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PROJECT DESCRIPTION

INTRODUCTION

The Chatswood CBD Planning and Urban Design Strategy to 2036 (henceforth, the Strategy) primarily focuses on creating capacity for future growth in the Chatswood CBD area. After the commencement of its public exhibition on January 2018, the Department of Planning, Industry and Environment (DP&E) raised a number of concerns to Willoughby City Council on a letter dated August 9, 2019, which requested an assessment of the Strategy to determine:

- the proposed transition of FSR and built form from the mixed-use areas identified in the strategy to HCAs
- visual impacts to demonstrate how the future built form will look along major roads; and
- potential amenity impacts (overshadowing) to the neighbouring low-density and/or existing development in HCAs, particularly during mid-winter.

In response to the letter from the DP&E, Willoughby City Council has initiated further studies on the Chatswood CBD Planning and Urban Design Strategy. GM Urban Design and Architecture (GMU) has been engaged to undertake an independent urban design study of the built form approach proposed by the Strategy.

GMU’s study seeks to investigate how the proposed building heights and FSRs in the mixed-use areas relate to the surrounding Heritage Conservation Areas (HCAs) and/or retained low density development. GMU has conducted extensive testing around the above mentioned three aspects, and our study has led to a number of findings, which will be discussed in the following sections of this report.

GMU’s testing has also considered the broader planning framework for the Chatswood CBD, the intent of the Northern District Plan for the locality by the Greater Sydney Commission (GSC), and the advice from the independent heritage consultant - Weir Phillips.

METHODOLOGY

In undertaking this study, GMU has conducted extensive analysis to understand the true potential of the study area. In arriving at the conclusions in this report, GMU has:

- conducted an extensive site visit with the heritage consultant from Weir Phillips to Chatswood CBD, especially the peripheral areas which border the HCAs
- reviewed Council’s previous studies and applicable controls, analysed the characteristics of the land holdings in the study area, and reviewed the correspondence between Willoughby Council and Department of Planning, Industry and Environment (DP&E)
- investigated relevant literature as a theoretical basis for the analysis
- tested opportunity and amalgamated sites identified on page 106 and 109 of the Chatswood CBD Planning and Urban Design Strategy (Architectus, January 2018) and created a compliant massing for each site that is consistent with ADG guidelines and applicable controls. Figure 3 is an example of how the massing was first tested in 2D form before height and FSRs were applied.
- applied the proposed height and FSRs into a 3D massing form of each opportunity sites as nominated by page 34 and 36 of the Chatswood CBD Planning and Urban Design Strategy to 2036 (January 2018) (Figure 1&2), and the outcome is shown in page 11.
- conducted high level transition, visual impact and potential overshadowing testing based on the interrogation of a full scale 3D model of Chatswood.

Figure 1. Opportunity Sites

Architectus, ‘Chatswood CBD Planning and Urban Design Strategy’, pp.106, Figure 4.6.1

Figure 2. Almagamation Pattern

Architectus, ‘Chatswood CBD Planning and Urban Design Strategy’, pp.109, Figure 5.2.1

Figure 3. Built Form Testing - Plan and Yield Table Sample

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Note: *existing PP 28 levels, ** bonus FSR

Figure 4.6.1 Architectus, ‘Chatswood CBD Planning and Urban Design Strategy’, pp.106

Figure 5.2.1 Architectus, ‘Chatswood CBD Planning and Urban Design Strategy’, pp.109
Greater Sydney Regional and District Plan - Chatswood

This section discusses the strategic planning direction at state level for the future of Chatswood, including the Greater Sydney Region Plan and District Plans by The Greater Sydney Commission (GSC).

A Metropolis of Three Cities

The plan released in March 2018 presents Greater Sydney as a metropolis of three cities, comprising the Western Parkland City, the Central River City and the Eastern Harbour City. The Eastern Harbour City is centred around the existing Sydney CBD and it is currently Australia’s global gateway and financial centre. Furthermore, several major infrastructure, including Sydney Metro, Northconnex, are underway to strengthen its competitiveness, and the Eastern Economic Corridor, which stretches from Macquarie Park to Sydney Airport, contributes to two-thirds of NSW’s economic growth in the 2015-16 financial year (Greater Sydney Regional Plan).

Chatswood is strategically located within the Eastern Economic Corridor and conveniently serviced by trains and the newly-built metro. In addition, Chatswood has been nominated as one of the major assets and commercial precincts of the Corridor. Other similar strategic centres within the Eastern Harbour City include: Macquarie Park, St. Leonards and the Harbour CBD.

Density has increased across the urban area ... more intense development is evident from the City of Sydney to Mascot and in Parramatta, Chatswood, Rhodes, Strathfield, Burwood and Hurstville

- Greater Sydney Commission, ‘Greater Sydney Regional Plan 2018’, pp.31
**North District Plan**

The North District forms a large part of the Eastern Harbour City, it will accommodate an additional 92,000 dwellings in the next 20 years, and the economy of the precinct will be strongly supported by intensification of health and education facilities and the office market.

As is shown on Figure 5, Chatswood is identified by the GSC as a Strategic Centre, expected to provide additional dwellings and services, and offer the fifth largest office precinct floor space within Greater Sydney. Furthermore, it is predicted to accommodate an additional 8,300 jobs by the year 2036 (Figure 6).

Also, Chatswood has the following strategic advantages:

- it has well-established retail and services precinct, including Westfield, Chatswood Chase and the Mandarin Centre within the town centre area (Figure 6)
- potential for further job generation (Figure 6)
- excellent connectivity by trains, Sydney Metro and buses

**Strengthen Chatswood** through approaches that:

- protect and grow the commercial core
- maximise the land use opportunities provided by Sydney Metro
- promote the role of the centre as a location for high quality, commercial office buildings and a diverse retail offering...

---

*Greater Sydney Commission, 'North District Plan', pp. 74*
The key findings are:

- as per Figure 7, Chatswood CBD (around the core area) will be a prime focus for population growth due to its great connectivity (Page 38, Draft Willoughby Housing Strategy to 2036),
- 6,000 to 6,700 additional dwellings will be required to achieve the population goal within the Willoughby LGA, and the rezoning by Chatswood CBD Planning and Urban Design Strategy to 2036 will take up 5,000 of this (Figure 8). In other words, without the strategy, the LGA will struggle achieving the population target.

These studies have also been identified to accommodate employment growth. How they address and accommodate housing growth:

- Development potential in existing zones
  - 1000
  - This figure is based on detailed land use surveys conducted of all land zoned for medium/high density and is an estimate of development potential remaining in these areas.

- Proposed rezonings - Chatswood CBD
  - 5000
  - This is the number of potential dwellings for the sites proposed to be rezoned in CBD Strategy
  - (Rezoning in Glenmore St and at the southern end of Naremburn is suggested to be a longer term proposition more appropriate for a later stage beyond 20 years).

The next step is to bring together the extra dwelling potential of all the above mentioned studies and conclude how they impact on the supply of land for dwellings.

The population forecasts anticipated that between 6,000 – 6,700 dwellings will be required to meet population growth to 2036.

Whilst the capacity anticipates 7891 extra dwellings, this assumes 100% take up. A feasibility assessment suggests the market may only deliver 6,300 under current market conditions. However, this will ensure that Council can make its dwelling requirements to 2036.

High density housing will be planned for the most accessible locations close to bus, train and Metro stations and walkable to all services ... As such, **Chatswood** and St Leonards Strategic Centres will be the focus of this style of housing.
Chatswood CBD Planning and Urban Design Strategy to 2036

This strategy has been prepared to provide guidance for future growth within Chatswood over the next 20 years. The objectives of the Strategy include:

- A reinvigorated commercial core area and economically buoyant CBD, to provide for future employment.
- A sustainable balance between commercial, retail, residential, education, cultural and other uses to ensure on-going vibrancy.
- A compact, walkable CBD.
- A city form and scale to accommodate future growth and change.
- A CBD of exceptional urban design, easy pedestrian linkages and good public domain, where local character and heritage are embraced, and the greening of the centre is achieved.
- Simplified controls for the LEP and DCP in relation to the CBD.

(Source: Chatswood CBD Planning and Urban Design Strategy to 2036)

To achieve the above objectives, the Strategy:

- expands the Chatswood CBD boundary.
- identifies the Commercial Core and Mixed Use areas and protects the residential uses from encroaching the core area (Figure 7).
- lifts the FSR restrictions within the town centre area to maximize the floor space provision (Figure 8), and requires a 1:1 commercial FSR inclusion within mixed use developments.
- increases height limits while protecting solar access to key public spaces.

Without a modification to planning controls, there is a risk that the market will fail to deliver the desired jobs growth.

- Willoughby Council, ‘Chatswood CBD Planning and Urban Design Strategy to 2036’, pp.8
**Scale Comparison**

Based on the methodology mentioned in the previous sections, GMU has tested each opportunity site in plan form (see Figure 3) and modelled three dimensionally the built form for each opportunity site consistent with the Chatswood CBD Planning and Urban Design Strategy to 2036. The evolving model form (see Figures 15 & 16) suggests an overall city skyline with two major spines: one along the train line of approximately 1.5km in length and the other one along Victoria Avenue of 1.2 km in length (Figure 13).

This is consistent with the development patterns observed in other Australian cities. Major cities tend to extend concentrically or linearly with greater scale and heights often expressed along major movement spines. For instance, the City of Sydney concentrates height along its ridge in a north-south axis from Circular Quay to Central Station. Recent developments are extending this scale to Broadway to the south and east. Similarly, the scale is extending to the west to capture Darling Harbour, and Ultimo. Its geographic extent north-south is some 3.0km and 1.2 to 3.2km east-west.

Although different in scale, both the Sydney CBD and Chatswood follow development spines. A translucent outline of the Chatswood CBD has been superimposed over the Sydney CBD aerial map for ease of comparison.

Brisbane also extends its CBD over 3.4 - 3.3km and follows linear spines along the peninsular formed by the river. As shown by the superimposed outline of Chatswood, the scale of Chatswood is closer in scale to that of Brisbane when compared to the scale of Sydney, it only occupies approximately the southern half of its north-south spine at approximately 1.8 km. Heights in these centres vary from 399m at the centre to 117-170m on the edges (Sydney), 249m at its centre and 243m at its edges for Brisbane (Figure 12).

Chatswood town centre area is smaller than above mentioned centres. It is roughly the same scale as the City of Sydney from Walsh Bay to Town Hall north-south (1.7km) and Barangaroo to Circular Quay (1.2km), which is the densest locality within Sydney CBD. Similarly, the densest place in Brisbane spreads along an area of 1.8km by 1km, and it is also close to the Chatswood town centre in size.

*Figure 13. Scale of future Chatswood town centre area*
Evolving built form suggested by Chatswood CBD Planning and Urban Design Strategy to 2036

The three-dimensional massing and built form resulting from the 3D testing described as part of GMU’s methodology (Page 6) has resulted in a comprehensive 3D model of the entire future Chatswood CBD shown in images 15 and 16. This model shows evolving north south spines along Pacific Highway and the rail corridor and east-west spines along Victoria Avenue. According to the testing only minor areas will experience difficulties reaching the nominated heights and FSRs even before any testing is conducted with regards to transition, overshadowing and visual impacts. These include sites to the north of Victoria Avenue and Johnson Street.

According to GMU’s analysis, due to the constraints of the study area, commercial buildings along Victoria Avenue are proposed as 40-storey towers with floor areas of approximately 400m² (highlighted in blue Figure 15). Such small footprint area is unlikely to be viable under current market conditions. Further, sites identified for this height are currently ‘fine-grain’ narrow lot shops with high levels of trading, which makes amalgamation challenging.

The existing apartments along Johnson Street are relatively new (Figure 14) and strata titled with numerous units (e.g. 40-49 owners) as per Figure 15 (buildings in green). So these sites have not been identified as opportunity sites in the strategy. GMU also does not consider that they have high levels of re-development potential in the short to mid terms.

GMU has applied the base FSR, which is 2.5:1 to these sites, thus showing no redevelopment in the short to medium terms. In addition, we consider that sites such as Chatswood Chase, Westfield and Council’s carpark at Albert Avenue have re-development potential and therefore they have been modelled with redevelopment above (shown in purple, see Figure 16).

![Figure 14: Existing apartment along Johnson Street](image)

![Figure 15: Evolving built form as per the Chatswood CBD Planning and Urban Design Strategy to 2036](image)

![Figure 16: Probable built form](image)
THEORETICAL BASIS

'The Future of The City - Tall Buildings and Urban Design' by K. Al-Kodmany & M. M. Ali (WIT Press 2013) is a well-regarded publication that primarily focuses on 'tall buildings and urban design in an inclusive manner in an effort to bridge the gap between the two'. The future of the Chatswood town centre area will be characterised by high-rise development and in order to assess the impact of the proposed evolving built form and its transition to the edges, the key concepts in this book had been used as a theoretical reference for this analysis.

Some of the key concepts drawn from the book are:

Figure 17 depicts a cluster of high-rise developments surrounded by low-rise buildings in its immediate context. This is considered to be a 'poor transition', where 'proper transition between the low-rise and high-rise buildings should be observed to avoid an abrupt elevation change.' The inference is that core areas experiencing rapid growth lead to concentrated heights and clusters of buildings immediately adjacent to low scale areas without any intermediate built form to provide transition in scale. This is what's considered a poor transition.

Kevin Lynch in his book 'The Image of the City', introduced the concept of 'imageability', as 'the quality in a physical object which gives it a high probability of evoking a strong image in any given observer. It is that shape, color, or arrangement which facilitates the making of vividly identified, powerfully structured, highly useful mental images of the environment...'

In Figure 18, a series of diagrams demonstrate his consideration of how an aesthetically pleasing skyline is formed. Variations in building's attributes should be considered, including heights, width and setbacks, to achieve the overall skyline. In GMU's opinion, while a flat and concave skyline can have architectural interest, the bell-curve skyline has higher aesthetic values.

Figure 19 discusses how to improve the imageability of cities by locating high-rises in clusters properly. This involves:

• creating focal points for better visual references and orientation
• reducing heights, for instances by open spaces or parks, to provide visual relief to viewers
• offering coherent gradation in height profile from high density areas to low density areas
• achieving varied building heights, for example, higher buildings located where they could function as landmarks and lower buildings near the 'pedestrian spines'
• designing the buildings diversely, while abiding a coherent design rationale

As per Figure 20, the view location and positioning of the taller forms may result in different visual impacts:

• Taller forms positioned behind or surrounded by the lower scale development in the distance appear as backdrop and have lesser visual impacts (Diagram 1)
• Taller forms in the foreground without any transition may have greater visual impacts and require mitigation measures,
• As illustrated in Diagram 4, when the taller forms are positioned in front of other high-rise buildings, they appear against the backdrop of taller development and act as a filter to the taller background.

Taking into account the above theoretical framework, the following chapter will present the findings of the testing for the overall transition, visual impacts and overshadowing.
The proposed Chatswood Town Centre is bounded by two Heritage Conservation Areas (Figure 21): C10, North Chatswood and C11, South Chatswood. As is described on Page 17 and 29 of the Chatswood CBD Strategy Heritage Strategy by Weir Phillips (January 2020):

(C10) "...North Chatswood Heritage Conservation Area is a good example of early North Shore residential development. The housing stock describes the progressive overlays of development taking place over half a century. The essential scale, form and spacing of the original dwellings is predominant, even where original architectural detailing has been lost, though much of this is still intact in fine residential buildings and as a general townscape impression..." (Page 18 - Heritage Strategy)

(C11) "...South Chatswood Heritage Conservation Area is a good example of early North Shore residential development. Much of the dwelling stock retains its original detailing and distinctive architectural features. Most retain the original scale and basic form, which, apart from the two storey mansions, is predominantly single storey...The Heritage Conservation Area displays a high level of amenity and originality in its development as an early residential suburb up to the Second World War..." (Page 30 - Heritage Strategy)

To address DPI&E’s concern over the transitional and amenity impacts to the HCA areas, GMU has examined all 8 HCA interfaces identified in Figure 21 with the most relevant illustrated in the following images on pages 14 to 15. The findings are as follows:

**C10:**

- Interface 1 (Anderson Street): The proposed development is bordering the HCA, but the dwellings along Anderson Street are facing away from the street, further information will be provided in page 14.
- Interface 2 (Wattle Lane): Wattle Lane is a rear service lane to garages and rear garden sheds with limited visual connection to the buildings. It has limited pedestrian activity. This interface is considered of lesser significance.
- Interface 3 and 4 (Malvern Avenue and Havilah Street): the HCA boundary shifts northwards after Wattle Lane, and separated from Malvern Avenue by the existing dwellings. These buildings function as a buffer between the HCA & the centre from Malvern Avenue. On the other side of Malvern Avenue, Chatswood Chase presents a blank frontage to Malvern Avenue currently and is unlikely to be redeveloped for taller buildings in the short to mid term. Similarly, the HCA along Havilah Street is also separated by existing dwellings which faces Chatswood Chase on the other side of the street.

**C11:**

- Interface 5 (Olga Street): the eastern boundary of the town centre ends at Olga Street. Between the HCA and the potential development are existing dwellings forming a buffer to future proposals.
- Interface 6 (Albert Avenue): the existing buildings within the HCA along Albert Avenue are north-facing and the future development sites sits to the north of these dwellings. There will be potential overshadowing impacts to the HCA and mitigation measures will be discussed in Chapter 5.
- Interface 7 (Bertram Street): Similar to Anderson Street, the future development will directly face the HCA, but this interface is considered of lesser significance.
- Interface 8 (Johnson Street): According to our analysis (page 11), the existing developments that faces the HCA have multiple strata titles and are unlikely to be redeveloped in the short to medium term. However, if they are redeveloped in the long term, these buildings will have the potential to create overshadowing impacts to the HCA to the south. Potential mitigation measures are discussed in Chapter 5.
Interface to Conservation Area - Anderson Street

An important characteristic affecting visual impact is the visual quality of the interface directly across the street. GMU conducted a comprehensive site visit with the heritage consultants Weir Phillips, and identified the following attributes for the HCA’s interface facing Anderson Street:

- The dwellings along Anderson Street present side elevations generally to Anderson Street (Figure 22)
- The existing CBD is already prominently visible as a backdrop to the HCA
- Street trees currently create a foreground element that partially reduces the visual awareness of the existing CBD

![Figure 22. Anderson Street - 20m Wide](image)

- Existing dwellings present side boundaries to Anderson Street, other than 20 Tulip Street
- The heritage building, 20 Tulip Street faces Anderson Street (Figure 22)
- Fencing edges the HCA facing Anderson Street
- Existing trees filter views to high-rise development in the background
Interface to Conservation Area - Bertram Street

The interface with Bertram Street has the following attributes:

- Bertram Street is a secondary street with limited activation
- Limited or discontinuous footpaths
- The dwellings fronting Bertram Street are later subdivisions of larger federation through-blocks with the secondary frontage to Neridah Street
- Dwellings within the HCA present either an inactive frontage or 'backs' to the street

![Dwellings facing Bertram Street presenting extensive high fences](image)

![Buildings along Bertram Street are from a more recent subdivision](image)

Figure 23. Bertram Street - 13m Wide
SECTION CONCLUSION

GMU’s introductory Chapter 1 above has sought to describe the methodology underpinning the testing of how the Strategy’s proposed building heights and FSRs in the mixed-use areas relate to the surrounding Heritage Conservation Areas (HCAs) and/or retained low density development. This methodology seeks to determine the built form outcomes on several concerns DPI&E raised in their letter titled ‘Request for endorsement of the Chatswood CBD Planning and Urban Design Strategy’ in August 2019. These concerns hoped to:

• ...review impacts to adjacent HCAs and/or retained low density development and determine what appropriate built form transitions in terms of FSR and buildings are appropriate in mixed use areas...
• Conduct “visual impact analysis to illustrate how future built development in the strategy area will look along road and laneway streetscapes that will form the edge to the strategy area,” and
• analyse “potential amenity impacts to the neighbouring low-density sites and/or existing development in HCAs by using accurate block modelling of potential future development to show extent of shadowing impacts, particularly during mid-winter”.

Thus far, the preliminary steps in the analysis of the strategy heights and evolving skyline has shown that the small-footprint towers along Victoria Avenue and the expectation of redevelopment of the existing strata apartments north of Johnson Street are unlikely to be feasible. Therefore, these sites are not likely to make a large contribution to the evolving spines, the one along Victoria Avenue and the other along the train line (Figure 15). Council’s carpark, Westfield and Chatswood Chase, however, are considered to have redevelopment potential, but perhaps in the long term. These findings have refined the 3D model to include sites with long-term redevelopment potential and to exclude those with low levels of potential in the short to medium terms such as the majority of the sites along Johnson Street.

The following chapters will use the theoretical framework and the preliminary findings to analyse the evolving built form’s transition, visual impacts and overshadowing based on the sites included in the refined 3D model.
1. SECTIONAL ANALYSIS
1.1 OVERVIEW

In this chapter, a series of sectional studies will investigate the evolving built form transitions and any potential visual impacts. As shown in Figure 24, the town centre area is surrounded by two major HCAs, which are C10, North Chatswood and C11, South Chatswood.

A total of 8 locations were interrogated across several areas of the CBD that have interfaces with the surrounding HCA (Figure 24), however, not all sections presented adverse impacts or a lack of transition. Therefore, only sections 1-3 will be discussed within this chapter and the rest (4-8) have been included in the appendix for reference as follows:

- Section 1 - Across Albert Avenue looking west
- Section 2 - Across Anderson Street looking south
- Section 3 - Across Bertram Street looking north
- Section 4 - Across Wattle Lane looking west
- Section 5 - Across Ola Street looking north
- Section 6 - Across Mowbray Road looking east
- Section 7 - Across Havilah Street looking north
- Section 8 - Across Bertram Street looking south

This chapter focuses on the first three sections as they can examine all the HCA boundaries. The remaining sections are in the appendix.

To complement the sectional analysis, GMU also investigated the potential visual impacts of proposed development from 10 different locations. Views 1 to 4 complement the sectional analysis above to better visualise the proposed built form by the strategy and are also within this chapter including recommendations for mitigation measures. Views 5 and 6 will be included in the following chapter as part of the visual impact analysis and views 7 to 10 will be included in the appendix for reference only (Figure 25):

- View 1 - From Pacific Highway due north
- View 2 - From Pacific Highway due south
- View 3 - From Blakesley Street due south
- View 4 - From Neridah Street due north
- View 5 - From Violet Street due west
- View 6 - From Daisy Street due west
- View 7 - From Pacific Highway due south
- View 8 - From Victoria Avenue due west
- View 9 - From Neridah Street due south
- View 10 - From Mowbray Road due east

Figure 24. Adapted from: Recommended Land Use, Architectus, ‘Chatswood CBD Planning and Urban Design Strategy’, pp.126, Figure 6.2.2

Figure 25. View Locations
1.2 SECTION 1 - ACROSS ALBERT AVENUE LOOKING WEST

The first section is cut across Albert Avenue, and it goes through the southern boundary of C10 facing Malvern Avenue and the northern boundary of the C11 conservation area facing Albert Avenue (Figure 26). The top section (Figure 27) illustrates the existing condition, the middle shows the evolving skyline in the short to mid term when the commercial core and mixed use areas get developed and the section at the bottom represents long term development when the sites such as the Council’s carpark, Westfield and Chatswood Chase redevelope.

According to our analysis, the existing skyline presents a ‘double-hump’ bell curve. Even when the commercial core and the mixed use development occur, the built form will still maintain the ‘double-hump’ bell curve. However, transitions at the northern and southern ends of the area start to appear sharply, and they are annotated as A and B in Figures 26 and 27.

In the long term, when the opportunity sites are fully developed, the overall skyline will present two layers: the commercial core in the background as a taller backdrop and the mixed-use development in the foreground as a lower transition.

The following pages discuss the potential visual impacts of site A and B and GMU built form recommendations for the interface for these sites are discussed in page 22.
Visual Impact - From Pacific Highway due north

This view discusses site A and view 1 in Figure 29. The selected view location is along one of the most important transport corridors serving the town centre - Pacific Highway. Views from highways and expressways can provide meaningful information to drivers about how the city is organized, how people use it, and how it relates to them. The selected location is the first point where the visitors approaching from the south have a holistic view of the Chatswood town centre area.

As per Figure 28 and 30, the existing Chatswood town centre is distant and does not have a significant visual impact. When the commercial core is developed as per the strategy, it will be visible from this distance, however, it does not significantly change the existing skyline (Figure 31).

As is illustrated in Figure 32, when the entire town centre area is fully developed, the potential development at this end will establish an abrupt presence and have significant visual impacts due to the change in scale to the surrounding heritage items that include Great Northern Hotel, Chatswood Reservoirs and Chatswood South Uniting Church. To mitigate the abrupt change in scale, it would be necessary to reduce the heights on the most prominent or visible section of the site at the intersection. It is estimated that other more internalised parts of the site will not experience the same level of visibility from the public domain, therefore, height can be explored there. GMU recommends a reduction in height to 17-18 storeys at the intersection of Mowbray Road and Pacific Highway and 24 storeys maximum for the rest of the site to relocate the massing towards the centre of the site to mitigate the corner’s visual impacts as per Figure 33, while maintaining a sense of arrival or a landmark.

Figure 28. Existing view from selected location (Source: Google Streetview)

Figure 29. Key Plan

Figure 30. Existing condition

Figure 31. Chatswood town centre with Commercial core developed

Figure 32. Fully developed in the long term

Figure 33. GMU recommendation
Visual Impact - From Pacific Highway due south

This section discusses site B and View 2 in Figure 35. The selected view location is along Pacific Highway and it is the first point where visitors approaching from the north have a holistic view of the Chatswood town centre area.

As per Figure 34 and 36, the existing Chatswood town centre is seen as a backdrop and does not have a significant visual impact, especially as the trees in the foreground filter the town centre’s massing. As the commercial core is developed as per the strategy, the change is visible, but from this location with the town centre still appearing to have a distinguishable ‘bell-curve’ with a sense of transition (Figure 37).

Figure 38 shows that when the mixed-use areas are fully developed, the potential development in the foreground shifts and competes with the town centre apex - the outcome flattens the bell-curve and skyline. GMU recommends a reduction in height to 18-20 storeys, as per Figure 39, to restore the bell curve apex and to create a greater sense of transition.
Recommendations for Section 1

Based on the visual impact study of these two viewing points, revised heights are recommended as per Figure 40. The recommended reduction in height achieves a more gradual transition to the edges and mitigates the potential view impacts observed in Figures 32 and 38. The revised skyline achieves a recognisable city form with appropriate transition.

The revised skyline concentrates heights at the train station and along Pacific Highway, with the intensity of development transitioning appropriately gradually, especially in terms of height and scale to the surrounding lower-rise context. The reduced heights of the sites at the northern and southern end of the town centre (site A and B), assist in reducing any adverse impacts with regards to transition and visual impacts (Figure 42).

Figure 40. Sections

Figure 41. Similar City Profile is seen at Minneapolis K.Al-Kodmany & M.M.Ali, 'The Future of The City', pp.86, Figure 3.22

Figure 42. Transition of development from the commercial core to surrounding areas
1.3 SECTION 2 - ACROSS ANDERSON STREET LOOKING SOUTH

The second section is cut across Anderson Street, and it transverses the HCA C10’s western interface fronting Anderson Street (Figure 43). The top section (Figure 44) illustrates the existing skyline, the one in the middle shows the skyline in the short to mid term when the commercial core and mixed use areas get developed and bottom section shows the long term development when the sites at Council’s carpark, Westfield and Chatswood Chase get redeveloped.

According to GMU’s analysis, the existing skyline presents a single bell curve from this vantage point. Once the commercial core and mixed use development occur, the built form starts to suggest a double-hump bell curve with abrupt transitions at the eastern and western ends of the skyline, annotated as C and A respectively (Figure 43 and 44). In the long term, when the opportunity sites are fully developed, the overall skyline presents two layers similar to the previous section 1: the commercial core as a taller backdrop and the mixed-use development in the foreground as a lower transition.

Site A has already been discussed in the previous section (Page 20), and the visual impacts for site C will be investigated in the following section.

Figure 43. Adapted from: Recommended Land Use, Architectus, ‘Chatswood CBD Planning and Urban Design Strategy’, pp.126, Figure 6.2.2

Figure 44. Sections
Visual Impact - From Blakesley Street due south

The selected view location is within HCA C10 looking south towards Site C (Figure 47).

As per Figure 48, the only visible development within the town centre area is the newly developed Chatswood Place at 260 Victoria Avenue. When the commercial core is developed as per the strategy, a small cluster of high-rises will emerge as a backdrop (Figure 49).

As is illustrated in Figure 50, when the entire town centre area is fully developed, there will be a significant change in the skyline and a lack of transition occurs to the west of Chatswood Place with Site C being out of scale (Figure 50). Hence GMU recommends reconsideration of the height control for this site, as per Figure 51, if the applicable control is reduced to a similar height as the adjoining Chatswood Place site, which is approximately 8 storeys, a better sense of transition will be presented. Any additional heights above 8-9 storeys would require testing to demonstrate that any visual impacts and transitional issues have been addressed.
Recommendations for Section 2

Based on the visual impact study, revised heights are recommended as per Figures 52 and 53. A localised reduction in height creates a better sense of transition, and mitigates potential visual impacts. The resulting built form would then achieve an appropriate scale transition to the centre edges.

Figure 52. Sections
Skyline as per the strategy

Revised skyline

Figure 53. Transition of development from the commercial core to surrounding areas

Figure 54. K. Al-Kodmany & M. M. Ali, 'The Future of The City', pp. 75, Figure 3.9 Toronto has a similar centre form
1.4 SECTION 3 - ACROSS BERTRAM STREET LOOKING NORTH

The third section cuts across Bertram Street, and it transverses the HCA C11’s western interface fronting Bertram Street (Figure 55). The top section (Figure 56) illustrates the existing skyline, the middle shows the evolving skyline in the short to mid term when the commercial core and mixed use areas get developed and the bottom section suggests the long term development when the sites at Council’s carpark, Westfield and Chatswood Chase redeveloped.

According to GMU’s analysis, the existing skyline presents a double-hump ‘bell curve’. Once the commercial core and mixed use development occur, the skyline starts to suggest a sharp transition next to the conservation area and towards the edges of the town centre (Figure 56). Site C has already been discussed in previous section. With regards to site D, the new development would create an edge to the heritage conservation area, with visual impacts at the interface. This is discussed in the following visual impact analysis.

In the long term, when the majority of opportunity sites are developed, the overall skyline will contain two important layers: the commercial core as a taller backdrop, and a foreground lower skyline.
Visual Impact - From Neridah Street due north

This section discusses the site annotated as D in Figure 57. The selected view location is along Neridah Street, which is a local street with continuous footpaths and contributory dwellings facing the street and away from the town centre. The street also has a good landscape character with mature street trees.

As per Figure 58 and 59, the existing Chatswood town centre backdrop is filtered by street trees. When the commercial core is developed as per the strategy, the town centre creates a backdrop filtered by the trees (Figure 60).

As is illustrated in Figure 61, the town centre area will present a row of 25-29 storey buildings along the western edge of C11, which is consistent with the findings of the sectional analysis.

To mitigate the potential visual impacts, GMU has conducted built form testing and concluded that, by locating lower-rise buildings along Bertram Street and transferring the density of taller forms to Archer Street, visual impacts could be mitigated while maintaining the density proposed by the strategy for this block (Figure 62).
Recommendation for Section 3

Based on the visual impact study, revised layout are recommended as per Figure 63. The recommended relocation of height within the blocks will assist in providing a better transition of scale from the analysed vantage point.

The revised skyline would resemble Chicago with a better transition at its eastern end as per Figure 64. The rearrangement of site D does not significantly change the overall skyline (Figure 63) but will mitigate visual impacts, and as is demonstrated in Figure 65, provide a better transition.

Figure 63. Sections
Figure 64. Adapted from K. Al-Kodmany & M. M. Ali, 'The Future of The City', pp.114, Figure 4.13
Figure 65. Strategy's built form transition from the commercial core to surrounding areas
2. ADDITIONAL VISUAL IMPACT ANALYSIS
2.1 OVERVIEW

In this chapter, additional views are studied to further assess the potential visual impacts in key CBD fringe areas (Figure 66). These include:

- View 1 - From Pacific Highway due north
- View 2 - From Pacific Highway due south
- View 3 - From Blakesley Street due south
- View 4 - From Neridah Street due north
- View 5 - From Violet Street due west
- View 6 - From Daisy Street due west
- View 7 - From Pacific Highway due south
- View 8 - From Victoria Avenue due west
- View 9 - From Neridah Street due south
- View 10 - From Mowbray Road due east

For Views 7-10, please refer to the appendix.

INCLUDED IN LAST CHAPTER
TO BE DISCUSSED IN THIS CHAPTER
TO BE INCLUDED IN THE APPENDIX
2.2 VISUAL IMPACT OF STREET TREES - DAISY STREET

The introduction of landscape can assist in providing a human scale relationship where taller forms occur (Figure 67).

When viewed from the footpath in a location devoid of street trees such as Daisy Street, a high-rise tower is visually dominant (Figure 68). As the viewpoint starts to shift, the highlighted tower is partly concealed by the significant street trees at the end of Daisy Street (Figure 69). When viewed from the middle of Daisy Street, the highlighted tower is completely hidden (Figure 70).

Chatswood is described as the 'green capital of the leafy North Shore' (Page 26, Chatswood CBD Planning and Urban Design Strategy to 2036). Chatswood’s green heritage could in itself be a practical mitigation measure to decrease potential visual impacts by the proposed scale of future development, whilst still facilitating significant density if new street trees introduced into surrounding areas.

GMU strongly recommends the planting of additional trees strategically located on perpendicular and parallel streets next to the CBD boundaries. Where existing trees are deciduous, an emphasis should be given to non-deciduous or ever green trees.

Figure 67. K.Al-Kodmany & M.M.Ali, ‘The Future of The City’, pp.122, Figure 4.23

Figure 68. View from the footpath
Figure 69. Shifting the view point rightward
Figure 70. Standing in the middle of Daisy Street
2.3 VIEW 5 - FROM VIOLET STREET DUE WEST

Violet Street is within the HCA and it is connected to Anderson Street. It provides a view to the northern end of the future town centre area and the existing condition presents an open view to the sky with a glimpse of the town centre area to the left hand side of the image (Figures 72 and 73).

Once the commercial core development occurs (Figure 74), there is a slight change in the skyline. Once the mixed-use areas in the CBD fringe get redeveloped, the scale within the view is significantly changed (Figure 75). The highlighted buildings have been discussed in the previous chapters, and they are identified as sites with transitional and visual impact issues.

By applying the previously mentioned mitigation measures to the two buildings: dropping the height of Building 1 to approximately 18-20 storeys and further sculpting the lower form of Building 2 for a better transition from Building 1, it creates lesser visual impacts due to an integrated and ascending built form to the town centre apex as presented in Figure 76.
2.4 VIEW 6 - FROM DAISY STREET DUE WEST

Daisy Street is also within the HCA that connects to Anderson Street. There is a view to the existing town centre due north. A high-rise skyline is already visible as a backdrop (Figure 78 and 79).

Once the commercial core development occurs (Figure 80), there will be a moderate change to the skyline, where the existing high-rise backdrop will not be significantly changed. Once the mixed-use sites redevelop, the skyline will experience a major change (Figure 81). However, these buildings will be seen partly against the backdrop of the town centre core. The overall skyline will have an ascending massing with the exception of the developments already identified as lacking of transition in the overall sectional study. However, when compared side by side, the majority of the changed skyline is currently moderated by street trees (Figure 81).

Similar to the Neridah Street view analysis, mitigation measures in the form of targeted reductions in height and/or sculpting of the form have been recommended for a few selected sites within this precinct and they are illustrated in Figure 82. With the drop of height for selected sites, the revised skyline is more harmonious and regains the desired ‘bell-curve’ (Figure 82).
2.5 SUMMARY AND SECTION CONCLUSION

In the last two sections, three overall precinct sections and six street level views were investigated to analyse the potential transition and visual impacts of the proposed Chatswood CBD Planning and Urban Design Strategy to 2036.

In general, the Strategy has already considered transition of scale in the allocation of height and FSR controls as per Figure 9 and 10, and the overall skyline and scale transitions results in a generally pleasant and well distributed skyline. The strategy locates the commercial core around Chatswood Train Station with the highest applicable height and FSR control in that general location with the lower density controls in the fringes (mix-use areas). As per the previous sectional analysis, the intensity of development at the peripheral area is lower than that of the commercial core (Figure 83).

Based on the overall findings of GMU’s testing, approximately seven sites require some built form modifications to achieve a more consistent and harmonious skyline and mitigate potential visual impacts. These sites are as follows:

1. 58 Anderson St.
2. 54-56 Anderson St.
3. Chatswood Dive Site
4. Block Between Olga St. and Hercules St.
5. 51-61 Archer St., 34-34B Albert Avenue & 30-32 Bertram Street
6. 29-35 Archer St.
7. 37-49 Archer St.

Among these, sites 1-4 require reduction in height:

1. 58 Anderson St.: from 90m to 18-20 storeys.
2. 54-56 Anderson St.: further sculpt the form to create a transitional step of 18-20 storeys to the north.
3. Chatswood Dive Site: 17-18 storeys at the intersection of Mowbray Road and Pacific Highway and 24 storeys maximum for the rest of the site.
4. Block Between Olga St. and Hercules St.: Reduce maximum height from 90m to 8-9 storeys.

Sites 5-7 need only a redistribution of the density on site. For instance, positioning density within the block on the farthest point away from HCA would be sufficient to mitigate visual impacts. This will be explained in the recommendations section (please see Chapter 5 for more details).
3. OVERSHADOWING
3.1 OVERSHADOWING IMPACT ANALYSIS - 9:00 AM TO 10:00 PM

This section examines the potential overshadowing impact on the adjacent existing development, especially to the HCA, between 9 am to 3 pm during winter solstice (Figures 84 and 85). The properties highlighted in red indicate existing properties being overshadowed. Properties highlighted in yellow represent the buildings within the HCA.

The proposal will overshadow a portion of the existing developments along the west of Pacific Highway from 9 am to 10 am. The shadow is moving relatively fast and will cease to impact these properties by 11 am.

With regards to the overshadowing impact on the HCAs, as per Willoughby DCP 2012 E1.10, the northern windows of living areas of adjoining buildings need to have at least 3 hours of solar access between 9 am to 3 pm. The overshadowed buildings are highlighted by dashed blue lines and according to our analysis, only a handful of dwellings located right next to the proposed future high-rise developments are impacted. This is mainly during the afternoon hours, which means that these properties meet their required provision of solar access in the morning hours.

In general, the proposed built form will generate fast-moving shadows and will allow for DCP compliant solar access levels to the surrounding low-rise HCAs. To further improve this level of performance, mitigation measures will be discussed in the following chapter.

Figure 84. Sun-eye views (9 am to 10 am)
3.2 OVERSHADOWING IMPACT ANALYSIS - 11:00 PM TO 12 PM

Sun-eye views (11 am to 12 am)
3.3 OVERSHADOWING IMPACT ANALYSIS - 1:00 PM TO 2:00 PM

Figure 85. Sun-eye views (1 pm - 2 pm)

<table>
<thead>
<tr>
<th>HERITAGE CONSERVATION AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>OVERSHADOWED PROPERTIES</td>
</tr>
</tbody>
</table>

[Image of 3D city model showing sun-eye views at 1pm and 2pm.]
3.4 OVERSHADOWING IMPACT ANALYSIS - 3:00 PM

3 p.m.

HERITAGE CONSERVATION AREA
OVERSHADOWED PROPERTIES
Sun-eye views (3 pm)
4. RECOMMENDATIONS
4.1 SUMMARY OF KEY FINDINGS

The GSC earmarks Chatswood as a strategic centre and one of the biggest office precincts within the Greater Sydney Region. It is important for Chatswood to achieve its housing and employment targets, hence the Chatswood CBD Planning and Urban Design Strategy to 2036 is intended to guide and foster future growth in an orderly way.

GMU’s sieving process and urban design analysis have concluded that, the majority of the built form proposed by the strategy will create adequate urban design outcome with the exception of a handful of sites identified in the previous chapters (Figure 86). GMU has accordingly identified mitigation measures (Figure 87) as discussed in this chapter. These measures address the concerns raised by DPI&E over the mixed-use development regarding transition, visual impact and overshadowing.

A summary of the key impacts found are:

<table>
<thead>
<tr>
<th>Address</th>
<th>Issues identified</th>
<th>Mitigation measures</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Visual Impact</td>
<td>Transition</td>
</tr>
<tr>
<td>54-56 Anderson Street</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>58 Anderson Street</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Chatswood Dive Site</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>28 Claude Street</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>29-35 Archer Street</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>37-49 Archer Street</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>51-61 Archer St., 34-34B Albert Avenue &amp; 30-32 Bertram Street</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>45 Neridah St.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Block Between Olga St. and Hercules St.</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Figure 86. Key findings

Figure 87. Overview of Recommendations
54-56 Anderson Street & 58 Anderson Street

According to our analysis, sites identified in Figure 88 will require mitigation of visual impact and transition issues (Figure 89). Mitigation measures are as follows:

- Reduce maximum building height from 90m to 18-20 storeys for site at 58 Anderson Street, and further sculpting of the form for 54-56 Anderson Street as per Figure 91.
- Position taller forms away from Anderson Street for a height transition zone of up to maximum of 4m from Anderson Street (Figure 90).
- As per the heritage advice by Weir Phillips, large street trees should be incorporated in the streetscape design.
- Outcome of mitigation shown is shown as per Figure 92.

![Figure 88. Key Plan](image)

![Figure 89. Built form proposed by the strategy](image)

![Figure 90. Overview of Recommendations (Plan)](image)

![Figure 91. Overview of Recommendations (3D)](image)

![Figure 92. Mitigation outcome](image)
Block bounded by Archer Street and Bertram Street

According to our analysis, sites identified in Figure 93 require mitigation for visual impact and transition issues to Bertram Street and also overshadowing to the properties to the south of Johnson Street (Figure 94). Mitigation measures are suggested as follows:

- Higher forms are recommended to be positioned along Archer Street with lower transitional heights provided along Bertram Street and Johnson Street without any drop in height or FSR for Site D* (Figures 95 and 96).
- The transitional zone requires a maximum depth of 25-30m from Bertram Street and Johnson Street with heights between 7-8 storeys.
- 3m upper level setbacks from the street wall along Bertram Street should be provided.
- As per the heritage advice by Weir Phillips, large street trees should be incorporated in the streetscape design to further mitigate any potential visual impacts of taller forms.
- Maximum building heights as per Figure 96 and the outcome of overshadowing and visual impact mitigation is as per Figure 97. The maximum building height for the site at No. 37-49 Archer Street is decreased from 90m maximum to 22-23 storeys and the height for No. 29-35 Archer Street should drop to 13-14 storeys from 90m. By doing so, the buildings to the south of Johnson Street are free from overshadowing for 3 hours from 9 am to 12 pm which is consistent with Willoughby DCP 2012 E1.10, the northern windows of living areas of adjoining buildings need to have at least 3 hours of solar access between 9 am and 3 pm.

*Site D Full Address: 51-61 Archer St., 34-34B Albert Avenue & 30-32 Bertram Street
28 Claude Street

According to our analysis, sites identified in Figure 98 have issues regarding overshadowing to the properties to the south of Johnson Street. Reduction in height is recommended as per Figure 99. This results in a potential reduction from 90m to approximately 17-18 storeys.

Sun-eye overshadowing testing

Figure 100 shows the outcome of the overshadowing mitigation measures. With the reduction in height, the buildings to the south of Johnson Street are free from overshadowing for 3 hours from 9 am to 12 pm, which is consistent with Willoughby DCP 2012 E1.10, which requires the northern windows of living areas of adjoining buildings to have at least 3 hours of solar access between 9 am to 3 pm.
Block Between Olga Street And Hercules Street

According to our analysis, sites identified in Figure 101 also requires mitigation of visual impact, transition and overshadowing issues (Figure 102). Recommended mitigation measures are as follows:

- Reduction of maximum height from 90m to 8-9 storeys (Figure 104) for better transition.
- Taller forms facing the residential dwellings are recommended to provide transitional zone from Olga Street (Figure 103), and the transitional zone requires a maximum of 30m from Olga Street.
- As per the heritage advice by Weir Phillips, large street trees should be incorporated in the streetscape design to mitigate any potential the visual impacts of taller forms.
- Maximum building heights as per Figure 104 and the outcome of overshadowing and visual impact mitigation is as per Figure 105. With the reduction of heights from 90m to 8-9 storeys, the buildings to the south of Albert Avenue are free from overshadowing for 3 hours from 9 am to 12 am which is consistent with Willoughby DCP 2012 E1.10, which states that the northern windows of living areas of adjoining buildings need to have at least 3 hours of solar access between 9 am to 3 pm.
45 Neridah Street

According to our analysis, sites identified in Figure 106 have issues regarding overshadowing to the properties to the south of Albert Avenue. Reduction in maximum height from 90m to 19-20 storeys is recommended as per Figure 107.

Sun-eye overshadowing testing

Figure 108 shows the outcome of the overshadowing mitigation measures for the site at No.45 Neridah Street. With the reduction in heights, the buildings to the south of Albert Avenue are free from overshadowing for 3 hours from 9 am to 12 pm, which is consistent with Willoughby DCP 2012 E1.10, which requires the northern windows of living areas of adjoining buildings to have at least 3 hours of solar access between 9 am to 3 pm.
Sydney Metro Chatswood Dive Site

According to our analysis, sites identified in Figure 109 have issues regarding visual impact and transition of scale (Figure 110). Recommended mitigation measures are as follows:

- Reduction in maximum height from 90m to 17-18 storeys at the intersection of Mowbray Road and Pacific Highway and 24 storeys maximum for the rest of the site for better transition.
- Locate landmark as built form marker at the southwestern corner of the site (Figure 112 in blue).
Developments along Johnson Street

In the previous sections, we have identified sites along Johnson Street as being not suitable for development in the short to mid terms due to the high number of owners in each strata title ranging from 40-49 owners. If these sites (Figure 114) are to be developed in the long term, they need to mitigate adverse impacts to the dwellings in the HCA to the south of Johnson Street including the following recommendations:

- Establish height plane for sunlight access to the dwellings south of Johnson Street. As is shown in Figure 115, 32.78 degree is the altitude angle of the sun in mid-winter (solstice). Preserving this solar angle ensures that the dwelling’s frontage will have at least 3 hours of solar access in the morning. Any additional or potential levels need to consider the height plane not to add additional overshadowing.
- Taller forms within deeper lots are recommended to provide a transitional zone from Johnson Street (Figure 116 and 117). The transitional zone requires a maximum of 32m from Johnson Street to the west of Devonshire Street and 12m to the east for narrower lots with heights between 10-14 storeys provided that mitigation of overshadowing is achieved.
- As per the heritage advice by Weir Phillips, large street trees should be incorporated in the streetscape design to mitigate any potential visual impacts of taller forms.
- Maximum building heights for these properties drop from 90m to 13-14 storeys (Figure 117) and the outcome of overshadowing is as per Figure 118. With the reduction of heights, the buildings to the south of Johnson Street are free from overshadowing for 3 hours from 9 am to 12 pm. It is consistent with Willoughby DCP 2012 E1.10, which requires the northern windows of living areas of adjoining buildings to have at least 3 hours of solar access between 9 am to 3 pm.
5. APPENDIX
Section 4 - Across Wattle Lane looking west

This section is cut across Wattle Lane, and it goes through the southern boundary of the C10 HCA facing Wattle Lane (Figure 119). The top section (Figure 120) illustrates the existing condition, the middle shows the evolving skyline when the town centre is fully developed and the bottom illustrates the proposed mitigation measures.

The findings are consistent with our analysis above: Wattle Lane is a service lane fronted by garages and sheds with limited amount of pedestrian activity, hence this frontage is considered of less importance (Page 13). The development identified as having transitional issues is 58 Anderson Street (Site B in Figure 120), which is in line with Section 1 (Page 19) and View 2 (Page 21) and it could be resolved through the reduction of height of selected buildings from 90m to 18-20 storeys (Figure 120).

Figure 119. Adapted from: Recommended Land Use, Architectus, ‘Chatswood CBD Planning and Urban Design Strategy’, pp.126, Figure 6.2.2

Figure 120. Sections

BACKGROUND SKYLINE  FOREGROUND SKYLINE  DEVELOPMENTS LACKING TRANSITION  BUILDING LACKING TRANSITION

REVISED BUILDINGS
Section 5 - Across Olga Street Looking North

This section cuts across Olga Street through the western boundary of the C11 HCA (Figure 121). The top section (Figure 122) illustrates the existing condition, the middle shows the evolving skyline when the town centre is fully developed and the bottom illustrates the suggested mitigation measure.

This section complements Section 2 (Page 23), which identifies the highlighted development site C as having an abrupt transition to the low rise dwellings east of Olga Street. The mitigation measure is to reduce height from 90m to 8-9 storeys, which is consistent with the advice provided in page 24. The final built form outcome is as per the bottom section.
Section 6 - Across Mowbray Road Looking East

This section cuts across Mowbray Road (Figure 123). The top section (Figure 124) illustrates the existing condition, the middle shows the evolving skyline when the town centre is fully developed and the bottom illustrates GMU’s recommended mitigation measure.

This section complements Section 1 (Page 19), which shows that the development will significantly change the existing character of the site and the highlighted building is identified with transition issues in Section 1. The bottom section shows the mitigation measure applied where the skyline transitions more gradually into the heritage site to the south of Mowbray Road.
Section 7 - Across Havilah Street looking north

This section is cut across Havilah Street (Figure 125) through the boundary of the C10 HCA. The top section (Figure 126) illustrates the existing condition, the middle shows the evolving skyline when the town centre is developed in the short to mid terms and the bottom one illustrates a scenario where Chatswood Chase is redeveloped as well.

The HCA along Havilah Street is separated by existing dwellings which face Chatswood Chase and form a 'sleeve' to the buildings within the HCA which face Blakesley Street. As is shown in the bottom section, Chatswood Chase is redeveloped in the long term and the towers are likely to be located away from Havilah Street. The dwellings along the street could provide a buffer between the HCA and the new developments.

Figure 125. Adapted from: Recommended Land Use, Architectus, ‘Chatswood CBD Planning and Urban Design Strategy’, pp.126, Figure 6.2.2

Figure 126. Sections

BACKGROUND SKYLINE
Section B - Across Bertram Street Looking South

This section cuts across Bertram Street (Figure 127). The top section illustrates the existing condition, the middle shows the evolving skyline when the town centre is fully developed and the bottom illustrates GMU’s recommended mitigation measures (Figure 128).

This section complements Section 1 (Page 19) where future development will significantly change the existing character of the site and the highlighted building (Building D) is identified as having transition issues (Section 3, page26). It has visual impacts by imposing a high-rise without a street wall adjacent to the HCA (Page 26). The bottom section shows that, by placing the tower away from Bertram street, these sites achieve a better transition in scale and also have the ability to mitigate visual impacts.
The following pages of the appendix include the rest of the visual impact testing. The locations of these views are shown in blue on the key plan as they are supplementary to the views explained within the report.

**Visual Impact - View 7 From Pacific Highway due south**

The selected view location is along Pacific Highway due south (Figure 129), which is closer to the town centre area than View 2 studied in page 21.

Similar to View 2, this image shows the commercial core fully developed as per the strategy. The change is visible but still achieves a sense of transition (Figure 132). However, when the mixed-use areas are fully developed, the foreground developments compete with the town centre apex (Figure 133).

As per Figure 134, a reduction in height has been applied to 58 Anderson Street as mitigation measure for better transition, and the sense of bell-curve with a clear apex is restored.
**View 8 - From Victoria Avenue due west**

Victoria Avenue is a main street with significant amount of pedestrian activity as a direct access to the town centre area from the east. The selected location is near Mashman Park due west (Figure 140).

Figures 135 and 136 shows the existing street view from that viewpoint. The street trees are dominant within the view and the town centre area is distant and almost imperceptible. If the town centre is fully developed as per the strategy, towers identified in Figure 138, which are the same ones identified in page 24, would be erected next to the low-rise existing dwellings without transition.

As per Figure 139, after applying the mitigation measures discussed on Page 44 (drop in height from 90m to 8-9 storeys), a better sense of transition in height is achieved.
Visual Impact - View 9 From Neridah Street due south

The selected view location (Figure 141) is on Neridah Street, similar to View 4 (Page 27).

There are a few existing developments in the background (Figures 142 and 143), and the proposed commercial core is not visible from this view (Figure 144); however, there is a significant change once the mixed-use developments occur.

The issue is similar to view 4, where the future buildings as per the strategy present a row of 25-29 storey buildings along western edge of the C11 HCA, and there is also a sharp transition into the HCA south of Johnson Street (Figure 145). After applying the mitigation measures as per Page 44 (relocation of built form away from the edge of the HCA) and also, reduce maximum height from 90m to 22-23 storeys for 37-49 Archer Street and 13-14 storeys for 29-35 Archer Street to mitigate overshadowing. These changes will produce a better transition with mitigated visual impacts.
**View 10 - From Mowbray Road due east**

Mowbray Road is another major access and egress route to the Chatswood Town Centre. The selected view location is near the first bus stop outside the town centre area (Figure 152).

Figures 147 and 148 shows the existing view of the selected location. The town centre is currently not perceivable from this viewpoint. Figure 149 shows that if the commercial core is developed according to the strategy, there would not be a significant change to the view.

In the long term, when the entire town centre is developed, the buildings highlighted within the dashed area will significantly change the existing skyline as they appear to be out of scale when standing next to surrounding lower-rise buildings (Figure 150). This is consistent with the findings within View 1 (Page 20). After applying the mitigation measures on Page 42 of the report, the identified site would present a skyline that tapers down more gradually and with a better transition in scale to the lower surrounding context (Figure 151).