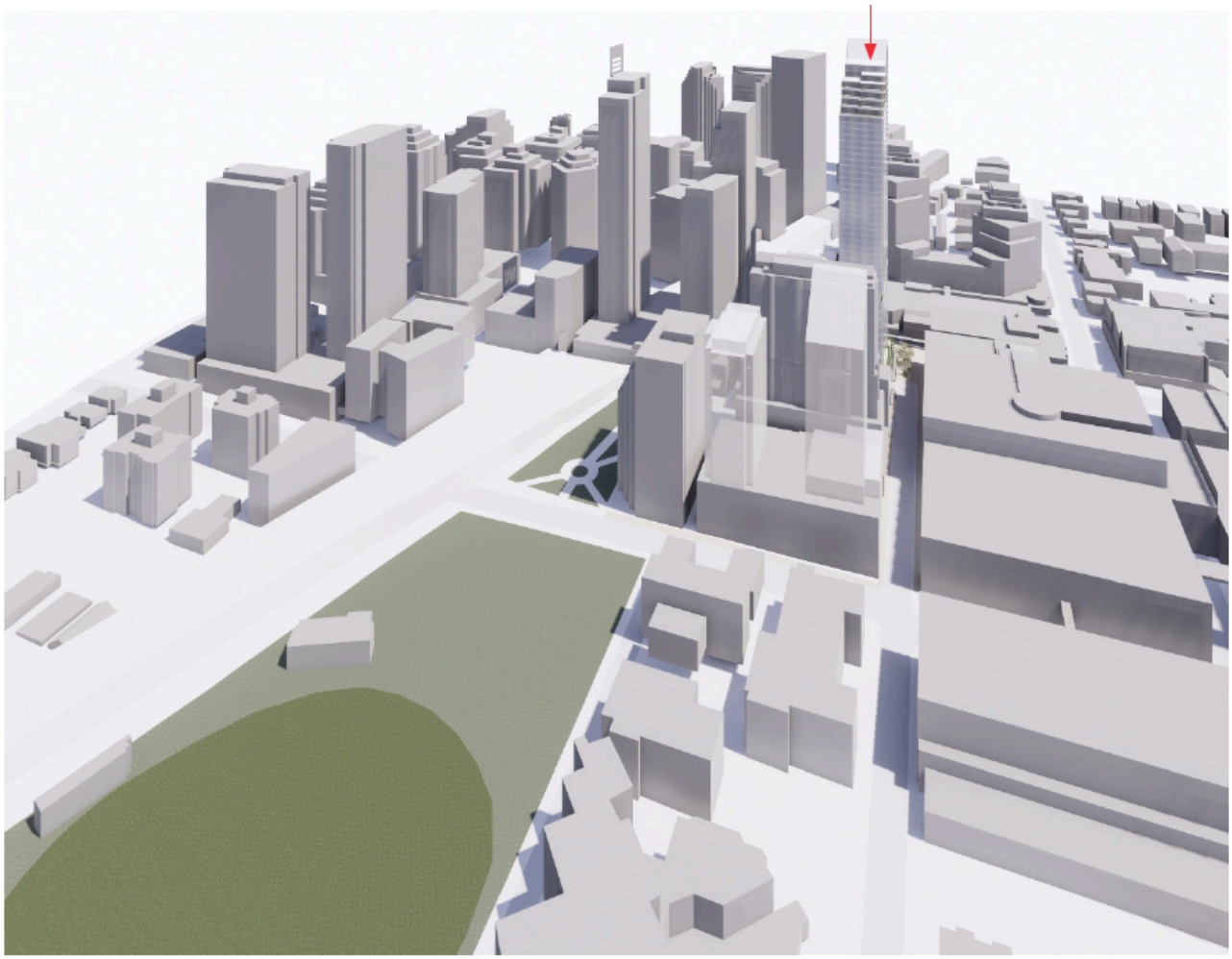


Figure 14: Proposed tower form (Source: Mirvac Design)

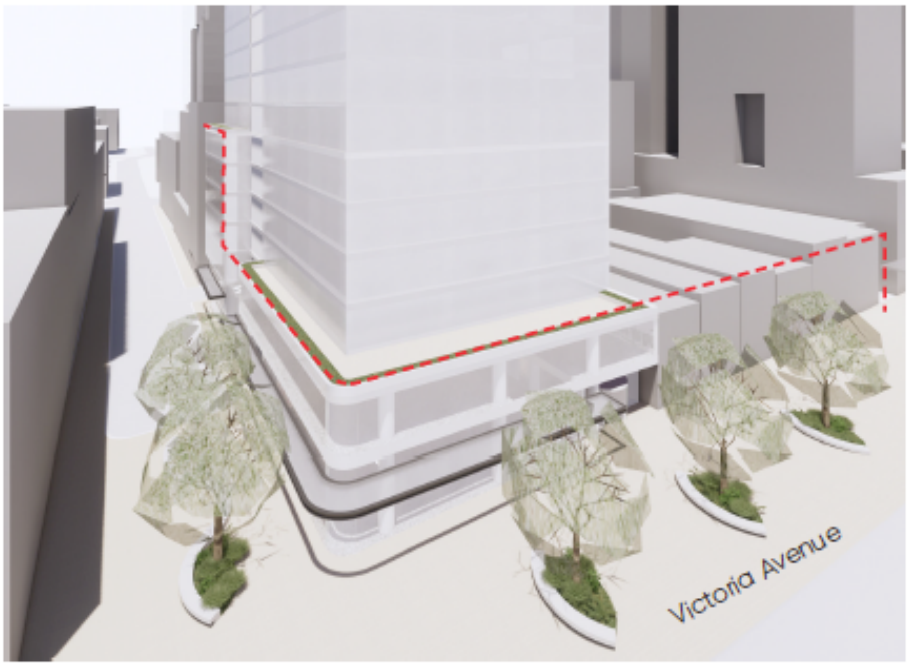


Figure 15: Proposed podium height (Source: Mirvac Design)

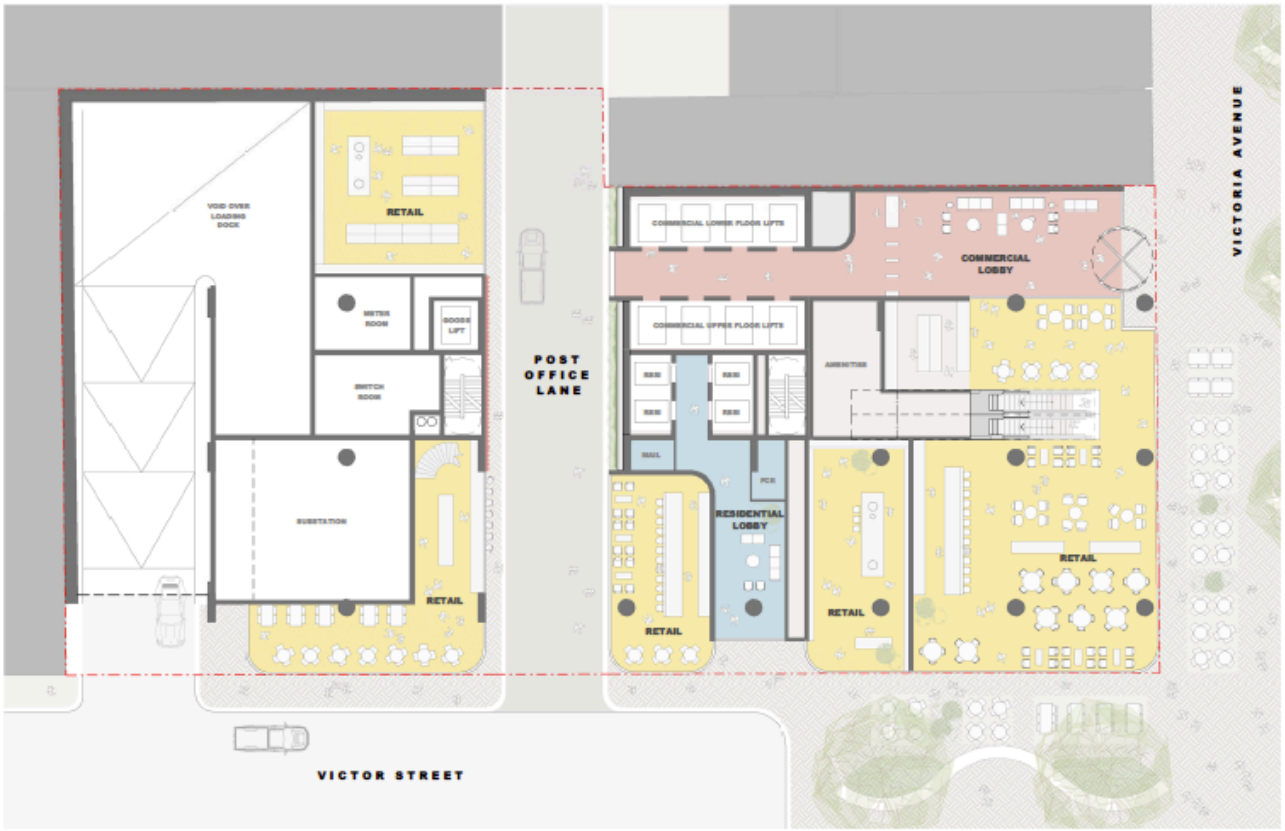


Figure 16: Indicative ground floor level (Source: Mirvac Design)

Figure 17 Indicative commercial floor plate – lower levels (Source: Mirvac Design)

Figure 18 Indicative commercial floor plate – upper levels (Source: Mirvac Design)

Figure 19: Indicative residential floor plate – lower levels (Source: Mirvac Design)

Figure 20: Indicative residential floor plate – upper levels (Source: Mirvac Design)

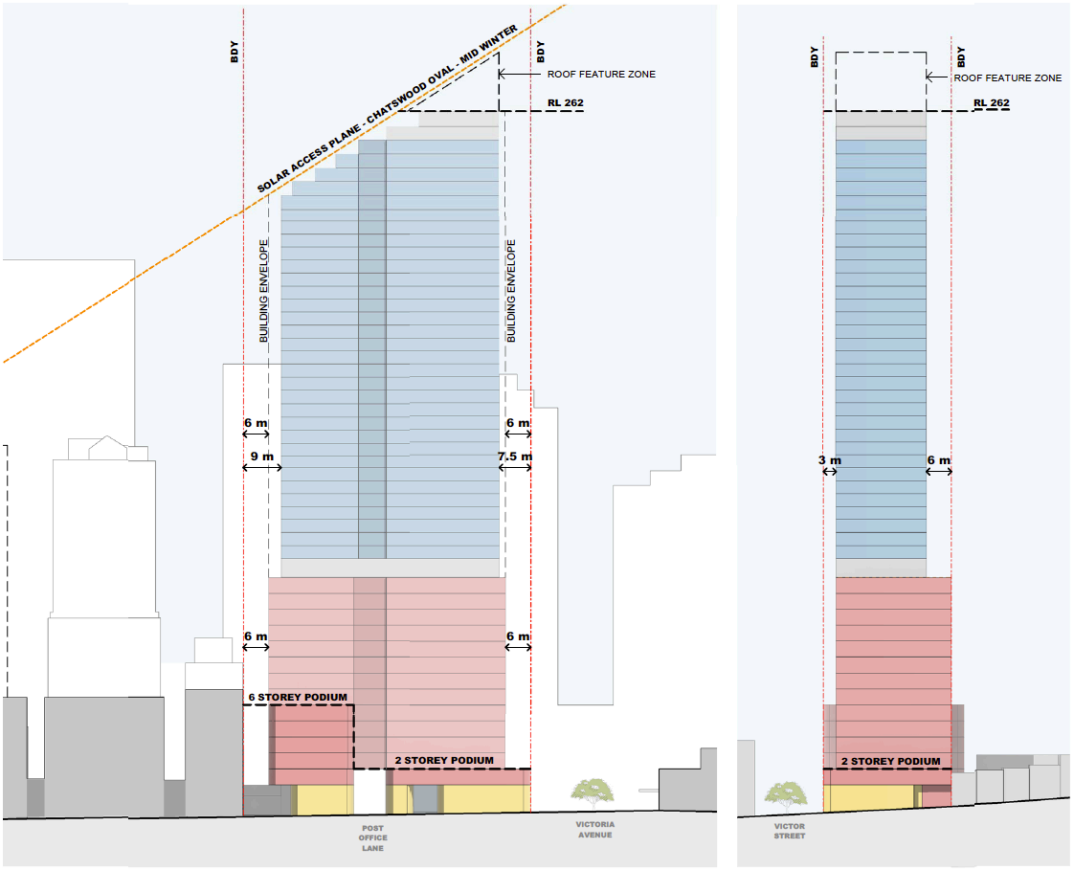


Figure 21: Indicative sections and solar access plane (Source: Mirvac Design)

Figure 22: Visualisation from corner of Victoria Avenue and Post Office Lane (Source: Mirvac Design)

5.3 Delivery of new commercial floor space

A key objective of Council, which is highlighted in its Chatswood CBD Strategy is to protect the potential for commercial floor space within the B3 Commercial Core zone and to restrict residential uses within this area.

DPIE has subsequently advised Council that the protection of a commercial core should focus on the established area to the to the west of Chatswood Station and that mixed use development can be permitted within appropriate parts of the remaining CBD core (i.e. east of the rail line) but only where this results in demonstratable, significant and assured job growth to align with key objectives of the District Plan.

Feasibility and market analysis has been prepared by JLL (Appendix B) and CBRE (Appendix C) which indicate that a stand-alone commercial building is not a viable proposition. JLL has also explored the benefits of delivering the proposed mixed use scheme on the site. The approach removes the need for a substantial commercial pre-commitment and will rely of residential sales to forward fund the provision of a substantial component of commercial GFA. On this basis the residential floor space would effectively subsidise the delivery of the commercial floor space.

JLL has provided a comparison of the proposed lettable commercial space with existing commercial buildings greater than 10,000sqm within the Chatswood CBD. This analysis demonstrates the proposal would be the third largest commercial office building in Chatswood and is generally comparable to most commercial buildings in Chatswood which are greater than 10,000sqm. It is also noted that the proposal would be the largest commercial building on the eastern side of the station, with the only other existing commercial building greater than 10,000sqm in this area being Sage Tower at 67 Albert Street. This further supports the argument that the established commercial core is focused to the west of the station.

Table 6: Comparison to Chatswood commercial buildings

Building name / address	Lettable area (sqm)
The Zenith, 821-841 Pacific Highway	44,034
Citadel Towers (A&B), 799 Pacific Highway	34,333
45 Victor Street and 410-416 Victoria Avenue (proposed)	**16,059**
465 Victoria Avenue	15,637
12 Help Street	15,236
Sage Tower, 67 Albert Avenue	14,836
Chatswood Central Towers, 1-5 Railway Street	14,538
Tower 1, 475 Victoria Avenue	14,092
Tower 3, 495 Victoria Avenue	11,000

JLL has also highlighted that demand for commercial office floor space in Chatswood has been low and that the Chatswood office market competes with other suburban markets which have experienced higher demand. This is further supported by the commercial demand analysis prepared by CBRE (Appendix C) which notes the recent high demand for campus style development in centres such as Macquarie Park, Rhodes and Sydney Olympic Park as well as for commercial office space in Parramatta which has benefited from the current decentralisation policies. JLL also notes that going forward, there will be a greater focus

away from the Chatswood market and into Western Sydney in both the short term (e.g. Parramatta) and long term (e.g. Western Sydney Aerotropolis).

The JLL report highlights the extremely low (if any) growth of commercial development in Chatswood CBD over the past decade with an average of 346sqm added per annum and the most recent major commercial office development being in 1995 as shown in Figure 23.

The Planning Proposal will significantly increase in the employment capacity of the site. When fully occupied the former Australia Post site and the retail tenancies of 414 – 416 Victoria Avenue may have employed up to 200 people at most, and this has reduced since the Post Office site vacated the property and further with the recent closure of a number of retail tenancies. Currently there are less than 55 people employed across the two buildings.

JLL has estimated that the proposal would provide for up to 1,578 jobs based on the commercial and retail floor space. This would deliver a significant portion of the employment target for the Chatswood CBD as identified in the District Plan (up to 25%). Further, when combined with other commercial proposals within the Chatswood CBD, being the RSL site (2,518 jobs) and the Mandarin Centre (1,664 jobs) up to 91% of the jobs target could be achieved should other proposals proceed (see Figure 24).

The proposed mixed use scheme presents a feasible development option to deliver a significant component of commercial which meets the objectives of the District Plan, along with retail use to complement the wider precinct and enhance street activation and new housing in a highly accessible location with access to services, facilities and public transport.

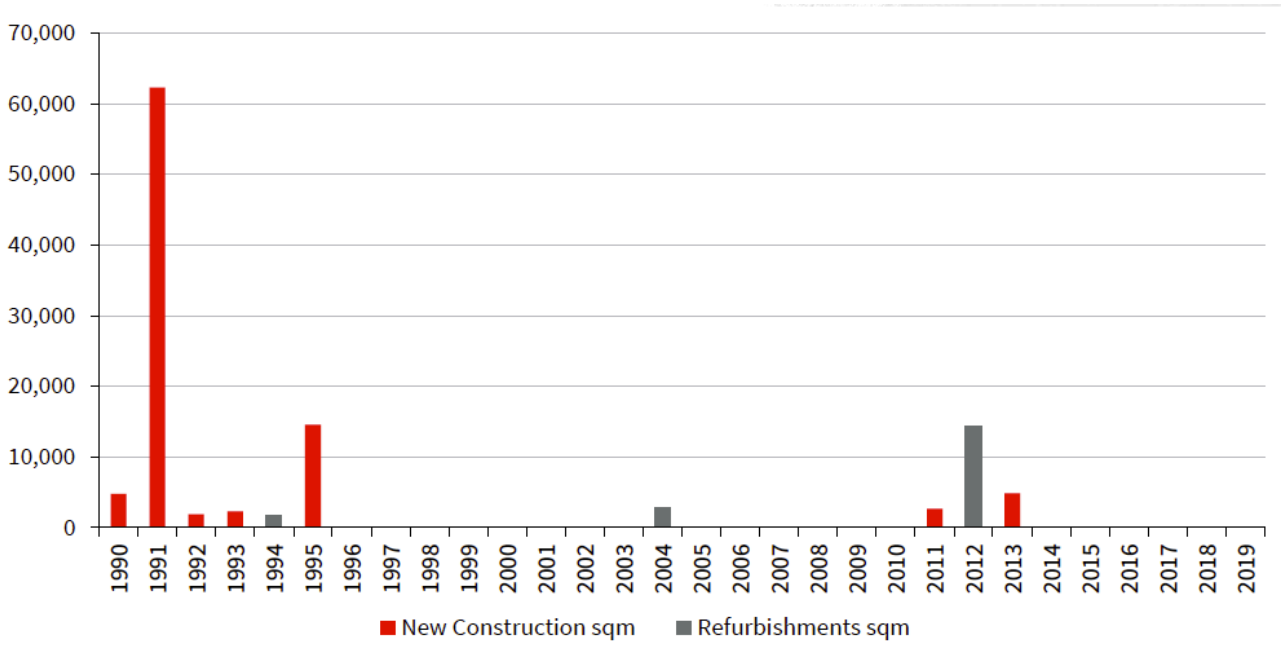


Figure 23: Historic commercial floor space supply (Source: JLL)

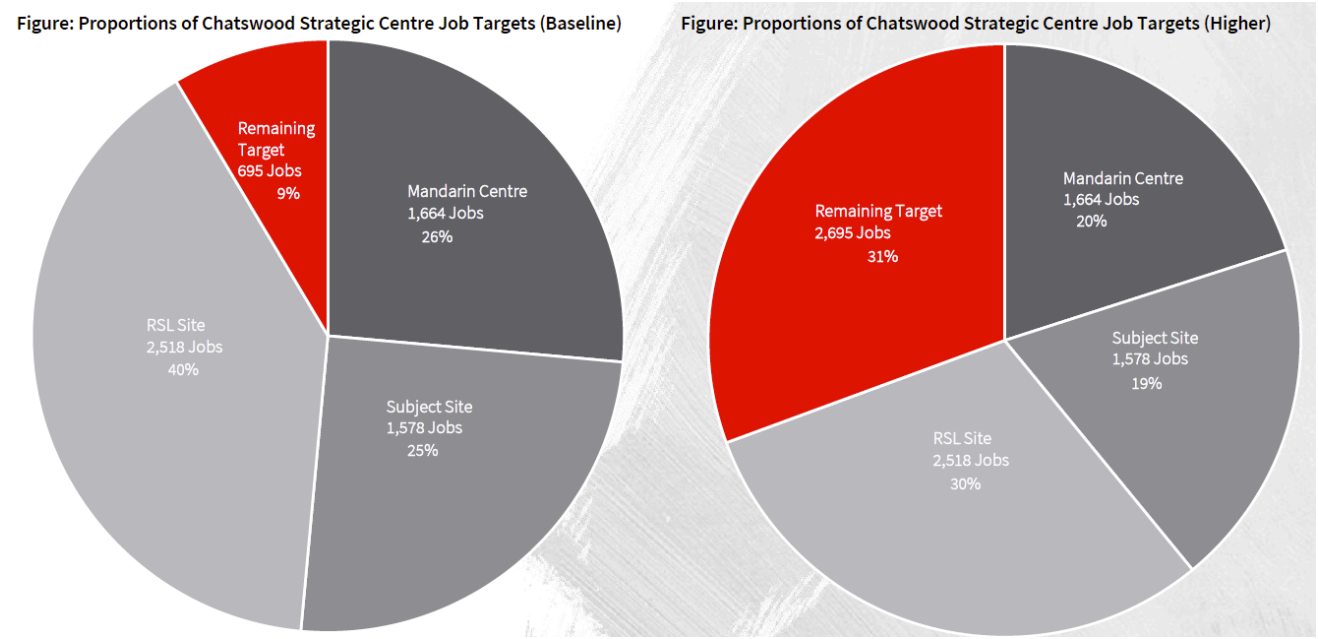


Figure 24: Consideration of Chatswood jobs target (Source: JLL)

5.4 Public domain improvements

The proposal will enhance the public domain through improved street activation and built form interfaces as well as through the upgrade of Post Office Lane to provide a high quality pedestrian friendly street providing safe and direct access to Chatswood Interchange.

As part of the development the applicant will deliver new street paving, lighting, green walls, public art and fine grain activation along Post Office Lane significantly enhancing amenity. This approach will ensure vehicular access is maintained for buildings to the west of the site and enhance the potential for these buildings to locate secondary frontages facing the laneway further enhancing street activation. The upgrade of Post Office Lane will be included as a requirement in the draft site specific development controls proposed for inclusion in the Willoughby DCP (Appendix F).

Figure 25: Post Office Lane – Visualisation (Source: Mirvac Design)

5.5 Design process

The Concept Design Scheme that has been prepared to inform this Planning Proposal is the result of extensive design provenance having been informed by detailed design analysis including the following:

- FJMT streetscape analysis 2016
- Architectus Chatswood CBD Strategy 2016
- FJMT Concept Design 2016
- Architectus review and advice on the FJMT Concept Design 2017
- Mirvac Design review and updated Concept Design August 2020.

The applicant is committed to delivering high quality design on the site noting its scale and prominent location within the Chatswood CBD. In recognition of the highly resolved nature of the proposal and the extensive design work already undertaken a competitive design process is proposed which as a benchmark, is generally consistent with the City of Sydney competitive design alternatives process.

Under this process the developer is proposing to invite a minimum of three architectural firms with demonstrated experience in the design of high quality buildings to participate in the process. The selected firms are supplied with a design process brief to respond to.

It is envisaged that the consent authority would nominate an independent representative as observer of the competitive design process to verify that the process has been followed appropriately and fairly. The developer's selection panel determines the outcome of the selection process.

A competitive design report is required to be submitted to the consent authority as part of the submission of the relevant development application which:

- Includes a copy of the brief issued to the competitors
- Includes each of the design alternatives considered
- Includes an assessment of the design merits of each alternative
- Sets out the rationale for the choice of the preferred design, including how it best exhibits high quality design.

The designer of the winning scheme would then be appointed as the Design Architect to:

- Be the concept lead architect for preparation of the Development Application
- Either prepare the drawings or have a lead architect role in the preparation of construction certificate and contract documentation
- Maintain continuity during the construction phases to the completion of the project
- Provide a statement at the end of the project.

This process will ensure the delivery of high quality design for the development, and accordingly has been reflected in the draft site specific development controls proposed for inclusion in the Willoughby DCP (Appendix F).

5.6 Affordable housing

The applicant is committed to delivering a mix of dwellings on the site including affordable housing. Affordable housing is proposed to be delivered at a rate of 4% of total residential floor space. It is noted that upon an examination of Council Affordable Housing schemes 4% of residential floor space currently represents close to best practice. The proposal has sought to maintain a balance between meeting the primary strategic objective of generating commercial floorspace and the need for affordable housing. The distribution and mix of affordable housing dwellings would be determined at the DA stage.

5.7 Sustainability

Principles of sustainable design are considered at a broad strategic level and are incorporated into all aspects of the project from design conception and the construction process, through to post-completion. The proposal is capable of achieving sustainability measures which will be outlined during the detailed design phases.

5.8 Proposed Willoughby LEP Amendments

The Planning Proposal seeks to make the following amendments to the Willoughby LEP:

- Allow shop top housing as an additional permitted use across the entire site
- Increase the maximum height to RL262m (excluding roof feature) across the entire site and remove the 7m height limit fronting Victoria Avenue noting that a street wall height control has been included in the draft site specific development controls
- Apply a maximum FSR of 20:1 and include a site specific control requiring a minimum FSR of 8:1 for non-residential uses.

A more detailed outline of the LEP changes and proposed mapping is included in Section 7.

5.9 Proposed Willoughby DCP Amendments

Draft site specific development controls are also proposed for inclusion in the Willoughby DCP (Appendix F) including to establish the following detailed controls to guide future development:

- Building height and roof feature zone
- Built form
- Street activation
- Public domain and landscaping
- Competitive design process
- Car parking.

5.10 Voluntary planning agreement

The applicant seeks to enter into discussions with Council regarding preparation of a Voluntary Planning Agreement (VPA) to support the proposal. It is envisaged that the VPA would make provisions for:

- Establishing a minimum 8:1 FSR for non-residential GFA
- The acquisition or other arrangements with council and upgrade and embellishment of Post Office Lane
- Delivery of 4% of the total residential floor space as affordable housing.

6 Objectives and intended outcomes

The objectives and intended outcomes of the proposal are outlined below:

- To amend the planning controls to facilitate a viable mixed use development scheme which achieves a high portion of employment generating uses to align with State and local objectives for the Chatswood Strategic Centre
- To implement the draft Chatswood CBD Strategy as it relates to the site, noting DPIE's comments on the potential for residential uses to the east of the train line
- To facilitate development of a consolidated site with the potential to deliver a commercial floor plate which meets requirements for A grade office space
- To ensure solar access is retained to key areas of open space by establishing appropriate maximum building heights
- To deliver a contextually appropriate building which delivers high quality design outcomes
- To support public transport patronage and reduce private vehicle travel demand by locating a mix of retail, commercial and residential uses in a highly accessible location within the Chatswood CBD with direct access to Chatswood Interchange
- To enhance street activation through the location of ground floor retail uses along Victor Street, Victoria Avenue and Post Office Lane
- To enhance vibrancy within the Chatswood CBD and in particular the Victoria Avenue Mall through the increase of the worker and resident populations and an improved public domain
- To improve connectivity through the upgrade of Post Office Lane enhancing pedestrian access to Chatswood Interchange whilst maintaining access for landholdings to the west of the site
- To deliver affordable housing at a rate of 4% of the total residential floor space
- To facilitate the delivery of a high quality proposal which will result in the renewal of the subject sites and laneway.

7 Explanation of provisions

The Planning Proposal seeks to achieve the intended outcomes outlined at Section by making amendments to the Willoughby LEP as outlined in Table 7.

Table 7: Proposed LEP Amendments

Control	Existing	Proposed
Zoning	B3 Commercial Core	B3 Commercial Core
Additional permitted uses	Shop top housing is identified as an additional permitted in Schedule 1 for 410-416 Victoria Avenue.	Shop top housing to be applied as an additional permitted use across the entire site by amending the Special Provisions Area Map to show the entire site as Area 5 as shown in Figure 28.
Height of buildings	12m / 14m Clause 4.3A requires lots fronting Victoria Road a maximum height of 7m applies for the first 1 metres of the building back from the road frontage.	Increase to RL 262m (excluding roof feature, see below) by amending the Height of Buildings maps as shown in Figure 26. Remove the application of Clause 4.3A noting that street frontage height would be addressed in the site specific development controls.
Architectural Roof Features	Clause 5.6 currently allows for development consent to be granted for buildings which exceed the height limit for an architectural roof feature.	No change.
Floor space ratio	2.5:1	Apply a maximum FSR of 20:1 by amending the FSR map as shown at Figure 27. Require a minimum non-residential FSR of 8:1 through inclusion of a site specific provision within Clause 4.4A and identification of the site as Area 15 on the FSR map (Figure 27)
Active Street Frontages	Clause 6.7 currently requires active street frontages along the Victoria Avenue and Victor Street site frontages.	No change

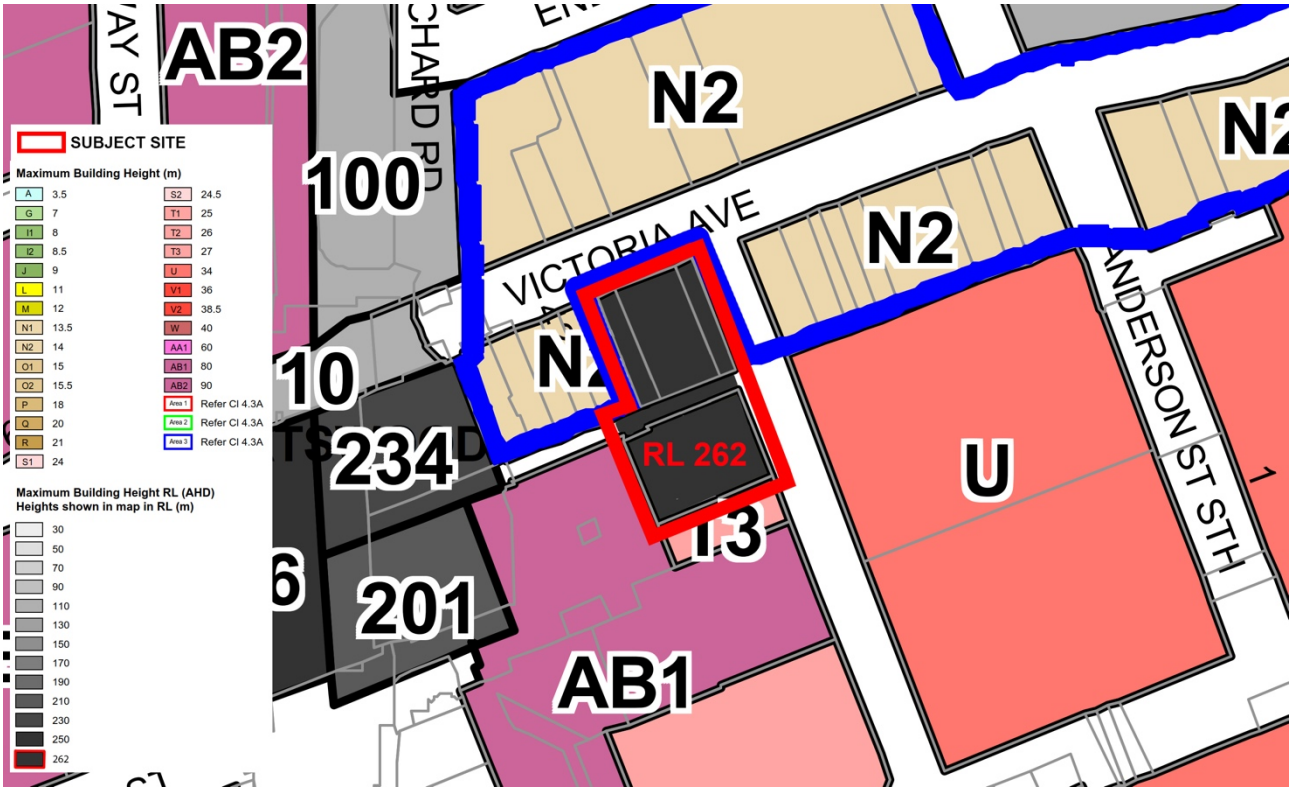


Figure 26: Proposed Height of buildings map (Source: Mirvac Design)

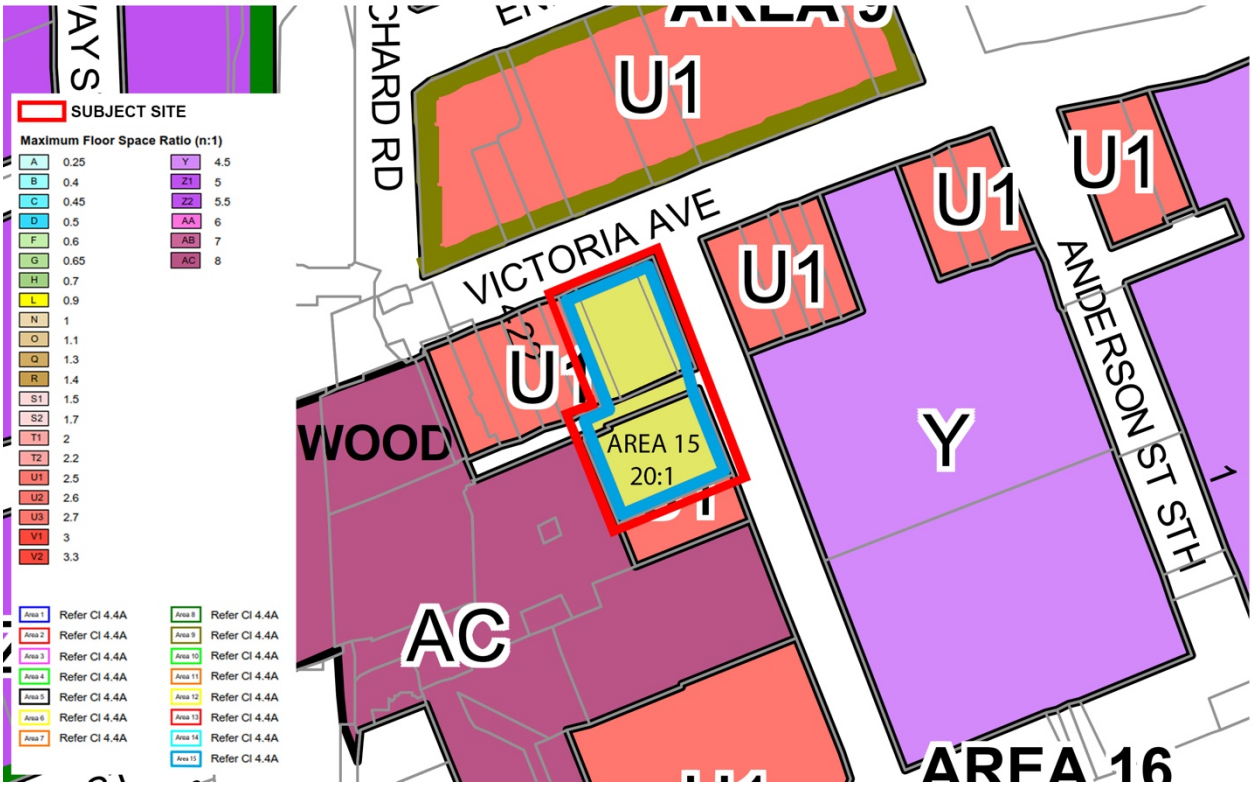


Figure 27: Proposed Floor Space Ratio map (Source: Mirvac Design)

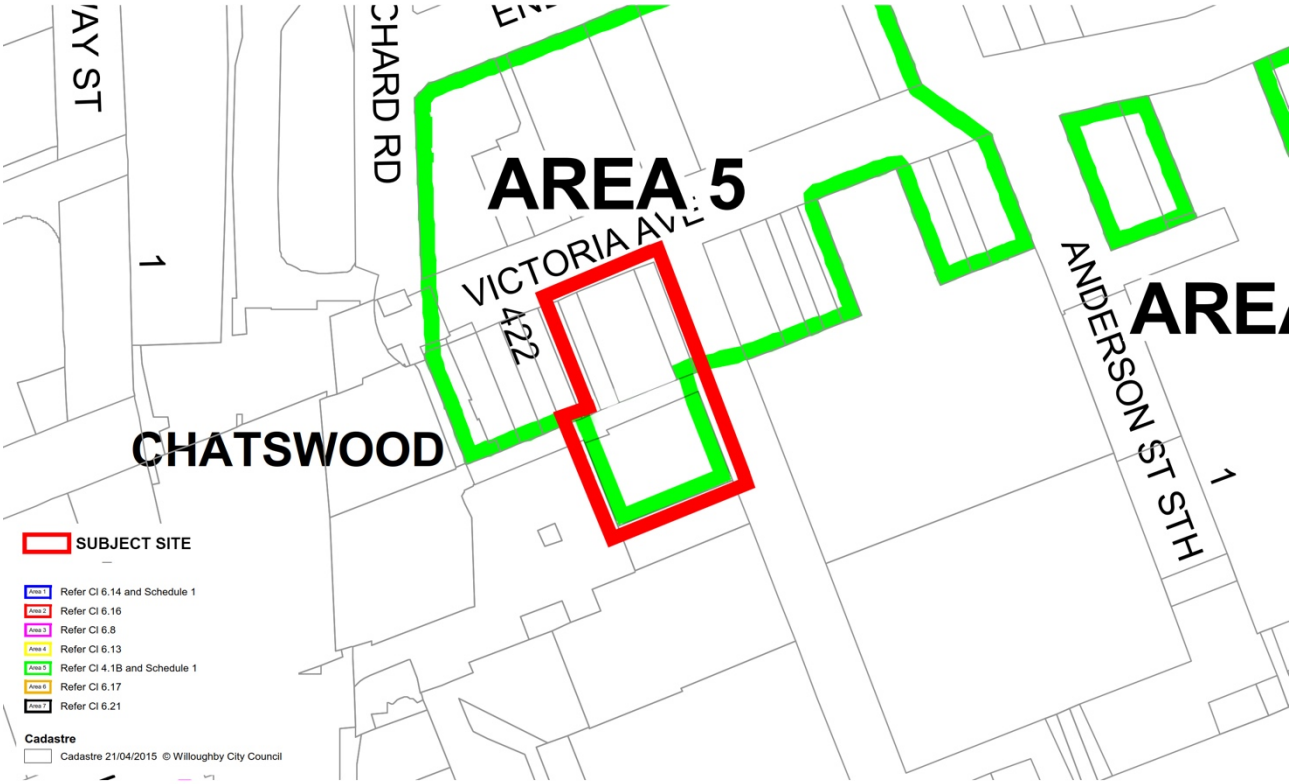


Figure 28: Proposed Special Provisions Area map (Source: Mirvac Design)

8 Justification

8.1 Need for the Planning Proposal

Q1. Is the Planning Proposal a result of any strategic study or report?

Yes. The Planning Proposal has been informed by the Chatswood CBD Strategy. The proposal is generally consistent with the draft Strategy, noting the advice of DPIE in relation to the potential to locate residential uses to the east of Chatswood Station subject to the delivery of a significant level of job growth to align with the District Strategy. A detailed assessment of the proposal against this and other relevant State and local strategies is provided in Section 4.

Q2. Is the Planning Proposal the best means of achieving the objective or intended outcomes or is there a better way?

The proposal is the best means of achieving the intended outcome, as amendments to the Willoughby LEP are required to amend the planning controls which apply to the site.

8.2 Relationship to Strategic Planning Framework

Q3. Is the Planning Proposal consistent with the objectives and actions of the applicable regional or sub-regional strategy (including the Sydney Metropolitan Strategy and exhibited draft strategies)?

The Planning Proposal is consistent with the Greater Sydney Region Plan and the North District Plan as outlined in Section 4. In particular the Planning Proposal would result in the delivery of a substantial component (up to 25%) of the jobs target for Chatswood Strategy Centre which is identified in the North District Plan.

Q4. Is the Planning Proposal consistent with a council's local strategy or other strategic plan?

The proposal has been considered against the Willoughby LSPS and is consistent with all the relevant strategic directions and actions as outlined at Section 4.3.

Q5. Is the Planning Proposal consistent with applicable State Environmental Planning Policies

An analysis of the consistency of the proposed amendments with relevant State Environmental Planning Policies (SEPPs) is listed in **Table 8**.

Table 8: Analysis against State Planning Policies

Policy	Assessment
SEPP 65 – Design Quality of Residential Apartment Buildings (SEPP 65)	SEPP 65 seeks to promote good design of apartments through the establishment of the Apartment Design Guide. The proposal has been designed in accordance with the requirements of both SEPP 65 and the Apartment Design Guide as outlined in the urban design report (Appendix A). A detailed assessment would be provided at the development application stage.
SEPP (Building Sustainability Index: BASIX) 2004	SEPP BASIX requires all future residential developments to achieve mandated levels of energy and water efficiency, as well as thermal comfort. BASIX Certificates would be included as part of future development applications to demonstrate compliance with SEPP BASIX requirements.

Policy	Assessment
SEPP (Infrastructure) 2007:	The Infrastructure SEPP sets out consultation requirements and identifies matters to be considered in the assessment of development adjacent to rail corridors and for traffic generating development. The Infrastructure SEPP also sets out noise criteria for development adjacent to rail corridors and busy roads, which is supported by an Interim Guideline which aims to reduce the health impacts of rail and road noise and adverse air quality on sensitive adjacent development. Consultation would be undertaken with relevant rail authorities as required at the development application stage of the proposal to facilitate any compliance with the requirements of the Infrastructure SEPP and Interim Guideline where applicable.

Q6. Is the Planning Proposal consistent with the applicable Ministerial Directions?

The proposal is consistent with all relevant Ministerial directions under Section 9.1 of the *Environmental Planning and Assessment Act 1979* (previously Section 117).

An assessment of the proposal against the applicable Section 9.1 directions is supplied in **Table 9.**

Table 9: Analysis against Ministerial Directions

Ministerial Direction	Assessment
1. Employment and resources	
1.1 Business and Industrial zones	The direction requires the relevant planning authority (RPA) to ensure that a Planning Proposal relating to an existing or proposed business zone must retain areas and locations of existing business zones and not reduce the total potential floor space area for employment uses and related public services in business zones. The Planning Proposal is consistent with the direction at is does not seek to amend the existing B3 Commercial Core zone. Whilst the Planning Proposal will expand the area where shop top housing is permissible it will significantly increase the floor space potential for employment uses.
2. Environment and heritage	
2.1 Remediation of contaminated land	The direction replaces the previous provisions of *State Environmental Planning Policy No. 55 – Remediation of Land* (SEPP 55) which related to Planning Proposals. It requires a preliminary site investigation where a change of land use is proposed for land which may be contaminated as a result of existing or past uses is proposed. A preliminary site investigation has been prepared which concluded that the site can be made suitable for the proposed mixed-use redevelopment in accordance with key recommendations. Future development applications will be subject of SEPP 55 which requires any contamination to be identified and appropriately remediated.

Ministerial Direction	Assessment
3. Housing, infrastructure and urban development	
3.1 Residential zones	The direction applies to planning proposals which effect land within a residential zone or any other zone where significant residential development is permitted. The Direction requires the relevant planning authority (RPA) to ensure that a Planning Proposal relating to residential land must include provisions to: – broaden the choice of building types and locations available in the housing market – make more efficient use of existing infrastructure and services – reduce the consumption of land for housing and associated urban development on the urban fringe, and – be of good design. The proposed LEP amendments will provide a greater range of housing options with a variety of apartment types and sizes. The location of high density housing adjacent to the Chatswood Interchange makes efficient use of existing infrastructure and services and new residents will have close access to a range of services and retail amenity. As discussed elsewhere in the report the envelope has potential to deliver high quality design and amenity and to enhance the public domain in the CBD area.
3.4 Integrating land use and transport	The direction requires the RPA to ensure that the Planning Proposal includes provisions consistent with the principles of Integrating Land Use and Transport as outlined in key polies and guidelines. The proposal meets these principles by locating retail, commercial and residential uses in a highly accessible location within the Chatswood CBD and direct access to Chatswood interchange. The proposal will also improve the surrounding pedestrian environment and enhance access to Chatswood Station.
3.5 Development near regulated airports and Defence airfields	This direction applies to Planning Proposals on land near a regulated airport. The direction requires the RPA to undertake consultation with the Commonwealth Department responsible for airports and the lessee / operator of the airport. It also requires the RPA to prepare appropriate development standards, such as height controls, for land affected by the prescribed airspace and not to allow development types that are incompatible with the current and future operation of that airport. The proposed maximum building height (RL262 excluding roof feature) is below the Sydney Airport Pans-Ops limitation for Chatswood of 340.0. Accordingly, the proposal would not impact on the operations of Sydney Airport. Consultation would be carried out with the relevant Commonwealth Government agencies and the airport operator / lessee during the public exhibition of the proposal, if required.

Ministerial Direction	Assessment
4. Hazards and risks	
4.1 Acid Sulfate soils	The direction applies to land identified as having a probability of containing acid sulfate soils. The Willoughby LEP identifies the site as having probability of containing acid sulfate soils (Class 5). Accordingly, more detailed assessment of the ground conditions will occur as part of the detailed design and development application phase. Importantly, if there is any presence of acid sulfate soils, these can be managed and redevelopment is capable of occurring.
7. Regional planning	
7.1 Implementing the Metropolitan Plan	This direction requires the RPA to ensure that a Planning Proposal is consistent with A Plan for Growing Sydney. A Plan for Growing Sydney was superseded by the Greater Sydney Region Plan in March 2018. The proposal is consistent with The Greater Sydney Region Plan as outlined in Section 4.1.

8.3 Section C: Environmental, social and economic impacts

Q7. Is there any likelihood that critical habit or threatened species, populations or ecological communities, or their habitats, will be adversely affected as a result of the proposal?

The proposal is contained within a site which is cleared of vegetation. No critical habitat or threatened species will be affected as a result of this proposal.

Q8. Are there any other likely environmental effects as a result of the Planning Proposal and how are they proposed to be managed?

8.3.1 Overshadowing

The Planning Proposal has considered the impacts of overshadowing on the public domain and existing and proposed residential uses.

The proposal is able to meet recommendations of the Chatswood CBD Strategy for maintaining solar access in midwinter to key spaces within the public domain including:

- Victoria Avenue (between interchange and Archer St) 12pm-2pm
- Garden of Remembrance 12pm-2pm
- Chatswood Oval 11am-2pm.

The solar access plane for overshadowing to Chatswood Oval is determined by the sun angle between 11.15 and 11.45 as shown at Figure 29

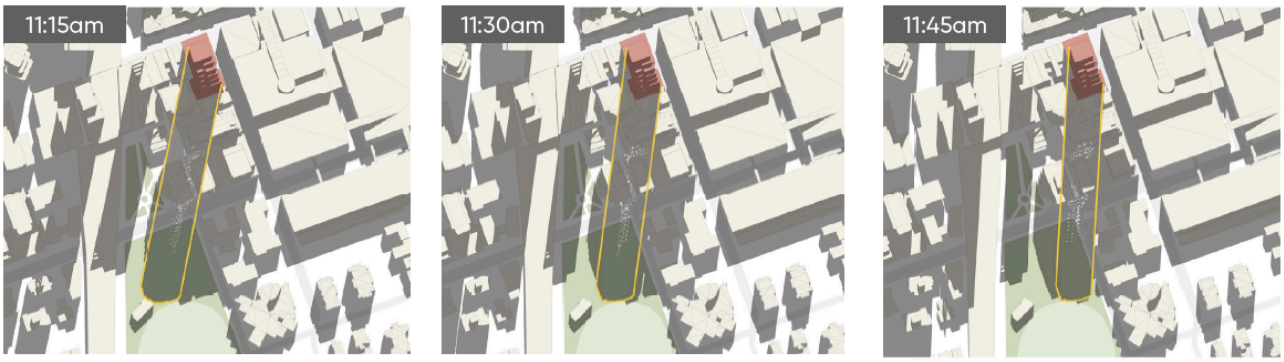


Figure 29: Chatswood Oval shadow diagrams (Source: Mirvac Design)

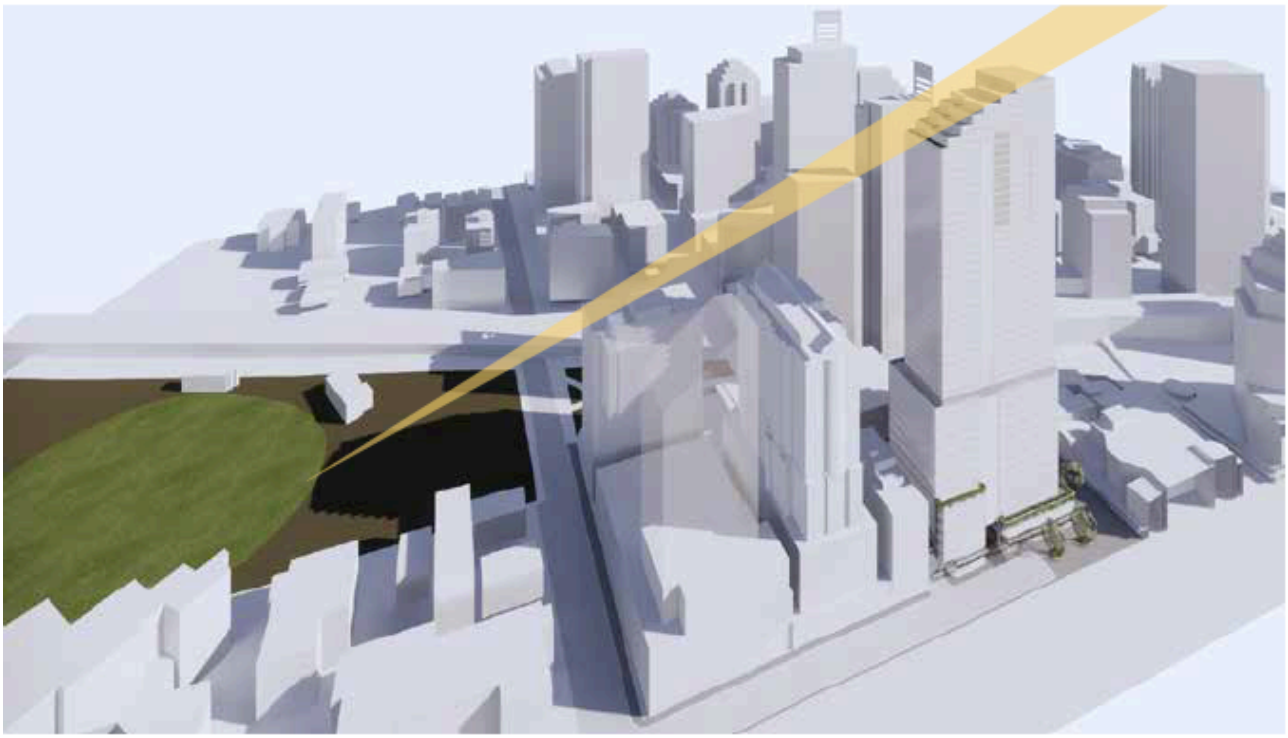


Figure 30: Solar access plane to Chatswood Oval (Source: Mirvac Design)

The north-south orientation of the proposed tower ensures all apartments enjoy excellent solar access and generous building separation to nearby towers while apartment depth is kept to a minimum so as to generate a slender tower form and to allow sunlight to penetrate deep into habitable spaces.

Solar access analysis has also been undertaken to demonstrate that the proposal will ensure an appropriate level of solar access to surrounding residential uses. At least two hours of solar access would be maintained to the façade of the north-facing apartment of the Sebel Tower and to the façade of north and east-facing apartments in the Metro Towers.

Minor overshadowing impacts are seen as acceptable given the overwhelming strategic objective to deliver a major employment outcome in the heart of the CBD. It is noted that given the more slender nature of the mixed use component the level of offsite impact is likely less than a full commercial outcome.

8.3.2 Visual impact and views

The high quality design and sensitive street interface and setbacks of the proposal will ensure that the streetscape is enhanced. Further the single slender tower will minimise visual impacts and allow for view sharing with buildings in the surrounding area including the over-station towers and the Sebel tower.

The assessment of views is seen as acceptable given:

- The subject site is within the centre of the Chatswood CBD, is key to meeting Councils strategic objective for the centre and as such it is reasonable to expect high density development
- The proposal is consistent with the built form paramaters of the Chatswood CBD Strategy developed by Council
- The views obtained from nearby residential flat buildings are private views and not public views and therefore the benefit of providing a major employment outcome and new housing within close proximity of public transport and other facilities within the centre is considered to outweigh the impact of the partial view loss that occurs as a result of the proposed development.

8.3.3 Traffic and transport

A traffic assessment has been prepared by GTA Consultants (Appendix D) to support the planning proposal.

The assessment highlights the significant benefits of the site's accessibility to sustainable transport options noting its location within the Chatswood CBD and adjacent to Chatswood Interchange. The Chatswood Interchange is a major public transport hub providing access to the Northern, North Shore and Western Lines as well as the Sydney Metro rail network. It is also the major bus interchange for the northern suburbs of Sydney providing access between key destinations including Sydney CBD, Manly, Lane Cove, Bondi Junction and Macquarie Park. The assessment highlights the benefits of the site in terms of increasing sustainable transport mode share and reducing demand for private vehicle trips.

SIDRA modelling was carried out as part of the traffic assessment and considered the impact of the proposal on key intersections in the vicinity of the site. The modelling demonstrates there is adequate capacity in the surrounding road network to cater for the traffic generated by the planning proposal and that satisfactory operating conditions would be achieved post development for the following intersections.

- Victor Street/Albert Avenue (Level of service A/B)
- Orchard Road/ Albert Avenue (level of service B)
- Thomas Lane / Albert Avenue (level of service A)

The intersection of Pacific Highway and Albert Street is identified as already operating at or near capacity during peak periods. The modelling demonstrated that the development traffic would have a minor impact on operation of this intersection with the additional traffic representing less than 1% of the base traffic volumes through this intersection. It is also important to note that this existing congestion on the wider traffic network is likely to further encourage increased mode share of sustainable transport options, particularly given the location's access to services, facilities and public transport.

A car parking assessment was also undertaken which recommends car parking rates as outlined in Table 10.

Reduced car parking rates, compared to the Willoughby DCP rates, are proposed for the retail and commercial floor space noting the site's public transport accessibility and to reflect changes in market demand for parking associated with commercial tenancies.

The recommended residential car parking rates are consistent with the Willoughby DCP rates for residential flat buildings within railway precincts. The traffic assessment notes that residential parking is desirable for residents who own a vehicle for other trip purposes, however, not necessarily to use for commuting.

Given the site's highly accessible location residents are likely to favour active and public transport for peak trips with car ownership providing accessibility for recreation, shopping and other activities outside of peak times. Accordingly, it is considered that the residential parking is unlikely to significantly impact on trip generation during peak periods.

No visitor parking is proposed in recognition of the site's accessibility to public transport as well as the location of three off-street public car parks within the vicinity, together with the high likelihood of visitor parking spaces in this location being susceptible to misuse by residents as well as visitors to the retail precinct.

Five car share spaces are also proposed to be provided on-site providing alternative options for travel.

Table 10: Car parking rates

Use	Car parking rates
Residential: • 1 bedroom • 2 bedroom • 3 bedroom • Visitor	 • 1 space per dwelling • 1 space per dwelling • 1.25 spaces per dwelling • 0 spaces
Retail / commercial	1 space per 330sqm

8.3.4 Preliminary site assessment

A preliminary site investigation has been prepared by Douglas Partners (Appendix E) to consider potential contamination of the site and any implications for the proposal.

The investigation concluded that there was a low to moderate risk of contamination of soil and groundwater due to the indicators of the possible presence of underground storage tanks on the premises and made recommendations for further investigations, including for soil (and possibly groundwater) sampling across the site following demolition.

It noted that a validation report for the removal of any tank would be required to be prepared by a suitably qualified environmental consultant.

The report concluded the findings are typical of a site in this location and as such, that the site can be made suitable for the proposed mixed-use redevelopment in accordance with the recommendations. Further contamination investigations would be carried out at the development application stage.

Q9. Has the planning proposal adequately addressed any social or economic effects?

8.3.5 Economic impacts

The proposal will generate economic benefits for the Chatswood CBD and wider area by securing a substantial commercial development within the Chatswood CBD delivering the third largest commercial office building in the Chatswood CBD and the first of its scale built in the area since 1995.

Both JLL and CBRE have provided commercial market advice to support the proposal which is summarised below.

JLL Chatswood Office Market and Feasibility Analysis

- Feasibility analysis of a potential commercial only scheme indicates a clear lack of viability for the site with the economic rent (rent required to support the development) much higher than the market rent.
- The proposed mixed use scheme would be the third largest in the Chatswood market and would materially contribute to the Chatswood employment target
- The proposal has potential to deliver 1,578 jobs (on completion) which represents a significant component of the jobs target for Chatswood (up to 25%). Further, when combined with other commercial proposals within the Chatswood CBD, being the RSL site (2,518 jobs) and the Mandarin Centre (1,664 jobs) up to 91% of the jobs target could be achieved should other proposals proceed, within the short term.
- The residential uses are an enabler to the commercial development, without which a commercial only scheme won't be developed. The only way to deliver on the desired commercial outcome is to also allow residential.
- We are heading into a period which will support significantly less office based development noting over the last 25 years Chatswood has failed to attract office development.
- While the continued growth of suburban office markets may suggest growth in Chatswood, Chatswood competes with other suburban markets for tenants. Going forward, there will be a greater focus away from the Chatswood market and into Western Sydney in both the short term (e.g. Parramatta) and long term (e.g. Western Sydney Aerotropolis). It is also likely that other suburban office markets will be more desirable than Chatswood going forward.
- The Chatswood office market poses a number of challenges including lower market rents, high incentives, longer letting up, smaller scale tenants and real challenges in getting a large pre commitment. Further, Chatswood typically services the smaller user market (0 to 2,000 sqm). These observations combined with the likely requirement for a large pre-commitment provides further challenge for large scale office only development

CBRE Chatswood Office Market Analysis

- Chatswood remains a fundamentally fragile office market, prone to sustained periods of stagnant rental growth and elevated vacancy which will be exacerbated in coming months by the detrimental impact of Covid 19.
- Chatswood fundamentally lacks a critical mass of quality office stock to underpin office development and it is questionable whether the required tenant demand exists to justify its development
- Having residential underpin a development enables the early delivery of alternative uses such as office and retail, which would only be feasible as part of a larger, predominantly residential mixed use scheme
- 10,000sqm of commercial net lettable area, as part of a mixed development, would be a more optimal outcome for the site. However even at this size there would be significant challenges in obtaining a viable development outcome.

8.3.6 Social impacts

The proposal is not expected to generate any significant negative social impacts and will realise a number of social benefits for the Chatswood CBD including the delivery of an enhanced public domain, improved pedestrian safety and amenity, additional jobs, and increased dwelling supply including affordable housing in a highly accessible location.

Q10. Is there adequate social infrastructure for the planning proposal

The site is located within an area with excellent access to social infrastructure including high frequency public transport including bus and rail, open space including Chatswood Park and Chatswood Oval and community facilities including Dougherty Community Centre and Chatswood Library. The site also has excellent access to retail and services being located within the retail precinct of Chatswood CBD and is adjacent to Chatswood Westfield and Chatswood Interchange and accessible to Chatswood Chase.

The proposal will deliver public domain enhancements through the delivery of upgrades to Post Office Lane and will provide local infrastructure contributions towards social infrastructure.

9 Consultation

This Planning Proposal has been developed through an extensive design and consultation process with Council and DPIE. The consultation undertaken in relation to the previous Planning Proposal and this revised Planning proposal is outlined Table 11.

Table 11: Consultation chronology

Site attribute	Description	Comments
7 April 2016	Meeting with Willoughby General Manager and Director of Planning	At this initial meeting Mirvac presented their intention to redevelop the amalgamated site and a proposal to hold a number of design workshops with Council was accepted.
6 May 2016	Design workshop with Council	FJMT led by Architect Richard Frances-Jones presented its design and built form analysis of the surrounding CBD area and proposed envelopes for the amalgamated site consistent with the scale of the over station development to the west (approx. RL265).
22 June 2016	Design workshop with Council	A follow up urban design workshop was provided at Council's request with FJMT to better understand the built form analysis and recommendations.
9 August 2016	Meeting with Council and Architectus	A further meeting was held with Council and Architectus who had recently been engaged to the prepare the Chatswood CBD Strategy.
15 September 2016	Meeting with Council	Council provided feedback on the proposal including that the envelope put forward by Mirvac was substantially supported by the Architectus study however Council had a preference for an entirely commercial outcome on the site.
November 2016 – March 2017	Exhibition of draft District Plan	The draft North District Plan was exhibited which included jobs targets for Chatswood Strategic Centre.
8 December 2016	Meeting with Council	Meeting with Council Planning staff to discuss release of Chatswood CBD Strategy. Council reiterated that the Strategy supports the envelope but recommends full commercial zoning for site.
22 December 2016	Previous Planning Proposal lodged with council	The proposal sought an FSR of 22.4:2 with a residential component of 17.4:1 and a commercial component of 5:1.
February – March 2017	Exhibition of Draft Chatswood CBD Strategy	Chatswood CBD Strategy recommended protection of employment uses in the B3 Commercial Core. For the site it recommended a base FSR of 2.5:1 and no maximum FSR for commercial uses.
3 February 2017	Meeting with Council	Meeting with Council staff to discuss timing and process for consideration of a Planning Proposal.

Site attribute	Description	Comments
3 March 2017	Advice to Willoughby Council from Architectus regarding the proposal	The advice was generally supportive of the built form envelope however it raised issue with the mixed-use nature of the proposal, and quoted input from BIS Shrapnel regarding desirability of commercial uses, this advice has not been released. Other minor urban design issues were raised which have been addressed in the revised proposal. The issues raised by Architectus are considered and addressed in Section 1.1.
6 March 2017	Briefing of Willoughby Councilors	Mirvac gave Willoughby Shire Councillors a briefing at their closed workshop in advance of their consideration of the Chatswood CBD Strategy. No advice or feedback was received.
17 March 2017	Submission to Chatswood CBD Strategy	Mirvac made a submission to the Strategy indicating support for the built form envelope and providing justification for a mixed use proposal.
24 March 2017	Meeting with Council	Mirvac met with Council staff to discuss VPA offer and progression of proposal.
27 March 2017	Letter to Council	Letter to Council seeking clarification on: • Configuration of the laneway and the line of sight from Victor Street to the station • Mix and ratio of building use • Requirement for parking.
26 June 2017	Council adopts the CBD Strategy	Council resolved to forward a copy to DPIE and Greater Sydney Commission for endorsement and begin preparation of amendments to Willoughby LEP and Willoughby DCP.
11 June 2017	Meeting with Council	Meeting to discuss consideration of the proposal.
27 July 2017	Meeting with DPIE	Meeting to brief DPIE on the Planning Proposal and discuss DPIE's review of the Chatswood CBD Strategy.
27 September 2017	Submission to DPIE	Mirvac wrote to DPIE regarding the CBD Strategy and seeking that DPIE adopt the built form recommendations of the Strategy and maintain the site for mixed use.
16 October 2018	Meeting with DPIE	Meeting to discuss submission.
October to December 2017	Revised Draft North District Plan exhibited.	Objectives in relation to Chatswood CBD were largely unchanged.
16 March 2018	Meeting with DPIE	Meeting to brief Director, Sydney Region East on proposal and discuss Chatswood CBD Strategy.
9 August 2019	Letter from DPIE to Council	DPIE endorsed the Chatswood CBD Strategy as it relates to the CBD core area, noting that mixed use can be

Site attribute	Description	Comments
		permitted east of the rail line where it results in significant jobs growth.
30 September 2019	Meeting with DPIE	Meeting with DPIE to discuss the Council's letter to Council.
2 October 2019	Letter from Council	Council advised that it cannot support the previous Planning Proposal given the low allocation of employment uses, and that the Proposal does not meet the DPIE's direction on jobs growth.
6 March 2020	Meeting with DPIE	Mirvac met with DPIE to discuss the preparation of a revised proposal.
4 May 2020	Meeting with DPIE	Mirvac met with DPIE to discuss the preparation of a revised proposal.
9 July 2020	Letter from DPIE to Council	DPIE provides full endorsement of the Chatswood CBD Strategy subject to its recommendations.

Q11. What are the views of the State and Commonwealth public authorities consulted in accordance with the Gateway determination

Consultation will be carried out with relevant State and Commonwealth public authorities, as required, following a Gateway decision. Consultation would also be carried out with the community in accordance with planning requirements.

10 Project timeline

An indicative project timeframe is set out in **Table 12** below.

The proposal may be suitable to be fast-tracked under either the Council or DPIE acceleration programs, and this will be the subject of ongoing discussions with Council and DPIE. In this regard Mirvac can commit to lodge the DA as soon as possible following rezoning.

Table 12: Anticipated project timeline

Task	Timing
Lodge Planning Proposal	August 2020
Consideration by Local Planning Panel	September 2020
Consideration by Council	October 2020
Council submits Planning Proposal to DPE for review	October 2020
Receive Gateway determination	November 2020
Completion of public exhibition and public authority consultation	February 2021
Completion of review of submissions received during public exhibition and public authority consultation	March 2021
Approval by relevant planning authority	April 2021
Drafting of instrument and finalisation of mapping	May 2021
Amendment to Willoughby LEP notified	May 2021

11 Conclusion

The proposal presents a rare opportunity for Council to secure the renewal of an important site within the Chatswood CBD to deliver a significant component of commercial floor space adjacent to Chatswood Station.

The proposal would be the first significant commercial office development in Chatswood since 1995. Once complete it would also be the third largest commercial office development in Chatswood and largest on the eastern side of the station. The proposal also has potential to accommodate 1,578 jobs making a significant contribution to the jobs targets (up to 25%) for Chatswood Strategic Centre.

The proposal may be suitable to be fast-tracked under either the Council or DPIE acceleration programs, and this will be the subject of ongoing discussions with Council and DPIE. In this regard Mirvac can commit to lodge the DA as soon as possible following rezoning.

The proposal will deliver a number of additional public benefits including:

- Delivery of housing supply in close proximity to excellent public transport and amenity
- Upgrade of Post Office Lane to deliver improved pedestrian amenity and connectivity to Chatswood Interchange
- Enhanced activation and built form interface to the surrounding streets
- Green walls and rooftop landscaping including accessible open space at the podium level
- Affordable housing at a rate of 4% of the total residential floor space
- Regeneration of two poor quality sites and a service laneway, which without this proposal going ahead are likely to remain as is indefinitely.

A competitive design process is also proposed to enhance the extensive design analysis already undertaken, through the development application and delivery stage. The proposal is also capable of achieving sustainability measures which will be outlined during the detailed design phases.

Environmental assessment of the proposal has been considered as summarised below:

- By placing significant employment and housing in such close proximity to Chatswood Station, increased levels of trip containment, opportunities for active transport and a much higher modal spilt to public transport will be achieved thereby reducing vehicle kilometres travelled and community health outcomes.
- Recommendations of the Chatswood CBD Strategy for maintaining solar access in midwinter to key spaces within the public domain at identified times can be achieved including Victoria Avenue, Garden of Remembrance and Chatswood Oval 11am-2pm.
- Solar access will be maintained to the residential units surrounding the site and a high level of solar access can be achieved to proposed dwellings within the development
- The streetscape will be enhanced through high quality design and sensitive street interface and setbacks
- The development of a single slender tower will minimise visual impacts and allow for view sharing with buildings in the surrounding area including the over-station towers and the Sebel tower
- There will be no unacceptable traffic impacts in terms of the performance of existing intersections and the surrounding road network.

The opportunity to revitalise the subject site to introduce a material non-residential component is extremely positive and provides the best chance for renewal. Failure to support the proposal will likely result in the exiting sites remaining as they are indefinitely.

Our assessment demonstrates the proposal has strategic and site specific merit and is capable of being supported.

Appendix A Urban Design Report

45 VICTOR STREET & 410-416 VICTORIA AVENUE CHATSWOOD

URBAN DESIGN STUDY

MIRVAC DESIGN
AUGUST 2020

1.0 Vision

2.0 Context

3.0 The Site

3.1 Amalgamated Sites

3.2 Site Analysis

4.0 Previous Proposal

5.0 Planning Principles

5.1 Site Optimisation

5.2 Connectivity

5.3 Mixed Use Development

5.4 Sun Access

5.5 Urban Scale

5.6 Slender Tower

5.7 Activated Ground Plane

5.8 Vehicles and Servicing

6.0 The Proposal

6.1 Design Concept

6.2 Built Form

6.2.1 Council Objectives

6.2.2 Height

6.2.3 Setbacks and Building Separation

6.3 Public Amenity and Street Activation

6.4 Post Office Lane

6.5 Solar Access and Overshadowing

6.6 Commercial

6.7 Residential

7.0 Sustainable Design

8.0 Chatswood CBD – Planning and Urban Design Strategy to 2036

9.0 SEPP 65 Design Quality Principles

10.0 Appendix

Architectural Drawings

Shadow Analysis

1.0 Vision

In its Draft Urban Design Strategy for Chatswood CBD, Willoughby City Council has articulated its vision and adopted a series of principles and guiding concepts aimed at delivering a reinvigorated CBD core:

Chatswood CBD will be confident, fine grain and green. It will be a diverse, vibrant, active and accessible place, with attractive places for residents, workers and visitors to enjoy.

This Planning Proposal for 45 Victor St and 410-416 Victoria Avenue, Chatswood seeks to build upon those principles and deliver a true mixed use outcome in the heart of the CBD that will activate the public realm, deliver a significant quantum of high-quality commercial space and provide opportunities for residents to live in a highly accessible urban environment.

By consolidating two sites, the proposal is able to deliver generous A-Grade commercial floorspace within immediate proximity of Chatswood Station and an activated ground plane that stitches into the existing CBD fabric, facilitating pedestrian movement through the site.

A slender tower is proposed with a stepped podium addressing the scale of the streetscape in this prominent corner location. The building envelope sits within a sun access plane protecting key public spaces, ensuring no additional overshadowing to Chatswood Oval.

The northerly aspect of the Victoria Avenue frontage provides the opportunity for sunny elevated 'green' open space on the podium roof while at ground level, publicly accessible active uses can occupy the full width of the site activating the pedestrianised public realm of Victoria Avenue.

2.0 Context

Chatswood is identified as a Strategic Centre within the Sydney metropolitan area, comprising a vibrant mix of commercial, retail and residential accommodation.

Chatswood Station, located at the heart of the CBD core, provides direct connectivity to the Sydney CBD and other Strategic centres throughout Sydney.

The Victor St site lies directly to the east of this key transport node and enjoys a prime location within the Victoria Avenue East precinct.

With the highly activated pedestrianised environment of Victoria Avenue as its primary address and the Westfield Centre located directly across the road, the site is located at the heart of the vibrant precinct. The site is also located within close proximity of community facilities, retail centres and recreational spaces such as The Concourse, Chatswood Chase and Chatswood Oval.

1. Site
2. Pacific Highway
3. Chatswood Station
4. Chatswood Oval
5. Chatswood Park
6. Garden of Remembrance
7. Victoria Avenue Mall
8. Westfield
9. The Concourse
10. Chatswood Private Hospital
11. Chatswood Chase

3.0 The Site

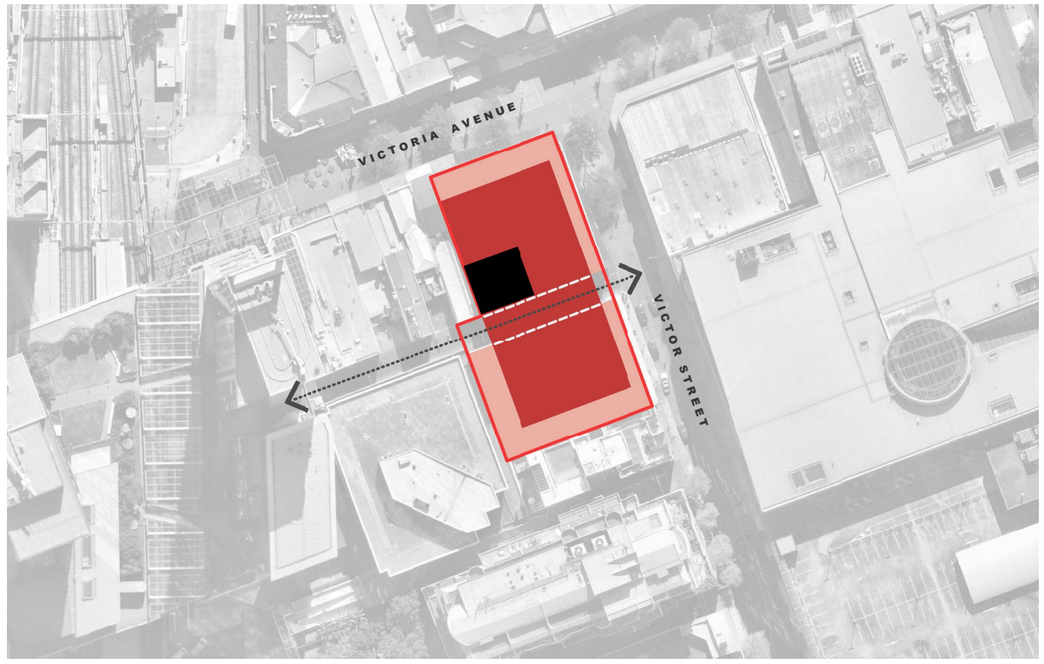
3.1 Amalgamated Sites

The Proposal involves the amalgamation of two sites in order to satisfy the minimum site area requirements for commercial development as prescribed in Council's Draft Planning and Urban Design Strategy. The two sites (45 Victor St and 410-416 Victoria Avenue) are located either side of Post Office Lane and, when combined and including a portion of the lane, provide an opportunity to mark the prominent corner location with a mixed use development of substance, scale and urban design quality.

Due to their size, the two sites, if developed individually, are unable to deliver a viable commercial outcome because they are below Council's indicative minimum site area of 1800sqm for commercial development in the B3 Commercial Core Zone and are unable to provide a sufficient floor plate size to meet market expectations. As such, the consolidation of the two sites unlocks significant development potential by offering the opportunity for a generous commercial floorplate and an activated ground plane.

Importantly the combined site incorporates the eastern end of Post Office Lane which provides service access to the neighbouring retail and commercial properties that back onto it. By retaining the laneway in its existing alignment and making it a key element of design, the opportunity exists to enhance the public realm by creating an activated shared zone providing a direct pedestrian link to the station.

SEPARATE SITES If developed separately, the two sites are unable to deliver a viable commercial outcome due to their small site area.



AMALGAMATED SITES The amalgamation of the two sites unlocks significant development potential for a single tower and results in a highly activated ground plane due to the consolidation and overall reduction of building cores, services and vehicle access.

3.0 The Site

3.2 Site Analysis

The consolidated site occupies a prime corner location at the intersection of Victor St and Victoria Avenue and provides the opportunity to deliver a high quality urban design outcome that responds to the strengths, weakness and constraints that the location offers.

Strengths

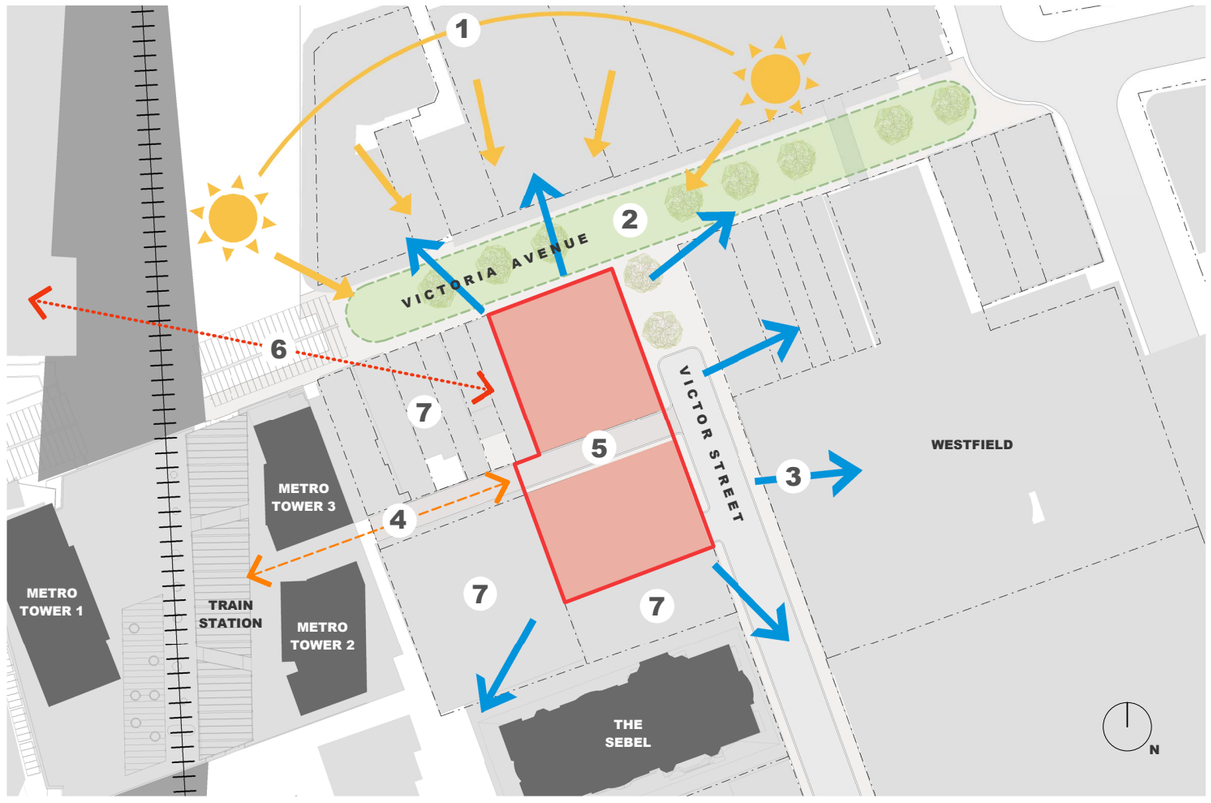
- Prime central location adjacent to a major rail and bus transport nodes, community facilities, recreational spaces and retail precinct
- Combined site area of 2297sqm in a rational, rectilinear configuration ideal for commercial floorplate
- Excellent orientation for solar access and outlook
- North facing frontage to a highly active, vibrant, pedestrianised ground plane
- Ability for a new building to be sited, massed and designed to ensure no additional overshadowing of Chatswood oval and to maintain solar access to neighbouring buildings.

Weaknesses and Constraints

- Location of site disjointed from western CBD commercial precinct and isolated amongst surrounding mixed uses to be meaningfully considered a commercial location for tenant occupants.
- Aged and dilapidated existing improvements on site with limited, if any redevelopment potential.
- Separate standalone sites unable to be redeveloped for commercial use due to site area of less than 1800sqm each and an inability to provide a sufficient floor plate size to meet market expectations.
- Existing buildings on site with blank walls to streetfronts
- No 'Green' space on existing sites.
- Unattractive and potentially unsafe nondescript vehicular laneway bisecting the sites

Opportunities

- Consolidation of sites to provide a large quantum of high quality A-Grade commercial office space with excellent amenity in a highly efficient, rational floorplate to seek to meet market expectations.
- The upgrade, reimagination and conversion of a nondescript vehicular service lane into a safe, attractive, inviting public space and activated thoroughfare facilitating pedestrian movement to Chatswood Station.
- Creation of highly activated public street frontages to what would otherwise be unachievable with standalone sites.
- Consolidation of services and vehicular access into one larger site to maximise the opportunities for activated street frontages.
- Greening' the CBD with opportunities for soft landscaping including green walls and landscaped roof terraces.
- Inclusion of high quality residential apartments with excellent access to public transport and amenity in order to facilitate the delivery of a large quantum of A-Grade commercial office space and to deliver a vibrant mixed use development in the heart of the CBD.



1. North-easterly aspect provides excellent solar access to activated public street frontages
2. Prime Victoria Avenue Mall adress
3. Unobstructed northerly and easterly views for tower
4. Direct connection to Chatswood Station via exsiting rear service laneway
5. Rational, rectilinear site configuration ideal for commercial floorplate
6. Site separated from western CBD by rail line
7. Neighbouring sites unable to be developed due to limited size

VICTOR STREET
6-8 storey street walls

POST OFFICE LANE
non-descript rear service lane providing access to station

VICTORIA AVENUE
prime opportunity to deliver a high quality urban design outcome in a key corner location

4.0 Previous Proposal - December 2016

The previous Planning Proposal lodged in 2016 sought amendments to the planning controls to allow the following::

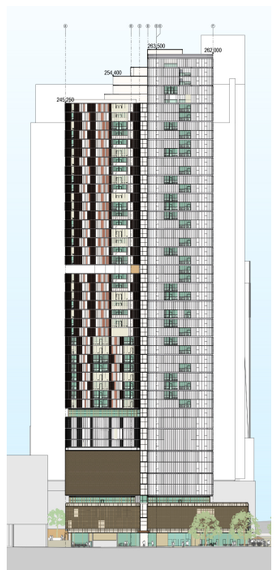
- Maximum height of RL 262.0
- Non-residential FSR of 5:1
- Inclusion of 45 Victor Street in Schedule One, Clause 31 of the WLEP to allow shop-top housing.

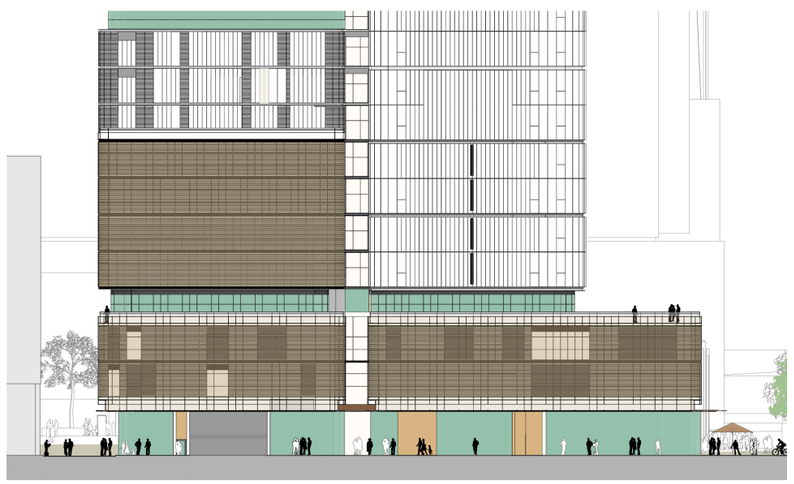
The indicative design comprised the following:

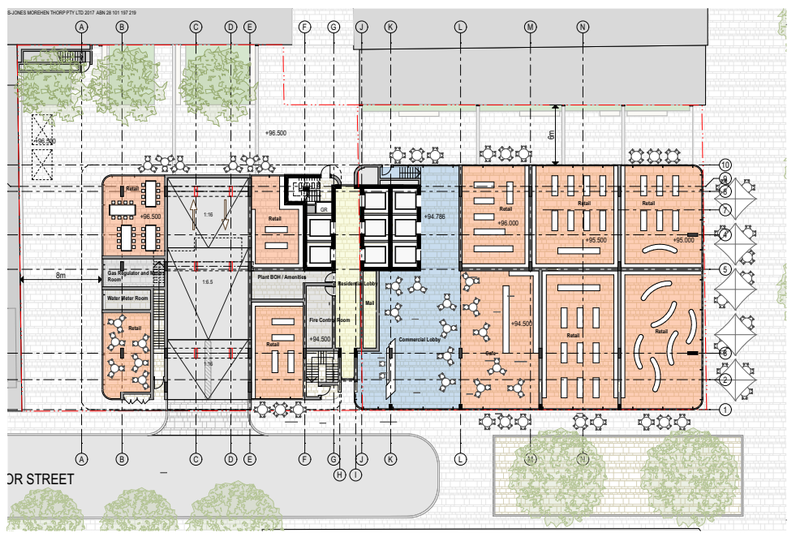
- Approximately 11,000sqm of A-grade office space
- Approximately 800sqm of retail
- Approximately 320 apartments

A review of the proposal, carried out by Architectus, raised a number of concerns which are addressed in this updated Proposal. The issues and recommendations raised by Architectus along with the responses adopted in this Proposal are as follows:

	Item	Issue	Recommendation	Response (Updated Proposal)
1	Land Use	*'The applicant's proposal for a mixed use building of primarily residential space is not consistent with Architectus' recommended zoning* (of B3 Commercial Core).'	*'The site should be protected for office uses.'*	The Proposal delivers approximately 18,000sqm of non-residential GFA (8:1 FSR). Residential apartments are also proposed in order to provide that quantum of non-residential floorspace. The outcome is a true mixed use development with a significant component of high-quality office space in the heart of the CBD.
2	Post Office Lane and Connectivity	*'The proposed link replacing Post Office Lane is not direct, which creates legibility issues for this highly used connection within the wider centre'.* *'The proposed link abuts neighbouring blank facades (with neighbouring sites that are likely to not redevelop for some time) and turns a corner which will result in a pedestrian link that is poorly activated particularly at night, without good passive surveillance and therefore has poor safety as well as legibility for pedestrians'.*	*'Architectus' preferred approach is to adopt a 'high direct north-south pedestrian link through the site (for the full width of the existing Post Office Lane) with a high ceiling of 3-4 storeys and an office tower above'*	The Proposal retains Post Office Lane in its existing alignment, upgrades and reimagines it as a significant public space, and bridges over it with an office tower and a high ceiling of up to 9.5m in height.
3	Overshadowing of Chatswood oval	*'Architectus' testing has shown that the Proposal would cause additional overshadowing of Chatswood Oval at around 11:30am.'*	*'The proposal be reduced in height to protect solar access to the Oval between 11am and 2pm'*	The proposal has been revised to ensure no additional overshadowing of the oval between 11am and 2pm.
4	Victoria Avenue street wall height	*'For Victoria Avenue, Architectus has recommended a two storey street wall height..... The proposal exceeds this with a three storey wall height.'*	*'The street wall facing Victoria Avenue should be reduced to two storeys to best protect the character of this street.'*	The proposal has a two-storey street wall height to Victoria Avenue.
5	Relationship to potential tower forms to the west	*'If the site is allowed to bridge the lane, adjacent sites may also seek to develop similarly across the lane.'*	*'Vehicular access and legibility of pedestrian connectivity needs to be considered in understanding the impacts of the proposal'.*	The Proposal considers vehicular access and legibility of pedestrian connectivity by retaining Post Office Lane in its existing alignment.





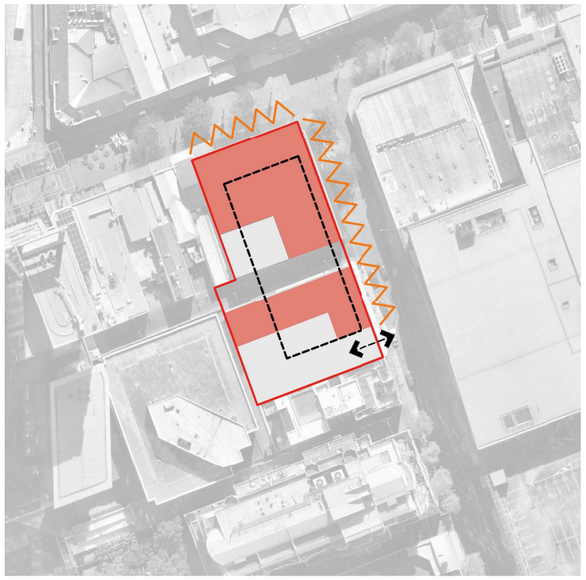


DECEMBER 2016 PLANNING PROPOSAL - IMAGES

5.0 Planning Principles

The new Proposal is underpinned by a series of planning principles informed by Council's Draft Planning and Urban Design Strategy which aims to deliver *'a distinctive, resilient and vibrant CBD'*.

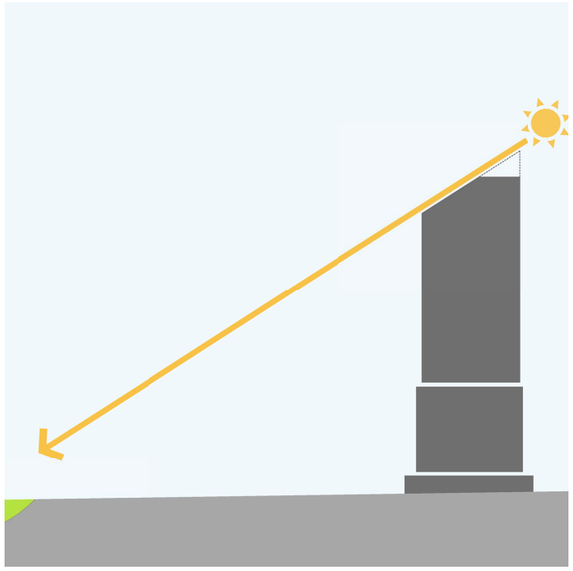
The principles are a framework of guiding concepts that demonstrate how a development of scale can deliver a high quality urban design outcome that is sensitive to and greatly enhances the context in which it sits.



5.1 Site Optimisation

Amalgamation of the two sites results in a total site area of almost 2300sqm which provides the opportunity to deliver a high quality commercial floorplate capable of attracting major tenants.

Consolidation of plant, services and car parking over a single site delivers building efficiencies that result in greater opportunities for activated street frontages.

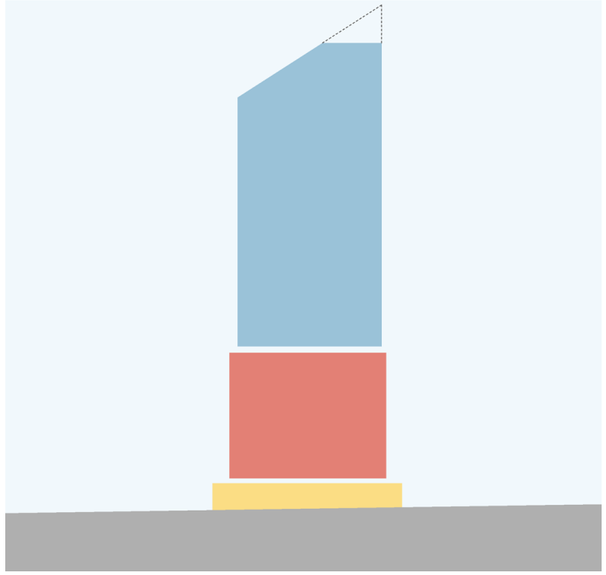


5.2 Sun Access

The building envelope steps down toward the south to ensure no additional overshadowing of Chatswood Oval on June 21.

5.3 Connectivity

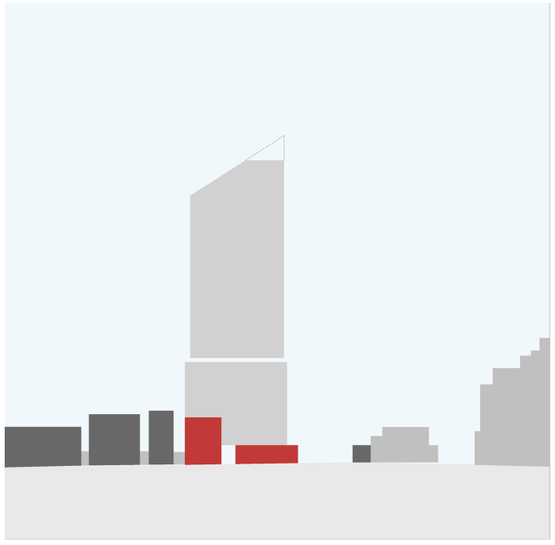
The site facilitates and enhances connectivity between the station, Victor St and Victoria Avenue by reinforcing and activating the street block edges with public uses. Alignments with Councils recommended future through-site links are established, setting up the framework for broader pedestrian permeability throughout the CBD.



5.4 Mixed Use Development

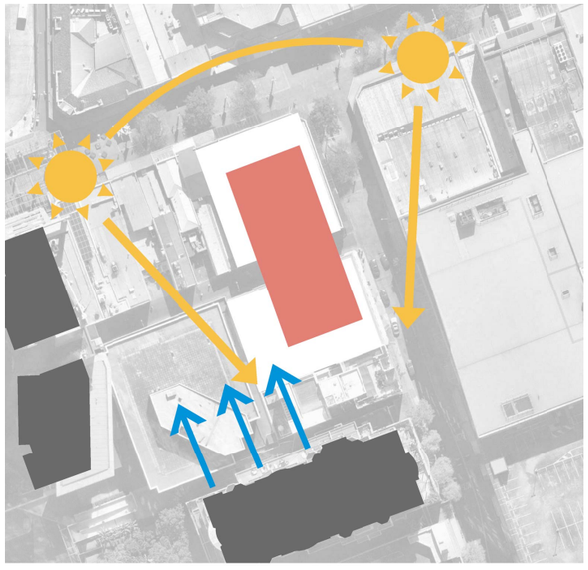
The proposal delivers a significant quantum of commercial and retail floor area with residential apartments at the upper levels resulting in a vibrant mix of uses.

5.0 Planning Principles



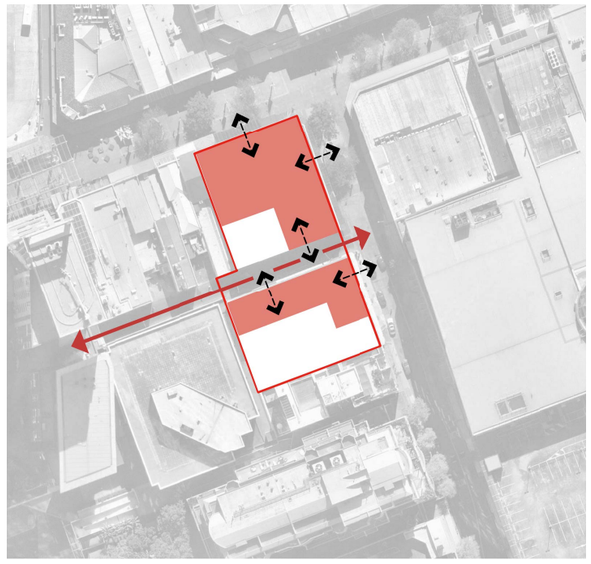
5.5 Urban Scale

The scale of the podium is modulated to integrate with the neighbouring street context. The podium street wall along Victor St transitions from 6 storeys at the south to 2 storeys at Victoria Avenue in response to the differing scales of the two streets.



5.6 Slender Tower

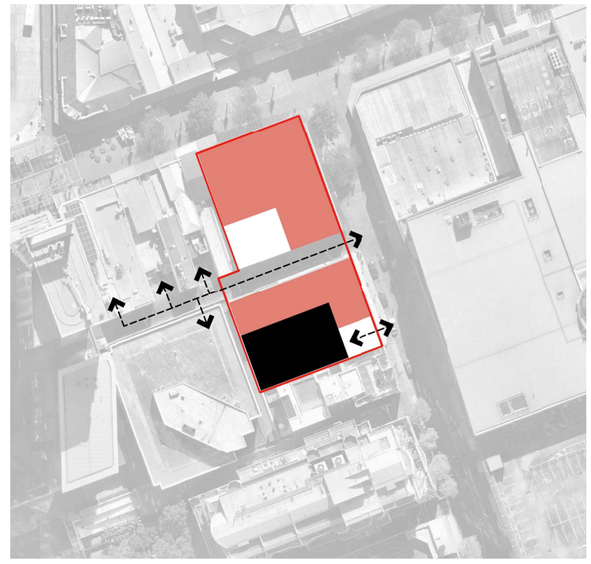
The amalgamation of the two sites provides the opportunity for a slender tower form running north-south. This minimises the impact of overshadowing to neighbouring residential buildings and key public spaces and facilitates view sharing with the Sebel tower to the immediate south.



5.7 Activated Ground Plane

The large majority of street frontage is activated by retail with the opportunity for sunny north and east facing food and beverage tenancies. Commercial and residential lobbies add diversity to the streetscape while vehicular access is minimised and located at the southern extremity of the site, as far from the prime retail and pedestrian environment as possible.

Post Office Lane also introduces a fine grain retail experience activating the upgraded pedestrian route to the station.



5.8 Vehicles and Servicing

The amalgamation of the two sites allows a single vehicular access point to service what would otherwise be two separate sites.

Post Office Lane is retained as a shared zone to maintain service access to the neighbouring properties.

Plant and service requirements are primarily concealed from public view behind active shopfronts while all parking is located underground.

6.0 The Proposal

6.1 Design Concept

The proposal envisions a diverse mix of uses in a multi-storey development with a substantial commercial component and a strong focus on pedestrian permeability and amenity at ground level.

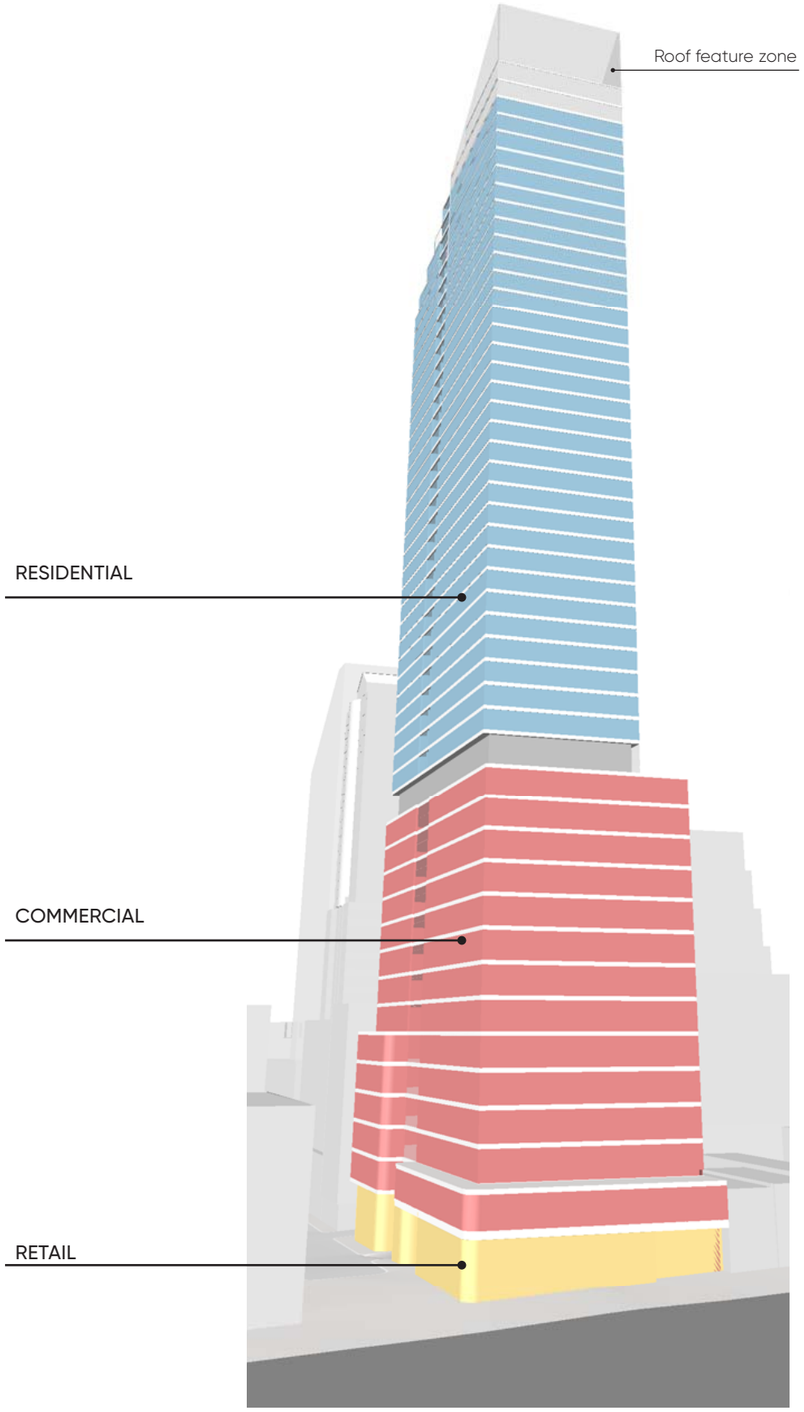
Configured as a single slender tower and podium, the proposal delivers a high density urban outcome with prime commercial, retail and residential floorspace and a considered built form response to location and context.

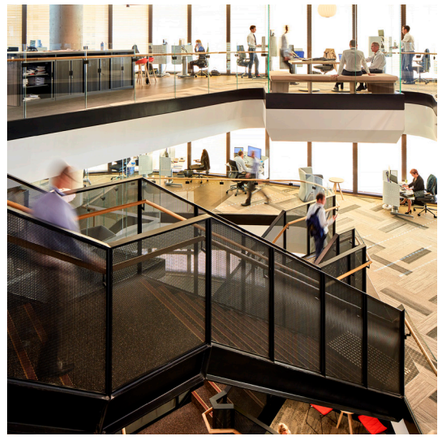
Details of the proposal are as follows:

	GFA	FSR
Commercial / Retail Residential	18,376 sqm 27,564 sqm	8:1 12:1
Total Apartments	310 (Approx.)	
Total Cars	380 (Approx.)	
Maximum Height	RL 262.0	(To top of building, excluding possible roof feature zone)

Roof feature zone

It is proposed that above RL 262 to the top of sun access plane, a roof feature zone be permitted to allow for architectural expression during the detailed design phase.





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SHAKES

6.0 The Proposal

6.2 Built Form

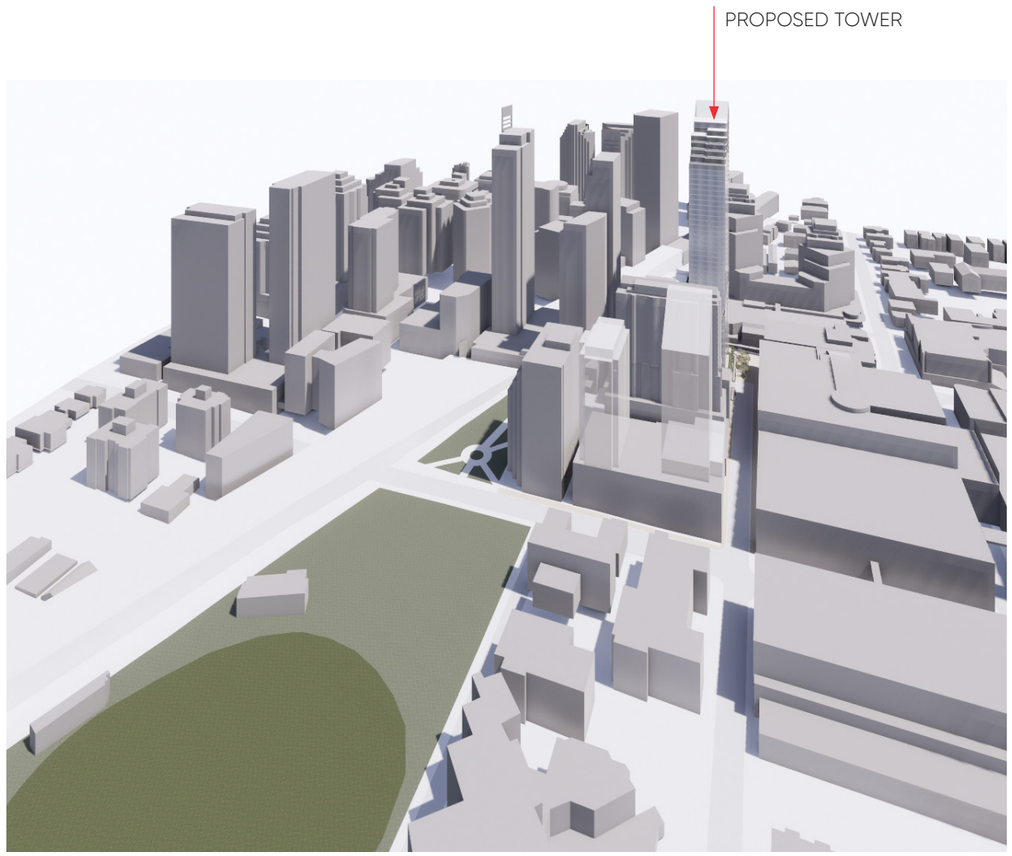
6.2.1 Council Objectives

The proposed built form is a response to the objectives outlined in Council's Draft Planning and Urban Design Strategy.

In summary the Strategy seeks to achieve the following:

- Slender tower forms
- Optimised commercial development opportunities through the amalgamation of sites
- Appropriate building separation between towers
- Consistency with the guidelines of the ADG
- Provision of sun access to key public spaces
- Street frontage heights and setbacks which reflect requirements for different parts of the Chatswood CBD
- Active street frontages
- Maximised floor space at ground level
- Concealed car parking, loading, plant and services
- Zero-setback podiums
- Traditional lot patterns along Victoria Avenue East.

The proposal satisfies Councils objectives and generally adheres to the desired metrics in relation to heights, setbacks and floor plate size with some exceptions in order to deliver a commercial outcome that is acceptable to the market.



The Proposal delivers a slender tower form consistent with the scale of the Metro towers to the west. The north-south orientation of the building minimises the impact of overshadowing to neighbouring buildings and key public spaces.

The tower is a slender addition to the CBD skyline when viewed from the north and south while the wider east and west elevations are generally obscured by or read against the OSD towers.

6.0 The Proposal

6.2.2 Height

The proposed tower extends in height to RL 262.0 and steps down to the south to ensure no additional overshadowing of Chatswood Oval between 11am and 2pm in mid winter.

In accordance with Council's indicative requirements, the proposal has a zero-setback podium to both street frontages.

In keeping with the scale of the neighbouring streetscape, the street wall to Victoria Avenue is 2 storeys in height though exceeds the 7 metre height limit in order to deliver a high quality design outcome with generous ceiling heights throughout the ground level retail tenancies and lobbies. At 2 storeys and approximately 10 metres in height the street wall is consistent with the neighbouring 2 storey streetscape which varies in height from lot to lot and includes the Westfield Shopping Centre directly to the east.

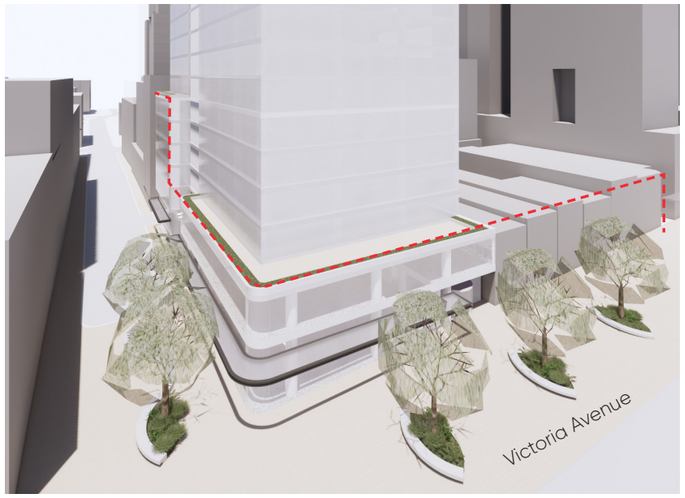
The street wall turns the corner into Victor St as a 2 storey podium and then steps up to 6 storeys beyond Post Office Lane to align with the streetscape to the south of the site. Due to the slope of the street, and in order to again deliver high quality ground level tenancies with generous ceiling heights, the street wall is approximately 25.5m in height at its highest point but is consistent with the scale of the neighbouring podiums which vary in height being both greater and less than the proposal.

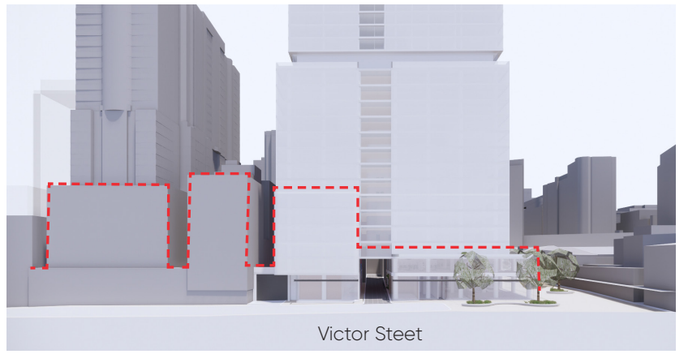
Above the commercial levels the tower footprint reduces in size to deliver a compact and efficient residential floorplate able to satisfy key guidelines of the ADG such as apartment depth, size and access to daylight.

Council's indicative controls outside of the CBD core suggest a maximum floorplate of 700sqm GFA with a 90 metre height limit in the B4 mixed use zone in order to achieve a slender tower form. At a maximum of 870 sqm GFA and by setting a maximum RL of 262 (excluding roof feature), the Proposal delivers a proportionally more slender outcome than the indicative controls achieve.

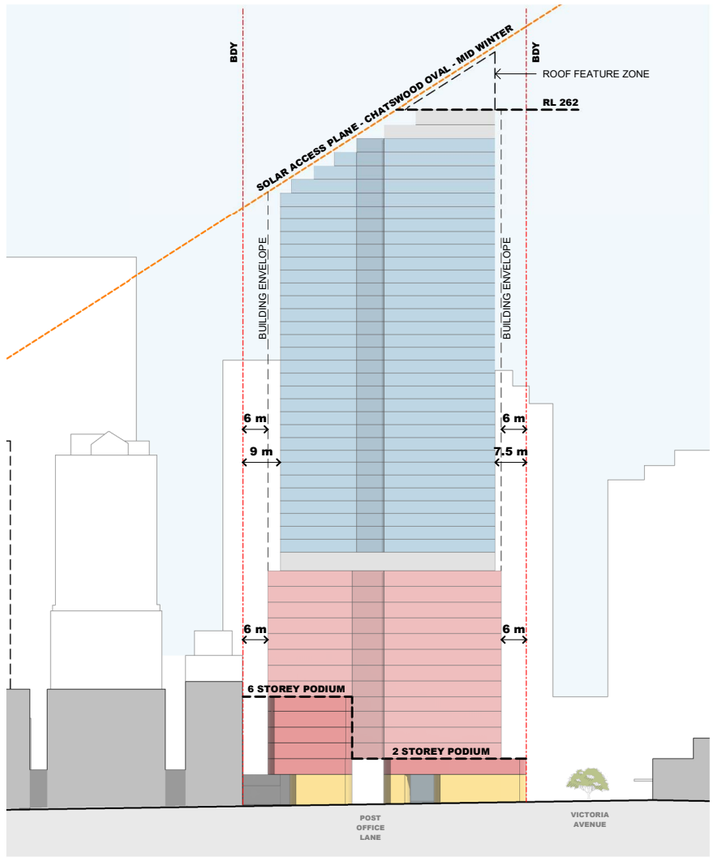
While RL 262.0 is set as a maximum building height, it is proposed that a roof feature zone be allowed from RL 262.0 up to the sun access plane to allow for a roof feature as part of detailed design.

The height and slenderness of the proposed tower is also consistent with the size and scale of the nearby Metro towers to the west.

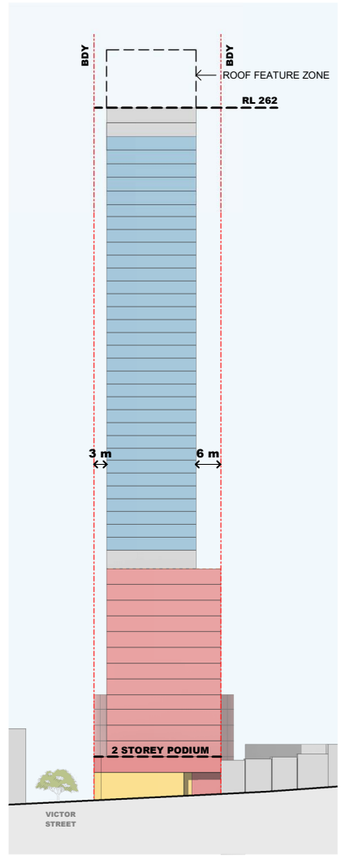




The street wall varies in height to respond to the different scales of Victor St and Victoria Avenue



The tower is approximately 168 metres in height and sits within the solar access plane ensuring compliance with Councils overshadowing controls for key public spaces.



The tower presents a very slender elevation to the north and south.

6.0 The Proposal

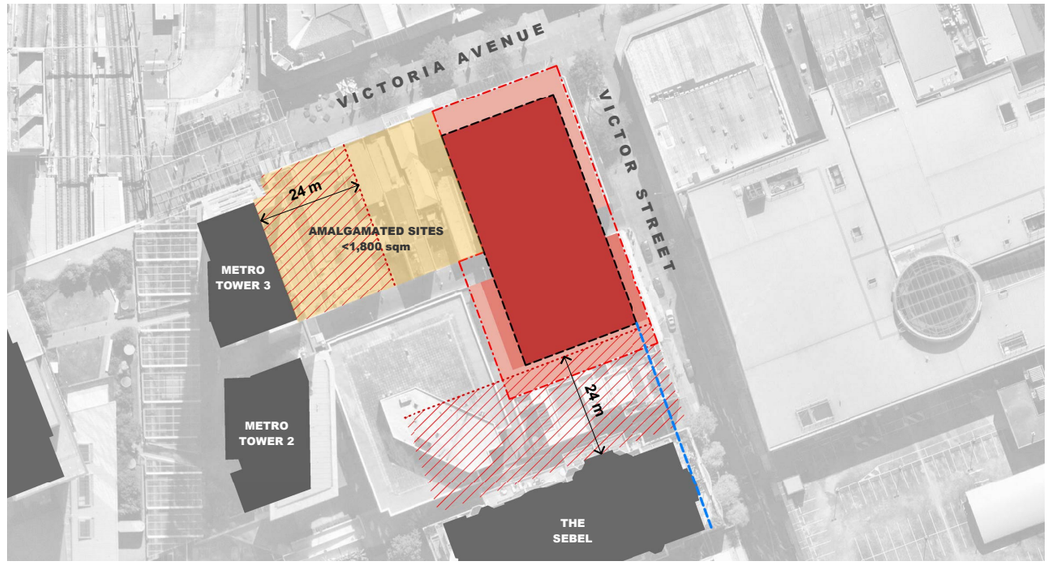
6.2.3 Setbacks and Building Separation

Building setbacks adhere to the principles of Council's Draft Planning and Urban Design Strategy and are generally in accordance with the suggested metrics. Where considered reasonable, variations to the indicative setbacks are proposed in order to achieve a more optimal A-Grade commercial footprint.

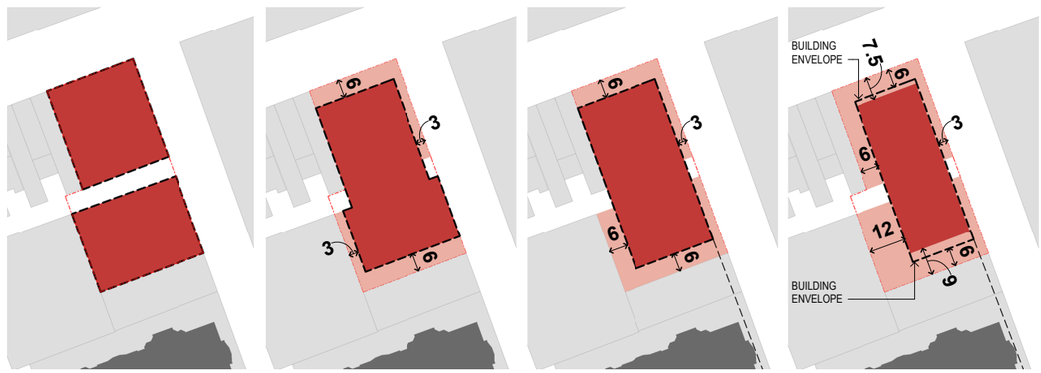
A summary of proposed setbacks is as follows:

	Council Indicative Setback	Proposed Setback	Comments
Northern Boundary (Victoria Avenue)	6m above street wall	6m as per Council Guidelines (refer note below regarding indicative building envelope)	
Eastern Boundary (Victor Street)	6m above street wall	3m above street wall	A 3m setback sets up an approximate alignment with the Sebel Tower to the immediate south and results in a superior A-Grade commercial floor plate
Southern Boundary	Minimum 6m for commercial uses above street wall height. 1:20 ratio of setback to building height.	6m for commercial uses above street wall height as per Council Guidelines. 6m for residential uses in lieu of 1:20 ratio. (refer note below regarding indicative building envelope)	The neighbouring site to the south is unable to be redeveloped as a commercial tower under Council's indicative requirements for minimum site areas. The Proposal therefore considers building separation requirements to the Sebel Tower further to the south in order to determine setbacks to the southern boundary. The proposal achieves a greater than 24m setback to the Sebel tower which is consistent with the guidelines of the ADG.
Western Boundary	Minimum 6m for commercial uses above street wall height. 1:20 ratio of setback to building height.	6m setback for commercial uses above street wall height south of Post Office Lane as per Council Guidelines. Zero setback for commercial uses above street wall height north of Post Office Lane. 12m for residential uses south of Post Office Lane. 6m for residential uses north of Post Office Lane in lieu of 1:20 ratio.	The neighbouring sites to the west (even if amalgamated) are unable to be redeveloped as a commercial tower under Council's indicative requirements for minimum site areas. The Proposal therefore considers building separation requirements to the Metro towers further to the west in order to determine setbacks to the western boundary. The proposal achieves over 50m building separation to the Metro towers which is consistent with the guidelines of the ADG.

An indicative building envelope is proposed for the residential floor plate to allow design flexibility in the design process. Rather than prescribe a fixed rectangular building footprint that the architect must use, an envelope is proposed to allow the architect to have more freedom in designing the shape of the floorplate. The envelope nominates setbacks and allows the opportunity for a residential floorplate of a maximum of 870sqm GFA to be configured in a range of ways subject to the design objectives of the architect.



Neighbouring sites (even if amalgamated) are not developable as commercial towers due to their size and requirement to satisfy 24m ADG building separation distances from the Metro towers and the Sebel tower



G & L1
Retail / Commercial

Zero podium setbacks to all boundaries

L2-5
Commercial

Southern and western setbacks provided to podium levels south of Post Office Lane to provide natural light to commercial floorplate.

L6-13
Commercial

3m setback to Victor St approximately aligns with Sebel Tower

L14-42 (L43-46 steps back)
Residential

Building envelope (dotted) to allow flexibility of design for residential footprint. Suggested north and south setbacks (of 7.5m and 9m) indicate possible building footprint for a residential floorplate of a maximum of 870sqm GFA

6.0 The Proposal

6.3 Public Amenity, Street Activation and Green Roofs

The Ground Floor will be dedicated as much as possible to publicly accessible uses. Retail tenancies front Victor St, Victoria Avenue and Post Office Lane while entries for both the commercial and residential occupants can have separate dedicated lobbies.

Generous ceiling heights of 4 to 5.5m throughout the ground level give a sense of spaciousness and grandeur and allow natural night to penetrate deep within the retail and lobby spaces.

The two-storey podium to Victoria Avenue offers the opportunity for double height retail tenancies with clear and accessible vertical circulation connecting ground level to the upper podium level and then again to the publicly accessible green space on the podium roof. A range of other green roof spaces are available for private and communal use at upper levels.

Post Office Lane is reimagined as an activated pedestrian thoroughfare with the opportunity for fine grain retail, public art and green walls.

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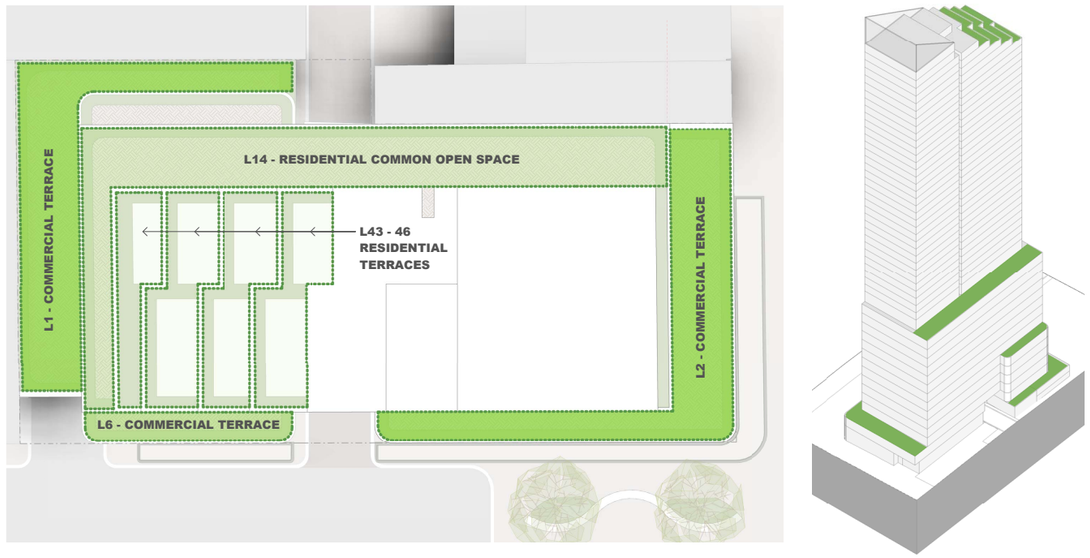
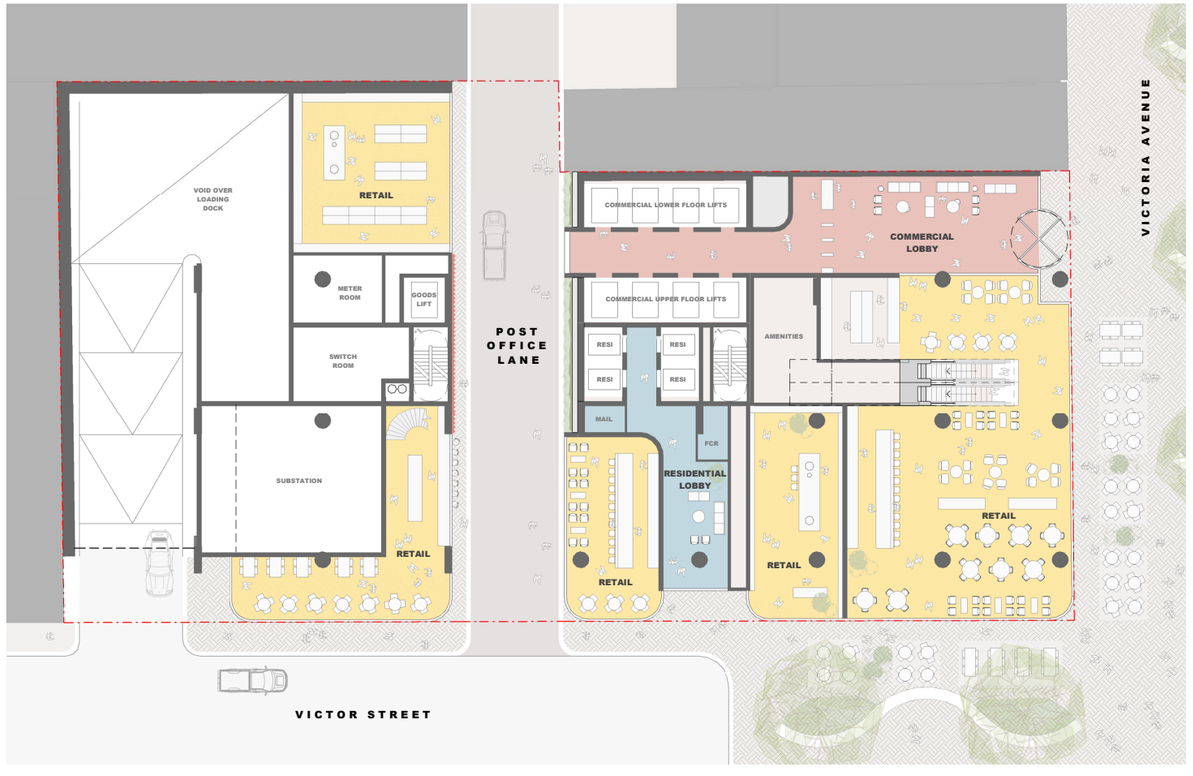
The two storey podium to Victoria Avenue provides the opportunity for clear and accessible vertical circulation to the north-facing rooftop terrace.



The opportunity for a range of green roof spaces is available for public and private use.



The ground level provides highly activated frontages to both streets and the laneway with plant, loading and vehicle access concealed behind active uses.

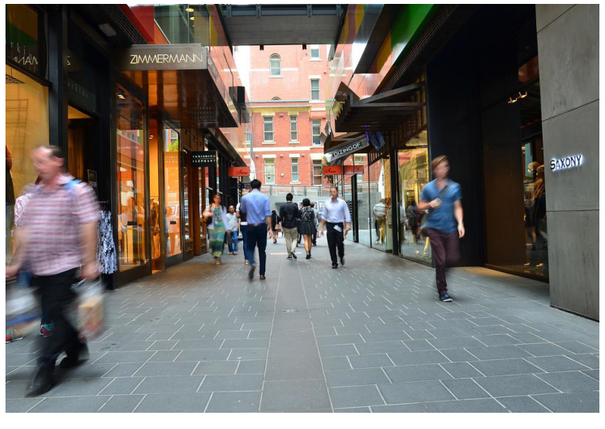
6.0 The Proposal

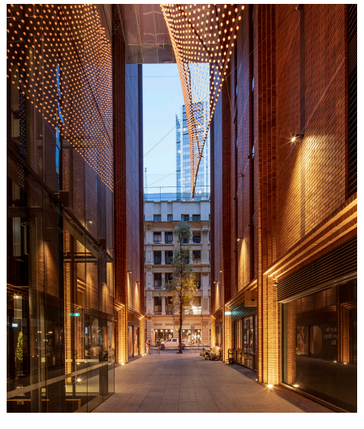
6.4 Post Office Lane

Post Office Lane provides an important link between Victor St and the station. It currently serves as a rear lane to a number of retail and commercial tenancies though it has the opportunity to be reimagined as an activated shared vehicular/pedestrian zone, enhancing the CBD laneway network and providing a safe, attractive approach and entry to the station.

The proposal incorporates the laneway within the design and bridges it, creating a dramatic covered public space of up to 9.5m in height with active uses on either side. It's suggested that the laneway could be upgraded with new paving, lighting, green walls, and public art offering the opportunity for a fine grain retail experience complementing the main retail tenancies along Victor Street and Victoria Avenue.

Post Office Lane reimagined as a highly activated and attractive shared public space with green walls and public art forming a safe inviting approach to Chatswood Station.



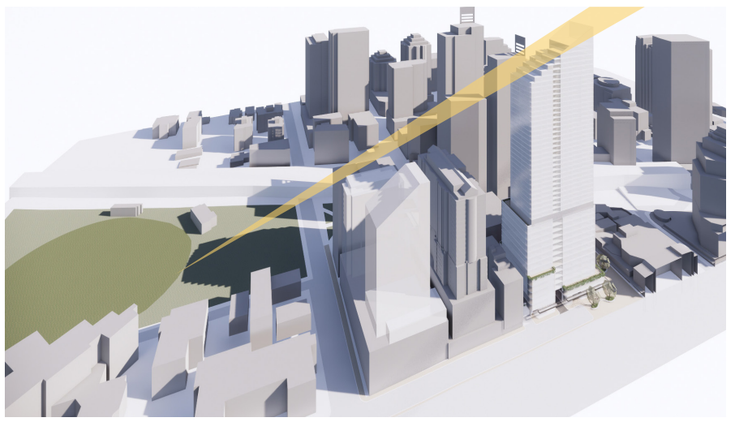


6.0 The Proposal

6.5 Solar Access and Overshadowing

In accordance with the indicative requirements of Council's Draft Planning and Urban Design Strategy the proposal ensures no additional overshadowing of Victoria Avenue, Concourse Open Space, Garden of Remembrance, Tennis and croquet club or Chatswood Oval within the suggested times. It is indeed the solar plane to Chatswood Oval that defines the building envelope which steps down towards the south to satisfy the solar access controls.

Studies have also been undertaken to demonstrate that 2 hours of sunlight is maintained to the façade of north-facing apartments in the Sebel building and to the façade of north and east-facing apartments in the Metro Towers between 9am and 3pm on June 21. It is considered that the built form as proposed and the associated overshadowing is acceptable, as a high level of amenity to surrounding dwellings is able to be maintained while balancing the requirement to achieve Council's strategic imperative under the Draft Chatswood CBD Strategy to deliver a significant quantum of new employment generating floor space within the Chatswood CBD.



The building envelope is defined by the shadow plane to Chatswood Oval.

Shadow analysis at mid winter.

CHATSWOOD OVAL/
GARDEN OF REMEMBRANCE

The solar access plane for overshadowing to Chatswood Oval is determined by the sun angle between 11:15am and 11:45am at which time the shadow passes the Oval.

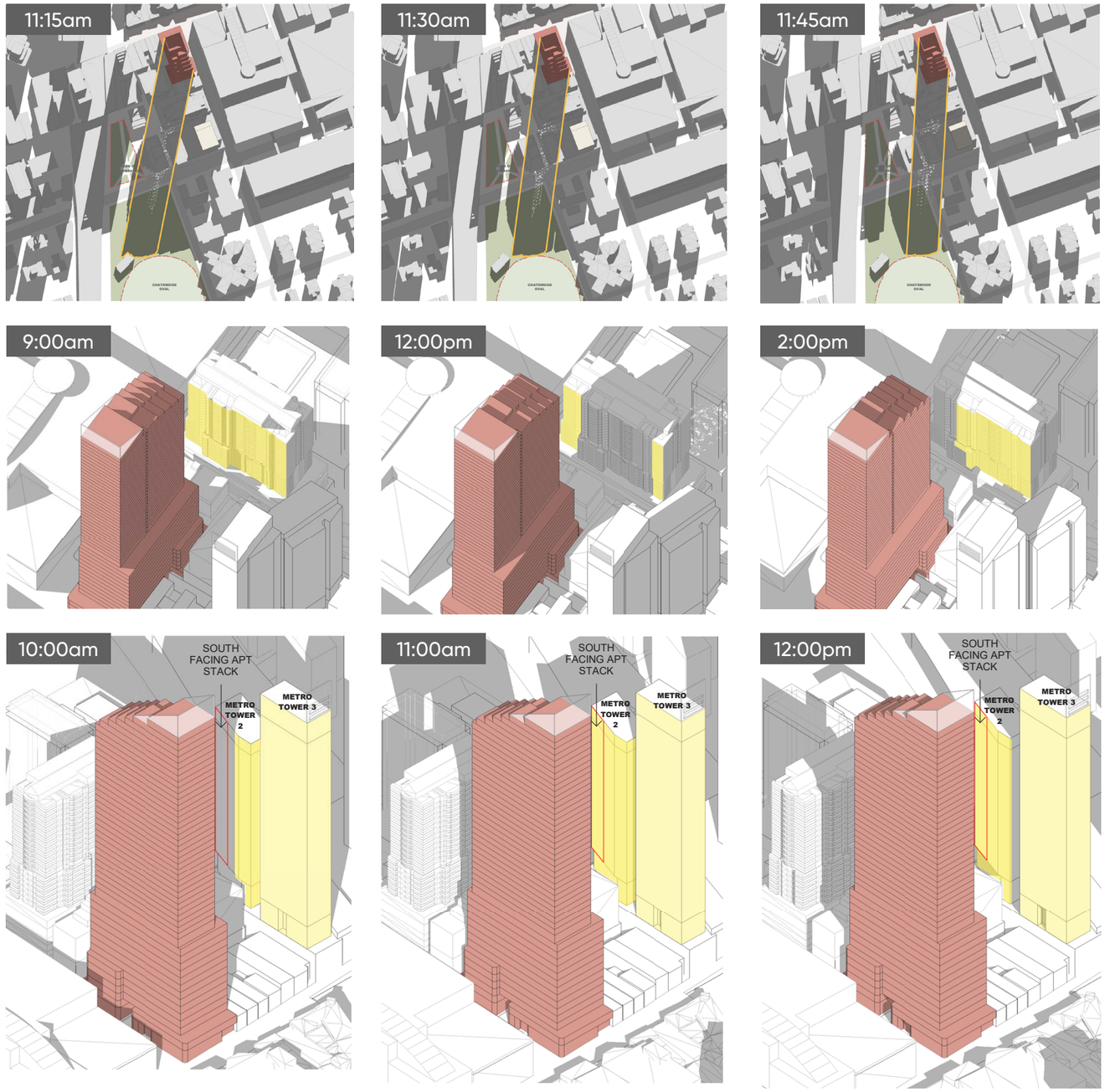
The shadow passes Garden of Remembrance by approx. 11:30am.

SEBEL BUILDING

The slender tower form ensures 2 hours solar access is maintained to the façade of north-facing apartments in the Sebel Tower.

METRO TOWERS

The Proposal maintains at least 2 hours solar access to the façade of north and east-facing apartments in the Metro Towers.



Refer to full shadow analysis in Appendix.

6.0 The Proposal

6.6 Commercial

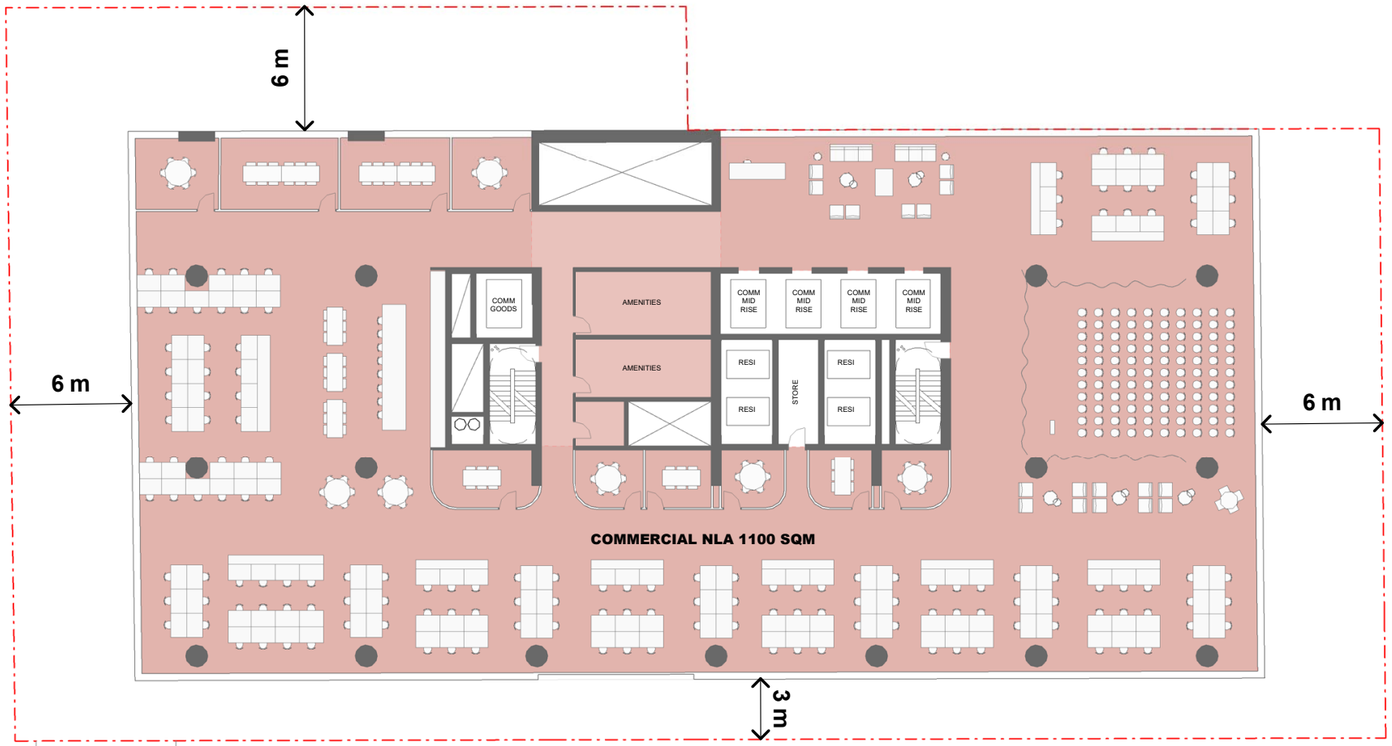
The proposal presents the opportunity to deliver high quality PCA 'A-Grade' commercial floorspace within immediate proximity of a major transport node and with direct access to retail, cultural and entertainment facilities.

The typical commercial floorplate has been maximised to deliver approximately 1100sqm of net lettable area per typical floor with larger floors in the podium. Despite falling short of the optimal size of 1200sqm from a market perspective the proposal provides the largest floorplate possible within the confines of the site.

The core location provides optimal regular shaped floorplates, allowing for flexible planning to suit activity-based working, cellular offices, or a combination of both.

The slender tower form means approximately 95% of the floorplate is within 12m of natural light and the structural grid offers the opportunity for voids to be cut in to provide interconnected floors for multi-floor tenants.

The proposal allows the opportunity for a generous commercial lobby at ground level off Victoria Avenue with casual seating and direct internal access to a café or retail tenancy.



INDICATIVE OFFICE FLOOR PLAN

6.0 The Proposal

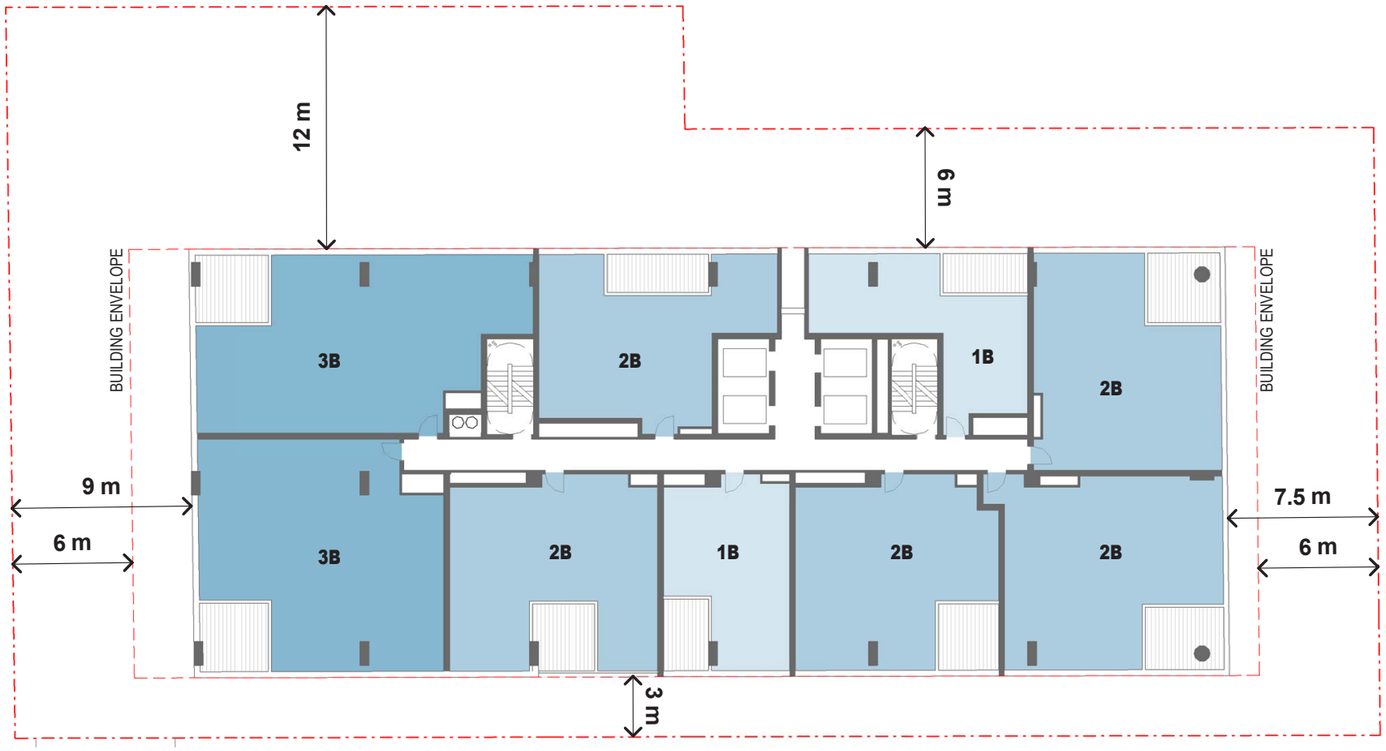
6.7 Residential

The residential floor plate has been designed to ensure consistency with the NSW Apartment Design Guide. The north-south orientation of the tower ensures all apartments receive direct solar access and generous building separation to nearby towers while apartment depth is kept to a minimum so as to generate a slender tower form and to allow sunlight to penetrate deep into habitable spaces.

The compact, efficient floorplate is capable of delivering a range of 1, 2 and 3 bed apartments, all with excellent amenity to cater to all demographics with large open terraces available at the upper levels for either communal or private use.

At ground level the entry foyer has a Victor St address, being the more discrete of the two street frontages while car parking and resident storage is located in below ground basements.

As referred to in Section 6.2.3 it is proposed that 6m setbacks to the north and south set a possible building envelope to allow for design flexibility during the detailed design process. These setbacks will also be constrained by a maximum residential GFA floorplate of 870sqm. The floor plan to the right indicates how a floorplate with a maximum GFA of 870sqm could fit within the building envelope footprint, ultimately resulting in northern and southern setbacks of 7.5m and 9m respectively.



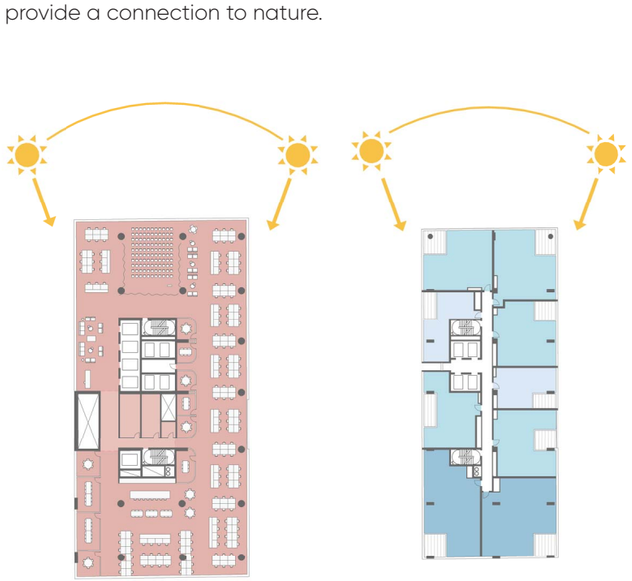
INDICATIVE RESIDENTIAL FLOOR PLAN

7.0 Sustainable Design

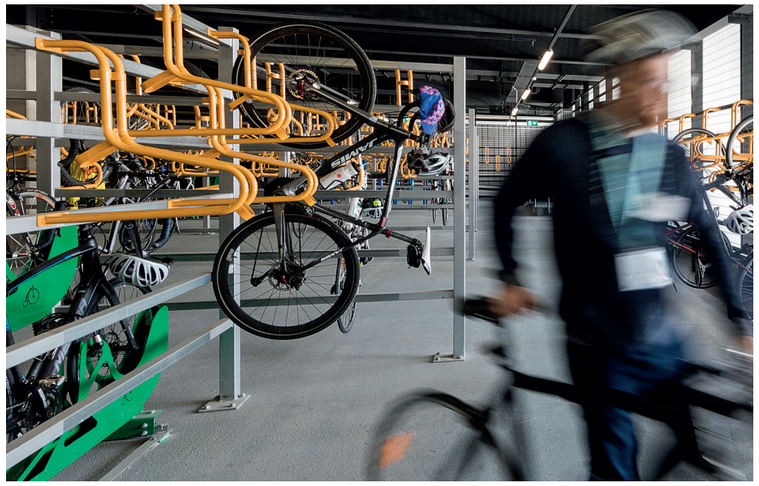
General principles of sustainable design are considered at a Planning Proposal level and will be incorporated into all aspects of the proposal from design conception and the construction process, through to post-completion.

The proposal is capable of achieving a high level of sustainable design and will incorporate appropriate commitments at the Development Application Stage should the Planning Proposal progress.

The building orientation facilitates optimal solar access to commercial and retail spaces and to the apartments above while the location of the development near a major transport node and retail precinct will significantly reduce car dependence. Areas for communal and private open space with green roofs will be incorporated into the design to encourage social interaction and to provide a connection to nature.



North-south building orientation facilitates optimal solar access for commercial and residential amenity.



8.0 Chatswood CBD
Draft Planning and Urban Design Strategy to 2036

In its Draft Planning and Urban Design Strategy for Chatswood CBD, Willoughby City Council has articulated its vision for the CBD and has outlined a series of principles aimed at delivering its vision for a reinvigorated commercial core. Furthermore the Draft Strategy outlines a series of desired measures and controls by which the Vision and Objectives can be achieved. The following schedule assesses the Proposal against these desired measures and controls.

Vision

Chatswood CBD will be confident, fine grain and green. It will be a diverse, vibrant, active and accessible place, with attractive places for residents, workers and visitors to enjoy.

Principles

To achieve this vision the Strategy has adopted the following seven principles:

1. *Promoting office growth in the core*
2. *Residential growth on the periphery of the CBD*
3. *Diverse mix of uses*
4. *Great public places*
5. *Sustainable and active transport*
6. *Urban design quality*
7. *Greening the Centre*

Achieving the Vision and Objectives

Item	Measures and Controls	Response
CBD boundary Land Use	1. The Chatswood CBD boundary is expanded to the north and south to accommodate future growth of the centre 2. Land uses in the LEP will be amended as shown in Figure 3.1.2, to: a. Protect the CBD core around the interchange as commercial, permitting retail throughout to promote employment opportunities (with no residential permitted) b. Enable other areas to be mixed use permitting commercial and residential 3. The existing DCP limits on office and retail use in parts of the commercial core to be removed 4. Serviced apartments to be removed as a permissible use from the B3 Commercial Core zone	The proposal seeks to deliver 18,736sqm GFA of high quality A-Grade commercial and retail space equating to an FSR of approximately 8:1. In order to be able to provide that quantum of non-residential space, private residential apartments are also proposed to maintain a rich and diverse mix of uses in line with Council's vision. Serviced apartments are not proposed.
Value uplift sharing to fund public domain	5. The existing FSR controls are to be simplified and be retained as a 'base' FSR (Figure 3.1.3) 6. Increased FSR between the base FSR and the maximum FSR is to be linked to a contributions scheme that will provide the public and social infrastructure in the Chatswood CBD necessary to support an increased working and residential population. 7. All developments in Chatswood Centre achieving a FSR uplift through this strategy should contribute public art in accordance with Council's Public Art Policy.	Public benefits are proposed to be negotiated with Council as part of the Planning Proposal process in accordance with DPIE guidelines..

8.0 Chatswood CBD Planning and Urban Design Strategy to 2036

Item	Measures and Controls	Response
Design Excellence and Building Sustainability	8. Design excellence is to be required for all developments exceeding the base FSR, based on the following process: a. A Design Review Panel for developments up to 35m high b. Competitive designs for development over 35m high 9. Achievement of design excellence will include achievement of higher building sustainability standards 10. The Architects for design excellence schemes should be maintained through the development application process and can only be substituted with written agreement of Council	The proposal is proposed to achieve design excellence. Please refer to the Planning Proposal Report for further details.
Floor Space Ratio (FSR)	11. Figure 3.1.3 shows a simplified FSR diagram to that in the existing LEP. It provides a maximum base FSR which: a. Is the maximum FSR for sites below the minimum site areas identified in Point 12 below b. Forms the base above which value uplift sharing and design excellence applies. 12. Minimum site area of: a. 1800sqm for commercial development in the B3 Commercial Core zone b. 1200sqm for mixed use development in the B4 Mixed Use zone 13. FSR's are as follows: a. No maximum FSR for commercial development in the centre b. 6:1 in outer centre c. Retention of 2.5:1 FSR along northern side of Victoria Avenue east. 14. Affordable housing is to be provided within the maximum floor space ratio, and throughout a development rather than in a cluster. 15. The minimum commercial floor space ratio sought in development in a mixed use zone is 1:1 in order to deliver a reasonable amount of employee floorspace.	As encouraged, the amalgamation of two sites results in a site area greater than 1800sqm. Proposed FSR's are as follows: 8:1 Commercial, Retail 12:1 Residential Any affordable housing will be distributed throughout the development as required.
Built Form	16. In order to achieve the slender tower forms sought by Council the maximum floor plate at each level of a development should be no more than: a. 2000sqm GFA for office and b. 700sqm GFA for residential towers above Podium within Mixed Use zones 17. In pursuit of the same goal of slender tower forms, the width of each side of any tower should be minimised to satisfactorily address this objective. To the same end, design elements that contribute to building bulk are not supported, and should be minimised. 18. If there is more than one residential tower on a site, sufficient separation is to be provided.	The typical commercial floorplate delivers approximately 1250sqm of GFA or 1100sqm of NLA. The typical residential floor plate will be limited to 870sqm of GFA. As per section 6.2 of this report the commercial footprint has aimed to be maximised in size to meet the market's requirements working in the confines of the site. Council's draft strategy for the B4 mixed use zone suggests a maximum floor plate size of 700sqm GFA for residential buildings in order to achieve a slender tower form. The draft strategy for this zone, however, anticipates a maximum height of 90 metres. At approximately 168 metres high with an 870sqm floorplate, the proposal delivers a proportionally more slender outcome. The height and slenderness of the proposed tower is also consistent with the size and scale of the nearby Metro towers to the west. An indicative building envelope is proposed for the residential floor plate to allow design flexibility in the design excellence process. The envelope nominates setbacks and allows the opportunity for a residential floorplate of a maximum of 870sqm GFA to be configured in a range of ways subject to the design objectives of the architect.

8.0 Chatswood CBD Planning and Urban Design Strategy to 2036

Item	Measures and Controls	Response
Sun Access to Key Public Spaces	19. No additional overshadowing and protection in mid winter of: a. Victoria Avenue (between interchange and Archer St) 12pm-2pm b. Concourse Open Space 12pm-2pm c. Garden of Remembrance 12pm-2pm d. Tennis and croquet club 12pm-2pm e. Chatswood Oval 11am-2pm (which in turn also protects Chatswood Park)	The proposal satisfies all requirements of the Draft Strategy
Building Heights	20. Maximum height of buildings in the CBD will be based on Figure 3.1.6, up to the airspace limits (Pans Ops plane), except as reduced further to meet: a. Sun access protection. 21. All structures located at roof top level, including lift over runs and any other architectural features are to be: a. Within the height maximums b. Integrated into the overall building form	The proposal satisfies all suggested building height requirements.
Links, Open Space and Landscaping	22. The links and open space plan in Figure 3.1.7 will form part of the DCP. All proposals should have regard to the potential on adjacent sites. Pedestrian and cycling linkages will be sought in order to improve existing access within and through the CBD. New linkages may also be sought where these are considered to be of public benefit. All such links should be provided with public rights of access and designed with adequate width, sympathetic landscaping and passive surveillance. 23. Publicly accessible open space and green landscaping such as street trees will be required by all development, subject to design principles. 24. All roofs up to 30 metres from ground to be green roofs. These are to provide a balance of passive and active green spaces that maximise solar access. 25. A minimum of 20% of the site is to be provided as soft landscaping, which may be located on Ground, Podium and roof top levels or green walls of buildings. 26. Any communal open space, with particular regard to roof top level on towers, should be designed to address issues of quality, safety and usability.	The proposal provides and enhances a strong pedestrian link to the station with the reimagination of Post Office Lane. The proposal provides a north-facing sunny green roof on top of the podium overlooking Victoria Avenue and also at the first residential level above the commercial levels where the tower sets back. Soft landscaping opportunities exist on the podium roof, stepped terraces at the top of the building and within the Laneway portal space marking the entry to Post Office Lane. Refer to Section 6.3 for further detail.

8.0 Chatswood CBD Planning and Urban Design Strategy to 2036

Item	Measures and Controls	Response
Street Frontage Heights and Setbacks	27. Street frontage heights and setbacks are to be provided based on Figure 3.1.8, which reflect requirements for different parts of the Chatswood CBD. With setbacks of 3 metres or more, including the Pacific Highway, deep soil planting for street trees is to be provided. a. Victoria Avenue retail frontage i. Maximum of 7 metre street wall height at front boundary ii. Minimum 6 metre setback above street wall b. Urban Core i. Maximum 24 metre wall height at front boundary ii. Minimum 6 metre setback above street wall 28. All buildings are to be setback from all boundaries a minimum of 1:20 ratio of the setback to building height (eg. 3m setback for a 60m building, and 6m setback for a 120m building) 29. Building separation to neighbouring buildings is to be: a. In accordance with the Apartment Design Guide for residential uses b. A minimum of 6 metres from all boundaries for commercial uses above street wall height	Street frontage heights and setbacks generally align with with Councils objectives though some departures are proposed in order to facilitate a commercial component that is more optimal in terms of meeting the markets requirements. Refer to Section 6.2 for further detail
Active Street Frontages	30. At ground level, to achieve the vibrant CBD Council desires, buildings are to maximise street frontages. Blank walls are to be minimised and located away from key street locations	By amalgamating two sites the opportunity exists to minimise the extent of 'non-active' uses such as vehicle entries and building services by consolidating them into one larger site. As such, the proposal delivers active street frontages for the majority of the site curtilage in a way that far exceeds that of the existing buildings on the sites. In addition the proposal reinvigorates Post Office Lane with opportunities for fine grain retail that will create a vibrant environment in what is currently a nondescript rear lane.
Further Built Form Controls	31. Site isolation will be discouraged and where unavoidable joined basements and zero-setback podiums should be provided. 32. Controls will be applied to ensure the traditional lot pattern along Victoria Ave east (building widths of between 6-12m) is reflected into the future. 33. Floor space at ground level is to be maximised, with supporting functions such as car parking, loading, garbage rooms, plant and other services located in basement levels. 34. Substations are to be provided within buildings, not within streets, open spaces or setbacks and not facing key active street frontages.	The proposal comprises a zero-setback podium and basement. The traditional lot pattern along Victoria Avenue east can be carried through in the ground level retail tenancies and lobbies of the proposal fronting Victoria Avenue. Car Parking, loading, garbage rooms, plant and services are located within the basement and any plant is concealed at ground level behind active uses which form the street frontage.

8.0 Chatswood CBD Planning and Urban Design Strategy to 2036

Item	Measures and Controls	Response
Traffic and Transport	35. Site specific traffic and transport issues are to be addressed as follows: a. Vehicle entry points to a site are to be rationalised to minimise street impact, with one entry into and exiting a site. To achieve this objective loading docks, including garbage and residential removal trucks, are to be located within Basement areas. b. In order to facilitate rationalisation of vehicle entry points on neighbouring sites, all development sites are to provide an opportunity within basement levels to provide vehicle access to adjoining sites when they are developed. c. All vehicles are to enter and exit a site in a forward direction. In this regard vehicle turntables should be provided where necessary. d. All commercial and residential loading and unloading is required to occur on-site and not in public streets. e. Car parking should be reduced by utilising RMS car parking rates for sites close to public transport, as well as reciprocal parking and car sharing strategies.	Vehicle access is on Victor St at the southern extremity of the site. This minimises potential conflict between vehicles and pedestrians by locating the entry as far as possible from Victoria Avenue. All loading and parking occurs in the basement which occupies the full extent of the site. A separate Transport Report has been provided as part of the Planning Proposal.

9.0 SEPP 65 Design Quality Principles

The proposal responds to the 9 SEPP65 Design quality Principles as follows:

PRINCIPLE 1

Context and neighbourhood character

The proposal is a contextual response to both the physical environment in which it is located and the social and environmental needs of the Chatswood CBD. The site sits within the heart of the commercial core, within immediate proximity of Chatswood train station and the proposal is conceived and designed accordingly.

The proposal responds to the following:

- Physical context

By modulating built form and activating street frontages in response to neighbouring streetscape and surrounding development.

- Social context

By integrating mixed uses within the building in order to reinvigorate the commercial core area with office, retail and residential opportunities.

- Transport context

By facilitating and promoting pedestrian movement to the train station by reimagining Post Office Lane

- Community context

By ensuring no additional overshadowing to key public spaces such as Chatswood Oval.

PRINCIPLE 2

Built form and scale

Located at the heart of the commercial core the proposal is of a scale and mix appropriate to deliver a built form outcome in line with Councils vision for a vibrant, active, reinvigorated commercial core.

The proposal achieves the following:

- A material commercial component in the Chatswood CBD
- A podium modulated in scale to be consistent with the street walls of both Victor Street and Victoria Avenue.
- A slender tower form of a scale consistent with neighbouring towers within the heart of the CBD that ensures no additional overshadowing to key public spaces and facilitates view sharing.
- A permeable ground plane designed to facilitate and promote pedestrian movement to the train station by reimagining Post Office Lane.
- Active and public uses to main street frontages of Victor Street and Victoria Avenue..

PRINCIPLE 3

Density

The Draft Chatswood CBD strategy aims to provide capacity for future growth as the CBD expands over the next 20 years. The proposal is located in the heart of the Chatswood CBD and is extremely well connected to public transport. As such, the proposed density is appropriate to the site and its context for the following reasons:

- Increased density supports Councils vision for a vibrant, active, reinvigorated CBD providing capacity for future growth
- The proposal is in close proximity to a major transport node and arterial roads connecting to the Sydney CBD and other Strategic Centres throughout Sydney
- The site proposes substantial employment uses with a significant commercial and retail component.
- The site is in close proximity to local established community facilities including the library, performing arts centre and hospital
- The apartments will enjoy a high level of amenity with solar access, outlook, private/communal open space and co-location with retail and commercial opportunities

PRINCIPLE 4

Sustainability

The Proposal is capable of achieving a high level of sustainable design and will incorporate appropriate commitments at the Development Application stage should the Planning Proposal progress.

The Proposal combines positive environmental, social and economic outcomes through the orientation and composition of the tower and through the level of ground level amenity provided.

Key sustainability features will include the following:

- North-south tower orientation to ensure every apartment receives optimal solar access
- Building services systems to reduce emissions
- Water efficiency measures.
- Solar shading to façade to reduce energy costs

9.0 SEPP 65 Design Quality Principles

PRINCIPLE 5

Landscape

A range of different landscape opportunities exist to provide both public and private amenity. Though the relatively small site area and central urban location precludes the ability to deliver deep soil zones, opportunities for a variety of landscaped roof terraces exist with the stepped tower and podium configuration.

Landscape design considerations include the following:

- Generous sunny north-facing podium roof terrace connected to ground floor tenancies with clearly articulated vertical circulation.
- Stepped landscaped roof terraces at top of tower providing views to the city
- Opportunities to enhance the Post Office Lane environment with green walls comprising shade tolerant planting.

PRINCIPLE 6

Amenity

Sound urban design principles around siting and orientation establish basic fundamentals that enable all apartments to enjoy a high level of amenity.

The proposal achieves good amenity through the following:

- North-south tower orientation ensuring all apartments receive good solar access.
- Generous building separation to neighbouring towers facilitating privacy and outlook.
- Ability to deliver good apartment design.
- Sunny outdoor private space to apartments
- Opportunities for rooftop communal space
- Apartment storage as required
- Parking to meet market demand

PRINCIPLE 7

Safety

Active uses at ground level facilitate passive surveillance of the public realm while secure entries to the building and car park are located in prominent and visible locations. Reimagining Post Office Lane with new lighting and active uses takes what was previously a nondescript and potentially unsafe rear lane and converts it to a pedestrian friendly active environment with greatly improved surveillance.

PRINCIPLE 8

Housing diversity and social interaction

In addition to the range of apartment types and sizes that can be accommodated in the flexible tower floor plate, the mixed use nature of the proposal creates vibrancy and diversity and offers opportunities for social interaction amongst residents.

Opportunities exist for a range of different communal spaces at both the base of the residential tower and at the top where generous open terraces are also available due to building setbacks.

Additionally, the vibrant ground plane and reimagined laneway offer opportunities for cafes and meetings spaces for residents and visitors to interact.

9.0 SEPP 65 Design Quality Principles

PRINCIPLE 9

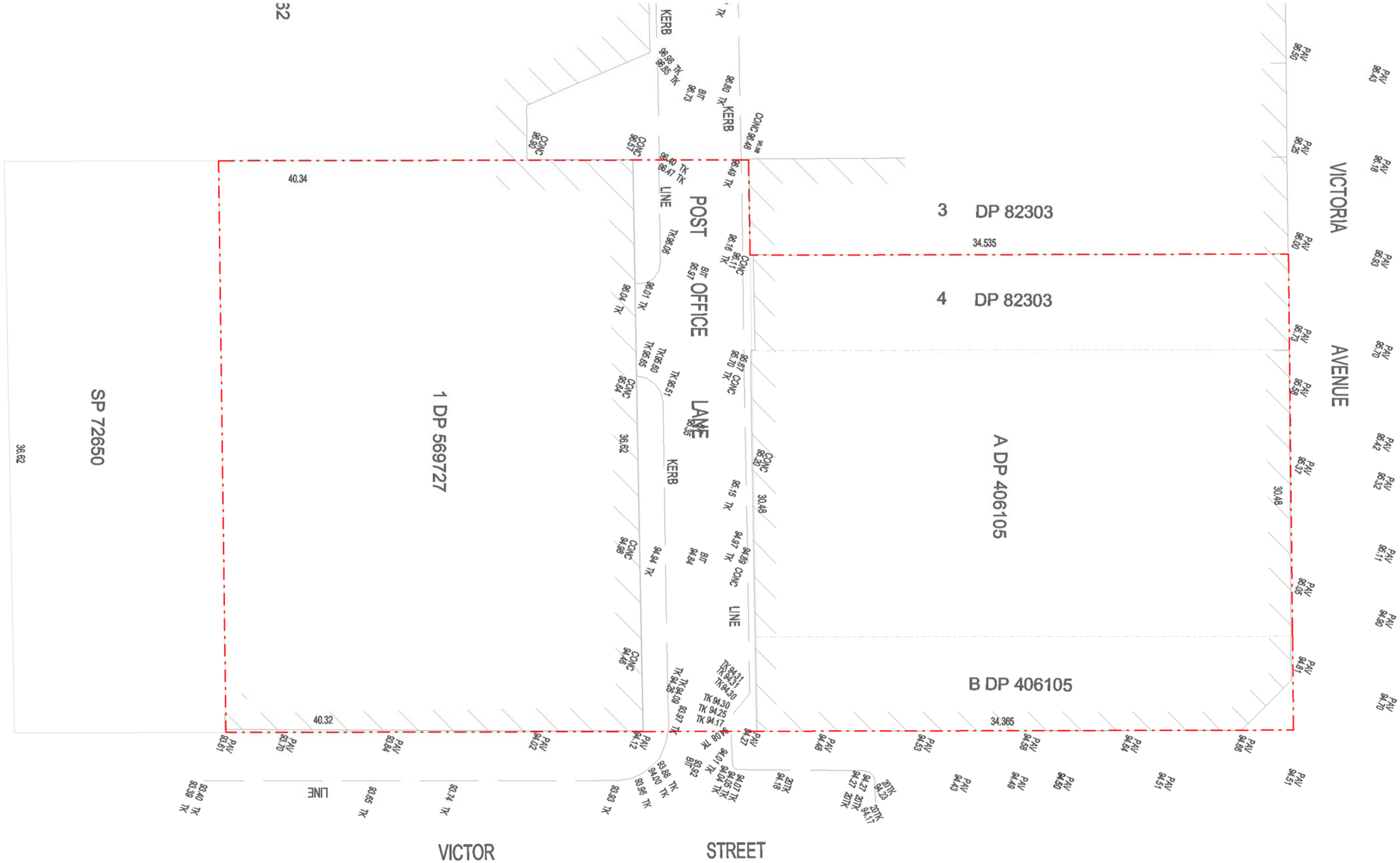
Aesthetics

The built form is generated as a contextual response to the scale of the streetscape and surrounding development. The tower and podium configuration is a balanced composition of elements that completes the street wall of both Victor St and Victoria Avenue and is informed by built form controls outlined in Councils Draft Planning and Urban Design Strategy.

The range of different uses within the development provides the opportunity for an expressive external aesthetic with a variety of different façade treatments, materials, colours and textures possible to provide diversity and interest.

At ground level, attention has been paid to concealing services and plant rooms to ensure active frontages comprising high quality retail, residential and commercial spaces are prominent. The reimagination of Post Office Lane provides the opportunity for a new attractive urban aesthetic to what is currently a nondescript rear lane.

10.0 Appendix



MIRVAC DESIGN

Mirvac Design Pty Ltd
ABN 78 003 359 153
Level 28, 200 George Street, Sydney NSW 2000
02 9080 8000 mirvac.design@mirvac.com
Nominated Architect: Diana Sarcasmo #5091

Victor Street, Chatswood

0 3.125 6.25 12.5
Scale 1 : 250

Survey

SK010

August 2020

VICTORIA AVENUE

COMM LOW RISE

COMM LOW RISE

COMM LOW RISE

COMM LOW RISE

LOBBY

COMM MID RISE

COMM MID RISE

COMM MID RISE

COMM MID RISE

RESI

RESI

LOBBY

RESI

RESI

1:8

LIFT PIT

PLANT / STORE / BIKES

1:8

28 COMMERCIAL / RETAIL SPACES
19 RESIDENTIAL SPACES (INCLUDING 6 ACCESSIBLE)

PLANT / STORE / BIKES

VICTOR STREET

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ABN 78 003 359 153
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02 9080 8000 mirvac.design@mirvac.com
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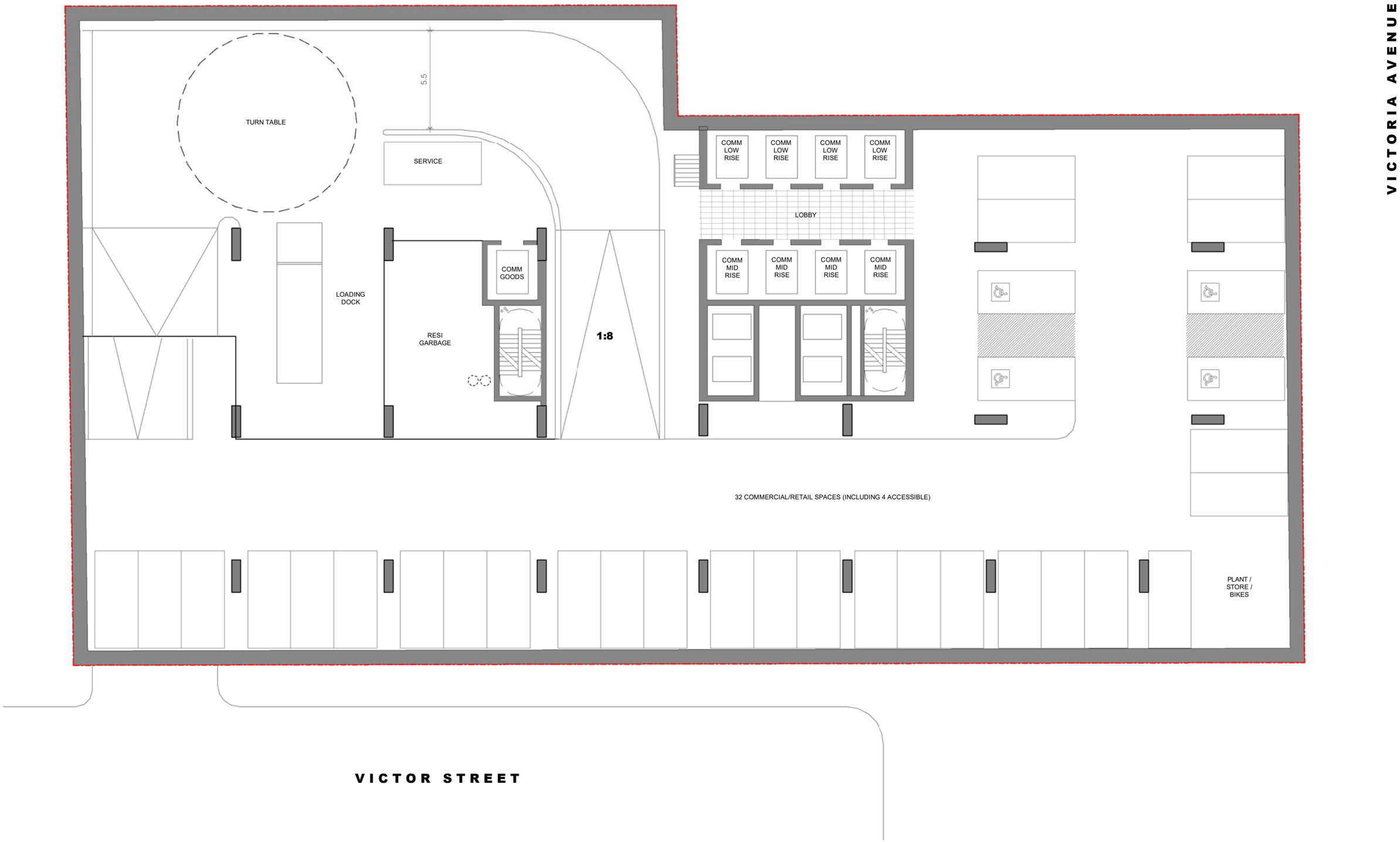
Victor Street, Chatswood

0 2.5 5 10
Scale 1 : 200

Typical Basement Plan

SK098

August 2020



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Victor Street, Chatswood

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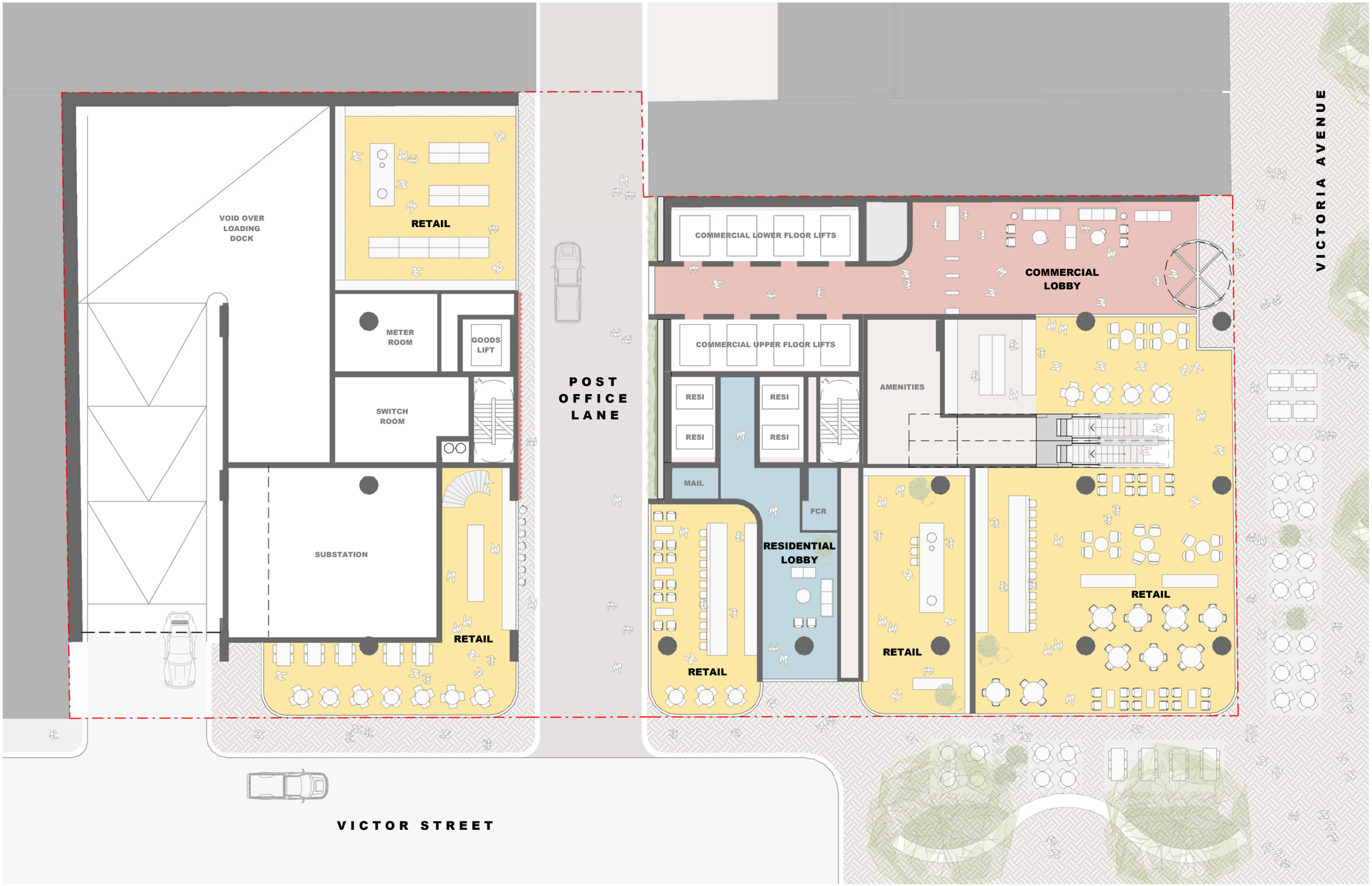
Scale 1 : 200

Basement 1 Plan

SK099

August 2020



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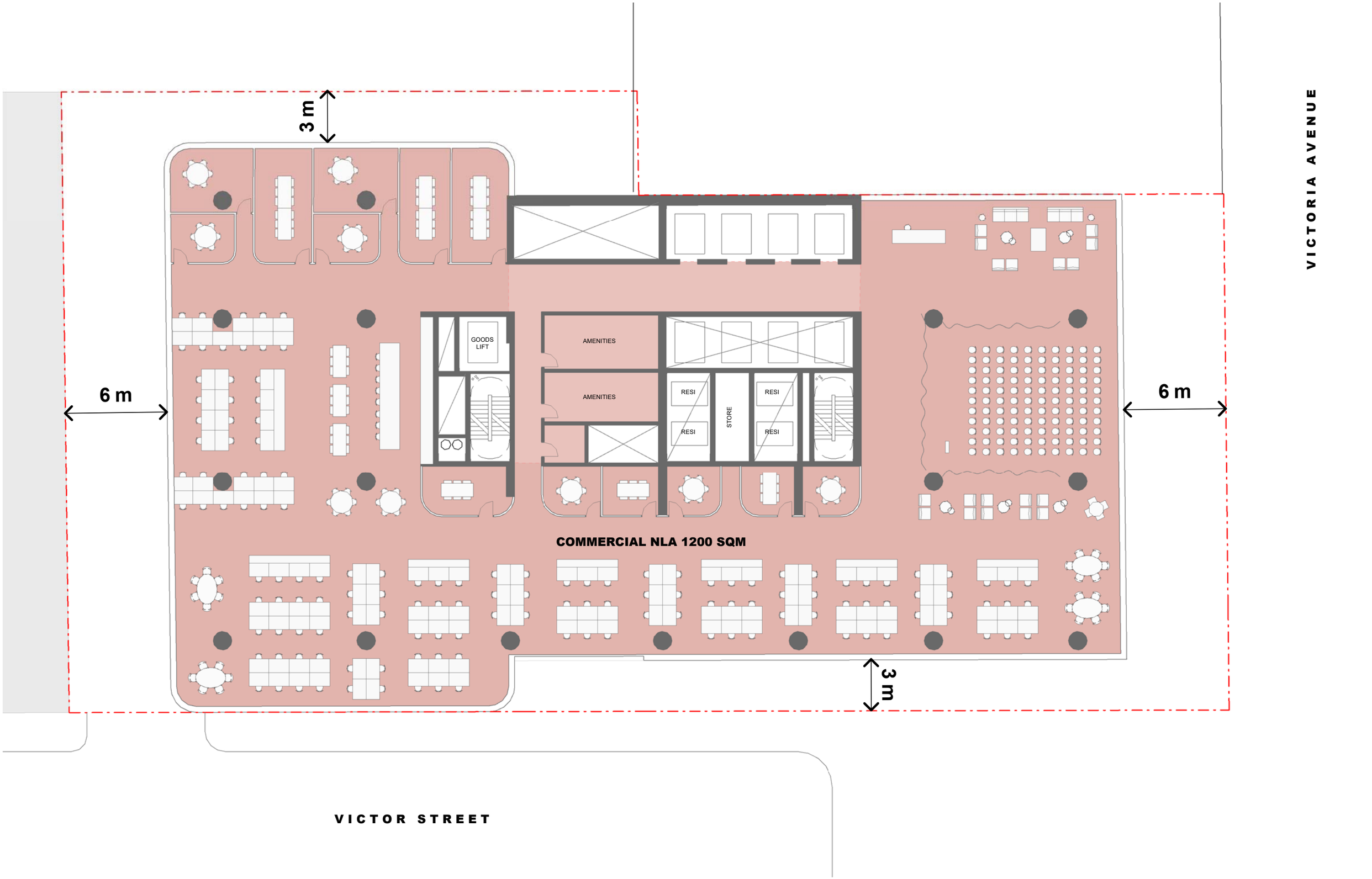
0 2.5 5 10
Scale 1 : 200

Ground Plan

SK100

August 2020



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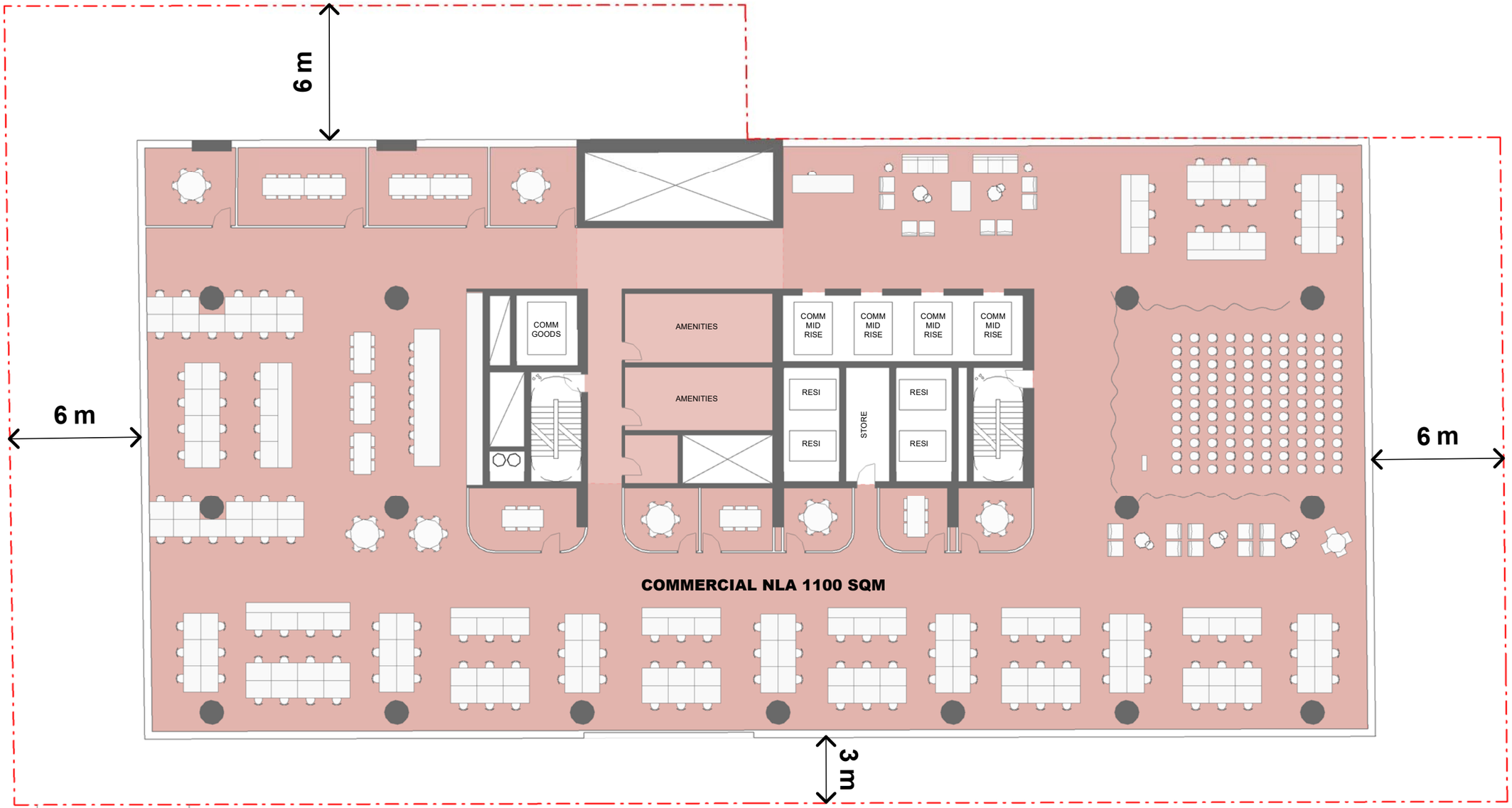
Victor Street, Chatswood

0 2.5 5 10
Scale 1 : 200

Typical Commercial Plan - Lower Levels **SK103** **August 2020**



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Victor Street, Chatswood

0 2.5 5 10
Scale 1 : 200

Typical Commercial Plan - Upper Levels **SK112** **August 2020**

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ABN 78 003 359 153
Level 28, 200 George Street, Sydney NSW 2000
02 9080 8000 mirvac.design@mirvac.com
Nominated Architect: Diana Sarcasmo #5091

Victor Street, Chatswood

0 2.5 5 10
Scale 1 : 200

Typical Residential Plan - Lower

SK126

August 2020

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Mirvac Design Pty Ltd
ABN 78 003 359 153
Level 28, 200 George Street, Sydney NSW 2000
02 9080 8000 mirvac.design@mirvac.com
Nominated Architect: Diana Sarcasmo #5091

Victor Street, Chatswood

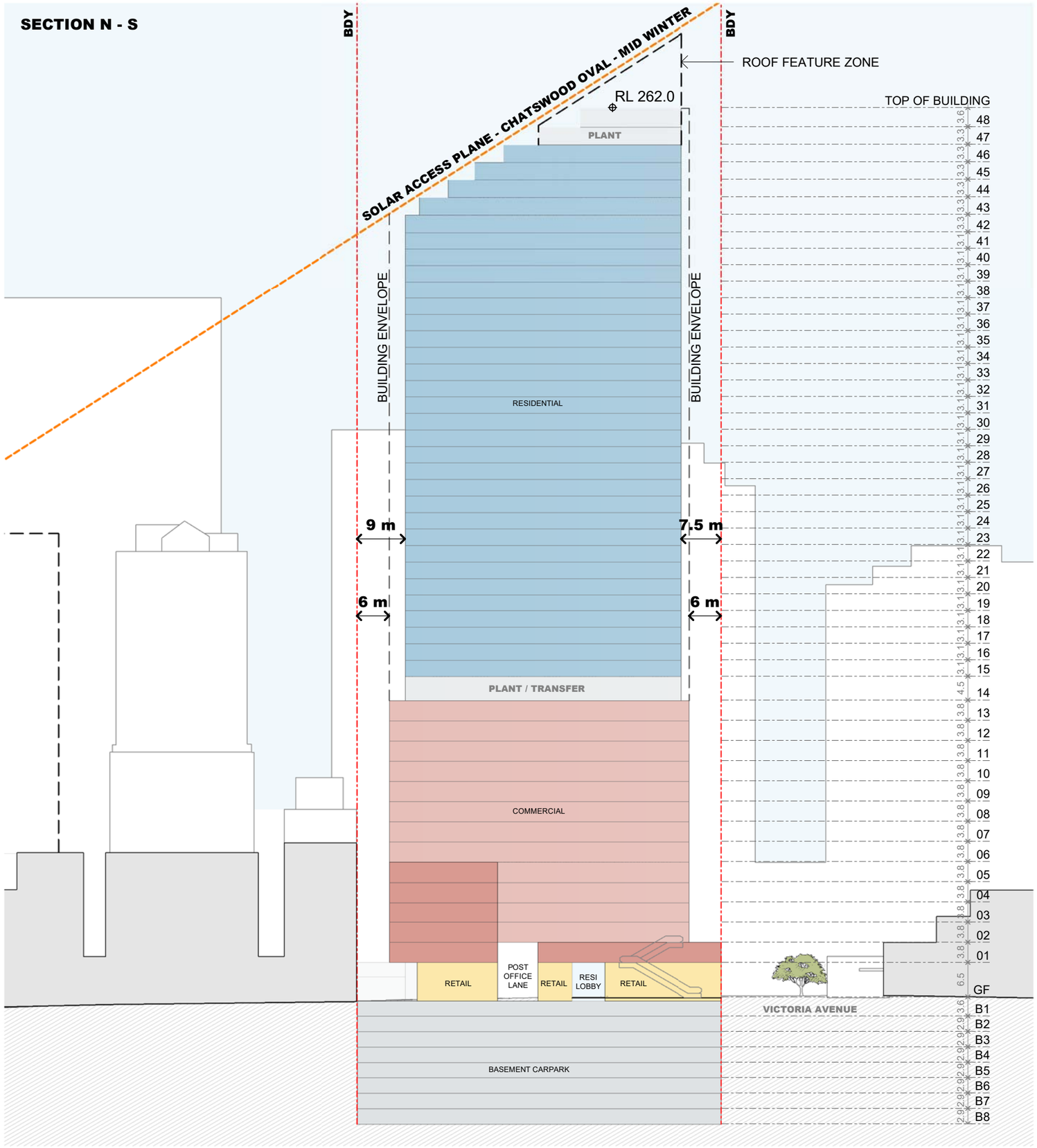
0 2.5 5 10
Scale 1 : 200

Typical Residential Plan - Upper

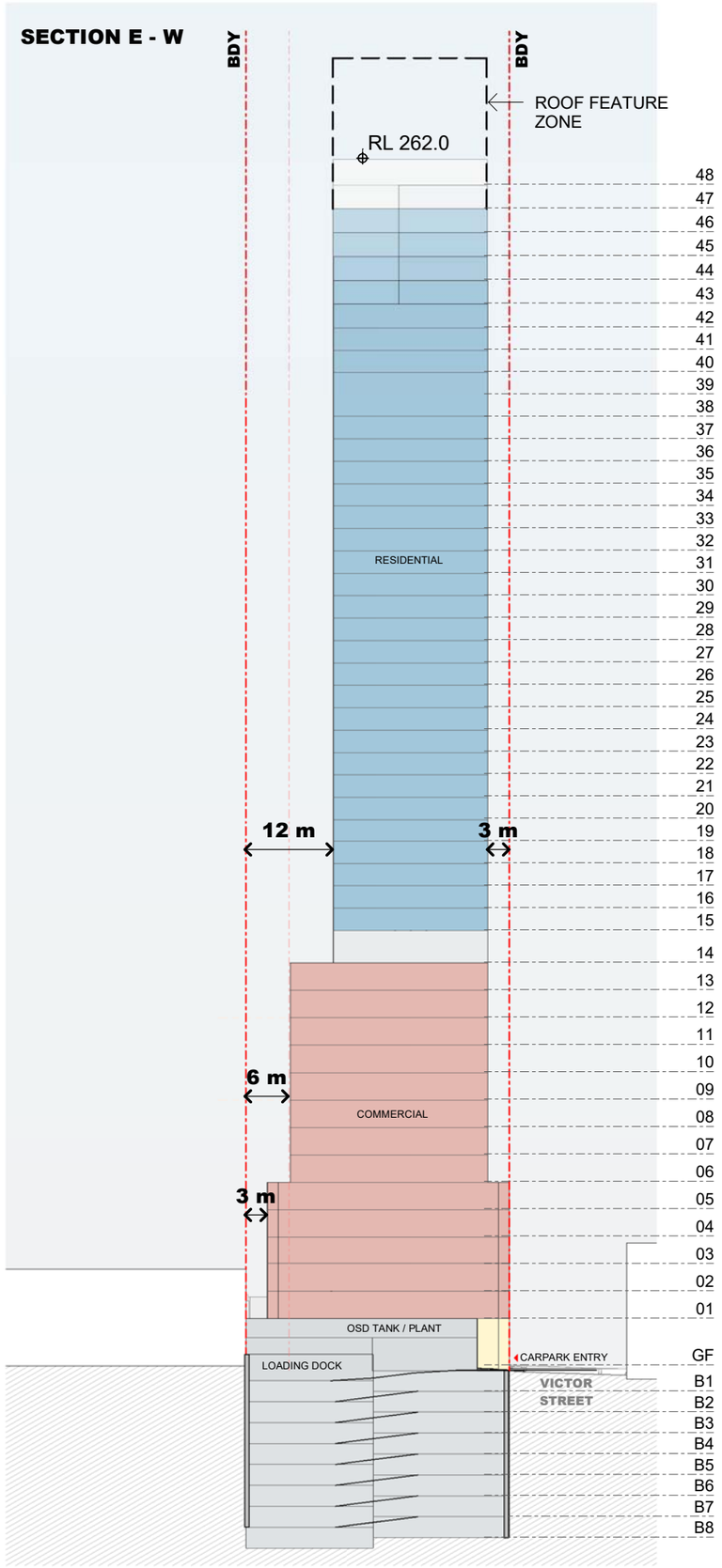
SK142

August 2020

SECTION N - S



SECTION E - W



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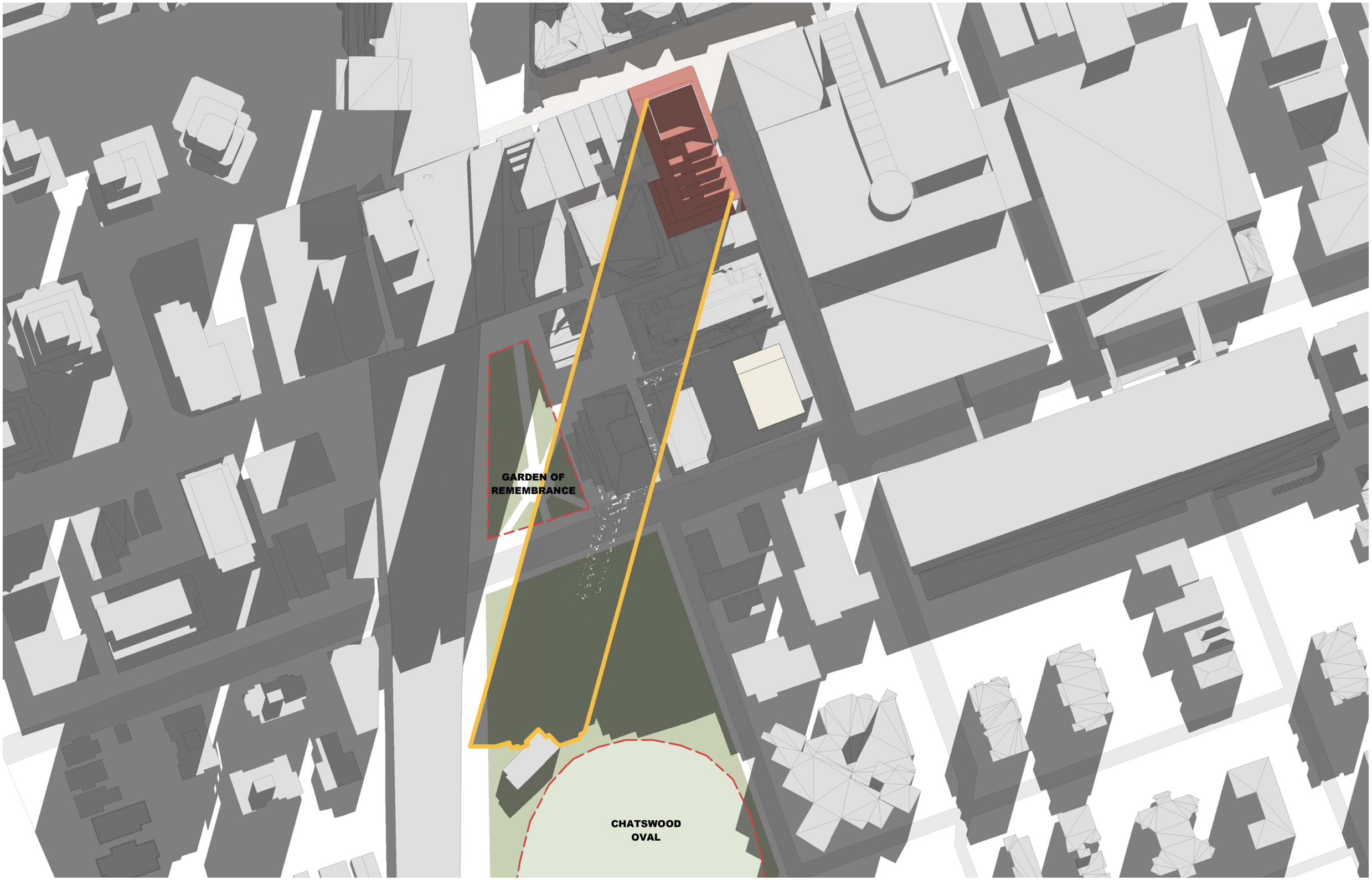
0 10 20 40
Scale 1 : 800

Sections **SK200** **August 2020**



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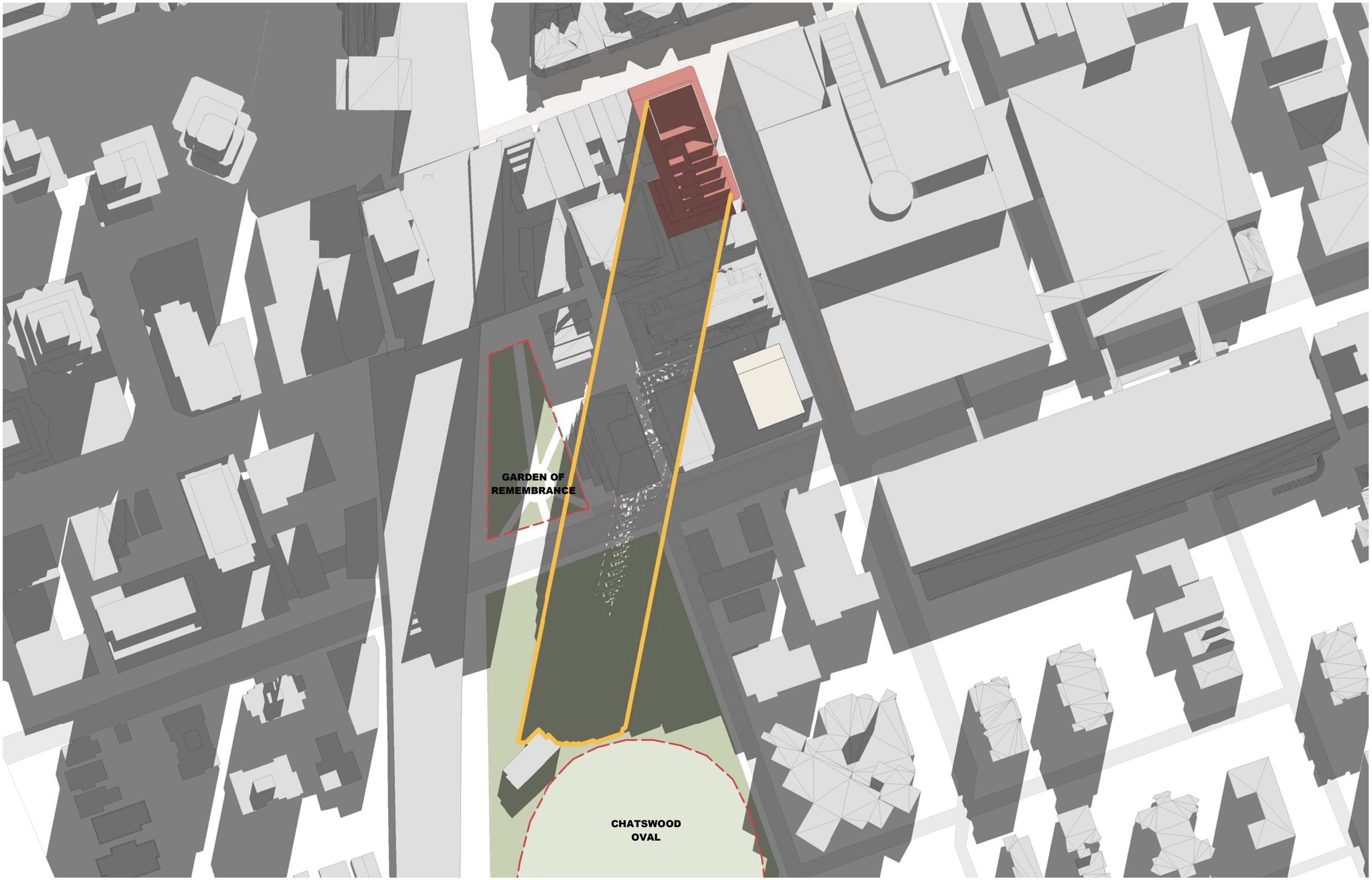
Victor Street, Chatswood

0 18.75 37.5 75
Scale 1 : 1500

1100am 21 June

SK500

August 2020



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Victor Street, Chatswood

0 18.75 37.5 75
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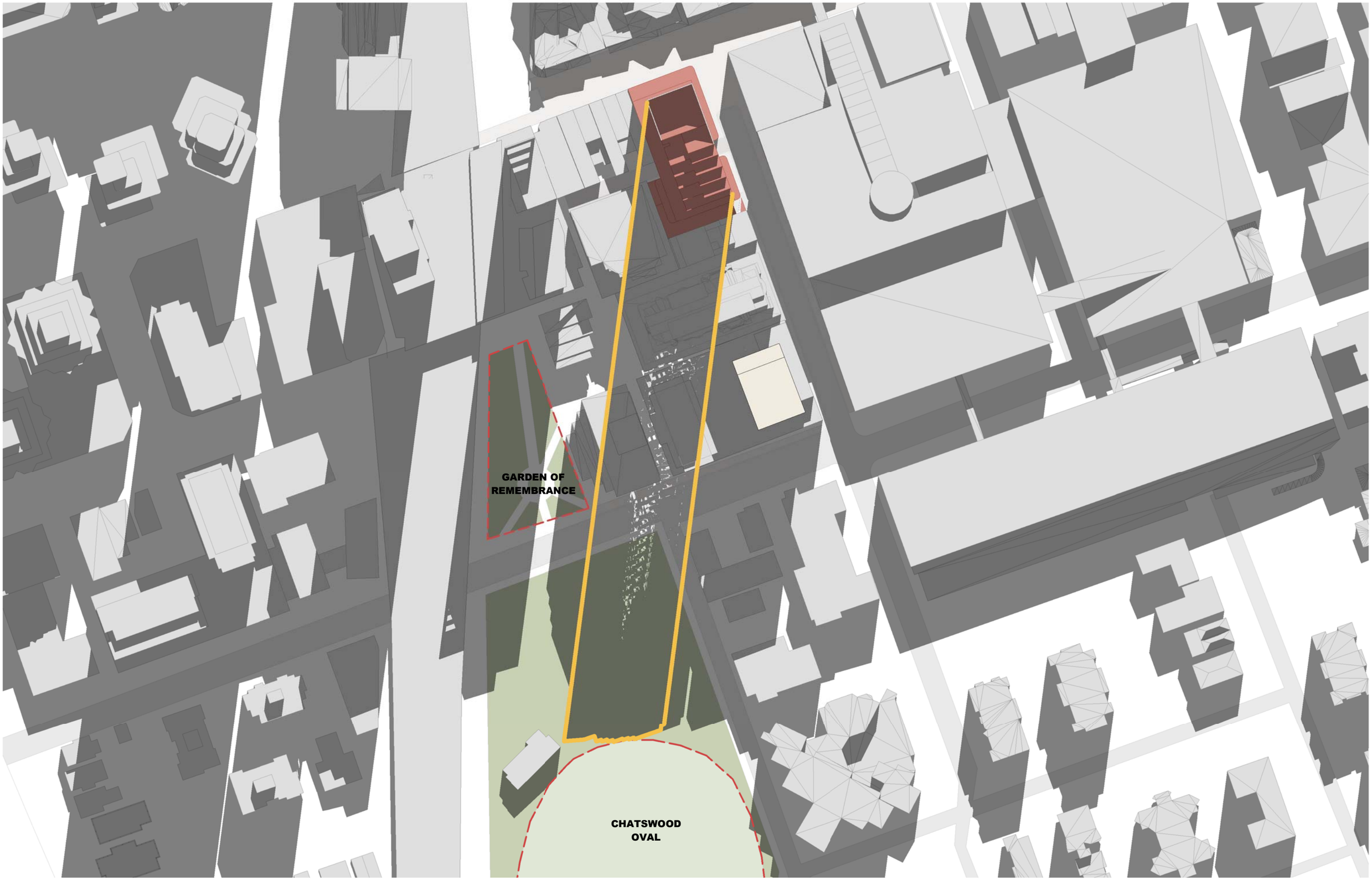
1115am 21 June

SK501

August 2020



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Victor Street, Chatswood

0 18.75 37.5 75
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1130am 21 June

SK503

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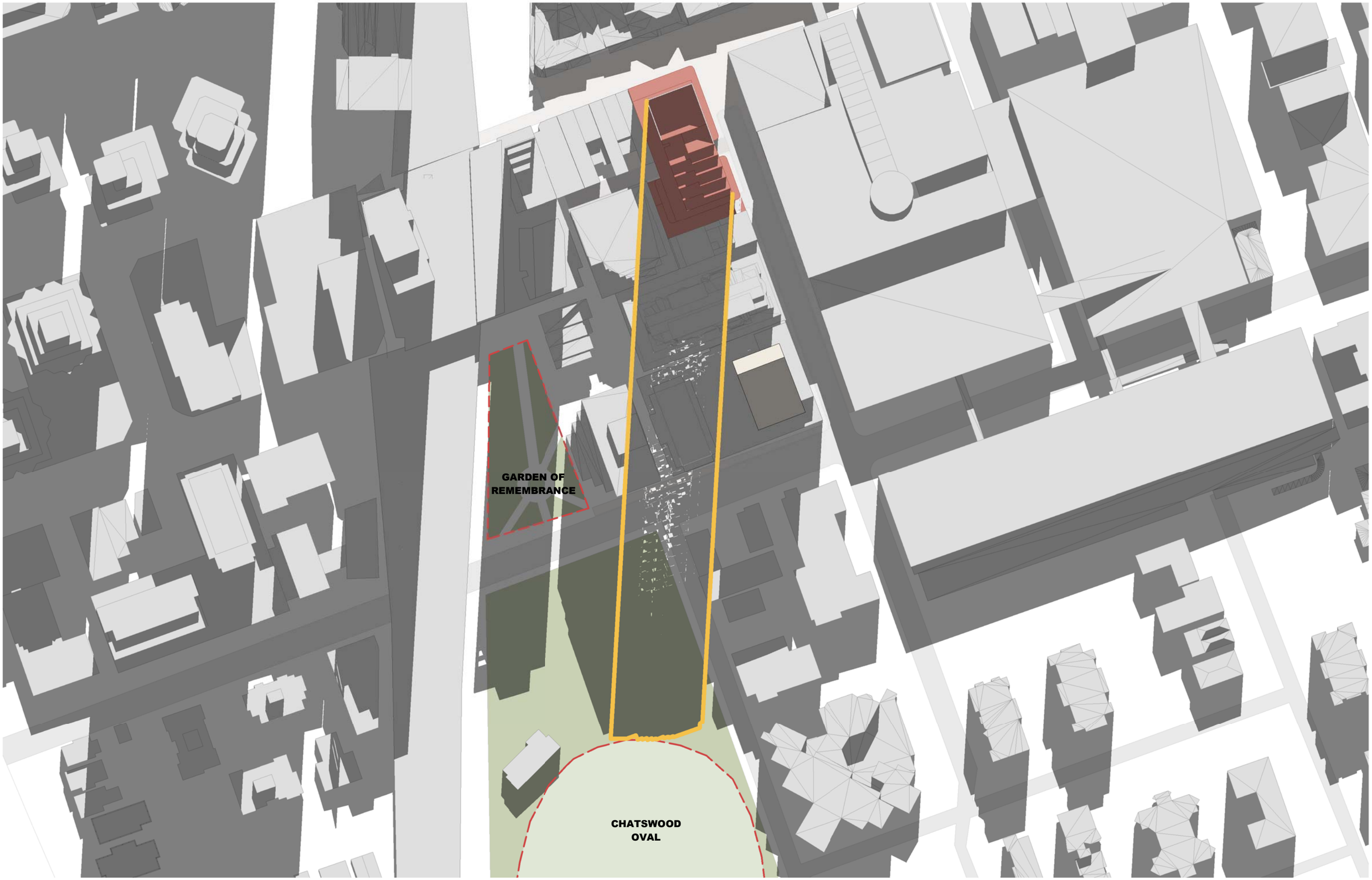

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0 18.75 37.5 75
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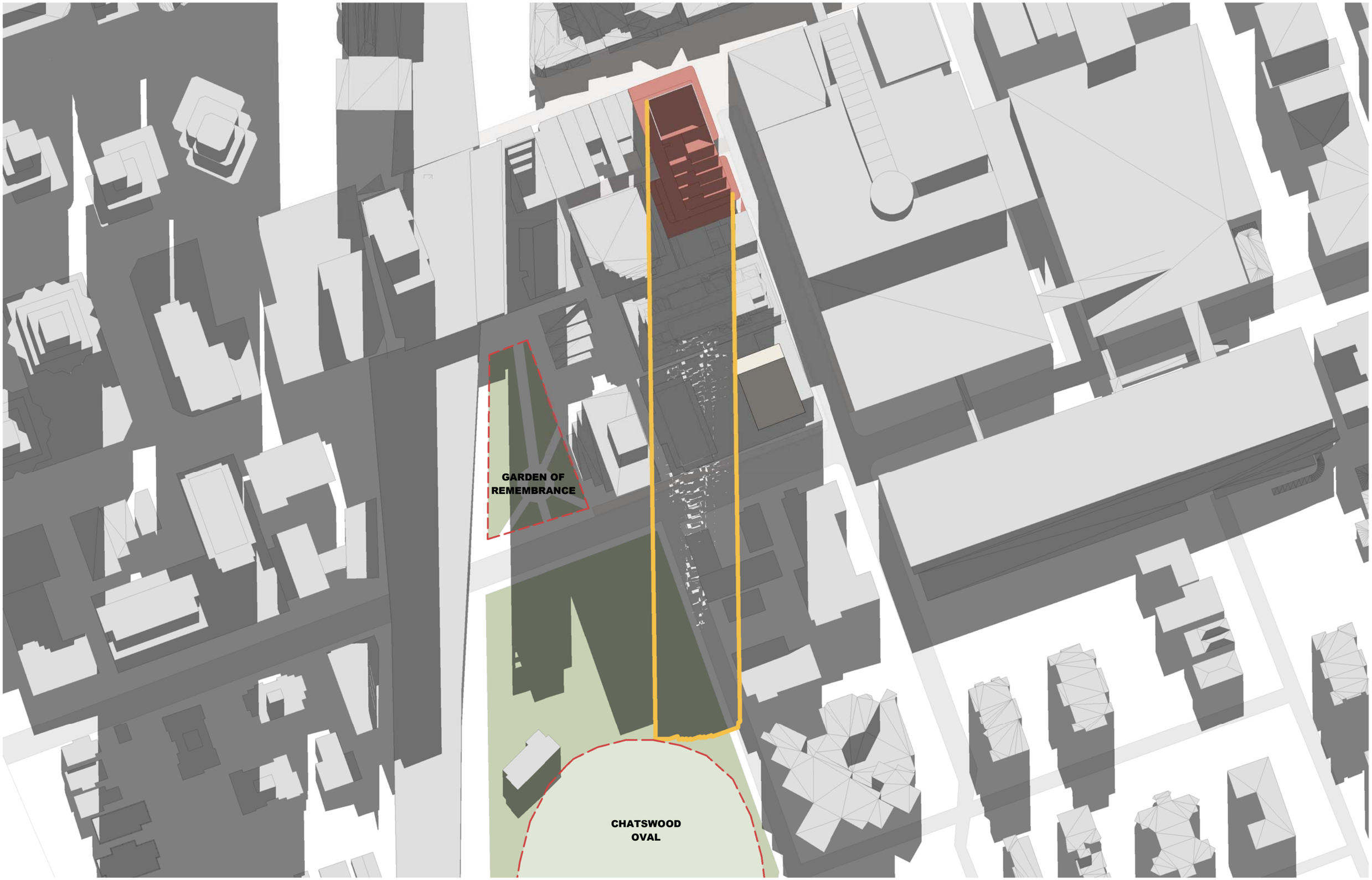
1145pm 21 June

SK504

August 2020



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0 18.75 37.5 75
Scale 1 : 1500

12pm 21 June

SK505

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ABN 78 003 359 153
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02 9080 8000 mirvac.design@mirvac.com
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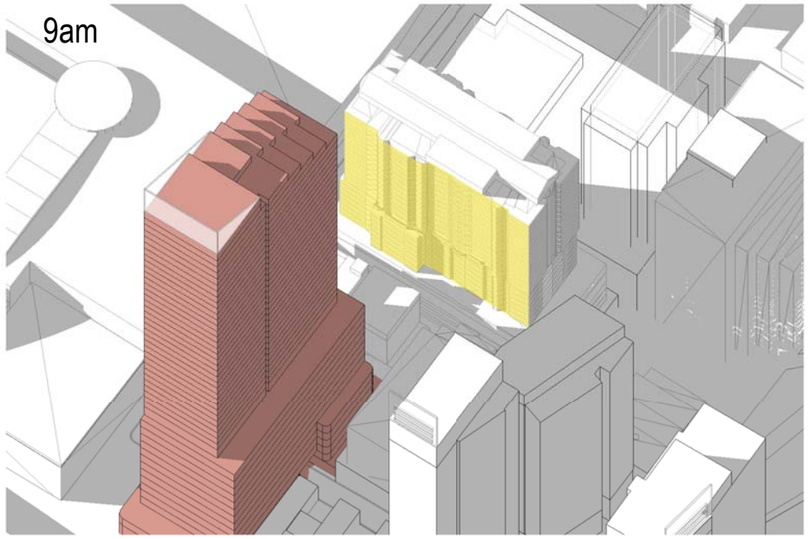
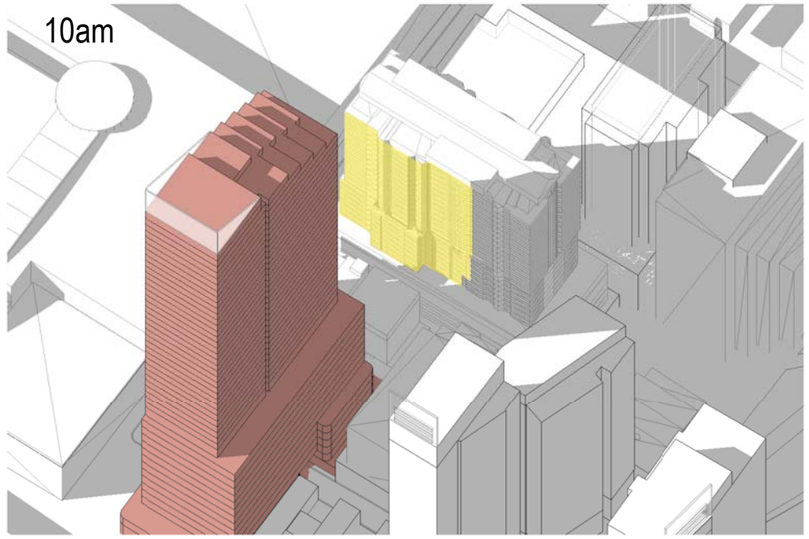
0 18.75 37.5 75
Scale 1 : 1500

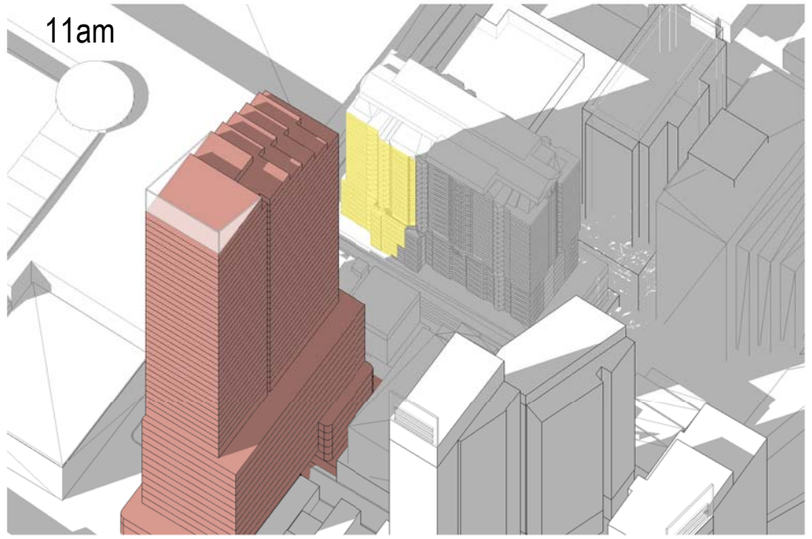
1215pm 21 June

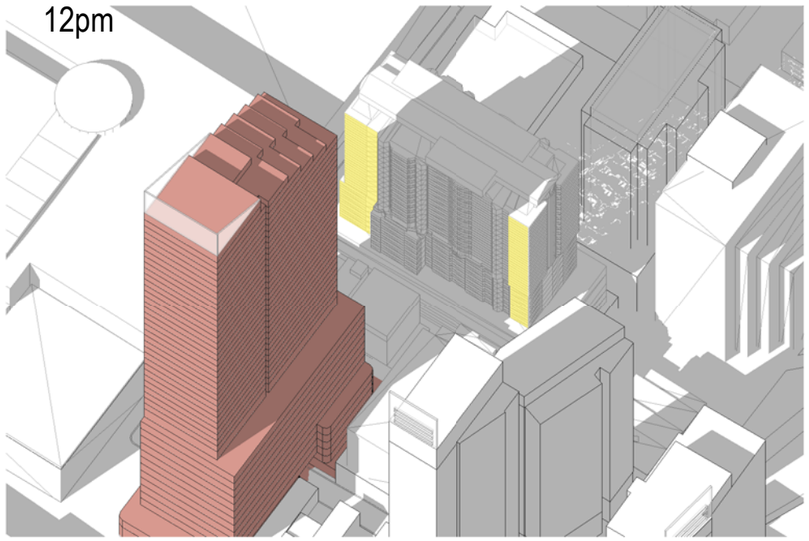
SK506

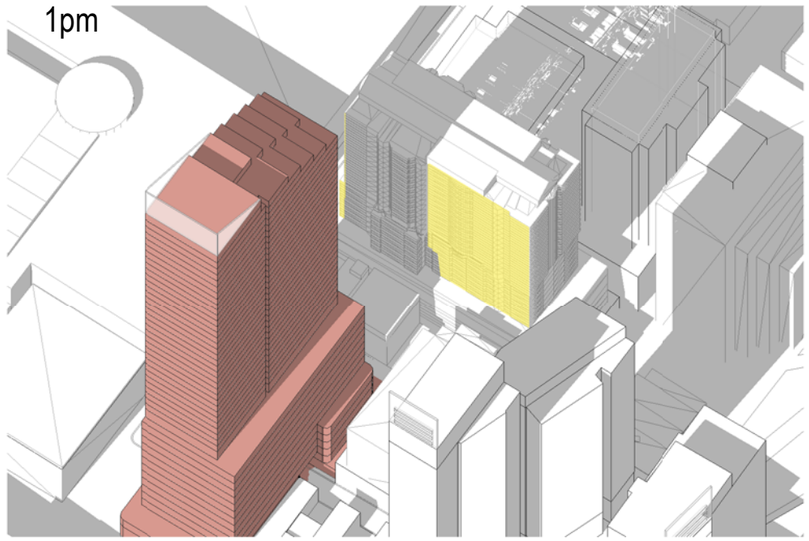
August
2020

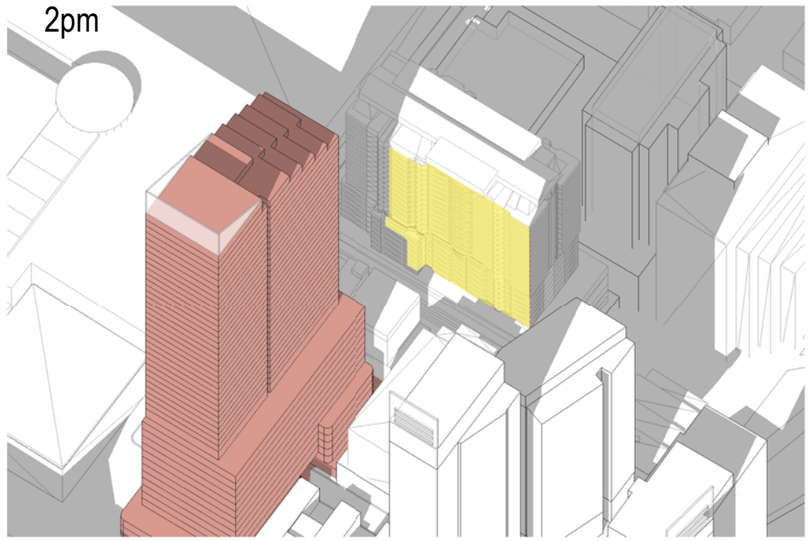


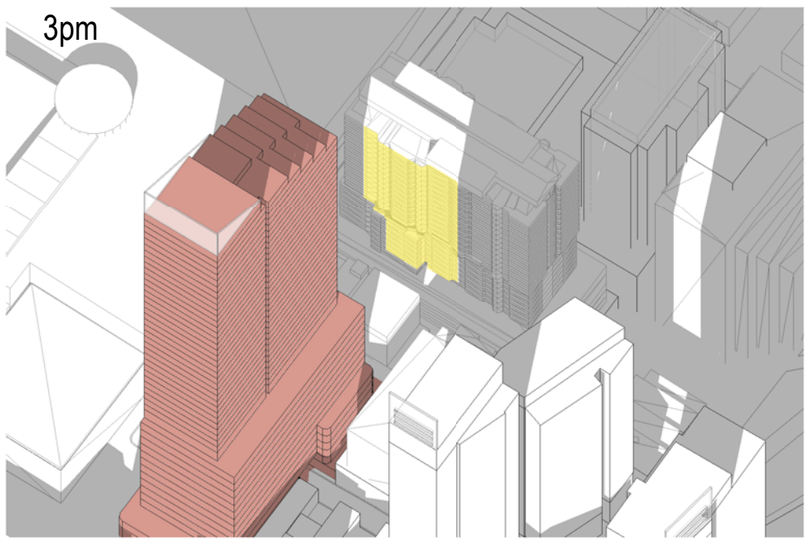












Portion of facade receiving direct sunlight at mid winter

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Mirvac Design Pty Ltd
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02 9080 8000 mirvac.design@mirvac.com
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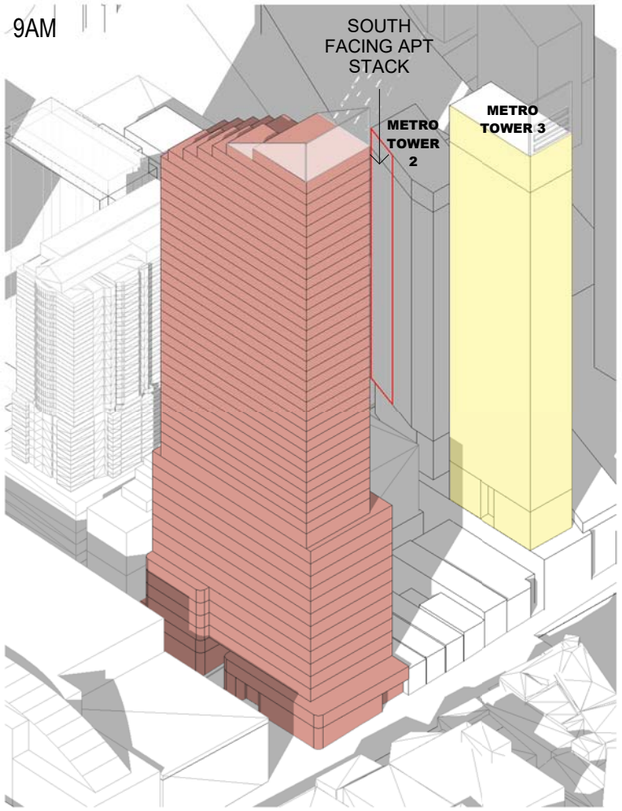
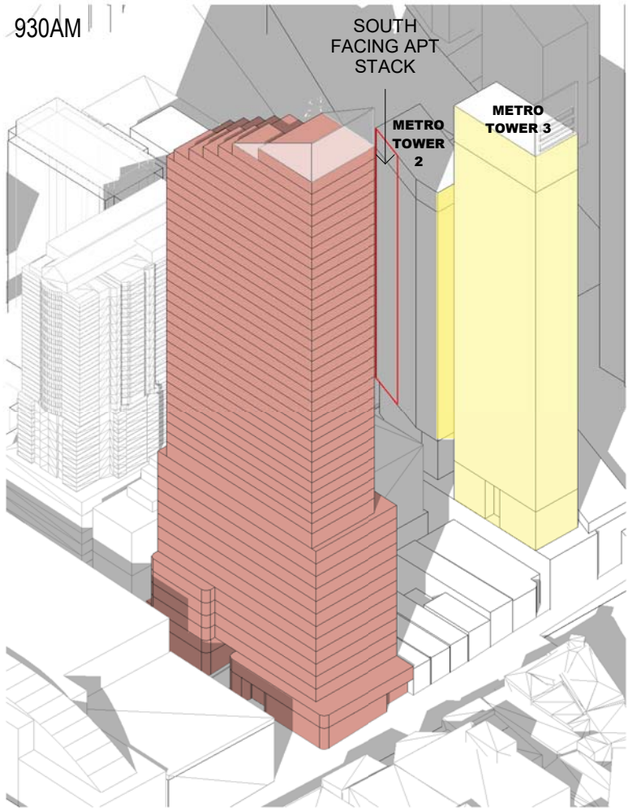
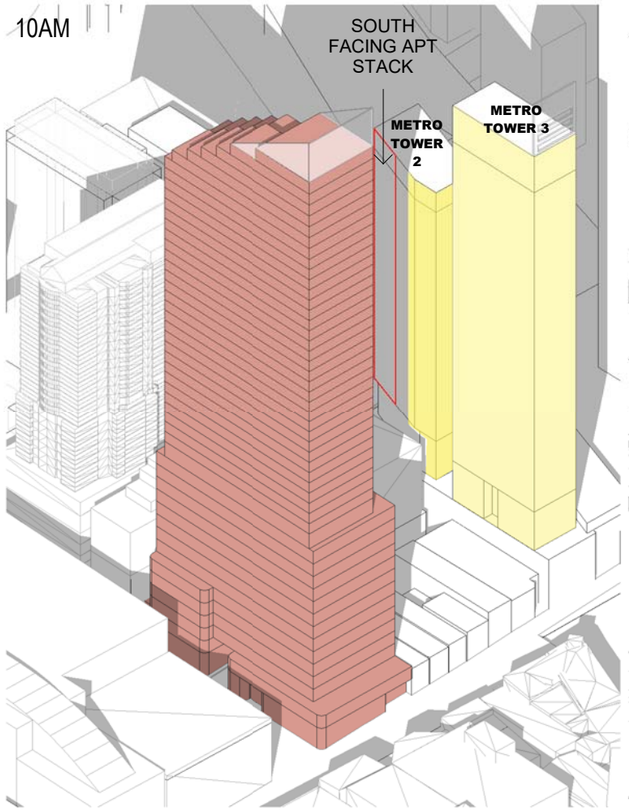
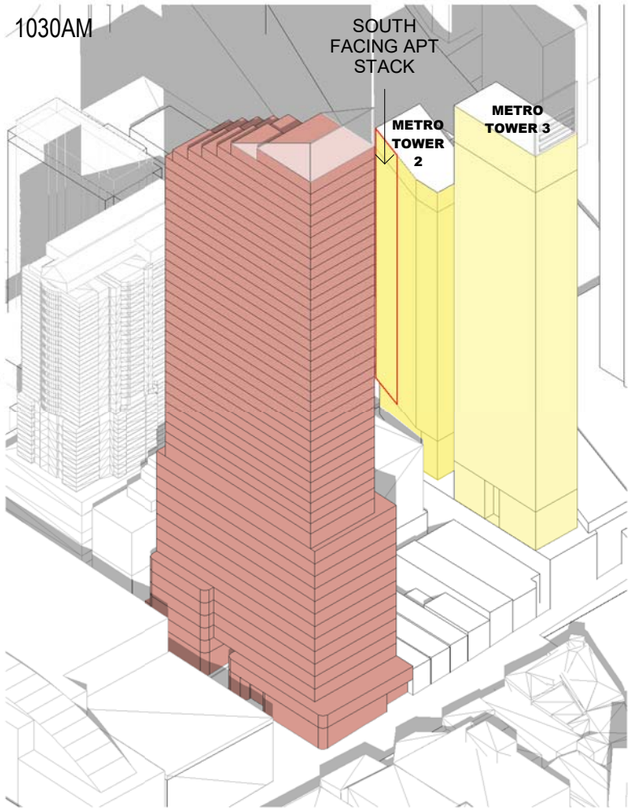
Victor Street, Chatswood

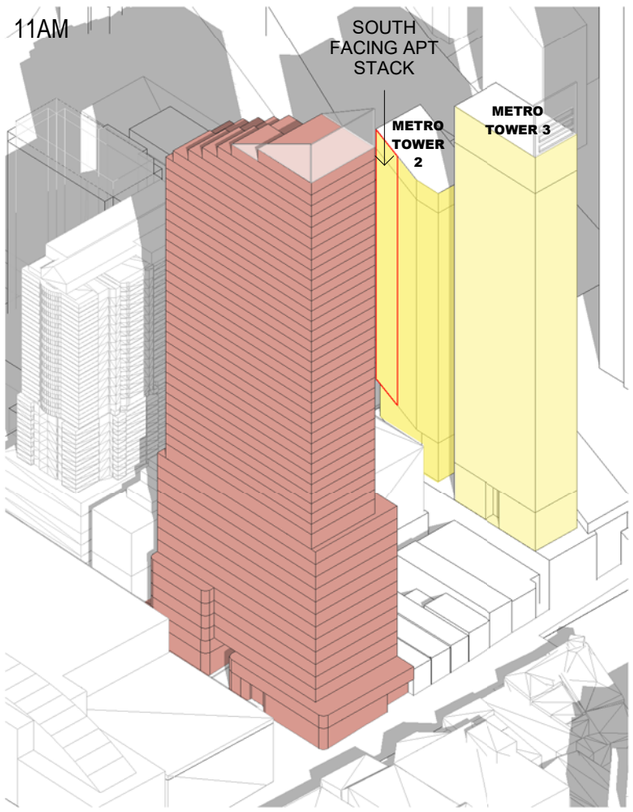
Solar Study_Sebel Apartments_21 June **SK601** **August 2020**

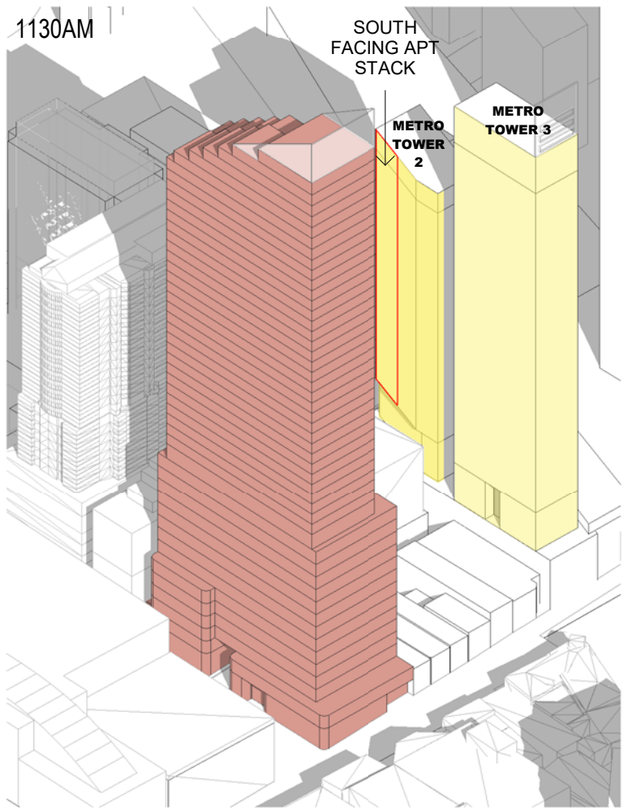


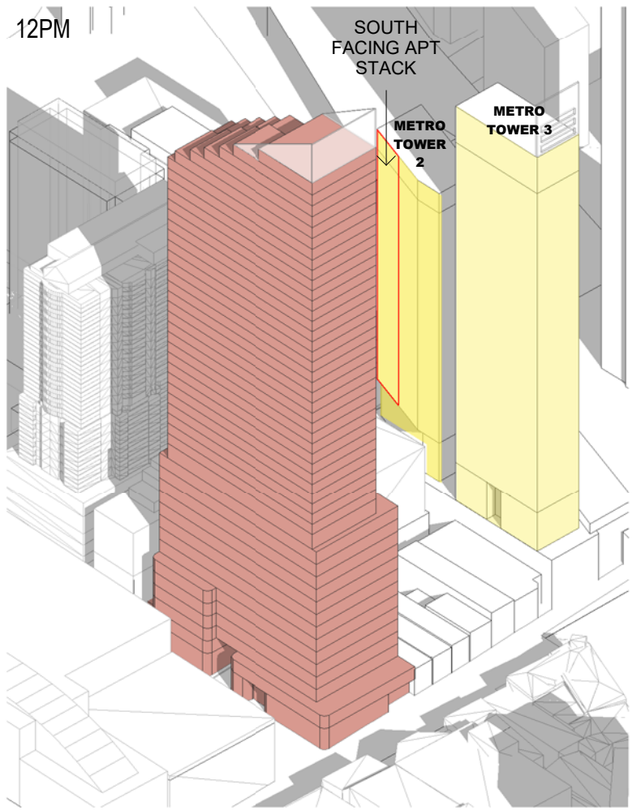


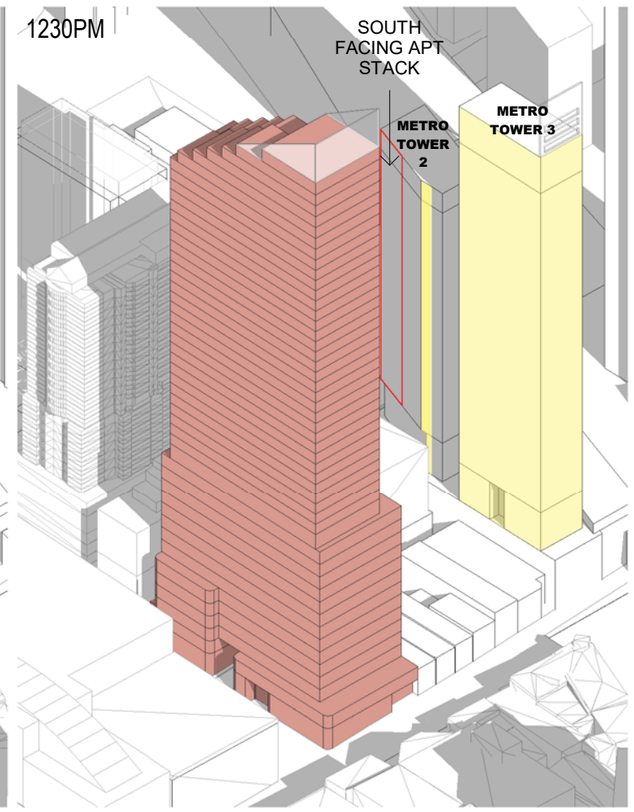












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02 9080 8000 mirvac.design@mirvac.com
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Victor Street, Chatswood

Portion of facade receiving direct sunlight at mid winter

Solar Study_Metro Towers_21 June

SK602

August 2020

Appendix B JLL Feasibility and Market Analysis

JLL | Achieve Ambitions

Chatswood Office Market Analysis

Prepared for Mirvac

August 2020

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Executive Summary

Background & Scope

Background

Mirvac, along with its development partners, are looking to undertake a redevelopment of 45 Victor Street and 410-416 Victoria Avenue, Chatswood (subject site). In order to inform the project they have engaged JLL to undertake a market analysis study on the Chatswood commercial office market.

Scope

Mirvac engaged JLL to undertake a market analysis study for the Chatswood office market. This study was to include research and analysis into:

- A review of prior research;
- The economic context and implications;
- The Sydney office market context & implications;
- The changing nature of Sydney office markets;
- The Chatswood investment office market analysis;
- The Chatswood commercial office challenges;
- Feasibility analysis of the subject site; and
- The commercial opportunity unlocked through a mixed-use outcome.

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Key Findings

Provided below is the key findings of the analysis undertaken in this report. These key findings should be read in conjunction with the detailed body of the report.

- We have undertaken feasibility analysis of a potential commercial only scheme for the subject site. The findings of our analysis was that despite assuming a pre-commitment of 50% of the space (which as identified within this report is a very optimistic assumption), as well as, other broadly optimistic inputs, **we found a clear lack of viability for the site** with the economic rent (rent required to support the development) much higher than the market rent.
- Mirvac have provided us with a mixed-use scheme which includes **~16,000 sqm of commercial floor area**. We have considered the potential commercial opportunity through this mixed -use outcome. This proposed scheme would enable an office building that would be the **3rd largest in the Chatswood market** and would **materially contribute to the employment targets** for the Chatswood Strategic Centre as identified by the Greater Sydney Commission in the North District Plan. The mixed-use scheme would **help support the viability** and in doing so can **help create a catalyst** to break through the historic status quo of the Chatswood commercial market.
- **From a pragmatic point of view, we consider embracing this mixed-use scheme will provide significantly more employment based commercial space (risk adjusted) compared to a commercial only outcome which will likely see continuation of the status quo i.e. no redevelopment of the site.**
- The **residential uses are an enabler to the commercial development**. Without the residential, a commercial only scheme won't be developed. The only way to deliver on the desired commercial outcome is to also allow residential.
- By comparison to the proceeding 25 years we are heading into a period which will support **significantly less office based development** due to a range of factors that include; softer population growth, higher workspace densities, offshoring and lower growth in white collar employment. More broadly we note that over this strong period **Chatswood has failed to attract office development**.
- Further, we note the likely **economic impacts of COVID-19** and more importantly, its potential to reshape how office based uses are viewed which adds further downward pressure on demand.
- While the continued growth of suburban office markets may suggest growth in Chatswood, **Chatswood competes with other suburban markets** for tenants. Going forward, there will be a **greater focus away from the Chatswood market** and into **Western Sydney** in both the short term (e.g. Parramatta) and long-term (e.g. Western Sydney Aerotropolis). It is also likely that other sub-urban office markets are / will be more desirable than Chatswood going forward.
- This report has touched on the broader Sydney office market and where Chatswood is positioned in relative terms. Chatwood benefits from significant levels of amenity relative to many of its suburban office market counterparts and its relative competitive accommodation cost, however, **lack of major tenant demand and feasibility challenges** (discussed further below) has resulted in **no new office development in ~25 years**. Major tenants are less likely to consider the Chatswood market as they previously had and in fact we are now seeing significant relocations out of the market with JLL currently expecting a **negative net absorption in 2020 of 25,000 sqm**, being the 2nd highest reduction in occupied stock in Chatswood since JLL began tracking the market 50 years ago.
- Within this report we have considered more specifically some of the challenges with the Chatswood office market (including lower market rents, high incentives, longer letting up, smaller scale tenants and real challenges in getting a large pre-commitment). We have reviewed the sizes of businesses by reference to both employee size and tenant deals recorded and have found **Chatswood typically services the smaller user market** (0 to 2,000 sqm). This observation combined with the likely **requirement for a large pre-commitment** provides further **challenge for large scale office only development**.

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Review of Prior Research

Review of Prior Research

Chatswood CBD Strategy Market Feasibility Testing (Update) – BIS Oxford Economics, March 2019

Study Objective

The study is an update to the 2016 report *Willoughby Council Report –Draft Chatswood CBD Strategy* which was used as an input to Chatswood's Draft CBD Strategy. The 2016 study argued the case for protecting the B3 commercial core area and relaxing the planning controls in order to stimulate office development and help meet the jobs target in the Greater Sydney Commission's North District Plan. This finding is again endorsed in the 2019 update.

We have outlined our comments on the study's findings below:

Key Observations

- JLL's view that the reality of the **Chatswood market is not accurately represented** in the report.
- At a higher level we consider the report presents a **naïve view of the commercial office market**, specifically around the likelihood of future stock being developed within Chatswood. It fails to consider the **reality of the market, evidence and structural reasons for the underperformance of the Chatswood office market**.
- This is evidenced by the **forecast net addition of 133,000 sqm** of office space between 2019 and 2036. This requires **~7,800 sqm** net to be added per annum over the 17 year period. **This is unrealistic**, especially given this assumes little change to existing controls. As discussed later in this report, Chatswood has experienced a very low level of net growth over the past decade. In the ten years to 2019 there has been an average **346 sqm** added per annum. Most of this coming in the first five years of the decade.
- The study criticises allowing residential buildings within office precincts based on a BIS Shrapnel study in Macquarie Park. This previous study consisted of an interview of 'office occupants' that stated '*the 'professionalism' of a commercial core is compromised by allowing residential towers alongside office towers or as 'mixed use' residential/office buildings'*. Our view is that the mixed use scheme provides a pragmatic solution to the historic underperformance of this market with the residential uses enabling the office uses that would otherwise not be developed.
- At a more granular level the study identified the strong performance of the overall office market and Chatswood office market in the lead up to the report, while we agree with the overall positive performance we identify some disparities between rates recorded by JLL and identified in the report, we acknowledge some of this may be due to the lack of definition in the BIS Oxford Economics report. Examples include:
  - The report identifies **22%** growth in A-grade net face rent, **34%** growth in A-grade effective rent ("over the last two years" with the report published March 2019). This compares to JLL recording growth of **16%** in both net face and effective rents between Q1 2017 and Q1 2019.
  - The report also identifies they expect rents to grow by a further **20%** over the next three years, while JLL has only recorded rental growth of **4.6%** between Q1 2019 and Q2 2020, with further growth over the next 18 months likely to be limited.
- Finally, the study states that there will be 'plenty' of office demand for office space in Chatswood, largely driven by transport accessibility and amenity unlocked by the Sydney Metro Northwest. Historically this market has been the beneficiary of amenity and transport accessibility and is still challenged in terms of office demand. The Sydney Metro Northwest opened in 2019 and yet Chatswood is expected to experience a negative net absorption of 25,000 sqm in 2020 – the 2nd highest in the 50 years tracked by JLL.

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Economic Context & Implications

Economic Context and Implications

Overview of Key Economic Indicators

We set out an overview of key economic indicators below for reference. To note, the majority of this latest data (except Population Growth) was released at the end of March and therefore started to account for the implications of COVID-19.

Table: Historic, Current and Forecast Economic Conditions (Average % or % p.a. CAGR)

National	Historic	Current	Forecast	Observations
Standard bank variable mortgage rate (average)	8.0% (FY90-FY19) 6.1% (FY10-FY19)	5.3% (FY19)	4.5% (FY20-FY29)	Interest rates to decrease in line with long term trends
Treasury Bonds (10 year) (average)	6.0% (FY90-FY19) 3.5% (FY10-FY19)	1.8% (FY19)	1.4% (FY20-FY29)	Risk free rates to decrease further over next 10 years
CPI (average)	2.8% (FY90-FY19) 2.2% (FY10-FY19)	1.6% (FY19)	1.8% (FY20-FY29)	CPI to revert to slightly higher levels than current
NSW	**Historic**	**Current**	**Forecast**	**Observations**
Gross State Product (CAGR)	2.6% (FY89-FY19) 2.4% (FY09-FY19)	1.9% (FY19)	1.7% (FY19-FY29)	GSP growth declining well below long term average over the next 10 years
Private housing investment (CAGR)	2.5% (FY89-FY19) 4.7% (FY09-FY19)	-3.7% (FY19)	0.1% (FY19-FY29)	Negative private housing investment growth in the short term and expected to moderate over next 10 years
Retail turnover (CAGR)	3.2% (FY89-FY19) 3.1% (FY09-FY19)	0.5% (FY19)	1.8% (FY19-FY29)	Negative retail turnover growth in the short term and expected to moderate over next 10 years
Population growth (Sydney Metro) (CAGR)	1.7% (2006-2016)	1.9% (2016)	2.1% (2016-2026) 1.7% (2016-2041)	Population growth in line with recent historic average with an eventual moderation over the longer term
Employment growth (Sydney GCCSA) (CAGR)	1.8% (FY89-FY19) 2.6% (FY09-FY19)	3.7% (FY19)	1.4% (FY19-FY29)	Employment growth declining below long term average over next 10 years

Source: Australian Bureau of Statistics, Deloitte Access Economics, NSW Department of Planning & Environment, JLL Notes: CAGR – Compound Annual Growth Rate; GCCSA – Greater Capital City Statistical Area

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COVID-19 Impact

Overview

The World Health Organisation declared the Coronavirus (COVID-19) a global pandemic on 11 March 2020. The outbreak of COVID-19 has spread globally and is continuing to spread. Countries across the world are implementing protective policy measures designed to slow the spread of COVID-19, including travel and border restrictions, closure of non-essential businesses and services, social distancing, self-isolation and other measures. Consequently, COVID-19 has caused global economic uncertainty which is having a significant impact on the financial markets, investment, business and consumer confidence. Whilst Governments are responding with fiscal policy measures, including the Australian Government, economic volatility is likely to continue given the current uncertainty as to the length and severity of the pandemic.

Property Markets

Economic uncertainty has consequences for property markets. Factors affecting value could include reduced investor and occupier confidence, softening investment yields, reduced occupier demand, lower rental values and higher vacancy rates. In addition, reduced transaction and development activity across all sectors is likely as decision making could be delayed in light of the current economic uncertainty. In residential markets, the restrictions on open houses and auctions are an additional factor affecting market liquidity. Property industry bodies are recommending valuers adopt 'material uncertainty' clauses, where appropriate to reflect the current property market and economic backdrop.

Overview of Key Economic Indicators

- Australian Gross Domestic Product (GDP) numbers show that Australia has had an unprecedented 27 years without recession, the only country in the developed world with such an extended period of uninterrupted economic growth. However, the economic shock caused by the COVID-19 pandemic will impact growth throughout 2020 and beyond. We have already started to witness this as the Australian economy contracted 0.3% in the first quarter of 2020 and is expected to contract further in the second quarter, reflecting the first recession in almost thirty years.
- Despite the historic strength of the Australian and NSW economies, there was considered to be a risk of future moderation before the onset of the COVID-19 pandemic. The outlook for the NSW economy was for a slowdown of growth in State Final Demand (SFD) and Gross State Product (GSP). A decline in residential construction activity was also expected, after a period of extraordinary growth, which may be accelerated due to the economic impacts of the COVID-19 pandemic.
- The Reserve Bank lowered the cash rate twice in March 2020 from 0.75% to 0.50% on 3 March 2020 and again to 0.25% on 19 March 2020 in response to the impacts of the COVID-19 pandemic.

COVID-19 Impact on Office

Some of the key impacts and observations to the office sector include:

- Most Australian office sectors were operating with low prime grade vacancy prior to the outbreak –risk is concentrated for secondary grade assets where vacancy is elevated. In the short term, the flexible / co-working space sector is likely to undergo significant consolidation.
- Over the longer term, the outbreak will fast track structural changes of remote working and investment in collaborative technologies. Despite the current switch to mass remote working, the physical office will maintain its importance for facilitating interaction, collaboration and employee health, wellbeing and productivity.

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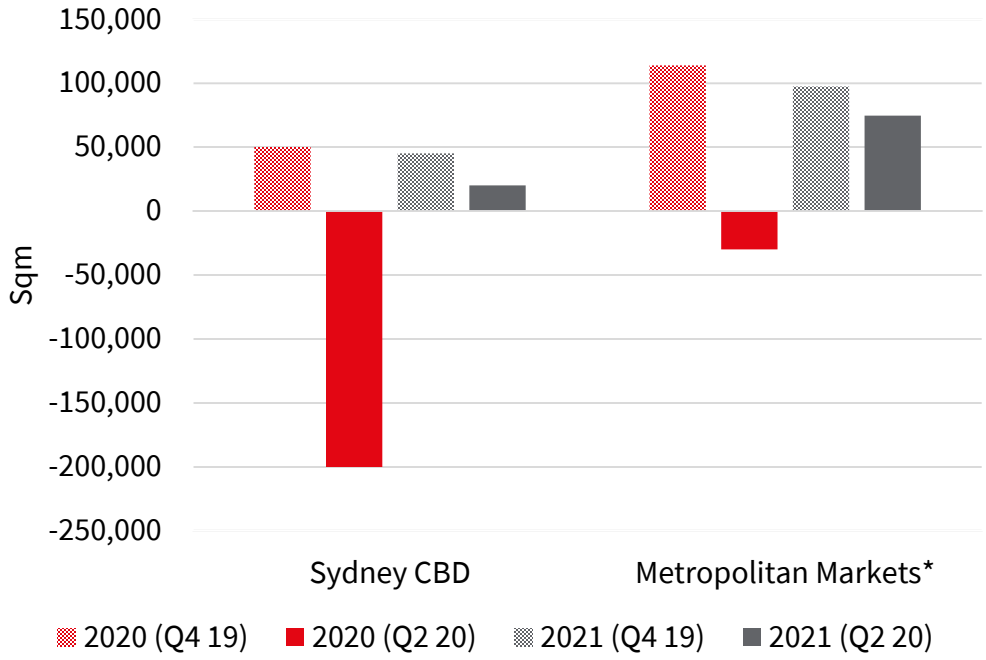
COVID-19 Impact on Office

JLL's Office Net Absorption Forecast

The office sector is highly sensitive to changes in the economy and employment expectations. As such, we have revised our house view of office net absorption for 2020 and 2021 (see figure below).

Figure: Sydney Office Market Net Absorption



Source: JLL Research
*Only includes the forecast markets of North Sydney, St Leonards, Chatswood, Parramatta, Macquarie Park

Vacancy

Historically, office market slowdowns are accompanied by an increase in sublease availability. We are already seeing evidence of an increase in sublease availability, but it is unlikely to reach the levels experienced in the early 1990s. Organisations have been on a 30 year journey to increase density and reduce workspace ratios. We estimate that average workspace ratios are 20% to 25% lower today than the late 1980s. Headcount reductions, therefore, lead to less excess space than previous economic downturns.

We have analysed previous office market downturns from the mid-1970s recession to the global financial crisis (see table). The large markets of Sydney, Melbourne and Auckland entered this downturn with very low vacancy. It is important to note that for Sydney and Melbourne the expected vacancy rate trajectory pushes those markets into the high single digit territory – well below the vacancy peaks recorded in the mid-1970s recession, early 1990s recession and post 2000 slowdown.

Table: CBD Office Market Vacancy Rate Peaks in Economic Downturns (Q1 2020)

	Vacancy rate peaks							
Downturn	Sydney	Melbourne	Brisbane	Perth	Adelaide	Ca nberra	Auckland	Wellington
Mid-1970s	13.0%	18.3%	11.7%	-	-	-	-	-
Early 1980s	4.3%	7.8%	8.3%	15.1%	-	-	-	-
Early 1990s	22.5%	25.8%	14.3%	31.8%	20.7%	6.9%	29.1%	17.6%
Post 2000	11.9%	10.2%	7.0%	13.4%	13.0%	6.1%	14.1%	7.7%
Financial Crisis*	8.0%	6.4%	10.2%	7.7%	8.2%	8.2%	12.6%	4.9%
Global Pandemic	9.6%	9.5%	12.5%	19.1%	15.7%	10.2%	6.6%	6.2%

Source: JLL Research
*2008/2009

Implications for this Report

This report has been prepared based on information available at the time of writing which may not be reflective of current market conditions due to the evolving and unprecedented nature of the COVID-19 pandemic.

The full impacts of the COVID-19 pandemic are yet to be known, however, early observations suggest a negative impact to the office market and office development, which will have implications for the development proposed at the subject site.

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Sydney Office Market Context & Implications

Office Market Definitions

Office uses broadly fit into three category types, these are:

1. Investment grade office assets. These are generally defined as large floor plate office buildings within 'defined' office precincts. Within Sydney these include Sydney CBD, Sydney Fringe, Chatswood, Macquarie Park and Parramatta, as well as others identified within this report. While Chatswood is considered an investment grade location, this is a secondary location that the majority of the A-REITS, which own the majority of investment grade assets, would consider Chatswood outside their investment profile.
2. Support office uses. These uses generally provide localised services to the community and share some characteristics to retail uses. They often benefit from access to the public and therefore public transport, car parking and exposure are important considerations. Examples include real estate agents, accountants and local solicitors' offices. These are often provided in smaller office type accommodation.
3. Office uses that support another primary land use e.g. a small amount of office within an industrial facility or medical facility. This is not considered in significant detail in this report as the nature of this type of product is generally found outside commercial centres. Note, for the purposes of definition we have assumed the small amount of office that supports retail uses within the 'support office uses' above.

Our observation of the opportunity for office uses in the Chatswood CBD generally fall into a mix of the first and second category. The first category being more limited due to competition and risk, while the second will be driven by growth in local and catchment population.

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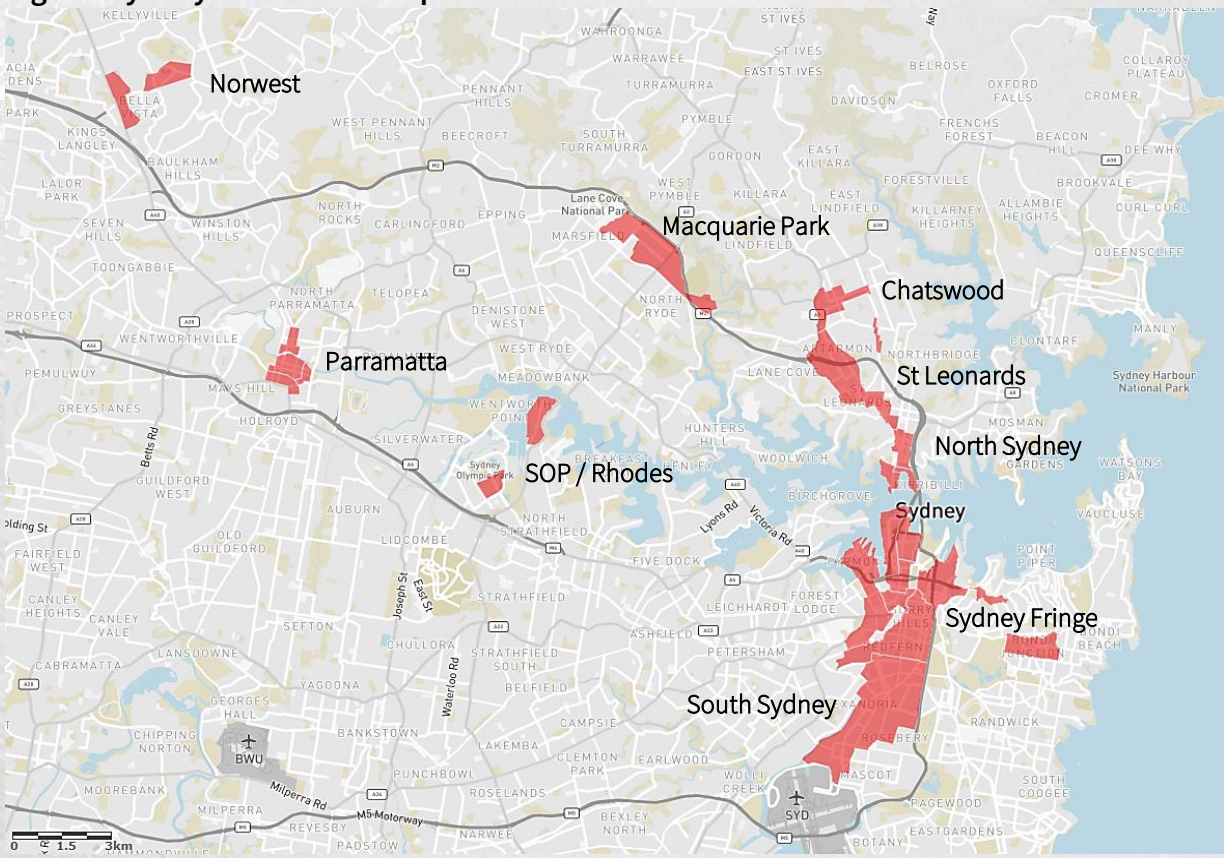
Overview of Sydney Office Markets

The Sydney office markets monitored by JLL comprise just over 9.9 million sqm of office space, 50.7% of which is located in the Sydney CBD market, and 49.3% located in the 9 major metropolitan office markets. The Sydney metropolitan markets monitored by JLL include the following:

- Sydney Fringe
- North Sydney
- Chatswood (the focus of this report)
- St Leonards
- Norwest
- Sydney Olympic Park/Rhodes
- Sydney South
- Macquarie Park (including North Ryde)
- Parramatta

For the purposes of this report, we will be focusing our observations on the Chatswood commercial office market.

Figure: Sydney CBD and Metropolitan Office Market Locations



Source: JLL

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Overview of Sydney Office Markets Continued

The metropolitan markets comprise a mix of fringe CBD locations, major suburban CBDs such as Parramatta and Chatswood, inner suburban locations and business parks. Each of these locations has quite different characteristics that may attract different occupiers.

- The Sydney Fringe office market adjoins the CBD market and provides a viable near city alternative to the CBD. Typically, occupancy costs are lower (both rents and parking costs) and car parking provision is higher. The Fringe locations suit companies that desire an affordable, central location with better access to low cost parking for both workers and customers.
- Suburban CBDs include Parramatta, North Sydney and Chatswood. Some of these markets have attracted a large government workforce (e.g. Parramatta) with state government in particular decentralising some of their services to these locations. The markets generally have reasonable access to public transport and a good mix of support services. Rents are significantly lower than the CBD market.
- Business parks are typically lower density office locations providing modern, affordable accommodation with plentiful parking for workers and customers. Low rise buildings with large floor plates are common, providing greater flexibility and efficiency. Examples in Sydney include Norwest and Sydney Olympic Park.
- Other inner suburban locations are often an extension of fringe markets and have attracted office accommodation due largely to their relatively central location and good access to transport e.g. St. Leonards/Crow Nest. These markets have often been attractive due to their proximity to higher socio-economic residential areas which are where a high proportion of the employees reside.

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Supply & Demand

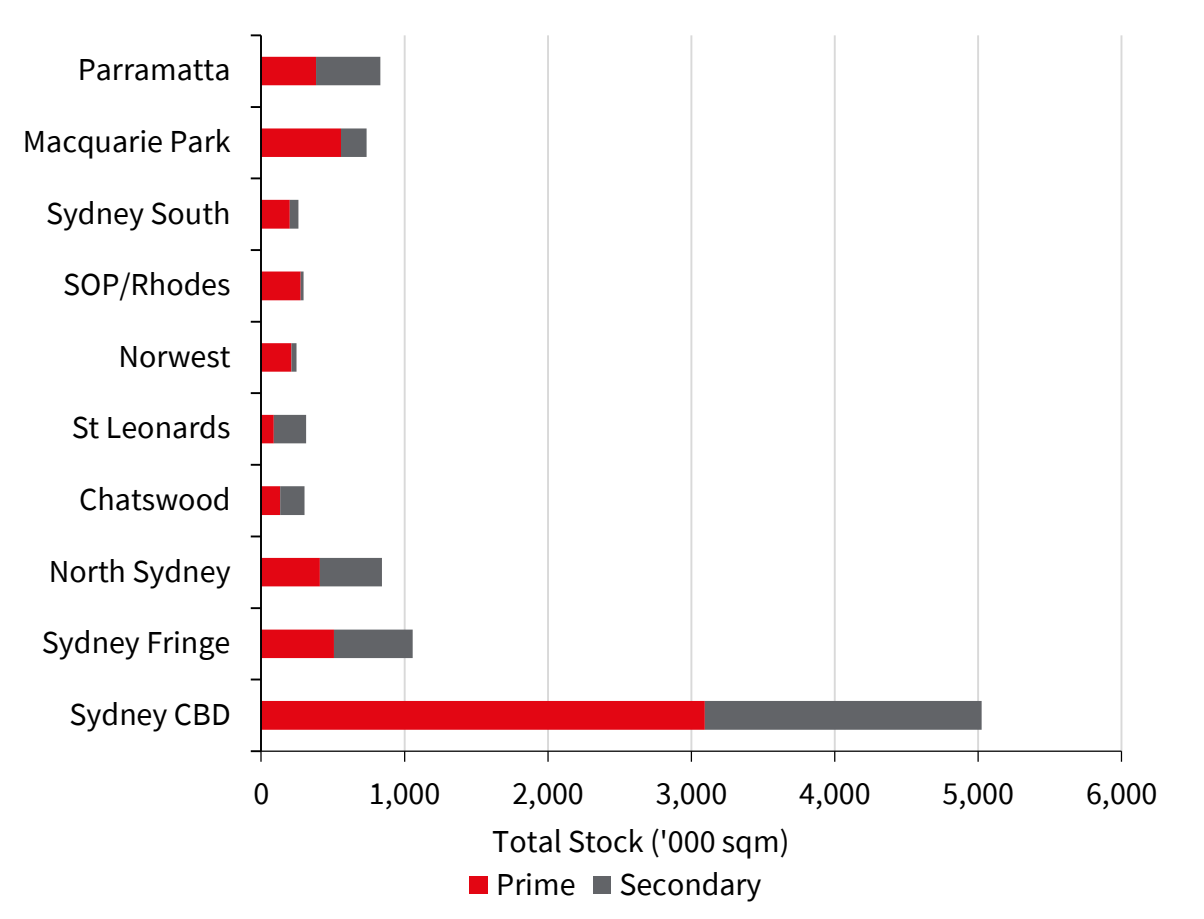
As at Q2 2020, the total stock across the nine monitored metropolitan markets was 4.87 million sqm. The largest Sydney metropolitan market is the Sydney Fringe and it comprises 1.057 million sqm of stock, accounting for 10.7% of the total Sydney office market, which includes Sydney CBD.

Table: Sydney Office Market Profile, Q2 2020

	Net Lettable Area	Prime Grade Stock	Secondary Grade Stock
	'000 sqm	% Total Stock	% Total Stock
CBD Markets			
Sydney CBD	5,024	61.6%	38.4%
Metropolitan Markets			
Sydney Fringe	1,057	47.9%	52.1%
North Sydney	842	48.8%	51.2%
Chatswood	303	44.2%	55.8%
St Leonards	313	28.4%	71.6%
Norwest	246	85.4%	14.6%
SOP/Rhodes	297	93.1%	6.9%
Sydney South	261	76.4%	23.6%
Macquarie Park	736	75.8%	24.2%
Parramatta	832	46.1%	53.9%

Source: JLL Research

Figure: Prime and Secondary Grade Stock by Metropolitan Market, Q2 2020



Source: JLL Research

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Supply & Demand Continued

We have recorded a slowdown in the Sydney office leasing market, with a negative net absorption in occupied stock in the 12 months to Q2 2020. The 10 Sydney markets overall contracted by -107,980 sqm over the last 12 months, which is mainly attributed to Sydney CBD, which experienced the largest contraction (-164,082 sqm). -66,600 sqm of net absorption was recorded in the Sydney CBD market over 2Q20, which was mainly driven by sub-1,000 sqm tenant activity (-48,000 sqm). This was the largest negative figure recorded since the economic recession in the 1990s.

There was some considerable divergence between the best performing and worst performing, with the largest expansion coming from Sydney Fringe (57,694 sqm), driven primarily by The Commonwealth Bank's consolidation into Australia Technology Park. CBA pre-leased 50,951 sqm in the Foundry Building at 2 Locomotive Street, Eveleigh.

New supply in the 12 months to Q2 2020 totalled 246,375 sqm across the nine metropolitan office markets, equivalent to 5% of existing stock in this market. Of the nine metropolitan markets, only two recorded no new supply in the 12 months to Q2 2020 – Chatswood and Norwest. The stand out of contributors to new supply was Parramatta which contributed 105,959 sqm, equating to 12.7% of its existing stock. During this same period, Sydney CBD saw completions total 73,306 sqm, equivalent to 1.5% of existing stock.

Projects currently under construction across the nine metropolitan office markets as at Q2 2020 totalled 371,446 sqm, equivalent to 7.6% of existing stock. This is a relatively high level of construction activity when compared to CBD market, where 345,789 sqm, equivalent to 6.9% of CBD stock, is under construction. Most of the metropolitan projects under construction are attributed to the Parramatta, North Sydney and St Leonards office markets, which together account for 83% of the total construction across the nine metropolitan office markets. Chatswood has recorded no new projects as currently under construction.

Table: Sydney Office Market Profile, Stock, Supply and Net Absorption, Q2 2020

	Net Lettable Area	Net Absorption 12 mths to Q2 2020	Completions 12 mths to Q2 2020	Completions 12 mths to Q2 2020	Under Construction	Under Construction
	'000 sqm	'000 sqm	'000 sqm	% of NLA	'000 sqm	% of NLA
CBD Markets						
Sydney CBD	5,024	-164.1	73.3	1.5%	345.8	6.9%
Metropolitan markets						
Sydney Fringe	1,057	57.7	81.2	7.7%	28.7	2.7%
North Sydney	842	-34.1	17.0	2.0%	94.4	11.2%
Chatswood	303	-25.3	0.0	0.0%	0.0	0.0%
St Leonards	313	-7.5	3.7	1.2%	38.5	12.3%
Norwest	246	4.2	0.0	0.0%	12.1	4.9%
SOP/Rhodes	297	-17.6	2.5	0.9%	0.0	0.0%
Sydney South	261	3.8	1.0	0.4%	9.4	3.6%
Macquarie Park	736	33.1	34.9	4.8%	14.4	2.0%
Parramatta	832	41.9	106.0	12.7%	173.9	20.9%

Source: JLL Research

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Vacancy

As at Q2 2020, the total prime grade vacancy rate in the nine metropolitan markets was 9.6% compared to 7.0% for the Sydney CBD market. The total metropolitan markets' vacancy was 9.8% while the total vacancy for the Sydney CBD market was 7.0%. Norwest currently has the lowest overall vacancy rate of 4.8%, however, both Sydney South and Macquarie Park have the lowest prime grade vacancy of the Sydney markets at 5.2%. Historically the metropolitan and CBD markets have typically had higher vacancy rates in secondary stock, however, more recently this has shown to be the opposite case. Five of the nine metropolitan markets (North Sydney, Chatswood, St Leonards, Norwest and SOP/Rhodes) recorded a higher prime-grade vacancy than secondary-grade vacancy in Q2 2020.

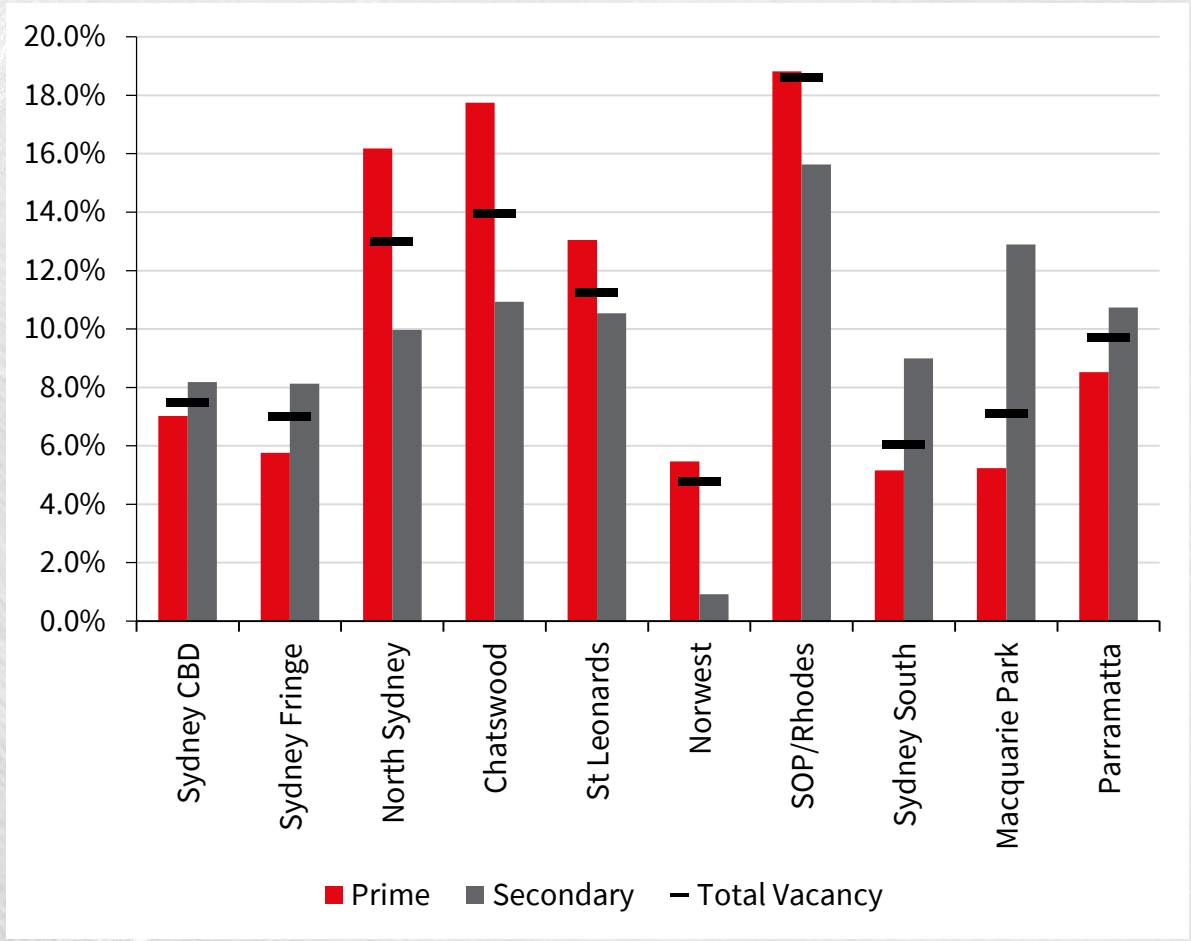
Within the Sydney office markets, Sydney Olympic Park/Rhodes has the highest total vacancy (18.6%) as well as the highest vacancy in prime stock (18.8%) and secondary stock (15.6%). The Commonwealth Bank consolidated their office accommodation and vacated 20,000 sqm from 2 Dawn Fraser Avenue, which explains the large increase in the Sydney Olympic Park/Rhodes' total vacancy rate from 9 months ago (12.4% in Q3 2019).

Table: Sydney Office Market Profile Vacancy, Q2 2020

	Vacancy	Prime Grade Vacancy	Secondary Grade Vacancy
	% NLA	% NLA	% NLA
CBD Markets			
Sydney CBD	7.5%	7.0%	8.2%
Metropolitan Markets			
Sydney Fringe	7.0%	5.8%	8.1%
North Sydney	13.0%	16.2%	10.0%
Chatswood	13.9%	17.7%	10.9%
St Leonards	11.3%	13.1%	10.5%
Norwest	4.8%	5.5%	0.9%
SOP/Rhodes	18.6%	18.8%	15.6%
Sydney South	6.1%	5.2%	9.0%
Macquarie Park	7.1%	5.2%	12.9%
Parramatta	9.7%	8.5%	10.7%

Source: JLL Research

Figure: Prime and Secondary Vacancy Rates, Q2 2020



Source: JLL Research

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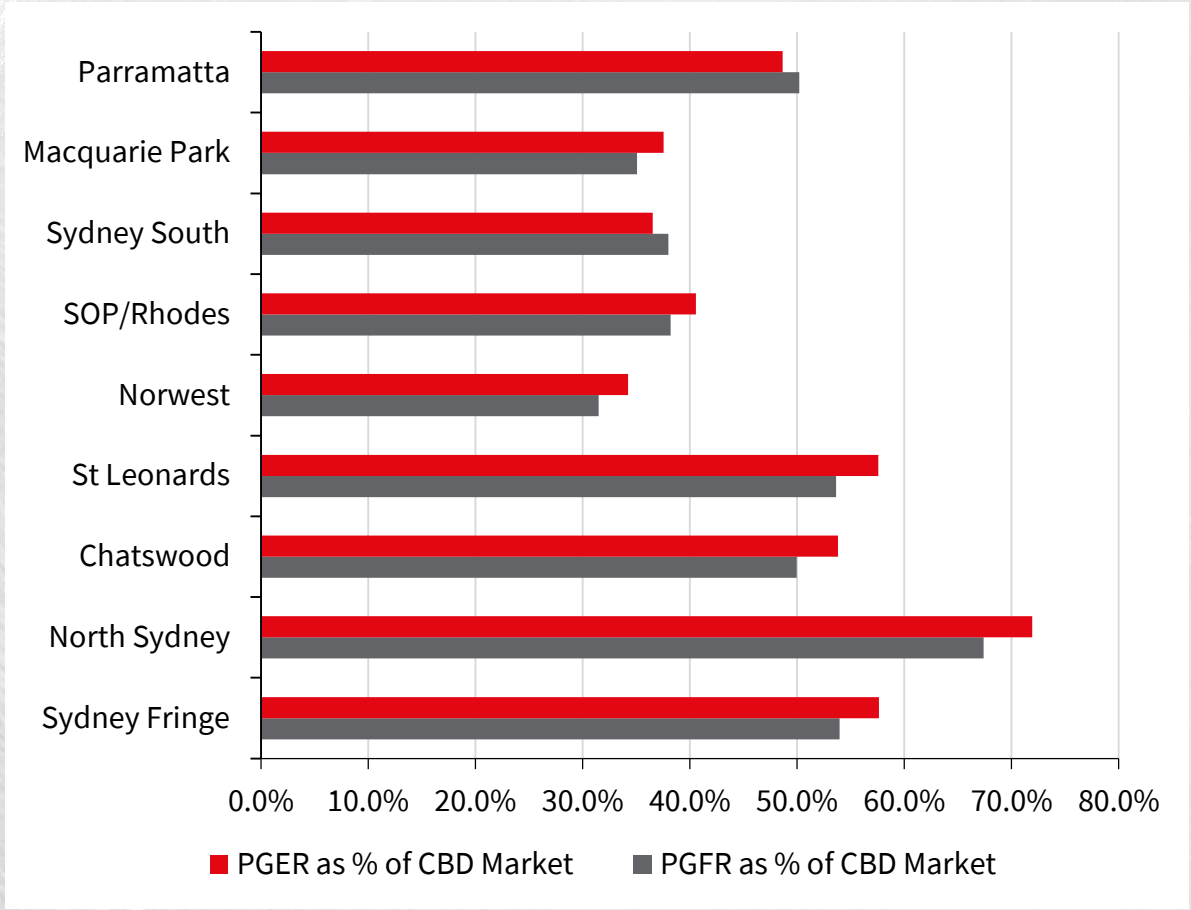
Rental Market

Metropolitan markets are more affordable than the CBD market. Generally, affordability is a key driver attracting occupiers to metropolitan markets, however, each market can also have alternative drivers e.g. proximity to demand driver i.e. university, hospital, etc. or clustering of certain industries.

Prime gross face rents in Sydney metropolitan markets range from an average of 31.5% of Sydney CBD rents in Norwest to 54% of CBD rents in Sydney Fringe, with other metropolitan markets in between these levels. The North Sydney market is comparatively much closer to Sydney CBD rents, with prime gross face rents averaging 67.4% of Sydney CBD rents.

However, when incentives are taken into account, the proportion of metropolitan to CBD rent increases for all Sydney metropolitan markets with the exception of Sydney South and Parramatta (as all metropolitan markets have a proportionally lower incentive, with the exception of these three markets) as evident to the right:

Figure: Prime Gross Face (PGFR) versus Effective Rents (PGER) Compared to Sydney CBD Market, Q2 2020



Source: JLL Research

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Rental Market Continued

Positive growth in prime gross face rents has occurred across all markets (Sydney CBD and metropolitan) in the 12 months to Q2 2020, this growth ranged from 2.3% in Sydney Fringe to 13.5% in Parramatta, with the market overall averaging growth of 5.3%.

In all markets except North Sydney, Chatswood and St Leonards, prime gross effective rents (rents adjusted for incentives) grew slower than prime gross face rents as incentives have increased.

We recorded prime effective rental decline across the majority of Sydney office markets over the quarter, which was mainly driven by an uptick in incentives due to the reduction in leasing activity caused by the COVID-19 outbreak. The largest decline in prime net effective rents was recorded in the Sydney South (14.3%), resulting from a 10% increase in incentives.

Table: Sydney Office Market Profile Rents, Q2 2020

	Prime Gross Face Rent	Annual Growth % Year to Q2 2020	Prime Gross Effective Rent	Annual Growth % Year to Q2 2020	Prime Incentives as at Q2 2020
	$/sqm p.a.	%	$/sqm p.a.	%	%
CBD Markets					
Sydney CBD	1,418	4.6%	1,028	-1.2%	23.3%
Metropolitan markets					
Sydney Fringe	765	2.3%	593	-6.3%	18.7%
North Sydney	956	2.9%	740	3.9%	22.0%
Chatswood	709	2.8%	553	3.1%	21.2%
St Leonards	761	3.3%	592	4.5%	21.8%
Norwest	447	3.3%	352	0.2%	23.0%
SOP/Rhodes	542	12.6%	417	6.1%	25.7%
Sydney South	539	3.8%	376	-9.9%	33.5%
Macquarie Park	497	3.6%	386	0.1%	24.9%
Parramatta	712	13.5%	500	0.9%	24.5%

Source: JLL Research

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Yields & Capital Values

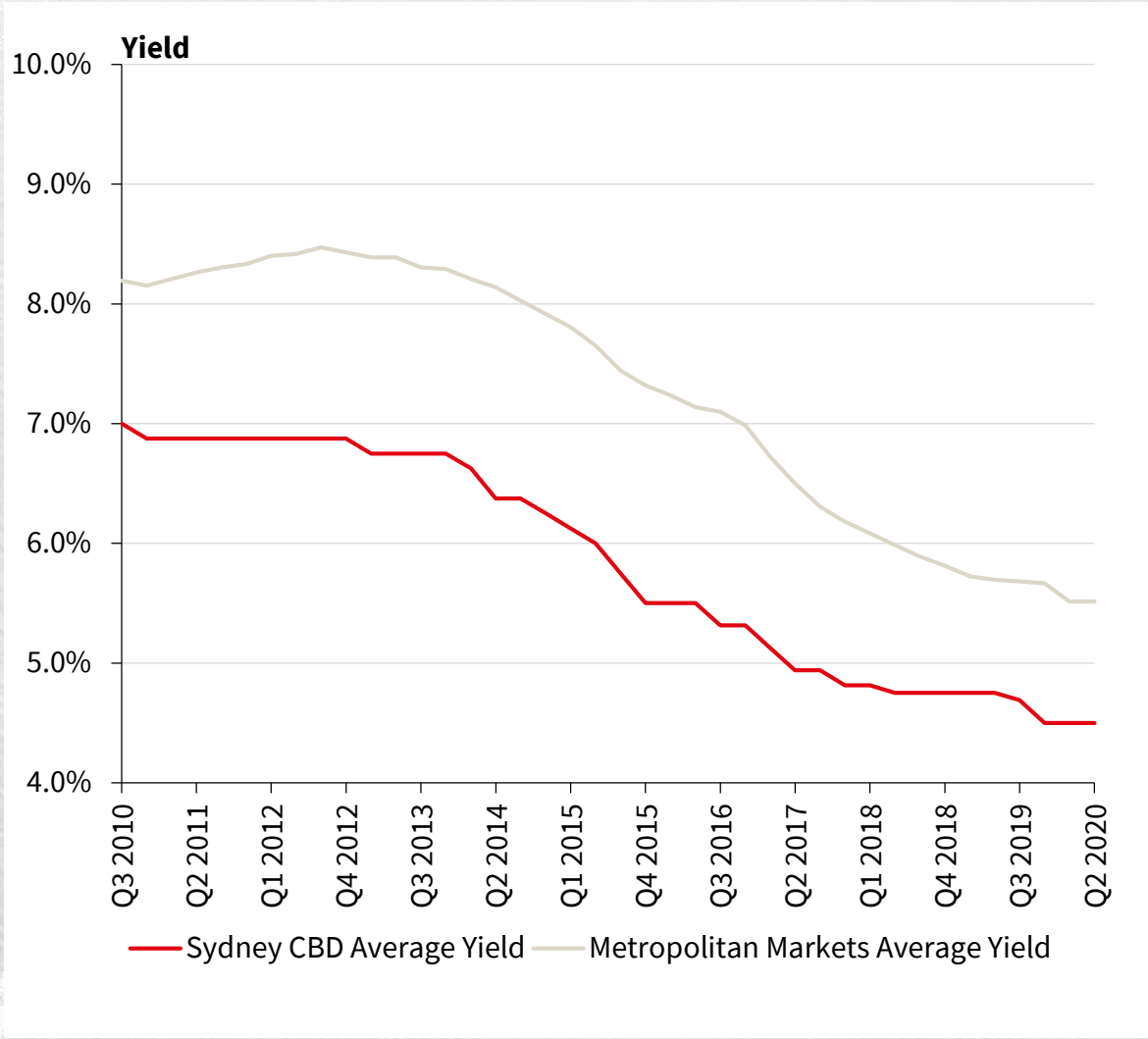
Nearly all Sydney metropolitan markets (except Chatswood and Sydney South, which have experienced no change) have experienced at least some yield compression for prime grade assets over the 12 months to Q2 2020.

Yields for metropolitan assets are higher than CBD assets, however, this spread has declined significantly in recent years. The yield spread between average prime yields across the CBD market and average prime metropolitan yields was 101.4 basis points in Q2 2020. The yield spread has increased over the last 12 months (from 94.5 basis points in Q2 2019), however it is still considerably lower than the historic average over the last 10-year period of 144 basis points.

There are a number of reasons for this compression, including the notion that during an improving market the difference between superior and inferior assets reduces, which has been the case recently. In addition, this compression can also relate to the metropolitan markets becoming more attractive, including:

- In recent years investors with desire or requirement to invest in the Sydney office market have in some instances been priced out of the Sydney CBD, as such, they have looked to the metropolitan markets in order to enable exposure to the office market.
- Development of new, large office assets in the metropolitan markets provides both better quality assets and as these assets are normally pre-committed with majors tenants, they also often benefit from longer weighted average lease expires (WALE).
- In certain metropolitan locations, yields have also been influenced by acquisitions seeking development upside. This could either be for additional commercial floor area than currently allowable or seek to alter use i.e. a mixed-use, primarily residential development.

Figure: Yield Spread between Sydney CBD and Metro Markets, Q3 2010 to Q2 2020



Source: JLL Research

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Yields & Capital Values Continued

Specific yield ranges for each of the office markets as at Q2 2020 are provided below:

Figure: Sydney Office Market Profile, Yields Q2 2020

	Prime Yields as at Q2 2020
	%
CBD Markets	
Sydney CBD	4.25 - 4.75
Metropolitan markets	
Sydney Fringe	4.75 - 5.00
North Sydney	4.75 - 5.00
Chatswood	5.50 - 6.25
St Leonards	5.00 - 5.25
Norwest	5.75 - 6.75
SOP/Rhodes	5.50 - 6.50
Sydney South	5.25 - 6.00
Macquarie Park	5.00 - 6.00
Parramatta	4.88 - 6.13

Source: JLL Research

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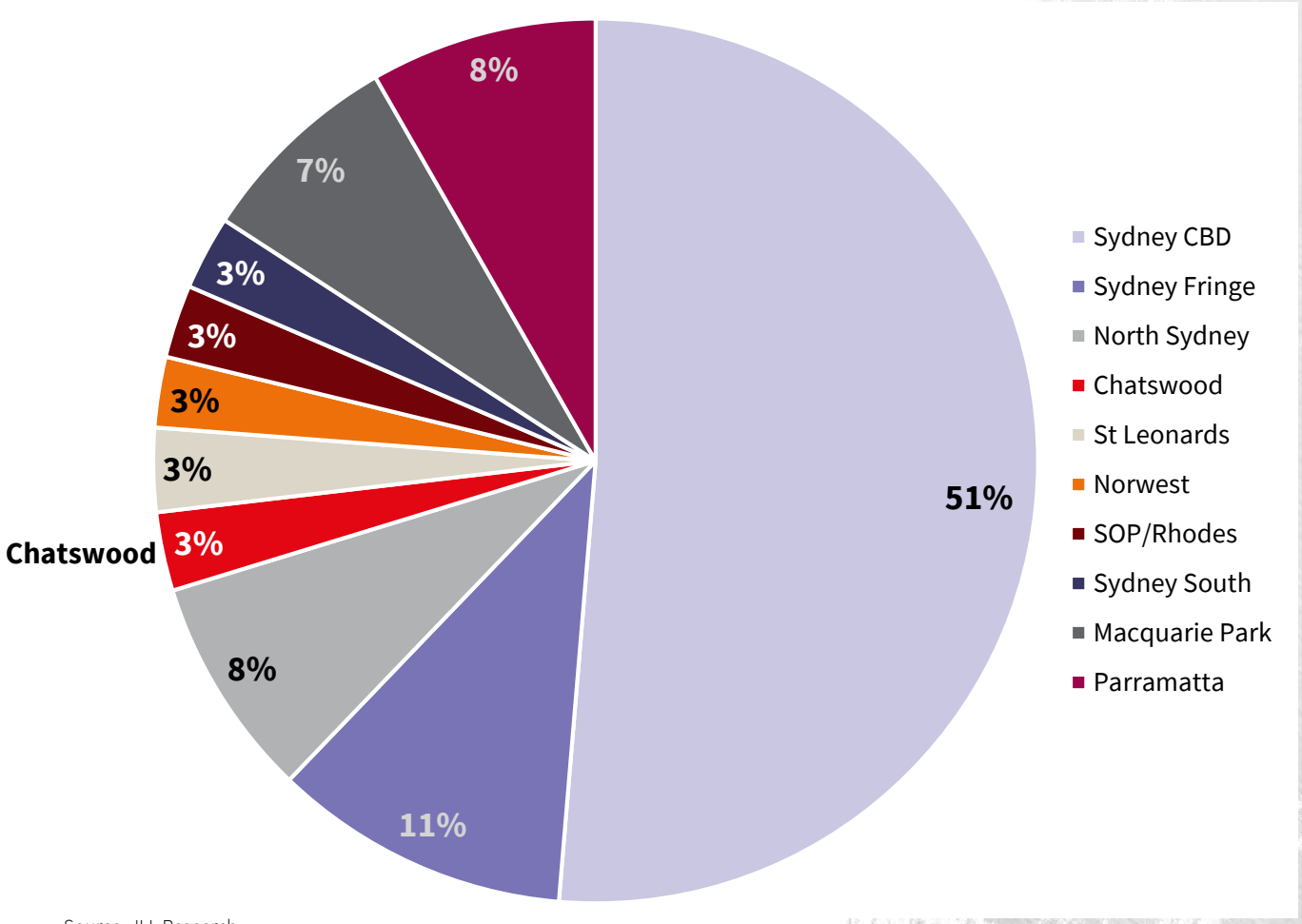
The Changing Nature of Sydney Office Markets

Sydney Occupied Office Stock

As at Q2 2020 the current occupied office space in the markets tracked by JLL totalled 9,057,963 sqm. The Chatswood office market as at this time equated to a total of 260,749 sqm in occupied stock, comprising approximately 2.9% of the total Sydney office market.

Figure: Sydney Office Markets – Current Occupied Stock Levels, Q2 2020



Source: JLL Research

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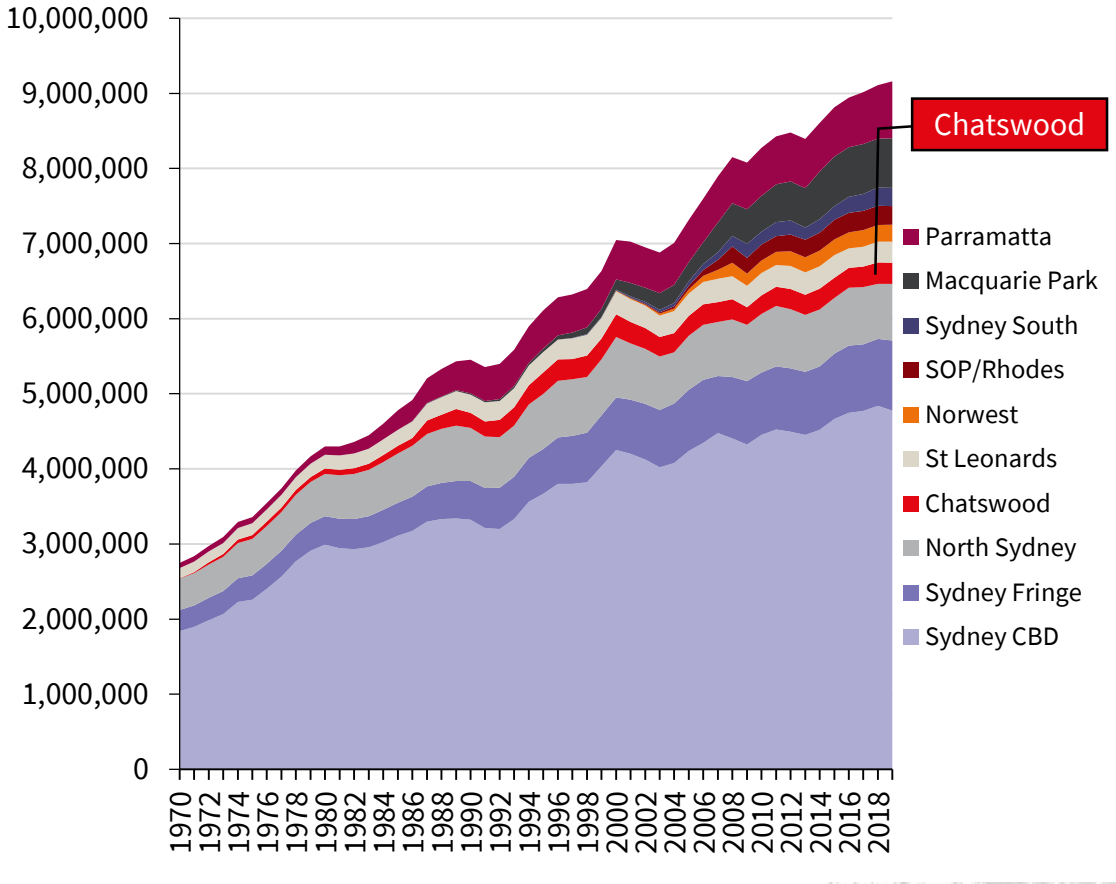
Historic Growth of the Suburban Markets

Decentralisation of the Sydney Market

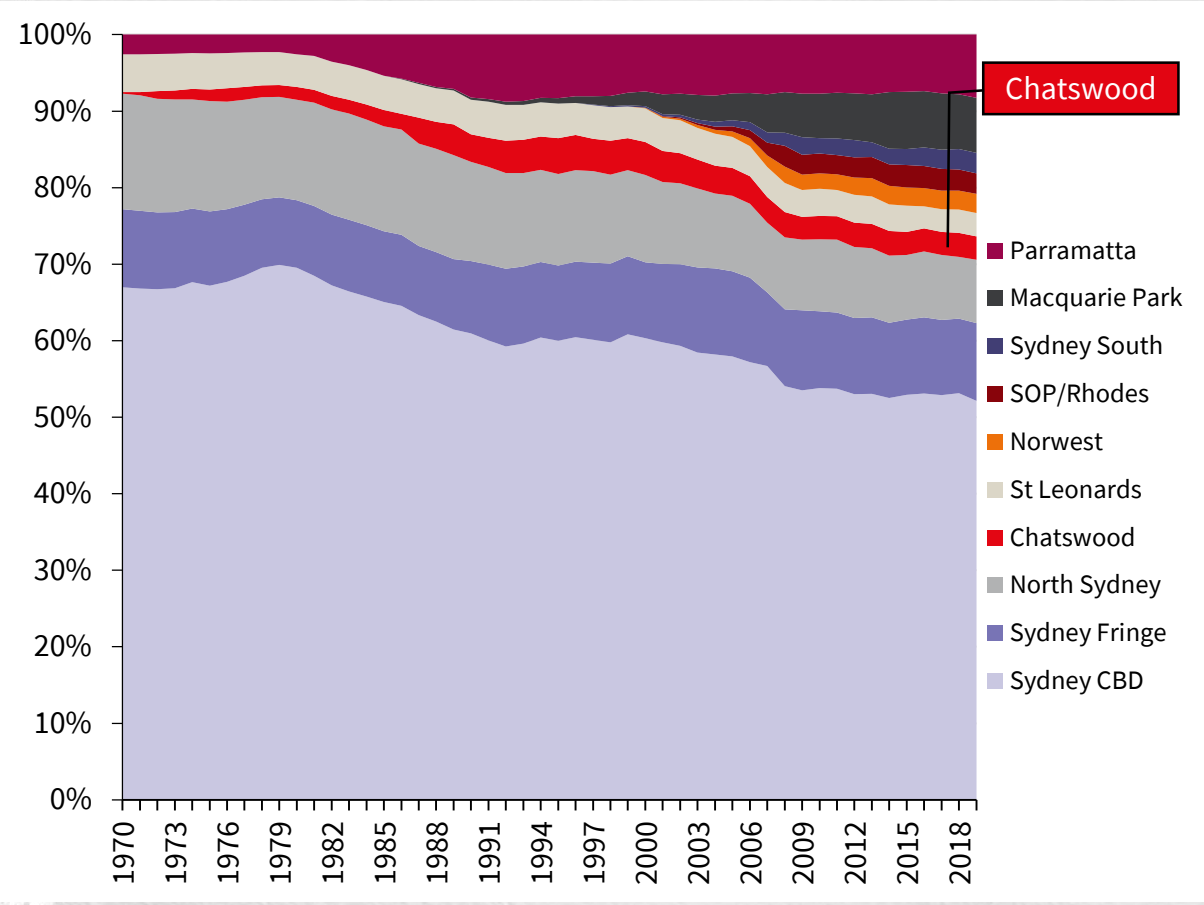
The below figures show the relative decentralisation of the Sydney office market. While the Sydney CBD has continued to grow in absolute terms it has shrunk as a proportion of the total market from 67% in 1970 to 52% by the end of 2019.

Figure: Sydney Office Market NLA, 1970-2019



Source: JLL Research

Figure: Sydney Office Market NLA (Proportion), 1970-2019



Source: JLL Research

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Historic Net Absorption

The table below provides five and 10 year (and selective longer term) occupied stock growth trends based on JLL actual data series.

Figure: Net Absorption Trends – Sydney Office Markets

	5 Year Average	10 Year Average	Longer term Average
	sqm	sqm	sqm
CBD Markets			
Sydney CBD	50,882	45,044	59,866 (49 years)
Metropolitan markets			
Sydney Fringe	17,797	8,872	N/A
North Sydney	-399	837	1,213 (31 years)
Chatswood	687	4,324	5,597 (49 years)
St Leonards	-3,706	-648	1,262 (30 years)
Norwest	3,967	6,873	N/A
Sydney Olympic Park/Rhodes	1,137	3,411	N/A
Sydney South	13,594	5,971	N/A
Macquarie Park	4,392	8,988	22,017 (20 years)
Parramatta	22,067	13,309	16,268 (41 years)

Source: JLL Research

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Observable Trends

The Emergence of the Hub & Spoke Model

Factors attributing to the decentralisation of the Sydney office market include emergence of the Hub & Spoke Model

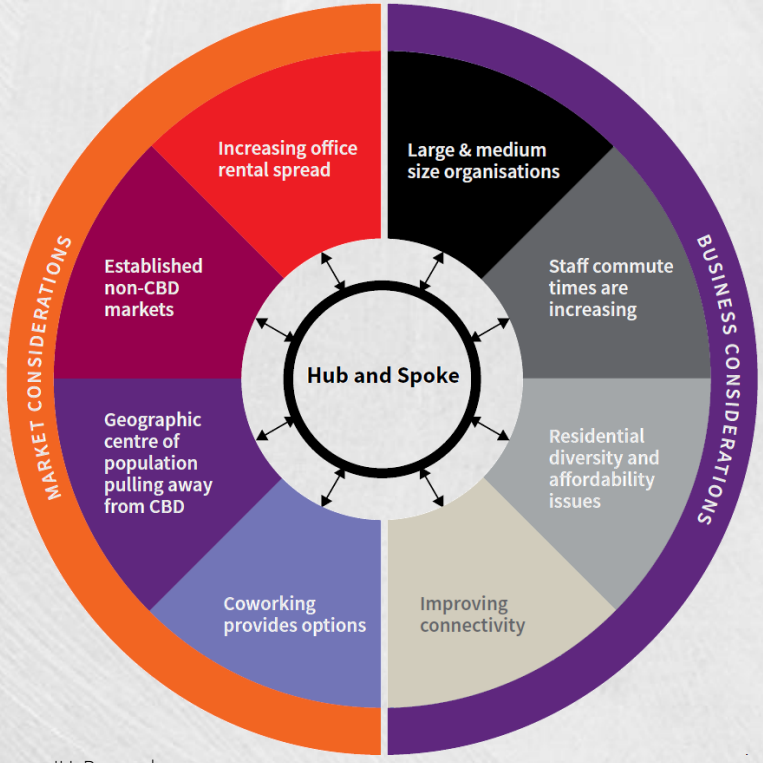
In Sydney we are seeing the emergence of a hub and spoke business model for some corporates, which in this context relates to office occupiers that are traditionally CBD based and that have reorganised their operations to have a major office presence in the CBD but also a significant but typically smaller secondary office location elsewhere. Examples are varied and can include major CBD tenants such as accounting firms (e.g. PWC – in the CBD and Parramatta) and law firms (e.g. Herbert Smith Freehills – in the CBD and Macquarie Park).

A hub and spoke business model has emerged in Sydney partly because of the office rental spread between CBD and non CBD markets (discussed overleaf) but is also driven by a number of human factors including staff attraction and retention.

Low housing diversity, residential affordability issues in near CBD locations, increasing congestion and commute times for some staff may make attracting and retaining high quality staff difficult and this may be alleviated with the adoption of a hub and spoke business model.

Almost half of Greater Sydney's population is projected to be residing west of Parramatta by the time Greater Sydney has grown to a population of 8 million people (GSC). Over time staff will be increasingly passing through Parramatta and other metropolitan centres to get to work in the CBD. Having multiple office locations allows for staff flexibility and this is facilitated by improving video conferencing technology.

Figure: Reasons for the Adoption of the Hub & Spoke Model



Source: JLL Research

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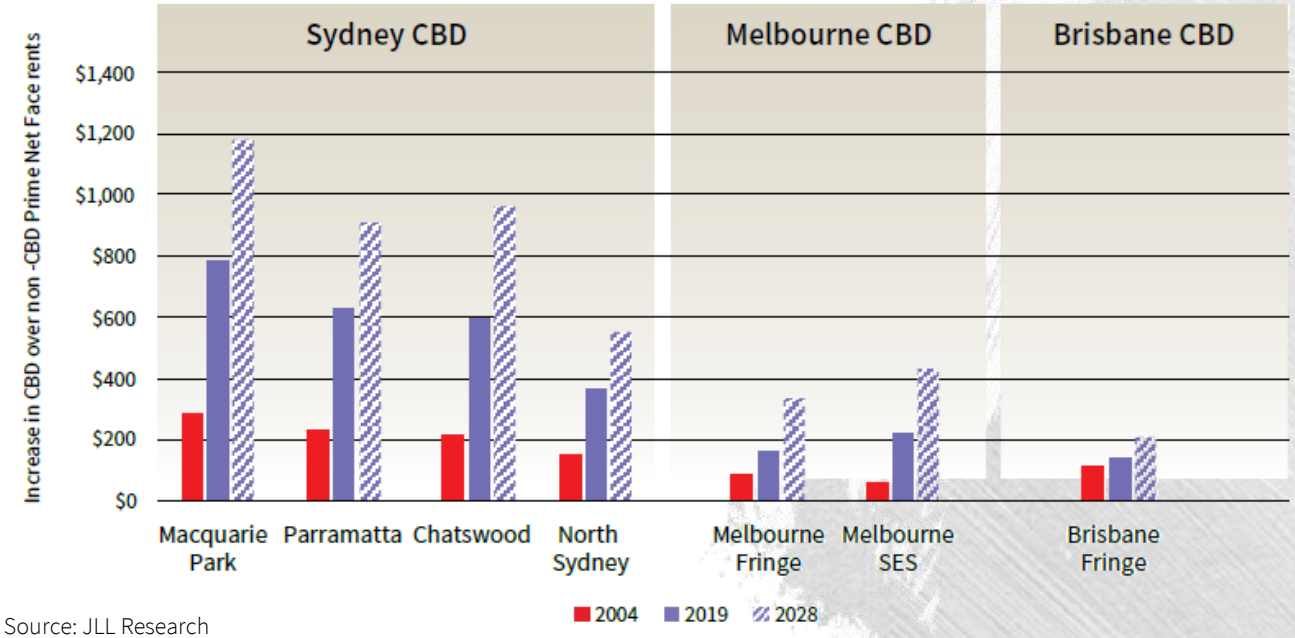
Observable Trends Continued

Rental Divergence

In all Australian cities CBD office rents are on average higher than for equivalent space in non-CBD or metropolitan markets. However, the rental spread between CBD and non-CBD Sydney rents is wider than in other capital city markets and is likely to be a contributing factor in the emergence of a hub and spoke business model for some occupiers in Sydney's office market. The hub and spoke business model is not yet established in other Australian metropolitan markets.

The rental spread has widened over the last fifteen years as rental growth in Sydney's CBD market has accelerated away . The rental spread between Sydney's CBD and non-CBD markets has increased in both nominal and percentage terms since 2004 .

Figure: CBD to non-CBD market average prime net face rental spread ($)



Source: JLL Research

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Future Role of Sydney Office Markets

In order to understand the likely future growth of these precincts, we have to have an appreciation of what level of market share they are likely to hold going forward i.e. will their growth in stock as a proportion increase, maintain or lower.

These markets cannot be considered in isolation and as such we have provided to the right our medium term outlook (i.e. beyond 10 years) of the likely change in market share. This view is broadly based on both current and anticipated demand trends, as well as, consideration to the precincts relative hierarchy i.e. Parramatta CBD and SOP/Rhodes have an expectation of a higher commercial office role than Chatswood or St Leonards. It also considers the constraints of locations such as the Sydney CBD, where demand and growth is likely to be high but due to constraints they are unable to maintain their share of the total office market (as has been witnessed in the past).

Shift to Western Sydney

Implicitly identified above and in the table is the continued growth of office within Western Sydney. As identified, office markets compete with each other, which is a challenge for Chatswood going forward with significant focus currently and into the future on Western Sydney, this includes both short term and long term considerations:

- Short-term: the continued growth of the Parramatta office market will pose a threat. Additionally, from a NSW government perspective, the continued focus on growing Sydney's 2nd CBD.
- Long-term: the NSW government has committed to the new rail connection, the Sydney Metro Western Sydney Airport, connecting St Marys to the new Western Sydney Aerotropolis via the Western Sydney Airport. This commitment includes a delivery time in line with the opening of the new airport at 2026. This new infrastructure is expected to catalyse development of further office uses in western Sydney, with a particular focus across three levels of government driven by the Western Sydney City Deal to unlock new jobs within the Western Parkland City.

Table: Future Role of Sydney Office Markets

	Expected Absolute Growth	Expected Rate of Growth
CBD Markets		
Sydney CBD	↑	↓
Metropolitan markets		
Sydney Fringe	↑	↓
North Sydney	↑	↔
Chatswood	↑	↓
St Leonards	↑	↓
Norwest	↑	↑
SOP/Rhodes	↑	↑
Sydney South	↑	↔
Macquarie Park	↑	↑
Parramatta	↑	↑
New Entrants		
Liverpool	↑	↑
The Bays Precinct	↑	↑
Western Sydney Airport	↑	↑

Source: JLL

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Chatswood Investment Office Market Analysis

Overview

The objective of this section is to provide more detailed information on the Chatswood office market, and in doing so, highlight the associated opportunities and risks associated with the 45 Victor Street and 410-416 Victoria Avenue, Chatswood site.

The Chatswood office market is located approximately 10 km north of the Sydney CBD, our tracking of this market dates back to 1970. Chatswood is a suburban CBD within metropolitan Sydney.

Figure: Chatswood Commercial Market

Source: nearmap

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Grade Analysis

The Chatswood office market is one of the oldest Sydney markets. The demand is driven primarily from major occupiers looking for cost-effective accommodation.

Table: Office Buildings by Grade, Q2 2020

Quality	Number of Buildings	Total NLA	Average Building NLA
A-Grade	7	133,932	19,133
B-Grade	17	81,018	4,766
C-Grade	34	76,526	2,251
D-Grade	10	11,521	1,152
Total	68	302,997	27,302

Source: JLL Research

The Chatswood office market is made up of primarily A-grade with the rest split between B-grade and C-grade buildings and only a small portion of D-grade. 44.2% of the Chatswood office stock is A-grade with 26.7% B-grade, 25.3% C-Grade and 3.8% D-Grade. No stock is classified as premium grade. Chatswood has the second lowest portion of prime grade stock across the Sydney metropolitan markets, with only St Leonards having a lower portion (28.4%).

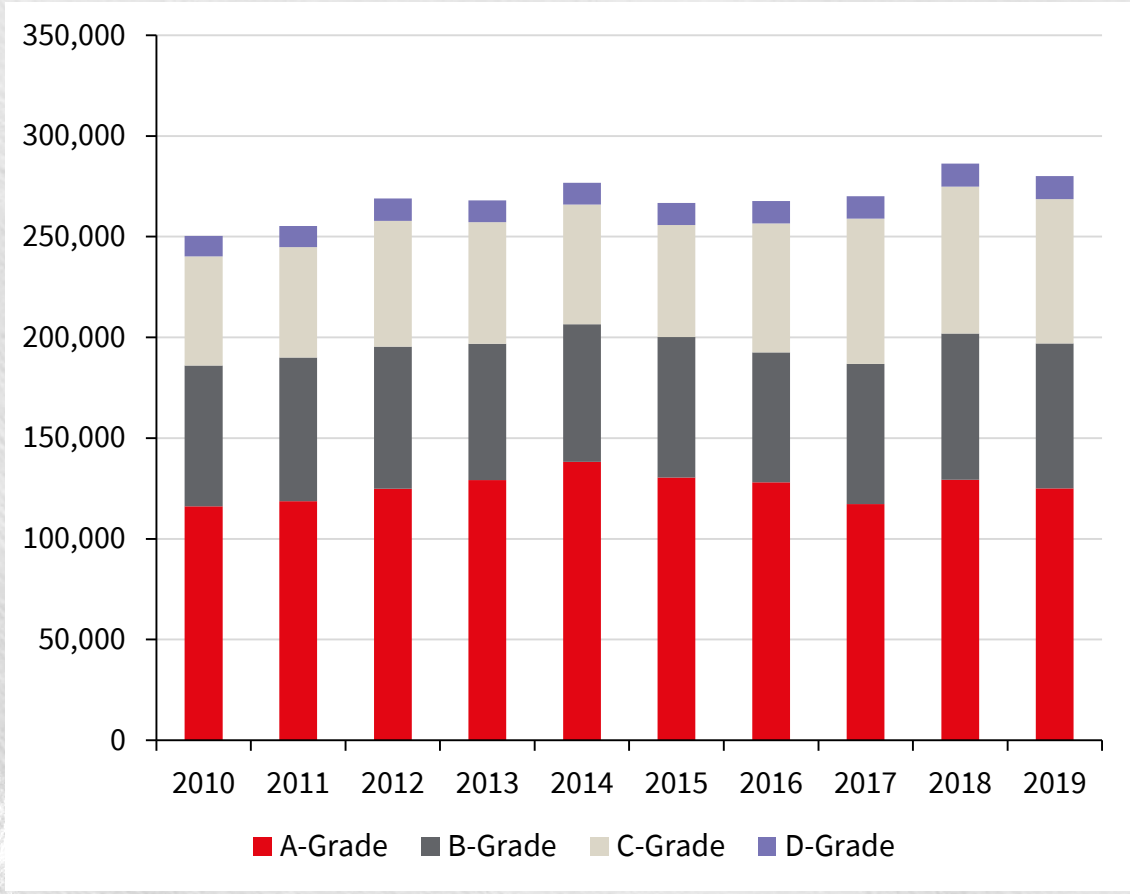
Table: Office Stock by Grade, Q2 2020

Quality	Stock	% Total
A-Grade	133,932	44.2%
B-Grade	81,018	26.7%
C-Grade	76,526	25.3%
D-Grade	11,521	3.8%
Total	302,997	100.0%
Prime	133,932	44.2%
Secondary	169,065	55.8%
Total	302,997	100.0%

Source: JLL Research

Chatswood has experienced a very low level of net growth over the past decade. In the ten years to 2019 there has been an average 346 sqm added per annum. Most of this coming in the first five years of the decade when 4,692 sqm was added (938 sqm p/a). This net addition was attributed to Mirvac's completion of its mixed-use Era development in 2013, which formed part of the Pacific Place development.

Table: Chatswood Occupied Office Stock by Grade, 2010-2019



Source: JLL Research

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Vacancy

The higher quality A-grade and B-grade stock has a much higher vacancy rate than that of the lower graded stock. The vacancy for A-grade stock has increased a significant amount in the last year from 2.25% at Q2 2019 to 17.75% at Q2 2020, while during this same period the vacancy for B-grade also increased by a fair amount, C-grade declined and D-grade slightly increased.

The higher overall rate of A-grade vacancy to all other grades of buildings, suggests a lack of demand for more investment grade office. However, the lower vacancy for the lower graded stock is supported by demand coming from cost conscience occupiers. This likely also reflects demand coming from smaller occupiers i.e. local service providers, which typically locate in lower graded stock by comparison to larger corporates searching for large A-grade contiguous space.

Overall, Chatswood at a vacancy rate of 13.9% has a high vacancy when compared to the rest of the Sydney office market. The market has been negatively impacted by the growth in size and recognition of other suburban markets, often with more cost-effective rentals.

The overall Chatswood vacancy rate is expected to increase to 15.8% by the end of 2020 due to public sector organisations relocating to other metropolitan office markets as new office projects complete. This includes ~13,200sqm made up largely of several NSW Government health agencies, relocating from Chatswood to Health Service Administrative Building in St Leonards.

Table: Chatswood Vacancy by Grade, Q2 2020

Quality	Vacant Space	Stock	Occupied Stock	Vacancy rate (%)
A-Grade	23,768	133,932	110,164	17.7%
B-Grade	13,909	81,018	67,109	17.2%
C-Grade	4,539	76,526	71,987	5.9%
D-Grade	32	11,521	11,489	0.3%
Total	42,248	302,997	260,749	13.9%

Source: JLL Research

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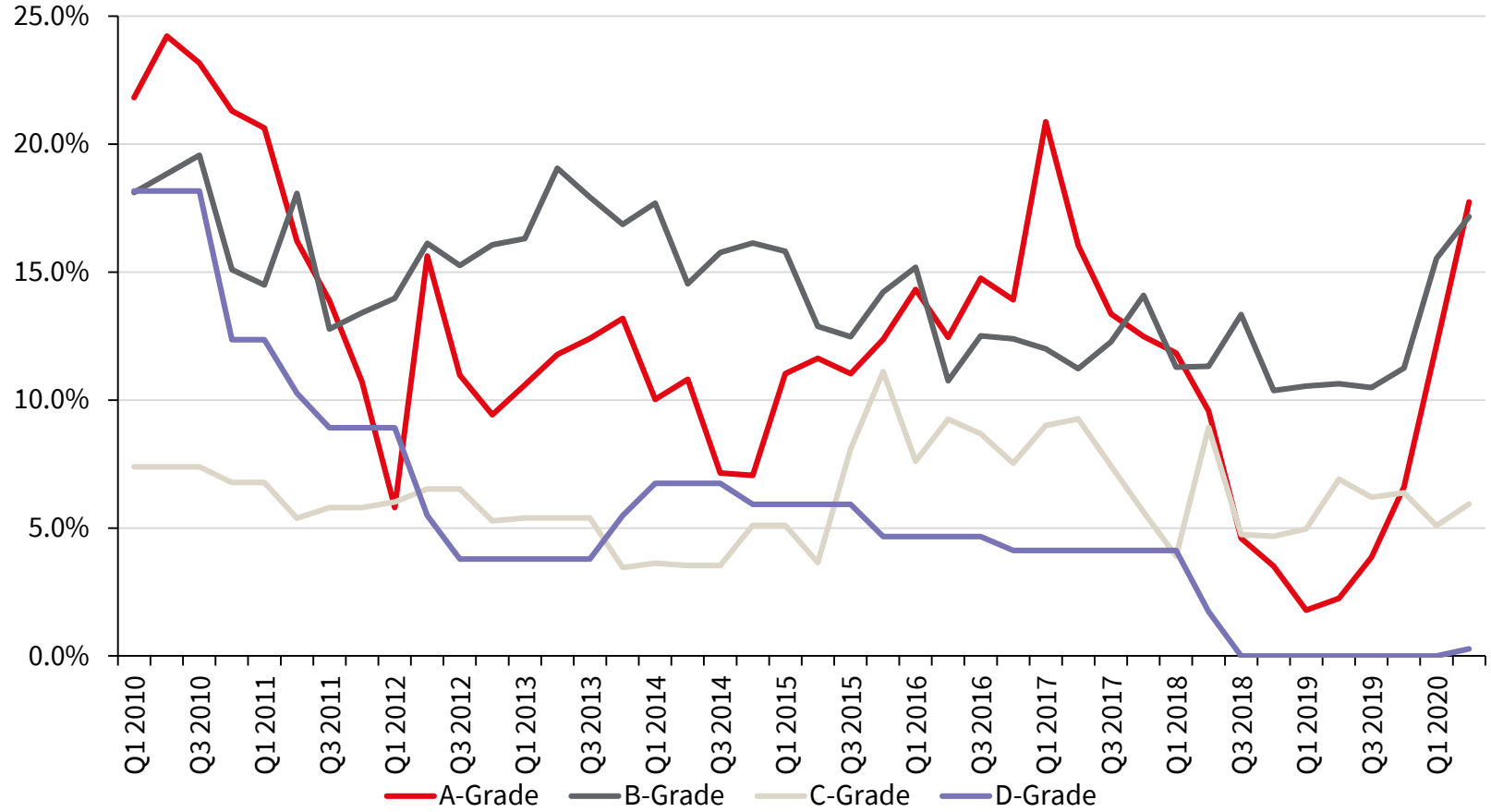
Vacancy Continued

As can be seen from the below figure, the A-grade market has experienced a significantly inconsistent performance in terms of vacancy. This is largely attributed to major tenant relocations which significantly shift the vacancy of the relatively small market. Overall, the vacancy has remained relatively high with an average rate between the period Q1 2010 and Q2 2020 of 12.3%.

Figure: Chatswood Vacancy by Grade, 2010-2020



Source: JLL Research

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Tenant Profile

Chatswood office market has been home to a number of multi-national firms. Historically there was a cluster of telecommunication firms, major federal and state government agencies, as well as engineering organisations. However, now Chatswood is much more mixed in terms of office tenants, resulting in a lack of identity for the centre relative to its suburban competitors. Some major tenants within Chatswood include the following:

- Reed Elsevier Australia
- Pepsi
- Huawei
- Coffey
- Lenovo
- Carnival Australia
- NSW Health (however a large portion is relocating later this year)

The above list, as well as the opposite table, confirms the importance of Professional, Scientific & Technical Services, Rental Hiring & Real Estate Services and Transport, Postal & Warehousing sectors to Chatswood. The Chatswood precinct benefits from significantly more retail amenity than many other suburban markets as well as good public transport infrastructure with a major railway station. It is also has lower accommodation costs compared to the Sydney CBD. For example, as of Q2 2020 gross effective rents for prime grade space in Chatswood were only 53.8% the prime grade rents in the Sydney CBD.

Table: Major Gross Take-up, Chatswood 2010-2020 (greater than 1,000 sqm)

Industry Group	Leased (sqm)	Vacated (sqm)	Net Change (sqm)
Administrative & Support Services	0	1,200	-1,200
Construction	11,703	17,304	-5,601
Finance & Insurance Services	9,403	10,809	-1,406
Information Media & Telecommunications	17,287	41,654	-24,367
Manufacturing	5,203	4,344	859
Professional, Scientific & Technical Services	17,825	16,120	1,705
Public Administration & Safety	10,341	12,695	-2,354
Rental Hiring & Real Estate Services	7,269	1,846	5,423
Transport, Postal & Warehousing	2,291	1,086	1,205
Grand Total	81,322	107,058	-25,736

Source: JLL Research

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Net Absorption

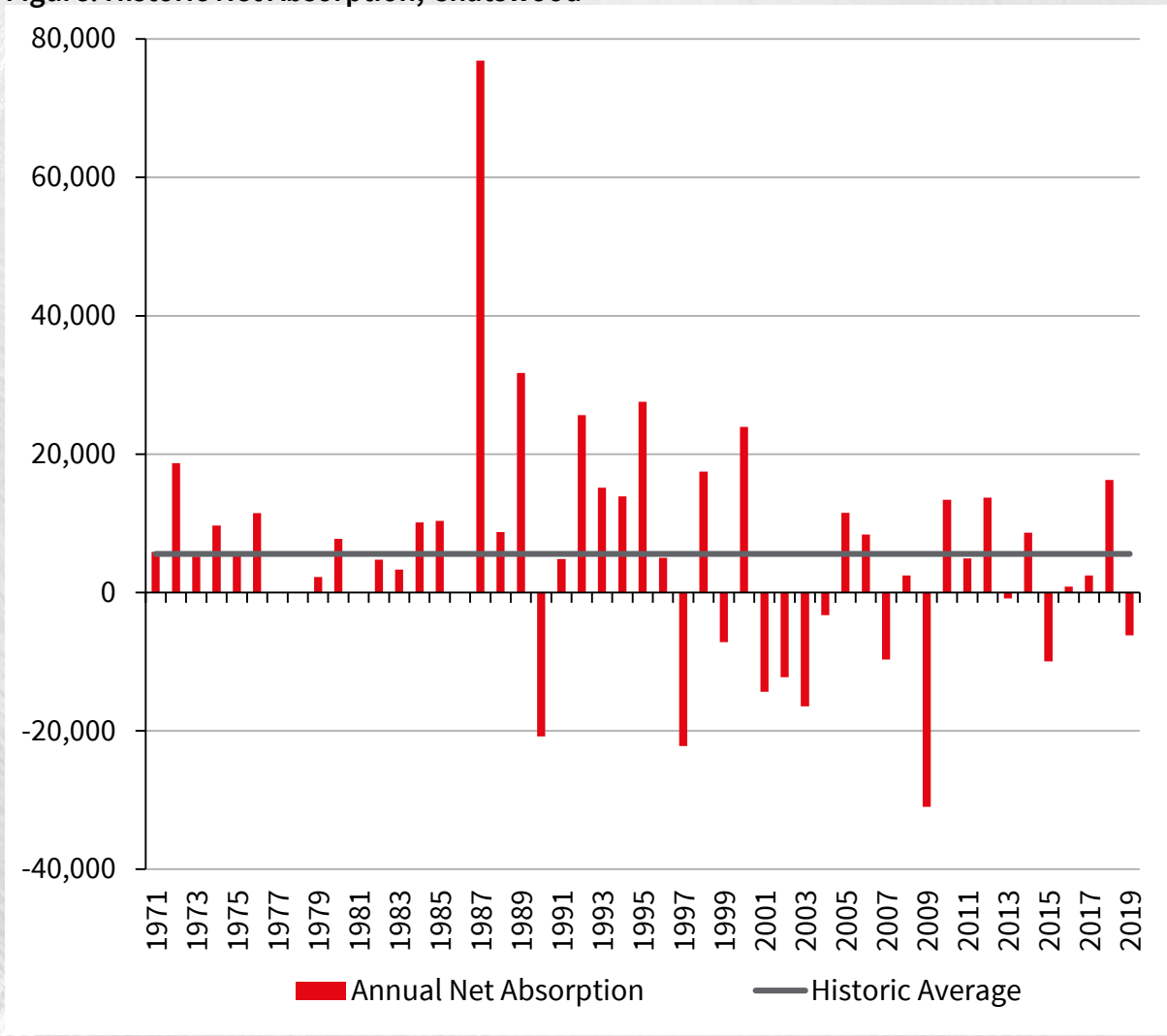
In the five years to Q4 2019, net absorption averaged 687 sqm per annum, which is significantly below the 10 year average of 4,324 sqm and 50 year average of 5,597 sqm. The figure to the right shows the annual net absorption in Chatswood over the past fifty years, with the historic average shown as well.

2015 saw the highest negative net absorption since 2009 with 9,951 sqm vacated (either direct or for sub-lease) resulting in the overall increase in vacancy. This primarily resulted from the contraction of Vodaphone and Leighton's consolidation of space. On the other hand, 2018 saw the highest net absorption since 2000 with 16,256 sqm taken up, with 5 major occupiers moving into the precinct, including the NSW Ministry of Health which took 2,043 sqm at 12 Help Street.

In Q1 2020, NSW Transport relocated to its pre-committed space at Glasshouse, 45-61 Waterloo Macquarie Park, vacating 9,452 sqm. This resulted in a negative net absorption of 9,900 sqm that quarter. As discussed earlier, further relocations of government agencies this year will result in additional negative net absorption. JLL is currently estimating 2020 will see an overall negative net absorption of 25,000 sqm, being the highest negative net absorption for the market since 2009 and the 2nd highest since JLL began tracking the market 50 years ago.

As has been seen, continued growth in suburban Sydney does not necessarily result in future growth in Chatswood's office market, with other suburban markets competing for tenants. This is particularly the case for large space needs, such as back office accommodation for finance and insurance companies, as these companies tend to be relatively "footloose" in terms of location. Examples of this have been witnessed this year with the large government tenant relocations from Chatswood to Macquarie Park and St Leonards.

Figure: Historic Net Absorption, Chatswood



Source: JLL Research

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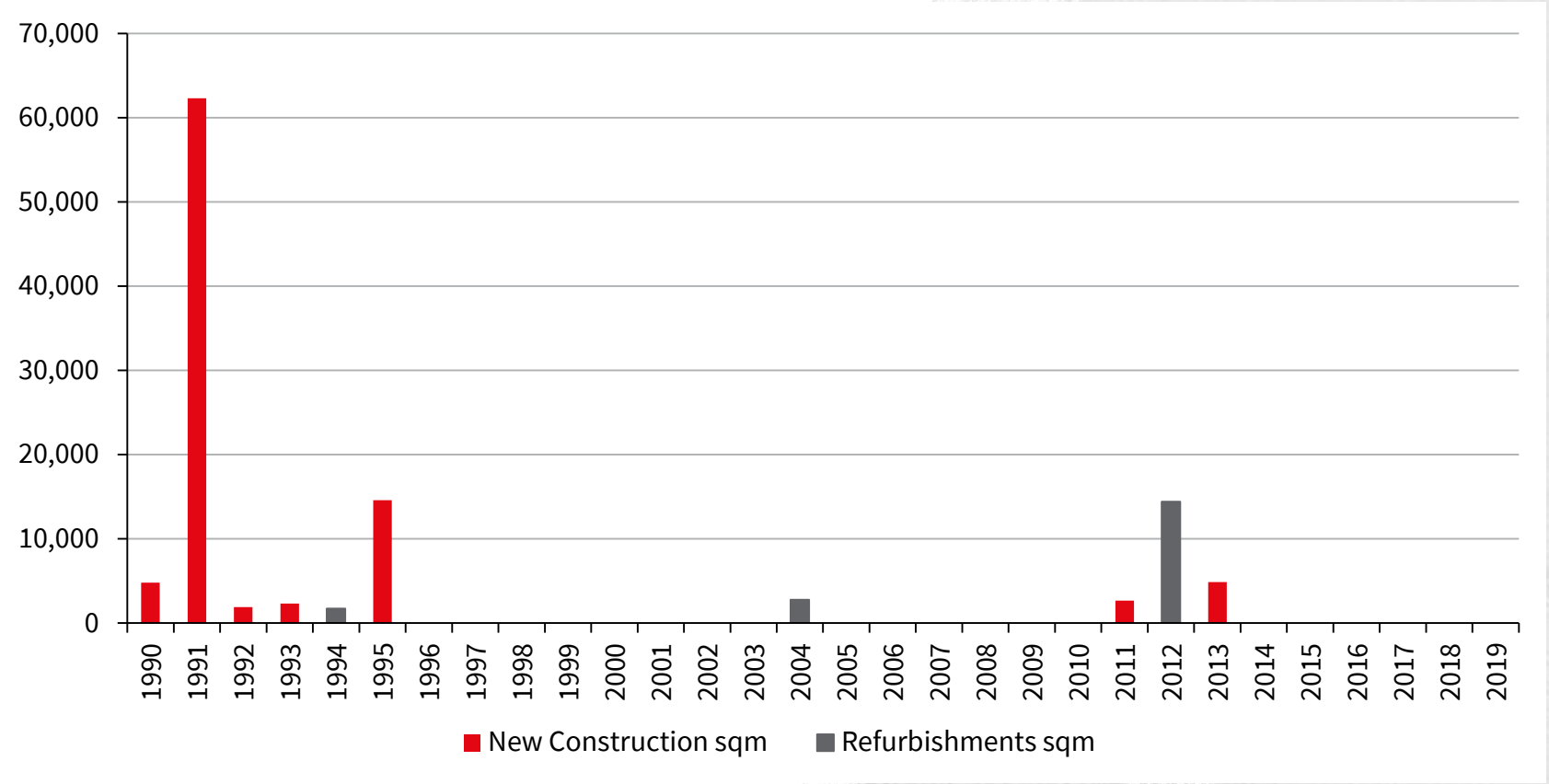
Historic Supply

The below figure identifies the historic supply in the Chatswood office market, both taking into account new construction as well as refurbishments. As can be seen there has been very limited supply activity within the Chatswood market, with the last major refurbishment occurring in 2012 and the last major new construction occurring in the mid-90s.

Figure: Historic Supply, Chatswood



Source: JLL Research

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Historic Rental Levels & Incentives

As at Q2 2020 the average prime gross effective rent (adjusted for incentives) was $553 per sqm p.a. having grown by circa 3.1% over the past 12 months, by comparison to average secondary gross effective at $427 per sqm p.a. which has grown by 4.5% over the past 12 months – largely reflective of a drop in incentives in support of growing demand for secondary grade stock. The cost differential of the grades helps justify the suggestion that the demand for the lower graded stock is supported by demand coming from cost conscience occupiers.

Prime incentives are currently at 21.2% net face as at Q2 2020 (based on a new 10-year lease term and 1,000 sqm) which is relatively low compared to other markets, which seems counterintuitive considering the current performance of the leasing market and high level of prime grade vacancy within the Chatswood market. This supports the expected increased in incentives (discussed further below).

Incentives in the past five years have decreased, with prime incentives in Q3 2019 being lowest they have been (21%) since 2002.

Chatswood prime gross effective rental growth is expected to decline over 2020 which is a result of the flattening face rental growth and the projected uptick in incentives. Incentives are expected to increase 3% over 2020 as government tenants will be leaving the Chatswood to St Leonards and the demand is likely to be negatively impacted by the outbreak of COVID-19.

Figure: Prime & Secondary Grade Rents, Chatswood, 2010-2020

Source: JLL Research

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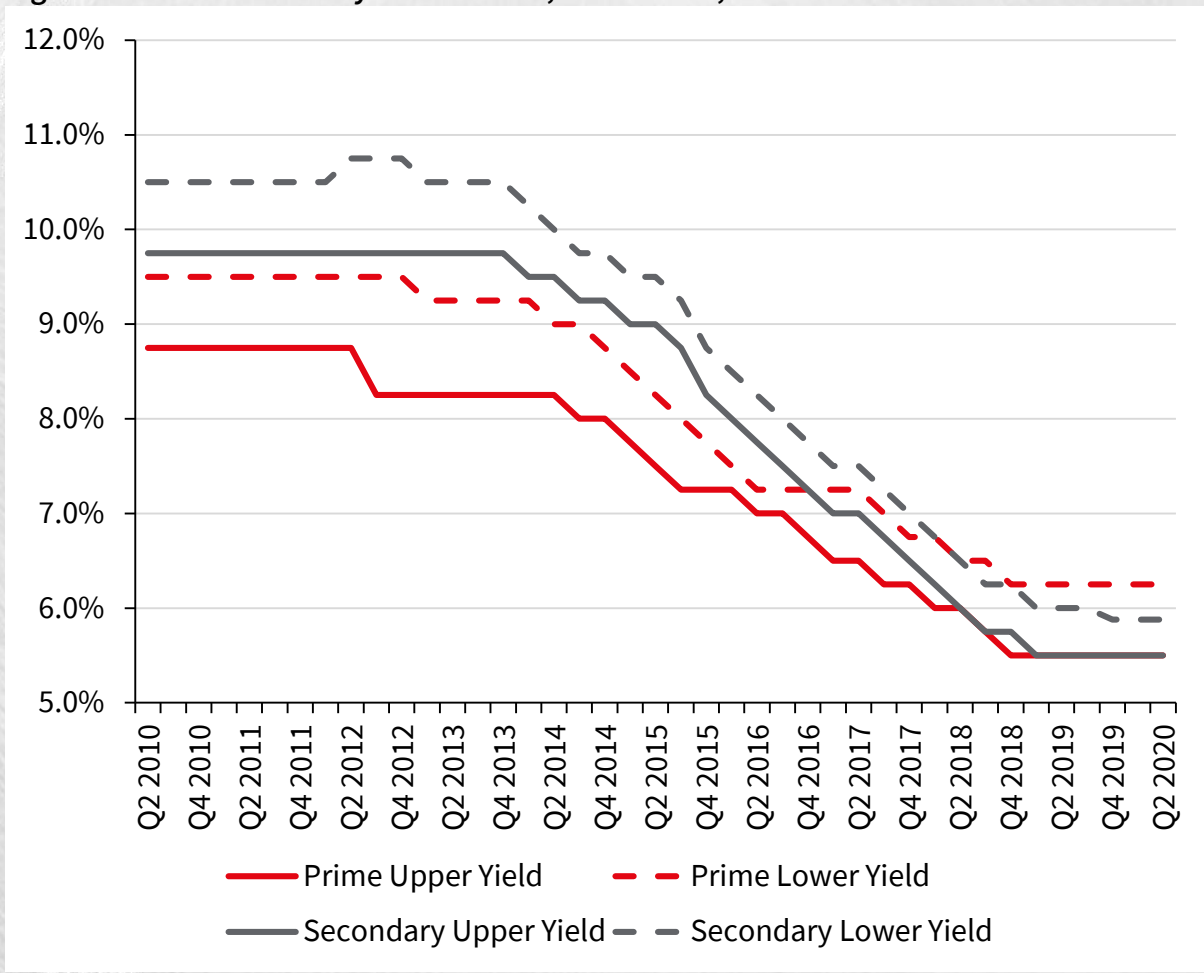
Yields and Investment Activity

The key trend in investment yields over the past four years has been a widening of the yield spread between the best and worse assets in the market. However, in recent years Chatswood has not experienced this trend, with the yield spread for prime grade assets remaining at a low of 75 basis points since 2018. Considering a longer timeframe, we can see in the five years to Q2 2015, the average yield spread for prime grade assets was 88 basis points, in the five years since this average has reduced to 63 basis points.

As at Q2 2020, secondary grade yields ranged from 5.50% to 5.88%. The yield spread has continually decreased since Q4 2012 where it was 100 basis points. Yield spreads for secondary assets are lower than that of prime assets, considering a longer timeframe we see can see in the five years to Q2 2015, the average yield spread for secondary grade assets was 74 basis points, whereas in the five years since this average as decreased significantly to 48 basis points.

An additional trend we can see from the opposite figure is the reducing differential in yields between primary and secondary yields overall. This is likely supported by; the growing demand for space within secondary grade stock (reflected in the shrinking vacancy) and the weakening demand for space within prime grade stock (reflected in the growing vacancy). This trend also supports the view that investors see the role of the Chatswood has shifted, away from the larger corporate occupier focused office precinct into a more cost-effective provider of support office space meeting the needs of the local population.

Figure: Prime & Secondary Grade Yields, Chatswood, 2010-2020



Source: JLL Research

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Chatswood Commercial Office Challenges

Business / Tenant Size

User Sizes

According to the ABS, as of June 2018 there are 5,651 businesses within the Chatswood (East) – Artarmon SA2, which broadly intersects with the Chatswood office market. Within the opposite table, we have identified the number of businesses by employment size .

As seen in the opposite table, ~97% of all businesses within Chatswood employ less than 20 people. This demonstrates the centre's demand from smaller occupiers who seek affordable office accommodation within the centre.

Figure: Chatswood Office Market, Chatswood (East) – Artarmon SA2

Source: JLL. MapIT

Table: Norwest Businesses by Industry Division and Employment Size, June 2018

Industry	Non employing	1-4	5-19	20-199	200+	Total
Accommodation and Food Services	67	143	48	21	0	279
Administrative and Support Services	128	100	36	12	0	276
Agriculture, Forestry and Fishing	18	6	3	0	0	27
Arts and Recreation Services	35	10	3	0	0	48
Construction	252	127	46	7	0	432
Currently Unknown	36	11	3	0	0	50
Education and Training	44	37	10	4	0	95
Electricity, Gas, Water and Waste Services	7	0	0	0	0	7
Financial and Insurance Services	605	132	21	0	0	758
Health Care and Social Assistance	250	180	79	10	0	519
Information Media and Telecommunications	43	27	12	3	0	85
Manufacturing	54	36	25	14	0	129
Mining	10	9	0	0	0	19
Other Services	79	76	26	3	0	184
Professional, Scientific and Technical Services	518	402	91	36	0	1,047
Public Administration and Safety	3	3	0	0	0	6
Rental, Hiring and Real Estate Services	677	142	26	3	0	848
Retail Trade	118	114	51	12	0	295
Transport, Postal and Warehousing	153	27	4	5	0	189
Wholesale Trade	166	123	52	17	0	358
Grand Total	3,263	1,705	536	147	0	5,651

Source: ABS, JLL

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Business / Tenant Size Continued

Demand for Smaller Occupiers

We have grouped all office leasing deals within Chatswood and the nearby competing markets of tenants 1,000 sqm or greater over the past 10 years into the following size brackets:

Table: Number of Leasing Transactions by Size, 2010-2020

sqm	Transactions
0-2,000	26
2,000-5,000	14
5,000-10,000	1
10,000-20,000	0
20,000 +	0
	41

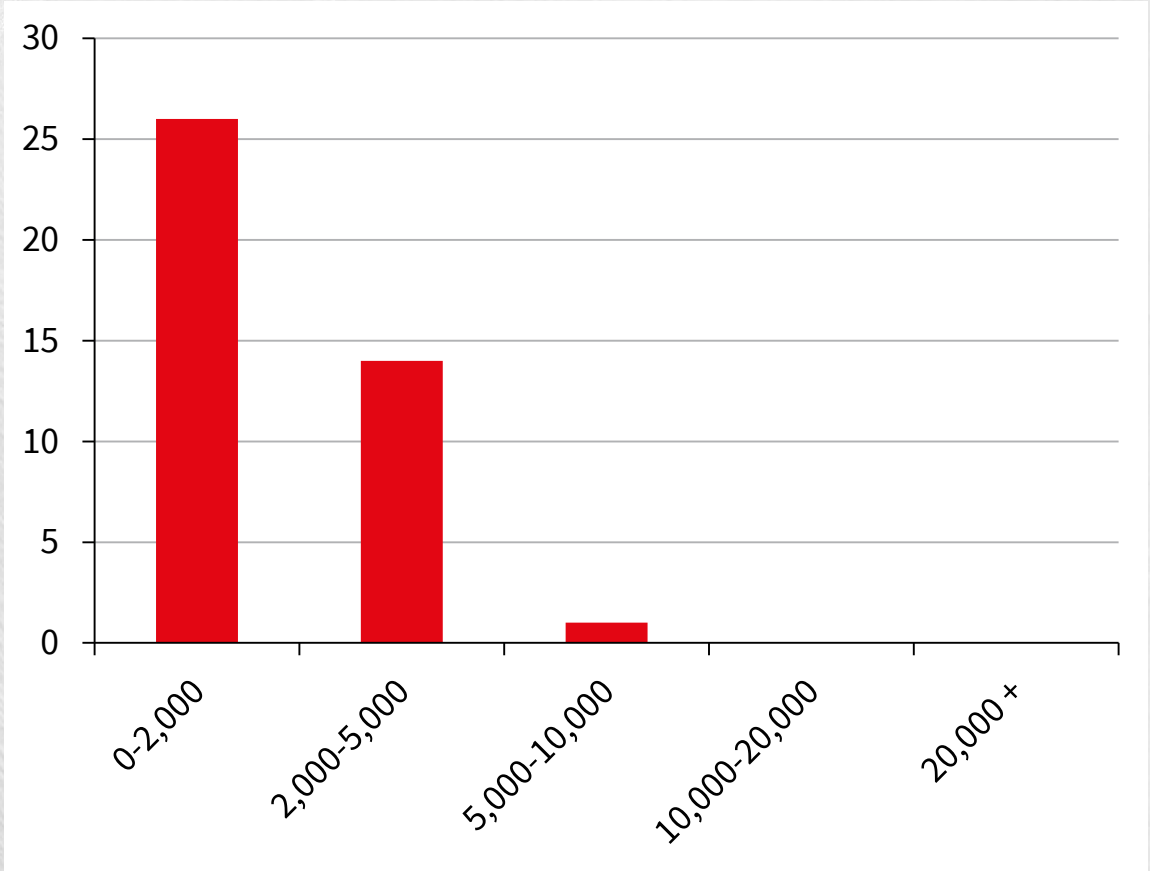
Source: JLL Research

As seen above, the majority of occupier moves within Chatswood were less than 2,000 sqm. The only deal above 5,000 sqm was Vodafone Hutchinson Australia relocating from there previous accommodation in Chatswood at 12 Help Street . They leased 5,567 sqm at 465 Victoria Avenue Chatswood in Q4 2011.

Apart from Vodaphone's relocation, the largest occupier move into Chatswood was Real Insurance that relocated from Norwest. They leased 4,915 sqm at 465 Victoria Avenue in Q3 2012.

No deals above 2,000 sqm have occurred within Chatswood since Q4 2018.

Figure: Number of Leasing Transactions by Size (sqm), 2010-2020



Source: JLL Research

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Benchmarking of Pre-Commitment Rates

We have analysed every new office project (excluding refurbishments) within the JLL tracked office markets which have completed over the past 10 years or are currently under construction which are greater than 10,000 sqm. This is in order to understand the pre-commitment rates achieved prior to the start of construction (also referred to as "hurdle rate").

In undertaking our analysis at times we have been required to make assumptions when the information available was not sufficient.

Overall Sydney Observations

- A total of 60 office developments were reviewed.
- There have been 14 examples of speculative buildings (where construction has commenced prior to the securement of a tenant) with half of these within the Sydney CBD. We note, in many of these cases, tenants are secured very shortly after the commencement of construction – suggesting negotiation was already well underway. Additionally, some of these are also part of a broader development e.g. separate office, hotel or retail.
- Conversely, there has been 13 examples of buildings 100% pre-committed prior to construction commencement. These are typically outside of the CBD with 10 of these examples within the suburban markets.
- The above suggests a greater likelihood to have a lower level of pre-commitment for more established markets i.e. Sydney CBD & North Sydney versus the rest of suburban Sydney, this is expressed in the below:
  - Sydney CBD & North Sydney projects had an average pre-commitment rate of 41% (28 projects)
  - Suburban Sydney projects had an average pre-commitment rate of 61% (32 projects)

Chatswood Observations

- As identified previously, the Chatswood office market hasn't had a new office building complete since the mid 1990s.
- As such, we have considered the markets in closest proximity of the Chatswood market, being Macquarie Park and St Leonards. In both these markets the level of pre-commitment has been relatively high, as expressed below:
  - Macquarie Park projects had an average pre-commitment rate of 80%
  - St Leonards projects had an average pre-commitment rate of 75%
- The above suggests a relatively high level of pre-commitment would likely be required for an office only development in Chatswood, although further to our analysis, evidence suggests this is unlikely to be achieved. In the absence of any pre-commitment, the only way a commercial asset could be developed currently is through a mixed-use outcome to support and act as a catalyst for the redevelopment (discussed further in the report).

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Feasibility Analysis of the Subject Site

Feasibility Analysis

The purpose of this section is to provide the reader an understanding of the process which has been undertaken in performing the feasibility analysis on a potential commercial only scheme for the Victor Street site. Additionally this section is to provide an explanation of the inputs required and the resulting outputs of the financial analysis. This, ultimately, will enable the reader to have an understanding of the market feasibility i.e. market rent versus economic rent.

Definitions

'In Use' Value

The 'In Use' value has regard to the current improvements on site. Where the 'in use' value is higher than the 'development value' there is no financial incentive for development to occur.

Development Value

The 'Development' value is the value of the development opportunity. Most frequently this value is determined by the use of the following approaches - the Residual Land Value (RLV) or feasibility approach and the Direct Comparison method. These are defined below.

- Residual Land Value (RLV): This method measures the price that a developer could afford to pay for the development site after making appropriate allowances for holding charges, development costs, transaction costs, etc. and a reasonable profit on the venture after taking into account the risks involved. This analysis assumes 100% debt financing.
- Direct Comparison: Direct comparison, analyses recent sales and compares these to the subject. Adjustments are made for differences such as development certainty, topography, location, size and area to determine the value of the subject. In all cases we have assumed the landholdings do not have development approval.

Development Value (Expressed in Rental Terms)

An alternative method of expressing the viability of a given project is to compare the market and economic rent of the project. Where the economic rent is higher than the market rent the project is unviable.

- Market Rent: The level of rent generally accepted within a given precinct for a given quality of office product. Resistance exists for paying any rent above this level (as the tenant could simply relocate to alternative premises).
- Economic Rent: The level of rent required to make a given development viable. Where the economic rent is greater than the market rent the development is unviable. Where the economic rent is lower than the market rent (subject to obtaining pre-commitment) the development is viable.

Viability Assessment

We have assessed the viability of the site by comparing the 'Development' value (from both the Residual Land Value (RLV) and the Direct Comparison Approach) to the site value 'In Use'.

To be viable the RLV must be greater than the 'In Use' value by an amount that compensates the land owner for the risk associated with development.

Table: Feasibility Scale

	Not Viable	Marginal	Viable
Measurement	In Use value exceeds the Development value.	Development value and In Use value are similar.	Development value exceeds the In Use value.
Description	If the development was to be undertaken it would result in a financial loss assuming the landholding could be purchased at the In Use value.	If the development was to be undertaken it shows marginal viability assuming the landholding could be purchased at the In Use value.	If the development was to be undertaken it would result in a risk adjusted profit assuming the landholding could be purchased at the In Use value. This is, however, still risk that the project could make a loss if certain assumptions were to vary.

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Feasibility Analysis

Methodology

We have provided below the high level methodology of the feasibility analysis as well as some assumptions related to the key inputs.

Residual Land Value (Development Feasibility)

We have specifically assumed 100% debt financing and with no price or revenue escalations.

Our assessments of value have been undertaken through a Discounted Cashflow method, utilising Estate Master Software.

Gross Realisation – 'As If Complete'

There are a large number of key variables involved in achieving sale prices into the future. In particular the marketing of the building is vital to its overall success and in this regard issues such as promotion budgets, target tenants and timing of the project to align with lease expiries may prove significant.

Whilst the marketing variable can to some degree be formulated and assessed, external factors such as economic conditions and real estate markets are more difficult to quantify.

In determining our gross realisations we have had particular regard to the type of product to be developed, broader market competition, as well as market forces which will affect both our potential sale prices and letting up assumptions.

We have assessed the gross realisations of the 'As If Complete' scenario based on a number of assumptions which are specified below under each respective scenario description. The assessment of these scenarios is obviously difficult given that we are working on hypothetical scenario; however, we have had regard to significant amounts of recent evidence and we advise that our gross realisation assessments herein are GST exclusive.

Feasibility Model Inputs

In determining our gross realisation we have used a series of modelling inputs and include considerations relating to:

- Rents;
- Capitalisation Rates;
- Let up Assumptions;
- Incentives;
- Timing;
- Construction Costs;
- Interest Costs; and
- Leasing & Selling Costs.

In addition we have allowed for a development profit and financial return that is appropriate.

Profit & Risk Allowance

The profit and risk factor is one of the most subjective elements in feasibility calculations. Effectively it quantifies the risk/return a developer is willing to subject themselves to. In determining a profit margin a developer would expect for the development, we have taken into account the size, nature and status of construction of the development, time frame of construction, and gross realisation calculation.

The determination of the profit margin is a difficult process, especially in the course of providing an objective evaluation of a proposed development. Influences on such rates of return are many and varied, with the pertinent factors summarised as follows:

- The nature of the proposed development including, amongst others, the specific market the end-product is targeting, demand and supply trends in the market and the size and scale of the development;

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Feasibility Analysis

Methodology (continued)

- Degree of confidence in the end-user market which encompasses the pricing of the end-product to meet the market, the timing of the leasing and sales and the costs associated with the project;
- The likelihood of potential problems during construction with issues including and not limited to industrial disputation, adverse weather conditions and unforeseen cost blowouts;
- Rates of return currently available on less risky, alternative investments;
- The timing of the development, particularly in relation to development margins, which are not annual returns but represent overall returns over the whole period;
- Level of pre-commitment negotiated and remaining proportion of office space available for lease;
- The inclusion of adequate contingencies in the development costs which form part of the evaluation;
- The reasonableness of input assumptions made in relation to issues such as construction costs, cost of funds and timing of costs and revenues; and
- The specific financial position and return criteria of the developer. Depending on factors such as the cost structure of the developer, its taxation position, its capacity to negotiate building contracts effectively and its on-site management style which should ensure an efficient development process, the requisite rates of return can vary accordingly.

Our primary method of analysis when determining the residual value has been to benchmark it against a nominated profit and risk.

The following bands provide a guide for different scenarios when determining a hurdle rate for the profit and risk:

- 15% - 17.5%: Usually short-term development considered to be relatively risk free, DA in place, construction costs fixed, pre-commitment reasonably certain, construction may be in progress;
- 17.5% - 20%: Generally medium term development with some associated risks such as prolonged development periods, possible lower level of pre-commitments; and
- 20% - 25%: Longer-term larger development with more risk be it requirement of approvals, critical milestones to be met, no pre-commitment in place and the like.

Industry standard is typically benched to 20% return on costs of the project with adjustments than made either side for risk. However, it depends greatly on the appetite of specific developers. For the purpose of our analysis we have adopted this benchmark rate.

Direct Comparison

The direct comparison approach has been used to determine the In Use values and as an additional method for assessing development feasibility.

The direct comparison method analyses recent development site sales and compares these to the subject. Adjustments are made for differences such as development certainty, topography, location, size and area to determine the value of the subject. In all cases we have assumed the landholdings do not have development approval.

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Feasibility Analysis

Key Inputs

As Is Value

We have undertaken preliminary valuation analysis to determine the 'as is' value of the current site and improvement at each of the subject sites. In doing so we have had regard to either current income or potential income. Generally we have made assumptions to ensure the 'as is' is not overstated. A summary of our indicative assessment values per asset is as follows:

- 410-414 Victoria Avenue $17.8m (sold 2012 for $16.4m)
- 416 Victoria Avenue $7.0m (sold 2012 for $5.2m)
- 45 Victor Street $10.5m
- Total $35.3m

Built Form – 100% Commercial Redevelopment

Mirvac has provided us with a draft commercial only scheme for the site. The summary of which can be seen below. We have utilised this scheme in order to determine our development value.

Table: Commercial Scheme for 45 Victor Street, Chatswood

Use	GBA	GFA	NLA
Basement carpark	27,571	0	0
Commercial	56,144	51,484	46,490
Commercial core	723	361	0
Commercial lobby	466	457	0
Loading / plant	1,345	0	0
Retail	1,453	1,380	1,311
Total	87,702	53,682	47,801

Source: Mirvac

Development Value

Site assumptions	46,500sqm NLA (office) and 1,300sqm NLA (retail)
Rent assumptions	10 year pre-commitment taken for 50% of space
	Lower floors $640/sqm, upper floors up to $800 net face (before incentive)
	Incentive: 35% of net lease
	Car income: $450 per space per month

Development Costs

We have utilised Rawlinsons 2020 as the basis for our development costs – a summary of the key assumptions are provided below.

Table: Development Costs for 45 Victor Street and 410-416 Victoria Avenue, Chatswood

Development Costs			
Scenarios	Unit	$/per	A-grade
Demolition	3,694	$100	$369,400
Car Parking (Rawlinson 10.1.2.1)	475	$64,200	$30,520,680
Built Form (Rawlinson 9.1.3.4)	53,682	$5,663	$303,974,325
Subtotal			$334,864,405
Plus Contingency (Hard Costs)	7.50%		$25,114,830
Subtotal			$359,979,235
Plus Prof. Fees	12.75%		$45,897,353
Total Development Costs			$405,876,588

Source: Rawlinsons Australian Construction Handbook 2020

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Feasibility Analysis

Key Inputs (continued)

Adjustments

In addition to the development costs the following costs have been included within the model:

Incentive (office):	Assumes a 10 year lease term at 35% net incentive
Incentive (retail):	Assumes a 10 year lease term at 25% net incentive
Let up:	30 months let up for space not pre-committed
Leasing costs:	15.0% of first year's gross income
Gross Realisations	
Net income:	$38,006,460
Capitalisation rate:	5.875% (reflecting average of 5.50% and 6.25%)
Capitalised value:	$646,918,468

In addition to the above, within the feasibility we had made assumptions on the following:

- Development Timing – for the purpose of our assessment we have assumed that planning and development will occur within a 48 month timeframe;
- Interest charges – Interest on development costs and holding charges has been assessed at a rate of 6% per annum inclusive of all costs;
- Profit & Risk Allowance – We have defined 'break even' as a profit and risk of 20%;
- Selling Expenses - Selling expenses has been calculated to include agents commission & advertising/promotion and legal costs at 1% of gross realisation;
- Rates and Taxes - We have assumed costs inclusive of land tax, council rates and water rates will be payable over the life of the project. These charges are levied on a diminishing basis as the end product is sold and settled. Council contributions have also been included at 3% of development costs.

Feasibility Outputs

The results of our Residual Land Value (RLV) assessments are as follows:

- Residual Land Value -$86.1 million

This analysis shows the landholders at 410-414 Victoria Avenue, 416 Victoria Avenue and 45 Victor Street, Chatswood would have to be paid $86.1m to provide the incentive to develop the site as a 100% commercial scheme (subject to obtaining a pre-commitment over ~23,000 sqm, which as flagged in other sections of this report would be very challenging).

As an alternative analysis we have compared the market with economic rent which is summarised below.

- Market Rent $720/sqm net face (reflecting rents between $640 to $800/sqm)
- Economic Rent $946/sqm net face

Even assuming the required tenant pre-commitment could be found, the above analysis clearly shows a lack of viability.

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Commercial Opportunity Unlocked Through a Mixed-use Outcome

Mixed Use Scheme for the Subject Site

Mirvac has provided us with a draft mixed-use scheme for the site, the summary of which can be seen below. The mixed use scheme for 45 Victor Street and 410-416 Victoria Avenue, Chatswood provides a mix of commercial, residential and retail floor space across 38,628 sqm of floor space, as provided in the table below.

This includes 15,351 sqm of office Net Lettable Area (NLA).

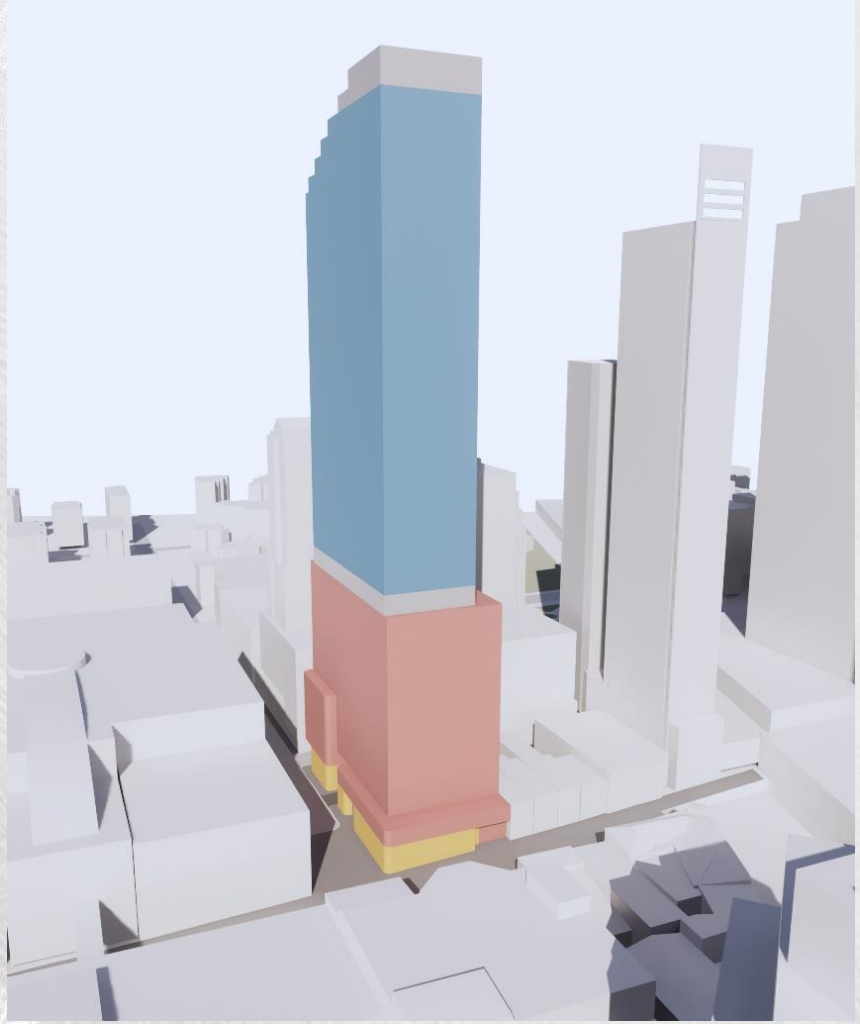
Table: Mixed Use Scheme Summary (SQM measurements)

Use	BEA	GBA	GFA	NLA / NSA
Basement Car Park	18,381	18,381	0	0
Commercial	20,867	19,823	17,445	15,351
Commercial Lobby	261	248	174	0
Loading/Plant	2,519	2,519	0	0
Residential	34,634	31,170	27,430	23,041
Residential Lobby	156	148	133	0
Retail	826	784	745	708
	77,642	73,074	45,926	39,100

Source: Mirvac

As demonstrated in the figure to the right, the building's mixed use scheme provides for retail use, a residential lobby and a commercial lobby on the ground floor, floors 1 to 13 are designated for commercial office floor space with 32 levels of residential apartments above.

Figure: Mixed Use Scheme for 45 Victor Street and 410-416 Victoria Avenue, Chatswood



Source: Mirvac

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Comparison to Existing Buildings in Chatswood

With reference to the mixed use scheme, we have considered the quantum of commercial uses and shown what this equates to by reference to the following existing buildings in Chatswood.

The table below provides the largest commercial office buildings (>10,000 sqm) in Chatswood by Net Lettable Area (NLA), according to JLL Research.

This table demonstrates that despite being a mixed-use scheme the proposal for the subject site would equate to the third largest provider of commercial floor space in Chatswood, based on existing commercial buildings.

Our analysis indicates that any new commercial space is significantly challenged in Chatswood and the proposal for over 16,000 sqm would be a very positive outcome for the Chatswood CBD.

Table: Mixed Use Scheme Comparison to Chatswood Commercial Buildings (>10,000 sqm)

Building Name	Address	Commercial Net Lettable Area (sqm)
The Zenith	821-841 Pacific Highway, Chatswood	44,034
Citadel Towers (A & B)	799 Pacific Highway, Chatswood	34,333
Subject Site	**45 Victor Street and 410-416 Victoria Avenue, Chatswood**	**16,059**
465 Victoria Avenue	465 Victoria Avenue, Chatswood	15,637
12 Help Street	12 Help Street, Chatswood	15,236
Sage Tower	67 Albert Avenue, Chatswood	14,836
Chatswood Central Towers	1-5 Railway Street, Chatswood	14,538
Tower 1	475 Victoria Avenue, Chatswood	14,092
Tower 3	495 Victoria Avenue, Chatswood	11,000

Source: JLL Research, Mirvac

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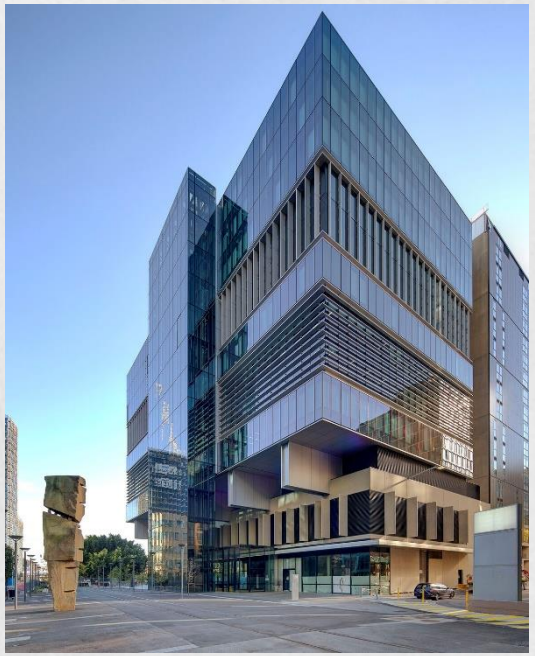
Comparison to New Buildings in Sydney

Despite the redevelopment of 45 Victor Street and 410-416 Victoria Avenue, Chatswood being proposed for a mixed-use scheme and the challenges for new commercial development in Chatswood, the redevelopment is proposing a commercial component of CBD scale, which is comparable to new developments in office markets across Sydney, including in Sydney CBD, North Sydney and Macquarie Park.

We have considered the quantum of commercial use in the mixed use scheme against recent buildings located in other major CBD markets across Sydney that have either completed recently (over the last 10 years) or are under construction. These examples are provided below and overleaf.

333 George St, Sydney
14,508 sqm NLA
Key Tenants:
- Clyde & Co
- WeWork



180 Thomas St, Sydney
13,950 sqm NLA
Key Tenants:
- TransGrid

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Comparison to New Buildings in Sydney Continued

20 Martin Place, Sydney
16,036 sqm NLA
Key Tenants:
- Apple
- REGUS
- Hogan Lovells

21 Harris St, Pyrmont
18,888 sqm NLA
Key Tenants:
- Publicis Groupe

97 Waterloo Road, Macquarie Park
14,400 sqm NLA
(Under construction)
Key Tenants:
- Schneider Electric

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Role in Achieving Employment Targets

Employment Targets

Within the North District Plan released by the Greater Sydney Commission in March 2018 the Chatswood Strategic Centre had the following estimated employment and jobs targets for 2036:

Table: Chatswood Strategic Centre Job Targets

Use	Jobs
2016 Estimate	24,700
2036 Baseline Target	31,000
2036 Higher Target	33,000

Source: Greater Sydney Commission – North District Plan

This equates to an increase in employment of:

- Baseline Target 6,300
- Higher Target 8,300

Role in Achieving Employment Targets

We have considered the role of the proposed mixed-use development in helping to meet the targets above, we have done so with reference to other major commercial developments proposed in Chatswood:

- Mandarin Centre – 65 Albert Avenue, Chatswood
- Chatswood RSL Club – 446 Victoria Avenue, Chatswood

In estimating the potential jobs from these sites, we have considered the estimated jobs included as part of the Mandarin Centre planning proposal (supported by an analysis by Urbis), utilising the Urbis ratios when no other information was available. The employment ratios adopted for the development sites are:

- 10sqm per job for commercial office for the subject site as it has been designed for this ratio of space to employees
- 11sqm per job for commercial office for the RSL site (based on the Urbis analysis)
- 16.5sqm per job for specialty retail for the subject site & RSL site (based on the Urbis analysis)

We have graphically represented these contributions on the following page. Across the three proposed developments the Chatswood Strategic Centre is able to achieve 91% of its baseline job target, well within the timeframe specified (2036).

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Role in Achieving Employment Targets

Figure: Proportions of Chatswood Strategic Centre Job Targets (Baseline)

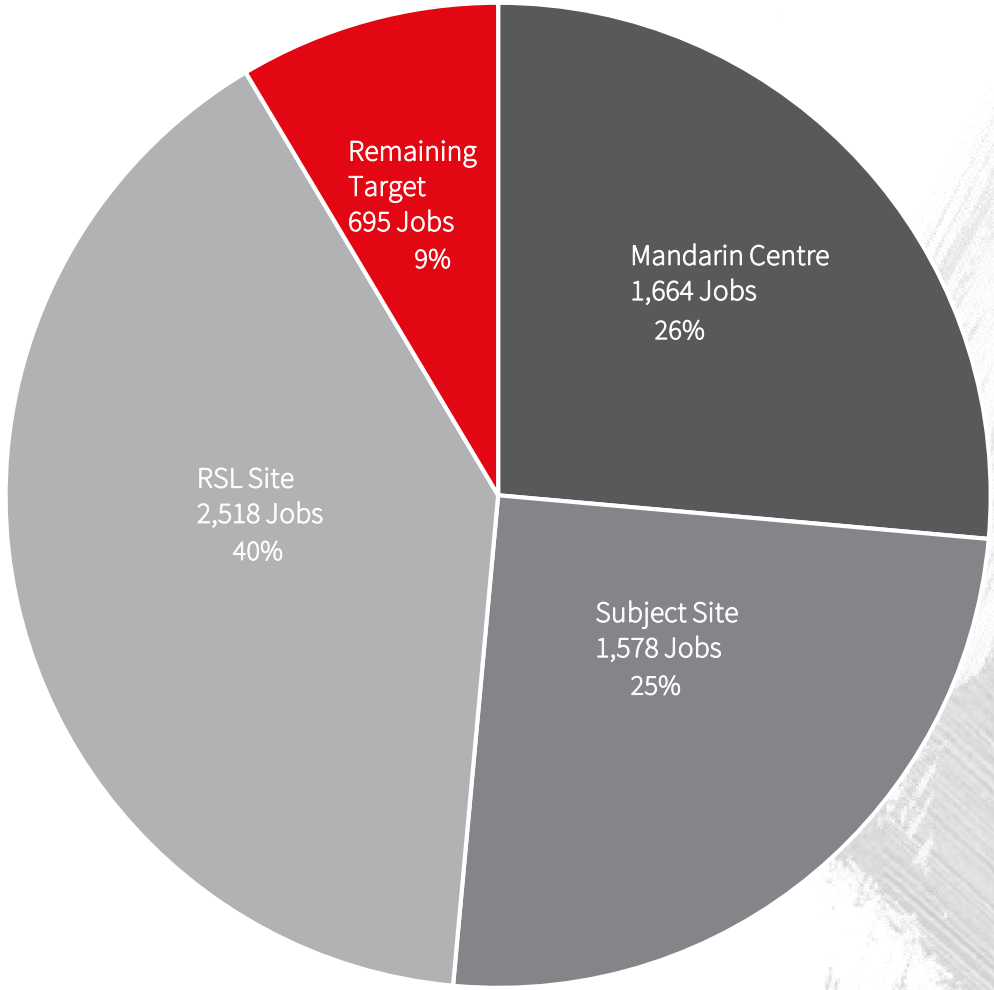
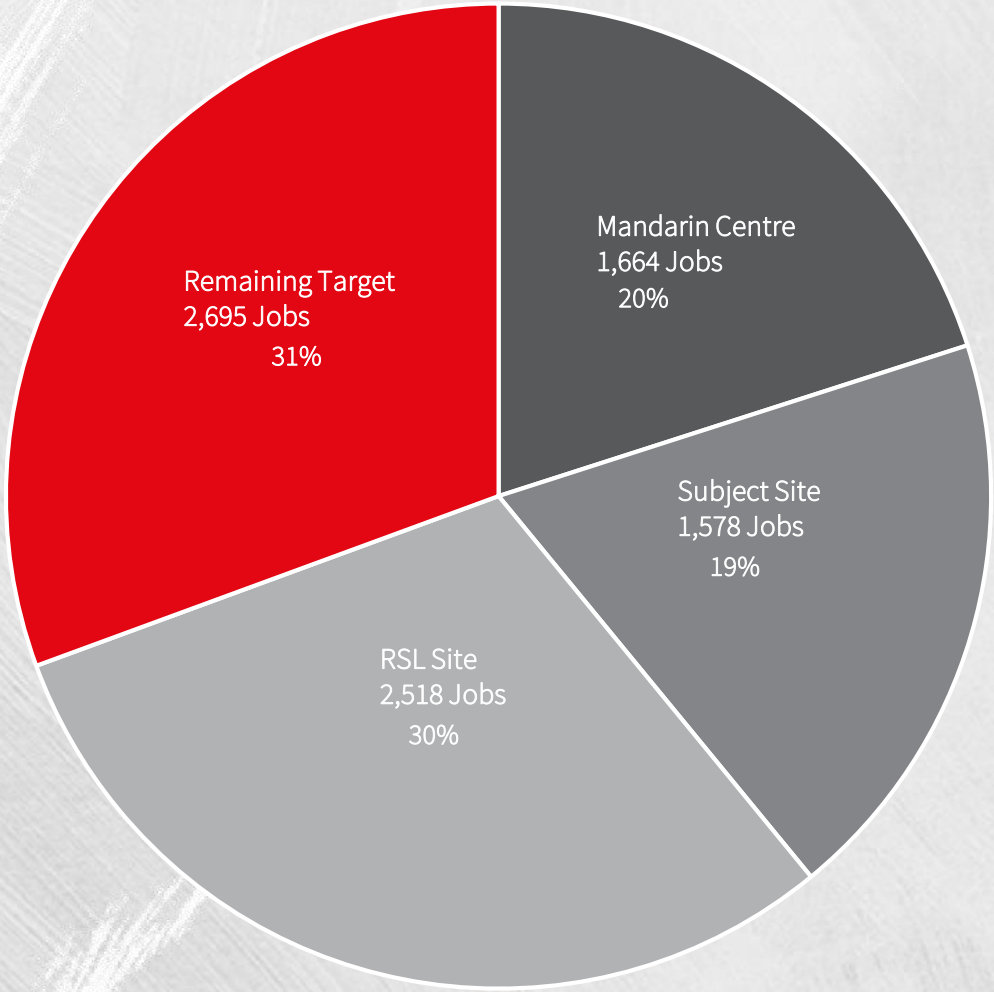


Figure: Proportions of Chatswood Strategic Centre Job Targets (Higher)



Source: Urbis, Mirvac, JLL Research, Greater Sydney Commission – North District Plan

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Conclusions

Conclusions

Provided below is the conclusions from the analysis undertaken in this report.

- We have undertaken feasibility analysis of a potential commercial only scheme for the subject site. From this analysis **we found a clear lack of viability for the site** with the economic rent (rent required to support the development) much higher than the market rent.
- Mirvac mixed use scheme which includes **~16,000 sqm** of commercial floor area would be the **3rd largest in the Chatswood market** and would **materially contribute to the employment targets**.
- The **residential uses are an enabler to the commercial development**. Without the residential, a commercial only scheme won't be developed. The only way to deliver on the desired commercial outcome is to also allow residential.
- We are heading into a period which will support **significantly less office based development noting** over the last 25 years **Chatswood has failed to attract office development**.
- While the continued growth of suburban office markets may suggest growth in Chatswood, **Chatswood competes with other suburban markets** for tenants. Going forward, there will be a **greater focus away from the Chatswood market** and into **Western Sydney** in both the short term (e.g. Parramatta) and long-term (e.g. Western Sydney Aerotropolis). It is also likely that other sub-urban office markets are / will be more desirable than Chatswood going forward.
- Within this report we have considered more specifically some of the challenges with the Chatswood office market (including lower market rents, high incentives, longer letting up, smaller scale tenants and real challenges in getting a large pre-commitment). We have reviewed the sizes of businesses by reference to both employee size and tenant deals recorded and have found **Chatswood typically services the smaller user market** (0 to 2,000 sqm). This observation combined with the likely **requirement for a large pre-commitment** provides further **challenge for large scale office only development**.

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Tim Brown

Head of Strategic Consulting – NSW

+61 2 9220 8440
tim.brown@ap.jll.com

Daniel Turini

Associate, Strategic Consulting – NSW

+61 2 9220 8757
daniel.turini@ap.jll.com

Level 25, 420 George Street
Sydney NSW 2000

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Appendix C CBRE Market Analysis

CBRE Valuations Pty Limited
ABN 15 008 912 641
Level 21
363 George Street
Sydney NSW 2000
T 61 2 9333 3348
F 61 2 9333 3337

michael.pisano@cbre.com.au
www.cbre.com.au

26 July 2020

Mr Adrian Checchin
Development Director – New Business & Apartments
Residential Development
Mirvac
Level 28, 200 George Street
Sydney NSW 2000

Via email: adrian.checchin@mirvac.com

Dear Sir

Market Consultancy Report
45 Victor Street and 410-416 Victoria Avenue, Chatswood, NSW 2067

1.0 INSTRUCTIONS

Thank you for your instruction dated 8 July 2020 requiring a report addressing the following key considerations in relation to the proposed redevelopment of 45 Victor Street and 410-416 Victoria Avenue, Chatswood.

- Site overview with an analysis of its strengths and weaknesses as an office location
- Overview of the Chatswood Office Market
- Historical assessment of net absorption in the Chatswood Office Market
- Review of Chatswood office rents and an assessment of the potential economic rent required to underpin an office development in Chatswood
- Analysis of current demand and office lease pre-commitments
- Analysis of the suburban investment market

This document has been prepared strictly and only for internal review purposes for the Reliant Party, being Mirvac. We understand it will form part of a planning proposal for the site and will be included as an addendum. Furthermore, this is a confidential document and therefore any use, or reliance upon this document, by anyone other than the Reliant Party is not authorised by CBRE Valuations Pty Limited and CBRE Valuations Pty Limited is not liable for any loss arising from such unauthorised use or reliance. This document should not be reproduced without our prior written authority.

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2.0 CHATSWOOD – LOCATIONAL OVERVIEW

The Chatswood office market is situated on Sydney's Lower North Shore, approximately 8.5 kilometres to the north of the Sydney Central Business District (CBD). It is viewed as an alternative North Shore office location to the established markets of North Sydney, St Leonards, Crows Nest and Macquarie Park; however it has diminished in the last ten years with a lack of new office development.

Similar to many other suburban office markets, Chatswood comprises a wide range of quality in office stock which is primarily concentrated around Chatswood Bus and Rail Interchange and the area bounded by Albert Avenue to the south, Day Street to the north and the Pacific Highway to the west. We consider this area of the Chatswood CBD to be better suited to office uses and development, given its proximity to the railway station to the immediate east and superior vehicle accessibility to the Pacific Highway which is in proximity to the west.

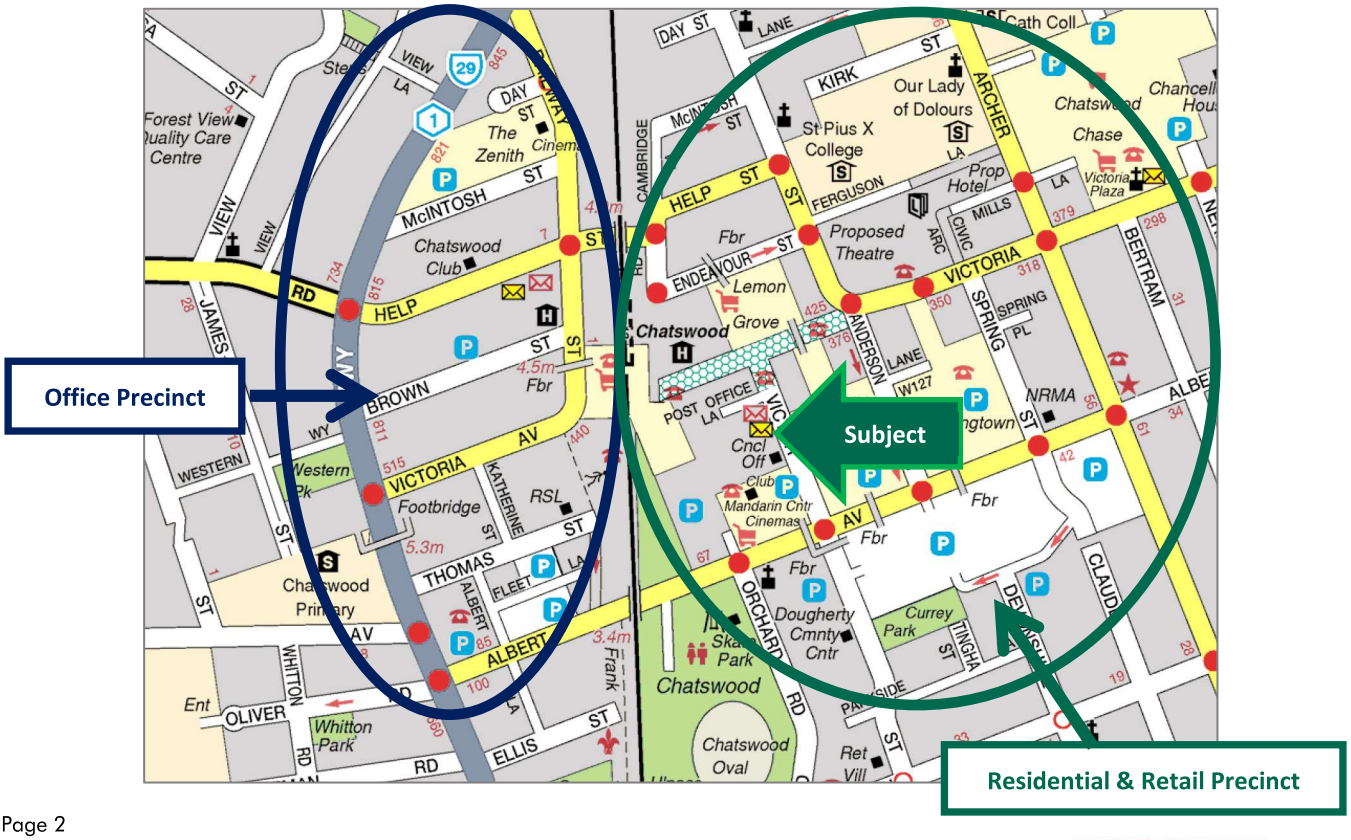
The area to the immediate east of Chatswood Railway Station is better suited to mixed-use development and is dominated by retailing and in particular Westfield Chatswood and Chatswood Chase. Vehicle access to this part of the Chatswood CBD is reduced from the west and limited to Albert and Help Streets, given it is bisected by the Northern Shore Rail line as is evident below.

The fringe of the Chatswood CBD to the south of the subject site along Albert Avenue is predominantly residential of varying densities and public spaces. There is also a concentration of medical uses to the south east.

3.0 SITE OVERVIEW

The subject property is located on the western alignment of Victor Street, at its intersection with Chatswood Mall (Victoria Avenue) and the heart of the Chatswood retail precinct. To the immediate east is Westfield Shoppingtown Chatswood, whilst to the south is the Mandarin Centre. The Baynei Residential Apartments are adjacent to the south, as are the Sebel Apartments at 31-37 Victor Street.

Chatswood Bus and Rail Interchange is approximately 50 metres to the north west and divides Chatswood into two segments, with the major office buildings positioned to the west in what is effectively a commercial precinct. To the east is predominantly retail, residential and mixed-use buildings.



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CBRE

The opening of the Chatswood Epping rail line has further increased accessibility for office workers using public transport to commute to. Additionally, the rail link, combined with the bus interchange, sets Chatswood apart from a number of other metropolitan markets when it comes to public transport infrastructure.

In saying this, its lack of connectivity with Parramatta and the west of Sydney, where the majority of the metropolitan population resides, has made it a difficult location to access by any mode of transport other than private vehicle, which results in congestion in and around the Chatswood CBD. As such and as noted earlier, the western portion of the Chatswood CBD is perceived to be the preferred office location, given its proximity to the Pacific Highway and ease of access.

Access to Chatswood via public transport has improved since the completion of the Sydney Metro in 2019, which is an automated rapid transit system. The first dedicated rapid transit line to be constructed is a link from Rouse Hill to Epping, with the line connecting to the existing Epping to Chatswood railway line. The Sydney Metro links Sydney's north west region to the south west at Bankstown, via the North Sydney and Sydney CBDs.

Significant office buildings within Chatswood are to the west of the subject property and are physically separated by the main North Shore Rail Line as noted previously. These office buildings and their approximate lettable areas include:

- Zenith Centre (Towers A & B) at 821 Pacific Highway 44,270 sqm
- 475 & 495 Victoria Avenue 24,915 sqm
- 465 Victoria Avenue 15,775 sqm
- Citadel Towers at 799 Pacific Highway 28,300 sqm

The only office building of note that is situated away from this precinct is 67 Albert Avenue, Chatswood which overlooks Chatswood Oval. However, it is our view that longer-term use may be residential, given its fringe CBD location, proximity to retail, panoramic views to the south east and that there is high and low density residential zoning to the south of both 67 Albert Avenue and the subject property

As Victoria Avenue is a pedestrian mall, vehicle access to the subject property is from Victor Street via Albert Avenue to the south, which links west with the Pacific Highway. As such, reduced private vehicle accessibility is considered to be a limitation of the site for office use.

The area immediately around the subject property is dominated by retailing and residential and more recently, there has been the introduction of student accommodation and hotels to the area. Westfield Shoppingtown is a major regional shopping centre extending to approximately 77,200 sqm over five levels. It includes six major stores, 290 specialty stores and 2,880 car spaces. It is bounded by Albert Avenue to the south, Spring Street to the east, Victoria Avenue to the north and Victor Street to the west. It is directly opposite the subject property to the east.

Chatswood Chase is situated further to the north east, at the intersection of Archer and Victoria Streets and is a fully enclosed, major regional shopping centre, extending to approximately 62,000 sqm over four levels.

There are also a number of smaller centres in Chatswood around the subject property, including the Mandarin Centre to the south, situated on the corner of Victor Street and Albert Avenue, together with numerous strip retailers along Victoria Avenue which creates a high street precinct running west to east from Chatswood Bus and Rail Interchange. Lemon Grove Shopping Centre is to the immediate north on Victoria Avenue.

Further to the east in proximity to the intersection of Albert Avenue, Archer and Spring Streets there are a number of high-rise residential developments, a Quest Hotel and a general concentration of commercial strata suites, medical practitioners and day surgeries. The most recent developments in this regard are 38 Albert Avenue which includes the Sydney Surgery Centre and the aforementioned Quest Hotel. The Archer at 63 Archer Street was completed in May 2011 and is an eight-storey building, with basement parking, ground retail, commercial suites on Level 1 and residential apartments on the upper floors.

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The properties comprising 1-11 Spring Street and 60 Archer Street which are situated at the juncture of Albert Avenue to the south, Spring Street to the west and Archer Street to the east, have recently been amalgamated and earmarked for a large mixed use/residential scheme.

As such, the key strengths of this location include:

- Proximity to public transport
- Proximity and concentration of retail amenity which needs to be serviced by an immediate mixed use/residential population
- A concentration of existing residential apartment towers and mixed-use buildings within the immediate vicinity
- Access to schooling with Our Lady of Dolours, Mercy Catholic College and St Pius College a short distance to the north east

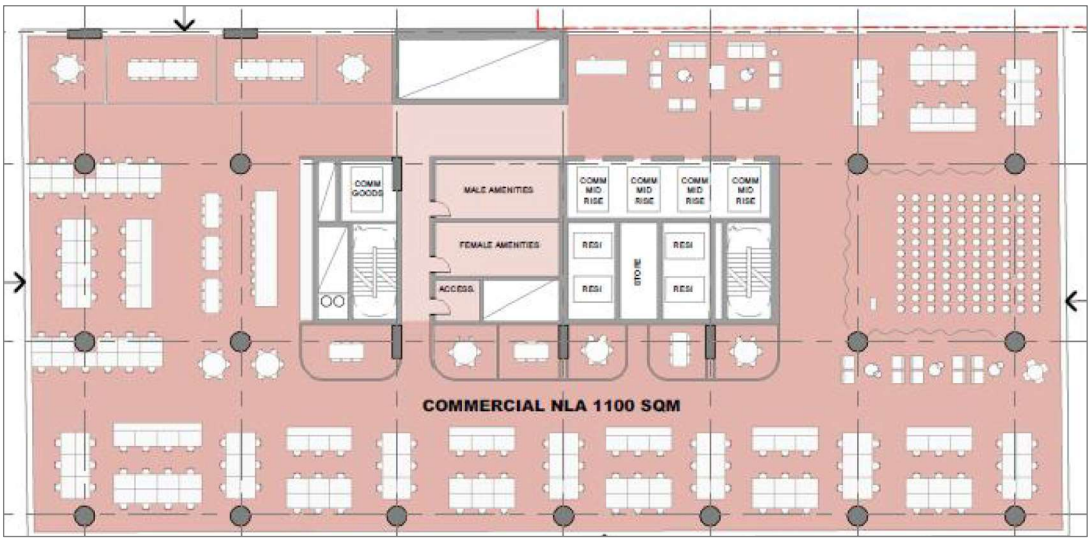
These strengths, together with the existing characteristics of the area support longer term residential use, with only ancillary retail or commercial uses on the ground or lower levels which support the residential above. Given the lack of tenant and investment demand for Chatswood, we recommend that any office component included in the development be capped at 10,000 sqm.

4.0 PROPOSED DEVELOPMENT

The redevelopment of 45 Victor Street and 410-416 Victoria Avenue, Chatswood proposed by Mirvac is a mixed-use building comprising an office net lettable area of 15,351 sqm, a residential net saleable area of 23,041 sqm and a retail gross lettable area of 708 sqm. There is a total of 310 apartments proposed, comprising 1 bedroom, 2 bedroom and 3 bedroom apartments.

This is a substantial development with a significant commercial presence which, in our opinion is too large for the Chatswood CBD. Moreover, the floorplate is compromised and not reflective of current market requirements. The revised scheme has a floorplate size of 1,100 sqm, and based upon our understanding and experience of current tenant requirements and workplace strategies, we would expect a minimum floorplate for a new suburban A Grade office building to be 1,200 to 1,800 sqm in size in order to achieve work space efficiency.

Given the size of the asset and the likely purchaser profile, there would be an expectation from investors for the same. Anything less would be potentially detrimental to the leasing and saleability of the asset.



The value of an asset reflects office leasing and investment fundamentals. Values however may change as a result of market fluctuations and the pricing of risk by the market. This is particularly relevant to what is proposed, given current uncertainty in property and economic markets as a result of COVID-19.

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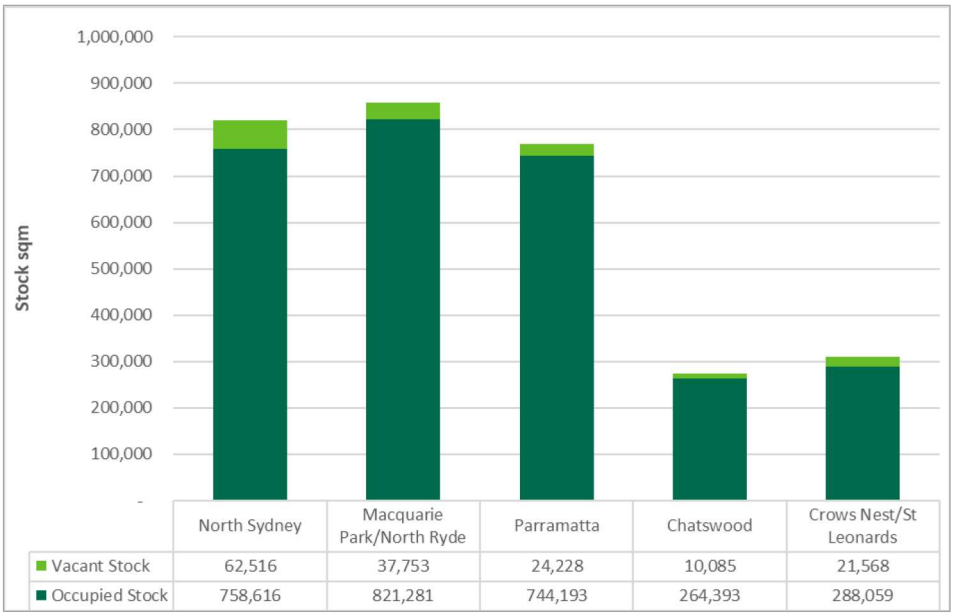
Asset values can vary significantly depending on broader market conditions. In buoyant conditions, the variance between prime and secondary assets may potentially be minimal. However, during market downturns, the value variance may increase due to a reduction in the number of potential purchasers in the market, investors applying higher risk premiums and reduced funding availability.

We consider the proposed floorplate and stratum title, two factors which may be detrimental to the asset value generated, particularly should the shared ownership and services agreement result in greater complexity and risk to the owner of the office component.

5.0 Chatswood Office Market Overview

According to the Property Council of Australia (PCA), Chatswood is Sydney's fifth largest metropolitan office market. It comprises 274,478 sqm of office stock as at January 2020, of which approximately 57% is considered to be A Grade, 27% B Grade, 5% C Grade and 0.2% D Grade office accommodation.

Metropolitan Sydney Office Stock



	North Sydney	Macquarie Park/North Ryde	Parramatta	Chatswood	Crows Nest/St Leonards
Vacant Stock	62,516	37,753	24,228	10,085	21,568
Occupied Stock	758,616	821,281	744,193	264,393	288,059

Source: CBRE & PCA July 2020

The Chatswood office market has ranged in size from circa 225,000 to 293,000 sqm, however it has not reached the upper end of this range since January 1998. There have been no substantial additions to the market in the intervening period.

The addition of a new building of circa 15,351 sqm would increase the size of the market to approximately 289,652 sqm, which represents an increase of 5.2% overall. This may be too large an increase for the market to efficiently digest, in the absence of a substantial pre-commitment. It would result in vacancy increasing to 8.7% from its current level of 3.7%, however this is assuming all things being equal. The effects of the COVID-19 pandemic are expected to have a detrimental impact on property markets over the course of the next 12 months which will result in higher vacancy levels.

According to the PCA, only 57% of the Chatswood office market is A Grade. It was constructed in the period from late 1980s to mid-1990s with no additions to the market over the intervening period. The refurbishment of buildings has been undertaken and notable A Grade office buildings and their owners are detailed as follows:

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Property	NLA (sqm)	Owner	Construction Date (Approx)
Zenith Centre, 821 Pacific Highway	44,270	Arrow/Starwood	1987 & 1991
Citadel Towers, 799 Pacific Highway	28,300	Private (Kyko)	1991
475 & 495 Victoria Avenue	24,915	Cromwell/Blackrock	1987
1–5 Railway Street	17,372	Sino IPG	1976 & 1980
465 Victoria Avenue	15,775	Centuria	1995
12 Help Street	15,349	Private (NMBE)	1989
67 Albert Avenue	15,048	Mapletree	Circa late 1980s
9 Help Street	9,834	Centuria	1991
Total	**170,863**		

5.1 VACANCY

According to the PCA, the Chatswood CBD office market saw moderate declines in vacancy, which was underpinned by the lack of supply. The vacancy rate was 3.7% as at January 2020, which was a decrease of 2.0% from July 2019 and a substantial reduction from the most recent high of 13.5% in January 2014. However, vacancy is expected to increase as a result of potential new supply from other suburban office markets seeking tenants and creating backfill options in Chatswood, in particularly Macquarie Park. Moreover, the full effects of the COVID-19 pandemic have yet to crystallise in the market statistics for Chatswood, however its impact is expected to become apparent over the course of the next 12 months, with higher vacancy, lower rents and greater incentives required to secure tenants.

Current Chatswood vacancy is delineated as follows:

Chatswood	July 2019	January 2020	6 Month Variance
Total Stock (sqm)	277,978	274,478	-3,500
Total Vacancy (sqm)	15,768	10,085	-5,683
Vacancy (%)	5.7%	3.7%	-2.00%
Net Absorption (sqm) 6 months	570	2,183	1,613
A Grade - Stock (sqm)	157,412	157,412	0
A Grade - Vacancy (%)	3.2%	2.1%	-1.10%
B Grade - Stock (sqm)	75,105	75,105	0
B Grade - Vacancy (%)	7.1%	7.9%	0.80%
C Grade - Stock (sqm)	45,007	41,507	-3,500
C Grade - Vacancy (%)	10,5%	2.1%	-8.40%
D Grade - Stock (sqm)	454	454	0
D Grade - Vacancy (%)	0.0%	0.0%	0.00%

After emerging as an office market in the 1980s, Chatswood experienced significant vacancy between January 1991 and July 1994, which peaked at 30.2% and averaged 19.2%. This coincided with a general downturn in the property market across Sydney.

Vacancy again increased for a sustained period from July 2002 to July 2014 where it averaged 13.2%. It reached a high of 19.2% in July 2010 and only fell below 10.0% in June 2007 (6.3%), January 2013 (8.9%) and July 2013 (9.8%). These reductions were generally the result of stock withdrawal, rather than significant net absorption and tenant demand.

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What is evident from this analysis is the Chatswood office market is generally susceptible to downturns in property and economic cycles and this impact appears to be more pronounced and sustained when compared to competing metropolitan office markets. This was highlighted most recently during the Global Financial Crisis (GFC) and the subsequent property market downturn which severely impacted the Chatswood commercial market, with vacancy increasing by 12.8% in the three years prior to July 2010, where it peaked at 19.2%. This was the highest level of vacancy recorded for the Chatswood office market since January 1993.

Historically, vacancy levels were also negatively impacted by a combination of corporate collapses, consolidation, relocations (e.g. Vero Insurance) and mergers (e.g. Vodafone and Hutchinson). Tenants also took advantage of attractive rental and incentive packages in superior buildings being offered in competing office markets such as North Sydney and Macquarie Park, and as a consequence relocated from Chatswood. The characteristics of these markets are such, that they are preferred locations for tenants.

As a result of these sustained challenges, high density residential emerged as a viable alternative to office and a number of prime sites were re-zoned and approved for residential development. This has resulted in the permanent loss of prime commercial sites and the gradual diminution of Chatswood as an office market due to a lack of critical mass.

Moreover, given the continued demand for high rise residential dwellings, this use has been seen by developers (and the market in general), as the highest and best use for land in Chatswood. The extent of residential and retail development in Chatswood CBD over the course of the last 20 years has fundamentally changed the dynamics and drivers of that market and diminished its importance as an office location. Whether it is retrievable through further development in the absence of tenant demand is unlikely.

Accordingly, this has not been a supply driven outcome for the Chatswood CBD, but reflective of a sustained lack of tenant demand that is needed to drive office development. We see no reason why this would change as a result of additional supply, given those sites have been available for office development for some time. However, there is demand for residential product and this will continue in the future.

5.2 SUPPLY

According to PCA data as at July 2020, office supply growth in the Chatswood market has been minimal over the past decade with a total of only 5,355 sqm of new supply completed over this period. Withdrawals from the market for refurbishment, residential conversion and redevelopment have seen the market contract by 6,326 sqm by 2015 and remain steady at 278,919 sqm since then. As of January 2020, the market contracted by a further 4,441 sqm to 274,478 sqm, highlight that Chatswood continues to diminish as an office location.

Stock withdrawal has greatly exceeded supply additions over the past decade, and this trend is expected to continue in the future. There is minimal new development proposed, with only the Plaza Building at 501 Victoria Avenue expect to come online. The existing two storey building will be demolished to accommodate a new four storey office building of just 3,000 sqm. Cromwell as the owner of the property, has approval to also construct a 15-storey hotel with ground floor retail on the remainder of the site, highlighting the limited expected demand for office space in the Chatswood CBD.

Historically, the main drivers of this reduction in office space in Chatswood are a strong residential market that appears to be continually taking a greater hold and strong competition coming from surrounding North Shore office markets and business parks. Moreover, Chatswood appears to be increasingly becoming a small to medium sized business location which is unable to attract larger office corporates that may have committed to the area historically.

Significantly supply has never been the overriding issue affecting the development of new office buildings in Chatswood, it has been tenant demand and the lack thereof. Key factors which impacted the office development in our view include:

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- Weak tenant demand overall and absence of pre-commitment demand
- Tight funding constraints and an uncertain economic climate
- Consistent high levels of vacancy within the Chatswood office market and a lack of rental growth
- Lack of suitable sites which can accommodate modern office and floorplates

It is our view that these overriding factors remain relevant today. Whilst there are sites with the potential to accommodate office development, tenant demand is lacking and has been for some time.

As noted earlier, there has been no office development in Chatswood since the mid-1990s and the only significant office refurbishment has been 465 Victoria Avenue, Chatswood. FKP acquired the building in August 2007 for $98 million and after the major occupant, Vero Insurance relocated from the building to the Sydney CBD, an extensive refurbishment and expansion program was undertaken without a lease pre-commitment in place. The building was extended to some 15,775 sqm and the existing improvements refurbished at a cost of $13 million. The works were completed in 2012. FKP ultimately sold the building in February 2013 for $92 million and the loss incurred appears to be significant.

However, at the time of sale, it was only 96% leased, with the largest tenants being Vodafone (5,581 sqm or 35% of NLA), Real Insurance (4,915 sqm or 31% of NLA) and Lendlease (2,949 sqm, 19% of NLA).

Accordingly, this appears on the face of it to be a loss-making exercise for a comparable building in terms of size, albeit with less capital outlay as it was a refurbishment. It highlights the risk of office development/refurbishment in the Chatswood office market overall, together with the lack of tenant demand and investor appetite outside of the cyclical market peaks. The most recent sales Chatswood (i.e. Zenith Centre, 475 Victoria Avenue and 67 Albert Avenue) continue to reflect a discount to competing suburban and Sydney CBD office markets.

It is difficult to quantify how long it would take to secure a lease pre-commitment for the Chatswood office market as there has not been one for quite some time. We note larger developments tend remain idle for a number of years as pre-commitments were sought, thereby incurring holding and financing costs as a result.

Of the current developments in North Sydney which are currently under construction, both 1 Denison Street and 118 Mount Street have vacancy of circa 20%. Both developments are due for completion in H2 2020.

Those suburban markets which have witnessed office development have generally been on a smaller scale and the pre-commitments secured have generally taken out the whole, or majority of the building. The length of time required to secure a pre-commitment may vary, however for larger tenants we would expect a time of 12 to 24 months, however timing is very important. With respect to 7 Railway Street, Chatswood the site remained vacant for much longer than this, despite being actively marketed with formal campaigns and pre-commitments being pursued.

St Leonards and North Sydney highlight the difficulty in completing large scale office developments across the North Shore office markets. Together with Parramatta and Macquarie Park, they compete directly for pre-commitments with the subject property if it were to proceed as an office development.

Current NSW Government policy around decentralisation and establishment of a Western Sydney CBD has resulted in elevated levels of market activity and interest for commercial office assets across Western Sydney, which has been to the detriment of the Sydney CBD. Parramatta has been a direct beneficiary of this policy, with the completion of Parramatta Square (PSQ) 1, 3 and 4, whilst PSQ 6 and 8 are under construction.

The success of Parramatta Square has been mainly attributed to its location, being adjacent and interconnected with Parramatta Rail and Bus Interchange. Furthermore, it is the creation of a precinct, with the redevelopment of three hectares of land into a mixed-use gateway to the Parramatta CBD. The buildings constructed are of an A Grade standard, with a Premium Grade specification for the services. Floorplates range in size from approximately 2,100 sqm to 3,100 sqm and the buildings range in size from circa 35,000 sqm to 128,000 sqm in size and geared towards large corporate and government tenants.

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National Australia Bank has committed to 3 PSQ, whilst 4 PSQ is occupied by the NSW State Government. 6 and 8 PSQ have secured pre-commitments substantial portion of the building, with the key attraction of the development for all these tenants being large, flexible floorplates.

The NSW Government also committed to in excess of 25,000 sqm of net lettable area at 45 Waterloo Road, Macquarie Park. Now complete, the building has individual floorplates of circa 4,200 sqm in size.

Property NSW (Department of Health) has committed to a new development at 1 Reserved Road, St Leonards. The property benefits from its proximity to Royal North Shore Hospital, however the development is being purpose built for various health related government departments with floorplates in excess of 3,000 sqm over nine levels in a standalone building.

The key obstacles for office development in Chatswood are therefore:

- Weak tenant demand which results in commercial only projects being unviable.
- A lack of sites which are large and provide a flexible floorplate for corporate and government tenants.

5.3 Demand (Net Absorption)

According to the PCA, net absorption has been positive, albeit moderate over the last three years, recording 2,684 sqm, 1,645 sqm and 2,753 sqm between 2017 to 2019. Net absorption has returned to negative figures in the first half of 2020, with -594 sqm recorded. Prior to the onset of COVID-19, the PCA was forecasting net absorption to remain low in the short to medium term and this is now expected to worsen.

Chatswood's office market is generally susceptible to downturns in property and economic cycles and this impact appears to be more pronounced and sustained for longer periods when compared to other metropolitan office markets. Additionally, tenants are taking advantage of attractive rental and incentive packages in superior buildings being offered in other office markets such as North Sydney and Macquarie Park, and consequently relocating from Chatswood.

Moreover, given the continued demand for high rise residential dwellings, this use has been seen by developers (and the market in general), as the highest and best use for land in Chatswood, particularly in the last 20 years. Enquiries have remained relatively active as Chatswood appears to be increasingly becoming more of a small to medium business location rather than a location for larger office users.

The highest level of net absorption for the Chatswood CBD since the PCA commenced tracking the market in January 1990 was 27,721 sqm which was achieved in July 1992, some 24 years ago. Absorption for a period of 12 months has not been achieved near that level since December 2007 (24,853 sqm) and the following chart highlights net absorption over the last five years, which has only exceeded 10,000 sqm once. Accordingly, it is questionable whether there would be sufficient demand to support a new office building in Chatswood of 15,351 sqm.

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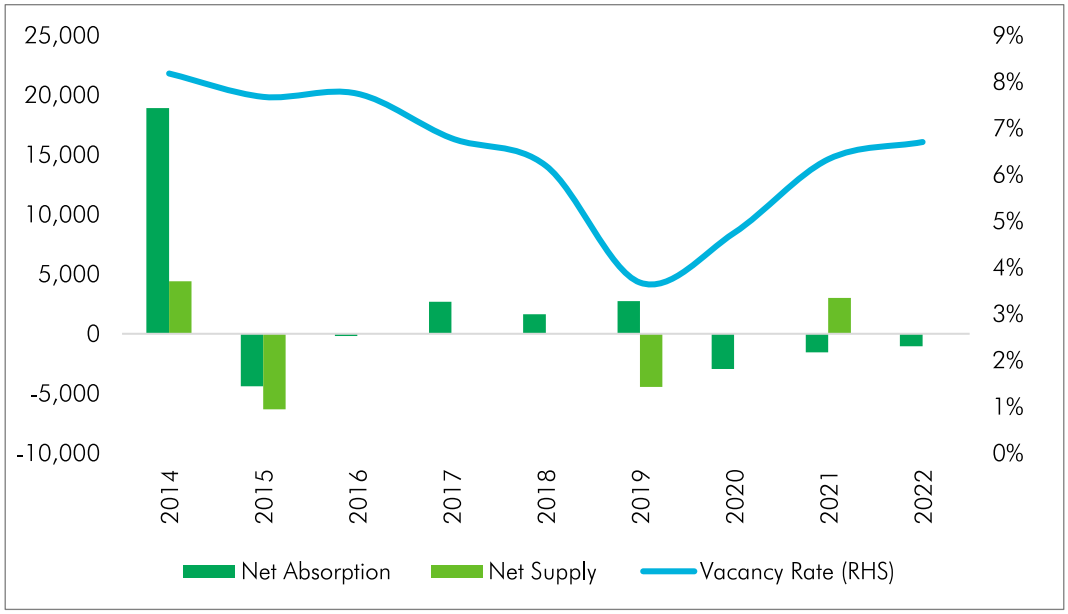
Chatswood Vacancy & Net Absorption



Source: CBRE & PCA July 2020

CBRE Research has tracked leasing activity in Chatswood for the last five years and identified that the average lease size over that period was ~900 sqm. However, the average lease size continues to decline. We have taken a sample of evidence from across the last three years which confirms this.

There has been some activity ranging from 1,000 and 3,000 sqm, however it is limited and there has been no new leasing activity above 5,000 sqm.

Property	Tenant	Area (sqm)	Commencement Date	Term (Yrs)
Zenith Centre **821 Pacific Highway, Chatswood**	McCabe Lawyers	2,200	Feb-19	Undisclosed
	Sennheiser	575	Jan-18	3.0
	Green Capital Group	300	Apr-18	5.0
	Next Science	144	Mar-18	3.0
	Hackers	109	Jan-18	5.0
Chatswood Central **1 Railway Street, Chatswood**	Aumax Finance	57	May-17	2.0
	PSC Solutions	171	Apr-17	5.0
	Atlas Property Holdings	162	Apr-17	5.0
475 Pacific Highway, Chatswood	Besins Healthcare	96	Jun-18	2.3
	Sydney North Primary Health Network	924	Sep-18	3.0
	ZTW	356	Dec-17	3.0
	Trend Investor Services	197	Nov-17	5.0
	Filtered Media	519	Sep-17	5.0
	Pronovate	102	Sep-17	5.0
12 Help Street, Chatswood	Lenovo	2,800	Dec-19	8.0

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Having regard to the size of deals recently completed in Chatswood, we would suggest the optimum size of any new development would be 10,000 sqm. Chatswood competes with Macquarie Park, St Leonards Rhodes and Sydney Olympic Park and they can develop A Grade buildings at a lower price point and economic rent in comparison to Chatswood. Moreover, these markets can provide campus style accommodation, which is preferred by these tenants. Lease pre-commitments across these suburban office markets tend to be 5,000 sqm to 10,000 sqm in size. Furthermore, tenant demand and historical net absorption levels in Chatswood would suggest there is minimal appetite for office buildings greater than this, particularly in the absence of more substantial pre-commitment.

Generally, when the suburban office market has been soft, tenants have taken the opportunity to relocate to perceived superior markets. This 'flight to quality' has enabled them to upgrade their accommodation and secure elevated incentives. This certainly occurred between 2010 and 2011 in Chatswood, where a number of larger tenants relocated to North Sydney, with incentives of 35% to 40% being offered at 40 Mount Street, Victoria Cross at 60 Miller Street and 141 Walker Street. These were (and remain) superior buildings to what was available at Chatswood at the time, and the relocation of tenants proved to be the catalyst for owners to upgrade their buildings.

Therefore, at the time it was difficult for Chatswood to compete for tenants, however building owners were able to retain tenants at lease renewal with attractive incentive packages and refurbishment programs. Significantly, they tended to secure larger tenants from within Chatswood itself; as such there was no major net absorption during this period and no tenant demand to relocate to Chatswood.

The major suburban lease pre-commitments and relocations in the last 15 years, include:

■ Optus to Macquarie Park	84,000 sqm and in excess of 1,000 car spaces recently renewed
■ Woolworths to Norwest	45,000 sqm and 3,120 car spaces
■ Resmed to Norwest	45,000 sqm and in excess of 1,000 car spaces. Owner-occupied premises
■ Commonwealth Bank of Australia	100,000 sqm at South Eveleigh (Australian Technology Park)
■ Property NSW to Parramatta	112,675 sqm across multiple buildings
■ NAB to Parramatta	34,875 and 168 car spaces
■ WSU to Parramatta	26,500 sqm
■ Zurich to North Sydney	12,500 sqm in new premises within North Sydney
■ Nine and Fairfax to North Sydney	25,000 sqm at 1 Denison Street, North Sydney
■ Microsoft to North Sydney	10,700 sqm relocating from North Ryde to North Sydney

These pre-commitments could not be accommodated within the Chatswood CBD in the form the tenants required, being purpose built A Grade office accommodation with large floorplates.

Over this period a number of larger tenants have remained in Chatswood to take advantage of the generous parking provisions within a number of office buildings, which generally exceed availability within competing office markets in

Macquarie Park, St Leonards and North Sydney. This cannot be provided at Victor Street, nor should it be contemplated given the environs of the site and its proximity to public transport.

Parking is desirable for suburban tenants and its availability and minimal cost was the catalyst for tenants such as Woolworths and Resmed to move to Norwest.

Over the last five years, universities have also become a major occupant of suburban office buildings and they have generally secured premises in the following markets:

- Sydney CBD - Various
- North Sydney – Australian Catholic University
- Macquarie Park – Macquarie University
- Parramatta – Western Sydney University
- Westmead – Western Sydney University
- Liverpool – Western Sydney University and University of Wollongong

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There has been no demand from these organisations for office space in Chatswood. Macquarie University is the dominant higher education provider on the North Shore, and it has concentrated its operations in Macquarie Park in proximity to its campus.

Macquarie Park and North Ryde is widely regarded as the premier business and office park location in Australia and has been popular with electronics, computer, internet, publishing, medical research and pharmaceutical corporations who leverage off its proximity to Macquarie University and its research capability.

5.4 Market Rents & Incentives

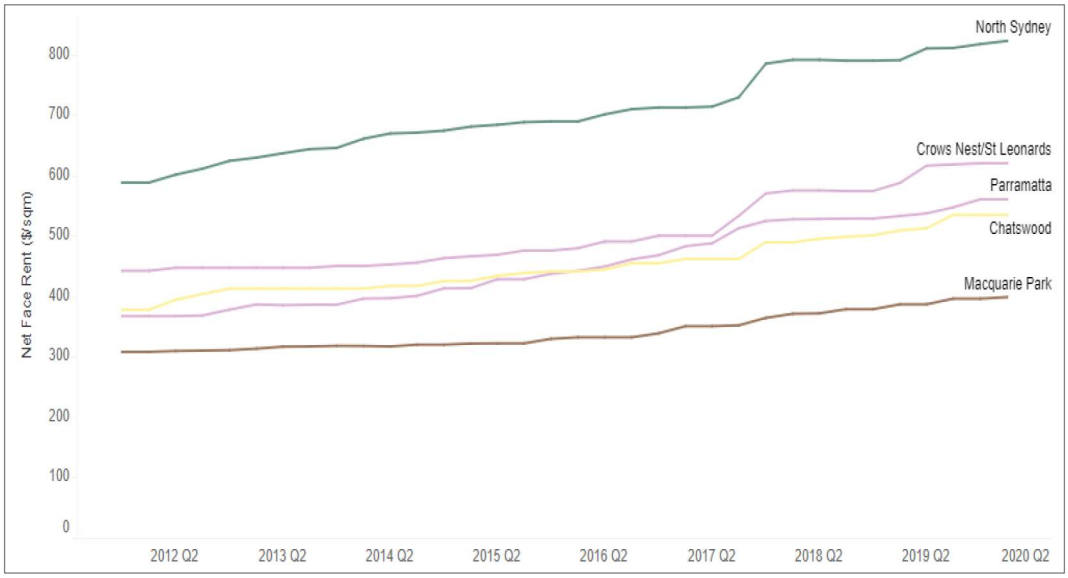
Incentives are currently at an elevated level as a result of the COVID-19 pandemic; however in the last three years A Grade rents have increased across the Chatswood office market as a result of the reduction in overall vacancy across the suburban office market and the permanent withdrawal of office stock to residential or infrastructure projects.

Chatswood occupancy costs are towards the upper end of the metropolitan office market range and are strongly correlated to the prime North Shore office markets of North Sydney and Crows Nest/St Leonards. Average occupancy costs for prime quality office buildings within selected Sydney metropolitan office markets are outlined as follows.

Location	Prime Net Face $/m²	Prime Net Incentives (%)	Car Park $/pspm	Outgoings $/m²
North Sydney	$850	25.0% - 30.0%	$700 - $750	$130
Crows Nest/St Leonards	$575	25.0% - 30.0%	$475 - $525	$120
Chatswood	**$525**	25.0% - 30.0%	**$450 -$500**	**$130**
Parramatta	$575	25.0% - 30.0%	$275 - $250	$115
Macquarie Park	$475	25.0% - 30.0%	$175 - $250	$110

Source: CBRE Research – Office 2020

Metropolitan Rents by Precinct



Source: CBRE Research – Office 2020

Commercial rents across the Sydney metropolitan office market are generally consistent, apart from North Sydney, Sydney CBD and the Sydney CBD Fringe markets. Compared with other metropolitan office markets, Chatswood provides average rentals comparable to St Leonards/Crows Nest and above that of competing office markets of

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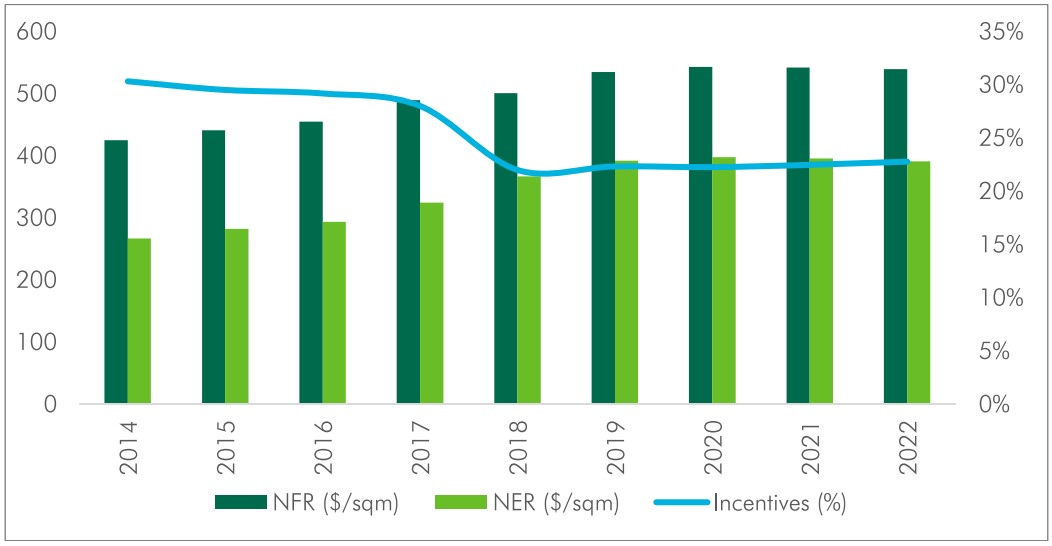
North Ryde. We would however, expect the economic rent required to underpin a development to be in excess of benchmark A Grade rents.

Incentives are currently reflecting circa 20% - 25% for existing office stock despite the decreases in availability. We would expect the required incentive to pre-commit to a development to be potentially higher and range from 25% to 30% net in order to secure an economic rent of $600 to $650 per square metre net. However, incentives are trending upwards as a result of the COVID-19 pandemic.

Chatswood Rents and Incentives (Prime)

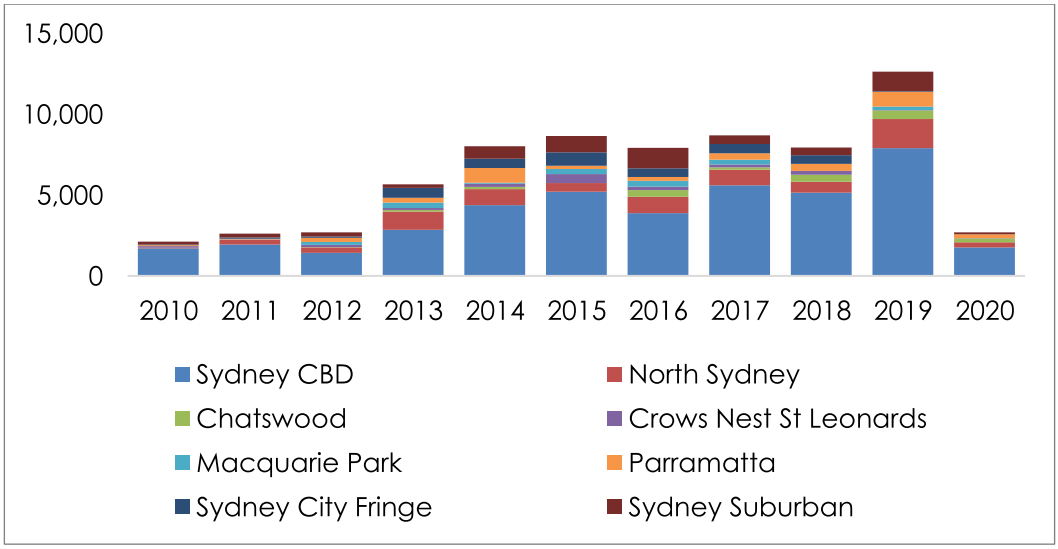


Source: CBRE 2020

5.5 Investment Market

Investment activity for the year to date across Sydney is $991 million, which is down on the previous two years mainly as a result of the COVID-19 pandemic. The vast majority of these sales are concentrated in the Sydney CBD which accounts for $452 million, whilst North Sydney is $160 million. The residual of the suburban office market, inclusive of Chatswood is $379 million. Approximately 65% of all investment sales for the year to date have been completed by foreign interests, up from 43% in 2019.

Sydney Metropolitan Office Sales by Market



Source: PCA, CBRE Research 2020

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The largest suburban sale in the last 12 months in Chatswood has been Zenith Centre for $438.2 million. We have detailed the relevant sales from across the North Shore and Suburban office markets, however it is evident investment properties in Chatswood have transacted at softer metrics relative to comparable sales in other competing suburban office markets.

5.6 North Shore Investment Sales Evidence

Property	Suburb	Sale Price ($'m)	Sale Date	NLA (sqm)	Initial Yield (%)	Equiv Yield (%)	IRR (%)	WALE (yrs)	Rate $psm
99 Walker Street	North Sydney	$311.30	Nov-19	19,295	4.71%	5.01%	6.30%	5.7	$16,133
45-61 Waterloo Road	Macquarie Park	$331.34	Nov-19	34,898	4.99%	5.32%	6.30%	9.4	$9,495
2 Elizabeth Plaza	North Sydney	$127.00	Oct-19	7,580	4.99%	5.18%	6.38%	2.4	$16,754
107 Mount Street	North Sydney	$115.0	Oct-19	6,675	3.97%	4.36%	4.25%	2.0	$17,230
52-54 Waterloo Road	Macquarie Park	$62.30	Oct-19	8,134	3.38%	5.72%	6.55%	6.0	$7,659
34-36 Chandos Street	St Leonards	$32.00	Sep-19	2,079		Confidential			$15,392
Zenith Centre, 821-843 Pacific Highway	Chatswood	$438.2	Jun-19	44,102	6.20%	6.18%	6.44%	4.0	$9,936
111 Pacific Highway	North Sydney	$273.7	Jun-19	18,668	5.19%	5.41%	6.34%	2.2	$14,665
11 Talavera Road	Macquarie Park	$231.20	Feb-19	35,670	4.79%	6.32%	6.99%	3.3	$6,482
72 Christie Street	St Leonards	$157.5	Dec-18	11,259	4.95%	5.01%	6.29%	9.3	$13,989
40 Mount Street	North Sydney	$453.0 (50% interest)	Dec-18	28,402	4.79%	5.07%	6.42%	6.4	$15,960
465 Victoria Avenue	Chatswood	$166.5	Nov-18	15,637	5.41%	5.66%	6.23%	5.0	$10,648
80 Mount Street	North Sydney	$71.0	Nov-18	6,204	4.32%	5.22%	6.15%	2.1	$11,444
67 Albert Avenue	Chatswood	$158.0	Nov-18	14,756	5.55%	5.71%	6.61%	3.1	$10,707
3 Carlingford Road	Epping	$36.0	Jun-18	4,706	5.41%	5.28%	5.85%	1.3	$7,650
77 Pacific Highway	North Sydney	$122.3	May-18	9,392	4.95%	5.38%	6.78%	1.3	$11,963
54 Miller Street	North Sydney	$59.4	Mar-18	6,955	5.31%	5.81%	6.60%	1.6	$9,049

At the time of writing, a 50% interest in 475 Victoria Avenue, Chatswood was reported to have exchanged for $120 million ($240 million for 100%). The property comprises two 13 level office buildings extending to 24,812 sqm and 363 car spaces. At the time of sale, it had a reported weighted average lease expiry profile by income of 2.4 years and generated an initial yield of circa 5.4% and a capital value on a rate psm of $9,673.

5.7 Sydney Suburban Investment Sales Evidence

Property	Suburb	Sale Price ($'m)	Sale Date	NLA (sqm)	Initial Yield	Equiv Yield	IRR (%)	WALE (yrs)	Rate $psm
The Octagon 110 George Street	Parramatta	$188.30	Dec-19	21,082	5.99%	6.04%	6.48%	3.4	$8,932
2-10 Wentworth Street	Parramatta	$105.30	Dec-19	10,941	5.56%	5.69%	6.38%	3.9	$9,625
Wentworth Place 9 Wentworth Street	Parramatta	$64.25	Dec-19	7,651	5.50%	5.81%	6.37%	3.1	$8,398

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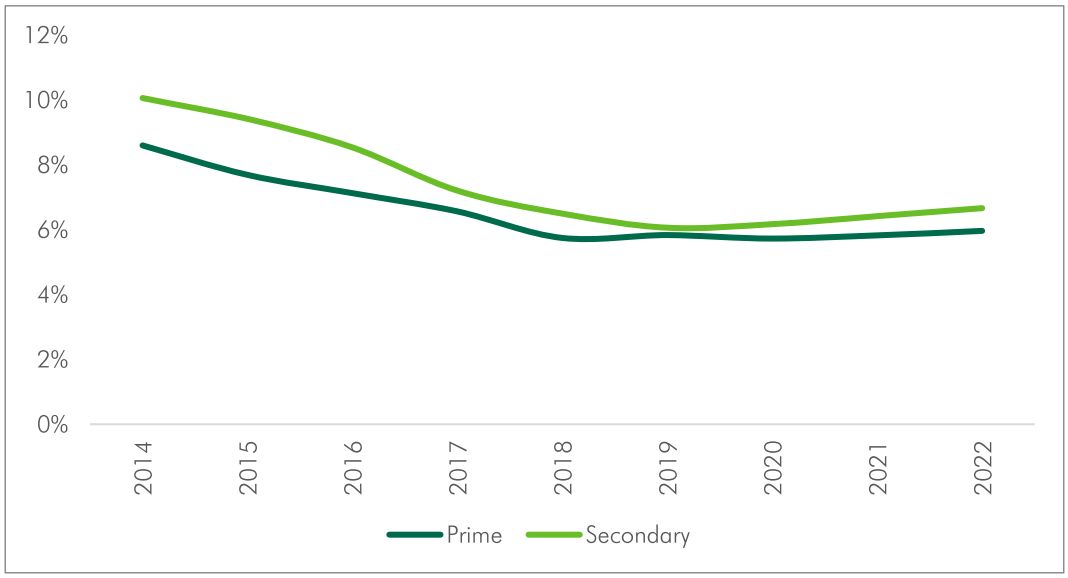
Jessie Street Centre 2-12 Macquarie Street	Parramatta	$415.00	Nov-19	53,904	6.35%	6.15%	6.94%	4.2	$7,699
1-3 Fitzwilliam Street	Parramatta	$80.00	Sep-19	9,678	5.33%	5.44%	6.42%	3.1	$8,266
9 George Street	Parramatta	$44.30	Feb-19	5,552	3.69%	6.07%	6.78%	3.5	$7,979
33 Argyle Street	Parramatta	$40.80	Nov-18	5,279	5.12%	6.36%	6.88%	3.5	$7,728
91 Phillip Street	Parramatta	$56.63	Oct-18	6,094	5.09%	5.77%	6.88%	2.8	$9,292
Eclipse Tower 60 Station Street	Parramatta	$227.60	Sep-18	25,729	5.34%	5.46%	6.33%	4.0	$10,789

It is evident yields and values overall have remained on a tightening trend over the last two years. Whether this will continue subsequent to the onset of COVID-19 is uncertain. What is evident from historical cycles is that the marketability (and hence value) of assets can vary significantly depending on broader market conditions. In buoyant conditions, the variance between prime and secondary assets may potentially be minimal. During market downturns however, the value variance may increase due to a reduction in the number of potential purchasers in the market, investors applying higher risk premiums and reduced funding availability.

The pricing of the office component of the subject property will be dependent on the lease covenants secured and the unexpired lease term (weighted average lease expiry profile). These in turn will be driven by the quality of location and proposed improvements which have been shown to be below the standard required by office tenants at present.

As is evident below, Chatswood yields have not moved significantly in the last five years and certainly not to the same extent as other suburban office markets across Sydney. However, the disparity from the height of the market to the low point is large and it is this volatility which makes the Chatswood office market challenging for investors particularly with the greater market uncertainty created by the COVID-19 pandemic.

Chatswood Prime and Secondary Yields



Source: CBRE 2020

We would also suggest there is limited investment demand for an asset of the size proposed and it may be difficult to sell this asset in one line without discounting the value or disposing of a partial interest. Moreover, stratum title and shared costs through a management agreement with the residential component may also be priced negatively by the market, as they create a further level of risk.

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It would also be difficult to dispose of such an asset in a deteriorating market, with potential purchasers reluctant to hold an asset of this size in a secondary market. Certainly, the sale of 50% interest in Space 207 at St Leonards in January 2013 is indicative of this, with Primewest acquiring a 50% interest from Eureka Funds Management for $61,750,000. The key metrics of the sale at the time reflected a substantial softening in pricing metrics.

6.0 Chatswood Strata Office Market

The strata office market within Chatswood is contained to the lower levels of mixed-use developments where there is a concentration of residential accommodation. The demand for this space and the quantum included within a particular development has been very much driven by location and quality of improvements. As noted earlier, there is a concentration of medical suite occupiers in and around the intersection of Albert Avenue and Archer Street and this has driven the development of more medical strata suites, however it has always been in conjunction with residential apartments, which are viewed as the higher and better use and a more risk averse development option.

To a large extent, the inclusion of office strata suites has been to cater for councils' desire for mixed use development and employment uses in conjunction with residential.

We detail below some recent office strata activity within the Chatswood market. It has been evident within Chatswood over the last 20 years that residential is the enabler for other users to be included within development, which in isolation would not be feasible. Examples include:

- Era Apartments, 7 Railway Street, Chatswood (294 apartments and 4,900 sqm of strata office)
- 63 Archer Street, Chatswood (8 storey apartment building with ground retail and commercial suites on Level 1)
- 38 Albert Avenue, Chatswood (mixed use development inclusive of residential apartments, a Quest Hotel and medical centre/day surgery)
- Epica Apartments, 9 Railway Street, Chatswood (221 residential units with two levels of commercial)
- Altura Apartments, 11 Railway Street, Chatswood (137 residential units, with five commercial units over two levels)

209/1 Katherine Street, Chatswood

Sale Date	**March 2020**	**Sale Price**	**$738,000**
Car Parking	**N/A**	**Parking Ratio**	**N/A**
Lettable Area	**77 m²**	**Rate PSM (Lettable)**	**$9,584**
		Rate PSM (ex. Parking)	**$8,545**
Passing Net Rent	**N/A**	**Net Initial Yield**	**N/A**
Market Net Rent	**$32,340 pa**	**Equivalent Yield**	**4.20%**

Description: Legally described as Lot 209/SP62325. A strata titled upper level commercial office suite within a circa 2000, high rise, mixed use development comprising lower level commercial/retail, upper level residential units and basement parking. This property comprises an irregular shaped lot including a lock up garage and additional storage area on title. Assessed at $80,000 per car space to derive a rate excluding parking.

Occupancy Comments: This property reportedly sold with vacant possession.

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Suite 506, 7 Railway Street, Chatswood "Era"

Sale Date	August 2019	Sale Price	$938,000
Car Parking	1 space	Parking Ratio	74
Lettable Area	74 m²	Rate PSM (Lettable) Rate PSM (ex. Parking)	$12,675 $11,662
Passing Net Rent	N/A	Net Initial Yield	N/A
Market Net Rent	$34,310 pa	Equivalent Yield	3.54%

Description: Legally described as Lot 33/SP88549. A strata titled commercial office suite within 'Era', an upper level commercial office suite within a circa 2014, high rise, mixed use development comprising lower level commercial/retail, upper level residential units and basement parking. This property comprises a rectangular shaped lot situated on the fourth floor having a westerly aspect providing good natural light. 1 x single basement car space on a separate title – Assessed at $75,000 per car space to derive a rate excluding parking.

Occupancy Comments: This property reportedly sold with vacant possession.

Lot 11, 82-86 Pacific Highway, St Leonards, "Garden Mews"

Sale Date	December 2018	Sale Price	$1,300,000
Site Area	N/A	Rate PSM (exc. Car)	$5,263*
Lettable Area	209 m²	Rate PSM (inc. Car)	$6,220
Passing Net Rent	N/A	Net Initial Yield	N/A
Market Net Rent	$71,720 pa	Equivalent Yield	5.27%

Description: Legally described as Lot 11/SP34757. A strata titled, part three level commercial terrace within 'Garden Mews', a circa 1983, complex of 12 commercial strata units of two and three storeys with allocated basement and on grade parking. Provides three levels of office accommodation with internal amenities and features courtyard and balcony (estimated to be approximately 15 sqm). Benefits from 2 x tandem car spaces and 1 x single car spaces with total parking provisions for 5 x cars. **Parking component assessed at $200,000 to derive a rate excluding parking.*

Occupancy Comments: This property reportedly sold with vacant possession.

Suite 310, 7 Railway Street, Chatswood "Era"

Sale Date	November 2018	Sale Price	$780,000
Site Area	N/A	Rate PSM (exc. Car)	$10,540
Lettable Area	74 m²	Rate PSM (inc. Car)	N/A
Passing Rent	N/A	Net Initial Yield	N/A
Market Rent	$34,040 pa	Equivalent Yield	4.18%

Description: Legally described as Lot 25/SP88549. A strata titled commercial office suite within 'Era', an upper level commercial office suite within a circa 2014, high rise, mixed use development comprising lower level commercial/retail, upper level residential units and basement parking. This property comprises and irregular shaped corner lot situated on the Third Floor providing good natural light. No parking provisions.

Comments: The property was sold with vacant possession.

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Lot 22, 1-3 Havilah Street, Chatswood

Sale Date	**August 2018**	**Sale Price**	**$676,000**
Site Area	**N/A**	**Rate PSM (exc. Car)**	**$6,082***
Lettable Area	**98 sqm**	**Rate PSM (inc. Car)**	**$6,897**
Passing Rent	**N/A**	**Net Initial Yield**	**N/A**
Market Rent	**$35,280 pa**	**Equivalent Yield**	**4.96%**

Description: Legally described as Lot 19/SP69904. This comprises a strata titled commercial unit within a circa 2002, 3-storey building consisting of five commercial units across the basement/ground level, 18 residential units across Levels 1 & 2 and two levels of basement parking. An irregular shaped lot situated on the ground floor to the rear of the development having no street exposure and poor exposure to natural light. Benefits from 2 x car spaces on title. **Parking component assessed at $80,000 to derive a rate excluding parking.*

Comments: The property was sold with vacant possession.

What is evident from the sales provided is that residential is by far the higher and better use in the Chatswood CBD, transacting at higher values when compared to the office investment market.

The strata market is currently dominated by investors, with CBRE experiencing enquiry from investors who are seeking well-located properties returning strong yields. Owner occupiers appear to be more price sensitive as they are focused on the suitability of the space for their business requirements and need to consider capital costs if further fitout works are required.

Importantly, having residential underpinning a development enables the early delivery and inclusion of alternative uses such as office and retail. Within Chatswood, the disposal of the Quest Hotel and medical centre which form part of 63 Archer Street, Chatswood prior to practical completion de-risked the project for the developer. However, their development was only feasible as they formed part of a larger predominantly residential mixed-use scheme.

In St Leonards, the inclusion of residential has been key to commencing the development of 500 Pacific Highway, which comprises 495 apartments, together with a non-residential podium. Furthermore, St Leonards Square recently achieved practical completion in 2019 and comprises approximately 500 residential units with ancillary commercial and retail uses. An excess of 4,000 sqm of commercial strata was sold off the plan, comprising 32 suites ranging in size from 60 sqm to 200 sqm. The retail was underpinned Virgin Active with a lease of 10+5+5 years secured. It was subsequently sold prior to practical completion in July 2019 for circa $11.6 million.

The inclusion of residential within these schemes was key to the funding and offsetting of risk associated with the retail and office uses, which would not have been viable in isolation.

With respect to the evidence provided the market reflects rates of $6,000 to $12,000 for suites up to 200 sqm in size, and lower rates for larger areas in excess of 250 sqm.

In the context of the subject property, circa 15,351 sqm of strata would need to a substantial number of investors and owner-occupiers (i.e. in excess of 100 if an average of 150 sqm is adopted). For those strata suites to be attractive to investors, tenants will need to be secured, which creates an additional layer of development risk. Regardless, this would appear to be an oversupply to the Chatswood market.

Accordingly, we consider a mixed-use scheme to be the most appropriate for the subject property, with ground level retail and minimal office. Consideration should be given to the quantum of commercial included to ensure it does not detract from the residential component and more importantly, that it is not of a size that would be difficult for the market to absorb.

Given the proximity of the site to Westfield Chatswood which is directly opposite, a retailing outcome for the lower levels would not only appear to be in keeping with the surrounding area and uses, but a lower risk option. We would also expect retail to be highly sought after by tenants and investors alike.

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Mirvac has previously been successful in developing residential apartments in the Chatswood CBD and therefore the only perceptible risk apart from a general downturn in the residential market, would be a prolonged period in which to sell down the commercial strata component.

7.0 SYDNEY METROPOLITAN OFFICE MARKET

The Sydney metropolitan office market comprises North Sydney, North Ryde/Macquarie Park, Crows Nest/St Leonards and Chatswood on the north, Parramatta, Rhodes, Sydney Olympic Park to the west and Norwest to the north west.

Epping, Burwood, Strathfield, Hurstville, Campbelltown and Bankstown have diminished in recent years with the withdrawal of stock for residential conversion, whilst Liverpool has been able to secure leases to the NSW State Government, together with the Wollongong and Western Sydney Universities in recent times. However, it remains a minor office market by comparison and the main centres previously noted have benefited from stock withdrawal from these markets.

The following table highlights the growth in stock in key suburban office market since 1990 when the PCA commenced tracking them. The only exception to this is Macquarie Park, where data has only been tracked since 2005.

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Market		Market Size (sqm)	Increase in Area (sqm)	(%)
Chatswood	Jan-90	225,271 sqm		
	Jan-20	274,478 sqm	49,201 sqm	17.9%
Crows Nest /St Leonards	Jan-90	263,515 sqm		
	Jan-20	309,627 sqm	46,112 sqm	14.9%
North Sydney	Jan-90	768,667 sqm		
	Jan-20	821,132 sqm	52,456 sqm	3.1%
Macquarie Park	Jan-05	527,920 sqm		
	Jan-20	859,034 sqm	331,114 sqm	38.5%
Parramatta	Jan-90	389,860 sqm		
	Jan-20	768,421 sqm	378,561 sqm	49.3%

Whilst Chatswood has increased in size by 17.9% since January 1990, as noted earlier its size has remained stagnant since the mid-1990s. In terms of size, the increase of 49,201 sqm is the lowest across the suburban office market apart from Crows Nest/St Leonards, however this does not take into account the recent completion of 1 Reserve Road which will add a further 28,153 sqm to this market on completion in H2 2020. As a result, this market will be 337,780 sqm and would have grown by 28.2% since 1990.

North Sydney will be in excess of 900,000 sqm with the completion of 118 Mount Street and 1 Denison Street in the next six months, while substantial developments are planned in the next five years which will increase its size above one million square metres.

We consider the main reasons for the growth in certain suburban office markets to be in no particular order:

- A critical mass and variety of stock which meets the needs of a diverse range of users.
- A concentration of like-minded industries. For example, Macquarie Park is now recognised as Sydney's premier business park precinct, having evolved from its initial industrial base to become a mature commercial office location. It has attracted a critical mass of electronic, scientific, computing, medical and pharmaceutical companies which operate independently and in conjunction with Macquarie University.
- Office markets which have grown substantially in the last 25 years, benefiting from significant improvements in infrastructure. For example, Macquarie Park has benefitted from the M2 Motorway and the Lane Cove Tunnel which link the Gore Hill/Warringah Freeway and Sydney CBD. The M2 has been expanded from four to six lanes between Windsor and Lane Cove Roads and includes additional access ramps at Herring Road which have improved access to Macquarie Park and eased congestion to Epping Road.
- More recently the Epping to Chatswood rail line became operational and provides a significant public transport link to the area, a key component which most other business parks lack.
- In addition, Macquarie University Hospital opened in June 2010. It is Australia's first campus-based university hospital and forms part of an integrated medical community. In proximity to the hospital is the Australian Hearing Hub which is located within the Macquarie University Research Park.
- As markets have grown they have been able to develop new office stock which caters for the needs of the users (i.e. Suburban markets have a concentration of campus style buildings of circa six to ten levels in size with floor plates in excess of 1,000 sqm).
- Lower occupancy costs which have been a key consideration for emerging industries which are seeking cost containment. Macquarie Park, Rhodes and Sydney Olympic Park have historically had lower rents and outgoings in comparison to Chatswood.
- Population growth has been concentrated in the west and north west which has benefited Parramatta, Macquarie Park, Sydney Olympic Park and Rhodes.
- Commonwealth and NSW State Government policy is geared towards relocating to suburban office locations, albeit within buildings which meet their wellness targets and NABERS rating requirements.

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Interestingly the markets which have grown most over the last 20 years, being Parramatta and Macquarie Park have had contrasting drivers. Parramatta up until recently has been able to offer new office developments at a comparable rental to Chatswood, with overall lower occupancy costs. Therefore, the quality of improvements, costs, proximity to amenity and public transport has been key considerations for tenants.

We would also suggest the economic rent required to commence development in Chatswood is higher than Parramatta, Sydney Olympic Park, Rhodes and Macquarie Park, thereby placing it at a distinct comparative disadvantage.

It is important to note, that whilst Chatswood provides a major railway station which is serviced by the Northern & Western lines, it is not necessarily easily accessible from the west, south or east of metropolitan Sydney. This has been a limitation to the desirability of Chatswood as an office location, which has been to the benefit of Parramatta as evidenced by the success of Parramatta Square which is being developed by Walker Corporation.

Chatswood and St Leonards to a lesser extent have been limited by their lack of critical mass, being markets of approximately 300,000 sqm in size. Moreover, 67% of stock within St Leonards is of a secondary nature (i.e. B, C and D Grade) which has not been readily accepted by the market. Conversely, Chatswood has first generation A Grade accommodation with small floorplates which has been attractive for smaller users as opposed to large corporate occupiers. However, the latter are needed to underpin office developments. These markets have had an opportunity to restock over the last 20 years, however the lack of tenant demand an inhibition to further office development.

It is only those buildings such as Zenith Centre and 475 Victoria Avenue which have been able to retain larger, corporate tenants as noted below. However, they are expected to come under pressure as leases expire.

Tenant	Building	Area (sqm)	Expiry
Transport for NSW	Zenith Centre	8,376	2020-2027
AUSTRAC	Zenith Centre	4,232	2022
PNSW / Healthshare NSW	Zenith Centre	11,445	2020-2027
Lendlease	Zenith Centre	3,120	2023
Reed Elsevier Australia	475 Victoria Avenue	8,231	2020-2025
Leighton Contractors Pty Ltd	475 Victoria Avenue	2,733	2021
Ventia	475 Victoria Avenue	3,694	2023

Moving forward, the markets where there is a concentration of the population with scope for growth such as Parramatta will continue to expand. These markets have and will continue to benefit from the current NSW State Government's decentralisation and transport infrastructure (both public and private) policies. As it comes into greater effect, we expect strong demand for office space in the metropolitan markets over the medium to long term. However, it will be strategic and limited supply of prime space entering the market and lack of tenant pre-commitments may hinder net absorption.

We would expect government departments to commit to new developments given their requirements and minimum standards for sustainable buildings and Parramatta rents are at a level to make this attractive.

The Sydney CBD fringe area spans the suburbs of East Sydney, Eveleigh, Darlinghurst, Surry Hills, Pyrmont, Redfern, Ultimo and Chippendale. The office market has continued to emerge as a viable office location, attracting tenants such as CBA to Australian Technology Park (ATP) and Domain to 100 Harris Street.

It continues to evolve and now caters for an increasing number of new industries, including start-ups and new businesses in the IT sector and co-working operators such as Canva and Hub Sydney. The location benefits from its proximity to the Sydney CBD, retail amenity and public transportation. Central Rail and Bus Interchange as well as the

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recently completed Sydney Light Rail provide convenient accessed from the north, east, south and west of metropolitan Sydney, together with regional locations such as the Illawarra and Blue Mountains.

Moving forward, the Sydney CBD Fringe office market will benefit from increased supply, with some 200,000 sqm of office space earmarked for development in and around Central Railway Station. Atlassian has announced it will commit to the world's tallest hybrid tower as part of a new technology precinct. The 40-storey tower has a cost estimation of $1 billion and is due for completion by 2025.

In addition, Dexus and Frasers Property Australia in partnership, have secured approval for their Central Place Sydney proposal to move to Stage 3 under the NSW Government's Unsolicited Proposal (USP) process. This is a significant office development, with the partnership proposing a circa $2.5 billion investment that will transform the western edge of Central Station.

The proposal includes:

- Up to 150,000 sqm of workspace across two towers and a podium building, underpinning the delivery of the Sydney Innovation and Technology Precinct
- An Integrated Distribution Facility that unlocks future over-station development, facilitating the renewal of Central station
- A comprehensive public realm of improvements that will redefine the experience of over 20 million pedestrians every year.

It will be difficult for secondary markets such as Chatswood to compete for lease pre-commitments with these projects, given the location and proposed improvements are inferior overall.

8.0 CONCLUSION

Whilst leasing activity in Chatswood has improved over the last 12 to 18 months, it fundamentally remains a fragile office market, prone to sustained periods of stagnant face rental growth, elevated vacancy and incentives. This will only be exacerbated by the detrimental impact of COVID-19 over the coming months.

Chatswood fundamentally lacks a critical mass of quality office stock to underpin office development, and it is questionable whether the required tenant demand exists to justify its development.

Given the locational attributes of the site and the dynamics of the Chatswood CBD outlined in this document, It is clear that a mixed-use outcome of the subject site is the second most suitable option, with residential being the highest and best use and most suitable in the context of the surrounding area.

We note that Mirvac have proposed a mixed-use scheme, with approximately 16,000 sqm of non-residential net lettable area. We consider the quantum of non-residential net lettable area to be excessive. The more optimal outcome in this location is considered to be 10,000 sqm net lettable area. However, even at this size, there will be significant challenges in obtaining lease pre-commitments, achieving viable economic rents and incentives required to underpin development, letting up vacant space and achieving a viable return on costs.

Importantly, having residential underpin a development enables the early delivery and inclusion of alternative uses such as office and retail. The development of these alternative uses is only feasible when they form part of a larger, predominantly residential mixed-use scheme.

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We trust the analysis herein is satisfactory for your purposes. Should you require any further assistance please do not hesitate to contact the undersigned on +61 2 9333 3348.

Yours sincerely

CBRE Valuations Pty Limited

Michael Pisano
Senior Director
Valuation & Advisory Services

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Appendix D Traffic Assessment

45 Victor Street and 410-416 Victoria Avenue, Chatswood

Planning Proposal – August 2020
Transport Assessment

Prepared by: GTA Consultants (NSW) Pty Ltd for Mirvac
on 10/08/2020
Reference: N109842
Issue #: B

GTAconsultants

45 Victor Street and 410-416 Victoria Avenue, Chatswood

Planning Proposal – August 2020
Transport Assessment

Client: Mirvac

on 10/08/2020

Reference: N109842

Issue #: B

Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
A	07/08/2020	Final	Ashish Modessa	Brett Maynard	Brett Maynard	Brett Maynard
B	10/08/2020	Final – minor amendments	Ashish Modessa	Brett Maynard	Brett Maynard	

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1. INTRODUCTION

1.1. Background

In December 2016, GTA Consultants prepared a transport assessment for a planning proposal that was lodged with Willoughby City Council for the land occupied by the former Chatswood Post Office and retail shops at 45 Victor Street and 410-416 Victoria Avenue, Chatswood. In April 2017, GTA completed a review of Post Office Lane and the site access in response to feedback received from Council on the proposal.

Mirvac has commissioned GTA to complete a transport assessment to accompany a revised Planning Proposal to be lodged with Council, which seeks to rezone the site in accordance with the controls outlined in the revised Planning Proposal report.

1.2. Purpose of this Report

This report sets out an assessment of the anticipated transport implications of the planning proposal, including consideration of the following:

1. existing traffic and parking conditions surrounding the site
2. suitability of the proposed parking in terms of supply (quantum) and layout
3. service vehicle requirements
4. pedestrian and bicycle requirements
5. the traffic generating characteristics of the planning proposal
6. suitability of the proposed access arrangements for the site
7. the transport impact of the planning proposal on the surrounding road network.

1.3. Reference

In preparing this report, reference has been made to the following:

- inspections of the site and its surrounds
- Willoughby City Council Development Control Plan (WDCP) 2006
- Willoughby City Council Local Environmental Plan (WLEP) 2012
- relevant Australian Standards including, AS 2890.1:2004, AS 2890.2:2002 and AS 2890.6:2009
- historic traffic and car parking surveys undertaken by GTA Consultants
- indicative layout plans for the planning proposal, prepared by Mirvac Design
- other documents and data as referenced in this report.

2. EXISTING CONDITIONS

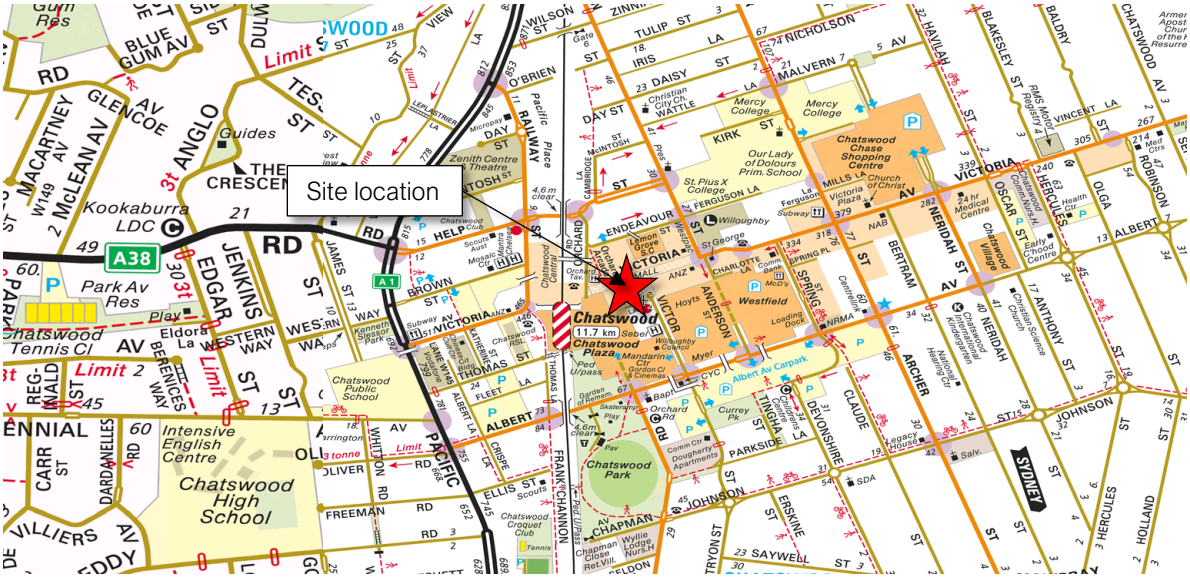
2.1. Site Location

The site is located near the end of Victor Street in Chatswood. The site of 2,297 square metres has a frontage of 70 metres to Victor Street and 30 metres to Victoria Avenue. Under Willoughby City Council LEP 2012 the site is classified 'B3 Commercial Core'.

The site is located within the Chatswood CBD with surrounding properties including predominantly retail, commercial and high-density residential uses. The pedestrian-only section of Victoria Avenue is located north of the site with Westfield Chatswood and the Mandarin Centre also located on Victor Street in close proximity to the site. A number of residential properties are located on Victor Street, the largest of which is The Sebel Residences accommodating approximately 200 residential and serviced apartments. Willoughby City Council offices are also located within this building, south of the site.

The location of the subject site and its surrounding environs is shown in Figure 2.1.

Figure 2.1: Subject Site and Its Environs



Basemap source: Sydway

2.2. Road Network

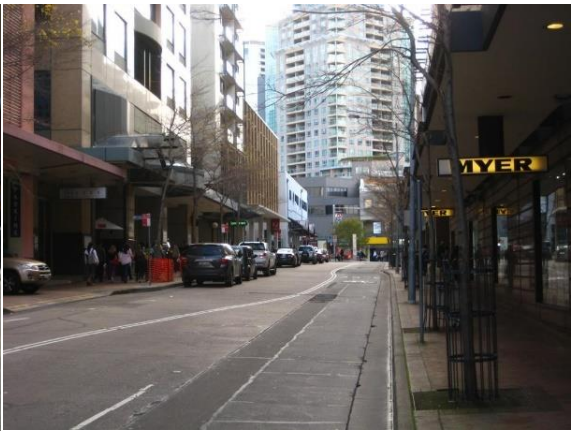
Victor Street

Victor Street is a local road aligned in a north-south direction. It is a two-way, no-through road with a nine-metre-wide carriageway, set within an approximately 13-metre-wide road reserve, configured with one lane in each direction. Traffic calming measures are located along the length of Victor Street and include speed cushions. Kerbside parking is permitted on the western side of Victor Street, subject to time restrictions.

Victor Street is shown in Figure 2.2 and Figure 2.3.

Figure 2.2: Victor Street (looking south)

Figure 2.3: Victor Street (looking north)



Post Office Lane

Post Office Lane is a local road aligned in an east-west direction that provides vehicle access to the rear of the properties fronting the Victoria Avenue pedestrian mall. It is a two-way, no-through road with a six-metre-wide carriageway, set within an approximately eight-metre-wide road reserve. Post Office Lane is shown in Figure 2.4.

Albert Avenue

Albert Avenue is a local road aligned in an east-west direction. It is a two-way road with a 15-metre-wide carriageway, set within an approximately 21-metre-wide road reserve and configured with two lanes in each direction. Kerbside parking is not permitted on Albert Avenue in the vicinity of the site.

Albert Avenue is shown in Figure 2.5 and carries approximately 12,000 vehicles per day[1].

Figure 2.4: Post Office Lane (looking west)

Figure 2.5: Albert Avenue (looking east)

2.3. Previous Transport Studies

GTA Consultants prepared an Aimsun traffic model as part of the redevelopment of the Chatswood Chase[1] shopping centre. This Aimsun traffic model covered an extensive area within the Chatswood CBD, including intersections along Albert Avenue between Pacific Highway and Archer Street. Transport for NSW (formerly Roads and Maritime Services) endorsed the Aimsun model as part of the development approval, with an amending DA submitted in late 2019 proposing less additional retail GFA than that previously approved. Transport for NSW has also endorsed the amending DA. The reports accompanying the Aimsun traffic model have been reviewed and key assumptions used within this study.

Based on the historic data and anecdotal evidence of other similar areas, the Transport Modelling Report[2], as supported by Transport for NSW, concluded that it is reasonable to expect that passing traffic in the Chatswood CBD may indeed decline in the future. Therefore, no growth rate on the external road network (i.e. non-development traffic) was adopted for the Aimsun traffic model.

2.4. Traffic Volumes

GTA Consultants has historically completed various peak hour traffic movement counts along the Albert Avenue corridor between Pacific Highway and Victor Street. A summary of these counts is presented in Table 2.1.

Table 2.1: Traffic Volume Sources

Peak Hour	Intersection				Date
	Victor St/ Albert Ave (Signals)	Orchard Rd/ Albert Ave (Signals)	Thomas Ln/ Albert Ave (Signals)	Pacific Hwy/ Albert Ave (Signals)	
Thursday AM Peak Hour	✓	-	-	-	11 September 2014
Thursday PM Peak Hour	✓	✓	✓	✓	18 September 2014
Saturday Peak Hour	✓	-	-	-	17 August 2013
Saturday Peak Hour	-	✓	✓	✓	13 September 2014

It is noted that the corridor is less congested during the morning peak hour, reflective of the surrounding retail land uses, and as such, less extensive traffic surveys have been completed during the morning peak hour.

Consistent with the Aimsun traffic modelling prepared by GTA Consultants as part of the redevelopment of Chatswood Chase (discussed in Section 2.3), no background traffic growth rate has been adopted for this assessment. Notwithstanding and as detailed in Section 6.3, other nearby developments constructed since the traffic surveys were completed or proposed immediately near the site have been considered for the modelling presented in this study. Therefore, this methodology is considered appropriate for the revised planning proposal, with any updated turning movement count surveys only necessary as part of any future development application.

[1] Chatswood Chase Development Application Transport Impact Assessment, GTA Consultants, 3 August 2018
[2] Chatswood Chase Development Application Transport Modelling Report, GTA Consultants, 31 May 2018

The Thursday and Saturday peak hour traffic volumes are summarised in Figure 2.6 to Figure 2.8.

Figure 2.6: 2014 Thursday AM Peak Hour Traffic Volumes

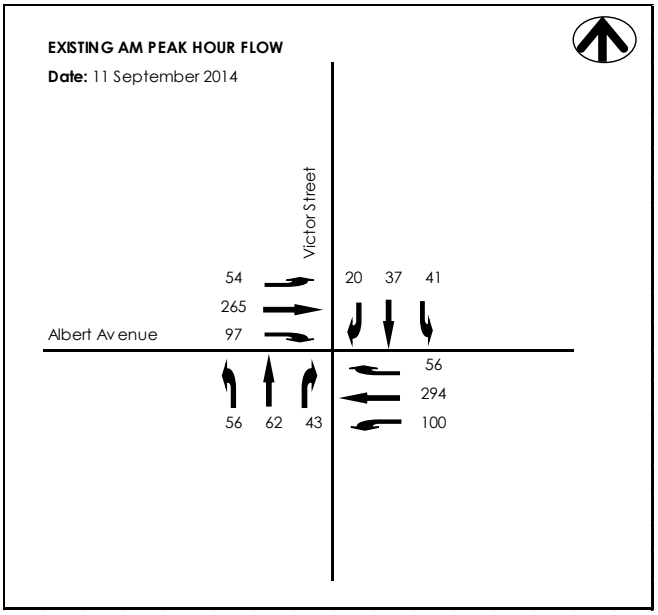


Figure 2.7: 2014 Thursday PM Peak Hour Traffic Volumes

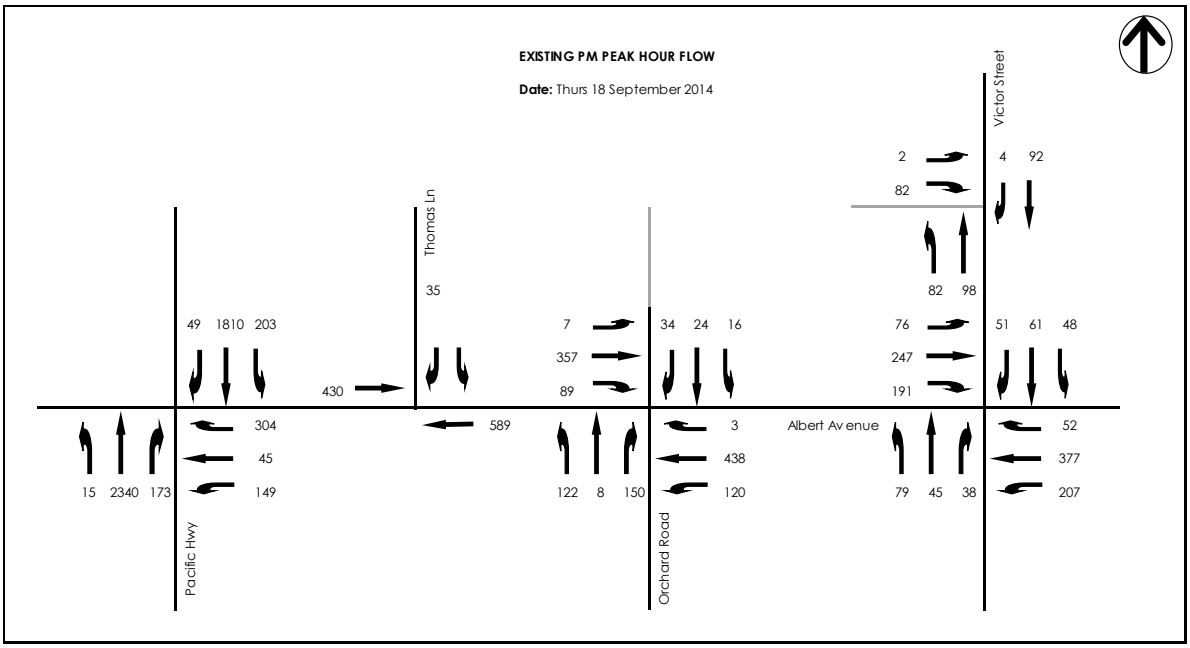
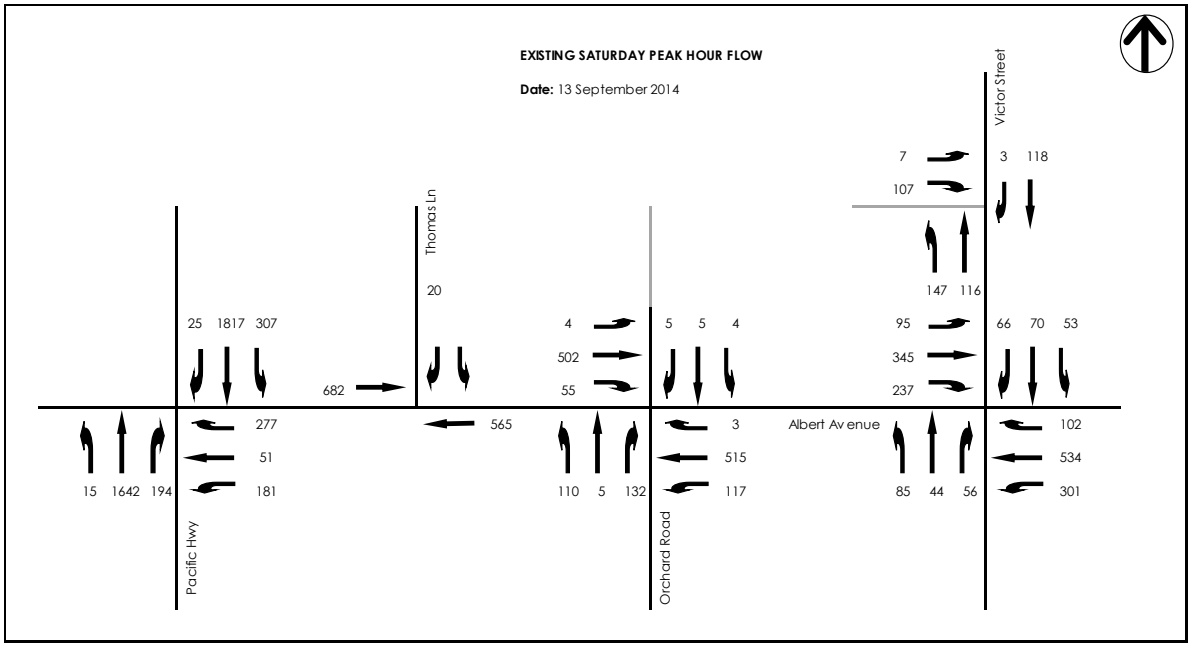


Figure 2.8: 2014 Saturday Peak Hour Traffic Volumes



2.5. Intersection Operation

The operation of the key intersections was assessed using SIDRA INTERSECTION[3], a computer based modelling package which calculates intersection performance.

The commonly used measure of intersection performance, as defined by Transport for NSW (TfNSW), is vehicle delay. SIDRA INTERSECTION determines the average delay that vehicles encounter and provides a measure of the level of service.

Table 2.2 shows the criteria that SIDRA INTERSECTION adopts in assessing the level of service.

Table 2.2: SIDRA INTERSECTION Level of Service Criteria

Level of Service (LOS)	Average Delay per vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way & Stop Sign
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Near capacity	Near capacity, accident study required
E	57 to 70	At capacity, at signals incidents will cause excessive delays	At capacity, requires other control mode
F	Greater than 70	Extra capacity required	Extreme delay, major treatment required

[3] Program used under license from Akcelik & Associates Pty Ltd.

Table 2.3 presents a summary of the operation of the intersections, with full results presented in Appendix A.

Table 2.3: 2014 Intersection Operating Conditions

Intersection	Peak	Degree of Saturation (DOS)	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
Albert Ave/ Victor St	Weekday AM	0.22	16	32	B
	Weekday PM	0.40	14	33	A
	Saturday	0.68	16	56	B
Albert Ave/ Orchard Rd	Weekday PM	0.57	16	69	B
	Saturday	0.43	18	67	B
Albert Ave/ Thomas Ln	Weekday PM	0.36	5	31	A
	Saturday	0.42	4	62	A
Albert Ave/ Pacific Hwy	Weekday PM	1.07	34	521	C
	Saturday	1.34	46	245	D

Table 2.3 indicates that the Pacific Highway/ Albert Avenue intersection operates at capacity. The surrounding intersections operate within the relevant theoretical capacities, with intersection Levels of Service of B or better.

2.6. Car Parking

GTA compiled an inventory of publicly available on-street parking along Victor Street and Post Office Lane. The inventory identified a total of five on-street car parking spaces along Victor Street, including three ¼P spaces (two of which are No Parking 6:30-9:30am and 3:30-6:30pm) and two disabled spaces. A motorcycle parking zone is provided on Post Office Lane; whilst a loading zone is also available on Victor Street, adjacent to The Sebel hotel.

Car parking observations indicate that most Victor Street parking spaces are typically occupied, with little to no vacancies during the morning and afternoon peak periods.

It is also noted that the site is located near four publicly accessible off-street car parks as summarised in Table 2.4.

Table 2.4: Public Off-Street Parking Summary

Location	Distance to Site	Number of spaces (approx.)
Mandarin Centre	50m	300
Chatswood Concourse	150m	400
Westfield Chatswood	200m	2,800
Chatswood Chase	550m	2,550
Total		**6,050**

When previously operational (the Post Office site is currently vacant), existing on-site car parking was accessed via a six metre wide two-way access driveway from Post Office Lane along the northern boundary of the site, with vehicles also able to exit the site directly to Victor Street. This on-site parking area had capacity for five vehicles (reserved for Post Office staff), as well as a loading area for one service vehicle. The 410-416 Victoria Avenue site also has driveway access from Post Office Lane.

2.7. Public Transport

Existing Services

The site is serviced by a range of well-established and frequent public transport services. Chatswood Railway Station and the bus interchange is located approximately 100 metres to the west and less than a two-minute walk. It is served by the Northern, North Shore and Western Lines and the intercity Central Coast and Newcastle Line and provides high frequency services to most of the Sydney Trains network, including Sydney CBD and North Sydney.

Chatswood is also a major node as part of the Sydney Metro Northwest rail link which links Chatswood to Schofields via Epping and Castle Hill with four-minute turn-up and go services.

Chatswood Interchange functions as one of the main bus interchanges in the northern suburbs of Sydney with at least 20 separate bus routes serviced by two bus operators, State Transit and Transdev, servicing key destinations including Sydney CBD, Manly, Lane Cove, Bondi Junction and Macquarie Park.

The site is also located within close proximity to taxi services with the nearest designated taxi rank located on Victoria Avenue, approximately 250 metres west of the site (west of the railway line).

Sydney Metro City & Southwest

Sydney Metro is Australia's largest public transport project. From the north west, metro rail is being extended under Sydney Harbour, through new underground city stations and beyond to the south west. In 2024, Sydney will have 31 metro railway stations and a 66-kilometre standalone metro railway system, revolutionising the way Australia's biggest city travels.

Of specific relevance to Chatswood Station are the following project features:

- an air-conditioned metro train every four minutes in the peak
- improved CCTV surveillance, platform screen doors, platforms level with train floors, minimal gaps between platforms and trains
- new or upgraded concourses and new station entries
- improved station interchange facilities
- less time spent waiting due to higher frequency services
- reduced travel times to key employment and education precincts
- new, direct and fast services to Martin Place, Barangaroo, North Sydney, Chatswood and Macquarie Park

On this basis, it can be expected that travel to Chatswood by rail will increase, with the Chatswood CBD benefiting from being a key interface with this infrastructure.

2.8. Pedestrian and Bicycle Infrastructure

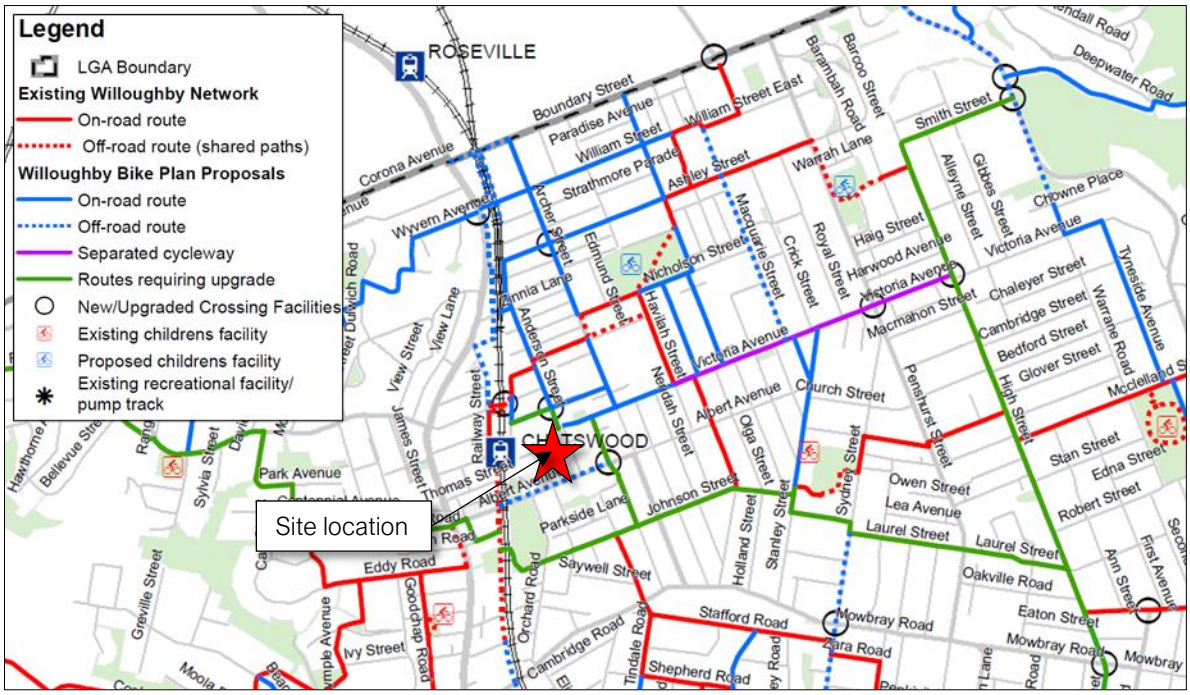
Pedestrian paths are located as follows:

- Victor Street (both sides) – 3-4.5 metres wide path providing access to the pedestrianised section of Victoria Avenue, Westfield and Chatswood Interchange
- Post Office Lane (southern side) – 1.5 metres wide path
- Albert Avenue (both sides) – 2-3 metres wide path.

Formal crossing points near the site include pedestrian crossings on all legs of the Victor Street/ Albert Avenue intersection. Generally, Chatswood CBD has well established pedestrian facilities with Victoria Avenue providing a mall at the northern end of Victor Street that provides convenient and safe access to/ from Chatswood Interchange and beyond.

The site is also well serviced by surrounding cycling infrastructure. The existing and proposed cycling network from the Willoughby Bike Plan is shown in Figure 2.9.

Figure 2.9: Surrounding cycling network



Base source: Willoughby Bike Plan (2012)

End-of-trip facilities are available in close proximity to the site as follows:

- four cycle racks in Victor Street pedestrian area – 10 metres from site. (see Figure 2.10)
- two cycle racks on Victor Street – 50 metres from site (see Figure 2.11)
- two cycle racks on Albert Avenue – 70 metres from site
- cycle lockers at Chatswood Interchange – 120 metres from site.

The majority of these facilities are conveniently located, and the high pedestrian activity offers good passive surveillance.

The future Development Application will outline further proposals to provide bicycle parking/ storage and end of trip facilities to support the increasing demand within the Chatswood CBD.

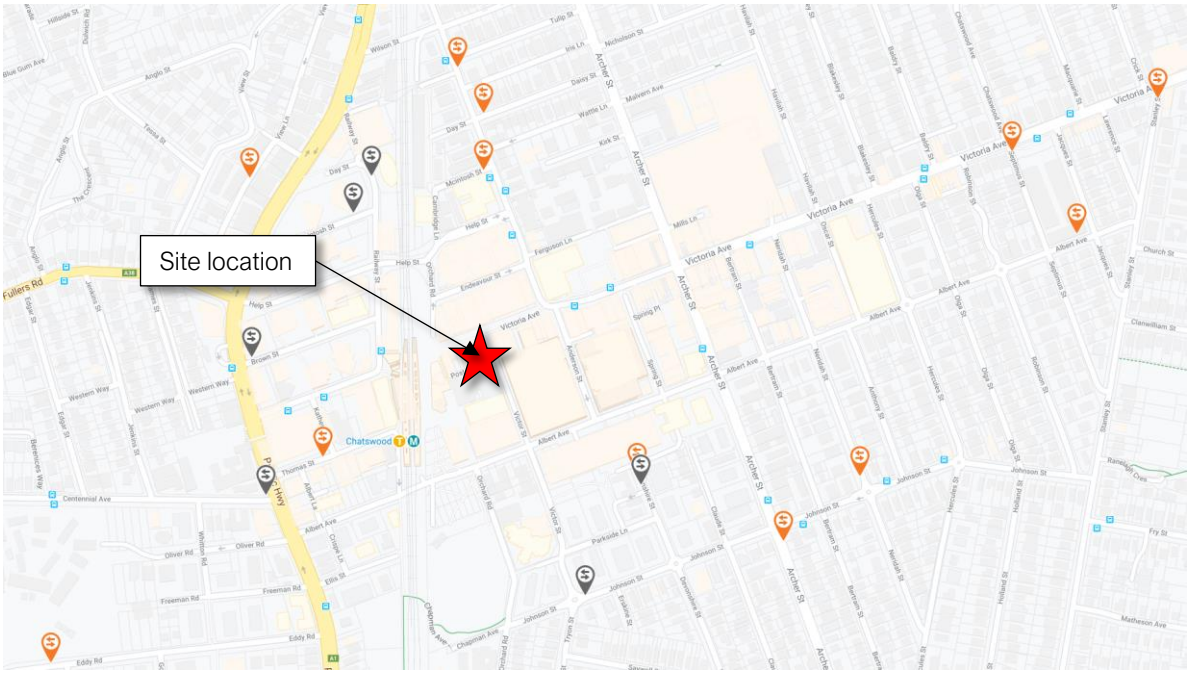
Figure 2.10: Victor Street Pedestrian Area Cycle Racks

Figure 2.11: Victor Street Cycle Racks

2.9. Local Car Sharing Initiatives

Several Go-Get car sharing pods are located in the vicinity of the site as shown Figure 2.12.

Figure 2.12: Go-Get Car Share Locations



Base source: GoGet accessed 8 July 2020

3. PLANNING PROPOSAL

3.1. Land Uses

The indicative Planning Proposal schedule is summarised in Table 3.1.

Table 3.1: Planning Proposal Schedule (Indicative Only)

Use	Type	No./ Area	Mix
Residential	1 bedroom	125	40%
	2 bedroom	157	50%
	3 bedroom	31	10%
	Subtotal	**313**	**100%**
Non-residential	Retail	745m^2 GFA	-
	Commercial	17,619m^2 GFA	-
	Subtotal	**18,364m^2 GFA**	-

3.2. Parking and Loading

It is proposed to provide a single crossover to the site from Victor Street (the vehicle access will cater for both private and loading vehicle movements).

The planning proposal has an indicative on-site car parking supply of 381 car parking spaces across nine basement levels. This includes 321 residential spaces, 55 spaces for non-residential (for commercial and retail staff only) and five spaces for car share vehicles (i.e. GoGet). No residential visitor parking is proposed.

A loading area (with a turntable), is proposed on basement level 1 that is capable of accommodating at least two service vehicles (up to an 8.8m medium rigid vehicle) at a time.

3.3. Pedestrian and Cycle Facilities

Pedestrian access to the residential and commercial uses would be via separate lobby areas accessed from the Victor Street and Victoria Avenue frontages, respectively. Pedestrian access to the ground floor retail tenancies would be provided from all street frontages.

As this is a planning proposal the indicative layout plans do not contain details of bicycle facilities. Bicycle facilities will be covered in more detail during the Development Application stage.

4. SUSTAINABLE TRANSPORT ASSESSMENT

4.1. Preamble

This chapter discusses potential for further measures that could encourage alternative means of travel to the private car and encourage the use of more environmentally sustainable forms of travel.

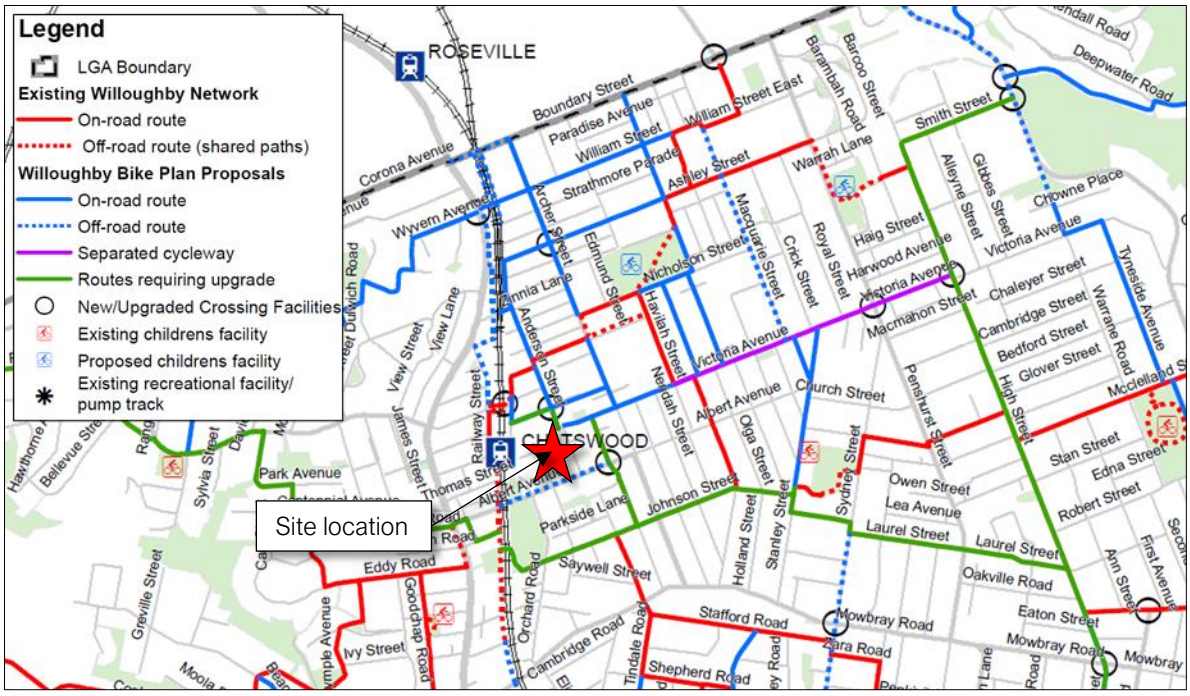
4.2. Bicycle Network

Willoughby Bike Plan (2012) identified and prioritised proposed cycle routes to be implemented in Willoughby LGA including the following two on-road routes in Chatswood CBD:

- Anderson Street and Ashley Street Bike Route (Route 3, medium priority)
- Chatswood CBD Access Bike Routes (Route 4, high priority).

These proposed cycle routes will improve cycling accessibility in and around Chatswood CBD and are shown in Figure 4.1.

Figure 4.1: Willoughby Bike Plan Proposed Cycle Routes



Source: Willoughby Bike Plan (2012)

4.3. Bicycle End of Trip Facilities

Willoughby Development Control Plan (WDCP) 2006 provides the following general requirements for bicycle parking as follows:

1. enable wheels and frame to be locked to the device without damaging the bicycle
2. be placed in public view and well-lit for security purposes
3. be in a convenient and accessible location outside pedestrian and vehicular movement paths
4. be protected from the weather.

The specific guide for bicycle parking facilities in WDCP 2006 for the relevant land uses are summarised in Table 4.1.

Table 4.1: WDCP Bicycle Parking Guide

Description	Suggested Parking Rate		No. of Dwellings/ GFA	Suggested Parking Provision	
	Bicycle Lockers	Bicycle Rails		Bicycle Lockers	Bicycle Rails
Residential	1 per 10 units	1 per 12 units	310 dwellings	31	26
Commercial	1 per 600m^2	1 per 2,500m^2	17,419m^2 GFA	29	7
Retail	1 per 450m^2	1 per 150m^2	747m^2 GFA	2	5
Total				**62**	**38**

Table 4.1 suggests that any future development application incorporate 62 bicycle lockers for residents/ employees and 38 bicycle rails for visitors.

Bicycle lockers for employees could be accommodated as bicycle racks within a secure cage facility to improve space efficiency and usage.

Bicycle lockers for use by residents should be included within the secure areas of the building noting that where security devices are provided for resident car parking, these are acceptable and can replace bike lockers.

Bicycle rails are intended for use by visitors/ employees and as such need to be located in publicly accessible areas near the site.

WDCP 2006 requires that the design of bicycle parking facilities be in accordance with AS2890.3.

It is anticipated that shower and change facilities will be either provided within a centrally located facility for all users or within individual commercial tenancies.

These items would be addressed as part of a future development application.

4.4. Pedestrian Network

The site is well connected to the existing pedestrian network with pedestrian paths provided on both sides of the roads immediately near the site. The site is located adjacent to Victoria Avenue pedestrian mall, an area of high pedestrian activity which provides access to key destinations within Chatswood CBD such as Chatswood Transport Interchange.

In addition, Post Office Lane provides a direct connection to the Chatswood Station retail area and the station itself.

4.4.1. Post Office Lane Upgrades

Previous discussions with Council in 2017 indicated a proposal to convert Post Office Lane to a shared zone given it is heavily used by pedestrians to link between Chatswood Railway Station and Chatswood Westfield.

At the time, GTA Consultants completed an assessment[4] of the laneway to understand existing pedestrian/ traffic volumes and vehicle types, as well as assessing the laneway against the *Safer Speeds Policy & Guidelines – Shared Zones* (Transport for NSW, July 2012) criteria for the installation of shared zones. It was found that the current arrangement meets the requirements for a shared zone.

Recent discussions indicate Council are developing a laneways strategy that includes Post Office Lane. Given Council has a current policy to protect service lanes for their intended function, any short to medium term proposal to convert it into a shared zone is made difficult given properties that front it and Victoria Avenue pedestrian mall rely on the laneway for service and delivery vehicle access (with associated reversing manoeuvres that are not ideal in a pedestrianised environment.

Notwithstanding, Council has advised that they are investigating potential short to medium term upgrades to the laneway to provide a higher level of pedestrian amenity. Mirvac proposes to contribute towards this improved pedestrian amenity as part of the development proposal, which can successfully interface with both the existing laneway and any future improvements.

4.5. Public Transport

As discussed previously, the site is easily accessible by public transport with Chatswood Interchange located 100 metres west of the site, which will encourage the use of public transport by residents and employees and discourage the use of private motor vehicles in the road network peak periods. The forthcoming Sydney Metro CBD and South West services, will further encourage the use of public transport (and particularly rail services).

4.6. Sustainable Travel Planning

4.6.1. Travel Plan Framework

Transport is a necessary part of life which has effects that can be managed. The transport sector is one of the fastest growing emissions sectors in Australia and therefore a robust travel plan provides an opportunity for reducing greenhouse gases, and for managing traffic congestion (which has adverse economic, health and social outcomes). As well as delivering better environmental outcomes, providing a range of travel choices with a focus on walking, cycling and public transport will have major public health benefits and will ensure strong and prosperous communities.

The physical infrastructure being provided as part of the proposal is only part of the solution. It is anticipated that a travel plan would be prepared prior to occupation of the development and is likely to be conditioned as part of any future DA. A travel plan will ensure that the transport infrastructure, services and policies both within and external to the site are tailored to the users and coordinated to achieve the most sustainable outcome possible.

[4] GTA Consultants '45 Victor Street, Chatswood – Post Office Lane and Site Access Review' dated 6 April 2017.

4.6.2. What is a Green Travel Plan?

A green travel plan (GTP) is a package of actions and strategies aimed at encouraging sustainable modes of transport such as walking, cycling, public transport and higher-occupancy car use for travel. The GTP for the proposed development will aim to mitigate travel by private car to allow people to carry out their daily business in a more sustainable manner. This includes:

- measures which encourage reduced car use (disincentives or 'sticks')
- measures which encourage or support sustainable travel (such as active transport, public transport and multi-occupant vehicle use)
- reduce the need to travel or make travelling more efficient (incentives or 'carrots').

A GTP would allow all users (visitors, residents, staff) to achieve the above outcomes by providing flexibility around how and when they travel. This is especially important in well planned precincts and town centre environments which attract a high number of visitors for a variety of reasons. As part of the proposal, a GTP would be implemented post-opening, which would tie in with the broader CBD to ensure consistency.

The travel plan will seek to:

- advise all users on the wider travel choices available to them and encourage use of sustainable travel modes
- aim to reduce congestion on the surrounding Chatswood CBD road network by causing a mode shift away from private vehicles, or at the very least encourage higher vehicle occupancy to reduce private vehicle trips.
- identify any wayfinding and public transport information (such as screens with 'next train/ bus' times) that would be beneficial for the site's interface with the adjacent public transport, walking and cycling networks.

4.6.3. Site Specific Measures

The following potential measures and initiatives could be implemented to encourage more sustainable travel modes:

1. Providing a Travel Access Guide (TAG) which would be provided to all residents and staff and publicly available to all visitors. The document would be based on facilities available at the site and include detail on the surrounding public transport services and active transport initiatives.
2. Providing public transport information boards/ apps to inform residents, staff and visitors of alternative transport options.
3. Providing car sharing pod(s) on-site or nearby and promoting the availability of car sharing pods for trips that require the use of private vehicles.
4. Providing bicycle facilities including secure bicycle parking for staff, bicycle racks/ rails for visitors and shower and change room facilities.
5. Encouraging staff that drive to work and park on surrounding roads to car-pool through creation of a car-pooling club or registry/ forum.
6. Regularly promoting ride/ walk to work days.
7. Providing a regular newsletter to all residents and staff bringing the latest news on sustainable travel initiatives in the area.

5. PARKING AND LOADING ASSESSMENT

5.1. Car Parking Requirements

5.1.1. Willoughby DCP 2006

The car parking requirements for different development types are set out in Willoughby DCP 2006. A review of the car parking rates and the floor area schedule results in a WDCP 2006 parking requirement for the planning proposal as summarised in Table 5.1.

Table 5.1: WDCP 2006 Car Parking Requirements

Description	WDCP Parking Rate	No. of Dwellings/ NLA (m^2)	WDCP Parking Requirement
Residential Flats within Railway Precincts	1 space/1 bedroom	125	125 spaces
	1 space/2 bedroom	157	157 spaces
	1.25 spaces/3 bedroom	31	38 spaces
	Subtotal	**313**	**320 spaces**
	1 space/4 dwellings (visitor parking)	313	78 spaces
		Subtotal	**398 spaces**
Commercial Premises in Chatswood	1 space/200m^2 (retail)	745	3 spaces
	1 space/200m^2 (office)	17,619	88 spaces
		Total	**489 spaces**

Note: where the parking spaces required is not a whole number, WDCP states that the number of spaces required is to be rounded down to the nearest whole number.

Table 5.1 indicates that the planning proposal is theoretically required to provide up to 489 car parking spaces. It is noted that the WDCP 2006 parking rates are neither minimum nor maximum rates and any departure from these rates requires justification.

5.1.2. Potential New Chatswood CBD B3 Commercial Core Zone Parking Rates

Recent consultation with Council has indicated that they are currently investigating new car parking rates to apply to B3 Commercial Core zones within Chatswood CBD. This follows a transport study that was completed for Council that recommended the following car parking rates be considered for the zone:

- Commercial office – one space per 400 square metres GFA
- Retail (>1000m^2) – one space per 300 square metres GFA.

Whilst Council has not adopted these rates it is expected that future developments will be assessed by Council with consideration for these future rates.

Application of the potential new parking commercial rate to the proposal would half the requirement from 88 spaces to 44 spaces. Reduced commercial parking provisions acknowledge the prime location of the site and public and active transport options available to commuters to reduce parking and traffic demand within Chatswood CBD. These also reflect changes in market demand for parking associated with commercial tenancies.

5.2. Council Decision Criteria Assessment

WDCP 2006 contains a list of criteria against which development applications are assessed when considering any departures from the WDCP 2006 car parking rates, and detailed as follows:

- the size and nature of the development, amount of additional floor area relative to the existing floor area and the parking demand generated
- whether a Green Travel Plan has been provided
- encouraging less use of motor vehicles, especially those developments close to railway stations and major public transport routes
- availability and accessibility of other public parking
- accessibility of public transport and the probable transport mode of users
- proximity to bicycle routes
- existing and likely future traffic volumes on the surrounding road network and the nature of this network
- the environmental implications of providing parking with particular regard to vegetation and landscape impacts
- results of a parking survey submitted to Council to justify demand for the proposed use
- the impact of not providing the parking.

The abovementioned decision guidelines relevant to the planning proposal have been considered and discussed below.

5.2.1. Green Travel Plan

As discussed in Section 4.6, it is anticipated that a detailed travel plan would be prepared prior to occupation of the development and is likely to be conditioned as part of any future DA.

5.2.2. Reduction in Motor Vehicle Usage

The site is easily accessible by public transport and is located within the Chatswood CBD. There are existing and proposed on/off-road cycle lanes along the nearby major roads that can service the site. End of trip cycle facilities would be provided.

As such, the proposed development is a prime opportunity to encourage the use of public transport, cycling, and walking and not encourage over-use of motor vehicles.

5.2.3. Car Parking Availability

In addition, and as discussed in Chapter 2, the site is located within close proximity to four major off-street public car parks; Westfield Chatswood, The Mandarin Centre, Chatswood Concourse and Chatswood Chase. These car parks have a capacity in excess of 6,000 car spaces all within an easy walking distance of the site. These car parks have the potential to accommodate any minor additional

visitor parking associated with the future non-residential site uses, with The Mandarin Centre also open to at least 12:30am every day.

It is worth noting that ease and availability of public parking is something that is generally not expected in a CBD environment. Visitors to Chatswood are therefore encouraged to seek alternative modes of travel based on a general expectation that on-site parking is not readily available, albeit with knowledge of the surrounding public car parks.

5.2.4. Public Transport Availability

The site is located within 100 metres, or less than two minutes' walk of Chatswood Interchange which provides access to high frequency bus and train services. This will encourage residents, staff and visitors to use public transport instead of private motor vehicles (particularly during commuter peak periods), which is in-line with the overall objectives of WDCP 2006 to "encourage the use of public transport in areas close to transport nodes"[5].

5.2.5. Residential Visitors

The proposal does not provide on-site car parking for residential visitors. Such visitors would be required to use alternate transport modes such as public transport, car share, ride share, cycling and walking. The surrounding on-street and off-street car parking near the site is time restricted and as such, suitable for residential visitors that intend on utilise these spaces for short-term parking. In CBD areas and near large retail centres, visitor parking is also typically misused by residents, employees and/or unrelated visitors where the surrounding parking supply is limited or charges exist. For these reasons, as well as reducing vehicle trips on the surrounding road network, omitting residential visitor parking provides clarity that such visitors should use public transport or make arrangements with residents to use their car parking space(s) if necessary.

In terms of precedents, the nearby Metro Grand Residences above Chatswood Station has around 15 residential visitor spaces for over 500 apartments. Such a parking supply prioritises the use public transport, but is also likely to result in parking availability challenges for visitors upon arrival. Omitting visitor parking altogether removes any such issues.

5.3. Adequacy of Parking Supply

The indicative development yield has a WDCP 2006 parking requirement of 489 spaces (320 residential spaces, 78 residential visitor spaces and 91 non-residential spaces). The proposal includes an indicative car parking supply of 381 spaces (321 residential spaces, 55 non-residential spaces and five spaces for car share vehicles).

The proposed non-residential parking provision equates to about one space per 330 square metres which sits between the potential new retail and commercial parking rates of 1 space per 300m and 400 square metres respectively that Council is considering for B3 Commercial Core zones within Chatswood CBD and should be supported by Council on this basis. The provision for five car share spaces for operators such as GoGet also reduces the reliance on private vehicle trips as these vehicles would be available to commercial staff and others for occasional use requirements.

[5] Willoughby City Council DCP 2006, p. C32

The proposed residential parking provision complies with WDCP 2006, with such parking desirable for residents who own a vehicle for other trip purposes, however, not necessarily to use for commuting.

As detailed above, the proposal to not provide residential visitor parking encourages use of public and active transport, promotes lower private vehicle use, provides clarity to visitors and prevents misuse of visitor spaces.

On this basis, the proposed parking supply is appropriate considering the proximity of the site to the Chatswood Transport Interchange, shopping precinct, and a range of other amenities all aiding travel demand management to/ from and within Chatswood CBD.

5.4. Motorcycle Parking

WDCP 2006 requires motorcycle parking to be provided at the rate of one space per 25 car parking spaces. Given the car parking requirements outlined above, the planning proposal is required to provide 19 motorcycle parking spaces on-site.

Motorcycle parking provision would be addressed as part of a future development application.

5.5. Loading Requirements

The loading requirements for different development types are contained in WDCP 2006, noting that residential developments in excess of 12 apartments are to provide for removalist trucks to park, load and unload on-site. WDCP 2006 also notes that Council will determine the required number of loading bays.

The proposal includes a loading area (with a turntable) that is capable of accommodating at least two services vehicles (up to an 8.8 metre medium rigid vehicle). This would also accommodate the standard 8-metre-long Willoughby Council rear loading waste collection vehicle, as well as typical removalist vehicles that vary in size between a 6.4m small rigid vehicle and 8.8 metre medium rigid vehicle.

Low service vehicle activity would be expected for the development, with opportunities for any smaller short-stay deliveries (i.e. couriers) to use the nearby loading zone on Victor Street, suitable for two-three B99 vehicles.

As such, it is anticipated that the proposed loading facility would adequately service the development (with an appropriate management plan).

5.6. Parking and Loading Layout Review

The car park and loading layout and site access provisions would be designed in accordance with the requirements of the WDCP 2006 and the Australian Standard for Off Street Car Parking (AS2890.1:2004, AS2890.2:2018 and AS2890.6:2009).

General car park access and circulation is considered appropriate and would be further addressed at the development application stage. The basement access ramp would comply with AS2890.2:2018 (Commercial Vehicles) with respect to grades and transitions for an 8.8m medium rigid vehicle.

A loading area is proposed on Basement Level 1, with vehicle access proposed from the Victor Street crossover. The loading dock, including the provision of a turntable, would be designed to cater for vehicles up to 8.8m medium rigid vehicles and allow them to enter and exit in a forward direction.

6. TRAFFIC ASSESSMENT

6.1. Traffic Generation

6.1.1. Residential

Traffic generation estimates for the residential use have been sourced from the *Guide to Traffic Generating Developments - Technical Direction* (TfNSW, August 2013). Specifically, the "Sydney Average" traffic generation rates for high density residential flat dwellings has been adopted. Further interrogation of the TfNSW dataset indicates that those sites with excellent public transport accessibility (i.e. located within 250 metres of a railway station) exhibit lower traffic generation rates than the remaining sites (i.e. located further than 250m from a railway station). A summary of this data is provided below:

- <250m of a railway station[6]: 0.11 movements per dwelling during the weekday peak hour
- >250m from a railway station: 0.20 movements per dwelling during the weekday peak hour.

Notwithstanding, sites with excellent public transport accessibility still have similar or higher car parking rates than proposed illustrating that residents are not using their vehicle for commuting purposes but have it for other trip purposes.

For the purposes of this assessment, the "average" traffic generation rate has been conservatively adopted. However, the subject site is located in close proximity to Chatswood Railway Station (i.e. less than 250 metres), which could acceptably permit the use of a lower trip generation rate.

6.1.2. Non-residential

In order to determine a per space traffic generation rate for the office use, GTA has extrapolated the per floor area car and traffic generation rates. In this respect, the TfNSW Guide indicates the following rates:

- Car Parking: 2.5 spaces per 100 square metres
- Peak Hour Traffic: 1.6 trips per 100 square metres
  (adopting the higher of the AM and PM rates)

Interpolating the above rates results in a traffic generation rate of 0.64 movements per car parking space. This has also been applied for the retail component given any parking will be for staff use only. For the purposes of this assessment the five car share spaces have been included in the non-residential supply.

6.1.3. Summary

Estimates of peak hour and daily traffic volumes resulting from the proposal are set out in Table 6.1.

[6] Includes St Leonards, Strathfield and Chatswood.

Table 6.1: Peak Hour Traffic Generation

Land Use	Size	Traffic Generation Rate			Traffic Generation (vph)		
		AM Peak Hour	PM Peak Hour	Saturday Lunchtime	AM Peak Hour	PM Peak Hour	Saturday Lunchtime
Residential	313 dwellings	0.19 movements per dwelling	0.15 movements per dwelling	0.19 movements per dwelling [1]	59	47	59
Non-residential	60 spaces	0.64 movement per space	0.64 movement per space	Retail staff only [2]	38	38	4
Total	-				**97**	**85**	**63**

[1] Saturday traffic generation rates are not provided in the Technical Direction and as such the AM peak hour rates have been adopted.
[2] Based on WDCP 2006 car parking requirement and assuming one movement per space.

Table 6.1 indicates that the site is anticipated to generate between 63 and 97 movements during each peak hour (including weekends).

6.2. Distribution and Assignment

In order to present a conservative assessment, GTA Consultants has assessed the traffic generation rates as per the TfNSW Guide. The directional distribution and assignment of traffic generated by the planning proposal will be influenced by several factors, including the:

- configuration of the arterial road network in the immediate vicinity of the site
- existing operation of intersections providing access between the local and arterial road network
- distribution of households in the vicinity of the site
- surrounding employment centres, retail centres and schools in relation to the site
- likely distribution of employee's residences in relation to the site
- configuration of access points to the site.

Having consideration for the above, for the purposes of estimating vehicle movements, the following directional distributions have been assumed:

- Albert Avenue (east) – 40 per cent
- Victor Street (south) – 20 per cent
- Albert Avenue (west) – 40 per cent.

In addition, the directional split of traffic (i.e. the ratio between the inbound and outbound traffic movements) has been assumed to be a commercial inbound and residential outbound in the morning peak period and a corresponding reversal in the evening peak with an even split on a Saturday.

This results in a directional split during the respective peak periods as shown in Table 6.2.

Table 6.2: Increase in Traffic Generation

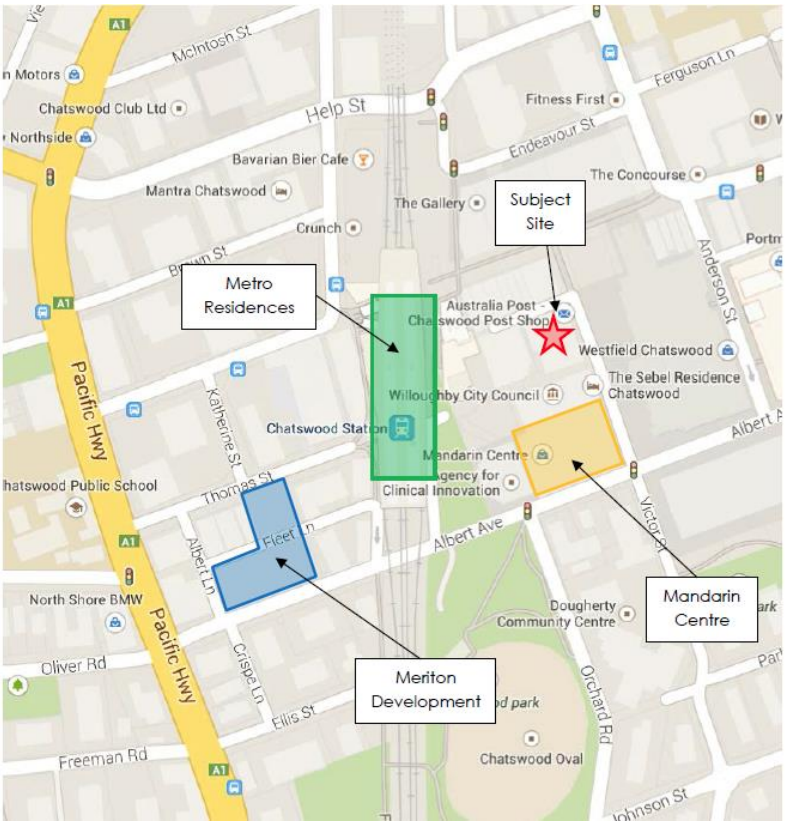
Peak Period	Land Use	Inbound	Outbound
Thu AM	Residential	20% (12 vehicles)	80% (47 vehicles)
	Commercial	80% (30 vehicles)	20% (8 vehicles)
	Total	**42 vehicles**	**55 vehicles**
Thu PM	Residential	80% (37 vehicles)	20% (10 vehicles)
	Commercial	20% (8 vehicles)	80% (30 vehicles)
	Total	**45 vehicles**	**40 vehicles**
Sat Midday	Residential	50% (29 vehicles)	50% (30 vehicles)
	Commercial	50% (2 vehicles)	50% (2 vehicles)
	Total	**31 vehicles**	**32 vehicles**

6.3. Other Developments

There are several key developments that have been constructed near the site since the traffic surveys were completed (September 2014) or are proposed that will increase traffic volumes along the Albert Avenue corridor. These key developments are illustrated in Figure 6.1, and include:

- Metro Grand Residences (constructed)
- Meriton Suites (constructed)
- Mandarin Centre (planning proposal).

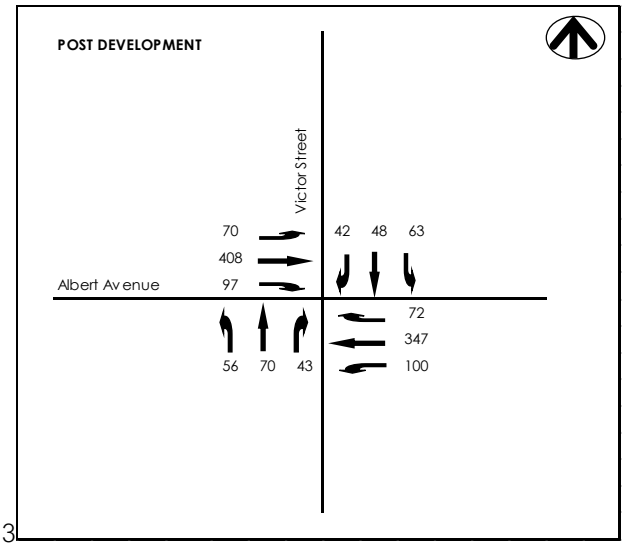
Figure 6.1: Surrounding Key Developments (not captured in surveys)



The anticipated traffic generation from these developments is assessed in Appendix B and is based on the traffic estimates presented in each of their respective traffic reports.

Based on the above, Figure 6.2 to Figure 6.4 have been prepared to show the post-development traffic volumes.

Figure 6.2: Post Development Thursday AM Peak Hour Traffic Volumes



3

Figure 6.3: Post Development Thursday PM Peak Hour Traffic Volumes

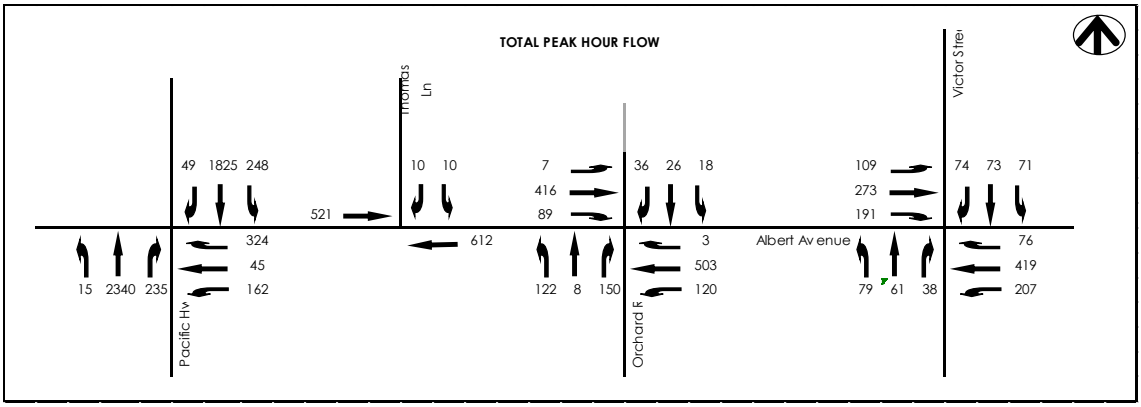
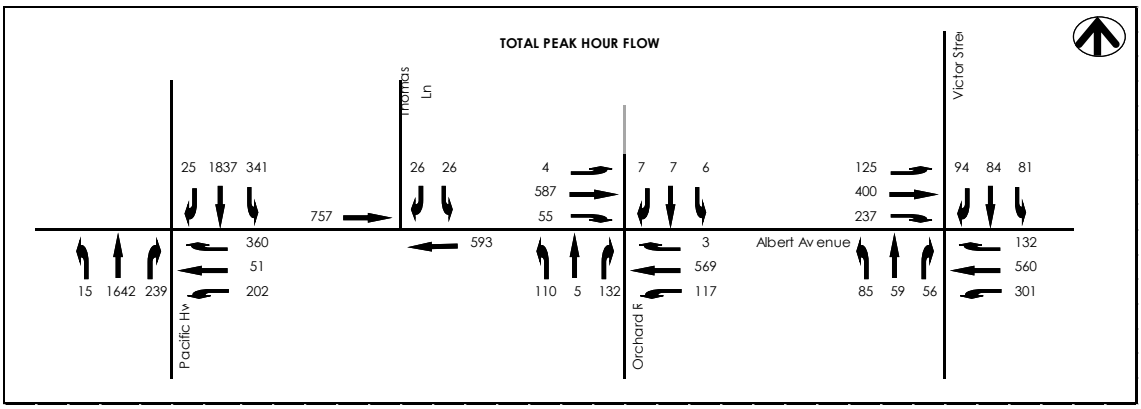


Figure 6.4: Post Development Saturday Midday Peak Hour Traffic Volumes



6.4. Traffic Impact

An assessment of the impact the future site traffic would have on the surrounding road network can be made by comparing intersection performance prior to and following full site development assuming planning approvals.

The impact of this additional traffic on the intersections near the site was previously assessed using SIDRA INTERSECTION Network Modelling function, which allows each of the intersections to be assessed in a network rather than in isolation as per traditional SIDRA modelling techniques.

Table 6.3 presents a summary of the anticipated operation of the intersections with the other developments assessed, to form the base condition scenario, with full results included in Appendix A.

Table 6.3: Base Operating Conditions – 2014 plus Other Developments

Intersection	Peak	2014 Level of Service (LOS)	Degree of Saturation (DOS)	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
Victor Street/ Albert Avenue	Weekday AM	B	0.30	13	31	A
	Weekday PM	A	0.48	15	45	B
	Saturday	B	0.83	19	90	B
Orchard Road/ Albert Avenue	Weekday PM	B	0.92	16	104	B
	Saturday	B	0.96	16	132	B
Thomas Lane/ Albert Avenue	Weekday PM	A	0.44	6	51	A
	Saturday	A	0.46	6	86	A
Pacific Highway/ Albert Avenue	Weekday PM	C	1.10	40	>500	C
	Saturday	D	1.43	53	245	D

Overall, the intersections continue to operate at similar levels of service when compared with 2014 conditions, except for Pacific Highway/ Albert Avenue, although it is noted this intersection was already at capacity and at the limit of the respective level of service values. The slight improvement in operation for Victor Street/ Albert Avenue during the weekday AM peak is likely attributed to additional through traffic along Albert Avenue as a result of the other developments, which reduces the average delay in this instance.

Table 6.4 presents a summary of the anticipated future operation of the intersections following the development of the site under the proposed planning controls, with full results included in Appendix A.

Table 6.4: Future Operating Conditions

Intersection	Peak	Base Level of Service (LOS)	Degree of Saturation (DOS)	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
Victor Street/ Albert Avenue	Weekday AM	A	0.25	16	38	B
	Weekday PM	B	0.49	16	45	B
	Saturday	B	0.83	20	90	B
Orchard Road/ Albert Avenue	Weekday PM	B	0.92	16	104	B
	Saturday	B	0.96	16	132	B
Thomas Lane/ Albert Avenue	Weekday PM	A	0.49	6	53	A
	Saturday	A	0.47	7	88	A
Pacific Highway/ Albert Avenue	Weekday PM	C	1.13	44	923	D
	Saturday	D	1.46	58	245	E

Overall, the intersections would continue to operate at the similar levels of service when compared with base conditions, except for Pacific Highway/ Albert Avenue. The additional five seconds of delay as a result of the proposal tips the level of service for this intersection across the line. The operation of Pacific Highway/ Albert Avenue is heavily influenced by through traffic along the highway, with any minor increases in traffic on side streets not affecting overall intersection operation. Capacity and performance of the Pacific Highway corridor is something that requires ongoing investigation at state government level.

6.5. Summary

Against base traffic volumes near the site, the additional traffic generated by the proposed development could not be expected to compromise the safety or function of the surrounding road network.

It is acknowledged that the existing Albert Avenue corridor is congested during peak periods, particularly during the weekday PM and Saturday lunchtime peak hours. The cause of the congestion is typically related to the Pacific Highway/ Albert Avenue intersection, which is located more than 500 metres from the subject site or three sets of signals away.

The proposed development is expected to generate approximately one additional vehicle movement through the Pacific Highway/ Albert Avenue intersection every 100 to 115 seconds during the critical weekday PM and Saturday lunchtime peak hours. This level of additional traffic is not anticipated to have a noticeable impact on the operation of this intersection, noting that the additional traffic generated by the development during the critical peak periods represents less than one per cent of the base traffic volumes through the intersection.

7. CONCLUSION

Based on the analysis and discussions presented within this report, the following conclusions are made:

1. A revised planning proposal is to be lodged with Willoughby City Council for the land formerly occupied by Chatswood Post Office at 45 Victor Street, Chatswood, as well as the adjacent 410-416 Victoria Avenue site currently occupied by retail tenancies.
2. The revised planning proposal seeks amended site controls to facilitate approximately 745 square metres of retail, 17,619 square metres of commercial and 313 residential apartments, above a basement containing approximately 381 parking spaces and a flexible loading dock with turntable.
3. The site location and context in terms of the proximity and availability of existing and future public transport services promotes the use of alternate transport modes. The proposed 5 car share parking spaces supports sustainable transport objectives.
4. The indicative proposal generates a WDCP 2006 parking requirement of 489 car parking spaces including 320 residential spaces, 78 residential visitor spaces and 91 spaces for commercial and retail uses.
5. The proposed residential parking provision of 321 spaces complies with WDCP 2006 and can be supported accordingly.
6. Considering Council has indicated that they are currently investigating new commercial car parking rates to apply to B3 Commercial Core zones within Chatswood CBD (down to one space per 300 and 400 square metres GFA for retail and commercial uses respectively) and given the close proximity to high-frequency public transport, the proposed non-residential parking provision of 55 spaces, which equates to about one space per 330 square metres, is between the above rates and considered appropriate.
7. The proposal to not provide any residential visitor parking encourages use of public and active transport, promotes lower vehicle use, provides clarity to visitors and prevents misuse of visitor spaces. The surrounding on-street and off-street car parking near the site is time restricted and as such, suitable for residential visitors that intend on utilise these spaces for short-term parking (if required). As such, the omission of residential visitor parking is considered appropriate.
8. At Development Application stage, further emphasis would be placed on sustainable transport infrastructure (including public domain integration, bicycle parking and end-of-trip facilities) leveraging the proximity of local services, employment and the Chatswood Transport Interchange.
9. General car park access and circulation, as well as the on-site loading facilities, are considered appropriate and would be further addressed at the development application stage.
10. Based on the TfNSW Guide to Traffic Generating Developments, the site would be expected to generate in the order of 63 and 97 vehicle movements during the typical weekday and weekend peak hours, which is no net change compared to the previous planning proposal lodged in 2016. There is scope to adopt reduced residential traffic generation rates as part of any future development application given the close proximity of the site to Chatswood Railway Station that would see residents less likely to use their vehicle for weekday peak period commuting, rather owning a vehicle for other trip purposes.

CONCLUSION

11. SIDRA INTERSECTION analysis indicates that there is adequate capacity in the surrounding road network to cater for the traffic generated by the planning proposal, with the intersection of Victor Street and Albert Avenue operating satisfactorily into the future.
12. While the intersection of Pacific Highway and Albert Avenue is operating at or near capacity during peak periods, the development traffic would have a minor impact on intersection operation noting that the intersection is heavily influenced by through traffic along the Highway.
13. On the basis of the above, the planning proposal can be supported from a traffic and transport perspective.

A. SIDRA INTERSECTION RESULTS

A

APPENDIX: SIDRA INTERSECTION RESULTS

A.1. Existing Conditions

MOVEMENT SUMMARY

Site: 1 [Existing AM]

Victor Street - Albert Avenue
Existing
AM Peak Hour
Signals - Fixed Time Isolated Cycle Time = 80 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Victor Street (S)											
1	L2	59	5.0	0.101	25.9	LOS B	1.6	11.8	0.73	0.72	41.2
2	T1	65	5.0	0.217	21.4	LOS B	3.2	23.2	0.76	0.67	43.3
3	R2	45	5.0	0.217	27.0	LOS B	3.2	23.2	0.76	0.67	42.4
Approach		169	5.0	0.217	24.5	LOS B	3.2	23.2	0.75	0.69	42.3
East: Albert Avenue (E)											
4	L2	105	5.0	0.212	16.5	LOS B	4.2	31.0	0.57	0.61	47.7
5	T1	309	5.0	0.212	10.9	LOS A	4.4	31.8	0.57	0.52	50.3
6	R2	59	5.0	0.107	17.6	LOS B	1.3	9.2	0.57	0.70	45.4
Approach		474	5.0	0.212	12.9	LOS A	4.4	31.8	0.57	0.56	49.1
North: Victor Street (N)											
7	L2	43	5.0	0.095	25.9	LOS B	1.5	11.2	0.73	0.68	41.8
8	T1	39	5.0	0.095	20.4	LOS B	1.5	11.2	0.73	0.65	43.4
9	R2	21	5.0	0.095	26.0	LOS B	1.3	9.4	0.73	0.63	42.7
Approach		103	5.0	0.095	23.8	LOS B	1.5	11.2	0.73	0.66	42.6
West: Albert Avenue (W)											
10	L2	57	5.0	0.171	16.2	LOS B	3.4	24.5	0.55	0.55	48.5
11	T1	279	5.0	0.171	10.6	LOS A	3.4	25.0	0.55	0.49	50.6
12	R2	102	5.0	0.202	18.9	LOS B	2.4	17.2	0.61	0.73	44.7
Approach		438	5.0	0.202	13.3	LOS A	3.4	25.0	0.57	0.55	48.8
All Vehicles		1184	5.0	0.217	15.7	LOS B	4.4	31.8	0.61	0.59	47.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	14.4	LOS B	0.1	0.1	0.60	0.60
P2	East Full Crossing	53	28.1	LOS C	0.1	0.1	0.84	0.84
P3	North Full Crossing	53	12.7	LOS B	0.1	0.1	0.56	0.56
P4	West Full Crossing	53	28.1	LOS C	0.1	0.1	0.84	0.84
All Pedestrians		211	20.8	LOS C			0.71	0.71

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1 [Victor / Albert PM]

Network: 1 [Weekday PM]

Victor Street - Albert Avenue
Existing
PM Peak Hour
Signals - Fixed Time Coordinated Cycle Time = 80 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Victor Street (S)													
1	L2	83	5.0	83	5.0	0.285	38.4	LOS C	3.0	21.6	0.92	0.76	26.8
2	T1	47	5.0	47	5.0	0.383	34.8	LOS C	3.2	23.6	0.94	0.75	37.3
3	R2	40	5.0	40	5.0	0.383	40.4	LOS C	3.2	23.6	0.94	0.75	29.5
Approach		171	5.0	171	5.0	0.383	37.9	LOS C	3.2	23.6	0.93	0.76	31.0
East: Albert Avenue (E)													
4	L2	218	5.0	218	5.0	0.241	10.6	LOS A	4.4	31.8	0.40	0.60	46.4
5	T1	397	5.0	397	5.0	0.241	5.0	LOS A	4.5	33.0	0.40	0.40	33.9
6	R2	55	5.0	55	5.0	0.079	10.7	LOS A	0.8	5.6	0.37	0.66	44.8
Approach		669	5.0	669	5.0	0.241	7.3	LOS A	4.5	33.0	0.40	0.49	42.6
North: Victor Street (N)													
7	L2	51	5.0	51	5.0	0.333	38.7	LOS C	3.6	26.0	0.93	0.75	29.9
8	T1	64	5.0	64	5.0	0.333	33.7	LOS C	3.6	26.0	0.93	0.75	37.4
9	R2	54	5.0	54	5.0	0.333	41.1	LOS C	2.6	18.7	0.94	0.75	26.3
Approach		168	5.0	168	5.0	0.333	37.5	LOS C	3.6	26.0	0.93	0.75	32.3
West: Albert Avenue (W)													
10	L2	80	5.0	80	5.0	0.133	9.1	LOS A	2.1	15.4	0.35	0.47	48.2
11	T1	260	5.0	260	5.0	0.133	4.3	LOS A	2.2	15.8	0.35	0.35	41.9
12	R2	201	5.0	201	5.0	0.402	12.5	LOS A	3.6	26.4	0.48	0.71	42.4
Approach		541	5.0	541	5.0	0.402	8.1	LOS A	3.6	26.4	0.40	0.50	43.4
All Vehicles		1549	5.0	1549	5.0	0.402	14.2	LOS A	4.5	33.0	0.51	0.55	38.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Network Model Accuracy Level (largest change in degree of saturation for any lane): 1.0 %
Number of Iterations: 4 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	6.8	LOS A	0.0	0.0	0.41	0.41
P2	East Full Crossing	53	34.3	LOS D	0.1	0.1	0.93	0.93
P3	North Full Crossing	53	5.6	LOS A	0.0	0.0	0.38	0.38
P4	West Full Crossing	53	34.3	LOS D	0.1	0.1	0.93	0.93
All Pedestrians		211	20.3	LOS C			0.66	0.66

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.

MOVEMENT SUMMARY

Site: 1 [Pacific / Albert PM]

Network: 1 [Weekday PM]

Pacific Hwy - Albert Avenue
Existing
PM Peak Hour
Signals - Fixed Time Coordinated Cycle Time = 149 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Hwy - S Leg													
1	L2	16	5.0	16	5.0	0.646	10.6	LOS A	13.6	99.0	0.25	0.24	53.8
2	T1	2463	5.0	2463	5.0	0.646	5.0	LOS A	13.6	99.1	0.25	0.24	55.4
3	R2	182	5.0	182	5.0	0.658	70.6	LOS F	12.4	90.3	0.97	0.82	18.4
Approach		2661	5.0	2661	5.0	0.658	9.5	LOS A	13.6	99.1	0.30	0.28	51.7
East: Albert Ave - E Leg													
4	L2	157	5.0	157	5.0	0.305	48.7	LOS D	9.5	69.2	0.89	0.80	26.5
5	T1	47	5.0	47	5.0	1.069	176.6	LOS F	21.4	155.9	1.00	1.26	10.9
6	R2	320	5.0	320	5.0	1.069	182.0	LOS F	21.4	155.9	1.00	1.22	10.8
Approach		524	5.0	524	5.0	1.069	141.6	LOS F	21.4	155.9	0.97	1.10	13.1
North: Pacific Hwy - N Leg													
7	L2	214	5.0	214	5.0	0.202	14.5	LOS A	3.8	27.9	0.27	0.65	40.9
8	T1	1905	5.0	1905	5.0	0.960	40.2	LOS C	71.4	521.2	0.73	0.81	36.2
9	R2	52	5.0	52	5.0	0.429	80.7	LOS F	3.7	27.1	0.99	0.75	25.4
Approach		2171	5.0	2171	5.0	0.960	38.6	LOS C	71.4	521.2	0.69	0.80	36.0
All Vehicles		5356	5.0	5356	5.0	1.069	34.2	LOS C	71.4	521.2	0.52	0.57	37.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Network Model Accuracy Level (largest change in degree of saturation for any lane): 1.0 %
Number of Iterations: 4 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	67.8	LOS F	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	17.0	LOS B	0.1	0.1	0.48	0.48
P4	West Full Crossing	53	8.4	LOS A	0.1	0.1	0.34	0.34
All Pedestrians		158	31.1	LOS D			0.59	0.59

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1 [Thomas / Albert PM]

Network: 1 [Weekday PM]

Thomas Lane - Albert Avenue
Existing
PM Peak Hour
Signals - Fixed Time Coordinated Cycle Time = 80 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Albert Ave - E Leg													
5	T1	620	5.0	620	5.0	0.355	2.9	LOS A	4.2	30.7	0.25	0.22	41.5
Approach		620	5.0	620	5.0	0.355	2.9	LOS A	4.2	30.7	0.25	0.22	41.5
North: Thomas Ln - N Leg													
7	L2	16	5.0	16	5.0	0.192	42.1	LOS C	1.4	10.0	0.94	0.73	25.4
9	R2	21	5.0	21	5.0	0.192	42.0	LOS C	1.4	10.0	0.94	0.73	25.4
Approach		37	5.0	37	5.0	0.192	42.0	LOS C	1.4	10.0	0.94	0.73	25.4
West: Albert Ave - W Leg													
11	T1	453	0.0	453	0.0	0.250	3.5	LOS A	4.4	31.1	0.33	0.29	44.1
Approach		453	0.0	453	0.0	0.250	3.5	LOS A	4.4	31.1	0.33	0.29	44.1
All Vehicles		1109	3.0	1109	3.0	0.355	4.5	LOS A	4.4	31.1	0.31	0.27	39.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Network Model Accuracy Level (largest change in degree of saturation for any lane): 1.0 %
Number of Iterations: 4 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P3	North Full Crossing	53	2.8	LOS A	0.0	0.0	0.26	0.26
P4	West Full Crossing	53	34.3	LOS D	0.1	0.1	0.93	0.93
All Pedestrians		105	18.5	LOS B			0.60	0.60

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 1 [Orchard / Albert PM]

Network: 1 [Weekday PM]

Orchard Road - Albert Avenue
Existing
PM Peak Hour
Signals - Fixed Time Coordinated Cycle Time = 80 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Orchard Rd - S Leg													
1	L2	128	5.0	128	5.0	0.556	28.7	LOS C	9.5	69.2	0.86	0.82	31.2
2	T1	8	5.0	8	5.0	0.556	23.1	LOS B	9.5	69.2	0.86	0.82	40.9
3	R2	158	5.0	158	5.0	0.556	28.6	LOS C	9.5	69.2	0.86	0.82	31.2
Approach		295	5.0	295	5.0	0.556	28.5	LOS B	9.5	69.2	0.86	0.82	31.6
East: Albert Ave - E Leg													
4	L2	126	5.0	126	5.0	0.305	14.4	LOS A	4.6	33.5	0.45	0.53	43.0
5	T1	461	5.0	461	5.0	0.332	9.8	LOS A	5.2	37.6	0.45	0.44	19.3
6	R2	3	5.0	3	5.0	0.332	14.6	LOS B	5.2	37.6	0.46	0.40	44.8
Approach		591	5.0	591	5.0	0.332	10.8	LOS A	5.2	37.6	0.45	0.46	30.4
North: Orchard Rd - N Leg													
7	L2	17	5.0	17	5.0	0.065	24.1	LOS B	1.1	8.0	0.69	0.60	35.9
8	T1	25	5.0	25	5.0	0.065	18.5	LOS B	1.1	8.0	0.69	0.60	44.8
9	R2	36	5.0	36	5.0	0.091	27.6	LOS B	1.0	7.5	0.75	0.71	31.7
Approach		78	5.0	78	5.0	0.091	23.9	LOS B	1.1	8.0	0.72	0.65	37.8
West: Albert Ave - W Leg													
10	L2	7	5.0	7	5.0	0.113	14.2	LOS A	1.5	10.8	0.38	0.33	46.2
11	T1	376	5.0	376	5.0	0.565	11.3	LOS A	8.0	58.0	0.53	0.51	21.2
12	R2	94	5.0	94	5.0	0.565	17.8	LOS B	8.0	58.0	0.58	0.57	41.9
Approach		477	5.0	477	5.0	0.565	12.6	LOS A	8.0	58.0	0.54	0.52	30.0
All Vehicles		1440	5.0	1440	5.0	0.565	15.7	LOS B	9.5	69.2	0.58	0.56	31.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Network Model Accuracy Level (largest change in degree of saturation for any lane): 1.0 %
Number of Iterations: 4 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	11.6	LOS B	0.1	0.1	0.54	0.54
P2	East Full Crossing	53	22.5	LOS C	0.1	0.1	0.75	0.75
P3	North Full Crossing	53	13.8	LOS B	0.1	0.1	0.59	0.59
P4	West Full Crossing	53	22.5	LOS C	0.1	0.1	0.75	0.75
All Pedestrians		211	17.6	LOS B			0.66	0.66

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.

MOVEMENT SUMMARY

Site: 1 [Victor / Albert Sat]

Network: 1 [Saturday]

Victor Street - Albert Avenue
Existing
Sat Peak Hour
Signals - Fixed Time Coordinated Cycle Time = 100 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Victor Street (S)													
1	L2	89	5.0	89	5.0	0.333	47.7	LOS D	4.0	29.4	0.94	0.77	23.6
2	T1	46	5.0	46	5.0	0.626	49.1	LOS D	5.3	38.4	1.00	0.82	32.4
3	R2	59	5.0	59	5.0	0.626	54.7	LOS D	5.3	38.4	1.00	0.82	24.7
Approach		195	5.0	195	5.0	0.626	50.2	LOS D	5.3	38.4	0.97	0.80	26.5
East: Albert Avenue (E)													
4	L2	317	5.0	317	5.0	0.325	10.6	LOS A	7.3	53.4	0.38	0.60	46.3
5	T1	562	5.0	562	5.0	0.325	5.0	LOS A	7.6	55.4	0.38	0.39	33.8
6	R2	107	5.0	107	5.0	0.172	11.1	LOS A	1.8	13.1	0.36	0.67	44.5
Approach		986	5.0	986	5.0	0.325	7.5	LOS A	7.6	55.4	0.38	0.49	42.6
North: Victor Street (N)													
7	L2	56	5.0	56	5.0	0.468	48.7	LOS D	6.0	43.5	0.96	0.78	26.5
8	T1	74	5.0	74	5.0	0.468	43.1	LOS D	6.0	43.5	0.96	0.78	34.4
9	R2	69	5.0	69	5.0	0.482	55.2	LOS D	3.4	25.1	0.99	0.76	21.6
Approach		199	5.0	199	5.0	0.482	48.9	LOS D	6.0	43.5	0.97	0.77	28.3
West: Albert Avenue (W)													
10	L2	100	5.0	100	5.0	0.170	6.2	LOS A	1.0	7.6	0.10	0.31	51.8
11	T1	363	5.0	363	5.0	0.170	3.4	LOS A	3.4	25.1	0.25	0.29	44.5
12	R2	249	5.0	249	5.0	0.684	18.9	LOS B	7.7	56.1	0.61	0.79	37.7
Approach		713	5.0	713	5.0	0.684	9.2	LOS A	7.7	56.1	0.36	0.47	41.7
All Vehicles		2093	5.0	2093	5.0	0.684	16.0	LOS B	7.7	56.1	0.48	0.54	36.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Network Model Accuracy Level (largest change in degree of saturation for any lane): 1.4 %
Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue Pedestrian	Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	South Full Crossing	53	6.5	LOS A	0.1	0.1	0.36	0.36
P2	East Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94
P3	North Full Crossing	53	5.5	LOS A	0.0	0.0	0.33	0.33
P4	West Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94
All Pedestrians		211	25.1	LOS C			0.64	0.64

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.

MOVEMENT SUMMARY

Site: 1 [Pacific / Albert Sat]

Network: 1 [Saturday]

Pacific Hwy - Albert Avenue
Existing
Sat Peak Hour
Signals - Fixed Time Coordinated Cycle Time = 148 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Hwy - S Leg													
1	L2	16	5.0	16	5.0	0.670	9.8	LOS A	13.0	94.9	0.23	0.22	54.4
2	T1	1728	5.0	1728	5.0	0.670	4.2	LOS A	13.0	95.0	0.23	0.22	56.1
3	R2	204	5.0	204	5.0	0.733	72.0	LOS F	14.2	103.9	0.99	0.85	18.2
Approach		1948	5.0	1948	5.0	0.733	11.4	LOS A	14.2	103.9	0.31	0.28	50.2
East: Albert Ave - E Leg													
4	L2	191	5.0	191	5.0	0.450	52.2	LOS D	12.0	87.7	0.93	0.83	25.5
5	T1	54	5.0	54	5.0	1.342	401.8	LOS F	33.5	244.8	1.00	1.72	5.4
6	R2	344	5.0	344	5.0	1.342	407.2	LOS F	33.5	244.8	1.00	1.68	5.4
Approach		588	5.0	588	5.0	1.342	291.8	LOS F	33.5	244.8	0.98	1.41	7.2
North: Pacific Hwy - N Leg													
7	L2	323	5.0	323	5.0	0.300	14.2	LOS A	5.9	43.4	0.28	0.66	41.2
8	T1	1913	5.0	1913	5.0	0.607	10.8	LOS A	18.8	137.5	0.40	0.36	51.0
9	R2	26	5.0	26	5.0	0.217	78.5	LOS F	1.8	13.4	0.96	0.72	25.7
Approach		2262	5.0	2262	5.0	0.607	12.0	LOS A	18.8	137.5	0.39	0.41	49.5
All Vehicles		4799	5.0	4799	5.0	1.342	46.1	LOS D	33.5	244.8	0.43	0.48	32.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Network Model Accuracy Level (largest change in degree of saturation for any lane): 1.4 %
Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	65.4	LOS F	0.2	0.2	0.94	0.94
P2	East Full Crossing	53	16.1	LOS B	0.1	0.1	0.47	0.47
P4	West Full Crossing	53	7.8	LOS A	0.1	0.1	0.33	0.33
All Pedestrians		158	29.8	LOS C			0.58	0.58

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1 [Thomas / Albert Sat]

Network: 1 [Saturday]

Thomas Lane - Albert Avenue
Existing
Sat Peak Hour
Signals - Fixed Time Coordinated Cycle Time = 100 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Albert Ave - E Leg													
5	T1	595	5.0	595	5.0	0.422	2.8	LOS A	3.4	25.0	0.22	0.19	42.3
Approach		595	5.0	595	5.0	0.422	2.8	LOS A	3.4	25.0	0.22	0.19	42.3
North: Thomas Ln - N Leg													
7	L2	11	5.0	11	5.0	0.160	51.5	LOS D	1.0	7.2	0.94	0.72	22.5
9	R2	11	5.0	11	5.0	0.160	51.5	LOS D	1.0	7.2	0.94	0.72	22.5
Approach		21	5.0	21	5.0	0.160	51.5	LOS D	1.0	7.2	0.94	0.72	22.5
West: Albert Ave - W Leg													
11	T1	718	0.0	718	0.0	0.379	3.7	LOS A	8.8	61.9	0.33	0.30	43.2
Approach		718	0.0	718	0.0	0.379	3.7	LOS A	8.8	61.9	0.33	0.30	43.2
All Vehicles		1334	2.3	1334	2.3	0.422	4.1	LOS A	8.8	61.9	0.29	0.26	40.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Network Model Accuracy Level (largest change in degree of saturation for any lane): 1.4 %
Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P3	North Full Crossing	53	2.9	LOS A	0.0	0.0	0.24	0.24
P4	West Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94
All Pedestrians		105	23.6	LOS C			0.59	0.59

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1 [Orchard / Albert Sat]

Network: 1 [Saturday]

Orchard Road - Albert Avenue
Existing
Sat Peak Hour
Signals - Fixed Time Coordinated Cycle Time = 100 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Orchard Rd - S Leg													
1	L2	116	5.0	116	5.0	0.421	29.0	LOS C	9.2	67.1	0.77	0.79	31.0
2	T1	5	5.0	5	5.0	0.421	23.4	LOS B	9.2	67.1	0.77	0.79	40.7
3	R2	139	5.0	139	5.0	0.421	29.0	LOS C	9.2	67.1	0.77	0.79	31.0
Approach		260	5.0	260	5.0	0.421	28.9	LOS C	9.2	67.1	0.77	0.79	31.3
East: Albert Ave - E Leg													
4	L2	123	5.0	123	5.0	0.355	18.6	LOS B	7.1	52.0	0.50	0.54	39.9
5	T1	542	5.0	542	5.0	0.395	14.1	LOS A	8.2	60.1	0.51	0.48	15.2
6	R2	3	5.0	3	5.0	0.395	18.9	LOS B	8.2	60.1	0.52	0.45	41.0
Approach		668	5.0	668	5.0	0.395	14.9	LOS B	8.2	60.1	0.51	0.49	24.7
North: Orchard Rd - N Leg													
7	L2	4	5.0	4	5.0	0.013	24.6	LOS B	0.3	2.0	0.62	0.53	35.4
8	T1	5	5.0	5	5.0	0.013	19.0	LOS B	0.3	2.0	0.62	0.53	44.4
9	R2	5	5.0	5	5.0	0.011	27.4	LOS B	0.2	1.2	0.66	0.65	31.8
Approach		15	5.0	15	5.0	0.013	23.6	LOS B	0.3	2.0	0.64	0.57	38.3
West: Albert Ave - W Leg													
10	L2	4	5.0	4	5.0	0.426	19.4	LOS B	7.3	53.6	0.50	0.43	41.9
11	T1	528	5.0	528	5.0	0.426	15.1	LOS B	7.3	53.6	0.53	0.48	18.2
12	R2	58	5.0	58	5.0	0.426	22.4	LOS B	7.0	51.1	0.57	0.55	38.6
Approach		591	5.0	591	5.0	0.426	15.8	LOS B	7.3	53.6	0.53	0.49	22.9
All Vehicles		1534	5.0	1534	5.0	0.426	17.7	LOS B	9.2	67.1	0.56	0.54	26.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Network Model Accuracy Level (largest change in degree of saturation for any lane): 1.4 %
Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	15.7	LOS B	0.1	0.1	0.56	0.56
P2	East Full Crossing	53	23.9	LOS C	0.1	0.1	0.69	0.69
P3	North Full Crossing	53	18.0	LOS B	0.1	0.1	0.60	0.60
P4	West Full Crossing	53	23.9	LOS C	0.1	0.1	0.69	0.69
All Pedestrians		211	20.4	LOS C			0.64	0.64

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.

A.2. Base Conditions

MOVEMENT SUMMARY

Site: 1 [Victor / Albert AM]

Victor Street - Albert Avenue
Base Scenario
AM Peak Hour
Signals - Fixed Time Isolated Cycle Time = 80 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Victor Street (S)											
1	L2	59	5.0	0.138	31.9	LOS C	1.8	13.4	0.82	0.73	30.3
2	T1	65	5.0	0.299	27.7	LOS B	3.6	26.6	0.86	0.72	40.3
3	R2	45	5.0	0.299	33.3	LOS C	3.6	26.6	0.86	0.72	32.6
Approach		169	5.0	0.299	30.7	LOS C	3.6	26.6	0.85	0.73	35.3
East: Albert Avenue (E)											
4	L2	105	5.0	0.206	12.9	LOS A	4.0	29.1	0.47	0.54	45.7
5	T1	365	5.0	0.206	7.3	LOS A	4.1	29.7	0.47	0.45	35.4
6	R2	59	5.0	0.115	14.5	LOS A	1.1	8.0	0.49	0.69	41.7
Approach		529	5.0	0.206	9.2	LOS A	4.1	29.7	0.47	0.49	40.1
North: Victor Street (N)											
7	L2	43	5.0	0.130	31.8	LOS C	1.8	12.8	0.82	0.71	32.2
8	T1	39	5.0	0.130	26.3	LOS B	1.8	12.8	0.82	0.68	40.5
9	R2	21	5.0	0.130	32.0	LOS C	1.5	10.8	0.82	0.67	21.9
Approach		103	5.0	0.130	29.8	LOS C	1.8	12.8	0.82	0.69	33.2
West: Albert Avenue (W)											
10	L2	57	5.0	0.212	12.1	LOS A	4.2	30.3	0.47	0.47	46.3
11	T1	429	5.0	0.212	7.3	LOS A	4.2	30.7	0.47	0.43	36.1
12	R2	102	5.0	0.195	14.1	LOS A	2.0	14.5	0.52	0.70	41.1
Approach		588	5.0	0.212	9.0	LOS A	4.2	30.7	0.48	0.48	39.3
All Vehicles		1391	5.0	0.299	13.3	LOS A	4.2	30.7	0.55	0.53	37.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	10.5	LOS B	0.1	0.1	0.51	0.51
P2	East Full Crossing	53	34.3	LOS D	0.1	0.1	0.93	0.93
P3	North Full Crossing	53	9.0	LOS A	0.1	0.1	0.48	0.48
P4	West Full Crossing	53	34.3	LOS D	0.1	0.1	0.93	0.93
All Pedestrians		211	22.0	LOS C			0.71	0.71

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1 [Victor / Albert PM]

Network: 1 [Weekday PM - Fixed Phase Splits]

Victor Street - Albert Avenue
Base Scenario
PM Peak Hour
Signals - Fixed Time Coordinated Cycle Time = 80 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Victor Street (S)													
1	L2	83	5.0	83	5.0	0.195	32.3	LOS C	2.6	19.3	0.84	0.75	29.4
2	T1	55	5.0	55	5.0	0.275	28.4	LOS B	3.1	23.0	0.87	0.72	39.9
3	R2	40	5.0	40	5.0	0.275	34.0	LOS C	3.1	23.0	0.87	0.72	32.3
Approach		178	5.0	178	5.0	0.275	31.5	LOS C	3.1	23.0	0.85	0.73	34.0
East: Albert Avenue (E)													
4	L2	218	5.0	218	5.0	0.290	13.4	LOS A	5.9	43.1	0.50	0.63	44.1
5	T1	441	5.0	441	5.0	0.290	7.8	LOS A	6.1	44.6	0.50	0.48	28.0
6	R2	71	5.0	71	5.0	0.121	14.0	LOS A	1.3	9.3	0.48	0.69	42.1
Approach		729	5.0	729	5.0	0.290	10.1	LOS A	6.1	44.6	0.50	0.55	38.5
North: Victor Street (N)													
7	L2	59	5.0	59	5.0	0.255	32.8	LOS C	3.6	26.2	0.85	0.72	32.4
8	T1	68	5.0	68	5.0	0.255	27.5	LOS B	3.6	26.2	0.85	0.73	39.9
9	R2	62	5.0	62	5.0	0.255	34.0	LOS C	2.6	19.0	0.86	0.74	29.2
Approach		189	5.0	189	5.0	0.255	31.3	LOS C	3.6	26.2	0.86	0.73	34.8
West: Albert Avenue (W)													
10	L2	96	5.0	96	5.0	0.168	11.5	LOS A	3.0	21.8	0.43	0.53	45.6
11	T1	287	5.0	287	5.0	0.168	6.7	LOS A	3.1	22.4	0.43	0.42	36.7
12	R2	201	5.0	201	5.0	0.485	17.2	LOS B	4.5	32.8	0.59	0.74	38.8
Approach		584	5.0	584	5.0	0.485	11.1	LOS A	4.5	32.8	0.49	0.55	39.7
All Vehicles		1681	5.0	1681	5.0	0.485	15.1	LOS B	6.1	44.6	0.57	0.59	37.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 1.0 %
Number of Iterations: 9 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	10.5	LOS B	0.1	0.1	0.51	0.51
P2	East Full Crossing	53	34.3	LOS D	0.1	0.1	0.93	0.93
P3	North Full Crossing	53	9.0	LOS A	0.1	0.1	0.48	0.48
P4	West Full Crossing	53	34.3	LOS D	0.1	0.1	0.93	0.93
All Pedestrians		211	22.0	LOS C			0.71	0.71

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1 [Pacific / Albert PM]

Network: 1 [Weekday PM - Fixed Phase Splits]

Pacific Hwy - Albert Avenue
Base Scenario
PM Peak Hour
Signals - Fixed Time Coordinated Cycle Time = 149 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Hwy - S Leg													
1	L2	16	5.0	16	5.0	0.646	10.6	LOS A	13.6	99.0	0.25	0.24	53.8
2	T1	2463	5.0	2463	5.0	0.646	5.0	LOS A	13.6	99.1	0.25	0.24	55.4
3	R2	240	5.0	240	5.0	0.867	79.9	LOS F	18.4	134.3	1.00	0.91	16.8
Approach		2719	5.0	2719	5.0	0.867	11.6	LOS A	18.4	134.3	0.32	0.30	50.0
East: Albert Ave - E Leg													
4	L2	164	5.0	164	5.0	0.319	49.0	LOS D	10.0	72.7	0.89	0.81	26.4
5	T1	47	5.0	47	5.0	1.103	179.7	LOS F	23.8	174.0	1.00	1.33	10.5
6	R2	332	5.0	332	5.0	1.103	185.4	LOS F	23.8	174.0	1.00	1.28	10.4
Approach		543	5.0	543	5.0	1.103	143.7	LOS F	23.8	174.0	0.97	1.14	12.7
North: Pacific Hwy - N Leg													
7	L2	249	5.0	249	5.0	0.236	14.7	LOS B	4.6	33.7	0.28	0.66	40.7
8	T1	1921	5.0	1921	5.0	0.982	51.5	LOS D	82.7	603.8	0.76	0.89	32.5
9	R2	52	5.0	52	5.0	0.429	80.7	LOS F	3.7	27.1	0.99	0.75	25.4
Approach		2222	5.0	2222	5.0	0.982	48.0	LOS D	82.7	603.8	0.71	0.86	32.7
All Vehicles		5484	5.0	5484	5.0	1.103	39.5	LOS C	82.7	603.8	0.54	0.61	35.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 1.0 %
Number of Iterations: 9 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	67.8	LOS F	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	17.0	LOS B	0.1	0.1	0.48	0.48
P4	West Full Crossing	53	8.4	LOS A	0.1	0.1	0.34	0.34
All Pedestrians		158	31.1	LOS D			0.59	0.59

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1 [Thomas / Albert PM]

Network: 1 [Weekday PM - Fixed Phase Splits]

Thomas Lane - Albert Avenue
Base Scenario
PM Peak Hour
Signals - Fixed Time Coordinated Cycle Time = 80 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Albert Ave - E Leg													
5	T1	628	5.0	628	5.0	0.443	5.5	LOS A	5.8	42.5	0.38	0.33	32.8
Approach		628	5.0	628	5.0	0.443	5.5	LOS A	5.8	42.5	0.38	0.33	32.8
North: Thomas Ln - N Leg													
7	L2	11	5.0	11	5.0	0.065	34.1	LOS C	0.7	5.0	0.84	0.70	28.5
9	R2	11	5.0	11	5.0	0.065	34.0	LOS C	0.7	5.0	0.84	0.70	28.5
Approach		21	5.0	21	5.0	0.065	34.0	LOS C	0.7	5.0	0.84	0.70	28.5
West: Albert Ave - W Leg													
11	T1	529	0.0	529	0.0	0.331	6.4	LOS A	7.2	50.6	0.46	0.40	36.0
Approach		529	0.0	529	0.0	0.331	6.4	LOS A	7.2	50.6	0.46	0.40	36.0
All Vehicles		1179	2.8	1179	2.8	0.443	6.4	LOS A	7.2	50.6	0.42	0.37	34.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 1.0 %
Number of Iterations: 9 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P3	North Full Crossing	53	5.6	LOS A	0.0	0.0	0.38	0.38
P4	West Full Crossing	53	34.3	LOS D	0.1	0.1	0.93	0.93
All Pedestrians		105	20.0	LOS B			0.65	0.65

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 1 [Orchard / Albert PM]

Network: 1 [Weekday PM - Fixed Phase Splits]

Orchard Road - Albert Avenue
Base Scenario
PM Peak Hour
Signals - Fixed Time Coordinated Cycle Time = 80 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Orchard Rd - S Leg													
1	L2	128	5.0	128	5.0	0.921	54.2	LOS D	14.3	104.1	1.00	1.04	21.8
2	T1	8	5.0	8	5.0	0.921	48.6	LOS D	14.3	104.1	1.00	1.04	31.8
3	R2	158	5.0	158	5.0	0.921	54.2	LOS D	14.3	104.1	1.00	1.04	21.8
Approach		295	5.0	295	5.0	0.921	54.1	LOS D	14.3	104.1	1.00	1.04	22.2
East: Albert Ave - E Leg													
4	L2	126	5.0	126	5.0	0.260	11.4	LOS A	5.1	37.6	0.46	0.53	46.0
5	T1	514	5.0	514	5.0	0.283	5.5	LOS A	5.1	37.6	0.36	0.36	26.7
6	R2	3	5.0	3	5.0	0.283	9.6	LOS A	3.8	27.4	0.31	0.27	50.1
Approach		643	5.0	643	5.0	0.283	6.7	LOS A	5.1	37.6	0.38	0.39	36.5
North: Orchard Rd - N Leg													
7	L2	19	5.0	19	5.0	0.118	33.4	LOS C	1.5	10.8	0.84	0.67	30.4
8	T1	27	5.0	27	5.0	0.118	27.8	LOS B	1.5	10.8	0.84	0.67	40.2
9	R2	38	5.0	38	5.0	0.176	39.0	LOS C	1.4	9.9	0.91	0.73	26.5
Approach		84	5.0	84	5.0	0.176	34.1	LOS C	1.5	10.8	0.87	0.70	32.6
West: Albert Ave - W Leg													
10	L2	7	5.0	7	5.0	0.095	8.0	LOS A	0.6	4.5	0.15	0.15	53.1
11	T1	419	5.0	419	5.0	0.473	3.2	LOS A	3.5	25.7	0.22	0.28	37.0
12	R2	94	5.0	94	5.0	0.473	9.0	LOS A	3.5	25.7	0.24	0.32	50.4
Approach		520	5.0	520	5.0	0.473	4.3	LOS A	3.5	25.7	0.22	0.28	43.6
All Vehicles		1542	5.0	1542	5.0	0.921	16.4	LOS B	14.3	104.1	0.47	0.50	30.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 1.0 %
Number of Iterations: 9 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	7.2	LOS A	0.1	0.1	0.43	0.43
P2	East Full Crossing	53	33.4	LOS D	0.1	0.1	0.91	0.91
P3	North Full Crossing	53	9.0	LOS A	0.1	0.1	0.48	0.48
P4	West Full Crossing	53	33.4	LOS D	0.1	0.1	0.91	0.91
All Pedestrians		211	20.8	LOS C			0.68	0.68

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1 [Victor / Albert Sat]

Network: 1 [Saturday - Fixed Phase Splits]

Victor Street - Albert Avenue
Base Scenario
Sat Peak Hour
Signals - Fixed Time Coordinated Cycle Time = 100 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Victor Street (S)													
1	L2	89	5.0	89	5.0	0.263	43.5	LOS D	3.8	27.7	0.89	0.76	25.0
2	T1	56	5.0	56	5.0	0.560	46.1	LOS D	5.5	40.2	0.98	0.79	33.3
3	R2	59	5.0	59	5.0	0.560	51.7	LOS D	5.5	40.2	0.98	0.79	25.6
Approach		204	5.0	204	5.0	0.560	46.6	LOS D	5.5	40.2	0.94	0.78	28.0
East: Albert Avenue (E)													
4	L2	317	5.0	317	5.0	0.354	12.3	LOS A	8.8	63.9	0.44	0.62	44.9
5	T1	589	5.0	589	5.0	0.354	6.7	LOS A	9.1	66.3	0.44	0.44	30.0
6	R2	125	5.0	125	5.0	0.233	13.8	LOS A	2.6	19.0	0.45	0.70	42.2
Approach		1032	5.0	1032	5.0	0.354	9.3	LOS A	9.1	66.3	0.44	0.53	40.1
North: Victor Street (N)													
7	L2	85	5.0	85	5.0	0.476	45.3	LOS D	7.4	54.0	0.94	0.78	27.5
8	T1	81	5.0	81	5.0	0.476	39.7	LOS C	7.4	54.0	0.94	0.78	35.4
9	R2	85	5.0	85	5.0	0.523	53.6	LOS D	4.2	30.4	0.99	0.78	22.0
Approach		252	5.0	252	5.0	0.523	46.3	LOS D	7.4	54.0	0.96	0.78	28.7
West: Albert Avenue (W)													
10	L2	118	5.0	118	5.0	0.209	6.5	LOS A	1.3	9.4	0.11	0.32	51.4
11	T1	421	5.0	421	5.0	0.209	4.4	LOS A	4.6	33.5	0.28	0.32	41.9
12	R2	249	5.0	249	5.0	0.831	40.0	LOS C	12.3	89.9	0.76	0.94	27.3
Approach		788	5.0	788	5.0	0.831	16.0	LOS B	12.3	89.9	0.41	0.52	34.4
All Vehicles		2276	5.0	2276	5.0	0.831	19.0	LOS B	12.3	89.9	0.53	0.58	33.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 2.7 %
Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	8.4	LOS A	0.1	0.1	0.41	0.41
P2	East Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94
P3	North Full Crossing	53	7.2	LOS A	0.1	0.1	0.38	0.38
P4	West Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94
All Pedestrians		211	26.1	LOS C			0.67	0.67

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1 [Pacific / Albert Sat]

Network: 1 [Saturday - Fixed Phase Splits]

Pacific Hwy - Albert Avenue
Base Scenario
Sat Peak Hour
Signals - Fixed Time Coordinated Cycle Time = 148 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Hwy - S Leg													
1	L2	16	5.0	16	5.0	0.670	9.8	LOS A	13.0	94.9	0.23	0.22	54.4
2	T1	1728	5.0	1728	5.0	0.670	4.2	LOS A	13.0	95.0	0.23	0.22	56.1
3	R2	246	5.0	246	5.0	0.884	81.2	LOS F	19.1	139.3	1.00	0.93	16.7
Approach		1991	5.0	1991	5.0	0.884	13.8	LOS A	19.1	139.3	0.33	0.31	48.4
East: Albert Ave - E Leg													
4	L2	207	5.0	207	5.0	0.490	52.9	LOS D	13.2	96.4	0.94	0.83	25.3
5	T1	54	5.0	54	5.0	1.431	451.7	LOS F	33.5	244.8	1.00	1.86	4.7
6	R2	371	5.0	371	5.0	1.431	457.4	LOS F	33.5	244.8	1.00	1.81	4.7
Approach		632	5.0	632	5.0	1.431	324.1	LOS F	33.5	244.8	0.98	1.49	6.4
North: Pacific Hwy - N Leg													
7	L2	351	5.0	351	5.0	0.325	14.4	LOS A	6.6	48.4	0.29	0.66	41.0
8	T1	1934	5.0	1934	5.0	0.617	10.8	LOS A	19.4	141.9	0.40	0.36	51.0
9	R2	26	5.0	26	5.0	0.217	78.5	LOS F	1.8	13.4	0.96	0.72	25.7
Approach		2311	5.0	2311	5.0	0.617	12.1	LOS A	19.4	141.9	0.39	0.41	49.4
All Vehicles		4933	5.0	4933	5.0	1.431	52.7	LOS D	33.5	244.8	0.44	0.51	30.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 2.7 %
Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	65.4	LOS F	0.2	0.2	0.94	0.94
P2	East Full Crossing	53	16.1	LOS B	0.1	0.1	0.47	0.47
P4	West Full Crossing	53	7.8	LOS A	0.1	0.1	0.33	0.33
All Pedestrians		158	29.8	LOS C			0.58	0.58

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1 [Thomas / Albert Sat]

Network: 1 [Saturday - Fixed Phase Splits]

Thomas Lane - Albert Avenue
Base Scenario
Sat Peak Hour
Signals - Fixed Time Coordinated Cycle Time = 100 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Albert Ave - E Leg													
5	T1	611	5.0	611	5.0	0.463	4.1	LOS A	4.4	31.9	0.27	0.24	37.1
Approach		611	5.0	611	5.0	0.463	4.1	LOS A	4.4	31.9	0.27	0.24	37.1
North: Thomas Ln - N Leg													
7	L2	27	5.0	27	5.0	0.286	47.3	LOS D	2.5	18.0	0.92	0.76	23.7
9	R2	27	5.0	27	5.0	0.286	47.2	LOS D	2.5	18.0	0.92	0.76	23.7
Approach		55	5.0	55	5.0	0.286	47.2	LOS D	2.5	18.0	0.92	0.76	23.7
West: Albert Ave - W Leg													
11	T1	783	0.0	783	0.0	0.442	5.8	LOS A	12.2	85.6	0.42	0.37	37.5
Approach		783	0.0	783	0.0	0.442	5.8	LOS A	12.2	85.6	0.42	0.37	37.5
All Vehicles		1448	2.3	1448	2.3	0.463	6.6	LOS A	12.2	85.6	0.37	0.33	34.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 2.7 %
Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P3	North Full Crossing	53	4.5	LOS A	0.0	0.0	0.30	0.30
P4	West Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94
All Pedestrians		105	24.4	LOS C			0.62	0.62

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1 [Orchard / Albert Sat]

Network: 1 [Saturday - Fixed Phase Splits]

Orchard Road - Albert Avenue
Base Scenario
Sat Peak Hour
Signals - Fixed Time Coordinated Cycle Time = 100 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Orchard Rd - S Leg													
1	L2	116	5.0	116	5.0	0.963	82.7	LOS F	18.1	131.9	1.00	1.12	16.3
2	T1	5	5.0	5	5.0	0.963	77.1	LOS F	18.1	131.9	1.00	1.12	25.5
3	R2	139	5.0	139	5.0	0.963	82.7	LOS F	18.1	131.9	1.00	1.12	16.3
Approach		260	5.0	260	5.0	0.963	82.6	LOS F	18.1	131.9	1.00	1.12	16.6
East: Albert Ave - E Leg													
4	L2	123	5.0	123	5.0	0.271	7.4	LOS A	2.3	16.6	0.15	0.31	50.8
5	T1	585	5.0	585	5.0	0.301	2.7	LOS A	2.6	19.2	0.15	0.20	36.1
6	R2	3	5.0	3	5.0	0.301	7.4	LOS A	2.6	19.2	0.16	0.14	52.9
Approach		712	5.0	712	5.0	0.301	3.5	LOS A	2.6	19.2	0.15	0.22	43.7
North: Orchard Rd - N Leg													
7	L2	6	5.0	6	5.0	0.035	39.4	LOS C	0.5	3.9	0.82	0.63	27.6
8	T1	7	5.0	7	5.0	0.035	33.8	LOS C	0.5	3.9	0.82	0.63	37.6
9	R2	7	5.0	7	5.0	0.037	46.5	LOS D	0.3	2.3	0.89	0.67	23.9
Approach		21	5.0	21	5.0	0.037	39.9	LOS C	0.5	3.9	0.85	0.64	30.6
West: Albert Ave - W Leg													
10	L2	4	5.0	4	5.0	0.346	8.4	LOS A	3.2	23.7	0.17	0.15	53.0
11	T1	604	5.0	604	5.0	0.346	2.8	LOS A	3.2	23.7	0.17	0.19	40.6
12	R2	58	5.0	58	5.0	0.346	8.4	LOS A	1.7	12.7	0.17	0.27	51.0
Approach		666	5.0	666	5.0	0.346	3.3	LOS A	3.2	23.7	0.17	0.19	43.8
All Vehicles		1659	5.0	1659	5.0	0.963	16.3	LOS B	18.1	131.9	0.30	0.36	27.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Largest change in Average Back of Queue or Degree of Saturation for any lane during the last three iterations: 2.7 %
Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	7.2	LOS A	0.1	0.1	0.38	0.38
P2	East Full Crossing	53	39.7	LOS D	0.1	0.1	0.89	0.89
P3	North Full Crossing	53	8.8	LOS A	0.1	0.1	0.42	0.42
P4	West Full Crossing	53	39.7	LOS D	0.1	0.1	0.89	0.89
All Pedestrians		211	23.9	LOS C			0.65	0.65

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

A.3. Post Development Conditions

MOVEMENT SUMMARY

Site: 1 [Post-Development AM]

Victor Street - Albert Avenue
Post-Development
AM Peak Hour
Signals - Fixed Time Isolated Cycle Time = 80 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Victor Street (S)											
1	L2	59	5.0	0.105	26.7	LOS B	1.6	12.0	0.74	0.72	40.8
2	T1	74	5.0	0.248	22.4	LOS B	3.5	25.7	0.78	0.68	42.8
3	R2	45	5.0	0.248	28.1	LOS B	3.5	25.7	0.78	0.68	42.0
Approach		178	5.0	0.248	25.3	LOS B	3.5	25.7	0.77	0.70	41.9
East: Albert Avenue (E)											
4	L2	105	5.0	0.235	16.1	LOS B	4.8	34.8	0.56	0.59	48.2
5	T1	365	5.0	0.235	10.5	LOS A	4.9	35.6	0.56	0.52	50.6
6	R2	76	5.0	0.160	18.7	LOS B	1.7	12.5	0.60	0.71	44.8
Approach		546	5.0	0.235	12.7	LOS A	4.9	35.6	0.57	0.56	49.2
North: Victor Street (N)											
7	L2	66	5.0	0.160	27.2	LOS B	2.6	18.9	0.76	0.70	41.3
8	T1	51	5.0	0.160	22.1	LOS B	2.6	18.9	0.77	0.70	42.2
9	R2	44	5.0	0.160	28.2	LOS B	2.0	14.9	0.77	0.69	41.2
Approach		161	5.0	0.160	25.8	LOS B	2.6	18.9	0.76	0.70	41.5
West: Albert Avenue (W)											
10	L2	74	5.0	0.250	16.2	LOS B	5.2	37.8	0.57	0.56	48.7
11	T1	429	5.0	0.250	10.6	LOS A	5.3	38.3	0.57	0.51	50.7
12	R2	102	5.0	0.209	19.0	LOS B	2.4	17.3	0.62	0.73	44.6
Approach		605	5.0	0.250	12.7	LOS A	5.3	38.3	0.58	0.55	49.3
All Vehicles		1491	5.0	0.250	15.6	LOS B	5.3	38.3	0.62	0.59	47.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	13.8	LOS B	0.1	0.1	0.59	0.59
P2	East Full Crossing	53	29.0	LOS C	0.1	0.1	0.85	0.85
P3	North Full Crossing	53	12.1	LOS B	0.1	0.1	0.55	0.55
P4	West Full Crossing	53	29.0	LOS C	0.1	0.1	0.85	0.85
All Pedestrians		211	21.0	LOS C			0.71	0.71

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1 [Victor / Albert PM]

Network: 1 [Weekday PM - Fixed Phase Splits]

Victor Street - Albert Avenue
Post Development - Option 1
PM Peak Hour
Signals - Fixed Time Coordinated Cycle Time = 80 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Victor Street (S)													
1	L2	83	5.0	83	5.0	0.195	32.3	LOS C	2.6	19.3	0.84	0.75	29.4
2	T1	64	5.0	64	5.0	0.314	29.6	LOS C	3.5	25.9	0.89	0.73	39.5
3	R2	40	5.0	40	5.0	0.314	35.2	LOS C	3.5	25.9	0.89	0.73	31.9
Approach		187	5.0	187	5.0	0.314	32.0	LOS C	3.5	25.9	0.86	0.74	34.2
East: Albert Avenue (E)													
4	L2	218	5.0	218	5.0	0.290	13.4	LOS A	5.9	43.1	0.50	0.63	44.1
5	T1	441	5.0	441	5.0	0.290	7.8	LOS A	6.1	44.6	0.50	0.48	28.0
6	R2	80	5.0	80	5.0	0.140	14.1	LOS A	1.5	10.6	0.49	0.69	42.0
Approach		739	5.0	739	5.0	0.290	10.1	LOS A	6.1	44.6	0.50	0.55	38.6
North: Victor Street (N)													
7	L2	75	5.0	75	5.0	0.322	33.3	LOS C	4.6	33.7	0.87	0.74	32.2
8	T1	77	5.0	77	5.0	0.322	28.1	LOS B	4.6	33.7	0.87	0.75	39.6
9	R2	78	5.0	78	5.0	0.322	36.3	LOS C	3.1	22.6	0.90	0.76	27.9
Approach		229	5.0	229	5.0	0.322	32.6	LOS C	4.6	33.7	0.88	0.75	33.9
West: Albert Avenue (W)													
10	L2	115	5.0	115	5.0	0.176	11.9	LOS A	3.0	21.8	0.42	0.54	44.8
11	T1	287	5.0	287	5.0	0.176	7.2	LOS A	3.1	22.5	0.42	0.41	35.8
12	R2	201	5.0	201	5.0	0.485	16.6	LOS B	4.3	31.6	0.57	0.74	39.2
Approach		603	5.0	603	5.0	0.485	11.2	LOS A	4.3	31.6	0.47	0.54	39.7
All Vehicles		1759	5.0	1759	5.0	0.485	15.8	LOS B	6.1	44.6	0.58	0.59	37.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Network Model Accuracy Level (largest change in degree of saturation for any lane): 0.8 %
Number of Iterations: 9 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	10.5	LOS B	0.1	0.1	0.51	0.51
P2	East Full Crossing	53	34.3	LOS D	0.1	0.1	0.93	0.93
P3	North Full Crossing	53	9.0	LOS A	0.1	0.1	0.48	0.48
P4	West Full Crossing	53	34.3	LOS D	0.1	0.1	0.93	0.93
All Pedestrians		211	22.0	LOS C			0.71	0.71

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1 [Orchard / Albert PM]

Network: 1 [Weekday PM - Fixed Phase Splits]

Orchard Road - Albert Avenue
Post Development - Option 1
PM Peak Hour
Signals - Fixed Time Coordinated Cycle Time = 80 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Orchard Rd - S Leg													
1	L2	128	5.0	128	5.0	0.921	54.2	LOS D	14.3	104.1	1.00	1.04	21.8
2	T1	8	5.0	8	5.0	0.921	48.6	LOS D	14.3	104.1	1.00	1.04	31.8
3	R2	158	5.0	158	5.0	0.921	54.2	LOS D	14.3	104.1	1.00	1.04	21.8
Approach		295	5.0	295	5.0	0.921	54.1	LOS D	14.3	104.1	1.00	1.04	22.2
East: Albert Ave - E Leg													
4	L2	126	5.0	126	5.0	0.267	11.6	LOS A	5.7	41.9	0.51	0.55	45.9
5	T1	529	5.0	529	5.0	0.290	6.1	LOS A	5.7	41.9	0.41	0.40	25.5
6	R2	3	5.0	3	5.0	0.290	10.4	LOS A	4.4	32.1	0.35	0.31	49.2
Approach		659	5.0	659	5.0	0.290	7.2	LOS A	5.7	41.9	0.43	0.43	35.5
North: Orchard Rd - N Leg													
7	L2	19	5.0	19	5.0	0.118	33.4	LOS C	1.5	10.8	0.84	0.67	30.4
8	T1	27	5.0	27	5.0	0.118	27.8	LOS B	1.5	10.8	0.84	0.67	40.2
9	R2	38	5.0	38	5.0	0.176	39.0	LOS C	1.4	9.9	0.91	0.73	26.5
Approach		84	5.0	84	5.0	0.176	34.1	LOS C	1.5	10.8	0.87	0.70	32.6
West: Albert Ave - W Leg													
10	L2	7	5.0	7	5.0	0.098	8.0	LOS A	0.6	4.7	0.15	0.15	53.1
11	T1	438	5.0	438	5.0	0.491	3.3	LOS A	3.8	27.4	0.22	0.28	36.7
12	R2	94	5.0	94	5.0	0.491	9.1	LOS A	3.8	27.4	0.24	0.32	50.3
Approach		539	5.0	539	5.0	0.491	4.4	LOS A	3.8	27.4	0.22	0.28	43.3
All Vehicles		1577	5.0	1577	5.0	0.921	16.4	LOS B	14.3	104.1	0.49	0.51	30.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Network Model Accuracy Level (largest change in degree of saturation for any lane): 0.8 %
Number of Iterations: 9 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	7.2	LOS A	0.1	0.1	0.43	0.43
P2	East Full Crossing	53	33.4	LOS D	0.1	0.1	0.91	0.91
P3	North Full Crossing	53	9.0	LOS A	0.1	0.1	0.48	0.48
P4	West Full Crossing	53	33.4	LOS D	0.1	0.1	0.91	0.91
All Pedestrians		211	20.8	LOS C			0.68	0.68

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1 [Thomas / Albert PM]

Network: 1 [Weekday PM - Fixed Phase Splits]

Thomas Lane - Albert Avenue
Post Development - Option 1
PM Peak Hour
Signals - Fixed Time Coordinated Cycle Time = 80 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Albert Ave - E Leg													
5	T1	644	5.0	644	5.0	0.487	5.5	LOS A	5.9	43.1	0.38	0.34	32.7
Approach		644	5.0	644	5.0	0.487	5.5	LOS A	5.9	43.1	0.38	0.34	32.7
North: Thomas Ln - N Leg													
7	L2	11	5.0	11	5.0	0.069	34.2	LOS C	0.7	5.0	0.84	0.70	28.5
9	R2	11	5.0	11	5.0	0.069	34.1	LOS C	0.7	5.0	0.84	0.70	28.5
Approach		21	5.0	21	5.0	0.069	34.1	LOS C	0.7	5.0	0.84	0.70	28.5
West: Albert Ave - W Leg													
11	T1	548	0.0	548	0.0	0.343	6.5	LOS A	7.6	52.9	0.46	0.40	35.9
Approach		548	0.0	548	0.0	0.343	6.5	LOS A	7.6	52.9	0.46	0.40	35.9
All Vehicles		1214	2.7	1214	2.7	0.487	6.4	LOS A	7.6	52.9	0.43	0.37	33.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Network Model Accuracy Level (largest change in degree of saturation for any lane): 0.8 %
Number of Iterations: 9 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P3	North Full Crossing	53	5.6	LOS A	0.0	0.0	0.38	0.38
P4	West Full Crossing	53	34.3	LOS D	0.1	0.1	0.93	0.93
All Pedestrians		105	20.0	LOS B			0.65	0.65

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 1 [Pacific / Albert PM]

Network: 1 [Weekday PM - Fixed Phase Splits]

Pacific Hwy - Albert Avenue
Post Development - Option 1
PM Peak Hour
Signals - Fixed Time Coordinated Cycle Time = 149 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Hwy - S Leg													
1	L2	16	5.0	16	5.0	0.646	10.6	LOS A	13.6	99.0	0.25	0.24	53.8
2	T1	2463	5.0	2463	5.0	0.646	5.0	LOS A	13.6	99.1	0.25	0.24	55.4
3	R2	247	5.0	247	5.0	0.894	83.0	LOS F	19.5	142.4	1.00	0.93	16.4
Approach		2726	5.0	2726	5.0	0.894	12.1	LOS A	19.5	142.4	0.32	0.30	49.7
East: Albert Ave - E Leg													
4	L2	171	5.0	171	5.0	0.332	49.2	LOS D	10.4	75.7	0.89	0.81	26.3
5	T1	47	5.0	47	5.0	1.131	225.8	LOS F	25.9	189.4	1.00	1.38	8.9
6	R2	341	5.0	341	5.0	1.131	231.2	LOS F	25.9	189.4	1.00	1.32	8.9
Approach		559	5.0	559	5.0	1.131	175.2	LOS F	25.9	189.4	0.97	1.17	11.1
North: Pacific Hwy - N Leg													
7	L2	261	5.0	261	5.0	0.246	14.8	LOS B	4.9	35.7	0.28	0.66	40.7
8	T1	1921	5.0	1921	5.0	0.987	54.3	LOS D	85.4	623.1	0.76	0.91	31.8
9	R2	52	5.0	52	5.0	0.429	80.7	LOS F	3.7	27.1	0.99	0.75	25.4
Approach		2234	5.0	2234	5.0	0.987	50.3	LOS D	85.4	623.1	0.71	0.88	32.0
All Vehicles		5519	5.0	5519	5.0	1.131	44.1	LOS D	85.4	623.1	0.54	0.62	33.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Network Model Accuracy Level (largest change in degree of saturation for any lane): 0.8 %
Number of Iterations: 9 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	67.8	LOS F	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	17.0	LOS B	0.1	0.1	0.48	0.48
P4	West Full Crossing	53	8.4	LOS A	0.1	0.1	0.34	0.34
All Pedestrians		158	31.1	LOS D			0.59	0.59

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1 [Victor / Albert Sat]

Network: 1 [Saturday - Fixed Phase Splits]

Victor Street - Albert Avenue
Post Development - Option 1
Sat Peak Hour
Signals - Fixed Time Coordinated Cycle Time = 100 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Victor Street (S)													
1	L2	89	5.0	89	5.0	0.263	43.5	LOS D	3.8	27.7	0.89	0.76	25.0
2	T1	62	5.0	62	5.0	0.590	46.5	LOS D	5.9	42.8	0.99	0.80	33.3
3	R2	59	5.0	59	5.0	0.590	52.1	LOS D	5.9	42.8	0.99	0.80	25.6
Approach		211	5.0	211	5.0	0.590	46.8	LOS D	5.9	42.8	0.95	0.79	28.2
East: Albert Avenue (E)													
4	L2	317	5.0	317	5.0	0.354	12.3	LOS A	8.8	63.9	0.44	0.62	44.9
5	T1	589	5.0	589	5.0	0.354	6.7	LOS A	9.1	66.3	0.44	0.44	30.0
6	R2	139	5.0	139	5.0	0.263	14.0	LOS A	3.0	21.6	0.46	0.70	42.1
Approach		1045	5.0	1045	5.0	0.354	9.4	LOS A	9.1	66.3	0.44	0.53	40.1
North: Victor Street (N)													
7	L2	85	5.0	85	5.0	0.497	45.5	LOS D	7.8	56.6	0.94	0.79	27.5
8	T1	88	5.0	88	5.0	0.497	39.9	LOS C	7.8	56.6	0.94	0.79	35.3
9	R2	99	5.0	99	5.0	0.621	55.5	LOS D	5.0	36.3	1.00	0.81	21.5
Approach		273	5.0	273	5.0	0.621	47.3	LOS D	7.8	56.6	0.96	0.80	28.3
West: Albert Avenue (W)													
10	L2	132	5.0	132	5.0	0.215	6.5	LOS A	1.3	9.7	0.11	0.34	51.2
11	T1	421	5.0	421	5.0	0.215	4.4	LOS A	4.7	34.3	0.29	0.33	41.7
12	R2	249	5.0	249	5.0	0.833	40.4	LOS C	12.3	90.0	0.76	0.94	27.2
Approach		802	5.0	802	5.0	0.833	15.9	LOS B	12.3	90.0	0.40	0.52	34.5
All Vehicles		2331	5.0	2331	5.0	0.833	19.5	LOS B	12.3	90.0	0.54	0.58	33.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Network Model Accuracy Level (largest change in degree of saturation for any lane): 1.4 %
Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	8.4	LOS A	0.1	0.1	0.41	0.41
P2	East Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94
P3	North Full Crossing	53	7.2	LOS A	0.1	0.1	0.38	0.38
P4	West Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94
All Pedestrians		211	26.1	LOS C			0.67	0.67

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1 [Pacific / Albert Sat]

Network: 1 [Saturday - Fixed Phase Splits]

Pacific Hwy - Albert Avenue
Post Development - Option 1
Sat Peak Hour
Signals - Fixed Time Coordinated Cycle Time = 148 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Pacific Hwy - S Leg													
1	L2	16	5.0	16	5.0	0.670	9.8	LOS A	13.0	94.9	0.23	0.22	54.4
2	T1	1728	5.0	1728	5.0	0.670	4.2	LOS A	13.0	95.0	0.23	0.22	56.1
3	R2	252	5.0	252	5.0	0.903	83.7	LOS F	19.9	145.5	1.00	0.95	16.3
Approach		1996	5.0	1996	5.0	0.903	14.3	LOS A	19.9	145.5	0.33	0.31	48.0
East: Albert Ave - E Leg													
4	L2	213	5.0	213	5.0	0.502	53.2	LOS D	13.6	99.2	0.94	0.84	25.2
5	T1	54	5.0	54	5.0	1.459	506.8	LOS F	33.5	244.8	1.00	1.89	4.4
6	R2	379	5.0	379	5.0	1.459	512.2	LOS F	33.5	244.8	1.00	1.84	4.4
Approach		645	5.0	645	5.0	1.459	360.5	LOS F	33.5	244.8	0.98	1.52	6.0
North: Pacific Hwy - N Leg													
7	L2	359	5.0	359	5.0	0.333	14.4	LOS A	6.9	50.0	0.29	0.66	41.0
8	T1	1934	5.0	1934	5.0	0.618	10.8	LOS A	19.5	142.2	0.40	0.36	50.9
9	R2	26	5.0	26	5.0	0.217	78.5	LOS F	1.8	13.4	0.96	0.72	25.7
Approach		2319	5.0	2319	5.0	0.618	12.2	LOS A	19.5	142.2	0.39	0.41	49.3
All Vehicles		4960	5.0	4960	5.0	1.459	58.3	LOS E	33.5	244.8	0.44	0.52	29.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Network Model Accuracy Level (largest change in degree of saturation for any lane): 1.4 %
Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	65.4	LOS F	0.2	0.2	0.94	0.94
P2	East Full Crossing	53	16.1	LOS B	0.1	0.1	0.47	0.47
P4	West Full Crossing	53	7.8	LOS A	0.1	0.1	0.33	0.33
All Pedestrians		158	29.8	LOS C			0.58	0.58

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1 [Thomas / Albert Sat]

Network: 1 [Saturday - Fixed Phase Splits]

Thomas Lane - Albert Avenue
Post Development - Option 1
Sat Peak Hour
Signals - Fixed Time Coordinated Cycle Time = 100 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Albert Ave - E Leg													
5	T1	624	5.0	624	5.0	0.473	4.0	LOS A	4.5	32.6	0.27	0.23	37.3
Approach		624	5.0	624	5.0	0.473	4.0	LOS A	4.5	32.6	0.27	0.23	37.3
North: Thomas Ln - N Leg													
7	L2	27	5.0	27	5.0	0.286	47.3	LOS D	2.5	18.0	0.92	0.76	23.7
9	R2	27	5.0	27	5.0	0.286	47.2	LOS D	2.5	18.0	0.92	0.76	23.7
Approach		55	5.0	55	5.0	0.286	47.2	LOS D	2.5	18.0	0.92	0.76	23.7
West: Albert Ave - W Leg													
11	T1	797	0.0	797	0.0	0.450	5.8	LOS A	12.5	87.8	0.42	0.38	37.4
Approach		797	0.0	797	0.0	0.450	5.8	LOS A	12.5	87.8	0.42	0.38	37.4
All Vehicles		1476	2.3	1476	2.3	0.473	6.6	LOS A	12.5	87.8	0.37	0.33	34.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Network Model Accuracy Level (largest change in degree of saturation for any lane): 1.4 %
Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P3	North Full Crossing	53	4.5	LOS A	0.0	0.0	0.30	0.30
P4	West Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94
All Pedestrians		105	24.4	LOS C			0.62	0.62

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 1 [Orchard / Albert Sat]

Network: 1 [Saturday - Fixed Phase Splits]

Orchard Road - Albert Avenue
Post Development - Option 1
Sat Peak Hour
Signals - Fixed Time Coordinated Cycle Time = 100 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Orchard Rd - S Leg													
1	L2	116	5.0	116	5.0	0.964	83.2	LOS F	18.1	132.4	1.00	1.13	16.3
2	T1	5	5.0	5	5.0	0.964	77.6	LOS F	18.1	132.4	1.00	1.13	25.4
3	R2	139	5.0	139	5.0	0.964	83.2	LOS F	18.1	132.4	1.00	1.13	16.3
Approach		260	5.0	260	5.0	0.964	83.1	LOS F	18.1	132.4	1.00	1.13	16.5
East: Albert Ave - E Leg													
4	L2	123	5.0	123	5.0	0.276	7.4	LOS A	2.3	17.0	0.15	0.31	50.8
5	T1	599	5.0	599	5.0	0.307	2.7	LOS A	2.7	19.7	0.16	0.20	36.1
6	R2	3	5.0	3	5.0	0.307	7.4	LOS A	2.7	19.7	0.16	0.14	52.9
Approach		725	5.0	725	5.0	0.307	3.5	LOS A	2.7	19.7	0.16	0.22	43.6
North: Orchard Rd - N Leg													
7	L2	6	5.0	6	5.0	0.035	39.4	LOS C	0.5	3.9	0.82	0.63	27.6
8	T1	7	5.0	7	5.0	0.035	33.8	LOS C	0.5	3.9	0.82	0.63	37.6
9	R2	7	5.0	7	5.0	0.037	46.5	LOS D	0.3	2.3	0.89	0.67	23.9
Approach		21	5.0	21	5.0	0.037	39.9	LOS C	0.5	3.9	0.85	0.64	30.6
West: Albert Ave - W Leg													
10	L2	4	5.0	4	5.0	0.354	8.4	LOS A	3.4	24.5	0.17	0.15	53.0
11	T1	618	5.0	618	5.0	0.354	2.8	LOS A	3.4	24.5	0.17	0.19	40.6
12	R2	58	5.0	58	5.0	0.354	8.4	LOS A	1.8	13.0	0.17	0.27	51.0
Approach		680	5.0	680	5.0	0.354	3.3	LOS A	3.4	24.5	0.17	0.19	43.7
All Vehicles		1686	5.0	1686	5.0	0.964	16.2	LOS B	18.1	132.4	0.30	0.36	27.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Network Model Accuracy Level (largest change in degree of saturation for any lane): 1.4 %
Number of Iterations: 10 (maximum specified: 10)

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	7.2	LOS A	0.1	0.1	0.38	0.38
P2	East Full Crossing	53	39.7	LOS D	0.1	0.1	0.89	0.89
P3	North Full Crossing	53	8.8	LOS A	0.1	0.1	0.42	0.42
P4	West Full Crossing	53	39.7	LOS D	0.1	0.1	0.89	0.89
All Pedestrians		211	23.9	LOS C			0.65	0.65

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

B.SURROUNDING DEVELOPMENTS AND SITE TRAFFIC GENERATION

B

APPENDIX: SURROUNDING DEVELOPMENTS AND SITE TRAFFIC GENERATION

The traffic assessment includes the traffic generation from a number of surrounding developments that have been constructed since the 2014 traffic surveys, including:

- Metro Residences (at the Chatswood Interchange)
- Meriton Development (Thomas Street).

The assessment also includes Mandarin Centre which is in planning.

The traffic generation estimates have been sourced from the following sources:

- Metro Residences – Department of Infrastructure, Planning and Natural Resources 'Planning Assessment Report: Development Application DA 119-5-2004'
  It is noted that the traffic report and modelling report that accompanied the application could not be sourced however the assessment report quotes an overall peak hour traffic generation of 116 movements (484 spaces x 0.24 movements per dwelling). No parking is allocated to retail land uses. It is noted that 1 of the 3 towers is now complete and inhabited.
- Meriton Development – Transport and Traffic Planning Associates report 'S75W Modification Application to Major Project MP 09-0066: Thomas Street Chatswood' dated December 2012
  It is noted that whilst the report assessed the yield associated with a 45 storey development, only a 39 storey development was approved for the site. As such, the assessment contained within the report is conservative on the high side. The assessment anticipated traffic generation of 158 and 175 for the AM and PM peak hours. The assessment adopted a residential traffic generation of 0.16 movements per dwelling.
- Mandarin Centre – Mandarin Centre Transport Impact Assessment, GTA Consultants, dated 13 April 2016
  An additional 49 retail spaces and 194 residential spaces will be generated by the development. The assessment adopted a residential traffic generation rate of 0.19 movements per space in the AM and Saturday peak periods, and 0.15 movements per space in the PM peak period. The assessment adopted a retail traffic generation rate of 0.16, 0.56 and 0.87 trips per space in the AM, PM and Saturday peak hour periods respectively.

A summary of the land uses and anticipated additional traffic generation for each of the surrounding sites is provided in Table B.1.

Table B.1: Surrounding Developments (Additional Vehicle Movements)

Development	Location	Site Overview	Peak Hour Traffic Generation (veh/hr)	
			AM	PM
Metro Residences	Chatswood Transport Interchange	• 553 apartments • 12,000m^2 retail GFA • 484 car spaces	116	116
Meriton Development	Thomas Street	• 543 apartments (including 241 private and 302 serviced) • 550m^2 retail • 50 place child care centre • 740 car spaces (approx.)	158	175
Mandarin Centre	61-65 Albert Avenue	• 285 apartments • 10,500m^2 retail/ entertainment GFA • 2,945m^2 supermarket GFA • 545 car spaces (approx.)	45 (plus 48 existing movements [1])	56 (plus 170 existing movements [1])
Total			**+319 movements**	**+347 movements**

[3] Adopting peak hour traffic generation rates of 0.52 and 0.92 movements per space during the AM and PM peak hours, respectively as noted in the GTA Report.

APPENDIX: SURROUNDING DEVELOPMENTS AND SITE TRAFFIC GENERATION

Table B.1 indicates that the nearby developments are anticipated to generate in the order of 319 and 347 additional AM and PM peak hour movements, respectively onto the surrounding road network. These developments did not strictly assess the Saturday lunchtime peak hour traffic generation; however, for assessment purposes the PM peak hour traffic generation rate has been adopted.

The traffic distributions provided in each of the assessments have been adopted to develop the base traffic volumes in the vicinity of the site. The resultant base traffic volumes, as well as the site generated traffic volumes, are presented below.

Figure B.1: AM Peak Hour – Base Traffic Volumes

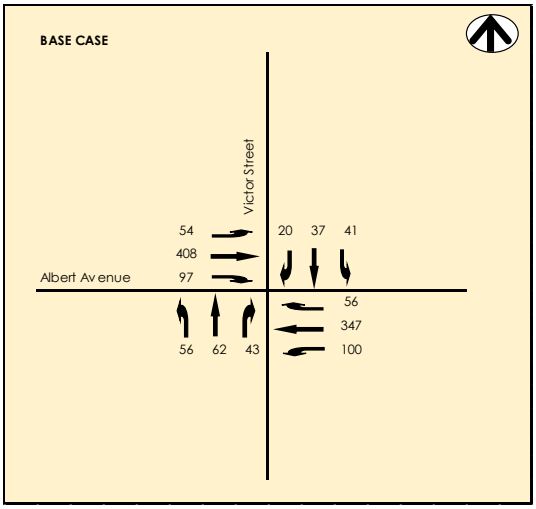
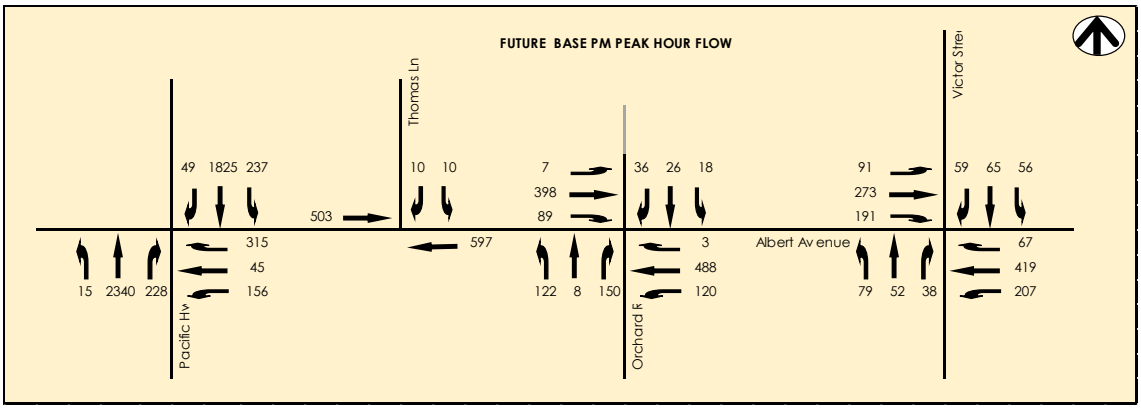


Figure B.2: PM Peak Hour – Base Traffic Volumes



APPENDIX: SURROUNDING DEVELOPMENTS AND SITE TRAFFIC GENERATION

Figure B.3: Saturday Peak Hour – Base Traffic Volumes

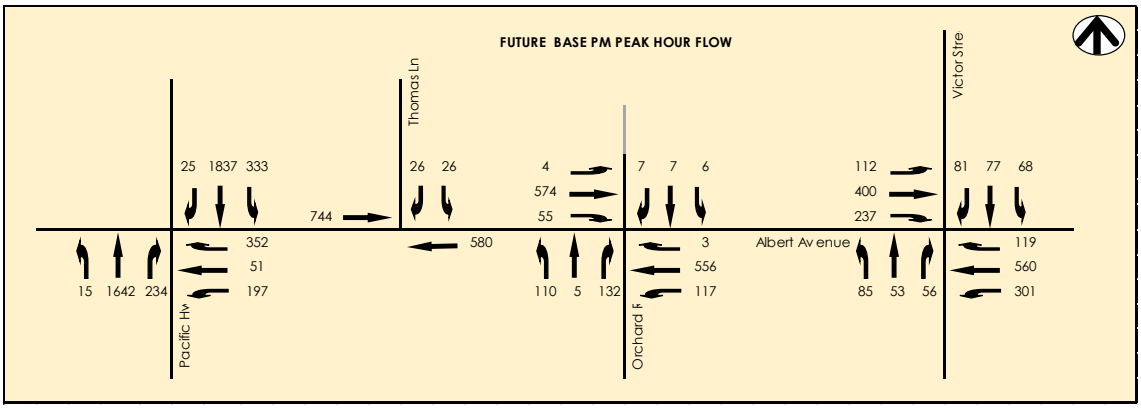


Figure B.4: AM Peak Hour – Site Generated Traffic Volumes

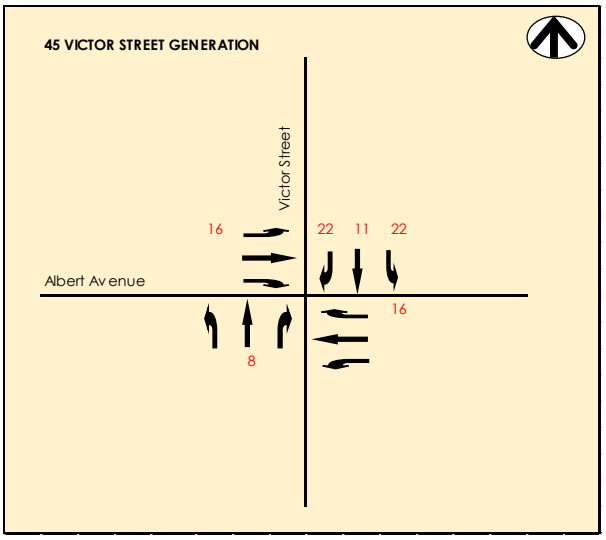


Figure B.5: PM Peak Hour – Site Generated Traffic Volumes

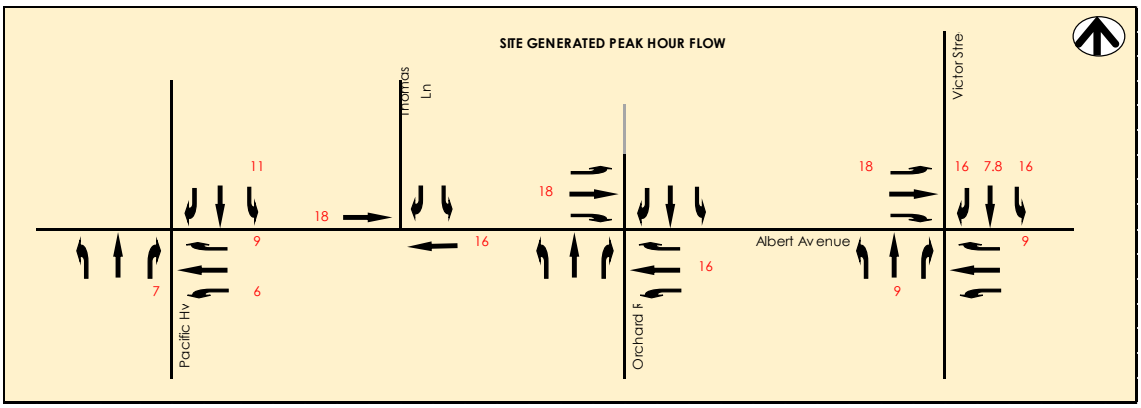
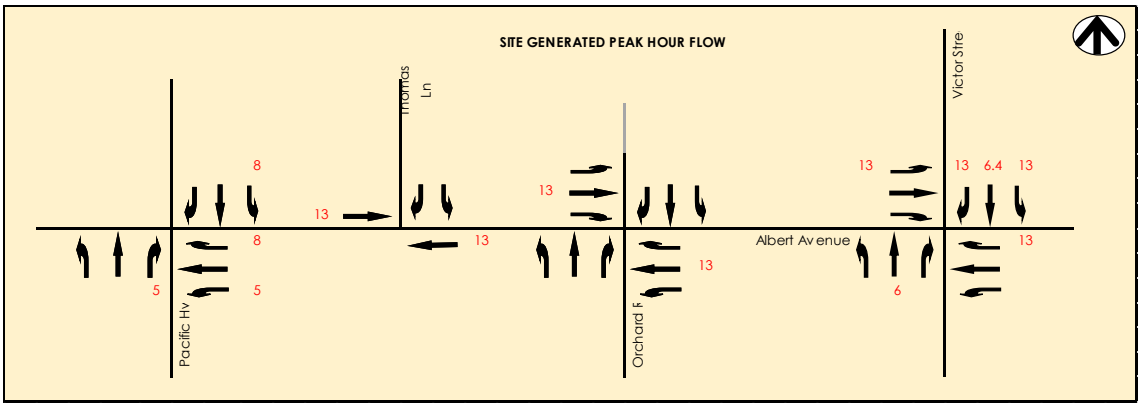


Figure B.6: Saturday Peak Hour – Site Generated Traffic Volumes



GTAconsultants

www.gta.com.au

Appendix E Preliminary Site Assessment

Douglas Partners Pty Ltd
ABN 75 053 980 117
www.douglaspartners.com.au
96 Hermitage Road
West Ryde NSW 2114
PO Box 472
West Ryde NSW 1685
Phone (02) 9809 0666

Mirvac
Level 28, 200 George Street
Sydney NSW 2000

Project 73843.02
11 August 2020
R.002.Rev0
LT:jl

Attention: Charles Maxwell

Email: charles.maxwell@mirvac.com

Summary of Preliminary Site (Contamination) Investigations
Proposed Mixed Use Redevelopment
410 - 416 Victoria Avenue and 45 Victor Street, Chatswood

1. Introduction

This letter report provides a summary of Preliminary Site (Contamination) Investigations undertaken by Douglas Partners Pty Ltd (DP) for the proposed mixed-use redevelopment of the site located at 410-416 Victoria Avenue and 45 Victor Street, Chatswood ('the site') and is shown in the attached Drawing R.002.D.01. It is noted that the site also includes a portion of Post Office Lane as shown on Drawing 1.

The proposed redevelopment is anticipated to be a mixed-use development comprising retail, commercial and residential uses with associated basement parking, with the final mix, use and yield to be confirmed as part of any future development application/s.

This summary has been undertaken to inform a statement in regard to the suitability of the site (from a contamination perspective) for the proposed redevelopment.

The following reports were reviewed in the preparation of this letter report:

- Douglas Partners, *Report on Preliminary Site (Contamination) Investigation, 45 Victor Street, Chatswood,* dated 16 July 2020 (DP reference: 73843.01.R.001.Rev0)(DP 2020a); and
- Douglas Partners, *Report on Preliminary Site (Contamination) Investigation, 410 - 416 Victoria Avenue, Chatswood,* dated 11 August 2020 (DP reference: 73843.02.R.001.Rev0) (DP 2020b).

2. Site Information

Site Address	410 - 416 Victoria Avenue and 45 Victor Street, Chatswood Section of Post Office Lane between the two properties
Legal Description	Lot 4, Deposited Plan 82303 Lot A and Lot B, Deposited Plan 406105 Lot 1 Deposited Plan 569727
Approximate Area	2,297 m^2
Current Zoning	Zone B3 Commercial Core
Local Council Area	Willoughby Council
Current Use	Commercial / Retail / Other Uses
Surrounding Uses	North - Victoria Avenue, commercial; East - Victor Street, then Westfield Chatswood shopping mall; South - Mixed commercial/residential high rise; and West - Multistorey commercial buildings, residential high-rise buildings, Post Office Lane then Chatswood train station.

3. Review and Comments on Previous Reports

3.1 PSI - 45 Victor Street (DP 2020a)

DP (2020a) comprised of a desktop site history review of the Victor Street site which included a site walkover. The investigation comprised a review of geological maps, acid sulphate soil risk maps and topography maps as well as a search of publicly available registers (groundwater bore search, NSW Environment Protection Authority (EPA) notices and licences), historical aerial photographs, historical title deeds, planning certificates, council records and a WorkCover (now SafeWork NSW) search for dangerous goods held on the premise.

The site history review indicated that the Victor Street site was likely previously used for residential purposes and as a shop since 1905. The northern most area (i.e. the northern part of 45 Victor Street adjacent to Post Office Lane) was possibly used as a fuel shop between 1905 and 1963, although it is unknown whether the fuel related to petrol, coal, wood or other forms of fuel. The Victor Street site was then used as a post office likely since the 1960s until the last 10 years.

There were also observed fill / dip points on the premises that indicated the possibility for one or two underground storage tanks (USTs) being present on the Victor Street site. These were identified as possibly associated to the fuelling of motorbikes onsite prior to *circa* 1994.

The investigation concluded that there was a moderate risk of contamination of soil and groundwater due to the indicators of the possible presence of USTs on the premise and the following further investigations were recommended:

- Where possible, use GPR to attempt to locate UST(s) in the vicinity of the dip / fill points;
- Sample soil and groundwater at and/or down gradient, in close proximity to, the (possible) UST(s) and associated pipes; and
- Following demolition of the existing building, undertake soil (and possibly groundwater) sampling across the site.

It was also noted that waste classification of soils could be conducted as part of the above recommended investigations and that any USTs / fuel lines (if present) would have to be removed (as part of the site redevelopment) in accordance with the Protection of the Environment (Underground Petroleum Storage Systems) Regulation 2008; Australian Standard (AS) 4976-2008. Furthermore, a validation report for the removal of any tank (including any tank, fuel line, tank contents and removal of any contaminated soil) would be required to be prepared by a suitably qualified environmental consultant.

It was considered that the Victor Street site can be made suitable for the proposed land use following further intrusive investigations and subsequent remediation (if required).

DP notes that these recommendations are still pertinent for the Victor Street site and that the Victor Street site can be made suitable for the proposed redevelopment if the recommendations are undertaken.

3.2 PSI - 410 - 416 Victoria Avenue (DP 2020b)

DP (2020b) comprised of a desktop site history review of the Victoria Avenue site which included a site walkover. The investigation comprised a review of geological maps, soil landscape maps, acid sulphate soil risk maps and topography maps as well as a search of publicly available registers (groundwater bore search, NSW EPA notices and licences), historical aerial photographs, historical title deeds, planning certificates a SafeWork NSW (formerly Work Cover) search for schedule 11 hazardous chemicals held on the premise. It is noted that the report does not include the results of the SafeWork search results as they had not been received at the time of reporting. Notwithstanding, we do not believe these results would change our assessment or recommendations.

The site history review indicated that the Victoria Avenue site was likely used for commercial (retail) purposed since the early 1930s and possible even as early as 1903 including some cabinet making (manufacturing). The previous buildings on the Victoria Avenue site were demolished and new building were constructed circa 1970 to 1986. A fuel fill / dip point was also observed located south of the premise in Post Office Lane (close to the 45 Victor Street site which was also identified in DP 2020a).

The Victoria Avenue site was considered to have a generally low risk of being impacted by any broad scale or significant contamination. As such, it was considered that the Victoria Avenue site is likely to be suitable for the proposed development following intrusive (soil) investigations and groundwater (if

warranted), a hazardous building materials survey of the existing buildings prior to demolition and if any contamination is found, the required remediation and/or management.

DP considers these recommendations are still pertinent for the Victoria Avenue site and the Victoria Avenue site is likely to be suitable for the proposed redevelopment if the recommendations are undertaken.

4. Conclusion and Recommendations

Based on the review herein, the site presents a low to moderate risk for contamination. Our view is that the desktop findings are typical of a site in this location and as such, DP considers that the site can be made suitable for the proposed mixed-use redevelopment in accordance with the recommendations outlined in Section 3.

5. Limitations

Douglas Partners (DP) has prepared this report for this project at 410 - 416 Victoria Avenue and 45 Victor Street, Chatswood in accordance with DP's proposal SYD200774.P.001.Rev0 dated 15 July 2020 and acceptance received from Mirvac Residential (NSW) Development Pty Ltd dated 16 July 2020. The work was carried out under the consultancy agreement with contract reference 200715. This report is provided for the exclusive use of for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during the visual inspection. The accuracy of the advice provided by DP in this report may be affected by budget constraints imposed by others or by site accessibility.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

The contents of this report do not constitute formal design components such as are required, by the Health and Safety Legislation and Regulations, to be included in a Safety Report specifying the hazards likely to be encountered during construction and the controls required to mitigate risk. This design process requires risk assessment to be undertaken, with such assessment being dependent upon factors relating to likelihood of occurrence and consequences of damage to property and to life. This, in turn, requires project data and analysis presently beyond the knowledge and project role respectively of DP. DP may be able, however, to assist the client in carrying out a risk assessment of potential hazards contained in the Comments section of this report, as an extension to the current scope of works, if so requested, and provided that suitable additional information is made available to DP. Any such risk assessment would, however, be necessarily restricted to the environmental components set out in this report and to their application by the project designers to project design, construction, maintenance and demolition.

Please contact the undersigned if you have any questions on this matter.

Yours faithfully
Douglas Partners Pty Ltd

Reviewed by

Lisa Teng
Environmental Engineer

Paul Gorman
Principal

Attachments: About this Report
Site Drawing

About this Report

Douglas Partners

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

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This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Conditions of Engagement for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

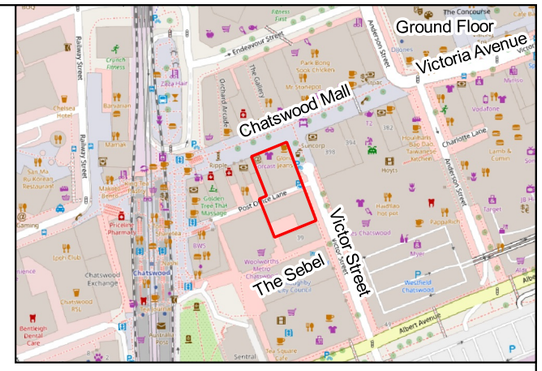
In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.



LOCALITY MAP

Notes:
1. Basemap from nearmap.com (dated 28/07/2020)
2. Boundaries and features shown are approximate only

Legend

- Approximate Site Boundary
- Possible Dip/Fill Point

0 10 20 30 m

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT:	Mirvac Residential (NSW) Developments Pty Ltd		
OFFICE:	Sydney	DRAWN BY:	LT
SCALE:	1:500 @ A3	DATE:	30.07.2020

TITLE: **Site Location**
Proposed Redevelopment
410 - 416 Victoria Avenue and 45 Victor Street, Chatswood

N

PROJECT No:	73843.02
DRAWING No:	R.002.D01
REVISION:	0

Appendix F Draft site specific development controls

FPD Pty Ltd
File Planning & Development Services

Draft Site Specific Development Controls

45 Victor Street and 410-416 Victoria Avenue, Chatswood

Prepared on behalf of: Mirvac

August 19, 2020

Document control

Authors

Reviewed by	Michael File, Director
Prepared by	Anna Johnston, Associate

Project summary

Applicant	Mirvac
Applicant's address	200 George Street, Sydney
Land to be developed	45 Victor Street and 410-416 Victoria Street, Chatswood
Legal description	Lot 4 DP82303, Lot A and Lot B DP406105, Lot 1 DP569272 and part of Post Office Lane
Project description	Amendment of Willoughby LEP to expand the additional permitted use of shop top housing and allow increased height and FSR

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1 Site specific controls

1.1 Background

The following objectives and provisions apply to 45 Victor Street and 410-416 Victoria Avenue, Chatswood as shown in Figure 1.

All other relevant provisions of this DCP apply. The provisions of this section prevail in the event of any inconsistency.

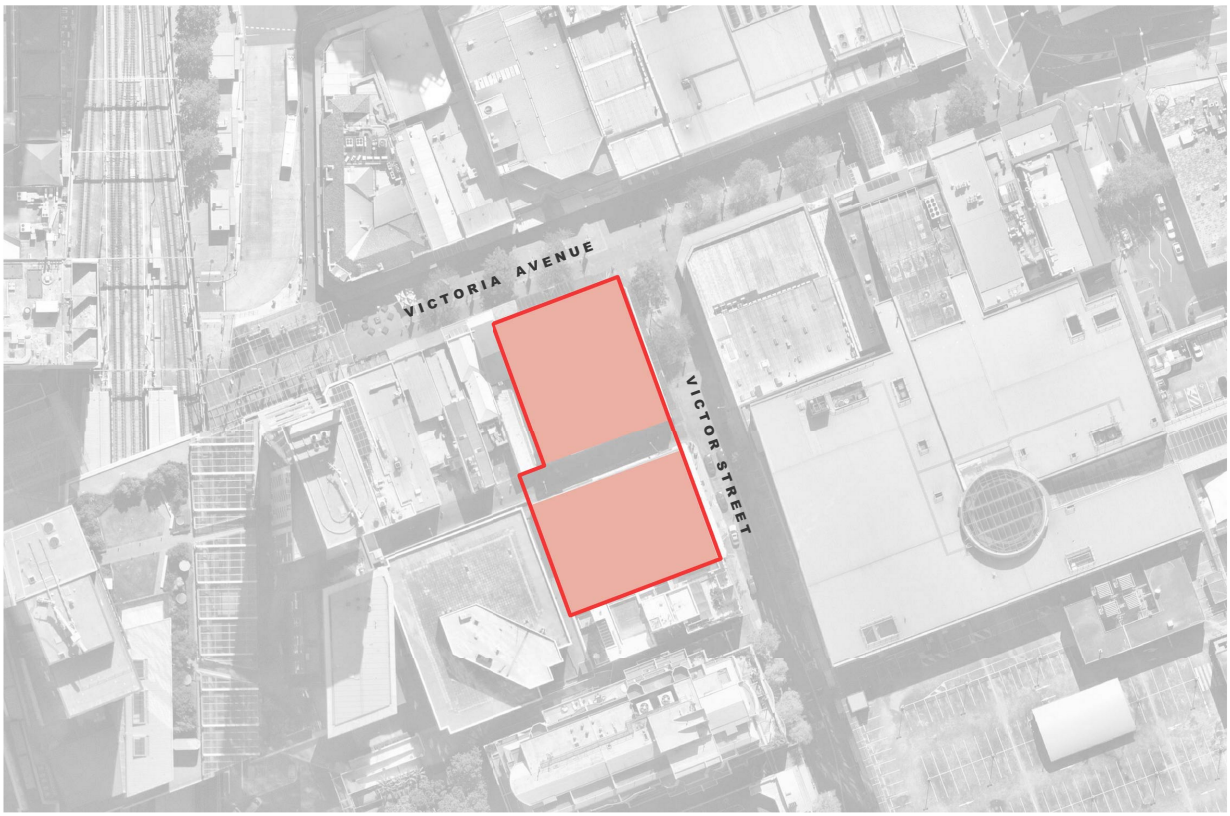

Figure 1: Site plan

1.2 Objectives

The objectives of this Part of the Chatswood Development Control Plan are as follows:

- To facilitate a mixed use development of the site to deliver a combination of retail, commercial office and residential uses
- To support public transport patronage by locating residential and commercial uses in a highly accessible location within the Chatswood CBD with immediate access to Chatswood Interchange
- To protect solar access to key areas of the public domain within the surrounding area
- To ensure that the built form responds to the surrounding character and provides a human scale at the street level
- To enhance the public domain through street activation and improved pedestrian connectivity and amenity
- To support high quality design and sustainable development outcomes.

1.3 Building height

Objectives

- To ensure that building height across the site maintains an adequate level of solar access to surrounding open space.

Development controls

- Building height is to be in accordance with the principles shown in Figure 2 to ensure no additional overshadowing of:
  - Garden of Remembrance 12pm-2pm
  - Chatswood Oval 11am-2pm.

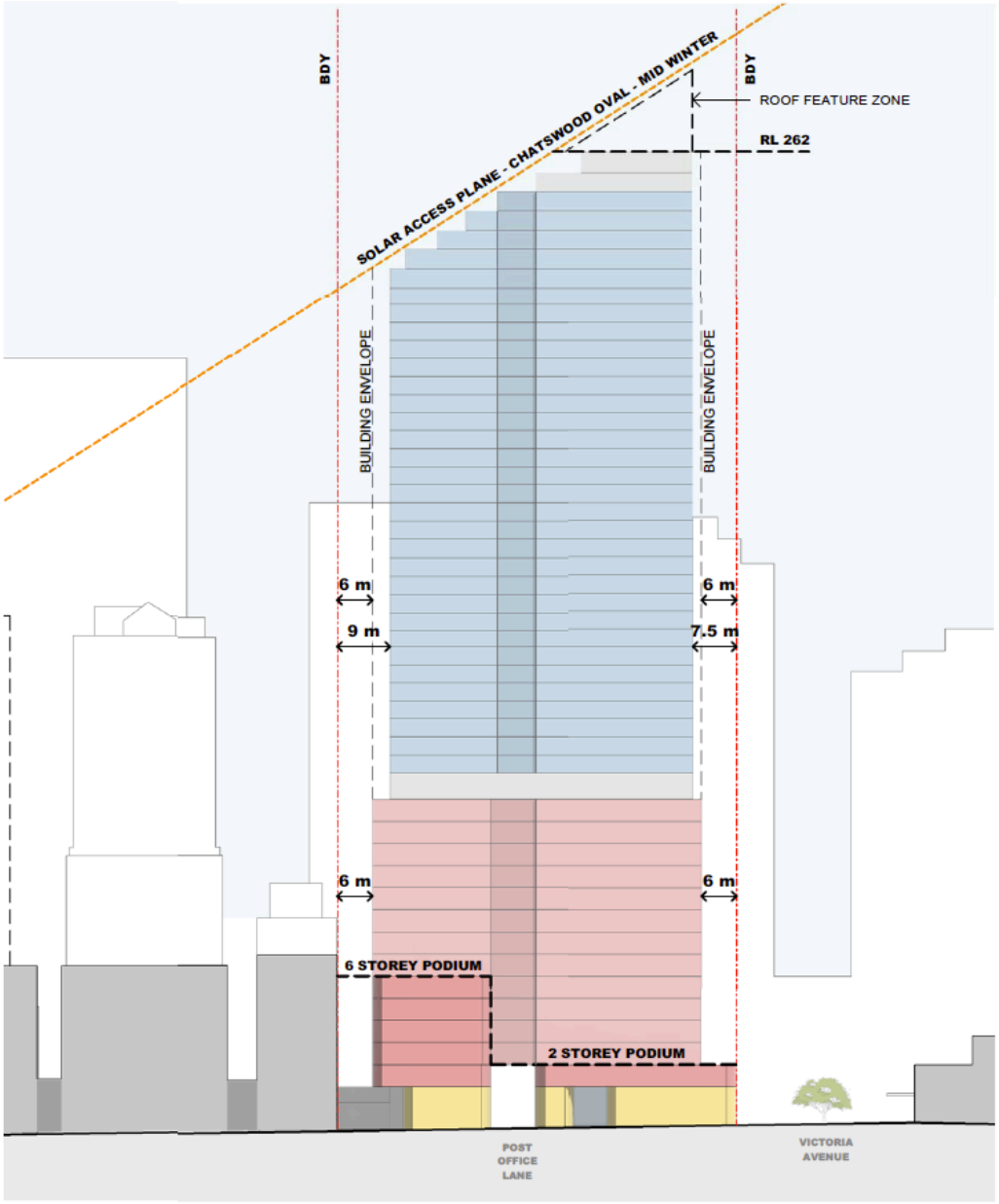

Figure 2: Solar access plane

1.4 Built form

Objectives

- To ensure that the building responds to the surrounding built form and character
- To provide for a human scale at street level with a slender tower form above
- To provide a high level of amenity along Post Office Lane
- To allow for flexibility in the location of the residential tower within the maximum floor plate size
- To ensure an appropriate level of solar access and amenity to the proposed development and surrounding residential buildings

Development controls

- The street wall height is to be a maximum of 2 storeys fronting Victoria Avenue and 6 storeys fronting Victor Street.
- Street and upper level setbacks are to be provided in accordance with Figure 3.
- The residential tower setbacks identified in Figure 3 are indicative only, with the residential tower to be located within the identified building envelope.
- The residential tower floor plate is to be a maximum 870sqm GFA.
- Built form above Post Office Lane is to allow for a minimum 8m clearance above the laneway pavement.

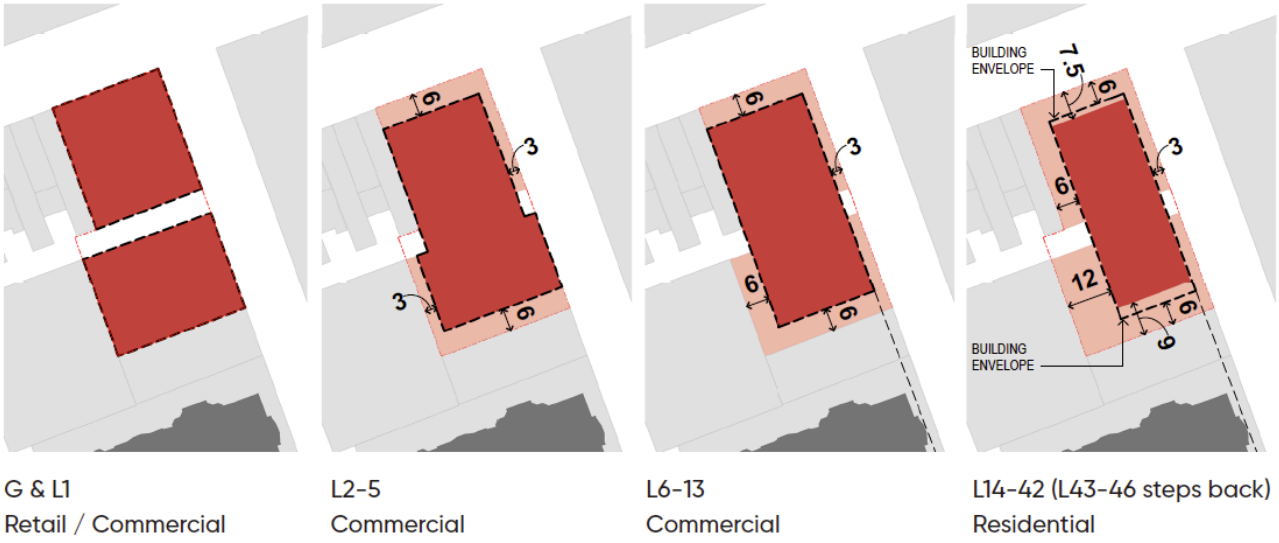

Figure 3: Street and upper level setbacks

1.5 Street activation

Objectives

- To enhance activation and vibrancy of the surrounding streets through the location of active uses at ground level.

Development controls

- Active frontages are to be provided along Victor Street and Victoria Avenue in accordance with the requirements of the Willoughby LEP.
- Opportunities for active frontages facing Post Office Lane are also to be identified where possible, to maximise activation.
- Floor to ceiling heights for ground floor uses are to be a minimum of 4m.

- Development applications are to demonstrate the relationship of the ground plane with the adjacent public domain, including identifying any opportunities (if available) for outdoor dining.

1.6 Public domain and landscaping

Objectives

- To enhance the public domain and improve connectivity and pedestrian access.
- To provide for increased vegetation cover in form of green walls and podium and rooftop landscaping.

Development controls

- A public domain plan is to be lodged with any development application which identifies the interface with the public domain and the future treatment of Post Office Lane including new paving, lighting, green walls and public art.
- A landscape plan is to be lodged with the development application identifying increased vegetation cover including through delivery of green walls and podium and rooftop landscaping.

1.7 Design quality

Objectives

- To ensure that innovation and excellence in architectural design is delivered on the site.

Development controls

- Prior to lodging a development application on the site, the applicant is to undertake a competitive design process.
- The applicant is to invite three architectural firms with experience in the design of high quality buildings to participate in the process.
- The selected firms are to be supplied with a competitive design process brief.
- The consent authority may appoint an independent representative as an observer of the design process to verify that the process has been followed appropriately and fairly.
- A presentation of the design submissions are to be made to the developer's selection panel.
- A copy of the submissions are to be provided to the independent representative a week prior to the presentation.
- A competitive design report is required to be submitted to the consent authority with the submission of the relevant development application which:
  - Includes a copy of the brief issued to the competitors
  - Includes each of the design alternatives considered
  - Includes an assessment of the design merits of each alternative
  - Sets out the rationale for the choice of the preferred design, including how it best exhibits high quality design.
- The designer of the winning scheme is to be appointed as the Design Architect to:
  - Be the concept lead architect for preparation of the Development Application
  - Either prepare the drawings or have a lead architect role in the preparation of construction certificate and contract documentation
  - Maintain continuity during the construction phases to the completion of the project
  - Provide a statement at the end of the project.

1.8 Car parking

Objectives

- To provide for an appropriate level of on-site car parking which minimises travel demand and encourages active and public transport usage.

Development controls

- On site car parking is to be provided at the rates shown in Table 1.
- A minimum of 5 car share spaces are to be provided on site.
- Accessible car spaces are to be provided at a rate of 3% of commercial / retail spaces and for 1 in 5 adaptable apartments.

Table 1: Car parking rates

Use	Car parking rates
Residential: • 1 bedroom • 2 bedroom • 3 bedroom • Visitor	 • 1 space per dwelling • 1 space per dwelling • 1.25 spaces per dwelling • 0 spaces
Retail / commercial	1 space per 330sqm