# Statement of Environmental Effects

## Demolition, Mixed Use Retail and Residential Development

## 15-31 Harbour Drive, Coffs Harbour

Prepared for: Paynter Dixon Constructions Pty Ltd

Date: December 2020

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# Executive Summary

**Brief Description of the Proposal**

This Development Application seeks consent for a 13 storey mixed use retail and residential building to be located at 15 - 31 Harbour Drive in the Coffs Harbour City Centre. The building will occupy three existing properties, including the City Boulevard Arcade and adjoining retail premises. The site has dual frontage to Harbour Drive and Vernon Street. The proposal includes demolition of existing buildings.

The proposed podium and tower building will deliver ground floor retail, three floors of car parking and residential apartments and nine storeys of residential apartments in a stepped, cascading building form. The building is highly responsive to the future context of the City Centre as envisaged in the City Centre Masterplan 2031. This is a compelling development that will strengthen the core of the city centre.

The development comprises 735 $m^2$ of retail space, 95 residential apartments of various sizes, 154 car parking spaces and a public pedestrian walkway linking Harbour Drive with Vernon Street.

The building design is sustainable comprising minimised energy usage promoted by excellent natural light, natural ventilation, winter gardens, balcony gardens and landscaped screening. The design seeks to create an inclusive, welcoming and equitable retail and living environment as part of a growing City Centre. The development will replace old retail arcades with a new retail precinct activating both the Harbour Drive and Vernon Street frontages as well as shop frontages to the pedestrian laneway.

The site is to the west of the approved to 12 storey 'Gowings Hotel' development located above the Coffs Centre Shopping Centre. It is likely that this project will encourage further redevelopment in the City Centre in response to the expected district growth, Pacific Highway bypass and City Centre developer incentives for employment generation and residential projects.

**Consent Authority**

The site is in the Coffs Harbour Local Government Area (LGA). The estimated cost of the development is over $30 million and is therefore classed as Regional Development. The Northern Regional Planning Panel is the Consent Authority for the proposed development. Coffs Harbour City Council will receive and process the Development Application and prepare an assessment report to assist the Planning Panel.

**Compliance with Planning Controls and Strategies**

The proposal is permissible with consent and meets the objectives and development standards of the *Coffs Harbour Local Environmental Plan 2013* and *State Environmental Planning Policy No 65—Design Quality of Residential Apartment Development.* The proposal is fully compliant with the *Coffs Harbour Development Control Plan 2015.*

The project has been purpose designed in response to the findings and recommendations in the Coffs Harbour City Centre Masterplan 2031. The residential component of the development meets Council's compact city objectives for increased density in the City Centre infill precinct.

**Benefits arising from the development include:**

***Renewal*** of commercial buildings and arcades that are past their design life.

***Revitalisation*** and ***Activation*** of both Harbour Drive and Vernon Street.

Reinforces the ***legibility*** of Harbour Drive and Vernon Street as Main and Supporting City Centre Streets

***Connection*** of the pedestrian pathway will link Harbour Drive and Vernon Street mid-block providing 24-hour public access within a landscaped environment.

***Compliance*** – this project has been purpose designed to align with the City Centre Masterplan. Council's LEP and DCP have been amended to reflect the Masterplan recommendations.

***Inclusion*** - 20 of the 95 apartments meet the Silver standard for liveable housing design of which 10 are adaptable to suit an aging population.

***Functionality*** - the building will function exceptionally well in terms of energy efficiency, accessibility and liveability.

***Public Domain*** enhancement through landscaping, connectivity and design.

The following Statement of Environmental Effects sets out the nature of the proposal, the activities for which consent is required, the statutory framework, the environmental interactions involved and the reasons and justification for the proposal.

**Harbour Drive Perspective:**

**Source: Turner Drawing DA-910-001**

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# 1.0 Introduction

## 1.1. Background

Keiley Hunter Town Planning has been engaged by Paynter Dixon Constructions Pty Ltd, to act as Planning Consultants for the preparation of a Statement of Environmental Effects (SoEE) to accompany a Development Application (DA) to Coffs Harbour City Council for a demolition and a mixed use development at 15 - 31 Harbour Drive, Coffs Harbour. The proponent for the development is C.ex Group. The proposed development involves:

- Demolition of existing buildings.
- Construction of one (1) thirteen storey tower comprising:
    - Ground floor retail, loading dock and car parking
    - Levels 1 to 3 – car parking and residential apartments
    - Levels 4 to 12 residential apartments
- 735 $m^2$ retail floor area within seven (7) tenancies.
- 95 residential apartments
- 154 car parking spaces
- Two lifts, communal open space and a pedestrian laneway between Harbour Drive and Vernon Street

## 1.2. Consent Authority

The subject site is located in the Coffs Harbour Local Government Area (LGA). The estimated cost of the development is over $30 million, therefore Schedule 7 of State Environmental Planning Policy (SEPP) (State and Regional Development) 2011 identifies the proposal as Regional Development.

The Northern Regional Planning Panel is the Consent Authority for the proposed development. Coffs Harbour City Council will receive and process the Development Application and prepare an assessment report to assist the Planning Panel.

## 1.3. Further Information

Should Council require any additional information or wish to clarify any matter raised by this Statement of Environmental Effects, please contact Keiley Hunter on 0458 515 963 or email keiley@keileyhunter.com.au.

## 1.4. Specialist Technical Advice

Specialist advice and design input was provided from consultants listed in **Table 1.1** below.

**Table 1.1 Specialist Technical Advice**

| *Consultant* | *Service* | *Appendix* |
|---|---|---|
| Paynter Dixon Constructions Pty Ltd | Project Management | |
| Turner | Project Architecture<br>Architectural Design Guide | B<br>C |
| Peter Duckitt, Registered Quantity Surveyor | Capital Investment Value (CIV) | A |
| Stantec Australia Pty Ltd | Civil Design<br>Stormwater Drainage Design Report<br>Services | F<br>F<br>J |
| Izzat | Structural Engineer | H |
| Conzept | Landscape Architect | E |
| TTPA | Traffic and Parking | D |
| Waste Audit | Waste Consultant | G |
| Application Solutions | Section J<br>BASIX | O<br>I |
| Accessible Building Solutions | Statement of Compliance – Access for People with a Disability Report | L |
| Acoustic Logic | Acoustic Assessment | M |
| BCA Logic | BCA Assessment Report | N |
| Windtech | Wind Consultant | P |
| EI Australia | Hazardous Materials Survey | Q |
| Fire Safety Studio | Fire Engineering Statement | R |
| BlairLanskey Surveyors | Detail Survey<br>Lot Consolidation (Post Consent) | S |

## 1.5. The Site

The subject land is described as Lots 9 and 10 DP 506454, Lot 4 Sec 7 DP 758258 and Lot 1 DP 305950 No. 15 - 31 Harbour Drive Coffs Harbour with a total area of 3,002.3 $m^2$. The land is within the central business district of Coffs Harbour and adjoins:

- 13 Harbour Drive - two storey vacant commercial building (formerly The Kitchen Shop) to the south west
- 7-11 Harbour Drive – two storey commercial building known as the Cinema Walk Arcade adjoins the western boundary of the site off Vernon Street.
- 33 Harbour Drive – two storey commercial building known as the Jack Simmons Centre to the east of the site.
- Harbour Drive to the south
- Vernon Street to the north.

**Table 1.2 Site Summary**

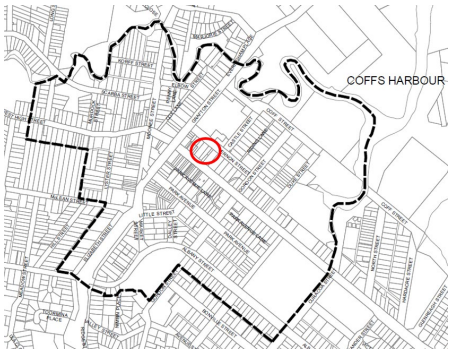
| ***LEP/SEPP*** | ***Coffs Harbour Local Environmental Plan 2013*** |
|---|---|
| Zone | **B3 Commercial Core** |
| FSR | **4.5:1 1** |
| Height of buildings | **44 m** |
| Heritage | **No** |
| Acid Sulfate Soils | **Class 4** |
| Flood Planning | **Clause 7.3 applies.**<br>**Site located in LEP flood planning level area. Council's most recent data from the Coffs Creek Flood Study (BMT WBM, 2018) indicates that the 100 year ARI flood (1% AEP) level closest to the property is estimated to be RL 4.67 m AHD. The Flood Planning Level is RL 5.17m AHD (1% AEP + 500mm freeboard).** |
| Design Excellence | **Yes. Clause 7.12** |
| Central Business District | **Yes. Clause 7.13**<br>  |
| Coastal Management | **Coastal Use Area**<br>**Coastal Environment Area**<br>**Coastal Wetlands Proximity Area** |
| ***DCP*** | ***Coffs Harbour Development Control Plan 2015*** |
| Precinct | **City Core Precinct**<br>**Masterplan Boundary – City Centre**<br>**Compact City Infill**<br>**CBD – City Heart** |
| D1 Commercial development controls | **Apply to B3 Commercial Core** |
| Setbacks | **Merit (front / side / rear)** |
| Prescribed vegetation | **No** |
| ***Other*** | |
| Bushfire Prone Land | **No** |
| AHIMS Database | **No items listed.** |
| Contaminated Land | **Not identified on CHCC Land Contamination Map** |
| Airport Height Limitations | **No.** |

**Illustration 1.1 Site Locality**

**Source: Turner Drawing DA-010-001**

**Illustration 1.2 Aerial Photo Surrounding Area**

**Source: Coffs Harbour CBD - Review of Heights and Built Form Controls**

**Illustration 1.3 Surrounding Land Uses**

**Source: Coffs Harbour CBD – Review of Height and Building Form Controls November 2017**

The City Centre *accommodates a mix of land uses, with retail, commercial, business and office uses concentrated at the core, along Harbour Drive and Gordon Street. Educational, Local Government, Community and Medical/Consultant uses form a second ring around the commercial core, whilst residential and open space reserves are situated at the periphery of the* CBD area (CM+2017).

Established two storey commercial premises and shops currently exist in the immediate vicinity of the subject site. The 'Gowings Hotel' development located above the Coffs Centre Shopping Centre is approved to 12 storeys (DA0751/16). It is likely that other sites in the City Centre will be redeveloped in response to the expected district growth, Pacific Highway bypass and City Centre developer incentives for mixed use retail/residential projects.

To the north of the subject site, on the opposite side of Vernon Street, is the Cex Coffs Club, Council Chambers of the site of the approved Civic and Cultural Centre.

**North of Site**

**CEX Coffs Club**

**CEX Coffs Club**

Immediately to the east and west of the subject site is a two storey retail and commercial building, the Jack Simmons Centre (east) and vacant premises (west).

**East and West of Site**

**Jack Simmons Centre - east of site (site shaded red)**

**Harbour Drive frontage**

**Site frontage to Harbour Drive**

**35-61 Harbour Drive**

**Coffs Central Shopping Centre**
**Upper storeys approved for future development.**

**Illustration 1.4** **Height Context**

**Source: Coffs Harbour CBD - Review of Height and Built Form Controls, November 2017**

**Illustration 1.5** **Desired Precinct Plan – Local Context**

**Source: Precinct Analysis Gordon Street New Library Gallery Preliminary Draft 2016**

# 2.0 Description of the Development

## 2.1. Overview

The proposal involves the construction of a thirteen (13) storey shop-top-housing development. The proposal includes 735 $m^2$ of retail floor area (GFA) within seven tenancies, a residential tower containing 95 residential apartments, as well as a total of 154 onsite parking spaces for residents, employees and visitors. The proposal includes demolition of existing buildings.

A 6 m wide pedestrian laneway will connect Harbour Drive with Vernon Street. This laneway will be available to the public at all times however it will remain within private ownership. The laneway will be formalised by a Section 88B Right of Public Access, 6 m wide, burdening the land in favour of Council.

Flexible retail tenancies on the ground floor will activate the area with a new open-to-sky laneway connecting the two streets. The proposed separate retail tenancies will accommodate typical retail or food and beverage uses, however, future uses of each of the retail tenancies is not nominated in this application. Freeboard and preventative flooding requirements are within the tenancy or created through level transitions or ramps.

Wintergardens are provided for 24 of the residential apartments. Wintergardens are a relatively new element of apartment design whereby balconies are enclosed with glazing to provide additional shelter and warmth during the cold months. The Apartment Design Guide recommends wintergardens for noise and wind attenuation.

Car parking is shielded from public view by residential tenancies and a combination of landscape and breeze-screens to the other frontages. There is no basement level, providing an opportunity for deep soil planting to the laneway.

Detailed drawings are provided at **Appendix C**.

## 2.2. Detailed Description

**Building Description (BCA):**

Rise in Storeys (Clause C1.2): The building has a rise in storeys of 13.

Classification (Clause A6.0): The building has been classified by BCA Logic as follows.

**Table 2.1 Building Classification**

| CLASS | LEVEL | DESCRIPTION |
|---|---|---|
| **6** | Part Ground Floor | Retail Tenancies |
| **7a** | Part Ground Floor, Part Level 1 to 3 | Car Parking |
| **7b*** | Mezzanine Level, Part Level 1 to 3 (Car parking area) | Residential storage cages |
| **2** | Part Level 1 to 3, Level 4 to 12 | Residential storage cages |

**Class 7b Classification: As the residential parking spaces have residential storage cages, the car parking fire compartment must also have the classification Class 7b. Note, the 10% minor use rule does not apply when the storey has three classifications (Class 2, 7a & 7b).*

The following table provides a detailed description of each proposed level:

**Table 2.2 Floor Levels – Description of Development**

| |
|---|
| ***Ground Floor*** |
| - A total of 735 $m^2$ of retail floor space. The floor space will be provided in seven (7) separate retail tenancies and will accommodate typical retail or food and beverage uses.<br>- Level pedestrian access directly to ground floor retail tenancies.<br>- Level pedestrian access to pedestrian laneway linking Harbour Drive with Vernon Street.<br>- Secure and dedicated residential lobby providing access to two (2) lifts.<br>- Bathrooms for public use.<br>- Direct vehicular access from Vernon Street to the loading dock as well as the basement levels.<br>- 14 retail tenancy car parking spaces, including one accessible space.<br>- 26 $m^2$ bike storage area.<br>- Electrical substation and fire control room (basement).<br>- Electrical, communications, NBN room.<br>- Retail waste (58 $m^2$) storage room, with direct access to the loading dock.<br>- Residential waste storage room (59 $m^2$), with direct access to the loading dock.<br>- Cleaners room (6 $m^2$).<br>- Two (2) emergency stairwells.<br>- 7% of the site area is deep soil landscaping, inclusive of permeable paving. |
| ***Mezzanine Level*** |
| - 26 storage cages for residential apartments<br>- Lift access<br>- Storage room (water supply infrastructure) |
| ***Level 1*** |
| - Five (5) residential apartments 1.01 to 1.05<br>  - 2 x 1 bedroom<br>  - 3 x 2 bedroom<br>- Vehicular ramp up from ground floor to security gate entry.<br>- 47 car parking spaces:<br>- 20 visitor parking spaces, including one (1) accessible space. |

- 10 residential car parking spaces
- 17retail tenancy car parking spaces
- 11 storage cages (residential)
- Retail mechanical plant (43 $m^2$)
- Lift lobby
- Two fire stairs

***Level 2***

- Five (5) residential apartments 2.01 to 2.05
    - 2 x 1 bedroom
    - 3 x 2 bedroom
- 47 residential car parking spaces including four (4) accessible spaces.:
- 25 storage cages (residential)
- Retail mechanical plant (31 $m^2$)
- Lift lobby
- Two fire stairs

***Level 3***

- Five (5) residential apartments 3.01 to 3.05
    - 2 x 1 bedroom
    - 3 x 2 bedroom
- 46 residential car parking spaces including six (6) accessible spaces.:
- 35 storage cages (residential)
- HW and electrical plant (31 $m^2$)
- CP mechanical fan plant (37 $m^2$)
- Lift lobby
- Two fire stairs

***PODIUM*** *Level 4*

- 13 residential apartments 4.01 to 4.13
    - 4 x 1 bedroom
    - 9 x 2 bedroom
- Communal podium (east and west) and internal breezeway.
- Communal barbeque area with seating
- Lift lobby
- Two fire stairs

***Level 5***

- 12 residential apartments 5.01 to 5.12
    - 2 x 1 bedroom
    - 10 x 2 bedroom

- Internal breezeway (no communal access).
- Lift lobby
- Two fire stairs

***Level 6***

- 11 residential apartments 6.01 to 6.11
  - 2 x 1 bedroom
  - 9 x 2 bedroom
- Internal breezeway (no communal access).
- Lift lobby
- Two fire stairs
- AC Plant room (120 $m^2$)

***Level 7***

- 10 residential apartments 7.01 to 7.10
  - 4 x 1 bedroom
  - 5 x 2 bedroom
  - 1 x 3 bedroom
- Internal breezeway (no communal access).
- Lift lobby
- Two fire stairs

***Level 8***

- 8 residential apartments 8.01 to 8.08
  - 1 x 1 bedroom
  - 6 x 2 bedroom
  - 1 x 3 bedroom
- Internal breezeway (no communal access).
- Lift lobby
- Two fire stairs

***Level 9***

- 8 residential apartments 9.01 to 9.08
  - 7 x 2 bedroom
  - 1 x 3 bedroom
- Lift lobby
- Two fire stairs

***Level 10***

- 8 residential apartments 10.01 to 10.08
  - 2 x 1 bedroom
  - 5 x 2 bedroom
  - 1 x 3 bedroom
- Lift lobby

- Two fire stairs

***Level 11***

- 6 residential apartments 11.01 to 11.06
  - 5 x 2 bedroom
  - 1 x 3 bedroom
- Lift lobby
- Two fire stairs

***Level 12***

- 4 residential apartments 12.01 to 12.04
  - 4 x 3 bedroom
- Lift lobby
- Two fire stairs

***Roof Level***

- AC Plant
- Access hatch (no lift access)

## 2.3. Development Statistics

Development statistics for the project are shown in the tables below:

**Table 2.3 Development Statistics**

| *Details* | | | *GFA Summary ($m^2$)** |
|---|---|---|---|
| Site Area | | 3,002.3 $m^2$ | |
| Gross Floor Area | | | |
| Retail Floor Area (GFA) | | | 735 |
| Residential Floor Area (GFA) | | 9293 + 389 (winter gardens) | 9682 |
| | | **Total Development Floor Area** | **10,648** |
| | | Allowable floor area | 13,510 |
| Number of residential apartments | | 95 | |
| Total number of storeys | | 13 | |
| Total number of onsite car parking spaces: | | 154 | |
| | Retail Tenancies | 31 (1 accessible) | |
| | Residential | 104 (4 accessible) | |
| | **Visitors** | **19 (1 accessible)** | |

* Refer GFA Diagrams Drawing DA-770-001

**Table 2.4 Apartment Mix**

| TYPE | | Mix | Average $m^2$ |
|---|---|---|---|
| 1B | **21** | 22% | 59 |
| 2B | **44** | 46% | 80 |
| 2B+ | **21** | 22% | 89 |
| 3B | **9** | 9% | 123 |
| **TOTAL:** | **95** | | |

## 2.4. Design Intent

An Apartment Design Guide Assessment and Design Report prepared by Turner Architects is provide at **Appendix B** and summarised below:

The vision of the project is to create a mixed-use development with a vibrant and activated ground plane and dwellings above with excellent amenity.

The proposal positively responds to the vision and design principles of the Coffs Harbour City Centre Masterplan 2031. Particularly:

***- Strategy: Key Connections***

Creating a new open-to-sky laneway from Harbour Drive to Vernon Street

***- Strategy: Parking***

Additional spaces provided for retail. Residential parking sleeved by other uses including residential apartments, landscape and permeable breeze-screening.

***- Strategy: City Centre Legibility***

Harbour Drive reinforced as the 'Main City Centre Street' with new retail tenancies with opportunities for outdoor dining and a new laneway connection activated by retail and the residential lobby.

Vernon Street activated by two new tenancies

***- Strategy: City Centre Management***

New laneway creates an open-to-sky connection between streets and creates opportunities for outdoor dining, large trees and increased urban permeability New retail tenancies designed to be flexible for various tenants and have level transitions to the public domain.

***- Strategy: Development Incentive Policy***

Open-to-sky laneway creates a positive urban space

Awnings to both street frontages in line with Council policy

Opportunities for public art or landscaping to blank walls

***- Strategy: Flood Planning***

Level retail and ground floor interface with the public domain with freeboard and other flood planning measures integrated into the overall design via ramps and level changes.

**Concept**

*The proposal reinforces the legibility of Harbour Drive and Vernon Street as Main and Supporting City Centre Streets. This is achieved by providing active, flexible retail tenancies*

*on the ground floor with a new open-to-sky laneway connecting the two streets. The tenancies are designed to encourage outdoor dining including areas covered by awnings and other areas where street umbrellas or canvas awnings could provide temporary cover.*

***The Laneway***

*The laneway is designed as a publicly accessible space open day and night. The Laneway is activated by retail tenancies at the corners of Harbour Drive and Vernon Street, and two additional tenancies and lobbies within the laneway. The lobby location allows residents to be dropped at either street frontage for access. There is no basement under the laneway so there are sufficient soil depths to support landscape and large trees. The western edge of the laneway will support landscape or public art elements. The laneway could also be configured to allow connection and activation from the adjoining western lot subject to boundary access approval.*

Vernon Street Laneway Entrance:

Harbour Drive Laneway Entrance:

***Building Integration***

*Building plant and services are optimised to minimise the disruption to the street with vehicle access from Vernon Street. The layout of services and access facilitates two retail tenancies to Vernon Street.*

*Car parking is located on ground to level 3 and is screened from the public domain by apartments to the north and a combination of landscape and breeze-screens to the other*

*frontages. The carpark ventilation strategy reduces the reliance on mechanical extraction by supplementing ventilation through natural air movement.*

***Residential***

*The residential dwellings are arranged around a central core with 3 levels of north facing apartments sleeving the parking area. All dwellings have excellent amenity with all dwellings achieving more than 15 minutes solar access in midwinter and the apartments achieve the ADG recommendations for solar access, natural cross-ventilation and apartment size. West and east elevations include shading to exposed glazing to reduce heat-gain.*

*Apartments are designed to have layouts with regular simple underlying geometries and highly efficient space-planning. Balconies are generous and are equipped with taps to encourage residents to supplement their balconies with planting.*

**Illustration 2.1 Perspective View – Harbour Drive**

**Source: Turner, Drawing DA-910-001 – Harbour Drive view**

**Illustration 2.2 Perspective View – Vernon Street**

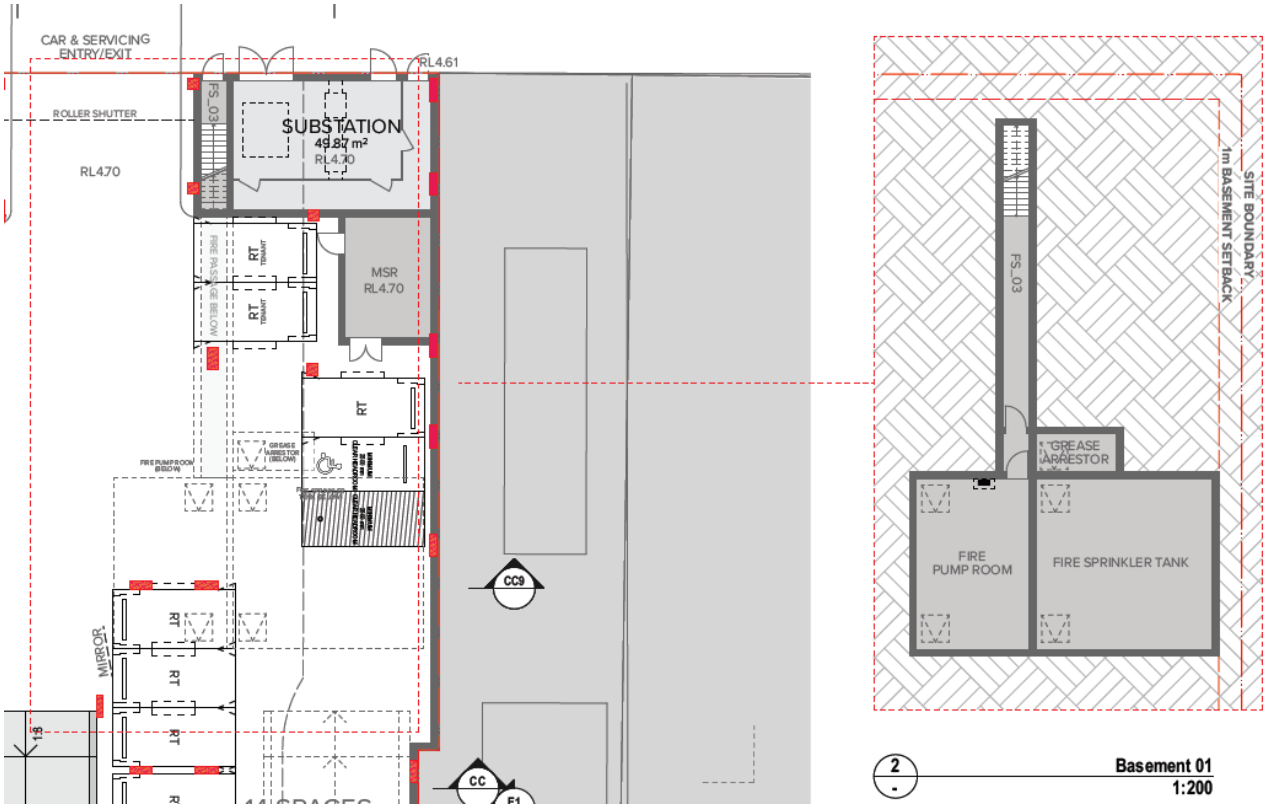
**Source: Turner, Drawing DA-910-002 – Vernon Street view**

## 2.5. Demolition

Demolition of all existing built structures on the subject site is proposed as part of this application. A Hazardous Materials Survey prepared by EI Australia is found at **Appendix Q**. Asbestos materials are present within existing site structures and should be removed prior to commence of any demolition works. EI Australia recommend that an Asbestos Removal Management Plan is prepared prior to the demolition works. Volumes of demolition waste and waste management principles are included as part of the Waste Management Plan at **Appendix G.**

## 2.6. Earthworks

The proposal involves earthworks and associated excavation for footings and servicing. The building is slab on ground construction, as such, excavation throughout the site will be minimal, up to 500 mm, except for the fire tank and pump room area where excavation will be local and may reach up to 3.5 m. The land is mapped as potential Acid Sulphate Soils Class 4 and therefore has a low probability of acid sulfate soils. A geotechnical investigation will be prepared prior to the commencement of works.




**Source: Turner, Dwg DA-110-001.**

## 2.7. Car Parking and Access

A Traffic and Parking Assessment by Transport and Traffic Planning Associates (TTPA) is provided at **Appendix D** and summarised below. TPPA make the relevant observation that the City Centre is on the cusp of significant changes resulting from the Pacific Highway bypass and the initiates of the City Centre Masterplan 2031.

### Access, Internal Circulation and Servicing

### Access

It is proposed to provide a 7.5m wide combined ingress/egress driveway on the Vernon Street frontage. This will require the relocation of existing kerbside parking spaces to the eastern side of the driveway and removal of an existing Loading Zone (which essentially served the existing building in lieu of on-site loading provision).

Vernon Street is straight and level at this location and the proposed driveway meets with the design requirements of AS2890.1 and 2. There will be satisfactory sight distances available for drivers and pedestrians.

**Internal Circulation**

A simple two-way internal circulation arrangement would be provided through the parking levels with design criteria compliant with AS2890. The residential carparking area will be secured and segregated from retail/visitor carparking. Generous manoeuvring and 'turnaround' provisions are a feature of the design.

**Servicing**

The loading dock is suitable for vans, MRVs and Council's garbage truck on Ground Level. Tenants vans typically associated with small retail tenancies and other small service vehicles (e.g. service personnel, couriers etc) will also be able to use the retail/visitor parking spaces. Details of the turning path assessment for Council's truck are provided in the report.

**Car Parking**

Coffs Harbour City Council's DCP specifies parking provision criteria in relation to the proposed development as follows:

**Residential Apartments**

- 1 & 2 Bed 1 space
- 3 Bed 2 spaces
- 1 space per 5 apartments for visitors

**Retail**

- 1 space per 25m$^2$ GLFA

Application of these criteria to the proposed development would indicate a provision of:

**Residential**

- 95 apartments 86 x 1 & 2 Bed 86 spaces
- 9 x 3 Bed 18 spaces
- Visitors (95) 19 spaces

**Retail**

- 735 m$^2$ GFA 29 spaces

A total 152 spaces are required to meeting Council's DCP requirements. It is proposed to provide a total of 154 spaces comprising:

Residents 104 spaces (4 accessible)
Visitors 19 spaces (1 accessible)
Retail 31 spaces (1 accessible)

Onsite car parking provided for the development exceeds Council's requirements.

**Bicycles**

A Class 1 secured storage room on the ground level for 12 bicycles with adjacent end of trip facilities for staff parking. Class 3 rack parking in the pedestrian laneway for visitor parking.

**Motorcycles**

Two (2) spaces are provided on the ground level (adjacent to bicycle room) and two (2) spaces on Level 1 (south-east corner).

**Traffic Generation and Manoeuvring:**

Traffic generated by the proposed development is based on the *RMS (2002) Guide to Traffic Generating Development* and is estimated as:

| | AM | PM |
|---|---|---|
| Residential Apartments (95) | 28 vtph* | 28 vtph |
| Retail | 17 vtph | 34 vtph |
| **Total** | **45 vtph** | **62 vtph** |
| In | 15 vtph | 39 vtph |
| Out | 30 vtph | 23 vtph |

* vehicle trips per hour

The distribution of generated traffic movements will inevitably be very diverse and there will be no real concentration of origins as destinations for either the retail or residential trips. It is also likely that some of the 10 retail car parking spaces will, in reality, be taken up by retail tenants and this will act to subdue the "turnover" of the retail spaces. Mitigating factor in trip generation arising from the development include existing trips generated by the many uses within the site (tenants and visitors) and the impact of dual visitation with the other City Centre uses.

**The Surrounding Traffic Environment**

Council's *Precinct Analysis Gordon Street New Library Gallery Preliminary Draft* was prepared to inform strategic planning for the colocation of a new library/gallery and other complementary facilities within the Coffs Harbour Central Business District (CBD). The findings are relevant to this proposal and include:

- the CBD has about 1300 on street parking spaces and 1600 public off street parking spaces;
- Four (4) off-street car parking areas are within a five minute walk from the site. These car parks provide nearly all the off-street short-term parking spaces in the CBD and about half of all the off street unrestricted (long-term) parking spaces;
- The Castle Street car park provides more than half the off-street short-term parking spaces in the CBD;
- Occupancy of parking spaces peak between 10am and 12pm and range from:
    - 85-100 % for short-term on street parking in the City Heart precinct and in Park Avenue between the highway and Gordon Street;
    - 65-90% for short-term parking elsewhere on the east side of the highway;

- 70-80% for long-term parking on the east side of the highway.

As shown at **Illustration 2.3**, excluding on street car parking, over 1,000 public car parking spaces are located within 100 m of the site

**Illustration 2.3 Car Parking**

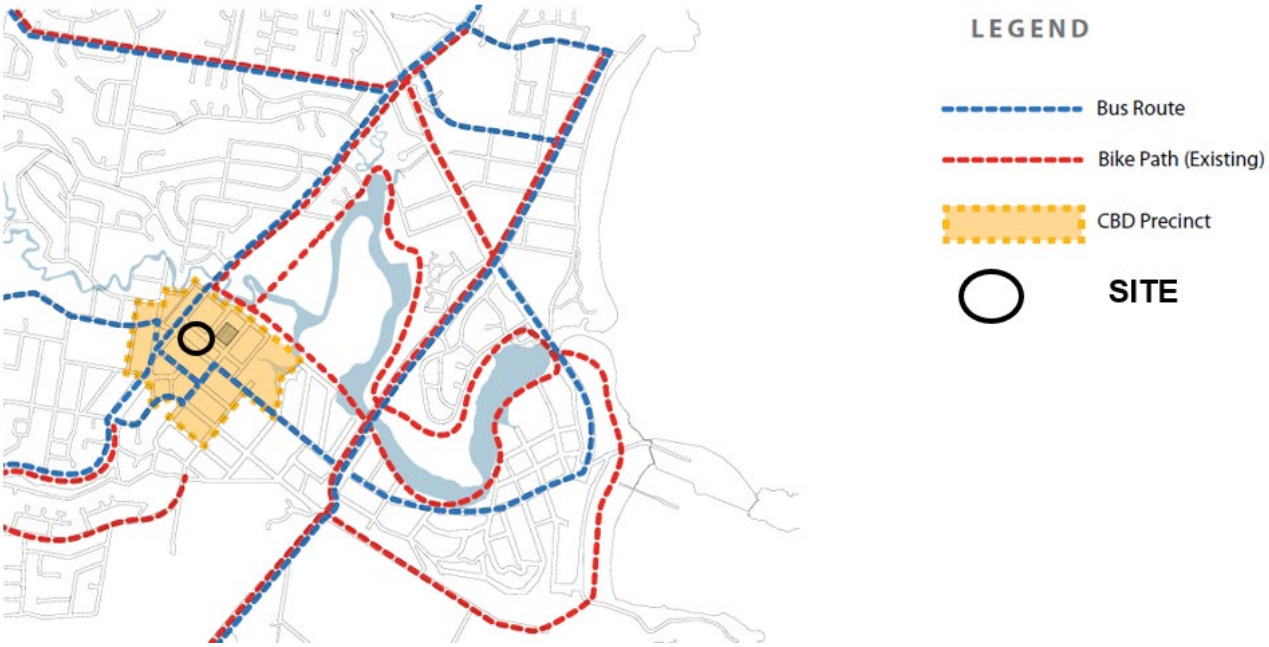
**Source: PRECINCT ANALYSIS GORDON STREET NEW LIBRARY GALLERY PRELIMINARY DRAFT**

### Bus and Bike Routes

As shown at **Illustration 2.3** below, the site is well positioned in terms of access to public transport and passive access paths. A contextual analysis of bus and bike routes discussed in the *Precinct Analysis* is copied below:

> *Three local bus operators service the CBD with connections to West Coffs, south to Sawtell/Toormina, and north to Woolgoolga. All buses currently stop in Park Avenue in the CBD. The buses generally operate:*
>
> - Monday to Saturday with frequencies between 30-60minutes. The last services are about 9:30pm; and
> - Sunday with reduced frequencies and operating times.
>
> *Existing bike paths connect the CBD to the Jetty, south to Sawtell/Toormina, and north to Park Beach. A key entry point for bikes into the CBD is on the northern CBD boundary next to the pool.*

**Illustration 2.4 Bus and Bike Routes**




**Source: Precinct Analysis Gordon Street New Library Gallery Preliminary Draft 2016**

## 2.8. Services

Mechanical Services include the provision of

- Ventilation inclusive of:
  - local exhaust systems
  - retail kitchen exhaust systems
  - smoke exhaust
  - stair press/relief systems
  - car park supply/exhaust
  - loading dock exhaust
  - plantroom exhausts
  - toilet exhaust
  - outside air systems
- Air Conditioning
- Fire Protections Services
- Electrical Services, including generator, comms rooms
- Sewer Main Connection
- Water supply
- Lift services
- CCTV System

Further servicing detail by Stantec Australia Pty Ltd is provided at **Appendix K**.

## 2.9. Accessibility

A Statement of Compliance – Access for People with a Disability Report prepared by Accessible Building Solutions is provided at **Appendix L**.

**Adaptable Housing**

Ten adaptable units are provided. The units designated as adaptable are Units 702, 802, 805, 902, 1002, 1102, 1201, 1202, 1203 & 1204. These units can comply with the spatial requirements of AS4299 for Adaptable Housing.

**Livable Housing Guidelines**

SEPP 65 requires 20% of the units to incorporate the features of the Livable Housing Guidelines Silver level. Total number of residential units in the development = 20% of 95 = 19 required Livable units.

Since 10 of the units (702, 802, 805, 902, 1002, 1102, 1201, 1202, 1203 & 1204) already comply with the Adaptable unit requirements, these units are also capable of satisfying the intent of Silver level of Livable Housing Guidelines as noted in the table below.

In addition to the adaptable units provided the following 10 units 407, 411, 412, 506, 510, 511, 605, 609, 610 & 709 are capable of providing compliance with the features of Silver level of Livable Housing Guidelines.

Accessible Building Solutions found that the proposed building can achieve compliance with the access provisions of the BCA, SEPP 65 and the essential requirements of AS4299 – Adaptable Housing.

## 2.10. Landscaping

Landscape Plans by Conzept are provided at **Appendix E**. Ground level landscaping to the site and footpath area meets the City Prosperity Plan 2013, Landscape Materials and Planting Section, guideline prepared for Council by TDEP & Roberts Day in March 2013.

Presently the site is completely impervious, it is fully covered in buildings. The proposed building will be setback from the western boundary 6 m to provide the for pedestrian laneway. The laneway will be landscaped and finished with permeable pavers resulting in a deep soil zone of approximately 7% of the site area, a significant beneficial outcome arising from the development. Refer Turner Drawing DA-730-001 showing Deep Soil and Communal Space Diagrams.

**Ground level landscape features:**

- Coffs harbour theme planting - - Cabbage tree Palm, *nicolai, imperialis 'Rubra', caerulea* 'Redback', *variegatum* (Croton Plant), *communis* and Xanadu.
- Laneway feature trees – four *Brachychiton acerifolius* (Illawarra Flame Tree).
- Climbers on tensile wires to western wall of laneway.
- Screen planting in troughs.
- Pavement selected to provide urban character of medium grey coloured granite

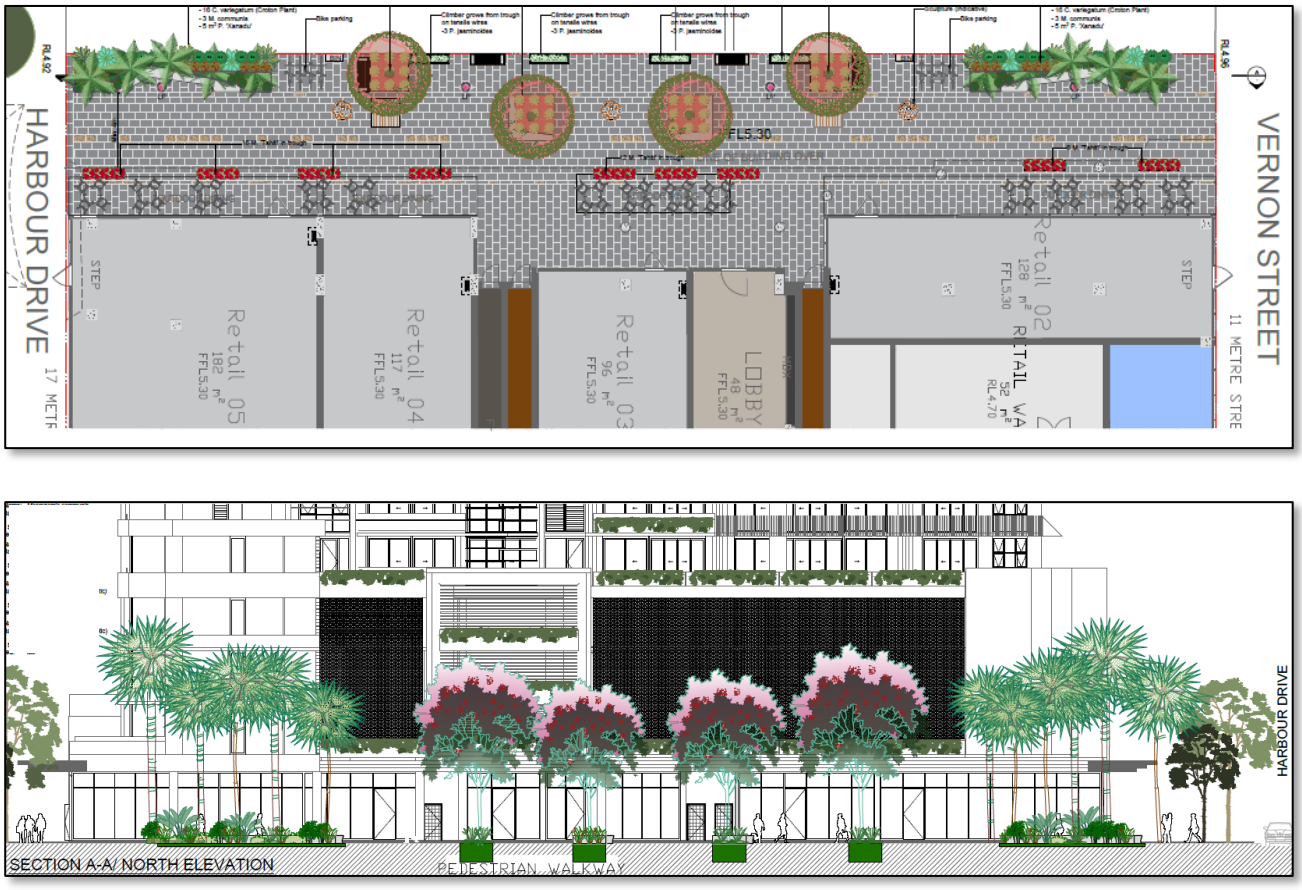
- Pavement treatment will extend the sense of space with simple kerb to building pavement pattern with no formal banding.
- Smart pole lighting – all in one LED pole light, WI-FI, CCTV, Banner.
- Strip lighting to pavement.
- Bike parking
- Sculptures and seating

**Level 4 Podium:** The communal areas within the podium level provides generous planting areas for screen and windbreak planting. There is sufficient planting area for small palms to grown up to around 3 m in height for shade and visual interest.

**Levels 1, 2 and 3:** Planters to the western and southern elevations.

**Levels 5 to 12**: A mix of balcony planters and winter gardens as shown on the Architectural drawings.

**Illustration 2.5 Public Domain Landscape**




**Conzept Plan extracts Public Domain Concept Ground Floor**

## 2.11. Safer by Design

Crime Prevention Through Environmental Design (CPTED) is a crime prevention strategy that focuses on the planning, design and structure of cities and neighbourhoods. CPTED aims to create

the reality (or perception) that the costs of committing crime are greater than the likely benefits. This is achieved by creating environmental and social conditions that:

- Maximise risk to offenders (increasing the likelihood of detection, challenge and apprehension).
- Maximise the effort required to commit crime (increasing the time, energy and resources required to commit crime).
- Minimise the actual and perceived benefits of crime (removing, minimising or concealing crime attractors and rewards).
- Minimise excuse making opportunities (removing conditions that encourage/facilitate rationalisation of inappropriate behaviour).

The design of the new building has taken into consideration the principles of CPTED to minimise crime by:

- Surveillance
- Access control
- Territorial reinforcement
- Space management.

**Surveillance:**

The following security and surveillance measures have been adopted in the building and landscape design:

- All access areas and pedestrian paths will be well lit and have security camera surveillance.
- All public entrances are clear and legible.
- The pedestrian laneway linking Harbour Drive and Vernon Street provides for passive surveillance.
- The smooth integration between public and private spaces supports clear sightlines between various uses in the building.
- The internal carpark has a clear and legible access, visible from the Vernon Street frontage. The single carpark access point will have controlled access and surveillance will be provided.
- Passive recreation and gathering will be encouraged within the pedestrian laneway.
- Landscaping is well considered to promote the appearance of the development and maintain passive surveillance.

**Access Control:**

As detailed in the Services Report at Appendix K, an access control system will be incorporated with the intercom system and will include the following:

- Proximity card / individual ID radio frequency (RF) button key ring or proximity device for tenant entry into carpark and lobby entrances.
- Card reader will be provided in each lift car for residents to access their own floor.
- Visitors shall only be given access to the floor of the apartment they are visiting via the apartment intercom system.

- Reed switches will be fitted to all perimeter doors.

The access control headend shall be located in the main comms room. There shall be provision for the Building Manager to have access to this system such that they can change the permissions on each of the access control cards and also issue new cards as required.

CCTV shall be provided to monitor certain areas of the building and be incorporated within the intercom system. CCTV cameras shall be located at all external entrances, lobby entries and carpark entry locations. The CCTV headend shall be located in the main comms room.

**Territorial Enforcement:**

- The pedestrian lane will be partially covered providing an all-weather linkage between Harbour Drive and Vernon Street and shelter for visitors to the building. This is a significant public and private asset arising from the development and is likely to be respected.
- Shared communal space at Level 4 will encourage residential gathering and increase the sense of ownership, surveillance and care of that space.
- Contemporary and attractive building and outdoor spaces with generous landscaping will increase the sense of ownership of all levels of the development.
- Clear delineation between public and private areas through all levels of the building.

**Space Management:**

- The pedestrian lane linkage between Harbour Drive and Vernon Street is open to the public however will be retained and managed in private ownership.
- An ongoing maintenance program will be implemented to ensure all public and communal areas of the building are managed and maintained.
- External surfaces have been selected for durability and ease of cleaning.

**General safety measures include:**

- Landscaping and lighting have been designed to mitigate risk from crime and unlawful entry to the building.
- Appropriate signage will be installed at entry points to convey the message of the residential areas of the development being private property.
- Clear delineation between vehicular and pedestrian areas within the development will be made to avoid potential adverse interactions.
- Footholds and climbing points that allow access to and between balconies have been eliminated from the design.
- The building elements and measures described above will significantly mitigate and reduce the risk of criminal activity and antisocial behaviour in and around the building.

## 2.12. Waste Management

A Waste Management Plan prepared by Waste Audit and Consultancy Services is provided at **Appendix G.** The Plan provides for Operational Waste Management, Demolition and Construction Waste. It is noted that, prior to demolition, hazardous waste, asbestos building products, will be

removed from the existing site buildings in accordance with the recommendation of the Hazardous Materials Survey by EI Australia (**Appendix Q**).

**Operational Waste:**

The following are the estimated rates of waste/recyclable generation (by volume), for the residential and retail aspects of the development. Retail waste generation assumes 'worst case scenario' whereby all retail tenancies will be food and beverage premises.

**Table 2.5 Waste Generation**

| | Approximate Rate | No / size of bins | Storage Area ($m^2$) |
|---|---|---|---|
| **Residential apartments** | | | 60 $m^2$ |
| General Waste (red) | 11,400 litres/week | 240 litre x 48 | |
| Recyclables (yellow) | 11,400 litres/week | 240 litre x 48 | |
| Organics (green) | 3,800 litres/week | 240 litre x 16 | |
| **Retail** | | | 60 $m^2$ |
| General Waste (red) | 16,800 litres/week | 1,100 litre x 16 | |
| Recyclables (yellow) | 11,200 litres/week | 1,100 litre x 11 | |
| Organics (green) | 5,600 litres/week | 240 litre x 16 | |

The waste generation rates above are based on Council's assumption of 240 litres/week of organics. In reality, the amount of green waste will be significantly less per apartment. Landscaping green waste would be managed by appointed contract gardener. Therefore, in developing the waste management plan, a lesser volume for organics (40 litres/apartment), has been used.

An additional dedicated area for the temporary storage of unwanted bulky items (e.g. cardboard, furniture, mattresses or appliances) is provided adjacent to waste storage rooms.

The proposed arrangements meet the recommendations of the NSW EPA guideline, *Better practice guide for resource recovery in residential developments,* April 2019:

- *In mixed-use developments, waste management areas for residential premises and commercial outlets must be kept separate. Residential and commercial tenants should be prevented from using each other's waste facilities.*
- *The simplest way to keep commercial and residential waste management systems separate is to build two separate and lockable bin storage areas that are only accessible by keys or swipe cards.*
- *Waste management systems for commercial tenants must also be designed and managed so that they minimise the noise and odour impact on residential dwellings within the development.*

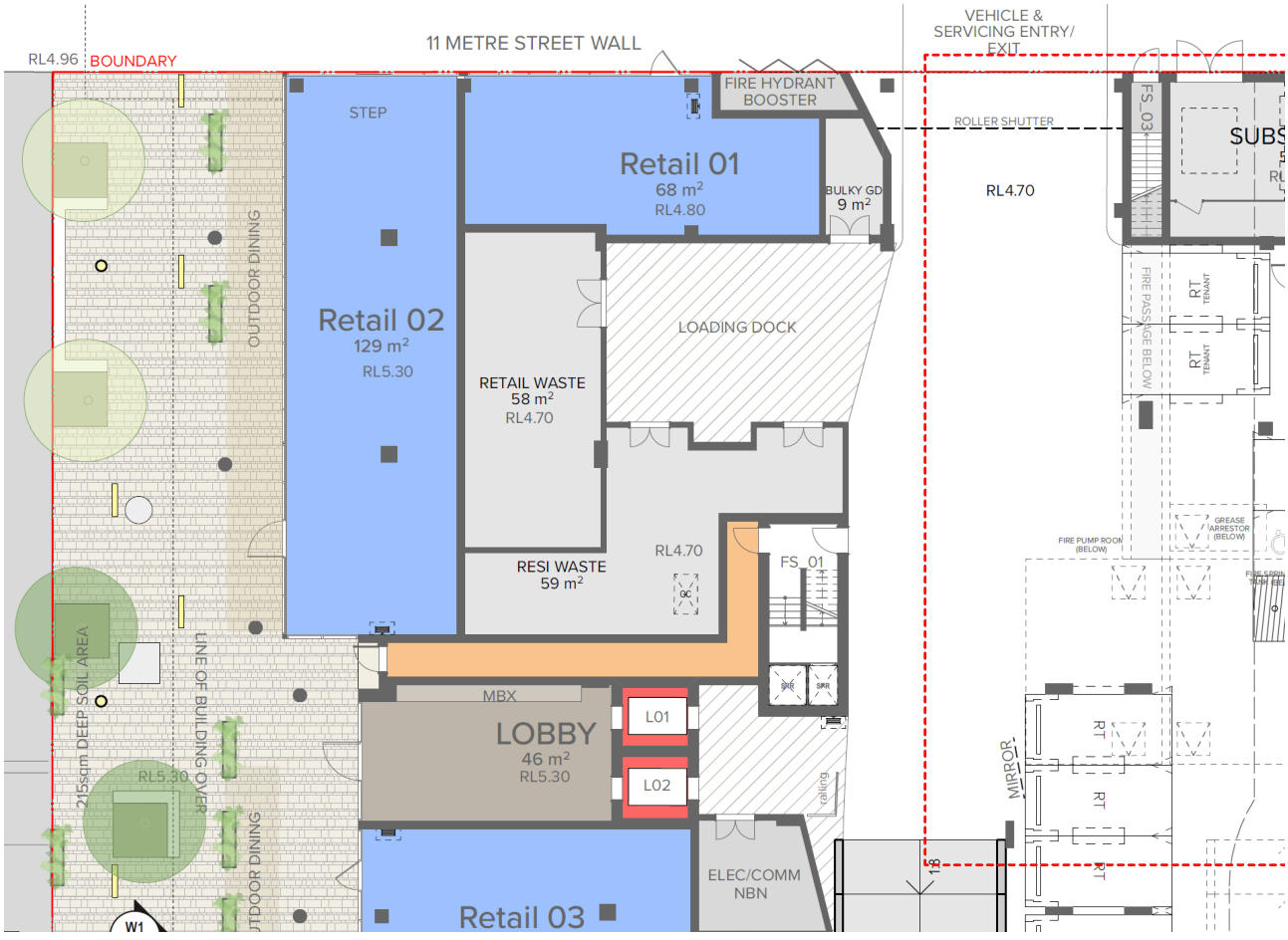
As shown on the architectural plans, the waste storage rooms for commercial and residential are separated and are of a suitable size and configuration to accommodate waste generated within the premises.

As recommended by the EPA, a chute system is proposed for residential waste. Key benefits of the chute system are:

- Simple to use.
- Encourages resource recovery through the co-locating waste and recycling.
- Short travel distance from each residential Level to the chute room.
- Reduced breakages.
- Rubbish will not be carried in the lifts.
- Secure access to residential waste room and chute area

Disadvantages of the chute system are that such a system requires regular monitoring. The proposal is of a sufficient size and density to justify onsite/regular management and surveillance by a building manager/caretaker.

**Illustration 2.6 Waste Storage Rooms**




**Source: Turner, Dwg DA-110-001**

## Demolition and Construction Waste

Estimated volumes of demolition and construction waste are provided in the Waste Management Plan (WMP). The WMP identifies recyclable waste, waste for re-use on site or waste to be disposed to a licenced facility.

## 2.13. Flood Prone Land

Flooding was considered by Stantec Australia Pty Ltd and summarised below:

In accordance with NSW Floodplain Development Manual (2005) and CHCC's LEP 2013 Clause 7.3, the Flood Planning Level for the site is RL 5.17 m AHD based on the 1% AEP flood level plus 500 mm of freeboard.

The proposed building ground floor level and any high risk and important site infrastructure such as substations is set at a minimum of RL 5.17 m AHD.

The site is categorised as low risk in terms of hydraulic categorisation and flood hazard, the proposed development will not impede on the current flood regime. The proposed building is be capable of withstanding loading, impacts and scour associated with a 1% AEP event, all of which will be negligible.

All electrical switches and all electrical equipment within the plant room will be elevated above the 1%AEP flood level or suitably waterproofed.

## 2.14. Acoustic

An Acoustic Assessment was prepared by Acoustic Logic (refer **Appendix M**).

Discussion:

*The assessment of mechanical plant onto the proposed residential tower shows the glazing will require upgrading over what is required for traffic noise alone. Some of the existing noise sources may be attenuated on the Cex site that could lead to the decreasing the glazing requirements and improving the acoustic amenity on the balconies that overlook the Cex Club's mechanical plant. Typically, existing plant would be exempt but as the Cex is the developer this approach may be possible. For example, attenuating the outdoor chiller by treating noisy compressor and hot water valve components may lower noise levels and eliminate the penalties (+10dB) that that have been applied as per NSW EPA recommendations to obtain equivalent levels of annoyance for night operations. The attenuation of existing plant is beyond the scope of this DA assessment but since this plant is most likely in standard form and unattenuated, significant noise reductions may be achievable and be economically feasible.*

Conclusion:

Provided recommended acoustic treatments are implemented the noise intrusion and noise emissions will satisfy the requirements of:

- Coffs Harbour City Council's Development Control Plan (DCP)
- Development Near Rail Corridors and Busy Roads – Interim Guideline 2008
- NSW EPA Noise Policy for Industry (NPfI) 2017
- Australian/ New Zealand Standard AS/NZS 2107:2016

At this early stage of the development process the only plant item selected for acoustic modelling were the outdoor air conditioning units, hence their impact has been analysed and indicative treatments were given. Noise emission goals have been set up for all mechanical services combined

to be installed on site. Acoustic Logic recommends further assessment is conducted at Construction Certificate (CC) stage once all plant items are selected and their details have been finalised.

Covid-19 restrictions have significantly reduced the loads on mechanical plant at the Cex Club and several items could not be operated so assumed figures for similar sized units were used in the acoustic assessment in lieu.

Acoustic treatments have been recommended for façade treatments, alternative ventilation and mechanical plant treatments.

The carpark ventilation strategy reduces the reliance on mechanical extraction by supplementing ventilation through natural air movement. This will mitigate noise impact.

## 2.15. Project Value and Job Creation

The estimated Capital Investment Value (CIV) for the project is $44,369,380.00 excluding goods and services tax (GST). A CIV assessment prepared by Peter Duckitt Registered Quantity Surveyor is attached as **Appendix A.** An economic analysis shows that up to 150 construction jobs will be created from the development over the building period. Job creation within the completed development will be maximised as the retail precinct will be a new and activated space. Ground level pedestrian traffic will be significantly increased through precinct activation and the 'çomings and goings' of the occupants of 95 new residential apartments. Additional employment generation will occur from the day to day running of the apartment complex.

## 2.16. Hours of Operation

Operational hours for future retail tenancies will be determined as part of separate DAs. Operational hours will be dependent on the specific operational nature of each prospective use, and their potential impacts. The residential areas of the building will be accessible to tenants 24 hours per day.

# 3.0 Statutory and Policy Assessment

The proposal's compliance and consistency with the relevant statutory framework is provided in the following Section.

## 3.1. State Environmental Planning Policies

The following table sets out the State Environmental Planning Policies (SEPPs) that are relevant to the subject proposal:

**Table 3.1 State Environmental Planning Policies**

| | |
|---|---|
| **SEPP State and Regional Development** | Schedule 7 of State Environmental Planning Policy (SEPP) (State and Regional Development) 2011 defines Regional development as:<br><br>Schedule 7 Regionally Significant Development<br>(2) General development over $30 million<br><br>The estimated cost of the development is $44,369,380.00. |
| **SEPP No 65—Design Quality of Residential Apartment Development** | SEPP 65 relates primarily to residential apartment developments. It seeks to achieve development which is socially and environmentally sustainable and is of high quality internal and external design.<br><br>Clause 4 Application of Policy:<br>The development involves residential accommodation within a new building of at least 3 or more storeys and contains 4 or more dwellings, the SEPP 65 applies to the development.<br><br>This proposal complies with the recommended controls of the related Apartment Design Guide (ADG), and, therefore, the proposal satisfies the objectives of the SEPP.<br><br>An ADG assessment report is provided at **Appendix B**.<br><br>Whilst the proposal achieves a high degree of compliance with the ADG's controls and guidelines, it is acknowledged that minor non-compliances occurs in relation to deep soil provision at ground floor level. The ADG provides that<br><br>*Achieving the design criteria may not be possible on some sites including where:*<br>- *the location and building typology have limited or no space for deep soil at ground level (e.g. central business district, constrained sites, high density areas, or in centres)* |

- *there is 100% site coverage or non-residential uses at ground floor level*

As discussed below, these are considered to be minor non-compliances which on merit are considered acceptable, and the proposal is generally compliant with the controls and guidelines of the ADG.

The proposal complies with Communal Open Space (COS) requirements of the ADG:

Objective 3D-1(1) of the ADG prescribes a minimum communal open space (COS) area of 25% of the site area. The subject site area is 3,002.3 $m^2$ in area, meaning, 750 $m^2$ of COS is required.

The proposal includes a total of 565 $m^2$ of COS located at ground level and 226 $m^2$ on the podium (L4) and 148 $m^2$ is provided over all levels within balcony and planter box treatments. This is compliant with this control.

The ADG provides that:

> *Where developments are unable to achieve the design criteria, such as on small lots, sites within business zones, or in a dense urban area, they should:*
>
> - *provide communal spaces elsewhere such as a landscaped roof top terrace or a common room*
> - *provide larger balconies or increased private open space for apartments*
> - *demonstrate good proximity to public open space and facilities and/or provide contributions to public open space*

The site is within walking distance of public open space including the proposed "All Welcome' Community and Civic precinct, the public pool, playing fields, showground, Brelsford Park and the Botanic Gardens.

As demonstrated in the attached report (**Appendix B**), the building complies with the recommended controls of the related Apartment Design Guide (ADG).

**SEPP (Infrastructure) 2007 (ISEPP)**

Clause 104 and Schedule 3 of ISEPP defines traffic generating development which requires referral to Roads and Maritime for comment.

The land is within 90 m of a Classified Road (Grafton Street). The development involves 50 or more car parking spaces and 75 or more dwellings and is therefore traffic generating development to be referred to Transport for NSW (formerly

| | |
|---|---|
| | RMS). |
| **SEPP No. 55 – Remediation of Land (SEPP 55)** | The land itself is not identified as being potentially contaminated, however asbestos building materials will be removed from the site prior to the demolition works as recommended by EI Australia in the Hazardous Materials Survey (**Appendix Q**).<br>All site structures will be demolished and cleared in accordance with the relevant requirements of SafeWork NSW, the Work Health and Safety Act 2011 and Australian Standard AS 2601-2001 "The Demolition of Structures".<br>Works for the proposed building will "seal" the site with the exception of the deep soil planting and permeable paving areas within the pedestrian laneway. Residential land uses will occur within the upper levels of the building. The land is considered suitable for the intended use in accordance with Clause 7(1) of the SEPP. |
| **SEPP (Building Sustainability Index: BASIX) 2004** | A BASIX certificate for the residential apartments is provided at **Appendix I**. |
| **Coastal Management SEPP 2018** | The Coastal SEPP applies to land within the coastal zone. The site is mapped as within the Coastal Environment Area and the Coastal Use Area. The following clauses of the SEPP apply:<br>*Clause 13 Development on land within the coastal environment area:*<br>1. *Development consent must not be granted to development on land that is within the coastal environment area unless the consent authority has considered whether the proposed development is likely to cause an adverse impact on the following:*<br>*(a) the integrity and resilience of the biophysical, hydrological (surface and groundwater) and ecological environment,*<br>*(b) coastal environmental values and natural coastal processes,*<br>*(c) the water quality of the marine estate (within the meaning of the Marine Estate Management Act 2014), in particular, the cumulative impacts of the proposed development on any of the sensitive coastal lakes identified in Schedule 1,*<br>*(d) marine vegetation, native vegetation and fauna and their habitats, undeveloped headlands and rock platforms,*<br>*(e) existing public open space and safe access to and along the foreshore, beach, headland or rock platform for members of the public, including persons with a disability,*<br>*(f) Aboriginal cultural heritage, practices and places,*<br>(g) *the use of the surf zone*. |

Consistent.

The site is fully developed urban land comprising retail and commercial development over the entire site.

Proposed stormwater measures and increased permeable ground levels areas will improve drainage quality and reduce the quantity of stormwater flowing to surrounding properties.

There are no Aboriginal cultural heritage items listed on the AHIMS database located within the subject land or within 50 m of the subject land.

The proposal will have no impact on the other matters listed.

*(2) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that—*

- *(a) the development is designed, sited and will be managed to avoid an adverse impact referred to in subclause (1), or*
- *(b) if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact, or*
- *(c) if that impact cannot be minimised—the development will be managed to mitigate that impact.*

Consistent.

The development proposal is highly unlikely to result in adverse impact referred to in subclause (1).

Clause 14 Development on land within the coastal use area

1. Development consent must not be granted to development on land that is within the coastal use area unless the consent authority:
   - *(a) has considered whether the proposed development is likely to cause an adverse impact on the following:*
   - *(b) existing, safe access to and along the foreshore, beach, headland or rock platform for members of the public, including persons with a disability,*
   - *(c) overshadowing, wind funnelling and the loss of views from public places to foreshores,*
   - *(d) the visual amenity and scenic qualities of the coast, including coastal headlands,*
   - *(e) Aboriginal cultural heritage, practices and places,*
   - *(f) cultural and built environment heritage, and*
   - *(g) is satisfied that:*
   - *(h) the development is designed, sited and will be managed*

| | |
|---|---|
| | *to avoid an adverse impact referred to in paragraph (a), or*<br>*(i) if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact, or*<br>*(j) if that impact cannot be minimised—the development will be managed to mitigate that impact, and*<br>*(k) has taken into account the surrounding coastal and built environment, and the bulk, scale and size of the proposed development.*<br><br>Consistent.<br>The proposed development will not significantly impact any of the matters listed in subsection '(a)'.<br>The land is in the CBD and will have no impact on the coastal environment.<br>The development meets local strategic planning aims to activate the City Centre core. There are no known items of cultural or built environment heritage within or surrounding the site.<br><br>*Clause 15 Development in coastal zone generally—development not to increase risk of coastal hazards*<br><br>*Development consent must not be granted to development on land within the coastal zone unless the consent authority is satisfied that the proposed development is not likely to cause increased risk of coastal hazards on that land or other land*.<br><br>The development will not increase risk of coastal hazards within the site or surrounding land. |
| **SEPP No 64—Advertising and Signage** | SEPP 64 does not apply to Business Identification Signage. No other signage is proposed under this application. |
| **SEPP (Vegetation in Non-Rural Areas) 2017 (Vegetation SEPP)** | The Vegetation SEPP (VSEPP) applies to land zoned B3 Commercial Core, therefore the VSEPP applies to the subject land. The proposal does not involve any native vegetation clearance. None of the site is declared by a DCP to be prescribed vegetation. No other parts of clauses of the VSEPP apply to the subject proposal. |
| **Draft SEPPS:** | |
| **Environment SEPP** | No relevance to the subject proposal. |
| **Draft Remediation of Land SEPP** | The development is consistent with the draft SEPP. No remediation work is required for the proposed development. |

## 3.2. Coffs Harbour Local Environmental Plan 2013

The subject land is zoned **B3 Commercial Core**.

**Permissibility**

*Shop top housing, Residential flat buildings* and *retail premises* within a *mixed use development* are permissible with development consent in the B3 Commercial Core zone.

**Definitions**

> *Retail premises means a building or place used for the purpose of selling items by retail, or hiring or displaying items for the purpose of selling them or hiring them out, whether the items are goods or materials (or whether also sold by wholesale), and includes any of the following—*
>
> *(a) (Repealed)*
>
> *(b) cellar door premises,*
>
> *(c) food and drink premises,*
>
> *(d) garden centres,*
>
> *(e) hardware and building supplies,*
>
> *(f) kiosks,*
>
> *(g) landscaping material supplies,*
>
> *(h) markets,*
>
> *(i) plant nurseries,*
>
> *(j) roadside stalls,*
>
> *(k) rural supplies,*
>
> *(l) shops,*
>
> *(la) specialised retail premises,*
>
> *(m) timber yards,*
>
> *(n) vehicle sales or hire premises,*
>
> *but does not include highway service centres, service stations, industrial retail outlets or restricted premises.*
>
> *Shop top housing means one or more dwellings located above ground floor retail premises or business premises.*
>
> *Residential flat building means "a building containing 3 or more dwellings but does not include an attached dwelling or multi dwelling housing."*
>
> *Mixed use development means a building or place comprising two or more different land uses.*

The proposal includes retail premises as well as residential flat building. As those uses are within a single building, the proposal is therefore consistent with the definition for 'mixed use development'.

The proposal includes dwellings entirely above retail premises. Alternatively, the proposal is also consistent with the definition of 'shop-top-housing'.

**The objectives of the B3 zone are:**

*To provide a wide range of retail, business, office, entertainment, community and other suitable land uses that serve the needs of the local and wider community.*

*To encourage appropriate employment opportunities in accessible locations.*

*To maximise public transport patronage and encourage walking and cycling.*

*To ensure that the scale and nature of future development reinforces the role of the Coffs Harbour central business district as the primary commercial, employment and retail centre in the region.*

*To ensure that the design of new commercial buildings makes a positive contribution to the streetscape through opportunities for improved pedestrian links, retention and creation of view corridors and the provision of a safe public domain.*

The proposal meets the objectives of the B3 zone as follows:

- The proposal will provide ground floor retail, onsite car parking and residential apartments within a City Centre core.
- The site is located within the City Centre in walking distance of community and urban services, schools, recreational areas, jobs and public transport. The building has been purpose designed by Turner Architects and will make a positive contribution to the streetscape and public domain.
- The development will reinforce the primacy of the Coffs Harbour central business district.
- The development will replace old retail arcades with a new retail precinct activating both the Harbour Drive and Vernon Street frontages, as well as shop frontages to the pedestrian laneway.

**Special Provisions Applicable**

The following provisions of the LEP are applicable to Council's consideration of the subject development application:

**Clause 2.7 Demolition requires development consent**

In accordance with this clause, consent for demolition of all existing structures on the subject site is required as part of the DA.

**Clause 4.3 Height of buildings**

*(1) The objectives of this clause are as follows:*

*(a) to ensure that building height relates to the land's capability to provide and maintain an appropriate urban character and level of amenity,*

*(b) to ensure that taller development is located in more structured urbanised areas that are serviced by urban support facilities,*

*(c) to ensure that the height of future buildings has regard to heritage sites and their settings and their visual interconnections,*

*(d) to enable a transition in building heights between urban areas having different characteristics,*

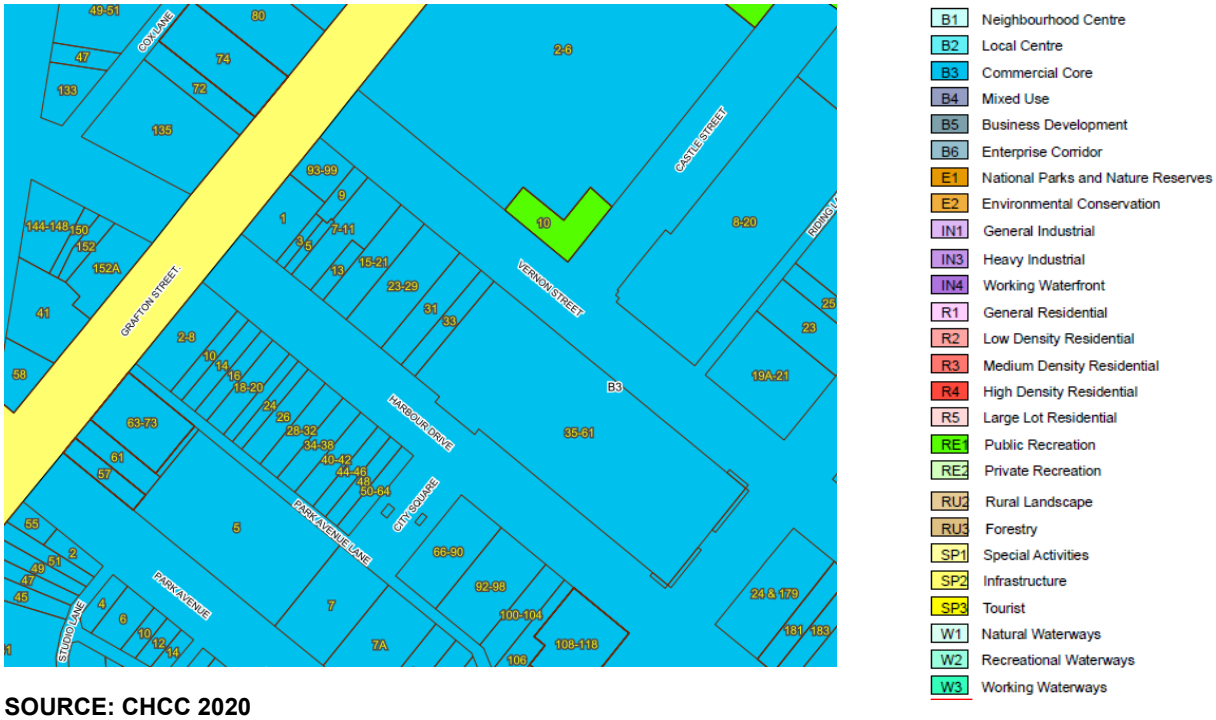
*(e) to limit the impact of the height of a building on the existing natural and built environment,*

*(f) to encourage walking and decreased dependency on motor vehicles by promoting greater population density in urban areas.*

*(2) The height of a building on any land is not to exceed the maximum height shown for the land on the Height of Buildings Map.*

The maximum permissible building height for the site is 44 m. The maximum height of the proposed building is 44 m including plant and lift overrun.

**Illustration 3.1 Land Zoning Map**

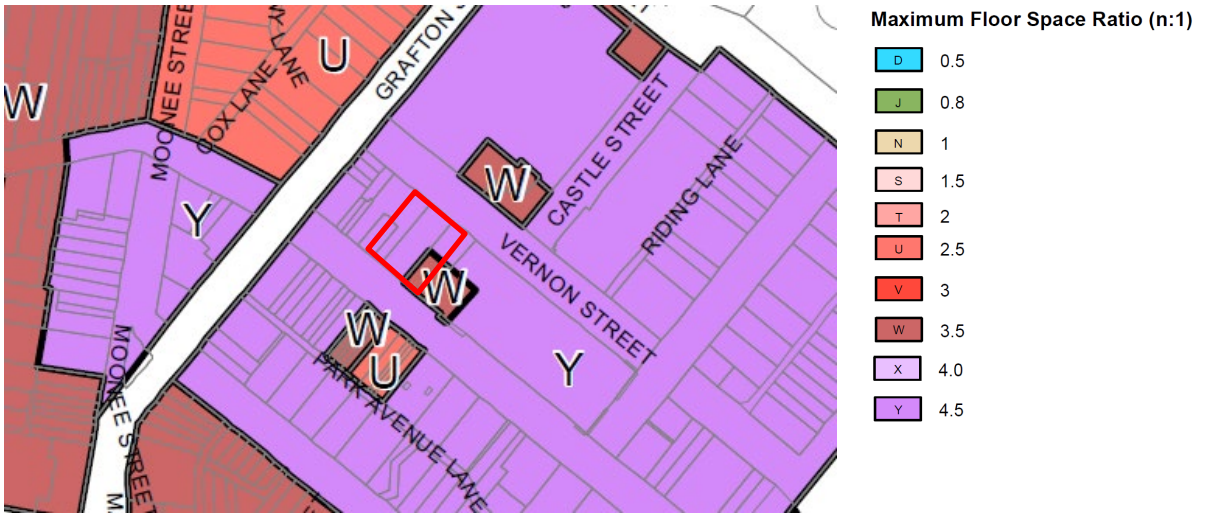



**SOURCE: CHCC 2020**

**Illustration 3.2 Height of Building Map**

**SOURCE: CHCC 2020**

**Illustration 3.3 Floor Space Ratio Map**




**SOURCE: CHCC 2020**

## Clause 4.4 Floor space ratio

*(1) The objectives of this clause are as follows:*

*(a) to define the allowable development density of a site,*

*(b) to encourage increased building densities through site amalgamation at certain locations.*

*(2) The maximum floor space ratio for a building on any land is not to exceed the floor space ratio shown for the land on the Floor Space Ratio Map.*

The floor space ratio for the site is 4.5:1. The area of the site is 3,002.3 $m^2$, therefore the maximum allowable floor space is 13,510 $m^2$. The floor area of the proposed building is 10,648 $m^2$ and is well below the allowable floor space.

### Clause 7.1 Acid Sulfate Soils

The proposal involves earthworks and associated excavation for footings and servicing. The building is slab on ground construction, as such, excavation throughout the site will be minimal, up to 500 mm, except for the fire tank and pump room area where excavation will be local and may reach up to 3.5 m. The land is mapped as potential Acid Sulphate Soils Class 4 and therefore has a low probability of acid sulfate soils. A geotechnical investigation will be prepared prior to the commencement of works. If acid sulfate soils are detected, an Acid Sulfate Soils Management Plan will be prepared for the proposed works in accordance with the Acid Sulfate Soils Manual.

### Clause 7.2 Earthworks

This proposal seeks consent for the excavation of the site as shown in the architectural drawings. The development has been designed to reduce earthworks (there is no basement car park proposed) and to mitigate the impact of necessary excavations. Standard sediment and erosion controls would be implemented to manage impacts arising from earthworks. An AHIMS search was conducted indicating that there are no known Aboriginal items located within or nearby the site.

### Clause 7.3 Flood Planning

The site is identified as within the flood planning area, therefore this clause applies. The Flood Planning Level for the site is RL 5.30 m AHD based on the 1% AEP flood level plus 500mm of freeboard.

This clause requires that:

Development consent must not be granted to development on land to which this clause *applies unless the consent authority is satisfied that the development—*

*(a) is compatible with the flood hazard of the land, and*

*(b) is not likely to significantly adversely affect flood behaviour resulting in detrimental increases in the potential flood affectation of other development or properties, and*

*(c) incorporates appropriate measures to manage risk to life from flood, and*

*(d) is not likely to significantly adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses, and*

*(e) is not likely to result in unsustainable social and economic costs to the community as a consequence of flooding.*

The development has been designed to ensure compliance with the flood planning provisions of the LEP.

### Clause 7.9 Air space operations

The site is located within the Airport Height Limitations map. The maximum height of the building is 42.7 m AHD and is below the required 48.06 m AHD restriction.

### Clause 7.11 Essential Services

Development consent must not be granted to development unless the consent authority is satisfied that any of the following services that are essential for the development are available or that adequate arrangements have been made to make them available when required—

*(a) the supply of water,*

*(b) the supply of electricity,*

*(c) the disposal and management of sewage,*

*(d) stormwater drainage or on-site conservation,*

*(e) suitable vehicular access.*

The subject land is already connected to the above services. These services will be extended or redesigned to accommodate the proposed development in accordance with Council's requirements.

**Clause 7.12 Design Excellence**

The objective of this clause is to ensure that development exhibits design excellence that will contribute to the natural, cultural, visual and built character values of Coffs Harbour. Turner Architects have addressed the SEPP 65 Architectural Design Guideline in a report at **Appendix B**.

In considering whether the development exhibits design excellence, the consent authority must have regard to the following matters:

| | | |
|---|---|---|
| **a** | **whether a high standard of architectural design, materials and detailing appropriate to the building type and location will be achieved,** | Consistent. The development exhibits a high standard of design by Turner Architects. A Design Verification Statement is provided at **Appendix B**.<br>Design, materials and detailing were chosen to meet the recommendations of the City Centre Masterplan and the particular environmental and climate attributes of the site and the locality. |
| **b** | **whether the form and external appearance of the development will improve the quality and amenity of the public domain,** | Consistent. The proposed building will contribute positively to the streetscape and the public domain as discussed in this report. The building and landscaping have been designed to accord with the recommendations of the City Centre Masterplan and the City Centre Prosperity Plan 2031. |
| **c** | **whether the development detrimentally impacts on view corridors,** | The residential tower is situated upon a podium ground and lower floorplate. The tower is setback from side boundaries between 9 and 12 metres to maintain separation and retain view corridors.<br>The building form and function meets the recommendations of the *Review of Building Heights and Building Form in the Coffs Harbour CBD* endorsed study and the exhibited *Precinct Analysis Gordon Street New Library Gallery.* |
| **d** | **the requirements of the Coffs Harbour DCP,** | Consistent. Refer to Section 3.4. |
| **e** | **how the development addresses the following matters:** | |
| **(i)** | **the suitability of the land for development,** | The land is zoned for commercial core functions and is identified in the exhibited *Precinct Analysis Gordon Street New Library Gallery* as 'city heart' functions. The land is within the City Centre core and is within walking distance of shops, public transport, pedestrian and cycleways, community support services, urban services, schools and |

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|---|---|---|
| | | recreation areas.<br>The land has the capacity to comfortably accommodate the proposed 13 storey building without adversely impacting any existing surrounding development. |
| **(ii)** | **existing and proposed uses and use mix,** | The surrounding land uses are predominantly commercial. The development meets Council's City Centre Masterplan vision to *create an attractive urban environment rich in lifestyle facilities that attracts **residential living** to the City Centre consistent with today's residential needs and expectations*. |
| **(iii)** | **heritage issues and streetscape constraints,** | The site is over 600 m from the nearest heritage item (cemetery). The building has been purpose designed in consideration of the City Centre Masterplan and will make a positive contribution to the streetscape. |
| **(iv)** | **the relationship of the development with other development (existing or proposed) on the same site or on neighbouring sites in terms of separation, setbacks, amenity and urban form,** | The podium and tower building design supports separation between properties to maintain or improve view sharing and amenity. The building is stepped back from Harbour Drive in line with the DCP solar plane control and to create an interesting feature of the cascading balcony alignments. |
| **(v)** | **bulk, massing and modulation of buildings,** | The building mass is reduced as each level is stepped back in line with the DCP solar plan. Various external finishes, balcony arrangements and expansive landscaping results in a well modulated building. |
| **(vi)** | **street frontage heights,** | The building will present as four storeys to the Harbour Drive frontage. The residential tower steps back from the Level 4 podium.<br>Street trees and laneway trees will screen and shade the buildings frontage and western elevation. |
| **(vii)** | **environmental impacts such as sustainable design, overshadowing, solar access, wind and reflectivity,** | The building has been designed to impact positively within the site and within the surrounding environment in terms of over-shadowing, solar access, wind and reflectivity. Significant podium and balcony landscaping will mitigate reflectivity and cool the building. |
| **(viii)** | **the achievement of the principles of ecologically sustainable development,** | The proposed development will increase the density of the infill site from its present predominantly retail use for retail to retail plus 95 residential apartments thereby maximising the use and functionality of an urban resource.<br>Further, sustainable material choice, substantial glazing and generous podium and balcony landscaping will ensure solar performance and meets BASIX requirements.<br>The development is well located in terms of |

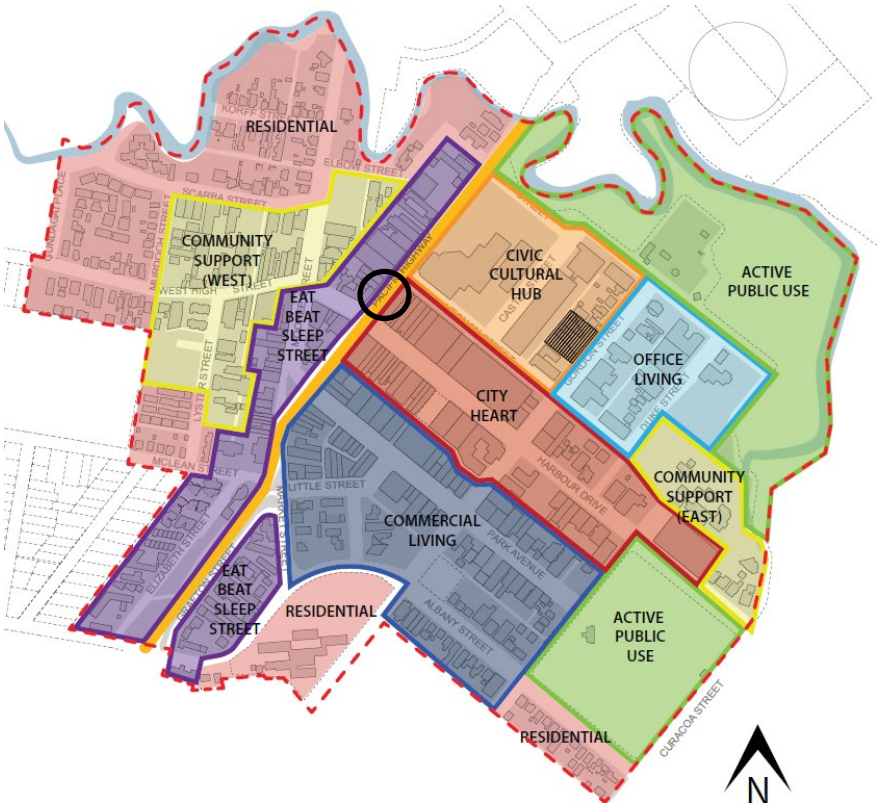
| | | |
|---|---|---|
| | | 'walkability' to shops, urban services and recreational areas, reducing or eliminating the need for car trips. |
| **(ix)** | **pedestrian, cycle, vehicular and service access, circulation and requirements,** | The development will improve pedestrian access and circulation within the core city block by opening up the pedestrian laneway linkage between Harbour Drive and Vernon Street for 24 hour public use.<br><br>The site is near the Coffs Creek pedestrian and cycleway and public transport options and is within an easy level walking distance of shops, the civic precinct, recreation areas and schools. |
| **(x)** | **the impact on, and any proposed improvements to, the public domain.** | The proposed pedestrian laneway will significantly improve the public domain within a core area of the City Centre. The building will have a positive impact on the streetscape. The Landscape Design by Conzept meets the City Prosperity Plan 2031 Landscape material and Planting Selection guide. |

**Clause 7.13 Central Business District**

*Development consent must not be granted to development on any land unless the consent authority has considered whether the development maintains the primacy of the CBD as the principal business, office and retail hub of the Coffs Harbour City.*

As shown in the image below, the site is within the CBD area within land identified by Council as the 'city heart'. This proposal will support the primacy of the CBD.

**Illustration 3.4 City Heart**




**Source: Precinct Analysis Gordon Street New Library Gallery Preliminary Draft, 2016**

## 3.3. Draft Environmental Planning Instruments

There are no known draft Environmental Planning Instruments (EPIs) that are applicable to the subject proposal.

## 3.4. Development Control Plans

### Coffs Harbour Development Control Plan 2015

It is noted that ***Clause 6A Development control plans cannot be inconsistent with Apartment Design Guide*** of SEPP 65 operates to ensure that, where DCP controls relate to visual privacy, solar and daylight access, common circulation and spaces, apartment size and layout, ceiling heights, private open space and balconies, natural ventilation, storage, the Apartment Design Guide will prevail.

The following components of the DCP are generally applicable to development in the B3 Commercial Core zone.

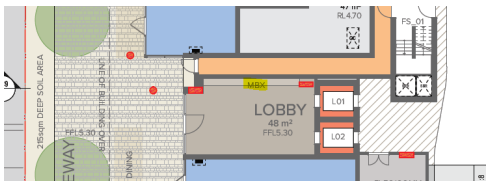
**Table 3.2 DCP Compliance**

| | *DCP CONTROL* | *Comment* |
|---|---|---|
| **D** | **BUILT FORM CONTROLS** | |
| 1.1 | Setback requirements | Merit based. |

| | DCP CONTROL | Comment |
|---|---|---|
| 1.2 | Design Requirements – General | |
| 1 | *Development is to be designed:*<br>*(a) so that buildings do not exceed a total length of 45 metres; and*<br>*(b) to address the street, with front entryways to be generally parallel with the street; and*<br>*(c) to incorporate modulation of form, articulation of building facades, window arrangements and architectural enhancements to add visual interest and to reduce the apparent bulk and scale of buildings as demonstrated below; and*<br>*(d) to contribute to a visually interesting skyline and to differentiate between the base, middle and top in design, where buildings are over 13 metres high; and*<br>*(e) so that large unrelieved expanses of wall or building mass do not face a public road or adjoin residential areas; and*<br>*(f) so that no blank or opaque side walls are provided on any street elevation; and*<br>*(g) so that building design, materials, construction and finishes achieve microclimate responsive solutions such as louvres, shading, verandahs and indoor/outdoor spaces; and*<br>*(h) so that colours and textures of all external finishes are of a high quality and are suitable for the locality and the context of the site; and*<br>*(i) to maximise glazing whilst avoiding large unrelieved expanses of glass; and*<br>*(j) to avoid the use of building materials that are highly reflective or less durable; and*<br>*(k) to integrate roof plant rooms and lift overruns into the overall architecture of the development; and*<br>*(l) so that any outdoor dining is provided at street level; and*<br>*(m) to include light wells and courtyards to improve internal building amenity and achieve ventilation.* | Note that the SEPP 65 Apartment Design Guide criteria overrides the DCP controls.<br>(a) The floorplate of the building occupies the length of the site to align with adjoining buildings and address both street frontages. The upper residential levels are stepped back to reduce the bulk and meet solar plane requirements.<br>The maximum length of the building at ground level is 64.41 m and at L4 (podium level) is 54.41 m.<br>(b) The retail premises address both street frontages.<br>*Exception:*<br>*Development comprising areas set aside for civic spaces is not required to address the street with parallel front entryways.*<br>The main entry lobby is located off the pedestrian laneway, (a public space).<br>(c) The building is well modulated.<br>(d) The building clearly expresses the base, podium and upper levels.<br>(e) There are no unrelieved elevations of the building.<br>(f) No blank walls face either street elevation.<br>(g) Breezeblocks, louvres, balcony screening and wintergardens are an integral part of the design.<br>(h) The colour palette was selected to accord with the City Centre Prosperity Plan 2031 recommendations.<br>(i) Complies.<br>(j) Complies – external building materials are non-reflective and durable.<br>(k) Complies. Rooftop plant and lift overrun are concealed by the parapet. |

| | DCP CONTROL | Comment |
|---|---|---|
| | | (l) The ground level retail tenancies could potentially accommodate outdoor dining, however, approval for the use of each tenancy is not part of this application.<br>(m) The podium at L4, balconies and terraces will enhance building amenity. |
| 2 | *Development on corner sites and on sites where vistas are terminated are to be designed to incorporate special architectural emphasis acknowledging the corner or vista and a design that addresses both street frontages.* | The building design addresses both street frontages as well as the eastern and western elevations. The building displays visually interesting architectural design from all elevations. |
| 3 | *Development applications for development with a construction value over $1 million are to be accompanied by a materials and colour sample board, and schedule.* | Refer Turner Drawing DA-890-001. |
| 4 | *Development with a zero front setback is to incorporate:*<br>*(a) continuous awnings for primary road frontages; and*<br>*(b) continuous awnings for a minimum of six metres for secondary road frontages, and*<br>*(c) continuous awnings where the development addresses public footpaths, car parks and internal pedestrian court yards.* | (a) Awnings to both street frontages and to the pedestrian laneway are provided.<br>(b) Awnings on Harbour Drive and Vernon Street are continuous from boundary to boundary.<br>(c) As above. |
| 5 | *Awnings are to:*<br>*(a) integrate with the design of the development and adjoining buildings; and*<br>*(b) be a minimum of:*<br>*(a) 2.8 metres deep where street trees are not required; or*<br>*(b) 2.4 metres deep where street trees are required; and*<br>*(c) have a minimum height of 3.2 metres and a maximum height of four metres above pedestrian level; and*<br>*(d) have a low profile, with slim vertical fascias or eaves (generally not exceeding 300mm in height); and*<br>*(e) be setback 600mm from the kerb; and*<br>*(f) include under awning lighting (recessed or wall mounted).* | Complies. |
| 6 | *Development is to provide a clearly articulated pedestrian entry and all weather protection at the* | Complies. |

| | DCP CONTROL | Comment |
|---|---|---|
| | *main entrance to each building.* | |
| **1.3** | **Design requirements - mixed use development** | |
| 1 | *Mixed use development is to be designed:*<br>*(a) so that entries to residential components of the development are clearly identified and accessed from primary road frontages; and*<br>*(b) to provide flexible building layouts which allow variable tenancies or uses on the first two floors of a building above the ground floor; and*<br>*(c) so that separate entries are provided to non-residential components of the development; and*<br>*(d) to incorporate security access controls for all private entries, including parking areas and internal courtyards.* | (a) The entry to the residential component is via Vernon Street vehicular entry and pedestrian entry is via the laneway. Retail and residential areas will be clearly delineated.<br>(b) Retail is located on the ground floor. The Level One (L1) car parking area is of open design and can accommodate other uses. Under present City Centre conditions, there is no demand for additional retail or commercial floor area, noting many empty retail and commercial tenancies in the CBD area.<br>(c) Each retail tenancy has a separate front and rear entrance.<br>(d) Security controls are provided at all entries to residential areas. |
| 2 | *Non-residential service requirements such as loading docks and waste storage areas are to be designed and located so as not to unreasonably interfere with any residential component of the development, including primary outlooks and amenity for residential buildings.* | The loading dock and waste storage areas are appropriately located on the ground floor. |
| **1.4** | **Infrastructure and site facility requirement** | |
| 1 | *Development is to provide the following infrastructure in accordance with Council's Development Specifications:*<br>*(a) sealed road pavement;*<br>*(b) concrete kerb and gutter;*<br>*(c) concrete footpath to the nearest cross street; and*<br>(d) *piped stormwater drainage.* | (a) – (d) are provided. |
| 3 | *Development is to provide the following utility services in accordance with Council's Development Specifications:*<br>*(a) water;*<br>*(b) sewer;*<br>*(c) telecommunications (including National Broadband Network where available);* | (a) – (e) are provided. |

| | DCP CONTROL | Comment |
|---|---|---|
| | *(d) electricity; and*<br>(e) *trade waste facilities (if applicable).* | |
| 4 | *Development is to provide the following site facilities:*<br>*(a) waste facilities in accordance with the relevant controls of F6 Waste Management of this Plan; and*<br>*(b) mailboxes in one accessible location adjacent to the main entrance to the development.* | Refer **Appendix G** for Waste Management.<br><br>Mailboxes are located in the lobby at the main entrance to the building.<br><br>  |
| 5 | *Site facilities such as communication structures, air conditioning units, ventilation stacks and any ancillary structures are to be:*<br>*(a) located away from the street frontage;*<br>*(b) integrated into the roofscape design and not a dominant skyline feature, and*<br>(c) *adequately setback from the perimeter wall or roof edge of buildings.* | All ancillary elements are appropriately located and screened.<br>Building plant and services are optimised to minimise the disruption to the street with vehicle access from Vernon Street. The layout of services and access facilitates two retail tenancies to Vernon Street. |
| 1.8 | Accessibility requirements | |
| | *(a) Where the provisions of the Disability (Access to Premises – Building Standards) 2010 apply for alterations and additions to an existing building, an accessible accessway is to be provided in accordance with the relevant Australian Standards from the site boundary to the principal pedestrian entrance.*<br>(b) *Public footpaths, recreation areas and other public spaces associated with development on commercial land are to be designed as barrier-free environments for all people in accordance with the Disability Discrimination Act 1992.* | Refer Access Report at **Appendix L**. |
| 1.9 | Safer by design requirements | Refer Section 2.11 of this report. |
| 1.10 | Consolidation requirements | |
| 1 | *Where development is situated over the boundary of two or more lots, the subject lots are to be consolidated into one allotment* | Lots 9 and 10 DP 506454, Lot 4 Sec 7 DP 758258 and Lot 1 DP 305950 will be consolidated into one lot prior to completion of the development. |
| **1.13** | **Water management requirements** | |
| 1 | *Stormwater drainage is to be provided in accordance with Council's Development Specifications.* | Complies. Onsite detention or WSUD measures are not required for this development. |

| | DCP CONTROL | Comment |
|---|---|---|
| | | |
| 2 | *Development applications are to be supported by concept stormwater drainage designs.* | A concept Stormwater Drainage Design Report is provided at **Appendix F**. |
| 3 | *Stormwater is to be gravity drained to Council's drainage system (where available).* | Complies |
| 4 | *N/A* | |
| 5 | *Stormwater drainage design is to generally reflect the pre-existing flow characteristics of the site, and may require on-site stormwater detention.* | Complies.<br>The existing site is virtually completely impervious, redevelopment of the site will not result in additional flows into councils stormwater infrastructure and therefore, on-site detention is not required for this development. |
| 6 | *Water sensitive urban design is to be incorporated into the design of the development in accordance with Council's Water Sensitive Urban Design Guidelines.* | Council require compliance with their Water Sensitive Urban Design (WSUD) Policy if development or redevelopment results in an increase of more than 300 $m^2$ of impervious area on the site. As the proposed development does not increase the impervious area on the site WSUD is not required. |
| **1.14** | **Erosion and sediment control requirements** | |
| 1 | *Erosion and sediment control measures are to be provided in accordance with the document Managing Urban Stormwater – Soils & Construction Volume 1 (Landcom 2004) for development comprising earthworks.* | The building is slab on ground construction, as such, excavation throughout the site will be minimal, up to 500 mm, except for the fire tank and pump room area where excavation will be local and may reach up to 3.5 m |
| 2 | *Development applications for development comprising earthworks are to be accompanied by supplementary information in accordance with the following table:*<br>Area of earthworks (m²) / Supplementary Information<br>< 800m² of disturbed area / Basic Erosion and Sediment Control Plan<br>800m² to 2,500m² of disturbed area / Erosion and Sediment Control Plan<br>>2,500m² of disturbed area / Soil and Water Management Plan | ***Noted*** |
| 5 | *Soil and Water Management Plans are to be of a scale 1:500 or larger and are to be prepared in accordance with the document Managing Urban Stormwater – Soils & Construction Volume 1 (Landcom 2004).* | Noted |

| | DCP CONTROL | Comment |
|---|---|---|
| **1.20** | **Amenity requirements** | |
| 1 | *Development is to be designed to incorporate methods to reduce visual and acoustic impacts on adjoining residential zoned land, including the following:*<br>*(a) landscaping,*<br>*(b) screening,*<br>*(c) unobtrusive lighting,*<br>*(d) the location of delivery areas and loading docks, and*<br>(e) *appropriate delivery hours and limited after hours deliveries.* | There is no adjoining residential zoned land.<br>Building separation meets SEPP 65 ADG requirements. |
| 2 | *All noise generating equipment including the following:*<br>*(a) mechanical plant or equipment,*<br>*(b) air conditioning units,*<br>*(c) fixed vacuum systems,*<br>*(d) mechanical ventilation associated with car parks,*<br>*(e) driveway entry shutters,*<br>*(f) waste storage facilities, and*<br>*(g) delivery areas*<br>*are to be acoustically screened and designed to minimise acoustic impacts on adjoining residential zoned land.* | There is no adjoining residential zoned land.<br>All noise generating equipment is appropriately located and screened.<br>Car parking is located on ground to level 3 and is screened from the public domain by apartments to the north and a combination of landscape and breeze-screens to the other frontages. The carpark ventilation strategy reduces the reliance on mechanical extraction by supplementing ventilation through natural air movement.<br>An Acoustic Assessment is provided at **Appendix M**. |
| E | **Flooding** | |
| 4.1 | Flood planning requirements – general | |
| 1 | *Development is to be designed and located so that it is free from any land that is at or below the 100-year Average Recurrence Interval flood level.* | Complies.<br>The Flood Planning Level (FPL) for the development is 5.17 m AHD.<br>The Finished Floor Level (FFL)for the building is 5.17 m AHD.<br>Note that for 15-21 Harbour Drive (the western-most property) the FPL is 4.8 m AHD and the FFL is 5.3 m AHD.<br>All new electrical infrastructure and equipment (wiring, power outlets, switches etc) will be located at minimum level of 5.17 m AHD or suitably waterproofed. |
| 2 | *Development is to be designed and located so that it is free from any floodways.* | Complies.<br>Note the flood hazard categorization |

| | DCP CONTROL | Comment |
|---|---|---|
| | | is Low. The land is located in the Low Flood Risk Precinct. |
| 3 | *Development is not to comprise the external storage of any materials below the 100-year Average Recurrence Interval flood level that are potentially hazardous or that may cause pollution.* | Complies. |
| 4 | *Development is not to result in an increase in flood levels on adjoining or surround land.* | Complies. |
| 5 | *Operational access to the development is to provide a level of service commensurate with the zoning and proposed use with consideration to both on site and off site access.* | Complies.<br>Retail tenancies are designed for direct access from the public domain. Any freeboard and preventative flooding requirements are within the tenancy or created through level transitions or ramps. |
| **4.2** | **Flood planning requirements - residential and tourist development.** | |
| 1 | *Buildings are to be designed and located so that they are free from any high hazard flood area.* | **Complies**<br>The flood hazard categorization is Low. |
| 4 | *The minimum finished floor level of all habitable room(s) is to be at the height of the 100-year Average Recurrence Interval flood level plus 0.5 metre freeboard.* | **Complies** |
| 5 | *The minimum finished floor level of all non-habitable room(s) is to be at the height of the 100-year Average Recurrence Interval flood level.* | **Complies** |
| **4.3** | **Flood planning requirements – commercial and industrial development** | |
| 1 | *Buildings are to be designed and located so that they are free from any high hazard flood area.* | **Complies** |
| 4 | *The minimum finished floor level for buildings is to be at the height of the 100-year Average Recurrence Interval flood level plus 0.5 metre freeboard.* | **Complies** |
| F | **General Development Controls** | |
| **F1.1** | **Vehicular Access and Manoeuvring - General** | |
| 1 | *Where possible, driveways are to be provided from lanes and secondary roads rather than primary roads.* | Access to the car park and loading bay is from Vernon Street. |
| 2 | *Vehicle access and entry points are to be integrated into the building design so as not to dominate the streetscape.* | Complies |
| 3 | *Driveway width and grades, vehicle circulation, passing bays and vehicular ramp width and* | Complies |

| | DCP CONTROL | Comment |
|---|---|---|
| | *grades are to accord with Australian Standard 2890.1.* | |
| 4 | *Vehicles must be able to enter and leave the site in a forward direction.* | Complies |
| 5 | *Driveway crossovers are to be:*<br>*(a) designed in accordance with Council's Driveway Specifications, and*<br>*(b) located to take into account any services within the road reserve, such as power poles, drainage inlet pits and existing street trees, and*<br>*(c) a minimum of six metres from any intersection of two roads, and*<br>*(d) located to minimise amenity impacts to adjacent residential properties.* | Complies |
| 6 | *N/A* | |
| 7 | *Vehicular ramps are to be less than 20 metres long within developments and parking stations must not exceed a maximum grade of 1 in 5 (20%). Ramp widths are to accord with Australian Standard 2890.1.* | Complies |
| 8 | *N/A* | |
| 9 | *N/A* | |
| 10 | *Certain parking areas will require dedicated pedestrian paths (separate to parking spaces and vehicle manoeuvring areas) where high public usage is expected.* | Complies |
| **F1.3** | **Vehicular Access and Manoeuvring – Commercial/Industrial** | |
| 1 | *Adequate space must be provided within any development for the loading and unloading of service/delivery vehicles, including waste collection.* | Complies. |
| 2 | *All service doors, loading docks and waste storage areas must be screened from street frontages where possible.* | Complies. |
| **F1.4** | **On-Site Parking - Residential Uses** | |
| | *This control applies to development for the purposes of an attached dwelling, dwelling house, dual occupancy, semi-detached dwelling, multi-dwelling housing and residential flat building ….*<br><br>*≤100m² GFA one space*<br>*>100m² GFA two spaces*<br>*Visitor spaces: One space per every five* | Complies.<br>The development is identified as shop top housing, however, Council's parking requirements are addressed as follows.<br><br><br>86 x < 100 $m^2$ = 86 spaces<br>9 x > 100$m^2$ = 18 spaces. |

| | DCP CONTROL | Comment |
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| | *dwellings or part thereof* | Visitor = 19 spaces<br>A total of 123 spaces are required.<br>123 spaces are provided |
| **F1.5** | **On-Site Parking – Non Residential Uses** | |
| | *Shops – One space per 25 $m^2$ of GLFA* | GLFA = 735 $m^2$.<br>30 spaces are required<br>31 retail tenancy spaces are provided |
| F3 | **Landscaping** | |
| **F3.1** | **Landscaping requirements – general** | |
| 1 | *Landscaping is to be provided which:*<br>*(a) complements and enhances the existing streetscape features of the locality; and*<br>*(b) creates human scale at ground level; and*<br>*(c) softens buildings and hard landscaping; and*<br>(d) *provides privacy.* | Complies.<br>Detailed Landscape Plans by Conzept are provided at **Appendix E**.<br>Landscape treatments have been design to align with Councils City Centre Masterplan and City Centre Prosperity Plan 2031. |
| 2 | *Soft landscaping is to comprise:*<br>*(a) species that are sensitive to local climate, topography and natural features; and*<br>*(b) understorey plantings to visually enhance the development (in keeping with NSW Police Safer by Design: Crime Prevention Through Environmental Guidelines); and*<br>*(c) groundcover to minimise unsealed ground; and*<br>*(d) deep soil zones to promote large tree growth; and*<br>*(e) species that will ensure driver visibility for ingress and egress to the site; and*<br>(f) *shade trees to soften the visual impact of large parking areas (where provided).* | Complies. |
| 3 | *Landscaping beds (internal dimensions not including edging or supports) are to be:*<br>*(a) a minimum of 1.5 metres in width where trees are likely to reach four metres in height upon maturity; or*<br>(b) *a minimum of two metres in width where trees are likely to reach more than four metres in height upon maturity.* | Complies. |
| 4 | *The visual impact of hard landscaping is to be minimised via soft landscaping.* | Complies. |
| 5 | *N/A* | All car parking is fully enclosed. |

| | DCP CONTROL | Comment |
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| 6 | *N/A* | |
| 7 | *N/A* | |
| 8 | *Where palms are incorporated into landscape designs, they are to complement and not substitute trees.* | Illawarra Flame Trees and Cabbage Tree Palms have been chosen for ground level planting. |
| **F3.3** | **Commercial areas** | |
| 1 | *N/A* | |
| 2 | *N/A* | |
| 3 | *N/A* | |
| F3.6 b | *Detailed Landscape Plans and Landscape Masterplans are to be prepared by a suitably qualified consultant with membership to the Australian Institute of Landscape Designers and Managers (AILDM)* | **Complies**<br>Landscape Plans have been prepared by Conzept Landscape Architects. |
| **F6** | **Waste Management** | |
| **F6.1** | **Waste requirements - general** | |
| 1 | *A three stream waste separation system is to be provided to cater for all waste generated by the development.* | **Complies**<br>Refer to Section 2.12 of this report and the Operational, Demolition and Construction Waste Management Plan by Waste Audit and Consultancy Services (**Appendix G**). |
| 2 | *The following variables are to be considered in the calculation of waste generation rates:*<br>*(a) the number of occupants;*<br>*(b) size of dwellings;*<br>*(c) nature of business;*<br>*(d) nature of waste being generated;*<br>*(e) frequency of collections; and*<br>*(f) peak season volume changes.* | Noted. |
| 3 | *The number and type of bins required for waste separation systems are to suit the type of development and may include any of the following options:*<br>*(a) 240 litre lime green-lidded bin for organics (green waste and food waste, collected weekly); and 240 litre yellow-lidded bin for recycling (collected on alternate fortnights); and 240 litre red-lidded bin for residual garbage (collected on alternate fortnights); or*<br>*(b) 660 litre red and yellow-lidded bulk bins* | Noted. |

| | DCP CONTROL | Comment |
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| | *(collected weekly) for multi dwelling housing (with six or more units) or commercial development; or*<br>*(c) 1,100 litre red and yellow-lidded bulk bins (collected weekly) for multi dwelling housing (with ten or more units) or commercial development; or*<br>*(d) 1m³ to 3m³ bulk bins for commercial and industrial development (with no council service).* | |
| 4 | *Maximum weekly waste generation rates collected through Council's standard waste collection service are outlined in the following table:*<br>Weekly waste entitlement through Council's standard waste collection service<br>Waste Stream / Weekly Volume Per Premises<br>Recycling: 120 litres<br>Organics (greenwaste and food scraps): 240 litres<br>Garbage: 120 litres<br>**Total Weekly Waste Entitlement: 480 litres**<br>Hotel/Motels: 10 litres per bed per day (additional generation rates apply for ancillary restaurants) | Noted. |
| | *Exceptions:*<br>*Chutes for the transfer of waste, food waste disposal units and in-sink-erators are not supported waste management systems.* | Whilst Council's exception is noted, it is not supported for this building.<br><br>As recommended by the NSW EPA guideline, *Better Practice Guide for Waste Management in Multi-unit Dwellings*, a chute system is proposed for residential waste. Key benefits of the chute system are:<br>• Simple to use.<br>• Encourages resource recovery through the co-locating waste and recycling.<br>• Short travel distance from each residential Level to the chute room.<br>• Reduced breakages.<br>• Rubbish will not be carried in the lifts.<br>• Secure access to residential waste room and chute area.<br><br>The architects and the waste consultants have had considerable experience in the design and development of multi storey mixed used buildings and highly recommend the use of a chute |

| | DCP CONTROL | Comment |
|---|---|---|
| | | system. |
| **F6.3** | **Waste storage requirements** | |
| 1 | *Development is to provide a communal bin storage/wash area where bulk bins or shared mobile garbage bins are used.* | Complies |
| 2 | *N/A* | |
| 3 | *Bin storage/wash areas are to be:*<br>*(a) large enough to accommodate the number of bins required to service the development; and*<br>*(b) a maximum height (to the underside of the roof) of 2.4 metres; and*<br>*(c) roofed with a 100mm overhang where one or more sides of the storage/wash area is open to the weather; and*<br>*(d) N/A*<br>*(e) N/A*<br>*(f) screened from public view and located to minimise potential odour and noise impacts to adjoining properties; and*<br>*(g) drained to the sewer, with a concrete floor graded and drained to a dry basket arrestor, prior to draining to the sewer (refer to Council's Liquid Trade Waste Policy); and*<br>*(h) N/A*<br>*(i) easily accessible from all residential areas and the service road, with a maximum bin carting grade of 1:14; and*<br>*(j) located near car parking areas or letter boxes for ease of use.* | Complies<br>The waste storage rooms are located on the ground floor and have been designed to comply with NSW EPA and Council criteria. |
| 4 | *Dry basket arrestors are to have fixed screens to any associated drains.* | Noted. |
| 5 | *Approval is to be conditional upon the ongoing management of bin storage/wash areas to:*<br>*(a) minimise nuisance to adjoining landowners; and*<br>*(b) ensure that dry basket arrestors are regularly cleaned and maintained to prevent odour nuisance and health risks; and*<br>*(c) ensure that clear signage, which depicts the correct use of bins within the storage area, is displayed at all times, including contact details for the complex management or person/s responsible for the management of the area; and*<br>*(d) ensure that a hose with a trigger nozzle or high pressure cleaner is available at all times* | Noted. |

| | DCP CONTROL | Comment |
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| | *to wash bins* | |
| **F6.4** | **Access and design requirements** | |
| 1 | *Development and subdivision proposals are to be designed:*<br>*(a) to enable waste collection vehicles to travel in a forward direction wherever possible; and*<br>*(b) N/A*<br>*(c) N/A*<br>*(d) so as not to interfere with parked cars on access roads; and*<br>*(e) to allow for collection vehicle overhang and minimise interference with bins and road furniture; and*<br>*(f) to enable waste collection vehicles to complete a full U-turn in a three-point turn; and*<br>*(g) to ensure that a minimum ceiling height of six metres is provided where bulk bins are to be retrieved from within a building.* | Complies.<br>Maneuvering within the internal ground level loading area meets AS2890 and enables efficient access to the waste storage areas. |
| 2 | *Development is to be designed so that road geometry complies with the following:*<br>*(a) a maximum road gradient of 10% for turning heads;*<br>*(b) a maximum longitudinal road gradient of 20%;*<br>*(c) a minimum radius of 11.25 metres and a minimum width of four metres;*<br>*(d) N/A*<br>*(e) an industrial strength pavement to withstand a maximum wheel loading of seven tonnes per axle.* | Complies.<br>Maneuvering within the internal ground level loading area meets AS2890 and enables efficient access to the waste storage areas. |
| 3 | *Where waste collection vehicles are proposed to enter private property for collection purposes:*<br>*(a) a sufficient manoeuvring area is required to be provided for collection vehicles; and*<br>*(b) approval is to be conditional upon the submission of a Section 88B Instrument (or inclusion of an appropriate Clause within a Management Statement for community title schemes or by-law for strata schemes) that allows for collection vehicles to access the land and indemnifies Council and its contractors.* | Noted. |
| **F6.5** | **Demolition and construction waste management requirements** | |
| 1 | *Demolition, construction and subdivision waste shall be stored within the development site and not within public areas such as footpaths, public* | Noted |

| | DCP CONTROL | Comment |
|---|---|---|
| | *and/or road reserves* | |
| 2 | *Adequate measures shall be implemented to prevent litter from being blown from the site* | Noted |
| 3 | *Any waste or materials that are transported off-site shall be transported to an approved waste management facility, in accordance with the requirements of the Protection of the Environment Operations Act 1997.* | Noted |
| 4 | *The generation, storage, treatment and disposal of hazardous waste and special waste (including asbestos) shall be undertaken in accordance with the requirements of the Environmental Protection Authority and WorkCover NSW.* | Noted |
| 5 | *Evidence of waste disposal such as weighbridge dockets and invoices shall be retained.* | Noted |
| 6 | *At the completion of construction works the development site shall be left clear of waste and debris.* | Noted |
| **F6.7** | **Application requirements** | |
| | *Development applications are to be accompanied by:*<br>*(a) a Waste Minimisation and Management Plan outlining measures to minimise and manage waste generation during the construction and operational stages of the development; and*<br>*(b) a site analysis plan (prepared at a scale of 1:200) detailing:*<br>*(i) the location of bin storage areas; and*<br>*(ii) design details for bin storage areas, including a floor plan, elevation plans, cross-sections, screening, dimensions and drainage.* | A Waste Management Plan by Waste Audit is provided at **Appendix G** |
| G | **Special Area Controls** | |
| **G3** | **Coffs Harbour City Centre Core Precinct** | |
| **G3.1** | **City Centre Masterplan** | |
| 1 | *Development is to comply with the principles of the Coffs Harbour City Centre Master Plan and appendices.* | The principles of the City Centre Master Plan (CCMP) are discussed in Section 3.6 of this report and the Architectural Design Statement. The design strategy for the project is aligned with the CCMP. The project will deliver street activation and a public pedestrian laneway connection between Harbour Drive and Vernon Street. |

| | DCP CONTROL | Comment |
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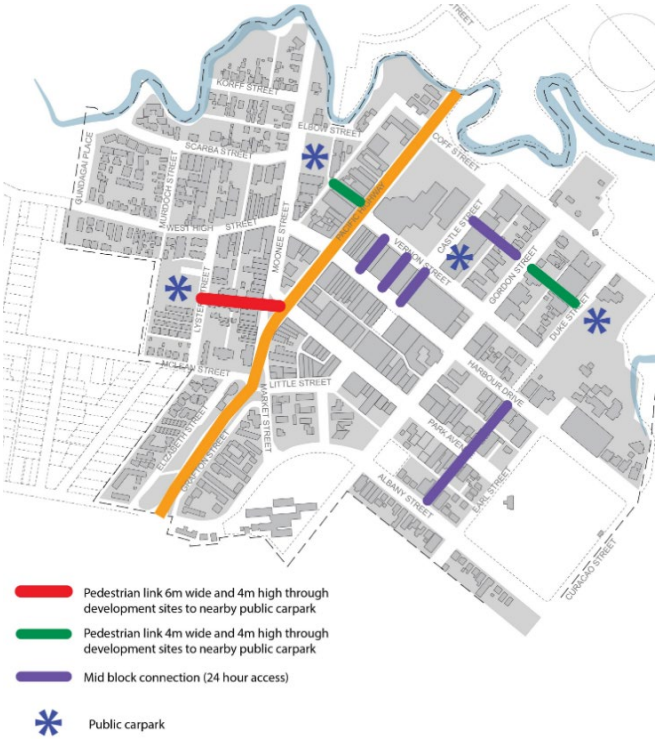
| | | |
| 2 | *Landscape materials and planting selection associated with development proposals are to accord with the Landscape Materials and Planting Section within the Coffs Harbour City Centre Master Plan.* | **Complies.**<br>Refer Landscape Plan by Conzept at **Appendix E**. |
| 4 | *Where practicable, pedestrian linkages shown in the following diagram are to be maintained for unrestricted public access as part of any new development or substantial redevelopment:*<br>  <br> | The pedestrian laneway provides *'mid block connection (24 hour access)*'.<br>The laneway will be retained in private ownership however public access rights will be formalised via a Right of Access and 88B agreement providing Council as the authority to agreement. |
| **G3.2** | ***Setback requirements*** | |
| | *Where a front setback requirement is shown on the Front Setbacks Map for land zoned B3 Commercial Core under Coffs Harbour LEP 2013, buildings are to be setback in accordance with the city core built form diagram.* | At L4 the building is setback 3 m. |
| **G3.3** | **Design Requirements General** | |
| 1 | *New development is to be of a high quality with a mix of uses that encourage safety and activity during the day and night.* | The development is of very high quality comprising retail and residential use. The development will increase activity in the area day and night. |
| 2 | *New buildings are to generally take the form of edge defining mixed use podium buildings with active frontages at street level.* | **Complies.**<br>The development comprises a mixed use podium building. The retail elements of the building address both street frontages and the |

| | DCP CONTROL | Comment |
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| | | pedestrian laneway. The development will contribute positively to precinct surveillance and pedestrian safety |
| 3 | *Podium buildings and above podium level tower buildings are to be:*<br>*(a) generously spaced and are to avoid creating a continuous 'wall' of towers which would block sunlight to streets and be of inappropriate scale and bulk; and*<br>*(b) are to be designed in accordance with the principles of the city core built form diagrams contained in G3.2 of this Plan* | Complies.<br>The building is setback from Harbour Drive in accordance with the solar plane.<br>The width of the building restrained by 3 m setbacks east and west with 12 m separation between the upper residential tower and the boundary of adjoining properties. |
| 4 | *Where tower buildings are proposed, the maximum tower footprint permitted is 600m$^2$ (building footprint, not gross floor area).* | The tower footprint from L4 exceeds 600 m$^2$. |
| 5 | *New development is to maximise permeability of the city block in accordance with the 'desired pedestrian links' diagram contained in G3.1 of this Plan.* | Complies.<br>A public pedestrian laneway link is provided between Harbour Drive and Vernon Street. |
| 6 | *Development Applications for buildings greater than four storey in height, must accompanied by a Wind Assessment, which includes details of measures to mitigate any adverse wind effects on the public domain*. | Complies**.**<br>Refer Wind Assessment by Windtech at **Appendix P**. |

## 3.5. Strategic Plans

**North Coast Regional Plan 2036**

The Regional Plan recognises the changing demographic of the region, noting the following:

> *There will be a number of changes over the next 20 years to household size and make-up. A different approach to housing delivery will be required on the North Coast to respond to these changes.*
>
> *The region will accommodate an additional 76,200 people, which will generate the need for 46,000 new homes. Almost one-third of residents will be aged over 65 years, and couple-only and single person households will represent the largest share of households.*
>
> *These changes will not only increase the demand for housing, but also the need for a greater variety of housing. Future housing will be directed to locations that can accommodate more housing and that have existing or planned infrastructure and services.*
>
> *Pursuing suitable housing densities in the right locations will create a more compact urban footprint and protect significant environmental areas. This approach to housing delivery will*

*be more sustainable as it will protect the environment and create stronger, better-connected communities. (North Coast Regional Plan. p. 53)*

The proposal will assist in the delivery of this key element of the North Coast Regional Plan, to provide a greater variety of housing in the correct location.

**Direction 22: Deliver greater housing supply**

A minimum of 8,950 new dwellings are required in Coffs Harbour by 2036.

**Direction 23: Increase housing diversity and choice**

*Providing housing diversity and choice will improve affordability, help meet the needs of an ageing population and support the reduction of household size. To support the changing population and dwelling needs, a 40 per cent target has been set for new dwellings to be in the form of apartments, dual occupancies, townhouses, villas and homes on lots less than 400 square metres, by 2036.*

*Promoting ageing in place should be encouraged by the development of liveable homes that are easy to enter and navigate; responsive to the changing needs of occupants; and relatively easy to adapt (for injured, disabled or elderly residents).*

*Enhance the variety of housing options available by increasing the number of homes in and around the Coffs Harbour city centre, Coffs Harbour Jetty and Park Beach.*

The development will deliver 95 new apartments in the City Centre comprising a mix of one, two, and three bedroom apartment sizes.

All residential areas of the building are accessible. Twenty (20) of the 95 apartments meet the Silver standard for liveable housing design of which 10 are adaptable. All of the apartments will suit an aging population.

**Leveraging the Pacific Highway**

*Maximise opportunities associated with the increased connectivity provided by the upgraded Pacific Highway and digital technology.*

*Leveraging and maximising the social and economic links being delivered by the Pacific Highway upgrade to cities and centres will provide business with access to new markets and offer residents greater choice in where to live and work.*

*Over the next 20 years, almost 77 per cent of population growth on the North Coast will be in the regional cities. There are opportunities for these regional cities to deliver greater housing choice, more jobs and services, and vibrant precincts that suit the needs of the growing and changing population.*

Coffs Harbour is identified as a regional city. Upon completion of the Pacific Highway bypass, the 'old highway' will carry less traffic, including heavy vehicles. This will contribute to the 'calming' of the City Centre and will re-establish linkages between east and west of the current highway corridor.

The proposed apartments are well positioned to deliver greater choice in living and working in the City Centre.

**Develop successful centres of employment**

*Growing cities and centres as the principal centres of employment for commerce and retail sectors as well as for social activity will support tourism, foster a strong sense of place and service growing populations. The vitality of central business precincts will be promoted.*

*Focus retail and commercial activities in existing centres and develop place-making focused planning strategies for centres.*

*Providing greater housing choice in regional cities through more townhouses, villas and apartments will maximise the use of existing and new infrastructure and provide greater access to jobs, services and lifestyle opportunities.*

This development will revitalise the City Centre and attract permanent residents into the *'heart'* of the city. Ground floor retail will activate Harbour Drive and Vernon Street frontages with the pedestrian laneway linking the town centre, improving access, wayfinding and passive surveillance of the precinct.

**Coffs Harbour City Centre Masterplan 2031**

The development has been planned and designed to align with the City Centre Masterplan and will deliver a key element of the plan: retail and residential accommodation, providing *secondary benefits compared to other standalone retail centres.*

**Principles**

*The City Centre stands united as one retail, business, cultural and entertainment precinct with preferred development to occur as close to the City Square as possible.*

> Retail and residential mix used development is a 'preferred' land use and is supported by the Coffs City Centre Development Incentive Policy.

*Having a strong core in the City Centre is a prerequisite to that strength flowing to its outer boundaries.*

> The development will improve, enhance and revitalise the core of the City Centre.

*The primary qualities of safety, cleanliness and convenience must be achieved before placemaking endeavours can be fully realised.*

> The building will be used 24 hours increasing activity and passive surveillance in the City Centre. The proposed 95 apartments will provide permanent accommodation for small households within the convenience of a city centre location. The residents of the apartments will pioneer placemaking in the Centre City.

*Development will be encouraged which is best practice and of a high quality modern standard that will lay the foundation for decades to come.*

The building has been designed utilising best practice in terms of material, energy efficiency and sustainability and will be of a high quality, landmark building for decades to come.

*For all stakeholders to work cohesively and passionately together to deliver greater results.*

This development application will be advertised in accordance with Council's Community Engagement Plan. The development is aligned with the Coffs City Centre Masterplan, an exhibited and endorsed strategic plan. The Masterplan was prepared following stakeholder and community engagement.

*Ensure the economic benefits of the Special Rate levy, are, in the long term, passed onto landowners through higher property values, to businesses through higher incomes and the community through better facilities and employment.*

The landowners have contributed to the Coffs City Centre Masterplan via the Special Rates levy. The private sector will meet the cost of the development whilst providing public infrastructure benefits, including the pedestrian laneway infrastructure and an enlivened City Centre.

*To increase the capacity of the City Centre to foster economic growth and to meet the demographic needs of Coffs Harbour which is characterised by a high population growth rate and an aging population.*

All public and residential areas of the building are accessible. Twenty (20) of the 95 apartments meet the Silver standard for liveable housing design of which 10 are adaptable. All of the apartments will suit an aging population.

*To provide short term stimulus measures to revitalise the City Centre, reduce the number of vacant shopfronts and increase retail sales.*

The proponents support Council's measures to revitalise the City Centre and are equally concerned regarding the number of vacant shopfronts in the Coffs City Centre. This building will demonstrate confidence in the City Centre and will revitalise and invigorate growth within the immediate area.

**Coffs Harbour Local Growth Management Strategy to 2040**

Coffs Harbour City Council has adopted a compact city growth scenario in the Local Growth Management Strategy (GMS) to 2040. The GMS has adopted the following growth estimates (profile.Id):

*The Coffs Harbour population is forecast to grow from 74,670 in 2016 to 102,958 by 2040 with a 24% change.*

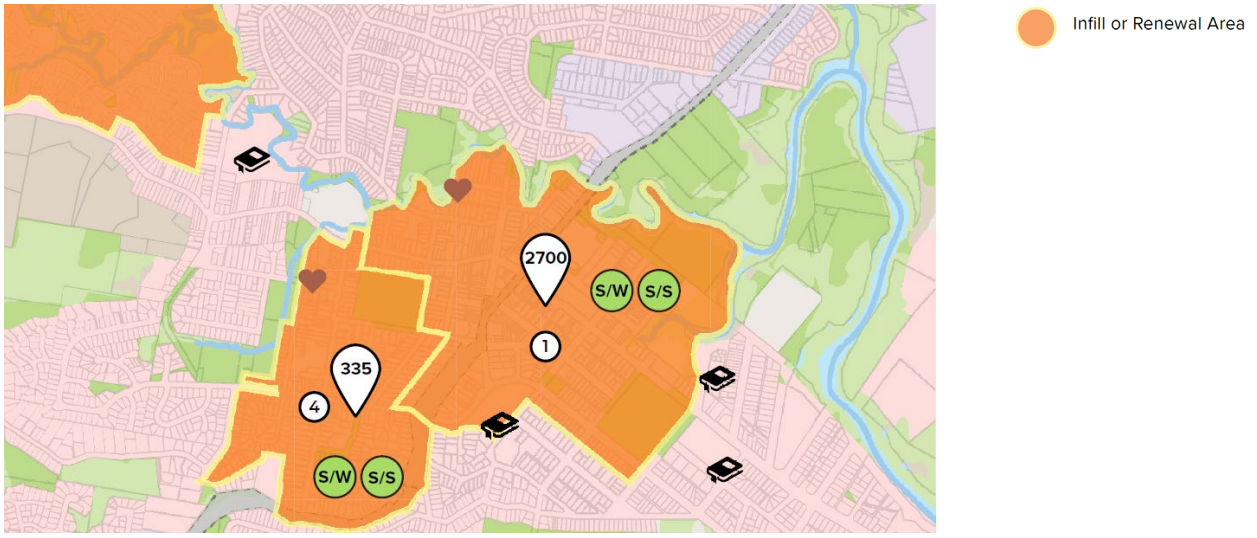
*Over the next 10 years, the age structure forecasts for Coffs Harbour by profile.id indicate a 16.0% increase in population under working age, a 28.7% increase in population of retirement age, and a 6.9% increase in population of working age. Extrapolating the 2036 profile.id forecast to 2040 demonstrates that an additional 12,195 dwellings are required for Coffs Harbour, taking the total number to 44,688, with an average of 508 dwellings per year.*

*The largest forecast increase to 2040 in household type is expected to be 'Couples without dependents'.*

Council has endorsed a compact city program and supports infill and renewal. A key object of the program is to *deliver quality housing that provides the choice our population needs, including universal, accessible and inclusive housing types for all ages.*

The City Centre is identified and mapped as an infill precinct. The GMS aims to support the delivery of 2,700 additional dwellings within the Coffs Harbour City Centre infill precinct. The development will contribute 95 apartments to meet the planned residential growth of the City Centre infill area.

**Illustration 3.5 Coffs Harbour City Centre Infill**




**Coffs Harbour Draft LGMS to 2040 – Page 58**

## 3.6. Policies and Guidelines

### Community Participation and Engagement Plan

The development is identified in Councils Community Participation and Engagement Plan as advertised development as it involves:

> *Residential accommodation with either more than 10 dwellings or higher than three stories (including seniors housing).*

The development application will be exhibited for 28 days in accordance with the plan.

### Coffs Harbour City Centre Development Incentive Policy

*The purpose of this policy is to help stimulate the development of residential and tourist accommodation within the Coffs Harbour City Centre and as outlined in the Coffs Harbour City Centre Masterplan. Council recognises the many benefits of supporting a vibrant and sustainable central business district. This proactive initiative may help promote and generate an increase in activity within this prominent community and business space.*

*The Vision to inspire and create a place where economic, social and cultural pursuits fuse to enrich and enliven all who live, work and visit the City Centre, would be promoted under this policy. Targeted key areas of growth include:*

- *A place for community - help enhance a vibrant, exciting and busy City Centre. Cafés, restaurants and other retail outlets may be encouraged to extend their normal operations into the evening.*
- *Economic - increasing the **population density in the CBD** could directly increase business activity and further promote business and investment growth. It would be reasonable to assume boosting community activity could have a significant and positive outcome on general revenue produced by local businesses.*
- *Social - help assist the growth of a lively, hospitable and safe space to enjoy. **Increasing public activity, particularly out of regular business hours,** could also reduce anti-social behaviour which has been a community concern expressed over recent years.*

The proposal meets the objectives of the Incentive Policy by increasing the population density of the CBD within a residential development. Apartment residents will increase public activity in and around the CBD, including out of regular business hours.

The proposal involves a residential development of greater than 4 Equivalent Tenements and is therefore eligible for a full developer contribution exemption (Section 7.11 and 64).

It is noted that the City Centre Development Incentive Policy states that in order to receive the concessions the below three items must be met;

1. A DA application deadline of the 23rd May 2021
2. Construction must be completed before the maximum cap allowance of $2,500,00 is reached; and
3. Issued a final occupation certificate within 3 years of lodgement

**Business Incentive Policy**

*This policy encourages the development of a robust Coffs Harbour economy which is resilient to fluctuations in the economic cycle, has a broad range of business activities and supports the growth and development of sustainable employment opportunities for Coffs Harbour's population. Council will provide leadership and support as well as advocating on behalf of new or existing businesses to the other levels of government to attract funding and any other applicable incentives. This policy provides a holistic approach to support business investment and reinvestment in the regional economy, when the investment would not otherwise occur. It also encourages diversification of the economy.*

*Assistance from Council to new business developments under this policy will comprise a non-cash incentive package which allows for an exemption/concession or payment by instalments of developer contributions for water supply and/or sewer services infrastructure, pursuant to Section 64 of the Local Government Act 1993 (Infrastructure Charge) and Section 7.11 of the Environmental Planning and Assessment Act 1979.*

The new retail area of the proposed development would be eligible for a 40% discount to Section 64 developer charges.

## 3.7. The Likely Impacts of the Development

The proposed development will have a positive impact in terms of the natural and built environments, social and economic aspects and community expectations as detailed in the Table below.

**Table 3.3 Impact Assessment**

| *Impact* | *Comment* |
|---|---|
| **Access, transport and traffic** | Positive impact arising from the development includes:<br>• 154 on site car parking spaces where none exist today.<br>• Replacement of on-street (Vernon Street) loading zone with internal loading and maneuvering.<br>• Car parking exceeds DCP requirements.<br>• Secure, all weather car parking, loading and maneuvering areas. |
| **Context and Setting** | The existing context and setting of the City Centre are predominantly two storey commercial buildings, some vacant and many outdated building forms. The Coffs Central Shopping Centre and the approved hotel development have revitalised and activated the east end of the core CBD area.<br>The proposed development is suited to the emerging context and City Centre setting as envisaged by the City Centre Masterplan. Detailed assessments were carried out to inform the masterplan with recommendations adopted by Council and included in the LEP and DCP.<br>The proposal is a compliant development and is considered suitable within the context and setting of the City Centre. |
| **Design** | The contemporary building design will complement recently completed modern buildings and CBD urban renewal. The building will add to the stock of modern buildings in the CBD area. The building has been designed so that it will not jeopardise the feasibility of surrounding sites to be redeveloped to their full potential. |
| **Height, bulk and scale** | The proposal has merit with regard to height bulk and scale as it will integrate effectively with the vision and principles of the City Centre Masterplan and the emerging built form character.<br>The podium and tower format achieves the desired outcome in terms of landuse, whilst providing for separation between the tower and adjoining property. Such separation will enable the redevelopment of adjoining sites whilst maintaining the amenity of the City Centre.<br>The podium style assists in creating a human scale at ground level and enable communal outdoor space for the residents at Level 4. |
| **Public domain** | The design of the ground level, particularly with various tenancies and lobbies facing the street, as well as the high quality design of the L4 podium, with related attractive finishes, ensures the public domain will be enhanced positively. The pedestrian laneway linking Harbour Drive with Vernon Street is an attractive visual feature and a public benefit to arise from the development. New shop fronts and awnings to both street frontages will modernise the precinct.<br>Ground level landscaping to the site and footpath area, street furniture and lighting meets the City Prosperity Plan 2013, Landscape Materials and Planting Section, guideline prepared for Council by TDEP & Roberts Day in March 2013. |
| **Landscape** | Due to the City Centre location and fully developed site, the extent of proposed landscaping is relatively limited, however the project has been designed to maximize deep soil zone planting and podium level and |

| Impact | Comment |
|---|---|
| | balcony landscaping.<br><br>As shown on the Landscaping Plan by Conzept at **Appendix E**, Illawarra Flame trees and Cabbage-tree palms capable of growth to 10 m to 25 m height, will screen and shade the laneway and street frontages. Public domain landscaping meets the design requirements of the City Centre Masterplan for street greening. Overall, the visual amenity of both street frontages will be improved as a result of the proposal.<br><br>The proposed landscaped treatments will result in a very pleasant living environment. |
| **Infrastructure** | All necessary infrastructure is available to the site. Works for extending services to the site will not cause excessive disruption to the City Centre. |
| **Reflectivity** | Reflectivity is miminised by external building finishes including:<br>• Extensive landscaping<br>• Perforated breezeblock screening<br>• Mixed finishes – brickwork, smooth matte finish concrete columns, metal and glass balastrades and screens. |
| **Acoustic** | Acoustic Logic (**Appendix M**) conducted an acoustic assessment of potential noise intrusion and noise emissions associated with the development.<br><br>Provided recommended acoustic treatments are implemented the noise intrusion and noise emissions will satisfy the requirements of:<br>- Coffs Harbour City Council's Development Control Plan (DCP)<br>- Development Near Rail Corridors and Busy Roads – Interim Guideline 2008<br>- NSW EPA Noise Policy for Industry (NPfI) 2017<br>- Australian/ New Zealand Standard AS/NZS 2107:2016<br><br>The acoustic impact of the development is considered acceptable. |
| **Wind Assessment** | A Pedestrian Wind Environment Statement prepared by Windtech Consultants is provided at Appendix P. Windtech examined the effect of wind activity for the three predominant wind directions for the Coffs Harbour region; namely the north-northeasterly and south-westerly winds.<br>Wind impact to the building is mitigated by:<br>• shielding provided by the neighbouring buildings<br>• recessed private balconies<br>• awnings along the street frontages<br>• planter areas and full height privacy balcony screens<br><br>Outdoor trafficable areas within and around the subject development site are potentially exposed to strong wind effects due to the interaction of the |

| Impact | Comment |
|---|---|
| | prevailing winds with the development built-form. Wind effects can be ameliorated by:<br>Ground Level:<br>• Awnings along the Harbour Drive and Vernon Street frontages<br>• The inclusion of densely foliating vegetation such as trees or shrubs/hedge planting along the pedestrian laneway; in particular around the street entrance and corner areas of the building.<br>• The use of localised fixed/mobile screening and/or densely foliating vegetation around any outdoor dining areas; in particular around any dining areas adjacent to the street entrance or corner areas of the site that are generally exposed to the strongest wind effects.<br>Level 4 Communal Rooftop Podium Area:<br>• The inclusion of a high impermeable screen along the western and southern perimeter edge of communal podium.<br>• The inclusion of densely foliating vegetation such as trees or shrubs/hedge planting within and around the communal podium; in particular around the corner areas of the building and areas intended for short duration stationary activities such as the outdoor seating etc.<br>Private Balconies and terraces<br>• Proposed privacy screens along the perimeter edges of the balconies and terraces as indicated in the architectural drawings. Such screening will create a wind stagnation zone within the balconies and terraces.<br>• The inclusion of a full-height impermeable screen along one of the exposed perimeter edges of the single aspect corner balconies to create a wind stagnation zone within the single aspect corner balconies.<br>• The inclusion of high impermeable balustrades and/or screens along the exposed perimeter edges of the larger dual aspect “wrap-around” balconies to deflect and reduce the intensity of the prevailing winds.<br>• The proposed wintergardens, especially to corner balconies into wintergardens.<br>• Densely foliating vegetation is to be of an evergreen species to ensure their effectiveness in wind mitigation throughout the year and the vegetation should be spaced such that the foliage is able to interlock between plants (where possible).<br>• The use of loose glass-tops and light-weight sheets or covers (including loose BBQ lids) is not appropriate on high-rise outdoor balconies or terraces.<br>• Lightweight furniture is not recommended unless it is securely attached to the balcony or terrace floor slab.<br><br>Windtech note that *with the consideration of the abovementioned treatment strategies in the final design, it is expected that wind conditions for the various trafficable outdoor areas within and around the development will be suitable for their intended uses and their applicable* |

| Impact | Comment |
|---|---|
| | *criteria.* |
| **Environmental** | *Soils:*<br>Soils are considered generally suitable for the proposed building foundations.<br>Construction impacts will be managed utilising standard sediment and erosion controls.<br>*Drainage*<br>A stormwater drainage strategy has been designed and documented by Stantec Australia Pty Ltd.<br>Sediment and erosion control measures will be implemented throughout the construction works to maintain water quality to the receiving environment.<br>*Flora and Fauna*<br>The site is managed urban land. There is no native or high value vegetation within the site. |
| **Waste** | A Site Waste Management Plan has been prepared to ensure appropriate demolition, construction and operational waste management. |
| **Lighting** | External lighting will comply with *Australian Standard AS 4282: 1997 Control of Obtrusive Effects of Outdoor Lighting.* |
| **Safety, security and crime prevention** | As discussed in Section 2.11, the development will result in a positive impact in terms of precinct activation and surveillance. |
| **Neighbourhood amenity** | The building has been purposely designed to enable adjoining sites to be developed to their full potential.<br>The residential tower is set back in accordance with the Apartment Design Guide amenity requirements. |
| **Equity** | The development complies with the requirements of the *Disability (Access to Premises - Buildings) Standards 2010* and the *Building Code of Australia*.<br>Lift access is provided to all levels of the building.<br>All public and residential areas of the building are accessible. 20 of the 95 apartments meet the Silver standard for livable housing design of which 10 are adaptable. The apartments will suit an aging population. |
| **Social** | Long term positive social impacts will result from the development by way of:<br>• Increase in ground level public space.<br>• Providing residential accommodation in the City Centre near shops, entertainment, transport, schools, recreation areas and jobs.<br>• Improving 24 hour surveillance of Vernon Street and Harbour Drive.<br>• Generous communal landscaped outdoor areas to promote socialisation among the residents within a pleasant environment.<br>• Equity of access to all levels of the building. |

| Impact | Comment |
|---|---|
| | • Meeting the demand for compact, dense, inclusive housing options within the City Centre.<br><br>Temporary nuisance impacts to the surrounding commercial environment during construction will be controlled by the actions in the Construction Management Plan and appropriate conditions of development consent. It is noted that there are no nearby residential dwellings within the impact area. |
| **Economic** | Development contributions will be levied in accordance with Council's Developer Contributions Plans. Short term economic benefit to the construction industry and flow on economic impact arising from the $42 million project. Long term economic benefit to the retail and housing sector. Economic benefits arising from the revitalising the city centre. This project demonstrates confidence in the City Centre. |
| **Visual** | Visual impact arising from the completed development will be positive in terms of visible, contemporary urban renewal in a predominant CBD streetscape. In November 2017, Council conducted a review of CBD building heights. Relevant findings from the review are listed below:<br><br>*Urban Structure – Potential for Growth*<br>*The significant width of the major CBD streets and the generous depth of the city blocks, combined with convenient rear laneway service access, indicate a robust urban structure able to accommodate increased density and building height. Most CBD blocks incorporate deep lots, and there are a many generous sized blocks (in individual or consolidated ownership) which bode well for accommodating new development at an increased density.*<br><br>The subject land meets these criteria and has the capacity to accommodate the proposed building without overwhelming the streetscape.<br><br>*Public Domain Character*<br>*City buildings that are primarily built to the street frontage and which incorporate a continuity of retail, commercial or community uses, which open up to the street, result in the most successful, safe, inviting and interesting streets in the city.*<br><br>The building will address both street frontages and create a new public area along the pedestrian laneway. As shown in the Concept Landscape Plans, public domain landscape treatment meets Councils guidelines in the *City Centre Prosperity Plan 2031.*<br><br>During construction, temporary visual impact will be managed by ensuring all waste material is disposed of into bulk waste bins within the site for the duration of the work. |
| **Overshadowing** | The building is stepped back to comply with the DCP solar access plane and to mitigate over shadowing to Harbour Drive and surrounding public |

| Impact | Comment |
|---|---|
| | spaces. |
| **Heritage** | There are no items of the environmental heritage identified in the locality that would be affected by the proposed development. There are no Aboriginal cultural heritage items listed on the AHIMS database.<br>The subject land is already modified urban land and unlikely to comprise Aboriginal items or relics. A condition of consent details statutory procedures should any artefacts be found within the site. |
| **Flooding** | The site is categorised as a low hazard in a flood event. The building and electrical substation are set at the flood planning level (FPL) of minimum of RL 5.17 m AHD. Evacuation during a significant flood event will not be necessary as the living floors of the building are well above the PMF. |
| **Construction impact, noise and dust** | A Construction Management Plan (CMP) will be prepared prior to the commencement of works to document the proposed method of work within the construction site boundaries with regard to the health and safety of the public and effect on the public footpath and road reserve.<br>A Traffic Management Plan will be part of the CMP.<br>Construction noise and vibration impacts can largely be contained to acceptable levels by limited construction hours.<br>Dust suppression at the point of impact is to be maintained throughout the duration of the construction work (consent condition).<br>Construction noise emanating from the site shall at all times be in accordance with the provisions of the *Protection of the Environment (Operations) Act 1997*. |
| **Cumulative** | The cumulative impact of redevelopment of the City Centre has been considered in the City Centre Masterplan. LEP and DCP development standards and controls have been adopted to guide development and manage cumulative impact. |

## 3.8. Suitability of the Site

The site is considered suitable for the proposed development for the following reasons:

- The proposal is a permissible land use in the subject B3 Commercial Core zone.
- The proposal satisfies the objectives of the B3 Commercial Core zone.
- The proposed development was designed to align with the strategic and master planning aims and objectives of the Coffs Harbour City Centre.
- The site is of a sufficient size and configuration to accommodate the proposed building within its boundaries in compliance with State and Council's requirements.
- The site is suitable for 'city centre infill' residential accommodation.
- The site is well located in terms of proximity to shops, community and urban services, transport, jobs and recreation areas.
- Development of the site is safe in terms of environmental hazards, including land contamination and flooding.
- The site is capable of accommodating the proposed building within its boundaries.

## 3.9. The Public Interest

The proposed development is not contrary to the public interest. The proposed development is not contrary to any relevant policy statements from Federal or State Government agencies. The public interest is well served by invigorating and activating the City Centre core in line with the exhibited and endorsed City Centre Masterplan.

Environmental impacts from the proposal have been found to be reasonable, whilst public domain and built form impacts are overwhelmingly positive.

## 3.10. The Regulations

Clause 50 (1A) of the *Environmental Planning and Assessment Regulation 2000* (the Regulation) requires that a DA for a residential apartment building must be accompanied by a design verification statement from a qualified designer, which confirms:

(a) *that he or she designed, or directed the design, of the development, and*

(b) *provide an explanation that verifies how the development:*

(i) *addresses how the design quality principles are achieved, and*

(ii) *demonstrates, in terms of the Apartment Design Guide, how the objectives in parts 3 and 4 of the guide have been achieved.*

A Design Verification Statement as well as the Apartment Design Guide (ADG) compliance table prepared by Turner Architects accompanies this Statement of Environmental Effects (SoEE). This SoEE and the attached plans and assessments meet the requirements of the *Environmental Planning and Assessment Act Regulation 2000*.

Demolition of buildings AS 2601 – Clause 92: Demolition of existing buildings will be carried out in compliance with the Australian Standard.

Fire Safety and other considerations: Fire safety matters have been addressed in the BCA assessment (**Appendix N**).

# 4.0 Conclusion

## 4.1. Conclusion

The proposed development is permissible with consent under the *Coffs Harbour Local Environmental Plan 2013*. The subject proposal complies with the objectives of the B3 Commercial Core and meets the controls of the *Coffs Harbour Development Control Plan 2015.*

The development can be carried out without any significant adverse impact to the surrounding natural or built environment. The building has been designed to ensure adjoining sites can be developed to their full commercial potential.

The project has been purpose designed in response to the findings and recommendations in the Coffs Harbour City Centre Masterplan 2031. The residential component of the development meets Council's compact city objectives for increased density in the City Centre infill precinct.

The development will result in the following beneficial outcomes:

- A modern building that is highly responsive to the future context of the City Centre as envisaged in the City Centre Masterplan 2031.
- Strengthening the core of the city centre.
- This development displays confidence in the City Centre and will encourage further redevelopment in the precinct.
- Public domain improvements, activated street frontages and a new laneway connection.
- City living - 95 residential apartments of various sizes.
- Liveable and adaptable apartments to suit and aging population.
- Urban renewal – existing commercial buildings and arcades are well past their design life.
- Sustainable design - minimised energy usage promoted by excellent natural light, natural ventilation, winter gardens, balcony gardens and extensive landscaping to the ground level and podium level.
- 154 onsite carparking spaces, where none exist today.
- The removal of an existing on street Loading Zone and replacement with a compliant internal loading dock.
- Reinforces the legibility of Harbour Drive and Vernon Street as Main and Supporting City Centre Streets
- Removal of all site structures, including asbestos building materials.

The proposal is permissible with consent and meets the objectives and development standards of the *Coffs Harbour Local Environmental Plan 2013.* The proposal is fully compliant with the *Coffs Harbour Development Control Plan 2015.*

It is recommended that this proposal be approved based on the justification provided within this report and the provisions of the *Coffs Harbour Local Environmental Plan 2013.*

KEILEY HUNTER
December 2020

# Appendix A.
# CIV ASSESSMENT

# Appendix B.
# APARTMENT DESIGN GUIDE ASSESSMENT

TURNER

# 15-31 HARBOUR DRIVE

## DESIGN STATEMENT

DEVELOPMENT APPLICATION SUBMISSION

Mixed Use Development

Prepared for Paynter Dixon & CEX

Incorporating:
SEPP 65 & ADG Statement

**Rev 1**
**Date_16.12.20**

# CONTENT


**PART 1:** **INTRODUCTION**

- Site description
- Proposal
- Project Team

**PART 2:** **SEPP 65 | DESIGN QUALITY PRINCIPLES**

**PART 3:** **RESPONSE TO APARTMENT DESIGN GUIDE OBJECTIVES**

**APPENDICES** **Development Schedule**

**Architectural Design Package**

# PART 1

T

## INTRODUCTION

This design statement by Turner forms part of Development Application (DA) submission for 15-31 Harbour Drive, Coffs Harbour, NSW 2450, seeking approval for the proposed Mixed-use retail and residential development applicable, associated public realm and street network on the subject land.

This report should be read in conjunction with the accompanying architectural design package and associated consultant's report [and if applicable, also includes SEPP65 Design Verification and provides relevant information on how the design responds to the design principles of the SEPP and the objectives of the Apartment Design Guide (ADG).

**SITE DESCRIPTION**

15-31 Harbour Drive, Coffs Harbour is located in the core of Coffs Harbour CBD that is undergoing a strategic reshaping of local identify through a redesigning of the city masterplan and diversions to Pacific Highway.
The site is bounded to the south by Harbour Drive and to the north by Vernon Street, to the east and west are existing retail precinct.
The site has an area of 3,002 sqm.

**PROPOSAL**

The proposal for the Site includes a 13-storey mixed use building with

- Ground level retail
- Level 4 communal podium
- 4 levels of car parking
- residential apartments to the upper 12 floors consisting of 21 x 1 Bed, 65 x 2 Beds and 9 x 3 Bed apartments.

**PROJECT TEAM**

Turner is engaged by PAYNTER DIXON to prepare the architectural design package for the proposed development of 15-31 Harbour Drive.
The project has been developed with the consulting team for the project which includes Planning, Landscape Architects, BCA, Fire, Traffic, Civil, Structural, Acoustic, Façade, Waste Management and Services Consultants, we have prepared the architectural design package including this design statement in support of the proposed development.

## VISION

The vision of the Harbour Drive project is to create a mixed-use development with a vibrant and activate ground plane and dwellings above with excellent amenity. The proposal positively responds to the vision and design principles of the Coffs Harbour City Centre Masterplan 2031. Particularly:

- Strategy: Key Connections
  Creating a new open-to-sky laneway from Harbour Drive to Vernon Street
- Strategy: Parking
  Additional spaces provided for retail.
  Residential parking sleeved by other uses including residential apartments, landscape and permeable breeze-screening.
- Strategy: City Centre Legibility
  Harbour Drive reinforced as the 'Main City Centre Street' with new retail tenancies with opportunities for outdoor dining and a new laneway connection activated by retail and the residential lobby.
  Vernon Street activated by two new tenancies
- Strategy: City Centre Management
  New laneway creates an open-to-sky connection between streets and creates opportunities for outdoor dining, large trees and increased urban permeability
  New retail tenancies designed to be flexible for various tenants and have level transitions to the public domain
- Strategy: Development Incentive Policy
  Open-to-sky laneway creates a positive urban space
  Awnings to both street frontages in line with Council policy
  Opportunities for public art or landscaping to blank walls
- Strategy: Flood Planning
  Level retail and ground floor interface with the public domain with freeboard and other flood planning measures integrated into the overall design via ramps and level changes.

## CONCEPT

The proposal reinforces the legibility of Harbour Drive and Vernon Street as Main and Supporting City Centre Streets. This is achieved by providing active, flexible retail tenancies on the ground floor with a new open-to-sky laneway connecting the two streets. The tenancies are designed to encourage outdoor dining including areas covered by awnings and other areas where street umbrellas or canvas awnings could provide temporary cover.

## THE LANEWAY

The laneway is designed as a publicly accessible space open day and night. The Laneway is activated by retail tenancies at the corners of Harbour Drive and Vernon Street, and two additional tenancies and lobbies within the laneway. The lobby location allows residents to be dropped at either street frontage for access. There is no basement under the laneway so there are sufficient soil depths to support landscape and large trees. The western edge of the laneway will support landscape or public art elements. The laneway could also be configured to allow connection and activation from the adjoining western lot subject to boundary access approval.

## RETAIL

Retail tenancies are configured to optimise street activation and facilitate flexibility and different layouts for various tenants. Retail tenancies are designed for direct access from the public domain. Any freeboard and preventative flooding requirements are within the tenancy or created through level transitions or ramps. Awnings on Harbour Drive and Vernon Street are continuous from boundary to boundary.

## BUILDING INTERGRATION

Building plant and services are optimised to minimise the disruption to the street with vehicle access from Vernon Street. The layout of services and access facilitates two retail tenancies to Vernon Street. Car parking is located on ground – level 3 and is screened from the public domain by apartments to the north and a combination of landscape and breeze-screens to the other frontages. The car park ventilation strategy reduces the reliance on mechanical extraction by supplementing ventilation through natural air movement.

## RESIDENTIAL

The residential dwellings are arranged around a central core with 3 levels of north facing apartments sleeving the parking area. All dwellings have excellent amenity with all dwellings achieving more than 15 minutes solar access in midwinter and the apartments achieve the ADG recommendations for solar access, natural cross-ventilation and apartment size. West and east elevations include shading to exposed glazing to reduce heat-gain. Apartments are designed to have layouts with regular simple underlying geometries and highly efficient space-planning. Balconies are generous and are equipped with taps to encourage residents to supplement their balconies with planting.

# PART 2

## SEPP 65
## DESIGN QUALITY PRINCIPLES

We confirm that Stephen Cox of Turner is registered as an architect under the Architects Act 2003 and has directed the DA design and documentation of the development at 15-31 Harbour Drive, Coffs Harbour NSW, and that the design quality principles set out in Schedule 1 of State Environmental Planning Policy No 65- Design Quality of Residential Apartment Development are achieved for the residential development.

Stephen Cox
Registration Number: 6391

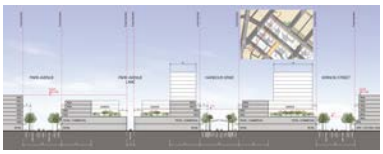
## DESIGN QUALITY PRINCIPLE 1

### CONTEXT AND NEIGHBORHOOD CHARACTER

**Good design responds and contributes to its context. Context is the key natural and built features of an area, their relationship and the character they create when combined. It also includes social, economic, health and environmental conditions. Responding to context involves identifying the desirable elements of an area's existing or future character. Well-designed buildings respond to and enhance the qualities and identity of the area including the adjacent sites, streetscape and neighbourhood. Consideration of local context is important for all sites, including sites in established areas, those undergoing change or identified for change.**

DCP City Core built form

DCP City Core set backs



### PROPOSAL

The revised planning controls are designed to improve the amenity, urban and development outcome of the Coffs Harbour City Centre Masterplan Precinct. The design concept is aligned with this strategy to contribute to the wider precinct.

## DESIGN QUALITY PRINCIPLE 2

### BUILT FORM AND SCALE

**Good design also achieves an appropriate built form for a site and the building's purpose in terms of building alignments, proportions, building type, articulation and the manipulation of building elements. Appropriate built form defines the public domain, contributes to the character of streetscapes and parks, including their views and vistas, and provides internal amenity and outlook.**

### PROPOSAL

Built Form, heights and Massing complies with the LEP height limit of 44m and DCP solar plane control, thus minimising impact to Harbour Drive.

The orientation and retail frontage contribute to existing streetscape and provide amenity to residents and the public.

The distance between the façade and site boundary is consistent with ADG requirements.

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## DESIGN QUALITY PRINCIPLE 3

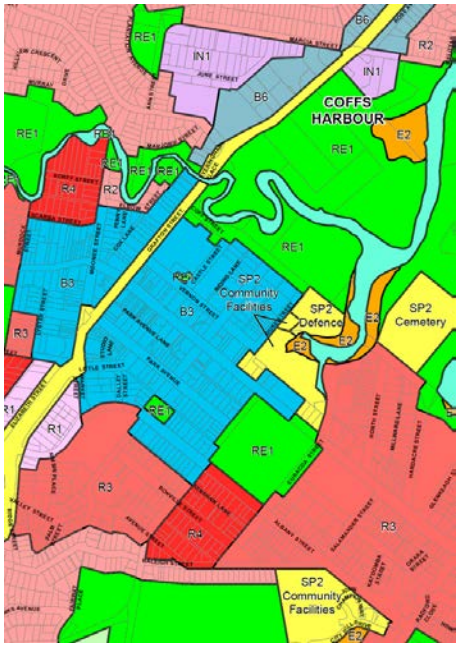
### DENSITY

**Good design achieves a high level of amenity for residents and each apartment, resulting in a density appropriate to the site and its context. Appropriate densities are consistent with the area's existing or projected population. Appropriate densities can be sustained by existing or proposed infrastructure, public transport, access to jobs, community facilities and the environment.**

**LEP 2013 Height of Buildings**

### PROPOSAL

The process for the proposed design has sought to provide a mixed-use development that is consistent with the statutory controls, including Coffs Harbour DCP2015 LEP FSR & Height Control, and SEPP65 to provide excellent amenity for residents, neighbours and visitors to the precinct.




LEP 2013 Land Zoning

LEP 2013 FSR

## DESIGN QUALITY PRINCIPLE 4

### SUSTAINABILITY

**Good design combines positive environmental, social and economic outcomes. Good sustainable design includes use of natural cross ventilation and sunlight for the amenity and liveability of residents and passive thermal design for ventilation, heating and cooling reducing reliance on technology and operation costs. Other elements include recycling and reuse of materials and waste, use of sustainable materials, and deep soil zones for groundwater recharge and vegetation.**

### PROPOSAL

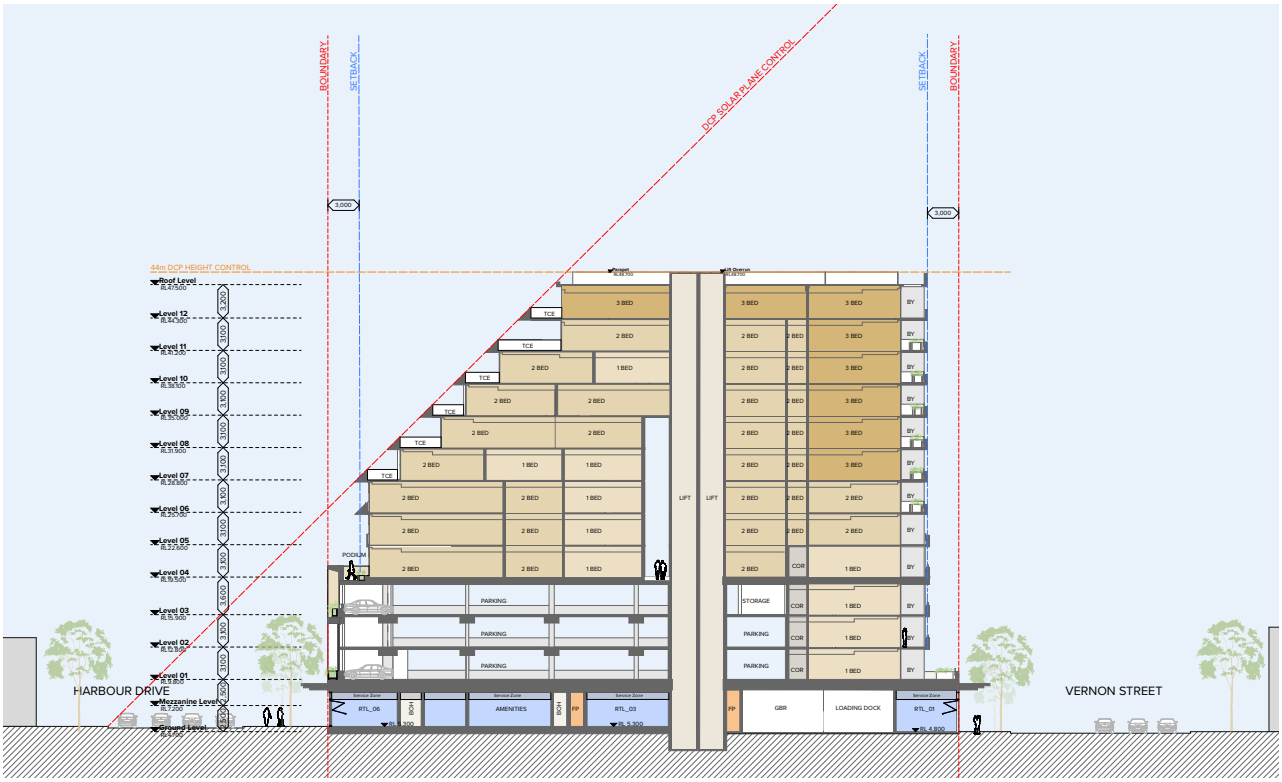
The proposed development is designed to achieve the requirements of the ADG for solar access and natural cross-ventilation. Apartment layouts are designed to allow penetration of daylight during winter, direct access to balconies and terraces and simple shapes to facilitate furnishing.

The overall massing of the proposal significantly increases the amenity of communal open space by consolidating areas of open space. The massing also allows a greater proportion of apartments to have a northern aspect and over shadowing onto Harbour drive is minimised by the DCP control solar plane.

The location of the project facilitates easy access to the services, shops and transport connections. Bicycle storage and end of trip facilities is provided for retail tenants.

A BASIX report is submitted with this report outlining the thermal comfort, water and energy use strategy for the development.

Refer to attached architectural package in appendices which provides further information relating to the above.



## DESIGN QUALITY PRINCIPLE 5

### LANDSCAPE

**Good design recognises that together landscape and buildings operate as an integrated and sustainable system, resulting in attractive developments with good amenity. A positive image and contextual fit of well-designed developments is achieved by contributing to the landscape character of the streetscape and neighbourhood.**
**Good landscape design enhances the development's environmental performance by retaining positive natural features which contribute to the local context, co-ordinating water and soil management, solar access, micro-climate, tree canopy, habitat values, and preserving green networks. Good landscape design optimises usability, privacy and opportunities for social interaction, equitable access, respect for neighbours' amenity, provides for practical establishment and long-term management.**

### PROPOSAL

The proposal includes a careful consideration of the integration of landscape and urban design principles. As an urban site the landscape strategy at ground level has considered the interfaces to the public domain, particularly Harbour Drive street frontage and Vernon Street Frontage.

An activated public laneway / site link is proposed with simple and direct access to the retail tenancies and residential lobbies. Landscape planting assists to soften the edges of the building and the transition into the street domain.

The retail spaces along the Harbour Drive frontage have wide terraced areas suitable for outdoor dining.

At level 4, the podium level, there is a communal open space for residents and terrace areas for the apartments facing the courtyards. The overall landscape approach facilitates different areas for various types of gatherings as well as transitions to private spaces such as terraces.

Further information regarding the approach to landscape can be found in the landscape design report and architectural drawings submitted as part of this proposal.

## DESIGN QUALITY PRINCIPLE 6

### AMENITY

**Good design positively influences internal and external amenity for residents and neighbours. Achieving good amenity contributes to positive living environments and resident well-being.**
**Good amenity combines appropriate room dimensions and shapes, access to sunlight, natural ventilation, outlook, visual and acoustic privacy, storage, indoor and outdoor space, and ease of access for all age groups and degree of mobility.**

### PROPOSAL

The proposal is designed to provide excellent amenity for residents and neighbours which is facilitated by the massing strategy, the arrangement of building program, vertical circulation and access, the integration of landscape elements and careful apartment planning.

From the concept design, alternate massing strategies were considered and the effects on apartment amenity was an important consideration in the analysis. The proposed massing was considered the best outcome for amenity as it consolidated podium level communal open space, reduced overall residential footprint on the podium, maximised the north aspect, provided good orientation for east and west aspect apartments and minimised south facing apartments.

The location of cores and apartment planning also allow excellent amenity with access to natural daylight and ventilation. Corners and relationships between adjacent apartments have been carefully considered to maximise outlooks while controlling visual and acoustic privacy.

Apartment planning embraces the principles of SEPP65 favouring simple shapes to create regular usable rooms. Storage within apartments is maximised with the balance located across mezzanine level and the residential carparking levels 1-3. Every apartment has a storage space in the carpark.

All apartments have generous balconies with many apartments enjoying generous terraces at the podium or top floor terraces.

The project achieves the SEPP65 targets for solar access and natural cross-ventilation.

## DESIGN QUALITY PRINCIPLE 7

### SAFETY

**Good design optimises safety and security, within the development and the public domain. It provides for quality public and private spaces that are clearly defined and fit for the intended purpose. Opportunities to maximise passive surveillance of public and communal areas promote safety.**
**A positive relationship between public and private spaces is achieved through clearly defined secure access points and well-lit and visible areas that are easily maintained and appropriate to the location and purpose.**

### PROPOSAL

Safety and security are important considerations for a mixed-use building such as the proposal. Accordingly, the design of the building has considered the usage of the building and the separation of the residential and retail, public and private components of the development.

Around the development, the public domain has been designed to activate each frontage of the building, with retail tenancies and residential lobbies activating all sides of the building. This is supplemented by lighting, visual, signage and wayfinding strategies delineating residential and retail entries, and consideration of retail close-down lines.

All residential entries will have intercom and CCTV monitoring. Full height glazing, internal mail rooms and building address signage also contribute to the overall safety and security of the development.

## DESIGN QUALITY PRINCIPLE 8

### HOUSING DIVERSITY AND SOCIAL INTERACTION

**Good design achieves a mix of apartment sizes, providing housing choice for different demographics, living needs and household budgets.**

**Well-designed apartment developments respond to social context by providing housing and facilities to suit the existing and future social mix. Good design involves practical and flexible features, including different types of communal spaces for a broad range of people, providing opportunities for social interaction amongst residents.**

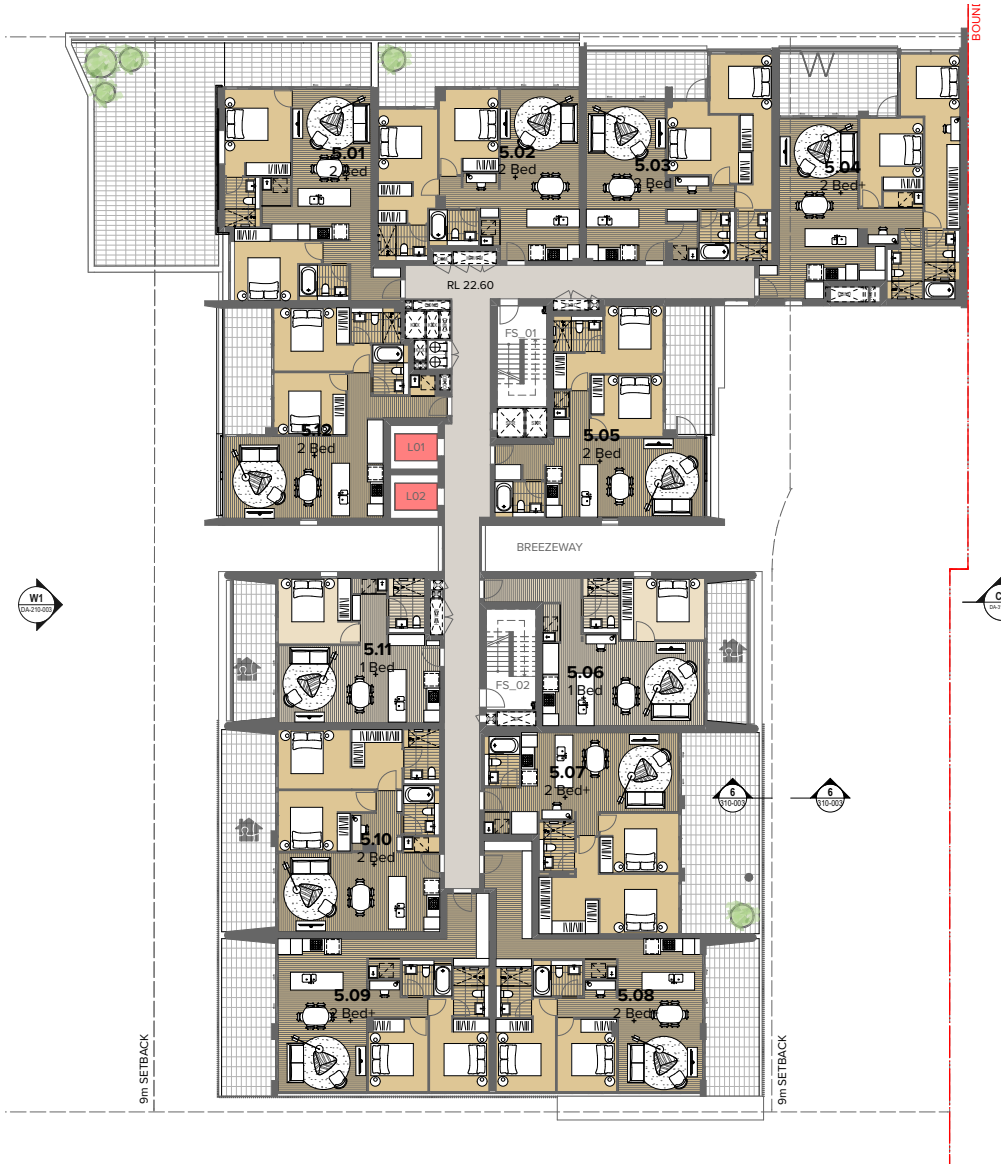
### PROPOSAL

The proposal provides a range of unit typologies and sizes that accommodate different demographics and appeal to different price points.

The outdoor spaces are designed to engender community spirit for residents within the development, by offering both public and private areas for congregation and activity.

The new landscaping and the communal open spaces will provide positive amenity for residents.

The retail component of the proposal is designed to be attractive to the local community and provide simple parking, access with retail tenancies that are complementary to the interests and needs of the locality.



## DESIGN QUALITY PRINCIPLE 9

### AESTHETICS

**Good design achieves a built form that has good proportions and a balanced composition of elements, reflecting the internal layout and structure. Good design uses a variety of materials, colours and textures.**

**The visual appearance of well-designed apartment development responds to the existing or future local context, particularly desirable elements and repetitions of the streetscape.**

**PROPOSAL**

The proposal is designed to fit within the context of the Harbour Drive and its future vision.

In order to achieve this a number of different design strategies were adopted.

From the concept design, numerous massing options were tested to consider the relationship of the building form to the existing and future context as well and the amenity for prospective residents and neighbours. The adopted massing is considered most appropriate reducing the mass of buildings to Harbour drive, in doing so, overshadowing is minimised.

Balustrades are designed to be semi-opaque so that outdoor furniture and the alike are not unsightly from the public domain.

The overall architectural design approach includes an integrated landscape concept to soften the building form and to integrate the built form into the public domain.

Parking is located under the building and internal public accessways are designed to segregate servicing and parking from pedestrians.

Entries are located around the building with direct connection to the public domain via the Laneway and are visually distinct from other uses and clear and legible wayfinding strategies and signage.

- The retail component of the building is also designed with the pragmatic industrial approach to design, using the nature of the materials to characterise the design rather than applied materials. The retail tenancy shopfronts are designed to permit a number of shopfront options allowing tenants to design the degree of openness to the tenancy and to incorporate features such as shopfront dining, integrated seats or renlita type doors.

# PART 3

## RESPONSE TO APARTMENT DESIGN GUIDE OBJECTIVES

The following provides a design response to the relevant objectives of the Apartment Design Guide (ADG) and describes the measures by which the proposed development meets these objects.

| 3A Site analysis [p.47] | |
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| **Objective 3A-1**<br><br>**Site Analysis illustrates that design decisions have been based on opportunities and constraints of the site conditions and their relationship to the surrounding context** | The proposal meets the objectives:<br><br>The site analysis plan is included in the architectural drawings demonstrating how the design has considered the site amenities;<br><br>Masterplan, Streets and Movement Networks<br>• The design is generally consistent with Coffs Harbour DCP & LEP<br><br>Built Form, Heights, and Massing:<br>• The building sits within the LEP height limit of 44m<br>• FSR is below LEP's limit of 4.5:1<br>• Complies with DCP Solar plane control.<br>• Orientation of buildings address the street to maximise engagement with the public domain<br>• The distance between the façade and site boundaries is consistent with ADG requirement<br><br>Refer to Landscape Concept Design, Acoustic Report, SEE and CPTED statements for further information. |
| **3B Orientation [p.49]** | |
| *Objective 3B-1*<br>*Building types and layouts respond to the streetscape and site while optimising solar access within the development* | The proposal meets the objectives:<br><br>• The building is consistent with the DCP for the Coffs Harbour.<br>• Several different massing options were considered with the proposed massing giving the best balance of solar access to apartments, open space and height restrictions.<br>• Scale and height of Street frontages and laneway is in keeping with existing surrounding context. |
| **Objective 3B-2**<br>**Overshadowing of neighbouring properties is minimised during mid-winter** | The proposal meets the objectives:<br><br>• The building forms have been informed by the objectives of the building envelope controls outlined of the DCP and the ADG; |

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| | • The proposed massing significantly reduces overshadowing to Harbour Drive<br>• The proposed forms reflect a considered approach, responding to orientation and context, to minimise overshadowing of public recreation and residential zones;<br><br>Refer to the shadow diagrams for further information. |
| **3C Public domain interface [p.51]** | |
| **Objective 3C-1**<br>**Transition between private and public domain is achieved without compromising safety and security** | The proposal meets the objectives:<br><br>• Residential access points are carefully and appropriately located for legibility for residents and visitors;<br>• Residential lobbies will be designed to be secured to control access and to appropriately separate circulation routes;<br>• All visitors and those residents requiring DDA compliant<br>• Apartment windows and balconies are located to provide for passive surveillance over the public domain;<br>• The proposed design has minimised any opportunities for people to be concealed. |
| **Objective 3C-2**<br>**Amenity of the public domain is retained and enhanced** | The proposal meets the objectives:<br><br>• The landscape for the public domain is designed to integrate with the architectural elements and to soften building edges to form a transition from soft to hard elements;<br>• The interface with the public domain is carefully considered by way of the lobby design, courtyard apartments and an integrated landscape concept;<br>• Plants and semi permeable screening clearly delineate between communal and private open space;<br>• The design minimises the prominence of service areas.<br><br>Refer to the landscape concept plan for further information. |
| **3D Communal and public open space [p.55]** | |
| **Objective 3D-1**<br>**An adequate area of communal open space is provided to enhance residential amenity and to provide opportunities for landscaping.**<br><br>**Design Criteria**<br>**• Communal open space has a minimum area equal to 25% of the site**<br>**• Developments achieve a minimum of 50%** | The proposal meets the objectives:<br><br>The numeric values of the Design Criteria are not applicable to Mixed Use developments in dense urban areas. However, the proposal complies with the intent of the criteria:<br>• At L4, the Communal open space (residential) is 560 sqm (19% of the site area);<br>• In additional at Ground Floor level there is 560 sqm space for shared public domain uses including landscaped areas, through site link, terraces and the retail courtyard. (19% of the site area); |

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| **direct sunlight to the principal usable part of the communal open space for a minimum of 2 hours between 9 am and 3 pm on 21 June (mid-winter)** | • In mid-winter, the principal usable part of the communal open space at L4 receives direct sun to at least 50% of the space. |
| **Objective 3D-2**<br>**Communal open space is designed to allow for a range of activities, respond to site conditions and be attractive and inviting** | The proposal meets the objectives:<br>• The residential communal open space at L4 includes seating, barbecue areas, paved areas, and soft landscaping with planting for larger trees<br>• The communal space has access to sun in winter, shade in summer from trees and pergola structure, with raised planters for shelter from strong winds in winter<br>Refer to the landscape concept plan for further information. |
| **Objective 3D-3**<br>**Communal open space is designed to maximise safety** | The proposal meets the objectives:<br>The communal open space<br>• is readily visible from habitable rooms and private open space areas while maintaining visual privacy.<br>• Receives extensive daylight and will be carefully lit at night to foster safety and avoid light spill to apartments;<br>• Communal open space/facilities are provided for flexible uses for individuals, groups, and families and are safe and contained |
| **Objective 3D-4**<br>**Public open space, where provided, is responsive to the existing pattern and uses of the neighbourhood** | The proposal meets the objectives:<br>• Public open spaces are well connected with public streets and through site links<br>• The pedestrian laneway provides the connection with all retail tenancies on Harbour drive and Verdon Street.<br>• Active frontages are adjacent to public open space. |
| **3E Deep soil zones [p.61]** | |
| **Objective 3E-1**<br>**Deep soil zones provide areas on the site that allow for and support healthy plant and tree growth. They improve residential amenity and promote management of water and air quality**<br><br>**Design criteria**<br>**Deep soil zones are to meet the** | The proposal meets the objectives:<br>The numeric values of the Design Criteria are not applicable to Mixed Use developments in dense urban areas. However, the proposal complies with the intent of the objective:<br>• The proposal has compliant deep soil zones via the use of permeable pavers at ground floor |

**following minimum requirements:**
**• 7% of site area**
**• <650sqm – no min dimension**
**• 650sqm-1500sqm – 3m min dimension**
**• >1500sqm – 6m min dimension**

- End of trip facilities for retail staff members are provided on GF.
- Planters all around the building softens the building edge to all sides of the building.

Refer to the Landscape Concept package for further information.

## 3F Visual Privacy [P.62]

**Objective 3F-1**
**Adequate building separation distances are shared equitably between neighbouring sites, to achieve reasonable levels of external and internal visual privacy**

**Design Criteria**
**1. Separation between windows and balconies is provided to ensure visual privacy is achieved. Minimum separation distances from buildings to the side and rear boundaries are as follows:**
**Up to 12m (4 storeys): Habitable rooms and balconies - 6m; Non-habitable rooms – 3m**
**Up to 25m (5-8 storeys): Habitable rooms and balconies - 9m; Non-habitable rooms – 4.5m**
**Over 25m (5-8 storeys): Habitable rooms and balconies - 12m; Non-habitable rooms – 6m**
**Note: Separation distances between buildings on the same site should combine required building separations depending on the type of room (see fig 3F.2)**
**Gallery access circulation should be treated as habitable space when measuring privacy separation distances between neighbouring properties**

The proposal meets the objectives:

- All setback requirements are compliant as indicated on the plans

**Objective 3F-2**
**Site and building design elements increase privacy without compromising access to light and air and balance outlook and views from habitable rooms and private open space**

The proposal meets the objectives:

- The Privacy is carefully considered at Level 4 interfaces with communal areas and at internal areas of the building; A green buffer zone and level change has been provided between terraces and communal space.
- Balconies are solid to conceal balcony furniture;

## 3G Pedestrian access and entries [p.66]

**Objective 3G-1**
**Building entries and pedestrian access connects to and addresses the public domain**

The proposal meets the objectives:

- The design allows the lobby to be in the heart of the pedestrian laneway, activating the public domain and increasing surveillance and movement through the site.

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| | • All visitors and those residents requiring DDA compliant access, can access from the main lobby in the pedestrian laneway.<br>• The residential lobby will be signposted and have a distinct architectural typology for legibility and amenity.<br>• Retail tenancies, and residential lobby open onto the pedestrian laneway and opportunities are provided for café seating and other retail activities. |
| **Objective 3G-2**<br>**Access, entries and pathways are accessible and easy to identify** | The proposal meets the objectives:<br>• Residential lobbies and amenity building entries are provided with a distinct architectural character and articulated awning structure/or are setback behind the building line over for increased legibility;<br>• Ramps and stairs are integrated with the overall landscape and building design concept for accessible and legible entries; |
| **Objective 3G-3**<br>**Large sites provide pedestrian links for access to streets and connection to destinations** | The proposal meets the objectives:<br>• The proposal provides a new pedestrian and cycle link.<br>• The new green connections provide permeability though the site and through the precinct; |
| **3H Vehicle access [p.68]** | |
| **Objective 3H-1**<br>**• Vehicle access points are designed and located to achieve safety, minimise conflicts between pedestrians and vehicles and create high quality streetscapes** | The proposal meets the objectives:<br>• The car park entry points are located to allow the smooth ingress of traffic and to avoid conflicts with pedestrian routes;<br>• In response to input from the traffic consultant, a traffic management plan including changes of paving, sightlines, remote controls and warning lights are provided at the loading dock and carpark entry/exit point and vehicle crossings;<br>Refer to traffic report and Landscape Concept Design for information. |
| **3J Bicycle and car parking [p.71]** | |
| **Objective 3J-1**<br>**Car parking is provided based on context of Coffs Harbour CPD** | The proposal Is consistent with the ADG objectives and DCP requirement:<br>The proposal provides parking for residential and retail use within the development:<br>• The proposed car parking is provided in accordance with traffic engineers calculations and requirement under the current DCP;<br>Refer to traffic report for information. |

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| **Objective 3J-2**<br>**Parking and facilities are provided for other modes of transport** | The proposal meets the objectives:<br>• Retail staff and residents parking is provided within secure enclosures within carpark; included also is end of trip facilities.<br>• Bicycle Racks for visitor parking are located at ground floor and integrated within the public domain landscape design.<br>Refer to traffic report and Landscape Concept Design for information. |
| **Objective 3J-3**<br>**Car park design and access is safe and secure** | The proposal meets the objectives:<br>• Car park access is secured at appropriate levels for amenity and residential uses;<br>• Retail and residential visitor parking is provided in a designated area of the carpark at GF and Level 1, and will include appropriate wayfinding signage;<br>• Residential vehicle parking is separated from retail parking with a secure roller shutter that will be operated by remote control; |
| **Objective 3J-4**<br>**Visual and environmental impacts of underground car parking are minimised** | The proposal meets the objectives:<br>• Loading dock and car parking entry is located off the Vernon Street with safety features to Traffic Engineer's recommendations. |
| **Objective 3J-5**<br>**Visual and environmental impacts of on-grade car parking is minimised** | The proposal meets the objectives:<br>• The new northern Shareway is designed to integrate the pedestrian and vehicular movement zones while providing safety through delineation of materials and textures and other elements to separate the movement zones such as bollards, planting, and seating. Refer to Landscape Concept Design for more information.<br>Refer to traffic report and Landscape Concept Design for information. |
| **Objective 3J-6**<br>**Visual and environmental impacts of aboveground enclosed car parking are minimised** | Planters and breezeblocks around the above carpark minimise the visual impact of the carpark. |
| **4A Solar and daylight access [p.79]** | |
| **Objective 4A-1**<br>**To optimise the number of apartments** | The proposal meets the objectives: |

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| **receiving sunlight to habitable rooms, primary windows and private open space**<br><br>**Design criteria**<br>**• Living rooms and private open spaces of at least 70% of apartments in a building receive a minimum of 2 hours direct sunlight between 9 am and 3 pm at mid-winter in the Sydney Metropolitan Area and in the Newcastle and Wollongong local government areas**<br>**• A maximum of 15% of apartments in a building receive no direct sunlight between 9 am and 3 pm at mid-winter** | • Minimum 70% of the apartments will achieve the ADG recommendation for solar access;<br>• Building design maximises opportunities for Living Rooms and private open spaces to be oriented to the north and east;<br>• Private open space balconies are designed with the depth required under DCP, and often exceed minimum ADG areas, have been integrated into the facade and building design, responding to the context and the desired objectives of the ADG;<br>• More than two thirds of apartments are dual aspect;<br>• No apartment receive no-direct sunlight between 9am and 3pm mid-winter across the precinct.<br><br>Refer to the Amenity Diagrams or further information. |
| **Objective 4A-2**<br>**Daylight access is maximised where sunlight is limited** | The proposal meets the objectives:<br>• Building envelopes have been developed to minimise the quantity of apartments with no direct sunlight midwinter South oriented apartments have wide frontages for daylight access; |
| **Objective 4A-3**<br>**Design incorporates shading and glare control, particularly for warmer months.** | The proposal meets the objectives:<br>• Balconies on north, east, and west facades sit within the building envelope for shading in summer and weather protection;<br>• Glazing is designed to meet BCA Section J energy ratings;<br>• Planting provides shading at Podium, Breezeways, and apartment terraces. |
| **4B Natural ventilation [p.83]** | |
| **Objective 4B-1**<br>**All habitable rooms are naturally ventilated** | The proposal meets the objectives:<br>• Windows and doors are provided to allow the ADG and BCA requirements for natural ventilation. Windows include high level awning windows than can be opened fully;<br>• Habitable room depths facilitate natural ventilation. |
| **Objective 4B-2**<br>**The layout and design of single aspect apartments maximises natural ventilation** | The proposal meets the objectives:<br>• The apartment layouts include open plan kitchen, dining and living and<br>• Apartment depths are limited to maximise ventilation and airflow. |
| **Objective 4B-3**<br>**The number of apartments with natural cross ventilation is maximised to create a comfortable** | The proposal meets the objectives:<br>• Minimum 60% of apartments achieve the cross-ventilation; |

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| **indoor environment for residents**<br><br>**Design criteria**<br>**• At least 60% of apartments are naturally cross ventilated in the first nine storeys of the building. Apartments at ten storeys or greater are deemed to be cross ventilated only if any enclosure of the balconies at these levels allows adequate natural ventilation and cannot be fully enclosed**<br>**• Overall depth of a cross-over or cross through apartment does not exceed 18m, measured glass line to glass line** | • Cross-through apartments do not exceed 18m glass line to glass line;<br>• Natural cross-ventilation is proposed by corner or cross-through strategy to the living area and n-1 bedrooms. Refer to the definition in the ADG [Appendix p.180];<br>• The building includes 39% dual aspect or cross over apartments.<br><br>Refer to the Amenity diagrams for further information. |

**4C Ceiling heights [p.87]**

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| **Objective 4C-1**<br>**Ceiling height achieves sufficient natural ventilation and daylight access**<br><br>**Design criteria**<br>**• Measured from finished floor level to finished ceiling level, minimum ceiling heights are:**<br>**• Habitable rooms: 2.7m**<br>**• Non-habitable: 2.4m**<br>**• For 2 storey apartments: 2.7m for main living area floor; 2.4m for second floor, where the area does not exceed 50% of the apartment area**<br>**• If located in mixed use area: 3.3m for ground and first floor to promote flexibility** | The proposal achieves the objectives:<br><br>• All apartments achieve sufficient daylight access and natural ventilation;<br>• A minimum floor-to-floor height of 3.1m is used to allow the ADG recommendation of 2.7m ceiling height to generally be achieved in living, dining and bedroom areas;<br>• In some cases, a reduced ceiling height or bulkhead is used in habitable rooms for mechanical services. In these cases, the minimum ceiling level will be 2.4m;<br>• Bulkheads will be minimised in these rooms, so that natural ventilation and daylight are maximised.<br>• The ceiling strategy to meet the objectives became<br>  • Ducted air conditioning<br>  • Mechanically ducted fresh air intake<br>  • Ducted exhaust from kitchen rangehoods and bathrooms<br>• Ceilings in kitchen areas are proposed at a minimum of 2.4m high where required to allow the integration of hydraulic services for island benches and for the incorporation of air conditioning units in apartments. The bulkhead permits the concealment of the air handling unit and services in a neat enclosure providing an appropriate proportion of spaces and a natural division between the living and dining areas from the kitchen area.<br>• As the kitchen is typically located at the rear of the living areas, the reduced ceiling height above the kitchen has a minimal effect on the access of daylight from the facade and natural ventilation.<br>• Floor to floor height has been maximised to the Ground floor Retail level for tenancies (5.0m) to achieve minimum 3.30m clear ceiling height or greater to the front of house areas of Market and retail tenancies. (ADG Fig 4C.1)<br><br>Refer to Sections for further information. |
| **Objective 4C-2**<br>**Ceiling height increases the sense of space in** | The proposal meets the objectives: |

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| **apartments and provides for well-proportioned rooms** | • Internal layouts have well-proportioned rooms with good access to daylight and ventilation, to maximise the feeling of spaciousness |
| **Objective 4C-3**<br>**Ceiling heights contribute to the flexibility of building use over the life of the building** | The proposal meets the objectives:<br>• Structural design is for flat slab soffits above residential levels, this allows flexibility for future conversion.<br>• Floor to floor height has been maximised to the Ground floor Retail level to allows flexibility for retail tenancy layouts and fitouts and for future conversion.<br>Refer to Sections for further information. |

**4D Apartment size and layout [p.89]**

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| **Objective 4D-1**<br>**The layout of rooms within an apartment is functional, well organised and provides a high standard of amenity**<br><br>**Design criteria**<br>**1. Apartments are required to have the following minimum internal areas:**<br>**• Studio: 35sqm**<br>**• 1 bedroom: 50sqm**<br>**• 2 bedrooms: 70sqm**<br>**• 3 bedrooms: 90sqm**<br>**The minimum internal areas include only one bathroom. Additional bathrooms increase the minimum internal area by 5sqm each**<br>**A fourth bedroom and further additional bedrooms increase the minimum internal area by 12sqm each**<br><br>**2. Every habitable room must have a window in an external wall with a total minimum glass area of not less than 10% of the floor area of the room. Daylight and air may not be borrowed from other rooms** | The proposal exceeds the objectives:<br>• A range of apartment typologies are provided adding to the flexibility and affordability of the development;<br>• The proposal includes a variety of apartments to suit different demographics including apartments with studies, dual aspect apartments, corner apartments and apartments at or exceeding the ADG size requirements;<br><br>The proposal achieves the Design Criteria<br>• Average apartment sizes exceed ADG requirements –<br>1 Bed apartments: by average +20%<br>2 Bed apartments: by average +20%<br>3 Bed apartments: by average +30%<br>• Layouts are functional providing well positioned and flexible storage solutions;<br>• 2 and 3 Bed apartments generally have island kitchens<br>• The depth of the apartment was carefully designed taken into account the special acoustic requirements. |
| **Objective 4D-2**<br>**Environmental performance of the apartment is maximised**<br><br>**Design criteria**<br>**• Habitable room depths are limited to a maximum of 2.5 x the ceiling height**<br>**• In open plan layouts (where the living, dining and kitchen are combined) the maximum habitable room depth is 8m from a window** | The proposal achieves the objectives:<br>• Refer to Objective 4C-1 for ceiling heights<br>• The depth of the apartment was carefully designed taken into account the special acoustic requirements. |
| **4D-3**<br>**Apartment layouts are designed to accommodate a variety of household activities and needs** | The proposal meets the objectives:<br>• Minimum areas and widths of habitable rooms are provided or exceeded. |

**Design criteria**
**•Master bedrooms have a minimum area of 10m2 and other bedrooms 9m2 (excluding wardrobe space)**
**•Bedrooms have a minimum dimension of 3m (excluding wardrobe space)**
**•Living rooms or combined living/dining rooms have a minimum width of 3.6m for studio and 1 bedroom apartments and 4m for 2 and 3 bedroom apartments**
**•The width of cross-over or cross-through apartments are at least 4m internally to avoid deep narrow apartment layouts**

- Access to bedrooms, bathrooms and laundries is generally separated from living areas minimising direct openings between living and service areas
- All bedrooms allow a minimum length of 1.5m for robes or 1.8m for master bedrooms
- Layouts facilitate a variety of furniture arrangements and removal
- Spaces are flexible for a range of activities and privacy levels between different spaces within the apartment
- Room sizes and proportions are open plans (rectangular spaces that are more easily furnished than square spaces
- Efficient planning of circulation by corridors and through rooms maximise the amount of usable floor space in rooms

**4E Private open space and balconies [p.92]**

**Objective 4E-1**
**Apartments provide appropriately sized private open space and balconies to enhance residential amenity**

**Design criteria**
**1. All apartments are required to have primary balconies as follows:**
**• Studio: 4sqm**
**• 1 bedroom: 8sqm, 2m deep**
**• 2 bedrooms: 10sqm, 2m deep**
**• 3 bedrooms: 12sqm, 2.4m deep**
**The minimum balcony depth to be counted as contributing to the balcony area is 1m**

**2. For apartments at ground level or on a podium or similar structure, a private open space is provided instead of a balcony. It must have a minimum area of 15sqm and a minimum depth of 3m**

The proposal meets the objectives:

- Minimum areas and widths of balconies and private open spaces are provided or exceeded, all apartments have a minimum balcony area of 15sqm except for a single 1 bedroom apartment with a balcony area of 10sqm, the average balcony area is 28sqm. The average podium level balcony is 36sqm.
- Balconies areas are free areas. Airconditioning units are provided at roof level.

**Objective 4E-2**
**Primary private open space and balconies are appropriately located to enhance liveability for residents**

The proposal meets the objectives:

- Private open spaces and balconies predominantly face north, east or west;
- Primary balconies open directly from Living Areas;

**Objective 4E-3**
**Private open space and balcony design is integrated into and contributes to the overall architectural form and detail of the building**

The proposal meets the objectives:

- Solid, partially solid or transparent fences and balustrades are selected to respond to the location;
- Obscure glass balustrades are used on balconies and give visual separation to the building forms;
- Balustrades are designed to allow views and passive surveillance of the street while maintaining visual privacy and allowing for a range of uses on the balcony;

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| | • Obscure glass privacy screens are used between adjacent balconies/habitable rooms;<br>• Masonry and metal rail screens give privacy to the private outdoor spaces at podium level;<br>• Downpipes and balcony drainage are integrated with the overall facade and building design;<br>• Air-conditioning units are at roof level and screened for visual and acoustic separation as required;<br>• Ceilings of apartments below terraces are insulated to avoid heat loss; |
| **Objective 4E-4**<br>**Private open space and balcony design maximises safety** | The proposal meets the objectives:<br>• Design and detailing of balconies avoids opportunities for climbing and falls<br>• Changes in ground levels are minimised |

**4F Common circulation and spaces [p.97]**

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| **Objective 4F-1**<br>**Common circulation spaces achieve good amenity and properly service the number of apartments**<br><br>**Design criteria**<br>**• The maximum number of apartments off a circulation core on a single level is eight, where this cannot be achieved, no more than 12 apartments should be provided off a circulation core on a single level.**<br>**• For buildings of 10 storeys and over, the maximum number of apartments sharing a single lift is 40** | The proposal achieves the objectives:<br><br>• As the building tappers in response to DCP requirement, it ranges from 12 to 4 apartments per floor with the exception of Level 4 Podium whereby there are 13 apartments. However, amenities have not been compromised on this level as the corridors have been separated into 2 zones with an adequate amount of natural daylight and natural ventilation, corridors are also wider, ranging from 1.7m to 2.3m<br>• 2 lifts in total are provided to service 95 apartments<br>• Typical lobbies achieve a high level of amenity as they are connected to the facade to facilitate access to daylight and natural ventilation.<br>• Lobbies are widened outside lifts and will include clear, legible wayfinding signage for comfortable movement of residents and visitors. |
| **Objective 4F-2**<br>**Common circulation spaces promote safety and provide for social interaction between residents** | The proposal meets the objectives:<br>• Common circulation spaces are designed to provide safe, legible spaces to foster interaction and harmony between residents;<br>• Dead end corridors lengths have been minimised;<br>• Circulation spaces will include wayfinding signage; |

**4G Storage [p.101]**

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| **Objective 4G-1**<br>**Adequate, well-designed storage is** | The proposal meets the objectives: |

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| **provided in each apartment**<br><br>**Design criteria**<br>**• In addition to storage in kitchens, bathrooms and bedrooms, the following storage is provided:**<br>**• Studio: 4m3**<br>**• 1 bed: 6m3**<br>**• 2 beds: 8m3**<br>**• 3 beds: 10m3**<br>**At least 50% of the required storage is to be located within the apartment** | • All Apartments have the minimum of 50% of the required storage within the apartment with the remainder located in secure and accessible locations within the car park;<br>• A variety of storage types are provided, accessed off living rooms and circulation corridors within the apartments, in joinery units, storage rooms, study areas or separated from the robes in bedrooms. |
| **Objective 4G-2**<br>**Additional storage is conveniently located, accessible and nominated for individual apartments** | The proposal meets the objectives:<br>• Storage locations are allocated within mezzanine and carpark levels 1-3 as part of the proposal. Mezzanine and carpark level storage zones are available, and these exceed the minimum ADG requirements. |
| **4H Acoustic Privacy [p.103]** | |
| **Objective 4H-1**<br>**Noise transfer is minimised through the siting of buildings and building layout** | The proposal meets the objectives:<br>• Recessed balconies provide sound reduction to the balcony and habitable rooms behind.<br>• Bi-fold glazing and wintergarden on the lower floors along Vernon street provide further sound reduction to the habitable spaces behind.<br><br>Refer to Acoustic report for further details. |
| **Objective 4H-2**<br>**Noise impacts are mitigated within apartments through layout and acoustic treatments** | The proposal meets the objectives:<br>• Noisy areas within the proposed development including building entries and corridors are generally located above each other and quieter areas above quieter areas;<br>• Typically, bedrooms are separated, and entries are away from living areas;<br>• Storage, circulation areas and non-habitable rooms are generally located to buffer noise from living areas and common areas;<br>• Refer to 4J-2 below regarding materials<br><br>Refer to Acoustic report for further details. |
| **4J Noise and Pollution [p.105]** | |
| **Objective 4J-1**<br>**In noisy or hostile environments, the impacts of external noise and pollution are minimised through the careful siting and layout of buildings** | The proposal meets the objectives:<br>• Apartments along harbour drive and Vernon Street have recessed balconies with solid balustrades to shield from noise. Most of these apartments are dual aspect or corner apartments allowing the flexibility to open up to the quieter open space, |

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| | • Noisy areas at ground floor are recessed below concrete awnings and/or separated by landscaped zones.<br>• Loading and waste collection is internal to the building and exhausted via duct risers to roof levels. |
| **Objective 4J-2**<br>**Appropriate noise shielding or attenuation techniques for the building design, construction and choice of materials are used to mitigate noise transmission** | The proposal meets the objectives:<br>• External facades have been designed to limit glazed openings to a maximum of 50% of the façade.<br>• (This excludes full height glazing at balconies, which is typically recessed behind masonry balustrades or balconies with glazed balustrade which are set back further behind the building line);<br>• Dense materials are used in the facades, brick and concrete, providing good noise reduction;<br>• Walls, glazing, and roofs are designed to meet the requirements of the acoustic report for sound mitigation;<br>• The party walls (walls shared with other apartments) are designed to meet the requirements of the acoustic report.<br><br>Refer to Acoustic report for further details. |
| **4K Apartment Mix [p.107]** | |
| **Objective 4K-1**<br>**A range of apartment types and sizes is provided to cater for different household types now and into the future** | The proposal meets the objectives:<br>• A variety of apartment types are provided;<br>• The proposal includes 22% 1 Bed apartments, 68% 2 Bed apartments, and 10% 3 Bed apartments, of varying sizes and typologies to suit a range of demographics.<br>Refer also to *4D-1* above regarding apartment typologies.<br>• The proposed apartment mix is appropriate, taking into consideration the distance to public transport, employment and education centres, as well as the current market demands and projected future demographic trends within the area. |
| **Objective 4K-2**<br>**The apartment mix is distributed to suitable locations within the building** | The proposal meets the objectives:<br>• Apartment mix is distributed throughout the development, providing 1 and 2 Bed apartments of varying size and typology in each core;<br>• Larger apartment types have been located on the top levels where there is opportunity for more open space including roof terraces and loft apartments. |
| **4L Ground floor apartments [p.109]** | |
| **Objective 4L-1** | Not applicable |

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|---|---|
| **Street frontage activity is maximised where ground floor apartments are located** | |
| **Objective 4L-2**<br>**Design of ground floor apartments delivers amenity and safety for residents** | Not applicable |

**4M Facades [p.111]**

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|---|---|
| **Objective 4M-1**<br>**Building facades provide visual interest along the street while respecting the character of the local area** | The proposal meets the objectives:<br>• Materials have been selected in response to the local context, such as use of bricks and blockwork.<br>• Shadow is created on the façade throughout the day by building articulation, texture of brickwork patterning, recessed balconies and awnings.<br>• The Landscaped Podium visible from Harbour drive provide greenery above the retail precinct. |
| **Objective 4M-2**<br>**Building functions are expressed by the façade** | The proposal meets the objectives:<br>• Retail frontages are clearly defined and expressed in the façade design and articulation<br>• Residential apartments are clearly identifiable and distinguishable from the retail level and amenities.<br>• Podium landscaping is also clearly defined and expressed; along with the breeze blocks that provides ventilation to the carpark.<br><br>Refer to the architectural drawings for further information. |

**4N Roof design [p.113]**

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|---|---|
| **Objective 4N-1**<br>**Roof treatments are integrated into the building design and positively respond to the street** | The proposal meets the objectives:<br>• Roofs are expressed in differing materials to compliment the architectural aesthetic and tie in with local context.<br>• Slab edges are expressed, and cantilevered slabs are used at appropriate locations to express the roof form and at the retail awning above street level; they also provide necessary sun shading and weather protection for the end users.<br>• Service elements are integrated within the roof and parapet design or set back behind screens. |
| **Objective 4N-2**<br>**Opportunities to use roof space for residential accommodation and open space are maximised** | NA |

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| **Objective 4N-3**<br>**Roof design incorporates sustainability features** | The proposal meets the objectives:<br>• Roof design maximises solar access to apartments during winter and provides shade during summer via overhanging roofs and planting; |
| **4O Landscape design [p.115]** | |
| **Objective 4O-1**<br>**Landscape design is viable and sustainable** | • Building performance is enhanced by incorporating a diverse planting including appropriately planted shading trees and street trees to meet DCP requirements.<br>• Initiatives include diverse and appropriate planting and composting.<br><br>Refer to the landscape design package for further information |
| **Objective 4O-2**<br>**Landscape design contributes to the streetscape and amenity** | • The proposal involves a significant improvement to the public domain with street trees proposed along the pedestrian laneway including deep soil zones on permeable paving.<br><br>Refer to the landscape design package for further information |
| **4P Planting on structures [p.116]** | |
| **Objective 4P-1**<br>**Appropriate soil profiles are provided** | • The communal courtyard at L4 provides a large area of landscaped open space including a minimum >0.5m depth of soil for tree planting;<br><br>Refer to the landscape design package for further information |
| **Objective 4P-2**<br>**Plant growth is optimised with appropriate selection and maintenance** | • Diverse planting that are low in maintenance and suited to the site are incorporated to enhance the performance of the landscaped areas.<br><br>Refer to the landscape design package for further information |
| **Objective 4P-3**<br>**Planting on structures contributes to the quality and amenity of communal and public open spaces** | • Planters on Level 4 and balconies are designed to accommodate plants, shrubs and trailing plants. Planting is positioned for visibility from the public domain and for privacy between private outdoors terraces and balconies;<br><br>Refer to the landscape design package for further information |
| **4Q Universal Design [p.118]** | |

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|---|---|
| **Objective 4Q-1**<br>**Universal design features are included in apartment design to promote flexible housing for all community members** | The Development achieves 21% of the total apartments incorporating the Livable Housing Guideline's silver level universal design features.<br><br>Refer to Access Report for further information. |
| **Objective 4Q-2**<br>**A variety of apartments with adaptable designs are provided**<br>**Adaptable housing should be provided in accordance with the relevant council policy** | 10% of apartments are adaptable housing in accordance with council policy<br>Design solutions for adaptable apartments include:<br>• convenient access to communal and public areas<br>• high level of solar access<br>• minimal structural change and residential amenity loss when adapted<br>• larger car parking spaces for accessibility<br>parking titled separately<br><br>Refer to Access Report for further information. |
| **Objective 4Q-3**<br>**Apartment layouts are flexible and accommodate a range of lifestyle needs** | Apartment design incorporates flexible design solutions which include:<br>• a mix of north facing and dual aspect apartments<br>• a variety of internal layouts<br>• 2 bathrooms in 2 and 3 bedroom apartments<br><br>Refer to Access Report for further information. |
| **4R Adaptive Reuse [p.120]** | |
| **Objective 4R-1**<br>**New additions to existing buildings are contemporary and complementary and enhance an area's identity and sense of place** | Not applicable |
| **Objective 4R-2**<br>**Adapted buildings provide residential amenity while not precluding future adaptive reuse** | Not applicable |
| **4S Mixed use [p.122]** | |
| **Objective 4S-1**<br><br>**Mixed use developments are provided in appropriate locations and provide active street frontages that encourage pedestrian movement** | The proposal meets the objectives:<br>• Ground Floor is dedicated to retail use.<br>• Retail includes 7 retail tenancies with extended height due to mezzanine level.<br>• All 7 retail spaces are activated to the street frontage.<br>• Retail 2-5 are set back providing covered outdoor space for possible café seating in the pedestrian laneway.<br>• Plant rooms and vehicular services zones are kept away from facades where possible. When required to extend to facades, services rooms are separated by retail areas and |

| | |
|---|---|
| | residential lobbies for street activation and pedestrian safety. |
| **Objective 4S-2**<br>**Residential levels of the building are integrated within the development, and safety and amenity is maximised for residents** | The proposal meets the objectives:<br>• The residential foyer is in the center of the development with secure access from the pedestrian laneway;<br>• The building design allows residential cores to be located away from activated street frontage.<br>• lobby and mailroom is located at the pedestrian laneway with secured access.<br>• Residents car parking and lift access is separated from retail parking and vertical transport. |
| **4T Awnings and signage [p.125]** | |
| **Objective 4T-1**<br>**Awnings are well located and complement and integrate with the building design** | The proposal meets the objectives:<br>• Awnings and covered areas are provided around the perimeter of Ground Floor, provided protection to building entries and opportunities for retail outdoor uses. |
| **Objective 4T-2**<br>**Signage responds to the context and desired streetscape character** | The proposal meets the objectives:<br>• Signage will be limited to building identification, navigation and statutory signs. It will be designed to fit harmoniously in the architecture and to contribute positively to the precinct.<br>• Commercial signage will be subject to future and separate Development Applications. |
| **4U Energy efficiency [p.127]** | |
| **Objective 4U-1**<br>**Development incorporates passive environmental design** | The proposal meets the objectives:<br>• Natural light is provided to all habitable rooms;<br>• Outdoor communal open space areas are designed to provide residents with a range of spaces offering flexibility and choice demonstrating a high level of passive environmental design.<br>• The proposed development will incorporate the following measures:<br>– Maximised openable windows<br>– Sensors to control artificial lighting in common circulation spaces<br><br>Refer to Basix report for more information |
| **Objective 4U-2**<br>**Development incorporates passive solar design to optimise heat storage in winter and reduce heat transfer in summer** | The proposal meets the objectives:<br>• The design development includes passive solar design measures including thermal insulation, overhangs for shading, insulated walls, roofs and floors, and seals on window and external door openings.<br>• Light finishes will be used on exposed roof slabs |

| | |
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| | Refer to Basix report for more information |
| **Objective 4U-3**<br>**Adequate natural ventilation minimises the need for mechanical ventilation** | The proposal meets the objectives:<br>• Natural ventilation will be provided to all habitable rooms and typically, to all common areas and circulation spaces;<br>• Opportunities for natural ventilation are incorporated in the design through, breezeways, voids, dual aspect apartments, corner apartments, and openable windows.<br><br>Refer to Basix report, Acoustic Report and Mechanical Engineer's statement for more information. |

**4V Water management and conservation [p.129]**

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|---|---|
| **Objective 4V-1**<br>**Potable water use is minimized** | • The development will incorporate water efficient fittings, appliances and rainwater collection;<br>• Plant selections are designed for the microclimate and are typically low-water use.<br><br>Further details about the proposed planting and landscape concept is detailed in the accompanying Landscape Concept Plan submitted as part of the development application.<br>Refer to Basix report for more information. |
| **Objective 4V-2**<br>**Urban storm water is treated on site before being discharged to receiving waters** | Refer to Civil and Hydraulic Engineers documents for further information. |
| **Objective 4V-3**<br>**Flood management systems are integrated into site design** | • Building levels are above flood free board levels to Civil Engineer's design and recommendations;<br><br>Refer to Civil Engineers documents for further information. |

**4W Waste management [p.131]**

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|---|---|
| **Objective 4W-1**<br>**Waste storage facilities are designed to minimise impacts on the streetscape, building entry and amenity of residents** | • A bulk-waste area for residents is provided on ground floor.<br>• Garbage collection loading area is internal to the building and is separated from public and residential areas.<br>• Retail and residential garbage rooms are separated. |

| | |
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| | Refer to waste management report and traffic report for more detail. |
| **Objective 4W-2**<br>**Domestic waste is minimised by providing safe and convenient source separation and recycling** | • Communal waste chutes will be provided for residents in convenient and accessible locations close to the lifts.<br>• Waste and recycling storage areas will be well ventilated and have durable and washable finishes<br>• Dwellings are be designed to have sufficient internal space for the holding of waste and recycling as required under the DCP<br><br>Refer to waste management report for more information. Refer to Landscape Concept Plan for information on composting facilities. |
| **4X Building Maintenance [p.133]** | |
| **Objective 4X-1**<br>**Building design detail provides protection from weathering** | The proposal meets the objectives:<br>• The façade is detailed to prevent staining and protect walls below;<br>• Planter boxes are designed to sit above paving levels for drainage and to minimise maintenance of waterproof membranes;<br>• Overhanging slabs will be detailed with drip lines to avoid staining.<br>• Awnings provided for street level retail |
| **Objective 4X-2**<br>**Systems and access enable ease of maintenance** | • Suitable access for cleaning will be provided from the shared public/communal domain or appropriately controlled roof access;<br>• The majority of windows can be cleaned from inside or from balconies. |
| **Objective 4X-3**<br>**Material selection reduces ongoing maintenance costs** | For example:<br>• Robust natural materials are used to withstand the demands of the environment and to weather gracefully;<br>• Painted and applied finishes are minimised;<br>• Ground floor minimises blank walls and/or includes graffiti resistant materials and finishes and possible artwork and mosaics.<br><br>Refer to future Retail Development Application for detail of finishes at Retail level |

# APPENDICES

## YIELD ANALYSIS

| | LEVEL | HEIGHT | PARKING | | RESIDENTIAL GFA | | RETAIL | | | MIX | | | | | ADG | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Retail | Resi | Apartment | Wintergarden | GFA | NLA | Storage Cages (No) | 1 Bed | 2 Bed | 2 Bed + | 3 Bed | Total | Solar (2hr) | CV | NDS | Livable | Adaptable |
| LEP Height limit 44m | Parapet | 1.2 | | | | | | | | | | | | | | | | | |
| | 12 | 3.2 | | | 574 | 10 | | | | 0 | 0 | 0 | 4 | 4 | 4 | | | 4 | 4 |
| | 11 | 3.1 | | | 638 | 10 | | | | 0 | 4 | 1 | 1 | 6 | 4 | | | 1 | 1 |
| | 10 | 3.1 | | | 743 | 10 | | | | 2 | 5 | 0 | 1 | 8 | 5 | | | 1 | 1 |
| | 9 | 3.1 | | | 808 | 10 | | | | 0 | 6 | 1 | 1 | 8 | 5 | | | 1 | 1 |
| | 8 | 3.1 | | | 794 | 10 | | | | 1 | 5 | 1 | 1 | 8 | 5 | 8 | | 2 | 2 |
| | 7 | 3.1 | | | 890 | 10 | | | | 4 | 5 | 0 | 1 | 10 | 6 | 8 | | 2 | 1 |
| | 6 | 3.1 | | | 1024 | 20 | | | | 2 | 6 | 3 | 0 | 11 | 7 | 8 | | 3 | 0 |
| | 5 | 3.1 | | | 1118 | 21 | | | | 2 | 6 | 4 | 0 | 12 | 8 | 8 | | 3 | 0 |
| | 4 | 3.1 | | | 1173 | 96 | | | | 4 | 4 | 5 | 0 | 13 | 9 | 8 | | 3 | 0 |
| | 3 | 3.6 | | 46 | 468 | 96 | | | 33 | 2 | 1 | 2 | 0 | 5 | 5 | 1 | | | |
| | 2 | 3.1 | | 47 | 468 | 96 | | | 25 | 2 | 1 | 2 | 0 | 5 | 5 | 1 | | | |
| | 1 | 3.1 | 17 | 30 | 468 | | | | 11 | 2 | 1 | 2 | 0 | 5 | 5 | 1 | | | |
| | Mezz | 2.5 | | | 14 | | | | 26 | | | | | | | | | | |
| | Ground | 5.0 | 14 | | 113 | | 966 | 735 | | | | | | | | | | | |
| Totals | | | 31 | 123 | 9293 | 389 | | | 95 | 21 | 44 | 21 | 9 | 95 | 68 | 43 | 0 | 20 | 10 |
| | | | | 154 | | | | | | | | | | | 72% | 62% | 0% | 21% | 11% |
| | Total Height | 44.0 | | | | | | | | | | | | | | | | | |

| | | | |
|---|---|---|---|
| **Resi NSA:** | **7,752** | **sqm** | |
| **Resi GFA:** | **9,682** | **sqm** | |
| **Retail GFA:** | **966** | **sqm** | |
| **TOTAL GFA:** | **10,648** | **sqm** | Max FSR 4.5:1 = 13510 sqm |
| **Site Area** | **3,002.3** | **sqm** | |
| **FSR:** | **3.55** | | |

| **TYPE** | # | mix | avg sqm |
|---|---|---|---|
| 1B | 21 | 22.1% | 59 |
| 2B | 44 | 46.3% | 80 |
| 2B+ | 21 | 22.1% | 89 |
| 3B | 9 | 9.5% | 123 |
| **TOTAL:** | **95** | | |

**Vehicular Parking Requirements Summary** (Parking no. to be rounded up)

| Residential | 1B/studio | 2B | 3B | Vis | | Total Resi | Retail | Street | **Total** |
|---|---|---|---|---|---|---|---|---|---|
| Rate | 1 | 1 | 2 | 20% | | | 1 per 25sqm | Offset | |
| No. | 21 | 65 | 18 | 19 | | 123 | 30 | 1 | 154 |

# APPENDICES

## APARTMENT DEVELOPMENT SCHEDULE

| TYPE | | Mix | Avg Sqm |
|---|---|---|---|
| 1B | 21 | 22% | 59 |
| 2B | 44 | 46% | 80 |
| 2B+ | 21 | 22% | 89 |
| 3B | 9 | 9% | 123 |
| TOTAL: | 95 | | |

| Apt | Type | NIA | Winter-garden | NEA | Total | Winter-garden | Apt Storage | Carpark Storage | Cross Vent | Solar | Non Solar | Adaptable | Livable | Lift | Orientation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | m² | m² | m² | m² | | m³ | m³ | | | | | | | |
| 1.01 | 2Bed+ | 85 | | 58 | 143 | | 4 | 4 | Y | Y | | | | Y | NW |
| 1.02 | 1Bed | 59 | | 37 | 96 | | 12 | | | Y | | | | Y | N |
| 1.03 | 1Bed | 57 | | 36 | 93 | | 10 | | | Y | | | | Y | N |
| 1.04 | 2Bed | 83 | | 46 | 129 | | 5 | | | Y | | | | Y | N |
| 1.05 | 2Bed+ | 90 | | 51 | 141 | | 4 | | | Y | | | | Y | N |
| | | | | | | | | | | | | | | | |
| 2.01 | 2Bed+ | 85 | 28 | | 113 | Y | 4 | | Y | Y | | | | Y | NW |
| 2.02 | 1Bed | 59 | 16 | | 75 | Y | 12 | | | Y | | | | Y | N |
| 2.03 | 1Bed | 57 | 15 | | 72 | Y | 10 | | | Y | | | | Y | N |
| 2.04 | 2Bed | 83 | 15 | | 98 | Y | 5 | | | Y | | | | Y | N |
| 2.05 | 2Bed+ | 90 | 20 | | 110 | Y | 4 | | | Y | | | | Y | N |
| | | | | | | | | | | | | | | | |
| 3.01 | 2Bed+ | 85 | 28 | | 113 | Y | 4 | | Y | Y | | | | Y | NW |
| 3.02 | 1Bed | 59 | 16 | | 75 | Y | 12 | | | Y | | | | Y | N |
| 3.03 | 1Bed | 57 | 15 | | 72 | Y | 10 | | | Y | | | | Y | N |
| 3.04 | 2Bed | 83 | 15 | | 98 | Y | 5 | | | Y | | | | Y | N |
| 3.05 | 2Bed+ | 90 | 20 | | 110 | Y | 4 | | | Y | | | | Y | N |
| | | | | | | | | | | | | | | | |
| 4.01 | 2Bed+ | 85 | 28 | | 113 | Y | 4 | | Y | Y | | | | Y | NW |
| 4.02 | 1Bed | 59 | 16 | | 75 | Y | 12 | | | Y | | | | Y | N |
| 4.03 | 1Bed | 57 | 15 | | 72 | Y | 10 | | | Y | | | | Y | N |
| 4.04 | 2Bed | 83 | 15 | | 98 | Y | 5 | | | Y | | | | Y | N |
| 4.05 | 2Bed+ | 93 | 20 | | 113 | Y | 4 | | Y | Y | | | | Y | N |
| 4.06 | 2Bed | 77 | | 40 | 117 | | 4 | | Y | | | | | Y | E |
| 4.07 | 1Bed | 65 | | 30 | 95 | | 5 | | Y | | | | Y | Y | E |
| 4.08 | 2Bed+ | 86 | | 55 | 141 | | 5 | | | | | | | Y | E |
| 4.09 | 2Bed+ | 91 | | 34 | 125 | | 14 | | Y | | | | | Y | SE |
| 4.10 | 2Bed+ | 88 | | 33 | 121 | | 11 | | Y | Y | | | | Y | SW |
| 4.11 | 2Bed | 84 | | 42 | 126 | | 7 | | | Y | | | Y | Y | W |
| 4.12 | 1Bed | 57 | | 30 | 87 | | 4 | | Y | Y | | | Y | Y | W |
| 4.13 | 2Bed | 79 | | 31 | 110 | | 4 | | Y | Y | | | | Y | W |
| | | | | | | | | | | | | | | | |
| 5.01 | 2Bed | 80 | | 91 | 171 | | 4 | | Y | Y | | | | Y | NW |
| 5.02 | 2Bed | 83 | | 26 | 109 | | 4 | | | Y | | | | Y | N |
| 5.03 | 2Bed | 83 | | 15 | 98 | Y | 5 | | | Y | | | | Y | N |
| 5.04 | 2Bed+ | 93 | 20 | | 113 | Y | 4 | | Y | Y | | | | Y | N |
| 5.05 | 2Bed | 77 | | 16 | 93 | | 4 | | Y | | | | | Y | E |
| 5.06 | 1Bed | 65 | | 15 | 80 | | 5 | | Y | | | | Y | Y | E |
| 5.07 | 2Bed+ | 86 | | 40 | 126 | | 5 | | | | | | | Y | E |
| 5.08 | 2Bed+ | 91 | | 22 | 113 | | 14 | | Y | | | | | Y | SE |
| 5.09 | 2Bed+ | 88 | | 22 | 110 | | 11 | | Y | Y | | | | Y | SW |
| 5.10 | 2Bed | 84 | | 28 | 112 | | 7 | | | Y | | | Y | Y | W |
| 5.11 | 1Bed | 57 | | 15 | 72 | | 4 | | Y | Y | | | Y | Y | W |
| 5.12 | 2Bed | 79 | | 15 | 94 | | 4 | | Y | Y | | | | Y | W |
| | | | | | | | | | | | | | | | |
| 6.01 | 2Bed | 80 | | 17 | 97 | | 4 | | Y | Y | | | | Y | NW |
| 6.02 | 2Bed | 83 | | 26 | 109 | | 4 | | | Y | | | | Y | N |
| 6.03 | 2Bed | 83 | 19 | | 102 | Y | 5 | | Y | Y | | | | Y | NE |
| 6.04 | 2Bed | 77 | | 16 | 93 | | 4 | | Y | | | | | Y | E |
| 6.05 | 1Bed | 65 | | 15 | 80 | | 5 | | Y | | | | Y | Y | E |
| 6.06 | 2Bed+ | 86 | | 40 | 126 | | 5 | | | | | | | Y | E |
| 6.07 | 2Bed+ | 91 | | 22 | 113 | | 14 | | Y | | | | | Y | SE |
| 6.08 | 2Bed+ | 88 | | 22 | 110 | | 11 | | Y | Y | | | | Y | SW |
| 6.09 | 2Bed | 84 | | 28 | 112 | | 7 | | | Y | | | Y | Y | W |
| 6.10 | 1Bed | 57 | | 15 | 72 | | 4 | | Y | Y | | | Y | Y | W |
| 6.11 | 2Bed | 79 | | 15 | 94 | | 4 | | Y | Y | | | | Y | W |
| | | | | | | | | | | | | | | | |
| 7.01 | 2Bed | 80 | | 17 | 97 | | 4 | | Y | Y | | | | Y | NW |
| 7.02 | 3Bed | 126 | 9 | 83 | 218 | Y | 13 | | Y | Y | | Y | Y | Y | NE |
| 7.03 | 2Bed | 77 | | 16 | 93 | | 4 | | Y | | | | | Y | E |
| 7.04 | 1Bed | 59 | | 16 | 75 | | 3 | | Y | | | | | Y | E |
| 7.05 | 1Bed | 63 | | 15 | 78 | | 12 | | | | | | | Y | E |
| 7.06 | 2Bed | 83 | | 26 | 109 | | 5 | | Y | | | | | Y | SE |
| 7.07 | 2Bed | 80 | | 52 | 132 | | 5 | | Y | Y | | | | Y | SW |
| 7.08 | 1Bed | 58 | | 20 | 78 | | 6 | | | Y | | | | Y | W |
| 7.09 | 1Bed | 57 | | 15 | 72 | | 4 | | Y | Y | | | Y | Y | W |
| 7.10 | 2Bed | 79 | | 15 | 94 | | 4 | | Y | Y | | | | Y | W |
| | | | | | | | | | | | | | | | |
| 8.01 | 2Bed | 80 | | 17 | 97 | | 4 | | Y | Y | | | | Y | NW |
| 8.02 | 3Bed | 126 | 9 | 23 | 158 | Y | 13 | | Y | Y | | Y | Y | Y | NE |
| 8.03 | 2Bed | 77 | | 16 | 93 | | 4 | | Y | | | | | Y | E |
| 8.04 | 1Bed | 59 | | 16 | 75 | | 3 | | Y | | | | | Y | E |
| 8.05 | 2Bed+ | 94 | | 59 | 153 | | 22 | | Y | | | Y | Y | Y | SE |
| 8.06 | 2Bed | 83 | | 62 | 145 | | 4 | | Y | Y | | | | Y | SW |
| 8.07 | 2Bed | 84 | | 24 | 108 | | 4 | | Y | Y | | | | Y | W |
| 8.08 | 2Bed | 79 | | 15 | 94 | | 6 | | Y | Y | | | | Y | W |
| | | | | | | | | | | | | | | | |
| 9.01 | 2Bed | 80 | | 17 | 97 | | 4 | | | Y | | | | Y | NW |
| 9.02 | 3Bed | 126 | 9 | 23 | 158 | Y | 13 | | | Y | | Y | Y | Y | NE |
| 9.03 | 2Bed | 77 | | 16 | 93 | | 4 | | | | | | | Y | E |
| 9.04 | 2Bed | 78 | | 15 | 93 | | 4 | | | | | | | Y | E |
| 9.05 | 2Bed | 84 | | 35 | 119 | | 8 | | | | | | | Y | SE |
| 9.06 | 2Bed+ | 86 | | 52 | 138 | | 5 | | | Y | | | | Y | SW |
| 9.07 | 2Bed | 84 | | 15 | 99 | | 7 | | | Y | | | | Y | W |
| 9.08 | 2Bed | 79 | | 15 | 94 | | 4 | | | Y | | | | Y | W |
| | | | | | | | | | | | | | | | |
| 10.01 | 2Bed | 80 | | 17 | 97 | | 4 | | | Y | | | | Y | NW |
| 10.02 | 3Bed | 126 | 9 | 23 | 158 | Y | 13 | | | Y | | Y | Y | Y | NE |
| 10.03 | 2Bed | 77 | | 16 | 93 | | 4 | | | | | | | Y | E |
| 10.04 | 2Bed | 78 | | 15 | 93 | | 4 | | | | | | | Y | E |
| 10.05 | 1Bed | 58 | | 34 | 92 | | 8 | | | | | | | Y | SE |
| 10.06 | 2Bed | 81 | | 54 | 135 | | 6 | | | Y | | | | Y | SW |
| 10.07 | 1Bed | 55 | | 10 | 65 | | 3 | | | Y | | | | Y | W |
| 10.08 | 2Bed | 79 | | 15 | 94 | | 4 | | | Y | | | | Y | W |
| | | | | | | | | | | | | | | | |
| 11.01 | 2Bed | 80 | | 17 | 97 | | 4 | | | Y | | | | Y | NW |
| 11.02 | 3Bed | 126 | 9 | 23 | 158 | Y | 13 | | | Y | | Y | Y | Y | NE |
| 11.03 | 2Bed | 77 | | 16 | 93 | | 4 | | | | | | | Y | E |
| 11.04 | 2Bed+ | 94 | | 55 | 149 | | 4 | | | | | | | Y | SE |
| 11.05 | 2Bed | 81 | | 73 | 154 | | 4 | | | Y | | | | Y | SW |
| 11.06 | 2Bed | 79 | | 15 | 94 | | 4 | | | Y | | | | Y | W |
| | | | | | | | | | | | | | | | |
| 12.01 | 3Bed | 110 | | 47 | 157 | | 13 | | | Y | | Y | Y | Y | NW |
| 12.02 | 3Bed | 126 | 9 | 23 | 158 | Y | 13 | | | Y | | Y | Y | Y | NE |
| 12.03 | 3Bed | 126 | | 81 | 207 | | 9 | | | Y | | Y | Y | Y | SE |
| 12.04 | 3Bed | 116 | | 41 | 157 | | 9 | | | Y | | Y | Y | Y | SW |
| | | | | | | | | | | | | | | | |
| 95 | | 7752 | 375 | 2314 | 10441 | 24 | 624 | | 43 | 68 | 0 | 10 | 20 | | |
| 69 | | | | | | | | | 62.3% | 71.6% | | 10.5% | 21.1% | | |
| | | | | | | | | | Cross Vent | Solar | Non Solar | Adaptable | Livable | | |

# Appendix C.
# ARCHITECTURAL DRAWINGS

# Appendix D.
# TRAFFIC AND PARKING

ttpa TRANSPORT AND TRAFFIC PLANNING ASSOCIATES
Established 1994

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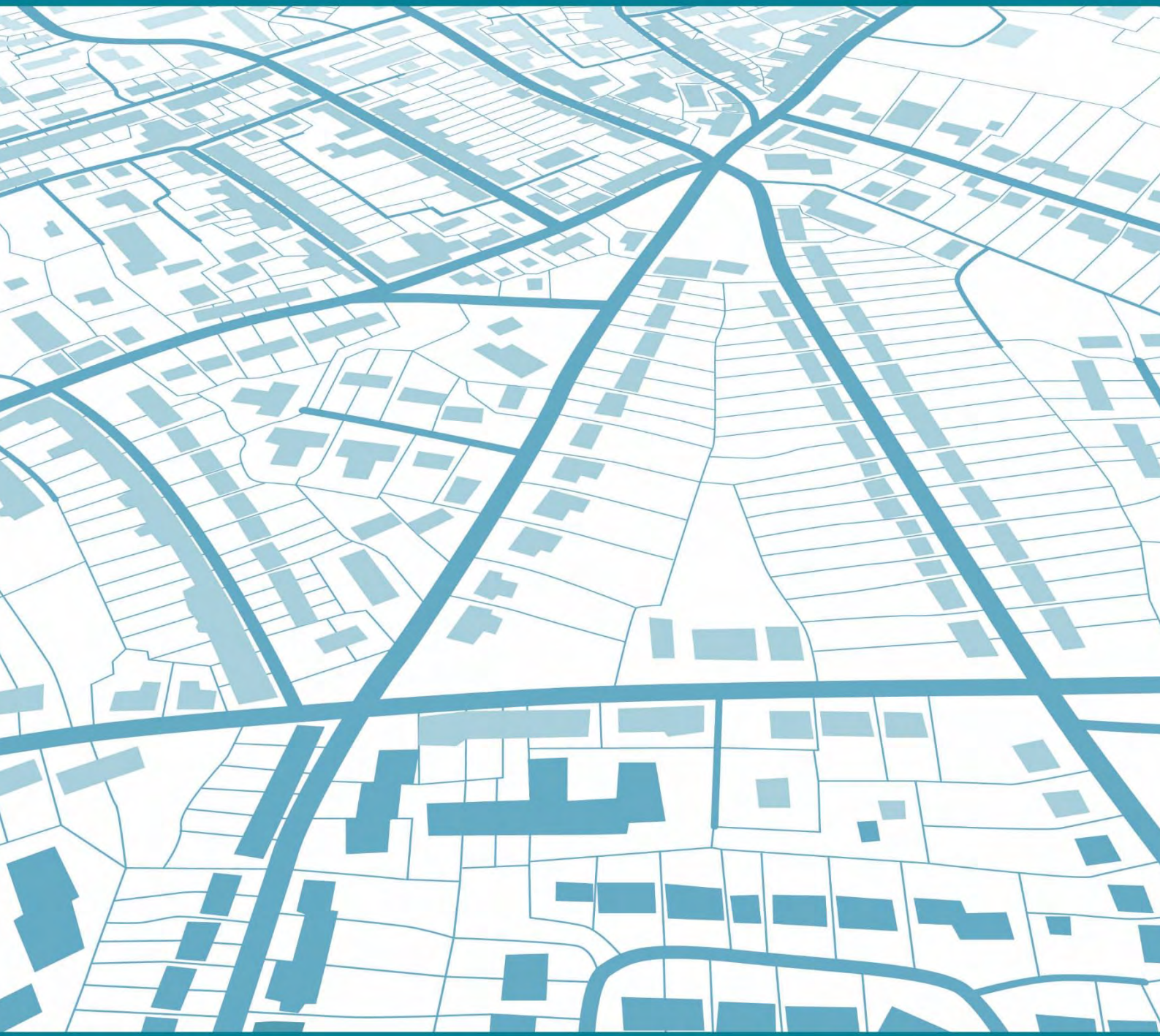

# Proposed Mixed Use Development

## 15-31 Harbour Drive, Coffs Harbour

## Traffic and Parking Assessment

Ref: 20269
Date: December 2020
Issue: D

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# 1.0 Introduction

This report has been prepared to accompany a Development Application to Coffs Harbour City Council for a proposed new mixed use complex on Harbour Drive in the Coffs Harbour City Centre (Figure 1).

The existing Coffs Harbour City Centre is on the "cusp" of very significant beneficial changes as a result of:

- Construction of the Pacific Highway bypass
- Initiatives of the Coffs Harbour City Centre Masterplan 2031 (CHCCM)

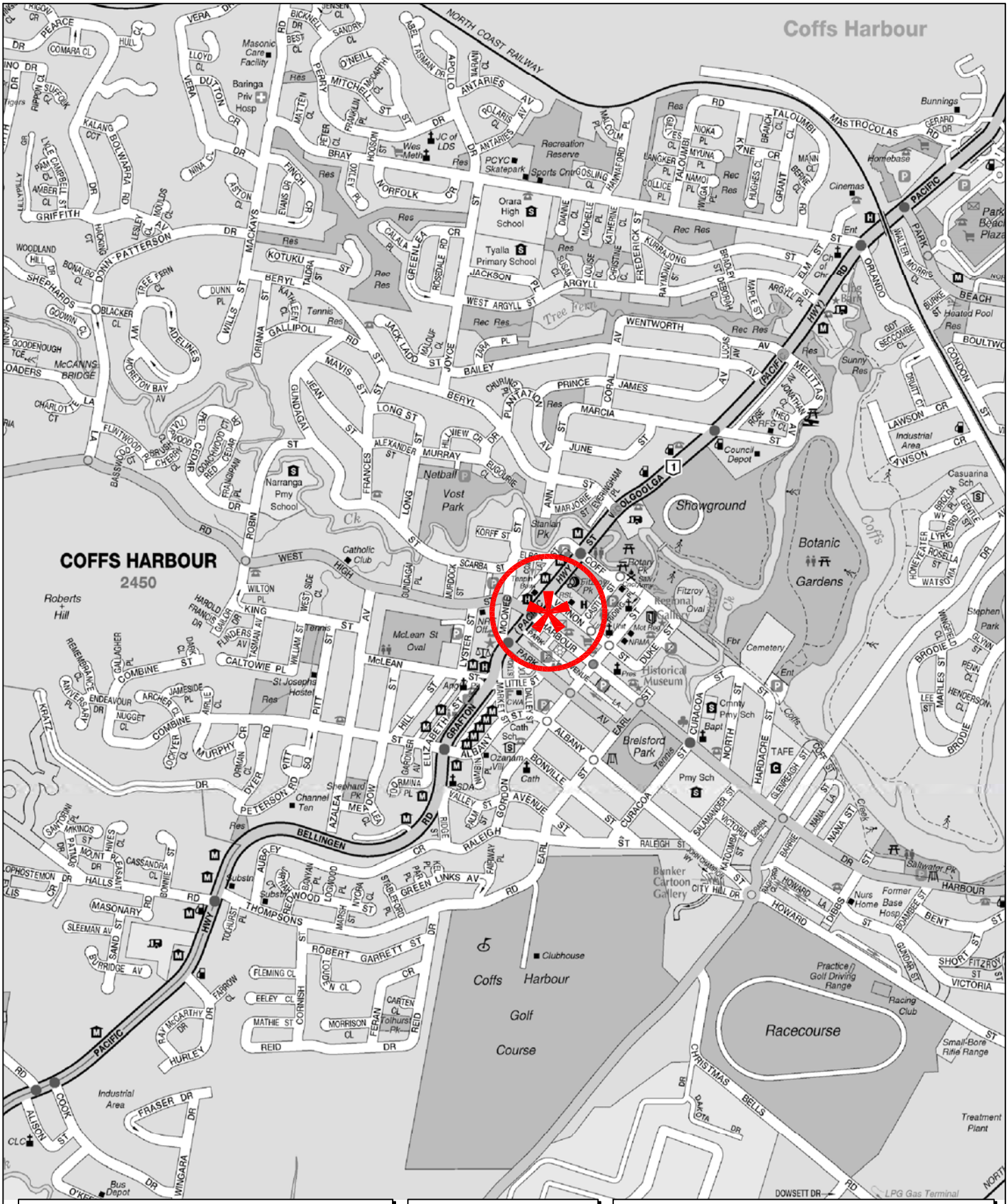
The Pacific Highway, which currently passes through the City Centre, carries large volumes of through traffic including a significant and increasing percentage of large trucks. The 2020-21 Federal Government Budget allocates some $490 million to the funding of the bypass construction (expected to commence in late 2020 and be completed in 2024) and this will result in a significant reduction in traffic passing through the City Centre.

The CHCCM has the objectives of:

- reinstating the City Centre as the key retail and core entertainment precinct
- encouraging development which is best practice and of a high quality modern standard
- fostering economic growth to meet the demographic needs
- encouraging sustainable transport

The subject site is located in the middle of the City precinct and the proposed development scheme comprises:

- 95 residential apartments
- 735m$^2$ retail floorspace
- On-site carparking


Coffs Harbour
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McLean St Oval
St Josephs Hostel
Channel Ten
Substn
Shepherd Pk
Meadow Pk
Tolhurst Pk
Creek
Lagoon
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NRMA
Ozanam Vill
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Cling Park
Heated Pool
Res
Rec
Substn
Pacific
Hwy
Orlando
Melitta
Bellingen
Albany
Graftons
Gordon
Bonville
Curacoa
Earl
Raleigh
Green Links
Thompsons
Robert Garrett
Fleming
Eeley
Mathie
Morrison
Carten
Feran
Reid
Hurley
Ray McCarthy
Fraser
Cook
Alison
Wingara
Sleeman
Masonary
Halls
Mount Pleasant
Cassandra
Bonnie
Sandy Burridge
Tourist
Ferrow
Auberley
Banyan
Logwood
Redwood
Marsh
Nyora
Stafford
Fairway
Substn
Dowsett
Christmas Bells
Dakota
Howard
Dibbs
Bombee
Bent
Short
Fitzroy
Victoria
Salamander
Victoria
Natcumba
Barrie
Niana
Hanna
Glenreagh
Hardacre
North
Curacoa
Albany
Bonville
Gordon
Avenue
Valley
Palm
Ormina
Gardiner
Elizabeth
Grafton
Market
Little
Duke
Moonee
Castle
Harbour
Park
Lyster
Scarba
Murdock
Gundagai
Korff
Marjorie
Olgoolga
Ann
Riverbank
Coral
James
Marcia
Plantation
Churinga
Prince
June
Bailey
Joyce
Zara
Jack Lado
Maloof
Wentworth
Rec Res
Argyll
West Argyll
Jackson
Rosedale
Calala
Greenlea
Kotuku
Talora
Mackays
Norfolk
Bray
Oxley
Evans
Finch
Aston
Nina
Griffith
Down Patterson
Woodland Hill
Bonalbo
Shepherds
Goodwin
Blacker
Tree Fern
Goodenough
McCanns Bridge
Loaders
Charlotte
Flintwood
Bassawarra
Toreton Bay
Adelines
Wills
Dunn
Beryl
Kath
Tennis
Oriana
Gallipoli
Jean
Mavis
Long
Frances
Alexander
Murray
Eucourie
Hill View
Robin
West
High
West Side
Wilton
King
Flinders
Tasman
William
Caltowie
Combine
Endeavour
Archer
Jamieside
Nugget
Murphy
Orman
Dyer
Pitt
Peterson
Azalea
Meadow
Ridge
Gardiner
Ormina
Valley
Palm
Gordon
Avenue
Bonville
Albany
Graftons
Elizabeth
Hill
Pitt
Mclean

The purpose of this report is to:

- describe the site, the planning for the City Centre and the proposed development scheme
- describe the existing road network and traffic conditions in the area and the proposed future circumstances
- assess the potential traffic implications
- assess the adequacy of the proposed parking provision
- assess the proposed vehicle access, internal circulation and servicing arrangements

# 2.0 Proposed Development Scheme

## 2.1 Site, Context and Existing Circumstances

The development site (Figure 2) is a consolidation of 4 lots which occupies a square shaped area of some 3011m$^2$ with frontages to Harbour Drive and Vernon Street located in the heart of the City Centre.

The surrounding uses comprise:

- the adjoining retail and commercial buildings including the Coffs Central retail complex
- the CEX Club on the opposite site of Vernon Street
- the retail and commercial uses extending along Harbour Drive and the Pacific Highway
- the surrounding residential areas

The existing 1 and 2 level building complex on the site contains a wide range of retail tenancies (some 18) plus some facilities associated with the CEX Club. There is no vehicle access, parking or loading provision on the site.

## 2.2 City Centre Masterplan

Council prepared the Coffs Harbour City Centre Masterplan 2031 with a "vision" to create a place where economic, social and cultural pursuits fuse to enrich and enliven all who live, work and visit the City Centre. The principal aims of the plan are to:

- reignite and grow the City Centre
- encourage long term development and investment
- feature world class design with a unique and creative streetscape
- reinstate the Centre as the key retail and entertainment precinct
- attract residential living to the City Centre

**LEGEND**

N

**SITE**

**FIG 2**

Details of the key elements of the plan are reproduced from the Masterplan document in Appendix A and include:

- an Access and Movement Plan to provide a balance between pedestrian, cyclist, public transport and private vehicle movements with “key connections”
- Outer and Inner Ring Roads
- a Bike Plan
- a Parking Strategy
- a Key Landuse and Open Space Plan

## 2.3 Proposed Development

It is proposed to demolish the existing buildings on the site and construct a 13 level tower building comprising:

- Ground level retail, loading dock and car parking
- Level 1 to 3 car parking and apartments
- Level 4 to 12 apartments

The proposed development comprises:

| | |
|---|---|
| Residential | 21 x 1 bed apartments |
| | 65 x 2 bed apartments |
| | 9 x 3 bed apartments |
| **Total:** | **95 apartments** |
| Retail | 735 $m^2$ GLFA |

A total of 154 parking spaces are proposed in 4 levels with vehicle access on the Vernon Street frontage.

In conjunction with the development, it is also proposed to:

- provide a “thru-site” pedestrian corridor between Harbour Drive and Vernon Street
- upgrade the frontage treatments
- relocate 4 on-street parking spaces to provide for the proposed access driveway

Details of the proposed development scheme are provided on the plans prepared by Turner Architects which accompany the Development Application and are reproduced in part in Appendix B.

## 2.4 Other Developments

There are 2 recent Development Applications which have potential traffic implications for the road system serving the subject site, namely:

- **Councils Multipurpose Cultural and Civic Space Project**

  This Gordon Street Coffs Harbour development is proposed on the existing Council Chambers/Admin Offices site and comprises:

  - Regional Library
  - Regional Gallery
  - Regional Museum
  - Function Space
  - Multipurpose Rooms
  - Co Working Space
  - Shop
  - Cafe

There will be a basement car park with 74 additional spaces (ie to that which presently exist) and the projected total traffic generation in the Traffic Study[1] which supported the Development Application was as follows:

| | **Year of Opening** | **10 Yr Horizon** |
|---|---|---|
| **AM** | 82 (77 in, 5 out) | 128 trips (120 in, 8 out) |
| **PM** | 94 (41 in, 52 out) | 175 trips (79 in, 96 out) |

- **Proposed Boarding House**
  Duke Street, Coffs Harbour

This Mission Australia Housing development comprises 40 units and 8 parking spaces while the traffic report which supported the DA[2] assessed the additional traffic generation as follows:

| | |
|---|---|
| **AM** | 7 vtph (2 in, 5 out) |
| **PM** | 5 vtph (3 in, 2 out) |

1 *Proposed Cultural & Civic Space Project*
*Gordon Street Coffs Harbour*
*Transport Assessment Report*
*June 2019*

2 *Proposed Boarding House*
*Duke Street Coffs Harbour*
*Traffic and Parking Impacts Report*
*TEF Consulting Dec 2019*

# 3.0 Existing Road Network and Traffic Conditions

## 3.1 Road Network

The road network serving the site (Figure 3) comprises:

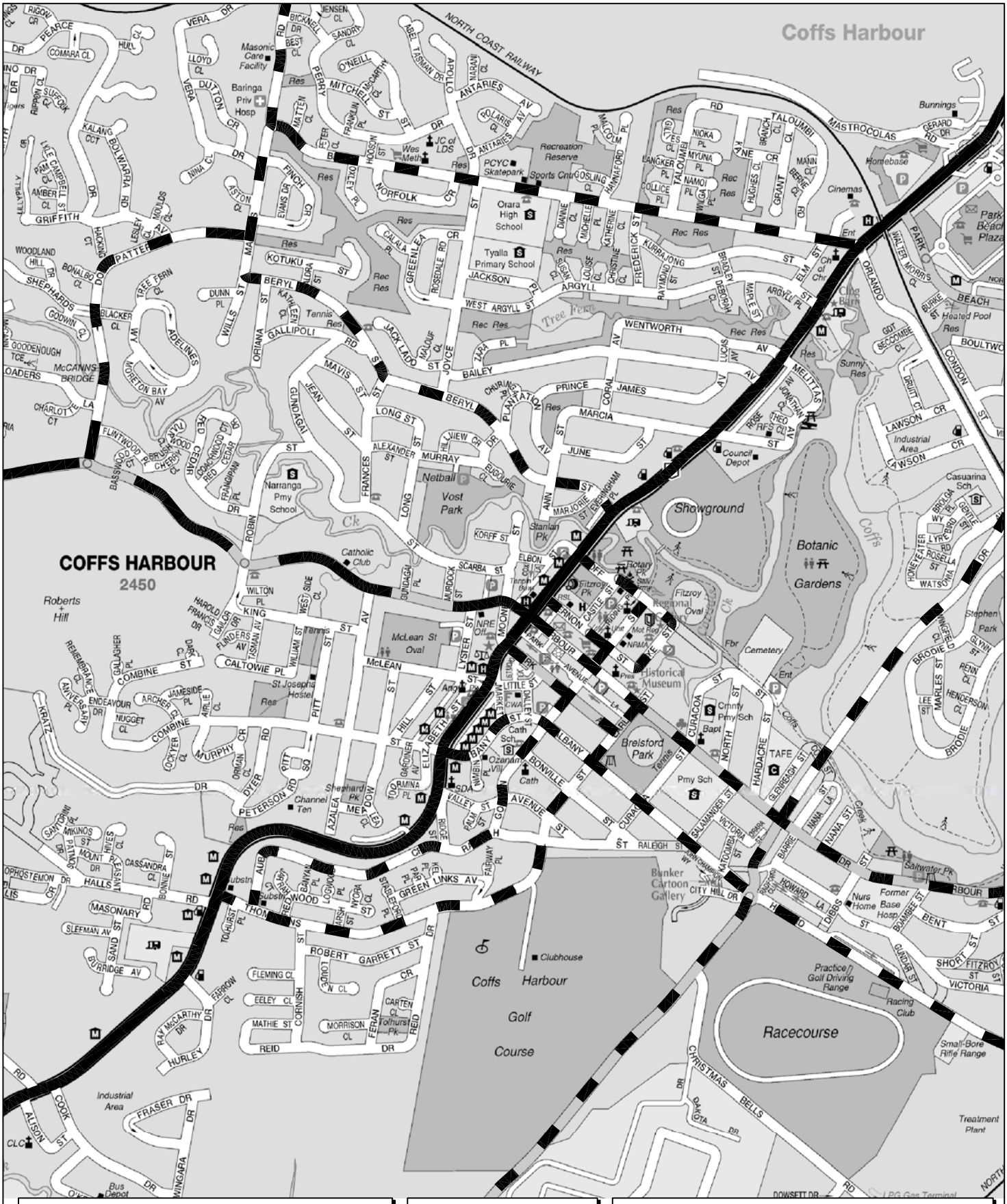
- *Pacific Highway (Woolgoolga Road etc)*– National Highway 1 and the principal interstate route between Sydney and Brisbane
- *Coramba Road/West High Street*– a sub-arterial route which provides a connection between Coffs Harbour and Grafton
- *Harbour Drive* – a major collector route linking between Pacific Highway and the Harbour
- *Hogben Drive* – a major collector route running to the east of the CBD
- *Vernon Street/Coff Street* – a minor collector road circuit which connects to the Pacific Highway

The Pacific Highway has 2 traffic lanes in each direction (plus parking lanes) with right and left turn supplementary lanes at major intersections while Vernon Street is some 20m wide with one traffic lane and angle parking in each direction.

## 3.2 Traffic Controls

The traffic controls which have been applied to the road system serving the site (Figure 4) comprise:

- the traffic signal controlled intersections along the Pacific Highway including the Harbour Drive/West High Street, Park Street, Coff Street and Park Avenue intersections and the traffic signals at the Harbour Drive/Gordon Street intersection
- the NO RIGHT TURN restrictions at the Pacific Highway/Harbour Drive intersection and the central median island in Pacific Highway across the Vernon Street intersection restricting access to left turn IN/OUT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Hosp
Substn
Ozanam Vill
Clng Barn
Sunny Res
Casuarina Sch
Stephen Park
Industrial Area
Lawson Cr
Boultwood St
Beach
Park
Walter Morris Cl
Orlando St
Elm St
Ch of Chr
Melitta Dr
Jonathan Cl
Theo Cl
Rose Cl
Fes Cl
Coral James Av
Marcia St
Prince St
June St
Bailey St
Churinga Plantation Res
Wentworth Av
Rec Res
Argyll St
West Argyll St
Jackson Pl
Dunn Pl
Kotuku St
Beryl St
Gallipoli Rd
Oriana St
Wills St
Jack Ladd St
Malouf St
Joyce St
Zara Pl
Lucas Av
Mavis St
Jean St
Gundagai St
Long St
Alexander St
Murray St
Hillview Cr
Frances St
Long St
Bucourie St
Ann St
Marjorie St
Edgingham Pl
Korff St
Elbon St
Scarba St
Murdock St
Gundagai Pl
Wilton Pl
King St
Flinders Av
Tasman Av
William St
Tennis
West Side Cl
Harold Francis Dr
Gaylor Dr
Gallagher Pl
Combine St
Remembrance Cl
Anniversary Pl
Endeavour Dr
Archer Pl
Jameside Pl
Airlie Cl
Nugget Cl
Lockyer Cl
Murphy Cr
Orman Cl
Dyer Rd
Peterson Rd
Kratz Dr
Caltowie Pl
St Josephs Hostel
Pitt St
McLean St
Lyster St
Moore St
Harbour St
Prince St
Rotary Pk
Mot Rec
Fitzroy Pl
Castle St
Albert St
Gordon St
Duke St
Queen St
Regent St
Princess St
Crown St
Curacoa St
North St
Hardacre St
Glenreagh St
Albany St
Bonville St
Cath Sch
Cath
Ozanam Vill
Eliz Beth St
Gardner Av
Tormina Pl
Sda
Valley St
Palm St
Goonoo Goonoo Rd
Meroo St
Azalea St
Rodeo Dr
Fairway Pl
Green Links Av
Aubrey Pl
Keith Pl
Strzelecki Pl
Logwood Pl
Nyora St
Ash St
Cassandra Cl
Bonnie St
Halls Rd
Mount Pleasant Dr
Santorini Dr
Mikonos St
Patmos Dr
Ophostemon Dr
Masonary Rd
Sleeman Av
Sandridge Av
Robert Garrett St
Fleming Cl
Eeley Cl
Mathie St
Morrison Cl
Reid Dr
Ferrow Cl
Ray McCarthy Dr
Hurley Dr
Cornish Cl
Carten Cl
Feran Cl
Reid Cl
Fraser Dr
Alison Cl
Cook St
Wingara Rd
Christmas Bells Dr
Dalgeta Dr
Dowsett Dr
Howard La
Dibbs St
Bramble St
Bent St
Short St
Victoria St
Gundar St
Barrie St
Nana St
Nana La
Salamander St
Victoria St
Katoomba St
Raleigh St
City Hill Dr
Gosling Cl
Hannaford Pl
Malcolm Pl
Fredrick St
Kurrajong St
Raymond St
Deborah St
Bradley Cl
Warles St
Graham Cl
Michelle Cl
Katherine Cl
Christine Cl
Louise Cl
Susan Cl
Danielle Cl
Greenlea Cl
Calala Pl
Rosedale Rd
Rec Res
Res
Tree Fern
Ck
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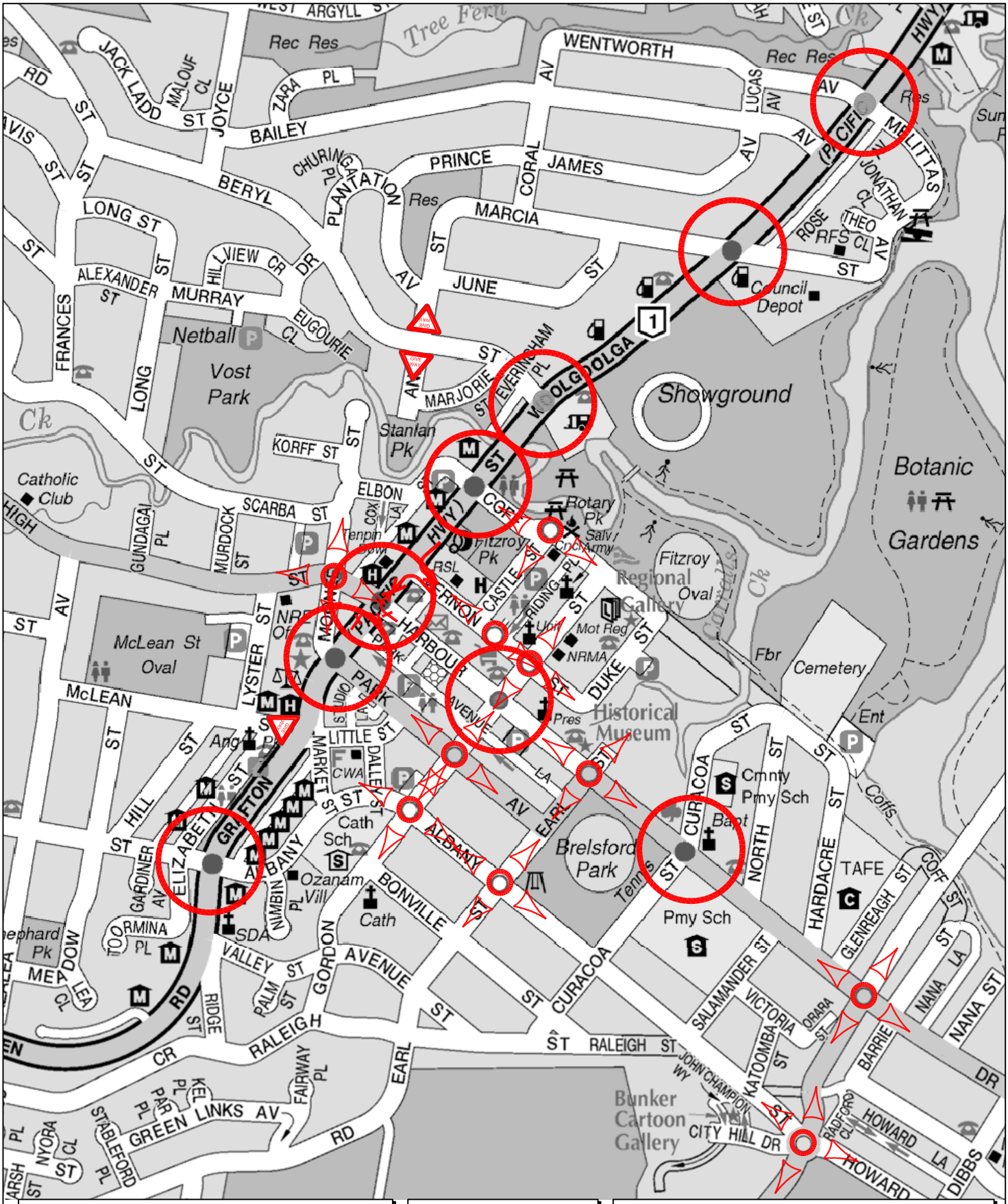
Fbr
Cemetery
Historical Museum
Showground
Botanic Gardens
Coffs
Creek




## LEGEND

- TRAFFIC SIGNAL CONTROL
- ROUNDABOUT
- RESTRICTED TURNING MOVEMENT

N

# TRAFFIC CONTROLS

FIG 4

- the 50 kmph speed restriction on the local and collector road system and 60 kmph restriction on the Pacific Highway with a section of 40 kmph on Harbour Drive in the vicinity of the site
- the numerous roundabouts at intersections along Gordon Street including Vernon Street

## 3.3 Traffic Conditions

An indication of the traffic conditions on the road system serving the site is provided by data published by TfNSW. This data is expressed in terms of Annual Average Daily Traffic (AADT) and latest published data is as follows:

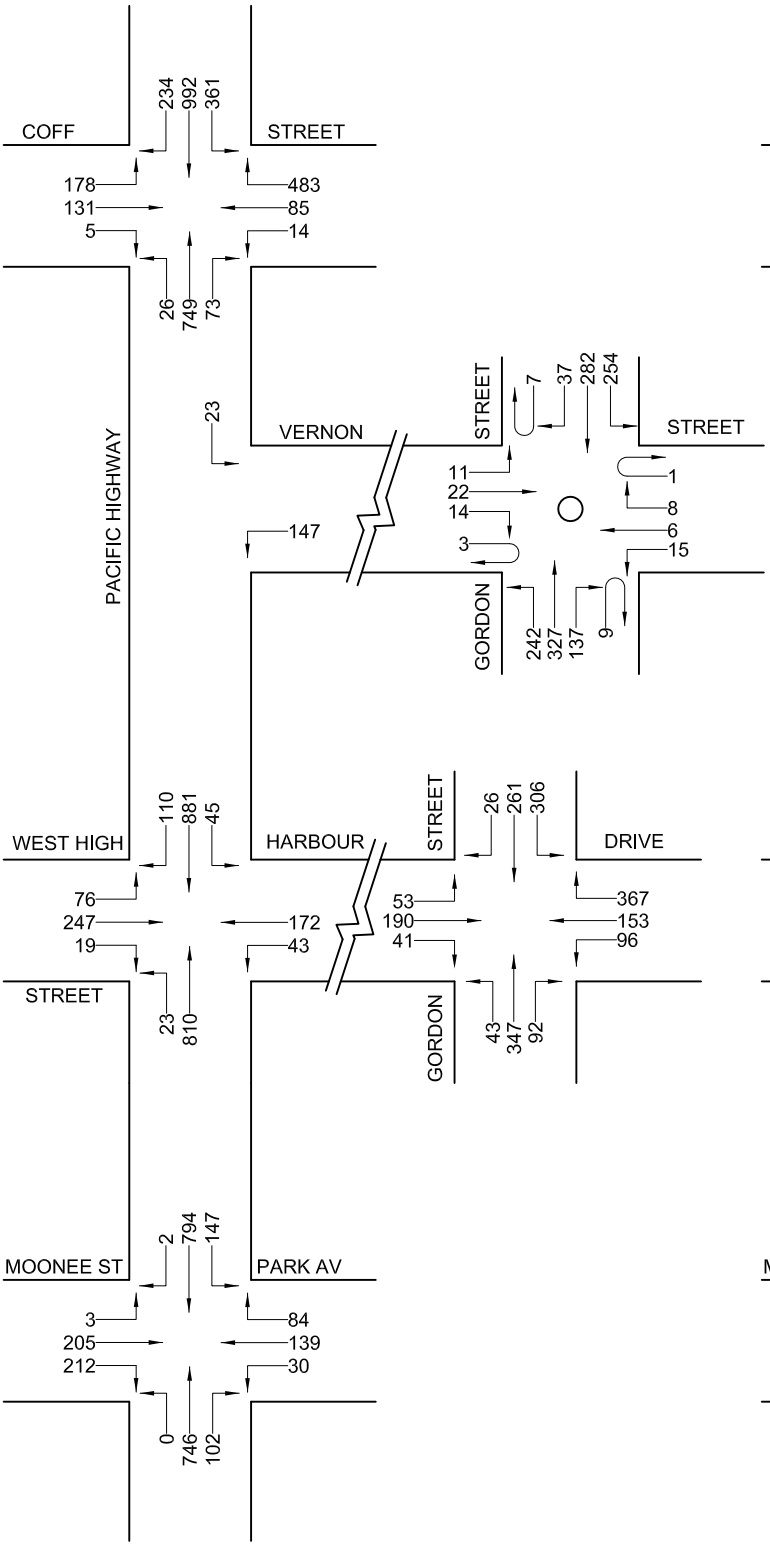
| Location | AADT |
|---|---|
| Pacific Highway south of Harbour Drive | 35,300 approx. |

Traffic surveys have been undertaken at intersections in the vicinity of the site during the morning and afternoon peak periods and the results of those surveys are provided in Appendix C and summarised in Figure 5.

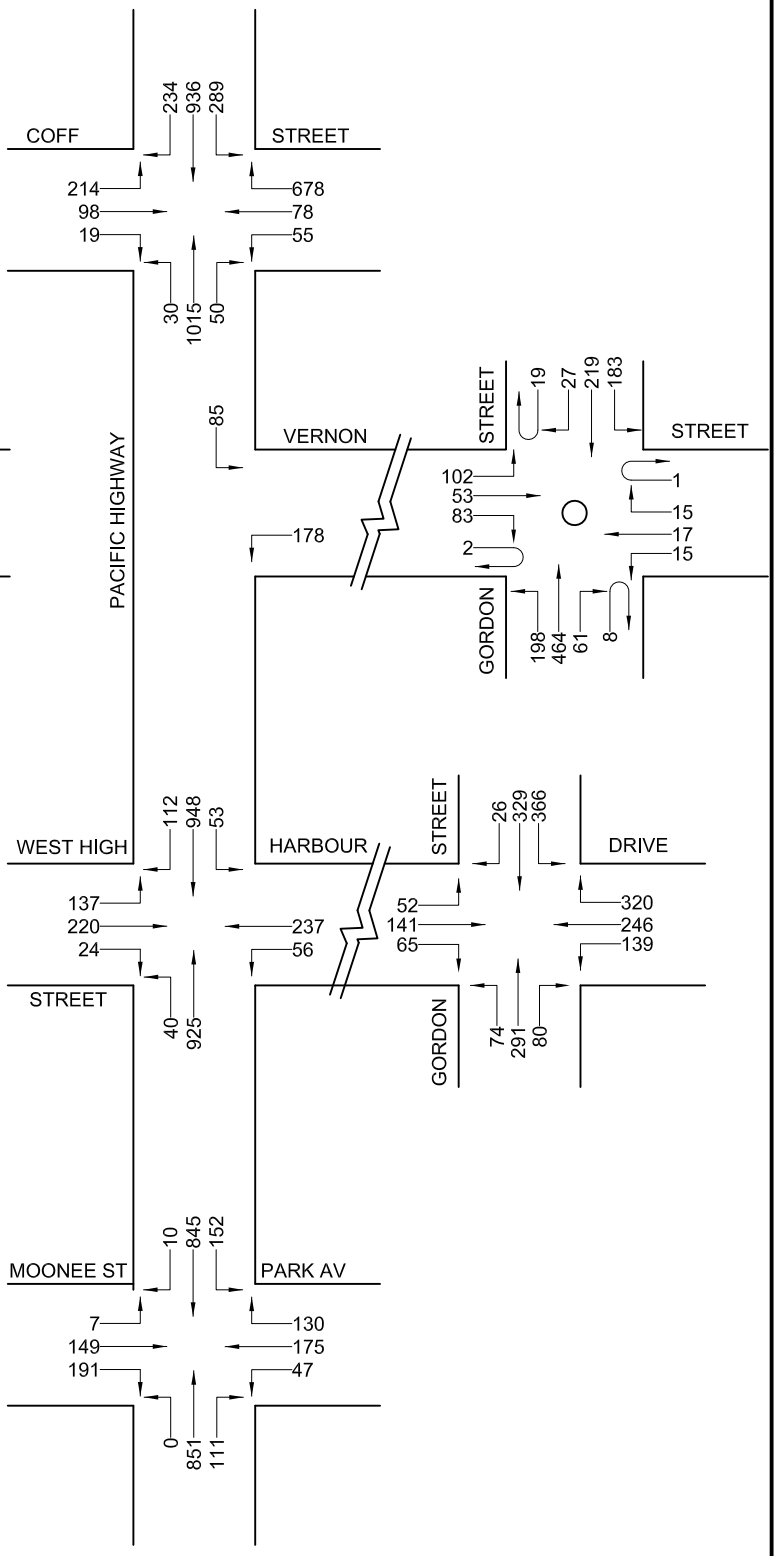
The existing operational performance of these intersections has been assessed with SIDRA. The results of this assessment are provided in Appendix D and summarised in the following while the criteria for interpreting SIDRA output is reproduced overleaf.

| | AM | | PM | |
|---|---|---|---|---|
| | LOS | AVD | LOS | AVD |
| Pacific/Harbour | B | 22.3 | B | 24.0 |
| Pacific/Coffs | C | 32.7 | C | 40.6 |
| Pacific/Park | C | 34.7 | C | 35.2 |
| Harbour/Gordon | C | 29.0 | B | 28.0 |
| Gordon/Vernon | A | 3.3 | A | 3.6 |

The SIDRA results indicate that these intersections operate with a satisfactory level of service during the existing AM and PM peak traffic periods.

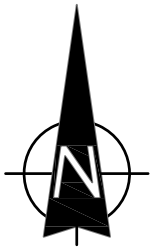



AM PEAK




PM PEAK

**LEGEND**




# EXISTING PEAK TRAFFIC VOLUMES

**FIG 5**

# Criteria for Interpreting Results of SIDRA Analysis

## 1. Level of Service (LOS)

| LOS | Traffic Signals and Roundabouts | Give Way and Stop Signs |
|---|---|---|
| 'A' | Good | Good |
| 'B' | Good with acceptable delays and spare capacity | Acceptable delays and spare capacity |
| 'C' | Satisfactory | Satisfactory but accident study required |
| 'D' | Operating near capacity | Near capacity and Accident Study required |
| 'E' | At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode | At capacity and requires other control mode |
| 'F' | Unsatisfactory and requires additional capacity | Unsatisfactory and requires other control mode |

## 2. Average Vehicle Delay (AVD)

The AVD provides a measure of the operational performance of an intersection as indicated on the table below, which relates AVD to LOS. The AVD's listed in the table should be taken as a guide only as longer delays could be tolerated in some locations (ie inner city conditions) and on some roads (ie minor side street intersecting with a major arterial route).

| Level of Service | Average Delay per Vehicle (secs/veh) | Traffic Signals, Roundabouts | Give Way and Stop Signs |
|---|---|---|---|
| A | Less than 14 | Good operation | Good operation |
| B | 15 to 28 | Good with acceptable delays and spare capacity | Acceptable delays and spare capacity |
| C | 29 to 42 | Satisfactory | Satisfactory but accident study required |
| D | 43 to 56 | Operating near capacity | Near capacity and accident study required |
| E | 57 to 70 | At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode | At capacity and requires other control mode |

## 3. Degree of Saturation (DS)

The DS is another measure of the operational performance of individual intersections.

For intersections controlled by **traffic signals**[1] both queue length and delay increase rapidly as DS approaches 1, and it is usual to attempt to keep DS to less than 0.9. Values of DS in the order of 0.7 generally represent satisfactory intersection operation. When DS exceeds 0.9 queues can be anticipated.

For intersections controlled by a **roundabout or GIVE WAY or STOP signs**, satisfactory intersection operation is indicated by a DS of 0.8 or less.

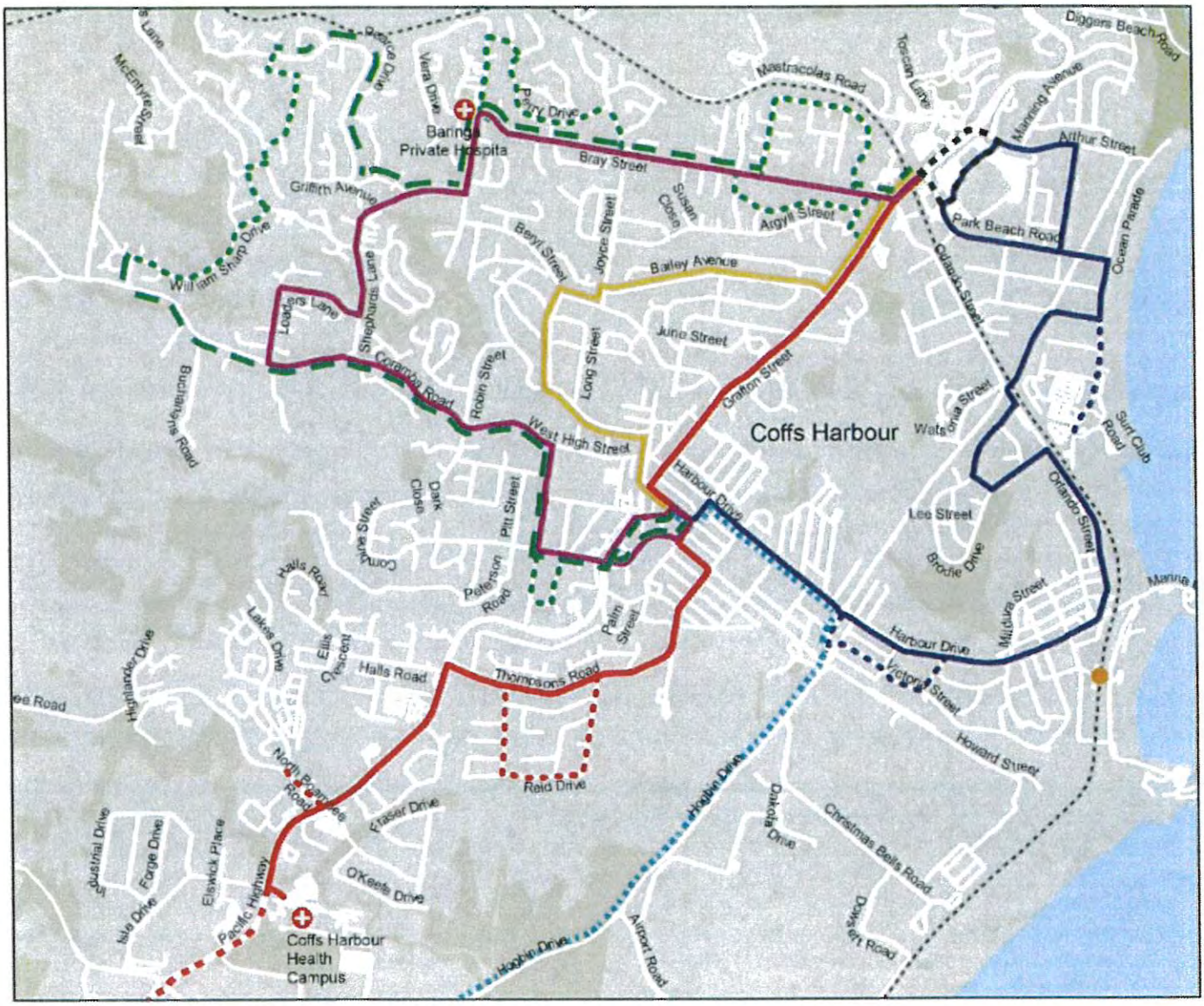
[1] *the values of DS for intersections under traffic signal control are only valid for cycle length of 120 secs*

## 3.4 Public Transport

Busways is the main public corridor in Coffs Harbour, providing regular services within Coffs Harbour and the surrounding towns; including Bonville, Urunga, Valla Beach, Nambucca Heads and Macksville etc. Routes servicing Coffs Harbour are illustrated overleaf. Routes 360, 360M, 365, 366, 367 and 368 all travel along the existing Pacific Highway for portions of their service.

- Busways Route 360 – this bus service travels between Park Beach Plaza and Park Avenue via the Pacific Highway, with selected trips servicing the Coffs Harbour Base Hospital
- Busways Route 360M – this service travels between Park Beach Plaza and Park Avenue via the Pacific Highway. This service also operates through to Urunga, Nambucca Heads and Macksville
- Busways Route 365 – travels from Park Beach Plaza to Park Avenue via The Jetty
- Busways Route 366 – services Park Beach Plaza through to Park Avenue via Frances Street
- Busways Route 367 – this bus service travels between Park Beach Plaza and Park Avenue via Donn Patterson Drive, servicing the Baringa Private Hospital
- Busways Route 368 – this service travels between Park Beach Plaza and Park Avenue via Pearce Drive servicing the Baringa Private Hospital

A number of bus companies provide regular services to and from Coffs Harbour and towns and regional centres such as Woolgoolga, Grafton, Sawtell, Tamworth, Armidale, Urunga, Warwick, Toowoomba and Brisbane. Several local bus companies also provide school and charter services to Coffs Harbour.


Coffs Harbour
Baringa Private Hospital
Coffs Harbour Health Campus
Bray Street
Harbour Drive
West High Street
Pacific Highway
Hogbin Drive
Thompsons Road
Reid Drive
Halls Road
Grafton Street
Arthur Street
Park Beach Road
Ocean Parade
Bailey Avenue
June Street
Joyce Street
Beryl Street
Argyll Street
Mastracolas Road
Diggers Beach Road
Manning Avenue
Orlando Street
Lee Street
Brodie Drive
Victoria Street
Howard Street
Christmas Bells Road
Coffs Harbour Bypass
Coffs Harbour Busway route map
Legend
Bus 360 & Bus 360M
Bus 360M
Bus 361
Bus 365
Bus 366
Bus 367
Bus 368
Common route
Occasional diversions
Bus 360
Bus 365
Bus 368
North Coast Railway
Railway stations
Hospitals
Scale @A4: 1:30,000
GDA 1994 MGA Zone 56
N

# 4.0 Future Road Network and Traffic Conditions

## 4.1 Road Network

The principal future change to the existing road network is the construction of the 12km long Coffs Harbour Bypass which is scheduled to commence late this year and completed in 2024. Details of the approved project are provided overleaf which include grade separated interchanges at the connections with the existing highway. It would not appear that traffic through Coffs Harbour Centre will be reduced until the project is complete.

The CHCC Masterplan identifies the upgrading of the Hogben Drive route as an "Outer Ring Road" running to the east of the centre and providing something of an interim bypass to the highway. The masterplan also identifies an Inner Ring Road, street reconfiguration and access improvements as identified on the Access and Movement diagram in Appendix A.

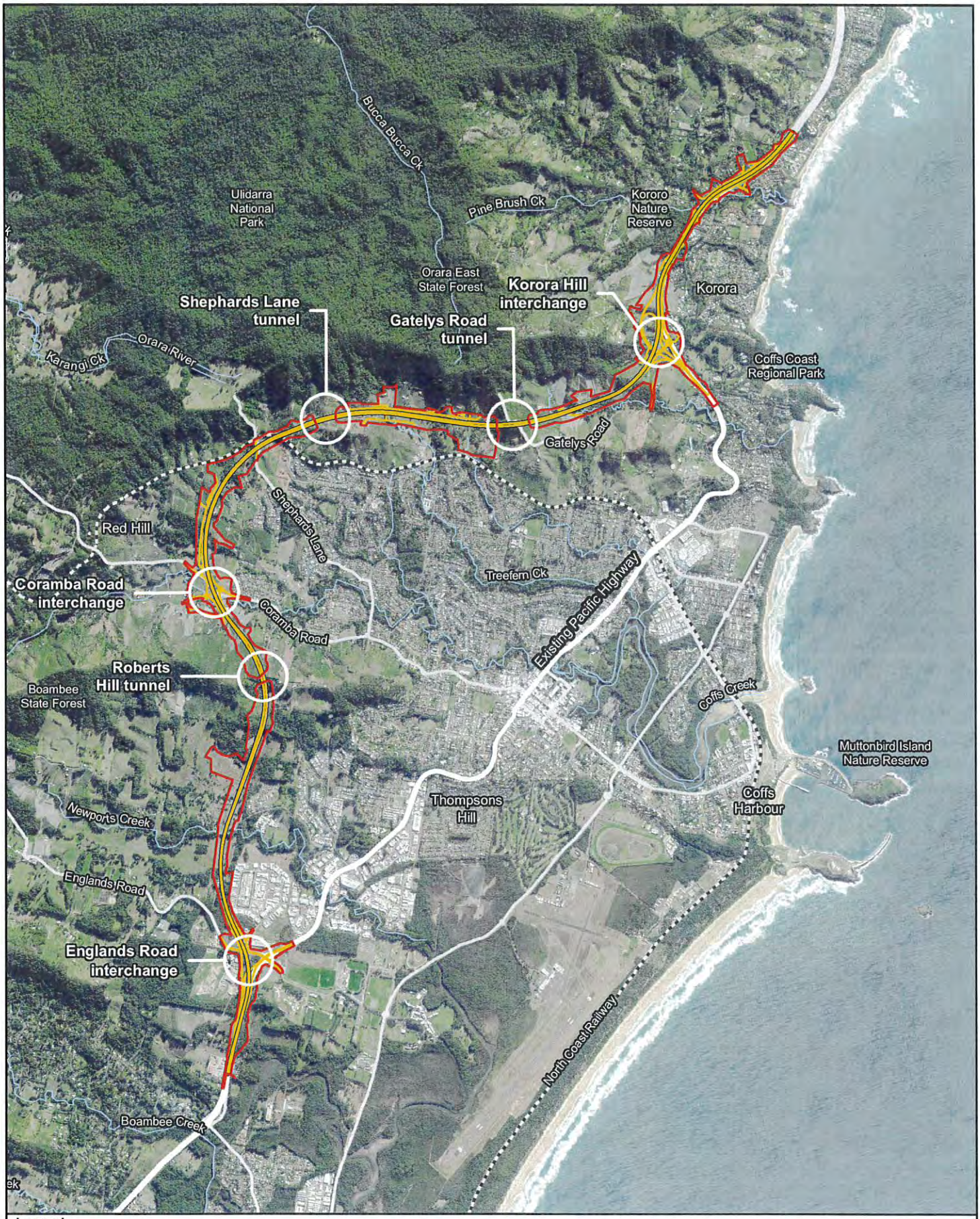
## 4.2 Traffic Conditions

Traffic modelling for the Bypass Project has taken into account traffic growth resulting from urban development in the Coffs Harbour region. The forecast changes to traffic on the highway through the City Centre and along the Hogben Drive are result of the Bypass provision are as follows:

| | Daily Traffic Volumes | | |
|---|---|---|---|
| | **2024** | **2034** | **2044** |
| Pacific Highway | – 39.7% | – 38.7% | – 38.5% |
| Hogben Drive | – 30.7% | – 36.0% | – 32.0% |

Importantly the bypass will take away the significant volume of large trucks currently travelling along the highway through the centre.

The Masterplan strategy is to achieve a mode shift goal to sustainable travel (bus, cycle) of 10%.


Bucca Bucca Ck
Ulidarra National Park
Pine Brush Ck
Kororo Nature Reserve
Orara East State Forest
Korora Hill interchange
Korora
Shephards Lane tunnel
Gatelys Road tunnel
Karangi Ck
Orara River
Coffs Coast Regional Park
Gatelys Road
Red Hill
Shephards Lane
Treefern Ck
Coramba Road interchange
Coramba Road
Existing Pacific Highway
Roberts Hill tunnel
Boambee State Forest
Coffs Creek
Muttonbird Island Nature Reserve
Thompsons Hill
Coffs Harbour
Newports Creek
Englands Road
Englands Road interchange
North Coast Railway
Boambee Creek
Legend
Construction footprint
Alignment
North Coast Railway
Watercourse
Coffs Harbour Bypass
Key features of the project
Figure 1
0 0.5 1 1.5 km
N
Scale @A4: 1:50,000
GDA 1994 MGA Zone 56

## 4.3 Transport Services, Pedestrians and Cyclists

Travel by bus will be improved as a result of the reduction in through traffic movements (transferred to the bypass road) as well as the 'ring road' and 'access improvements' while a 'bus hub' is to be provided on Vernon Street. The Masterplan initiatives will both encourage and facilitate increased bus services and bus patronage.

The Masterplan identifies proposed new and upgraded pedestrian linkages including extended mall access for Coffs Central and connection across the highway at Vernon Street.

The Masterplan proposes to extend the existing cycle network including reconfiguring City Centre streets to facilitate cycling (e.g. a dedicated cycleway along Gordon Street). See Appendix A details.

## 4.4 Parking

The Masterplan recognises the need to provide additional public parking in the City Centre while some existing on-street spaces will be lost as a result street reconfiguration and a change in travel mode is to be encouraged. The Masterplan proposes to upgrade existing parking, convert some long stay parking to short stay and investigate opportunities for the provision of additional public parking.

# 5.0 Traffic

An indication of the potential traffic generation of the proposed residential apartments is provided by the TfNSW Development Guidelines which specify a rate of 0.29 vtph per apartment for the morning and afternoon peak periods for sites which do not have convenient access to rail services. Whilst this criteria is not exactly related to a location such as Coffs Harbour the traffic generation of the proposed apartments will be "tempered" by the retiree/holiday rental element and the CBD location with close proximity to shops, cafes, entertainment and other services.

The TfNSW Development Guideline traffic generation criteria for 'retail' is for large shopping centres and is not applicable to the proposed small retail element, however the Guidelines provide an indication of the traffic generation rate of "specialty shops" as follows:

Thursday PM

V (P) = 46 A (ss)

*A = 1,000m$^2$ GLA of ss floorspace*

On this basis, the proposed 735m$^2$ of retail floorspace will generate some 34 vtph during the Thursday afternoon peak while the morning peak generation will be some 50% or 17 vtph at most.

Accordingly, on this basis, the projected traffic generation of the proposed development is as follows:

| | | AM | PM |
|---|---|---|---|
| **Residential Apartments** | | | |
| | 95 | 28 vtph | 28 vtph |
| **Retail** | | 17 vtph | 34 vtph |
| | **Total:** | **45 vtph** | **62 vtph** |
| | **IN** | 15 vtph | 39 vtph |
| | **OUT** | 30 vtph | 23 vtph |

The distribution of generated traffic movements will inevitably be very diverse as indicated on Fig 6 and there will be no real concentration of origins as destinations for either the retail or residential trips. It is also likely that some 10 of the retail spaces will in reality be taken up by retail tenants and this will act to subdue the “turnover” of the retail spaces.

One additional mitigating factor will be the existing trips generated by the many uses in the existing building (tenants and visitors) al be it generated from on-street or other public parking areas. However, it is not possible to identify or discount these potentially significant existing movements while the identified retail movements will also have an element of dual visitation with the other Town Centre uses.

It is not feasible to exactly identify the generated directional traffic movement outcome of the proposed development while in relation to the “other developments” the following considerations apply:

- **Duke Street Boarding House**

  This assessed additional vehicle trips in the Traffic Report which accompanied the Development Application was 4 vtph in the Am and 3 vtph in the PM and the traffic movements would be quite imperceptible and meaningless.

- **Councils “All Welcome Centre”**

  The Traffic Report which accompanied the Development Application did not identify the parking provision or traffic generation of the existing 3 commercial buildings. While a traffic generation assessment is given for the proposed development there is no indication of what the “additional traffic generation” (ie with existing traffic discounted) will be except that the new car park will have 74 spaces, 37 of which will be designated for Council use.

  This noted however that the traffic modelling assessment was that LOS A would be retained at the principal access intersection.

A normal traffic generation factor for traffic (i.e. Council) use is that 60% of staff arrive/depart in the AM and PM peak hour respectively. Thus the 37 spaces represent some 22 trips arriving in the AM and departing in the PM while the other 37 spaces would only have minor use in the AM and might generate 1 vtph per space at most in the PM 50% IN/ 50% OUT.

Thus the assessed "additional" trip generated by the Council development is as follows:

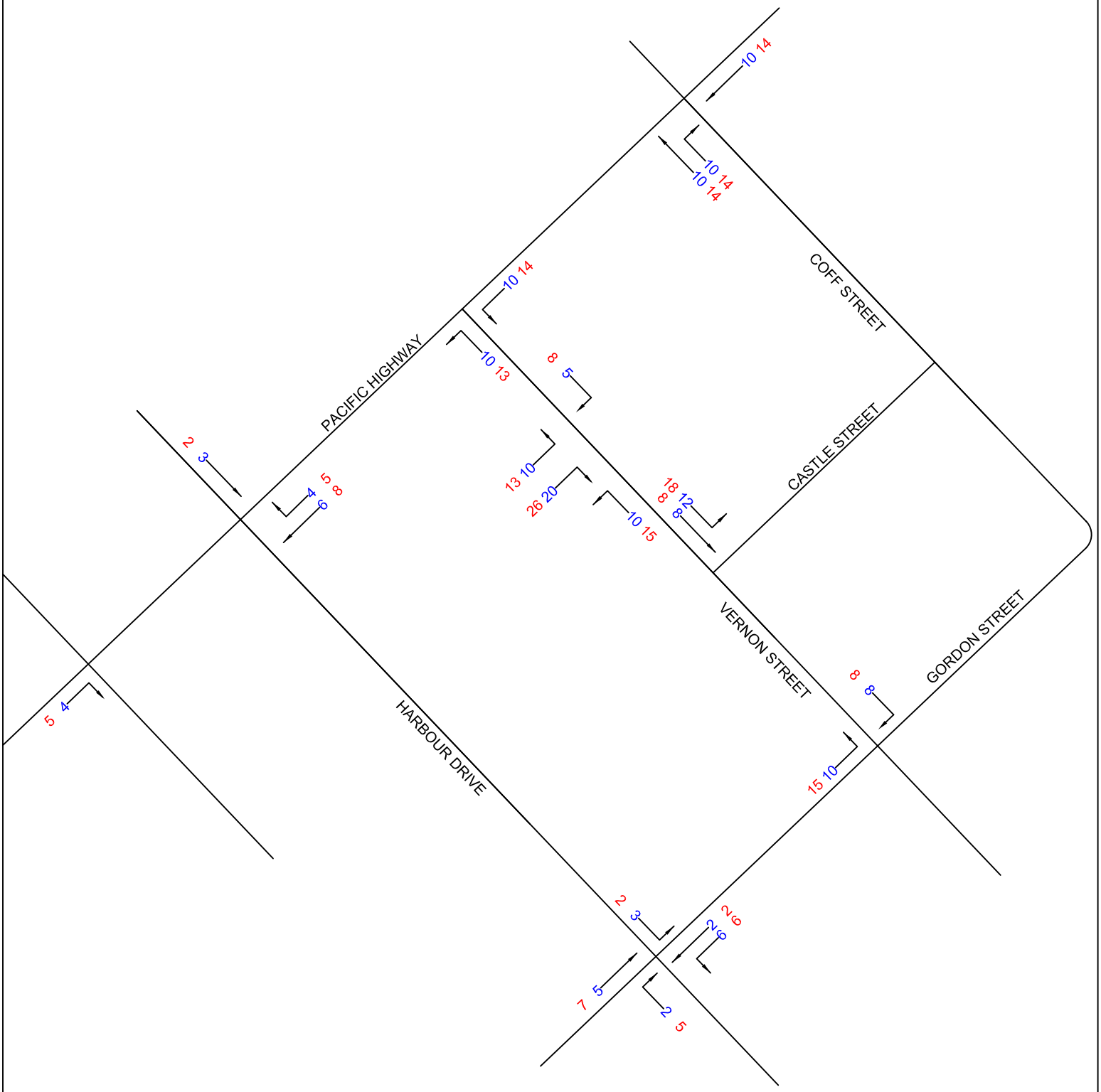
| AM | | PM | |
|---|---|---|---|
| **IN** | **OUT** | **IN** | **OUT** |
| 27 | 5 | 20 | 40 |

These movements have been distributed on the basis of the Anson assessment together with the generation of the other proposed development (Figure 6) with no 10 year design horizon being assessed due to the program to construct the Highway Bypass.

SIDRA assessment has been undertaken for "post development" circumstance and the results are provided in Appendix D and summarised in the following:

| | AM | | PM | |
|---|---|---|---|---|
| | **LOS** | **AVD** | **LOS** | **AVD** |
| Pacific/Harbour | B | 22.3 | B | 24.1 |
| Pacific/Coffs | C | 33.3 | C | 40.8 |
| Pacific/Park | C | 34.3 | C | 36.3 |
| Harbour/Gordon | C | 29.8 | B | 27.7 |
| Gordon/Vernon | A | 3.3 | A | 3.6 |

The results indicate that the existing levels of reserve will be retained and the additional traffic movements will be largely imperceptible.




**LEGEND**

- AM
- PM

# GENERATED PEAK TRAFFIC MOVEMENTS

**FIG 6**

# 6.0 Parking

Coffs Harbour City Council's DCP specifies parking provision criteria in relation to the proposed development as follows:

**Residential Apartments**

| | |
|---|---|
| 1 & 2 Bed | 1 space |
| 3 Bed | 2 spaces |
| 1 space per 5 apartments for visitors | |

**Retail**

1 space per 25m$^2$ GLFA

Application of these criteria to the proposed development would indicate a provision of:

**Residential**

| | | | |
|---|---|---|---|
| 95 apartments | 86 x 1 & 2 Bed | | 86 spaces |
| | 9 x 3 Bed | | 18 spaces |
| | | **Total** | **104 spaces** |
| **Visitors** (95) | | | 19 spaces |
| **Retail** 735m$^2$ GFA | | | 29 spaces |
| | | **Total** | **152 spaces** |

It is proposed to provide a total of 154 spaces comprising:

| | |
|---|---|
| **Residents** | 104 spaces (4 accessible) |
| **Visitors** | 19 spaces (1 accessible) |
| **Retail** | 31 spaces (1 accessible) |

It is proposed to provide parking for bicycles and motorcycles as follows:

**Bicycles**

A Class 1 secured storage room on the ground level for 12 bicycles with adjacent end of trip facilities for staff parking.

Class 3 rack parking in the pedestrian laneway for visitor parking.

**Motorcycles**

It is proposed to provide 2 spaces on the ground level (adjacent to bicycle room) and 2 spaces on Level 1.

# 7.0 Access, Internal Circulation and Servicing

## Access

It is proposed to provide a 7.5m wide combined ingress/egress driveway on the Vernon Street frontage and this will require the relocation of existing kerbside parking spaces to the eastern side of the driveway and removal of an existing Loading Zone (which essentially served the existing building which has no on-site loading provision).

Vernon Street is straight and level at this location and the proposed driveway will accord with the design requirements of AS2890.1 and 2 and there will be satisfactory sight distances available for drivers and pedestrians.

## Internal Circulation

A simple two-way internal circulation arrangement would be provided through the parking levels with design criteria compliant with AS2890.1 and 6. The residential carparking will be secured and segregated from retail/visitor carparking and quite generous manoeuvring and 'turnaround' provisions are a feature of the design.

## Servicing

A loading dock will be provided suitable for vans, MRVs and Council's garbage truck on Ground Level. Tenants vans typically associated with small retail units and other small service vehicles (e.g. service personnel, couriers etc) will also be able to use the retail/visitor parking spaces. Details of the turning path assessment for Council's truck are provided in Appendix E.

# 8.0 Conclusion

Assessment of the proposed development scheme has concluded that:

- the proposed parking provision will be adequate and appropriate
- the proposed vehicle access, internal circulation and servicing arrangements will be suitable
- there will be no unsatisfactory traffic implications

# Appendix A

## Extracts from Masterplan

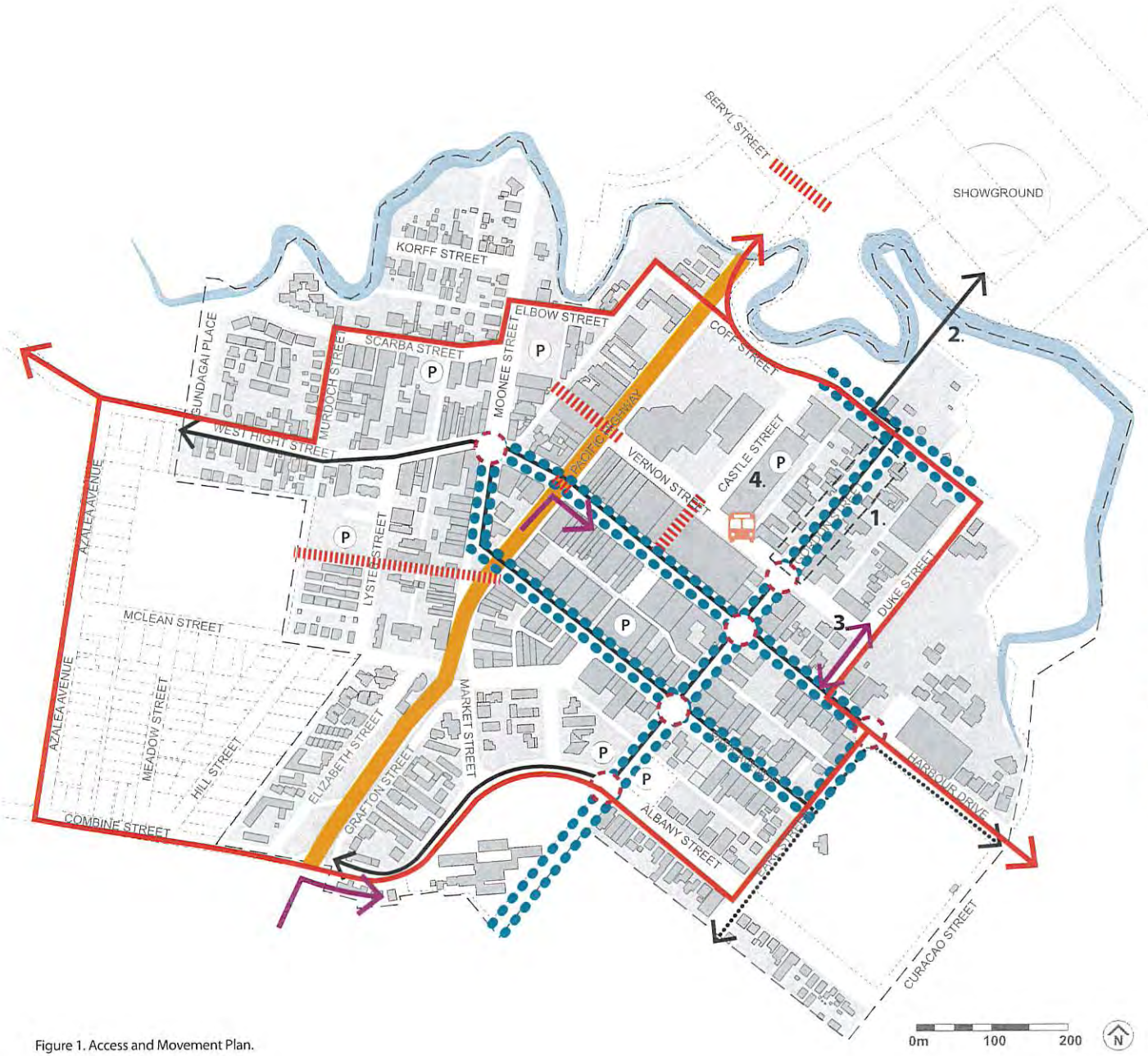
COFFS HARBOUR CITY CENTRE

# MASTERPLAN 2031

# Access and Movement

One of the key objectives of this Masterplan is to achieve a connected City Centre. The Strategies and Projects outlined within the Masterplan will result in an environment where there is a balance between the pedestrian, cyclist, public transport and private vehicle. Equitable access will be key to the evolution of the City Centre towards 2031.

The plan opposite illustrates the multi- modal intent of the Masterplan and compatibility of the transport systems. The *Details* below are discussed as components of the Strategies and Projects within the balance of this document.



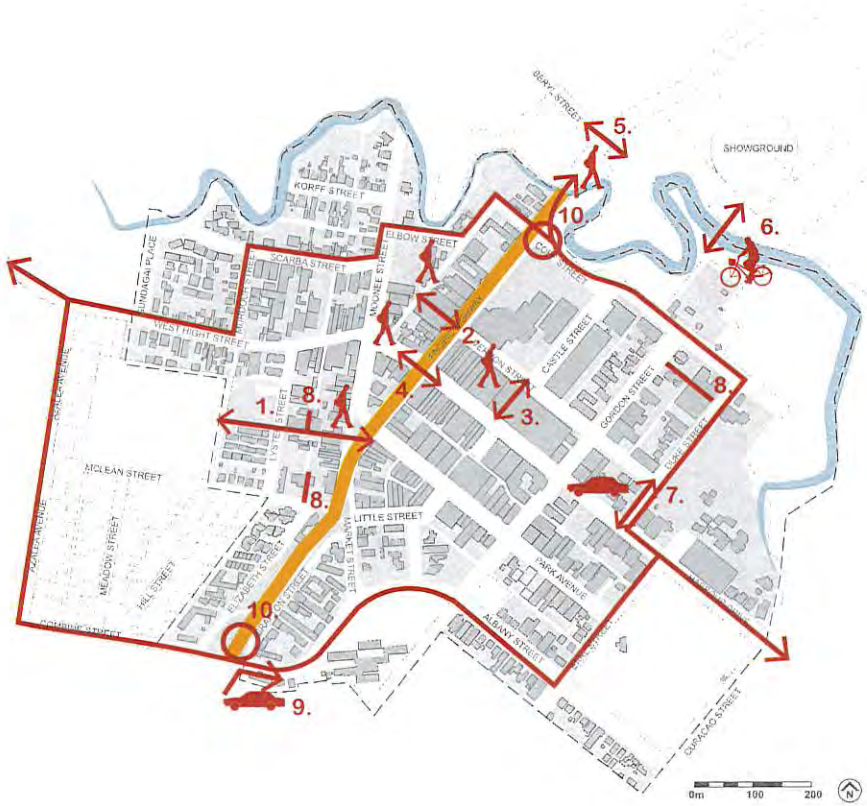

ACCESS AND MOVEMENT

- City Centre Study Area Boundary
- Existing Block
- Existing Building Footprint
- Development Outside Study Area
- Pacific Highway
- Pedestrian Connection
- Street Reconfiguration
- Roundabout Retrofit
- Cycleway- Separated
- Cycleway - Park Trail
- Bus Hub
- Access Improvement
- Inner Ring Road
- P Carpark Investigation Site

*Details*

1. Gordon Street- Trial 'Display Street Reconfiguration'
2. Coffs Bridge Upgrade
3. Duke Street Extension
4. Castle Street Carpark- New Rooftop Sail and Lift

Figure 1. Access and Movement Plan.



# Strategy: Key Connections (S- KC)

Principle: A City Centre movement network should allow safe and equitable access for cars, pedestrians and cyclists. By providing a number of routes and a hierarchy of thoroughfares traffic can self-regulate and the function of the City Centre will improve.

Finding: The city benefits from a robust street network however, there are a number of missing links. Completing these missing links will improve the legibility and permeability of the City over time.

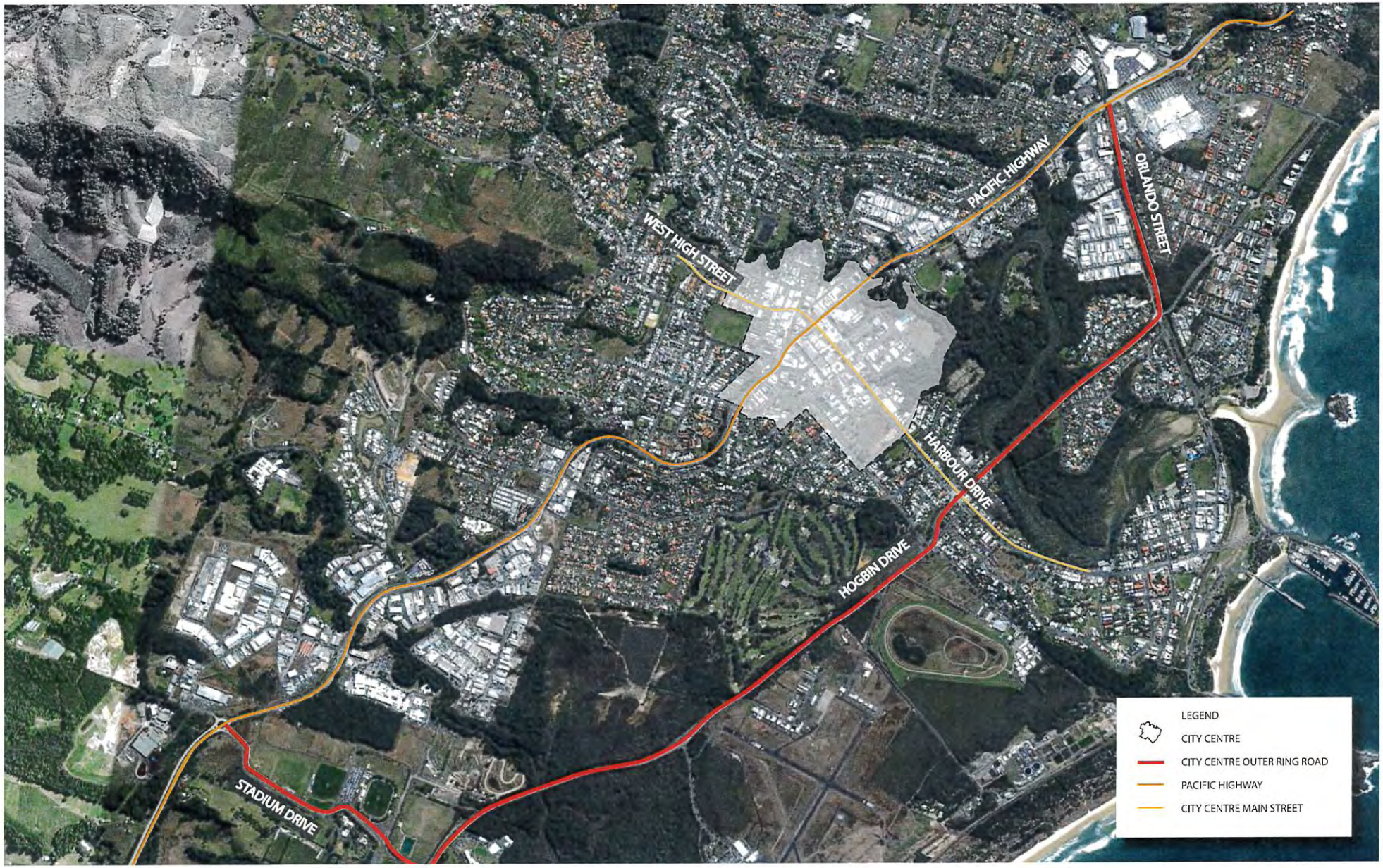
Benefits:

- To alleviate current capacity issues encouraging drivers to visit the City Centre;
- To bypass Harbour Drive and the City Centre;
- To accept driving slower in order to be a part of the retail, civic and cultural experience of Harbour Drive;
- To improve pedestrian connections across the Pacific Highway;
- To improve legibility, access and safety by encouraging mid- block pedestrian connections as part of private development; and
- To provide a recreational loop for pedestrians and cyclists connecting the City Centre to parks and natural assets.

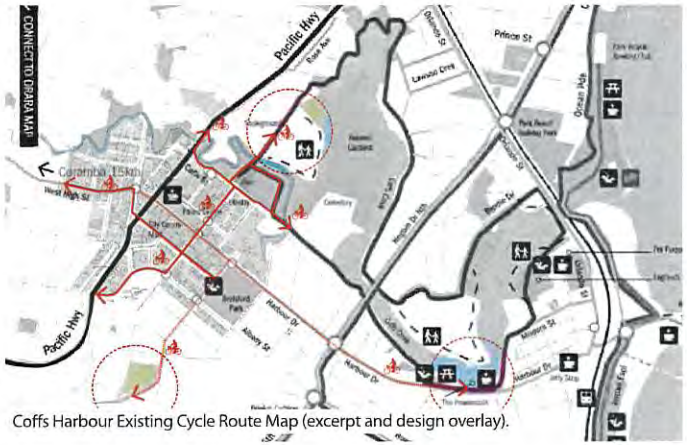
1. Police Station redevelopment is to retain the public connection between Lyster St. Carpark and Pacific Hwy. and Improve Pacific Hwy pedestrian crossing.
2. Future redevelopment is to retain public connection between Moonee St. Carpark and Vernon St.
3. Coffs Central to provide for extended mall access.
4. Pedestrian crossing from Moonee St. to Harbour Dr.
5. Pedestrian crossing to be included at Beryl St. (Justice Precinct) signals. Note: Funded by State Government.
6. Improve Coffs Creek Bridge to increase cycle and pedestrian use.
7. Formalise the proposed Duke St. connection.
8. Complete and connect rear laneways for rear vehicle access encouraging new development to address open space and key streets.
9. Extend the right turn lane at the intersection of Pacific Hwy and Albany St.
10. Establish a City Centre ring road with the Pacific Hwy and Coff St. and Albany St. as key connection points.
11. Facilitate outer ring road (diagram overleaf).

Figure 2. Key Connections Plan.

| Projects: | Cost: |
|---|---|
| Facilitate the function of an outer ring road. | N/A |
| Establish a City Centre inner ring road. | N/A |
| Provide and formalise the Duke St extension as a permanent component of the inner ring road. | $300,000 |
| Incorporate pedestrian crossings with City Sail Projects including Pacific Hwy/ Harbour Dr intersection. | TBD |
| Upgrade the Coffs Creek Bridge. | $36,900 |
| Extend the right turn lane onto Albany St to alleviate current capacity issues and ensure satisfactory operation into the future. | $200,000 |
| Incentivise private developers to realise the mid- block pedestrian connections and rear laneways. | N/A |
| Coffs Central to provide extended mall access. | N/A |




# 11. Strategy: Key Connections (S- KC) - THE OUTER RING ROAD



Coffs Harbour Existing Cycle Route Map (excerpt and design overlay).

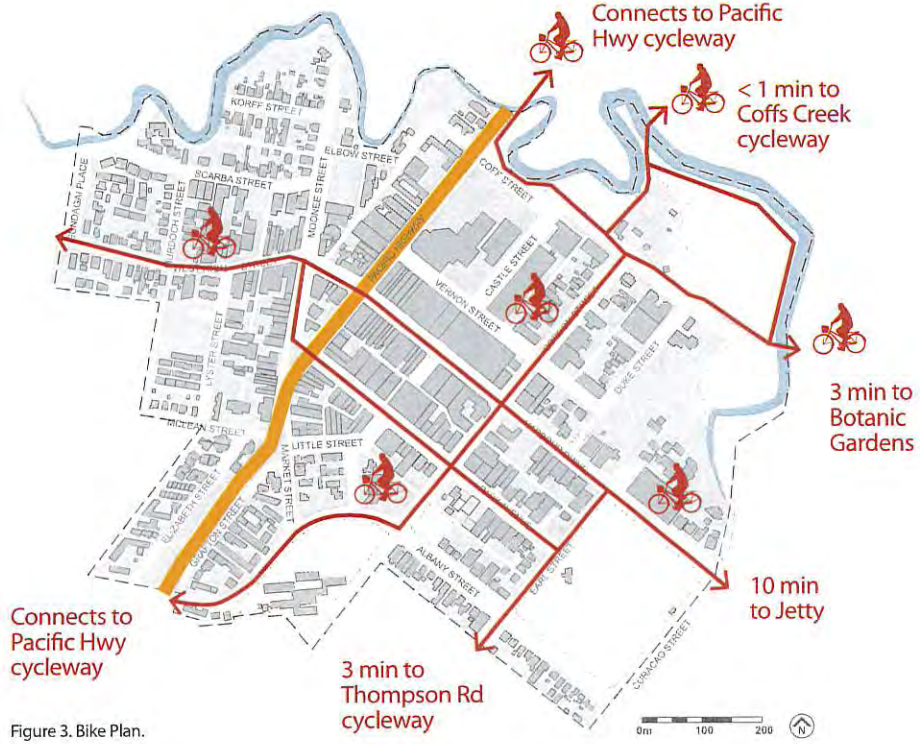


Figure 3. Bike Plan.

# Strategy: Bike Plan (S-BP)

Principle: The greatest revolution of sustainable transport underway in progressive cities is welcoming bikes into the City Centre as a viable alternative transport choice. By shifting even a portion of people going to work onto a bike cities significantly benefit socially, economically and environmentally.

Finding: The opportunity exists to extend the existing cycle network into the City Centre and provide the framework for a balanced, sustainable transport network to evolve over time.

Benefits:

- To appeal to an emerging demographic;
- To provide opportunities to leverage off of associated retail uses such as bike rental and repair shops;
- To increase retail sales along bike routes consistent with research findings into retail spending patterns;
- To facilitate a shift in modal choice resulting in additional parking capacity;
- To use the Gordon Street trial to observe increased cycle activity and monitor the areas where bicycles are parked informally and provide formal parking and end of trip facilities in these locations; and
- To most efficiently utilise City Centre land when 10 parked bikes occupy the same area as one parked car.

| Projects: | Cost: |
|---|---|
| Use Gordon St between Coff St and Harbour Dr as the trial for a separated cycleway and intersection performance. | $275,650 |
| Implement the City Centre Street Reconfiguration Project for all streets. | Refer to (P- SR) p.42 |
| Adopt the City Centre Bike Plan. | N/A |
| Strengthen and promote Ride-To-Work Day and family cycling events and education days. | Refer to (P- EP) p.57 |
| Provide +100 bike racks and end of trip facilities at locations identified through observation of ad- hoc parking locations. | TBD |
| Incorporate end of trip facilities into the Bus Hub and into new developments in the City Centre core as required over time. | TBD |

# Legibility

One of the key objectives of this Masterplan is to ensure that visitors to the City Centre are easily able to experience the City's natural and urban assets and to encourage them to stay longer.

As the City Centre transforms into a 21st Century City, the Strategies and Projects outlined within this report will provide a framework for the City to be known by visitors as a unique, memorable and accessible destination.

The plan opposite illustrates the numerous Strategies and Projects that will reinforce the Vision for the City Centre. The *Details* below are discussed as components of the Strategies and Projects within the balance of this document.

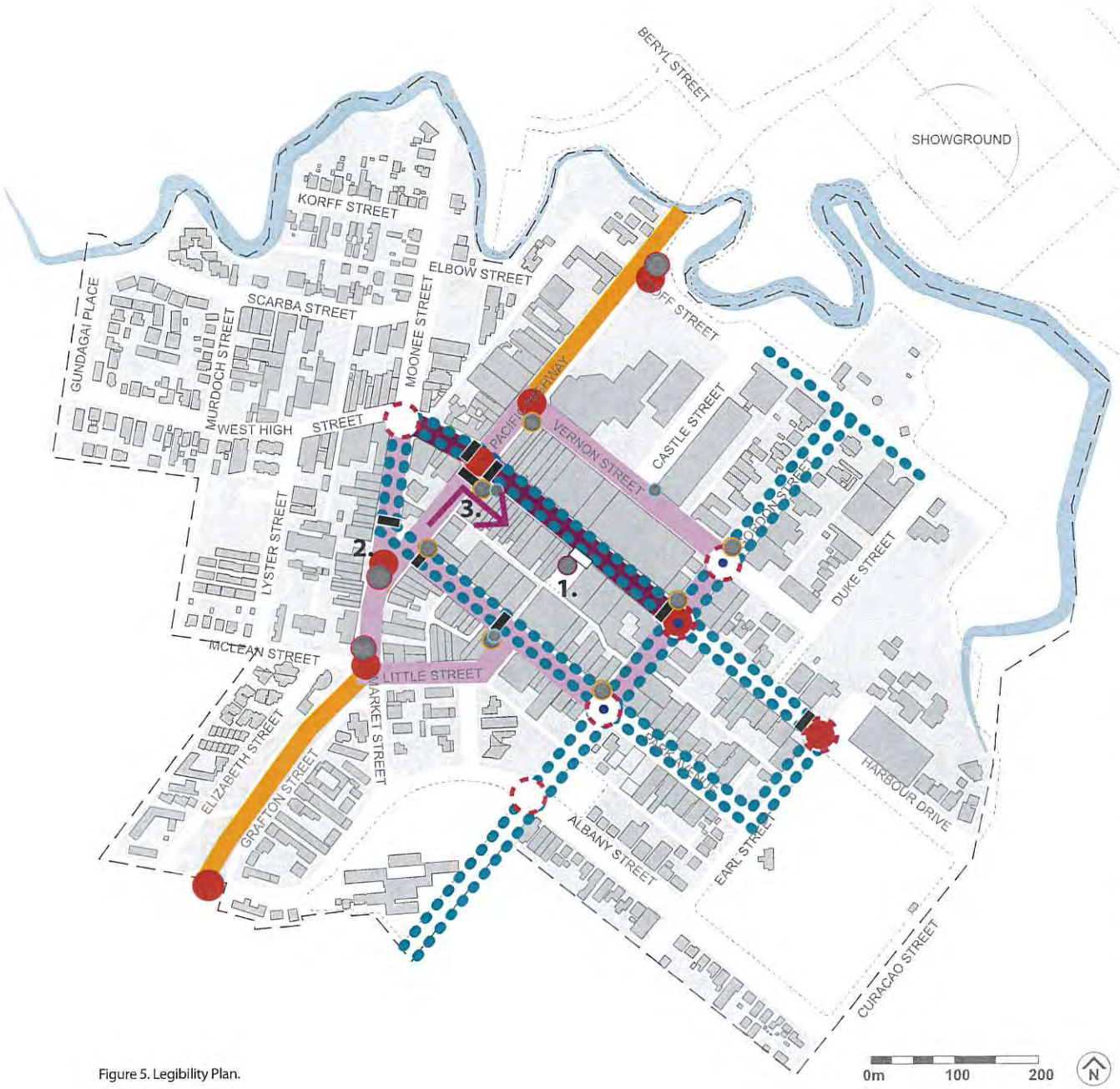



Figure 5. Legibility Plan.

LEGIBILITY

- City Centre Study Area Boundary
- Existing Block
- Existing Building Footprint
- Development Outside Study Area
- Pacific Highway
- Street Reconfiguration
- City Centre Main Street
- City Centre Supporting Street
- Roundabout Retrofit
- City Centre Gateway
- City Sails
- City Sail To Be Relocated

Signage-

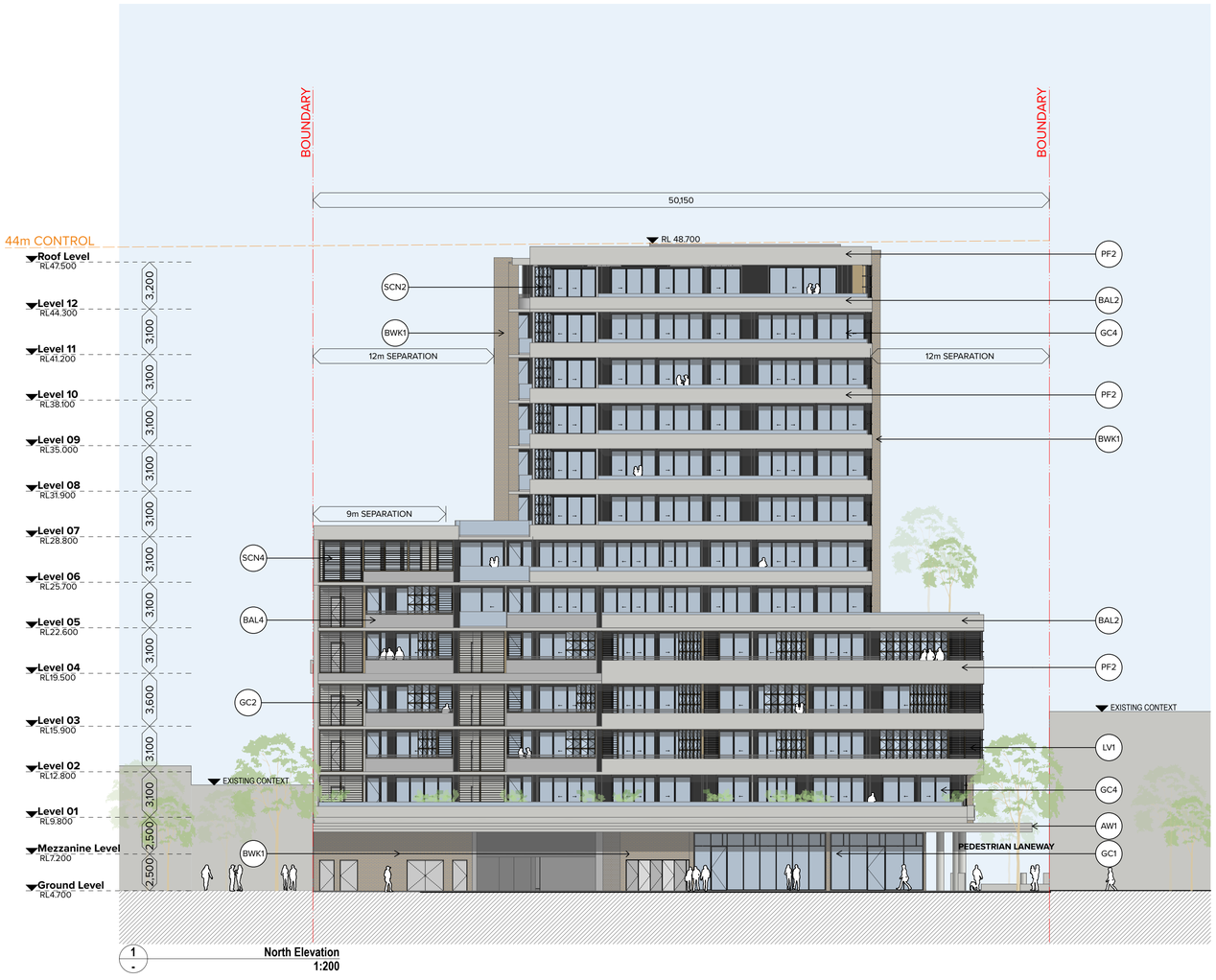
- City Centre Entry Post
- Key Streets Entry Post
- Relocatable Median Banner
- City Centre Information Post 1
- City Centre Information Post 2
- Direct Main Street Access

*Details*

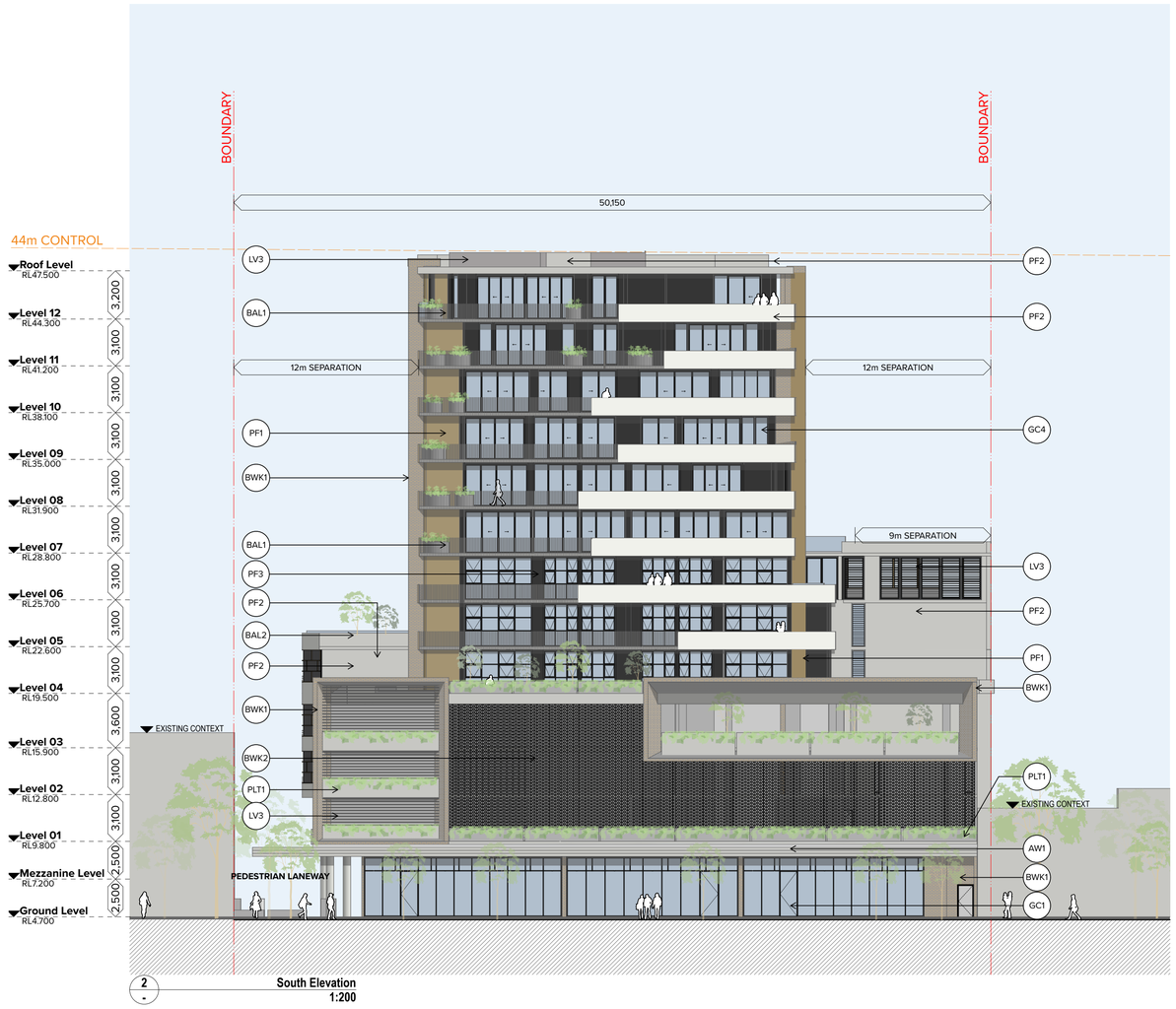
1. City Square Public Domain Improvements
2. Moonee Street Entry Statement
3. Harbour Drive Right Turn From South

# Appendix B

## Development Plans




1 - **North Elevation**
**1:200**




2 - **South Elevation**
**1:200**

**Materials Legend:**

- BAL1 Balustrade Type 1 — Vertical 100 x 20 metal baluster, no top rail. Slab front fixed. Colour to match PF1.
- BAL2 Balustrade Type 2 — Semi-Frameless opaque glass fixed to concrete upturn balustrade
- BAL3 Balustrade Type 3 — Semi-frameless full height opaque glass. PF3 Metal baluster fixed to slab
- BAL4 Balustrade Type 4 — Horizontal balusters fixed to concrete upturn. COF1 finish.
- BWK1 Brickwork Pattern Type 1 — Stretcher Bond Austral Bowral Dry Pressed Brick Colour to match "Simmental Silver"
- BWK2 Brickwork Pattern Type 2 — Perforated screening similar to Austral breeze-block
- GC1 Retail Glazing with PF3 framing (Refer to Section J for glass requirement)
- GC2 Residential Glazing with PF1 framing (Refer to BASIX for glass requirement)
- GC3 Residential Glazing with PF2 framing (Refer to BASIX for glass requirement)
- GC4 Residential Glazing with PF3 framing (Refer to BASIX for glass requirement)
- GC5 Colourback Glazing with PF1 framing (Refer to BASIX for glass requirement)
- GC6 Colourback Glazing with PF2 framing (Refer to BASIX for glass requirement)
- LV1 Louvre Type 1 — Operable Glass Louvre Window with PF1 framing
- LV2 Louvre Type 2 — Operable Glass Louvre Window with PF3 framing
- LV3 Louvre Type 3 — Fixed Horizontal Louvre System to plantrooms.
- COF1 Concrete Off Form 1 — Smooth off form concrete. Penetrating clear matte sealer over.
- PF1 Paint Finish Type 1 — Paint finish - light bronze or equivalent powdercoat finish where applicable
- PF2 Paint Finish Type 2 — Paint finish to match Dulux "Natural White" or equivalent powdercoat finish where applicable
- PF3 Paint Finish Type 3 — Paint finish to match Dulux "Monument" or equivalent powdercoat finish where applicable
- PLT1 Planter Type 1 — GRC Planter
- AW1 Awning with PF2 finish
- SCN1 Screen Type 1 — Bifold glazing. PF1 finish.
- SCN2 Screen Type 2 — Bifold glazing. PF2 finish.
- SCN3 Screen Type 3 — Aluminium plant screen. PF3 finish.
- SCN4 Screen Type 4 — Aluminium plant screen. PF1 finish.

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DLCS Quality Endorsed Company ISO 9001:2015, Registration Number 20476
Nominated Architect: Nicholas Turner 6935, ABN 86 094 684 911

**CLIENT**
**Paynter Dixon**
Level 2 2 Richardson Place Riverside
Corporate Park North Ryde NSW 2113

Project Title
**15-31 Harbour Drive**
Harbour Drive Coffs Harbour State Postcode Country

Drawing Title
**Elevations**
**North and South Elevation**

| Rev | Date | Approved by | Revision Notes |
|---|---|---|---|
| 02 | 11.12.20 | BF | For DA Submission |
| 01 | 01.12.20 | BF | For Coordination |

Scale: **1:200, 1:100 @A1, 50%@A3**
Project No.: **20023**
Drawn by: **TURNER**
North
Status: **For Information**
Dwg No.: **DA-210-001**
Rev: **02**

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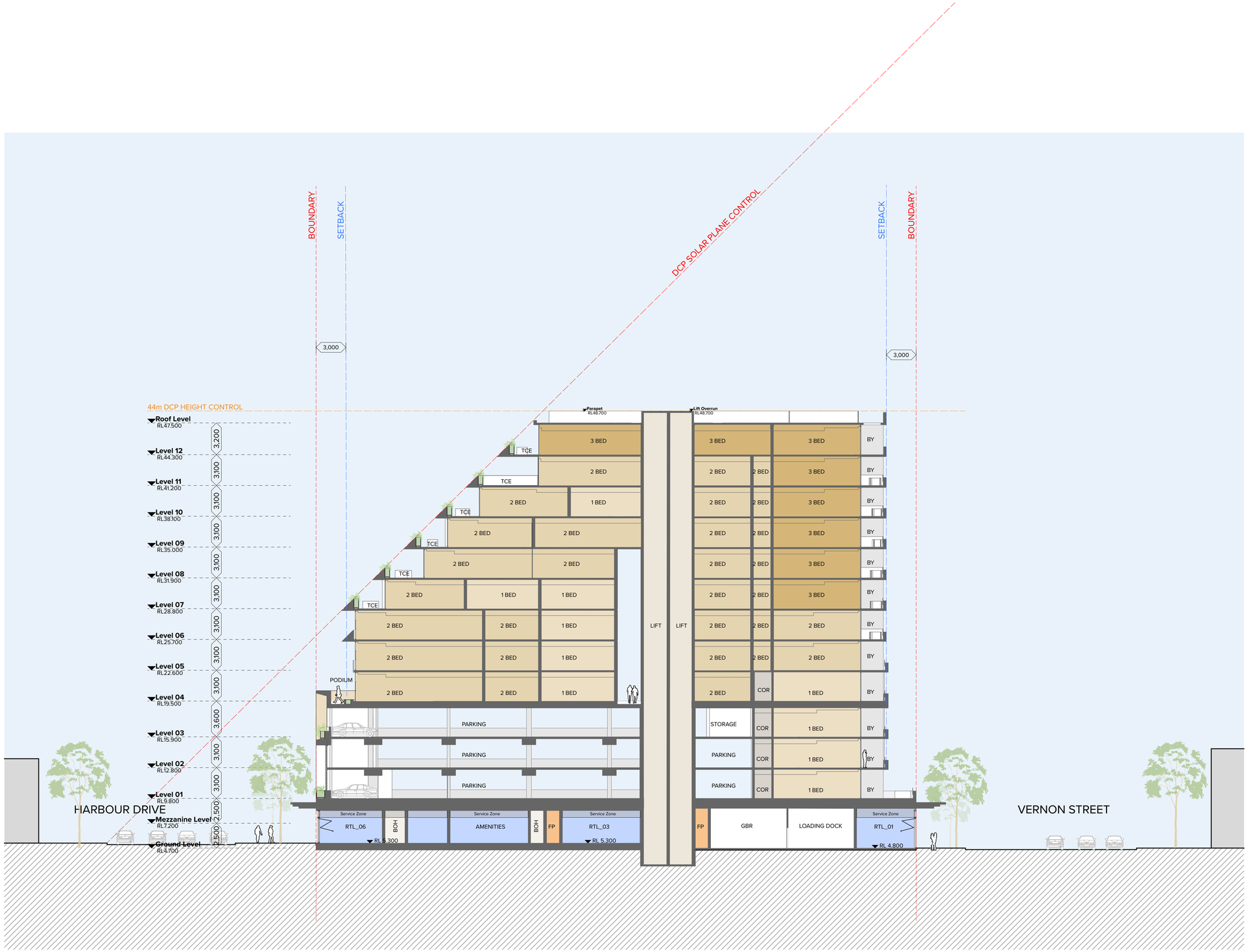


1 / - Section (2)
1:200

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DLCS Quality Endorsed Company ISO 9001:2015, Registration Number 20476
Nominated Architect: Nicholas Turner 6685, ABN 86 064 094 911

**CLIENT**
**Paynter Dixon**
Level 2 2 Richardson Place Riverside
Corporate Park North Ryde NSW 2113

Project Title
**15-31 Harbour Drive**
Harbour Drive Coffs Harbour State Postcode Country

Drawing Title
**Sections**
**Section 01**

| Rev | Date | Approved by | Revision Notes |
|---|---|---|---|
| 02 | 11.12.20 | BF | For DA Submission |
| 01 | 11.11.20 | BF | For Coordination |

Scale: 1:200 @A1, 50%@A3
Project No.: 20023
Drawn by: TURNER
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Status: For Information
Dwg No.: DA-310-001
Rev: 02

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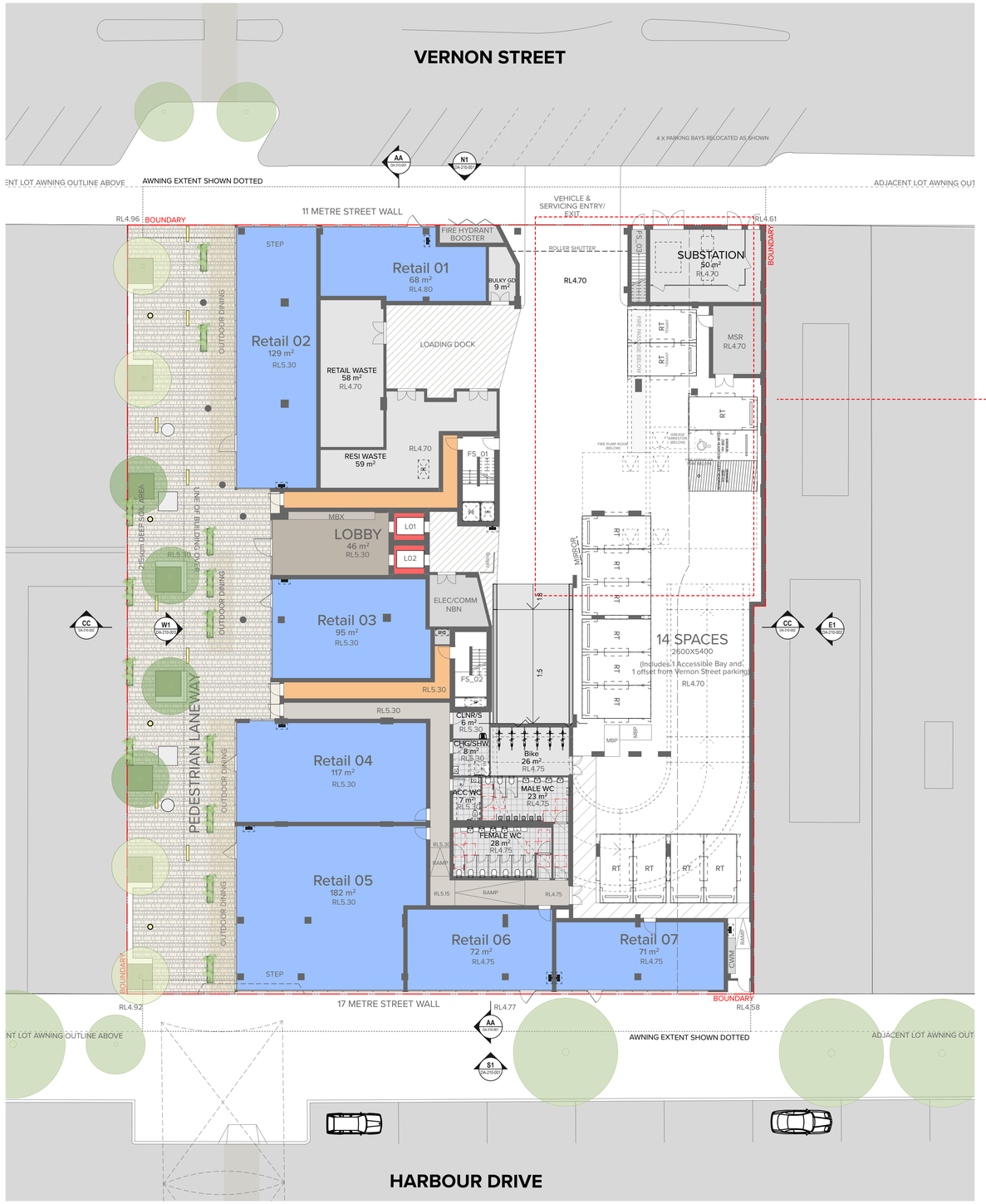
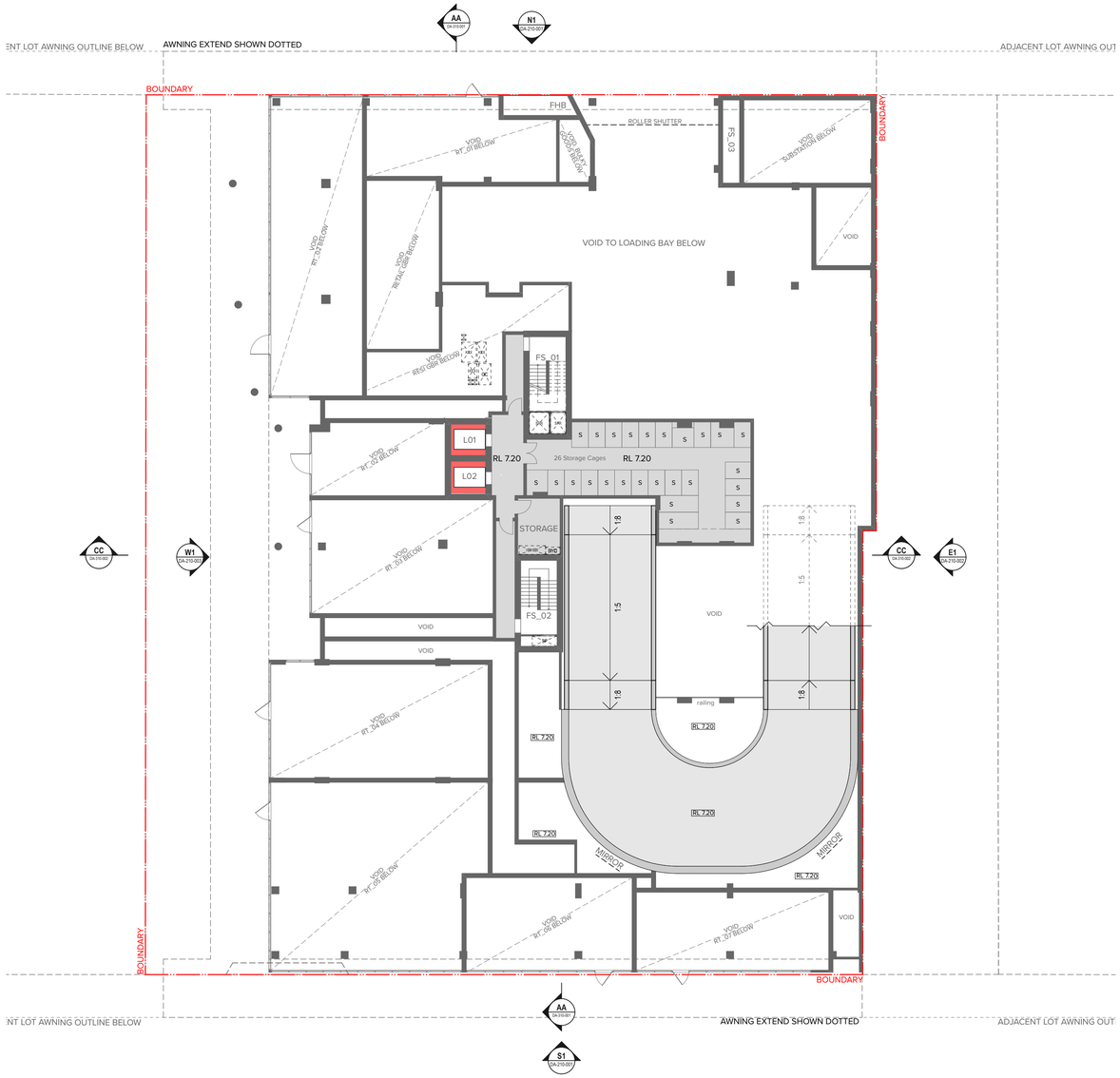

VERNON STREET
4 X PARKING BAYS RELOCATED AS SHOWN
AA DA-210-001
N1 DA-210-001
ENT LOT AWNING OUTLINE ABOVE
AWNING EXTENT SHOWN DOTTED
ADJACENT LOT AWNING OUT
11 METRE STREET WALL
VEHICLE & SERVICING ENTRY/ EXIT
RL4.96
BOUNDARY
RL4.61
BOUNDARY
FIRE HYDRANT BOOSTER
STEP
Retail 01
68 m²
RL4.80
BULKY GD
9 m²
ROLLER SHUTTER
RL4.70
FIRE DOOR
SUBSTATION
50 m²
RL4.90
Retail 02
129 m²
RL5.30
OUTDOOR DINING
RETAIL WASTE
58 m²
RL4.70
LOADING DOCK
RESI WASTE
59 m²
RL4.70
FS_01
MSR
RL4.70
RT
RT
RT
RT
FIRE PUMP ROOM BELOW
GREASE TURRETOR BELOW
HYDRANT AND SPRINKLER BOOSTER PUMPS
FIRE PUMP ROOM BELOW
MBX
LOBBY
46 m²
RL5.30
L01
L02
LINE OF AWNING OVER
WIDTH DEPOT AREA
RL5.30
OUTDOOR DINING
ELEC/COMM NBN
LIFT OVERRUN
Retail 03
95 m²
RL5.30
FS_02
RL5.30
CLNR/S
6 m²
RL5.30
CHG/STW
8 m²
RL5.30
RL5.30
PEDESTRIAN LANEWAY
Retail 04
117 m²
RL5.30
OUTDOOR DINING
Bike
26 m²
RL4.75
MBP
MBP
ACC WC
7 m²
RL5.30
MALE WC
23 m²
RL4.75
FEMALE WC
28 m²
RL4.75
RL5.30
RAMP
Retail 05
182 m²
RL5.30
OUTDOOR DINING
RL5.15
RAMP
RL4.75
14 SPACES
2600X5400
(Includes 1 Accessible Bay and 1 offset from Vernon Street parking)
RL4.70
RT
RT
RT
RT
Retail 06
72 m²
RL4.75
Retail 07
71 m²
RL4.75
GWM
RAMP
STEP
BOUNDARY
RL4.92
17 METRE STREET WALL
RL4.77
BOUNDARY
RL4.58
AA DA-210-001
S1 DA-210-001
NT LOT AWNING OUTLINE ABOVE
AWNING EXTENT SHOWN DOTTED
ADJACENT LOT AWNING OUT
HARBOUR DRIVE
CC DA-210-002
W1 DA-210-001
CC DA-210-002
E1 DA-210-001
1:5
1:5
1:5




1 / - **Mezzanine Level**
**1:200**

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DLCS Quality Endorsed Company: ISO 9001:2015, Registration Number 20476
Nominated Architect: Nicholas Turner: 6695, ABN 86 064 084 911

**CLIENT**
**Paynter Dixon**
Level 2 2 Richardson Place Riverside
Corporate Park North Ryde NSW 2113

| Rev | Date | Approved by | Revision Notes |
|---|---|---|---|
| 04 | 11.12.20 | BF | For DA Submission |
| 03 | 08.12.20 | BF | For Coordination |
| 02 | 01.12.20 | BF | For Coordination |
| 01 | 27.11.20 | BF | For Coordination |

Project Title
**15-31 Harbour Drive**
Harbour Drive Coffs Harbour State Postcode Country

Drawing Title
**GA Plans**
**Mezzanine Level**

Scale **1:200 @A1, 50%@A3**
Status **For Information**
Project No. **20023**
Dwg No. **DA-110-005**
Drawn by **TURNER**
Rev **04**
North

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# VERNON STREET

# HARBOUR DRIVE

1 / - **Level 01**
**1:200**

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DLCS Quality Endorsed Company: ISO 9001:2015, Registration Number 20476
Nominated Architect: Nicholas Turner 6695, ABN 86 064 084 911

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Project Title
**15-31 Harbour Drive**
Harbour Drive Coffs Harbour State Postcode Country

Drawing Title
**GA Plans**
**Level 01**

| Rev | Date | Approved by | Revision Notes |
|---|---|---|---|
| 07 | 11.12.20 | BF | For DA Submission |
| 06 | 08.12.20 | BF | For Coordination |
| 05 | 01.12.20 | BF | For Coordination |
| 04 | 27.11.20 | BF | For Coordination |
| 03 | 20.11.20 | BF | For Coordination |
| 02 | 11.11.20 | BF | For Coordination |
| 01 | 29.10.20 | BF | For Coordination |

Scale: **1:200 @A1, 50%@A3**
Project No.: **20023**
Drawn by: **TURNER**
North
Status: **For Information**
Dwg No.: **DA-110-010**
Rev: **07**

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VERNON STREET

HARBOUR DRIVE

1 - **Level 02**
**1:200**

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Nominated Architect: Nicholas Turner 6695, ABN 88 094 084 911

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Project Title
**15-31 Harbour Drive**
Harbour Drive Coffs Harbour State Postcode Country

Drawing Title
**GA Plans**
**Level 02**

| Rev | Date | Approved by | Revision Notes |
|---|---|---|---|
| 07 | 11.12.20 | BF | For DA Submission |
| 06 | 08.12.20 | BF | For Coordination |
| 05 | 01.12.20 | BF | For Coordination |
| 04 | 27.11.20 | BF | For Coordination |
| 03 | 20.11.20 | BF | For Coordination |
| 02 | 11.11.20 | BF | For Coordination |
| 01 | 29.10.20 | BF | For Coordination |

Scale **1:200 @A1, 50%@A3**
Status **For Information**
Project No. **20023**
Dwg No. **DA-110-020**
Drawn by **TURNER**
Rev **07**
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VERNON STREET

HARBOUR DRIVE

1
-

**Level 03**
**1:200**


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DLCS Quality Endorsed Company ISO 9001:2015, Registration Number 20476
Nominated Architect: Nicholas Turner 6935, ABN 88 094 084 911


**CLIENT**

**Paynter Dixon**
Level 2 2 Richardson Place Riverside
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Project Title
**15-31 Harbour Drive**
Harbour Drive Coffs Harbour State Postcode Country

Drawing Title
**GA Plans**
**Level 03**

| Rev | Date | Approved by | Revision Notes |
|---|---|---|---|
| 07 | 11.12.20 | BF | For DA Submission |
| 06 | 08.12.20 | BF | For Coordination |
| 05 | 01.12.20 | BF | For Coordination |
| 04 | 27.11.20 | BF | For Coordination |
| 03 | 20.11.20 | BF | For Coordination |
| 02 | 11.11.20 | BF | For Coordination |
| 01 | 29.10.20 | BF | For Coordination |

Scale: **1:200 @A1, 50%@A3**
Status: **For Information**
Project No.: **20023**
Dwg No.: **DA-110-030**
Drawn by: **TURNER**
Rev: **07**
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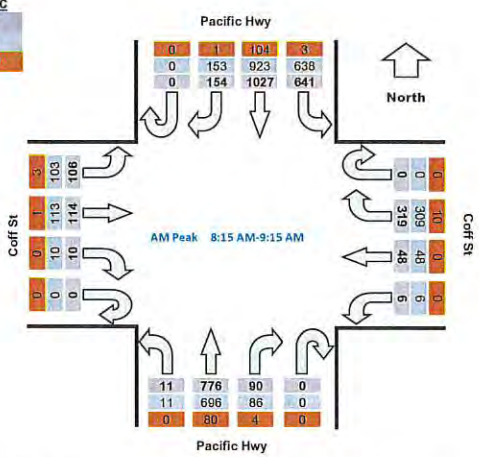
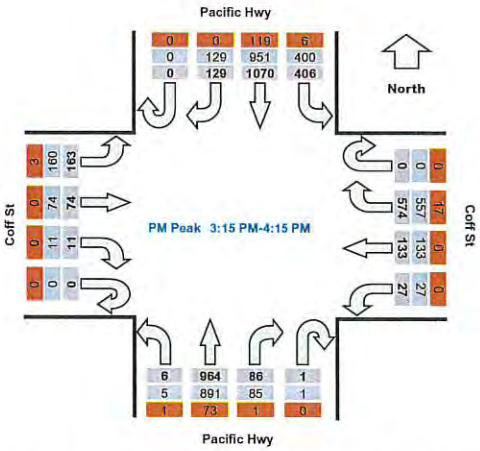
# Appendix C

## Traffic Survey Results

Graphic
Total
Light
Heavy




*Light Vehicles*

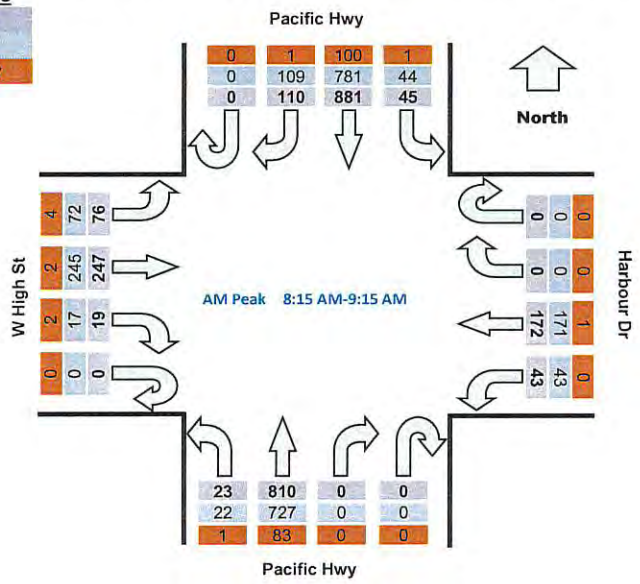
| Time | | North Approach Pacific Hwy | | | | East Approach Coff St | | | | South Approach Pacific Hwy | | | | West Approach Coff St | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Period Start | Period End | U | R | SB | L | U | R | WB | L | U | R | NB | L | U | R | EB | L |
| 6:00 | 6:15 | 0 | 0 | 103 | 12 | 0 | 10 | 1 | 0 | 0 | 1 | 66 | 0 | 0 | 0 | 0 | 2 |
| 6:15 | 6:30 | 0 | 1 | 117 | 17 | 0 | 12 | 2 | 0 | 0 | 1 | 69 | 1 | 0 | 1 | 1 | 3 |
| 6:30 | 6:45 | 0 | 0 | 111 | 29 | 0 | 15 | 0 | 0 | 0 | 0 | 75 | 0 | 0 | 0 | 0 | 5 |
| 6:45 | 7:00 | 0 | 1 | 131 | 30 | 0 | 16 | 1 | 0 | 0 | 1 | 86 | 1 | 0 | 1 | 2 | 5 |
| 7:00 | 7:15 | 0 | 0 | 125 | 39 | 0 | 22 | 3 | 0 | 0 | 3 | 83 | 1 | 0 | 1 | 3 | 10 |
| 7:15 | 7:30 | 0 | 9 | 163 | 42 | 0 | 22 | 3 | 0 | 0 | 1 | 96 | 1 | 0 | 1 | 9 | 9 |
| 7:30 | 7:45 | 0 | 6 | 207 | 74 | 0 | 29 | 1 | 0 | 0 | 6 | 128 | 1 | 0 | 0 | 9 | 6 |
| 7:45 | 8:00 | 0 | 20 | 209 | 124 | 0 | 35 | 4 | 0 | 0 | 7 | 141 | 0 | 0 | 0 | 19 | 16 |
| 8:00 | 8:15 | 0 | 20 | 211 | 139 | 0 | 50 | 6 | 3 | 0 | 19 | 137 | 0 | 0 | 1 | 30 | 15 |
| 8:15 | 8:30 | 0 | 39 | 242 | 177 | 0 | 43 | 14 | 0 | 0 | 26 | 165 | 4 | 0 | 3 | 30 | 17 |
| 8:30 | 8:45 | 0 | 26 | 272 | 182 | 0 | 87 | 10 | 0 | 0 | 22 | 176 | 3 | 0 | 1 | 36 | 28 |
| 8:45 | 9:00 | 0 | 48 | 228 | 155 | 0 | 77 | 9 | 3 | 0 | 25 | 191 | 1 | 0 | 4 | 25 | 26 |
| 9:00 | 9:15 | 0 | 40 | 181 | 124 | 0 | 102 | 15 | 3 | 0 | 13 | 164 | 3 | 0 | 2 | 22 | 32 |
| 9:15 | 9:30 | 0 | 31 | 194 | 86 | 0 | 58 | 9 | 4 | 0 | 17 | 160 | 7 | 0 | 3 | 32 | 27 |
| 9:30 | 9:45 | 0 | 28 | 172 | 104 | 0 | 78 | 23 | 2 | 0 | 22 | 178 | 3 | 0 | 4 | 16 | 23 |
| 9:45 | 10:00 | 0 | 32 | 212 | 135 | 0 | 75 | 19 | 10 | 0 | 10 | 176 | 2 | 0 | 6 | 36 | 30 |
| 10:00 | 10:15 | 0 | 28 | 184 | 88 | 0 | 81 | 17 | 8 | 0 | 18 | 169 | 3 | 0 | 4 | 25 | 31 |
| 10:15 | 10:30 | 0 | 22 | 205 | 79 | 0 | 101 | 32 | 4 | 0 | 20 | 208 | 2 | 0 | 4 | 25 | 39 |
| 10:30 | 10:45 | 0 | 32 | 219 | 79 | 0 | 93 | 19 | 9 | 0 | 13 | 202 | 2 | 0 | 1 | 34 | 46 |
| 10:45 | 11:00 | 0 | 23 | 207 | 107 | 0 | 94 | 27 | 7 | 1 | 26 | 192 | 2 | 0 | 7 | 21 | 26 |
| 11:00 | 11:15 | 0 | 35 | 218 | 106 | 0 | 97 | 24 | 6 | 0 | 18 | 211 | 5 | 0 | 2 | 20 | 29 |
| 11:15 | 11:30 | 0 | 32 | 211 | 87 | 0 | 120 | 22 | 8 | 0 | 26 | 195 | 1 | 0 | 3 | 23 | 31 |
| 11:30 | 11:45 | 0 | 34 | 200 | 103 | 0 | 80 | 15 | 7 | 0 | 20 | 173 | 7 | 0 | 0 | 24 | 31 |
| 11:45 | 12:00 | 0 | 22 | 216 | 103 | 0 | 104 | 29 | 7 | 0 | 31 | 160 | 8 | 0 | 5 | 21 | 25 |
| 12:00 | 12:15 | 0 | 27 | 207 | 97 | 0 | 138 | 17 | 8 | 0 | 22 | 171 | 5 | 0 | 4 | 23 | 39 |
| 12:15 | 12:30 | 0 | 27 | 209 | 91 | 0 | 102 | 21 | 10 | 0 | 20 | 192 | 3 | 0 | 2 | 18 | 34 |
| 12:30 | 12:45 | 0 | 29 | 214 | 103 | 0 | 114 | 31 | 16 | 0 | 21 | 176 | 1 | 0 | 5 | 12 | 40 |
| 12:45 | 13:00 | 0 | 30 | 198 | 104 | 0 | 91 | 17 | 9 | 0 | 16 | 182 | 1 | 0 | 2 | 24 | 23 |
| 13:00 | 13:15 | 0 | 30 | 218 | 93 | 0 | 123 | 23 | 15 | 0 | 19 | 204 | 3 | 0 | 3 | 23 | 25 |
| 13:15 | 13:30 | 0 | 28 | 202 | 92 | 0 | 138 | 24 | 12 | 0 | 10 | 185 | 6 | 0 | 0 | 21 | 28 |
| 13:30 | 13:45 | 0 | 29 | 216 | 76 | 0 | 88 | 45 | 7 | 0 | 16 | 172 | 3 | 0 | 2 | 8 | 30 |
| 13:45 | 14:00 | 0 | 33 | 197 | 82 | 0 | 119 | 22 | 8 | 0 | 10 | 190 | 7 | 0 | 3 | 24 | 30 |
| 14:00 | 14:15 | 0 | 35 | 211 | 80 | 0 | 133 | 34 | 12 | 0 | 26 | 187 | 4 | 0 | 1 | 29 | 32 |
| 14:15 | 14:30 | 0 | 25 | 212 | 100 | 0 | 98 | 25 | 8 | 0 | 9 | 204 | 4 | 0 | 3 | 15 | 32 |
| 14:30 | 14:45 | 0 | 39 | 239 | 87 | 0 | 115 | 28 | 7 | 0 | 22 | 182 | 7 | 0 | 1 | 28 | 30 |
| 14:45 | 15:00 | 0 | 25 | 186 | 119 | 0 | 95 | 23 | 6 | 0 | 17 | 180 | 1 | 0 | 3 | 21 | 20 |
| 15:00 | 15:15 | 0 | 40 | 213 | 89 | 0 | 146 | 41 | 6 | 2 | 19 | 228 | 3 | 0 | 2 | 22 | 39 |
| 15:15 | 15:30 | 0 | 25 | 225 | 104 | 0 | 139 | 30 | 3 | 0 | 18 | 222 | 1 | 0 | 2 | 22 | 37 |
| 15:30 | 15:45 | 0 | 41 | 264 | 117 | 0 | 139 | 31 | 16 | 0 | 22 | 238 | 2 | 0 | 3 | 19 | 40 |
| 15:45 | 16:00 | 0 | 35 | 236 | 80 | 0 | 132 | 33 | 5 | 1 | 19 | 221 | 1 | 0 | 2 | 19 | 41 |
| 16:00 | 16:15 | 0 | 28 | 226 | 99 | 0 | 147 | 39 | 3 | 0 | 26 | 210 | 1 | 0 | 4 | 14 | 42 |
| 16:15 | 16:30 | 0 | 29 | 195 | 84 | 0 | 143 | 45 | 8 | 0 | 14 | 217 | 3 | 0 | 4 | 22 | 33 |
| 16:30 | 16:45 | 0 | 32 | 203 | 107 | 0 | 148 | 45 | 6 | 0 | 13 | 210 | 4 | 0 | 3 | 15 | 31 |
| 16:45 | 17:00 | 0 | 33 | 183 | 76 | 0 | 159 | 36 | 12 | 0 | 18 | 195 | 1 | 0 | 1 | 13 | 34 |
| 17:00 | 17:15 | 0 | 30 | 210 | 83 | 0 | 159 | 36 | 2 | 2 | 14 | 216 | 4 | 0 | 3 | 14 | 53 |

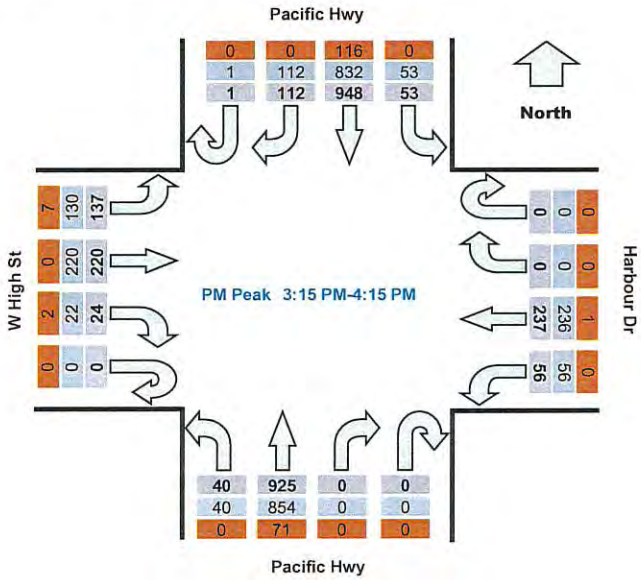
| Peak Time | | North Approach Pacific Hwy | | | | East Approach Harbour Dr | | | | South Approach Pacific Hwy | | | | West Approach W High St | | | | Peak |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Period Start | Period End | U | R | SB | L | U | R | WB | L | U | R | NB | L | U | R | EB | L | total |
| 8:15 | 9:15 | 0 | 110 | 881 | 45 | 0 | 0 | 172 | 43 | 0 | 0 | 810 | 23 | 0 | 19 | 247 | 76 | 2426 |
| 15:15 | 16:15 | 1 | 112 | 948 | 53 | 0 | 0 | 237 | 56 | 0 | 0 | 925 | 40 | 0 | 24 | 220 | 137 | 2753 |

*Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.*

**Graphic**

Total
Light
Heavy




***Light Vehicles***

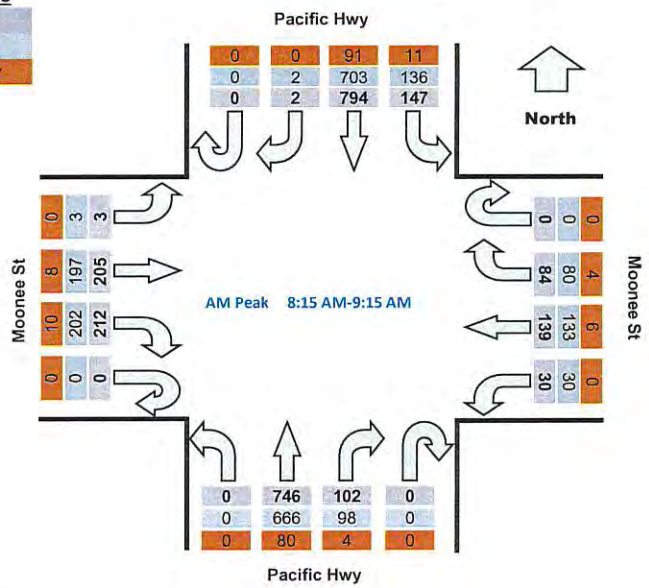
| Time | | North Approach Pacific Hwy | | | | East Approach Harbour Dr | | | | South Approach Pacific Hwy | | | | West Approach W High St | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Period Start | Period End | U | R | SB | L | U | R | WB | L | U | R | NB | L | U | R | EB | L |
| 6:00 | 6:15 | 0 | 1 | 102 | 0 | 0 | 0 | 15 | 0 | 0 | 0 | 67 | 0 | 0 | 0 | 9 | 1 |
| 6:15 | 6:30 | 0 | 0 | 116 | 1 | 0 | 0 | 17 | 1 | 0 | 0 | 71 | 0 | 0 | 1 | 11 | 0 |
| 6:30 | 6:45 | 0 | 2 | 107 | 2 | 0 | 0 | 17 | 2 | 0 | 0 | 73 | 0 | 0 | 0 | 15 | 2 |
| 6:45 | 7:00 | 0 | 3 | 127 | 2 | 0 | 0 | 19 | 2 | 0 | 0 | 87 | 0 | 0 | 1 | 15 | 2 |
| 7:00 | 7:15 | 0 | 5 | 115 | 6 | 0 | 0 | 24 | 4 | 0 | 0 | 83 | 0 | 0 | 1 | 20 | 3 |
| 7:15 | 7:30 | 0 | 10 | 151 | 7 | 0 | 0 | 17 | 10 | 0 | 0 | 89 | 0 | 0 | 3 | 33 | 10 |
| 7:30 | 7:45 | 0 | 13 | 183 | 10 | 0 | 0 | 20 | 5 | 0 | 0 | 129 | 1 | 0 | 1 | 31 | 8 |

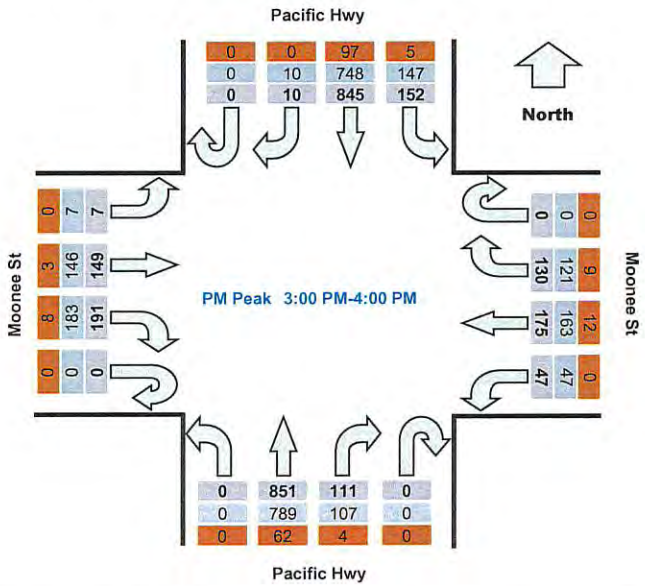
| Peak Time | | North Approach Pacific Hwy | | | | East Approach Moonee St | | | | South Approach Pacific Hwy | | | | West Approach Moonee St | | | | Peak |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Period Start | Period End | U | R | SB | L | U | R | WB | L | U | R | NB | L | U | R | EB | L | total |
| 8:15 | 9:15 | 0 | 2 | 794 | 147 | 0 | 84 | 139 | 30 | 0 | 102 | 746 | 0 | 0 | 212 | 205 | 3 | 2464 |
| 15:00 | 16:00 | 0 | 10 | 845 | 152 | 0 | 130 | 175 | 47 | 0 | 111 | 851 | 0 | 0 | 191 | 149 | 7 | 2668 |

*Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.*

**Graphic**

Total
Light
Heavy




***Light Vehicles***

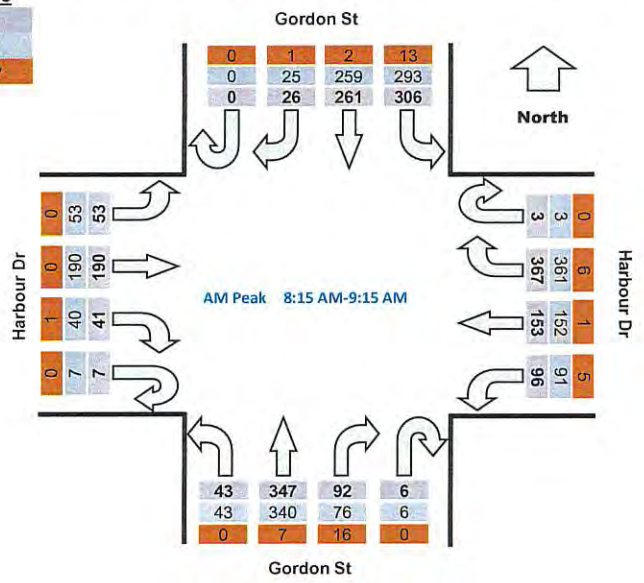
| Time | | North Approach Pacific Hwy | | | | East Approach Moonee St | | | | South Approach Pacific Hwy | | | | West Approach Moonee St | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Period Start | Period End | U | R | SB | L | U | R | WB | L | U | R | NB | L | U | R | EB | L |
| 6:00 | 6:15 | 0 | 0 | 97 | 5 | 0 | 1 | 2 | 1 | 0 | 4 | 66 | 0 | 0 | 10 | 8 | 0 |
| 6:15 | 6:30 | 0 | 0 | 112 | 6 | 0 | 2 | 3 | 0 | 0 | 6 | 69 | 0 | 0 | 15 | 9 | 0 |
| 6:30 | 6:45 | 0 | 0 | 101 | 8 | 0 | 2 | 4 | 1 | 0 | 7 | 71 | 0 | 0 | 16 | 10 | 0 |
| 6:45 | 7:00 | 0 | 0 | 120 | 10 | 0 | 4 | 4 | 1 | 0 | 8 | 83 | 0 | 0 | 21 | 15 | 0 |
| 7:00 | 7:15 | 0 | 0 | 108 | 15 | 0 | 4 | 5 | 1 | 0 | 10 | 79 | 0 | 0 | 28 | 21 | 0 |
| 7:15 | 7:30 | 0 | 0 | 145 | 15 | 0 | 4 | 18 | 3 | 0 | 13 | 85 | 0 | 0 | 30 | 17 | 0 |
| 7:30 | 7:45 | 0 | 0 | 171 | 16 | 0 | 6 | 11 | 4 | 0 | 11 | 124 | 0 | 0 | 37 | 21 | 0 |

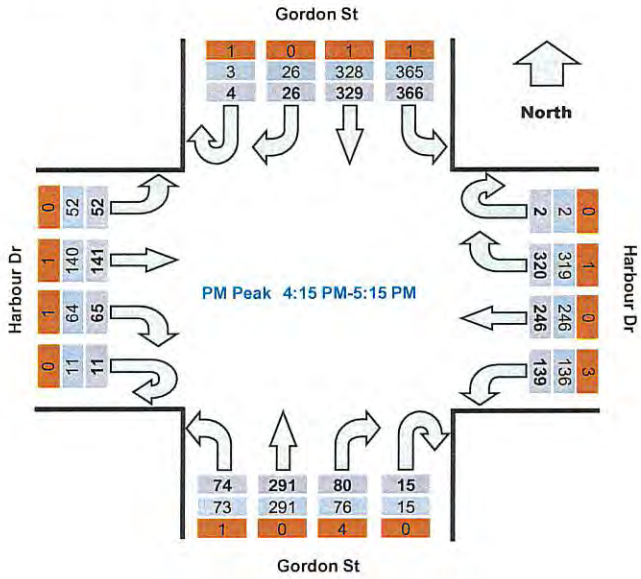
| Peak Time | | North Approach Gordon St | | | | East Approach Harbour Dr | | | | South Approach Gordon St | | | | West Approach Harbour Dr | | | | Peak |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Period Start | Period End | U | R | SB | L | U | R | WB | L | U | R | NB | L | U | R | EB | L | total |
| 8:15 | 9:15 | 0 | 26 | 261 | 306 | 3 | 367 | 153 | 96 | 6 | 92 | 347 | 43 | 7 | 41 | 190 | 53 | 1991 |
| 16:15 | 17:15 | 4 | 26 | 329 | 366 | 2 | 320 | 246 | 139 | 15 | 80 | 291 | 74 | 11 | 65 | 141 | 52 | 2161 |

*Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.*

**Graphic**

Total
Light
Heavy




***Light Vehicles***

| Time | | North Approach Gordon St | | | | East Approach Harbour Dr | | | | South Approach Gordon St | | | | West Approach Harbour Dr | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Period Start | Period End | U | R | SB | L | U | R | WB | L | U | R | NB | L | U | R | EB | L |
| 6:00 | 6:15 | 0 | 1 | 10 | 10 | 0 | 15 | 16 | 0 | 0 | 1 | 5 | 2 | 0 | 1 | 7 | 1 |
| 6:15 | 6:30 | 0 | 2 | 12 | 11 | 0 | 16 | 15 | 1 | 1 | 2 | 10 | 3 | 0 | 0 | 10 | 2 |
| 6:30 | 6:45 | 0 | 1 | 13 | 15 | 0 | 19 | 19 | 1 | 1 | 3 | 15 | 1 | 0 | 2 | 12 | 3 |
| 6:45 | 7:00 | 0 | 2 | 14 | 16 | 0 | 22 | 19 | 2 | 0 | 3 | 16 | 2 | 0 | 1 | 12 | 3 |
| 7:00 | 7:15 | 0 | 2 | 16 | 19 | 0 | 28 | 24 | 4 | 1 | 6 | 17 | 3 | 2 | 4 | 14 | 5 |
| 7:15 | 7:30 | 0 | 1 | 16 | 24 | 0 | 25 | 19 | 3 | 0 | 9 | 28 | 7 | 0 | 9 | 33 | 2 |
| 7:30 | 7:45 | 1 | 1 | 20 | 27 | 0 | 22 | 18 | 10 | 1 | 9 | 33 | 8 | 0 | 8 | 24 | 8 |

# Appendix D

## SIDRA Results

# MOVEMENT SUMMARY

## Site: 1 [Pacific Hwy & Coffs St (Site Folder: Existing AM)]

15-31 Harbour Drive, Coffs Harbour
Site Category: Existing Volumes
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Pacific Highway | | | | | | | | | | | | | | |
| 1 | L2 | 26 | 0 | 27 | 0.0 | 0.041 | 26.6 | LOS B | 0.7 | 4.9 | 0.55 | 0.67 | 0.55 | 32.1 |
| 2 | T1 | 829 | 80 | 873 | 9.7 | 0.666 | 27.1 | LOS B | 16.5 | 125.0 | 0.82 | 0.71 | 0.82 | 30.4 |
| 3 | R2 | 77 | 4 | 81 | 5.2 | 0.302 | 47.5 | LOS D | 3.5 | 25.3 | 0.89 | 0.75 | 0.89 | 19.3 |
| Approach | | 932 | 84 | 981 | 9.0 | 0.666 | 28.8 | LOS C | 16.5 | 125.0 | 0.81 | 0.72 | 0.81 | 29.3 |
| East: Coffs Street | | | | | | | | | | | | | | |
| 4 | L2 | 14 | 0 | 15 | 0.0 | 0.336 | 44.5 | LOS D | 4.6 | 32.3 | 0.93 | 0.74 | 0.93 | 20.2 |
| 5 | T1 | 85 | 0 | 89 | 0.0 | 0.336 | 41.5 | LOS C | 4.6 | 32.3 | 0.93 | 0.74 | 0.93 | 23.2 |
| 6 | R2 | 493 | 10 | 519 | 2.0 | * 0.886 | 59.3 | LOS E | 14.6 | 104.3 | 1.00 | 1.06 | 1.37 | 13.6 |
| Approach | | 592 | 10 | 623 | 1.7 | 0.886 | 56.4 | LOS D | 14.6 | 104.3 | 0.99 | 1.01 | 1.29 | 15.3 |
| North: Pacific Highway | | | | | | | | | | | | | | |
| 7 | L2 | 364 | 3 | 383 | 0.8 | 0.208 | 5.6 | LOS A | 0.0 | 0.0 | 0.00 | 0.53 | 0.00 | 46.4 |
| 8 | T1 | 1096 | 104 | 1154 | 9.5 | * 0.872 | 25.1 | LOS B | 26.0 | 196.8 | 0.90 | 0.88 | 1.00 | 31.6 |
| 9 | R2 | 235 | 1 | 247 | 0.4 | * 0.891 | 52.2 | LOS D | 13.0 | 91.5 | 1.00 | 0.92 | 1.22 | 23.1 |
| Approach | | 1695 | 108 | 1784 | 6.4 | 0.891 | 24.7 | LOS B | 26.0 | 196.8 | 0.72 | 0.81 | 0.81 | 30.7 |
| West: Coffs Street | | | | | | | | | | | | | | |
| 10 | L2 | 181 | 3 | 191 | 1.7 | 0.346 | 33.0 | LOS C | 7.3 | 51.8 | 0.83 | 0.76 | 0.83 | 27.2 |
| 11 | T1 | 132 | 1 | 139 | 0.8 | * 0.827 | 55.3 | LOS D | 7.8 | 54.7 | 1.00 | 0.99 | 1.32 | 20.3 |
| 12 | R2 | 5 | 0 | 5 | 0.0 | 0.827 | 58.6 | LOS E | 7.8 | 54.7 | 1.00 | 0.99 | 1.32 | 23.7 |
| Approach | | 318 | 4 | 335 | 1.3 | 0.827 | 42.7 | LOS D | 7.8 | 54.7 | 0.90 | 0.86 | 1.04 | 24.0 |
| All Vehicles | | 3537 | 206 | 3723 | 5.8 | 0.891 | 32.7 | LOS C | 26.0 | 196.8 | 0.81 | 0.82 | 0.91 | 26.0 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

**Pedestrian Movement Performance**

| Mov ID | Crossing | Input Vol. ped/h | Dem. Flow ped/h | Aver. Delay sec | Level of Service | AVERAGE BACK OF QUEUE [ Ped ped | Dist ] m | Prop. Que | Effective Stop Rate | Travel Time sec | Travel Dist. m | Aver. Speed m/sec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Pacific Highway | | | | | | | | | | | | |
| P1 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 216.4 | 223.8 | 1.03 |
| East: Coffs Street | | | | | | | | | | | | |
| P2 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 212.4 | 218.5 | 1.03 |
| West: Coffs Street | | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P4 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 209.8 | 215.2 | 1.03 |
| All Pedestrians | | 150 | 158 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 212.9 | 219.2 | 1.03 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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# MOVEMENT SUMMARY

## Site: 1 [Pacific Hwy & Coffs St (Site Folder: Existing PM)]

15-31 Harbour Drive, Coffs Harbour
Site Category: Existing Volumes
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 110 seconds (Site Optimum Cycle Time - Minimum Delay)

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Pacific Highway | | | | | | | | | | | | | | |
| 1 | L2 | 30 | 1 | 32 | 3.3 | 0.052 | 31.0 | LOS C | 0.9 | 6.8 | 0.59 | 0.68 | 0.59 | 30.5 |
| 2 | T1 | 1015 | 73 | 1068 | 7.2 | * 0.888 | 44.2 | LOS D | 29.7 | 221.0 | 0.96 | 0.98 | 1.12 | 23.2 |
| 3 | R2 | 50 | 1 | 53 | 2.0 | 0.186 | 49.9 | LOS D | 2.4 | 16.9 | 0.86 | 0.73 | 0.86 | 18.7 |
| Approach | | 1095 | 75 | 1153 | 6.8 | 0.888 | 44.1 | LOS D | 29.7 | 221.0 | 0.94 | 0.96 | 1.10 | 23.2 |
| East: Coffs Street | | | | | | | | | | | | | | |
| 4 | L2 | 55 | 0 | 58 | 0.0 | 0.336 | 42.8 | LOS D | 6.4 | 44.8 | 0.89 | 0.74 | 0.89 | 20.4 |
| 5 | T1 | 78 | 0 | 82 | 0.0 | 0.336 | 39.8 | LOS C | 6.4 | 44.8 | 0.89 | 0.74 | 0.89 | 23.3 |
| 6 | R2 | 678 | 17 | 714 | 2.5 | * 0.896 | 61.9 | LOS E | 22.2 | 158.6 | 1.00 | 1.05 | 1.31 | 13.2 |
| Approach | | 811 | 17 | 854 | 2.1 | 0.896 | 58.5 | LOS E | 22.2 | 158.6 | 0.98 | 1.00 | 1.24 | 14.7 |
| North: Pacific Highway | | | | | | | | | | | | | | |
| 7 | L2 | 289 | 6 | 304 | 2.1 | 0.166 | 5.6 | LOS A | 0.0 | 0.0 | 0.00 | 0.53 | 0.00 | 46.3 |
| 8 | T1 | 936 | 119 | 985 | 12.7 | 0.813 | 25.9 | LOS B | 22.3 | 173.2 | 0.87 | 0.80 | 0.91 | 31.1 |
| 9 | R2 | 234 | 0 | 246 | 0.0 | * 0.858 | 53.6 | LOS D | 13.7 | 95.8 | 1.00 | 0.89 | 1.15 | 22.8 |
| Approach | | 1459 | 125 | 1536 | 8.6 | 0.858 | 26.3 | LOS B | 22.3 | 173.2 | 0.72 | 0.76 | 0.77 | 29.9 |
| West: Coffs Street | | | | | | | | | | | | | | |
| 10 | L2 | 214 | 3 | 225 | 1.4 | 0.435 | 38.4 | LOS C | 9.9 | 70.4 | 0.87 | 0.79 | 0.87 | 25.7 |
| 11 | T1 | 98 | 0 | 103 | 0.0 | * 0.875 | 64.8 | LOS E | 7.5 | 52.6 | 1.00 | 1.04 | 1.44 | 18.7 |
| 12 | R2 | 19 | 0 | 20 | 0.0 | 0.875 | 68.0 | LOS E | 7.5 | 52.6 | 1.00 | 1.04 | 1.44 | 21.9 |
| Approach | | 331 | 3 | 348 | 0.9 | 0.875 | 47.9 | LOS D | 9.9 | 70.4 | 0.91 | 0.88 | 1.07 | 23.1 |
| All Vehicles | | 3696 | 220 | 3891 | 6.0 | 0.896 | 40.6 | LOS C | 29.7 | 221.0 | 0.86 | 0.88 | 1.00 | 23.1 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

**Pedestrian Movement Performance**

| Mov ID | Crossing | Input Vol. ped/h | Dem. Flow ped/h | Aver. Delay sec | Level of Service | AVERAGE BACK OF QUEUE [ Ped ped | Dist ] m | Prop. Que | Effective Stop Rate | Travel Time sec | Travel Dist. m | Aver. Speed m/sec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Pacific Highway | | | | | | | | | | | | |
| P1 | Full | 50 | 53 | 49.3 | LOS E | 0.2 | 0.2 | 0.95 | 0.95 | 221.4 | 223.8 | 1.01 |
| East: Coffs Street | | | | | | | | | | | | |
| P2 | Full | 50 | 53 | 49.3 | LOS E | 0.2 | 0.2 | 0.95 | 0.95 | 217.3 | 218.5 | 1.01 |
| West: Coffs Street | | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P4 | Full | 50 | 53 | 49.3 | LOS E | 0.2 | 0.2 | 0.95 | 0.95 | 214.8 | 215.2 | 1.00 |
| All Pedestrians | | 150 | 158 | 49.3 | LOS E | 0.2 | 0.2 | 0.95 | 0.95 | 217.9 | 219.2 | 1.01 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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# MOVEMENT SUMMARY

## Site: 2 [Pacific Hwy & Harbour Drive (Site Folder: Existing AM)]

15-31 Harbour Drive, Coffs Harbour
Site Category: Existing Volumes
Signals - EQUISAT (Fixed-Time/SCATS) Isolated  Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Pacific Highway | | | | | | | | | | | | | | |
| 1 | L2 | 23 | 1 | 24 | 4.3 | 0.032 | 23.6 | LOS B | 0.7 | 5.0 | 0.61 | 0.67 | 0.61 | 18.5 |
| 2 | T1 | 810 | 83 | 853 | 10.2 | * 0.565 | 23.6 | LOS B | 16.1 | 122.5 | 0.81 | 0.71 | 0.81 | 29.6 |
| Approach | | 833 | 84 | 877 | 10.1 | 0.565 | 23.6 | LOS B | 16.1 | 122.5 | 0.80 | 0.71 | 0.80 | 29.3 |
| East: Harbour Drive | | | | | | | | | | | | | | |
| 4 | L2 | 172 | 1 | 181 | 0.6 | * 0.593 | 44.6 | LOS D | 8.2 | 58.0 | 0.96 | 0.80 | 0.96 | 17.6 |
| 5 | T1 | 43 | 0 | 45 | 0.0 | 0.129 | 37.4 | LOS C | 1.9 | 13.1 | 0.87 | 0.66 | 0.87 | 18.8 |
| Approach | | 215 | 1 | 226 | 0.5 | 0.593 | 43.1 | LOS D | 8.2 | 58.0 | 0.94 | 0.77 | 0.94 | 17.8 |
| North: Pacific Highway | | | | | | | | | | | | | | |
| 7 | L2 | 45 | 1 | 47 | 2.2 | 0.062 | 23.9 | LOS B | 1.4 | 9.7 | 0.62 | 0.70 | 0.62 | 30.7 |
| 8 | T1 | 881 | 100 | 927 | 11.4 | 0.492 | 12.6 | LOS A | 13.8 | 106.1 | 0.61 | 0.54 | 0.61 | 38.7 |
| 9 | R2 | 110 | 1 | 116 | 0.9 | * 0.299 | 29.6 | LOS C | 4.2 | 29.3 | 0.80 | 0.77 | 0.80 | 24.6 |
| Approach | | 1036 | 102 | 1091 | 9.8 | 0.492 | 14.9 | LOS B | 13.8 | 106.1 | 0.63 | 0.57 | 0.63 | 36.1 |
| West: West High Street | | | | | | | | | | | | | | |
| 10 | L2 | 76 | 4 | 80 | 5.3 | 0.097 | 19.6 | LOS B | 2.2 | 15.9 | 0.59 | 0.66 | 0.59 | 27.7 |
| 11 | T1 | 247 | 2 | 260 | 0.8 | 0.525 | 30.6 | LOS C | 10.3 | 72.6 | 0.86 | 0.72 | 0.86 | 20.8 |
| 12 | R2 | 19 | 2 | 20 | 10.5 | * 0.082 | 38.5 | LOS C | 0.8 | 6.2 | 0.88 | 0.68 | 0.88 | 12.4 |
| Approach | | 342 | 8 | 360 | 2.3 | 0.525 | 28.6 | LOS C | 10.3 | 72.6 | 0.80 | 0.70 | 0.80 | 21.6 |
| All Vehicles | | 2426 | 195 | 2554 | 8.0 | 0.593 | 22.3 | LOS B | 16.1 | 122.5 | 0.74 | 0.65 | 0.74 | 28.6 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

**Pedestrian Movement Performance**

| Mov ID | Crossing | Input Vol. ped/h | Dem. Flow ped/h | Aver. Delay sec | Level of Service | AVERAGE BACK OF QUEUE [ Ped ped | Dist ] m | Prop. Que | Effective Stop Rate | Travel Time sec | Travel Dist. m | Aver. Speed m/sec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Pacific Highway | | | | | | | | | | | | |
| P1 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 215.4 | 222.5 | 1.03 |
| East: Harbour Drive | | | | | | | | | | | | |
| P2 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 207.3 | 211.9 | 1.02 |
| North: Pacific Highway | | | | | | | | | | | | |
| P3 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 216.0 | 223.3 | 1.03 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| West: West High Street | | | | | | | | | | | |
| P4 Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 211.7 | 217.7 | 1.03 |
| All Pedestrians | 200 | 211 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 212.6 | 218.9 | 1.03 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: T:\WORK20\20269 -15 - 31 HARBOUR DRIVE, COFFS HARBOUR\MODEL\15 - 31 HARBOUR DRIVE, COFFS HARBOUR MODEL 08 DEC 20.sip9

# MOVEMENT SUMMARY

## Site: 2 [Pacific Hwy & Harbour Drive (Site Folder: Existing PM)]

15-31 Harbour Drive, Coffs Harbour
Site Category: Existing Volumes
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Pacific Highway | | | | | | | | | | | | | | |
| 1 | L2 | 40 | 0 | 42 | 0.0 | 0.057 | 25.1 | LOS B | 1.2 | 8.7 | 0.64 | 0.70 | 0.64 | 17.9 |
| 2 | T1 | 925 | 71 | 974 | 7.7 | *0.675 | 26.3 | LOS B | 20.1 | 150.1 | 0.87 | 0.77 | 0.87 | 28.0 |
| Approach | | 965 | 71 | 1016 | 7.4 | 0.675 | 26.2 | LOS B | 20.1 | 150.1 | 0.86 | 0.77 | 0.86 | 27.6 |
| East: Harbour Drive | | | | | | | | | | | | | | |
| 4 | L2 | 56 | 0 | 59 | 0.0 | 0.144 | 37.5 | LOS C | 2.3 | 16.3 | 0.84 | 0.72 | 0.84 | 19.3 |
| 5 | T1 | 237 | 1 | 249 | 0.4 | *0.662 | 38.5 | LOS C | 11.1 | 78.3 | 0.95 | 0.80 | 0.96 | 18.5 |
| Approach | | 293 | 1 | 308 | 0.3 | 0.662 | 38.3 | LOS C | 11.1 | 78.3 | 0.93 | 0.79 | 0.94 | 18.7 |
| North: Pacific Highway | | | | | | | | | | | | | | |
| 7 | L2 | 53 | 0 | 56 | 0.0 | 0.075 | 25.3 | LOS B | 1.7 | 11.6 | 0.65 | 0.70 | 0.65 | 30.0 |
| 8 | T1 | 948 | 116 | 998 | 12.2 | 0.571 | 15.6 | LOS B | 16.5 | 127.9 | 0.68 | 0.61 | 0.68 | 35.7 |
| 9 | R2 | 112 | 0 | 118 | 0.0 | *0.388 | 36.8 | LOS C | 4.9 | 34.1 | 0.90 | 0.79 | 0.90 | 21.6 |
| Approach | | 1113 | 116 | 1172 | 10.4 | 0.571 | 18.2 | LOS B | 16.5 | 127.9 | 0.70 | 0.63 | 0.70 | 33.2 |
| West: West High Street | | | | | | | | | | | | | | |
| 10 | L2 | 137 | 7 | 144 | 5.1 | 0.168 | 19.1 | LOS B | 3.9 | 28.7 | 0.60 | 0.68 | 0.60 | 28.1 |
| 11 | T1 | 220 | 0 | 232 | 0.0 | 0.451 | 26.6 | LOS B | 8.5 | 59.2 | 0.79 | 0.66 | 0.79 | 22.2 |
| 12 | R2 | 24 | 2 | 25 | 8.3 | *0.098 | 37.7 | LOS C | 1.0 | 7.6 | 0.88 | 0.69 | 0.88 | 12.6 |
| Approach | | 381 | 9 | 401 | 2.4 | 0.451 | 24.6 | LOS B | 8.5 | 59.2 | 0.73 | 0.67 | 0.73 | 23.4 |
| All Vehicles | | 2752 | 197 | 2897 | 7.2 | 0.675 | 24.0 | LOS B | 20.1 | 150.1 | 0.79 | 0.70 | 0.79 | 27.5 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

**Pedestrian Movement Performance**

| Mov ID | Crossing | Input Vol. ped/h | Dem. Flow ped/h | Aver. Delay sec | Level of Service | AVERAGE BACK OF QUEUE [ Ped ped | Dist ] m | Prop. Que | Effective Stop Rate | Travel Time sec | Travel Dist. m | Aver. Speed m/sec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Pacific Highway | | | | | | | | | | | | |
| P1 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 215.4 | 222.5 | 1.03 |
| East: Harbour Drive | | | | | | | | | | | | |
| P2 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 207.3 | 211.9 | 1.02 |
| North: Pacific Highway | | | | | | | | | | | | |
| P3 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 216.0 | 223.3 | 1.03 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| West: West High Street | | | | | | | | | | | | |
| P4 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 211.7 | 217.7 | 1.03 |
| All Pedestrians | | 200 | 211 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 212.6 | 218.9 | 1.03 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: T:\WORK20\20269 -15 - 31 HARBOUR DRIVE, COFFS HARBOUR\MODEL\15 - 31 HARBOUR DRIVE, COFFS HARBOUR MODEL 08 DEC 20.sip9

# MOVEMENT SUMMARY

## Site: 3 [Pacific Hwy & Park Ave (Site Folder: Existing AM)]

15-31 Harbour Drive, Coffs Harbour
Site Category: Existing Volumes
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Pacific Highway | | | | | | | | | | | | | | |
| 1 | L2 | 1 | 0 | 1 | 0.0 | 0.001 | 16.3 | LOS B | 0.0 | 0.2 | 0.51 | 0.58 | 0.51 | 39.5 |
| 2 | T1 | 746 | 80 | 785 | 10.7 | 0.664 | 29.2 | LOS C | 17.6 | 134.4 | 0.89 | 0.77 | 0.89 | 32.4 |
| 3 | R2 | 102 | 4 | 107 | 3.9 | *0.660 | 56.7 | LOS E | 5.5 | 39.4 | 1.00 | 0.82 | 1.10 | 24.5 |
| Approach | | 849 | 84 | 894 | 9.9 | 0.664 | 32.5 | LOS C | 17.6 | 134.4 | 0.90 | 0.78 | 0.91 | 30.9 |
| East: Park Avenue | | | | | | | | | | | | | | |
| 4 | L2 | 30 | 0 | 32 | 0.0 | 0.131 | 45.9 | LOS D | 1.4 | 9.8 | 0.92 | 0.71 | 0.92 | 26.4 |
| 5 | T1 | 139 | 6 | 146 | 4.3 | *0.631 | 46.2 | LOS D | 7.0 | 51.1 | 0.99 | 0.82 | 1.03 | 18.4 |
| 6 | R2 | 84 | 4 | 88 | 4.8 | 0.379 | 47.7 | LOS D | 4.1 | 29.8 | 0.96 | 0.76 | 0.96 | 17.1 |
| Approach | | 253 | 10 | 266 | 4.0 | 0.631 | 46.7 | LOS D | 7.0 | 51.1 | 0.97 | 0.79 | 0.99 | 19.1 |
| North: Pacific Highway | | | | | | | | | | | | | | |
| 7 | L2 | 147 | 11 | 155 | 7.5 | 0.251 | 30.7 | LOS C | 5.4 | 40.1 | 0.75 | 0.76 | 0.75 | 22.6 |
| 8 | T1 | 794 | 91 | 836 | 11.5 | *0.683 | 29.7 | LOS C | 18.1 | 139.1 | 0.90 | 0.79 | 0.90 | 32.1 |
| 9 | R2 | 2 | 0 | 2 | 0.0 | 0.013 | 50.9 | LOS D | 0.1 | 0.7 | 0.93 | 0.61 | 0.93 | 13.5 |
| Approach | | 943 | 102 | 993 | 10.8 | 0.683 | 29.9 | LOS C | 18.1 | 139.1 | 0.88 | 0.78 | 0.88 | 30.6 |
| West: Moonee Street | | | | | | | | | | | | | | |
| 10 | L2 | 3 | 0 | 3 | 0.0 | 0.009 | 38.5 | LOS C | 0.1 | 0.9 | 0.83 | 0.61 | 0.83 | 15.2 |
| 11 | T1 | 205 | 8 | 216 | 3.9 | 0.604 | 41.0 | LOS C | 9.8 | 71.2 | 0.97 | 0.80 | 0.97 | 19.7 |
| 12 | R2 | 212 | 10 | 223 | 4.7 | *0.654 | 45.0 | LOS D | 10.4 | 75.8 | 0.98 | 0.83 | 1.00 | 25.2 |
| Approach | | 420 | 18 | 442 | 4.3 | 0.654 | 43.0 | LOS D | 10.4 | 75.8 | 0.97 | 0.81 | 0.98 | 22.5 |
| All Vehicles | | 2465 | 214 | 2595 | 8.7 | 0.683 | 34.7 | LOS C | 18.1 | 139.1 | 0.91 | 0.79 | 0.92 | 27.7 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

**Pedestrian Movement Performance**

| Mov ID | Crossing | Input Vol. ped/h | Dem. Flow ped/h | Aver. Delay sec | Level of Service | AVERAGE BACK OF QUEUE [ Ped ped | Dist ] m | Prop. Que | Effective Stop Rate | Travel Time sec | Travel Dist. m | Aver. Speed m/sec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| East: Park Avenue | | | | | | | | | | | | |
| P2 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 213.5 | 220.0 | 1.03 |
| North: Pacific Highway | | | | | | | | | | | | |
| P3 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 216.0 | 223.3 | 1.03 |
| West: Moonee Street | | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P4 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 213.5 | 220.0 | 1.03 |
| All Pedestrians | | 150 | 158 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 214.4 | 221.1 | 1.03 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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# MOVEMENT SUMMARY

## Site: 3 [Pacific Hwy & Park Ave (Site Folder: Existing PM)]

15-31 Harbour Drive, Coffs Harbour
Site Category: Existing Volumes
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Pacific Highway | | | | | | | | | | | | | | |
| 1 | L2 | 1 | 0 | 1 | 0.0 | 0.001 | 15.8 | LOS B | 0.0 | 0.2 | 0.50 | 0.58 | 0.50 | 39.8 |
| 2 | T1 | 851 | 62 | 896 | 7.3 | *0.720 | 29.5 | LOS C | 20.5 | 152.1 | 0.90 | 0.80 | 0.91 | 32.2 |
| 3 | R2 | 111 | 4 | 117 | 3.6 | *0.717 | 57.7 | LOS E | 6.0 | 43.5 | 1.00 | 0.85 | 1.16 | 24.3 |
| Approach | | 963 | 66 | 1014 | 6.9 | 0.720 | 32.8 | LOS C | 20.5 | 152.1 | 0.92 | 0.80 | 0.94 | 30.8 |
| East: Park Avenue | | | | | | | | | | | | | | |
| 4 | L2 | 47 | 0 | 49 | 0.0 | 0.178 | 44.2 | LOS D | 2.2 | 15.1 | 0.91 | 0.73 | 0.91 | 26.8 |
| 5 | T1 | 175 | 12 | 184 | 6.9 | *0.737 | 46.7 | LOS D | 9.1 | 67.4 | 0.99 | 0.91 | 1.12 | 18.3 |
| 6 | R2 | 130 | 9 | 137 | 6.9 | 0.515 | 46.9 | LOS D | 6.4 | 47.2 | 0.97 | 0.79 | 0.97 | 17.3 |
| Approach | | 352 | 21 | 371 | 6.0 | 0.737 | 46.5 | LOS D | 9.1 | 67.4 | 0.97 | 0.84 | 1.04 | 19.2 |
| North: Pacific Highway | | | | | | | | | | | | | | |
| 7 | L2 | 152 | 5 | 160 | 3.3 | 0.245 | 29.9 | LOS C | 5.5 | 39.3 | 0.74 | 0.76 | 0.74 | 22.9 |
| 8 | T1 | 845 | 97 | 889 | 11.5 | 0.716 | 29.6 | LOS C | 19.4 | 149.2 | 0.91 | 0.80 | 0.91 | 32.2 |
| 9 | R2 | 10 | 0 | 11 | 0.0 | 0.063 | 51.8 | LOS D | 0.5 | 3.4 | 0.94 | 0.67 | 0.94 | 13.3 |
| Approach | | 1007 | 102 | 1060 | 10.1 | 0.716 | 29.8 | LOS C | 19.4 | 149.2 | 0.88 | 0.79 | 0.89 | 30.6 |
| West: Moonee Street | | | | | | | | | | | | | | |
| 10 | L2 | 7 | 0 | 7 | 0.0 | 0.025 | 41.7 | LOS C | 0.3 | 2.1 | 0.87 | 0.64 | 0.87 | 14.5 |
| 11 | T1 | 149 | 3 | 157 | 2.0 | 0.525 | 42.7 | LOS D | 7.2 | 51.2 | 0.96 | 0.78 | 0.96 | 19.3 |
| 12 | R2 | 191 | 8 | 201 | 4.2 | *0.697 | 48.6 | LOS D | 9.8 | 71.0 | 1.00 | 0.87 | 1.07 | 24.2 |
| Approach | | 347 | 11 | 365 | 3.2 | 0.697 | 45.9 | LOS D | 9.8 | 71.0 | 0.98 | 0.82 | 1.02 | 22.0 |
| All Vehicles | | 2669 | 200 | 2809 | 7.5 | 0.737 | 35.2 | LOS C | 20.5 | 152.1 | 0.92 | 0.81 | 0.94 | 27.5 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

**Pedestrian Movement Performance**

| Mov ID | Crossing | Input Vol. ped/h | Dem. Flow ped/h | Aver. Delay sec | Level of Service | AVERAGE BACK OF QUEUE [ Ped ped | Dist ] m | Prop. Que | Effective Stop Rate | Travel Time sec | Travel Dist. m | Aver. Speed m/sec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| East: Park Avenue | | | | | | | | | | | | |
| P2 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 213.5 | 220.0 | 1.03 |
| North: Pacific Highway | | | | | | | | | | | | |
| P3 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 216.0 | 223.3 | 1.03 |
| West: Moonee Street | | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P4 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 213.5 | 220.0 | 1.03 |
| All Pedestrians | | 150 | 158 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 214.4 | 221.1 | 1.03 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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# MOVEMENT SUMMARY

## Site: 4 [Harbour Dr & Gordon St (Site Folder: Existing AM)]

15-31 Harbour Drive, Coffs Harbour
Site Category: Existing Volumes
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Gordon Street | | | | | | | | | | | | | | |
| 1 | L2 | 43 | 0 | 45 | 0.0 | 0.685 | 36.2 | LOS C | 17.5 | 124.5 | 0.94 | 0.81 | 0.94 | 20.6 |
| 2 | T1 | 347 | 7 | 365 | 2.0 | 0.685 | 32.9 | LOS C | 17.5 | 124.5 | 0.94 | 0.82 | 0.94 | 12.9 |
| 3 | R2 | 92 | 16 | 97 | 17.4 | * 0.685 | 52.0 | LOS D | 5.2 | 41.3 | 1.00 | 0.90 | 1.15 | 14.1 |
| Approach | | 482 | 23 | 507 | 4.8 | 0.685 | 36.9 | LOS C | 17.5 | 124.5 | 0.95 | 0.83 | 0.98 | 14.0 |
| East: Harbour Drive | | | | | | | | | | | | | | |
| 4 | L2 | 96 | 5 | 101 | 5.2 | 0.099 | 13.8 | LOS A | 2.2 | 16.1 | 0.48 | 0.62 | 0.48 | 26.9 |
| 5 | T1 | 153 | 1 | 161 | 0.7 | 0.146 | 10.6 | LOS A | 3.6 | 25.5 | 0.50 | 0.41 | 0.50 | 32.0 |
| 6 | R2 | 367 | 6 | 386 | 1.6 | * 0.535 | 17.8 | LOS B | 10.4 | 73.7 | 0.79 | 0.78 | 0.79 | 22.8 |
| Approach | | 616 | 12 | 648 | 1.9 | 0.535 | 15.4 | LOS B | 10.4 | 73.7 | 0.67 | 0.67 | 0.67 | 26.1 |
| North: Gordon Street | | | | | | | | | | | | | | |
| 7 | L2 | 306 | 13 | 322 | 4.2 | 0.553 | 28.3 | LOS B | 14.9 | 107.7 | 0.82 | 0.78 | 0.82 | 18.7 |
| 8 | T1 | 261 | 2 | 275 | 0.8 | 0.553 | 33.9 | LOS C | 14.9 | 107.7 | 0.90 | 0.78 | 0.90 | 12.5 |
| 9 | R2 | 26 | 1 | 27 | 3.8 | 0.553 | 40.7 | LOS C | 10.0 | 70.5 | 0.93 | 0.78 | 0.93 | 18.2 |
| Approach | | 593 | 16 | 624 | 2.7 | 0.553 | 31.3 | LOS C | 14.9 | 107.7 | 0.86 | 0.78 | 0.86 | 16.0 |
| West: Harbour Drive | | | | | | | | | | | | | | |
| 10 | L2 | 53 | 0 | 56 | 0.0 | 0.137 | 37.4 | LOS C | 2.0 | 14.1 | 0.77 | 0.69 | 0.77 | 18.3 |
| 11 | T1 | 190 | 0 | 200 | 0.0 | * 0.715 | 40.2 | LOS C | 10.8 | 76.0 | 0.92 | 0.82 | 0.98 | 20.5 |
| 12 | R2 | 41 | 1 | 43 | 2.4 | 0.715 | 43.7 | LOS D | 10.8 | 76.0 | 0.92 | 0.82 | 0.98 | 18.4 |
| Approach | | 284 | 1 | 299 | 0.4 | 0.715 | 40.1 | LOS C | 10.8 | 76.0 | 0.89 | 0.80 | 0.94 | 19.8 |
| All Vehicles | | 1975 | 52 | 2079 | 2.6 | 0.715 | 29.0 | LOS C | 17.5 | 124.5 | 0.83 | 0.76 | 0.84 | 18.9 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

**Pedestrian Movement Performance**

| Mov ID | Crossing | Input Vol. ped/h | Dem. Flow ped/h | Aver. Delay sec | Level of Service | AVERAGE BACK OF QUEUE [ Ped ped | Dist ] m | Prop. Que | Effective Stop Rate | Travel Time sec | Travel Dist. m | Aver. Speed m/sec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Gordon Street | | | | | | | | | | | | |
| P1 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 209.8 | 215.2 | 1.03 |
| East: Harbour Drive | | | | | | | | | | | | |
| P2 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 209.8 | 215.2 | 1.03 |
| North: Gordon Street | | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P3 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 209.8 | 215.2 | 1.03 |
| West: Harbour Drive | | | | | | | | | | | | |
| P4 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 207.3 | 211.9 | 1.02 |
| All Pedestrians | | 200 | 211 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 209.2 | 214.4 | 1.02 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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# MOVEMENT SUMMARY

## Site: 4 [Harbour Dr & Gordon St (Site Folder: Existing PM)]

15-31 Harbour Drive, Coffs Harbour
Site Category: Existing Volumes
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Gordon Street | | | | | | | | | | | | | | |
| 1 | L2 | 74 | 1 | 78 | 1.4 | 0.643 | 35.6 | LOS C | 16.3 | 114.1 | 0.92 | 0.80 | 0.92 | 20.7 |
| 2 | T1 | 291 | 0 | 306 | 0.0 | 0.643 | 32.2 | LOS C | 16.3 | 114.1 | 0.92 | 0.80 | 0.92 | 13.0 |
| 3 | R2 | 80 | 4 | 84 | 5.0 | * 0.689 | 55.1 | LOS D | 4.4 | 32.2 | 1.00 | 0.89 | 1.17 | 13.5 |
| Approach | | 445 | 5 | 468 | 1.1 | 0.689 | 36.9 | LOS C | 16.3 | 114.1 | 0.93 | 0.82 | 0.97 | 14.6 |
| East: Harbour Drive | | | | | | | | | | | | | | |
| 4 | L2 | 139 | 3 | 146 | 2.2 | 0.140 | 14.0 | LOS A | 3.3 | 23.4 | 0.50 | 0.64 | 0.50 | 26.7 |
| 5 | T1 | 246 | 0 | 259 | 0.0 | 0.233 | 11.3 | LOS A | 6.2 | 43.1 | 0.53 | 0.45 | 0.53 | 31.7 |
| 6 | R2 | 320 | 1 | 337 | 0.3 | * 0.447 | 16.9 | LOS B | 8.7 | 61.3 | 0.73 | 0.75 | 0.73 | 23.4 |
| Approach | | 705 | 4 | 742 | 0.6 | 0.447 | 14.4 | LOS A | 8.7 | 61.3 | 0.61 | 0.63 | 0.61 | 27.4 |
| North: Gordon Street | | | | | | | | | | | | | | |
| 7 | L2 | 366 | 1 | 385 | 0.3 | 0.635 | 29.4 | LOS C | 18.4 | 129.2 | 0.86 | 0.81 | 0.86 | 18.3 |
| 8 | T1 | 329 | 1 | 346 | 0.3 | 0.635 | 34.0 | LOS C | 18.4 | 129.2 | 0.93 | 0.81 | 0.93 | 12.5 |
| 9 | R2 | 26 | 0 | 27 | 0.0 | 0.635 | 40.0 | LOS C | 12.8 | 89.8 | 0.95 | 0.81 | 0.95 | 18.4 |
| Approach | | 721 | 2 | 759 | 0.3 | 0.635 | 31.9 | LOS C | 18.4 | 129.2 | 0.89 | 0.81 | 0.89 | 15.7 |
| West: Harbour Drive | | | | | | | | | | | | | | |
| 10 | L2 | 52 | 0 | 55 | 0.0 | 0.128 | 36.4 | LOS C | 1.9 | 13.6 | 0.75 | 0.69 | 0.75 | 18.5 |
| 11 | T1 | 141 | 1 | 148 | 0.7 | * 0.687 | 39.2 | LOS C | 9.5 | 67.1 | 0.91 | 0.81 | 0.95 | 20.6 |
| 12 | R2 | 65 | 1 | 68 | 1.5 | 0.687 | 42.7 | LOS D | 9.5 | 67.1 | 0.91 | 0.81 | 0.95 | 18.5 |
| Approach | | 258 | 2 | 272 | 0.8 | 0.687 | 39.5 | LOS C | 9.5 | 67.1 | 0.88 | 0.78 | 0.91 | 19.7 |
| All Vehicles | | 2129 | 13 | 2241 | 0.6 | 0.689 | 28.0 | LOS B | 18.4 | 129.2 | 0.81 | 0.75 | 0.82 | 19.4 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

**Pedestrian Movement Performance**

| Mov ID | Crossing | Input Vol. ped/h | Dem. Flow ped/h | Aver. Delay sec | Level of Service | AVERAGE BACK OF QUEUE [ Ped ped | Dist ] m | Prop. Que | Effective Stop Rate | Travel Time sec | Travel Dist. m | Aver. Speed m/sec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Gordon Street | | | | | | | | | | | | |
| P1 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 209.8 | 215.2 | 1.03 |
| East: Harbour Drive | | | | | | | | | | | | |
| P2 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 209.8 | 215.2 | 1.03 |
| North: Gordon Street | | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P3 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 209.8 | 215.2 | 1.03 |
| West: Harbour Drive | | | | | | | | | | | | |
| P4 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 207.3 | 211.9 | 1.02 |
| All Pedestrians | | 200 | 211 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 209.2 | 214.4 | 1.02 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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# MOVEMENT SUMMARY

## Site: 5 [Vernon St & Gordon St (Site Folder: Existing AM)]

15-31 Harbour Drive, Coffs Harbour
Site Category: Existing Volumes
Roundabout

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Gordon Street | | | | | | | | | | | | | | |
| 1 | L2 | 242 | 0 | 255 | 0.0 | 0.217 | 2.7 | LOS A | 1.0 | 7.2 | 0.21 | 0.38 | 0.21 | 32.8 |
| 2 | T1 | 332 | 5 | 349 | 1.5 | 0.347 | 2.0 | LOS A | 2.0 | 13.9 | 0.22 | 0.37 | 0.22 | 38.8 |
| 3 | R2 | 139 | 2 | 146 | 1.4 | 0.347 | 5.8 | LOS A | 2.0 | 13.9 | 0.22 | 0.37 | 0.22 | 38.8 |
| 3u | U | 9 | 0 | 9 | 0.0 | 0.347 | 9.6 | LOS A | 2.0 | 13.9 | 0.22 | 0.37 | 0.22 | 30.4 |
| Approach | | 722 | 7 | 760 | 1.0 | 0.347 | 3.0 | LOS A | 2.0 | 13.9 | 0.22 | 0.37 | 0.22 | 37.7 |
| East: Vernon Street | | | | | | | | | | | | | | |
| 4 | L2 | 17 | 2 | 18 | 11.8 | 0.018 | 3.7 | LOS A | 0.1 | 0.5 | 0.41 | 0.47 | 0.41 | 34.4 |
| 5 | T1 | 6 | 0 | 6 | 0.0 | 0.017 | 2.9 | LOS A | 0.1 | 0.5 | 0.42 | 0.53 | 0.42 | 36.0 |
| 6 | R2 | 9 | 1 | 9 | 11.1 | 0.017 | 6.9 | LOS A | 0.1 | 0.5 | 0.42 | 0.53 | 0.42 | 38.1 |
| 6u | U | 1 | 0 | 1 | 0.0 | 0.017 | 11.8 | LOS A | 0.1 | 0.5 | 0.42 | 0.53 | 0.42 | 41.5 |
| Approach | | 33 | 3 | 35 | 9.1 | 0.018 | 4.7 | LOS A | 0.1 | 0.5 | 0.42 | 0.50 | 0.42 | 36.4 |
| North: Gordon Street | | | | | | | | | | | | | | |
| 7 | L2 | 269 | 15 | 283 | 5.6 | 0.272 | 3.6 | LOS A | 1.4 | 9.9 | 0.36 | 0.45 | 0.36 | 37.5 |
| 8 | T1 | 295 | 13 | 311 | 4.4 | 0.272 | 2.6 | LOS A | 1.4 | 9.9 | 0.37 | 0.41 | 0.37 | 38.6 |
| 9 | R2 | 39 | 2 | 41 | 5.1 | 0.272 | 6.5 | LOS A | 1.3 | 9.8 | 0.37 | 0.40 | 0.37 | 28.3 |
| 9u | U | 7 | 0 | 7 | 0.0 | 0.272 | 11.4 | LOS A | 1.3 | 9.8 | 0.37 | 0.40 | 0.37 | 45.3 |
| Approach | | 610 | 30 | 642 | 4.9 | 0.272 | 3.4 | LOS A | 1.4 | 9.9 | 0.36 | 0.43 | 0.36 | 37.3 |
| West: Vernon Street | | | | | | | | | | | | | | |
| 10 | L2 | 11 | 0 | 12 | 0.0 | 0.016 | 5.6 | LOS A | 0.1 | 0.5 | 0.58 | 0.54 | 0.58 | 35.3 |
| 11 | T1 | 22 | 0 | 23 | 0.0 | 0.043 | 3.7 | LOS A | 0.2 | 1.7 | 0.55 | 0.56 | 0.55 | 35.2 |
| 12 | R2 | 22 | 0 | 23 | 0.0 | 0.043 | 7.5 | LOS A | 0.2 | 1.7 | 0.55 | 0.56 | 0.55 | 26.9 |
| 12u | U | 3 | 0 | 3 | 0.0 | 0.043 | 11.3 | LOS A | 0.2 | 1.7 | 0.55 | 0.56 | 0.55 | 17.2 |
| Approach | | 58 | 0 | 61 | 0.0 | 0.043 | 5.9 | LOS A | 0.2 | 1.7 | 0.56 | 0.56 | 0.56 | 31.8 |
| All Vehicles | | 1423 | 40 | 1498 | 2.8 | 0.347 | 3.3 | LOS A | 2.0 | 13.9 | 0.30 | 0.41 | 0.30 | 37.3 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 5 [Vernon St & Gordon St (Site Folder: Existing PM)]

15-31 Harbour Drive, Coffs Harbour
Site Category: Existing Volumes
Roundabout

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Gordon Street | | | | | | | | | | | | | | |
| 1 | L2 | 199 | 1 | 209 | 0.5 | 0.203 | 2.9 | LOS A | 0.9 | 6.5 | 0.24 | 0.39 | 0.24 | 32.5 |
| 2 | T1 | 467 | 3 | 492 | 0.6 | 0.392 | 2.1 | LOS A | 2.3 | 16.1 | 0.25 | 0.32 | 0.25 | 39.2 |
| 3 | R2 | 61 | 0 | 64 | 0.0 | 0.392 | 5.9 | LOS A | 2.3 | 16.1 | 0.25 | 0.32 | 0.25 | 39.4 |
| 3u | U | 8 | 0 | 8 | 0.0 | 0.392 | 9.7 | LOS A | 2.3 | 16.1 | 0.25 | 0.32 | 0.25 | 30.9 |
| Approach | | 735 | 4 | 774 | 0.5 | 0.392 | 2.7 | LOS A | 2.3 | 16.1 | 0.25 | 0.34 | 0.25 | 38.3 |
| East: Vernon Street | | | | | | | | | | | | | | |
| 4 | L2 | 16 | 1 | 17 | 6.3 | 0.020 | 4.0 | LOS A | 0.1 | 0.6 | 0.42 | 0.48 | 0.42 | 34.6 |
| 5 | T1 | 17 | 0 | 18 | 0.0 | 0.033 | 2.8 | LOS A | 0.1 | 1.0 | 0.40 | 0.51 | 0.40 | 36.4 |
| 6 | R2 | 16 | 1 | 17 | 6.3 | 0.033 | 6.7 | LOS A | 0.1 | 1.0 | 0.40 | 0.51 | 0.40 | 38.4 |
| 6u | U | 1 | 0 | 1 | 0.0 | 0.033 | 11.6 | LOS A | 0.1 | 1.0 | 0.40 | 0.51 | 0.40 | 42.0 |
| Approach | | 50 | 2 | 53 | 4.0 | 0.033 | 4.6 | LOS A | 0.1 | 1.0 | 0.40 | 0.50 | 0.40 | 37.0 |
| North: Gordon Street | | | | | | | | | | | | | | |
| 7 | L2 | 184 | 1 | 194 | 0.5 | 0.203 | 3.4 | LOS A | 1.0 | 7.2 | 0.37 | 0.44 | 0.37 | 37.5 |
| 8 | T1 | 221 | 2 | 233 | 0.9 | 0.203 | 2.6 | LOS A | 1.0 | 7.2 | 0.38 | 0.43 | 0.38 | 38.8 |
| 9 | R2 | 27 | 0 | 28 | 0.0 | 0.203 | 6.4 | LOS A | 1.0 | 7.1 | 0.38 | 0.42 | 0.38 | 28.5 |
| 9u | U | 19 | 0 | 20 | 0.0 | 0.203 | 11.4 | LOS A | 1.0 | 7.1 | 0.38 | 0.42 | 0.38 | 45.4 |
| Approach | | 451 | 3 | 475 | 0.7 | 0.203 | 3.5 | LOS A | 1.0 | 7.2 | 0.38 | 0.43 | 0.38 | 37.8 |
| West: Vernon Street | | | | | | | | | | | | | | |
| 10 | L2 | 103 | 1 | 108 | 1.0 | 0.127 | 5.8 | LOS A | 0.7 | 5.1 | 0.64 | 0.64 | 0.64 | 35.2 |
| 11 | T1 | 53 | 0 | 56 | 0.0 | 0.136 | 4.3 | LOS A | 0.8 | 5.9 | 0.63 | 0.65 | 0.63 | 34.2 |
| 12 | R2 | 84 | 1 | 88 | 1.2 | 0.136 | 8.2 | LOS A | 0.8 | 5.9 | 0.63 | 0.65 | 0.63 | 26.0 |
| 12u | U | 2 | 0 | 2 | 0.0 | 0.136 | 12.0 | LOS A | 0.8 | 5.9 | 0.63 | 0.65 | 0.63 | 16.8 |
| Approach | | 242 | 2 | 255 | 0.8 | 0.136 | 6.3 | LOS A | 0.8 | 5.9 | 0.63 | 0.65 | 0.63 | 32.6 |
| All Vehicles | | 1478 | 11 | 1556 | 0.7 | 0.392 | 3.6 | LOS A | 2.3 | 16.1 | 0.36 | 0.42 | 0.36 | 37.2 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 1 [Pacific Hwy & Coffs St (Site Folder: Future AM)]

15-31 Harbour Drive, Coffs Harbour
Site Category: Existing Volumes
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Pacific Highway | | | | | | | | | | | | | | |
| 1 | L2 | 26 | 0 | 27 | 0.0 | 0.041 | 26.6 | LOS B | 0.7 | 4.9 | 0.55 | 0.67 | 0.55 | 32.1 |
| 2 | T1 | 829 | 80 | 873 | 9.7 | 0.666 | 27.1 | LOS B | 16.5 | 125.0 | 0.82 | 0.71 | 0.82 | 30.4 |
| 3 | R2 | 77 | 4 | 81 | 5.2 | 0.302 | 47.5 | LOS D | 3.5 | 25.3 | 0.89 | 0.75 | 0.89 | 19.3 |
| Approach | | 932 | 84 | 981 | 9.0 | 0.666 | 28.8 | LOS C | 16.5 | 125.0 | 0.81 | 0.72 | 0.81 | 29.3 |
| East: Coffs Street | | | | | | | | | | | | | | |
| 4 | L2 | 14 | 0 | 15 | 0.0 | 0.343 | 44.5 | LOS D | 4.7 | 33.0 | 0.93 | 0.74 | 0.93 | 20.2 |
| 5 | T1 | 87 | 0 | 92 | 0.0 | 0.343 | 41.6 | LOS C | 4.7 | 33.0 | 0.93 | 0.74 | 0.93 | 23.2 |
| 6 | R2 | 505 | 10 | 532 | 2.0 | *0.907 | 62.4 | LOS E | 15.5 | 110.3 | 1.00 | 1.10 | 1.43 | 13.1 |
| Approach | | 606 | 10 | 638 | 1.7 | 0.907 | 59.0 | LOS E | 15.5 | 110.3 | 0.99 | 1.04 | 1.34 | 14.9 |
| North: Pacific Highway | | | | | | | | | | | | | | |
| 7 | L2 | 377 | 3 | 397 | 0.8 | 0.215 | 5.6 | LOS A | 0.0 | 0.0 | 0.00 | 0.53 | 0.00 | 46.4 |
| 8 | T1 | 1101 | 104 | 1159 | 9.4 | *0.876 | 25.4 | LOS B | 26.3 | 199.3 | 0.91 | 0.89 | 1.01 | 31.4 |
| 9 | R2 | 235 | 1 | 247 | 0.4 | *0.891 | 52.2 | LOS D | 13.0 | 91.5 | 1.00 | 0.92 | 1.22 | 23.1 |
| Approach | | 1713 | 108 | 1803 | 6.3 | 0.891 | 24.7 | LOS B | 26.3 | 199.3 | 0.72 | 0.81 | 0.81 | 30.6 |
| West: Coffs Street | | | | | | | | | | | | | | |
| 10 | L2 | 181 | 3 | 191 | 1.7 | 0.346 | 33.0 | LOS C | 7.3 | 51.8 | 0.83 | 0.76 | 0.83 | 27.2 |
| 11 | T1 | 134 | 1 | 141 | 0.7 | *0.839 | 56.0 | LOS D | 7.9 | 55.9 | 1.00 | 1.01 | 1.34 | 20.2 |
| 12 | R2 | 5 | 0 | 5 | 0.0 | 0.839 | 59.2 | LOS E | 7.9 | 55.9 | 1.00 | 1.01 | 1.34 | 23.6 |
| Approach | | 320 | 4 | 337 | 1.3 | 0.839 | 43.0 | LOS D | 7.9 | 55.9 | 0.90 | 0.87 | 1.05 | 23.9 |
| All Vehicles | | 3571 | 206 | 3759 | 5.8 | 0.907 | 33.3 | LOS C | 26.3 | 199.3 | 0.81 | 0.83 | 0.93 | 25.8 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

**Pedestrian Movement Performance**

| Mov ID | Crossing | Input Vol. ped/h | Dem. Flow ped/h | Aver. Delay sec | Level of Service | AVERAGE BACK OF QUEUE [ Ped ped | Dist ] m | Prop. Que | Effective Stop Rate | Travel Time sec | Travel Dist. m | Aver. Speed m/sec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Pacific Highway | | | | | | | | | | | | |
| P1 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 216.4 | 223.8 | 1.03 |
| East: Coffs Street | | | | | | | | | | | | |
| P2 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 212.4 | 218.5 | 1.03 |
| West: Coffs Street | | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P4 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 209.8 | 215.2 | 1.03 |
| All Pedestrians | | 150 | 158 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 212.9 | 219.2 | 1.03 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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# MOVEMENT SUMMARY

## Site: 1 [Pacific Hwy & Coffs St (Site Folder: Future PM)]

15-31 Harbour Drive, Coffs Harbour
Site Category: Existing Volumes
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Pacific Highway | | | | | | | | | | | | | | |
| 1 | L2 | 30 | 1 | 32 | 3.3 | 0.053 | 29.4 | LOS C | 0.9 | 6.3 | 0.60 | 0.68 | 0.60 | 31.1 |
| 2 | T1 | 1015 | 73 | 1068 | 7.2 | * 0.901 | 43.8 | LOS D | 28.3 | 210.6 | 0.97 | 1.02 | 1.19 | 23.3 |
| 3 | R2 | 50 | 1 | 53 | 2.0 | 0.205 | 47.7 | LOS D | 2.2 | 15.9 | 0.88 | 0.73 | 0.88 | 19.3 |
| Approach | | 1095 | 75 | 1153 | 6.8 | 0.901 | 43.6 | LOS D | 28.3 | 210.6 | 0.96 | 1.00 | 1.16 | 23.4 |
| East: Coffs Street | | | | | | | | | | | | | | |
| 4 | L2 | 55 | 0 | 58 | 0.0 | 0.380 | 39.6 | LOS C | 6.7 | 47.2 | 0.90 | 0.75 | 0.90 | 21.4 |
| 5 | T1 | 97 | 0 | 102 | 0.0 | 0.380 | 36.7 | LOS C | 6.7 | 47.2 | 0.90 | 0.75 | 0.90 | 24.2 |
| 6 | R2 | 707 | 17 | 744 | 2.4 | * 0.926 | 63.5 | LOS E | 22.6 | 161.8 | 1.00 | 1.12 | 1.43 | 13.0 |
| Approach | | 859 | 17 | 904 | 2.0 | 0.926 | 59.0 | LOS E | 22.6 | 161.8 | 0.98 | 1.06 | 1.33 | 14.7 |
| North: Pacific Highway | | | | | | | | | | | | | | |
| 7 | L2 | 299 | 6 | 315 | 2.0 | 0.172 | 5.6 | LOS A | 0.0 | 0.0 | 0.00 | 0.53 | 0.00 | 46.3 |
| 8 | T1 | 944 | 119 | 994 | 12.6 | 0.835 | 25.6 | LOS B | 21.6 | 167.5 | 0.89 | 0.84 | 0.96 | 31.3 |
| 9 | R2 | 234 | 0 | 246 | 0.0 | * 0.947 | 60.1 | LOS E | 14.1 | 98.8 | 1.00 | 0.98 | 1.37 | 21.5 |
| Approach | | 1477 | 125 | 1555 | 8.5 | 0.947 | 27.0 | LOS B | 21.6 | 167.5 | 0.73 | 0.80 | 0.83 | 29.5 |
| West: Coffs Street | | | | | | | | | | | | | | |
| 10 | L2 | 214 | 3 | 225 | 1.4 | 0.454 | 36.4 | LOS C | 9.2 | 65.4 | 0.88 | 0.79 | 0.88 | 26.2 |
| 11 | T1 | 98 | 0 | 103 | 0.0 | * 0.910 | 63.1 | LOS E | 7.1 | 49.9 | 1.00 | 1.11 | 1.58 | 19.0 |
| 12 | R2 | 19 | 0 | 20 | 0.0 | 0.910 | 66.3 | LOS E | 7.1 | 49.9 | 1.00 | 1.11 | 1.58 | 22.2 |
| Approach | | 331 | 3 | 348 | 0.9 | 0.910 | 46.0 | LOS D | 9.2 | 65.4 | 0.92 | 0.90 | 1.13 | 23.5 |
| All Vehicles | | 3762 | 220 | 3960 | 5.8 | 0.947 | 40.8 | LOS C | 28.3 | 210.6 | 0.87 | 0.93 | 1.07 | 22.9 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

**Pedestrian Movement Performance**

| Mov ID | Crossing | Input Vol. ped/h | Dem. Flow ped/h | Aver. Delay sec | Level of Service | AVERAGE BACK OF QUEUE [ Ped ped | Dist ] m | Prop. Que | Effective Stop Rate | Travel Time sec | Travel Dist. m | Aver. Speed m/sec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Pacific Highway | | | | | | | | | | | | |
| P1 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 216.4 | 223.8 | 1.03 |
| East: Coffs Street | | | | | | | | | | | | |
| P2 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 212.4 | 218.5 | 1.03 |
| West: Coffs Street | | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P4 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 209.8 | 215.2 | 1.03 |
| All Pedestrians | | 150 | 158 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 212.9 | 219.2 | 1.03 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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# MOVEMENT SUMMARY

## Site: 2 [Pacific Hwy & Harbour Drive (Site Folder: Future AM)]

15-31 Harbour Drive, Coffs Harbour
Site Category: Existing Volumes
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Pacific Highway | | | | | | | | | | | | | | |
| 1 | L2 | 23 | 1 | 24 | 4.3 | 0.032 | 23.6 | LOS B | 0.7 | 5.0 | 0.61 | 0.67 | 0.61 | 18.5 |
| 2 | T1 | 810 | 83 | 853 | 10.2 | * 0.565 | 23.6 | LOS B | 16.1 | 122.5 | 0.81 | 0.71 | 0.81 | 29.6 |
| Approach | | 833 | 84 | 877 | 10.1 | 0.565 | 23.6 | LOS B | 16.1 | 122.5 | 0.80 | 0.71 | 0.80 | 29.3 |
| East: Harbour Drive | | | | | | | | | | | | | | |
| 4 | L2 | 172 | 1 | 181 | 0.6 | * 0.593 | 44.6 | LOS D | 8.2 | 58.0 | 0.96 | 0.80 | 0.96 | 17.6 |
| 5 | T1 | 43 | 0 | 45 | 0.0 | 0.129 | 37.4 | LOS C | 1.9 | 13.1 | 0.87 | 0.66 | 0.87 | 18.8 |
| Approach | | 215 | 1 | 226 | 0.5 | 0.593 | 43.1 | LOS D | 8.2 | 58.0 | 0.94 | 0.77 | 0.94 | 17.8 |
| North: Pacific Highway | | | | | | | | | | | | | | |
| 7 | L2 | 45 | 1 | 47 | 2.2 | 0.062 | 23.9 | LOS B | 1.4 | 9.7 | 0.62 | 0.70 | 0.62 | 30.7 |
| 8 | T1 | 887 | 100 | 934 | 11.3 | 0.497 | 12.7 | LOS A | 14.0 | 107.4 | 0.61 | 0.54 | 0.61 | 38.7 |
| 9 | R2 | 114 | 1 | 120 | 0.9 | * 0.310 | 29.7 | LOS C | 4.3 | 30.6 | 0.81 | 0.77 | 0.81 | 24.5 |
| Approach | | 1046 | 102 | 1101 | 9.8 | 0.497 | 15.0 | LOS B | 14.0 | 107.4 | 0.63 | 0.57 | 0.63 | 36.0 |
| West: West High Street | | | | | | | | | | | | | | |
| 10 | L2 | 76 | 4 | 80 | 5.3 | 0.097 | 19.6 | LOS B | 2.2 | 15.9 | 0.59 | 0.66 | 0.59 | 27.7 |
| 11 | T1 | 250 | 2 | 263 | 0.8 | 0.532 | 30.7 | LOS C | 10.4 | 73.6 | 0.86 | 0.72 | 0.86 | 20.8 |
| 12 | R2 | 19 | 2 | 20 | 10.5 | * 0.082 | 38.5 | LOS C | 0.8 | 6.2 | 0.88 | 0.68 | 0.88 | 12.4 |
| Approach | | 345 | 8 | 363 | 2.3 | 0.532 | 28.7 | LOS C | 10.4 | 73.6 | 0.80 | 0.71 | 0.80 | 21.5 |
| All Vehicles | | 2439 | 195 | 2567 | 8.0 | 0.593 | 22.3 | LOS B | 16.1 | 122.5 | 0.74 | 0.66 | 0.74 | 28.6 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

**Pedestrian Movement Performance**

| Mov ID | Crossing | Input Vol. ped/h | Dem. Flow ped/h | Aver. Delay sec | Level of Service | AVERAGE BACK OF QUEUE [ Ped ped | Dist ] m | Prop. Que | Effective Stop Rate | Travel Time sec | Travel Dist. m | Aver. Speed m/sec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Pacific Highway | | | | | | | | | | | | |
| P1 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 215.4 | 222.5 | 1.03 |
| East: Harbour Drive | | | | | | | | | | | | |
| P2 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 207.3 | 211.9 | 1.02 |
| North: Pacific Highway | | | | | | | | | | | | |
| P3 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 216.0 | 223.3 | 1.03 |
| West: West High Street | | | | | | | | | | | | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| P4 Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 211.7 | 217.7 | 1.03 |
| All Pedestrians | 200 | 211 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 212.6 | 218.9 | 1.03 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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# MOVEMENT SUMMARY

## Site: 2 [Pacific Hwy & Harbour Drive (Site Folder: Future PM)]

15-31 Harbour Drive, Coffs Harbour
Site Category: Existing Volumes
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Pacific Highway | | | | | | | | | | | | | | |
| 1 | L2 | 40 | 0 | 42 | 0.0 | 0.057 | 25.1 | LOS B | 1.2 | 8.7 | 0.64 | 0.70 | 0.64 | 17.9 |
| 2 | T1 | 925 | 71 | 974 | 7.7 | * 0.675 | 26.3 | LOS B | 20.1 | 150.1 | 0.87 | 0.77 | 0.87 | 28.0 |
| Approach | | 965 | 71 | 1016 | 7.4 | 0.675 | 26.2 | LOS B | 20.1 | 150.1 | 0.86 | 0.77 | 0.86 | 27.6 |
| East: Harbour Drive | | | | | | | | | | | | | | |
| 4 | L2 | 56 | 0 | 59 | 0.0 | 0.144 | 37.5 | LOS C | 2.3 | 16.3 | 0.84 | 0.72 | 0.84 | 19.3 |
| 5 | T1 | 237 | 1 | 249 | 0.4 | * 0.662 | 38.5 | LOS C | 11.1 | 78.3 | 0.95 | 0.80 | 0.96 | 18.5 |
| Approach | | 293 | 1 | 308 | 0.3 | 0.662 | 38.3 | LOS C | 11.1 | 78.3 | 0.93 | 0.79 | 0.94 | 18.7 |
| North: Pacific Highway | | | | | | | | | | | | | | |
| 7 | L2 | 53 | 0 | 56 | 0.0 | 0.075 | 25.3 | LOS B | 1.7 | 11.6 | 0.65 | 0.70 | 0.65 | 30.0 |
| 8 | T1 | 956 | 116 | 1006 | 12.1 | 0.577 | 15.7 | LOS B | 16.8 | 129.8 | 0.69 | 0.61 | 0.69 | 35.6 |
| 9 | R2 | 117 | 0 | 123 | 0.0 | * 0.405 | 37.0 | LOS C | 5.1 | 35.9 | 0.90 | 0.80 | 0.90 | 21.5 |
| Approach | | 1126 | 116 | 1185 | 10.3 | 0.577 | 18.4 | LOS B | 16.8 | 129.8 | 0.71 | 0.63 | 0.71 | 33.1 |
| West: West High Street | | | | | | | | | | | | | | |
| 10 | L2 | 137 | 7 | 144 | 5.1 | 0.168 | 19.1 | LOS B | 3.9 | 28.7 | 0.60 | 0.68 | 0.60 | 28.1 |
| 11 | T1 | 222 | 0 | 234 | 0.0 | 0.456 | 26.6 | LOS B | 8.5 | 59.8 | 0.80 | 0.67 | 0.80 | 22.2 |
| 12 | R2 | 24 | 2 | 25 | 8.3 | * 0.098 | 37.7 | LOS C | 1.0 | 7.6 | 0.88 | 0.69 | 0.88 | 12.6 |
| Approach | | 383 | 9 | 403 | 2.3 | 0.456 | 24.6 | LOS B | 8.5 | 59.8 | 0.73 | 0.67 | 0.73 | 23.3 |
| All Vehicles | | 2767 | 197 | 2913 | 7.1 | 0.675 | 24.1 | LOS B | 20.1 | 150.1 | 0.79 | 0.70 | 0.79 | 27.5 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

**Pedestrian Movement Performance**

| Mov ID | Crossing | Input Vol. ped/h | Dem. Flow ped/h | Aver. Delay sec | Level of Service | AVERAGE BACK OF QUEUE [ Ped ped | Dist ] m | Prop. Que | Effective Stop Rate | Travel Time sec | Travel Dist. m | Aver. Speed m/sec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Pacific Highway | | | | | | | | | | | | |
| P1 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 215.4 | 222.5 | 1.03 |
| East: Harbour Drive | | | | | | | | | | | | |
| P2 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 207.3 | 211.9 | 1.02 |
| North: Pacific Highway | | | | | | | | | | | | |
| P3 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 216.0 | 223.3 | 1.03 |
| West: West High Street | | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P4 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 211.7 | 217.7 | 1.03 |
| All Pedestrians | | 200 | 211 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 212.6 | 218.9 | 1.03 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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# MOVEMENT SUMMARY

## Site: 3 [Pacific Hwy & Park Ave (Site Folder: Future AM)]

15-31 Harbour Drive, Coffs Harbour
Site Category: Existing Volumes
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Pacific Highway | | | | | | | | | | | | | | |
| 1 | L2 | 1 | 0 | 1 | 0.0 | 0.001 | 16.3 | LOS B | 0.0 | 0.2 | 0.51 | 0.58 | 0.51 | 39.5 |
| 2 | T1 | 746 | 80 | 785 | 10.7 | 0.648 | 28.3 | LOS B | 17.4 | 132.8 | 0.87 | 0.76 | 0.87 | 32.8 |
| 3 | R2 | 106 | 4 | 112 | 3.8 | * 0.686 | 57.1 | LOS E | 5.7 | 41.2 | 1.00 | 0.84 | 1.12 | 24.4 |
| Approach | | 853 | 84 | 898 | 9.8 | 0.686 | 31.8 | LOS C | 17.4 | 132.8 | 0.89 | 0.77 | 0.90 | 31.2 |
| East: Park Avenue | | | | | | | | | | | | | | |
| 4 | L2 | 30 | 0 | 32 | 0.0 | 0.142 | 47.0 | LOS D | 1.4 | 9.9 | 0.93 | 0.71 | 0.93 | 26.1 |
| 5 | T1 | 139 | 6 | 146 | 4.3 | * 0.684 | 48.2 | LOS D | 7.2 | 52.5 | 1.00 | 0.86 | 1.09 | 18.0 |
| 6 | R2 | 84 | 4 | 88 | 4.8 | 0.410 | 48.9 | LOS D | 4.2 | 30.3 | 0.97 | 0.77 | 0.97 | 16.9 |
| Approach | | 253 | 10 | 266 | 4.0 | 0.684 | 48.3 | LOS D | 7.2 | 52.5 | 0.98 | 0.81 | 1.03 | 18.8 |
| North: Pacific Highway | | | | | | | | | | | | | | |
| 7 | L2 | 147 | 11 | 155 | 7.5 | 0.244 | 29.9 | LOS C | 5.3 | 39.4 | 0.74 | 0.76 | 0.74 | 22.9 |
| 8 | T1 | 800 | 91 | 842 | 11.4 | * 0.667 | 28.8 | LOS C | 17.9 | 137.8 | 0.89 | 0.78 | 0.89 | 32.5 |
| 9 | R2 | 2 | 0 | 2 | 0.0 | 0.013 | 50.9 | LOS D | 0.1 | 0.7 | 0.93 | 0.61 | 0.93 | 13.5 |
| Approach | | 949 | 102 | 999 | 10.7 | 0.667 | 29.1 | LOS C | 17.9 | 137.8 | 0.87 | 0.78 | 0.87 | 31.1 |
| West: Moonee Street | | | | | | | | | | | | | | |
| 10 | L2 | 3 | 0 | 3 | 0.0 | 0.009 | 38.5 | LOS C | 0.1 | 0.9 | 0.83 | 0.61 | 0.83 | 15.2 |
| 11 | T1 | 205 | 8 | 216 | 3.9 | 0.604 | 41.0 | LOS C | 9.8 | 71.2 | 0.97 | 0.80 | 0.97 | 19.7 |
| 12 | R2 | 212 | 10 | 223 | 4.7 | * 0.654 | 45.0 | LOS D | 10.4 | 75.8 | 0.98 | 0.83 | 1.00 | 25.2 |
| Approach | | 420 | 18 | 442 | 4.3 | 0.654 | 43.0 | LOS D | 10.4 | 75.8 | 0.97 | 0.81 | 0.98 | 22.5 |
| All Vehicles | | 2475 | 214 | 2605 | 8.6 | 0.686 | 34.3 | LOS C | 17.9 | 137.8 | 0.90 | 0.78 | 0.92 | 27.8 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

**Pedestrian Movement Performance**

| Mov ID | Crossing | Input Vol. ped/h | Dem. Flow ped/h | Aver. Delay sec | Level of Service | AVERAGE BACK OF QUEUE [ Ped ped | Dist ] m | Prop. Que | Effective Stop Rate | Travel Time sec | Travel Dist. m | Aver. Speed m/sec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| East: Park Avenue | | | | | | | | | | | | |
| P2 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 213.5 | 220.0 | 1.03 |
| North: Pacific Highway | | | | | | | | | | | | |
| P3 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 216.0 | 223.3 | 1.03 |
| West: Moonee Street | | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P4 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 213.5 | 220.0 | 1.03 |
| All Pedestrians | | 150 | 158 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 214.4 | 221.1 | 1.03 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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# MOVEMENT SUMMARY

## Site: 3 [Pacific Hwy & Park Ave (Site Folder: Future PM)]

15-31 Harbour Drive, Coffs Harbour
Site Category: Existing Volumes
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Pacific Highway | | | | | | | | | | | | | | |
| 1 | L2 | 1 | 0 | 1 | 0.0 | 0.001 | 15.8 | LOS B | 0.0 | 0.2 | 0.50 | 0.58 | 0.50 | 39.8 |
| 2 | T1 | 851 | 62 | 896 | 7.3 | 0.742 | 31.2 | LOS C | 21.1 | 157.3 | 0.92 | 0.83 | 0.95 | 31.4 |
| 3 | R2 | 116 | 4 | 122 | 3.4 | * 0.674 | 55.9 | LOS D | 6.2 | 44.4 | 1.00 | 0.83 | 1.10 | 24.7 |
| Approach | | 968 | 66 | 1019 | 6.8 | 0.742 | 34.2 | LOS C | 21.1 | 157.3 | 0.93 | 0.83 | 0.97 | 30.2 |
| East: Park Avenue | | | | | | | | | | | | | | |
| 4 | L2 | 47 | 0 | 49 | 0.0 | 0.178 | 44.2 | LOS D | 2.2 | 15.1 | 0.91 | 0.73 | 0.91 | 26.8 |
| 5 | T1 | 175 | 12 | 184 | 6.9 | * 0.737 | 46.7 | LOS D | 9.1 | 67.4 | 0.99 | 0.91 | 1.12 | 18.3 |
| 6 | R2 | 130 | 9 | 137 | 6.9 | 0.515 | 46.9 | LOS D | 6.4 | 47.2 | 0.97 | 0.79 | 0.97 | 17.3 |
| Approach | | 352 | 21 | 371 | 6.0 | 0.737 | 46.5 | LOS D | 9.1 | 67.4 | 0.97 | 0.84 | 1.04 | 19.2 |
| North: Pacific Highway | | | | | | | | | | | | | | |
| 7 | L2 | 152 | 5 | 160 | 3.3 | 0.252 | 30.7 | LOS C | 5.6 | 40.0 | 0.75 | 0.76 | 0.75 | 22.6 |
| 8 | T1 | 853 | 97 | 898 | 11.4 | * 0.744 | 31.5 | LOS C | 20.5 | 157.1 | 0.93 | 0.83 | 0.96 | 31.2 |
| 9 | R2 | 10 | 0 | 11 | 0.0 | 0.057 | 50.6 | LOS D | 0.5 | 3.3 | 0.93 | 0.67 | 0.93 | 13.5 |
| Approach | | 1015 | 102 | 1068 | 10.0 | 0.744 | 31.6 | LOS C | 20.5 | 157.1 | 0.90 | 0.82 | 0.93 | 29.8 |
| West: Moonee Street | | | | | | | | | | | | | | |
| 10 | L2 | 7 | 0 | 7 | 0.0 | 0.025 | 41.7 | LOS C | 0.3 | 2.1 | 0.87 | 0.64 | 0.87 | 14.5 |
| 11 | T1 | 149 | 3 | 157 | 2.0 | 0.525 | 42.7 | LOS D | 7.2 | 51.2 | 0.96 | 0.78 | 0.96 | 19.3 |
| 12 | R2 | 191 | 8 | 201 | 4.2 | * 0.697 | 48.6 | LOS D | 9.8 | 71.0 | 1.00 | 0.87 | 1.07 | 24.2 |
| Approach | | 347 | 11 | 365 | 3.2 | 0.697 | 45.9 | LOS D | 9.8 | 71.0 | 0.98 | 0.82 | 1.02 | 22.0 |
| All Vehicles | | 2682 | 200 | 2823 | 7.5 | 0.744 | 36.3 | LOS C | 21.1 | 157.3 | 0.93 | 0.83 | 0.97 | 27.1 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

**Pedestrian Movement Performance**

| Mov ID | Crossing | Input Vol. ped/h | Dem. Flow ped/h | Aver. Delay sec | Level of Service | AVERAGE BACK OF QUEUE [ Ped ped | Dist ] m | Prop. Que | Effective Stop Rate | Travel Time sec | Travel Dist. m | Aver. Speed m/sec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| East: Park Avenue | | | | | | | | | | | | |
| P2 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 213.5 | 220.0 | 1.03 |
| North: Pacific Highway | | | | | | | | | | | | |
| P3 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 216.0 | 223.3 | 1.03 |
| West: Moonee Street | | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P4 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 213.5 | 220.0 | 1.03 |
| All Pedestrians | | 150 | 158 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 214.4 | 221.1 | 1.03 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 4 [Harbour Dr & Gordon St (Site Folder: Future AM)]

15-31 Harbour Drive, Coffs Harbour
Site Category: Existing Volumes
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Gordon Street | | | | | | | | | | | | | | |
| 1 | L2 | 43 | 0 | 45 | 0.0 | 0.732 | 38.3 | LOS C | 18.9 | 134.4 | 0.96 | 0.85 | 0.98 | 20.0 |
| 2 | T1 | 358 | 7 | 377 | 2.0 | 0.732 | 34.9 | LOS C | 18.9 | 134.4 | 0.96 | 0.85 | 0.99 | 12.4 |
| 3 | R2 | 92 | 16 | 97 | 17.4 | * 0.732 | 54.6 | LOS D | 5.2 | 41.6 | 1.00 | 0.94 | 1.23 | 13.6 |
| Approach | | 493 | 23 | 519 | 4.7 | 0.732 | 38.9 | LOS C | 18.9 | 134.4 | 0.97 | 0.87 | 1.03 | 13.5 |
| East: Harbour Drive | | | | | | | | | | | | | | |
| 4 | L2 | 96 | 5 | 101 | 5.2 | 0.097 | 13.3 | LOS A | 2.2 | 15.7 | 0.47 | 0.62 | 0.47 | 27.2 |
| 5 | T1 | 153 | 1 | 161 | 0.7 | 0.143 | 10.2 | LOS A | 3.5 | 24.8 | 0.49 | 0.40 | 0.49 | 32.3 |
| 6 | R2 | 376 | 6 | 396 | 1.6 | * 0.535 | 17.3 | LOS B | 10.4 | 74.1 | 0.78 | 0.78 | 0.78 | 23.1 |
| Approach | | 625 | 12 | 658 | 1.9 | 0.535 | 14.9 | LOS B | 10.4 | 74.1 | 0.66 | 0.66 | 0.66 | 26.4 |
| North: Gordon Street | | | | | | | | | | | | | | |
| 7 | L2 | 306 | 13 | 322 | 4.2 | 0.585 | 30.1 | LOS C | 15.7 | 113.4 | 0.85 | 0.80 | 0.85 | 18.1 |
| 8 | T1 | 261 | 2 | 275 | 0.8 | 0.585 | 35.4 | LOS C | 15.7 | 113.4 | 0.92 | 0.80 | 0.92 | 12.1 |
| 9 | R2 | 26 | 1 | 27 | 3.8 | 0.585 | 42.6 | LOS D | 9.9 | 70.1 | 0.95 | 0.80 | 0.95 | 17.7 |
| Approach | | 593 | 16 | 624 | 2.7 | 0.585 | 33.0 | LOS C | 15.7 | 113.4 | 0.89 | 0.80 | 0.89 | 15.5 |
| West: Harbour Drive | | | | | | | | | | | | | | |
| 10 | L2 | 56 | 0 | 59 | 0.0 | 0.144 | 37.5 | LOS C | 2.1 | 15.0 | 0.77 | 0.70 | 0.77 | 18.2 |
| 11 | T1 | 190 | 0 | 200 | 0.0 | * 0.719 | 40.3 | LOS C | 10.8 | 76.1 | 0.92 | 0.82 | 0.98 | 20.5 |
| 12 | R2 | 41 | 1 | 43 | 2.4 | 0.719 | 43.7 | LOS D | 10.8 | 76.1 | 0.92 | 0.82 | 0.98 | 18.4 |
| Approach | | 287 | 1 | 302 | 0.3 | 0.719 | 40.2 | LOS C | 10.8 | 76.1 | 0.89 | 0.80 | 0.94 | 19.8 |
| All Vehicles | | 1998 | 52 | 2103 | 2.6 | 0.732 | 29.8 | LOS C | 18.9 | 134.4 | 0.84 | 0.77 | 0.86 | 18.6 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

**Pedestrian Movement Performance**

| Mov ID | Crossing | Input Vol. ped/h | Dem. Flow ped/h | Aver. Delay sec | Level of Service | AVERAGE BACK OF QUEUE [ Ped ped | Dist ] m | Prop. Que | Effective Stop Rate | Travel Time sec | Travel Dist. m | Aver. Speed m/sec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Gordon Street | | | | | | | | | | | | |
| P1 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 209.8 | 215.2 | 1.03 |
| East: Harbour Drive | | | | | | | | | | | | |
| P2 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 209.8 | 215.2 | 1.03 |
| North: Gordon Street | | | | | | | | | | | | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| P3 Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 209.8 | 215.2 | 1.03 |
| West: Harbour Drive | | | | | | | | | | | |
| P4 Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 207.3 | 211.9 | 1.02 |
| All Pedestrians | 200 | 211 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 209.2 | 214.4 | 1.02 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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# MOVEMENT SUMMARY

## Site: 4 [Harbour Dr & Gordon St (Site Folder: Future PM)]

15-31 Harbour Drive, Coffs Harbour
Site Category: Existing Volumes
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Gordon Street | | | | | | | | | | | | | | |
| 1 | L2 | 74 | 1 | 78 | 1.4 | 0.660 | 35.2 | LOS C | 17.2 | 120.9 | 0.92 | 0.81 | 0.92 | 20.8 |
| 2 | T1 | 313 | 0 | 329 | 0.0 | 0.660 | 31.7 | LOS C | 17.2 | 120.9 | 0.92 | 0.81 | 0.92 | 13.2 |
| 3 | R2 | 80 | 4 | 84 | 5.0 | * 0.662 | 53.8 | LOS D | 4.3 | 31.7 | 1.00 | 0.87 | 1.14 | 13.7 |
| Approach | | 467 | 5 | 492 | 1.1 | 0.662 | 36.1 | LOS C | 17.2 | 120.9 | 0.93 | 0.82 | 0.96 | 14.7 |
| East: Harbour Drive | | | | | | | | | | | | | | |
| 4 | L2 | 139 | 3 | 146 | 2.2 | 0.143 | 14.6 | LOS B | 3.4 | 23.9 | 0.51 | 0.64 | 0.51 | 26.4 |
| 5 | T1 | 246 | 0 | 259 | 0.0 | 0.240 | 11.8 | LOS A | 6.3 | 44.2 | 0.54 | 0.46 | 0.54 | 31.4 |
| 6 | R2 | 330 | 1 | 347 | 0.3 | * 0.476 | 17.6 | LOS B | 9.3 | 65.4 | 0.75 | 0.76 | 0.75 | 22.9 |
| Approach | | 715 | 4 | 753 | 0.6 | 0.476 | 15.0 | LOS B | 9.3 | 65.4 | 0.63 | 0.63 | 0.63 | 27.0 |
| North: Gordon Street | | | | | | | | | | | | | | |
| 7 | L2 | 372 | 1 | 392 | 0.3 | 0.628 | 28.6 | LOS C | 18.5 | 129.5 | 0.85 | 0.81 | 0.85 | 18.5 |
| 8 | T1 | 331 | 1 | 348 | 0.3 | 0.628 | 33.2 | LOS C | 18.5 | 129.5 | 0.92 | 0.80 | 0.92 | 12.7 |
| 9 | R2 | 26 | 0 | 27 | 0.0 | 0.628 | 39.2 | LOS C | 12.8 | 89.5 | 0.94 | 0.80 | 0.94 | 18.6 |
| Approach | | 729 | 2 | 767 | 0.3 | 0.628 | 31.1 | LOS C | 18.5 | 129.5 | 0.89 | 0.80 | 0.89 | 16.0 |
| West: Harbour Drive | | | | | | | | | | | | | | |
| 10 | L2 | 54 | 0 | 57 | 0.0 | 0.128 | 35.6 | LOS C | 2.0 | 13.8 | 0.74 | 0.69 | 0.74 | 18.8 |
| 11 | T1 | 141 | 1 | 148 | 0.7 | * 0.661 | 37.7 | LOS C | 9.2 | 65.2 | 0.89 | 0.78 | 0.91 | 21.0 |
| 12 | R2 | 65 | 1 | 68 | 1.5 | 0.661 | 41.2 | LOS C | 9.2 | 65.2 | 0.89 | 0.78 | 0.91 | 18.9 |
| Approach | | 260 | 2 | 274 | 0.8 | 0.661 | 38.1 | LOS C | 9.2 | 65.2 | 0.86 | 0.76 | 0.88 | 20.1 |
| All Vehicles | | 2171 | 13 | 2285 | 0.6 | 0.662 | 27.7 | LOS B | 18.5 | 129.5 | 0.81 | 0.75 | 0.82 | 19.5 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

**Pedestrian Movement Performance**

| Mov ID | Crossing | Input Vol. ped/h | Dem. Flow ped/h | Aver. Delay sec | Level of Service | AVERAGE BACK OF QUEUE [ Ped ped | Dist ] m | Prop. Que | Effective Stop Rate | Travel Time sec | Travel Dist. m | Aver. Speed m/sec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Gordon Street | | | | | | | | | | | | |
| P1 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 209.8 | 215.2 | 1.03 |
| East: Harbour Drive | | | | | | | | | | | | |
| P2 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 209.8 | 215.2 | 1.03 |
| North: Gordon Street | | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P3 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 209.8 | 215.2 | 1.03 |
| West: Harbour Drive | | | | | | | | | | | | |
| P4 | Full | 50 | 53 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 207.3 | 211.9 | 1.02 |
| All Pedestrians | | 200 | 211 | 44.3 | LOS E | 0.1 | 0.1 | 0.94 | 0.94 | 209.2 | 214.4 | 1.02 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 5 [Vernon St & Gordon St (Site Folder: Future AM)]

15-31 Harbour Drive, Coffs Harbour
Site Category: Existing Volumes
Roundabout

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Gordon Street | | | | | | | | | | | | | | |
| 1 | L2 | 252 | 0 | 265 | 0.0 | 0.225 | 2.7 | LOS A | 1.1 | 7.6 | 0.21 | 0.38 | 0.21 | 32.8 |
| 2 | T1 | 345 | 5 | 363 | 1.4 | 0.356 | 2.0 | LOS A | 2.0 | 14.4 | 0.22 | 0.37 | 0.22 | 38.8 |
| 3 | R2 | 139 | 2 | 146 | 1.4 | 0.356 | 5.8 | LOS A | 2.0 | 14.4 | 0.22 | 0.37 | 0.22 | 38.8 |
| 3u | U | 9 | 0 | 9 | 0.0 | 0.356 | 9.6 | LOS A | 2.0 | 14.4 | 0.22 | 0.37 | 0.22 | 30.4 |
| Approach | | 745 | 7 | 784 | 0.9 | 0.356 | 3.0 | LOS A | 2.0 | 14.4 | 0.22 | 0.37 | 0.22 | 37.7 |
| East: Vernon Street | | | | | | | | | | | | | | |
| 4 | L2 | 17 | 2 | 18 | 11.8 | 0.018 | 3.7 | LOS A | 0.1 | 0.5 | 0.42 | 0.47 | 0.42 | 34.4 |
| 5 | T1 | 6 | 0 | 6 | 0.0 | 0.017 | 2.9 | LOS A | 0.1 | 0.5 | 0.42 | 0.53 | 0.42 | 36.0 |
| 6 | R2 | 9 | 1 | 9 | 11.1 | 0.017 | 6.9 | LOS A | 0.1 | 0.5 | 0.42 | 0.53 | 0.42 | 38.1 |
| 6u | U | 1 | 0 | 1 | 0.0 | 0.017 | 11.8 | LOS A | 0.1 | 0.5 | 0.42 | 0.53 | 0.42 | 41.5 |
| Approach | | 33 | 3 | 35 | 9.1 | 0.018 | 4.7 | LOS A | 0.1 | 0.5 | 0.42 | 0.50 | 0.42 | 36.4 |
| North: Gordon Street | | | | | | | | | | | | | | |
| 7 | L2 | 271 | 15 | 285 | 5.5 | 0.274 | 3.6 | LOS A | 1.4 | 10.0 | 0.36 | 0.45 | 0.36 | 37.5 |
| 8 | T1 | 297 | 13 | 313 | 4.4 | 0.274 | 2.6 | LOS A | 1.4 | 10.0 | 0.37 | 0.41 | 0.37 | 38.5 |
| 9 | R2 | 39 | 2 | 41 | 5.1 | 0.274 | 6.5 | LOS A | 1.4 | 9.9 | 0.37 | 0.40 | 0.37 | 28.3 |
| 9u | U | 7 | 0 | 7 | 0.0 | 0.274 | 11.4 | LOS A | 1.4 | 9.9 | 0.37 | 0.40 | 0.37 | 45.3 |
| Approach | | 614 | 30 | 646 | 4.9 | 0.274 | 3.4 | LOS A | 1.4 | 10.0 | 0.36 | 0.43 | 0.36 | 37.4 |
| West: Vernon Street | | | | | | | | | | | | | | |
| 10 | L2 | 11 | 0 | 12 | 0.0 | 0.016 | 5.7 | LOS A | 0.1 | 0.5 | 0.58 | 0.54 | 0.58 | 35.2 |
| 11 | T1 | 22 | 0 | 23 | 0.0 | 0.044 | 3.7 | LOS A | 0.2 | 1.7 | 0.56 | 0.57 | 0.56 | 35.1 |
| 12 | R2 | 22 | 0 | 23 | 0.0 | 0.044 | 7.6 | LOS A | 0.2 | 1.7 | 0.56 | 0.57 | 0.56 | 26.9 |
| 12u | U | 3 | 0 | 3 | 0.0 | 0.044 | 11.4 | LOS A | 0.2 | 1.7 | 0.56 | 0.57 | 0.56 | 17.1 |
| Approach | | 58 | 0 | 61 | 0.0 | 0.044 | 5.9 | LOS A | 0.2 | 1.7 | 0.56 | 0.56 | 0.56 | 31.8 |
| All Vehicles | | 1450 | 40 | 1526 | 2.8 | 0.356 | 3.3 | LOS A | 2.0 | 14.4 | 0.30 | 0.41 | 0.30 | 37.3 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## Site: 5 [Vernon St & Gordon St (Site Folder: Future PM)]

15-31 Harbour Drive, Coffs Harbour
Site Category: Existing Volumes
Roundabout

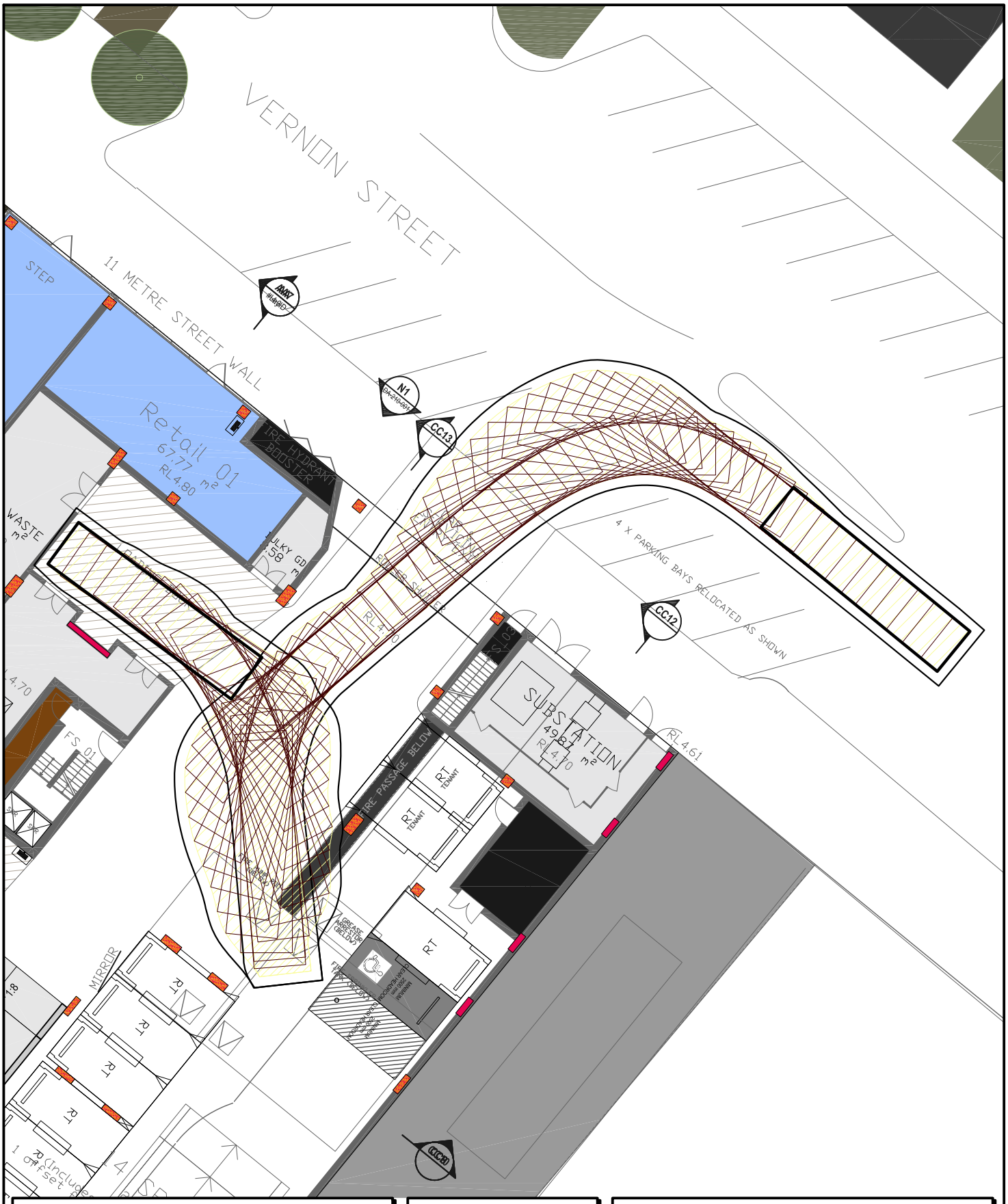
**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] veh/h | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Gordon Street | | | | | | | | | | | | | | |
| 1 | L2 | 214 | 1 | 225 | 0.5 | 0.214 | 2.9 | LOS A | 1.0 | 7.0 | 0.24 | 0.39 | 0.24 | 32.5 |
| 2 | T1 | 477 | 3 | 502 | 0.6 | 0.399 | 2.1 | LOS A | 2.4 | 16.6 | 0.26 | 0.32 | 0.26 | 39.2 |
| 3 | R2 | 61 | 0 | 64 | 0.0 | 0.399 | 5.9 | LOS A | 2.4 | 16.6 | 0.26 | 0.32 | 0.26 | 39.4 |
| 3u | U | 8 | 0 | 8 | 0.0 | 0.399 | 9.7 | LOS A | 2.4 | 16.6 | 0.26 | 0.32 | 0.26 | 30.9 |
| Approach | | 760 | 4 | 800 | 0.5 | 0.399 | 2.7 | LOS A | 2.4 | 16.6 | 0.25 | 0.34 | 0.25 | 38.2 |
| East: Vernon Street | | | | | | | | | | | | | | |
| 4 | L2 | 16 | 1 | 17 | 6.3 | 0.020 | 4.1 | LOS A | 0.1 | 0.6 | 0.43 | 0.49 | 0.43 | 34.5 |
| 5 | T1 | 17 | 0 | 18 | 0.0 | 0.033 | 2.8 | LOS A | 0.1 | 1.0 | 0.41 | 0.51 | 0.41 | 36.4 |
| 6 | R2 | 16 | 1 | 17 | 6.3 | 0.033 | 6.7 | LOS A | 0.1 | 1.0 | 0.41 | 0.51 | 0.41 | 38.3 |
| 6u | U | 1 | 0 | 1 | 0.0 | 0.033 | 11.7 | LOS A | 0.1 | 1.0 | 0.41 | 0.51 | 0.41 | 41.9 |
| Approach | | 50 | 2 | 53 | 4.0 | 0.033 | 4.7 | LOS A | 0.1 | 1.0 | 0.41 | 0.50 | 0.41 | 37.0 |
| North: Gordon Street | | | | | | | | | | | | | | |
| 7 | L2 | 194 | 1 | 204 | 0.5 | 0.214 | 3.5 | LOS A | 1.1 | 7.7 | 0.39 | 0.45 | 0.39 | 37.4 |
| 8 | T1 | 231 | 2 | 243 | 0.9 | 0.214 | 2.6 | LOS A | 1.1 | 7.7 | 0.39 | 0.43 | 0.39 | 38.8 |
| 9 | R2 | 27 | 0 | 28 | 0.0 | 0.214 | 6.5 | LOS A | 1.1 | 7.6 | 0.39 | 0.43 | 0.39 | 28.5 |
| 9u | U | 19 | 0 | 20 | 0.0 | 0.214 | 11.5 | LOS A | 1.1 | 7.6 | 0.39 | 0.43 | 0.39 | 45.4 |
| Approach | | 471 | 3 | 496 | 0.6 | 0.214 | 3.5 | LOS A | 1.1 | 7.7 | 0.39 | 0.44 | 0.39 | 37.8 |
| West: Vernon Street | | | | | | | | | | | | | | |
| 10 | L2 | 103 | 1 | 108 | 1.0 | 0.129 | 5.9 | LOS A | 0.7 | 5.2 | 0.65 | 0.65 | 0.65 | 35.1 |
| 11 | T1 | 53 | 0 | 56 | 0.0 | 0.145 | 4.4 | LOS A | 0.9 | 6.3 | 0.64 | 0.66 | 0.64 | 34.1 |
| 12 | R2 | 92 | 1 | 97 | 1.1 | 0.145 | 8.3 | LOS A | 0.9 | 6.3 | 0.64 | 0.66 | 0.64 | 25.8 |
| 12u | U | 2 | 0 | 2 | 0.0 | 0.145 | 12.0 | LOS A | 0.9 | 6.3 | 0.64 | 0.66 | 0.64 | 16.7 |
| Approach | | 250 | 2 | 263 | 0.8 | 0.145 | 6.5 | LOS A | 0.9 | 6.3 | 0.64 | 0.66 | 0.64 | 32.4 |
| All Vehicles | | 1531 | 11 | 1612 | 0.7 | 0.399 | 3.6 | LOS A | 2.4 | 16.6 | 0.36 | 0.43 | 0.36 | 37.2 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# Appendix E

## Turning Path Assessment



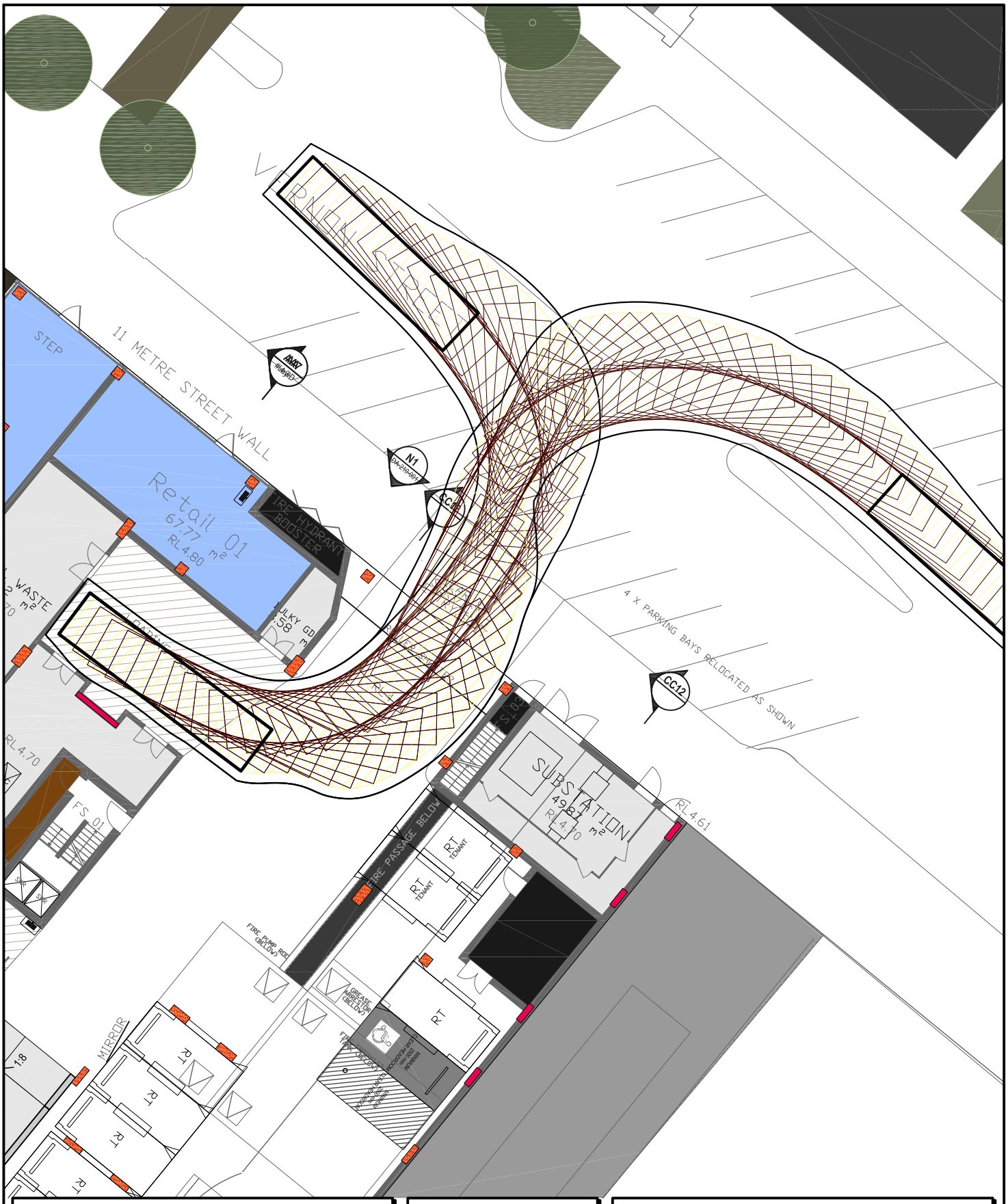

## LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V5.00a in conjunction with AutoCAD 2013. The vehicle used is based upon vehicle data provided by Austroads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.

N

# SWEPT PATH ANALYSIS OF AN 11.01m COUNCIL REFUSE VEHICLE ENTERING THE SITE

**SP 1**




## LEGEND

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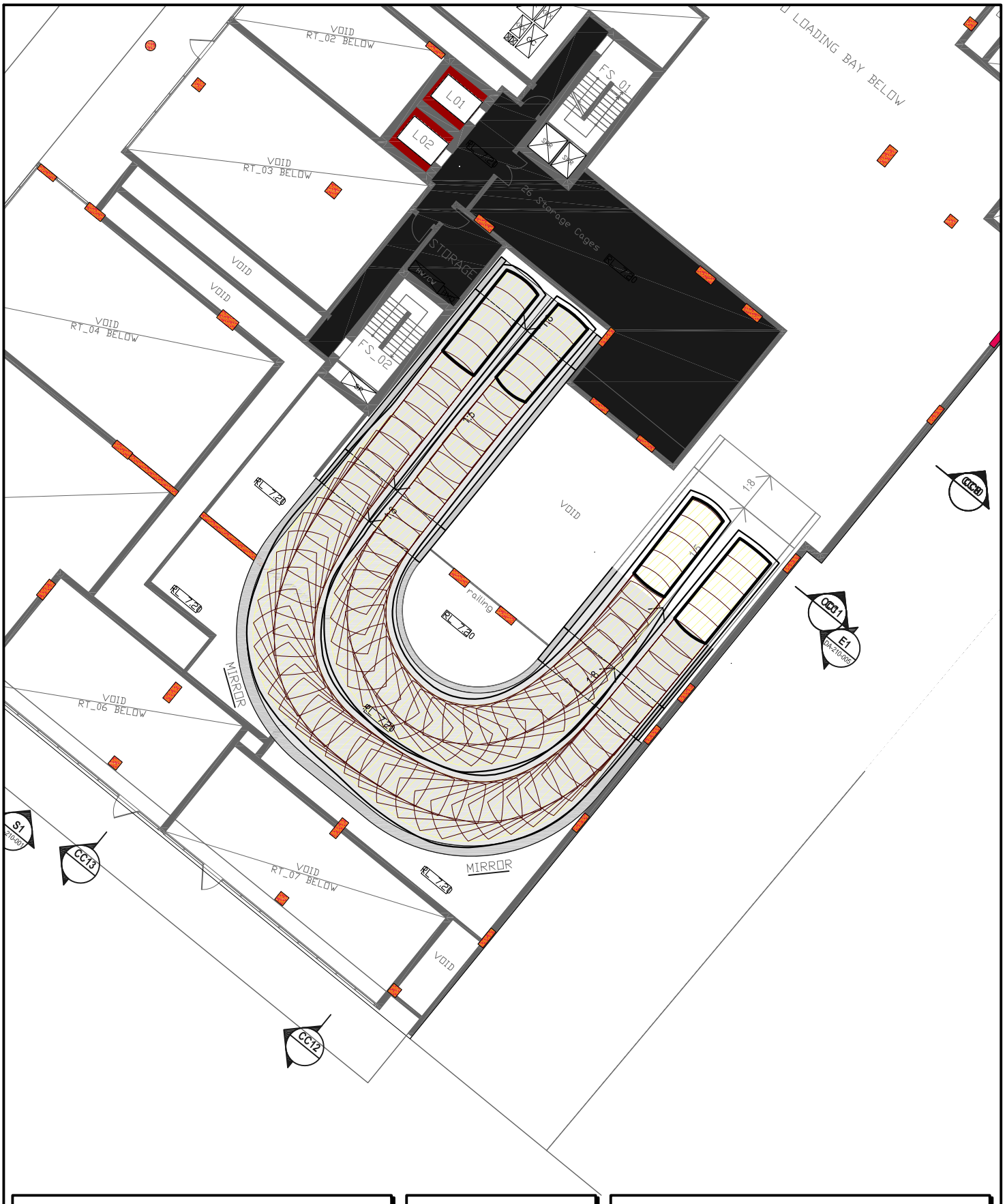
N

# SWEPT PATH ANALYSIS OF AN 11.01m COUNCIL REFUSE VEHICLE EXITING THE SITE

**SP 2**




## LEGEND

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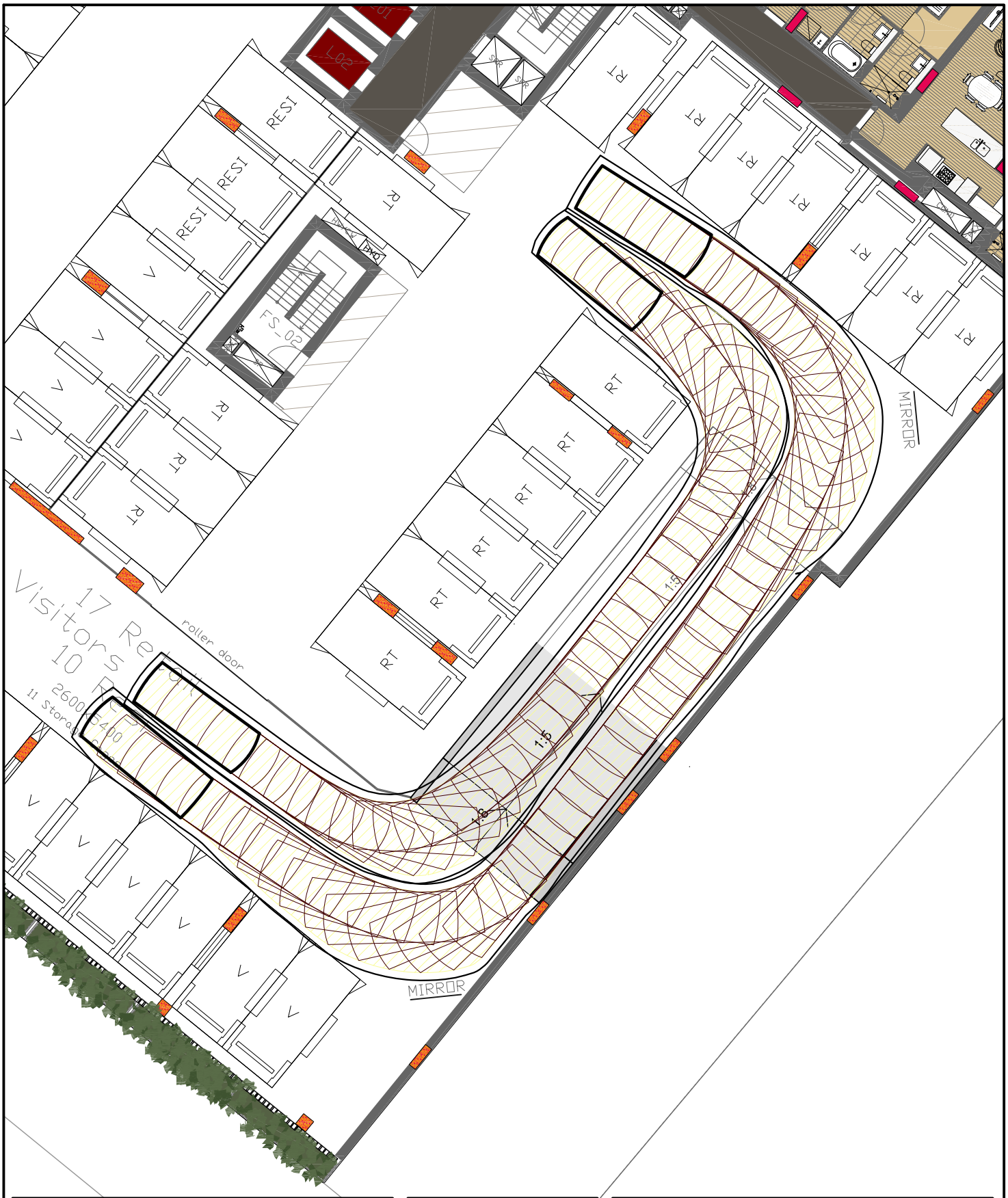
N

# SWEPT PATH ANALYSIS OF A 99th AND AN 85th PERCENTILE VEHICLE PASSING

**SP 3**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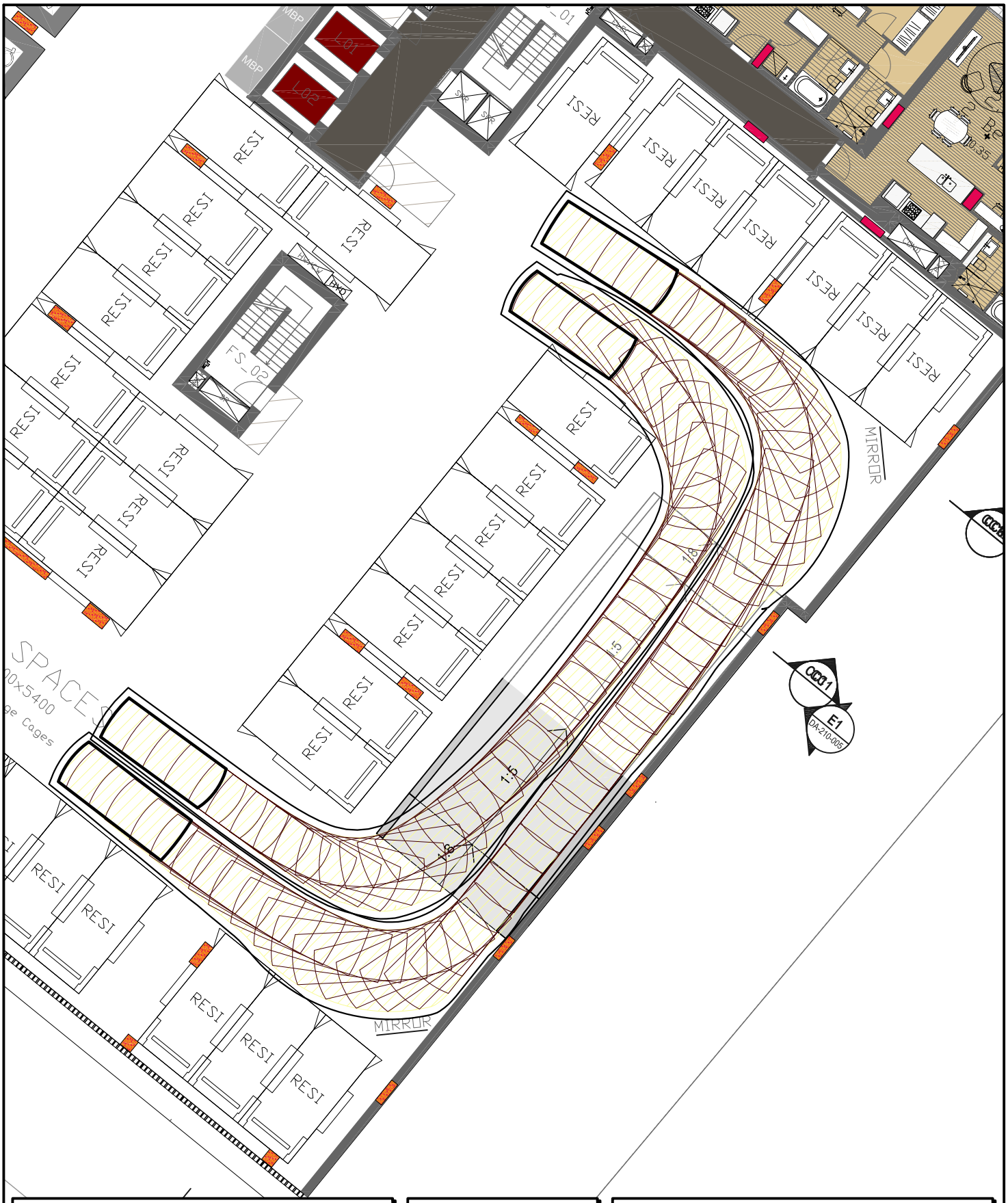


## LEGEND

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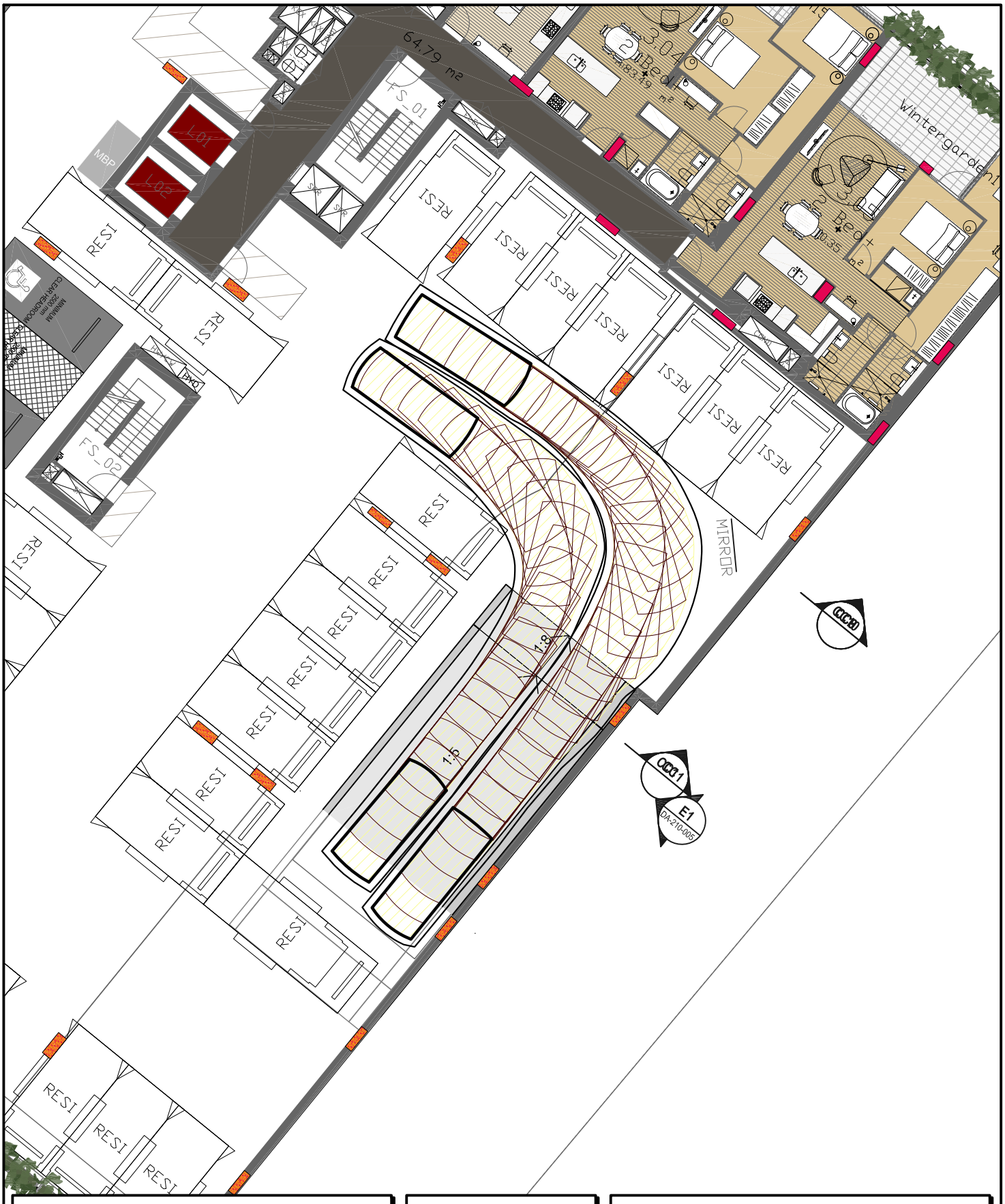
N

# SWEPT PATH ANALYSIS OF A 99th PERCENTILE VEHICLE ENTERING AND AN 85th PERCENTILE VEHICLE EXITING THE SITE (LEVEL 2)

**SP 5**




## LEGEND

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N

# SWEPT PATH ANALYSIS OF A 99th PERCENTILE VEHICLE ENTERING AND AN 85th PERCENTILE VEHICLE EXITING THE SITE (LEVEL 3)

**SP 6**

TRANSPORT AND TRAFFIC PLANNING ASSOCIATES

Suite 502, Level 5, 282 Victoria Avenue, Chatswood NSW 2067
**P** (02) 9411 5660 **F** (02) 9904 6622 **W** ttpa.com.au **E** ross@ttpa.com.au

11 March 2021
Ref: 20269 Rev C

Mr Mohamed Sallam
Design Project Manager
Paynter Dixon Constructions Pty Limited

*E: Mohamed.Sallam@paynterdixon.com.au*

Dear Mohamed

**15 – 31 Harbour Drive, Coffs Harbour**

I have considered the Council comments and respond in the following:

**On-Street Parking and Loading Zone**

It was thought that the on-street Loading Zone was provided to serve the existing use on the site which has no on-site loading provision. However, as that now appears to not be the case, it is proposed to relocate 4 (not 5) on-street parking spaces into the development (to provide for the proposed driveway) and these are now shown on the revised development plans.

**Manoeuvring**

(i) The design of the ramp has been modified to emphasis that it is not a “circular or spiral” ramp. As such, the design only needs to provide for cars to readily pass each other as is demonstrated by the attached turning paths. A centreline pavement marking can be added if required by Council.

(ii) The revised plans show modified kerbs to overcome this issue. AS2890.1 specifies assessment using a 99$^{th}$ percentile car on the outside, 2.5.2 does not specify sight distances.

(iii) The revised plans show that compliant aisle width is now achieved. “Intersection” testing as per 2.5.2 (c) does not apply to the ground level circumstance as cars will not to/from the ramp and the Ground Level spaces.

## Traffic Study

- The Traffic Study was undertaken in December 2020
- The RMS 2013 surveys for residential apartments was for sites (very largely Sydney Metropolitan) with ready access to railway stations
- As stated in the report, the GTTGD traffic generation rate for retail is for large shopping centres. The generation rate adopted is from the GTTGD for speciality shops
- The attached SIDRA modelling reveals that the operation of the development access on Vernon Street will be quite satisfactory

## Waste

1. The loading dock is now shown as 13m deep on the revised plans and this will quite adequately fully accommodate the 11m side loading refuse truck and the rear loading bulk bin truck. Warning signage and mirrors will be installed adjacent to the loading dock as indicated on the revised plans. It is considered that this will be quite adequate to the circumstances.
2. The loading dock will quite adequately accommodate 2-3 small delivery vehicles concurrently to serve the retail tenancies while retail tenant parking spaces will also accommodate vans etc.

Yours faithfully

Ross Nettle
Director
Transport and Traffic Planning Associates

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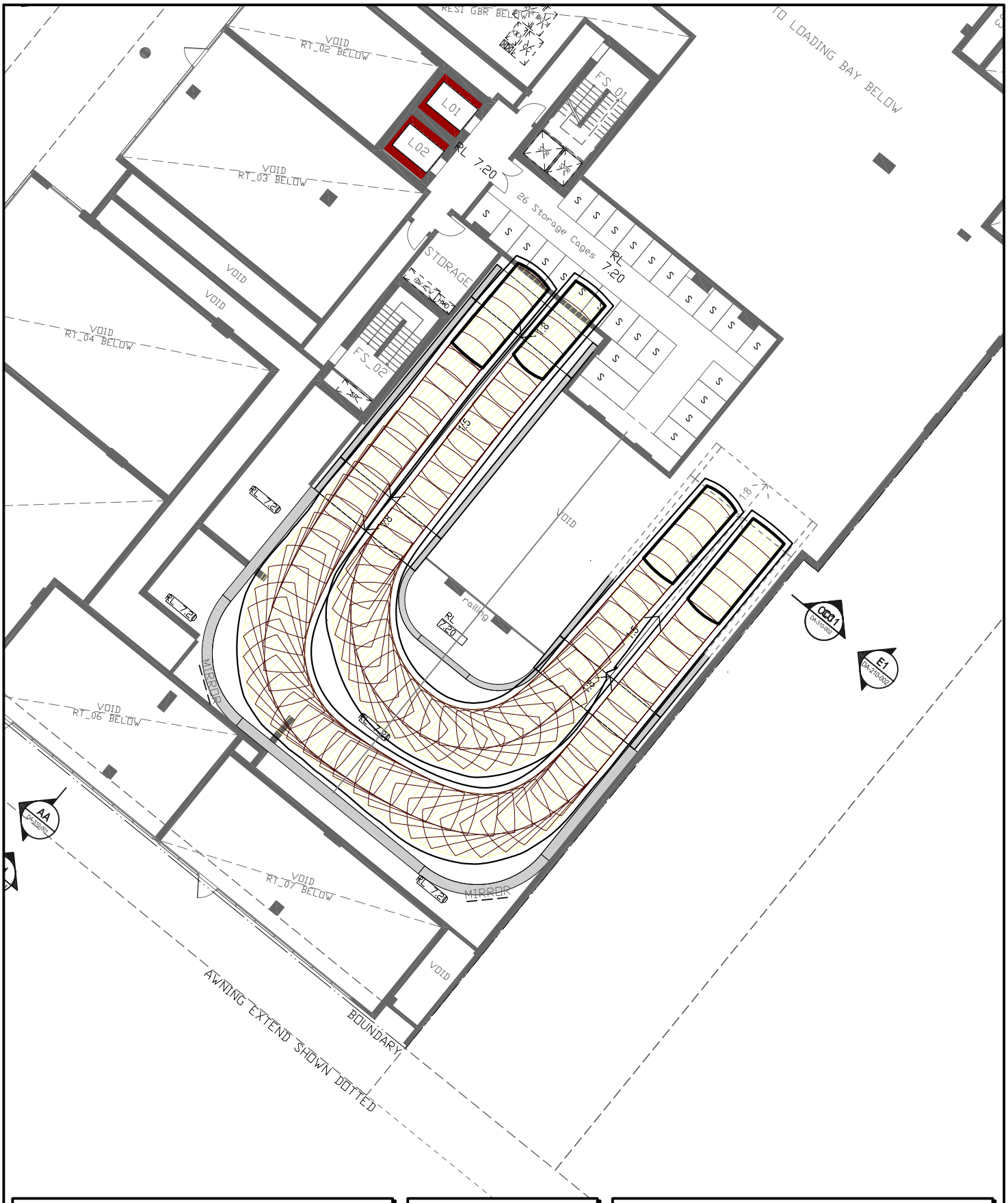


## LEGEND

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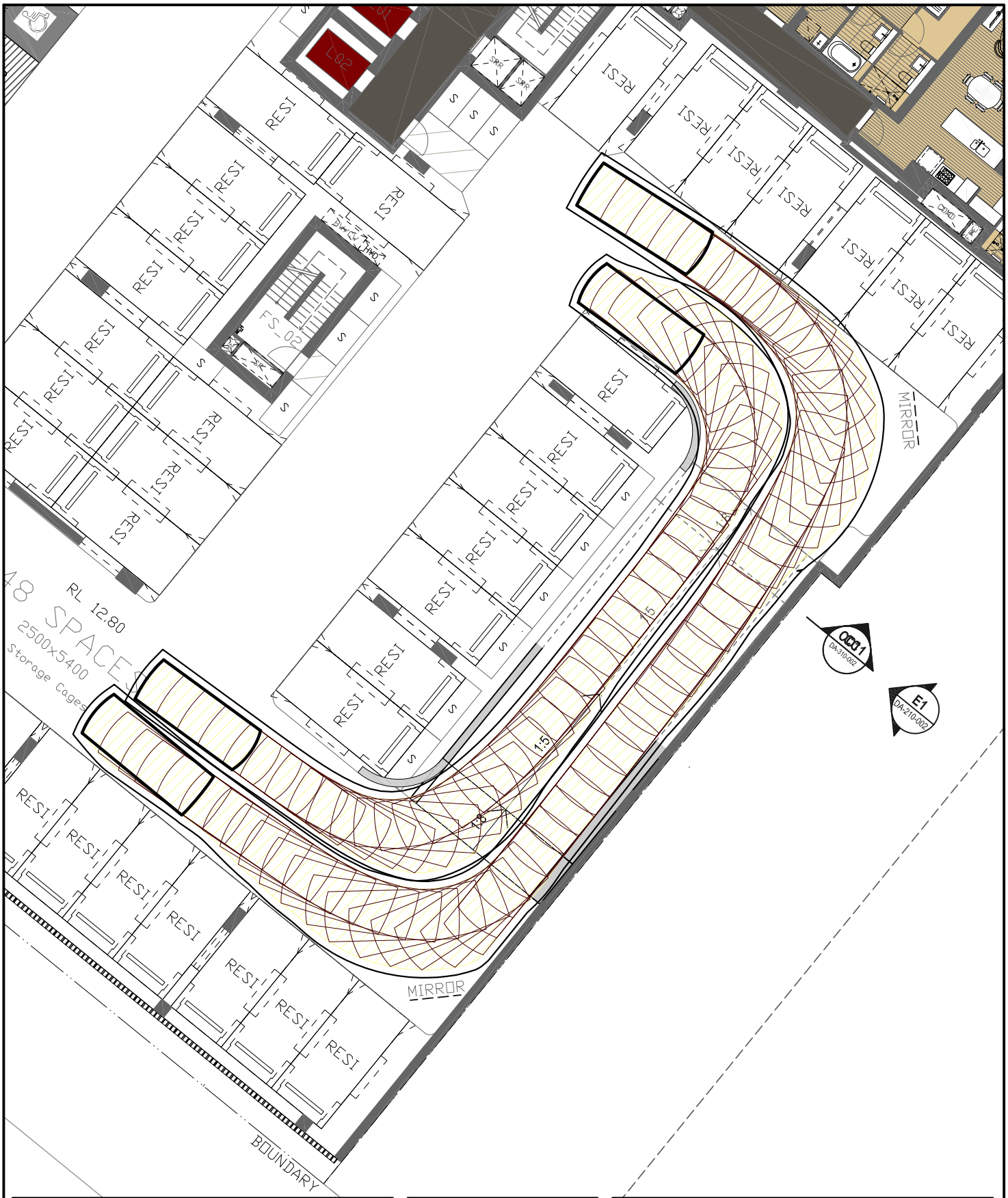
N

# SWEPT PATH ANALYSIS OF A 99th AND AN 85th PERCENTILE VEHICLE PASSING

**SP 1**




## LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V5.00a in conjunction with AutoCAD 2013. The vehicle used is based upon vehicle data provided by Austroads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.

# SWEPT PATH ANALYSIS OF A 99th PERCENTILE VEHICLE ENTERING AND AN 85th PERCENTILE VEHICLE EXITING THE SITE (LEVEL 1)

**SP 2**

# MOVEMENT SUMMARY

## ▽ Site: 1 [Vernon St Access AM Peak 1 LANE (Site Folder: General)]

15-31 Harbour Drive, Coffs Harbour
Site Category: Proposed
Give-Way (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] % | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Access | | | | | | | | | | | | | | |
| 1 | L2 | 10 | 0.0 | 11 | 0.0 | 0.027 | 3.6 | LOS A | 0.1 | 0.6 | 0.26 | 0.53 | 0.26 | 20.2 |
| 3 | R2 | 20 | 0.0 | 21 | 0.0 | 0.027 | 3.7 | LOS A | 0.1 | 0.6 | 0.26 | 0.53 | 0.26 | 45.2 |
| Approach | | 30 | 0.0 | 32 | 0.0 | 0.027 | 3.6 | LOS A | 0.1 | 0.6 | 0.26 | 0.53 | 0.26 | 37.0 |
| East: Vernon Street | | | | | | | | | | | | | | |
| 4 | L2 | 10 | 0.0 | 11 | 0.0 | 0.086 | 5.5 | LOS A | 0.0 | 0.0 | 0.00 | 0.04 | 0.00 | 53.2 |
| 5 | T1 | 157 | 0.0 | 165 | 0.0 | 0.086 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.04 | 0.00 | 59.0 |
| Approach | | 167 | 0.0 | 176 | 0.0 | 0.086 | 0.3 | NA | 0.0 | 0.0 | 0.00 | 0.04 | 0.00 | 58.7 |
| West: Vernon Street | | | | | | | | | | | | | | |
| 11 | T1 | 28 | 0.0 | 29 | 0.0 | 0.017 | 0.1 | LOS A | 0.0 | 0.2 | 0.10 | 0.09 | 0.10 | 56.7 |
| 12 | R2 | 5 | 0.0 | 5 | 0.0 | 0.017 | 5.9 | LOS A | 0.0 | 0.2 | 0.10 | 0.09 | 0.10 | 42.2 |
| Approach | | 33 | 0.0 | 35 | 0.0 | 0.017 | 1.0 | NA | 0.0 | 0.2 | 0.10 | 0.09 | 0.10 | 55.5 |
| All Vehicles | | 230 | 0.0 | 242 | 0.0 | 0.086 | 0.9 | NA | 0.1 | 0.6 | 0.05 | 0.11 | 0.05 | 55.2 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

## ▽ Site: 1 [Vernon St Access PM Peak 1 LANE (Site Folder: General)]

15-31 Harbour Drive, Coffs Harbour
Site Category: Proposed
Give-Way (Two-Way)

**Vehicle Movement Performance**

| Mov ID | Turn | INPUT VOLUMES [ Total veh/h | HV ] % | DEMAND FLOWS [ Total veh/h | HV ] % | Deg. Satn v/c | Aver. Delay sec | Level of Service | 95% BACK OF QUEUE [ Veh. veh | Dist ] m | Prop. Que | Effective Stop Rate | Aver. No. Cycles | Aver. Speed km/h |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South: Access | | | | | | | | | | | | | | |
| 1 | L2 | 13 | 0.0 | 14 | 0.0 | 0.038 | 3.7 | LOS A | 0.1 | 0.9 | 0.31 | 0.56 | 0.31 | 19.9 |
| 3 | R2 | 26 | 0.0 | 27 | 0.0 | 0.038 | 4.1 | LOS A | 0.1 | 0.9 | 0.31 | 0.56 | 0.31 | 44.6 |
| Approach | | 39 | 0.0 | 41 | 0.0 | 0.038 | 4.0 | LOS A | 0.1 | 0.9 | 0.31 | 0.56 | 0.31 | 36.5 |
| East: Vernon Street | | | | | | | | | | | | | | |
| 4 | L2 | 15 | 0.0 | 16 | 0.0 | 0.107 | 5.6 | LOS A | 0.0 | 0.0 | 0.00 | 0.04 | 0.00 | 53.0 |
| 5 | T1 | 191 | 0.0 | 201 | 0.0 | 0.107 | 0.0 | LOS A | 0.0 | 0.0 | 0.00 | 0.04 | 0.00 | 58.8 |
| Approach | | 206 | 0.0 | 217 | 0.0 | 0.107 | 0.4 | NA | 0.0 | 0.0 | 0.00 | 0.04 | 0.00 | 58.4 |
| West: Vernon Street | | | | | | | | | | | | | | |
| 11 | T1 | 91 | 0.0 | 96 | 0.0 | 0.051 | 0.1 | LOS A | 0.1 | 0.4 | 0.06 | 0.05 | 0.06 | 58.0 |
| 12 | R2 | 8 | 0.0 | 8 | 0.0 | 0.051 | 6.0 | LOS A | 0.1 | 0.4 | 0.06 | 0.05 | 0.06 | 44.4 |
| Approach | | 99 | 0.0 | 104 | 0.0 | 0.051 | 0.6 | NA | 0.1 | 0.4 | 0.06 | 0.05 | 0.06 | 57.5 |
| All Vehicles | | 344 | 0.0 | 362 | 0.0 | 0.107 | 0.9 | NA | 0.1 | 0.9 | 0.05 | 0.10 | 0.05 | 55.4 |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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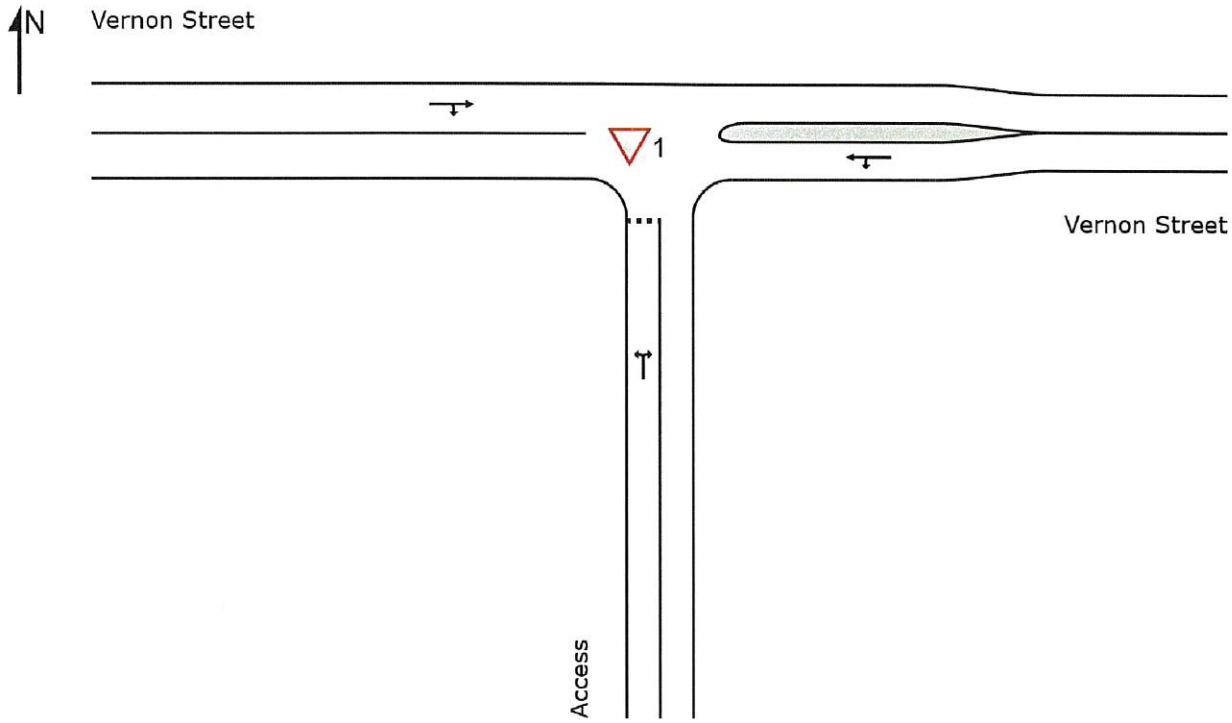
# SITE LAYOUT

## ▽ Site: 1 [Vernon St Access 1 LANE (Site Folder: General)]

15-31 Harbour Drive, Coffs Harbour
Site Category: Proposed
Give-Way (Two-Way)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.

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TRANSPORT AND TRAFFIC PLANNING ASSOCIATES

Suite 502, Level 5, 282 Victoria Avenue, Chatswood NSW 2067
**P** (02) 9411 5660 **F** (02) 9904 6622 **W** ttpa.com.au **E** ross@ttpa.com.au

6 May 2021
Ref: 20269 Rev B

Mr Marion Rhodes
Coffs Harbour City Council

*E:* *marion.rhodes@chcc.nsw.gov.au*
*c.c.* *Mohamed.Sallam@paynterdixon.com.au*

Dear Marion

**Re: 15 – 31 Harbour Drive, Coffs Harbour**

I have considered your email comments and respond in the following:

**Manoeuvring Diagram**
It is the normal "industry" convention to model 85th on the inside and 99th on the outside, however, I concede that AS2890.1 does not specify this. The attached additional swept path diagrams indicate passing in compliance with AS2890.1 and Council's requirements with 99th on the inside and some very minor changes to the kerbs previously indicated.

**Controlled Entry**
The roller shutter will be open during retail trading hours with some additional time for early arrival and late departure.

The roller shutter will now be 6m inside the boundary and residents will have "remote control" for the roller shutter which can be activated "on approach". The only need to stop for access will be for visitors outside of the hours that the roller shutter will be open and there will be an intercom positioned for a visitor car waiting within the site boundary.

It is quite improbable that 2 visitor cars could arrive at the exact same time when the roller shutter is closed. There will be another intercom prior to the boom gate on Level 1 for visitors to use when the roller shutter is open.

Table 3.3 in AS2890.1 is for a circumstance where there is a "*boom gate with ticket issuing devices based on the proposed size of the parking station and anticipated peak hourly inflow of traffic*". It is therefore not applicable to the proposed circumstances.

**Traffic Study**

As designated on the cover, the Traffic Study Revision D was undertaken in December 2020. If you are referring to the traffic surveys, they were undertaken on a single Thursday morning and afternoon.

The Traffic Report was undertaken in strict compliance with Section 2 of the Guide To Traffic Generating Developments. A copy of that document is attached and it can be seen that there is no requirement for a 10 year "design horizon". What is more, such a requirement would not be appropriate when:

- the maximum total peak traffic generation is only some 60 vtph
- the traffic generation of the existing development would be a discount. Even though there is no existing on-site parking, traffic would be generated by on-street and other parking areas
- the relatively small shops will largely have "convenience" and not "destination" trade and therefore will have relatively high "multi purpose" and "passing trade" trip factors
- the number of generated trips travelling to/from the highway (Figure 6) will be entirely imperceptible

The appropriate "peak" traffic circumstance is the weekday afternoon due to the concurrence of peak traffic movements on the road network with residential and retail peaks even though the Saturday retail generation may be higher.

The statement that more cars are shown to be leaving the site in the afternoon than entering is incorrect. Page 12 indicates a total of 62 vtph with 39 entering and 23 exiting (i.e. residential and retail movements).

**Entry Works**

It is agreed that kerb extensions (or freestanding islands depending on drainage considerations) would be beneficial as shown indicatively on the attached architectural plan.

Yours faithfully

Ross Nettle
Director
Transport and Traffic Planning Associates

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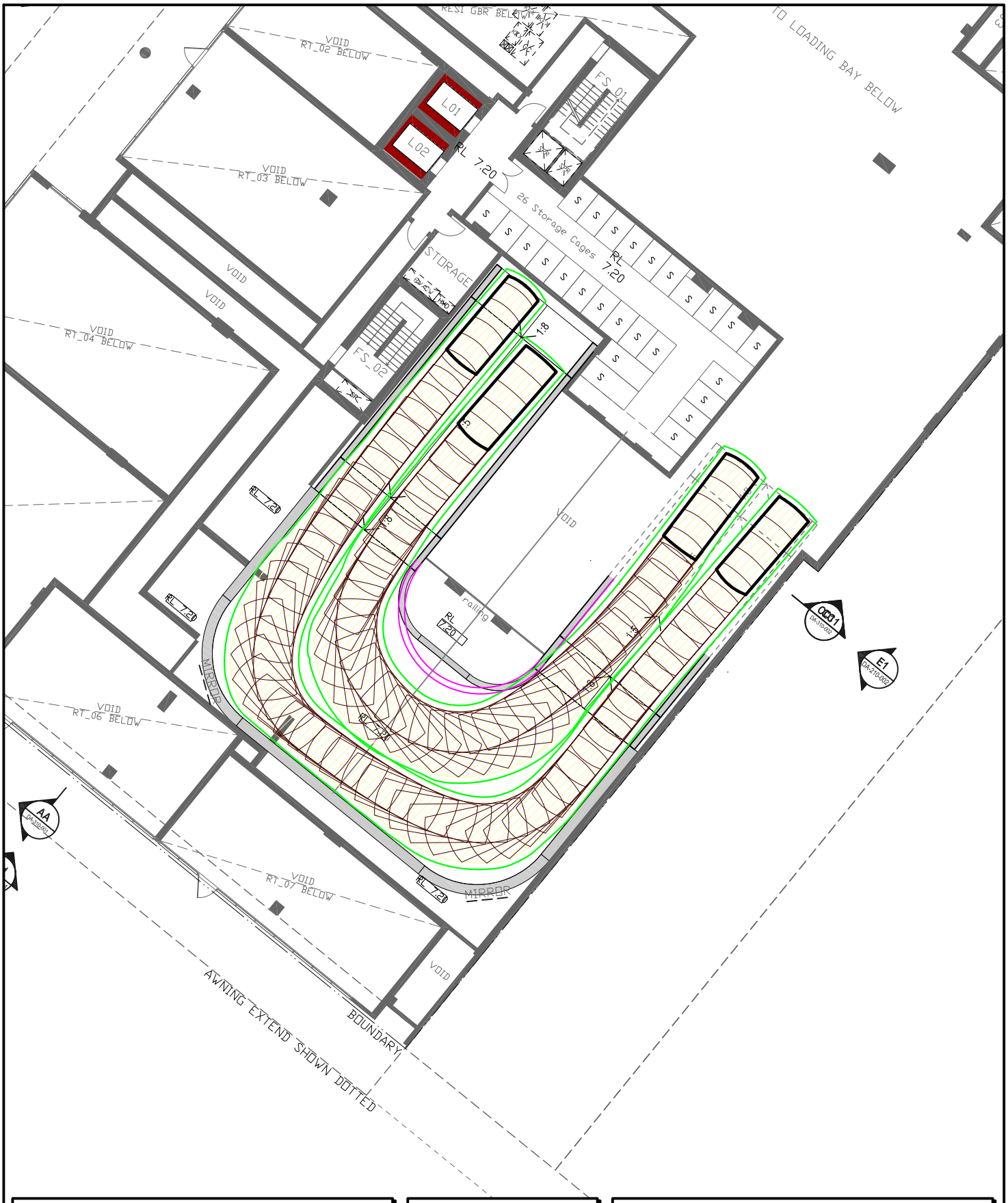


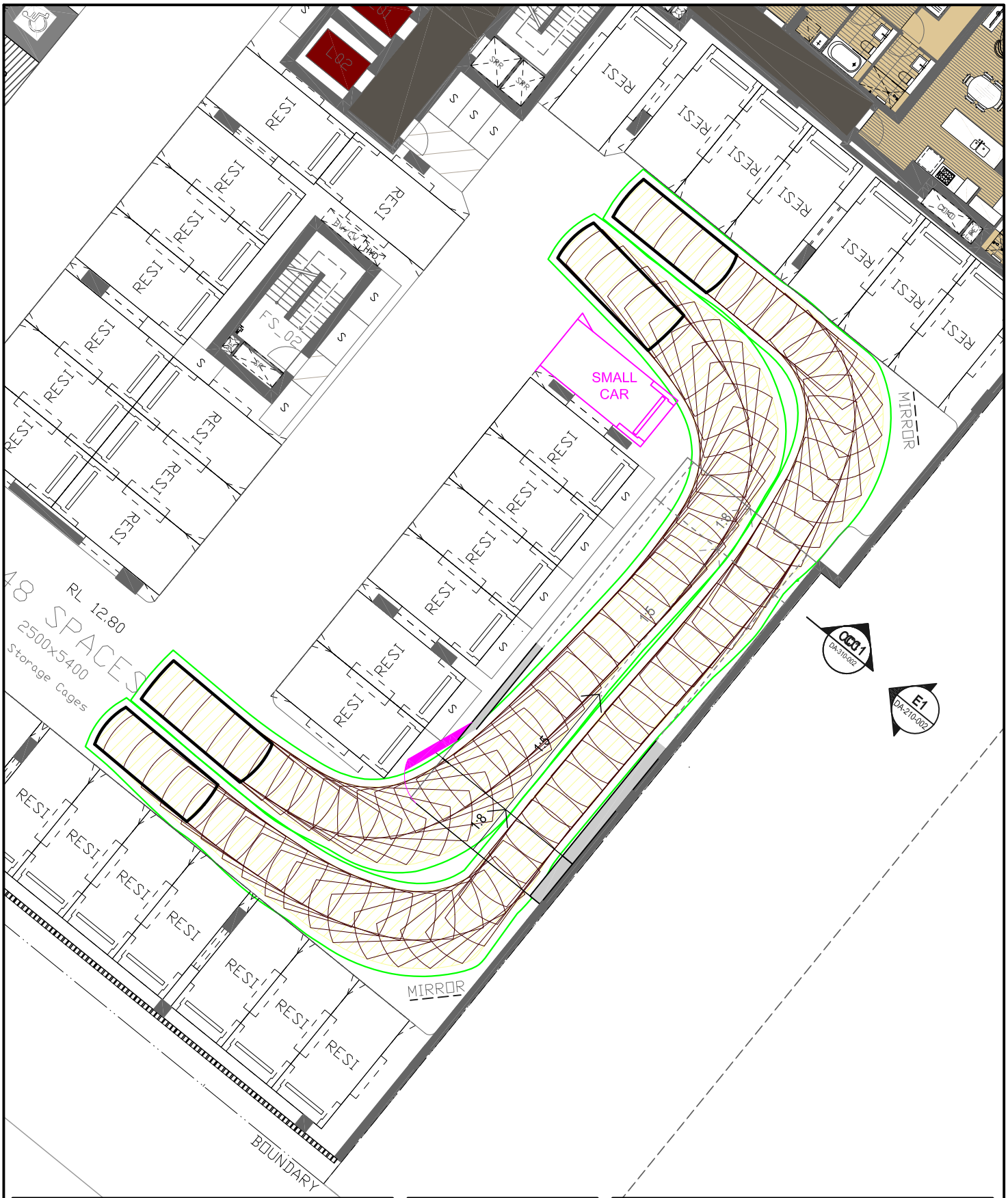

## LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V5.00a in conjunction with AutoCAD 2013. The vehicle used is based upon vehicle data provided by Austroads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.

N

# SWEPT PATH ANALYSIS OF A 99th (INSIDE) AND AN 85th (OUTSIDE) PERCENTILE VEHICLE PASSING

**SP 3**




## LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V5.00a in conjunction with AutoCAD 2013. The vehicle used is based upon vehicle data provided by Austroads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.

N

# SWEPT PATH ANALYSIS OF AN 85th PERCENTILE VEHICLE ENTERING AND A 99th PERCENTILE VEHICLE EXITING THE SITE (LEVEL 1)

**SP 4**

# Section 2 Traffic impact studies.

## 2.1 Introduction.

This section looks at traffic impact studies and the key issues of their use. It is important to ensure that all relevant traffic impacts are identified and assessed. The findings of a traffic impact study may be used for local development control, ensuring the provision of a safe and efficient road system.

## 2.2 What is a traffic impact study?

A traffic impact study is a simplified technical appraisal of the traffic and safety implications relating to a specific development. The information provided in the study report should enable the relevant authorities (i.e. council and the RTA) to assess the traffic impact of a development.

Information collected in such studies should reflect the size and type and location of the development as well as its relationship to surrounding developments and the adjacent transport network.

The following outlines issues to be addressed in traffic impact studies:

- existing proposals for improvements to the adjacent road network and hierarchy.
- impact on road safety.
- impact of traffic noise.
- AADT– annual average daily traffic. It is the estimated yearly total of traffic movements divided by 365.
- examine volumes and historical trends on key adjacent roads.
- peak period traffic volumes and congestion levels at key adjacent intersections.
- existing parking supply and demand in the vicinity of the proposed development.
- existing public transport services in the vicinity of the proposed development.
- parking provisions appropriate to the development (in relation to demand and statutory requirements).
- traffic generation / attraction and trip distribution of the proposed development.
- safety and efficiency of internal road layout, including service and parking areas.
- impact of generated traffic on key adjacent intersections, streets in the neighbourhood of the development, the environment and other major traffic generating development sites in close proximity.
- safety and efficiency of access between the site and the adjacent road network.

All proposed developments listed in Schedules 1 and 2 of SEPP 11 require referral to either a Regional Development Committee or a Council Development Committee.

(See Section 9, Appendix B).

## 2.2.1 Schedule 1 developments.

In most situations, a traffic impact study is required for developments listed in Schedule 1. In circumstances where the impact on traffic will be minimal, a statement relating to the impact of development on traffic is sufficient. Developments involving transport terminals, bulk stores and liquid fuel depots, or small developments with low traffic movements into and out of the site, are examples of developments that may require a traffic impact statement.

Consider the following factors when planning Schedule 1 Developments.

### Location.

The impact of a development varies depending on whether it is located in an urban or rural environment.

### Existing infrastructure.

The introduction of heavy vehicles into areas such as the inner city with its narrow road widths would have substantial impact.

### Developments in sensitive areas.

Any development with a higher generation rate than the existing adjacent developments, will have an impact on the environment and amenity of the affected area.

## 2.2.2 Schedule 2 developments.

The scale of the development is the major determinant of whether a traffic impact study is required for developments listed in Schedule 2. As a minimum requirement, driveway location and design and the internal site layout should be investigated.

Schedule 2 developments which require a detailed traffic impact study are:

- clubs and licensed premises.
- drive-in take away food outlets.
- service stations and convenience stores.

## 2.3 Issues to be addressed.

A traffic impact study should follow the standard format and structure that is listed in Table 2.1. This format covers the key issues to be addressed in determining the impact on traffic of a development. Use of this format and the checklist will ensure those involved in the preparation and / or assessment of Development Applications that the most significant matters are considered.

**Table 2.1**
**Key issues in preparing traffic impact studies**

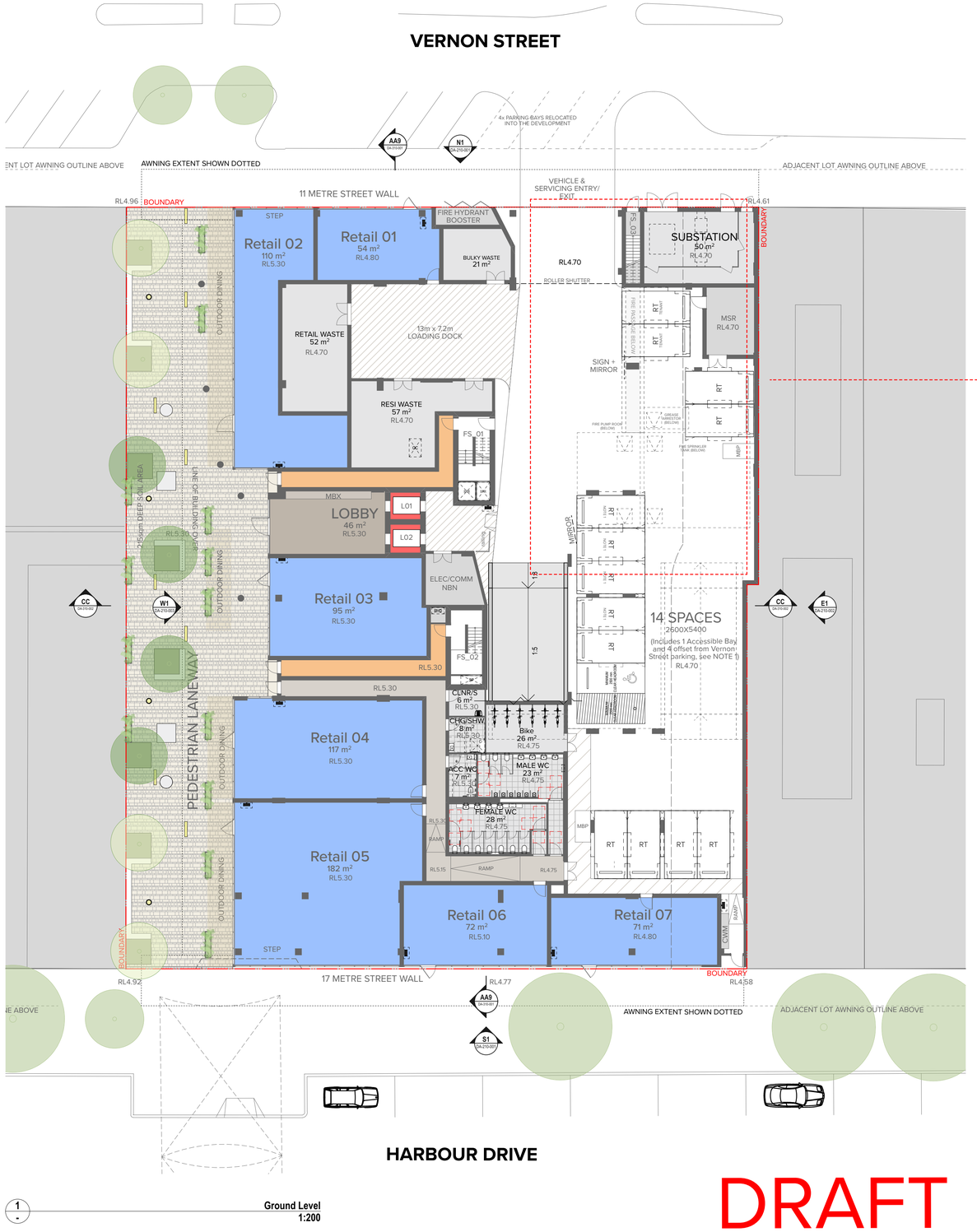
| Procedures & Key Parameters | Source | Check✓ |
|---|---|---|
| *Brief description of the development* | | |
| *Application and study process* | | |
| **Introduction** | | |
| *Background* | | |
| *Scope of report* | | |
| *The key issues and objectives of a traffic impact study* | | |
| **General Data Collection / Existing Conditions** | | |
| *Description of the Site and Proposed Activity* | | |
| *Site location* | | |
| Current land use characteristics (zoning) of the proposed site and land use in the vicinity | Development Consent Authority | |
| *Site access* | | |
| *The Existing Traffic Conditions* | | |
| Road hierarchy; including the identification of the classified road network (major and minor roads) which may be affected by the development proposal | Council / RTA | |
| Inventory of road widths, road conditions, traffic management and parking control | Council / RTA and Survey | |
| Current and proposed roadworks, traffic management works and bikeways | Council / RTA | |
| *Traffic Flows* | | |

| Procedures & Key Parameters | Source | Check✓ |
|---|---|---|
| Selection of key streets - possibly divided into the major and the minor road network; selection of key assessment periods, chosen to cover the times at which the development would be expected to have its major impacts | Section 3 | |
| AADT on key streets | Council / RTA and Survey | |
| Daily traffic flow hourly distribution, particularly in or near residential areas | Survey | |
| Estimate of the speed of traffic on the road to which vehicular access is proposed | Survey | |
| Current traffic generation of site | Survey | |
| Daily and peak period heavy vehicle flows and percentages | Survey | |
| The adaptation of appropriate computer models or techniques for assessing levels of traffic congestion and queuing conditions | | |
| *Traffic Safety* | | |
| Accident history of road network in the area | Council / RTA | |
| *Parking Supply and Demand* | | |
| On-street parking provision | Council | |
| Off-street parking provision | Council / Survey | |
| Current parking demand, including utilisation by time of day and turnover rates | Survey | |
| Short term pick up and set down areas | Council / Survey | |
| *Modal Split* | | |
| *Public Transport* | | |
| Rail station locations | State Rail / Cityrail | |
| Bus routes and bus stop locations; Pedestrian access to bus stops; Constraints and conflicts | STA / Private Operators / Council / Survey | |
| Rail and bus service frequencies, ideally separated into Monday to Friday, Saturday and Sunday, for both peak and off-peak times | State Rail / Cityrail / Survey | |

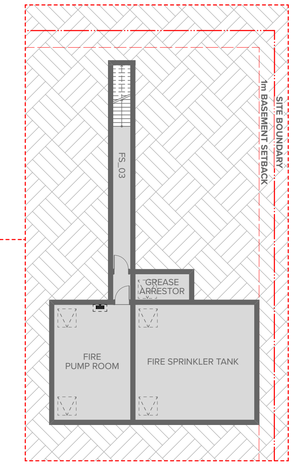
| Procedures & Key Parameters | Source | Check✓ |
|---|---|---|
| Commuter parking provision | State Rail / Cityrail / Survey | |
| *Pedestrian Network* | | |
| Identify major pedestrian routes | Survey | |
| Pedestrian flows and potential conflicts with vehicles, particularly where such conflicts cause capacity constraint on either vehicular or pedestrian movement | Survey | |
| Pedestrian infrastructure | Survey | |
| *Proposed developments in the vicinity* | | |
| **Proposed Development** | | |
| *The Development* | | |
| Plan reference, if plans not contained in study report | | |
| Nature of development | | |
| Gross floor areas of each component of development | | |
| Projected number of employees/users/residents | | |
| Hours and days of operations | | |
| Staging and timing of development | | |
| Selection of appropriate design vehicles for determining access and circulation requirements | Section 6 | |
| *Access* | | |
| Driveway location, including review of alternative locations | Sections 5, 6 | |
| Sight distance of driveways and comparisons with stopping and desirable minimum sight distances | Section 6 | |
| Service vehicle access | Section 6 | |
| Analysis of projected queuing at entrances | Section 6 | |
| Current access to site and comparison with proposed access | | |
| Provision for access to, and by, public transport | Section 6 | |

| Procedures & Key Parameters | Source | Check✓ |
|---|---|---|
| *Circulation* | | |
| Proposed pattern of circulation | Section 6 | |
| Internal road widths | Section 6 | |
| Provision for bus movements | Section 6 | |
| Service area layout | | |
| *Parking* | | |
| Proposed supply | | |
| Parking provision recommended by State Government policy | RTA / DUAP | |
| Council code and local parking policies and plans | Council | |
| Parking layout | | |
| Projected peak demand, based where appropriate on similar research reports and on surveys of similar developments; | Section 5 | |
| Parking for Service / courier vehicles and bicycles | Section 5 | |
| **Impact of Proposed Development** | | |
| *Traffic generation during design periods* | | |
| Daily and seasonal factors | | |
| Pedestrian generation and movements | | |
| *Traffic Distribution and Assignments* | | |
| Hourly distribution of trips | | |
| Assignments of these trips to the road system based where possible on development feasibility studies or on origin/ destination surveys undertaken at similar developments in the areas | | |
| *Impact on Traffic Safety* | | |
| Assessment of Road Safety Impact | | |
| *Impact of Generated Traffic* | | |
| Daily traffic flows and composition on key streets and their expected effect on the environment particularly in residential areas | | |

| Procedures & Key Parameters | Source | Check✓ |
|---|---|---|
| Peak period volumes at key intersections and effect of generated traffic on congestion levels | Survey | |
| Impact of construction traffic during construction stages | | |
| Other proposed developments in the vicinity their timing and likely impact, if known | | |
| Assessment of traffic noise | | |
| *Public Transport* | | |
| Options for extensions and changes to bus routes and bus stops following discussions with the STA and or private bus operators | STA / Private Operators | |
| Provision for pedestrian access to bus stops | | |
| *Recommended Works* | | |
| Improvements to site access and circulation | | |
| Improvements to roads, signals, roundabouts and other traffic management measures | | |
| Improvements to pedestrian facilities | | |
| Effect of recommended works on the operation of adjacent developments | | |
| Effect of recommended works on public transport services including access to bus routes and bus stops | | |
| Provision of LATM measures | | |
| Funding of proposed improvement projects | | |
| Noise attenuation measures | | |




1 / - Ground Level 1:200




2 / - Basement 01 1:200

DRAFT

**Basix Building Fabric Requirements**

| Element | Material Type | Detail |
|---|---|---|
| External walls | CFC sheet + R2.0 Insulation + PB | As per plan, Medium colour |
| | Colour back glass + R2.0 Insulation + PB | As per plan, Medium colour |
| | Hebel+ R2.0 Insulation + PB | As per plan, Medium colour |
| Internal walls | Plasterboard on stud | Within apartments |
| | Hebel + Acoustic Insulation +PB | Between apartment or to common area |
| Windows | Aluminium frame, Single glazed, Clear Throughout, UNO | NFRC Glazing System (Glass+Frame) values: ⇒ U = 6.7 and SHGC = 0.70 (All sliding/fixed/louvre windows/doors) ⇒ U = 6.7 and SHGC = 0.57 (All awning/casement windows/doors) Weather stripping fitted on windows |
| | Aluminium frame, Single glazed, low solar gain Low-E To units 101,201,202,203,301,302,303,401,402,403,708,1007 all windows/doors | NFRC Glazing System (Glass+Frame) values: ⇒ U = 5.6 and SHGC = 0.41 (All sliding/fixed/louvre windows/doors) ⇒ U = 5.6 and SHGC = 0.36 (All awning/casement windows/doors) Weather stripping fitted on windows |
| | Aluminium frame, Single glazed, High solar gain Low-E To units 505,604,703,704,705,803,804,903,904,1003,1004,1103 1201(kitchen/living only) all windows/doors | NFRC Glazing System (Glass+Frame) values: ⇒ U = 5.4 and SHGC = 0.58 (All sliding/fixed/louvre windows/doors) ⇒ U = 5.4 and SHGC = 0.49 (All awning/casement windows/doors) Weather stripping fitted on windows |
| | Aluminium frame, Double glazed, Clear To unit 406 (kitchen/living only),409 ,508(kitchen/living only),607(kitchen/living only) 706(kitchen/living only),1204 all windows/doors | NFRC Glazing System (Glass+Frame) values: ⇒ U = 4.8 and SHGC = 0.59 (All sliding/fixed/louvre windows/doors) ⇒ U = 4.8 and SHGC = 0.51 (All awning/casement windows/doors) Weather stripping fitted on windows |
| | Aluminium frame, Double glazed, High solar gain Low-E To unit 410,509,608,707,805,806,905,906,1005,1006,1104,1203 all windows/doors | NFRC Glazing System (Glass+Frame) values: ⇒ U = 4.3 and SHGC = 0.47 (All sliding/fixed/louvre windows/doors) ⇒ U = 4.3 and SHGC = 0.53 (All awning/casement windows/doors) Weather stripping fitted on windows |
| Skylights | N/A | |
| Floor | Concrete floor | Tile (Bathroom, laundry and kitchen) Timber (Living and bedroom) |
| | Concrete floor with R2.0 floor insulation | To floor above unconditioned space |
| Roof | Concrete + R3.5 Insulation + PB | Medium colour |
| Downlights | All LED downlights | All downlights comply with AS60598 IC-F Rating. |
| Exhaust fans | All exhaust fans to have draft stoppers attached. | |

| Rev | Date | Approved by | Revision Notes |
|---|---|---|---|
| 08 | 09.03.21 | BF | Amendment as per CHCC comments |
| 07 | 11.12.20 | BF | For DA Submission |
| 06 | 08.12.20 | BF | For Coordination |
| 05 | 01.12.20 | BF | For Coordination |
| 04 | 27.11.20 | BF | For Coordination |
| 03 | 20.11.20 | BF | For Coordination |
| 02 | 11.11.20 | BF | For Coordination |
| 01 | 29.10.20 | BF | For Coordination |

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DLCS Quality Endorsed Company ISO 9001:2015, Registration Number 20476
Nominated Architect: Nicholas Turner 6685, ABN 86 094 694 911

**CLIENT**
**Paynter Dixon**
Level 2 2 Richardson Place Riverside
Corporate Park North Ryde NSW 2113

Project Title
**15-31 Harbour Drive**
Harbour Drive Coffs Harbour State Postcode Country

Drawing Title
**GA Plans**
**Ground Level**

| Scale | Project No. | Drawn by | North |
|---|---|---|---|
| 1:200 @A1, 50%@A3 | 20023 | BF | |
| Status | Dwg No. | Rev | |
| DA Submission | DA-110-001 | 08 | |

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# Appendix E.
# LANDSCAPE PLAN

# Appendix F.
# STORMWATER AND CIVIL

DATE PLOTTED: 4/12/2020 11:12:12 AM BY: TRACEY, RENATA

# CIVIL ENGINEERING WORKS

LOCALITY PLAN

SCALE 1:1000

| DRAWING REGISTRY | |
|---|---|
| DRAWING NUMBER | DRAWING TITLE |
| CI-000-01 | COVER SHEET, DRAWING REGISTRY AND LOCALITY PLAN |
| CI-007-01 | GENERAL NOTES |
| CI-070-01 | EROSION AND SEDIMENT CONTROL PLAN |
| CI-076-01 | EROSION AND SEDIMENT CONTROL DETAILS |
| CI-520-01 | STORMWATER DRAINAGE PLAN GROUND FLOOR |
| CI-526-01 | STORMWATER DRAINAGE - DETAILS |

APPROVAL

NOT FOR CONSTRUCTION

| TURNER | 15-31 HARBOUR DRIVE, COFFS HARBOUR | Stantec | 47738 | CI-000-01 | A |
|---|---|---|---|---|---|
| CLIENT | PROJECT | | PROJECT No | DRAWING No | REV |

CAD FILE: 47738-CI-000-01.DWG

DATE PLOTTED: 4/12/2020 11:35:23 AM BY: TRACEY RENATA

## GENERAL NOTES

1. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH COUNCIL / RELEVANT AUTHORITY SPECIFICATIONS AND DETAILS.
2. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH OTHER CONSULTANTS' DRAWINGS AND SPECIFICATIONS AND WITH OTHER SUCH WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ANY DISCREPANCY SHALL BE REFERRED TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.
3. ALL DIMENSIONS ARE IN MILLIMETRES & ALL LEVELS ARE IN METRES, UNO (UNLESS NOTED OTHERWISE).
4. NO DIMENSION SHALL BE OBTAINED BY SCALING THE DRAWINGS.
5. ALL LEVELS AND SETTING OUT DIMENSIONS SHOWN ON THE DRAWINGS SHALL BE CHECKED ON SITE PRIOR TO COMMENCEMENT OF WORKS.
6. EXISTING SERVICES WHERE SHOWN HAVE BEEN PLOTTED FROM SUPPLIED DATA AND SUCH THEIR ACCURACY CAN NOT BE GUARANTEED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ESTABLISH THE LEVEL OF ALL EXISTING SERVICES PRIOR TO THE COMMENCEMENT OF WORK.
7. CAD FILES / DTM FILES TO BE SUPPLIED IN AUTOCAD FORMAT FOR SETOUT PURPOSES (UPON REQUEST).

## SITEWORKS NOTES

1. ORIGIN OF LEVELS:- REFER SURVEY NOTES.
2. CONTRACTOR MUST VERIFY ALL DIMENSIONS AND EXISTING LEVELS ON SITE PRIOR TO COMMENCEMENT OF WORK. ANY DISCREPANCIES TO BE REPORTED TO STANTEC.
3. CONTRACTOR TO CONFIRM ALL CBR VALUES PRIOR TO COMMENCEMENT OF WORKS.
4. MAKE SMOOTH CONNECTION WITH EXISTING WORKS.
5. ALL TRENCH BACKFILL MATERIAL SHALL BE COMPACTED TO THE SAME DENSITY AS THE ADJACENT MATERIAL.
6. ALL SERVICE TRENCHES UNDER VEHICULAR PAVEMENTS SHALL BE BACKFILLED WITH SAND TO 300mm ABOVE PIPE. WHERE PIPE IS UNDER PAVEMENTS BACKFILL REMAINDER OF TRENCH TO UNDERSIDE OF PAVEMENT WITH SAND OR APPROVED GRANULAR MATERIAL COMPACTED IN 150mm LAYERS TO MINIMUM 98% MODIFIED MAXIMUM DRY DENSITY IN ACCORDANCE WITH AS 1289 5.2.1. (OR A DENSITY INDEX OF NOT LESS THAN 75)
7. PROVIDE 10mm WIDE EXPANSION JOINTS BETWEEN BUILDINGS AND ALL CONCRETE OR UNIT PAVEMENTS.
8. ASPHALTIC CONCRETE SHALL CONFORM TO RMS. SPECIFICATION R116.
9. ALL BASECOURSE MATERIAL SHALL BE IGNEOUS ROCK QUARRIED MATERIAL TO COMPLY WITH RMS. FORM 3051 (UNBOUND), RMS. FORM 3052 (BOUND) COMPACTED TO MINIMUM 98% MODIFIED DENSITY IN ACCORDANCE WITH AS 1289 5.2.1.
   FREQUENCY OF COMPACTION TESTING SHALL NOT BE LESS THAN 1 TEST PER 50m$^3$ BASECOURSE MATERIAL PLACED.
10. ALL SUB-BASE COURSE MATERIAL SHALL BE IGNEOUS ROCK QUARRIED MATERIAL TO COMPLY WITH RMS. FORM 3051, 3051.1 AND COMPACTED TO MINIMUM 95% MODIFIED DENSITY IN ACCORDANCE WITH A.S 1289 5.2.1
    FREQUENCY OF COMPACTION TESTING SHALL NOT BE LESS THAN 1 TEST PER 50m$^3$ OF SUB-BASE COURSE MATERIAL PLACED.
11. AS AN ALTERNATIVE TO THE USE OF IGNEOUS ROCK AS A SUB-BASE MATERIAL IN (9) A CERTIFIED RECYCLED CONCRETE MATERIAL COMPLYING WITH RMS. FORM 3051 AND 3051.1 WILL BE CONSIDERED. SUBJECT TO MATERIAL SAMPLES AND APPROPRIATE CERTIFICATIONS BEING PROVIDED TO THE SATISFACTION OF STANTEC.
12. SHOULD THE CONTRACTOR WISH TO USE A RECYCLED PRODUCT THIS SHALL BE CLEARLY INDICATED IN THEIR TENDER AND THE PRICE DIFFERENCE BETWEEN AN IGNEOUS PRODUCT AND A RECYCLED PRODUCT SHALL BE CLEARLY INDICATED.
13. WHERE NOTED ON THE DRAWINGS THAT WORKS ARE TO BE CARRIED BY OTHERS, (eg. ADJUSTMENT OF SERVICES), THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CO-ORDINATION OF THESE WORKS.

## SURVEY NOTES

THE EXISTING SITE CONDITIONS SHOWN ON THE FOLLOWING DRAWINGS HAVE BEEN SHOWN AS PER THE TOPOGRAPHIC SURVEY RECEIVED ON 26/07/2020 FILE 9725, AS INVESTIGATED BY BLAIRLANSKEY SURVEYS PTY LTD. THE INFORMATION IS SHOWN TO PROVIDE A BASIS FOR DESIGN. STANTEC DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF THE SURVEY BASE OR ITS SUITABILITY AS A BASIS FOR CONSTRUCTION DRAWINGS. SHOULD DISCREPANCIES BE ENCOUNTERED DURING CONSTRUCTION BETWEEN THE SURVEY DATA AND ACTUAL FIELD DATA, CONTACT STANTEC.

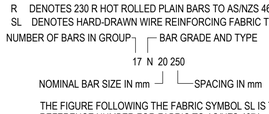
## CONCRETE NOTES

1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS 3600 CURRENT EDITION WITH AMENDMENTS, EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.
2. CONCRETE QUALITY ALL REQUIREMENTS OF THE CURRENT ACSE CONCRETE SPECIFICATION DOCUMENT 1 SHALL APPLY TO THE FORMWORK, REINFORCEMENT AND CONCRETE UNLESS NOTED OTHERWISE.

| ELEMENT | AS 3600 F'c MPa AT 28 DAYS | SPECIFIED SLUMP | NOMINAL AGG. SIZE |
|---|---|---|---|
| VEHICULAR BASE | 32 | 60 | 20 |
| KERBS, PATHS, AND PITS | 25 | 80 | 20 |

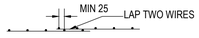
- CEMENT TYPE SHALL BE (ACSE SPECIFICATION) TYPE SL
- PROJECT CONTROL TESTING SHALL BE CARRIED OUT IN ACCORDANCE WITH AS 1379.

3. NO ADMIXTURES SHALL BE USED IN CONCRETE UNLESS APPROVED IN WRITING BY STANTEC.
4. CLEAR CONCRETE COVER TO ALL REINFORCEMENT FOR DURABILITY SHALL BE 40mm TOP AND 70mm FOR EXTERNAL EDGES UNLESS NOTED OTHERWISE.
5. ALL REINFORCEMENT SHALL BE FIRMLY SUPPORTED ON MILD STEEL PLASTIC TIPPED CHAIRS, PLASTIC CHAIRS OR CONCRETE CHAIRS AT NOT GREATER THAN 1m CENTRES BOTH WAYS. BARS SHALL BE TIED AT ALTERNATE INTERSECTIONS.
6. THE FINISHED CONCRETE SHALL BE A DENSE HOMOGENEOUS MASS, COMPLETELY FILLING THE FORMWORK, THOROUGHLY EMBEDDING THE REINFORCEMENT AND FREE OF STONE POCKETS. ALL CONCRETE INCLUDING SLABS ON GROUND AND FOOTINGS SHALL BE COMPACTED AND CURED IN ACCORDANCE WITH R.M.S. SPECIFICATION R83.
7. REINFORCEMENT SYMBOLS:
   N DENOTES GRADE 450 N BARS TO AS/NZS 4671 GRADE N
   R DENOTES 230 R HOT ROLLED PLAIN BARS TO AS/NZS 4671
   SL DENOTES HARD-DRAWN WIRE REINFORCING FABRIC TO AS/NZS 4671




THE FIGURE FOLLOWING THE FABRIC SYMBOL SL IS THE REFERENCE NUMBER FOR FABRIC TO AS/NZS 4671.

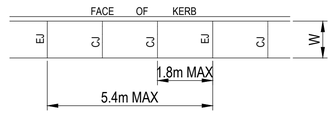
8. FABRIC SHALL BE LAPPED IN ACCORDANCE WITH THE FOLLOWING DETAIL:




## JOINTING NOTES

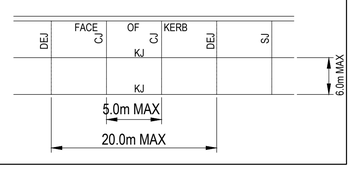
### PEDESTRIAN PAVEMENT JOINTS

1. ALL PEDESTRIAN PAVEMENTS ARE TO BE JOINTED AS FOLLOWS. (U.N.O)
2. EXPANSION JOINTS ARE TO BE LOCATED WHERE POSSIBLE AT TANGENT POINTS OF CURVES AND ELSEWHERE AT MAX. 5.4m CENTRES.
3. CONTRACTION JOINTS ARE TO BE LOCATED AT A MAX. SPACING OF 1.8m
4. WHERE POSSIBLE JOINTS SHOULD BE LOCATED TO MATCH KERBING AND OR ADJACENT PAVEMENT JOINTS.
5. PEDESTRIAN PAVEMENT JOINT DETAIL:




### VEHICULAR PAVEMENT JOINTS

6. ALL VEHICULAR PAVEMENTS TO BE JOINTED AS FOLLOWS. (U.N.O)
7. CONTRACTION JOINTS SHOULD GENERALLY BE LOCATED AT A MAX OF 5.0m CENTRES WITH DOWELED EXPANSION JOINTS AT MAX 20.0m CENTRES
8. VEHICULAR PAVEMENT JOINT DETAIL.




## KERBING NOTES

1. ALL CONCRETE TO HAVE A MINIMUM COMPRESSIVE STRENGTH OF 25 MPa U.N.O IN REINFORCED CONCRETE NOTES.
2. ALL KERBS, GUTTERS, DISH DRAINS AND CROSSINGS TO BE CONSTRUCTED ON 100mm GRANULAR BASECOURSE COMPACTED TO MINIMUM 95% MODIFIED DRY DENSITY (AS 1289 5.2.1).
3. EXPANSION JOINTS (E.J) TO BE FORMED FROM 10mm COMPRESSIBLE CORK FILLER BOARD FOR THE FULL DEPTH OF THE SECTION AND CUT TO PROFILE. EXPANSION JOINTS TO BE LOCATED AT DRAINAGE PITS, ON TANGENT POINTS OF CURVES AND ELSEWHERE AT MAX 12m CENTRES EXCEPT FOR INTEGRAL KERBS WHERE THE EXPANSION JOINTS ARE TO MATCH THE JOINT LOCATIONS IN THE SLABS.
4. WEAKENED PLANE JOINTS TO BE MIN 3mm WIDE AND LOCATED AT 3m CENTRES EXCEPT FOR INTEGRAL KERBS WHERE THE WEAKENED PLANE JOINTS ARE TO MATCH THE JOINT LOCATIONS IN THE SLABS.
5. BROOMED FINISH TO ALL RAMPED AND VEHICULAR CROSSINGS. ALL OTHER KERBING OR DISH DRAINS TO BE STEEL FLOAT FINISHED.
6. IN THE REPLACEMENT OF KERB AND GUTTER :- EXISTING ROAD PAVEMENT IS TO BE SAWCUT 900mm U.N.O FROM THE LIP OF GUTTER. UPON COMPLETION OF THE NEW KERB AND GUTTER NEW BASECOURSE AND SURFACE TO BE LAID 600mm WIDE U.N.O.
7. EXISTING ALLOTMENT DRAINAGE PIPES ARE TO BE BUILT INTO THE NEW KERB AND GUTTER WITH 100mm DIA HOLE.
8. EXISTING KERB AND GUTTER IS TO BE COMPLETELY REMOVED WHERE NEW KERB AND GUTTER IS SHOWN.

## PROPOSED SERVICES NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH RELEVANT SERVICE AUTHORITY DOCUMENTATION AND CURRENT NSW STREETS OPENING CONFERENCE GUIDE TO CODES AND PRACTICES FOR STREETS OPENING LITERATURE.
2. THE CONTRACTOR SHALL ATTEND, MANAGE & SUPERVISE THE PROVISION OF PUBLIC UTILITY SERVICES TO THE WORKS GENERALLY AS INDICATED ON THE SERVICES PLANS, NOTING THAT PRIOR & DURING CONSTRUCTION THE PUBLIC UTILTITY AUTHORITIES WILL FINALISE THEIR DOCUMENTATION TO CONSTRUCTION ISSUE STANDARD.
3. THE CIVIL CONTRACTOR (TRENCH PROVIDER) IS TO ARRANGE ON SITE MEETING WITH ALL SERVICE AUTHORITIES PRIOR TO THE INSTALLATION OF CONDUITS.
4. THE CIVIL CONTRACTOR TO CO-ORDINATE INSTALLATION OF ELECTRICITY, GAS,TELECOMMUNICATION, WATER AND SEWER SERVICES.
5. ELECTRICITY, GAS AND TELECOMMUNICATION SERVICES ARE TO BE LAID FOLLOWING THE INSTALLATION OF STORMWATER, SEWER AND WATER SERVICES AND KERB AND GUTTER.
6. ALL UTILITY AUTHORITY REPRESENTATIVES TO INSPECT ROAD CROSSINGS PRIOR TO SEALING.
7. ALL ELECTRICAL ROAD CROSSINGS TO BE CLASS 6 (ORANGE) uPVC CONDUITS.
8. ALL GAS ROAD CROSSINGS TO BE uPVC GREY SEWER GRADE CONDUITS.
9. ALL STREET POLES TO BE POSITIONED THE APPROPRIATE DISTANCE FROM FACE OF KERB TO FACE OF POLE ACCORDING TO THE CURRENT NSW STREETS OPENING CONFERENCE GUIDE TO CODES AND PRACTICES FOR STREETS OPENING LITERATURE. CONTRACTOR TO ALLOW TO EXCAVATE AND BACKFILL TRENCH GENERALLY IN ACCORDANCE WITH NOTE 2.
10. ALL SERVICE PIT COVERS AND MARKERS ARE TO BE LAID WHOLLY WITHIN THE CONCRETE FOOTPATH. CONTACT SUPERINTENDANT SHOULD DIFFICULTIES ARISE.

## TELSTRA - DUTY OF CARE NOTE

TELSTRA'S PLANS SHOW ONLY THE PRESENCE OF CABLES AND PLANT. THEY ONLY SHOW THEIR POSITION RELATIVE TO ROAD BOUNDARIES, PROPERTY FENCES ETC. AT THE TIME OF INSTALLATION AND TELSTRA DOES NOT WARRANT OR HOLD OUT THAT SUCH PLANS ARE ACCURATE THEREAFTER DUE TO CHANGES THAT MAY OCCUR OVER TIME. DO NOT ASSUME DEPTH OR ALIGNMENT OF CABLES OR PLANT AS THESE VARY SIGNIFICANTLY.
THE CONTRACTOR HAS A DUTY OF CARE WHEN EXCAVATING NEAR TELSTRA CABLES AND PLANT. BEFORE USING MACHINE EXCAVATORS TELSTRA PLANT MUST FIRST BE PHYSICALLY EXPOSED BY SOFT DIG POTHOLING TO IDENTIFY IT'S LOCATION TELSTRA WILL SEEK COMPENSATION FOR DAMAGES CAUSED TO IT'S PROPERTY AND LOSSES CAUSED TO TELSTRA AND IT'S CUSTOMERS.

## EROSION AND SEDIMENT CONTROL NOTES

### GENERAL INSTRUCTIONS

1. THE SITE SUPERINTENDENT/ENGINEER WILL ENSURE THAT ALL SOIL AND WATER MANAGEMENT WORKS ARE LOCATED AS DOCUMENTED.
2. ALL WORK SHALL BE GENERALLY CARRIED OUT IN ACCORDANCE WITH
   2.1. LOCAL AUTHORITY REQUIREMENTS
   2.2. EPA REQUIREMENTS
   2.3. NSW DEPARTMENT OF HOUSING MANUAL "MANAGING URBAN STORMWATER, SOILS AND CONSTRUCTION", 4th EDITION, MARCH 2004.
3. MAINTAIN THE EROSION CONTROL DEVICES TO THE SATISFACTION OF THE SUPERINTENDENT AND THE LOCAL AUTHORITY.
4. WHEN STORMWATER PITS ARE CONSTRUCTED, PREVENT SITE RUNOFF ENTERING UNLESS SEDIMENT FENCES ARE ERECTED AROUND PITS.
5. CONTRACTOR IS TO ENSURE ALL EROSION & SEDIMENT CONTROL DEVICES ARE MAINTAINED IN GOOD WORKING ORDER AND OPERATE EFFECTIVELY. REPAIRS AND OR MAINTENANCE SHALL BE UNDERTAKEN AS REQUIRED, PARTICULARLY FOLLOWING STORM EVENTS.

### LAND DISTURBANCE

6. WHERE PRACTICAL, THE SOIL EROSION HAZARD ON THE SITE WILL BE KEPT AS LOW AS POSSIBLE. TO THIS END, WORKS SHOULD BE UNDERTAKEN IN THE FOLLOWING SEQUENCE:
   6.1. INSTALL A SEDIMENT FENCE ALONG THE BOUNDARIES AS SHOWN ON PLAN. REFER DETAIL.
   6.2. CONSTRUCT STABILISED CONSTRUCTION ENTRANCE TO LOCATION AS DETERMINED BY SUPERINTENDENT/ENGINEER. REFER DETAIL.
   6.3. INSTALL SEDIMENT BASIN AS SHOWN ON PLAN
   6.4. INSTALL SEDIMENT TRAPS AS SHOWN ON PLAN.
7. UNDERTAKE SITE DEVELOPMENT WORKS IN ACCORDANCE WITH THE ENGINEERING PLANS. WHERE POSSIBLE, PHASE DEVELOPMENT SO THAT LAND DISTURBANCE IS CONFINED TO AREAS OF WORKABLE SIZE.

### EROSION CONTROL

8. DURING WINDY WEATHER, LARGE, UNPROTECTED AREAS WILL BE KEPT MOIST (NOT WET) BY SPRINKLING WITH WATER TO KEEP DUST UNDER CONTROL.
9. FINAL SITE LANDSCAPING WILL BE UNDERTAKEN AS SOON AS POSSIBLE AND WITHIN 20 WORKING DAYS FROM COMPLETION OF CONSTRUCTION ACTIVITIES.

### SEDIMENT CONTROL

10. STOCKPILES WILL NOT BE LOCATED WITHIN 2 METRES OF HAZARD AREAS, INCLUDING LIKELY AREAS OF CONCENTRATED OR HIGH VELOCITY FLOWS SUCH AS WATERWAYS. WHERE THEY ARE BETWEEN 2 AND 5 METRES FROM SUCH AREAS, SPECIAL SEDIMENT CONTROL MEASURES SHOULD BE TAKEN TO MINIMISE POSSIBLE POLLUTION TO DOWNSLOPE WATERS, E.G. THROUGH INSTALLATION OF SEDIMENT FENCING.
11. ANY SAND USED IN THE CONCRETE CURING PROCESS (SPREAD OVER THE SURFACE) WILL BE REMOVED AS SOON AS POSSIBLE AND WITHIN 10 WORKING DAYS FROM PLACEMENT.
12. WATER WILL BE PREVENTED FROM ENTERING THE PERMANENT DRAINAGE SYSTEM UNLESS IT IS RELATIVELY SEDIMENT FREE, I.E. THE CATCHMENT AREA HAS BEEN PERMANENTLY LANDSCAPED AND/OR ANY LIKELY SEDIMENT HAS BEEN FILTERED THROUGH AN APPROVED STRUCTURE.
13. TEMPORARY SOIL AND WATER MANAGEMENT STRUCTURES WILL BE REMOVED ONLY AFTER THE LANDS THEY ARE PROTECTING ARE REHABILITATED.

### OTHER MATTERS

13. ACCEPTABLE RECEPTORS WILL BE PROVIDED FOR CONCRETE AND MORTAR SLURRIES, PAINTS, ACID WASHINGS, LIGHT-WEIGHT WASTE MATERIALS AND LITTER.
14. ANY EXISTING TREES WHICH FORM PART OF THE FINAL LANDSCAPING PLAN WILL BE PROTECTED FROM CONSTRUCTION ACTIVITIES BY:
    14.1. PROTECTING THEM WITH BARRIER FENCING OR SIMILAR MATERIALS INSTALLED OUTSIDE THE DRIP LINE
    14.2. ENSURING THAT NOTHING IS NAILED TO THEM
    14.3. PROHIBITING PAVING, GRADING, SEDIMENT WASH OR PLACING OF STOCKPILES WITHIN THE DRIP LINE EXCEPT UNDER THE FOLLOWING CONDITIONS.
    14.4. ENCROACHMENT ONLY OCCURS ON ONE SIDE AND NO CLOSER TO THE TRUNK THAN EITHER 1.5 METRES OR HALF THE DISTANCE BETWEEN THE OUTER EDGE OF THE DRIP LINE AND THE TRUNK, WHICH EVER IS THE GREATER
    14.5. A DRAINAGE SYSTEM THAT ALLOWS AIR AND WATER TO CIRCULATE THROUGH THE ROOT ZONE (E.G. A GRAVEL BED) IS PLACED UNDER ALL FILL LAYERS OF MORE THAN 300 MILLIMETRES DEPTH
    14.6. CARE IS TAKEN NOT TO CUT ROOTS UNNECESSARILY NOR TO COMPACT THE SOIL AROUND THEM.

## BULK EARTHWORKS NOTES

1. REFER SPECIFICATIONS NOTES FOR EARTHWORKS GENERAL REQUIREMENTS.
2. STRIP EXISTING TOPSOIL IN CONSULTATION WITH THE GEOTECHNICAL ENGINEER / REPORT. FOR THE PURPOSES OF EARTHWORKS CALCULATIONS A TOPSOIL STRIPPING DEPTH OF XXXXmm HAS BEEN ASSUMED. GROUND SLAB DEPTH OF XXXXmm HAS BEEN ASSUMED WHERE REQUIRED.
3. NO ALLOWANCE HAS BEEN MADE FOR BULKING FACTORS. NOTE ALL VOLUMES DEPICTED ARE SOLID VOLUMES ONLY AND MAY NOT REFLECT DETAILED EARTHWORKS.
4. NO ALLOWANCE HAS BEEN MADE FOR DETAILED EARTHWORKS; ie SERVICE TRENCHING, DETAILED EXCAVATION, FOOTINGS, RETAINING WALLS AND THE LIKE.
5. THE CONTRACTOR SHALL USE FINAL SURFACE LEVELS AND TYPICAL PAVEMENT DETAILS FOR ACTUAL EARTHWORKS LEVELS.
6. BULK EARTHWORKS ARE BASED ON THE SETDOWN TO UNDERSIDE OF PAVEMENT BUILDUPS AS SPECIFIED FROM FINISHED SURFACE LEVELS.
7. SITE STRIPPING VOLUMES HAVE NOT BEEN INCLUDED IN BULK EARTHWORKS CALCULATIONS.

## STORMWATER DRAINAGE NOTES

1. ON COMPLETION OF STORMWATER INSTALLATION, ALL DISTURBED AREAS MUST BE RESTORED TO ORIGINAL CONDITION, INCLUDING KERBS, FOOTPATHS, CONCRETE AREAS, GRAVEL AND GRASSED AREAS AND ROAD PAVEMENTS, UNLESS DIRECTED OTHERWISE.
2. PIPES 300 DIA. AND LARGER TO BE REINFORCED CONCRETE CLASS '3' APPROVED SPIGOT AND SOCKET WITH RUBBER RING JOINTS. U.N.O.
3. PIPES UP TO 300 DIA SHALL BE SEWER GRADE uPVC WITH SOLVENT WELDED JOINTS.
4. EQUIVALENT STRENGTH VCP OR FRC PIPES MAY BE USED.
5. ALL STORMWATER DRAINAGE LINES UNDER PROPOSED BUILDING SLABS TO BE uPVC PRESSURE PIPE GRADE 6. ENSURE ALL VERTICALS AND DOWNPIPES ARE uPVC PRESSURE PIPE, GRADE 6 FOR A MIN OF 3.0m IN HEIGHT.
6. PIPES TO BE INSTALLED TO TYPE HS3 (ROAD) HS2 (LOTS) SUPPORT IN ACCORDANCE WITH AS 3725 (2007) IN ALL CASES BACKFILL TRENCH WITH SAND TO 300mm ABOVE PIPE. WHERE PIPE IS UNDER PAVEMENTS BACKFILL REMAINDER OF TRENCH TO UNDERSIDE OF PAVEMENT WITH SAND OR APPROVED GRANULAR MATERIAL COMPACTED IN 150mm LAYERS TO MINIMUM 98% STANDARD MAXIMUM DRY DENSITY IN ACCORDANCE WITH AS 1289 5.2.1. (OR A DENSITY INDEX OF NOT LESS THAN 75)
7. ALL INTERNAL WORKS WITHIN PROPERTY BOUNDARIES ARE TO COMPLY WITH THE REQUIREMENTS OF AS 3500 3.1 (2006) AND AS/NZS 3500 3.2 (2010).
8. PRECAST PITS MAY BE USED EXTERNAL TO THE BUILDING SUBJECT TO APPROVAL BY STANTEC.
9. ENLARGERS, CONNECTIONS AND JUNCTIONS TO BE PREFABRICATED FITTINGS WHERE PIPES ARE LESS THAN 300 DIA.
10. WHERE SUBSOIL DRAINS PASS UNDER FLOOR SLABS AND VEHICULAR PAVEMENTS, UNSLOTTED uPVC SEWER GRADE PIPE IS TO BE USED.
11. CARE IS TO BE TAKEN WITH LEVELS OF STORMWATER LINES. GRADES SHOWN ARE NOT TO BE REDUCED WITHOUT APPROVAL.
12. GRATES AND COVERS SHALL CONFORM TO AS 3996.
13. ALL INTERNAL PIT DIMENSIONS TO CONFORM TO AS3500.3 TABLE 7.5.2.1
14. AT ALL TIMES DURING CONSTRUCTION OF STORMWATER PITS, ADEQUATE SAFETY PROCEDURES SHALL BE TAKEN TO ENSURE AGAINST THE POSSIBILITY OF PERSONNEL FALLING DOWN PITS.
15. ALL EXISTING STORMWATER DRAINAGE LINES AND PITS THAT ARE TO REMAIN ARE TO BE INSPECTED AND CLEANED. DURING THIS PROCESS ANY PART OF THE STORMWATER DRAINAGE SYSTEM THAT WARRANTS REPAIR SHALL BE REPORTED TO THE SUPERINTENDENT/ENGINEER FOR FURTHER DIRECTIONS.
16. THE CONTRACTOR IS TO ORGANISE AND STAGE CONSTRUCTION WORK AND UNDERTAKE ANY DIVERSION WORKS TO ENSURE THE EXISTING DRAINAGE IS ABLE TO CONVEY ALL STORMWATER FLOWS THAT MAY OCCUR DURING THE PERIOD OF THE CONSTRUCTION WORKS.
17. ANY DAMAGE TO THE WORKS DUE TO STORMWATER FLOWS OR FLOODING DURING THE CONSTRUCTION PERIOD IS AT THE CONTRACTOR'S RISK.
18. SETOUT POINTS FOR STORMWATER STRUCTURES ARE AS INDICATED IN THE DRAWINGS UNLESS OTHERWISE NOTED.
19. ALL PAVED SURFACE LEVELS AND GRADES TO BE COORDINATED WITH GULLY PIT LEVELS TO ENSURE NO UNDRAINED AREAS OCCUR.
20. THE SIDES OF ALL PIPE TRENCH EXCAVATIONS DEEPER THAN 1.0m SHALL BE FULLY SUPPORTED AT ALL TIMES AND HAVE APPROPRIATE EDGE PROTECTION.
21. ALL NEW PIPES TO BE LAID IN AN UPSTREAM DIRECTION. THE LINE, LEVEL AND LOCATION OF EXISTING SERVICES CROSSING THE LINE OF THE PROPOSED STORMWATER PIPE SHALL BE DETERMINED BY EXCAVATION PRIOR TO THE LAYING OF THE PIPE. IF CONFLICT IS APPARENT, THE ENGINEER SHALL BE NOTIFIED AND INSTRUCTIONS AS TO WHETHER THE EXISTING SERVICE IS TO BE ADJUSTED OR THE PROPOSED PIPE INVERT ALTERED WILL BE ISSUED.
22. PIPE BEDDING, HAUNCH AND BACKFILL TO BE AS SHOWN ON THE CIVIL DETAILS DRAWINGS AND THE CIVIL SPECIFICATION.
23. SUBSOIL DRAINAGE PIPES TO BE SLOTTED PIPE AND FILTER SOCK CLASS 1000 TO AS2439 PART 1 LAID AT PREFERABLE MINIMUM GRADE 1 IN 100 OR ABSOLUTE MINIMUM 1 IN 200 WHERE LIMITED BY OUTFALL LEVELS.
24. STORMWATER STRUCTURES ARE TO BE CONSTRUCTED PERPENDICULAR TO THE INCOMING PIPEWORK UNLESS OTHERWISE NOTED.
25. PRECAST COMPONENTS SHALL BE CONNECTED BY MEANS OF EPOXY OR CHEMICAL GROUTED BARS OF THE SAME DIAMETER AND SPACING AS THE SMALLER BARS IN THE RESPECTIVE COMPONENTS.
26. PRE-CAST PITS MUST HAVE LIFTING ANCHORS.
27. WORKING LOADS ARE THOSE DUE TO FILL MATERIAL AND STANDARD HIGHWAY VEHICLES AS PER AS3725. CONSTRUCTION LOADS HAVE NOT BEEN ALLOWED FOR.
28. ALL EXPOSED EDGES ON STORMWATER PITS TO BE ROUNDED TO 5mm RAD. UNO.

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15-31 HARBOUR DRIVE, COFFS HARBOUR
PROJECT

GENERAL NOTES
TITLE

Stantec

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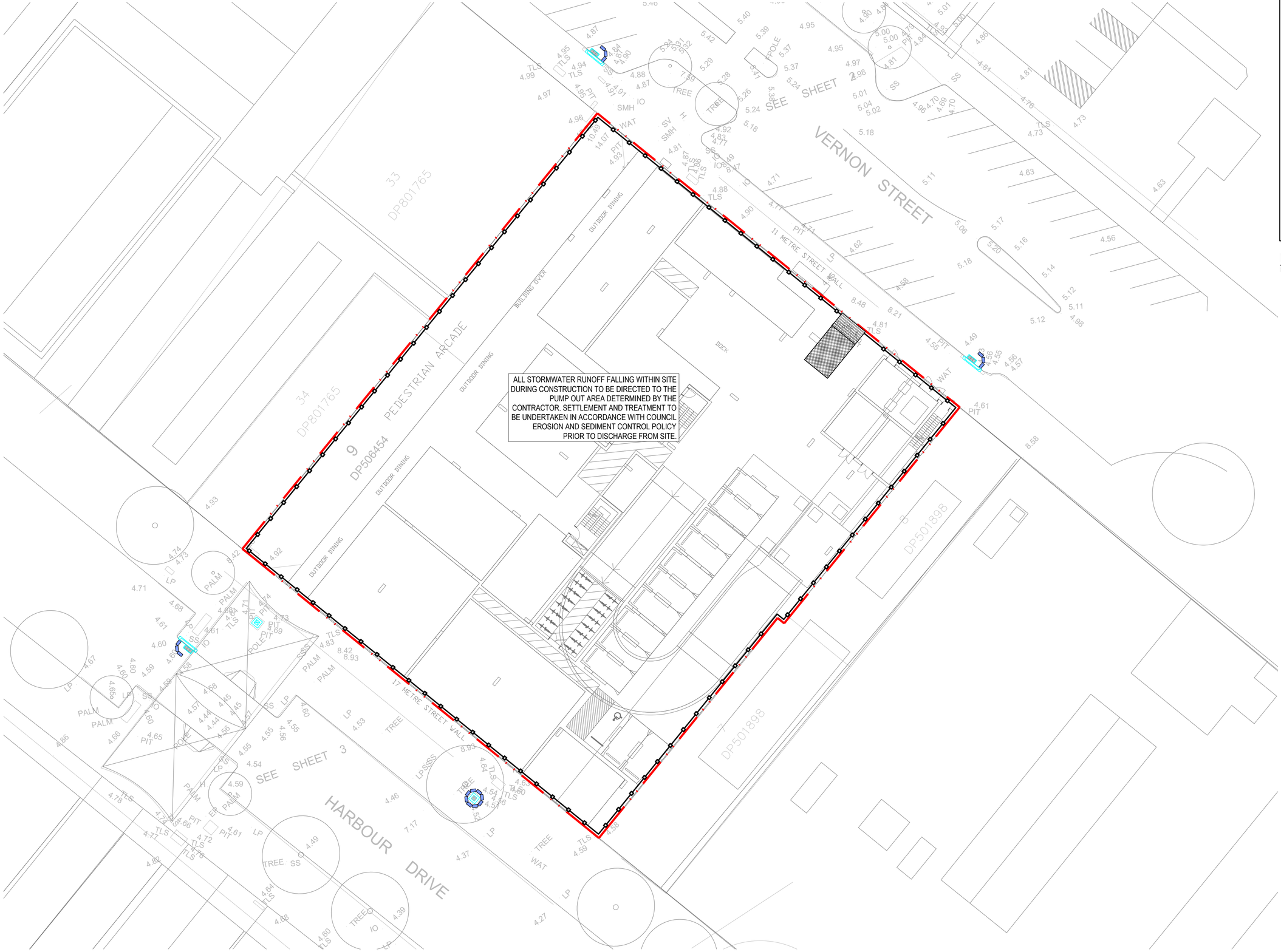


## LEGEND

- PROPOSED SITE BOUNDARY
- VEHICLE SHAKEDOWN DEVICE
- PROPOSED SILT FENCE
- SANDBAG PIT PROTECTION
- PROPOSED JUNCTION PIT
- EXISTING JUNCTION PIT
- PROPOSED GRATED PIT
- EXISTING GRATED PIT
- PROPOSED KERB INLET PIT
- EXISTING KERB INLET PIT

## NOTE:

REFER DRAWING CI-076-01 FOR EROSION AND SEDIMENT CONTROL DETAILS

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EROSION AND SEDIMENT CONTROL PLAN

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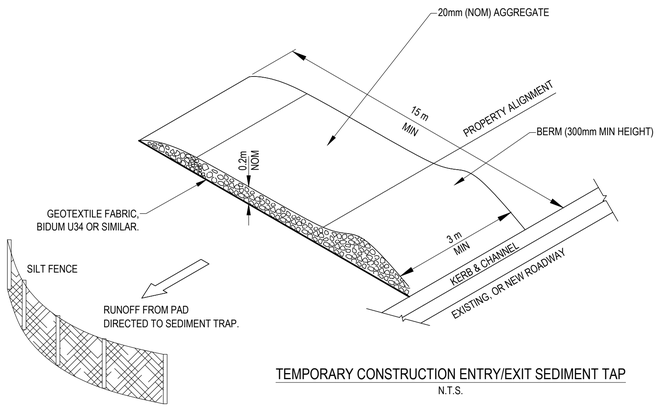


TEMPORARY CONSTRUCTION ENTRY/EXIT SEDIMENT TAP
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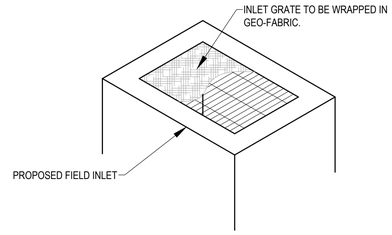


FIELD INLET SEDIMENT CONTROL
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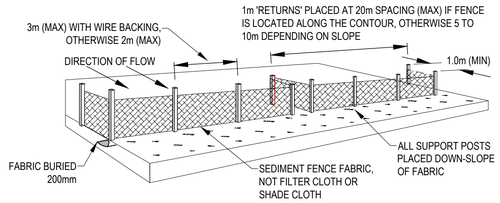


INSTALLATION OF SEDIMENT FENCE
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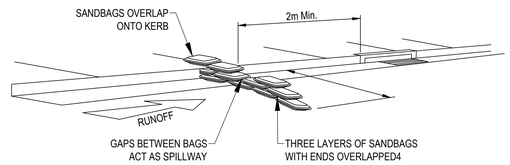


SANDBAG KERB INLET SEDIMENT TRAP
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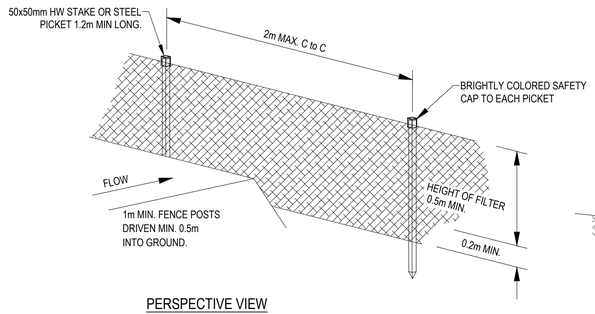


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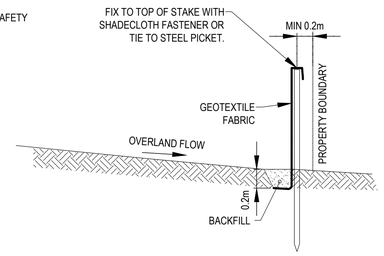


TYPICAL SECTION

SEDIMENT FENCE DETAIL
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PROJECT

EROSION AND SEDIMENT
CONTROL DETAILS
TITLE

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## LEGEND

- PROPOSED SITE BOUNDARY
- PROPOSED BUILDING
- PROPOSED ROOF EXTENT
- PROPOSED STORMWATER PIPE
- EXISTING STORMWATER PIPE
- PROPOSED JUNCTION PIT
- EXISTING JUNCTION PIT
- PROPOSED GRATED PIT
- EXISTING GRATED PIT
- PROPOSED KERB INLET PIT
- EXISTING KERB INLET PIT

EXISTING KERB INLET PIT
RL:4.84

EXISTING KERB INLET PIT
RL: 4.53

EXISTING KERB INLET PIT
RL: 4.60

EXISTING JUNCTION PIT
(TBC PRIOR TO CONSTRUCTION)
RL:4.74
IL: 4.69

EXISTING GRATED PIT
RL:4.51
IL:3.41

VERNON STREET
HARBOUR DRIVE
PEDESTRIAN ARCADE
11 METRE STREET WALL
17 METRE STREET WALL
BUILDING OVER
OUTDOOR DINING
DOCK
ENTRY/EXIT RAMP
SEE SHEET 3
SEE SHEET 4
33 DP801765
34 DP801765
DP506454
DP501898

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1:400 A3

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STORMWATER DRAINAGE PLAN
TITLE

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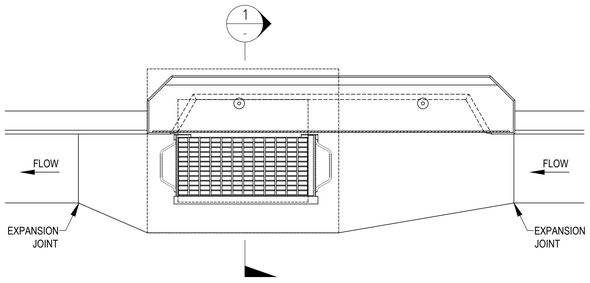
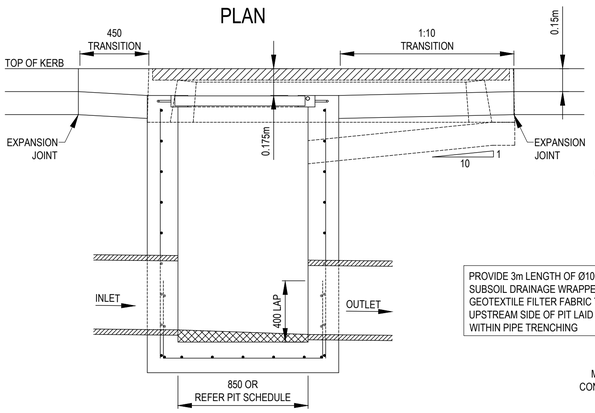
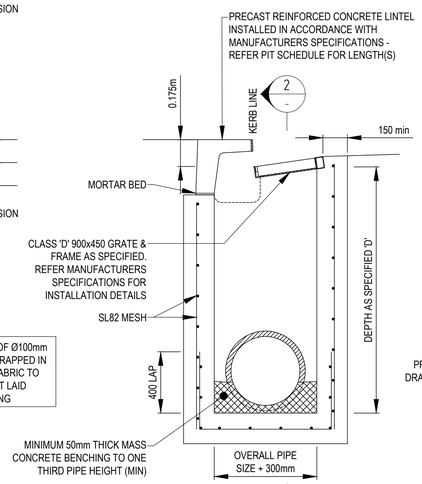



PLAN



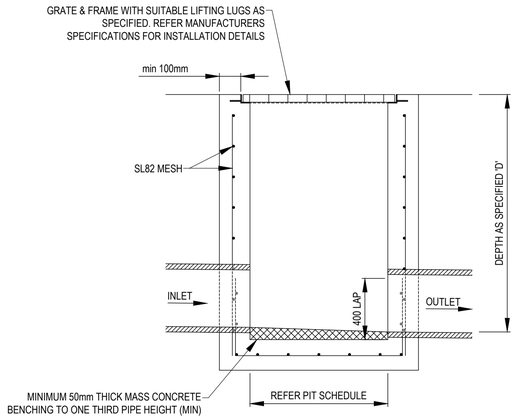

SECTION 2
SCALE 1:20

PROVIDE 3m LENGTH OF Ø100mm SUBSOIL DRAINAGE WRAPPED IN GEOTEXTILE FILTER FABRIC TO UPSTREAM SIDE OF PIT LAID WITHIN PIPE TRENCHING

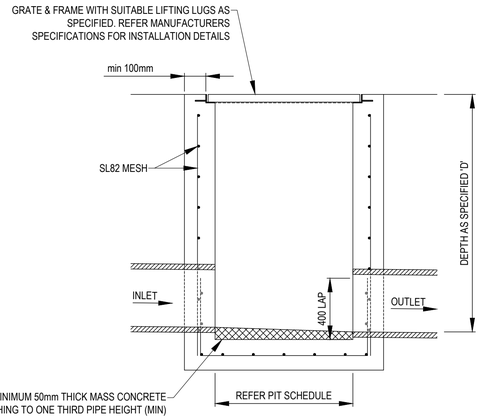



SECTION 1
SCALE 1:20

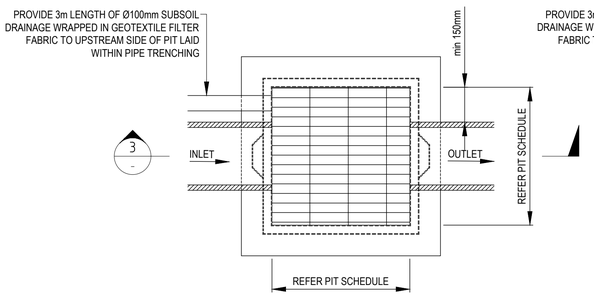
KERB INLET PIT
SCALE 1:20



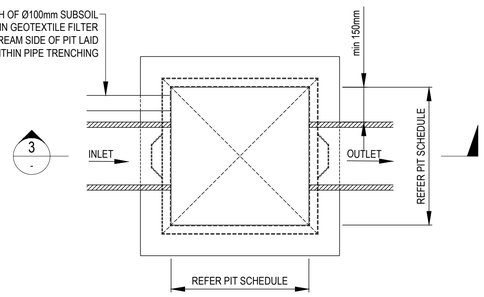

SECTION 3
SCALE 1:20



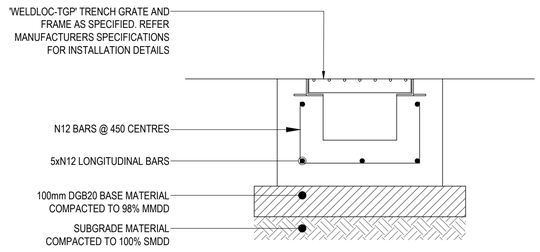

SECTION 3
SCALE 1:20



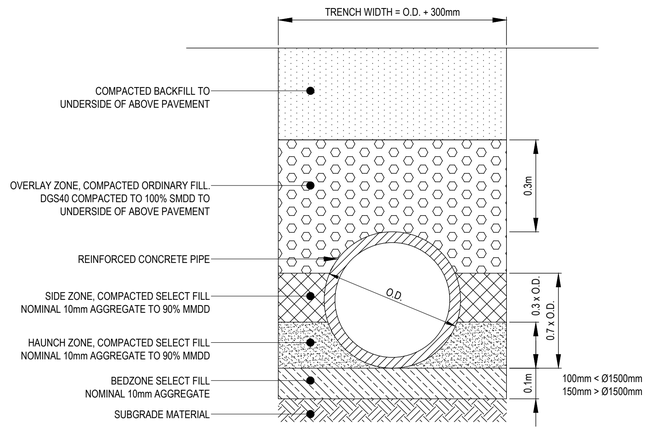

GRATED PIT PLAN
SCALE 1:20




JUNCTION PIT PLAN
SCALE 1:20




GRATED TRENCH DRAIN
(SCALE 1:10)




TYPICAL PIPE TRENCH DETAIL
SCALE 1:10

1:10 0.1 0 0.1 0.2 0.3 0.4 0.5 A1
1:20 A3

1:20 0.2 0 0.2 0.4 0.6 0.8 1 A1
1:40 A3

| REV | DESCRIPTION | DRAWN | APP'D | DATE |
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| A | ISSUED FOR DA APPROVAL | JDU | RET | NYI |

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| DRAWN: | |
| DESIGNED: | |
| VERIFIED: | |
| APPROVED FOR TENDER: | |
| APPROVED FOR CONSTRUCTION: | |

TURNER
ARCHITECT/CLIENT

15-31 HARBOUR DRIVE, COFFS HARBOUR
PROJECT

STORMWATER DRAINAGE - DETAILS
TITLE

Stantec

APPROVAL
NOT FOR CONSTRUCTION

| MGA | mAHD | AS SHOWN | 47738 | CI-526-01 | A |
|---|---|---|---|---|---|
| | | SCALE @ A1 | PROJECT No | DRAWING No | REV |

CAD FILE: 47738-CI-526-01.DWG

# 15-31 Harbour Drive, Coffs Harbour NSW 2450

# Stormwater Management Plan

**Prepared for: Paynter Dixon Constructions Pty Limited**

**Attention: Shaza Rifi**

**Date: 16 December 2020**

**Prepared by: Renata Tracey**

**Ref: 47738**

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Tel: +61 2 8484 7000 Web: www.stantec.com

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Stantec

# Revision

| | |
|---|---|
| **Site Address:** | 15-31 Harbour Drive, Coffs Harbour NSW 2450 |
| **Proposed Development:** | Mixed use development consisting of 14 storeys with a podium and laneway |
| **Client:** | Paynter Dixon Constructions Pty Limited |
| **Local Authority** | Coffs Harbour City Council |
| **Authority Reference #:** | N/A |
| **Stantec Reference:** | 47738 |

R. Tracey

**Renata Tracey CPEng NER**

For and on behalf of

**Stantec Australia Pty Ltd**

| REVISION | DATE | COMMENT | APPROVED BY |
|---|---|---|---|
| **A** | 04.12.20 | DRAFT DA ISSUE | **RET** |
| **B** | 16.12.20 | DA ISSUE | **RET** |
| | | | |
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# 1. Introduction

Stantec have been commissioned by Paynter Dixon Constructions Pty Limited to prepare this Stormwater Management Plan (SMP) in support of the Development Application for the proposed development at 15-31 Harbour Drive, Coffs Harbour, NSW. The sites real address is Lot 9 & Lot 10/DP506454, Lot 4/DP758258, Lot 1/DP305950.

This SMP outlines the conceptual water management design for the proposed development of the 13-storey mixed use development with a podium and laneway.

This SMP demonstrates the application of Water Sensitive Urban Design (WSUD) principles and illustrates that the proposed development complies with the Coffs Harbour City Council Standards and Guidelines for Stormwater, Australian Rainfall and Runoff, Australian Standards and best engineering practise.

The purpose of this SMP is to evaluate the stormwater management methodology associated with the proposed development plan so as to demonstrate that the appropriate strategies have been adopted.

The SMP specifically addresses the following items for both the construction and operational phases of the development:

- Flood Impacts
- Stormwater runoff volumes and detention (Stormwater Quantity)
- Stormwater quality treatment measures (Stormwater Quality)
- Erosion and Sedimentation Control

# 2. Relevant Policies, Standards and Guidelines

The following listed policies, standards and guidelines were referred to in the preparation of this report:

- Coffs Harbour City Council Development Control Plan
- AS3500
- Australian Rainfall & Runoff 2016;
- AS3500 parts 0-5: 2013 Plumbing and Drainage
- AS2890 parts 1-6: 2009 Parking Facilities
- AS1428 parts 1-5: 2010 Design for Access and Mobility
- Landcom Managing Urban Stormwater: Soils and Construction Volume 1 2004
- NSW Floodplain Development Manual 2005
- Guidelines for development adjoining land and water managed by DECCW (OEH, 2013)

# 3. Existing Site Characteristics

## 3.1 Property Detail

Address: **15-31 Harbour Drive, Coffs Harbour**

Lot 9 & Lot 10/DP506454

Lot 4/DP758258

Lot 1/DP305950

Total Site Area: 0.3012 Ha

The proposed development can be seen on the concept design drawings in Appendix A of this report.

The proposed development of the site will consist of a mixed use development consisting of 13 storeys with a podium and laneway.

As can be seen in the site location aerial photo below (Figure 3.1), the site is bound by Vernon Street to the North/East, Harbour Drive to the South/West, and neighbouring properties on Harbour Drive (11&13 and 33 Harbour Drive) on the North/West and South/East.

**Figure 3-1 - Site Location**

## 3.2 Topography

Assessment of publicly available Lidar information indicates that the site generally falls from North to South with the lowest point at the southeast corner boundary. The proposed development lies on relatively flat slope with street frontages slope of approximately 1% falling to the east. Site topography can be seen in **Figure *3-2*** below.

**Figure 3-2 Existing Overland Flow Routes**

## 3.3 Stormwater Catchments

### 3.3.1 External Catchments

No external catchments contributing from upstream is expected since the proposed site is surrounded by street frontages and existing buildings draining to road reserves.

As indicated by the arrows on the below figure, both Vernon Street and Harbour Drive fall from north-west to south-east.

### 3.3.2 Internal Catchments

The entire site falls towards the south east, however the existing roof structure will govern internal catchments.

## 3.4 Existing Drainage

Given the whole site area consists of roof area the existing drainage onsite is expected to consist of an eave, gutter and downpipe system.

## 3.5 Existing Stormwater Discharge

Survey of the existing infrastructure in Vernon Street and Harbour Drive dated July 2020 show the presence of existing drainage networks to both street frontages on Vernon Street and Harbour Drive. **Figure *3-3*** below shows the presence of two kerb inlet pits on Vernon Street. **Figure *3-4* Error! Reference source not found.** shows the presence of a grated inlet pit on Harbour Drive.

**Figure 3-3 Survey - Existing Stormwater Network Vernon Street**

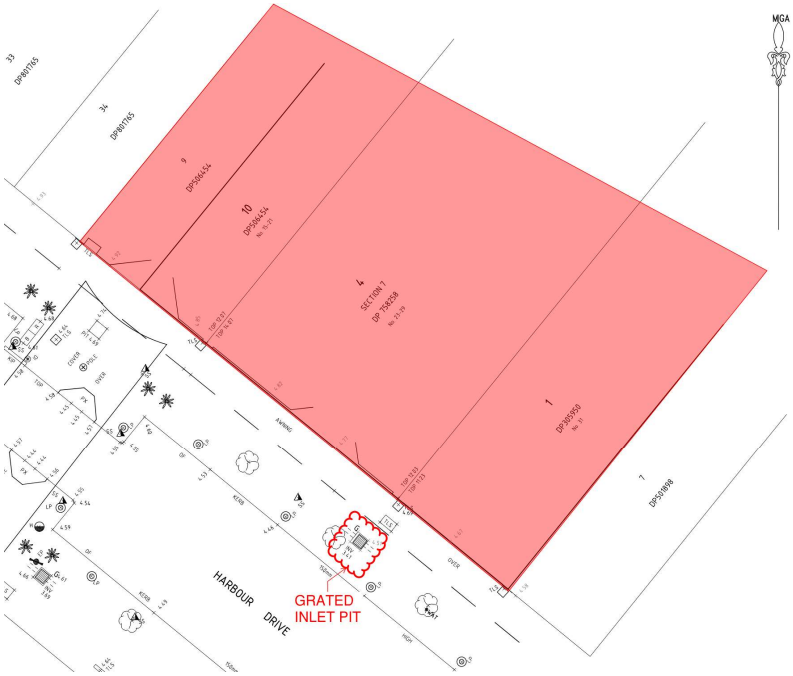



**Figure 3-4 Survey - Existing Stormwater Network Harbour Drive**

# 4. Authority Requirements

## 4.1 Local Council

Design requirements for water management on the site has been set in the Coffs Harbour City Council Development Control Plan. These requirements are summarised in the sections below.

### 4.1.1 Stormwater Conveyance

The Coffs Harbour City Council Development Control Plan states the minimum requirements for the design of stormwater conveyance infrastructure.

The table below summarises the requirements for the stormwater conveyance infrastructure.

**Table 1 Stormwater Drainage Serviceability**

| Infrastructure | Design ARI | Conveyance Method |
|---|---|---|
| Minor System | 5 years | Pit & Pipe System |
| Major System | 100 years | Overland |

### 4.1.2 On Site Detention Requirements

Coffs Harbour City Council only require on-site detention be used in order to minimise/mitigate any adverse affects of development on its stormwater infrastructure.

The existing site is virtually completely pervious, redevelopment of the site will not result in additional flows into councils stormwater infrastructure and therefore, on-site detention is not required for this development.

This has been confirmed in email correspondence between Coffs Harbour City Council and Stantec dated, Friday, 10th July 2020. Refer Appendix B for correspondence.

### 4.1.3 Stormwater Quality Treatment

Coffs Harbour City Council require compliance with their Water Sensitive Urban Design (WSUD) Policy if development or redevelopment results in an increase of more than 300 sqm of impervious area on the site. As the proposed development does not increase the impervious area on the site WSUD is not required.

This has been confirmed in email correspondence between Coffs Harbour City Council and Stantec dated, Friday, 10th July 2020. Refer Appendix B for correspondence.

# 5. Flooding

Coffs Harbour City Council online map services for planning and flood information indicates that the area adjacent to the site within the road reserve is flood affected and that a Flood Planning Level applies to the proposed site.

**Figure 5-1 100-year ARI Flood Extents – Council's Online Map (Planning – Flooding Information)**

A flood information enquiry was submitted to Coffs Harbour Council for further information and the following information was obtained.

Councils latest flooding information indicates that the maximum 1% AEP flood level is 4.8mAHD, located adjacent to the Western boundary of No.15-21. Therefore, the flood planning level for No.15-21 would be 5.3 mAHD.

Information was also obtained for property No.23-29. The maximum 1% AEP flood level is 4.67mAHD and therefore the flood planning level for No.23-29 would be 5.17mAHD.

No flood information has yet been obtained for property No.31 however, through correspondence with Coffs Harbour City Council it is known that the flood planning level is not above 5.3mAHD. If an accurate flood planning level is required for this property, a further flood information enquiry will need to be submitted to council.

Refer Appendix C for flood advice letter and correspondence.

# 6. Stormwater Conveyance

This section of the report discusses the systems proposed to allow for stormwater to be conveyed across the site to the legal point of discharge.

As discussed in section 4.1 of this report, Coffs Harbour City Council DCP and associated attachments set the minimum design parameters for the design of stormwater conveyance infrastructure through the site.

## 6.1 Building Drainage

All roof areas will be drained through a conventional downpipe system. The drainage system will be designed in accordance with AS3500.3:2003 to convey the minor design storm runoff from the roof to the in-ground drainage system. Flows in excess of the design flows will surcharge the roof drainage system and discharge onto the surrounding ground where it will then be conveyed to the proposed pit at the rear of the lot.

## 6.2 Surface Drainage

The surface areas will be drained through a variety of methods, discussed below, in accordance with AS3500.3:2015 and Council's stormwater drainage guidelines.

### 6.2.1 In-Ground Drainage

The in-ground drainage has been designed to meet the following criteria:

- In the minor design storm event (5 year) there will be no surcharging of the in-ground drainage system and;
- In the major design storm event (100 year) there will be no uncontrolled discharge from the site.

Surface runoff from the development site will be directed to stormwater inlet structures using the design topography of these elements. The inlet structures have been designed to adequately convey the surface runoff into the in-ground drainage network.

The runoff will then be conveyed underground across the site through a pit and pipe system and then to the legal point of discharge using gravity and the geometric falls of the pipe system.

## 6.3 Legal Point of Discharge

There is an existing stormwater outlet pipe to the curb of Vernon Street to the north of the site. This pipe will be demolished and disposed of from site and replaced with a similar outlet to suit the proposed driveway location.

# 7. Erosion & Sedimentation Control

Landcom have published a design guide entitled “Managing Urban Stormwater - Soils and Construction” which is regarded as the standard to which erosion and sedimentation control should be designed to within NSW.

The control of erosion and sedimentation describes the measures incorporated during and following construction of a new development to prevent the pollution and degradation of the downstream watercourse.

A Soil and Water Management Plan has prepared as part of the development application documentation and is included in Appendix A of this report.

**Stormwater Drainage Infrastructure Inlets**

Risk:

- Sediment from the construction site washing into the existing stormwater drainage inlet infrastructure.

Consequence:

- The sediment will then be conveyed into the downstream waterbody by stormwater runoff, contaminating the waterbody.
- The sediment will build up blocking the stormwater infrastructure and preventing stormwater conveyance to the downstream waterbody and impacting drainage upstream.

Mitigation:

- Sandbag protection will be installed surrounding all existing stormwater drainage infrastructure inlets to prevent sediment entering the system.

Maintenance:

- Frequent inspection of the sandbags to ensure they are arranged in a manner that prevents sediment from accessing the drainage system. If sediment is building up on the sandbags they should be cleared of sediment and re-established.

**Construction Exit Protection**

Risk:

- Spoil such as soil being conveyed from the site on the wheels of vehicles.

Consequence:

- Spoil being tracked onto the public road corridors where it is then washed into the existing stormwater drainage infrastructure and is then washed downstream polluting the downstream waterbody.
- Spoil being tracked onto the public road creating dangerous driving conditions for other road users.

Mitigation:

- A shaker grid and wash down facility will be installed at all exits from the construction site. All vehicles leaving the site will have their wheels washed down and pass over the shaker grid to remove any spoil collected on their wheels and retaining the spoil on site.

Maintenance:

- Frequent inspection of the shaker grid to ensure it is clean and still functioning.

**Downstream Site Boundaries**

Risk:

- Rainfall runoff falling on the site collecting sediment from the construction site and conveying it overland onto downstream properties and waterbodies.

Consequence:

- Sediment discharge polluting downstream properties and waterbodies.

Mitigation:

- Installation of sediment fences on all downstream boundaries of the site to collect sediment and prevent it discharging onto downstream properties or waterbodies.

Maintenance:

- Regular inspection of the sediment fences to ensure they are functioning correctly and are intact.
- If sediment build up is present it should be removed to ensure correct functionality of the fences.

# Appendix A Civil Drawings

DATE PLOTTED: 4/12/2020 11:12:12 AM BY: TRACEY, RENATA

# CIVIL ENGINEERING WORKS

LOCALITY PLAN

SCALE 1:1000

| DRAWING REGISTRY | |
|---|---|
| DRAWING NUMBER | DRAWING TITLE |
| CI-000-01 | COVER SHEET, DRAWING REGISTRY AND LOCALITY PLAN |
| CI-007-01 | GENERAL NOTES |
| CI-070-01 | EROSION AND SEDIMENT CONTROL PLAN |
| CI-076-01 | EROSION AND SEDIMENT CONTROL DETAILS |
| CI-520-01 | STORMWATER DRAINAGE PLAN GROUND FLOOR |
| CI-526-01 | STORMWATER DRAINAGE - DETAILS |

APPROVAL

NOT FOR CONSTRUCTION

| TURNER | 15-31 HARBOUR DRIVE, COFFS HARBOUR | Stantec | 47738 | CI-000-01 | A |
|---|---|---|---|---|---|
| CLIENT | PROJECT | | PROJECT No | DRAWING No | REV |

CAD FILE: 47738-CI-000-01.DWG

DATE PLOTTED: 4/12/2020 11:35:23 AM BY: TRACEY RENATA

## GENERAL NOTES

1. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH COUNCIL / RELEVANT AUTHORITY SPECIFICATIONS AND DETAILS.
2. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH OTHER CONSULTANTS' DRAWINGS AND SPECIFICATIONS AND WITH OTHER SUCH WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ANY DISCREPANCY SHALL BE REFERRED TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.
3. ALL DIMENSIONS ARE IN MILLIMETRES & ALL LEVELS ARE IN METRES, UNO (UNLESS NOTED OTHERWISE).
4. NO DIMENSION SHALL BE OBTAINED BY SCALING THE DRAWINGS.
5. ALL LEVELS AND SETTING OUT DIMENSIONS SHOWN ON THE DRAWINGS SHALL BE CHECKED ON SITE PRIOR TO COMMENCEMENT OF WORKS.
6. EXISTING SERVICES WHERE SHOWN HAVE BEEN PLOTTED FROM SUPPLIED DATA AND SUCH THEIR ACCURACY CAN NOT BE GUARANTEED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ESTABLISH THE LEVEL OF ALL EXISTING SERVICES PRIOR TO THE COMMENCEMENT OF WORK.
7. CAD FILES / DTM FILES TO BE SUPPLIED IN AUTOCAD FORMAT FOR SETOUT PURPOSES (UPON REQUEST).

## SITEWORKS NOTES

1. ORIGIN OF LEVELS:- REFER SURVEY NOTES.
2. CONTRACTOR MUST VERIFY ALL DIMENSIONS AND EXISTING LEVELS ON SITE PRIOR TO COMMENCEMENT OF WORK. ANY DISCREPANCIES TO BE REPORTED TO STANTEC.
3. CONTRACTOR TO CONFIRM ALL CBR VALUES PRIOR TO COMMENCEMENT OF WORKS.
4. MAKE SMOOTH CONNECTION WITH EXISTING WORKS.
5. ALL TRENCH BACKFILL MATERIAL SHALL BE COMPACTED TO THE SAME DENSITY AS THE ADJACENT MATERIAL.
6. ALL SERVICE TRENCHES UNDER VEHICULAR PAVEMENTS SHALL BE BACKFILLED WITH SAND TO 300mm ABOVE PIPE. WHERE PIPE IS UNDER PAVEMENTS BACKFILL REMAINDER OF TRENCH TO UNDERSIDE OF PAVEMENT WITH SAND OR APPROVED GRANULAR MATERIAL COMPACTED IN 150mm LAYERS TO MINIMUM 98% MODIFIED MAXIMUM DRY DENSITY IN ACCORDANCE WITH AS 1289 5.2.1. (OR A DENSITY INDEX OF NOT LESS THAN 75)
7. PROVIDE 10mm WIDE EXPANSION JOINTS BETWEEN BUILDINGS AND ALL CONCRETE OR UNIT PAVEMENTS.
8. ASPHALTIC CONCRETE SHALL CONFORM TO RMS. SPECIFICATION R116.
9. ALL BASECOURSE MATERIAL SHALL BE IGNEOUS ROCK QUARRIED MATERIAL TO COMPLY WITH RMS. FORM 3051 (UNBOUND), RMS. FORM 3052 (BOUND) COMPACTED TO MINIMUM 98% MODIFIED DENSITY IN ACCORDANCE WITH AS 1289 5.2.1.
   FREQUENCY OF COMPACTION TESTING SHALL NOT BE LESS THAN 1 TEST PER 50m$^3$ BASECOURSE MATERIAL PLACED.
10. ALL SUB-BASE COURSE MATERIAL SHALL BE IGNEOUS ROCK QUARRIED MATERIAL TO COMPLY WITH RMS. FORM 3051, 3051.1 AND COMPACTED TO MINIMUM 95% MODIFIED DENSITY IN ACCORDANCE WITH A.S 1289 5.2.1
    FREQUENCY OF COMPACTION TESTING SHALL NOT BE LESS THAN 1 TEST PER 50m$^3$ OF SUB-BASE COURSE MATERIAL PLACED.
11. AS AN ALTERNATIVE TO THE USE OF IGNEOUS ROCK AS A SUB-BASE MATERIAL IN (9) A CERTIFIED RECYCLED CONCRETE MATERIAL COMPLYING WITH RMS. FORM 3051 AND 3051.1 WILL BE CONSIDERED. SUBJECT TO MATERIAL SAMPLES AND APPROPRIATE CERTIFICATIONS BEING PROVIDED TO THE SATISFACTION OF STANTEC.
12. SHOULD THE CONTRACTOR WISH TO USE A RECYCLED PRODUCT THIS SHALL BE CLEARLY INDICATED IN THEIR TENDER AND THE PRICE DIFFERENCE BETWEEN AN IGNEOUS PRODUCT AND A RECYCLED PRODUCT SHALL BE CLEARLY INDICATED.
13. WHERE NOTED ON THE DRAWINGS THAT WORKS ARE TO BE CARRIED BY OTHERS, (eg. ADJUSTMENT OF SERVICES), THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CO-ORDINATION OF THESE WORKS.

## SURVEY NOTES

THE EXISTING SITE CONDITIONS SHOWN ON THE FOLLOWING DRAWINGS HAVE BEEN SHOWN AS PER THE TOPOGRAPHIC SURVEY RECEIVED ON 26/07/2020 FILE 9725, AS INVESTIGATED BY BLAIRLANSKEY SURVEYS PTY LTD. THE INFORMATION IS SHOWN TO PROVIDE A BASIS FOR DESIGN. STANTEC DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF THE SURVEY BASE OR ITS SUITABILITY AS A BASIS FOR CONSTRUCTION DRAWINGS. SHOULD DISCREPANCIES BE ENCOUNTERED DURING CONSTRUCTION BETWEEN THE SURVEY DATA AND ACTUAL FIELD DATA, CONTACT STANTEC.

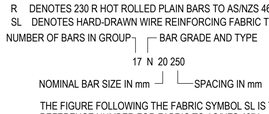
## CONCRETE NOTES

1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS 3600 CURRENT EDITION WITH AMENDMENTS, EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.
2. CONCRETE QUALITY ALL REQUIREMENTS OF THE CURRENT ACSE CONCRETE SPECIFICATION DOCUMENT 1 SHALL APPLY TO THE FORMWORK, REINFORCEMENT AND CONCRETE UNLESS NOTED OTHERWISE.

| ELEMENT | AS 3600 F'c MPa AT 28 DAYS | SPECIFIED SLUMP | NOMINAL AGG. SIZE |
|---|---|---|---|
| VEHICULAR BASE | 32 | 60 | 20 |
| KERBS, PATHS, AND PITS | 25 | 80 | 20 |

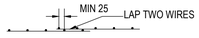
- CEMENT TYPE SHALL BE (ACSE SPECIFICATION) TYPE SL
- PROJECT CONTROL TESTING SHALL BE CARRIED OUT IN ACCORDANCE WITH AS 1379.

3. NO ADMIXTURES SHALL BE USED IN CONCRETE UNLESS APPROVED IN WRITING BY STANTEC.
4. CLEAR CONCRETE COVER TO ALL REINFORCEMENT FOR DURABILITY SHALL BE 40mm TOP AND 70mm FOR EXTERNAL EDGES UNLESS NOTED OTHERWISE.
5. ALL REINFORCEMENT SHALL BE FIRMLY SUPPORTED ON MILD STEEL PLASTIC TIPPED CHAIRS, PLASTIC CHAIRS OR CONCRETE CHAIRS AT NOT GREATER THAN 1m CENTRES BOTH WAYS. BARS SHALL BE TIED AT ALTERNATE INTERSECTIONS.
6. THE FINISHED CONCRETE SHALL BE A DENSE HOMOGENEOUS MASS, COMPLETELY FILLING THE FORMWORK, THOROUGHLY EMBEDDING THE REINFORCEMENT AND FREE OF STONE POCKETS. ALL CONCRETE INCLUDING SLABS ON GROUND AND FOOTINGS SHALL BE COMPACTED AND CURED IN ACCORDANCE WITH R.M.S. SPECIFICATION R83.
7. REINFORCEMENT SYMBOLS:
   N DENOTES GRADE 450 N BARS TO AS/NZS 4671 GRADE N
   R DENOTES 230 R HOT ROLLED PLAIN BARS TO AS/NZS 4671
   SL DENOTES HARD-DRAWN WIRE REINFORCING FABRIC TO AS/NZS 4671




THE FIGURE FOLLOWING THE FABRIC SYMBOL SL IS THE REFERENCE NUMBER FOR FABRIC TO AS/NZS 4671.

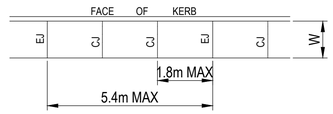
8. FABRIC SHALL BE LAPPED IN ACCORDANCE WITH THE FOLLOWING DETAIL:




## JOINTING NOTES

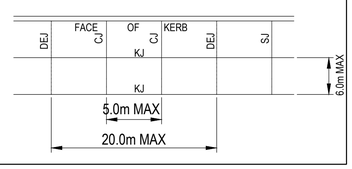
### PEDESTRIAN PAVEMENT JOINTS

1. ALL PEDESTRIAN PAVEMENTS ARE TO BE JOINTED AS FOLLOWS. (U.N.O)
2. EXPANSION JOINTS ARE TO BE LOCATED WHERE POSSIBLE AT TANGENT POINTS OF CURVES AND ELSEWHERE AT MAX. 5.4m CENTRES.
3. CONTRACTION JOINTS ARE TO BE LOCATED AT A MAX. SPACING OF 1.8m
4. WHERE POSSIBLE JOINTS SHOULD BE LOCATED TO MATCH KERBING AND OR ADJACENT PAVEMENT JOINTS.
5. PEDESTRIAN PAVEMENT JOINT DETAIL:




### VEHICULAR PAVEMENT JOINTS

6. ALL VEHICULAR PAVEMENTS TO BE JOINTED AS FOLLOWS. (U.N.O)
7. CONTRACTION JOINTS SHOULD GENERALLY BE LOCATED AT A MAX OF 5.0m CENTRES WITH DOWELED EXPANSION JOINTS AT MAX 20.0m CENTRES
8. VEHICULAR PAVEMENT JOINT DETAIL.




## KERBING NOTES

1. ALL CONCRETE TO HAVE A MINIMUM COMPRESSIVE STRENGTH OF 25 MPa U.N.O IN REINFORCED CONCRETE NOTES.
2. ALL KERBS, GUTTERS, DISH DRAINS AND CROSSINGS TO BE CONSTRUCTED ON 100mm GRANULAR BASECOURSE COMPACTED TO MINIMUM 95% MODIFIED DRY DENSITY (AS 1289 5.2.1).
3. EXPANSION JOINTS (E.J) TO BE FORMED FROM 10mm COMPRESSIBLE CORK FILLER BOARD FOR THE FULL DEPTH OF THE SECTION AND CUT TO PROFILE. EXPANSION JOINTS TO BE LOCATED AT DRAINAGE PITS, ON TANGENT POINTS OF CURVES AND ELSEWHERE AT MAX 12m CENTRES EXCEPT FOR INTEGRAL KERBS WHERE THE EXPANSION JOINTS ARE TO MATCH THE JOINT LOCATIONS IN THE SLABS.
4. WEAKENED PLANE JOINTS TO BE MIN 3mm WIDE AND LOCATED AT 3m CENTRES EXCEPT FOR INTEGRAL KERBS WHERE THE WEAKENED PLANE JOINTS ARE TO MATCH THE JOINT LOCATIONS IN THE SLABS.
5. BROOMED FINISH TO ALL RAMPED AND VEHICULAR CROSSINGS. ALL OTHER KERBING OR DISH DRAINS TO BE STEEL FLOAT FINISHED.
6. IN THE REPLACEMENT OF KERB AND GUTTER :- EXISTING ROAD PAVEMENT IS TO BE SAWCUT 900mm U.N.O FROM THE LIP OF GUTTER. UPON COMPLETION OF THE NEW KERB AND GUTTER NEW BASECOURSE AND SURFACE TO BE LAID 600mm WIDE U.N.O.
7. EXISTING ALLOTMENT DRAINAGE PIPES ARE TO BE BUILT INTO THE NEW KERB AND GUTTER WITH 100mm DIA HOLE.
8. EXISTING KERB AND GUTTER IS TO BE COMPLETELY REMOVED WHERE NEW KERB AND GUTTER IS SHOWN.

## PROPOSED SERVICES NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH RELEVANT SERVICE AUTHORITY DOCUMENTATION AND CURRENT NSW STREETS OPENING CONFERENCE GUIDE TO CODES AND PRACTICES FOR STREETS OPENING LITERATURE.
2. THE CONTRACTOR SHALL ATTEND, MANAGE & SUPERVISE THE PROVISION OF PUBLIC UTILITY SERVICES TO THE WORKS GENERALLY AS INDICATED ON THE SERVICES PLANS, NOTING THAT PRIOR & DURING CONSTRUCTION THE PUBLIC UTILTITY AUTHORITIES WILL FINALISE THEIR DOCUMENTATION TO CONSTRUCTION ISSUE STANDARD.
3. THE CIVIL CONTRACTOR (TRENCH PROVIDER) IS TO ARRANGE ON SITE MEETING WITH ALL SERVICE AUTHORITIES PRIOR TO THE INSTALLATION OF CONDUITS.
4. THE CIVIL CONTRACTOR TO CO-ORDINATE INSTALLATION OF ELECTRICITY, GAS,TELECOMMUNICATION, WATER AND SEWER SERVICES.
5. ELECTRICITY, GAS AND TELECOMMUNICATION SERVICES ARE TO BE LAID FOLLOWING THE INSTALLATION OF STORMWATER, SEWER AND WATER SERVICES AND KERB AND GUTTER.
6. ALL UTILITY AUTHORITY REPRESENTATIVES TO INSPECT ROAD CROSSINGS PRIOR TO SEALING.
7. ALL ELECTRICAL ROAD CROSSINGS TO BE CLASS 6 (ORANGE) uPVC CONDUITS.
8. ALL GAS ROAD CROSSINGS TO BE uPVC GREY SEWER GRADE CONDUITS.
9. ALL STREET POLES TO BE POSITIONED THE APPROPRIATE DISTANCE FROM FACE OF KERB TO FACE OF POLE ACCORDING TO THE CURRENT NSW STREETS OPENING CONFERENCE GUIDE TO CODES AND PRACTICES FOR STREETS OPENING LITERATURE. CONTRACTOR TO ALLOW TO EXCAVATE AND BACKFILL TRENCH GENERALLY IN ACCORDANCE WITH NOTE 2.
10. ALL SERVICE PIT COVERS AND MARKERS ARE TO BE LAID WHOLLY WITHIN THE CONCRETE FOOTPATH. CONTACT SUPERINTENDANT SHOULD DIFFICULTIES ARISE.

## TELSTRA - DUTY OF CARE NOTE

TELSTRA'S PLANS SHOW ONLY THE PRESENCE OF CABLES AND PLANT. THEY ONLY SHOW THEIR POSITION RELATIVE TO ROAD BOUNDARIES, PROPERTY FENCES ETC. AT THE TIME OF INSTALLATION AND TELSTRA DOES NOT WARRANT OR HOLD OUT THAT SUCH PLANS ARE ACCURATE THEREAFTER DUE TO CHANGES THAT MAY OCCUR OVER TIME. DO NOT ASSUME DEPTH OR ALIGNMENT OF CABLES OR PLANT AS THESE VARY SIGNIFICANTLY.
THE CONTRACTOR HAS A DUTY OF CARE WHEN EXCAVATING NEAR TELSTRA CABLES AND PLANT. BEFORE USING MACHINE EXCAVATORS TELSTRA PLANT MUST FIRST BE PHYSICALLY EXPOSED BY SOFT DIG POTHOLING TO IDENTIFY IT'S LOCATION TELSTRA WILL SEEK COMPENSATION FOR DAMAGES CAUSED TO IT'S PROPERTY AND LOSSES CAUSED TO TELSTRA AND IT'S CUSTOMERS.

## EROSION AND SEDIMENT CONTROL NOTES

### GENERAL INSTRUCTIONS

1. THE SITE SUPERINTENDENT/ENGINEER WILL ENSURE THAT ALL SOIL AND WATER MANAGEMENT WORKS ARE LOCATED AS DOCUMENTED.
2. ALL WORK SHALL BE GENERALLY CARRIED OUT IN ACCORDANCE WITH
   2.1. LOCAL AUTHORITY REQUIREMENTS
   2.2. EPA REQUIREMENTS
   2.3. NSW DEPARTMENT OF HOUSING MANUAL "MANAGING URBAN STORMWATER, SOILS AND CONSTRUCTION", 4th EDITION, MARCH 2004.
3. MAINTAIN THE EROSION CONTROL DEVICES TO THE SATISFACTION OF THE SUPERINTENDENT AND THE LOCAL AUTHORITY.
4. WHEN STORMWATER PITS ARE CONSTRUCTED, PREVENT SITE RUNOFF ENTERING UNLESS SEDIMENT FENCES ARE ERECTED AROUND PITS.
5. CONTRACTOR IS TO ENSURE ALL EROSION & SEDIMENT CONTROL DEVICES ARE MAINTAINED IN GOOD WORKING ORDER AND OPERATE EFFECTIVELY. REPAIRS AND OR MAINTENANCE SHALL BE UNDERTAKEN AS REQUIRED, PARTICULARLY FOLLOWING STORM EVENTS.

### LAND DISTURBANCE

6. WHERE PRACTICAL, THE SOIL EROSION HAZARD ON THE SITE WILL BE KEPT AS LOW AS POSSIBLE. TO THIS END, WORKS SHOULD BE UNDERTAKEN IN THE FOLLOWING SEQUENCE:
   6.1. INSTALL A SEDIMENT FENCE ALONG THE BOUNDARIES AS SHOWN ON PLAN. REFER DETAIL.
   6.2. CONSTRUCT STABILISED CONSTRUCTION ENTRANCE TO LOCATION AS DETERMINED BY SUPERINTENDENT/ENGINEER. REFER DETAIL.
   6.3. INSTALL SEDIMENT BASIN AS SHOWN ON PLAN
   6.4. INSTALL SEDIMENT TRAPS AS SHOWN ON PLAN.
7. UNDERTAKE SITE DEVELOPMENT WORKS IN ACCORDANCE WITH THE ENGINEERING PLANS. WHERE POSSIBLE, PHASE DEVELOPMENT SO THAT LAND DISTURBANCE IS CONFINED TO AREAS OF WORKABLE SIZE.

### EROSION CONTROL

8. DURING WINDY WEATHER, LARGE, UNPROTECTED AREAS WILL BE KEPT MOIST (NOT WET) BY SPRINKLING WITH WATER TO KEEP DUST UNDER CONTROL.
9. FINAL SITE LANDSCAPING WILL BE UNDERTAKEN AS SOON AS POSSIBLE AND WITHIN 20 WORKING DAYS FROM COMPLETION OF CONSTRUCTION ACTIVITIES.

### SEDIMENT CONTROL

10. STOCKPILES WILL NOT BE LOCATED WITHIN 2 METRES OF HAZARD AREAS, INCLUDING LIKELY AREAS OF CONCENTRATED OR HIGH VELOCITY FLOWS SUCH AS WATERWAYS. WHERE THEY ARE BETWEEN 2 AND 5 METRES FROM SUCH AREAS, SPECIAL SEDIMENT CONTROL MEASURES SHOULD BE TAKEN TO MINIMISE POSSIBLE POLLUTION TO DOWNSLOPE WATERS, E.G. THROUGH INSTALLATION OF SEDIMENT FENCING.
11. ANY SAND USED IN THE CONCRETE CURING PROCESS (SPREAD OVER THE SURFACE) WILL BE REMOVED AS SOON AS POSSIBLE AND WITHIN 10 WORKING DAYS FROM PLACEMENT.
12. WATER WILL BE PREVENTED FROM ENTERING THE PERMANENT DRAINAGE SYSTEM UNLESS IT IS RELATIVELY SEDIMENT FREE, I.E. THE CATCHMENT AREA HAS BEEN PERMANENTLY LANDSCAPED AND/OR ANY LIKELY SEDIMENT HAS BEEN FILTERED THROUGH AN APPROVED STRUCTURE.
13. TEMPORARY SOIL AND WATER MANAGEMENT STRUCTURES WILL BE REMOVED ONLY AFTER THE LANDS THEY ARE PROTECTING ARE REHABILITATED.

### OTHER MATTERS

13. ACCEPTABLE RECEPTORS WILL BE PROVIDED FOR CONCRETE AND MORTAR SLURRIES, PAINTS, ACID WASHINGS, LIGHT-WEIGHT WASTE MATERIALS AND LITTER.
14. ANY EXISTING TREES WHICH FORM PART OF THE FINAL LANDSCAPING PLAN WILL BE PROTECTED FROM CONSTRUCTION ACTIVITIES BY:
    14.1. PROTECTING THEM WITH BARRIER FENCING OR SIMILAR MATERIALS INSTALLED OUTSIDE THE DRIP LINE
    14.2. ENSURING THAT NOTHING IS NAILED TO THEM
    14.3. PROHIBITING PAVING, GRADING, SEDIMENT WASH OR PLACING OF STOCKPILES WITHIN THE DRIP LINE EXCEPT UNDER THE FOLLOWING CONDITIONS.
    14.4. ENCROACHMENT ONLY OCCURS ON ONE SIDE AND NO CLOSER TO THE TRUNK THAN EITHER 1.5 METRES OR HALF THE DISTANCE BETWEEN THE OUTER EDGE OF THE DRIP LINE AND THE TRUNK, WHICH EVER IS THE GREATER
    14.5. A DRAINAGE SYSTEM THAT ALLOWS AIR AND WATER TO CIRCULATE THROUGH THE ROOT ZONE (E.G. A GRAVEL BED) IS PLACED UNDER ALL FILL LAYERS OF MORE THAN 300 MILLIMETRES DEPTH
    14.6. CARE IS TAKEN NOT TO CUT ROOTS UNNECESSARILY NOR TO COMPACT THE SOIL AROUND THEM.

## BULK EARTHWORKS NOTES

1. REFER SPECIFICATIONS NOTES FOR EARTHWORKS GENERAL REQUIREMENTS.
2. STRIP EXISTING TOPSOIL IN CONSULTATION WITH THE GEOTECHNICAL ENGINEER / REPORT. FOR THE PURPOSES OF EARTHWORKS CALCULATIONS A TOPSOIL STRIPPING DEPTH OF XXXXmm HAS BEEN ASSUMED. GROUND SLAB DEPTH OF XXXXmm HAS BEEN ASSUMED WHERE REQUIRED.
3. NO ALLOWANCE HAS BEEN MADE FOR BULKING FACTORS. NOTE ALL VOLUMES DEPICTED ARE SOLID VOLUMES ONLY AND MAY NOT REFLECT DETAILED EARTHWORKS.
4. NO ALLOWANCE HAS BEEN MADE FOR DETAILED EARTHWORKS; ie SERVICE TRENCHING, DETAILED EXCAVATION, FOOTINGS, RETAINING WALLS AND THE LIKE.
5. THE CONTRACTOR SHALL USE FINAL SURFACE LEVELS AND TYPICAL PAVEMENT DETAILS FOR ACTUAL EARTHWORKS LEVELS.
6. BULK EARTHWORKS ARE BASED ON THE SETDOWN TO UNDERSIDE OF PAVEMENT BUILDUPS AS SPECIFIED FROM FINISHED SURFACE LEVELS.
7. SITE STRIPPING VOLUMES HAVE NOT BEEN INCLUDED IN BULK EARTHWORKS CALCULATIONS.

## STORMWATER DRAINAGE NOTES

1. ON COMPLETION OF STORMWATER INSTALLATION, ALL DISTURBED AREAS MUST BE RESTORED TO ORIGINAL CONDITION, INCLUDING KERBS, FOOTPATHS, CONCRETE AREAS, GRAVEL AND GRASSED AREAS AND ROAD PAVEMENTS, UNLESS DIRECTED OTHERWISE.
2. PIPES 300 DIA. AND LARGER TO BE REINFORCED CONCRETE CLASS '3' APPROVED SPIGOT AND SOCKET WITH RUBBER RING JOINTS. U.N.O.
3. PIPES UP TO 300 DIA SHALL BE SEWER GRADE uPVC WITH SOLVENT WELDED JOINTS.
4. EQUIVALENT STRENGTH VCP OR FRC PIPES MAY BE USED.
5. ALL STORMWATER DRAINAGE LINES UNDER PROPOSED BUILDING SLABS TO BE uPVC PRESSURE PIPE GRADE 6. ENSURE ALL VERTICALS AND DOWNPIPES ARE uPVC PRESSURE PIPE, GRADE 6 FOR A MIN OF 3.0m IN HEIGHT.
6. PIPES TO BE INSTALLED TO TYPE HS3 (ROAD) HS2 (LOTS) SUPPORT IN ACCORDANCE WITH AS 3725 (2007) IN ALL CASES BACKFILL TRENCH WITH SAND TO 300mm ABOVE PIPE. WHERE PIPE IS UNDER PAVEMENTS BACKFILL REMAINDER OF TRENCH TO UNDERSIDE OF PAVEMENT WITH SAND OR APPROVED GRANULAR MATERIAL COMPACTED IN 150mm LAYERS TO MINIMUM 98% STANDARD MAXIMUM DRY DENSITY IN ACCORDANCE WITH AS 1289 5.2.1. (OR A DENSITY INDEX OF NOT LESS THAN 75)
7. ALL INTERNAL WORKS WITHIN PROPERTY BOUNDARIES ARE TO COMPLY WITH THE REQUIREMENTS OF AS 3500 3.1 (2006) AND AS/NZS 3500 3.2 (2010).
8. PRECAST PITS MAY BE USED EXTERNAL TO THE BUILDING SUBJECT TO APPROVAL BY STANTEC.
9. ENLARGERS, CONNECTIONS AND JUNCTIONS TO BE PREFABRICATED FITTINGS WHERE PIPES ARE LESS THAN 300 DIA.
10. WHERE SUBSOIL DRAINS PASS UNDER FLOOR SLABS AND VEHICULAR PAVEMENTS, UNSLOTTED uPVC SEWER GRADE PIPE IS TO BE USED.
11. CARE IS TO BE TAKEN WITH LEVELS OF STORMWATER LINES. GRADES SHOWN ARE NOT TO BE REDUCED WITHOUT APPROVAL.
12. GRATES AND COVERS SHALL CONFORM TO AS 3996.
13. ALL INTERNAL PIT DIMENSIONS TO CONFORM TO AS3500.3 TABLE 7.5.2.1
14. AT ALL TIMES DURING CONSTRUCTION OF STORMWATER PITS, ADEQUATE SAFETY PROCEDURES SHALL BE TAKEN TO ENSURE AGAINST THE POSSIBILITY OF PERSONNEL FALLING DOWN PITS.
15. ALL EXISTING STORMWATER DRAINAGE LINES AND PITS THAT ARE TO REMAIN ARE TO BE INSPECTED AND CLEANED. DURING THIS PROCESS ANY PART OF THE STORMWATER DRAINAGE SYSTEM THAT WARRANTS REPAIR SHALL BE REPORTED TO THE SUPERINTENDENT/ENGINEER FOR FURTHER DIRECTIONS.
16. THE CONTRACTOR IS TO ORGANISE AND STAGE CONSTRUCTION WORK AND UNDERTAKE ANY DIVERSION WORKS TO ENSURE THE EXISTING DRAINAGE IS ABLE TO CONVEY ALL STORMWATER FLOWS THAT MAY OCCUR DURING THE PERIOD OF THE CONSTRUCTION WORKS.
17. ANY DAMAGE TO THE WORKS DUE TO STORMWATER FLOWS OR FLOODING DURING THE CONSTRUCTION PERIOD IS AT THE CONTRACTOR'S RISK.
18. SETOUT POINTS FOR STORMWATER STRUCTURES ARE AS INDICATED IN THE DRAWINGS UNLESS OTHERWISE NOTED.
19. ALL PAVED SURFACE LEVELS AND GRADES TO BE COORDINATED WITH GULLY PIT LEVELS TO ENSURE NO UNDRAINED AREAS OCCUR.
20. THE SIDES OF ALL PIPE TRENCH EXCAVATIONS DEEPER THAN 1.0m SHALL BE FULLY SUPPORTED AT ALL TIMES AND HAVE APPROPRIATE EDGE PROTECTION.
21. ALL NEW PIPES TO BE LAID IN AN UPSTREAM DIRECTION. THE LINE, LEVEL AND LOCATION OF EXISTING SERVICES CROSSING THE LINE OF THE PROPOSED STORMWATER PIPE SHALL BE DETERMINED BY EXCAVATION PRIOR TO THE LAYING OF THE PIPE. IF CONFLICT IS APPARENT, THE ENGINEER SHALL BE NOTIFIED AND INSTRUCTIONS AS TO WHETHER THE EXISTING SERVICE IS TO BE ADJUSTED OR THE PROPOSED PIPE INVERT ALTERED WILL BE ISSUED.
22. PIPE BEDDING, HAUNCH AND BACKFILL TO BE AS SHOWN ON THE CIVIL DETAILS DRAWINGS AND THE CIVIL SPECIFICATION.
23. SUBSOIL DRAINAGE PIPES TO BE SLOTTED PIPE AND FILTER SOCK CLASS 1000 TO AS2439 PART 1 LAID AT PREFERABLE MINIMUM GRADE 1 IN 100 OR ABSOLUTE MINIMUM 1 IN 200 WHERE LIMITED BY OUTFALL LEVELS.
24. STORMWATER STRUCTURES ARE TO BE CONSTRUCTED PERPENDICULAR TO THE INCOMING PIPEWORK UNLESS OTHERWISE NOTED.
25. PRECAST COMPONENTS SHALL BE CONNECTED BY MEANS OF EPOXY OR CHEMICAL GROUTED BARS OF THE SAME DIAMETER AND SPACING AS THE SMALLER BARS IN THE RESPECTIVE COMPONENTS.
26. PRE-CAST PITS MUST HAVE LIFTING ANCHORS.
27. WORKING LOADS ARE THOSE DUE TO FILL MATERIAL AND STANDARD HIGHWAY VEHICLES AS PER AS3725. CONSTRUCTION LOADS HAVE NOT BEEN ALLOWED FOR.
28. ALL EXPOSED EDGES ON STORMWATER PITS TO BE ROUNDED TO 5mm RAD. UNO.

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DESIGNED:
VERIFIED:
APPROVED FOR TENDER:
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TURNER
ARCHITECT/CLIENT

15-31 HARBOUR DRIVE, COFFS HARBOUR
PROJECT

GENERAL NOTES
TITLE

Stantec

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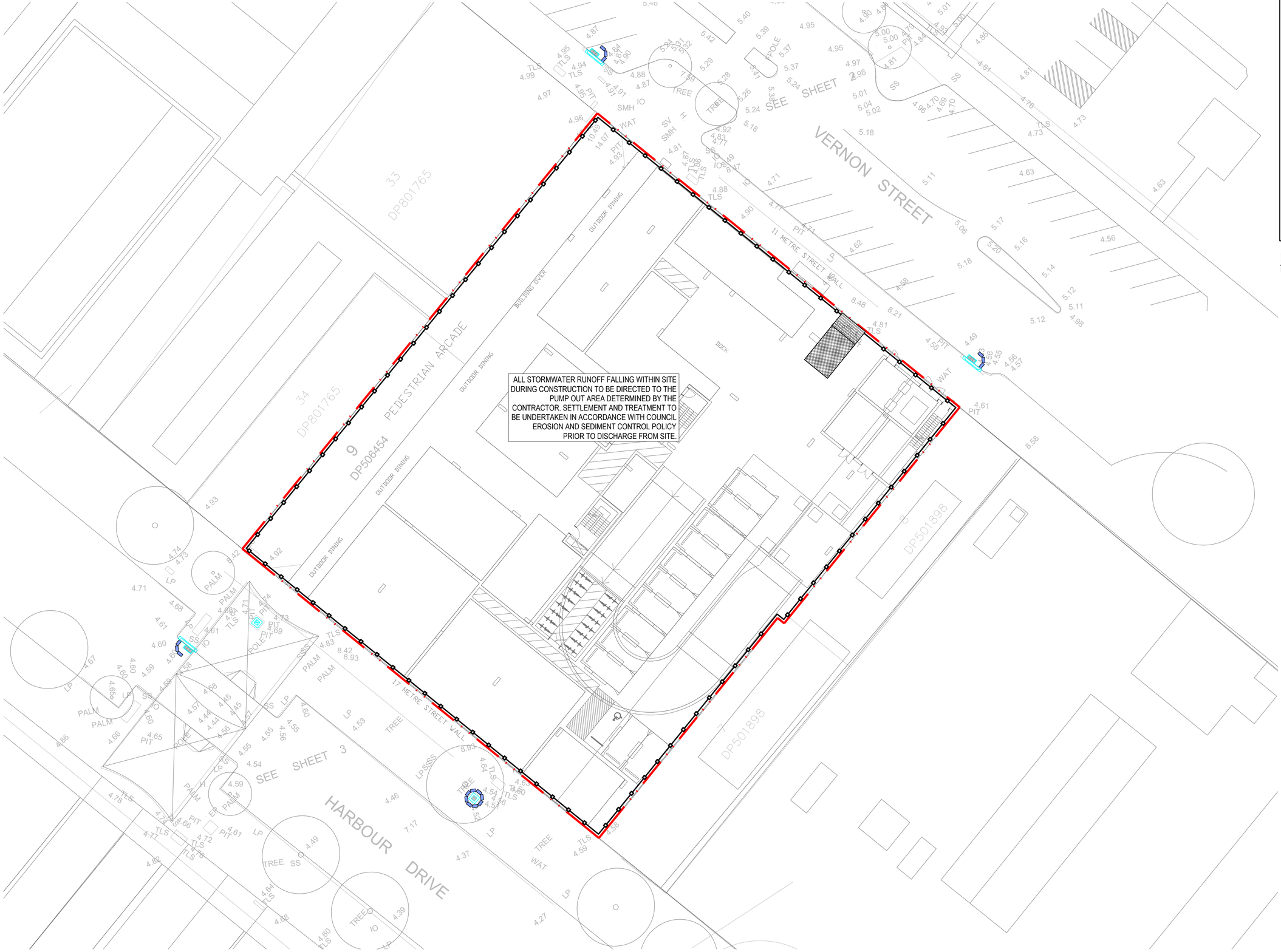


## LEGEND

- PROPOSED SITE BOUNDARY
- VEHICLE SHAKEDOWN DEVICE
- PROPOSED SILT FENCE
- SANDBAG PIT PROTECTION
- PROPOSED JUNCTION PIT
- EXISTING JUNCTION PIT
- PROPOSED GRATED PIT
- EXISTING GRATED PIT
- PROPOSED KERB INLET PIT
- EXISTING KERB INLET PIT

## NOTE:

REFER DRAWING CI-076-01 FOR EROSION AND SEDIMENT CONTROL DETAILS

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EROSION AND SEDIMENT CONTROL PLAN

TITLE

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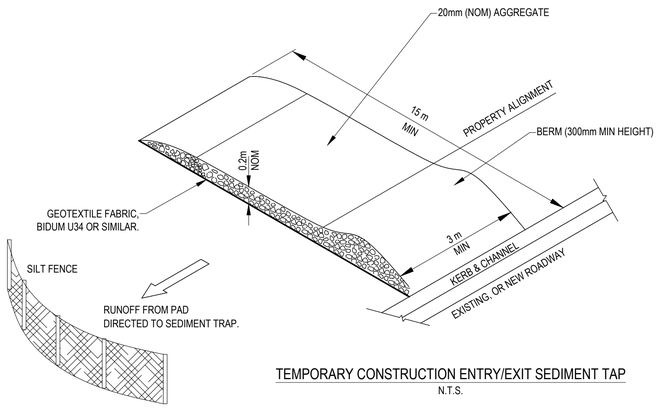
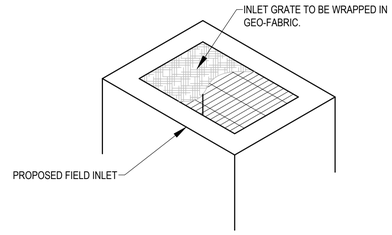



TEMPORARY CONSTRUCTION ENTRY/EXIT SEDIMENT TAP
N.T.S.




FIELD INLET SEDIMENT CONTROL
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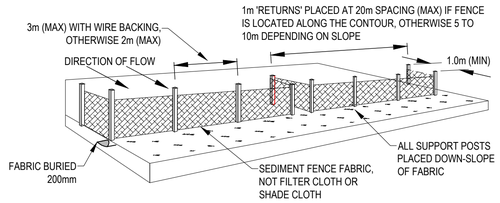


INSTALLATION OF SEDIMENT FENCE
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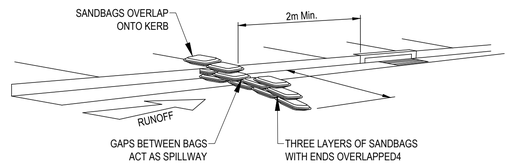


SANDBAG KERB INLET SEDIMENT TRAP
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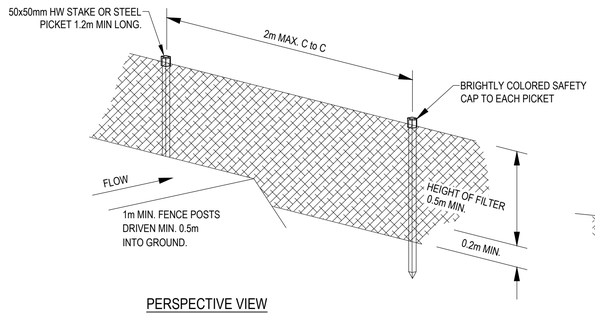
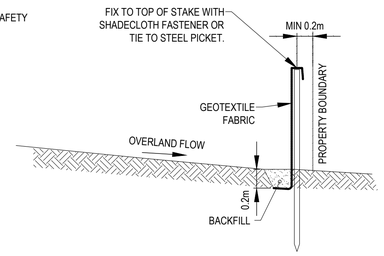



PERSPECTIVE VIEW




TYPICAL SECTION

SEDIMENT FENCE DETAIL
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EROSION AND SEDIMENT
CONTROL DETAILS
TITLE

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## LEGEND

- PROPOSED SITE BOUNDARY
- PROPOSED BUILDING
- PROPOSED ROOF EXTENT
- PROPOSED STORMWATER PIPE
- EXISTING STORMWATER PIPE
- PROPOSED JUNCTION PIT
- EXISTING JUNCTION PIT
- PROPOSED GRATED PIT
- EXISTING GRATED PIT
- PROPOSED KERB INLET PIT
- EXISTING KERB INLET PIT

EXISTING KERB INLET PIT
RL:4.84

EXISTING KERB INLET PIT
RL: 4.53

EXISTING KERB INLET PIT
RL: 4.60

EXISTING JUNCTION PIT
(TBC PRIOR TO CONSTRUCTION)
RL:4.74
IL: 4.69

EXISTING GRATED PIT
RL:4.51
IL:3.41

VERNON STREET
HARBOUR DRIVE
PEDESTRIAN ARCADE
11 METRE STREET WALL
17 METRE STREET WALL
BUILDING OVER
OUTDOOR DINING
DOCK
ENTRY/EXIT RAMP
SEE SHEET 3
SEE SHEET 4
33 DP801765
34 DP801765
DP506454
DP501898

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1:400 A3

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15-31 HARBOUR DRIVE, COFFS HARBOUR
PROJECT

STORMWATER DRAINAGE PLAN
TITLE

Stantec

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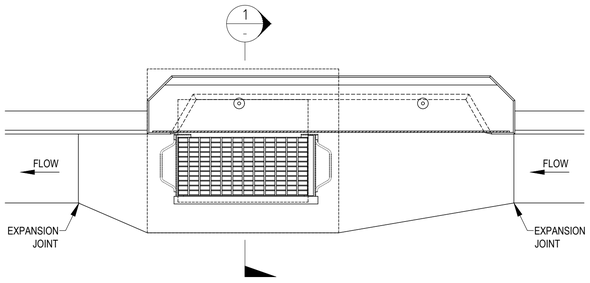
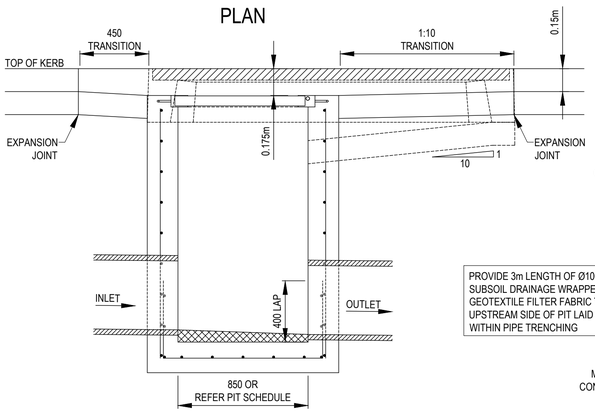
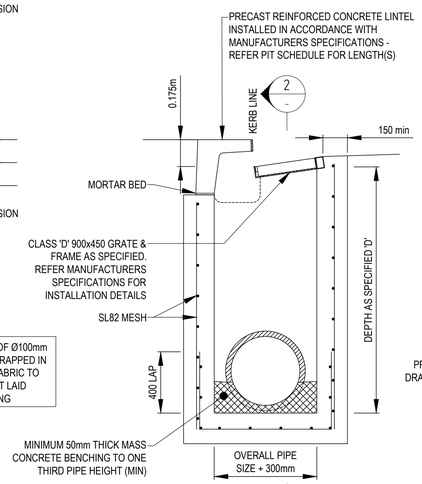



PLAN



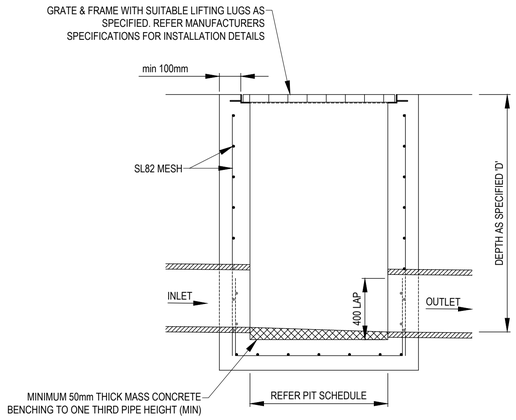

SECTION 2
SCALE 1:20

PROVIDE 3m LENGTH OF Ø100mm SUBSOIL DRAINAGE WRAPPED IN GEOTEXTILE FILTER FABRIC TO UPSTREAM SIDE OF PIT LAID WITHIN PIPE TRENCHING

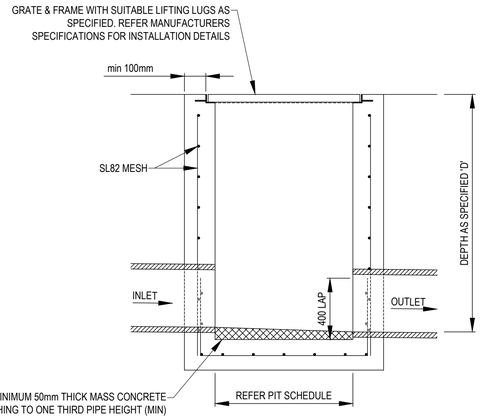



SECTION 1
SCALE 1:20

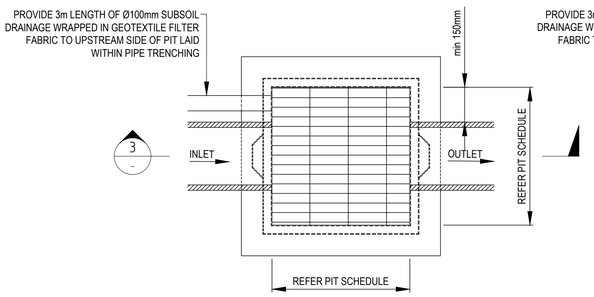
KERB INLET PIT
SCALE 1:20



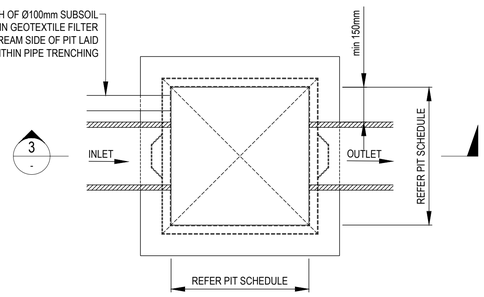

SECTION 3
SCALE 1:20



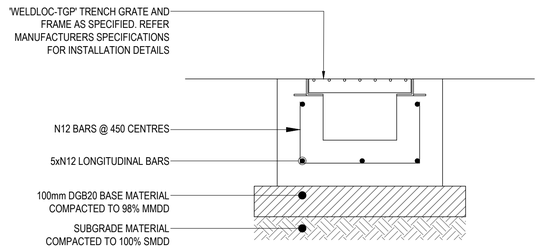

SECTION 3
SCALE 1:20



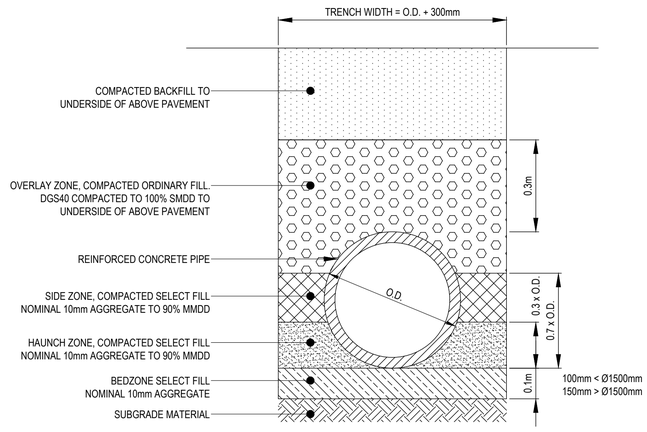

GRATED PIT PLAN
SCALE 1:20




JUNCTION PIT PLAN
SCALE 1:20




GRATED TRENCH DRAIN
(SCALE 1:10)




TYPICAL PIPE TRENCH DETAIL
SCALE 1:10

1:10 0.1 0 0.1 0.2 0.3 0.4 0.5 A1
1:20 A3

1:20 0.2 0 0.2 0.4 0.6 0.8 1 A1
1:40 A3

| REV | DESCRIPTION | DRAWN | APP'D | DATE |
|---|---|---|---|---|
| A | ISSUED FOR DA APPROVAL | JDU | RET | NYI |

| | |
|---|---|
| DRAWN: | |
| DESIGNED: | |
| VERIFIED: | |
| APPROVED FOR TENDER: | |
| APPROVED FOR CONSTRUCTION: | |

TURNER
ARCHITECT/CLIENT

15-31 HARBOUR DRIVE, COFFS HARBOUR
PROJECT

STORMWATER DRAINAGE - DETAILS
TITLE

Stantec

APPROVAL
NOT FOR CONSTRUCTION

| MGA | mAHD | AS SHOWN | 47738 | CI-526-01 | A |
|---|---|---|---|---|---|
| | | SCALE @ A1 | PROJECT No | DRAWING No | REV |

CAD FILE: 47738-CI-526-01.DWG

# Appendix B Council Stormwater Advice

## Tracey, Renata

**From:** Mark Hankinson <mark.hankinson@chcc.nsw.gov.au>
**Sent:** Friday, 10 July 2020 3:17 PM
**To:** Tracey, Renata
**Subject:** RE: Stormwater Detention Requirements

Hi Renata,

AS per our phone call, there would not be a need for any on-site detention at this site as the site is virtually already completely impervious. On-site detention is typically utilised to prevent additional flows into the stormwater infrastructure by the addition of impervious areas of which no more can be added to this site.

Council's Water Sensitive Urban Design Policy (WSUD) again would not be triggered here, only triggered for an existing commercial development with an increase of more than 300m2 of impervious area. If the client does wish however to undertake any water treatment solutions to provide some benefit regardless Council would of course be open to this.

As mentioned, Council offers a "pre-lodgement" type consultation service at the developer's request which I would recommend in this instance. It is a paid service ($200/hr of which these are typically 1-2 hrs) through which the developer can provide preliminary plans to Council and have a subsequent meeting to seek advice on the pending DA submission. Particularly for a development site like this it may be a prudent process to go through to help steer some of the design elements up front to tie in with Council requirements. Developer's choice.

https://www.coffsharbour.nsw.gov.au/Business/Your-Business/Pages/Technical-Liaison-Committee.aspx

Regards,

**Mark Hankinson**
Development Engineering Officer

Development Assessment | Coffs Harbour City Council
P: 02 6648 4702
E: mark.hankinson@chcc.nsw.gov.au | www.coffsharbour.nsw.gov.au
@coffscouncil | @heartofcoffs | www.heartofcoffs.com.au

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**From:** Coffs Council Email Account
**Sent:** Tuesday, 7 July 2020 12:14 PM
**To:** Joshua Roberts <joshua.roberts@chcc.nsw.gov.au>; Mark Hankinson <mark.hankinson@chcc.nsw.gov.au>
**Subject:** FW: Stormwater Detention Requirements

Hi Josh and Mark
Would one of you be able to respond to this enquiry please .

If this needs to be registered in ECM and tasked please let me know.

Thank you

Regards

Karen Hewson
Customer Resolution Officer l Customer Service Group l Coffs Harbour City Council
E: karen.hewson@chcc.nsw.gov.au Ph: (02) 6648 4000
E: coffs.council@chcc.nsw.gov.au l W: www.coffsharbour.nsw.gov.au
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**From:** Tracey, Renata [mailto:renata.tracey@stantec.com]
**Sent:** Monday, 6 July 2020 5:05 PM
**To:** Coffs Council Email Account <coffs.council@chcc.nsw.gov.au>
**Subject:** Stormwater Detention Requirements

Hi there,

I am looking to determine the on-site stormwater detention requirements for a site located at 15-31 Harbour Drive, Coffs Harbour. Page 9 of the attached Development Specification Design for Stormwater Drainage does not specify the site-specific requirements.

Any help to determining the on-site detention requirements would be much appreciated.

Thanks,

**Renata Tracey**
Civil Project Engineer

Mobile: +61 474 750 260
renata.tracey@stantec.com

Stantec Australia Pty Ltd
Level 6, Building B, 207 Pacific Highway
St Leonards
New South Wales 2065
Australia

**Better Together, Even If We're Apart.** Read more about Stantec's COVID-19 response, including remote working and business continuity measures.

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# Appendix C Council Flooding Advice

## Tracey, Renata

**From:** Aaron Stoja <aaron.stoja@chcc.nsw.gov.au>
**Sent:** Thursday, 9 July 2020 3:51 PM
**To:** Tracey, Renata
**Subject:** Flood Certificate - 23-29 Harbour Drive, Coffs Harbour, NSW.
**Attachments:** Flood Certificate - 23-29 Harbour Drive Coffs Harbour.pdf

Dear Ms Renata,

Please find your Flood Level Information Request on 23-29 Harbour Drive, Coffs Harbour, NSW.

In terms of your enquiry regarding the 3 properties, No. 15-21, 23-29, and 31, Harbour Drive. Council's latest flooding information indicates that the maximum available 1% AEP (1 in 100 year) flood level on Harbour Drive, for all 3 properties, is 4.8mAHD, located adjacent to the Western boundary of No.15-21 (Harbour Drive slopes uphill towards Grafton St) . Therefore the Flood Planning Level on No.15-21, Harbour Drive, would be 5.3mAHD (100 year + 0.5m freeboard). However, further advice from Flood Planning may be provided to the Planner at DA stage.

For more information regarding Coffs Harbour City Council flooding requirements and controls on development, please see Clause 7.3 of Coffs Harbour Local Environmental Plan 2013 and Section E4 (Flooding) of Coffs Harbour Development Control Plan 2015 on Councils website.
https://www.coffsharbour.nsw.gov.au/Building-and-Planning/Planning-Controls-and-Guidelines/Pages/default.aspx

Sincerely,

Aaron Stoja
Assistant Waterway Engineer
Local Planning | Coffs Harbour City Council
E: aaron.stoja@chcc.nsw.gov.au | W: www.coffsharbour.nsw.gov.au

To keep up-to-date with council news and community events please subscribe to our social media and e-newsletter services at www.coffsharbour.nsw.gov.au/subscribenow

COFFS HARBOUR CITY COUNCIL

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# Property Flood Certificate

**Property Details** 23-29 Harbour Drive, Coffs Harbour, NSW, 2450
Lot 4 DP 758258, PN 831400

**Applicant** Ms T Renata

**Date of Certificate** 09/07/2020

## Classification of Flood Risk

Council records indicate that the above property is located within the

**Low Flood Risk Precinct**

## Flood Related Development Controls

The property **is subject** to flood related development controls – refer to Clause 7.3 of the Coffs Harbour Local Environment Plan 2013 and Section E4 of the Coffs Harbour Development Control Plan 2015

## Technical Information

### ❖ Property Levels

| Description | Minimum (m AHD) | Maximum (m AHD) |
|---|---|---|
| Approximate Ground Level | 4.6 | 4.8 |
| Approximate Floor Level | Not Available | |

### ❖ Planning Levels *

| Planning Level | Level (m AHD) |
|---|---|
| Design Flood Level (1 in 100 year) | 4.67 |
| Flood Planning Level | 5.17 |
| Flood Categorisation | N/A |
| Maximum Flood Hazard | Low |

* Planning Levels provided are maximum values across the property

### ❖ Estimated Flood Levels

| Flood Event | Minimum Level (m AHD) | Maximum Level (m AHD) |
|---|---|---|
| 1 in 20 year (5% AEP) | Not Flooded | Not Flooded |
| 1 in 100 year (1% AEP) | 4.48 | 4.67 |
| 1 in 100 year (1% AEP) + Climate Change 2100 | 4.60 | 4.89 |
| 1 in 500 year (0.2% AEP) | 4.60 | 4.89 |
| Probable Maximum Flood (PMF) | 6.30 | 6.35 |

**Source of Information**

Flood Levels: Coffs Creek and Park Beach Flood Study (BMT WBM, 2018)
Ground Levels: LiDAR (2018)
Floor Levels: Not Available

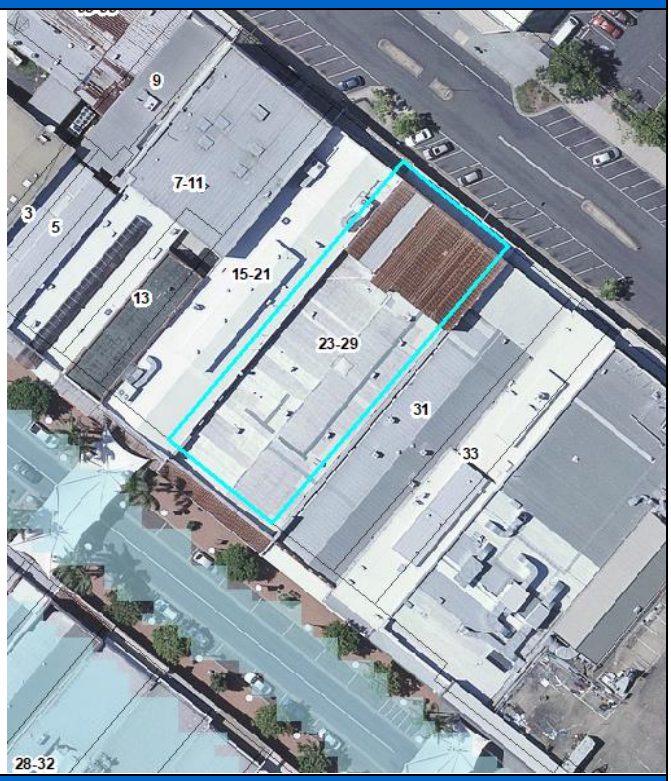
Locked Bag 155, Coffs Harbour 2450 (Customer Service Centre: 2 Castle Street, Coffs Harbour)
Tel: (02) 6648 4000 Email: coffs.council@chcc.nsw.gov.au
Website: www.coffsharbour.nsw.gov.au
ABN 79 126 214 487

COFFS HARBOUR CITY COUNCIL

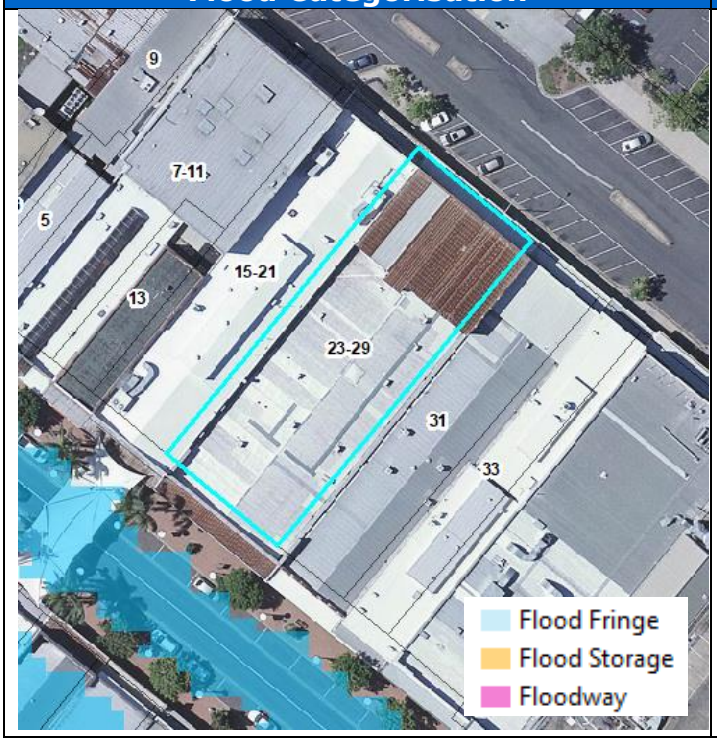
## Mapping

### Overview (Flood Planning Level area, Historical Data where applicable)

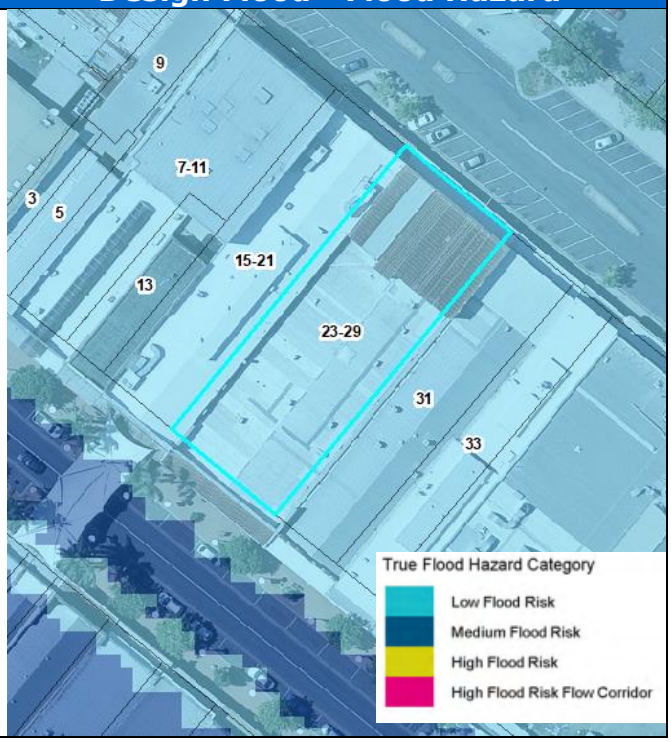
### Design Flood (1 in 100 year) - Extent




### Flood Categorisation




### Design Flood - Flood Hazard




Detailed mapping data, including flood mapping, can be found on Councils Online Mapping Tool: http://chccmaps.coffsharbour.nsw.gov.au:8080/Html5Viewer/?viewer=html5

For more information regarding Coffs Harbour City Council flooding requirements and controls, please see Clause 7.3 of Coffs Harbour Local Environmental Plan 2013 and Section E4 (Flooding) of Coffs Harbour Development Control Plan 2015 on Councils website.

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https://www.coffsharbour.nsw.gov.au/Building-and-Planning/Planning-Controls-and-Guidelines/Pages/default.aspx

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Website: www.coffsharbour.nsw.gov.au
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## Disclaimer

*Flood information is provided in good faith and Council gives no warranty (express or implied) as to the currency, accuracy and/or completeness of any Information contained on the geographic information system (GIS) maps. The plans provided show the modelled, estimated and/or recorded design flood levels in accordance with the information contained in Council records. It is not possible to accurately predict exact future flood levels for any location. A qualified consultant and/or surveyor should be engaged to assess the potential impact of flooding for any particular property before making any decision to purchase, sell or do anything on, at or to that property.*

*Please note that the 1 in 100 year (1% AEP) flood is not the limit of possible flooding. Rarer events are possible and may result in higher flood levels. Local drainage problems, if any, may cause higher localised flood levels. Estimated flood levels are subject to periodic review and the estimated 1 in 100 year AEP flood level may change in the future.*

## Definitions

Annual Exceedance Probability (AEP) - The chance of a flood of a given or larger size occurring in any one year, usually expressed as a percentage. E.g. If a peak flood discharge of 500$m^3$/s has an AEP of 5%, it means that there is a 5% chance (that is one-in-20 chance) of a 500$m^3$/s or larger event occurring in any one year (see ARI).

Approximate Floor Level – Approximate floor levels of dwellings, usually taken from the street. These are generally the level of the front step of the habitable level of the building most visible from the street frontage. If available, it is based on the conditions of the date of the survey.

Approximate Ground Level - Highest and lowest ground levels on the property based on available ground level information normally taken from LiDAR survey.

Average Recurrence Interval (ARI) – Term used to describe flood size (measured in years). It is the long term average number of years between the occurrence of a flood as big as or larger than the selected event. For example, a 100-year ARI flood is a flood that occurs or is exceeded on average once every 100 years.

Australian Height Datum (AHD) - Common national plane of levels approximately equivalent to the height above mean sea level.

Design Flood Level - A hypothetical flood representing a specific likelihood of occurrence. In Coffs Harbour City Council, for residential properties, the peak of the modelled 1 in 100 year (1% AEP) flood is the Design Flood Level.

Flood Planning Level - Flood planning level means the level of the 100-year design flood plus 0.5 metres freeboard. The Flood Planning Level defines the minimum floor level for habitable rooms.

Freeboard - is a factor of safety expressed as the height above the design flood level. Freeboard provides a factor of safety to compensate for uncertainties in the estimation of flood levels across the floodplain, such as wave action, localised hydraulic behaviour.

LiDAR - Light Detection and Ranging, or Airborne Laser Scanning (ALS), is a technology that determines the distance to a surface using laser pulses. The absolute accuracy (where a point fits in relation to the world) is generally in the decimetre range. The relative accuracy (where points lie in relation to each other) is generally in the centimetre range however, land survey may be required to confirm existing ground levels.

Probable Maximum Flood (PMF) - The largest flood likely to ever occur. The PMF defines the extent of flood prone land or flood liable land, that is, the floodplain.

Flood Categorisation (Floodway) - Areas and flow paths where a significant proportion of floodwaters are conveyed (including all bank-to-bank creek sections). Strict development controls may be placed in floodway areas.

Flood Categorisation (Flood Storage) - Areas that are important in the temporary storage of the floodwater during the passage of the flood. If the area is substantially removed by levees or fill it will result in elevated water levels and/or elevated discharges. Significant development controls may be placed in flood storage areas.

Flood Categorisation (Flood Fringe) - Areas that are low-velocity backwaters within the floodplain. Filling of these areas generally has little consequence to overall flood behaviour.

Flood Hazard (Low) - Area of flood where, should it be necessary, a truck could evacuate people and their possessions or an able-bodied adult would have little difficulty in wading to safety.

Flood Hazard (High) - Area of flood which poses a possible danger to personal safety, where the evacuation of trucks would be difficult, where able-bodied adults would have difficulty wading to safety or where there is a potential for significant damage to buildings.

Climate Change - Climate Change Design Flood Events are based on reasonable predictions of increased rainfall intensity and sea level rise.

Low Flood Risk Precinct – Generally this means that your property would not be affected by a 100-year flood but still has a very slight chance of being affected from larger (i.e. rarer) floods. If you are a residential property owner, there will be virtually no change to how you may develop your property. However, there will be controls on the location of essential services such as hospitals, evacuation centres, nursing homes and emergency services.

Medium Flood Risk Precinct – Generally this means that your property may be affected by a 100-year flood, however conditions are not likely to be hazardous. If you are a residential property owner development controls will probably be similar to those that currently exist.

High Flood Risk Precinct – Generally this means that your property will be affected by a 100-year flood and that hazardous conditions may occur. This could mean that there would be a possible danger to personal safety, able-bodied adults may have difficulty wading to safety, evacuation by vehicles may be difficult, or there may be a potential for significant structural damage to buildings. This is an area of higher hazard where stricter controls may be applied.

**Stantec Australia Pty Ltd**
Level 6, Building B, 207 Pacific Highway
St Leonards NSW 2065
Tel: +61 2 8484 7000
Email: enquiries.sdy@stantec.com www.stantec.com

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Quality
ISO 9001
SAI GLOBAL

18 March 2021

Enquiries: Renata Tracey
Project No: 47738

Coffs Harbour City Council

Attention of: Clayton Logan

Dear Mr Logan

**RE: 15-31 Harbour Drive, Coffs Harbour (0583/21DA)**

This letter is written in response to the Coffs Harbour Council's RFI's with respect to Civil Design package prepared by Stantec. Council comments are quoted in italics.

1. *Please provide conceptual WSUD details that comply with the objectives and targets outlined with Coffs Harbour City Council's WSUD Guidelines (2018).*

   Stantec's Stormwater Management Strategy has been designed as to comply with the performance criteria set out in section 3.0 of the Coffs Harbour City Council Water Sensitive Urban Design (WSUD) Guideline 2018. Stantec have proposed a treatment train landscape-integrated solution in order to comply with the WSUD design requirements. The proposed strategy is outlined below.

   The proposed treatment train consist of:

   - 130 sqm of Pervious pavement
   - Two Bioretention basins of 30 sqm each.
   - Two Ocean protect pit inserts for the high flow by-pass at the outlet of the bioretention

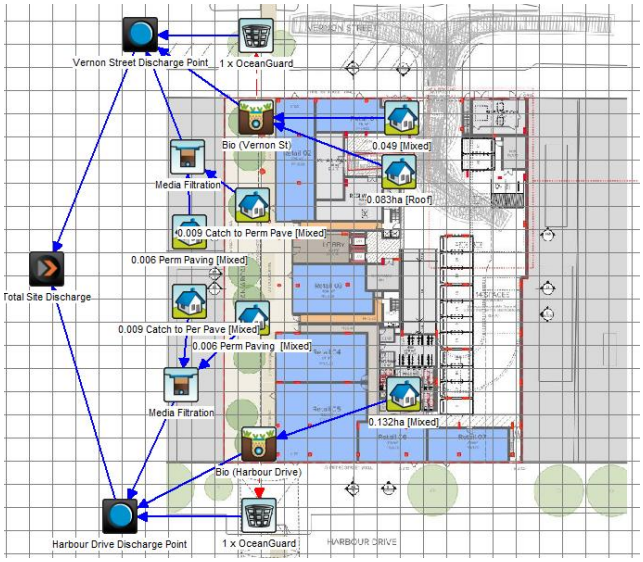



*Figure 1: Proposed MUSIC Layout*

All building drainage will be piped and directed to the proposed treatment units located at the north and south boundary of the development. The ground level surface catchment will be directed to the pervious pavement designed with filtration properties to reduce pollutants. The proposed stormwater system will connect to the existing stormwater pits at Vernon Street and Harbour Drive. This design has been modelled in MUSIC using the Coffs Harbour Council Music Link, the proposed layout is shown in Figure 1.

As per *Section 3.3 Detention Requirements* the post-development flow has been maintained under pre-development levels as result of the incorporation of landscaped areas and pervious pavement on the site complying with the condition set in the council's policy. It is also noted that the proposed development site is located within a floodplain and any on-site detention storage would likely be redundant, worsen flood conditions and have a drowned orifice.

The MUSIC link report and the proposed catchment plan has been attached at the end of this document.

Please contact the undersigned for any questions, concerns or further information required.

Yours sincerely

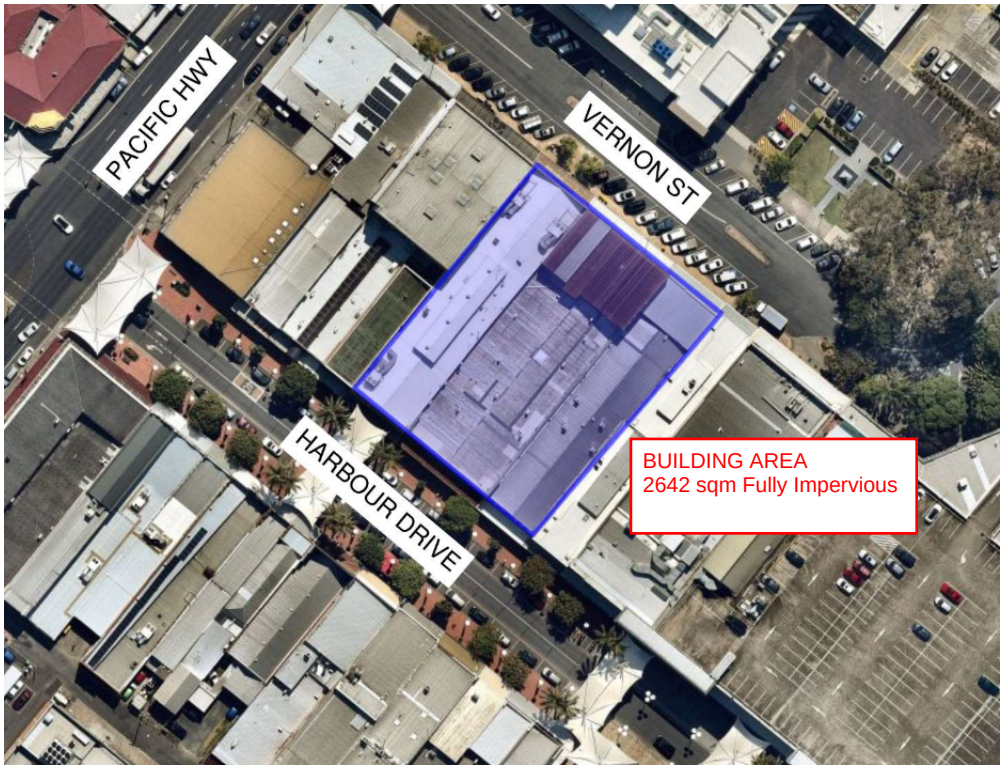
R. Tracy

**Renata Tracey CPEng NER**

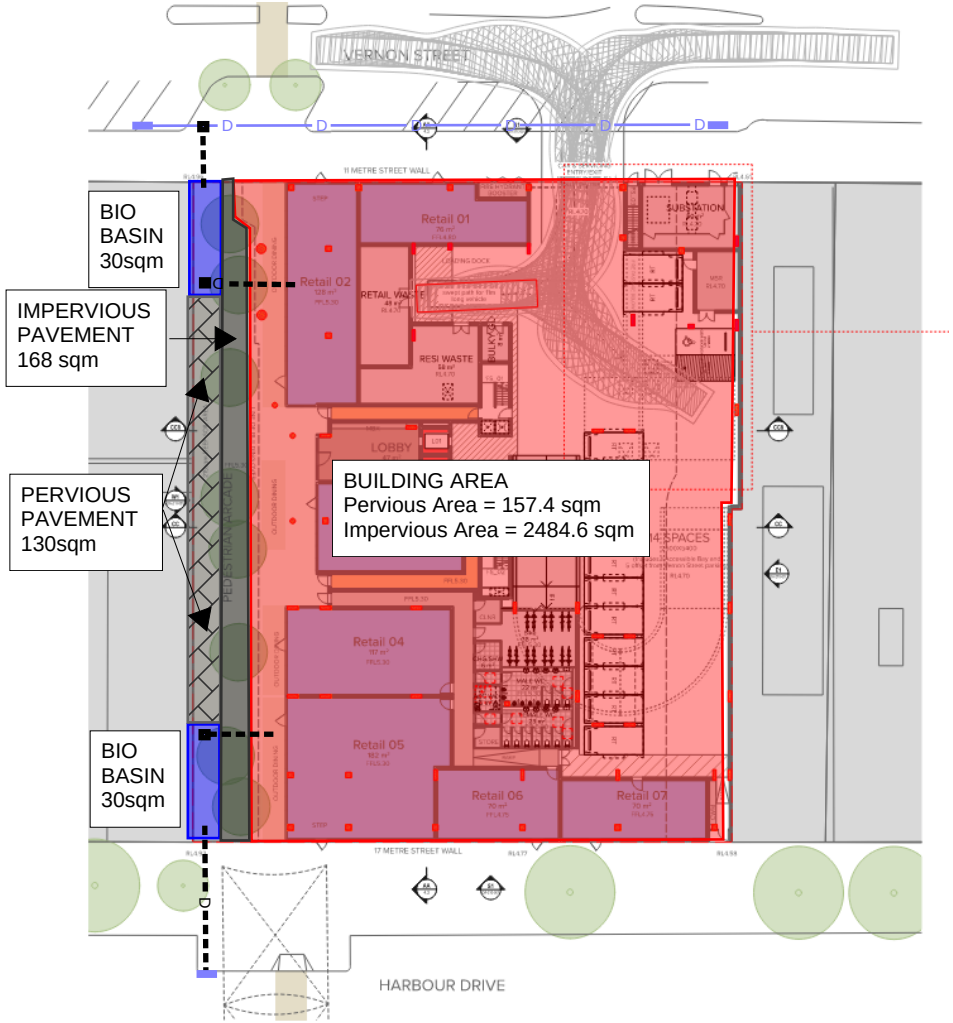
**Civil Project Engineer**

**Stantec Australia Pty Ltd**

# WSUD Analysis




EXISTING SITE CONDITIONS




PROPOSED SITE CONDITIONS

| | PRE-DEVELOPMENT | POST DEVELOPMENT | Difference |
|---|---|---|---|
| PERVIOUS AREA | 0% | 7.25% | 7.25% |
| REMAINING IMPERVIOUS AREA | 0% | 4.30% | 4.30% |
| IMPERVIOUS AREA | 100% | 88.45% | -11.55% |
| 1% FLOW cumecs | 0.32 | 0.3 | -6.25% |
| 20% FLOW cumecs | 0.163 | 0.153 | -6.13% |

COFFS HARBOUR CITY COUNCIL

music@link

# MUSIC-*link* Report

| Project Details | | Company Details | |
|---|---|---|---|
| **Project:** | | **Company:** | Stantec |
| **Report Export Date:** | 18-Mar-21 | **Contact:** | Miqueas Moreno |
| **Catchment Name:** | Harbour Drive MUSIC Model Rev 002 (Perv Pavement) | **Address:** | |
| **Catchment Area:** | 0.294ha | **Phone:** | |
| **Impervious Area*:** | 174.8% | **Email:** | miqueas.moreno@stantec.com |
| **Rainfall Station:** | 59040 COFFS | | |
| **Modelling Time-step:** | 6 Minutes | | |
| **Modelling Period:** | 01-Jan-85 - 31-Dec-94 11:54:00 PM | | |
| **Mean Annual Rainfall:** | 1642mm | | |
| **Evapotranspiration:** | 1456mm | | |
| **MUSIC Version:** | 6.3.0 | | |
| **MUSIC-link data Version:** | 6.33 | | |
| **Study Area:** | Coffs Harbour | | |
| **Scenario:** | Coffs Harbour Development | | |

* takes into account area from all source nodes that link to the chosen reporting node, excluding Import Data Nodes

## Treatment Train Effectiveness

| Node: Total Site Discharge | Reduction |
|---|---|
| **Flow** | 3.75% |
| **TSS** | 91.2% |
| **TP** | 62% |
| **TN** | 56.7% |
| **GP** | 100% |

## Treatment Nodes

| Node Type | Number |
|---|---|
| Bio Retention Node | 2 |
| Media Filtration Node | 2 |
| GPT Node | 2 |

## Source Nodes

| Node Type | Number |
|---|---|
| Urban Source Node | 7 |

## Comments

## Passing Parameters

| Node Type | Node Name | Parameter | Min | Max | Actual |
|---|---|---|---|---|---|
| Bio | Bio (Harbour Drive) | Exfiltration Rate (mm/hr) | 0 | None | 0 |
| Bio | Bio (Harbour Drive) | Filter depth (m) | 0.4 | 1 | 0.5 |
| Bio | Bio (Harbour Drive) | Hi-flow bypass rate (cum/sec) | 0 | None | 100 |
| Bio | Bio (Harbour Drive) | Orthophosphate Content in Filter (mg/kg) | 0 | 55 | 55 |
| Bio | Bio (Harbour Drive) | PET Scaling Factor | 2.1 | 2.1 | 2.1 |
| Bio | Bio (Harbour Drive) | Saturated Hydraulic Conductivity (mm/hr) | 50 | 200 | 200 |
| Bio | Bio (Harbour Drive) | Total Nitrogen Content in Filter (mg/kg) | 1 | 800 | 800 |
| Bio | Bio (Vernon St) | Exfiltration Rate (mm/hr) | 0 | None | 0 |
| Bio | Bio (Vernon St) | Filter depth (m) | 0.4 | 1 | 0.5 |
| Bio | Bio (Vernon St) | Hi-flow bypass rate (cum/sec) | 0 | None | 100 |
| Bio | Bio (Vernon St) | Orthophosphate Content in Filter (mg/kg) | 0 | 55 | 55 |
| Bio | Bio (Vernon St) | PET Scaling Factor | 2.1 | 2.1 | 2.1 |
| Bio | Bio (Vernon St) | Saturated Hydraulic Conductivity (mm/hr) | 50 | 200 | 200 |
| Bio | Bio (Vernon St) | Total Nitrogen Content in Filter (mg/kg) | 1 | 800 | 800 |
| GPT | 1 x OceanGuard | Hi-flow bypass rate (cum/sec) | None | 99 | 0.02 |
| GPT | 1 x OceanGuard | Hi-flow bypass rate (cum/sec) | None | 99 | 0.02 |
| Post | Total Site Discharge | % Load Reduction | None | None | 3.75 |
| Post | Total Site Discharge | GP % Load Reduction | 90 | None | 100 |
| Post | Total Site Discharge | TN % Load Reduction | 45 | None | 56.7 |
| Post | Total Site Discharge | TP % Load Reduction | 60 | None | 62 |
| Post | Total Site Discharge | TSS % Load Reduction | 80 | None | 91.2 |
| Urban | 0.006 Perm Paving | Area Impervious (ha) | None | None | 0.006 |
| Urban | 0.006 Perm Paving | Area Pervious (ha) | None | None | 0 |
| Urban | 0.006 Perm Paving | Total Area (ha) | None | None | 0.006 |
| Urban | 0.006 Perm Paving | Area Impervious (ha) | None | None | 0.006 |
| Urban | 0.006 Perm Paving | Area Pervious (ha) | None | None | 0 |
| Urban | 0.006 Perm Paving | Total Area (ha) | None | None | 0.006 |
| Urban | 0.009 Catch to Per Pave | Area Impervious (ha) | None | None | 0.009 |
| Urban | 0.009 Catch to Per Pave | Area Pervious (ha) | None | None | 0 |
| Urban | 0.009 Catch to Per Pave | Total Area (ha) | None | None | 0.009 |
| Urban | 0.009 Catch to Perm Pave | Area Impervious (ha) | None | None | 0.009 |
| Urban | 0.009 Catch to Perm Pave | Area Pervious (ha) | None | None | 0 |
| Urban | 0.009 Catch to Perm Pave | Total Area (ha) | None | None | 0.009 |
| Urban | 0.049 | Area Impervious (ha) | None | None | 0.039 |
| Urban | 0.049 | Area Pervious (ha) | None | None | 0.009 |
| Urban | 0.049 | Total Area (ha) | None | None | 0.049 |
| Urban | 0.083ha | Area Impervious (ha) | None | None | 0.083 |
| Urban | 0.083ha | Area Pervious (ha) | None | None | 0 |
| Urban | 0.083ha | Total Area (ha) | None | None | 0.083 |
| Urban | 0.132ha | Area Impervious (ha) | None | None | 0.119 |

Only certain parameters are reported when they pass validation

| Node Type | Node Name | Parameter | Min | Max | Actual |
|---|---|---|---|---|---|
| Urban | 0.132ha | Area Pervious (ha) | None | None | 0.012 |
| Urban | 0.132ha | Total Area (ha) | None | None | 0.132 |

Only certain parameters are reported when they pass validation

# Appendix G.
# WASTE MANAGEMENT PLAN

# 15-31 Harbour Drive, Coffs Harbour NSW

MARCH 2021

# Operational, Demolition and Construction Waste Management Plan

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This report contains confidential information. It has been compiled by Waste Audit and Consultancy Services (Aust) Pty Ltd on behalf of Paynter Dixon for the 15-31 Harbour Drive, Coffs Harbour development.

This Waste Management Plan is not a substitute for legal advice on the relevant environmental legislation, which applies to Paynter Dixon, its contractors or other bodies. Accordingly, Waste Audit and Consultancy Services (Aust) Pty Ltd will not be liable for any loss or damage that may arise out of this project, other than loss or damage caused as a direct result of Waste Audit and Consultancy Services (Aust) Pty Ltd's negligence.

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# 1 Introduction

This Waste Management Plan (WMP) has been prepared on behalf of Paynter Dixon for the 15-31 Harbour Drive, Coffs Harbour development.

In summary, the development consists of a mix of residential (95 apartments), retail premises and associated infrastructure.

This Plan has been developed with consideration of the City of Coffs Harbour Council's *Coffs Harbour Development Control Plan 2015* and specifically *Part F6 Waste Management* and *Appendix 4 Waste Management Examples*. Further guidance has been obtained from the Department of Environment and Climate Changes NSW's *Better Practice Guide for Waste Management in Multi-Unit Dwellings*, and the NSW Environment Protection Authority's *Better Practice Guide for Waste Management and Recycling in Commercial and Industrial Facilities*.

These sources have been referred to in the development of the waste estimates and related requirements. They are intended to inform the design of the waste services by identifying the estimated waste profile for the development and providing the total area required by the recommended equipment/systems.

Waste audit and management strategies are recommended for new developments to provide support for the building design and promote strong sustainability outcomes for the building. All recommended waste management plans will comply with council codes and any statutory requirements.

To assist building management in achieving effective waste and recycling management, this waste management plan has three key objectives:

i. **to minimise the environmental impacts of the operations of the development** – this will be achieved by ensuring maximum diversion of waste from landfill; correct containerisation and transport of materials; correct segregation of materials into appropriate management streams; awareness among tenants of waste avoidance practices.

ii. **to minimise the impact of the management of waste within the development on local residents** – this will be achieved by ensuring waste is managed so as to avoid odour and litter and collected during suitable times.

iii. **to ensure waste is managed so as to reduce the amount landfilled and to minimise the overall quantity generated** – this will be achieved by implementing systems that assist tenants to segregate appropriate materials that can be recycled; displaying signage in all tenant areas to remind and encourage avoidance and recycling to residents; and through associated signage in the communal and waste storage areas to reinforce these messages.

The Demolition and Construction Waste Management Plan has been developed to ensure that all waste resulting from demolition and construction activities is managed in an effective, safe and environmentally aware manner. Specifically,

- To minimise the generation of waste to landfill
- To maximise waste material avoidance and reuse on site
- To ensure that where practicable, an efficient recycling procedure is applied to waste materials

- To raise awareness among employees and subcontractors of their waste management responsibilities

Management strategies reflect current best-practice requirements, and relevant Sections of the *Protection of the Environment Operations Act 1997* and the NSW Environment Protection Authority *Waste Classification Guidelines, Part 1: Classifying Waste*, as well as consideration of industry best practice for this type of development.

In particular, there will be compliance with *Australian Standard AS2601: The demolition of structures.* This in summary requires that the demolition of structures:

- sets out requirements for the planned demolition of buildings and certain other structures so that the risk of injury to workers, other site personnel and the public, and the risk of damage to adjacent property and the immediate environment is minimised;
- covers the methods and safety procedures applicable to demolition work in general as well as procedures for some types of structures;
- deals with manual and mechanical demolition techniques including those employing specialised earth-moving type machinery;
- includes informative appendices covering some contractual considerations, a checklist for contractors and qualifications for site personnel;
- safety and health issues are addressed under the headings of:
    - Health and safety of the public - covering general requirements, lighting, falling materials, fencing, hoardings and warning notices, scaffolding, overhead protection for footpaths, and hazardous materials and conditions;
    - Safety and health of site personnel - covering general safety, personal protective clothing and equipment, cutting and welding, fire protection, first aid, amenities, removal of hazardous material and electrical safety;
    - Protection of adjoining buildings and protection of immediate environment - covering requirements relating to access and egress, damage and structural integrity, vibration and concussion, weatherproofing, burning, dust control, noise control, protection of public roads and protection of sewers and water courses; and protection of the site.

Adherence to AS2601 is required under the Environmental Planning and Assessment Regulation 2000.

Section 143 of the Protection of the Environment Operations Act 1997 requires waste to be transported to a place that can lawfully accept it. It will be the responsibility of the site developers to ensure all contractors clearly specify where all wastes are to be transported, the capacity of the nominated facilities to receive/manage the waste and to ensure that reports on management aspects (types, quantities and disposal pathways) are provided.

**Note:** The testing and classification of any excavated material is not covered in this report. Where necessary separate specialist testing has been conducted by the project managers.

# 2 Operational Waste Management

## 2.1 Waste Streams

Based on the development profile, the following waste streams would be expected:

- General Waste
- Commingled Recycling
- Paper/Cardboard Recycling

Other wastes may be generated, but these would be in small volumes and irregular in terms of when generated. The management of the site will conduct a waste assessment once the site is operational to determine the additional types and quantities of wastes that may be generated. Following this, appropriate management systems will be implemented and where necessary generators advised of these management requirements.

It is not expected that significant quantities of garden waste will be generated. The appointed gardener will be required to manage this waste by disposal at a composting facility.

## 2.2 Waste Generation Estimates

The following are the estimated rates of waste/recyclable generation (by volume), for the residential and retail aspects of the development. It has been assumed that the retail will all be food and beverage premises.

**Apartments**

Will generate (approximately):

- 11,400 litres/week for waste
- 11,400 litres/week for recyclables
- 3,800 litres/week for organics

Note that the above is based on Council's assumption of 240 litres/week of organics. It has been assumed that in reality, the amount of green waste will be significantly less per apartment and would be managed in any case by an appointed gardener – there for in developing the waste management plan, a lesser volume for organics (40 litres/apartment), has been used.

Council's bin requirements are:

- 240 litre for waste - 48 (11,520 litres)
- 240 litre for recyclables - 48 (11,520 litres)
- 240 litre for organics - 16 (3,840 litres)

The development will utilise 1,100 bins (as per Council's recommendation) for waste and recyclables[1]. This equates to the following number of bins and associated footprint – this is also calculated on a once per week servicing schedule. Increasing the schedule will result in a reduction of the number of bins required and associated footprint.:

- Waste – 11 (footprint = 11.44 $m^2$)
- Recyclables – 11 (footprint = 11.44 $m^2$)
- Organics – 16 (footprint = 7.04 $m^2$)

**Retail**

Will generate (approximately):

- 16,800 litres/week for waste
- 11,200 litres/week for recyclables
- 5,600 litres/week for organics

Bin requirement and footprint are:

- 1100 litre for waste – 16 (footprint = 16.64 $m^2$)
- 1100 litre for recyclables - 11 (footprint = 11.44 $m^2$)
- 240 litre for organics - 24 (footprint = 10.56 $m^2$)

The following summarises the waste storage requirements in regards to size.

**Apartments**

Total approximate footprint (with a 30% allowance for bin movement) is 40 $m^2$. The recent drawings indicate that the residential waste room is 59 $m^2$.

**Retail**

Based on the required number of bins, the total approximate footprint (with a 30% allowance for bin movement) is 52 $m^2$. Based on the recent drawings, 58 $m^2$ has been allocated. If a commercial waste operator was to be used, then more than one collection per week could be scheduled which would reduce the required number of bins and subsequent bin footprint.

[1] 240 litre bins are recommended due to the potential for large weights with larger bins.

# 3 Waste Management System

## 3.1 Proposed System

The following summarises the recommended waste and recycling systems that will be implemented. These recommendations are based on the City of Coffs Harbour's requirements and systems implemented for similar developments (ie., type of development and tenants).

Responsibility for correct waste management will be included in all tenancy agreements. This responsibility will include factors such as correct segregation and managing "ad-hoc" wastes.

Waste and recycling collection services will be provided by a commercial waste contractor (TBA). Utilising a commercial waste contractor affords the development greater flexibility regarding collection schedules and the appropriate collection frequencies will be determined in consultation with the waste contractor once appointed – however once operational, collection schedules may need to be adjusted accordingly depending on actual waste generation.

Note that once appointed, the contract between the development's management and the waste/recycling contractor will be submitted to Council if required. This contract will detail the responsibilities of waste management in accord with all of Council's requirements.

The appointed contractor will service the bins directly from the waste storage areas located on the Ground Level.

Items such as furniture/whitegoods stored within the bulky waste storage room will be managed by building management. Appropriate collection organisations will be called to collect the items for recycling/reuse as required.

Residents and commercial tenants will also be provided with ad hoc recycling systems such as e-waste; batteries etc. Systems for these streams will be located back-of-house or in common areas or be available upon request from building management.

Signage will be a crucial element of the waste management system. Appendix A contains examples of signage. These are the type of signs that should be used throughout the commercial tenancies and waste storage area(s).

## 3.2 Residential Waste System

To assist, residents (ie., each apartment), bins will be located for disposal of waste and recyclables. These bins will be clearly signed as to the type of materials to be deposited into them and have the capacity for a minimum 2 day's waste/recycling generation.

All residents and staff will be briefed on the proper use of waste management system, as it is imperative that the recycling streams remain free of contamination to ensure compliance with contractor collection protocols. Residents will be encouraged to maximise the separation of general waste and recyclables to aid the proper disposal of all materials.

Residents will dispose of general waste and recyclables into the waste chute system via the chute access provided for on each level. This system has a separate chute for waste and another for recyclables. This system has been selected to enable more efficient management of the recyclables so as to maximise the volume of materials diverted from landfill.

Organic waste will be deposited into a separate container located (as illustrated below) in an area adjacent to the chute rooms on each level. Cleaning staff will be responsible for collecting and transporting the organic waste to the waste storage room.

A chute system for managing waste and recyclables has been selected. According to NSW EPA's *Better practice guide for resource recovery in residential developments 2019*, use of chutes within high rise developments is the most efficient way of collecting waste and recyclables.

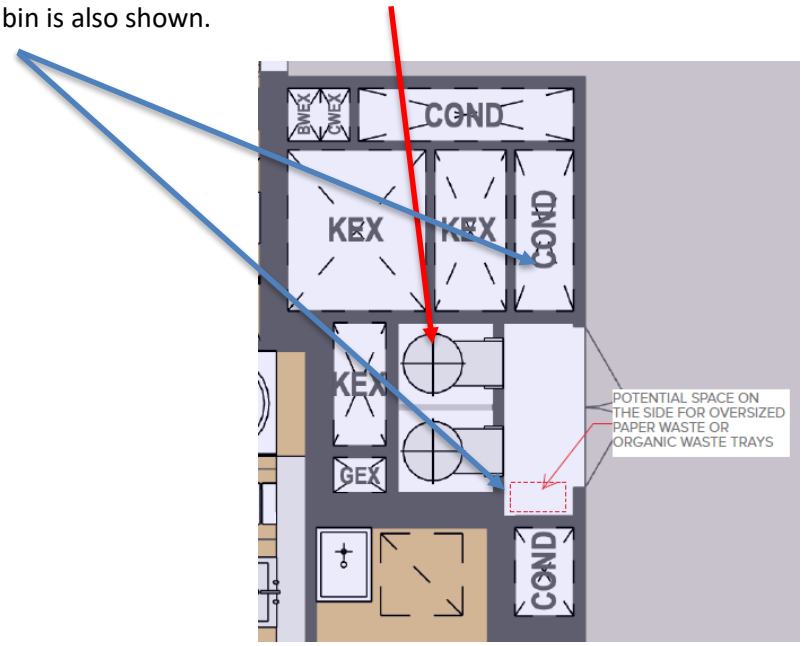
In summary, the chute system for this development will:

- Enable easier and more efficient segregation of wastes and recyclables for residents.
- Reduce the potential for dumping of materials in waste rooms that would need to be established on each level for waste and recycling bins. This will also reduce the potential for odour from the dumping.
- Reduce the number of movements within the development as cleaners transport waste and recycling bins from each level to the waste storage room. This also reduces the potential for any OH&S issues.

This chute system will be designed so as to alleviate any potential noise issues from the disposal of materials and the collecting of them in the waste storage room. In addition, maintenance will be scheduled so as to avoid any odour related issues. As indicated below, organics will be collected separately. Examples of chute designs have been included at the conclusion of this report.

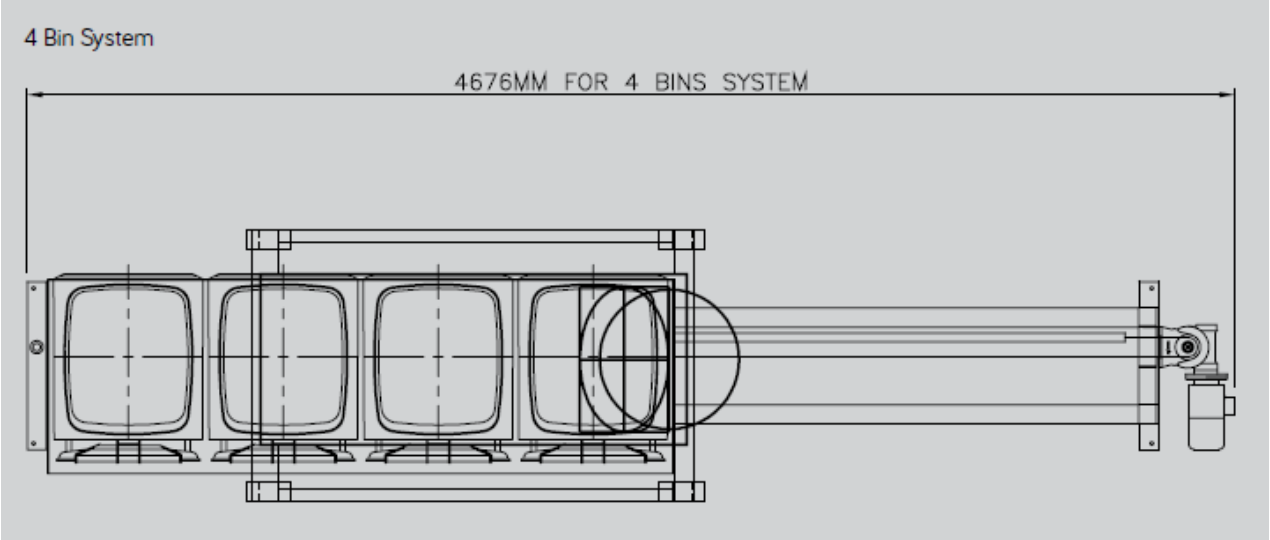
Appropriate signage will be installed in the chute rooms, as well as communications to residents will be undertaken to ensure that they understand the detail correct management of this stream.

An example of the location of one of the chutes is illustrated below. The location of the space for the organics bin is also shown.




Cleaning staff will manage waste storage rooms, operating the linear track by replacing full MGBs with empty ones when required, and ensuring that waste areas remain clean and organised.

The following illustrates an example of the linear track system to be utilised within the waste room (ie., where chutes empty. The example shows a 4 bin system, but a 2 bin system may be installed. More detail is provided at the conclusion of this report.




Bins will be located within the chute rooms on each level for food organics. These will be managed by the development. The bins will be transported to the waste rooms (by cleaners), and contents emptied into the dedicated organic waste bins.

## 3.3 Retail Waste System

The commercial tenancies will be designed so as to allow effective segregation of recyclables. These tenancies will (depending on the types of wastes/recyclables generated) be provided with sufficient smaller bins to allow for effective segregation of wastes/recyclables. This will include:

- General waste
- Paper & cardboard recycling
- Commingled recycling

To ensure that wastes and recyclables are managed correctly (ie., deposited into the correct container):

Tenancy staff will be provided with information on the proper disposal of wastes and recyclables – that is correct segregation requirements.

Tenancy staff and cleaning contractors will have the responsibility for transporting waste/recyclables from the retail premises to the bins located in waste room. Cleaners will have the additional responsibility for ensuring bins are cleaned as required

## 3.4 Waste Storage

The following illustrates the location of the commercial, residential and bulky waste storage rooms.

In keeping with best practice sustainability programs, all waste areas and waste and recycling bins will be clearly differentiated through appropriate signage and colour coding to Australia Standards to reflect the materials contained.

All waste and recycling bins that are located in the waste storage areas will be colour coded and clearly signed. Each stream will be located in a designated area. This will assist in easy identification of correct bins by cleaners.

The waste storage area will be locked so as to prevent unauthorised access and the incorrect dumping of waste materials.

The waste and recycling bins will be colour coded and clearly signed. Each stream will be located in a designated area. This will assist in easy identification of correct bins by cleaners and staff.

**Photographs 1 & 2 - Examples of waste room colour coding**

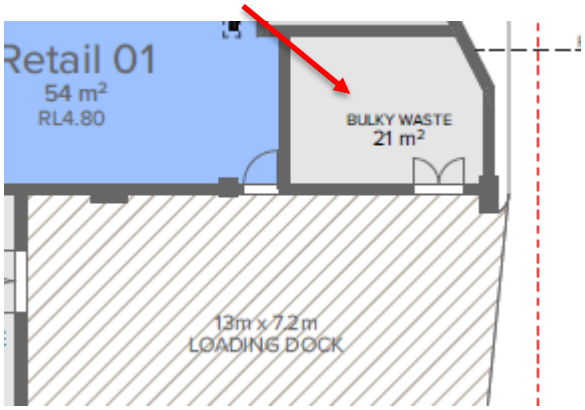
The waste rooms will contain the following to minimise odours, deter vermin, protect surrounding areas, and make it a user-friendly and safe area:

- Have a practical layout, be free of obstructions.
- Have a floor area capable of storing the required number of bins
- Be graded and drained to an approved drainage system.
- Be serviced by an easily accessible water tap.
- Have smooth rounded corners at the floor and wall intersections.
- Be clear of any service and utilities infrastructure and related activities.
- Be capable of being kept clean and tidy at all times.
- Be in accordance with the BCA, relevant Australian Standards and legislation

Occupational Health and Safety issues such as slippery floors will need to be monitored. Cleaners will monitor the storage areas and all spills will be attended to immediately by cleaners.

## 3.5 Bulky Waste

An additional dedicated area for the temporary storage of unwanted bulky items (e.g. cardboard, furniture, mattresses or appliances) provided adjacent to waste storage areas and available to all residents has been provided. This is located as below and is approximately 21 $m^2$.



# 4 Tenant Education

All residents and retail premises staff of the development will receive information regarding the waste collection systems including how to use the system, which items are appropriate for each stream and collection times.

Appropriate signage and updated information will also be provided, as well as receiving feedback on issues such as contamination of the recycling stream or leakage of the recyclables into the general waste. Facilities management will have the responsibility for these tasks.

All waste receptacles will be appropriately signed and additional room signage is usually provided from most waste contractors during implementation of the waste contract.

It is recommended that all signs should:

- Clearly identify the waste/recycling stream;
- Use correct waste/recycling stream colour coding;
- Identify what can and cannot be disposed of in the receptacle; and
- Include highly visual elements to accommodate for individuals with inadequate English literacy.
- As part of the staff (and resident) induction and welcoming process, a waste and recycling toolkit will be provided. This toolkit will include the details of each of the systems in place; acceptance criteria for each stream and how each stream is managed.

All waste receptacles will be appropriately signed and additional room signage is usually provided from most waste contractors during implementation of the waste contract.

It is recommended that all signs should:

- Clearly identify the waste/recycling stream;
- Use correct waste/recycling stream colour coding;
- Identify what can and cannot be disposed of in the receptacle; and
- Include highly visual elements to accommodate for individuals with inadequate English literacy.
- An active waste monitoring program will be employed. The cleaning contracts will ensure that contractors actively participate in the waste reduction program for the site and meet regularly to identify performance and new opportunities for diversion and avoidance.

On a quarterly basis waste and recycling performance reports will be reported back to residents so that they are aware of their performance and areas for improvement. An active waste monitoring program will be employed. The waste and cleaning contracts will ensure that contractors actively participate in the waste reduction program for the site and meet monthly to identify performance and new opportunities for diversion and avoidance.

Note that the details of tenancy agreements relating to management of wastes and education resource materials will be developed prior to any retail tenancy being occupied and residents occupying apartments. Similarly, arrangements with monitoring systems will be developed in consultation with

cleaning contractor and waste/recycling service companies. If required, these can then be provided to Council.

# 5 Ongoing Management

Having suitable systems in place is only one element of an effective waste management system. Compliance by all stakeholders is essential.

Cleaners are a key element in the effectiveness of the systems in place. Prior to acceptance of the cleaning contract, the contractor will be required to demonstrate how the management of waste and recycling will be carried out so as to ensure that segregated materials are placed in the correct systems. This process will be agreed and a training program implemented by the cleaning contractor to ensure full understanding by all cleaners. Monitoring of the system will be carried out by the cleaning supervisor and site management throughout the term of the contract.

In addition, cleaners will be required to feed back to site management any non-compliance issues they observe during their cleaning activities. This may include contamination of recycling; non-participation in the recycling system, or missing or damaged bins. In this way issues can be promptly dealt with by management.

Waste and recycling contractors will be required to report actual volumes collected by stream so that site management can monitor performance and feed this back to stakeholders.

It is highly recommended that a reporting program be set up at the site which would include bin tally sheets that detail the number of bins collected and how full they are at the time of collection, in addition to communication procedures to allow waste contractors to provide feedback regarding contamination and leakage.

All stakeholders should be educated and made aware of any changes to the existing waste systems.

# 6 Demolition and Construction Waste Management Principles

## 6.1 Waste Management Principles

The following waste hierarchy will be used as a guiding principle:

### Avoid and Reduce

Minimise the production of waste materials in the demolition and construction process by:

- Assessing and taking into consideration the resultant waste from different demolition, design and construction options
- Purchasing materials that will result in less waste, which have minimal packaging, are pre-cut or fabricated.
- Not over ordering products and materials

### Reuse

Ensure that where ever possible, materials are reused either on site or offsite.

- Identify all waste products that can be reused
- Put systems in place to separate and store reusable items
- Identify the potential applications for reuse both onsite and offsite and facilitate reuse

### Recycling

Identify all recyclable waste products to be produced on site.

- Provide systems for separating and stockpiling of recyclables
- Provide clear signage to ensure recyclable materials are separated
- Process the material for recycling either onsite or offsite

Note: In some cases, it may be more economical to send the unsorted waste to specialised waste contractors who will separate and recycle materials at an offsite location.

### Disposal

Waste products which cannot be reused or recycled will be removed and disposed of. The following will need to be considered:

- Ensure the chosen waste disposal contractor complies with regulatory requirements
- Implement regular collection of bins

Section 143 of the Protection of the Environment Operations Act 1997 requires waste to be transported to a place that can lawfully accept it. It will be the responsibility of the site developers to ensure all contractors clearly specify where all wastes are to be transported, the capacity of the nominated facilities to receive/manage the waste and to ensure that reports on management aspects (types, quantities and disposal pathways) are provided.

## 6.2 Liquid Waste

Liquid waste may be produced on site for environmental control measures such as:

- Site and vehicle cleaning
- Dust control waste

The following measures will be taken to minimise the impact of liquid waste:

- Ensure water is used in moderation and no taps are left continuously running
- Use any grey water produced on site for irrigation or for dust suppression
- Only discharge clean water into storm water

## 6.3 Stormwater Pollution Prevention

All actions will be undertaken to avoid pollution entering stormwater drains and for litter generation. The following will be initiated:

i. Prior to commencement of any works a Safe Work Method Statement will be completed and reviewed to determine potential for stormwater pollution and/or litter generation

ii. The proponent (contractor), will need to develop a management strategy to manage the potential for these issues to be realised

iii. Site inspections will be conducted during the working day to monitor potential for stormwater pollution generation and where identified, works will cease until appropriate controls are implemented

iv. Waste water and storm water will be managed and disposed of in accordance with Water Authority requirements.

## 6.4 Litter Management

i. Daily site inspections will be conducted to identify litter, remedy the situation and investigate the cause so as to reduce the potential for the issue to occur in the future.

ii. Sufficient quantities of bins (and/or bin space), will be made available so as to avoid dumping of materials outside bins

iii. All waste/recycling bins will have covers so as to ensure that wastes cannot be blown out during windy conditions. This will also apply to relevant stocks of materials to be used in construction.

iv. Personnel will be allocated the role of litter management in that they will periodically inspect the site and surrounds for litter and if identified collect and dispose of it.

## 6.5 Records

Records will be kept of all wastes and recyclables generated and either used on site, or transported off–site during the demolition and construction stages of the development.

It will be a condition of appointment that all waste/recycling contractors involved in the demolition and/or construction stages provide these records, and that they also contain details of the facilities that the materials are transported to.

These records will be made available to Council on request.

## 6.6 Waste/recyclables storage (on-site)

All waste and recycling materials will be stored in bins provided by the appointed contractor(s). These bins will be appropriately coloured and signed to indicate what materials are to be deposited into them and located so as to maximise the recovery of reusable/recyclable materials.

As construction activities progress, the designated bins will be moved so as to maximise the collection of materials that will be diverted from landfill. This will also involve relocating signage advising as to correct waste management.

## 6.7 Waste/recyclables treatment (on-site)

There will be no treatment of wastes or recyclables on-site except for possible removal of contaminants prior to forwarding to off-site recyclers.

# 7 Demolition Materials

## 7.1 Overview

The table below details the different waste streams expected in the demolition phase. The relevant disposal/recycling facilities have not been detailed as the waste contractor and sub-contractors have not yet been appointed for the project.

All waste contractors/sub-contractors will be required to detail all intended disposal facilities to ensure that legislative and safety requirements are met, the guiding principles of the waste hierarchy are upheld and maximum diversion from landfill is achieved. As previously stated, records will be required to be maintained by all contractors and made available to Council so as to validate management pathways.

The potential for reuse of materials on-site (and this will be encouraged for both demolition activities as well as considering what could be used for the construction phase of the development), will depend on the quality of the materials once demolition proceeds.

## 7.2 Estimated Volumes

The following table details the estimated composition by $m^3$ of demolition waste to be generated and management strategy. It is important to note that these are estimates and the important issue is that the materials will be managed so as to avoid wherever possible disposal to landfill.

This process and the management of any excavation and removal of contaminated soil and waste (if identified), from the site will be undertaken and managed by qualified contractors and consultants in accordance with all the relevant standards and regulations and is not addressed in this report.

The relevant disposal/recycling facilities have not been detailed as the waste contractor and sub-contractors have not yet been appointed for the project.

All waste contractors/sub-contractors will be required to detail all intended disposal facilities to ensure that legislative and safety requirements are met, the guiding principles of the waste hierarchy are upheld and maximum diversion from landfill is achieved. As previously stated, records will be required to be maintained by all contractors and made available to Council so as to validate management pathways.

The potential for reuse of materials on-site (and this will be encouraged for both demolition activities as well as considering what could be used for the construction phase of the development), will depend on the quality of the materials once demolition proceeds.

A range of other materials may be present on the site once the demolition activities commence.

All potentially recyclable materials are to be separated and stored on-site for an appointed waste/recycling contractor to inspect and to determine the suitability of the material for recycling (or even reuse). If approved for either action, then the contractor can then remove the items.

For materials that are not designated as potentially able to be reused or recycled, then they are to be disposed of at a landfill (or other facility) licenced to receive those specific materials.

### Waste management systems - demolition

| Materials on site | | Destination | | |
|---|---|---|---|---|
| Type of material | Estimated volume ($m^3$/tonnes) | On-site (Reuse or recycle) | Off-site (Detail contractor and recycling facility) | Disposal (Detail contractor and landfill site) |
| Concrete | 90$m^3$ | No on-site reuse | Collected by contractor and disposed at concrete recycling facility | No disposal to landfill |
| Bricks | 75$m^3$ | Bricks will be stockpiled and reused wherever possible. | Acceptable quality bricks collected by a contractor and sold for reuse.<br>Unusable bricks will be collected and recycled at an appropriate brick/rubble recycling facility to be used in aggregate gravel products | Facility TBA upon appointment of contractor[2] |
| Timber | 65$m^3$ | No on-site reuse | Recyclable timber (untreated) will be collected and recycled at appropriate timber yard. Unrecyclable timber will be disposed at landfill | Facility TBA upon appointment of contractor |
| Mixed hard plastics | 30$m^3$ | No on-site reuse | Collected by contractor for recycling. Facility TBA upon appointment of contractor. | No disposal to landfill |

[2] The actual site will be finalised once waste/recycling contractors have been appointed.

| Materials on site | | Destination | | |
|---|---|---|---|---|
| Type of material | Estimated volume ($m^3$/tonnes) | On-site (Reuse or recycle) | Off-site (Detail contractor and recycling facility) | Disposal (Detail contractor and landfill site) |
| Plasterboard | 70$m^3$ | No on-site reuse | Collected by the waste subcontractor on a weekly basis (or as required) for recycling. Possible use as soil improver with gypsum etc removed by recycler | Facility TBA upon appointment of contractor |
| Metals | 100$m^3$ | No on-site reuse | Collected by specialist metal subcontractor for recycling. | No disposal to landfill. Facility TBA upon appointment of contractor. |
| Carpet | 25$m^3$ | No on-site reuse | This will be disposed of into a designated bin and collected regularly as required for recycling is of the required quality or disposal to landfill | Facility TBA upon appointment of contractor |
| Glazing | 25$m^3$ | No on-site reuse | Recyclers consulted as to potential for recycling and if suitable separated for recycling by a facility | Facility TBA upon appointment of contractor |
| Mixed Recyclables | 55$m^3$ | No on-site reuse or recycling | Separated onsite into dedicated receptacles. Collected by the waste subcontractor for recycling. Facility TBA upon appointment of contractor. | Facility TBA upon appointment of contractor |

| Materials on site | | Destination | | |
|---|---|---|---|---|
| **Type of material** | **Estimated volume ($m^3$/tonnes)** | **On-site (Reuse or recycle)** | **Off-site (Detail contractor and recycling facility)** | **Disposal (Detail contractor and landfill site)** |
| General waste | 120$m^3$ | No on-site reuse or recycling | Separated onsite into dedicated receptacles. Collected by the waste subcontractor for disposal to landfill with the facility TBA upon appointment of contractor. | Disposed into general waste bins onsite and collected by the waste contractor for disposal. Facility (TBA) upon appointment of contractor |

# 8 Hazardous Waste Materials

## 8.1 Management Procedures

A *Hazardous Materials Survey 2020* has been prepared by Paynter Dixon Constructions Pty Ltd. This Survey did identify some hazardous materials and provided recommended work plans for management of them.

Contractors employed to manage any identified hazardous wastes will be required (prior to appointment), to demonstrate their compliance with NSW EPA and WorkCover requirements for management of the specific materials they are contracted to manage.

The following are the recommended approaches for managing the wastes and other materials that were identified during the site analysis.

The key principles that need to be adhered to are[3]:

1. All hazardous wastes need to be correctly identified and managed in accord with all relevant legislation, Codes of Practices and the developed management actions (as per the *Hazardous Materials Survey 2020*.
2. Hazardous materials need to be separated into their individual categories and not mixed with any other materials

Prior to commencing any demolition or clean-up activities, a Workplace Health & Safety Plan will be developed, implemented and monitored with all relevant site personnel receiving specific training in management of hazardous waste materials (including suspected hazardous materials).

In regards to potentially contaminated soil, a Remedial Action Plan is being prepared to ensure that this material is to be managed in accord with applicable regulations.

## 8.2 Asbestos

The process for managing what has been suspected of being or containing asbestos waste is as follows:

i. Treat the material as asbestos unless proven otherwise

ii. Do not disturb the material (ie., shift or place into a container) at all

iii. Seek advice from a suitably qualified laboratory to test the material(s) to determine if it is or is not asbestos.

iv. If determined not to be asbestos, then it can be managed as an inert waste.

v. If determined to be asbestos then managed by a licenced contractor for packaging, removal and disposal.

[3] Reference should be made to the NSW EPA publication, Waste Classification Guidelines Part 1: Classifying Waste.

vi. If the material has accidently been uncovered, then the area should be cleared, barriers erected to prevent access, NSW WorkCover and EPA notified, and if broken, covered with a fine spray/mist of water.

For what has been conclusively identified as asbestos containing materials (including soils), a specialist/licenced asbestos contractor will be used. As required, only workers trained in asbestos removal techniques will be allowed to manage the removal of asbestos contaminated soil and any contained on the buildings.

In regards to disposal of asbestos containing materials, there are regulatory requirements under clause 42 of the Protection of the Environment Operations (Waste) Regulation 2005 that apply to the management of asbestos waste, including:

- Waste must be stored on the premises in an environmentally safe manner.
- Non-friable asbestos material must be securely packaged at all times.
- Friable asbestos material must be kept in a sealed container.
- Asbestos-contaminated soil must be wetted down.
- All asbestos waste must be transported in a covered, leak-proof vehicle.
- Asbestos waste must be disposed of at a landfill site that can lawfully receive this waste. Always contact the landfill beforehand to find out whether asbestos is accepted and any requirements for delivering asbestos to the landfill.
- It is illegal to dispose of asbestos waste in domestic garbage bins.
- It is also illegal to re-use, recycle or dump asbestos waste

These requirements will be adhered to.

# 9 Construction Waste Profile

## 9.1 Overview

The following summarises the types, quantities and management systems for construction materials that may be generated during construction.

The quantity of waste materials to be generated onsite are estimates and therefore the systems that will be put in place need to incorporate flexibility to allow for variation in the total quantities generated. Active site management during the construction phase will ensure all waste/recyclable materials are disposed of appropriately and that all waste receptacles are of sufficient capacity to manage onsite activities.

Finalisation of the system(s) that will be implemented for the recovery of materials and for disposal of others to landfill will occur following appointment of contractor(s). A component of the appointment will be that contactors will be required to provide data as to the disposal pathway (eg., materials, volumes and final disposal site), as well as a validation process for this information.

The appointed contractor(s) will also be responsible for sourcing speciality recycling facilities for the materials that cannot be reused on site

## 9.2 Estimated Volumes

The following table details the estimated composition by $m^2$ of construction waste to be generated for the total site.

The quantity of waste materials to be generated onsite are estimates and therefore the systems that will be put in place need to incorporate flexibility to allow for variation in the total quantities generated. Active site management during the construction phase will ensure all waste/recyclable materials are disposed of appropriately and that all waste receptacles are of sufficient capacity to manage onsite activities.

Finalisation of the system(s) that will be implemented for the recovery of materials and for disposal of others to landfill will occur following appointment of contractor(s). A component of the appointment will be that contactors will be required to provide data as to the disposal pathway (eg., materials, volumes and final disposal site), as well as a validation process for this information.

The appointed contractor(s) will also be responsible for sourcing speciality recycling facilities for the materials that cannot be reused on site.

### Waste management systems – construction

| Materials on site | | Destination | | |
|---|---|---|---|---|
| Type of material | Estimated volume ($m^3$) | On-site (Reuse or recycle) | Off-site (Detail contractor and recycling contractor) | Disposal (Detail contractor and landfill site) |
| Excavation material | $400m^3$ | Will either be stockpiled for use during construction if required and if not disposed off-site. | Collected and used as clean fill (if appropriate), by the appointed contractor and/or forwarded to various facilities such as garden landscapers, or roadworks. | Facility TBA upon appointment of contractor. |
| Concrete | $30m^3$ | Separated on site and crushed for use in pavement construction where possible | Collected by contractor and disposed at concrete recycling facility | Facility TBA upon appointment of contractor |
| Timber | $50m^3$ | Separated and where feasible, reused for further formwork | Unused material separate and stockpiled onsite.<br>Collected by specialist timber subcontractor for recycling | Facility TBA upon appointment of contractor |
| Bricks | $10m^3$ | Bricks will be stockpiled and reused wherever possible. | Acceptable quality bricks collected by a contractor and sold for reuse.<br>Unusable bricks will be collected and recycled at an appropriate facility. | Facility TBA upon appointment of contractor. No disposal to landfill. |
| Metals | $25m^3$ | No on-site reuse | Collected by specialist metal subcontractor for recycling | Facility TBA upon appointment of contractor |

| Materials on site | | Destination | | |
|---|---|---|---|---|
| Type of material | Estimated volume ($m^3$) | On-site (Reuse or recycle) | Off-site (Detail contractor and recycling contractor) | Disposal (Detail contractor and landfill site) |
| Plasterboard | 25$m^3$ | No on-site reuse | Collected by the contractor for recycling. | Facility TBA upon appointment of contractor |
| Mixed hard plastics | 20$m^3$ | No on-site reuse | Collected by contractor for recycling. | Facility TBA upon appointment of contractor. |
| Tiles | 10$m^3$ | No on-site reuse | Unusable tiles will be collected and recycled at an appropriate recycling facility | Facility TBA upon appointment of contractor[4] |
| Carpet | 10$m^3$ | No on-site reuse | This will be disposed of into a designated bin and collected regularly as required for recycling if of the required quality or disposal to landfill | Facility TBA upon appointment of contractor |
| Glazing | 3$m^3$ | No on-site reuse | Recyclers consulted as to potential for recycling and if suitable separated for recycling. | Facility TBA upon appointment of contractor |
| Soil/Sand/Gravel | 10$m^3$ | Will be stockpiled for reuse. | Disposed of a clean-fill. | Facility TBA upon appointment of contractor |

[4] The actual site will be finalised once waste/recycling contractors have been appointed.

| Materials on site | | Destination | | |
|---|---|---|---|---|
| Type of material | Estimated volume ($m^3$) | On-site (Reuse or recycle) | Off-site (Detail contractor and recycling contractor) | Disposal (Detail contractor and landfill site) |
| Mixed Recyclables | $60m^3$ | No on-site reuse | Contractor appointed to collect and recycle | No disposal to landfill. Facility TBA upon appointment of contractor |
| General waste | $90m^3$ | No on-site reuse | No recycling or reuse | Facility TBA upon appointment of contractor |

## 9.3 Other Materials

A range of other materials may be present on the site once the demolition activities commence.

All potentially recyclable materials are to be separated and stored on-site for an appointed waste/recycling contractor to inspect and to determine the suitability of the material for recycling (or even reuse). If approved for either action, then the contractor can then remove the items.

For materials that are not designated as potentially able to be reused or recycled, then they are to be disposed of at a landfill (or other facility) licenced to receive those specific materials.

# 10 Contracts and purchasing

Each subcontractor working on the site will be required to adhere to this Waste Management Plan.

The Head Contractor will ensure each subcontractor:

- Takes practical measures to prevent waste being generated from their work
- Implements procedures to ensure waste resulting from their work will be actively managed and where possible recycled, as part of the overall site recycling strategy or separately as appropriate
- Ensures that the right quantities of materials are ordered, minimally packaged and where practical pre-fabricated. Any oversupplied materials are returned to the supplier
- Implements source separation of off cuts to facilitate reuse, resale or recycling.

The Site Manager will be responsible for:

- Ensuring there is a secure location for on-site storage of materials to be reused on site, and for separated materials for recycling off site.
- Engaging appropriate waste and recycling contractors to remove waste and recycling materials from the site
- Co-coordinating between subcontractors, to maximise on site reuse of materials
- Monitoring of bins on a regular basis by site supervisors to detect any contamination or leakage
- Ensuring the site has clear signs directing staff to the appropriate location for recycling and stockpiling station/s. And that each bin/skip/stockpile is clearly sign posted
- Proving training to all site employees and subcontractors in regards to the WMP as detailed in section 11 below.

Should a subcontractor cause a bin to be significantly contaminated, the Site Manager will be advised by a non-conformance report procedure. The offending subcontractor will then be required to take corrective action, at their own cost. The non-conformance process would be managed by the Head Contractors' Quality Management Systems

# 11 Training and Education

All site employees and sub-contractors will be required to attend a site specific induction that will outline the components of the WMP and explain the site specific practicalities of the waste reduction and recycling strategies outlined in the WMP.

All employees are to have a clear understanding of which products are being reused/recycled on site and where they are stockpiled. They are also to be made aware of waste reduction efforts in regards to packaging.

The site manager will post educational signage in relation the recycling activities on site in breakout areas, lunch rooms etc.

# Appendix A – Waste Signage

WASTECH

Design. Develop. Deliver.

# Waste Chute Systems

Waste and Recycling Chute and Disposal Systems Product Guide

1800 465 465
www.wastech.com.au

# Welcome to your complete guide to Wastech Waste Management Systems and Chutes range.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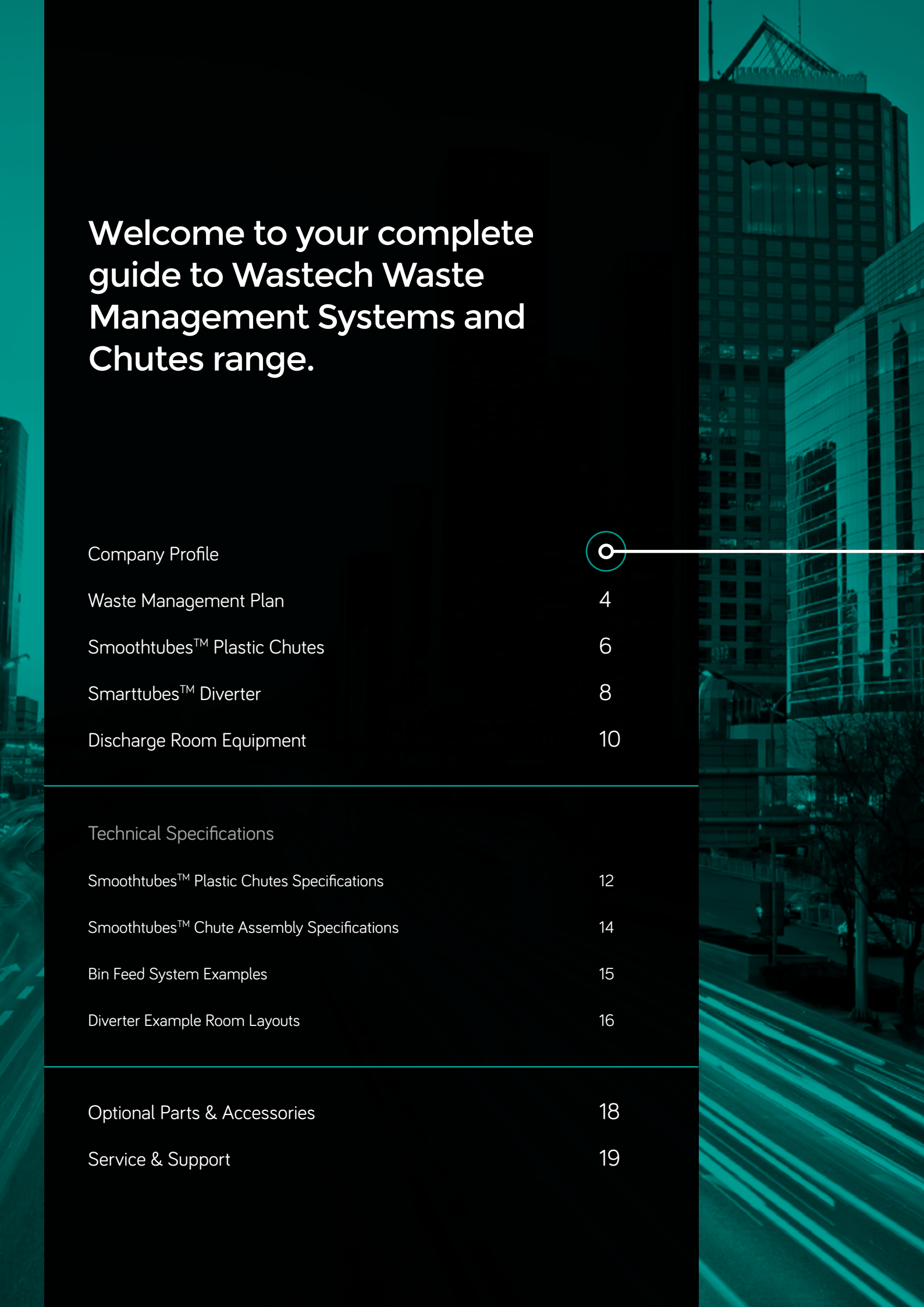
Optional Parts & Accessories 18

Service & Support 19

# Company Profile

Over 23 years of experience supplying waste and recycling equipment, both Australia wide and internationally. Wastech consultants have extensive industry knowledge coupled with state of the art equipment that will save you both time and money.

Whether it's general waste, cardboard, plastic, e-waste or polystyrene, Wastech has a solution for your site. From Melbourne to Darwin, Brisbane to Perth, Sydney to Adelaide; our waste management consultants are able to tailor solutions for each unique site to save on costs, while promoting a sustainable future.

Company owned branches Australia wide.

## Design.

Dedicated and experienced design and engineering teams for all Wastech products and equipment.

## Develop.

Supporting our engineers, our on-site manufacturing facility furthers our ability to develop tailored solutions quickly, efficiently and cost-effectively.

## Deliver.

On-time project delivery backed by a national 24/7 Service & Support network. Offering delivery on a national scale, our Service and Support team operate out of dedicated facilities to maintain a high level of service, Australia wide.

Waste Recycling Linen Organics

# Waste Management Plan

## Preparing a plan to manage the waste and recycling needs of your development is an important part of the application process.

### Don't know where to start?

Wastech Waste Management Plans provide a comprehensive report on waste volumes, equipment recommendations, collection methods and operational requirements all in one place!

## Upfront capability from inception to council submission.

- Waste stream and volume assessment.
- Equipment recommendations and collection alternatives.
- Operational requirements.

AVOIDANCE
▼
REUSE
▼
RECYCLING
▼
RECOVERY OF ENERGY
▼
TREATMENT
▼
CONTAINMENT
▼
DISPOSAL

From low, medium or high density residential developments, through to large commercial or mixed used developments, Wastech will deliver a waste management plan that works within your projects space and design objectives.

Let our experienced Waste Management consultants work closely with you to deliver a comprehensive report that complies with all council codes, BCA, Australian standards and statutory requirements.

**To arrange a detailed discussion, Contact a Wastech Waste Management consultant today on 1800 465 465.**

**Preliminary Advice**
Talk to an experienced waste consultant to consider waste and recycling elements at the design phase.

**Priority Service**
Fast, efficient and reliable service with complete reports available within ten business days from receiving final plans.

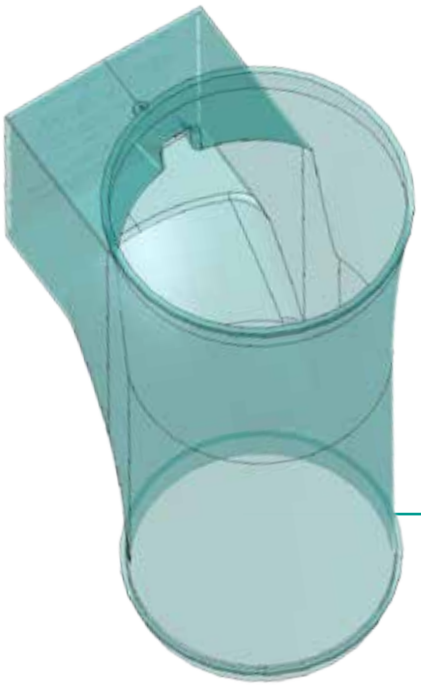
**Tailored & Comprehensive Reporting**
Working closely with you to cover all specific planning and design requirements.

Delivered in just 10 business days!

Waste Recycling Linen Organics

# Smoothtubes™ Plastic Chutes

Introducing Wastech's very own super smooth plastic Waste Chute system offering 80% less friction than steel, allowing for quieter and smoother waste disposal, whilst being a more cost effective solution.



**Pioneering the design of Australia's first plastic chutes, Wastech's Smoothtubes™ Chutes system offers:**

- Superior industrial grade plastic
- Superior acoustic properties
- Low density, flexible material
- Corrosion proof
- Australian designed and developed
- Made from recycled* Polyethylene
- Offers less restricted continuous flow
- Self cleaning smooth internal surface

**Recommended configuration/installation options are:**

## Single Chute System

## Dual Chute System

For more detailed specifications on Single and Dual chute systems, please refer to page 14.

## Innovative Design

The Smoothtubes™ modular design caters for any application without the need to custom build sections. The innovative slip-joint assembly system significantly reduces installation time.

Smoothtubes™ also offer UV and impact resistance while weighing less than 15kg per section.

## Builder Friendly

Easy installation by offering:

- In-built block-off panels that seal the chute until installation of doors is complete. This helps to ensure no usage or damage to occur during construction and installation.
- Self supporting modular sections with built in mounts.
- Lightweight for easy handling.

## Cleaner & Quieter

Smoothtubes™ are designed to be cleaner whilst eliminating noise by:

- Offering crevice free joins with no sharp angles eliminating collection of any waste particles.
- Closed cell, non-porous material repelling grime, bacteria, odour and liquid.



*Recycled materials used on availability.

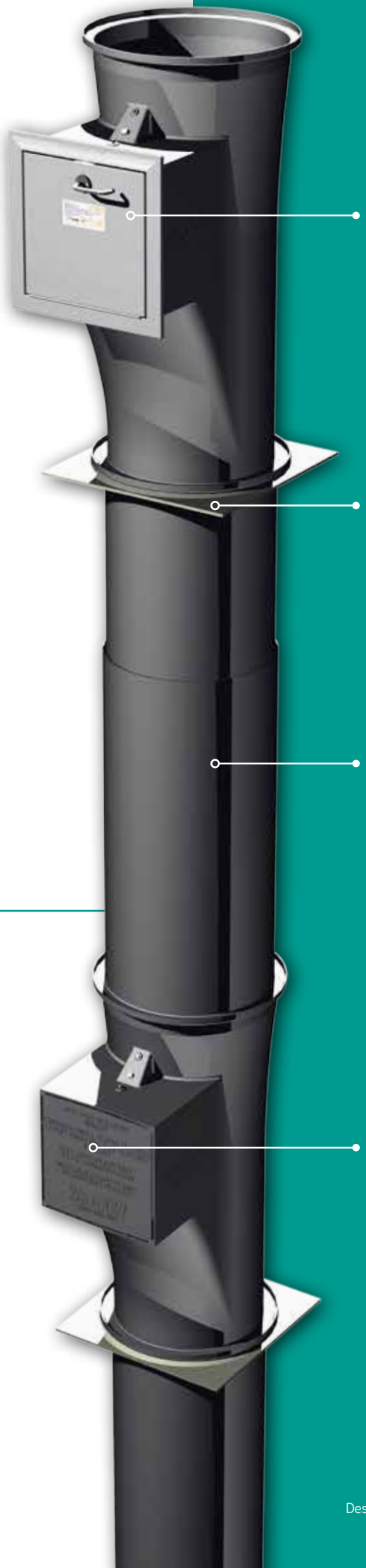
## Fact!

Wastech pioneered the plastic chute system with Smoothtubes™ and have successfully manufactured, delivered and installed over 900 waste chute major commercial projects Australia wide!

## Contact Us

A large range of options are available including Steel chutes and custom built solutions.

**To arrange a detailed discussion, contact a Waste Management consultant today on 1800 465 465.**



Stainless Steel fire rated door. (AS1530)

Flexible floor level penetration section for mounting onto slab.

Lightweight self supporting chute modular section.

In-built installation block off panel.

**For detailed specifications, please refer to page 12.**

Waste Recycling Linen Organics

# Smarttubes™ Diverter

## A smart, space saving, single chute diverter system for both waste and recycling.

Designed for use with a single chute waste disposal system, the Smarttubes™ diverter provides a simple and efficient method for disposing of multiple waste streams while saving valuable building space.

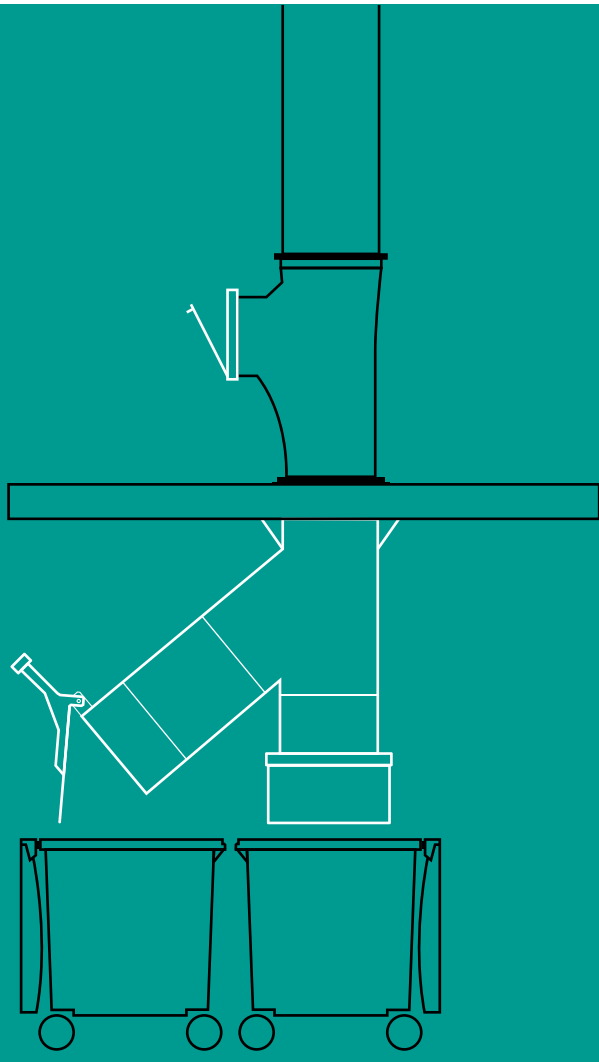
Smarttubes™ is an intelligent system that is simple to use for residents and building managers alike. The basic door control panel allows residents to easily select their desired waste stream, while the advanced web-based dial in system allows building managers to control the chute from anywhere within the building through wifi access!

### Wifi Dial-In

The Smarttubes™ single chute diverter systems allow for web based, wifi dial-in. This enables the user to lock individual or sets of doors, lock out of all doors for maintenance, or setting of the programmable timer. (i.e. disposal only allowed between 6am and 12am).

### Programmable & Remote Lock-Out

The Smarttubes™ system is fully programmable, allowing building managers to lock out specific levels or even the entire system for maintenance. Additionally, the system can be used to enforce a building disposable curfew via a programmable timer.



 **For detailed specifications, and configuration options, please refer to page 16.**

## Easy Installation & Maintenance

The electric actuator of the Smarttubes™ system eliminates the need for expensive hydraulics and results in lower lifetime maintenance costs. The electric motor also allows for lower power requirements, only requiring one standard 240V outlet.

## Simplified Operation

**1. Select** waste stream (waste or recycling).
**2. Wait*** - Diverter arm will move to the appropriate position.
**3. Open -** Chute door unlocks for disposal.
To ensure correct disposal, the chute door will only open for one waste stream at any stage of operation.

## Smarttubes™ Door Control Panel

***Wait time will vary depending on building height and current/active users.**

Waste Recycling Linen Organics

# Discharge Room Eq

Introducing Wastech Chute compactors designed for efficient waste disposal for multi-story or multi-level buildings.

## Chutepac™ Compactor

Introducing an extremely quiet and fast, hydraulic free, state-of-the-art compactor, designed to handle high volumes of even the most diverse garbage types with ease.

Running costs are minimised, while maintenance and cleaning is kept simple and safe.

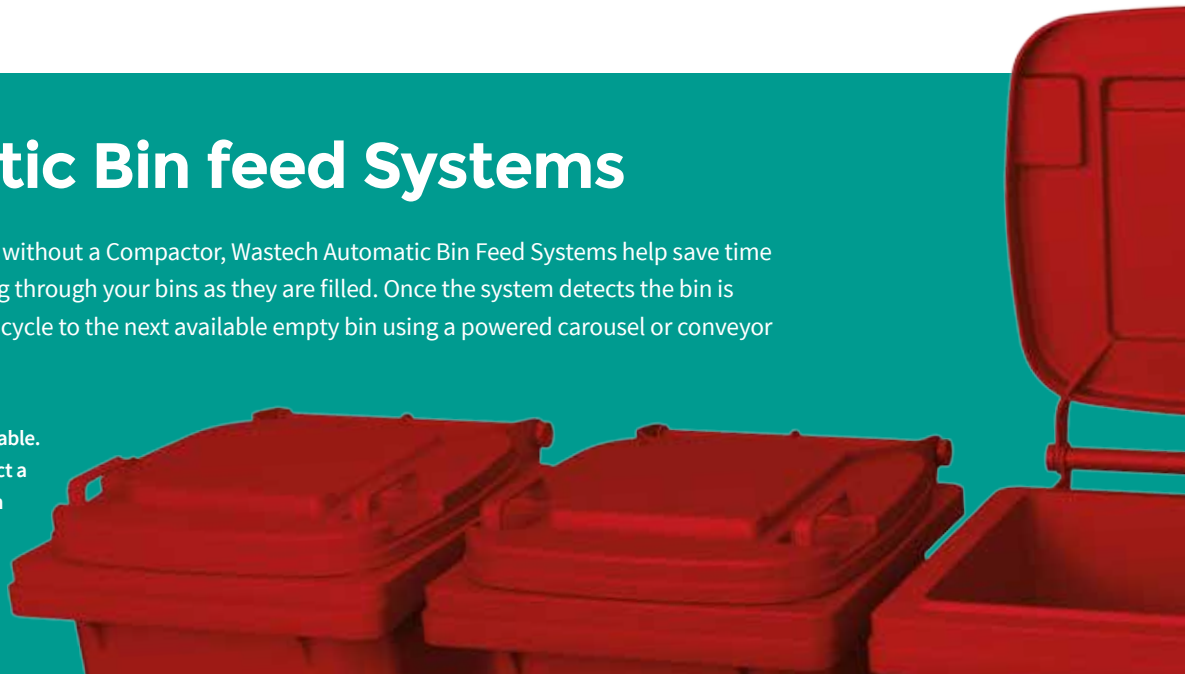
- Low power drive motor
- Self cleaning compact drum
- Compact profile
- Large access panels
- Jam sensor switch
- Light weight bin cradles
- Configurable control box mount

| | |
|---|---|
| Bin feed system compatible | ✓ |
| Compaction Ratio | **2:1 to 10:1 (dependant on waste types.)** |
| Construction | **5mm to 10mm Grade 250 M/Steel** |
| Chamber Dimensions | **N/A** |
| Waste Capacity | **N/A** |
| Power Requirements | **240V / 10A GPO** |
| Hydraulic Specs | **N/A** |
| Compaction Force | **680kg** |
| Waste Bin Qty | **4-8 x 240ltr Bins** |
| Electric Control | **PLC Control with Electronic Cycle** |
| Service | **Hydraulic Free 24 Hour Service** |
| Warranty | **12 months** (terms & conditions apply) |

## Automatic Bin feed Systems

Designed for use with or without a Compactor, Wastech Automatic Bin Feed Systems help save time by automatically rotating through your bins as they are filled. Once the system detects the bin is full, it will automatically cycle to the next available empty bin using a powered carousel or conveyor machine system.

**Smart alert options are available. For more information, contact a Wastech waste consultant on 1800 465 465.**



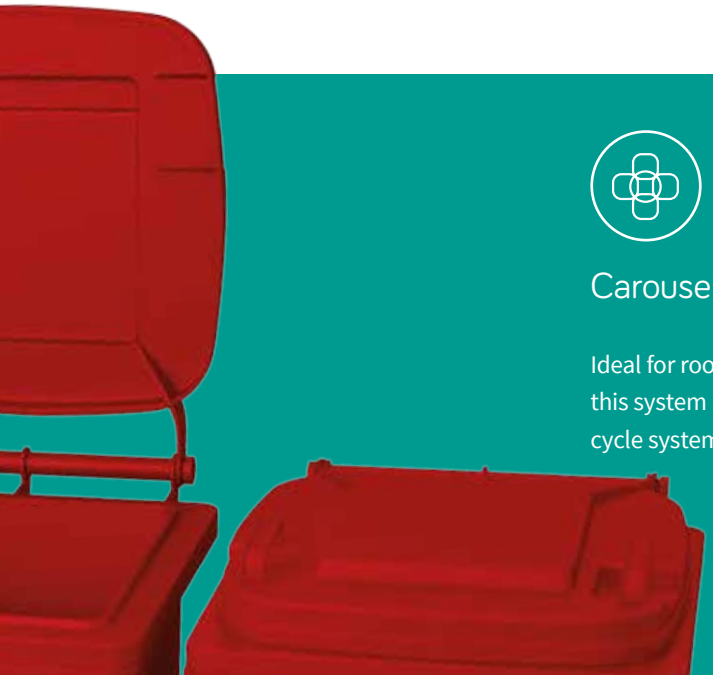
# uipment

## Eco-pack Compactor

Engineered for working installation within tight space restrictions, the economical Eco-pack is a hydraulic based compactor offering high packing force to help eliminate potential OH&S issues and bin damage.

- High compaction reducing bins required in floor space
- Robust high tensile steel construction
- Quiet and efficient hydraulic system
- Continually sealed door
- Suits all bin sizes
- Suits both carousel or linear bin feed systems
- Waste is compacted inside the compactor unit and not the bin
- No bin damage

| |
|---|
| 3:1 to 10:1 (dependant on waste types.) |
| 5mm and 20mm Grade 350 High Tensile Steel |
| 560 x 600mm |
| 80 ltr/sec per 15 second cycle = 20m³/hr |
| 415V / 20A / 5 Pin power point |
| 12 Lpm Pump / 5.5kW Motor |
| 62kn or 6.3 tonnes force @ 14Mpa |
| On Carousel System: Multiple Configurations Available |
| PLC Control with Electronic Cycle |
| Comprehensive fixed price service available |
| 12 months (terms & conditions apply) |



### Carousel System

Ideal for rooms with tighter space, this system rotates bins in a circular cycle system.

### Conveyor System

Ideal for rooms with longer, narrower space, this system rotates bins in a linear cycle system.

For specifications and configuration examples, please refer to page 15

# Smoothtubes™ Plastic Chutes

## Chute Construction

**Nominal Internal Diameter:** Garbage 530mm
Material LLDPE (linear low density polyethylene). Internal surface is closed cell, ultra smooth finish that resists waste residue build up, odour, blockages, corrosion and liquid. +Fire hazard property tests in accordance with BCA Clause C1.10 and Specification C1. 10 in complying with Australian Standard AS1530 by Warrington Fire Research (Aust) Pty Ltd.

**Material Thickness:** Chute tubes 5mm nominal.

**Mounts:** Designed to be flexible and smoke seal at every level.

**Noise & Vibration Prevention:** Acoustic lagging is not necessary. Refer to #acoustic report. Isolation is provided at every level under the floor mounts. Flexible mount is isolated from concrete using polyurethane sealant that is acoustically rated.

**Ventilation:** 200mm diameter galvanised steel ventilation fan and discharge cowl assembly. The fan is supplied with 240 volt single phase plug and lead. The cowl assembly comes complete with dektite flashing. The vent is connected to the top of the chute by a flexible duct.

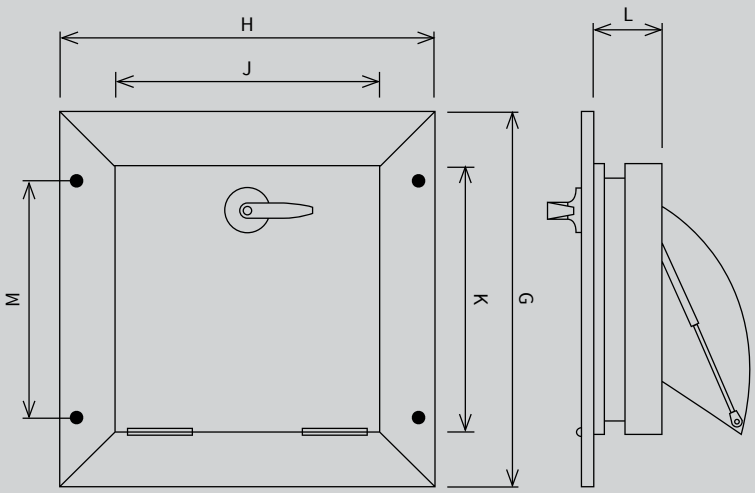
**Loading throat door:** Smoothtubes™ Loading Throats are molded within the chute tube creating a smooth flowing entry to reduce impact noise and minimise blockages. Loading doors -304 grade Stainless Steel with a fire block core, door frame sealed to wall using fire sealant. Compliance to Australian Standards AS.1530.1 (FRL:-/120/30). Doors are self closing. Key locks are supplied standard for Linen doors, Garbage and recycling doors. Fire sprinklers are installed in every loading throat ready for connection to fire services by others.

**Deflector:** The discharge of the chute has a 3 or 5mm thick Galvanised Steel deflector, set at 45 degrees (min) for discharge directly into a bin. The deflector is fitted with a fire activated fusible link close-off door which can be manually overridden, to close the chute for bin changes. For garbage discharge into an EcoPack Compactor the fire door is not required as the Compactor isolates the chute at all times.

## Installation

Chute sections weigh no more than 15kg each allowing easy transport and installation by hand without reliance on Tower Cranes. Bricking up instructions are detailed on the front panel of every loading throat, which stays fitted until installation of loading door to prevent unauthorised use and potential damage from building rubble.

## Chute Door Dimensions

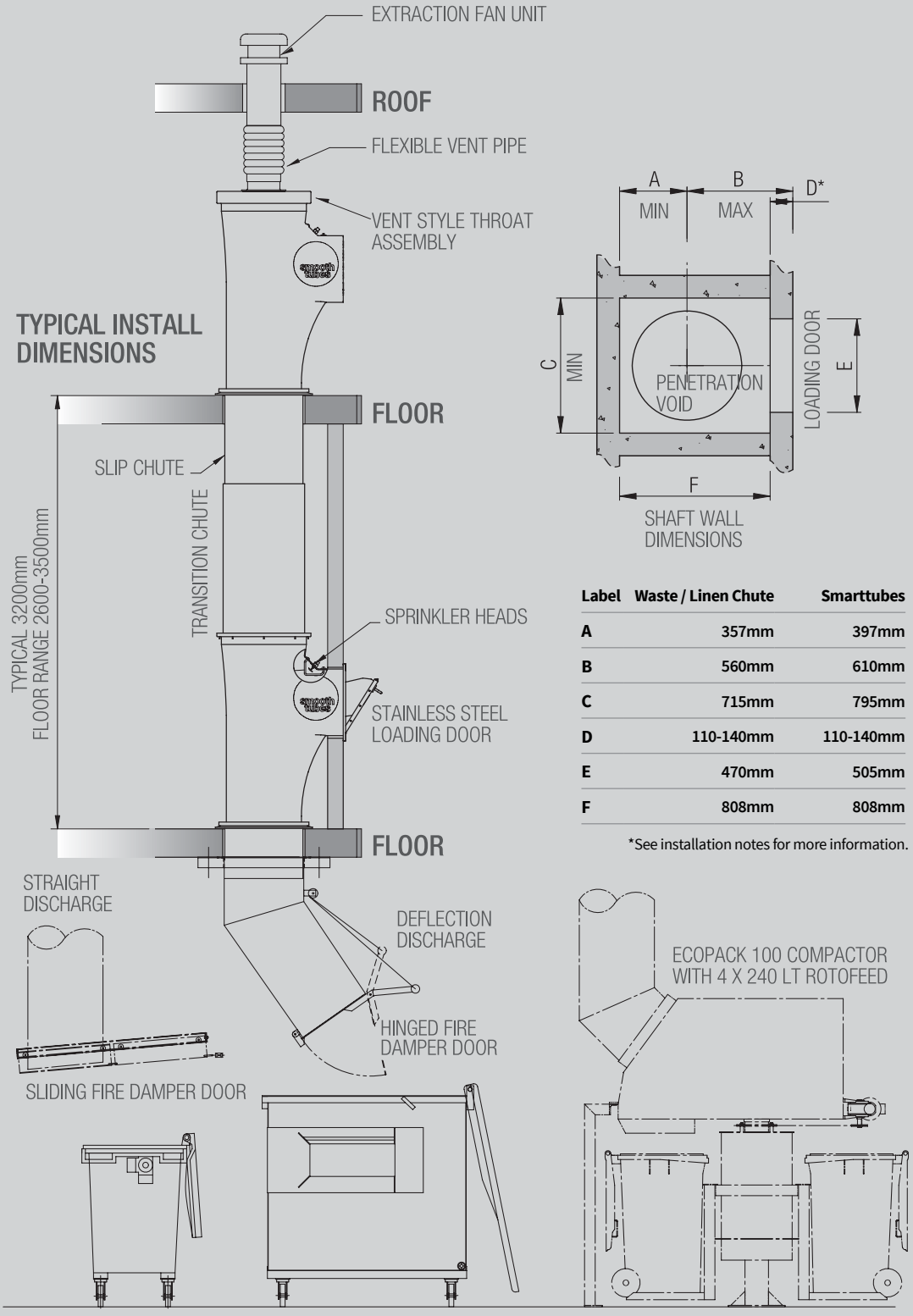



**Dimensions**

| Label | Waste Door | Linen Door | Recycling Door |
|---|---|---|---|
| G | 603mm | 573mm | 603mm |
| H | 603mm | 573mm | 603mm |
| J | 435mm | 432mm | 432mm |
| K | 435mm | 432mm | 432mm |
| L | 110mm | 110mm | 110mm |
| M | 380mm | 380mm | 380mm |

 A large range of configuration options and layouts are available. For more information or specifications, please contact a Wastech consultant on 1800 465 465.

## TYPICAL INSTALL DIMENSIONS







| Label | Waste / Linen Chute | Smarttubes |
|---|---|---|
| A | 357mm | 397mm |
| B | 560mm | 610mm |
| C | 715mm | 795mm |
| D | 110-140mm | 110-140mm |
| E | 470mm | 505mm |
| F | 808mm | 808mm |

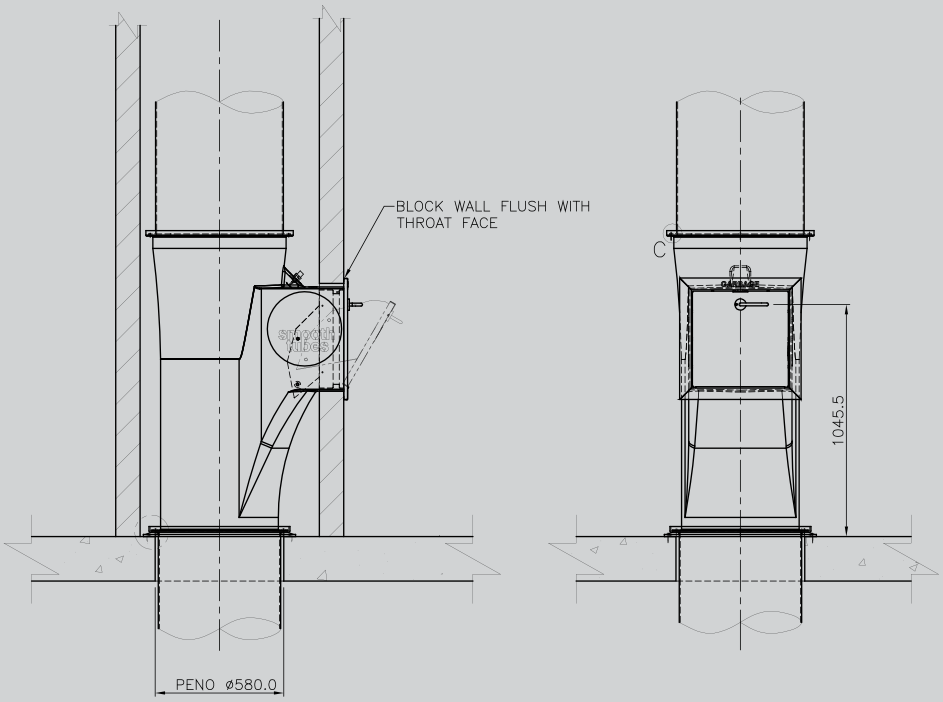
*See installation notes for more information.



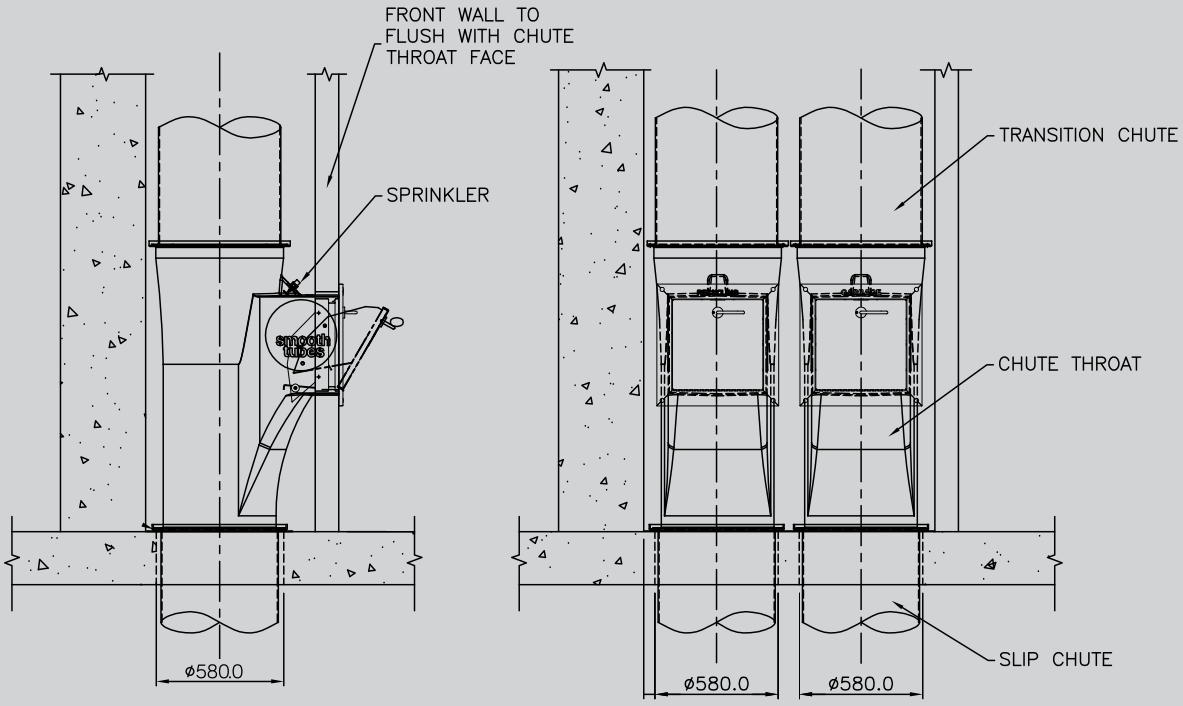

Wastech reserves the right to make improvements, adjustments and amendments to design and dimensions.

# Smoothtubes™ Chute Assembly

Single Chute Assembly Example




Dual Chute Assembly Example

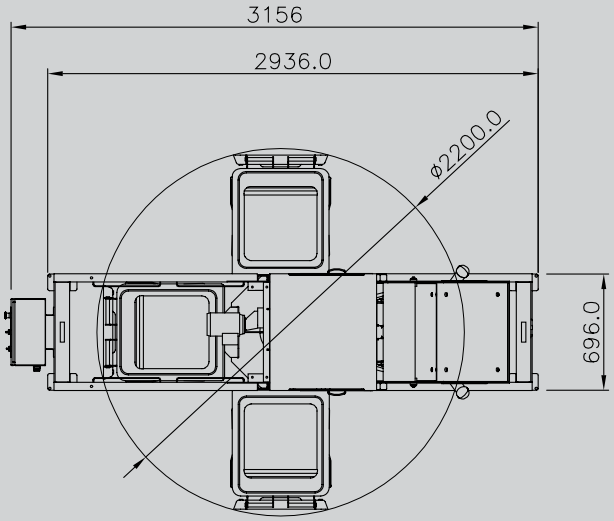



 A large range of configuration options and layouts are available. For more information or specifications, please contact a Wastech consultant on 1800 465 465.

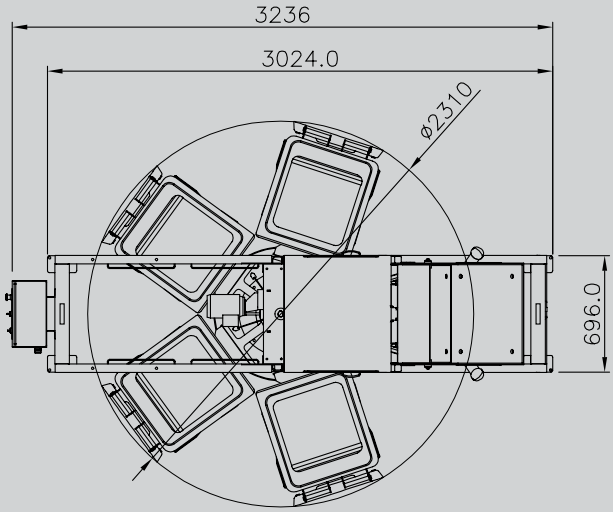
# Bin Feed System
# Examples

## Carousel Bin Feed System Examples

4 Bin System

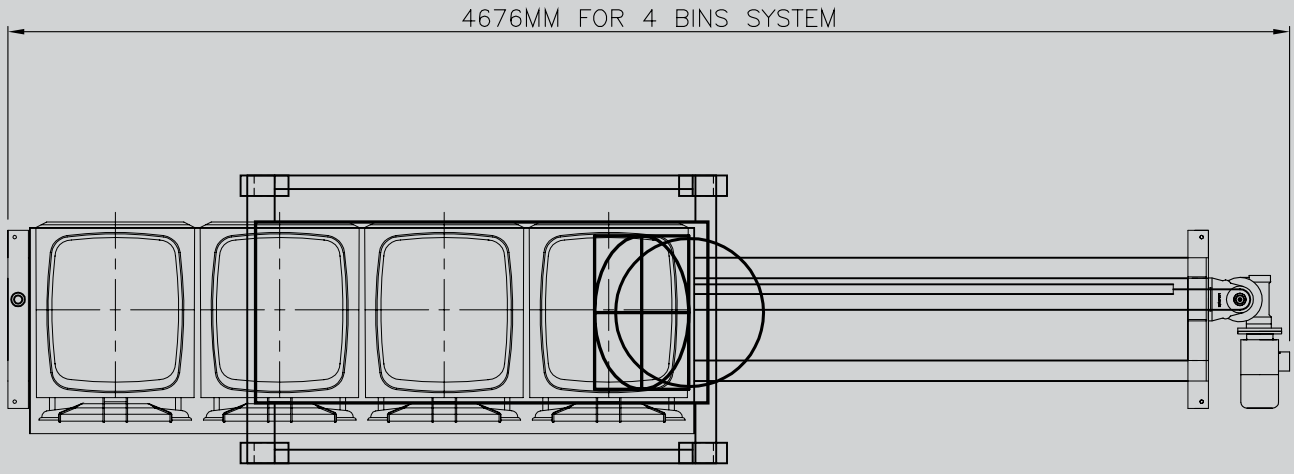



5 Bin System



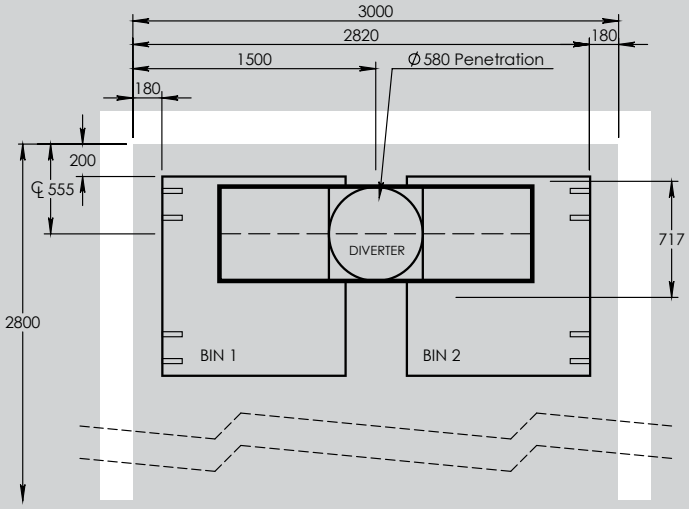

## Conveyor Bin Feed System Example

4 Bin System

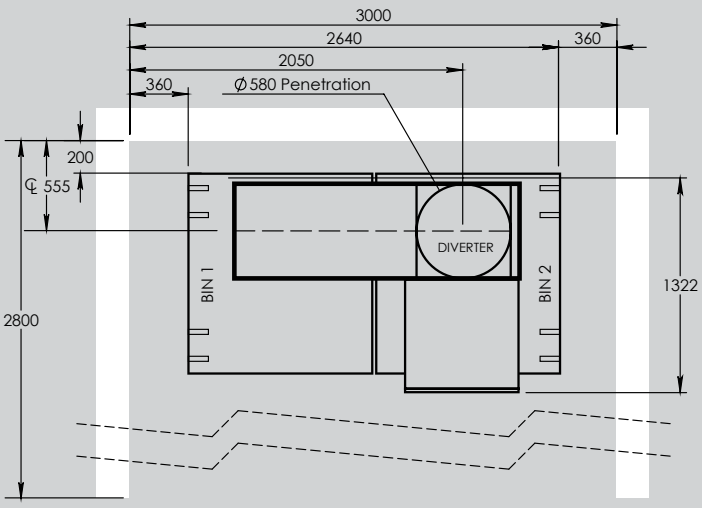


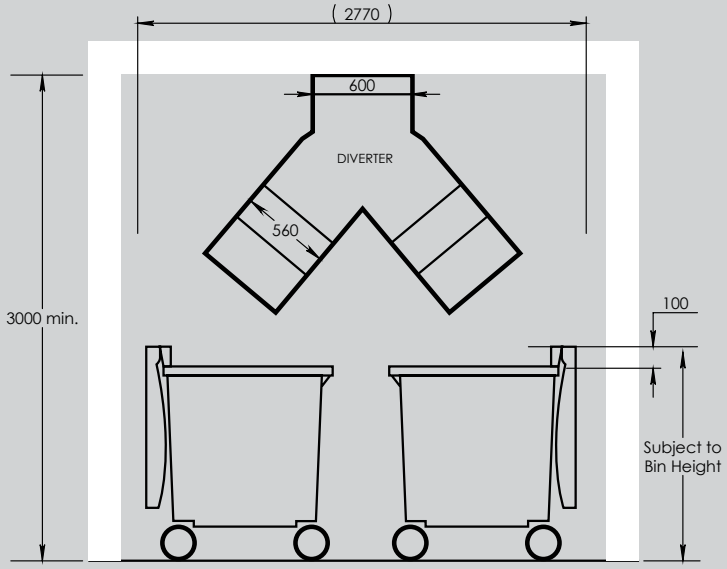
# **Diverter** Example Room Layouts

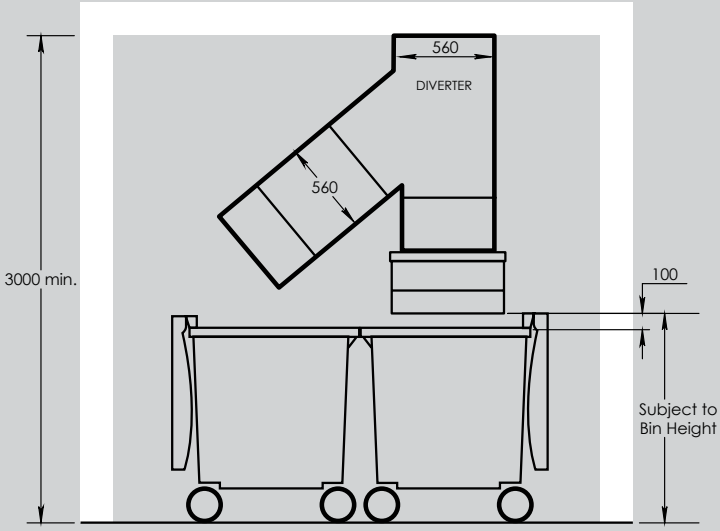
Standard Configuration 1




Standard Configuration 2



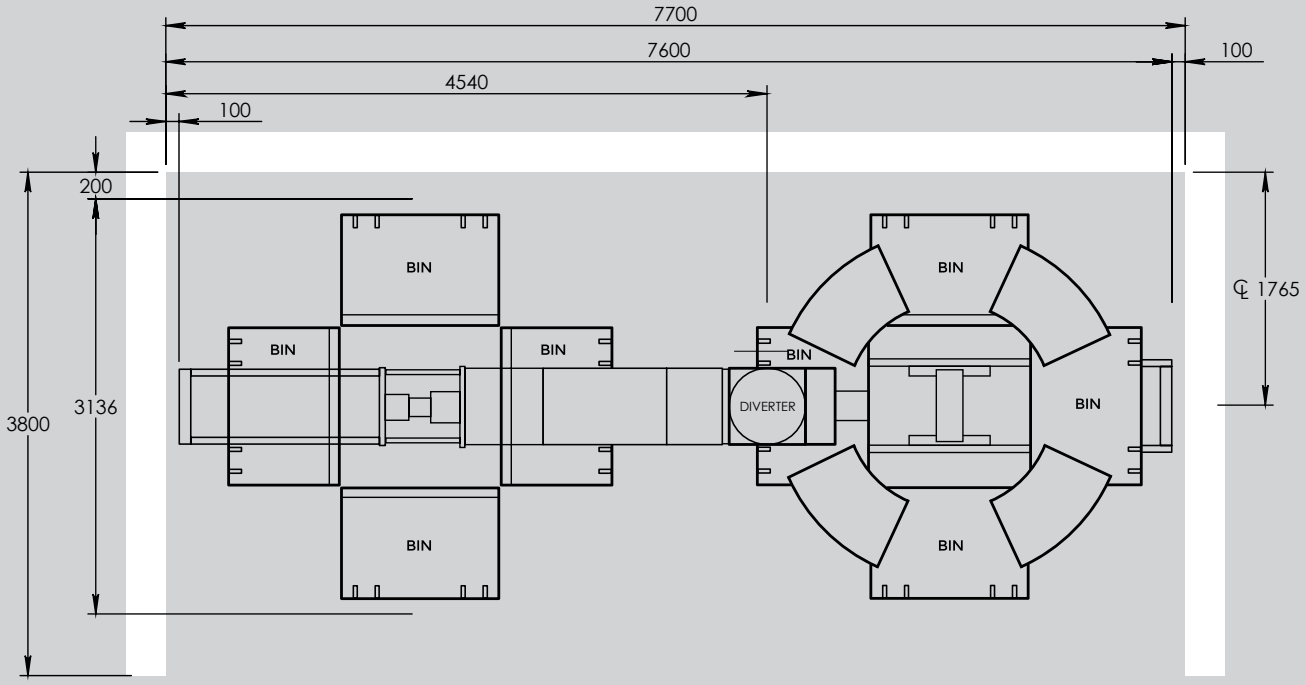

 A large range of configuration options and layouts are available. For more information or specifications, please contact a Wastech consultant on 1800 465 465.

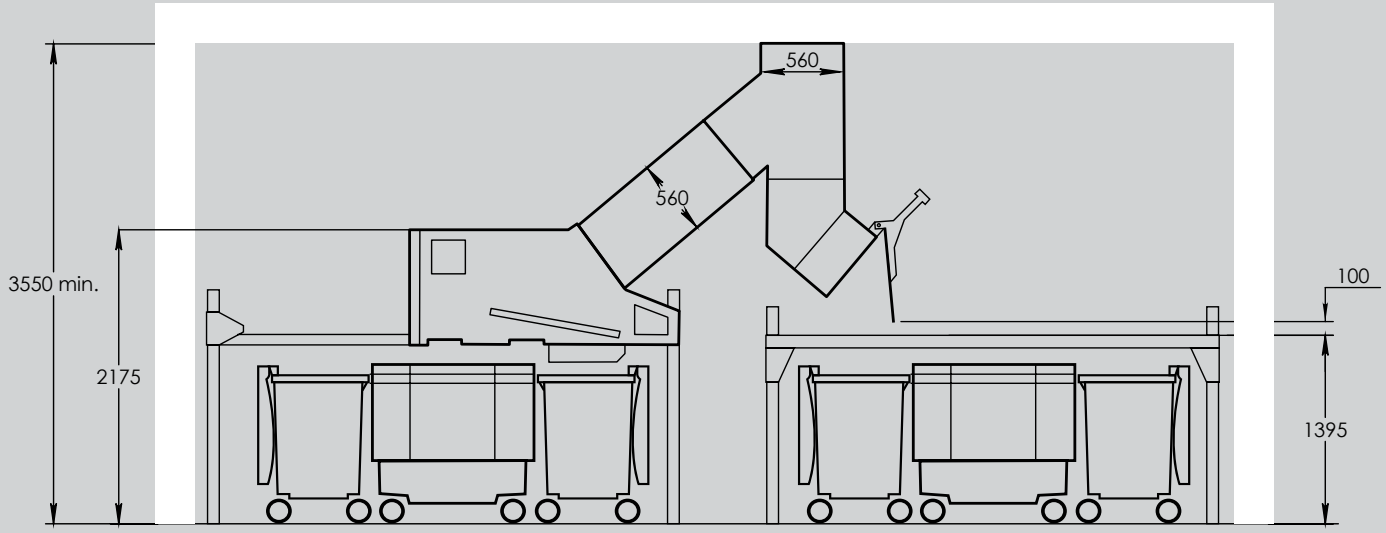
## Design Guides

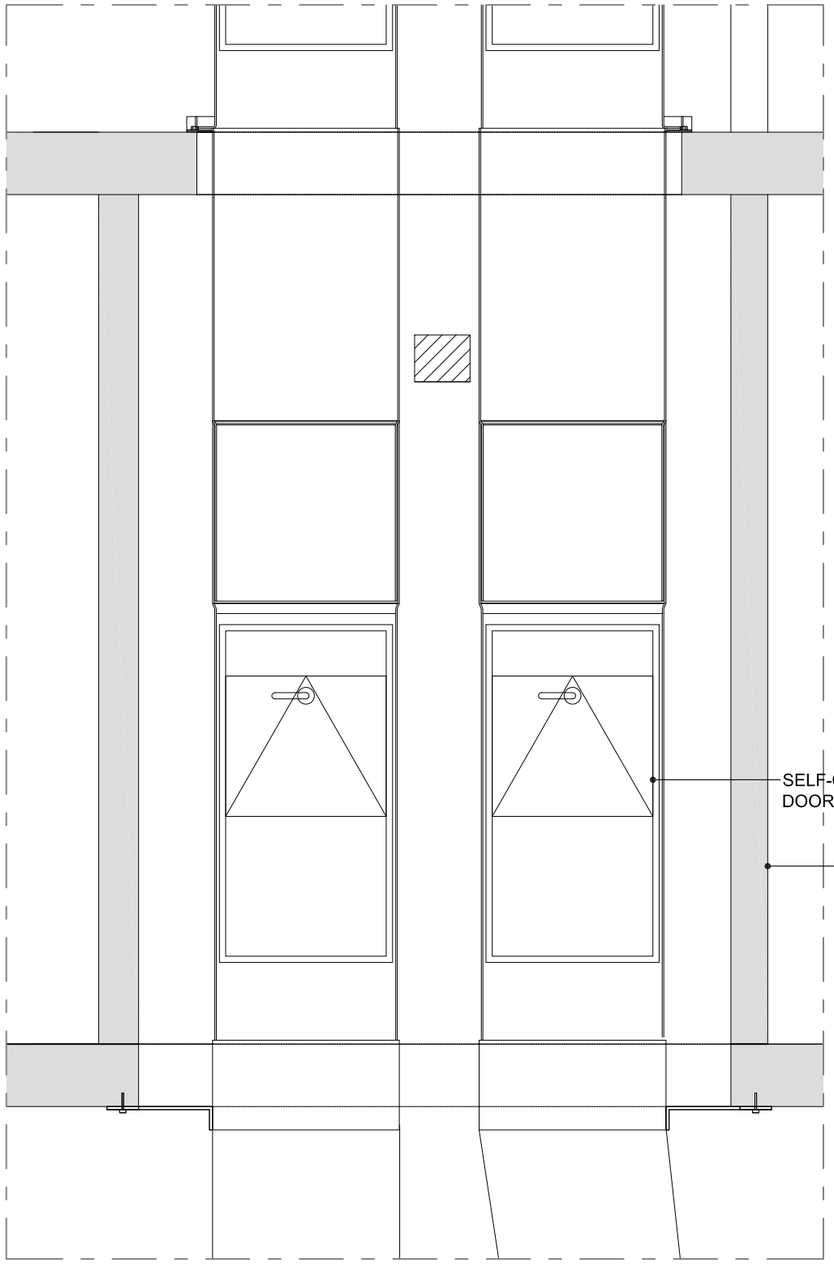
The following are standard installation spacings and requirements solely intended to assist in the design of refuse rooms and chute systems. These are intended as guides only and do not constitute a complete site specific design. Bin arrangements and compacting options  vary significantly and are unique to each site.

Please contact Wastech for a formal assessment of your site and for further options.

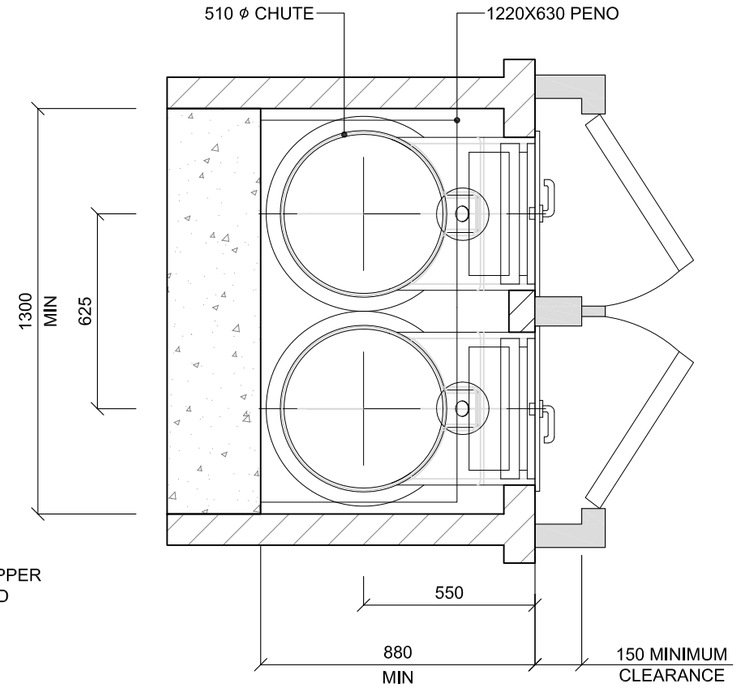
## Carousel Feed System Configuration: Ecopac & Bin Carousel






TYPICAL DUAL CHUTE LAYOUT
(510Ø)
SCALE 1:20




TYPICAL LLDPE PLASTIC TWIN CHUTE LAYOUT
w/ADDED ENCLOSURE (510Ø) (STEEL SIMILAR)
SCALE 1:20

NOTE: ENCLOSURES ARE REQUIRED IF THE CHUTE OPENS DIRECTLY TO A CORRIDOR OR IS NOT LOCATED IN A WASTE ROOM.

**VENT:**

PVC 150MM DIAMETER VENT PIPE WITH COWL, DEKTITE FLASHING AND EXTRACTION CAP FITTED FROM THE TOP OF THE CHUTES. PIPE EXITS AS PER REQUIRED BY BUILDER THROUGH PLANT ROOM ROOF AND CAPPED WITH GALVANISED STEEL REDUCTION CAP. ACCESS HATCH TO BE SUPPLIED ON LAST LEVEL FOR SERVICING OF THE WASH DOWN SYSTEM

**CHUTE DOORS**

SUPPLY AND FIT STAINLESS STEEL, TWO HOUR FIRE-RATED (AS1530.4-2005) REFUSE CHUTE DOORS AND THROAT ASSEMBLIES AT EACH SERVICE LEVEL. ALL DOORS ARE FITTED WITH A SELF-CLOSING MECHANISM TO MEET BSA FIRE STANDARDS. DOORS TO BE BLOCKED IN BY OTHERS INSTALLATION OF DOORS ON COMPLETION OF THE BUILDING STRUCTURE, THE CHUTE PIPES BRICKED IN, RENDERED AND THE WALLS PAINTED.

**OPTIONAL EQUIPMENT**

ELEPHANTS FOOT SUPPLY BALERS SUITABLE FOR BALING CARDBOARD PRODUCT IN COMMERCIAL, RETAIL AND RESIDENTIAL AREAS. BALED PRODUCT REDUCES THE REQUIREMENTS FOR ADDITIONAL COLLECTION EQUIPMENT. STATE OF THE ART COMPACTORS ARE ALSO AVAILABLE IN AUGER, BLADE AND ECO MODELS.

| Rev | Date | Description | By |
|---|---|---|---|
| A | XX.XX.14 | FOR REVIEW | EB |

ELEPHANTS FOOT recycling solutions
44-46 Gibson Ave Padstow NSW 2211
Ph 02 9780 3500 Info@elephantsfoot.com.au
Free Call 1800 025 073 Fax 02 9707 2588

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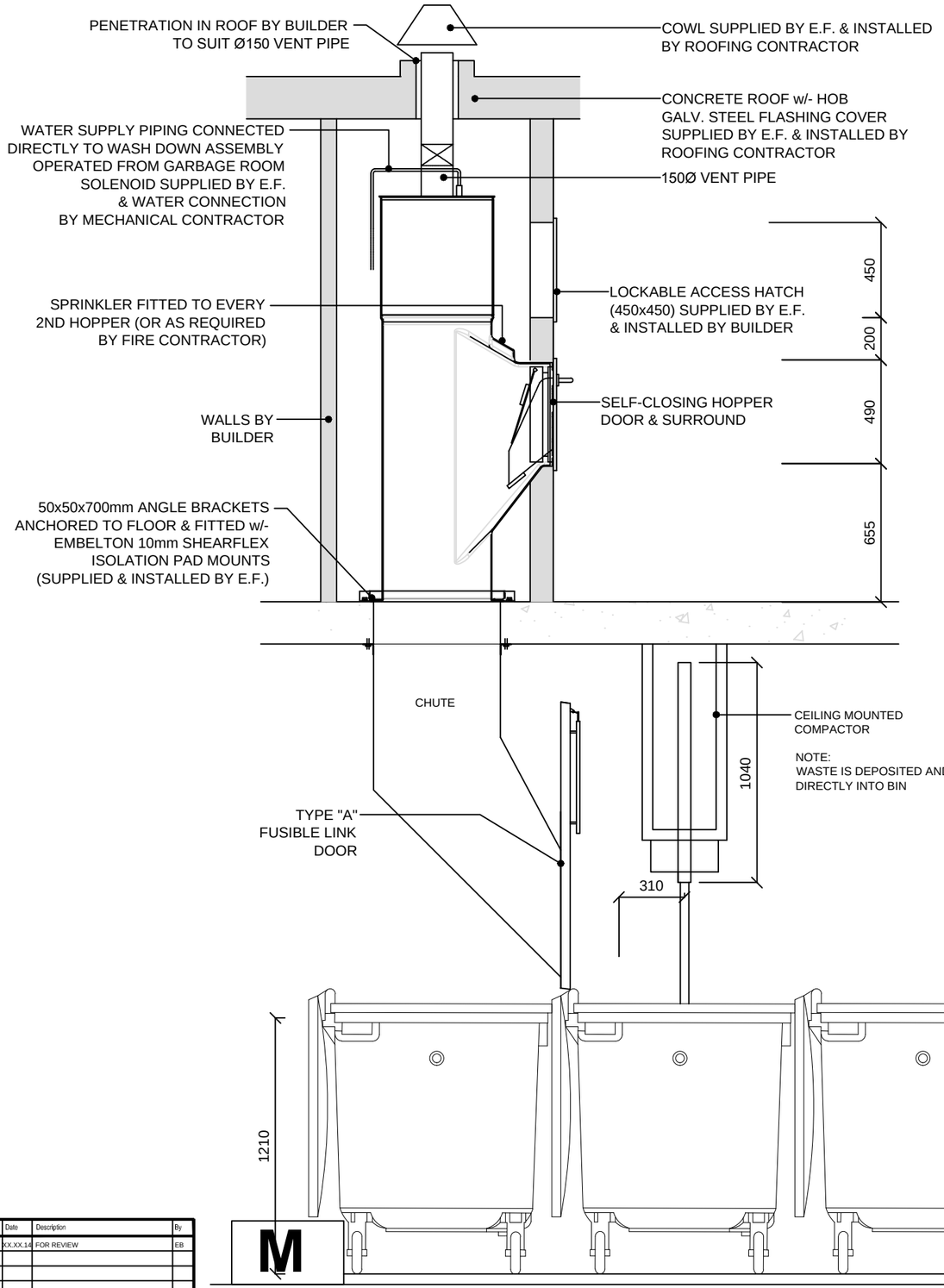
Checked BATME
Scale 1:100 Sheet Size A3

ELEPHANTS FOOT
RECYCLING SOLUTIONS

TYPICAL DUAL CHUTE LAYOUTS

Title: STANDARD DETAILS

Job Number EF-ST | Drawing Number P-00 | Revision A




**VENT:**

PVC 150MM DIAMETER VENT PIPE WITH COWL, DEKTITE FLASHING AND EXTRACTION CAP FITTED FROM THE TOP OF THE CHUTES. PIPE EXITS AS PER REQUIRED BY BUILDER THROUGH PLANT ROOM ROOF AND CAPPED WITH GALVANISED STEEL REDUCTION CAP. ACCESS HATCH TO BE SUPPLIED ON LAST LEVEL FOR SERVICING OF THE WASH DOWN SYSTEM

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**FIRE**

FIRE SYSTEM CONTRACTOR TO:

- SUPPLY FIRE SPRINKLERS AND CONNECTION FOR SPRINKLER SYSTEM
- SPRINKLERS FITTED ON EVERY 2ND LEVEL (OR AS PER FIRE CONTRACTOR INSTRUCTION)

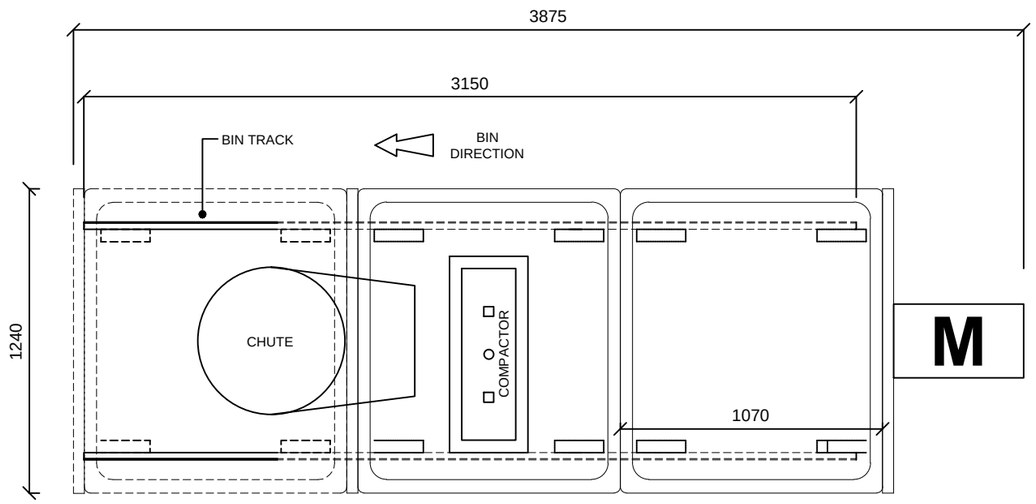
**ELECTRICAL**

YOUR ELECTRICIAN TO PROVIDE:

- ONE (1) STANDARD 240V GPO IN MAIN GARBAGE ROOM
- ONE (1) 415VOLTS, 5 PINS, 20AMPS FOR EACH REQUIRED COMPACTOR, CAROUSEL OR LINEAR
- COORDINATE WITH ELECTRICAL SUBCONTRACTOR

**OPTIONAL EQUIPMENT**

ELEPHANTS FOOT SUPPLY BALERS SUITABLE FOR BALING CARDBOARD PRODUCT IN COMMERCIAL, RETAIL AND RESIDENTIAL AREAS. BALED PRODUCT REDUCES THE REQUIREMENTS FOR ADDITIONAL COLLECTION EQUIPMENT. STATE OF THE ART COMPACTORS ARE ALSO AVAILABLE IN AUGER, BLADE AND ECO MODELS.




TYPICAL 2-BIN 1100L LINEAR WITH COMPACTOR
SCALE NTS

| Rev | Date | Description | By |
|---|---|---|---|
| A | XX.XX.14 | FOR REVIEW | EB |

ELEPHANTS FOOT recycling solutions
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Ph 02 9780 3500
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info@elephantsfoot.com.au
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|---|---|
| EBOONE | 25.08.14 |
| Checked | |
| BATME | |
| Scale | Sheet Size |
| 1:100 | A3 |

ELEPHANTS FOOT
RECYCLING SOLUTIONS

510Ø PLASTIC CHUTE
2-BIN 1100L LINEAR TRACK
WITH COMPACTOR

Title
STANDARD DETAILS

| Job Number | Drawing Number | Revison |
|---|---|---|
| EF-ST | P-00 | A |

# Appendix H.
# STRUCTURAL ASSESSMENT

Our Ref: J6953 DA Statement 01 Rev A

7/12/2020

Paynter Dixon Constructions Pty Ltd
Level 2, 2 Richardson Place, Riverside Corporate Park

Attention: Mohamed Sallam

Dear: Mohamed

**RE: 15-31 HARBOUR DRIVE, COFFS HARBOUR - STRUCTURAL ENGINEERING LETTER**

This letter has been prepared to provide a Structural Engineering Statement to accompany the DA submission in relation to the above project address.

We confirm that our preliminary conceptual design follows the architectural scheme as documented by Turner Architects drawings DA-110-001, 005, 010, 020, 030, 040, 050, 060, 070, 080, 090, 110, 110, 120 and 130 inclusive.

We also confirm that our Preliminary Conceptual Design takes appropriate consideration of the geotechnical considerations outlined by the following neighbouring sites:

- Ex-Service Club Coffs Harbour by Regional Geotechnical Solutions (Report RGS31484.4 – AB)
- Ex-Service Club Coffs Harbour by Douglas Partner (Project 19,538)
- 5-9 Duke Street by D and N (Report Number C-0378.00 R1)

When referencing the above-mentioned Geotechnical Reports, we found that the soils for the neighbouring sites could adopt a bored or screw pile foundation solution. For economic reasons, a screw piled solution will be adopted for 13-31 Harbour Drive, Coffs Harbour. The decision to use screw piles is dependent on the verification of a site-specific geotechnical investigation.

We also confirm that our Structural Preliminary Conceptual Design and Sketch Documentation, is compliant with the relevant structural provisions of the Building Code of Australia and the following Australian Standards.

- AS/NZS 1170.0 GENERAL PRINCIPLES
- AS/NZS 1170.0 PERMANENT, IMPOSED AND OTHER ACTIONS
- AS/NZS 1170.2 WIND LOADS
- AS/NZS 1170.4 EARTHQUAKE LOADS
- AS 3600 CONCTRETE STRUCTURES
- AS 4100 STEEL STRUCTURES

Please contact the undersigned if you require any further information.

Yours faithfully,

Alan Dowling BSc (Eng) DipEng TechDipEng MIEAust CPEng NER RPEQ
Principal Engineer & Business Manager



IZZAT CONSULTING ENGINEERS PTY LTD
Suite 4, 56 Hudson St Hamilton NSW | PO Box 988 Hamilton NSW 2303 | phone +61 2 4940 0090
fax +61 2 4940 0091 | email mail@izzat.com.au | www.izzat.com.au | abn 60 110 255 582

CONSULT AUSTRALIA
Member Firm

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Different thinking. Smarter solutions.

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**Attachments**

- Appendix A – Drawings



CONSULT AUSTRALIA Member Firm
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## APPENDIX A DRAWINGS



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1 / - **Ground Level**
**1:200**

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A DOCKRILL FAMILY COMPANY

DATE: 07/12/2020

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*DLCS Quality Endorsed Company ISO 9001:2015, Registration Number 20476*
*Nominated Architect: Nicholas Turner 6695, ABN 86 064 084 911*

**CLIENT**
**Paynter Dixon**
*Level 2 2 Richardson Place Riverside*
*Corporate Park North Ryde NSW 2113*

*Project Title*
**15-31 Harbour Drive**
*Harbour Drive Coffs Harbour State Postcode Country*

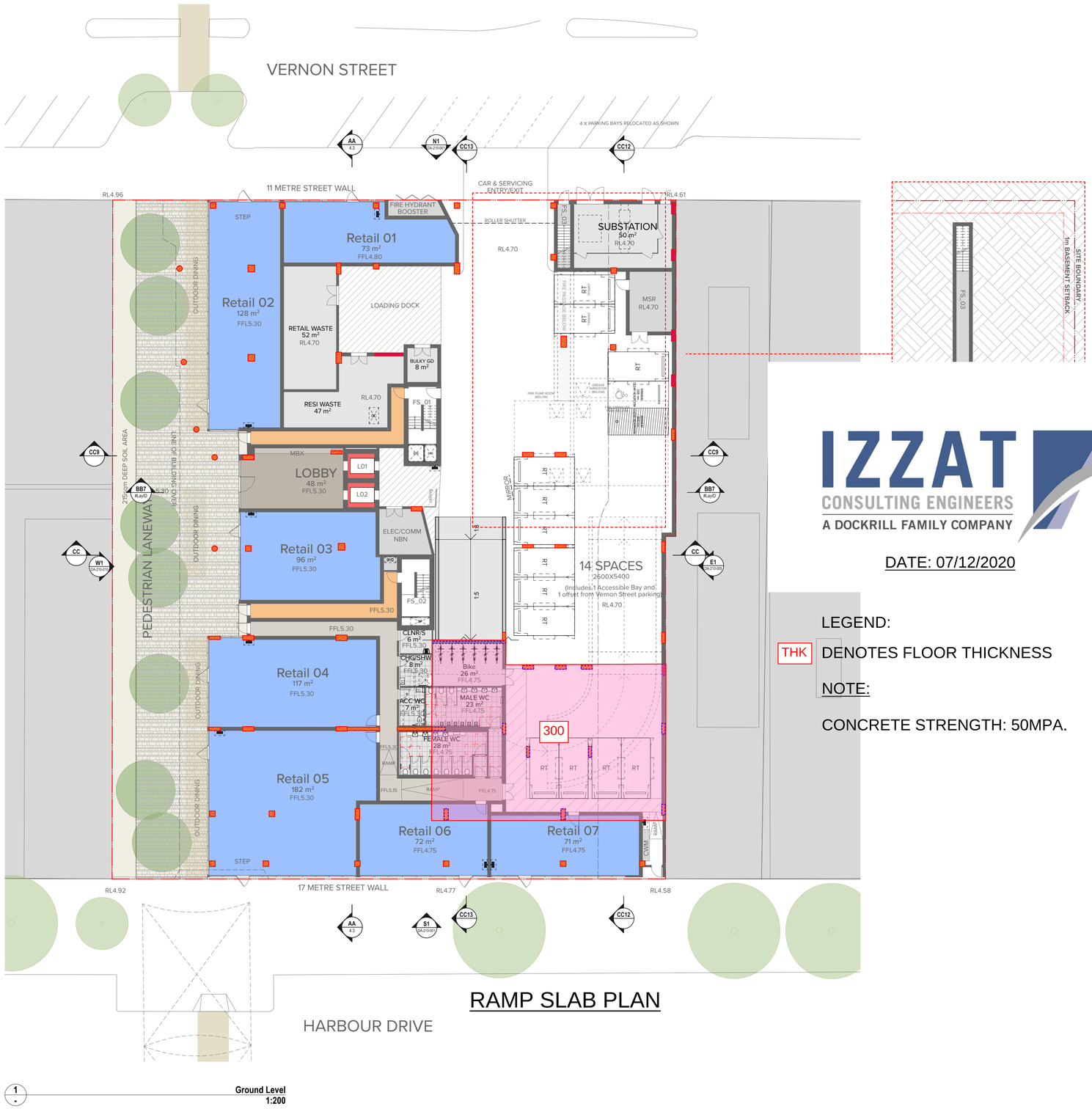
*Drawing Title*
**GA Plans**
**Ground Level**

| Rev | Date | Approved by | Revision Notes |
|---|---|---|---|
| 05 | 01.12.20 | BF | For Coordination |
| 04 | 27.11.20 | BF | For Coordination |
| 03 | 20.11.20 | BF | For Coordination |
| 02 | 11.11.20 | BF | For Coordination |
| 01 | 29.10.20 | BF | For Coordination |

*Scale* 1:200 @A1, 50%@A3
*Status* For Information
*Project No.* 20023
*Dwg No.* DA-110-001
*Drawn by* TURNER
*Rev* 05
*North*

TURNER

*Level 7 ONE Oxford Street*
*Darlinghurst NSW 2010*
*AUSTRALIA*
*T +61 2 8668 0000*
*F +61 2 8668 0088*
*turnerstudio.com.au*




# RAMP SLAB PLAN

1 / - **Ground Level**
**1:200**

IZZAT CONSULTING ENGINEERS
A DOCKRILL FAMILY COMPANY

DATE: 07/12/2020

LEGEND:

THK DENOTES FLOOR THICKNESS

NOTE:

CONCRETE STRENGTH: 50MPA.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| 02 | 11.11.20 | BF | For Coordination |
| 01 | 29.10.20 | BF | For Coordination |

*Project Title*
**15-31 Harbour Drive**
*Harbour Drive Coffs Harbour State Postcode Country*

*Drawing Title*
**GA Plans**
**Ground Level**

*Scale* 1:200 @A1, 50%@A3
*Status* For Information
*Project No.* 20023
*Dwg No.* DA-110-001
*Drawn by* TURNER
*Rev* 05
*North*


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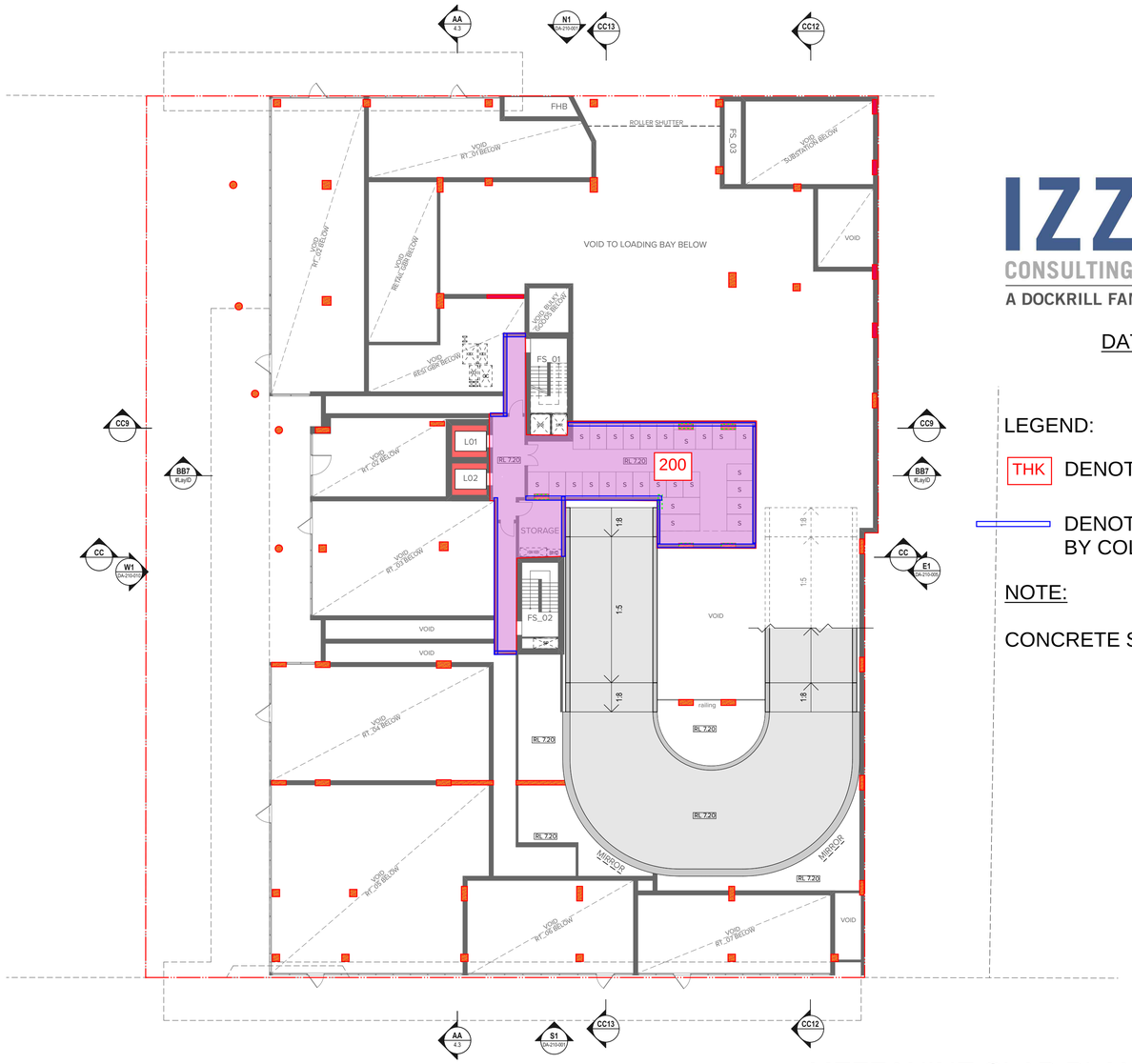
AA
A3
N1
CC13
CC12
FHB
ROLLER SHUTTER
FS_03
VOID TO LOADING BAY BELOW
VOID
VOID
VOID

VERNON STREET

L1 SLAB PLAN

HARBOUR DRIVE

1 Level 01
- 1:200

IZZAT CONSULTING ENGINEERS
A DOCKRILL FAMILY COMPANY

DATE: 07/12/2020

LEGEND:

THK DENOTES FLOOR THICKNESS

NOTE:

NO PLANTER LOADS HAVE BEEN ALLOWED TO ALL AREAS.

ALL RESIDENTIAL INTERNAL WALLS ARE ASSUMED TO BE OF LIGHTWEIGHT CONSTRUCTION.

ALL PARKING/DRIVEWAY LOADING ASSUMED TO BE LIGHT VEHICLE (NOT EXCEEDING 2500KG GROSS MASS).

ALL BEAM/SLAB ARE POST-TENSIONED.

CONCRETE STRENGTH: 50MPA.


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DLCS Quality Endorsed Company: ISO 9001:2015, Registration Number 20476
Nominated Architect: Nicholas Turner 6695, ABN 86 064 084 911


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Corporate Park North Ryde NSW 2113

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| 02 | 11.11.20 | BF | For Coordination |
| 01 | 29.10.20 | BF | For Coordination |

Project Title
**15-31 Harbour Drive**
Harbour Drive Coffs Harbour State Postcode Country

Drawing Title
**GA Plans**
**Level 01**

Scale: 1:200 @A1, 50%@A3
Project No.: 20023
Drawn by: TURNER
Status: For Information
Dwg No.: DA-110-010
Rev: 05
North


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VERNON STREET

L2 SLAB PLAN

HARBOUR DRIVE

1 / - Level 02 1:200

IZZAT CONSULTING ENGINEERS
A DOCKRILL FAMILY COMPANY

DATE: 07/12/2020

LEGEND:

THK DENOTES FLOOR THICKNESS

NOTE:

NO PLANTER LOADS HAVE BEEN ALLOWED TO ALL AREAS.

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ALL PARKING/DRIVEWAY LOADING ASSUMED TO BE LIGHT VEHICLE (NOT EXCEEDING 2500KG GROSS MASS).

ALL BEAM/SLAB ARE POST-TENSIONED.

CONCRETE STRENGTH: 50MPA.


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DLCS Quality Endorsed Company: ISO 9001:2015, Registration Number 20476
Nominated Architect: Nicholas Turner 6695, ABN 86 064 084 911


**CLIENT**
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Corporate Park North Ryde NSW 2113

Project Title
**15-31 Harbour Drive**
Harbour Drive Coffs Harbour State Postcode Country

Drawing Title
**GA Plans**
**Level 02**

| Rev | Date | Approved by | Revision Notes |
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| 04 | 27.11.20 | BF | For Coordination |
| 03 | 20.11.20 | BF | For Coordination |
| 02 | 11.11.20 | BF | For Coordination |
| 01 | 29.10.20 | BF | For Coordination |

Scale: 1:200 @A1, 50%@A3
Status: For Information
Project No.: 20023
Dwg No.: DA-110-020
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Rev: 05
North


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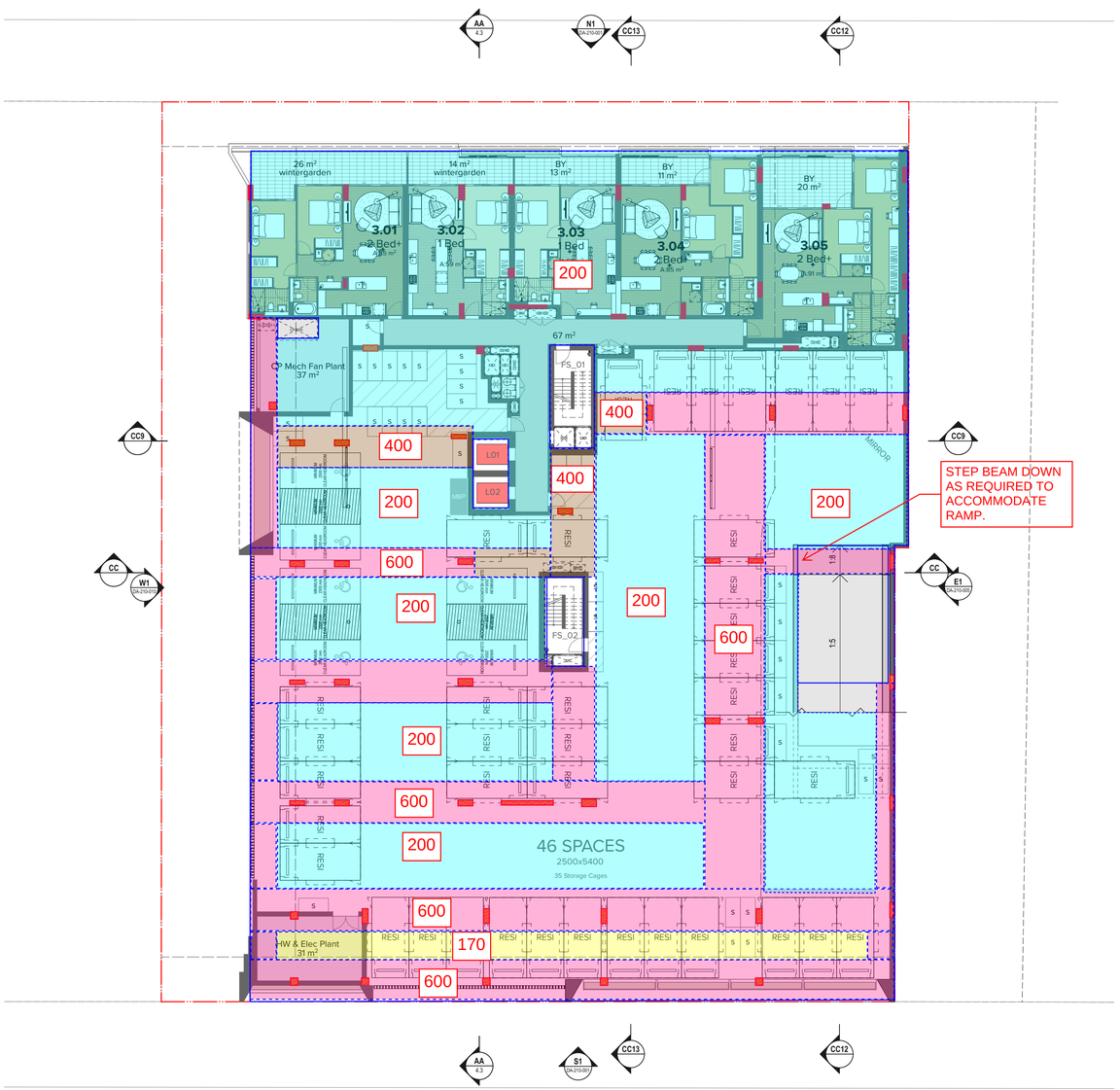
VERNON STREET




L3 SLAB PLAN

HARBOUR DRIVE

1 / - Level 03 1:200

IZZAT CONSULTING ENGINEERS
A DOCKRILL FAMILY COMPANY

DATE: 07/12/2020

LEGEND:

THK DENOTES FLOOR THICKNESS

NOTE:

NO PLANTER LOADS HAVE BEEN ALLOWED TO ALL AREAS.

ALL RESIDENTIAL INTERNAL WALLS ARE ASSUMED TO BE OF LIGHTWEIGHT CONSTRUCTION.

ALL PARKING/DRIVEWAY LOADING ASSUMED TO BE LIGHT VEHICLE (NOT EXCEEDING 2500KG GROSS MASS).

ALL BEAM/SLAB ARE POST-TENSIONED.

CONCRETE STRENGTH: 50MPA.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DLCS Quality Endorsed Company: ISO 9001:2015, Registration Number 20476
Nominated Architect: Nicholas Turner 6695, ABN 86 064 084 911


**CLIENT**
**Paynter Dixon**
Level 2 2 Richardson Place Riverside
Corporate Park North Ryde NSW 2113

Project Title
**15-31 Harbour Drive**
Harbour Drive Coffs Harbour State Postcode Country

Drawing Title
**GA Plans**
**Level 03**

| Rev | Date | Approved by | Revision Notes |
|---|---|---|---|
| 05 | 01.12.20 | BF | For Coordination |
| 04 | 27.11.20 | BF | For Coordination |
| 03 | 20.11.20 | BF | For Coordination |
| 02 | 11.11.20 | BF | For Coordination |
| 01 | 29.10.20 | BF | For Coordination |

Scale: 1:200 @A1, 50%@A3
Project No.: 20023
Drawn by: TURNER
North
Status: For Information
Dwg No.: DA-110-030
Rev: 05


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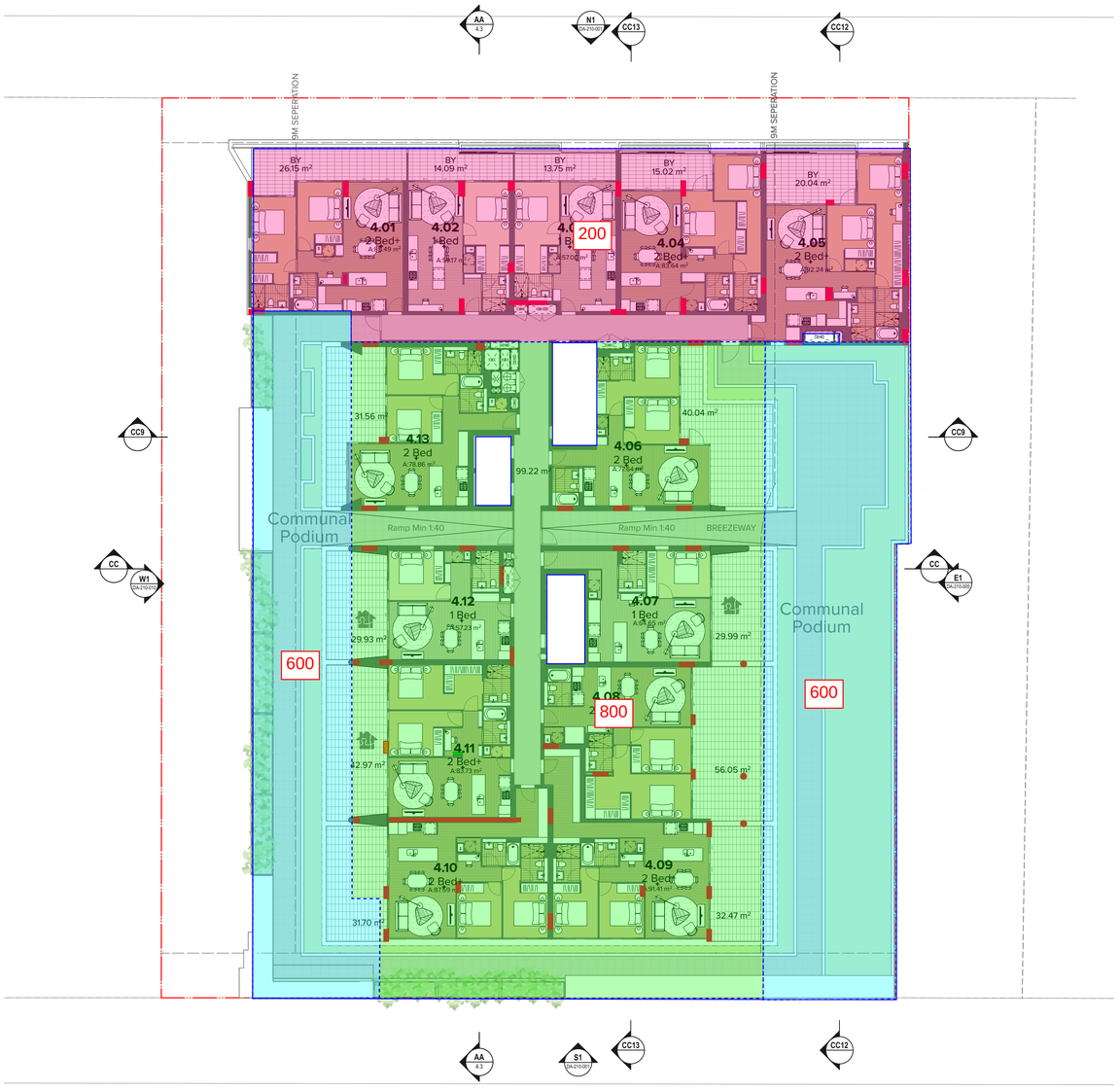


L4 SLAB PLAN

HARBOUR DRIVE

1 / - Level 04 1:200

IZZAT CONSULTING ENGINEERS
A DOCKRILL FAMILY COMPANY

DATE: 07/12/2020

LEGEND:

THK DENOTES FLOOR THICKNESS

NOTE:

NO PLANTER LOADS HAVE BEEN ALLOWED TO ALL AREAS.

ALL RESIDENTIAL INTERNAL WALLS ARE ASSUMED TO BE OF LIGHTWEIGHT CONSTRUCTION.

ALL BEAM/SLAB ARE POST-TENSIONED.

CONCRETE STRENGTH: 50MPA.

COLUMN & WALL SIZE TO BE CONFIRMED LATER.


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*DLCS Quality Endorsed Company: ISO 9001:2015, Registration Number 20476*
*Nominated Architect: Nicholas Turner 6585, ABN 86 094 694 911*


**CLIENT**
**Paynter Dixon**
*Level 2 2 Richardson Place Riverside*
*Corporate Park North Ryde NSW 2113*

*Project Title*
**15-31 Harbour Drive**
*Harbour Drive Coffs Harbour State Postcode Country*

*Drawing Title*
**GA Plans**
**Level 04**

| Rev | Date | Approved by | Revision Notes |
|---|---|---|---|
| 04 | 01.12.20 | BF | For Coordination |
| 03 | 20.11.20 | BF | For Coordination |
| 02 | 11.11.20 | BF | For Coordination |
| 01 | 29.10.20 | BF | For Coordination |

*Scale* 1:200 @A1, 50%@A3
*Project No.* 20023
*Drawn by* TURNER
*North*
*Status* For Information
*Dwg No.* DA-110-040
*Rev* 04


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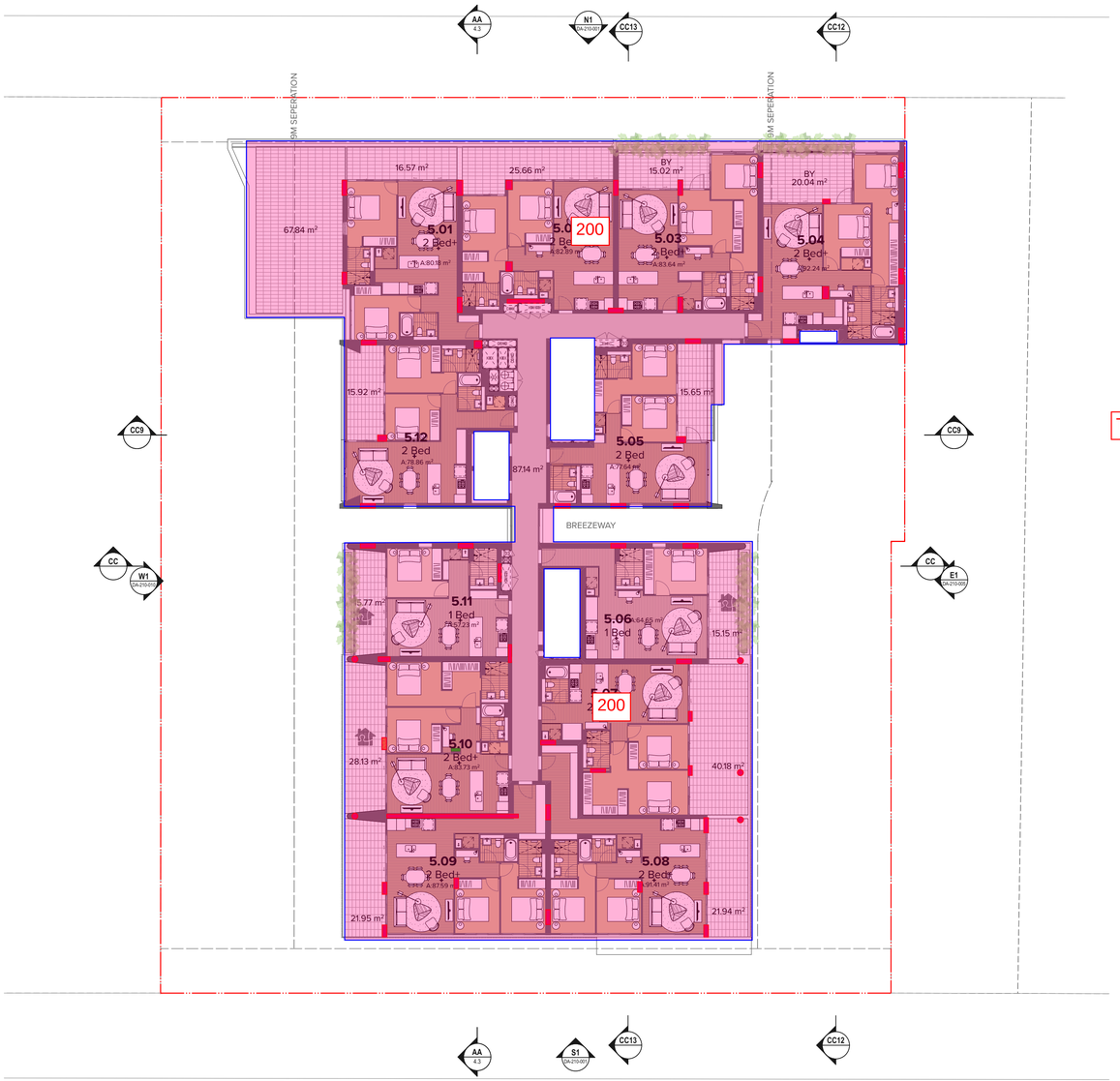


L5 SLAB PLAN

HARBOUR DRIVE

1 / - Level 05 1:200

IZZAT CONSULTING ENGINEERS
A DOCKRILL FAMILY COMPANY

DATE: 07/12/2020

LEGEND:

THK DENOTES FLOOR THICKNESS

NOTE:

NO PLANTER LOADS HAVE BEEN ALLOWED TO ALL AREAS.

ALL RESIDENTIAL INTERNAL WALLS ARE ASSUMED TO BE OF LIGHTWEIGHT CONSTRUCTION.

ALL BEAM/SLAB ARE POST-TENSIONED.

CONCRETE STRENGTH: 50MPA.

COLUMN & WALL SIZE TO BE CONFIRMED LATER.


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*DLCS Quality Endorsed Company: ISO 9001:2015, Registration Number 20476*
*Nominated Architect: Nicholas Turner 6565, ABN 86 064 084 911*


**CLIENT**
**Paynter Dixon**
*Level 2 2 Richardson Place Riverside*
*Corporate Park North Ryde NSW 2113*

| Rev | Date | Approved by | Revision Notes |
|---|---|---|---|
| 04 | 01.12.20 | BF | For Coordination |
| 03 | 20.11.20 | BF | For Coordination |
| 02 | 11.11.20 | BF | For Coordination |
| 01 | 29.10.20 | BF | For Coordination |

*Project Title*
**15-31 Harbour Drive**
*Harbour Drive Coffs Harbour State Postcode Country*

*Drawing Title*
**GA Plans**
**Level 05**

*Scale* 1:200 @A1, 50%@A3
*Status* For Information
*Project No.* 20023
*Dwg No.* DA-110-050
*Drawn by* TURNER
*Rev* 04
*North*


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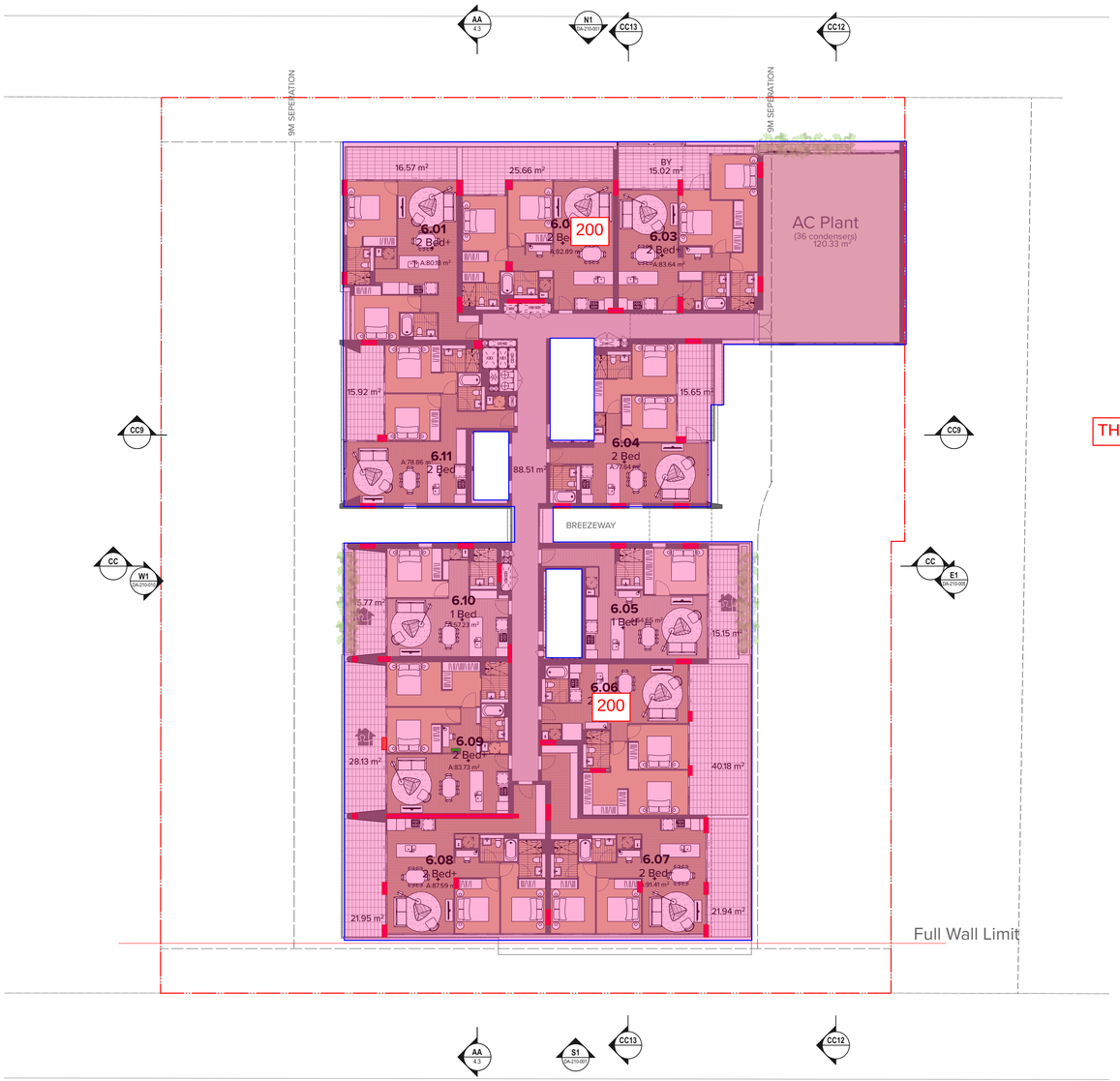


L6 SLAB PLAN

HARBOUR DRIVE

1 / - Level 06 1:200

IZZAT CONSULTING ENGINEERS
A DOCKRILL FAMILY COMPANY

DATE: 07/12/2020

LEGEND:

THK DENOTES FLOOR THICKNESS

NOTE:

NO PLANTER LOADS HAVE BEEN ALLOWED TO ALL AREAS.

ALL RESIDENTIAL INTERNAL WALLS ARE ASSUMED TO BE OF LIGHTWEIGHT CONSTRUCTION.

ALL BEAM/SLAB ARE POST-TENSIONED.

CONCRETE STRENGTH: 50MPA.

COLUMN & WALL SIZE TO BE CONFIRMED LATER.


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*DLCS Quality Endorsed Company: ISO 9001:2015, Registration Number 20476*
*Nominated Architect: Nicholas Turner 6565, ABN 86 064 084 911*


**CLIENT**
**Paynter Dixon**
*Level 2 2 Richardson Place Riverside*
*Corporate Park North Ryde NSW 2113*

*Project Title*
**15-31 Harbour Drive**
*Harbour Drive Coffs Harbour State Postcode Country*

*Drawing Title*
**GA Plans**
**Level 06**

| Rev | Date | Approved by | Revision Notes |
|---|---|---|---|
| 04 | 01.12.20 | BF | For Coordination |
| 03 | 20.11.20 | BF | For Coordination |
| 02 | 11.11.20 | BF | For Coordination |
| 01 | 29.10.20 | BF | For Coordination |

*Scale* 1:200 @A1, 50%@A3
*Project No.* 20023
*Drawn by* TURNER
*North*
*Status* For Information
*Dwg No.* DA-110-060
*Rev* 04


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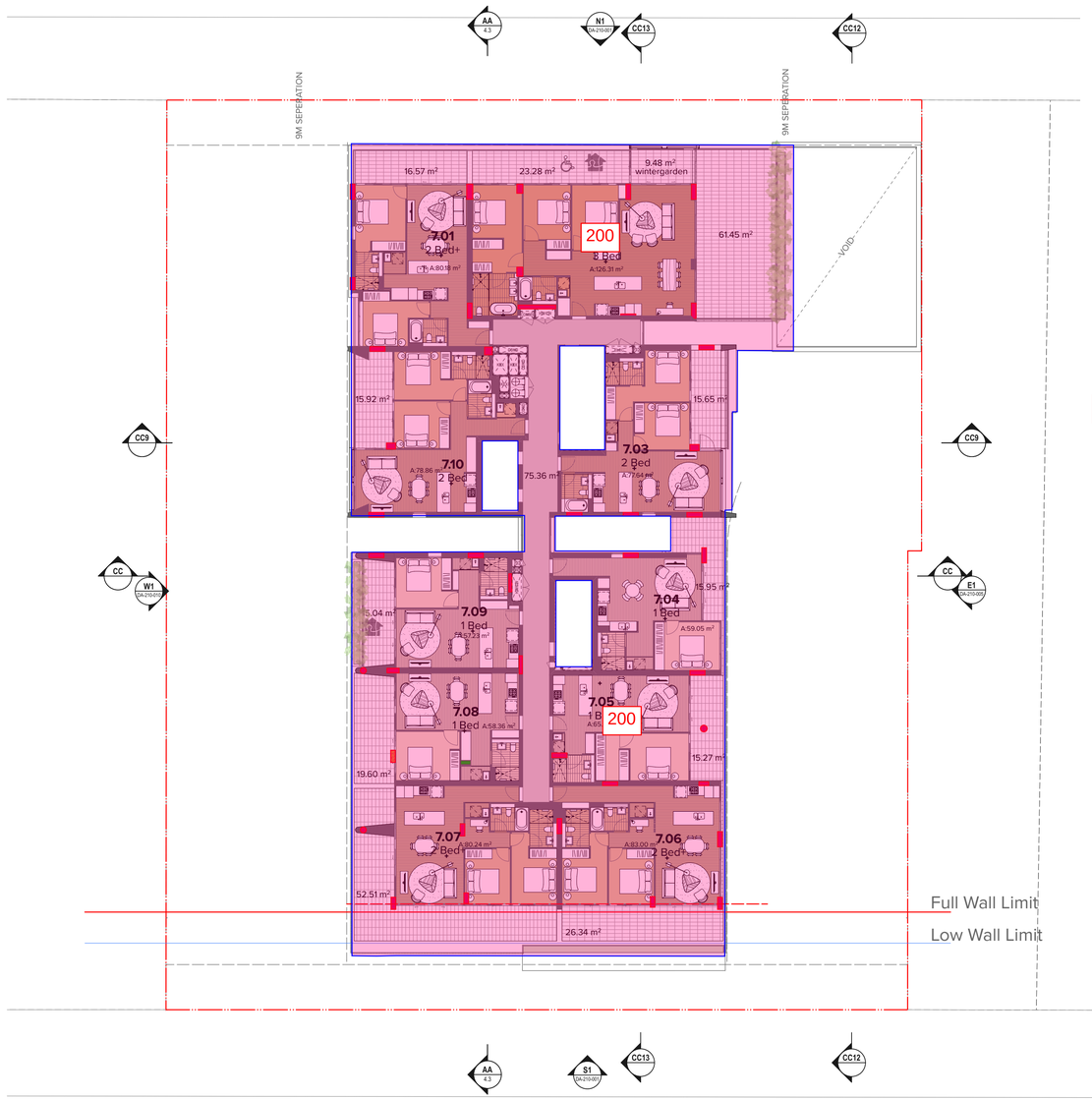


L7 SLAB PLAN

HARBOUR DRIVE

1 Level 07
- 1:200

IZZAT CONSULTING ENGINEERS
A DOCKRILL FAMILY COMPANY

DATE: 07/12/2020

LEGEND:

THK DENOTES FLOOR THICKNESS

NOTE:

NO PLANTER LOADS HAVE BEEN ALLOWED TO ALL AREAS.

ALL RESIDENTIAL INTERNAL WALLS ARE ASSUMED TO BE OF LIGHTWEIGHT CONSTRUCTION.

ALL BEAM/SLAB ARE POST-TENSIONED.

CONCRETE STRENGTH: 50MPA.

COLUMN & WALL SIZE TO BE CONFIRMED LATER.


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*Nominated Architect: Nicholas Turner 6595, ABN 86 064 084 911*


**CLIENT**
**Paynter Dixon**
*Level 2 2 Richardson Place Riverside*
*Corporate Park North Ryde NSW 2113*

*Project Title*
**15-31 Harbour Drive**
*Harbour Drive Coffs Harbour State Postcode Country*

*Drawing Title*
**GA Plans**
**Level 07**

| Rev | Date | Approved by | Revision Notes |
|---|---|---|---|
| 04 | 01.12.20 | BF | For Coordination |
| 03 | 20.11.20 | BF | For Coordination |
| 02 | 11.11.20 | BF | For Coordination |
| 01 | 29.10.20 | BF | For Coordination |

*Scale* 1:200 @A1, 50%@A3
*Status* For Information
*Project No.* 20023
*Dwg No.* DA-110-070
*Drawn by* TURNER
*Rev* 04
*North*


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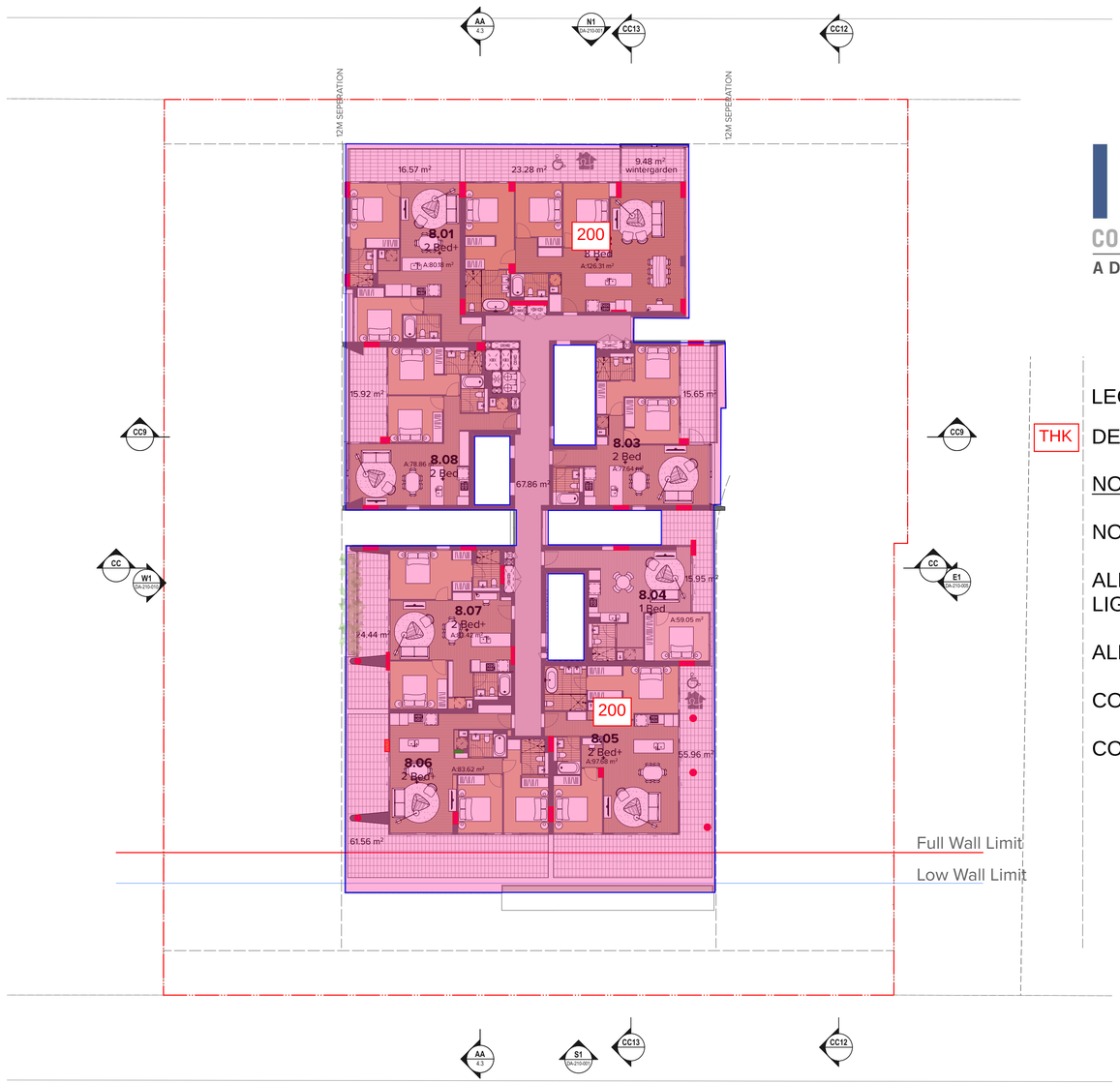


# L8 SLAB PLAN

HARBOUR DRIVE

1 / - Level 08 1:200

IZZAT CONSULTING ENGINEERS
A DOCKRILL FAMILY COMPANY

DATE: 07/12/2020

LEGEND:

THK DENOTES FLOOR THICKNESS

NOTE:

NO PLANTER LOADS HAVE BEEN ALLOWED TO ALL AREAS.

ALL RESIDENTIAL INTERNAL WALLS ARE ASSUMED TO BE OF LIGHTWEIGHT CONSTRUCTION.

ALL BEAM/SLAB ARE POST-TENSIONED.

CONCRETE STRENGTH: 50MPA.

COLUMN & WALL SIZE TO BE CONFIRMED LATER.


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*DLCS Quality Endorsed Company: ISO 9001:2015, Registration Number 20476*
*Nominated Architect: Nicholas Turner 6585, ABN 86 064 694 911*


**CLIENT**
**Paynter Dixon**
*Level 2 2 Richardson Place Riverside*
*Corporate Park North Ryde NSW 2113*

| Rev | Date | Approved by | Revision Notes |
|---|---|---|---|
| 04 | 01.12.20 | BF | For Coordination |
| 03 | 20.11.20 | BF | For Coordination |
| 02 | 11.11.20 | BF | For Coordination |
| 01 | 29.10.20 | BF | For Coordination |

*Project Title*
**15-31 Harbour Drive**
*Harbour Drive Coffs Harbour State Postcode Country*

*Drawing Title*
**GA Plans**
**Level 08**

*Scale* 1:200 @A1, 50%@A3
*Project No.* 20023
*Drawn by* TURNER
*Status* For Information
*Dwg No.* DA-110-080
*Rev* 04
*North*


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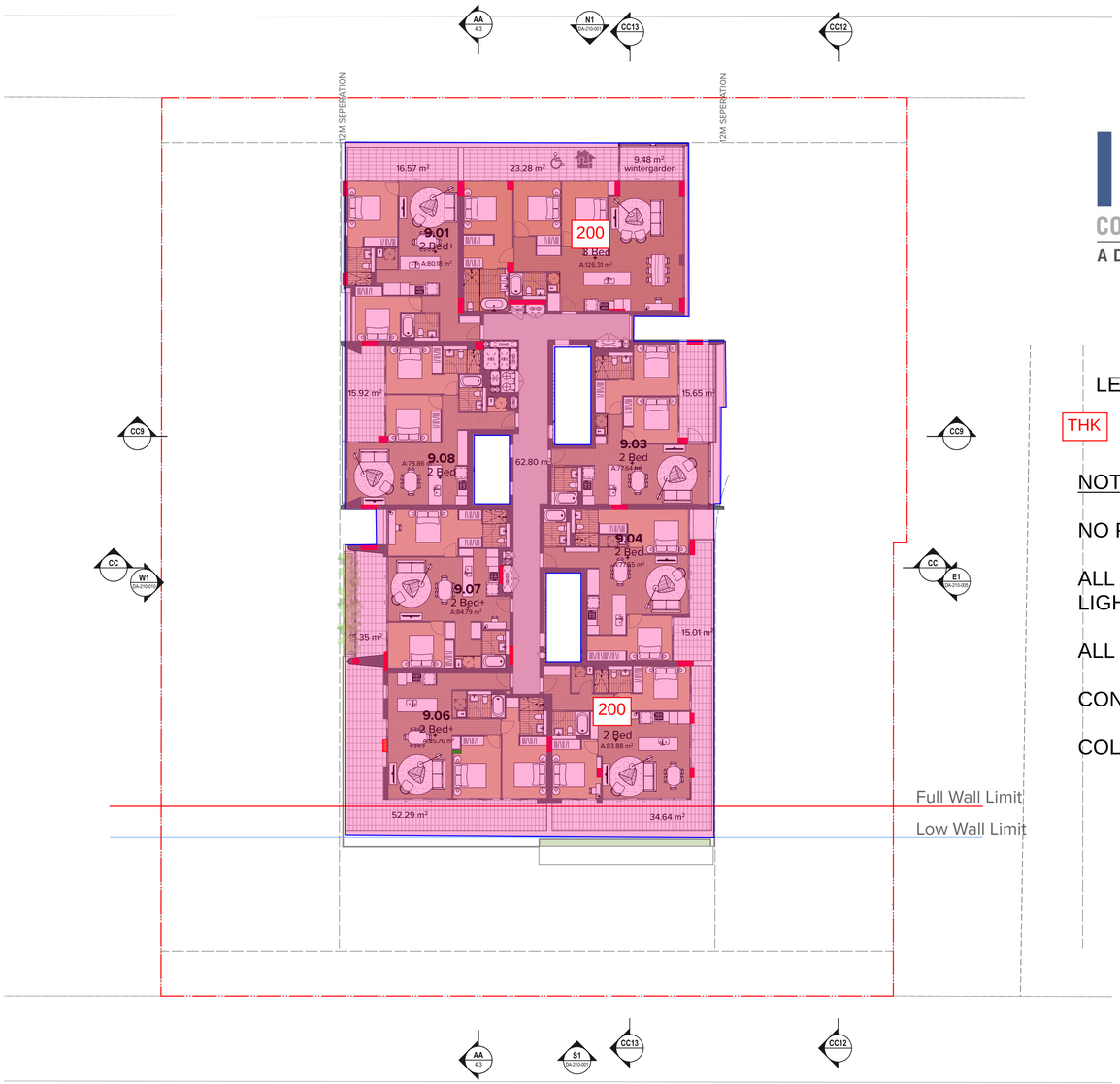


L9 SLAB PLAN

HARBOUR DRIVE

1 - Level 09 1:200

IZZAT CONSULTING ENGINEERS
A DOCKRILL FAMILY COMPANY

DATE: 07/12/2020

LEGEND:

THK DENOTES FLOOR THICKNESS

NOTE:

NO PLANTER LOADS HAVE BEEN ALLOWED TO ALL AREAS.

ALL RESIDENTIAL INTERNAL WALLS ARE ASSUMED TO BE OF LIGHTWEIGHT CONSTRUCTION.

ALL BEAM/SLAB ARE POST-TENSIONED.

CONCRETE STRENGTH: 50MPA.

COLUMN & WALL SIZE TO BE CONFIRMED LATER.


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*Nominated Architect: Nicholas Turner 6595, ABN 86 064 084 911*


**CLIENT**
**Paynter Dixon**
*Level 2 2 Richardson Place Riverside*
*Corporate Park North Ryde NSW 2113*

*Project Title*
**15-31 Harbour Drive**
*Harbour Drive Coffs Harbour State Postcode Country*

*Drawing Title*
**GA Plans**
**Level 09**

| Rev | Date | Approved by | Revision Notes |
|---|---|---|---|
| 04 | 01.12.20 | BF | For Coordination |
| 03 | 20.11.20 | BF | For Coordination |
| 02 | 11.11.20 | BF | For Coordination |
| 01 | 29.10.20 | BF | For Coordination |

*Scale* 1:200 @A1, 50%@A3
*Status* For Information
*Project No.* 20023
*Dwg No.* DA-110-090
*Drawn by* TURNER
*Rev* 04
*North*


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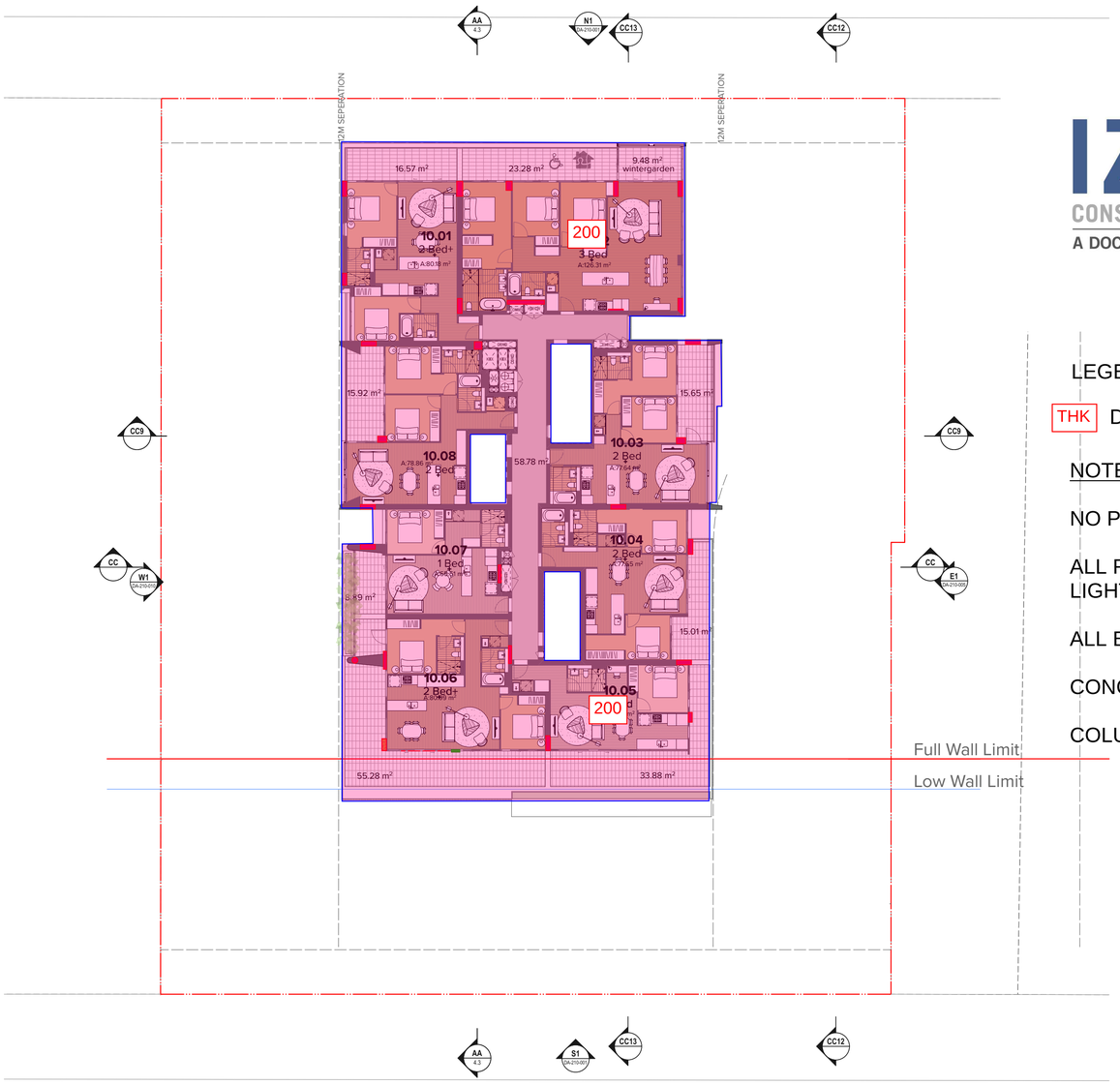


# L10 SLAB PLAN

HARBOUR DRIVE

1 - Level 10
1:200

IZZAT CONSULTING ENGINEERS
A DOCKRILL FAMILY COMPANY

DATE: 07/12/2020

LEGEND:

THK DENOTES FLOOR THICKNESS

NOTE:

NO PLANTER LOADS HAVE BEEN ALLOWED TO ALL AREAS.

ALL RESIDENTIAL INTERNAL WALLS ARE ASSUMED TO BE OF LIGHTWEIGHT CONSTRUCTION.

ALL BEAM/SLAB ARE POST-TENSIONED.

CONCRETE STRENGTH: 50MPA.

COLUMN & WALL SIZE TO BE CONFIRMED LATER.


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*Nominated Architect: Nicholas Turner 6505, ABN 86 094 694 911*


**CLIENT**
**Paynter Dixon**
*Level 2 2 Richardson Place Riverside*
*Corporate Park North Ryde NSW 2113*

| Rev | Date | Approved by | Revision Notes |
|---|---|---|---|
| 04 | 01.12.20 | BF | For Coordination |
| 03 | 20.11.20 | BF | For Coordination |
| 02 | 11.11.20 | BF | For Coordination |
| 01 | 29.10.20 | BF | For Coordination |

*Project Title*
**15-31 Harbour Drive**
*Harbour Drive Coffs Harbour State Postcode Country*

*Drawing Title*
**GA Plans**
**Level 10**

*Scale* 1:200 @A1, 50%@A3
*Status* For Information
*Project No.* 20023
*Dwg No.* DA-110-100
*Drawn by* TURNER
*Rev* 04
*North*


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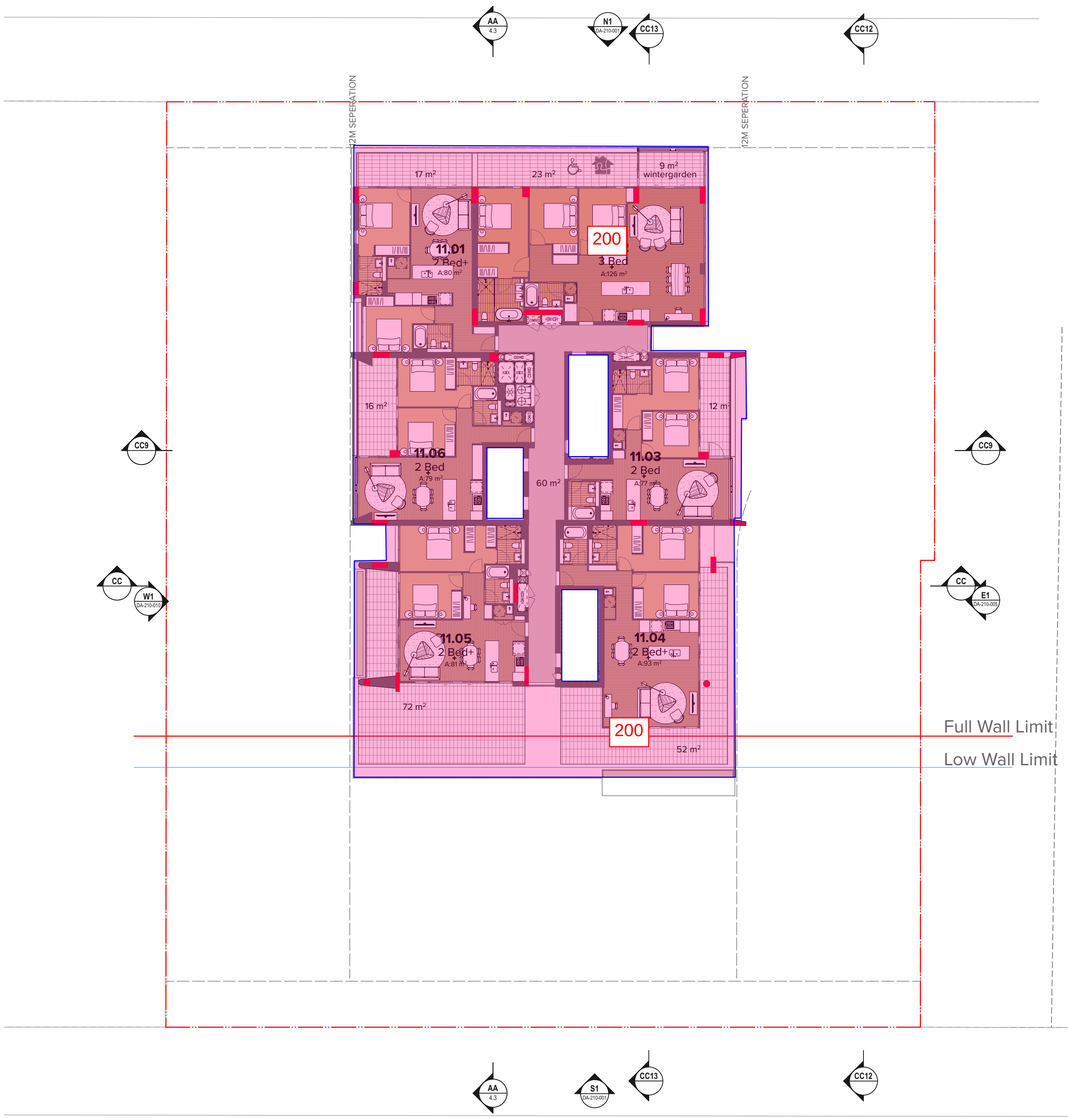


L11 SLAB PLAN

HARBOUR DRIVE

1
-
Level 11
1:200

IZZAT
CONSULTING ENGINEERS
A DOCKRILL FAMILY COMPANY

DATE: 07/12/2020

LEGEND:

THK DENOTES FLOOR THICKNESS

NOTE:

NO PLANTER LOADS HAVE BEEN ALLOWED TO ALL AREAS.

ALL RESIDENTIAL INTERNAL WALLS ARE ASSUMED TO BE OF LIGHTWEIGHT CONSTRUCTION.

ALL BEAM/SLAB ARE POST-TENSIONED.

CONCRETE STRENGTH: 50MPA.

COLUMN & WALL SIZE TO BE CONFIRMED LATER.

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DLCS Quality Endorsed Company ISO 9001:2015, Registration Number 20476
Nominated Architect: Nicholas Turner 6695, ABN 88 094 694 911

CLIENT
**Paynter Dixon**
Level 2 2 Richardson Place Riverside
Corporate Park North Ryde NSW 2113

Project Title
**15-31 Harbour Drive**
Harbour Drive Coffs Harbour State Postcode Country

Drawing Title
**GA Plans**
**Level 11**

| Rev | Date | Approved by | Revision Notes |
|---|---|---|---|
| 04 | 01.12.20 | BF | For Coordination |
| 03 | 20.11.20 | BF | For Coordination |
| 02 | 11.11.20 | BF | For Coordination |
| 01 | 29.10.20 | BF | For Coordination |

Scale: 1:200 @A1, 50%@A3
Project No.: 20023
Drawn by: TURNER
Status: For Information
Dwg No.: DA-110-110
Rev: 04
North

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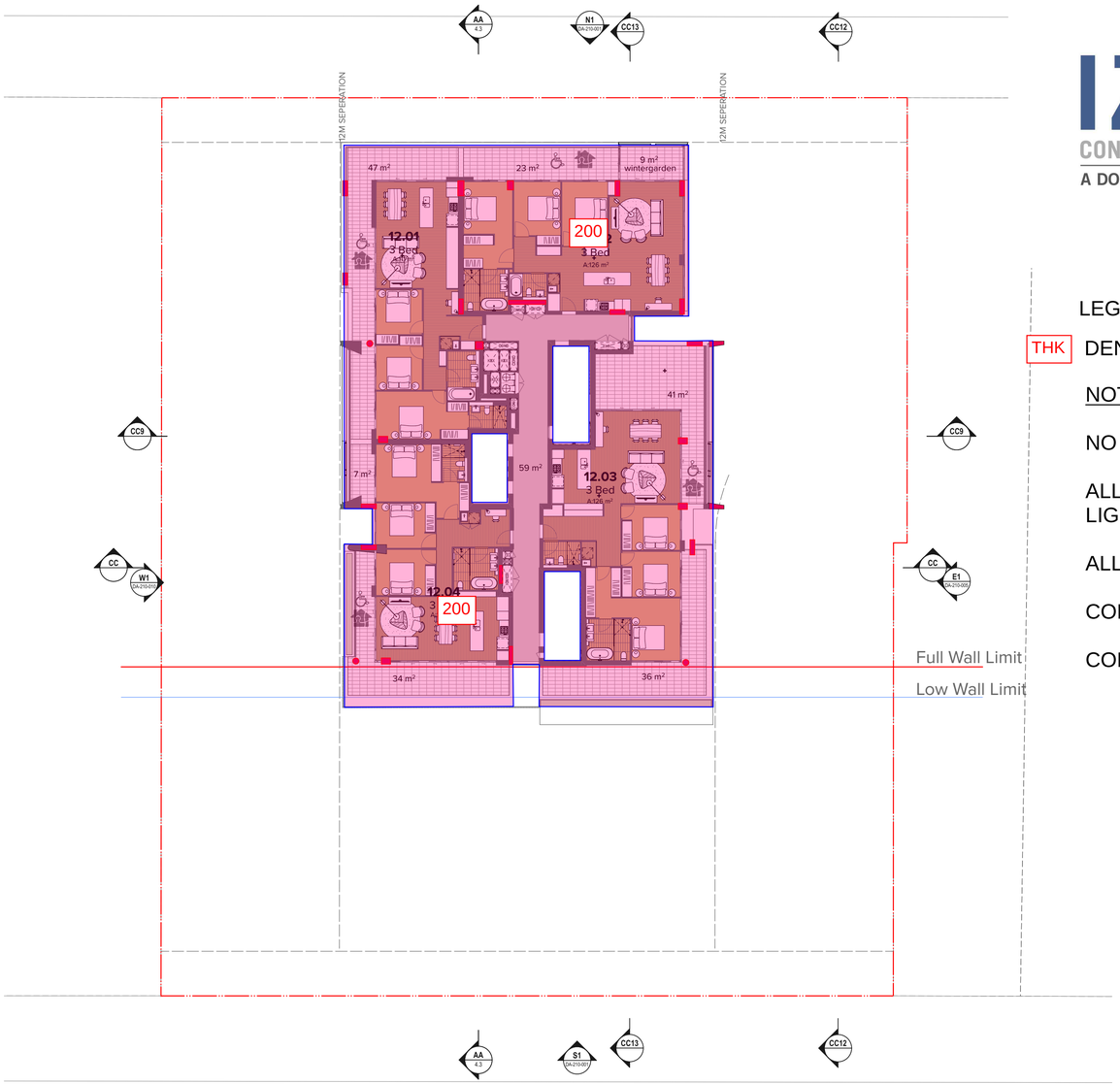


L12 SLAB PLAN

HARBOUR DRIVE

1 / - Level 12 1:200

IZZAT CONSULTING ENGINEERS
A DOCKRILL FAMILY COMPANY

DATE: 07/12/2020

LEGEND:

THK DENOTES FLOOR THICKNESS

NOTE:

NO PLANTER LOADS HAVE BEEN ALLOWED TO ALL AREAS.

ALL RESIDENTIAL INTERNAL WALLS ARE ASSUMED TO BE OF LIGHTWEIGHT CONSTRUCTION.

ALL BEAM/SLAB ARE POST-TENSIONED.

CONCRETE STRENGTH: 50MPA.

COLUMN & WALL SIZE TO BE CONFIRMED LATER.


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QLCS Quality Endorsed Company: ISO 9001:2015, Registration Number 20476
Nominated Architect: Nicholas Turner 6905, ABN 88 094 094 911


**CLIENT**
**Paynter Dixon**
Level 2 2 Richardson Place Riverside
Corporate Park North Ryde NSW 2113

Project Title
**15-31 Harbour Drive**
Harbour Drive Coffs Harbour State Postcode Country

Drawing Title
**GA Plans**
**Level 12**

| Rev | Date | Approved by | Revision Notes |
|---|---|---|---|
| 04 | 01.12.20 | BF | For Coordination |
| 03 | 20.11.20 | BF | For Coordination |
| 02 | 11.11.20 | BF | For Coordination |
| 01 | 29.10.20 | BF | For Coordination |

Scale **1:200 @A1, 50%@A3**
Status **For Information**
Project No. **20023**
Dwg No. **DA-110-120**
Drawn by **TURNER**
Rev **04**
North


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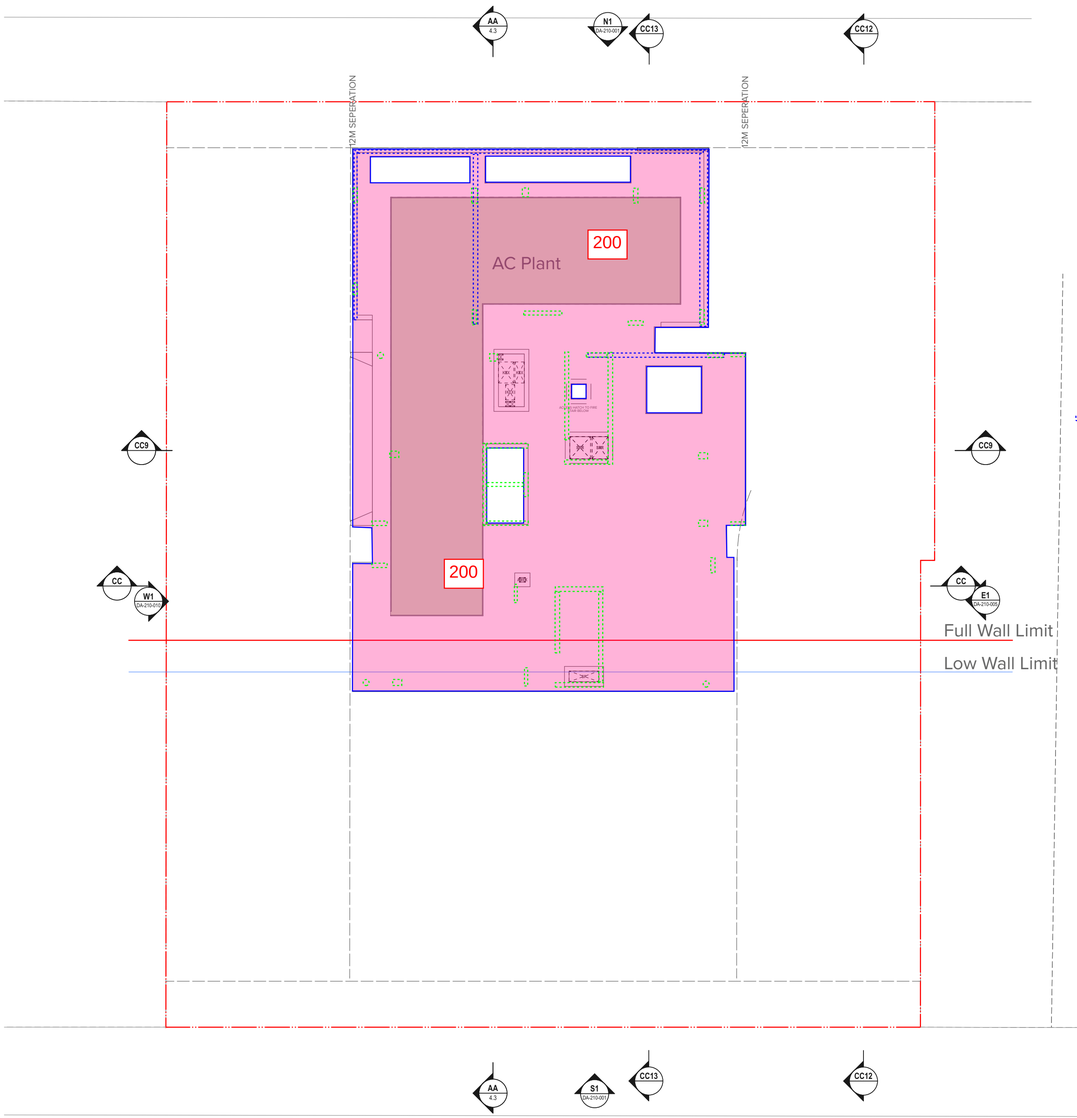
VERNON STREET




ROOF SLAB PLAN

HARBOUR DRIVE

1
-
Roof Level
1:200

IZZAT CONSULTING ENGINEERS
A DOCKRILL FAMILY COMPANY

DATE: 07/12/2020

LEGEND:

THK DENOTES FLOOR THICKNESS

DENOTES 400D BEAMS TO BE SUPPORTED BY COLUMNS BELOW

NOTE:

NO PLANTER LOADS HAVE BEEN ALLOWED TO ALL AREAS.

ALL BEAM/SLAB ARE POST-TENSIONED.

CONCRETE STRENGTH: 50MPA.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DLCS Quality Endorsed Company: ISO 9001:2015, Registration Number 20476
Nominated Architect: Nicholas Turner: 6695, ABN 86 064 084 911


**CLIENT**
**Paynter Dixon**
Level 2 2 Richardson Place Riverside
Corporate Park North Ryde NSW 2113

| Rev | Date | Approved by | Revision Notes |
|---|---|---|---|
| 05 | 01.12.20 | BF | For Coordination |
| 04 | 27.11.20 | BF | For Coordination |
| 03 | 20.11.20 | BF | For Coordination |
| 02 | 11.11.20 | BF | For Coordination |
| 01 | 29.10.20 | BF | For Coordination |

Project Title
**15-31 Harbour Drive**
Harbour Drive Coffs Harbour State Postcode Country

Drawing Title
**GA Plans**
**Roof Level**

Scale: 1:200 @A1, 50%@A3
Status: For Information
Project No.: 20023
Dwg No.: DA-110-130
Drawn by: TURNER
Rev: 05
North


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# GROUND FLOOR COLUMN/WALL PLAN

1 / - Ground Level 1:200

IZZAT CONSULTING ENGINEERS
A DOCKRILL FAMILY COMPANY

DATE: 07/12/2020

LEGEND:

- DENOTES 1000x500mm COLUMNS
- DENOTES 1000x400mm COLUMNS
- DENOTES 1000x300mm COLUMNS
- DENOTES 600x600mm COLUMNS
- DENOTES 500x500mm COLUMNS
- DENOTES 500mm dia. COLUMNS
- DENOTES 300mm RC WALLS
- DENOTES 400mm CONCRETE WALLS UP TO UNDERSIDE OF L4 & 275mm CONCRETE WALLS ABOVE L4

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DLCS Quality Endorsed Company ISO 9001:2015, Registration Number 20476
Nominated Architect: Nicholas Turner 6695, ABN 86 064 084 911

**CLIENT**

**Paynter Dixon**
*Level 2 2 Richardson Place Riverside*
*Corporate Park North Ryde NSW 2113*

| Rev | Date | Approved by | Revision Notes |
|---|---|---|---|
| 05 | 01.12.20 | BF | For Coordination |
| 04 | 27.11.20 | BF | For Coordination |
| 03 | 20.11.20 | BF | For Coordination |
| 02 | 11.11.20 | BF | For Coordination |
| 01 | 29.10.20 | BF | For Coordination |

*Project Title*
**15-31 Harbour Drive**
*Harbour Drive Coffs Harbour State Postcode Country*

*Drawing Title*
**GA Plans**
**Ground Level**

*Scale* 1:200 @A1, 50%@A3
*Status* For Information
*Project No.* 20023
*Dwg No.* DA-110-001
*Drawn by* TURNER
*Rev* 05
*North*

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VERNON STREET

# L1 & L2 FLOOR COLUMN/WALL PLAN

HARBOUR DRIVE

1 / - Level 01 1:200

IZZAT CONSULTING ENGINEERS
A DOCKRILL FAMILY COMPANY

DATE: 07/12/2020

LEGEND:

- DENOTES 1000x500mm COLUMNS
- DENOTES 1000x400mm COLUMNS
- DENOTES 1000x300mm COLUMNS
- DENOTES 500x500mm COLUMNS
- DENOTES 600x600mm COLUMNS
- DENOTES 300mm RC WALLS
- DENOTES 400mm CONCRETE WALLS UP TO UNDERSIDE OF L4 & 275mm CONCRETE WALLS ABOVE L4

ALL RESIDENTIAL COLUMNS ARE 1100 x 270 DINCEL COLUMNS TYPICAL.


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*DLCS Quality Endorsed Company: ISO 9001:2015, Registration Number 20476*
*Nominated Architect: Nicholas Turner 6585, ABN 86 564 694 911*


**CLIENT**
**Paynter Dixon**
*Level 2 2 Richardson Place Riverside*
*Corporate Park North Ryde NSW 2113*

*Project Title*
**15-31 Harbour Drive**
*Harbour Drive Coffs Harbour State Postcode Country*

*Drawing Title*
**GA Plans**
**Level 01**

| Rev | Date | Approved by | Revision Notes |
|---|---|---|---|
| 05 | 01.12.20 | BF | For Coordination |
| 04 | 27.11.20 | BF | For Coordination |
| 03 | 20.11.20 | BF | For Coordination |
| 02 | 11.11.20 | BF | For Coordination |
| 01 | 29.10.20 | BF | For Coordination |

*Scale* 1:200 @A1, 50%@A3
*Project No.* 20023
*Drawn by* TURNER
*Status* For Information
*Dwg No.* DA-110-010
*Rev* 05
*North*


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# Appendix I.
# BASIX

# BASIX® Certificate

Building Sustainability Index www.basix.nsw.gov.au

## Multi Dwelling

Certificate number: 1157442M

This certificate confirms that the proposed development will meet the NSW government's requirements for sustainability, if it is built in accordance with the commitments set out below. Terms used in this certificate, or in the commitments, have the meaning given by the document entitled "BASIX Definitions" dated 10/09/2020 published by the Department. This document is available at www.basix.nsw.gov.au

Secretary
Date of issue: Wednesday, 16 December 2020
To be valid, this certificate must be lodged within 3 months of the date of issue.

NSW GOVERNMENT | Planning, Industry & Environment

| Project summary | |
|---|---|
| Project name | 15-31 Harbour Dr, Coffs Harbour |
| Street address | 15-31 Harbour Drive Coffs Harbour 2450 |
| Local Government Area | Coffs Harbour City Council |
| Plan type and plan number | deposited 506454 |
| Lot no. | - |
| Section no. | - |
| No. of residential flat buildings | 1 |
| No. of units in residential flat buildings | 95 |
| No. of multi-dwelling houses | 0 |
| No. of single dwelling houses | 0 |

| Project score | | |
|---|---|---|
| Water | ✔ 40 | Target 40 |
| Thermal Comfort | ✔ Pass | Target Pass |
| Energy | ✔ 20 | Target 20 |

| Certificate Prepared by |
|---|
| Name / Company Name: Application Solutions Pty Ltd |
| ABN (if applicable): 45124991073 |

# Description of project

| Project address | |
|---|---|
| Project name | 15-31 Harbour Dr, Coffs Harbour |
| Street address | 15-31 Harbour Drive Coffs Harbour 2450 |
| Local Government Area | Coffs Harbour City Council |
| Plan type and plan number | deposited 506454 |
| Lot no. | - |
| Section no. | - |

| Project type | |
|---|---|
| No. of residential flat buildings | 1 |
| No. of units in residential flat buildings | 95 |
| No. of multi-dwelling houses | 0 |
| No. of single dwelling houses | 0 |

| Site details | |
|---|---|
| Site area (m²) | 3003 |
| Roof area (m²) | 840 |
| Non-residential floor area (m²) | - |
| Residential car spaces | 122 |
| Non-residential car spaces | - |

| Common area landscape | |
|---|---|
| Common area lawn (m²) | 490.0 |
| Common area garden (m²) | 60.0 |
| Area of indigenous or low water use species (m²) | - |

| Assessor details | |
|---|---|
| Assessor number | 18/1849 |
| Certificate number | 0005513170 |
| Climate zone | 11 |
| Ceiling fan in at least one bedroom | No |
| Ceiling fan in at least one living room or other conditioned area | No |

| Project score | | |
|---|---|---|
| Water | ✔ 40 | Target 40 |
| Thermal Comfort | ✔ Pass | Target Pass |
| Energy | ✔ 20 | Target 20 |

# Description of project

The tables below describe the dwellings and common areas within the project

## Residential flat buildings - Building1, 95 dwellings, 13 storeys above ground

| Dwelling no. | No. of bedrooms | Conditioned floor area (m²) | Unconditioned floor area (m²) | Area of garden & lawn (m²) | Indigenous species (min area m²) |
|---|---|---|---|---|---|
| 101 | 2 | 85.0 | 0.0 | 0.0 | 0.0 |
| 105 | 2 | 91.0 | 0.0 | 0.0 | 0.0 |
| 204 | 2 | 85.0 | 0.0 | 0.0 | 0.0 |
| 303 | 1 | 57.0 | 0.0 | 0.0 | 0.0 |
| 402 | 1 | 59.0 | 0.0 | 0.0 | 0.0 |
| 406 | 2 | 77.0 | 0.0 | 0.0 | 0.0 |
| 410 | 2 | 89.0 | 0.0 | 0.0 | 0.0 |
| 501 | 2 | 80.0 | 0.0 | 0.0 | 0.0 |
| 505 | 2 | 77.0 | 0.0 | 0.0 | 0.0 |
| 509 | 2 | 89.0 | 0.0 | 0.0 | 0.0 |
| 601 | 2 | 80.0 | 0.0 | 0.0 | 0.0 |
| 605 | 1 | 64.0 | 0.0 | 0.0 | 0.0 |
| 609 | 2 | 85.0 | 0.0 | 0.0 | 0.0 |
| 702 | 3 | 126.0 | 0.0 | 0.0 | 0.0 |
| 706 | 2 | 85.0 | 0.0 | 0.0 | 0.0 |
| 710 | 2 | 79.0 | 0.0 | 0.0 | 0.0 |
| 804 | 1 | 59.0 | 0.0 | 0.0 | 0.0 |
| 808 | 2 | 79.0 | 0.0 | 0.0 | 0.0 |

| Dwelling no. | No. of bedrooms | Conditioned floor area (m²) | Unconditioned floor area (m²) | Area of garden & lawn (m²) | Indigenous species (min area m²) |
|---|---|---|---|---|---|
| 102 | 1 | 59.0 | 0.0 | 0.0 | 0.0 |
| 201 | 2 | 85.0 | 0.0 | 0.0 | 0.0 |
| 205 | 2 | 91.0 | 0.0 | 0.0 | 0.0 |
| 304 | 2 | 85.0 | 0.0 | 0.0 | 0.0 |
| 403 | 1 | 57.0 | 0.0 | 0.0 | 0.0 |
| 407 | 1 | 64.0 | 0.0 | 0.0 | 0.0 |
| 411 | 2 | 85.0 | 0.0 | 0.0 | 0.0 |
| 502 | 2 | 83.0 | 0.0 | 0.0 | 0.0 |
| 506 | 1 | 64.0 | 0.0 | 0.0 | 0.0 |
| 510 | 2 | 85.0 | 0.0 | 0.0 | 0.0 |
| 602 | 2 | 83.0 | 0.0 | 0.0 | 0.0 |
| 606 | 2 | 87.0 | 0.0 | 0.0 | 0.0 |
| 610 | 1 | 57.0 | 0.0 | 0.0 | 0.0 |
| 703 | 2 | 77.0 | 0.0 | 0.0 | 0.0 |
| 707 | 2 | 82.0 | 0.0 | 0.0 | 0.0 |
| 801 | 2 | 80.0 | 0.0 | 0.0 | 0.0 |
| 805 | 2 | 98.0 | 0.0 | 0.0 | 0.0 |
| 901 | 2 | 80.0 | 0.0 | 0.0 | 0.0 |

| Dwelling no. | No. of bedrooms | Conditioned floor area (m²) | Unconditioned floor area (m²) | Area of garden & lawn (m²) | Indigenous species (min area m²) |
|---|---|---|---|---|---|
| 103 | 1 | 57.0 | 0.0 | 0.0 | 0.0 |
| 202 | 1 | 59.0 | 0.0 | 0.0 | 0.0 |
| 301 | 2 | 85.0 | 0.0 | 0.0 | 0.0 |
| 305 | 2 | 91.0 | 0.0 | 0.0 | 0.0 |
| 404 | 2 | 85.0 | 0.0 | 0.0 | 0.0 |
| 408 | 2 | 87.0 | 0.0 | 0.0 | 0.0 |
| 412 | 1 | 57.0 | 0.0 | 0.0 | 0.0 |
| 503 | 2 | 85.0 | 0.0 | 0.0 | 0.0 |
| 507 | 2 | 87.0 | 0.0 | 0.0 | 0.0 |
| 511 | 1 | 57.0 | 0.0 | 0.0 | 0.0 |
| 603 | 2 | 85.0 | 0.0 | 0.0 | 0.0 |
| 607 | 2 | 92.0 | 0.0 | 0.0 | 0.0 |
| 611 | 2 | 79.0 | 0.0 | 0.0 | 0.0 |
| 704 | 1 | 59.0 | 0.0 | 0.0 | 0.0 |
| 708 | 1 | 60.0 | 0.0 | 0.0 | 0.0 |
| 802 | 3 | 126.0 | 0.0 | 0.0 | 0.0 |
| 806 | 2 | 83.0 | 0.0 | 0.0 | 0.0 |
| 902 | 3 | 126.0 | 0.0 | 0.0 | 0.0 |

| Dwelling no. | No. of bedrooms | Conditioned floor area (m²) | Unconditioned floor area (m²) | Area of garden & lawn (m²) | Indigenous species (min area m²) |
|---|---|---|---|---|---|
| 104 | 2 | 85.0 | 0.0 | 0.0 | 0.0 |
| 203 | 1 | 57.0 | 0.0 | 0.0 | 0.0 |
| 302 | 1 | 59.0 | 0.0 | 0.0 | 0.0 |
| 401 | 2 | 85.0 | 0.0 | 0.0 | 0.0 |
| 405 | 2 | 93.0 | 0.0 | 0.0 | 0.0 |
| 409 | 2 | 92.0 | 0.0 | 0.0 | 0.0 |
| 413 | 2 | 79.0 | 0.0 | 0.0 | 0.0 |
| 504 | 2 | 93.0 | 0.0 | 0.0 | 0.0 |
| 508 | 2 | 92.0 | 0.0 | 0.0 | 0.0 |
| 512 | 2 | 79.0 | 0.0 | 0.0 | 0.0 |
| 604 | 2 | 77.0 | 0.0 | 0.0 | 0.0 |
| 608 | 2 | 89.0 | 0.0 | 0.0 | 0.0 |
| 701 | 2 | 80.0 | 0.0 | 0.0 | 0.0 |
| 705 | 1 | 66.0 | 0.0 | 0.0 | 0.0 |
| 709 | 1 | 57.0 | 0.0 | 0.0 | 0.0 |
| 803 | 2 | 77.0 | 0.0 | 0.0 | 0.0 |
| 807 | 2 | 83.0 | 0.0 | 0.0 | 0.0 |
| 903 | 2 | 77.0 | 0.0 | 0.0 | 0.0 |

| Dwelling no. | No. of bedrooms | Conditioned floor area ($m^2$) | Unconditioned floor area ($m^2$) | Area of garden & lawn ($m^2$) | Indigenous species (min area $m^2$) |
|---|---|---|---|---|---|
| 904 | 2 | 79.0 | 0.0 | 0.0 | 0.0 |
| 908 | 2 | 79.0 | 0.0 | 0.0 | 0.0 |
| 1004 | 2 | 79.0 | 0.0 | 0.0 | 0.0 |
| 1008 | 2 | 79.0 | 0.0 | 0.0 | 0.0 |
| 1104 | 2 | 93.0 | 0.0 | 0.0 | 0.0 |
| 1202 | 3 | 126.0 | 0.0 | 0.0 | 0.0 |

| Dwelling no. | No. of bedrooms | Conditioned floor area ($m^2$) | Unconditioned floor area ($m^2$) | Area of garden & lawn ($m^2$) | Indigenous species (min area $m^2$) |
|---|---|---|---|---|---|
| 905 | 2 | 84.0 | 0.0 | 0.0 | 0.0 |
| 1001 | 2 | 80.0 | 0.0 | 0.0 | 0.0 |
| 1005 | 1 | 59.0 | 0.0 | 0.0 | 0.0 |
| 1101 | 2 | 80.0 | 0.0 | 0.0 | 0.0 |
| 1105 | 2 | 81.0 | 0.0 | 0.0 | 0.0 |
| 1203 | 3 | 126.0 | 0.0 | 0.0 | 0.0 |

| Dwelling no. | No. of bedrooms | Conditioned floor area ($m^2$) | Unconditioned floor area ($m^2$) | Area of garden & lawn ($m^2$) | Indigenous species (min area $m^2$) |
|---|---|---|---|---|---|
| 906 | 2 | 86.0 | 0.0 | 0.0 | 0.0 |
| 1002 | 3 | 126.0 | 0.0 | 0.0 | 0.0 |
| 1006 | 2 | 86.0 | 0.0 | 0.0 | 0.0 |
| 1102 | 3 | 126.0 | 0.0 | 0.0 | 0.0 |
| 1106 | 2 | 79.0 | 0.0 | 0.0 | 0.0 |
| 1204 | 3 | 116.0 | 0.0 | 0.0 | 0.0 |

| Dwelling no. | No. of bedrooms | Conditioned floor area ($m^2$) | Unconditioned floor area ($m^2$) | Area of garden & lawn ($m^2$) | Indigenous species (min area $m^2$) |
|---|---|---|---|---|---|
| 907 | 2 | 85.0 | 0.0 | 0.0 | 0.0 |
| 1003 | 2 | 77.0 | 0.0 | 0.0 | 0.0 |
| 1007 | 1 | 55.0 | 0.0 | 0.0 | 0.0 |
| 1103 | 2 | 77.0 | 0.0 | 0.0 | 0.0 |
| 1201 | 3 | 111.0 | 0.0 | 0.0 | 0.0 |

# Description of project

The tables below describe the dwellings and common areas within the project

## Common areas of unit building - Building1

| Common area | Floor area (m²) |
|---|---|
| Car park area (No. 3) | 1700.0 |
| Lift car (No.2) | - |
| Hallway/common corridors | 854.0 |

| Common area | Floor area (m²) |
|---|---|
| Car park area (No. 4) | 1670.0 |
| Resi Garbage room | 59.0 |

| Common area | Floor area (m²) |
|---|---|
| Lift car (No.1) | - |
| Ground floor lobby type (No. 1) | 45.0 |

## Common areas of the development (non-building specific)

| Common area | Floor area (m²) |
|---|---|
| Car park area (No. 1) | 1019.0 |
| Retail Garbage room | 57.0 |

| Common area | Floor area (m²) |
|---|---|
| Car park area (No. 2) | 1700.0 |
| Plant or service rooms | 180.0 |

| Common area | Floor area (m²) |
|---|---|
| MSR & Elec Room | 40.0 |
| EOT Facilities | 115.0 |

# Schedule of BASIX commitments

1. Commitments for Residential flat buildings - Building1
    (a) Dwellings
        (i) Water
        (ii) Energy
        (iii) Thermal Comfort
    (b) Common areas and central systems/facilities
        (i) Water
        (ii) Energy

2. Commitments for multi-dwelling houses

3. Commitments for single dwelling houses

4. Commitments for common areas and central systems/facilities for the development (non-building specific)
        (i) Water
        (ii) Energy

# Schedule of BASIX commitments

The commitments set out below regulate how the proposed development is to be carried out. It is a condition of any development consent granted, or complying development certificate issued, for the proposed development, that BASIX commitments be complied with.

## 1. Commitments for Residential flat buildings - Building1

### (a) Dwellings

| (i) Water | Show on DA plans | Show on CC/CDC plans & specs | Certifier check |
|---|---|---|---|
| (a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below. | | | |
| (b) The applicant must plant indigenous or low water use species of vegetation throughout the area of land specified for the dwelling in the "Indigenous species" column of the table below, as private landscaping for that dwelling. (This area of indigenous vegetation is to be contained within the "Area of garden and lawn" for the dwelling specified in the "Description of Project" table). | ✔ | ✔ | |
| (c) If a rating is specified in the table below for a fixture or appliance to be installed in the dwelling, the applicant must ensure that each such fixture and appliance meets the rating specified for it. | | ✔ | ✔ |
| (d) The applicant must install an on demand hot water recirculation system which regulates all hot water use throughout the dwelling, where indicated for a dwelling in the "HW recirculation or diversion" column of the table below. | | ✔ | ✔ |
| (e) The applicant must install:<br>(aa) a hot water diversion system to all showers, kitchen sinks and all basins in the dwelling, where indicated for a dwelling in the "HW recirculation or diversion" column of the table below; and<br>(bb) a separate diversion tank (or tanks) connected to the hot water diversion systems of at least 100 litres. The applicant must connect the hot water diversion tank to all toilets in the dwelling. | | ✔<br>✔ | ✔<br>✔ |
| (e) The applicant must not install a private swimming pool or spa for the dwelling, with a volume exceeding that specified for it in the table below. | ✔ | ✔ | |
| (f) If specified in the table, that pool or spa (or both) must have a pool cover or shading (or both). | | ✔ | |
| (g) The pool or spa must be located as specified in the table. | ✔ | ✔ | |
| (h) The applicant must install, for the dwelling, each alternative water supply system, with the specified size, listed for that dwelling in the table below. Each system must be configured to collect run-off from the areas specified (excluding any area which supplies any other alternative water supply system), and to divert overflow as specified. Each system must be connected as specified. | ✔ | ✔ | ✔ |

| | Fixtures | | | | | Appliances | | Individual pool | | | | Individual spa | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dwelling no. | All shower-heads | All toilet flushing systems | All kitchen taps | All bathroom taps | HW recirculation or diversion | All clothes washers | All dish-washers | Volume (max volume) | Pool cover | Pool location | Pool shaded | Volume (max volume) | Spa cover | Spa shaded |
| All dwellings | 4 star (> 4.5 but <= 6 L/min) | 5 star | 5 star | 5 star | - | - | 5.5 star | - | - | - | - | - | - | - |

| | Alternative water source | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Dwelling no. | Alternative water supply systems | Size | Configuration | Landscape connection | Toilet connection (s) | Laundry connection | Pool top-up | Spa top-up |
| None | - | - | - | - | - | - | - | - |

| (ii) Energy | Show on DA plans | Show on CC/CDC plans & specs | Certifier check |
|---|---|---|---|
| (a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below. | | | |
| (b) The applicant must install each hot water system specified for the dwelling in the table below, so that the dwelling's hot water is supplied by that system. If the table specifies a central hot water system for the dwelling, then the applicant must connect that central system to the dwelling, so that the dwelling's hot water is supplied by that central system. | ✔ | ✔ | ✔ |
| (c) The applicant must install, in each bathroom, kitchen and laundry of the dwelling, the ventilation system specified for that room in the table below. Each such ventilation system must have the operation control specified for it in the table. | | ✔ | ✔ |
| (d) The applicant must install the cooling and heating system/s specified for the dwelling under the "Living areas" and "Bedroom areas" headings of the "Cooling" and "Heating" columns in the table below, in/for at least 1 living/bedroom area of the dwelling. If no cooling or heating system is specified in the table for "Living areas" or "Bedroom areas", then no systems may be installed in any such areas. If the term "zoned" is specified beside an air conditioning system, then the system must provide for day/night zoning between living areas and bedrooms. | | ✔ | ✔ |
| (e) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Artificial lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that the "primary type of artificial lighting" for each such room in the dwelling is fluorescent lighting or light emitting diode (LED) lighting. If the term "dedicated" is specified for a particular room or area, then the light fittings in that room or area must only be capable of being used for fluorescent lighting or light emitting diode (LED) lighting. | | ✔ | ✔ |

| (ii) Energy | Show on DA plans | Show on CC/CDC plans & specs | Certifier check |
|---|---|---|---|
| (f) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Natural lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that each such room or area is fitted with a window and/or skylight. | ✔ | ✔ | ✔ |
| (g) This commitment applies if the applicant installs a water heating system for the dwelling's pool or spa. The applicant must: | | | |
| (aa) install the system specified for the pool in the "Individual Pool" column of the table below (or alternatively must not install any system for the pool). If specified, the applicant must install a timer, to control the pool's pump; and | | ✔ | |
| (bb) install the system specified for the spa in the "Individual Spa" column of the table below (or alternatively must not install any system for the spa). If specified, the applicant must install a timer to control the spa's pump. | | ✔ | |
| (h) The applicant must install in the dwelling: | | | |
| (aa) the kitchen cook-top and oven specified for that dwelling in the "Appliances & other efficiency measures" column of the table below; | | ✔ | |
| (bb) each appliance for which a rating is specified for that dwelling in the "Appliances & other efficiency measures" column of the table, and ensure that the appliance has that minimum rating; and | | ✔ | ✔ |
| (cc) any clothes drying line specified for the dwelling in the "Appliances & other efficiency measures" column of the table. | | ✔ | |
| (i) If specified in the table, the applicant must carry out the development so that each refrigerator space in the dwelling is "well ventilated". | | ✔ | |

| | Hot water | Bathroom ventilation system | | Kitchen ventilation system | | Laundry ventilation system | |
|---|---|---|---|---|---|---|---|
| Dwelling no. | Hot water system | Each bathroom | Operation control | Each kitchen | Operation control | Each laundry | Operation control |
| All dwellings | central hot water system 1 | individual fan, ducted to façade or roof | interlocked to light | individual fan, ducted to façade or roof | manual switch on/off | individual fan, ducted to façade or roof | manual switch on/off |

| | Cooling | | Heating | | Artificial lighting | | | | | | Natural lighting | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dwelling no. | living areas | bedroom areas | living areas | bedroom areas | No. of bedrooms &/or study | No. of living &/or dining rooms | Each kitchen | All bathrooms/ toilets | Each laundry | All hallways | No. of bathrooms &/or toilets | Main kitchen |
| 702 | 1-phase airconditioning EER > 4.0 (zoned) | 1-phase airconditioning EER > 4.0 (zoned) | 1-phase airconditioning EER > 4.0 (zoned) | 1-phase airconditioning EER > 4.0 (zoned) | - | - | - | - | - | - | - | - |
| All other dwellings | 1-phase airconditioning EER > 4.0 | - | 1-phase airconditioning EER > 4.0 (zoned) | 1-phase airconditioning EER > 4.0 (zoned) | - | - | - | - | - | - | - | - |

| | Individual pool | | Individual spa | | Appliances & other efficiency measures | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dwelling no. | Pool heating system | Timer | Spa heating system | Timer | Kitchen cooktop/oven | Refrigerator | Well ventilated fridge space | Dishwasher | Clothes washer | Clothes dryer | Indoor or sheltered clothes drying line | Private outdoor or unsheltered clothes drying line |
| All dwellings | - | - | - | - | electric cooktop & electric oven | - | - | 4.5 star | - | 4.5 star | - | - |

| (iii) Thermal Comfort | Show on DA plans | Show on CC/CDC plans & specs | Certifier check |
|---|---|---|---|
| (a) The applicant must attach the certificate referred to under "Assessor details" on the front page of this BASIX certificate (the "Assessor Certificate") to the development application and construction certificate application for the proposed development (or, if the applicant is applying for a complying development certificate for the proposed development, to that application). The applicant must also attach the Assessor Certificate to the application for a final occupation certificate for the proposed development. | | | |
| (b) The Assessor Certificate must have been issued by an Accredited Assessor in accordance with the Thermal Comfort Protocol. | | | |
| (c) The details of the proposed development on the Assessor Certificate must be consistent with the details shown in this BASIX Certificate, including the details shown in the "Thermal Loads" table below. | | | |

| (iii) Thermal Comfort | Show on DA plans | Show on CC/CDC plans & specs | Certifier check |
|---|---|---|---|
| (d) The applicant must show on the plans accompanying the development application for the proposed development, all matters which the Thermal Comfort Protocol requires to be shown on those plans. Those plans must bear a stamp of endorsement from the Accredited Assessor, to certify that this is the case. | ✔ | | |
| (e) The applicant must show on the plans accompanying the application for a construction certificate (or complying development certificate, if applicable), all thermal performance specifications set out in the Assessor Certificate, and all aspects of the proposed development which were used to calculate those specifications. | | ✔ | |
| (f) The applicant must construct the development in accordance with all thermal performance specifications set out in the Assessor Certificate, and in accordance with those aspects of the development application or application for a complying development certificate which were used to calculate those specifications. | | ✔ | ✔ |
| (g) Where there is an in-slab heating or cooling system, the applicant must:<br>(aa) Install insulation with an R-value of not less than 1.0 around the vertical edges of the perimeter of the slab; or<br>(bb) On a suspended floor, install insulation with an R-value of not less than 1.0 underneath the slab and around the vertical edges of the perimeter of the slab. | ✔ | ✔ | ✔ |
| (h) The applicant must construct the floors and walls of the development in accordance with the specifications listed in the table below. | ✔ | ✔ | ✔ |
| | | | |
| | | | |

| | Thermal loads | |
|---|---|---|
| **Dwelling no.** | **Area adjusted heating load (in mJ/m²/yr)** | **Area adjusted cooling load (in mJ/m²/yr)** |
| 101 | 3.4 | 31.3 |
| 102 | 20.5 | 29.8 |
| 103 | 20.5 | 30.8 |
| 104 | 21.9 | 24.6 |
| 105 | 10.0 | 22.0 |
| 201 | 3.7 | 31.0 |
| 202 | 1.0 | 33.8 |
| 203 | 1.2 | 34.2 |
| 204 | 2.5 | 30.6 |

| | Thermal loads | |
|---|---|---|
| **Dwelling no.** | **Area adjusted heating load (in mJ/m²/yr)** | **Area adjusted cooling load (in mJ/m²/yr)** |
| 205 | 9.6 | 24.5 |
| 301 | 5.6 | 27.1 |
| 302 | 1.8 | 29.5 |
| 303 | 2.0 | 30.5 |
| 304 | 3.6 | 21.7 |
| 305 | 12.2 | 18.5 |
| 401 | 12.3 | 32.1 |
| 402 | 2.0 | 29.3 |
| 403 | 2.2 | 29.6 |
| 404 | 3.8 | 21.3 |
| 405 | 12.7 | 18.1 |
| 406 | 27.0 | 16.6 |
| 407 | 20.5 | 16.0 |
| 408 | 25.8 | 25.9 |
| 409 | 26.3 | 23.1 |
| 410 | 22.4 | 32.0 |
| 411 | 13.4 | 25.3 |
| 412 | 13.6 | 29.9 |
| 413 | 10.4 | 30.1 |
| 501 | 7.2 | 23.9 |
| 502 | 4.2 | 29.5 |
| 503 | 4.0 | 21.1 |
| 504 | 20.1 | 19.3 |
| 505 | 23.9 | 19.5 |
| 506 | 15.7 | 16.9 |
| 507 | 21.4 | 29.2 |
| 508 | 24.8 | 26.5 |

| | Thermal loads | |
|---|---|---|
| **Dwelling no.** | **Area adjusted heating load (in mJ/m²/yr)** | **Area adjusted cooling load (in mJ/m²/yr)** |
| 509 | 20.1 | 32.9 |
| 511 | 12.6 | 33.9 |
| 512 | 12.8 | 29.5 |
| 601 | 7.5 | 22.9 |
| 602 | 4.4 | 29.1 |
| 603 | 3.4 | 20.8 |
| 604 | 23.3 | 19.4 |
| 605 | 13.3 | 17.1 |
| 606 | 19.0 | 29.3 |
| 607 | 25.3 | 25.5 |
| 608 | 20.6 | 32.2 |
| 610 | 13.0 | 34.0 |
| 611 | 13.2 | 28.4 |
| 701 | 7.6 | 22.7 |
| 702 | 15.5 | 16.7 |
| 703 | 23.8 | 19.0 |
| 704 | 9.4 | 36.4 |
| 705 | 16.1 | 31.8 |
| 706 | 25.7 | 25.5 |
| 707 | 19.0 | 32.2 |
| 708 | 12.7 | 29.5 |
| 709 | 13.5 | 33.9 |
| 710 | 13.5 | 28.1 |
| 801 | 7.8 | 22.3 |
| 803 | 20.5 | 18.3 |
| 804 | 9.8 | 36.0 |
| 805 | 23.7 | 19.6 |

| | Thermal loads | |
|---|---|---|
| **Dwelling no.** | **Area adjusted heating load (in mJ/m²/yr)** | **Area adjusted cooling load (in mJ/m²/yr)** |
| 806 | 19.3 | 32.0 |
| 807 | 11.2 | 28.4 |
| 808 | 13.6 | 26.7 |
| 901 | 8.0 | 22.0 |
| 903 | 20.9 | 18.3 |
| 904 | 21.9 | 35.0 |
| 905 | 25.9 | 24.1 |
| 906 | 19.5 | 31.7 |
| 907 | 12.3 | 27.4 |
| 908 | 13.9 | 27.4 |
| 1001 | 8.1 | 22.1 |
| 1003 | 21.1 | 18.3 |
| 1004 | 22.2 | 34.7 |
| 1005 | 25.7 | 22.8 |
| 1006 | 24.2 | 19.5 |
| 1007 | 13.4 | 28.8 |
| 1008 | 14.1 | 27.5 |
| 1101 | 8.2 | 22.3 |
| 1102 | 16.3 | 15.9 |
| 1103 | 25.2 | 18.0 |
| 1104 | 23.7 | 36.8 |
| 1105 | 18.4 | 35.3 |
| 1106 | 14.3 | 27.0 |
| 1201 | 24.9 | 21.6 |
| 1202 | 25.5 | 22.6 |
| 1203 | 17.1 | 16.3 |
| 1204 | 24.6 | 35.5 |

| | Thermal loads | |
|---|---|---|
| **Dwelling no.** | **Area adjusted heating load (in mJ/m²/yr)** | **Area adjusted cooling load (in mJ/m²/yr)** |
| 510, 609 | 10.7 | 28.5 |
| All other dwellings | 15.8 | 16.5 |

**(b) Common areas and central systems/facilities**

| (i) Water | Show on DA plans | Show on CC/CDC plans & specs | Certifier check |
|---|---|---|---|
| (a) If, in carrying out the development, the applicant installs a showerhead, toilet, tap or clothes washer into a common area, then that item must meet the specifications listed for it in the table. | | ✔ | ✔ |
| (b) The applicant must install (or ensure that the development is serviced by) the alternative water supply system(s) specified in the "Central systems" column of the table below. In each case, the system must be sized, be configured, and be connected, as specified in the table. | ✔ | ✔ | ✔ |
| (c) A swimming pool or spa listed in the table must not have a volume (in kLs) greater than that specified for the pool or spa in the table. | ✔ | ✔ | |
| (d) A pool or spa listed in the table must have a cover or shading if specified for the pool or spa in the table. | | ✔ | |
| (e) The applicant must install each fire sprinkler system listed in the table so that the system is configured as specified in the table. | | ✔ | ✔ |
| (f) The applicant must ensure that the central cooling system for a cooling tower is configured as specified in the table. | | ✔ | ✔ |

| Common area | Showerheads rating | Toilets rating | Taps rating | Clothes washers rating |
|---|---|---|---|---|
| All common areas | 4 star (> 6 but <= 7.5 L/min) | 5 star | 5 star | no common laundry facility |

| Central systems | Size | Configuration | Connection (to allow for...) |
|---|---|---|---|
| Fire sprinkler system (No. 3) | - | - | - |
| Fire sprinkler system (No. 4) | - | - | - |

| (ii) Energy | Show on DA plans | Show on CC/CDC plans & specs | Certifier check |
|---|---|---|---|
| (a) If, in carrying out the development, the applicant installs a ventilation system to service a common area specified in the table below, then that ventilation system must be of the type specified for that common area, and must meet the efficiency measure specified. | | ✔ | ✔ |

| (ii) Energy | Show on DA plans | Show on CC/CDC plans & specs | Certifier check |
|---|---|---|---|
| (b) In carrying out the development, the applicant must install, as the "primary type of artificial lighting" for each common area specified in the table below, the lighting specified for that common area. This lighting must meet the efficiency measure specified. The applicant must also install a centralised lighting control system or Building Management System (BMS) for the common area, where specified. | | ✔ | ✔ |
| (c) The applicant must install the systems and fixtures specified in the "Central energy systems" column of the table below. In each case, the system or fixture must be of the type, and meet the specifications, listed for it in the table. | ✔ | ✔ | ✔ |

| | Common area ventilation system | | Common area lighting | | |
|---|---|---|---|---|---|
| Common area | Ventilation system type | Ventilation efficiency measure | Primary type of artificial lighting | Lighting efficiency measure | Lighting control system/BMS |
| Car park area (No. 3) | ventilation exhaust only | carbon monoxide monitor + VSD fan | fluorescent | zoned switching with motion sensor | No |
| Car park area (No. 4) | ventilation exhaust only | carbon monoxide monitor + VSD fan | fluorescent | zoned switching with motion sensor | No |
| Lift car (No.1) | - | - | light-emitting diode | connected to lift call button | Yes |
| Lift car (No.2) | - | - | light-emitting diode | connected to lift call button | Yes |
| Resi Garbage room | ventilation exhaust only | - | fluorescent | motion sensors | No |
| Ground floor lobby type (No. 1) | no mechanical ventilation | - | light-emitting diode | zoned switching with motion sensor | No |
| Hallway/common corridors | no mechanical ventilation | - | light-emitting diode | zoned switching with motion sensor | No |

| Central energy systems | Type | Specification |
|---|---|---|
| Central hot water system (No. 1) | electric heat pump - gas boosted | Piping insulation (ringmain & supply risers):<br>(a) Piping external to building: R1.0 (~38 mm);<br>(b) Piping internal to building: R0.6 (~25 mm) |
| Lift (No. 1) | gearless traction with V V V F motor and regenerative drive | Number of levels (including basement): 13 |

| Central energy systems | Type | Specification |
|---|---|---|
| Lift (No. 2) | gearless traction with V V V F motor and regenerative drive | Number of levels (including basement): 13 |

## 4. Commitments for common areas and central systems/facilities for the development (non-building specific)

### (b) Common areas and central systems/facilities

| (i) Water | Show on DA plans | Show on CC/CDC plans & specs | Certifier check |
|---|---|---|---|
| (a) If, in carrying out the development, the applicant installs a showerhead, toilet, tap or clothes washer into a common area, then that item must meet the specifications listed for it in the table. | | ✔ | ✔ |
| (b) The applicant must install (or ensure that the development is serviced by) the alternative water supply system(s) specified in the "Central systems" column of the table below. In each case, the system must be sized, be configured, and be connected, as specified in the table. | ✔ | ✔ | ✔ |
| (c) A swimming pool or spa listed in the table must not have a volume (in kLs) greater than that specified for the pool or spa in the table. | ✔ | ✔ | |
| (d) A pool or spa listed in the table must have a cover or shading if specified for the pool or spa in the table. | | ✔ | |
| (e) The applicant must install each fire sprinkler system listed in the table so that the system is configured as specified in the table. | | ✔ | ✔ |
| (f) The applicant must ensure that the central cooling system for a cooling tower is configured as specified in the table. | | ✔ | ✔ |

| Common area | Showerheads rating | Toilets rating | Taps rating | Clothes washers rating |
|---|---|---|---|---|
| All common areas | 4 star (> 6 but <= 7.5 L/min) | 5 star | 5 star | no common laundry facility |

| Central systems | Size | Configuration | Connection (to allow for...) |
|---|---|---|---|
| Fire sprinkler system (No. 1) | - | - | - |
| Fire sprinkler system (No. 2) | - | - | - |

| (ii) Energy | Show on DA plans | Show on CC/CDC plans & specs | Certifier check |
|---|---|---|---|
| (a) If, in carrying out the development, the applicant installs a ventilation system to service a common area specified in the table below, then that ventilation system must be of the type specified for that common area, and must meet the efficiency measure specified. | | ✔ | ✔ |
| (b) In carrying out the development, the applicant must install, as the "primary type of artificial lighting" for each common area specified in the table below, the lighting specified for that common area. This lighting must meet the efficiency measure specified. The applicant must also install a centralised lighting control system or Building Management System (BMS) for the common area, where specified. | | ✔ | ✔ |
| (c) The applicant must install the systems and fixtures specified in the "Central energy systems" column of the table below. In each case, the system or fixture must be of the type, and meet the specifications, listed for it in the table. | ✔ | ✔ | ✔ |

| | Common area ventilation system | | Common area lighting | | |
|---|---|---|---|---|---|
| Common area | Ventilation system type | Ventilation efficiency measure | Primary type of artificial lighting | Lighting efficiency measure | Lighting control system/BMS |
| Car park area (No. 1) | ventilation exhaust only | carbon monoxide monitor + VSD fan | fluorescent | zoned switching with motion sensor | No |
| Car park area (No. 2) | ventilation exhaust only | carbon monoxide monitor + VSD fan | fluorescent | zoned switching with motion sensor | No |
| MSR & Elec Room | ventilation supply only | thermostatically controlled | fluorescent | manual on / manual off | No |
| Retail Garbage room | ventilation exhaust only | - | fluorescent | motion sensors | No |
| Plant or service rooms | ventilation supply only | thermostatically controlled | fluorescent | manual on / manual off | No |
| EOT Facilities | ventilation (supply + exhaust) | time clock or BMS controlled | light-emitting diode | zoned switching with motion sensor | No |

| Central energy systems | Type | Specification |
|---|---|---|
| Other | Active power factor correction installed?: yes | - |

## Notes

| |
|---|
| 1. In these commitments, "applicant" means the person carrying out the development. |
| 2. The applicant must identify each dwelling, building and common area listed in this certificate, on the plans accompanying any development application, and on the plans and specifications accompanying the application for a construction certificate / complying development certificate, for the proposed development, using the same identifying letter or reference as is given to that dwelling, building or common area in this certificate. |
| 3. This note applies if the proposed development involves the erection of a building for both residential and non-residential purposes (or the change of use of a building for both residential and non-residential purposes). Commitments in this certificate which are specified to apply to a "common area" of a building or the development, apply only to that part of the building or development to be used for residential purposes. |
| 4. If this certificate lists a central system as a commitment for a dwelling or building, and that system will also service any other dwelling or building within the development, then that system need only be installed once (even if it is separately listed as a commitment for that other dwelling or building). |
| 5. If a star or other rating is specified in a commitment, this is a minimum rating. |
| 6. All alternative water systems to be installed under these commitments (if any), must be installed in accordance with the requirements of all applicable regulatory authorities. NOTE: NSW Health does not recommend that stormwater, recycled water or private dam water be used to irrigate edible plants which are consumed raw, or that rainwater be used for human consumption in areas with potable water supply. |

## Legend

| |
|---|
| 1. Commitments identified with a "✔" in the "Show on DA plans" column must be shown on the plans accompanying the development application for the proposed development (if a development application is to be lodged for the proposed development). |
| 2. Commitments identified with a "✔" in the "Show on CC/CDC plans and specs" column must be shown in the plans and specifications accompanying the application for a construction certificate / complying development certificate for the proposed development. |
| 3. Commitments identified with a "✔" in the "Certifier check" column must be certified by a certifying authority as having been fulfilled. (Note: a certifying authority must not issue an occupation certificate (either interim or final) for a building listed in this certificate, or for any part of such a building, unless it is satisfied that each of the commitments whose fulfilment it is required to monitor in relation to the building or part, has been fulfilled). |

# Appendix J.
# FIRE ENGINEERING STATEMENT

Fire Safety Studio Pty Ltd
ABN 38 631 460 930
PO Box 258, Petersham NSW 2049
www.firesafetystudio.com

# FIRE ENGINEERING LETTER

# 15-31 HARBOUR DRIVE, COFFS HARBOUR

**Reference No:** 2020254-L01-V03
**Company:** Paynter Dixon Constructions Pty Ltd
**Attention:** Mohamed Sallam
**Email:** mohamed.sallam@paynterdixon.com.au
**Date:** 15/12/2020

Dear Mohamed,

This letter has been prepared to provide a fire engineering statement to accompany the DA submission in relation to the above project address. As part of our preliminary review, we have considered the following documents:

- BCA Assessment Report from BCA Logic Pty Ltd (Reference: 112796-BCA-r3, Date: 15/12/2020)
- Architectural drawings by Turner received on 11/12/2020

## SCOPE OF FIRE ENGINEERING

The following table is a list of the variation(s) to the BCA DtS provision(s) that require fire engineering assessment.

**Table 1: Summary of Performance Solution(s)**

| Item No | Relevant BCA DtS Clause(s) | Relevant Performance Requirement(s) | Description of Performance Solution(s) |
|---|---|---|---|
| 1 | C1.1, C2.7, C2.8, C2.9, C3.5 & Spec. C1.1 | CP1, CP2 & CP8 | Rationalise the fire rating of Class 6 areas on Ground Floor to 2 hours as nominated by Table 3 of BCA Specification C1.1, instead of achieving a fire rating of 3 hours.<br>Rationalise the fire rating of Class 7b areas on Ground Floor to Level 3 to 2 hours as nominated by Table 3 of BCA Specification C1.1, instead of achieving a fire rating of 4 hours. |
| 2 | C2.14 | EP2.2 | The length of the public corridor on Levels 4 to 6 is approx. 55 m, instead of 40 m. |
| 3 | C3.2 & C3.4 | CP2 & CP8 | Alternative method of protection to nominated openings that is located less than 3 m from the north-eastern side boundary, instead of protection in accordance with Clause C3.4.<br>*NOTE: A 1 m wide nib wall will be required to the side boundary for Units 1.05, 2.05, 3.05, 4.05, 5.04.* |

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| Item No | Relevant BCA DtS Clause(s) | Relevant Performance Requirement(s) | Description of Performance Solution(s) |
|---|---|---|---|
| 4 | Specification C1.1 (Clause 2.7) | CP2 & CP8 | Non-fire rated access panel within the fire-isolated exit, instead of achieving an FRL -/90/90. |
| 5 | D1.2 | DP4 | Single exit from Retails 01 & 03 and Ground Floor lobby areas that does not access to a 2nd exit, instead of providing 2 exits for a building with an effective height of more than 25 m. |
| 6 | D1.4 (car park areas) | DP4 & EP2.2 | Maximum travel distance to a point of choice of up to 24 m on Ground Floor, instead of 20 m.<br>Maximum travel distance from Level 1 Retail Mech Plant room to the nearest exit of up to 48 m, instead of 40 m. |
| 7 | D1.4 (residential) | DP4 & EP2.2 | Maximum travel distance from the furthest SOU door to a point of choice of up to 12 m, instead of 6 m. |
| 8 | D1.4, D1.5 & G6.4 (communal) | DP4 & EP2.2 | Maximum travel distance between alternative exits of up to 145 m, instead of 45 m. |
| 9 | D1.4 (Level 6 plantroom) | DP4 & EP2.2 | Maximum travel distance to a point of choice of up to 28 m, instead of 20 m. |
| 10 | D1.7(c) | DP5 & EP2.2 | Having unprotected glazing within the path of travel from the point of discharge of a fire-isolated exits (i.e. Fire Stairs 1 & 2) to a road/open space, instead of protection in accordance with Clause D1.7(c).<br>*NOTE: Glazing of Retail 02 directly adjacent to the discharge from Fire Stair 1 will required internal drencher protection to comply with BCA Clause D1.7(c).* |
| 11 | E1.3 | EP1.3 | Location of the fire hydrant booster assembly to be along Vernon Street, instead of being within sight of the main entrance of the building (i.e. Harbour Drive). |
| 12 | E2.2 & Table E2.2a | EP2.2 | Non-provision of zone smoke control system within the Class 6 part of the building, instead of providing zone smoke control as required under Table E2.2a. |

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## CONCLUSION

Subject to approval from the Certifying Authority and fire brigade support during the consultation process during the detailed CC stage, the proposed Performance Solution(s) related to the subject development can be demonstrated to meet the Performance Requirement(s) of the BCA.

Should you have any queries, please do not hesitate to contact the undersigned.

Yours sincerely,

**Jaimee Choi**

Director | Accredited Fire Safety Engineer (BPB 2221)

**e** jaimee@firesafetystudio.com

**m** 0421 555 953

# Appendix K.
# SERVICES

# Appendix L.
# ACCESS REPORT

Document Control Job No: 220263

| Principal Author: Michael Moutrie |
|---|
| Reviewed: Howard Moutrie |

| Issue. | Revision | Date |
|---|---|---|
| - | Original for DA | 15-12-2020 |
| | | |
| | | |

report

# Statement of Compliance Access for People with a Disability

# Proposed Mixed Use Development

**15-31 Harbour Dr Coffs Harbour**

**Accessible Building Solutions**
124 Upper Washington Drive
Bonnet Bay NSW 2226

P (office) 0415 255 163
P (Howard) 0414 876 539
P (Michael) 0450 334 995
E michael@absaccess.com.au

accessible building solutions

# Report

**Report Type:** Statement of Compliance - BCA Access Provisions
**Development:** 15-31 Harbour Dr Coffs Harbour

**Introduction:**
This report has been prepared to accompany a Development Application and has been based on the following drawings prepared by Turner:

| | |
|---|---|
| DA-110-001 Rev 7 | Ground Floor Plan |
| DA-110-005 Rev 4 | Mezzanine Plan |
| DA-110-010 Rev 7 | Level 1 Plan |
| DA-110-020 Rev 7 | Level 2 Plan |
| DA-110-030 Rev 7 | Level 3 Plan |
| DA-110-040 Rev 6 | Level 4 Plan |
| DA-110-050 Rev 6 | Level 5 Plan |
| DA-110-060 Rev 6 | Level 6 Plan |
| DA-110-070 Rev 6 | Level 7 Plan |
| DA-110-080 Rev 6 | Level 8 Plan |
| DA-110-090 Rev 6 | Level 9 Plan |
| DA-110-100 Rev 6 | Level 10 Plan |
| DA-110-110 Rev 6 | Level 11 Plan |
| DA-110-120 Rev 6 | Level 12 Plan |
| DA-110-130 Rev 7 | Roof Plan |
| DA-810-001-006 Rev 2 | Adaptable Unit Plans |

Limitations and Copyright information:
This report is not to be used for any other purpose than its original intention. The assessment is based on the provided drawings and compliance relies upon the implementation of all the recommendations listed in this report and the works constructed in accordance with AS1428.1-2009 and other latest, relevant standards and regulations applicable at the time of construction.

Assessment is based on the classification/use of the building. If the Class of the building changes to any other building Class, this access report will have to be updated accordingly.

All dimensions mentioned in the report are CLEAR dimensions and are not to be reduced by projecting skirting, kerbs, handrails, lights, fire safety equipment, door handles less than 900mm above FFL (finished floor level) or any other fixtures/fit out elements. Only some numerical requirements from relevant AS (Australian Standards) have been noted in the report, however for further details and for construction purposes refer to the relevant AS, a copy of which can be purchased from SAI Global.

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This report does not assess compliance matters related to WHS, Structural design, Services design, Parts of DDA other than those related to APS or Parts of BCA or Parts of Australian Standards other than those directly referenced in this report.
ABS gives no warranty or guarantee that this report is correct or complete and will not be liable for any loss arising from the use of this report. We are not to be held responsible if LHA comes to a different conclusion about compliance with the Livable Housing Guidelines. At this point of time only LHA is able to confirm whether a project has met all the requirements needed to be awarded a particular Quality Mark.

*We have no ability to check for slip resistance of surfaces. All wet areas, parking areas, pavement markings shall have the appropriate slip resistance for the location. We also have no ability to check for wall reinforcements once the walls have already been constructed. The builder is to take full responsibility that these requirements are met as a part of construction being as per requirements of AS1428.1/ AS4299 / AS2890.6/ AS3661/ AS4586*

A report issued for DA (development application) is not suitable for use for CC (construction certificate application).



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**Assessment:**

Assessment Criteria DA
This assessment has been undertaken to the extent necessary to issue development consent under the Environmental Planning and Assessment Act. Generally, assessment has been in regard to the capability of the proposal to achieve compliance where there is insufficient information to fully assess if compliance has been achieved. The project documentation should incorporate the requirements as listed in this report to ensure compliance.

Note: At design/drawing stage there is not enough information provided to ensure full compliance as a lot of access requirements depend on fittings and finishes. Where this report lists “capable of compliance” it means that there is nothing to stop full compliance as long as fittings and finishes are completed to the relevant standard

Compliance is required with the following:
- The Access Provisions of the BCA 2019
- The Access To Premises Standard
- AS1428 suite of Standards
- AS2890.6 for car parking
- AS1735.12 for lifts
- AS4299 Adaptable Housing
- SEPP 65 – Part 4Q
- Council’s DCP relating to Access for People with a Disability

Assessment
The building work comprises of ground floor retail units with residential units and multi level parking above

Under the BCA the building is classified as follows,
- Class 2 (building containing more than 2 SOUs i.e. sole-occupancy units)
- Class 6 (shops, sale of goods and services by retail)
- Class 7a (car park)



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The following tables assess compliance with the relevant parts of the BCA and Standards
BCA Assessment

BCA Part D3 Access for People with a Disability
**BCA D3.1 Requirements for Access for people with a disability**
SOU refers to Sole Occupancy Unit

| | |
|---|---|
| *Requirement* | **Class 2**<br>• From a required accessible pedestrian entrance to at least 1 floor with SOUs and till the entry of doors of each SOU on that level.<br>• To and within 1 of each type of room or space in common use.<br>• Where floor is accessed by an AS1428.1 ramp or lift, all SOUs on that level till the entry door and to and within all common use areas on that level. |
| *Compliance* | Complies. |
| *Comments* | Access has been provided from the main pedestrian entry to the entry doors of all SOUs on all levels by means of a lift.<br>Access has been provided to communal open space on Level 4.<br>Details to be verified at CC stage of works. |
| *Requirement* | **Class 5, 6, 7b, 8, 9a, 9b- Schools and early childhood centres**<br>To and within all areas that are normally used by the occupants. |
| *Compliance* | Complies. |
| *Comments* | Details to be verified at CC stage of works. |
| *Requirement* | **Class 7a**<br>To and within any level containing accessible carparking spaces. |
| *Compliance* | Complies. |
| *Comments* | Access has been provided to the ground level containing the accessible car parking spaces by means of a ramp.<br>Details to be verified at CC stage of works. |
| *Requirement* | **In areas required to be accessible, the following is to be provided:**<br>• Width of accessways shall be min 1M clear, and to be increased for door circulation, turning areas and passing areas as required by AS 1428.1<br>• Doors shall provide a clear opening of 850mm with a step free threshold and the required circulation spaces, hardware and luminance contrast as required by AS 1428.1<br>• Door mats, floor grates and the abutment of different finishes shall comply with BCA and AS 1428.1<br>• In accessible sole occupancy units, the light switches shall be 30x30mm min size at a height to match the door handles. GPOs shall be located between 600 and 1100mm above the floor and 500mm from an internal corner. |
| *Compliance* | Capable of compliance. |
| *Comments* | All of the above listed requirements are achievable and to be assessed for compliance at verified at CC stage of works. |



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**BCA Part D3.2 Access to buildings**

*Requirement*

**Accessway is required from;**

- Main pedestrian entry at the site boundary for new buildings
- Main pedestrian entry door for existing buildings
- Any other accessible building connected by a pedestrian link
- Accessible car parking spaces

*Compliance* Complies.

*Comments*

Level access has been provided from the main pedestrian entry at the site boundary.

Access has been provided from accessible car parking spaces by means of a ramp. Details to be verified at CC stage of works.

*Requirement*

**Accessway** is required through:

- Main entry and
- Not less than 50% of all pedestrian entrances and in building with floor area over 500m², non-accessible entry and accessible entry to be not more than 50M apart.

*Compliance* Capable of compliance.

*Comments*

The residential development has only 1 main entry which has been designed to be accessible. Each retail unit has an accessible entry
Details to be verified at CC stage of works.

*Requirement*

Where **Accessible pedestrian entry** has multiple doorways

- At least 1 to be accessible if 3 provided
- At least 50% to be accessible, if more than 3 provided

Where doorway has multiple leaves, at least 1 leaf is to have clear opening of 850mm (excluding automatic doors).

*Compliance* Capable of compliance.

*Comments*

Where multiple leaf doorways have been used, at least 1 operable leaf is required to provide a clear opening of 850mm with the door circulations spaces as per AS1428.1. Where single hinged doors have been used, the door leaf is required to provide a clear opening of 850mm with the door circulations spaces as per AS1428.1.

This is achievable and the door selections are to be verified at CC stage of works.

**BCA Part D3.3 Parts of buildings required to be accessible**

*Requirement*

Every **Ramp** (excluding fire-isolated ramp) to be compliant with AS1428.1 and slip resistance of ramp and landings compliant with BCA Table D2.14

*Compliance* Capable of compliance.

*Comments*

Detailed features of the ramp will be assessed with the requirements of AS1428.1 at the CC stage of works.

*Requirement*

Every **Walkway** to be compliant with AS1428.1

*Compliance* Capable of compliance.

*Comments*

Detailed features of the walkways will be assessed with the requirements of AS1428.1 at the CC stage of works.

Note: all walkways shall have a barrier or continue for a further 600mm in a different material on each side of the walkway.



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| | |
|---|---|
| *Requirement* | **Step / Kerb ramp** if provided is to be compliant with AS1428.1 and Slip resistance of ramp and landings compliant with BCA Table D2.14 |
| *Compliance* | N/A |
| *Comments* | No step / kerb ramps have been identified in the development. |
| *Requirement* | Every **Stairway** (excluding fire-isolated stairway) is to be compliant with AS1428.1 and slip resistance of treads, landings and nosing strips compliant with BCA Table D2.14 |
| *Compliance* | Capable of compliance. |
| *Comments* | Where non-fire-isolated stairways have been provided, the features of the stairway will be assessed with the requirements of AS1428.1 at the CC stage of works. |
| *Requirement* | Every **Fire-isolated Stairway** is to be compliant with the relevant sections of AS1428.1 & slip resistance of treads, landings and nosing strips compliant with BCA Table D2.14 |
| *Compliance* | Capable of compliance. |
| *Comments* | Where fire-isolated stairways have been provided, the features of the stairway will be assessed with the relevant requirements of AS1428.1 at the CC stage of works. |
| *Requirement* | **Passing spaces requirement**<br>It is a requirement to provide passing spaces in accessways complying with AS1428.1 at maximum 20 M intervals, where a direct line of sight is not available. Space required is width of 1800mmx2800mm (in the direction of travel). Chamfer of 400x400mm is permitted at corners. |
| *Compliance* | N/A |
| *Comments* | There are no accessways over 20 M lengths in the development where a direct line of sight is not available. |
| *Requirement* | **Turning spaces requirement**<br>It is a requirement to provide turning spaces in accessways complying with AS1428.1 within 2M of the end of accessways where it is not possible to continue travelling and at every 20M intervals. Space required is width of 1540mm x 2070mm (in the direction of travel). |
| *Compliance* | Complies. |
| *Comments* | Adequate turning spaces have been provided.<br>Details to be verified at CC stage of works. |
| *Requirement* | **Small building concession**<br>In a Class 5, 6, 7b or 8 building containing not more than 3 storeys, a lift / ramp is not required to provide access to levels other than the entrance level if the floor area of the levels other than the entrance level is not more than 200m². |
| *Compliance* | N/A |
| *Comments* | |
| *Requirement* | **Carpet specifications**<br>Carpet if used in areas required to be accessible are to be provided with pile height or thickness not more than 11mm and carpet backing not more than 4mm bringing the total height to a maximum of 15mm. |
| *Compliance* | Capable of compliance |
| *Comments* | Only applies to carpets provided in the common use areas and commercial use areas.<br><br>Carpet selections generally take place at CC stage of works.<br>Selection of carpets as specified above will lead to compliance and these selection details are to be verified at CC stage of works. |



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**BCA Part D3.4 Exemption**

*Requirement*

**Access is not required to be provided in the following areas :**

- where access would be inappropriate because of the use of the area
- where area would pose a health and safety risk
- any path which exclusively provides access to an exempted area

*Compliance*

For information only.

*Comments*

Areas such as lift machine rooms, fire services room, and mechanical rooms in the development are exempted from providing access under this clause due to WHS concerns.

**BCA Part D3.5 Accessible Carparking**

*Requirement*

**Parking Service**

Accessible carparking space need not be provided when a parking service is provided and direct access to any of the carparking spaces is not available to the public.

*Compliance*

N/A

*Comments*

*Requirement*

**Accessible car parking spaces shall have pavement marking in accordance with AS 2890.6**.

*Compliance*

Complies.

*Comments*

Note: the pavement marking shall have the appropriate slip resistance for the location. The wheelchair symbol is not required to be marked for the adaptable unit parking spaces.

*Requirement*

**In situations where not more than 5 carparking spaces have been provided**

The car parking space need not be designated, so as to restrict the use of the carparking space only for people with a disability.

*Compliance*

N/A

*Comments*

*Requirement*

**Class 2**

There are no carparking requirements for a Class 2 under the BCA. If adaptable housing has been mandated by the Council, carparking spaces will be required under the requirements of AS4299- Adaptable housing

*Compliance*

N/A

*Comments*

The parking for the adaptable units is assessed later in this report.

*Requirement*

**Class 5, 7, 8 or 9c**

- 1 space per 100 carparking spaces

**Class 6**

- 1 space per 50 carparking spaces ( up to 1000 spaces) and additional 1 space per additional 100 spaces provided

*Compliance*

Complies.

*Comments*

Total number of spaces provided = 31
Total number of Accessible car parking spaces required= 1
Total number of Accessible car parking spaces provided= 1
Car parking spaces are to comply with the requirements of AS2890.6. This is to be verified at the CC stage of works.



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**BCA Part D3.6 Signage**

| | |
|---|---|
| *Requirement* | Braille and Tactile signage is required to identify Accessible Sanitary facilities, Fire Exits and the location of accessible entrances and toilets |
| *Compliance* | Capable of compliance. |
| *Comments* | Verify at CC. |

**BCA Part D3.8 Tactile indicators (TGSIs)**

| | |
|---|---|
| *Requirement* | TGSIs are required when approaching;<br>- Stairways other than fire-isolated stairways and stairways within a SOU of a Class 2 building or a non-accessible SOU of a Class 3 building<br>- Escalators / passenger conveyor / moving walk<br>- Ramp (other than fire-isolated ramps / kerb or step or swimming pool ramps)<br>- Under an overhead obstruction of <2M if no barrier is provided<br>- When accessway meets a vehicular way adjacent to a pedestrian entry (if no kerb / kerb ramp provided at the location)<br>Compliance is required with AS1428.4.1 including Luminance contrast and slip resistance requirements for all TGSIs. |
| *Compliance* | Capable of compliance. |
| *Comments* | In the proposal, TGSIs are required in the following locations:<br>• At <u>top and bottom landings</u> of stairways and 1:14 ramps, <u>600-800mm</u> depth or min 12 discrete cones are required at 300+/-10mm from edge of hazard<br>• At <u>mid landings</u> of stairway and 1:14 ramp, <u>300-400mm</u> depth or min 6 discrete cones are required <u>only where handrails are not continuous</u> or landing is more than 3M<br>• Where accessway meets a vehicular way, 600-800mm depth or min 12 discrete cones are required at 300+/-10mm from edge of hazard.<br>• Under the stairway to warn of overhead obstruction, 600-800mm depth or min 12 discrete cones are required at 300+/-10mm from edge of hazard<br>Details to be verified at CC stage of works. |

**BCA Part D3.11 Limitations on Ramps**

| | |
|---|---|
| *Requirement* | • A series of connecting ramps cannot have a vertical height of 3.6M<br>• A landing for a step ramp cannot overlap a landing for another ramp |
| *Compliance* | Complies |
| *Comments* | The series of connecting ramps do not exceed a vertical height of 3.6M<br>Details to be verified at CC stage of works. |



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**BCA Part D3.12 Glazing on Accessways**

*Requirement* **Glazing requirements**- Where there is no chair rail, handrail or transom, all frameless or fully glazed doors, sidelights and any glazing capable of being mistaken for a doorway or opening are required to have a glazing strip as per requirements of AS1428.1

*Compliance* Capable of compliance

*Comments* Applies to full length glazing used in common use areas such as lift lobbies and common passageways and in all commercial use areas.
Glazing strip selections generally take place at CC stage of works.
Selection of glazing strips as specified above will lead to compliance and these selection details are to be verified at CC stage of works.

BCA Part F Accessible Sanitary Facilities

**BCA F2.4 Accessible sanitary facilities**

*Requirement* **Accessible unisex toilet** is to be provided in accessible part of building such that;

- It can be entered without crossing an area reserved for 1 sex only
- Where male and female sanitary facilities are provided at different locations, Accessible unisex toilet is only required at one of the locations
- Even distribution of LH and RH facilities

If no lift is required to be provided to a level, then accessible facility is not required on that level.

*Compliance* Complies.

*Comments* Common use unisex accessible toilet facilities have been provided in the development.
Details to be verified at CC stage of works.

*Requirement* Accessible unisex toilets are to be designed in accordance with AS1428.1

*Compliance* Capable of compliance

*Comments* The width and length requirements depend on selected fixtures.

Minimum size of an accessible toilet is required to be 1.9M x 2.7M after tiling works.
To be verified at CC stage of works.

*Requirement* **Ambulant use male / female toilets** are to be provided if an additional toilet to the Accessible unisex toilet is provided.

*Compliance* Complies

*Comments* The following Ambulant facilities have been provided
1 Male Ambulant use toilets + 1 Female Ambulant use toilets

*Requirement* **Ambulant use toilets are to be designed in accordance with AS1428.1.**

*Compliance* Complies with the width and length requirements

*Comments* Minimum size of an ambulant accessible toilet is required to be 900mm to 920mm width x 1.62M (dependent on WC pan and location of door to the cubicle)
To be verified at CC stage of works.



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**BCA F2.4(a) Accessible unisex sanitary compartments**

| | |
|---|---|
| *Requirement* | **Class 2**<br>At least 1 when sanitary compartments are provided in common areas. |
| *Compliance* | N/A |
| *Comments* | No common use sanitary facilities have been proposed in the development. |
| *Requirement* | **Class 5, 6, 7, 8 or 9 ( excluding ward area of 9a health-care)**<br>1 on every storey containing sanitary compartments.<br>Where more than 1 bank of sanitary compartments on a level, at 50% of banks |
| *Compliance* | Complies. |
| *Comments* | To be verified at CC stage of works. |

**BCA F2.9 Accessible Adult Change Facilities**

| | |
|---|---|
| *Requirement* | **Class 6**<br>Where the building is a shopping centre having a design occupancy of not less than 3,500 people ( approx. 10,500 sqm at ground level or 17,500 sqm above ground.) and containing a minimum of 2 sole occupancy units |
| *Compliance* | N/A |
| *Comments* | No accessible adult change facilities are required in the development. |

**BCA Part E Lift Installations**

| | |
|---|---|
| *Requirement* | In an accessible building, every passenger lift must comply with Tables E3.6(a) and E3.6(b). |
| *Compliance* | Capable of compliance |
| *Comments* | Lift floor dimensions (excluding stairway platform lift) are listed below.<br>• Lifts traveling 12M or under, floor size, 1100mm wide x 1400mm deep<br>• Lifts travelling more than 12M, floor size 1400mm wide x 1600mm deep<br>Details to be verified at CC stage of works. |
| *Requirement* | If the effective height of the building is over 12M, at least one of the lifts is required to be a stretcher lift, which is to accommodate a raised stretcher with clear space of not less than 600 x 2000mm long x 1400mm high above FFL. |
| *Compliance* | Capable of compliance |
| *Comments* | Details to be verified at CC stage of works. |



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DCP Requirements

Adaptable Housing

Ten adaptable units are required by the Council's DCP. The units designated as adaptable are Units 702, 802, 805, 902, 1002, 1102, 1201, 1202, 1203 & 1204

At DA stage there is insufficient information to certify compliance with the Standard, however, in accordance with the table below, the units can comply with the spatial requirements of AS4299 for Adaptable Housing.

**AS 4299 Adaptable Housing Class C requirements**

| | | |
|---|---|---|
| *The Site* | *Requirement* | **An accessible path of travel from the street, letterboxes, car park and to common facilities is provided** |
| | *Compliance* | Complies |
| | *Comment* | Details to be verified at CC stage of works. |
| *Carparking* | *Requirement* | **A car space 6m x 3.8m is provided** |
| | *Compliance* | Complies |
| | *Comment* | The layout includes spaces based on AS2890.6 which is acceptable.<br>Details to be verified at CC stage of works. |
| *Unit Entry* | *Requirement* | **The entry is accessible, covered, level, has a low threshold, permits wheelchair maneuverability and has an 850 clear door with lever handles** |
| | *Compliance* | Capable of Compliance |
| | *Comment* | Details to be verified at CC stage of works. |
| *Interior - General* | *Requirement* | **Access to bathroom, kitchen, laundry and living areas is provided.** |
| | *Compliance* | Complies |
| | *Comment* | Threshold ramps may be required in adapted state for wheelchair unless the floor of wet areas have been recessed.<br>Details to be verified at CC stage of works. |
| | *Requirement* | **Doors are 820mm clear (870 leaf) with corridors a min. 1000mm wide with circulation space at doors as per AS1428.1** |
| | *Compliance* | Capable of Compliance |
| | *Comment* | It is recommended that the door to adaptable bedroom and adaptable bathroom be 850mm clear opening.<br>Details to be verified at CC stage of works. |
| *Living/ Dining Rms* | *Requirement* | **Provision for circulation space of min 2250 dia,** |
| | *Compliance* | Complies |
| | *Comment* | Details to be verified at CC stage of works. |
| | *Requirement* | **Provision of, a telephone point adjacent to GPO and lighting which can achieve min 300 lux** |
| | *Compliance* | Capable of Compliance |
| | *Comment* | Details to be verified at CC stage of works. |



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| | | |
|---|---|---|
| *Kitchen* | *Requirement* | **Floor surface to be non-slip with 1550 clear between benches and circulation space at door to comply with AS1428.1.** |
| | *Compliance* | Capable of Compliance |
| | *Comment* | Details to be verified at CC stage of works. |
| | *Requirement* | **Provision for work benches, appliances and other services including tap type and location, GPO locations in accordance with AS 4299.** |
| | *Compliance* | Capable of Compliance |
| | *Comment* | Details to be verified at CC stage of works. |
| *Main Bedroom* | *Requirement* | **Can accommodate a queen size bed, wardrobe and circulation to allow a 180deg turn at the foot of the bed or in front of the robe** |
| | *Compliance* | Complies |
| | *Comment* | Details to be verified at CC stage of works. |
| *Bathroom* | *Requirement* | **Provision to allow bathroom to be converted to complying with AS 1428.1. The floor is slip resistant and the shower recess is hobless and can provide a compliant shower area with provision for grabrails, mirror, GPO etc.** |
| | *Compliance* | Complies |
| | *Comment* | Details to be verified at CC stage of works. |
| *Toilet* | *Requirement* | **An accessible toilet or an enlarged toilet with an area 1250x900w in front of pan is provided which is capable of modification to comply with AS 1428.1. The floor is slip resistant and the wall is capable of installing grabrails.** |
| | *Compliance* | Complies |
| | *Comment* | Details to be verified at CC stage of works. |
| *Laundry* | *Requirement* | **Circulation at doors to comply with AS 1428.1 is provided, with adequate circulation in front of appliances (min 1550mm). Provision for washing machine and drier is available and an accessible path of travel to clothes line if provided.** |
| | *Compliance* | Complies |
| | *Comment* | Details to be verified at CC stage of works. |
| | *Requirement* | **Provide a double GPO and the floor is to be slip resistant.** |
| | *Compliance* | Capable of compliance |
| | *Comment* | Details to be verified at CC stage of works. |
| *Door Hardware* | *Requirement* | **Lever door handles are provided, located 900-1100mm above floor** |
| | *Compliance* | Capable of Compliance |
| | *Comment* | Details to be verified at CC stage of works. |



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SEPP 65 – Part 4Q1

Compliance assessment with Objective 4Q1 that requires 20% of the units to incorporate the features of the **Livable Housing Guidelines Silver level**.

Total number of residential units in the development = 20% of 95 = **19** required Livable units.

Since **10** of the units (**702, 802, 805, 902, 1002, 1102, 1201, 1202, 1203 & 1204**) already comply with the Adaptable unit requirements, these units are also capable of satisfying the intent of Silver level of Livable Housing Guidelines as noted in the table below.

In addition to the adaptable units provided the following 10 units **407, 411, 412, 506, 510, 511, 605, 609, 610 & 709** are capable of providing compliance with the features of Silver level of Livable Housing Guidelines as noted in the table below.

By incorporating the requirements of the below Checklist in the Specifications of the project, the nominated Livable units can achieve full compliance with Livable Housing Guidelines- Silver Level

Note that in this case the adaptable units are also be counted as Livable / LHA Silver level unit in which case the below requirements apply in addition to the AS4299 requirements.

| **Design Element** | **Requirements** (All dimensions noted are required to be clear of finishes as required under AS1428.1) | **Compliance / Comments** |
|---|---|---|
| **1** **Dwelling Access** | (a) Provide a safe and continuous 1M clear width pathway from front site boundary to an entry door to the dwelling.<br>(b) Path including any ramps and walkways to have no steps, even firm, slip-resistant surface, max 1:40 crossfall, max slope of 1:14 with landings of 1.2M every 9M and landings every 15M for 1:20 walkways. 1.2M clear width of ramps are required. | Complies. Verify at CC |
| | (c) Pathway may be provided via an associated car parking in which case the car parking space to be<br>- 3200 (width) x5400 (length),<br>- even, firm and slip resistant, level surface of 1:40 max grade and 1:33 max grade for bitumen | Complies. Verify at CC |
| | (d) Step ramp may be provided at an entrance doorway. The step ramp to be max 190mm height, max 1:10 grade, max 1900mm length. | N/A |
| | (e) Level landings of 1200mm are required exclusive of the swing of the door or gate and to be provided at the head and foot of the ramp. | N/A |
| **2** **Dwelling entry** | (a) Dwelling Entry should provide an entrance door with<br>(i) min **clear** opening width of door to be 820mm<br>(ii) Step free threshold of max 5mm with rounded or bevelled lip<br>(iii) reasonable shelter from the weather | Capable of compliance. Verify at CC |
| | (b) Level landing of 1200x1200mm at step-free entrance door on the arrival / external side of the entrance door. | Complies Verify at CC |
| | (c) Max permissible threshold is less than 56mm where provided with a 1:8 grade threshold ramp. | N/A |
| | (d) Entrance to be connected to a pathway (specified under Element 1) Note: The entrance to incorporate waterproofing and termite management requirements as specified in the NCC | Complies |
| **3** **Internal doors and corridors** | (a) Doors to rooms on the entry level used for living, dining, bedroom, bathroom, kitchen, laundry and sanitary compartments to be<br>(i) 820mm clear opening and<br>(ii) provided with a level threshold of max 5mm between abutting surfaces with rounded or bevelled lip | Capable of compliance. Verify at CC |
| | (b) Internal corridors and passageways to doorway to be min 1M clear (measured from skirting to skirting) | Capable of compliance. Verify at CC |



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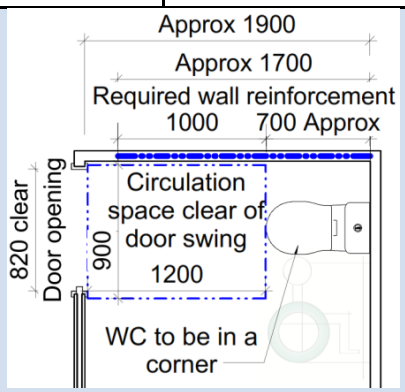
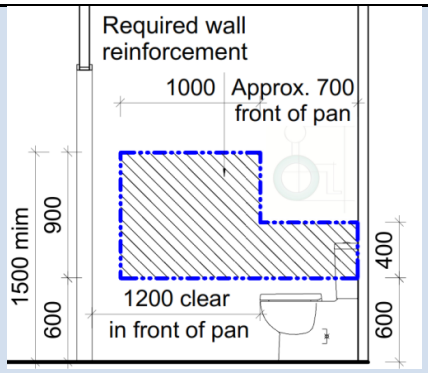
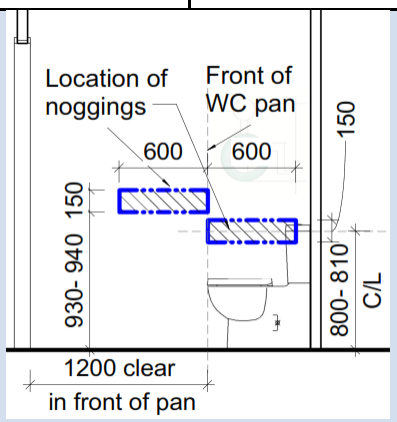
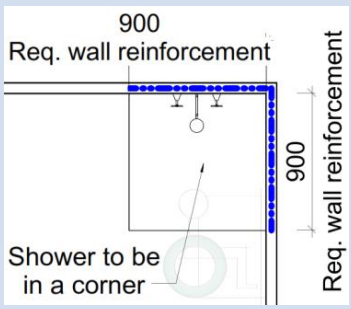
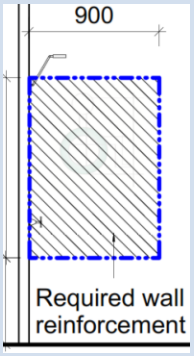
| | | |
|---|---|---|
| **4**<br>**Toilet** | (a) Toilet to be provided on the ground or entry level that provides,<br>(i) Min 900mm between walls if located in separate room<br>(ii) Min 1200mm clear space in forward of the WC pan exclusive of door swing.<br>(iii) The toilet pan to be positioned in the corner of a room to enable handrails | Complies.<br>Verify at CC |
| | | |
| **5**<br>**Shower** | (a) One bathroom should feature a slip resistant, hobless shower recess. Shower screens are permitted provided they can be easily removed at a later date.<br>(b) The shower recess should be located in the corner of the room to enable the installation of grabrails at a future date. | Capable of compliance.<br>Verify at CC |
| | For hobless specification please see Australian Standard AS3740-3.6. Reinforcement guidelines for walls in bathrooms and toilets are found in element 6 | |
| **6**<br>**Reinforcement of bathroom & toilet walls** | (a) Except for walls constructed of solid masonry or concrete, the walls around the shower, bath (if provided) and toilet should be reinforced to provide a fixing surface for the safe installation of grabrails. | Capable of compliance.<br>Verify at CC |
| | (b), (c) and (d) the walls around toilet, bath and shower to be via:<br>(i) Noggins with a thickness of at least 25mm<br>(ii) Sheeting with a thickness of at least 12mm<br>Refer to diagrams provided in the Livable Housing Guideline document. | Capable of compliance.<br>Verify at CC |

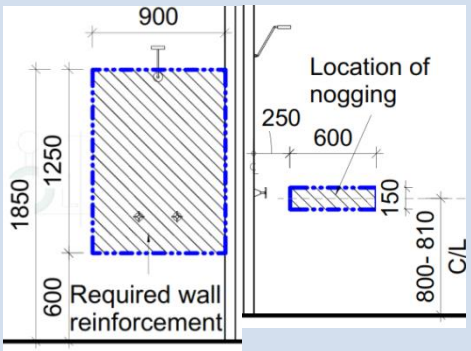


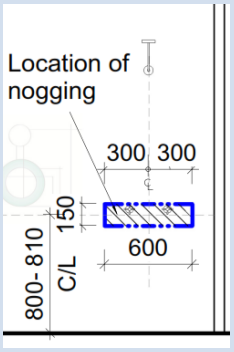




| | | |
|---|---|---|
| **7**<br>**Internal Stairways** | Stairways in dwellings must feature:<br>(i) a continuous handrail on one side of the stairway where there is a rise of more than 1m.a minimum clear width of 1000mm | N/A<br>No internal stairway in units. |

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**Statement of Compliance**
On the basis of the above assessment, I am satisfied that the proposal can achieve compliance with the access provisions of the BCA, SEPP 65 and the essential requirements of AS4299 – Adaptable Housing.

**Michael Moutrie**
ACAA Accredited Access Consultant No 581



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# Statement of experience

## Howard Moutrie

Qualifications:

- B. Arch (Hons) Registered Architect ARB Reg. No 4550
- ACAA Accredited Access Consultant Reg. No. 177
- OHS Induction Training,
- OHS – Monitoring a Safe Workplace
- Registered Assessor of Livable Housing Australia (License no 10054)
- Registered Changing Places assessor ( No 007)

Howard has been or is a member of the following:
Standards Australia ME/64 Committee (Access Standards)
Sutherland Council Design Review Panel
Sutherland Council Access Committee
City of Sydney Access Panel 2010
Building Professionals Board Access Advisory Panel
ACAA Management Committee
ACAA NSW Network of Access Consultants Management Committee

Howard Moutrie is an architect with over 30 years of experience and is an experienced practicing access consultant with over 15 years experience. Howard has contributed for over 10 years on the Standards Australia Disabled Access Committee ME/64, providing input into the AS 1428 suite of Standards and the Adaptable Housing Standard has acted as an expert witness in the Land & Environment Court.

Howard maintains a high level of continuing education programs and has presented at numerous seminars and training sessions including ACAA National Conference, ACAA State Network Seminars, RAIA Network Seminars, Building Designers Association Seminars.

## Michael Moutrie

Qualifications:

- ACAA Accredited Access Consultant No 581
- Certificate IV in Access Consulting
- Registered Assessor of Livable Housing Australia (License no 20265)
- Registered Changing Places assessor ( No 021)
- Accredited SDA Assessor (No 045)
- OH&S Induction Training Certificate

Michael is a member of Camden Council's Access Committee

Combining his background in fitness and travel, Michael has an interest in the application of accessibility to recreational activities and has been involved with the access award winning Wet'n' Wild Sydney, Jamberoo Action Park and numerous Leisure Centres. He has also reviewed the accessibility of popular tourist areas around the world.

Michael maintains a high level of continuing professional education and has published articles in the ACAA Insight magazine.



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# Appendix M.
# ACOUSTIC ASSESSMENT

MATTHEW PALAVIDIS
VICTOR FATTORETTO
MATTHEW SHIELDS

# 15 - 31 Harbour Dr, Coffs Harbour

# Acoustics Assessment for Development Application

**SYDNEY**
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| | |
|---|---|
| Project ID | 20201192.1 |
| Document Title | Acoustics Assessment for Development |
| Attention To | Paynter Dixon Constructions Pty Limited |

| Revision | Date | Document Reference | Prepared By | Checked By | Approved By |
|---|---|---|---|---|---|
| 0 | 10/12/2020 | 20201192.1/1012A/R0/TB | TB | | GW |
| | | | | | |

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# 1 INTRODUCTION

Acoustic Logic (AL) have been engaged to conduct an acoustic assessment of potential noise intrusion and noise emissions associated with the proposed new shop top residential building at 15 - 31 Harbour Dr, Coffs Harbour.

This assessment addresses:

- Noise intrusion into the development from external noise sources, namely the Pacific Highway and the surrounding rooftop mechanical plant
- Noise emissions from the building's mechanical plant to external receivers
- Noise emissions from the building's mechanical plant to internal receivers
- Noise emissions from the building's driveway and loading dock to internal receivers

Noise transfer between the apartments and other areas in the building are covered by the National construction code (BCA) and will not be covered in this report.

AL have utilised the following documents and regulations in this noise assessment;

- Development Near Rail Corridors and Busy Roads – Interim Guideline 2008
- NSW EPA Noise Policy for Industry (NPfI) 2017

This assessment has been conducted using the architectural drawings provide as per the following Table.

**Table 1 - Architectural Drawing Information**

| Prepared By | Drawing Number | Revision and Date |
|---|---|---|
| Turner Architects | Floor Plans | DA-110-120 to DA-110-40 (Rev6) (11/12/2020) |
| Turner Architects | Floor Plans | DA-110-30 to DA-110-10 (Rev7) (11/12/2020) |
| Turner Architects | Elevations | DA-210-001,2,3 (Rev2) (11/12/20) |

## 2 SITE DESCRIPTION

The subject site is located at 15 - 31 Harbour Dr, Coffs Harbour within the Coffs Harbour CBD, hence nearly all of the nearest and most affected receivers are commercial. Currently the development site consists of two off two storey commercial blocks within the retail strip.

The proposed shop top residential tower will be 44m tall and will take up the two blocks. There will be an open laneway on the western boundary that will have some commercial and retail suites. The first five levels will take up the remainder of the block. The residential tower will then be slender above the podium level. The tower will also be terraced on the southern façade.

A site survey has been carried out by this office around the proposed development site. The site is located within the business zone, hence the surrounding receivers are commercial. The nearest and most affected noise receivers identified are as follows:

- Receiver 1 – The Coffs Harbour Ex Servicemen's Club (Cex), on the opposite side of Vernon Street.
- Receiver 2 – The memorial park on the opposite side of Vernon Street (10 Vernon Street)
- Receiver 3 – Harbour Street mall on the other façade of the development
- Receiver 4 – Triton, 8 storey residential building due to its height is the nearest and potentially most affected residential receiver
- Receiver 5 –The upper hotel floors of The Coffs Hotel are the nearest and potentially affected hotel receiver

A site map, measurement description and surrounding receivers are presented in Figure 1.

**Figure 1 – Aerial View of Site & Receivers**
***(Sourced from Six Maps 2020)***

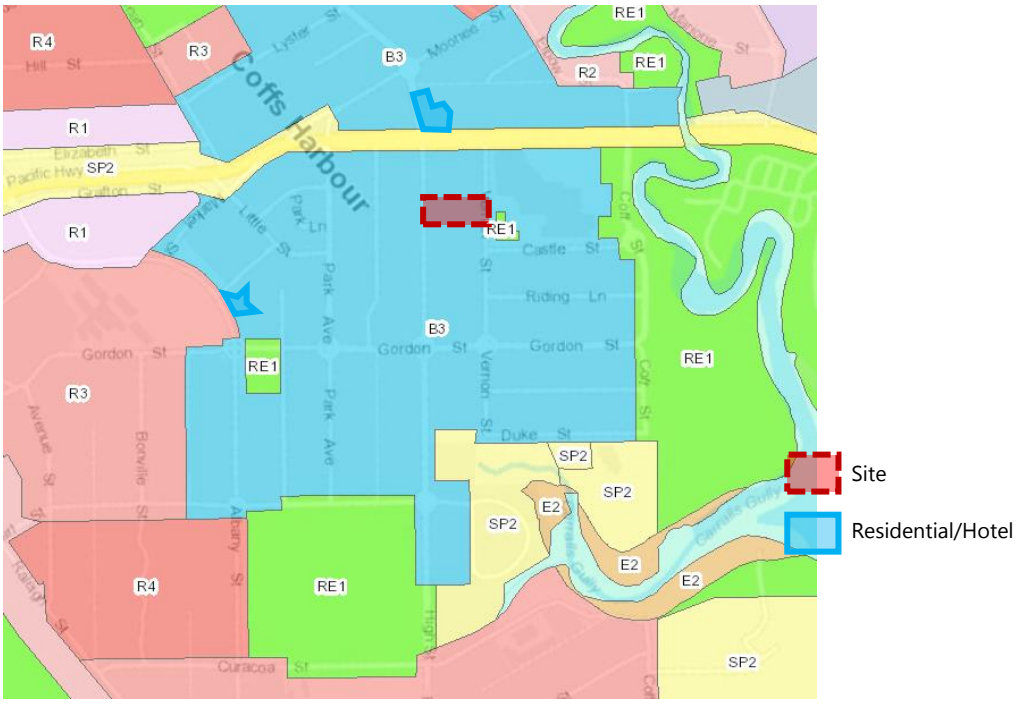



**Figure 2 – LEP Planning Zones**
***(Sourced from ePlanning Spatial Viewer)***

# 3 EXISTING ACOUSTIC ENVIRONMENT

The existing acoustic environment was assessed by aural observations, attended measurements and long tern noise monitoring.

## 3.1 ENVIRONMENTAL NOISE DESCRIPTORS

Environmental noise constantly varies. Accordingly, it is not possible to accurately determine prevailing environmental noise conditions by measuring a single, instantaneous noise level.

To accurately determine the environmental noise a 15-20 minute measurement interval is utilised. Over this period, noise levels are monitored on a continuous basis and statistical and integrating techniques are used to determine noise description parameters.

In analysing environmental noise, three-principle measurement parameters are used, namely $L_{10}$, $L_{90}$ and $L_{eq}$.

The $L_{10}$ and $L_{90}$ measurement parameters are statistical levels that represent the average maximum and average minimum noise levels respectively, over the measurement intervals.

The $L_{10}$ parameter is commonly used to measure noise produced by a particular intrusive noise source since it represents the average of the loudest noise levels produced by the source.

Conversely, the $L_{90}$ level (which is commonly referred to as the background noise level) represents the noise level heard in the quieter periods during a measurement interval. The $L_{90}$ parameter is used to set the allowable noise level for new, potentially intrusive noise sources since the disturbance caused by the new source will depend on how audible it is above the pre-existing noise environment, particularly during quiet periods, as represented by the $L_{90}$ level.

The $L_{eq}$ parameter represents the average noise energy during a measurement period. This parameter is derived by integrating the noise levels measured over the 15-minute period. $L_{eq}$ is important in the assessment of environmental noise impact as it closely corresponds with human perception of a changing noise environment; such is the character of environmental noise.

## 3.2 BACKGROUND NOISE LEVELS

Background noise levels which will be used as a basis for this assessment are detailed in the following sections.

### 3.2.1 Measurement Equipment

Unattended noise monitoring was conducting using one Rion NL-27 noise logger. The logger was programmed to store 15-minute statistical noise levels throughout the monitoring period. The equipment was calibrated at the beginning and the end of each measurement using a Rion NC-74 calibrator; no significant drift was detected. All measurements were taken on A-weighted fast response mode.

### 3.2.2 Measurement Location

An unattended noise monitor was installed on the awning of the existing retail/commercial building at 13-15 Vernon Street, Coffs Harbour CBD. For a detailed location refer to Figure 1. The location was suitable as it was set approximately 3m below the roof where it was shielded from the roof top mechanical plant of the adjacent commercial/retail buildings. The location was selected to be able to obtain the most representative background noise levels in the vicinity of the development.

### 3.2.3 Measurement Period

Unattended noise monitoring was conducted from Wednesday the 4th of November to Tuesday the 17th of November 2020

### 3.2.4 Measured Background Noise Levels

The background noise levels established from the unattended noise monitoring are detailed in the tables below.

NSW EPA's RBL assessment procedure requires determination of background noise level for each day (the ABL) then the median of the individual days as set out for the entire monitoring period.

Appendix 1 provides the results of the unattended noise monitoring. Weather affected data was excluded from the assessment. The processed Rating Background Noise Levels (lowest 10th percentile noise levels during operation time period) are presented in Tables 2 and 3.

## Table 2 - Monitored Background Noise Levels

| DAY | Rated Background Noise Level $L_{A90}$, dB (Lowest 10th percentile) | | |
|---|---|---|---|
| | Day (7am-6pm) | Evening (6pm – 10pm) | Night (10pm-7am) |
| Wednesday 04 November 2020 | - | 48 | - |
| Thursday 05 November 2020 | - | - | 42 |
| Friday 06 November 2020 | - | - | 44 |
| Saturday 07 November 2020 | - | - | 41 |
| Sunday 08 November 2020 | - | - | - |
| Monday 09 November 2020 | - | 46 | 39 |
| Tuesday 10 November 2020 | 53 | 48 | 42 |
| Wednesday 11 November 2020 | - | - | 41 |
| Thursday 12 November 2020 | - | - | 42 |
| Friday 13 November 2020 | - | - | - |
| Saturday 14 November 2020 | 52 | 48 | 43 |
| Sunday 15 November 2020 | 50 | 47 | 42 |
| Monday 16 November 2020 | - | - | 41 |
| Tuesday 17 November 2020 | - | - | - |
| **Rating Background Noise Level** | **52** | **48** | **42** |

## Table 3 - Monitored Ambient Noise Levels

| DAY | Measured Ambient Noise Levels $L_{Aeq}$, dB | | |
|---|---|---|---|
| | Day (7am-6pm) | Evening (6pm – 10pm) | Night (10pm-7am) |
| Wednesday 04 November 2020 | - | - | - |
| Thursday 05 November 2020 | - | - | - |
| Friday 06 November 2020 | - | - | - |
| Saturday 07 November 2020 | - | - | 58 |
| Sunday 08 November 2020 | - | - | - |
| Monday 09 November 2020 | - | 60 | - |
| Tuesday 10 November 2020 | 61 | 61 | 60 |
| Wednesday 11 November 2020 | - | - | 60 |
| Thursday 12 November 2020 | - | - | 60 |
| Friday 13 November 2020 | - | - | - |
| Saturday 14 November 2020 | - | 61 | - |
| Sunday 15 November 2020 | 59 | 59 | 55 |
| Monday 16 November 2020 | - | - | 57 |
| Tuesday 17 November 2020 | - | - | - |
| **Amenity Noise Levels** | **60** | **60** | **59** |

The above tables show a significant amount of missing data, which would normally require re-monitoring. It is noted that the only automated BOM weather station is located at Coffs Harbour airport which is adjacent to the beach and where coastal afternoon sea breezes are strongest. It is noted that our monitor was installed within the CBD zone of Coffs Harbour which is further inland and where there are numerous buildings unlike the open field of the airport. Although we can predict the wind velocity at the monitor using Australian Standard AS1170-2 and the difference in terrain categories, however, to avoid disputes the overall noise levels between weather affected and non-weather affected data are compared in Table 4 and its shown that the data is insignificantly affected by weather. Hence re-monitoring of background and ambient noise levels are not warranted.

**Table 4 - Rating Background and Ambient Noise Levels**

| Noise Level Type | Weather | Day (7:00am – 6:00pm) | Evening (6:00pm – 10:00pm) | Night (10:00pm – 7:00am) |
|---|---|---|---|---|
| RBL | Removed | **52** | **48** | **42** |
| RBL | Included | 53 | 49 | 42 |
| Ambient | Removed | **60** | **60** | **59** |
| Ambient | Included | 61 | 60 | 59 |

# 4 NOISE CRITERIA

The following documents specified in the Coffs Harbour City Council's DCP (Section D3- Residential) have been used to determine applicable noise intrusion and noise emissions criteria for the proposed shop top residential tower development:

- *Development applications comprising noise generating development adjacent to or within line of sight from established noise-sensitive developments such as schools, hospitals or residential accommodation are to have regard to the Noise Policy for Industry (Environment Protection Authority 2017)*

- *Development applications comprising development in or adjacent to the proposed Pacific Highway bypass corridor are to be accompanied by sufficient information to demonstrate that future residential development can equitably satisfy the following criteria:*
    - *in any bedroom in the building - 35 dB(A) at any time between 10.00pm and 7.00am; and*
    - *anywhere else in the building (other than a garage, kitchen, bathroom or hallway) - 40 dB(A) at any time.*

The above road noise criteria have been assumed to be extracted from the NSW Department of Planning – Development near Rail Corridors or Busy Roads – Interim Guideline, hence we have assumed the conditions in the Planning Guideline will apply also to this development.

Relevant noise criteria from each document will be presented and the governing noise criteria for the operating periods will be determined.

## 4.1 NOISE INTRUSION CRITERIA

### 4.1.1 Development near Rail Corridors or Busy Roads – Interim Guideline

Section 3.5 of the NSW Department of Planning's 'Development near Rail Corridors and Busy Roads (Interim Guideline)' states:

*"The following provides an overall summary of the assessment procedure to meet the requirements of clauses 87 and 102 of the Infrastructure SEPP. The procedure covers noise at developments for both Road and Rail.*

- *If the development is for the purpose of a building for residential use, the consent authority must be satisfied that appropriate measures will be taken to ensure that the following LAeq levels are not exceeded:*

    - *in any bedroom in the building: 35dB(A) at any time 10pm-7am*

    - *anywhere else in the building (other than a garage, kitchen, bathroom or hallway): 40dB(A) at any time."*

Section 3.6.1 states:

*If internal noise levels with windows or doors open exceed the criteria by more than 10dBA, the design of the ventilation for these rooms should be such that occupants can leave windows closed, if they so desire, and also to meet the ventilation requirements of the Building Code of Australia.*

### 4.1.2 State Environmental Planning Policy (SEPP) (INFRASTRUCTURE) 2007

Clause 102 of the NSW SEPP for road traffic noise stipulates

*"This clause applies to development for any of the following purposes that is on land in or adjacent to the road corridor for a freeway, a tollway or a transit way or any other road with an annual average daily traffic volume of more than 40,000 vehicles (based on the traffic volume data published on the website of the RTA) and that the consent authority considers is likely to be adversely affected by road noise or vibration:*

*(a) a building for residential use,*

*(b) a place of public worship,*

*(c) a hospital,*

*(d) an education establishment or child care centre.*

*If the development is for the purposes of a building for residential use, the consent authority must not grant consent to the development unless it is satisfied that appropriate measures will be taken to ensure that the following LAeq levels are not exceeded:*

*(a) in any bedroom in the building – 35 dB(A) at any time between 10 pm and 7am,*

*(b) anywhere else in the building (other than a garage, kitchen, bathroom or hallway) – 40 dB(A) at any time."*

### 4.1.3 Australian Standard AS2107:2016

Australian Standard AS 2107-2016: *Recommended design sound levels and reverberation times for building interiors* specifies allowable internal noise levels for internal spaces within residential and commercial buildings.

Table 5 presents the sound levels applicable to the proposed redevelopment based the requirements for houses and apartments in inner city areas or entertainment districts or near major roads.

**Table 5 – Recommended Design Sound Levels of AS2107:2016**

| Space /Activity Type | Recommended Design Sound Level Range, $L_{Aeq}$ dB |
|---|---|
| Inner city - Living Areas | 35-45 |
| Inner city - Sleeping Areas (night time) | 35-40 |

The midpoint noise level has been chosen as the design level for each room type, so the final noise levels are within the range.

## 4.2 NSW EPA NOISE POLICY FOR INDUSTRY

The NPfI provides guidelines for assessing noise impacts from developments. The recommended assessment objectives vary depending on the potentially affected receivers, the time of day, and the type of noise source. The NPfI has two requirements which both have to be complied with, namely an intrusiveness criterion and an amenity criterion.

### 4.2.1 Intrusiveness Criterion

***Section 2.3: Project Intrusiveness Noise Level***

*"The intrusiveness of an industrial noise source may generally be considered acceptable if the level of noise from the source (represented by the $L_{Aeq}$ descriptor), measured over a 15-minute period, does not exceed the background noise level by more than 5 dB when beyond a minimum threshold. This intrusiveness noise level seeks to limit the degree of change a new noise source introduces to an existing environment.*

**Table 6 – Residential Intrusiveness Criteria**

| Receiver | Time of day | Background Noise Level $L_{A90}$,dB | Project Intrusiveness Criteria $L_{Aeq}$,dB |
|---|---|---|---|
| Residential Receivers | Day (7am – 6pm) | 52 | 57 |
| | Evening (6pm – 10pm) | 48 | 53 |
| | Night (10pm – 7am) | 42 | 47 |

### 4.2.2 Amenity Criteria

***Section 2.4: Amenity Noise Levels and Project Amenity Noise Levels***

*"To limit continuing increases in noise levels from application of the intrusiveness level alone, the ambient noise level within an area from all industrial noise sources combined should remain below the recommended amenity noise levels specified in Table 2.2 where feasible and reasonable. The recommended amenity noise levels will protect against noise impacts such as speech interference, community annoyance and some sleep disturbance.*

*The recommended amenity noise levels represent the objective for total industrial noise at a receiver location, whereas the project amenity noise level represents the objective for noise from a single industrial development at a receiver location."*

Table 2.2 on page 11 of the policy has four categories to distinguish different residential areas. They are rural, suburban, urban and urban/industrial interface. The subject site has been assessed against noise emission criteria in accordance with the 'urban' category and the criteria are presented in Table 7.

## Table 7 - Amenity Criteria

| Type of Receiver | Time of day | Normalised Amenity Noise Level $L_{Aeq,}$dB |
|---|---|---|
| Residential (Urban) | Day (7am – 6pm) | 58 |
| | Evening (6pm – 10pm) | 48 |
| | Night (10pm – 7am) | 43 |
| Commercial | When in Use | 63 |

### 4.2.3 Maximum noise level event criteria

As the subject sites retail loading dock and driveway may have vehicular movements within the night period an assessment for sleep disturbance must be carried out at the nearest and most affected residents. The criteria are as follows:

- $L_{Aeq,}$15min 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or
- $L_{AFmax}$ 52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater,

The sleep disturbance criteria are shown in Table 8.

## Table 8 - Sleep Disturbance Criteria

| Descriptor | BG Noise Level $L_{A90,}$dB | BG plus Allowance Noise Level, dB | Baseline Noise Level, dB | Project Event Level Criteria $L_{Aeq,}$dB |
|---|---|---|---|---|
| $L_{Aeq,\ 15min}$ | 42 | 47 | 40 | 47 |
| $L_{AFmax}$ | 42 | 57 | 52 | 57 |

## 4.3 PROJECT NOISE CRITERIA

The following tables present governing noise objectives from all the relevant criteria for the proposed shop top residential tower.

### 4.3.1 Summarised Noise Intrusion Criteria

Summarised internal noise criteria adopted for each internal space is summarised in Table 9. The noise levels from mechanical plant may have additional corrections for undesirable noise characteristics.

**Table 9 – Project Internal Noise Levels**

| Space / Activity Type | Noise Source | Design Internal Noise Level |
|---|---|---|
| Living Areas | Road Traffic | 40 dB(A) $L_{eq\ (15hr)}$ ***SEPP (Infrastructure) 2007*** |
| Sleeping Areas (night time) | Road Traffic | 35 dB(A) $L_{eq\ (9hr)}$ ***SEPP (Infrastructure) 2007*** |
| Living Areas | Road Traffic & Mechanical Plant | 40 dB(A) $L_{eq}$ ***AS2107:2016*** |
| Sleeping Areas (night time) | Road Traffic & Mechanical Plant | 37 dB(A) $L_{eq}$ ***AS2107:2016*** |

### 4.3.2 Summarised Noise Emissions Criteria

Summarised internal noise criteria adopted for each internal space is summarised in Tables 10 and 11. The noise levels from mechanical plant may have additional corrections for undesirable noise characteristics.

**Table 10 - Project Emissions Criteria**

| Receiver | Time of day | Project Intrusiveness Criteria $L_{Aeq,}$dB | Normalised Amenity Noise Level $L_{Aeq,}$dB | Governing Noise Level $L_{Aeq,}$dB |
|---|---|---|---|---|
| Residential Receivers | Day (7am – 6pm) | 57 | 58 | **57** |
| | Evening (6pm – 10pm) | 53 | 48 | **48** |
| | Night (10pm – 7am) | 47 | 43 | **43** |
| Commercial Receivers | When in Use | - | 63 | **63** |

**Table 11 - Project Sleep Disturbance Criteria**

| Descriptor | BG Noise Level $L_{A90,}$dB | BG plus Allowance Noise Level, dB | Baseline Noise Level, dB | Project Event Level Criteria $L_{Aeq,}$dB |
|---|---|---|---|---|
| $L_{Aeq,\ 15min}$ | 42 | 47 | 40 | **47** |
| $L_{AFmax}$ | 42 | 57 | 52 | **57** |

# 5 TRAFFIC NOISE INTRUSION ASSESSMENT

The proposed shop top residential tower development is twelve storeys tall and the southern, western and northern facades of the building will have views of the Pacific highway. Hence, attended noise measurements and noise monitoring was carried out.

A noise model was made in a SoundPlan (software suite) to predict the noise levels from road traffic noise acting on the proposed building's facade. These noise levels will be used to predict the glazing requirements. It is noted that the building heights, other than the residential tower were all estimated from Google Street Views.

The model was initially calibrated to the measured and monitored noise levels. This confirmed the observations that traffic on Harbour Drive and Vernon Street had insignificant noise contributions. The model then was run for daytime and night periods so both the living areas and bedrooms could be analysed. The SoundPlan model was run for traffic noise independently from any mechanical plant noise as the traffic noise assessment is now required for Roads that carry more that 20,000 AADT. In 2011 the RTA traffic count was 29,024 AADT.

## 5.1 TRAFFIC NOISE INTRUSION LEVELS

### 5.1.1 Monitoring Equipment

Unattended noise monitoring was conducting using one Rion NL-27 noise logger. The logger was programmed to store 15-minute statistical noise levels throughout the monitoring period. The equipment was calibrated at the beginning and the end of each measurement using a Rion NC-74 calibrator; no significant drift was detected. All measurements were taken on A-weighted fast response mode.

### 5.1.2 Monitoring Location

An unattended noise monitor was installed on the awning of commercial/retail building at 13-15 Vernon Street, Coffs Harbour. For a detailed location refer to Figure 1. The monitoring location was suitable for the background noise level monitoring and for monitoring the traffic noise levels.

### 5.1.3 Monitoring Period

Unattended noise monitoring was conducted from Wednesday the 4th of November to Tuesday the 17th of November 2020

### 5.1.4 Monitoring Results

The average traffic noise levels for the Day and Night periods recorded by the noise monitor are shown in Table 12.

**Table 12 - Monitored Traffic Noise Levels**

| Location | Day (7am to 10pm) $L_{Aeq(15hr)}$, dB | Night (10pm to 7am) $L_{Aeq(9hr)}$, dB |
|---|---|---|
| 13-15 Vernon Street, Coffs | 61 | 59 |

### 5.1.5 Measurement Equipment

Attended noise measurements were conducting using a Norsonics 140 Type 1 sound analyser. The meter was programmed to store equivalent energy and statistical noise levels. The equipment was calibrated at the beginning and the end of each measurement using a Norsonic 1251 Type 1 calibrator; no significant drift was detected. All measurements were taken on A-weighted and Z-weighted octave bands in fast response mode.

### 5.1.6 Measurement locations

Attended noise measurements were taken at street level on both Vernon Street and Harbour Drive.

The measurements on Harbour Drive were taken near the crossing at the end of the arcade of the existing site. The location had views of the Pacific Highway which was the dominant noise source. The road traffic on Harbour Drive was low and slow due to the number of speed humps at the pedestrian crossings.

The measurements on Vernon Street were taken at the last 45 degree parking spot on before the Highway intersection. This location was chosen as there was minimal road traffic on Vernon Street and the Pacific Highway the dominant noise source.

### 5.1.7 Measurement Periods

The attended 15 minute noise measurement on Harbour Drive was taken at around 12:30pm. The attended noise measurements on Vernon Street were taken from 3pm to 4pm. This time was selected to obtain the afternoon peak as predicted from the last RMS road counts on Grafton Street (Pacific Hwy) shown in Figure 4.

**Figure 3 – RTA Traffic Count 2011**

### 5.1.8 Measured Traffic Noise Levels

The traffic noise levels from the attended noise measurements are presented in Table 13.

### Table 13 - Measured Traffic Noise Levels

| Location | Time | Traffic Noise level $L_{Aeq(15min)}$, dB |
|---|---|---|
| Harbour Drive | 12:30 | 63 |
| Vernon Street | 3:00 | 66 |
| Vernon Street | 3:30 | 68 |
| Vernon Street | 3:45 | 68 |

## 5.2 METHODOLOGY

Internal noise levels will primarily be as a result of noise transmission through the roof, windows and doors as these are relatively light building elements that offer less resistance to the transmission of sound.

The predicted noise levels through the roof, walls, windows and doors are discussed below. The predicted noise levels have been based on the expected level and spectral characteristics of the external noise, the area of building elements exposed to road traffic noise, the absorption characteristics of the rooms and the noise reduction performance of the building elements.

The building is assumed to be of masonry construction, with a concrete roof and glazed facades. The room floor finishes have been assumed to be as follows:

- Bedrooms will have carpet floors
- Living Areas are timber floors

The following table, Table 14 shows that the governing noise criteria for the bedrooms is the night criterion as a greater noise reduction is required.

### Table 14 - Traffic Noise Reduction Levels

| Room | Time | External Traffic Noise Level, dB(A) | Internal Criterion Level dB(A) | Required Reduction, dB |
|---|---|---|---|---|
| Living Room | ALL | 61 | 40 | 21 |
| Bedroom | Day | 61 | 40 | 21 |
| Bedroom | Night | 59 | 35 | 24 |

## 5.3 RECOMMENDED CONSTRUCTIONS FOR TRAFFIC NOISE

The following constructions are recommended in order to comply with the noise objectives stated in Table 9.

### 5.3.1 Glazed Windows and Doors

The window and door glazing proposed for this project is listed below. The windows and doors will be satisfactory provided they meet the criteria listed below.

The proposed glazing thickness will satisfy the acoustic requirements of the NSW Department of Planning – *Development near Rail Corridors or Busy Roads – Interim Guideline*. Thicker glazing may be required for structural, safety or other purposes. Where it is required to use thicker glazing than scheduled, this will also be acoustically acceptable, however any form of double glazing must have its acoustic performance analysed to check its compatibility to the requirements. The thicknesses of the glazing elements are specified in Tables 16 and 17.

It has been assumed that the winter gardens on all levels on the Northern Façade will have operable glass louvres and bi-fold windows installed. The breezeway louvres manufacturer's lab test sound transmission loss presented in Table 15 and the assumed installed performance of bi-fold windows. It is assumed that to meet the windows closed internal noise levels that both the wintergarden glazing and the apartment façade glazing are closed to form a large double glazed unit.

**Table 15 – Winter Garden Glazing Sound Transmission Loss, dB**

| Item | 63Hz | 125Hz | 250Hz | 500Hz | 1kHz | 2kHz | 4kHz | 8kHz | Rw |
|---|---|---|---|---|---|---|---|---|---|
| Breezeway Dualair Louvre, 6mm glass, 6mm aluminium | 20 | 26 | 26 | 38 | 40 | 35 | 37 | 39 | 35 |
| 6.38mm laminated bi-fold Glazing (installed) | 17 | 17 | 22 | 24 | 26 | 25 | 25 | 29 | 26 |

## Table 16 – Recommended Glazing Construction - Bedrooms

| Level | Space | Facade | Element | Glazing Thickness | Acoustic Seals |
|---|---|---|---|---|---|
| All | bedrooms | West | Glazing | 10.38mm lam | Yes |
| All | Bedrooms (see note) | North | Glazing | 6.38mm lam | Yes |
| L5/6 | bedrooms | North Balcony | Glazing | 6.38mm lam | Yes |
| L5/6 | bedrooms | North | Glazing | 10mm float | Yes |
| All | bedrooms | North (Wintergarden) | Glazing | 4mm float | Yes |
| All | NW corner bedrooms | West | Glazing | 6.38mm lam | Yes |
| All | NW corner bedrooms | North | Glazing | 10.38mm lam | Yes |
| All | bedrooms | North (Wintergarden) | Glazing | 4mm float | Yes |
| All | NW corner bedrooms | West | Glazing | 10mm float | Yes |
| All | NW corner bedrooms | North | Glazing | 10mm float | Yes |
| All | bedrooms | South | Glazing | 6.38mm lam | Yes |
| All | bedrooms | East | Glazing | Standard | No |
| L1 | bedrooms | North | Glazing | 10mm float | Yes |
| L1 | bedrooms | West (balcony) | Glazing | 10mm float | Yes |

Note: This specification is for rooms with a glazed panel for a single façade only. Rooms with another glazed façade such as a balcony door will have a higher requirement.

## Table 17 – Recommended Glazing Construction – Living Rooms

| Level | Space | Facade | Element | Glazing Thickness | Acoustic Seals |
|---|---|---|---|---|---|
| All | Corner Living rooms | West | Glazing | 10mm float | Yes |
| All | Corner Living rooms | North | Glazing | 6.38mm lam | Yes |
| All | Corner Living rooms | South | Glazing | 6.38mm lam | Yes |
| All | SE Corner Living rooms | South | Glazing | 4mm float | Yes |
| All | SE Corner Living rooms | East | Glazing | Standard | No |
| All | Living rooms | West | Glazing | 10mm float | Yes |
| All | Living rooms | North | Glazing | 4mm float | Yes |
| All | Living rooms | North (winter garden) | Glazing | Standard | No |
| All | Living rooms | East | Glazing | standard | No |
| All | Western Living rooms | Breezeway | Glazing | 6mm float | Yes |
| 7to12 | NE Corner Living room | East Windows | Glazing | 4mm float | No |
| 7to12 | NE Corner Living room | East Wintergarden | Glazing | 4mm float | No |
| 7to12 | NE Corner Living room | West Wintergarden door | Glazing | 6.38mm lam | No |
| 7to12 | NE Corner Living room | North -Bifold | Glazing | 6.38mm lam | No |
| 7to12 | NE Corner Living room | North – Wintergarden | Glazing | 4mm float | No |
| 2 to 5 | Living rooms | North (bifold) | Glazing | 6.38mm lam | No |
| 2 to 5 | Living rooms | North (wintergarden) | Glazing | 4mm float | No |
| All | Eastern Living rooms | Breezeway | Glazing | 4mm float | Yes |

In addition to complying with the minimum scheduled glazing thickness, the $R_w$ rating of the glazing fitted into operable frames and fixed into the building opening should not be lower than the values listed in Table 18 in all areas. Where nominated, this will require the use of acoustic seals around the full perimeter of operable frames, and the frame will need to be sealed into the building using a flexible sealant. **Note that mohair or mohair + fin seals in windows and doors <u>are not acceptable</u> where acoustic seals are required.**

Suppliers should provide evidence that the window systems proposed have been tested in a registered laboratory with the recommended glass thicknesses, and comply with the minimum $R_w$ requirements listed in Table 18, and that they will be constructed and installed in a manner equal to the test samples.

### Table 18 – Minimum $R_w$ of Glazing

| Glazing Assembly | Minimum $R_w$ of Installed Window | Acoustic Seals |
|---|---|---|
| Standard | 20 | No |
| 6.38mm Bi-Fold Windows | 26 | No |
| 4mm float | 27 | Yes |
| 5mm float | 28 | Yes |
| 6mm Breezeway Louvres | 28 | Proprietary |
| 6mm float | 29 | Yes |
| 6.38mm laminate | 31 | Yes |
| 10mm float | 33 | Yes |
| 10.38mm laminate | 35 | Yes |

#### 5.3.2 Entry Doors

All external entry doors shall have glazing thicknesses equal to those recommended in Section 5.3.1.

#### 5.3.3 External Wall construction

External walls are assumed to be constructed from heavy masonry elements (brick veneer, double brick, precast or insitu cast concrete walls) and will not require acoustic treatment.

Walls which are constructed from light weight cladding or Hebel are to be upgraded to achieve an equivalent sound transmission loss to a heavy masonry construction. For example for traffic noise only, the NW bedroom's external glass clad wall will require the following construction: 6.38mm laminated glass on a 92mm steel stud wall with 100mm glass wool insulation in the cavity and 2x16mm plasterboard lining.

#### 5.3.4 External Roof & Ceiling Construction

The roof and terrace ceiling construction will have a concrete slab so no further upgrade are required.

### 5.4 ALTERNATIVE VENTILATION

For rooms that have windows and doors on the Eastern façade these may be permitted to be open for natural ventilation.

For other rooms the internal noise levels cannot be achieved with windows open it is recommended that an alternative outside air supply system or air conditioning be installed in accordance with AS1668.2 requirements. Any mechanical ventilation system that is installed should be acoustically designed such that the acoustic performance of the recommended construction is not reduced by any duct or pipe penetrating the wall/ceiling/roof. Noise emitted to the property boundaries by any ventilation system shall comply with Council requirements.

# 6 MECHANICAL PLANT AND TRAFFIC NOISE INTRUSION ASSESSMENT

As the proposed shop top residential tower development will be twelve storeys tall and built within a central business district it will be exposed to rooftop mechanical plant noise from the surrounding commercial, retail buildings and the Coff's Harbour Ex Servicemen's Club.

An aural and visual survey was carried out on the day of the background noise logger installation visit. The site survey found a significant amount of mechanical plant on the roofs of the adjacent buildings. Noise measurements were taken of plant items that were clearly audible and were accessible to be measured. As the site visit was carried out during Covid-19 restrictions the majority of the Cex's mechanical plant was not operating. The operations manager said that the large 1600kW Air cooled chiller (#3) on the lower roof was not operating, the 1300kW chiller (#2) on the highest roof was also inactive and the newest 1200kW chiller (#1) was operating at 30% capacity. Hence the sample sound power levels for equivalent units were used in the model and measured levels were used for new chiller.

It is noted that there were rooftop plant items that could not be accessed on the initial site visit as they were inaccessible or needed safety equipment to get within measuring distances. Hence there may be additional noise contributions from these items that have not been accounted for. Other less dominant noise sources may also be present and may become significant when either the measured plant items are switched off or if acoustic treatments are applied in the future. Items such as the Blue Room AC plant behind the rooftop plant room and the Refrigeration deck were not accessible at the time of the visit and may be significant.

The chillers measured were found to have tonal characteristics so an additional 5dB penalty has been applied to the noise levels for all chillers. The new chiller (#1) has an additional efficiency feature that heats water however there is a valve that activates intermittently raising the noise level by 25dB for an instant. This attracts an additional 5dB penalty for night operations (after 10pm).

A noise model was made in a SoundPlan (noise propagation software) to predict the noise levels from the plant noise acting on the proposed building's facade. These noise levels will be used to predict the glazing requirements. It is noted that the building heights, other than the residential tower were all estimated from Google Street Views.

The model was run to obtain the total façade noise exposure for daytime operations (all plant) and the Pacific Hwy noise levels. Then re-run with night traffic noise levels and for all of the club plant operating. It is assumed that all shopping centre plant is off or idle during the night period (10pm to 7am and 10pm to 8am, Sundays & Public Holidays).

## 6.1 MECHANICAL PLANT NOISE MEASUREMENTS

### 6.1.1 Measurement Equipment

Attended noise measurements were conducting using a Norsonics 140 Type 1 sound analyser. The meter was programmed to store equivalent energy and statistical noise levels. The equipment was calibrated at the beginning and the end of each measurement using a Norsonic 1251 Type 1 calibrator; no significant drift was detected. All measurements were taken on A-weighted and Z-weighted 1/3 octave bands in fast response mode.

### 6.1.2 Measurement Locations

The attended measurements of significant mechanical plant were taken on the carpark level of the Coffs Central Shopping Centre and on the roofs of the Cex.

### 6.1.3 Measurement Results

The measurements were carried out in 1/3 octave bands for the purpose of calculating the sound power levels of the mechanical plant items and to determine if there were undesirable noise characteristics. The sound data was converted to 1/1 octave band noise levels to be used for noise predictions and is presented in Table 19.

**Table 19 – Measured Octave Band Sound Power Levels, dB**

| Plant Item | 63Hz | 125Hz | 250Hz | 500Hz | 1kHz | 2kHz | 4kHz | 8kHz | Undesirable Characteristic |
|---|---|---|---|---|---|---|---|---|---|
| Coffs Central Twin Cooling Towers | 96 | 94 | 89 | 88 | 88 | 85 | 86 | 82 | - |
| Coffs Central Chiller | 89 | 89 | 85 | 88 | 82 | 77 | 74 | 67 | Tonal |
| Post Office Vent Fan | 87 | 90 | 87 | 83 | 80 | 75 | 73 | 65 | - |
| Coffs Central Food Hall Exhaust Fan | 100 | 103 | 99 | 96 | 94 | 89 | 88 | 81 | Tonal |
| Cex – New Chiller (30%) | 100 | 88 | 87 | 83 | 78 | 74 | 70 | 65 | Tonal & Intermittent |
| Cex – CP exhaust fan | 92 | 89 | 84 | 83 | 83 | 79 | 73 | 67 | - |

## 6.2 NOISE SOURCE DATA

Where noise levels could not be taken of plant items manufacturer's data has been used in lieu. The assumed sound power levels used for the noise model are shown in Table 20. For all chillers a 5dB penalty was applied to the overall sound power level in the noise model to account for tonality.

**Table 20 - Octave Band Sound Power Levels of Plant, dB**

| Plant Item | 63Hz | 125Hz | 250Hz | 500Hz | 1kHz | 2kHz | 4kHz | 8kHz | Source |
|---|---|---|---|---|---|---|---|---|---|
| Chiller 2 (upper roof) | 101 | 102 | 100 | 98 | 98 | 93 | 87 | 84 | Assumed spectrum, similar kW unit |
| Chiller 3 (lower roof) | 103 | 103 | 103 | 100 | 102 | 92 | 91 | 91 | Assumed spectrum similar kW unit |

## 6.3 METHODOLOGY

Internal noise levels will primarily be as a result of noise transmission through the roof, windows and doors as these are relatively light building elements that offer less resistance to the transmission of sound.

The predicted noise levels through the roof, walls, windows and doors are discussed below. The predicted noise levels have been based on the expected level and spectral characteristics of the external noise, the area of building elements exposed to road traffic noise, the absorption characteristics of the rooms and the noise reduction performance of the building elements.

The building is assumed to be of masonry construction, with a concrete roof and glazed facades. The room floor finishes have been assumed to be as follows:

- Bedrooms will have carpet floors
- Living Areas are timber floors

## 6.4 RECOMMENDED CONSTRUCTIONS FOR TRAFFIC AND MECHANICAL PLANT

The following constructions are recommended in order to comply with the noise objectives stated in Table 2.

### 6.4.1 Glazed Windows and Doors

The window and door glazing proposed for this project is listed below. The windows and doors will be satisfactory provided they meet the criteria listed in Tables 21, 22 and 23.

Thicker glazing may be required for structural, safety or other purposes. Where it is required to use thicker glazing than scheduled, this will also be acoustically acceptable, however any form of double glazing must have its acoustic performance analysed to check its compatibility to the requirements.

It has been assumed that the winter gardens on all levels on the Northern Façade will have operable glass louvres and bi-fold windows installed. The breezeway louvres manufacturer's lab test sound transmission loss presented in Table 15 and the assumed installed performance of bi-fold windows. It is assumed that to meet the windows closed internal noise levels that both the wintergarden glazing and the apartment façade glazing are closed to form a large double glazed unit.

**Table 21 – Recommended Glazing Construction - Bedrooms**

| Level | Space | Facade | Element | Glazing Thickness | Acoustic Seals |
|---|---|---|---|---|---|
| All | bedrooms | West | Glazing | 10.38mm lam | Yes |
| All>L1 | bedrooms | North | Glazing | 12.76mm lam | Yes |
| 5/6 | bedrooms | North Balcony | Glazing | 12.76mm lam | Yes |
| All | bedrooms | North (Wintergarden) | Glazing | 4mm float | Yes |
| All | NW corner bedrooms | West | Glazing | 12.76mm lam | Yes |
| All | NW corner bedrooms | North | Glazing | 12.76mm lam | Yes |
| All | bedrooms | South | Glazing | 6mm | Yes |
| All | bedrooms | East | Glazing | 4mm | Yes |
| All | Bedrooms (breezeway) | West | Glazing | 12.76mm lam | Yes |
| All | bedrooms(breezeway) | Breezeway | Glazing | 6.38mm lam | Yes |
| L1 | bedrooms | North | Glazing | 10.38mm lam | Yes |
| L1 | bedrooms | West (balcony) | Glazing | 10.38mm lam | Yes |

## Table 22 – Recommended Glazing Construction – Living Rooms

| Level | Space | Facade | Element | Glazing Thickness | Acoustic Seals |
|---|---|---|---|---|---|
| All | Corner Living rooms | West | Glazing | 10.38mm lam | Yes |
| All | Corner Living rooms | North | Glazing | 10.38mm lam | Yes |
| 12 | SW Corner Living room | South | Glazing | 10mm float | Yes |
| All | SW Corner Living rooms | South | Glazing | 6.38mm lam | Yes |
| All | SE Corner Living rooms | South | Glazing | 4mm float | Yes |
| All | Corner Living rooms | East | Glazing | 4mm float | Yes |
| 7to12 | NE Corner Living room | East Windows | Glazing | 4mm float | Yes |
| 7to12 | NE Corner Living room | East Wintergarden | Glazing | 4mm float | Yes |
| 7to12 | NE Corner Living room | West Wintergarden door | Glazing | 6.38mm lam | No |
| 7to12 | NE Corner Living room | North -Bifold | Glazing | 6.38mm lam | No |
| 7to12 | NE Corner Living room | North – Wintergarden | Glazing | 4mm float | Yes |
| All | Living rooms | West | Glazing | 10.38mm lam | Yes |
| All | Living rooms | North | Glazing | 6.38mm lam | Yes |
| 2 to 5 | Living rooms | North (bifold) | Glazing | 6.38mm lam | No |
| 2 to 5 | Living rooms | North (wintergarden) | Glazing | 4mm | No |
| All | Living rooms | East | Glazing | 4mm float | Yes |
| All | Western Living rooms | Breezeway | Glazing | 6mm float | Yes |
| All | Eastern Living rooms | Breezeway | Glazing | 4mm float | Yes |

In addition to complying with the minimum scheduled glazing thickness, the $R_w$ rating of the glazing fitted into operable frames and fixed into the building opening should not be lower than the values listed in Table 23 in all areas. Where nominated, this will require the use of acoustic seals around the full perimeter of operable frames, and the frame will need to be sealed into the building using a flexible sealant. **Note that mohair or mohair + fin seals in windows and doors <u>are not acceptable</u> where acoustic seals are required.**

Suppliers should provide evidence that the window systems proposed have been tested in a registered laboratory with the recommended glass thicknesses, and comply with the minimum $R_w$ requirements listed in Table 23, and that they will be constructed and installed in a manner equal to the test samples.

### Table 23 – Minimum $R_w$ of Glazing

| Glazing Assembly | Minimum $R_w$ of Installed Window | Acoustic Seals |
|---|---|---|
| Standard | 20 | No |
| 6.38mm Bi-Fold Windows | 26 | No |
| 4mm float | 27 | Yes |
| 5mm float | 28 | Yes |
| 6mm Breezeway Louvres | 28 | Proprietary |
| 6mm float | 29 | Yes |
| 6.38mm laminate | 31 | Yes |
| 10mm float | 33 | Yes |
| 10.38mm laminate | 35 | Yes |
| 12.76mm laminate | 37 | Yes |

#### 6.4.2 Entry Doors

All external entry doors shall have glazing thicknesses equal to those recommended in Section 6.4.1.

#### 6.4.3 External Wall construction

External walls are assumed to be constructed from heavy masonry elements (brick veneer, double brick, precast or insitu cast concrete walls) and will not require acoustic treatment.

Walls which are constructed from light weight cladding or Hebel are to be upgraded to achieve an equivalent sound transmission loss to a heavy masonry construction. For example the glass clad western wall of the NW corner bedrooms will require the following construction: 4mm glass backed by 2x9mm fibre cement sheet cladding on 92mm steel stud with 100mm glass wool insulation and internally lined with 2 sheets of 16mm fire rated plasterboard. The same construction less the glass will be suitable for the L12 Living room western wall.

#### 6.4.4 External Roof & Ceiling Construction

The roof and terrace ceiling construction will have a concrete slab so no further upgrade are required.

### 6.5 ALTERNATIVE VENTILATION

As the internal noise levels cannot be achieved with windows open it is recommended that an alternative outside air supply system or air conditioning be installed in accordance with AS1668.2 requirements. Any mechanical ventilation system that is installed should be acoustically designed such that the acoustic performance of the recommended construction is not reduced by any duct or pipe penetrating the wall/ceiling/roof. Noise emitted to the property boundaries by any ventilation system shall comply with Council requirements.

# 7 NOISE EMISSIONS ASSESSMENT

At this early stage of the development equipment selection have not been made other than the outdoor AC units. The mechanical plant will be arranged into two areas. A plant room on Level 6 and a plant deck on the rooftop. This mechanical plant noise will be assessed to the NSW EPA NPfI. At these required outdoor levels the plant will not need to be assessed for noise intrusion via the façade.

A cursory noise assessment will also be carried out for the use of the loading dock.

## 7.1 NOISE SOURCE DATA

Acoustic Logic were provided with an outdoor air conditioner model for which an overall sound power was available. An assumed spectrum was used for the analyses.

**Table 24 - Octave Band Sound Power Levels of Plant, dB**

| Plant Item | 63Hz | 125Hz | 250Hz | 500Hz | 1kHz | 2kHz | 4kHz | 8kHz | Source |
|---|---|---|---|---|---|---|---|---|---|
| AC outdoor unit | 72 | 71 | 72 | 68 | 64 | 58 | 56 | 50 | Assumed spectrum, SWL(dB(A)) manufacturer |

For noise levels from the loading dock/driveway use have used the following assumed sound power levels:

- Truck SWL, 100 dB(A), Air brake release SWL, 113dB(A)
- Car SWL 81dB(A) (AAAC Guide for Childcare Centres V3)

## 7.2 PREDICTED NOISE LEVELS

### 7.2.1 Rooftop Air Conditioning Plant

The rooftop plant deck will house 59 outdoor air conditioning units. Noise level predictions have been performed at the nearest and most affected residence. The mechanical plant drawings show two rows of 18 AC units on the roof parallel to the western façade. A prediction has been made from these line sources to the middle bedroom balcony on Level 12. It has been assumed in the analyses that 50% (-3dB) of the AC units would be in operation at any one time in the evening period and 25% (-6dB) of the units would operate at any one time during the night period. The predicted results with attenuation measures installed are presented in Table 26.

The AC unit noise was also spot checked at the Triton residential tower using the EPA minimum intrusiveness criterion level and the Coffs Hotel (assuming there is accommodation).

### Table 25 – Predicted treated AC Noise Levels

| Receiver | External Noise Level, dB(A) | Criteria Noise Level, dB(A) | Complies |
|---|---|---|---|
| Unit 1204 Bedroom (balcony) | 49 | 57 (day) | Yes |
| Unit 1204 Bedroom (balcony) | 46 | 48 (eve) | Yes |
| Unit 1204 Bedroom (balcony) | 43 | 43 (night) | Yes |
| Residential Tower (330m away) | <21 | 35 (eve) | Yes |
| Coffs Hotel (115m away) | <27 | 43 (night) | Yes |

#### 7.2.2 Level 6 - Air Conditioning Plant

The Level 6 plant room will house 36 outdoor air conditioning units. The northern and southern facades and the roof will be 80% open area weather louvres. With this open area the plant room walls and roof will be quite acoustically transparent and acoustic treatment is necessary. Noise level predictions have been performed at the nearest and most affected residences from the treated plant room for the night period (after 10pm), which is the most stringent. Note it has been assumed in the analyses that 25% (-6dB) of the units would operate at any one time during the night period

### Table 26 – Predicted treated AC Plant Room Noise Levels

| Receiver | External Noise Level, dB(A) | Criteria Noise Level, dB(A) | Complies |
|---|---|---|---|
| Level 7 Terrace (above) | 43 | 43 | Yes |
| Unit 603 Bedroom (window) | 40 | 43 | Yes |
| Unit 6.04 (Balcony) | 42 | 43 | Yes |

#### 7.2.3 Driveway Use and Loading Dock use

The driveway use will be analysed for this development. The expected peak hour has been predicted using the RMS Guide to Traffic Generating Developments (update 2013) which for regional high density residential flat dwellings has an average weekday morning peak hour at 0.53 movements/unit and an afternoon peak hour at 0.32 movements/unit. Hence the morning peak will be assessed at the nearest and most affected residential receiver 13 cars traveling at 10km/hr per 15minutes.

The loading dock use will be carried out for 1 truck visit per 15 minute period at the nearest and most affected residential receiver. It would be reasonable to assume a morning garbage truck visit.

Vehicle noise on Vernon Street is exempt and only the driveway and loading dock movement are assessible. The analyses assumed a 2.8m deep, heavyweight, continuous and solid awning on level 1.

**Table 27 – Predicted Driveway Noise Levels**

| Receiver | Source Type | Noise Level, dB(A) | Criteria Noise Level, dB(A) | Complies |
|---|---|---|---|---|
| L1 Bedroom (balcony) | Cars | 29 | 43 | Yes |
| L1 Bedroom (balcony) | Truck | 43 | 43 | Yes |
| L1 Bedroom (bedroom) | Truck Brake | 32 | $L_{max}$57 | Yes |
| Cex Club | Truck | 48 | 63 | Yes |

## 7.3 RECOMMENDATIONS

### 7.3.1 Rooftop - Air Conditioning Plant

The plant deck on level 12 will need acoustic treatment to meet the noise goals. The proposed treatment is a 1.1m tall continuous and solid (9mm FC sheet) noise barrier enclosing the AC units. The 1.1m hoarding and the current edge will form a double diffraction barrier, hence the alcove on the western edge will need to be filled at the roof top level. The barrier installation has been assumed at 0.9m from the roof edge, and the Air conditioner set at 1.4m back from the edge (as scaled from dwg). Other options may be to move the air conditioning units further in and possibly stacking them. This may permit the use of an acoustic louvre instead of a solid barrier. The same barrier to edge distances are assumed at the northern voids.

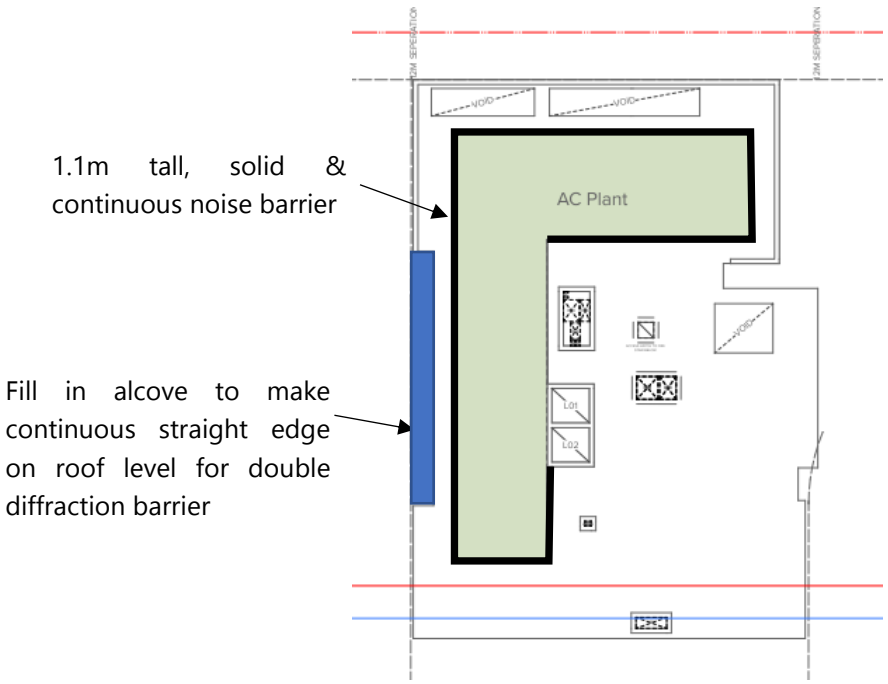



**Figure 4 – Proposed Rooftop Barrier Treatment for AC noise**

### 7.3.2 Level 6 - Air Conditioning Plant

The plant room on Level 6 will need acoustic treatment to meet the noise goals. Our cursory analyses considered a partial enclosure, acoustic absorptive lining on the masonry walls and acoustic louvres on the front and rear facades. Just recently we were informed that night running mode upgrades are available for the proposed AC units, which would alter our recommendations. Detailed acoustic treatments will be finalised in the CC stage of development.

## 8 DISCUSSION

The assessment of mechanical plant onto the proposed residential tower shows the glazing will require upgrading over what is required for traffic noise alone. Some of the existing noise sources may be attenuated on the Cex site that could lead to the decreasing the glazing requirements and improving the acoustic amenity on the balconies that overlook the Cex Club's mechanical plant. Typically, existing plant would be exempt but as the Cex is the developer this approach may be possible. For example, attenuating the outdoor chiller by treating noisy compressor and hot water valve components may lower noise levels and eliminate the penalties (+10dB) that that have been applied as per NSW EPA recommendations to obtain equivalent levels of annoyance for night operations. The attenuation of existing plant is beyond the scope of this DA assessment but since this plant is most likely in standard form and unattenuated, significant noise reductions may be achievable and be economically feasible.

# 9 CONCLUSION

The Acoustic assessment for the proposed shop top residential tower at 15 - 31 Harbour Dr, Coffs Harbour has been carried out. Provided acoustic treatments in Section 5 of this report are implemented the noise intrusion and noise emissions will satisfy the requirements of:

- Coffs Harbour City Council's Development Control Plan (DCP)
- Development Near Rail Corridors and Busy Roads – Interim Guideline 2008
- NSW EPA Noise Policy for Industry (NPfI) 2017
- Australian/ New Zealand Standard AS/NZS 2107:2016

At this early stage of the development process the only plant item selected so far have been the outdoor air conditioning units, hence they their impact has been analysed and indicative treatments were given. Noise emission goals have been set up for all mechanical services combined to be installed on site. Acoustic Logic recommends further assessment is conducted at CC stage once all plant items are selected and their details have been finalised.

As explained in report Covid-19 restrictions have significantly reduced the loads on mechanical plant at the Club and several items could not be operated so assumed figures for similar sized units have been used in lieu.

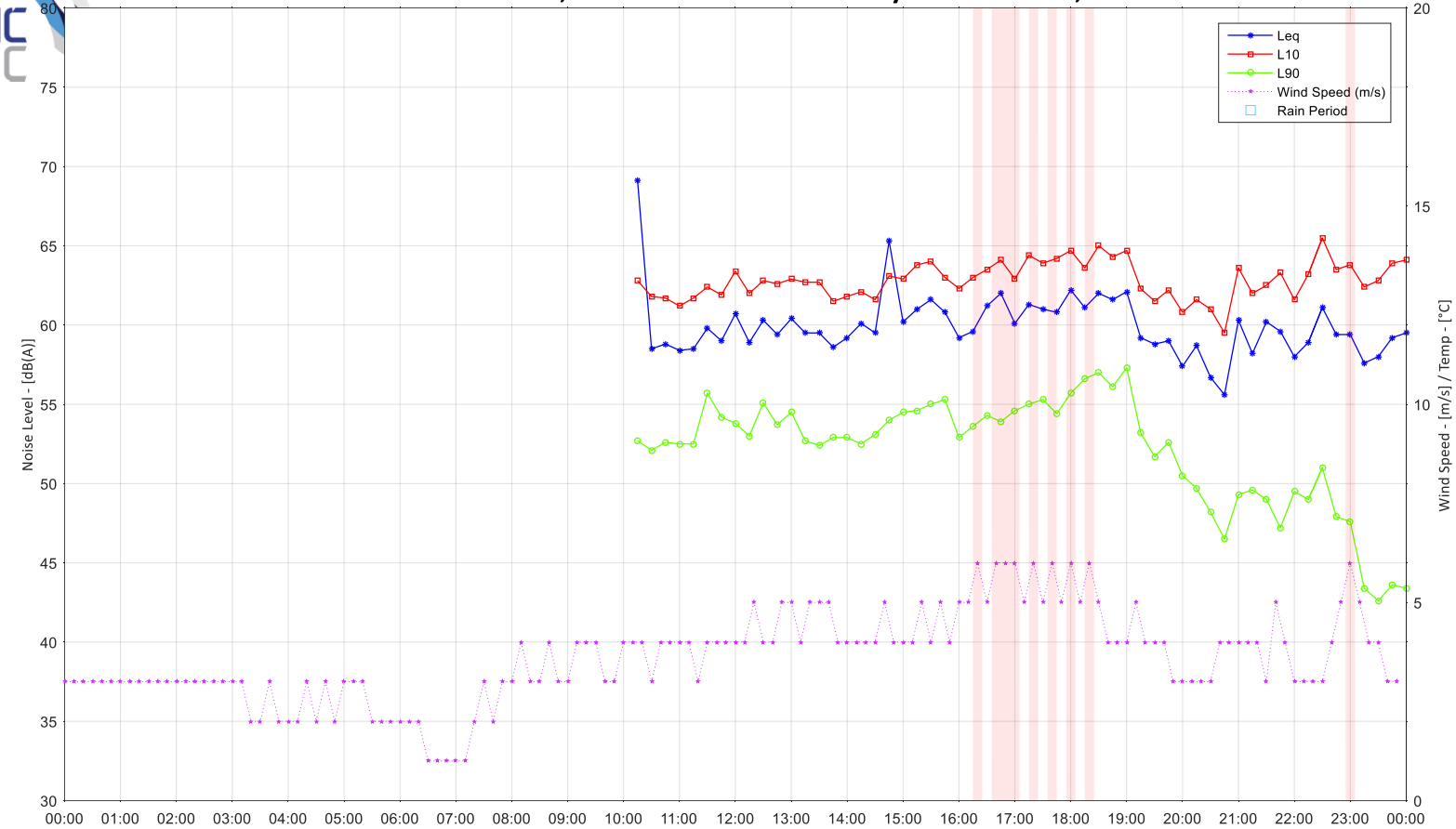
Acoustic treatments have been recommended in Sections 6.4, 6.5 and 7.3 for façade treatments, alternative ventilation and mechanical plant treatments.

We trust this information is satisfactory. Please contact us should you have any further queries.

Yours faithfully,

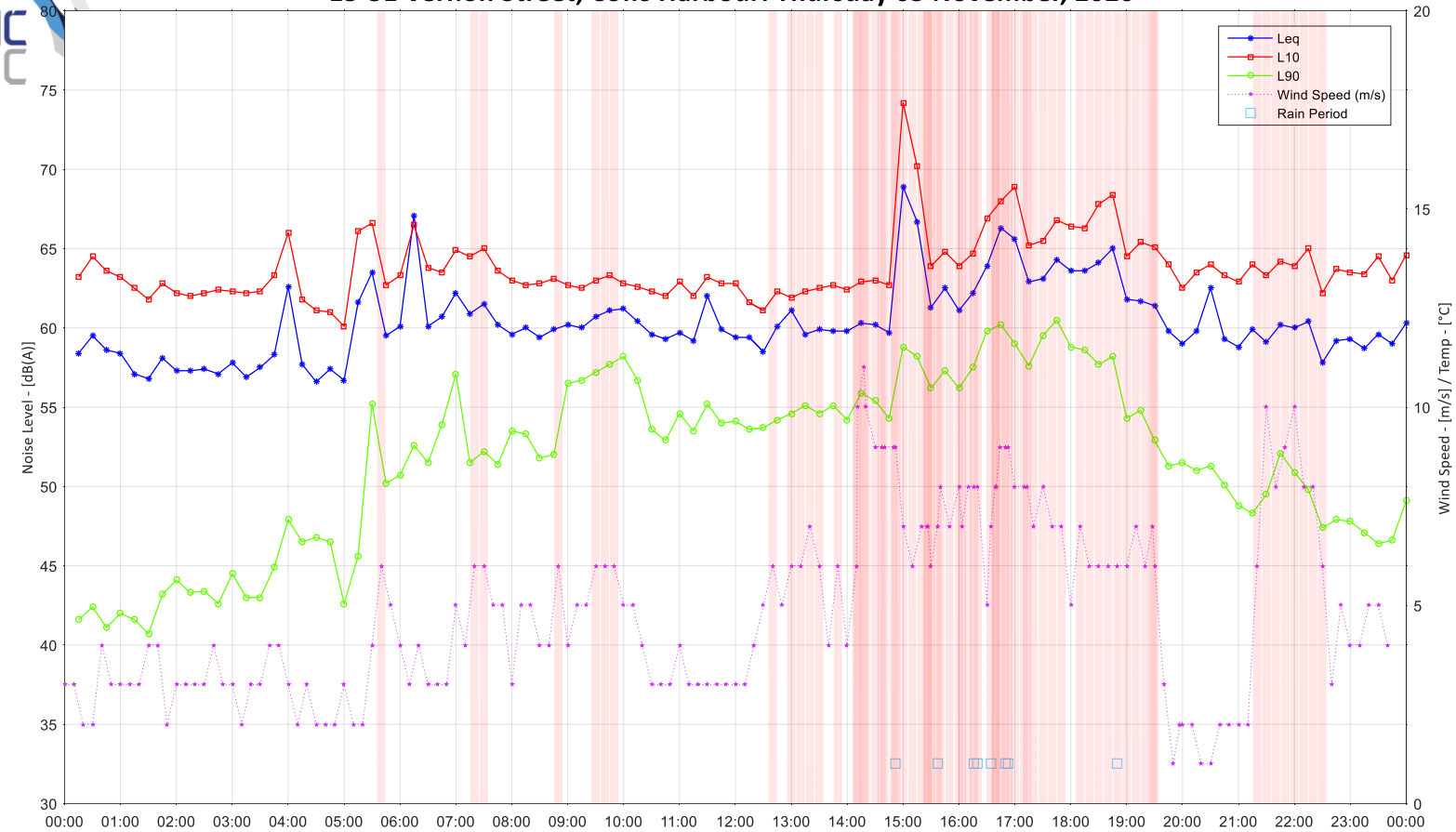
Acoustic Logic Pty Ltd
Tomas Bohdan

# 15-31 Vernon Street, Coffs Harbour: Wednesday 04 November, 2020




- Adverse Weather

# 15-31 Vernon Street, Coffs Harbour: Thursday 05 November, 2020




- Adverse Weather

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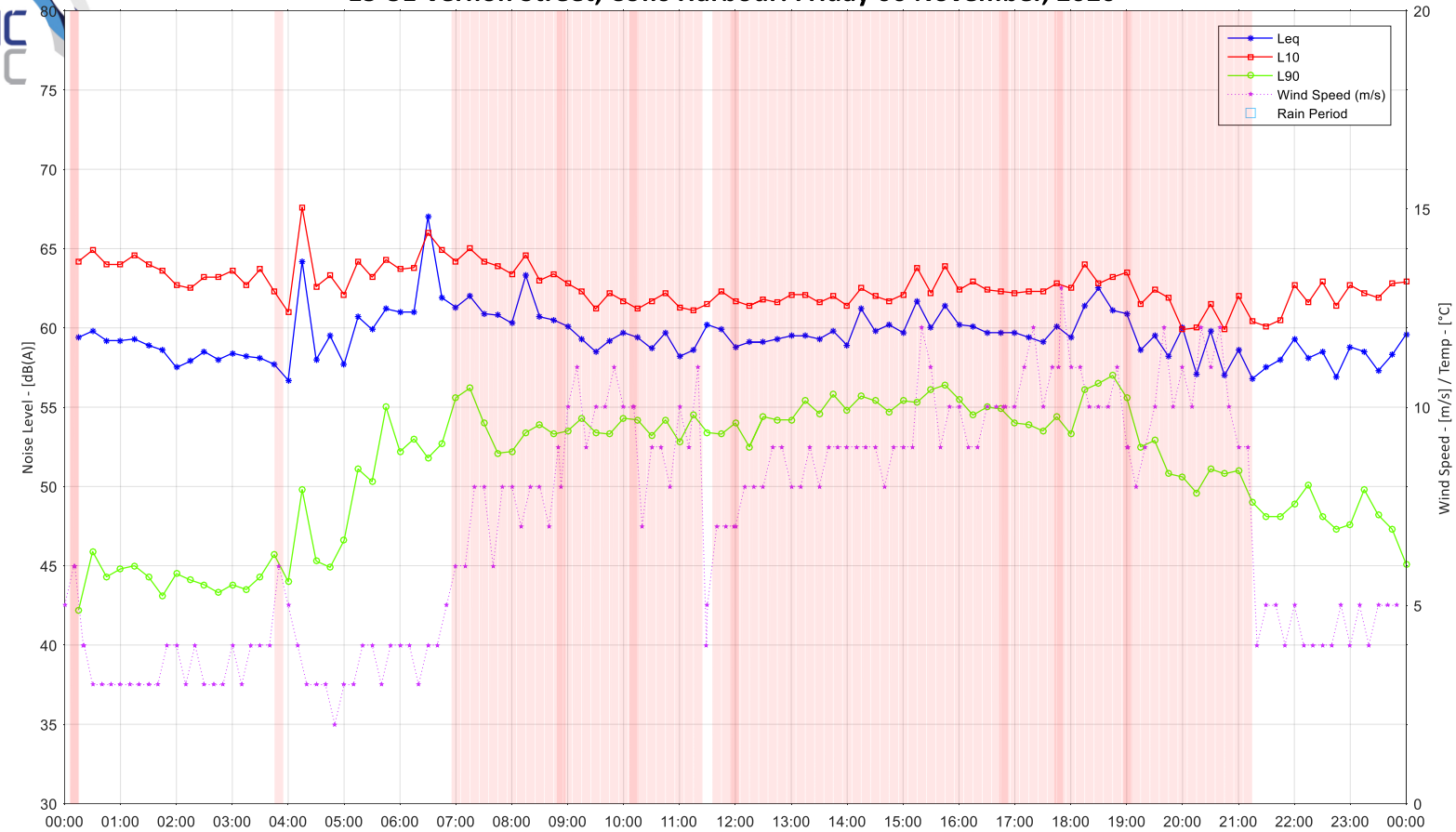
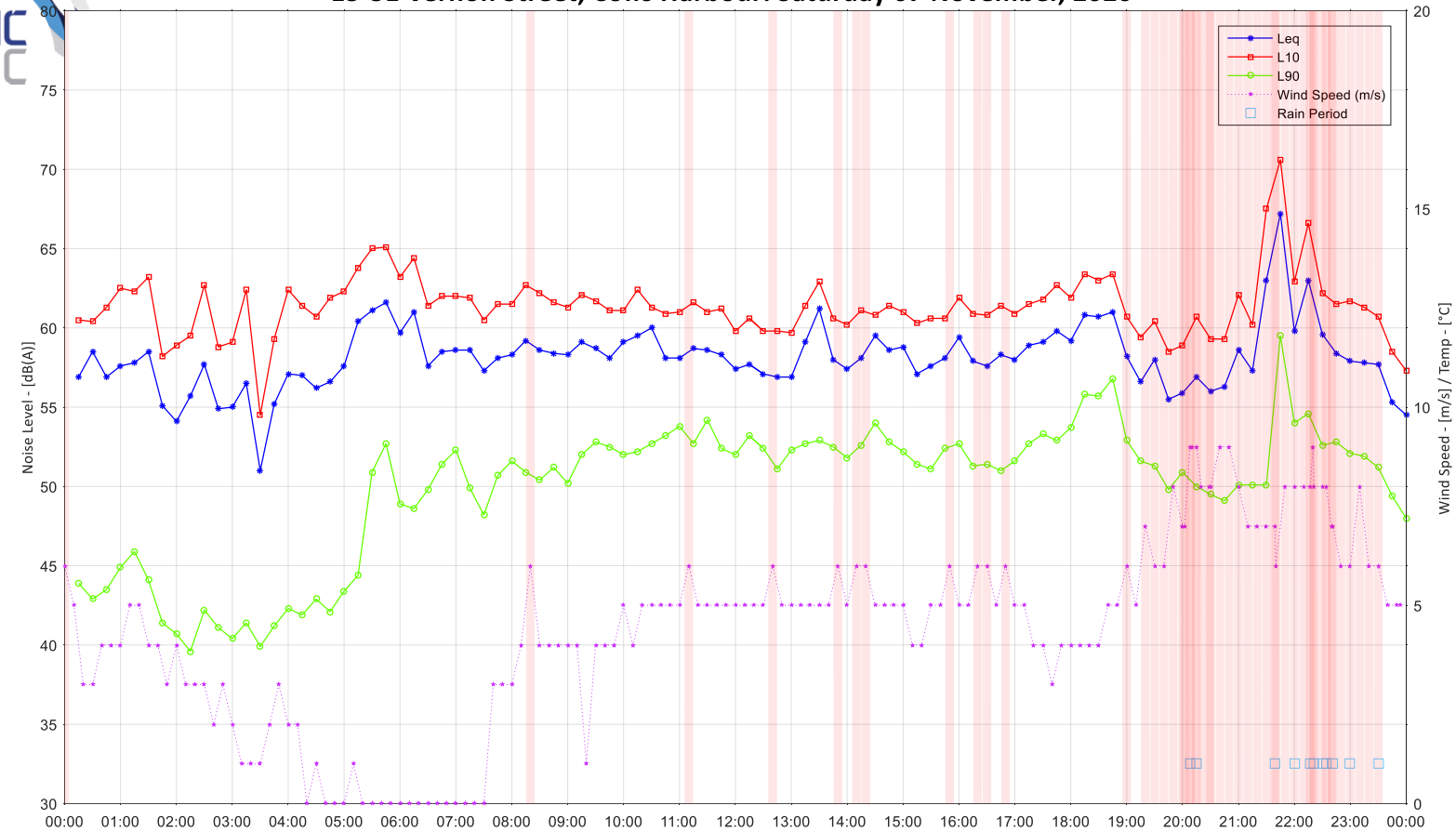


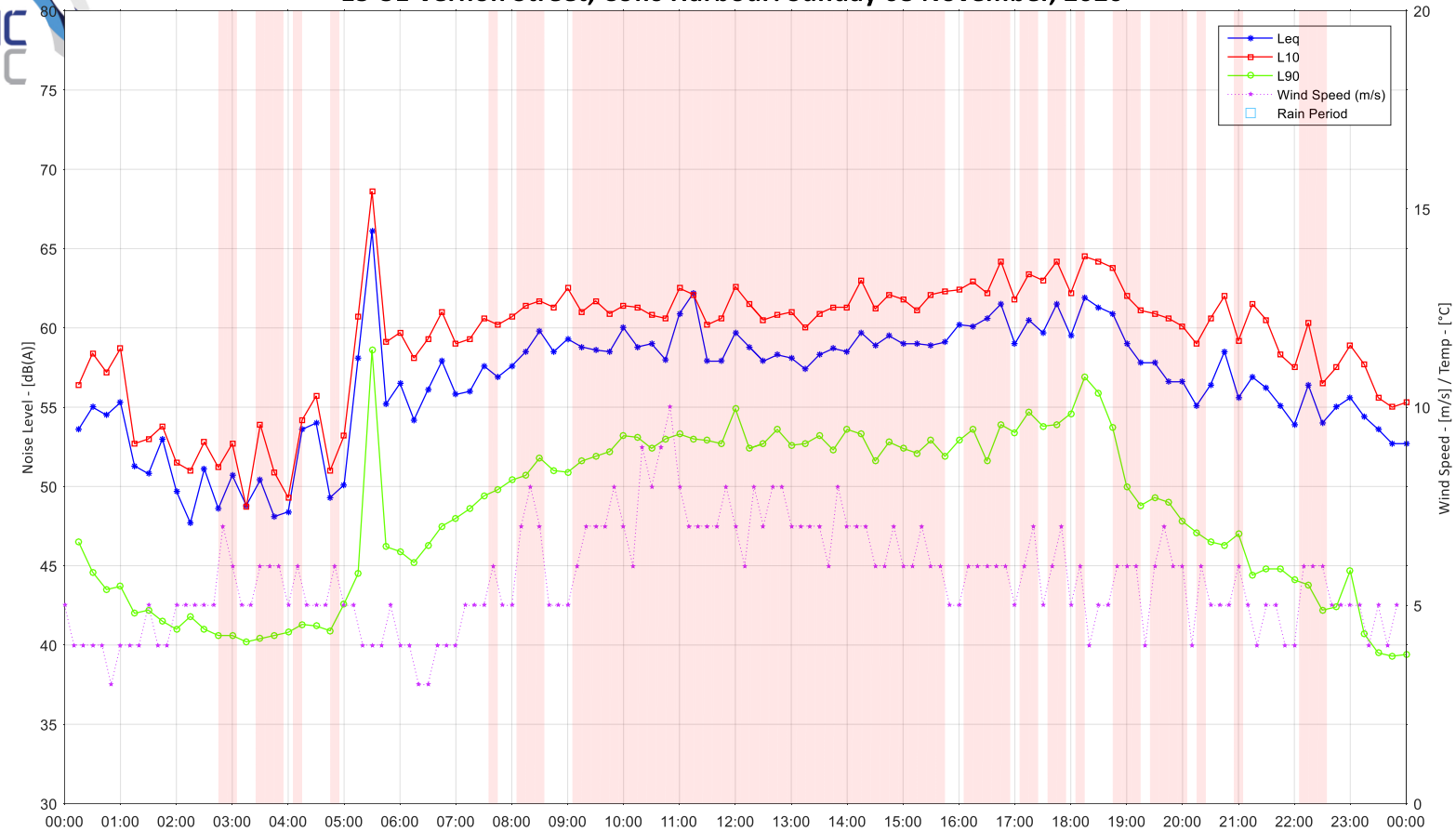

- Adverse Weather

# 15-31 Vernon Street, Coffs Harbour: Saturday 07 November, 2020




- Adverse Weather

# 15-31 Vernon Street, Coffs Harbour: Sunday 08 November, 2020




- Adverse Weather

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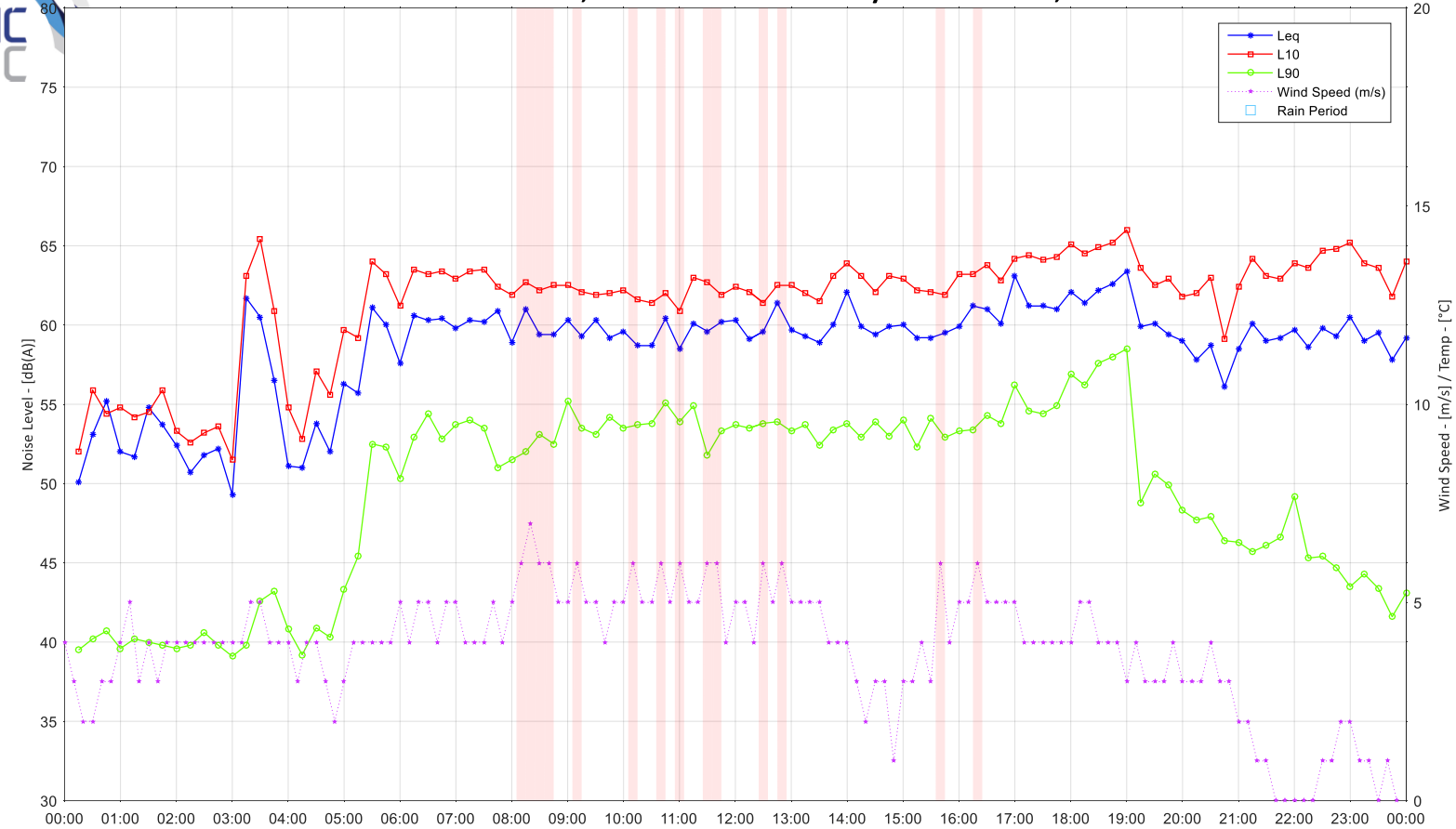
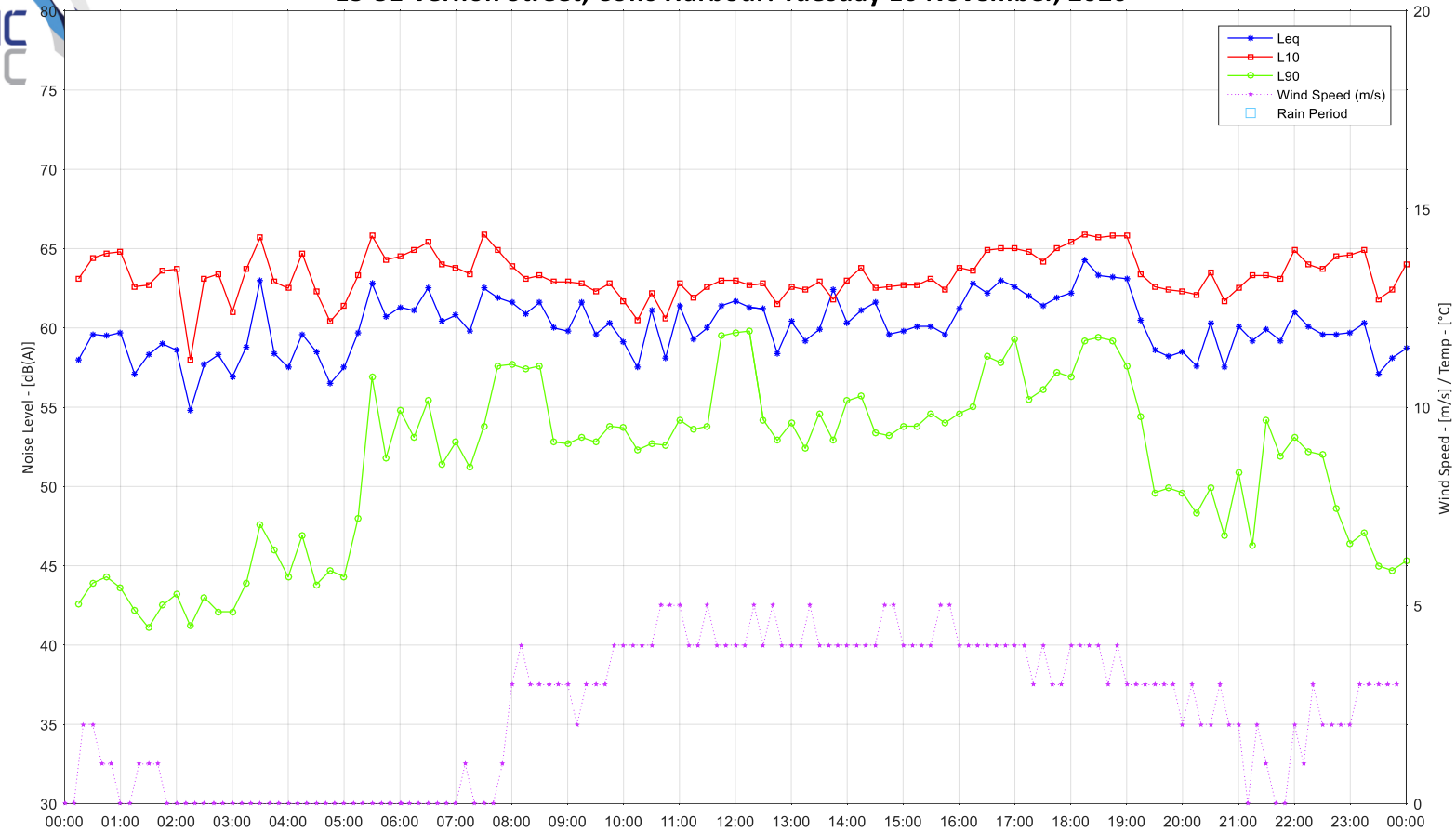



- Adverse Weather

# 15-31 Vernon Street, Coffs Harbour: Tuesday 10 November, 2020




- Adverse Weather

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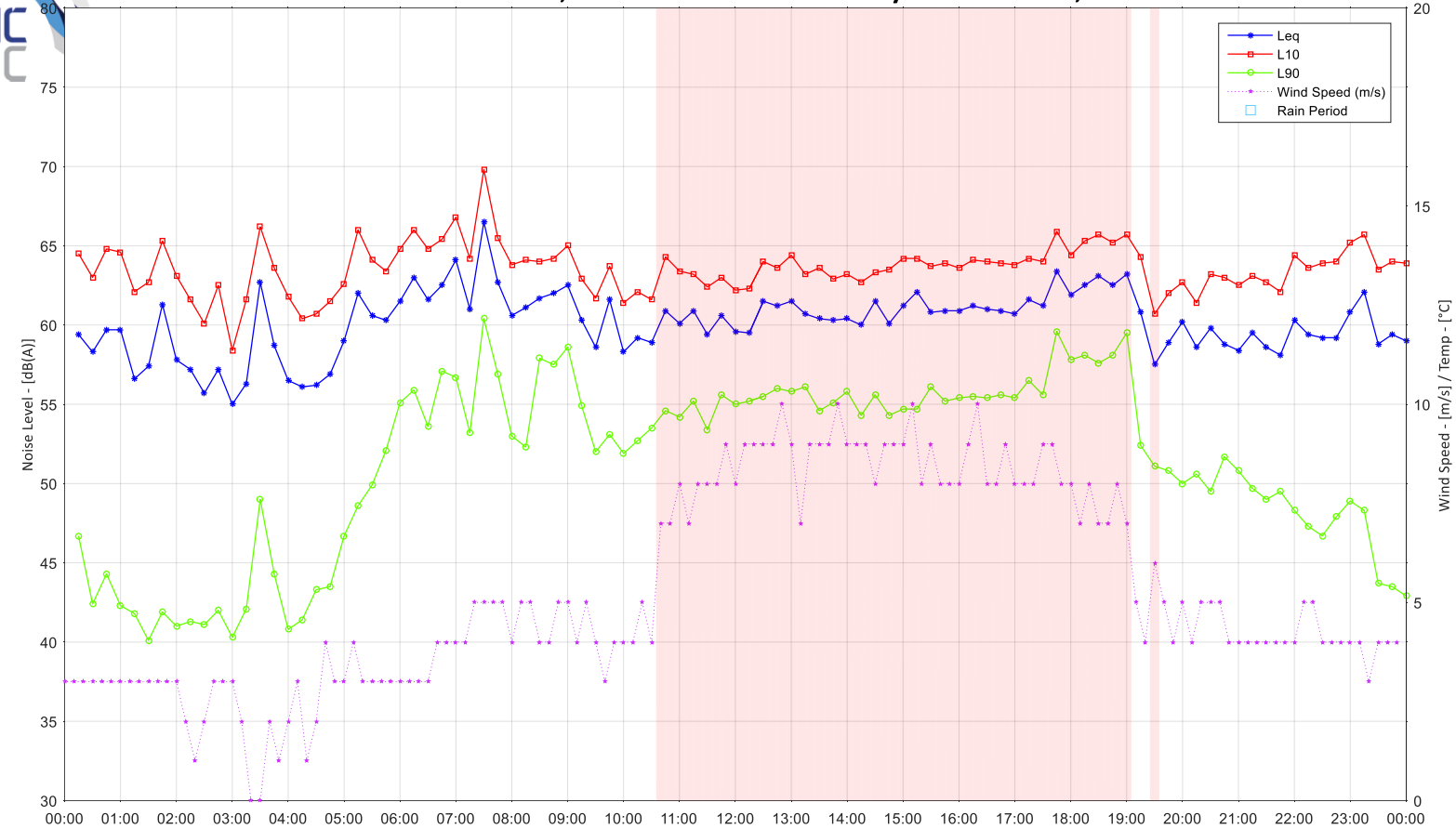
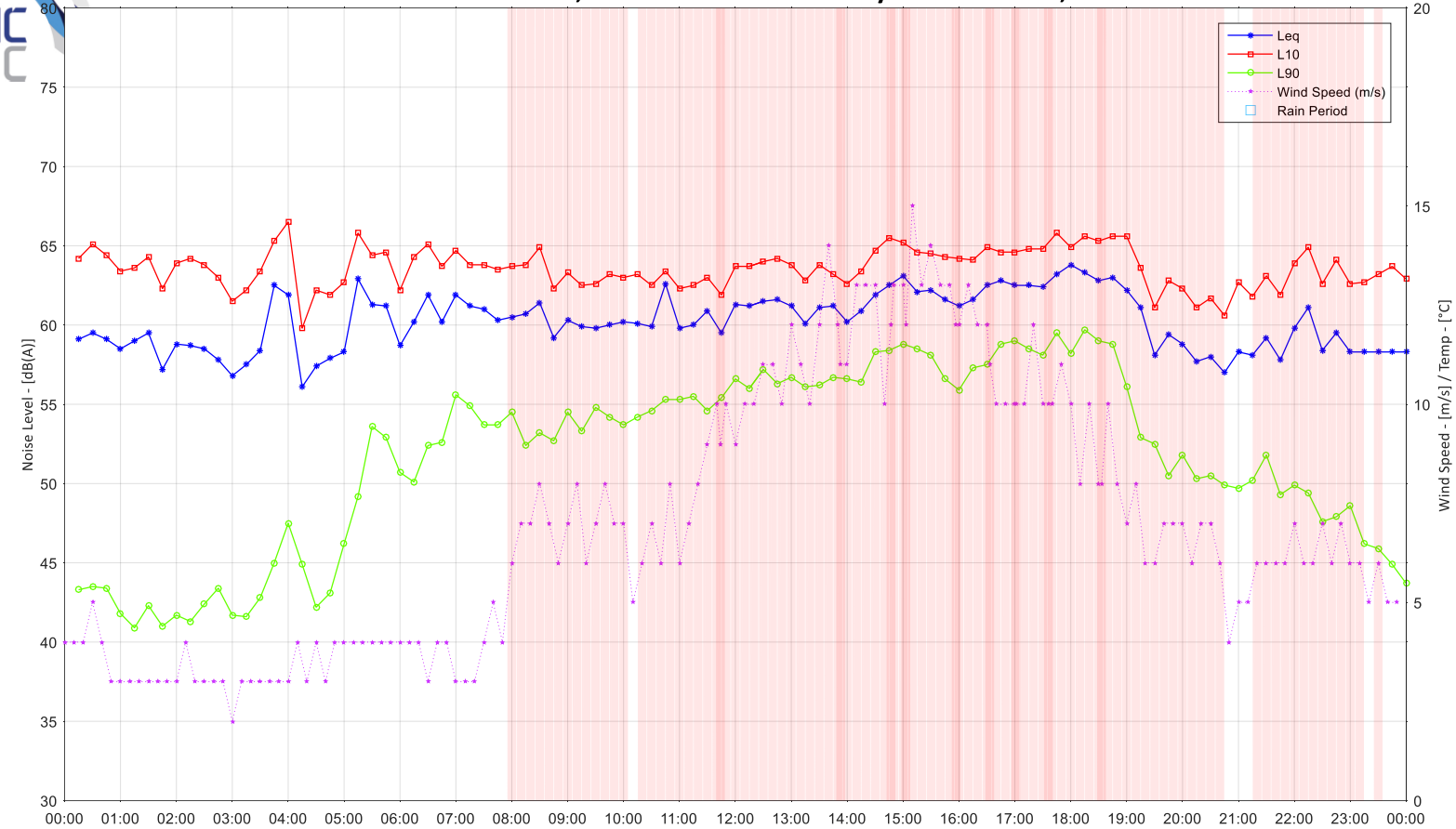



- Adverse Weather

# 15-31 Vernon Street, Coffs Harbour: Thursday 12 November, 2020




- Adverse Weather

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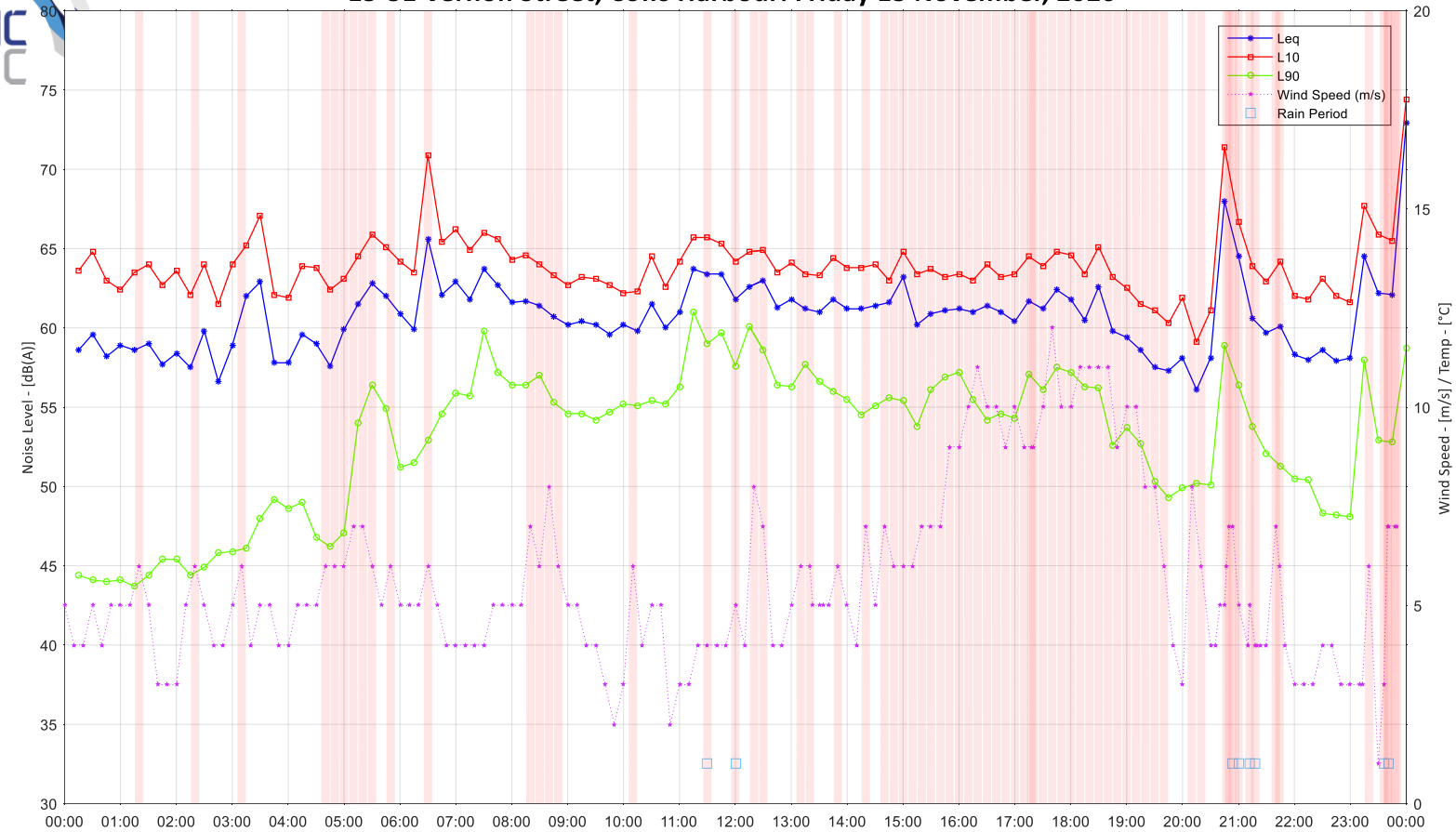


- Adverse Weather

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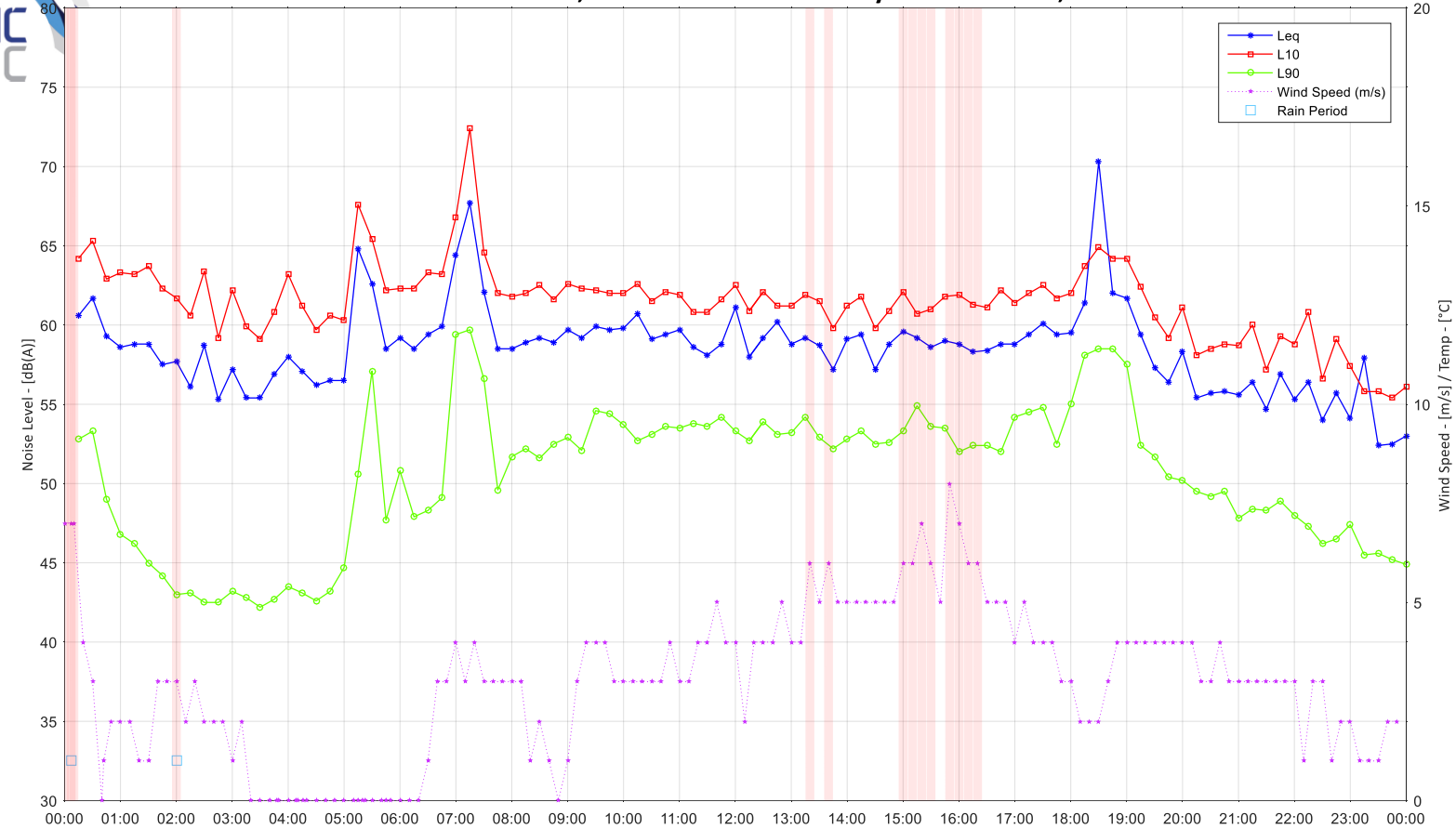
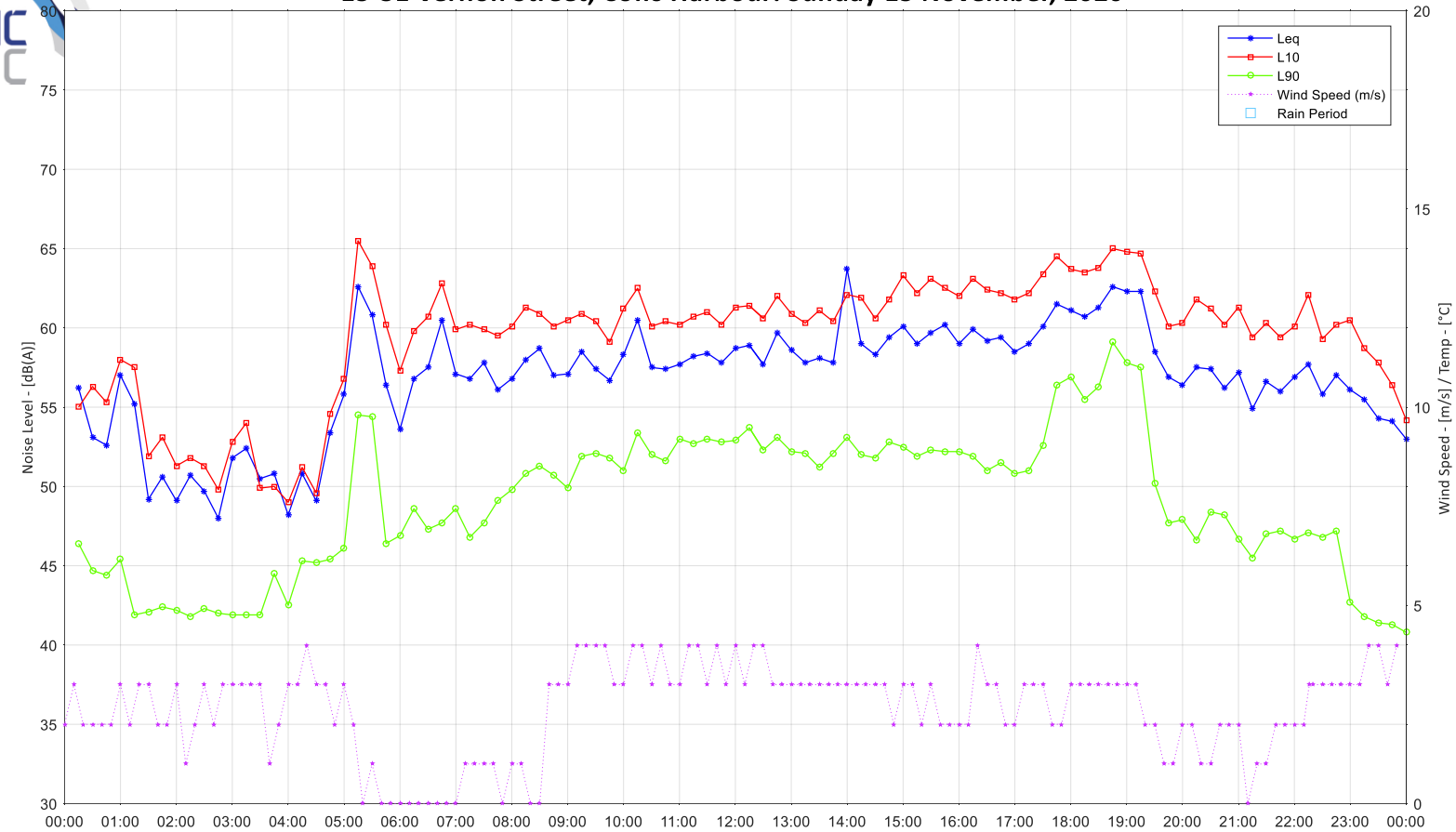



- Adverse Weather

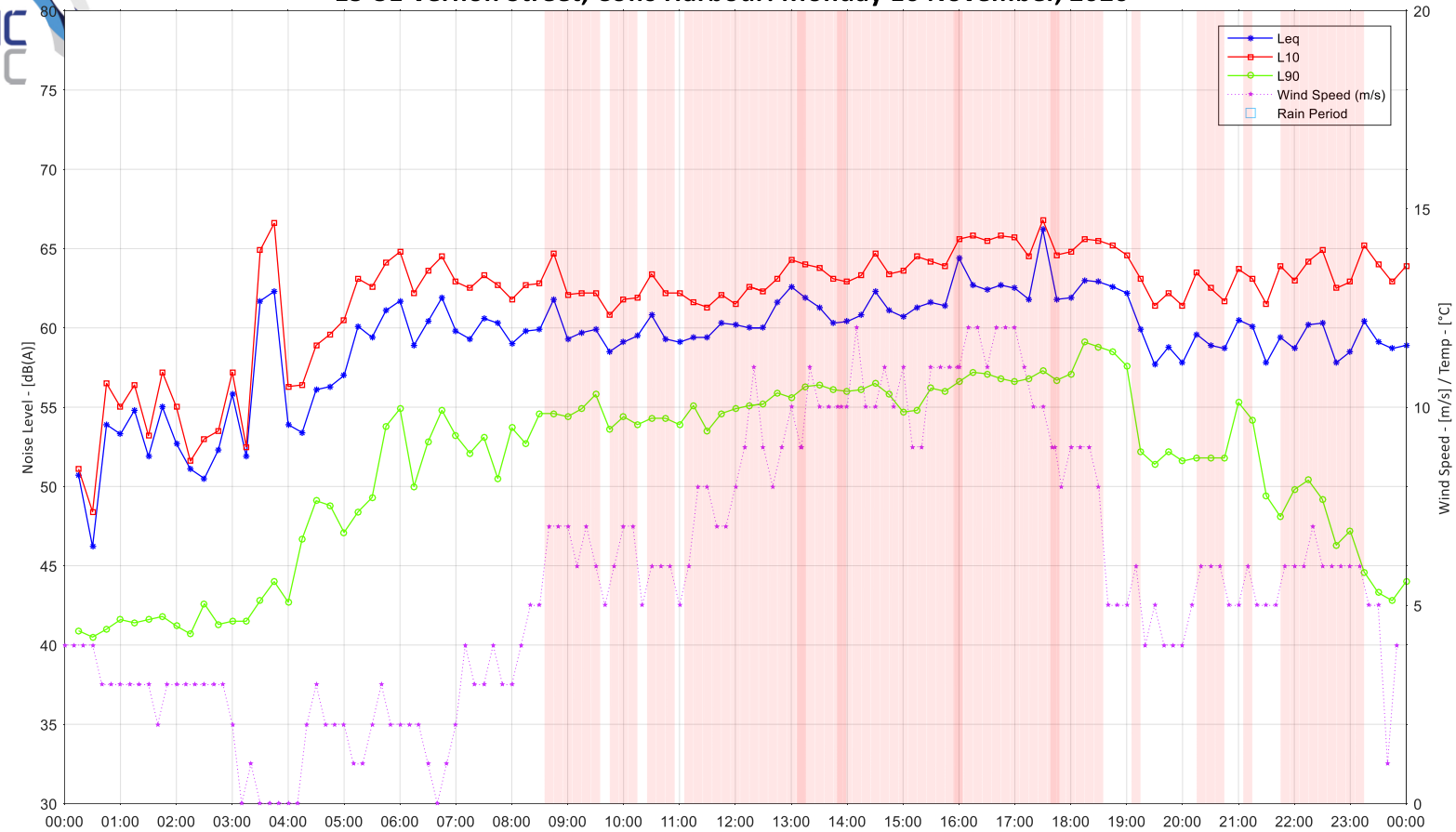
# 15-31 Vernon Street, Coffs Harbour: Sunday 15 November, 2020




- Adverse Weather

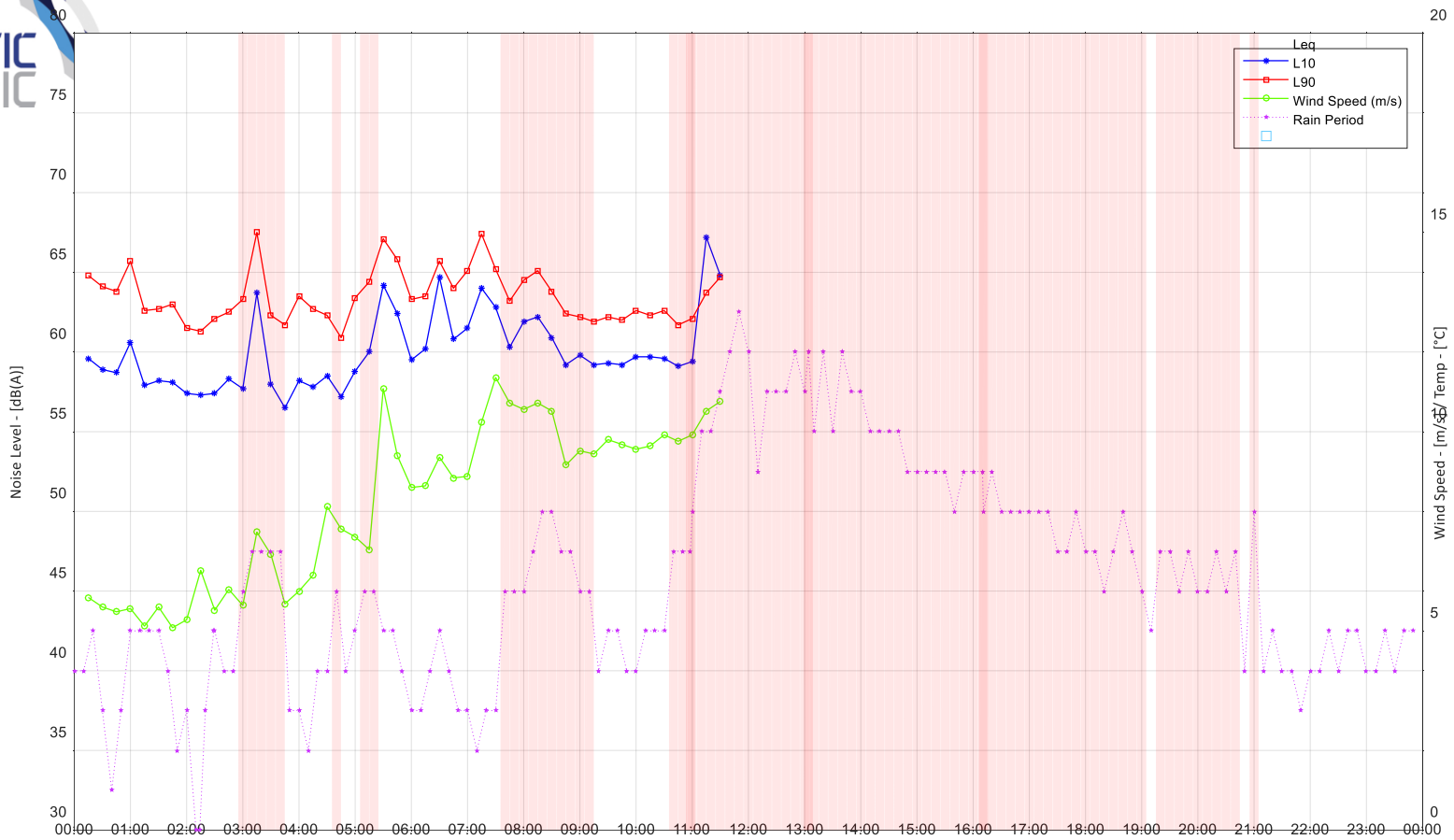
ACOUSTIC LOGIC

# 15-31 Vernon Street, Coffs Harbour: Monday 16 November, 2020




- Adverse Weather

# 15-31 Vernon Street, Coffs Harbour: Tuesday 17 November, 2020



# Appendix N.
# BCA REPORT

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VICTOR FATTORETTO
MATTHEW SHIELDS

20201192.1/1003A/R0/TB

10/03/2021

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2 Richardson Place
Riverside Corporate Park
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Attn: Mohamed Sallam

**15 - 31 Harbour Dr, Coffs Harbour - Supplementary Queries for Development Application Acoustics Assessment**

## 1 INTRODUCTION

We have reviewed the concerns raised by Coffs Harbour City Council in their document (0583/21DA) in Section C. Noise. We have revisited the job and made some conservative calculations to predict the building's mechanical plant noise emissions levels at the nominated noise receivers.

## 2 DESCRIPTION

The sensitive receivers that CHC Council have nominated to be checked are:

- Multi-storey residential flat dwelling located at 49-51 Moonee Street:
  - This 8-storey unit block is behind the Coffs Hotel and drive thru bottle shop on Cox Lane.
  - It is assumed that there will be refrigeration plant operating 24x7 behind the pub.
  - There is also significant mechanical plant on the back side of the pub
  - High street appears to be a busy road
  - Moonee Street has a large public carpark so it would also be busy
- Backpacker accommodation at the Plantation Hotel on Grafton Street:
  - This is a two storey building on Grafton Street facing the roadway (Pacific Hwy)

## 3 CRITERIA

For the Moonee Street residential receivers facing the proposed residential tower the background noise level would be expected to be similar to our measurements at Vernon Street due to similar distances from

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traffic and surrounding mechanical plant. It is noted that the lower levels would be screened from the highway noise but would experience more plant noise and the upper levels will see traffic so it will dominate over the plant noise. We propose to assess the impact using our monitored background noise level. So the Intrusiveness (BG+5dB) and Amenity Criteria apply to the residential receiver. Referring to the Project Noise Criteria in Table 10 of the DA acoustics report. So, the goals are:

- Leq 57dB(A)-Day
- Leq 48 dB(A) – Evening
- Leq 43 db(A)-Night

The Backpacker accommodation receivers are Hotel receivers and are not residential. Hence the background noise level is not relevant as the typical intrusiveness noise criterion (BG+5dB) does not apply. Only the Amenity criteria apply.

Hence the Hotel receiver Amenity from the Noise Policy for Industry ("Urban" residential Amenity+5dB) are:

- Leq 63dB(A)-Day
- Leq 53 dB(A) – Evening
- Leq 48 db(A)-Night

It is noted that the EPA Noise Policy also allows for LAeq+15dBA for areas which high traffic. As we have not measured the traffic noise in front of the Pub/Backpackers we will use the Amenity criteria "as-is" to be conservative, however it is highly likely that a higher noise level limit could be set for the day period.

# 4 PREDICTED NOISE LEVELS

The new shop top residential tower's main mechanical plant areas are a plant room on Level 6 and a plant deck on the top floor roof of the building. In our analyses we have eliminated some potential noise sources for the following reasons:

- The Level 6 plant room noise emissions will not be included as:
  - Noise emissions from this must comply at the residents in the proposed Tower. If it complies at them (at 10-15m) then it will comply at these receivers.
  - The Moonee Street tower residents have no views of the plant room
  - The Plantation Hotel/Backpacker guests will most likely be screened by the CEX building
- The carpark movements, dock truck movements and sleep disturbance will not be assessed as these receivers have no views of the dock and car park entries and they are too distant.

A simple first principles calculation has been carried out and is attached used to predict the noise emissions from the rooftop plant deck. As stated in our DA report a noise barrier 1.1m tall encloses the rooftop AC units and been designed to reduce noise levels to the tower's residents. This barrier will also be effective to the nominated receivers as they will have no views of the plant.

The AC units are all assumed to run during the day, half will run at any one time in the evening (-3dB) and a quarter (-6dB) will be active at any one time at night. These assumptions were outlined in the DA report.

It is noted that there is actually a double diffraction barrier formed by the use of the 1.1m perimeter barrier and the edge of the building, hence the barrier effect will be over 5dB for a simple line of sight barrier. Also, the AC units are set back at various distances from the barrier and this will lead to an increase in the barrier effect.

The predicted noise levels at the receivers are presented in Table 1.

**Table 1 -Predicted Noise Levels at Receivers**

| Location | Period | Noise Level, dB(A) | Noise Goal, dB(A) | Complies? |
|---|---|---|---|---|
| Moonee | Day | 31 | 57 | Yes |
| Moonee | Evening | 28 | 48 | Yes |
| Moonee | Night | 25 | 43 | Yes |
| Backpackers | Day | 35 | 63 | Yes |
| Backpackers | Evening | 32 | 53 | Yes |
| Backpackers | Night | 29 | 48 | Yes |

## 5 CONCLUSION

The noise levels at the Council's nominated potentially affected receiver locations were predicted using distance attenuation and a conservative "line of sight" barrier. The resultant noise levels were found to comply.

We trust this information is satisfactory. Please contact us should you have any further queries.

Yours faithfully,

Acoustic Logic Pty Ltd
Tomas Bohdan

AC sound power level per unit = 70dB(A)

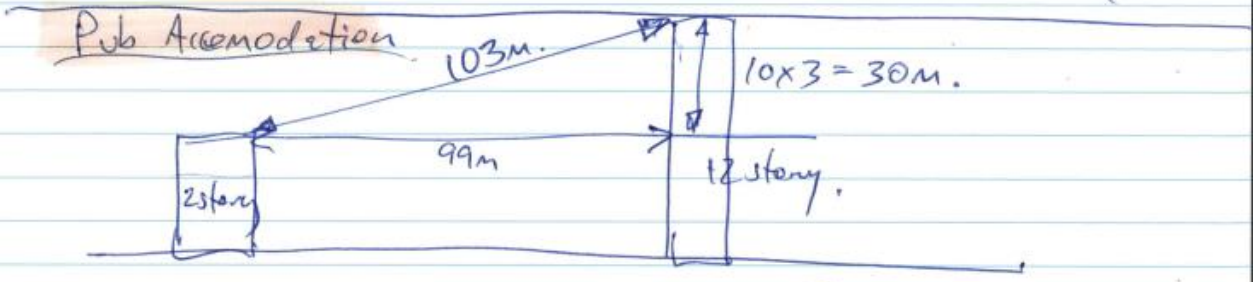
↑ SECTION 7 of Report has assumed noise spectrum/unit.
There are 59 units on roof.

$SPL_{RES,DAY} = 70 + 10\log(59) - [20\log(160) + 8] - 5.$

- 70: AC unit SWL
- $10\log(59)$: No of AC units
- $20\log(160)+8$: hemispherical spread.
- 5: line of sight barrier

$= 3$ (dB(A)) – DAY TIME.

Note: in evening 50% of units on at any one time (−3dB)
" night 25% of " " " " " " " (−6dB).




$SPL_R = 70 + 10\log(59) - [20\log(103) + 8] - 5$

$= 35$ dB(A)

# BCA Assessment Report

## 15-31 Harbour Drive Coffs Harbour

| | |
|---|---|
| **Project:** | 15-31 Harbour Drive Coffs Harbour |
| **Reference No:** | 112796-BCA-r3 |
| **Date:** | 15 December 2020 |
| **Client:** | Paynter Dixon |
| **Client Contact:** | Mohamed Sallam |
| **Email:** | Mohamed.sallam@paynterdixon.com.au |
| **BCA Logic Contact:** | Alex Newberry |
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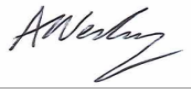
| **Email:** | anewberry@bcalogic.com.au |

## Document Control

| Revision | Date | Description | |
|---|---|---|---|
| 112796-BCA-r1 | 25.11.2020 | Preliminary BCA Assessment Report | |
| 112796-BCA-r2 | 10.12.2020 | BCA Assessment Report | |
| 112796-BCA-r3 | 15.12.2020 | BCA Assessment Report – DA submission | |
| | | Prepared by | Verified by |
| | | Alex Newberry | Stuart Boyce |
| | | Senior Building Regulations Consultant | Registered Certifier<br>Grade A1, No. BDC 0044 |
| | |  | |

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## EXECUTIVE SUMMARY

This document provides an assessment of the architectural design drawings for the proposed residential / retail development at 15-31 Harbour Drive Coffs Harbour, against the Deemed-to-Satisfy provisions of the Building Code of Australia (BCA) 2019, Volume 1 Amendment 1.

Part 3 'Statement of Compliance' in this report outlines the architectural design documentation as referred to in report has been assessed against the applicable provisions of the Building Code of Australia, (BCA) and it is considered that such documentation complies or is capable of complying (as outlined in Annexure D) with that Code.

As noted below, compliance may be achieved via the Performance Provisions of the BCA and any Performance Solution will need to be detailed in a separate report and must clearly indicate methodologies for achieving compliance with the relevant BCA Performance Requirements.

| Item | Description | BCA Provision |
|---|---|---|
| **Performance Solutions Required** | | |
| 1. | Class 6 retail tenancies will have their FRLs rationalised down from 3 hours to 2 hours<br>Ground Floor to Level 03 car park fire compartment will have the Class 7b FRLs rationalised down from 4 hours to 2 hours | C1.1, Spec C1.1, C2.7, C2.8, C2.9, C3.5<br>CP1, CP2 & CP8 |
| 2. | Level 04 to 07 are public corridors over 40m and the provision of smoke wall/doors will be omitted from the design | C2.14<br>EP2.2 |
| 3. | Level 02 to 05 NE corner SOUs: Blade wall provides an alternative method of protection to openings within 3m | C3.2 & C3.4<br>CP2 & CP8 |
| 4. | Non-fire rated access hatch to the roof of the fire stair instead of achieving FRL -/90/90 | Spec C1.1 Clause 2.7<br>CP2 & CP8 |
| 5. | Retail 01 & 03 and Lobby only require a single exit in lieu of two due to their design | D1.2<br>DP4 |
| 6. | Travel distances which are not in accordance with D1.4 & D1.5 | D1.4 & D1.5 & G6.4<br>DP4 & EP2.2 |
| 7. | FS 01&02 discharge to the laneway requires the egress path to reach the road in either direction to pass within 6m of the external glazed walls and protection will be omitted | D1.7(c)<br>DP5 & EP2.2 |
| 8. | Performance Solution is required as booster is not within sight of the main entrance on Harbour Drive or Lobby entrance | E1.3<br>EP1.3 |
| 9. | Class 6 parts are required to be provided with zone pressurisation system however this will be omitted | E2.2, Table E2.2a<br>EP2.2 |
| 10. | The construction of external walls is such that they will prevent the penetration of water that could cause unhealthy or dangerous conditions or loss of amenity to occupants and undue dampness or deterioration of building elements. | No DtS Provisions – FP1.4 Performance Provisions Only |

**Annexure D** to this report provides a detailed assessment of the proposal against ALL relevant Deemed-to-Satisfy Provisions of the BCA.

# 1 BASIS OF ASSESSMENT

## 1.1. Location and Description

The building development, the subject of this report, is located at 15-31 Harbour Drive Coffs Harbour. The development consists of the following:

- Ground Floor with vehicular entry & carparking and retail tenancies on three frontages.
- Mezzanine level for storage cages between GF & Level 1.
- Level 1 to 3 with main car park portions and residential SOUs facing the northern Vernon Street
- Level 4 with residential SOUs and communal roof terrace areas
- Level 5 to 12 the main tower with residential SOUs

## 1.2. Purpose

The purpose of this report is to assess the current design proposal against the Deemed-to-Satisfy Provisions of BCA 2019, and to clearly outline those areas (if any) where compliance is not achieved, where areas may warrant redesign to achieve strict BCA compliance or where areas may be able to be assessed against the relevant performance criteria of BCA 2019. Such assessment against relevant performance criteria will need to be addressed by means of a separate Performance Based Fire Safety Engineered Assessment Report to be prepared under separate cover.

## 1.3. Building Code of Australia

This report is based on the Deemed-to-Satisfy Provisions of the National Construction Code Series Volume 1 – Building Code of Australia, 2019 Amendment One (BCA 2019 herein) incorporating the State variations where applicable. Please note that the version of the BCA applicable to new building works is the version applicable at the time of the lodgement of the Construction Certificate application to the Accredited Certifying Authority. The BCA is updated generally on a three-yearly cycle, starting from the 1st of May 2016.

## 1.4. Limitations

This report does not include nor imply any detailed assessment for design, compliance or upgrading for:

(a) the structural adequacy or design of the building;

(b) the inherent derived fire-resistance ratings of any proposed structural elements of the building (unless specifically referred to); and

(c) the design basis and/or operating capabilities of any proposed electrical, mechanical or hydraulic fire protection services.

This report does not include, or imply compliance with:

(a) the National Construction Code – Plumbing Code of Australia Volume 3

(b) the Disability Discrimination Act 1992 including the Disability ((Access to Premises – Buildings) Standards 2010), (Note: The provision of disabled access to the subject development (Part D3 and F2.4 of BCA2019) is subject to separate report by the Access Consultant);

(c) Work Health and Safety Act 2011 or Work Cover;

(d) Requirements of Australian Standards unless specifically referred to;

(e) Requirements of other Regulatory Authorities including, but not limited to, Telstra, Telecommunications Supply Authority, Water Supply Authority, Electricity Supply Authority, Roads and Maritime Services (RMS), Local Council, ARTC, Department of Planning and the like; and

(f) Conditions of Development Consent issued by the Local Consent Authority.

## 1.5. Design Documentation

This report has been based on the Design plans and Specifications listed in Annexure A of this Report.

# 2 BUILDING DESCRIPTION

For the purposes of the Building Code of Australia (BCA) the development may be described as follows.

## 2.1. Rise in Storeys (Clause C1.2)

The building has a rise in storeys of 13.

## 2.2. Classification (Clause A6.0)

The building has been classified as follows.

Table 1. Building Classification

| Class | Level | Description |
|---|---|---|
| 6 | Part Ground Floor | Retail Tenancies |
| 7a | Part Ground Floor, Part Level 1 to 3 | Car Parking |
| 7b | Mezzanine Level, Part Level 1 to 3 (Car parking area) | Residential storage cages |
| 2 | Part Level 1 to 3, Level 4 to 12 | Residential Storage Cages |

Class 7b Classification: As the residential parking spaces have residential storage cages, the car parking fire compartment must also have the classification Class 7b. Note, the 10% minor use rule does not apply when the storey has three classifications (Class 2, 7a & 7b).

## 2.3. Effective Height (Clause A1.0)

The building has an *effective height* of more than 25 metres: Level 12 RL 39.60 – Ground Floor RL 4.70 = 34.90m.

## 2.4. Type of Construction Required (Table C1.1)

The building is required to be of Type A Construction.

## 2.5. Floor Area and Volume Limitations (Table C2.2)

The building is subject to maximum floor area and volume limits of:-

| | | |
|---|---|---|
| Class 6 & 7b | Maximum Floor Area | 5,000m$^2$ |
| | Maximum Volume | 30,000m$^3$ |
| Class 7a | The carpark is to be provided with a sprinkler system (AS2118.1) complying with Specification E1.5 and as such there are no maximum floor area or volume limitations for this area. | |
| Class 2 | The Class 2 portions of the building are not subject to floor area and volume limitations of C2.2 as Table 3 of Specifications C1.1 and Clause C3.11 of the BCA regulates the compartmentation and separation provisions applicable to buildings, or building portions, of Class 2 classifications. | |

## 2.6. Fire Compartments

The following *fire compartments* have been assumed:

(a) Ground Floor: Retail tenancies will be split into 3 x fire compartments.

- Retail 01 & 02 form a separate fire compartment
- Retail 03 forms a separate fire compartment
- Retail 04 to 07 form a separate fire compartment
- Performance Solution is proposed to rationalise the Class 6 FRLs down to 2 hours thereby allowing the fire walls around retail tenancies to be 120/120/120.

(b) Ground Floor car parking/loading dock area, Mezzanine Level and Level 01 to 03 car parking areas are connected by the ramps and will form a separate fire compartment. Residential Lobby is included in the fire compartment. The fire compartment will be subject to a Performance Solution to rationalise the Class 7b FRLs down to 2 hours thereby allowing the fire walls around Class 2 parts to be 120/120/120

(c) Level 01 to 03: The residential Class 2 part will form a separate fire compartment per storey separated by 120/120/120 fire walls.

(d) Level 04 to 12 each storey will form a separate fire compartment.

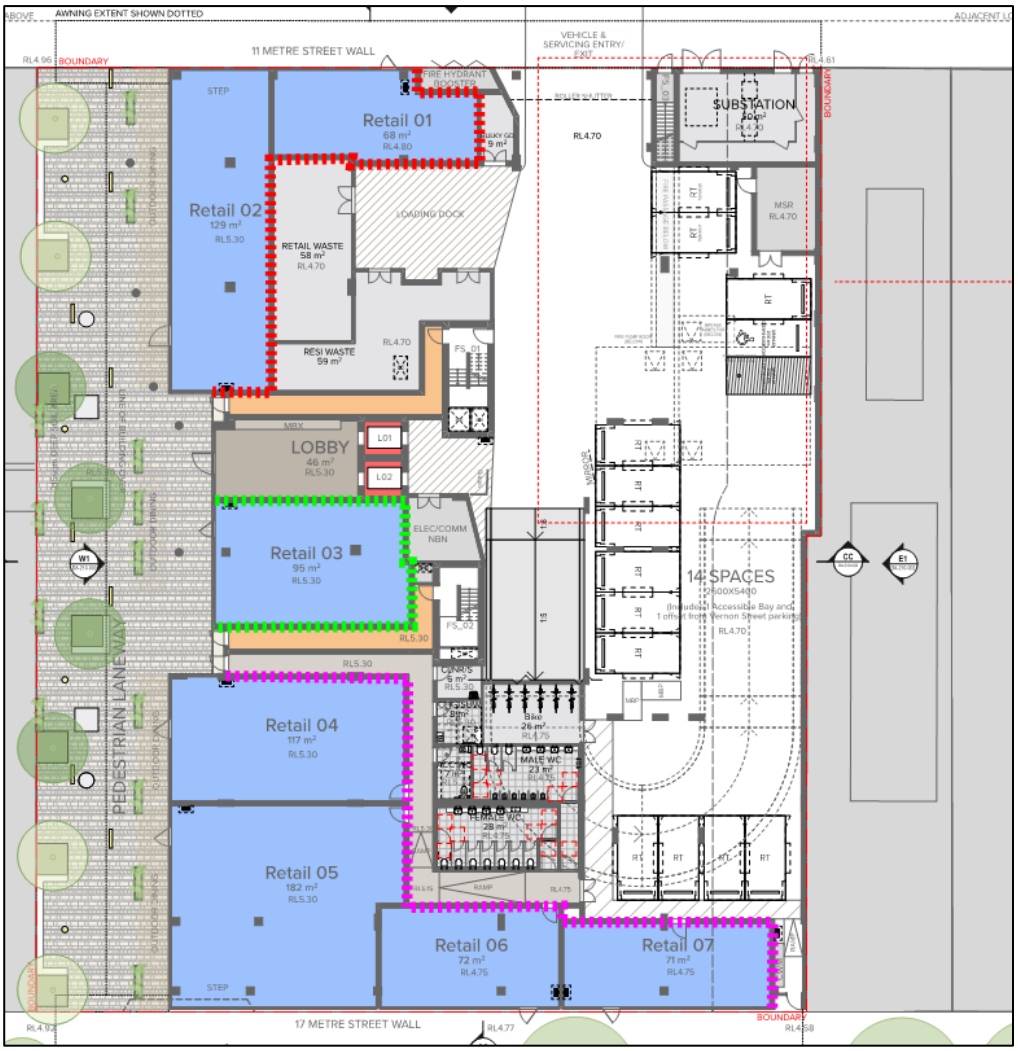


*Figure 1: Retail 01 & 02 form a separate fire compartment; Retail 03 a fire compartment; Retail 04 to 07 form a separate fire compartment.*

*Figure 2: Level 01 to 03 - the Class 2 parts are separated by Fire Walls 120/120/120*

## 2.7. Exits

The following points in the building have been considered as the exits: assumed:

(a) Lower Ground fire pump room is served by a single fire-isolated exit.

(b) Ground Floor: Retail 01 has a single exit to Vernon Street

(c) Ground Floor: Retail 02 has two exit doors

(d) Ground Floor: Retail 03 has a single exit to pedestrian area/open space

(e) Ground Floor: Retail 04 to 07 have an exit to the road or open space and a second exit via the BOH corridor to the SE corner with an exit door to Harbour Drive.

(f) Ground Floor parking area has exit to FS01, SE corner with an exit door to Harbour Drive and BOH corridor exit door to pedestrian laneway.

(g) Ground Floor lobby has a single exit to pedestrian laneway.

(h) Mezzanine storage levels has access to FS01 and FS02.

(i) Level 01 to 03 residential SOUs have access to FS01 and FS02 via the car park.

(j) Level 01 to 03 car park areas have access to FS02 and FS01 via the residential lobby.

(k) Level 04 to 12 have access to FS 01 & 02.

## 2.8. Climate Zone (Clause A1.0)

The building is located within Climate Zone 2.

## 2.9. Location of Fire-source features

The fire source features for the subject development are:

Project North: The far boundary of Vernon Street.

Project South: The far boundary of Harbour Drive.

Project East: The allotment boundary.

Project West: The allotment boundary which is the western boundary of the pedestrian laneway. The pedestrian laneway/thoroughfare will remain part of the lot.

In accordance with Clause 2.1 of Specification C1.1, a part of a building element is exposed to a *fire-source feature* if any of the horizontal straight lines between that part and the fire-source feature, or vertical projection of the feature, is not obstructed by another part of the building that–

(a) has an FRL of not less than 30/–/–; and

(b) is neither transparent nor translucent.

Note: The north-east corner SOUs have a concrete blade wall to partially prevent the openings facing Vernon Street being exposed to the eastern boundary.

# 3 STATEMENT OF COMPLIANCE

## 3.1. General

The architectural design documentation as referred to in report has been assessed against the applicable provisions of the Building Code of Australia, (BCA) and it is considered that such documentation complies or is capable of complying (as outlined in Annexure D) with that Code. As noted below, compliance may be achieved via the Performance Provisions of the BCA and any *Performance Solutions* will be required to clearly indicate methodologies for achieving compliance with the relevant *Performance Requirements* at CC stage.

Annexure D to this report provides a detailed assessment of the proposal against ALL relevant Deemed-to-Satisfy Provisions of the BCA.

Note: It is important that Annexure D is read in conjunction with the items below, as some matters may not have had sufficient information provided to allow a detailed assessment to be undertaken at DA stage.

## 3.2. Dimensions and Tolerances

The BCA contains the minimum standards for building construction and safety, and therefore generally stipulates minimum dimensions which must be met. BCA Logic's assessment of the plans and specifications has been undertaken to ensure the minimal dimensions have been met.

The designer and builder should ensure that the minimum dimensions are met onsite and consideration needs to be given to construction tolerances for wall set outs, applied finishes and skirtings to corridors and bathrooms for example, tiling bed thicknesses and the like which can adversely impact on critical maters such as access for people with disabilities, stair and corridor widths and balustrade heights.

## 3.3. Performance Based Design – Performance Solutions

There are specific areas throughout the development where strict Deemed-to-Satisfy BCA Compliance will not be achieved by the proposed design and site constraints. These matters will need to be address in a detailed Fire Safety Engineering Report to be prepared for this development under separate cover:

Table 2. Performance Solutions

| Item | Description of Performance Solution | DTS Provision | Relevant Performance Requirements |
|---|---|---|---|
| 1. | Class 6 retail tenancies will have their FRLs rationalised down from 3 hours to 2 hours<br>Ground Floor to Level 03 car park fire compartment will have the Class 7b FRLs rationalised down from 4 hours to 2 hours | C1.1, Spec C1.1, C2.7, C2.8, C2.9, C3.5 | CP1, CP2 & CP8 |
| 2. | Level 04 to 07 are public corridors over 40m and the provision of smoke wall/doors will be omitted from the design | C2.14 | EP2.2 |
| 3. | Level 02 to 05 NE corner SOUs: Blade wall provides an alternative method of protection to openings within 3m | C3.2 & C3.4 | CP2 & CP8 |
| 4. | Non-fire rated access hatch to the roof of the fire stair instead of achieving FRL -/90/90 | Spec C1.1 Clause 2.7 | CP2 & CP8 |
| 5. | Retail 01 & 03 and Lobby only require a single exit in lieu of two due to their design | D1.2 | DP4 |
| 6. | Travel distances which are not in accordance with D1.4 & D1.5 | D1.4 & D1.5 & G6.4 | DP4 & EP2.2 |

| Item | Description of Performance Solution | DTS Provision | Relevant Performance Requirements |
|---|---|---|---|
| 7. | FS 01&02 discharge to the laneway requires the egress path to reach the road in either direction to pass within 6m of the external glazed walls and protection will be omitted | D1.7(c) | DP5 & EP2.2 |
| 8. | Performance Solution is required as booster is not within sight of the main entrance on Harbour Drive or Lobby entrance | E1.3 | EP1.3 |
| 9. | Class 6 parts are required to be provided with zone pressurisation system however this will be omitted | E2.2, Table E2.2a | EP2.2 |
| 10. | The construction of the external walls is such that they will prevent the penetration of water that could cause unhealthy or dangerous conditions or loss of amenity to occupants and undue dampness or deterioration of building elements. | No DtS Provisions – FP1.4 Performance Provisions Only | FP1.4 |

### 3.4. Façade Construction – Non Combustible

As the building is required to be of Type A Construction, the external façade is required to be *non-combustible* and comply with Clause C1.9 of BCA2019 which states as follows:

(a) In a building required to be of Type A or B construction, the following building elements and their components must be *non-combustible*:

(i) External walls and common walls, including all components incorporated in them including the facade covering, framing and insulation.

(ii) The flooring and floor framing of lift pits.

(iii) Non-*loadbearing* internal walls where they are required to be fire-resisting.

(b) A shaft, being a lift, ventilating, pipe, garbage, or similar shaft that is not for the discharge of hot products of combustion, that is non-loadbearing, must be of *non-combustible* construction in—

(i) a building required to be of Type A construction; and

(ii) a building required to be of Type B construction, subject to C2.10, in—

(A) a Class 2, 3 or 9 building; and

(B) a Class 5, 6, 7 or 8 building if the shaft connects more than 2 storeys.

(c) A l*oadbearing* internal wall and a *loadbearing fire wall*, including those that are part of a *loadbearing* shaft, must comply with Specification C1.1.

(d) The requirements of (a) and (b) do not apply to gaskets, caulking, sealants, termite management systems, Glass including laminated glass, thermal breaks associated with glazing systems and damp-proof courses.

(e) The following materials, may be used wherever a *non-combustible* material is required:

(i) Plasterboard.

(ii) Perforated gypsum lath with a normal paper finish

(iii) Fibrous-plaster sheet.

(iv) Fibre-reinforced cement sheeting.

(v) Pre-finished metal sheeting having a combustible surface finish not exceeding 1 mm thickness and where the Spread-of-Flame Index of the product is not greater than 0.

(vi) *Sarking-type materials* that do not exceed 1 mm in thickness and have a *Flammability Index* not greater than 5.

(vii) Bonded laminated materials where—

(A) each lamina, including any core, is *non-combustible*; and

(B) each adhesive layer does not exceed 1 mm in thickness and the total thickness of the adhesive layers does not exceed 2 mm; and

(C) the Spread-of-Flame Index and the Smoke-Developed Index of the bonded laminated material as a whole do not exceed 0 and 3 respectively.

Currently the external façade construction is under review and further assessment will be required as design progresses to ensure *non-combustible* wall construction complies with above. Detailed design compliance is not required at DA stage and will be assessed at CC stage.

It is also noted that this clause also prohibits the use of in situ formwork containing combustible elements including PVC lined formwork products where the PVC lining remains in place for the life of the building where proposed to be used as an external wall element, common walls, the flooring and floor framing of lift pits, services riser shafts or non-*loadbearing* internal walls required to be fire resisting.

Note that perimeter walls of basement (below ground) floor levels are also deemed to be external walls.

# ANNEXURE A DESIGN DOCUMENTATION

## Annexure A – Design Documentation

This report has been based on the following design documentation for DA submission by Turner, Project No. 20023, dated 11.12.2020.

| Series | Drawing No. | Drawing Name | Scale | Rev | Size |
|---|---|---|---|---|---|
| **General** | | | | | |
| | DA-001-001 | Title Sheet | 1:1.25 | 01 | A1 |
| **Siteworks** | | | | | |
| | DA-010-001 | Location Plan 01 | | 01 | A1 |
| | DA-010-002 | Location Plan 02 | 1:1000 | 01 | A1 |
| | DA-010-003 | Site Plan | 1:500 | 01 | A1 |
| | DA-010-004 | Demolition Plan | 1:200 | 01 | A1 |
| **GA Plans** | | | | | |
| | DA-110-001 | Ground Level | 1:200 | 07 | A1 |
| | DA-110-005 | Mezzanine Level | 1:200 | 04 | A1 |
| | DA-110-010 | Level 01 | 1:200 | 07 | A1 |
| | DA-110-020 | Level 02 | 1:200 | 07 | A1 |
| | DA-110-030 | Level 03 | 1:200 | 07 | A1 |
| | DA-110-040 | Level 04 | 1:200 | 06 | A1 |
| | DA-110-050 | Level 05 | 1:200 | 06 | A1 |
| | DA-110-060 | Level 06 | 1:200 | 06 | A1 |
| | DA-110-070 | Level 07 | 1:200 | 06 | A1 |
| | DA-110-080 | Level 08 | 1:200 | 06 | A1 |
| | DA-110-090 | Level 09 | 1:200 | 06 | A1 |
| | DA-110-100 | Level 10 | 1:200 | 06 | A1 |
| | DA-110-110 | Level 11 | 1:200 | 06 | A1 |
| | DA-110-120 | Level 12 | 1:200 | 06 | A1 |
| | DA-110-130 | Roof Level | 1:200 | 07 | A1 |
| **Elevations** | | | | | |
| | DA-210-001 | North and South Elevation | 1:200, 1:100 | 02 | A1 |
| | DA-210-002 | East Elevation | 1:200, 1:100 | 02 | A1 |
| | DA-210-003 | West Elevation | 1:200, 1:100 | 02 | A1 |
| **Sections** | | | | | |
| | DA-310-001 | Section 01 | 1:200 | 02 | A1 |
| | DA-310-002 | Section 02 | 1:200 | 02 | A1 |
| | DA-310-003 | Section Details | 1:100, 1:50, 1:1 | 01 | A1 |
| **Shadow Diagrams** | | | | | |
| | DA-710-001 | June 21st 9am | 1:500 | 01 | A1 |
| | DA-710-002 | June 21st 12pm | 1:500 | 01 | A1 |
| | DA-710-003 | June 21st 3pm | 1:500 | 01 | A1 |
| **Amenity Diagrams (ADG)** | | | | | |
| | DA-720-001 | SEPP65 Amenities Diagram | 1:500 | 02 | A1 |
| **Deep Soil and Communal Space Diagrams (ADG)** | | | | | |
| | DA-730-001 | Deep Soil and Communal Space | 1:200 | 01 | A1 |
| **GFA Diagrams** | | | | | |
| | DA-770-001 | GFA Diagram | 1:500 | 01 | A1 |
| **Adaptable & Livable Apartment Layouts** | | | | | |
| | DA-810-001 | Sheet 01 | 1:50 | 02 | A1 |
| | DA-810-002 | Sheet 02 | 1:50 | 02 | A1 |
| | DA-810-003 | Sheet 03 | 1:50 | 02 | A1 |
| | DA-810-004 | Sheet 04 | 1:50 | 02 | A1 |
| | DA-810-005 | Sheet 05 | 1:50 | 02 | A1 |
| | DA-810-006 | Sheet 06 | 1:50 | 02 | A1 |
| **Materials & Finishes Board** | | | | | |
| | DA-890-001 | External Materials Palette | 1:100 | 01 | A1 |
| **3D Views** | | | | | |
| | DA-910-001 | Perspective 01 | | 01 | A1 |
| | DA-910-002 | Perspective 02 | | 01 | A1 |

# ANNEXURE B ESSENTIAL SERVICES

## Annexure B - Essential Services

The following fire safety measures are required to be installed in the building. The following table may be required to be updated as the design develops and options for compliance are confirmed.

Table 3. Essential Fire Safety Measures

| Item | Essential Fire and Other Safety Measures | Standard of Performance |
|---|---|---|
| **Fire Resistance (Floors – Walls – Doors – Shafts)** | | |
| 1. | Access Panels & doors/hoppers (fire rated) | **BCA2019 C3.13** (Openings in Shafts)<br>**BCA2019 Spec C3.4**<br>AS 1905.1:2015 (Fire Resistant Doorsets) |
| 2. | Fire doors | **BCA2019 C2.12** (Separation of Equipment)<br>**BCA2019 C2.13** (Electricity Supply Systems)<br>**BCA2019 C3.4** (Acceptable methods of Protection)<br>**BCA2019 C3.5** (Doors in Fire Walls)<br>**BCA2019 C3.8** (Openings in Fire Isolated Exits)<br>**BCA2019 C3.11** (Bounding Construction)<br>Spec C3.4, AS1905.1: 2015<br>**BCA2019 C3.10** (Opening in Fire Isolated Lift Shafts) & AS1735.11- 1986 |
| 3. | Fire seals protecting openings in fire resisting components of the building | **BCA2019 C3.15** (Openings for service installations)<br>**BCA2019 C3.16** (Construction joints)<br>AS1530.4:2014 & AS4072.1-2005 |
| 4. | Fire windows<br>> Fixed Internal wall-wetting sprinklers | **BCA2019 C3.3** (Separation of external walls and associated openings in different fire compartments)<br>**BCA2019 C3.4** (Acceptable Methods of Protection)<br>**BCA2019 D1.7** (Travel Via Fire Isolated Exits)<br>AS2118.1-2017 |
| 5. | Lightweight construction<br>> Fire Rating of Bounding Construction to Class 2 parts | **BCA2019 C1.1, Spec. C1.1**<br>**BCA2019 C1.8, Spec C1.8**<br>AS1530.4:2014 |
| **General** | | |
| 6. | Fire control centre | **BCA2019 E1.8, Spec E1.8** (Fire Control Centres) |

| Item | Essential Fire and Other Safety Measures | Standard of Performance |
|---|---|---|
| 7. | Portable fire extinguishers | **BCA2019 E1.6**<br>AS 2444–2001 |
| **General Egress** | | |
| 8. | Automatic fail safe devices | **BCA2019 D2.21** (Operation of Latches)<br>**BCA2019 D2.22** (Re-entry from fire-isolated stairs)<br>AS 1670.1:2018 |
| 9. | Warning & operational signs | **BCA2019 D2.23 (**Signs on Fire Doors)<br>**BCA2019 D3.6** (Braille Exit Signs) (Note: E4.5 (Exit Signs))<br>**BCA2019 E3.3** (Lift Signs) |
| **Lifts** | | |
| 10. | Emergency lifts<br>> Lift No 01 & 02 | **BCA2019 E3.4** |
| 11. | Stretcher Lifts including<br>> Fire Service Controls<br>> Recall Operation<br>> Drive control switch | **BCA2019 E3.2**<br>**BCA2019 E3.7** (Fire Service Controls)<br>**BCA2019 E3.9** (Fire Service Recall Operation Switch)<br>**BCA2019 E3.10** (Lift Car Fire Service drive control switch)<br>**BCA2019 Spec E3.1** |
| **Electrical Services** | | |
| 12. | Automatic fire detection & alarm: | **BCA2019 E2.2**, **Table E2.2a**<br>**Spec E2.2a** - Clause 3 (Smoke alarm system)<br>**Spec E2.2a** – Clause 6 (Smoke detection for smoke control systems)<br>**Spec E2.2a** - Clause 7 (BOWS)<br>AS 3786:2014 (Amdt 1-4)<br>AS 1670.1:2018<br>AS 1670.3:2018<br>AS 1670.4:2018 |
| 13. | Emergency lighting | **BCA2019 E4.2, E4.4**<br>AS/NZS 2293.1:2018 |
| 14. | Exit signs | **BCA2019 E4.5, E4.6 & E4.8**<br>AS/NZS 2293.1:2018 |

| Item | Essential Fire and Other Safety Measures | Standard of Performance |
|---|---|---|
| 15. | Emergency warning and intercom systems (EWIS)<br>Residential areas: 75 dB(A) at all bedheads. | **BCA2019 E4.9**<br>AS 1670.4:2018 |
| 16. | System Monitoring | **BCA2019 E1.5, Spec E1.5**<br>AS 1670.3:2018 |
| **Hydraulic Services** | | |
| 17. | Automatic fire suppression systems<br>> Combined Sprinklers and Hydrant | **BCA2019 E1.5 & Spec E1.5**<br>AS 2118.1:2017<br>AS 2118.6:2012 |
| 18. | Fire hydrant systems<br>> NSW Storz Couplings<br>> Ring Main required (>25m)<br>> On-site water storage (>25m) | **BCA2019 E1.3**<br>AS 2419.1:2005<br>FRNSW Technical Sheet D15/45534.V9 issued 10.01.19, 'Compatible Hose Connections' |
| 19. | Hose reel systems | **BCA2019 E1.4**<br>AS 2441:2005 |
| **Mechanical Services** | | |
| 20. | Fire dampers | **BCA2019 E2.2, Spec E2.2a, Spec E2.2b**<br>**BCA2019 C3.15**<br>AS 1668.1:2015 (Amdt 1) AS 1682.1:2015 & AS 1682.2:2015 |
| 21. | Mechanical air handling systems<br>1. Mechanical ventilation to carpark.<br>2. Fire Isolated Exit Pressurisation System | **BCA2019 E2.2, Table E2.2a, Spec E2.2a**<br>AS 1668.1:2015 (Amdt 1)<br>AS 1670.1:2018 |

Notes:

(An air-handling system which does not form part of a smoke hazard management system in accordance with Table E2.2a or Table E2.2b and which recycles air from one *fire compartment* to another *fire compartment* or operates in a manner that may unduly contribute to the spread of smoke from one *fire compartment* to another *fire compartment* must—

(i) ((be designed and installed to operate as a smoke control system in accordance with AS 1668.1:2015; or

(ii)

(A) incorporate smoke dampers where the air-handling ducts penetrate any elements separating the fire compartments served; and

(B) be arranged such that the air-handling system is shut down and the smoke dampers are activated to close automatically by smoke detectors complying with clause 7.5 of AS 1670.1:2018; and

for the purposes of this provision, each *sole-occupancy unit* in a Class 2 or 3 building is treated as a separate *fire compartment*.

| Item | Essential Fire and Other Safety Measures | Standard of Performance |
|---|---|---|
| Miscellaneous air-handling systems covered by Sections 5 and 6 of AS 1668.1:2015 serving more than one *fire compartment* (other than a carpark ventilation system) and not forming part of a smoke hazard management system must comply with that Section of the Standard. | | |
| 22. | **Performance Solutions – To be prepared CC stage**<br>*Fire Engineering Report (FER) prepared by XXXX, report no. XXX, issue XXXX, dated XXX. | |

# ANNEXURE C FIRE RESISTANCE LEVELS

## Annexure C - Fire Resistance Levels

The following fire resistance levels (FRL's) are required for the various building elements, with a fire source feature being the far boundary of a road adjoining the allotment, a side or rear boundary or an external wall of another building on the allotment except a Class 10 structure.

Note: The Class 6 & 7b parts will be subject to a performance solution to rationalise their FRLs down to 2 hours.

### Type A Construction

Table 4. Type A Construction

| Item | Class 2 | Class 6, 7a & 7b |
|---|---|---|
| Loadbearing External Walls (including columns and other building elements incorporated therein)<br>- Less than 1.5m to a *fire- source feature*<br>- 1.5 – less than 3m from a *fire-source feature*<br>- 3m or more from a *fire source feature* | <br>90/90/90<br>90/60/60<br>90/60/30 | <br>120/120/120<br>120/90/90<br>120/60/30 |
| Non-Loadbearing External Walls<br>- Less than 1.5m to a *fire-source feature*<br>- 1.5 – less than 3m from a *fire-source feature*<br>- 3m or more from a *fire-source feature* | <br>-/90/90<br>-/60/60<br>-/-/- | <br>-/120/120<br>-/90/90<br>-/-/- |
| External Columns<br>- Loadbearing<br>- Non-loadbearing | <br>90/-/-<br>-/-/- | <br>120/-/-<br>-/-/- |
| Common Walls & Fire Walls | 90/90/90 | 120/120/120 |
| Stair and Lift Shafts required to be fire-resisting<br>- Loadbearing<br>- Non-loadbearing | <br>90/90/90<br>-/90/90 | <br>120/120/120<br>-/120/120 |
| Internal walls bounding sole occupancy units<br>- Loadbearing<br>- Non-loadbearing | <br>90/90/90<br>-/60/60 | <br>120/-/-<br>-/-/- |
| Internal walls bounding public corridors, public lobbies and the like:<br>- Loadbearing<br>- Non-loadbearing | <br>90/90/90<br>-/60/60 | <br>120/-/-<br>-/-/- |
| Ventilating, pipe, garbage and like shafts:<br>- Loadbearing<br>- Non-loadbearing | <br>90/90/90<br>-/90/90 | <br>120/90/90<br>-/90/90 |
| Other loadbearing internal walls, beams trusses and columns | 90/-/- | 120/-/- |
| Floors | 90/90/90 | 120/120/120 |
| Roofs[1] | ~~90/60/30~~ | ~~120/60/30~~ |

N.B. [1] The roof need not comply with any FRL's due to the sprinkler protection of the entire building.

# ANNEXURE D DETAILED BCA 2019 ASSESSMENT

## Annexure D – Detailed BCA 2019 Assessment

Outlined below is a detailed assessment of the design under the Deemed-to-Satisfy Provisions of the Building Code of Australia (BCA) including the State variations where applicable.

All Deemed-to-Satisfy clauses that are applicable to the subject building have been referred to below, including a comment adjacent to each clause of the proposal's ability to satisfy each respective clause.

The abbreviations outlined below have been used in the following table.

| | |
|---|---|
| **N/A** | Not Applicable. The Deemed-to-Satisfy clause is not applicable to the proposed design. |
| **Complies** | The relevant provisions of the Deemed-to-Satisfy clause have been satisfied by the proposed design. |
| **CRA – Refer Annexure F** | 'COMPLIANCE READILY ACHIEVABLE'. It is considered that there is not enough information included in the documentation to accurately determine strict compliance with the individual clause requirements. However, with further design development, compliance can readily be achievable. This item is to be read in conjunction with the BCA Specification included within Annexure F of this report. |
| **FI** | Further Information is necessary to determine the compliance potential of the building design. |
| **PS** | Performance Solution with respect to this Deemed-to-Satisfy Provision is necessary to satisfy the relevant Performance Requirements. |
| **DNC** | Does Not Comply. |
| **Noted** | BCA Clause simply provides a statement not requiring specific design comment or confirmation. |

## Deemed to Satisfy Clause Assessment

Table 5. Deemed to Satisfy Clause Assessment

| Clause | Clause Requirements | Comment | Status |
|---|---|---|---|
| **Section B: Structure** | | | |
| **Part B1 – Structural Provisions** | | | |
| B1.0: Deemed-to-Satisfy Provisions | Informational | Noted | Noted |
| B1.1: Resistance to actions | The resistance of the building must be greater than the most critical action effect resulting from different combinations of actions, where the most critical action has been determined in accordance with this Part | Structural Engineer to certify at CC stage. | CRA – Refer Annexure F |
| B1.2: Determination of individual actions | The magnitude of actions must be determined in accordance with this Clause. | Structural Engineer to certify at CC stage. | CRA – Refer Annexure F |
| B1.4: Determination of structural resistance of materials and forms of construction | The structural resistance of materials and forms of construction must be determined in accordance with this Clause. | Structural Engineer to certify at CC stage. | CRA – Refer Annexure F |
| B1.5: Structural software | Structural software used in computer aided design of a building or structure within the geometrical limits of (b) of this Clause must comply with the ABCB Protocol for Structural Software. | Structural Engineer to certify at CC stage. | CRA – Refer Annexure F |
| B1.6 Construction of buildings in flood hazard areas | A Class 2 building in a flood hazard area (refer to Council maps) must comply the ABCB Standard for Construction of Buildings in Flood Hazard Areas. | Structural Engineer to certify at CC stage. | CRA – Refer Annexure F |

| Section C: Fire Resistance | | | |
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| **Part C1 – Fire Resistance and Stability** | | | |
| C1.0: Deemed-to-Satisfy Provisions | Informational | Noted | Noted |
| C1.1: Type of construction required | The building is required to be of Type A Construction.<br>Refer to Specification C1.1 requirements at the end of this Section. | Performance Solutions:<br>▪ Class 6 retail tenancies will have their FRLs rationalised down from 3 hours to 2 hours<br>▪ Ground Floor to Level 03 car park fire compartment will have the Class 7b FRLs rationalised down from 4 hours to 2 hours | **PS**<br>**Refer Part 3.3 of Report** |
| C1.2: Calculation of rise in storeys | The building has a rise in storeys of thirteen (13). | Noted | Noted |
| C1.3: Buildings of multiple classification | Informational | The building is required to be of Type A Construction. | Noted |
| C1.4: Mixed Types of construction | | Not applicable to this development | N/A |
| C1.5: Two Storey Class 2, 3 or 9c buildings | | Not applicable to this development | N/A |
| C1.6: Class 4 Parts of building | | Not applicable to this development | N/A |
| C1.7: Open spectator stands and indoor sports stadium | | Not applicable to this development | N/A |
| C1.8: Lightweight construction | Lightweight construction used in a fire-rated application is to comply with Specification C1.8. | To be detailed at CC stage. | CRA – Refer Annexure F |

| Section C: Fire Resistance | | | | |
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| C1.9: | Non-combustible building elements | (a) In a building required to be of Type A or B construction, the following building elements and their components must be *non-combustible*:<br>(i) External walls and common walls, including all components incorporated in them including the facade covering, framing and insulation.<br>(ii) The flooring and floor framing of lift pits.<br>(iii) Non-loadbearing internal walls where they are required to be fire-resisting.<br>(b) A shaft, being a lift, ventilating, pipe, garbage, or similar shaft that is not for the discharge of hot products of combustion, that is non-loadbearing, must be of *non-combustible* construction in—<br>(i) a building required to be of Type A construction; and<br>(ii) a building required to be of Type B construction, subject to C2.10, in—<br>(A) a Class 2, 3 or 9 building; and<br>(B) Class 5, 6, 7 or 8 building if the shaft connects more than 2 storeys.<br>(c) A loadbearing internal wall and a loadbearing *fire wall*, including those that are part of a loadbearing shaft, must comply with Specification C1.1.<br>(d) The requirements of (a) and (b) do not apply to gaskets, caulking, sealants, termite management systems, Glass including laminated glass, thermal breaks associated with glazing systems and damp-proof courses.<br>(e) The following materials, may be used wherever a *non-combustible* material is required:<br>(i) Plasterboard. | Currently the external façade construction is under review and further assessment will be required as design progresses to ensure *non-combustible* wall construction complies with above. Detailed design compliance is not required at DA stage and will be assessed at CC stage.<br>This clause also prohibits the use of in situ formwork containing combustible elements including PVC lined formwork products where the PVC lining remains in place for the life of the building. Where the use of such products is proposed – in all instances the material must be the subject of a site specific Performance Assessment Report. | CRA – Refer Annexure F |

| Section C: Fire Resistance | | | |
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| | (ii) Perforated gypsum lath with a normal paper finish.<br>(iii) Fibrous-plaster sheet.<br>(iv) Fibre-reinforced cement sheeting.<br>(v) Pre-finished metal sheeting having a combustible surface finish not exceeding 1 mm thickness and where the Spread-of-Flame Index of the product is not greater than 0.<br>(vi) *Sarking-type materials* that do not exceed 1 mm in thickness and have a *Flammability Index* not greater than 5.<br>(vii) Bonded laminated materials where—<br>(A) each lamina, including any core, is *non-combustible*; and<br>(B) each adhesive layer does not exceed 1 mm in thickness and the total thickness of the adhesive layers does not exceed 2 mm; and<br>(C) the Spread-of-Flame Index and the Smoke-Developed Index of the bonded laminated material as a whole do not exceed 0 and 3 respectively. | | |
| C1.10: Fire hazard properties | Fire hazard properties of internal linings, materials and assemblies must comply with C1.10 of the BCA and Specification C1.10, including floor, wall and ceiling linings, air-handling ductwork, lift cars, insulation, *sarking-type materials* and attachments, or be considered *non-combustible*. | | CRA – Refer Annexure F |
| C1.11: Performance of external walls in fire | | Not applicable to this development | N/A |

| Section C: Fire Resistance | | | |
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| C1.12: Non-combustible materials | Clause now deleted and relocated to C1.9. | | Noted |
| C1.13: Fire-protected timber: Concession | | Not applicable to this development | N/A |
| C1.14: Ancillary elements | An ancillary element must not be fixed, installed or attached to the internal parts or external face of an external wall that is required to be *non-combustible* unless it is one of the following:<br>(a) An ancillary element that is *non-combustible*.<br>(b) A gutter, downpipe or other plumbing fixture or fitting.<br>(c) A flashing.<br>(d) A grate or grille not more than 2 m² in area associated with a building service.<br>(e) An electrical switch, socket-outlet, cover plate or the like.<br>(f) A light fitting.<br>(g) A required sign.<br>(h) A sign other than one provided under (a) or (g) that—<br>(i) achieves a group number of 1 or 2; and<br>(ii) does not extend beyond one storey; and<br>(iii) does not extend beyond one fire compartment; and<br>(iv) is separated vertically from other signs permitted under (h) by at least 2 storeys.<br>(i) An awning, sunshade, canopy, blind or shading hood other than one provided under (a) that— | Privacy and sunshade screens shall comply. Detailed design compliance is not required at DA stage and will be assessed at CC stage. | CRA – Refer Annexure F |

| Section C: Fire Resistance | | | |
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| | (i) meets the relevant requirements of Table 4 of Specification C1.10 as for an internal element; and<br>(ii) serves a storey—<br>(A) at ground level; or<br>(B) immediately above a storey at ground level; and<br>(iii) does not serve an *exit*, where it would render the *exit* unusable in a fire.<br>(j) A part of a security, intercom or announcement system.<br>(k) Wiring.<br>(l) A paint, lacquer or a similar finish.<br>(m) A gasket, caulking, sealant or adhesive directly associated with (a) to (k). | | |
| **Part C2 – Compartment and Separation** | | | |
| C2.0: Deemed-to-Satisfy Provisions | Informational | Noted | Noted |
| C2.1: Application of Part | Informational -<br>C2.2, C2.3 and C2.4 do not apply to a carpark provided with a sprinkler system complying with Specification E1.5 (other than an FPAA101D or FPAA101H system), an open-deck carpark or an open spectator stand. | Class 7a part will have AS 2118.1 system | Noted |
| C2.2: General floor area and volume limitations | The size of *fire compartments* in the building must not exceed that specified in Table C2.2. | Class 6 complies | Complies |
| C2.3: Large isolated buildings | | Not applicable to this development | N/A |

| Section C: Fire Resistance | | | |
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| C2.4: Requirements for open spaces and vehicular access | | Not applicable to this development | N/A |
| C2.5: Class 9a and 9c Buildings | | Not applicable to this development | N/A |
| C2.6: Vertical separation of openings in external walls | | Not applicable to this development | N/A |
| C2.7: Separation by fire walls | **Construction** - A *fire wall* must be constructed in accordance with the following:<br>> Any openings in a *fire wall* must not reduce the *FRL* required by Specification C1.1 for the *fire wall*, except where permitted by the Deemed-to-Satisfy Provisions of Part C3.<br>> Building elements, other than roof battens with dimensions of 75 mm x 50 mm or less or *sarking-type material*, must not pass through or cross the *fire wall* unless the required fire resisting performance of the *fire wall* is maintained.<br>**Separation of *fire compartments*** – A part of a building separated from the remainder of the building by a *fire wall* may be treated as a separate *fire compartment* if it is constructed in accordance with this clause and the *fire wall* extends to the underside of –<br>> a floor having an *FRL* required for a *fire wall*; or<br>> the roof covering. | Performance Solutions:<br>▪ Class 6 retail tenancies will have their FRLs rationalised down from 3 hours to 2 hours<br>▪ Level 01 to 03 car park fire compartment will have the Class 7b FRLs rationalised down from 4 hours to 2 hours<br>▪ As a result, Fire Walls will match the reduced FRL of the fire compartment and the floor above the fire compartment will match the reduced FRL.<br>Fire walls to be detailed at CC stage. | **PS**<br>**Refer Part 3.3 of Report** |
| C2.8: Separation of classifications in the same storey | Where a storey has different classifications located alongside one another: | Performance Solutions:<br>▪ Class 6 retail tenancies will have their FRLs rationalised down from 3 hours to 2 hours | **PS**<br>**Refer Part 3.3 of Report** |

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| | > each building element in that storey must have the higher *FRL* prescribed in Specification C1.1 for that element for the classifications concerned; or<br>> the parts must be separated in that storey by a *fire wall* having the higher *FRL* prescribed in Table 3; or<br>> where one part is a carpark complying with Table 3.9, 4.2 or 5.2 of Specification C1.1, the parts may be separated by a *fire wall* complying with the appropriate Table. | ▪ Level 01 to 03 car park fire compartment will have the Class 7b FRLs rationalised down from 4 hours to 2 hours<br>▪ As a result, Fire Walls will match the reduced FRL of the fire compartment.<br>Refer to Part 2.6 of Report for Fire Compartments which separate classifications within the same storey. | |
| C2.9: Separation of classifications in different storeys | Floors separating storeys of different classifications must have an *FRL* of not less than that prescribed in Specification C1.1 for the classification of the lower storey.<br>Note: Determination of Floor *FRL*'s must also consider compliance with C2.7 whereby the floor must have the same *FRL* as the fire wall of the *fire compartment* below and D2.12 whereby roof as open space must have an *FRL* not less than 120/120/120. | Performance Solutions:<br>▪ Class 6 retail tenancies will have their FRLs rationalised down from 3 hours to 2 hours<br>▪ Level 01 to 03 car park fire compartment will have the Class 7b FRLs rationalised down from 4 hours to 2 hours<br>▪ As a result, Fire Walls will match the reduced FRL of the fire compartment and the floor above the fire compartment will match the reduced FRL. | **PS**<br>**Refer Part 3.3 of Report** |
| C2.10: Separation of lift shafts | Passenger lifts must be separated from the remainder of the building by enclosure in a fire rated shaft achieving an *FRL* prescribed by Table 3 of Specification C1.1.<br>Emergency lifts must be in fire-rated shafts not less than *FRL* 120/120/120. | Emergency lifts must be in fire-rated shafts not less than *FRL* 120/120/120. | CRA – Refer Annexure F |
| C2.11: Stairways and lifts in one shaft | A stairway and lift must not be in the same shaft if either the stairway or the lift is required to be in a fire-resisting shaft. | Complies | Complies |
| C2.12: Separation of equipment | Any of the following equipment located in the building must be separated from the remainder of the building: | To be detailed at CC stage. | CRA – Refer Annexure F |

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| | > lift motors and lift control panels; or<br>> emergency generators used to sustain emergency equipment operating in the emergency mode; or<br>> central smoke control plant; or<br>> boilers; or<br>> a battery system installed in the building that has a total voltage of 12 volts or more and a storage capacity of 200 kWh or more.<br>Equipment need not be separated in if the equipment comprises:<br>> smoke control exhaust fans located in the air stream which are constructed for high temperature operation in accordance with Specification E2.2b; or<br>> stair pressurizing equipment installed in compliance with the relevant provisions of AS 1668.1:2015; or<br>> a lift installation without a machine room; or<br>> equipment otherwise adequately separated from the remainder of the building.<br>Separation must be by construction having an *FRL* as required by Specification C1.1, but not less than *FRL* 120/120/120 with openings protected by self-closing fire doors having an *FRL* of not less than –/120/30.<br>Separation of on-site fire pumps must comply with the requirements of AS 2419.1:2005. | | |
| C2.13: Electricity supply system | > Any electrical substation located within the building must be separated from the remainder of the building by construction having an *FRL* of not less than 120/120/120, and doorways protected with self-closing fire doors having an *FRL* of not less than –/120/30. | To be detailed at CC stage. | CRA – Refer Annexure F |

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| | > A main switchboard which sustains emergency equipment operating in the emergency mode must be fire separated from any other part of the building by construction having an *FRL* of not less than 120/120/120 and have the doorway fitted with self-closing fire door having an *FRL* of not less than –/120/30.<br>> Any electrical conductors located within the building that supply a substation or main switchboard for emergency equipment must comply with BCA clause C2.13.<br>> Emergency equipment switchgear must be separated from non-emergency equipment switchgear by metal partitions designed to minimize the spread of a fault from the non-emergency equipment switchgear.<br>> Emergency equipment includes but is not limited to the following:<br>o fire hydrant booster pumps;<br>o sprinkler pumps;<br>o hose reel pumps;<br>o air-handling systems designed to exhaust and control the spread of smoke;<br>o emergency lifts;<br>o control and indicating equipment; and<br>o sound systems and intercom systems for emergency purposes. | | |
| C2.14: Public corridors in Class 2 and 3 Buildings | Public corridors in Class 2 parts that exceed 40 m in length must be divided at intervals of not more than 40m with smoke-proof walls complying with Clause 2 of Specification C2.5. | Level 04 to 07 are public corridors over 40m and the provision of smoke wall/doors will be omitted from the design – Performance Solution. | **PS**<br>**Refer Part 3.3 of Report** |

| Section C: Fire Resistance | | | |
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| **Part C3 – Protection of Openings** | | | |
| C3.0: Deemed-to-Satisfy Provisions | Informational | Noted | Noted |
| C3.1: Application of Part | (a) The Deemed-to-Satisfy Provisions of this Part do not apply to–<br>(i) Control joints, weep holes and the like in external walls of masonry construction and joints between panels in external walls of pre-cast concrete panel construction if, in all cases they are not larger than necessary for the purpose; and<br>(ii) Non-combustible ventilators for subfloor or cavity ventilation, if each does not exceed 45 000 mm2 in face area and is spaced not less than 2 m from any other ventilator in the same wall; and<br>(iii) Openings in the vertical plane formed between building elements at the construction edge or perimeter of a balcony or verandah, colonnade, terrace, or the like; and<br>(iv) In a carpark–<br>(A) Service penetrations through; and<br>(B) Openings formed by a vehicle ramp in,<br>(aa) A floor other than a floor that separates a part not used as a carpark, providing the connected floors comply as a single fire compartment for the purposes of all other requirements of the Deemed-to-Satisfy Provisions of Sections C, D and E. | To be detailed at CC stage. | Noted |

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| | (b) For the purposes of the Deemed-to-Satisfy Provisions of this Part, openings in building elements required to be fire-resisting include doorways, windows (including any associated fanlight), infill panels and fixed or openable glazed areas that do not have the required FRL.<br>(c) For the purposes of the Deemed-to-Satisfy Provisions of this Part, openings, other than those covered under (a)(iii), between building elements such as columns, beams and the like, in the plane formed at the construction edge or perimeter of the building, are deemed to be openings in an external wall. | | |
| C3.2: Protection of openings in external walls | Openings in an external wall that is required to have an *FRL* must be protected in accordance with C3.4 if the distance between the opening and the *fire-source feature* is:<br>> less than 3 m from a side or rear boundary; or<br>> less than 6 m from the far boundary of a road, river, lake or the like adjoining the allotment, if not located in a storey at or near ground level; or<br>> less than 6 m from another building on the allotment that is not Class 10; and<br>if required to be protected under (a), not occupy more than 1/3 of the area of the external wall of the storey in which it is located unless they are in a Class 9b building used as an open spectator stand.<br>Where wall-wetting sprinklers are used, they must be located externally. | Level 02 to 05 NE corner SOUs: Blade wall only provides partial protection therefore the opening is still exposed to the eastern boundary and will be rationalised to omit protection of openings via a Performance Solution. | **PS**<br>**Refer Part 3.3 of Report** |
| C3.3: Separation of external walls and associated | The distance between parts of external walls and any openings within them in different *fire compartments* | The following openings in external walls of different fire compartments will require further design compliance at CC stage: | CRA – Refer Annexure F |

<table>
<tr><th colspan="4">Section C: Fire Resistance</th></tr>
<tr><td></td><td>openings in different fire compartments</td><td>separated by a fire wall must not be less than that set out in Table C3.3, unless—<br>(a) those parts of each wall have an FRL not less than 60/60/60; and<br>(b) any openings protected in accordance with C3.4.<br>Table C3.3 DISTANCE BETWEEN EXTERNAL WALLS AND ASSOCIATED OPENINGS IN DIFFERENT FIRE COMPARTMENTS<br><table><tr><th>Angle between walls</th><th>Min. Distance</th></tr><tr><td>0° (walls opposite)</td><td>6 m</td></tr><tr><td>more than 0° to 45°</td><td>5 m</td></tr><tr><td>more than 45° to 90°</td><td>4 m</td></tr><tr><td>more than 90° to 135°</td><td>3 m</td></tr><tr><td>more than 135° to less than 180°</td><td>2 m</td></tr><tr><td>180° or more</td><td>Nil</td></tr></table></td><td>• Retail 02 to Lobby – the glazing in these areas is at 90 deg and within 4m so the glazing can be fixed and provided with internal wall-wetting sprinklers (subject to Retail 02 glazing not requiring high level louvres for fresh air intake).<br>• Retail 03 to 04 - the glazing in these areas is at 90 deg and within 4m so the glazing can be fixed and provided with internal wall-wetting sprinklers (subject to Retail glazing not requiring high level louvres for fresh air intake).<br>• Alternatively option at CC stage to pursue a Performance Solution to protect one opening with internal wall-wetting sprinklers in lieu of both openings to allow high-level louvres for fresh air intake.</td><td></td></tr>
<tr><td>C3.4:</td><td>Acceptable methods of protection</td><td>Where protection is required, openings must be protected as follows:<br><u>Doorways:</u><br>(i) Internal or external wall-wetting sprinklers as appropriate used with doors that are self-closing; or<br>(ii) –/60/30 fire doors that are self-closing.<br><u>Windows:</u><br>(i) Internal or external wall-wetting sprinklers as appropriate used with windows that are automatic closing or permanently fixed in the closed position; or</td><td>To be detailed at CC stage.</td><td>CRA – Refer Annexure F</td></tr>
</table>

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| | | (ii) –60/– fire windows that are automatically closing or permanently fixed in the closed position; or<br>(iii) –/60/– automatic closing fire shutters.<br><u>Other openings:</u><br>(i) Excluding voids – internal or external wall-wetting sprinklers; or<br>(ii) Construction having an *FRL* not less than –/60/–<br>Fire doors, fire windows and fire shutters must comply with BCA Specification C3.4. | | |
| C3.5: | Doorways in fire walls | Doorways in the fire walls must be protected by a self-closing fire door that achieves an *FRL* of not less than that required by Specification C1.1 for the *fire wall* except that each door must have an insulation level of at least 30. | Fire doors in fire walls will have the reduced FRL (-/120/30) as part of the Performance Solution to reduce the Class 6 & 7b FRLs | **PS**<br>**Refer Part 3.3 of Report** |
| C3.6: | Sliding fire doors | | Not applicable to this development | N/A |
| C3.7: | Protection of doorways in horizontal exits | | Not applicable to this development<br>Retail tenancies and Level 01-03 doors in fire walls are simply doors in a path of travel to an exit. | N/A |
| C3.8: | Openings in fire-isolated exits | Doorways that open to fire-isolated stairways, fire-isolated passageways or fire-isolated ramps, and are not doorways opening to a road or open space, must be protected by –/60/30 fire doors that are self-closing, or automatic-closing in accordance with (ii) and (iii) of Clause C3.8. | To be detailed at CC stage. | CRA – Refer Annexure F |
| C3.9: | Service penetrations in fire-isolated exits | The fire isolated *exits* are not to be penetrated by any services **other** than:<br>> electrical wiring associated with: | To be detailed at CC stage. | CRA – Refer Annexure F |

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| | ○ a lighting, detection, or pressurization system serving the exit; or<br>○ a security, surveillance or management system serving the exit; or<br>○ an intercommunication system or an audible or visual alarm system in accordance with D2.22; or<br>○ the monitoring of hydrant or sprinkler isolating valves.<br>> ducting associated with a pressurisation system if it;<br>(iii) is constructed of material having an *FRL* of not less than –/120/60 where it passes through any other part of the building; and<br>(iv) does not open into any other part of the building; or<br>> water supply pipes for fire services. | | |
| C3.10: Openings in fire-isolated lift shafts | > Lift landing doors are required to be fire doors with an *FRL* of -/60/- that comply with AS 1735.11:1986, and be set to remain closed except when discharging or receiving, passengers, goods or vehicles.<br>> Panels in the wall of the lift shaft must be backed by construction having an *FRL* of not less than –/60/60 if it exceeds 35 000 mm2 in area. | To be detailed at CC stage. | CRA – Refer Annexure F |
| C3.11: Bounding Construction: Class 2, 3 and 4 Buildings | The doorways between sole occupancy units and the public lobbies and any common / service rooms and the public lobbies (class 2 parts) must be protected by self–closing -/60/30 fire doors. | To be detailed at CC stage. | CRA – Refer Annexure F |
| C3.12: Openings in floors and ceilings for services | Where services pass through a floor which is required to achieve an *FRL* or a ceiling required to have a *resistance to the incipient spread of fire*, the service must be | To be detailed at CC stage. | CRA – Refer Annexure F |

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| | enclosed within a fire resisting shaft or fire protected in accordance with Clause C3.15.<br><br>Where a service passes through a floor which is required to be protected by a *fire-protective* covering, the penetration must not reduce the fire performance of the covering. | | |
| C3.13: Openings in shafts | Openings in shafts must be protected by:<br><br>(a) if it is in a sanitary compartment – a door or panel which together with its frame, is *non-combustible* or has an *FRL* of not less than –/30/30; or<br><br>(b) a self-closing –/60/30 fire door or hopper; or<br><br>(c) an access panel having an *FRL* of not less than –/60/30; or<br><br>(d) if the shaft is a garbage shaft – a door or hopper of *non-combustible* construction. | To be detailed at CC stage. | CRA – Refer Annexure F |
| C3.15: Openings for service installations | Where services pass through an element which is required to achieve an *FRL* (other than an external wall or roof), the service must be fire protected in accordance with BCA Clause C3.15.<br><br>**Note:** contractors should check with PCA to confirm compliance with their proposed fire stopping method. | To be detailed at CC stage. | CRA – Refer Annexure F |
| C3.16: Construction joints | Construction joints, spaces and the like in and between building elements required to be fire-resisting with respect to integrity and insulation must be protected in a manner identical with a prototype tested in accordance with AS 1530.4:2014 to achieve the required *FRL*. | To be detailed at CC stage. | CRA – Refer Annexure F |
| C3.17: Columns protected with lightweight construction to achieve an FRL | A column protected by lightweight construction to achieve an *FRL* which passes through a building element that is required to have an *FRL* or a resistance to the incipient spread of fire, must be installed using a | To be detailed at CC stage – if required | CRA – Refer Annexure F |

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| | | method and materials identical with a prototype assembly of the construction which has achieved the required *FRL* or resistance to the incipient spread of fire. | | |
| **Specification C1.1 – Fire-Resisting Construction** | | | | |
| 2.0: | General Requirements | Informational | Noted | Noted |
| 2.1: | Exposure to fire-source features | A building element is exposed to a *fire-source feature* if any of the horizontal straight lines between that part and the *fire-source feature*, or vertical projection of the feature, is not obstructed by another part of the building that–<br>(i) has an *FRL* of not less than 30/–/–; and<br>(ii) is neither transparent nor translucent. | Note: The north-east corner SOUs have a concrete blade wall to partially prevent the openings facing Vernon Street being exposed to the eastern boundary. Concrete blade wall can readily comply. | CRA – Refer Annexure F |
| 2.2: | Fire protection for a support of another part | Where a part of a building required to have an *FRL* depends upon direct vertical or lateral support from another part to maintain its *FRL*, that supporting part must have an *FRL* not less than that required by other provisions of this Specification; and if located within the same *fire compartment* as the part it supports have an FRL in respect of structural adequacy the greater of that required for the supporting part itself and for the part it supports. | To be detailed at CC stage. | CRA – Refer Annexure F |
| 2.3: | Lintels | A lintel must have the FRL required for the part of the building in which it is situated unless it does not contribute to the support of a fire door, fire window or fire shutter and meets the requirements of Spec C1.1 clause 2.3 (a) & (b). | To be detailed at CC stage. | CRA – Refer Annexure F |
| 2.4: | Attachments not to impair fire-resistance | The method of attaching or installing a finish, lining, ancillary element or service installation to a building | To be detailed at CC stage. | CRA – Refer Annexure F |

| Section C: Fire Resistance | | | | |
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| | | element must not reduce the fire-resistance of that element to below that required. | | |
| 2.5: | General concessions | Structures on roofs — A *non-combustible* structure situated on a roof need not comply with the other provisions of this Specification if it only contains—<br>(i) lift motor equipment; or<br>(ii) one or more of the following:<br>(A) Hot water or other water tanks.<br>(B) Ventilating ductwork, ventilating fans and their motors.<br>(C) Air-conditioning chillers.<br>(D) Window cleaning equipment.<br>(E) Other service units that are *non-combustible* and do not contain flammable or combustible liquids or gases. | To be detailed at CC stage. | CRA – Refer Annexure F |
| 2.6: | Mezzanine floors: Concession | | Not applicable to this development | N/A |
| 2.7: | Enclosure of shafts | Fire-isolated shafts are required to be enclosed at the top and bottom of the shaft with fire rated construction having an *FRL* required for the walls of a non-load-bearing shaft in the same building, as per specification C1.1. This fire rating is required in two directions.<br>The above does not apply to shafts extending beyond the roof covering, other than fire isolated stair and lift shafts and the bottom of *non-combustible* shafts laid directly on the ground. | To be detailed at CC stage.<br>GF Residential Waste room will be fire rated -/120/120 walls and -/120/30 fire doors as it will form the bottom room at the bottom of the garbage chute shaft.<br>Retail waste room is not required to be fire rated.<br>Performance Solution: Non-fire rated access hatch to the roof of the fire stair (roof plant access). | **PS**<br>**Refer Part 3.3 of Report** |
| 2.8: | Carparks in Class 2 and 3 Buildings | | Not applicable to this development | N/A |

| Section C: Fire Resistance | | | | |
|---|---|---|---|---|
| 2.9: | Residential Aged Care building: Concession | | Not applicable to this development | N/A |
| 3.0: | Type A fire-resisting construction | Type A fire-resisting construction is applicable to the development. | Refer to part 3 clauses below for the relevant Type A Construction requirements appliable to the project. | - |
| 3.1: | Fire-resistance of building elements | > The FRL's of all elements are to be in accordance with the FRL's detailed in the Table contained within Part 4.0 of this report.<br>> External walls, common walls and the flooring and floor framing of lift pits must be *non-combustible*. (Note: insulation used must be *non-combustible*)<br>> Internal walls required to be fire rated must extend to–<br>(i) to the underside of the floor next above; or<br>(ii) the underside of a roof complying with Table 3; or<br>(iii) if under Clause 3.5 the roof is not required to comply with Table 3, the underside of the *non-combustible* roof covering and, except for roof battens with dimensions of 75 mm x 50 mm or less or *sarking-type material*, must not be crossed by timber or other combustible building elements; or<br>(iv) a ceiling that is immediately below the roof and has a resistance to the incipient spread of fire to the roof space above itself of not less than 60 minutes.<br>> Load bearing internal walls (including those part of a loadbearing shaft) and fire walls must be of concrete or masonry.<br>Non-loadbearing internal walls required to be fire rated, as well as non-load bearing lift, ventilating, | Performance Solutions:<br>▪ Class 6 retail tenancies will have their FRLs rationalised down from 3 hours to 2 hours<br>▪ Level 01 to 03 car park fire compartment will have the Class 7b FRLs rationalised down from 4 hours to 2 hours<br>FRLs and wall schedule to be detailed at CC stage. | **PS**<br>**Refer Part 3.3 of Report** |

| Section C: Fire Resistance | | | | |
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| | | pipe, garbage or similar shaft wall must be of non-combustible construction. **Note:** This includes *non-combustible* insulation.<br>> The *FRL*s specified in Table 3 for an external column apply also to those parts of an internal column that face and are within 1.5m of a window and are exposed through that window to a *fire-source feature*. | | |
| 3.2: | Concessions for floors | A floor need not comply with Table 3 if—<br>(a) it is laid directly on the ground; or<br>(b) in a Class 2, 3, 5 or 9 building, the space below is not a *storey*, does not accommodate motor vehicles, is not a storage or work area, and is not used for any other ancillary purpose; or<br>(c) it is a timber stage floor in a Class 9b building laid over a floor having the *required FRL* and the space below the *stage* is not used as a dressing room, store room, or the like; or<br>(d) it is within a *sole-occupancy unit* in a Class 2 or 3 building or Class 4 part of a building; or<br>(e) it is an open-access floor (for the accommodation of electrical and electronic services and the like) above a floor with the *required FRL*. | To be detailed at CC stage. | Noted |
| 3.3: | Floor Loading of Class 5 and 9b buildings: Concession | | Not applicable to this development | N/A |
| 3.4: | Roof superimposed on concrete slab: Concession | | Not applicable to this development | N/A |

| Section C: Fire Resistance | | | | |
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| 3.5: | Roof: Concession | A roof need not comply with Table 3 if its covering is *non-combustible* and the building—<br>(a) has a sprinkler system (other than a FPAA101D or FPAA101H system) complying with Specification E1.5 installed throughout; or<br>(b) has a rise in storeys of 3 or less; or<br>(c) is of Class 2 or 3; | A roof need not comply with Table 3 if its covering is *non-combustible* and the building has a sprinkler system (other than a FPAA101D or FPAA101H system) complying with Specification E1.5 installed throughout | Noted |
| 3.6: | Roof lights | If a roof is required to have an *FRL* or its covering is required to be *non-combustible*, roof lights or the like installed in that roof must—<br>(a) have an aggregate area of not more than 20% of the roof surface; and<br>(b) be not less than 3 m from—<br>(i) any boundary of the allotment other than the boundary with a road or public place; and<br>(ii) any part of the building which projects above the roof unless that part has the *FRL* required of a *fire wall* and any openings in that part of the wall for 6 m vertically above the rooflight or the like are protected in accordance with C3.4; and<br>(iii) any rooflight or the like in an adjoining *sole-occupancy unit* if the walls bounding the unit are required to have an *FRL*; and<br>(iv) any rooflight or the like in an adjoining fire-separated section of the building; and<br>(c) if a ceiling with a resistance to the incipient spread of fire is required, be installed in a way that will maintain the level of protection provided by the ceiling to the roof space. | None proposed | N/A |

| Section C: Fire Resistance | | | | |
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| 3.7: | Internal columns and walls: Concession | | Not applicable to this development | N/A |
| 3.8: | Open spectator stands and indoor sports stadiums concession | | Not applicable to this development | N/A |
| 3.9: | Carparks | | Not applicable to this development – car park fire compartment also attracts Class 7b classification which rules out the concession. | N/A |
| 3.10: | Class 2 and 3 buildings Concession | | Not applicable to this development | N/A |
| **Specification C1.10 – Fire Hazard Properties** | | | | |
| 1. | Scope | Informational | Noted | - |
| 2. | Application | Informational | Noted | Noted |
| 3. | Floor linings and floor coverings | A floor lining or floor covering must have–<br>(a) a *critical radiant flux* not less than that listed in Table 2; and<br>(b) in a building not protected by a sprinkler system complying with Specification E1.5, a maximum smoke development rate of 750 percent-minutes; and<br>(c) a *group number* complying with Clause 6(b), for any portion of the floor covering that is continued more than 150 mm up a wall. | To be detailed at CC stage. | CRA – Refer Annexure F |
| 4. | Wall and ceiling linings | (a) A wall or ceiling lining system must comply with the *group number* specified in Table 3 and for buildings | To be detailed at CC stage. | CRA – Refer Annexure F |

| Section C: Fire Resistance | | | | |
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| | | not fitted with a sprinkler system complying with Specification E1.5 have–<br>(i) a *smoke growth rate index* not more than 100; or<br>(ii) an *average specific extinction area* less than 250 m2/kg.<br>(b) A *group number* of a wall or ceiling lining and the *smoke growth rate index* or *average specific extinction area* must be determined in accordance with AS 5637.1:2015. | | |
| 5. | Air-handling ductwork | Rigid and flexible ductwork must comply with the fire hazard properties set out in AS 4254 Parts 1 and 2. | To be detailed at CC stage. | CRA – Refer Annexure F |
| 6. | Lift cars | Materials used as—<br>(a) floor linings and floor coverings must have a *critical radiant flux* not less than 2.2; and<br>(b) wall and ceiling linings must be a Group 1 material or a Group 2 material in accordance with AS 5637.1:2015. | To be detailed at CC stage. | CRA – Refer Annexure F |
| 7. | Other materials | Materials and assemblies not included in Clauses 3, 4, 5 or 6 must not exceed the indices set out in Table 4. | To be detailed at CC stage. | CRA – Refer Annexure F |
| **Specification C2.5 – Smoke Proof Walls in Health Care and Aged Buildings** | | | | |
| 1. | Scope | Informational | Noted | Noted |
| 2. | Class 9a health-care buildings | | Not applicable to this development – Performance Solution to delete the smoke walls/doors on Class 2 levels | N/A |
| **Specification C3.4 – Fire Doors, Smoke Doors, Fire Window and Shutters** | | | | |

| Section C: Fire Resistance | | | | |
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| 1. | Scope | Informational | Noted | Noted |
| 2. | Fire doors | Fire doorsets must comply with AS 1905.1:2015 and not fail by radiation through any glazed part during the period specified for integrity in the required *FRL*. | To be detailed at CC stage. | CRA – Refer Annexure F |
| 3. | Smoke doors | | Not applicable to this development | N/A |
| 4. | Fire shutters | Fire shutters must comply with Clause 4 of BCA Specification C3.4. | Not applicable to this development – not required at this stage | CRA – Refer Annexure F |
| 5. | Fire windows | Fire window must be identical to the prototype which achieved the required *FRL* and be installed in the same manner and in an opening that is not larger than the tested prototype. | Not applicable to this development – not required at this stage | CRA – Refer Annexure F |
| **Specification C3.15 – Penetration of Walls, Floors and Ceilings by Services** | | | | |
| 1. | Scope | Informational | Noted | Noted |
| 2. | Application | (a) This Specification applies to installations permitted under the Deemed-to-Satisfy Provisions of the BCA as alternatives to systems that have been demonstrated by test to fulfil the requirements of C3.15(a).<br>(b) This Specification does not apply to installations in ceilings required to have a resistance to the incipient spread of fire nor to the installation of piping that contains or is intended to contain a flammable liquid or gas. | To be detailed at CC stage | CRA – Refer Annexure F |
| 3. | Metal pipe system | Refer full clause | To be detailed at CC stage | CRA – Refer Annexure F |

| Section C: Fire Resistance | | | | |
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| 4. | Pipes penetrating sanitary compartments | Refer full clause | To be detailed at CC stage | CRA – Refer Annexure F |
| 5. | Wires and cables | Refer full clause | To be detailed at CC stage | CRA – Refer Annexure F |
| 6. | Electrical switches and outlets | Refer full clause | To be detailed at CC stage | CRA – Refer Annexure F |
| 7. | Fire-stopping | Refer full clause | To be detailed at CC stage | CRA – Refer Annexure F |

| Section D: Access and Egress | | | | |
|---|---|---|---|---|
| **Part D1 – Provision for Escape** | | | | |
| D1.0: | Deemed-to-Satisfy Provisions | Informational | Noted | Noted |
| D1.1: | Application of Part | The Deemed-to-Satisfy Provisions of this Part do not apply to the internal parts of a *sole-occupancy unit* in a Class 2 or 3 building or a Class 4 part of a building. | Noted | Noted |
| D1.2: | Number of exits required | Basements–<br>Not less than 2 *exits* must be provided from any storey if egress from that storey involves a vertical rise within the building of more than 1.5 m, unless –<br>(i) the floor area of the storey is not more than 50 m2; and<br>(ii) the distance of travel from any point on the floor to a single *exit* is not more than 20 m.<br>Over 25m: | There is provision of a below ground fire pump room served by a single stair which will comply with less than 50m2 floor area and less than 20m to the exit. (Fire tank is not considered part of the storey as it is not floor space as it is accessed via access hatches from Ground Floor).<br>Retail 01 & 03 and Lobby only require a single exit in lieu of two due to their design & size – Performance Solution.<br>Retail 04-07 have two exits with access to the BOH corridor and SE corner exit. | **PS**<br>**Refer Part 3.3 of Report** |

| Section D: Access and Egress | | | |
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| | > As the building has an *effective height* of more than 25 metres, not less than 2 *exits* must be provided from each storey.<br>> Without passing through another *sole-occupancy unit*, every occupant of a storey or part of a storey must have access to an *exit* or at least 2 *exits*, if 2 or more are required. | Level 01 & above – the whole storey has access to two exits. | |
| D1.3: When fire-isolated stairways and ramps are required | Every *exit* stairway must be fire-isolated in this development. | FS01 & 02 are required to be fire-isolated.<br>FS03 which serves the fire pump room is required to be fire-isolated under AS2419.1 & D1.7. | Complies |
| D1.4: Exit travel distances | Class 2 residential —<br>> The entrance doorway of each *sole-occupancy unit* must be not more than –<br>○ 6 m from an *exit* or from a point from which travel in different directions to 2 *exits* is available; or<br>○ 20 m from a single *exit* serving the storey at the level of egress to a road or open space; and<br>> No point on the floor of a room (or occupiable outdoor area) which is not in a *sole-occupancy unit* must be more than 20 m from an *exit* or from a point at which travel in different directions to 2 *exits* is available.<br>Class 6 & 7a carpark—<br>No point on a floor must be more than 20 m from an *exit*, or a point from which travel in different directions to 2 *exits* is available, in which case the maximum distance to one of those *exits* must not exceed 40 m. | Ground Floor Retail Waste room has up to 24m to a point of choice (in lieu of 20m) with less than 40m to FS01 – Performance Solution.<br>Retail 01 & 03 & Lobby have less than 20m to a single exit.<br>All other retail comply.<br>Level 01 Retail Mech Plant room is up to 48m to an exit in lieu of 40m – Performance Solution.<br>Level 02 & 03 car park areas comply.<br>Residential Parts:<br>Level 01 to 05 – the eastern SOU is up to 12m to a point of choice – Performance Solution.<br>Level 05 Communal Podium –travel distance complies with less than 20m to a point of choice in all locations.<br>Level 04 to 07 – the southern SOU is up to 9.5m to a point of choice – Performance Solution.<br>Level 06 – the plant room is up to 28m to a point of choice in lieu of 20m – Performance Solution | **PS**<br>**Refer Part 3.3 of Report** |

| Section D: Access and Egress | | | |
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| | | Level 06 – Unit 6.03 is up to 7m to a point of choice – Performance Solution. | |
| D1.5: Distance between alternative exits | *Exits* that are required as alternative means of egress must be–<br>(a) distributed as uniformly as practicable within or around the storey served and in positions where unobstructed access to at least 2 *exits* is readily available from all points on the floor including lift lobby areas; and<br>(b) not less than 9 m apart; and<br>(c) not more than—<br>(i) in a Class 2 or 3 building — 45 m apart; or<br>(ii) in a Class 9a health-care building, if such required *exit* serves a patient care area — 45 m apart; or<br>(iii) in all other cases — 60 m apart; and<br>(d) located so that alternative paths of travel do not converge such that they become less than 6 m apart.<br>Note: the distance between *exits* must be measured through the point at which travel two *exits* is available. | Ground Floor: Distance between FS01 and SE corner exit door is less than 60m. Distance between SE corner exit and BOH corridor exit adjacent Retail 04 is less than 60m. Distance between Retail 04 exit and SE corner exit is less than 60m.<br>Level 01 distance between FS01 & 02 via the security gate is up to 68m in lieu of 60m – Performance Solution.<br>Level 05 Communal Podium – with walkway all around the podium the travel distance between exits is up to 145m in lieu of 45m – Performance Solution | **PS**<br>**Refer Part 3.3 of Report** |
| D1.6: Dimensions of exits and paths of travel to exits | In a required *exit* or path of travel to an *exit*–<br>> the unobstructed height throughout *exits* and paths of travel to *exits* must not be less than 2 m, except the unobstructed height of any doorway may be reduced to not less than 1980 mm; and<br>> the unobstructed width of each *exit* or path of travel to an *exit*, except for doorways must be not less than 1m; | To be detailed at CC stage to ensure 1m egress path is maintained throughout including, but not limited to, car park areas and retail areas.<br>Aggregate *exit* widths where storey accommodates more than 100 persons:<br>• Ground Floor retail tenancies – some of the larger tenancies may have a restaurant population over 100 persons however with each larger tenancy having an exit to open space | CRA – Refer Annexure F |

| Section D: Access and Egress | | | |
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| | > the unobstructed width of doorways must be not less than 750 mm, unless providing access for people with disabilities in which case the unobstructed width must be not less than 850 mm.<br>> the required width of a stairway or ramp must be measured clear of all obstructions such as handrails.<br>> the unobstructed width of a required *exit* must not diminish in the direction of travel to a road or open space. | /road and access to a second exit it can readily cater for 100 + persons with the aggregate exit width provided. | |
| D1.7: Travel via fire-isolated exits | > A doorway from a room must not open directly into a stairway that is required to be fire-isolated unless it is from –<br>(i) a public corridor, public lobby or the like; or<br>(ii) a *sole-occupancy unit* occupying all of a storey; or<br>(iii) a sanitary compartment, airlock or the like.<br>> D1.7 (b) - Each fire-isolated stairway or fire-isolated ramp must provide independent egress from each storey served and discharge directly, or by way of its own fire-isolated passageway—<br>(i) to a road or open space; or<br>(ii) to a point—<br>(A) in a storey or space, within the confines of the building, that is used only for pedestrian movement, car parking or the like and is open for at least 2/3 of its perimeter; and<br>(B) from which an unimpeded path of travel, not further than 20 m, is available to a road or open space; or | FS01 & 02 discharge into a covered area which has an open perimeter of more than 1/3 and a height of 3m, complies with 6m to open space.<br>Retail 02 & 04 has openings which are directly exposed to the egress path direct from the fire stairs so will require internal wall-wetting sprinklers as per C3.4 & AS2118.1.<br>FS 01&02 discharge to the laneway requires the egress path to reach the road in either direction to pass within 6m of the external glazed wall – this requires a Performance Solution, noting it has option for egress to the road in opposite directions, so the Performance Solution will note retail glazing along the pedestrian walkway does not require protection. | **PS**<br>**Refer Part 3.3 of Report** |

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| | (iii) into a covered area that—<br>(A) adjoins a road or open space;<br>(B) and is open for at least 1/3 of its perimeter; and<br>(C) has an unobstructed clear height throughout, including the perimeter openings, of not less than 3 m; and<br>(D) provides an unimpeded path of travel from the point of discharge to the road or open space of not more than 6 m.<br>> D1.7 (c) - Where a path of travel from the point of discharge of a fire-isolated *exit* necessitates passing within 6 m of any part of an external wall of the same building, measured horizontally at right angles to the path of travel, that part of the wall must have—<br>(i) an FRL of not less than 60/60/60; and<br>(ii) any openings protected internally in accordance with C3.4,<br>(iii) for a distance of 3 m above or below, as appropriate, the level of the path of travel, or for the height of the wall, whichever is the lesser. | | |
| D1.8: External stairways or ramps in lieu of fire-isolated exits | | Not applicable to this development | N/A |
| D1.9: Travel by non-fire-isolated stairways or ramps | | Not applicable to this development | N/A |

<table>
<tr><th colspan="4">Section D: Access and Egress</th></tr>
<tr><td>D1.10: Discharge from exits</td><td>Exits must not be blocked at the point of discharge and where necessary, suitable barriers must be provided to prevent vehicles from blocking the exit.<br><br>If a required exit leads to open space, the path of travel to the road must have an unobstructed width of not less than 1m.<br><br>If an exit discharges to open space that is at a different level that the public road to which it is connected, the path of travel to the road must be by a ramp or other incline not steeper than 1:8, or a BCA compliant stairway.<br><br>The discharge points of alternative exits must be as far apart as practical.</td><td>All exits are required 1m egress paths.<br>All exits discharge to the road or the pedestrian laneway without the need for stairs or ramps.</td><td>CRA – Refer Annexure F</td></tr>
<tr><td>D1.11: Horizontal exits</td><td></td><td>Not applicable to this development</td><td>N/A</td></tr>
<tr><td>D1.12: Non-required stairways, ramps or escalators</td><td></td><td>Not applicable to this development</td><td>N/A</td></tr>
<tr><td>D1.13: Number of persons accommodated</td><td>Informational–<br><br>The number of persons accommodated in a storey, room or mezzanine must be determined within consideration to the purpose for which it is used and the layout of the floor area by–<br><br>(a) calculating the sum of the numbers obtained by dividing the floor area of each part of the storey by the number of square metres per person listed in BCA Table D1.13 according to the use of that part, excluding spaces set aside for—<br><br>(i) lifts, stairways, ramps and escalators, corridors, hallways, lobbies and the like; and<br><br>(ii) service ducts and the like, sanitary compartments or other ancillary uses; or</td><td>Retail Tenancies:<br><br>Largest population would be restaurant or bar use as compared to retail/shop use. Worst case scenario would be restaurant or bar use for every tenancy, based on 60% floor area patronage and 40% BOH/Kitchen or the like. 60% patronage is based on 1 person / m$^2$.<br><br><table><tr><th>Retail</th><th>Floor Area</th><th>60% Patronage</th></tr><tr><td>01</td><td>76</td><td>46 persons</td></tr><tr><td>02</td><td>128</td><td>77 persons</td></tr><tr><td>03</td><td>100</td><td>60 persons</td></tr><tr><td>04</td><td>117</td><td>70 persons</td></tr></table></td><td>Noted</td></tr>
</table>

| Section D: Access and Egress | | | |
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| | (b) reference to the seating capacity in an assembly building or room; or<br>(c) any other suitable means of assessing its capacity.<br>Based on floor area and Table D1.13, the population numbers are as follows:<br><table><tr><td>05</td><td>182</td><td>110 persons</td></tr><tr><td>06</td><td>70</td><td>42 persons</td></tr><tr><td>07</td><td>70</td><td>42 persons</td></tr><tr><td></td><td>Total</td><td>447 persons</td></tr></table> | | |
| D1.14: Measurement of distances | Informational –<br>The nearest part of an *exit* means in the case of—<br>(a) a fire-isolated stairway, fire-isolated passageway, or fire-isolated ramp, the nearest part of the doorway providing access to them; and<br>(b) a non-fire-isolated stairway, the nearest part of the nearest riser; and<br>(c) a non-fire-isolated ramp, the nearest part of the junction of the floor of the ramp and the floor of the storey; and<br>(d) a doorway opening to a road or open space, the nearest part of the doorway; and<br>(e) a *horizontal exit*, the nearest part of the doorway. | Noted | Noted |
| D1.15: Method of Measurement | Informational | Noted | Noted |
| D1.16: Plant rooms, lift motor rooms and electricity network substations: concession | Informational –<br>(a) A ladder may be used in lieu of a stairway to provide egress from—<br>(i) a plant room with a floor area of not more than 100 m2; or<br>(ii) all but one point of egress from a plant room, a lift machine room or a Class 8 electricity network | To be detailed at CC stage | CRA – Refer Annexure F |

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| | substation with a floor area of not more than 200 m2.<br>(b) A ladder permitted under (a)—<br>(i) may form part of an *exit* provided that in the case of a fire-isolated stairway it is contained within the shaft; or<br>(ii) may discharge within a storey in which case it must be considered as forming part of the path of travel; and<br>(iii) for a plant room or a Class 8 electricity network substation, must comply with AS 1657. | | |
| D1.17: Access to lift pits | Access to the lift pit is assumed to be through the bottom landing doors as the pit is assumed to be less than 3m deep. | To be detailed at CC stage | CRA – Refer Annexure F |
| D1.18: Egress from early childhood centres | | Not applicable to this development | N/A |
| **Part D2 – Construction of Exits** | | | |
| D2.0: Deemed-to-Satisfy Provisions | Informational | Noted | Noted |
| D2.1: Application of Part | Informational–<br>Except for D2.13, D2.14(a), D2.16, D2.17(d), D2.17 (e), D2.18 & D2.24, the deemed-to-satisfy Provisions of this Part do not apply to internal parts of the Class 2 *sole-occupancy units.* | Noted | Noted |
| D2.2: Fire-isolated stairways and ramps | The fire isolated stairways must be constructed of *non-combustible* materials and constructed so that if there is | Concrete fire stairs assumed. | CRA – Refer Annexure F |

| Section D: Access and Egress | | | |
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| | local failure it will not cause structural damage to, or impair the fire-resistance of the shaft. | | |
| D2.3: Non-fire-isolated stairways and ramps | | Not applicable to this development | N/A |
| D2.4: Separation of rising and descending stair flights | | Not applicable to this development | N/A |
| D2.5: Open access ramps and balconies | | Not applicable to this development | N/A |
| D2.6: Smoke lobbies | | Not applicable to this development | N/A |
| D2.7: Installations in exits and paths of travel | > Access to service shafts and services other than to fire-fighting or detection equipment must not be provided from a fire-isolated stairway or fire-isolated passageway.<br>> Gas or other fuel services must not be installed in a required *exit*.<br>> Any electricity meters, distribution boards or ducts, or telecommunications distribution boards or equipment installed in corridors/hallways/lobbies or the like must be enclosed with *non-combustible* construction or a fire protective covering with doorways suitably sealed against smoke spread.<br>> Electrical wiring may be installed in a fire-isolated *exit* if the wiring is associated with:<br>o a lighting, detection, or pressurization system serving the *exit*; or<br>o a security, surveillance or management system serving the *exit*; or | To be detailed at CC stage | CRA – Refer Annexure F |

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| | ○ an intercommunication system or an audible or visual alarm system in accordance with D2.22; or<br>○ the monitoring of hydrant or sprinkler isolating valves. | | |
| D2.8: Enclosure of space under stairs and ramps | The space under the fire-isolated stairways within the shaft must not be enclosed to form a cupboard or similar enclosed space. | No enclosures within or under fire stairs | CRA – Refer Annexure F |
| D2.9: Width of stairways and ramps | Informational– | All exits are 1m width | Noted |
| D2.10: Pedestrian ramps | > A ramp serving as a required *exit* must—<br>(i) where the ramp is also serving as an accessible ramp under Part D3, be in accordance with AS 1428.1:2009; or<br>(ii) in any other case, have a gradient not steeper than 1:8.<br>> The floor surface of a ramp must have a slip-resistance classification complying with Table D2.14 when tested in accordance with AS 4586:2013. | To be detailed at CC stage | CRA – Refer Annexure F |
| D2.11: Fire-isolated passageways | The enclosing construction of a fire isolated passageway must have an FRL not less than that required for the fire isolated stair. | To be detailed at CC stage | CRA – Refer Annexure F |
| D2.12: Roof as open space | | Not applicable to this development | N/A |
| D2.13: Goings and risers | Stairways must comply with the following:<br>> Stairways must have not more than 18 and not less than 2 risers in each flight; | To be detailed at CC stage | CRA – Refer Annexure F |

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| | > Goings must be between 250 mm and 355 mm;<br>> Risers must be between 115 mm high and 190 mm high;<br>> The slope relationship (2 x riser dimension + going dimension) must be within the range of 550-700;<br>> The goings and risers must be constant (uniform) throughout each flight and the dimensions of goings (G) and risers (R) are considered constant if the variation between–<br>(A) adjacent risers, or between adjacent goings, is no greater than 5 mm; and<br>(B) the largest and smallest riser within a flight, or the largest and smallest going within a flight, does not exceed 10 mm.<br>> Risers must not contain any openings that would permit a 125 mm sphere to pass through.<br>> Treads must be of solid construction (not mesh or perforated) if the stairway is more than 10 m high or connects more than 3 storeys.<br>> In the case of a required stairway, no winders in lieu of a landing<br>> Treads must have a surface or nosing strip with a slip-resistant classification not less than that listed in Table D2.14 when tested in accordance with AS 4586-2013 Slip resistance classification of new pedestrian surface materials. | | |
| D2.14: Landings | Landings must be not less than 750 mm long and have either a surface with a slip-resistance classification complying with Table D2.14 or a strip at the edge of the landing with a slip-resistance classification complying with Table D2.14 when tested in accordance with AS 4586:2013. | To be detailed at CC stage | CRA – Refer Annexure F |

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| | <table><tr><th rowspan="2">Application</th><th colspan="2">Surface Condition</th></tr><tr><th>Dry</th><th>Wet</th></tr><tr><td>Ramp steeper than 1:14</td><td>P4 or R11</td><td>P5 or R12</td></tr><tr><td>Ramp steeper than 1:20 but not steeper than 1:14</td><td>P3 or R10</td><td>P4 or R11</td></tr><tr><td>Tread or landing surface</td><td>P3 or R10</td><td>P4 or R11</td></tr><tr><td>Nosing or landing edge strip</td><td>P3</td><td>P4</td></tr></table> | | |
| D2.15: Thresholds | The threshold of a doorway must not incorporate a step or ramp at any point closer to the doorway than the width of the door leaf unless–<br>(a) in a building required to be accessible, the doorway–<br>(i) opens to a road or open space; and<br>(ii) is provided with a threshold ramp or step ramp in accordance with AS 1428.1:2009; or<br>(b) in other cases–<br>(i) the doorway opens to a road or open space, external stair landing or external balcony; and<br>(ii) the door sill is not more than 190 mm above the finished surface of the ground, balcony, or the like, to which the doorway opens. | To be detailed at CC stage | CRA – Refer Annexure F |
| D2.16: Barriers to prevent falls | Balustrades must be provided to stairs and balconies, driveway ramps etc where there is a fall of more than 1m. Balustrades must comply with the following:<br><u>Balustrade minimum heights</u> | To be detailed at CC stage | CRA – Refer Annexure F |

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| | > 865 mm above stair nosings;<br>> 865 mm above landings to a stair where the barrier is provided along the inside edge of the landing and does not exceed 500 mm in length; and<br>> 1 m in all other locations.<br><u>Balustrade openings – fire-isolated stairs</u><br>> maximum openings of 300 mm; or<br>> where rails are used–<br>o a 150 mm sphere must not be able to pass through the opening between the nosing line of the stair treads and the rail or between the rail and the floor of the landing, balcony or the like; and<br>o the opening between rails must not be more than 460 mm<br><u>Balustrade openings – other than fire-isolated stairs</u><br>> A 125 mm sphere must not be able to pass through any opening and for stairways, the 125 mm is measured above the nosing line of the stair treads.<br><u>Climbability – other than fire-isolated stairs</u><br>For floors more than 4m above the surface beneath, the balustrade must not incorporate any horizontal or near horizontal elements between 150 mm and 760 mm above the floor that could facilitate climbing. | | |
| D2.17: Handrails | Handrails to stairways must:<br>> be located along at least one side of the ramp or flight (a flight being 2 or more risers); and<br>> located along each side if the total width of the stairway or ramp is 2m or more; and | To be detailed at CC stage – it is noted FS01&02 have correctly provided offset risers to achieve handrail compliance. | CRA – Refer Annexure F |

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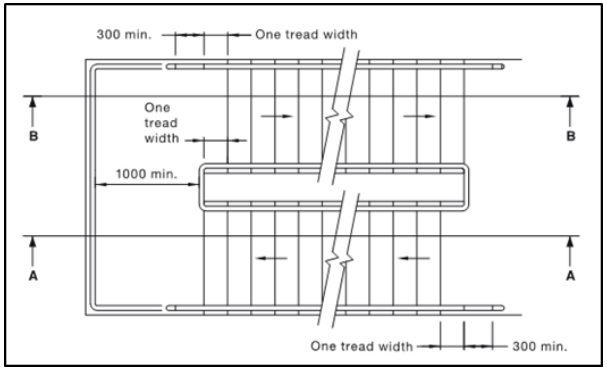
| | > be fixed at a height of not less than 865 mm above the nosings of the stair treads and the floor surface of the ramp, landing, or the like; and<br>> be continuous between stair flight landings and have no obstruction that will break a hand-hold.<br>> be constructed to comply with clause 12 of AS 1428.1:2009 (including handrails to the fire stairs).<br>> Handrails in common areas (other than fire stairs) must also accord with D3.3.<br><u>Clause 12 of AS 1428.1:2009</u><br>A required *exit* (fire isolated or non-fire isolated) serving an area required to be accessible must be fitted with handrails in accordance with Clause 12 of AS 1428.1:2009.<br>The handrail shall follow the angle of the nosings and be consistent height through the stair flight and any landings with no vertical sections at the landing. Compliance can be achieved via offset risers at the bottom of the flight in accordance with Figure 28 in AS 1428.1:2009 or with larger landings to accommodate required handrail extensions.<br>  <br> | | |

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| | Figure 28 in AS 1428.1:2009 | | |
| D2.18: Fixed platforms, walkways stairways and ladders | Plant areas may be accessed via stairs and ladders compliant with AS 1657:2018. | To be detailed at CC stage | CRA – Refer Annexure F |
| D2.19: Doorways and doors | > Sliding doors serving as *exit* doors must be openable manually under a force of not more than 110N.<br>> *Exit* doors that are power operated must be able to be opened manually under a force of not more than 110 N if there is a malfunction or failure of the power source and if leading to road or open space, open automatically if there is a power failure or on the activation of a fire or smoke alarm anywhere in the *fire compartment* served by the door.<br>> A power operated door in a path of travel to a required *exit* must be able to be opened manually under a force of not more than 110 N if there is a malfunction of the power source. | To be detailed at CC stage | CRA – Refer Annexure F |
| D2.20: Swinging doors | Swinging doors in a required *exit* must not encroach–<br>(i) at any part of its swing by more than 500 mm on the required 1m width of the *exit* and<br>(ii) when fully open, by more than 100 mm on the required 1m *exit* width; and<br>the measurement of encroachment in each case is to include door handles or other furniture or attachments to the door.<br>A swinging door in a required *exit* must swing in the direction of egress unless–<br>> it serves a building or part with a floor area not more than 200 m2, it is the only required *exit* from the | To be detailed at CC stage | CRA – Refer Annexure F |

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| | building or part and it is fitted with a device for holding it in the open position; or<br>> it serves a sanitary compartment or airlock (in which case it may swing in either direction). | | |
| D2.21: Operation of latch | All doors in a required *exit* or forming part of a required *exit* AND doors in a path of travel to a required *exit* must be readily openable without a key from the side that faces a person seeking egress, by–<br>(iii) a single hand downward action or pushing action on a single device which is located between 900mm and 1.1 m from the floor and if serving an area required to be accessible by Part D3 –<br>(A) be such that the hand of a person who cannot grip will not slip from the handle during the operation of the latch; and<br>(B) have a clearance between the handle and the back plate or door face at the centre grip section of the handle of not less than 35mm and not more than 45mm; or<br>(iv) a single hand pushing action on a single device which is located between 900mm and 1.2m from the floor.<br>(v) where the latch operation device referred to in (ii) is not located on the door leaf itself—<br>(A) manual controls to power-operated doors must be at least 25 mm wide, proud of the surrounding surface and located—<br>(aa) not less than 500 mm from an internal corner; and<br>(bb) for a hinged door, between 1 m and 2 m from the door leaf in any position; and | To be detailed at CC stage | CRA – Refer Annexure F |

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| | (cc) for a sliding door, within 2 m of the doorway and clear of a surface mounted door in the open position.<br>(B) braille and tactile signage complying with Clause 3 and 6 of Specification D3.6 must identify the latch operation device.<br>The above requirements do not apply to a door that –<br>(i) serves only or is within a *sole-occupancy unit* in a Class 2 building; or<br>(ii) serves a *sole-occupancy unit* in a Class 5, 6, 7 or 8 building with a floor area not more than 200m2; or<br>(iii) are fitted with a fail-safe device which automatically unlocks the door upon the activation of an AS 1670.1 detection system installed throughout the building and is readily openable when unlocked. | | |
| D2.22: Re-entry from fire-isolated exits | Doors of the fire-isolated *exits* must not be locked from the inside unless the door is fitted with a fail-safe device which automatically unlocks the door upon the activation of a fire alarm and –<br>(i) on at least every fourth storey, the doors are not able to be locked and a sign is fixed on such doors stating that re-entry is available; or<br>(ii) an intercommunication system, or an audible or visual alarm system, operated from within the enclosure is provided near the doors and a sign is fixed adjacent to such doors explaining its purpose and method of operation. | To be detailed at CC stage | CRA – Refer Annexure F |
| D2.23: Signs on doors | Signage in accordance with this clause is to be located on all fire and smoke doors stating “Fire Safety Door, Do | To be detailed at CC stage | CRA – Refer Annexure F |

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| | Not Obstruct, Do Not Keep Open" and the discharge door from the fire isolated stairways are to state "Fire Safety Door – Do Not Obstruct" in capital letters not less than 20mm in height.<br><br>Note: Fire signage in accordance with clause 183 of the Environmental Planning and Assessment Regulation 2000 is also required. | | |
| D2.24: Protection of openable windows | (a) Bedroom windows must be provided with protection if the floor below the window is 2m or more above the surface beneath.<br><br>(b) Where the lowest level of the window opening is less than 1.7m above the floor, a window opening covered by (a) must comply with the following:<br><br>(i) The openable portion of the window must be protected with–<br><br>(A) a device to restrict the window opening; or<br><br>(B) a screen with secure fittings.<br><br>(ii) A device or screen required by (i) must–<br><br>(A) not permit a 125 mm sphere to pass through the window opening or screen; and<br><br>(B) resist an outward horizontal action of 250 N against the–<br><br>(aa) window restrained by a device; or<br><br>(bb) screen protecting the opening; and<br><br>(C) have a child resistant release mechanism if the screen or device is able to be removed, unlocked or overridden.<br><br>(c) A barrier with a height not less than 865 mm above the floor is required to an openable window– | To be detailed at CC stage | CRA – Refer Annexure F |

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| | (i) in addition to window protection, when a child resistant release mechanism is required by (b)(ii)(C); and<br>(ii) where the floor below the window is 4m or more above the surface beneath if the window is not covered by (a).<br>(d) A barrier covered by (c) except for (e) must not–<br>(i) permit a 125 mm sphere to pass through it; and<br>(ii) have any horizontal or near horizontal elements between 150 mm and 760 mm above the floor that facilitate climbing.<br>(e) A barrier required by (c) to an openable window in—<br>(i) fire-isolated stairways, fire-isolated ramps and other areas used primarily for emergency purposes, excluding external stairways and external ramps; and<br>(ii) Class 7 (other than carparks) and Class 8 buildings and parts of buildings containing those classes;<br>(A) must not permit a 300mm sphere to pass through it.<br>**Note:** when considering the preferred option to comply with this clause consideration will need to be given to natural ventilation required under Clause F4.6. | | |
| D2.25: Timber stairways: concession | | Not applicable to this development | N/A |
| **Part D3 – Access for People with A Disability** | | | |
| Not part of this Report – Refer to Access Report by Access Consultant | | | Noted |

| Section E: Services and Equipment | | | | |
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| **Part E1 – Fire Fighting Equipment** | | | | |
| E1.0: | Deemed-to-Satisfy Provisions | Informational | Noted | Noted |
| E1.3: | Fire hydrants | As the building has a floor area greater than 500 m2, a fire hydrant system complying with AS 2419.1:2005 must be provided to serve the building. | Details to be provided at DA stage:<br>> Hydrant booster assembly location. The booster location must comply with the following:<br>o be within 8m of a hardstand for fire brigade appliance;<br>o at least 10m away from substation;<br>o be within sight of the main entry;<br>o Performance Solution is required as booster is not within sight of the main entrance on Harbour Drive – however the Vernon Street frontage would be the preferred location for brigade truck access.<br>> Hydrant pump room location is basement level and has egress to open space via a fire-isolated *exit*;<br>> Internal hydrants in each fire-isolated exit at each storey providing coverage to all parts of the building. For internal fire hydrant coverage, all points on the floor must be covered by a 10m hose stream, issuing from 30 m hose length, extending not less than 1m into the room.<br>> Please confirm if a combined Sprinkler & Hydrant System as per AS2118.6:2012?<br>> Hydraulic Engineer to confirm if large bore suction is required at the booster and then we need coordination with traffic to allow FRNSW appliances reverse into the booster to be within 4.5m to connect semi-rigid hoses. | **PS**<br>**Refer Part 3.3 of Report** |

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| E1.4: Fire hose reels | A fire hose reel system complying with BCA clause E1.4 and AS 2441:2005 must be provided to the building (excluding Classes 2, 3, 4, 5, 8 and 9c).<br>All points on a floor shall be within reach of a 4 m hose stream issuing from a nozzle at the end of the hose laid on floor. The hose length shall not exceed 36 m.<br>Fire hose reels must be located so that the fire hose will not need to pass through doorways fitted with fire or smoke doors, except—<br>(iii) doorways in walls referred to in C2.5(a)(v) in a Class 9a building and C2.5(b)(iv) in a Class 9c building, separating ancillary use areas of high potential fire hazard; and<br>(iv) doorways in walls referred to in C2.12 or C2.13 separating equipment or electrical supply systems; and<br>(v) doorway openings to shafts referred to in C3.13. | A fire hose reel system complying with BCA clause E1.4 and AS 2441:2005 must be provided to the retail tenancies and car park areas.<br>To be detailed at CC stage. | CRA – Refer Annexure F |
| E1.5: Sprinklers | The building must be provided with a sprinkler system complying with Table E1.5 and Specification E1.5 installed throughout. | To be detailed at CC stage. | CRA – Refer Annexure F |
| E1.6: Portable fire extinguishers | Portable fire extinguishers must be provided in accordance with clause E1.6 & Table E1.6 of the BCA and must be selected, located and distributed in accordance with Sections 1, 2, 3 and 4 of AS 2444:2001.<br>For the Class 2, 3 or 4 parts, portable fire extinguishers must be–<br>(i) an ABE type fire extinguisher; and<br>(ii) a minimum size of 2.5 kg; and<br>(iii) distributed outside a *sole-occupancy unit*— | To be detailed at CC stage. | CRA – Refer Annexure F |

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| | (A) to serve only the storey at which they are located; and<br>(B) so that the travel distance from the entrance doorway of any *sole-occupancy unit* to the nearest fire extinguisher is not more than 10 m. | | |
| E1.8: Fire control centres | > The building must be provided with a fire control centre facility in accordance with BCA Specification E1.8.<br>> The fire control centre must be located so that egress from any part of its floor to a public road or open space does not involve changes in level which in aggregate exceed 300 mm. | To be detailed at CC stage.<br>DBEP would be the residential lobby which complies with level access to pedestrian laneway. | CRA – Refer Annexure F |
| E1.9: Fire precautions during construction | Informational–<br>> During construction, not less than one portable fire extinguisher to suit Class A, B and C fires and electrical fires must be provided at all times on each storey adjacent to each required / temporary *exit*; and<br>> After the building has reach an *effective height* of 12m, the required fire hydrants and fire hose reels must be operational on all floor / roof covered storeys, except for the 2 uppermost storeys; and all required booster connections must be installed. | To be detailed at CC stage. | Noted |
| E1.10: Provision for special hazards | | Not applicable to this development | N/A |
| **Specification E1.5 – Fire Sprinkler Systems** | | | |
| 1. Scope | Informational | Noted | Noted |

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| 2. | Application of automatic fire sprinkler standards | An automatic fire sprinkler system shall comply with AS2118 as relevant to the building classification and the design of the hydraulic consultant. | Hydraulic Engineer to certify design at CC stage. | CRA – Refer Annexure F |
| 3. | Separation of sprinklered and non-sprinklered areas | | Not applicable to this development | N/A |
| 4. | Protection of openings | | Not applicable to this development | N/A |
| 5. | Fast response sprinklers | Fast response sprinklers may be installed only if they are suitable for the type of application proposed and it is demonstrated that the sprinkler system is designed to accommodate their use.<br>Note Table E2.2a – Class 9a and 9c buildings – residential sprinkler heads in patient care areas, and Class 9b buildings – fast response sprinkler heads. Spec G3.8 – fast response sprinkler heads for atrium floor protection. | Hydraulic Engineer to certify design at CC stage. | CRA – Refer Annexure F |
| 6. | Sprinkler valve enclosures | (a) Sprinkler alarm valves must be located in a secure room or enclosure which has direct egress to a road or open space.<br>(b) All sprinkler valve rooms and enclosures must be secured with a system suitable for use by the fire brigade. | Hydraulic Engineer to certify design at CC stage. | CRA – Refer Annexure F |
| 7. | Water supply | (a) A required sprinkler system must be provided with at least one water supply.<br>(b) A required sprinkler system in a building greater than 25 m in effective height must be provided with dual water supply except that a secondary water supply storage capacity of 25,000 litres may be used if – | Hydraulic Engineer to certify design at CC stage. | CRA – Refer Annexure F |

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| | | (i) the storage tank is located at the topmost storey of the building; and<br>(ii) the building occupancy is classified as no more hazardous than Ordinary Hazard 2 (OH2) under AS 2118.1:2017; and<br>(iii) an operational fire brigade service is available to attend a building fire. | | |
| 8. | Building occupant warning system | A required sprinkler system, except a FPAA101D sprinkler system, must be connected to and activate a building occupant warning system complying with Clause 7 of Specification E2.2a. | Hydraulic & Electrical Engineer to certify design at CC stage. Note building will have EWIS. | CRA – Refer Annexure F |
| 9. | Connection to Other Systems | Where a smoke hazard management system is installed and is actuated by smoke detectors, the sprinkler system must, wherever practicable, be arranged to also activate the smoke hazard management system. | Hydraulic & Electrical Engineer to certify design at CC stage. Sprinklers will activate stair press systems. | CRA – Refer Annexure F |
| 10. | Anti-tamper Devices | (a) Where a sprinkler system is installed –<br>(i) over any stage area in a theatre, public hall or the like, visual and audible status indication of sprinkler valves must be provided at the location normally used by the stage manager; or<br>(ii) in a space housing lift electrical and control equipment (including machine rooms, secondary floors and sheave rooms), any valves provided to control sprinklers in these spaces must be located adjacent to the space.<br>(b) Any valves provided to control sprinklers required by (a) must be fitted with anti-tamper monitoring devices connected to a monitoring panel. | Hydraulic Engineer to certify design at CC stage. | CRA – Refer Annexure F |
| 11. | Sprinkler Systems in Carparks | | Not applicable to this development | N/A |

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| 12. | Residential Care Buildings | | Not applicable to this development | N/A |
| 13. | Sprinkler systems in lift installations | (a) Where sprinklers are installed in a space housing lift electrical and control equipment, including machine rooms, secondary floors and sheave rooms, sprinklers in these spaces must –<br>(i) have heads protected from accidental damage by way of a guard that will not impair the performance of the head; and<br>(ii) be capable of being isolated and drained, either separately or collectively, without isolating any other sprinklers within the building.<br>(b) Valves provided to control sprinklers referred to in (a) must be installed in accordance with Clause 10(b). | Hydraulic Engineer to certify design at CC stage. | CRA – Refer Annexure F |
| **Specification E1.5a – Class 2 and 3 Buildings Not More Than 25m In Effective Height** | | | | |
| 1. | Scope and application | | Not applicable to this development | N/A |
| **Part E1.8 – Fire Control Centres** | | | | |
| 1. | Scope | Informational | Noted | Noted |
| 2. | Purpose and content | A fire control centre must—<br>(a) provide an area from which fire-fighting operations or other emergency procedures can be directed or controlled; and<br>(b) contain controls, panels, telephones, furniture, equipment and the like associated with the required fire services in the building; and | To be detailed at CC stage. | CRA – Refer Annexure F |

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| | | (c) not be used for any purpose other than the control of—<br>(i) fire-fighting activities; and<br>(ii) other measures concerning the occupant safety or security. | | |
| 3. | Location of fire control centre | A fire control centre must be so located in a building that egress from any part of its floor, to a road or open space, does not involve changes in level which in aggregate exceed 300 mm. | DBEP would be the residential lobby which complies with level access to pedestrian laneway. | Complies |
| 4. | Equipment not permitted within a fire control centre | An internal combustion engine, pumps, sprinkler control valves, pipes and pipe fittings must not be located in a fire control centre but may be located in rooms accessed through the fire control centre. | To be detailed at CC stage. | CRA – Refer Annexure F |
| 5. | Ambient sound level of fire control centre | (a) The ambient sound level within the fire control centre measured when all fire safety equipment is operating in the manner in which it operates in an emergency must not exceed 65 dB(A).<br>(b) The measurement must be taken for a sufficient time to characterize the effects of all sound sources. Where there is not a great variation in noise level, a measurement time of 60 seconds may be used. | To be detailed at CC stage. | CRA – Refer Annexure F |
| **Part E2 – Smoke Hazard Management** | | | | |
| E2.0: | Deemed-to-Satisfy Provisions | Informational | Noted | Noted |
| E2.1: | Application of Part | Informational | Noted | Noted |

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| E2.2: | General requirements (including Tables E2.2a and E2.2b) | **Clause E2.2: General smoke hazard management requirements**<br><br>An air-handling system which does not form part of a smoke hazard management system in accordance with Table E2.2a or Table E2.2b and which recycles air from one *fire compartment* to another *fire compartment* or operates in a manner that may unduly contribute to the spread of smoke from one *fire compartment* to another *fire compartment* (such as lobby air supply) must—<br><br>(i) be designed and installed to operate as a smoke control system in accordance with AS 1668.1:2015; or<br><br>(ii)<br><br>(A) incorporate smoke dampers where the air-handling ducts penetrate any elements separating the *fire compartments* served; and<br><br>(B) be arranged such that the air-handling system is shut down and the smoke dampers are activated to close automatically by smoke detectors complying with clause 7.5 of AS 1668.1:2015; and<br><br>for the purposes of this provision, each *sole-occupancy unit* in a Class 2 or 3 building is treated as a separate *fire compartment*.<br><br>Miscellaneous air-handling systems covered by Sections 5 and 6 of AS 1668.1:2015 serving more than one *fire compartment* (other than a carpark ventilation system) and not forming part of a smoke hazard management system must comply with that Section of the Standard.<br><br>**Table E2.2a – Refer to comments for applicable assessment** | **Class 2 parts**<br><br>Class 2 parts must be provided with an automatic smoke detection and alarm system complying with BCA Specification E2.2a. Note: Smoke alarms in sole occupancy units are required to be interconnected.<br><br>**Class 7a buildings**<br><br>A Class 7a building including a basement provided with a mechanical ventilation system in accordance with AS 1668.2:2012 must comply with clause 5.5 of AS 1668.1:2015 except that fans with metal blades for operation at normal temperatures may be used, and the electrical power and control cabling need not be fire rated.<br><br>**Fire-isolated exits**<br><br>All fire-isolated *exits* serving a storey above an *effective height* of 25 m must be provided with an automatic air pressurisation system for fire-isolated *exits* in accordance with AS 1668.1:2015. The automatic air pressurisation system applies to the entire *exit*.<br><br>A smoke detection system must be installed in accordance with Clause 6 of Specification E2.2a to operate AS1668.1:2015 systems that are provided for zone pressurisation and automatic air pressurisation for fire-isolated *exits*.<br><br>**Class 6 Retail**<br><br>Class 6 parts are required to be provided with zone pressurisation system however this will be omitted via a Performance Solution.<br><br>Class 6 fire compartment sizes do not require smoke exhaust under Table E2.2b. | **PS**<br><br>**Refer Part 3.3 of Report** |

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| | **Table E2.2b – Refer to comments for applicable assessment** | | |
| E2.3: Provisions for special hazards | | Not applicable to this development | N/A |
| **Specification E2.2a – Smoke Detection and Alarm System** | | | |
| 1. Scope | Informational | Noted | Noted |
| 2. Type of system | A required automatic smoke detection and alarm system must be provided in accordance with the following:<br>(a) Class 2 buildings and Class 4 parts of a building—<br>(i) a smoke alarm system complying with Clause 3; or<br>(ii) a smoke detection system complying with Clause 4; or<br>(iii) a combination of a smoke alarm system and a smoke detection system complying with Clause 5.<br>(b) Class 3 buildings—<br>(i) with a Class 3 part located more than 2 storeys above ground level — a smoke detection system complying with Clause 4; or<br>(ii) which accommodate more than 20 residents and are the residential part of a school, accommodation for the aged, children or people with a disability — a smoke detection system complying with Clause 4; or<br>(iii) all other Class 3 buildings—<br>(A) a smoke alarm system complying with Clause 3; or | Refer Clause 3, 6 & 7. | CRA – Refer Annexure F |

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| | (B) a smoke detection system complying with Clause 4; or<br>(C) a combination of a smoke alarm system and a smoke detection system complying with Clause 5.<br>(c) Class 5, 6, 7, 8, 9b and 9c buildings— a smoke detection system complying with Clause 4.<br>(d) Class 9a health-care buildings —<br>(i) where more than 6 bed patients are accommodated — a smoke detection system complying with Clause 4; or<br>(ii) where 6 or less bed patients are accommodated—<br>(A) a smoke alarm system complying with Clause 3; or<br>(B) a smoke detection system complying with Clause 4. | | |
| 3. Smoke alarm system | (a) All Class 2 - 9 buildings—<br>(i) A smoke alarm system must—<br>(A) consist of smoke alarms complying with AS 3786; and<br>(B) be powered from the consumer mains source.<br>(ii) In kitchens and other areas where the use of the area is likely to result in smoke alarms causing spurious signals—<br>(A) any other alarm deemed suitable in accordance with AS 1670.1 may be installed provided that smoke alarms are installed elsewhere in the sole-occupancy | Residential SOUs shall have smoke alarms comply with Clause 3. | CRA – Refer Annexure F |

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| | unit in accordance with Clause 3(b)(i) and Clause 3(b)(ii); or<br>(B) an alarm acknowledgement facility may be installed, except where the kitchen or other area is in a building protected with a sprinkler system complying with Specification E1.5 (other than a FPAA101D system), the alarms need not be installed in the kitchen or other areas likely to result in spurious signals.<br>(b) Class 2 or 3 buildings or Class 4 parts of a building — In a Class 2 or 3 building or Class 4 part of a building provided with a smoke alarm system, the following applies:<br>(i) Alarms must be installed within each sole-occupancy unit, and located on or near the ceiling in any storey—<br>(A) containing bedrooms—<br>(aa) between each part of the sole-occupancy unit containing bedrooms and the remainder of the sole-occupancy unit; and<br>(bb) where bedrooms are served by a hallway, in that hallway; and<br>(B) not containing any bedrooms, in egress paths.<br>(ii) Where there is more than one alarm installed within a sole-occupancy unit, alarms must be interconnected within that sole-occupancy unit.<br>(iii) Subject to (iv), alarms must be—<br>(A) installed in public corridors and other internal public spaces, located in | | |

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| | accordance with the requirements for smoke detectors in AS 1670.1; and<br>(B) connected to activate a building occupant warning system in accordance with Clause 7.<br>(iv) In a Class 2 or 3 building or Class 4 part of a building protected with a sprinkler system complying with Specification E1.5 (other than a FPAA101D system), alarms are not required in public corridors and other internal public spaces.<br>(c) Class 9a buildings — Smoke alarms must—<br>(i) installed in every room, public corridor and other internal public space; and<br>(ii) located in accordance with the requirements for smoke detectors in AS 1670.1; and<br>(iii) interconnected to provide a common alarm; and<br>(iv) have manual call points installed in evacuation routes so that no point on a floor is more than 30 m from a manual call point. | | |
| 4. Smoke detection system | | Not applicable to this development | N/A |
| 5. Combined smoke alarm and smoke detection system | | Not applicable to this development | N/A |
| 6. Smoke detection for smoke control system | (a) Smoke detectors required to activate air pressurisation systems for fire-isolated exits and zone pressurisation systems must—<br>(i) be installed in accordance with AS 1670.1; and<br>(ii) have additional smoke detectors installed adjacent to each bank of lift landing doors set | Smoke detectors required to activate air pressurisation systems for fire-isolated exits must comply with Clause 6 | CRA – Refer Annexure F |

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| | back horizontally from the door openings by a distance of not more than 3 m.<br>(b) Smoke detectors required to activate—<br>(i) automatic shutdown of air-handling systems in accordance with Table E2.2b; or<br>(ii) a smoke exhaust system in accordance with Specification E2.2b,<br>must—<br>(iii) be spaced—<br>(A) not more than 20 m apart and not more than 10 m from any wall, bulkhead or smoke curtain; and<br>(B) in enclosed malls and walkways in a Class 6 building not more than 15 m apart and not more than 7.5 m from any wall, bulkhead or curtain; and<br>(iv) have a sensitivity—<br>(A) in accordance with AS 1670.1 in areas other than a multi- storey walkway and mall in a Class 6 building; and<br>(B) not exceeding 0.5% smoke obscuration per metre with compensation for external airborne contamination as necessary, in a multi- storey walkway and mall in a Class 6 building.<br>(c) Smoke detectors provided to activate a smoke control system must—<br>(i)<br>(A) form part of a building fire or smoke detection system complying with AS 1670.1; or | | |

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| | (B) be a separate dedicated system incorporating control and indicating equipment complying with AS 1670.1; and<br>(ii) activate a building occupant warning system complying with Clause 7, except that smoke detectors provided solely to initiate automatic shutdown of air-handling systems in accordance with (b)(i) need not activate a building occupant warning system. | | |
| 7. Building occupant warning system | Subject to E4.9, a building occupant warning system provided as part of a smoke hazard management system must comply with clause 3.22 of AS 1670.1 to sound through all occupied areas except—<br>(a) in a Class 2 and 3 building or Class 4 part of a building provided with a smoke alarm system in accordance with Clause 3(b)(iii)—<br>(i) the sound pressure level need not be measured within a sole-occupancy unit if a level of not less than 85 dB(A) is provided at the door providing access to the sole-occupancy unit; and<br>(ii) the inbuilt sounders of the smoke alarms may be used to wholly or partially meet the requirements; and<br>(b) in a Class 2 and 3 building or Class 4 part of a building provided with a smoke detection system in accordance with Clause 4(b), the sound pressure level from a building occupant warning system need not be measured within a sole-occupancy unit if a level of not less than 100 dB(A) is provided at the door providing access to the sole-occupancy unit; and<br>(c) in a Class 3 building used as a residential care building, the system— | To be detailed at CC stage.<br>Note building will have EWIS. | CRA – Refer Annexure F |

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| | (i) must be arranged to provide a warning for occupants; and<br>(ii) in areas used by residents, may have its alarm adjusted in volume and content to minimise trauma consistent with the type and condition of residents; and<br>(d) in a Class 9a health-care building, in a patient care area, the system—<br>(i) must be arranged to provide a warning for occupants; and<br>(ii) in a ward area, may have its alarm adjusted in volume and content to minimise trauma consistent with the type and condition of the patients; and<br>(e) in a Class 9c building, the system—<br>(i) must be arranged to provide a warning for occupants; and<br>(ii) must notify staff caring for the residents of the building; and<br>(iii) in areas used by residents, may have its alarm adjusted in volume and content to minimise trauma consistent with the type and condition of residents. | | |
| 8. System Monitoring | | Not applicable to this development – however sprinkler system is monitored under AS2118.1. | N/A |
| **Specification E2.2b – Smoke Exhaust System** | | | |
| 1. Scope | Informational | | Noted |
| **Specification E2.2d – Residential Fire Safety Systems** | | | |

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| 1. Application | Informational | Not applicable to this development | N/A |
| **Part E3 – Lift Installations** | | | |
| E3.0: Deemed-to-Satisfy Provisions | Informational | Noted | Noted |
| E3.1: Lift installations | An electric passenger lift installation and an electrohydraulic passenger lift installation must comply with Specification E3.1 | To be detailed at CC stage. | CRA – Refer Annexure F |
| E3.2: Stretcher facility in lifts | A stretcher facility must be provided to an emergency lift required by E3.4.<br>A stretcher facility must accommodate a raised stretcher with a patient lying on it horizontally by providing a clear space not less than 600mm wide x 2000mm long x 1400mm high above floor level. | To be detailed at CC stage. | CRA – Refer Annexure F |
| E3.3: Warning against use of lifts in fire | Warning signs indicating “DO NOT USE LIFTS IF THERE IS A FIRE” shall be displayed near every call button for a passenger lift or group of lifts throughout a building as per E3.3. | To be detailed at CC stage. | CRA – Refer Annexure F |
| E3.4: Emergency lifts | Refer Full Clause. | Both lifts will be emergency lifts. | CRA – Refer Annexure F |
| E3.5: Landings | Access and egress to and from lift-well landings must comply with the Deemed-to-Satisfy Provisions of Section D. | To be detailed at CC stage. | CRA – Refer Annexure F |
| E3.6: Passenger lifts | In an accessible building, every passenger lift must be one of the types specified in Table E3.6a, have accessible features in accordance with Table E3.6b, and not rely on a constant pressure device for its operation if the lift car is fully enclosed. | To be detailed at CC stage. | CRA – Refer Annexure F |

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| E3.7: | Fire service controls | The lifts serving any storey above an *effective height* of 12 m must be provided with:<br>(a) A fire service recall control switch complying with E3.9 for—<br>(i) a group of lifts; or<br>(ii) a single lift not in a group that serves the storey.<br>(b) A lift car fire service drive control switch complying with E3.10 for every lift. | To be detailed at CC stage. | CRA – Refer Annexure F |
| E3.8: | Aged care buildings | | Not applicable to this development | N/A |
| E3.9: | Fire service recall switch | The fire service control switch required by E3.7, is to comply with this clause. Lift services design to confirm compliance at CC stage. | To be detailed at CC stage. | CRA – Refer Annexure F |
| E3.10: | Lift car service drive control switch | The lift car service drive control switch required by E3.7, is to comply with this clause. Lift services design to confirm compliance at CC stage. | To be detailed at CC stage. | CRA – Refer Annexure F |
| **Specification E3.1 – Lift Installations** | | | | |
| 1. | Scope | Informational | Noted | Noted |
| 2. | Lift cars exposed | | Not applicable to this development | N/A |
| 3. | Lift car emergency lighting | A lift car must have an emergency lighting system designed –<br>(a) to come on automatically upon failure of the normal light supply; and<br>(b) to provide at least 20 lux of lighting for 2 hours on the alarm initiation button. | To be detailed at CC stage. | CRA – Refer Annexure F |

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| 4. | Cooling of lift shaft | While a lift in a lift shaft is in service, the cooling of the lift shaft must –<br>(a) ensure that the dry bulb air temperature in the lift shaft does not exceed 40°C; and<br>(b) if the cooling is by a ventilation system, be provided with an air changed rate determined using a temperature rise of no more than 5 K. | To be detailed at CC stage. | CRA – Refer Annexure F |
| 5. | Lift foyer access | Where there is a security foyer in a building, access may be via locked security doors provided –<br>(a) security doors revert to the unlocked state in the event of –<br>(i) power failure; or<br>(ii) fire alarm; and<br>(b) locked foyer areas are monitored by closed circuit television and intercom system to a 24-hour staffed location. | To be detailed at CC stage. | CRA – Refer Annexure F |
| 6. | Emergency access doors in a single enclosed lift shaft | | Not applicable to this development | N/A |
| **Part E4 – Visibility In An Emergency, Exit Signs And Warning Systems** | | | | |
| E4.0: | Deemed-to-Satisfy Provisions | Informational | Noted | Noted |
| E4.2: | Emergency lighting requirements | An emergency lighting system must be installed throughout the building in accordance with Clause E4.2 of the BCA and AS/NZS 2293.1:2018. | To be detailed at CC stage. | CRA – Refer Annexure F |
| E4.3: | Measurement of distance | Informational | Noted | Noted |

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| E4.4: Design and operation of emergency lighting | The emergency lighting system must comply with AS/NZS 2293.1:2018. | To be detailed at CC stage. | CRA – Refer Annexure F |
| E4.5: Exit signs | *Exits* signs are to be provided above or adjacent to a door providing egress as well as directional signage throughout the entire development where necessary. | To be detailed at CC stage. | CRA – Refer Annexure F |
| E4.6: Direction signs | Where an *exit* is not readily apparent, directional signage is to be installed indicating the direction of egress. | To be detailed at CC stage. | CRA – Refer Annexure F |
| E4.7: Class 2 and 3 buildings and Class 4 Parts: Exemptions | Informational | Noted | Noted |
| E4.8: Design and operation of exit signs | *Exit* signs must comply with AS/NZS 2293.1:2018 and be clearly visible at all times when the building is occupied. | To be detailed at CC stage. | CRA – Refer Annexure F |
| E4.9: Emergency warning and intercom systems | An Emergency warning and intercom system complying where applicable with AS 1670.4:2018 must be installed within the building. | To be detailed at CC stage. | CRA – Refer Annexure F |

| Section F: Health and Amenity | | | |
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| **Part F1 – Damp and Weatherproofing** | | | |
| F1.0: Deemed-to-Satisfy Provisions | *Performance Requirement* FP1.4, for the prevention of the penetration of water through external walls, must be complied with. There are no Deemed-to-Satisfy Provisions for this *Performance Requirement* in respect of external walls. The assessment contained within this report does not include an assessment against Performance Provision FP1.4. | To be detailed at CC stage. | **PS Required** |

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| F1.1: | Stormwater drainage | Stormwater drainage to comply with AS/NZS 3500.3:2018. | To be detailed at CC stage. | CRA – Refer Annexure F |
| F1.4: | External above ground membranes | Waterproofing membranes for external above ground use to comply with AS 4654 Parts 1 and 2:2012. | | CRA – Refer Annexure F |
| F1.5: | Roof coverings | | Not applicable to this development – concrete roof proposed | N/A |
| F1.6: | Sarking | *Sarking-type materials* used for weatherproofing must comply with AS/NZS 4200 Part 1 and 2:2017. | To be detailed at CC stage. | CRA – Refer Annexure F |
| F1.7: | Water proofing of wet areas in buildings | Wet areas must be constructed in accordance with AS 3740:2010 and F1.7 of the BCA. | To be detailed at CC stage. | CRA – Refer Annexure F |
| F1.9: | Damp-proofing | Moisture is to be prevented from reaching the walls above a damp-proof course, and the underside of the suspended floors. | To be detailed at CC stage. | CRA – Refer Annexure F |
| F1.10: | Damp-proofing of floors on the ground | If a floor of a room is laid on the ground or on fill, moisture from the ground must be prevented from reaching the upper surface of the floor and adjacent walls by the insertion of a vapour barrier in accordance with AS 2870:2011 (N/A to areas that do not require weatherproofing – refer specific clause exemptions). | To be detailed at CC stage. | CRA – Refer Annexure F |
| F1.11: | Provision of floor wastes | In Class 2 or 3 buildings or Class 4 part of a building, a bathroom or laundry is to have a floor waste where the floor is graded to the floor waste to permit the drainage of water. | To be detailed at CC stage. | CRA – Refer Annexure F |
| F1.12: | Sub-floor ventilation | | Not applicable to this development | N/A |

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| F1.13: Glazed Assemblies | Glazed assemblies are to comply with AS 2047:2014 and AS 1288:2006. | To be detailed at CC stage. | CRA – Refer Annexure F |
| **Part F2 – Sanitary and Other Facilities** | | | |
| F2.0: Deemed-to-Satisfy Provisions | Informational | Noted | Noted |
| F2.1: Facilities in residential buildings (including Table F2.1) | Each SOU must be provided with sanitary facilities; a kitchen sink; facility for the preparation and cooking of food; a bath or shower; a closet pan; wash basin; laundry wash tub and space for a washing machine and dryer. | Residential SOUs comply | Cmoplies |
| F2.2: Calculation of number of occupants and facilities | Informational –<br>(a) The number of persons accommodated must be calculated according to D1.13 if it cannot be more accurately determined by other means<br>(b) Unless the premises are used predominantly by one sex, sanitary facilities must be provided on the basis of equal numbers of males and females<br>(c) In calculating the number of sanitary facilities to be provided under F2.1 and F2.3, a unisex facility required for people with a disability may be counted once for each sex<br>(d) For the purpose of this Part, a unisex facility comprises one closet pan, one washbasin and means for the disposal of sanitary towels | Noted | CRA – Refer Annexure F |
| F2.3: Facilities in Class 3 to 9 buildings (including Table F2.3) | (a) Except where permitted by (b), (c), (f), F2.4(a) and F2.4(b), separate sanitary facilities for males and females must be provided for Class 3, 5, 6, 7, 8 or 9 buildings in accordance with Table F2.3. | Refer to D1.13 for population assessment of Retail areas. Employees and the public may share the same facilities in a Class 6 building provided the number of facilities provided is not less than the total number of facilities required for employees plus those required for the public | Complies |

<table>
<tr><th colspan="4">Section F: Health and Amenity</th></tr>
<tr><td></td><td>(b) If not more than 10 people are employed, a unisex facility may be provided instead of separate facilities for each sex.<br>(c) If the majority of employees are one sex, not more than 2 employees of the other sex may share toilet facilities if the facilities are separated by means of walls, partitions and doors to afford privacy.<br>(d) Employees and the public may share the same facilities in a Class 6 and 9b building (other than a school or early childhood centre) provided the number of facilities provided is not less than the total number of facilities required for employees plus those required for the public.<br>(e) Adequate means of disposal of sanitary towels must be provided in sanitary facilities for use by females.<br>(f) Separate sanitary facilities for males and females need not be provided for patients in a ward area of a Class 9a building.</td><td>The population was estimated at approximately 450 patrons and 50 staff. The facilities provided comply with the requirements of Table F2.3 as shown in the Table below. The unisex accessible toilet is counted once for both Male & Female pan.
<table>
<tr><td colspan="4">450 Patrons: 225 Males & Females</td></tr>
<tr><td></td><td>Pan</td><td>Urinal</td><td>Washbasin</td></tr>
<tr><td>Male</td><td>2</td><td>5</td><td>3</td></tr>
<tr><td>Female</td><td>6</td><td>-</td><td>3</td></tr>
<tr><td colspan="4">50 Staff: 25 Males & Females</td></tr>
<tr><td></td><td>Pan</td><td>Urinal</td><td>Washbasin</td></tr>
<tr><td>Male</td><td>2</td><td>1</td><td>1</td></tr>
<tr><td>Female</td><td>2</td><td>-</td><td>1</td></tr>
</table></td><td></td></tr>
<tr><td>F2.4: Accessible sanitary facilities (including Table F2.4)</td><td>Sanitary facility required by Clause F2.3 is to be an accessible unisex compartment compliant with AS 1428.1:2009.</td><td>Refer to Access Report – note one unisex accessible toilet is provided.</td><td>CRA – Refer Annexure F</td></tr>
<tr><td>F2.5: Construction of sanitary compartments</td><td>(a) Other than in an early childhood centre, sanitary compartments must have doors and partitions that separate adjacent compartments and extend—<br>(i) from floor level to the ceiling in the case of a unisex facility; or<br>(ii) to a height of not less than 1.5 m above the floor if primary school children are the principal users; or<br>(iii) 1.8 m above the floor in all other cases.</td><td>To be detailed at CC stage.</td><td>CRA – Refer Annexure F</td></tr>
</table>

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| | (b) The door to a fully enclosed sanitary compartment must—<br>(i) open outwards; or<br>(ii) slide; or<br>(iii) be readily removable from the outside of the sanitary compartment, unless there is a clear space of at least 1.2 m, measured in accordance with Figure F2.5, between the closet pan within the sanitary compartment and the doorway.<br><u>Early childhood centre</u><br>In an early childhood centre, facilities for use by children must have each sanitary compartment screened by a partition which, except for the doorway, is opaque for a height of at least 900 mm but not more than 1200 mm above the floor level. | | |
| F2.6: Interpretation: urinals and washbasins | Informational–<br>(a) A urinal may be—<br>(i) an individual stall or wall-hung urinal; or<br>(ii) each 600 mm length of a continuous urinal trough; or (iii) a closet pan used in place of a urinal.<br>(b) A washbasin may be—<br>(i) an individual basin; or<br>(ii) a part of a hand washing trough served by a single water tap. | To be detailed at CC stage – note current design is for individual urinals and basins. | Noted |
| F2.8: Waste Management | | Not applicable to this development | N/A |
| F2.9: Accessible adult change facilities | | Not applicable to this development | N/A |

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| **Part F3 – Room Sizes** | | | |
| F3.0: Deemed-to-Satisfy Provisions | Informational | Noted | Noted |
| F3.1: Height of rooms and other spaces | (a) The height of rooms and other spaces must be not less than—<br>(b) in a Class 2 part of a building—<br>(i) a kitchen, laundry, or the like — 2.1 m; and<br>(ii) a corridor, passageway or the like — 2.1 m; and<br>(iii) a habitable room excluding a kitchen — 2.4 m; and<br>(iv) in a room or space with a sloping ceiling or projections below the ceiling line<br>(v) within—<br>(A) a habitable room—<br>(aa) in an attic — a height of not less than 2.2 m for not less than two thirds of the floor area of the room or space; and<br>(bb) in other rooms — a height of not less than 2.4 m for not less than two thirds of the floor area of the room or space; and<br>(B) a non-habitable room — a height of not less than 2.1 m for not less than two thirds of the floor area of the room or space; and<br>(aa) when calculating the floor area of a room or space, any part that has a ceiling height of less than 1.5 m is not included; and | To be detailed at CC stage. | CRA – Refer Annexure F |

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| | (c) in a Class 6 building—<br>(i) except as allowed in (ii) and (f) — 2.4 m; and<br>(ii) a corridor, passageway, or the like — 2.1 m; and<br>(f) in any building—<br>(i) a bathroom, shower room, sanitary compartment, airlock, tea preparation room, pantry, store room, garage, car parking area, or the like — 2.1 m; and<br>(ii) a commercial kitchen — 2.4 m; and<br>(iii) above a stairway, ramp, landing or the like — 2 m measured vertically above the nosing line of stairway treads or the floor surface of the ramp, landing or the like. | | |
| **Part F4 – Light and Ventilation** | | | |
| F4.0: Deemed-to-Satisfy Provisions | Informational | Noted | Noted |
| F4.1: Provision of natural light | Class 2 SOUs<br>Natural light must be provided to all habitable rooms. | Compliance can be readily achieved. | CRA – Refer Annexure F |
| F4.2: Methods and extent of natural lighting | (a) Natural light must be provided by:<br>(i) Windows:<br>(A) with an aggregate light transmitting area of not less than 10% the floor area of the room; and<br>(B) that are open to the sky or face a court or other space open to the sky or an open verandah, carport or the like; or<br>(ii) Rooflights, that: | Architect to certify compliance with habitable rooms with an aggregate light transmitting area of not less than 10% the floor area of the room.<br>Study Areas – plans show some SOUs with areas showing study desks and they are in locations where they can form part of the larger habitable space (living/dining/kitchen/study area) and comply with 10% natural light from windows and balcony doors.<br>Level 12 Unit 12.04: The unit entry area shows a desk however it is not deemed a habitable space as it can be used by occupants for multiple purposes as part of an | CRA – Refer Annexure F |

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| | (A) have an aggregate light transmitting area of not less than 3% the floor area of the room; or<br>(iii) a proportional combination of windows and roof lights required by (i) and (ii).<br>(b) ~~In a Class 9b early childhood centre, the sills of 50% of windows in children's rooms must be located not more than 500 mm above the floor level.~~<br>(c) A required window that faces a boundary of an adjoining allotment or a wall of the same building or another building on the allotment must be not less than a horizontal distance from that boundary or wall that is the greater of –<br>(d) 1m; and<br>(e) 50% of the square root of the exterior height of the wall in which the window is located, measured from its sill. | open entry foyer area. The plans may show a desk however this does not make it a habitable room as it is an open entry foyer area.<br>Note: Windows which face the breezeway are not required windows as natural light is achieved via the east & west windows/doors of the same SOU. | |
| F4.3: Natural light borrowed from adjoining room | | Not applicable to this development | N/A |
| F4.4: Artificial Lighting | Lighting to all areas is to comply with AS/NZS 1680.0:2009. | Electrical engineer to Certify at CC stage. | CRA – Refer Annexure F |
| F4.5: Ventilation of rooms | All rooms to be provided with Clause F4.6 compliant natural ventilation **OR** a mechanical ventilation or air-conditioning system complying with AS 1668.2:2012. | Mechanical engineer to Certify at CC stage. | CRA – Refer Annexure F |
| F4.6: Natural ventilation | (a) Natural ventilation provided in accordance with F4.5(a) must consist of permanent openings, windows, doors or other devices which can be opened— | Architect to certify compliance with habitable rooms with an aggregate opening or openable size not less than 5% the floor area of the room.<br>Study Areas – plans show some SOUs with areas showing study desks and they are in locations where they can form part of the larger habitable space | CRA – Refer Annexure F |

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| | (i) with an aggregate opening or openable size not less than 5% of the floor area of the room required to be ventilated; and<br>(ii) open to—<br>(A) a suitably sized court, or space open to the sky; or<br>(B) an open verandah, carport, or the like; or<br>(C) an adjoining room in accordance with F4.7. | (living/dining/kitchen/study area) and comply with 5% natural ventilation from windows and balcony doors. | |
| F4.7: Ventilation borrowed from adjoining room | | Not applicable to this development | N/A |
| F4.8: Restriction on position of water closets and urinals | Sanitary compartments must not open directly into a –<br>> kitchen or pantry<br>> public dining room or restaurant<br>> workplace normally occupied by more than one person. | Retail tenancies will be subject to future CDC or DA approval for compliance with this clause.<br>SOUs comply by not having sanitary compartments open directly into kitchens. | CRA – Refer Annexure F |
| F4.9: Airlocks | If sanitary compartments are prohibited from opening directly to another room:<br>Class 2 SOUs<br>> access must be by an airlock, hallway or other room; or<br>> the sanitary compartments must be provided with mechanical exhaust ventilation.<br>Class 6 retail<br>> access must be by an airlock, hallway or other room with a floor area of not less than 1.1m2 and fitted with self-closing doors at all access doorways; or | Retail tenancies will be subject to future CDC or DA approval for compliance with this clause.<br>SOUs comply by not having sanitary compartments open directly into kitchens – noting they will also have mechanical ventilation to AS1668.2. | CRA – Refer Annexure F |

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| | > the sanitary compartments must be provided with mechanical exhaust ventilation and the doorway to the room adequately screened from view. | | |
| F4.11: Carparks | Every storey of a carpark (except an open deck carpark) must have:<br>> a system of mechanical ventilation complying with AS 1668.2:2012; or<br>> a system of natural ventilation complying with Section 4 of AS 1668.4:2012. | Mechanical engineer to Certify at CC stage. | CRA – Refer Annexure F |
| F4.12: Kitchen local exhaust ventilation | Any commercial kitchen must be provided with a kitchen exhaust hood complying with AS 1668.1:2015 and AS 1668.2:2012 where:<br>> any cooking apparatus has:<br>o a total maximum electrical power input exceeding 8 kW; or<br>o a total gas power input exceeding 29 MJ/h; or<br>> the total maximum power input to more than one apparatus exceeds:<br>o 0.5 kW electrical power; or<br>o 1.8 MJ gas,<br>Per m2 of floor area of the room or enclosure. | Mechanical engineer to Certify at CC stage.<br>Three (3) x separate KEX shafts are provided to serve the three retail fire compartments. | CRA – Refer Annexure F |
| **Part F5 – Sound Transmission and Insulation** | | | |
| F5.0: Deemed-to-Satisfy Provisions | Informational | Noted | Noted |
| F5.1: Application of Part | Informational– | To be detailed at CC stage. | Noted |

| Section F: Health and Amenity | | | | |
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| | | The Deemed-to-Satisfy Provisions of this Part apply to Class 2 and 3 buildings and Class 9c buildings. | | |
| F5.2: | Determination of airborne sound insulation ratings | A form of construction required to have an airborne sound insulation rating must—<br>(a) have the required value for weighted sound reduction index ($R_w$) or weighted sound reduction index with spectrum adaptation term ($R_w$ + Ctr) determined in accordance with AS/NZS ISO 717.1 using results from laboratory measurements; or<br>(b) comply with Specification F5.2. | To be detailed at CC stage. | CRA – Refer Annexure F |
| F5.3: | Determination of impact sound insulation ratings | (a) A floor in a building required to have an impact sound insulation rating must—<br>(i) have the required value for weighted normalised impact sound pressure level with spectrum adaptation term ($L_{n,w}$ + CI) determined in accordance with AS/ISO 717.2 using results from laboratory measurements; or<br>(ii) comply with Specification F5.2.<br>(b) A wall in a building required to have an impact sound insulation rating must be of discontinuous construction; and<br>(c) For the purposes of this Part, discontinuous construction means a wall having a minimum 20 mm cavity between 2 separate leaves, and<br>(i) for masonry, where wall ties are required to connect leaves, the ties are of the resilient type; and<br>(ii) for other than masonry, there is no mechanical linkage between leaves except at the periphery. | To be detailed at CC stage. | CRA – Refer Annexure F |

| Section F: Health and Amenity | | | | |
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| F5.4: | Sound insulation rating of floors | A floor in a Class 2 building must achieve an $R_w + C_{tr}$ (airborne) not less than 50, and an $L_{n,w}+C_l$ (impact) not more than 62, if separating:<br>> SOU's; or<br>> An SOU from a plant room, lift shaft, public corridor, public lobby or parts of a different classification. | To be detailed at CC stage. | CRA – Refer Annexure F |
| F5.5: | Sound insulation rating of walls | (a) A wall in a Class 2 building must:<br>(i) have an $R_w + C_{tr}$ (airborne) not less than 50 if it separates *sole-occupancy units*; and<br>(ii) have an $R_w$ (airborne) not less than 50 if it separates a sole occupancy unit from a plant room, lift shaft, stairway, public corridor, public lobby or the like, or parts of a different classification; and<br>(iii) be of discontinuous construction in accordance with F5.3(b) if it separates:<br>(A) a bathroom, sanitary compartment, laundry or kitchen in one *sole-occupancy unit* from a habitable room (other than a kitchen) in an adjoining unit; or<br>(B) a *sole-occupancy unit* from a plant room or lift shaft.<br>(b) Where a wall required to have sound insulation has a floor above, the wall must continue to:<br>(i) the underside of the floor above; or<br>(ii) a ceiling that provides the sound insulation required for the wall.<br>(c) Where a wall required to have sound insulation has a roof above, the wall must continue to:<br>(i) the underside of the roof above; or | To be detailed at CC stage. | CRA – Refer Annexure F |

| Section F: Health and Amenity | | | | |
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| | | (ii) a ceiling that provides the sound insulation required for the wall.<br>(d) Doorways in walls separating the Class 2 *sole-occupancy units* from a stairway, public corridor, public lobby or the like must be provided with a door assembly that has an $R_w$ not less than 30.<br>(e) Class 9c requirements not listed here | | |
| F5.6: | Sound insulation rating of services | (a) If a duct, soil, waste or water supply pipe, including a duct or pipe that is located in a wall or floor cavity, serves or passes through more than one *sole-occupancy unit*, the duct or pipe must be separated from the rooms of any sole occupancy unit by construction with an $R_w + C_{tr}$ (airborne) not less than—<br>(i) 40 if the adjacent room is a habitable room (other than a kitchen); or<br>(ii) 25 if the adjacent room is a kitchen or non-habitable room.<br>(b) If a storm water pipe passes through a *sole-occupancy unit* it must be separated in accordance with (a)(i) and (ii). | To be detailed at CC stage. | CRA – Refer Annexure F |
| F5.7: | Sound isolation of pumps | A flexible coupling must be used at the point of connection between the service pipes in a building and any circulating pump. | To be detailed at CC stage. | CRA – Refer Annexure F |
| **Specification F5.2 – Sound Insulation for Building Elements** | | | | |
| 1. | Scope | Informational | Noted | Noted |
| 2. | Construction Deemed-to-Satisfy | Information only | To be detailed at CC stage. | Noted |

| Section F: Health and Amenity | | | | |
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| **Specification F5.5 – Impact Sound – Test of Equivalence** | | | | |
| 1. | Scope | Noted | | - |
| 2. | Construction to be Tested | Information only | To be detailed at CC stage. | Noted |
| 3. | Method | Information only | To be detailed at CC stage. | Noted |
| **Part F6 – Condensation Management** | | | | |
| F6.0: | Deemed-to-satisfy provisions | Informational | Noted | Noted |
| F6.1: | Application of Part | Informational | Noted | Noted |
| F6.2 | Pliable building membrane | Where a pliable building membrane is installed in an external wall it shall comply with AS/NZS 4200.1:2017 and installed in accordance with AS 4200.2:2017. | To be detailed at CC stage. | CRA – Refer Annexure F |
| F6.3: | Flow rate and discharge of exhaust systems | (a) An exhaust system installed in a kitchen, bathroom, sanitary compartment or laundry must have a minimum flow rate of—<br>(i) 25 L/s for a bathroom or sanitary compartment; and<br>(ii) 40 L/s for a kitchen or laundry.<br>(b) Exhaust from a kitchen must be discharged directly or via a shaft or duct to outdoor air.<br>(c) Exhaust from a bathroom, sanitary compartment, or laundry must be discharged—<br>(i) directly or via a shaft or duct to outdoor air; or | To be detailed at CC stage. | CRA – Refer Annexure F |

| Section F: Health and Amenity | | | |
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| | (ii) to a roof space that is ventilated in accordance with F6.4 | | |
| F6.4: Ventilation of roof spaces | | Not applicable to this development | N/A |

| Section G: Ancillary Provisions | | | |
|---|---|---|---|
| **Part G1 – Minor Structures and Components** | | | |
| G1.0: Deemed-to-Satisfy Provisions | Informational | Noted | Noted |
| G1.1: Swimming pools | | Not applicable to this development | N/A |
| G1.2: Refrigerated chambers, strong-rooms and vaults | | Not applicable to this development | N/A |
| G1.3: Outdoor play spaces | | Not applicable to this development | N/A |
| NSW G1.101:<br>Provision for cleaning windows | A safe manner for cleaning of windows located 3 or more storeys above ground level must be provided, and compliance is achieved where:<br>> the windows can be cleaned wholly from within the building; or<br>> via a method complying with the Work Health and Safety Act 2011 and regulations made under that Act. | To be detailed at CC stage. | CRA – Refer Annexure F |
| **Part G2 – Boilers, Pressure Vessels, Heating Appliances, Fireplaces, Chimneys and Flues** | | | |
| G2.0: Deemed-to-Satisfy Provisions | Informational | Noted | Noted |

| Section G: Ancillary Provisions | | | | |
|---|---|---|---|---|
| G2.2: | Installation of Appliances | The installation of a stove, heater or similar appliance in a building must comply with:<br>> Domestic solid-fuel burning appliances — Installation: AS/NZS 2918:2018.<br>> For boilers and pressure vessels: Specification G2.2 | Assumed not required or proposed | N/A |
| G2.3: | Open Fireplaces | | Not applicable to this development | N/A |
| G2.4: | Incinerator Rooms | | Not applicable to this development | N/A |
| **Part G3 – Atrium Construction** | | | | |
| G3.1: | Atriums Affected by the Part | This Part does not apply to an atrium which—<br>(a) connects only 2 storeys; or<br>(b) connects only 3 storeys if—<br>(i) each storey is provided with a sprinkler system (other than a FPAA101D or FPAA101H system) complying with Specification E1.5 throughout; and<br>(ii) one of those storeys is situated at a level at which there is direct egress to a road or open space. | Not applicable to this development | CRA – Refer Annexure F |
| **Part G6 – Occupiable Outdoor Areas** | | | | |
| G6.1: | Application of part | (a) The Deemed-to-Satisfy Provisions of this Part apply to buildings containing an occupiable outdoor area in addition to the other Deemed-to-Satisfy Provisions of the BCA.<br>(b) The Deemed-to-Satisfy Provisions of this Part take precedence where there is a difference to the Deemed-to-Satisfy Provisions of Sections C, D, E, F and G. | Level 4 communal podium space shall comply. | Noted |

| Section G: Ancillary Provisions | | | |
|---|---|---|---|
| | (c) Except for G6.2, the Deemed-to-Satisfy Provisions of this Part do not apply to –<br>(i) an occupiable outdoor area of a *sole-occupancy unit* in a Class 2 or 3 building, Class 9c building or Class 4 part of a building; or<br>(ii) an occupiable outdoor area with an area less than $10m^2$. | | |
| G6.2: Fire hazard properties | (a) Subject to (b), a lining material or assembly in an occupiable outdoor area must comply with C1.10 as for an internal element.<br>(b) The following fire hazard properties of a lining, material or assembly in an occupiable outdoor area are not required to comply with C1.10:<br>(i) *Average specific extinction area.*<br>(ii) Smoke-Developed Index.<br>(iii) Smoke development rate.<br>(iv) *Smoke growth rate index* ($SMOGRA_{RC}$). | To be detailed at CC stage. | CRA – Refer Annexure F |
| G6.3: Fire Separation | For the purposes of the Deemed-to-Satisfy Provisions of C2.7, C2.8 and C2.9, a reference to a storey includes an occupiable outdoor area, however a *fire wall* cannot be used to separate an occupiable outdoor area into different *fire compartments*. | Level 4 SOUs and podium are one fire compartment | CRA – Refer Annexure F |
| G6.4: Provision for escape | For the purposes of the Deemed-to-Satisfy Provisions of Part D1, a reference to a storey or room includes an occupiable outdoor area. | Travel distance which exceeds 20m to a point of choice to alternative exits and exceeds 45m between exits in a Class 2 building will be addressed as a Performance Solution – Refer D1.4 & D1.5. | PS Required |
| G6.5: Construction of exits | For the purposes of the Deemed-to-Satisfy Provisions of Part D2, a reference to a storey or room includes an occupiable outdoor area. | Internal fire stairs are the exits | N/A |

| Section G: Ancillary Provisions | | | | |
|---|---|---|---|---|
| G6.6: | Fire fighting equipment | Except for Clause 7(b)(i) of Specification E1.5, for the purposes of the Deemed-to-Satisfy Provisions of Part E1, a reference to a storey includes an occupiable outdoor area. | To be detailed at CC stage – additional hydrants may be required to serve podium. | CRA – Refer Annexure F |
| G6.7: | Lift installations | For the purposes of the Deemed-to-Satisfy Provisions of Part E3, a reference to a storey includes an occupiable outdoor area. | Internal lifts serve the podium | Complies |
| G6.8: | Visibility in an emergency, exit signs and warning systems | For the purposes of the Deemed-to-Satisfy Provisions of Part E4, a reference to a storey includes an occupiable outdoor area. | To be detailed at CC stage. | CRA – Refer Annexure F |
| G6.9: | Light and ventilation | For the purposes of the Deemed-to-Satisfy Provisions of F4.4, F4.8 and F4.9, a reference to a room includes an occupiable outdoor area. | To be detailed at CC stage. | CRA – Refer Annexure F |
| G6.10: | Fire orders | | Not applicable to this development | N/A |

| Section J: Energy Efficiency (Class 6) | | | | |
|---|---|---|---|---|
| **Part J0 – Energy Efficiency** | | | | |
| J0.1: | Application of Section J | Informational | Noted | Noted |
| J0.2: | Heating & cooling loads of Sole Occupancy Units to Class 2 & 4 parts | Not applicable, clause relevant to class 2 & 4 only | - | NA |
| J0.3: | Ceiling fans | Not applicable | - | NA |
| J0.4: | Roof thermal breaks | Not applicable, clause relevant to J0.2 only | - | NA |

| Section J: Energy Efficiency (Class 6) | | | |
|---|---|---|---|
| J0.5: Wall thermal breaks | Not applicable, clause relevant to J0.2 only | - | NA |
| **Part J1 – Building Fabric** | | | |
| J1.0: Deemed-to-Satisfy Provisions | Informational | Noted | Noted |
| J1.1: Application of Part | The provisions of Part J1 apply to building elements forming part of the *envelope* of the building. | To be detailed at CC stage. | CRA – Refer Annexure F |
| J1.2: Thermal construction general | Where required insulation is to comply with AS/NZS 4859.1:2018 and be installed in accordance with this clause.<br>The required Total R-Value and Total System U-Value, must be determined in accordance with Clause J1.2 (e). | To be detailed at CC stage. | CRA – Refer Annexure F |
| J1.3: Roof and ceiling construction | (a) A roof or ceiling must achieve a Total R-Value greater than or equal to—<br>(i) in climate zones 1, 2, 3, 4 and 5, R3.7 for a downward direction of heat flow; and<br>(ii) in climate zone 6, R3.2 for a downward direction of heat flow; and<br>(iii) in climate zone 7, R3.7 for an upward direction of heat flow; and<br>(iv) in climate zone 8, R4.8 for an upward direction of heat flow.<br>(b) In climate zones 1, 2, 3, 4, 5, 6 and 7, the solar absorptance of the upper surface of a roof must be not more than 0.45. | To be detailed at CC stage. | CRA – Refer Annexure F |
| J1.4: Roof lights | | Not applicable to this development | N/A |

| Section J: Energy Efficiency (Class 6) | | | |
|---|---|---|---|
| J1.5: Walls | (a) The Total System U-Value of wall-glazing construction must not be greater than—<br>(i) for a Class 2 common area, a Class 5, 6, 7, 8 or 9b building or a Class 9a building other than a ward area, U2.0; and<br>(ii) for a Class 3 or 9c building or a Class 9a ward area—<br>(A) in climate zones 1, 3, 4, 6 or 7, U1.1; or<br>(B) in climate zones 2 or 5, U2.0; or<br>(C) in climate zone 8, U0.9.<br>(b) The Total System U-Value of display glazing must not be greater than U5.8.<br>(c) The Total System U-Value of wall-glazing construction must be calculated in accordance with Specification J1.5a.<br>(d) Wall components of a wall-glazing construction must achieve a minimum Total R-Value of—<br>(i) where the wall is less than 80% of the area of the wall-glazing construction, R1.0; or<br>(ii) where the wall is 80% or more of the area of the wall-glazing construction, the value specified in Table J1.5a.<br>(e) The solar admittance of externally facing wall-glazing construction must not be greater than—<br>(i) for a Class 2 common area, a Class5, 6, 7, 8 or 9b building or a Class 9a building other than a ward area, the values specified in Table J1.5b; and<br>(ii) for a Class 3 or 9c building or a Class 9a ward area, the values specified in Table J1.5c. | To be detailed at CC stage. | CRA – Refer Annexure F |

| Section J: Energy Efficiency (Class 6) | | | |
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| | (f) The solar admittance of a wall-glazing construction must be calculated in accordance with Specification J1.5a.<br>(g) The Total system SHGC of display glazing must not be greater than 0.81 divided by the applicable shading factor specified in Clause 7 of Specification J1.5a. | | |
| J1.6: Floors | (a) A floor must achieve the Total R-Value specified in Table J1.6.<br>(b) A floor must be insulated around the vertical edge of its perimeter with insulation having an R-Value greater than or equal to 1.0 when the floor—<br>(i) is a concrete slab-on-ground in climate zone 8; or<br>(ii) has an in-slab or in-screed heating or cooling system, except where used solely in a bathroom, amenity area or the like.<br>(c) Insulation required by (b) for a concrete slab-on-ground must—<br>(i) be water resistant; and<br>(ii) be continuous from the adjacent finished ground level—<br>(A) to a depth not less than 300 mm; or<br>(B) for the full depth of the vertical edge of the concrete slab-on-ground. | To be detailed at CC stage. | CRA – Refer Annexure F |
| **Part J2 – Glazing** | | | |
| J2.0: Deemed-to-Satisfy Provisions | Part J2 has deliberately been left blank from the BCA2019 | | Noted |
| **Part J3 – Building Sealing** | | | |

| Section J: Energy Efficiency (Class 6) | | | | |
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| J3.0: | Deemed-to-Satisfy Provisions | Informational | Noted | Noted |
| J3.1: | Application of Part | The requirements of this Part apply to elements forming the *envelope* of the building other than:<br>> a building in a climate zones 1, 2, 3 and 5 where the only means of air-conditioning is by using an evaporative cooler; or<br>> a permanent building opening necessary for the safe operation of a gas appliance;<br>> a building or space where mechanical ventilation required by Part F4 provides sufficient pressurisation to prevent infiltration;<br>> parts of building that cannot be fully enclosed. | To be detailed at CC stage. | Noted |
| J3.2: | Chimneys and flues | | Not applicable to this development | N/A |
| J3.3: | Roof lights | | Not applicable to this development | N/A |
| J3.4: | Windows and doors | (a) A door, openable window or the like must be sealed—<br>(i) when forming part of the *envelope*; or<br>(ii) in climate zones 4, 5, 6, 7 or 8.<br>(b) The above does not apply to:<br>(i) a window complying with AS 2047; or<br>(ii) a fire door or smoke door; or<br>(iii) roller shutter door, roller shutter grille or other security device or device installed only for out-of-hours security.<br>(c) A seal to restrict air infiltration— | To be detailed at CC stage. | CRA – Refer Annexure F |

| Section J: Energy Efficiency (Class 6) | | | |
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| | (i) for the bottom edge of a door, must be a draft protection device; and<br>(ii) for the other edges of a door or the edges of an openable window or other such opening, may be a foam or rubber compression strip, fibrous seal or the like.<br>(d) An entrance to a building, if leading to a conditioned space must have an airlock, self-closing door, revolving door or the like, other than–<br>(i) where the conditioned space has a floor area of not more than 50m2; or<br>(ii) where a café, restaurant, open front shop or the like has–<br>(A) a 3m deep un-conditioned zone between the main entrance, including an open front, and the conditioned space; and<br>(B) at all other entrances to the café, restaurant, open from shop of the like, self-closing doors | | |
| J3.5: Exhaust fans | The exhaust fans serving conditioned spaces or habitable room in climate 4 - 8, must be fitted with a sealing device, such as a self-closing damper of the like. | To be detailed at CC stage. | CRA – Refer Annexure F |
| J3.6: Construction of ceilings, walls and floors | The roof, walls, floors and any other openings, such as window or doors, are to be constructed to minimise air leakage by being enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions; or are sealed by expanding architraves, skirting, cornices; or expanding foam, rubber compressible strip, caulking or the like. | To be detailed at CC stage. | CRA – Refer Annexure F |

| Section J: Energy Efficiency (Class 6) | | | | |
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| J3.7: | Evaporative Coolers | The evaporative cooler must be fitted with a self-closing damper or like when serving heated space OR in climate zones 4 - 8. | To be detailed at CC stage. | CRA – Refer Annexure F |
| **Part J4** | | | | |
| J4.0: | | This part has deliberately been left blank in the BCA2019 | | N/A |
| **Part J5 – Air Conditioning and Ventilation Systems** | | | | |
| J5.0: | Deemed-to-Satisfy Provisions | Informational | Noted | Noted |
| J5.1: | Application of Part | Informational | Noted | Noted |
| J5.2: | Air-conditioning systems | Clause contains requirements for air conditioning system control. | Compliance required, design certification to be provided by Mechanical Engineer. | CRA – Refer Annexure F |
| J5.3: | Mechanical ventilation system control | Clause contains requirements for mechanical ventilation system control. | Compliance required, design certification to be provided by Mechanical Engineer. | CRA – Refer Annexure F |
| J5.4: | Fan systems | Clause contains requirements for fans, ductwork and duct components. | Compliance required, design certification to be provided by Mechanical Engineer. | CRA – Refer Annexure F |
| J5.5: | Ductwork Insulation | Clause contains requirements for ductwork insulation. | Compliance required, design certification to be provided by Mechanical Engineer. | CRA – Refer Annexure F |
| J5.6: | Ductwork Sealing | Ductwork in an air-conditioning system with a capacity of 3000 L/s or greater, not located within the only or last room served by the system, must be sealed against air loss in accordance with the duct sealing requirements of AS 4254.1 and AS 4254.2 for the static pressure in the system. | Compliance required, design certification to be provided by Mechanical Engineer. | CRA – Refer Annexure F |

| Section J: Energy Efficiency (Class 6) | | | | |
|---|---|---|---|---|
| J5.7: | Pump Systems | Clause contains requirements for pumps and pipework that form part of air-conditioning systems. | Compliance required, design certification to be provided by Mechanical Engineer. | CRA – Refer Annexure F |
| J5.8: | Pipework Insulation | Clause contains requirements for pipework insulation. | Compliance required, design certification to be provided by Mechanical Engineer. | CRA – Refer Annexure F |
| J5.9: | Space Heating | Clause contains requirements for space heating. | Compliance required, design certification to be provided by Mechanical Engineer. | CRA – Refer Annexure F |
| J5.10: | Refrigerant Chillers | Clause contains requirements for air-conditioning system refrigerant chillers. | Compliance required, design certification to be provided by Mechanical Engineer. | CRA – Refer Annexure F |
| J5.11: | Unitary Air-Conditioning Equipment | Clause contains requirements for unitary air-conditioning equipment. | Compliance required, design certification to be provided by Mechanical Engineer. | CRA – Refer Annexure F |
| J5.12: | Heat Rejection Equipment | Clause contains requirements for heat rejection equipment. | Compliance required, design certification to be provided by Mechanical Engineer. | CRA – Refer Annexure F |
| **Part J6 – Artificial Lighting and Power** | | | | |
| J6.0: | Deemed-to-Satisfy Provisions | Informational | Noted | Noted |
| J6.1: | Application of Part | Informational | Noted | Noted |
| J6.2: | Artificial lighting | Artificial lighting must comply with BCA Clause J6.2. | Design certification to be provided by the electrical designer. | CRA – Refer Annexure F |
| J6.3: | Interior artificial lighting and power control | Lighting switches and control devices must comply with BCA Clause J6.3. | Design certification to be provided by the electrical designer. | CRA – Refer Annexure F |
| J6.4: | Interior decorative and display lighting | Lighting falling under this clause is to be separately switched from other lighting, be under a manual switch and controlled with a time switch. | Design certification to be provided by the electrical designer. | CRA – Refer Annexure F |

| Section J: Energy Efficiency (Class 6) | | | | |
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| J6.5: | Exterior artificial lighting | Exterior lighting attached to or directed at the façade of the building must be controlled by daylight sensors or time switches in accordance with the specific requirements of this clause. | Design certification to be provided by the electrical designer. | CRA – Refer Annexure F |
| J6.6: | Boiling water and chilled water storage units | The power supply to a fixed boiling water or chilled water storage unit must be controlled by a time switch in accordance with BCA Specification J6. | Design certification to be provided by the electrical designer. | CRA – Refer Annexure F |
| J6.7: | Lifts | Lifts must be configured to ensure artificial lighting and ventilation in the car are turned off when it is unused for 15 minutes; it also must achieve energy control requirements that comply to Clause J6.7 (b) and (c). | Design certification to be provided by the electrical designer. | CRA – Refer Annexure F |
| J6.8: | Escalators and moving walkways | Escalators and moving walkways must have the ability to slow to between 0.2 m/s and 0.05 m/s when unused for more than 15 minutes. | Design certification to be provided by the electrical designer. | CRA – Refer Annexure F |
| **Part J7 – Heated Water Supply** | | | | |
| J7.0: | Deemed-to-Satisfy Provisions | Informational | Noted | Noted |
| J7.2: | Heated water supply system | A heated water supply system for food preparation and sanitary purposes must be designed and installed in accordance with Part B2 of NCC Volume Three — Plumbing Code of Australia. | To be detailed at CC stage. | CRA – Refer Annexure F |
| **Part J8 – Facilities for Energy Monitoring** | | | | |
| J8.0: | Deemed-to-Satisfy Provisions | Informational | Noted | Noted |
| J8.1: | Application of Part | Informational | Noted | Noted |

| Section J: Energy Efficiency (Class 6) | | | | |
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| J8.3: | Facilities for energy monitoring | > A building with a floor area of more than 500m$^2$ must have an energy meter configured to record the time-of-use consumption of gas and electricity.<br>> A building with a floor area of more than 2,500m$^2$ must have the energy meters configured to enable individual time-of-use energy consumption data recording, in accordance with (c), of the energy consumption of –:<br>○ air-conditioning plant including, where appropriate, heating plant, cooling plant and air handling fans; and<br>○ artificial lighting; and<br>○ appliance power; and<br>○ central hot water supply; and<br>○ internal transport devices including lifts, escalators and moving walkways where there is more than one serving the building; and<br>○ other ancillary plant.<br>> Energy meters required by (b) must be interlinked by a communication system that collates the time-of-use energy consumption data to a single interface monitoring system where it can be stored, analysed and reviewed.<br>> The provisions of (b) do not apply to a Class 2 building with a floor area of more than 2500 m$^2$ where the total area of the common areas is less than 500 m$^2$. | To be detailed at CC stage. | CRA – Refer Annexure F |

| Section J: Energy Efficiency (Class 2 & 4) |
|---|
| **NSW Part J(A)1 – Building Fabric** |

| Section J: Energy Efficiency (Class 2 & 4) | | | |
|---|---|---|---|
| NSW J(A)1.0:<br>Deemed-to-Satisfy Provisions | Informational | Noted | Noted |
| NSW J(A)1.1:<br>Application of Part | Informational–<br>> The Deemed-to-Satisfy Provisions of this Part only apply to thermal insulation in the Class 2 part where development consent specifies that the insulation is to be provided as part of the development.<br>> The Deemed-to-Satisfy provisions of this Part for thermal breaks apply. | Noted | Noted |
| NSW J(A)1.2:<br>Compliance with BCA Provisions | Sole occupancy units of the Class 2 building must comply with the following National Provisions except that the reference to 'where required' in J1.2 is deemed to refer to 'where a development consent specifies that insulation is to be provided as part of the development.'<br>> for general thermal construction, comply with J1.2; and<br>> for thermal breaks, comply with J0.4 and J0.5; and<br>> for compensating for a loss of ceiling insulation, comply with J0.4; and<br>> for floor edge insulation, comply with J1.6(b) and J1.6 (c). | To be detailed at CC stage. | CRA – Refer Annexure F |
| **NSW Part J(A)2 – Building Sealing** | | | |
| NSW J(A)2.0:<br>Deemed-to-Satisfy Provisions | Informational | Noted | Noted |
| NSW J(A)2.1:<br>Application of Part | The requirements of this Part are applicable to Class 2 buildings excluding: | | Noted |

| Section J: Energy Efficiency (Class 2 & 4) | | | |
|---|---|---|---|
| | > a building in a climate zones 2 and 5 where the only means of air-conditioning is by using an evaporative cooler;<br>> a building ventilation opening necessary for the safe operation of a gas appliance;<br>> parts of the building that cannot be fully enclosed. | | |
| NSW J(A)2.2:<br>Compliance with BCA Provisions | Class 2 buildings and Class 4 parts of buildings, must comply with the following National Provisions:<br>(a) J3.2 Chimneys and flues; and<br>(b) J3.3 Roof lights; and<br>(c) J3.4 (a) to (d) windows and;<br>(d) J3.5 Exhaust fans; and<br>(e) J3.6 Construction of ceilings, walls and floors; and<br>(f) J3.7 Evaporative coolers. | To be detailed at CC stage. | CRA – Refer Annexure F |
| J3.2: Chimneys and flues | | Not applicable to this development | N/A |
| J3.3: Roof lights | | Not applicable to this development | N/A |
| J3.4: Windows and doors | (a) A door, openable window or the like must be sealed—<br>(i) when forming part of the *envelope*; or<br>(ii) in climate zones 4, 5, 6, 7 or 8.<br>(b) The above does not apply to:<br>(i) a window complying with AS 2047:2014; or<br>(ii) a fire door or smoke door; or | To be detailed at CC stage. | CRA – Refer Annexure F |

| Section J: Energy Efficiency (Class 2 & 4) | | | |
|---|---|---|---|
| | (iii) roller shutter door, roller shutter grille or other security device or device installed only for out-of-hours security.<br>(c) A seal to restrict air infiltration—<br>(i) for the bottom edge of a door, must be a draft protection device; and<br>(ii) for the other edges of a door or the edges of an openable window or other such opening, may be a foam or rubber compression strip, fibrous seal or the like.<br>(d) An entrance to a building, if leading to a conditioned space must have an airlock, self-closing door, revolving door or the like, other than–<br>(i) where the conditioned space has a floor area of not more than 50m2; or<br>(ii) where a café, restaurant, open front shop or the like has–<br>(A) a 3m deep un-conditioned zone between the main entrance, including an open front, and the conditioned space; and<br>(B) at all other entrances to the café, restaurant, open from shop of the like, self-closing doors | | |
| J3.5: Exhaust Fans | The exhaust fans serving conditioned spaces or habitable room in climate 4 - 8, must be fitted with a sealing device, such as a self-closing damper of the like. | To be detailed at CC stage. | CRA – Refer Annexure F |
| J3.6: Construction of Ceilings, Walls and Floors | The roof, walls, floors and any other openings, such as window or doors, are to be constructed to minimise air leakage by being enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions; or are sealed by expanding architraves, skirting, cornices; or | To be detailed at CC stage. | CRA – Refer Annexure F |

| Section J: Energy Efficiency (Class 2 & 4) | | | |
|---|---|---|---|
| | expanding foam, rubber compressible strip, caulking or the like. | | |
| J3.7: Evaporative Coolers | The evaporative cooler must be fitted with a self-closing damper or like when serving heated space OR in climate zones 4 - 8. | To be detailed at CC stage. | CRA – Refer Annexure F |
| **NSW Part J(A)3 – Air-Conditioning and Ventilating Systems** | | | |
| NSW J(A)3.0:<br>Deemed-to-Satisfy Provisions | Informational | Noted | Noted |
| NSW J(A)3.1:<br>Application of Part | Informational | Noted | Noted |
| NSW J(A)3.2:<br>Compliance with BCA Provisions | Class 2 buildings must comply with the following national BCA provisions (as applicable):<br>(a) for air-conditioning system control: J5.2; and<br>(b) for mechanical ventilation system control: J5.3; and<br>(c) for fan systems: J5.4; and<br>(d) for ductwork insulation: J5.5; and<br>(e) for ductwork sealing: J5.6; and<br>(f) for pump systems: J5.7; and<br>(g) for pipework insulation: J5.8; and<br>(h) for refrigerant chillers: J5.10; and<br>(i) for unitary air-conditioning equipment: J5.11; and<br>(j) for heat rejection equipment: J5.12<br>Provision of J5.9 are regulated under BASIX | To be detailed at CC stage. | Noted |

| Section J: Energy Efficiency (Class 2 & 4) | | | | |
|---|---|---|---|---|
| J5.2: | Air-conditioning systems | Compliance required, design certification to be provided by Mechanical Engineer. | To be detailed at CC stage. | CRA – Refer Annexure F |
| J5.3: | Mechanical ventilation system control | Compliance required, design certification to be provided by Mechanical Engineer. | To be detailed at CC stage. | CRA – Refer Annexure F |
| J5.4: | Fan systems | Compliance required, design certification to be provided by Mechanical Engineer. | To be detailed at CC stage. | CRA – Refer Annexure F |
| J5.5: | Ductwork Insulation | Compliance required, design certification to be provided by Mechanical Engineer. | To be detailed at CC stage. | CRA – Refer Annexure F |
| J5.6: | Ductwork Sealing | Compliance required, design certification to be provided by Mechanical Engineer. | To be detailed at CC stage. | CRA – Refer Annexure F |
| J5.7: | Pump Systems | Compliance required, design certification to be provided by Mechanical Engineer. | To be detailed at CC stage. | CRA – Refer Annexure F |
| J5.8: | Pipework Insulation | Compliance required, design certification to be provided by Mechanical Engineer. | To be detailed at CC stage. | CRA – Refer Annexure F |
| J5.10: | Refrigerant Chillers | Compliance required, design certification to be provided by Mechanical Engineer. | To be detailed at CC stage. | CRA – Refer Annexure F |
| J5.11: | Unitary Air-Conditioning Equipment | Compliance required, design certification to be provided by Mechanical Engineer. | To be detailed at CC stage. | CRA – Refer Annexure F |
| J5.12: | Heat Rejection Equipment | Compliance required, design certification to be provided by Mechanical Engineer. | To be detailed at CC stage. | CRA – Refer Annexure F |
| **NSW Part J(A)4 – Heated Water Supply** | | | | |
| NSW J(A)4.0 | | Informational | Noted | Noted |

| Section J: Energy Efficiency (Class 2 & 4) | | | |
|---|---|---|---|
| Deemed-to-Satisfy Provisions | | | |
| NSW J(A)4.1<br>Application of Part | Informational | Noted | Noted |
| NSW J(A)4.2<br>Compliance with BCA Provisions | The hot water supply system must comply with Clause J7.2 Heated Water Supply. Provisions of J7.3 & J7.4 are regulated under BASIX. | To be detailed at CC stage. | Noted |
| J7.2: Hot Water Supply | The hot water supply systems must be designed and installed in accordance with Part B2 of NCC Volume Three — Plumbing Code of Australia. | To be detailed at CC stage. | CRA – Refer Annexure F |
| **NSW Part J(A)5 – Facilities for Energy Monitoring** | | | |
| NSW J(A)5.0<br>Deemed-to-Satisfy Provisions | Informational | Noted | Noted |
| NSW J(A)5.1<br>Application of Part | Informational–<br>The *Deemed-to-Satisfy* Provisions of this Part apply to a Class 2 building except within a *sole-occupancy unit*. | Noted | Noted |
| NSW J(A)5.3<br>Compliance with BCA Provisions | Class 2 Buildings must comply with national BCA provisions J8.3. | To be detailed at CC stage. | Noted |
| J8.3 Facilities for energy monitoring | > A building with a floor area of more than 500m2 must have an energy meter configured to record the time-of-use consumption of gas and electricity.<br>> A building with a floor area of more than 2,500m2 must have the energy meters configured to enable individual time-of-use energy consumption data recording, in accordance with (c), of the energy consumption of –: | To be detailed at CC stage. | CRA – Refer Annexure F |

| Section J: Energy Efficiency (Class 2 & 4) | | | |
|---|---|---|---|
| | ○ air-conditioning plant including, where appropriate, heating plant, cooling plant and air handling fans; and<br>○ artificial lighting; and<br>○ appliance power; and<br>○ central hot water supply; and<br>○ internal transport devices including lifts, escalators and moving walkways where there is more than one serving the building; and<br>○ other ancillary plant.<br>> Energy meters required by (b) must be interlinked by a communication system that collates the time-of-use energy consumption data to a single interface monitoring system where it can be stored, analysed and reviewed.<br>> The provisions of (b) do not apply to a Class 2 building with a floor area of more than 2500 $m^2$ where the total area of the common areas is less than 500 $m^2$. | | |

| Section J: Energy Efficiency (Class 7a carpark) |
|---|
| **Part J1 – Building Fabric** |
| Part J1 is not applicable to the carpark |
| **Part J2 – Glazing** |
| Part J2 is not applicable to the carpark |
| **Part J3 – Building Sealing** |

| Section J: Energy Efficiency (Class 7a carpark) | | | |
|---|---|---|---|
| Part J3 is not applicable to the carpark | | | |
| **Part J4** | | | |
| J4.0: | This part has deliberately been left blank in the BCA2019 | Noted | N/A |
| **Part J5 – Air Conditioning and Ventilation Systems** | | | |
| J5.0: Deemed-to-Satisfy Provisions | Informational | Noted | Noted |
| J5.1: Application of Part | Informational | Noted | Noted |
| J5.2: Air-conditioning systems | Not applicable | Not applicable | N/A |
| J5.3: Mechanical ventilation system control | Clause contains requirements for mechanical ventilation system control. | Design certification to be provided by Mechanical Engineer. | CRA – Refer Annexure F |
| J5.4: Fan systems | Clause contains requirements for fans, ductwork, duct components and carpark exhaust systems. | Design certification to be provided by Mechanical Engineer. | CRA – Refer Annexure F |
| J5.5: Ductwork Insulation | Not applicable | Not applicable | N/A |
| J5.6: Ductwork Sealing | Not applicable | Not applicable | N/A |
| J5.7: Pump Systems | Not applicable | Not applicable | N/A |
| J5.8: Pipework Insulation | Not applicable | Not applicable | N/A |
| J5.9: Space Heating | Not applicable | Not applicable | N/A |
| J5.10: Refrigerant Chillers | Not applicable | Not applicable | N/A |

| Section J: Energy Efficiency (Class 7a carpark) | | | |
|---|---|---|---|
| J5.11: Unitary Air-Conditioning Equipment | Not applicable | Not applicable | N/A |
| J5.12: Heat Rejection Equipment | Not applicable | Not applicable | N/A |
| **Part J6 – Artificial Lighting and Power** | | | |
| J6.0: Deemed-to-Satisfy Provisions | Informational | Noted | Noted |
| J6.1: Application of Part | Informational | Noted | Noted |
| J6.2: Artificial lighting | Artificial lighting must comply with BCA Clause J6.2. | Design certification to be provided by the electrical designer. | CRA – Refer Annexure F |
| J6.3: Interior artificial lighting and power control | Lighting switches and control devices must comply with BCA Clause J6.3. | Design certification to be provided by the electrical designer. | CRA – Refer Annexure F |
| J6.4: Interior decorative and display lighting | Not applicable | Not applicable | N/A |
| J6.5: Exterior artificial lighting | Exterior lighting attached to or directed at the façade of the building must be controlled by daylight sensors or time switches in accordance with the specific requirements of this clause. | Design certification to be provided by the electrical designer. | CRA – Refer Annexure F |
| J6.6: Boiling water and chilled water storage units | Not applicable | Not applicable | N/A |
| J6.7: Lifts | Lifts must be configured to ensure artificial lighting and ventilation in the car are turned off when it is unused for 15 minutes; it also must achieve energy control requirements that comply to Clause J6.7 (b) and (c). | Design certification to be provided by the lift designer. | CRA – Refer Annexure F |

| Section J: Energy Efficiency (Class 7a carpark) | | | |
|---|---|---|---|
| J6.8: Escalators and moving walkways | Not applicable | Not applicable | N/A |
| **Part J7 – Heated Water Supply** | | | |
| J7.0: Deemed-to-Satisfy Provisions | Informational | Noted | Noted |
| J7.2: Heated water supply system | Not applicable | Not applicable | N/A |
| **Part J8 – Facilities for Energy Monitoring** | | | |
| J8.0: Deemed-to-Satisfy Provisions | Informational | Noted | Noted |
| J8.1: Application of Part | Informational | Noted | Noted |
| J8.3: Facilities for energy monitoring | > A building with a floor area of more than 500m$^2$ must have an energy meter configured to record the time-of-use consumption of gas and electricity.<br>> A building with a floor area of more than 2,500m$^2$ must have the energy meters configured to enable individual time-of-use energy consumption data recording of the energy consumption of –:<br>o air-conditioning plant including, where appropriate, heating plant, cooling plant and air handling fans; and<br>o artificial lighting; and<br>o appliance power; and<br>o central hot water supply; and | To be detailed at CC stage. | CRA – Refer Annexure F |

| Section J: Energy Efficiency (Class 7a carpark) | | | |
|---|---|---|---|
| | ○ internal transport devices including lifts, escalators and moving walkways where there is more than one serving the building; and<br>○ other ancillary plant.<br>> Energy meters required must be interlinked by a communication system that collates the time-of-use energy consumption data to a single interface monitoring system where it can be stored, analysed and reviewed. | | |

# ANNEXURE E DEFINITIONS

## Annexure E - Definitions

*Average specific extinction area*

Average specific extinction area means the average specific extinction area for smoke as determined by AS 5637.1:2015.

*Critical radiant flux*

Critical radiant flux (CRF) means the critical heat flux at extinguishment (CHF in kW/m2) as determined by AS ISO 9239.1:2003.

*Effective height*

Effective height means the vertical distance between the floor of the lowest storey included in a determination of rise in storeys and the floor of the topmost storey (excluding the topmost storey if it contains only heating, ventilating, lift or other equipment, water tanks or similar service units).

*Envelope*

Envelope, for the purposes of Section J in Volume One, means the parts of a building's fabric that separate a conditioned space or habitable room from—

(a) the exterior of the building; or

(b) a non-conditioned space including—

(i) the floor of a rooftop plant room, lift-machine room or the like; and

(ii) the floor above a carpark or warehouse; and

(iii) the common wall with a carpark, warehouse or the like.

*Exit*

Exit means –

(a) Any, or any combination of the following if they provide egress to a road or open space—

(i) An internal or external stairway.

(ii) A ramp.

(iii) A fire-isolated passageway.

(iv) A doorway opening to a road or open space.

(v) A horizontal exit or a fire-isolated passageway leading to a horizontal exit.

*Fire compartment*

Fire compartment means –

(a) the total space of a building; or

(b) when referred to in—

(i) the Performance Requirements — any part of a building separated from the remainder by barriers to fire such as walls and/or floors having an appropriate resistance to the spread of fire with any openings adequately protected; or

(ii) the Deemed-to-Satisfy Provisions — any part of a building separated from the remainder by walls and/or floors each having an FRL not less than that required for a fire wall for that type of construction and where all openings in the separating construction are protected in accordance with the Deemed-to Satisfy Provisions of the relevant Part.

*Fire-resistance level (FRL)*

Fire-resistance level (FRL) means the grading periods in minutes determined in accordance with Specification A2.3, for the following criteria—

(a) structural adequacy; and

(b) integrity; and

(c) insulation,

and expressed in that order.

Note: A dash means that there is no requirement for that criterion. For example, 90/–/– means there is no requirement for an FRL for integrity and insulation, and –/–/– means there is no requirement for an FRL.

*Fire-source feature*

(a) the far boundary of a road, river, lake or the like adjoining the allotment; or

(b) a side or rear boundary of the allotment; or

(c) an external wall of another building on the allotment which is not a Class 10 building

*Fire wall*

Fire wall means a wall with an appropriate resistance to the spread of fire that divides a storey or building into fire compartments.

*Flammability index*

Flammability Index means the index number as determined by AS 1530.2:1993.

*Group number*

Group number means the number of one of 4 groups of materials used in the regulation of fire hazard properties and applied to materials used as a finish, surface, lining, or attachment to a wall or ceiling.

*Loadbearing*

Intended to resist vertical forces additional to those due to its own weight.

*Non-combustible*

Non-combustible means—

(a) applied to a material — not deemed combustible as determined by AS 1530.1:1994 — Combustibility Tests for Materials; and

(b) applied to construction or part of a building — constructed wholly of materials that are not deemed combustible

*Occupiable outdoor area*

Occupiable outdoor area means a space on a roof, balcony or similar part of a building–

(a) that is open to the sky; and

(b) to which access is provided, other than access only for maintenance; and

(c) that is not open space or directly connected with open space.

*Open space*

Open space means a space on the allotment, or a roof or similar part of a building adequately protected from fire, open to the sky and connected directly with a public road.

*Performance Requirement*

Performance Requirement means a requirement which states the level of performance which a Performance Solution or Deemed-to-Satisfy Solution must meet.

*Performance Solution*

Performance Solution means a method of complying with the Performance Requirements other than by a Deemed-to-Satisfy Solution.

*Sarking-type material*

Sarking-type material means a material such as a reflective insulation or other flexible membrane of a type normally used for a purpose such as waterproofing, vapour management or thermal reflectance.

*Smoke developed index*

Smoke developed index means the index number for smoke as determined by AS/NZS 1530.3.

*Smoke development rate*

Smoke development rate means the development rate for smoke as determined by testing flooring materials in accordance with AS ISO 9239.1.

*Smoke growth rate index*

Smoke growth rate index (SMOGRA RC) means the index number for smoke used in the regulation of fire hazard properties and applied to materials used as a finish, surface, lining or attachment to a wall or ceiling.

*Sole-occupancy unit*

Sole-occupancy unit means a room or other part of a building for occupation by one or joint owner, lessee, tenant, or other occupier to the exclusion of any other owner, lessee, tenant, or other occupier and includes—

(a) a dwelling; or

(b) a room or suite of rooms in a Class 3 building which includes sleeping facilities; or

(c) a room or suite of associated rooms in a Class 5, 6, 7, 8 or 9 building; or

(d) a room or suite of associated rooms in a Class 9c building, which includes sleeping facilities and any area for the exclusive use of a resident.

# ANNEXURE F BCA COMPLIANCE SPECIFICATION

## Annexure F – BCA Compliance Specification

The following BCA matters are to be addressed by specific BCA Design Certificate to be issued by the relevant architectural, services and engineering consultants at the Construction Certificate Stage. This schedule should be forwarded to all consultants to obtain verification that these items have and will be included in the design documentation / specifications:

### Architectural Design Certification

1. The FRL's of building elements for the proposed works have been designed in accordance with Table 3 of Specification C1.1 of BCA2019 for a building of Type A Construction, subject to a Performance Solution at CC stage.
2. Lightweight construction used to achieve required fire resistance levels will comply with Specification C1.8 of BCA2019.
3. Building elements must be non-combustible in accordance with C1.9 of BCA2019.
4. Materials, floor and wall linings/coverings, surface finishes and air-handling ductwork used in the works will comply with the fire hazard properties of Clause C1.10 and Specification C1.10 of BCA2019.
5. Any ancillary elements fixed, installed or attached to the internal parts or external face of an external wall that is required to be non-combustible will comply with Clause C1.14 of BCA2019.
6. The parts of different classifications located alongside one another in the same storey will be separated in accordance with Clause C2.8 and Specification C1.1 of BCA2019.
7. Floors separating storeys of different classifications will comply with BCA Clause C2.9 of BCA2019.
8. Equipment will be separated in accordance with Clause C2.12 of BCA2019.
9. The electricity substation and any main switch room sustaining emergency equipment required to operate in emergency mode, will be separated from the remaining building with construction having an FRL 120/120/120 and provided with self-closing -/120/130 fire doors in accordance with Clause C2.13 of BCA2019.
10. The public corridors more than 40m in length will be subject to a Performance Solution at CC stage.
11. Openings in the external walls that are required to have an FRL will be in located in accordance with Clause C3.2 and C3.3 of BCA2019 or protected in accordance with Clause C3.4 of BCA2019.
12. Doorways in any fire walls separating fire compartments will be protected in accordance with Clause C3.5 of BCA2019.
13. Doors in a fire-isolated exit will be self-closing or automatic closing fire doors with an FRL of not less than -/60/30 in accordance with Clause C3.8 of BCA2019.
14. Fire-isolated stairways will not be penetrated by services other than those permitted by Clause C3.9 of BCA2019.
15. Services penetrating elements required to possess an FRL including the floor slabs, walls, shafts, etc. will be protected in accordance with Clause C3.12, C3.13 and C3.15 and Specification C3.15 of BCA2019.
16. Construction joints, spaces and the like in and between building elements required to be fire-resisting with respect to integrity and insulation will be protected in accordance with BCA Clause C3.16.
17. The lift doors will be --/60/- fire doors complying with AS 1735.11:1986 in accordance Clause C3.10 of BCA2019.

18. Doorways and other opening in internal walls required to have an FRL will be protected in accordance with Clause C3.11 of BCA2019.
19. Columns protected by light weight construction will achieve an FRL not less than the FRL for the element it is penetrating, in accordance with Clause C3.17 of BCA2019.
20. A lintel will have the FRL required for the part of the building in which it is situated, unless it does not contribute to the support of a fire door, fire window or fire shutter, and it spans an opening in masonry which is not more than 150 mm thick and is not more than 3m wide if the masonry is non-loadbearing; or not more than 1.8m wide if the masonry is loadbearing and part of a solid wall or one of the leaves of a cavity wall, or it spans an opening in a non-loadbearing wall of the Class 2 or 3 building, in accordance with Specification C1.1 Clause 2.3 BCA2019.
21. All attachments to the external façade of the building will be fixed in a way that does not affect the fire resistance of that element in accordance with Clause 2.4 of Specification C1.1 of BCA2019.
22. The top and bottom of the riser shafts will achieve an FRL not less than the FRL required for the walls of the shaft in accordance with Clause 2.7 of Specification C1.1 of BCA2019.
23. Fire doors will comply with AS 1905.1:2015 and Specification C3.4 of BCA2019.
24. The number of exits provided to the building will be in accordance with Clause D1.2 of BCA2019, subject to a Performance Solution at CC stage.
25. The required exits will be fire-isolated in accordance with Clause D1.3 of BCA2019.
26. Travel distances to exits will be in accordance with Clause D1.4 of BCA2019, subject to a Performance Solution at CC stage.
27. The alternative exits will be distributed uniformly around the storey and will not be less than 9m apart, and not more that 45m apart in the residential portion or patient care areas in the health-care building or 60m, in accordance with Clause D1.5 of BCA2019, subject to a Performance Solution at CC stage.
28. The dimensions of exits and paths of travel to exits will be provided in accordance with Clause D1.6 of BCA2019.
29. The fire-isolated exits will be in accordance with Clause D1.7 of BCA2019, subject to a Performance Solution at CC stage.
30. Discharge from exits will be in accordance with Clause D1.10 of BCA2019.
31. The non-required stairways, ramps and escalators will be in accordance with Clause D1.12 of BCA2019.
32. The ladder from the plant, lift machine rooms, and electricity network substation in lieu of a stairway will be in accordance with Clause D1.16 of BCA2019.
33. Access to the lift pit will be in accordance with Clause D1.17 of BCA2019.
34. The stairway or ramp within the fire-isolated shaft is to be non-combustible, and if there is a local failure not cause structural damage or impair the fire resistance of the shaft, in accordance with Clause D2.2 of BCA2019.
35. The construction of EDB's and telecommunications distribution boards will be in accordance with Clause D2.7 of BCA2019 with the enclosure bounded by non-combustible construction or fire protective covering and smoke seals provided around the perimeter of the non-combustible doors and any openings sealed with non-combustible mastic to prevent smoke spreading from the enclosure.
36. New pedestrian ramps will comply with AS 1428.1:2009, Clause D2.10 and Part D3 of BCA2019. The floor surface of a ramp must have a slip-resistance classification complying with Table D2.14 when tested in accordance with AS 4586:2013.

37. The fire-isolated passageway will be in accordance with Clause D2.11 of BCA2019.
38. Stair geometry to the new stairways will be in accordance with Clause D2.13 of BCA2019. Stair treads are to have a surface with a slip-resistance classification complying with Table D2.14 when tested in accordance with AS 4586:2013.
39. Landings and door thresholds throughout the development will be provided in accordance with Clause D2.14 and D2.15 of BCA2019. Landings to have either a surface with a slip-resistance classification complying with Table D2.14 when tested in accordance with AS 4586:2013 or a strip at the edge of the landing with a slip-resistance classification complying with Table D2.14 when tested in accordance with AS 4586:2013 where the edge ledge to a flight below.
40. The handrails and balustrades to all stairs and throughout the building will be in accordance with Clause D2.16, and D2.17 of BCA2019.
41. The fixed platform, walkway, stairway and ladder and any associated going and riser, landing handrail, balustrade, located within the machinery room, boiler house, lift-machine room, plant-room, or non-habitable attic/storeroom within the sole occupancy unit will comply with AS 1657:2013 or Part D2 of BCA2019.
42. The doorways and doors will be in accordance with Clause D2.19 and D2.20 of BCA2019.
43. Door latching mechanisms will be in accordance with Clause D2.21 of BCA2019
44. Re-entry doors from the fire-isolated exits will be in accordance with Clause D2.22 of BCA2019.
45. Signage will be provided on fire and smoke doors in accordance with Clause D2.23 of BCA2019.
46. The openable portion of a window in a bedroom of a Class 2 building will be protected with a restricting device or secure screen that does not allow a 125mm sphere to pass through the opening or screen and resist an outward horizontal action of 250N in accordance with Clause D2.24 of BCA2019. In addition to window protection, and for other openable windows 4 meters or more above the ground below, a barrier with a height not less than 865mm above the floor will be installed to the openable window.
47. The fire control centre will be in accordance with Specification E1.8 or BCA2019.
48. Fire precautions whilst the building is under construction fire precautions will be in accordance with Clause E1.9 of BCA2019.
49. External above ground waterproofing membranes will comply with Clause F1.4 of BCA2019 and AS 4654 Parts 1 & 2:2012.
50. Any sarking proposed will be installed in accordance with Clause F1.6 of BCA2019.
51. Waterproofing of all wet areas to the building will be carried out in accordance with Clause F1.7 of BCA2019 and AS 3740:2010.
52. Damp proofing of the proposed structure will be carried out in accordance with Clause F1.9 and F1.10 of BCA2019.
53. Floor wastes will be installed to bathrooms and laundries above sole occupancy units or public space in accordance with Clause F1.11 of BCA2019.
54. All new glazing to be installed throughout the development will be in accordance with Clause F1.13 of BCA2019 and AS 1288:2006 / AS 2047:2014.
55. Sanitary facilities will be provided in the building in accordance with Clause F2.1, Table F2.1, Clause F2.3 and Table F2.3 of BCA2019.
56. Accessible sanitary facilities will be provided in the building in accordance with Clause F2.4, Table F2.4 (a) of BCA2019 and AS1428.1:2009.
57. The construction of the sanitary facilities will be in accordance with Clause F2.5 of BCA2019.

58. Ceiling heights to the new areas will be in accordance with Clause F3.1 of BCA2019.
59. Natural light will be provided in accordance with Clause F4.1, F4.2, and F4.3 of BCA2019.
60. Natural ventilation will be provided in accordance with Clause F4.5, F4.6 and F4.7 of BCA2019.
61. Water closets and urinals will be located in accordance with Clause F4.8 of BCA2019.
62. The sanitary compartments will be either be provided with mechanical exhaust ventilation or an airlock in accordance with Clause F4.9 of BCA2019.
63. Pliable building membranes installed in external walls will comply with Clause F6.2 of BCA2019 and where a pliable building membrane is not installed in an external wall, the primary water control layer will be separated from water sensitive materials by a drained cavity.
64. Every storey of the carpark will be provided with an adequate system of permanent natural or mechanical ventilation in accordance with Clause F4.11 of BCA2019.
65. A safe manner for cleaning of windows located 3 or more storeys above ground level will be provided in accordance with the Work Health & Safety Act 2011 and regulations made under that Act in accordance with NSW G1.101 of BCA2019.
66. The construction of the residential portions of the development will be undertaken in accordance with the relevant BASIX commitments that form part of the Development Consent approval.
67. Essential fire or other safety measures must be maintained and certified on an ongoing basis, in accordance with the provisions of the Environmental Planning and Assessment Regulation, 2000.
68. Building Fabric and Thermal Construction will be in accordance with Part J1 of BCA2019.
69. Glazing will be in accordance with Part J1 of BCA2019.
70. Building sealing will be in accordance with Part J3 of BCA2019.
71. Facilities for Energy Monitoring will be provided in accordance with Clause J8.3 of BCA2019.

**Electrical Services Design Certification:**

72. A smoke detection and alarm system will be installed throughout the building in accordance with Table E2.2a and Specification E2.2a of BCA2019.
73. Emergency lighting will be installed throughout the development in accordance with Clause E4.2, E4.4 of BCA2019 and AS/NZS 2293.1:2018.
74. Exit signage will be installed in accordance with Clause E4.5, E4.7, and E4.8 of BCA2019 and AS/NZS 2293.1:2018.
75. An emergency warning and intercom system (EWIS) will be provided to the building in accordance with Clause E4.9 of BCA2019.
76. Artificial lighting will be installed throughout the development in accordance Clause F4.4 of BCA2019 and AS/NZS 1680.0:2009.
77. Lighting power and controls will be installed in accordance with Part J6 of BCA2019.
78. Electrical conductors located within the building that supply a main switchboard that sustains emergency equipment will comply with Clause C2.13 of BCA2019.

**Hydraulic Services Design Certification:**

79. Storm water drainage will be provided in accordance with Clause F1.1 of BCA2019 and AS/NZS 3500.3:2018
80. Fire hydrant system will be installed in accordance with Clause E1.3 of BCA2019 and AS 2419.1:2005, subject to a Performance Solution at CC stage.

81. Fire hose reels will be installed in accordance with Clause E1.4 of BCA2019 and AS 2441:2005.
82. A sprinkler system will be installed in accordance with Clause E1.5 of BCA2019, Specification E1.5 and appropriate part(s) of AS 2118.
83. Portable fire extinguishers will be installed in accordance with Clause E1.6 of BCA2019 and AS 2444:2001.
84. The heated water supply systems will be designed and installed to NCC Volume 3 – Plumbing code and Clause J7.2 of BCA2019.

**Mechanical Services Design Certification:**

85. An air-handling system which does not form part of a smoke hazard management system will be installed in accordance with Clause E2.2 of BCA2019, and AS 1668.1:2015.
86. Stair pressurisation will be installed in the building in accordance with Table E2.2a of BCA2019 and AS 1668.1:2015 (Amdt 1).
87. Where not naturally ventilated the building will be mechanically ventilated in accordance with Clause F4.5 of BCA2019 and AS 1668.2:2012.
88. Every storey of the car park will be ventilated in accordance with Clause F4.11 of BCA2019 and where not naturally ventilated it will be mechanically ventilated in accordance with AS 1668.2:2012 as applicable. Car park mechanical system shall also comply with Table E2.2a and AS1668.1:2015 (Amdt 1).
89. The commercial kitchen will be provided with a kitchen exhaust hood in accordance with Clause F4.12 of BCA2019, and AS 1668.1:2015 and AS 1668.2:2012.
90. Exhaust systems installed in a kitchen, bathroom, sanitary compartment or laundry of a Class 2 or 4 *sole-occupancy unit* will have a minimum flow rate and discharge location in accordance with Clause F6.3 of BCA2019.
91. Where exhaust discharges directly or via shaft into a roof space of a Class 2 or 4 *sole-occupancy unit*, ventilation of the roof space will comply with Clause F6.4 of BCA2019.
92. The air-conditioning and ventilations systems will be designed and installed in accordance with Part J5 of BCA2019
93. Rigid and flexible ductwork will comply with the fire hazard properties set out in AS 4254 Parts 1 and 2.

**Structural Engineers Design Certification:**

94. The material and forms of construction for the proposed works will be in accordance with Clause B1.2, B1.4 and B1.6 of BCA2019 as follows:
    a. Dead and Live Loads – AS/NZS 1170.1:2002
    b. Wind Loads – AS/NZS 1170.2:2011
    c. Earthquake actions – AS 1170.4:2007
    d. Masonry – AS 3700:2018
    e. Concrete Construction – AS 3600:2018
    f. Steel Construction AS 4100:1998
    g. ABCB Standard for Construction of Buildings in Flood Hazard Areas.
95. The FRL's of the structural elements for the proposed works have been designed in accordance with Specification C1.1 of BCA2019, including Table 3 for a building of Type A Construction, subject to a Performance Solution at CC stage.

96. The lift shaft will have an FRL in accordance with Clause C2.10 and Specification C1.1 of BCA2019.
97. Lightweight construction used to achieve required fire resistance levels will comply with Specification C1.8 of BCA2019.
98. The construction joints to the structure will be in accordance with Clause C3.16 of BCA2019 to reinstate the FRL of the element concerned.
99. Upon completion of the works, a structural engineer will be able to certify that local failure will be in accordance with Clause D2.2 of BCA2019 for the fire isolated stairs.

**Lift Services Design Certification:**

100. The lifts throughout the development will be provided with stretcher facilities in accordance with Clause E3.2 of BCA2019 and will be capable of accommodating a stretcher with a patient lying horizontally by providing a clear space not less than 600mm wide x 2000mm long x 1400mm high above the floor level.
101. Warning signage in accordance with Clause E3.3 of BCA2019 will be provided to the lifts to advise not to use the lifts in a fire.
102. An emergency lift/s will be provided in the building in accordance with Clause E3.4 of BCA2019.
103. A fire service recall control switch is to be installed on a landing at a location nominated by the appropriate authority in accordance with Clause E3.9.
104. A lift car fire service drive control switch is to be installed within the lift car in accordance with Clause E3.10.
105. Access and egress to the lift well landings will comply with the Deemed-to-Satisfy Provisions of D3 of the BCA2019 and will be suitable to accommodate disabled persons.
106. The type of lifts will also be suitable to accommodate persons with a disability in accordance with Clause E3.6, Table E3.6a, and will have accessible features in accordance with Table E3.6b of BCA2019.
107. The lifts will comply with AS 1735.12:1999 in accordance with Clause E3.6 of BCA2019.
108. All electric passenger lifts and electrohydraulic passenger lifts shall comply with Specification E3.1 of BCA2019.

**Acoustic Services Design Certification:**

109. The sound transmission and insulation of the residential portions of the development will comply with Part F5 of BCA2019.

# Appendix O.
# SECTION J REPORT

# Mixed Use Development

## 15/31 Harbour Drive

## COFFS HARBOUR, NSW

# Compliance Report

NCC - Building Code of Australia (2019 Amendment 1)
Section J – Energy Efficiency

December 2020

**FR**


**Application Solutions**

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**The reader's attention is drawn to the following important information:**

## Disclaimer

**Scope Limitations:** This report is to assess the proposed development (named above), with reference to the documents listed in the report, with respect to compliance with the Building Code of Australia (2019 Amendment 1) Section J Energy Efficiency provisions and report the results of the assessment to the client

**Exclusive Use:** This report has been prepared for the exclusive use of Application Solutions' client to meet their particular objectives and by its nature is limited in scope. The material contained in this report should not be used for any other purpose or by other persons or entities without contacting Application Solutions. No warrantee is given in relation to the material in this report used for other purposes or by other persons or entities without the consent of Application Solutions.

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## Document Control

| | | |
|---|---|---|
| **Document Number:** | AS1643 | |
| **Issue Date:** | 15/12/2020 | |
| **Description:** | The proposed development comprises a multi-level residential apartment building with 3 levels of carparking above ground floor commercial and carparking. The development includes a basement level for fire services. | |
| **Prepared By:** | Thomas Harris | Dip. Building Surveying |
| | | |
| **Reviewed By** | Andrew Latimer | B. Eng. (Civil) |
| | | |

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# Executive Summary

The development has been assessed against the Deemed to Satisfy provisions of Section J (Energy Efficiency) of the Building Code of Australia. The items outlined below are the requirements for this development to achieve compliance with Section J. These requirements have been determined based on the information provided to Application Solutions at the time of carrying out this assessment. Any design changes should be checked to ensure these requirements remain correct and accurate. Contact Application Solutions for assistance if reassessment is required.

## Section J: Sign-Off - On Completion of Construction

1. **Documentation of Compliance During Construction**
   It is important to document compliance for each item noted in the Executive Summary throughout construction. Refer to the "Section J: Sign-Off – on Completion of Construction" section of this report for guidance. If further assistance is required, contact Application Solutions.
   Note: In NSW, Section J is replaced with NSW Section J.

## Part J0 – Energy Efficiency

2. **Roof thermal break**
   If there is to be any metal sheet roofing fixed directly to a metal frame roof that has a ceiling lining fixed directly to the same metal frame, a thermal break will be required consisting of a material with an R-Value of not less than R0.2, installed at all points of contact between the metal sheet roofing and its supporting metal frame.

3. **Wall thermal break**
   If there is to be any metal frame walls that have lightweight external cladding such as weatherboards, fibre cement sheet or metal sheeting fixed directly to the metal frame with an internal wall lining fixed directly to the same metal frame, a thermal break will be required consisting of a material with an R-Value of not less than R0.2, installed at all points of contact between the external cladding and the metal frame.

## Part J1 – Building Fabric and Glazing

4. **Construction Requirements – Installation of Insulation**
   Where required, insulation must comply with AS/NZS 4859.1 and be installed so that it:
   (i) abuts or overlaps adjoining insulation other than at supporting members; and
   (ii) forms a continuous barrier…and
   (iii) does not affect the safe or effective operation of a service or fitting.
   Reflective insulation must be installed with:
   (i) the necessary airspace to achieve the required R-Value between a reflective side of the reflective insulation and a building lining or cladding; and
   (ii) the reflective insulation closely fitted against any penetration, door or window opening; and
   (iii) the reflective insulation adequately supported by framing members; and
   (iv) each adjoining sheet of roll membrane being overlapped not less than 50 mm or taped together.
   Bulk insulation must be installed so that:
   (i) it maintains its position and thickness, other than where it crosses roof battens, water pipes, electrical cabling or the like; and
   (ii) in a ceiling, where there is no bulk insulation or reflective insulation in the wall beneath, it overlaps the wall by not less than 50 mm.


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**5. Construction Requirements – Roof and Ceiling Insulation**

The minimum total R-Value for the roof/ceiling system which forms part of the envelope required by BCA J1.3a is R3.7.

To achieve compliance, insulation with an R-Value R3.4 is required to be incorporated into the roof/ceiling systems which forms part of the envelope for the following retail parts of the building. i.e. The area of roof where there is no conditioned space above. See Appendix for roof calculations and ceiling thermal envelope.

Retail 01,02:

**Roof Summary**

| Description | Insulation Required* | Solar Absoptance ** | Thermal Break* |
|---|---|---|---|
| Concrete Slab | R3.4 | 0.45 | N/A |

**See Appendix for full details*

***If a roof colour with a higher Solar absorptance is planned, contact Application Solutions*

Paynter Dixon Retail 01-02 - Coffs Harbour

Retail 03:

**Roof Summary**

| Description | Insulation Required* | Solar Absoptance ** | Thermal Break* |
|---|---|---|---|
| Concrete Slab | R3.4 | 0.45 | N/A |

**See Appendix for full details*

***If a roof colour with a higher Solar absorptance is planned, contact Application Solutions*

Paynter Dixon Retail 03 - Coffs Harbour

Retail 04,05,06,07:

**Roof Summary**

| Description | Insulation Required* | Solar Absoptance ** | Thermal Break* |
|---|---|---|---|
| Concrete Slab | R3.4 | 0.45 | N/A |

**See Appendix for full details*

***If a roof colour with a higher Solar absorptance is planned, contact Application Solutions*

Paynter Dixon Retail 04-07 - Coffs Harbour

Note: Thermal break not required as the relevant roof part for the conditioned space is concrete .
This assumes a light colour roof, with solar absorptance less than 0.45.
See Appendix for sample roof colours and their associated solar absorptance values.
If a darker roof is planned contact Application Solutions to reassess.

**6. Maximum U-value**

NOTE: The maximum U-value for the wall-glazing system is U2.0

**7. Maximum U-value**

The maximum U-value of display glazing is U5.8


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## 8. Calculation of U-value

The wall-glazing system U-value of the proposed retail parts of the building are as follows:
Retail 01,02: U0.27
Retail 03: U0.77
Retail 04,05,06,07: U0.40
The U-Values are not more than the max permitted in J1.5(a) See Appendix for full calculations
The walls must be insulated as follows:
Retail 01,02:

| Wall Summary | Insulation Required* | Thermal Break* |
|---|---|---|
| *Concrete Block Walls* | R0.5 | N/A |

**See Appendix for full details*

Paynter Dixon Retail 01-02 - Coffs Harbour

Retail 03:

| Wall Summary | Insulation Required* | Thermal Break* |
|---|---|---|
| *Concrete Block Walls* | R0.5 | N/A |

**See Appendix for full details*

Paynter Dixon Retail 03 - Coffs Harbour

Retail 04,05,06,07:

| Wall Summary | Insulation Required* | Thermal Break* |
|---|---|---|
| *Concrete Block Walls* | R0.5 | N/A |

**See Appendix for full details*

Paynter Dixon Retail 04-07 - Coffs Harbour

## 9. Calculation of Wall R-value

NOTE: The wall component of the wall-glazing system is less than 80% of the total area, therefore the minimum R-value is R1.0 . This minimum R-value is achieved. See Appendix for full calculations for minimum required insulation.
See Appendix for walls forming part of the envelope.

## 10. Max Solar admittance Permitted

Using Table J1.5b

| Max Solar Admittance Permitted | | | |
|---|---|---|---|
| East | North | South | West |
| 0.13 | 0.13 | 0.13 | 0.13 |

NOTE:-

## 11. Construction Requirements – Display Glazing

As display glazing is proposed, refer to clause J1.5 (g) for the calculation of solar admittance.
Calculation of Solar Admittance for display glazing has been carried out in accordance with Specification J1.5a.
See summary Below.


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### 12. Calculation of Solar Admittance

Calculation of Solar Admittance for display glazing has been carried out in accordance with Specification J1.5a.
The resultant U and SHGC values for display glazing are as shown below: (*values can be lower)*
Retail 01,02:

| Glazing Summary | U-Value | SHGC Value |
|---|---|---|
| East | No Glazing on this Orientation | No Glazing on this Orientation |
| North | 5.80 | 1.00 |
| South | 5.80 | 1.00 |
| West | 5.80 | 1.00 |

*Paynter Dixon Retail 01-02 - Coffs Harbour*

Retail 03:

| Glazing Summary | U-Value | SHGC Value |
|---|---|---|
| East | No Glazing on this Orientation | No Glazing on this Orientation |
| North | No Glazing on this Orientation | No Glazing on this Orientation |
| South | No Glazing on this Orientation | No Glazing on this Orientation |
| West | 5.80 | 1.00 |

***Paynter Dixon Retail 03 - Coffs Harbour***

Retail 04,05,06,07:

| Glazing Summary | U-Value | SHGC Value |
|---|---|---|
| East | No Glazing on this Orientation | No Glazing on this Orientation |
| North | 5.80 | 1.00 |
| South | 5.80 | 1.00 |
| West | 5.80 | 1.00 |

*Paynter Dixon Retail 04-07 - Coffs Harbour*

### 13. Construction Requirements – Floor Insulation

Where floors form part of the envelope, a Total R-value of R2.0 is required to be achieved. To achieve this, the following minimum insulation R-Values apply.
Retail 01,02: R0.7
Retail 03: R0.8
Retail 04,05.06,07: R0.4

## Part J3 – Building Sealing

### 14. Construction Requirements – Window and Door Sealing

A door, openable window or the like must be sealed when forming part of the envelope
The seal may be a foam or rubber compression strip, fibrous seal or the like.
For the bottom edge of an external swing door, a draft protection device must be installed.
For exemptions to this clause see body of report.


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**15. Construction Requirements – Building Entrance Sealing**
An entrance to a building leading to a conditioned space must have an airlock, self-closing door, revolving door or the like.

**16. Construction Requirements – Exhaust Fan Sealing**
An exhaust fan must be fitted with a sealing device such as a self-closing damper or the like when serving a conditioned space.

**17. Construction Requirements – Roof, Wall and Floor Sealing**
Roofs, ceilings, walls, floors and any opening such as a window frame, door frame, roof light frame or the like must be constructed to minimise air leakage when forming part of the envelope and must be enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions OR sealed with expanding foam, rubber compressible strip, caulking or the like at bottom plates or skirting; and cornices and shadow lines; and gaps around ceiling, wall or floor penetrations

## Part J5 – Air-conditioning and Ventilation Systems

**18. Construction Requirements – Deactivation Capability**
Any air-conditioning system must be capable of being deactivated when the building or part of the building served is not occupied.

**19. Construction Requirements – Air-conditioning Zones**
Different air-conditioning zones shall be separately thermostatically controlled and not have their temperature controlled by mixing actively heated air or actively cooled air. Reheating must be limited to not more than a 7.5K rise in temperature for a fixed supply air rate, or for a variable supply air rate, not more than 7.5K rise in temperature at the normal supply air rate but increased or decreased at the same rate that the supply air rate is respectively decreased or increased.

**20. Construction Requirements – Economy Cycle**
Where the air-conditioning system provides the required mechanical ventilation and has a total air flow rate of greater than or equal to 3000 L/s, it shall have an outdoor air economy cycle.

**21. Construction Requirements – Water Flow**
An air-conditioning system which contains more than one water heater, chiller or coil, must be capable of stopping the flow of water to those not operating.

**22. Construction Requirements – Variable Speed Fans**
Where the air-conditioning system has an air flow rate greater than 1,000L/s it must have variable speed fans

**23. Construction Requirements – Controls**
The air-conditioning system must have the ability to use direct signals from the control components responsible for the delivery of comfort conditions in the building to regulate the operation of central plant.

**24. Construction Requirements – Deadband**
The air-conditioning system must have a minimum control dead band of 2ºC, except where a smaller range is required for specialised applications.

**25. Construction Requirements – Balancing Dampers and Valves**
The air-conditioning system must be provided with balancing dampers and balancing valves that ensure the maximum design air or fluid flow is achieved but not exceeded at each component as required to meet the needs of the system at its maximum operating condition.

**26. Construction Requirements – Airflow Termination**
The air-conditioning system must ensure that each independently operating space of over 1000 m² of the building has provision to terminate airflow independently of the remainder of the system sufficient to allow for different operating times.

**27. Construction Requirements – Variable Temperature Operation**
The air-conditioning system must have automatic variable temperature operation of heated water and chilled water circuits.

**28. Construction Requirements – Motorised Damper**
When deactivated, the air conditioning system must close any motorised outdoor air and return air damper.

**29. Construction Requirements – Control Sequences**
When two or more air-conditioning systems serve the same space, they must use control sequences that prevent the systems from operating in opposing heating and cooling modes.


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**30. Construction Requirements – Time Switch**

A time switch must be provided to control all air-conditioning systems of more than 2 kWr and heaters of more than 1 $kW_{heating}$. The time switch must be capable of switching on and off electric power at variable pre-programmed times and on variable pre-programmed days.

**31. Construction Requirements – Ventilation Operation**

A mechanical ventilation system (including one which is part of an air-conditioning system) must be capable of being deactivated when the building or part of the building served is not occupied.

**32. Construction Requirements – Mechanical Ventilation of Conditioned Space**

Any mechanical ventilation system that is serving a conditioned space and has an outside air flow greater than 1000L/s shall have an energy reclaiming system in accordance with (aa) or modulating control in accordance with (bb)

The mechanical ventilation system shall not provide mechanical ventilation in excess of the minimum quantity required by BCA Part F4 by more than 20% other than in the conditions detailed in the body of the report.

**33. Construction Requirements – Variable Speed Fans**

Any mechanical ventilation system that is serving a conditioned space and has an air flow rate of more than 1,000L/s shall have variable speed fans unless the downstream air flow is required by Part F4 to be constant

**34. Construction Requirements – Exhaust System**

An exhaust system with an air flow rate of more than 1000 l/s must be capable of stopping the motor when the system is not needed.

**35. Construction Requirements – Carpark exhaust systems**

Carpark exhaust systems must have an atmospheric contaminant monitoring system in accordance with AS 1668.2.

**36. Construction Requirements –Ventilation Time Switch Control**

Any mechanical ventilation system with an air flow rate of more than 1000 L/s must be controlled by a time switch and be capable of switching on and off electric power at variable pre-programmed times and on variable pre-programmed days.

See BCA J5.3(d)(iii) for any appropriate exclusions to this requirement.

**37. Construction Requirements –Fans**

Fans, ductwork and duct components that form part of an air-conditioning system or mechanical ventilation system must

- separately comply with BCA J5.3 (b), (c), (d), (e) and (f); or
- achieve a fan motor input power per unit of flowrate lower than the fan motor input power per unit of flowrate achieved when applying BCA J5.4 (b), (c), (d), (e) and (f) together.

**38. Construction Requirements – Fans**

Fans in systems with a static pressure not more than 200Pa must have an efficiency calculated using the formula in J5.4(b)(i)

**39. Construction Requirements – Fans**

Fans in systems with a static pressure more than 200Pa must have an efficiency calculated using the formula in J5.4(b)(ii)

**40. Construction Requirements – Ductwork**

The average pressure drop in the index run across all straight sections of rigid ductwork and all sections of flexible ductwork must not exceed a pressure drop of 1 Pa/m. The pressure drop of flexible ductwork sections may be calculated as if the flexible ductwork is laid straight

**41. Construction Requirements – Ductwork**

Flexible ductwork must not account for more than 6m in length in any duct run.

**42. Construction Requirements – Ductwork**

The upstream connection of ductwork bends, elbows and tees must be at least equivalent in size to the connected duct.

**43. Construction Requirements – Ductwork**

Turning vanes must be included in all rigid ductwork bends of 90º or more acute except where the inclusion of turning vanes presents a fouling risk or a long radius bend in accordance with AS4254.2

**44. Construction Requirements – Ductwork**

This clause contains detailed design criteria which must be met for any ductwork installed. Refer to the clause extract in the body of the report and the tables referenced in the BCA


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**45. Construction Requirements – Ductwork Insulation**

J5.5 (a)Ductwork and fittings in an *air-conditioning* system must be provided with insulation—
(i)complying with AS/NZS 4859.1; and
(ii)having an insulation *R-Value* greater than or equal to—
(A)for flexible ductwork, 1.0; or
(B)for cushion boxes, that of the connecting ductwork; or
(C)that specified in Table J5.5.
(b)Insulation must—
(i)be protected against the effects of weather and sunlight; and
(ii)be installed so that it—
(A)abuts adjoining insulation to form a continuous barrier; and
(B)maintains its position and thickness, other than at flanges and supports; and
(iii)when conveying cooled air—
(A)be protected by a vapour barrier on the outside of the insulation; and
(B)where the vapour barrier is a membrane, be installed so that adjoining sheets of the membrane—
(aa)overlap by at least 50 mm; and
(bb)are bonded or taped together.

**46. Construction Requirements – Ductwork**

Note:
(c)The requirements of (a) do not apply to—
(i)ductwork and fittings located within the only or last room served by the system; or
(ii)fittings that form part of the interface with the *conditioned space*; or
(iii)return air ductwork in, or passing through, a *conditioned space*; or
(iv)ductwork for *outdoor air* and exhaust air associated with an *air-conditioning* system; or
(v)the floor of an in-situ air-handling unit; or
(vi)packaged air conditioners, split systems, and variable refrigerant flow *air-conditioning* equipment complying with *MEPS*; or
(vii)flexible fan connections.

**47. Construction Requirements – Ductwork Sealing**

Ductwork in an air-conditioning system with a capacity of 3000 L/s or greater, not located within the only or last room served by the system, must be sealed against air loss in accordance with the duct sealing requirements of AS 4254.1 and AS 4254.2 for the static pressure in the system

**48. Construction Requirements – Pumps and Pipework**

This clause contains detailed design criteria which must be met for any pumps and pipework installed as part of an air-conditioning system. Refer to the clause extract in the body of the report and the tables referenced in the BCA.

**49. Construction Requirements – Pipework Insulation**

This clause contains detailed design criteria which must be met for insulation of pipework which may be installed as part of an air-conditioning system. Refer to the clause extract in the body of the report and the tables referenced in the BCA

**50. Construction Requirements – Heaters**

Any heater planned to be used must be a solar heater, a gas heater or a heat pump heater.
If an electric heater is planned, refer to the detail requirements and limitations in the body of the report

**51. Construction Requirements – Heaters**

An electric heater may be used for heating a bathroom in a Class 2 building if the heating capacity is not more than 1.2 kW and the heater has a timer.

**52. Construction Requirements – Outdoor Heaters**

If any outdoor heaters are proposed, they must be configured to automatically shut down if there are no occupants in the space served, or one hours has elapse since the last activation of the heater or the space has reached the design temperature.

**53. Construction Requirements – Gas Water Heater**

Any gas water heater proposed which forms part of an air-conditioning system must achieve 86% thermal efficiency if rated to consume 500MJ/hr or less or if it consumes more it must achieve an efficiency of 90%.

**54. Construction Requirements – Chillers**

This clause contains detailed efficiency criteria which must be met for air-conditioning system refrigerant chillers which may be installed. Refer to the clause extract in the body of the report and the tables referenced in the BCA.


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**55. Construction Requirements – Miscellaneous Exhaust**

Any unitary air-conditioning equipment must comply with MEPS and if over 65kWr
For water cooled have a minimum energy efficiency ratio of 4.0 Wr/Winput for cooling and for air cooled have a minimum energy efficiency ratio of 2.9 Wr/Winput for cooling
Refer to the body of the report or to the BCA for the testing requirements

**56. Construction Requirements – Heat Rejection Equipment**

This clause contains detailed design criteria which must be met for heat rejection equipment which may be installed as part of an air-conditioning system. Refer to the clause extract in the body of the report and the tables referenced in the BCA.

## Part J6 – Artificial Lighting and Power

**57. Construction Requirements – Maximum Interior Illumination Power Load**

The total maximum allowed interior illumination power load for the development is 32,472W.
The aggregate design illumination power load must not exceed this allowed wattage.
Note 1: The total has been calculated using adjustment factors for enclosed spaces with a Room Aspect Ratio of less than 1.5.
Note 2: Emergency lighting and signage lighting are exempted from this requirement.
See Appendix for detailed calculation of allowed interior illumination power load for each space.

**58. Construction Requirements –**

**Illumination Power Load**

Note:
The requirements of BCA J6.2 (b) do not apply to the following:
(i) emergency lighting in accordance with BCA Part E4.
(ii) signage, display lighting within cabinets and display cases that are fixed in place.
(iii) lighting for accommodation within the residential part of a detention centre.
(iv) a heater where the heater also emits light, such as in bathrooms.
(v) lighting of a specialist process nature such as in a surgical operating theatre, fume cupboard or clean workstation.
(vi) lighting of performances such as theatrical or sporting.
(vii) lighting for the permanent display and preservation of works of art or objects in a museum or gallery other than for retail sale, purchase or auction.
(viii) lighting installed solely to provide photosynthetically active radiation for indoor plant growth on green walls and the like.

**59. Construction Requirements – Lighting Control**

Artificial lighting of a room or space must be individually operated by a switch or other control device.

**60. Construction Requirements – Lighting Switch or other Control Device**

An artificial lighting switch or other control device must not operate lighting for an area more than 250 $m^2$ for a space not more than 2000$m^2$, or 1000 $m^2$ for a space of more than 2000$m^2$ in the Class 6 and Class 7 parts of the building.

**61. Construction Requirements – Time Switch or Occupant Sensing Device**

95% of the lighting in the ground floor and carpark must be controlled by a time switch in accordance with BCA Specification J6 or an occupant sensing device such as a security card reader that registers a person entering and leaving the building or a motion detector in accordance with BCA Specification J6.

**62. Construction Requirements – Artificial lighting in natural Lighting Zone**

Artificial lighting in a natural lighting zone adjacent to windows must be separately controlled from artificial lighting not in a natural lighting zone in the same storey except where-
(i) The room containing the natural lighting zone is less than 20 $m^2$
(ii) The room's natural lighting zone contains less than 4 luminaires
70% or more of the luminaires in the room are in the natural lighting zone

**63. Construction Requirements – Lighting in Fire Stair**

Artificial lighting in a fire-isolated stairway or passage must be controlled by a motion detector in accordance with Specification J6

**64. Construction Requirements – Lighting in Foyer, Corridor and Other Circulation Spaces**

Artificial lighting in a foyer, corridor and other circulation spaces of more than 250 W within a single zone and adjacent to windows, must be controlled by a daylight sensor and dynamic lighting control device in accordance with Specification J6.


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**65. Construction Requirements – Artificial Lighting in Carpark Entry Zone**

Artificial lighting in the first 19 m of travel in a carpark entry zone must be controlled by a motion sensor in accordance with Specification J6.

**66. Construction Requirements – Exceptions**

The requirements of BCA J6.3 (a), (b), (c), (d), (e), (f), (g) and (h) do not apply to the following:
(i)emergency lighting in accordance with BCA Part E4.
(ii) where artificial lighting is needed for 24-hour occupancy such as for a manufacturing process, parts of a hospital, an airport control tower or within a detention centre.
(j) The requirements of (d) do not apply to the following:
(i) artificial lighting in a space where the sudden loss of artificial lighting would cause an unsafe situation such as in a patient care area in a Class 9a building or in a Class 9c building or a plant room, lift motor room, or a workshop where power tools are used.
(ii) a heater where the heater also emits light, such as in bathrooms.

**(i) Construction Requirements – Decorative or Display Lighting**

Interior decorative and display lighting (such as for foyer mural art display), shall be controlled separately from other lighting by a manual switch for each area (where the operating times of the displays are the same in multiple areas, they may be combined).
Where the decorative/display lighting exceeds 1 kW, it must be controlled by a time switch in accordance with BCA Specification J6.

**(ii) Construction Requirements – Window Display Lighting**

Window display lighting must be controlled separately from other display lighting.

**(iii) Construction Requirements – Perimeter Lighting**

Artificial lighting around the perimeter of the building must be controlled by a daylight sensor or a time switch in accordance with BCA Specification J6.
When the total perimeter lighting load exceeds 100 W
A Use LED luminaries for 90% of total lighting load or
B be controlled by a motion detector in accordance with BCA Specification J6. And
C When used for decorative purposes have a separate time switch in accordance with Specification J6
Note: The requirements of BCA J6.5(a)(ii) do not apply to emergency lighting in accordance with BCA Part E4.

**(iv) Construction Requirements – Boiling/Chilled Water Storage Units**

The power supply to a boiling water or chilled water storage unit must be controlled by a time switch in accordance with BCA Specification J6.

**67. Lifts**

(ii) if a dedicated goods lift, energy efficiency class D in accordance with ISO 25745-2.

## Part J7 – Heated Water Supply and Swimming Pool and Spa Pool Plant

**(v) Construction Requirements – Hot Water Heater**

Any heated water service for food preparation or sanitary purposes must be designed and installed in accordance with Part B2 of NCC Volume Three - Plumbing Code of Australia.

## Part J8 – Access for Maintenance and Facilities for Monitoring

**(vi) Construction Requirements – Facilities for energy monitoring**

The development must have an energy meter configured to record the time of use consumption of gas and electricity.

**(vii) Construction Requirements – Facilities for energy monitoring**

A building with a floor area of more than 2,500 m2 must have energy meters configured to separately record the time of use energy consumption of-
(i) air-conditioning plant including, where appropriate, heating plant, cooling plant and air handling fans; and
(ii) artificial lighting; and
(iii) appliance power; and
(iv) central hot water supply; and
(v) internal transport devices including lifts, escalators and, moving walkways where there is more than one serving the building; and
(vi) other ancillary plant.

**(viii) Construction Requirements – Facilities for energy monitoring**

Energy meters required by BCA J8.3 (b) must be interlinked by a communication system that collates the data to a single interface where it can be stored, analysed and reviewed.


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# Compliance Summary - Part J1- Building fabric

## Retail Areas 01 and 02

### Compliance Summary

| Item | Description | Requirement | Achieved | | Reference |
|---|---|---|---|---|---|
| **Roof** | *Total System Requirement* | **R3.7** | | ✓ | *J1.3* |
| **Total System R-value Achieved** | *Concrete Slab* | | **R3.7** | ✓ | *J1.3* |
| **Insulation Required** | *Concrete Slab* | | **R3.4** | ✓ | *J1.3* |
| **Maximum Solar Absorptance** | If a roof colour with a higher Solar absorptance is planned, contact Application Solutions to reassess. | **0.45** | see note at left | ✓ | *J1.3* |
| **Roof light** | There are no proposed works affected by this part therefore this part is not applicable | | | ✓ | *J1.4* |
| **Maximum U-value** | Max U-value for wall-glazing system | **U = 2** | **U = 0.27** | ✓ | *J1.5(a) + J1.5(c) J1.5(g)* |
| **Minimum R-value for walls** | | **R1.0** | | ✓ | *J1.5(d)* |
| **Total System R-Value Achieved** | Concrete Block Walls | | **1.01** | ✓ | *J1.5(c)* |
| **Insulation Required in walls** | Concrete Block Walls | | **R0.5** | ✓ | *J1.5(c)* |
| | Thermal Break - as specified in the report for the Class 2 part | | **If Required** | ✓ | *J1.5(c)* |
| **Glazing** | U-values - East | | **No Glazing on this Orientation** | ✓ | |
| | U-values - North | | **5.80** | ✓ | *J1.5(c)* |
| | U-values - South | | **5.80** | ✓ | |
| | U-values - West | | **5.80** | ✓ | |
| | SHGC-values - East | | **No Glazing on this Orientation** | ✓ | |
| | SHGC-values - North | | **1.00** | ✓ | *J1.5(f)* |
| | SHGC-values - South | | **1.00** | ✓ | |
| | SHGC-values - West | | **1.00** | ✓ | |
| **Display Glazing** | Display Window(s) all have SHGC less than max permitted | **2.31** | **1.00** | ✓ | |
| | There is/are 4 display glazing element(s) in the proposed building | | | ✓ | *J1.5(g)* |
| **Floor** | Minimum R-value for concrete slab on-ground | **R2** | **R2.05** | ✓ | *J1.6(a)* |
| | Insulation Required | | **0.7** | ✓ | |
| **Floor Edge Beam Insulation** | No edge beam insulation required | | | | |

*Paynter Dixon Retail 01-02 - Coffs Harbour*


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# Retail Area 03

## Compliance Summary

| Item | Description | Requirement | Achieved | | Reference |
|---|---|---|---|---|---|
| **Roof** | *Total System Requirement* | **R3.7** | | ✓ | *J1.3* |
| **Total System R-value Achieved** | *Concrete Slab* | | **R3.7** | ✓ | *J1.3* |
| **Insulation Required** | *Concrete Slab* | | **R3.4** | ✓ | *J1.3* |
| **Maximum Solar Absorptance** | If a roof colour with a higher Solar absorptance is planned, contact Application Solutions to reassess. | **0.45** | see note at left | ✓ | *J1.3* |
| **Roof light** | There are no proposed works affected by this part therefore this part is not applicable | | | ✓ | *J1.4* |
| **Maximum U-value** | Max U-value for wall-glazing system | **U = 2** | **U = 0.77** | ✓ | *J1.5(a) + J1.5(c) J1.5(g)* |
| **Minimum R-value for walls** | | **R1.0** | | ✓ | *J1.5(d)* |
| **Total System R-Value Achieved** | Concrete Block Walls | | **1.01** | ✓ | *J1.5(c)* |
| **Insulation Required in walls** | Concrete Block Walls | | **R0.5** | | *J1.5(c)* |
| | Thermal Break - as specified in the report for the Class 2 part | | **If Required** | | *J1.5(c)* |
| **Glazing** | U-values - East | **No Glazing on this Orientation** | | ✓ | *J1.5(c)* |
| | U-values - North | **No Glazing on this Orientation** | | ✓ | |
| | U-values - South | **No Glazing on this Orientation** | | ✓ | |
| | U-values - West | | **5.80** | ✓ | |
| | SHGC-values - East | **No Glazing on this Orientation** | | ✓ | *J1.5(f)* |
| | SHGC-values - North | **No Glazing on this Orientation** | | ✓ | |
| | SHGC-values - South | **No Glazing on this Orientation** | | ✓ | |
| | SHGC-values - West | | **1.00** | ✓ | |
| **Display Glazing** | Display Window(s) all have SHGC less than max permitted | **2.31** | **1.00** | ✓ | |
| | There is/are 1 display glazing element(s) in the proposed building | | | ✓ | *J1.5(g)* |
| **Floor** | Minimum R-value for concrete slab on-ground | **R2** | **R2.09** | ✓ | *J1.6(a)* |
| | Insulation Required | | **0.8** | ✓ | |
| **Floor Edge Beam Insulation** | No edge beam insulation required | | | | |

*Paynter Dixon Retail 03 - Coffs Harbour*


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# Retail Areas 04 to 07

## Compliance Summary

| Item | Description | Requirement | Achieved | |
|---|---|---|---|---|
| **Roof** | *Total System Requirement* | **R3.7** | | ✓ |
| **Total System R-value Achieved** | *Concrete Slab* | | **R3.7** | ✓ |
| **Insulation Required** | *Concrete Slab* | | **R3.4** | ✓ |
| | | | | |
| **Maximum Solar Absorptance** | If a roof colour with a higher Solar absorptance is planned, contact Application Solutions to reassess. | **0.45** | see note at left | ✓ |
| | | | | |
| **Roof light** | There are no proposed works affected by this part therefore this part is not applicable | | | ✓ |
| | | | | |
| **Maximum U-value** | Max U-value for wall-glazing system | **U = 2** | **U = 0.4** | ✓ |
| | | | | |
| **Minimum R-value for walls** | | **R1.0** | | ✓ |
| **Total System R-Value Achieved** | Concrete Block Walls | | **1.01** | ✓ |
| **Insulation Required in walls** | Concrete Block Walls | | **R0.5** | ✓ |
| Thermal Break - as specified in the report | | | **If Required** | |
| | | | | |
| **Glazing** | U-values - East | | **No Glazing on this Orientation** | ✓ |
| | U-values - North | | **5.80** | ✓ |
| | U-values - South | | **5.80** | ✓ |
| | U-values - West | | **5.80** | ✓ |
| | SHGC-values - East | | **No Glazing on this Orientation** | ✓ |
| | SHGC-values - North | | **1.00** | ✓ |
| | SHGC-values - South | | **1.00** | ✓ |
| | SHGC-values - West | | **1.00** | ✓ |
| | | | | |
| **Display Glazing** | Display Window(s) all have SHGC less than max permitted | **2.31** | **1.00** | ✓ |
| | There is/are 6 display glazing element(s) in the proposed building | | | ✓ |
| | | | | |
| **Floor** | Minimum R-value for concrete slab on-ground | **R2** | **R2.07** | ✓ |
| | Insulation Required | | **0.8** | ✓ |
| **Floor Edge Beam Insulation** | No edge beam insulation required | | | |
| | | | | |
| *Paynter Dixon Retail 04-07 - Coffs Harbour* | | | | |


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# Introduction

Application Solutions has been engaged to provide a compliance assessment of the proposed development with respect to the Building Code of Australia (2019) (BCA), Section J – Energy Efficiency. The BCA2019 is part of the National Construction Series.

The assessment is based on the Deemed-to-Satisfy (DTS) provisions of the BCA. The assessment references the National provisions of the BCA and the NSW Appendix to the BCA.

Throughout this report, reference is made to the ***envelope*** of a building. This is an important term in the application of Section J and is defined in the BCA as follows:

> ***Envelope****, for the purposes of Section J, means the parts of a building's fabric that separate a conditioned space or habitable room from-*
> *(a) The exterior of the building; or*
> *(b) A non-conditioned space including-*
> *(i) The floor of a rooftop plant room, lift-machine room or the like; and*
> *(ii) The floor above a carpark or warehouse; and*
> *(iii) The common wall with a carpark, warehouse or the like.*

For complete understanding, the term ***conditioned space*** *and* ***wall-glazing construction*** is also referred to and is defined in the BCA as follows:

> ***Conditioned space*** *means a space within a building, including a ceiling or under-floor supply air plenum or return air plenum, where the environment is likely, by the intended use of the space, to have its temperature controlled by air-conditioning*

> ***Wall-glazing construction***, for the purposes of Section J in Volume One, means the combination of wall and *glazing* components comprising the *envelope* of a building, excluding—
> (a)*display glazing*; and
> (b)opaque non-glazed openings such as doors, vents, penetrations and shutters.

> ***Display glazing*** means *glazing* used to display retail goods in a shop or showroom directly adjacent to a walkway or footpath, but not including that used in a café or restaurant.

> ***Habitable room*** means a room used for normal domestic activities, and—
> (a)includes a bedroom, living room, lounge room, music room, television room, kitchen, dining room sewing room, study, playroom, family room, home theatre and sunroom; but
> (b)excludes a bathroom, laundry, water closet, pantry, walk-in wardrobe, corridor, hallway, lobby, photographic darkroom, clothes-drying room, and other spaces of a specialised nature occupied neither frequently nor for extended periods.

References are also made to Specifications and additional information contained within the BCA. It is important to be aware of these details as relevant to Section J compliance. Copies of these are now available free of charge through the Australian Building Codes Board at www.abcb.gov.au

Contact Application Solutions if you need assistance in accessing the online version of the BCA.


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## Proposed Development

The proposed development comprises a multi-level residential apartment building with 3 levels of carparking above ground floor commercial and carparking. The development includes a basement level for fire services.

The proposed development has been classified:

| | |
|---|---|
| Retail | Class 6 |
| Carpark | Class 7a |
| Residential Units | Class 2 |

The development is in the Local Government Area (LGA) of Coffs Harbour City Council

and therefore, the relevant climate zone is Climate Zone 2

The designer for the proposed development is:

Turner Studio
Level 7, 1 Oxford Street
Darlinghurst
NSW

## Assessment Outline

This Assessment examines each Part of Section J in turn and provides an opinion on whether the Part applies in this case and if so whether the Deemed–to-Satisfy provisions have been met. In some cases, further clarification is specified in the form of notes to be included on the plans and/or specifications.

A summary of items required to achieve Section J compliance is provided at the beginning of this report. These matters will need to be incorporated into the Construction Certificate documentation before a Construction Certificate is granted.

In the preparation of this assessment, reference was made to the following plans:


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| Series | Drawing No. | Drawing Name | Scale | Rev | Size |
|---|---|---|---|---|---|
| **General** | | | | | |
| | DA-001-001 | Title Sheet | 1:1.25 | 01 | A1 |
| **Siteworks** | | | | | |
| | DA-010-001 | Location Plan 01 | | 01 | A1 |
| | DA-010-002 | Location Plan 02 | 1:1000 | 01 | A1 |
| | DA-010-003 | Site Plan | 1:500 | 01 | A1 |
| | DA-010-004 | Demolition Plan | 1:200 | 01 | A1 |
| **GA Plans** | | | | | |
| | DA-110-001 | Ground Level | 1:200 | 07 | A1 |
| | DA-110-005 | Mezzanine Level | 1:200 | 04 | A1 |
| | DA-110-010 | Level 01 | 1:200 | 07 | A1 |
| | DA-110-020 | Level 02 | 1:200 | 07 | A1 |
| | DA-110-030 | Level 03 | 1:200 | 07 | A1 |
| | DA-110-040 | Level 04 | 1:200 | 06 | A1 |
| | DA-110-050 | Level 05 | 1:200 | 06 | A1 |
| | DA-110-060 | Level 06 | 1:200 | 06 | A1 |
| | DA-110-070 | Level 07 | 1:200 | 06 | A1 |
| | DA-110-080 | Level 08 | 1:200 | 06 | A1 |
| | DA-110-090 | Level 09 | 1:200 | 06 | A1 |
| | DA-110-100 | Level 10 | 1:200 | 06 | A1 |
| | DA-110-110 | Level 11 | 1:200 | 06 | A1 |
| | DA-110-120 | Level 12 | 1:200 | 06 | A1 |
| | DA-110-130 | Roof Level | 1:200 | 07 | A1 |
| **Elevations** | | | | | |
| | DA-210-001 | North and South Elevation | 1:200, 1:100 | 02 | A1 |
| | DA-210-002 | East Elevation | 1:200, 1:100 | 02 | A1 |
| | DA-210-003 | West Elevation | 1:200, 1:100 | 02 | A1 |
| **Sections** | | | | | |
| | DA-310-001 | Section 01 | 1:200 | 02 | A1 |
| | DA-310-002 | Section 02 | 1:200 | 02 | A1 |
| | DA-310-003 | Section Details | 1:100, 1:50, 1:1 | 01 | A1 |
| **Shadow Diagram** | | | | | |
| | DA-710-001 | June 21st 9am | 1:500 | 01 | A1 |
| | DA-710-002 | June 21st 12pm | 1:500 | 01 | A1 |
| | DA-710-003 | June 21st 3pm | 1:500 | 01 | A1 |
| **Amenity Diagrams (ADG)** | | | | | |
| | DA-720-001 | SEPP65 Amenities Diagram | 1:500 | 02 | A1 |
| **Deep Soil and Communal Space Diagrams (ADG)** | | | | | |
| | DA-730-001 | Deep Soil and Communal Space | 1:200 | 01 | A1 |
| **GFA Diagrams** | | | | | |
| | DA-770-001 | GFA Diagram | 1:500 | 01 | A1 |
| **Adaptable & Livable Apartment Layouts** | | | | | |
| | DA-810-001 | Sheet 01 | 1:50 | 02 | A1 |
| | DA-810-002 | Sheet 02 | 1:50 | 02 | A1 |
| | DA-810-003 | Sheet 03 | 1:50 | 02 | A1 |
| | DA-810-004 | Sheet 04 | 1:50 | 02 | A1 |
| | DA-810-005 | Sheet 05 | 1:50 | 02 | A1 |
| | DA-810-006 | Sheet 06 | 1:50 | 02 | A1 |
| **Materials & Finishes Board** | | | | | |
| | DA-890-001 | External Materials Palette | 1:100 | 01 | A1 |
| **3D Views** | | | | | |
| | DA-910-001 | Perspective 01 | | 01 | A1 |
| | DA-910-002 | Perspective 02 | | 01 | A1 |


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# Section J: Sign-Off - On Completion of Construction

This report was prepared at the pre-DA stage. Later, at the construction certificate stage, the Section J compliance requirements for this project these requirements must be incorporated into the CC application. The requirements are set out in this report, based on various assumptions outlined in each point of the report. In some cases, where information was not available at the time of preparing the report, we have identified the requirement and it is up to the developer/builder of the project to ensure compliance is met.

It is critical that the developer/builder takes the time to understand the requirements outlined in this report and the underlying assumptions. If the design, construction methods or materials are changed after this report was prepared, please contact Application Solutions to reassess to ensure compliance is maintained.

The Executive Summary provides the documentation of Section J requirements which apply to this proposed development. Attention is drawn to the need to provide documentation during construction that each requirement has been met for submission at Occupancy Certificate Stage.

This should include, where relevant.

- Certificates from specific suppliers and contractors
- Photographic record and
- Site inspections

It is important that the information in this report be forwarded to the person/s responsible on site to ensure all work is carried out in compliance and that each item is documented appropriately.

**INSPECTIONS:**
Where Application Solutions is asked to prepare a sign-off report at the Occupancy Certificate (OC) stage, several crucial phase inspections will be required during construction. These inspections points may be different for different projects but generally will include:

1. Commencement site meeting with the site supervisor. The meeting may include the site project manager and contract administrator depending on the project's management structure. The purpose of the meeting is to go through the Section J report and identify critical issues. It will also look at the best method of demonstrating compliance at OC.
2. The commencement meeting will identify crucial phase inspection points to take place during construction. Typically, it will include an inspection(s) to create a record of insulation installation, thermal break installation and structural build up.
3. A completion inspection will be conducted at the end of the project. Prior to the completion inspection and at the direction of the developer/builder, Application Solutions will prepare a Completion Check List to be used by the developer/builder to ensure relevant trade/supplier certificates are obtained.

**CERTIFICATES:**
Typically, a range of certificates will be required as part of the sign-off process at the OC stage. These may include, work involved in insulation/thermal breaks, glazing, mechanical and electrical works. The requirement for a certificate from relevant trades (or suppliers) should be set out in the terms of engagement of the trade/supplier. The certificates should be obtained immediately after the work is done rather than at the end of construction. Particular issues related to a particular project can be addressed at the commencement site meeting to ensure a smooth path for achieving the OC sign-off. Some general notes are provided below:


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The NCC provides methods for demonstrating that any given aspect of construction meets the codes requirements. For this project it is likely to involve critical trades/suppliers providing a certificate of compliance.

Although this situation is of long standing it has recently been brought into stark relief through the NSW government's decision to adopt the recommendations of the Shergold-Weir report - Building Confidence and the NSW Upper House Public Accountability Committee inquiry into the regulation of building standards, building quality and building disputes.

With the heightened focus on demonstrating compliance, greater attention must be given to this area. It is also important to realise that all participants in the building process have a share of responsibility for the successful outcome of the project

The genesis of the compliance certificate is found in the NCC A5.2(1). Of relevance to this project is A5.2(1)(e): See below.

> ***A5.2(1) (e)A certificate or report from a professional engineer or other appropriately qualified person that—***
> ***(i)certifies that a material, product, form of construction or design fulfils specific requirements of the BCA; and***
> ***(ii)sets out the basis on which it is given and the extent to which relevant standards, specifications, rules, codes of practice or other publications have been relied upon to demonstrate it fulfils specific requirements of the BCA.***

The clause is in 2 parts. Part (i) The certificate and Part (ii) a supporting document setting out the basis on which the certificate is given.

Part (i): Clearly Identify the person giving the certificate:
- Full Name
- Job Title
- Company Details (letter head)
- Qualifications and Experience

Statement of the matters being certified and that they comply
Signed and Dated

Part (ii) We recommend that the supporting document be created using the Executive Summary from this report. The Executive Summary contains a list of compliance items relevant to this project. Extract the relevant items and make a compliance statement under each item. The compliance statement should include what was actually installed in terms relevant to the particular item. If an item is not relevant or not applicable, then the reason for this should be stated.

## Section J: Sign-Off - On Completion of Construction

| | |
|---|---|
| **1. Documentation of Compliance During Construction** | **It is important to document compliance for each item noted in the Executive Summary throughout construction. Refer to the "Section J: Sign-Off – on Completion of Construction" section of this report for guidance. If further assistance is required, contact Application Solutions.** |


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## NSW Section J – Energy Efficiency

**Note: In NSW, Section J is replaced with NSW Section J.**

### NSW Part J(A)1 Building fabric

<table>
<tr><td>BCA extract</td><td>

***NSW J(A)1.1 Application of Part***
*(a)The Deemed-to-Satisfy Provisions only apply to thermal insulation in a Class 2 building or Class 4 part of a building where a development consent or complying development certificate specifies that the insulation is to be provided as part of the development.*
*(b)In (a), development consent and complying development certificate, have the meaning given to these terms by the Environmental Planning and Assessment Act 1979.*
*(c)The Deemed-to-Satisfy Provisions of this Part for thermal breaks apply to all Class 2 buildings and Class 4 parts.*

***NSW J(A)1.2 Compliance with BCA provisions***
*The sole-occupancy units of a Class 2 building and a Class 4 part of a building must comply with the national BCA provisions of J0.2(b) to (d) - except that the reference to "Where required" in J1.2 is deemed to refer to "Where a development consent or a complying development certificate specifies that insulation is to be provided as part of the development."*
*Note: Compliance is not required with the national BCA provisions of J0.2(a) as those matters are regulated under BASIX and the national BCA provisions of J0.2(e) are covered by NSW J(A)2.2.*

</td></tr>
<tr><td>Application to Development</td><td>

<table>
<tr><td>Retail</td><td>Class 6</td><td>This Part does not apply as it is not a Class 2 or 4 part.</td></tr>
<tr><td>Carpark</td><td>Class 7a</td><td>This Part does not apply as it is not a Class 2 or 4 part.</td></tr>
<tr><td>Residential Units</td><td>Class 2</td><td>This Part applies.</td></tr>
</table>

**See body of report for requirements.**

</td></tr>
</table>


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## NSW Part J(A)2 Building sealing

<table>
<tr><td>BCA extract</td><td>

***NSW J(A)2.1 Application of Part***
*The Deemed-to-Satisfy Provisions of this Part apply to elements forming the envelope of a Class 2 building and a Class 4 part of a building, other than—*
*(a)a building in climate zones 2 and 5 where the only means of air-conditioning is by using an evaporative cooler; or*
*(b)a permanent building opening, in a space where a gas appliance is located, that is necessary for the safe operation of a gas appliance; or*
*(c)parts of buildings that cannot be fully enclosed.*

***NSW J(A)2.2 Compliance with BCA provisions***
*Class 2 buildings and Class 4 parts of buildings must comply with the following national BCA provisions, as applicable—*
*(a)J3.2 Chimneys and flues; and*
*(b)J3.3 Roof lights; and*
*(c)J3.4(a) to (d) Windows and doors; and*
*(d)J3.5 Exhaust fans; and*
*(e)J3.6 Construction of ceilings, walls and floors; and*
*(f)J3.7 Evaporative coolers.*

</td></tr>
<tr><td>Application to Development</td><td>

<table>
<tr><td>Retail</td><td>Class 6</td><td>This Part does not apply as it is not a Class 2 or 4 part.</td></tr>
<tr><td>Carpark</td><td>Class 7a</td><td>This Part does not apply as it is not a Class 2 or 4 part.</td></tr>
<tr><td>Residential Units</td><td>Class 2</td><td>This Part applies.</td></tr>
</table>

**See body of report for requirements.**

</td></tr>
</table>


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## NSW Part J(A)3 Air-conditioning and ventilation systems

<table>
<tr><td>BCA extract</td><td>

***NSW J(A)3.1 Application of Part***
*The Deemed-to-Satisfy Provisions of this Part apply to a Class 2 building and a Class 4 part of a building.*

***NSW J(A)3.2 Compliance with BCA provisions***
*Class 2 buildings and Class 4 parts of buildings must comply with the following national BCA provisions, as applicable—*
*(a)for air-conditioning system control: J5.2; and*
*(b)for mechanical ventilation system control: J5.3; and*
*(c)for fan systems: J5.4; and*
*(d)for ductwork insulation: J5.5; and*
*(e)for ductwork sealing: J5.6; and*
*(f)for pump systems: J5.7; and*
*(g)for pipework insulation: J5.8; and*
*(h)for refrigerant chillers: J5.10; and*
*(i)for unitary air-conditioning equipment: J5.11; and*
*(j)for heat rejection equipment: J5.12.*
*Note: Compliance is not required with the national BCA provisions of J5.9 as those matters are regulated under BASIX.*

</td></tr>
<tr><td>Application to Development</td><td>

<table>
<tr><td>Retail</td><td>Class 6</td><td>This Part does not apply as it is not a Class 2 or 4 part.</td></tr>
<tr><td>Carpark</td><td>Class 7a</td><td>This Part does not apply as it is not a Class 2 or 4 part.</td></tr>
<tr><td>Residential Units</td><td>Class 2</td><td>This Part applies.</td></tr>
</table>

**See body of report for requirements.**

</td></tr>
</table>


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## NSW Part J(A)4 Heated Water Supply

| | |
|---|---|
| BCA extract | ***NSW J(A)4.1 Application of Part***<br>*The Deemed-to-Satisfy Provisions of this Part apply to a Class 2 building and a Class 4 part of a building.*<br><br>***NSW J(A)4.2 Compliance with BCA provisions***<br>*Class 2 buildings and Class 4 parts of buildings must comply with the national BCA provisions of J7.2 Heated water supply.*<br>*Note: Compliance is not required with the national BCA provisions of J7.3 and J7.4 as those matters are regulated under BASIX.* |
| Application to Development | **Retail** — **Class 6** — **This Part does not apply as it is not a Class 2 or 4 part.**<br>**Carpark** — **Class 7a** — **This Part does not apply as it is not a Class 2 or 4 part.**<br>**Residential Units** — **Class 2** — **This Part applies.**<br><br>**See body of report for requirements.** |

## NSW Part J(A)5 Facilities for energy monitoring

| | |
|---|---|
| BCA extract | ***NSW J(A)5.1 Application of Part***<br>*The Deemed-to-Satisfy Provisions of this Part apply to a Class 2 building except within a sole-occupancy unit.*<br><br>***NSW J(A)5.3 Compliance with BCA provisions***<br>*Class 2 buildings must comply with the national BCA provisions of J8.3.* |
| Application to Development | **Retail** — **Class 6** — **This Part does not apply as it is not a Class 2 or 4 part.**<br>**Carpark** — **Class 7a** — **This Part does not apply as it is not a Class 2 or 4 part.**<br>**Residential Units** — **Class 2** — **This Part applies.**<br><br>**See body of report for requirements.** |


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## NSW Subsection J(B)

<table>
<tr><td>BCA extract</td><td>NSW J(B)1 Compliance with BCA provisions<br>Class 3 and Class 5 to 9 buildings must comply with all of the provisions of the national Section J that are applicable to the relevant classifications, except as varied by NSW J3.1 Application of Part.<br>Add NSW J3.1(d) as follows:<br>NSW J3.1 Application of Part<br>(d) parts of buildings that cannot be fully enclosed.</td></tr>
<tr><td>Application to Development</td><td>
<table>
<tr><td>Retail</td><td>Class 6</td><td>This Part applies.</td></tr>
<tr><td>Carpark</td><td>Class 7a</td><td>This Part applies.</td></tr>
<tr><td>Residential Units</td><td>Class 2</td><td>This Part does not apply as it is not a Class 3 or 5 to 9 part of the building.</td></tr>
</table>
See body of report for requirements.
</td></tr>
</table>


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# Part J0 – Energy Efficiency

## J0.1 Application of Section J

<table>
<tr><td>BCA extract</td><td>J0.1 Performance Requirement JP1 is satisfied by complying with—<br>(a) for reducing the heating or cooling loads—<br>(i) of sole-occupancy units of a Class 2 building or a Class 4 part of a building, J0.2 to J0.5; and</td></tr>
<tr><td>Application to Development</td><td>
<table>
<tr><td>Retail</td><td>Class 6</td><td>This Part does not apply as it is not a Class 2 or 4 part.</td></tr>
<tr><td>Carpark</td><td>Class 7a</td><td>This Part does not apply as it is not a Class 2 or 4 part.</td></tr>
<tr><td>Residential Units</td><td>Class 2</td><td>This Part does not apply as these matters in NSW are regulated under BASIX.</td></tr>
</table>
</td></tr>
</table>


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| | |
|---|---|
| BCA extract | *J0.1 (a)*<br>*(ii) of a Class 2 to 9 building, other than the sole-occupancy units of a Class 2 building or a Class 4 part of a building, Parts J1 and J3; and*<br>*(b) for air-conditioning and ventilation, Part J5; and*<br>*(c) for artificial lighting and power, Part J6; and*<br>*(d) for heated water supply and swimming pool and spa pool plant, Part J7; and*<br>*(e) for facilities for monitoring, Part J8* |
| Application to Development | |

| | | |
|---|---|---|
| **Retail** | **Class 6** | **This Part applies.** |
| **Carpark** | **Class 7a** | **This Part applies.** |
| **Residential Units** | **Class 2** | **This Part does not apply as in NSW these matters are regulated under BASIX.** |

**See body of report for requirements.**

## J0.2 Heating and cooling loads of sole-occupancy units of a Class 2 building or a Class 4 part

| | |
|---|---|
| BCA extract | *J0.2 The sole-occupancy units of a Class 2 building or a Class 4 part of a building must—*<br>*(a)for reducing the heating or cooling loads—*<br>*(i)collectively achieve an average energy rating of not less than 6 stars, including the separate heating and cooling load limits; and*<br>*(ii)individually achieve an energy rating of not less than 5 stars, including the separate heating and cooling load limits,*<br>*using house energy rating software and the load limits specified in the ABCB Standard for NatHERS Heating and Cooling Load Limits.* |
| Application to Development | |

| | | |
|---|---|---|
| **Retail** | **Class 6** | **This Part does not apply as it is not a Class 2 or 4 part.** |
| **Carpark** | **Class 7a** | **This Part does not apply as it is not a Class 2 or 4 part.** |
| **Residential Units** | **Class 2** | **This Part does not apply as specified by NSW Section J(A)1.2 as these matters are regulated under BASIX.** |


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<table>
<tr><td>BCA extract</td><td>J0.2 (b) for general thermal construction, comply with J1.2; and<br>(c) for thermal breaks, comply with J0.4 and J0.5; and<br>(d) for floor edge insulation, comply with J1.6(b) and J1.6(c); and</td></tr>
<tr><td>Application to Development</td><td>
<table>
<tr><td>Retail</td><td>Class 6</td><td>This Part does not apply as it is not a Class 2 or 4 part.</td></tr>
<tr><td>Carpark</td><td>Class 7a</td><td>This Part does not apply as it is not a Class 2 or 4 part.</td></tr>
<tr><td>Residential Units</td><td>Class 2</td><td>This Part applies as specified by NSW Section J(A)1.2 .</td></tr>
</table>
See body of report for requirements.
</td></tr>
</table>

<table>
<tr><td>BCA extract</td><td>J0.2(e) for building sealing, comply with Part J3. As specified by NSW Section J(A)2.2 below,<br><br>Class 2 buildings and Class 4 parts of buildings must comply with the following national BCA provisions, as applicable—<br>(a)J3.2 Chimneys and flues; and<br>(b)J3.3 Roof lights; and<br>IJ3.4(a) to (d) Windows and doors; and<br>(d)J3.5 Exhaust fans; and<br>IJ3.6 Construction of ceilings, walls and floors; and<br>(f)J3.7 Evaporative coolers</td></tr>
<tr><td>Application to Development</td><td>
<table>
<tr><td>Retail</td><td>Class 6</td><td>This Part does not apply as it is not a Class 2 or 4 part.</td></tr>
<tr><td>Carpark</td><td>Class 7a</td><td>This Part does not apply as it is not a Class 2 or 4 part.</td></tr>
<tr><td>Residential Units</td><td>Class 2</td><td>This Part applies as specified by NSW Section J(A2.2)</td></tr>
</table>
See body of report for requirements.
</td></tr>
</table>


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## J0.3 Ceiling fans

| | |
|---|---|
| BCA extract | *J0.3 Ceiling fans required as part of compliance with J0.2(a), must—*<br>*(a)be permanently installed; and*<br>*(b)have a speed controller; and*<br>*(c)serve the whole room, with the floor area that a single fan serves not exceeding—*<br>*(i)15 m2 if it has a blade rotation diameter of not less than 900 mm; and*<br>*(ii)25 m2 if it has a blade rotation diameter of not less than 1 200 mm.* |
| Application to Development | |

| | | |
|---|---|---|
| **Retail** | **Class 6** | **This Part does not apply as it is not a Class 2 or 4 part.** |
| **Carpark** | **Class 7a** | **This Part does not apply as it is not a Class 2 or 4 part.** |
| **Residential Units** | **Class 2** | **This Part does not apply as specified by NSW Section J(A)1.2 as these matters are regulated under BASIX.** |

## J0.4 Roof thermal breaks

| | |
|---|---|
| BCA extract | *For compliance with J0.2(c), a roof that—*<br>*(a)has metal sheet roofing fixed to metal purlins, metal rafters or metal battens; and*<br>*(b)does not have a ceiling lining or has a ceiling lining fixed directly to those metal purlins, metal rafters or metal battens,*<br>*must have a thermal break, consisting of a material with an R-Value of not less than R0.2, installed at all points of contact between the metal sheet roofing and its supporting metal purlins, metal rafters or metal battens.* |
| Application to Development | |

| | | |
|---|---|---|
| **Retail** | **Class 6** | **This Part does not apply as it is not a Class 2 or 4 part.** |
| **Carpark** | **Class 7a** | **This Part does not apply as it is not a Class 2 or 4 part.** |
| **Residential Units** | **Class 2** | **This Part applies as specified by NSW Section J(A)1.2 .** |

| | |
|---|---|
| **2. Roof thermal break** | **If there is to be any metal sheet roofing fixed directly to a metal frame roof that has a ceiling lining fixed directly to the same metal frame, a thermal break will be required consisting of a material with an R-Value of not less than R0.2, installed at all points of contact between the metal sheet roofing and its supporting metal frame.** |


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## J0.5 Wall thermal breaks

<table>
<tr><td>BCA extract</td><td>For compliance with J0.2(c), a wall that—<br>(a)does not have a wall lining or has a wall lining that is fixed directly to the same metal frame; and<br>(b)has lightweight external cladding such as weatherboards, fibre-cement or metal sheeting fixed to a metal frame,<br>must have a thermal break, consisting of a material with an R-Value of not less than R0.2, installed at all points of contact between the external cladding and the metal frame.</td></tr>
<tr><td>Application to Development</td><td>
<table>
<tr><td>Retail</td><td>Class 6</td><td>This Part does not apply as it is not a Class 2 or 4 part.</td></tr>
<tr><td>Carpark</td><td>Class 7a</td><td>This Part does not apply as it is not a Class 2 or 4 part.</td></tr>
<tr><td>Residential Units</td><td>Class 2</td><td>This Part applies as specified by NSW Section J(A)1.2 .</td></tr>
</table>
</td></tr>
<tr><td>3. Wall thermal break</td><td>If there is to be any metal frame walls that have lightweight external cladding such as weatherboards, fibre cement sheet or metal sheeting fixed directly to the metal frame with an internal wall lining fixed directly to the same metal frame, a thermal break will be required consisting of a material with an R-Value of not less than R0.2, installed at all points of contact between the external cladding and the metal frame.</td></tr>
</table>


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# Part J1 – Building Fabric and Glazing

## J1.1 Application of Part

<table>
<tr><td>BCA extract</td><td>The Deemed-to-Satisfy Provisions of this Part apply to building elements forming the envelope of a Class 2 to 9 building.</td></tr>
<tr><td>Application to Development</td><td>
<table>
<tr><td>Retail</td><td>Class 6</td><td>This Part applies.</td></tr>
<tr><td>Carpark</td><td>Class 7a</td><td>This Part applies.</td></tr>
<tr><td>Residential Units</td><td>Class 2</td><td>J1.2 only applies to this Part as specified by NSW Section J(A)1.2 .</td></tr>
</table>
See body of report for requirements.
</td></tr>
</table>

*Continues on next page…*


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## J1.2 Thermal construction – general

| | |
|---|---|
| BCA extract | *J1.2 (a) Where required, insulation must comply with AS/NZS 4859.1 and be installed so that it-*<br>*(i) abuts or overlaps adjoining insulation other than at supporting members such as studs, noggins, joists, furring channels and the like where the insulation must be against the member; and*<br>*(ii) forms a continuous barrier with ceilings, walls, bulkheads, floors or the like that inherently contribute to the thermal barrier; and*<br>*(iii) does not affect the safe or effective operation of a service or fitting.*<br>*(b) Where required, reflective insulation must be installed with-*<br>*(i) the necessary airspace to achieve the required R-Value between a reflective side of the reflective insulation and a building lining or cladding; and*<br>*(ii) the reflective insulation closely fitted against any penetration, door or window opening; and*<br>*(iii) the reflective insulation adequately supported by framing members; and*<br>*(iv) each adjoining sheet of roll membrane being-*<br>*(A) overlapped not less than 50 mm; or*<br>*(B) taped together.*<br>*(c) Where required, bulk insulation must be installed so that-*<br>*(i) it maintains its position and thickness, other than where it is compressed between cladding and supporting members, water pipes, electrical cabling or the like; and*<br>*(ii) in a ceiling, where there is no bulk insulation or reflective insulation in the wall beneath, it overlaps the wall by not less than 50 mm.*<br>*(d) Roof, ceiling, wall and floor materials, and associated surfaces are deemed to have the thermal properties listed in BCA Specification J1.2.*<br>*(e) The required Total R-Value and Total System U-Value, including allowance for thermal bridging, must be-*<br>*(i) calculated in accordance with AS/NZS4859.2 for a roof or floor; or*<br>*(ii) determined in accordance with Specification J1.5a for wall-glazing construction; or*<br>*(iii) determined in accordance with SpecificationJ1.6 or Section3.5 of CIBSE Guide A for soil or sub-floorspaces.* |
| Application to Development | **This clause applies where insulation is required in the proposed development.** |
| **4. Construction Requirements – Installation of Insulation** | **Where required, insulation must comply with AS/NZS 4859.1 and be installed so that it:**<br>**(i) abuts or overlaps adjoining insulation other than at supporting members; and**<br>**(ii) forms a continuous barrier…and**<br>**(iii) does not affect the safe or effective operation of a service or fitting.**<br>**Reflective insulation must be installed with:**<br>**(i) the necessary airspace to achieve the required R-Value between a reflective side of the reflective insulation and a building lining or cladding; and**<br>**(ii) the reflective insulation closely fitted against any penetration, door or window opening; and**<br>**(iii) the reflective insulation adequately supported by framing members; and**<br>**(iv) each adjoining sheet of roll membrane being overlapped not less than 50 mm or taped together.**<br>**Bulk insulation must be installed so that:**<br>**(i) it maintains its position and thickness, other than where it crosses roof battens, water pipes, electrical cabling or the like; and**<br>**(ii) in a ceiling, where there is no bulk insulation or reflective insulation in the wall beneath, it overlaps the wall by not less than 50 mm.** |


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## J1.3 Roof and ceiling construction

| | |
|---|---|
| BCA extract | *J1.3 -* *(a)* A roof or ceiling must achieve a *Total R-Value* greater than or equal to—<br>*(i) in climate zones 1, 2, 3, 4 and 5, 3.7 for a downward direction of heat flow; and*<br>*(ii) In climate zone 6, 3.2 for a downward direction of heat flow; and*<br>*(iii) In climate zone 7, 3.7 for an upward direction of heat flow; and*<br>*(iv) In climate zone 8, 4.8 for an upward direction of heat flow*<br>*(b) In climate zones 1, 2, 3, 4, 5, 6 and 7, the solar absorptance of the upper surface of a roof must be not more than 0.45* |
| Application to Development | **This clause applies to the proposed development. The roof/ceiling system which forms part of the envelope shall have a minimum total R-Value as required by BCA J1.3(a). The components of the proposed new roof/ceiling system and their respective R-Values are tabulated below:** |

*…. continues on next page*


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**5. Construction Requirements – Roof and Ceiling Insulation**

**The minimum total R-Value for the roof/ceiling system which forms part of the envelope required by BCA J1.3a is R3.7.**

**To achieve compliance, insulation with an R-Value R3.4 is required to be incorporated into the roof/ceiling systems which forms part of the envelope for the following retail parts of the building. i.e. The area of roof where there is no conditioned space above. See Appendix for roof calculations and ceiling thermal envelope.**

**Retail 01,02:**

**Roof Summary**

| Description | Insulation Required* | Solar Absoptance ** | Thermal Break* |
|---|---|---|---|
| Concrete Slab | R3.4 | 0.45 | N/A |

**See Appendix for full details*
***If a roof colour with a higher Solar absorptance is planned, contact Application Solutions*
Paynter Dixon Retail 01-02 - Coffs Harbour

**Retail 03:**

**Roof Summary**

| Description | Insulation Required* | Solar Absoptance ** | Thermal Break* |
|---|---|---|---|
| Concrete Slab | R3.4 | 0.45 | N/A |

**See Appendix for full details*
***If a roof colour with a higher Solar absorptance is planned, contact Application Solutions*
Paynter Dixon Retail 03 - Coffs Harbour

**Retail 04,05,06,07:**

**Roof Summary**

| Description | Insulation Required* | Solar Absoptance ** | Thermal Break* |
|---|---|---|---|
| Concrete Slab | R3.4 | 0.45 | N/A |

**See Appendix for full details*
***If a roof colour with a higher Solar absorptance is planned, contact Application Solutions*
Paynter Dixon Retail 04-07 - Coffs Harbour

**Note: Thermal break not required as the relevant roof part for the conditioned space is concrete .**
**This assumes a light colour roof, with solar absorptance less than 0.45.**

**See Appendix for sample roof colours and their associated solar absorptance values.**
**If a darker roof is planned contact Application Solutions to reassess.**


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## J1.4 Roof lights

| | |
|---|---|
| BCA extract | *Roof lights must have—*<br><br>*J1.4 (a) have a total area not more than 5% of the floor area of the room or space served; and*<br><br>*(b) transparent and translucent elements, including any imperforate ceiling diffuser, with a combined performance of—*<br>*(i)for Total system SHGC, in accordance with Table J1.4; and*<br>*(ii)for Total system U-Value, not more than U3.9.* |
| Application to Development | **This clause does not apply to the development as there are no roof lights shown proposed which form part of the envelope.** |

## J1.5 Wall-glazing construction

| | |
|---|---|
| BCA extract | *J1.5 (a)The Total System U-Value of wall-glazing construction must not be greater than—*<br>*(i)for a Class 2 common area, a Class 5, 6, 7, 8 or 9b building or a Class 9a building other than a ward area, U2.0; and*<br>*(ii)for a Class 3 or 9c building or a Class 9a ward area—*<br>*(A)in climate zones 1, 3, 4, 6 or 7, U1.1; or*<br>*(B)in climate zones 2 or 5, U2.0; or*<br>*(C)in climate zone 8, U0.9.* |
| Application to Development | **Part (i), above, applies to the proposed development.** |
| **6. Maximum U-value** | **NOTE: The maximum U-value for the wall-glazing system is U2.0** |

| | |
|---|---|
| BCA extract | *J1.5 (b)The Total System U-Value of display glazing must not be greater than U5.8.* |
| Application to Development | **This clause applies to the development.** |
| **7. Maximum U-value** | **The maximum U-value of display glazing is U5.8** |


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| | |
|---|---|
| BCA extract | *J1.5 (c) The Total System U-Value of wall-glazing construction must be calculated in accordance with Specification J1.5a* |
| Application to Development | **This clause applies to the proposed development. The Retail areas have been broken into 3 blocks for the purpose of this assessment as shown in the table below.<br>The assessment is based on 1 wall type for the retail parts of the building, as summarized below. A breakdown of the wall type is tabled in the Appendix.** |
| **8. Calculation of U-value** | **The wall-glazing system U-value of the proposed retail parts of the building are as follows:**<br><br>**Retail 01,02: U0.27**<br>**Retail 03: U0.77**<br>**Retail 04,05,06,07: U0.40**<br><br>**The U-Values are not more than the max permitted in J1.5(a) See Appendix for full calculations**<br>**The walls must be insulated as follows:** |

**Retail 01,02:**

| Wall Summary | Insulation Required* | Thermal Break* |
|---|---|---|
| *Concrete Block Walls* | R0.5 | N/A |

**See Appendix for full details*

Paynter Dixon Retail 01-02 - Coffs Harbour

**Retail 03:**

| Wall Summary | Insulation Required* | Thermal Break* |
|---|---|---|
| *Concrete Block Walls* | R0.5 | N/A |

**See Appendix for full details*

Paynter Dixon Retail 03 - Coffs Harbour

**Retail 04,05,06,07:**

| Wall Summary | Insulation Required* | Thermal Break* |
|---|---|---|
| *Concrete Block Walls* | R0.5 | N/A |

**See Appendix for full details*

Paynter Dixon Retail 04-07 - Coffs Harbour


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| | |
|---|---|
| BCA extract | *J1.5 (d)Wall components of a wall-glazing construction must achieve a minimum Total R-Value of—*<br>*(i)where the wall is less than 80% of the area of the wall-glazing construction, R1.0; or*<br>*(ii)where the wall is 80% or more of the area of the wall-glazing construction, the value specified in* Table J1.5a. |
| Application to Development | **This clause applies to the proposed development. The wall components of the wall-glazing construction for all retail parts are less than 80% of the total of each respective part. Therefore, clause (i) above, applies.** |
| **9. Calculation of Wall R-value** | **NOTE: The wall component of the wall-glazing system is less than 80% of the total area, therefore the minimum R-value is R1.0 . This minimum R-value is achieved. See Appendix for full calculations for minimum required insulation.**<br><br>**See Appendix for walls forming part of the envelope.** |

| | |
|---|---|
| BCA extract | *J1.5 (e)The solar admittance of externally facing wall-glazing construction must not be greater than—*<br>*(i)for a Class 2 common area, a Class 5, 6, 7, 8 or 9b building or a Class 9a building other than a ward area, the values specified in Table J1.5b; and*<br>*(ii)for a Class 3 or 9c building or a Class 9a ward area, the values specified in Table J1.5c.* |
| Application to Development | **This applies to the proposed development. Clause (i) above applies to the building. See maximum Solar Admittance values in table below.** |
| **10. Max Solar admittance Permitted** | Using Table J1.5b<br>**NOTE:** |

| Max Solar Admittance Permitted | | | |
|---|---|---|---|
| **East** | **North** | **South** | **West** |
| 0.13 | 0.13 | 0.13 | 0.13 |

| | |
|---|---|
| BCA extract | *J1.5 (f)The solar admittance of a wall-glazing construction must be calculated in accordance with Specification J1.5a.* |
| Application to Development | **This clause applies to the development.** |
| **11. Construction Requirements – Display Glazing** | **As display glazing is proposed, refer to clause J1.5 (g) for the calculation of solar admittance.** |


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| | |
|---|---|
| BCA extract | *J1.5 (g) The Total system SHGC of display glazing must not be greater than 0.81 divided by the applicable shading factor specified in Clause 7 of Specification J1.5a.* |
| Application to Development | **Calculation of Solar Admittance for display glazing has been carried out in accordance with Specification J1.5a. See summary Below.** |

## 12. Calculation of Solar Admittance

**Calculation of Solar Admittance for display glazing has been carried out in accordance with Specification J1.5a.**

**The resultant U and SHGC values for display glazing are as shown below: (*values can be lower)***

**Retail 01,02:**

| Glazing Summary | U-Value | SHGC Value |
|---|---|---|
| East | No Glazing on this Orientation | No Glazing on this Orientation |
| North | 5.80 | 1.00 |
| South | 5.80 | 1.00 |
| West | 5.80 | 1.00 |

*Paynter Dixon Retail 01-02 - Coffs Harbour*

**Retail 03:**

| Glazing Summary | U-Value | SHGC Value |
|---|---|---|
| East | No Glazing on this Orientation | No Glazing on this Orientation |
| North | No Glazing on this Orientation | No Glazing on this Orientation |
| South | No Glazing on this Orientation | No Glazing on this Orientation |
| West | 5.80 | 1.00 |

***Paynter Dixon Retail 03 - Coffs Harbour***

**Retail 04,05,06,07:**

| Glazing Summary | U-Value | SHGC Value |
|---|---|---|
| East | No Glazing on this Orientation | No Glazing on this Orientation |
| North | 5.80 | 1.00 |
| South | 5.80 | 1.00 |
| West | 5.80 | 1.00 |

*Paynter Dixon Retail 04-07 - Coffs Harbour*


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## J1.6 Floors

**BCA extract**

*J1.6 (a)A floor must achieve the Total R-Value specified in Table J1.6.*
*(b)A floor must be insulated around the vertical edge of its perimeter with insulation having an R-Value greater than or equal to 1.0 when the floor—*
*(i)is a concrete slab-on-ground in climate zone 8; or*
*(ii)has an in-slab or in-screed heating or cooling system, except where used solely in a bathroom, amenity area or the like.*
*(c)Insulation required by (b) for a concrete slab-on-ground must—*
*(i)be water resistant; and*
*(ii)be continuous from the adjacent finished ground level—*
*(A)to a depth not less than 300 mm; or*
*(B)for the full depth of the vertical edge of the concrete slab-on-ground*

**Application to Development**

**Floors forming part of the envelope must achieve the Total R-Value in accordance with this part. Refer to the Appendix for the calculation sheet. There is a summary below.**

**Retail 01,02:**

**Concrete Slab On-Ground**

| Item | Description | Thickness | Thermal Conductivity | R-Value | Note |
|---|---|---|---|---|---|
| 1 | Sub-Floor | | | 1.05 | from specification J1.6 |
| 2 | Solid concrete | 0.2 | 1.44 | 0.14 | from specification J1.2 |
| 3 | Indoor air film | | | 0.16 | from specification J1.2 |
| 4 | **Added Insulation** | | | **0.7** | *Iterated* |
| **TOTAL R-value** | | | | **2.05** | |

| | |
|---|---|
| **TOTAL R-value required** | **2.00** |

✔

*Paynter Dixon Retail 01-02 - Coffs Harbour*

**Retail 03:**

**Concrete Slab On-Ground**

| Item | Description | Thickness | Thermal Conductivity | R-Value | Note |
|---|---|---|---|---|---|
| 1 | Sub-Floor | | | 0.99 | from specification J1.6 |
| 2 | Solid concrete | 0.2 | 1.44 | 0.14 | from specification J1.2 |
| 3 | Indoor air film | | | 0.16 | from specification J1.2 |
| 4 | **Added Insulation** | | | **0.8** | *Iterated* |
| **TOTAL R-value** | | | | **2.09** | |

| | |
|---|---|
| **TOTAL R-value required** | **2.00** |

✔

*Paynter Dixon Retail 03 - Coffs Harbour*

**Retail 04,05,06,07:**

**Concrete Slab On-Ground**

| Item | Description | Thickness | Thermal Conductivity | R-Value | Note |
|---|---|---|---|---|---|
| 1 | Sub-Floor | | | 1.37 | from specification J1.6 |
| 2 | Solid concrete | 0.2 | 1.44 | 0.14 | from specification J1.2 |
| 3 | Indoor air film | | | 0.16 | from specification J1.2 |
| 4 | **Added Insulation** | | | **0.4** | *Iterated* |
| **TOTAL R-value** | | | | **2.07** | |

| | |
|---|---|
| **TOTAL R-value required** | **2.00** |

✔

*Paynter Dixon Retail 04-07 - Coffs Harbour*

**13. Construction Requirements – Floor Insulation**

**Where floors form part of the envelope, a Total R-value of R2.0 is required to be achieved. To achieve this, the following minimum insulation R-Values apply.**

**Retail 01,02: R0.7**
**Retail 03: R0.8**
**Retail 04,05.06,07: R0.4**


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## Part J2 – Glazing

The Content of **Part J2** for *glazing*, which existed in NCC 2016, has been removed. *Glazing* provisions are now included in **Part J1**.

The Part number **Part J2** has been retained so as not to change the numbering of the current NCC from that of NCC 2016.

## Part J3 – Building Sealing

### J3.1 Application of Part

| | |
|---|---|
| BCA extract | *The Deemed-to-Satisfy Provisions of this Part apply to elements forming the envelope of a Class 2 to 9 building, other than-*<br>*(a) a building in climate zones 1, 2, 3 and 5 where the only means of air-conditioning is by using an evaporative cooler; or*<br>*(b) a permanent building opening, in a space where a gas appliance is located, that is necessary for the safe operation of a gas appliance; or*<br>*(c) a building or space where the mechanical ventilation required by **BCA Part F4** provides sufficient pressurisation to prevent infiltration; or*<br>*(d) **NSW BCA J3.1(d)** parts of the building that cannot be fully enclosed.* |
| Application to Development | <table><tr><td>**Retail**</td><td>**Class 6**</td><td>**This Part applies.**</td></tr><tr><td>**Carpark**</td><td>**Class 7a**</td><td>**This Part applies.**</td></tr><tr><td>**Residential Units**</td><td>**Class 2**</td><td>**This Part applies as specified by NSW Section J(A)2.2 .**</td></tr></table><br>**See body of report for requirements.** |

### J3.2 Chimneys and flues

| | |
|---|---|
| BCA extract | *The chimney or flue of an open solid-fuel burning appliance must be provided with a damper or flap that can be closed to seal the chimney or flue.* |
| Application to Development | **This clause does not apply as there is no chimney/flue shown proposed.** |


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## J3.3 Roof lights

| | |
|---|---|
| BCA extract | *J3.3 (a) A roof light must be sealed, or capable of being sealed,*<br>*(i) when serving a conditioned space; or*<br>*(ii) in climate zones 4, 5, 6, 7 and 8.*<br>*(b) A roof light required by **(a)** to be sealed, or capable of being sealed, must-*<br>*(i) be constructed with*<br>*(A) an imperforate ceiling diffuser or the like installed at the ceiling or internal lining level; or*<br>*(B) a weatherproof seal; or*<br>*(Ci) a shutter system readily operated either manually, mechanically or electronically by the occupant; and*<br>*(ii) have all junctions between the ceiling or internal lining, framing and architraves sealed with expanding foam, rubber compressible strip, caulking or the like.* |
| Application to Development | **This clause does not apply to the development as there are no roof lights shown proposed.** |

## J3.4 Windows and doors

| | |
|---|---|
| BCA extract | *J3.4 (a) A door, openable window or the like must be sealed-*<br>*(i) when forming part of the envelope of a conditioned space; or*<br>*(ii) in climate zones 4, 5, 6, 7 or 8.*<br>*(b) The requirements of **BCA J3.4 (a)** do not apply to-*<br>*(i) a window complying with AS 2047; or*<br>*(ii) a fire door or smoke door; or*<br>*(iii) a roller shutter door, roller shutter grille or other security door or device installed only for out-of-hours security.*<br>*(c) A seal to restrict air infiltration—*<br>*(i) for the bottom edge of a door, must be a draft protection device; and*<br>*(ii) for the other edges of a door or the edges of an openable window or other such opening, may be a foam or rubber compression strip, fibrous seal or the like.* |
| Application to Development | **These clauses apply to the development.** |
| **14. Construction Requirements – Window and Door Sealing** | **A door, openable window or the like must be sealed when forming part of the <u>envelope</u>**<br>**The seal may be a foam or rubber compression strip, fibrous seal or the like.**<br>**For the bottom edge of an external swing door, a draft protection device must be installed.**<br><br>**For exemptions to this clause see body of report.** |

| | |
|---|---|
| BCA extract | *J3.4 (d) An entrance to a building, if leading to a conditioned space must have an airlock, self-closing door, rapid roller door, revolving door or the like, other than-*<br>*(i) where the conditioned space has a floor area of not more than 50 $m^2$; or*<br>*(ii) where a café, restaurant, open front shop or the like has-*<br>*(A) a 3 m deep un-conditioned zone between the main entrance, including an open front, and the conditioned space; and*<br>*(B) at all other entrances to the café, restaurant, open front shop or the like, self-closing doors.* |
| Application to Development | **This clause applies to the development.** |
| **15. Construction Requirements – Building Entrance Sealing** | **An entrance to a building leading to a <u>conditioned space</u> must have an airlock, self-closing door, revolving door or the like.** |


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| | |
|---|---|
| BCA extract | *J3.4 (e) A loading dock entrance, if leading to a conditioned space, must be fitted with a rapid roller door or the like.* |
| Application to Development | **This clause does not apply to the development as the loading dock does not have an entrance that leads to a conditioned space.** |

## J3.5 Exhaust fans

| | |
|---|---|
| BCA extract | *J3.5 (a)An exhaust fan must be fitted with a sealing device such as a self-closing damper or the like when serving—*<br>*(i)a conditioned space; or*<br>*(ii)a habitable room in climate zones 4, 5, 6, 7 or 8.* |
| Application to Development | **This clause applies to the development if exhaust fans serving the conditioned space are proposed.** |
| **16. Construction Requirements – Exhaust Fan Sealing** | **An exhaust fan must be fitted with a sealing device such as a self-closing damper or the like when serving a conditioned space.** |

## J3.6 Construction of ceilings walls and floors

| | |
|---|---|
| BCA extract | *J3.6 (a)Ceilings, walls, floors and any opening such as a window frame, door frame, roof light frame or the like must be constructed to minimise air leakage in accordance with (b) when forming part of—*<br>*(i)the envelope; or*<br>*(ii)in climate zones 4, 5, 6, 7 or 8.*<br>*(b)Construction required by (a) must be—*<br>*(i)enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions; or*<br>*(ii)sealed at junctions and penetrations with—*<br>*(A)close fitting architrave, skirting or cornice; or*<br>*(B)expanding foam, rubber compressible strip, caulking or the like.*<br>*(c)The requirements of (a) do not apply to openings, grilles or the like required for smoke hazard management* |
| Application to Development | **This clause applies to the development.** |
| **17. Construction Requirements – Roof, Wall and Floor Sealing** | **Roofs, ceilings, walls, floors and any opening such as a window frame, door frame, roof light frame or the like must be constructed to minimise air leakage when forming part of the envelope and must be enclosed by internal lining systems that are close fitting at ceiling, wall and floor junctions OR sealed with expanding foam, rubber compressible strip, caulking or the like at bottom plates or skirting; and cornices and shadow lines; and gaps around ceiling, wall or floor penetrations** |

## J3.7 Evaporative coolers

| | |
|---|---|
| BCA extract | *An evaporative cooler must be fitted with a self-closing damper or the like-*<br>*J3.7 (a) when serving a heated space; or*<br>*(b) in climate zones 4, 5, 6, 7 and 8.* |
| Application to Development | **This clause does not apply as there is no evaporative cooler shown proposed.** |


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## Part J4

This Part has deliberately been left blank due to its removal in BCA 2010.

## Part J5 – Air-conditioning and Ventilation Systems

### J5.1 Application of Part

| | |
|---|---|
| BCA extract | *The Deemed-to-Satisfy Provisions of this Part do not apply to a Class 8 electricity network substation.* |
| Application to Development | |

| | | |
|---|---|---|
| **Retail** | **Class 6** | **This Part applies.** |
| **Carpark** | **Class 7a** | **This Part applies.** |
| **Residential Units** | **Class 2** | **This Part applies as specified by NSW Section J(A)3.2 .** |

**See body of report for requirements.**

### J5.2 Air-conditioning system control

| | |
|---|---|
| BCA extract | *J5.2 (a) An air-conditioning system-*<br>*(i) must be capable of being deactivated when the building or part of a building served is not occupied; and* |
| Application to Development | **This clause applies to the development.** |
| **18. Construction Requirements – Deactivation Capability** | **Any air-conditioning system must be capable of being deactivated when the building or part of the building served is not occupied.** |


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| | |
|---|---|
| BCA extract | *J5.2 (a) (ii) when serving more than one air-conditioning zone or area with different heating or cooling needs, must-*<br>*(A) thermostatically control the temperature of each zone or area; and*<br>*(B) not control the temperature by mixing actively heated air and actively cooled air; and*<br>*(C) limit reheating to not more than-*<br>*(aa) for a fixed supply air rate, a 7.5 K rise in temperature; and*<br>*(bb) for a variable supply air rate, a 7.5 K rise in temperature at the nominal supply air rate but increased or decreased at the same rate that the supply air rate is respectively decreased or increased; and* |
| Application to Development | **This clause may apply to the development depending on air-conditioning system selection and setup.** |
| **19. Construction Requirements – Air-conditioning Zones** | **Different air-conditioning zones shall be separately thermostatically controlled and not have their temperature controlled by mixing actively heated air or actively cooled air. Reheating must be limited to not more than a 7.5K rise in temperature for a fixed supply air rate, or for a variable supply air rate, not more than 7.5K rise in temperature at the normal supply air rate but increased or decreased at the same rate that the supply air rate is respectively decreased or increased.** |

| | |
|---|---|
| BCA extract | *J5.2 (a) (iii) which provides the required mechanical ventilation, other than in climate zones 1, 2 or 3 or where humidity control is needed, must have an outdoor air economy cycle- if the total air flow rate of any airside component of an air-conditioning system is greater than or equal to the figures in **Table J5.2**; and-* |
| Application to Development | **This clause may apply to the development depending on air-conditioning system selection and setup and where the air flow rate of any air side component of the air-conditioning system is equal or greater than 3000L/s.** |
| **20. Construction Requirements – Economy Cycle** | **Where the air-conditioning system provides the required mechanical ventilation and has a total air flow rate of greater than or equal to 3000 L/s, it shall have an outdoor air economy cycle.** |

| | |
|---|---|
| BCA extract | *J5.2 (a) (iv) which contains more than one water heater, chiller or coil, must be capable of stopping the flow of water to those not operating; and* |
| Application to Development | **This clause may apply to the development depending on air-conditioning system selection and setup.** |
| **21. Construction Requirements – Water Flow** | **An air-conditioning system which contains more than one water heater, chiller or coil, must be capable of stopping the flow of water to those not operating.** |


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| | |
|---|---|
| BCA extract | *J5.2 (a) (v) with an airflow of more than 1000 L/s, must have a variable speed fan when its supply air quantity is capable of being varied;* |
| Application to Development | **This clause applies if the air-conditioning system air-flow rate is greater than 1,000L/s.** |
| **22. Construction Requirements – Variable Speed Fans** | **Where the air-conditioning system has an air flow rate greater than 1,000L/s it must have variable speed fans** |

| | |
|---|---|
| BCA extract | *J5.2 (a) (vi) when serving a sole-occupancy unit in a Class 3 building, must not operate when any external door of the sole-occupancy unit that opens to a balcony or the like, is open for more than one minute; and* |
| Application to Development | **This clause does not apply to the development as it is not a Class 3 building.** |

| | |
|---|---|
| BCA extract | *J5.2 (a) (vii) must have the ability to use direct signals from the control components responsible for the delivery of comfort conditions in the building to regulate the operation of central plant; and* |
| Application to Development | **This clause applies to the development.** |
| **23. Construction Requirements – Controls** | **The air-conditioning system must have the ability to use direct signals from the control components responsible for the delivery of comfort conditions in the building to regulate the operation of central plant.** |

| | |
|---|---|
| BCA extract | *J5.2 (a) (viii) must have a minimum control dead band of 2ºC, except where a smaller range is required for specialised applications; and* |
| Application to Development | **This clause applies to the development.** |
| **24. Construction Requirements – Deadband** | **The air-conditioning system must have a minimum control dead band of 2ºC, except where a smaller range is required for specialised applications.** |

| | |
|---|---|
| BCA extract | *J5.2 (a) (ix) must be provided with balancing dampers and balancing valves that ensure the maximum design air or fluid flow is achieved but not exceeded at each component as required to meet the needs of the system at its maximum operating condition; and* |
| Application to Development | **This clause applies to the development.** |
| **25. Construction Requirements – Balancing Dampers and Valves** | **The air-conditioning system must be provided with balancing dampers and balancing valves that ensure the maximum design air or fluid flow is achieved but not exceeded at each component as required to meet the needs of the system at its maximum operating condition.** |


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| | |
|---|---|
| BCA extract | *J5.2 (a) (x) must ensure that each independently operating space of over 1000 m² and every separate floor of the building has provision to terminate airflow independently of the remainder of the system sufficient to allow for different operating times; and* |
| Application to Development | **This clause may apply to the development depending on air-conditioning system setup.** |
| **26. Construction Requirements – Airflow Termination** | **The air-conditioning system must ensure that each independently operating space of over 1000 m² of the building has provision to terminate airflow independently of the remainder of the system sufficient to allow for different operating times.** |

| | |
|---|---|
| BCA extract | *J5.2 (a) (xi) must have automatic variable temperature operation of heated water and chilled water circuits; and* |
| Application to Development | **This clause may apply to the development depending on air-conditioning system selection and setup.** |
| **27. Construction Requirements – Variable Temperature Operation** | **The air-conditioning system must have automatic variable temperature operation of heated water and chilled water circuits.** |

| | |
|---|---|
| BCA extract | *J5.2 (a) (xii) when deactivated, must close any motorised outdoor air and return air damper.* |
| Application to Development | **This clause may apply to the development depending on air-conditioning system selection and setup.** |
| **28. Construction Requirements – Motorised Damper** | **When deactivated, the air conditioning system must close any motorised outdoor air and return air damper.** |

| | |
|---|---|
| BCA extract | *J5.2 (b) When two or more air-conditioning systems serve the same space they must use control sequences that prevent the systems from operating in opposing heating and cooling modes.* |
| Application to Development | **This clause may apply to the development depending on air-conditioning system selection and setup.** |
| **29. Construction Requirements – Control Sequences** | **When two or more air-conditioning systems serve the same space, they must use control sequences that prevent the systems from operating in opposing heating and cooling modes.** |


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| | |
|---|---|
| BCA extract | *J5.2(c) Time switches—*<br>*(i)A time switch must be provided to control—*<br>*(A)an air-conditioning system of more than 2 kWr; and*<br>*(B)a heater of more than 1 kWheating used for air-conditioning.*<br>*(ii)The time switch must be capable of switching electric power on and off at variable pre-programmed times and on variable pre-programmed days.*<br>*(iii)The requirements of (i) and (ii) do not apply to—*<br>*(A)an air-conditioning system that serves—*<br>*(aa)only one sole-occupancy unit in a Class 2, 3 or 9c building; or*<br>*(bb)a Class 4 part of a building; or*<br>*(B)a conditioned space where air-conditioning is needed for 24-hour continuous use..* |
| Application to Development | **This clause may apply to the development depending on air-conditioning system and/or heater selection** |
| **30. Construction Requirements – Time Switch** | **A time switch must be provided to control all air-conditioning systems of more than 2 kWr and heaters of more than 1 $kW_{heating}$. The time switch must be capable of switching on and off electric power at variable pre-programmed times and on variable pre-programmed days.** |

**J5.3 Mechanical Ventilation system control**

| | |
|---|---|
| BCA extract | *J5.3 (a) General - A mechanical ventilation system, including one that is part of an air-conditioning system, except where the mechanical system serves only one sole-occupancy unit in a Class 2 building or serves only a Class 4 part of a building, must-*<br>*(i) be capable of being deactivated when the building or part of the building served by that system is not occupied; and* |
| Application to Development | **This clause applies to the development where mechanical ventilation systems are installed.** |
| **31. Construction Requirements – Ventilation Operation** | **A mechanical ventilation system (including one which is part of an air-conditioning system) must be capable of being deactivated when the building or part of the building served is not occupied.** |

| | |
|---|---|
| BCA extract | *J5.3 (a) (ii) when serving a conditioned space-*<br>*(A) where specified in Table J5.3, have -*<br>*(aa) an energy reclaiming system that preconditions outdoor air at a minimum efficacy of 60%; or*<br>*(bb) demand control ventilation in accordance with AS 1668.2 if appropriate to the application; and*<br>*(B) not exceed the minimum outdoor air quantity required by **BCA Part F4**, by more than 20%, except where*<br>*(aa) additional unconditioned outdoor air is supplied for free cooling; or*<br>*(bb) additional mechanical ventilation is needed to balance the required exhaust or process exhaust; or*<br>*(cc) an energy reclaiming system preconditions all the outdoor air.* |
| Application to Development | **Clause J5.3(a)(ii)(A)and(B) applies where mechanical ventilation systems serve a conditioned space.** |
| **32. Construction Requirements – Mechanical Ventilation of Conditioned Space** | **Any mechanical ventilation system that is serving a conditioned space and has an outside air flow greater than 1000L/s shall have an energy reclaiming system in accordance with (aa) or modulating control in accordance with (bb)**<br><br>**The mechanical ventilation system shall not provide mechanical ventilation in excess of the minimum quantity required by BCA Part F4 by more than 20% other than in the conditions detailed in the body of the report.** |


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| | |
|---|---|
| BCA extract | *J5.3 (a) (iii) for an airflow of more than 1000 L/s, have a variable speed fan unless the downstream airflow is required by Part F4 to be constant.* |
| Application to Development | **Clause J5.3(a)(iii) applies where mechanical ventilation systems serve a <u>conditioned space</u>.** |
| **33. Construction Requirements – Variable Speed Fans** | **Any mechanical ventilation system that is serving a conditioned space and has an air flow rate of more than 1,000L/s shall have variable speed fans unless the downstream air flow is required by Part F4 to be constant** |

| | |
|---|---|
| BCA extract | *J5.3 (b) **Exhaust systems**— An exhaust system with an air flow rate of more than 1000 l/s must be capable of stopping the motor when the system is not needed, except for an exhaust system in a sole-occupancy unit in a Class 2, 3 or 9c building.* |
| Application to Development | **This clause applies to the development if an exhaust fan with an air flow rate of more than 1000L/s is to be installed.** |
| **34. Construction Requirements – Exhaust System** | **An exhaust system with an air flow rate of more than 1000 l/s must be capable of stopping the motor when the system is not needed.** |

| | |
|---|---|
| BCA extract | *J5.3 (c) **Carpark exhaust systems—** Carpark exhaust systems must have an atmospheric contaminant monitoring system in accordance with AS 1668.2.* |
| Application to Development | **This clause applies to the development if a carpark exhaust system is proposed.** |
| **35. Construction Requirements – Carpark exhaust systems** | **Carpark exhaust systems must have an atmospheric contaminant monitoring system in accordance with AS 1668.2.** |

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| BCA extract | *J5.3 (d) **Time switches -***<br>*(i) A time switch must be provided to control a mechanical ventilation system with an air flow rate of more than 1000 L/s.*<br>*(ii) The time switch must be capable of switching on and off electric power at variable pre-programmed times and on variable pre-programmed days.* |
| Application to Development | **This clause applies to the development where mechanical ventilation systems are installed.** |
| **36. Construction Requirements – Ventilation Time Switch Control** | **Any mechanical ventilation system with an air flow rate of more than 1000 L/s must be controlled by a time switch and be capable of switching on and off electric power at variable pre-programmed times and on variable pre-programmed days.**<br><br>**See BCA J5.3(d)(iii) for any appropriate exclusions to this requirement.** |


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| BCA extract | *J5.3 (d) (iii) The requirements of **BCA Clause J5.3(d) (i) and (iii)** do not apply to-*<br>*(A) a mechanical ventilation system that serves-*<br>*(aa) only one sole-occupancy unit in a Class 2, 3; or 9c building; or*<br>*(bb) a Class 4 part of a building; or*<br>*(B) a building where mechanical ventilation is needed for 24-hour occupancy.* |

## J5.4 Fan systems

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| BCA extract | *J5.4 (a) Fans, ductwork and duct components that form part of an air-conditioning system or mechanical ventilation system must –*<br>*(i) separately comply with **BCA J5.3** (b), (c), (d), (e) and (f); or*<br>*(ii) achieve a fan motor input power per unit of flowrate lower than the fan motor input power per unit of flowrate achieved when applying **BCA J5.4** (b), (c), (d), (e) and (f) together.* |
| Application to Development | **This clause applies to the development where mechanical ventilation systems are installed.** |
| **37. Construction Requirements –Fans** | **Fans, ductwork and duct components that form part of an air-conditioning system or mechanical ventilation system must**<br>• **separately comply with BCA J5.3 (b), (c), (d), (e) and (f); or**<br>• **achieve a fan motor input power per unit of flowrate lower than the fan motor input power per unit of flowrate achieved when applying BCA J5.4 (b), (c), (d), (e) and (f) together.** |

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| BCA extract | *J5.4 (b) Fans-*<br>*(i) Fans in systems that have a static pressure of not more than 200 Pa must have an efficiency at the full load operating point not less than the efficiency calculated with the following formula: man = 13 x ln(p) - 30*<br>*where—*<br>*ηmin = the minimum required system static efficiency for installation type A or C or the minimum required system total efficiency for installation type B or D; and*<br>*p = the static pressure of the system (Pa). (Refer to Table J5.4a)* |
| Application to Development | **Fans in systems with a static pressure not more than 200Pa must have an efficiency calculated using the formula in this clause.** |
| **38. Construction Requirements – Fans** | **Fans in systems with a static pressure not more than 200Pa must have an efficiency calculated using the formula in J5.4(b)(i)** |


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| BCA extract | *J5.4 (b) Fans-*<br>*(ii) Fans in systems that have a static pressure above 200 Pa must have an efficiency at the full load operating point not less than the efficiency calculated with the following formula:*<br><br>*ηmin = 0.85 x (a x ln(P) - b + N) / 100*<br>*where—*<br><br>*total efficiency for installation type B or D; and*<br>*P = the motor input power of the fan (kW); and*<br>*N = the minimum performance grade obtained from Table J5.4a; and*<br>*a = regression coefficient a, obtained from Table J5.4b; and*<br>*b = regression coefficient b, obtained from Table J5.4c; and*<br>*ln = natural logarithm.* |
| Application to Development | **Fans in systems with a static pressure more than 200Pa must have an efficiency calculated using the formula in this clause.** |
| **39. Construction Requirements – Fans** | **Fans in systems with a static pressure more than 200Pa must have an efficiency calculated using the formula in J5.4(b)(ii)** |

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| BCA extract | *J5.4 (b) (iii) The requirements of (i) and (ii) do not apply to fans that need to be explosion proof* |

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| BCA extract | *J5.4 (c) Ductwork-*<br>*(i) The pressure drop in the index run across all straight sections of rigid ductwork and all sections of flexible ductwork must not exceed 1 Pa/m when averaged over the entire length of straight rigid duct and flexible duct. The pressure drop of flexible ductwork sections may be calculated as if the flexible ductwork is laid straight.* |
| Application to Development | **This clause applies to any ductwork installed.** |
| **40. Construction Requirements – Ductwork** | **The average pressure drop in the index run across all straight sections of rigid ductwork and all sections of flexible ductwork must not exceed a pressure drop of 1 Pa/m. The pressure drop of flexible ductwork sections may be calculated as if the flexible ductwork is laid straight** |

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| BCA extract | *J5.4 (c) (ii) Flexible ductwork must not account for more than 6m in length in any duct run.* |
| Application to Development | **This clause applies to any ductwork installed.** |
| **41. Construction Requirements – Ductwork** | **Flexible ductwork must not account for more than 6m in length in any duct run.** |


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| BCA extract | *J5.4 (c) (iii) The upstream connection of ductwork bends, elbows and tees must be at least equivalent in size to the connected duct.* |
| Application to Development | **This clause applies to any ductwork installed.** |
| **42. Construction Requirements – Ductwork** | **The upstream connection of ductwork bends, elbows and tees must be at least equivalent in size to the connected duct.** |

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| BCA extract | *J5.4(c)(iv) Turning vanes must be included in all rigid ductwork elbows of 90° or more acute than 90° in the index run except where—*<br>*(A)the inclusion of turning vanes presents a fouling risk; or*<br>*(B)a long radius bend in accordance with AS 4254.2 is used* |
| Application to Development | **This clause applies to any ductwork installed.** |
| **43. Construction Requirements – Ductwork** | **Turning vanes must be included in all rigid ductwork bends of 90º or more acute except where the inclusion of turning vanes presents a fouling risk or a long radius bend in accordance with AS4254.2** |

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| BCA extract | *J5.4 (d) Ductwork components in the index run-*<br>*(i) The pressure drop across a coil must not exceed the value specified in Table J5.4d.*<br>*(ii) A high efficiency particulate arrestance (HEPA) air filter must not exceed the higher of—*<br>*(A)a pressure drop of 200 Pa when clean; or*<br>*(B) the filter design pressure drop when clean at an air velocity of 1.5 m/s.*<br>*(iii) Any other air filter must not exceed—*<br>*(A)the pressure drop specified in Table J5.4e when clean; or*<br>*(B)the filter design pressure drop when clean at an air velocity of 2.5 m/s.*<br>*(iv) The pressure drop across intake louvres must not exceed the higher of—*<br>*(A)for single stage louvres, 30 Pa; and*<br>*(B)for two stage louvres, 60 Pa; and*<br>*(C)for acoustic louvres, 50 Pa; and*<br>*(D)for other non-weatherproof louvres, 30 Pa.*<br>*(v) The pressure drop across a variable air volume box, with the damper in the fully open position, must not exceed—*<br>*(A)for units with electric reheat, 100 Pa; and*<br>*(B)for other units, 25 Pa not including coil pressure losses.*<br>*(vi) Rooftop cowls must not exceed a pressure drop of 30 Pa.*<br>*(vii )Attenuators must not exceed a pressure drop of 40 Pa.*<br>*(viii) Fire dampers must not exceed a pressure drop of 15 Pa when open.*<br>*(ix) Balancing and control dampers in the index run must not exceed a pressure drop of 25 Pa when in the fully open position.*<br>*(x) Supply air diffusers and grilles must not exceed a pressure drop of 40 Pa.*<br>*(xi) Exhaust grilles must not exceed a pressure drop of 30 Pa.*<br>*(xii) Transfer ducts must not exceed a pressure drop of 12 Pa.*<br>*(xiii) Door grilles must not exceed a pressure drop of 12 Pa.*<br>*(xiv) Active chilled beams must not exceed a pressure drop of 150 Pa.* |
| Application to Development | **This clause applies to any ductwork installed.** |
| **44. Construction Requirements – Ductwork** | **This clause contains detailed design criteria which must be met for any ductwork installed. Refer to the clause extract in the body of the report and the tables referenced in the BCA** |


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| BCA extract | *(e)The requirements of (a), (b), (c) and (d) do not apply to—*<br>*(i)fans in unducted air-conditioning systems with a supply air capacity of less than 1000 L/s; and*<br>*(ii)smoke spill fans, except where also used for air-conditioning or ventilation; and*<br>*(iii)the power for process-related components; and*<br>*(iv)kitchen exhaust systems.* |

## J5.5 Ductwork Insulation

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| BCA extract | *J5.5 (a)Ductwork and fittings in an air-conditioning system must be provided with insulation—*<br>*(i)complying with AS/NZS 4859.1; and*<br>*(ii)having an insulation R-Value greater than or equal to—*<br>*(A)for flexible ductwork, 1.0; or*<br>*(B)for cushion boxes, that of the connecting ductwork; or*<br>*(C)that specified in Table J5.5.*<br>*(b)Insulation must—*<br>*(i)be protected against the effects of weather and sunlight; and*<br>*(ii)be installed so that it—*<br>*(A)abuts adjoining insulation to form a continuous barrier; and*<br>*(B)maintains its position and thickness, other than at flanges and supports; and*<br>*(iii)when conveying cooled air—*<br>*(A)be protected by a vapour barrier on the outside of the insulation; and*<br>*(B)where the vapour barrier is a membrane, be installed so that adjoining sheets of the membrane—*<br>*(aa)overlap by at least 50 mm; and*<br>*(bb)are bonded or taped together.* |
| Application to Development | **This clause applies to any ductwork installed.** |
| **45. Construction Requirements – Ductwork Insulation** | **J5.5 (a)Ductwork and fittings in an *air-conditioning* system must be provided with insulation—**<br>**(i)complying with AS/NZS 4859.1; and**<br>**(ii)having an insulation *R-Value* greater than or equal to—**<br>**(A)for flexible ductwork, 1.0; or**<br>**(B)for cushion boxes, that of the connecting ductwork; or**<br>**(C)that specified in Table J5.5.**<br>**(b)Insulation must—**<br>**(i)be protected against the effects of weather and sunlight; and**<br>**(ii)be installed so that it—**<br>**(A)abuts adjoining insulation to form a continuous barrier; and**<br>**(B)maintains its position and thickness, other than at flanges and supports; and**<br>**(iii)when conveying cooled air—**<br>**(A)be protected by a vapour barrier on the outside of the insulation; and**<br>**(B)where the vapour barrier is a membrane, be installed so that adjoining sheets of the membrane—**<br>**(aa)overlap by at least 50 mm; and**<br>**(bb)are bonded or taped together.** |


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| BCA extract | *J5.5 (c)The requirements of (a) do not apply to—*<br>*(i)ductwork and fittings located within the only or last room served by the system; or*<br>*(ii)fittings that form part of the interface with the conditioned space; or*<br>*(iii)return air ductwork in, or passing through, a conditioned space; or*<br>*(iv)ductwork for outdoor air and exhaust air associated with an air-conditioning system; or*<br>*(v)the floor of an in-situ air-handling unit; or*<br>*(vi)packaged air conditioners, split systems, and variable refrigerant flow air-conditioning equipment complying with MEPS; or*<br>*(vii)flexible fan connections.* |
| Application to Development | **This clause applies to any ductwork installed.** |
| **46. Construction Requirements – Ductwork** | **Note:**<br>**(c)The requirements of (a) do not apply to—**<br>**(i)ductwork and fittings located within the only or last room served by the system; or**<br>**(ii)fittings that form part of the interface with the *conditioned space*; or**<br>**(iii)return air ductwork in, or passing through, a *conditioned space*; or**<br>**(iv)ductwork for *outdoor air* and exhaust air associated with an *air-conditioning* system; or**<br>**(v)the floor of an in-situ air-handling unit; or**<br>**(vi)packaged air conditioners, split systems, and variable refrigerant flow *air-conditioning* equipment complying with *MEPS*; or**<br>**(vii)flexible fan connections.** |

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| BCA extract | *J5.5 (d)For the purposes of (a), (b) and (c), fittings—*<br>*(i)include non-active components of a ductwork system such as cushion boxes; and*<br>*(ii)exclude active components such as air-handling unit components.* |

## J5.6 Ductwork Sealing

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| BCA extract | *Ductwork in an air-conditioning system with a capacity of 3000 L/s or greater, not located within the only or last room served by the system, must be sealed against air loss in accordance with the duct sealing requirements of AS 4254.1 and AS 4254.2 for the static pressure in the system* |
| Application to Development | **This clause applies to any ductwork installed with a capacity of 3000L/s or greater.** |
| **47. Construction Requirements – Ductwork Sealing** | **Ductwork in an air-conditioning system with a capacity of 3000 L/s or greater, not located within the only or last room served by the system, must be sealed against air loss in accordance with the duct sealing requirements of AS 4254.1 and AS 4254.2 for the static pressure in the system** |


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## J5.7 Pump Systems

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| BCA extract | *J5.7 (a)General — Pumps and pipework that form part of an air-conditioning system must either—*<br>*(i)separately comply with (b), (c) and (d); or*<br>*(ii)achieve a pump motor power per unit of flowrate lower than the pump motor power per unit of flowrate achieved when applying (b), (c) and (d) together.*<br><br>*(b)Circulator pumps — A glandless impeller pump, with a rated hydraulic power output of less than 2.5 kW and that is used in closed loop systems must have an energy efficiency index (EEI) not more than 0.27 calculated in accordance with European Union Commission Regulation No. 622/2012.*<br><br>*(c)Other pumps — Pumps that are in accordance with Articles 1 and 2 of European Union Commission Regulation No. 547/2012 must have a minimum efficiency index (MEI) of 0.4 or more when calculated in accordance with European Union Commission Regulation No. 547/2012.*<br><br>*(d)Pipework — Straight segments of pipework along the index run, forming part of an air-conditioning system—*<br>*(i)in pipework systems that do not have branches and have the same flow rate throughout the entire pipe network, must achieve an average pressure drop of not more than—*<br>*(A)for constant speed systems, the values nominated in Table J5.7a; or*<br>*(B)for variable speed systems, the values nominated in Table J5.7b; or*<br>*(ii)in any other pipework system, must achieve an average pressure drop of not more than—*<br>*(A)for constant speed systems, the values nominated in Table J5.7c; or*<br>*(B)for variable speed systems, the values nominated in Table J5.7d.* |
| Application to Development | **This clause applies to pumps and pipework which are part of an air-conditioning system.** |
| **48. Construction Requirements – Pumps and Pipework** | **This clause contains detailed design criteria which must be met for any pumps and pipework installed as part of an air-conditioning system. Refer to the clause extract in the body of the report and the tables referenced in the BCA.** |

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| BCA extract | *J5.4 (e) the requirements of (d) do not apply—*<br>*(i)to valves and fittings; or*<br>*(ii)where the smallest pipe size compliant with (d) results in a velocity of 0.7 m/s or less at design flow.* |


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## J5.8 Pipework Insulation

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| BCA extract | *J5.7 (a) Piping, vessels, heat exchangers and tanks containing heating or cooling fluid, where the fluid is held at a heated or cooled temperature, that are part of an air-conditioning system, other than in appliances covered by MEPS, must be provided with insulation—*<br>*(i)complying with AS/NZS 4859.1; and*<br>*(ii)for piping of heating and cooling fluids, having an insulation R-Value in accordance with Table J5.8a; and*<br>*(iii)for vessels, heat exchangers or tanks, having an insulation R-Value in accordance with Table J5.8b; and*<br>*(iv)for refill or pressure relief piping, having an insulation R-Value equal to the required insulation R-Value of the connected pipe, vessel or tank within 500 mm of the connection.*<br><br>*(b)Insulation must—*<br>*(i)be protected against the effects of weather and sunlight; and*<br>*(ii)be able to withstand the temperatures within the piping, vessel, heat exchanger or tank.*<br><br>*(c)Insulation provided to piping, vessels, heat exchangers or tanks containing cooling fluid must be protected by a vapour barrier on the outside of the insulation.*<br><br>*(d)The requirements of (a) and (b) do not apply to piping, vessels or heat exchangers—*<br>*(i)located within the only or last room served by the system and downstream of the control device for the regulation of heating or cooling service to that room; or*<br>*(ii)encased within a concrete slab or panel which is part of a heating or cooling system; or*<br>*(iii)supplied as an integral part of a chiller, boiler or unitary air-conditioner complying with the requirements of J5.9, J5.10 and J5.11; or*<br>*(iv)inside an air-handling unit, fan-coil unit, or the like.*<br><br>*(e)For the purposes of (a), (b), (c) and (d)—*<br>*(i)heating fluids include refrigerant, heated water, steam and condensate; and*<br>*(ii)cooling fluids include refrigerant, chilled water, brines and glycol mixtures, but do not include condenser cooling water.* |
| Application to Development | **This clause applies to pipework which are part of an air-conditioning system.** |
| **49. Construction Requirements – Pipework Insulation** | **This clause contains detailed design criteria which must be met for insulation of pipework which may be installed as part of an air-conditioning system. Refer to the clause extract in the body of the report and the tables referenced in the BCA** |

## J5.9 Space Heating

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| BCA extract | *J5.9 (a)A heater used for air-conditioning or as part of an air-conditioning system must be—*<br>*(i)a solar heater; or*<br>*(ii)a gas heater; or*<br>*(iii)a heat pump heater; or*<br>*(iv)a heater using reclaimed heat from another process such as reject heat from a refrigeration plant; or*<br>*(v)an electric heater if—*<br>*(A)the heating capacity is not more than—*<br>*(aa)10 W/m2 of the floor area of the conditioned space in climate zone 1; or*<br>*(bb)40 W/m2 of the floor area of the conditioned space in climate zone 2; or*<br>*(cc)the value specified in Table J5.9 where reticulated gas is not available at the allotment boundary; or*<br>*(B)the annual energy consumption for heating is not more than 15 kWh/m2 of the floor area of the conditioned space in climate zones 1, 2, 3, 4 and 5; or*<br>*(C)the in-duct heater complies with J5.2(a)(ii)(C); or*<br>*(vi)any combination of (i) to (v).* |
| Application to Development | **This clause applies to any heater used for air-conditioning.** |
| **50. Construction Requirements – Heaters** | **Any heater planned to be used must be a solar heater, a gas heater or a heat pump heater. If an electric heater is planned, refer to the detail requirements and limitations in the body of the report** |


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| BCA extract | *J5.9 (b)An electric heater may be used for heating a bathroom in a Class 2, 3, 9a or 9c building if the heating capacity is not more than 1.2 kW and the heater has a timer.* |
| Application to Development | **This clause applies to the development if any electric heaters are proposed to be used for heating a bathroom.** |
| **51. Construction Requirements – Heaters** | **An electric heater may be used for heating a bathroom in a Class 2 building if the heating capacity is not more than 1.2 kW and the heater has a timer.** |

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| BCA extract | *J5.9 (c)A fixed heating or cooling appliance that moderates the temperature of an outdoor space must be configured to automatically shut down when—*<br>*(i)there are no occupants in the space served; or*<br>*(ii)a period of one hour has elapsed since the last activation of the heater; or*<br>*(iii)the space served has reached the design temperature.* |
| Application to Development | **This clause applies to any proposed outdoor heaters.** |
| **52. Construction Requirements – Outdoor Heaters** | **If any outdoor heaters are proposed, they must be configured to automatically shut down if there are no occupants in the space served, or one hours has elapse since the last activation of the heater or the space has reached the design temperature.** |

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| BCA extract | *J5.9 (d)A gas water heater, that is used as part of an air-conditioning system, must—*<br>*(i)if rated to consume 500 MJ/hour of gas or less, achieve a minimum gross thermal efficiency of 86%; or*<br>*(ii)if rated to consume more than 500 MJ/hour of gas, achieve a minimum gross thermal efficiency of 90%.* |
| Application to Development | **This clause applies if any gas water heaters are proposed that are part of an air-conditioning system.** |
| **53. Construction Requirements – Gas Water Heater** | **Any gas water heater proposed which forms part of an air-conditioning system must achieve 86% thermal efficiency if rated to consume 500MJ/hr or less or if it consumes more it must achieve an efficiency of 90%.** |

## J5.10 Refrigerant Chillers

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| BCA extract | *An air-conditioning system refrigerant chiller must comply with MEPS and the full load operation energy efficiency ratio and integrated part load energy efficiency ratio in Table J5.10a or Table J5.10b when determined in accordance with AHRI 551/591.* |
| Application to Development | **This clause applies to any proposed air-conditioning system refrigerant chillers.** |
| **54. Construction Requirements – Chillers** | **This clause contains detailed efficiency criteria which must be met for air-conditioning system refrigerant chillers which may be installed. Refer to the clause extract in the body of the report and the tables referenced in the BCA.** |


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## J5.11 Unitary Air-conditioning Equipment

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| BCA extract | *Unitary air-conditioning equipment including packaged air-conditioners, split systems, and variable refrigerant flow systems must comply with MEPS and for a capacity greater than or equal to 65 kWr—*<br><br>*(a)where water cooled, have a minimum energy efficiency ratio of 4.0 Wr / Winput power for cooling when tested in accordance with AS/NZS 3823.1.2 at test condition T1, where input power includes both compressor and fan input power; or*<br><br>*(b)where air cooled, have a minimum energy efficiency ratio of 2.9 Wr / Winput power for cooling when tested in accordance with AS/NZS 3823.1.2 at test condition T1, where input power includes both compressor and fan input power* |
| Application to Development | **This clause applies to any proposed unitary air-conditioning equipment.** |
| **55. Construction Requirements – Miscellaneous Exhaust** | **Any unitary air-conditioning equipment must comply with MEPS and if over 65kWr For water cooled have a minimum energy efficiency ratio of 4.0 Wr/Winput for cooling and for air cooled have a minimum energy efficiency ratio of 2.9 Wr/Winput for cooling**<br><br>**Refer to the body of the report or to the BCA for the testing requirements** |

## J5.12 Heat Rejection Equipment

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| BCA extract | *(a)The motor rated power of a fan in a cooling tower, closed circuit cooler or evaporative condenser must not exceed the allowances in Table J5.12.*<br><br>*(b)The fan in an air-cooled condenser must have a motor rated power of not more than 42 W for each kW of heat rejected from the refrigerant, when determined in accordance with AHRI 460 except for—*<br>*(i)a refrigerant chiller in an air-conditioning system that complies with the energy efficiency ratios in J5.10; or*<br>*(ii)packaged air-conditioners, split systems, and variable refrigerant flow air-conditioning equipment that complies with the energy efficiency ratios in J5.11.* |
| Application to Development | **This clause applies to any proposed heat rejection equipment.** |
| **56. Construction Requirements – Heat Rejection Equipment** | **This clause contains detailed design criteria which must be met for heat rejection equipment which may be installed as part of an air-conditioning system. Refer to the clause extract in the body of the report and the tables referenced in the BCA.** |


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# Part J6 – Artificial Lighting and Power

## J6.1 Application of Part

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| Application to Development | <table><tr><td>**Retail**</td><td>**Class 6**</td><td>**This Part applies.**</td></tr><tr><td>**Carpark**</td><td>**Class 7a**</td><td>**This Part applies.**</td></tr><tr><td>**Residential Units**</td><td>**Class 2**</td><td>**This Part does not apply in NSW as these matters are regulated under BASIX.**</td></tr></table><br>**See body of report for requirements** |

## J6.2 Artificial lighting

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| BCA extract | *J6.2 (a) In a sole-occupancy unit of a Class 2 building or a Class 4 part of a building-*<br>*(i) the lamp power density or illumination power density of artificial lighting must not exceed the allowance of -*<br>*(A) 5 W/m$^2$ within a sole-occupancy unit; and*<br>*(B) 4 W/m$^2$ on a verandah, balcony or the like attached to a sole occupancy unit; and*<br>*(ii) the illumination power density in **BCA J6.2 (a) (i)** may be increased by dividing it by the illumination power density adjustment factor for a control device in **BCA Table J6.2b** as applicable; and*<br>*(iii) when designing the lamp power density or illumination power density, the power of the proposed installation must be used rather than nominal allowances for exposed batten holders or luminaires; and*<br>*(iv) halogen lamps must be separately switched from fluorescent lamps.* |
| Application to Development | **This clause does not apply in NSW as these matters are regulated under BASIX.** |


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| BCA extract | *J6.2 (b) In a building other than a sole-occupancy unit of a Class 2 building or a Class 4 part of a building-*<br>*(i) for artificial lighting, the aggregate design illumination power load must not exceed the sum of the allowances obtained by multiplying the area of each space by the maximum illumination power density in BCA Table J6.2a; and*<br>*(ii) the aggregate design illumination power load for BCA J6.2 (b) (i) is the sum of the design illumination power loads in each of the spaces served; and*<br>*(iii) where there are multiple lighting systems serving the same space, the design illumination power load for (ii) is—*<br>*(A)the total illumination power load of all systems; or*<br>*(B)where a control system permits only one system to operate at a time—*<br>*(aa)based on the highest illumination power load; or*<br>*(bb)determined by the formula—*<br>*[H x T/2 + P x (100 - T/2)] / 100*<br>*where—*<br>*H =the highest illumination power load; and*<br>*T = the time for which the maximum illumination power load will occur, expressed as a percentage; and*<br>*P = the predominant illumination power load.* |
| Application to Development | **This clause applies to the development. Refer to Appendix for calculation of maximum allowable lighting power.**<br><br>**Note: That Table J6.2a allows the maximum power load to be adjusted by a factor provided in the table where lighting is controlled by movement detectors or dimmers. The adjustment would have the effect of increasing the maximum allowable illumination power. At this stage no adjustment has been made.** |
| **57. Construction Requirements – Maximum Interior Illumination Power Load** | **The total maximum allowed interior illumination power load for the development is 32,472W.**<br><br>**The aggregate design illumination power load must not exceed this allowed wattage.**<br><br>**Note 1: The total has been calculated using adjustment factors for enclosed spaces with a Room Aspect Ratio of less than 1.5.**<br>**Note 2: Emergency lighting and signage lighting are exempted from this requirement.**<br><br>**See Appendix for detailed calculation of allowed interior illumination power load for each space.** |


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| | |
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| BCA extract | *J6.2 (c) The requirements of **BCA J6.2 (a)** and **BCA J6.2 (b)** do not apply to the following:*<br>*(i) emergency lighting in accordance with **BCA Part E4**.*<br>*(ii) signage, display lighting within cabinets and display cases that are fixed in place.*<br>*(iii) lighting for accommodation within the residential part of a detention centre.*<br>*(iv) a heater where the heater also emits light, such as in bathrooms.*<br>*(v) lighting of a specialist process nature such as in a surgical operating theatre, fume cupboard or clean workstation.*<br>*(vi) lighting of performances such as theatrical or sporting.*<br>*(vii) lighting for the permanent display and preservation of works of art or objects in a museum or gallery other than for retail sale, purchase or auction.*<br>*(viii) lighting installed solely to provide photosynthetically active radiation for indoor plant growth on green walls and the like.* |
| Application to Development | **This clause applies to the development.** |
| **58. Construction Requirements – Illumination Power Load** | **Note:**<br>**The requirements of BCA J6.2 (b) do not apply to the following:**<br>**(i) emergency lighting in accordance with BCA Part E4.**<br>**(ii) signage, display lighting within cabinets and display cases that are fixed in place.**<br>**(iii) lighting for accommodation within the residential part of a detention centre.**<br>**(iv) a heater where the heater also emits light, such as in bathrooms.**<br>**(v) lighting of a specialist process nature such as in a surgical operating theatre, fume cupboard or clean workstation.**<br>**(vi) lighting of performances such as theatrical or sporting.**<br>**(vii) lighting for the permanent display and preservation of works of art or objects in a museum or gallery other than for retail sale, purchase or auction.**<br>**(viii) lighting installed solely to provide photosynthetically active radiation for indoor plant growth on green walls and the like.** |

| | |
|---|---|
| BCA extract | *J6.2(d) For the purposes of Table J6.2b, the following control devices must comply with Specification J6:*<br>*(i)Lighting timers.*<br>*(ii)Motion detectors.*<br>*(iii)Daylight sensors and dynamic lighting control devices* |

## J6.3 Interior artificial lighting and power control

| | |
|---|---|
| BCA extract | *J6.3 (a) All artificial lighting of a room or space must be individually operated by-*<br>*(i) a switch; or*<br>*(ii) other control device; or*<br>*(i) A combination of (i) and (ii)* |
| Application to Development | **This clause applies to the development.** |
| **59. Construction Requirements – Lighting Control** | **Artificial lighting of a room or space must be individually operated by a switch or other control device.** |


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| | |
|---|---|
| BCA extract | *J6.3 (b) An occupant activated device, such as a room security device, a motion detector in accordance with **BCA Specification J6**, or the like, must be provided in the sole occupancy unit of a Class 3 building, other than where providing accommodation for people with a disability or the aged, to cut power to the artificial lighting, air-conditioner, local exhaust fans and bathroom m heater when the sole-occupancy unit is unoccupied.* |
| Application to Development | **This clause does not apply as the proposed development is not a Class 3 building.** |

| | |
|---|---|
| BCA extract | *J6.3 (c) An artificial lighting switch or other control device in **BCA J6.2 (a)** must-*<br>*(i) if an artificial lighting switch, be located in a visible and easily accessed position-*<br>*(A) in the room or space being switched; or*<br>*(B) in an adjacent room or space from where 90% of the lighting being switched is visible; and*<br>*(ii) for other than a single functional space such as an auditorium, theatre, swimming pool, sporting stadium or warehouse-*<br>*(A) not operate lighting for an area of more than 250 $m^2$ if in a Class 5 building or a Class 8 laboratory; or*<br>*(B) not operate lighting for an area of more than-*<br>*(aa) 250 $m^2$ for a space of not more than 2000 $m^2$; or*<br>*(bb) 1000 $m^2$ for a space of more than 2000 $m^2$, if in a Class 3, 6, 7, 8 (other than a laboratory) or 9 building.* |
| Application to Development | **Clause J6.3(c)(ii)(B)(aa)(bb) applies to the development.** |
| **60. Construction Requirements – Lighting Switch or other Control Device** | **An artificial lighting switch or other control device must not operate lighting for an area more than 250 $m^2$ for a space not more than 2000$m^2$, or 1000 $m^2$ for a space of more than 2000$m^2$ in the Class 6 and Class 7 parts of the building.** |

| | |
|---|---|
| BCA extract | *J6.3 (d) 95% of the light fittings in a building or storey of a building, other than a Class 2 or 3 building or a Class 4 part, of more than 250 $m^2$ must be controlled by-*<br>*(i) a time switch in accordance with **BCA Specification J6**; or*<br>*(ii) an occupant sensing device such as-*<br>*(A) a security key card reader that registers a person entering and leaving the building; or*<br>*(B) a motion detector in accordance with **BCA Specification J6**.* |
| Application to Development | **This clause applies to the development as the floor area of the building is greater than 250$m^2$.** |
| **61. Construction Requirements – Time Switch or Occupant Sensing Device** | **95% of the lighting in the ground floor and carpark must be controlled by a time switch in accordance with BCA Specification J6 or an occupant sensing device such as a security card reader that registers a person entering and leaving the building or a motion detector in accordance with BCA Specification J6.** |


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| | |
|---|---|
| BCA extract | *J6.3 (e) In a Class 5, 6 or 8 building of more than 250 $m^2$, artificial lighting in a natural lighting zone adjacent to windows must be separately controlled from artificial lighting not in a natural lighting zone in the same storey except where-*<br>*(i) the room containing the natural lighting zone is less than 20 $m^2$; or*<br>*(ii) the room's natural lighting zone contains less than 4 luminaires; or*<br>*(iii) 70% or more of the luminaires in the room are in the natural lighting zone.* |
| Application to Development | **This clause applies to the Class 6 parts of the development.** |
| **62. Construction Requirements – Artificial lighting in natural Lighting Zone** | **Artificial lighting in a natural lighting zone adjacent to windows must be separately controlled from artificial lighting not in a natural lighting zone in the same storey except where-**<br>**(i) The room containing the natural lighting zone is less than 20 $m^2$**<br>**(ii) The room's natural lighting zone contains less than 4 luminaires**<br>**70% or more of the luminaires in the room are in the natural lighting zone** |

| | |
|---|---|
| BCA extract | *J6.3 (f) Artificial lighting in a fire-isolated stairway, fire-isolated passageway or fire-isolated ramp, must be controlled by a motion detector in accordance with **Specification J6**.* |
| Application to Development | **This clause applies where fire-isolated stairway, fire-isolated passageway or fire-isolated ramp are required.** |
| **63. Construction Requirements – Lighting in Fire Stair** | **Artificial lighting in a fire-isolated stairway or passage must be controlled by a motion detector in accordance with Specification J6** |

| | |
|---|---|
| BCA extract | *J6.3 (g) Artificial lighting in a foyer, corridor and other circulation spaces*<br>*(i) of more than 250 W within a single zone; and*<br>*(ii) adjacent to windows,*<br>*must be controlled by a daylight sensor and dynamic lighting control device in accordance with **Specification J6**.* |
| Application to Development | **This clause applies to the development if artificial lighting in a foyer, corridor or other circulation space is more than 250 W within a single zone and adjacent to windows.** |
| **64. Construction Requirements – Lighting in Foyer, Corridor and Other Circulation Spaces** | **Artificial lighting in a foyer, corridor and other circulation spaces of more than 250 W within a single zone and adjacent to windows, must be controlled by a daylight sensor and dynamic lighting control device in accordance with Specification J6.** |


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| | |
|---|---|
| BCA extract | *J6.3 (h) Artificial lighting in the first 19 m of travel in a carpark entry zone must be controlled by a motion sensor in accordance with **Specification J6**.* |
| Application to Development | **This clause applies to the development.** |
| **65. Construction Requirements – Artificial Lighting in Carpark Entry Zone** | **Artificial lighting in the first 19 m of travel in a carpark entry zone must be controlled by a motion sensor in accordance with Specification J6.** |

| | |
|---|---|
| BCA extract | *J6.3 (i) The requirements of **BCA J6.3 (a), (b), (c), (d), (e), (f), (g) and (h)** do not apply to the following:*<br>*(i) emergency lighting in accordance with **BCA Part E4**.*<br>*(ii) where artificial lighting is needed for 24-hour occupancy such as for a manufacturing process, parts of a hospital, an airport control tower or within a detention centre.*<br>*(j) The requirements of **(d)** do not apply to the following:*<br>*(i) artificial lighting in a space where the sudden loss of artificial lighting would cause an unsafe situation such as*<br>*(A) in a patient care area in a Class 9a building or in a Class 9c building; or*<br>*(B) a plant room or lift motor room; or*<br>*(C) a workshop where power tools are used.*<br>*(ii) a heater where the heater also emits light, such as in bathrooms.* |
| Application to Development | **These clauses may apply to the development as applicable.** |
| **66. Construction Requirements – Exceptions** | **The requirements of BCA J6.3 (a), (b), (c), (d), (e), (f), (g) and (h) do not apply to the following:**<br>**(i)emergency lighting in accordance with BCA Part E4.**<br>**(ii) where artificial lighting is needed for 24-hour occupancy such as for a manufacturing process, parts of a hospital, an airport control tower or within a detention centre.**<br>**(j) The requirements of (d) do not apply to the following:**<br>**(i) artificial lighting in a space where the sudden loss of artificial lighting would cause an unsafe situation such as in a patient care area in a Class 9a building or in a Class 9c building or a plant room, lift motor room, or a workshop where power tools are used.**<br>**(ii) a heater where the heater also emits light, such as in bathrooms.** |

## J6.4 Interior decorative and display lighting

| | |
|---|---|
| BCA extract | *J6.4 (a) Interior decorative and display lighting, such as for a foyer mural or art display, must be controlled-*<br>*(i) separately from other artificial lighting; and*<br>*(ii) by a manual switch for each area other than when the operating times of the displays are the same in a number of areas such as in a museum, art gallery or the like, in which case they may be combined; and*<br>*(iii) by a time switch in accordance with **BCA Specification J6** where the display lighting exceeds 1 kW.* |
| Application to Development | **This clause applies to the development if decorative or display lighting is proposed.** |
| **(i) Construction Requirements – Decorative or Display Lighting** | **Interior decorative and display lighting (such as for foyer mural art display), shall be controlled separately from other lighting by a manual switch for each area (where the operating times of the displays are the same in multiple areas, they may be combined). Where the decorative/display lighting exceeds 1 kW, it must be controlled by a time switch in accordance with BCA Specification J6.** |


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| | |
|---|---|
| BCA extract | *J6.4 (b) Window display lighting must be controlled separately from other display lighting.* |
| Application to Development | **This clause applies to the development if window display lighting is proposed.** |
| **(ii) Construction Requirements – Window Display Lighting** | **Window display lighting must be controlled separately from other display lighting.** |

## J6.5 Exterior artificial lighting

| | |
|---|---|
| BCA extract | *J6.5 (a) Exterior artificial lighting attached to or directed at the façade of a building, must-*<br>*(i) be controlled by-*<br>*(A) a daylight sensor; or*<br>*(B) a time switch that is capable of switching on and off electric power to the system at variable pre-programmed times and on variable pre-programmed days; and*<br>*(ii) when the total lighting load exceeds 100 W-*<br>*(A) use LED luminaires for 90% of the total lighting load; or*<br>*(B) be controlled by a motion detector in accordance with BCA Specification J6; and*<br>*(C)when used for decorative purposes, such as façade lighting or signage lighting, have a separate time switch in accordance with Specification J6* |
| Application to Development | **This clause applies to the development if external lighting is proposed.** |
| **(iii) Construction Requirements – Perimeter Lighting** | **Artificial lighting around the perimeter of the building must be controlled by a daylight sensor or a time switch in accordance with BCA Specification J6.**<br><br>**When the total perimeter lighting load exceeds 100 W**<br>**A Use LED luminaries for 90% of total lighting load or**<br>**B be controlled by a motion detector in accordance with BCA Specification J6. And**<br>**C When used for decorative purposes have a separate time switch in accordance with Specification J6**<br>**Note: The requirements of BCA J6.5(a)(ii) do not apply to emergency lighting in accordance with BCA Part E4.** |

| | |
|---|---|
| BCA extract | *J6.5 (b) The requirements of **BCA J6.5 (a)(ii)** do not apply to the following:*<br>*(i) emergency lighting in accordance with **BCA Part E4**.*<br>*(ii) lighting around a detention centre* |


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## J6.6 Boiling water and chilled water storage units

| | |
|---|---|
| BCA extract | *Power supply to a boiling water or chilled water storage unit must be controlled by a time switch in accordance with **BCA Specification J6**.* |
| Application to Development | **This clause applies to the development if boiling water or chilled water storage units are proposed to be installed.** |
| **(iv) Construction Requirements – Boiling/Chilled Water Storage Units** | **The power supply to a boiling water or chilled water storage unit must be controlled by a time switch in accordance with BCA Specification J6.** |

## J6.7 Lifts

| | |
|---|---|
| BCA extract | *J6.5 Lifts must-*<br>*(a) be configured to ensure artificial lighting and ventilation in the car are turned off when it is unused for 15 minutes; and*<br>*(b) achieve the idle and standby energy performance level in **Table 6.7a**; and*<br>*(c) achieve-*<br>*(i) the energy efficiency class in **Table 6.7b**, or*<br>*(ii) if a dedicated goods lift, energy efficiency class D in accordance with ISO 25745-2.* |
| Application to Development | **This clause applies to the development.** |
| **67. Lifts** | **Lifts must-**<br>**(a) be configured to ensure artificial lighting and ventilation in the car are turned off when it is unused for 15 minutes; and**<br>**(b) achieve the idle and standby energy performance level in Table 6.7a; and**<br>**(c) achieve-**<br>**(i) the energy efficiency class in Table 6.7b, or**<br>**(ii) if a dedicated goods lift, energy efficiency class D in accordance with ISO 25745-2.** |

## J6.8 Escalators and moving walkways

| | |
|---|---|
| BCA extract | *Escalators and moving walkways must slow to between 0.2 m/s and 0.05 m/s when unused for 15 minutes.* |
| Application to Development | **This clause is not applicable as no escalators or moving walkways are shown proposed.** |


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# Part J7 – Heated Water Supply and Swimming Pool and Spa Pool Plant

## J7.1 Blank

| | |
|---|---|
| Application to Development | <table><tr><td>**Retail**</td><td>**Class 6**</td><td>**This Part applies.**</td></tr><tr><td>**Carpark**</td><td>**Class 7a**</td><td>**This Part applies.**</td></tr><tr><td>**Residential Units**</td><td>**Class 2**</td><td>**Part J7.2 only applies as specified in NSW Section J(A)4.2.**<br>**J7.3 and J7.4 are regulated under BASIX**</td></tr></table><br>**See body of report for requirements** |

## J7.2 Heated water supply

| | |
|---|---|
| BCA extract | *A heated water supply system for food preparation and sanitary purposes must be designed and installed in accordance with **Part B2 of NCC Volume Three – Plumbing Code of Australia**.* |
| Application to Development | **This clause applies to the development.** |
| **(v) Construction Requirements – Hot Water Heater** | **Any heated water service for food preparation or sanitary purposes must be designed and installed in accordance with Part B2 of NCC Volume Three - Plumbing Code of Australia.** |

## J7.3 Swimming pool heating and pumping

| | |
|---|---|
| BCA extract | *J7.3 (a) Heating for a swimming pool must be by-*<br>*(i) a solar heater; or*<br>*(ii) a heater using reclaimed heat from another process such as reject heat from a refrigeration plant; or*<br>*(iii) a geothermal heater; or*<br>*(iv) a gas heater that-*<br>*(A) if rated to consume 500 MJ/hour or less, achieves a minimum gross thermal efficiency of 86%; or*<br>*(B) if rated to consume more than 500 MJ/hour, achieves a minimum gross thermal efficiency of 90%; or*<br>*(v) a heat pump; or*<br>*(v) a combination of **(i) to (v)**.* |
| Application to Development | **This clause does not apply to the development as there is no swimming pool proposed and is also regulated in NSW under BASIX.** |


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### J7.4 Spa pool heating and pumping

| | |
|---|---|
| BCA extract | *J7.4 (a) Heating for a spa pool that shares a water recirculation system with a swimming pool must be by-*<br>*(i) a solar heater; or*<br>*(ii) a heater using reclaimed heat from another process such as reject heat from a refrigeration plant; or*<br>*(iii) a geothermal heater; or*<br>*(iv) a gas heater that-*<br>*(A) if rated to consume 500 MJ/hour or less, achieves a minimum gross thermal efficiency of 86%; or*<br>*(B) if rated to consume more than 500 MJ/hour, achieves a minimum gross thermal efficiency of 90%; or*<br>*(v) a heat pump; or*<br>*(vi) a combination of **(i) to (vi)**.* |
| Application to Development | **This clause does not apply to the development as there is no spa pool proposed and is also regulated in NSW under BASIX.** |

## Part J8 – Access for Maintenance and Facilities for Monitoring

### J8.1 Application of Part

| | |
|---|---|
| BCA extract | *The Deemed-to-Satisfy Provisions of this Part do not apply-*<br>*(a) within a sole-occupancy unit of a Class 2 building or a Class 4 part of a building; or*<br>*(b) to a Class 8 electricity network substation.* |
| Application to Development | <table><tr><td>**Retail**</td><td>**Class 6**</td><td>**This Part applies.**</td></tr><tr><td>**Carpark**</td><td>**Class 7a**</td><td>**This Part applies.**</td></tr><tr><td>**Residential Units**</td><td>**Class 2**</td><td>**This Part applies except within a sole-occupancy unit as specified in NSW Section J(A)5.**</td></tr></table><br>**See body of report for requirements.** |

### J8.2 Blank

This clause has deliberately been left blank as per BCA.


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## J8.3 Facilities for energy monitoring

| | |
|---|---|
| BCA extract | *J8.3 (a) A building or sole-occupancy unit with a floor area of more than 500 $m^2$ must have an energy meter configured to record the time of use consumption of gas and electricity.* |
| Application to Development | **This clause applies to the development as the floor area is more than 500$m^2$.** |
| **(vi) Construction Requirements – Facilities for energy monitoring** | **The development must have an energy meter configured to record the time of use consumption of gas and electricity.** |

| | |
|---|---|
| BCA extract | *J8.3 (b) A building with a floor area of more than 2,500 $m^2$ must have energy meters configured to separately record the time of use energy consumption of-*<br>*(i) air-conditioning plant including, where appropriate, heating plant, cooling plant and air handling fans; and*<br>*(ii) artificial lighting; and*<br>*(iii) appliance power; and*<br>*(iv) central hot water supply; and*<br>*(v) internal transport devices including lifts, escalators and, moving walkways where there is more than one serving the building; and*<br>*(vi) other ancillary plant.* |
| Application to Development | **This clause applies to the development as the floor area of the proposed development is more than 2,500$m^2$.** |
| **(vii) Construction Requirements – Facilities for energy monitoring** | **A building with a floor area of more than 2,500 m2 must have energy meters configured to separately record the time of use energy consumption of-**<br>**(i) air-conditioning plant including, where appropriate, heating plant, cooling plant and air handling fans; and**<br>**(ii) artificial lighting; and**<br>**(iii) appliance power; and**<br>**(iv) central hot water supply; and**<br>**(v) internal transport devices including lifts, escalators and, moving walkways where there is more than one serving the building; and**<br>**(vi) other ancillary plant.** |

| | |
|---|---|
| BCA extract | *J8.3 (c) Energy meters required by **BCA J8.3 (b)** must be interlinked by a communication system that collates the data to a single interface where it can be stored, analysed and reviewed.* |
| Application to Development | **This clause applies to the development as the floor area of the proposed development is more than 2,500 $m^2$.** |
| **(viii) Construction Requirements – Facilities for energy monitoring** | **Energy meters required by BCA J8.3 (b) must be interlinked by a communication system that collates the data to a single interface where it can be stored, analysed and reviewed.** |

| | |
|---|---|
| BCA extract | *J8.3 (d) The provisions of **BCA J8.3 (b)** do not apply to a Class 2 building with a floor area of more than 2,500 $m^2$ where the total area of the common areas is less than 500 $m^2$.* |
| Application to Development | **This clause does not apply to the development as the total area of common areas are not less than 500$m^2$.** |


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## Appendix 1 – Sample Solar Absorptance Values for Roof Colours

The Table below is taken from the **COLORBOND®** range for guidance only.

See link below to source this reference.

It is important to obtain the roof material manufacturer's data sheet for the selected roof cladding material for this building to ensure the Solar Absorptance value is not more than that permitted.

If a roof cladding material is intended to be used with a higher solar absorptance value, then contact Application Solutions to reassess this part. It is likely a Performance Solution will need to be prepared.

*Ref:* *http://steel.com.au/products/coated-steel/colorbond-steel/basix-and-bca-classification*

*Range of colours that meet Deemed-to-Satisfy compliance*
*Contact Application Solutions if a darker colour is planned*

**Table 1 - Classification of COLORBOND® steel Colours for BCA and BASIX for the COLORBOND® steel Standard 22 Colours**

| Colour | Solar Absorptance |
|---|---|
| Classic Cream™ | 0.32 |
| Surfmist® | 0.32 |
| Paperbark® | 0.42 |
| Evening Haze® | 0.43 |
| Shale Grey™ | 0.43 |
| Dune® | 0.47 |
| Cove™ | 0.54 |
| Windspray® | 0.58 |
| Pale Eucalypt® | 0.6 |
| Gully™ | 0.63 |
| Mangrove® | 0.64 |
| Wallaby® | 0.64 |
| Jasper® | 0.68 |
| Terrain® | 0.69 |
| Basalt® | 0.69 |
| Manor Red® | 0.69 |
| Woodland Grey® | 0.71 |
| Monument® | 0.73 |
| Ironstone® | 0.74 |
| Cottage Green® | 0.75 |
| Deep Ocean® | 0.75 |
| Nightsky® | 0.96 |

Sample http://steel.com.au/products/coated-steel/colorbond-steel/basix-and-bca-classification


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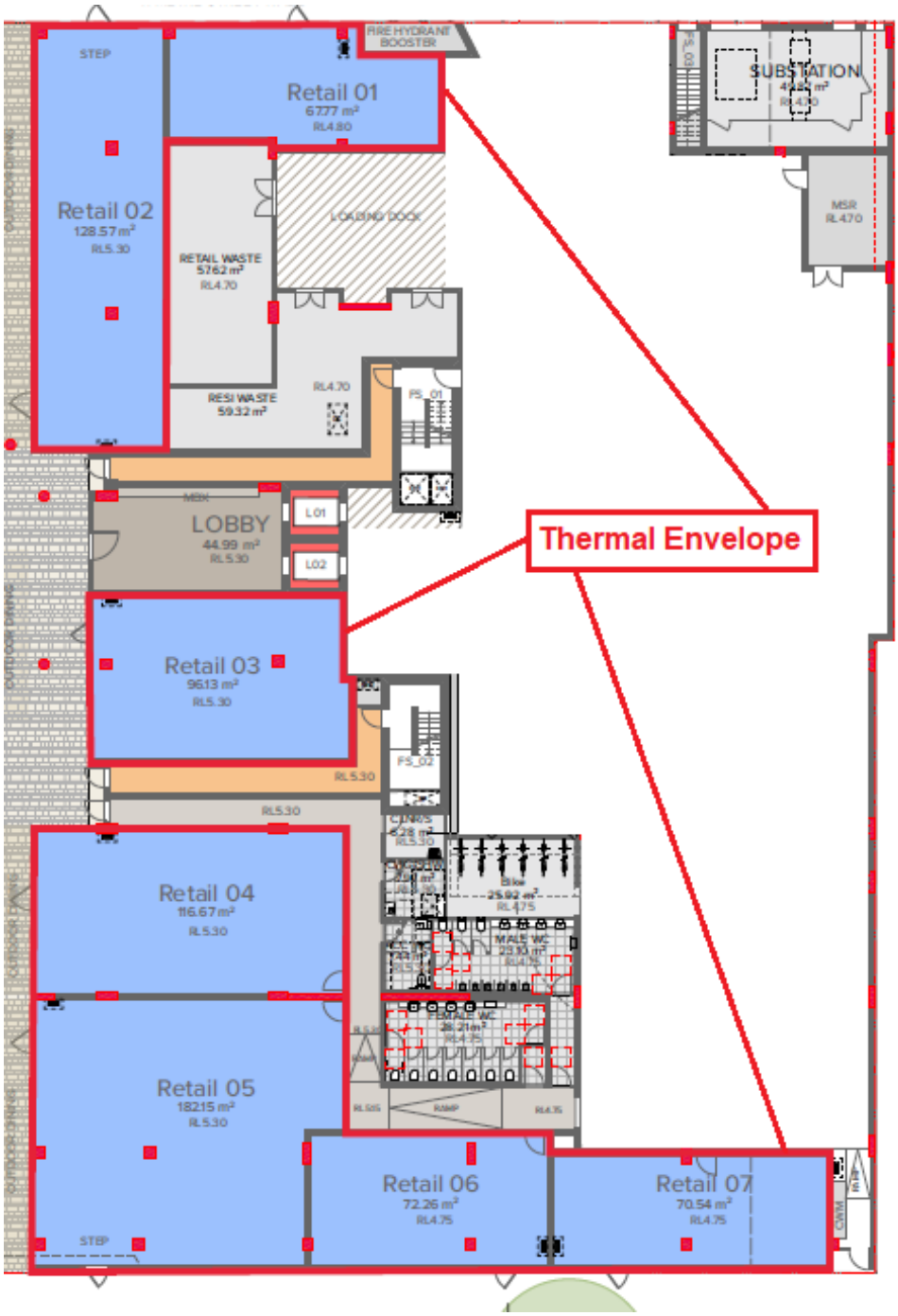
## Appendix 2 – Envelope Markup




**Walls Forming Part of the Thermal Envelope**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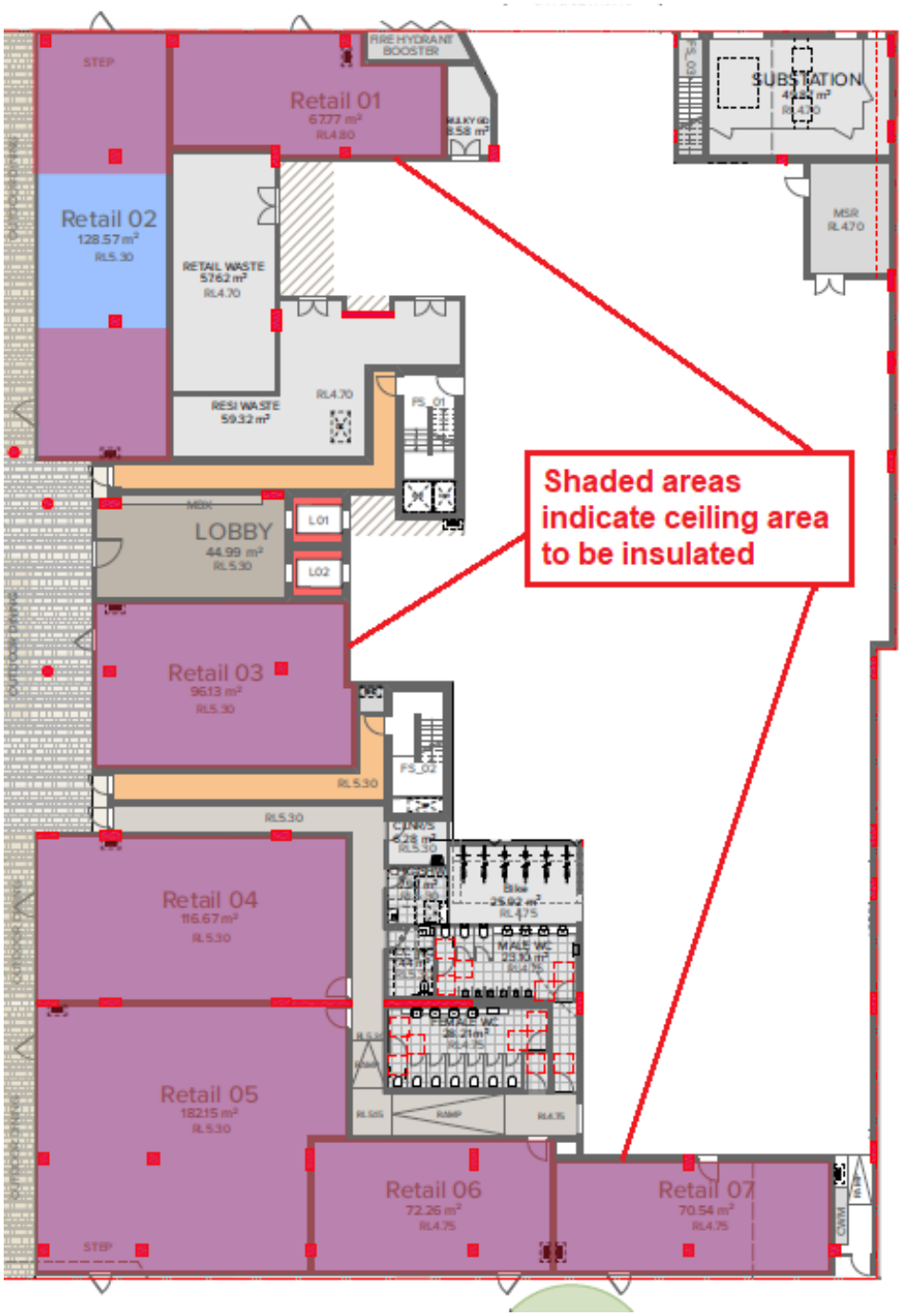


**Ceiling Areas Forming Part of the Envelope**


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# Appendix 3 – Roof Types

## Retail 01,02

Roof Type 1 — Concrete Slab

| Item | Description | Thermal Conductivity | Thickness (m) | R-Value for Roof | R-Value for Structure | Note |
|---|---|---|---|---|---|---|
| 1 | Outdoor air film | | | 0.03 | | *from specification J1.2 Table 2b* |
| 2 | Concrete Slab | 1.44 | 0.200 | 0.14 | | *from specification J1.2 Table 2a* |
| 3 | **Thermal Break** | | | | | *from specification J1.2 Table 2b* |
| 4 | **Insulation** | | | **3.4** | | *to be specified* |
| 5 | | | | | | *from specification J1.2 Table 2a* |
| 6 | Indoor air film | | | 0.16 | | *from specification J1.2 Table 2b* |
| **TOTALS** | | | | **3.73** | **0.00** | |

| | | |
|---|---|---|
| **Weighting Factor** | 100.0% | |
| **R-Value for Each Component** | 3.73 | 0.00 |
| **Combined R-Value** | **3.7** | ✓ |

**Requirements for Concrete Slab**

| | | |
|---|---|---|
| **Required System R-Value (J1.3) is:** | **R3.7** | *J1.3(a)* |
| **Insulation Required:** | **R3.4** | |
| **Thermal Break Required** | **NA** | |
| **Maximum Solar Absorptance** *(Refer to sample roof colors in report for guidance)* | **0.45** | |

*Note: In climate zones 1, 2, 3, 4, 5, 6 and 7, the solar absorptance of the upper surface of a roof must be not more than 0.45.*
**If a roof colour with a higher Solar absorptance is planned, contact Application Solutions to reassess.**

Paynter Dixon Retail 01-02 - Coffs Harbour

## Retail 03

Roof Type 1 — Concrete Slab

| Item | Description | Thermal Conductivity | Thickness (m) | R-Value for Roof | R-Value for Structure | Note |
|---|---|---|---|---|---|---|
| 1 | Outdoor air film | | | 0.03 | | *from specification J1.2 Table 2b* |
| 2 | Concrete Slab | 1.44 | 0.200 | 0.14 | | *from specification J1.2 Table 2a* |
| 3 | **Thermal Break** | | | | | *from specification J1.2 Table 2b* |
| 4 | **Insulation** | | | **3.4** | | *to be specified* |
| 5 | | | | | | *from specification J1.2 Table 2a* |
| 6 | Indoor air film | | | 0.16 | | *from specification J1.2 Table 2b* |
| **TOTALS** | | | | **3.73** | **0.00** | |

| | | |
|---|---|---|
| **Weighting Factor** | 100.0% | |
| **R-Value for Each Component** | 3.73 | 0.00 |
| **Combined R-Value** | **3.7** | ✓ |

**Requirements for Concrete Slab**

| | | |
|---|---|---|
| **Required System R-Value (J1.3) is:** | **R3.7** | *J1.3(a)* |
| **Insulation Required:** | **R3.4** | |
| **Thermal Break Required** | **NA** | |
| **Maximum Solar Absorptance** *(Refer to sample roof colors in report for guidance)* | **0.45** | |

*Note: In climate zones 1, 2, 3, 4, 5, 6 and 7, the solar absorptance of the upper surface of a roof must be not more than 0.45.*
**If a roof colour with a higher Solar absorptance is planned, contact Application Solutions to reassess.**

Paynter Dixon Retail 03 - Coffs Harbour


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## Retail 04,05,06,07

**Roof Type 1** — **Concrete Slab**

| Item | Description | Thermal Conductivity | Thickness (m) | R-Value for Roof | R-Value for Structure | Note |
|---|---|---|---|---|---|---|
| 1 | Outdoor air film | | | 0.03 | | *from specification J1.2 Table 2b* |
| 2 | Concrete Slab | 1.44 | 0.200 | 0.14 | | *from specification J1.2 Table 2a* |
| 3 | **Thermal Break** | | | | | *from specification J1.2 Table 2b* |
| 4 | **Insulation** | | | **3.4** | | *to be specified* |
| 5 | | | | | | *from specification J1.2 Table 2a* |
| 6 | Indoor air film | | | 0.16 | | *from specification J1.2 Table 2b* |
| **TOTALS** | | | | **3.73** | **0.00** | |

| | | |
|---|---|---|
| **Weighting Factor** | 100.0% | |
| **R-Value for Each Component** | 3.73 | 0.00 |
| **Combined R-Value** | **3.7** | ✔ |

**Requirements for Concrete Slab**

| | | |
|---|---|---|
| **Required System R-Value (J1.3) is:** | **R3.7** | *J1.3(a)* |
| **Insulation Required:** | **R3.4** | |
| **Thermal Break Required** | **NA** | |
| **Maximum Solar Absorptance** *(Refer to sample roof colors in report for guidance)* | **0.45** | |

*Note: In climate zones 1, 2, 3, 4, 5, 6 and 7, the solar absorptance of the upper surface of a roof must be not more than 0.45.*
**If a roof colour with a higher Solar absorptance is planned, contact Application Solutions to reassess.**

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# Appendix 4 – Wall Types

## Retail 01,02

**Wall Type 1** — **Concrete Block Walls**

| Item | Description | Thickness | Thermal Conductivity | R-Value | R-Value for Structure | Note |
|---|---|---|---|---|---|---|
| 1 | Outdoor air film | | | 0.04 | | from specification J1.2 |
| 2 | Concrete block wall | 0.19 | 1.1 | 0.17 | | from specification J1.2 |
| 3 | **Thermal Break** | | | | | |
| 4 | Plasterboard | 0.01 | 0.17 | 0.06 | | from specification J1.2 |
| 5 | Indoor air film | | | 0.12 | | from specification J1.2 |
| 6 | **Added Insulation** | | | **0.5** | | *Iterated* |
| | **TOTAL R-value** | | | **1.01** | **0.00** | |
| | **Weighting Factor** | | | 100.0% | 0.0% | *Based on proportional area of each component* |
| | **R-Value for Each Component** | | | 1.01 | 0.00 | |
| | **Combined R-Value** | | | **1.0** | | |
| | **Combined Total U-Value** | | | **0.99** | | |

| | |
|---|---|
| **Required minimum R-Value for wall component:** | **R1.0** ✓ |
| **Requirements for** | |
| **Insulation Required:** | **R0.5** |
| **Thermal Break:** | **N/A** |

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## Retail 03

**Wall Type 1** — **Concrete Block Walls**

| Item | Description | Thickness | Thermal Conductivity | R-Value | R-Value for Structure | Note |
|---|---|---|---|---|---|---|
| 1 | Outdoor air film | | | 0.04 | | from specification J1.2 |
| 2 | Concrete block wall | 0.19 | 1.1 | 0.17 | | from specification J1.2 |
| 3 | **Thermal Break** | | | | | |
| 4 | Plasterboard | 0.01 | 0.17 | 0.06 | | from specification J1.2 |
| 5 | Indoor air film | | | 0.12 | | from specification J1.2 |
| 6 | **Added Insulation** | | | **0.5** | | *Iterated* |
| | **TOTAL R-value** | | | **1.01** | **0.00** | |
| | **Weighting Factor** | | | 100.0% | 0.0% | *Based on proportional area of each component* |
| | **R-Value for Each Component** | | | 1.01 | 0.00 | |
| | **Combined R-Value** | | | **1.0** | | |
| | **Combined Total U-Value** | | | **0.99** | | |

| | |
|---|---|
| **Required minimum R-Value for wall component:** | **R1.0** ✓ |
| **Requirements for** | |
| **Insulation Required:** | **R0.5** |
| **Thermal Break:** | **N/A** |

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## Retail 04,05,06,07

**Wall Type 1** — **Concrete Block Walls**

| Item | Description | Thickness | Thermal Conductivity | R-Value | R-Value for Structure | Note |
|---|---|---|---|---|---|---|
| 1 | Outdoor air film | | | 0.04 | | from specification J1.2 |
| 2 | Concrete block wall | 0.19 | 1.1 | 0.17 | | from specification J1.2 |
| 3 | **Thermal Break** | | | | | |
| 4 | Plasterboard | 0.01 | 0.17 | 0.06 | | from specification J1.2 |
| 5 | Indoor air film | | | 0.12 | | from specification J1.2 |
| 6 | **Added Insulation** | | | **0.5** | | *Iterated* |
| | **TOTAL R-value** | | | **1.01** | **0.00** | |
| | **Weighting Factor** | | | 100.0% | 0.0% | *Based on proportional area of each component* |
| | **R-Value for Each Component** | | | 1.01 | 0.00 | |
| | **Combined R-Value** | | | **1.0** | | |
| | **Combined Total U-Value** | | | **0.99** | | |

| | |
|---|---|
| **Required minimum R-Value for wall component:** | **R1.0** ✓ |
| **Requirements for** | |
| **Insulation Required:** | **R0.5** |
| **Thermal Break:** | **N/A** |

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# Appendix 5 – Calculation of U-value

## Retail 01,02

### Calculation of U-value - Multiple Aspects

| | | |
|---|---|---|
| Maximum Total Allowed U-value from J1.5(a) | 2.0 | |
| Maximum U-value for display glazing from J1.5 (b) | U=5.8 | 4 |
| Calculated U-value (see below) | 0.27 | 114.02 |

✓ Calculated U-value is less than max permitted - complies

Paynter Dixon Retail 01-02 - Coffs Harbour

| Element | Wall Type | Description | Orientation | Width | Height | Area | Adopted Area | Weighting Factor | U-values of Elements | Weighted U-values |
|---|---|---|---|---|---|---|---|---|---|---|
| Façade 1 area | | | - East | | | 74.91 | 74.91 | | | |
| Façade 2 area | | | - North | | | 86.34 | 86.34 | | | |
| Façade 3 area | | | - South | | | 86.34 | 86.34 | | | |
| Façade 4 area | | | - West | | | 72.1 | 72.1 | | | |
| TOTAL Façade Area | | | | | | | 319.69 | | | |

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| Element | Wall Type | Description | Orientation | Width | Height | Area | f opaque openings a | Weighting Factor | U-values of Elements | Weighted U-values |
|---|---|---|---|---|---|---|---|---|---|---|
| Wall Element 1 | Wall Type 1 | Concrete Block Walls | East | | | 74.91 | 74.91 | 0.2343 | 0.50 | 0.1172 |
| Wall Element 2 | Wall Type 1 | Concrete Block Walls | North | | | 21.95 | 21.95 | 0.0687 | 0.50 | 0.0343 |
| Wall Element 3 | Wall Type 1 | Concrete Block Walls | South | | | 77.205 | 77.21 | 0.2415 | 0.50 | 0.1207 |
| Wall Element 4 | Wall Type 1 | Concrete Block Walls | West | | | 0.21 | 0.21 | 0.0007 | 0.50 | 0.0003 |
| | | | | | | | 174.28 | | | |

Paynter Dixon Retail 01-02 - Coffs Harbour

| Element | Wall Type | Description | Orientation | Width | Height | Area | Adopted Area | Weighting Factor | U-values of Elements | Weighted U-values |
|---|---|---|---|---|---|---|---|---|---|---|
| Doors and other opaque openings | Wall Type 1 | *Concrete Block Walls* | East | | | - | | | | |
| Doors and other opaque openings | Wall Type 1 | *Concrete Block Walls* | North | | | - | | | | |
| Doors and other opaque openings | Wall Type 1 | *Concrete Block Walls* | South | | | - | | | | |
| Doors and other opaque openings | Wall Type 1 | *Concrete Block Walls* | West | | | - | | | | |
| | | | | | | | - | | | |

Paynter Dixon Retail 01-02 - Coffs Harbour

| Element | Description | Orientation | Width | Height | Area | Adopted Area | Weighting Factor | U-values of Elements | Weighted U-values |
|---|---|---|---|---|---|---|---|---|---|
| Glazing Element 1 | Display Glazing | *Retail 01* | North | 10.55 | 4 | 42.2 | 42.2 | 0.1320 | 5.80 | 0.0000 |
| Glazing Element 2 | Display Glazing | *Retail 02 N* | North | 6.34 | 3.5 | 22.19 | 22.19 | 0.0694 | 5.80 | 0.0000 |
| Glazing Element 3 | Display Glazing | *Retail 02 NW* | West | 20.54 | 3.5 | 71.89 | 71.89 | 0.2249 | 5.80 | 0.0000 |
| Glazing Element 4 | Display Glazing | *Retail 02 SW* | South | 2.61 | 3.5 | 9.135 | 9.135 | 0.0286 | 5.80 | 0.0000 |
| | | | | | | | 145.42 | 0.454862523 | | |

| | |
|---|---|
| Weighted Average U-value | 0.2700 |
| Weighted Aveage R-value | 3.70 |

NOTE: Display Glazing is exduded from calculation

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# Retail 03

## Calculation of U-value - Multiple Aspects

| | | |
|---|---|---|
| Maximum Total Allowed U-value from J1.5(a) | 2.0 | |
| | | 4 |
| Maximum U-value for display glazing from J1.5 (b) | U=5.8 | 114.02 |
| Calculated U-value (see below) | 0.77 | ✔ Calculated U-value is less than max permitted - complies |

Paynter Dixon Retail 03 - Coffs Harbour

| Element | Wall Type | Description | Orientation | Width | Height | | Area | Adopted Area | Weighting Factor | U-values of Elements | Weighted U-values |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Facade 1 area | | - | East | 8.5 | | 4 | 34.00 | 34 | | | |
| Façade 2 area | | - | North | 12.96 | | 4 | 51.84 | 51.84 | | | |
| Façade 3 area | | - | South | 12.96 | | 4 | 51.84 | 51.84 | | | |
| Façade 4 area | | - | West | 8.5 | | 4 | 34.00 | 34 | | | |
| **TOTAL Façade Area** | | | | | | | | **171.68** | | | |

Paynter Dixon Retail 03 - Coffs Harbour

| Element | Wall Type | Description | Orientation | Width | Height | | Area | (net of opaque openn | Weighting Factor | U-values of Elements | Weighted U-values |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Wall Element 1 | Wall Type 1 | Concrete Block Walls | East | 8.5 | | 4 | 34.00 | 34.00 | 0.1980 | 0.94 | 0.1858 |
| Wall Element 2 | Wall Type 1 | Concrete Block Walls | North | 12.96 | | 4 | 51.84 | 51.84 | 0.3020 | 0.94 | 0.2833 |
| Wall Element 3 | Wall Type 1 | Concrete Block Walls | South | 12.96 | | 4 | 51.84 | 51.84 | 0.3020 | 0.94 | 0.2833 |
| Wall Element 4 | Wall Type 1 | Concrete Block Walls | West | | | | 2.52 | 2.52 | 0.0147 | 0.94 | 0.0138 |
| | | | | | | | | **140.20** | | | |

Paynter Dixon Retail 03 - Coffs Harbour

| Element | Wall Type | Description | Orientation | Width | Height | Area | Adopted Area | Weighting Factor | U-values of Elements | Weighted U-values |
|---|---|---|---|---|---|---|---|---|---|---|
| Doors and other opaque openings | Wall Type 1 | *Concrete Block Walls* | East | | | 0.0 | | | | |
| Doors and other opaque openings | Wall Type 1 | *Concrete Block Walls* | North | | | 0.0 | | | | |
| Doors and other opaque openings | Wall Type 1 | *Concrete Block Walls* | South | | | 0.0 | | | | |
| Doors and other opaque openings | Wall Type 1 | *Concrete Block Walls* | West | | | 0.0 | | | | |
| | | | | | | | - | | | |

Paynter Dixon Retail 03 - Coffs Harbour

| Element | Description | Orientation | Width | Height | | Area | Adopted Area | Weighting Factor | U-values of Elements | Weighted U-values |
|---|---|---|---|---|---|---|---|---|---|---|
| Glazing Element 1 | *Retail 03* | West | 7.87 | | 4 | 31.48 | 31.48 | 0.1834 | 5.80 | 0.0000 |
| | | | | | | | **31.48** | 0.183364399 | | |

| | |
|---|---|
| **Weighted Average U-value** | **0.7700** |
| **Weighted Aveage R-value** | **1.30** |

NOTE: Display Glazing is excluded from calculation

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## Calculation of U-value - Multiple Aspects

| | | | |
|---|---|---|---|
| **Maximum Total Allowed U-value from J1.5(a)** | **2.0** | | |
| **Maximum U-value for display glazing from J1.5 (b)** | **U=5.8** | 4 | 114.02 |
| **Calculated U-value (see below)** | **0.4** | ✔ | Calculated U-value is less than max permitted - complies |

Paynter Dixon Retail 04-07 - Coffs Harbour

| Element | Wall Type | Description | Orientation | Width | Height | Area | Adopted Area | Weighting Factor | U-values of Elements | Weighted U-values |
|---|---|---|---|---|---|---|---|---|---|---|
| Facade 1 area | | - | East | | | 78.26 | 78.26 | | | |
| Façade 2 area | | - | North | | | 148.4 | 148.4 | | | |
| Façade 3 area | | - | South | | | 149.71 | 149.71 | | | |
| Façade 4 area | | - | West | | | 75.075 | 75.075 | | | |
| **TOTAL Façade Area** | | | | | | | **451.45** | | | |

Paynter Dixon Retail 04-07 - Coffs Harbour

| Element | Wall Type | Description | Orientation | Width | Height | Area | (net of opaque openn | Weighting Factor | U-values of Elements | Weighted U-values |
|---|---|---|---|---|---|---|---|---|---|---|
| Wall Element 1 | Wall Type 1 | Concrete Block Walls | East | | | 78.26 | 74.06 | 0.1641 | 0.94 | 0.1539 |
| Wall Element 2 | Wall Type 1 | Concrete Block Walls | North | | | 140.76 | 136.56 | 0.3025 | 0.94 | 0.2838 |
| Wall Element 3 | Wall Type 1 | Concrete Block Walls | South | | | -9.4675 | - 9.47 | - 0.0210 | 0.94 | -0.0197 |
| Wall Element 4 | Wall Type 1 | Concrete Block Walls | West | | | -8.365 | - 8.36 | - 0.0185 | 0.94 | -0.0174 |
| | | | | | | | **192.79** | | | |

Paynter Dixon Retail 04-07 - Coffs Harbour

| Element | Wall Type | Description | Orientation | Width | Height | Area | Adopted Area | Weighting Factor | U-values of Elements | Weighted U-values |
|---|---|---|---|---|---|---|---|---|---|---|
| Doors and other opaque openings | Wall Type 1 | *Concrete Block Walls* | East | 1 | 2.1 | 4.2 | | | | |
| Doors and other opaque openings | Wall Type 1 | *Concrete Block Walls* | North | 1 | 2.1 | 4.2 | | | | |
| Doors and other opaque openings | Wall Type 1 | *Concrete Block Walls* | South | | | 0.0 | | | | |
| Doors and other opaque openings | Wall Type 1 | *Concrete Block Walls* | West | | | 0.0 | | | | |
| | | | | | | | **8.40** | | | |

Paynter Dixon Retail 04-07 - Coffs Harbour

| Element | Description | Orientation | Width | Height | Area | Adopted Area | Weighting Factor | U-values of Elements | Weighted U-values |
|---|---|---|---|---|---|---|---|---|---|
| Glazing Element 1 | *Retail 04* | North | 1.91 | 4 | 7.64 | 7.64 | 0.0169 | 5.80 | 0.0000 |
| Glazing Element 1 | *Retail 04* | West | 7.95 | 4 | 31.8 | 31.8 | 0.0704 | 5.80 | 0.0000 |
| Glazing Element 2 | *Retail 05* | West | 12.91 | 4 | 51.64 | 51.64 | 0.1144 | 5.80 | 0.0000 |
| Glazing Element 3 | *Retail 05 Harbur Drive* | South | 13.12 | 4 | 52.48 | 52.48 | 0.1162 | 5.80 | 0.0000 |
| Glazing Element 4 | *Retail 06* | South | 11.41 | 4.55 | 51.9155 | 51.9155 | 0.1150 | 5.80 | 0.0000 |
| Glazing Element 5 | *Retail 07* | South | 12.04 | 4.55 | 54.782 | 54.782 | 0.1213 | 5.80 | 0.0000 |
| | | | | | | **250.26** | 0.554347706 | | |

| | |
|---|---|
| **Weighted Average U-value** | **0.4000** |
| **Weighted Aveage R-value** | **2.50** |

NOTE: Display Glazing is excluded from calculation

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# Appendix 6 – Floor Calculations

## Retail 01,02

**Ratio of Floor Area to Floor Perimeter**

| | | |
|---|---|---|
| **Floor Area** | 204 | $m^2$ |
| **Floor Perimeter** | 85.83 | *m* |
| **Ratio** | 2.38 | |
| **Is it Slab on Ground?** | Yes | Use Table 2b |
| **Enter Wall Thickness** | 0.190 | *m* |
| **Sub Floor R-value** | 1.05 | |

**Concrete Slab On-Ground**

| Item | Description | Thickness | Thermal Conductivity | R-Value | Note |
|---|---|---|---|---|---|
| 1 | Sub-Floor | | | 1.05 | from specification J1.6 |
| 2 | Solid concrete | 0.2 | 1.44 | 0.14 | from specification J1.2 |
| 3 | Indoor air film | | | 0.16 | from specification J1.2 |
| 4 | **Added Insulation** | | | **0.7** | *Iterated* |
| **TOTAL R-value** | | | | **2.05** | |

| | |
|---|---|
| **TOTAL R-value required** | **2.00** |

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## Retail 03

**Ratio of Floor Area to Floor Perimeter**

| | | |
|---|---|---|
| **Floor Area** | 96 | $m^2$ |
| **Floor Perimeter** | 43.2 | *m* |
| **Ratio** | 2.22 | |
| **Is it Slab on Ground?** | Yes | Use Table 2b |
| **Enter Wall Thickness** | 0.190 | *m* |
| **Sub Floor R-value** | 0.99 | |

**Concrete Slab On-Ground**

| Item | Description | Thickness | Thermal Conductivity | R-Value | Note |
|---|---|---|---|---|---|
| 1 | Sub-Floor | | | 0.99 | from specification J1.6 |
| 2 | Solid concrete | 0.2 | 1.44 | 0.14 | from specification J1.2 |
| 3 | Indoor air film | | | 0.16 | from specification J1.2 |
| 4 | **Added Insulation** | | | **0.8** | *Iterated* |
| **TOTAL R-value** | | | | **2.09** | |

| | |
|---|---|
| **TOTAL R-value required** | **2.00** |

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## Retail 04,05,06,07

**Ratio of Floor Area to Floor Perimeter**

| | | |
|---|---|---|
| **Floor Area** | 442 | $m^2$ |
| **Floor Perimeter** | 139.06 | *m* |
| **Ratio** | 3.18 | |
| **Is it Slab on Ground?** | Yes | Use Table 2b |
| **Enter Wall Thickness** | 0.190 | *m* |
| **Sub Floor R-value** | 1.37 | |

**Concrete Slab On-Ground**

| Item | Description | Thickness | Thermal Conductivity | R-Value | Note |
|---|---|---|---|---|---|
| 1 | Sub-Floor | | | 1.37 | from specification J1.6 |
| 2 | Solid concrete | 0.2 | 1.44 | 0.14 | from specification J1.2 |
| 3 | Indoor air film | | | 0.16 | from specification J1.2 |
| 4 | **Added Insulation** | | | **0.4** | *Iterated* |
| **TOTAL R-value** | | | | **2.07** | |

| | |
|---|---|
| **TOTAL R-value required** | **2.00** |

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# Appendix 7 – Lighting

**2019 version**

**NCC(BCA) 2019 Section J - Artificial Lighting Power Assessment**

**15-31 Harbour Drive, Coffs Harbour, NSW**

| Spaces | QTY | Space Categories | Area ($m^2$) | Power Density ($W/m^2$) | Perimeter (m) | Floor-to-Ceiling Height (m) | Room Aspect Ratio | Room Aspect Ratio Adjustment Table J6.2a Note 2 | Maximum Power Load (W) | Adjusted Maximum Power Load (W) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Ground Level** | | | | | | | | | | |
| Retail 01 | 1 | Retail space including a museum and gallery whose purpose is the sale of objects | 67.77 | 14.00 | 37.68 | 4 | 0.45 | 0.65 | 949 | 1,460 |
| Retail 02 | 1 | Retail space including a museum and gallery whose purpose is the sale of objects | 128.57 | 14.00 | 53.53 | 4 | 0.60 | 0.70 | 1,800 | 2,571 |
| Retail waste | 1 | Storage | 57.62 | 1.50 | 33.42 | 3.88 | 0.44 | 0.65 | 86 | 133 |
| Resi waste | 1 | Storage | 59.32 | 1.50 | 44.33 | 3.88 | 0.34 | 0.61 | 89 | 145 |
| Bulky GD | 1 | Storage | 8.58 | 1.50 | 12.15 | 3.88 | 0.18 | 0.56 | 13 | 23 |
| Lobby | 1 | Entry lobby from outside the building | 44.99 | 9.00 | 28.15 | 4.96 | 0.32 | 0.61 | 405 | 667 |
| L02,L03 | 2 | Lift cars | 2.85 | 3.00 | 6.79 | 2.1 | 0.20 | 0.57 | 17 | 30 |
| Retail 03 | 1 | Retail space including a museum and gallery whose purpose is the sale of objects | 96.13 | 14.00 | 40.32 | 4 | 0.60 | 0.70 | 1,346 | 1,926 |
| Elec/Comm NBN | 1 | Control room, switch room, and the like - intermittant monitoring | 16.32 | 3.00 | 16.46 | 3.88 | 0.26 | 0.59 | 49 | 84 |
| Retail 04 | 1 | Retail space including a museum and gallery whose purpose is the sale of objects | 116.67 | 14.00 | 45.38 | 4 | 0.64 | 0.71 | 1,633 | 2,287 |
| Retail 05 | 1 | Retail space including a museum and gallery whose purpose is the sale of objects | 182.15 | 14.00 | 55.5 | 4 | 0.82 | 0.77 | 2,550 | 3,297 |
| Retail 06 | 1 | Retail space including a museum and gallery whose purpose is the sale of objects | 72.26 | 14.00 | 35.28 | 4 | 0.51 | 0.67 | 1,012 | 1,508 |
| Retail 07 | 1 | Retail space including a museum and gallery whose purpose is the sale of objects | 70.54 | 14.00 | 37.32 | 4 | 0.47 | 0.66 | 988 | 1,502 |
| Female WC | 1 | Toilet, locker room, staff room, rest room and the like | 28.21 | 3.00 | 23.25 | 2.1 | 0.58 | 0.69 | 85 | 122 |
| Male WC | 1 | Toilet, locker room, staff room, rest room and the like | 23.1 | 3.00 | 20.35 | 2.1 | 0.54 | 0.68 | 69 | 102 |
| Acc WC | 1 | Toilet, locker room, staff room, rest room and the like | 7.44 | 3.00 | 11.13 | 2.4 | 0.28 | 0.59 | 22 | 38 |
| Chg/Shw | 1 | Toilet, locker room, staff room, rest room and the like | 7.97 | 3.00 | 11.18 | 2.1 | 0.34 | 0.61 | 24 | 39 |
| CLNR/S | 1 | Service area, cleaner's room and the like | 6.28 | | 9.81 | | | | | |
| Bike | 1 | Storage | 25.92 | 1.50 | 20.32 | 2.1 | 0.61 | 0.70 | 39 | 55 |
| Substation | 1 | Plant room where an average of 160 lx vertical illuminance is required on a vertical panel such as in switch rooms | 49.87 | 4.00 | 28.66 | 2.4 | 0.73 | 0.74 | 199 | 269 |
| MSR | 1 | Control room, switch room, and the like - Constant monitoring | 19.54 | 4.50 | 18.26 | 2.4 | 0.45 | 0.65 | 88 | 136 |
| FS 02,03 | 1 | Stairways, including fire-isolated stairways | 19.14 | 2.00 | 14.82 | 2.1 | 0.61 | 0.70 | 38 | 54 |
| Ramp & WC entries | 1 | Corridors | 72.82 | 5.00 | 106.13 | 2.40 | 0.29 | 0.60 | 364 | 612 |
| Carpark | 1 | Carpark - entry zone 15m during daytime | 126.46 | 11.50 | 47.6 | 2.40 | 1.11 | 0.87 | 1,454 | 1,674 |
| Carpark | 1 | Carpark - entry zone next 4m during daytime | 33.24 | 2.50 | 24.94 | 2.40 | 0.56 | 0.69 | 83 | 121 |
| Carpark | 1 | Carpark -general | 955.34 | 2.00 | 274.99 | 2.40 | 1.45 | 0.98 | 1,911 | 1,945 |
| Carpark lift area | 1 | Zone (d) In other areas not specified in Table J6.2a, for an illuminance of more than 240 lx and not more than 320 lx | 24.42 | 4.50 | 22.33 | 2.40 | 0.46 | 0.65 | 110 | 169 |
| Loading dock | 1 | Zone (d) In other areas not specified in Table J6.2a, for an illuminance of more than 240 lx and not more than 320 lx | 64.2 | 4.50 | 32.74 | 4.70 | 0.42 | 0.64 | 289 | 452 |
| | | | | | | | | | | |
| **Level 01** | | | | | | | | | | |
| FS 02 | 1 | Stairways, including fire-isolated stairways | 11.96 | 2.00 | 14.99 | 2.10 | 0.38 | 0.63 | 24 | 38 |
| Retail Mech Plant | 1 | Plant room where an average of 160 lx vertical illuminance is required on a vertical panel such as in | 43.14 | 4.00 | 25.98 | 2.85 | 0.58 | 0.69 | 173 | 249 |
| Carpark | 1 | Carpark -general | 1624.99 | 2.00 | 242.7 | 2.85 | 2.35 | 1.00 | 3,250 | 3,250 |
| | | | | | | | | | | |
| **Level 02** | | | | | | | | | | |
| FS 02 | 1 | Stairways, including fire-isolated stairways | 11.96 | 2.00 | 14.99 | 2.10 | 0.38 | 0.63 | 24 | 38 |
| Retail Mech Plant | 1 | Plant room where an average of 160 lx vertical | 30.6 | 4.00 | 22.44 | 2.85 | 0.48 | 0.66 | 122 | 186 |
| Carpark | 1 | Carpark -general | 1626.67 | 2.00 | 239.98 | 2.85 | 2.38 | 1.00 | 3,253 | 3,253 |
| | | | | | | | | | | |
| **Level 03** | | | | | | | | | | |
| FS02 | 1 | Stairways, including fire-isolated stairways | 11.96 | 2.00 | 14.99 | 2.1 | 0.38 | 0.63 | 24 | 38 |
| HW & Elec Plant | 1 | Plant room where an average of 160 lx vertical illuminance is required on a vertical panel such as in | 30.6 | 4.00 | 22.68 | 2.50 | 0.54 | 0.68 | 122 | 180 |
| Carpark | 1 | Carpark -general | 1642.72 | 2.00 | 223.01 | 2.50 | 2.95 | 1.00 | 3,285 | 3,285 |
| CP Mech Fan Plant | 1 | Plant room where an average of 160 lx vertical illuminance is required on a vertical panel such as in | 37.37 | 4.00 | 24.27 | 2.50 | 0.62 | 0.71 | 149 | 212 |
| | | | | | | | | | | |
| **Basement 01** | | | | | | | | | | |
| Fire pump room | 1 | Plant room where an average of 160 lx vertical illuminance is required on a vertical panel such as in | 38.16 | 4.00 | 25.06 | 2.40 | 0.63 | 0.71 | 153 | 215 |
| Corridor | 1 | Corridors | 12.66 | 5.00 | 24.65 | 2.10 | 0.24 | 0.58 | 63 | 109 |
| **Total** | | | 7,510.51 | | | | | | 26,356 | **32,472** |


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# Appendix P.
# WIND ASSESSMENT

# PEDESTRIAN WIND ENVIRONMENT STATEMENT

# 15-31 HARBOUR DRIVE, COFFS HARBOUR

WF801-01F02(REV1)- WS REPORT

DECEMBER 8, 2020

Prepared for:

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## EXECUTIVE SUMMARY

This report presents an opinion on the likely impact of the proposed development located at 15-31 Harbour Drive, Coffs Harbour on the local wind environment at the critical outdoor areas within and around the subject development. The effect of wind activity is examined for the three predominant wind directions for the Coffs Harbour region; namely the north-north-easterly and south-westerly winds. The analysis of the wind effects relating to the proposed development was carried out in the context of the local wind climate, building morphology and land topography.

The conclusions of this report are drawn from our extensive experience in this field and are based on an examination of the latest architectural drawings. No wind tunnel testing was undertaken for the subject development, and hence this report addresses only the general wind effects and any localised effects that are identifiable by visual inspection. Any recommendations in this report are made only in-principle and are based on our extensive experience in the study of wind environment effects.

The results of this assessment indicate that the subject building benefits from shielding provided by the subject/neighbouring buildings, and incorporating several design features and wind mitigating strategies in the building design such as recessing private balconies into the building footprint, the inclusion of awnings along the street frontages, planter areas and full-height privacy balcony screens. There are however outdoor trafficable areas within and around the subject development site that are potentially exposed to strong wind effects due to the interaction of the prevailing winds with the development built-form. It is expected that the wind effects identified in the report can be ameliorated and the local wind conditions further enhanced with the consideration of the following treatment strategies into the design of the development:

Ground Level

- Retention of the proposed awnings along the Harbour Drive and Vernon Street frontages of the site.
- The inclusion of densely foliating vegetation such as trees or shrubs/hedge planting along the pedestrian arcade as indicated in the architectural drawings; in particular around the street entrance and corner areas of the building.
- The use of localised fixed/mobile screening and/or densely foliating vegetation around the outdoor dining areas; in particular around the dining areas adjacent to the street entrance or corner areas of the site that are generally exposed to the strongest wind effects.

Level 4 Communal Rooftop Podium Area

- The inclusion of a high impermeable screen along the western and southern perimeter edge of communal podium.
- The inclusion of densely foliating vegetation such as trees or shrubs/hedge planting within and around the communal podium; in particular around the corner areas of the building and areas intended for short duration stationary activities such as the outdoor seating etc.

Private Balconies and terraces

- Retention of the proposed privacy screens along the perimeter edges of the balconies and terraces as indicated in the architectural drawings. The screen will create a wind stagnation zone within the balconies and terraces.
- The inclusion of a full-height impermeable screen along one of the exposed perimeter edges of the single aspect corner balconies. The screen will create a wind stagnation zone within the single aspect corner balconies.
- The inclusion of high impermeable balustrades and/or screens along the exposed perimeter edges of the larger dual aspect "wrap-around" balconies. The balustrades/screens will deflect and reduce the intensity of the prevailing winds.
- Retention of the proposed wintergardens. Consider the conversation of the remaining proposed corner balconies into wintergardens. The wintergardens will create a wind stagnation zone within the single or dual aspect corner balcony configurations.

With the consideration of the abovementioned treatment strategies in the final design, it is expected that wind conditions for the various trafficable outdoor areas within and around the development will be suitable for their intended uses and their applicable criteria.

Note the densely foliating vegetation is to be of an evergreen species to ensure their effectiveness in wind mitigation throughout the year and the vegetation should be spaced such that the foliage is able to interlock between plants (where possible).

Furthermore, as a general note, the use of loose glass-tops and light-weight sheets or covers (including loose BBQ lids) is not appropriate on high-rise outdoor balconies or terraces. Lightweight furniture is not recommended unless it is securely attached to the balcony or terrace floor slab.

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# 1 INTRODUCTION

An opinion on the likely impact of the proposed design on the local wind environment affecting pedestrians within the critical outdoor areas within and around the subject development is presented in this report. The analysis of wind effects relating to the proposed development was carried out in the context of the predominant wind directions for the region, building morphology of the development and nearby buildings, and local land topography. The conclusions of this report are drawn from our extensive experience in the field of wind engineering and studies of wind environment effects.

No wind tunnel testing was undertaken for this assessment. Hence this report addresses only the general wind effects and any localised effects that are identifiable by visual inspection, and any recommendations in this report are made only in-principle.

# 2 DESCRIPTION OF THE DEVELOPMENT AND SURROUNDINGS

The development site is bounded by Harbour Drive to the south, a low-rise retail building to the east, Vernon Street to the north and a proposed pedestrian arcade to the west. The development is located in the CBD of Coffs Harbour and surrounded predominantly low-rise retail buildings varying up to 4 storeys in height; such as the Coffs Central Shopping Mall along the Harbour Drive corridor. A survey of the land topography indicates there is a general rise in elevation towards the north-west of the site. An aerial image of the subject site and the local surroundings is shown in Figure 1.

The existing site consists of a 1-2 storey high retail complex. The Claremont Community Hub & Library is proposed to be retained with the remaining retail building to be redeveloped into a 20-storey high mixed-use building with retail/commercial tenancies proposed on the podium levels and private residential tenancies and associated amenities on the remaining levels.

The critical outdoor trafficable areas associated with the proposed development, which are the focus of this assessment with regards to wind effects, are detailed as follows:

- Ground Level pedestrian footpaths along the Harbour Drive and Vernon Street frontages of the site.
- Ground Level pedestrian arcade along the western boundary of the site
- The Level 4 communal rooftop podium areas.
- Private residential balconies and terraces.

**Figure 1: Aerial Image of the Site Location**

# 3 REGIONAL WIND

The Coffs Harbour region is governed by two principal wind directions, and these can potentially affect the subject development. These winds prevail from the north-north-east and south-west. A summary of the principal time of occurrence of these winds throughout the year is presented in Table 1 below. This summary is based on a detailed analysis undertaken by Windtech Consultants of recorded directional wind speeds obtained at the meteorological station located at Coffs Harbour Station by the Bureau of Meteorology (recorded from 1995 to 2014). From this analysis, directional probabilities of exceedance and directional wind speeds for the region are determined. The directional wind speeds and corresponding directional frequencies of occurrence are presented in Figure 2.

As shown in Figure 2, the south-westerly winds are the most frequent wind for the Coffs Harbour region, while the north-north-easterly winds are the strongest. The south-westerly winds occur predominantly in the morning and year-round, while the north-north-easterly winds occur in the afternoons and most frequently during the warmer months of the year, dropping off slightly in the winter, and hence are usually welcomed within outdoor areas.

**Table 1: Principal Time of Occurrence of Winds for the Coffs Harbour Region**

| Season | NNE Winds | | SW Winds | |
|---|---|---|---|---|
| | Morning | Afternoon | Morning | Afternoon |
| Summer | | X | X | |
| Autumn | | X | X | |
| Winter | | X | X | X |
| Spring | | X | X | |

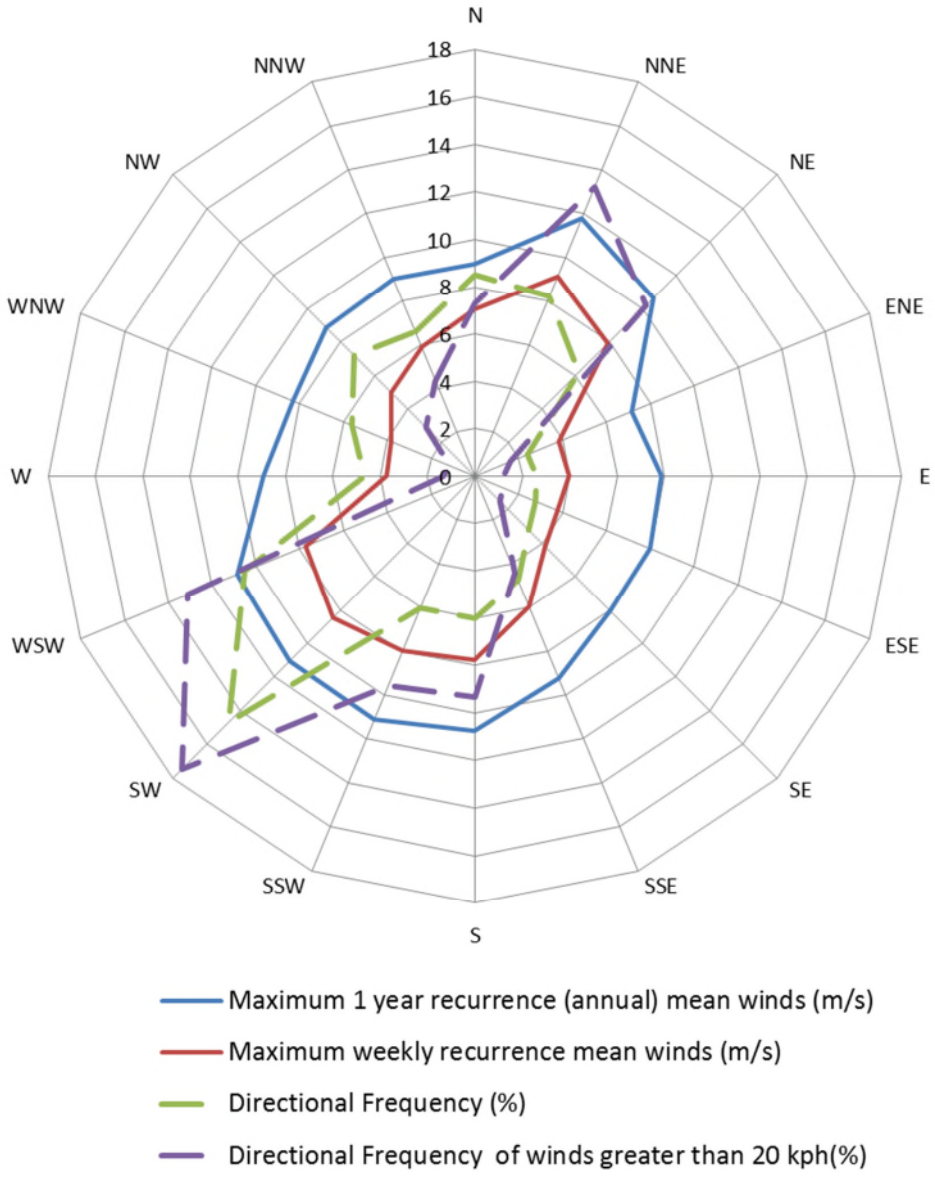


**Figure 2: Annual and 5% Exceedance Hourly Mean Wind Speeds, and Frequencies of Occurrence, for the Coffs Harbour Region (referenced to 10m above ground in standard open terrain)**

# 4 WIND EFFECTS ON PEOPLE

The acceptability of wind in any area is dependent upon its use. For example, people walking or window-shopping will tolerate higher wind speeds than those seated at an outdoor restaurant. Various other researchers, such as A.G. Davenport, T.V. Lawson, W.H. Melbourne, and A.D. Penwarden, have published criteria for pedestrian comfort for pedestrians in outdoor spaces for various types of activities. Some Councils and Local Government Authorities have adopted elements of some of these into their planning control requirements.

For example, A.D. Penwarden (1973) developed a modified version of the Beaufort scale which describes the effects of various wind intensities on people. Table 2 presents the modified Beaufort scale. Note that the effects listed in this table refers to wind conditions occurring frequently over the averaging time (a probability of occurrence exceeding 5%). Higher ranges of wind speeds can be tolerated for rarer events.

**Table 2: Summary of Wind Effects on People (A.D. Penwarden, 1973)**

| Type of Winds | Beaufort Number | Mean Wind Speed (m/s) | Effects |
|---|---|---|---|
| Calm | 0 | Less than 0.3 | Negligible. |
| Calm, light air | 1 | 0.3 – 1.6 | No noticeable wind. |
| Light breeze | 2 | 1.6 – 3.4 | Wind felt on face. |
| Gentle breeze | 3 | 3.4 – 5.5 | Hair is disturbed, clothing flaps, newspapers difficult to read. |
| Moderate breeze | 4 | 5.5 – 8.0 | Raises dust, dry soil and loose paper, hair disarranged. |
| Fresh breeze | 5 | 8.0 – 10.8 | Force of wind felt on body, danger of stumbling |
| Strong breeze | 6 | 10.8 – 13.9 | Umbrellas used with difficulty, hair blown straight, difficult to walk steadily, wind noise on ears unpleasant. |
| Near gale | 7 | 13.9 – 17.2 | Inconvenience felt when walking. |
| Gale | 8 | 17.2 – 20.8 | Generally impedes progress, difficulty balancing in gusts. |
| Strong gale | 9 | Greater than 20.8 | People blown over. |

It should be noted that wind speeds can only be accurately quantified with a wind tunnel study. This assessment addresses only the general wind effects and any localised effects that are identifiable by visual inspection and the acceptability of the conditions for outdoor areas are determined based on their intended use (rather than referencing specific wind speeds). Any recommendations in this report are made only in-principle and are based on our extensive experience in the study of wind environment effects.

# 5 RESULTS AND DISCUSSION

The expected wind conditions are discussed in the following sub-sections of this report for the various outdoor areas within and around the subject development. The interaction between the wind and the building morphology in the area is considered and important features taken into account including the distances between the surrounding buildings and the proposed building form, as well as the surrounding landform. Note that only the potentially critical wind effects are discussed in this report. A glossary of the different wind effects described in this report included in the Appendix section.

For this assessment, the wind comfort criterion that were considered as part of this assessment were the following:

- Comfortable Walking Criterion (7.5m/s with a 5% probability of exceedance) for general circulation and pedestrian thoroughfares, e.g. footpaths, private balconies/terraces, through-site links etc.
- Short Exposure Criterion (5.5m/s with a 5% probability of exceedance) for stationary activities generally less than an hour, e.g. waiting areas, communal terraces, main entries, café seating etc.
- Long Exposure Criterion (3.5m/s with a 5% probability of exceedance) for stationary activities longer than an hour, e.g. outdoor cinemas, outdoor fine dining etc.

Although this assessment is of a qualitative nature, the abovementioned comfort criteria are considered when assessing the wind environment impacts. All areas are also assessed with consideration of the 23m/s annual gust criterion for safety.

## 5.1 Ground Level Areas

The pedestrian footpath along the Harbour Drive frontage of the site benefits from the shielding provided by the subject and neighbouring buildings from the prevailing north-north-easterly and south-westerly winds. Down-wash wind effects off the tower façade are expected to be minimal due to the tower setback from the podium edge and the proposed porous façade of the car-park levels. The proposed awning and densely foliating street trees along the street frontage are expected to be effective in further enhancing the local wind conditions along the pedestrian footpath, hence it is recommended to be retained in the design of the development.

The pedestrian footpath along the Vernon Street frontage of the site benefits from the shielding provided by the subject building to the prevailing south-westerly winds. Down-wash wind effects off the tower façade are also expected to be minimal due to the tower setback from the podium edge and the proposed porous façade of the car-park levels. It is potentially exposed to

the prevailing north-north-easterly winds travelling along the open carpark to the north of the site. It should be noted that this is an existing wind condition for the site and the inclusion of the subject development is not expected to adversely affect the wind conditions along the pedestrian footpath when the prevailing wind is coming from the north-north-easterly direction. The proposed awning along the street frontage are expected to be effective in further enhancing the local wind conditions along the pedestrian footpath, hence it is recommended to be retained in the design of the development.

The proposed pedestrian arcade along the western boundary of the site is potentially exposed to strong wind conditions due to the arcade's alignment with the prevailing wind directions for the region. The interaction of the prevailing winds with the building morphology may result in potential wind effects such as the direct winds travelling along the arcade, accelerating flows around the corners of the building and funnelling wind effects between the subject and neighbouring building. Outdoor dining is proposed along the pedestrian arcade where occupant sensitivity to wind comfort and amenity is typically greater than those along pedestrian thoroughfares. The following treatment strategies are expected to be effective in mitigating the abovementioned potential wind effects and enhance the local wind conditions within the pedestrian arcade, hence they are recommended to be considered in the design of the development:

- The inclusion of densely foliating vegetation such as trees or shrubs/hedge planting along the pedestrian arcade as indicated in the architectural drawings; in particular around the street entrance and corner areas of the building.
- The use of localised fixed/mobile screening and/or densely foliating vegetation around the outdoor dining areas; in particular around the dining areas adjacent to the street entrance or corner areas of the site that are generally exposed to the strongest wind effects.

Note the densely foliating vegetation is to be of an evergreen species to ensure their effectiveness in wind mitigation throughout the year and the vegetation should be spaced such that the foliage is able to interlock between plants (where possible).

## 5.2 Level 4 Communal Rooftop Podium Areas

Down-wash wind effects are expected to have a minimal impact on the communal podium wind conditions due to the staggered design of the tower build-form. The eastern communal podium benefit from the shielding provided by the proposed build-form of the tower acting to the direct wind effects from the north-north-easterly direction. It is however exposed to direct wind effects from the prevailing south-westerly direction due to the lack of shielding provided by the surrounding low-rise buildings at this elevated position. Similarly, the western communal podium benefits from some shielding afforded by the tower build-form component along the Vernon Street frontage. However, it is exposed to the aforementioned direct wind effects from

the south-westerly direction as well as from the prevailing north-north-easterly direction as the wind travels around/over the tower build-form.

The following treatment strategies are expected to be effective in mitigating the abovementioned potential wind effects and enhance the local wind conditions within the communal podium areas, hence they are recommended to be considered in the design of the development:

- The inclusion of a high impermeable screen along the western and southern perimeter edge of communal podium.
- The inclusion of densely foliating vegetation such as trees or shrubs/hedge planting within and around the communal podium; in particular around the corner areas of the building and areas intended for short duration stationary activities such as the outdoor seating etc.

Note the densely foliating vegetation is to be of an evergreen species to ensure their effectiveness in wind mitigation throughout the year and the vegetation should be spaced such that the foliage is able to interlock between plants (where possible).

## 5.3 Private Balconies

Wind conditions within the various private terraces and a majority of the single aspect balconies located are expected to be acceptable for its intended uses. This is due to the shielding provided by the subject building, and the inclusion of effective wind mitigating elements in the design, such as the recessing balconies into the overall building footprint and full-height privacy screens along the perimeter edges of the balconies and terraces as indicated in the architectural drawings. Hence these proposed elements are recommended to be retained in the design of the development.

Wintergardens are proposed on several of the north-eastern corner apartments. Wind conditions within wintergardens are expected to be acceptable for its intended uses due to its capabilities of being completely enclosed from external wind effects. The remaining corner balconies however are exposed to adverse wind effects such as accelerating flows around the corners of the building and direct wind effects from the prevailing wind directions due to the lack of shielding from the surround low-rise buildings on the tower levels. The larger dual aspect "wrap-around" balconies are proposed on the upper tower levels that are also potentially exposed to additional side-stream wind effects along the tower façade. Furthermore, due to their dual aspect configuration they are susceptible to wind effects from both prevailing wind directions.

The following treatment strategies are expected to be effective in mitigating the abovementioned potential wind effects and enhance the local wind conditions within the various

private corner balconies, hence they are recommended to be considered in the design of the development:

- Retention of the proposed privacy screens along the perimeter edges of the balconies and terraces as indicated in the architectural drawings. The screen will create a wind stagnation zone within the balconies and terraces.
- The inclusion of a full-height impermeable screen along one of the exposed perimeter edges of the single aspect corner balconies. The screen will create a wind stagnation zone within the single aspect corner balconies.
- The inclusion of high impermeable balustrades and/or screens along the exposed perimeter edges of the larger dual aspect "wrap-around" balconies. The balustrades/screens will deflect and reduce the intensity of the prevailing winds.
- Retention of the proposed wintergardens. Consider the conversation of the remaining proposed corner balconies into wintergardens. The wintergardens will create a wind stagnation zone within the single or dual aspect corner balcony configurations.

As a general note, the use of loose glass-tops and light-weight sheets or covers (including loose BBQ lids) is not appropriate on high-rise outdoor balconies or terraces. Lightweight furniture is not recommended unless it is securely attached to the balcony or terrace floor slab.

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# 7 APPENDIX – WIND EFFECTS GLOSSARY

## 7.1 Downwash and Upwash Effects

The downwash wind effect occurs when wind is deflected down the building's windward facade causing accelerated wind speeds at pedestrian level. This can lead to other adverse effects as corner acceleration as the wind attempts to flow around the building, as seen in Figure A1. This can also lead to recirculating flow in the presence of a shorter upstream building, causing the local ground level wind flow to move towards the prevailing wind.

The upwash effect occurs near upper level edge of a building form as the wind flows over the top of the building. This has the potential to cause acceleration of winds near the leading edge, as well as potentially reattaching onto the roof area. This effect causes wind issues particularly near the leading edges of tall building and on the rooftop areas if there is sufficient depth along the wind direction. Upwash is more apparent in taller towers and podia.

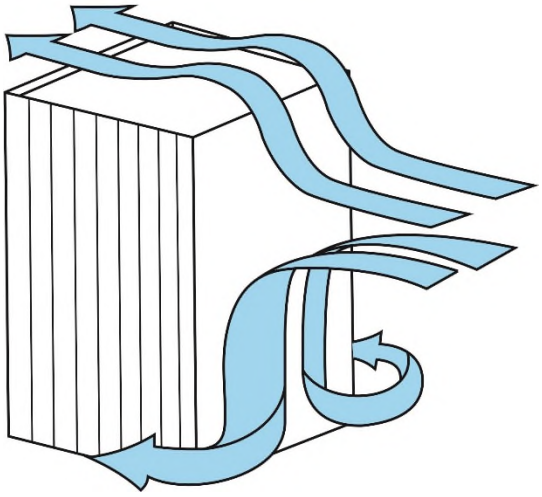

**Figure A1: Downwash Leading to Corner Wind Effect, and Upwash Effects**

## 7.2 Funnelling/Venturi Effect

Funnelling effects occur when the wind interacts with two or more buildings which are located adjacent to each other and the building form design results in a bottleneck, as shown in Figure A2. This can cause the wind to be forced through the gap between the buildings resulting in adverse wind conditions and pedestrian discomfort within the constricted space. Funnelling effects are common along pedestrian links and thoroughfares generally located between neighbouring buildings that have moderate gaps between them.

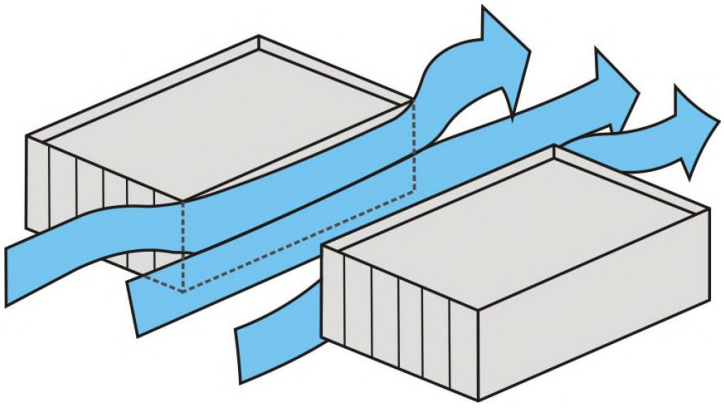

**Figure A2: Funnelling/Venturi Wind Effect**

## 7.3 Gap Effect

The gap effect occurs in small openings in the façade that are open to wind on opposite faces, as seen in Figure A3. This can involve a combination of funnelling and downwash effects. Presenting a small gap in the façade on the windward aspect as the easiest means through which the wind can flow through can result in wind acceleration through this gap. The pressure difference between the windward façade and the leeward façade also tends to exacerbate the wind flow through this gap.

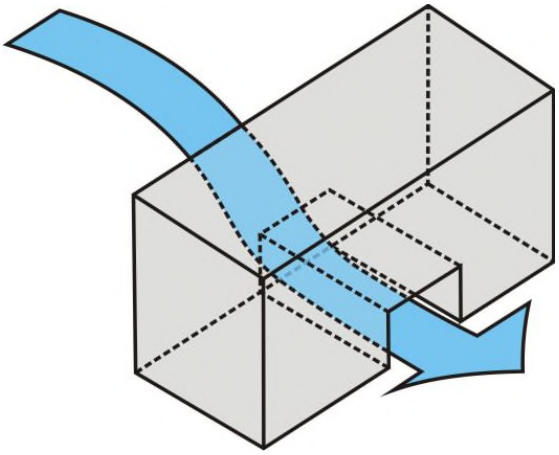

**Figure A3: Gap Wind Effect**

## 7.4 Sidestream and Corner Effects

The sidestream effect is due to a gradual accumulation of winds shearing along the building façade that eventuates in an acceleration corner effect. The flow is parallel to the façade and can be exacerbated by downwash effects as well, or due to corner effect winds reattaching on the façade. This is shown in Figure A4

The corner refers to the acceleration of wind at the exterior vertical edge of a building, caused by the interaction of a large building massing with the incident wind, with the flow at the corner being accelerated due to high pressure differentials sets up between the windward façade and the orthogonal aspects. It can be further exacerbated by downwash effects that build up as the flow shears down the façade.

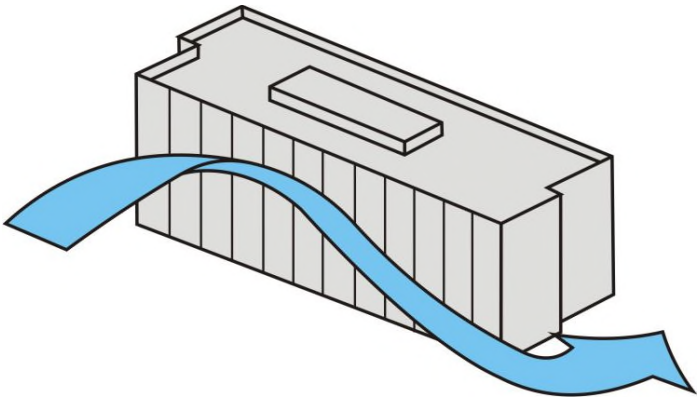

**Figure A4: Sidestream and Corner Wind Effect**

## 7.5 Stagnation

Stagnation in a region refers to an area where the wind velocity is significantly reduced due to the effect of the flow being impeded by the bluff body. For a particular prevailing wind direction, this is typically located near the middle of the windward face of the building form or over a short distance in front of the windward face of a screen or fence. Concave building shapes tend to create an area of stagnation within the cavity, and wind speeds are generally low in these areas.

# Appendix Q.
# HAZARDOUS MATERIALS SURVEY

eiaustralia

Contamination | Remediation | Geotechnical

# PAYNTER DIXON CONSTRUCTIONS PTY LTD

# Hazardous Materials Survey

15-31 Harbour Drive, Coffs Harbour NSW

E24924.E10_Rev0
30 November 2020

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# Appendices

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# Executive Summary

Paynter Dixon Constructions Pty Ltd engaged EI Australia (EI) to report on a Hazardous Materials Survey for the buildings located at 15-31 Harbour Drive, Coffs Harbour NSW ('the site'), as shown in **Figure 1**.

The purpose of this Hazardous Materials Survey is to present the findings of a qualitative risk assessment of the hazardous building materials located on the site. The site inspection was undertaken on 12 November 2020.

This report has been completed to assist Paynter Dixon Constructions Pty Ltd with redevelopment of the site. It was understood that the proposed development involved demolition of the existing structures.

**Key Findings**

The overall status (presence) of each hazardous material type at the site is tabulated below.

| ACM (friable) | ACM (non-friable) | SMF | LBP | PCB |
|---|---|---|---|---|
| No | Yes | Yes | No | No |

Note 1 Hazardous materials may be present within the inaccessible areas stated in the register (**Appendix A**).

All hazardous materials inspected were deemed to be *Priority 4*, with the exception of the following ACM:

- Eaves of the west side entry (*Priority 2: Elevated Risk Level*);
- Air vents of the western boulevard roof cavity (*Priority 3: Low Risk Level*); and
- Cavity lining of the western boulevard roof cavity (*Priority 3: Low Risk Level*).

Refer to **Appendix A** for the formal Hazardous Materials Register, which includes recommended management actions. Additional recommendations are made in **Section 6**.

Refer to **Appendix C** for site plans.

# 1. Introduction

## 1.1 Background and Purpose

EI Australia (EI) was engaged by Paynter Dixon Constructions Pty Ltd to report on a Hazardous Materials Survey (HMS) for the buildings located at 15-31 Harbour Drive, Coffs Harbour NSW (herein referred to as 'the site').

EI understood that the site was designated for redevelopment, involving demolition of the existing structures. A HMS was required prior to commencement of the works, in accordance with the Development Application with Coffs Harbour City Council.

This report documents the findings of the HMS, which involved inspection of the site buildings, identification and sampling of potential hazardous materials and subsequent laboratory analysis for the relevant hazardous substance(s). In addition, it provides recommendations for the safe management of hazardous materials during demolition works.

## 1.2 Scope of Works

The scope of the HMS included:

- Inspection of the site buildings, to ascertain whether they contained hazardous material(s), namely:
  - asbestos-containing materials (ACM);
  - lead-based paint (LBP);
  - synthetic mineral fibres (SMF); and/or
  - polychlorinated biphenyls (PCB);
- Undertake a qualitative risk assessment of the identified hazardous materials;
- Provide recommendations where remedial works were needed; and
- Prepare a report with the findings of the survey, including a hazardous material register and recommendations (control strategies) for the on-going management of the identified hazardous materials.

# 2. Site Description

## 2.1 Property Identification and Location

The site identification details and associated information are presented in **Table 2-1**. Refer also to **Appendix C** for site plans.

**Table 2-1 Site Identification and Location**

| Attribute | Description |
|---|---|
| Street Address | 15-31 Harbour Drive, Coffs Harbour NSW |
| Location Description | Located within the Coffs Harbour central business district, the block is bound by Vernon Street (north), Pacific Highway (west) Harbour Drive (south) and commercial lots (east). |
| Site Coordinates | Northeast corner of site (GDA2020-MGA56):<br>Easting: 511107.534<br>Northing: 6648366.575.<br>(Source: http://maps.six.nsw.gov.au) |
| Site Area | Approximately 3940m$^2$<br>(Source: http://maps.six.nsw.gov.au) |

## 2.2 Building Descriptions

A brief description of each building/structure inspected is located in **Table 2-2**.

**Table 2-2 Building Descriptions**

| Description | |
|---|---|
| 15-31 Harbour Drive, Coffs Harbour NSW consisted of three, two-storey buildings, comprising eight commercial (retail) stores.<br>The buildings were primarily constructed of rendered brick walls, metal finishing (framework), tiled floors and a corrugated asbestos cement sheet roof. | |

# 3. General Methodology

The survey was conducted to identify the presence and condition of hazardous building materials within the site. Based on EI's experience, those most likely to be present included:

- ACM;
- LBP systems applied to building surfaces;
- SMF insulation; and
- Fluorescent light capacitor fittings, containing PCB.

The scope of this survey was limited to inspection of the accessible building construction materials, including finishes and operational services, with the collection of representative samples suspected of containing a hazardous substance (listed above), where it was permissible to do so. Limitations were placed on the ambit of the inspection, due to access restrictions on some parts of the site.

Due to the destructive nature of the sampling process, as well as access constraints, it was not possible to collect samples of all (suspected) materials. Where it was not possible to collect a sample, the inspector used their professional experience to make a judgement on the status of the material, or area, concerned. Where the inspector believed the material could contain asbestos, LBP, SMF and/or PCB, this was recorded in the survey report and the corresponding material should be treated as hazardous.

## 3.1 Asbestos

This component of the survey was carried out in accordance with the guidelines documented in the SafeWork NSW (2019) *How to Manage and Control Asbestos in the Workplace* and SafeWork NSW (2019) *How to Safely Remove Asbestos*. Below are definitions of the two forms of asbestos.

***Non-friable (bonded) asbestos material***

Non-friable asbestos is any material that contains asbestos in a bonded matrix. It may consist of Portland cement or various resin/binders and cannot be crushed by hand when dry.

***Friable asbestos material***

Friable asbestos is any material that contains asbestos and is in the form of a powder, or can be crumbled, pulverized or reduced to powder by hand pressure when dry.

Samples of suspected ACM were laboratory analysed for their asbestos content (presence / absence), in accordance with Australian Standard AS4964-2004 *Method for the Qualitative Identification of Asbestos in Bulk Samples*. The reporting limit of the method was 0.1 g/kg.

## 3.2 Lead in Paint

For this HMS, painted surfaces were not sampled for laboratory analysis of their lead content. All areas where surface coatings had been applied (e.g. exterior gloss paints, window and door architraves, skirting boards, etc.) were deemed to be in good condition, with only minor peeling and/or deterioration. Hence, the presence of LBP on this site was deemed unlikely.

**Note:** Australian Standard AS 4361.2-2017 *Guide to Lead Paint Management, Part 2: Lead Paint in Residential, Public and Commercial Buildings* defines LBP as a paint film or component coat of a paint system in which the lead content (calculated as lead metal) is in excess of 0.1% by weight of the dry film, as determined by laboratory testing. The *NSW WHS Regulation 2017*

currently defines a lead process as works on paint containing more than 1.0% by dry weight of lead.

## 3.3 Synthetic Mineral Fibres (SMF)

This component of the survey was carried out in accordance with the guidelines documented in the SafeWork Australia *Code of Practice for the Safe Use of Synthetic Mineral Fibres* [NOHSC: 2006 (1990)]. This code broadly identifies SMF materials found or suspected of being present during the survey based on a visual assessment.

## 3.4 Polychlorinated Biphenyls

Where safe access was gained, detailed information of capacitors in light fittings and other electrical equipment were noted for cross-referencing with the Australian and New Zealand Environmental and Conservation Council (ANZECC, 1997) *Identification of PCB Containing Capacitors Information Booklet*. This document defines PCB materials and wastes as follows:

| | |
|---|---|
| <2 mg/kg | - PCB free |
| 2 mg/kg - <50 mg/kg | - Non-scheduled PCB material or waste |
| >50 mg/kg | - Scheduled PCB material or waste |
| >100,000 mg/kg (10%) | - Concentrated PCB material |

Due to the inherent hazard in accessing electrical components, or other reasons such as height restrictions, immovable equipment and furniture, some light fittings could not be safely accessed. In these instances, comment was made on the likelihood of PCB-containing materials, based upon age and appearance.

# 4. Risk Assessment

The buildings located at 15-31 Harbour Drive, Coffs Harbour NSW were the subject of this HMS. The Hazardous Materials Register, presented in **Appendix A**, includes assessment of the risks associated with each identified hazardous material. In order to assess the health risks associated with asbestos, LBP, SMF and PCB, the following must be considered:

- Product type;
- Friability of the material;
- Condition;
- Accessibility requirements for building and/or maintenance;
- Exposed surface area; and
- Surface treatment (if any).

The purpose of the material risk assessment is to establish the relative risk posed by specific hazardous building materials identified in this assessment. The following risk factors are defined to assist in determining the relative health risk posed by each item.

## 4.1 Friability

The friability of a material describes the ease by which the material can be crumbled, which in turn, can increase the release of fibres into the air. Therefore, friability is only applicable to asbestos and SMF.

- **Friable asbestos** can be crumbled, pulverised, or reduced to powder by hand pressure, which makes it more dangerous than non-friable asbestos.
- **Non-friable asbestos** is typically comprised of asbestos fibres tightly bound in a non-asbestos matrix. If accidentally damaged or broken these ACM may release fibres initially but will not continue to do so.
- **Bonded SMF** describes a synthetic fibrous material which has a specific designed shape and exists within a stable manufactured product.
- **Un-bonded SMF** is a loosely packed synthetic fibrous material which has no adhesive or cementitious binding properties.
- **Friable LBP** exhibits signs of severe deterioration and crumbled, pulverised, or reduced to powder by hand pressure.
- **Non-friable LBP** has remained adhered to the surface and is not easily removed.

## 4.2 Condition

The condition of each identified hazardous building material is reported as being **good**, **fair** or **poor**.

- **Good** refers to a material that is in sound condition, with no or very minor damage or deterioration.
- **Fair** refers to a material that is generally in a sound condition, with some areas of damage or deterioration.
- **Poor** refers to a material that is extensively damaged or deteriorated.

## 4.3 Accessibility

The accessibility of each identified hazardous building material is reported as:

- **Regular:** in an occupied space of the building and accessible to all personnel using/entering the building.
- **Occasional:** buildings or rooms that are used infrequently.
- **Maintenance Only:** accessible to maintenance personnel only.

## 4.4 Priority Ratings

The risk elements above are used to rate the overall health risk posed by the presence of the hazardous materials.

***Priority 1: Immediate Risk Level***

A material which, due to its present condition and location, presents an immediate health risk. The material and area surrounding should be isolated from personnel with remedial action(s) undertaken at the earliest practicable time.

***Priority 2: Elevated Risk Level***

Damaged or unstable material which, if disturbed, presents an elevated health risk to personnel within the vicinity and has potential for contamination to be spread to other areas. The material should be stabilised immediately, with remedial action(s) considered.

***Priority 3: Low Risk Level***

Stable material that has minor areas of damage requiring remedial action, or is likely to be subject to damage or to degrade due environmental conditions. It is recommended that maintenance work be performed to stabilise and repair damaged areas. Controls should be implemented to protect these materials from further damage or degrading factors.

***Priority 4: Negligible Risk Level***

Stable material that presents a negligible health risk unless damaged. Such material should be maintained in good condition. It should be reassessed prior to any works that will impact the material.

***Inaccessible:***

The location was not accessed during the survey and a priority rating could not be applied. Once a location is accessed, the priority rating should be reassessed prior to any works being undertaken in the area.

# 5. Summary of Survey

The identified hazardous materials on the surveyed buildings are listed in **Table 5-1**. Recommendations for their handling and disposal are outlined in **Section 6**. Photographs of the identified materials are presented in the register in **Appendix A**.

**Table 5-1 Summary Hazardous Materials**

| Location | Material Description |
|---|---|
| **ACM** | |
| Roof cavity, western boulevard, air vents | Asbestos cement sheeting |
| Roof cavity, western boulevard, cavity lining | Asbestos cement sheeting |
| Male and female toilets, cubicle dividers, 2nd floor hallway | Compressed concrete |
| Electrical switch-room door, western 2nd floor | Door with asbestos core |
| Electrical switch-room door, western 2nd floor | Electrical backing board |
| Electrical switch-room door, western 2nd floor | Vinyl tile |
| *Quadrant Travel* (Shop 1), rear | Electrical backing board |
| Display facia, Shop 2 | Fibre cement board |
| North side, east switch room | Electrical backing board |
| North-side east switch room | 100 amp fuse |
| Roof, east side, angle edges and capping | *Super-6* ACM sheet roof |
| Eaves of east side building | flat cement sheet |
| East side building, outside walls, north and south ends of building | Square corrugated cement sheeting |
| 1st floor ceiling void | Bakelite switch |
| *Dollars & Sense* back storeroom | Electrical backing board |
| West side entry, eaves | Cement flat sheet |
| **SMF** | |
| Roof above gym | Roof sarking |
| Ceiling above gym | Air conditioning ducting |
| Shop 1, rear | Hot water system |
| Shops 3, 5, 16 and 23 | Hot water systems |
| Kitchenette in Shop 6/8 | Hot water system |
| Shop 15, Hairdressers | Hot water system |
| 3rd floor kitchen | Hot water system |

| Location | Material Description |
|---|---|
| 3rd floor kitchen | Hot water system |
| 1st floor, *Dollars & Sense* store, bathrooms | Vinyl tile |
| 1st floor, ceiling void, east side | Insulation batts |
| *Jolly Roger Barber* | Hot water system |

Note 1 Hazardous materials may be present within the inaccessible areas stated in the register (**Appendix A**).

# 6. Recommendations

## 6.1 Asbestos

Asbestos materials should be removed prior to the commencement of any demolition works that may cause their disturbance. The removal of these materials is to be done in accordance with *NSW Work Health and Safety Act* and *Regulations 2017* and the following SafeWork NSW approved codes of practice:

- SafeWork NSW (2019) *How to Manage and Control Asbestos in the Workplace*; and
- SafeWork NSW (2019) *How to Safely Remove Asbestos.*

The asbestos removal works require a minimum *Class B* licenced asbestos removal contractor. At the completion of asbestos removal works a clearance certificate is required.

The following recommendations must be observed as minimum requirements during the removal of all ACM.

- The work area should be barricaded and appropriate signage installed.
- The ACM should be sealed or wetted with water.
- ACM should be removed with minimal breakage and where applicable, should be lowered to the ground not dropped.
- Where ACMs are too large to fit into an asbestos labelled waste bag, the ACM should be stacked or placed on a 200µm plastic ground sheet or lined skip bin and not allowed to lie about the site where they may be further broken or crushed by machinery or workers.
- Asbestos waste is to be securely packaged and labelled. Asbestos waste bags are to be double bagged while ACM in polythene sheeting should be double wrapped with adhesive tape applied to the entire length of every overlap to secure materials to minimise the risk of the polythene sheeting tearing or splitting.
- Any dust and/or ACM debris remaining around the removal area should be cleaned up using an approved “H” type HEPA vacuum cleaner.
- All asbestos containing waste is to be disposed at an approved disposal facility (contact local council or SafeWork NSW for nearest asbestos waste facility).

Where asbestos is to be removed, the licenced asbestos removal contractor should prepare an asbestos removal control plan prior to undertaking any removal works.

### 6.1.1 Asbestos Removal Management Plan

A site-specific Asbestos Removal Management Plan (ARMP) must be prepared by a hygienist, or licensed asbestos assessor, to document the management measures required to address the risks associated with potential exposure to asbestos. The ARMP must cover:

- Work area isolation (barrier protection, buffer zone);
- Removal methods (friable/non-friable);
- Contamination control methods (decontamination procedures); and
- Health and safety procedures (respiratory protection).

Asbestos removal works at the site, including the disturbance of any asbestos-impacted soils, must be managed strictly in accordance with the ARMP.

### 6.1.2 Asbestos Roofing

The composition of the asbestos cement products used in roofing is a mixture of Portland cement, sand, binders and various combinations of both asbestos and non-asbestos fibres. The fibres are bound within the cement matrix and cannot be released in significant airborne quantities unless the cement matrix is severely disrupted.

Asbestos roofing is prone to weathering, where the surface is exposed to the elements causing long term slow degradation. During this degradation the growth of lichens on the external surface of the roof is common, with the lichens adding to the erosion of the cement matrix. Once the cement matrix begins to be eroded from the surface of the sheeting, asbestos fibres are exposed. Consequently, the weathered surface of the sheet has a thin friable layer of asbestos and lichen.

The presence of asbestos fibres does not constitute a measurable asbestos related health risk to the occupants of buildings. The health effects associated with exposure to asbestos fibres are due to inhalation of airborne asbestos fibres in the respirable size range, generally caused by severe disruption of fibres (e.g. using power tools to cut asbestos products).

However, slough/erosion of fibre from the weathered surface of the roof sheets results in the accumulation of asbestos laden dusts under the lap joints (of the sheets) and in the gutters, etc. The amount of erosion of asbestos from the exposed surface of the sheet is dependent on the level of surface degradation and environmental factors (e.g. heavy rain and hail). The stormwater run-off from roofs clad with weathered cement sheeting can be heavily contaminated with free asbestos fibres (particularly following periods of heavy rain and hail), resulting in accumulation at the bottom of down pipes and in gutters.

### 6.1.3 Air Monitoring for Asbestos Fibres

There is no requirement to undertake asbestos fibre air monitoring during the removal of the non-friable asbestos materials on the boundary of the work areas. However as a matter of due diligence asbestos fibre air monitoring is recommended to be undertaken on the boundary of the work areas. Asbestos fibre air monitoring is required to be undertaken by a company independent of the demolition and /or asbestos removal company. The asbestos fibre air monitoring should be undertaken by a company that is NATA (National Association of Testing Authorities) accredited.

### 6.1.4 Management of Asbestos Waste

The transportation and management of asbestos waste must be carried out in accordance with Part 7 of the *Protection of the Environment Operations (Waste) Regulation 2014*, which includes:

- Appropriate packaging, sealing, covering and/or wetting of the waste, as is required for the form of the asbestos contamination (i.e. bonded asbestos, friable asbestos or asbestos-contaminated soil);
- Reporting on transportation of asbestos waste by the transporter to the NSW EPA as required under Part 7, Section 79 of the *Waste Regulation 2014*; and

Disposal to an appropriately licensed (i.e. lawful) premises, with proper advice to the occupier of the premises, while incorporating measures for the prevention of dust generation, in accordance with Part 7, Section 80 of the *Waste Regulation 2014*.

Any ACM removed from the site should be tracked from the time of their removal from the structure or excavation until their disposal. Tracking of all ACM should be completed on the EPAs WasteLocate system. This system will require all details of the ACM to be transported, including but not limited to:

- Origin of material;
- Material type;

- Approximate volume; and
- Truck registration number.

Disposal locations will be determined by the remediation contractor. Disposal location, waste disposal documentation (i.e. weighbridge dockets, trip tickets and consignment disposal confirmation) and the above listed information should be provided to the remediation consultant for reporting purposes.

### 6.1.5 Asbestos Clearance Inspection

Under Clause 473 of the *NSW Work Health and Safety Regulation* 2017, a clearance inspection is required following the removal of any ACM. At the completion of the removal of friable asbestos a licenced asbestos assessor is required to undertake clearance inspections. A clearance inspection is to be carried out and a clearance certificate issued before the area can be re-occupied. The company undertaking the clearance inspection should be independent of the demolition and / or asbestos removal company.

## 6.2 Synthetic Mineral Fibres

SMF materials should be removed during any demolition works that may cause their disturbance. SMF materials must be handled and removed in accordance with the *NSW Work Health and Safety Regulation 2017* and the Safe Work Australia *Synthetic Mineral Fibres National Standard* (NOHSC:1004) and *National Code of Practice* (NOHSC:2006).

The following guidance documents should be consulted for guidance regarding removal and disposal of SMF:

- *National Standard for the Safe Use of Synthetic Mineral Fibres* [NOHSC:1004 (1990)];
- *National Code of Practice for the Safe Use of Synthetic Mineral Fibres* [NOHSC:2006 (1990)]; and
- *Code of Practice for the Safe Use of Synthetic Mineral Fibres* (NOHSC, 1993).

These documents should be referred to for the disposal SMF materials. Under the EPA (2014) *Waste Classification Guidelines*, “synthetic fibre waste from materials such as fibreglass, polyesters and other plastics, being waste that is packaged securely to prevent dust emissions, but excluding asbestos waste which is a special waste”, is pre-classified as *General Solid Waste (Non Putrescible)*.

## 6.3 Polychlorinated Biphenyl Capacitors

All metal-cased capacitors, including fluorescent light fittings, should be assumed as containing PCBs. Any leaking PCB-containing capacitors identified should be removed and disposed prior to the commencement of any demolition works that may cause their disturbance.

The following recommendations must be observed when removing / handling PCB containing capacitors.

- Small quantities of PCBs are usually found in sealed containers known as capacitors. PCB-containing capacitors are unlikely to pose a health risk unless they become damaged and leak. Care must be taken when handling a damaged capacitor to ensure that spillage does not occur.
- The person handling any (damaged) capacitor should use disposable gloves. Wear gloves that are made of materials that are resistant to PCBs, such as Viton, polyethylene, polyvinyl alcohol (PVA), polytetrafluoroethylene (PTFE), butyl rubber, nitrile rubber or neoprene. Mid-arm length gauntlets may be required. Do not use gloves made of polyvinyl chloride (PVC) or natural rubber (latex).

- Wear disposable overalls made of Tyvek or materials with similar chemical resistant properties.
- When working with overhead equipment (e.g. fluorescent light fixtures), wear a full face shield and appropriate hair protection.
- Wash any non-disposable contaminated equipment with kerosene and collect the kerosene for disposal as a PCB-contaminated waste.
- PCB-containing equipment (capacitors, ballasts, etc.) is to be placed in a polyethylene bag, which then is to be placed in a sealable metal container. This container must be clearly marked with the details of the contents and must be maintained in good order (that is, no visible signs of damage or corrosion). If some of these materials are leaking, the container should be partially filled with an absorbent material, such as a commercial absorbent, kitty litter or a diatomaceous earth. The plastic wrapped leaking components can then be placed in the container.
- If PCB vapours are suspected (e.g. PCB leaks onto a hot surface in a confined space), wear a suitable respirator. Use a cartridge respirator suitable for chlorinated vapours. It is always prudent to ensure adequate ventilation. NOTE: PCBs do not vaporise readily at room temperature.
- Do not smoke while handling PCB capacitors.
- After handling PCBs, even if gloves were worn, wash hands well in warm, soapy water before eating, drinking, smoking, handling food or drink, or using toilet facilities.

PCB capacitors are to be disposed at a licenced waste facility. If PCB concentration is above the threshold concentration for PCBs scheduled waste (i.e. >50mg/kg), the waste must be also be transported by a suitably licenced contractor. For further details on this, contact the NSW EPA.

# 7. Statement of Limitations

This report has been prepared by EI Australia (EI) pursuant to EI Australia's Terms and Conditions.

The report is for the sole use by Paynter Dixon Constructions Pty Ltd. No responsibility is accepted for the use of any part of this report in any other context or for any other purpose or by other third parties. This report does not purport to provide legal advice. This report is prepared in response to specific instructions from Paynter Dixon Constructions Pty Ltd.

Unless otherwise stated in this report, the survey evaluates the presence of hazardous materials in/on the building(s) of the identified site, and excludes buried waste materials, contaminated dusts, and soils. The findings presented in this report are the result of a site walkover inspection, sampling, laboratory analysis, interviews with site personnel, and review of any documentation provided to EI. To the best of EI's knowledge, and in view of these limitations, the findings presented in this report represent a reasonable interpretation of the building materials on the site at the time of investigation.

This report relies upon data, surveys, measurements, and/or results taken at, or under, the particular times and conditions specified in this report. Any conclusions or recommendations only apply to the findings at that particular time.

EI is not a professional quantity surveyor (QS) organisation. Any areas, volumes, tonnages or any other quantities noted in this report are indicative estimates only. The services of a professional QS organisation should be engaged if quantities are to be relied upon.

The report should not be separated or reproduced in part, and EI should be retained to assist other professionals who may be affected by the issues addressed in this report to ensure the report is not misused in any way. In the interests of Work Health and Safety, and in the absence of a comprehensive testing program, EI recommends that where there is doubt over the composition of any suspect material, it should be assumed to contain asbestos until verified otherwise by appropriate analysis.

This report must be read in its entirety, and must not be copied, distributed or referred to in part. This report is not intended to be used for the purpose of tendering, preparation of costing or budgets, programming of works, refurbishment works or demolition works, unless expressly stated. The report must not be reproduced without the written approval of EI.

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***Inaccessible Areas***

It is noted that given the constraints of practicable access encountered during the HMS, the following areas were not accessed or inspected:

- Detailed inspection within wall cavities and set ceilings;
- Within those areas accessible only by dismantling equipment;
- Concealed within the building structure;

- Within voids or internal areas of plant, equipment, air-conditioning ducts, etc;
- Energised services, gas, electrical, and pressurised vessels;
- Areas deemed unsafe or hazardous at time of inspection;
- Within voids and cavities created and intimately concealed within the building structure and only accessible during major demolition works; and
- Height restricted areas, including building roof areas.

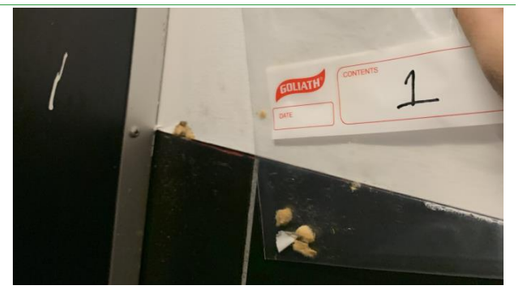
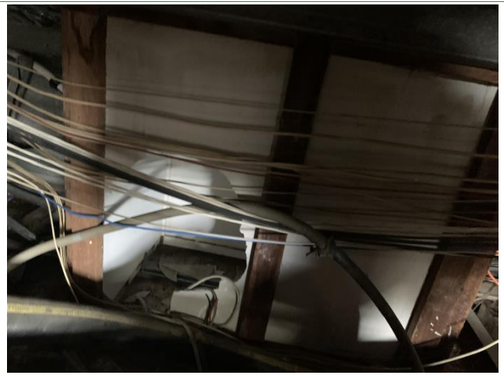
Should demolition operations entail disturbance of materials in these locations, further investigation and sampling of specific areas should be conducted as part of a hazardous materials management and abatement program, in accordance with *AS 2601-2001: The Demolition of Structures*, prior to any works proceeding.

# Appendix A - Hazardous Materials Register

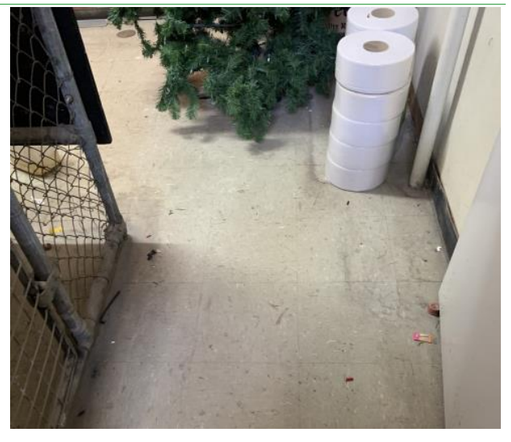
**Table A.1 Explanatory Notes to Hazardous Building Material Register**

| Register Section | Description |
|---|---|
| Location | A detailed description of the location of the hazardous building material relevant to this entry. |
| Material Type | The specific hazardous building material type. For example:<br>**Asbestos:** asbestos cement sheet, corrugated asbestos cement sheet, vinyl asbestos tiles, etc.<br>**SMF:** foil backed SMF, compressed SMF ceiling tiles, SMF insulation to upper surface of ceiling, etc.<br>**Paint:** White coloured lead-based paint system.<br>**PCB:** Metal case capacitor 'Plessey 6.5 µF Type APF 265CR'.<br>***If inaccessible areas are noted, any of the above material types may be present.*** |
| Friability | If the material can be crushed to a powder by hand pressure. |
| Sample | Sample reference number allocated to the sample collected from this asbestos containing material. Refer to **Appendix B**. |
| Results | Laboratory analytical results. Refer to **Appendix B** for laboratory analytical reports. |
| Quantity | The approximate quantity of hazardous building material relevant to this location. Depending on the nature of the material, the quantity is given as an area ($m^2$), length (m), number of pieces/units or not determined (ND). |
| Condition | **Good**: good and stable condition.<br>**Fair**: early signs of deterioration or localised areas of damage. For PCB capacitors this would include evidence of seals deteriorating.<br>**Poor**: the material is in poor condition and remedial action is required (e.g. deteriorated friable asbestos materials, capacitors are leaking, etc).<br>**Unknown**: the area was inaccessible. |
| Accessibility | **Regular**: in the occupied space of the building and accessible to all personnel using/entering the building.<br>**Occasional**: buildings or rooms that are used infrequently.<br>**Maintenance Only**: accessible to maintenance personnel only.<br>**Inaccessible**: the area was not able to be accessed during the inspection. |
| Risk Rating | The allocated priority rating for this entry (refer to Section **4.4**).<br>If the location was not accessible the risk rating is not able to be determined and shall be listed as inaccessible. |
| Recommendations | Recommended actions for demolition works or damaged material. |
| Photograph | Photograph of location where sample was taken. |

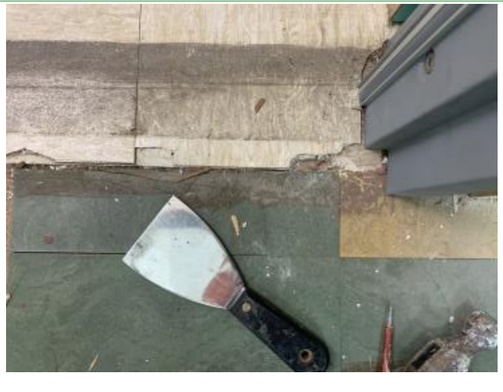
**Hazardous Materials Register**
**15-31 Harbour Drive, Coffs Harbour NSW**

| Location | Material Type | Friability | Sample | Analysis Result: | Quantity | Condition and Accessibility | Priority | Recommendations/ Comments | Photograph of material |
|---|---|---|---|---|---|---|---|---|---|
| **Inaccessible** | | | | | | | | | |
| Internal, Shop 21 and Shop 17 | Possible hazardous materials | Unknown | Inaccessible | NA | Not determined | Unknown<br>Inaccessible | Inaccessible | **No access available at time of inspection.**<br>**When areas are accessible, confirm status of hazardous materials.** | |
| **Asbestos** | | | | | | | | | |
| Southern wall, ladies toilet, gym | Fibre board | Non-friable | 1 | No asbestos detected<br>(organic fibres) | Not determined | NA | NA | NA |  |
| Roof cavity, western boulevard, air vents | Fibre cement sheet | Non-Friable | 2 | Amosite and chrysotile asbestos detected | Not determined | Fair<br>Maintenance only | Priority 3: Low Risk Level | **Stabilise any damaged surfaces of material or restrict access to area.**<br>**Remove loose debris.**<br>**Remove prior to demolition works** |  |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Roof cavity, western boulevard, cavity lining | Fibre cement sheet | Non-Friable | 3 | Amosite and chrysotile asbestos detected | Not determined | Fair<br>Maintenance only | Priority 3: Low Risk Level | **Stabilise any damaged surfaces of material or restrict access to area.**<br>**Remove loose debris.**<br>**Remove prior to demolition works** | |
| Roof cavity, western boulevard | Dust | Friable | 4 | No asbestos detected<br>(organic fibres) | Not determined | NA | NA | NA | |
| Male and female toilets, cubicle dividers, 2nd floor hallway | Compressed concrete | Non-friable | 5 | Chrysotile asbestos detected | Not determined | Good<br>Regular | Priority 4: Negligible Risk Level | **Remove prior to demolition works.** | *No photo available |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Electrical switch-room door, western 2nd floor | Asbestos core | Non-friable | Visual assessment | Presumed ACM | Not determined | Good<br>Regular | Priority 4: Negligible Risk Level | **Remove prior to demolition works.** | |
| Electrical switch-room door, western 2nd floor | Electrical backing board | Non-friable | Visual assessment | Presumed ACM | Not determined | Good<br>Regular | Priority 4: Negligible Risk Level | **Remove prior to demolition works.** | |
| Electrical switch-room door, western 2nd floor | Vinyl tile | Non-friable | 6 | Chrysotile asbestos detected | Not determined | Good<br>Regular | Priority 4: Negligible Risk Level | **Remove prior to demolition works** |  |

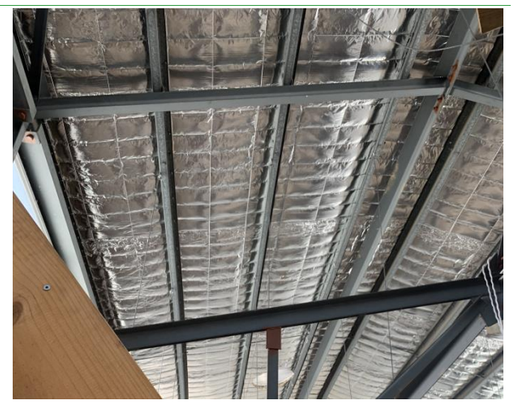
| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| *Quadrant Travel* (Shop 1), rear | Electrical backing board | Non-friable | Visual assessment | Presumed ACM | Not determined | Good<br>Regular | Priority 4: Negligible Risk Level | **Remove prior to demolition/ works.** | |
| Display facia, Shop 2 | Fibre cement board | Non-friable | 7 | Chrysotile asbestos detected | Not determined | Good<br>Regular | Priority 4: Negligible Risk Level | **Remove prior to demolition works.** | |
| North side, east switch room | Electrical backing board | Non-friable | 8 | Chrysotile asbestos detected | Not determined | Good<br>Regular | Priority 4: Negligible Risk Level | **Remove prior to demolition works.** | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| North-side east switch room | 100 amp fuse | Non-Friable (contained within body of fuse) | Visual assessment | Presumed ACM | Not determined | Good<br>Regular | Priority 4: Negligible Risk Level | **Remove prior to demolition works.**<br>**Do not damage fuse during removal.** | |
| North-side east switch room | Green tile | Non-friable | 9 | No asbestos detected<br>(organic fibres) | Not determined | NA | NA | NA | |
| North-side east switch room | Yellow tile | Non-friable | 10 | No asbestos detected<br>(organic fibres) | Not determined | NA | NA | NA | |
| Level Two, east side hallway, subfloor | Mastic | Non-friable | 11 | No asbestos detected<br>(organic fibres) | Not determined | NA | NA | NA |  |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Level Two, east side hallway | Olive vinyl tile | Non-friable | 12 | No | Not determined | NA | NA | NA | |
| Roof, east side, angle edges and capping | *Super-6* ACM roof | Visual inspection | Visual assessment | Presumed ACM | Not determined | Good<br>Maintenance only | Priority 4: Negligible Risk Level | **Remove prior to demolition works.** | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Eaves of east side building | Flat cement sheet | Visual inspection | Visual assessment | Presumed ACM | Not determined | Good<br>Maintenance only | Priority 4: Negligible Risk Level | **Remove prior to demolition works.** | |
| East side building, outside walls, north and south ends of building | Square corrugated cement sheeting | Visual inspection | Visual assessment | Presumed ACM | Not determined | Good<br>Maintenance only | Priority 4: Negligible Risk Level | **Remove prior to demolition works.** | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1st floor ceiling void | Bakelite switch | Visual inspection | Visual assessment | Presumed ACM | Not determined | Good<br>Maintenance only | Priority 4: Negligible Risk Level | **Remove prior to demolition works.** | |
| 1st floor | Yellow vinyl tile | Non-friable | 14 | No asbestos detected<br>(organic fibres) | Not determined | NA | NA | NA | |
| *Dollars & Sense* back storeroom | Electrical backing board | Non-friable | Visual assessment | Presumed ACM | Not determined | Good<br>Regular | Priority 4: Negligible Risk Level | **Remove prior to demolition works.** | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| *Dollars & Sense*, store floor | Vinyl tile | Non-friable | 15 | No asbestos detected | Not determined | NA | NA | NA | |
| West side entry, eaves | Cement flat sheet | Non-Friable | 16 | Chrysotile asbestos detected | Not determined | Poor<br>Maintenance only | Priority 2: Elevated Risk Level | **Stabilise any damaged surfaces of material or restrict access to area.**<br>**Remove any debris as soon as possible.**<br>**Remove prior to demolition works.** | |
| SMF | | | | | | | | | |
| Roof above gym | Roof sarking | Non-friable | Visual inspection | Assume positive | Not determined | Good<br>Maintenance only | Priority 4: Negligible Risk Level | **Remove during demolition works.** |  |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Ceiling above gym | Air conditioning ducting | Non-friable | Visual inspection | Assume positive | Not determined | Good<br>Maintenance only | Priority 4: Negligible Risk Level | **Remove during demolition works.** | |
| Shop 1, rear | Hot water system | Non-friable | Visual inspection | Assume positive | Not determined | Good<br>Maintenance only | Priority 4: Negligible Risk Level | **Remove during demolition works.** | |
| Shop 5 | Hot water system | Non-friable | Visual inspection | Assume positive | Not determined | Good<br>Maintenance only | Priority 4: Negligible Risk Level | **Remove during demolition works.** | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Kitchenette in Shop 6/8 | Hot water system | Non-friable | Visual inspection | Assume positive | Not determined | Good<br>Maintenance only | Priority 4: Negligible Risk Level | **Remove during demolition works.** | |
| Shop 16 | Hot water system | Non-friable | Visual inspection | Assume positive | Not determined | Good<br>Maintenance only | Priority 4: Negligible Risk Level | **Remove during demolition works.** | |
| Shop 23 | Hot water system | Non-friable | Visual inspection | Assume positive | Not determined | Good<br>Maintenance only | Priority 4: Negligible Risk Level | **Remove during demolition works.** | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Shop 15, Hairdressers | Hot water system | Non-friable | Visual inspection | Assume positive | Not determined | Good<br>Maintenance only | Priority 4: Negligible Risk Level | **Remove during demolition works.** | |
| 3rd floor kitchen | Hot water system | Non-friable | Visual inspection | Assume positive | Not determined | Good<br>Maintenance only | Priority 4: Negligible Risk Level | **Remove during demolition works.** | |
| 3rd floor kitchen | Hot water system | Non-friable | Visual inspection | Assume positive | Not determined | Good<br>Maintenance only | Priority 4: Negligible Risk Level | **Remove during demolition works.** | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1st floor, *Dollars & Sense* store, bathrooms | Vinyl tile | Non-friable | 13 | No asbestos detected (SMF) | Not determined | Good<br>Regular | Priority 4: Negligible Risk Level | **Remove prior to demolition works.** | |
| 1st floor, ceiling void, east side | Insulation batts | Friable | Visual inspection | Assume positive | Not determined | Good<br>Maintenance only | Priority 4: Negligible Risk Level | **Remove during demolition works.** | |
| *Jolly Roger Barber* | Hot water system | Non-friable | Visual inspection | Assume positive | Not determined | Good<br>Maintenance only | Priority 4: Negligible Risk Level | **Remove during demolition works.** | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Shop 3 | Hot water system | Non-friable | Visual inspection | Assume positive | Not determined | Good<br>Maintenance only | Priority 4: Negligible Risk Level | **Remove during demolition works.** | |
| **Paints** | | | | | | | | | |
| It was the professional opinion of the occupation hygienist that inspected the site that no LBPs were present. | | | | | | | | | |
| **PCBs** | | | | | | | | | |
| 3rd Floor | Fluorescent ballast | NA | Visual inspection | Assume negative | NA | NA | NA | NA | |

# Appendix B - Laboratory CoC and Results

source: Sydney.pdf page: 11 SGS Ref: SE213585_COC

Sheet 1 of 2

| Site: | Project No: |
|---|---|
| 15-31 Harbour Drive, Coffs Harbour NSW | E24924.E10 |

**Laboratory:** SGS Australia
Unit 16, 33 Maddox Street,
ALEXANDRIA NSW 2015
P: 02 8594 0400 F: 02 8594 0499

| Sample ID | Laboratory ID | Container Type | Sampling Date | Sampling Time | Sample Matrix: WATER | SOIL | OTHER |
|---|---|---|---|---|---|---|---|
| 1 | 1 | ZLB | 12/11/20 | | | | X |
| 2 | 2 | | | | | | |
| 3 | 3 | | | | | | |
| 4 | 4 | | | | | | |
| 5 | 5 | | | | | | |
| 6 | 6 | | | | | | |
| 7 | 7 | | | | | | |
| 8 | 8 | | | | | | |
| 9 | 9 | | | | | | |
| 10 | 10 | | | | | | |
| 11 | 11 | | | | | | |
| 12 | 12 | | | | | | |

Analysis

| HM [A] /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos | HM [A] /TRH/BTEX/PAHs | HM [A] /TRH/BTEX | BTEX | VOCs | Asbestos | Asbestos Quantification | pH / CEC (cation exchange) | pH / EC (electrical conductivity) | Dewatering Suite | sPOCAS | PFAS | Sulphates | Chlorides | | TCLP HM A/ / PAH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | X | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
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**SGS EHS Sydney COC**
**SE213585**

**Comments**

HM [A]
Arsenic
Cadmium
Chromium
Copper
Lead
Mercury
Nickel

HM [B]
Arsenic
Cadmium
Chromium
Lead
Mercury
Nickel

**Dewatering Suite**
pH & EC
TDS / TDU
Hardness
Total Cyanide
Metals (Al, As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)
TRH (F1, F2, F3, F4)
BTEX
PAH
Total Phenol

**LABORATORY TURNAROUND**
- [X] Standard
- [ ] 24 Hours
- [ ] 48 Hours
- [ ] 72 Hours
- [ ] Other ____

**Container Type:**
J = solvent washed, acid rinsed, Tefton sealed glass jar
S = solvent washed, acid rinsed glass bottle
P = natural HDPE plastic bottle
VC = glass vial, Tefton Septum
ZLB = Zip-Lock Bag

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

Report with EI Waste Classification Table ☐

| Sampler's Name: | Received by (SGS): |
|---|---|
| Print: James McMahon | Print: Suba |
| Signature: | Signature: |
| Date: | Date: 16/11/20 @ 11:00 |

Sampler's Comments:
Please cc Alejandra Beltran

eiaustralia
Contamination | Remediation | Geotechnical
Suite 6.01, 55 Miller Street,
PYRMONT NSW 2009
Ph: 9516 0722
lab@eiaustralia.com.au

COC March 2018 FORM v.4 - SGS

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

Sheet 2 of 2

| Site: | Project No: |
|---|---|
| 15-31 Harbour Drive, Coffs Harbour NSW | E24924.E10 |

**Laboratory:** SGS Australia
Unit 16, 33 Maddox Street,
ALEXANDRIA NSW 2015
P: 02 8594 0400 F: 02 8594 0499

| Sample ID | Laboratory ID | Container Type | Sampling Date | Sampling Time | Sample Matrix: WATER | SOIL | OTHER | Analysis: HM [A] /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos | HM [A] /TRH/BTEX/PAHs | HM [A] /TRH/BTEX | BTEX | VOCs | Asbestos | Asbestos Quantification | pH / CEC (cation exchange) | pH / EC (electrical conductivity) | Dewatering Suite | sPOCAS | PFAS | Sulphates | Chlorides | | TCLP HM A/ / PAH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 13 | 13 | ZLB | 12/11/20 | | | | X | | | | | | X | | | | | | | | | | |
| 14 | 14 | ↓ | ↓ | | | | ↓ | | | | | | ↓ | | | | | | | | | | |
| 15 | 15 | ↓ | ↓ | | | | ↓ | | | | | | ↓ | | | | | | | | | | |
| 16 | 16 | ↓ | ↓ | | | | ↓ | | | | | | ↓ | | | | | | | | | | |

**Comments**

HM [A]
Arsenic
Cadmium
Chromium
Copper
Lead
Mercury
Nickel

HM [B]
Arsenic
Cadmium
Chromium
Lead
Mercury
Nickel

**Dewatering Suite**
pH & EC
TDS / TDU
Hardness
Total Cyanide
Metals (Al, As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)
TRH (F1, F2, F3, F4)
BTEX
PAH
Total Phenol

**LABORATORY TURNAROUND**

- [X] Standard
- [ ] 24 Hours
- [ ] 48 Hours
- [ ] 72 Hours
- [ ] Other_____

**Container Type:**
J = solvent washed, acid rinsed, Tefton sealed glass jar
S = solvent washed, acid rinsed glass botlle
P = natural HDPE plastic bottle
VC = glass vial, Tefton Septum
ZLB = Zip-Lock Bag

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

Report with EI Waste Classification Table ☐

| Sampler's Name: | Received by (SGS): |
|---|---|
| Print: James McMahon | Print: Sasha |
| Signature: | Signature: |
| Date: | Date: 16/11/20 @ 11~ |

Sampler's Comments:
Please cc Alejandra Beltran

eiaustralia
Contamination | Remediation | Geotechnical
Suite 6.01, 55 Miller Street,
PYRMONT NSW 2009
Ph: 9516 0722
lab@eiaustralia.com.au

COC March 2018 FORM v.4 - SGS

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

# ANALYTICAL REPORT

Accreditation No. 2562

## CLIENT DETAILS

| | |
|---|---|
| Contact | Alejandra Beltran |
| Client | EI AUSTRALIA |
| Address | SUITE 6.01<br>55 MILLER STREET<br>PYRMONT NSW 2009 |
| Telephone | 61 2 95160722 |
| Facsimile | (Not specified) |
| Email | Alejandra.beltran@eiaustralia.com.au |
| Project | **E24924.E10 15-31 Harbour Drive, Coffs** |
| Order Number | **E24924.E10** |
| Samples | 16 |

## LABORATORY DETAILS

| | |
|---|---|
| Manager | Huong Crawford |
| Laboratory | SGS Alexandria Environmental |
| Address | Unit 16, 33 Maddox St<br>Alexandria NSW 2015 |
| Telephone | +61 2 8594 0400 |
| Facsimile | +61 2 8594 0499 |
| Email | au.environmental.sydney@sgs.com |
| SGS Reference | **SE213585 R0** |
| Date Received | 16 Nov 2020 |
| Date Reported | 23 Nov 2020 |

## COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

Sample #1, 4, 9-15: No trace asbestos fibres detected using trace analysis technique.

Asbestos analysed by Approved Identifier Ravee Sivasubramaniam.

## SIGNATORIES

S. Ravee

Ravee SIVASUBRAMANIAM
Hygiene Team Leader

RESULTS

Fibre ID in bulk materials — Method AN602

| Laboratory Reference | Client Reference | Matrix | Sample Description | Date Sampled | Fibre Identification | Est.%w/w* |
|---|---|---|---|---|---|---|
| SE213585.001 | 1 | Other | 20x10x2mm Light brown fibre board fragments | 12 Nov 2020 | No Asbestos Detected<br>Organic Fibres Detected | |
| SE213585.002 | 2 | Other | 65x50x5mm Cement sheet fragment | 12 Nov 2020 | Amosite & Chrysotile Asbestos Detected<br>Organic Fibres Detected | |
| SE213585.003 | 3 | Other | 15x6x3mm Cement sheet fragment | 12 Nov 2020 | Amosite & Chrysotile Asbestos Detected<br>Organic Fibres Detected | |
| SE213585.004 | 4 | Other | 60x45x5mm Spongy fibrous material | 12 Nov 2020 | No Asbestos Detected<br>Organic Fibres Detected | |
| SE213585.005 | 5 | Other | 10x10x2mm Cement sheet fragment | 12 Nov 2020 | Chrysotile Asbestos Detected | |
| SE213585.006 | 6 | Other | 50x40x2mm Vinyl tile Fragments | 12 Nov 2020 | Chrysotile Asbestos Detected | |
| SE213585.007 | 7 | Other | 15x10x2mm Cement sheet fragments | 12 Nov 2020 | Chrysotile Asbestos Detected<br>Organic Fibres Detected | |
| SE213585.008 | 8 | Other | 60x40x10mm Dark brown resinous board fragment | 12 Nov 2020 | Chrysotile Asbestos Detected | |
| SE213585.009 | 9 | Other | 70x40x3mm Green vinyl tile fragment with fibrous adhesive layer | 12 Nov 2020 | No Asbestos Detected<br>Organic Fibres Detected | |
| SE213585.010 | 10 | Other | 60x30x3mm Vinyl tile fragment with fibrous adhesive layer | 12 Nov 2020 | No Asbestos Detected<br>Organic Fibres Detected | |
| SE213585.011 | 11 | Other | 60x50x2mm Cement sheet fragments | 12 Nov 2020 | No Asbestos Detected<br>Organic Fibres Detected | |
| SE213585.012 | 12 | Other | 25x15x2mm Vinyl tile fragment | 12 Nov 2020 | No Asbestos Detected | |
| SE213585.013 | 13 | Other | 60x20x2mm Vinyl sheet fragment | 12 Nov 2020 | No Asbestos Detected<br>Synthetic Mineral Fibres Detected | |
| SE213585.014 | 14 | Other | 40x30x2mm Vinyl tile fragments | 12 Nov 2020 | No Asbestos Detected<br>Organic Fibres Detected | |
| SE213585.015 | 15 | Other | 30x20x2mm Vinyl tile fragments | 12 Nov 2020 | No Asbestos Detected | |
| SE213585.016 | 16 | Other | 30x20x2mm Cement sheet fragments | 12 Nov 2020 | Amosite & Chrysotile Asbestos Detected | |

# METHOD SUMMARY

| METHOD | METHODOLOGY SUMMARY |
|---|---|
| AN602 | Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by polarised light microscopy (PLM) in conjunction with dispersion staining (DS). AS4964 provides the basis for this document. Unequivocal identification of the asbestos minerals present is made by obtaining sufficient diagnostic `clues`, which provide a reasonable degree of certainty, dispersion staining is a mandatory `clue` for positive identification. If sufficient `clues` are absent, then positive identification of asbestos is not possible. This procedure requires removal of suspect fibres/bundles from the sample which cannot be returned. |
| AN602 | Fibres/material that cannot be unequivocably identified as one of the three asbestos forms, will be reported as unknown mineral fibres (umf). The fibres detected may or may not be asbestos fibres. |
| AN602 | AS4964.2004 Method for the Qualitative Identification of Asbestos in Bulk Samples , Section 8.4, Trace Analysis Criteria, Note 4 states:"Depending upon sample condition and fibre type, the detection limit of this technique has been found to lie generally in the range of 1 in 1,000 to 1 in 10,000 parts by weight, equivalent to 1 to 0.1 g/kg." |

## FOOTNOTES

| | | | | | |
|---|---|---|---|---|---|
| Amosite | - | Brown Asbestos | NA | - | Not Analysed |
| Chrysotile | - | White Asbestos | LNR | - | Listed, Not Required |
| Crocidolite | - | Blue Asbestos | * | - | NATA accreditation does not cover the performance of this service . |
| Amphiboles | - | Amosite and/or Crocidolite | ** | - | Indicative data, theoretical holding time exceeded. |
| | | | *** | - | Indicates that both * and ** apply. |

(In reference to soil samples only) This report does not comply with the analytical reporting recommendations in the Western Australian Department of Health Guidelines for the Assessment and Remediation and Management of Asbestos Contaminated sites in Western Australia - May 2009.

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received.

Where reported: 'Asbestos Detected': Asbestos detected by polarised light microscopy, including dispersion staining.
Where reported: 'No Asbestos Found': No Asbestos Found by polarised light microscopy, including dispersion staining.
Where reported: 'UMF Detected': Mineral fibres of unknown type detected by polarised light microscopy, including dispersion staining. Confirmation by another independent analytical technique may be necessary.

Even after disintegration it can be very difficult, or impossible, to detect the presence of asbestos in some asbestos -containing bulk materials using polarised light microscopy. This is due to the low grade or small length or diameter of asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au/en-gb/environment-health-and-safety .

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This test report shall not be reproduced, except in full.

# SAMPLE RECEIPT ADVICE

SE213585

## CLIENT DETAILS

| | |
|---|---|
| Contact | Alejandra Beltran |
| Client | EI AUSTRALIA |
| Address | SUITE 6.01<br>55 MILLER STREET<br>PYRMONT NSW 2009 |
| Telephone | 61 2 95160722 |
| Facsimile | (Not specified) |
| Email | Alejandra.beltran@eiaustralia.com.au |
| Project | **E24924.E10 15-31 Harbour Drive, Coffs** |
| Order Number | **E24924.E10** |
| Samples | 16 |

## LABORATORY DETAILS

| | |
|---|---|
| Manager | Huong Crawford |
| Laboratory | SGS Alexandria Environmental |
| Address | Unit 16, 33 Maddox St<br>Alexandria NSW 2015 |
| Telephone | +61 2 8594 0400 |
| Facsimile | +61 2 8594 0499 |
| Email | au.environmental.sydney@sgs.com |
| Samples Received | Mon 16/11/2020 |
| Report Due | Mon 23/11/2020 |
| SGS Reference | **SE213585** |

## SUBMISSION DETAILS

This is to confirm that 16 samples were received on Monday 16/ 11/2020. Results are expected to be ready by COB Monday 23/ 11/2020. Please quote SGS reference SE213585 when making enquiries. Refer below for details relating to sample integrity upon receipt.

| | | | |
|---|---|---|---|
| Samples clearly labelled | Yes | Complete documentation received | Yes |
| Sample container provider | Client | Sample cooling method | None |
| Samples received in correct containers | Yes | Sample counts by matrix | 16 Material |
| Date documentation received | 16/11/2020 | Type of documentation received | COC |
| Samples received in good order | Yes | Samples received without headspace | N/A |
| Sample temperature upon receipt | 18.6°C | Sufficient sample for analysis | Yes |
| Turnaround time requested | Standard | | |

Unless otherwise instructed, water and bulk samples will be held for one month from date of report, and soil samples will be held for two months.

## COMMENTS

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# SAMPLE RECEIPT ADVICE

SE213585

CLIENT DETAILS

Client EI AUSTRALIA

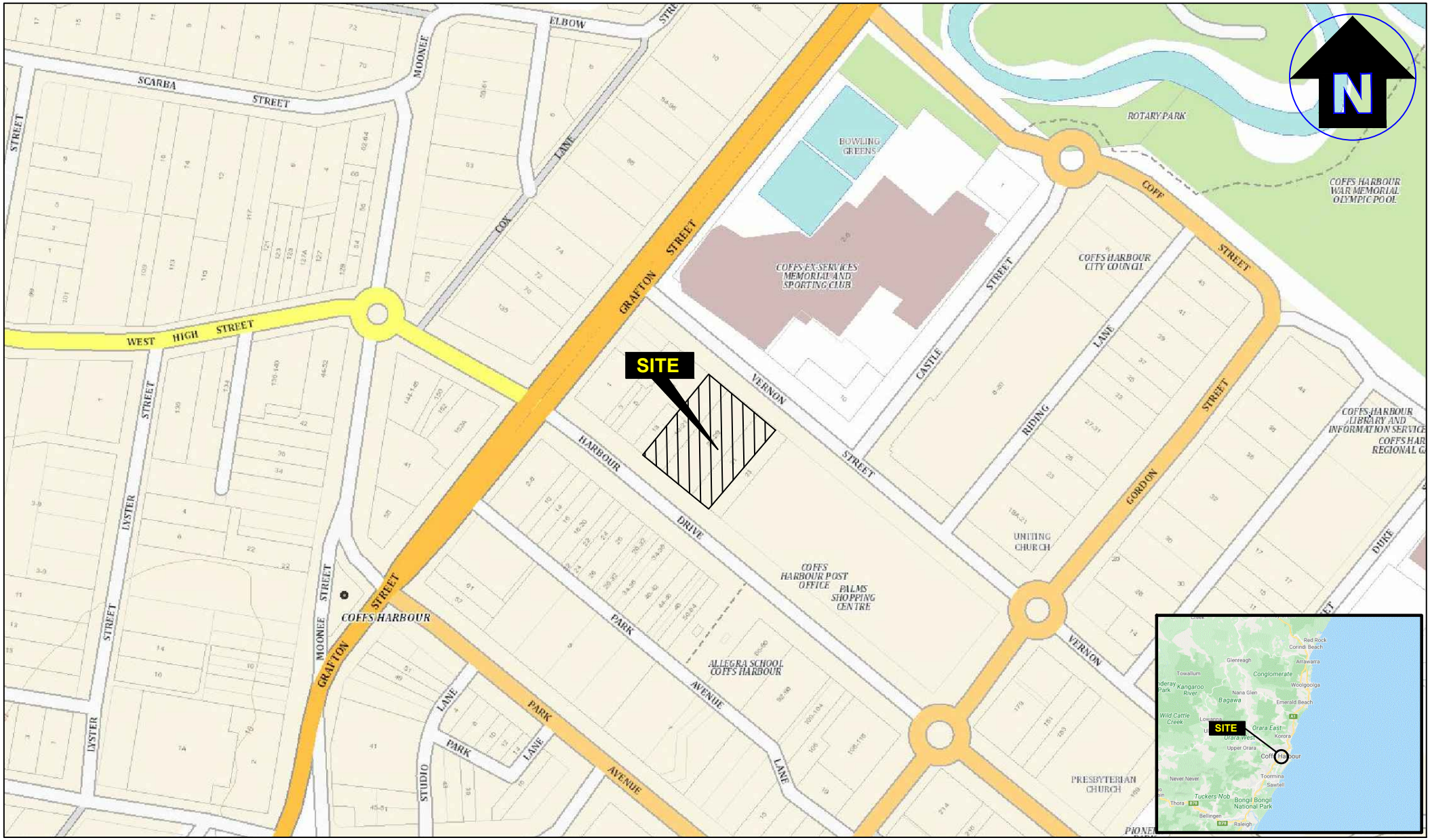
Project E24924.E10 15-31 Harbour Drive, Coffs

SUMMARY OF ANALYSIS

| No. | Sample ID | Fibre ID in bulk materials |
|---|---|---|
| 001 | 1 | 1 |
| 002 | 2 | 1 |
| 003 | 3 | 1 |
| 004 | 4 | 1 |
| 005 | 5 | 1 |
| 006 | 6 | 1 |
| 007 | 7 | 1 |
| 008 | 8 | 1 |
| 009 | 9 | 1 |
| 010 | 10 | 1 |
| 011 | 11 | 1 |
| 012 | 12 | 1 |
| 013 | 13 | 1 |
| 014 | 14 | 1 |
| 015 | 15 | 1 |
| 016 | 16 | 1 |

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

# Appendix C - Figure




eiaustralia
Contamination | Remediation | Geotechnical
Suite 6.01, 55 Miller Street, PYRMONT 2009
Ph (02) 9516 0722 Fax (02) 9518 5088

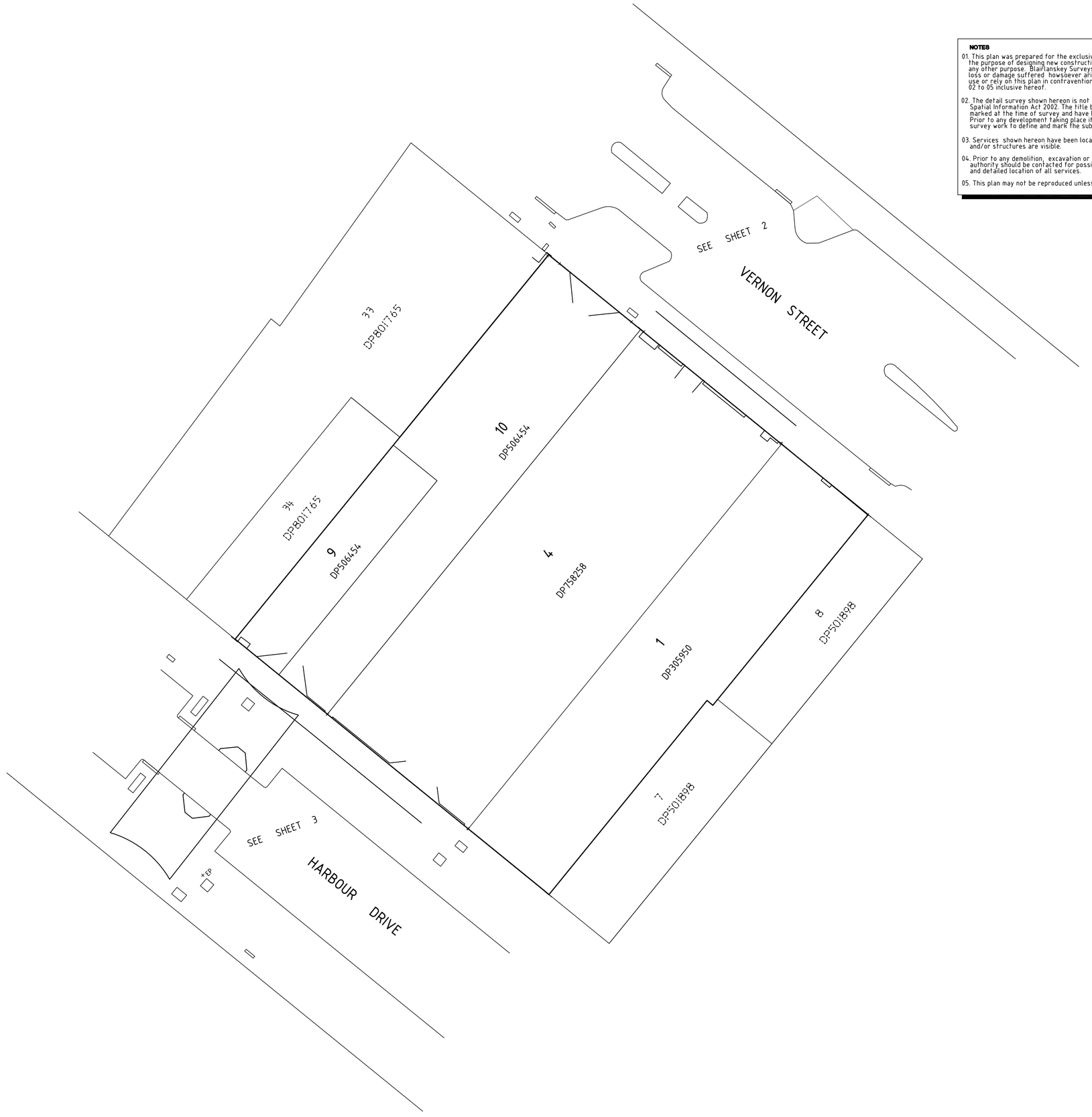
| | |
|---|---|
| Drawn: | AM.H. |
| Approved: | A.B. |
| Date: | 30-11-20 |
| Scale: | Not To Scale |

**Paynter Dixon Constructions Pty Ltd**
Hazardous Materials Survey
15-31 Harbour Drive, Coffs Harbour NSW
Site Locality Plan

Figure:
1

Project: E24924.E10

# Appendix R.
# SITE SURVEY




**NOTES**

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02. The detail survey shown hereon is not a survey defined by the Surveying and Spatial Information Act 2002. The title boundaries of the subject land were not marked at the time of survey and have been determined by title dimensions only. Prior to any development taking place it would be advisable to carry out further survey work to define and mark the subject boundaries.

03. Services shown hereon have been located by field survey where surface markers and/or structures are visible.

04. Prior to any demolition, excavation or construction on the site, the relevant authority should be contacted for possible location of further underground services and detailed location of all services.

05. This plan may not be reproduced unless this note is included.

MGA

**BLAIRLANSKEY SURVEYS**

REGISTERED SURVEYORS ABN 66 711 849 214

P. O. Box 2453 COFFS HARBOUR N.S.W. 2450
190 PACIFIC HIGHWAY(NORTH)
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Tel: (02) 6652 5090
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Email: bls@blsurvey.com

Client and Project

**PAYNTER DIXON**
**15-31 VERNON STREET**
**COFFS HARBOUR**

Drawing Title

# DETAIL AND LEVELS IN VERNON STREET AND HARBOUR DRIVE

| Scale AT A1 | Date | Approved |
|---|---|---|
| 1 : 250 | JULY 2020 | |
| Job No. | Datum | Field Book No. |
| 9725 | A.H.D. | |

Drawing No. Revision No.

## LEGEND

- TLS — COMMS PIT
- G — GRATED DRAINAGE PIT
- SS — SIGN
- PX — PRAM CROSSING
- KIP — KERB INLET PIT
- FP — FLAG POLE
- PIT COVER
- LARGE TREE
- H — HYDRANT
- WM — WATER METER
- PB — ELECTRICAL BOX
- SMH — SEWER MANHOLE
- WAT — WATER CONNECTION
- SV — STOP VALVE
- IO — INSPECTION OPENING
- LIGHT POLE
- TOP 14.07 — TOP OF FACADE LEVEL

MGA

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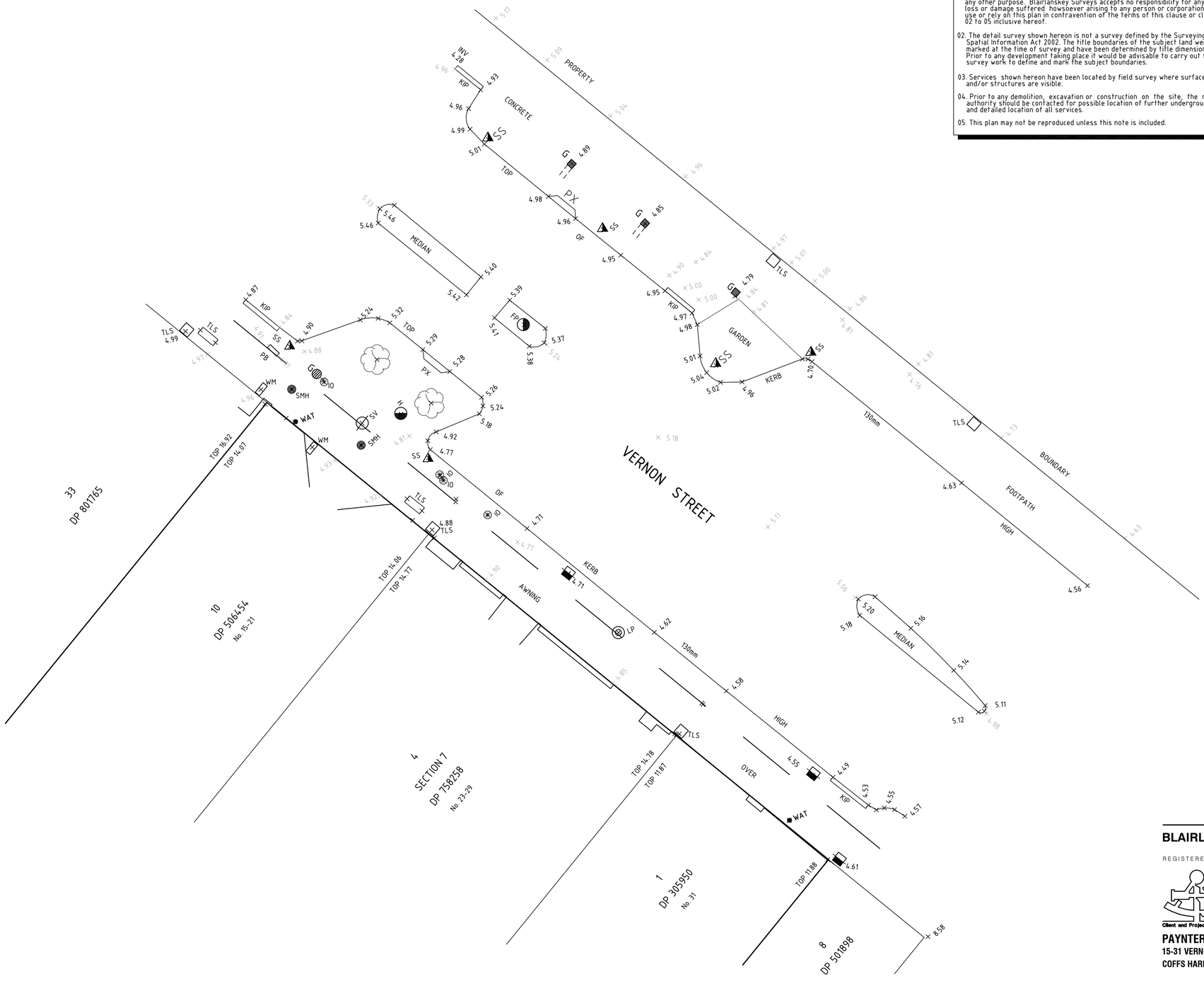


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# DETAIL AND LEVELS IN VERNON STREET AND HARBOUR DRIVE

| Scale AT A1 | Date | Approved |
|---|---|---|
| 1 : 150 | JULY 2020 | |
| **Job No.** | **Datum** | **Field Book No.** |
| 9725 | A.H.D. | |

**Drawing No.** **Revision No.**

## LEGEND

- TLS — COMMS PIT
- G — GRATED DRAINAGE PIT
- SS — SIGN
- PX — PRAM CROSSING
- KIP — KERB INLET PIT
- FB — FLAG POLE
- PIT COVER
- LARGE TREE
- H — HYDRANT
- PB — ELECTRICAL BOX
- WAT — WATER CONNECTION
- IO — INSPECTION OPENING
- LIGHT POLE
- LARGE PALM TREE
- B | R — BIKE RACK
- TOP 14.07 — TOP OF FACADE LEVEL
- POLE — SHADE COVER SUPPORT
- ELECTRICAL PIT

MGA

33 DP801765

34 DP801765

9 DP506454

10 DP506454 No. 15-21

4 SECTION 7 DP 758258 No. 23-29

1 DP305950 No. 31

7 DP501898

HARBOUR DRIVE

PROPERTY BOUNDARY

AWNING

SHADE COVER

KERB

OF

OVER

HIGH

150mm

TOP

PX

KIP

LP

PB

SS

TLS

PIT

INV

WAT

H

G

B R

IO

POLE

TOP 12.07

TOP 14.07

TOP 12.03

TOP 11.23

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