PLANNING
BUILDING
HERITAGE
URBAN DESIGN

CITY PLAN URBAN DESIGN

BUILDING HEIGHT AND POTENTIAL ENVELOPE INVESTIGATION FOR THE ST LEONARDS BUSINESS DISTRICT

LGA's of

Lane Cove / North Sydney / Willoughby

23 FEBRUARY 2011

TELEPHONE 82703534
FACSIMILE 82703501

LEVEL 1 364 KENT STREET
SYDNEY NSW 2000

WWW.CITYPLAN.COM.AU
ABN 41 107 317 206

PLANNING
BUILDING
HERITAGE
URBAN DESIGN

CITY PLAN URBAN DESIGN

Building Height Investigation for the St Leonards Business District

Contents

Project Team:

Paul Walter (Director), Axel Teschke (Senior Urban Designer), Liz Zhang (Graduate Urban Design)

EXECUTIVE SUMMARY

This Investigation Report examines the existing height limits established by the Local Environmental Plans (LEP) of North Sydney, Willoughby and Lane Cove and recommends amendments to the limits in order to more effectively optimise this important centre. The investigation finds that presently the height limits especially of the North Sydney LEP 2001 do not reflect the goal of the development of a centre with increased density around the St Leonards train station. However, the recommendations are based on the premise that any proposed development within the centre has to consider its impact on existing structures in the centre and its surrounding.

General development principles are included in this report for development of high rise buildings, especially when planning for mixed use with a large residential portion. The urban and architectural integration of a high-rise building, its positive relationship to the urban fabric as well as on other buildings in the nearer and further surrounding must be assured. Shadow analysis demonstrates how the development of certain high-rise building opportunities within the St Leonards Centre will have little or no impact on existing residential uses. Another key consideration is the impact of high rise residential uses on the development potential of neighbouring sites due to their requirements for solar access and privacy.

Within the St Leonards Centre there are only a limited number of sites which may be developed above the present height limits with manageable impacts on existing structures. These have been identified as Opportunity Sites and height limits have been established which will allow development of high rise building. The existing tower of the Forum serves as maximum height within the centre core. From the core the height levels step down towards the existing areas with lower height and density. This enables the clear definition of a central district as well as appropriate transition towards the low-rise areas.

This investigation recommends the amendment of the building height limits of the North Sydney LEP 2001 to enable high-rise buildings within the St Leonards Centre. These should express the maximum utilisation to be commercially attractive and successful. The increased development potential of selected locations can also be expected to result in architectural design excellence.

SCOPE

This report investigates the building height limits and potential envelopes for the St Leonards' business and commercial district. It investigates the question whether the existing building height limits in the Local Environmental Plans (LEP) of Lane Cove, North Sydney and Willoughby are sufficient to allow and encourage the development of a vibrant and commercially successful centre around the St Leonards train station. This is underpinned by the principle that high-order centres with excellent transport access should be developed to a high level while maintaining amenity of the urban environment.

The applicable LEP height limits and SEPP65 regulations restrain especially the development of residential accommodation within the dense centre. This investigation report will in particular examine the possibilities to increase the portion of residential development within the centre with a view to sustainable development principles as well as investigate the development potential of identified Opportunity Sites.

THE STUDY AREA

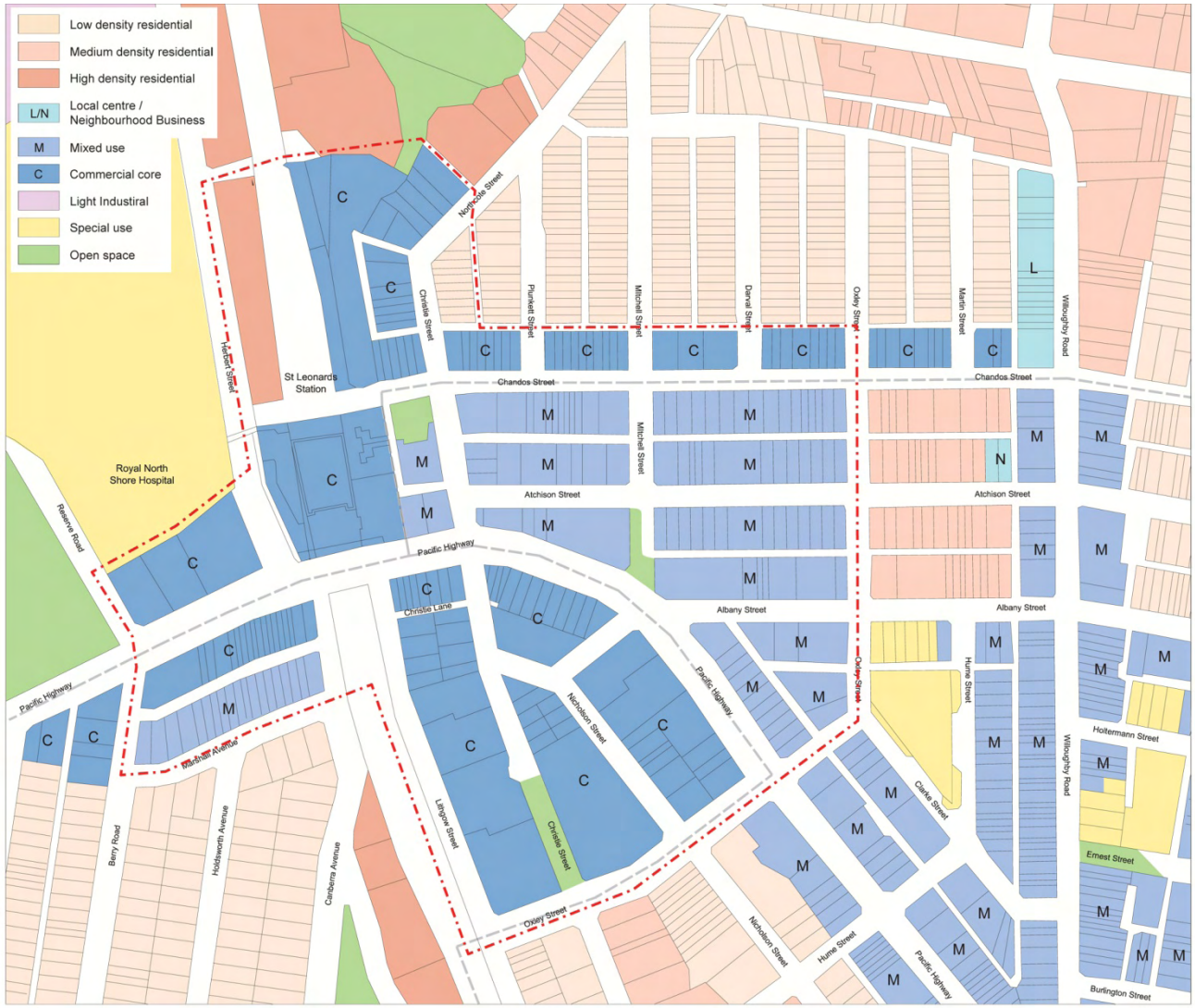
The study area comprises of the St Leonards business district around St Leonards train station. It is located within the municipalities of North Sydney, Lane Cove and Willoughby. An overall development of the St Leonards Centre ought to sensibly embody a common approach within all three adjoining LGA's.

The definition of the study area boundary responds to the disposition of urban structure. The boundary recognises that sensible development control derives from urban structure rather than administrative jurisdiction.

The study area is crossed north-south by the train corridor (connecting Chatswood and the City), which has been overbuilt around St Leonards station. This large scale development is known as The Forum and includes commercial as well as residential uses.

The main road corridor in the study area is formed by the Pacific Highway. It passes in a wide quarter circle through the southern study area. Chandos and Christie Street are main commercial streets while Atchison, Mitchell, Nicholson and Albany Street are internal distributors.

Low height residential areas adjoin the St Leonards Centre to the north and southwest, the Royal North Shore Hospital precinct adjoins to the northwest and mixed areas continue to the east and southeast.



EXISTING LAND USE

According to the LEPs of Lane Cove, North Sydney and Willoughby most of the study area is designated as Mixed, Business or Commercial Use. Only residential designation is within the northern study area along Herbert Street (high density) and along Christie Street (low density). Despite the 'Commercial' land use designation the most southern corner of the study area between Lithgow and Christie Street has been developed with large residential complexes.

The Lane Cove and the Willoughby LEP distinguish business zones between Commercial Core (C) and Mixed Use (M). Commercial Core objectives are to provide employment close to public transport as well as to create attractive public domain. Residential components, as in Mixed Use, are not included apart from hotel or motel.

The North Sydney LEP 2001 specifies that within a Mixed Use zone '*the non-residential component of the building is provided at the lower levels of the building and the ground level is not used for residential purposes, except access*.'

EXISTING HEIGHT LEVELS

According to the LEPs of Lane Cove, North Sydney and Willoughby the existing height limits determine a pattern of higher levels around the St Leonards train station and the train corridor as well as along Pacific Highway. The core area of the St Leonards centre along Chandos, Atchison, Mitchell and Albany Street has general block height levels while the Forum block has been divided into distinctive different height areas. Transition heights step down towards east to meet heights along Willoughby Road, south of the Pacific Highway and surrounding residential areas.

The Willougbhy LEP works with specific RL height limits. Depicted levels result of identified datum base around the Forum (80m), along Herbert Street (75m) and along Northcote Street (70m). The Herbert Street block is divided in areas from RL 98 to RL 140 (LEP Clause 4.3).
Present height levels are coordinated within each LEP boundary, however amendments to reflect the overall centre development are recommended.

Assuming a general floor height of 3m for Residential uses and 3.5m for Commercial uses the existing height levels in the vicinity of the St Leonards Centre can be converted into numbers of possible floors.

20m:	5 to 6 floors
26m:	7 to 8 floors
33m:	9 to 10 floors
36m:	10 to 12 floors
40m:	11 to 13 floors
45m:	12 to 15 floors
65m:	18 to 21 floors
72m:	20 to 24 floors

The Forum (Datum base 80m) – Commercial / Residential

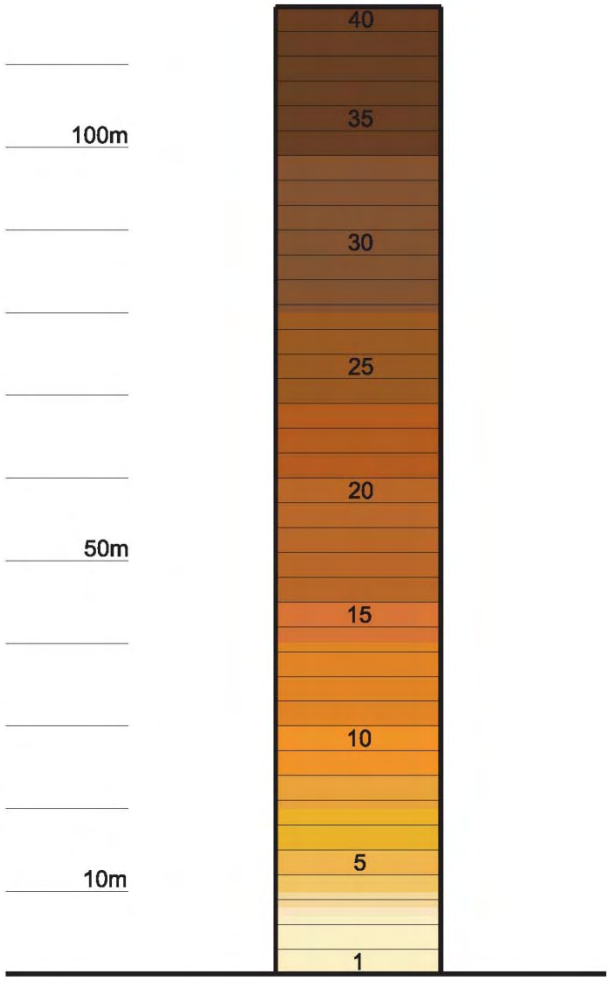
RL 90 = 10m	2 to 3 floors
RL 115 = 35m	10 to 11 floors
RL 124 = 44m	12 to 14 floors
RL 130 = 50m	14 to 16 floors
RL 166.5 = 86.5m	24 to 28 floors
RL 190 = 110m	31 to 37 floors

Herbert Street (Datum base 75m) - Residential

RL 98 = 23m	7 to 8 floors
RL 130 = 55m	18 to 19 floors
RL 140 = 65m	21 to 22 floors

Northcote Street (Datum base 70m) – Commercial / Residential

RL 86 = 10m	2 to 3 floors



DEVELOPMENT PRINCIPLES

Development principles for the increase of floor space within the St Leonards Centre have to consider the existing environment as well as create opportunities for further development. The spatial relationship of buildings is an important factor in the determination of the urban form. In the case of the St Leonards Centre the requirenments for residential components in particular within the Mixed Use area determine the frame for possible and likely development. Requirements for solar access to residential areas (habitable rooms) can result in development constraints for neighbouring sites, especially on the northern side of the residential use.

Shadows created by a higher building impact on other buildings. The general development of business and commercial areas reflects this by positioning residential uses within the higher floor levels and using the lower floor levels with constricted sun access for commercial premises. This principle requires the development of individual access to the different uses, e.g. separate lifts and lobbies, which can be somewhat problematic.

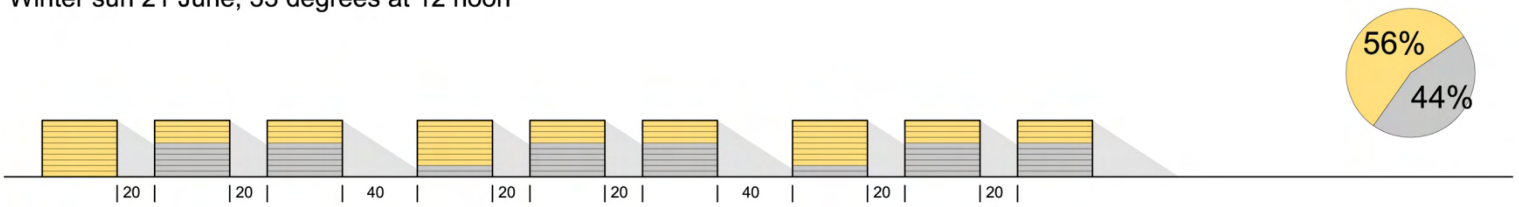
Within a dense centre environment the requirements for residential components need special consideration. Existing residential uses must be protected and proposed residential uses influence future development potentials. The permeability of the entire precinct with sun and air is paramount for the sucessfull integration of residential uses in a dense centre.

Development Opportunities can be identified at locations which are not developed to its maximal potential at present or which create an opportunity to act as catalyst for other developments. Preferably Opportunity Sites have the potential to be developed in short term and without large logistic effort. In this regard questions of land ownership, present use and surrounding developments are crucial. A site might have a theoretcially high development potential for the overall improvement of an environment, however in reality there can be factors that restrict the short term process.

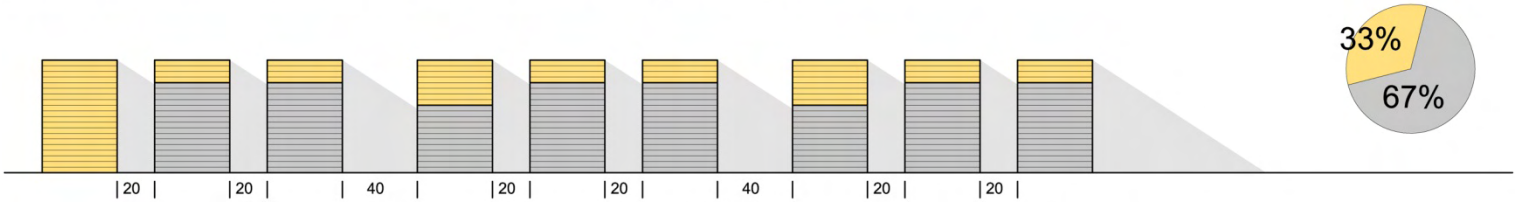
The principle of higher development potential for some sites within the centre instead of uniform levels for all areas reflects the particular constraints or opportunites of each site. A significant level increase at selected locations can result in a higher yield with higher amenity.

The diagrams below demonstrate that a significant height differential at particular locations will result in a larger percentage of floorspace with good sun access than an approach that increases the height limit to a general higher level. A doubling of the base case floorspace can either result in 33% of floorspace with good sun access or 66% in the case of drastic height increase. Residential uses are proposed in higher levels while buildings with constricted sun access should be reserved for commercial uses.

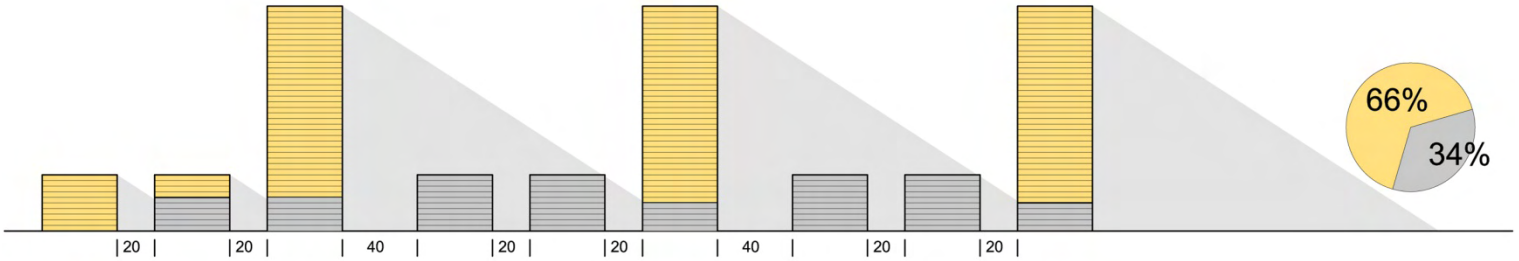
Winter sun 21 June, 33 degrees at 12 noon



Base: Commercial precinct, 20 and 40m roads, 30m height, 10 floors

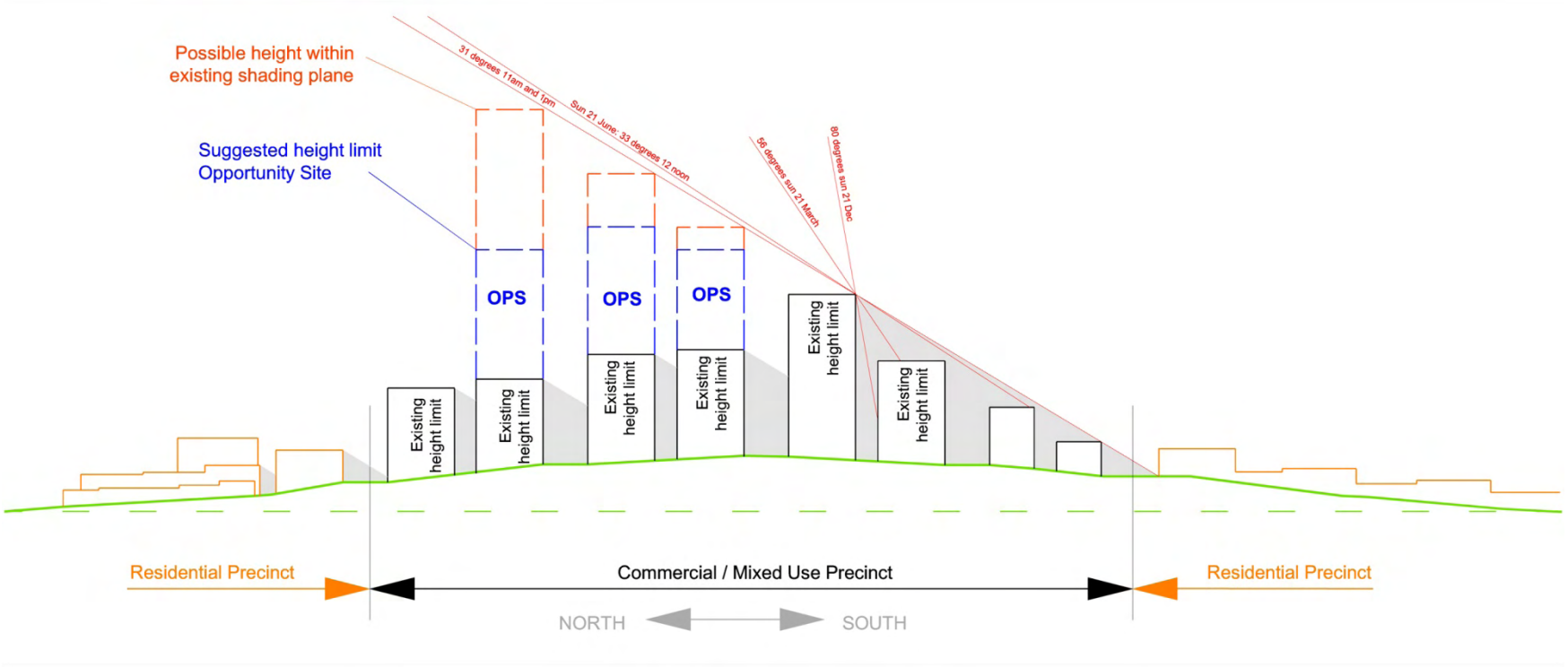


Example 1: Base floorspace doubled, general common height limit increase to 60m height, 20 floors



Example 2: Base floorspace doubled, selected height limit increase to 120m height, 40 floors

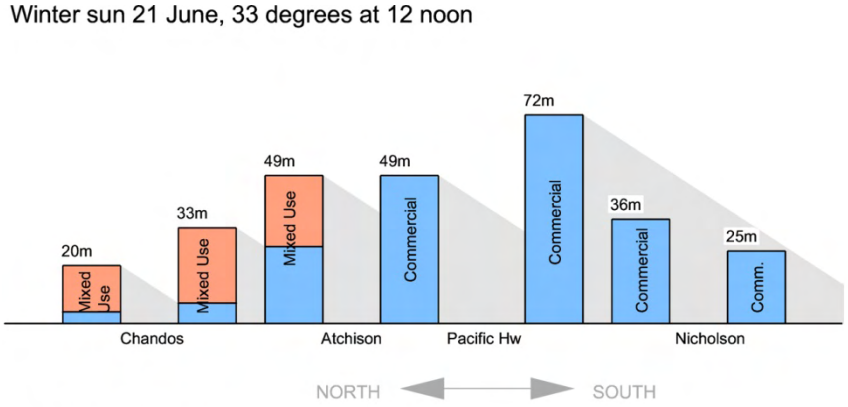
Height potential is influenced by overshadowing impacts on adjoining areas. Generally residential areas demand a higher level of sunlight access protection. However, within an existing shading plane an Opportunity Site (OPS) can theoretically be developed within a projected angle. In practise, of course, height limits also have to consider existing terrain, visual impact, building separation as well as skyline development. Another generally accepted consideration for a central district with high-rise buildings includes consistent skyline profile. The schematic section below illustrates a height plane to fulfill minimum requirements for high density residential uses with a 2 hours sun access at lowest sun position (21 June 11am to 1pm, sun in 31 degrees). In addition the suggested heignt limit responds to the consideration of a transitioned profile.



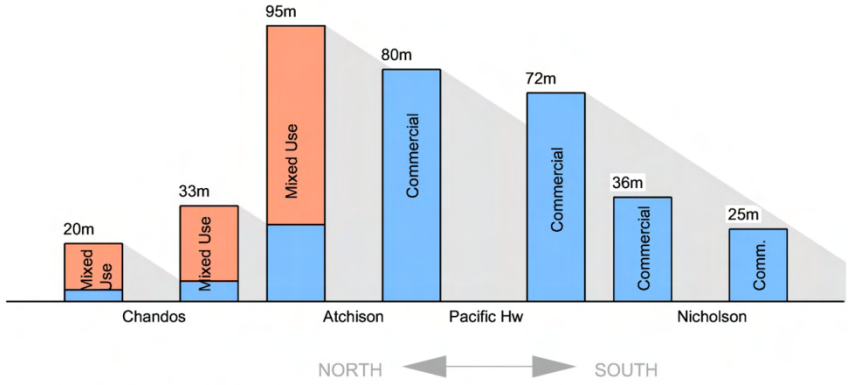
This report inverstigates the special conditions within the St Leonards Centre. An increase of height will have to consider the existing road and lane grid as well as the existing urban structure.

The preferred location for high rise mixed use / residential components within a centre is along the northern side of the centre. That way the solar access for the residential uses in the higher levels may be maximised. Commercial uses located along the southern edge of the centre may also be developed to a high level, however a height transition to the neighbouring precincts has to be considered.

Comparison between existing height limit regulation and suggested height limit increase demonstrates the increase of floor space with sufficient sun access to develop residential uses as well as potential for additional commercial uses. Lower levels and buildings along Pacific Highway are appropriate for commercial uses. The sites suitable for development of higher levels are defined as Opportunity Sites within the precinct.

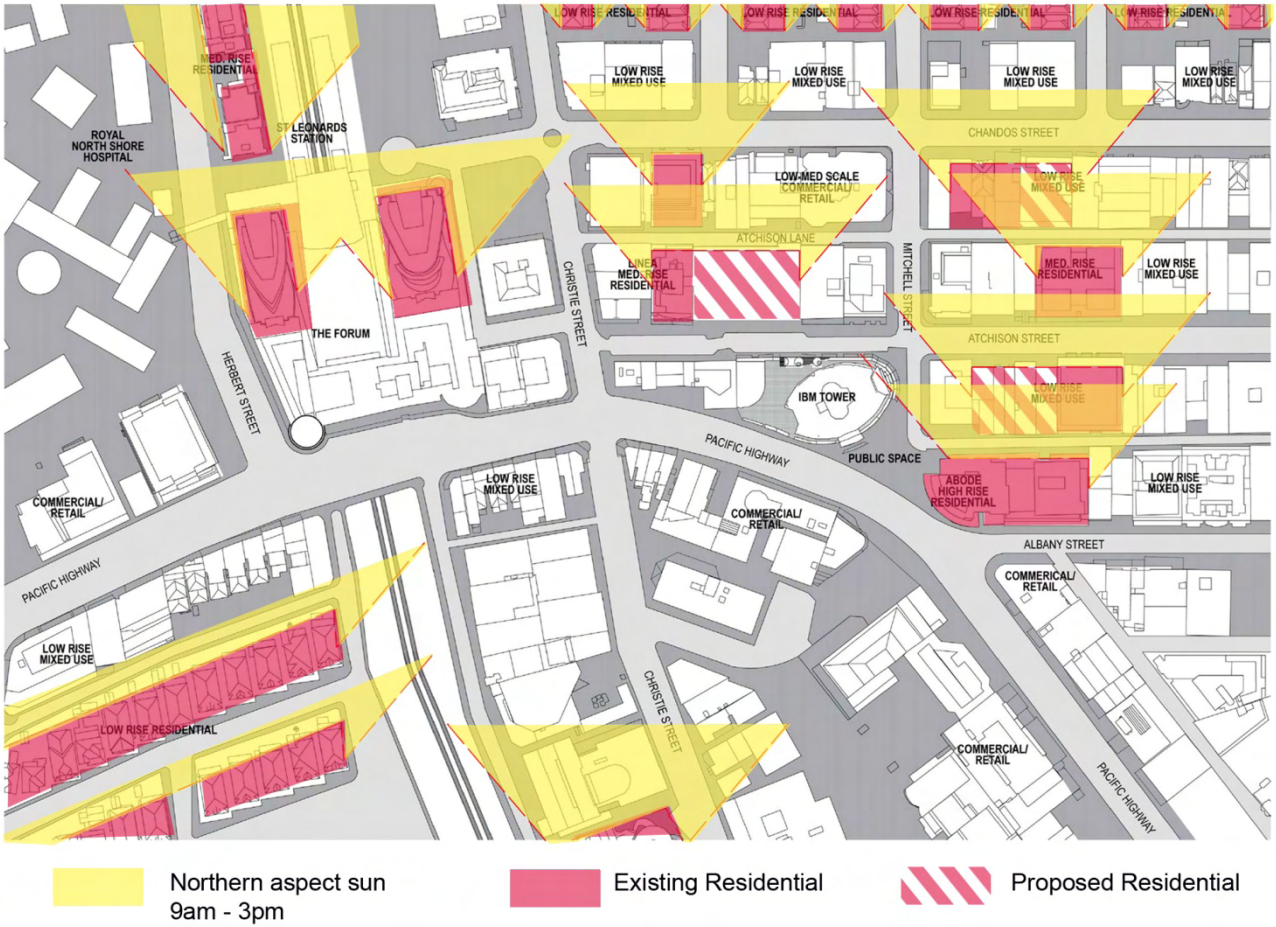


Existing Height Limits



Suggested increased Height Limit on northern side of centre

St Leonards Centre - Existing Residential Uses



EXISTING RESIDENTIAL USES IN THE ST LEONARDS CENTRE

Within the St Leonards Centre are a number of major existing residential developments, in particular the Abode building on Pacific Highway / Albany Street, the Linea building on Atchison Street as well as the two Forum towers at St Leonards Station. Additional medium rise complexes are along Herbert and Atchison Street. New developments have been constructed east of Mitchell Street.

Based on the existing road grid, the existing residential uses require special protection with respect to northern sun access. This limits the development potential especially on the northern side of an existing residential buildings.

The diagram demonstrates the existing northern aspect sun access for main existing residential uses in the St Leonards Centre.

St Leonards Centre - Opportunity Sites

Height Development Opportunity

Commercial Development Opportunities identified by Lane Cove LEP

IDENTIFICATION OF OPPORTUNITY SITES

The existing urban frame with residential uses as part of the St Leonards centre limts the number of locations which can be identified as Opportunity Sites (OPS). Fragmented land ownership further restricts the development potential of some areas.

The sites idetified as OPS may be developed to a greater height than presently prescribed with limited or manageable impact on existing residential uses.

These sites create an opportunity within the St Leonards Centre to increase commercial and employment floor space as well as the residential portion in mixed use buildings.

OPS are predominantely at the central and southern edge of the centre and opposite site of commercial land use. Significant increases in permissable height north of Atchison Lane is not suggested owing to the position of a number of residential buildings to the south.

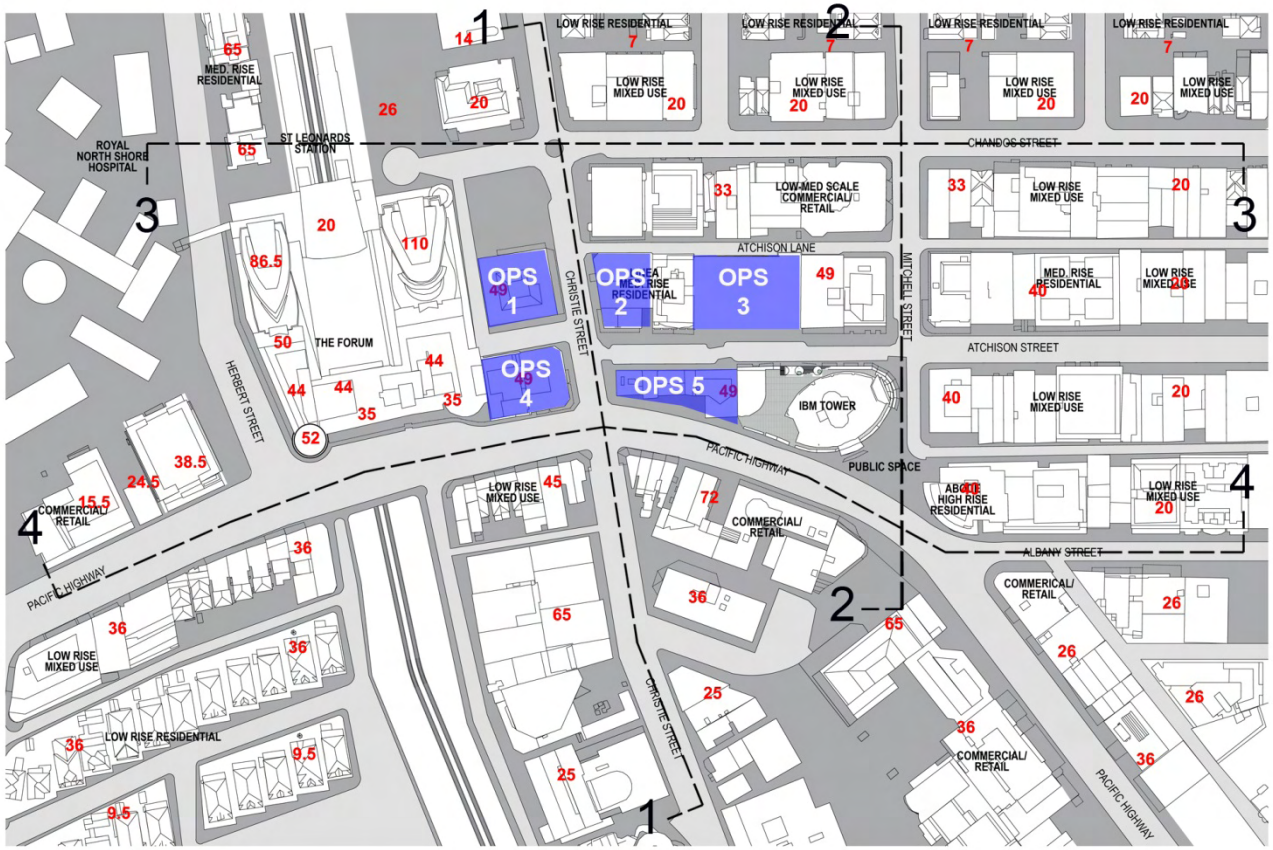
St Leonards Centre - Opportunity Sites

ANALYSIS OF OPPORTUNITY SITES

An analysis of the identified Opportunity Sides depicts the short, medium and long term possibility of development on the site. In this case the suitability for high rise buildings is the preferred option. OPS 1, 2 and 3 are tested for mixed use, while OPS 4 and 5 which would be overshadowed by OPS 1,2 and 3, are proposed for commercial use.

	No fragmented land ownership	No adverse impact of development potential on other sites	Sun access for residential portion	No existing large scale development on site
OPS 1	☆☆☆	☆	☆☆☆	
OPS 2		☆☆	☆☆	☆☆☆
OPS 3	☆☆☆	☆☆☆	☆☆☆	☆☆
OPS 4	☆☆	☆☆		
OPS 5	☆☆	☆☆		

St Leonards Centre - Sections



Height Development Opportunity

20 Existing LEP Height Limits

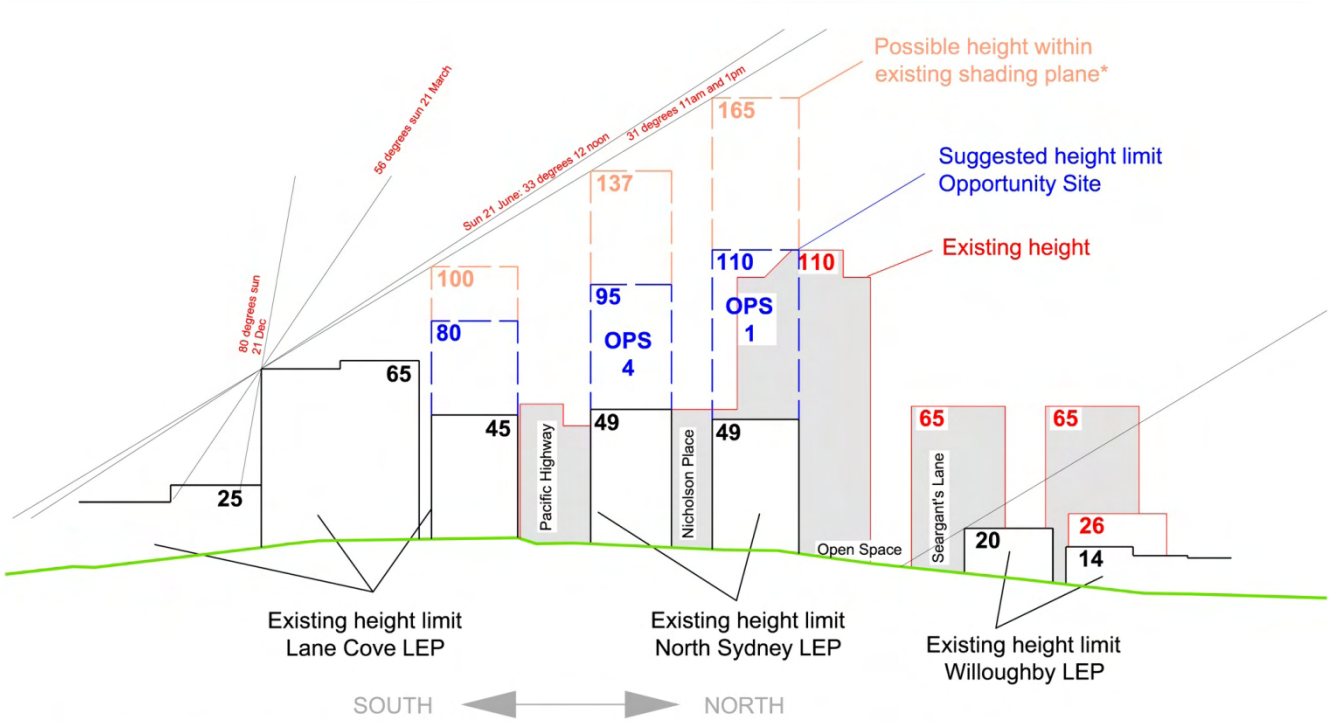
SECTIONS

To demonstrate the development opportunities on the OPS as well as potential impact on existing structures a number of sections have been prepared. The map shows the location of individual sections. This exercise was conducted to determine the potential height of buildings within an existing shadow plane as well as prevent shadowing impact on residential uses.

The existing Height Limits according to the Willoughby, Lane Cove as well as North Sydney LEP determine the base for the following section drawings.

Section 1: Determination of Height Limit for Opportunity Sites 1 and 4 (OPS 1, 4)

Using existing shadow plane



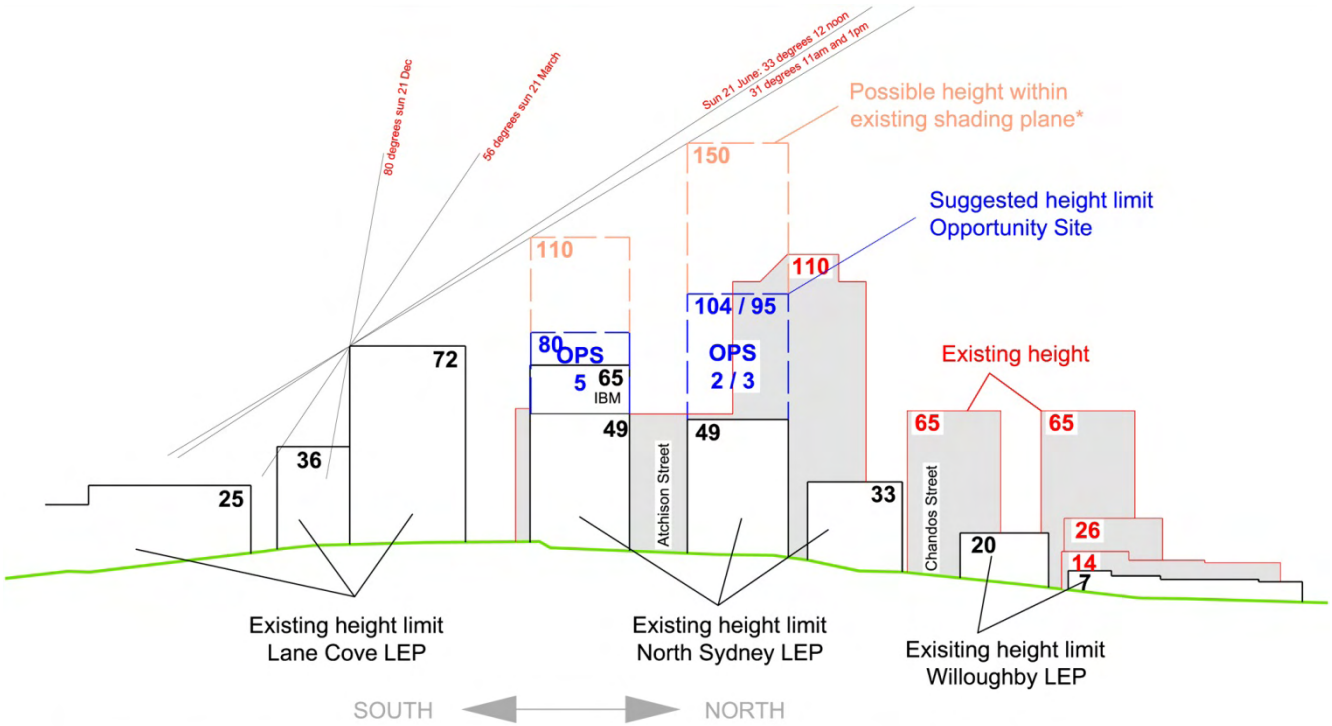
* Existing shading plane considers midday mid winter shadowing as result of existing LEP Height Limits

At present the height of development for OPS 1 and 4 is limited to 49m. However, a significant increase of the height limit may be permitted to increase the density around the train station and to foster a centre with diverse employment opportunities.

The existing height of the Forum building may be taken as the height limited for new development within the St Leonards Centre. OPS 1 would create, together with the tower of the Forum, the upper level of the Centre's skyline. OPS 4 creates a transition towards the surrounding height limits. The commercial development opportunities along the south side of Pacific Highway are also suggested for a higher level development to match the surrounding environment (here suggested at 80m).

Section 2: Determination of Height Limit for Opportunity Site 2, 3 and 5 (OPS 2, 3, 5)

Using existing shadow plane



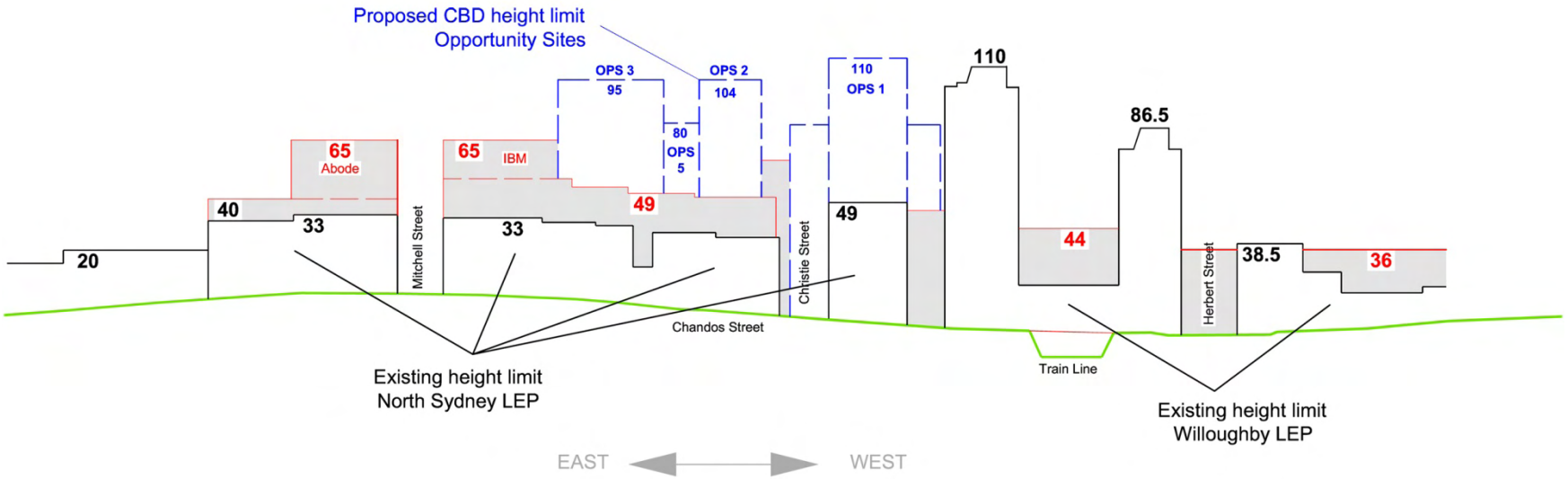
* Existing shading plane considers midday mid winter shadowing as result of existing LEP Height Limits

At present the height development for OPS 2, 3 and 5 is limited to 49m. A significant increase of the height limit for OPS 2, 3 and 5 may be permitted to increase the density around the train station and to foster diverse employment as well as mixed use opportunities within the St Leonards Centre. The OPS 3 is recommended for mixed use as it has been identified with the best preconditions for residential development within the St Leonards Centre. Furthermore it would be available for short term development.

The transition steps from the centre core towards the surrounding neighbourhood as formed by OPS 2/3 and OPS 5. The existing height limit south of the Pacific Highway would be matched.

Section 3: St Leonards Skyline development with Opportunity Sites– view from north / Chandos Street

Creation of a cohesive skyline under consideration of existing and proposed height limits

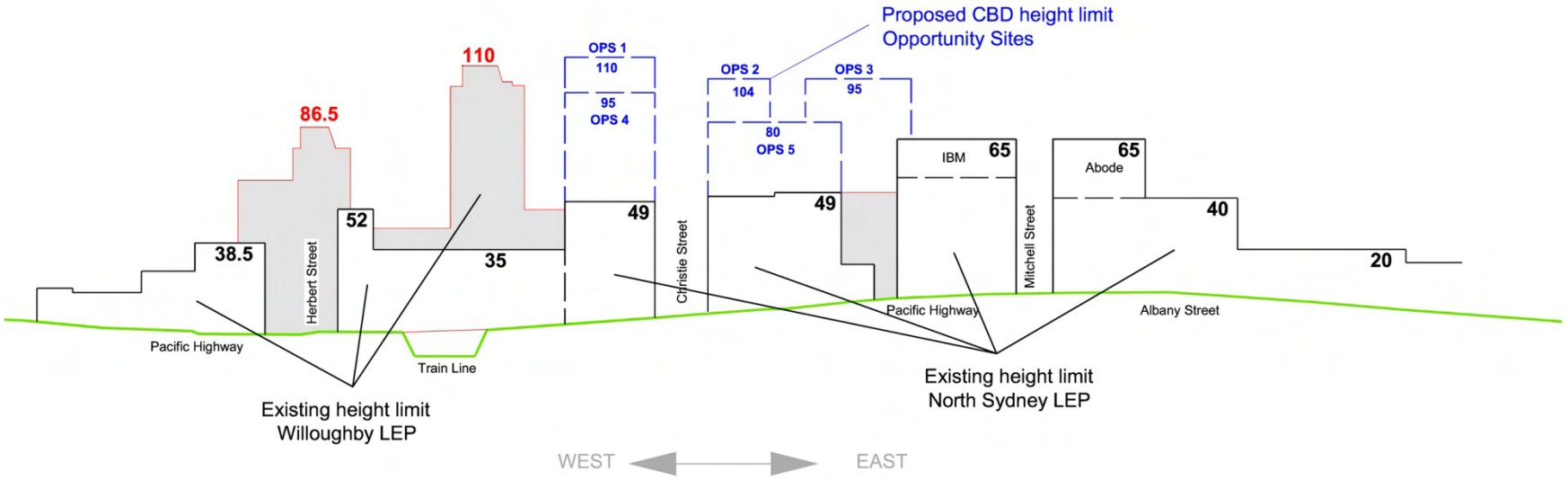


At present the St Leonards skyline is dominated by the Forum towers. Furthermore the IBM as well as the Abode building exceed the present LEP height limits and create a second hub at the eastern centre edge. It is suggested to increase the height limit for Opportunity Site 1 to 110m to match the existing height of the Forum tower. OPS 2 and 3 are suggested with a matching height limit to create a transition towards the surrounding precinct, especially the IBM and the Abode building. Reflecting the sloping terrain the suggested height for OPS 2 is 104m and 95m for OPS 3.

Viewed from the north, OPS 5 as well as the potential height increases on the southern side of Pacific Highway (under gazetted Lane Cove LEP), creates the background of the centre skyline along Pacific Highway. A height limit of 80m for OPS 5 would create a transition towards the existing heights of the IBM and the Abode building as well as create a transition to the existing Lane Cove LEP height limits on the opposite side of the Pacific Highway. It is suggested to increase the height limits for the IBM (at present 49m) and the Abode building (at present 40m) to 65m to retrospectively match the already developed heights.

Section 4: St Leonards Skyline development with Opportunity Sites – view from south / Pacific Highway

Creation of a cohesive skyline under consideration of existing and proposed height limits



At present the St Leonards skyline is dominated by the Forum towers. Furthermore the IBM as well as the Abode building exceed the present LEP height limits and create a second hub at the eastern centre edge. It is suggested to increase the height limit for Opportunity Site 1 to 110m to match the existing height of the Forum tower. OPS 2 and 3 are suggested with a height limit of 104m and 95m to create a transition towards the surrounding precinct, especially the IBM and the Abode building.

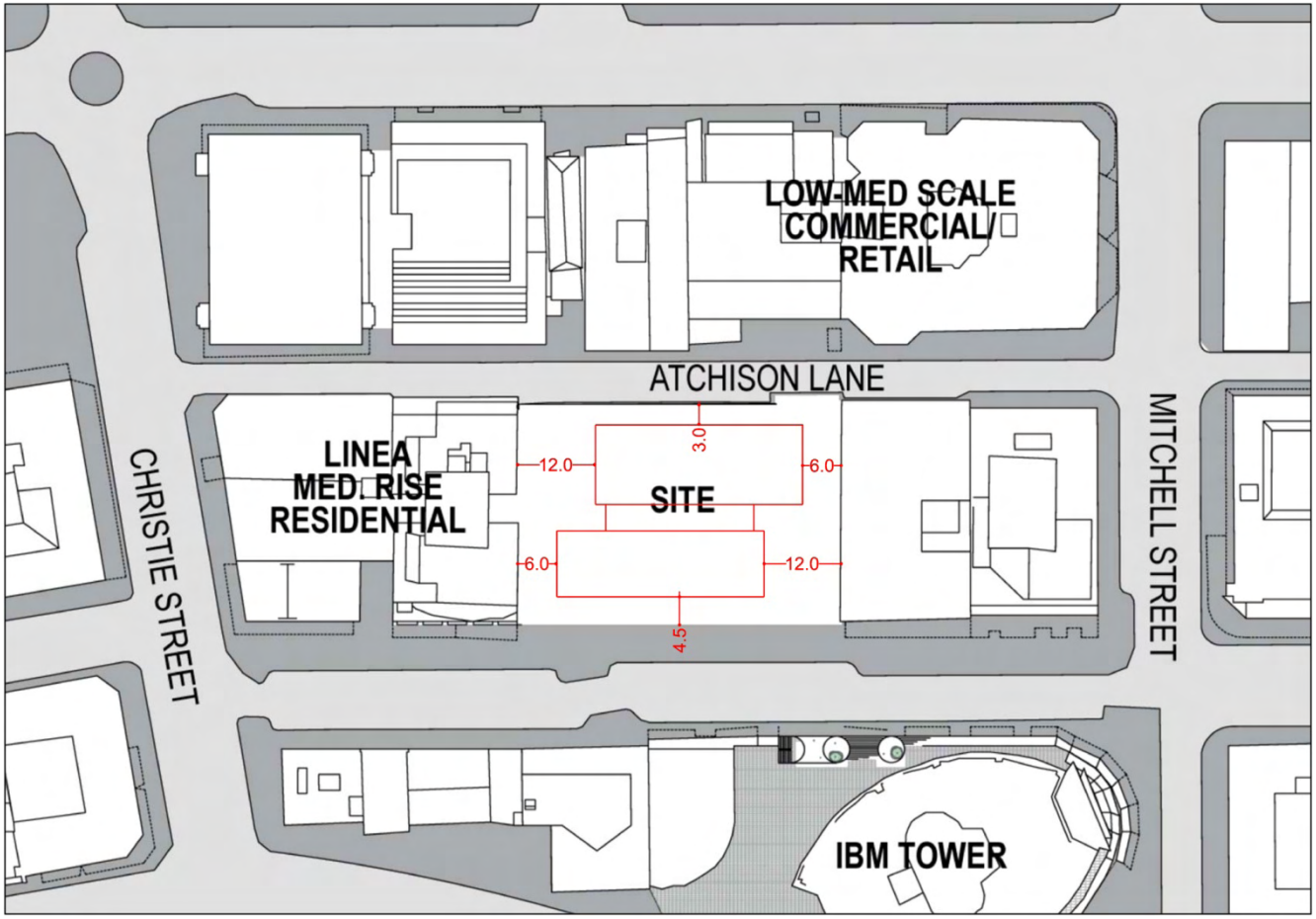
For OPS 4 a height limit of 95m is suggested to create a transition from the Centre core to the surrounding precincts in accordance with the Lane Cove LEP height limits. A height limit of 80m for OPS 5 would create a transition towards the existing heights of the IBM and the Abode building as well as create a transition to the existing Lane Cove LEP height limits on the opposite side of the Pacific Highway. It is suggested to increase the height limits for the IBM (at present 49m) and the Abode building (at present 40m) to 65m to retrospectively match the already developed heights.

St Leonards Skyline development with Opportunity Sites – view from south

Creation of a cohesive skyline under consideration of existing and proposed height limits

The St Leonards Centre Skyline is part of a sequence of hubs within the Sydney metropolitan area which is formed by the centres along the Northshore train line (North Sydney – St Leonards – Chatswood). The present St Leonards skyline (shown in yellow) is predominantly formed by the Forum towers on its western edge as well as the IBM and Abode on the eastern edge. A dent is result of lower levels in the central area.

The skyline formed by the suggested height limits (shown in blue) demonstrates the creation of a dome by the existing buildings together with the suggested height limits in the central area. Such skyline would clearly identify the St Leonards Centre within the Sydney metropolitan urban structure and define the business district. A transitional rising in steps from the eastern side allows the even development of a skyline dome with the building around St Leonards Station at peak level.

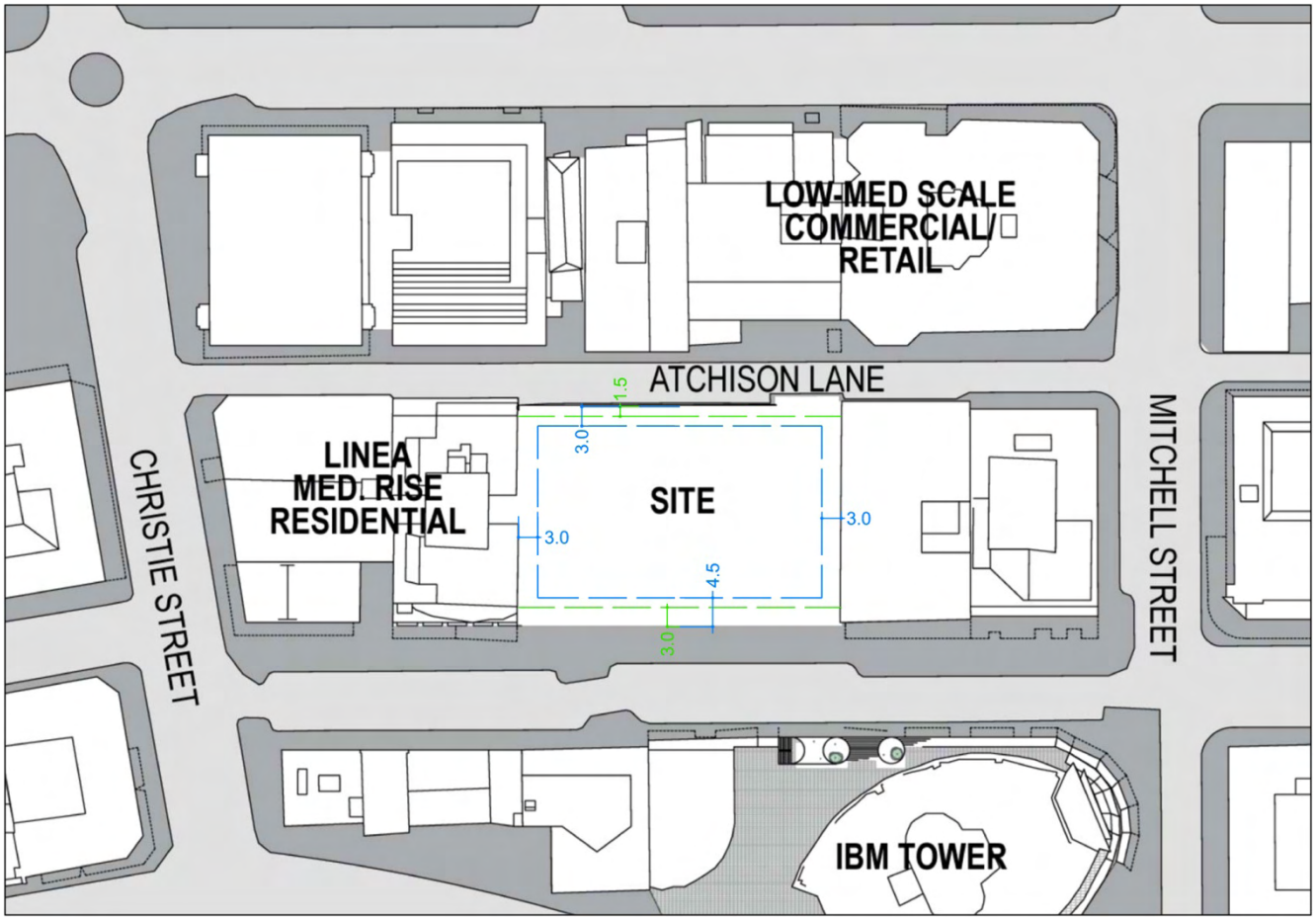


ANALYSIS OF OPS 3

The investigation of potential height development options within the St Leonards Centre identified OPS 3 as only short term possibility. The potential impact of an increased height development (above the present 49m) will be examined. This exercise will in particularly focus on the envelope development potential of neighbouring sites having regard for building separation as well as shadowing on existing or possible buildings.

A design proposal for OPS 3 prepared by FJMT will be considered and analysed. This proposal includes:

- Hospitality, access and open spaces on ground level;
- Serviced apartments / commercial use on lower levels;
- Residential apartments on higher levels (where SEPP65 regulations are considered).

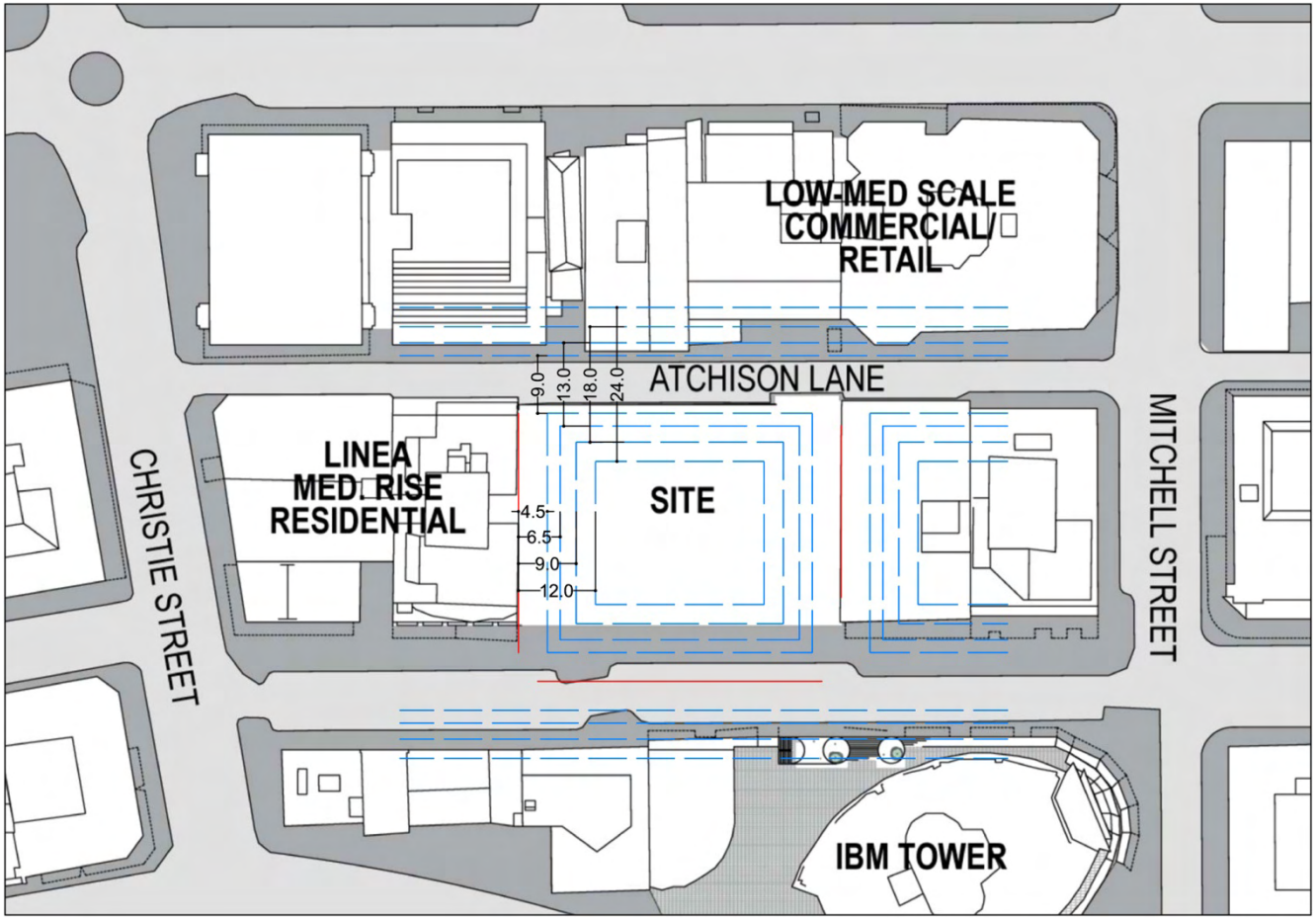


REQUIRED BUILDING SETBACK

According to the North Sydney DCP 2001 the following general setbacks have to be considered:

Podium Setbacks:
Lane: 1.5m
Street: 3.0m
Sides: 0.0m

Tower Setbacks:
Lane: 3.0m
Street: 4.5m
Sides: 3.0m



SEPP 65 SETBACK

According to SEPP 65 the following general setbacks have to be considered for residential uses:

Building height up to 12m:
- 12m between habitable rooms/balconies
- 9m between habitable rooms/balconies and non-habitable rooms
- 6m between non-habitable rooms

Building height up to 25m:
- 18m between habitable rooms/balconies
- 13m between habitable rooms/balconies and non-habitable rooms
- 9m between non-habitable rooms

Building height over 25m:
- 24m between habitable rooms/balconies
- 18m between habitable rooms/balconies and non-habitable rooms
- 12m between non-habitable rooms

BUILDING SEPARATION

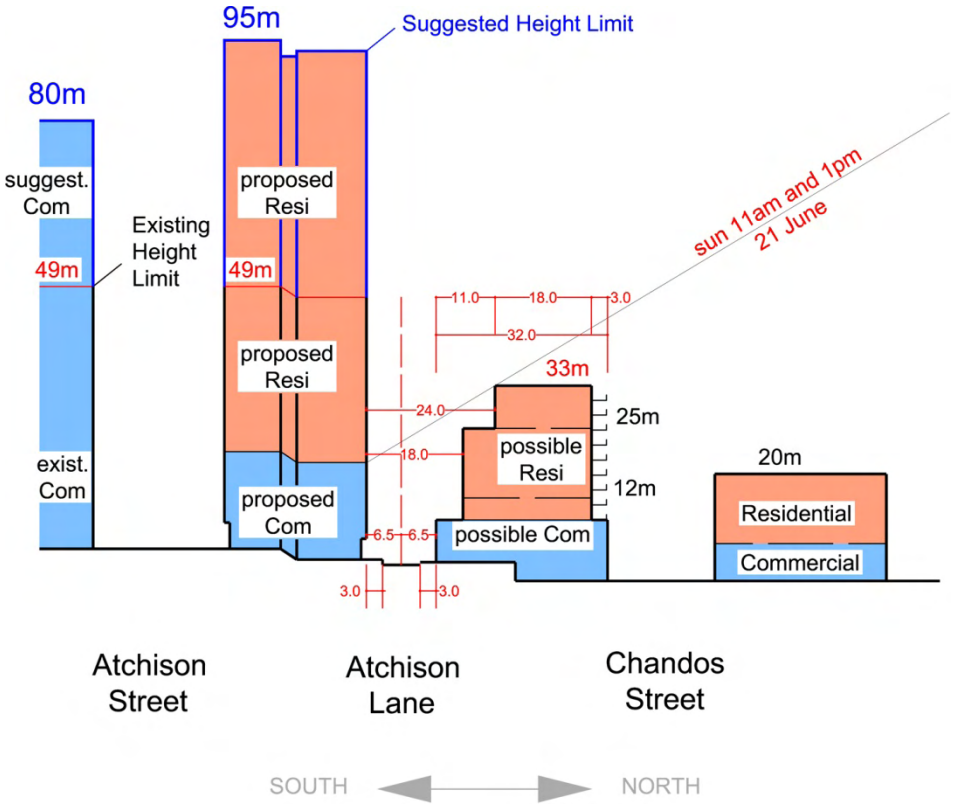
An independent SEPP 65 review of the proposal has been prepared by Peter John Cantrell (Tzannes Associates) in July 2010. The result was a general compliance of the proposal with the SEPP 65 regulations, apart from issues regarding the building separation between the eastern/western and the northern neighbouring sites.
Parts of the proposed building provide a distance of 6m to the eastern as well as to the western boundary. This results in potential privacy and overlooking issues with the neighbouring site; however, generally the rooms on this face of the proposed building are second bedrooms or have another orientation to the north or to the south. The SEPP 65 review recommends that "*in order to maintain visual privacy the east facing windows on this face should be screened. The screen would need to be designed to allow for sun access where this is required.*"

The potential to redevelop the site to the east of OPS 3 to an increased height limit above the present 49m is limited because it would compromise the solar access of the existing residential apartments in the Abode building. Therefore, for the proposed building on OPS 3 it is suggested to provide screening of windows or adequate privacy design in consideration of the maximum development potential of 49m on the site to the east.

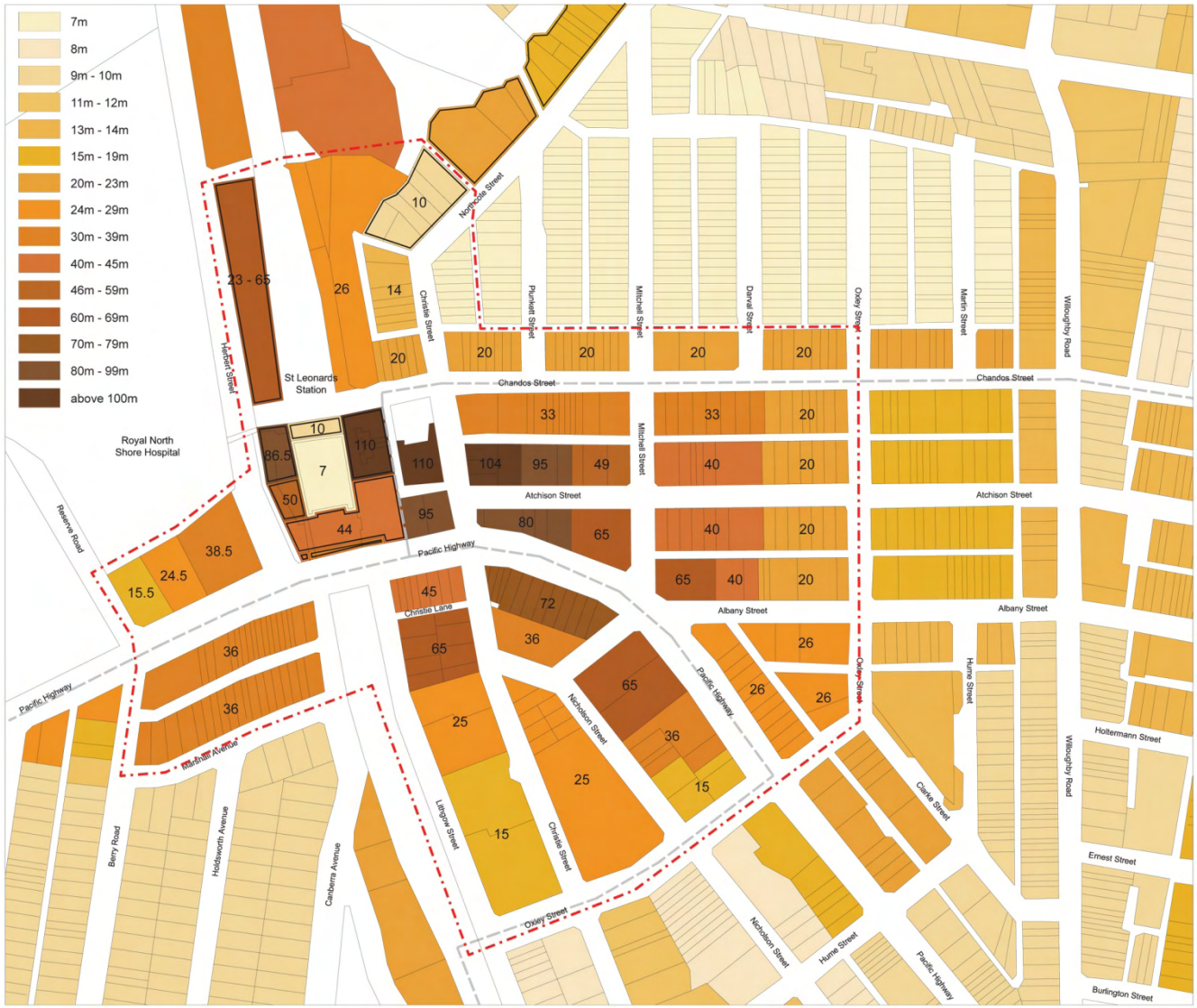
On the west, the proposed building faces the existing Linea building which has only glass block apertures on the east facing facade as well as an internal light well. The rooms on this side of the proposed building on OPS 3 generally have another orientation to the north or south. As there are no substantial openings in the Linea building, privacy screening is considered less necessary. A redevelopment of the Linea building in foreseeable future is unlikely as it is a substantial new building with strata apartments.

To the north of OPS 3, across Atchison Lane the proposed distance to the existing commercial buildings is around 16.5m. This is greater than the 13m required between habitable and non-habitable rooms for buildings up to 25m. However, in case the site would be re-developed at a later stage to its full height potential of 33m, the required setback would be 18m above 12m. It can be expected that the bulk of any new building would be oriented towards Chandos Street and an additional 1.5m setback for the parts above 25m can be considered acceptable. Such stepping is consistent with other existing developments between Atchison Lane and Chandos Street.

The before mentioned independent SEPP 65 review examined the case of a site re-development on Chandos Street to mixed use / residential in the future in which case a separation of 18m (up to 25m) and 24m (up to 33m) would be required between habitable rooms. The review states that it can be expected that any residential development would result in a more narrow building than the present commercial building depth. Again, it can be expected that the building would be oriented towards Chandos Street and the required building separation could be achieved without unreasonable impact.



The diagram depicts the re-development potential for a mixed use building between Atchison Lane and Chandos Street. Commercial space would be located on the lower levels with residential uses on the upper levels. Residential uses can be located on higher levels; however, as a result of the block depth it will be difficult to meet SEPP 65 requirements on the southern side of the lot.
Considering the required lane setback according to North Sydney DCP a separation of 13m would result in sufficient distance for Com/Com as well as Com/Resi up to 25m. Resi/Resi would require a distance of 18m and 24m above the 25m mark. Importantly, there is no additional impact on the development potential for the site between Atchison Lane and Chandos Street by the suggested height increase on OPS 3 from 49m to 95m.



RECOMMENDATIONS

It is recommended to amend the North Sydney LEP to permit increased heights within the St Leonards Centre. Opportunity sites should allow increased heights along the Pacific Highway corridor.

Tall tower buildings are proposed to achieve an increase of commercial and mixed uses close to the St Leonards train station. Impact on existing structures has been considered and analysed as manageable. A significant increase within the centre core will create a distinctive centre skyline with transition towards the surrounding lower density precincts. Mixed use buildings with residential portions are recommended along the northern edge of the centre, commercial uses should preferably be located along the southern side of the centre.

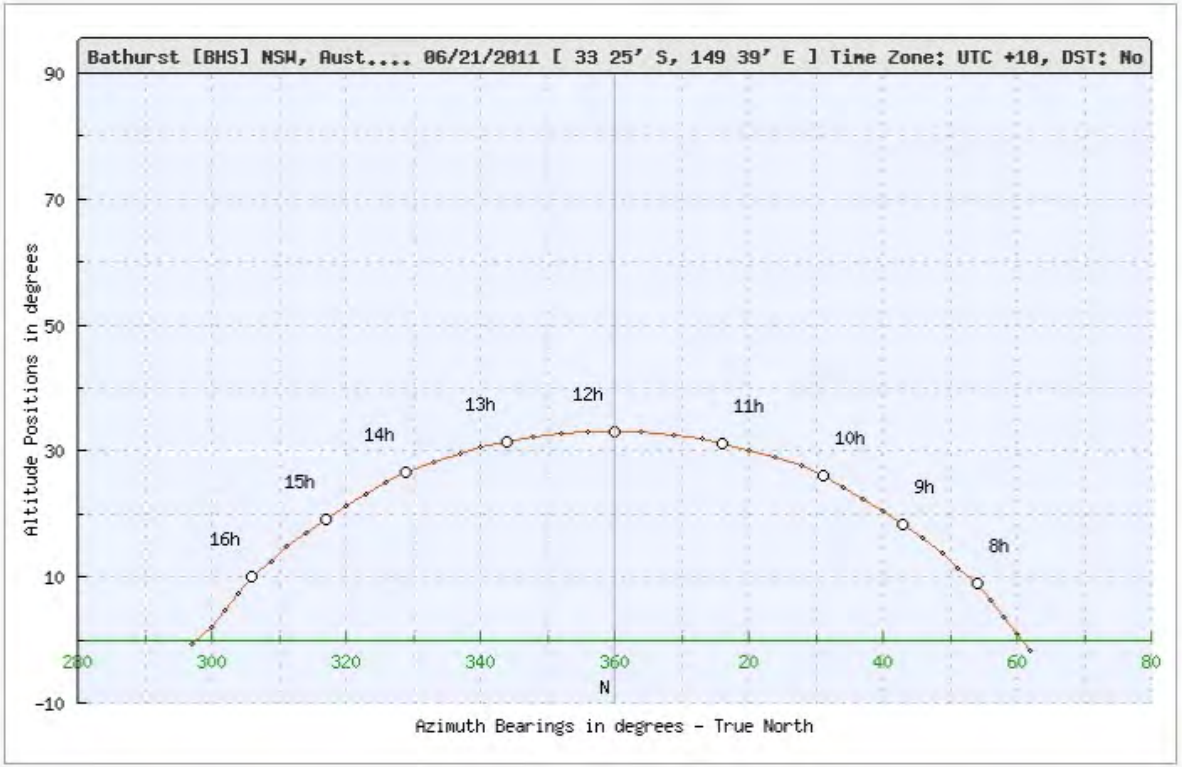
Also considered in the recommended height map is an increase to 65m for the IBM and the Abode buildings to reflect the actual situation.

Attachment 1:
Sun Position Calculator
21 June
(sunposition.info)

» Tuesday, 21st June 2011 « Selected

Sunrise: 07:04 (Az 62°), Sunset: 17:00 (Az 297°)

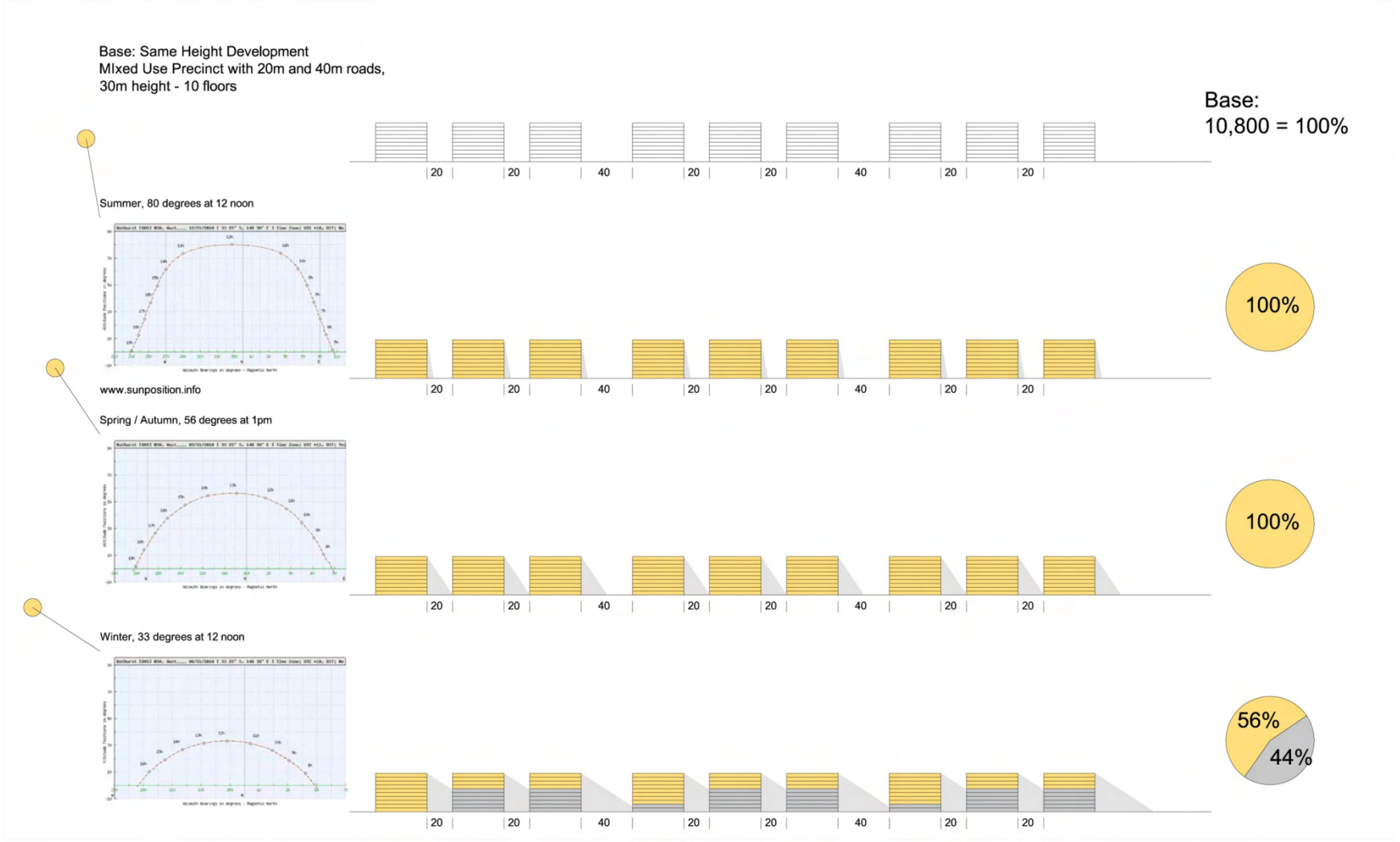
14:00	329°	27°
14:15	326°	25°
14:30	323°	23°
14:45	320°	21°
15:00	317°	19°
15:15	314°	17°
15:30	311°	15°
15:45	309°	12°
16:00	306°	10°
16:15	304°	7°
16:30	302°	5°
16:45	300°	2°



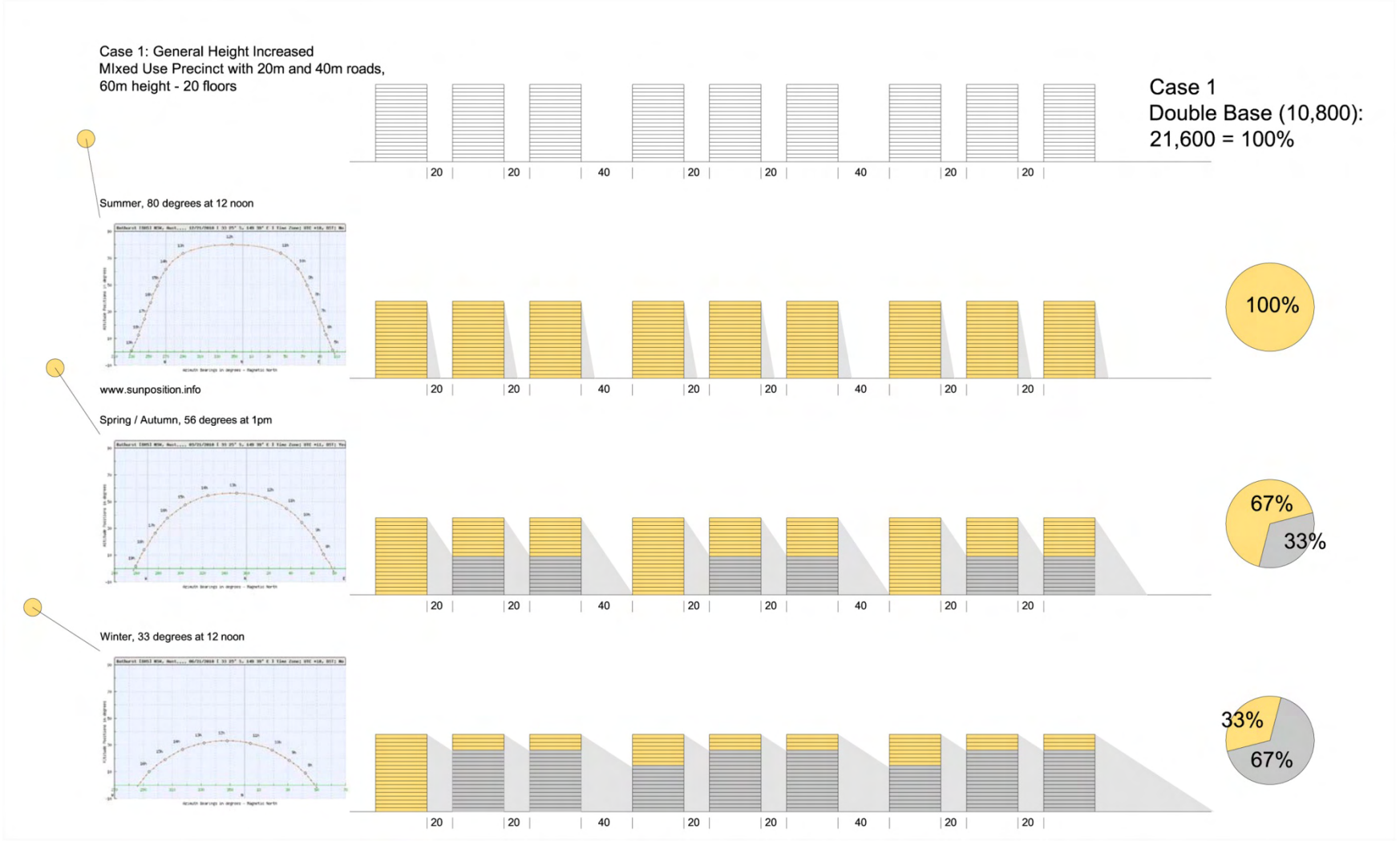
PLANNING
BUILDING
HERITAGE
URBAN DESIGN

CITY PLAN URBAN DESIGN

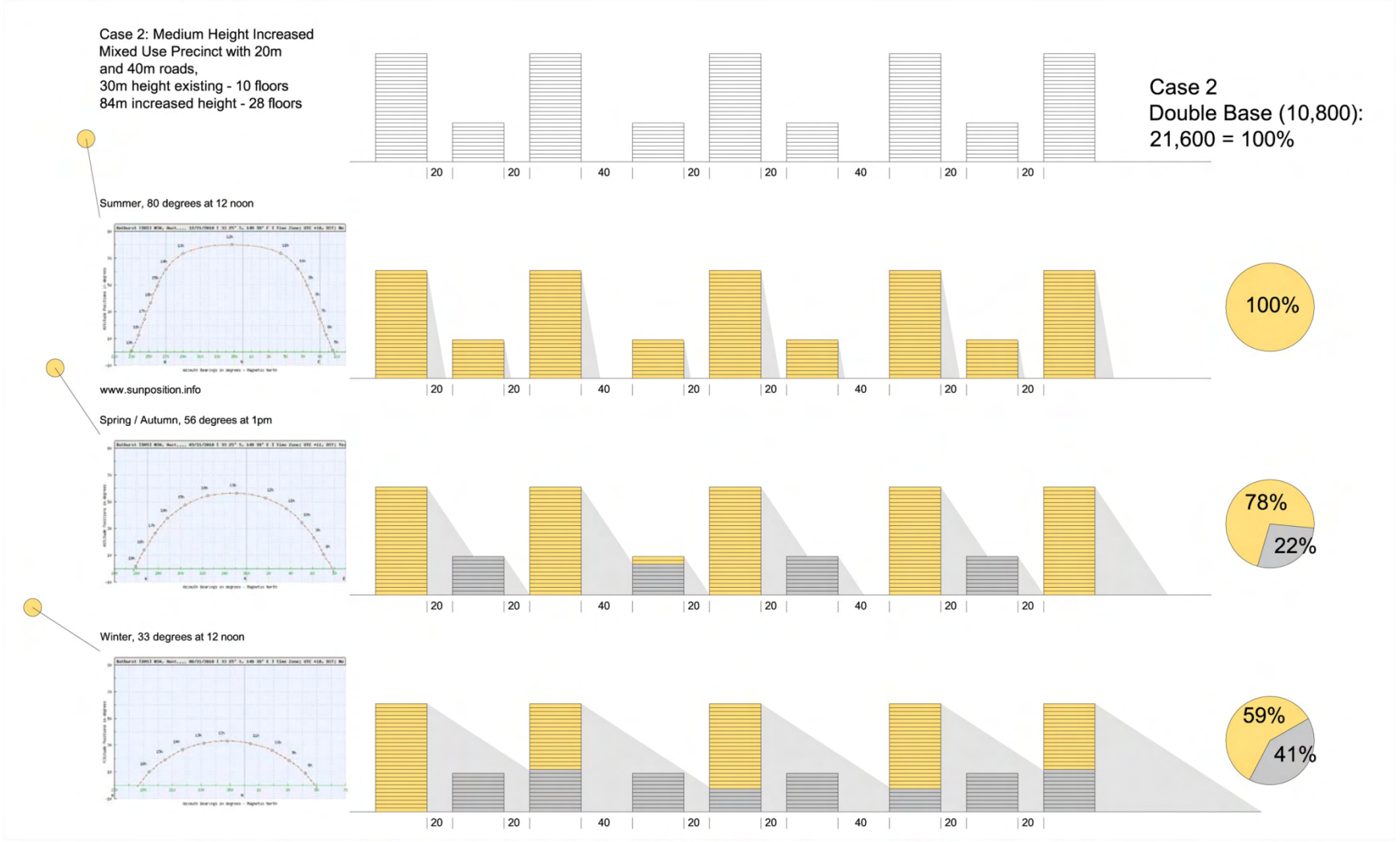
Attachment 2: Shadow Study – Base Case



Attachment 3: Shadow Study – Case 1



Attachment 4: Shadow Study – Case 2



Attachment 5: Shadow Study – Case 3