Planning Proposal

Image by FJMT Architects

Victor St, Chatswood

Prepared on of behalf Mirvac Group

December 2016

Contents

Table of Figures

List of Tables

Executive Summary

This request for an amendment to the *Willoughby Local Environmental Plan 2012* (WLEP) has been prepared by FPD on behalf of Mirvac Group for a proposed amalgamated site located on the corner of Victor Street and Victoria Avenue (the site).

The site is located in the B3 commercial core area of Chatswood adjacent to the Chatswood Interchange entrance and shop top housing is permissible on the northern half of the site.

The planning proposal is to add the remaining portion of the amalgamated site to Schedule one, clause 31 of the WLEP to allow "shop top housing", to increase the maximum building height to RL 262 across the whole of the site (reflective of a solar access plane to Chatswood Park), and to institute a minimum non-residential FSR of 5:1.

These controls will allow for a commercial office component of approximately 11,000m^2 of "A" grade office space which is comparable to most of the large commercial office buildings on the western side of the Chatswood rail line and will be the first major commercial development in Chatswood since 1995.

The planning proposal will also facilitate approximately 800m^2 of retail which will play in important role in activating the Victor Street and Victoria Avenue interface and provides an opportunity for a the new laneway network to be created. The proposal will also facilitate approximately 320 apartments which will add vitality to the town centre and will provide a supply of homes in a high amenity location close to public transport and facilities.

The proposal has been designed to provide a mix of uses consistent with the current and future needs of the local area and to make a positive addition to the Victoria Avenue Mall streetscape. The new laneway network, utilising Post Office Lane and its connection to the Chatswood Interchange, will also enhance the pedestrian environment and retail streetscape through improvements to amenity and site permeability. Much attention has been paid to minimising adverse impact on the surrounding area.

The major strategic benefits of this proposal are summarised below:

- Deliver a significant amount of new jobs and housing within an existing strategic centre, providing new commercial floor space, retail floor space and new dwellings within 100 metres of high quality public transport;
- Concentrate a critical mass of employment and housing close to a major rail station to support public transport. It is expected that the proposal will reduce travel demand including the number of trips generated by the development and the distances travelled especially by car;
- Provision of a new laneway network to increase amenity and activation at ground level and provide greater accessibility to and from Chatswood Interchange.
- Encourage vibrancy within the Chatswood CBD and the Victoria Avenue Mall in particular through the increase of the worker and resident populations and an improved public domain which encourages activation within CBD.
- The amalgamation of the individual sites and the mix of uses proposed has enabled the proposal to deliver on the above strategic objectives.

The proposal will provide for significantly more employment than currently exists on the individual sites, provide improved quantum and quality of public domain and the retail and residential uses will serve to further enliven the Chatswood town centre.

This proposal is unlikely to set a precedent for further erosion of the amount of commercial floor space in Chatswood given its location east of the station away from the main commercial area, the sizable commercial component and due to the fact that "shop top" housing is already permissible across almost half of the amalgamated site.

With regard to any potential environmental impact the proposal will:

- Not generate any overshadowing on the Chatswood Oval or the Garden of Remembrance to the south of Chatswood Train Station;
- Not overshadow the Victoria Avenue pedestrian mall;
- Maintain at least two hours of solar access to the residential units surrounding the site;
- Not result in any unacceptable traffic impacts in terms of the performance of existing intersections and the surrounding road network; and
- Comply with the view sharing planning principle established in Tenacity Consulting v Warringah Council [2004] NSWLEC 140

Report Structure

This report has been prepared consistent with the Department of Planning and Environment's *A guide to preparing planning proposals 2016* for the purpose of requesting the Willoughby City Council to initiate the request for a gateway determination pursuant to Section 55 of the *Environmental Planning and Assessment Act 1979.* The report contains:

- A description of the site, state and regional context, local context and the current planning framework.
- **Part 1** –objectives and intended outcomes of the planning proposal and the key strategic arguments.
- **Part 2** – an explanation of the provisions that are to be included in the proposed instrument.
- **Part 3** – The justification and consideration
- **Part 4** – Mapping
- **Part 5** – Details of the community consultation that is to be undertaken on the planning proposal.
- **Part 6** – Project timeline

The Planning Proposal also contains the following supporting documentation:

- Appendix A: Architectural Statement by FJMT
- Appendix B: Market Demand Assessment by JLL
- Appendix C: Commercial Office Assessment by CBRE.
- Appendix D: Transport Study by GTA

1 Site analysis and context

The site is located on the corner of Victor Street and Victoria Avenue in the suburb of Chatswood and within the Willoughby local government area (refer to Figure 1).

The site is located within the heart of the Chatswood CBD less than 100 metres from the Chatswood Interchange. However, the planning controls under the *Willoughby Local Environmental Plan 2012* (WLEP) are clearly out of date and represent neither the potential of the site or the surrounding context.

The site has significant potential to contribute towards improving the amenity and activation of a key corner of the Chatswood town centre and Victoria Avenue Mall, a primary route for station access. It also has the potential to make a substantial contribution to local housing and employment.

Figure 1 - Site Aerial

1.1 Site description

This Planning Proposal is in relation to a proposed amalgamated site, within the Willoughby local government area, as detailed in Table 1.

Table 1 – Site Details

Site	Details
Land Description	Lot 1 DP569727, Lot A and B in DP406105 and Lot 4 DP82303
Site area	2, 255m^2
Existing uses	The former Australia Post shop and offices is now vacant. The land on the corner of Victoria Street 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 corner site is occupied by two, double storey retail buildings
Vehicle access	Current vehicle access to the site exists from Victor Street

Figure 2 - Land description (Source: SIX Maps)

Separating the two land parcels is Post Office Lane, owned by Willoughby City Council. This provides rear service access for the six retail tenancies on 420-430 Victoria Avenue and serves as a pedestrian access way to the Chatswood Interchange, including retail tenancies such as Woolworths.

1.2 Current Planning Controls

The principal instrument applying to the site is the WLEP. The site is zoned *B3 - Commercial Core*. The height of building map applies a 12m height limit to the site and a maximum floor space ration of 2.5:1 currently applies to the site.

The key planning controls apply to the site under the WLEP are discussed below.

Zoning and Land Use

The site is located in the B3 Commercial Core Zone, 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 WLEP allows shop top housing as a permissible use across almost half of the subject site. As can be seen from Figure 3, this additional permitted use has been used extensively in the Chatswood B3 zone, including on the sites directly adjacent to the South.

Height and FSR

The following height and FSR controls apply to the site under Willoughby LEP 2012:

- Height –12 metres on the southern lot (approximately RL106.5) and 14 metres on the northern lot
- FSR – 2.5:1

These development controls reflect the existing built form on the site. As shown in Figure ***4***, 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.

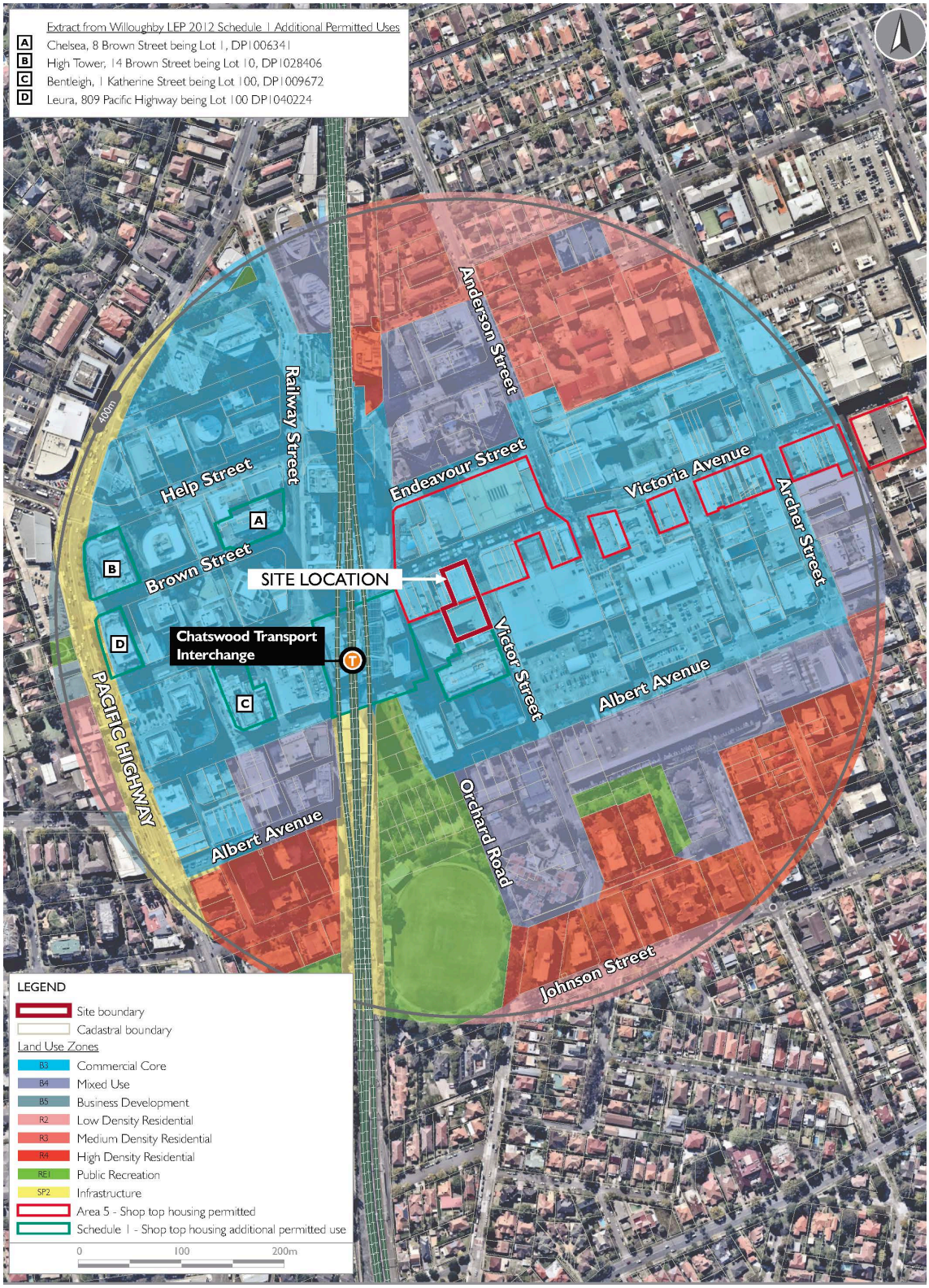

Figure 3 – WLEP Zoning and Additional permitted uses

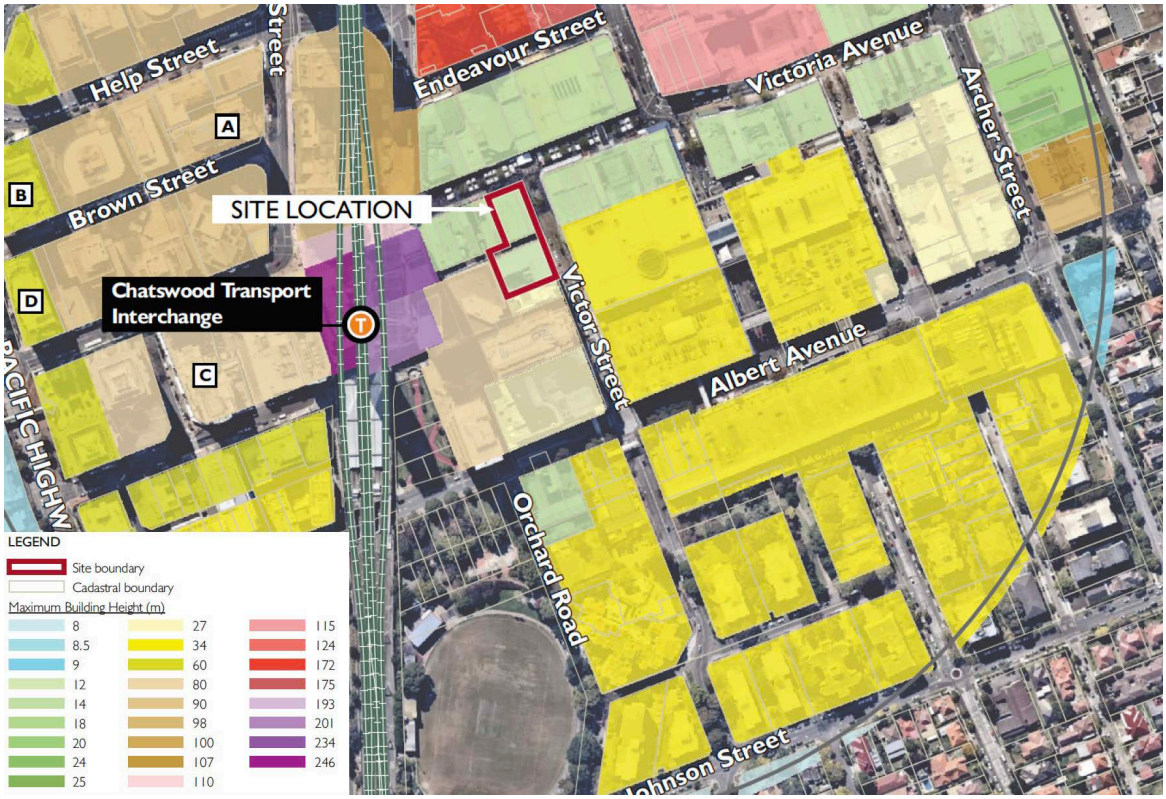

Figure 4 - Heights from Willoughby LEP 2012

1.3 Local Context

The Chatswood retail centre is the largest agglomeration of retail outside of the Sydney CBD. The area east of the Chatswood Interchange 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.

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. This will be further enhanced when the North West Metro service commences in 2019, which will connect Chatswood to the major centres of Macquarie Park, Castle Hill and Norwest. By 2023 the line will be further extended to connect to the Sydney CBD and beyond to Bankstown.

Chatswood is the largest retail area outside of the CBD and provides a large variety of retail, service and dining options. The subject site is situated in the core of the main retail area.

1.4 Location Pictures

Figure 5 – Victor Street, looking South

Figure 6 – Post Office Lane, corner of Victor Street and entrance to Chatswood Interchange

1.5 Consultation with Willoughby City Council

Mirvac Group and the consultant team have met with Willoughby City Council on numerous occasions since March 2016 with respect to the site. A number of workshops were held with FJMT and council staff in order to understand the built form context and strategic imperatives. This dialogue and feedback from Willoughby City Council has helped to inform and shape this planning proposal.

Consultation sessions were held with Council on the following dates;

- 7 April 16 – Meeting with General Manager and Director of Planning
- 6 May 2016 – Design Workshop with FJMT
- 22 June 16 - FJMT workshop at Council
- 9 August 16 – Meeting with Council and Architectus
- 15 September 16 - Meeting with Council for feedback on Strategy
- 8 December 16 – Meeting with Council

2 The Planning Proposal

2.1 The objective of the planning proposal

The Planning Proposal is to add the remaining portion of the site to Schedule one, clause 31 of the WLEP to allow "shop top housing", to increase the maximum building height to RL262 across the whole of the site (reflective of a solar access plane to Chatswood Park), and to institute a minimum non-residential FSR of 5:1.

The Planning Proposal will facilitate a mixed use development comprising, commercial, retail and residential uses to a maximum height of RL262. With approximately the first 10 storeys of the development comprising a mix of retail and commercial office space.

While the exact form and mix will be subject to a development application it is expected that the proposed planning controls will deliver a commercial office component of approximately 11,000m^2 of "A" grade office space which is comparable to most of the large commercial office buildings on the western side of the Chatswood rail line. It will be the first major commercial development in Chatswood since 1995.

The Planning Proposal will also facilitate approximately 800m^2 of retail which will play in important role in activating the Victor Street and Victoria Avenue frontages as well as the new laneway network, which will be created. Also facilitated by this proposal is approximately 320 apartments which will further add to the vitality of the town centre and provide a supply of homes in a high amenity location close to public transport and facilities.

2.2 Strategic Justification

The site is located in the heart of the Chatswood retail area and is adjacent to the Chatswood Interchange, opposite the Westfield retail centre. The site is surrounded on several sides by high density mixed use buildings. The Chatswood retail area is the largest agglomeration of retail outside of the Sydney CBD.

Chatswood is already well connected to the major employment areas of the Sydney CBD, North Sydney CBD, St Leonards and Macquarie Park. It will also soon be the beneficiary of a high frequency metro service to the North West and soon after to the Sydney CBD and onwards to Bankstown.

This Planning Proposal has been formulated to respond to the physical attributes of its location and provide a mix of uses that both responds to the market demand in the location and the strategic aspiration of the Willoughby City Council and the NSW Governments planning strategies.

The amalgamated development site

Mirvac has investigated the feasibility of both 45 Victor Street and 414-416 Victoria Avenue separately and combined.

A previous proposal for 45 Victor Street by Mirvac had looked at smaller footprint outcome on the site of the former Chatswood Post Office and had proposed a predominantly residential scheme. The planning proposal was considered by the Joint Regional Planning Panel in 2013. While the Panel were supportive of the use of shop top housing, the Panel had concerns with the proposed height, overshadowing, separation distances and view loss. Advice was also received from Willoughby City Council at this time that Mirvac should seek to amalgamate with adjoining sites to achieve a better urban design outcome.

Similar constraints apply to the 414-416 Victoria Avenue when developed in isolation. This site is further constrained if an urban design objective of low scale frontage to Victoria Avenue is realised.

As detailed in the JJMT Architectural Statement at Appendix A and depicted in Figure 7, only a very small footprint can be achieved on each of the sites, if considered in isolation from one another. The

suggestion in Councils draft Chatswood strategy of the introduction of a 12 metre upper storey setback for the Victoria Avenue Mall would reduce the potential of the 414-416 Victoria Avenue site even more.

Figure 7 – Indicative setbacks and footprints (Source: FJMT, 2016)

In order to offer an improved public domain and tangible public benefit with minimised impact on neighbouring buildings, a consolidated approach has been developed. This has allowed for the creation of a laneway network, the development of a predominantly active frontage to both Victoria Avenue, Victor Street and the ground floor western elevation facing the station entrance. It has also allowed for compliance with streetscape setback to Victoria Avenue proposed as part of Willoughby City Council's recently released draft *Chatswood CBD Planning and Urban Design Strategy*.

The amalgamation of the two properties also allows for the delivery of a viable commercial floorplates of approximately 1,000m^2. Advice from both JLL and CBRE stipulate that this is a minimum requirement for attracting commercial tenants. Without the amalgamation of the shop top housing site at the corner of Victoria Avenue Mall, a very limited commercial outcome would have been achieved on either of the sites, if considered in isolation. In combination however the scale of the commercial outcome is equivalent to several of the major 'A grade' commercial buildings in Chatswood.

The built form outcome

Mirvac, FJMT and FPD commenced consultation with Willoughby City Council in early 2016 on the appropriate built form and development outcome for the site. During this period Willoughby City Council commenced the preparation a strategic planning study into future land use options for the Chatswood Town Centre.

The site planning and building design for the site has sought to reflect Willoughby City Council's aspirations for the location, leverage off the proximity of the site to Chatswood Station and to enhance the successful Victoria Avenue Mall.

A building envelope has been created that considers and provides for the following key factors:

- Creation of a footprint that can accommodate a significant and viable scale of commercial activity;
- A strong commercial presentation to Victor Street. The commercial component will deliver patronage to the small scale retail spaces vital to the proposed lanes as well as to the Victor Street and Victoria Avenue frontages;
- Improved quality and experience of the pedestrian access to Chatswood Interchange;
- Creation of new public domain;
- Creation of create a street wall that is sympathetic to its surroundings, breaking up the slender tower form, providing a setback to Victoria Street, while providing retail opportunities at a street level;
- Minimising overshadowing to surrounding residences and providing no adverse impact on Chatswood Oval with the building form stepped towards the north protecting sun access at 21st June to Chatswood Oval, during the hours of 10am to 3pm; and
- The height of RL 262 is reflective of the site location in close proximity to the Chatswood Interchange and the context of the surrounding buildings, which are of a similar scale.

Generation of Employment Floor space

While “shop top” housing is permissible on approximately half of the site, Willoughby City Council indicated a preference for a significant commercial outcome across the site. This prompted Mirvac to explore the feasibility of a full commercial outcome.

Most of the significant commercial buildings in Chatswood were constructed more than 20 years ago, with the last significant addition in 1995. The relatively small size of the office market, sustained competition of surrounding areas and loss of floor space to residential uses has resulted in a stagnation of growth in the recent decade.

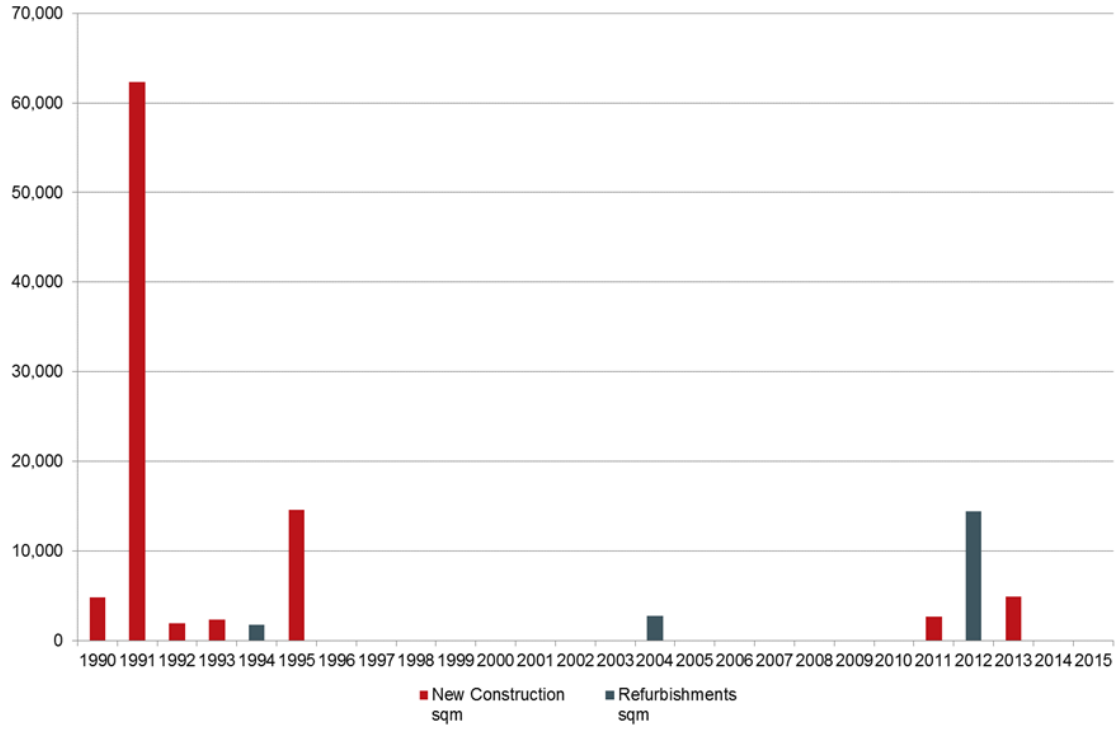

Figure 8 – Historic Supply, Commercial (Source:JLL Research, 2016)

The market demand research and feasibility testing done by Mirvac has indicated that a stand-alone commercial building is unlikely to prove to be a commercial proposition. This Planning Proposal removes the need for a substantial commercial pre-commitment and will rely of residential sales to forward fund the provision of approximately 11,000m^2 of commercial floor space.

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 best, and this has reduced since the Post Office site vacated the property. Currently there is a total of 55 people employed across all of the sites. This Planning Proposal is likely to provide space for up to 1,000 employees, when considering the combined commercial and retail floor space (refer to Table 2).

The addition of up to 11,000m^2 of commercial and 1,000m^2 retail GFA would make this comparable to most of the 'A grade' commercial buildings in Chatswood and larger than many of the B grade buildings (refer to Table 3).

Table 2 – Employment Numbers for Future Commercial and Retail at the Site

Employment Type	Approximate Jobs
Commercial	920
Retail	30-40
Total Employment	950-960

Corresponding base FSRs in the commercial core precinct west of the highway are all 5:1 providing an appropriate benchmark and parallel for the commercial outcome on the subject site. See Figure 9 below;

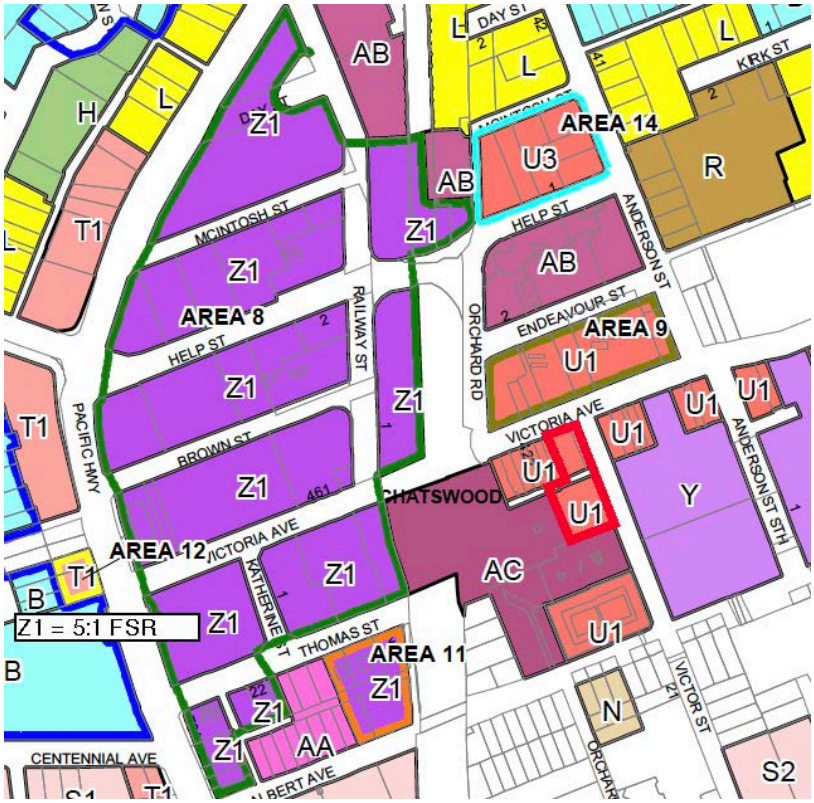

Figure 9 - Western commercial core highlighted in green, subject site highlighted in red. (Z1=5:1 FSR)

Table 3 – The Ten Largest Commercial Office Buildings in Chatswood, Q3 2016 (JLL Research, 2016)

Building name	Address	Building Grade	Area (m^2)
The Zenith	821-841 Pacific Highway, Chatswood	A	44,034
Citadel Towers B	799 Pacific Highway, Chatswood	A	22,123
Sage Tower	67 Albert Avenue, Chatswood	A	15,664
	12 Help Street, Chatswood	A	15,236
	465 Victoria Avenue, Chatswood	A	14,422
Leightons House	475 Victoria Avenue, Chatswood	A	14,092
Citadel Towers A	799 Pacific Highway, Chatswood	A	12,210
Leightons Tower	495 Victoria Avenue, Chatswood	A	11,000

Building name	Address	Building Grade	Area (m^2)
	9 Help Street, Chatswood	B	9,587
Chatswood Central - North Tower	1-5 Railway Street, Chatswood	B	8,200

New public domain, laneway network and improved station access

The amalgamated site of 2,255m^2 encompasses an area of Post Office Lane (of which new development is proposed to cover 128m^2.) In spite of the direct connection and high pedestrian use, the lane currently presents as a service lane with no activation and very poor amenity (refer to Figure 6).

The Planning Proposal seeks to create a laneway network with a predominately north-south orientation with access to both Victoria Avenue and Victor Street (refer to Figure 10 and Figure 11). This network will incorporate retail and dining options along most of the building ground floor frontages and also is planned to incorporate a public domain courtyard area that will offer a quiet space for relaxation, informal gatherings and casual outdoor dining for the retail spaces or cafes located adjacent to this space. The space will enjoy good sunlight during lunchtime hours.

The area of new laneway created will be approximately 800m^2 representing more than one third of the site.

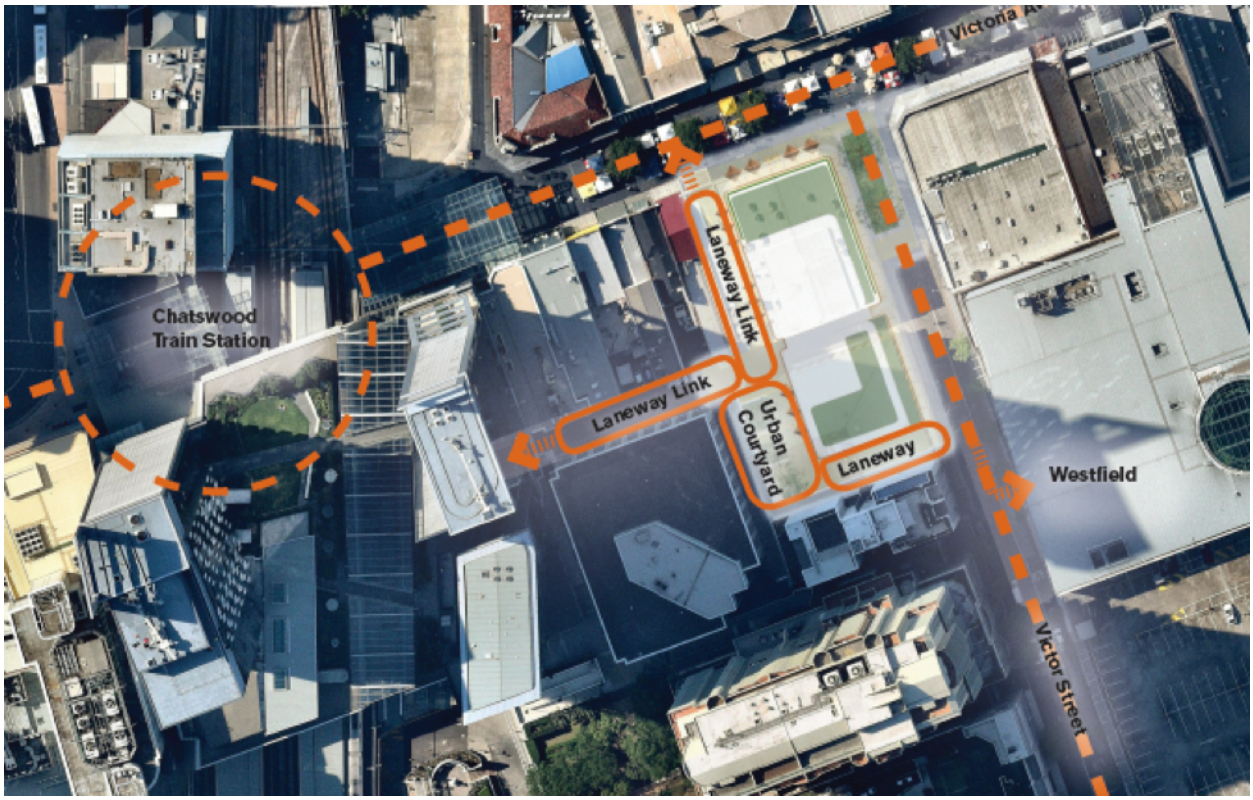

Figure 10 - Proposed laneway network (Source: FJMT)

Figure 11- Image of proposed laneway network showing courtyard area in foreground (Source: FJMT)

Figure 12 - Current Laneway

3 Need for the Planning Proposal

3.1 Is the Planning Proposal the result of any strategic study or report?

This Planning Proposal was developed in consultation with Willoughby City Council while it was in the process of preparing the *Draft Chatswood CBD Planning and Urban Design Strategy*.

The built form outcome and the intention of growing the amount of employment generating floor space in Chatswood are generally consistent with the recommendations of this draft study. This Planning Proposal includes an assessment against this and other relevant strategies.

3.2 Is the Planning Proposal the best means of achieving the objectives or intended outcomes, is there a better way

The FJMY analysis at Appendix one contains an analysis of the outcome possible of each of the sites in isolation. The analysis shows that no significant employment outcome can be achieved and that the impacts on surrounding properties is potentially more severe. The outcome for each of the sites individually fails to fulfil any of the stated strategic objectives and fails to maximise the potential of this premium location.

Willoughby Council and the State Government have both made substantial investments in the Victoria Avenue Mall and the Chatswood Interchange and the planning for the town centre should make the most of these assets. This is only achievable through the amalgamation of the sites and the addition of a mixed use component on the site.

As described elsewhere in this report, the objective for Chatswood Strategic Centre in *A Plan for Growing Sydney* is to *"work with council to provide capacity for additional mixed-use development in Chatswood including offices, retail, services and housing*".

Further, the *Draft North District Plan* and Willoughby City Council's *Draft Chatswood CBD Planning and Urban Design Strategy* are focused on increasing employment generating uses in the Chatswood Town Centre.

This Planning Proposal has been formulated to achieve this in a form that can be feasibly delivered. It will also facilitate the *A Plan for Growing Sydney* objective of providing capacity for additional mixed use development in Chatswood as listed above.

4 Relationship to Strategic Planning Framework

Is the planning proposal consistent with the objectives and action of the applicable regional, subregional or district plan/strategy (included any exhibited drafts)?

In formulating this proposal careful regard has been given not only to the environmental factors affecting the site and its location but the aims and objectives of the relevant plans and strategies.

The main strategic documents of relevance to the proposal are:

- A Plan for Growing Sydney
- The draft Northern District Plan
- Willoughby City Strategy
- Chatswood Town Centre Study
- Chatswood City Centre Vision and Strategic Plan (2008)
- Draft Chatswood CBD Planning and Urban Design Strategy

4.1 A Plan for Growing Sydney

A Plan for Growing Sydney is the metropolitan strategy for Sydney, released in 2014. It provides a framework for planning decisions in the Sydney metropolitan area. The relevant objectives are considered below.

Table 4 – Relevant Goals/Directions/Actions of A Plan for Growing Sydney

Goal/Direction/Action	Assessment
Goal 1: A competitive economy with world class services and transport	
Direction 1.7: Grow strategic centres – providing more jobs closer to home	This Planning Proposal will facilitate almost 1,000 new jobs in the heart of the Chatswood Strategic Centre. It will also provide a supply of housing in close proximity to major employment centres in Chatswood, St Leonard's, North Sydney, Macquarie Park and the Sydney CBD.
Goal 2: A city of housing choice with homes the meet our lifestyle and needs	
Direction 2.1: Accelerate housing supply across Sydney	The site located in the heart of the retail and cultural area in Chatswood positioned 100 metres from the Chatswood Interchange it is ideally situated to provide a significant supply of both new employment and housing.
Action 2.1.1: Accelerate housing supply and local housing choices	The Planning Proposal has been designed to provide a mix of housing that will be within easy access to local amenities and public transport. A range of apartment types are proposed and the addition of higher density housing in the Chatswood area will complement the established dwelling stock in the Willoughby local government area.
Direction 2.2: Accelerate urban renewal across Sydney – providing homes closer to jobs	The most suitable areas for significant urban renewal are those areas best connected to employment and transport. The site located in the heart of the retail and cultural area in Chatswood within 100 metres from the Chatswood Interchange it is ideally situated to provide a significant supply of both new employment and housing. It is also closely located to existing jobs and public transport.
Action 2.2.2: Undertake urban renewal in transport	The Chatswood town centre is already well served by public transport and the subject site is adjacent to the Chatswood

Goal/Direction/Action	Assessment
corridors which are being transformed by investment and around strategic centres	Interchange. In 2019 the North West Metro will begin servicing Chatswood and in 2023, further connections to the City CBD and southern region of Sydney will commence operation.
Goal 3: A great place to live with communities that are strong, healthy and well connected	
Direction 3.1: Revitalise existing suburbs	The Planning Proposal will facilitate a new laneway network, improved station access, new public domain, new retail and a significant supply of employment and residential floorspace.

In dramatically increasing employment on the site, providing significant housing opportunities, creating new public domain and activating the area adjacent to the Station and Chatswod Mall the proposal satisfies the objectives of A Plan for Growing Sydney.

4.2 Draft North District Plan

The Sydney metropolitan area has been divided up into six districts, with Chatswood located in the Northern District Plan. On 22 November 16 the Greater Sydney Commission (GSC) released the draft *North District Plan*.

Chatswood is described in the draft *North District Plan* as one of the Northern District's Strategic Centres along with North Sydney, St Leonards, Macquarie Park and Northern Beaches. The draft plan notes the following;

- Chatswood is a centre containing over 24,000 jobs (2016) with the majority in retail, knowledge and professional services. Chatswood has increasing pressure for commercial land to be rezoned for residential uses and a clear direction is needed to ensure Chatswood's role as a strategic centre is maintained (Page 33).
- Good public transport access and proximity to Sydney City have made some of the North District's strategic centres, such as St Leonards and Chatswood, attractive locations for residential developments. A cautious approach to ongoing residential intensification should be adopted to balance the capacity for further jobs growth with other uses in these centres (Page 45).
- Chatswood has been given an ambitious employment target of increasing its current workforce from 24,700 mostly office based jobs to between 31,000 or an aspirational higher target of 33,000 jobs.
- Commercial employment density is usually calculated as requiring 12m^2 of commercial floor space per job. For Chatswood this would require the addition of 75,600 to 99,600m^2 given that the larger commercial buildings (Table 3) along the Pacific Highway are largely in the range of 8,000-12,000m^2 this would require seven to ten new large commercial buildings over this period.
- The draft plan has a five-year housing target for the whole of Willoughby of 1,250 dwellings, however the 20-year target for the Northern District is 97,000 dwellings.

This Planning Proposal has evaluated the prevailing market conditions and within a justified and generally compliant envelope formulated a land use mix that will deliver on both the employment and land use objectives of the draft District Plan.

As discussed elsewhere in this report, the two properties, when considered in isolation, are only capable of delivering a smaller predominantly residential outcome. The amalgamated proposal will deliver a supply of 'A grade' commercial floor space equivalent to some of the more significant

commercial buildings in the western commercial core of Chatswood town centre,. A location not necessarily conducive to commercial development, dominated by retail and residential development.

The addition of almost 11,000m^2 of commercial would represent the largest addition to commercial floor space in Chatswood in 20 years and is achievable under current market conditions. Without the mixed use as an enabler of the commercial development it is difficult to determine when such an outcome would be achievd, if at all.

This proposal is unlikely to set a precedent for further erosion of the commercial core in Chatswood given its location East of the Station away from the main commercial area and due to the fact that "shop top" housing is already permissible across almost half of the site.

4.3 Willoughby City Strategy 2013-2029

The *Willoughby City Strategy 2013-2029* is Willoughby Council's community strategic plan for the future of the City to guide decision making and planning. The strategic directions and goals relevant to the Planning Proposal are discussed in Table 5.

Table 5 – Willoughby City Strategy – Relevant Strategic Directions and Goals

Strategic Direction No.3 – Homes	
Goal: to be a place with housing that is liveable, sustainable and enhances urban character.	
Investigate changing demographics of the Willoughby area and review planning controls to encourage new housing types to meet community and intergenerational needs;	The addition of high density apartment close to the Inter change will appeal to a range of demographics and intergenerational needs.
Protect employment areas (industrial, commercial land) from incursion by residential development and other uses that affect the long term integrity of those areas;	In providing for a greater amount of commercial floor space than is currently on the site and than could otherwise be achieved as separate sites. The proposal will deliver more commercial supply than has been achieved in recent history
Ensure development can be provided with adequate infrastructure and services	The site is located adjacent to a major interchange and in the heart of the retail and community core of Chatswood.
Universally accessible measures into all new housing design; and	The proposal has the ability to comply with all BCA standards and the accessibility provisions of the Willoughby DCP.
Encourage quality design and construction.	The architectural concept has been designed by a renowned architectural firm and there is potential for future design excellence processes.
Strategic Direction No.4 – Infrastructure	
Goal: Transport and Mobility. To manage the transport needs of the community in a sustainable manner by reducing car dependence and promoting public transport use, walking and cycling.	
Increased use of active and public transport.	The location of significant employment and housing within 100 metres of the Transport Interchange will result in increased public and

	active transport usage. The development application will outline sustainable transport measures including, car share, bike ,storage, green transport plans, etc.
Strategic Direction No.5 – Economic Activity	
Goal: Sustainable Business Activity. To maintain and promote the City's employment opportunities and the range and quality of businesses, industry and services.	
Facilitate business and employment opportunities servicing local and regional needs; and	As mentioned above approximately 11,000 square metres of employment generating floor space and up to 1000 jobs in the heart of the CBD are possible under the proposal.
Provide development guidelines for business centres to maintain sustainable and high quality architecture and public domain	More than 800m^2 of new high quality activated public domain will be created.

4.4 Chatswood City Centre Vision and Strategic Plan (2008)

The *Chatswood City Centre Vision and Strategic Plan* identities eight strategies for guiding planning and land use decisions in Chatswood. The plan contains the below diagram and divides the centre up into the following precincts;

- Retail Core
- Office Core
- Fringe
- Education
- Recreation

It is important to note that the site is located in the Retail Core Precinct rather than the office core.

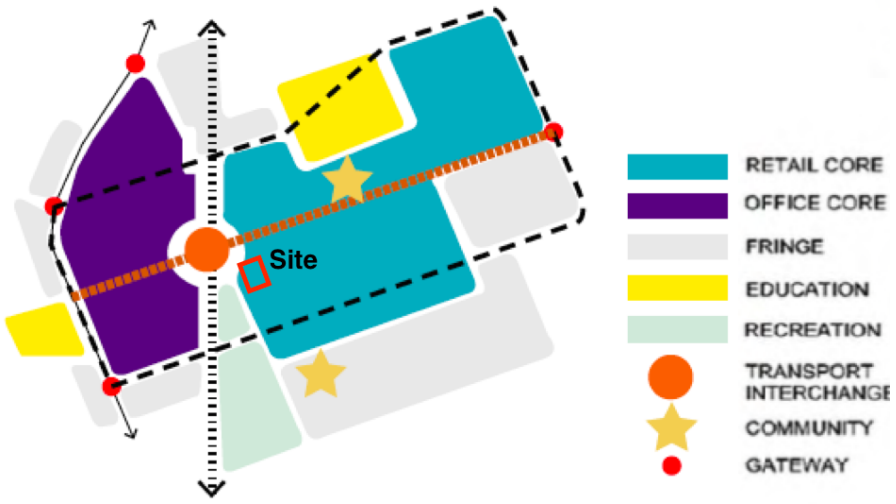

Figure 13 - Strategic Plan (Source: Chatswood City Centre Vision)

The Vision for the City Centre is for "*A city within a City, a major player within the greater metropolis – and the nation – with its own community and culture and integrated with the economy,*

environment and lifestyle of our City. A centre of major retailing, city living, government services and corporate headquarters."

Vision components for the Chatswood City Centre which are relevant to the Planning Proposal include:

1. Be a vibrant and multi-functional business district serving a local and regional role;
2. Be recognised as a prestigious office centre for major corporations;
3. Provide for city living;
4. Be environmentally sustainable;
5. Be characterised by buildings, public art and places that integrate with and enhance the positive features of the centre;
6. Be characterised by visually interesting buildings and places with a diversity of activity at street level;
7. Provide pleasant landscaped areas and public spaces for passive recreation and outdoor eating; and
8. Be a centre where residential and commercial uses complement each other.

The plan contains a number of strategies as to how this vision may be achieved. An assessment of Strategies relevant to the Planning Proposal is provided Table 6.

Table 6 – Chatswood City Centre Vision and Strategic Plan - Relevant Strategies

Strategy	Comment
Encourage innovative and sustainable architectural design and development that is carried out by qualified designers	The urban design and site planning has been conducted by FJMT and provided in Appendix A. Willoughby City Council's desire for design excellence provisions is noted and can be accommodated at the development application stage.
Recognise and especially treat 'gateways' or entry sites to Chatswood to clarify and confirm its identity at street level	The scale of the proposed built form reflects the site's location next to the Chatswood Interchange in the heart of the retail area. The construction of a laneway network, improved station access and activated ground floor is in recognition of the key location.
Maintain visual links to focal points within Chatswood so that pedestrians can easily 'read where they are' in the Centre	Higher built form closer to stations is the predominant urban design themes on the Sydney North Shore. It serves as a market for the town centre and station.
Promote sustainable transport solutions and infrastructure that reduces reliance on private motor vehicles	Locating significant employment and residual adjacent to a major public transport node will promote public transport usage as this will be the best option for many trips.
Promote higher density of commercial activity in development at public transport nodes in the Centre	The non-residential component of 5:1 or approximately 11,000m^2 is comparable in scale to major commercial buildings in the Commercial core west of the station. The locations proximity to the Transport Interchange presents a significant opportunity to reduce parking numbers and place greater

	reliance on public transport and alternative methods of travel such as car share and cycling.
Use sites to the potential of their location and their precinct purpose giving certainty of outcome	The proposal has been designed to maximize its potential within a reasonable environmental envelope.
Encourage redevelopment of under-utilised and obsolete development sites	The Australia Post site has been vacant since November 2014 and the height controls of 12m and 14m respectively represent an under utilisation of the site.
Balance the competing demands of residential versus business and employment generating uses	The proposal contains a commercial component equivalent to major office buildings in Chatswood, is not located in the main commercial area and is already partly zoned for shop top housing. It represents a balances of these uses that can be delivered in a feasible project.
Provide for land uses within the precincts of Chatswood (the site is located in the Office Core precinct) that consolidate and reinforce the role of the precincts in the overall structure of the Chatswood City Centre	The additional of ground floor retail, commercial and housing in this location will increase the viability of the surrounding uses. This can only be achieved because of the amalgamation of sites.
Recognise the focal points of public transport and the gateways to the City Centre that give identity as the start of the Centre;	The subject site is located at the entrance to the public transport interchange in the heart of the retail core.
Investigate opportunities for expansion of the City Centre for higher density residential development in and around it whilst protecting adjoining low density residential areas and the long term viability of the office and retail core; and;	The proposal will represent the largest addition of commercial floor space in 20 years and create more than 300 dwellings in Chatswood City Centre.
Allow residential use that supports a safe and accessible City Centre but does not jeopardise the retail or commercial balance to sustain the future of the City Centre.	The amalgamated site proposal delivers a significant supply of both commercial and residential on two sites that otherwise have significantly less potential for both uses.

The Planning Proposal is consistent with the Willoughby City Council's strategic documents. The commercial/employment core is protected, and the proposal will facilitate a significant addition of employment generating floor space to the retail core, including A grade commercial floor space.

The ground floor retail and new laneway network will serve to significantly improve the street life and amenity of the current laneway, the access to the Transport Interchange and the town centre core.

4.5 Chatswood CBD Planning and Urban Design Strategy – Draft report

Over the course of 2016, Willoughby City Council have been working with Architectus to prepare an updated strategic plan for the Chatswood CBD. Mirvac have continued a dialogue with Willoughby City Council during this time and have sought to comply with the emerging strategy where possible.

The proposal is consistent with the height and setback arrangement proposed within the draft Strategy. There has been ongoing discussion with Council regarding the proposals ability to achieve a significant commercial outcome on the amalgamated sites which cannot be achieved on the individual sites. The introduction of a non-residential FSR of 5:1 would facilitate approximately 11,000m^2 of A grade commercial floor space on the site.

A consideration of the proposal against the draft strategy is provided Table 7.

Table 7 – Consideration of the draft Chatswood CBD Planning and Urban Design Strategy

Strategy	Comment
Promoting office growth The office market in Chatswood will continue to improve and it is vital that the centre accommodates this. A key focus for this will be new office growth along Albert Avenue.	The site will facilitate approximately 11,000m^2 of A grade commercial space outside the Chatswood main commercial area. This has not been achieved even within the main commercial area since 1995. The 5:1 proposed is equivalent to the base FSRs within the above mentioned areas. This is made possible by addition of mixed use and its ability to amalgamate the sites and overcome market demand issues.
Residential growth in the right locations Chatswood is an accessible urban centre, however residential use will need to focus outside of the Commercial Core.	Shop top housing is already permissible on approximately 50% of the site and according to the Chatswood City Centre Vision the site is in the retail core. Additionally the study contains the following quotes *Potentially some 'outer' areas of the office core which may not be appropriate for office development … may also be suitable for residential uses, where a mix of uses helps to deliver office, or to achieve major public benefit such as significant open space. Pg 65* This proposal will deliver new high quality public domain, significant office supply and is already half zoned for mixed use. Without the amalgamation of sites none of this would be possible.
Ensuring the right mix of uses Retail, medical, community and other uses will also need to be provided in Chatswood. Future use clusters for education (around existing schools), arts and culture (around the concourse) and recreation (around Chatswood Oval and other Council properties) have been identified.	Within the 5:1 nonresidential area, some of these uses could be accommodated and are permissible in the B3 zone.

Strategy	Comment
Providing great public places Key new spaces and links as well as improvements to existing will provide a variety of high quality, interesting spaces for Chatswood into the future.	The proposal will provide a new courtyard space, a laneway network, improved access to the Chatswood Interchange and an almost fully activated ground plane adjacent to the Victoria Avenue Mall.
Addressing transport issues A balanced approach is required to address future transport needs to ensure sustainable outcomes for Chatswood.	The location of significant employment and housing adjacent to the station will facilitate reduced car travel as will the proposed improved access arrangements.
Urban design quality Ensuring a high quality and cohesive environment will provide an attractive centre for all. A clear and implementable vision will help to shape the centre for its future needs.	FJMT have designed a ground plane and public domain network that will complement and enhance the Chatswood centre.
Greening the centre Chatswood is the focal centre of the leafy North Shore and this should be reflected through both the streetscape and new development.	There is opportunity in the North facing urban courtyard area to accommodate green landscape elements and there may be other opportunities within the proposal. These can be further explored at DA stage.

4.6 Consistency with State Environmental Planning Policies and guidelines

Consideration of relevant State Environmental Planning Policies (SEPP) and guidelines is provided in Table 8.

Table 8 – Relevant State Environmental Planning Policies

SEPP / Guideline	Consistent	Assessment
SEPP 55 – Remediation of Land	Yes	SEPP 55 introduces planning controls for the remediation of contaminated land. It provides that the planning authority must consider whether the land is contaminated, and it so that the land is suitable in its contaminated state for the permitted uses in the zone, or that the land requires remediation before the land is developed for that purpose. The assessment of potential contamination and any necessary remediation would be undertaken at the Development Application stage of this proposal. Given the amount of excavation required, the proposed built form and the CBD nature of the Planning Proposal it is considered that any contamination can be remediated to accommodate the future use.
SEPP 65 – Design Quality of Residential Flat Development	Yes	SEPP 65 aims to improve the design quality of residential apartment development by requiring compliance with specified design quality principles and the NSW Government's *Apartment Design Guide*. The proposal has been designed in accordance with the requirements of both SEPP 65 and the Apartment Design Guide.

SEPP / Guideline	Consistent	Assessment
		An appropriate level of assessment is provided in the attached Architectural Statement by FJMT (provided in Appendix A).
SEPP (Building Sustainability Index: BASIX) 2004	Yes	SEPP (BASIX) requires future residential developments to achieve mandated levels of energy efficiency, water efficiency and thermal comfort. BASIX assessments and certificates would be included in any Development Application for the proposal.
SEPP (Infrastructure) 2007	Yes	SEPP (Infrastructure) 2007 sets out consultation requirements and identifies matters to be considered in the assessment of development adjacent to road corridors including: development with frontage to a classified road; excavation immediately adjacent to road corridors; and traffic-generating development. Consultation with and referral of the application to relevant government departments as required by SEPP (Infrastructure) 2007 would be undertaken and the Development Application stage of the proposal to ensure compliance with the requirements of SEPP (Infrastructure) 2007.
Development near Rail Corridors and Busy Roads – Interim Guideline	Yes	The *Development near Rail Corridors and Busy Roads – Interim Guideline* (the Interim Guideline) aims to: reduce the health impacts of rail and road noise and adverse air quality on sensitive adjacent development; assist the planning, design and assessment of development adjacent to rail corridors and busy roads; and protect the safety and integrity of key transport infrastructure from adjacent development. Consultation would be undertaken with relevant road and rail authorities as required at the development application stage of the proposal to facilitate any compliance with the requirements of the Interim Guideline.
Apartment Design Guide	Yes	The NSW Government's *Apartment Design Guide* aims to achieve better design and planning for residential apartment development, by providing benchmarks for designing and assessing these developments. The Planning Proposal has been designed in accordance with the requirements of the *Apartment Design Guide*. Also refer to SEPP 65 assessment.

4.7 Consistency with Section 117 Directions

Consideration of relevant Section 117 directions is provided in Table 9.

Table 9 – Section 117 Directions

S. 117 Direction	Consistent	Assessment
Direction 1.1 Business and Industrial Zones		
The objectives of this direction are to: (a) encourage employment growth in suitable locations,	Yes	This proposal is consistent with this direction as it substantially increases the amount of commercial GFA and

S. 117 Direction	Consistent	Assessment
(b) protect employment land in business and industrial zones, and (c) support the viability of identified strategic centres		retail GFA in the Chatswood City Centre (retaining the current B3 Commercial Core zoning of the site) by almost 11,000m^2. This would be the biggest increase since 1995.
Environment and Heritage		
Heritage Conservation The objective of this direction is to conserve items, areas, objects and places of environmental heritage significance and indigenous heritage significance.	Yes	No heritage items are impacted by this proposal.
Housing, Infrastructure and Urban Development		
Residential Zones The objectives of this direction are: - to encourage a variety and choice of housing types to provide for existing and future housing needs; - to make efficient use of existing infrastructure and services and ensure that new housing has appropriate access to infrastructure and services; and - to minimise the impact of residential development on the environment and resource lands.	Yes	A variety of apartment sizes will be delivered as part of the proposal, the proposal is capable of compliance with the accessibility provisions of the Willoughby DCP. The location of high density housing adjacent to the Chatswood Interchange makes efficient use of existing infrastructure and services and new resident swill have close access to a range of services and retail amenity. As discussed elsewhere in the report the envelope has been designed to protect solar access to important public spaces and create high quality public domain in the CBD area.
Integrating Land Use and Transport The objective of this direction is to ensure that urban structures, building forms, land use locations, development designs, subdivision and street layouts achieve the following planning objectives: - improving access to housing, jobs and services by walking, cycling and public transport; - increasing the choice of available transport and reducing dependence on cars; - reducing travel demand including the number of trips generated by development and the distances travelled, especially by car; - supporting the efficient and viable operation of public transport services; and - providing for the efficient movement of freight.	Yes	This proposal is located on one of the main access points to the Chatswood Station and Interchange. The location of both employment and residential floor space in this location will improve access to jobs, housing , reduce car based trips and encourage short active transport trips. Improving the quantum and quality of access to the Chatswood Station will also benefit public transport and walking trips.

S. 117 Direction	Consistent	Assessment
Hazard and Risk		
Acid Sulfate Soils The objective of this direction is to avoid significant adverse environmental impacts from the use of land that has a probability of containing acid sulfate soils.	Yes	The site is mapped as class 5 in the WLEP, should acid sulfate soils be found clause 6.1 of the WLEP will apply.
Flood Prone Land The objectives of this direction are: - to ensure that development of flood prone land is consistent with the NSW Government's Flood Prone Land Policy and the principles of the Floodplain Development Manual 2005; and - To ensure that the provisions of an LEP on flood prone land is commensurate with flood hazard and includes consideration of the potential flood impacts both on and off the subject land.	Yes	There is no evidence of flooding affecting the site.
Metropolitan Planning		
Implementation of *A Plan for Growing Sydney* The objective of this direction is to give legal effect to the planning principles, directions, and priorities for subregions, strategic centres and transport gateways contained in *A Plan for Growing Sydney*.	Yes	The Planning Proposal is consistent with the relevant requirements of *A Plan for Growing Sydney*. Refer to information provided above for further information.

5 Environmental Social and Economic Impacts

This section shows how the work of the specialist consultants has informed the development of the proposal.

5.1 Land use and Economic Assessment

Given the strategic imperative to toward expanding the amount of commercial floor space in the Chatswood Strategic Centre and in response to feedback from Council about a strong desire for a significant commercial outcome on the site Mirvac was keen to explore the extent to which a commercial outcome could be achieved on the site. CBRE were engaged to provide advice on the sites strength as an office location and the possibility of delivering a significant stand-alone commercial building on the site.

Independently and without any knowledge of the CBRE engagement or findings JLL were also engaged for the same purpose but additionally they were asked to also complete an analysis of the development feasibility, review of previous analysis by Council and in the case that a full commercial outcome was unfeasible conduct a review of mixed use buildings and provide advice on the success of this building typology as an enabler of commercial floor space.

Both the CBRE and JLL studies reinforced previous findings about Chatswood having a price advantage to the office markets of the CBD and highlighted that as similar construction costs existed this price advantage translated into an inability to build the commercial floor space at a rate that would make the project feasible. Both consultant reports found that currently the market rent ($585m2) available for commercial doesn't meet the economic rent ($811m^2) required to make a development feasible for a new significant stand-alone commercial building in the Chatswood CBD.

Lower priced and very accessible alternatives such as Macquarie Park may serve to exacerbate the ability to attract larger commercial tenants to the area. These factors probably coupled with a relative lack of available sites has meant there has been no significant addition to commercial floor space to the Chatswood CBD since 1995 and Chatswood has the second highest vacancy rate of any of Sydneys office markets.

Both studies are attached in their entirety at and brief synopsis of their findings is below.

As stated above CBRE were engaged to consider the market demand for a full commercial building on the subject site. Listed below is a number of key observations from the CBRE Report;

- CBRE noted that the site is located in a predominately retail and residential area of Chatswood and that significant office building are almost all located to the west physically separated by the North Shore Rail Line. The only office building of note in the immediate precinct is 67 Albert St. CBRE stated a view that the longer term use of Albert St would likely be residential given its proximity to retail and panoramic views to the South East.
- The Chatswood market has ranged from 225,000m^2 – 293,000m^2 however it has been declining since 1998.
- Key factors influencing a proposed office development area weak tenant demand, an absence of pre-commitment demand and consistent high level of vacancy within the Chatswood office market.
- The CBRE report highlights the supply situation in North Sydney and St Leonards as having a negative effect on the ability to secure a tenant of sufficient size in Chatswood. It also cites competition from successful office markets in Parramatta and Macquarie Park as having a significant impact in attracting commercial tenants especially given both of these markets have a significantly lower market rent.

In summary CBRE conclude that while Chatswood has improved as an office market over the last 12-18 months it remains a fragile market prone to sustained periods of stagnant rent growth and elevated vacancy rates. CBRE states the view that that Chatswood lacks the critical mass of quality office stock to underpin development of a new stand-alone office development of a significant size.

CBRE go on to state that that the highest and best use of the site given its location in the heart of the residential and retail precinct is high density residential.

JLL were engaged to provide advice on the following

- The broader economic context and implications for commercial development in Chatswood;
- The wider Sydney and Chatswood office markets;
- The feasibility of a full commercial option for the site, in context to the Chatswood office market;
- Short, medium and longer term outlook for the Chatswood office market;
- In the event this was not a positive outlook JLL were asked to provide advice on mixed use as an enabler for commercial floorspace and provide examples and success factors, and;
- a peer review of the prior Hill PDA, SGS and AEC studies as they relate to commercial development of the site.

The JLL report makes the makes following key findings;

NSW is currently experiencing strong economic drivers, which are conducive to office investment and development within the Sydney office market. While most markets are currently benefitting from this cycle, Chatswood is an exception. This suggests that if now, during a very strong phase in the commercial office cycle commercial development seems unviable (both unfeasible and a lack of market acceptance), it is difficult to ascertain when it will be.

The proposed office development of circa 40,000m^2 is unrealistic, as it would be the third largest office building in suburban Sydney. JLL discussions with market operators suggest that a development of 20,000 to 30,000m^2 would also be unfeasible as a 10,000 sqm pre-commitment would be difficult. This appears to be a reasonable observation considering historic net absorption (3,300 sqm p.a. over the past five years, 5,400m^2 p.a. over the past forty years) and historic new supply (last major additions occurred in the early to mid-1990s).

Chatswood's recent office growth shortcomings is further evidenced by reference to the *The Vision and Strategic Plan for Chatswood City Centre Plan 2008* adopted by Council in November 2010. This plan identified a number of targets, in regards to office these are summarised in the table below, along with current position as tracked by JLL.

Table 1: The Vision and Strategic Plan for Chatswood City Centre Plan 2008, Office Targets

Target Type	Where we are (2008)	Where we are planning to be (2031)	*Currently (as at Q3/2016)*
Office Floor Space (NLA)	301,300 sqm	440,000 sqm	304,234 sqm
Vacancy	10.5%	<7%	12.4%

Source: The Vision and Strategic Plan for Chatswood City Centre Plan 2008, JLL

The above table suggests that the current market dynamics is not achieving the targeted outcome. If existing status quo was to continue, these targets and other targets, such as those released by the Greater Sydney Commission's District Plans (growth of between 6,300 to 8,300 jobs in the 20 years to 2036), is unlikely to be met.

JLL states that this this relates to the nature of office being targeted by the Chatswood market. JLL envision the role of Chatswood going forward as a more support office centre, with much better drivers from a demand perspective for this type of use. The only concern for this coming from the appropriate facilitation of supply.

JLL envisage that an enabler of this supply could come from mixed-use development with the significant demand for residential development within Chatswood acting as the support for economic

viability. In doing so, this would create a catalyst to break through the historic status quo of the Chatswood commercial market.

The findings from the JLL case studies of mixed use are a requirement for the building to be designed to a high quality that does not appear obviously residential and the use of separated lobbies for different uses. These recommendations have been incorporated into the proposal..

JLL considers mixed-use development will provide significantly more employment based commercial space rather than excluding residential uses from the commercial core which will likely see continuation of the trends of the last two decades.

5.2 View sharing

The laneway and consolidated site strategy maximises sun light access to the existing residents in the Sebel building to the south and view sharing for the Sebel building and the above station development to the west.

Figure 14 - Indicative view corridors (Source: FJMT)

Whilst the proposed development has some impact on existing views, the proposed envelope will allow for a degree of view sharing consistent with the principle established in Tenacity Consulting v Warringah Council [2004] NSW LEC.

The impact on views is seen as acceptable given:

- The subject site is within the centre of the Chatswood CBD and as such it is reasonable to expect that higher density;
- development will occur and development of the site to these parameters is envisioned by Councils own strategies; and
- The views obtained from both 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 centre facilities is considered to outweigh the impact of the partial view loss that occurs as a result of the proposed development.

5.3 Overshadowing

Several principles have shaped the design of the proposal with regard to overshadowing, the FJMT report contains an in-depth analysis and this has been confirmed by detailed overshadowing surveys given the relative importance of the issue.

Key principles are

- Avoid overshadowing public spaces
- Ensure surrounding residential development achieves SEPP65 compliance, and
- Design a sustainable and efficient built form the future occupants in accordance with the Apartment Design Guideline.

How the proposal responds to these principles is discussed below;

Avoid overshadowing public spaces

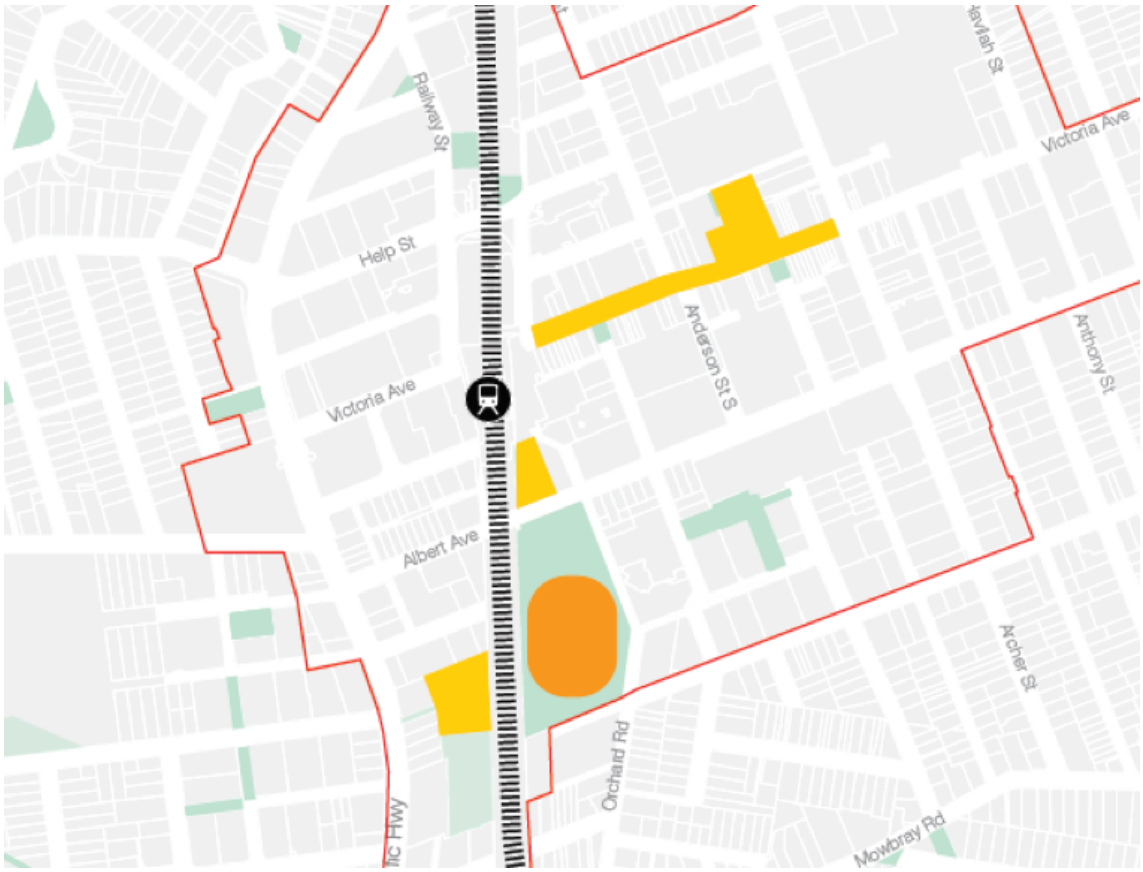

Figure 15 –Recommended sun access to key public spaces (Source: draft Chatswood CBD Planning and Urban Design Strategy)

The main public space to the South of the site is Chatswood Park, Councils recent draft Strategy contains the following diagram depicting the areas to be protected. Relevant to the site, it recommends that no additional overshadowing on Chatswood Oval within Chatswood Park between 11am and 2pm mid winter. It also recommends that There be no additional overshadowing between 12pm to 2pm on the Garden of Remembrance.

The Study also contains the image Figure 15 which proposes a new LEP control for maximum height based on a sun access plane to these areas. FJMT have tested these controls with the proposed envelope and are satisfied that the future building can comply. It is recommended that a

height limit of RL260 be adopted with either a map similar to that depicted in Figure 18 or a DCP control regarding the solar access plane.

Figure 16 Sun Access Height Map (Source: draft Chatswood CBD Planning and Urban Design Strategy)

Figure 17 - Overshading Analysis on Chatswood Oval (Source: FJMT)

Ensure surrounding residential development achieves SEPP65 compliance.

The laneway and consolidated sites strategy maximises sun light access to the existing residents in the Sebel building to the south and view sharing for the Sebel building and the station development to the west. A more detailed analysis of this is contained in the FJMT report at Appendix A.

The main residential development to the south is the Sebel building studies have been undertaken to demonstrate that 2 hours of sunlight is maintained to apartments on the north side of the Sebel building between 9 and 3 on 21st of June.

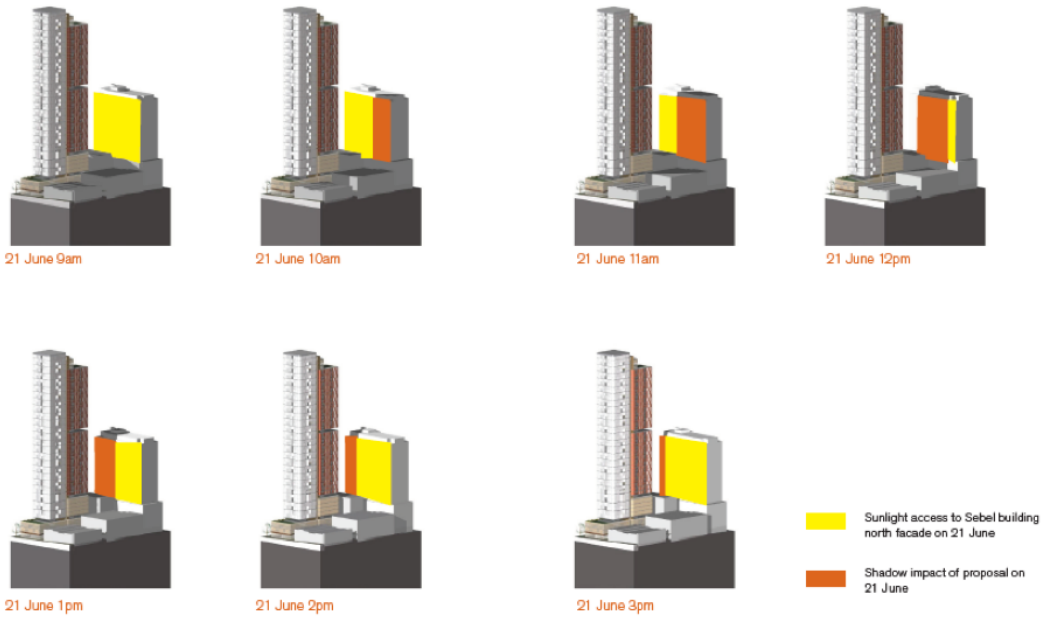

Figure 18 - Sebel building Shadow analysis (Source: FJMT)

Design a sustainable and efficient built form for the future occupants in accordance with the Apartment Design Guideline.

While SEPP 65 and the Apartment Design Guideline relate specifically to development applications FJMT have designed the envelope and surrounding laneway network using the SEPP65 design quality principles in order to create a high quality environment and ensure a high level of compliance at development application stage. An analysis is contained in section 8 of the FJMT Architectural Statement at Appendix A.

5.4 Traffic, Transport and Car Parking

The subject site is well served by public transport services with Chatswood Transport Interchange located approximately 120m west of the site. Chatswood Interchange is a major transport node in the CityRail network having undergone a major redevelopment in recent years and is well served by the Northern, North Shore and Western Lines. In 2019 Chatswood will also serve as a major interchange for the North West rail link. Which in 2023 will be connected directly to Crows Nest, North Sydney, Barrangaroo and onto Bankstown via Waterloo near Central.

Currently the rail journey time between Chatswood and Town Hall is 23 minutes, the major employment area of Macquarie Park begins one stop away to the west. Chatswood Interchange also functions as one of the main bus interchanges in the northern suburbs of Sydney.

As outlined in the previous section many state and local planning policies support the location of higher density employment and housing near major transport nodes recognising the long term role this will have in reducing overall traffic congestion in Sydney. Where public transport is the best option people will most often make this choice. This is particularly evident for commuter trips in the AM peak period which traditionally is the highest period of congestion in Sydney.

GTA Transport Consultants were engaged to provide an assessment of the anticipated transport impacts of the planning proposal, including consideration of the following;

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

GTA completed various peak hour traffic movement counts along the Albert Avenue corridor between Pacific Highway and Victor Street in September and August of 2016.

They noted the sites excellent location with regards to public transport and the significant amount of pedestrian, car share and cycling infrastructure in the vicinity of the site.

GTA concluded that against existing traffic volumes in the vicinity of the site, the additional traffic generated by the planning proposal could not be expected to compromise the safety or function of the surrounding road network. Overall, the intersection would continue to operate at the same levels of service (LOS B, which is described as a 'good' level of service) when compared with existing conditions.

The proposal has the ability to comply with RMS parking rates and includes na new pedestrian laneway network to improve Interchange access. However, in consultation with Council the proponent would like to further explore travel demand measures at the development application stage in order to further maximise the sites location and acknowledge that public and active transport options are viable alternatives in this location. These could include measures such as;

- Reduction in number of onsite car spaces
- Provision of bicycle storage facilities
- Workplace travel plans, and
- Car share provision onsite

5.5 Aviation Issues

The upper limit to height in the Chatswood CBD is affected by airspace controls from the operation of Sydney Airport the CBD is not affected by the Obstacle limitation Surface (OLS) from the Airport however the Radar Terrain Clearance Chart Surfaces (RTCC) published by the Commonwealth Department of Infrastructure and Regional Development will potentially have an effect on some higher building forms. The Chatswood Transport Precinct building to the immediate west have already been permitted to RL 263.8 so this is not expected to be an issue but will require a referral at development application stage.

6 Mapping

The following amendments to Willoughby LEP are proposed

- Amendment to the Zoning map to map the entire site as being included in Area 5 – Shop Top Housing Permitted
- Amendment to the Maximum floor space map to include a minimum non residential FSR of 5:1
- Amendment to the Height of buildings map to indicate the maximum height of RL262 (or the possible introduction of a map showing a solar access plane and RLs)

7 State and Commonwealth Interests

Aside from the Australia Post ownership of the 45 Victor Street site there are no direct Commonwealth or State interests which would be affected by the proposal.

8 Community Consultation

Given Councils plan to exhibit the Draft Chatswood CBD Planning and Urban Design Strategy in advance of any gateway determination and subsequent public exhibition of this proposal and the history of the subject site additional community consultation prior to formal exhibition is unlikely to be required. It is recommended that the statutory period of 28 days form the core of the community consultation for the purpose of the Gateway determination.

9 Project Timeline

Planning Proposal Stage	Date
Lodgment of planning proposal	December 2016
Willoughby City Council Reviews and prepares Planning Proposal	February 2017 – March 2017
Willoughby City Council submits Planning Proposal to Greater Sydney Commission or delegate for Gateway Determination.	March 2017
Receive Gateway Determination	April 2017
Public exhibition and public authority consultation of Planning Proposal	May 2017- June 2017
Willoughby City Council reviews submissions received during public exhibition and submits finalised planning proposal to Greater Sydney Commission or delegate.	July August 2017
Drafting of instrument and finalisation of mapping.	September 2017 – October 2017
Amendment to Willoughby LEP notified.	October 2017

Appendix A

Separate A3 Report

Victor Street, Chatswood
Architectural Statement

for Planning Proposal
Mirvac

fjmt studio architecture interiors urban landscape

12/01/17 – PLANNING PROPOSAL ISSUE – Rev 1

Project Name		45 Victor Street	
Project Code		MVV	
Document Name		Architectural Statement	
Document ID		170112 fjmt Architectural Statement - 45 Victor Street	
Revision	Date	Comment	Approved
0	22/12/16	PLANNING PROPOSAL SUBMISSION	DH
1	12/01/17	MINOR DRAWING AMENDMENTS	DH

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Contents

1.0 Vision

Chatswood is a key commercial, retail and residential centre in the Sydney Metropolitan area and is continuing its development as a culturally rich and active focal point in the Lower North Shore. The role and importance of Chatswood will increase with new infrastructure projects linking the centre more effectively to the living and working hubs of Sydney.

The structure of Chatswood is robust and enduring with the central pedestrian focussed street, Victoria Avenue, linking the station, the retail centres and the community and cultural heart, The Concourse.

A finer grain of lanes and places can be developed to complement the established main street dining character that is drawing people across the North Shore in the evenings in particular. The 45 Victor Street proposal unites two sites either side of an existing laneway and creates a network of active retail frontages and a new small north facing place that can be enjoyed by those passing from the station to Westfield, and to Victoria Avenue.

A mixed use building of retail, commercial and residential accommodation is proposed, optimising the use of the site so well located to public transport and urban amenity. The building envelope steps to the south, protecting sun access to the playing field of Chatswood Oval, an important recreation space for residents.

The north-south orientation of the tower considers sun light access to residents in the Sebel building to the south and view sharing with the more recent towers above Chatswood Station.

Street walls heights and setbacks acknowledge the dominant urban forms along Victor Street and Victoria Avenue. The indicative design shows the possibility for slender tower forms over an articulated base. Terraces are formed at the base and roof for sun drenched communal areas to the north and city views to the south.

2.0 Design Statement

The Victor Street site lies directly adjacent the transport hub of Chatswood Station, harnessing the potential of the new metro transport developments and integrating a mix of uses providing commercial retail and residential floor space, 45 Victor Street will significantly contribute to the urban heart of Chatswood.

2.1 **Context**

Chatswood is located 11km to the north west of Sydney, centred in an area of significant residential and business growth. Chatswood has developed itself as a retail hub with two large scale retail centres; Westfields and Chatswood Chase, as well as a large cultural centre with The Concourse offering theatre, musicals and community events.

Chatswood is located in close proximity to the significant motorways connecting the Pacific Hwy to Sydney's CBD, as well as the north coast (M1). Chatswood Station is a key interchange in Sydney's public transport network and connects to key centres to the north, south and west.

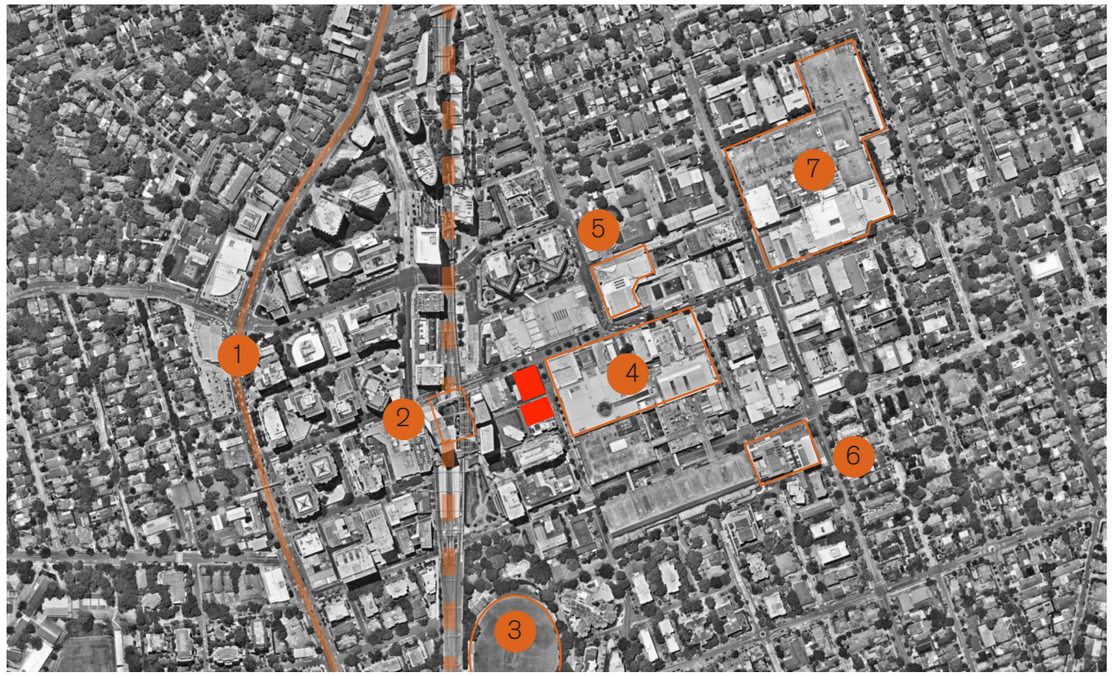
The construction of the Chatswood to Sydenham metro link including, Chatswood Station, creates a significant public transport interchange with increased public connectivity.

2.2 **Site Context**

The site is located adjacent and connected to:
- Chatswood Stration
- Westfield Centre

The site is located adjacent or in close proximity to existing community facilities including:
- The Concourse
- Chatswood Chase
- Chatswood Oval

Key sites in urban heart of Chatswood



Chatswood Retail, Transport and Cultural Facilities

1 Pacific Hwy
2 Chatswood Station
3 Chatswood Oval
4 Westfield
5 The Concourse
6 Chatswood Private Hospital
7 Chatswood Chase

2.3 **Two Sites**

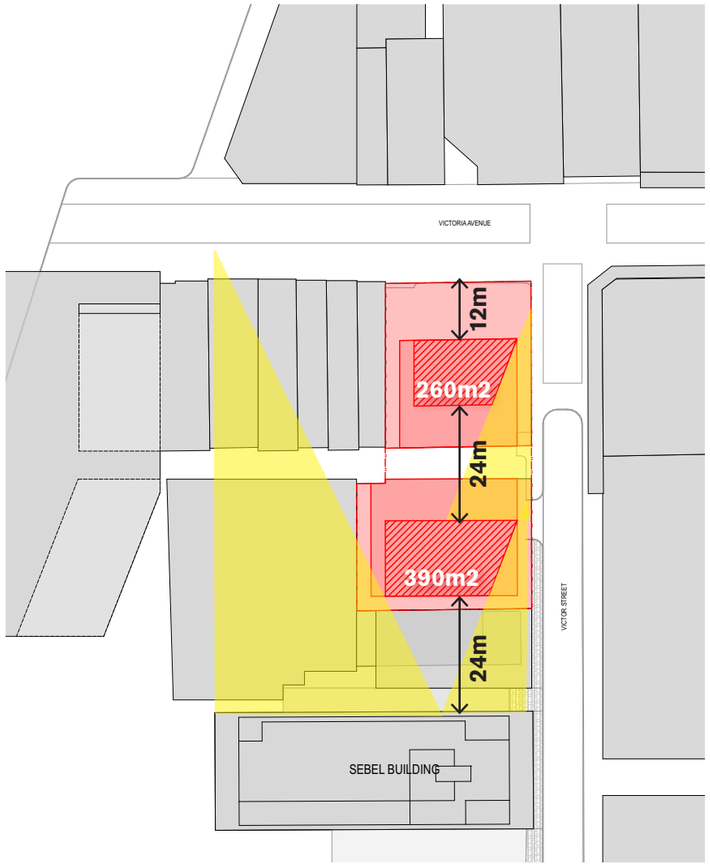
In keeping with Council's preference, the 45 Victor Street Scheme proposes the amalgamation of adjacent sites to facilitate the delivery of a larger commercial footprint.

As illustrated below, the treatment of each site individually (separated by Post Office Lane as the site currently sits) does not allow for the creation of viable commercial or residential floor plates on either of the sites and places significant restrictions on a development outcome. Once the setbacks required to achieve building separation and solar access to the neighbouring buildings are applied, the individual sites do not yield floor plates that are workable for development.

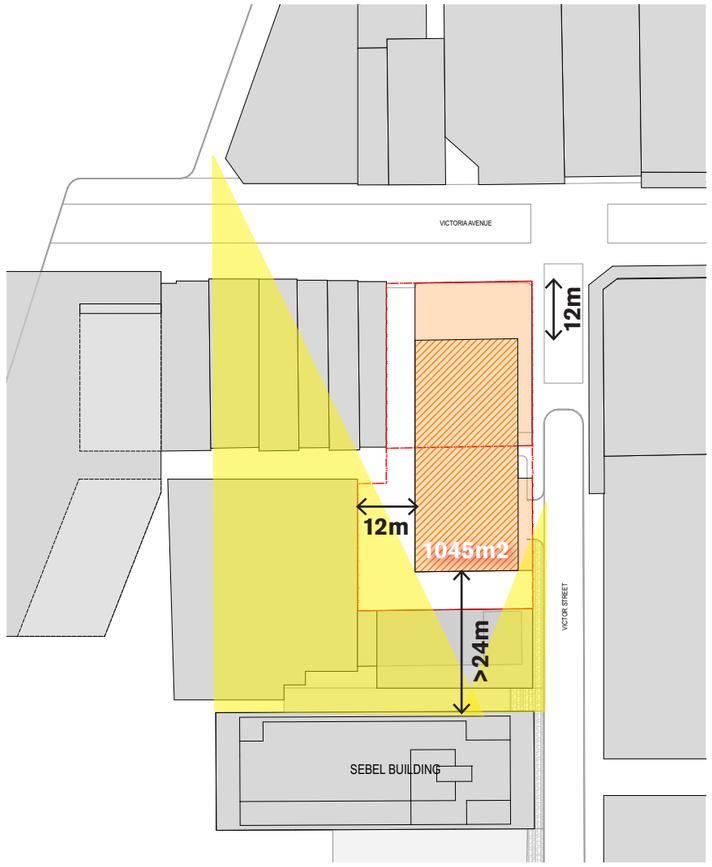
Commercial floor plates for the individual sites are smaller than desirable in the market (typically a minimum of 1,000m2 is required) and would present wide blank walls to the neighbouring residential buildings. In addition, residential floor plates over a podium are limited by building separation and side boundary setbacks making them inefficient.

To address the above constraints, this proposal considers the site holistically and recommends relocating Post Office Lane. This approach achieves the desired commercial outcome whilst maintaining appropriate building setbacks, to enhance public domain and residential amenity. The amalgamation of the two sites permits the creation of an optimised, efficient commercial floor plate greater than 1,000m2.

This unlocks the sites potential to deliver new employment space to the Chatswood CBD which would otherwise not be feasible if the two sites were treated separately. The proposed scheme also offers a superior urban design outcome with improved solar access and reduced view loss for the neighbouring sites.



Two Sites _ Floorplate Constraints

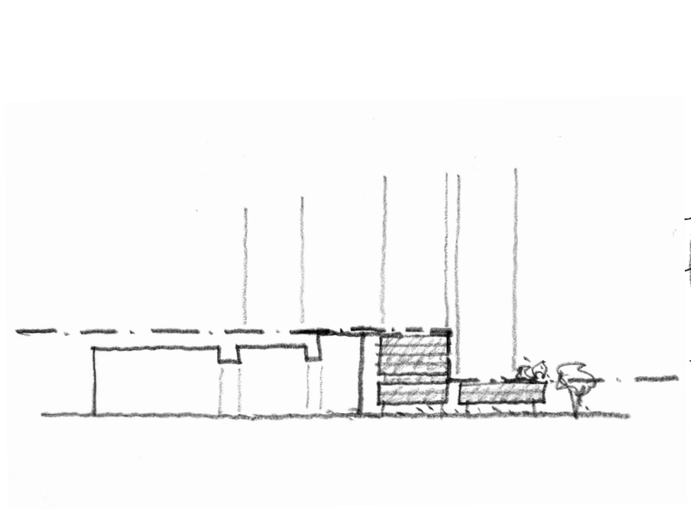


Amalgamated Mixed Use Proposal _ Greater amenity and optimised floorplates

Indicative sunlight access on 21 June at 11am and 2pm

Design Statement

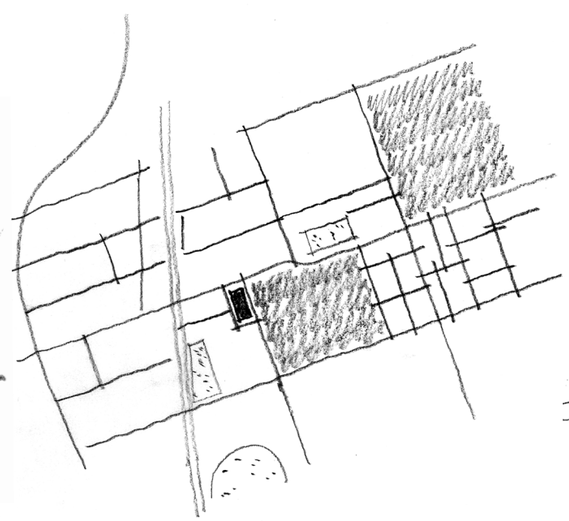
2.4 Urban Design Concepts



2.4.1 Streetwall

The Victor Street proposal intergrates with the surrounding context by forming street wall relationships to the neighbouring buildings. The contrasting heights of the neighbouring buildings, and throughout Chatswood, create a mixture of scale at the street edge.

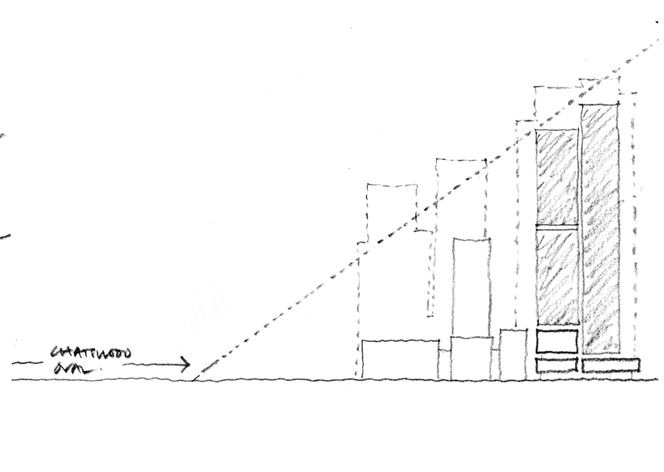
Working with the existing heights of the low lying buildings to create a street wall that is sympathetic to its surroundings, breaking up the tower form whilst providing retail opportunities at a street level.



2.4.2 Fine Grain

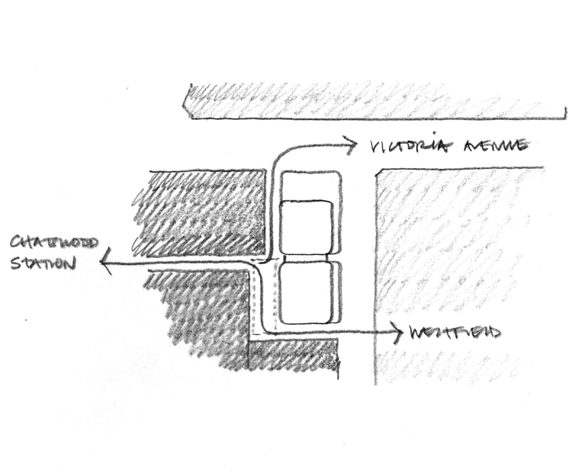
In contrast to the large block retail centres, 45 Victor Street proposes a fine grain pattern of meandering laneway networks, providing an experience of small food and retail offerings.

45 Victor Street reflects the pedestrian nature of the surrounding area, in particular the western end of Victoria Ave, creating a dynamic and activated precinct. These laneways create a small urban courtyard.



2.4.3 Over Shadowing

The profile of 45 Victor Street is stepped towards the north protecting sun access at 21st June to Chatwsood Oval, a local community sporting field, during the hours of 10am to 3pm.



2.4.4 Laneway Network

The key principles establish a connection aligned to Chatswood Station, Victoria Avenue and Victor Street via a series of intimate laneways creating interstitial spaces encouraging social and community interaction within a public space.

The design concept for 45 Victor Street considers the site proximity to Chatswood Station, a transport hub, and contributes to the fine grain network of lanes and places developing in the Chatswood CBD.

New Urban Courtyard

3.0 Planning Principles

45 Victor Street provides a multi-faceted mixed use building with a series of supporting planning principles to create a legible and permeable pedestrian focused addition to the Chatswood skyline.

3.1 The Sites

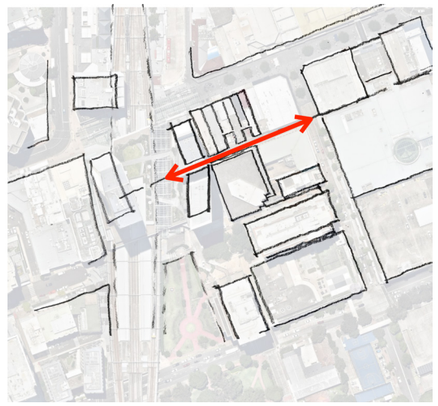
The Sites

The two sites 45 Victor Street have important frontages to Victoria Avenue and Victor Street. The sites are seperated by a small under utlised laneway connecting Victor Street to Chatswood Station. The individual sites are constrained and are not able to fully realise the proximity to the transport and retail nodes in Chatswood

3.2 Post Office Lane

Post Office Lane

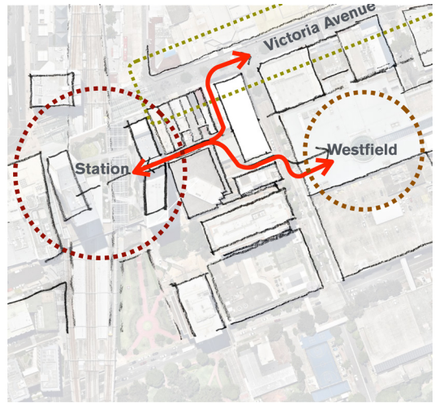
The laneway provides an important entry point into the Chatswood station development to the west but terminates at Victor Street to the east looking at the side wall of Westfield with no clear purpose for pedestrian connectivity. The laneway is currently presented as a service lane and is not activated.



3.3 Connections

Transport - Retail - Commercial

The primary destinations around Post Office Lane are Chatswood Station, Westfield, and Victoria Avenue. A bifurcation of the existing lane would allow a fine grain network to be developed, providing mid block connection between Victoria Avenue and Chatswood station and supporting pedestrian movement from Chatswood station to the entry of Westfield and to Victoria Avenue.



3.4 Lanes and Places

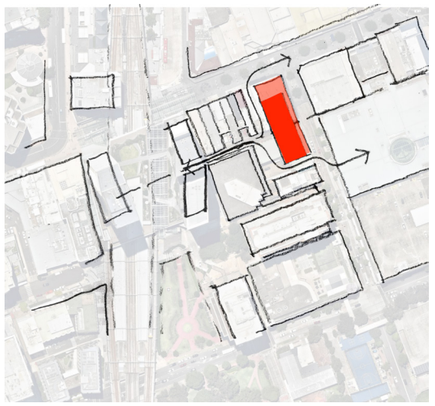
Laneway and Urban Courtyard

The split lane approach works with the land parcels to deliver three lanes and a pivotal place, a small urban plaza that is open to the sun at lunch time throughout the year.

3.5 Consolidated Site

Mixed use

Amalgamating the 45 Victor and 414-416 Victoria Avenue sites and matching the benefits of the the laneways with the need for building separation allows for, a more effective retail, commercial and residential development to be framed.



3.6 **Slender Building Form**

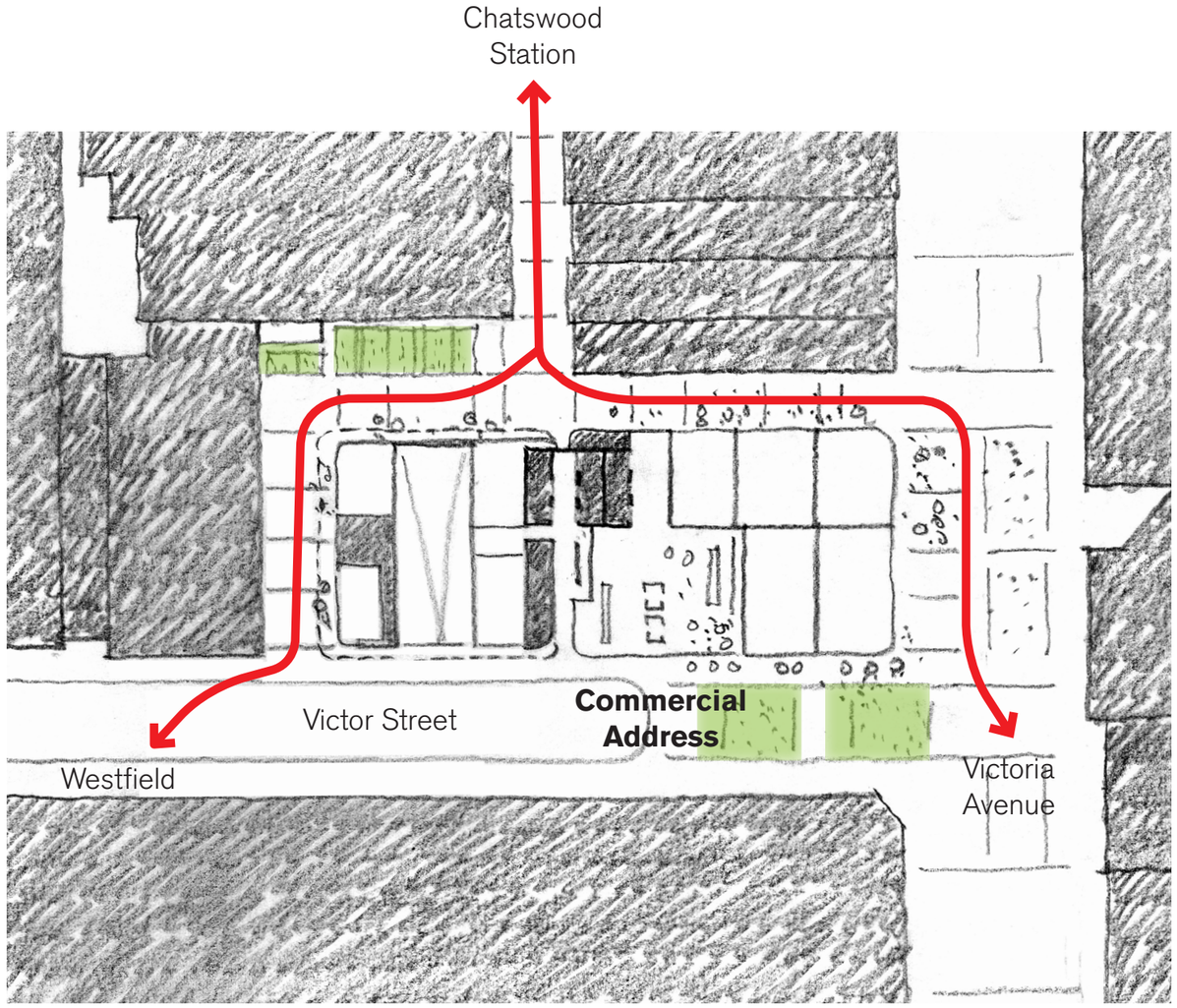
Tower Form

The redistribution of the pubic domain and developable land allows a slender building to be positioned on a north-south alignment benefitting building separation, ventilation and sun light access.

3.7 **Overshadowing and View sharing**

Conservation of Views

The laneway and consolidated sites strategy maximises sun light access to the existing residents in the Sebel building to the south and view sharing for the Sebel building and the station development to the west.



Amalgamated Sites and Activated Groundplane

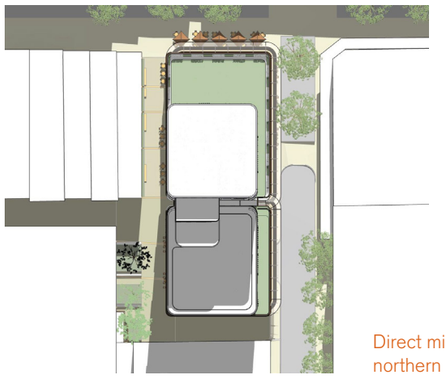
The Planning Principles developed for 45 Victor Street embrace the opportunity for the amalgamated sites to deliver an enhanced public domain, activated frontages, a clear commercial address and employment accommodation, and quality residential connected to Chatswood Station and Victoria Avenue.

4.0 Lanes + Places

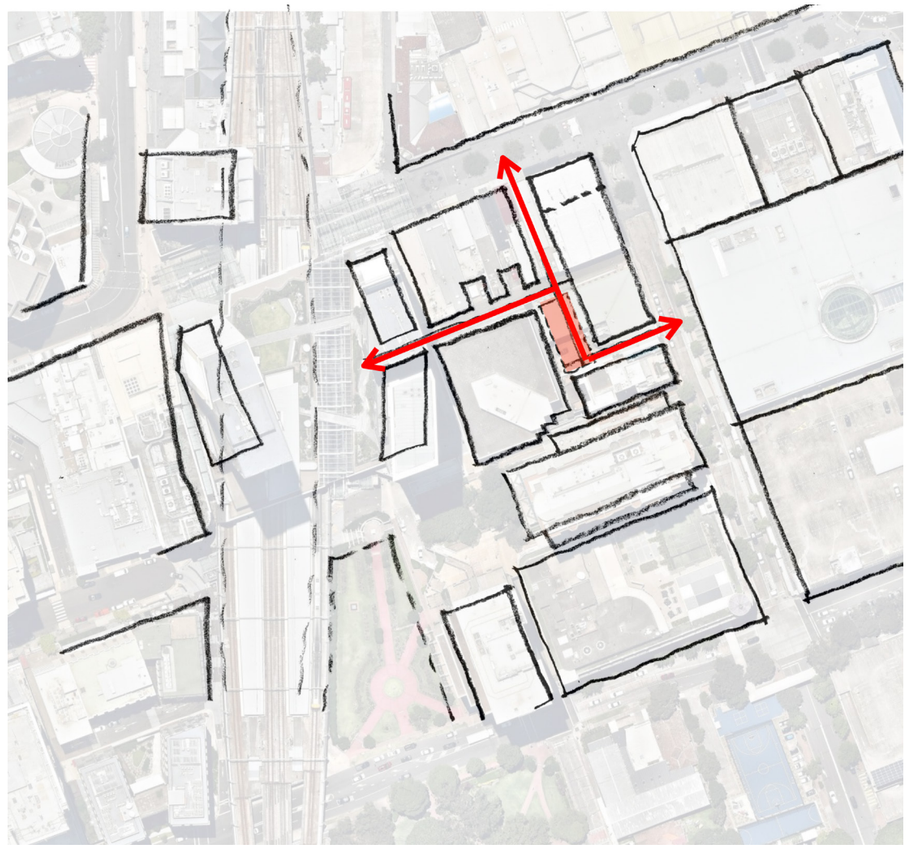
The successful pedestrian focus of Victoria Avenue and growing dining culture of the Chatswood CBD can be enhanced between Victor Street and the station through a network of lanes and inclusion of small scale retail spaces opening to the new public domain.

Service access to the rear of Victoria Avenue is maintained and incorporated in a landscaped shared way.

An urban courtyard is provided at the intersection of the new lanes. This space is north facing and receives direct sunlight during lunchtime in winter and throughout the year. It can be a green space with landscape elements that support public seating and informal gathering, complementing the retail spaces drawing locals and visitors to the fine grain spaces around 45 Victor Street.



Direct mid winter sun to Urban Courtyard and northern lane at lunch time



Lanes and Urban Courtyard


Rob Roasters
PATISSERIE

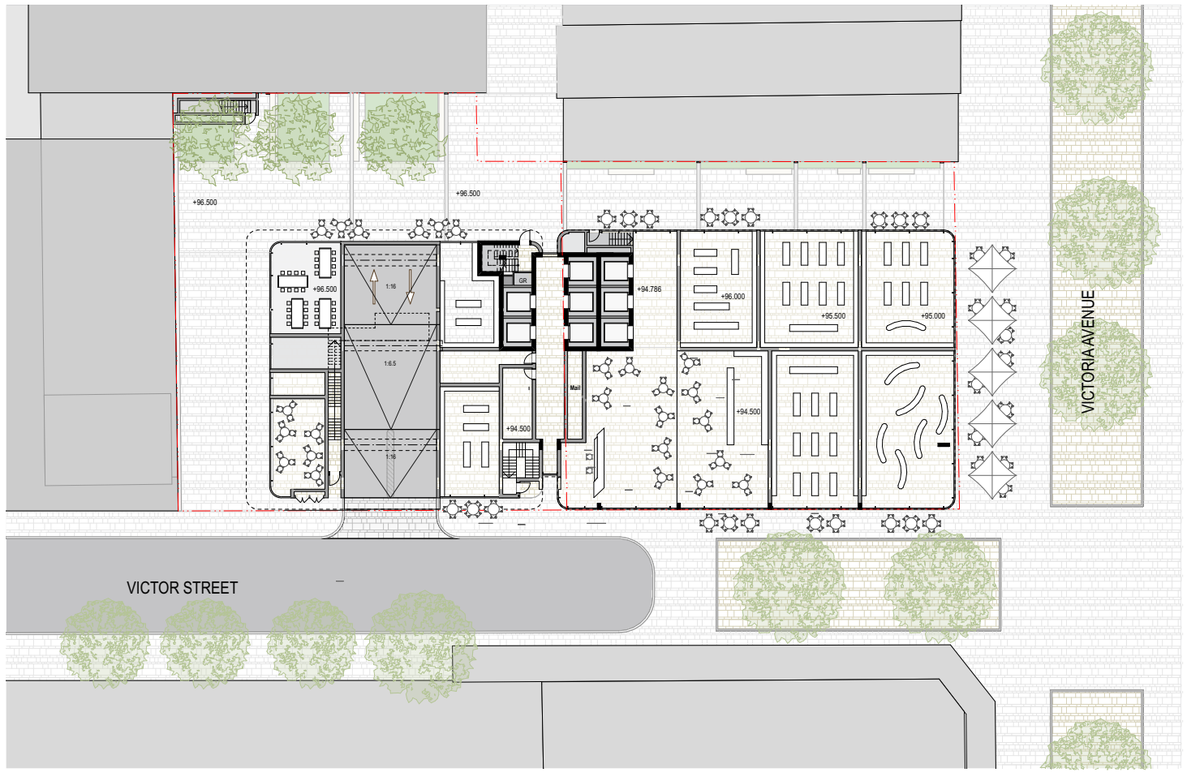
5.0 Victor Street Office + Retail Precinct

The 45 Victor Street proposal delivers on employment space in the Chatswood CBD. 5:1 commercial and retail space will be provided incorporating large commercial floor plates above the ground level retail activation.

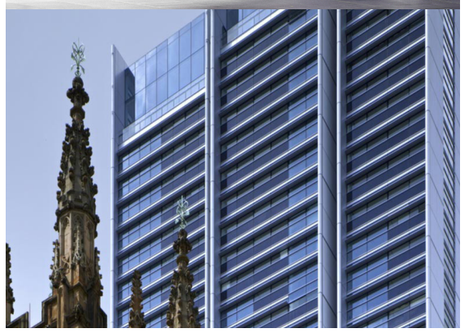
A strong commercial presentation to Victor Street is proposed with a broad and high quality lobby space, lobby cafe and connecting void space to the first office levels. The commercial functions will deliver patronage to the small scale retail spaces vital to the lanes in particular and to the Victor Street and Victoria Avenue frontages.

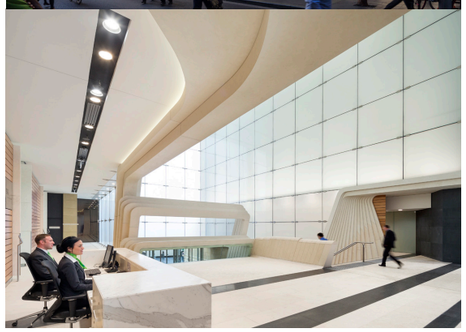
The laneways and urban courtyard will be perfect for business breakfasts, informal meetings and quick lunches.

The building facades apply a commercial sensibility. Flush fitting facade components with integrated and recessed balcony spaces for the residential portions enhance the commercial focus of the building presentation.

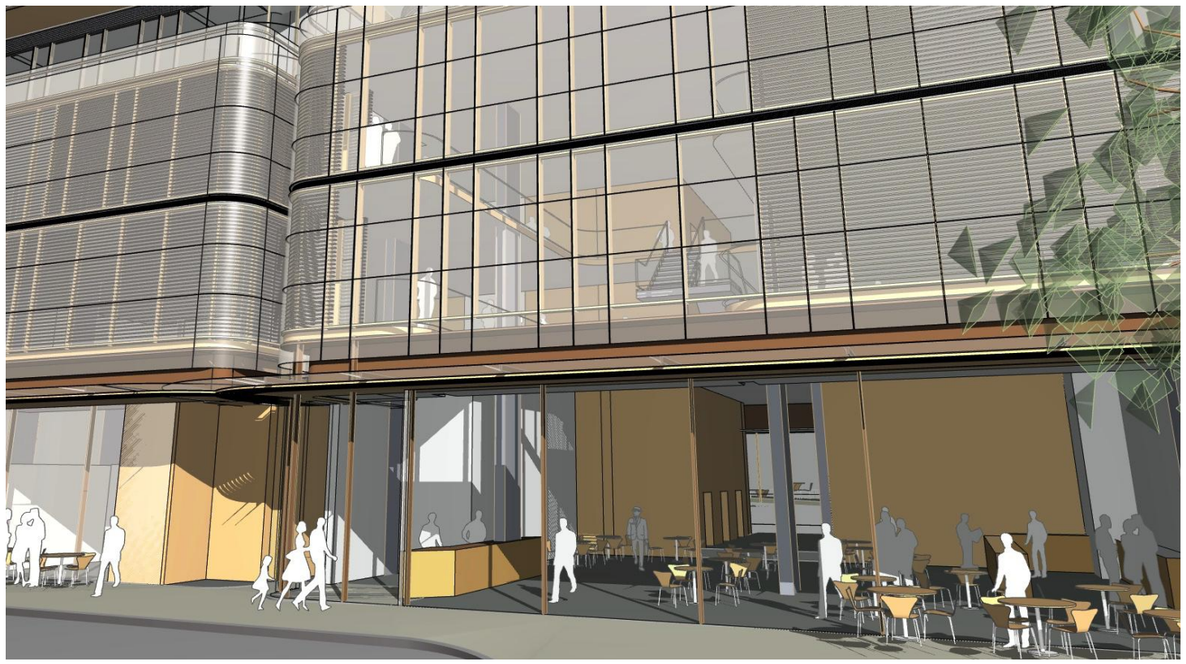


Ground Level Retail and Commercial Lobby





Victor Street Commercial Address



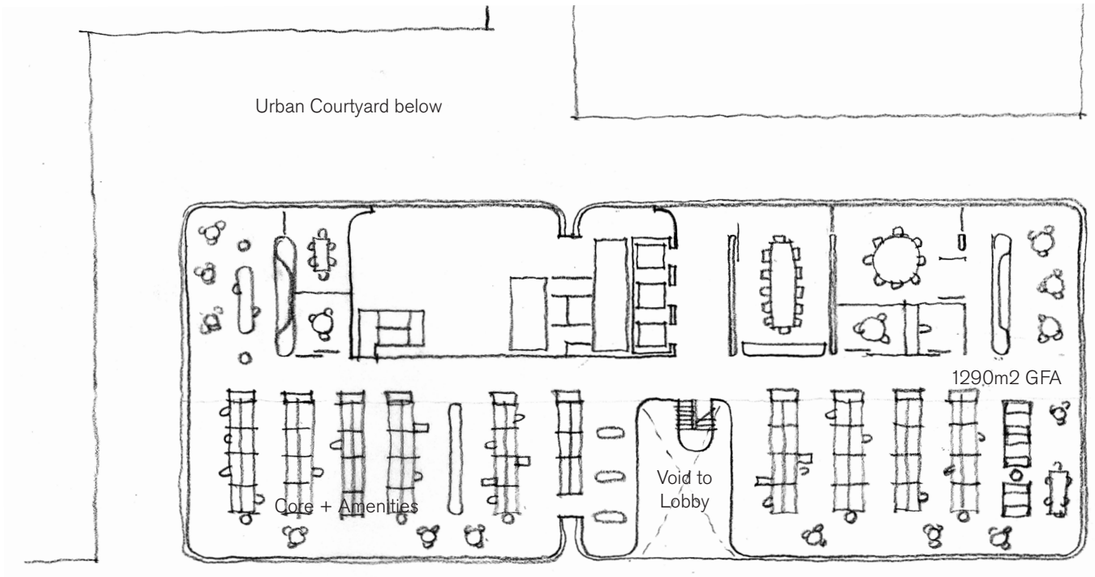
Victor Street Office + Retail Precinct

A contemporary workplace presence on Victor Street will transform the station precinct. Ten floors of office and retail space will define the building's character at ground and podium levels.

45 Victor Street will offer A-grade commercial space with a direct pedestrian link to one of Sydney's most connected commercial centres. The new Metro line will expand the public transport options available to workers and businesses and will reduce travel times to the Sydney CBD to less than 10mins.

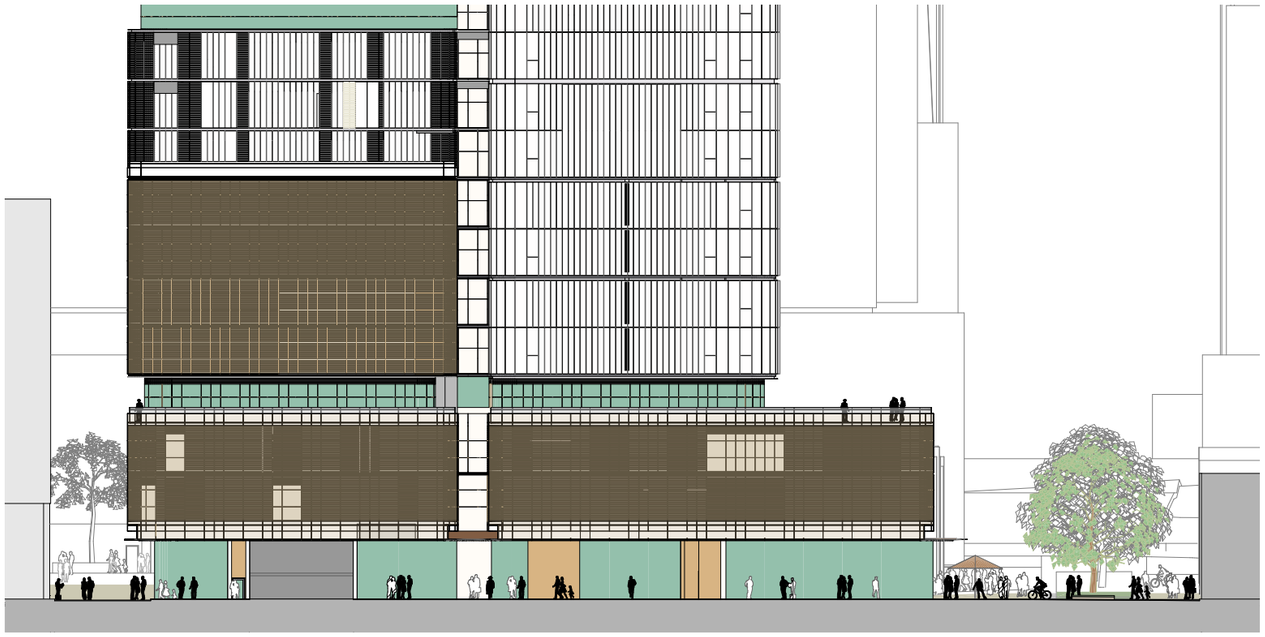
The commercial floorplates will offer generous access to natural light and outlook to the street life of Chatswood. A potential side core configuration would deliver flexible floor plates of greater than 1000m2.

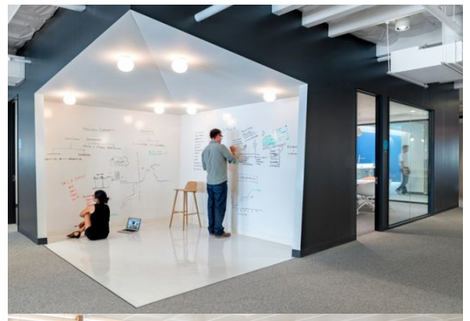
The commercial space for 45 Victor Street will be a unique offeering of high amenity, great connectivity and commercial quality. The proposal can establish a new benchmark for commercial and retail space on the east side of the Chatswood CBD.

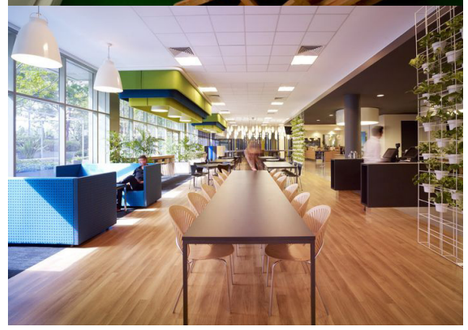


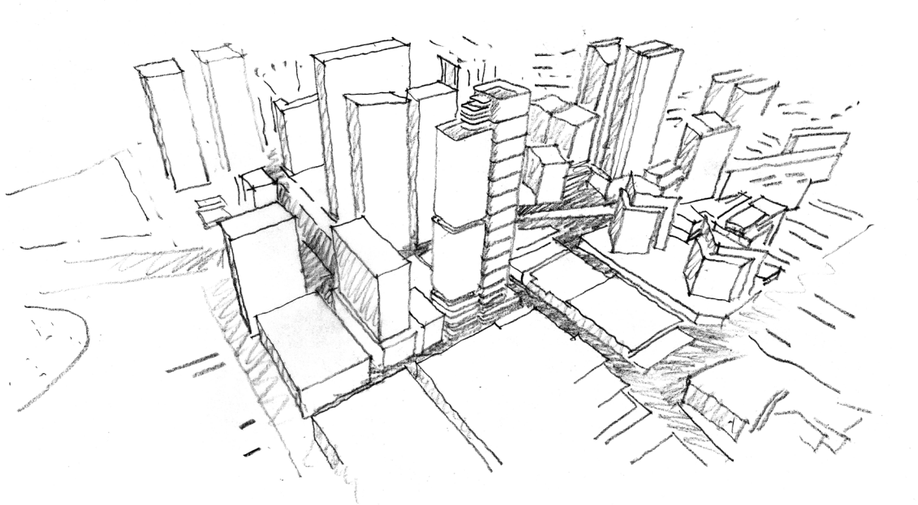
Indicative Office Floor Plan

Victor Street Commercial Elevation







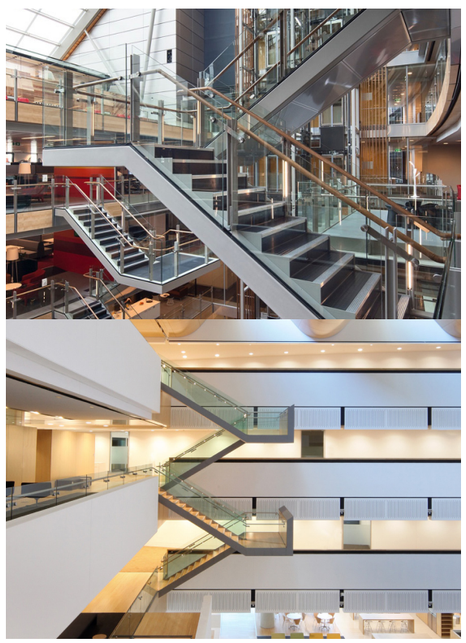
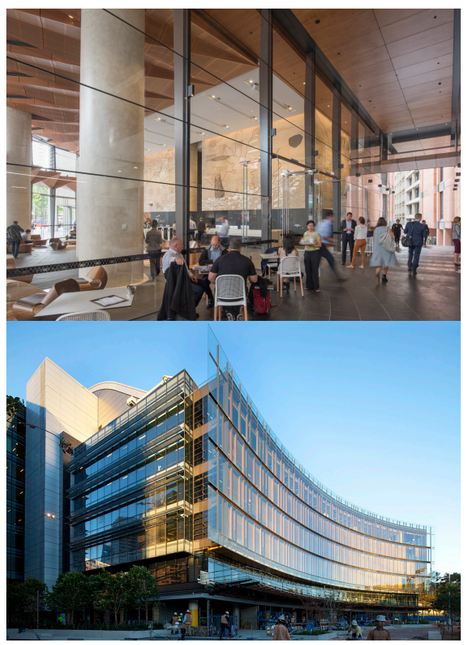


45 Victor Street will apply world's best standard sustainability and indoor air quality principles

The proposal harnesses the land use potential of the site through the provision of a mix of uses directly adjacent a public transport node. The proposal minimises vehicle use, and associated emissions, and supports pedestrian movement and public transport use as the most sustainable forms of urban transport.

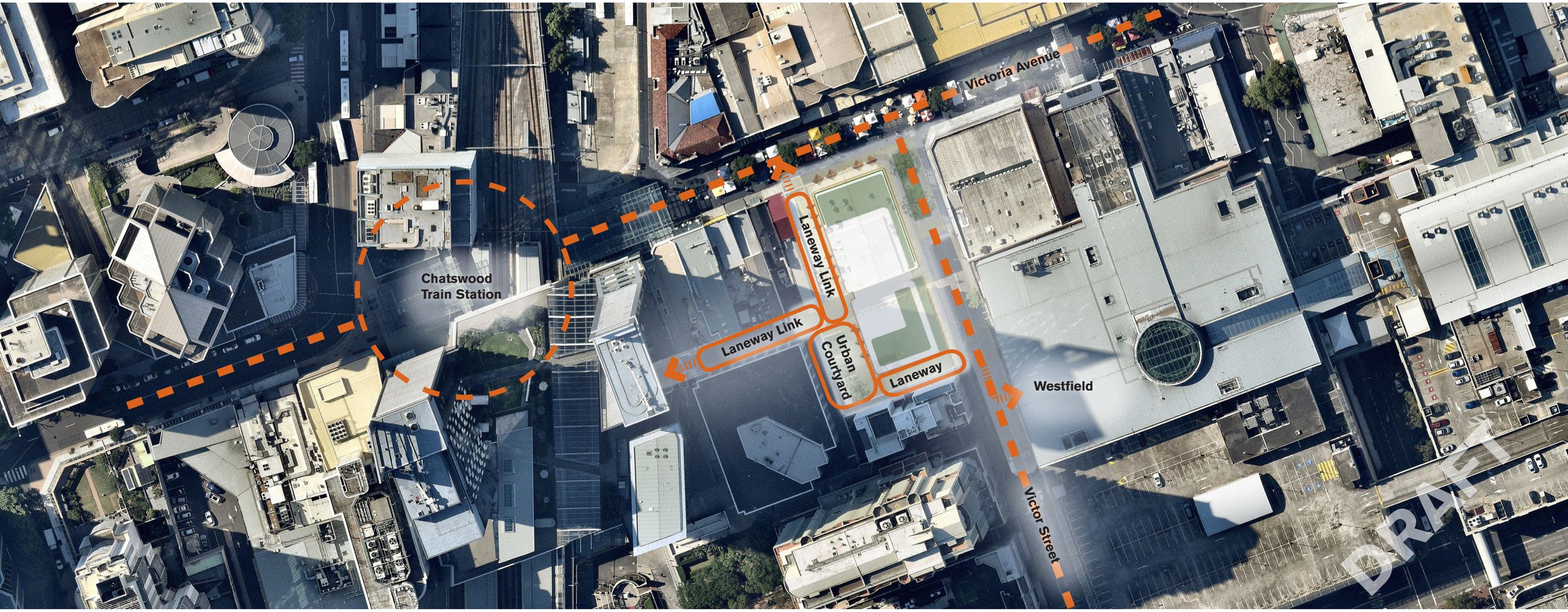
The development of the proposal would explore possible sustainability initiatives incluidng:

- Thermal Labyrinth
- Tri-generation
- Bio-fuels
- Efficient Construction (Hollow Core Slabs)
- Reuse and Recycling
- Renewables
- Embodied Energy
- Indoor Air Quality / Displacement Air Conditioning
- Building Information Monitoring Display
- GreenStar / NABERS / NatHERS / WELLS


6.0 Urban Character

The urban character is intimate, pedestrian, permeable, flexible, relaxed with high amenity throughout. These qualities are defined through a series of lanweways with contrasting purposes and character.



New Public Domain _ Active and Connected

6.1 **Retail and Cafe Laneway**

45 Victor Street frames a series of small laneways primarily hardscaped, soften with trees offering shadeand protection. Consisting of cafes and small retail it's primary function is connection and amenity, providing an intimate pathway through the site connecting to the pedestrian streets adjacent and public transport.

Intimate laneway

Urban Identity

Cafe / Dining

Connected to retail

Connected to commercial

Connected to transport

6.2 **Pedestrian Street**

Victoria Avenue is the main connector and pedestrian street running from Chatswood Station to the Concourse and retail centre. 45 Victor Street provides active frontage to this key street and offers generous setbacks to upper levels.

Spatial Sequence

Pedestrian Connector

Public Space

Cafe / Dining

Building Address

6.3 **Rooftop Terraces**

The Rooftop Garden Terraces are informal community spaces for relaxation. They are open spaces including a mix of soft and hardscapes. Facing both north and south offers panoramic views to the city , the terraces will be a place to meet friends, have an outdoor lunch and soak up some sun.

Community Functions

Informal Gathering

Relaxation

Shared Barbecue

Views to the city

Open Space

6.4 **Urban Courtyard**

The network of laneways through the site create a small urban courtyard within the site offerring a quiet interstitial space for relaxation, informal gatherings and casual outdoor dining for the retail spaces or cafes adjacent. The space enjoys good sunlight during lunchtime hours.

Outdoor Dining

Protected

Community

Public Space

6.5 **Tower Form**

The tower form of 45 Victor Street is broken up into several smaller sections reflecting the interior program creating a dynamic form. Differring materiality is incorporated to break up the tower, as well as the use of multiple setbacks create a scale sensitive streetwall and multiple terrace spaces.

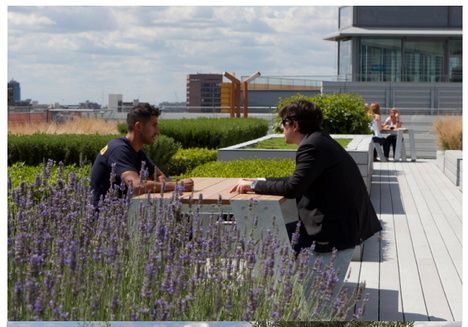
Materiality

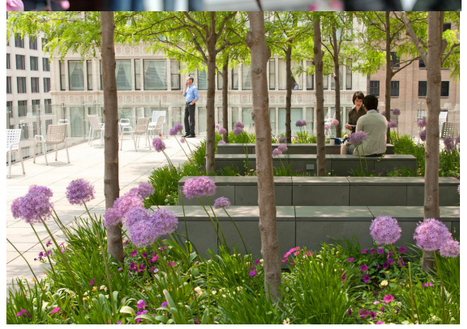
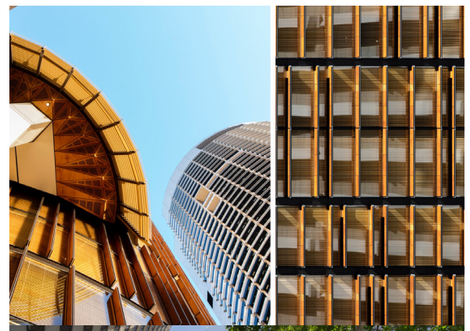
Scale

Streetwall

Terrace






7.0 Sustainable Design Features

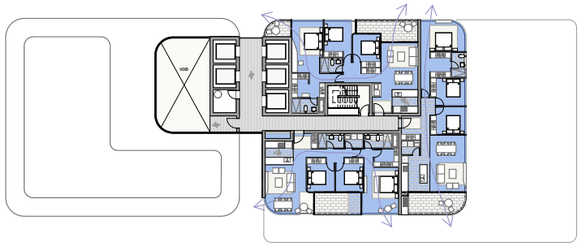
Environmentally sustainable design principles have driven the overall form of the building, coupled with the organisation of the internal apartment planning, 45 Victor Street embodies environmentally conscious design.

7.1 Cross Ventilation

Natural ventilation and cross ventilation has been considered in developing typical apartment layouts in order to reduce the reliance on mechanical ventilation and air conditioning systems.

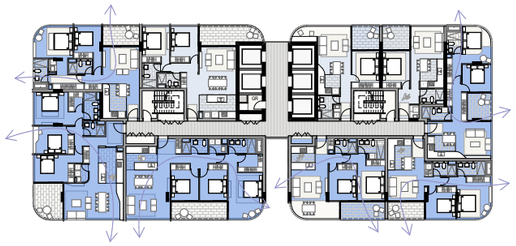
Items considered in relation to cross ventilation include:
- Dual aspect apartments with window openings having different orientations and/ or of different facades
- Facade design with window area maximised
- Ceiling heights relative to apartment depth
- Limiting apartment depths.

The cross ventilation of an indicative apartment layout relative to the requirements of SEPP 65's Apartment Design Guide (ADG) are shown below.



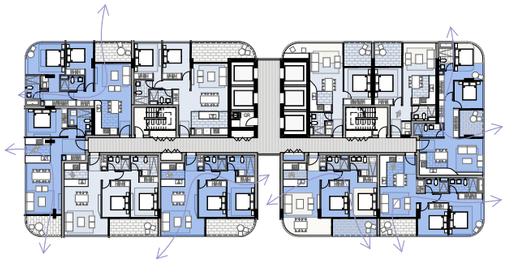
Natural Ventilation:

Cross Ventilated Apartments (60%)
Naturally Ventilated Apartment (40%)



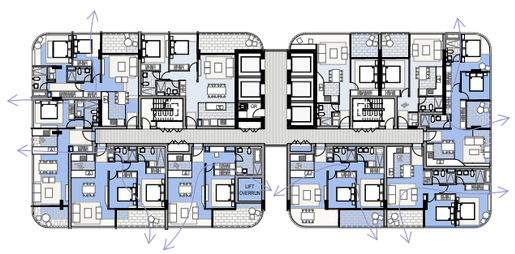
Natural Ventilation:

Cross Ventilated Apartments (60%)
Naturally Ventilated Apartment (40%)



Natural Ventilation:

Cross Ventilated Apartments (60%)
Naturally Ventilated Apartment (40%)



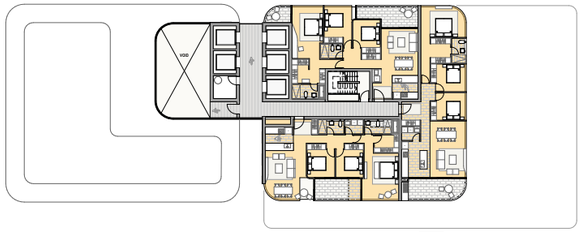
Natural Ventilation:

Cross Ventilated Apartments (60%)
Naturally Ventilated Apartment (40%)

7.2 Solar & Daylight Access

A solar access analysis has been carried out to determine the sunlight hours to apartments.

The typical tower floor plan shows apartments with more than 2 hours of direct sunlight to their living areas and private open spaces. They demonstrate that the Design Criteria specified in the ADG will be achieved.



+2 Hours (100%)
-2 Hours (0%)
0 Hours (0%)

+2 Hours (89%)
-2 Hours (11%)
0 Hours (0%)

+2 Hours (80%)
-2 Hours (20%)
0 Hours (0%)

-2 Hours (70%)
+2 Hours (30%)
0 Hours (0%)

8.0 SEPP 65 Design Quality Principles

The way in which the SEPP 65 Design Quality Principles have been applied in this proposal are noted below. Where the principle is referred to elsewhere in this report, that reference is also listed.

8.1 Principle 1: Context & Local Character

The urban design principles employed respond and connect 45 Victor Street to the transport interchange, local street grid and topography.

The proposal has responded to the:
- Social context through integration of mixed uses within the building to enhance Chatswood's retail and commercial centre, whilst providing residential opportunities in a vibrant and bustling business and cultural hub.
- Transport context through linking with Chatswood station,
- Streetscape through extending an established street grid,
- Community context by avoiding overshadowing of neighbouring community playing fields.

Refer to sections:
- 2.1 Context
- 2.2 Site
- 2.3 Urban Design Concept

8.2 Principle 2: Built Form & Scale

The built form and scale is appropriate to the vision and existing precinct character for Chatswood, and the site's location adjacent to Victoria Avenue and Victor Street creates a thoroughfare to Chatswood Station.

The proposal has established appropriate:
- Scale of building, based on the surrounding existing urban structures.
- Built form that contributes to the skyline profile of Chatswood.
- Building setbacks and alignments create intimate lane-ways and throughways to link public transport to retail and cultural precincts.
- Building articulation enhances the existing streetscape and provides a scale transition to the tower form.

Refer to sections:
- 2.3 Urban Design Concepts
- 3.0 Planning Principles
- 4.0 Urban Character

8.3 Principle 3: Density

The proposed density is appropriate as 45 Victor Street includes a mix of uses intertwined with public open space and fine grain urban and landscape amenity.

The density proposed is consistent with:
- Developments in close proximity to Chatswood Station
- Proximity to motorways connecting to greater Sydney
- Access to employment opportunities within the site
- Local established community facilities including library, performing arts centre and a hospital.
- Accessed both via pedestrian streets and vehicle accessible roads.
- Future metro public transport expansion.

The density is appropriate to the high level of amenity provided through:
- Multiple north facing rooftop terrace gardens
- Apartments achieving natural light
- Co-location with retail and commercial opportunities.

Refer to sections:
- 3.6 Place and Community
- 3.8 Mixed use

8.4 Principle 4: Sustainability

Sustainable design is integral to this proposal as orientation, building separation and ground level amenity has informed the layout of spaces and will inform the design of the building.

Environmentally sustainable design features include:
- Building massing layout to maintain solar access to open spaces
- Building orientation to achieve solar access to a maximum of dwellings
- Layout for appropriate cross ventilation

Other ESD considerations are:
- Facade design for solar shading
- Rooftop garden terrace to enhance residential and community wellbeing.
- Building services systems to reduce emissions.
- Water efficiency.

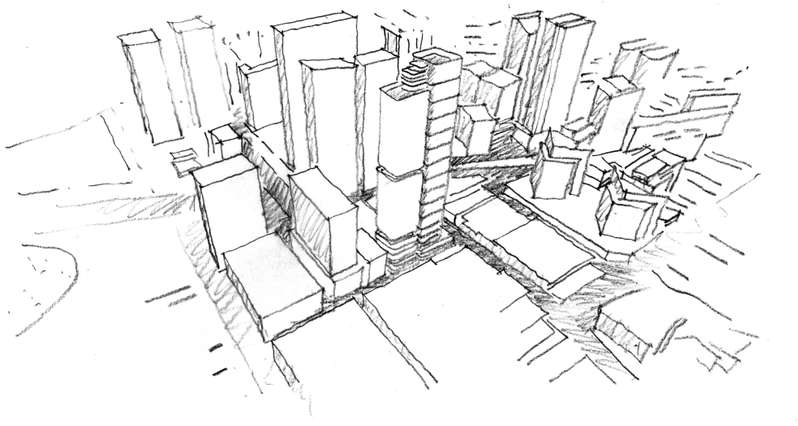
Refer to sections:
- 2.3 Urban Design Concepts
- 5.0 Sustainable Design Features

8.5 Principle 5: Landscape

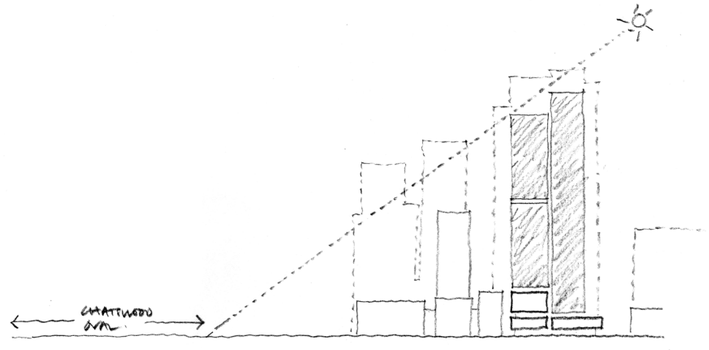
The Rooftop Garden Terraces and all the pedestrianised and public spaces have been considered carefully in terms of creating diverse and interesting characters' of landscape design.

Landscape Design considerations include:
- Defining the character of each space with variation of hard and soft landscape elements,
- Environmentally sustainable landscape design,
- Dual-facing rooftop terrace garden considerations including ensuring appropriate summer shade and winter sunlight access and
- Views from the rooftop terrace to the city skyline.

Refer to sections:
- 3.0 Planning Principles
- 4.0 Urban Character



Proposal achieves good tower separation for residential amenity



Built Form within mid winter sun plane to Chatswood Oval

SEPP 65 Design Quality Principles

8.6 Principle 6: Amenity

Amenity within each apartment building is achieved firstly through the establishment of strong urban design principles that set up the orientation, views and access to each of the buildings.

In addition amenity is enhanced through:
- Adequate building separation
- Good apartments design, size and layout which the floor plates allow for
- Each apartment has an private open outdoor space
- Storage areas as required
- Roof gardens possible as being communal private open spaces distinct from the ground plane public open spaces

Refer to sections:
- 2.3 Urban Design Concepts
- 3.0 Planning Principles
- 5.0 Sustainable Design Features

8.7 Principle 7: Safety

Passive surveillance of the public domain is inherent in the activation of the entire ground plane as a permeable public domain.

Further features that enhance safety are:
- Regular distribution of public space and retail uses across the site
- Residential entries positioned to coexist with places of retail and commercial activity
- Residential apartment balconies overlook public spaces
- Separation and security access to residential parking
- Activation of a perviously unactivated laneway, now a vibrant passageway.

Refer to sections:
- 3.0 Planning Principles
- 3.8 Mixed Use

8.8 Principle 8: Diversity & Interaction

Creating vibrancy and diversity is a key aspiration achieved through a vertical mix of uses and active public domain.

Diversity is achieved through:
- Mix of appropriate scale across the site enhances the fine grain of the laneway and urban courtyard, encouraging interaction.
- Mix of both retail, commercial and residential all within the same site offers a broad mix of interactions.
- Community spaces are created via the various rooftop terrace gardens.

Refer to sections:
- 3.8 Mixed Use

8.9 Principle 9: Aesthetics

The visual presentation of 45 Victor Street remains sensitive to its context through the use of various setbacks throughout the building to create a dynamic tower form.

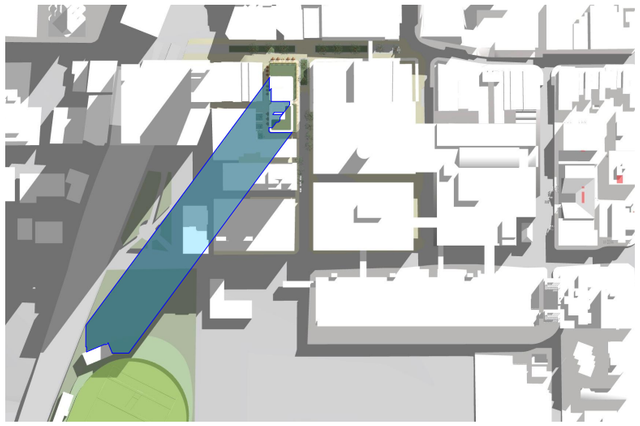
Considerations that have been made and that will be developed inlcude:
- Commercial emphasis to building form and expression to relate to commercial and retail focus of the Chatswood CBD
- Heirachy of building elements
- Slender tower form made dynamic up by setbacks
- Facade design to reduce appearance of builk and scale through use of feathered edges and tops and rounded corners
- Facade materiality that reflects the internal program of the building, commercial different to residential and retail etc.
- Detailed facade design to enhance apartment internal layouts.

Refer to sections:
- 2.4.5 Expression

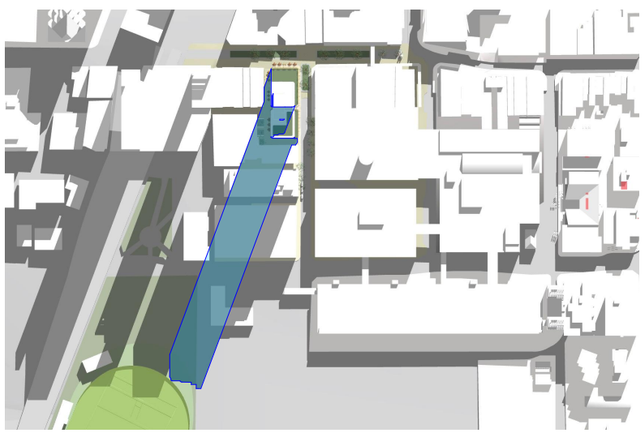
8.10 **Shadow Studies**

Chatswood Oval

A sun access plane has been developed for the Victor Street sites in order to protect the amenity of the playing surface between the hours of 11am and 2pm on 21st of June. The proposed maximum building height is aligned with the sun access plane.



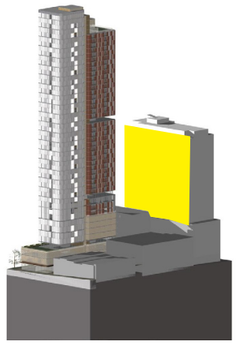
21 June 11am _ shadow of proposed massing shown in blue



21 June 12pm

Sebel Building

Shadow studies have been undertaken to demonstrate that 2 hours of sunlight is maintained to apartments on the north side of the Sebel building between 9 and 3 on 21st of June.

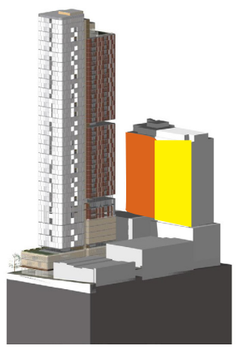


21 June 9am

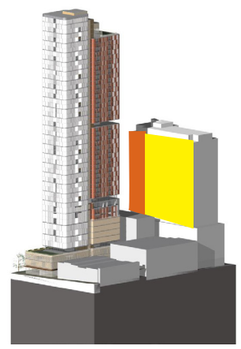
21 June 10am

21 June 11am

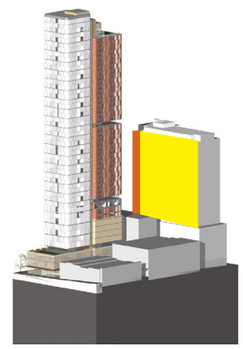
21 June 12pm



21 June 1pm



21 June 2pm



21 June 3pm

Sunlight access to Sebel building north facade on 21 June

Shadow impact of proposal on 21 June

fjmt

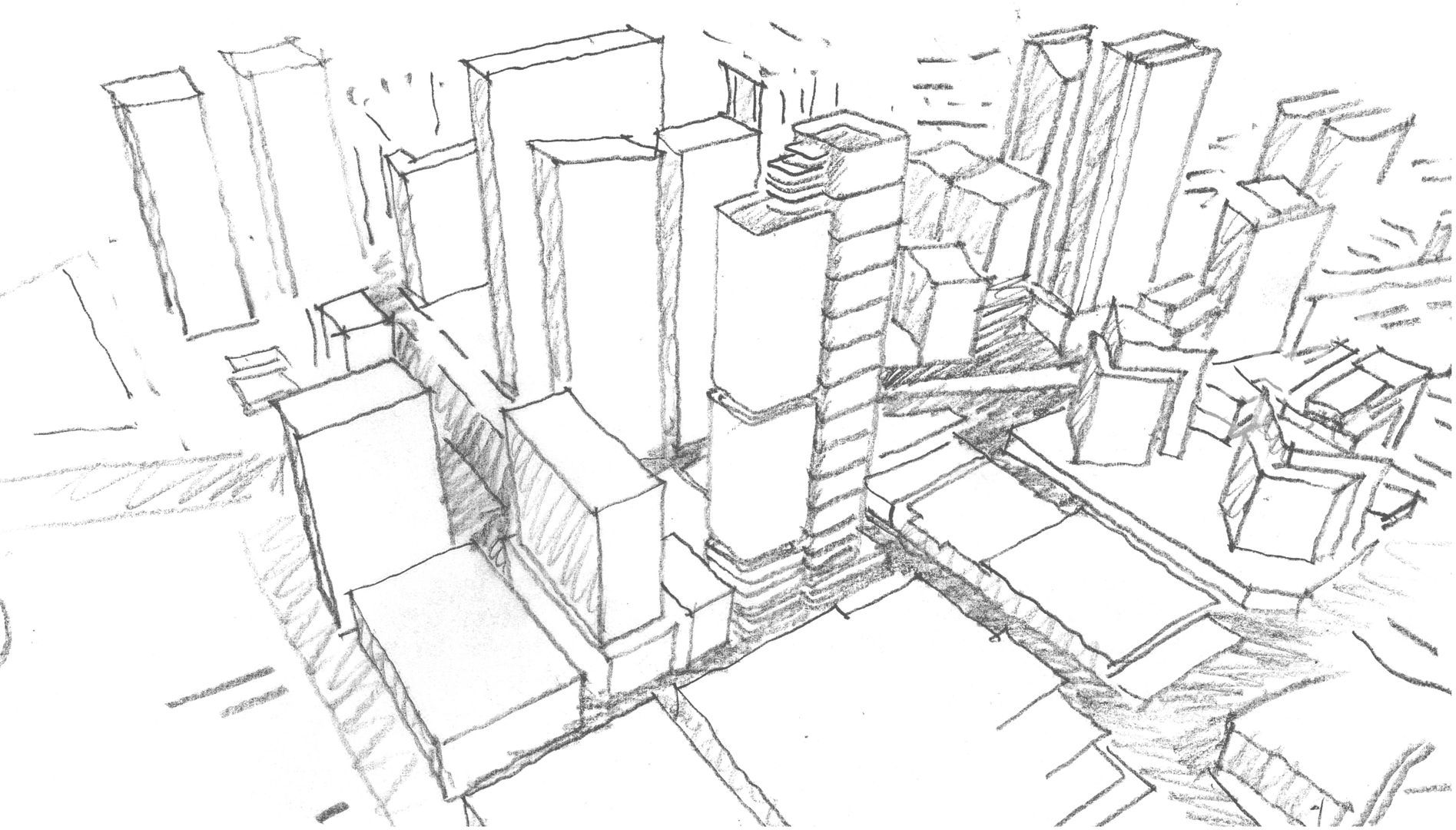
architecture
interiors
urban
landscape

Sydney
Melbourne
Oxford
London

9.0

9.1 Architectural Drawing List

Drawing Number	Drawing Name
1000	Ground Plan
1001	Level 1 Floor Plan
1002	Level 2 Floor Plan
1003	Level 3 Floor Plan
1004	Level 4 to 7 - Typical Floor Plan
1005	Level 8 Floor Plan
1006	Level 9 Floor Plan
1007	Level 10 Floor Plan
1008	Level 11 Floor Plan
1009	Level 12 Floor Plan
1010	Level 13 to 15 - Typical Floor Plan
1011	Level 16 to 19 - Typical Floor Plan
1012	Level 20 to 26 - Typical Floor Plan
1013	Level 27 Floor Plan - Mid Riser
1014	Level 28 to 45 - Typical Floor Plan
1015	Level 46 to 49 - Typical Floor Plan
1016	Level 50 Floor Plan - Plant
1017	Level 51 Floor Plan - Roof
1018	Basement Plan 1
1019	Basement Plan 2
1020	Basement Plan 3
124	Elevation
2001	9am 21 June Solar Study
2002	10am 21 June Solar Study
2003	11am 21 June Solar Study
2004	12pm 21 June Solar Study
2005	1pm 21 June Solar Study
2006	2pm 21 June Solar Study
2007	3pm 21 June Solar Study



fjmt
francis-jones morehen thorp

Ground Floor Plan Public Domain Colour

MIRVAC - Victor Street Chatswood

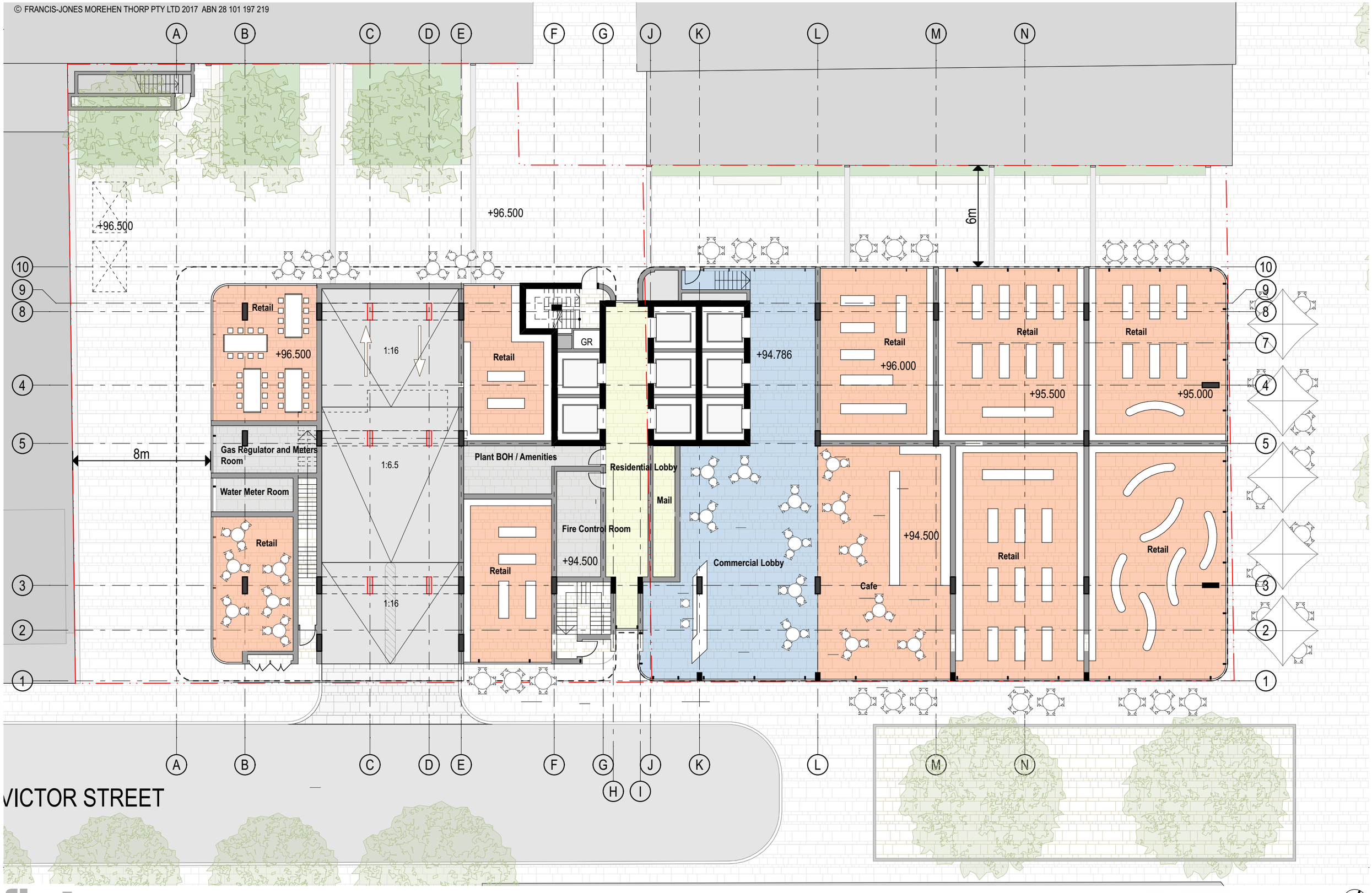
0 5 10 20m

1:500 @ A3

12/01/2017

Preliminary

1000



Ground Floor Plan

MIRVAC - Victor Street Chatswood

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francis-jones morehen thorp

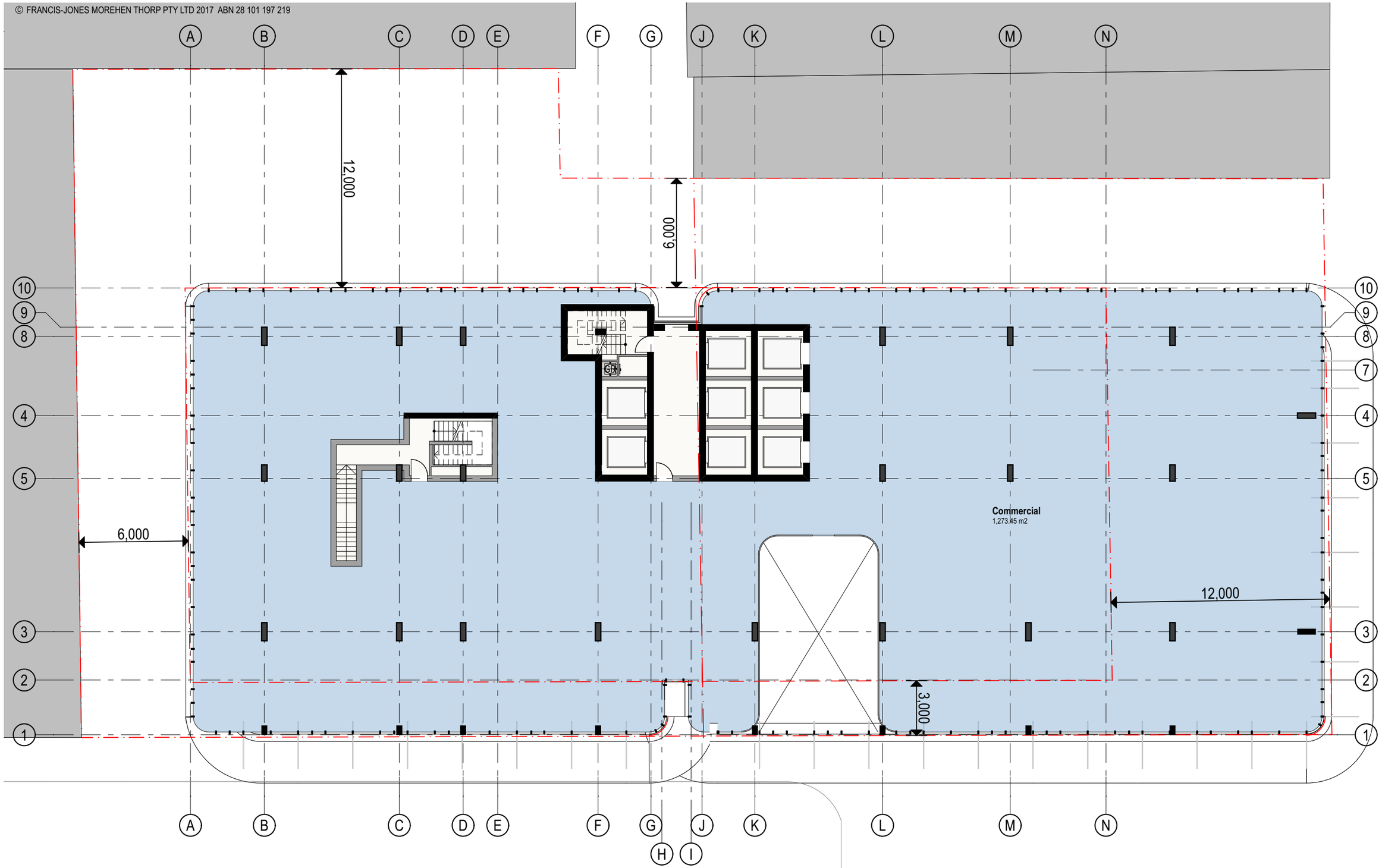
0 2 5 10m

1:200 @ A3

12/01/2017

Preliminary

1000



Level 1 Floor Plan

MIRVAC - Victor Street Chatswood

fjmt
francis-jones morehen thorp

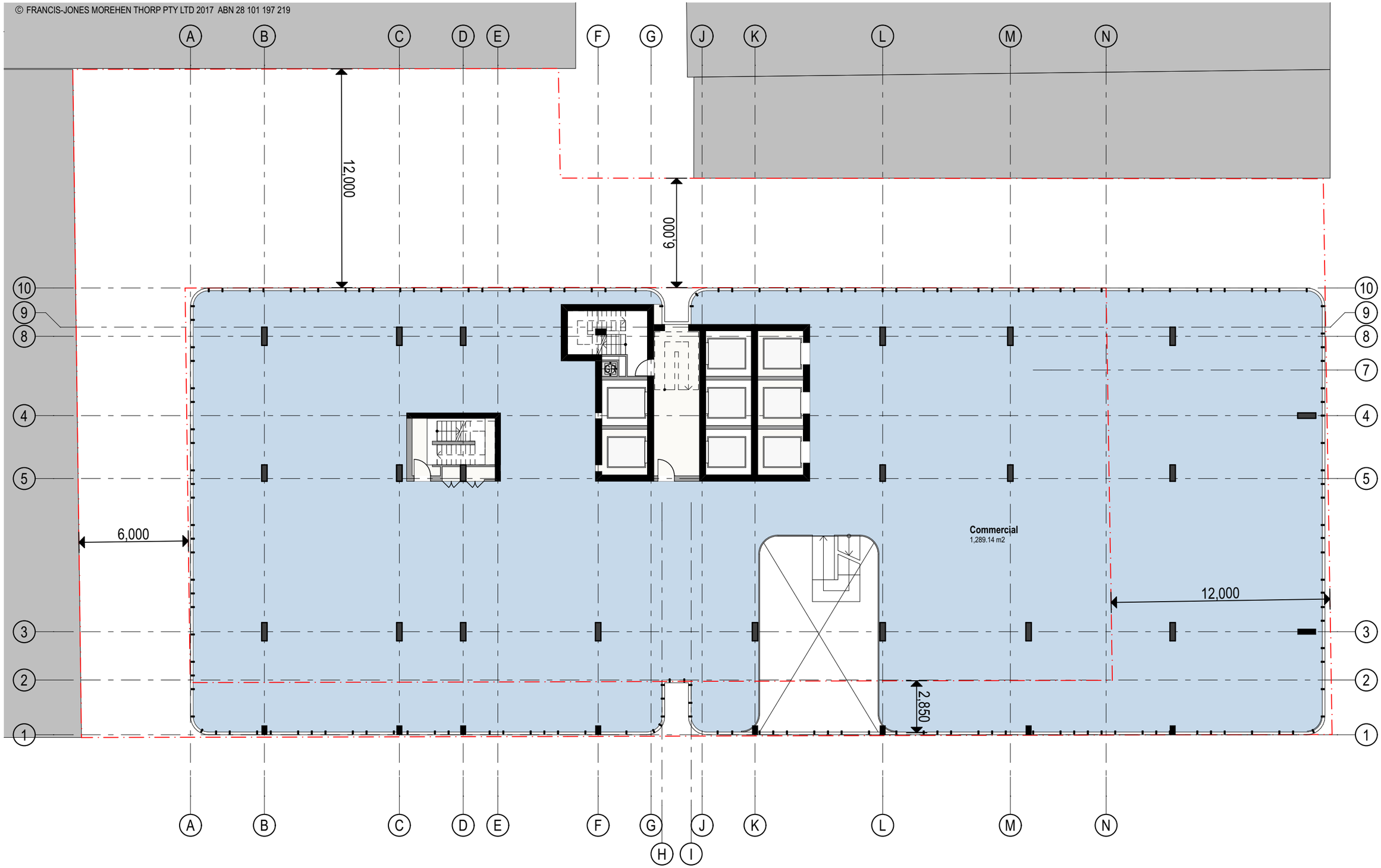
0 2 5 10m

1:200 @ A3

12/01/2017

Preliminary

1001



Level 2 Floor Plan

MIRVAC - Victor Street Chatswood

0 2 5 10m

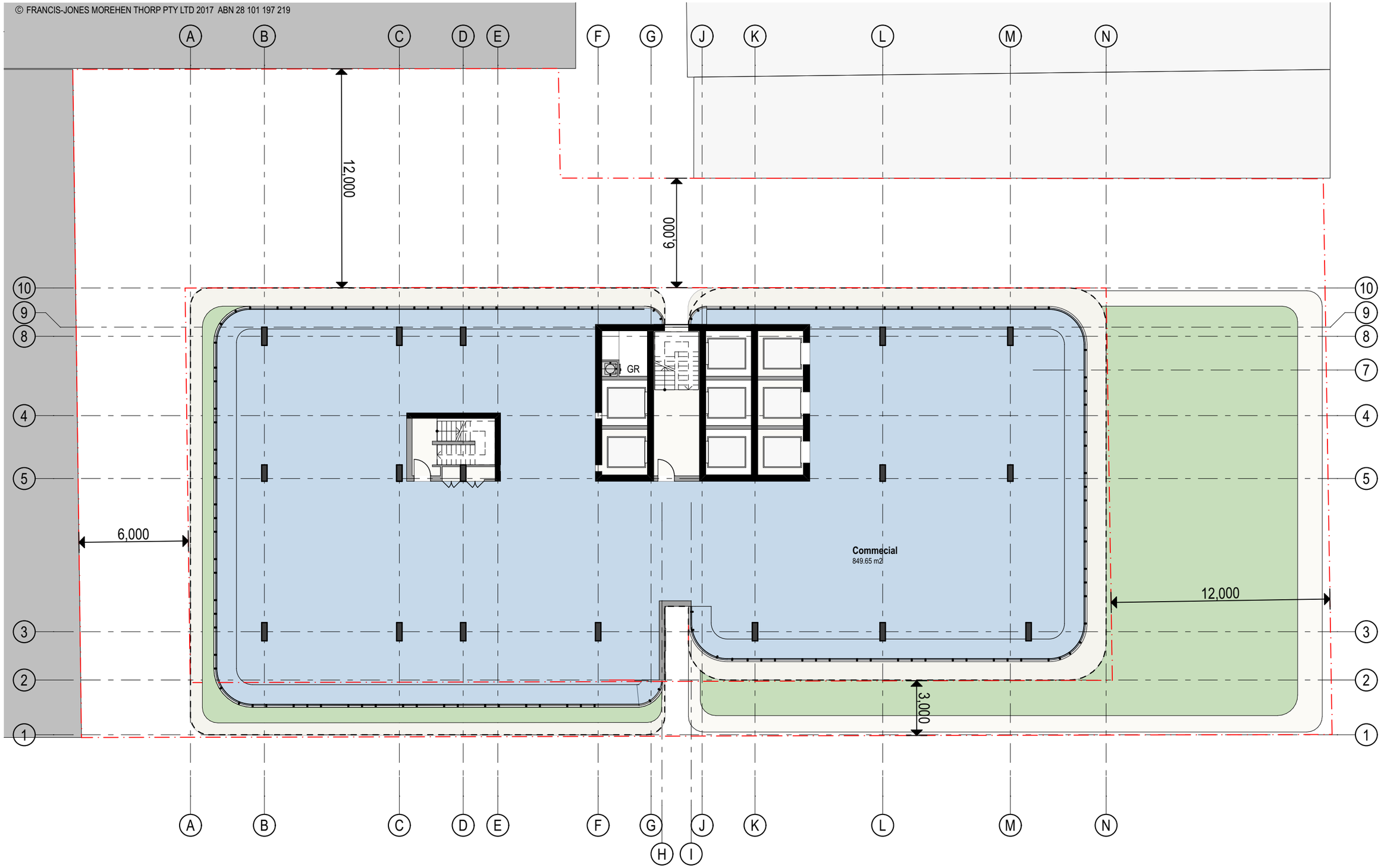
1:200 @ A3

12/01/2017

Preliminary

1002

francis-jones morehen thorp



Level 3 Floor Plan

MIRVAC - Victor Street Chatswood

francis-jones morehen thorp

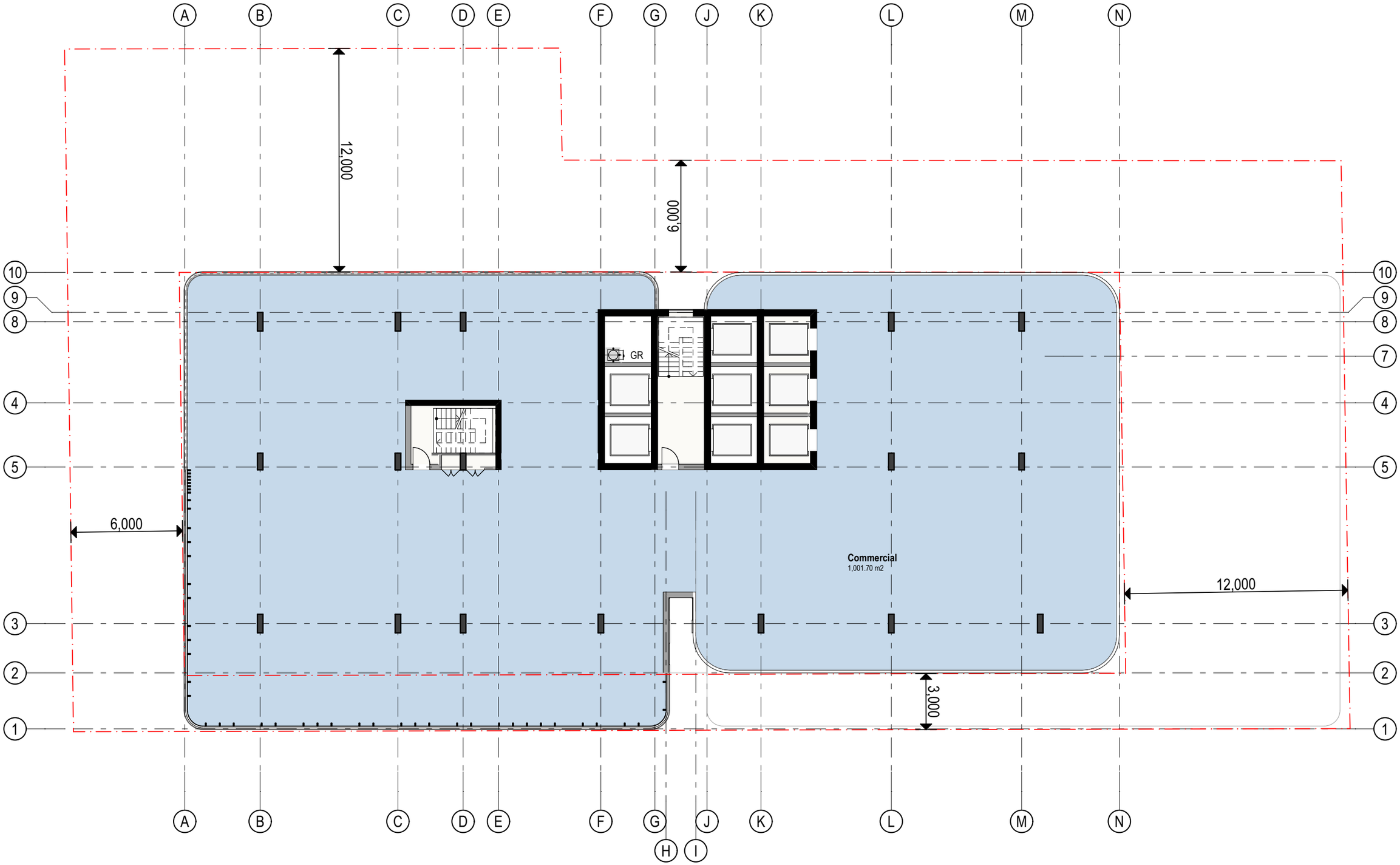
0 2 5 10m

1:200 @ A3

12/01/2017

Preliminary

1003



Level 4 to 7 Typical Floor Plan

MIRVAC - Victor Street Chatswood

0 2 5 10m

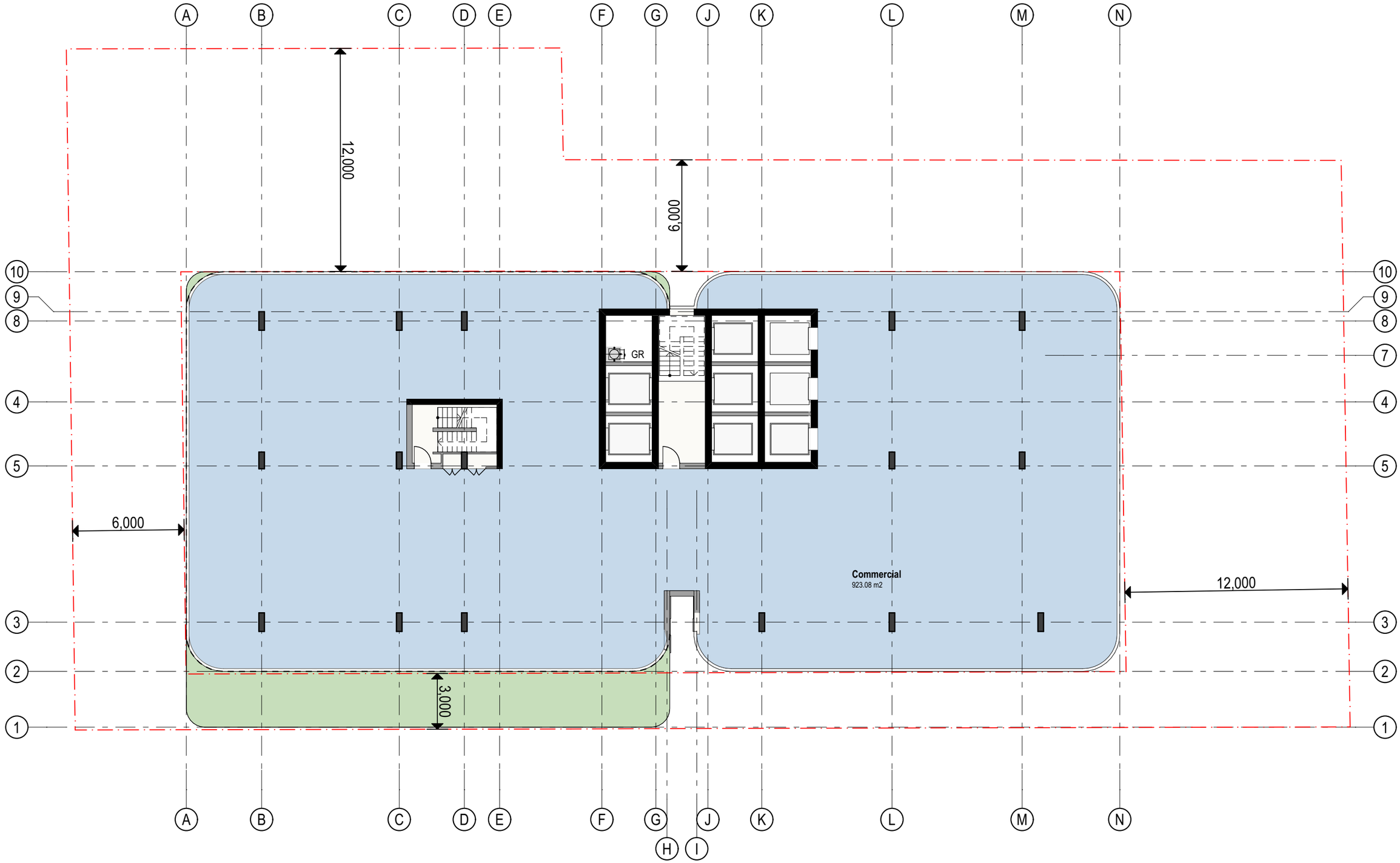
1:200 @ A3

12/01/2017

Preliminary

1004

fjmt
francis-jones morehen thorp



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Level 8 Floor Plan

MIRVAC - Victor Street Chatswood

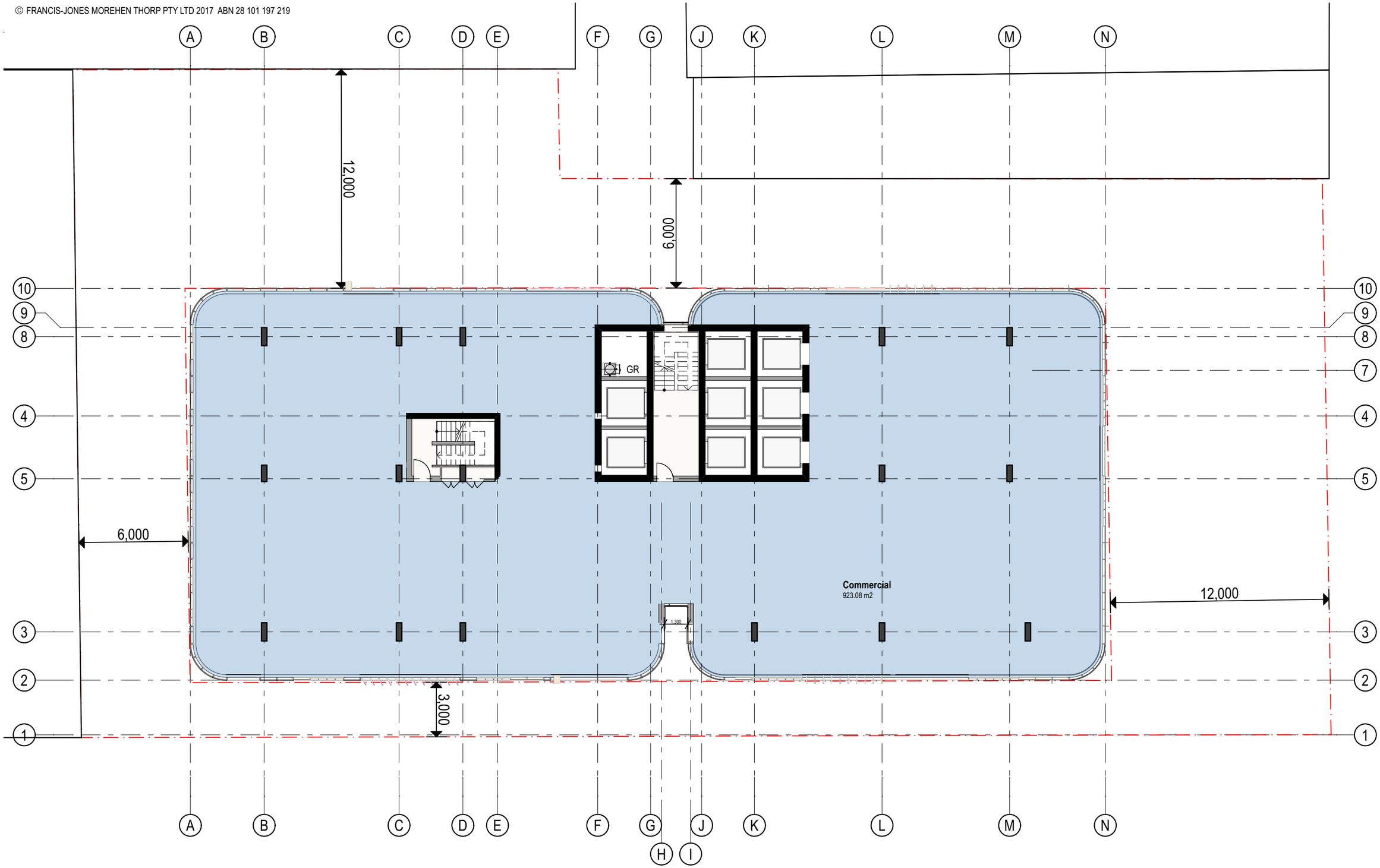
0 2 5 10m

1:200 @ A3

12/01/2017

Preliminary

1005



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Level 9 Floor Plan

MIRVAC - Victor Street Chatswood

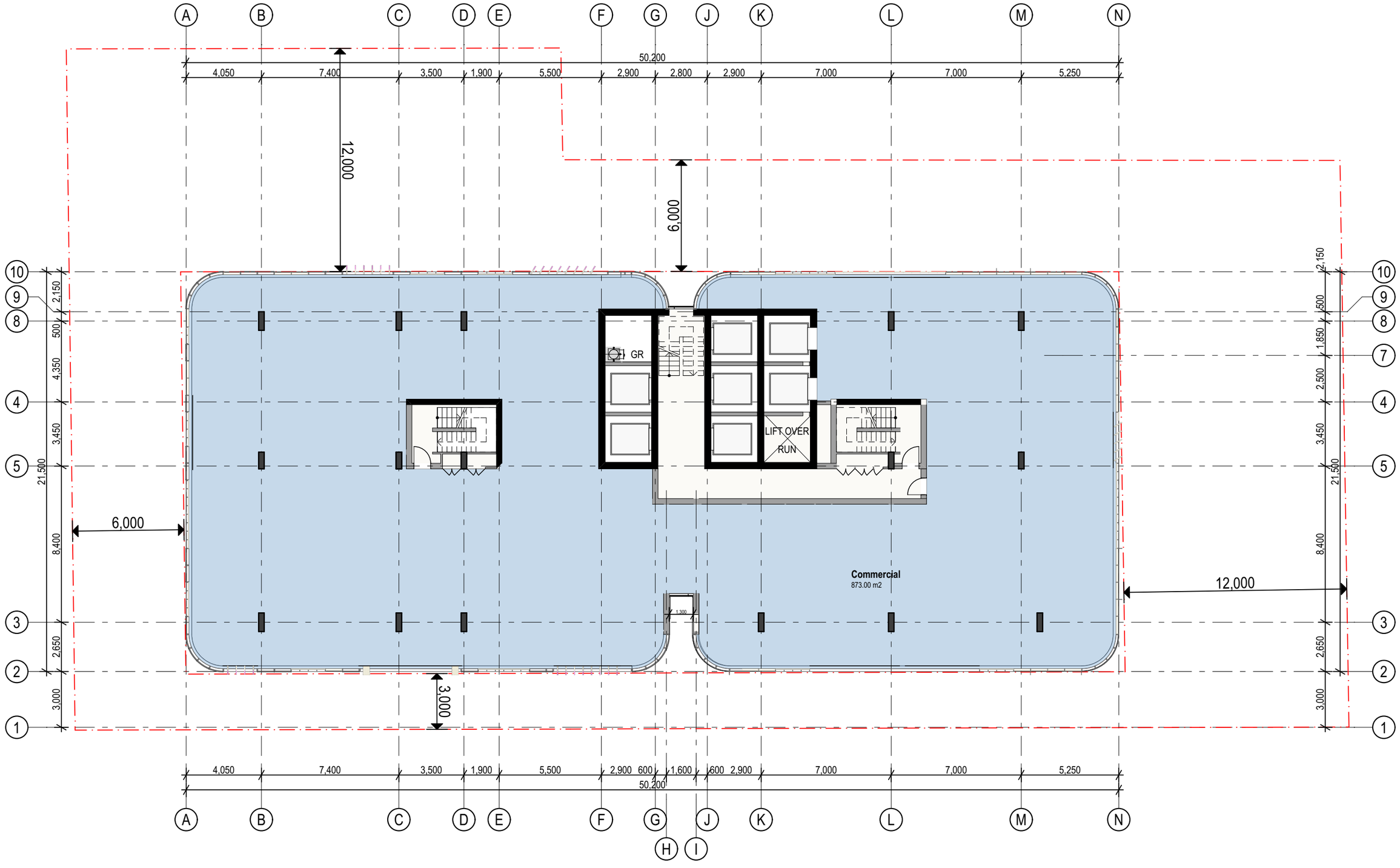
0 2 5 10m

1:200 @ A3

12/01/2017

Preliminary

1006



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francis-jones morehen thorp

Level 10 Floor Plan

MIRVAC - Victor Street Chatswood

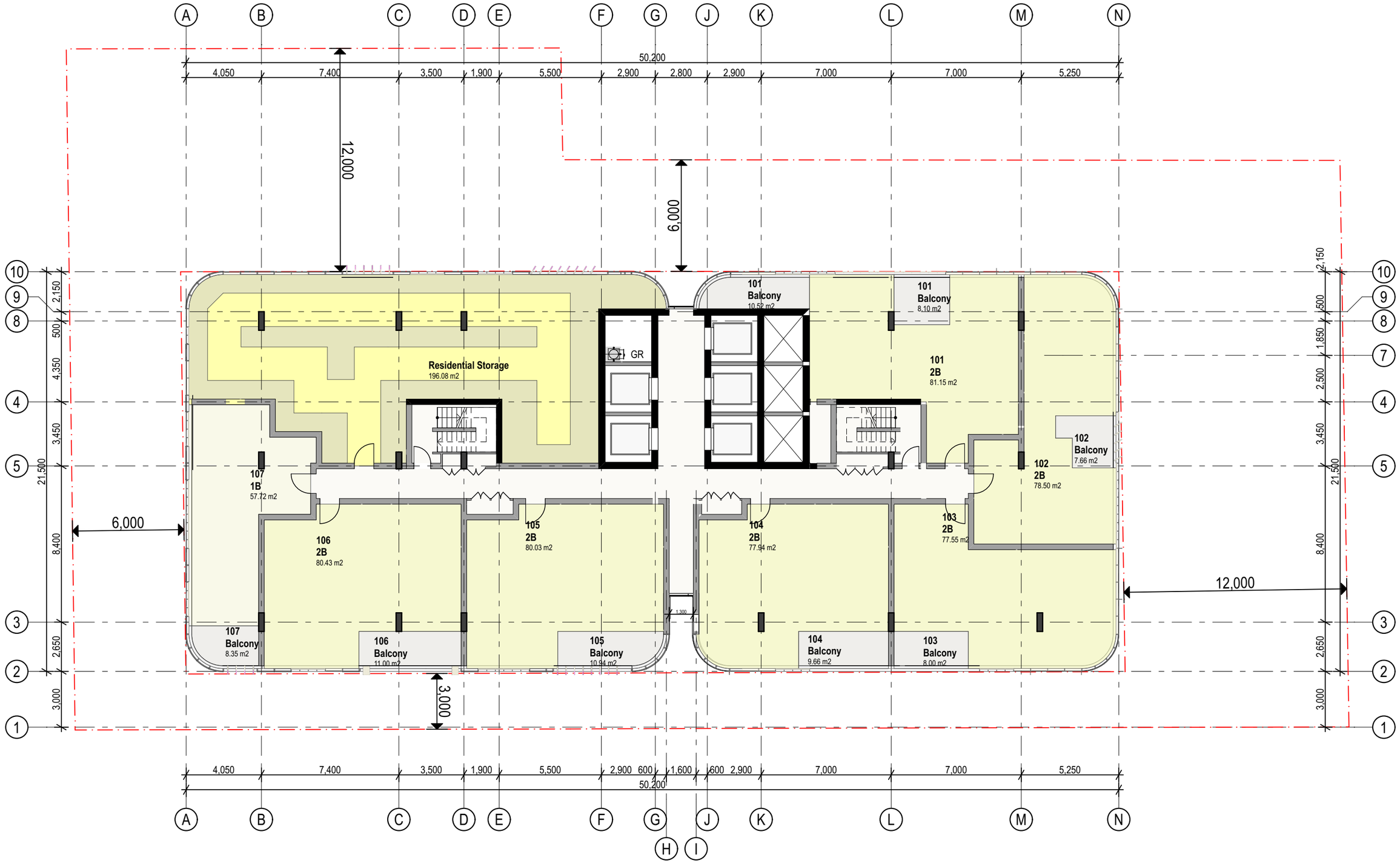
0 2 5 10m

1:200 @ A3

12/01/2017

Preliminary

1007



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Level 11 Floor Plan

MIRVAC - Victor Street Chatswood

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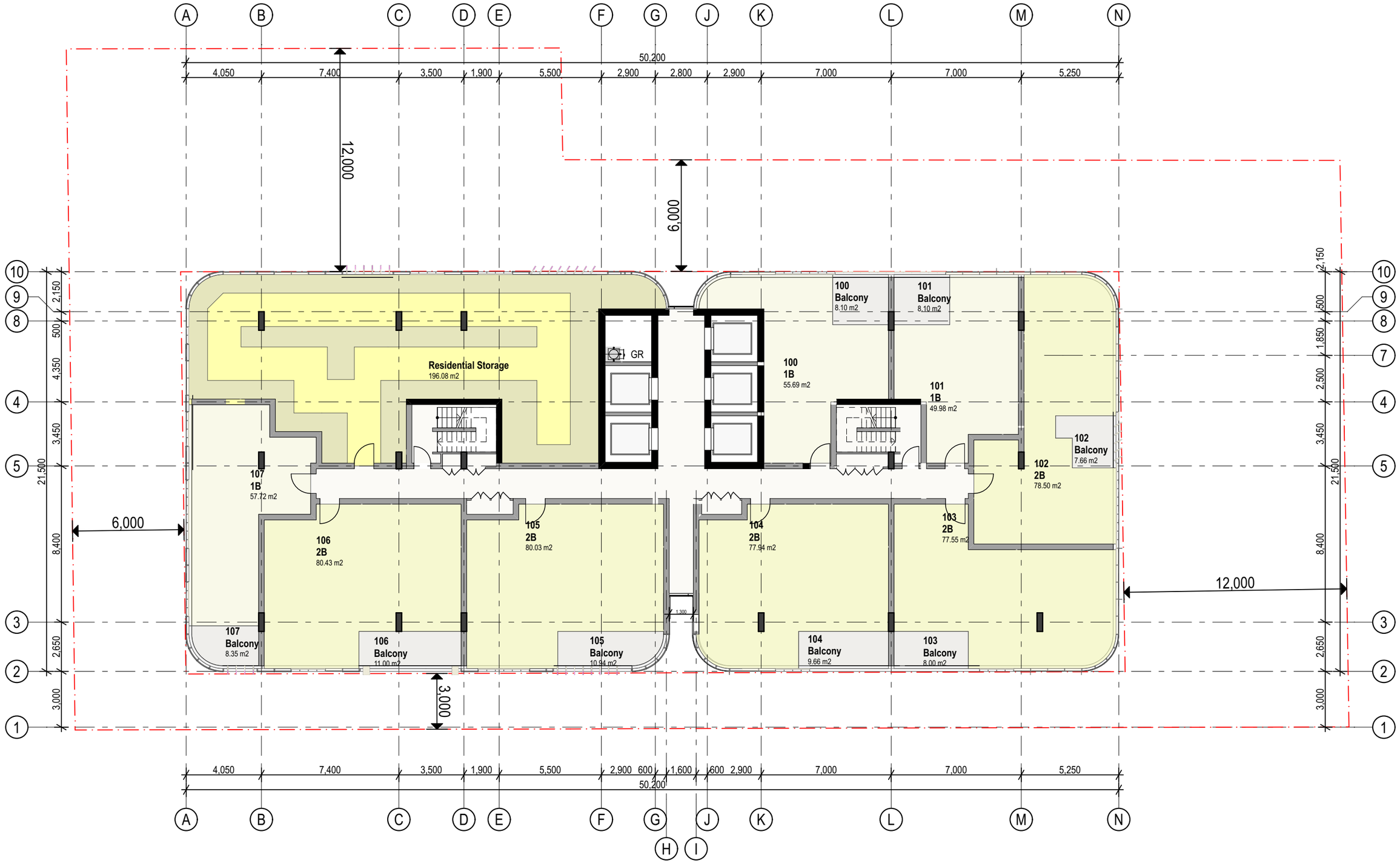
1:200 @ A3

12/01/2017

Preliminary

1008



fjmt
francis-jones morehen thorp

Level 12 to 15 Typical Floor Plan

MIRVAC - Victor Street Chatswood

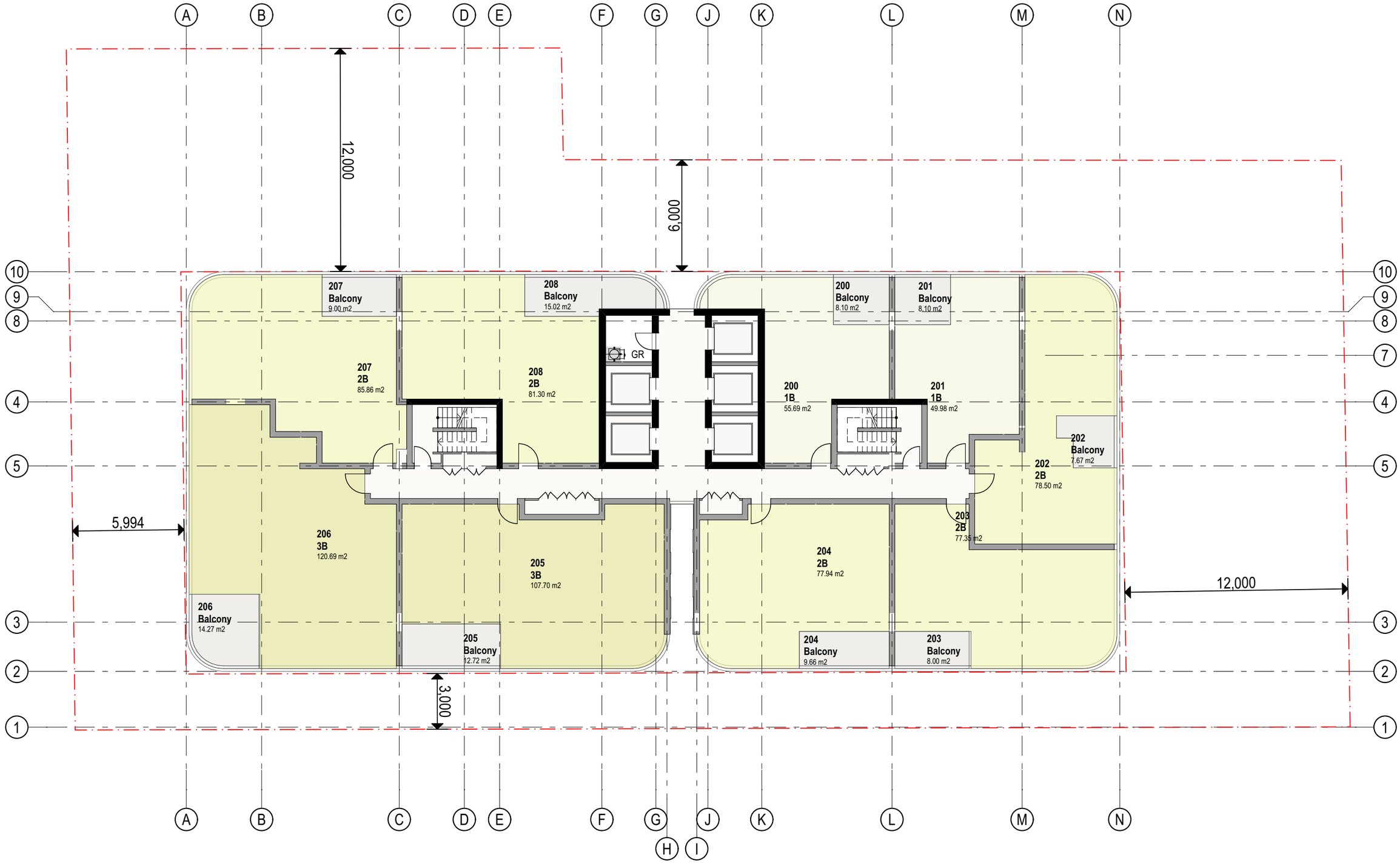
0 2 5 10m

1:200 @ A3

12/01/2017

Preliminary

1009



fjmt
francis-jones morehen thorp

Level 16 to 19 Typical Floor Plan

MIRVAC - Victor Street Chatswood

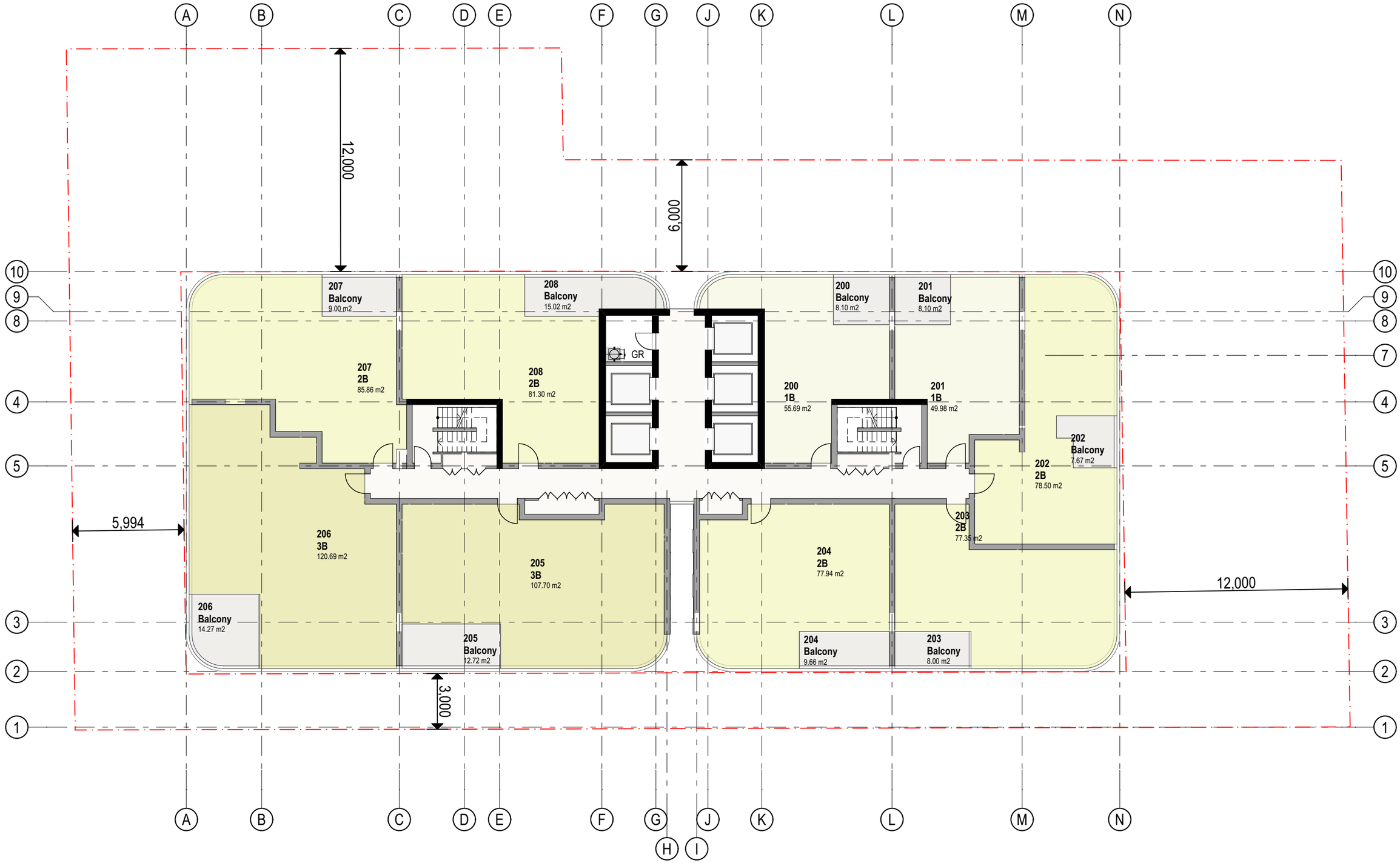
0 2 5 10m

1:200 @ A3

12/01/2017

Preliminary

1010



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francis-jones morehen thorp

Level 20 to 26 Typical Floor Plan

MIRVAC - Victor Street Chatswood

0 2 5 10m

1:200 @ A3

12/01/2017

Preliminary

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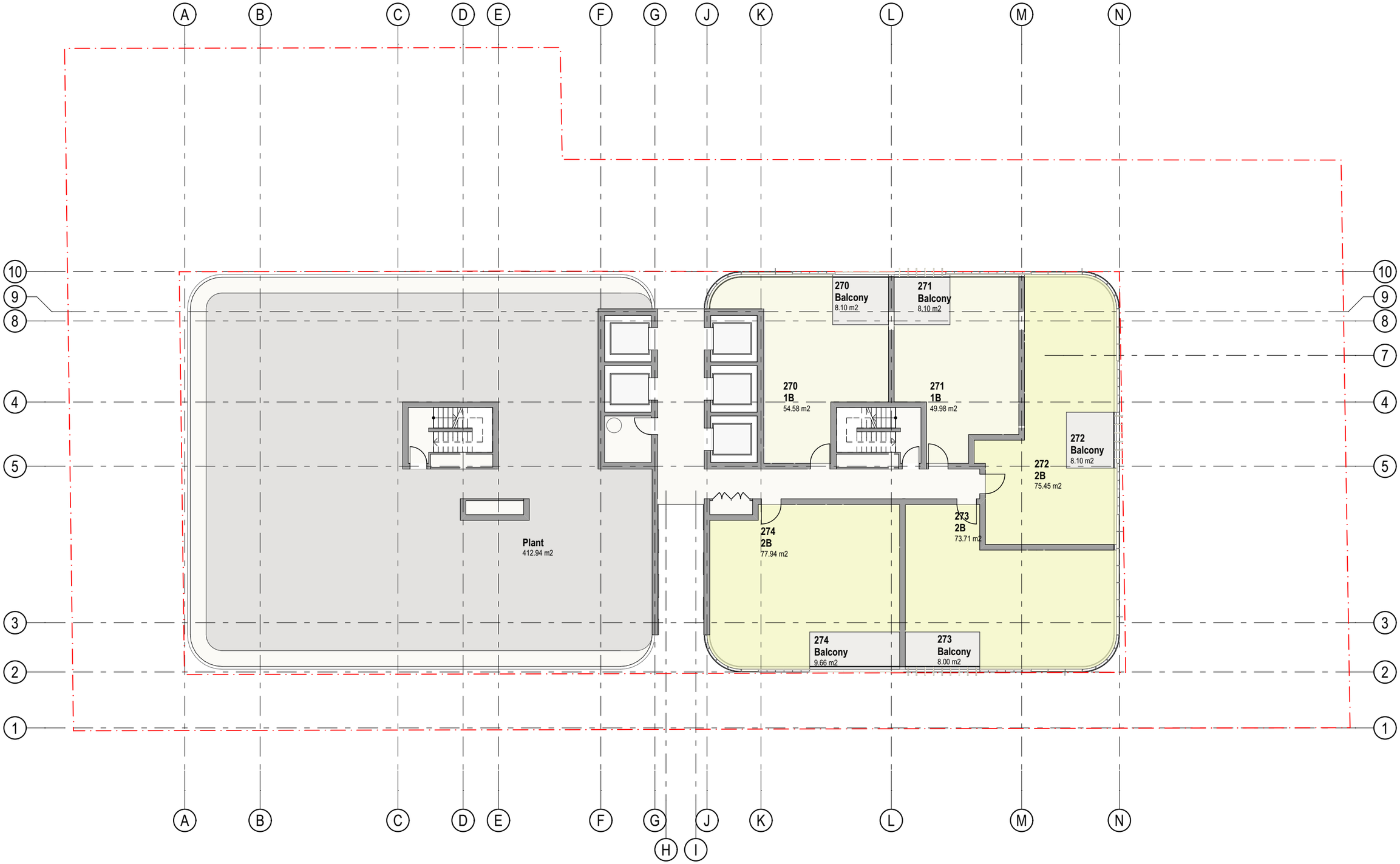

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francis-jones morehen thorp

Level 27 - Mid Plant

MIRVAC - Victor Street Chatswood

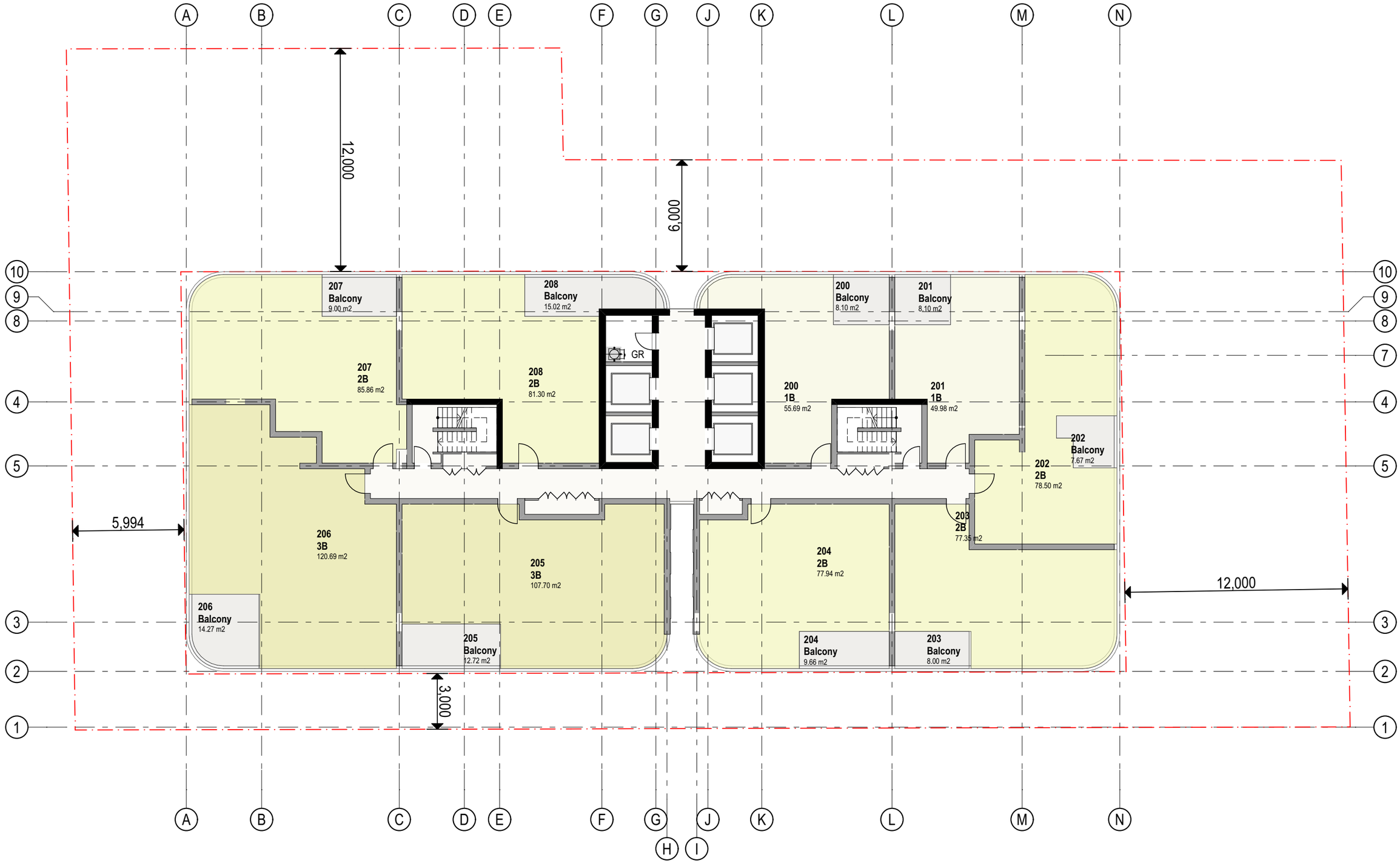
0 2 5 10m

1:200 @ A3

12/01/2017

Preliminary

1012



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francis-jones morehen thorp

Level 28 to 45 Typical Floor Plan

MIRVAC - Victor Street Chatswood

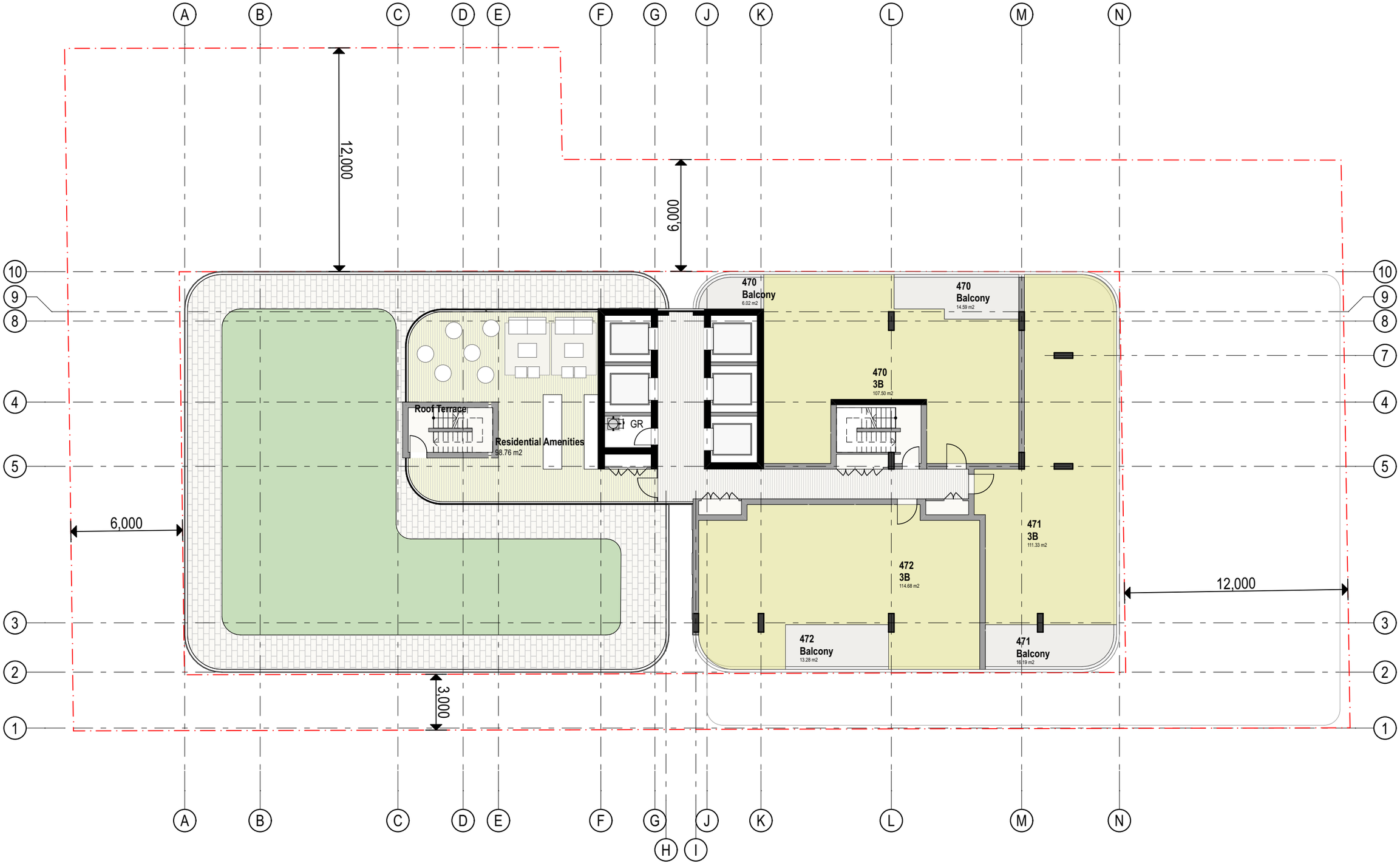
0 2 5 10m

1:200 @ A3

12/01/2017

Preliminary

1013



fjmt
francis-jones morehen thorp

Level 46

MIRVAC - Victor Street Chatswood

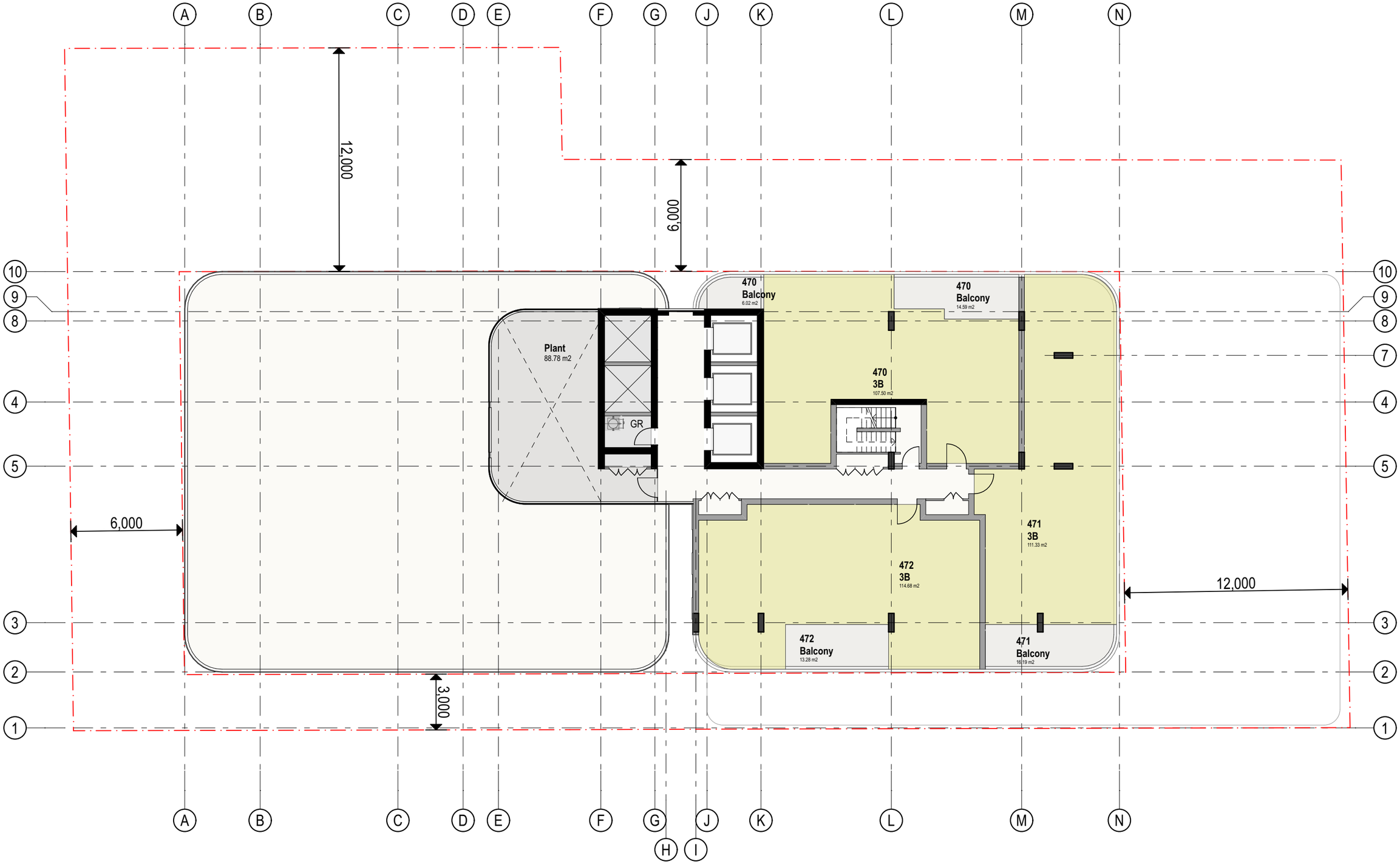
0 2 5 10m

1:200 @ A3

12/01/2017

Preliminary

1014



fjmt
francis-jones morehen thorp

Level 47 - 49

MIRVAC - Victor Street Chatswood

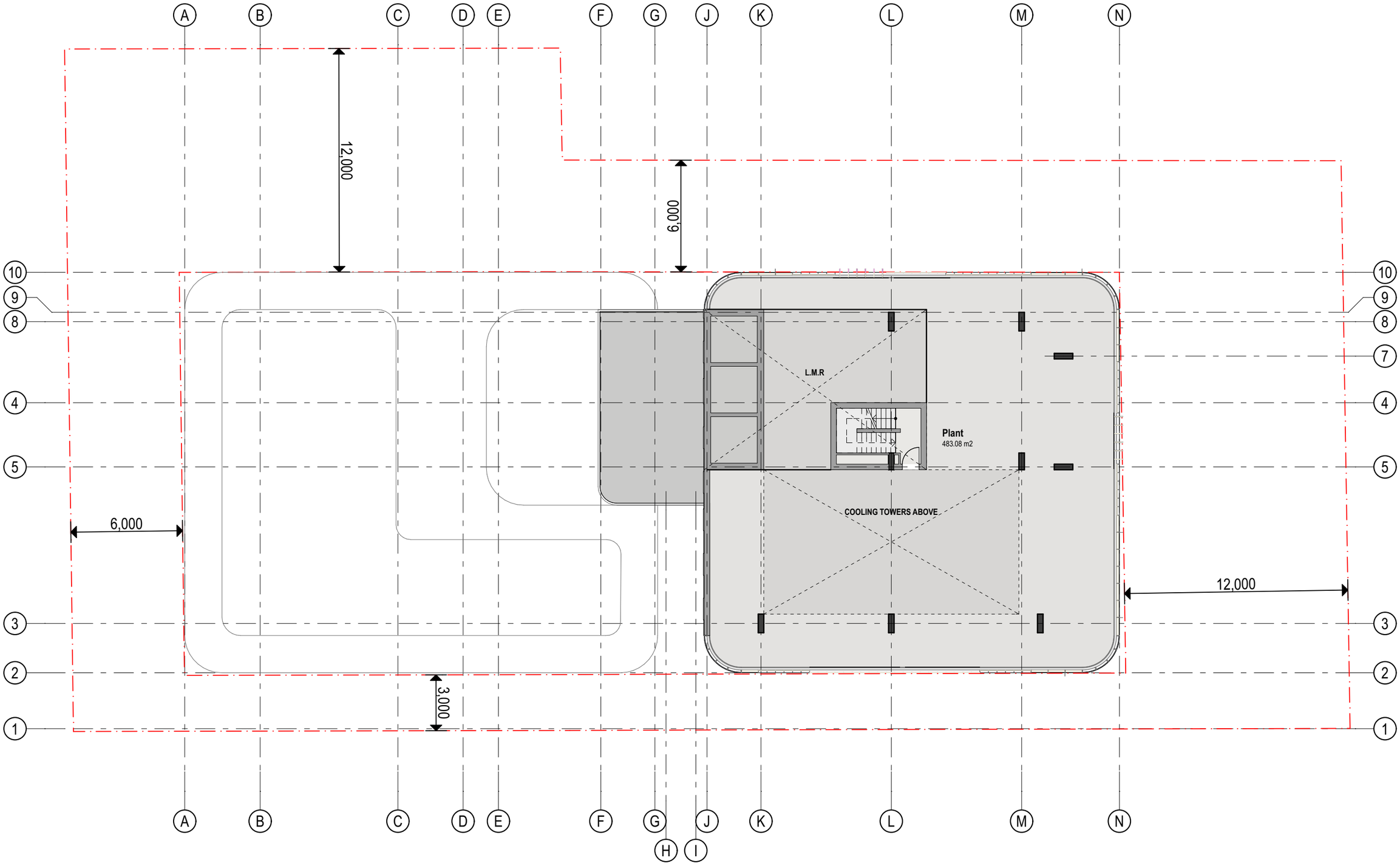
0 2 5 10m

1:200 @ A3

12/01/2017

Preliminary

1015



fjmt
francis-jones morehen thorp

Level 50 Plant

MIRVAC - Victor Street Chatswood

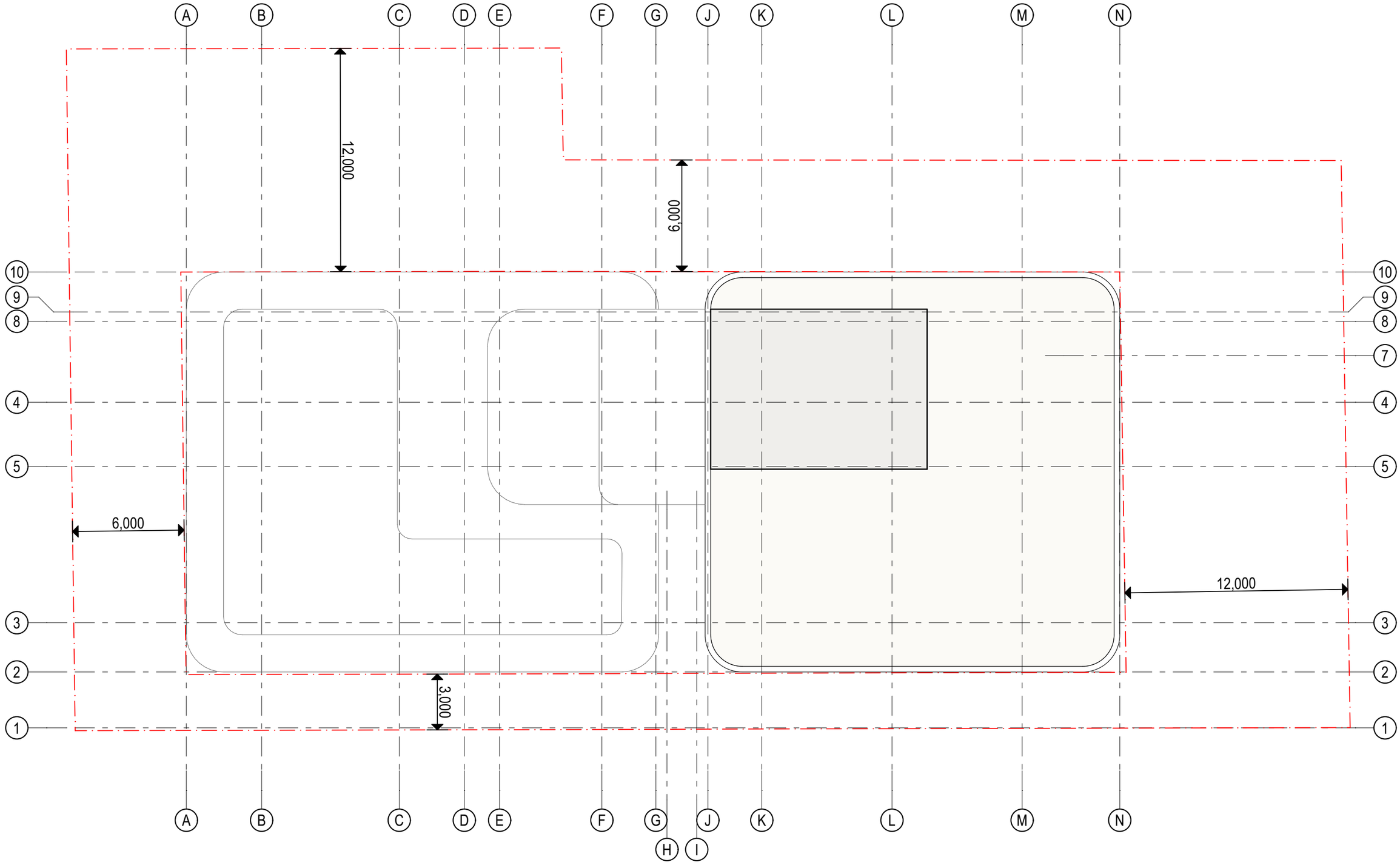
0 2 5 10m

1:200 @ A3

12/01/2017

Preliminary

1016



fjmt
francis-jones morehen thorp

Level 51 Roof

MIRVAC - Victor Street Chatswood

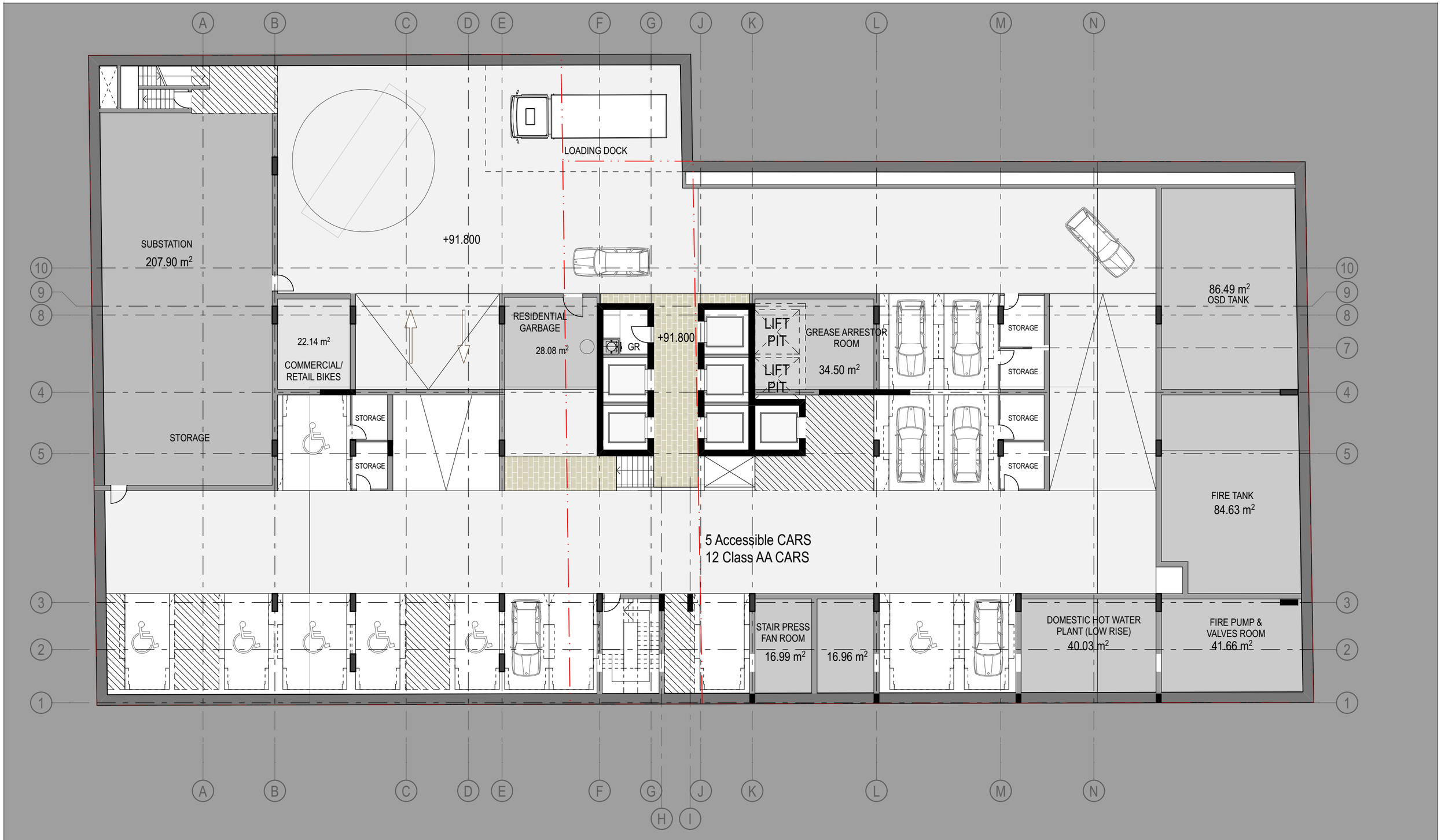
0 2 5 10m

1:200 @ A3

12/01/2017

Preliminary

1017



fjmt
francis-jones morehen thorp

Typical Basement Plan 1

MIRVAC - Victor Street Chatswood

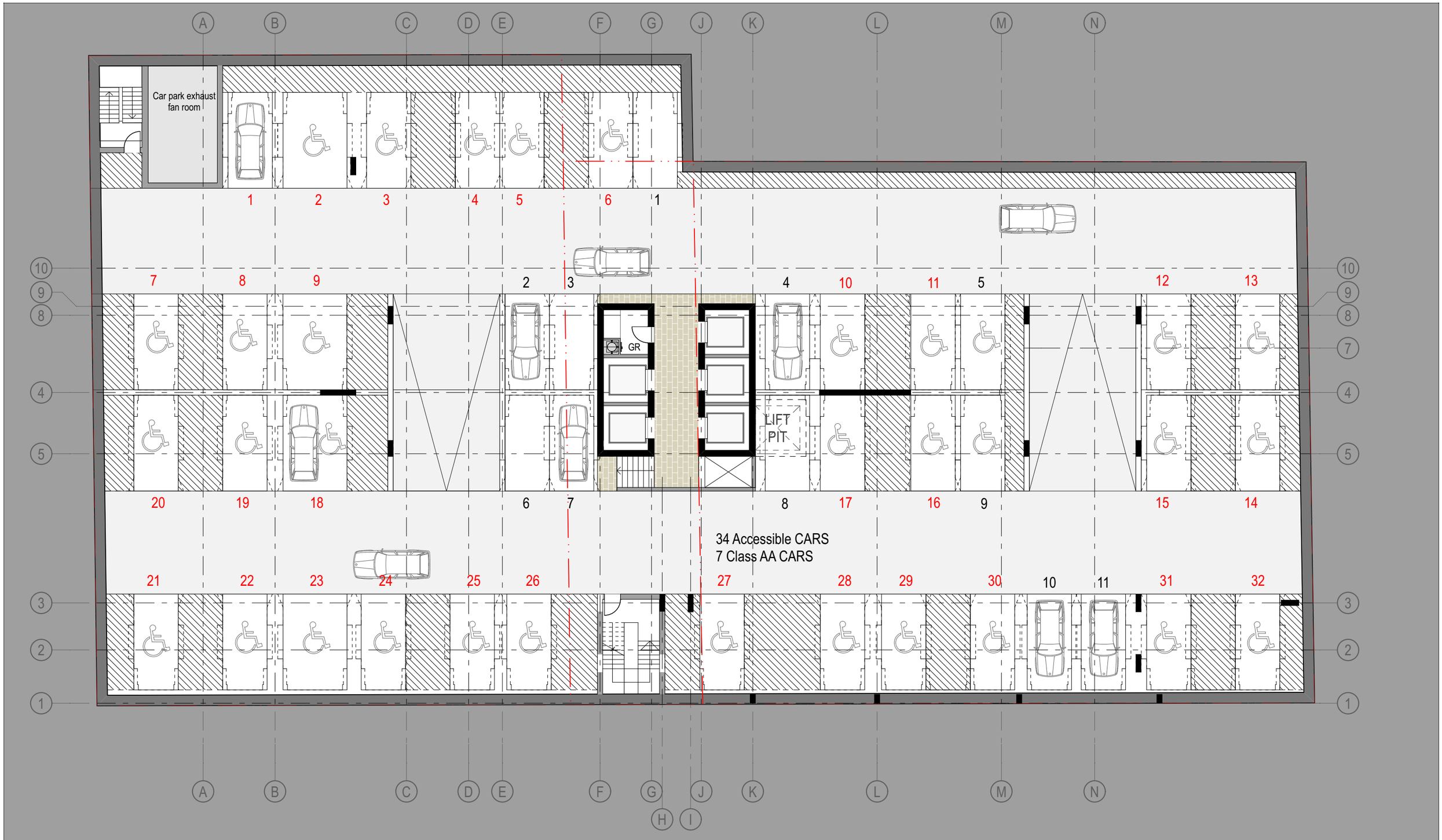
0 2 5 10m

1:200 @ A3

12/01/2017

Preliminary

1018



fjmt
francis-jones morehen thorp

Typical Basement Plan 2

MIRVAC - Victor Street Chatswood

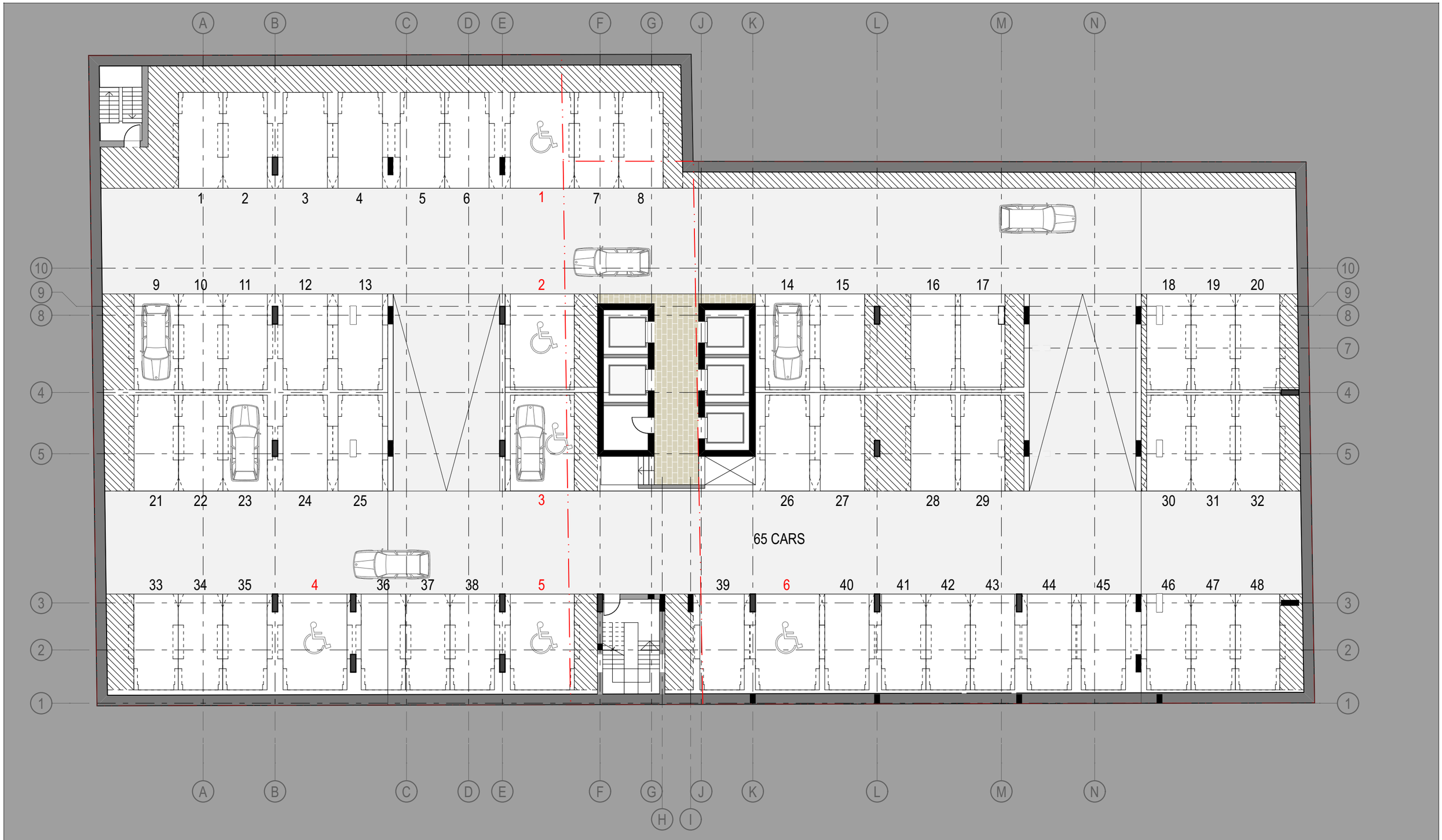
0 2 5 10m

1:200 @ A3

12/01/2017

Preliminary

1019



fjmt
francis-jones morehen thorp

Typical Basement Plan 3

MIRVAC - Victor Street Chatswood

0 2 5 10m

1:200 @ A3

12/01/2017

Preliminary

1020

fjmt
francis-jones morehen thorp

Eastern Elevation - RL 263.5m

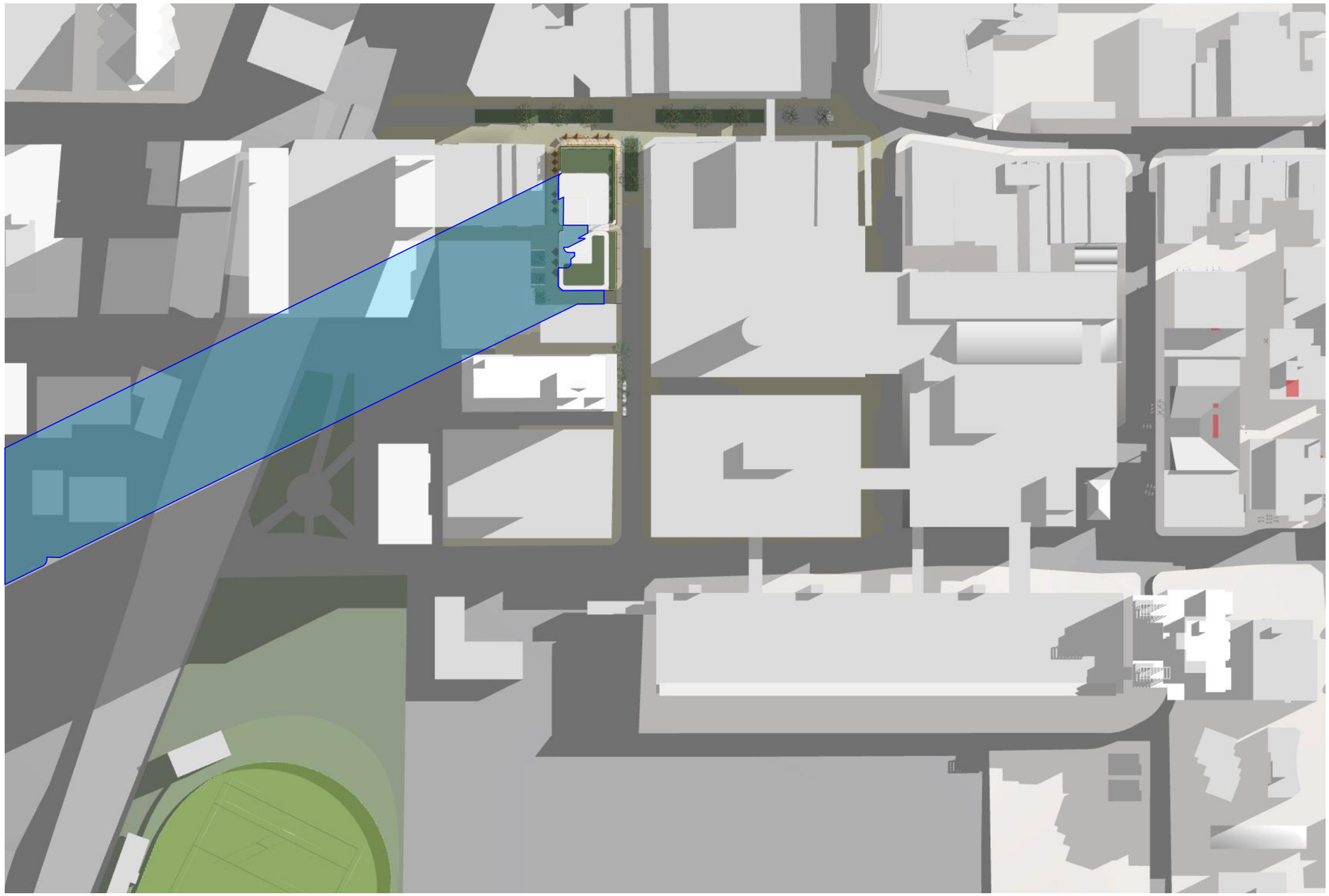
0 10 20 50m

1:1000 @ A3

12/01/2017

MIRVAC - Victor Street Chatswood

Preliminary



fjmt
francis-jones morehen thorp

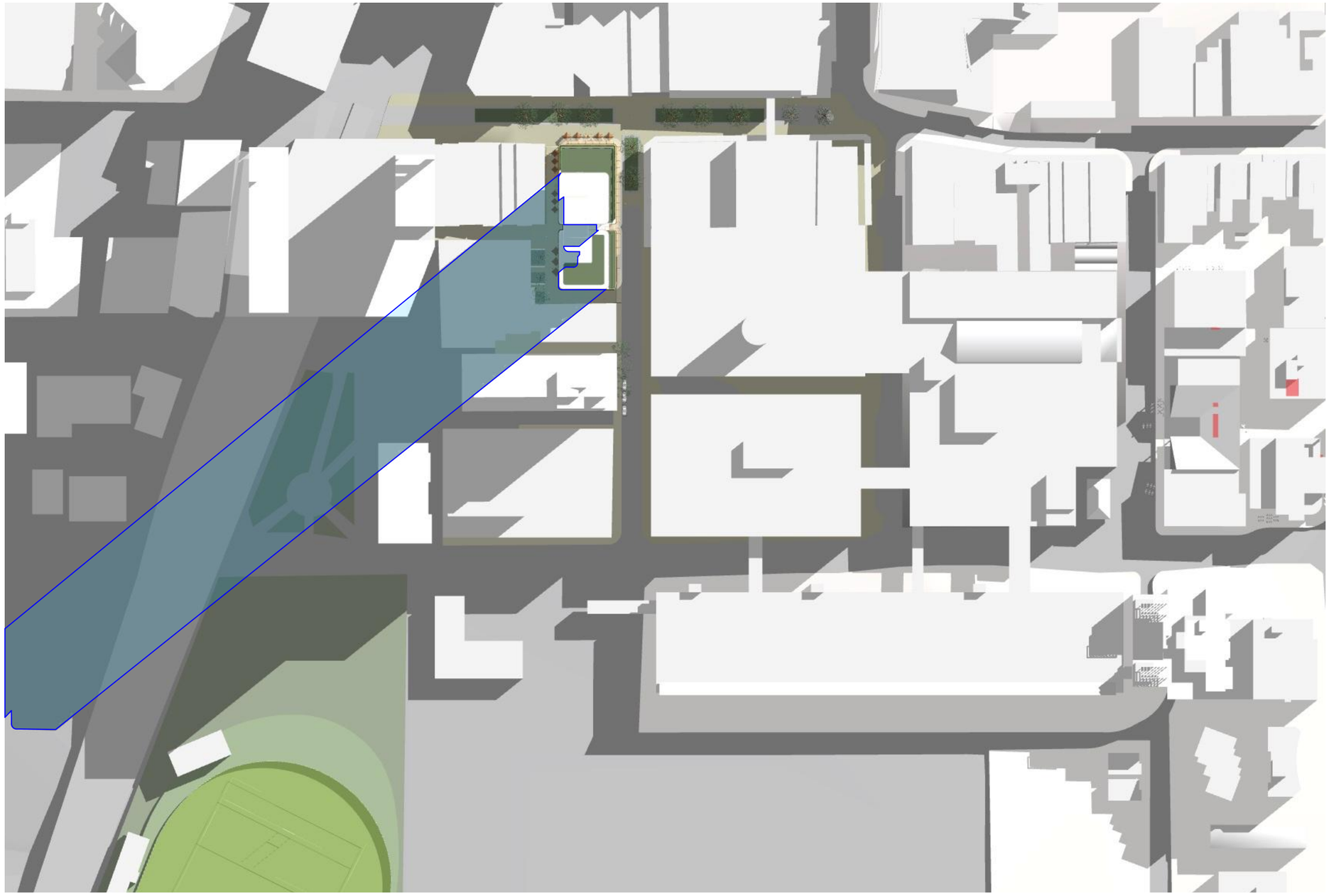
Shadow Study - 9am

MIRVAC - Victor Street Chatswood

12/01/2017

Preliminary

2001



fjmt
francis-jones morehen thorp

Shadow Study - 10am

MIRVAC - Victor Street Chatswood

12/01/2017

Preliminary

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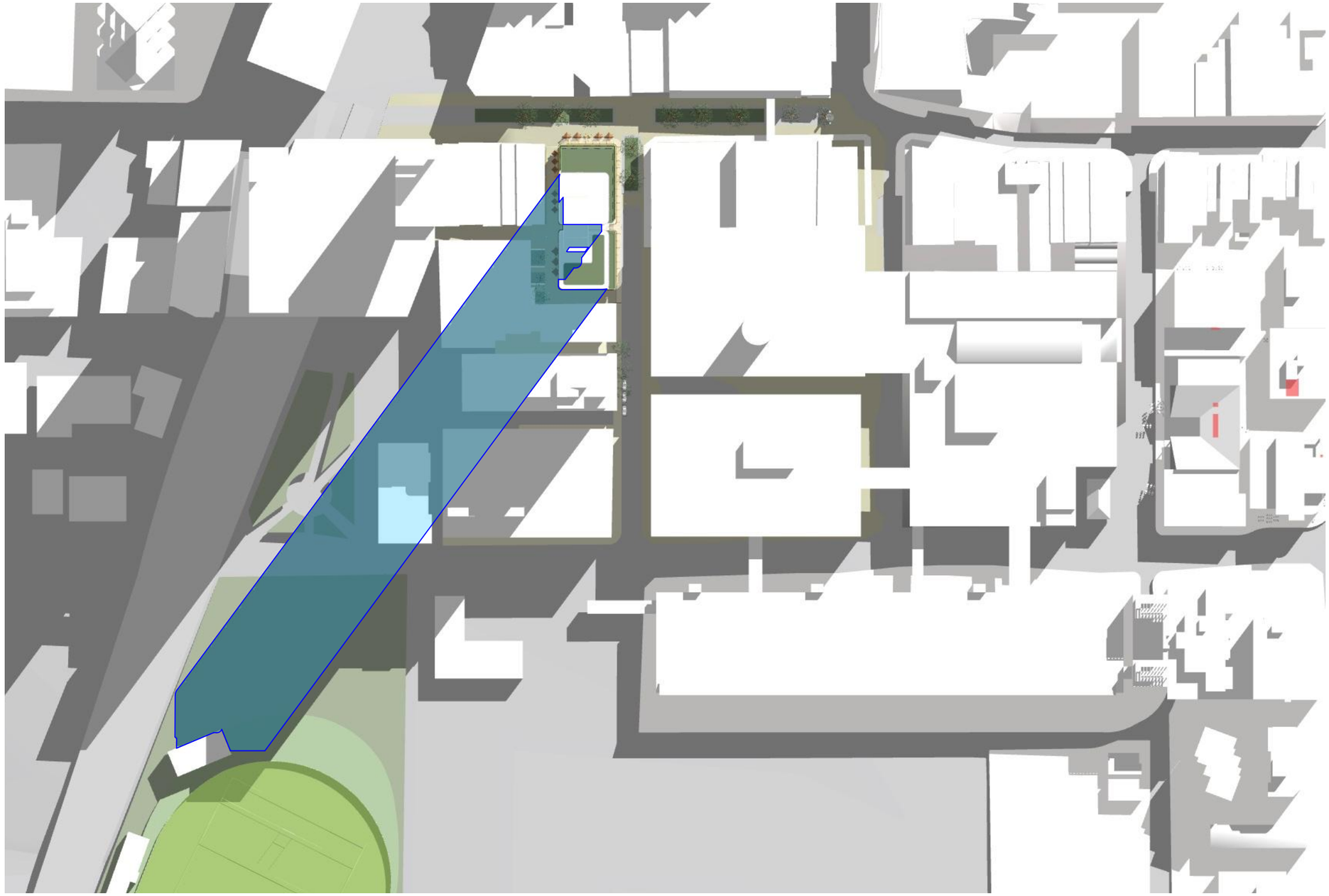


fjmt
francis-jones morehen thorp

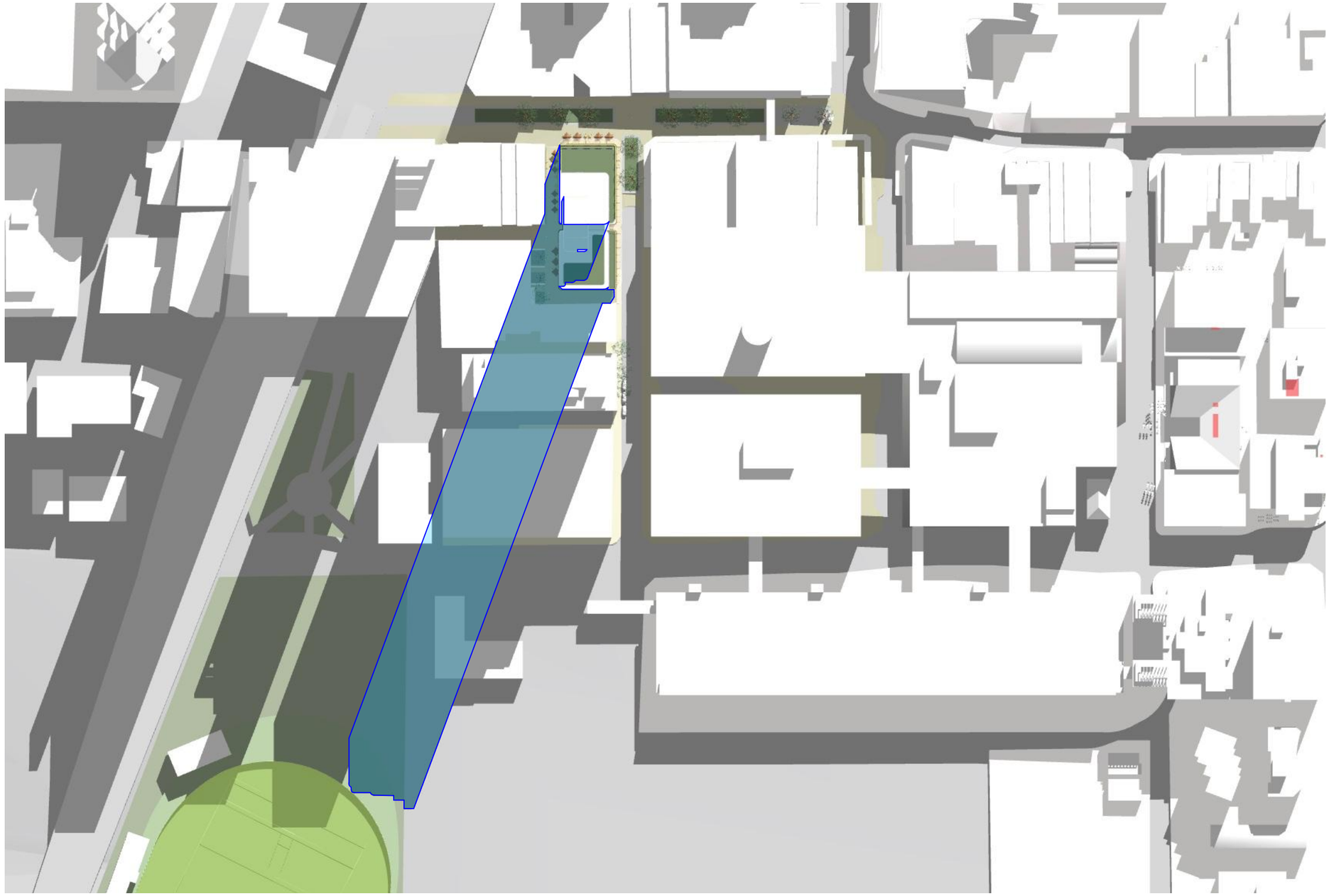
Shadow Study - 11am

MIRVAC - Victor Street Chatswood

12/01/2017

Preliminary

2003



fjmt
francis-jones morehen thorp

Shadow Study - 12pm

MIRVAC - Victor Street Chatswood

12/01/2017

Preliminary

2004

fjmt
francis-jones morehen thorp

Shadow Study - 1pm

MIRVAC - Victor Street Chatswood

12/01/2017

Preliminary

2005

fjmt
francis-jones morehen thorp

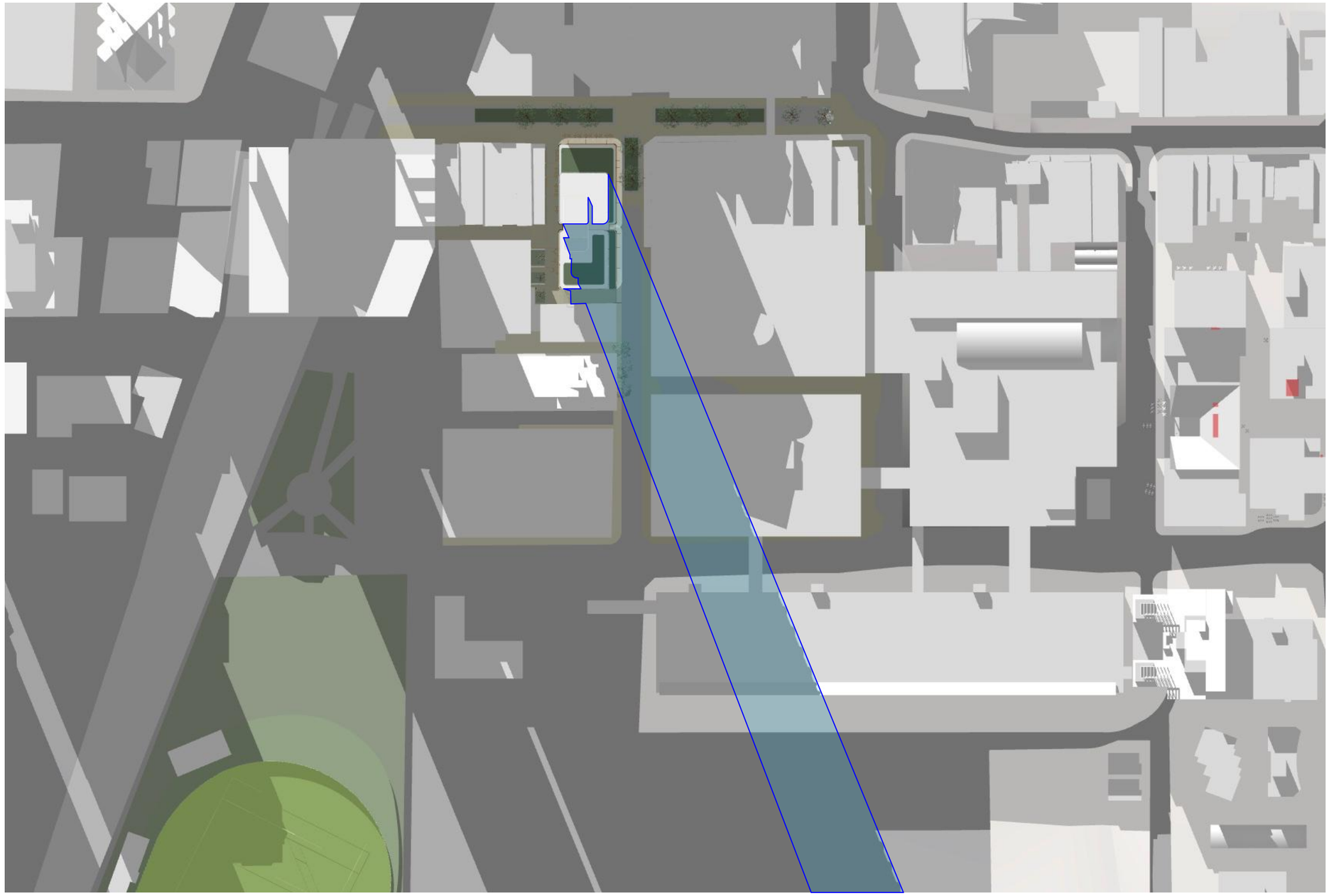
Shadow Study - 2pm

MIRVAC - Victor Street Chatswood

12/01/2017

Preliminary

2006



fjmt
francis-jones morehen thorp

Shadow Study - 3pm

MIRVAC - Victor Street Chatswood

12/01/2017

Preliminary

2007


Rob Roasters
PATISSERIE

Appendix B

45 Victor Street, Chatswood – Market Analysis

Prepared for Mirvac

20 December 2016

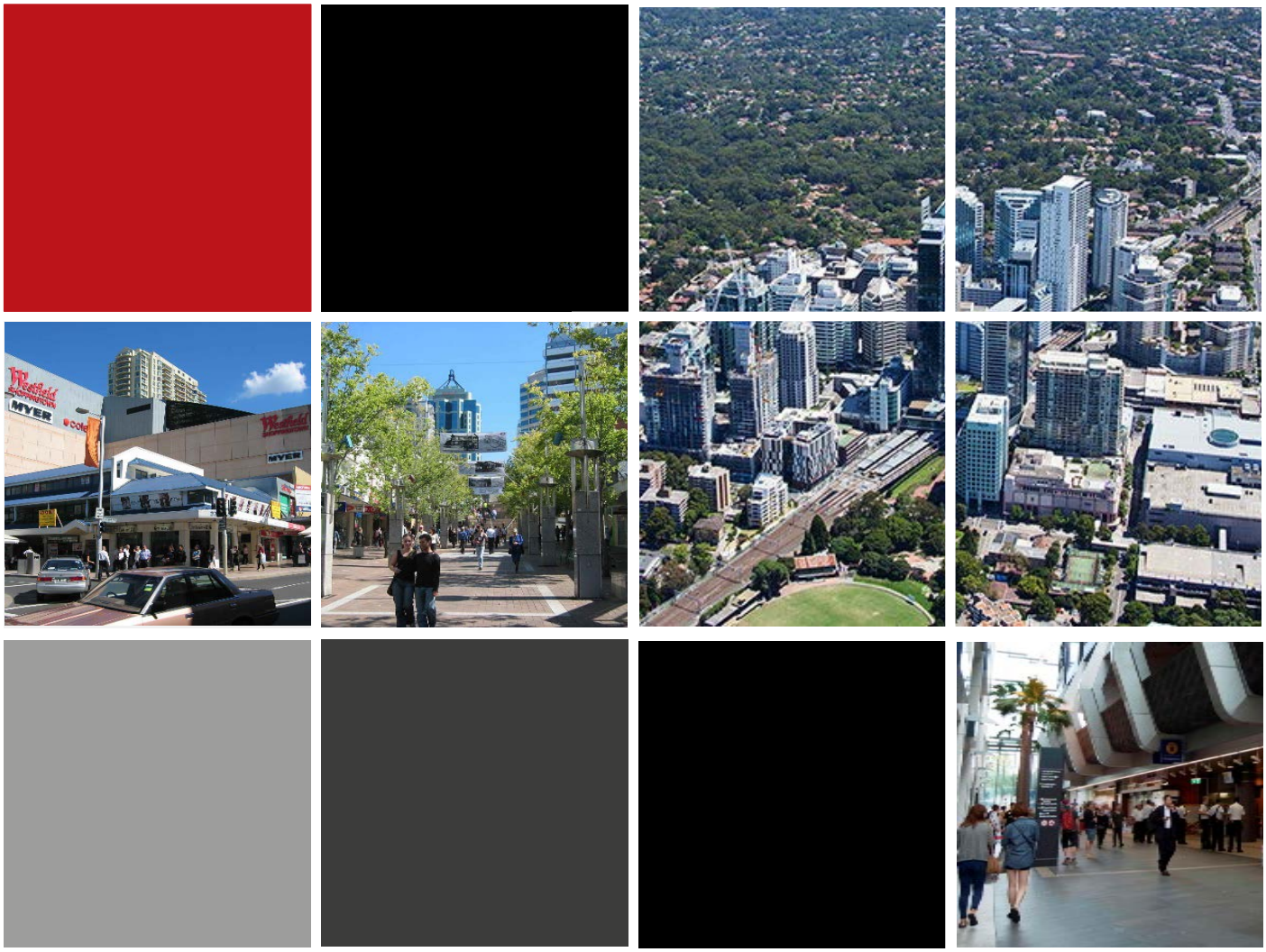


Table of Contents

List of Tables

List of Figures

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1 Executive Summary

1.1 Background

Mirvac, along with its development partners, are looking to undertake a development of 45 Victor Street, Chatswood, and associated sites. They are having consideration to both a potential full commercial option and mixed-use option. In order to inform their project they have engaged JLL to undertake a market analysis study on the Chatswood commercial office market, as well as, have consideration to case studies of successful mixed-use developments.

1.2 Scope

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

- The broader economic context and implications;
- The Sydney and Chatswood office markets;
- The feasibility of the proposed full commercial option;
- The full commercial option in context to the Chatswood office market;
- Short, medium and longer term outlook for the Chatswood office market;
- Case studies of successful national mixed-use development and observations on key learnings from their success;
- A peer review of prior studies; and
- Ultimately our key findings for the research and analysis described above.

1.3 Key Findings

The analysis within this report has derived the following key findings.

- NSW is currently experiencing strong economic drivers, which are conducive to office investment and development within the Sydney office market. While most markets are currently benefitting from this cycle, Chatswood is an exception. This suggests that if now, during a very strong phase in the commercial office cycle commercial development seems unviable (both unfeasible and a lack of market acceptance), it is difficult to ascertain when it will be.
- The proposed office development of circa 46,500 sqm is unrealistic, as it would be the third largest office building in suburban Sydney. However, our discussion with market operators suggest that a development of 20,000 to 30,000 sqm would also be unlikely as a 10,000 sqm pre-commitment would be difficult. This appears to be a reasonable observation considering historic net absorption (3,300 sqm p.a. over the past five years, 5,400 sqm p.a. over the past forty years) and historic new supply (last major additions occurred in the early to mid-1990s).
- Chatswood's recent office growth shortcomings is further reiterated by reference to the "The Vision and Strategic Plan for Chatswood City Centre Plan 2008" adopted by Council in November 2010. This plan identified a number of targets, in regards to office these are summarised in the table below, along with current position as tracked by JLL.

Table 1: The Vision and Strategic Plan for Chatswood City Centre Plan 2008, Office Targets

Target Type	Where we are (2008)	Where we are planning to be (2031)	*Currently (as at Q3/2016)*
Office Floor Space (NLA)	301,300 sqm	440,000 sqm	304,234 sqm
Vacancy	10.5%	<7%	12.4%

Source: The Vision and Strategic Plan for Chatswood City Centre Plan 2008, JLL

- The above suggests that the current market dynamics is not achieving the targeted outcome. If existing status quo was to continue, these targets and other targets, such as those released

by the Greater Sydney Commission's District Plans (growth of between 6,300 to 8,300 jobs in the 20 years to 2036), is unlikely to be met.

- Our view is that this relates to the nature of office being targeted by the Chatswood market. We envision the role of Chatswood going forward as a more support office centre, with much better drivers from a demand perspective for this type of use. The only concern for this coming from the appropriate facilitation of supply.
- An enabler of this supply could come from mixed-use development with the significant demand for residential development within Chatswood acting as the support for economic viability. In doing so, this would create a catalyst to break through the historic status quo of the Chatswood commercial market.
- Our study researched a number of successful examples of mixed-use developments across Australian CBD's. The key learnings from these in terms of drivers of success include; a requirement for the building to be designed to a high quality that does not appear obviously residential and the use of separated lobbies for different uses. Should mixed-use development be pursued within the Chatswood market, we recommend doing so with consideration of these success factors.
- From a pragmatic point of view, JLL considers the embracing mixed-use development will provide significantly more employment based commercial space (risk adjusted) by comparison to maintaining the commercial core which will likely see continuation of the status quo i.e. very low provision of commercial space.

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2 Economic Context and Implications

The objective of this section is to provide the economic context as to the factors which may impact the property market. This makes reference to the conditions which are currently being experienced in the global, national and state economies and how these will impact the property market, particularly the office markets and therefore the Chatswood office market.

2.1 Overview of Key Economic Considerations

Key Points

- Global growth is expected to be 3.0% in 2016 before picking up to 3.4% in 2017. Interest rates are now expected to stay 'lower for longer' amid concerns about low inflationary or even deflationary pressures and subdued growth.
- Exports are expected to continue to support growth over the next few years. DAE forecasts that Australian GDP will grow by 3.0% in 2016 before slowing to 2.7% in 2017. The transition of the economy away from the resources sector still has some way to go.
- The New South Wales economy has been one of the strongest performing state economies with State Final Demand (SFD) and Gross State Product (GSP) well outperforming the national average, and GSP the strongest of any state at 3.5% in the year to June 2016 (DAE).
- The outlook for the NSW economy is positive with State Final Demand growth forecast to be 4.0% for 2016 falling to 2.0% in 2017 (DAE). The fall in growth is a result of the peak in residential construction expected in 2016 and lower house price growth ensuring that consumer confidence will be below where it has been in recent times.

Global Economy

- Global growth is expected to be 3.0% in 2016 before picking up to 3.4% in 2017. Interest rates are now expected to stay 'lower for longer' amid concerns about low inflationary or even deflationary pressures and subdued growth.
- The Euro area's recovery continued in 2015 with growth over the year of 1.9%. Strong growth was recorded in the Czech Republic, Sweden and Spain. The momentum in growth slowed slightly in 2Q16 recording 0.3% q-o-q.
- Economic activity in the US picked up in the second quarter of 2016 but remains disappointing. Growth was recorded at 1.4% (seasonally adjusted annual rate), following growth of only 0.8% in Q1.
- The Federal Reserve increased interest rates for the first time since 2006 in December 2015 and has held rates steady at between 0.25% and 0.5% since then. A very gradual tightening cycle is now anticipated with the next move generally expected in December.
- China's economic growth remained stable at 6.7% y-o-y in 2Q16 within the government's growth range of 6.50 - 7.00%. This was boosted by government stimulus measures which supported investment by State owned companies.
- Following a relatively strong start to the year in Japan economic growth in 2Q16 slowed to 0.2% q-o-q. Net exports was the main drag on growth being hampered by sluggish global demand and the strength of the yen. The yen has appreciated by 17% against the USD since the end of last year.

Domestic Economy

- In 2Q16 GDP grew by 0.5% q-o-q in 2Q16; equivalent to 3.3% growth on 2Q15. Growth is marginally higher than the 20-year average of 3.2%.
- Mining capex is still 44.6% higher than prior to the mining investment boom in 2Q10. Therefore despite a sharply falling trajectory there is still some distance for mining capex to fall before that floor is reached. However, with several large resource construction projects

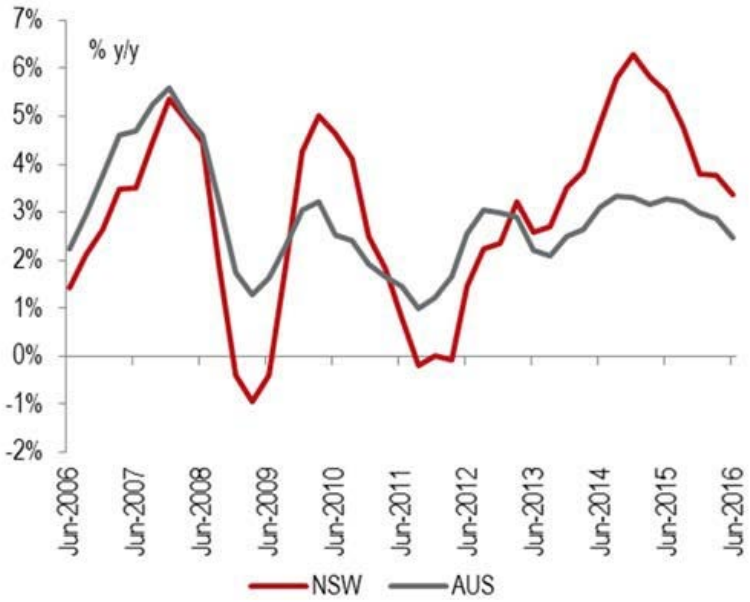
moving towards production, a less capital intensive phase of the cycle, it is likely that the gap will be quickly closed.

- Net exports detracted 0.2% from GDP in 2Q16, as imports grew by 2.7% q-o-q to offset export growth of 1.3% q-o-q, resulting in a negative trade balance for the quarter. However the upside is that rising imports are a factor in rising household consumption.
- Exports are expected to continue to support growth over the next few years. DAE forecasts that Australian GDP will grow by 3.0% in 2016 before slowing to 2.7% in 2017.

2.2 NSW Outlook

- The New South Wales economy continues to be one of the strongest performing in Australia. State Final Demand has grown by 3.7% y-o-y as of June 2016, well above the national average of 1.2% (ABS). NSW Gross State Product growth (y-o-y) is the strongest of any state at 3.5% in the year to June 2016 (DAE).
- The labour market in NSW is also the best performing with the unemployment rate at 5.0% compared with 5.6% nationally in August 2016 (ABS). Strong house price growth from lower interest rates over the past few years has been the major driver of the economy. The increased wealth from this house price growth has triggered strong performances in the retail sector as well as residential construction. Another benefit is that NSW has limited exposure to the resources sector, which has been a negative drag on economic growth for other states.

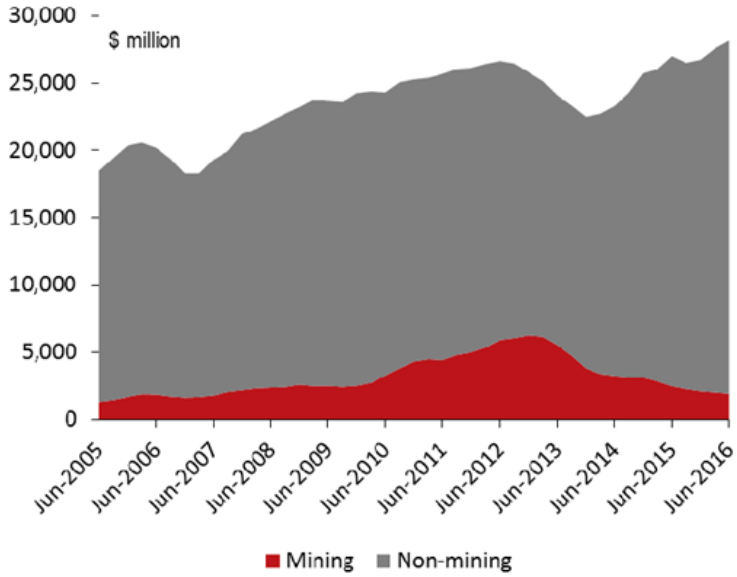
Figure 1: NSW Retail Turnover Growth (%)



Source: ABS, JLL Research

- Retail turnover growth has been strong in New South Wales at 3.4% y-o-y compared with 2.5% nationally (ABS). The buoyant labour market and high consumer confidence on the back of rising housing prices has been the reason for the strength in the retail sector.
- Residential property prices in Sydney have risen by 3.6% for the 12 months to June 2016. This is below the national average (weighted average of eight capital cities) of 4.1%, the first time Sydney price growth has underperformed since March 2010. Lower residential price growth is to be expected for Sydney after a significant rise in property prices over the past few years.
- The figure below shows the limited exposure that NSW has had to mining investment. Whilst the mining investment that has previously occurred has fallen over the past three years, non-mining investment has been strong. The strong residential construction activity is one of the main reasons for this trend.

Figure 2: Business Investment (rolling annual)



Source: ABS, JLL Research

- The lower Australian dollar continues to have a positive effect on tourism for New South Wales. Education is another sector that has been able to take advantage of the lower currency with an increase in foreign students. This is also reflected in the labour force for NSW where employment in the education sector has increased over the past 12 months.
- The outlook for the NSW economy is positive with State Final Demand growth forecast to be 4.0% for 2016 falling to 2.0% in 2017 (DAE). The fall in growth is a result of the peak in residential construction expected in 2016 and lower house price growth ensuring that consumer confidence will be below where it has been in recent times.

2.3 Implications for Property Markets

Investor sentiment and near term expectations of market volatility as represented by the S&P/ASX 200 VIX index have trended below the longer-term average through 3Q16. The S&P/ASX 200 VIX index fell from 19.38 at end-June to 13.48 at end-September 2016.

Several factors in global markets, however, remain a key focus because of their potential to impact on real estate yields. The US Federal Reserve kept monetary policy unchanged over the quarter and has not changed policy year to date in 2016. The FOMC decided at its most recent meeting *'to wait for further evidence of continued progress towards its objectives'*. The FOMC decision has provided a boost of confidence to financial market participants. The take out from this episode, however, is probably that the "lower for longer" outlook for interest rates has gained support.

Monetary settings in global markets are expected to impact cross-border capital flows, exchange rates and interest rate settings within the Australian economy. Persistent low global interest rates continue to support financing for the business sector. However, with the low interest rate environment there is increased potential for excessive risk taking behaviour.

China's outlook for growth and current debt situation also remains a key focus for the outlook of the Australian economy. As noted in the *Financial Stability Review* (October 2016): *'The main connections between China and other economies that would be relevant in a negative scenario are trade volumes and commodity prices, as well as sentiment in global financial markets.'*

While the yield premium to real bond rates remains elevated, yield-seeking capital flows toward Australian commercial property markets are expected to remain robust over the short-term. The expected outcome is that assets with sustainable income returns are likely to attract greater interest from investors seeking superior risk-adjusted returns. Assets with strong leasing covenants and fixed escalation clauses are likely to benefit. Nevertheless, with elevated pricing levels there is increased risk of volatility in asset prices in the event of a negative shock or a change in sentiment towards these assets.

Improving market fundamentals across property asset classes and geographies are expected to support the income return component of asset returns. On the other hand, fundamentals remain divergent across resource driven and non-resource driven markets. The upper band yield for prime office assets in Perth CBD (6.00%) with vacancy at 24.7% is lower than the 6.50% prevailing in 1Q08 with vacancy of 0.10%. While this breakdown of historical relationships is particularly extreme in the case of Perth, all resource driven CBD office markets show a similar displacement. The conundrum of establishing value and risk premiums in a low interest rate environment remains unresolved.

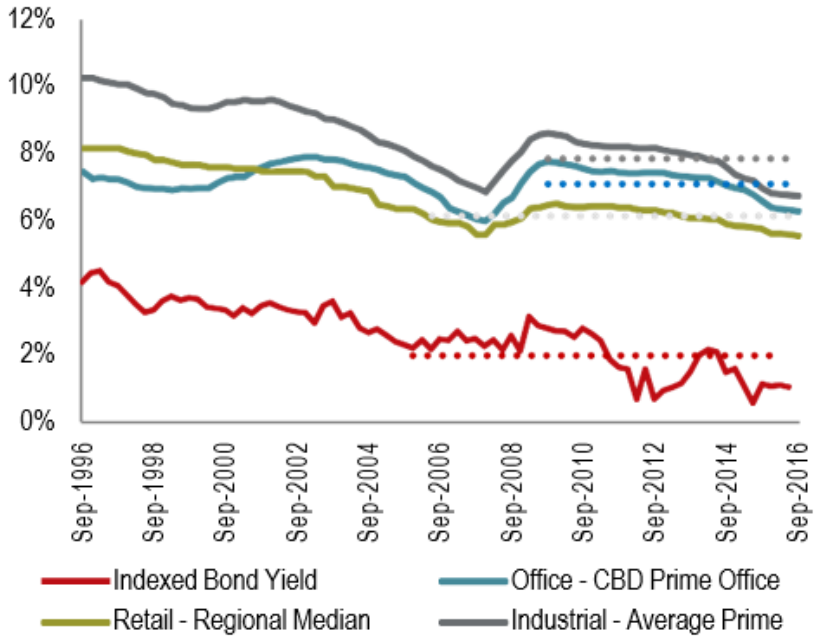
In the non-resource driven markets (Melbourne and Sydney) where the physical and financial fundamentals are more closely aligned, record low office yields have been achieved over the quarter. Yield compression has been most evident across secondary grade assets, where more upside is anticipated.

With yields on some sectors of the commercial property market at or near record lows, affordability is improving for some international investors because of favourable exchange rates. Nations that have traditionally been net buyers within the Australian property market and their respective exchange rate has appreciated against the AUD over recent years, include: China, US, UK, Europe, Canada, Japan and Singapore. Correspondingly an increase in offshore investor activity has been recorded and is expected to continue over the short-term.

Our forecasts across office, retail and industrial sectors now reflect a longer period of low yields through 2016 and into 2018 before a moderate cyclical reversion. Consequently, investors are expected to pursue investment opportunities across non-CBD markets in the search of yield. This is particularly the case with secondary grade assets in the industrial market and neighbourhood shopping centres. Yield compression has been very sharp in both these market sub- sectors in recent quarters. An interpretation of this is that more investors now accept that investment returns will be structurally lower across all categories of investments in the future, and a big discount for non-prime assets no longer applies.

Although debt costs have been falling, the availability of debt financing is constrained whilst banks look to limit their exposure to commercial real estate. A growing source of debt finance in the domestic market is the expansion of activity by offshore banks (particularly from Asia), although their primary focus is on servicing their existing clients.

Figure 3: Property and Inflation-Indexed Bond Yields



Source: RBA, JLL Research

While yields are likely to stay 'lower for longer', the end of the yield compression cycle implies that performance will be harder to achieve in the future. Thus emphasis will focus on asset and market selection, timing decisions to enter or exit markets and comparisons between sub-markets and precincts.

The macro-economic tail winds that have lifted transaction volumes and values since 2009 are moderating. Total transactions activity in the commercial sector was AUD 18.6 billion for the first three quarters of 2016, a 17.0% decline on the first three quarters of 2015.

2.4 Implications for Chatswood

As described above, the economic conditions, particularly in NSW, is currently conducive of office investment and development. Additionally, investors are expected to pursue investment opportunities across non-CBD markets (suburban office markets) in the search of yield. We are therefore at a point in the office market cycle supportive of office investment and development within suburban markets such as Chatswood. Should these economic conditions change, the primary implication will be a reduced support of development and investment across suburban markets.

3 Office Market Analysis and Implications

This section will provide observations on the role of the Chatswood market in its Sydney / suburban market context, inclusive of relevant supply and demand metrics. This analysis is supported by high-level feasibility testing. We have also provided as a key finding from this analysis the forecasted role of Chatswood in providing additional investment grade product against other office typologies i.e. support office product.

3.1 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.

3.2 Overview of Investment Grade Sydney Office Markets

The Sydney office markets monitored by JLL comprise just over 9.612 million sqm of office space, 53% of which is located in the Sydney CBD market, and 47% located in the 9 major metropolitan office markets. The Sydney metropolitan markets monitored by JLL include the following:

- Sydney Fringe
- North Sydney
- Chatswood
- St Leonards
- Norwest
- Sydney Olympic Park/Rhodes
- Sydney South
- Macquarie Park (including North Ryde)
- Parramatta

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

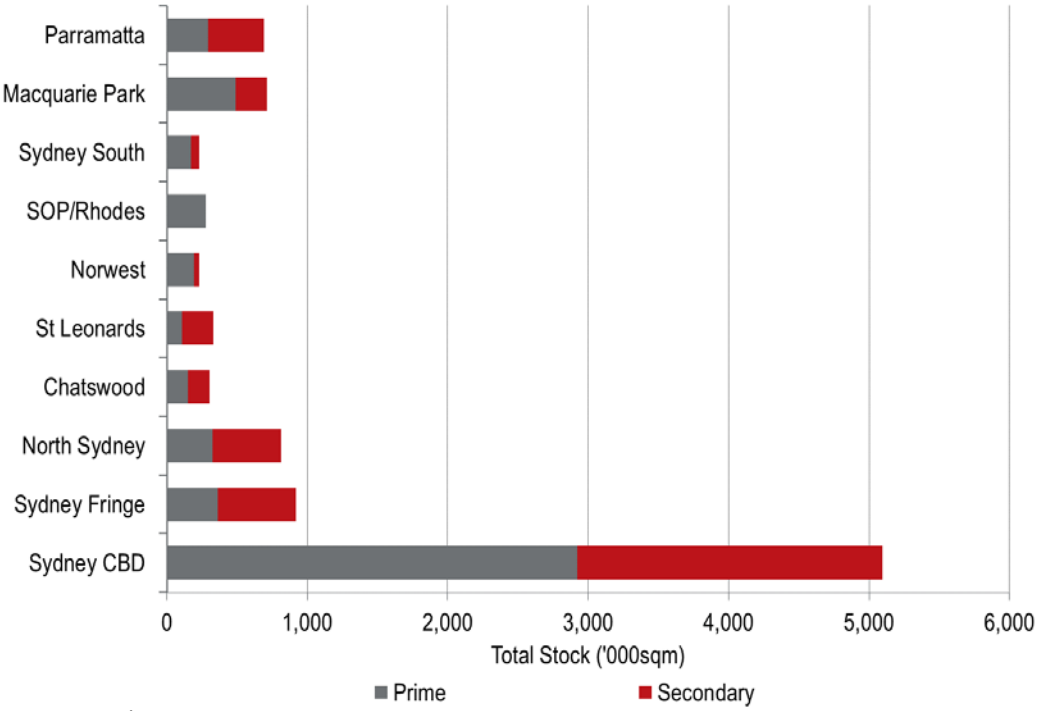
have reasonable access to public transport and a good mix of support services. Rents are significantly lower than the CBD market.

- 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 attracted to their proximity to higher socio-economic residential areas which are where a high proportion of the employees reside.

Supply and Demand

As at Q2/2016, the total stock across the 9 monitored metropolitan markets was 4.516 million sqm. The largest metropolitan market in Sydney is the Sydney Fringe and it comprises 0. 920 million sqm of stock and accounts for 9.6% of the total Sydney metropolitan market.

Figure 4: Prime and Secondary Grade Stock by Metropolitan Market, Q2/2016



Source: JLL Research

Table 2: Sydney Office Market Profile, Q2/2016

	Total Net Lettable Area	Prime Grade Stock	Secondary Grade Stock
	'000 sqm	% Total Stock	% Total Stock
CBD Market			
Sydney CBD	5,096	57.4%	42.6%
Metropolitan markets[1]			
Sydney Fringe	920	39.5%	60.5%
North Sydney	816	40.1%	59.9%
St Leonards	332	32.9%	67.1%
Chatswood	304	48.9%	51.1%
Norwest	230	84.5%	15.5%

[1] Only Prime Grade office stock is monitored at Sydney Olympic Park / Rhodes

SOP/Rhodes	279	100.0%	0.0%
Sydney South	228	74.5%	25.5%
Macquarie Park	715	68.4%	31.6%
Parramatta	691	42.8%	57.2%
Sydney Metropolitan Markets	4,516	52.7%	47.3%

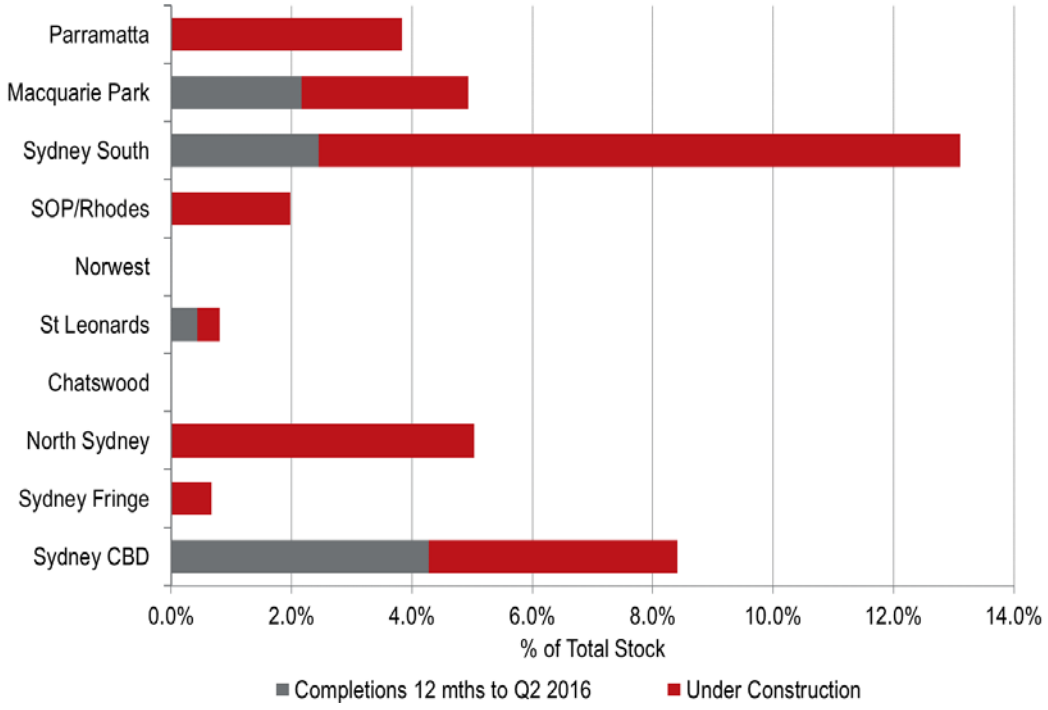
Source: JLL Research

The Sydney leasing market has been buoyant across both the overall metropolitan market and the CBD market, with a net absorption in occupied stock in the 12 months to Q2 2016. While the Sydney metropolitan markets overall expanded by 74,614sqm, there was some considerable divergence between the best performing and worst performing, with the largest expansion coming from the Sydney Fringe (24,247sqm) and the largest contraction coming from North Sydney (22,837sqm). The level of expansion, however, was considerably less than the CBD market, which during the same period grew by 119,095sqm of occupied space.

New supply in the 12 months to Q2 2016 totalled 22,529sqm across the 9 metropolitan office markets, equivalent to just 0.5% of existing stock in this market. Of the 9 markets, 6 recorded no new supply with Macquarie Park, Sydney South and St Leonards being the only contributors. The stand out of these, having consideration to size, being Sydney South which contributed 5,592sqm equating to 2.5% of existing stock. During this same period the CBD saw supply of 217,980sqm, equivalent to 4.3% of existing stock.

Projects currently under construction across the Sydney metropolitan markets as at Q2 2016 totalled 124,638sqm, equivalent to 2.8% of existing stock. This is a relatively low level of construction activity when compared to CBD market, where 210,538sqm, equivalent to 4.1% of CBD stock, was under construction. Most of the metropolitan projects under construction are attributed to the North Sydney, South Sydney and Parramatta markets, which together account for 74% of the total construction across the metropolitan office markets.

Figure 5: Recent Construction Activity as % of Total Stock, Q2 2016



Source: JLL Research

Table 3: Sydney Office Market Profile, Stock, Supply and Net Absorption, Q2 2016

	Net Lettable Area	Net Absorption 12 mths to Q2 2016	Completions 12 mths to Q2 2016	Completions 12 mths to Q2 2016	Under Construction	Under Construction
	'000 sqm	'000 sqm	'000 sqm	% of NLA	'000 sqm	% of NLA
CBD Market						
Sydney CBD	5,096	119.1	218.0	4.3%	210.5	4.1%
Suburban markets						
Sydney Fringe	920	24.2	0.0	0.0%	6.1	0.7%
North Sydney	816	-22.8	0.0	0.0%	41.1	5.0%
Chatswood	304	-2.7	0.0	0.0%	0.0	0.0%
St Leonards	332	2.2	1.4	0.4%	1.3	0.4%
Norwest	230	8.0	0.0	0.0%	0.0	0.0%
SOP/Rhodes	279	16.5	0.0	0.0%	5.5	2.0%
Sydney South	228	18.5	5.6	2.5%	24.3	10.7%
Macquarie Park	715	20.9	15.5	2.2%	19.8	2.8%
Parramatta	691	9.9	0.0	0.0%	26.5	3.8%
Sydney Metropolitan Markets	4,516	74.6	22.5	0.5%	124.6	2.8%

Source: JLL Research

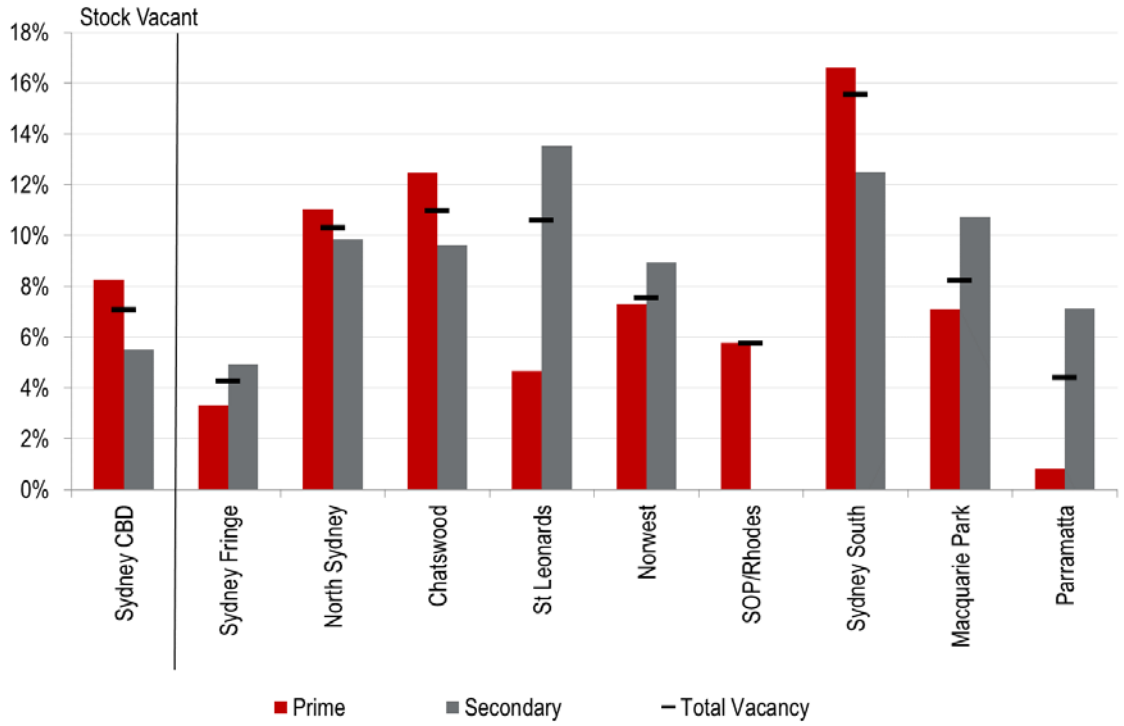
Vacancy

As at Quarter 2 2016, the average prime grade vacancy rate in metropolitan markets was 7.0% compared to 8.3% for the Sydney CBD market. Total vacancy was 7.8% while total vacancy for the CBD market was 7.1%%. The Sydney Fringe currently has the lowest overall vacancy rate of 4.3%, however, Parramatta has the lowest vacancy prime grade vacancy of any market at just 0.8%.

Historically the metropolitan and CBD market has typically had higher vacancy rates in secondary stock, however, more recently this has shifted with an almost even split between the markets. Three of the nine metropolitan markets (North Sydney, Chatswood and South Sydney), along with the CBD, recorded a higher prime-grade vacancy than secondary-grade vacancy.

The relatively small South Sydney market has the highest vacancy rate of all monitored markets (15.6%) and the highest prime grade vacancy rate, 16.6%. Surprisingly, despite this vacancy level there had been an increase of 5,592sqm in the 12 months to Q2/2016, with additional stock of 24,314sqm currently under construction representing 10.7% of NLA, which will likely result in a continued increase to the vacancy rate in the next 12-24 months.

Figure 6: Prime and Secondary Vacancy Rates, Q2/2016



Source: JLL Research

Centre specific vacancy is provided in the following table.

Table 4: Australian Office Market Profile Vacancy, Q2/2016

	Vacancy	Prime Grade Vacancy	Secondary Grade Vacancy
	% NLA	% NLA	% NLA
CBD Market			
Sydney	7.1%	8.3%	5.5%
Metropolitan markets			
Sydney Fringe	4.3%	3.3%	4.9%
North Sydney	10.3%	11.0%	9.9%
Chatswood	11.0%	12.5%	9.6%
St Leonards	10.6%	4.7%	13.5%
Norwest	7.6%	7.3%	9.0%
SOP/Rhodes	5.8%	5.8%	n.a.
Sydney South	15.6%	16.6%	12.5%
Macquarie Park	8.2%	7.1%	10.7%
Parramatta	4.4%	0.8%	7.1%
Sydney Metropolitan Markets	7.8%	7.0%	8.6%

Source: JLL Research

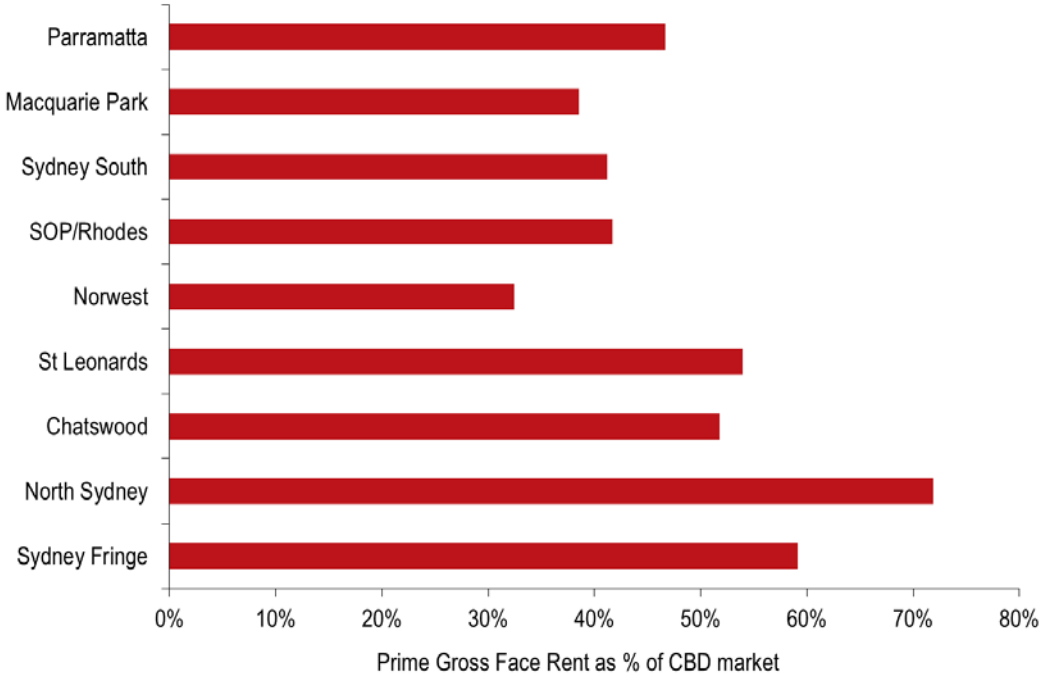
Rental Market

Metropolitan markets are more affordable than the CBD market. Affordability is one of the key drivers attracting occupiers to metropolitan markets.

Prime gross face rents in Sydney metropolitan markets range from an average 32.5% of Sydney CBD rents in Norwest Business Park to 59.2% of CBD rents in Sydney Fringe, with other

metropolitan markets in between these levels. The North Sydney market is closer to Sydney CBD rents with prime gross face rents averaging 71.9% of Sydney CBD rents.

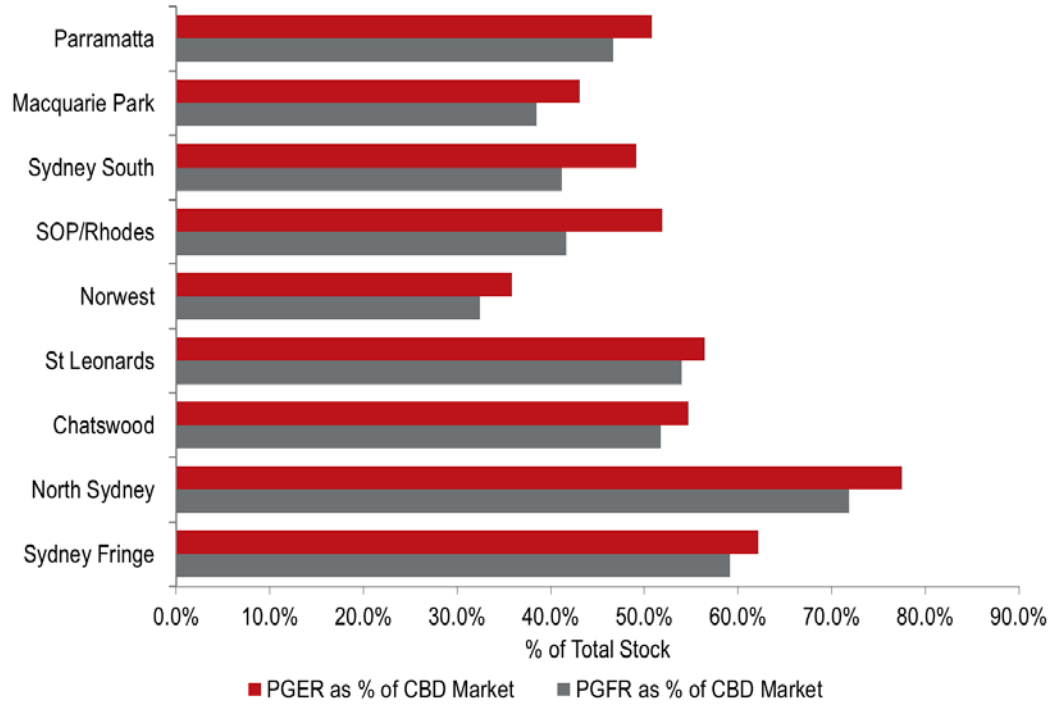
Figure 7: Gross Face Rents Compared to Sydney CBD Market, Q2 2016



Source: JLL Research

However, when incentives are taken into account the proportion of metropolitan to CBD rent increases for all Sydney metropolitan markets. See below.

Figure 8: Gross Face versus Effective Rents Compared to Sydney CBD Market, Q2 2016



Source: JLL Research

As discussed, the resurgence in the Sydney office leasing market resulted in positive growth in prime gross face rents across practically all markets in the 12 months to Q2 2016 (exception being Norwest with no change), this growth ranged from 7.9% in North Sydney to moderate growth experienced in SOP/Rhodes (1.2%), with the market overall averaging growth of around 3.8%.

Incentives have also fallen, except within Sydney South, with markets recording greater growth in effective rentals (rents adjusted for incentives). The decline was significant in the Sydney CBD and North Sydney which recorded growth in effective rents of approximately double the rate than that in face rents.

Table 5: Sydney Office Market Profile Rents, Q2/2016

	Prime Gross Face Rent	Annual Growth % Year to Q2 2016	Prime Gross Effective Rent	Annual Growth % Year to Q2 2016
	$/sqm p.a.	%	$/sqm p.a.	%
CBD Market				
Sydney CBD	1,085	5.7%	714	12.2%
Metropolitan markets[2]				
Sydney Fringe	642	7.8%	444	15.6%
North Sydney	780	7.9%	554	8.5%
Chatswood	562	6.3%	390	7.9%
St Leonards	585	4.3%	403	6.0%
Norwest	352	0.0%	256	0.9%
SOP/Rhodes	452	1.2%	371	2.2%
Sydney South	447	2.4%	351	2.3%
Macquarie Park	418	1.7%	308	3.2%
Parramatta	506	0.8%	363	0.9%

Source: JLL Research

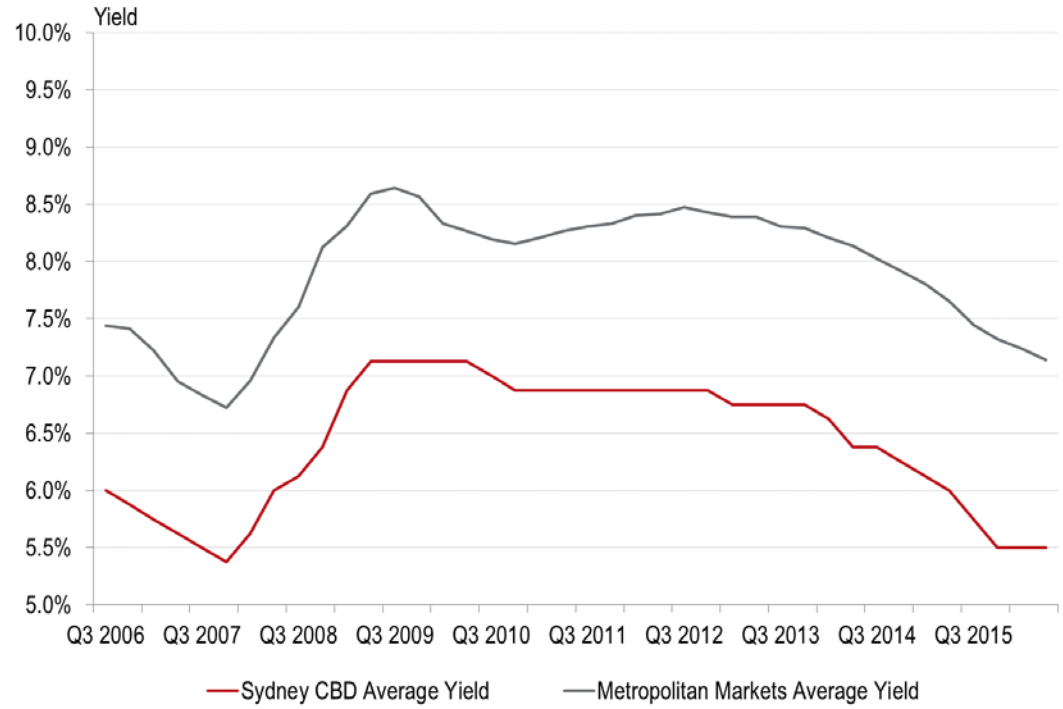
Yield and Capital Values

All Sydney metropolitan markets have experienced at least some yield compression for prime grade assets over the 12 months to Q2/2016, the main standouts during the period being the Chatswood, Macquarie Park, St Leonards and Sydney Fringe markets where the upper and/or lower yields compressed by at least 75 basis points.

Compared to the Sydney CBD market, yields for metropolitan assets are quite high. The yield spread between average prime yields across the CBD market and average prime metropolitan yields was 164 basis points in Q2/2016. The yield spread has just passed a peak period and is starting to return to closer to historic averages. Over the last 10 year period, the yield spread has historically averaged 150 basis points.

[2] Incentives based on 10 year lease deal except Macquarie Park, Sydney Olympic Park/Rhodes, Norwest, Sydney South (5 years)

Figure 9: Yield Spread between Sydney CBD and Metropolitan Markets, Q1 2006 to Q2 2016[3]



Source: JLL Research

Specific yield ranges for each of the office markets as at Q2 2016 are provided below.

Table 6: Sydney Office Market Profile, Yields Q2/2016

	Prime Yield as at Q2 2016
	%
CBD Markets	
Sydney CBD	5.00 - 6.00
Metropolitan markets	
Sydney Fringe	6.25 - 7.00
North Sydney	5.75 - 6.75
Chatswood	7.00 - 7.25
St Leonards	6.75 - 7.25
Norwest	8.50 - 9.00
SOP/Rhodes	6.75 - 8.50
Sydney South	6.50 - 7.00
Macquarie Park	6.25 - 7.50
Parramatta	6.25 - 8.25

Source: JLL Research

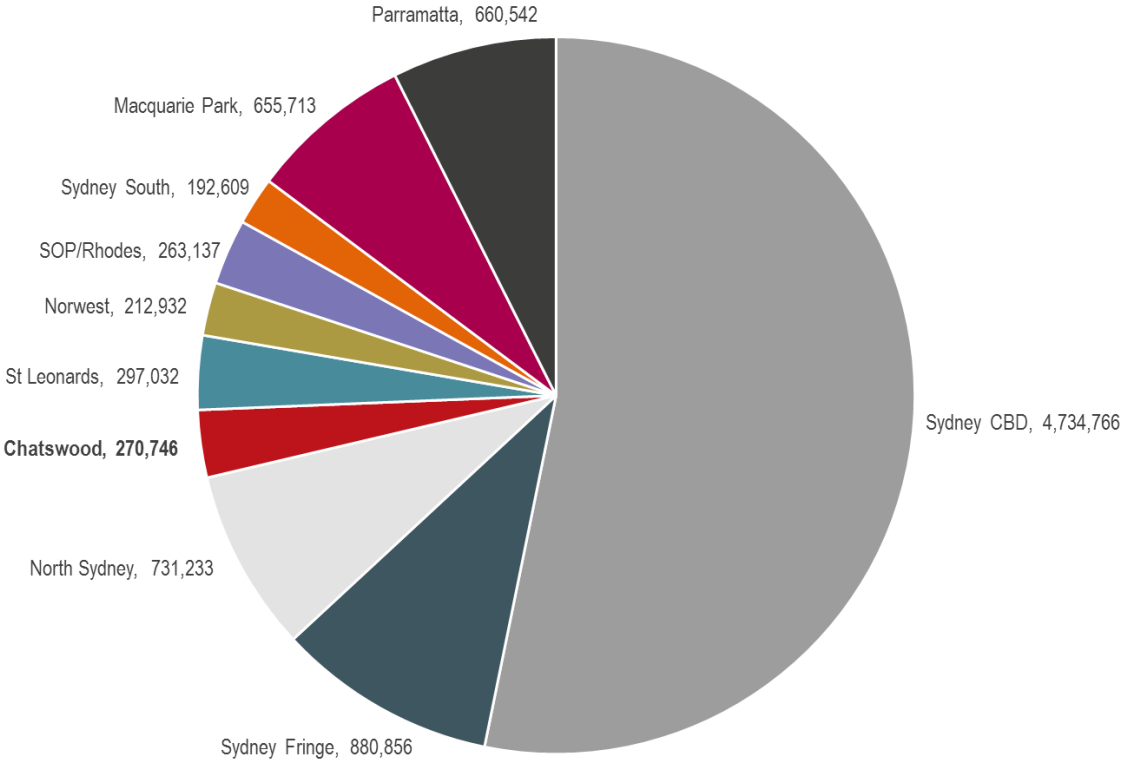
Observations on the Historic Growth of the Suburban Markets

Our starting point for our detailed analysis of Chatswood is to understand the size of the Sydney Office Market. As at Q2/2016 the occupied office space in the markets tracked by JLL totalled

[3] JLL note that not all Sydney metropolitan market yields were monitored from the start of the above period. The markets which were not monitored include; Norwest (from Q2 2009), Sydney Fringe (from Q3 2007), SOP/Rhodes (from Q4 2009) and Sydney South (from Q1 2010).

8,899,566 sqm. Chatswood, highlighted in the figure below, as at this time equated to a total of 270,746 sqm in occupied stock, being approx. 3.0% of the total Sydney office market.

Figure 10: Sydney Office Markets – Current Occupied Stock Levels, Q2/2016

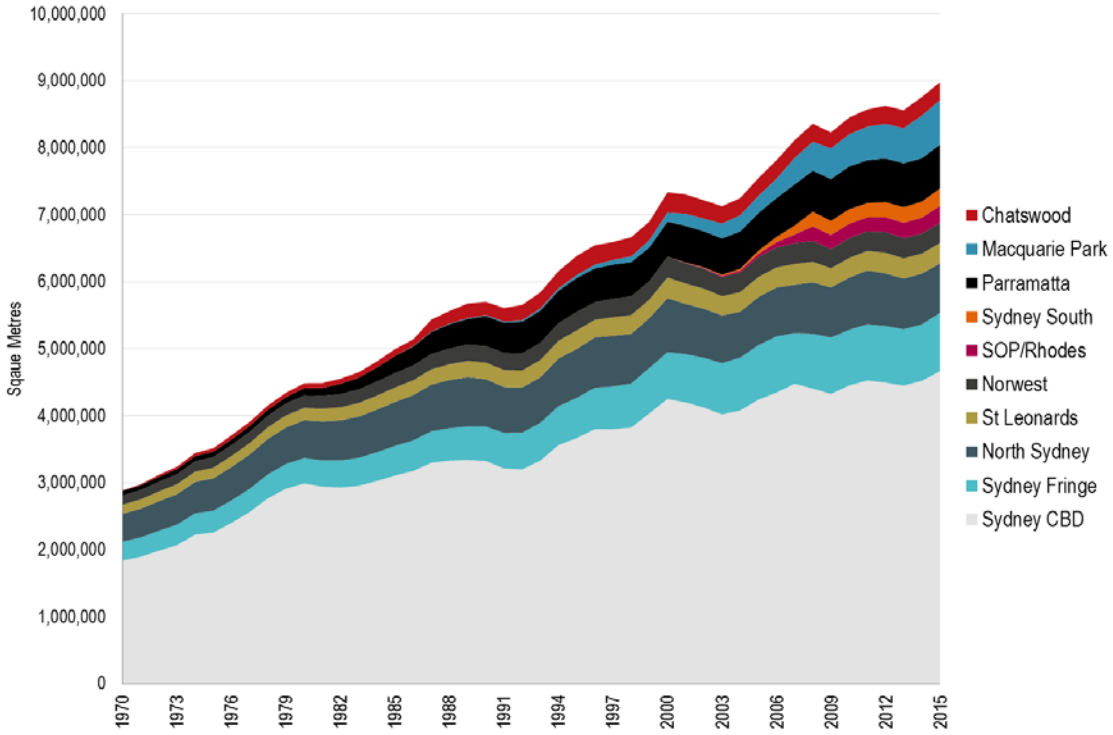


Source: JLL Research

JLL has had reference to its historic occupied stock data to derive historic demand for each of the office precincts in Sydney. In undertaking this exercise JLL has made specific assumptions about historic take up rates beyond our current data records for all markets other than Sydney CBD and Chatswood. Specifically we have assumed:

- Parramatta, Sydney Fringe, North Sydney and St Leonards historically grew at 3.0% p.a. up to the date JLL tracked these markets, which are 1977, 2006, 1998 and 1989 respectively.
- For Norwest, Macquarie Park, Sydney Olympic Park/Rhodes and South Sydney we have assumed 'material' office stock was developed and occupied in 2000, 1986, 2001 and 1997 respectively.

Figure 11: Growth of Sydney Office Markets (with Assumptions), 1970 to 2015

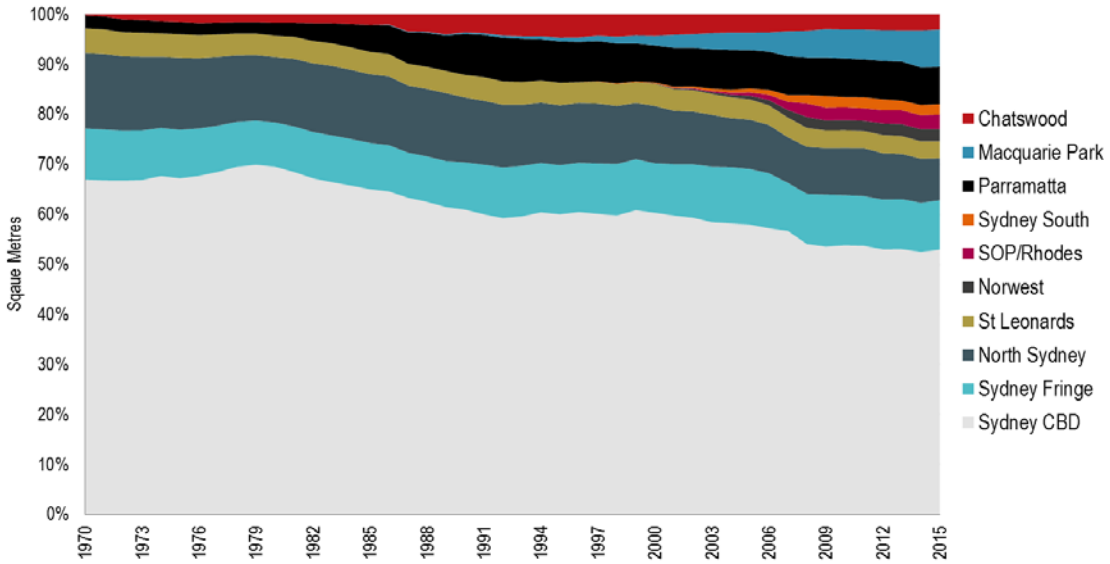


Source: JLL Research

The figure above shows the quantum increase of stock in the Sydney office markets. Based on the data above, and after making assumptions regarding the existing stock JLL have shown the relative contribution of each office market to the overall total over time. Of note from this analysis are the following changes in the 1970-2015 periods:

- Sydney CBD has declined from 67% to 53%.
- Chatswood started at under 1%, rose to a peak of 5% in the mid-90s and more recently declined to 3%.
- Parramatta started at 3%, rose to 9% and have more recently declined to 7% (i.e. generally holding onto its share.
- Macquarie Park which started as a traditional industrial park and now has 7% of market share.
- Sydney Olympic Park / Rhodes which started originally as an industrial location and which now attracts 3% market share.

Figure 12: Sydney Office Market NLA (Proportion), 1970-2015



Source: JLL Research

The table below provides 5 and 10 year (and selective longer term) occupied stock growth trends based on JLL actual data series. Some markets do not have a long enough time series to calculate a 5 or 10 year trend.

Table 7: Net Absorption Trends – Sydney Office Markets

	5 Year Average	10 Year Average	Longer Term Averages
	sqm	sqm	sqm
CBD Markets			
Sydney CBD	42,826	42,586	60,237 (40 years)
Metropolitan markets			
Sydney Fringe	7,493	N/A	N/A
North Sydney	-7,354	2,241	835 (27 years)
Chatswood	3,292	7	5,398 (40 years)
St Leonards	1,474	381	2,293 (26 years)
Norwest	9,153	N/A	N/A
SOP/Rhodes	7,915	N/A	N/A
Sydney South	3,346	N/A	N/A
Macquarie Park	14,974	29,767	27,780 (16 years)
Parramatta	3,465	9,443	15,317 (37 years)

Source: JLL Research

3.3 Support Office Overview

As defined above, support office generally provide localised services to the community. This type of office shares some characteristics with retail uses, mostly strip retail, particularly as it primarily seeks to service the local population, examples including; medical services, accounts and business services. Support office, by comparison to investment grade office, is typically smaller and often found within ground floor or part of another development (e.g. first floor above retail shops). The users are typically small local businesses.

While this support office plays a vital role within local economies, JLL, like most of the property research houses, don't track this market. Principally this is due to two factors, first is that the demand for research surrounding this office use is limited, as most demand for office research is

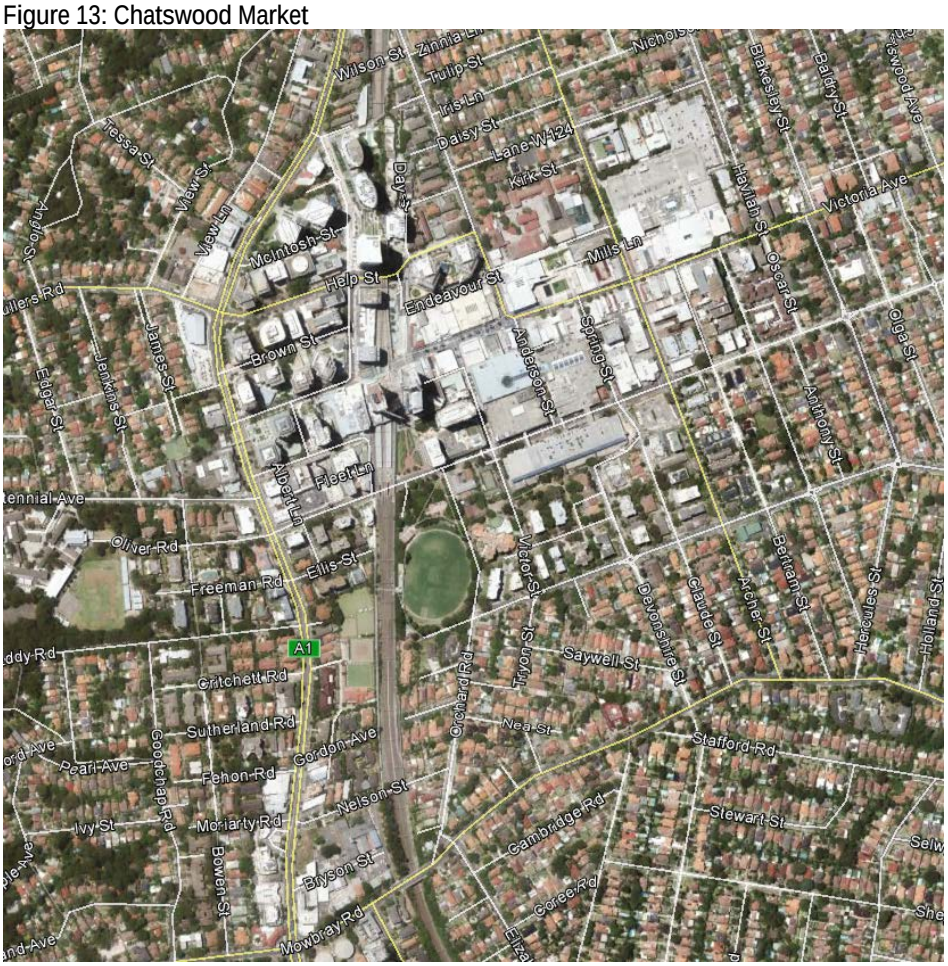
driven by the investment market, and secondly the difficulty in tracking this market, as it does not cluster, the quantum of offices are large and there is significant variance in the market pricing.

3.4 Chatswood Investment Office Market Analysis

The objective of this section is to provide a more detailed appreciation of the Chatswood office market, and in doing so, highlight the associated opportunities and risks associated with the 45 Victor Street 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 13: Chatswood Market



Source: NSW Globe

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 8: Office Buildings by Grade, Q3 2016

Quality	Number of Buildings	Total NLA	Average Building NLA
A-Grade	8	148,781	18,598
B-Grade	25	73,613	2,945
C-Grade	25	70,319	2,813
D-Grade	10	11,521	1,152
Total	68	304,234	4,474

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 tiny portion of D-grade. 48.9% of the Chatswood office stock is A-grade with 24.2% B-grade, 23.1% C-Grade and 3.8% D-Grade. No stock is classified as premium grade. The slightly high proportion of prime grade stock is atypical of other Sydney markets with the Sydney Fringe (39.5%), North Sydney (40.1%) and Parramatta (42.8%) with lower proportions, however, the Sydney CBD does have a higher proportion at 57.4%.

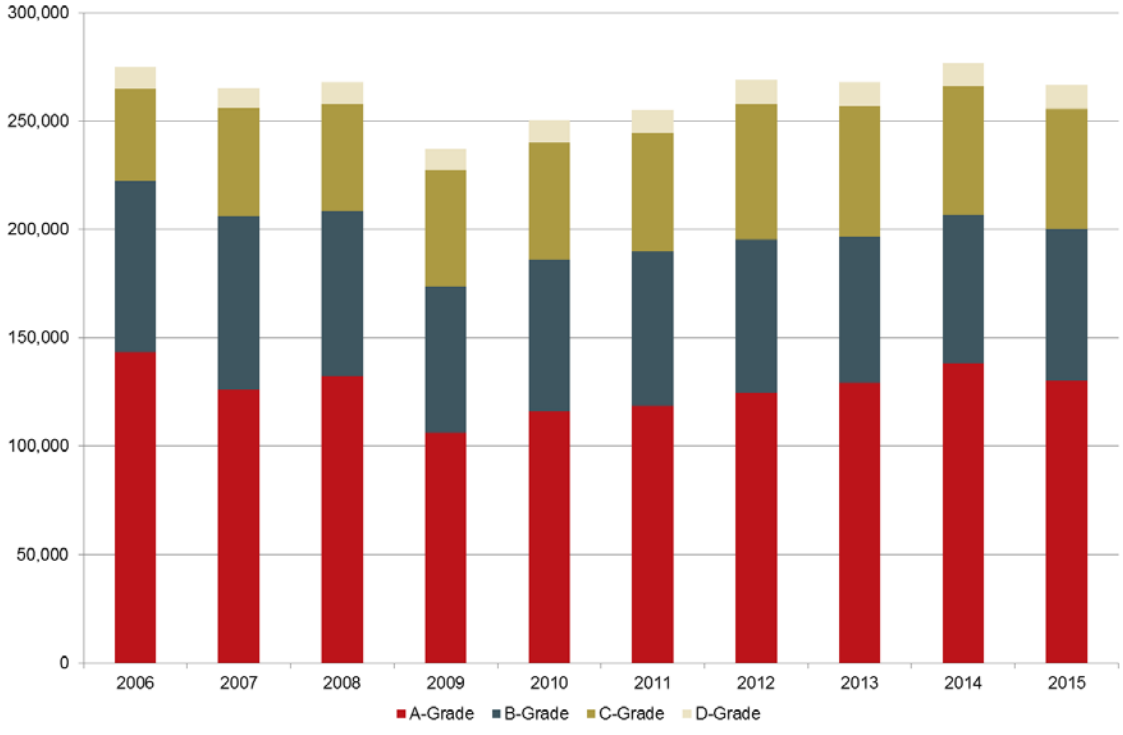
Table 9: Office Stock by Grade, Q3 2016

Quality	Stock	% Total
A-Grade	148,781	48.9%
B-Grade	73,613	24.2%
C-Grade	70,319	23.1%
D-Grade	11,521	3.8%
Total	304,234	
Prime	148,781	48.9%
Secondary	155,453	51.1%
Total	304,234	

Source: JLL Research

Chatswood has experienced a very low level of net growth over the past decade. In the ten years to 2015 there has been an average 230sq.m added per annum. Most of this coming in the first five years of the decade when 4,692sq.m was added (938sq.m p.a.).

Figure 14: Chatswood Occupied Office Stock by Grade, 2006-2015



Source: JLL Research

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 fair amount in the last year from 11.0% at Q3/2015, while during this same period the vacancy for B-grade and C-grade slightly rose and D-grade declined. 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 12.4% 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.

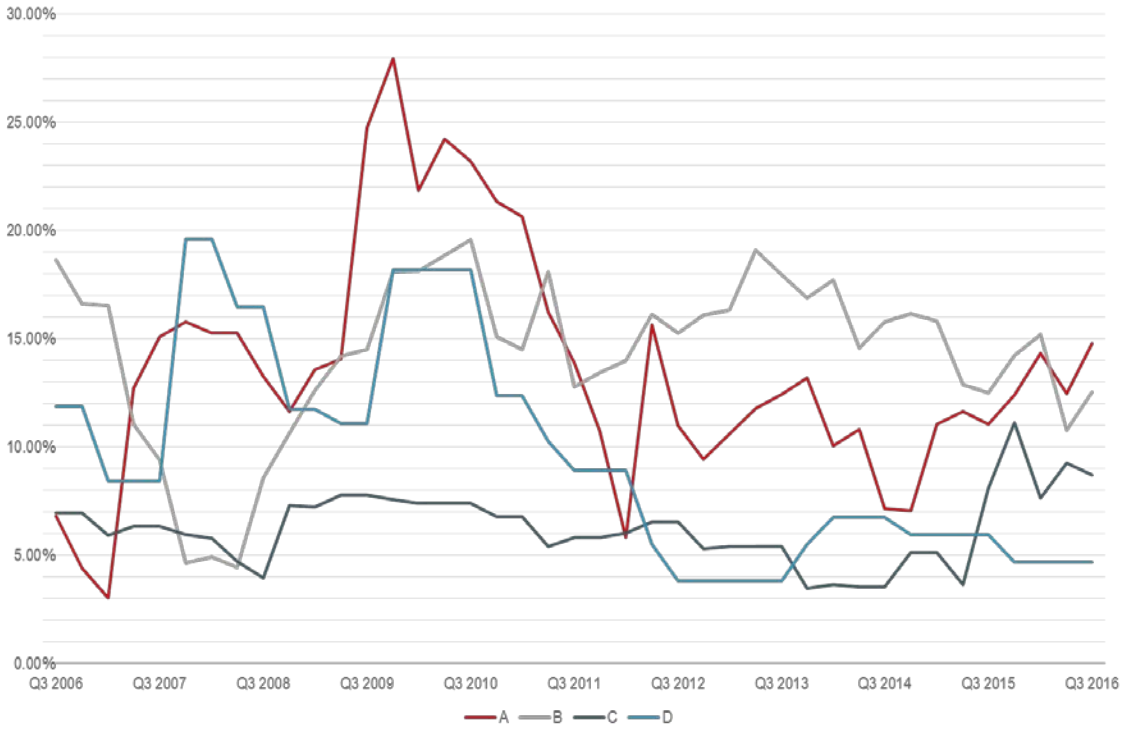
Table 10: Chatswood Vacancy by Grade, Q3 2016

Quality	Vacant Space	Stock	Occupied Stock	Vacancy rate (%)
A-Grade	21,970	148,781	126,811	14.8%
B-Grade	9,211	73,613	64,402	12.5%
C-Grade	6,109	70,319	64,210	8.7%
D-Grade	538	11,521	10,983	4.7%
Total	37,828	304,234	255,423	12.4%

Source: JLL Research

As can be seen from the chart below, the A-grade market has experienced a significantly inconsistent performance in terms of vacancy. Overall, the vacancy has remained relatively high with an average rate between the period Q3/2006 and Q3/2016 of 13.6%.

Figure 15: Chatswood Vacancy by Grade, 2006-2016



Source: JLL Research

Tenant Profile

Chatswood office market is 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 it is much more mixed, 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
- Huawei Australia
- Pepsi
- Coffey
- Lend Lease
- Lenovo

The above list, as well as the below table, confirms the importance of *Construction* as well as *Professional, Scientific & Technical Services* 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 significantly lower accommodation costs compared to the Sydney CBD. For example, as of Q2 2016 gross effective rents for prime grade space in Chatswood were only 54.7% the prime grade rents in the Sydney CBD.

Table 11: Major Gross Take-up, Chatswood 2005-2016 (greater than 1,000sq.m)

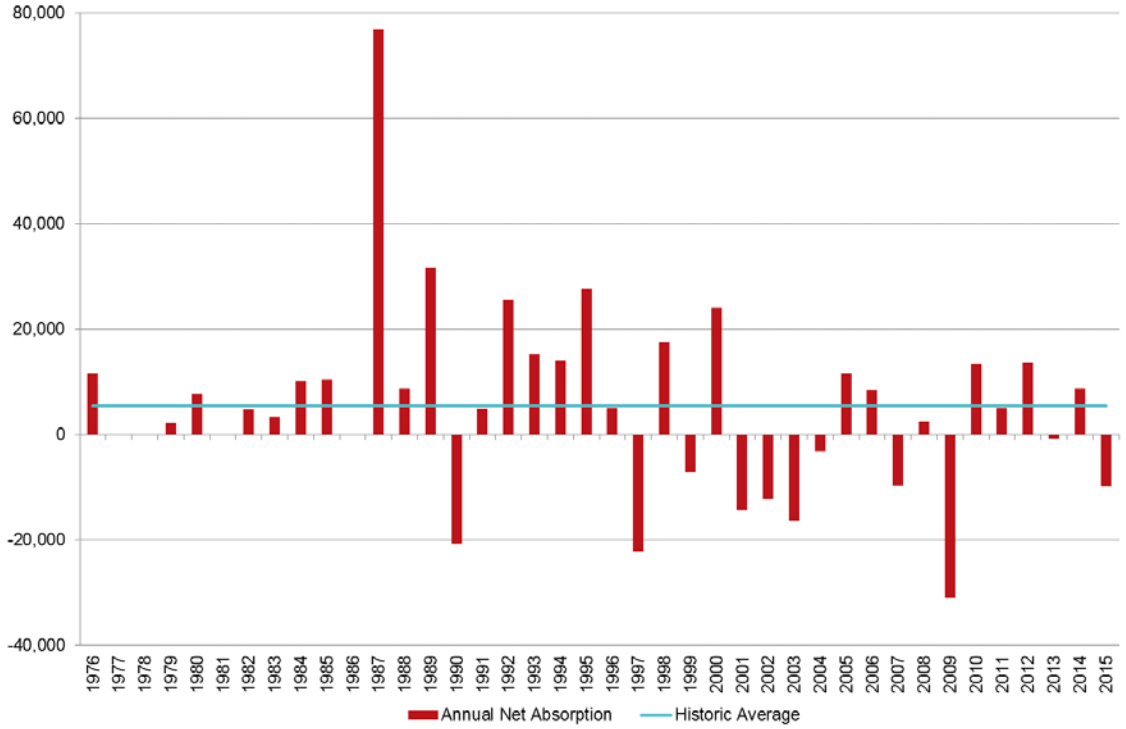
Industry Group	Leased (sq.m)	Vacated (sq.m)	Net Change (sq.m)
Administrative & Support Services	0	1,200	-1,200
Construction	40,497	27,423	13,074
Electricity, Gas and Water Supply	0	9,447	-9,447
Manufacturing	9,734	31,601	-21,867
Professional, Scientific & Technical Services	58,002	45,781	12,221
Rental Hiring & Real Estate Services	2,250	0	2,250
Retail Trade	1,845	0	1,845
Transport, Postal & Warehousing	2,086	1,200	886
Financial and Insurance Services	19,635	35,273	-15,638
Public Administration and Safety	12,968	23,834	-10,866
Health Care and Social Assistance	5,920	0	5,920
Unknown	0	2,527	-2,527
Information Media and Telecommunications	60,221	84,192	-23,971
Total – Major Moves	213,158	262,478	-49,320

Source: JLL Research

Net Absorption

In the five years to Q4 2015, net absorption averaged 3,292sq.m per annum, which is very high when compared to the 10 year average of 7sq.m. This is slightly low when compared to the 40 year average of 5,398sq.m. The figure below shows the annual net absorption in Chatswood over the past forty years, with the historic average shown as well.

Figure 16: Historic Net Absorption, Chatswood



Source: JLL Research

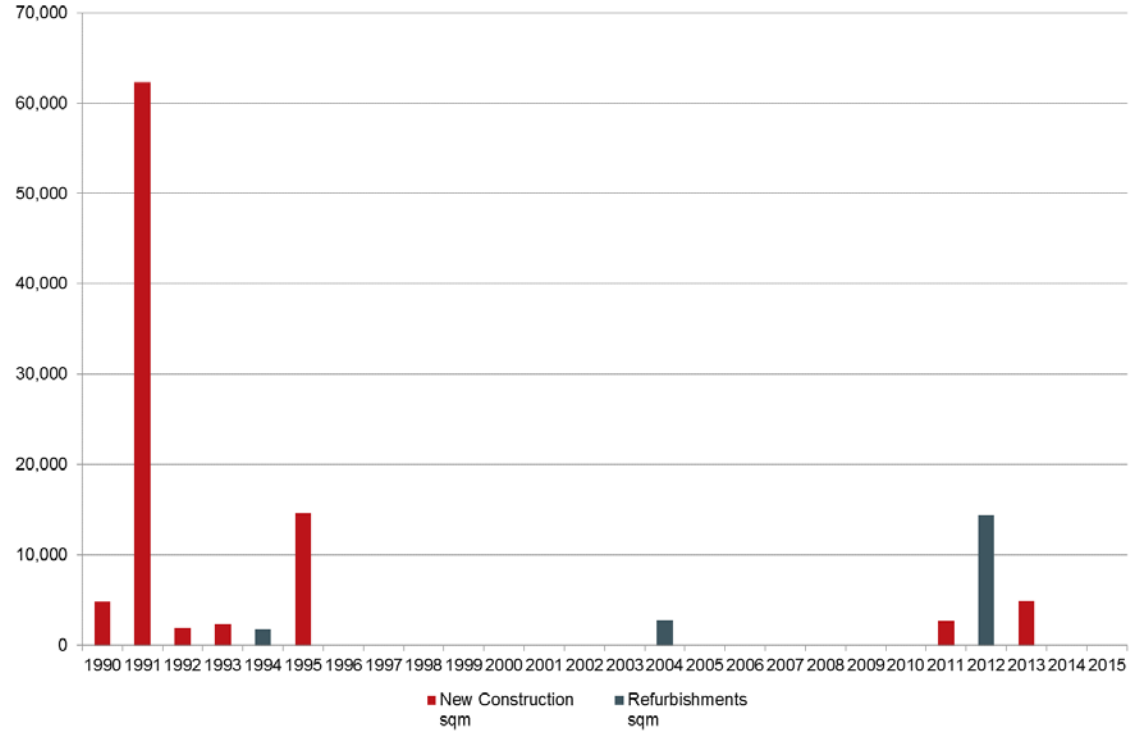
2015 saw the highest negative net absorption since 2009 with 9,951sq.m vacated (either direct or for sub-lease) resulting in the overall increase in vacancy. This primarily resulted from the contraction of Vodaphone and Leighton's consolidation of space. As discussed, 2015 was a buoyant year for most office markets nationally, however, Chatswood appears to have been an exception.

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. Potential competition may come from North Sydney, Macquarie Park, Parramatta and Norwest.

Historic Supply

The chart below 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 17: Historic Supply, Chatswood



Source: JLL Research

Historic Rental Levels and Incentives

As at Q3/2016 the average prime gross effective rent (adjusted for incentives) was $396 per sqm p.a. having grown by circa 8% over the past 12 months, by comparison to average secondary gross effective at $307 per sqm p.a. which has grown by 11% 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.

Incentives are currently at 29.3% (based on a new 10-year lease term) which is relatively high compared to other markets, but on balance seems reasonable considering the current performance of the leasing market and high level of prime grade vacancy within the Chatswood market. Incentives in the past five years have fluctuated slightly with a general tendency to decline, however, always staying above levels seen in mid-2009. High incentives have become a common occurrence across virtually all Australian office markets since the onset of the GFC.

As noted earlier, prime grade gross effective rents in Chatswood are significantly lower than Sydney CBD rents; as at Q2/2016 they were only 54.7% of the gross effective rents in the Sydney CBD.

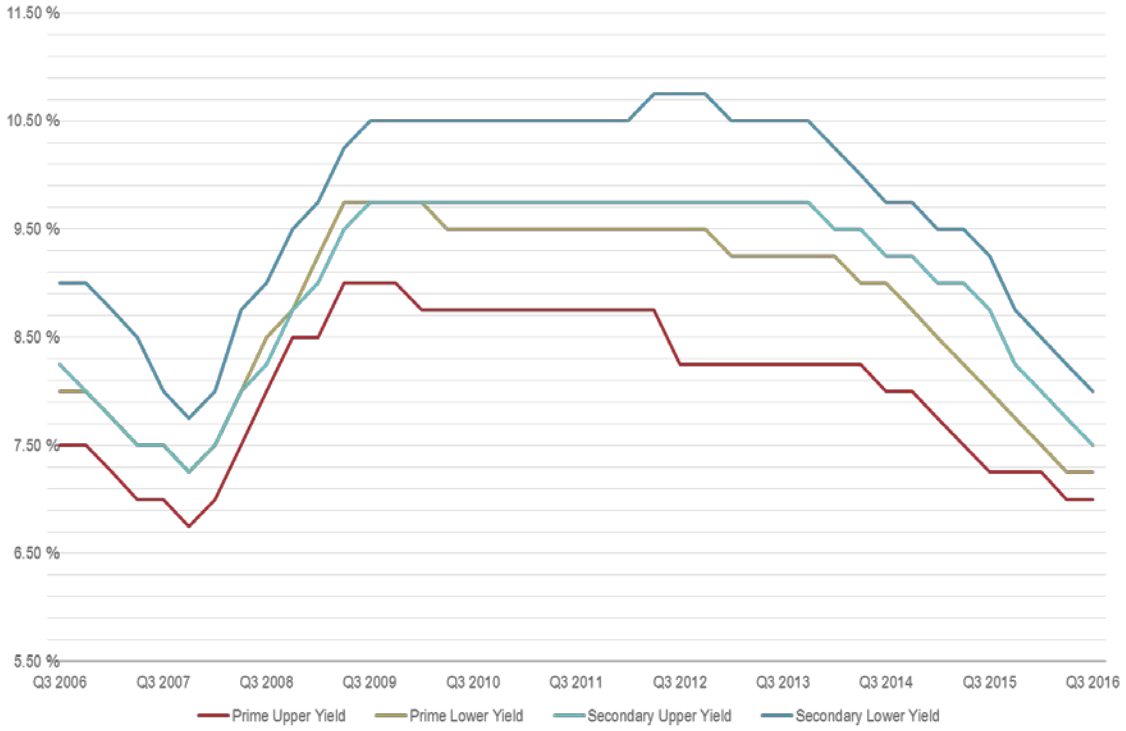
Yields and Investment Activity

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 decreasing to a low of 25 basis points (last seen in Q4/2008). Considering a longer timeframe, we can see in the five years to Q3/2011, the average yield spread for prime grade assets was 63 basis points, in the five years since this average has widened slightly to 79 basis points.

As at in Q3/2016, secondary grade yields ranged from 7.50% to 8.00%. The yield spread has continually decreased since Q4/2012 where it was 100 basis points. Unlike the prime grade yields, considering a longer timeframe we see can see in the five years to Q3/2011, the average yield spread for secondary grade assets was 75 basis points, whereas in the five years since this average as decreased slightly to 67 basis points.

An additional trend we can see from the figure below 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 18: Prime & Secondary Grade Yields, Chatswood, 2006-2016



Source: JLL Research

Investment activity in Chatswood has been weak in recent years. Since 2012 circa $659 million in major assets have transacted (≥ $5.0 million), which is largely due to the sale of The Zenith Centre in the first half of this year for $279.1 million being the largest transaction to have occurred in the Chatswood market. This transaction aside, every year since 2012 has not managed to achieve a total sales value in excess of $120 million.

3.5 Feasibility of Office Uses in Chatswood

The purpose of this section is to provide the reader an understanding of the process which has been undertaken in performing the feasibility analysis. Additionally this section is to provide an explanation of the inputs required and the resulting outputs of the financial analysis. This, ultimately, enabling the reader to have an understanding of the market feasibility i.e. market rent versus economic rent.

Definitions

We have provided below the key definitions relating to the feasibility analysis.

'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.

1. **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.

2. **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.

1. **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)

2. **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) then 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. We have allowed for a premium over and above the 'In Use' value to compensate the seller, this is a common occurrence in site amalgamation.

Our feasibility scale is as follows:

Table 12: 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.

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)

The project team has 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 project is vital to its overall success and in this regard issues such as promotion budgets, target markets and timing of the project 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 including quality of finish, surrounding competition, as well as market forces which will affect both our potential sale prices and take-up rates.

We have assessed the gross realisations of the 'As If Complete' scenarios 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 scenarios; 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:

- Sale Rate;
- Timing;
- Construction Costs;
- Interest Costs; and
- Selling Costs.

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

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 segment the end-product is targeting, demand and supply trends in that market and the size and scale of the development;
- Degree of confidence in the end-user market which encompasses the pricing of the end-product to meet the market, the timing of the sales on completion 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-sales negotiated and remaining proportion of units available for sale;
- 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, presales 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 presales; and
- 20% - 25%: Longer-term larger development with more risk be it requirement of approvals, critical milestones to be met, no pre-sales in place and the like.

We have allowed a differing profit and risk dependent on the characteristics of each scenario. 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. The currently heated residential market has seen many developers, mainly foreign, lower this standard rate, often a reflection of finance source (local banks typically require testing at 20%).

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.

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 conservative 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	$12.0m (sold 2012 for $16.4m)
416 Victoria Avenue	$5.0m (sold 2012 for $5.0m)
45 Victor Street	$7.0m
Total	$24m

Mirvac has provided us with a draft commercial 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 13: 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 70% of space
	Lower floors $550/sqm, upper floors up to $620 net face (before incentive)
	Incentive: 25% of gross lease
	Car income: $450 per space per month

Development Costs

We have utilised Rawlinson 2016 as the basis for our development costs – a summary of the key assumptions are provided below.

Development Costs			
Scenarios	**Unit**	**$/per unit**	**Total**
Demolition	53,682	$100	$5,368,200
Car Parking (Rawlinson 10.1.2.1)	475	$54,750	$26,028,150
Built Form (Rawlinson 9.1.3.4)	53,682	$5,255	$282,098,910
Subtotal			$313,495,260
Plus Prof. Fees	12.75%		$39,970,646
Total Construction Cost			$353,465,906
Plus Contingency (Hard Costs)	5.00%		$15,674,763
Total Development Costs			**$369,140,669**

Adjustments

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

Tenant incentive (office)	Assumes a 10 year lease term at 25% gross incentive
Tenant incentive (retail)	Assumes a 10 year lease term at 10% gross incentive
Let up	18 months let up for space not pre-committed (assumed 30%)
Leasing costs	10% of first year's gross income

Gross Realisations

Net income	$31,730,310
Capitalisation rate	6.375% (reflection average of 6.25% to 6.5%)

Capitalised value $497,730,353

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 36 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.

Feasibility Outputs

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

- Residual Land Value -$87.5 million

This analysis shows the landholders at 410-414 Victoria Avenue, 416 Victoria Avenue and 45 Victor Street, Chatswood would have to be paid $87.5m to provide the incentive to develop the site as proposed (subject to obtaining a pre-commitment over ~32,000 sqm).

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

- Market rent $585/sqm net face (reflecting rents between $550 to $620/sqm)
- Economic rent $811/sqm net face

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

3.6 45 Victor Street, Chatswood Development in Context

As identified above, Mirvac provided us with a draft commercial scheme for the site. We have utilised this scheme in order to make comment on its comparability to the Chatswood and broader Sydney suburban office market.

Comparison of Subject Development Yield with Current Stock and Proposed Stock

In comparing the above subject development yield to the current stock within the Chatswood market, we identify that should the development go ahead it would be the largest commercial office building within the Chatswood market. The ten largest office buildings within Chatswood can be seen in the table below.

Table 14: Ten Largest Commercial Office Buildings in Chatswood, Q3 2016

Building name	Address	Building Grade	Area sqm
The Zenith	821-841 Pacific Highway, Chatswood	A	44,034
Citadel Towers B	799 Pacific Highway, Chatswood	A	22,123
Sage Tower	67 Albert Avenue, Chatswood	A	15,664
	12 Help Street, Chatswood	A	15,236
	465 Victoria Avenue, Chatswood	A	14,422
Leightons House	475 Victoria Avenue, Chatswood	A	14,092
Citadel Towers A	799 Pacific Highway, Chatswood	A	12,210

Leightons Tower	495 Victoria Avenue, Chatswood	A	11,000
	9 Help Street, Chatswood	B	9,587
Chatswood Central - North Tower	1-5 Railway Street, Chatswood	B	8,200

Source: JLL Research

In terms of proposed stock, JLL are currently only tracking a single plan submitted development within the Chatswood market being a mixed-use development at 654-666 Pacific Highway with circa 2,200 sqm of office space proposed with an anticipated completion year of 2019.

Comparison of Subject Development Yield with Existing Suburban Stock

In comparing the above subject development yield to the current stock within the rest of the Sydney suburban market, we identify that should the development go ahead it would be the third largest commercial office building within the Sydney suburban market. The only larger suburban buildings are:

- Optus Centre 1 Lyon Park Road, Macquarie Park: circa 84,200 sqm
- Jessie Street Centre 2-12 Macquarie Street, Parramatta: circa 55,000 sqm

It would therefore be larger than any office building in the following markets:

- North Sydney
- St Leonards
- Sydney Fringe
- Norwest
- Sydney Olympic Park / Rhodes
- Sydney South

Market Operator Demand Observations

Our discussions with market operators suggest that the above commercial offering is unrealistic, they note that this would likely still be the case for a development of 20,000 to 30,000 sqm, as a pre-commitment of 10,000 sqm would be difficult from a demand perspective. This appears to be a reasonable observation considering Chatswood has not created any new supply of reasonable scale (greater than 10,000 sqm) since 1995 and even this was only circa 15,000 sqm, with the last major addition coming in 1991 (circa 62,000 sqm) mainly from the developments of 9 Help Street and the Citadel Towers.

As identified previously, Chatswood doesn't benefit from any recognisable identity and as a consequence targeting tenants, particularly major tenants, can be difficult. In regards to where these tenants are more likely to come from, they are unlikely to come from the city and would mostly likely come from within Chatswood, North Sydney, Macquarie Park and Parramatta. See below some comments on these:

Chatswood	Demand from tenants already occupying within Chatswood, however, there are limited major tenants within the centre
North Sydney	Demand from tenants looking to reduce cost
Macquarie Park	Demand from tenants looking for a more CBD type location, however, strong competition exist from Parramatta, North Sydney, as well as the CBD
Parramatta	Currently significant demand for Parramatta office, with the tightest prime grade vacancy of any national market – could therefore provide opportunity for Chatswood with tenants that have been unable to find accommodation

3.7 Short, Medium and Longer Term Outlook

Provided above is significant historic research on Sydney's and Chatswood's investment grade office markets. However, critical to understanding the strengths, weaknesses, opportunities,

threats and future role for a single market is to understand these elements for other markets. As such we have provided within the appendices a SWOT and our view of the future role of each of Sydney's office markets. The summary of the Chatswood market can be seen below.

Table 15: Chatswood SWOT and Forecast Role

Market & Context	Strengths & Opportunities	Weaknesses & Threats	Forecast Role
Chatswood Occupied Office Stock sqm: 267,000 (as at Q4 2015) Examples of tenants moves over 3,000 sqm over the last 10 years include; Lend Lease, Reed Elsevier Australia and Huawei Australia	• The train infrastructure will continue to be a competitive advantage as traffic gets more congested over time, particularly following the connection to the Metro North West. • Provides CBD style accommodation with significant retail and good pedestrian walkability.	• Chatswood has a fragmented office market after years of high-density residential and widespread retail development amongst its existing office towers. • Perception that momentum is only with residential or mixed-use development.	• Lower share of market growth.

Future Role of Chatswood Office Market

Investment grade

Provided above is a number of historic trends relating to the Chatswood office market. We believe these trends suggest a shift has and will continue to occur from Chatswood as a primary investment grade office location to a more support office location. Trends that suggest this shift include:

- Higher prime grade vacancy compared to secondary grade, suggesting greater demand for secondary stock;
- The lack of any meaningful corporate identity, which acts as a demand driver for major tenants;
- The historic lack of office absorption and no major new supply since the early to mid-90s;
- The compression of prime grade and secondary grade yields, suggesting growth in demand for secondary grade stock; and,
- The lack of financial viability for a stand-alone commercial redevelopment.

Support office

Unlike the investment grade market, we see much more opportunity for Chatswood as a support office centre. We are of the view that from a demand perspective significant medium to long term opportunity should exist for Chatswood CBD. This opportunity will be driven by the growing population within and immediately surrounding the CBD. The Chatswood CBD should therefore continue its logical role in supporting the local area through the provision of this support office.

The only likely constraint we envision relates to the potential supply of this support office. Development will inherently be required to enable growth of support office and if the economics of development are not supportive, this development won't occur. However, we believe that through a greater focus towards mixed-use development (further discussed in the section below) the supply limitation should be alleviated.

Likely Shorter, Medium and Longer Term Outlook

Based on historic evidence, should Chatswood continue with status quo, we see no reason that justifies any material change to historic performance i.e. no to limited new supply and negative to limited net office absorption, continuing to put upward pressure on vacancy levels. Further justifying this point is the fact that Sydney is currently at a strong point in the commercial office cycle, with Chatswood being an exception. If at this very strong phase of the commercial office cycle a commercial development seems unviable (both unfeasible and a lack of market acceptance), when will it be viable.

As discussed above, we envision a much more positive outlook for the growth of the CBD as a support office precinct. Should the appropriate facilitation of supply occur (e.g. through mixed-use developments) to meet the growing demand, Chatswood CBD can further cement its position as a vital support services cluster for the north shore.

4 Mixed-Use Developments (The Enabler)

This section provides brief observations on the residential market and the potential to be an 'enabler' of employment based land uses through mixed-use developments. It also provides some research and observations into a number of mixed-use developments both nationally and within Sydney.

4.1 Residential Context and Pricing Metrics – Chatswood

Provided below are details of two recently completing residential developments, to provide an appreciation of the significant level of demand.

"The Chatswood" Corner of Help, Anderson and McIntosh Streets, Chatswood

The Chatswood is located within the Chatswood CBD and within close proximity to the range of retail and infrastructure provided within the area.

This 12 storey projects consists of 156 apartments over 2 levels of basement parking. The unit mix includes 35 one bedroom, 70 one bedroom + study, 45 two bedroom and 6 three bedroom apartments designed around a central landscaped garden.

The building has been designed by Kannfinch and finishes will include timber floors, Smeg stainless steel kitchen appliances, stone benchtops, built-in wardrobes and air conditioning throughout.

Communal areas includes a ground-level, communal garden and two landscaped roof top gardens with barbecues and views of the north shore.

Marketing of the project by CBRE Project Marketing commenced in November 2014, with 80% selling on launch day in December. The project is now sold out, pre-sales averaging $15,607/sqm overall.

Developer	Toga	Current Apartments Pre-Sales			
Total Units	156	Type	Apartment Areas m² (internal area)	Average Sales Achieved	$ Rate/m²
Units Sold	156	1 bedroom	50m² -54m²	$671,300 - $835,000	$13,417 - $16,500
Available For Sale	0	1 Bedroom + Study	58m² -62m²	$793,800 - $885,000	$12,824 - $14,914
Sales Rate	32/Month	2 bedroom	77m² -89m²	$1,249,500 - $1,525,000	$15,072 - $19,281
		3 bedroom	106m² - 112m²	$1,825,000 -$2,275,000	$17,152 - $20,736

"The Gallery" 544 Pacific Highway, Chatswood

The proposed development will provide for a mixed use complex providing a bulky goods style ground level showroom with 35 residential apartments constructed on the upper levels. The proposed dwelling mix comprises 7 x 1 bedroom, 2 x 1 bedroom plus study, 2 x 2 bedroom loft, and 24 x 2 bedroom units.

Marketing of the project by CBRE Project Marketing commenced in July 2014, with 28 of the proposed total of 35 units sold by early September 2014. The project pre-sales averaged $12,304/sqm overall.

The project is located on the busy pacific Highway in the North Shore hub of Chatswood. The Gallery is Only 11 minutes from the CBD and within close proximity to bus stops, Chatswood train station, shopping centres, commercial offices, restaurants/cafes and parks.

The project designed by Architecture Saville Isaacs, provides all apartments with parking and is finished with timber floors, Ceasarstone bench tops, mirrored splashbacks and Smeg appliances.

Developer	Lenland	Current Apartments Pre-Sales			
Total Units	35	Type	Apartment Areas m² (internal area)	Average Sales Achieved	$ Rate/m²
Units Sold	28	1 bedroom	52m² -54m²	$649,000 - $755,000	$12,481 - $13,981
Available For Sale	7	1 Bedroom + Study	54m² -62m²	$680,000 - $760,000	$12,258 - $12,593
Sales Rate	14/Month	2 bedroom loft	78m² -78m²	$1,025,000 - $1,025,000	$13,141 - $13,141
		2 bedroom	74m² - 80m²	$749,000 - $1,155,000	$9,855 - $15,197

4.2 Mixed-Use Case Studies

We have undertaken research into a number of successful mixed-use developments across Australian CBD's in order to identify key factors which may help explain their success. These case studies include:

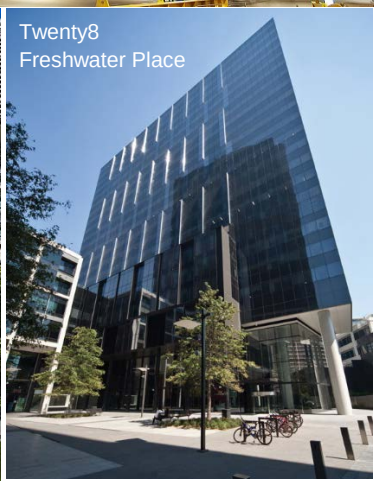
- Conservatory on Hindmarsh, Adelaide
- Riparian Plaza, Brisbane
- Freshwater Place, Melbourne
- Aurora Place, Sydney
- Lumiere, Sydney
- St Leonards Forum, Sydney
- World Square, Sydney

Case Study	
Project Name	**Conservatory on Hindmarsh** 
Developer	Babcock & Brown and The Hines Group
Address	41 - 47 Hindmarsh Square, Adelaide
Location	The site is located in the Adelaide CBD on the corner of Hindmarsh Square and Grenfell Street, overlooking Hindmarsh Square. The site is located approximately 650m east of the Pirie Street tram stop.
Completion	July 2009
Property Description	The Conservatory development on Hindmarsh Square is a 19-level building comprising 430 sqm of ground floor retail space, four floors of above-ground parking, five floors of office space and nine floors of residential development. Construction of the building commenced in October 2007.
Commercial	The office accommodation is located on levels 5 to 9 with approximately 4,000 sqm of space on an 800 sqm floor plate. In April 2009, the Department of Trade and Economic Development (now Department of State Development) signed a 10-year lease with an option of another five years, from December 2009, for the entire office space component.

Residential	Includes 53 apartments on the top 10 floors of the development
Built Form	The office accommodation is serviced by three elevators with an exclusive office lobby on Grenfell Street. Residential occupants utilise separate elevators via the residential entrance off Hindmarsh Square. The different components of the building are easy to identify with the façade of the parking, commercial and residential uses easy to differentiate. The balconies on the residential component are quite obvious that may reduce visual amenity to nearby buildings.
Key Learnings	The Conservatory is an example of office and residential developed in the same building. The balconies on the residential component may have an impact on adjacent office buildings. Each component of the development (retail, parking, office and residential) has distinct design characteristics, which means the building does not look like an integrated development. The development does benefit from lobby separation for different uses.

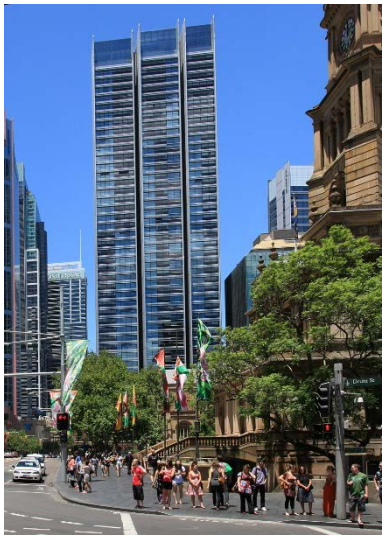
Case Study	
Project Name	**Riparian Plaza** 
Developer	Bloomberg and Grocon
Address	71-75 Eagle Street, Brisbane
Location	The subject site is located on the eastern end of the Brisbane CBD on the Brisbane River. The site is located adjacent to the Eagle Street Pier ferry terminal and approximately 550m south-west of the Central Railway Station.
Completion	September 2005
Property Description	The Riparian Plaza is a 53-storey mixed use building, with 11 car park levels from the ground up, 25 commercial levels and 13 residential levels originally housing 50 penthouse apartments. Plant rooms and recreational facilities are located on the other levels. The building has a total floor area of approximately 55,000 sqm. The building provides a broadly commercial “look and feel” as well as including separate lobbies for commercial and residential occupiers.

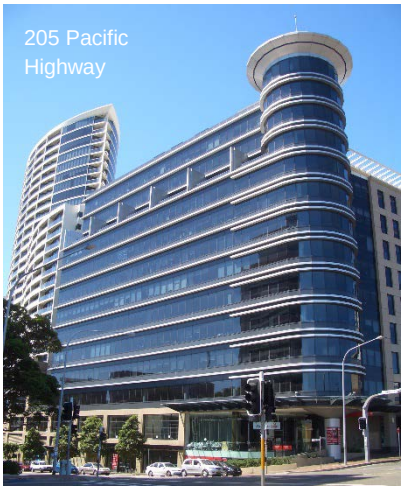
Commercial	The premium commercial office is located over 25 levels with a GLA of 30,500 sqm and floor plate of around 1,200 sqm. In 2001 Clayton Utz announced it would be pre-committing to almost 20% of the commercial office space.
Residential	50 apartments on the upper 13 levels. The apartments are prestige properties and have attracted a high proportion of affluent owner occupiers.
Built Form	Riparian Plaza was designed by architect Harry Seidler. Most office spaces have river views, due to the 45-degree angle to the river. Each penthouse has its own curvilinear, projecting terrace that faces the river. The cantilevering balconies have a highly sculptured shape and it is not immediately evident that they are balconies.
Key Learnings	Riparian Plaza is an example of office and residential developed in the same building. The development was designed to a premium standard and comprises prime office space and luxury penthouse apartments. The high residential standard reduces the issues of 'laundry drying on the balcony' that has been cited as having the potential to reduce the attractiveness of the area to commercial tenants. In addition to this, the separation of the lobbies and its predominately commercial "look and feel" assist in avoiding any negative sentiment to the buildings mixed use nature.

Case Study	
Project Name	**Freshwater Place**  One Freshwater Place / Queensbridge Square  2 Southbank Boulevard  Twenty8 Freshwater Place

Developer	Australand (now Frasers)
Address	Freshwater Place, Southbank
Location	The subject site is located within the Southbank precinct of the Melbourne CBD, along the Yarra River. The site is approximately 900 m south west from Flinders Street Railway Station.
Completion	One Freshwater Place / Queensbridge Square – late 2005 2 Southbank Boulevard – June 2005 Twenty8 Freshwater Place – Early 2009
Property Description	Freshwater Place is a commercial, residential and retail mixed use development. It has a residential tower and two commercial towers above a retail and commercial use podium.
Commercial	2 Southbank Boulevard is a 37 storey premium grade commercial tower providing 55,000 sqm of commercial space (including ~1,400 sqm of retail). The building has typical office floor plate of 1,860 sqm. Twenty8 is a 26 storey premium grade commercial tower providing 33,520 sqm of commercial space with a typical office floor plate of 1,780 sqm.
Residential	One Freshwater Place / One Queensbridge Square is a 60 storey residential tower containing 532 units. The residential tower has three sections: podium, mid-rise and high rise.
Built Form	Freshwater Place was built with premium grade finishes and it has superb views of the Yarra River, the CBD skyline and Port Phillip Bay. The residential tower looks relatively commercial in its design with the residents likely to be relatively affluent.
Key Learnings	Freshwater Place was developed on a significant site which allowed for a mixed-use master planned development, with different towers for different uses which allowed a use separation to reduce potential conflicts. The development is of a premium quality including both the commercial and residential component. The high residential standard reduces the issues of 'laundry drying on the balcony' that has been cited as having the potential to reduce the attractiveness of the area to commercial tenants. In addition to this, the separation of the buildings and its predominately commercial "look and feel" assist in avoiding any negative sentiment to the commercial buildings.

Case Study	
Project Name	**Aurora Place & Macquarie Apartments** 
Developer	East Asia Property Group, Lend Lease, Mirvac (only residential)
Address	88 Phillip Street, Sydney and 155 Macquarie Street, Sydney
Location	The subject site is located in the core of the Sydney CBD bounded by Phillip Street, Bent Street and Macquarie Street. The site is approximately 400 m south of Circular Quay.
Completion	November 2000
Property Description	Aurora Place is a commercial, residential and retail mixed use development consisting of a 41 level commercial tower, a 17 level residential building and retail facilities around the piazza.
Commercial	The commercial tower comprises 34 levels of office space with a NLA of approximately 48,000 sqm on a floor plate of 1,420 sqm.
Residential	Macquarie Apartments is a 17 level residential tower on a site area of 1,666 sqm. The development includes 62 apartments including 2 x 2 bedroom, 58 x 3 bedroom and 2 x penthouses. The residential component included larger apartments (97% with more than 2 bedrooms) which is more attractive to owner occupiers compared to investors. In addition, the prestige nature of the apartments meant that buyers are very affluent. This reduces the number of renters and potential impacts on the office tenants.
Built Form	Aurora Place was designed by Italian architect Renzo Piano. The building has an unusual geometric shape where not one panel is parallel to any grid. The residential apartments face away from the office tower with winter gardens that overlook the Botanic Gardens. The high quality of the apartments and separation between the buildings means there is very limited impacts between the uses.
Key Learnings	Aurora Place was developed on a relatively large site that allowed for the commercial and residential components to be developed in separate buildings that are connected by a retail piazza. With the Apartments fronting Macquarie Street and the office building fronting Phillip Street, it allowed for the uses to be separated to reduce potential conflicts. The residential apartments were architecturally designed to a very high standard, which fits in with the premium office buildings in the core of the CBD and does not impact on visual amenity. The apartments are among the most prestigious in Sydney.

Case Study	
Project Name	**Lumiere** 
Developer	Frasers Property
Address	501 George Street, Sydney
Location	The subject site is located adjacent Town Hall in Sydney's mid-town precinct. It is opposite St Andrew's Cathedral and 580 George Street (the former HSBC Centre).
Completion	December 2007
Property Description	Lumiere is a 56 level residential and commercial building. It has a five level podium with three levels of retail space called Regent Place and one level of office suites called Lumiere Commercial. Lumiere Residences has 456 apartments built above the Regent Place podium.
Commercial	Lumiere Commercial has 19 office suites with a NLA of 1,400 sqm.
Residential	Lumiere Residences has 456 apartments over 41 levels.
Built Form	Lumiere was designed by Foster and Partners as a sustainable, high-density urban form combining home, work, commerce and leisure in the heart of Sydney's CBD. The residential tower is built on top of a sandstone-faced podium which offers a variety of retail amenities. The apartments have winter gardens instead of balconies. A 50m swimming pool is suspended over the lobby.
Key Learnings	Lumiere has been designed to a high quality with extensive use of tinted glass in the façade. This creates an 'androgynous' feel to the building with some difficulty in determining whether it is a residential or commercial building from first glance, a deliberate design element to allow the building to fit in with the surrounding commercial building forms. The use of winter gardens improve the built form of the residential component and reduce visual amenity issues on surrounding office buildings such as laundry being placed on balconies.

Case Study	
Project Name	**St Leonards Forum**  
Developer	Winten Group
Address	201-205 Pacific Highway, 1 Sergeant's Lane & 3 Herbert Street, St Leonards
Location	The Forum is located in St Leonards, approximately 5km north-west of the Sydney CBD. The development is built directly over St Leonards train station and represents a transport orientated development.
Completion	Stage 1: Forum – Completed in 2000 which included; • 1 Sergeant's Lane (Forum Tower – residential) • 201 Pacific Highway (Cisco Systems Building – commercial) • 203 Pacific Highway (Verizon Building – commercial) • Forum Plaza (retail and public open space) Stage 2: Forum West – Completed in 2002 • 3 Herbert Street (Forum West – residential) • 205 Pacific Highway (commercial)
Property Description	The Forum is an example of a horizontal mixed-use development with separate commercial and residential buildings connected by a retail podium. The Forum comprises three commercial office buildings with over 36,000 sqm of office and retail space, two residential towers containing 773 apartments, a Coles supermarket and 34 food and retail shops. The buildings surround a large open plaza incorporating retail, the Station concourse and public space.
Commercial	The 201 Pacific Highway (Cisco Systems Building) is an A-grade building over 10 storeys with an NLA of approximately 16,500 sqm. 203 Pacific Highway (Verizon Building) is an A-grade building over 11 storeys with an NLA of approximately 11,700 sqm. 205 Pacific Highway is an A-grade building over 11 storeys with an NLA of approximately 7,700 sqm.
Residential	Forum Tower is a 35 storey residential building with 483 apartments. Forum West is a 26 storey residential building with 290 apartments.

Built Form	The Forum was designed by PTW Architects and was planned as a town centre. The residential apartments have open balconies, which has the potential to negatively impact the adjacent office tenants.
Key Learnings	The Forum development was developed on a significant site which allowed for a mixed-use master planned development, with different towers for different uses and benefitted by being a transport orientated development over St Leonards Railway Station. The development is seen to have tried to build critical mass to establish the St Leonards centre though has since experienced competition from growth in other centres, namely Macquarie Park. The residential and commercial towers appear to have distinct design characteristics, namely the provision of balconies on the residential component, which may have an impact on adjacent office buildings.

Case Study	
Project Name	**World Square**  
Developer	Multiplex (now Brookfield Multiplex), Meriton (residential component)
Address	644-694 George Street, Sydney
Location	The subject site is an entire block (almost 2 hectares) in the in the Sydney CBD bounded by George Street, Liverpool Street, Pitt Street and Goulburn Street.
Completion	The development was completed in two stages in 1999 and 2004.
Property Description	World Square consists of one hotel, one shopping centre, one retail arcade, four commercial buildings, one residential tower and one commercial/residential tower. World Square comprises office (over 90,000 sqm), residential (around 910 apartments/serviced apartments), a hotel (445 rooms) and retail (over 16,500 sqm).
Commercial	680 George Street is a 55 level office tower with a commercial NLA of 62,250 sqm. Latitude East (ATO Centre) is a 12 level commercial office building with a commercial NLA of 23,103 sqm and an average floor plate size of 2,500. World Tower is a 75 level commercial/residential tower with 77 commercial suites.

	50 Goulburn Street is a 7 level commercial office building with a commercial NLA of 5,748 sqm across 4 levels. 650 George@World Square is a 5 level commercial office building, comprising strata office space.
Residential	Hordern Tower is a 55 level residential building with 278 apartments and recreational facilities including a 25m pool, spa, sauna, gym and squash court. World Tower is a 75 level commercial/residential tower with 517 residential apartments and 115 serviced apartments.
Built Form	World Tower was designed to a high standard with the architecture similar to the adjacent Ernst & Young office tower.
Key Learnings	World Square was a major urban redevelopment of a site that had been dormant for almost 20 years. The development rejuvenated the southern end of the Sydney CBD with a successful mixed-use development including office, residential, retail and hotel. It is noted that World Square is a large site of almost two hectares and was developed in several stages involving residential, office, retail and hotels, with different buildings having predominantly different uses.

4.3 Implications

Significant demand for residential development within Chatswood currently exists, with underlying support for these drivers expected to continue this demand at least in the medium-term. As such, mixed-use development provides an opportunity to support the economic viability of development, which would include a portion of new commercial floor space. In doing so, this would create a catalyst to break through the historic status quo of the Chatswood commercial market i.e. no development.

We have provided above a number of successful examples of mixed-use developments across Australian CBD's. Within these case studies are a number of observations identifying drivers of success, broadly the two most common being; the designing of the building to a high quality that does not appear obviously residential (so as to not conflict with surrounding commercial buildings) and the use of separate lobbies, with a slight preference on the presentation of the commercial lobby.

5 Peer Review of Prior Studies

Significant work has been undertaken to date on the risks and opportunities associated with office based uses with Chatswood. Provided below is a summary of these studies. We have identified in blue text specific findings that we have commented on, with JLL comments in red text.

In summary, JLL's overall observation that

5.1 Willoughby Economic Development Study (SGS 2016)

Scope

Willoughby City Council commissioned SGS to review the factors affecting the future growth and economic sustainability of its employment hubs.

More specifically, the purpose of this review is to ensure Council's economic development policies and land use planning provisions:

- support the retention of existing employment and services in the LGA,
- assist in the achievement of the growth targets identified for the City in the draft Metropolitan Strategy for Sydney to 2031, and
- cater for global and local trends as well as the land use requirements of modern businesses and the expectations of customers.

Key Findings

Strategic centres - Chatswood

Chatswood is identified as a strategic centre in A Plan for Growing Sydney. The centre has a dual role as a commercial and retail centre, with most of the office floorspace concentrated between the Pacific Highway and the rail line, with the retail floorspace concentrated to the east of the rail line. Not surprisingly, given this floorspace profile, retail and professional services are the two major industries of employment within the Chatswood strategic centre.

Chatswood is accessible to residents on the north shore, particularly those along the railway corridor. This is reflected in journey to work patterns with a significant proportion (over 50 percent) of workers residing in the local area (being the north shore of Sydney). The Sydney Metro4 will further enhance the public transport accessibility of the centre from both the north west of Sydney and city and south west.

It is expected that bus services will be restructured to suit the high capacity and frequent service offered by the Metro by increasing feeder services.

A comparative advantage for Chatswood as a commercial centre is its competitive rents when compared to North Sydney and the Sydney CBD. However commercial rents are significantly higher in Chatswood compared to other metropolitan office markets such as Macquarie Park. JLL - This 'competitive' rent makes office development unviable.

Tenants are primarily looking for large floorplates of at least 1000 square metres (sqm) which are located within walking distance of Chatswood railway station. Transport accessibility and general amenity is a strong attractor for the Chatswood commercial market. Rents are projected to rise particularly due to low vacancy rates (11%) and the constrained availability of sites for commercial floorspace. Disagree – Chatswood has the second highest vacancy rate in the Sydney Metropoltian Market. There is general consensus from property market stakeholders that sites for commercial or employment only development should be retained and protected from conversion to mixed use which includes residential.

New commercial and office development along the north shore is concentrated in North Sydney and North Ryde and these centres remain strong competitors for Chatswood.

Growth Scenarios

Scenario 1 Lower office growth in Chatswood: assumes recent decline in the centre (336 office jobs between 2006 and 2011) persists till 2031 and then stabilises. The 'lost' office jobs from Chatswood are captured by Macquarie Park.

Scenario Higher office growth in Chatswood and higher employment in East Chatswood: assumes Sydney Metro NW shuttle encourages office development in Chatswood - 20 percent higher in office than baseline forecast at 2041, meaning lower growth in North Sydney (down by two thirds of the Chatswood increase) and St Leonards (down by one third of the Chatswood increase).

Scenario 3 Lower light industry employment in East Chatswood: employment and light industry departs East Chatswood at an accelerated rate - jobs at 2041 is 50 percent lower than the base case. The displaced jobs move to Lane Cove, Northern Beaches and Western Sydney (a third each).

The following table shows the redistribution of employment growth under each alternative scenario described above.

TABLE 13. SCENARIOS EMPLOYMENT CHANGE 2011 TO 2041

Centre/region	Jobs in 2011	Jobs in 2041	2011-41	Employment change over base at 2041		
		Base	Base	Scenario 1	Scenario 2	Scenario 3
Artarmon Industrial	8,824	11,297	2,473	0	0	0
Chatswood	20,000	26,553	6,553	-2,849	1,629	0
East Chatswood	3,253	3,859	606	0	769	-229
Lane Cove Industrial	5,834	7,137	1,303	0	0	76
Macquarie Park	53,777	76,004	22,228	2,849	0	0
North Sydney	16,150	20,748	4,597	0	-1,086	0
Northern Beaches	51,616	64,980	13,363	0	-769	76
St Leonards/Crows Nest	31,629	42,556	10,927	0	-543	0
Western Sydney	9,721	25,872	16,151	0	0	76
Total	200,804	279,005	78,201	0	0	0

Source: SGS Economics and Planning, 2015

Market Assessment

A comparative advantage for Chatswood as a commercial centre is its competitive rental prices when compared to North Sydney and the Sydney CBD.

As of 2014, commercial rents in Chatswood were around $455 per sqm per annum (p.a.) which compares to $625 per sqm p.a. for North Sydney (refer to Figure 28), and $730 per sqm p.a. for commercial floorspace within the Sydney CBD.

However commercial rents are significantly higher in Chatswood compared to other metropolitan office markets in Sydney such as Macquarie Park.

A strong competitor for Chatswood is Macquarie Park (North Ryde) which has significantly lower rents compared to Chatswood and Parramatta. St Leonards also provides strong competition for Chatswood with equivalent net commercial rents.

Agents have advised that B grade commercial net rents for Chatswood range from $260 to $350 per sqm which is still significantly higher than North Ryde.

Real estate agents advised that tenants have been leaving Chatswood for a number of reasons. Whilst there has been little movement over the past five years, between 2000 and 2008 there was considerably large scale movement, particularly to Macquarie Park with companies such as Optus, Nortel and CSR leaving Chatswood and relocating to Macquarie Park.

Tenants are primarily looking for large floorplates of at least 1000 sqm which are located within walking distance of Chatswood railway station.

Corporate clients tend to be looking for new or renovated A Grade office space with four or five star energy ratings. Several large organisations have moved to Chatswood to expand or consolidate their operations. These include Lend Lease, Real Insurance, Coffey and Lenovo.

Lend Lease moved a division to Chatswood as part of an expansion of their business and chose Chatswood because of the price and quality of the building. They occupy 6000 sqm. Real Insurance moved from Norwest to a 5000 sqm office in Chatswood to improve accessibility to staff living along the north shore. Price and quality of the building were also driving factors. Coffey consolidated their offices which were formerly at Lane Cove, Rhodes and CBD, into a 3000 sqm site in Chatswood. Lenovo has also taken up 4000 sqm in Chatswood as well.

Chatswood would require new stock every three to five years to continue meeting the needs of these larger corporate tenants, However Leighton Holdings will be moving into a new building in North Sydney in 2016 in order to consolidate their operations and will vacate 17,000 sqm of commercial floorspace in Chatswood.

Transport accessibility and general amenity is a strong attractor for the Chatswood commercial market.

The railway station has always been a strong attractor for Chatswood, and this pull should increase with the continued activation of the train station interchange precinct and development of the Sydney Metro North West (NW). The Epping to Chatswood Rail Link and Sydney Metro NW provide a strong connection with the professional workforce residing in the northern and north-western suburbs of Sydney.

Retail development also provides amenity for workers and supports the function of the centre during the day and also at night. The density of the centre facilitates this as well.

Rents are likely to rise particularly due to low vacancy rates and a constrained supply of commercial floorspace. The absolute amount of vacant commercial floorspace in Chatswood is relatively low compared to the nearby markets of North Sydney and North Ryde/Macquarie Park. However, Chatswood has a vacancy rate of around 11 percent which is generally consistent with the other markets along the north shore (though this may increase with the departure of Leighton Holdings mentioned above). Disagree – Chatswood has the second highest vacancy rate in the Sydney Metropolitan Market

The vacancy rates vary between A grade and B grade commercial floorspace markets. There is generally more B grade office space lying vacant because it is ageing and generally in smaller tenancies of around 700 sqm, which do not meet the needs of tenants who are looking for large new or refurbished commercial floorspace. According to Willoughby City Council owners of B Grade office space are not upgrading as they want to convert to residential.

In terms of total commercial floorspace, Chatswood is relatively small when compared to North Sydney and the growing markets of North Ryde/Macquarie Park and Parramatta (refer to Figure 29). Supply is relatively constrained due to the lack of new development and reduction of commercial core sites due to their conversion to mixed use in Chatswood.

There is general consensus among real estate agents that the commercial core should be retained. Disagree – we consider the market has a view that Chatswood's success is a mixed use precinct. No appetite for investment grade office development exists.

Some agents have advised that the encroachment of residential and mixed use in the recent past has compromised the commercial character of the Chatswood CBD and it is now seen as more of a retail centre rather than commercial centre. From this perspective, conversions need to be restricted and the commercial core better protected, because there is otherwise a negative impact on the commercial address of Chatswood (poor outlook and amenity).

North Sydney Council has adopted a blanket approach to prohibiting residential uses in the commercial core area and this has been suggested by agents to be a successful approach (though it should be noted there are critics of this approach who suggest that North Sydney is not sufficiently activated outside of weekday work hours because of the employment only focus of the zoning).

St Leonards has been suffering from a "lost identity" with residential development encroaching on the commercial core and agents have advised that large companies do not want to locate in St Leonards due to a lack of amenity and identity.

New supply of commercial development along the north shore is concentrated in North Sydney and North Ryde and these centres remain strong competitors for Chatswood.

As highlighted in Figure 30, new commercial development is occurring in a number of centres along the north shore, except for Chatswood. Mirvac Group's ERA development at 7 Railway Street, Chatswood has now reached completion but only includes 4400 square metres of office space. According to agents, this space is predominantly small commercial strata suites and has about 50% commitment, mainly from owner occupiers.

Pre-commitments for office development are rare and this limits office development prospects in Chatswood shows the location of strata titled sites around Chatswood. These are also in evidence in the commercial or office precinct west of the rail line. Office redevelopment prospects in Chatswood are constrained, because of the presence of these strata titled sites but also because the feasibility of redeveloping existing office buildings is difficult to achieve. Developing at higher density on any particular site will typically require a significant pre-commitment by a tenant. This might require a company of perhaps a 1000 employees or more to commit to Chatswood. In the absence of this occurring developers are unlikely to redevelop existing sites; in this case a 'stalemate' results.

JLL Observations

Key observations on the above report findings are as follows;

- Chatswood is identified and recognised by the market for its competitive rents. It follows that this necessarily makes development difficult given the cost of development within Sydney key commercial centres remains largely similar.
- JLL disagrees with the observation that rents are projected to rise particularly due to low vacancy rates (11%) and the constrained availability of sites for commercial floorspace. Chatswood has the second highest vacancy rate within the Sydney office markets.
- JLL disagree there is general consensus among real estate agents that the commercial core should be retained – our view is that, from a pragmatic approach, far more commercial supply will be provided under a mixed use approach compared with maintain the commercial core.
- JLL agrees that the pre-commitments for office developments are rare – and from a pragmatic approach it would be better to achieve the office development from a mixed use outcome (i.e. the residential is the 'enabler' for the office uses).

5.2 Chatswood Office Precinct Economic Analysis (Hill PDA 2010)

Scope

In 2010 Hill PDA undertook an economic analysis of the Chatswood CBD Office Precinct. Council commissioned the work concerning the nature of the existing office market in Chatswood and its future role in light of competing land uses, particularly residential. More specifically Hill PDA:

- Provided an understanding of the existing and prospective office market in Chatswood.
- Analysed the impact of a policy change regarding office development in Chatswood CBD.
- Advised how the existing office market and built form would adjust to a revised policy position.
- Identified economic planning incentives to encourage commercial office development in Chatswood.

Key Findings

Overall the market analysis found that the Chatswood office precinct had seen little redevelopment activity over the past 10 to 15 years. Whilst wider economic trends and changes to industry indicate that demand for commercial office space will increase significantly in the future, existing

vacancy levels in Chatswood coupled with a growth in new supply in other centres, will mean that it is likely to be another 10 to 15 years before major office development will become attractive once again in Chatswood. JLL - we consider the market has a view that Chatswood's success is a mixed use precinct in the short, medium and longer term. No appetite for investment grade office development exists.

Following on from the market analysis Hill PDA looked at potential policy scenarios. The preferred policy scenario was 'Protect and Encourage'. Hill PDA considered it appropriate to not only protect the existing Chatswood office precinct but encourage additional commercial development across the Centre. Overall it was recommended that the existing office precinct be maintained and commercial floorspace be encouraged around it (particularly within the proposed B4 mixed use zones) through the implementation of development controls that encourage the provision of commercial office floorspace on the first and second floors of all new developments. This control would be applied to sites in excess of 1,000sqm in site area. JLL – agree with this pragmatic approach.

In summary the recommendations made included:

- The proposed controls for the B3 zone west of the railway line (the office core) should proceed in the draft LEP with an FSR for commercial office development of 10.5:1 and height limit of 90 metres, subject to a minimum lot size of 2,500sqm and no residential.
- The exceptions are appropriate peripheral sites of the office precinct where a component of (no greater than 50% of the floor area) residential might be allowed subject to no net loss of existing jobs and open book financial appraisal justifying that the residential component is necessary to render viable the office component. JLL – agree with this pragmatic approach.
- On the east side of the railway (Zones B4 and B3), minimum car parking requirements could be removed for retail and commercial elements for developments on sites over 1,000sqm, subject to an active ground floor use with offices at the upper levels.
- Existing policy be retained for Zone B5, west of Pacific Highway, as this area performs an important transition between the employment and residential areas beyond.
- Coordinated promotion and marketing of the CBD should also be pursued in addition to high quality/sustainable buildings.

JLL Observations

Key observations on the above report findings are as follows;

- JLL disagree that significant future supply will be provided, even within a 10-15 year timeframe. Given the lack of development with the currently strong economic context (low interest rates, yields below GFC levels) we consider that the demand for stand-alone A grade office space will not occur over the short, medium or longer term. This is also supported by the markets' sentiments of the Chatswood market - which, as a function of its residential development, has passed its 'tipping point' as growing commercial market.
- As identified commercial uses as part of a mixed use development provide a pragmatic approach to achieving office development.

5.3 Chatswood CBD, Competitive and Comparative Advantage (AEC 2016)

Scope

AEC Group (AEC) was engaged by Willoughby City Council to help understand Chatswood's competitive offer as an employment centre as well as weaknesses that may be preventing Chatswood from achieving its full economic potential.

Key Findings

Despite being an established office market located in close proximity to the North Shore executive belt, over the past decade, Chatswood commercial office centre has experienced significant competition from locations such as North Sydney, St Leonards/Crows Nest and Macquarie Park. This competition, combined with the loss of some major government tenants resulted in vacancy

rates that approached 20% in 2010. Since that time the commercial office market has rebounded with vacancy rates trending downwards, most recently at 7.7% (December 2015).

Residential development has been a double-edged sword for Chatswood, contributing to a vibrant and desirable centre with an array of retail, entertainment and lifestyle options but also resulting in tensions between residential and non-residential uses. Chatswood is not unique in this respect. Many centres that benefit from good transport connections face similar challenges.

Recent participation of Chinese and overseas developers created intense competition between players and resulted in significant premiums paid for development sites, compressing development margins in some instances to below 10%. That said, the frenzied market conditions of 2014-2015 are observed to have tempered slightly with more moderate market activity observed in the last three to six months.

Completion of the Chatswood Interchange and The Concourse, and associated streetscape and public domain works has contributed immensely to the overall image of Chatswood. Tenant and worker amenity in Chatswood is widely commented upon to be a major drawcard for businesses locating in Chatswood.

Chatswood is the smallest metropolitan office market on the North Shore (<290,000sqm) and currently subject to the lowest vacancy rate compared to other markets. JLL - Disagree – Chatswood has the second highest vacancy rate in the Sydney Metropolitan Market As a percentage of total prime grade space, recent annual net absorption of nearly 9,000sqm in Chatswood is impressive. While average net face rents in North Ryde/Macquarie Park are the lowest, Chatswood relative to St Leonards/Crows Nest and North Sydney offers an affordable price point. JLL - This 'competitive' rent makes office development unviable.

Chatswood is the beneficiary of a number of factors which have converged to increase net absorption of space and cause vacancy rates to fall from 2013-14. The vacancy rates still remain the second highest in Sydney.

- Strong public transport links, both bus and rail.
- Displacement of tenants elsewhere including from St Leonards/Crows Nest and North Sydney, following the residential conversion of existing office stock and rising rents.
- Comparative slowing of new floorspace additions to North Ryde/Macquarie Park.
- Completion of Chatswood Interchange and other retail/community facilities offering improved tenant amenity and increased centre vibrancy.
- Competitive price offer in consideration of excellent retail facilities and tenant amenity.
- Demand for project space by companies involved in major infrastructure projects in Sydney's North West region, e.g. Lend Lease taking space in the Zenith Centre in 2015.
- Growing local resident population which generates demand for urban support services and contributes to the skilled labour pool.

Chatswood CBD is mostly zoned B3 Commercial Core which prohibits residential development. Retail and office uses dominate this area. The B3 zone is abutted by B4 Mixed Use, B5 Business Development and residential land uses. Given strong residential market conditions there has been significant development activity around the market which has served to change the nature of the area from an employment precinct historically towards a broader, mixed-use and residential focused precinct.

Whilst the commercial core is preserved for non-residential uses, the level of market rents is such that new office developments are not viable. The economic rents which would be required to justify a new commercial development are significantly greater than the current rents being achieved. This has inhibited new supply within the core, whilst on the CBD fringe the strength of residential demand has seen development opportunities which may once have led to new office buildings, instead being built out for residential uses. JLL - Given the current economic and investment environment is very supportive of development (low interest rates, yields tighter than pre-GFC levels) we do not see this changing in the short, medium and longer term.

Whilst there has been no sizeable reduction in commercial office floorspace in Chatswood, the sector has lacked investment and development for some time. In due course, this could result in a decline in the diversity of tenants within the centre and a resultant impact on the quality and quantity of jobs sustained.

Chatswood's flat growth as a commercial office market is a constraint to its future growth prospects. While office stock increased to the mid-1990's, the amount of stock in Chatswood has largely remained unchanged since then.

While Sydney's metropolitan office markets are each established in their own right, they do, to degrees, compete with each other for occupier interest and investment.

Recommendations

It is recommended that residential uses continue to be excluded from the B3 Commercial Core zone. In planning for Chatswood's future sustainability, it is important to recognise a number of key factors.

Distinct Role and Function

Chatswood is the beneficiary of market cycles. While it was vulnerable to tenant leakage to more attractive lease terms in Macquarie Park in the 2008-2010 period, Chatswood has since grown and developed into a vibrant retail and entertainment precinct. JLL – disagree that the market developed as suggested, Chatswood is still vulnerable to these tenant "leakages" as suggested with 2015 seeing the largest negative net absorption since 2009.

Chatswood is fulfilling a critical need in the market by providing affordable space for a range of tenant sizes in a high amenity environment benefitting from excellent public transport and retail facilities. As Chatswood's desirability as a commercial office destination continues to build JLL - Disagree in the market as more tenants take up space JLL - Disagree, effective rents will rise JLL - Disagree and thereby generate investor interest in the market JLL - Disagree.

Chatswood is already on the institutional investor radar, with two major transactions occurring in 2015 and 2016. Continued build of tenant interest will conceivably lift its profile even further, eventually to the level where investment into refurbishment of office space will represent a commercial proposition.

Commercial floorspace in buildings and locations that convey a sense of corporate identity and image is important. The preservation of opportunities to allow momentum in the commercial office market to continue to build will ensure investment opportunities are available when the time is ripe and market conditions are conducive.

Critical Mass

Critical mass is important in order for commercial office precincts to remain competitive. Chatswood is the smallest of the North Shore office markets, the quantum of floorspace having remained largely flat since the mid-1990's.

Already disadvantaged from having a small commercial core, it is essential existing stock is not eroded and thereby undermining the corporate image and identity of the centre.

A defensive strategy to 'hold the line' will allow market conditions to strengthen further and investment returns to improve. This will in time provide an incentive for the refurbishment/ upgrade of existing space. The expansion of existing stock could then occur ahead of comprehensive redevelopment, noting that economic rents required for financially feasible new development are still significantly higher than current market rents. JLL – agree, market rents and economic rents are significantly different and unlikely to be similar.

Commercial Floorspace within Mixed-use Buildings

The market appeal of commercial floorspace within mixed use residential buildings is less likely to convey a corporate image or identity that is typically sought on the western side of the rail line. Accordingly, large corporate occupiers are unlikely to seek space within a mixed use residential building unless the space is innovative in design and finish. JLL – disagree, various examples are provided within this report of successful mixed use developments.

While commercial tenancies within mixed use residential buildings can be well sought after by small businesses, e.g. professional services offices (lawyer, accountant, tax advisor, etc.) and other businesses who respond to local population growth, it is not uncommon for many a commercial suite to remain vacant long after completion due to isolation and poor amenity. JLL – disagree, Chatswood has seen strong demand for the small office size typology.

Notwithstanding overall demand for retail and commercial floorspace, not all locations are suitable. Commercial occupiers are generally drawn to attractive buildings in close proximity to the train station and retail core.

While demand for retail and commercial floorspace has strengthened commensurate with growth of residential uses in Chatswood, retail and commercial suites within a mixed use development that is dominated by residential uses need careful planning and design, as well as astute market positioning to be sustainable. JLL – agree, herein lies the opportunity.

Incentives for Smaller Commercial Tenancies

It is important that demand for smaller commercial tenancies is able to be suitably met in Chatswood. Emerging technology and creative occupiers typically demand small amounts of space initially but can expand quickly depending on business success. Many professional services firms also require smaller tenancies.

The reconfiguration of floorplates and building services layout from accommodating a single occupier to multiple smaller tenants can be a costly exercise. Some building owners can be reluctant to manage multiple tenants rather than a single blue chip covenant. New buildings that feature flexible design from the outset could remove the disincentive to partition a building into smaller tenancies.

The nature and extent of any incentive offered needs to at a minimum offset the additional cost of incorporating flexible building design.

Increase to Market Profile of Chatswood

Chatswood has benefitted from a resurgence of tenant and market interest. JLL – disagree, we consider this statement is based on no supporting metrics. The recent sale of two prominent A-grade office buildings signals the market's confidence in investment returns in Chatswood. JLL – disagree, a sale of a building does support a view that there is underlying demand for additional development. Previous perceptions of reduction in prestige (owing to encroaching residential uses) would appear to have dissipated following completion of the Chatswood Interchange and boost to the vibrancy of the centre. JLL – disagree, the market perception of Chatswood is a mixed use precinct.

With Chatswood on the cusp of an uptick in the market. JLL – disagree – this is baseless. Council could work to leverage industry and market interest/activity in the centre to promote Chatswood as a commercial office destination, highlighting the value proposition of Chatswood.

Even if new additions to office stock are not pursued yet, an ability for Chatswood to renew (upgrade and refurbishment of existing stock) is critical for market perception and appeal.

Renewal (whether refurbishment/upgrade of space or public spaces) of sites in strategic locations has flow-on impacts for the entire commercial office precinct, increasing its desirability and appeal which is then met by increasing rents and prices which could then stimulate their upgrade/renewal.

There is unfortunately no silver bullet for Chatswood's success and sustainability. Development of new office buildings will only occur when rents are sufficiently attractive. Council could work with building owners to collectively secure the necessary lifts in profile and image that will result in commensurate rises in overall commercial rent. JLL – our view is that the perception of the Chatswood market will not materially benefit from attempts to market the precinct. We consider the opportunity for the Chatswood office market is to embrace the employment land uses that come from mixed use development. The alternative is to wait for the development of investment grade office product, which we consider very unlikely to occur.

JLL Observations

Key observations on the above report findings are as follows;

- JLL does not agree that development is likely to occur within another 10 to 15 years – we consider the nature of the opportunity has materially changed and the opportunity is now to investment in mixed use developments.
- Reference to Chatswood having a low vacancy rate is incorrect. Reference recent sales s
- The competitive market rent inhibits viability.
- Examples provided within this report show that mixed use development can be completed successfully.

5.4 Forecasting the Distribution of Stand-alone Office Employment (BIS Shrapnel 2014)

Scope

The Department of Planning and Infrastructure's Draft Metropolitan Strategy sets the framework for Sydney's growth in population and employment to 2031. As part of a process of review, BIS Shrapnel was asked by the Department to provide forecasts of the distribution of stand-alone office employment within Sydney to 2035. The analysis incorporates 35 centres nominated as global centres, regional cities, major centres and specialised precincts within the Draft Metropolitan Strategy.

Key Findings

Chatswood Specific Findings

Table 16: Forecasted Stand-Alone Office Employment within Chatswood to 2035

SAOWF	2010	2015	2020	2025	2030	2035
'000 persons	12	13	14	13	14	14

Source: BIS Shrapnel

- Whilst Chatswood is identified as a major centre under the Draft Metropolitan Strategy, the SAOWF within the centre has been steadily declining over the past 15 years, reflecting increasing competition from other centres—most notably Macquarie Park—and competing demands for sites from other uses, particularly residential.
- The commercial core of the centre is constrained by the railway and Pacific Highway. Most sites that were earmarked for future office space have now been turned over to residential use and unless Council takes proactive steps to identify and rezone new sites, there is unlikely to be any significant growth in office stock over the forecast horizon.
- Residential uses are expected to continue to compete for sites within Chatswood during upswing phases of the cycle.
- We have assumed a 'low growth' rate in the SAOWF from 2030 unless there is an active strategy by state and local government to encourage greater office development.

JLL Observations

Key observations on the above report findings are as follows;

- JLL note the lack of significant growth in investment grade or 'stand-alone' office product within the Chatswood office market.
- We agree with the BIS Shrapnel approach which is to consider the risks and opportunities of each of office markets in the context of the whole Sydney Suburban office market. This approach recognises the market sentiment to Chatswood, which is a lower cost provider of office product, without specific industry clustering.
- From an outcomes point of view we consider more success will come from embracing a mixed use outcome, with the employment based land uses being enabled by residential uses.

5.5 Implications

JLL have observations on a number of common themes that come from prior studies. These are;

- Chatswood is identified and recognised by the market for its competitive rents. It follows that this necessarily makes development difficult given the high cost of development within Sydney key commercial centres.
- JLL disagrees with the observation that vacancy is low – it is the second highest in the Sydney Metropolitan market.
- JLL disagree that there is general consensus among real estate agents that the commercial core should be retained – the market shares our view is that, from a pragmatic approach, far more commercial supply will be provided under a mixed use scheme compared with maintaining a commercial core.
- JLL does not agree with the observation that the market will begin to see office development / demand as it did in the early to mid-90s. The markets perception on Chatswood has moved to that of a low cost accommodation with primarily demand for support office. Therefore, the opportunity exists for development of support office, through mixed-use development as an enabler.
- Examples provided within this report show that mixed use development can be completed successfully.
- We agree with the BIS Shrapnel report which is to consider the risks and opportunities of each of office markets in the context of the whole Sydney Suburban office market. This approach recognises the market sentiment to Chatswood, which is a lower cost provider of office product, without specific industry clustering.
- From an outcomes point of view we consider more success will come from embracing a mixed use outcome, with the employment based land uses being enabled by residential uses.

6 Key Findings

The analysis within this report has derived the following key findings.

- NSW is currently experiencing strong economic drivers, which are conducive to office investment and development within the Sydney office market. While most markets are currently benefitting from this cycle, Chatswood is an exception. This suggests that if now, during a very strong phase in the commercial office cycle commercial development seems unviable (both unfeasible and a lack of market acceptance), it is difficult to ascertain when it will be.
- The proposed office development of circa 46,500 sqm is unrealistic, as it would be the third largest office building in suburban Sydney. However, our discussion with market operators suggest that a development of 20,000 to 30,000 sqm would also be unlikely as a 10,000 sqm pre-commitment would be difficult. This appears to be a reasonable observation considering historic net absorption (3,300 sqm p.a. over the past five years, 5,400 sqm p.a. over the past forty years) and historic new supply (last major additions occurred in the early to mid-1990s).
- Chatswood's recent office growth shortcomings is further reiterated by reference to the "The Vision and Strategic Plan for Chatswood City Centre Plan 2008" adopted by Council in November 2010. This plan identified a number of targets, in regards to office these are summarised in the table below, along with current position as tracked by JLL.

Table 17: The Vision and Strategic Plan for Chatswood City Centre Plan 2008, Office Targets

Target Type	Where we are (2008)	Where we are planning to be (2031)	*Currently (as at Q3/2016)*
Office Floor Space (NLA)	301,300 sqm	440,000 sqm	304,234 sqm
Vacancy	10.5%	<7%	12.4%

Source: The Vision and Strategic Plan for Chatswood City Centre Plan 2008, JLL

- The above suggests that the current market dynamics is not achieving the targeted outcome. If existing status quo was to continue, these targets and other targets, such as those released by the Greater Sydney Commission's District Plans (growth of between 6,300 to 8,300 jobs in the 20 years to 2036), is unlikely to be met.
- Our view is that this relates to the nature of office being targeted by the Chatswood market. We envision the role of Chatswood going forward as a more support office centre, with much better drivers from a demand perspective for this type of use. The only concern for this coming from the appropriate facilitation of supply.
- An enabler of this supply could come from mixed-use development with the significant demand for residential development within Chatswood acting as the support for economic viability. In doing so, this would create a catalyst to break through the historic status quo of the Chatswood commercial market.
- Our study researched a number of successful examples of mixed-use developments across Australian CBD's. The key learnings from these in terms of drivers of success include; a requirement for the building to be designed to a high quality that does not appear obviously residential and the use of separated lobbies for different uses. Should mixed-use development be pursued within the Chatswood market, we recommend doing so with consideration of these success factors.
- From a pragmatic point of view, JLL considers the embracing mixed-use development will provide significantly more employment based commercial space (risk adjusted) by comparison to maintaining the commercial core which will likely see continuation of the status quo i.e. very low provision of commercial space.

Appendices

Role of Sydney's Competing Office Markets

Market & Context	Strengths & Opportunities	Weaknesses & Threats	Forecast Role
Sydney CBD Occupied Office Stock sqm: 4,666,000 (as at Q4 2015) The Sydney CBD is the identified core office market of the city. Numerous firms are headquartered within the precinct.	• Is the identifiable centre. • Significant clustering in finance, insurance and legal services. • Many large occupiers are headquartered in the location and improbable to ever locate in an alternative market. • Excellent transport infrastructure to and from the precinct.	• High demand for residential in the precinct may lead to less clustering in certain areas. • There is significant capacity constraints, unlike those faced in other markets. • The economic rent is significantly higher than other markets. • Risk of market loss from suburban office markets.	• Lower share of market growth.
Sydney Fringe Occupied Office Stock sqm: 869,000 (as at Q4 2015) Examples of tenant moves over 5,000 sqm over.the last 10 years include; Meridian International School, Google, Accenture, Campus Group, Pacific Magazines, Seven Network, Global Television, John Holland Group, Australian Federal Police, British American Tobacco Australia.	• Occupiers are attracted to its trendy, ready-made amenity which attracts a younger tenant. • Discount to CBD rents with easy access still available • Significant investment has occurred within the Darling Harbour / Haymarket / Ultimo precincts including the development of the CUB site and SICEEP • Investment from educational providers • Infrastructure investment including light rail and Redfern Eveleigh	• Development of residential and student accommodation dilutes the 'office' offering	• Lower share of market growth.

Market & Context	Strengths & Opportunities	Weaknesses & Threats	Forecast Role
North Sydney Occupied Office Stock sqm: 742,000 (as at Q4 2015) Examples of tenant moves over 10,000 sqm over the last 10 years include; RTA, Vodafone Hutchison Australia and Coca-Cola Amatil.	• North Sydney is the largest of the North Shore office markets and is perceived as a viable alternative to the CBD when companies are weighing up business locations involving large rental expenditures. • Discount to CBD rents with easy access still available • It is well serviced by both bus and rail infrastructure, has a diverse and mature retail offering, and a large residential population nearby. • Some of its redundant office buildings have been converted into top-end residential accommodation, and a handful of hotels service the market, but it is largely a commercial office location. • Viewed as an extension of the Sydney CBD	• Perceived lost momentum for office users	• Lower share of market growth.
Parramatta Occupied Office Stock sqm: 657,000 (as at Q4 2015) Examples of tenant moves over 10,000 sqm over the last 10 years include; Medicare, Attorney-General's Department, IAG, Sydney Water and QBE Insurance Australia.	• Parramatta's office market has been influenced by a decentralisation push over several decades by both the State and Federal governments. A large proportion of tenants within the Parramatta CBD are therefore public sector based. • A number of initiatives including redevelopment of Parramatta Square which will eventually add a significant amount of mixed use space to the precinct. • Development of residential users around the core will provide supporting population. • Potential for an enhanced educational offering • Proximity to courts – Campbelltown & Penrith.	• Implications if the Government moves away from a decentralisation program • Potential for a 'mixed' or confused offering if residential development dominates office users.	• Equal or higher share of market growth.

Market & Context	Strengths & Opportunities	Weaknesses & Threats	Forecast Role
Macquarie Park Occupied Office Stock sqm: 663,000 (as at Q4 2015) In 2003 Optus moved from North Sydney taking up 84,000 sqm. Examples of other tenant moves over 10,000 sqm over the last 10 years include; Computer Science Corporation, Aristrocrat and the Department of Innovation, Industry, Science and Research.	• Macquarie Park is the fastest growing office precinct in Australia. • It is centred on Macquarie University and benefits from the synergy associated with the high tech focus. It is home to many multi-national IT&T, medical research and pharmaceutical companies. • Solid public transport infrastructure supports the Macquarie Park precinct including three train stations • The New LEP gives greater development potential to develop office uses • Potential to strengthen its dominance in the market • Redevelopment of the Macquarie Shopping Centre.	• Potential that most of the 'market share steeling' has now occurred. • While new development controls are available it is unlikely the viability of these high density uses will stack up for some time. • The historic attraction of generous parking ratios is decreasing	• Higher share of market growth.
Chatswood Occupied Office Stock sqm: 267,000 (as at Q4 2015) Examples of tenants moves over 3,000 sqm over the last 10 years include; Lend Lease, Reed Elsevier Australia and Huawei Australia	• The train infrastructure will continue to be a competitive advantage as traffic gets more congested over time, particularly following the connection to the Metro North West. • Provides CBD style accommodation with significant retail and good pedestrian walkability.	• Chatswood has a fragmented office market after years of high-density residential and widespread retail development amongst its existing office towers. • Perception that momentum is only with residential or mixed-use development.	• Lower share of market growth.
St Leonards Occupied Office Stock sqm: 302,000 In 2008 STW Communications took up over 11,000 sqm. Examples of other tenant moves over 3,000 sqm over the last 10 years include; Leightons, STW Communications Group, URS Australia, EMC Corporation, Cardno and Fox Sports Australia	• Clustering of medical uses around Royal North Shore. The development of the Hospital will continue attract medical users.	• The St Leonards office market is only slightly larger than Chatswood despite being spread over a larger geographical area. • Residential demand will provide opportunity for conversion which may confuse the offering. • Lacks critical office mass.	• Lower share of market growth.

Market & Context	Strengths & Opportunities	Weaknesses & Threats	Forecast Role
Sydney Olympic Park /Rhodes Occupied Office Stock NLA sqm: 256,000 (as at Q4 2015) Examples of other tenant moves over 10,000 sqm over the last 10 years include; Australian Administration Services, Alcatel-Lucent and the Lion Group.	• Sydney Olympic Park began to develop as an office precinct after the completion of the Sydney Olympics. It has slowly evolved into a mixed use precinct befitting the description of a "business park", with retail and recreation facilities complementing the growing stock of office space. • The Carter Street Priority Precinct will add to exposure. • Increased connectivity through the Parramatta Light Rail	• Commonwealth Bank have recently signed a deal to move out of Sydney Olympic Park which will result in a significant amount of space to be backfilled • Rhodes is a niche office market controlled almost entirely by a single developer, Australand which is nearing capacity • Potential to compete with Macquarie Park with more office development	• Higher share of market growth.
Norwest NLA Occupied Office Stock sqm: 212,000 (as at Q4 2015) Norwest Business Park is a master planned industrial/commercial hub that began its development in Sydney's North-West in the 1980s. The masterplan was collaboratively designed with significant input from the Hills Shire Council, and has developed into Sydney's second largest specialist business park (after Macquarie Park). In 2012 The Hills Shire Council moved taking up over 16,000 sqm. Examples of other tenant moves over 2,000 sqm over the last 10 years include; Capital Finance Australia, Hollard Insurance, MD Equity Pty Ltd, Caroma and B Braun.	• Occupiers include a mix of manufacturing, retail / wholesale, finance & insurance and general business services. • This greenfield business park will continue to provide flexibility to accommodate a range of users • Population growth in the North-west sector supported by the Metro North West.	• Norwest only attracts 2% of total office stock and therefore lacks the exposure of other business parks such as Macquarie Park.	• Higher share of market growth.

Market & Context	Strengths & Opportunities	Weaknesses & Threats	Forecast Role
Sydney South Occupied Office Stock sqm: 183,000 (as at Q4 2015) The wider South Sydney area has emerged from a traditional industrial and logistics area (underpinned by close proximity to the Airport and to a lesser extent, Port Botany) to a mixed-use area with material residential, office and bulky goods retail development over the past 10 years. Examples of tenant moves over 5,000 sqm over the last 10 years include; Corporate Express, Westpac Banking Corporation, Australian Federal Police, Qantas and Sydney Airport.	• Clustering of transport related uses attracted by the port and airport. • Good rail infrastructure i.e. Mascot Railway Station. • Potential to diversity from traditional logistics / transport focus. • Potential to attract occupiers that are located in Sydney Fringe. • Centralised location with strong transport offering.	• Risk associated with users moving to accommodate the Badgerys Creek Airport.	• Equal share of market growth.

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Appendix C

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8 November 2016

Mr Peter Carstairs
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Mirvac
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Via email: peter.carstairs@mirvac.com

Dear Sir

Market Consultancy Report
45 Victor Street, Chatswood, NSW 2067

1.0 INSTRUCTIONS

Thank you for your instruction dated 23 August 2016 and subsequent email correspondence clarifying your requirements. In accordance with those same instructions, this report addresses the following key considerations:

- Site overview with an analysis of its strengths and weaknesses 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

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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.

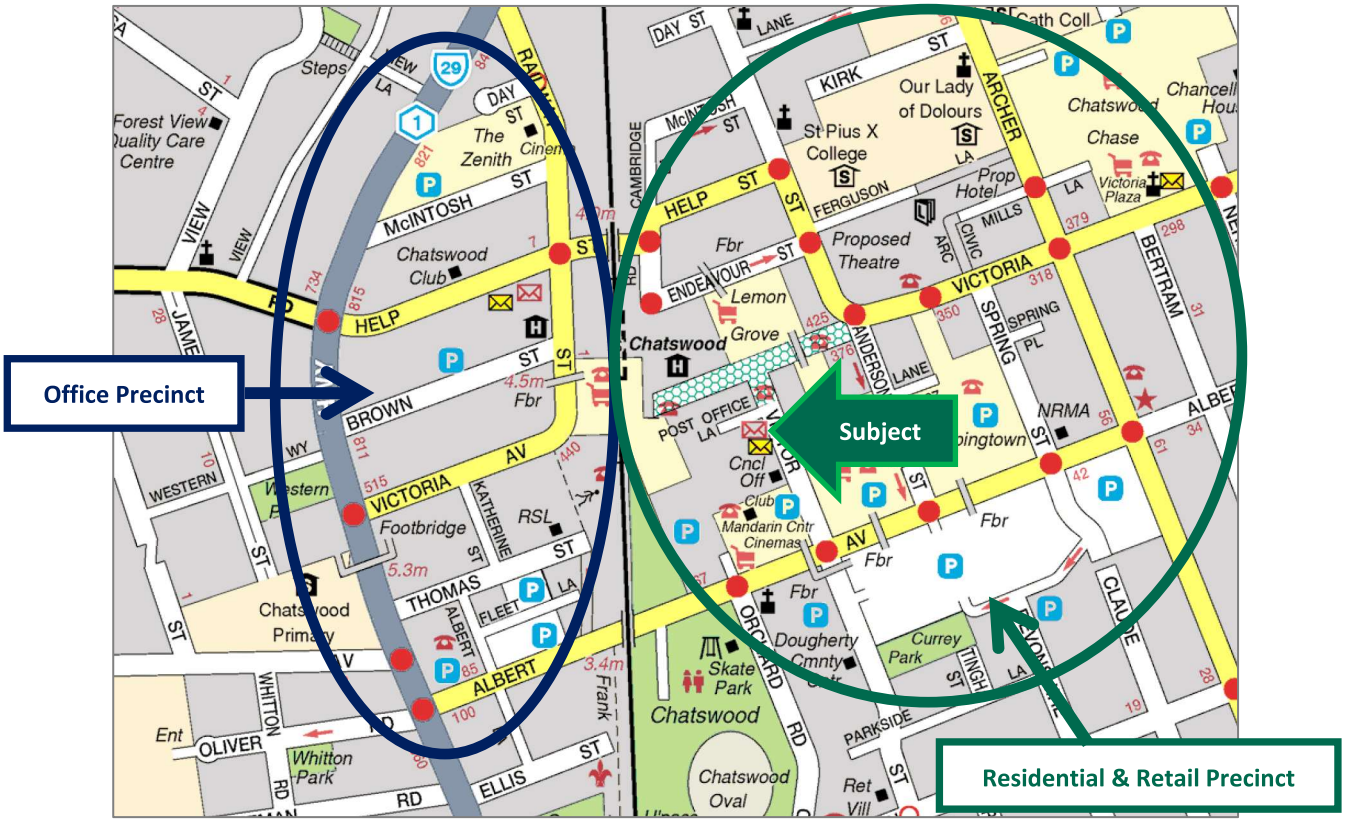
Similar to many other suburban office markets, Chatswood comprises a wide range of quality in office stock which is primarily concentrated around Chatswood Bus and Rail Interchange and the area bounded by Albert Avenue to the south, Day Street to the north and the Pacific Highway to the west. We consider 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 dominated by retailing and in particular Westfield Chatswood and Chatswood Chase. Vehicle access to this part of the Chatswood CBD is problematic from the west and limited to Albert and Help Streets, given it is bisected by the Northern Shore Rail line as is evident below.

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 150 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.



The opening of the Chatswood Epping Rail has further increased accessibility for office workers using public transport to commute to work and the new 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 may be improved by the Sydney Metro which is an automated rapid transit system currently under construction. 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. It is expected to open in 2019 and on completion it will link Sydney's north west region to the south west at Bankstown, via the North Sydney and Sydney CBDs. To a large extent however, it is simply a duplication of the existing network and does not access or unlock the greater west of Sydney.

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 earlier. These office buildings and their approximate lettable areas include:

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

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 anticipated that its longer term use may be residential, given its proximity to retail and panoramic views to the south east.

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, poor 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. Westfield Shoppingtown is a major regional shopping centre extending to approximately 71,400 square metres over five levels. It is bound by Albert Avenue to the south, Spring Street to the east, Victoria Avenue to the north and Victor Street to the west, directly opposite the subject property.

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 59,970 square metres over four levels.

There are also a number of smaller centres in Chatswood in and around the subject property, including the Mandarin Centre to the south on the corner 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.

The properties comprising 1-11 Spring Street and 54-60 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 residential scheme.
As such, the key strengths of this location include:

- Proximity to public transport
- Proximity and concentration of retail amenity
- Concentration of residential apartment towers and mixed use buildings within the immediate vicinity
- Access to schooling with Our Lady of Dolours and St Pius College a short distance to the north east

These strengths, together with the existing characteristics of the area appear to support longer term residential use, with only ancillary retail or commercial uses on the ground or lower levels. However, given the lack of tenant and investment demand for Chatswood, we would recommend that this component be capped.

4.0 Proposed Development

We understand the Instructing Party is considering redeveloping 45 Victor Street, Chatswood and it proposes an A Grade office building of approximately 40,000 square metres. This is a substantial office development which, in our opinion is too large for the Chatswood CBD.

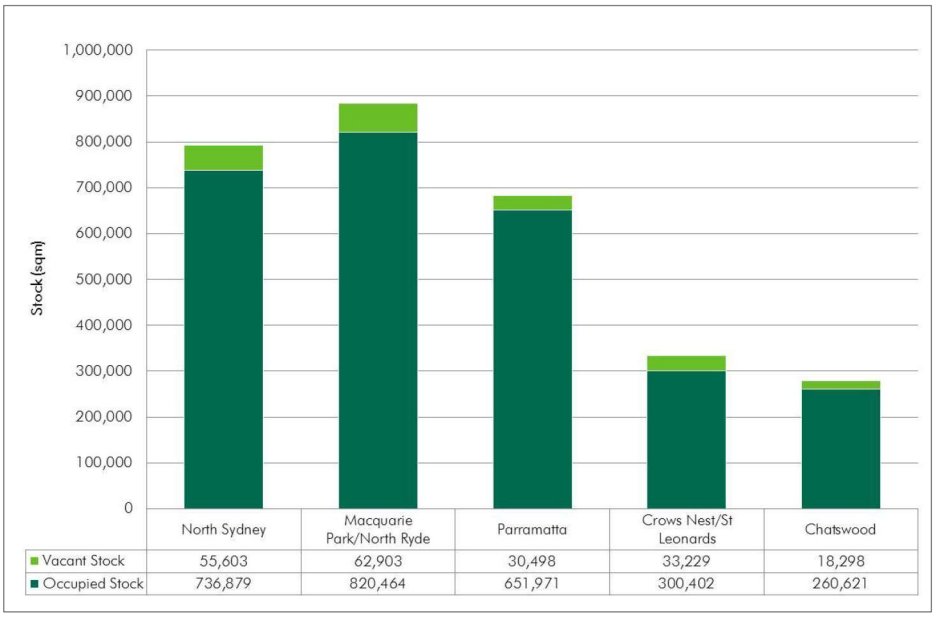
Based upon our understanding and experience of current tenant requirements and workplace strategies, we would expect a minimum floorplate for a new suburban A Grade office building to be 1,200 to 1,800 square metres in size in order to achieve work space efficiency.

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.

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 278,919 square metres of office stock as at July 2016, of which approximately 56.4% is considered to be A Grade, 27.3% B Grade and 16.1% C Grade office accommodation.

Metropolitan Sydney Office Stock



	North Sydney	Macquarie Park/North Ryde	Parramatta	Crows Nest/St Leonards	Chatswood
Vacant Stock	55,603	62,903	30,498	33,229	18,298
Occupied Stock	736,879	820,464	651,971	300,402	260,621

Source: CBRE & PCA July 2016

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

The addition of a new building of circa 40,000 square metres would increase the size of the market to approximately 318,919 square metres, which represents an increase of 14.3% overall. This may be too large an increase for the market to efficiently digest, as the addition of 40,000 square metres of office, in the absence of a substantial pre-commitment would result in vacancy increasing to 19.3% from its current level of 6.6%.

56.4% of the stock is A Grade, albeit constructed in the period from late 1980s to mid-1990s. The refurbishment of buildings has been undertaken over the intervening period and notable office buildings and their owners are detailed as follows:

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

5.1 Vacancy

According to the PCA, vacancy within the Chatswood CBD was 6.6% as at July 2016, a decrease of 1.1% from January 2016 and a substantial reduction from the most recent high of 13.5% in January 2014. However, vacancy is expected to increase over the coming 12 months with Abigroup, Vodafone and Leighton Property all expected to vacate space. As a result, we expect it to be above 10.0% again in 2017.

Current Chatswood vacancy is delineated as follows:

Chatswood	January 2016	July 2016	6 Month Variance
Total Stock (sqm)	278,919	278,919	-
Total Vacancy (sqm)	21,417	18,298	
Vacancy (%)	7.7%	6.6%	-1.1%
Net Absorption (sqm) 6 months	- 7,674	3,119	10,793
A Grade - Stock (sqm)	157,412	157,412	
A Grade - Vacancy (%)	7.27%	6.13%	-1.1%
B Grade - Stock (sqm)	76,046	76,046	
B Grade - Vacancy (%)	10.11%	9.87%	-0.2%
C Grade - Stock (sqm)	45,007	45,007	
C Grade - Vacancy (%)	5.07%	2.53%	-2.5%
D Grade - Stock (sqm)	454	454	
D Grade - Vacancy (%)			

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.

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 a moot point.

Accordingly, this has not been supply driven outcome for the Chatswood CBD, but reflective of a continued sustained lack of tenant demand in order to drive office development and take up. 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.

5.2 Supply

According to PCA data as at July 2016, there are no projected supply additions to the Chatswood office market expected in the short or medium term. The last site capable of being developed in the Chatswood CBD was 7 Railway Parade Chatswood, in the heart of the office precinct. It was previously owned by Mirvac who attempted for several years to secure a lease pre-commitment for a 19 level, 25,000 square metre A Grade office building, almost half the size of what is proposed at Victor Street. It was unable to do so and ultimately sought and received Part 3A approval in February 2011 for a mixed use development comprising 295 apartments and only 4,870 square metres of commercial floor space. This has been successfully developed by Mirvac and sold off the plan at benchmark residential prices for Chatswood at the time.

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 proposed office development included:

- 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

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 square metres 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.

At the time of sale however, it was only 96.3% leased, with the largest tenants being Vodafone (5,581 square metres or 35.4% of NLA), Real Insurance (4,915 square metres or 31.2% of NLA) and Lendlease (2,949 square metres, 18.7% of NLA).

Accordingly, this appears on the face of it to be a loss making exercise for a substantially smaller building than the subject property, with less capital outlay. 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.

Significantly, in the context of what is potentially proposed for the subject property, St Leonards is a comparable secondary suburban office market to Chatswood and it has three sites of a similar size to what is proposed, which we detail as follows.

Address	Development Stage	Potential NLA	Comments
486 Pacific Highway, St Leonards	DA Approved	50,000 m^2	The site was earmarked by the previous owner Leighton Properties for development as an office building, subject to lease pre-commitments being secured. The development remained dormant for a number of years and in December 2014 it was ultimately abandoned, with an application (222/2014) lodged for the demolition of the existing buildings and construction of a two-tower, 570 residential unit development with retail space and parking for 520 cars. The application was approved in May 2016 and will be developed by Mirvac.
88 Christie Street, St Leonards	DA Approved	34,000 m^2	An application for the construction of a 18-storey office tower with ground level retail was lodged with NSW Planning in December 2009. The proposed tower was designed to achieve a 4.5 star Green Star rating and the application was approved in July 2011. The site remained vacant awaiting lease pre-commitments for some time and the developer ultimately sold the property to a residential developer. It now has development approval for a mixed use project comprising 777 apartments, supermarket, specialty retail and commercial.
Gore Hill Technology Park – Building D	DA Approved	33,375 m^2	Building D will be a substantial mixed use development situated on the corner of the Pacific Highway and Campbell Street. Comprising three separate structures, the improvements will include parking for 610 vehicles. It will require pre-leases to be secured prior to commencement and has been available since 2010/11.

These sites had the potential to be developed as office building with approval in place and owners who actively sought lease pre-commitments. However, the lack of tenant demand was a constraint to this occurring.

With respect to North Sydney, 177 Pacific Highway is the most recent development and it comprises a 39-storey commercial office building with basement parking and garden plaza. Leighton pre-committed to this development, anchoring 29,714 square metres of the 40,100 square metres available, however it subsequently made the commercial decision to remain in Chatswood and lease terms were subsequently secured with Jacobs, Vodafone, LGPS, Cisco and Pepper to occupy this space. This site remained dormant for a number of years and was only activated once Leighton committed to the site as a tenant and owner.

There are two other major office projects in North Sydney which could be developed that are likely to be contingent on tenant pre-commitments.

- 1 Denison Street, North Sydney has approval for a 47,000 square metre office tower, which could potentially increase to 60,000 square metres in size. The site is now controlled by Winten Group; however, it has been earmarked as a potential office development site since circa 2010. As at October 2016 there were no pre-commitments in place, albeit they are close to being secured.
- 90-100 Mount Street, North Sydney was recently acquired by DEXUS and will be developed into a 41,000 square metre office tower. Laing & Rourke as the former owner of the site is the only pre-commitment at this stage and will occupy 16% of the net lettable area. The site has been owned and optioned by several parties over the course of the last 12 years, with the first development approval secured in 2010.

North Sydney is Sydney's third largest office market behind the Sydney CBD (5,082,215 square metres) and Macquarie Park / North Ryde (883,367 square metres) and extends to 792,482 square metres as at July 2016. Accordingly, it has the capacity and tenant demand to absorb buildings greater than 30,000 square metres in size when compared to Chatswood, which is a third of the size. However, it still remains a challenge to secure lease pre commitments.

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 such as 177 Pacific Highway and 90-100 Mount Street, North Sydney remained idle for a number of years as pre-commitments were sought.

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 six to 24 months, however timing is very important. With respect to 7 Railway Street, Chatswood that site remain 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 market. Moreover, we would expect these two sites noted above, together with Parramatta and Macquarie Park to compete directly for pre-commitments with the subject property if it were to proceed as an office development. The North Sydney assets would be at a distinct advantage as development approval has been granted and a number of pre-commitments are close to being secured, and the same applied to Parramatta and a number of sites at Macquarie Park.

The advantage the latter two locations have is that they have larger site which provide tenants with the flexibility to meet their specific needs. For example, in pre-committing to 3 Parramatta Square, Walker Corporation will provide NAB with 3,000 square metre floorplates. NAB has a choice of a number of locations with Parramatta and North Sydney shortlisted.

We would also suggest the economic rent to develop in Macquarie Park and Parramatta is substantially lower, ranging from $385 to 400 per square metre net for Macquarie Park and $500 to $575 per square metre net for Parramatta.

It is evident through the experience of St Leonards/Crows Nest that it is extremely difficult for a secondary office market to develop and absorb buildings of the size proposed for the subject site of circa 40,000 square metres. The key obstacles being:

- Weak tenant demand.
- Multiple lease pre-commitments required to secure funding (i.e. may require three or four tenants to be secured of circa 5,000 square metres or more).
- Limited demand from larger tenants.
- Economic rents required to underpin development are generally higher than those being achieved in the market.

As is evident herein, there is potential for these sites to remain dormant for some time, thereby incurring holding and financing costs as a result.

We detail below major pre-commitment activity in the suburban office market and note that there are a few tenants available which are greater than 10,000 square metres in size. Western Sydney University (WSU) and Commonwealth Bank of Australia (CBA) are the obvious exceptions, however they would not be candidates for Chatswood as WSU is anchored to the west of Sydney in and around the Parramatta CBD. The campus environment being sought by CBA cannot be replicated in Chatswood where sites are constrained and high rise development is prevalent.

Property	Tenant	Area (sqm)	Net Rent $/m²	Date	Term (years)	Net Incentive (%)	Rent Review Structure
105 Phillip Street, Parramatta	NSW Department of Education	20,400	Confidential	Sep-16		Confidential	
Australian Technology Park, Redfern	CBA	95,000	$570	Dec-15	15	Confidential	3.50%
1 Thomas Holt Drive, Macquarie Park	Metcash	8,127	$380	Oct-15	10	Confidential	3.75%
118 Talavera Road, Macquarie Park	Fujitsu (Levels 1-4)	9,228	$385	Jul-14	10+3+3	26%	3.75%
169 Macquarie Street, Parramatta	Western Sydney University (WSU)	26,000	$520	Dec-14	15	Confidential	Confidential
The Park 5 Talavera Road, Macquarie Park	Canon (Building A)	11,222	$360	May-14	10+5+5	26%	3.50%
Link Business Park 22 Giffnock Avenue, Macquarie Park	Optus	9,786	$355	Nov-13	10+3+3	24%	3.50%
177 Pacific Highway, North Sydney	Leighton	26,000	$675	Nov-13	12	Confidential	4.00%

The Leighton lease has underpinned the development and subsequent sale in 2013 of 177 Pacific Highway, North Sydney. However, the tenant has subsequently decided to stay in Chatswood where it occupies approximately 15,800 square metres across multiple buildings. The reasoning for this is cost containment and as consequence its floors at 177 Pacific Highway have been leased to the following tenants:

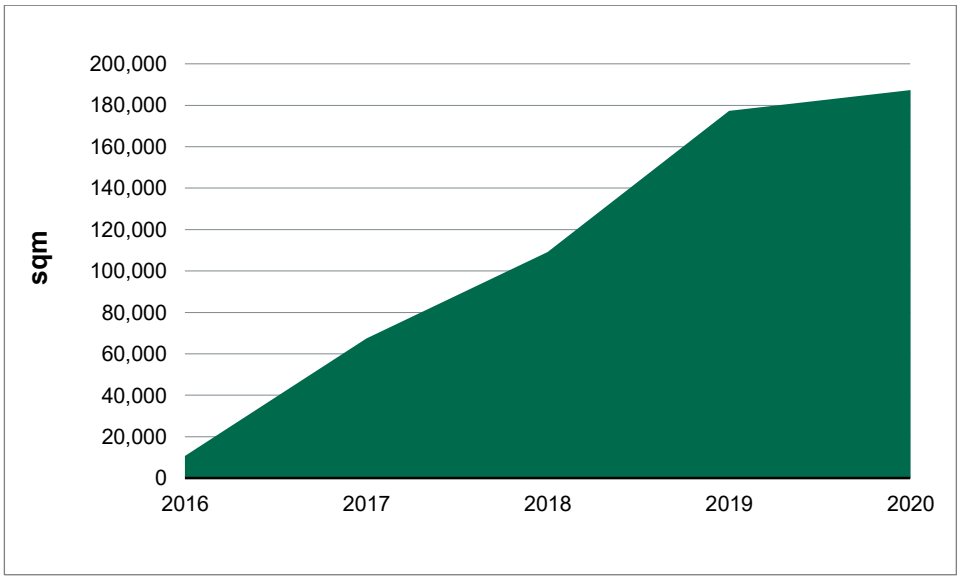
Tenancy	Tenant	Area (sqm)	Net Rent $/m²	Comm Date	Term (years)	Net Incentive (%)	Rent Review Structure
Levels 5 to 9	Jacobs	6,872	$675	Dec -15	7.2	> 35%	3.75%
Level 10 to 16	Vodafone	9,235	$690	Dec -15	12	> 35%	3.75%
Levels 16 to 21	LGPS	6,797	$675	Dec -15	12	> 35%	3.50%
Levels 22 to 24	Cisco	4,583	$675	Dec -15	7	> 35%	3.75%
Levels 26 to 29	Pepper	4,694	$750	Dec -15	7	> 35%	3.75%

Whilst the terms of the incentives remain confidential, they are considered to be extremely attractive and above market expectations. However, Leighton was motivated to complete these deals and bore the additional incentive impost.

These deals represent 32,181 square metres and would represent 80.5% of what is proposed at Victor Street, Chatswood (assuming 40,000 square metres is developed). The securing and aligning of multiple lease pre-commitments in order to secure funding represents the greatest challenge in developing such a large office building in a secondary office market. Furthermore, the incentives required to secure these tenants would be prohibitive for any new development, regardless of the market. Ultimately, though there needs to be a desire and demand from these tenants to actually be located in Chatswood and as evident, this has been lacking for a number of years.

Detailed below are the cumulative North Shore office withdrawals known to CBRE from 2016. It is estimated that 187,000 square metres will be withdrawn from the North Shore office market by 2020. This will continue to exert downward pressure on vacancy and upward pressure on rental growth and may be a catalyst for future development. As noted earlier, the developments at 1 Denison Street and 90 Mount Street are at an advanced stage and better placed to capture this perceived upside. Moreover, the expected rental growth may result in some of these residential projects being shelved for a period of time as owners take advantage of the positive office market conditions.

Cumulative Office Withdrawals from the North Shore Office Market



Source: CBRE Research, September 2016

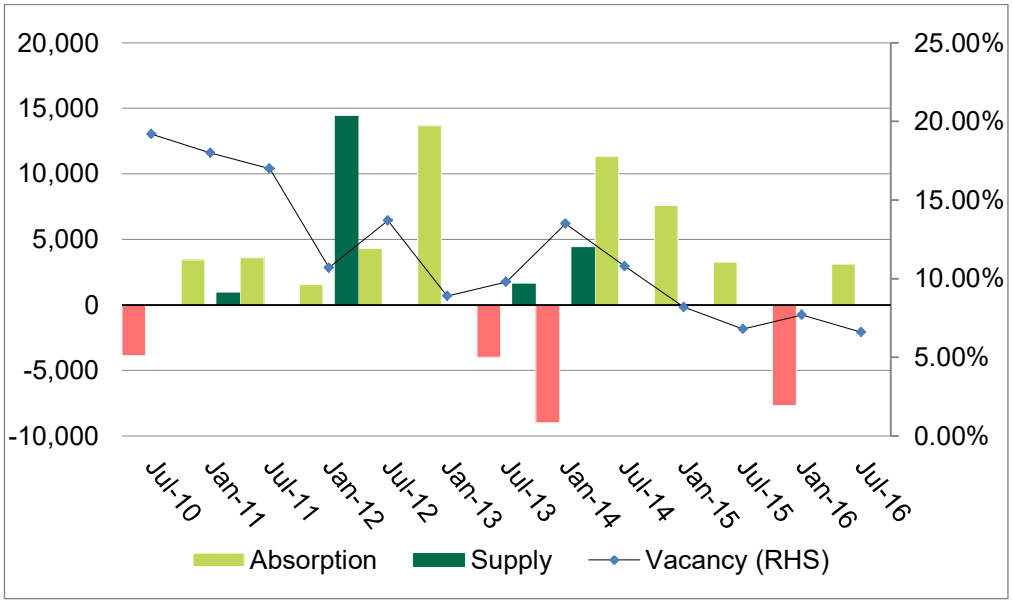
As yet there are no significant office buildings withdrawn from the Chatswood office market for residential redevelopment; however, a number of the key sites such as 7 to 11 Railway Street, Chatswood have been developed for residential purposes given the sustained lack demand from potential office tenants. As noted earlier, 67 Albert Avenue appears to be the most likely conversion from office to residential, given its location and attributes. However, its leasehold tenure maybe a limiting factor to any proposed residential scheme.

5.3 Demand (Net Absorption)

According to the PCA, net absorption for the 12 months to July 2016 for the Chatswood CBD was -4,555 square metres and this was consistent with net absorption of -4,407 square metres for the 12 months to January 2016. However, prior to this the market experienced positive net absorption of only 10,840 square metres in the 12 months to July 2015 and 18,918 square metres to January 2015.

The highest level of net absorption for the Chatswood CBD since the PCA commenced tracking the market in January 1990 was 27,721 square metres which was achieved in July 1992, some 24 years ago. Absorption for a period of 12 months has not been achieved at close to that level since January 2008 (24,853 square metres) and the following chart highlights net absorption over the last five years, which has only exceeded 10,000 square metres on two occasions. Accordingly, it is questionable whether there would be sufficient demand to support a new office building in Chatswood of 40,000 square metres.

Chatswood Vacancy & Net Absorption



Source: CBRE & PCA July 2016

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 square metres. However, the average lease size has declined over the past two years, averaging <500 square metres. These are new leases and do not include renewals.

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 square metres however, it is limited and there has been no new leasing activity above 5,000 square metres.

Property	Tenant	Area (sqm)	Commencement Date	Term (Yrs)
Zenith Centre, 821 Pacific Highway, Chatswood	Gemalto (Pt L14 Bldg B)	561	Feb-15	3+2
	Australian Pharmaceutical Publishing (Pt L8 Bldg A)	192	Mar-15	4+4
	BT Australasia (Twr B L9, 10 &11)	3,152	Early-17	10
	Gemalto (Pt L14 Bldg B)	561	Feb-15	3+2
	Geistlich Pharma (Pt L19 Bldg A)	123	Dec-14	5
	Fastrack Technology(Pt L19 Bldg A)	147	Oct-14	5
475 Pacific Highway, Chatswood	Ventia (L3,4 & Pt L5)	2,724	Mar-16	5
	Interleasing (L11 & Pt 12)	1,331	Oct-15	10
67 Albert Avenue, Chatswood	Grove International (L14)	924	Jul-16	5

Property	Tenant	Area (sqm)	Commencement Date	Term (Yrs)
	Robert Walters (Ste 1501)	324	Feb-16	5
	Orange Business Services (Pt L11)	442	Aug-14	5
	Government Property NSW (Pt L13)	397	Apr-14	4
	IPAC (Pt L6)	353	Nov-14	3
66-70 Archer Street, Chatswood	Mission Providence (L1 S1)	338	Sep-15	3
	Hsien Michael Soo (L2 Ste 5)	122	Sep-14	5
29 Albert Avenue, Chatswood	Pilates Institute of Australia (L2)	71	Jun-15	3
12 Help Street, Chatswood	Lenovo (L4 & Pt L3)	1,800	Jan-15	5

By contrast over the last five years, the average lease in North Sydney has been 1,300 square metres in size, whilst Parramatta has been 2,800 square metres. It is important to note that this market does not have any A Grade vacancy at present. St Leonards has an average lease size of 1,200 square metres.

Surprisingly, the average leasing deal in Macquarie Park has been much higher at 7,700 square metres. This is slightly skewed as only 19 transactions have been tracked over the past five years. It also includes lease deals to Optus and Metcash. If we were to exclude these transactions, the average is ~3,000 square metres, which is still quite impressive for a suburban office market and superior to Chatswood.

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 to 15,000 square metres. However at this size, Chatswood competes with Macquarie Park, Rhodes and Sydney Olympic Park and they can develop A Grade of building 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.

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 where 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.

If we were to look at the major suburban lease commitments and relocations in the last 15 years, they would include:

- Optus to Macquarie Park — 84,000 square metres and in excess of 1,000 car spaces
- Woolworths to Norwest — 45,000 square metres and 3,120 car spaces
- Resmed to Norwest — 45,000 square metres and in excess of 1,000 car spaces
- Commonwealth Bank of Australia — Circa 70,000 square metre across Sydney Olympic Park and Parramatta

These pre-commitments could not be accommodated within the Chatswood CBD in the form the tenants required, being purpose, exclusive, campus style office accommodation.

A number of larger tenants have also 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 increased congestion it would generate.

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

5.4 Market Rents & Incentives

Incentives are currently at an elevated level; however, A Grade rents have increased across the Chatswood office market as a result of the reduction in overall vacancy across the suburban office market.

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.

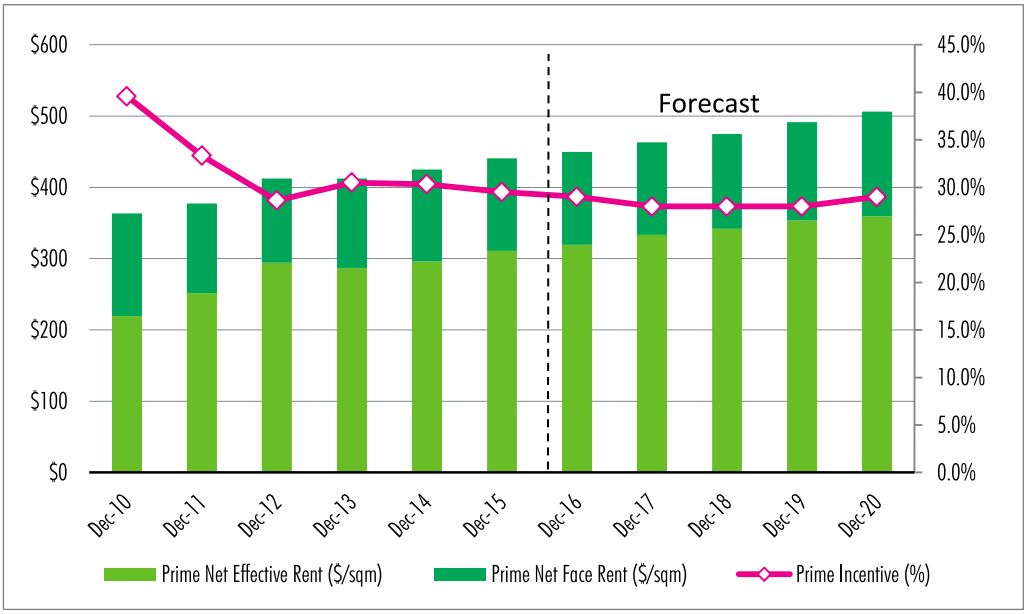
Location	Prime Net Face $/m²	Prime Net Incentives (%)	Car Park $/pspa	Outgoings $/m²
North Sydney	$550 - $750	25% - 35%	$7,000 - $9,000	$120 - $150
Crows Nest/St Leonards	$400 - $550	25% - 30%	$3,500 - $5,000	$85 - $115
Chatswood	**$350 - $550**	**25% - 30%**	**$3,500 - $5,000**	**$90 - $125**
Parramatta	$450 - $550	15% - 25%	$3,500 - $4,000	$90 - $120
Macquarie Park	$350 - $390	25% – 30%	$2,000 - $2,700	$75 - $100
South Sydney	$360 - $380	20% - 25%	$2,000 - $2,700	$70 - $80
Rhodes	$380 - $420	25% - 30%	$2,000 - $2,700	$75 - $100

Sydney Suburban Office Market Comparison Average Prime Net Face Rentals (2016) – Source CBRE 2016

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

Incentives are currently reflecting circa 30% 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 30 to 35% net in order to secure an economic rent of $600 to $650 per square metre net.

Chatswood Net Effective Rents and Vacancy

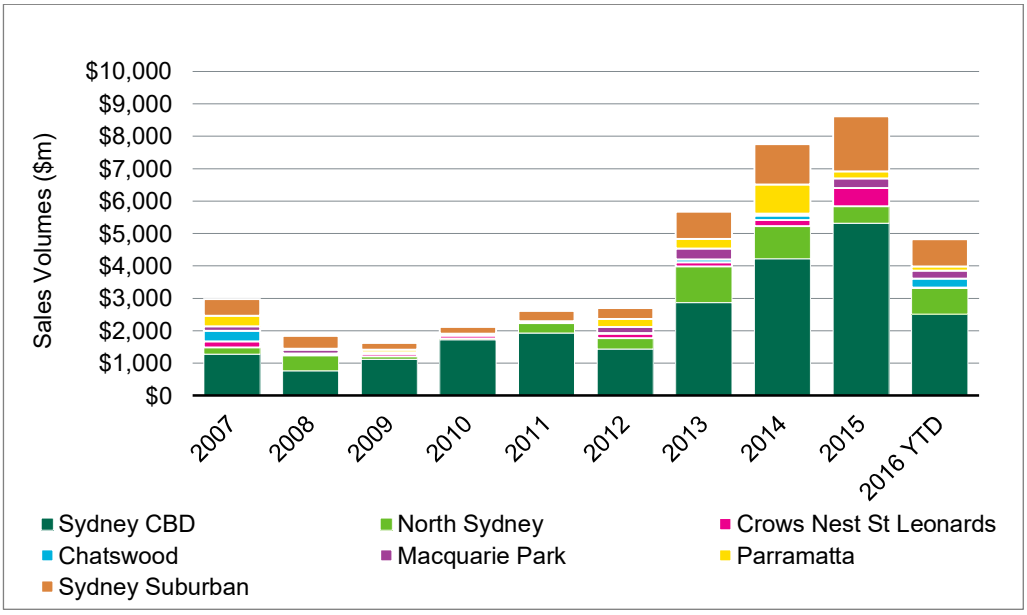


Source: CBRE 2016

5.5 Investment Market

Investment activity for the year to date across Sydney is $3.36 billion, which is down on the previous two years. The vast majority of these sales are from the Sydney CBD which accounts for 2.52 billion, whilst North Sydney is $801.6 million. The residual of the suburban office market, inclusive of Chatswood is $664.3 million. Approximately 40% of all investment sales for the year to date have been completed by foreign interests, down from 58% in 2015.

Sydney Metropolitan Office Sales by Market



Source: CBRE 2016

The largest suburban sale in 2016 has been Zenith Centre at Chatswood for $279.06 million. We detail the relevant sales from across the North Shore and 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
Zenith Centre 821 – 843 Pacific Highway	Chatswood	$279.06	May-16	44,271	8.31%	7.71%	8.18%	3.1	$6,303
10 & 10a Julius Ave, 12 Julius Ave and 1 Lucknow Ave	North Ryde	$94.00	Feb-16	20,455	7.51%	7.80%	8.50%	5.1	$4,596
100 Arthur Street	North Sydney	$313.25	Jan-16	27,395	6.18%	6.31%	6.90%	3.8	$11,435
78 Waterloo Road	Macquarie Park	$106.00	Nov-15	15,019	6.23%	6.16%	6.64%	5.1	$7,058
203 Pacific Highway	St Leonards	$86.05	Dec-15	11,736	8.10%	7.93%	8.32%	4.7	$7,332
166 Epping Road	Lane Cove West	$27.80	Sep-15	7,130	8.77%	7.95%	8.72%	3.6	$3,899
12 Waterloo Road	Macquarie Park	$14.56	Sep-15	3,887	8.64%	7.84%	8.55%	6.0	$3,746
1 City View Road	Pennant Hills	$43.25	Sep-15	8,484	7.57%	7.44%	7.53%	3.4	$5,098
Space 207 207 Pacific Highway	St Leonards	$168.55	Aug-15	19,955	6.80%	6.75%	7.64%	4.2	$8,446
20 Berry Street	North Sydney	$59.00	Aug-15	9,726	7.35%	7.20%	7.90%	5.6	$6,066
22 Giffnock Ave	Macquarie Park	$74.00	Jul-15	13,398	6.73%	6.53%	7.78%	6.6	$5,523
118 Talavera Rd	Macquarie Park	$80.00	Jul-15	11,662	6.54%	6.48%	7.67%	8.4	$6,860
407 Pacific Highway	Artarmon	$18.50	Jul-15	5,926	8.84%	8.10%	7.82%	4.8	$3,122
201 Pacific Highway	St Leonards	$115.00	Jun-15	16,499	8.46%	7.91%	8.71%	2.5	$6,970
6 & 7 Eden Park Dr	Macquarie Park	$81.80	Mar-15	18,131	7.25%	8.10%	8.61%	2.9	$4,512
73 Miller Street	North Sydney	$116.50	Dec-14	14,672	7.99%	8.06%	8.46%	4.3	$7,940
101-103 Miller Street (50% Interest - office only)	North Sydney	$209.25	Nov-14	37,548	6.40%	6.35%	7.75%	3.2	$11,146
465 Victoria Avenue,	Chatswood	$92.00	Feb-13	15,777	7.79%	8.25%	9.50%	6.6	$5,831

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
18 Smith Street	Parramatta	$85.40	Sep-16	12,087	6.83%	6.78%	7.37%	4.5	$7,043
197 – 201 Coward Street	Mascot	$143.40	Sep-16	22,628	6.85%	6.79%	7.57%	5.0	$6,337
3 & 5 Rider Boulevard	Rhodes	$235.00	Jun-16	41,713	7.67%	7.41%	8.02%	3.2	$5,634
Woolworth National HQ 2 Woolworths Way	Norwest	$336.45	Feb-16	44,911	6.07%	6.06%	7.45%	15.7	$7,491
93 George Street	Parramatta	$37.24	Oct-15	7,158	7.99%	8.41%	8.02%	3.1	$5,226
91 Phillip Street	Parramatta	$30.00	Jun-15	5,704	7.56%	7.96%	8.75%	3.4	$5,260
9 George Street	Parramatta	$30.00	Jul-15	5,395	7.64%	7.21%	7.92%	2.4	$5,561
2-14 Meredith Street	Bankstown	$52.50	May-15	13,254	9.64%	9.04%	8.95%	2.7	$3,961
Norwest Quay 21-23 Solent Circuit	Baulkham Hills	$38.90	Apr-15	10,836	8.12%	9.07%	9.77%	5.5	$3,590

Property	Suburb	Sale Price ($'m)	Sale Date	NLA (sqm)	Initial Yield	Equiv Yield	IRR	WALE (yrs)	Rate $psm
Justice Precinct 160 Marsden Street and 4 George Street	Parramatta	$170.10	Dec-14	21,575	6.27%	6.26%	8.32%	15.0	$7,884
NSW Police HQ 1 Charles Street	Parramatta	$241.12	Jun-14	31,954	7.52%	6.87%	8.35%	10.0	$7,546
Sydney Water 1 Smith Street	Parramatta	$165.80	Oct-13	23,330	6.95%	7.06%	8.64%	10.6	$7,107

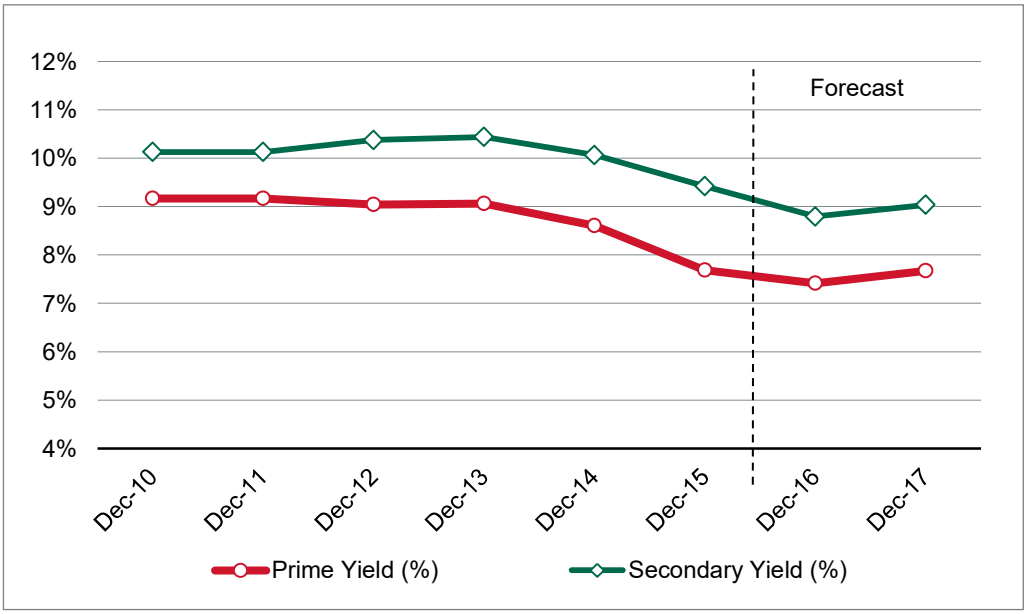
It is evident yields and values overall have remained on a tightening trend, however it is also evident that there is a disparity in returns for suburban assets greater than $200 million in value. The exceptions to this are assets such as the Woolworth Headquarters at Norwest which sold on a yield of 6.07%. However, given the quality of the covenant and the unexpired lease term of 15 years, its pricing is reflective of a bond as opposed to pure property fundamentals.

Whether the subject property could be priced at a similar level would be dependent on the lease covenants secured and the unexpired lease term (weighted average lease expiry profile). Benchmarking the subject property with 177 Pacific Highway, North Sydney suggests that it would be extremely difficult, with lease terms across the five major leases noted earlier ranging from 7 to 12 years. The covenants provided also vary in quality.

Further supporting our view is the pricing for Zenith Centre which is considered to be the benchmark office complex within the Chatswood CBD. This sale took approximately 12 months to complete, highlighting the shallow nature of the buyer pool. Jesse Street Centre, Parramatta is a building of a comparable size and it also remains on the market some nine months after being formally marketed.

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.

Chatswood Prime and Secondary Yields



Source: CBRE 2016

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 of 25% to 50%.

It would also be highly 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 are follows and reflect a substantial softening in pricing metrics.

Property	Sale Price ($mil)	Sale Date	NLA (sqm)	Initial Yield (%)	Equiv Yield (%)	IRR (%)	WALE (years)	$PSM NLA
Space 207, 207 Pacific Highway, St Leonards (*)	$123.50	Jan 2013	19,943	8.15%	8.25%	9.26%	3.7	$6,193

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. 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 suites 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 to councils' desire for mixed use development and employment uses in conjunction with residential. We detail below some recent strata activity within the Chatswood market.

Lots 61 & 90, 47-53 Neridah Street, Chatswood

Sale Date	December 2015	Sale Price	$2,230,000
Site Area	N/A	Rate PSM (Site)	N/A
Lettable Area	242 sqm	Rate PSM (lettable)	$9,215 psm
Passing Rent	$127,000 pa	Net Initial Yield	5.70 %
Market Rent	$127,000 pa	Equivalent Yield	5.70 %

Description: Legally described as Lots 61 & 90/SP21982. Two strata titled commercial suites within 'Chatswood Village', a circa 1986, multi-storey commercial development with basement parking. Two regular shaped lots across Levels 2-4 (Lot 61) and Levels 3-4 (Lot 90) which are fitted out and utilised as a dental clinic. Benefits from one secure car space.

Lot 5, 7 Help Street, Chatswood

Sale Date	January 2015	Sale Price	$1,700,000
Site Area	N/A	Rate PSM (Site)	N/A
Lettable Area	468 sqm	Rate PSM (lettable)	$3,632 psm
Passing Rent	N/A	Net Initial Yield	N/A
Market Rent	$137,340 pa	Equivalent Yield	6.20 %

Description: Legally described as Lots 5 & 36/SP33531. A strata titled quasi retail/commercial suite within a circa 1980s (strata titled 1988), eight level commercial building containing ground floor/mezzanine retail, upper level office suites and basement car parking. A regular shaped lot situated on the Ground Floor (elevated) and configured as two separate tenancies - Travel agent and Physiotherapist. Benefits from three tandem car spaces on title.

Bentleigh, Lot 212, 1 Katherine Street, Chatswood

Sale Date	April 2016	Sale Price	$288,000
Site Area	N/A	Rate PSM (Site)	N/A
Lettable Area	47 sqm	Rate PSM (lettable)	$6,128 psm
Passing Rent	N/A	Net Initial Yield	N/A
Market Rent	$18,380 pa	Equivalent Yield	6.08 %

Description: Legally described as Lot 212/SP62325. A strata titled commercial office suite within 'Bentleigh', a circa 2000, 23-storey mixed residential/commercial building with basement parking. A regular shaped lot situated internally on Level 2 with no direct exposure to natural light. The suite features partitioned office accommodation, common amenities, store room and benefits from one secure basement garage.

Era, Suite 301, 7 Railway Street, Chatswood

Sale Date	September 2016	Sale Price	$1,056,000
Site Area	N/A	Rate PSM (Site)	N/A
Lettable Area	160 sqm	Rate PSM (lettable)	$6,600 psm
Passing Rent	$67,200 pa	Net Initial Yield	6.36 %
Market Rent	$67,200 pa	Equivalent Yield	6.36 %

Description: Legally described as Lot 17/SP88549. A strata titled commercial office suite within 'Era', a circa 2014, 42-storey mixed use development. A regular shaped lot situated on Level 2 providing modern commercial open plan accommodation with common amenities. No car parking noted on title.

Leura, Lot 24, 809-811 Pacific Highway, Chatswood

Sale Date	March 2016	Sale Price	$920,000
Site Area	N/A	Rate PSM (Site)	N/A
Lettable Area	139 sqm	Rate PSM (lettable)	$6,619 psm
Passing Rent	N/A	Net Initial Yield	N/A
Market Rent	$58,176 pa	Equivalent Yield	6.05 %

Description: Legally described as Lot 24/SP69352. A strata titled commercial office suite within 'Leura', a circa 2002, 18-storey mixed use development. A regular shaped corner lot situated on Level 2 (Level 11 SP) providing conventional office accommodation with a good level of fit-out including reception, five partitioned offices, open plan workstations, two balconies (approximately 10 square metres in total), internal kitchenette and common toilet amenities. Benefits from two secure basement car spaces on title (tandem).

Pacific Place, Suite 201, 7 Railway Street, Chatswood

No image to display.

Sale Date	May 2016	Sale Price	$1,010,000
Site Area	N/A	Rate PSM (Site)	N/A
Lettable Area	170 sqm	Rate PSM (lettable)	$5,941 psm
Passing Rent	N/A	Net Initial Yield	N/A
Market Rent	$63,401 pa	Equivalent Yield	5.95 %

Description: Legally described as Lot 5/SP88549. A strata titled commercial office suite within 'Era', a circa 2014, 42-storey mixed use development. A regular shaped lot situated on Level 2 providing modern commercial open plan accommodation with common amenities. No car accommodation noted on title.

Era, Suite 201, 7 Railway Street, Chatswood

Sale Date	May 2016	Sale Price	$1,010,000
Site Area	N/A	Rate PSM (Site)	N/A
Lettable Area	170 sqm	Rate PSM (lettable)	$5,941 psm
Passing Rent	N/A	Net Initial Yield	N/A
Market Rent	$63,401 pa	Equivalent Yield	5.95 %

Description: Legally described as Lot 5/SP88549. A strata titled commercial office suite within 'Era', a circa 2014, 42-storey mixed use development. A regular shaped lot situated on Level 2 providing modern commercial open plan accommodation with common amenities. No car park noted on title.

The strata market is currently dominated by investors, with CBRE experiencing an influx of 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.

With respect to the evidence provided the market reflects rates of $5,000 to $7,000 for suites up to 200 square metres in size, and lower rates for larger areas in excess of 250 square metres.

In the context of the subject property where circa 4,000 square metre of retail and commercial strata is proposed, demand is required from approximately 20 to 40 owner occupiers and/or investors, assuming suites ranging in size from 100 to 200 square metres. This could be more or less depending on the final configuration. For those strata suites to be attractive to investors, tenants will need to be secured, which creates an additional layer of development risk.

Accordingly, we consider a mixed use scheme to be the most appropriate for the subject property. Consideration should be given to the quantum of commercial strata 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.

Mirvac has been successful in developing residential apartments in the Chatswood and therefore the only perceptible risk apart from a general down turn 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, 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 two leases to NSW Government tenants 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.

Market		Market Size (sqm)	Increase in Area (sqm)	(%)
Chatswood	Jan-90	225,271 sqm		
	Jul-16	278,919 sqm	53,648 sqm	23.8%
St Leonards	Jan-90	263,515 sqm		
	Jul-16	333,631 sqm	70,116 sqm	26.6%
North Sydney	Jan-90	768,667 sqm		
	Jul-16	792,482 sqm	23,815 sqm	3.1%
Macquarie Park	Jan-05	527,920 sqm		
	Jul-16	883,367 sqm	355,447 sqm	67.3%
Parramatta	Jan-90	389,860 sqm		
	Jul-16	682,469 sqm	292,609 sqm	75.1%

Whilst Chatswood has increased in size by 23.8% since January 1990, as noted earlier its size has remained stagnant since the mid 1990s. In terms of square metres, the increase of 53,648 square metres is the lowest across the suburban office market apart from North Sydney, however there are mitigating circumstance for this. Namely, North Sydney is already a mature office market of substantial size. It has also been physically constrained in its expansion, particularly to the north by residential and to the south and east by rail and road infrastructure. Moreover, it is a market where it has been difficult to amalgamate sites due to the preponderance of office strata and the need therefore to deal with multiple owners.

The lack of growth in Chatswood would appear to be from a lack of tenant demand, as sites have been readily available.

The data for North Sydney is slightly misleading as it does not include the recently completed 177 Pacific Highway, which is approximately 40,100 square metres, nor does it include new developments which will commence shortly, thereby adding a further 100,000 square metres to the total lettable area over the next three years. Accordingly, North Sydney will be restored to its place as the second largest office market behind the Sydney CBD.

We consider the main reasons for the growth in certain markets as opposed to others to be as follows

- 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 also have also benefited 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.

  Completed in 2012, The Hearing Hub provides world class, purpose built facilities designed to facilitate collaborative research into hearing and related speech and language disorders. It attracted the likes of Cochlear who have established their global headquarters within a campus style facility.
- 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 square metres).
- Lower occupancy costs which has 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.

Interestingly the markets which have grown most over the last 20 years, being Parramatta and Macquarie Park have had contrasting drivers. Growth in Parramatta has been supplied led, with new office buildings at 25 Smith Street (circa 11,100 square metres) and Eclipse Tower at 60 Station Street (approximately 25,700 square metres) speculatively developed. Tenants were subsequently secured once development had commenced and certainty of delivery guaranteed. Also the Centurion at 27 Argyle Street, Parramatta extending to 10,500 square metres was developed speculatively, with a lease subsequently secured to the NSW State Government (RTA) by completion.

The only buildings in Parramatta which have been constructed as a result of lease pre-commitments are:

- Sydney Water HQ at 40-60 Darcy Street, Parramatta. Extending to circa 23,000 square metres, it is leased to Sydney Water.
- 1 Charles Street, Parramatta. Extending to some 32,750 square metres, it has been purpose built for the NSW Police Department.
- Parramatta Square Development. Currently under construction and extending to 26,000 square metres, it will be leased by Western Sydney University on completion.
- 105 Phillip Street Development. Sitting to the rear of 130 George Street, Parramatta, DEXUS have been seeking a lease pre-commitment for this site for a number of years. The NSW Department of Education has recently been secured and will lease 20,400 square metres. The rent appears to be discounted which reflects the inherently low site value.

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 rail 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.

Conversely, Macquarie Park has been the opposite and driven by tenant demand. It has had multiple development sites which are DA approved and able to offer substantial on-site, secure parking in order to attract tenants. The most recent activity at Macquarie Park has been underpinned by lease pre-commitments to Optus, National Measurement Institute, Cannon and Fujitsu. The only building which has been offered to the market speculatively has been 1 Thomas Holt Drive, which was an existing building re-positioned and refurbishment by its owners AMP. Metcash were secured relatively quickly, once delivery certainty was established.

Given the nature of the developments in business park locations, the proposed lead in time is somewhat less, whilst the accommodation provided in modern and at a lower occupancy cost for tenants when compared to more traditional locations and high rise office buildings.

Chatswood and St Leonards to a lesser extent have been limited by their lack of critical mass, being markets of approximately 300,000 square metres in size. Moreover, 75% 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 market 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, 465 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
GPNSW / Transport for NSW	Zenith Centre	11,597.7	2018
GPNSW / Healthshare NSW	Zenith Centre	5,412.8	2020
Commonwealth of Australia (Austrac)	Zenith Centre	4,232.4	2022
Abigroup/Lend Lease	Zenith Centre	7,345.2	2017
Reed Elsevier Australia	475 Victoria Avenue	8,230.5	2020
Leighton Contractors Pty Ltd	475 Victoria Avenue	7,323.7	Various 2017 - 2023
Interleasing	475 Victoria Avenue	1,330.5	2025

St Leonards has been unable to substantially increase its stock as the buildings proposed have been too large to be easily absorbed by the market or their location is considered secondary (i.e. Gore Hill Technology Park). Conversely, Chatswood has lacked tenant demand and therefore developers have tended to gravitate towards residential development.

Where Parramatta and the suburban office markets such as Macquarie Park, Rhodes and Sydney Olympic Park have been successful is having the supply of land which can cater for smaller requirements of circa 10,000 square metres (i.e. Canon), and also larger requirements up to 30,000 square metres as necessary (i.e. CBA at Sydney Olympic Park) across multiple buildings.

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 beyond 2016.

Already the NSW Government's decentralisation program has a brief for 55,000 square metres and Walker Corporations' three new office towers in Parramatta are the obvious choice to secure these leases. NAB has also committed to a portion of this space as well.

The three towers in question, being Commercial Towers 5 and 6, together with 3 Parramatta Square would add circa 157,000 square metres of new supply between 2019 and 2020. As noted earlier, the NSW Department of Education has already committed to Parramatta, securing a lease pre-commitment of 20,400 square metres at 105 Phillip Street (DEXUS).

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.

In the last 24 months, the Sydney CBD fringe 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. The location benefits from its proximity to the Sydney CBD, retail amenity and public transportation. Central Railway Station and Bus Interchange in particular provides convenient accessed from the north, east, south and west of metropolitan Sydney, together with regional locations such as the Illawarra and Blue Mountains.
This will only be enhanced over the coming years with the completion of the Sydney Light Rail and Metro and this could be at the expense of more established suburban office markets as evidenced by CBA relocating from Sydney Olympic Park and Parramatta to ATP. Moreover, the NSW State Government is committed to greater office and mixed uses projects within the Bays Precinct and this could be at the expense of established suburban office markets as it commits resources to this area.

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. It lacks a critical mass of quality office stock to underpin development, particularly of the size proposed and it is questionable whether the required tenant demand exists to justify it.

Given the locational attributes of the site and the dynamics of the Chatswood CBD outlined in this document, residential would appear to be the highest and best use for the site and the lowest risk option. Should there be a requirement for a mixed use scheme, it is our view that retail, as opposed to office is a superior and viable option, albeit with caps in place, as the property sits within the retailing heart of the CBD, opposite Westfield Chatswood and within proximity to Victoria Avenue. This would be an outcome which would not only suit the site, but the wider Chatswood community.

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
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Liability limited by a scheme approved under Professional Standards Legislation.

Appendix D

GTAconsultants

45 Victor Street, Chatswood
Planning Proposal
Transport Impact Assessment

Client // Mirvac
Office // NSW
Reference // N102340
Date // 21/12/2016

45 Victor Street, Chatswood

Planning Proposal

Transport Impact Assessment

Issue: A 21/12/2016

Client: Mirvac
Reference: N102340
GTA Consultants Office: NSW

Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
A	21/12/16	Final	Anna Burnett	Andrew Farran	Brett Maynard	

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Melbourne | Sydney | Brisbane
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Gold Coast | Townsville

Table of Contents

Appendices

Figures

Tables

1. Introduction

1.1 Background

As GTA Consultants understands it, a planning proposal is to be lodged with Willoughby City Council for land occupied by the former Chatswood Post Office at 45 Victor Street and 414-416 Victoria Avenue, Chatswood. The planning proposal seeks to amend the following planning controls applying to the site:

- Amendment to the zoning map and map the entire site as being included in Area 5 - Shop Top Housing permitted.
- Amendment to the maximum floor space to include a minimum non-residential Floor Space Ratio (FSR) of 5:1.
- Amendment to the height of building map to indicate the maximum height of RL262.

Mirvac commissioned GTA Consultants to complete a transport impact assessment considering the planning proposal and indicative site layout.

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:

i existing traffic and parking conditions surrounding the site
ii suitability of the proposed parking in terms of supply (quantum) and layout
iii service vehicle requirements
iv pedestrian and bicycle requirements
v the traffic generating characteristics of the planning proposal
vi suitability of the proposed access arrangements for the site
vii the transport impact of the planning proposal and indicative site layout on the surrounding road network.

1.3 References

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

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

2. Existing Conditions

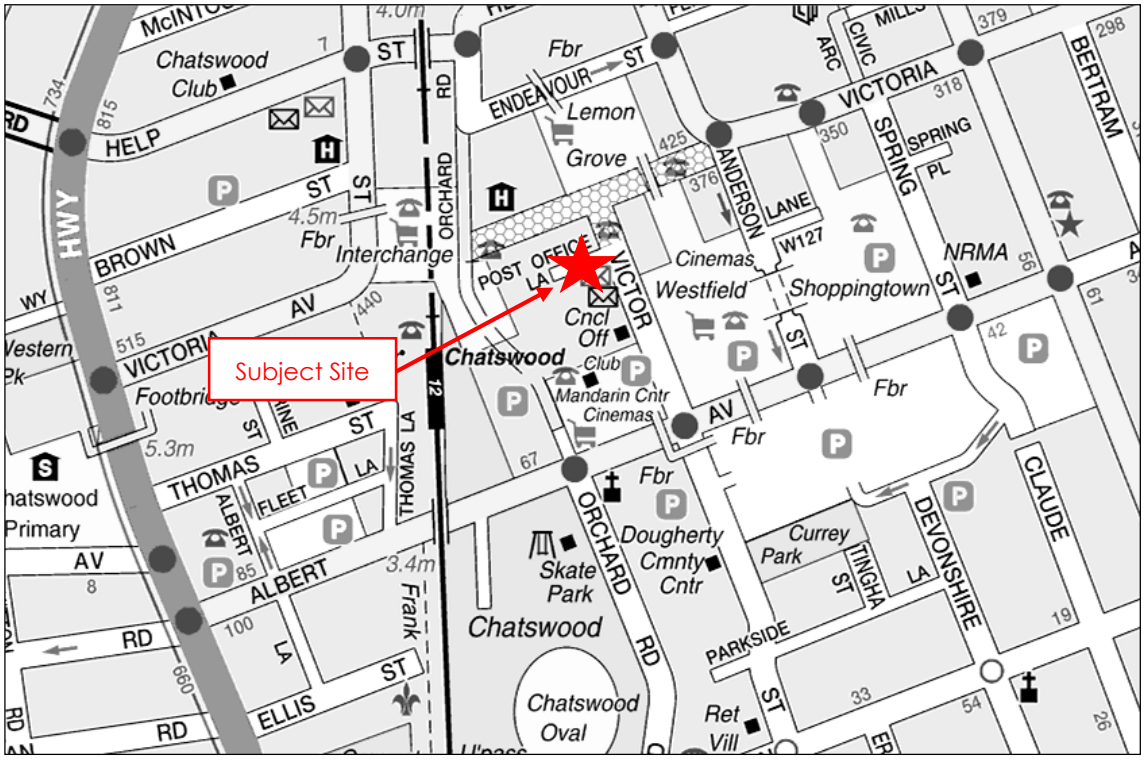
2.1 Subject Site

The subject site is located on Victor Street, Chatswood. The site of approximately 2,255m^2 has a frontage of 70m to Victor Street and 30m to Victoria Avenue. Under Willoughby City Council LEP 2012 the site is classified 'B3 Commercial Core'.

The site is located within 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 within in close proximity to the site. A number of residential properties are located on Victor Street, the largest of which is The Sebel Residence accommodating approximately 200 residential and serviced apartments. Willoughby City Council is 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: UBD

2.2 Road Network

2.2.1 Adjoining Roads

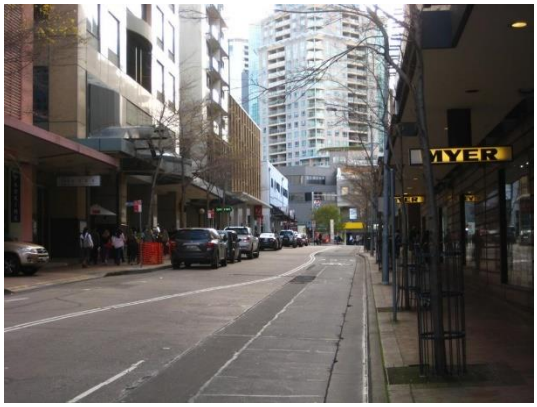
Victor Street

Victor Street is a local road and in the vicinity of the site is aligned in a north-south direction. It is a two-way, no-through road with a 9-metre-wide carriageway, set within a 13-metre-wide road reserve (approx), 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 and carries approximately 4,000 vehicles per day[1].

Figure 2.2: Victor Street (looking south)

Figure 2.3: Victor Street (looking north)



Post Office Lane

Post Office Lane is a local road and in the vicinity of the site is aligned in an east-west direction. It is a two-way, no-through road with a 6-metre-wide carriageway, set within an 8-metre-wide road reserve (approx). Kerbside parking is permitted, subject to time restrictions, on the northern side of Post Office Lane.

Post Office Lane is shown in Figure 2.4.

Albert Avenue

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

[1] Based on the peak hour traffic counts undertaken by GTA September 2014 and assuming a peak-to-daily ratio of 10%.

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)

2.2.2 Surrounding Intersections

The following intersections currently exist in the vicinity of the site:

- Victor Street/ Post Office Lane (unsignalised)
- Victor Street/ Albert Avenue (signalised).

2.3 Traffic Volumes

GTA Consultants has 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	Orchard Rd / Albert Ave	Thomas Ln / Albert Ave	Pacific Hwy / Albert Ave	
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 AM peak hour, reflective of the surrounding retail land uses, and as such, less extensive traffic surveys have been completed during the AM peak hour.

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

Figure 2.6: Existing Thursday AM Peak Hour Traffic Volumes

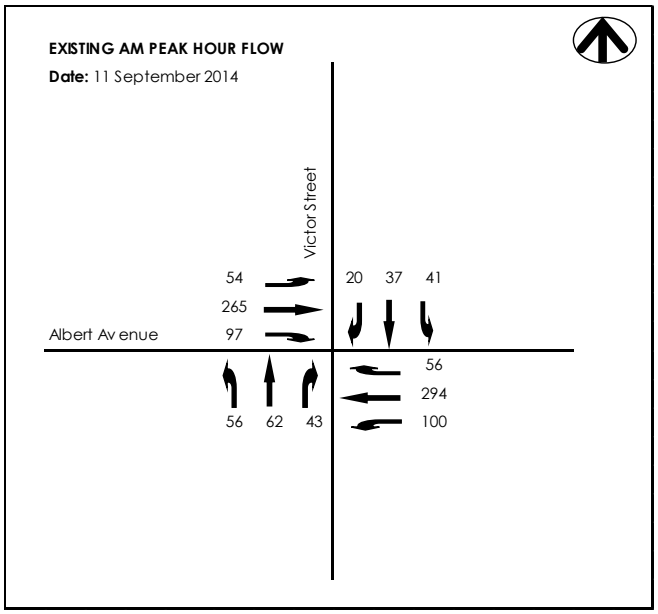


Figure 2.7: Existing Thursday PM Peak Hour Traffic Volumes

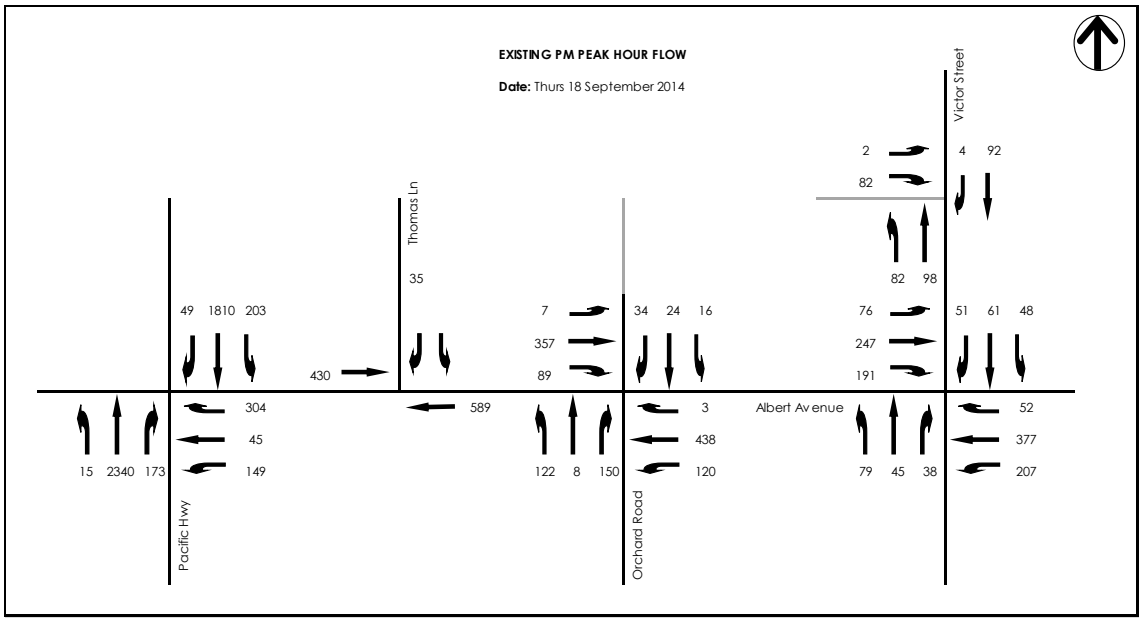
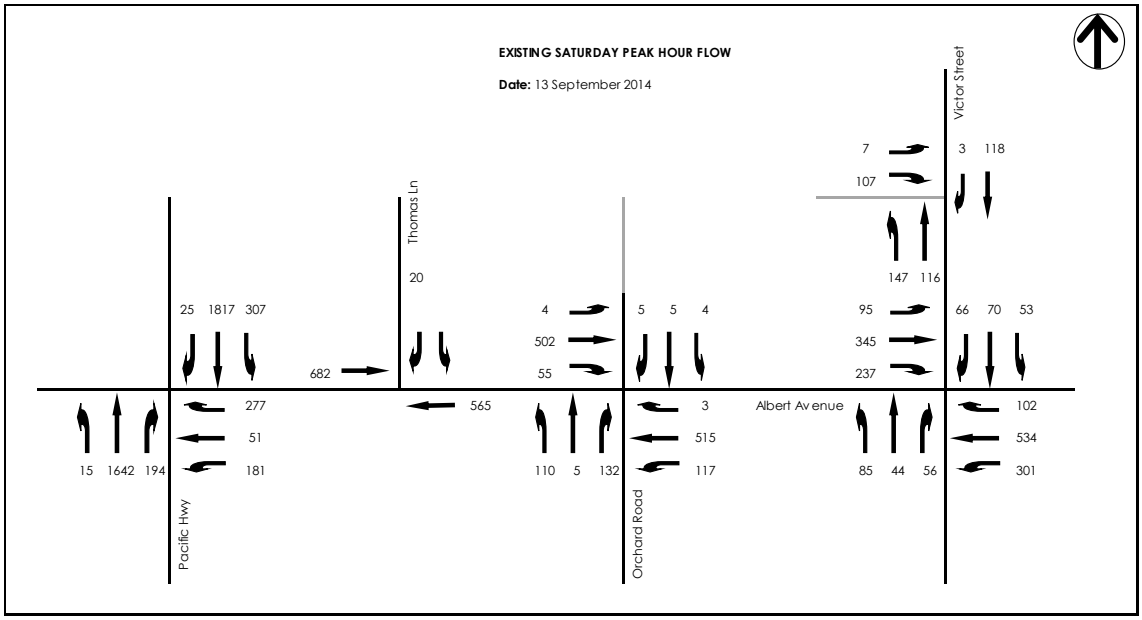


Figure 2.8: Existing Saturday Peak Hour Traffic Volumes



2.4 Intersection Operation

The operation of the key intersections within the study area have been assessed using SIDRA INTERSECTION[2], a computer based modelling package which calculates intersection performance.

The commonly used measure of intersection performance, as defined by the RMS, 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

Table 2.3 presents a summary of the existing operation of the intersection, with full results presented in Appendix A of this report.

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

Table 2.3: Existing Intersection Operating Conditions

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

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

2.5 Car Parking

GTA Consultants compiled an inventory of publicly available on-street parking along Victor Street and Post Office Lane. The inventory identified a total of six on-street car parking spaces, including three ¼P spaces (two of which are No Parking 6:30-9:30am and 3:30-6:30pm), two disabled spaces and one '5 min' space, together with two motorcycle spaces. A loading zone is also available on Victor Street, closer to Albert Avenue.

Parking demand sample surveys were undertaken by GTA Consultants during the weekday AM and PM peak periods and indicate that the majority of Victor Street parking spaces are typically occupied, with little to no vacancies.

It is also noted that the site is located in close proximity to three publicly available 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
Westfield Chatswood	200m	2,800
Chatswood Chase	550m	2,550
	Total	**5,650**

When previously operational (the Post Office site is currently vacant), the on-site car park was accessed via a 6m 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 414-416 Victoria Avenue also has driveway access from Post Office Lane.

2.6 Public Transport

The subject site is well served by public transport services with Chatswood Transport Interchange located approximately 120m west of the site. Chatswood is considered a major node in the CityRail network having undergone a major redevelopment in recent years and is well served by the Northern, North Shore and Western Lines. In the near future Chatswood will also serve as a major interchange for the North West rail link. The rail journey time between Chatswood and Town Hall is 23 minutes. Chatswood Interchange also functions as one of the main bus interchanges in the northern suburbs of Sydney.

A review of the rail and bus services available in the vicinity of the site are summarised in Table 2.5 and Table 2.6.

Table 2.5: Chatswood Interchange Rail Services

Route	Route Description	Frequency On/Off peak
Northern Line	Hornsby or Epping to the City	15 mins peak/ 20-30 mins off peak
North Shore Line	Berowra to Parramatta via City	3-5 mins peak/ 5-10 mins off peak
Western Line	Emu Plains or Richmond to Chatswood	3-5 mins peak/ 5-10 mins off peak

Table 2.6: Chatswood Interchange Bus Services

Route #	Route Description	Frequency On/Off peak
136/137	Chatswood to Manly, Dee Why & Mona Vale	15 mins peak/ 30 mins off peak
143/144	Chatswood to Manly	15 mins peak/ 15-20 mins off peak
200	Chatswood to Bondi Junction	15 mins, peak only
255/256	Chatswood to Chatswood West	30 mins, peak only
257/258	Chatswood to Balmoral/ Lane Cove Industrial	30 mins peak and off peak
267	Chatswood to Crows Nest	30 mins peak and off peak
273	Chatswood to City - Wynyard via Willoughby and North Sydney	10 mins peak/ 20-30 mins off peak
277/278/279	Chatswood to Castle Cove/ Killarney Heights/ Frenchs Forest	Hourly peak and off peak/ 20 mins peak only/ 3 services daily
280/281/283	Chatswood to Warringah Mall/ Davidson/ Belrose	15-30 mins peak/ hourly off peak
284	Chatswood to Duffys Forest via Frenchs Forest and Terrey Hills	10-30 mins peak/ hourly off-peak
533/534	Chatswood to Sydney Olympic Park via Mowbray Rd and Ryde	40 mins peak and off peak
536	Gladesville via Lane Cove and Hunters Hill	40 mins peak and off peak
545/550	Chatswood to Parramatta	15 mins peak and off peak
558	Chatswood to Lindfield	Hourly peak and off peak
565	Chatswood to Macquarie University via UTS Ku-ring-gai, Lindfield and West Lindfield	Hourly off peak
M40	Chatswood to Bondi Junction	10 mins peak/ 15 mins off peak

N90	Hornsby to Town Hall via Chatswood	30 mins, night only

The site is also located within close proximity to taxi services with the nearest designated taxi rank located on Victoria Avenue, 150m west of the site.

2.7 Pedestrian Infrastructure

Pedestrian paths are located as follows:

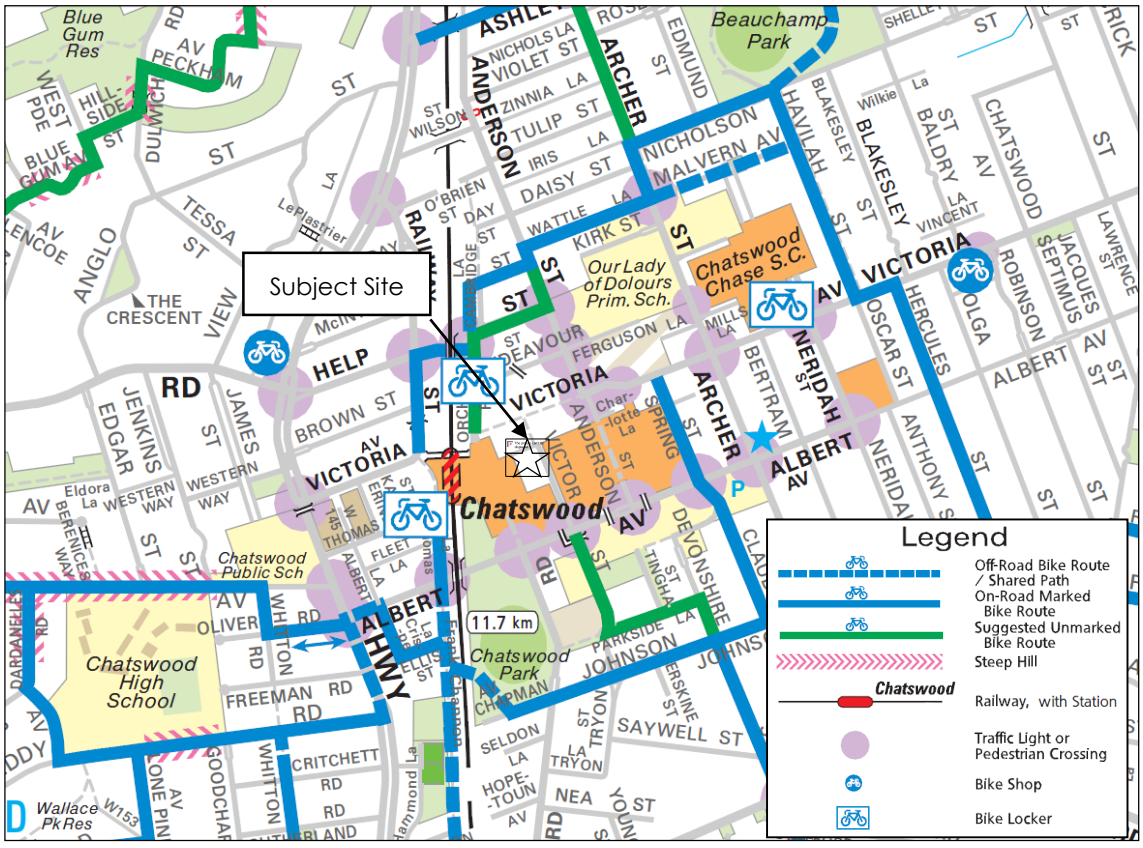
- Victor Street (both sides) – 3-4.5m wide path providing access to the pedestrianised section of Victoria Avenue, Westfield and Chatswood Interchange
- Post Office Lane (southern side) – 1.5m wide path
- Albert Avenue (both sides) – 2-3m wide path.

Safe crossing points in vicinity of 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.

2.8 Cycle Infrastructure

The subject site is located close to several established cycle routes. An extract of the Northern Sydney Cycling Map showing cycling infrastructure surrounding the subject site is shown in Figure 2.9.

Figure 2.9: Cycle Infrastructure



Source: Northern Sydney Cycling Map

End-of-trip facilities are available in close proximity to the site as follows:

- 4 cycle racks in Victor Street pedestrian area – 10m from site. (see Figure 2.10)
- 2 cycle racks on Victor Street – 50m from site (see Figure 2.11)
- 2 cycle racks on Albert Avenue – 70m from site
- cycle lockers at Chatswood Interchange – 120m 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 storage and end of trip facilities.

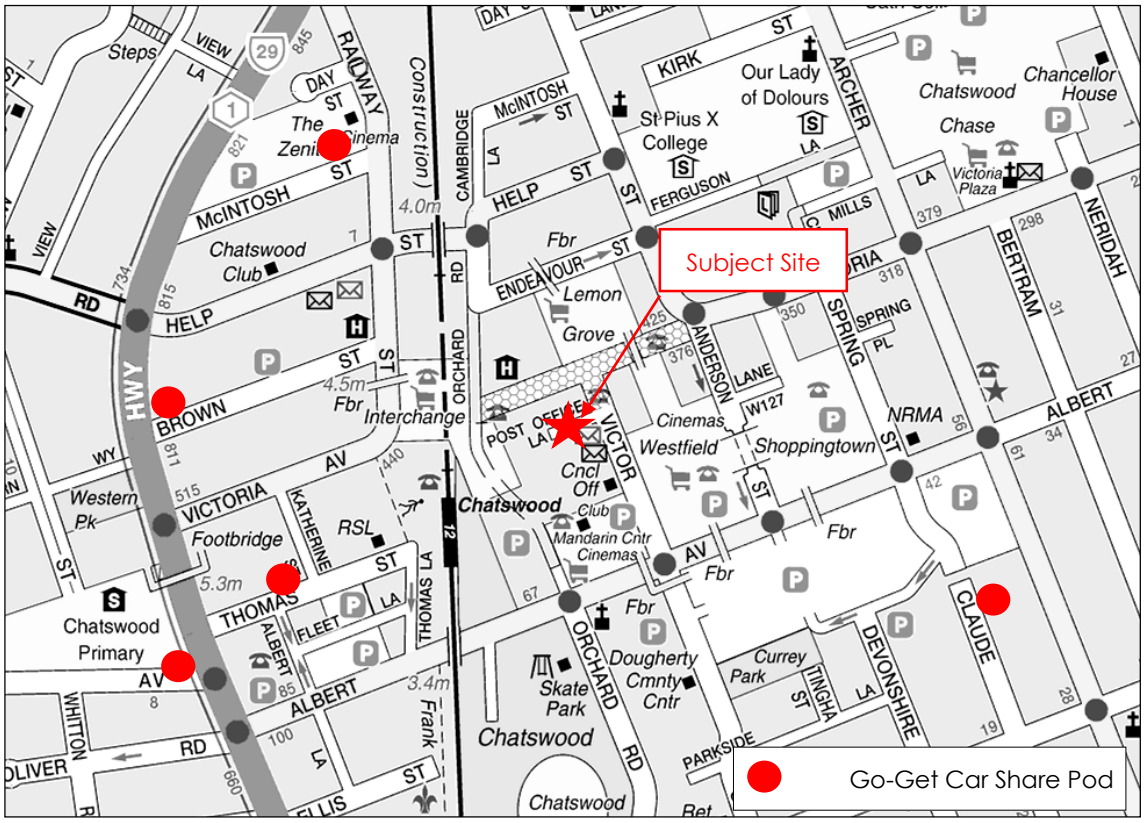
Figure 2.10: Victor Street Pedestrian Area Cycle Racks

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



Basemap source: UBD

The Development Application will outline further proposals to provide car sharing pods.

3. Development Proposal

3.1 Land Uses

The planning proposal intends to amend the following planning controls applying to the site:

- Amendment to the zoning map and map the entire site as being included in Area 5 - Shop Top Housing permitted.
- Amendment to the maximum floor space to include a minimum non-residential Floor Space Ratio (FSR) of 5:1.
- Amendment to the height of building map to indicate the maximum height of RL262.

The amended planning controls are being sought in order to construct a mixed use development incorporating retail, commercial and residential uses to a height of RL262).

The indicative development schedule is summarised in Table 3.1.

Table 3.1: Planning Proposal Schedule (Indicative Only)

Use	Type	No./Size	Mix
Residential	1 bedroom	77	24%
	2 bedroom	182	57%
	3 bedroom	62	19%
	Subtotal	**321**	**100%**
Commercial	Retail	753sq.m GFA	-
	Commercial (lower floors)	10,353sq.m GFA	-
	Subtotal	**11,106sq.m GFA**	-

3.2 Vehicle Access

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 site layout would also relocate access to Post Office Lane to the western boundary of the site.

The suitability of the proposed access arrangements is discussed in Section 4 of this report.

3.3 Car Parking

The planning proposal has an indicative on-site car parking supply of 365 car parking spaces across nine basement levels.

The suitability of the car parking provision and layout is discussed in Section 4 of this report.

3.4 Pedestrian Facilities

Pedestrian access to the residential and commercial uses would be via a lobby area accessed from the Victor Street frontage and the new north-south pedestrian lane at the rear of the site. Pedestrian access to the ground floor retail tenancies would be provided from each frontage.

The suitability of these pedestrian facilities is discussed in Section 5 of this report.

3.5 Bicycle Facilities

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.

The recommended bicycle facilities are discussed in Section 5 of this report.

3.6 Loading Areas

A loading area (with a turntable), is proposed on basement level 1. The loading area would offer some flexibility in terms of its operation and capable of accommodating at least two service vehicles (up to an 8.8m medium rigid vehicle) at a time, including one vehicle on the turntable itself.

Loading access would also be maintained to the reconfigured Post Office Lane, with access arrangements to be confirmed in consultation with Council and adjacent land owners.

The suitability of these loading arrangements is discussed in Section 6 of this report.

4. Car Parking

4.1 Car Parking Requirements

4.1.1 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 DCP parking requirement for the planning proposal as summarised in Table 4.1.

Table 4.1: DCP 2006 Car Parking Requirements

Description	DCP Parking Rate	No. of Dwellings/ NLA (m^2)	DCP Parking Requirement
Residential Flats within Railway Precincts	1 space/1 bedroom	77	77 spaces
	1 space/2 bedroom	182	182 spaces
	1.25 spaces/3 bedroom	62	77 spaces
	Subtotal	**321**	**336 spaces**
	1 space/4 dwellings (visitor parking)	321	80 spaces
Subtotal			**416 spaces**
Commercial Premises in Chatswood	1 space/200m^2 (retail)	753	3 spaces
	1 space/200m^2 (office)	10,353	51 spaces
Total			**470 spaces**

Note: where the parking spaces required is not a whole number, DCP 2006 states that the number of spaces required is to be rounded down to the nearest whole number.

Table 4.1 indicates that the planning proposal is theoretically required to provide up to 470 car parking spaces. It is noted that the DCP 2006 parking rates are neither minimum nor maximum rates and any departure from these rates requires justification.

4.1.2 RMS Guide to Traffic Generating Developments (Residential)

Reference has been made to the RMS 'Guide to Traffic Generating Developments' (October 2002) to determine appropriate residential car parking rates. An assessment of the car parking requirements adopting the high density residential rates is presented in Table 4.2.

Table 4.2: Residential Parking Demands

Type	Number of Dwellings	Car Parking Rate	Car Parking Demand
1-bedroom	77	0.4 spaces per dwelling	31 spaces
2-bedroom	182	0.7 spaces per dwelling	127 spaces
3 bedroom	62	1.2 spaces per dwelling	74 spaces
		Sub Total	**232 spaces**
Residential (visitor)	321 dwellings	1 space per 7 dwellings	46 spaces
		Total	**278 spaces**

Table 4.2 indicates that adopting the RMS rates the site is anticipated to generate a residential parking demand of 278 spaces incorporating 232 resident spaces and 46 visitor spaces. It is understood that Council has previously been supportive of adopting the RMS car parking rates for the residential uses. This approach is also consistent with the updated SEPP65 car parking

requirements, which indicates that adopting the RMS residential parking rates as being appropriate, given the site location near Chatswood Station.

The proposal has adopted the RMS parking rates. However, consultation with Council, the proponent would like to further explore travel demand measures at the Development Application stage in order to further maximise the site's location and acknowledge that public and active transport options are viable options in this location in order to reduce the parking requirements at this site.

4.2 Council Decision Criteria Assessment

DCP 2006 contains a list of criteria against which development applications are assessed when considering any departures from the DCP 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.

4.2.1 Green Travel Plan

Green Travel Plans have also proven to be a successful way of changing travel behaviour for a number of employers throughout Australia and overseas. A Green Travel Plan is a way in which a development is able to manage the transport needs of staff and visitors. The aim of the plan is to reduce the environmental impact of travel to and from a given site and in association with its operation. In essence, the plan encourages more efficient use of motor vehicles as well as alternatives to single occupant car usage.

4.2.2 Reduction in Motor Vehicle Usage

Encouraging the use of public transport and walking and cycling as modes of transport is central to reducing motor vehicle usage. The site is easily accessible by public transport and is within the Chatswood CBD. There are some 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.

The proposed development is a prime opportunity to promote this vision by encouraging the use of public transport, cycling, and walking and not encouraging an abundance of car parking within this area, and in turn an over use of motor vehicles.

4.2.3 Car Parking Availability

In addition, and as discussed in Section 2, the site is located within close proximity to three off-street public car parks; Westfield Chatswood, The Mandarin Centre and Chatswood Chase. These car parks have a capacity in excess of 5,500 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. Education and information about the services of the other modes is also provided through the use of a Green Travel Plan.

4.2.4 Public Transport Availability

The site is located within 120m, or 3 minutes walk of Chatswood Interchange which provides access to high frequency bus and train services. As such, the provision of reduced on-site car parking will encourage residents, staff and visitors to use public transport instead of private motor vehicles. This is in-line with the overall objectives of DCP 2006 to "encourage the use of public transport in areas close to transport nodes"[3].

This level of public transport accessibility will support a zero level of car ownership on the subject land.

4.2.5 Impacts of not Providing Parking for Residential Visitors

It is noted that as a result of not providing on-site car parking for all residential visitors, they will be required to use alternate transport modes such as public transport, cycling and walking. The surrounding on-street car parking facilities in the vicinity of the site are time restricted and as such, residents of the development will not be able to utilise these spaces for long-term parking.

It is noted that several councils in the Sydney metropolitan area have reduced visitor parking required to 1 space for every 10 dwellings, which is more reflective of appropriate CBD residential visitor parking supply and demand.

4.3 Adequacy of Parking Supply

When considering the RMS rates for the residential component of the development and DCP 2006 rates for non-residential, the indicative development yield has a parking requirement of 332 spaces (278 residential spaces and 54 commercial spaces) and an indicative car parking supply of 365 spaces. On this basis, the proposed parking supply is appropriate considering its close proximity to the Chatswood Transport Interchange, shopping precinct, and a range of other amenities.

4.4 Motorcycle Parking

DCP 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

[3] Willoughby City Council DCP 2006, p. C32

required to provide 19 motorcycle parking spaces on-site (=470 x 25%). Details of motorcycle parking provision would be further addressed at the development application stage.

4.5 Bicycle Parking

DCP 2006 contains a guide to bicycle parking facilities for different types of developments as summarised in Table 4.3.

Table 4.3: DCP 2006 Bicycle Parking Guide

Description	Suggested Parking Rate		No. of Dwellings/ NLA (m^2)	Suggested Parking Provision	
	Bicycle Lockers	Bicycle Rails		Bicycle Lockers	Bicycle Rails
Residential	1 per 10 units	1 per 12 units	321 dwellings	32	27
Commercial	1 per 600m^2	1 per 2,500m^2	11,106m^2	19	4
			Total	51	31

Based on the above, DCP 2006 suggests that the planning proposal incorporate 51 bicycle lockers for residents and staff. A further 31 bicycle rails are required for residential and commercial visitors. A bicycle parking area is shown on basement level 1. Whilst the provision of bicycle parking has not yet been determined it is anticipated that the DCP requirement be met on-site.

The 51 bicycle lockers could be accommodated as bicycle racks within a secure cage facility to improve space efficiency and usage and/or accommodated with the storage requirements for each dwelling (for the residential requirements).

4.6 Car Parking Layout Review

The car park layout and site access provisions would be designed in accordance with the requirements of the Willoughby City Council's DCP 2006 and the Australian Standard for Off Street Car Parking (AS2890.1:2004 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 AS2890.2:2002 (Commercial Vehicles) with respect to grades and transitions for an 8.8m medium rigid vehicle.

5. Sustainable Transport Infrastructure

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.

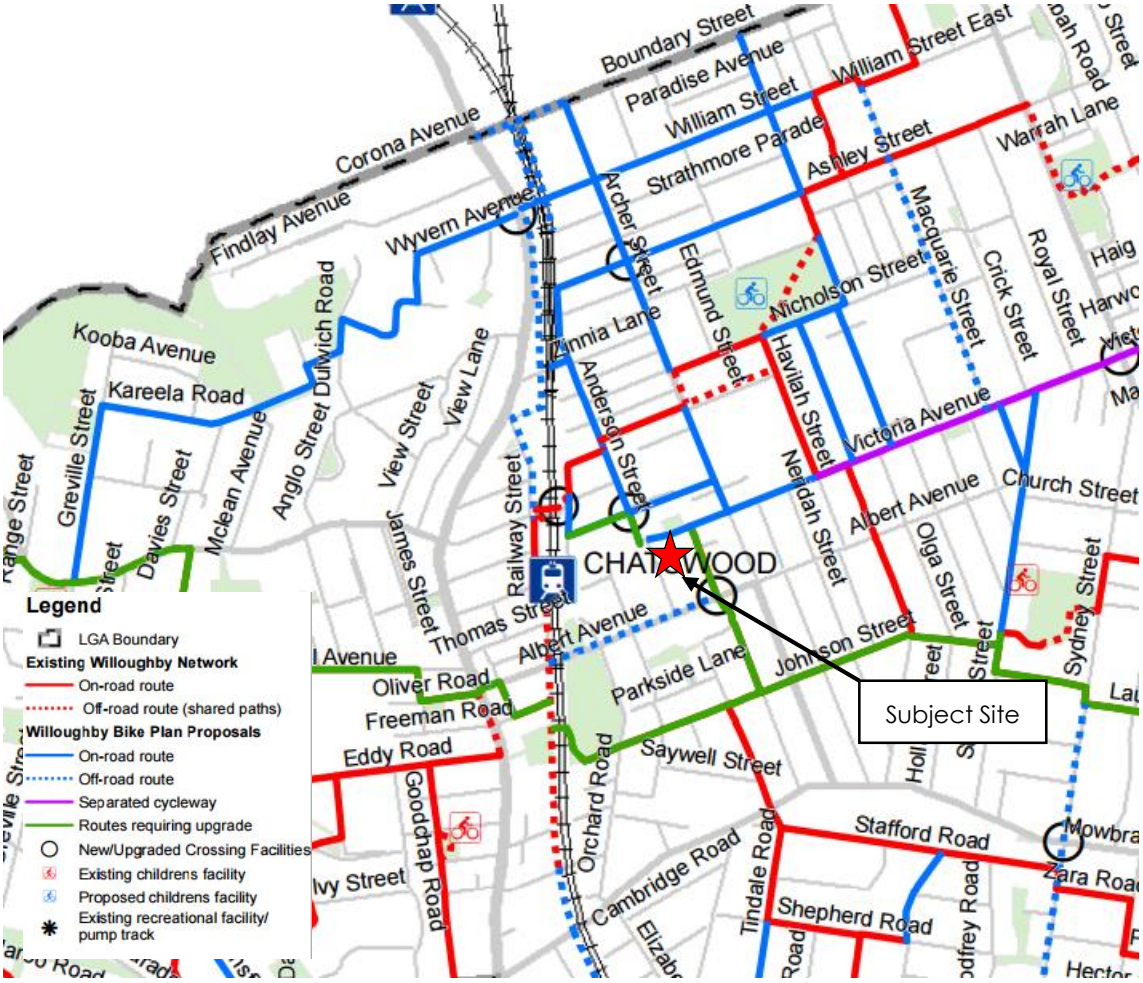
5.1 Cycle Network

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 5.1.

Figure 5.1: Willoughby Bike Plan Proposed Cycle Routes



Source: Willoughby Bike Plan (2012)

5.2 Bicycle End of Trip Facilities

DCP 2006 contains general requirements for bicycle parking as follows:

i enable wheels and frame to be locked to the device without damaging the bicycle
ii be placed in public view and well-lit for security purposes
iii be in a convenient and accessible location outside pedestrian and vehicular movement paths
iv be protected from the weather.

DCP 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 provided within individual commercial tenancies.

Bicycle lockers are intended for use by residents and therefore 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 within close proximity to the site.

5.3 Pedestrian Network

The site is well connected to the existing pedestrian network with pedestrian paths provided on both sides of the roads in the immediate vicinity of 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. As previously noted, the proposed site layout realigns Post Office Lane around the site and along the western boundary. This offers the following:

- a high-quality pedestrian environment that extends the Victoria Avenue and Chatswood Station retail offering, adding to these successful public domain areas.
- active frontages that would improve passive surveillance and personal security.
- a continued visual connection to Victor Street through the building lobby.
- opportunities for a true Shared Zone environment and/or timed loading access to the adjacent properties, improving pedestrian safety and amenity.

5.4 Public Transport

As discussed previously, the site is easily accessible by public transport with Chatswood Interchange located 120m west. The proximity to public transport will increase the use of public transport by residents and employees and discourage the use of private motor vehicles.

6. Loading Facilities

6.1 Loading Requirements

The loading requirements for different development types are contained in DCP 2006, noting that residential developments in excess of 12 apartments are to provide for removalist trucks to park, load and unload on-site. DCP 2006 also notes that Council will determine the required number of loading bays.

6.2 Proposed Loading Arrangements

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 (which also accommodates the standard 8.0m long Willoughby Council rear loading waste collection vehicle) and allow them to enter and exit in a forward direction.

Low service vehicle activity would be expected for the development, with opportunities for any smaller short-stay deliveries (e.g. couriers) to use nearby on-street facilities. It is anticipated that the proposed loading facilities would adequately service the development (with an appropriate management plan), however would be further addressed at the development application stage.

7. Traffic Impact Assessment

7.1 Traffic Generation

7.1.1 Residential

Traffic generation estimates for the residential use have been sourced from the RMS Technical Direction (August 2013). Specifically, the "Sydney Average" traffic generation rates for high density residential flat dwellings has been adopted. Further interrogation of the RMS dataset indicates that those sites with excellent public transport accessibility (i.e. located within 250m 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[4]: 0.11 movements per weekday peak hour
- >250m from a railway station: 0.20 movements per weekday peak hour

Given that the subject site is located in close proximity to the Chatswood Railway Station (i.e. less than 250m) the adoption of the "average" traffic generation rates is considered to be conservatively high.

7.1.2 Office

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 RMS Guide indicates the following rates:

- Car Parking: 2.5 spaces per 100sq.m
- Peak Hour Traffic: 1.6 spaces per 100sq.m (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.

7.1.3 Retail

A traffic generation rate of one movement per space has been adopted for each of the retail car parking spaces.

7.1.4 Summary

Estimates of peak hour and daily traffic volumes resulting from the proposal are set out in Table 7.1.

Table 7.1: Residential 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	321 dwellings	0.19 movements per dwelling	0.15 movements per dwelling	0.19 movements per dwelling [1]	61	48	61

[4] Includes St Leonards, Strathfield and Chatswood.

Office	10,353sq.m (51 spaces)	0.64 movement per space	0.64 movement per space	none	33	33	0
Retail	753sq.m (3 spaces)	1 movement per space	1 movement per space	1 movement per space	3	3	3
Total	-				97	84	64

[1] Saturday traffic generation rates are not provided in the Technical Direction and as such the AM peak hour rates have been adopted.

Table 7.1 indicates that the site is anticipated to generate between 64 and 97 movements during each peak hour (including weekend).

Given the existing traffic generation of the site, the planning proposal can be expected to generate approximately 81 to 94 additional vehicle movements[5] during a typical weekday peak hour.

Whilst not assessed, traffic associated with the existing on-street car parking demand for the Australia Post store will no longer be attracted to the immediate surrounds and would likely result in a further reduction in traffic accessing Victor Street.

7.2 Distribution and Assignment

In order to present a conservative assessment, GTA Consultants has assessed the traffic generation rates as per the RMS Guide. The directional distribution and assignment of traffic generated by the planning proposal will be influenced by several factors, including the:

i configuration of the arterial road network in the immediate vicinity of the site
ii existing operation of intersections providing access between the local and arterial road network
iii distribution of households in the vicinity of the site
iv surrounding employment centres, retail centres and schools in relation to the site
v likely distribution of employee's residences in relation to the site
vi 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%
- Victor Street (south) – 20%
- Albert Avenue (west) – 40%.

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.

[5] Based on an existing traffic generation of 3 peak hour vehicle movements to/from the site.

This results in a directional split during the respective peak periods as shown in Table 7.2.

Table 7.2: Increase in Traffic Generation

Peak Period	Land Use	Inbound	Outbound
Thu AM	Residential	20% (12 vehicles)	80% (49 vehicles)
	Commercial	80% (29 vehicles)	20% (7 vehicles)
	Total	**41 vehicles**	**56 vehicles**
Thu PM	Residential	80% (38 vehicles)	20% (10 vehicles)
	Commercial	20% (7 vehicles)	80% (29 vehicles)
	Total	**45 vehicles**	**39 vehicles**
Sat Midday	Residential	50% (31 vehicles)	50% (30 vehicles)
	Commercial	50% (1 vehicles)	50% (2 vehicles)
	Total	**32 vehicles**	**32 vehicles**

7.3 Traffic Volumes

7.3.1 Other Developments

There are a number of developments that have been constructed or are proposed in the vicinity of the site since the traffic surveys were undertaken (September 2014) that will increase traffic volumes along the Albert Avenue corridor. These developments are illustrated in Figure 7.1, and include:

- Metro residences (constructed)
- Meriton development (constructed)
- Mandarin Centre (Planning Proposal)

Figure 7.1: Surrounding 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 7.2 to Figure 7.4 have been prepared to show the post-development traffic volumes assuming planning approvals for each of the adjacent developments.

Figure 7.2: Post Development Thursday AM Peak Hour Traffic Volumes

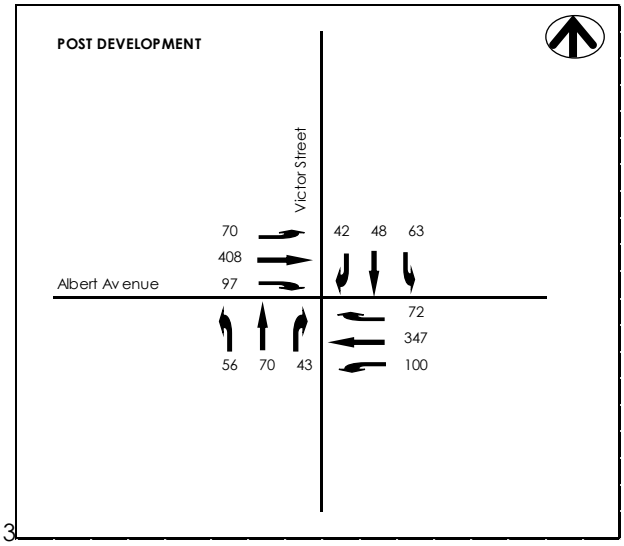


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Figure 7.3: Post Development Thursday PM Peak Hour Traffic Volumes

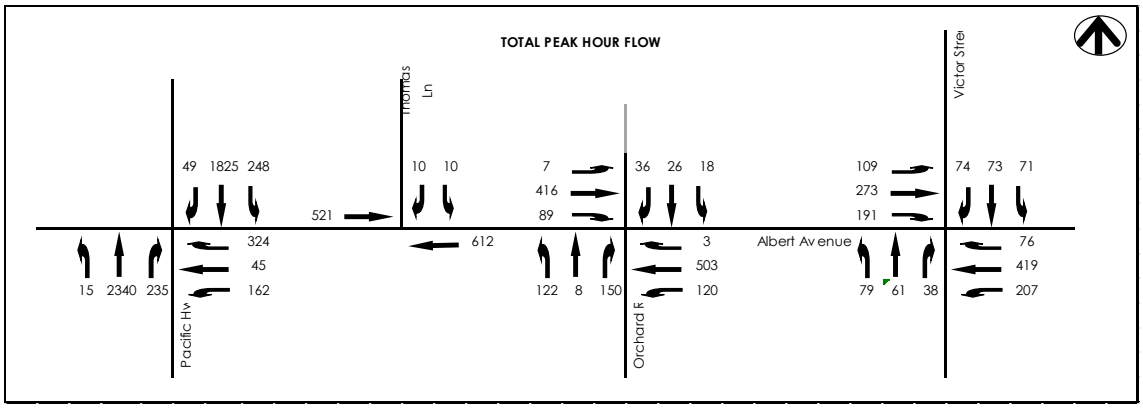
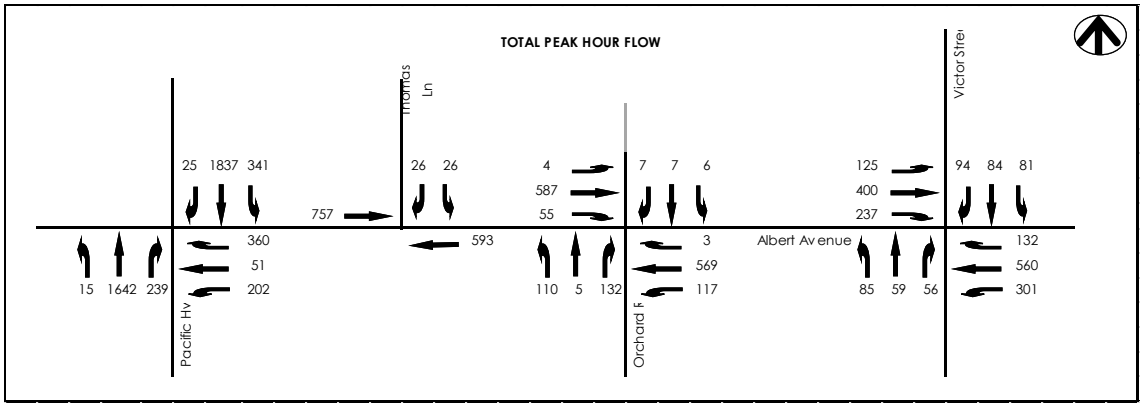


Figure 7.4: Post Development Saturday Midday Peak Hour Traffic Volumes



7.4 Traffic Impact

An assessment of the impacts that future 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 in the vicinity of the site has been assessed using SIDRA INTERSECTION 7 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 7.3 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 7.3: Future Operating Conditions

Intersection	Peak	Degree of Saturation (DOS)	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
Victor Street/ Albert Avenue	Weekday AM	0.25	16	38	B
	Weekday PM	0.49	16	45	B
	Saturday	0.83	20	90	B
Orchard Road/ Albert Avenue	Weekday PM	0.92	16	104	B
	Saturday	0.96	16	132	B
Thomas Lane/ Albert Avenue	Weekday PM	0.49	6	53	A
	Saturday	0.47	7	88	A
Pacific Highway/ Albert Avenue	Weekday PM	1.13	44	923	D
	Saturday	1.46	58	245	E

Against existing traffic volumes in the vicinity of the site, the additional traffic generated by the planning proposal could not be expected to compromise the safety or function of the surrounding road network. Overall, the intersection would continue to operate at the same levels of service when compared with existing conditions.

On the basis of the above assessment, it is clear that the development of the site would have a negligible impact on the operation of the intersection of Victor Street and Albert Avenue with the intersection remaining at LOS B, which is described as a 'good' level of service.

7.5 Summary

Against existing traffic volumes in the vicinity of 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 500m 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 1% of the existing traffic volumes through the intersection.

8. Conclusion

Based on the analysis and discussions presented within this report, the following conclusions are made:

i A 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 414-416 Victoria Avenue site.

ii The planning proposal seeks amended site controls to facilitate approximately 753m^2 of retail, 10,353m^2 of commercial and 321 residential apartments (50 storeys in total), above a basement containing approximately 365 parking spaces and a flexible loading dock with turntable.

iii The indicative proposal generates a Willoughby DCP 2006 parking requirement of 470 car parking spaces.

iv When considering RMS parking rates for the residential component (as per SEPP 65, given the site in in close proximity to high-frequency public transport), 332 parking spaces are required. Approximately 365 parking spaces are proposed over nine basement levels. As such, the proposed supply meets these requirements.

v At Development Application stage the proponent, in consultation with Council, would propose to reduce car parking requirements and place further emphasis on sustainable measures (including car share pods, bicycle parking, green travel plans, etc.) especially being closely located to amenities, employment and the Chatswood Transport Interchange.

vi 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.

vii It is proposed that Post Office Lane is realigned around the site. The resultant layout and activated frontages would improve pedestrian safety, security and amenity, whilst having flexibility to accommodate operational requirements of stakeholders under restricted access arrangements.

viii Based on the RMS Guide to Traffic Generating Developments, the site would be expected to generate in the order of 102 and 115 vehicle movements (including 97 and 110 additional movements) during a typical weekday (PM) and weekend peak hour.

ix 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.

x While the intersection of Pacific Highway and Albert Avenue is operating at or near capacity during peak periods, the cumulative development traffic would have a minor impact on intersection operation.

Appendix A

SIDRA INTERSECTION Results

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.

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 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	0.333	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 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	6.5	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.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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	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
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	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	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	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	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.

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.

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.

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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.

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]

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.

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.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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 [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.

Appendix B

Surrounding Developments and Site Traffic Generation

The traffic impact assessment includes the traffic generation from a number of surrounding developments, including the Metro Residences (at the Chatswood Interchange) and the Meriton Development (Thomas Street). Both these developments are constructed. 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 ○ 12,000sq.m retail GFA ○ 484 car spaces	116	116
Meriton Development	Thomas Street	○ 543 apartments (including 241 private and 302 serviced) ○ 550sq.m retail ○ 50 place child care centre ○ 740 car spaces (approx.)	158	175
Mandarin Centre	61-65 Albert Avenue	• 285 apartments • 10,500sq.m retail/ entertainment GFA • 2,945sq.m supermarket GFA ○ 545 car spaces (approx.)	45 (plus 48 existing movements [1])	56 (plus 170 existing movements [1])
Total			**+319 movements**	**+347 movements**

[1] 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.

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 8.1: AM Peak Hour – Base Traffic Volumes

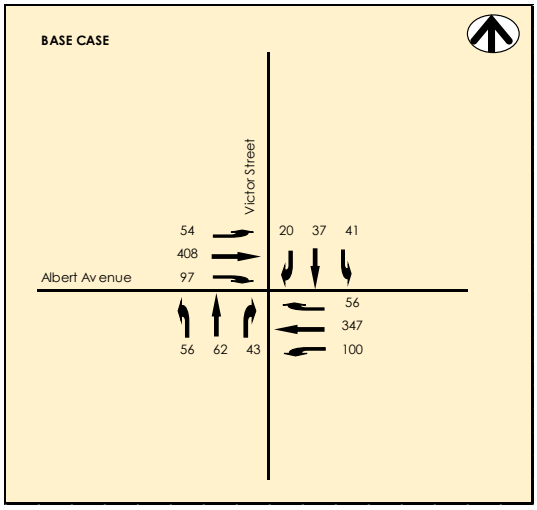


Figure 8.2: PM Peak Hour – Base Traffic Volumes

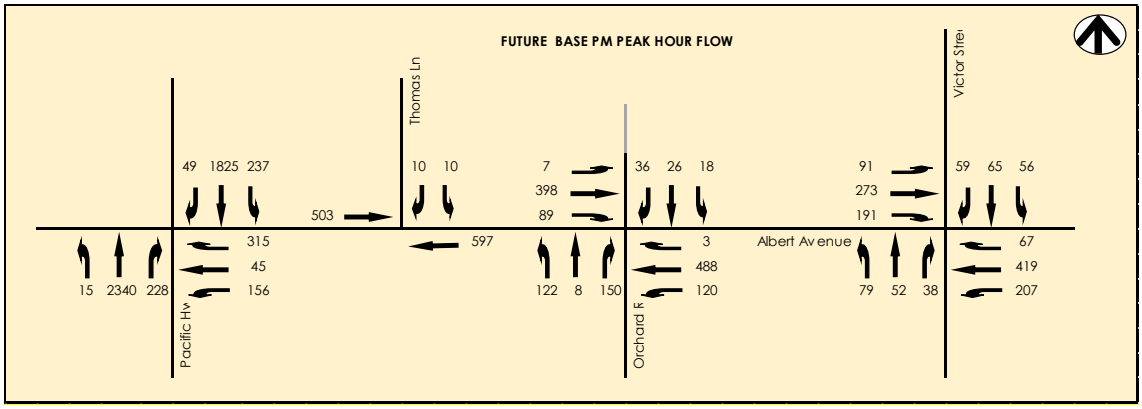


Figure 8.3: Saturday Peak Hour – Base Traffic Volumes

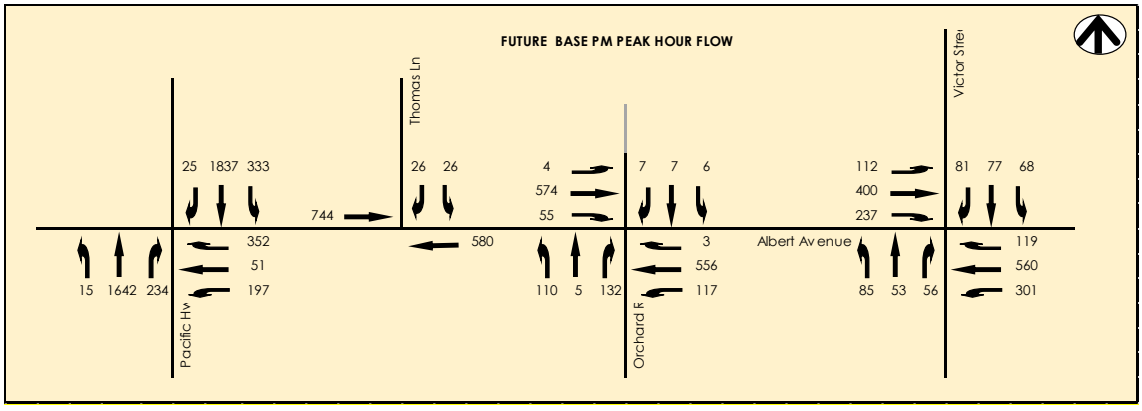


Figure 8.4: AM Peak Hour – Site Generated Traffic Volumes

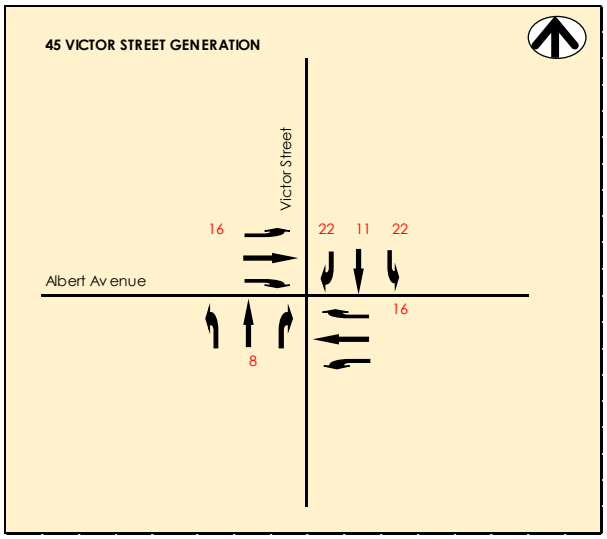


Figure 8.5: PM Peak Hour – Site Generated Traffic Volumes

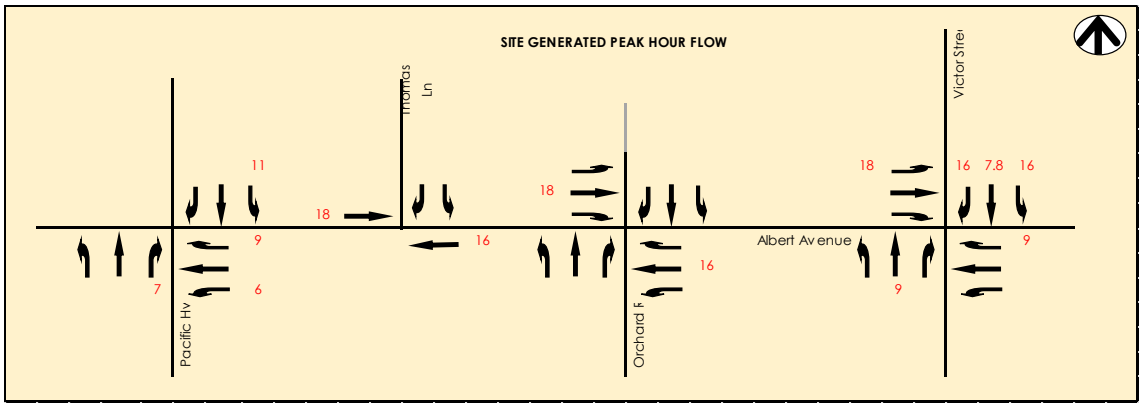
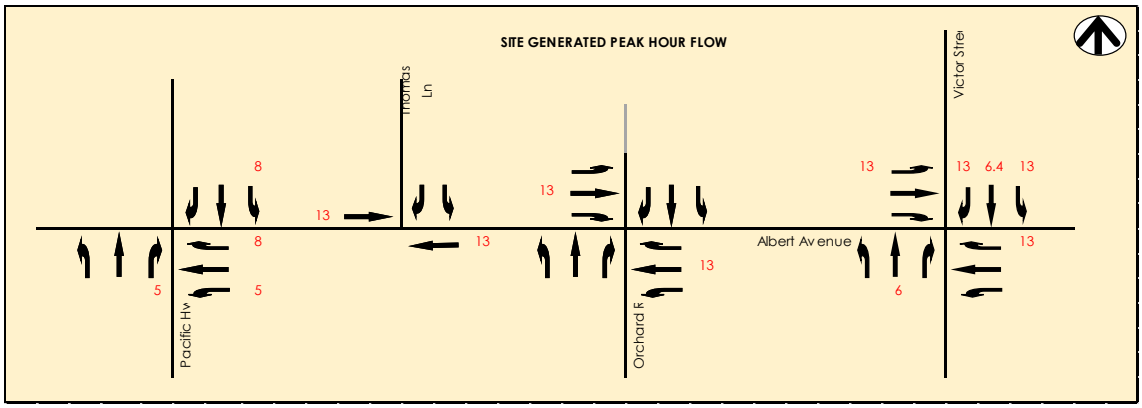


Figure 8.6: Saturday Peak Hour – Site Generated Traffic Volumes



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