



**BYRON SHIRE COUNCIL**

PO Box 219  
 Mullumbimby NSW 2482  
 DX 20007 MULLUMBIMBY  
 Ph : (02) 6626 7000  
 E-mail: council@byron.nsw.gov.au  
 Web: www.byron.nsw.gov.au

**\*\*\*Office Use Only\*\*\***

PreDA No: **111.2017.29.1** Date **8/2/17**

DA No: **10.1** Date .....

Concurrent application/s  YES  NO

Parcel No(s): **188 980**

Zoning: **IN2**

Notations: FPL DIP **(ASS)** BPL HCV HER (item / area)  
 PR123 (Precinct:..... )

Record No: #...../.....Container: .....

#E2016/107508 updated January 2017

## Development Application Form

Issued under Section 78A of the Environmental Planning and Assessment Act 1979

Use this form to apply for **consent to carry out development**. A Development Application **Help Guide** is available to help you to complete the application. Please place a cross in the relevant boxes  and fill out all appropriate blank Steps. Please ensure you have submitted all relevant information to minimise delays. Once your application has been assessed you will be advised in writing of Council's Determination.

### Pre-DA Review

Council has introduced an optional serviced aimed at reducing waiting times on applications by carrying out a PreDA review of your documentation prior to formally lodging a development application. Refer to the 'PreDA Factsheet' for further information.

Would you like to lodge a PreDA Review?  Yes  No

### Step 1 Description of Land you propose to Develop

Unit No.	House No. 88-94	Street Name Centennial	Street Type e.g. St, Rd Circuit
Suburb or Town Byron Bay			Postcode
Lot No. 60	DP or SP No. DP 835249	Sec No.	Owner/s Name Sixty Centennial Pty Ltd
Owner/s Email bruce@koolkidstrainingcollege.com.au			

### Step 2 Details of the Applicant/s

Anyone can submit an application but if the applicant is not the owner of the land, then the Owner(s) written consent to lodge the application is required. All correspondence will be sent to the applicant. It is important to notify Council of any change of address and/or telephone number if this occurs during the processing of the application.

Name/ Company Name Newton Denny Chapelle	
Contact Name (in the case of a Company) Damian Chapelle	
Postal address PO Box 1138, Lismore NSW 2480	
Email dchapelle@newtondennychapelle.com.au	Fax
Mobile 0438 862 856	Daytime Telephone 6622 1011

### Step 3 Describe the Development you wish to carry out

**Will this work involve:**

- New Construction (vacant)     Fit-Out of Existing Building     Change of Use – No Building Works  
 Alterations and / or Additions     Demolition of Existing Building     Change of Use – Building Works  
 Subdivision of Land     Relocation of Existing Building     Other .....

**Description of Proposal:** Describe briefly everything you want approved by Council

Proposed mixed use development comprising a Kool Kids Learning Centre, industrial retail outlets with associated takeaway food and retail floor area.

Development estimated cost (inc GST)	\$ 4,800,000.00	Floor area of proposed development	m <sup>2</sup>
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<b>Step 4 Staged Development Consent</b>											
<p>You can apply for Development Consent for part of your proposal now and for the remaining part (s) at a later stage.  <b>Warning:</b> If "Yes" is ticked, then all stages after Stage 1 must be the subject of a separate Development Application. If all stages are to be approved under one Development Consent, then tick "No" in answer to this question and simply describe the staging of the development in your SEE or EIS.</p> <p><b>Are you applying for development consent in stages?</b></p> <p>No <input checked="" type="checkbox"/></p> <p>Yes <input type="checkbox"/> Please describe stages:</p>											
<b>Step 5 Other Approvals from Council</b>											
<p>Does the proposal require approval for one or more of the following activities? You can apply now or at a later stage.</p> <ul style="list-style-type: none"> <li>– Please complete a separate <b>Activity(s) Approval Application Form</b>.</li> <li>– Where the approval is to install a new Onsite Sewage Management System (OSMS) or upgrade an existing system, a <b>On-Site Sewage Management System Application Form</b> is required</li> </ul> <p><i>Three copies of plans and accompanying documentation will be required. Office use only</i></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;"><input type="checkbox"/> Works in Council Road Reserve (ie. driveway) (Roads Act 1993)</td> <td style="width: 20%; text-align: center;">51.</td> </tr> <tr> <td><input type="checkbox"/> Plumbing, Water Supply, Trade Waste or Sewer Drainage Connected to Council Infrastructure (LGA 1993)</td> <td style="text-align: center;">60.</td> </tr> <tr> <td><input type="checkbox"/> Stormwater connected to Council Infrastructure or On-Site Detention (LGA 1993)</td> <td style="text-align: center;">55.</td> </tr> <tr> <td><input type="checkbox"/> Onsite Sewage Management System (LGA 1993)</td> <td style="text-align: center;">70.</td> </tr> <tr> <td><input type="checkbox"/> Other Local Government Act Approvals – Please Specify: .....</td> <td></td> </tr> </table>		<input type="checkbox"/> Works in Council Road Reserve (ie. driveway) (Roads Act 1993)	51.	<input type="checkbox"/> Plumbing, Water Supply, Trade Waste or Sewer Drainage Connected to Council Infrastructure (LGA 1993)	60.	<input type="checkbox"/> Stormwater connected to Council Infrastructure or On-Site Detention (LGA 1993)	55.	<input type="checkbox"/> Onsite Sewage Management System (LGA 1993)	70.	<input type="checkbox"/> Other Local Government Act Approvals – Please Specify: .....	
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<input type="checkbox"/> Onsite Sewage Management System (LGA 1993)	70.										
<input type="checkbox"/> Other Local Government Act Approvals – Please Specify: .....											
<b>Step 6 Environmental Effects of your Development</b>											
<p>Is your proposal likely to significantly impact on threatened species, populations, ecological communities or their habitats?</p> <p><input checked="" type="checkbox"/> No Please provide a Statement of Environmental Effects (SEE)</p> <p><input type="checkbox"/> Yes Please provide a Species Impact Statement</p>	<p>Is any part of the land critical habitat?</p> <p><input checked="" type="checkbox"/> No</p> <p><input type="checkbox"/> Yes</p>										
<b>Step 7 BASIX Certificate</b>											
<p>Is a BASIX Certificate required? If a BASIX Certificate is required it must be less than <b>3 months old</b> at the date of DA lodgement and all details indicated on the BASIX Certificate as "show on DA plans" must be shown on the plans.</p> <p><input checked="" type="checkbox"/> No</p> <p><input type="checkbox"/> Yes BASIX Certificate No: .....</p>											
<b>Step 8 Concurrence from State Agencies</b>											
<p>Is the concurrence or agreement of a State Agency required?</p> <p><input checked="" type="checkbox"/> No</p> <p><input type="checkbox"/> Yes Please list any agencies whose concurrence is needed: <i>Please include a cheque made payable to each agency for the applicable fees and additional copies of all supporting documents.</i></p>											
<b>Step 9 Approvals from State Agencies – Integrated Development</b>											
<p>Does this proposal require additional approval as Integrated Development?</p> <p><input checked="" type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <i>Further information is required, please complete and provide an <b>Integrated Development Checklist</b> and submit it with your application, a cheque made payable to each agency for the applicable fees and additional copies of all supporting documentation.</i></p>											

**Step 10 Construction Certificate**

If your proposal involves construction or structural work, you may need a Construction Certificate. You can apply for a Construction Certificate now, or at a later date, either from Council's Building and Construction Services Team or from a Private Certifier.

**Is a Construction Certificate application to be lodged with Council at the same time as this application?**

- No  
 Yes *Please complete separate **Construction Approval Application Form** and submit along with the three (3) copies of the associated plans/documentation and payment of the required fees.*

**Step 11 Privacy Policy**

The information you provide in this application will enable your application to be assessed by Council and any relevant state agency. If the information is not provided, Council can refuse the application. Your application will be notified or advertised to the public for comment if the development is Designated Development, Integrated Development or other Advertised Development. Council will also keep the application in a Register that can be viewed by the public at any time. Please contact the Council if the information in your application is incorrect or if it changes. Information collected will be used in accordance with Council's Privacy and Personal Information Management Plan.

**Step 12 Political Donations and Gifts**

Please be aware of the Statutory obligations to disclose **Political Donations and Gifts** that may apply to you or associated people if you are lodging a Development or S96 Application. A failure to meet your obligations is an offence. Links to information and resources on this topic are available from Council's website at [www.byron.nsw.gov.au/political-donations](http://www.byron.nsw.gov.au/political-donations). All Political Donations and Gifts Disclosure Statements will be public documents. Does a Political Donations and Gifts Disclosure Statement accompany this application?

- No  
 Yes

**Step 13 Payment Options**

Council accepts payments by cash, cheque, money order, eftpos or credit card (Visa and Master only) at Council's Administration Office. All cheques are to be made payable to **Byron Shire Council**. Should you wish to mail your application package to Council and wish to use the credit card facility, please download an Authority to Charge Credit Card form which can be found at <http://www.byron.nsw.gov.au/forms> or alternatively enclose a cheque or money order.

## Application Requirements

The following matrix and checklist will assist you with the preparation of your application. In providing the information outlined below, you will be assisting Council staff to process your application in a timely manner.

**Please be aware that if the required information is not provided, your application will not be accepted by Council.**

- All documentation, including plans, must be prepared to a scale which will enable easy assessment, A3 in size and a scale of 1:100 is generally preferred.
- The following information should be included on all plans and documents:
  - Applicant name, block / house / shop / flat number, street / road name, town or locality.
  - Lot number, section number, DP number.
  - Measurements in metric.
  - The position of true north.
  - Building or parts of building to be demolished to be indicated in outline.
  - Author name and date of plan
- **Three (3) copies of all plans and all supporting documents are required to be provided, along with an electronic copy (preferably on CD or USB drive). All documents should be labelled correctly to reflect the type of documentation submitted. If you do not provide an electronic version of your application you will be charged a Scanning Fee of \$30.**

## Matrix of documentation to accompany your application

The matrix identifies the **minimum** information (plans and supporting documents) required for common types of developments. Please note that if any other plans or documents relate to your proposal that are not listed in the matrix they may still be submitted to Council for assessment.

Legend											
	New Residential Dwellings	Alts / Adds to Residential Dwelling	Garage, Outbuilding, Awning, Carport etc	Secondary Dwelling	Farm Building	Swimming Pool	Dual Occupancy	Multi Dwelling Housing	Commercial / Industrial Buildings	Subdivision	
✓ Document required	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
● Document may be required											
n/a Document not required											
Statement of Environmental Effects	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Site Plan	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Floor Plan	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	●
Elevations	✓	✓	✓	✓	✓	●	✓	✓	✓	✓	●
Section Plans	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	●
BASIX (correct type of certificate)	✓	●	●	✓	n/a	●	✓	✓	n/a	n/a	n/a
Notification Plan	●	●	●	✓	●	●	✓	✓	●	✓	✓
Landscaping Plan	●	●	●	●	●	●	●	●	●	●	●
Erosion & Sediment Control	✓	●	●	✓	●	✓	✓	✓	✓	✓	✓
Driveway Plan & Section	✓	●	●	✓	●	n/a	✓	✓	✓	✓	✓
Stormwater Plan & Calculations	●	●	●	✓	●	n/a	✓	✓	✓	✓	●
OSMS Report / Plans	●	●	●	●	●	n/a	●	●	●	●	●
Waste Minimisation Plan	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
External Finishes & Materials	✓	●	✓	✓	✓	✓	✓	✓	✓	✓	●
Heritage Management Document	●	●	●	●	●	●	●	●	●	●	●
SEPP 55 Contamination Report	●	●	●	●	●	●	●	●	●	●	●
Carparking Plan	✓	●	●	✓	●	n/a	✓	✓	✓	✓	●

## Checklist of documentation to accompany your application

This checklist will assist with the lodgement of your application by ensuring you have included all the necessary details. This will prevent delays in processing your application. **Please do not lodge your Development Application until you have checked each item on this checklist and indicated whether you have included the required information. Please be aware that if the required information is not provided, your application will not be accepted by Council.**

	REQUIRED INFORMATION	SUPPLIED
<b>1. Application form</b>	a. Have mobile phone numbers and email addresses been provided for the Applicant at Step 2?	<input checked="" type="checkbox"/> Yes
	b. Has the proposed development been adequately described and the cost of works provided at Step 3?	
	c. Is Concurrence from State Agencies noted at Step 9? If so please ensure that the application fee to each of the relevant State Authorities has been provided and the required administration fee/s paid.	
	d. Is the application Integrated Development as noted at Step 10? If so please ensure that the application fee to each of the relevant State Authorities has been provided and the required administration fee/s paid.	
	e. Have ALL owner/s provided consent at Step 13? <i>Note if owner is a company then two (2) directors or one (1) director and one (1) company secretary must sign. If the owner is a Strata then a Strata Seal is required.</i>	
	f. Have ALL applicant/s provided consent at Step 14? <i>Note if applicant is a company then two (2) directors or one (1) director and one (1) company secretary must sign.</i>	
<b>2. Statement of Environmental Effects</b>	a. Environmental impacts of the development described?	<input checked="" type="checkbox"/> Yes
	b. Have the environmental impacts of the development have been identified?	
	c. Have the steps to be taken to protect the environment or to lessen the expected harm to the environment been described?	
	d. Relevant provisions of the following addressed:	
	1. Environmental Planning and Assessment Regulation 2000	
	2. State Environmental Planning Policies	
3. Byron Local Environmental Plan (LEP 1988 and / or LEP 2014)		
4. Byron Shire Development Control Plan (DCP 2010 and / or DCP 2014)		
e. If the proposal relates to residential flat developments to which State Environmental Planning Policy No 65 – Design Quality of Residential Flat Development, have all details as described in the State Policy been provided?		
<b>3. Environmental Impact Statement</b>	If the development was identified in Step 6 as requiring an Environmental Impact Statement (EIS), have the required copies been provided? <i>Note: For full details regarding the requirements for an EIS, please contact NSW Planning and Environment or see their website as follows: <a href="http://www.planningportal.nsw.gov.au/understanding-planning/assessment-systems/local-development">www.planningportal.nsw.gov.au/understanding-planning/assessment-systems/local-development</a>.</i>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> N/A
<b>4. Species Impact Statement</b>	If the development was identified in Step 6 as requiring a Species Impact Statement, have the required copies been provided?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> N/A
<b>5. Site Plan</b>	a. Location, boundary dimensions, site area and north point clearly shown?	<input checked="" type="checkbox"/> Yes
	b. Existing vegetation and trees on the land indicated?	
	c. Location and uses of existing buildings on the land listed?	
	d. Existing levels of the land in relation to buildings and roads provided?	
	e. Location and uses of buildings on sites adjoining the land provided?	
	f. If the property is flood affected, are the existing contours or spot heights to be provided in A.H.D?	

<b>6. Plans / Sketches</b>	a. Floor plans of existing and proposed building indicating layout, partitioning, room sizes and intended uses of each part of the building provided?	<input checked="" type="checkbox"/> Yes
	b. Elevations and sections showing existing and proposed external finishes and heights of any proposed buildings provided?	
	c. Proposed finished levels of the land in relation to existing and proposed buildings and roads provided?	
	d. If the property is flood affected, are the existing and proposed finished floor levels provided in A.H.D?	
	e. Proposed parking arrangements, entry and exit points for vehicles and provision for movement of vehicles within the site provided, including dimensions?	
	f. Proposed landscaping and treatment of the land provided including plant type, height and maturity?	
	g. Proposed methods of draining the land provided?	
	h. For BASIX affected and BASIX optional development, are all BASIX requirements indicated on plans?	
	i. Do the plans contain details of existing and proposed subdivision pattern, including the number of lots and location of roads?	
	j. For proposals involving subdivision, have the appropriate engineering details and plans been provided?	
<b>7. Notification Plans</b>	Where notification is required, has one copy of A4 Notification Plans been provided? These plans are to have the floor plans removed?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> N/A
<b>8. BASIX Certificate</b>	A BASIX certificate is required for all new dwellings (including secondary dwellings), dwelling alterations and additions (where the cost of works exceeds \$50,000.00) and swimming pools over 40,000 litres.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> N/A
	a. For BASIX affected and BASIX optional development has certificate/s issued no earlier than 3 months before the date of lodgement has been provided? b. Have the required details been included on the plans?	
<b>9. Fire Safety Schedule</b>	a. If the proposal includes change off use of a building, has a list of category 1 fire safety provisions been provided for both current provisions and provisions that apply following the change of use?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> N/A
	b. For commercial, retail and industrial development, has a list of category 1 fire safety provisions been provided?	
<b>10. Specific Use Requirements</b>	If the proposal involves the use of a building as an <b>entertainment venue or a function centre, pub, registered club or restaurant</b> , has a statement that specifies the maximum number of persons proposed to occupy, at any one time, that part of the building to which the use applies been provided?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> N/A
<b>11. Other Required Documents</b>	a. If applicable, have details regarding the access to and impact of the development upon infrastructure including water, sewerage, electricity, stormwater disposal and vehicular access, noting in particular the requirements of Council Policy 4.20 "Building over pipelines and other underground structures" been provided?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> N/A
	b. If the property is not in a sewerage area, have details of the proposed on site sewage management system been provided?	
	c. If stormwater works are proposed, have engineer's plans and calculations been provided?	
	d. Where the property is identified as having contaminated soil, have details addressing the requirements of State Environmental Planning Policy 55 – Remediation of Contaminated Land been provided?	
	e. For residential building works, has a schedule of the building materials and colours, in accordance with the provisions of Chapter D1.2.4 of Council's Development Control Plan 2014 been provided?	
	f. For works in a Heritage Conservation Area or Heritage Item, has a Heritage Impact Statement addressing the requirements of Chapter C1 of Council's Development Control Plan 2014 been provided.	
	g. Has a Site Waste Minimisation Plan been provided?	
	h. Where the property is identified as being bushfire effected, have bushfire requirements been addressed in accordance with NSW Rural Fire Service?	
<b>12. Documents Provided</b>	a. Have three (3) copies of the SEE, all plans and all supporting documents been provided? It is preferred that plans and supporting documents are not bound and that all documents are stapled / bundled as required.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> N/A
	b. Has an electronic copy of the SEE, all plans and all supporting documents been provided? Please note that a scanning fee <b>will</b> be charged if an electronic copy has not been provided.	
	c. Have additional copies of the SEE, all plans and all supporting documents been provided for any referral bodies noted at Steps 8 and 9.	



**DISCLOSURE OF POLITICAL DONATIONS AND GIFTS.**

Legislation requires the disclosure of reportable political donations, made within the past two years (by you or any person or entity with a financial interest connected to this application) to political parties, elected members of NSW Parliament, Local Government elections and elected Council members. This includes disclosure of gifts made to Councillors or Council employees, and any donation or gift made when a person was a candidate for Council election.

Have you made a political donation or gift:

YES  NO

*(if ticked yes, a separate disclosure form must be completed. Forms are available at Council or downloaded from the Department of Planning's website)*

Significant penalties apply to non-disclosure. For more information and to obtain a political donations and gifts disclosure statement go to the Department of Planning website at [www.planning.nsw.gov.au](http://www.planning.nsw.gov.au).

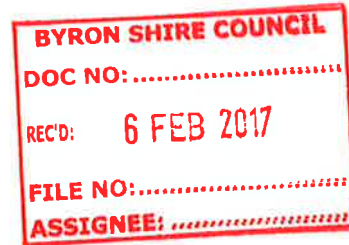


# Newton Denny Chapelle

SURVEYORS PLANNERS ENGINEERS

Date: 24<sup>th</sup> January 2017  
Our Ref: 16/296

General Manager  
Byron Shire Council  
PO Box 219  
MULLUMBIMBY NSW 2482



Dear Sir,

**Re: Development Application  
Lot 60 DP 835249 No. 88-94 Centennial Circuit, Byron Bay**

Newton Denny Chapelle have been engaged by Sixty Centennial Pty Ltd to lodge a Development Application for the proposed Mixed Use Development at Centennial Circuit, Byron Bay.

We have attached 3 copies of the Statement of Environmental Effects together with a cheque of \$10,182.00 being Council's Development Application fee.

A4 copies of design plans have also been included as required by Council for notification purposes.

Also enclosed is a CD containing an electronic copy of the Statement of Environmental Effects.

Should you have any questions, please do not hesitate contacting Damian Chapelle of this office.

Yours sincerely,  
**NEWTON DENNY CHAPELLE**



**DAMIAN CHAPELLE**  
Town Planner. BTP CPP.

# DEVELOPMENT APPLICATION

## PROPOSED INDUSTRIAL SPACES + CHILD CARE

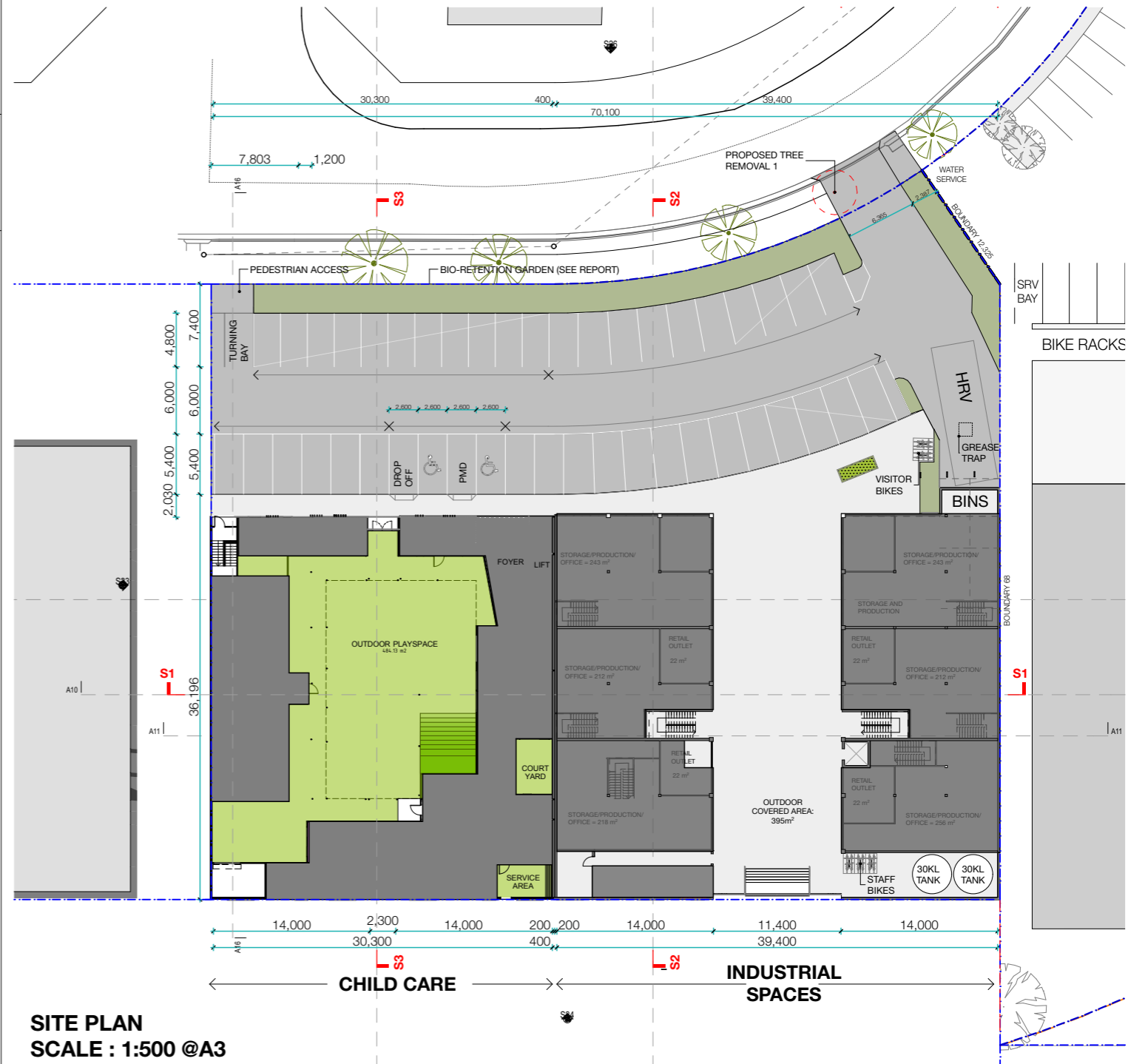
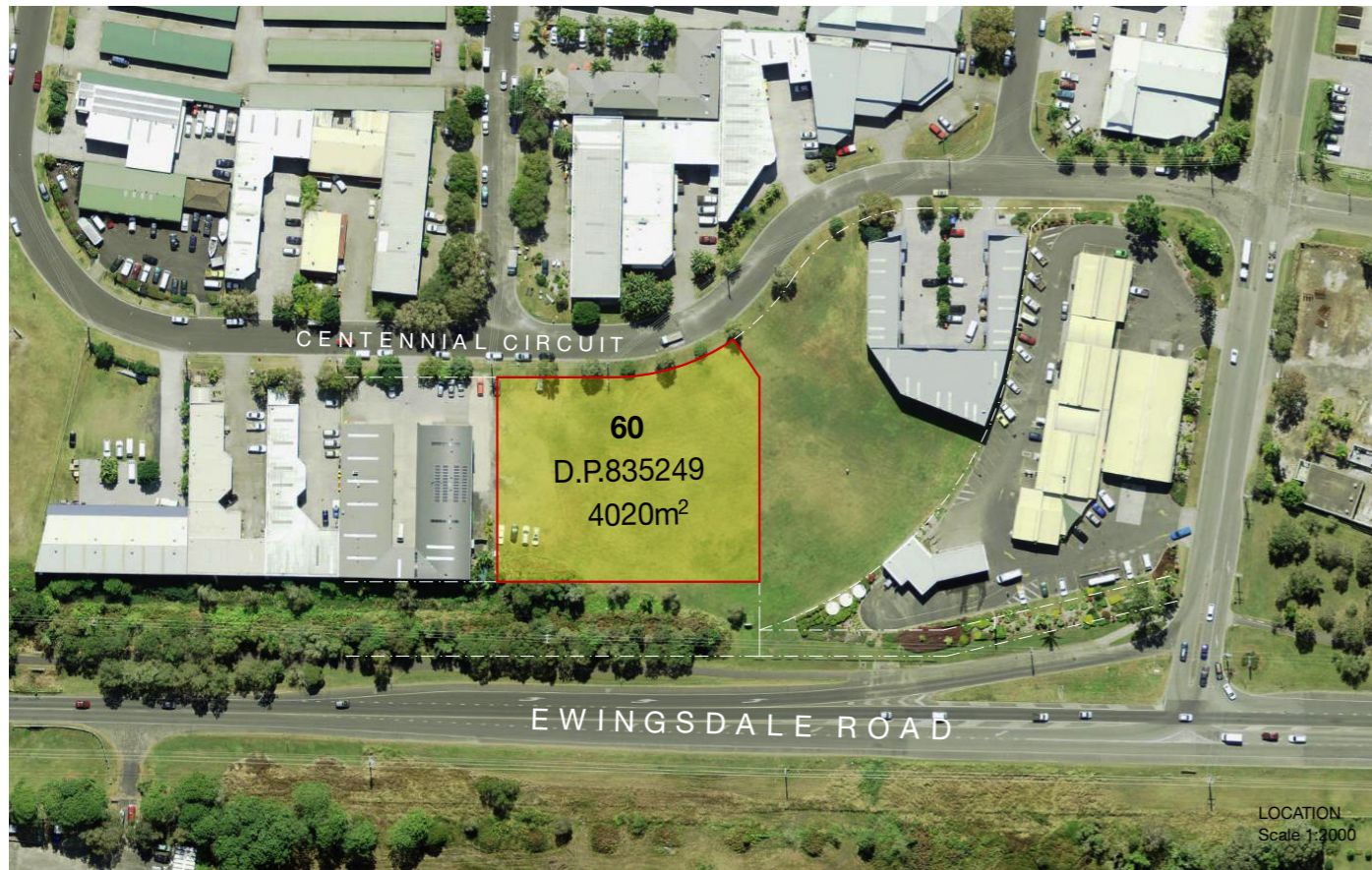
LOT 60 CENTENNIAL CIRCUIT  
BYRON BAY NSW 2481

### DRAWING SCHEDULE

ISSUE	No	NAME	SCALE
	01	DRAWING LIST / LOCATION / SITE PLAN	1:2000 / 1:500
	02	AREA AND USES	1:500
	03	LEVEL 00	1:200
	04	LEVEL 01	1:200
	05	PARKING AND ACCESS	1:200
	06	SECTIONS	1:200
	07	ELEVATIONS	1:200

### FLOOR SPACE RATIO AREAS

ZONE NAME	AREA	SITE AREA	FSR
INDUSTRIAL SPACES	1,562m <sup>2</sup>	4020m <sup>2</sup>	<b>38.8%</b>
CHILD CARE AREA	861m <sup>2</sup>	4020m <sup>2</sup>	<b>21.4%</b>
<b>TOTAL</b>	<b>2,423m<sup>2</sup></b>	<b>4020m<sup>2</sup></b>	<b>60.2%</b>



**SITE PLAN**  
SCALE : 1:500 @A3

### PLANNER

#### NDC - NEWTON DENNY CHAPELLE

Suite 1/31 Carrington Street, Lismore  
Post: PO Box 1138 Lismore NSW 2480  
T: 02 66221 011  
F: 02 6622 4088  
M: 0438 862 856  
e. dchappelle@newtondennychapelle.com.au



SCALE : 1:500 @A3

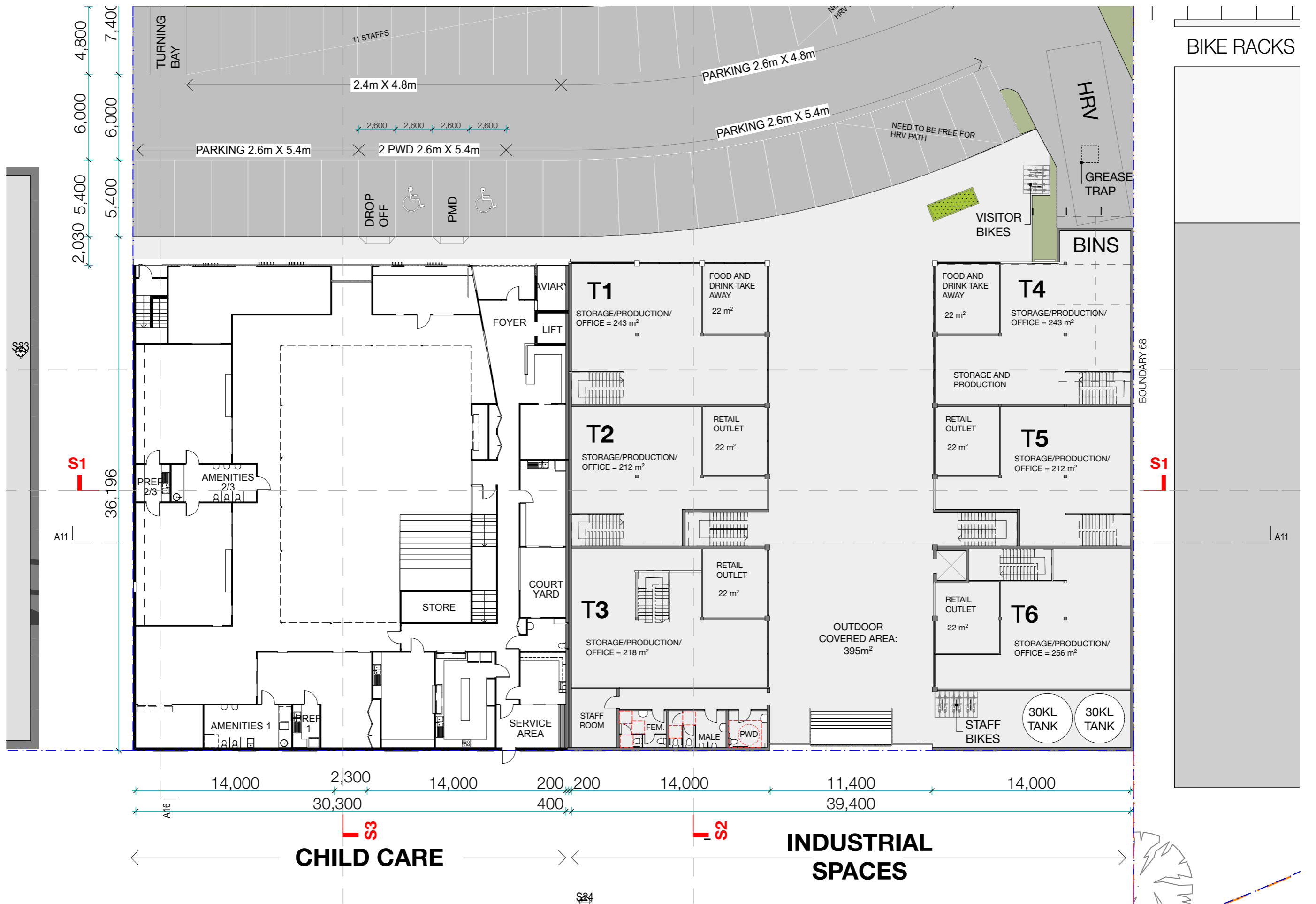
LEVEL 00



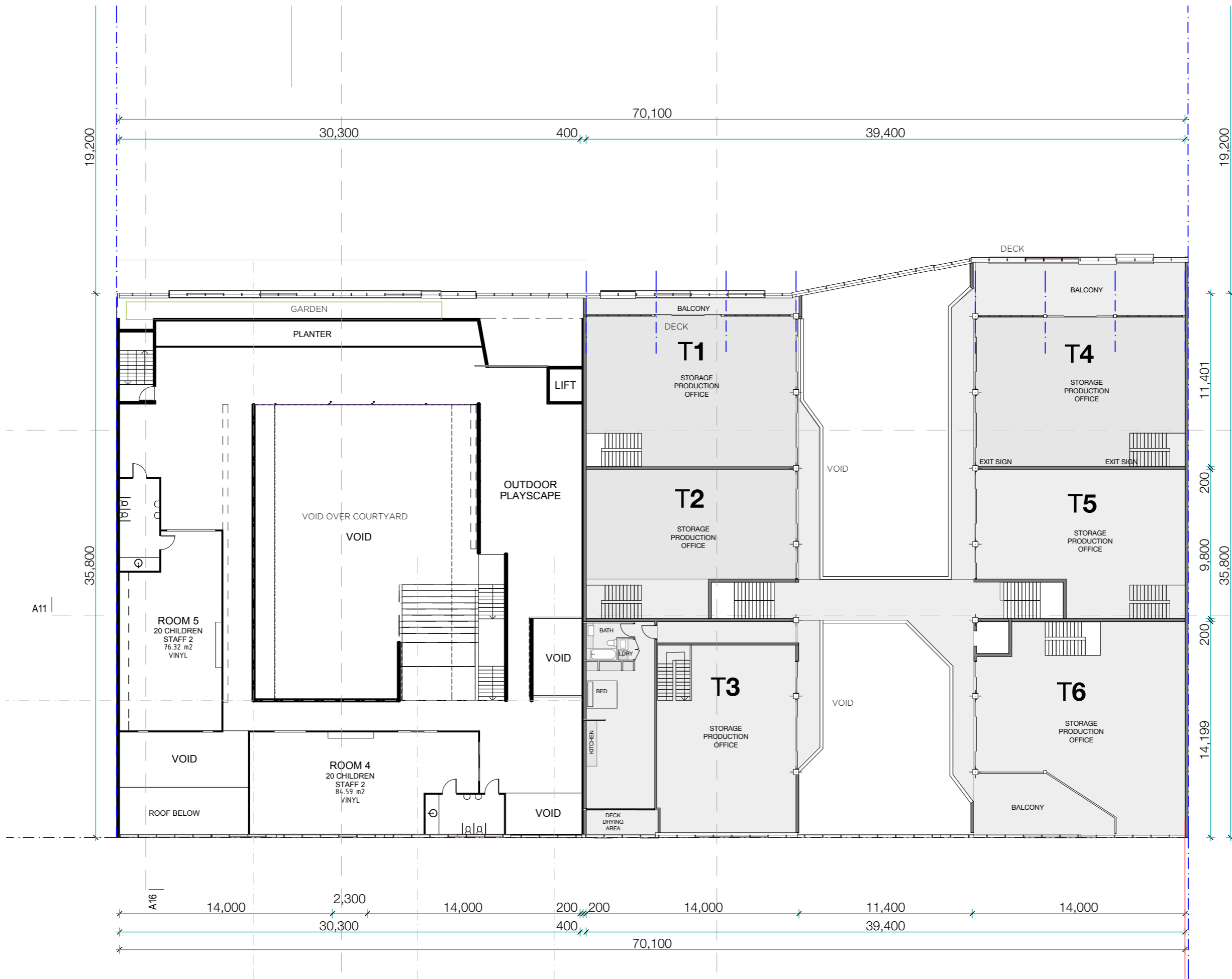
SCALE : 1:500 @A3

LEVEL 01

INDUSTRIAL SPACES	
<b>LEVEL 0</b>	
INDUSTRIAL	680 m <sup>2</sup>
RETAIL	88 m <sup>2</sup>
TAKE AWAY	44 m <sup>2</sup>
WC	40 m <sup>2</sup>
<b>LEVEL 1</b>	
INDUSTRIAL	710 m <sup>2</sup>
MANAGER RESIDENCE	56 m <sup>2</sup>
DECK	140 m <sup>2</sup>
<b>TOTAL GFA</b>	<b>1,562 m<sup>2</sup></b>



SCALE : 1:250 @A3



LEVEL 01  
Scale 1:250

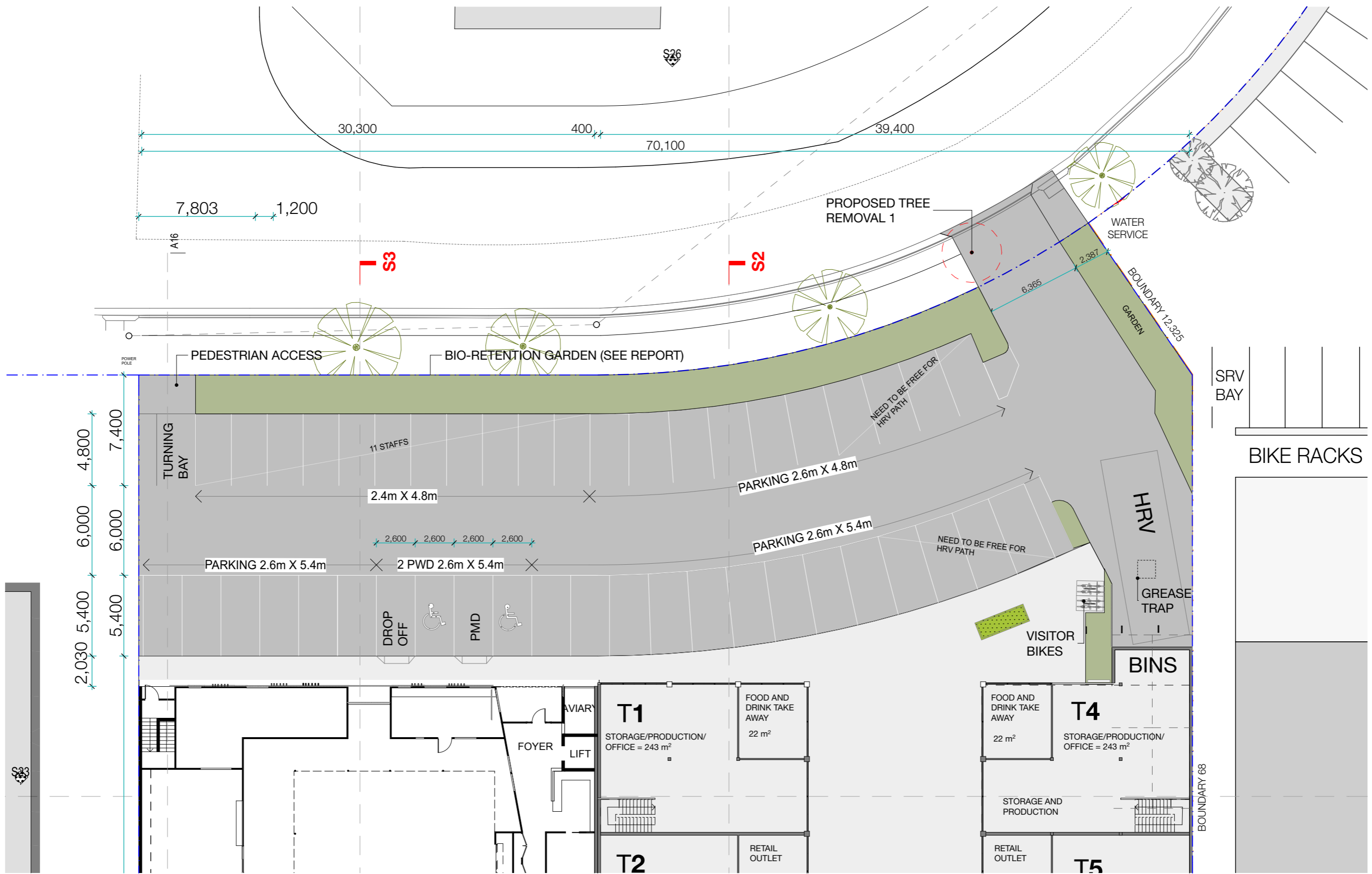


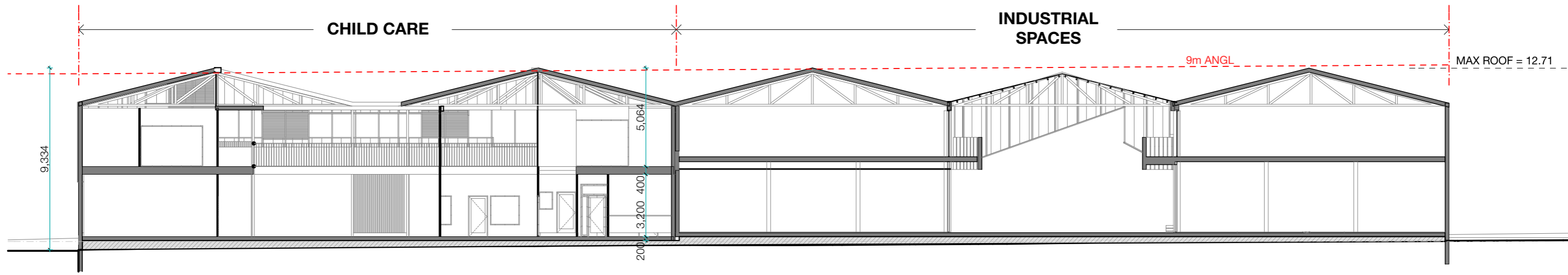
LEVEL 1/ 144 JONSON STREET BYRON BAY | PO BOX 1285 NSW 2481  
F: 02 66809820 | T: 02 66809690 | E: office@harleygraham.com ABN: 85158246003 NSW 7892

All building works to be carried out in accordance with the Building Code of Australia (BCA) and to the satisfaction of the principle certifying authority.  
Builders/Contractors are to verify all dimensions prior to commencement of site work or off-site fabrication.  
Figured dimensions take precedence - do not scale.  
© Copyright HARLEY GRAHAM ARCHITECTS

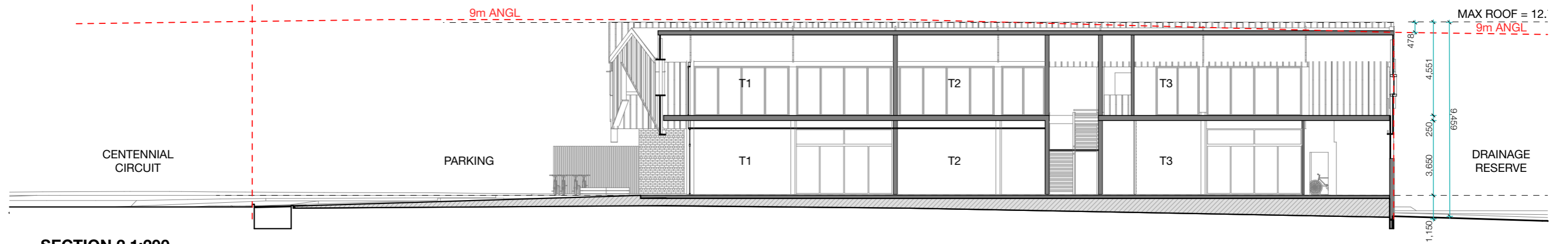
**ISSUE/REVISIONS**  
A DA SET 21.12.16

CLIENT	DENWOL DEVELOPMENTS	ADDRESS	LOT 60 CENTENNIAL CIRCUIT BYRON BAY	APPROVED: HG	JOB NO: HGA048
JOB NAME	MIXED USED BUILDING + CHILD CARE	LOT + DP	LOT 60 SP 835249	SCALE	PAPER
DRAWING	LEVEL 01			1:200	A3 DA 04 A

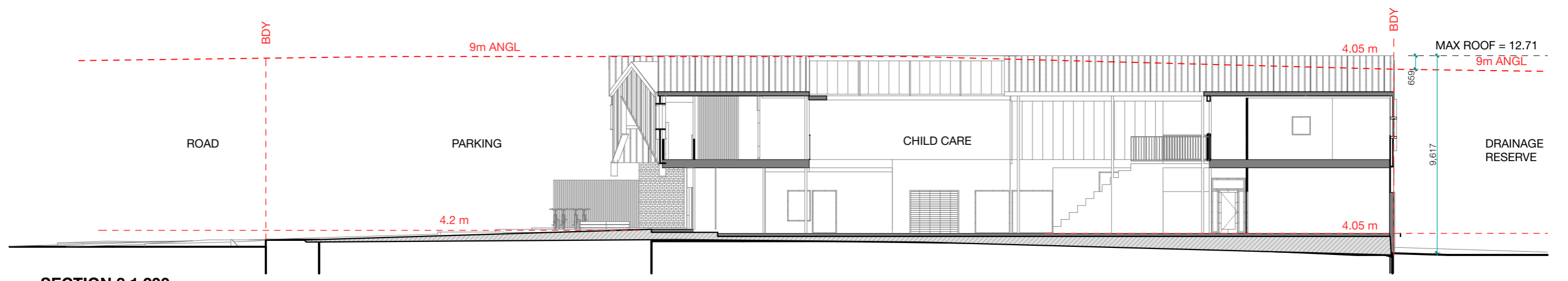




SECTION 1 1:200



SECTION 2 1:200



SECTION 3 1:200

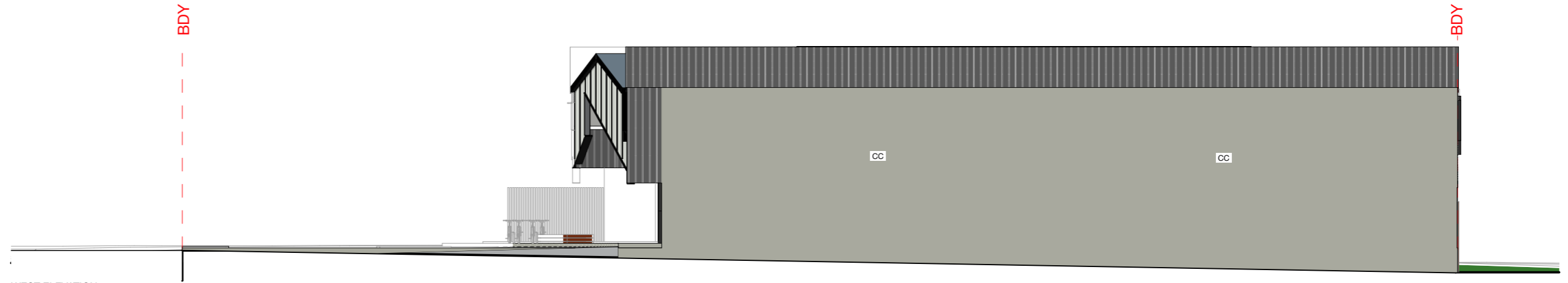


NORTH ELEVATION  
Scale 1:200

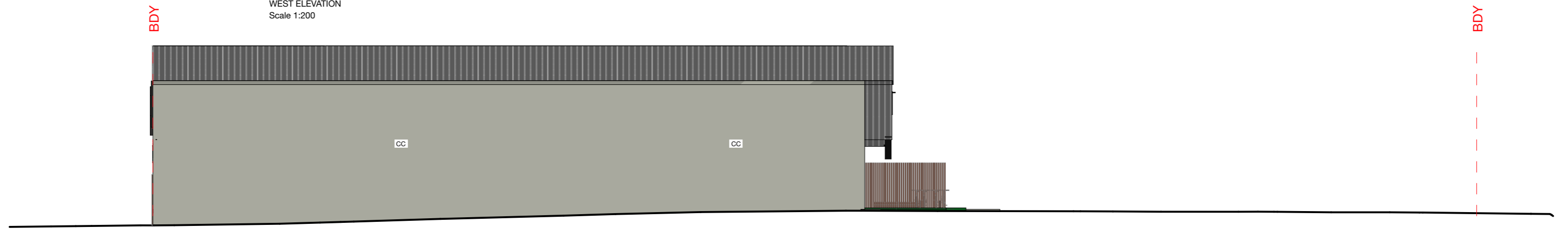


SOUTH ELEVATION  
Scale 1:200

CC	CONCRETE / COLOUR : NATURAL
FC	FIBROCIMENT SHEETING / COLOUR : NATURAL
Da	DAMPALON TRANSLUCENT SHEETING. COLOUR = GREY
GZ	GLAZING / IRONSTONE ALUMINUM FRAMES
Td	ROOF SHEETING : TRIMDEK / COLOUR : IRONSTONE
HW	HARDWOOD BATTENS
BLK	IRONSRTONE PAINTED BLOCKWORK



WEST ELEVATION  
Scale 1:200



EAST ELEVATION  
Scale 1:200

**HGA** X **LOCAL OFFICE ARCHITECTURE**

LEVEL 1/ 144 JONSON STREET BYRON BAY | PO BOX 1285 NSW 2481  
F: 02 66809820 | T: 02 66809690 | E: office@harleygraham.com ABN: 85158246003 NSW 7892

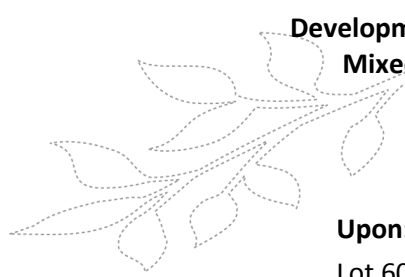
All building works to be carried out in accordance with the Building Code of Australia (BCA) and to the satisfaction of the principle certifying authority.  
Builders/Contractors are to verify all dimensions prior to commencement of site work or off-site fabrication.  
Figured dimensions take precedence - do not scale.  
© Copyright HARLEY GRAHAM ARCHITECTS

ISSUE/REVISIONS	
A	DA SET
	21.12.16

CLIENT	DENWOL DEVELOPMENTS	ADDRESS	LOT 60 CENTENNIAL CIRCUIT BYRON BAY	APPROVED: HG	JOB NO: HGA048
JOB NAME	MIXED USED BUILDING + CHILD CARE	LOT + DP	LOT 60 SP 835249	SCALE	PAPER
DRAWING	ELEVATIONS			1:200	A3
				DA	07
					A

# Engineering Services Report

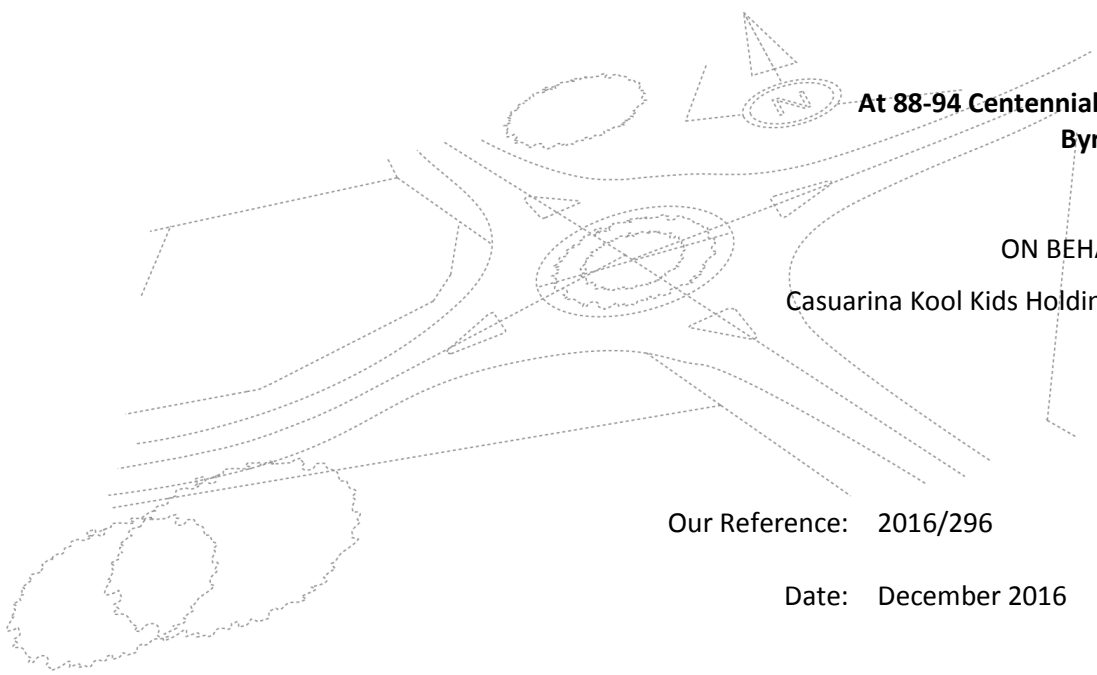
**Development Application for  
Mixed Use Development**



**Upon:**

Lot 60 DP 835249

**At 88-94 Centennial Circuit  
Byron Bay**



ON BEHALF OF:

Casuarina Kool Kids Holding Trust

Our Reference: 2016/296

Date: December 2016

  
**Newton Denny Chapelle**  
CONSULTING SURVEYORS & PLANNERS

Revision History				
REVISION #	DATE	DESCRIPTION	ORIGINATOR	APPROVED
A	01/02/2017	Issued for DA	CP	JN

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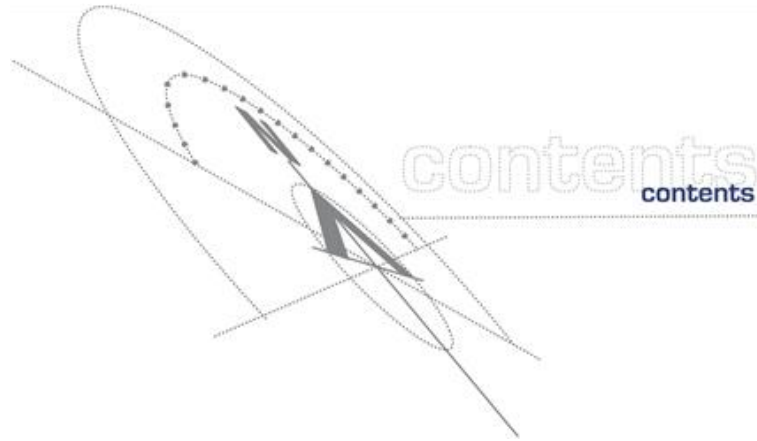
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## Appendices

### Appendix A

#### Concept Engineering Plans:

Drawing Number:	Title:
DA-CIV-01	Bulk Earthworks Plan
DA-CIV-02	Bulk Earthworks Section – West to East
DA-CIV-03	Bulk Earthworks Section – North to South
DA-CIV-04	Bioretention Typical Section
DA-CIV-05	Engineering Services Plan
DA-CIV-06	Erosion & Sediment Control Plan
DA-CIV-07	Stormwater Catchment Plan

## Executive Summary

This Engineering Services Report is to accompany the Development Application seeking approval for a mixed use development comprising of industrial retail (inclusive of retail and takeaway food), managers residence and a childcare centre (78 children). The development is located within the Byron Arts and Industry Estate at 88-94 Centennial Circuit, Byron Bay (Lot 60 DP 835249). The site is approximately 4020m<sup>2</sup> in size.

This report details the engineering design elements required for the development to comply with the relevant approvals, polices, standards and regulations required for a residential development in the Byron Shire Council Local Government Area. The following components have been assessed:

- Bulk Earthworks – The site will be filled to a maximum depth of 1.2m with retaining walls to be provided on the boundaries.
- Stormwater Attenuation – Stormwater attenuation for the 1 in 100 year event has been provided for the site. 112m<sup>3</sup> of attenuation storage will be provided as part of the development to ensure the pre development storm flows from the site are not exceeded.
- Stormwater Quality – MUSIC modelling has demonstrated that the proposed treatment train for the site (including a bioretention system and litter baskets) achieves the pollutant reduction targets.
- Water Reticulation – The site will be connected to the existing water reticulation network within Centennial Circuit
- Sewer Reticulation – Sewer will be provided for the site via the existing vacuum sewer pod within the site.
- Electrical and Telecommunications – The site will be connected to the existing Telstra and Essential Energy infrastructure within Centennial Circuit. The existing power pole stay within the site will be relocated.
- Section 64 Contributions – Water and Sewer Contributions have been estimated at approximately \$415,900 in accordance with the Equivalent Tenement rates provided by Byron Shire Council.

## 1 Introduction

Newton Denny Chapelle has been engaged to prepare an Engineering Services Report to accompany the Development Application a mixed use development comprising of industrial retail (inclusive of retail and takeaway food), managers residence and a childcare centre, located at 88 – 94 Centennial Circuit (Lot 60 DP 835249) Byron Bay. The total development site is approximately 4020m<sup>2</sup>.



Figure 1-1 – Site Location (Source: nearmap)

## 2 Report Scope

This report focuses on providing sufficient concept engineering concepts/details to facilitate a thorough understanding of the proposed works. The works covered by this report include new infrastructure for stormwater (quality and attenuation), earthworks and servicing provisions for the proposed development.

It is recognised that a subsequent submission of detailed (construction certificate) engineering design plans and specifications are required to be made before final approval of the development is granted by Byron Shire Council. At this Stage any minor amendments of the design elements proposed will be addressed to meet any of the Council's requirements.

### 2.1 Reference Documents

The following documents have been referenced in the preparation of this report:

- Northern Rivers Local Government, *Development Design Manual*
- Byron Shire Council, *Comprehensive Guidelines for Stormwater Management*
- Byron Shire Council, *Development Control Plan 2014 – Chapter D5 – Industrial Development*
- Lismore City Council, *Development Control Plan – Water Sensitive Design*

## 3 Site Description

### 3.1 Existing Site Conditions

The site primarily consists of cleared land and forms part of the Byron Bay arts and industrial estate, refer Figure 3-1.



**Figure 3-1 - View looking South to North Across the Site**

The subject land is gently sloping with a minor ridgeline running east to west across the site from the eastern boundary. This ridgeline divides the site into 3 catchments flowing to the north, south and west boundaries. The maximum slope across the site is less than 2%. The areas surrounding the site can be summarised as:

- Northern Boundary – Is formed by Centennial Circuit.
- Eastern Boundary – Is currently formed by a vacant industrial lot. It is noted that there is currently a development application approved for the construction of a brewery on the site
- Southern Boundary – Is formed by a drainage reserve adjacent to Ewingsdale Road. This reserve contains an existing drainage swale that drains east to west.
- Western Boundary – Is formed by and existing industrial development.

### 3.2 Description of Proposed Development

The proposed development will consist of:

- 78 place child care centre (comprising 78 children and 12 staff)
- 1,390m<sup>2</sup> of Industrial floor area
- 88m<sup>2</sup> of retail area
- 44m<sup>2</sup> of take way shops
- 1 managers residence

The proposed development areas outlined above are split over two levels with access to the development from Centennial Circuit.

## 4 Bulk Earthworks

The site will be shaped to maintain the existing crest running east to west across the site. To create suitable building pads and to enable the connection of the stormwater system to existing Council infrastructure the site will be filled to achieved the finished levels shown on the Bulk Earthwork Plan (attached in Appendix A). Retaining structures will be required along the eastern, western and southern boundaries with a maximum height of 1.2m along the southern and western boundaries expected.

The works are expected to require 1,650m<sup>3</sup> of fill material to a maximum depth of 1.2m adjacent to the retaining structures.

## 5 Stormwater Management

The Stormwater generated by the development will be collected and treated prior to discharge from the site. The proposed stormwater system has been designed in accordance with the *Byron Shire Council – Comprehensive Guidelines for Stormwater Management*.

Stormwater attenuation has been provided to ensure that there is no increase in post development flows leaving the site for a range of events up to the 100 year ARI. This in in accordance with the requirements outlined in the *Byron Shire Council – Comprehensive Guidelines for Stormwater Management* and the *NRLG Development and Design Manual*.

In the absence of Byron Shire stormwater quality targets the targets outlined in the *Lismore Development Control Plan – Water Sensitive Design* (refer Figure 5-1) have been adopted for the development.

Stormwater Quality		
Total Suspended Solids	75% reduction in the mean annual load compared to baseline	Minimise the risk of water quality degradation in downstream waterways and thereby protect aquatic ecosystems
Total Phosphorus	65% reduction in the mean annual load compared to baseline	
Total Nitrogen	40% reduction in the mean annual load compared to baseline	
Gross Pollutants	90% reduction in the mean annual load compared to baseline	

Figure 5-1 - LCC Stormwater Quality Targets

### 5.1 Stormwater Quality

The stormwater generated by the development will be treated prior to discharge to achieve the pollutant reduction targets outlined in Figure 5-1. The site has been split into 3 post development catchments (also refer to the Stormwater Catchment Plan attached in Appendix A):

- The front Carpark draining north
- The Child Care Centre draining south
- The Industrial area draining south

The treatment train for each catchment is summarised in Table 5-1. Figure 5-1

**Table 5-1 - Summary of Proposed Treatment Train**

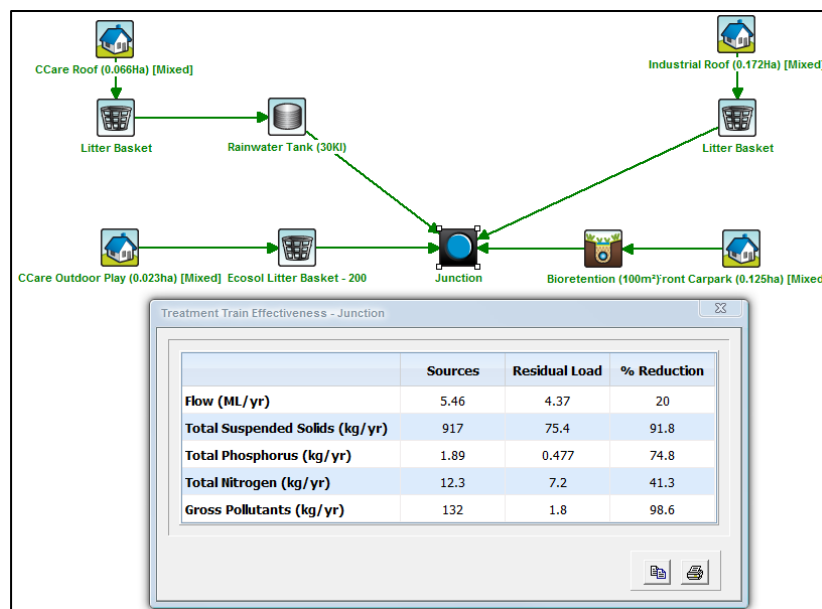
Catchment	Treatment Train
Front Carpark	Bioretention (100m <sup>2</sup> )
Industrial Area	Litter Basket
Child Care Centre	Litter Basket Rainwater Re-use (30kl)

It is important to note that the bioretention system for the front carpark has been oversized for the catchment area to compensate for other areas of the site. Rainwater re-use for the Child Care Centre has been modelled as 30% of the expected sewer demand of the centre. The sewer generation rate for the site has been based on the daily sewer ET of 590 l/day from *BSC Policy 13/005 – Water and Sewer Equivalent Tenements* (refer Table 5-2).

**Table 5-2 - Childcare Centre Rainwater Re-use**

Area	Sewer ET Unit rate	Unit of Measure	Qty	Total Daily Discharge to Sewer (l)	Re-use Percentage	Reuse amount (kl/day)
Childcare Centre	0.1	person	100	5900	30%	1.77

The MUSIC Model for the site presented in Figure 5-2 demonstrates that the proposed treatment train is able to achieve the pollutant reduction targets for the site.



**Figure 5-2 - MUSIC Model**

## 5.2 Stormwater Attenuation

Stormwater generated by the development will be attenuated prior to discharge to ensure the post development flows do not exceed the pre development flows generated by the site. The pre and post development catchments are shown on the Stormwater Catchment Plan attached in Appendix

A. The pre development site primarily drains into two catchments being north towards Centennial Circuit and south towards into the drainage swale beside Ewingsdale Road. The post development site also drains into two primary catchments with the carpark area draining north to Centennial Circuit and the Industrial area and Child Care centre draining south to Ewingsdale Road.

In accordance with Section 12 of the Northern Rivers Handbook of Stormwater Drainage Design the site has been modelled using the ILSAX method via the Drains software program. The 5, 20 and 100 year storm events have been checked to ensure the pre development flows are not exceeded.

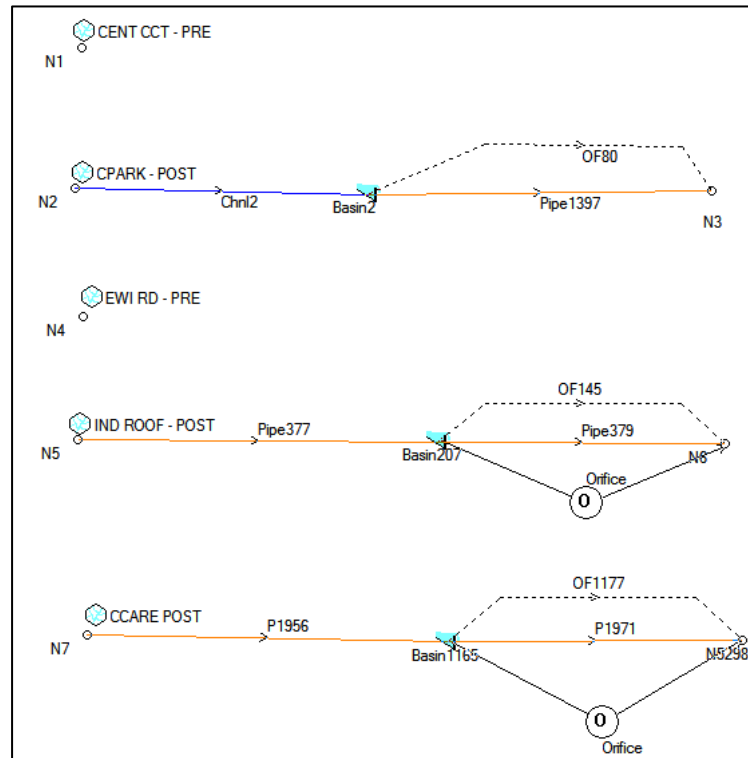


Figure 5-3 - Excerpt from Drains Model

Each catchment has been provided with attenuation storage as outlined in Table 5-3.

Table 5-3 - Attenuation Storage Volumes

Catchment	Attenuation Storage Required
Northern Catchment	24m <sup>3</sup>
Southern Catchment (Child Care)	28m <sup>3</sup>
Southern Catchment (Industrial)	60m <sup>3</sup>

The results from the Drains model are attached in Appendix B and are summarised below in Table 5-4.

Table 5-4 - Summary of Drains Results

	Pre Development (m <sup>3</sup> /s)			Post Development (m <sup>3</sup> /s)		
	5 yr	20 yr	100 yr	5 yr	20 yr	100 yr
Northern Catchment	0.051	0.069	0.087	0.040	0.043	0.077
Southern Catchment	0.067	0.091	0.115	0.067	0.086	0.101

As shown above the attenuation storage proposed for the site is adequate to ensure that the post development stormwater discharges do not exceed the pre development case.

## **6 Sewer Services**

The site will be connected to the existing vacuum sewer network within the greater industrial estate. The point of connection will be via the existing vacuum sewer pod stub line located within the site. The access lid to this pod will be upgraded to a trafficable lid as necessary.

## **7 Water Reticulation**

The site will be connected to the existing water reticulation network within Centennial Circuit. Should the stub line provided to the site be missing or redundant a new feed from the water main on the northern side of Centennial Circuit will be installed to service the site.

## **8 Electrical and Telecommunication Services**

The site has two existing connection points to the Telstra network located in the middle of the northern boundary. It is expected that the electrical feed for the site will come from the existing overhead supply network within Centennial Circuit via an underground pipe from the existing pole in front of the site. The works will require the relocation of the existing stay from this power pole outside of the site boundaries.

## **9 Sediment and Erosion Control Plan**

During construction sediment and erosion control measures will be installed to ensure the loss of soil from the site is minimised. Refer to Appendix A – Erosion and Sediment Control Plan for the proposed site control measures. Temporary sediment and erosion control measures such as silt fencing are the responsibility of the Contractor and will be installed prior to construction.

## **10 Section 64 Contributions**

The water and sewer contributions for the proposed development have been calculated based on the Equivalent Tenement (ET) rates outlined in the Byron Shire Council Policy 13/005 Water and Sewer Equivalent Tenements. The total water and sewer ET's expected for the site are outlined in Table 10-1.

**Table 10-1 - Water and Sewer Equivalent Tenements**

Type of Use	Water ET	Sewer ET	Unit of Measure	Quantity	Total Water ET's	Total Sewer ET's
Managers Residence	0.40	0.50	Dwelling	1	0.4	0.5
Child Care Centre	0.06	0.10	Person	100	6	10
Light Industrial (Mixed use)	0.003	0.003	m <sup>2</sup>	1390	4.17	4.17
Take Away / Fast Food	0.02	0.02	m <sup>2</sup>	44	0.88	0.88
Retail	0.003	0.003	m <sup>2</sup>	88	0.264	0.264
Public Amenities	0.40	0.63	per WC	7	2.8	4.41
Existing Site Entitlement	-1.00	-1.00		1	-1	-1
				<b>Totals:</b>	<b>13.514</b>	<b>19.224</b>

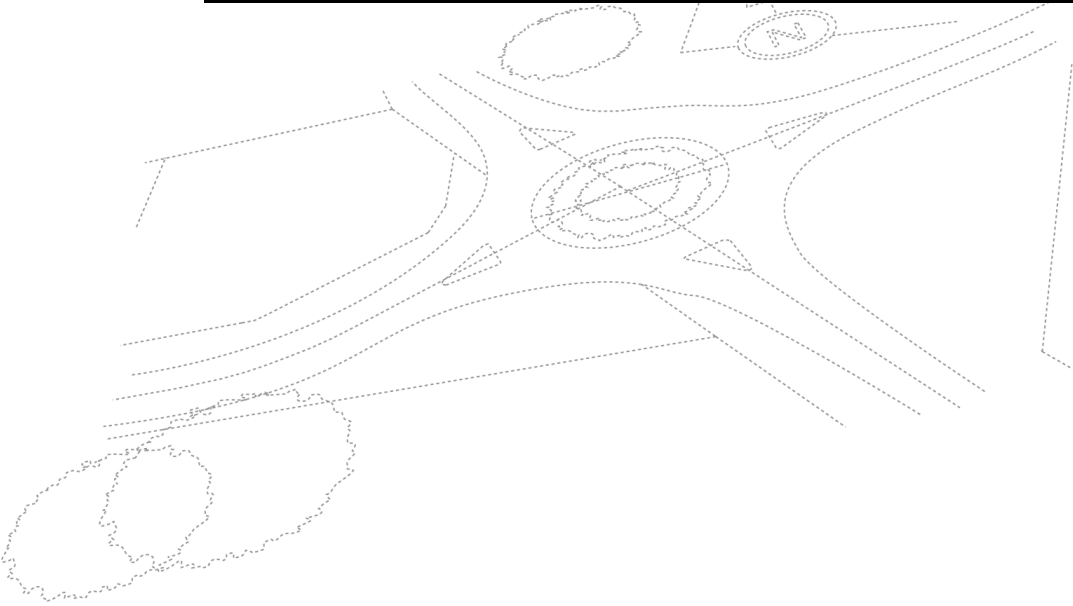
Based on the contribution rates in the Byron Shire Council, *Fees and Charges 2016-2017* the total Section 64 contributions for the site are outlined in Table 10-2.

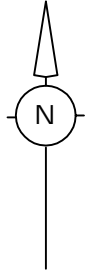
**Table 10-2 - Section 64 Contributions**

Contribution	Qty	Rate (2015/16)	Amount
Water - Byron Bay	13.514	\$ 3,575.00	\$ 48,312.55
Water - Rous	13.514	\$ 8,256.00	\$ 111,571.58
Sewer - Byron Bay	19.224	\$ 13,318.00	\$ 256,025.23
		<b>Total:</b>	<b>\$ 415,909.37</b>

# Appendix A Concept Engineering Plans

Drawing Number:	Title:
DA-CIV-01	Bulk Earthworks Plan
DA-CIV-02	Bulk Earthworks Section – West to East
DA-CIV-03	Bulk Earthworks Section – North to South
DA-CIV-04	Bioretention Typical Section
DA-CIV-05	Engineering Services Plan
DA-CIV-06	Erosion & Sediment Control Plan
DA-CIV-07	Stormwater Catchment Plan





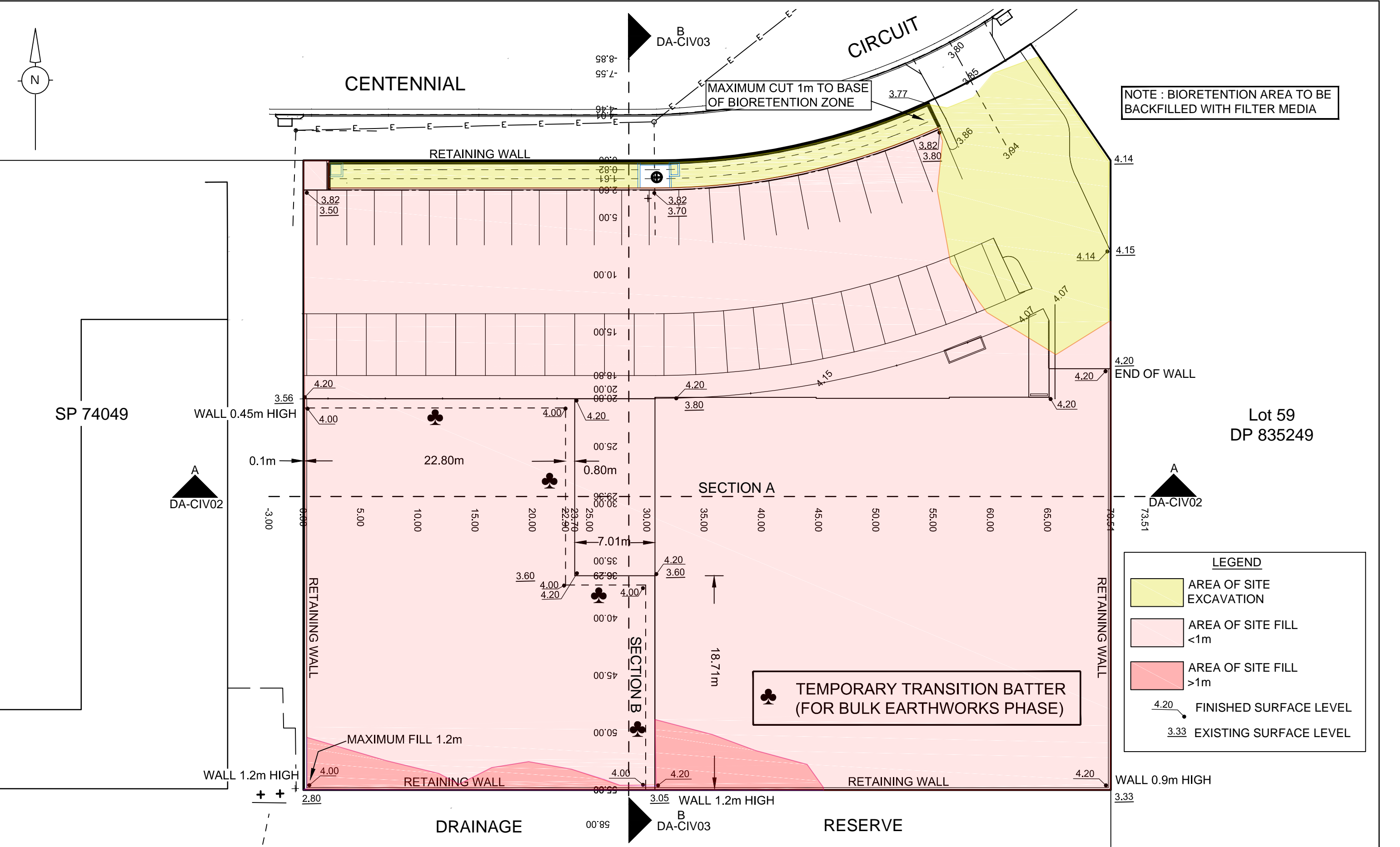
CENTENNIAL

CIRCUIT

NOTE : BIORETENTION AREA TO BE BACKFILLED WITH FILTER MEDIA

B DA-CIV03

MAXIMUM CUT 1m TO BASE OF BIORETENTION ZONE



**LEGEND**

- AREA OF SITE EXCAVATION
- AREA OF SITE FILL <1m
- AREA OF SITE FILL >1m
- 4.20 FINISHED SURFACE LEVEL
- 3.33 EXISTING SURFACE LEVEL

SP 74049

A DA-CIV02

Lot 59 DP 835249

A DA-CIV02

SECTION A

SECTION B

TEMPORARY TRANSITION BATTER (FOR BULK EARTHWORKS PHASE)

WALL 1.2m HIGH

MAXIMUM FILL 1.2m

DRAINAGE

B DA-CIV03

RESERVE

WALL 0.9m HIGH

Rev	Date	Amendment
A		
B		
C		
D		
E		
F		
G		
H		

Design:PS / CP  
 Survey:CANTY'S  
 Drawn:PS  
 Datum:AHD  
 Scale : 1:300@A3

**NDC**

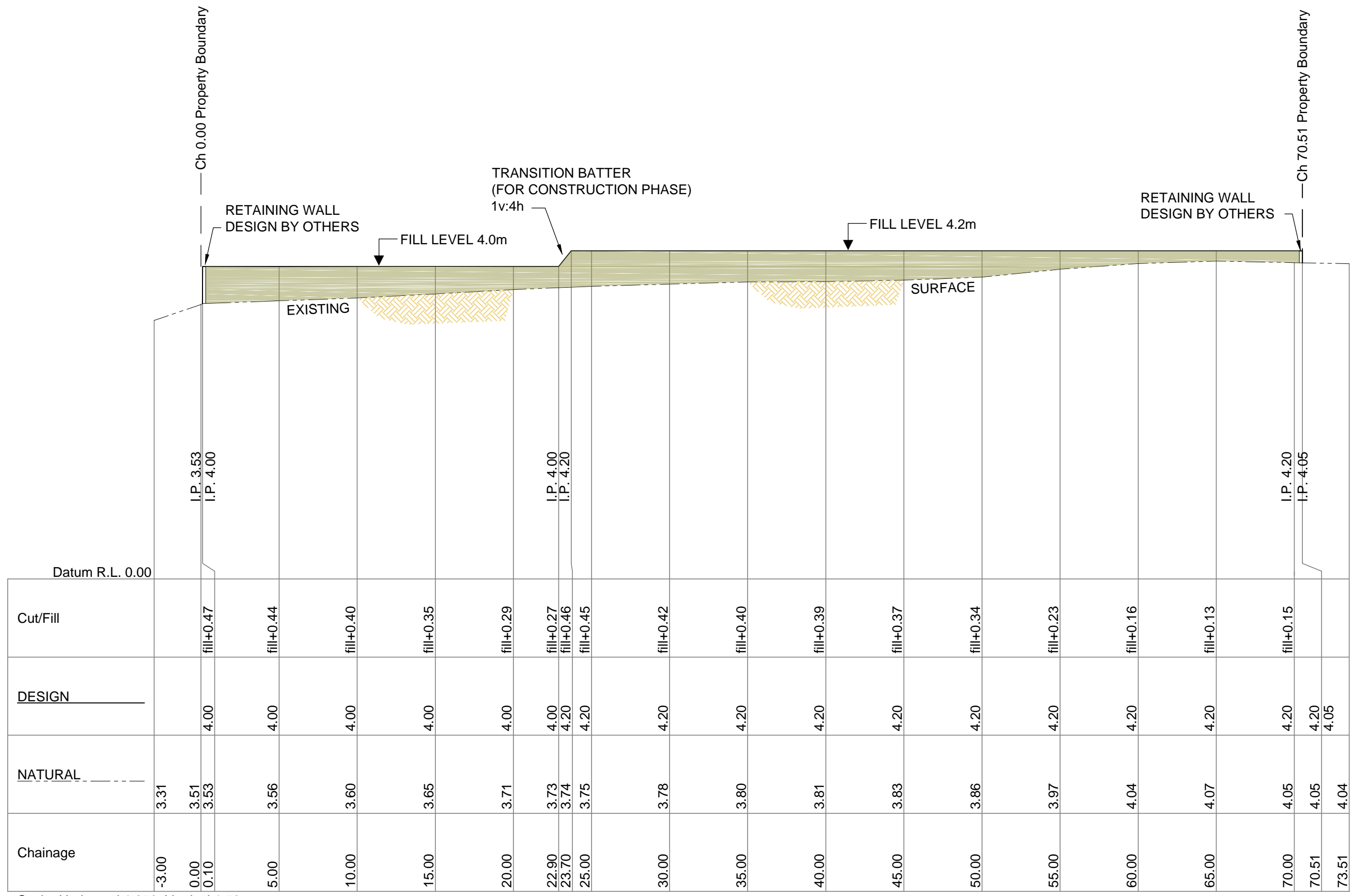
**Newton Denny Chapelle**  
 Surveyors Planners Engineers

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 Casino  
 100 Barker St. Casino 2470  
 T & F : 66 625000

Client:  
**MIXED USE BLD / CHILD CARE**  
**88-94 CENTENNIAL CIRCUIT**  
**BYRON BAY**

Project : Date: 18/01/2017  
**BULK EARTHWORKS PLAN**  
 Ref:16/296 DA-CIV 01



Scale Horizontal 1:250 Vertical 1:50

**SECTION A WEST TO EAST**

Rev	Date	Amendment
A		
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D		
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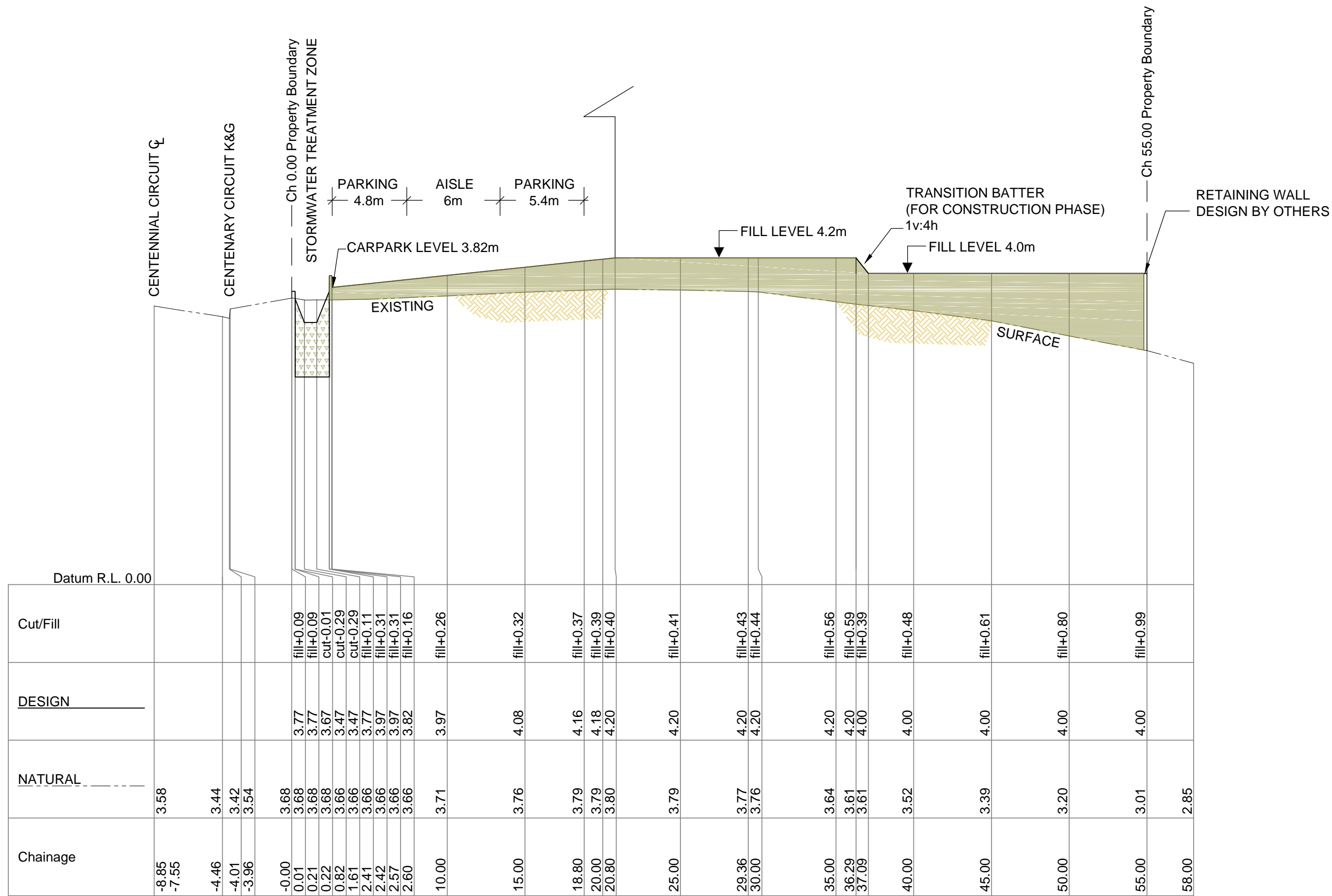
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 Survey:CANTY'S  
 Drawn:PS  
 Datum:AHD  
 Scale :As Shown

  
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Client:  
**MIXED USE BLD / CHILD CARE**  
**88-94 CENTENNIAL CIRCUIT**  
**BYRON BAY**

Project : Date: 18/01/2017  
**BULK EARTHWORKS SECTION**  
**WEST TO EAST**  
 Ref:16/296 DA-CIV 02




Datum R.L. 0.00

Chainage	NATURAL	DESIGN	Cut/Fill
-8.85	3.58		
-7.55			
-4.46	3.44		
-4.01	3.42		
-3.96	3.54		
-0.00	3.68		
0.01	3.68	3.77	fill+0.09
0.21	3.68	3.77	fill+0.09
0.22	3.68	3.67	cut-0.01
0.82	3.66	3.47	cut-0.29
1.61	3.66	3.47	cut-0.29
2.41	3.66	3.77	fill+0.11
2.42	3.66	3.97	fill+0.31
2.57	3.66	3.97	fill+0.31
2.60	3.66	3.82	fill+0.16
10.00	3.71	3.97	fill+0.26
15.00	3.76	4.08	fill+0.32
18.80	3.79	4.16	fill+0.37
20.00	3.79	4.18	fill+0.39
20.80	3.80	4.20	fill+0.40
25.00	3.79	4.20	fill+0.41
29.36	3.77	4.20	fill+0.43
30.00	3.76	4.20	fill+0.44
35.00	3.64	4.20	fill+0.56
36.29	3.61	4.20	fill+0.59
37.09	3.61	4.00	fill+0.39
40.00	3.52	4.00	fill+0.48
45.00	3.39	4.00	fill+0.61
50.00	3.20	4.00	fill+0.80
55.00	3.01	4.00	fill+0.99
58.00	2.85		

Scale Horizontal 1:250 Vertical 1:50

Rev	Date	Amendment
A		
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Design:PS / CP  
 Survey:CANTY'S  
 Drawn:PS  
 Datum:AHD  
 Scale :As Shown

  
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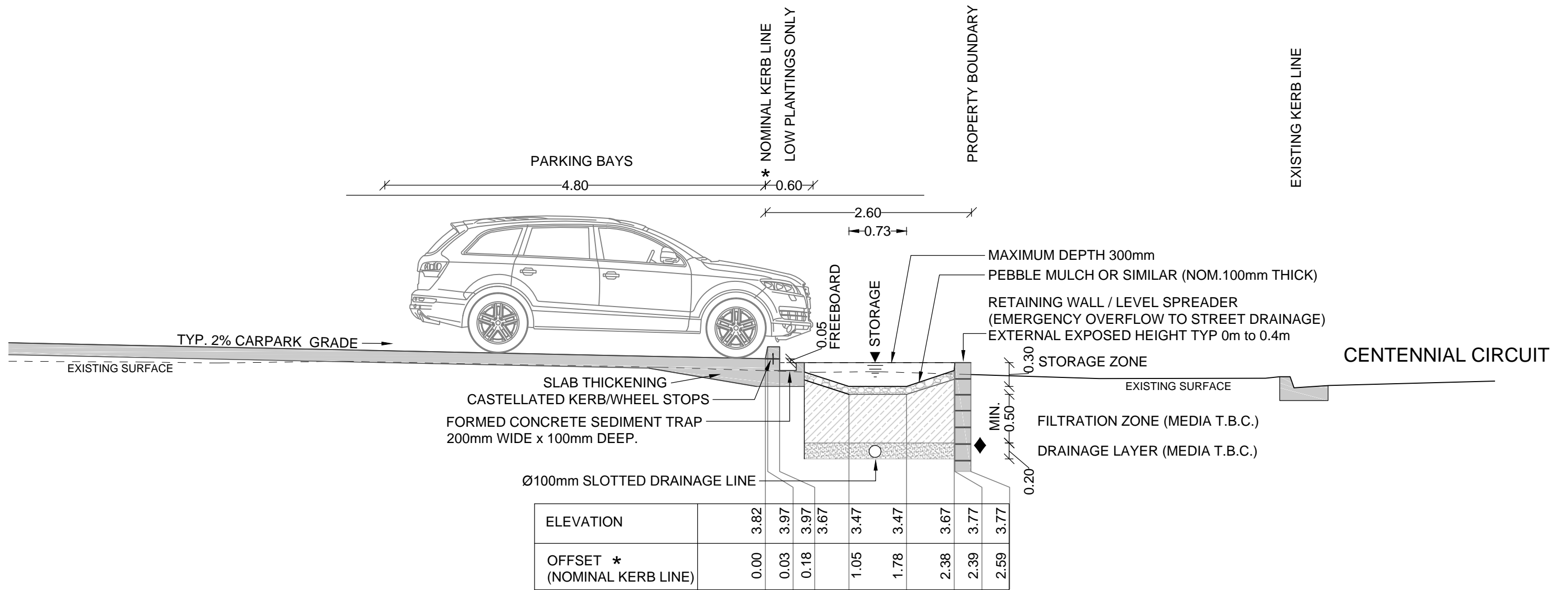
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 Casino  
 100 Barker St. Casino 2470  
 T & F : 66 625000

Client:  
**MIXED USE BLD / CHILD CARE**  
**88-94 CENTENNIAL CIRCUIT**  
**BYRON BAY**

Project :  
**BULK EARTHWORKS SECTION**  
**NORTH TO SOUTH**  
 Ref:16/296

Date: 18/01/2017  
**DA-CIV 03**

◆ DEPTH OF RETAINING WALL TO BE DETERMINED BY STRUCTURAL ENGINEER




TYPICAL SECTION THROUGH BIO RETENTION TREATMENT AREA

NOT FOR CONSTRUCTION

Rev	Date	Amendment
A		
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E		
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G		
H		

Design:PS / CP  
 Survey:CANTY'S  
 Drawn:PS  
 Datum:AHD  
 Scale : N.T.S.

  
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 100 Barker St. Casino 2470  
 T & F : 66 625000

Client:  
**MIXED USE BLD / CHILD CARE**  
**88-94 CENTENNIAL CIRCUIT**  
**BYRON BAY**

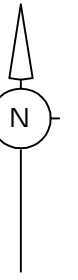
Project :  
**BIORETENTION TYPICAL SECTION**  
 Ref:16/296  
 Date: 18/01/2017  
**DA-CIV 04**

STORMWATER CONNECTION TO EXISTING PIT  
NEW JUNCTION PIT REQUIRED TO AVOID  
CONFLICT WITH POWER POLE. Ø225 uPVC OUTLET

ELECTRICAL CONNECTION  
BY OTHERS

CONNECT TO EXISTING  
WATER SERVICE

CONSTRUCT NRLG COMPLIANT  
CONCRETE DRIVEWAY



CENTENNIAL

CIRCUIT

Ex. SW PIT

PEDESTRIAN ACCESS

O/H POWER LINE

Ex. TELSTRA PIT

CONNECT TO EXISTING  
VACUUM SEWER SERVICE

RELOCATE ELECTRICAL  
POLE STAY

SP 74049

Lot 59  
DP 835249

RETAINING WALL

RETAINING WALL

PROVIDE RAINWATER TANKS  
- 28ki ATTENUATION STORAGE  
- 30ki REUSE \*

PROVIDE RAINWATER TANKS  
- 60ki ATTENUATION \*

STORMWATER OVERFLOW OUTLET.  
Ø225 uPVC TO DRAINAGE RESERVE

STORMWATER OVERFLOW OUTLET.  
Ø225 uPVC TO DRAINAGE RESERVE



RETAINING WALL

RETAINING WALL

DRAINAGE


RESERVE

LEGEND

-  BIORETENTION AREA
-  NEW EXTERNAL DRIVEWAY
- \* REFER TO ARCHITECTURAL PLANS FOR LOCATION AND TYPE OF TANK

Rev	Date	Amendment
A		
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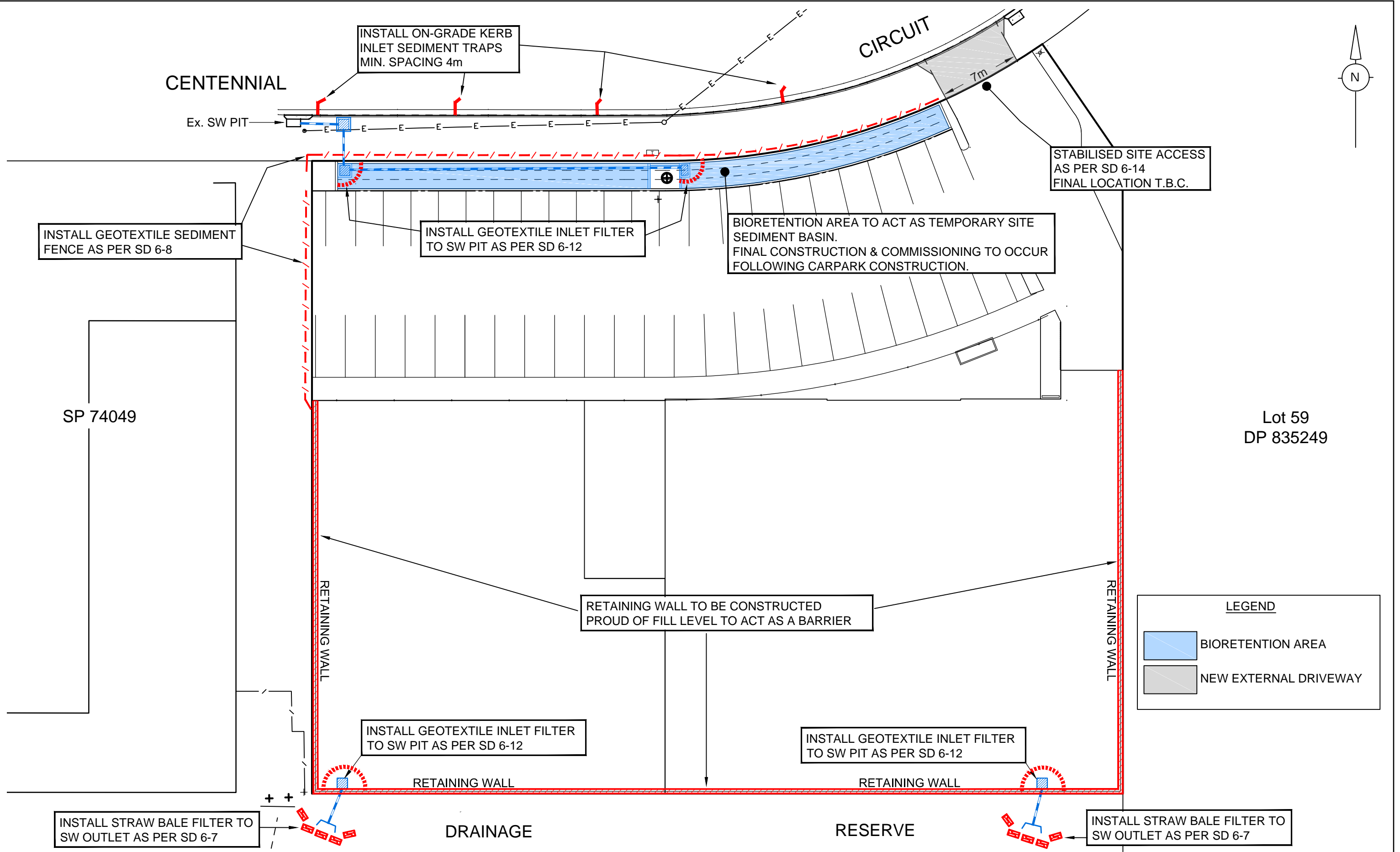
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Survey:CANTY'S  
Drawn:PS  
Datum:AHD  
Scale : 1:300@A3

  
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Client:  
**MIXED USE BLD / CHILD CARE**  
**88-94 CENTENNIAL CIRCUIT**  
**BYRON BAY**

Project :  
**ENGINEERING SERVICES PLAN**  
Date: 18/01/2017  
Ref:16/296  
**DA-CIV 05**



INSTALL GEOTEXTILE SEDIMENT FENCE AS PER SD 6-8

INSTALL ON-GRADE KERB INLET SEDIMENT TRAPS MIN. SPACING 4m

INSTALL GEOTEXTILE INLET FILTER TO SW PIT AS PER SD 6-12

BIORETENTION AREA TO ACT AS TEMPORARY SITE SEDIMENT BASIN. FINAL CONSTRUCTION & COMMISSIONING TO OCCUR FOLLOWING CARPARK CONSTRUCTION.

STABILISED SITE ACCESS AS PER SD 6-14 FINAL LOCATION T.B.C.

RETAINING WALL TO BE CONSTRUCTED PROUD OF FILL LEVEL TO ACT AS A BARRIER

INSTALL GEOTEXTILE INLET FILTER TO SW PIT AS PER SD 6-12

INSTALL GEOTEXTILE INLET FILTER TO SW PIT AS PER SD 6-12

INSTALL STRAW BALE FILTER TO SW OUTLET AS PER SD 6-7

INSTALL STRAW BALE FILTER TO SW OUTLET AS PER SD 6-7

**LEGEND**

- BIORETENTION AREA
- NEW EXTERNAL DRIVEWAY

Rev	Date	Amendment
A		
B		
C		
D		
E		
F		
G		
H		

Design:PS / CP  
 Survey:CANTY'S  
 Drawn:PS  
 Datum:AHD  
 Scale : 1:300@A3

**NDC**

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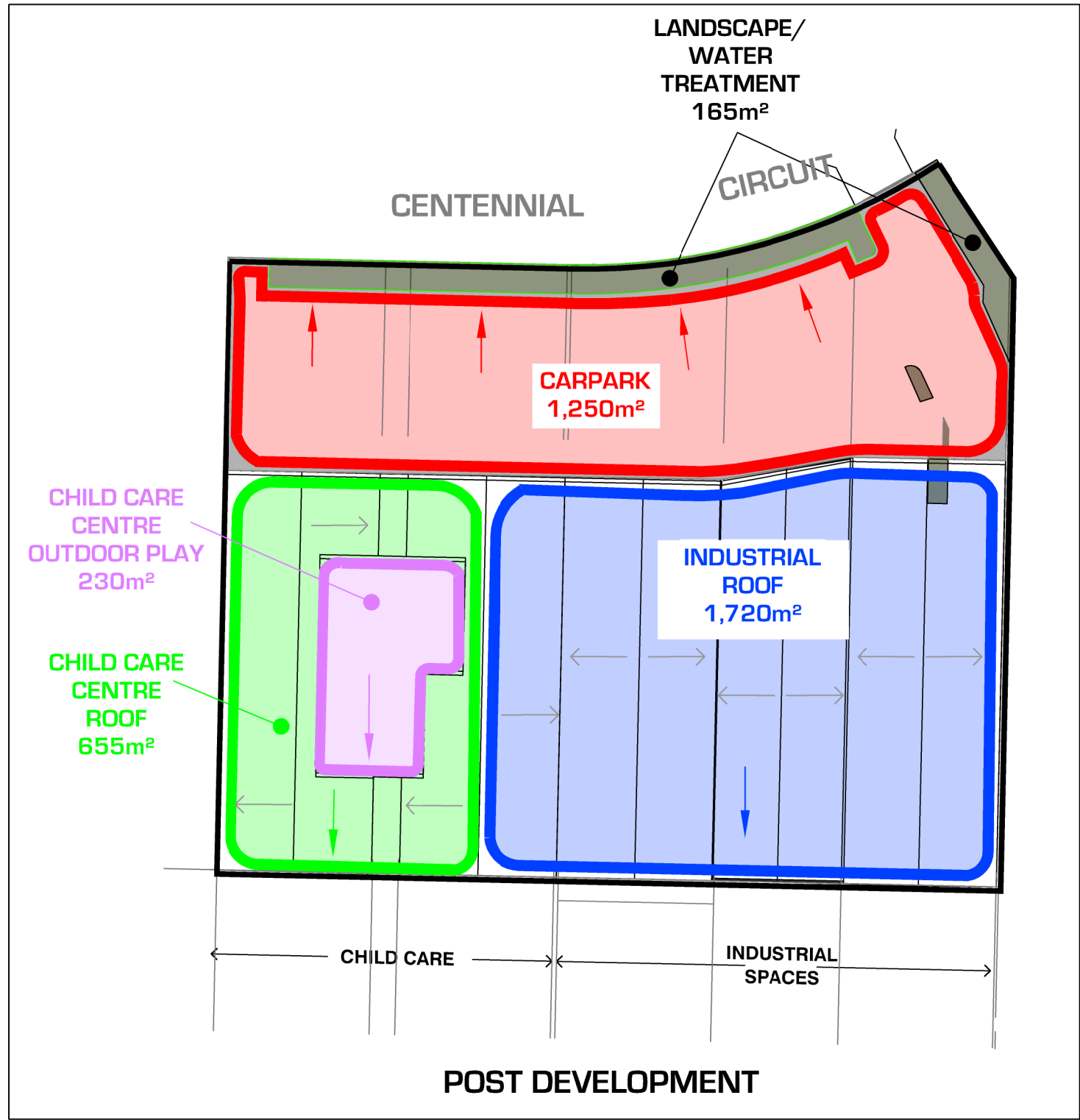
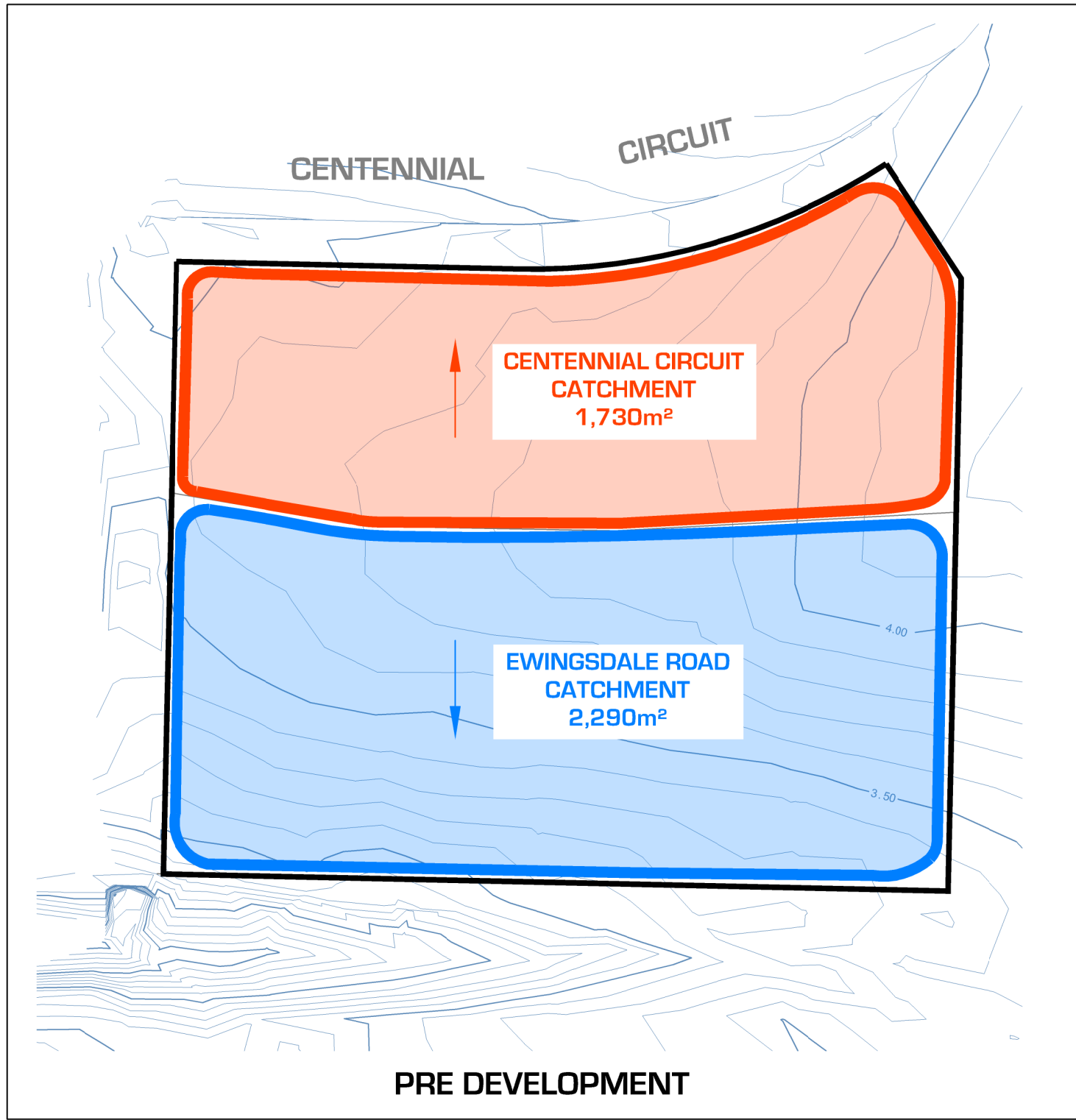
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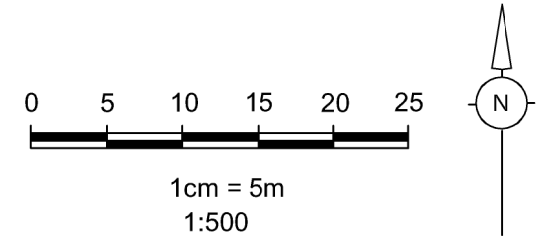
Client:  
**MIXED USE BLD / CHILD CARE**  
**88-94 CENTENNIAL CIRCUIT**  
**BYRON BAY**

Project :  
**EROSION & SEDIMENT CONTROL PLAN**

Date: 18/01/2017  
 Ref:16/296  
**DA-CIV 06**



**NOTE:**  
 This preliminary layout has been completed in accordance with the instructions provided by Casuarina Kook Kids Holding Trust. In this respect preliminary desktop data has been used to form this layout. The final layout is subject to the completion of a detailed survey & engineering plans. Accordingly, the conclusions reached within this report may be modified by the author upon the completion of the final design plans & site inspection. Newton Denny Chapelle accepts no responsibility for any loss or damage suffered, however so arising, to any person or corporation who may use or rely on this report.



REV	DATE	AMENDMENT
A		
B		
C		
D		
E		

SOURCE PLAN: N/A  
 k:\jobs\2016\16296 - kool kids\engineering\reports\stormwater\16296 - kool kids: catchments.dwg - catchments

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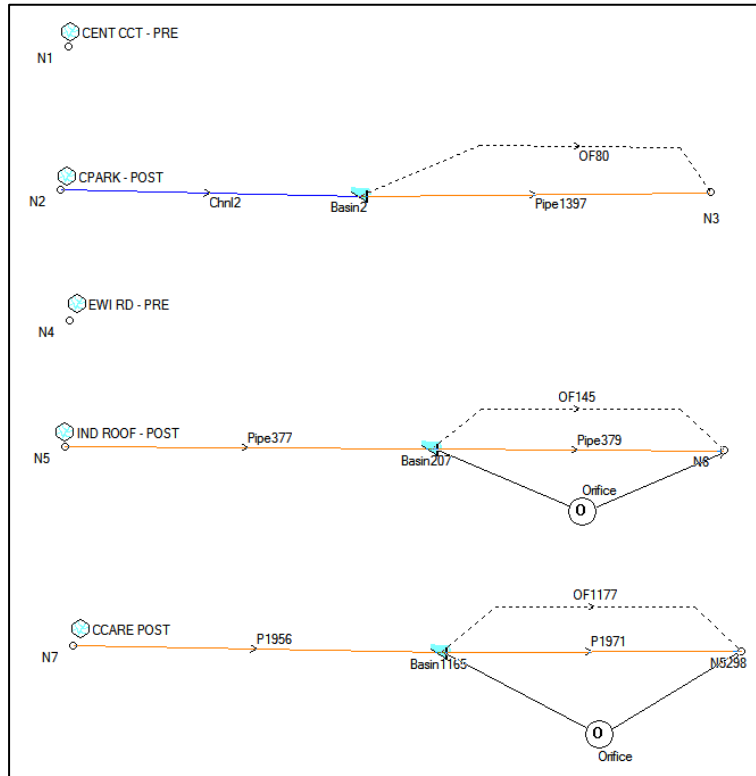
**DA-CIV-07**  
**STORMWATER CATCHMENT PLAN**  
 CLIENT: CASUARINA KOOL KIDS HOLDING TRUST  
 LOCATION: LOT 60 DP835249  
 88 - 94 CENTENNIAL CCT  
 BYRON BAY NSW  
 DATE: 10.01.16 REF: 16/296  
 SCALE: 1: 500 @ A3 DRAWN: bk

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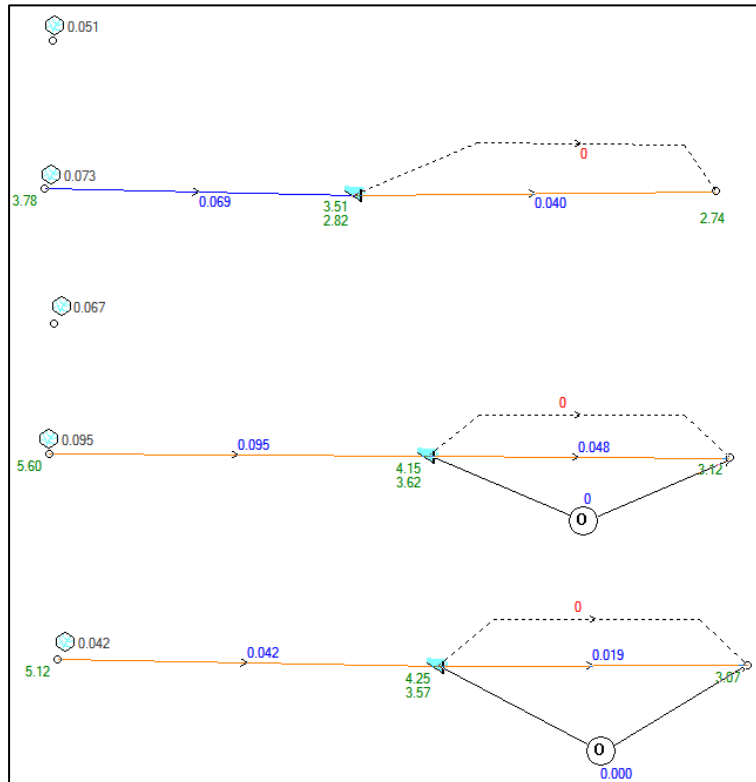
# Appendix B Drains Results



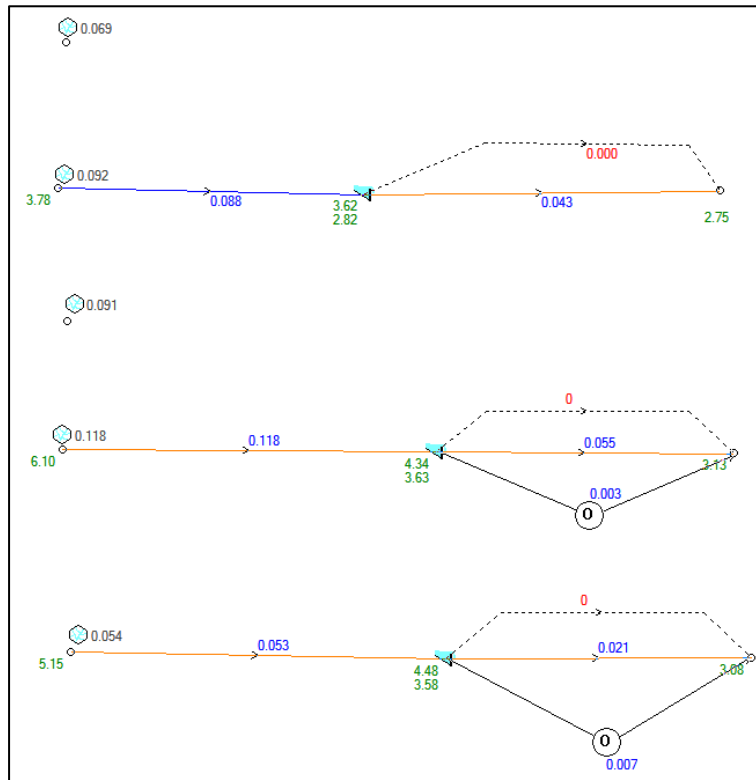
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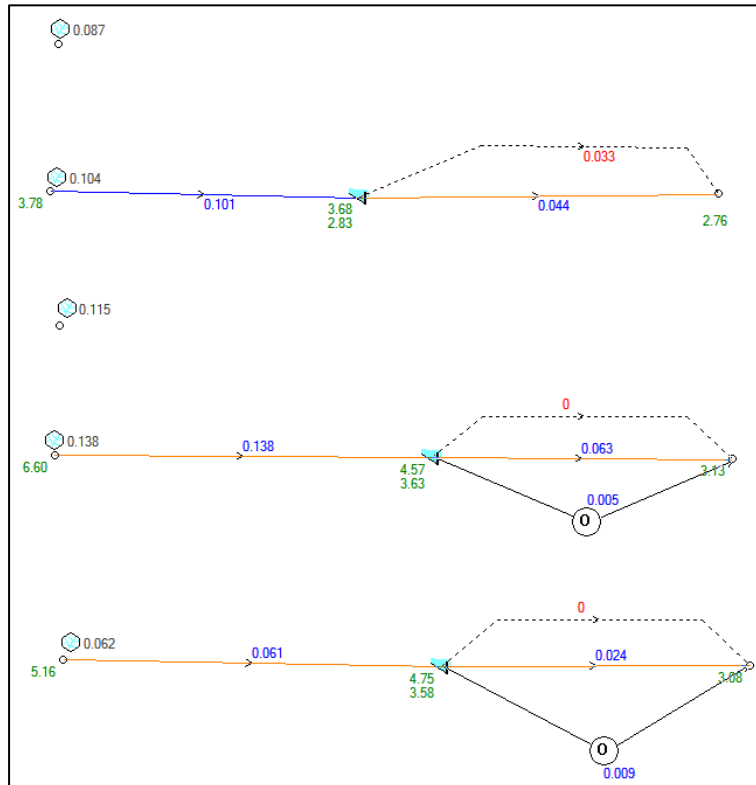
### 5 Year Results:



### 20 Year Results:



### 100 Year Results:



Proposed Childcare and Industrial Centre  
Centennial Circuit, Byron Bay  
(Lot 60 on DP835249)

## **ENVIRONMENTAL NOISE IMPACT REPORT**

Prepared for

Denwol Developments

**23 January 2017**

crgref: 16186 report

## 1.0 INTRODUCTION

This report is in response to a request from Denwol Developments for an environmental noise impact assessment of proposed childcare industrial centre and caretaker's apartment along Centennial Circuit in the Byron Bay Arts & Industry Estate. The report is intended to form part of a development application to Byron Shire Council in accordance with the Byron Local Environment Plan 2014. In undertaking the assessment, noise monitoring was conducted near the site and through modelling, predictions of road noise associated with traffic on Ewingsdale Road, and proposed onsite and existing offsite commercial / industrial noise impacting the noise sensitive components of the development. Based upon the predicted noise impact levels, recommendations regarding acoustic treatment have been provided.

## 2.0 DESCRIPTION OF THE DEVELOPMENT

The parcel of land is described as part of Lot 60 on DP835249 and is current undeveloped land within the Byron Bay Arts & Industrial Estate. The site is bounded by Centennial Circuit to the north, Ewingsdale Road to the south, vacant land to the immediate east, with a commercial building to the immediate west. The topography of the site and surrounding land is generally flat. It is noted that a large residential estate is proposed across Ewingsdale Road to the south, but this development will be screened by an acoustical barrier for control of road traffic noise, which will also serve to mitigate any noise from the subject site – for this reason, this development is not considered in this assessment. For site location refer to Appendix A.

The proposal is as follows:

- A two level childcare centre to cater for 78 children. The building is proposed to the western portion of the site. Outdoor play area at ground level is located in the centre of the building, to take advantage of acoustical screening to neighbouring commercial facilities;
- Car parking at the northern part of the site, with access via Centennial Circuit only;
- Two level industrial building to the eastern side of the site. The driveway and access to the 6 spaces will be in the centre of the industrial component, with ground level being for small retail or takeaway food space, with larger storage / production spaces, and storage / production / office at top floor level.

The childcare centre is likely to operate between 6:30am and 6pm Monday to Friday; with the industrial development likely to operate between 7am and 6pm, Monday to Saturday. For Development Plans refer to Appendix B.

Offsite and proposed onsite industrial activity noise impacts have the potential to impact upon proposed childcare centre (i.e. building façades, outdoor playspace and inside activity rooms) and has been assessed in accordance with the “*NSW Industrial Noise Policy*”.

Road traffic noise from Ewingsdale Road has been assessed in accordance with the “*NSW Road Noise Policy*”. We have not assessed noise from increased traffic on Ewingsdale Road as a result of the development, as the expected increase is not significant in the context of the existing volume of traffic on Ewingsdale Road.

### 3.0 AMBIENT NOISE SURVEY

#### 3.1 Instrumentation

The following equipment was used to record ambient noise levels in the locale:

- Rion NC 73 Calibrator; and
- Rion NL 21 Environmental Noise Logger.

All instrumentation used in this assessment hold current calibration certificate from a certified NATA calibration laboratory.

#### 3.2 Ambient Noise Monitoring Methodology and Results

A logger was located across Ewingsdale Road to the south-east of the site. The microphone was in a free-field location approximately 1.4m above ground and approximately 13m from the nearest lane of Ewingsdale Road. For logger location refer to Figure 8 of Appendix A.

The logger was set to record noise statistics in 15 minute blocks continually between Tuesday 23/08/2016 and Tuesday 30/08/2016. All measurements were conducted generally in accordance with Australian Standard AS 1055:1997 - *“Acoustics-Description and measurement of environmental noise”*. The operation of the sound level logging equipment was field calibrated before and after the measurement session with no significant drift from the reference signal recorded.

Daily weather observations were obtained from the Bureau of Meteorology’s website at the Byron Bay station. Weather conditions during the noise monitoring period were generally fine with the exception of rain periods on Wednesday 24/08/16 and Thursday 25/08/16, with a temperature range between approximately 10 and 24°C and relative humidity between approximately 40% and 80%.

From a series of observations on Tuesday 23/08/2016, Tuesday 30/08/2016, and Wednesday 18/01/2017, no significant noise from offsite and adjacent industrial premises was noted.

Table 1 presents the measured ambient noise levels at the unattended logger location. Graphical presentation of the measured noise levels is presented in Appendix C to this report. It is noted that data collected on Wednesday 24/08/16 and Thursday 25/08/16 have been excluded from the final Rating Background Level (RBL) calculations due to the occurrence of rain. The cleanest two days of road traffic noise results have been presented in Table 1.

Road Traffic Noise	Time Period	Measured Level dB(A)		
		26/08/2016	29/08/2016	Average
L <sub>10</sub> (18hr)	6am to Midnight	68	67	68
L <sub>eq</sub> (24hr)	6am to 6am	65	64	65
L <sub>eq</sub> (15hr)	7am to 10pm	66	66	66
L <sub>eq</sub> (9hr)	10pm to 7am	61	60	61
L <sub>eq</sub> (1hr) Daytime	7am to 10pm	68	68	68
L <sub>eq</sub> (1hr) Night-time	10pm to 7am	66	66	66

Background Noise	Measured L <sub>90</sub> dB(A)		
	Daytime (7am to 6pm)	Evening (6pm to 10pm)	Night (10pm to 7am)
Tuesday 23/08/16	-	47	-
Wednesday 24/08/16	61	62	44
Thursday 25/08/16	59	52	48
Friday 26/08/16	56	49	44
Saturday 27/08/16	55	49	43
Sunday 28/08/16	52	48	43
Monday 29/08/16	56	47	44
Tuesday 30/08/16	56	-	-
<b>RBL L<sub>90</sub></b>	<b>56</b>	<b>48</b>	<b>43</b>

**Table 1:** Measured ambient noise levels at the logger location.

## 4.0 NOISE ASSESSMENT CRITERION

### 4.1 Onsite and Offsite Industrial Activity Noise Criterion

Noise associated with industrial premises impacting the proposed childcare centre is regulated by the “NSW Industrial Noise Policy”. The Policy requires the following amenity noise levels are met:

Recommended $L_{Aeq}$ noise levels from industrial noise sources				
Type of Receiver	Indicative Noise Amenity Area	Time of Day	Recommended $L_{Aeq}$ Noise Level, dB(A) <i>(see Note 8 in Section 2.2.1)</i>	
<i>(see Notes in Section 2.2.1)</i>			Acceptable <i>(See Note 11)</i>	Recommended Maximum <i>(See Note 11)</i>
School classroom—internal	All	Noisiest 1-hour period when in use	35 <i>(See Note 10)</i>	40
Active recreation area (e.g. school playground, golf course)	All	When in use	55	60

**Table 2:** Amenity Criterion Prescribed in the “NSW Industrial Noise Policy”.

### 4.2 Road Traffic Noise Criterion

The New South Wales Environment, Climate Change and Water’s document “NSW Road Noise Policy” states the following in respect to childcare developments impacted by road traffic noise (i.e. from Ewingsdale Road):

Existing sensitive land use	Assessment criteria – dB(A)		Additional considerations
	Day (7 a.m.–10 p.m.)	Night (10 p.m.–7 a.m.)	
8. Childcare facilities	Sleeping rooms $L_{Aeq, (1 \text{ hour})}$ 35 (internal)  Indoor play areas $L_{Aeq, (1 \text{ hour})}$ 40 (internal)  Outdoor play areas $L_{Aeq, (1 \text{ hour})}$ 55 (external)	–	Multi-purpose spaces, e.g. shared indoor play/sleeping rooms should meet the lower of the respective criteria.  Measurements for sleeping rooms should be taken during designated sleeping times for the facility, or if these are not known, during the highest hourly traffic noise level during the opening hours of the facility.

**Table 3:** Road Noise Criterion Prescribed in the “NSW Road Noise Policy”.

It is noted that the caretaker’s dwelling should meet the noise goals outlined in the Infrastructure SEPP (Department of Planning NSW 2007) which are internal noise levels of 35 dB(A) for bedrooms during the night-time period and 40 dB(A) for other habitable rooms.

## 5.0 PREDICTED NOISE IMPACTS

### 5.1 Predicted Onsite and Offsite Industrial Activity Noise Emissions

All noise source levels used in the assessment have been collected from similar previous investigations – as no significant noise was noted during our site visits, all impacts have been based upon assumed worst case scenario noise source levels. All noise levels have been corrected for impulsiveness or tonality as per Australian Standard AS 1055:1997 – “Acoustics-Description and measurement of environmental noise”.

Short-term measured  $L_{Aeq}$  levels have been converted to  $L_{Aeq 15min}$  levels by estimating a worst case number of events / duration for which each activity occurs during any 15 minute period. For children’s outdoor play we have assumed that the activity will occur for a full 15 minute period.

For continuous noise sources (i.e. mechanical plant), a 15 minute duration has been adopted. It should be stressed that mechanical plant selection have yet to be undertaken, for this reason, we have applied noise levels from other similar developments.

The following activities and associated noise source levels are typical of industrial activities and have been assessed within this report:

Activity / Noise Source	Distance (m)	Measured $L_{eq}$ Adjusted dB(A)	Duration per 15 minutes	Noise Level, SPL $L_{eq 15 min}$ dB(A)
<b>Fluctuating Noise Source</b>				
Car door closures 80 events	1m	80** (0.052 secs)	4.2 secs	<b>57**</b>
Car bypass at 5km/hr 40 events	1m	66 (7 secs)	4.7 mins	<b>61</b>
Light industrial production	1m	85	15	<b>85**</b>
Goods delivery	1m	81**	7.5	<b>81**</b>
Waste collection	1m	97	2	<b>88</b>
<b>Continuous Noise Source</b>				
A/C unit x 6	1m	65	15	<b>65</b>
Toilet exhaust fan	1m	52	15	<b>52</b>

\* Denotes + 5 dB(A) correction due to tonality as per AS1055 – 1997 ; \*\* Denotes + 5 dB(A) correction due to impulsiveness as per AS1055 – 1997

**Table 4:** Typical noise source levels associated with industrial activities.

Based upon the location of the proposed onsite and offsite activities in relation to proposed childcare centre (i.e. at the nearest building façades), we predict the following noise impact levels as presented in Table 5.

The predicted levels assume that the recommended treatments detailed in Section 6.1 are incorporated into the development.

Noise source – Proposed Onsite Industrial Activity	Predicted Noise Impact, SPL $L_{eq}$ 15min dB(A)
	Inside Activity / Sleep Rooms Windows Closed
Car door closures in carpark	< 25
Car movement in carpark	< 25
Manufacturing activity	< 25
Goods unloading industrial driveway	< 25
Waste collection industrial driveway	25
A/C unit x 6 in industrial internal driveway	< 25
Toilet exhaust fan rooftop	< 25
Combined noise impact	28
<b>Noise Criterion</b>	<b>35 – 40</b>
<b>Centre of Ground Level Outdoor Playspace</b>	
Car door closures in carpark	26
Car movement in carpark	30
Manufacturing activity	35
Goods unloading industrial driveway	35
Waste collection industrial driveway	42
A/C unit x 6 in industrial internal driveway	< 25
Toilet exhaust fan rooftop	< 25
Combined noise impact	44
<b>Centre of Top Level Outdoor Playspace</b>	
Car door closures in carpark	33
Car movement in carpark	34
Manufacturing activity	35
Goods unloading industrial driveway	35
Waste collection industrial driveway	42
A/C unit x 6 in industrial internal driveway	< 25
Toilet exhaust fan rooftop	< 25
Combined noise impact	44
<b>Noise Criterion</b>	<b>55 – 60</b>
Noise source – Existing Offsite Industrial Activity	Predicted Noise Impact, SPL $L_{eq}$ 15min dB(A)
	Inside Activity / Sleep Rooms Windows Closed
Car door closures in carpark	< 25
Car movement in carpark	< 25
Manufacturing activity	29
Goods unloading industrial driveway	< 25
Waste collection industrial driveway	< 25
A/C unit east side of existing building	< 25
Toilet exhaust fan rooftop	< 25
Combined noise impact	30
<b>Noise Criterion</b>	<b>35 – 40</b>
<b>Centre of Ground Level Outdoor Playspace</b>	
Car door closures in carpark	< 25
Car movement in carpark	27
Manufacturing activity	30
Goods unloading industrial driveway	32
Waste collection industrial driveway	39
A/C unit east side of existing building	< 25
Toilet exhaust fan rooftop	< 25
Combined noise impact	40
<b>Centre of Top Level Outdoor Playspace</b>	
Car door closures in carpark	< 25
Car movement in carpark	30
Manufacturing activity	33
Goods unloading industrial driveway	32
Waste collection industrial driveway	39
A/C unit east side of existing building	< 25
Toilet exhaust fan rooftop	< 25
Combined noise impact	41
<b>Noise Criterion</b>	<b>55 – 60</b>

**Table 6:** Predicted onsite industrial activity noise impacts at the proposed childcare centre.

For point source calculations refer to Appendix C of this report.

## 5.2 Predicted Ewingsdale Road Traffic Noise Impacts

### 5.2.1 Road Traffic Volumes

Peak am & pm surveyed traffic data and ultimate year 2028 am & pm peak traffic volume predictions for Ewingsdale Road (inclusive of the proposed West Byron subdivision and surrounding future Western Precincts) were obtained from the Bitzios Report completed for the West Byron development. Daily traffic volumes have been estimated by multiplying the averaged of the am & pm peak traffic volumes by 10. Percentage of heavy vehicles were obtained from the TTM Acoustics report completed for the West Byron development (dated June 2010). The modelled traffic volumes for Ewingsdale Road are as follows:

<b>2016 Traffic Volume:</b>	AADT 24 hour:	16,260 vehicles, 4.3% heavy vehicles.
<b>2028 Traffic Volume:</b>	AADT 24 hour:	23,530 vehicles, 4.3% heavy vehicles.

### 5.2.2 Modelled Road Traffic Noise Levels – Existing Situation

Road traffic noise modelling was conducted using PEN3D, which is based upon the “CoRTN” (Control of Road Traffic Noise) method produced by the UK Department of Transport 1988. To verify the road traffic noise prediction model, the  $L_{Aeq\ 24hr}$  traffic noise level was calculated and compared to the measured noise level. For PEN3D point calculation sheets refer to the Appendix.

The predicted free-field  $L_{eq\ 24hr}$  existing noise level, approximately 13m from the nearest lane of Ewingsdale Road is 65.4 dB(A). Compared with the measured  $L_{eq\ 24hr}$  level of 64.5 dB(A), the model is within the allowable 2 dB(A) deviation from measured levels.

### 5.2.3 Modelled Road Traffic Noise Levels – Ultimate Situation

Based upon the traffic volumes presented in Section 5.2.1 of this report, the PEN3D model predicts the following façade corrected traffic noise levels as presented in Table 6 over the page.

The following parameters were used in the PEN3D model for the proposed development:

- 2.5 dB(A) façade correction for building façade predictions.
- 60 km/hr posted speed limit environment on Ewingsdale Road near childcare centre.
- 80 km/hr posted speed limit environment on Ewingsdale Road at the logger location.
- 3.2 dB(A) adjustment to the model to determine the  $L_{Aeq\ 24hr}$  from the  $L_{A10\ 18hr}$  based on the measured differences between the  $L_{Aeq\ 24hr}$  level as outlined in Table 1 of Section 3.3
- $L_{Aeq\ 15hr}$  and 9hr levels based on the measured differences between the  $L_{Aeq\ 24hr}$  level as outlined in Table 1 of Section 3.3.
- Ground level façade receiver heights of 1.5m above ground floor level.
- Level 1 façade receiver heights of 5.4m above ground floor level.

Receiver Location	Predicted Ultimate Road Traffic Noise: dB(A)	
	L <sub>10</sub> (24 hour)	L <sub>eq</sub> (1 hour)
<b>Building Façades (Façade Corrected)</b>		
Room 1 North / West	45	48
Room 1 South	63	66
Room 2 East / South	46	49
Room 2 West	55	58
Room 3 North / East	46	49
Room 3 West	51	54
Room 4 North / East / West	51	54
Room 4 South	65	68
Room 5 North / East / South	52	55
Room 5 West	59	62
Caretaker's	65	66 L <sub>eq</sub> 15hr / 61 L <sub>eq</sub> 9hr
<b>Outdoor Play Spaces (Free-field)</b>		
Ground Level Zen Space	44	47
Ground Level Main Area	45	48
Ground Level Southwest Area	44	47
Level 1 Northwest Area	49	52
Level 1 Northeast Area	49	52
Level 1 Southeast area	50	53

**Table 6:** Predicted road noise levels from Ewingsdale Road at the proposed development.

## 6.0 RECOMMENDED ACOUSTIC TREATMENTS

### 6.1 Recommended Acoustic Treatments to Control Onsite and Offsite Activity Noise

Based upon the adopted noise source levels, the following acoustic treatments and management principles are recommended to mitigate onsite activity noise emissions:

- Provision of air-conditioning or sealed mechanical ventilation to the entire childcare centre be provided.
- The full height of the party wall separating the industrial from the childcare centre be rated to a minimum  $R_w$  55.
- The western facing wall of the childcare centre be rated to a minimum  $R_w$  50.
- The top floor level of the roof / ceiling system of the childcare centre be rated to  $R_w$  45.
- All glazings be rated to a minimum  $R_w$  30.

### 6.2 Recommended Acoustic Treatments to Control Road Traffic Noise

To achieve the required indoor noise levels for road traffic noise, we recommend the building shell treatment  $R_w$  ratings as detailed in Table 7. Building shell treatment  $R_w$  ratings were determined by using the calculation methods detailed in Australian Standard AS3671 1989 “Road Traffic Noise Intrusion – Building Siting and Construction”. Calculations for building treatment determination are presented in Appendix C.

To allow occupants to close windows and doors and still have a supply of fresh air, provision for air conditioning or sealed mechanical ventilation is required to rooms affected by traffic noise (rooms listed in Table 7). The plant should not reduce the acoustic performance of the building shell.

Byron Bay Childcare Centre Space	Building Component	$R_w$
Activity Room 1	North / West Glazings	30*
	North / West Walls	26
	South Glazing	35
	South Wall	39
Activity Room 2	South / East Glazings	30*
	South / East Walls	26
	West Wall	50*
Activity Room 3	North / East Glazings	30*
	North / East Walls	25
	West Wall	50*
Activity Room 4	North / East Glazings	30*
	North / West / East Walls	33
	South Glazings	36
	South Wall	43
	Roof / Ceiling	45*
Activity Room 5	North / South / East Glazings	30*
	North / South / East Walls	34
	West Wall	50*
	Roof / Ceiling	45*
Caretaker's Dwelling	South Glazing	33
	South Wall	28
	Roof / Ceiling	37

\* Upgraded to include the  $R_w$  requirements of Section 6.1 of this report

**Table 7:** Recommended building shell treatments for road traffic noise intrusion.

## 7.0 DISCUSSION

### 7.1 Onsite and Offsite Industrial Activity Noise

Based upon the assumed noise source levels for existing offsite and proposed onsite industrial activities and the recommended acoustic treatments, predicted noise impacts at the proposed childcare activity rooms and outdoor playspaces are predicted to be within the relevant external noise criterion. The design is such that blank walls face the existing industrial premises to the west, and will be separated by an acoustically rated party wall to the proposed industrial. Further, only services and offices are located on the party wall shared with the proposed industrial to further mitigate impacts.

Based upon the assumed noise source levels for future onsite industrial activities and the recommended acoustic treatments, predicted noise impacts at the proposed childcare activity rooms and outdoor playspaces are predicted to be within the relevant external noise criterion.

To mitigate noise impacts at the childcare centre we have recommended upgraded wall and glazing treatments; and provision of air-conditioning or sealed mechanical ventilation to the entire childcare centre. It is noted that for south facing glazings at Activity Rooms 1 and 4 (i.e. facing Ewingsdale Road) higher  $R_w$  ratings are required to mitigate road traffic noise.

### 7.2 Road Traffic Noise

Based upon year ultimate volumes on Ewingsdale Road, we have recommended acoustic building shell treatments to childcare activity rooms and caretaker's dwelling to show that compliance with the internal criterion can be achieved. Provision for air conditioning or sealed mechanical ventilation is also required to noise affected habitable rooms to allow occupants to close windows and doors. The plant should not reduce the acoustic performance of the building shell.

Predicted road traffic noise impacts are predicted to be below the external noise criterion at all the outdoor play spaces due to the proposed building envelope.

## 8.0 CONCLUSIONS

This report is in response to a request from Denwol Developments for an environmental noise impact assessment of proposed childcare industrial centre and caretaker's apartment along Centennial Circuit in the Byron Bay Arts & Industry Estate.

Overall, the proposed development will generally be within acceptable levels of the adopted criterion, subject to the acoustic treatments recommended in Section 6 being integrated into the design, construction and operation of the development.

Report Prepared By:



**JAY CARTER BSc**  
Director

**APPENDIX A**

Subject Site and Logger Location

Figure No. 1: Subject Site Location (Google Maps).

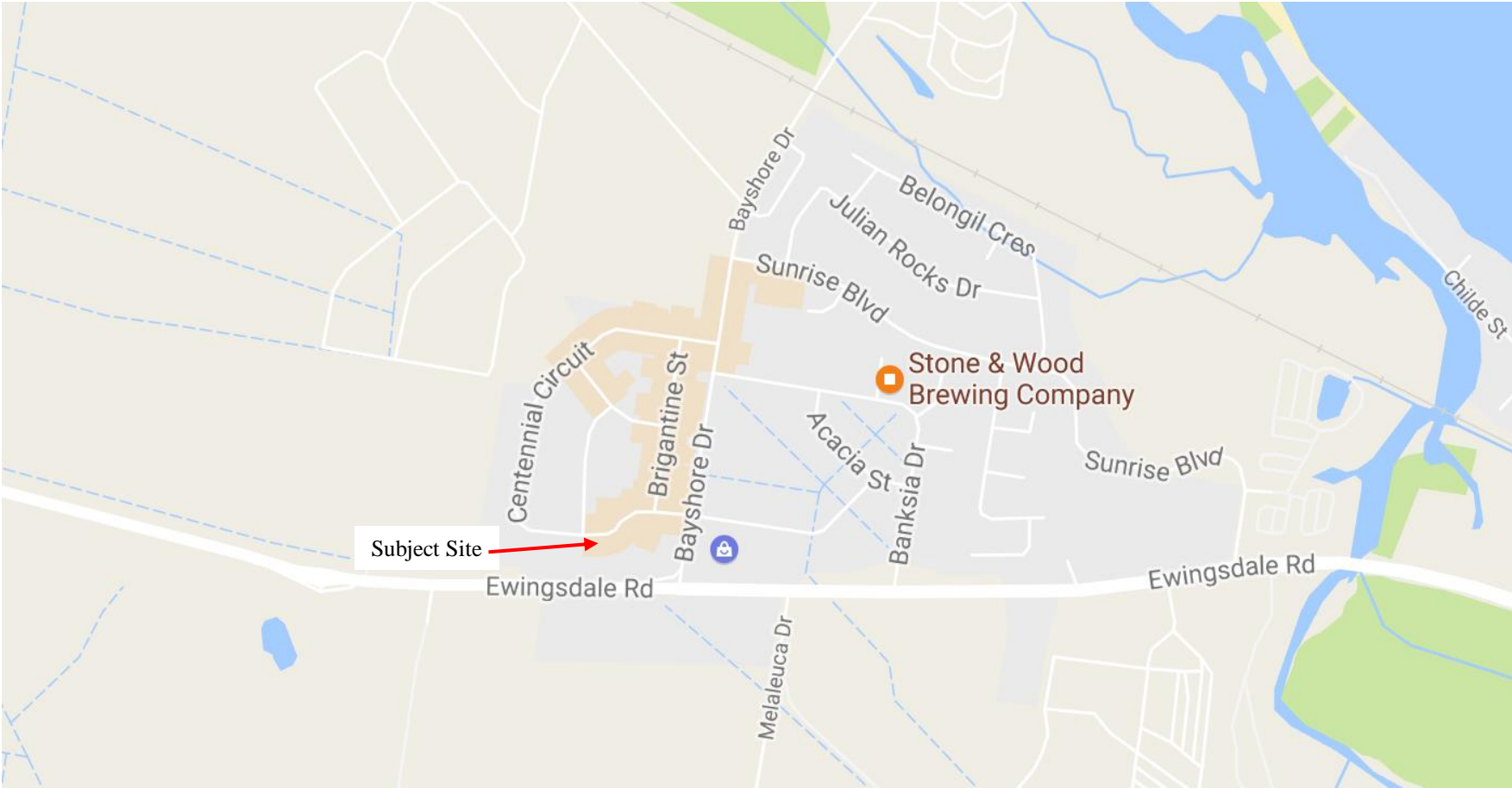


Figure No. 2: Subject Site, Logger Location and Surrounding Environs (NSW Six Maps).



Byron Bay, New South Wales  
August 2016 Daily Weather Observations



Date	Day	Temps		Rain	Evap	Sun	Max wind gust				9am				3pm				
		Min	Max				Dirn	Spd	Time	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn
		°C	°C	mm	mm	hours	km/h	local	°C	%	heights	km/h	hPa	°C	%	heights	km/h	hPa	
1	Mo	14.3	21.6	0			N	28	18:14	15.6	54	SSW	17	1019.0	21.2	56	NE	17	1015.0
2	Tu	14.4	22.0	0			NNE	41	12:42	19.8	79	N	13	1014.8	20.7	83	N	26	1010.1
3	We	14.2	18.6	2.4			W	61	20:34	15.5	96	WSW	13	1008.9	16.1	89	W	17	1005.2
4	Th	11.3	17.1	27.6			S	115	04:48	14.4	90	SW	50	1014.2	13.8	98	SW	35	1016.8
5	Fr	9.9	16.9	29.6			SSW	65	13:26	11.8	100	SW	33	1025.1	15.3	89	SSW	41	1023.8
6	Sa	11.6	16.9	3.6			SW	50	17:07	13.1	100	SW	24	1026.1	14.1	100	S	20	1024.7
7	Su	11.7	17.7	6.8			S	41	14:07	14.0	94	SW	20	1026.2	17.2	81	SSE	24	1023.3
8	Mo	11.9	17.8	0			SE	39	00:56	14.2	90	SW	17	1025.0	17.6	63	SSE	20	1022.3
9	Tu	12.6	20.8	0			WSW	31	02:37	15.6	74	SW	15	1024.5	19.9	57	E	11	1021.7
10	We	15.6	22.3	0			N	46	17:37	18.6	73	N	15	1022.4	20.6	64	NNE	24	1018.7
11	Th	15.2	22.6	0			N	43	00:40	18.3	79	NNW	13	1020.3	20.7	73	N	9	1017.4
12	Fr	13.1	18.7	1.4			SW	43	06:48	13.3	76	WSW	28	1022.3	18.5	74	SW	17	1020.5
13	Sa	12.6	22.7	0.4			ESE	41	20:19	16.2	79	W	20	1023.4	20.8	33	SW	20	1019.7
14	Su	12.6	18.6	0			WSW	39	03:19	15.2	63	SW	22	1026.5	18.3	53	S	31	1025.1
15	Mo	12.0	20.1	0			ESE	50	17:43	15.8	86	SW	24	1030.2	18.8	64	SSE	28	1028.9
16	Tu	14.2	20.4	0			ESE	37	01:13	16.7	67	SSW	11	1031.7	20.3	55	E	15	1028.3
17	We	12.1	19.2	0			WSW	33	05:23	14.9	75	WSW	20	1027.8	18.6	73	SSE	20	1024.4
18	Th	12.5	20.5	0			WSW	31	03:31	15.6	82	SW	19	1025.2	17.7	80	NE	24	1022.6
19	Fr	14.5	22.5	1.4			NNE	46	18:41	18.9	71	NNW	6	1023.9	20.4	53	NE	22	1019.7
20	Sa	17.3	22.4	0			N	46	12:30	19.7	79	N	30	1017.8	20.9	79	NNE	24	1014.5
21	Su	11.2	18.2	2.2			SW	44	06:54	13.8	48	WSW	28	1020.6	17.2	62	S	20	1018.0
22	Mo	13.8	21.5	0			N	52	21:07	18.1	78	E	7	1018.7	20.2	65	NNE	30	1014.4
23	Tu	15.8	23.8	1.6			N	35	00:04	21.0	78	N	19	1013.9	21.3	81	NNE	17	1012.0
24	We	14.7	17.1	50.6			S	70	10:55	16.1	1	SSW	35	1009.4	15.1	1	SW	22	1007.1
25	Th	13.5	18.8	23.8			W	59	12:26	14.7	64	W	24	1010.1	18.5	39	W	28	1009.7
26	Fr	10.9	16.8	0			W	43	02:31	13.9	57	WSW	20	1017.6	16.4	62	SE	22	1015.0
27	Sa	10.2	18.1	0			SSW	57	14:01	13.9	55	SW	30	1019.8	17.0	63	SSW	43	1018.4
28	Su	11.9	20.5	0.2			WSW	46	01:38	15.6	65	SW	26	1024.0	19.8	59	E	19	1021.2
29	Mo	13.1	22.2	0			NE	31	20:10	16.2	75	SW	17	1026.4	21.2	60	E	9	1025.1
30	Tu	16.2	23.0	0			NE	28	18:07	20.8	57	E	13	1029.5	21.1	50	NE	13	1027.0
31	We	14.1	21.8	0			N	44	16:14	19.4	77	NNE	7	1026.8	20.2	72	N	28	1021.5

Statistics for August 2016		Mean	13.2	20.0					16.2	75		20	1021.7	18.7	67			22	1019.1
Lowest	9.9	16.8							11.8	48	NNW	6	1008.9	13.8	33		#	9	1005.2
Highest	17.3	23.8	50.6			S	115		21.0	100	SW	50	1031.7	21.3	100			43	1028.9
Total			151.6																

Observations were drawn from Byron Bay (Cape Byron AWS) (station 058216) IDCJDW2022.201608 Prepared at 16:00 GMT on 2 Oct 2016  
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Users of this product are deemed to have read the information and accepted the conditions described in the notes at <http://www.bom.gov.au/climate/dwo/IDCJDW000.pdf>

**APPENDIX B**

Development Plans

# DEVELOPMENT APPLICATION

## PROPOSED INDUSTRIAL SPACES + CHILD CARE

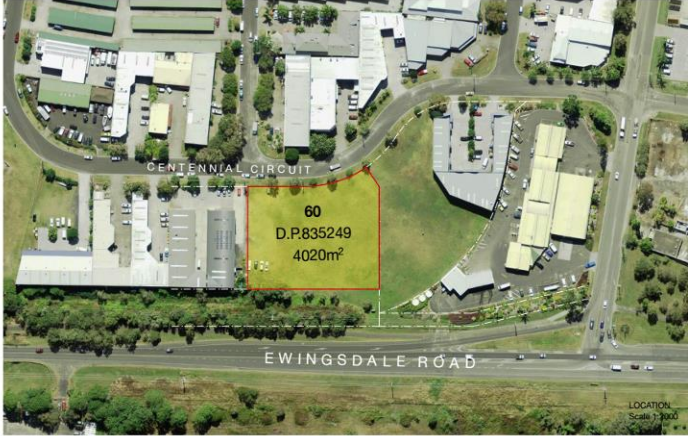
LOT 60 CENTENNIAL CIRCUIT  
BYRON BAY NSW 2481

### DRAWING SCHEDULE

ISSUE	No	NAME	SCALE
01		DRAWING LIST / LOCATION / SITE PLAN	1:2000 / 1:500
02		AREA AND USES	1:500
03		LEVEL 00	1:200
04		LEVEL 01	1:200
05		PARKING AND ACCESS	1:200
06		SECTIONS	1:200
07		ELEVATIONS	1:200

### FLOOR SPACE RATIO AREAS

ZONE NAME	AREA	SITE AREA	FSR
INDUSTRIAL SPACES	1,562m <sup>2</sup>	4020m <sup>2</sup>	<b>38.8%</b>
CHILD CARE AREA	861m <sup>2</sup>	4020m <sup>2</sup>	<b>21.4%</b>
<b>TOTAL</b>	<b>2,423m<sup>2</sup></b>	<b>4020m<sup>2</sup></b>	<b>60.2%</b>



**SITE PLAN**  
SCALE : 1:500 @A3

### PLANNER

**NDC - NEWTON DENNY CHAPELLE**  
Suite 1/31 Carrington Street, Lismore  
Post: PO Box 1138 Lismore NSW 2480  
T: 02 66221 011  
F: 02 6622 4088  
M: 0438 862 856  
e. dchapelle@newtondennychapelle.com.au



LEVEL 1/144 JONSON STREET BYRON BAY | PO BOX 1285 NSW 2481  
F: 02 66809820 | T: 02 66809890 | E: office@hargreaves.com.au | AEN: 85158246003 NSW 7892

All building works to be carried out in accordance with the Building Code of Australia (BCA) and to the satisfaction of the principle certifying authority.  
Builders/Contractors are to verify all dimensions prior to commencement of site work or off-site fabrication.  
Figured dimensions take precedence - do not scale.  
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**ISSUE/REVISIONS**  
A DA-SET 21.12.16

CLIENT	DENWOL DEVELOPMENTS	ADDRESS	LOT 60 CENTENNIAL CIRCUIT BYRON BAY	APPROVED: HG	JOB NO: H30408
JOB NAME	MIXED USED BUILDING + CHILD CARE	LOT + DP	LOT 60 SP 835249	SCALE	PAPER
DRAWING	<b>DRAWING LIST / LOCATION / SITE PLAN</b>			1:2000 1:500	A3 DA 01 A



SCALE : 1:500 @A3

LEVEL 00



SCALE : 1:500 @A3

LEVEL 01

### INDUSTRIAL SPACES

LEVEL 0	
INDUSTRIAL	680 m <sup>2</sup>
RETAIL	88 m <sup>2</sup>
TAKE AWAY	44 m <sup>2</sup>
WC	40 m <sup>2</sup>
LEVEL 1	
INDUSTRIAL	710 m <sup>2</sup>
MANAGER RESIDENCE	56 m <sup>2</sup>
DECK	140 m <sup>2</sup>
<b>TOTAL GFA</b>	<b>1,562 m<sup>2</sup></b>

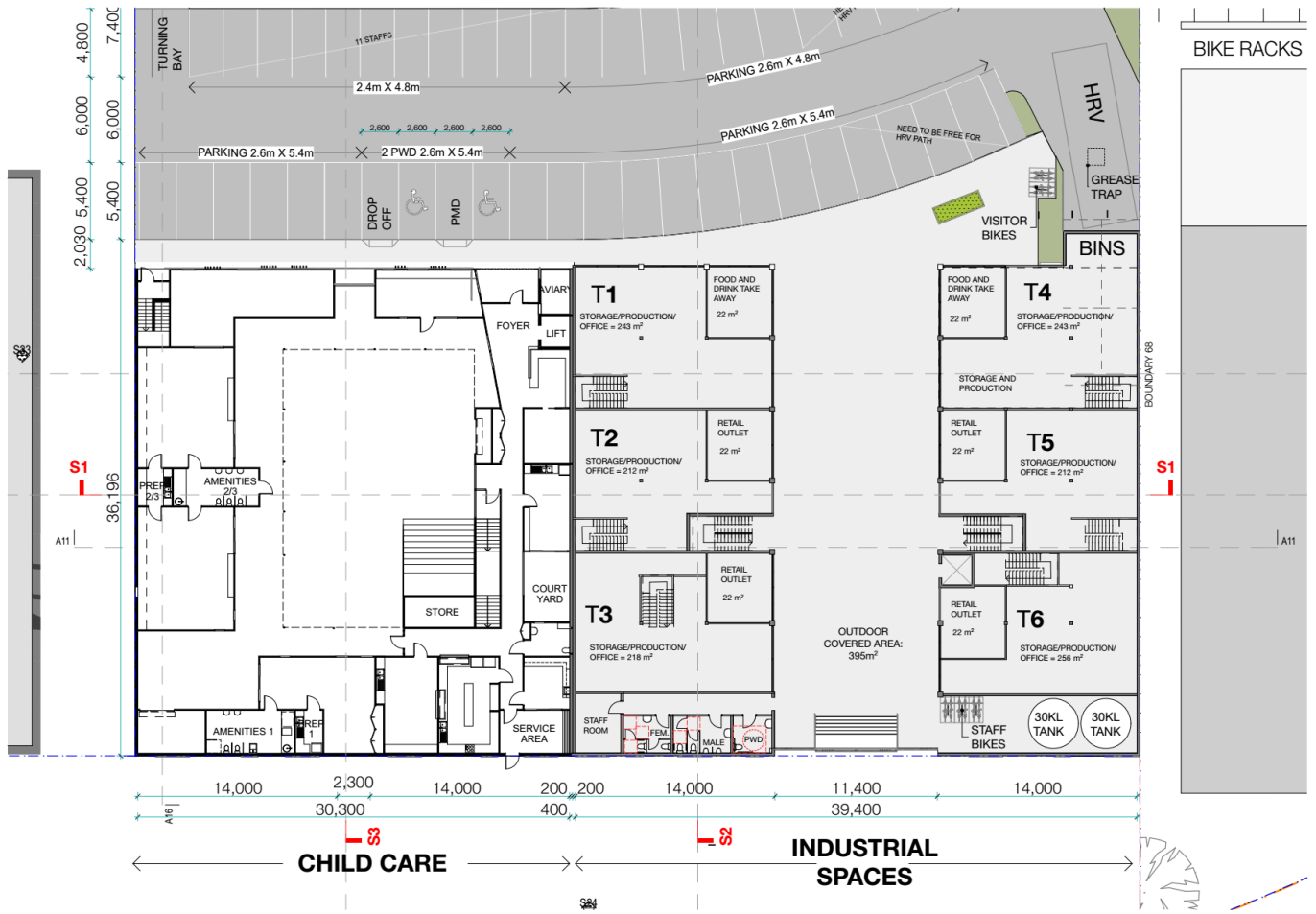


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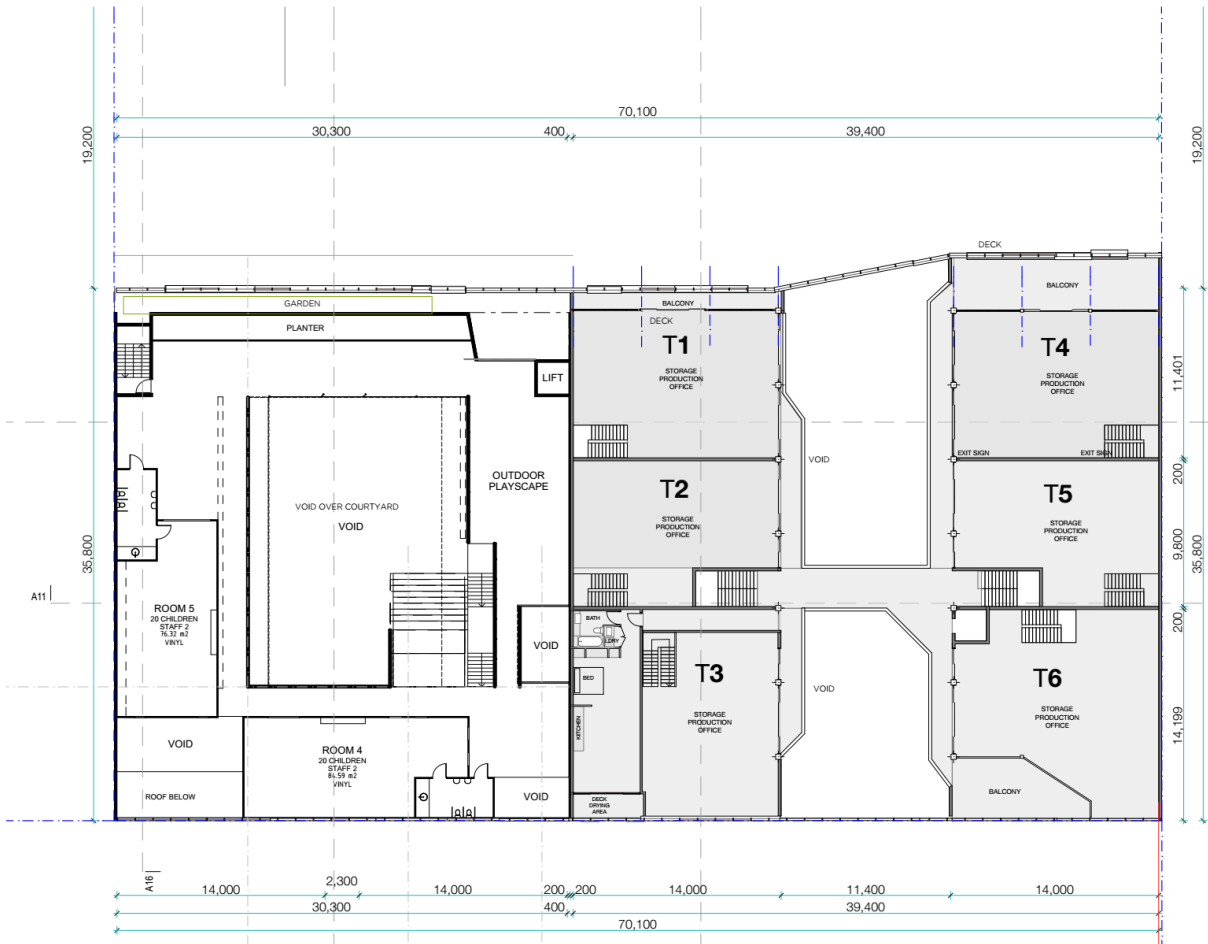
**ISSUE/REVISIONS**  
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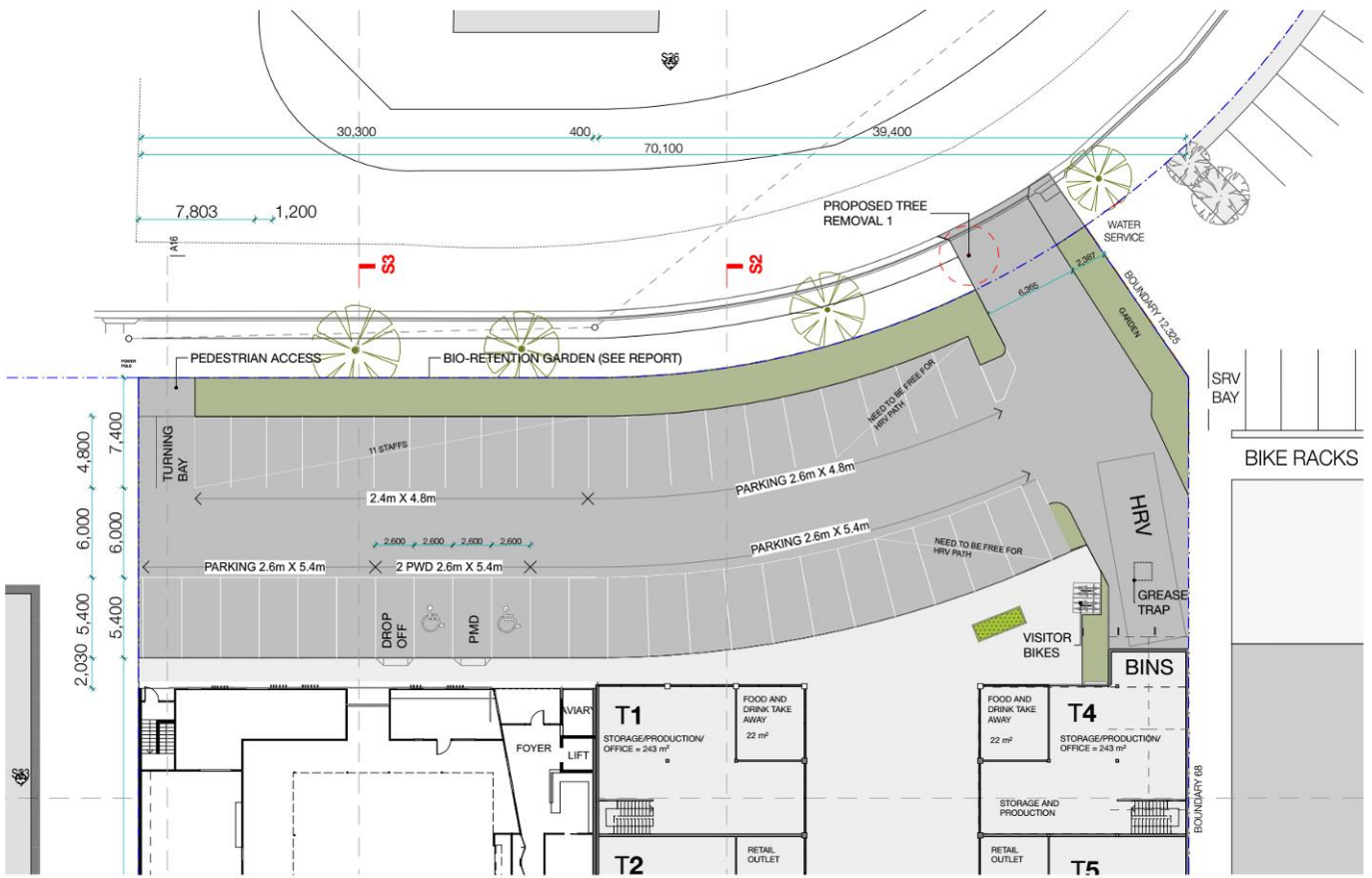
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LEVEL 01  
Scale 1:250

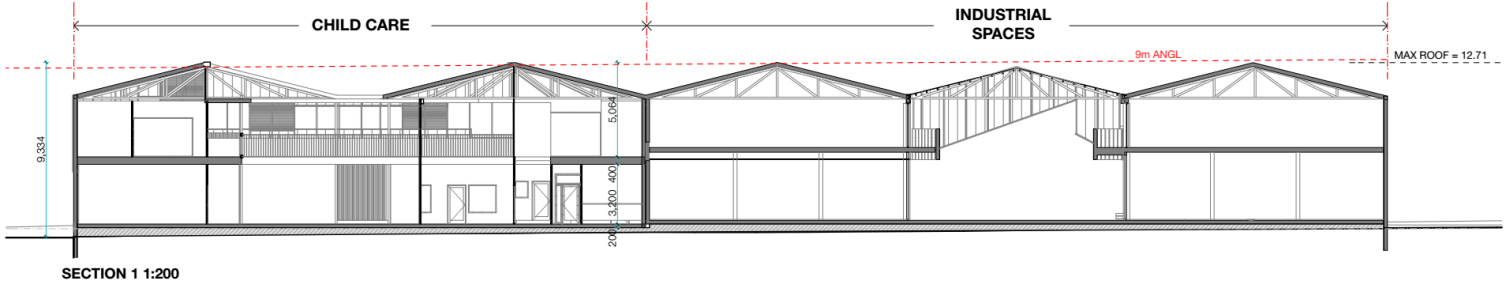
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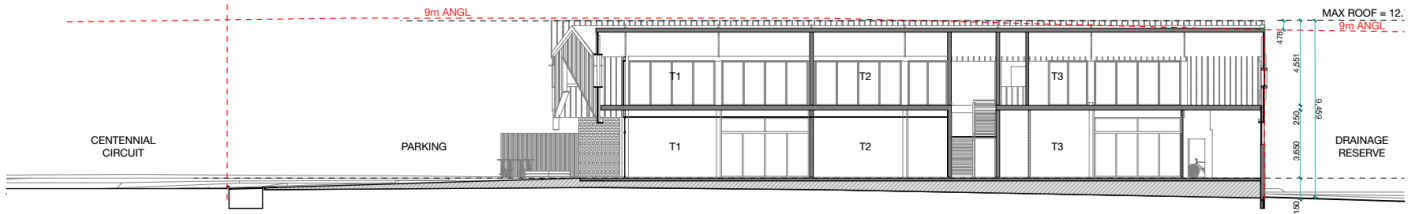
All building works to be carried out in accordance with the Building Code of Australia (BCA) and to the satisfaction of the principle certifying authority.  
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 A DA SET 21.12.16

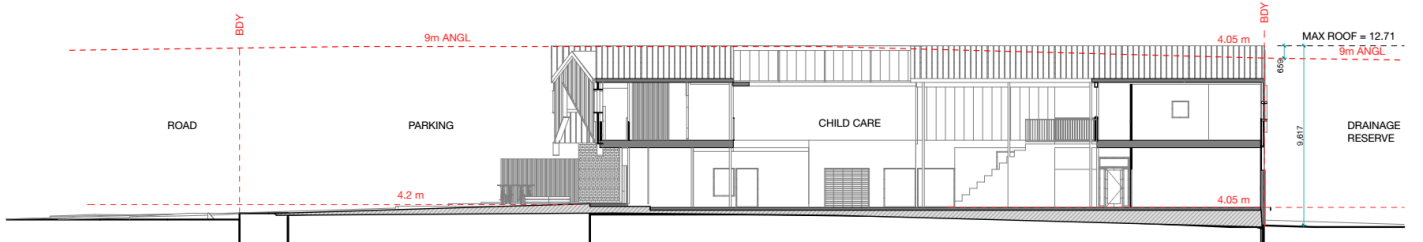
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SECTION 1 1:200



SECTION 2 1:200

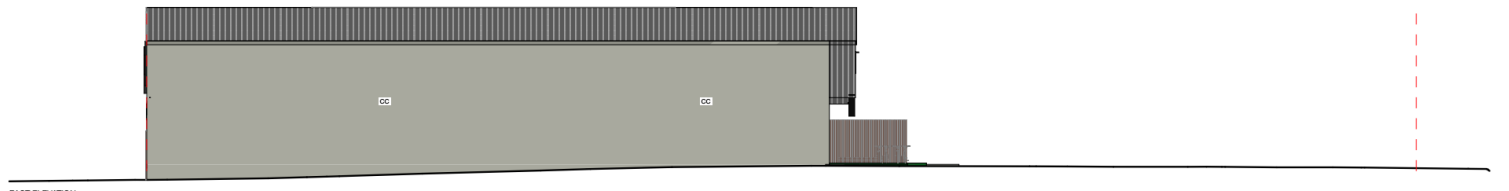
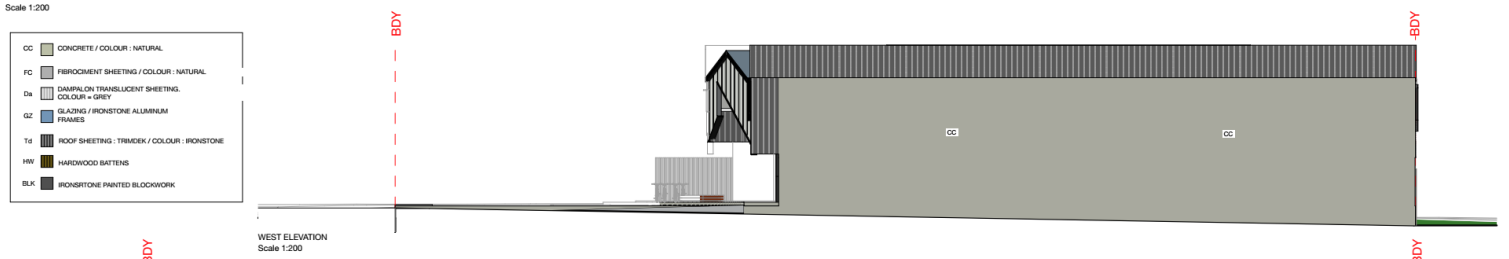
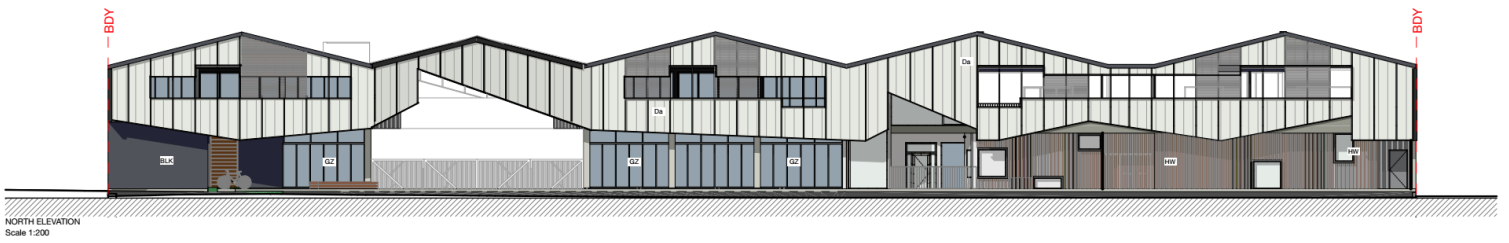


SECTION 3 1:200

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 A DA SET 21.12.16

CLIENT	DENWOL DEVELOPMENTS	ADDRESS	LOT 60 CENTENNIAL CIRCUIT BYRON BAY	APPROVED: HG	JOB NO: HG2408
JOB NAME	MIXED USED BUILDING + CHILD CARE	LOT + DP	LOT 60 SP 835249	SCALE	PAPER
DRAWING	SECTIONS			1:200	A3 DA 06 A



- CC CONCRETE / COLOUR : NATURAL
- FC FIBROCEMENT SHEETING / COLOUR : NATURAL
- DT DAMPALON TRANSLUCENT SHEETING, COLOUR = GREY
- GZ GLAZING / IRONSTONE ALUMINIUM FRAMES
- Td ROOF SHEETING - TRAPEZ / COLOUR : IRONSTONE
- HW HARDWOOD BATTENS
- BLK IRONSTONE PAINTED BLOCKWORK

HGA X LOCAL OFFICE ARCHITECTURE LOCAL

LEVEL 1/ 144 JOHNSON STREET BYRON BAY | PO BOX 1285 NSW 2481  
 F: 02 66809600 | T: 02 66809600 | E: office@haleygraham.com AEN: BS156040000 NSW 7892

All building works to be carried out in accordance with the Building Code of Australia (BCA) and to the satisfaction of the principle certifying authority.  
 Builders/Contractors are to verify all dimensions prior to commencement of site work or off-site fabrication.  
 Figure dimensions take precedence - do not scale.  
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ISSUE/REVISIONS

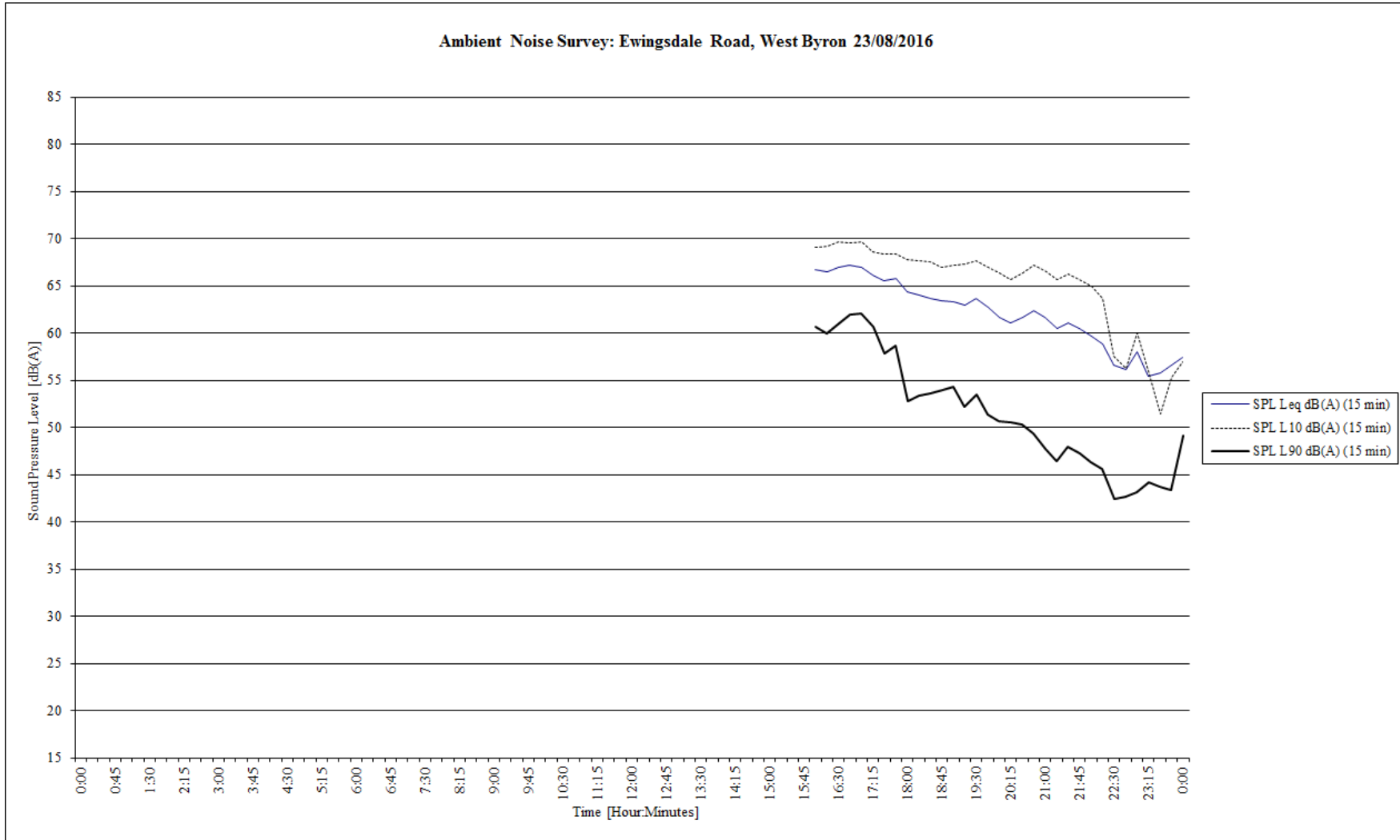
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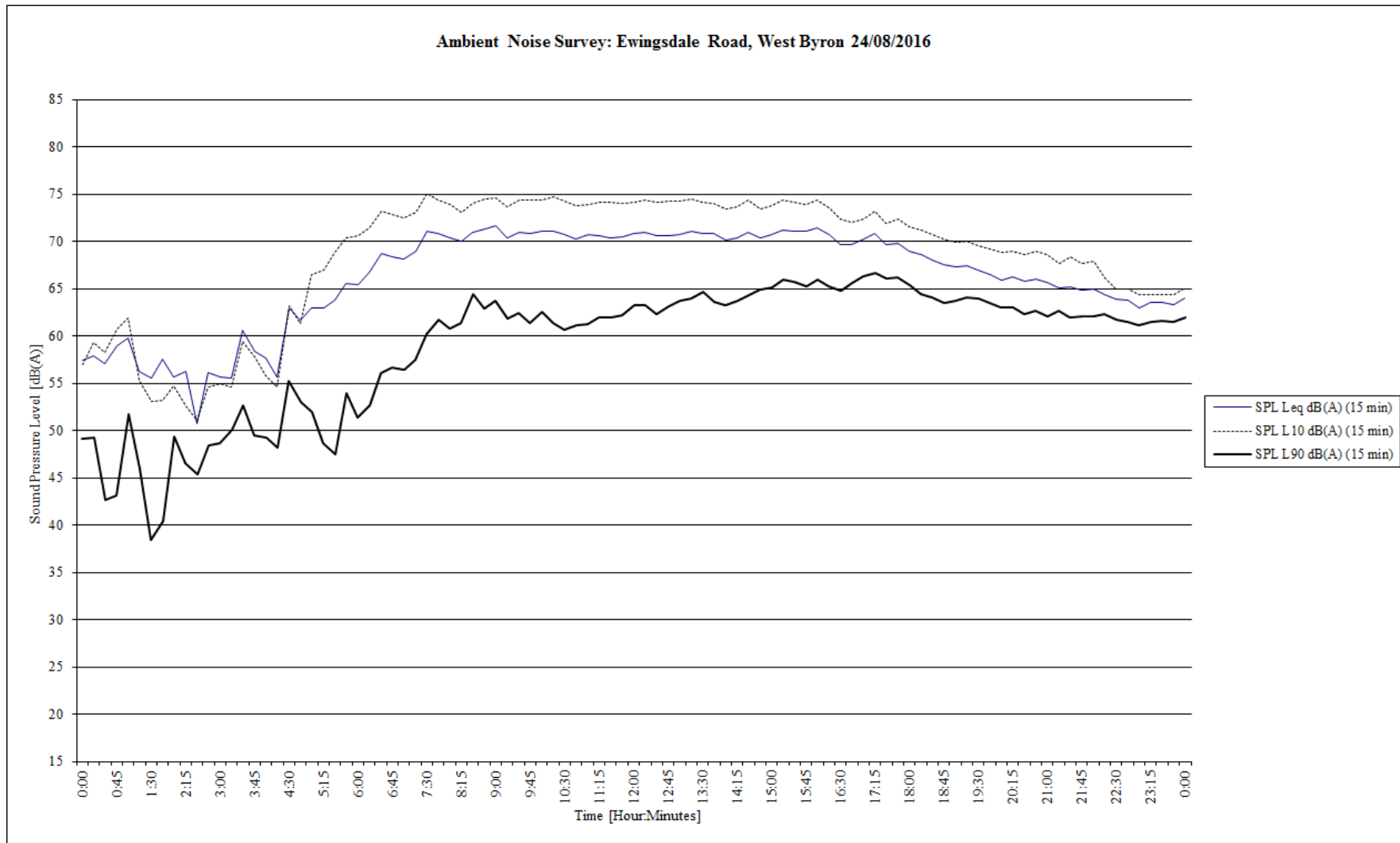
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**APPENDIX C**

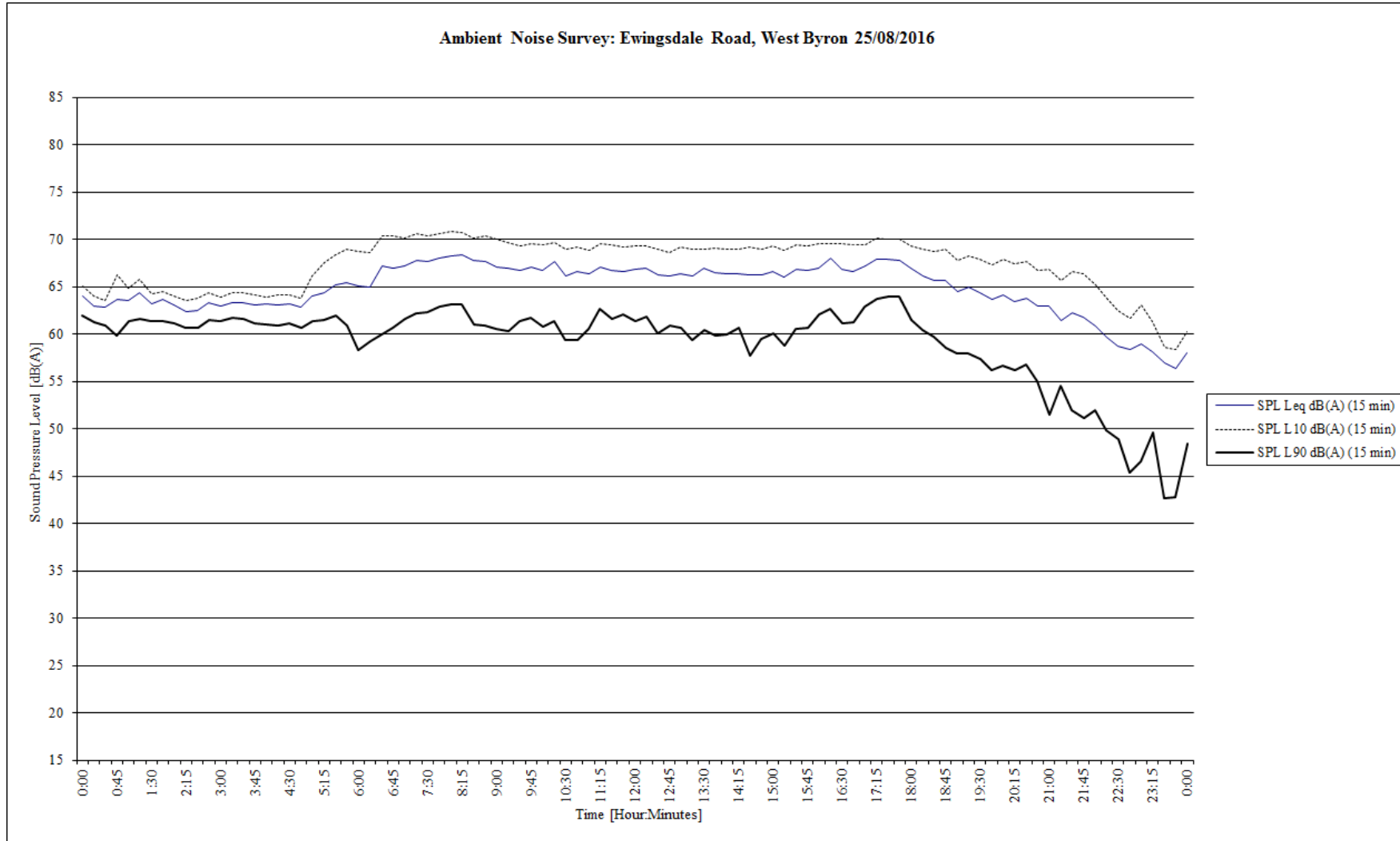
Measurement Results, Model Calculations / Predictions

Ambient Noise Survey: Ewingsdale Road, West Byron 23/08/2016

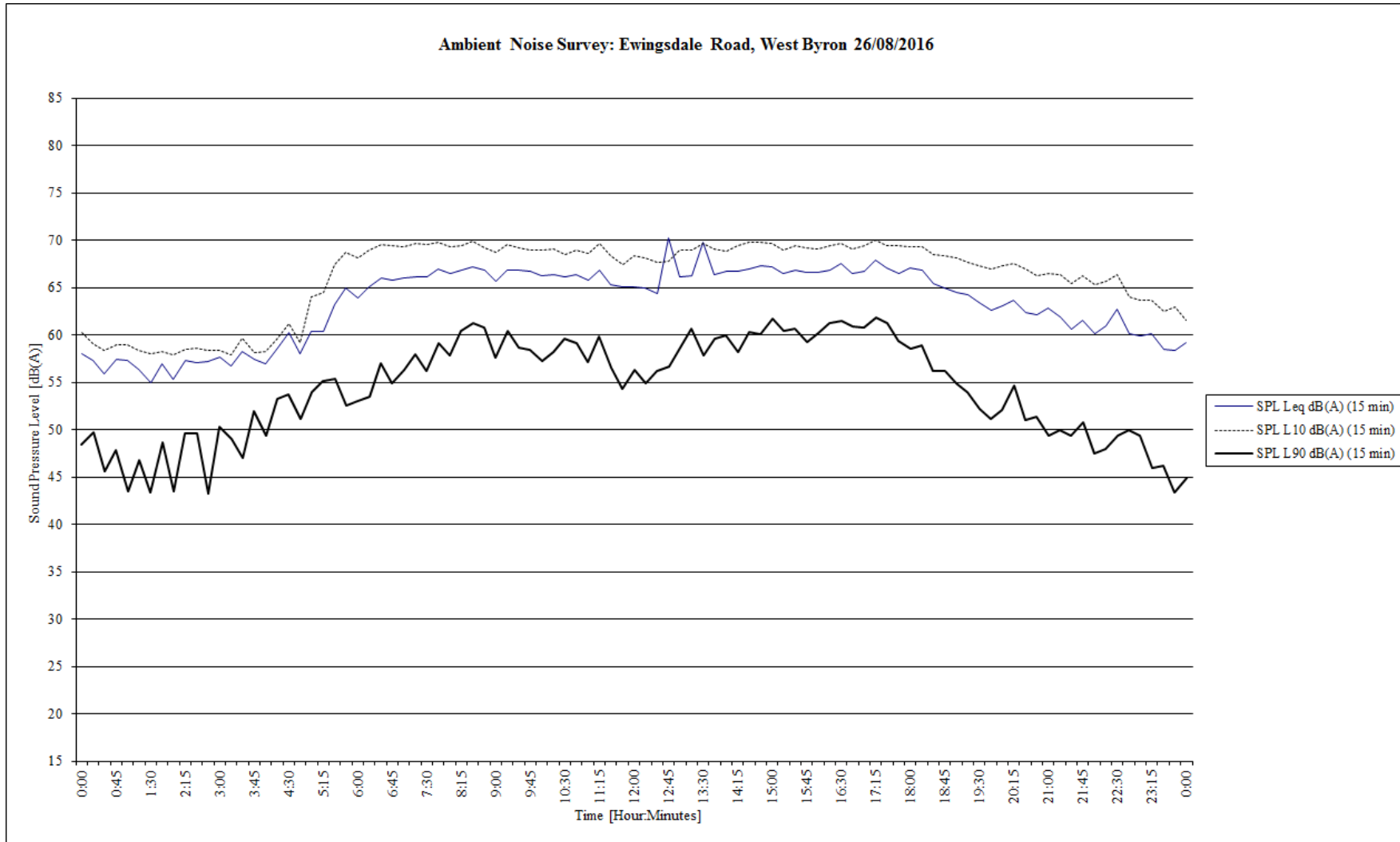


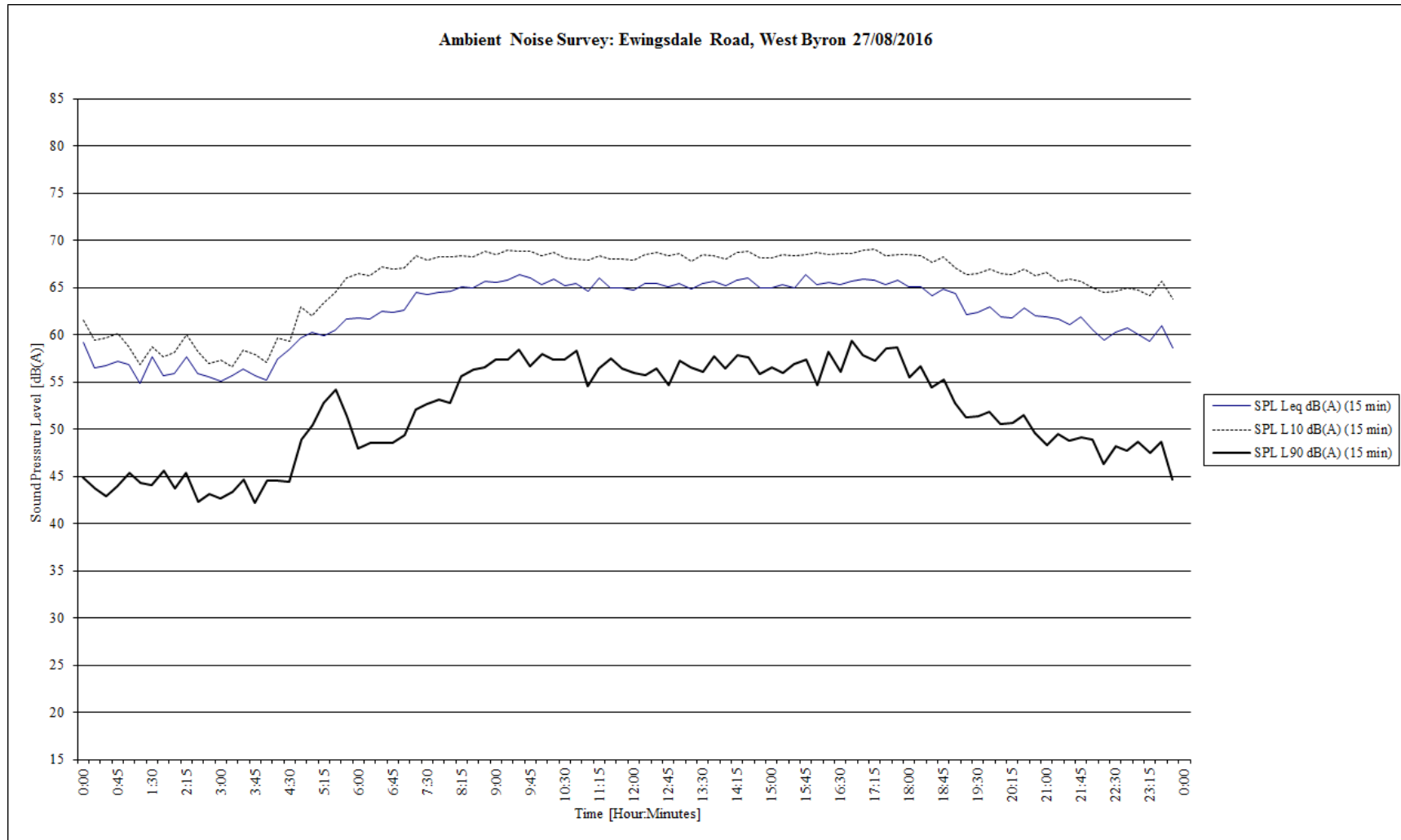


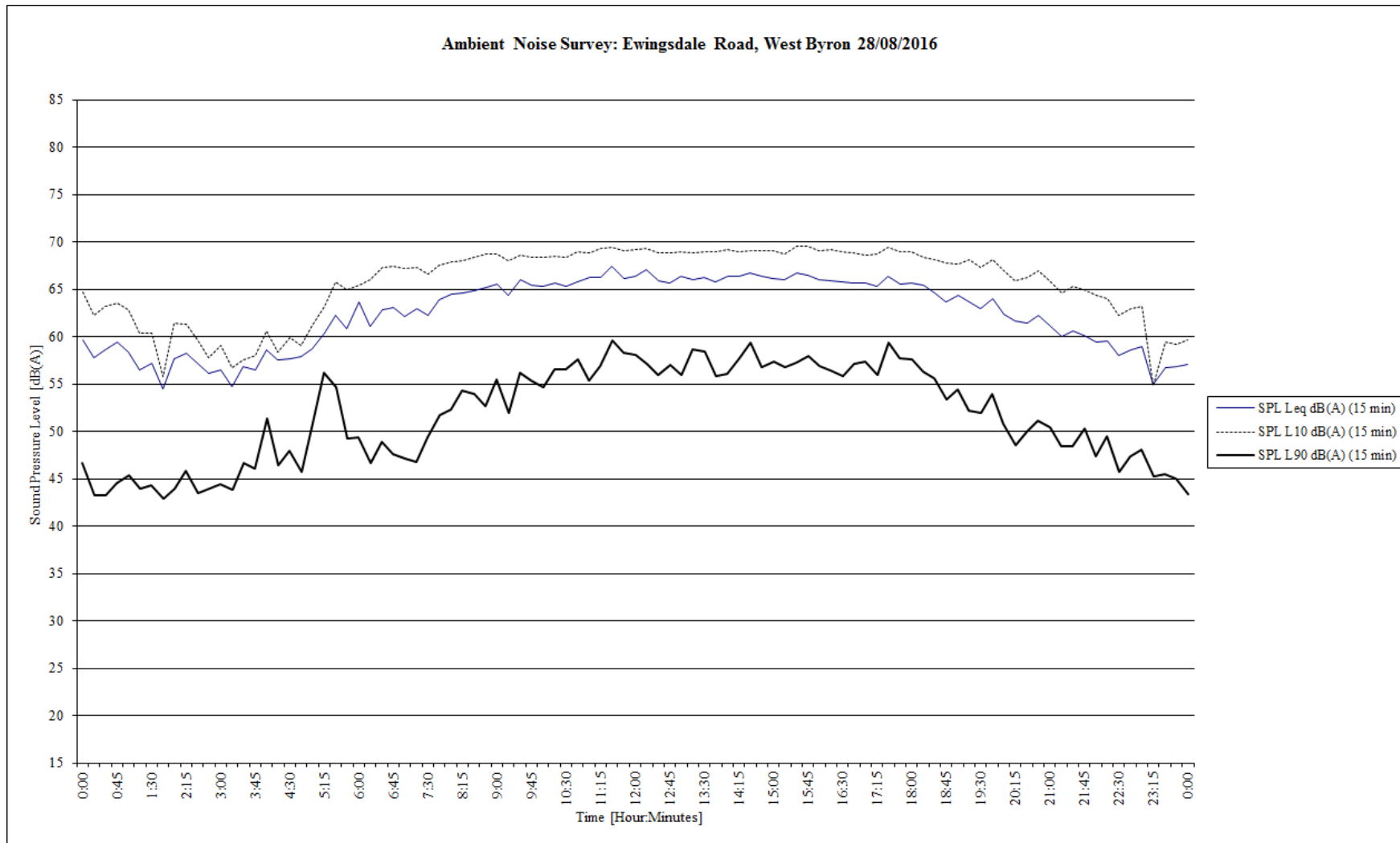
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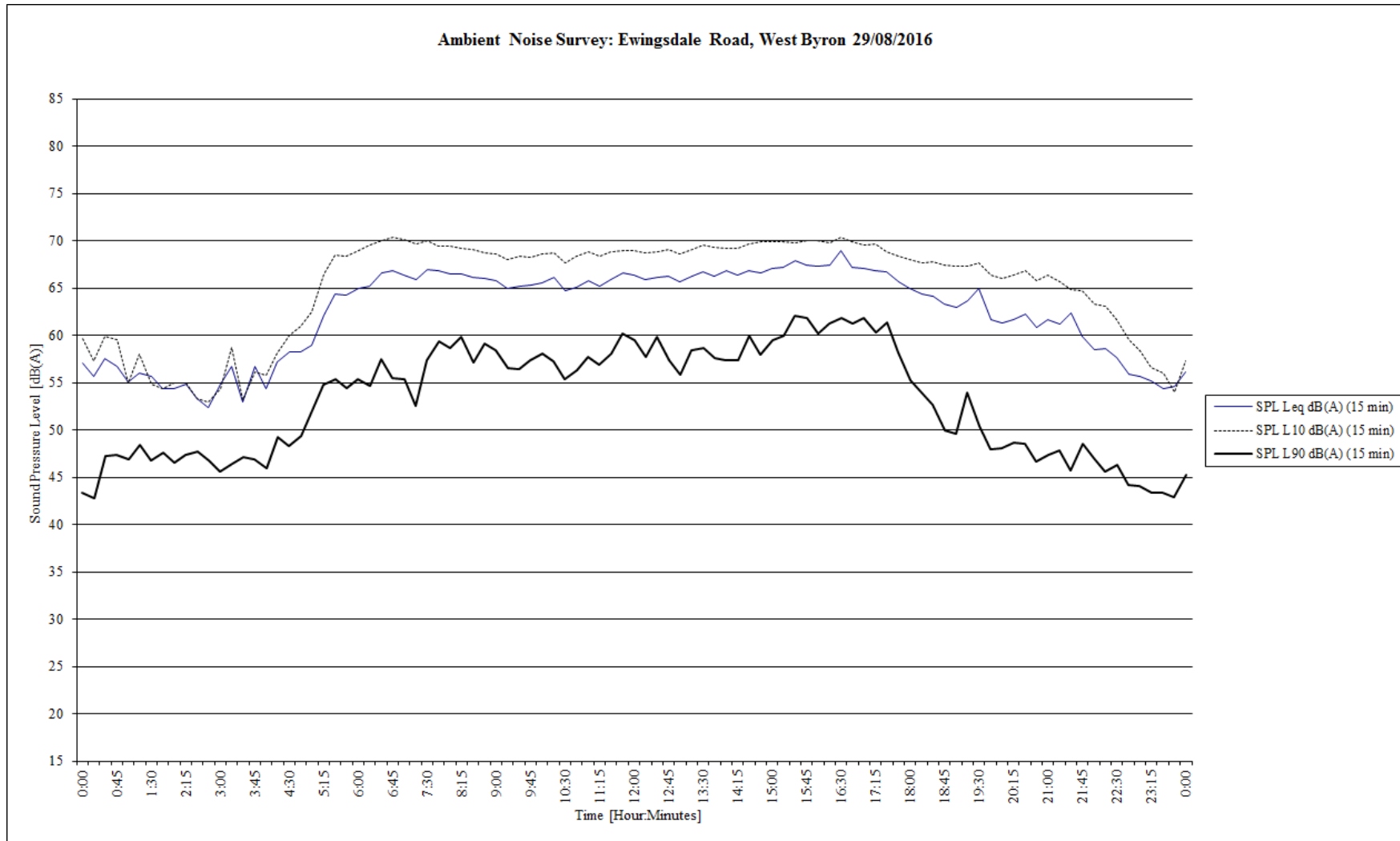


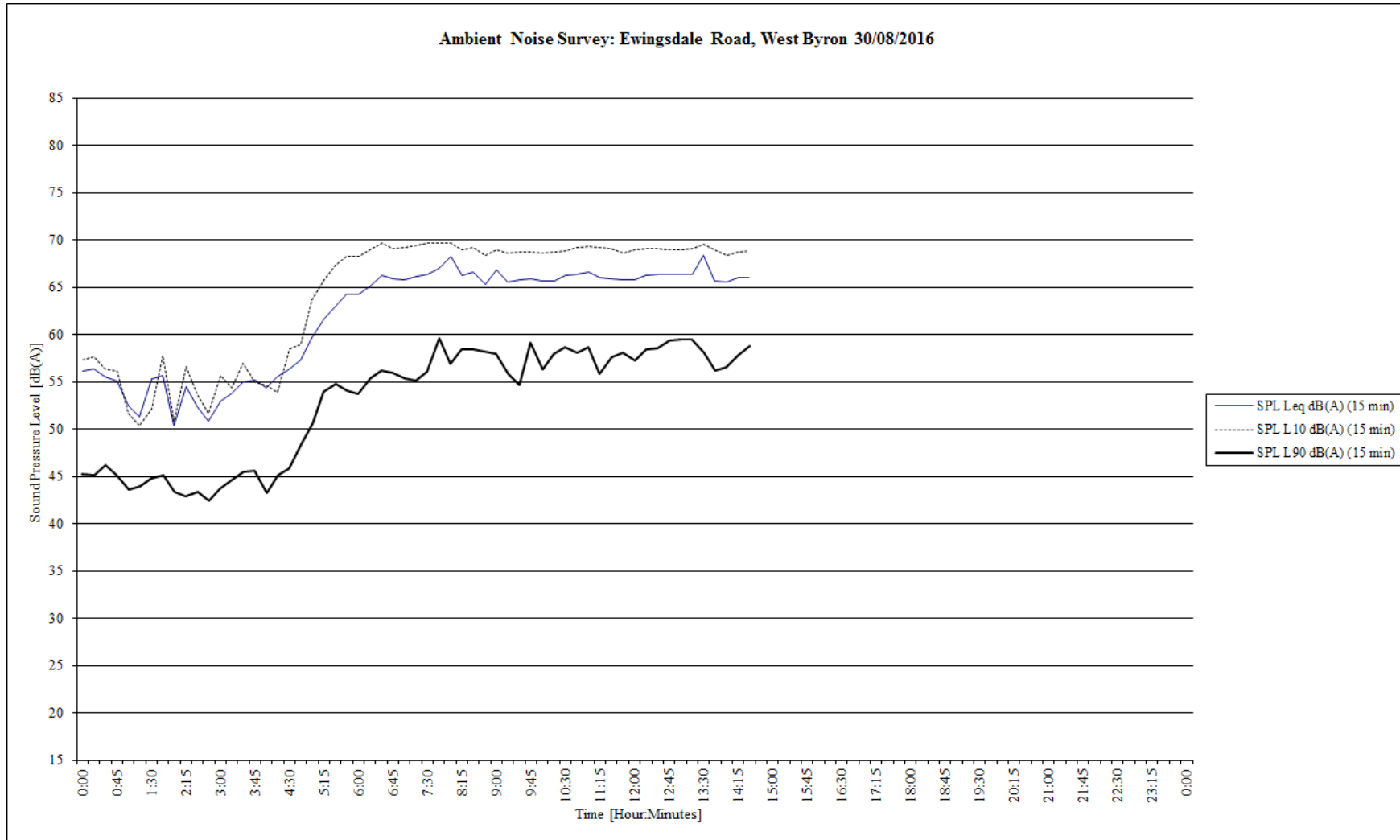
Ambient Noise Survey: Ewingsdale Road, West Byron 26/08/2016











**ONSITE ACTIVITY NOISE IMPACTING THE FAÇADES OF:**

<b>Proposed Childcare Indoor</b>	
Car door closures	57 dB(A) @ 1m
Distance source to receiver	11 m
Distance attenuation	-20.8 dB(A)
Building screening	0 dB(A)
Façade reflection	2.5 dB(A)
Impact inside closed windows	20.2 dB(A)
Car bypasses	61 dB(A) @ 1m
Distance source to receiver	15 m
Distance attenuation	-23.5 dB(A)
Building screening	0 dB(A)
Façade reflection	2.5 dB(A)
Impact inside closed windows	21.9 dB(A)
Manufacturing activity	85 dB(A) @ 1m
Distance source to receiver	10 m
Distance attenuation	-20.0 dB(A)
Inside to outside factory	-35 dB(A)
Façade reflection	2.5 dB(A)
Impact inside closed windows	14.5 dB(A)
Goods unloading on industrial driveway	81 dB(A) @ 1m
Distance source to receiver	24 m
Distance attenuation	-27.6 dB(A)
Building screening	-20 dB(A)
Façade reflection	2.5 dB(A)
Impact inside closed windows	17.9 dB(A)
Waste collection on industrial driveway	88 dB(A) @ 1m
Distance source to receiver	24 m
Distance attenuation	-27.6 dB(A)
Building screening	-20 dB(A)
Façade reflection	2.5 dB(A)
Impact inside closed windows	24.9 dB(A)
A/C unit x 6	65 dB(A) @ 1m
Distance source to receiver	24 m
Distance attenuation	-27.6 dB(A)
Building screening	-20 dB(A)
Façade reflection	2.5 dB(A)
Impact inside closed windows	1.9 dB(A)
Toilet exhaust	52 dB(A) @ 1m
Distance source to receiver	16 m
Distance attenuation	-24.1 dB(A)
Building screening	-10 dB(A)
Façade reflection	2.5 dB(A)
Impact inside closed windows	2.4 dB(A)
<b>Combined impact</b>	<b>28.2 dB(A)</b>

<b>Proposed Childcare Ground level playspace</b>	
Car door closures	57 dB(A) @ 1m
Distance source to receiver	17 m
Distance attenuation	-24.6 dB(A)
Building screening	-8 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	26.4 dB(A)
Car bypasses	61 dB(A) @ 1m
Distance source to receiver	24 m
Distance attenuation	-27.6 dB(A)
Building screening	-6 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	29.8 dB(A)
Manufacturing activity	85 dB(A) @ 1m
Distance source to receiver	13 m
Distance attenuation	-22.3 dB(A)
Building screening	-30 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	35.2 dB(A)
Goods unloading on industrial driveway	81 dB(A) @ 1m
Distance source to receiver	27 m
Distance attenuation	-28.6 dB(A)
Building screening	-20 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	34.9 dB(A)
Waste collection on industrial driveway	88 dB(A) @ 1m
Distance source to receiver	27 m
Distance attenuation	-28.6 dB(A)
Building screening	-20 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	41.9 dB(A)
A/C unit x 6	65 dB(A) @ 1m
Distance source to receiver	27 m
Distance attenuation	-28.6 dB(A)
Building screening	-20 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	18.9 dB(A)
Toilet exhaust	52 dB(A) @ 1m
Distance source to receiver	24 m
Distance attenuation	-27.6 dB(A)
Building screening	-15 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	11.9 dB(A)
<b>Combined impact</b>	<b>43.7 dB(A)</b>

<b>Proposed Childcare Top floor level playspace</b>	
Car door closures	57 dB(A) @ 1m
Distance source to receiver	10 m
Distance attenuation	-20.0 dB(A)
Building screening	-6 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	33.0 dB(A)
Car bypasses	61 dB(A) @ 1m
Distance source to receiver	15 m
Distance attenuation	-23.5 dB(A)
Building screening	-6 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	33.9 dB(A)
Manufacturing activity	85 dB(A) @ 1m
Distance source to receiver	13 m
Distance attenuation	-22.3 dB(A)
Building screening	-30 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	35.2 dB(A)
Goods unloading on industrial driveway	81 dB(A) @ 1m
Distance source to receiver	27 m
Distance attenuation	-28.6 dB(A)
Building screening	-20 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	34.9 dB(A)
Waste collection on industrial driveway	88 dB(A) @ 1m
Distance source to receiver	27 m
Distance attenuation	-28.6 dB(A)
Building screening	-20 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	41.9 dB(A)
A/C unit x 6	65 dB(A) @ 1m
Distance source to receiver	27 m
Distance attenuation	-28.6 dB(A)
Building screening	-20 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	18.9 dB(A)
Toilet exhaust	52 dB(A) @ 1m
Distance source to receiver	24 m
Distance attenuation	-27.6 dB(A)
Building screening	-8 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	18.9 dB(A)
<b>Combined impact</b>	<b>44.2 dB(A)</b>

**OFFSITE ACTIVITY NOISE IMPACTING THE FAÇADES OF:**

<b>Proposed Childcare Indoor</b>	
Car door closures	57 dB(A) @ 1m
Distance source to receiver	23 m
Distance attenuation	-27.2 dB(A)
Building screening	0 dB(A)
Façade reflection	2.5 dB(A)
Impact inside closed windows	13.8 dB(A)
Car bypasses	61 dB(A) @ 1m
Distance source to receiver	18 m
Distance attenuation	-25.1 dB(A)
Building screening	0 dB(A)
Façade reflection	2.5 dB(A)
Impact inside closed windows	20.3 dB(A)
Manufacturing activity	85 dB(A) @ 1m
Distance source to receiver	8 m
Distance attenuation	-18.1 dB(A)
Inside to outside factory open doors	-10 dB(A)
Façade reflection	2.5 dB(A)
Impact inside closed windows	29.4 dB(A)
Goods unloading on industrial driveway	81 dB(A) @ 1m
Distance source to receiver	22 m
Distance attenuation	-26.8 dB(A)
Building screening	-20 dB(A)
Façade reflection	2.5 dB(A)
Impact inside closed windows	6.7 dB(A)
Waste collection on industrial driveway	88 dB(A) @ 1m
Distance source to receiver	22 m
Distance attenuation	-26.8 dB(A)
Building screening	-20 dB(A)
Façade reflection	2.5 dB(A)
Impact inside closed windows	13.7 dB(A)
A/C unit x 2 east side of building	55 dB(A) @ 1m
Distance source to receiver	8 m
Distance attenuation	-18.1 dB(A)
Building screening	0 dB(A)
Façade reflection	2.5 dB(A)
Impact inside closed windows	9.4 dB(A)
Toilet exhaust	52 dB(A) @ 1m
Distance source to receiver	12 m
Distance attenuation	-21.6 dB(A)
Building screening	0 dB(A)
Façade reflection	2.5 dB(A)
Impact inside closed windows	2.9 dB(A)
<b>Combined impact</b>	<b>30.2 dB(A)</b>

<b>Proposed Childcare Ground level playspace</b>	
Car door closures	57 dB(A) @ 1m
Distance source to receiver	39 m
Distance attenuation	-31.8 dB(A)
Building screening	-8 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	19.2 dB(A)
Car bypasses	61 dB(A) @ 1m
Distance source to receiver	34 m
Distance attenuation	-30.6 dB(A)
Building screening	-6 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	26.8 dB(A)
Manufacturing activity	85 dB(A) @ 1m
Distance source to receiver	25 m
Distance attenuation	-28.0 dB(A)
Building screening	-30 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	29.5 dB(A)
Goods unloading on industrial driveway	81 dB(A) @ 1m
Distance source to receiver	39 m
Distance attenuation	-31.8 dB(A)
Building screening	-20 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	31.7 dB(A)
Waste collection on industrial driveway	88 dB(A) @ 1m
Distance source to receiver	39 m
Distance attenuation	-31.8 dB(A)
Building screening	-20 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	38.7 dB(A)
A/C unit x 2 east side of building	55 dB(A) @ 1m
Distance source to receiver	25 m
Distance attenuation	-28.0 dB(A)
Building screening	-20 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	9.5 dB(A)
Toilet exhaust	52 dB(A) @ 1m
Distance source to receiver	28 m
Distance attenuation	-28.9 dB(A)
Building screening	-15 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	10.6 dB(A)
<b>Combined impact</b>	<b>40.1 dB(A)</b>

**ONSITE ACTIVITY NOISE IMPACTING THE FAÇADES OF:**

<b>Proposed Childcare Top floor level playspace</b>	
Car door closures	57 dB(A) @ 1m
Distance source to receiver	27 m
Distance attenuation	-28.6 dB(A)
Building screening	-6 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	24.4 dB(A)
Car bypasses	61 dB(A) @ 1m
Distance source to receiver	23 m
Distance attenuation	-27.2 dB(A)
Building screening	-6 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	30.2 dB(A)
Manufacturing activity	85 dB(A) @ 1m
Distance source to receiver	16 m
Distance attenuation	-24.1 dB(A)
Building screening	-30 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	33.4 dB(A)
Goods unloading on industrial driveway	81 dB(A) @ 1m
Distance source to receiver	40 m
Distance attenuation	-32.0 dB(A)
Building screening	-20 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	31.5 dB(A)
Waste collection on industrial driveway	88 dB(A) @ 1m
Distance source to receiver	40 m
Distance attenuation	-32.0 dB(A)
Building screening	-20 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	38.5 dB(A)
A/C unit x 2 east side of building	55 dB(A) @ 1m
Distance source to receiver	16 m
Distance attenuation	-24.1 dB(A)
Building screening	-20 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	13.4 dB(A)
Toilet exhaust	52 dB(A) @ 1m
Distance source to receiver	16 m
Distance attenuation	-24.1 dB(A)
Building screening	-8 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	22.4 dB(A)
<b>Combined impact</b>	<b>40.8 dB(A)</b>

POINT CALCULATIONS

Pen3D2000 V 1.10.0

Project Code:16186a

Project Description:Noise assessment of Byron Childcare

File:G:\Users\Matty\CRGNAS\2016\16186 Childcare and Industrial Byron Bay COMM IND\16186a\_existing.PEN

Monday 23 Jan, 2017 at 09:28:58

CoRTN Calculations

All road segments included. Segmentation angle: 1degrees. Road elevations apply.

Receptor	X Posn (m)	Y Posn (m)	Height (m)	Leq(24hour) (dB(A))
monitor	557284.7	6831963.8	1.4	65.4 free-field

Project Description:Noise assessment of Byron Childcare

File:G:\Users\Matty\CRGNAS\2016\16186 Childcare and Industrial Byron Bay COMM IND\16186a\_ultimate.PEN

File Description:Data file covering ultimate

Monday 23 Jan, 2017 at 11:41:47

CoRTN Calculations

All road segments included. Segmentation angle: 1degrees. Road elevations apply.

Receptor	X Posn (m)	Y Posn (m)	Height (m)	Leq(24hour) (dB(A))
room1	556673.7	6832036.6	1.5	45.2
r1 ex	556680.2	6832030.4	1.5	62.6
room 2	556671.5	6832039.7	1.5	46.2
r2 ext	556664.6	6832041.2	1.5	55
room 3	556673.2	6832053.7	1.5	45.7
r3 ext	556664.9	6832055.6	1.5	50.6
room4	556689.8	6832036.5	5.4	51.4
r4 ext	556680.2	6832030.4	5.4	65.4
room5	556673.2	6832045.4	5.4	51.6
r5 ext	556664.6	6832041.2	5.4	58.5
caretaker's	556698.7	6832031.5	5.4	64.8
zen	556673.1	6832063.6	1.5	46.9
main	556680.9	6832049.5	1.5	47.1
sw	556669.7	6832037.4	1.5	46
nw	556673.9	6832056.7	5.4	51.8
ne	556693.4	6832053.8	5.4	51.8
se	556693.3	6832037	5.4	52.4

Proposed Job no.	Childcare Centre											
16186a												
<b>Rw Calculations to AS3671</b>												
Road Traffic Noise Space	Building Component	Impact dB(A)	Criteria dB(A)	TNR dB(A)	Element Area (m2)	Floor Area (m2)	Height (m)	RT60 (s)	C	TNA	Rw	
Activity Room 1	North / West Glazings	48.0	35	13.0	14.16	41.00	3.00	0.70	4	15.86	22	
Activity Room 1	North / West Walls	48.0	35	13.0	34.59	41.00	3.00	0.70	4	19.74	26	
Activity Room 1	South Glazing	66.0	35	31.0	5.04	41.00	3.00	0.70	4	29.38	35	
Activity Room 1	South Wall	66.0	35	31.0	12.51	41.00	3.00	0.70	4	33.33	39	
Activity Room 2	South / East Glazings	49.0	35	14.0	9.60	51.39	3.00	0.70	3	12.95	19	
Activity Room 2	South / East Walls	49.0	35	14.0	50.85	51.39	3.00	0.70	3	20.19	26	
Activity Room 2	West Wall	58.0	35	23.0	34.32	51.39	3.00	0.70	3	27.48	33	
Activity Room 3	North / East Glazings	49.0	35	14.0	9.39	51.82	3.00	0.70	3	12.81	19	
Activity Room 3	North / East Walls	49.0	35	14.0	41.31	51.82	3.00	0.70	3	19.25	25	
Activity Room 3	West Wall	54.0	35	19.0	33.93	51.82	3.00	0.70	3	23.39	29	
Activity Room 4	North / East Glazings	54.0	35	19.0	15.63	84.59	3.00	0.70	5	20.12	26	
Activity Room 4	North / West / East Walls	54.0	35	19.0	74.07	84.59	3.00	0.70	5	26.87	33	
Activity Room 4	South Glazings	68.0	35	33.0	6.00	84.59	3.00	0.70	5	29.96	36	
Activity Room 4	South Wall	68.0	35	33.0	29.40	84.59	3.00	0.70	5	36.86	43	
Activity Room 4	Roof / Ceiling	66.0	35	31.0	84.59	84.59	3.00	0.50	5	37.99	44	
Activity Room 5	North / South / East Glazings	55.0	35	20.0	11.04	76.32	3.00	0.70	4	19.09	25	
Activity Room 5	North / South / East Walls	55.0	35	20.0	83.73	76.32	3.00	0.70	4	27.88	34	
Activity Room 5	West Wall	62.0	35	27.0	31.80	76.32	3.00	0.70	4	30.68	37	
Activity Room 5	Roof / Ceiling	60.0	35	25.0	76.32	76.32	3.00	0.70	4	32.48	38	
Caretaker's dwelling	South Glazing	61.0	35	26.0	10.80	43.65	2.40	0.70	3	27.14	33	
Caretaker's dwelling	South Wall	61.0	35	26.0	3.30	43.65	2.40	0.70	3	21.99	28	
Caretaker's dwelling	Roof / Ceiling	59.0	35	24.0	43.65	43.65	2.40	0.70	3	31.20	37	



# THE HIVE – CENTENNIAL CIRCUIT BYRON BAY TRAFFIC IMPACT ASSESSMENT REPORT

FOR

SIXTY CENTENNIAL PTY LTD



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## DOCUMENT CONTROL SHEET

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## 1. INTRODUCTION

Bitzios Consulting has been engaged by Sixty Centennial Pty Ltd to prepare a traffic impact assessment for a proposed mix-use development located at 88 – 94 Centennial Circuit, Byron Bay. The site currently exists as a vacant lot, with the site location shown in Figure 1.1.



Source: Google Earth – NSW Globe

**Figure 1.1: Development Site location**

### 1.1 PROPOSED DEVELOPMENT

The proposed development comprises of the following land uses:

- a two-story child care centre ('Kool Kids') with a total capacity of 78 enrolments;
- a 56m<sup>2</sup> manager's residence; and
- six (6) industrial tenancies ('The Hive');
- four (4) retail tenancies; and
- two (2) food and drink tenancies.

Access is proposed via a two-way driveway crossover from Centennial Circuit. All movements (i.e. left and right in) are permitted. Detailed development plans are provided in Appendix A.

### 1.2 SCOPE

The scope of this assessment includes:

- estimation of development's traffic generation and the distribution onto the external road network;
- summary of the site's traffic generation and any impacts on the surrounding road and intersections. This includes SIDRA modelling of the intersection of Centennial Circuit / Grevillea Street / Bayshore Drive and the intersection of Ewingsdale Road / Bayshore Drive for the expected year of opening and a 10-year design horizon for the AM and PM peak hours;
- assessment of site access location and form in accordance with Council's requirements;
- assessment of the development's car and bicycle parking requirements in accordance with Council's Development Control Plan (DCP) and Australian Standards (AS2890);
- assessment of the on-site parking layout for general traffic and service vehicle manoeuvring, including swept path checks using AutoTURN software;

- a review of on-site active transport amenity provisions; and
- assessment of public transport, pedestrian and cycling networks and connectivity within the vicinity of the site.

## 2. EXISTING CONDITIONS

### 2.1 ROAD NETWORK

The existing road network is summarised in Table 2.1.

Table 2.1: Surrounding Road Network Details

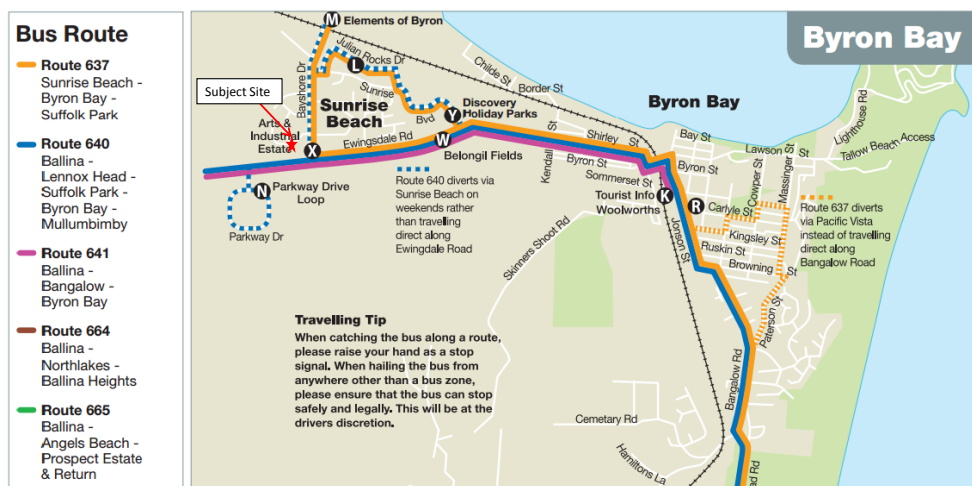
Road Name	No. of Lanes	Speed Limit	Divided	Jurisdiction	Hierarchy	Comments
Ewingsdale Road	2	80 km/h	No	Byron Shire Council	Arterial	Primary east-west arterial road connecting Byron Bay to the Pacific Highway.
Bayshore Drive	2	50 km/h	Yes (north to Grevillea Street)	Byron Shire Council	Local Collector	Links to Ewingsdale Road and is a no-through road. Services a number of residential and industrial land uses.
Centennial Circuit	2	50 km/h	No	Byron Shire Council	Local Access	Provides access to the development. Links from Ewingsdale Road and Bayshore Drive. Services a number of industrial land uses.

### 2.2 ALTERNATIVE TRANSPORT

#### 2.2.1 Public Transport

The development is reasonably well serviced by public transport (refer to Figure 2.1) with the closest bus stop (Stop X) located approximately 220m walking distance from the site. The Belongil Fields bus stop (Stop W) located approximately 1.3km walking distance, provides additional services to Ballina, Bangalow, Lennox Head and Mullumbimby.

A summary of bus routes that service the nearby stops are presented in Table 2.2.



Source: Blanch's Bus Company

Figure 2.1: Bus Route Map

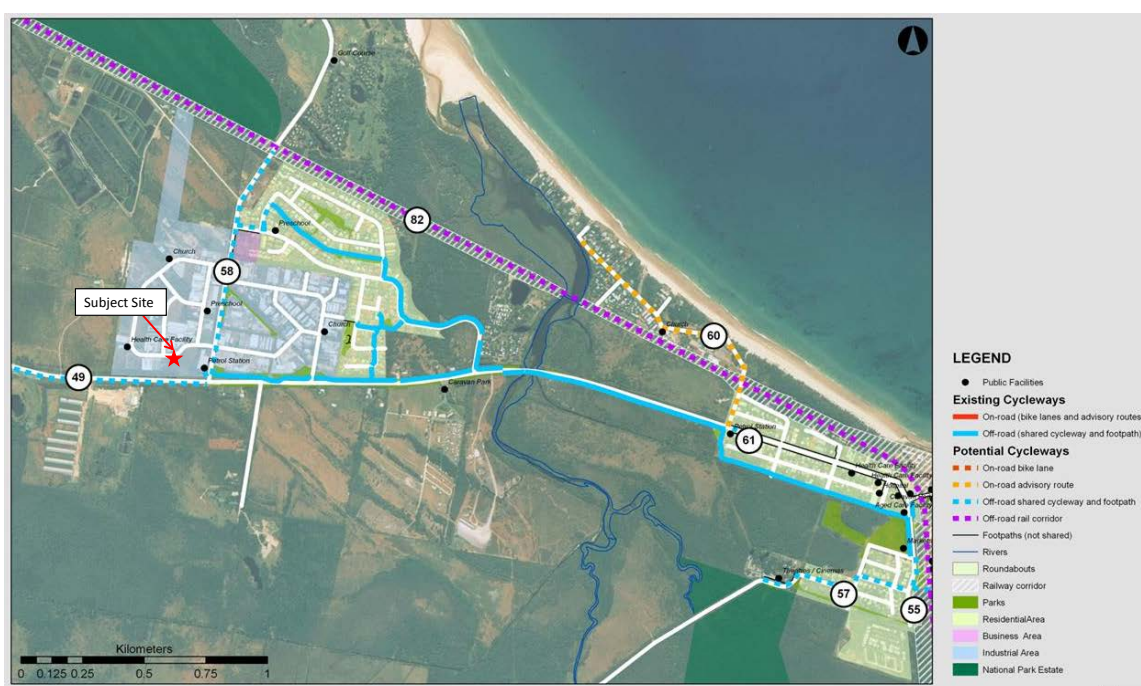
Table 2.2: Bus Routes Servicing the Development

Route Number	Closest Bus Stop	Key Stops	Peak Service Interval
637	X	Sunrise Beach – Byron Bay – Suffolk Park	60 minutes
640	W	Ballina – Lennox Head – Suffolk park – Byron Bay - Mullumbimby	60 minutes
641	W	Ballina – Bangalow - Byron Bay	67 minutes

Additional bus stops are likely to be introduced near the Bayshore Drive / Ewingsdale Road intersection subject to the approval of a potential residential development on the southern side of Ewingsdale Road.

### 2.2.2 Active Transport

High quality shared pedestrian and bicycle footpaths are provided on surrounding streets including Bayshore Drive and Ewingsdale Road. Council Plans also indicate the potential construction of several pathways in the proximity of the development as shown in Figure 2.2.



Source: Byron Shire Council and the NSW Department of Lands

Figure 2.2: Active Transport Map

### 3. TRAFFIC ASSESSMENT

#### 3.1 OVERVIEW

This traffic assessment covers the following:

- identifying key surrounding roads and intersections;
- determining background traffic volumes from intersection count data;
- forecasting background traffic volumes using a compounding growth rate;
- estimating development traffic generation and distribution;
- determining design traffic volumes by combining forecast background traffic volumes and development trips for the anticipated year of opening and 10-year design horizon; and
- undertaking SIDRA intersection analysis for the key intersections.

The key intersections subject to the assessment are the intersection of Ewingsdale Road / Bayshore Drive and intersection of Bayshore Drive / Centennial Circuit / Grevillea Street.

#### 3.2 BACKGROUND TRAFFIC VOLUMES

##### 3.2.1 Intersection Count

Background traffic volumes for the intersection of Ewingsdale Road / Bayshore Drive and intersection of Bayshore Drive / Centennial Circuit / Grevillea Street were obtained from traffic counts undertaken by Traffic Data and Control (TDC) on Thursday 20<sup>th</sup> October 2016. The count data was recorded for both the AM and PM peak periods, where the network peak hour was identified as being from 8:00-9:00AM and 4:00-5:00PM respectively. The survey results for the AM and PM peak period traffic volumes are provided in Appendix B.

		Bayshore Drive							
		L	T	R	U	U	R	T	L
Centennial Circuit	AM Peak 8:00 - 9:00AM	24	14		L	3	17	346	24
	PM Peak 4:00 - 5:00PM	33	22		T	1	11	183	20
Development Site Location		207	99		R	U	R	T	L
		1	0		U	U	R	T	L
Ewingsdale Road		L	T	R	U	U	0	0	
		274	283	86	13	L	20	20	
		151	237	85	37	T	15	18	
						R	28	64	
Ewingsdale Road						404	261		
		268	434		L	180	164		
		502	699		T	R	L		
						R	230	214	
					T	462	690		

Figure 3.1: 2016 Background Traffic Volumes

#### 3.3 GROWTH RATE

The *West Byron Development Transport Study Report (March 2011)* prepared by Veitch Lister Consulting provides 2018 and 2028 Base Case Zenith Model Traffic Forecasts on Ewingsdale Road. The Zenith Model Scenario used to forecast the average weekday traffic volumes assumes that the following development and infrastructure projects are excluded:

- West Byron Development (all stages);
- Ewingsdale Road Four Lane Upgrade;

- Mini-Bypass (Butler Street to Jonson Street / Marvell Street); and
- Long-Bypass (Butler Street to Jonson Street / Browning Street).

The forecast growth rates summarised in Table 3.1 have been derived from 2018 and 2028 Daily Forecast Traffic Volumes for the key road links surrounding the subject site.

Table 3.1: Forecast Growth Rate Summary

Road Link	2018 Daily Forecast Volume	2028 Daily Forecast Volume	Forecast Growth Rate (compounded p.a)
Ewingsdale Road (West of Bayshore Drive)	18,820	20,340	0.77%
Ewingsdale Road (East of Bayshore Drive)	15,860	16,660	0.67%
Bayshore Drive	7,720	8,250	0.49%

A conservative compounding growth rate of 1% p.a. has been adopted for the estimation of forecast background traffic volumes on all roads assessed. Figure 3.2 and Figure 3.3 illustrate the forecast background traffic volumes for the expected year-of-opening (2018) with the 10-year design horizon (2028).

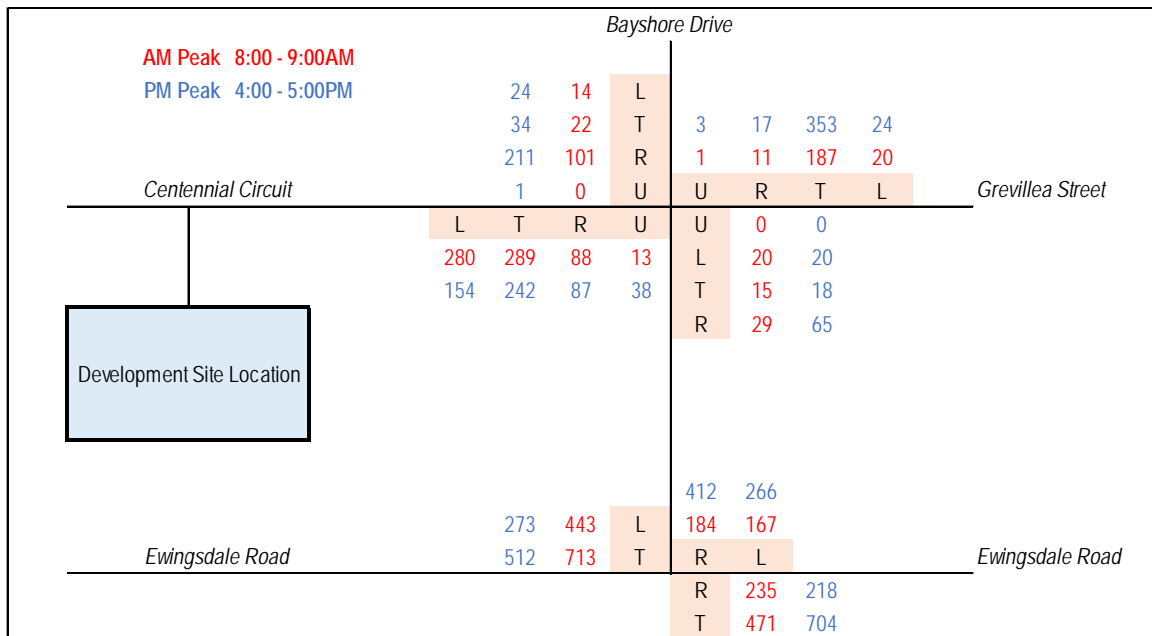


Figure 3.2: Forecast 2018 Background Traffic Volumes

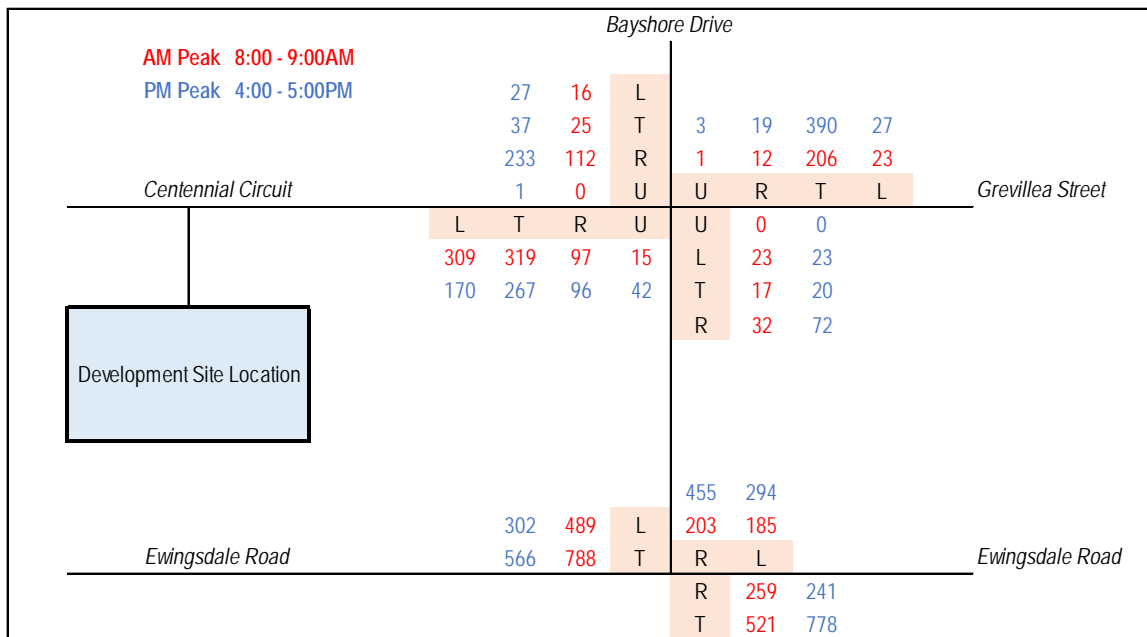


Figure 3.3: Forecast 2028 Background Traffic Volumes

### 3.4 DEVELOPMENT TRAFFIC GENERATION

Traffic generation rates for the proposed development were sourced from the *Roads and Maritime Services (Roads and Maritime) Guide to Traffic Generating Developments* (2002), and applied to each land use as follows:

- **Child Care Centre** – Roads and Maritime defined “Long Day Care”, specified AM and PM peak rates;
- **Industry** – Roads and Maritime defined “Factory”, specified PM peak rate. AM peak trips taken as 50% of PM peak trips;
- **Retail and Food and Drink Premises** – Roads and Maritime defined “Shopping Centre” (“A(SS) secondary retail”), specified PM peak rate. AM peak trips taken as 50% of PM peak trips; and
- it was assumed that the manager was working during peak hours and therefore the manager’s residence would not contribute to the peak hour trip generation.

The resultant AM and PM traffic generation is presented in Table 3.2 and Table 3.3.

Table 3.2: AM Development Traffic Generation

Land Use	Quantity	Rate	Trips (veh/hr)
Child Care Centre	78 Children Enrolled	0.8 trips per child enrolled	62.4
Industry	1390m <sup>2</sup> GFA	0.5 trips per 100m <sup>2</sup> GFA	7.0
Food and Drink	44m <sup>2</sup> GFA	2.8 trips per 100m <sup>2</sup> GFA	1.2
Retail	88m <sup>2</sup> GFA	2.8 trips per 100m <sup>2</sup> GFA	2.5
<b>Total AM Peak Trips</b>			<b>73</b>

Table 3.3: PM Development Traffic Generation

Land Use	Quantity	Rate	Trips (veh/hr)
Child Care Centre	78 Children Enrolled	0.7 trips per child enrolled	54.6
Industry	1390m <sup>2</sup> GFA	1 trips per 100m <sup>2</sup> GFA	13.9
Food and Drink	44m <sup>2</sup> GFA	5.6 trips per 100m <sup>2</sup> GFA	2.5
Retail	88m <sup>2</sup> GFA	5.6 trips per 100m <sup>2</sup> GFA	4.9
<b>Total PM Peak Trips</b>			<b>76</b>

The proposed development is expected to generate 73 vehicle trips in the AM peak hour and 76 trips in the PM peak hour. This is equivalent to approximately one (1) peak hour vehicle movement (ingress or egress) every 48 seconds.

The proposed developments IN/OUT trip splits are expected to be 50% / 50% for all land uses except for the industry components which are expected to have an 80% IN / 20% OUT split in the AM peak hour and vice versa in the PM peak hour based on the ITE Handbook. Table 3.4 details the expected total IN/OUT development trips.

**Table 3.4: AM and PM Development Traffic Splits**

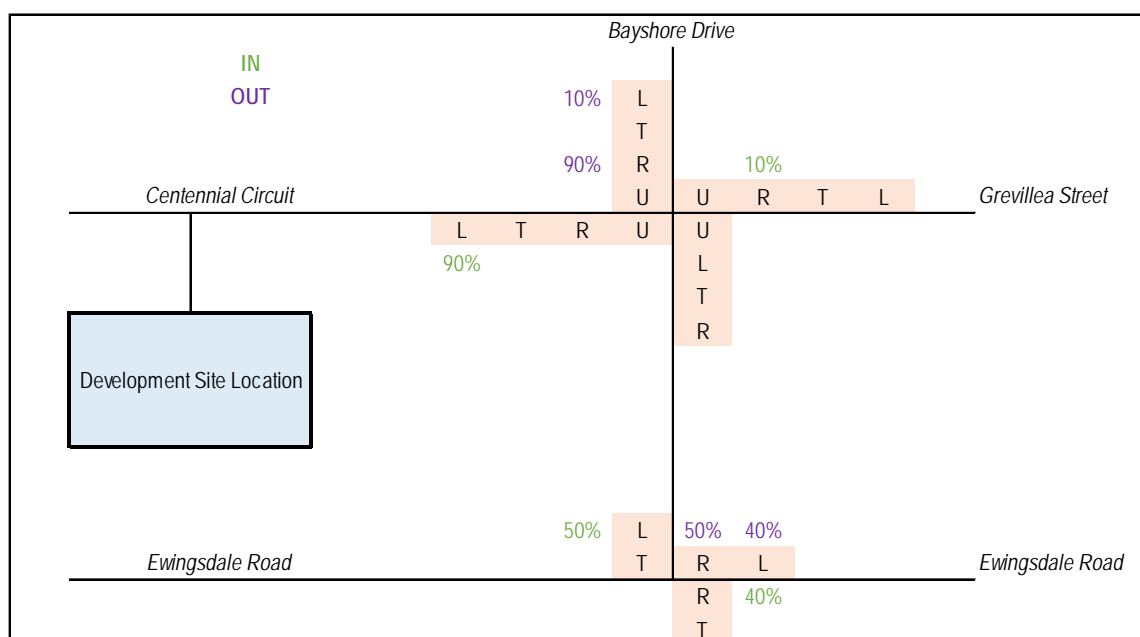
Land Use	AM		PM		AM		PM	
	IN%	OUT%	IN%	OUT%	IN	OUT	IN	OUT
Child Care Centre	50%	50%	50%	50%	31.2	31.2	27.3	27.3
Industry	80%	20%	20%	80%	5.6	1.4	2.8	11.1
Food and Drink	50%	50%	50%	50%	0.6	0.6	1.2	1.2
Retail	50%	50%	50%	50%	1.2	1.2	2.5	2.5
<b>Total Trips</b>					<b>39</b>	<b>34</b>	<b>34</b>	<b>42</b>

For the purpose of this assessment it has been assumed that the majority of traffic generated by the development will travel to and from Ewingsdale Road with a small percentage assumed to travel to and from the north (i.e. residential catchment). It should be noted that the intersection of Bayshore Drive / Ewingsdale Road is planned to be upgraded to a roundabout in the future to alleviate existing traffic congestion at this intersection and provide access to the future residential subdivision in the West Byron Development Area. The predicted intersection upgrade is likely to result in a reduction of vehicles choosing alternative routes to access Ewingsdale Road from Banksia Drive and Sunrise Boulevard.

The development’s directional traffic distribution percentage has been assumed as follows:

- trips to/from the development site are assumed as follows:
  - 10% to/from the north;
  - 40% to/from the east; and
  - 50% to/from the west.

The expected development AM and PM IN/OUT trip distributions at the key intersections are illustrated in Figure 3.4.



**Figure 3.4: Development Distribution**

The AM and PM development traffic volumes are illustrated in Figure 3.5.

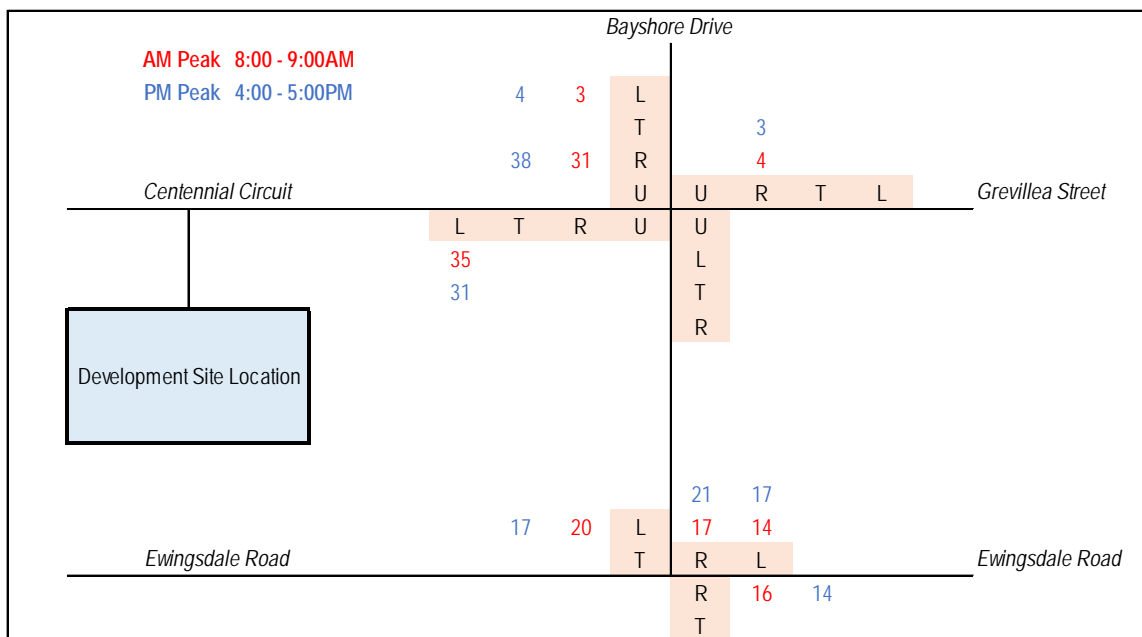


Figure 3.5: Development Traffic Volumes

### 3.5 DESIGN TRAFFIC VOLUMES

The traffic generated by the proposed development has been added to the background traffic volumes to determine design traffic volumes ('with development' scenario). The 2018 and 2028 design traffic volumes are shown in Figure 3.6 and Figure 3.7 respectively.

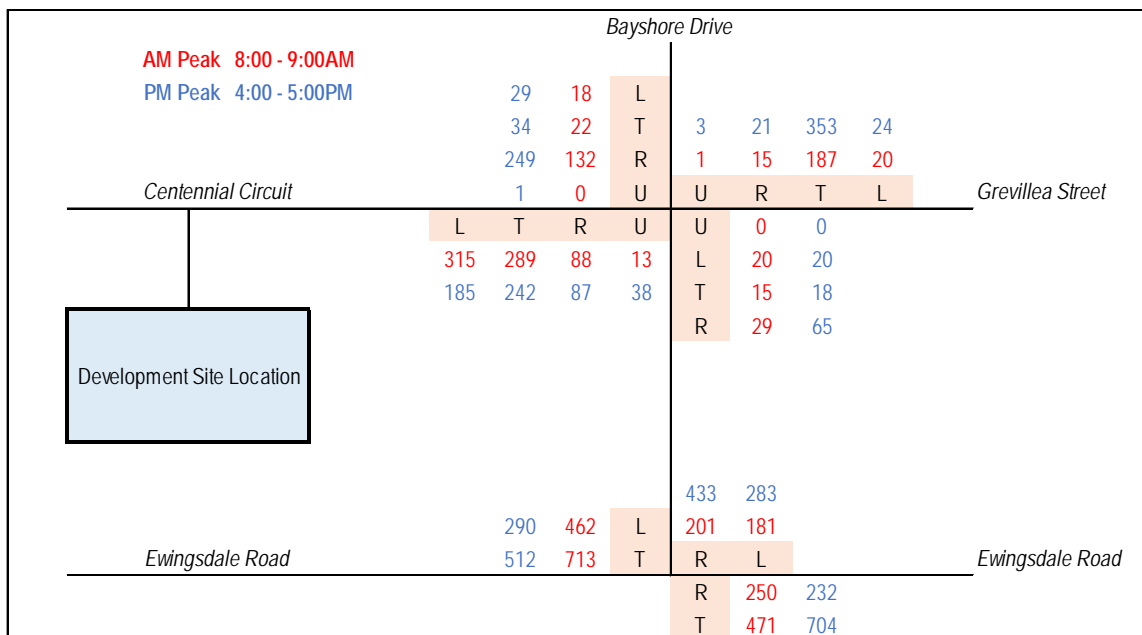


Figure 3.6: 2018 Design Traffic Volumes

		Bayshore Drive							
AM Peak 8:00 - 9:00AM		31	19	L					
PM Peak 4:00 - 5:00PM		37	25	T	3	23	390	27	
		271	142	R	1	16	206	23	
Centennial Circuit		1	0	U	U	R	T	L	Grevillea Street
		L	T	R	U	U	0	0	
		344	319	97	15	L	23	23	
		201	267	96	42	T	17	20	
						R	32	72	
						476	311		
		319	509	L	220	198			
Ewingsdale Road		566	788	T	R	L			Ewingsdale Road
					R	275	255		
					T	521	778		

Figure 3.7: 2028 Design Traffic Volumes

### 3.6 SIDRA ANALYSIS RESULTS

#### 3.6.1 Overview

The intersections of Ewingsdale Road / Bayshore Drive and Bayshore Drive / Centennial Circuit / Grevillea Street have been assessed in SIDRA 7.0 Plus intersection modelling software. The background and design traffic scenarios for the current year (2016), expected year of opening (2018) and 10-year design horizon (2028) have been analysed to determine the intersection's operational performance during the AM and PM peak hours.

#### 3.6.2 Intersection of Ewingsdale Road / Bayshore Drive

The SIDRA intersection layout of Ewingsdale Road / Bayshore Drive is illustrated in Figure 3.8. The intersection configuration is of a 'Seagull Arrangement', which will be assessed as a staged crossing in SIDRA.

The following points apply when assessing the staged crossing SIDRA results:

- the degree of saturation is the higher of the values for the two stages;
- the overall average delay is the sum of the average delay values for the two stages; and
- the level of service for the staged crossing could be assess using the average delay calculated as the sum of delays at the two stages of crossing.

The actual arrangement of the intersection is illustrated in Figure 3.9.

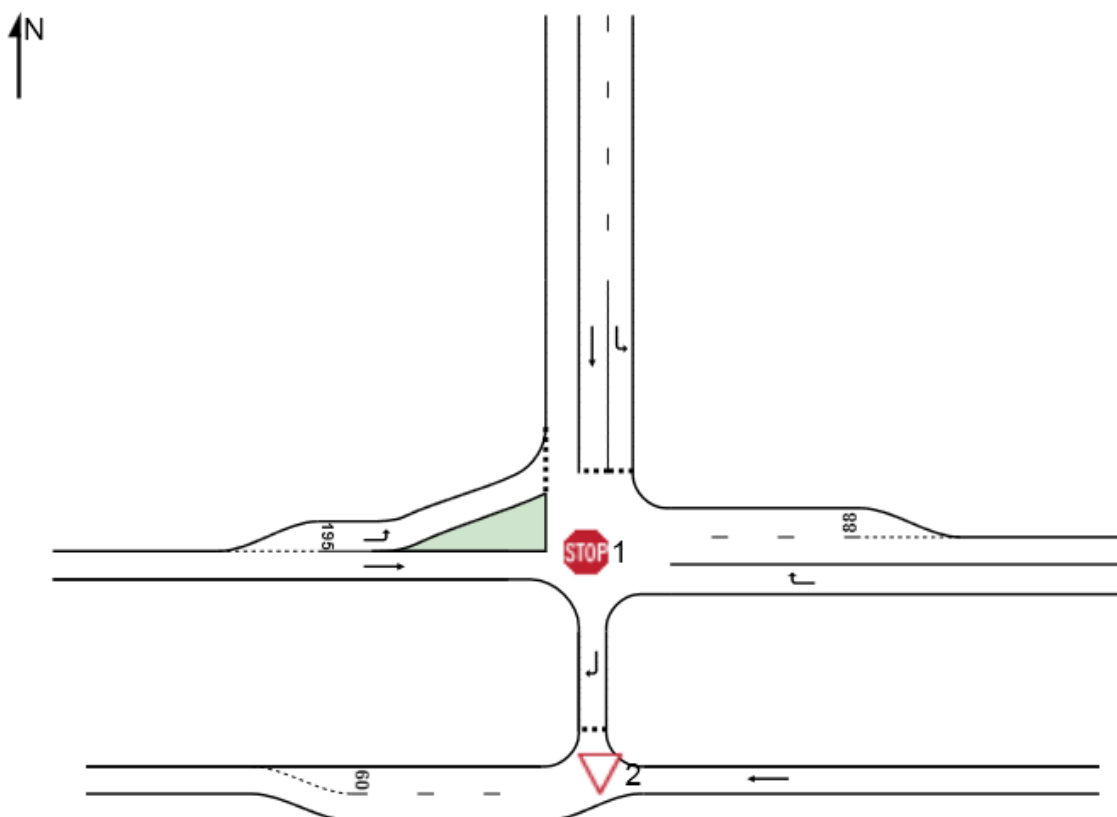


Figure 3.8: SIDRA Intersection Layout of Ewingsdale Road / Bayshore Drive



Figure 3.9: Actual Intersection Arrangement of Ewingsdale Road / Bayshore Drive

The SIDRA results for stage 1 2016 background traffic volumes are detailed in Table 3.5.

Table 3.5: 2016 SIDRA Results – Ewingsdale Rd / Bayshore Dr Intersection Stage 1

Approach	AM Peak					PM Peak				
	VOL	DOS	Average Delay (s)	LOS	95%ile Queue (m)	VOL	DOS	Average Delay (s)	LOS	95%ile Queue (m)
<b>2016 Background Results</b>										
Ewingsdale Rd (E)	242	0.34	11	N/A	12	242	0.244	8	N/A	8
Bayshore Dr (N)	362	1.01*	62*	E	97*	700	1.43*	258*	F	633*
Ewingsdale Rd (W)	1193	0.424	3	A	20	811	0.27	3	A	9

\*Note: Once DOS exceeds 1 the average delay and 95<sup>th</sup> percentile queue values become inaccurate

The SIDRA results for stage 2 2016 background traffic volumes are detailed in Table 3.6.

**Table 3.6: 2016 SIDRA Results – Ewingsdale Rd / Bayshore Dr Intersection Stage 2**

Approach	AM Peak					PM Peak				
	VOL	DOS	Average Delay (s)	LOS	95 <sup>th</sup> ile Queue (m)	VOL	DOS	Average Delay (s)	LOS	95 <sup>th</sup> ile Queue (m)
<b>2016 Background Results</b>										
Ewingsdale Rd (E)	486	0.26	0	N/A	0	726	0.382	0	N/A	0
Storage Area	189	0.23	2	A	5	425	0.446	5	A	11

The 2016 background traffic scenario for the intersection of Ewingsdale Road / Bayshore Drive fails in terms of Degree of Saturation (DOS), Level of Service (LOS), average delay and the 95<sup>th</sup> percentile queue on the Bayshore Drive approach. The SIDRA movement summaries for the intersection of Ewingsdale Road / Bayshore Drive are provided in Appendix C.

The failure of the intersection is an existing issue where the *Byron Shire Council Section 94 Contributions Plan* (2012) indicates that the intersection will be upgraded to a roundabout based on the scheduling of land release at the West Byron Development Area. The roundabout has been planned for taking into consideration surrounding developments; therefore, no additional modelling has been undertaken at this intersection. In addition, this development is only a minor traffic generator in comparison to the surrounding future development yields.

The applicant will provide development contributions (S94) to Council for this application. Council can decide whether they would like to use these contributions towards the roundabout upgrade, or any other enhancement, such as improvements to the cycling network in the area.

### 3.6.3 Intersection of Bayshore Drive / Centennial Circuit / Grevillea Street

The SIDRA intersection layout for the intersection of Bayshore Drive / Centennial Circuit / Grevillea Street is illustrated in Figure 3.10

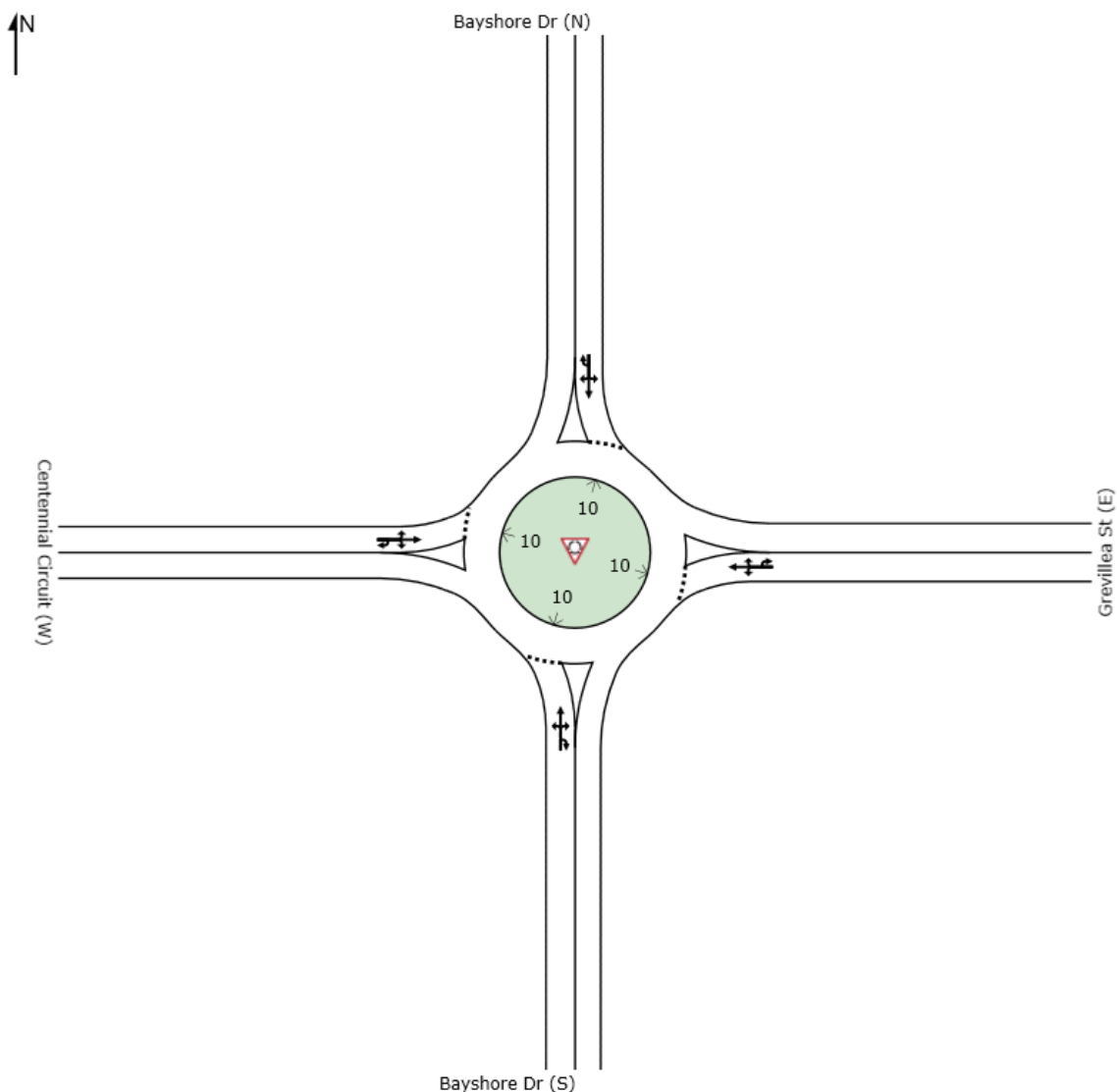


Figure 3.10: SIDRA Intersection Layout of Bayshore Dr / Centennial Circuit / Grevillea St

### 3.6.4 SIDRA Intersection Results

The SIDRA results for the 2016 background traffic volumes are detailed in Table 3.7.

Table 3.7: 2016 SIDRA Results – Bayshore Dr / Centennial Circuit / Grevillea St Intersection

Approach	AM Peak					PM Peak				
	VOL	DOS	Average Delay (s)	LOS	95%ile Queue (m)	VOL	DOS	Average Delay (s)	LOS	95%ile Queue (m)
<b>2016 Background Results</b>										
Bayshore Dr (S)	691	0.48	5	A	26	537	0.38	5	A	19
Grevillea St (E)	67	0.07	6	A	2	108	0.14	8	A	6
Bayshore Dr (N)	226	0.22	5	A	9	411	0.43	6	A	20
Centennial Circuit (W)	143	0.16	9	A	6	279	0.29	9	A	13
<b>Intersection</b>	<b>1127</b>	<b>0.48</b>	<b>5</b>	<b>A</b>	<b>26</b>	<b>1335</b>	<b>0.43</b>	<b>6</b>	<b>A</b>	<b>20</b>

The SIDRA results for the 2018 background and design traffic volumes are detailed in Table 3.8.

**Table 3.8: 2018 SIDRA Results – Bayshore Dr / Centennial Circuit / Grevillea St Intersection**

Approach	AM Peak					PM Peak				
	VOL	DOS	Average Delay (s)	LOS	95 <sup>th</sup> ile Queue (m)	VOL	DOS	Average Delay (s)	LOS	95 <sup>th</sup> ile Queue (m)
<b>2018 Background Results</b>										
Bayshore Dr (S)	705	0.49	5	A	27	548	0.39	5	A	19
Grevillea St (E)	68	0.07	6	A	2	109	0.14	8	A	6
Bayshore Dr (N)	231	0.22	5	A	9	418	0.44	6	A	21
Centennial Circuit (W)	145	0.16	9	A	7	284	0.30	9	A	13
<b>Intersection</b>	<b>1149</b>	<b>0.49</b>	<b>5</b>	<b>A</b>	<b>27</b>	<b>1360</b>	<b>0.44</b>	<b>7</b>	<b>A</b>	<b>21</b>
<b>2018 Design Results</b>										
Bayshore Dr (S)	742	0.51	5	A	30	581	0.42	5	A	21
Grevillea St (E)	68	0.07	7	A	3	109	0.15	8	A	6
Bayshore Dr (N)	235	0.23	5	A	10	422	0.46	7	A	23
Centennial Circuit (W)	182	0.20	9	A	8	331	0.35	9	A	16
<b>Intersection</b>	<b>1227</b>	<b>0.51</b>	<b>6</b>	<b>A</b>	<b>30</b>	<b>1443</b>	<b>0.46</b>	<b>7</b>	<b>A</b>	<b>23</b>

The SIDRA results for the 2028 background and design traffic volumes are detailed in Table 3.9.

**Table 3.9: 2028 SIDRA Results – Bayshore Dr / Centennial Circuit / Grevillea St Intersection**

Approach	AM Peak					PM Peak				
	VOL	DOS	Average Delay (s)	LOS	95 <sup>th</sup> ile Queue (m)	VOL	DOS	Average Delay (s)	LOS	95 <sup>th</sup> ile Queue (m)
<b>2028 Background Results</b>										
Bayshore Dr (S)	779	0.54	5	A	33	605	0.44	5	A	23
Grevillea St (E)	77	0.08	7	A	3	122	0.17	9	A	7
Bayshore Dr (N)	255	0.25	5	A	11	462	0.50	7	A	27
Centennial Circuit (W)	162	0.19	9	A	8	314	0.35	9	A	15
<b>Intersection</b>	<b>1273</b>	<b>0.54</b>	<b>5</b>	<b>A</b>	<b>33</b>	<b>1503</b>	<b>0.50</b>	<b>7</b>	<b>A</b>	<b>27</b>
<b>2028 Design Results</b>										
Bayshore Dr (S)	816	0.57	5	A	36	638	0.46	5	A	25
Grevillea St (E)	77	0.08	7	A	3	122	0.18	9	A	8
Bayshore Dr (N)	259	0.26	6	A	11	466	0.53	8	A	30
Centennial Circuit (W)	198	0.23	9	A	10	359	0.40	10	A	18
<b>Intersection</b>	<b>1349</b>	<b>0.57</b>	<b>6</b>	<b>A</b>	<b>36</b>	<b>1585</b>	<b>0.53</b>	<b>7</b>	<b>A</b>	<b>30</b>

In all 2016, 2018 and 2028 background and design traffic scenarios, the intersection of Bayshore Drive / Centennial Circuit / Grevillea Street performs well in terms of DOS, LOS, average delay and the 95<sup>th</sup> percentile queue. The addition of development traffic does not significantly impact the intersections performance; therefore, the intersection is not required to be upgraded. The SIDRA movement summaries for the intersection of Bayshore Drive / Centennial Circuit / Grevillea Street are provided in Appendix D.

It should be noted that the intersection of Bayshore Drive / Centennial Circuit / Grevillea Street currently experiences vehicle queues from the intersection of Ewingsdale Road / Bayshore Drive causing congestion. The above SIDRA results illustrate how the intersection performs by itself without impacts from adjacent intersections. The operations of the Ewingsdale Road / Bayshore Drive intersection is an existing issue which is expected to be resolved with the upgrade to a roundabout in the future.

## 4. PARKING AND ACCESS ASSESSMENT

### 4.1 CAR PARKING REQUIREMENTS

The car parking requirements for the development have been calculated in accordance with the Byron Shire Council DCP 2014. The car parking requirements are summarised in Table 4.1.

Table 4.1: Development Car Parking Requirements

Land Use	Quantity	Rate	Required
Child Care Centre	78 children enrolled	1 space per 4 children enrolled plus 1 pick-up/drop-off bay	20.5
Industry	1390m <sup>2</sup> GFA	1 space per 100m <sup>2</sup> GFA	13.9
Food and Drink Premises	44m <sup>2</sup> GFA	1 space per 20m <sup>2</sup> GFA	2.2
Retail	88m <sup>2</sup> GFA	1 space per 20m <sup>2</sup> GFA	4.4
Managers Residence	1 bedroom unit	-	1
<b>Total Car Parking Spaces</b>			<b>42</b>

The development has a car parking requirement of 42 car parking spaces including the pick-up/drop-off bay and two (2) People with Disability (PWD) bays. The proposed development plans illustrate provision for 43 car spaces, therefore complying with Council's car parking requirement.

### 4.2 CAR PARKING LAYOUT

The proposed development will provide User Class 3 and User Class 1A parking bay provisions designed in accordance with *Australian Standards AS2890.1:2004 Off-Street Parking*, *AS2890.2:2002 Off-Street Commercial Vehicle Facilities*, *AS2890.6:2009 Off Street Parking for people with Disabilities* and *Byron Shire Council DCP*. The car park layout geometrical design is summarised as follows:

- staff and visitor car parking bays have been provided in accordance with the relevant AS2890.1 User Class requirements (user Class 1A – 2.4m wide for staff, User Class 3 – 2.6m wide for visitors);
- the northern stretch of car parking bays are provided at 4.8m long with 0.6m of vehicle overhang in accordance with AS2890.1. The maximum kerb height will need to be 0.15m with any landscaping to be low lying;
- the southern stretch of car parking bays are provided at 5.4m long in accordance with AS2890.1;
- People with Disability (PWD) parking bays exceed AS2890.6 requirements with dimensions of 2.6m wide by 5.4m long with an adjacent shared area with the same dimensions;
- aisle widths are provided at 6m wide and therefore achieve the minimum requirement stipulated in AS2890.1 of 5.8m wide;
- the car parking design envelope for all car spaces are free of obstructions;
- a turnaround bay has been provided at the end of the parking aisle for visitors; and
- the car parking space at the end of the parking aisle will need to utilise the turnaround bay to reverse in to the end parking bay (i.e. reverse in only bay).

A swept path assessment was undertaken of all critical turning manoeuvres. The B99 and B85 swept path assessment provided in Appendix E illustrates no conflicts within the car parking area. Development plans outlining the geometry of the development car park are attached in Appendix A.

### 4.3 BICYCLE PARKING REQUIREMENTS

The bicycle parking requirements for the proposed development have been calculated in accordance with the Byron Shire Council DCP. The bicycle parking requirements are summarised in Table 4.2.

**Table 4.2: Development Bicycle Parking Requirements**

Land Use	Quantity	Rate	Required
Child Care Centre	78 children enrolled	0	0
Industry	1390m <sup>2</sup> GFA	0	0
Food and Drink Premises	44m <sup>2</sup> GFA	1 per 25m <sup>2</sup> GFA	1.76
Retail	88m <sup>2</sup> GFA	2 per 100m <sup>2</sup> GFA	1.76
Managers Residence	1 bedroom unit	-	0
<b>Total Bicycle Parking Spaces</b>			<b>4</b>

The proposed development has a bicycle parking requirement of four (4) bicycle spaces. The development plans provide four (4) visitor bicycle spaces and six (6) staff bicycle spaces which complies with Council's requirement. All bicycle parking spaces have been designed in accordance with the dimensional requirements of *AS2890.3: 2015 Bicycle Parking Facilities* (i.e. 0.5m space width, 1.8m space length and 1.5m aisle width). In addition, end of trip facilities will be provided in the form of one (1) unisex shower and change room within the area labelled as staff rooms. Female and male toilets are provided as part of the development.

## 5. ACCESS AND SERVICING ASSESSMENT

### 5.1 DRIVEWAY CROSSOVER

The proposed development has one (1) all movement crossover designed to allow the ingress and egress of a 12.5m Heavy Rigid Vehicle (HRV) and Council's Refuse Collection Vehicle (RCV). The driveway width is a minimum of 6m which is designed in accordance with AS2890.1 Category 2 crossover specifications.

A grade of 1:20 is required to be provided for the first 6m into the site from the property boundary in accordance with AS2890.1.

The development plans currently show no obstructions on the egress side of the driveway that would obstruct drivers line of sight to pedestrians. Sight triangles should be provided on the development plans in accordance with AS2890.1 at 2m across the property boundary and 2.5m into the property.

Swept path assessment for the access driveway has been provided in Appendix E.

### 5.2 SIGHT DISTANCE ASSESSMENT

The proposed access to the development site provides a minimum desirable gap acceptance sight distance equal to or greater than the minimum requirement of 69m in both directions in accordance with AS2890.1.

### 5.3 QUEUEING

In accordance with AS2890.1, the minimum queuing requirement for the proposed development is two (2) car lengths (i.e. 12m). The proposed development plans provide sufficient queuing space of approximately 13m; therefore, complying with AS2890.1.

### 5.4 SERVICING VEHICLES

Table 5.1 details the design service vehicle requirements for each land use as stipulated in the Byron Shire Council DCP.

**Table 5.1: Service Vehicle Requirements**

Land Use	Design Vehicle
Industry 200-799m <sup>2</sup> GFA	12.5m HRV
Retail Premises <199m <sup>2</sup> GFA	6.4m SRV
Business Premises <999m <sup>2</sup> GFA	6.4m SRV
Child Care Centre	VAN

The loading area illustrated on the development plans exceeds the requirements stipulated in AS2890.2 for a HRV (12.5m long by 3.5m wide). It is considered appropriate that all service vehicles that exceed the dimensions of a B99 vehicle can use the one (1) loading bay provided on site. The VAN service vehicle requirement for the child care centre can use the visitor car parking bays.

The largest design vehicle required for the proposed development is expected to be a 12.5m HRV. A swept path assessment (see Appendix E) demonstrates the ability for the HRV to ingress and egress the site in a forward direction. The HRV requires the first four (4) car parking spaces on both sides of the parking aisle on entry to the site during its ingress manoeuvring. It is recommended that the eight (8) car parking spaces are allocated to staff members and a site management plan implemented to manage HRV ingress and egress to the site.

The swept path of the HRV and RCV illustrates that the vehicles overhang the driveway when egressing the site; therefore, no obstructions are allowed adjacent to the driveway that would prevent the service and refuse vehicles from entering and exiting the site (i.e. fence, trees etc).

On the basis of the above, site servicing is expected to operate adequately.

## 5.5 REFUSE COLLECTION VEHICLE

Council's front end RCV will access the site, collect the refuse from the refuse collection area, and egress the site in a forward gear via Centennial Circuit. A swept path assessment provided in Appendix E has been undertaken illustrating the ingress and egress movements of the RCV.

On the basis of the above, the refuse collection arrangements are considered appropriate.

## 6. CONCLUSION

The key findings of the above traffic impact assessment report are summarised as follows:

- the proposed development is expected to generate 73 trips in the AM peak hour and 76 trips in the PM peak hour;
- the SIDRA assessment for the intersection of Ewingsdale Road / Bayshore Drive shows that the 2016 background traffic scenario fails in terms of DOS, LOS, average delay and the 95th percentile queue on the Bayshore Drive approach. The failure of the intersection is an existing issue where the Byron Shire Council Section 94 Contributions Plan (2012) indicates that the intersection will be upgraded to a roundabout based on the scheduling of land release at the West Byron Development Area. The roundabout has been planned for taking into consideration surrounding developments; therefore, no additional modelling has been undertaken at this intersection. In addition, this development is only a minor traffic generator in comparison to the surrounding future development yields;
- the SIDRA assessment for the intersection of Bayshore Drive / Centennial Circuit / Grevillea Street shows that all 2016, 2018 and 2028 background and design traffic scenarios perform well in terms of DOS, LOS, average delay and the 95th percentile queue;
- the development has a car parking requirement of 42 car parking spaces including the pick-up/drop-off bay and two PWD bays. The proposed development plans illustrate provision for 43 car spaces, therefore complying with Council's car parking requirement;
- the car park layout geometrical design complies with AS2890.1 and Council's DCP;
- the proposed development has a bicycle parking requirement of four (4) bicycle spaces. The development plans provide four (4) visitor bicycle spaces and six (6) staff bicycle spaces which complies with Council's requirement;
- the driveway crossover has been designed in accordance with AS2890.1 Category 2 crossover specifications (i.e. minimum width of 6m). A grade of 1:20 is required to be provided for the first 6m into the site from the property boundary in accordance with AS2890.1;
- the development plans currently show no obstructions on the egress side of the driveway that would obstruct drivers line of sight to pedestrians. Sight triangles should be provided on the development plans in accordance with AS2890.1 at 2m across the property boundary and 2.5m into the property.
- the proposed development complies with the minimum desirable gap acceptance sight distance of 69m;
- the proposed development complies with the minimum queueing requirement of two (2) vehicle lengths (i.e. 12m);
- the proposed development provides provision for a HRV to ingress and egress the site in a forward gear. The first four (4) car space on both sides of the aisle are required to be vacant during servicing;
- Council's front end RCV will access the site, collect the refuse from the refuse collection area, and egress the site in a forward gear via Centennial Circuit; and
- the public and active transport infrastructure surrounding the development site is considered to be adequate.

Based on the above assessment we conclude that there are no significant traffic or transport impacts associated with the proposed development that would preclude its approval and relevant conditioning by Council.

## APPENDIX A

### DEVELOPMENT PLANS



SCALE : 1:500 @A3

LEVEL 00

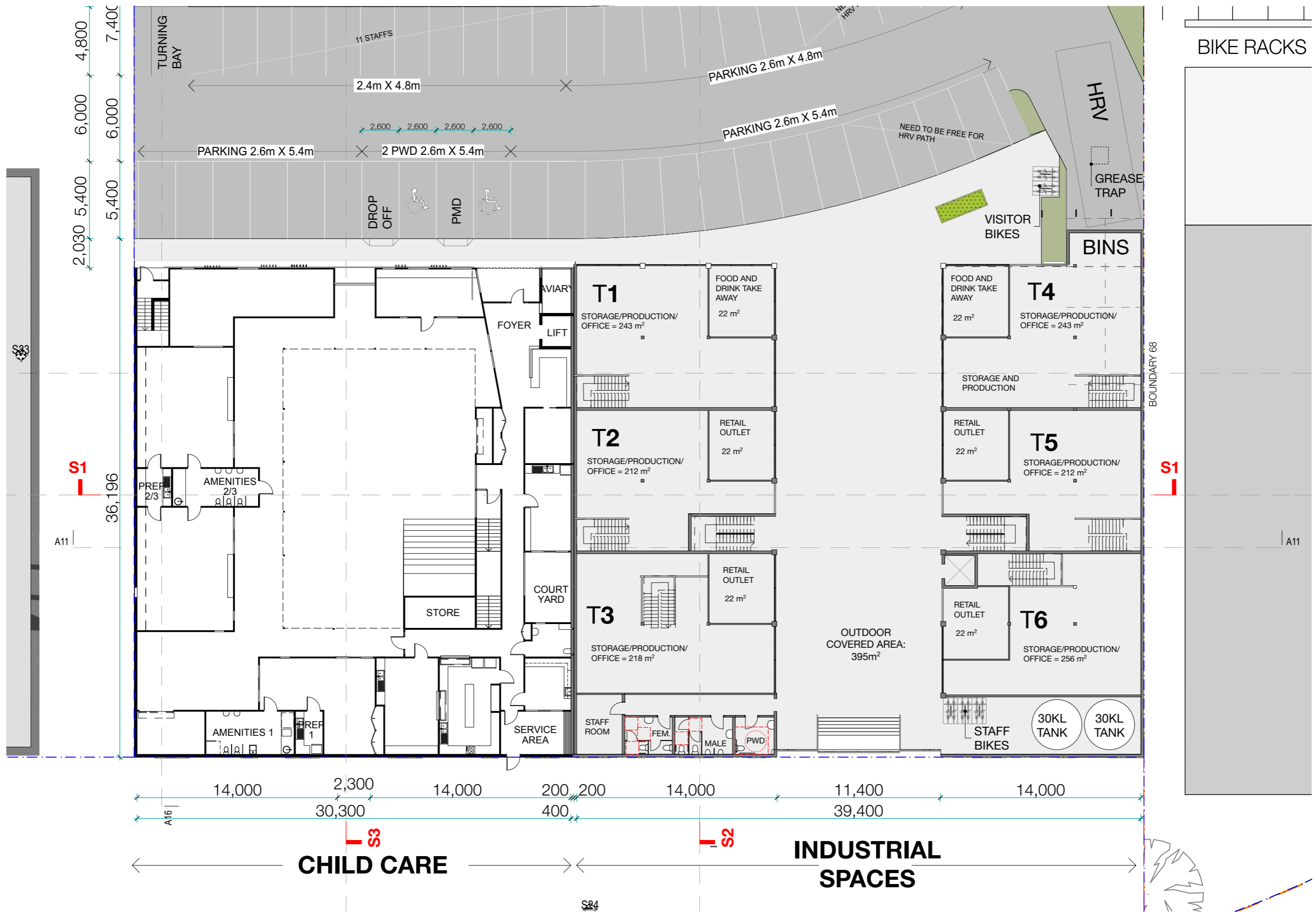


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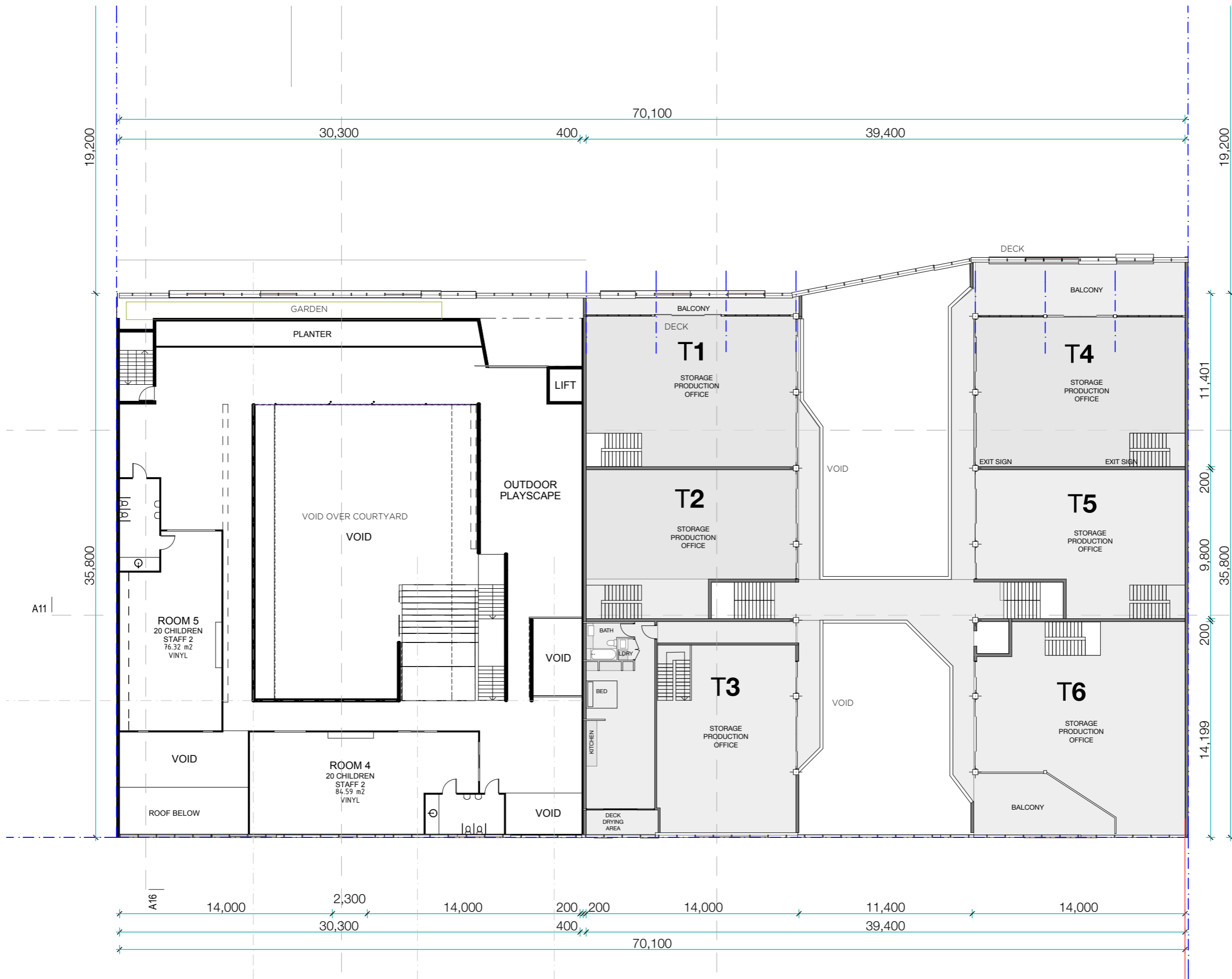
LEVEL 01

### INDUSTRIAL SPACES

LEVEL 0	
INDUSTRIAL	680 m <sup>2</sup>
RETAIL	88 m <sup>2</sup>
TAKE AWAY	44 m <sup>2</sup>
WC	40 m <sup>2</sup>
LEVEL 1	
INDUSTRIAL	710 m <sup>2</sup>
MANAGER RESIDENCE	56 m <sup>2</sup>
DECK	140 m <sup>2</sup>
<b>TOTAL GFA</b>	<b>1,562 m<sup>2</sup></b>



SCALE : 1:250 @A3



LEVEL 01  
Scale 1:250

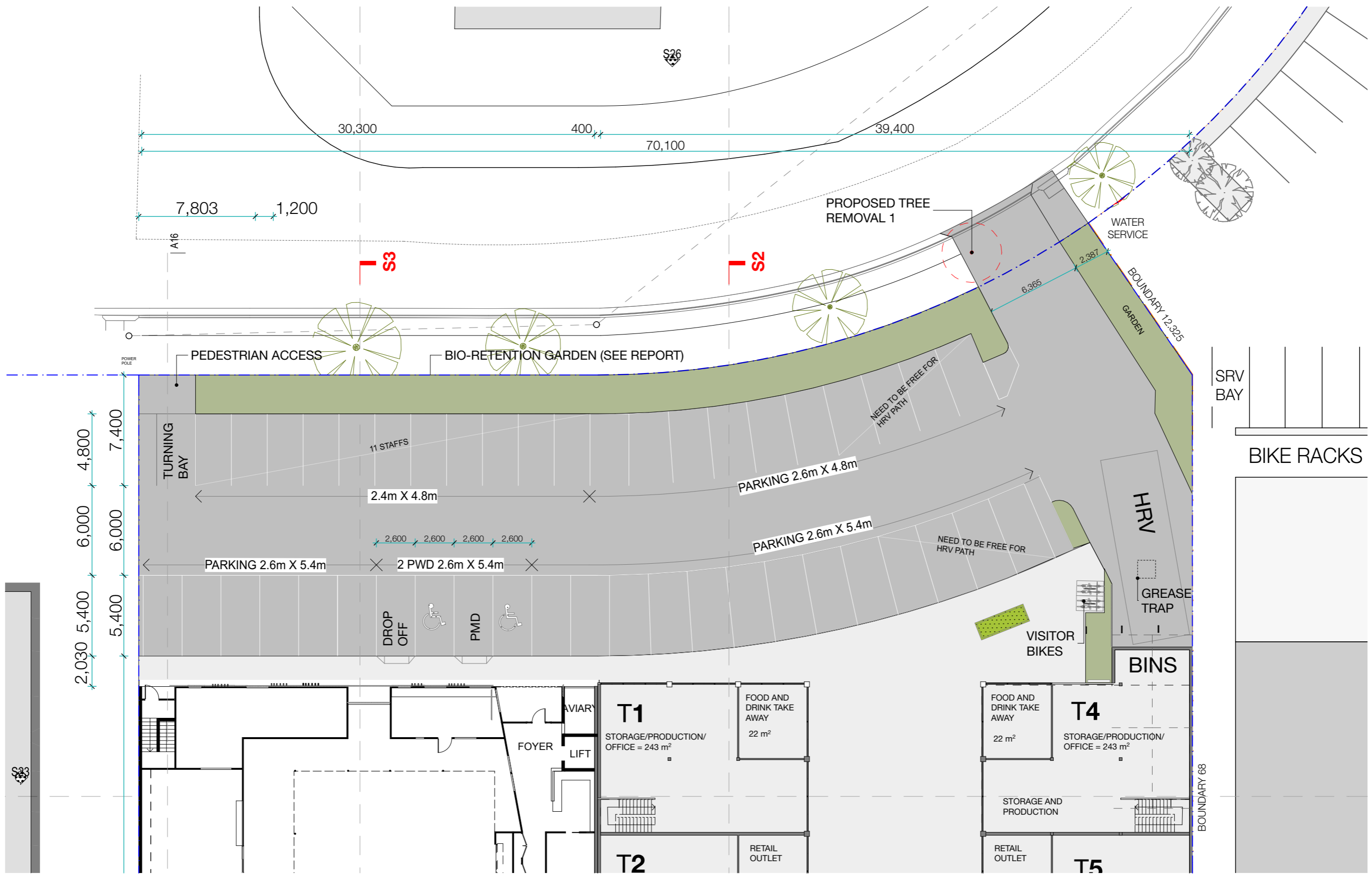


LEVEL 1/ 144 JONSON STREET BYRON BAY | PO BOX 1285 NSW 2481  
F: 02 66809820 | T: 02 66809690 | E: office@harleygraham.com ABN: 85158246003 NSW 7892

All building works to be carried out in accordance with the Building Code of Australia (BCA) and to the satisfaction of the principle certifying authority.  
Builders/Contractors are to verify all dimensions prior to commencement of site work or off-site fabrication.  
Figured dimensions take precedence - do not scale.  
© Copyright HARLEY GRAHAM ARCHITECTS

**ISSUE/REVISIONS**  
A DA SET 21.12.16

CLIENT	DENWOL DEVELOPMENTS	ADDRESS	LOT 60 CENTENNIAL CIRCUIT BYRON BAY	APPROVED: HG	JOB NO: HGA048
JOB NAME	MIXED USED BUILDING + CHILD CARE	LOT + DP	LOT 60 SP 835249	SCALE	PAPER
DRAWING	LEVEL 01			1:200	A3 DA 04 A

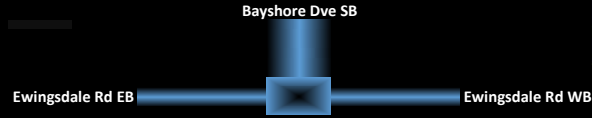


## APPENDIX B

### TRAFFIC SURVEYS



Site ID: 1  
 Location: Bayshore Dve & Ewingsdale Rd, Byron Bay  
 Date: 20-Oct-2016  
 Period 2 Time: 3:00 PM to 6:00 PM  
 Weather: Fine  
 Period 2 Peak Hour: 4:00 PM to 5:00 PM



TOTALS AND PEAKS																																																	
Period 2 Total		690	12	0	2	1037	44	10	0	0	0	0	0	0	0	1916	68	6	1	609	26	0	0	0	0	0	0	0	0	743	41	7	2	1387	48	3	5	0	0	0	0	0	6657	1795	2626	2236			
Period 2 Peak Hr		256	5	0	0	388	12	4	0	0	0	0	0	0	0	664	24	2	0	202	12	0	0	0	0	0	0	0	0	254	11	3	0	488	13	0	1	0	0	0	0	0	2339	665	904	770			
Time Starting	Bayshore Dve SB	Bayshore Dve SB	Bayshore Dve SB	Bayshore Dve SB	Bayshore Dve SB	Bayshore Dve SB	Bayshore Dve SB	Bayshore Dve SB	Bayshore Dve SB	Bayshore Dve SB	Bayshore Dve SB	Bayshore Dve SB	Bayshore Dve SB	Bayshore Dve SB	Ewingsdale Rd WB	Ewingsdale Rd WB	Ewingsdale Rd WB	Ewingsdale Rd WB	Ewingsdale Rd WB	Ewingsdale Rd WB	Ewingsdale Rd WB	Ewingsdale Rd WB	Ewingsdale Rd WB	Ewingsdale Rd WB	Ewingsdale Rd WB	Ewingsdale Rd WB	Ewingsdale Rd WB	Ewingsdale Rd EB	Ewingsdale Rd EB	Ewingsdale Rd EB	Ewingsdale Rd EB	Ewingsdale Rd EB	Ewingsdale Rd EB	Ewingsdale Rd EB	Ewingsdale Rd EB	Ewingsdale Rd EB	Ewingsdale Rd EB	Ewingsdale Rd EB	Ewingsdale Rd EB	Ewingsdale Rd EB	Ewingsdale Rd EB	Ewingsdale Rd EB	GRAND TOTAL	Bayshore Dve SB	Ewingsdale Rd WB	Ewingsdale Rd EB			
	Light Vehicles	Light Trucks (3-5)	Heavy Trucks (6-12)	Bicycles on Road	Light Vehicles	Light Trucks (3-5)	Heavy Trucks (6-12)	Bicycles on Road	Light Vehicles	Light Trucks (3-5)	Heavy Trucks (6-12)	Bicycles on Road	Light Vehicles	Light Trucks (3-5)	Heavy Trucks (6-12)	Bicycles on Road	Pedestrians	Light Vehicles	Light Trucks (3-5)	Heavy Trucks (6-12)	Bicycles on Road	Light Vehicles	Light Trucks (3-5)	Heavy Trucks (6-12)	Bicycles on Road	Pedestrians	Light Vehicles	Light Trucks (3-5)	Heavy Trucks (6-12)	Bicycles on Road	Pedestrians	Light Vehicles	Light Trucks (3-5)	Heavy Trucks (6-12)	Bicycles on Road	Pedestrians	Light Vehicles	Light Trucks (3-5)	Heavy Trucks (6-12)	Bicycles on Road	Pedestrians	TOTALS	All Classes	All Classes	All Classes				
15:00	69	2	0	1	80	3	1	0	0	0	0	0	0	0	146	10	3	0	40	5	0	0	0	0	0	0	0	70	6	0	0	141	6	2	1	0	0	0	0	0	0	0	0	0	586	156	204	226	
15:15	60	2	0	0	73	5	0	0	0	0	0	0	0	0	145	6	0	0	53	3	0	0	0	0	0	0	0	83	11	2	1	116	6	0	0	0	0	0	0	0	0	0	0	566	140	207	219		
15:30	54	0	0	0	87	7	2	0	0	0	0	0	0	0	142	4	0	1	57	2	0	0	0	0	0	0	0	70	2	2	1	111	7	0	0	0	0	0	0	0	0	0	0	549	150	206	193		
15:45	51	0	0	0	52	6	2	0	0	0	0	0	0	0	150	9	1	0	59	1	0	0	0	0	0	0	0	74	4	0	0	150	6	1	2	0	0	0	0	0	0	0	0	568	111	220	237		
16:00	68	0	0	0	106	3	0	0	0	0	0	0	0	0	158	9	0	0	55	6	0	0	0	0	0	0	0	81	2	1	0	117	4	0	0	0	0	0	0	0	0	0	0	610	177	228	205		
16:15	56	2	0	0	102	2	0	0	0	0	0	0	0	0	162	8	0	0	39	4	0	0	0	0	0	0	0	65	1	2	0	126	4	0	0	0	0	0	0	0	0	0	0	573	162	213	198		
16:30	72	1	0	0	75	3	3	0	0	0	0	0	0	0	163	4	1	0	63	1	0	0	0	0	0	0	0	52	4	0	0	132	1	0	1	0	0	0	0	0	0	0	0	0	576	154	232	190	
16:45	60	2	0	0	105	4	1	0	0	0	0	0	0	0	181	3	1	0	45	1	0	0	0	0	0	0	0	56	4	0	0	113	4	0	0	0	0	0	0	0	0	0	0	0	580	172	231	177	
17:00	75	1	0	0	102	5	0	0	0	0	0	0	0	0	188	4	0	0	48	0	0	0	0	0	0	0	0	64	5	0	0	107	4	0	1	0	0	0	0	0	0	0	0	0	604	183	240	181	
17:15	57	1	0	0	89	2	0	0	0	0	0	0	0	0	181	4	0	0	57	2	0	0	0	0	0	0	0	44	0	0	0	98	4	0	0	0	0	0	0	0	0	0	0	0	539	149	244	146	
17:30	33	0	0	1	95	1	1	0	0	0	0	0	0	0	183	6	0	0	53	1	0	0	0	0	0	0	0	44	2	0	0	88	2	0	0	0	0	0	0	0	0	0	0	0	510	131	243	136	
17:45	35	1	0	0	71	3	0	0	0	0	0	0	0	0	117	1	0	0	40	0	0	0	0	0	0	0	0	40	0	0	0	88	0	0	0	0	0	0	0	0	0	0	0	0	0	396	110	158	128





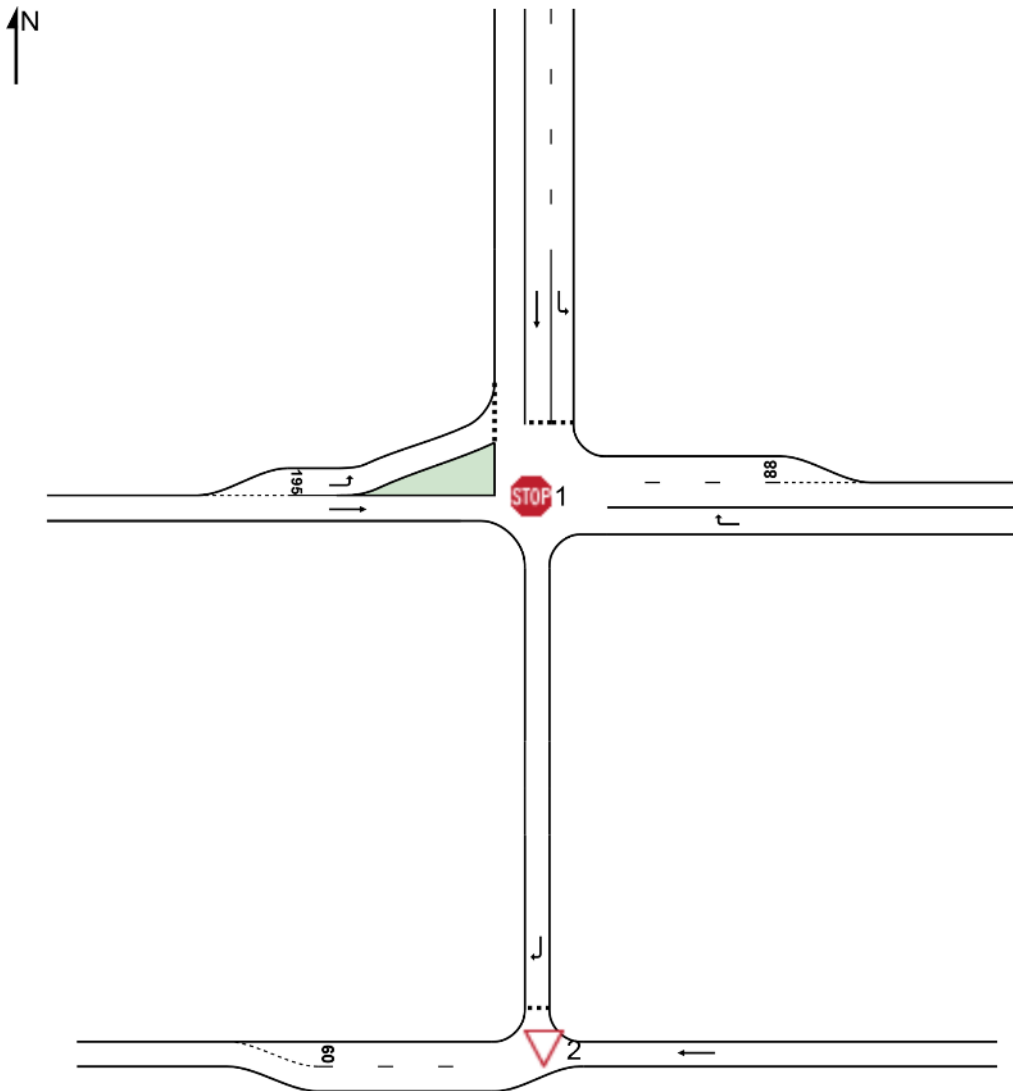
## APPENDIX C

### SIDRA RESULTS – EWINGSDALE ROAD / BAYSHORE

#### DRIVE INTERSECTION

# NETWORK LAYOUT

Network: N101 [2016 AM Base]



SITES IN NETWORK	
Site ID	Site Name
STOP1	2016 AM Base - Stage 1
▽2	2016 AM Base - Stage 2

# MOVEMENT SUMMARY

 Site: 1 [2016 AM Base - Stage 1]

 Network: N101 [2016 AM Base]

Intersection of Ewingsdale Rd / Bayshore Dr  
2016 AM Background Traffic  
Stop (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV %	Arrival Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h		veh/h		v/c	sec		veh	m		per veh	km/h
East: Ewingsdale Rd (E)													
12	R2	242	4.8	242	4.8	0.336	11.0	LOS A	1.7	12.1	0.68	0.92	30.1
Approach		242	4.8	242	4.8	0.336	11.0	NA	1.7	12.1	0.68	0.92	30.1
North: Bayshore Dr (N)													
1	L2	173	6.1	173	6.1	0.261	10.5	LOS A	1.1	7.8	0.65	0.88	29.6
2	T1	189	15.0	189	15.0	1.009	108.9	LOS F	12.2	96.8	1.00	1.95	3.8
Approach		362	10.8	362	10.8	1.009	62.0	LOS E	12.2	96.8	0.84	1.44	8.2
West: Ewingsdale Rd (W)													
4	L2	457	6.7	457	6.7	0.424	7.6	LOS A	2.6	19.5	0.47	0.67	48.6
5	T1	736	4.7	736	4.7	0.387	0.1	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		1193	5.5	1193	5.5	0.424	3.0	LOS A	2.6	19.5	0.18	0.26	54.9
All Vehicles		1797	6.4	1797	6.4	1.009	15.9	NA	12.2	96.8	0.38	0.58	37.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Network Model Accuracy Level (largest change in degree of saturation for any lane): 0.0 %

Number of Iterations: 3 (maximum specified: 10)

# MOVEMENT SUMMARY

Site: 2 [2016 AM Base - Stage 2]

Network: N101 [2016 AM Base]

Intersection of Ewingsdale Rd / Bayshore Dr  
2016 AM Background Traffic  
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Queue Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
East: Ewingsdale Rd (E)													
11	T1	486	5.2	486	5.2	0.258	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		486	5.2	486	5.2	0.258	0.0	NA	0.0	0.0	0.00	0.00	59.9
North: Storage Area													
3	R2	189	15.0	188	15.0	0.225	2.4	LOS A	0.8	4.9	0.48	0.46	48.6
Approach		189	15.0	188 <sup>N1</sup>	15.0	0.225	2.4	LOS A	0.8	4.9	0.48	0.46	48.6
All Vehicles		676	7.9	674 <sup>N1</sup>	8.0	0.258	0.7	NA	0.8	4.9	0.13	0.13	57.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Network Model Accuracy Level (largest change in degree of saturation for any lane): 0.0 %

Number of Iterations: 3 (maximum specified: 10)

**N1** Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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Organisation: BITZIOS CONSULTING | Processed: Monday, 9 January 2017 1:21:46 PM

Project: P:\P2841 Centennial Drive Byron Bay TIA\Technical Work\Models\P2841.001 Bayshore Dve & Ewingsdale Rd.sip7

# MOVEMENT SUMMARY

 Site: 1 [2016 PM Base - Stage 1]

 Network: N101 [2016 PM Base]

Intersection of Ewingsdale Rd / Bayshore Dr  
2016 PM Background Traffic  
Stop (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV %	Arrival Total	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Ewingsdale Rd (E)													
12	R2	242	5.2	242	5.2	0.244	8.2	LOS A	1.1	8.1	0.58	0.77	33.7
Approach		242	5.2	242	5.2	0.244	8.2	NA	1.1	8.1	0.58	0.77	33.7
North: Bayshore Dr (N)													
1	L2	275	1.9	275	1.9	0.292	8.4	LOS A	1.3	9.4	0.56	0.81	32.3
2	T1	425	4.0	425	4.0	1.431	418.4	LOS F	87.5	633.2	1.00	6.28	1.0
Approach		700	3.2	700	3.2	1.431	257.5	LOS F	87.5	633.2	0.83	4.13	2.1
West: Ewingsdale Rd (W)													
4	L2	282	5.2	282	5.2	0.259	7.0	LOS A	1.2	8.7	0.41	0.62	49.0
5	T1	528	2.6	528	2.6	0.274	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		811	3.5	811	3.5	0.274	2.5	LOS A	1.2	8.7	0.14	0.22	55.5
All Vehicles		1753	3.6	1753	3.6	1.431	105.1	NA	87.5	633.2	0.48	1.85	10.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Network Model Accuracy Level (largest change in degree of saturation for any lane): 0.5 %

Number of Iterations: 6 (maximum specified: 10)

# MOVEMENT SUMMARY

Site: 2 [2016 PM Base - Stage 2]

Network: N101 [2016 PM Base]

Intersection of Ewingsdale Rd / Bayshore Dr  
2016 PM Background Traffic

Giveaway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Queue Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
East: Ewingsdale Rd (E)													
11	T1	726	3.8	726	3.8	0.382	0.1	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		726	3.8	726	3.8	0.382	0.1	NA	0.0	0.0	0.00	0.00	59.9
North: Storage Area													
3	R2	425	4.0	297	4.0	0.446	5.4	LOS A	2.0	11.4	0.67	0.86	45.7
Approach		425	4.0	297 <sup>N1</sup>	4.0	0.446	5.4	LOS A	2.0	11.4	0.67	0.86	45.7
All Vehicles		1152	3.8	1023 <sup>N1</sup>	4.3	0.446	1.6	NA	2.0	11.4	0.19	0.25	56.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Network Model Accuracy Level (largest change in degree of saturation for any lane): 0.5 %

Number of Iterations: 6 (maximum specified: 10)

<sup>N1</sup> Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

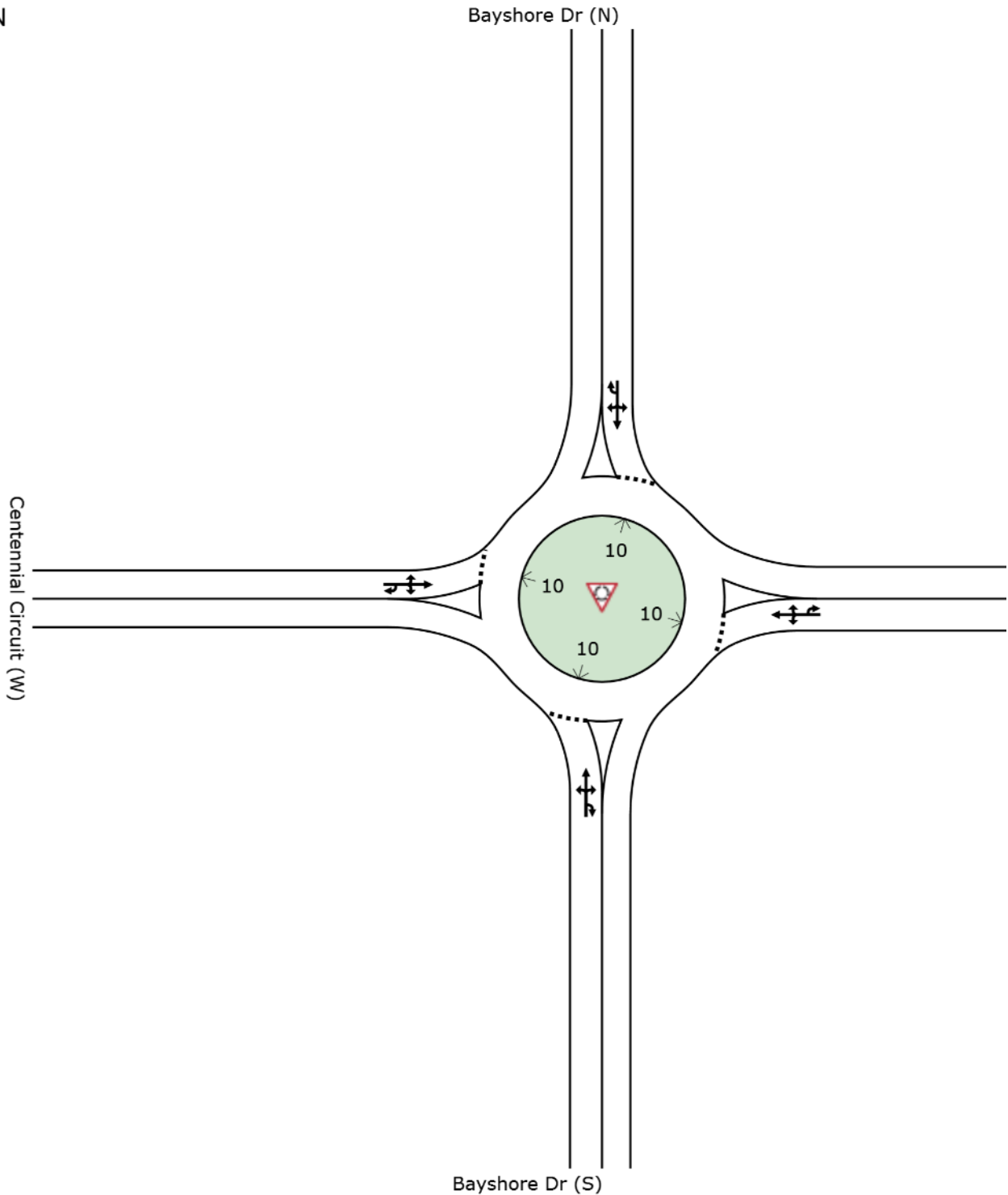
## APPENDIX D

### SIDRA RESULTS – BAYSHORE DRIVE / CENTENNIAL CIRCUIT / GREVILLEA STREET INTERSECTION

# SITE LAYOUT

 Site: [2016 AM Base]

Intersection of Bayshore Dr / Centennial Circuit / Grevillea St  
2016 AM Background Traffic  
Roundabout



# MOVEMENT SUMMARY

 Site: [2016 AM Base]

Intersection of Bayshore Dr / Centennial Circuit / Grevillea St  
2016 AM Background Traffic  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue	Prop. Queued	Effective Stop Rate	Average Speed	
		Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m	per veh	km/h	
South: Bayshore Dr (S)											
1	L2	288	1.5	0.478	3.9	LOS A	3.6	26.0	0.25	0.46	44.1
2	T1	298	8.8	0.478	3.9	LOS A	3.6	26.0	0.25	0.46	45.4
3	R2	91	7.0	0.478	7.4	LOS A	3.6	26.0	0.25	0.46	44.3
3u	U	14	0.0	0.478	8.9	LOS A	3.6	26.0	0.25	0.46	34.6
Approach		691	5.3	0.478	4.5	LOS A	3.6	26.0	0.25	0.46	44.6
East: Grevillea St (E)											
4	L2	29	7.1	0.068	5.2	LOS A	0.3	2.4	0.44	0.59	41.7
5	T1	16	6.7	0.068	5.1	LOS A	0.3	2.4	0.44	0.59	46.0
6	R2	21	10.0	0.068	8.6	LOS A	0.3	2.4	0.44	0.59	45.8
6u	U	1	0.0	0.068	10.0	LOS A	0.3	2.4	0.44	0.59	48.8
Approach		67	7.8	0.068	6.3	LOS A	0.3	2.4	0.44	0.59	44.6
North: Bayshore Dr (N)											
7	L2	21	0.0	0.219	4.8	LOS A	1.2	9.1	0.44	0.54	45.5
8	T1	193	13.7	0.219	5.0	LOS A	1.2	9.1	0.44	0.54	44.3
9	R2	12	0.0	0.219	8.2	LOS A	1.2	9.1	0.44	0.54	46.6
9u	U	1	0.0	0.219	9.8	LOS A	1.2	9.1	0.44	0.54	50.2
Approach		226	11.6	0.219	5.2	LOS A	1.2	9.1	0.44	0.54	44.7
West: Centennial Circuit (W)											
10	L2	15	7.1	0.160	6.2	LOS A	0.9	6.4	0.57	0.70	44.3
11	T1	23	4.5	0.160	6.1	LOS A	0.9	6.4	0.57	0.70	44.7
12	R2	104	7.1	0.160	9.7	LOS A	0.9	6.4	0.57	0.70	40.5
12u	U	1	0.0	0.160	11.1	LOS A	0.9	6.4	0.57	0.70	48.4
Approach		143	6.6	0.160	8.7	LOS A	0.9	6.4	0.57	0.70	41.9
All Vehicles		1127	6.9	0.478	5.3	LOS A	3.6	26.0	0.34	0.51	44.2

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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

 Site: [2016 PM Base]

Intersection of Bayshore Dr / Centennial Circuit / Grevillea St  
2016 PM Background Traffic  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue	Prop. Queued	Effective Stop Rate	Average Speed	
		Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m	per veh	km/h	
South: Bayshore Dr (S)											
1	L2	159	5.3	0.384	4.1	LOS A	2.6	18.8	0.25	0.48	43.8
2	T1	249	3.4	0.384	3.9	LOS A	2.6	18.8	0.25	0.48	45.2
3	R2	89	8.2	0.384	7.5	LOS A	2.6	18.8	0.25	0.48	44.0
3u	U	39	8.1	0.384	9.1	LOS A	2.6	18.8	0.25	0.48	33.9
Approach		537	5.1	0.384	4.9	LOS A	2.6	18.8	0.25	0.48	44.2
East: Grevillea St (E)											
4	L2	67	4.7	0.138	7.2	LOS A	0.8	5.5	0.66	0.72	40.5
5	T1	19	0.0	0.138	6.9	LOS A	0.8	5.5	0.66	0.72	45.3
6	R2	21	0.0	0.138	10.4	LOS A	0.8	5.5	0.66	0.72	45.1
6u	U	1	0.0	0.138	12.0	LOS A	0.8	5.5	0.66	0.72	47.8
Approach		108	2.9	0.138	7.8	LOS A	0.8	5.5	0.66	0.72	42.9
North: Bayshore Dr (N)											
7	L2	25	4.2	0.430	6.2	LOS A	2.8	20.4	0.64	0.68	44.8
8	T1	364	4.3	0.430	6.2	LOS A	2.8	20.4	0.64	0.68	43.8
9	R2	18	0.0	0.430	9.5	LOS A	2.8	20.4	0.64	0.68	46.0
9u	U	3	0.0	0.430	11.1	LOS A	2.8	20.4	0.64	0.68	49.5
Approach		411	4.1	0.430	6.3	LOS A	2.8	20.4	0.64	0.68	44.1
West: Centennial Circuit (W)											
10	L2	25	4.2	0.294	6.3	LOS A	1.8	12.5	0.60	0.73	44.3
11	T1	35	0.0	0.294	6.1	LOS A	1.8	12.5	0.60	0.73	44.6
12	R2	218	1.4	0.294	9.6	LOS A	1.8	12.5	0.60	0.73	40.5
12u	U	1	0.0	0.294	11.2	LOS A	1.8	12.5	0.60	0.73	48.3
Approach		279	1.5	0.294	8.9	LOS A	1.8	12.5	0.60	0.73	41.6
All Vehicles		1335	3.9	0.430	6.4	LOS A	2.8	20.4	0.48	0.61	43.4

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.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

 Site: [2018 AM Base]

Intersection of Bayshore Drive / Centennial Circuit  
2018 AM Background Traffic  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
		Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m		per veh	km/h
South: Bayshore Dr (S)											
1	L2	295	1.4	0.487	3.9	LOS A	3.7	26.9	0.25	0.46	44.1
2	T1	304	8.7	0.487	3.9	LOS A	3.7	26.9	0.25	0.46	45.4
3	R2	93	6.8	0.487	7.4	LOS A	3.7	26.9	0.25	0.46	44.3
3u	U	14	0.0	0.487	8.9	LOS A	3.7	26.9	0.25	0.46	34.6
Approach		705	5.2	0.487	4.5	LOS A	3.7	26.9	0.25	0.46	44.6
East: Grevillea St (E)											
4	L2	31	6.9	0.069	5.2	LOS A	0.3	2.4	0.45	0.59	41.7
5	T1	16	6.7	0.069	5.1	LOS A	0.3	2.4	0.45	0.59	46.0
6	R2	21	10.0	0.069	8.7	LOS A	0.3	2.4	0.45	0.59	45.8
6u	U	1	0.0	0.069	10.1	LOS A	0.3	2.4	0.45	0.59	48.8
Approach		68	7.7	0.069	6.3	LOS A	0.3	2.4	0.45	0.59	44.5
North: Bayshore Dr (N)											
7	L2	21	0.0	0.224	4.9	LOS A	1.2	9.3	0.44	0.54	45.5
8	T1	197	13.4	0.224	5.0	LOS A	1.2	9.3	0.44	0.54	44.3
9	R2	12	0.0	0.224	8.2	LOS A	1.2	9.3	0.44	0.54	46.6
9u	U	1	0.0	0.224	9.9	LOS A	1.2	9.3	0.44	0.54	50.2
Approach		231	11.4	0.224	5.2	LOS A	1.2	9.3	0.44	0.54	44.7
West: Centennial Circuit (W)											
10	L2	15	7.1	0.163	6.3	LOS A	0.9	6.6	0.57	0.70	44.3
11	T1	23	4.5	0.163	6.2	LOS A	0.9	6.6	0.57	0.70	44.7
12	R2	106	6.9	0.163	9.7	LOS A	0.9	6.6	0.57	0.70	40.5
12u	U	1	0.0	0.163	11.1	LOS A	0.9	6.6	0.57	0.70	48.4
Approach		145	6.5	0.163	8.8	LOS A	0.9	6.6	0.57	0.70	41.9
All Vehicles		1149	6.8	0.487	5.3	LOS A	3.7	26.9	0.34	0.52	44.2

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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

 Site: [2018 PM Base]

Intersection of Bayshore Dr / Centennial Circuit / Grevillea St  
2018 PM Background Traffic  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
		Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m		per veh	km/h
South: Bayshore Dr (S)											
1	L2	162	5.2	0.392	4.1	LOS A	2.7	19.4	0.25	0.48	43.8
2	T1	255	3.3	0.392	4.0	LOS A	2.7	19.4	0.25	0.48	45.2
3	R2	92	8.0	0.392	7.5	LOS A	2.7	19.4	0.25	0.48	44.0
3u	U	40	7.9	0.392	9.1	LOS A	2.7	19.4	0.25	0.48	33.8
Approach		548	5.0	0.392	5.0	LOS A	2.7	19.4	0.25	0.48	44.2
East: Grevillea St (E)											
4	L2	68	4.6	0.141	7.3	LOS A	0.8	5.6	0.67	0.73	40.5
5	T1	19	0.0	0.141	7.0	LOS A	0.8	5.6	0.67	0.73	45.2
6	R2	21	0.0	0.141	10.5	LOS A	0.8	5.6	0.67	0.73	45.1
6u	U	1	0.0	0.141	12.1	LOS A	0.8	5.6	0.67	0.73	47.7
Approach		109	2.9	0.141	7.9	LOS A	0.8	5.6	0.67	0.73	42.8
North: Bayshore Dr (N)											
7	L2	25	4.2	0.441	6.3	LOS A	2.9	21.1	0.65	0.69	44.8
8	T1	372	4.2	0.441	6.2	LOS A	2.9	21.1	0.65	0.69	43.7
9	R2	18	0.0	0.441	9.6	LOS A	2.9	21.1	0.65	0.69	46.0
9u	U	3	0.0	0.441	11.2	LOS A	2.9	21.1	0.65	0.69	49.5
Approach		418	4.0	0.441	6.4	LOS A	2.9	21.1	0.65	0.69	44.0
West: Centennial Circuit (W)											
10	L2	25	4.2	0.302	6.3	LOS A	1.8	12.9	0.61	0.73	44.2
11	T1	36	0.0	0.302	6.2	LOS A	1.8	12.9	0.61	0.73	44.6
12	R2	222	1.4	0.302	9.7	LOS A	1.8	12.9	0.61	0.73	40.4
12u	U	1	0.0	0.302	11.2	LOS A	1.8	12.9	0.61	0.73	48.2
Approach		284	1.5	0.302	8.9	LOS A	1.8	12.9	0.61	0.73	41.6
All Vehicles		1360	3.8	0.441	6.5	LOS A	2.9	21.1	0.48	0.62	43.4

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.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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# MOVEMENT SUMMARY

 Site: [2018 AM Design]

Intersection of Bayshore Dr / Centennial Circuit / Grevillea St  
2018 AM Design Traffic  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
		Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m		per veh	km/h
South: Bayshore Dr (S)											
1	L2	332	1.3	0.514	4.0	LOS A	4.0	29.5	0.27	0.46	44.1
2	T1	304	8.7	0.514	4.0	LOS A	4.0	29.5	0.27	0.46	45.3
3	R2	93	6.8	0.514	7.4	LOS A	4.0	29.5	0.27	0.46	44.3
3u	U	14	0.0	0.514	9.0	LOS A	4.0	29.5	0.27	0.46	34.5
Approach		742	5.0	0.514	4.5	LOS A	4.0	29.5	0.27	0.46	44.5
East: Grevillea St (E)											
4	L2	31	6.9	0.071	5.4	LOS A	0.3	2.5	0.47	0.60	41.6
5	T1	16	6.7	0.071	5.3	LOS A	0.3	2.5	0.47	0.60	46.0
6	R2	21	10.0	0.071	8.9	LOS A	0.3	2.5	0.47	0.60	45.7
6u	U	1	0.0	0.071	10.2	LOS A	0.3	2.5	0.47	0.60	48.7
Approach		68	7.7	0.071	6.5	LOS A	0.3	2.5	0.47	0.60	44.4
North: Bayshore Dr (N)											
7	L2	21	0.0	0.234	5.0	LOS A	1.3	9.9	0.48	0.57	45.3
8	T1	197	13.4	0.234	5.2	LOS A	1.3	9.9	0.48	0.57	44.1
9	R2	16	0.0	0.234	8.4	LOS A	1.3	9.9	0.48	0.57	46.5
9u	U	1	0.0	0.234	10.0	LOS A	1.3	9.9	0.48	0.57	50.0
Approach		235	11.2	0.234	5.4	LOS A	1.3	9.9	0.48	0.57	44.5
West: Centennial Circuit (W)											
10	L2	19	5.6	0.204	6.3	LOS A	1.1	8.4	0.59	0.72	44.2
11	T1	23	4.5	0.204	6.2	LOS A	1.1	8.4	0.59	0.72	44.6
12	R2	139	5.3	0.204	9.8	LOS A	1.1	8.4	0.59	0.72	40.4
12u	U	1	0.0	0.204	11.2	LOS A	1.1	8.4	0.59	0.72	48.2
Approach		182	5.2	0.204	9.0	LOS A	1.1	8.4	0.59	0.72	41.6
All Vehicles		1227	6.3	0.514	5.5	LOS A	4.0	29.5	0.37	0.53	44.0

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.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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# MOVEMENT SUMMARY

 Site: [2018 PM Design]

Intersection of Bayshore Dr / Centennial Circuit / Grevillea St  
2018 PM Design Traffic  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Bayshore Dr (S)											
1	L2	195	4.3	0.416	4.1	LOS A	2.9	21.1	0.27	0.49	43.8
2	T1	255	3.3	0.416	4.0	LOS A	2.9	21.1	0.27	0.49	45.2
3	R2	92	8.0	0.416	7.5	LOS A	2.9	21.1	0.27	0.49	44.0
3u	U	40	7.9	0.416	9.1	LOS A	2.9	21.1	0.27	0.49	33.8
Approach		581	4.7	0.416	4.9	LOS A	2.9	21.1	0.27	0.49	44.1
East: Grevillea St (E)											
4	L2	68	4.6	0.147	7.7	LOS A	0.8	6.0	0.69	0.75	40.1
5	T1	19	0.0	0.147	7.4	LOS A	0.8	6.0	0.69	0.75	45.0
6	R2	21	0.0	0.147	10.9	LOS A	0.8	6.0	0.69	0.75	44.8
6u	U	1	0.0	0.147	12.5	LOS A	0.8	6.0	0.69	0.75	47.4
Approach		109	2.9	0.147	8.3	LOS A	0.8	6.0	0.69	0.75	42.5
North: Bayshore Dr (N)											
7	L2	25	4.2	0.462	6.7	LOS A	3.2	22.9	0.69	0.73	44.6
8	T1	372	4.2	0.462	6.6	LOS A	3.2	22.9	0.69	0.73	43.5
9	R2	22	0.0	0.462	10.0	LOS A	3.2	22.9	0.69	0.73	45.8
9u	U	3	0.0	0.462	11.6	LOS A	3.2	22.9	0.69	0.73	49.3
Approach		422	4.0	0.462	6.9	LOS A	3.2	22.9	0.69	0.73	43.8
West: Centennial Circuit (W)											
10	L2	31	3.4	0.351	6.4	LOS A	2.2	15.6	0.63	0.74	44.1
11	T1	36	0.0	0.351	6.3	LOS A	2.2	15.6	0.63	0.74	44.5
12	R2	263	1.2	0.351	9.8	LOS A	2.2	15.6	0.63	0.74	40.3
12u	U	1	0.0	0.351	11.4	LOS A	2.2	15.6	0.63	0.74	48.1
Approach		331	1.3	0.351	9.1	LOS A	2.2	15.6	0.63	0.74	41.4
All Vehicles		1443	3.6	0.462	6.7	LOS A	3.2	22.9	0.51	0.64	43.2

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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

 Site: [2028 AM Base ]

Intersection of Bayshore Dr / Centennial Circuit / Grevillea St  
2028 AM Background Traffic  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
		Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m		per veh	km/h
South: Bayshore Dr (S)											
1	L2	325	1.3	0.540	4.0	LOS A	4.5	32.5	0.29	0.47	44.0
2	T1	336	7.8	0.540	4.0	LOS A	4.5	32.5	0.29	0.47	45.3
3	R2	102	6.2	0.540	7.5	LOS A	4.5	32.5	0.29	0.47	44.2
3u	U	16	0.0	0.540	9.0	LOS A	4.5	32.5	0.29	0.47	34.3
Approach		779	4.7	0.540	4.6	LOS A	4.5	32.5	0.29	0.47	44.5
East: Grevillea St (E)											
4	L2	34	6.3	0.079	5.4	LOS A	0.4	2.8	0.47	0.61	41.6
5	T1	18	5.9	0.079	5.3	LOS A	0.4	2.8	0.47	0.61	45.9
6	R2	24	8.7	0.079	8.8	LOS A	0.4	2.8	0.47	0.61	45.7
6u	U	1	0.0	0.079	10.2	LOS A	0.4	2.8	0.47	0.61	48.7
Approach		77	6.8	0.079	6.5	LOS A	0.4	2.8	0.47	0.61	44.5
North: Bayshore Dr (N)											
7	L2	24	0.0	0.251	5.0	LOS A	1.4	10.6	0.48	0.56	45.4
8	T1	217	12.1	0.251	5.2	LOS A	1.4	10.6	0.48	0.56	44.2
9	R2	13	0.0	0.251	8.4	LOS A	1.4	10.6	0.48	0.56	46.5
9u	U	1	0.0	0.251	10.0	LOS A	1.4	10.6	0.48	0.56	50.1
Approach		255	10.3	0.251	5.4	LOS A	1.4	10.6	0.48	0.56	44.6
West: Centennial Circuit (W)											
10	L2	17	6.3	0.189	6.6	LOS A	1.1	7.8	0.61	0.73	44.1
11	T1	26	4.0	0.189	6.5	LOS A	1.1	7.8	0.61	0.73	44.5
12	R2	118	6.3	0.189	10.1	LOS A	1.1	7.8	0.61	0.73	40.2
12u	U	1	0.0	0.189	11.5	LOS A	1.1	7.8	0.61	0.73	48.2
Approach		162	5.8	0.189	9.1	LOS A	1.1	7.8	0.61	0.73	41.7
All Vehicles		1273	6.1	0.540	5.4	LOS A	4.5	32.5	0.38	0.53	44.1

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.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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# MOVEMENT SUMMARY

 Site: [2028 PM Base]

Intersection of Bayshore Dr / Centennial Circuit / Grevillea St  
2028 PM Background Traffic  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue	Prop. Queued	Effective Stop Rate	Average Speed	
		Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m	per veh	km/h	
South: Bayshore Dr (S)											
1	L2	179	4.7	0.435	4.1	LOS A	3.1	22.9	0.29	0.49	43.7
2	T1	281	3.0	0.435	4.0	LOS A	3.1	22.9	0.29	0.49	45.1
3	R2	101	7.3	0.435	7.6	LOS A	3.1	22.9	0.29	0.49	43.8
3u	U	44	7.1	0.435	9.2	LOS A	3.1	22.9	0.29	0.49	33.7
Approach		605	4.5	0.435	5.0	LOS A	3.1	22.9	0.29	0.49	44.0
East: Grevillea St (E)											
4	L2	76	4.2	0.169	7.9	LOS A	1.0	7.1	0.72	0.77	39.9
5	T1	21	0.0	0.169	7.7	LOS A	1.0	7.1	0.72	0.77	44.8
6	R2	24	0.0	0.169	11.1	LOS A	1.0	7.1	0.72	0.77	44.7
6u	U	1	0.0	0.169	12.7	LOS A	1.0	7.1	0.72	0.77	47.2
Approach		122	2.6	0.169	8.5	LOS A	1.0	7.1	0.72	0.77	42.3
North: Bayshore Dr (N)											
7	L2	28	3.7	0.504	7.1	LOS A	3.8	27.1	0.72	0.76	44.5
8	T1	411	3.8	0.504	7.1	LOS A	3.8	27.1	0.72	0.76	43.4
9	R2	20	0.0	0.504	10.4	LOS A	3.8	27.1	0.72	0.76	45.8
9u	U	3	0.0	0.504	12.0	LOS A	3.8	27.1	0.72	0.76	49.2
Approach		462	3.6	0.504	7.3	LOS A	3.8	27.1	0.72	0.76	43.7
West: Centennial Circuit (W)											
10	L2	28	3.7	0.346	6.7	LOS A	2.2	15.3	0.65	0.76	44.0
11	T1	39	0.0	0.346	6.6	LOS A	2.2	15.3	0.65	0.76	44.4
12	R2	245	1.3	0.346	10.1	LOS A	2.2	15.3	0.65	0.76	40.1
12u	U	1	0.0	0.346	11.7	LOS A	2.2	15.3	0.65	0.76	48.0
Approach		314	1.3	0.346	9.4	LOS A	2.2	15.3	0.65	0.76	41.3
All Vehicles		1503	3.4	0.504	6.9	LOS A	3.8	27.1	0.53	0.65	43.1

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.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).


HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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# MOVEMENT SUMMARY

 Site: [2028 AM Design]

Intersection of Bayshore Dr / Centennial Circuit / Grevillea St  
2028 AM Design Traffic  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
		Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m		per veh	km/h
South: Bayshore Dr (S)											
1	L2	362	1.2	0.568	4.1	LOS A	4.9	35.5	0.31	0.47	43.9
2	T1	336	7.8	0.568	4.0	LOS A	4.9	35.5	0.31	0.47	45.2
3	R2	102	6.2	0.568	7.5	LOS A	4.9	35.5	0.31	0.47	44.1
3u	U	16	0.0	0.568	9.0	LOS A	4.9	35.5	0.31	0.47	34.2
Approach		816	4.5	0.568	4.6	LOS A	4.9	35.5	0.31	0.47	44.4
East: Grevillea St (E)											
4	L2	34	6.3	0.082	5.6	LOS A	0.4	2.9	0.50	0.62	41.4
5	T1	18	5.9	0.082	5.5	LOS A	0.4	2.9	0.50	0.62	45.9
6	R2	24	8.7	0.082	9.0	LOS A	0.4	2.9	0.50	0.62	45.6
6u	U	1	0.0	0.082	10.4	LOS A	0.4	2.9	0.50	0.62	48.6
Approach		77	6.8	0.082	6.7	LOS A	0.4	2.9	0.50	0.62	44.4
North: Bayshore Dr (N)											
7	L2	24	0.0	0.263	5.2	LOS A	1.5	11.3	0.51	0.59	45.2
8	T1	217	12.1	0.263	5.4	LOS A	1.5	11.3	0.51	0.59	44.0
9	R2	17	0.0	0.263	8.6	LOS A	1.5	11.3	0.51	0.59	46.4
9u	U	1	0.0	0.263	10.2	LOS A	1.5	11.3	0.51	0.59	49.9
Approach		259	10.2	0.263	5.6	LOS A	1.5	11.3	0.51	0.59	44.4
West: Centennial Circuit (W)											
10	L2	20	5.3	0.230	6.7	LOS A	1.3	9.8	0.63	0.74	44.0
11	T1	26	4.0	0.230	6.6	LOS A	1.3	9.8	0.63	0.74	44.4
12	R2	151	4.9	0.230	10.1	LOS A	1.3	9.8	0.63	0.74	40.1
12u	U	1	0.0	0.230	11.6	LOS A	1.3	9.8	0.63	0.74	48.0
Approach		198	4.8	0.230	9.3	LOS A	1.3	9.8	0.63	0.74	41.4
All Vehicles		1349	5.8	0.568	5.6	LOS A	4.9	35.5	0.41	0.54	43.9

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.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: BITZIOS CONSULTING | Processed: Monday, 9 January 2017 1:02:21 PM

Project: P:\P2841 Centennial Drive Byron Bay TIA\Technical Work\Models\P2841.001 Bayshore Dve & Centennial Circuit Rd.sip7

# MOVEMENT SUMMARY

 Site: [2028 PM Design]

Intersection of Bayshore Dr / Centennial Circuit / Grevillea St  
2028 PM Design Traffic  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
		Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m		per veh	km/h
South: Bayshore Dr (S)											
1	L2	212	4.0	0.460	4.1	LOS A	3.4	24.8	0.30	0.49	43.7
2	T1	281	3.0	0.460	4.0	LOS A	3.4	24.8	0.30	0.49	45.0
3	R2	101	7.3	0.460	7.6	LOS A	3.4	24.8	0.30	0.49	43.8
3u	U	44	7.1	0.460	9.2	LOS A	3.4	24.8	0.30	0.49	33.6
Approach		638	4.3	0.460	5.0	LOS A	3.4	24.8	0.30	0.49	44.0
East: Grevillea St (E)											
4	L2	76	4.2	0.177	8.4	LOS A	1.1	7.6	0.74	0.79	39.5
5	T1	21	0.0	0.177	8.1	LOS A	1.1	7.6	0.74	0.79	44.5
6	R2	24	0.0	0.177	11.6	LOS A	1.1	7.6	0.74	0.79	44.4
6u	U	1	0.0	0.177	13.2	LOS A	1.1	7.6	0.74	0.79	46.9
Approach		122	2.6	0.177	9.0	LOS A	1.1	7.6	0.74	0.79	42.0
North: Bayshore Dr (N)											
7	L2	28	3.7	0.529	7.9	LOS A	4.2	30.4	0.76	0.82	44.2
8	T1	411	3.8	0.529	7.8	LOS A	4.2	30.4	0.76	0.82	43.0
9	R2	24	0.0	0.529	11.1	LOS A	4.2	30.4	0.76	0.82	45.5
9u	U	3	0.0	0.529	12.8	LOS A	4.2	30.4	0.76	0.82	48.9
Approach		466	3.6	0.529	8.0	LOS A	4.2	30.4	0.76	0.82	43.3
West: Centennial Circuit (W)											
10	L2	33	3.2	0.396	6.9	LOS A	2.6	18.3	0.68	0.78	43.9
11	T1	39	0.0	0.396	6.7	LOS A	2.6	18.3	0.68	0.78	44.2
12	R2	286	1.1	0.396	10.2	LOS A	2.6	18.3	0.68	0.78	40.0
12u	U	1	0.0	0.396	11.8	LOS A	2.6	18.3	0.68	0.78	47.9
Approach		359	1.2	0.396	9.5	LOS A	2.6	18.3	0.68	0.78	41.1
All Vehicles		1585	3.3	0.529	7.2	LOS A	4.2	30.4	0.56	0.67	42.9

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.

Roundabout Capacity Model: SIDRA Standard.

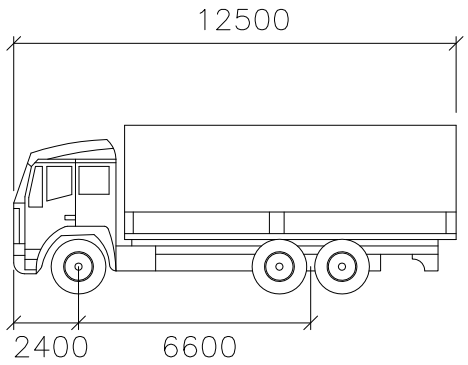
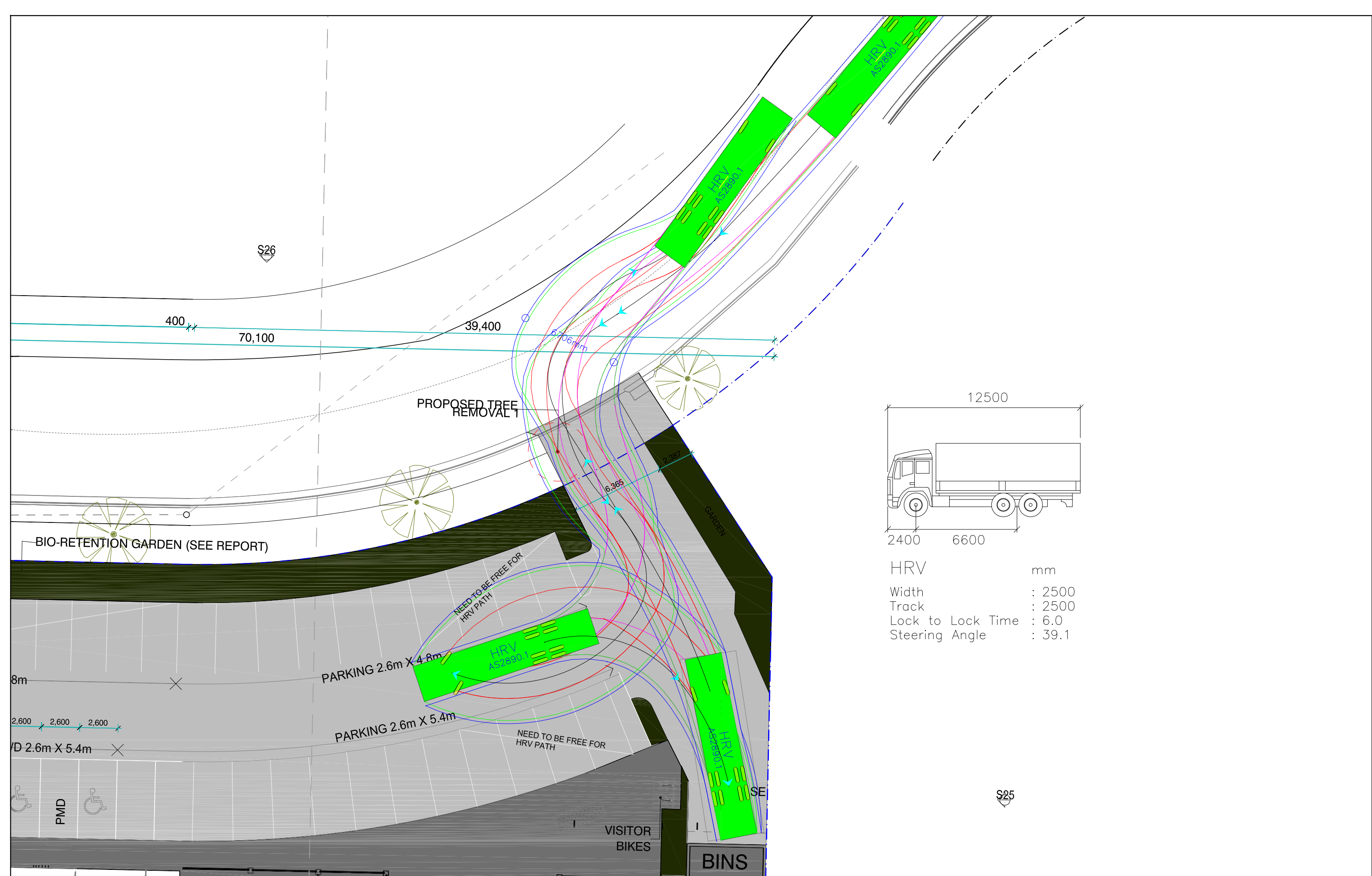
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

## APPENDIX E

### SWEPT PATH ASSESSMENT

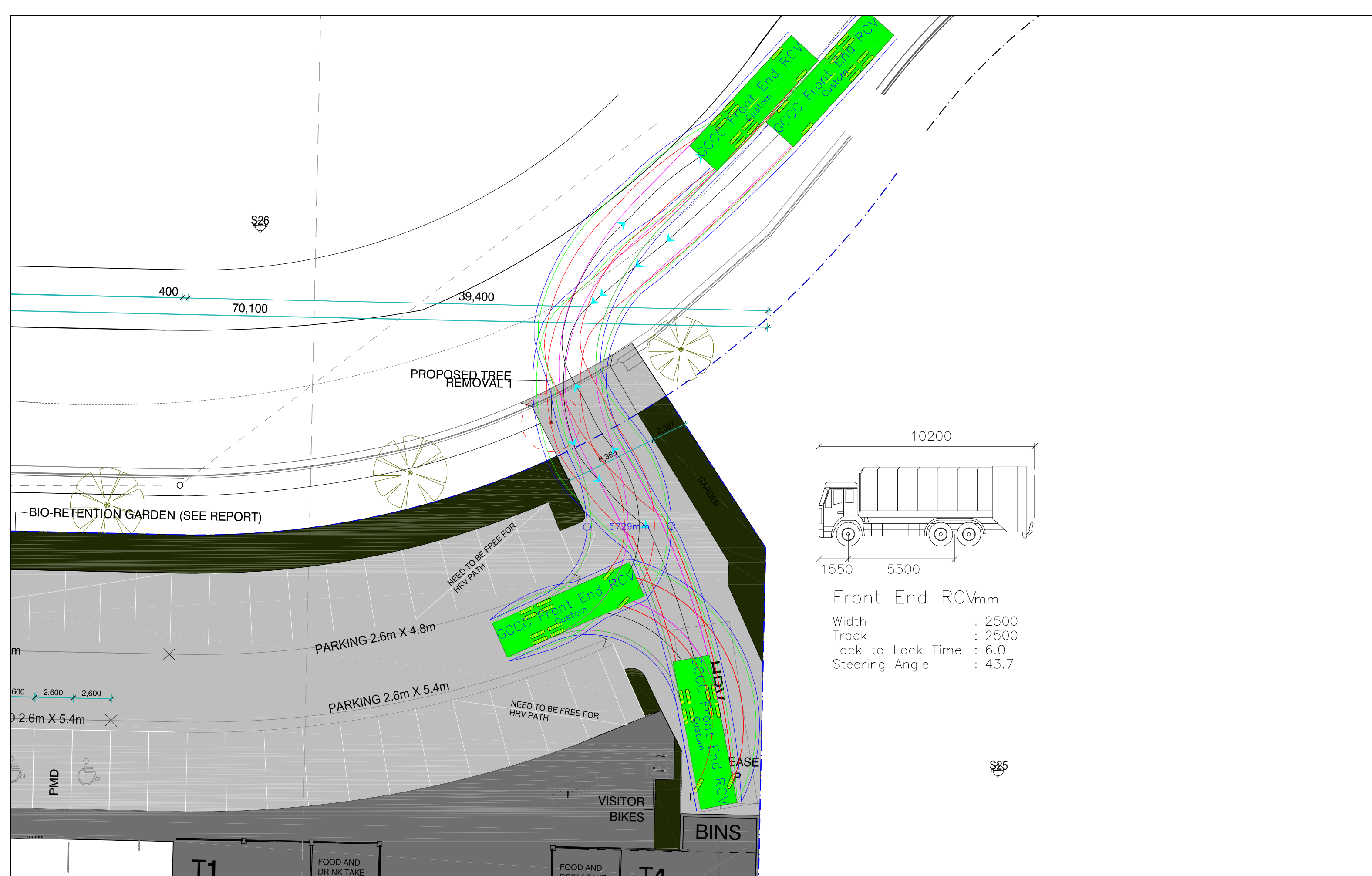


HRV : mm  
 Width : 2500  
 Track : 2500  
 Lock to Lock Time : 6.0  
 Steering Angle : 39.1

Date:	16/01/17
Project No:	P2841

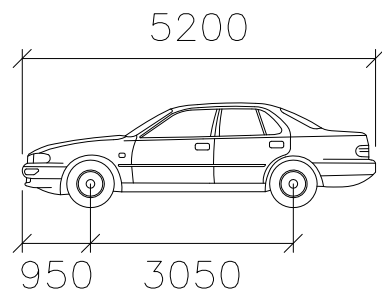
Drawing Name:	HRV Swept Path Assessment
Project Name:	The Hive - Centennial Circuit Byron Bay TIA

<b>BITZIOS</b> -consulting	
Sheet	Version
1	A



Date: 16/01/17  
 Project No: P2841

Drawing Name: RCV Swept Path Assessment  
 Project Name: The Hive - Centennial Circuit Byron Bay TIA



B99 mm  
 Width : 1940  
 Track : 1840  
 Lock to Lock Time : 6.0  
 Steering Angle : 38.0

7,400  
 4,800  
 6,000  
 6,000  
 5,400  
 2,030

POWER POLE

PEDESTRIAN ACCESS

BIO-RETENTION GARDEN (S)

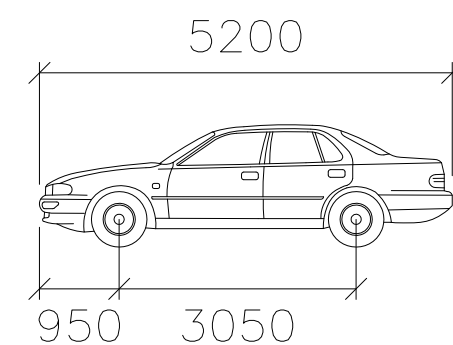
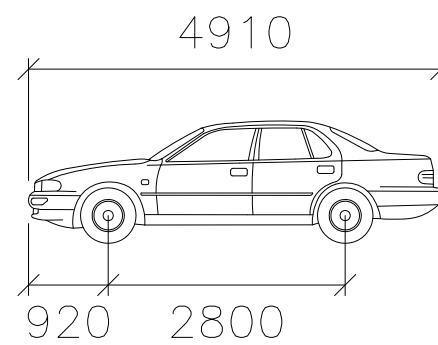
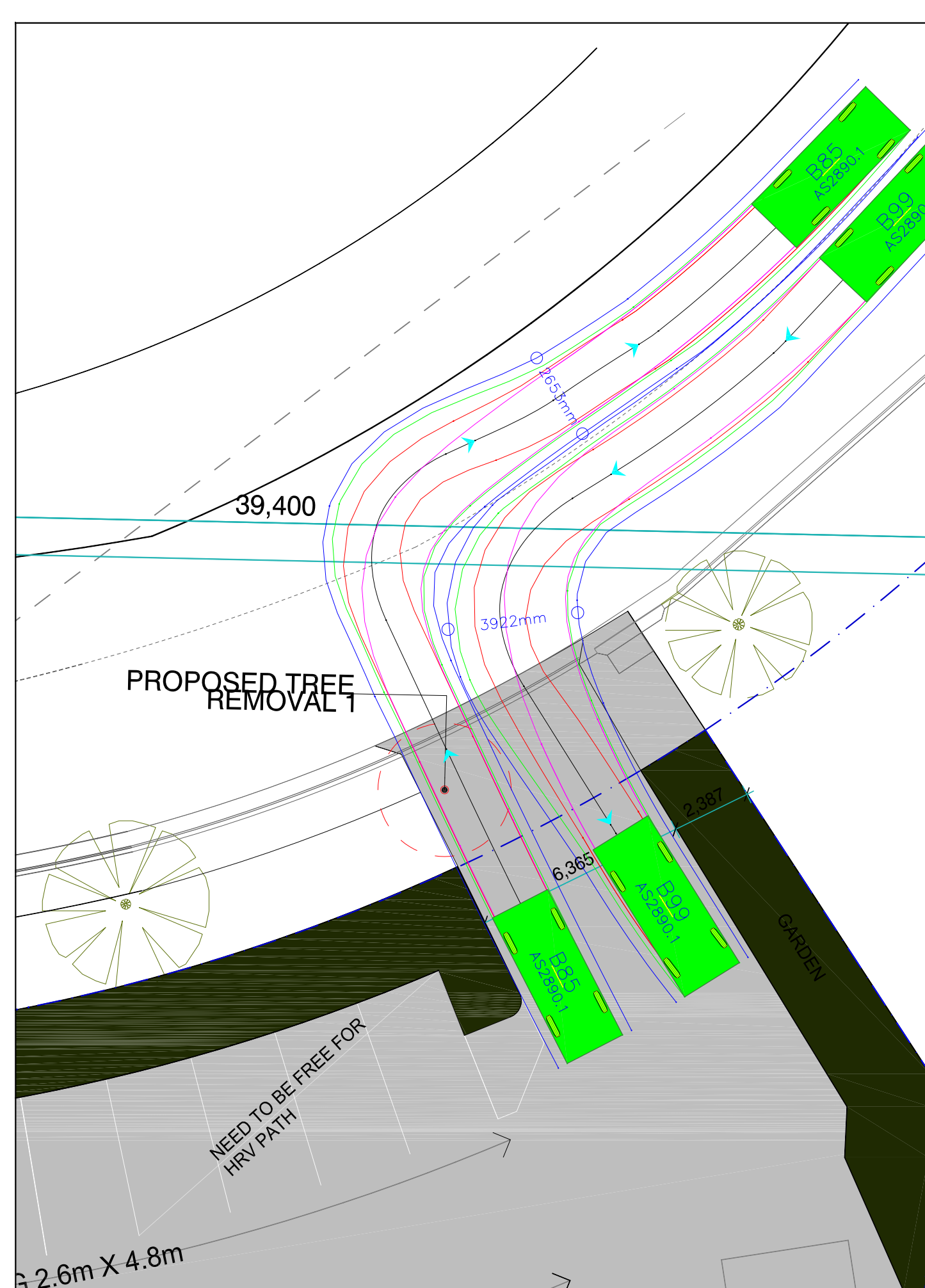


Date: 16/01/17  
 Project No: P2841

Drawing Name: Reverse Only Bay Swept Path Assessment  
 Project Name: The Hive - Centennial Circuit Byron Bay TIA

**BITZIOS**  
 consulting

Sheet	Version
3	A



B85 mm

Width : 1870

Track : 1770

Lock to Lock Time : 6.0

Steering Angle : 38.5

B99 mm

Width : 1940

Track : 1840

Lock to Lock Time : 6.0

Steering Angle : 38.0

Date: 16/01/17

Project No: P2841

Drawing Name:

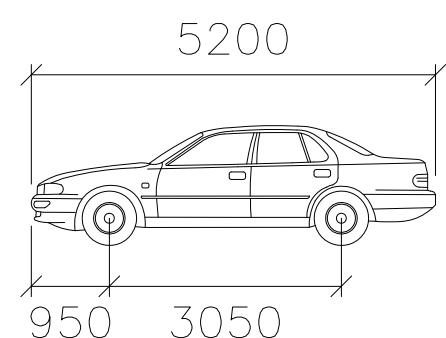
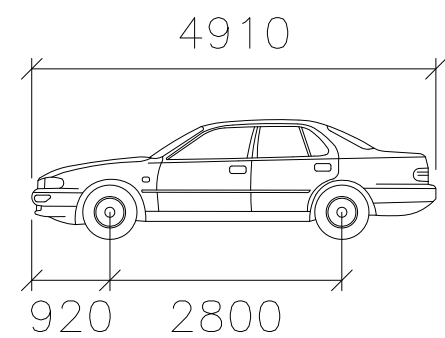
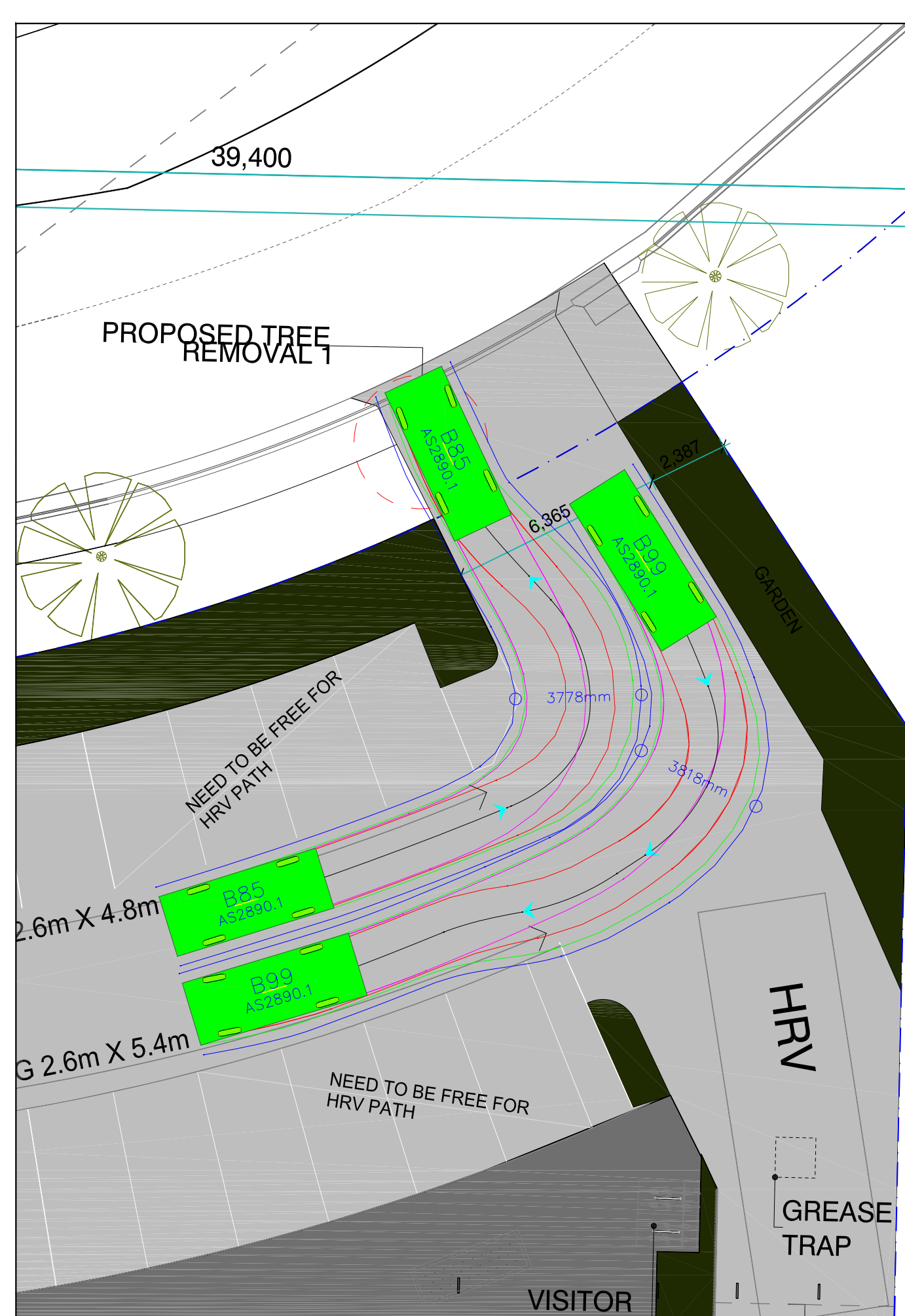
Project Name:

B99 and B85 Entry Swept Path Assessment

The Hive - Centennial Circuit Byron Bay TIA

**BITZIOS**  
-consulting

Sheet	Version
4	A



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 Width : 1870 mm  
 Track : 1770 mm  
 Lock to Lock Time : 6.0  
 Steering Angle : 38.5

B99  
 Width : 1940 mm  
 Track : 1840 mm  
 Lock to Lock Time : 6.0  
 Steering Angle : 38.0

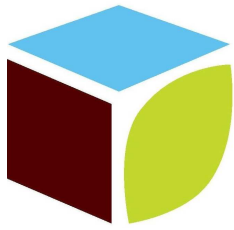
S25

Date:	16/01/17
Project No:	P2841

Drawing Name:	
Project Name:	

B99 and B85 Internal Swept Path Assessment  
 The Hive - Centennial Circuit Byron Bay TIA

<b>BITZIOS</b> -consulting	
Sheet	Version
5	A



# Techoon

**BUILDING SERVICES**

## **BUILDING CODE OF AUSTRALIA ASSESSMENT**

**PROPERTY:**

**LOT 60, DP 835249  
88-94 CENTENNIAL CIRCUIT  
BYRON BAY NSW 2481**

**APPLICANT:**

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**PREPARED BY:**

**CRAIG NOWLAN**

**DATE:**

**12 JANUARY 2107**

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[www.techoon.com.au](http://www.techoon.com.au)  
ABN 20 128 806 002**

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## REPORT REGISTER

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The following report register documents the development and issue of this report prepared by Tecton Building Services.

Ref	Issue No:	Comment:	Date:
	1	Report prepared for applicant	12 January 2017

---

## AUTHORISATION

---

Report	Issue No:	Name	Signature	Date:
Prepared by	1	Craig Nowlan		12 January 2017

### DISCLAIMER

This report has been prepared for the purposes and exclusive use of Bruce Coulson for use in the proposed development and is not to be used for any other purpose or by any other person or Corporation. Tecton Building Services Pty Ltd accepts no responsibility for any loss or damage suffered, howsoever, arising to any person or Corporation who may use or rely on this report in contravention of the terms of this clause.

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## 1.0 EXECUTIVE SUMMARY

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Techton Building Services has been requested by Newton Denny Chapelle to undertake an assessment of the proposed mixed use development located at Lot 60, DP 835249, 88-94 Centennial Circuit, Byron Bay and provide a written compliance report against the requirements of the Building Code of Australia (BCA) 2016.

The assessment has been requested to identify areas of non-compliance with the Building Code of Australia to enable the development of strategies to ensure that the premises complies with the relevant provisions of the BCA and Australian Standards.

The report has assessed the adequacy of proposed fire safety measures against current BCA 2016 requirements. The description of the services undertaken include:

- Site Inspection
- BCA Report

The inspection revealed a number of departures from the requirements of the BCA in respect of the provision of fire resistance levels and the provision of suitable egress pathways from the building.

This report does not include assessment of matters of a specialist nature. Limitations of this report include:

- Determination of structural adequacy in relation to fire resistance levels of building elements. If necessary an Independent assessment by a qualified structural engineer may be required for assessment of structural adequacy of fire resisting construction.
- Determination of compliance with the relevant Australian Standards in respect of fire safety measures including, fire hydrants, fire hose reels, emergency and exit lighting. Specialist Consultants shall be engaged to provide detailed designs to accompany the lodgement of a Construction Certificate.

---

## 2.0 BRIEF

---

Newton Denny Chapelle has requested that Techton Building Services undertake a BCA Assessment and provide a Report on the compliance status of the proposed development with the requirements of the application sections of the Building Code of Australia (BCA) with a view to upgrading to current standards where possible.

The proposal comprises a mixed use development including a Child Care Centre and Industrial Work Hub containing six (6) sole occupancy units.

---

## 3.0 SITE

---

The subject property is identified as Lot 60, DP 835249, No. 88-94 Centennial Circuit, Byron Bay.

The site is currently vacant land.

**Aerial Map**



Source: Six Maps

**Locality Map**



Source: Google Maps

---

## 4.0 METHODOLOGY

---

### PROCESS ADOPTED

The following method of assessment has been used in the preparation of this report;

- 1) Conduct a desktop review of the supplied documentation.
- 2) Determine the basic assessment data for the building.
- 3) Undertake site inspection of the facility.
- 4) Assess the existing design of the building against the current Deemed-to-Satisfy requirements of Sections C, D, E, F and J of the BCA having regard to the scope listed above. Establish the status of each clause into the following categories:
  - a) Clause is administrative information only (**Noted**).
  - b) Clause is applicable to the assessment (**Applies**).
  - c) Clause is not relevant to the building (**N/A**).
  - d) The building complies with the requirements of the clause (**Complies**).
  - e) Compliance with the requirements of the clause is unable to be determined from the site inspection or the documentation available. (**Not Determined**). A recommendation in the "Comments" column will indicate if further information or investigation is required or if the feature should be brought into conformity with the requirements of the BCA.
  - f) Spot checks and the visual inspection revealed no non-compliances (**No issues identified**) (Note that a full audit is not conducted in regard of certain 'generic' items as identified in the scope)
- 5) The building does not comply with the requirements of the clause (**Does Not Comply**).
- 6) Nominate the status of the design against each BCA requirement.
- 7) Details assessed for the purposes of this report are floor plans layouts prepared by Harley Graham and Associates and Local Office Architecture

#### 1.1. BUILDING CHARACTERISTICS

The following assessment data has been drawn from the provisions of the BCA.

##### 1.1.1. Classification

The significant spaces in the design have been classified in accordance with the requirements of Clause A3.2 of the BCA and are summarised in the table below: -

## The Hive – Child Care

Position	Space	Classification
Ground	Office, Childcare Rooms, Amenities, Staff Room and Play space	Class 9b
First	Childcare Rooms and Play Space	Class 9b

## Industrial Spaces – 6 Tenancies/Caretaker's Flat

Position	Space	Classification
Ground	Storage/Production and Office Space	Class 8
	Takeaway Food Shop	Class 6
First	Storage/Production and Office Space	Class 8
	Caretaker's Residence	Class 4

### 1.1.2. Number of storeys contained

The design contains two storeys.

### 1.1.3. Rise in storeys

In accordance with the provisions of Clause C1.2 of the BCA the design has a rise in storey of 2.

### 1.1.4. Type of Construction

Clause C1.1 of the BCA requires the Child Care Centre component of the design to be of Type B construction whilst the Industrial tenancies are required to be Type C Construction subject to a fire wall separating the two separate uses in accordance with the requirements of Part C2.7.

## 5.0 BCA ASSESSMENT - CHILDCARE COMPONENT

The following section of the report presents a summary of the assessment of the existing building against the DTS provisions of Sections C, D, E, F and J of the BCA for the **Child Care component**. A separate assessment has been prepared for the industrial tenancies and is attached to this report.

### PART C - FIRE RESISTANCE

Clause	Description	Status	Comments
<b>Part C1</b>	<b>Fire Resistance &amp; Stability</b>		
C1.1	Type of construction required	<b>Applies</b>	Type B Construction
C1.2	Calculation of rise in storeys	<b>Applies</b>	Two
C1.3	Buildings of multiple classification	<b>Applies</b>	The development comprises a mixture of classifications including <ul style="list-style-type: none"> <li>▪ Child Care – Class 9b</li> <li>▪ Industrial Buildings – Class 8</li> <li>▪ Food Shops – Class 6</li> <li>▪ Caretaker's Flat – Class 4</li> </ul>
C1.4	Mixed types of construction	<b>Applies</b>	The building is to be separated into two uses by a fire wall in accordance with Part C2.7.
C1.5	Two storey Class 2 or 3 buildings	<b>N/A</b>	
C1.6	Class 4 parts of buildings	<b>N/A</b>	This section of the report deals with the Child Care component only. Refer to Section 6 of this assessment which deals with the Industrial component
C1.7	Open stands and indoor stadiums	<b>N/A</b>	
C1.8	Lightweight construction	<b>N/A</b>	
C1.9	-		
C1.10	Fire hazard properties	<b>Applies</b>	All floor and wall coverings to have the required fire hazard indices.
C1.11	Performance of external walls in fire	<b>Applies</b>	A Structural Engineer is to confirm if the walls have been designed to prevent outward collapse.
C1.12	Non-combustible materials	<b>N/A</b>	
C1.13	Fire protected timber: Concession	<b>N/A</b>	

Clause	Description	Status	Comments
Spec C1.1	Fire resisting construction	<b>Applies</b>	<p>The following Fire Resistance Levels are required for the relevant components:</p> <p>External Walls:            &lt; 1.5m to boundary – 120/120/120            1.5 – &lt; 3.0m - 120/90/60            3.0 - &lt; 9.0m - 120/30/30            9.0 - &lt; 18.0m - 120/30/-            18.0m or more - -/-/-</p> <p>Fire Walls: - 120/120/120</p> <p>Internal Walls:            Lift and stair shafts – 120/120/120            Non-loadbearing stair shafts - -/120/120</p> <p>Other loadbearing internal walls and columns- 120/-/-</p> <p>Floors – separating ground and first floor</p> <ul style="list-style-type: none"> <li>- A resistance to the incipient spread of fire for at least 60 minutes, or</li> <li>- Have an FRL of at least 30/30/30.</li> <li>- Have a fire protective covering</li> </ul>
Part C2	Compartmentation & Separation		
C2.1	Application of Part	<b>Applies</b>	Informative
C2.2	General floor area limitations	<b>Applies</b>	Complies
C2.3	Large isolated buildings	<b>N/A</b>	
C2.4	Requirements for open space and vehicular access	<b>N/A</b>	
C2.5	Class 9a and 9c buildings	<b>N/A</b>	
C2.6	Vertical separation of openings in external walls	<b>N/A</b>	
C2.7	Separation by fire walls	<b>Applies</b>	The walls separating the childcare centre and industrial component are to be designed to achieve an FRL of 240/240/240.
C2.8	Separation of classifications in the same storey	<b>N/A</b>	
C2.9	Separation of classifications in different storeys	<b>N/A</b>	
C2.10	Separation of lift shafts	<b>N/A</b>	
C2.11	Stairways and lifts in one shaft	<b>Applies</b>	Complies
C2.12	Separation of equipment	<b>N/A</b>	
C2.13	Electricity supply system	<b>Applies</b>	Unable to assess. Details of the location of the MSB are to be indicated on the plan.

Clause	Description	Status	Comments
C2.14	Public corridors in Class 2 & 3 buildings	N/A	
<b>Part C3</b>	<b>Protection of Openings</b>		
C3.1	Application of Part	<b>Applies</b>	
C3.2	Protection of openings in external walls	<b>Applies</b>	The following openings require protection: <ul style="list-style-type: none"> <li>▪ The door to the service area located in the south eastern corner of the building, and</li> <li>▪ The door opening affording access to the stair in the north west corner of the building</li> <li>▪ Windows to the "Zen" room if located less than 3.0m from the adjacent boundary</li> </ul>
C3.3	Separation of openings in different fire compartments	<b>Applies</b>	Complies. Openings are at 180° or greater – no protection required.
C3.4	Acceptable method of protection	<b>Applies</b>	Protection of openings to be undertaken in accordance with this clause.
C3.5	Doorways in fire walls	N/A	No doors in firewall.
C3.6	Sliding fire doors	N/A	
C3.7	Protection of doorways in horizontal exits	N/A	
C3.8	Openings in fire isolated exits	N/A	
C3.9	Service penetrations in fire isolated exits	N/A	
C3.10	Openings in fire isolated lift shafts	N/A	
NSW C3.11	Bounding construction: Class 2 & 3 and 4 buildings	N/A	
C3.12	Openings in floors for services	N/A	
C3.13	Openings in shafts	N/A	
C3.14	-		
C3.15	Openings for service installation	<b>Applies</b>	Service penetrations through the floor to have suitable protection to maintain FRL of floor/ceiling system.
C3.16	Construction Joints	<b>Applies</b>	Joints in tilt panels to achieve the required FRL.
C3.17	Columns protected with lightweight construction	N/A	

#### PART D - ACCESS AND EGRESS

Clause	Description	Status	Comments
<b>Part D1</b>	<b>Provision for Escape</b>		
D1.1	Application of Part	<b>Applies</b>	
NSW D1.2	Number of exits required	<b>Applies</b>	Complies
D1.3	When fire-isolated exits are required	N/A	
D1.4	Exit travel distances	<b>Applies</b>	Generally complies. Details of the location of access points to the outdoor playground area required to ensure adequate travel distances are provided.

<b>Clause</b>	<b>Description</b>	<b>Status</b>	<b>Comments</b>
D1.5	Distance between alternative exits	<b>Applies</b>	Complies
NSW D1.6	Dimensions of exits	<b>Applies</b>	In sufficient detail. Working drawing required to determine width of exits.
D1.7	Travel via fire-isolated exit	<b>N/A</b>	
D1.8	External stairways	<b>N/A</b>	
D1.9	Travel by non-fire-isolated stairways or ramps	<b>Applies</b>	Complies
NSW D1.10	Discharge from exits	<b>Applies</b>	Complies
D1.11	Horizontal exits	<b>N/A</b>	
D1.12	Non required stairways, ramps or escalators	<b>N/A</b>	
NSW D1.13	Number of persons accommodated	<b>Applies</b>	Ground floor area Library - 15 persons Office - 2 persons Staff - 2 persons Laundry - 2 persons Kitchen - 3 persons Lab - 3 persons Room 1 - 11 persons Room 2 - 13 persons Room 3 - 13 persons Zen - 12 persons First Floor Room 4 - 22 persons Room 5 - 20 persons <b>Total 118 persons</b>
D1.14	Measurement of distances	<b>Applies</b>	Informative clause
D1.15	Method of measurement	<b>Applies</b>	Informative clause
D1.16	Plant rooms and lift motor rooms; Concession	<b>Applies</b>	
D1.17	Access to lift pits	<b>N/A</b>	
<b>Part D2</b>	<b>Construction of Exits</b>		
NSW D2.1	Application of Part	<b>Applies</b>	
D2.2	Fire isolated stairs or ramps	<b>N/A</b>	
D2.3	Non-fire-isolated stairways and ramps	<b>N/A</b>	
D2.4	Separation of rising and descending stair flights	<b>N/A</b>	
D2.5	Open access ramps and balconies	<b>N/A</b>	
D2.6	Smoke lobbies	<b>N/A</b>	
D2.7	Installations in exits and paths of travel	<b>Applies</b>	Insufficient Detail – location of switchboard and electrical distribution boards to be nominated. All distribution boards located in paths of travel to exits are to be enclosed in a non-combustible cabinet with the enclosing door lined with a non-combustible lining and smoke seals fitted to the door opening.

Clause	Description	Status	Comments
D2.8	Enclosure of space under stairs and ramps	<b>Applies</b>	Insufficient detail – the space below the stair flights shall not be enclosed to form a cupboard unless: (i) the enclosing walls and ceilings have an FRL of not less than 60/60/60; and (ii) any access doorway to the enclosed space is fitted with a <a href="#">self-closing</a> –/60/30 fire door.
D2.9	Width of stairways	<b>N/A</b>	
D2.10	Pedestrian ramps	<b>N/A</b>	
D2.11	Fire-isolated passageways	<b>N/A</b>	
D2.12	Roof as open space	<b>N/A</b>	
NSW D2.13	Treads and risers	<b>Applies</b>	Insufficient details – working drawings to nominate tread and riser dimensions.
D2.14	Landings	<b>Applies</b>	Insufficient details – working drawings to detail landing dimensions
NSW D2.15	Thresholds	<b>Applies</b>	
NSW D2.16	Balustrades	<b>Applies</b>	Insufficient details – working drawings to detail balustrade dimensions
D2.17	Handrails	<b>Applies</b>	Insufficient details – working drawings to detail handrail dimensions. Note: Handrails are to be installed on both sides of the stair flights.
D2.18	Fixed platforms walkways, stairways, and ladders	<b>N/A</b>	
NSW D2.19	Doorways and doors	<b>Applies</b>	Complies
D2.20	Swinging doors	<b>Applies</b>	Does not comply Required exit doors are to swing in the direction of egress. All designated exit doors shall be capable of swinging in the direction of egress in the event of an emergency. The door at the base of the internal stairs shall swing in the direction of egress. The door to the corridor outside the Lab shall be dual action and capable of swinging in both directions.
NSW D2.21	Operation of latch	<b>Applies</b>	Insufficient detail – Architect to detail door furniture
D2.22	Re-entry fire-isolated exits	<b>N/A</b>	
D2.23	Signs on doors	<b>N/A</b>	
NSW D2.101	Doors in path of travel in a POPE	<b>N/A</b>	
D2.24	Protection of openable windows	<b>N/A</b>	
D2.25	Timber stairways: Concession	<b>N/A</b>	
<b>Part D3</b>	<b>Access for People with Disabilities</b>		
D3.1	General building access requirements	<b>Applies</b>	
D3.2	Access to buildings	<b>Applies</b>	Access required to and within all areas normally used by the occupants

Clause	Description	Status	Comments
D3.3	Parts of buildings to be accessible	<b>Applies</b>	<p>Access required to and within all areas normally used by the occupants:</p> <ul style="list-style-type: none"> <li>▪ All stairs to be provided with handrails on both sides.</li> <li>▪ Handrails to comply with Cl 12 of AS1428.1</li> <li>▪ Lifts to comply with Part E3.6 of the BCA</li> <li>▪ The floor surface proposed for the outdoor play space shall comply with the requirements of Part D3.3 of the BCA and Cl 7 of AS1428.1</li> </ul> <p>The following comments are made in respect of access to and within the building:</p> <ul style="list-style-type: none"> <li>▪ Corridor width to be a min. 1670mm to enable access to rooms.</li> <li>▪ Circulation space to accessible w.c does not comply from within the room. A min. 530mm is to be provided on the latch side.</li> </ul>
D3.4	Concessions	<b>Applies</b>	Disabled access not assessed for store room.
D3.5	Car parking	<b>Applies</b>	Complies – details of line marking and bollards to be provided on working drawings.
D3.6	Signage	<b>Applies</b>	To be provided
D3.7	Hearing augmentation	<b>Applies</b>	Hearing augmentation to be provided if an inbuilt amplification system is installed within the building.
D3.8	Tactile indicators	<b>Applies</b>	Tactile indicators to be provided to stairs in accordance with the Standard.
D3.9	Wheelchair seating spaces in Class 9b assembly building	<b>N/A</b>	
D3.10	Swimming Pools	<b>N/A</b>	
D3.11	Ramps	<b>N/A</b>	
D3.12	Glazing on an access way	<b>Applies</b>	Frameless glass or fully glazed doors are to be clearly marked or etched.

#### PART E - SERVICES AND EQUIPMENT

Clause	Description	Status	Comments
<b>Part E1</b>	<b>Fire Fighting Equipment</b>		
E1.1	-		
E1.2	-		
E1.3	Fire hydrants	<b>Applies</b>	A fire hydrant system designed to provide coverage to the building in accordance with the requirements of the Standard is required. Details of the design of the system are to be prepared by a suitably qualified Hydraulic Engineer.
E1.4	Hose reels	<b>Applies</b>	A fire hose reel system is to be installed within the building so that all parts of the building are provided with coverage. Details of the design of the system are to be prepared by a suitably qualified Hydraulic Engineer.
E1.5	Sprinklers	<b>N/A</b>	
E1.6	Portable fire extinguishers	<b>Applies</b>	Portable fire extinguishers are to be installed throughout the building.
E1.7	-		

Clause	Description	Status	Comments
E1.8	Fire control centres	N/A	
E1.9	Fire precautions during construction	Applies	Builder to ensure appropriate fire safety measures are provided throughout the construction phase.
E1.10	Provision for special hazards	N/A	
<b>Part E2</b>	<b>Smoke Hazard Management</b>		
E2.1	Application of Part	Applies	
E2.2	General requirements	Applies	Details of the mechanical ventilation system are to be prepared by a suitably qualified Mechanical Engineer. Details of the system design are to be submitted with the Construction Certificate.
E2.3	Provisions for special hazards	N/A	
<b>Part E3</b>	<b>Lift Installations</b>		
E3.1	Lift installations	Applies	
E3.2	Stretcher facility in lifts	N/A	
E3.3	Warning against use of lifts in fire	Applies	Appropriate signage to be provided advising against the use of lifts in the event of fire.
E3.4	Emergency lifts	N/A	
E3.5	Landings	Applies	Complies
E3.6	Passenger lifts	Applies	Lift to include accessible features – Architect to detail
E3.7	Fire Services Control	N/A	
E3.8	Aged care buildings	N/A	
E3.9	Fire service recall operation switch	N/A	
E3.10	Lift car fire service drive control switch	N/A	
<b>Part E4</b>	<b>Emergency Lighting, Exit Signs and Warning Systems</b>		
E4.1	-		
E4.2	Emergency light requirements	Applies	A system of emergency lighting and exit signs are to be installed throughout the building in accordance with AS2293.1. The emergency lighting system is to be designed by a suitably qualified Electrical Engineer.
E4.3	Measurement of distance	Applies	
E4.4	Design & operate emergency light	Applies	
E4.5	Exit signs	Applies	A system of exit signs are to be provided to clearly identify required exits and paths of travel to required exits in accordance with AS2293.1. The emergency lighting system is to be designed by a suitably qualified Electrical Engineer.
E4.6	Direction signs	Applies	Directional exit signs are to be provided to clearly identify paths of travel to required exits in accordance with AS2293.1. The emergency lighting system is to be designed by a suitably qualified Electrical Engineer.

Clause	Description	Status	Comments
E4.7	Class 2, 3 & 4 buildings: Exemptions	N/A	
E4.8	Design and operation of exit signs	Applies	Informative Clause
E4.9	EWIS systems	N/A	

## PART F - HEALTH AND AMENITY

Clause	Description	Status	Comments
<b>Part F1</b>	<b>Damp and Weatherproofing</b>		
F1.1	Stormwater drainage	Applies	Details of stormwater drainage to be provided by Civil Engineer.
F1.2	-		
F1.3	-		
F1.4	External above ground membranes	Applies	
F1.5	Roof coverings	Applies	
F1.6	Sarking	N/A	
F1.7	Water-proofing of wet areas	Applies	Waterproofing to be undertaken in accordance with AS3740. Installation Certificate to be provided by installer on completion of work.
F1.8	-		
F1.9	Damp proofing	Applies	
F1.10	Damp proofing of floors on the ground	Applies	
F1.11	Provision of floor wastes	N/A	
F1.12	Sub-floor ventilation	N/A	
F1.13	Glazed assemblies	Applies	All glazing to comply with AS2047. Installation Certificate to be provided by supplier on completion.
<b>Part F2</b>	<b>Sanitary and Other Facilities</b>		
F2.1	Facilities in residential buildings	N/A	
F2.2	Calculation of number of occupants and fixtures	Applies	Refer to D1.13.
F2.3	Facilities in Class 3 to 9 buildings	Applies	<p>The following facilities are to be provided:</p> <ul style="list-style-type: none"> <li>▪ A separate hand washing sink is to be provided in the kitchen.</li> <li>▪ Access to the kitchen is to be restricted by a door or gate to prevent unsupervised access to the kitchen.</li> <li>▪ Provide a bath, shower or shower bath.</li> <li>▪ If the centre accommodates children younger than 3 years – laundry facilities, bench type baby bath adjacent to a nappy change bench.</li> <li>▪ Junior pans to be provided for children's amenities.</li> <li>▪ Washbasins to have a rim not exceeding 600mm</li> </ul>

<b>Clause</b>	<b>Description</b>	<b>Status</b>	<b>Comments</b>
F2.4	Facilities for people with disabilities	<b>Applies</b>	Insufficient details – details of the size of the accessible toilet to be provided with the working drawings. An additional accessible sanitary facility is to be provided on level 1 in accordance with Table F2.4(a). The shower required under F2.3 is to be accessible or alternatively an additional accessible shower is to be provided within a compliant accessible sanitary facility.
F2.5	Construction of sanitary compartments	<b>Applies</b>	Accessible facilities to be constructed in accordance with AS1428.1 – 2009.
F2.6	Interpretation: Urinals and washbasins	<b>Applies</b>	Informative clause.
NSW F2.7	Warm water installations	<b>N/A</b>	
F2.8	Waste Management	<b>N/A</b>	
<b>Part F3</b>	<b>Room Sizes</b>		
F3.1	Height of rooms	<b>Applies</b>	Complies.
<b>Part F.4</b>	<b>Light and Ventilation</b>		
F4.1	Provision of natural light	<b>Applies</b>	Natural lighting to be provided to all play rooms
F4.2	Methods and extent of natural light	<b>Applies</b>	Insufficient details – details of windows and openings to all playrooms to be provided.
F4.3	Natural light borrowed from adjoining room	<b>N/A</b>	
F4.4	Artificial lighting	<b>Applies</b>	
NSW F4.5	Ventilation of rooms	<b>Applies</b>	Mechanical ventilation complying with AS1668.2 to be provided to all office spaces and sanitary compartments. Details to be provided by a Mechanical Engineer.
F4.6	Natural ventilation	<b>Applies</b>	
F4.7	Ventilation borrowed from adjoining room	<b>N/A</b>	
F4.8	Restriction on position of water closets and urinals	<b>Applies</b>	Complies.
F4.9	Airlocks	<b>N/A</b>	
F4.10	-	<b>N/A</b>	
F4.11	Carparks	<b>N/A</b>	
F4.12	Kitchen local exhaust ventilation	<b>N/A</b>	
<b>Part F5</b>	<b>Sound Transmission and Insulation</b>		
F5.1	Application of part	<b>N/A</b>	
F5.2	Determination of airborne sound insulation ratings	<b>N/A</b>	
F5.3	Determination of impact sound insulation ratings	<b>N/A</b>	
F5.4	Sound insulation of floors between units	<b>N/A</b>	
F5.5	Sound insulation of walls between units	<b>N/A</b>	

Clause	Description	Status	Comments
F5.6	Walls between a bathroom, sanitary compartment, laundry or kitchen and a habitable room in adjoining unit.	N/A	
F5.6	Sound insulation rating of internal services	N/A	
F5.7	Sound insulation of pumps	N/A	

## PART J – ENERGY EFFICIENCY

Clause	Description	Status	Comments
<b>Part J1</b>	<b>Building Fabric</b>		
J1.1	Application of part	<b>Applies</b>	Section J Report to be provided.
J1.2	Thermal construction general	<b>Applies</b>	Section J Report to be provided.
J1.3	Roof and ceiling construction	<b>Applies</b>	Section J Report to be provided.
J1.4	Roof lights	<b>Applies</b>	
J1.5	Walls	<b>Applies</b>	Section J Report to be provided.
J1.6	Floors	<b>Applies</b>	Section J Report to be provided.
<b>Part J2</b>	<b>External glazing</b>		
J2.1	Application of Part	<b>Applies</b>	Section J Report to be provided.
J2.2	Applicable glazing provisions	<b>Applies</b>	Section J Report to be provided.
J2.3	Glazing – Method 1	N/A	
J2.4	Glazing – Method 2	N/A	
J2.5	Shading	N/A	
<b>Part J3</b>	<b>Building Sealing</b>		
J3.1	Application of Part	<b>Applies</b>	Section J Report to be provided.
J3.2	Chimneys and flues	N/A	
J3.3	Roof lights	N/A	
J3.4	External windows and doors	<b>Applies</b>	Section J Report to be provided.
J3.5	Exhaust fans	<b>Applies</b>	Section J Report to be provided.
J3.6	Construction of roofs, walls and floors	<b>Applies</b>	Section J Report to be provided.
J3.7	Evaporative coolers	N/A	
<b>Part J4</b>	Left blank	N/A	
<b>Part J5</b>	<b>Air-Conditioning and Ventilation Systems</b>		
J5.1	*****	-	
J5.2	Air-conditioning and ventilations systems	N/A	
J5.3	Time Switch	N/A	
J5.4	Heating and chilling systems	N/A	
J5.5	Miscellaneous exhaust systems	N/A	
<b>Part J6</b>	<b>Artificial Lighting and Power</b>		

<b>Clause</b>	<b>Description</b>	<b>Status</b>	<b>Comments</b>
J6.1	Application of Part	<b>Applies</b>	Section J Report to be provided.
J6.2	Interior artificial lighting	<b>Applies</b>	Section J Report to be provided.
J6.3	Control of interior and artificial lighting and power	<b>Applies</b>	Section J Report to be provided.
J6.4	Interior decorative and display lighting	<b>N/A</b>	
J6.5	Artificial lighting around the perimeter of a building	<b>N/A</b>	
J6.6	Boiling water and chilled water storage units	<b>N/A</b>	
<b>Part J7</b>	<b>Hot Water Supply</b>		
J7.1		-	
J7.2	Hot water supply	<b>Applies</b>	Section J Report to be provided.
J7.3	Swimming pool heating & pumping	<b>N/A</b>	
J7.4	Spa pool heating & pumping	<b>N/A</b>	
<b>Part J8</b>	<b>Access for Maintenance</b>		
J8.1	Application of Part	<b>Applies</b>	
J8.2	Access for maintenance	<b>Applies</b>	Section J Report to be provided.

## 6.0 BCA ASSESSMENT – INDUSTRIAL COMPLEX

The following section of the report presents a summary of the assessment of the existing building against the DTS provisions of Sections C, D, E, F and J of the BCA for the **Industrial Complex component**. A separate assessment has been prepared for the industrial tenancies and is attached to this report.

### PART C - FIRE RESISTANCE

Clause	Description	Status	Comments
<b>Part C1</b>	<b>Fire Resistance &amp; Stability</b>		
C1.1	Type of construction required	<b>Applies</b>	Type C Construction
C1.2	Calculation of rise in storeys	<b>Applies</b>	Two
C1.3	Buildings of multiple classification	<b>Applies</b>	The development comprises a mixture of classifications including <ul style="list-style-type: none"> <li>▪ Child Care – Class 9b</li> <li>▪ Industrial Buildings – Class 8</li> <li>▪ Food Shops – Class 6</li> <li>▪ Caretaker's Flat – Class 4</li> </ul>
C1.4	Mixed types of construction	<b>Applies</b>	The building is to be separated into two uses by a fire wall in accordance with Part C2.7.
C1.5	Two storey Class 2 or 3 buildings	<b>N/A</b>	
C1.6	Class 4 parts of buildings	<b>N/A</b>	This section of the report deals with the Industrial component only. Refer to Section 5 of this assessment which deals with the Child Care component
C1.7	Open stands and indoor stadiums	<b>N/A</b>	
C1.8	Lightweight construction	<b>N/A</b>	
C1.9	-		
C1.10	Fire hazard properties	<b>Applies</b>	All floor and wall coverings to have the required fire hazard indices.
C1.11	Performance of external walls in fire	<b>Applies</b>	A Structural Engineer is to confirm if the walls have been designed to prevent outward collapse.
C1.12	Non-combustible materials	<b>N/A</b>	
C1.13	Fire protected timber: Concession	<b>N/A</b>	
Spec C1.1	Fire resisting construction	<b>Applies</b>	The following Fire Resistance Levels are required for the relevant components: External Walls: < 1.5m to boundary – 90/90/90 1.5 – < 3.0m – 60/60/60  Fire Walls: – 120/120/120  Internal Walls: Bounding sole occupancy units

Clause	Description	Status	Comments
<b>Part C2</b>	<b>Compartmentation &amp; Separation</b>		
C2.1	Application of Part	<b>Applies</b>	Informative
C2.2	General floor area limitations	<b>Applies</b>	Complies
C2.3	Large isolated buildings	<b>N/A</b>	
C2.4	Requirements for open space and vehicular access	<b>N/A</b>	
C2.5	Class 9a and 9c buildings	<b>N/A</b>	
C2.6	Vertical separation of openings in external walls	<b>N/A</b>	
C2.7	Separation by fire walls	<b>Applies</b>	The walls separating the childcare centre and industrial component are to be designed to achieve an FRL of 240/240/240.
C2.8	Separation of classifications in the same storey	<b>Applies</b>	Walls separating the caretaker's residence from the industrial units shall have an FRL of 60/60/60 extending to the underside of the roof covering.
C2.9	Separation of classifications in different storeys	<b>N/A</b>	The floor separating the caretaker's residence from the industrial unit below shall: <ul style="list-style-type: none"> <li>▪ Be a floor/ceiling system incorporating a ceiling which has a resistance to the incipient spread of fire to the space above of not less than 60 minutes, or</li> <li>▪ Have an FRL of 30/30/30, or</li> <li>▪ Have a fire protective covering on the underside of the floor including beams.</li> </ul>
C2.10	Separation of lift shafts	<b>N/A</b>	
C2.11	Stairways and lifts in one shaft	<b>Applies</b>	Complies
C2.12	Separation of equipment	<b>N/A</b>	
C2.13	Electricity supply system	<b>Applies</b>	Unable to assess. Details of the location of the MSB are to be indicated on the plan.
C2.14	Public corridors in Class 2 & 3 buildings	<b>Applies</b>	Complies
<b>Part C3</b>	<b>Protection of Openings</b>		
C3.1	Application of Part	<b>Applies</b>	
C3.2	Protection of openings in external walls	<b>Applies</b>	Insufficient detail. Details of the openings in the southern wall are to be provided in order to determine compliance.
C3.3	Separation of openings in different fire compartments	<b>Applies</b>	Complies. Openings are at 180° or greater – no protection required.
C3.4	Acceptable method of protection	<b>Applies</b>	Protection of openings to be undertaken in accordance with this clause.
C3.5	Doorways in fire walls	<b>N/A</b>	No doors in firewall.
C3.6	Sliding fire doors	<b>N/A</b>	
C3.7	Protection of doorways in horizontal exits	<b>N/A</b>	
C3.8	Openings in fire isolated exits	<b>N/A</b>	

Clause	Description	Status	Comments
C3.9	Service penetrations in fire isolated exits	N/A	
C3.10	Openings in fire isolated lift shafts	N/A	
NSW C3.11	Bounding construction: Class 2 & 3 and 4 buildings	Applies	The entry door affording access to the caretaker's residence is to be protected by a 35mm self closing solid core door.
C3.12	Openings in floors for services	Applies	Service penetrations through the floor to have suitable protection to maintain FRL of floor/ceiling system.
C3.13	Openings in shafts	N/A	
C3.14	-		
C3.15	Openings for service installation	Applies	Service penetrations through the floor to have suitable protection to maintain FRL of floor/ceiling system.
C3.16	Construction Joints	Applies	Joints in tilt panels to achieve the required FRL.
C3.17	Columns protected with lightweight construction	N/A	

#### PART D - ACCESS AND EGRESS

Clause	Description	Status	Comments
<b>Part D1</b>	<b>Provision for Escape</b>		
D1.1	Application of Part	Applies	
NSW D1.2	Number of exits required	Applies	Complies
D1.3	When fire-isolated exits are required	N/A	
D1.4	Exit travel distances	Applies	Does not comply. The entry door to the caretaker's unit is to be located not greater than 6.0m from an exit or a point where travel in different directions is available. The travel distances from the ground floor staff room, amenities and bike storage exceed the required distances. It is recommended that an additional "fire exit" be located in the southern wall of the building to afford occupants an alternative means of egress in the event of fire.
D1.5	Distance between alternative exits	Applies	
NSW D1.6	Dimensions of exits	Applies	In sufficient detail. Working drawing required to determine width of exits.
D1.7	Travel via fire-isolated exit	N/A	
D1.8	External stairways	N/A	
D1.9	Travel by non-fire-isolated stairways or ramps	Applies	Does not comply. The entry door to the caretaker's flat and the point of egress to a road or open space shall not exceed 30m.
NSW D1.10	Discharge from exits	Applies	Complies
D1.11	Horizontal exits	N/A	
D1.12	Non required stairways, ramps or escalators	N/A	

Clause	Description	Status	Comments
NSW D1.13	Number of persons accommodated	<b>Applies</b>	Ground floor area T1 - 9 persons T1 – Food Shop - 8 persons T2 - 8 persons T2 – Retail - 8 persons T3 - 8 persons T3 - Retail - 8 persons T4 - 9 persons T4 – Food Shop - 8 persons T5 - 8 persons T5 - Retail - 8 persons T6 - 9 persons T6 - Retail - 8 persons <b>Total 99 persons</b>
D1.14	Measurement of distances	<b>Applies</b>	Informative clause
D1.15	Method of measurement	<b>Applies</b>	Informative clause
D1.16	Plant rooms and lift motor rooms; Concession	<b>Applies</b>	
D1.17	Access to lift pits	<b>N/A</b>	
<b>Part D2</b>	<b>Construction of Exits</b>		
NSW D2.1	Application of Part	<b>Applies</b>	
D2.2	Fire isolated stairs or ramps	<b>N/A</b>	
D2.3	Non-fire-isolated stairways and ramps	<b>N/A</b>	
D2.4	Separation of rising and descending stair flights	<b>N/A</b>	
D2.5	Open access ramps and balconies	<b>N/A</b>	
D2.6	Smoke lobbies	<b>N/A</b>	
D2.7	Installations in exits and paths of travel	<b>Applies</b>	Insufficient Detail – location of switchboard and electrical distribution boards to be nominated. All distribution boards located in paths of travel to exits are to be enclosed in a non-combustible cabinet with the enclosing door lined with a non-combustible lining and smoke seals fitted to the door opening.
D2.8	Enclosure of space under stairs and ramps	<b>Applies</b>	Insufficient detail – the space below the stair flights shall not be enclosed to form a cupboard unless: (i) the enclosing walls and ceilings have an FRL of not less than 60/60/60; and (ii) any access doorway to the enclosed space is fitted with a <a href="#">self-closing</a> –/60/30 fire door.
D2.9	Width of stairways	<b>N/A</b>	
D2.10	Pedestrian ramps	<b>N/A</b>	
D2.11	Fire-isolated passageways	<b>N/A</b>	
D2.12	Roof as open space	<b>N/A</b>	
NSW D2.13	Treads and risers	<b>Applies</b>	Insufficient details – working drawings to nominate tread and riser dimensions.
D2.14	Landings	<b>Applies</b>	Insufficient details – working drawings to detail landing dimensions

Clause	Description	Status	Comments
NSW D2.15	Thresholds	<b>Applies</b>	
NSW D2.16	Balustrades	<b>Applies</b>	Insufficient details – working drawings to detail balustrade dimensions
D2.17	Handrails	<b>Applies</b>	Insufficient details – working drawings to detail handrail dimensions. Note: Handrails are to be installed on both sides of the stair flights.
D2.18	Fixed platforms walkways, stairways, and ladders	<b>N/A</b>	
NSW D2.19	Doorways and doors	<b>Applies</b>	Complies
D2.20	Swinging doors	<b>Applies</b>	Complies
NSW D2.21	Operation of latch	<b>Applies</b>	Insufficient detail – Architect to detail door furniture
D2.22	Re-entry fire-isolated exits	<b>N/A</b>	
D2.23	Signs on doors	<b>N/A</b>	
NSW D2.101	Doors in path of travel in a POPE	<b>N/A</b>	
D2.24	Protection of openable windows	<b>N/A</b>	
D2.25	Timber stairways: Concession	<b>N/A</b>	
<b>Part D3</b>	<b>Access for People with Disabilities</b>		
D3.1	General building access requirements	<b>Applies</b>	
D3.2	Access to buildings	<b>Applies</b>	Access required to and within all areas normally used by the occupants
D3.3	Parts of buildings to be accessible	<b>Applies</b>	Access required to and within all areas normally used by the occupants: <ul style="list-style-type: none"> <li>▪ All stairs to be provided with handrails on both sides.</li> <li>▪ Handrails to comply with Cl 12 of AS1428.1</li> <li>▪ Lifts to comply with Part E3.6 of the BCA</li> </ul> The following comments are made in respect of access to and within the building: <ul style="list-style-type: none"> <li>▪ The layout of the accessible toilet shall be in accordance with the details confirmed via email to HG Architects dated 19/12/2016.</li> <li>▪ First floor balcony widths to comply with circulation requirements of AS1428.1.</li> </ul>
D3.4	Concessions	<b>Applies</b>	
D3.5	Car parking	<b>Applies</b>	Complies – details of line marking and bollards to be provided on working drawings.
D3.6	Signage	<b>Applies</b>	To be provided
D3.7	Hearing augmentation	<b>N/A</b>	
D3.8	Tactile indicators	<b>Applies</b>	Tactile indicators to be provided to stairs in accordance with the Standard.
D3.9	Wheelchair seating spaces in Class 9b assembly building	<b>N/A</b>	
D3.10	Swimming Pools	<b>N/A</b>	

Clause	Description	Status	Comments
D3.11	Ramps	N/A	
D3.12	Glazing on an access way	Applies	Frameless glass or fully glazed doors are to be clearly marked or etched.

## PART E - SERVICES AND EQUIPMENT

Clause	Description	Status	Comments
<b>Part E1</b>	<b>Fire Fighting Equipment</b>		
E1.1	-		
E1.2	-		
E1.3	Fire hydrants	Applies	A fire hydrant system designed to provide coverage to the building in accordance with the requirements of the Standard is required. Details of the design of the system are to be prepared by a suitably qualified Hydraulic Engineer.
E1.4	Hose reels	Applies	A fire hose reel system is to be installed within the building so that all parts of the building are provided with coverage. Details of the design of the system are to be prepared by a suitably qualified Hydraulic Engineer.
E1.5	Sprinklers	N/A	
E1.6	Portable fire extinguishers	Applies	Portable fire extinguishers are to be installed throughout the building.
E1.7	-		
E1.8	Fire control centres	N/A	
E1.9	Fire precautions during construction	Applies	Builder to ensure appropriate fire safety measures are provided throughout the construction phase.
E1.10	Provision for special hazards	N/A	
<b>Part E2</b>	<b>Smoke Hazard Management</b>		
E2.1	Application of Part	Applies	
E2.2	General requirements	Applies	Details of any mechanical ventilation system are to be prepared by a suitably qualified Mechanical Engineer. Details of the system design are to be submitted with the Construction Certificate.
E2.3	Provisions for special hazards	N/A	
<b>Part E3</b>	<b>Lift Installations</b>		
E3.1	Lift installations	Applies	
E3.2	Stretcher facility in lifts	N/A	
E3.3	Warning against use of lifts in fire	Applies	Appropriate signage to be provided advising against the use of lifts in the event of fire.
E3.4	Emergency lifts	N/A	
E3.5	Landings	Applies	Complies
E3.6	Passenger lifts	Applies	Lift to include accessible features – Architect to detail
E3.7	Fire Services Control	N/A	
E3.8	Aged care buildings	N/A	

Clause	Description	Status	Comments
E3.9	Fire service recall operation switch	N/A	
E3.10	Lift car fire service drive control switch	N/A	
<b>Part E4</b>	<b>Emergency Lighting, Exit Signs and Warning Systems</b>		
E4.1	-		
E4.2	Emergency light requirements	<b>Applies</b>	A system of emergency lighting and exit signs are to be installed throughout the building in accordance with AS2293.1. The emergency lighting system is to be designed by a suitably qualified Electrical Engineer.
E4.3	Measurement of distance	<b>Applies</b>	
E4.4	Design & operate emergency light	<b>Applies</b>	
E4.5	Exit signs	<b>Applies</b>	A system of exit signs are to be provided to clearly identify required exits and paths of travel to required exits in accordance with AS2293.1. The emergency lighting system is to be designed by a suitably qualified Electrical Engineer.
E4.6	Direction signs	<b>Applies</b>	Directional exit signs are to be provided to clearly identify paths of travel to required exits in accordance with AS2293.1. The emergency lighting system is to be designed by a suitably qualified Electrical Engineer.
E4.7	Class 2, 3 & 4 buildings: Exemptions	<b>Applies</b>	
E4.8	Design and operation of exit signs	<b>Applies</b>	Informative Clause
E4.9	EWIS systems	N/A	

#### PART F - HEALTH AND AMENITY

Clause	Description	Status	Comments
<b>Part F1</b>	<b>Damp and Weatherproofing</b>		
F1.1	Stormwater drainage	<b>Applies</b>	Details of stormwater drainage to be provided by Civil Engineer.
F1.2	-		
F1.3	-		
F1.4	External above ground membranes	<b>Applies</b>	
F1.5	Roof coverings	<b>Applies</b>	
F1.6	Sarking	N/A	
F1.7	Water-proofing of wet areas	<b>Applies</b>	Waterproofing to be undertaken in accordance with AS3740. Installation Certificate to be provided by installer on completion of work.
F1.8	-		
F1.9	Damp proofing	<b>Applies</b>	
F1.10	Damp proofing of floors on the ground	<b>Applies</b>	
F1.11	Provision of floor wastes	N/A	
F1.12	Sub-floor ventilation	N/A	

Clause	Description	Status	Comments
F1.13	Glazed assemblies	<b>Applies</b>	All glazing to comply with AS2047. Installation. Certificate to be provided by supplier on completion.
<b>Part F2</b>	<b>Sanitary and Other Facilities</b>		
F2.1	Facilities in residential buildings	<b>N/A</b>	
F2.2	Calculation of number of occupants and fixtures	<b>Applies</b>	Refer to D1.13.
F2.3	Facilities in Class 3 to 9 buildings	<b>Applies</b>	Based on the number of persons accommodated in accordance with Part D1.13 the following facilities are required to be provided <ul style="list-style-type: none"> <li>▪ 4 x female w.c + 3 x vanity basins.</li> <li>▪ 3 x male w.c + 2 x male urinal + 3 x vanity basins.</li> </ul> Note: The unisex accessible facility may be counted as one for each sex. Therefore based upon the above the following additional facilities are required: <ul style="list-style-type: none"> <li>▪ 1 x female w.c + 1 x vanity basin</li> <li>▪ 1 x male vanity basin</li> </ul>
F2.4	Facilities for people with disabilities	<b>Applies</b>	The layout of the accessible toilet shall be in accordance with the details confirmed via email to HG Architects dated 19/12/2016.
F2.5	Construction of sanitary compartments	<b>Applies</b>	Accessible facilities to be constructed in accordance with AS1428.1 – 2009.
F2.6	Interpretation: Urinals and washbasins	<b>Applies</b>	Informative clause.
NSW F2.7	Warm water installations	<b>N/A</b>	
F2.8	Waste Management	<b>N/A</b>	
<b>Part F3</b>	<b>Room Sizes</b>		
F3.1	Height of rooms	<b>Applies</b>	Complies.
<b>Part F.4</b>	<b>Light and Ventilation</b>		
F4.1	Provision of natural light	<b>N/A</b>	
F4.2	Methods and extent of natural light	<b>N/A</b>	
F4.3	Natural light borrowed from adjoining room	<b>N/A</b>	
F4.4	Artificial lighting	<b>Applies</b>	
NSW F4.5	Ventilation of rooms	<b>Applies</b>	Mechanical ventilation complying with AS1668.2 to be provided to all spaces and sanitary compartments. Details to be provided by a Mechanical Engineer.
F4.6	Natural ventilation	<b>Applies</b>	
F4.7	Ventilation borrowed from adjoining room	<b>N/A</b>	
F4.8	Restriction on position of water closets and urinals	<b>Applies</b>	Complies.
F4.9	Airlocks	<b>Applies</b>	Complies
F4.10	-	<b>N/A</b>	
F4.11	Carparks	<b>N/A</b>	
F4.12	Kitchen local exhaust ventilation	<b>N/A</b>	
<b>Part F5</b>	<b>Sound Transmission and Insulation</b>		


<b>Clause</b>	<b>Description</b>	<b>Status</b>	<b>Comments</b>
F5.1	Application of part	<b>N/A</b>	
F5.2	Determination of airborne sound insulation ratings	<b>N/A</b>	
F5.3	Determination of impact sound insulation ratings	<b>N/A</b>	
F5.4	Sound insulation of floors between units	<b>N/A</b>	
F5.5	Sound insulation of walls between units	<b>N/A</b>	
F5.6	Walls between a bathroom, sanitary compartment, laundry or kitchen and a habitable room in adjoining unit.	<b>N/A</b>	
F5.6	Sound insulation rating of internal services	<b>N/A</b>	
F5.7	Sound insulation of pumps	<b>N/A</b>	

#### **PART J – ENERGY EFFICIENCY**

<b>Clause</b>	<b>Description</b>	<b>Status</b>	<b>Comments</b>
<b>Part J1</b>	<b>Building Fabric</b>		
J1.1	Application of part	<b>Applies</b>	Section J Report to be provided.
J1.2	Thermal construction general	<b>Applies</b>	Section J Report to be provided.
J1.3	Roof and ceiling construction	<b>Applies</b>	Section J Report to be provided.
J1.4	Roof lights	<b>Applies</b>	
J1.5	Walls	<b>Applies</b>	Section J Report to be provided.
J1.6	Floors	<b>Applies</b>	Section J Report to be provided.
<b>Part J2</b>	<b>External glazing</b>		
J2.1	Application of Part	<b>Applies</b>	Section J Report to be provided.
J2.2	Applicable glazing provisions	<b>Applies</b>	Section J Report to be provided.
J2.3	Glazing – Method 1	<b>N/A</b>	
J2.4	Glazing – Method 2	<b>N/A</b>	
J2.5	Shading	<b>N/A</b>	
<b>Part J3</b>	<b>Building Sealing</b>		
J3.1	Application of Part	<b>Applies</b>	Section J Report to be provided.
J3.2	Chimneys and flues	<b>N/A</b>	
J3.3	Roof lights	<b>N/A</b>	
J3.4	External windows and doors	<b>Applies</b>	Section J Report to be provided.
J3.5	Exhaust fans	<b>Applies</b>	Section J Report to be provided.
J3.6	Construction of roofs, walls and floors	<b>Applies</b>	Section J Report to be provided.
J3.7	Evaporative coolers	<b>N/A</b>	
<b>Part J4</b>	Left blank	<b>N/A</b>	
<b>Part J5</b>	<b>Air-Conditioning and Ventilation Systems</b>		

<b>Clause</b>	<b>Description</b>	<b>Status</b>	<b>Comments</b>
J5.1	*****	-	
J5.2	Air-conditioning and ventilations systems	N/A	
J5.3	Time Switch	N/A	
J5.4	Heating and chilling systems	N/A	
J5.5	Miscellaneous exhaust systems	N/A	
<b>Part J6</b>	<b>Artificial Lighting and Power</b>		
J6.1	Application of Part	<b>Applies</b>	Section J Report to be provided.
J6.2	Interior artificial lighting	<b>Applies</b>	Section J Report to be provided.
J6.3	Control of interior and artificial lighting and power	<b>Applies</b>	Section J Report to be provided.
J6.4	Interior decorative and display lighting	N/A	
J6.5	Artificial lighting around the perimeter of a building	N/A	
J6.6	Boiling water and chilled water storage units	N/A	
<b>Part J7</b>	<b>Hot Water Supply</b>		
J7.1		-	
J7.2	Hot water supply	<b>Applies</b>	Section J Report to be provided.
J7.3	Swimming pool heating & pumping	N/A	
J7.4	Spa pool heating & pumping	N/A	
<b>Part J8</b>	<b>Access for Maintenance</b>		
J8.1	Application of Part	<b>Applies</b>	
J8.2	Access for maintenance	<b>Applies</b>	Section J Report to be provided.

## 1. Waste Management Plan (All Developments)

Applicant Details	
Application No.	TBA
Name	Newton Denny Chapelle
Address	PO Box 1138 Lismore NSW 2480
Phone Number(s)	(02) 6622 1011
Email	office@newtondennychapelle.com.au
Project Details	
Address of Development	Lot 60 DP 835249, Parish of Byron, being land situated at 88-94 Centennial Circuit, Byron Bay
Existing Buildings & Structures on Land	Lot 60 is currently vacant
Description of Development	Development consent is sought for the development of a mixed-use project comprising a Kool Kids Learning Centre (78 places), industrial retail outlets with associated takeaway food and retail floor area and a managers residence.
<p>This development achieves the waste objectives set out in the DCP. The details on this form are the provisions and intentions for minimising waste relating to this project. All records demonstrating lawful disposal of waste may be retained and kept readily accessible for inspection by regulatory authorities such as Council, DECC or WorkCover NSW.</p>	
Name	Damian Chapelle
Signature	
Date	24 January 2017
Name and telephone contact for principal person nominated for implementation of SWMMP (if different to above)	<p><b>Name:</b> Sixty Centennial Pty Ltd</p> <p><b>Telephone Contact:</b> Phone number to become available upon construction of the development and connection of telecommunication services.</p>

## 2. Construction Phase (All Types of Developments)

This part of the WMP providing details may be completed and submitted with the Construction Certificate associated with the Development Application. In this regard, following approval of the Development Application, the required Construction Certificate drawings can then be prepared to enable the inclusion of information within the WMP concerning the *reuse, recycling, and disposal* of materials during the construction phase of the development.

The WMP is also dependant on appointing a contractor to carry out the construction works to enable inclusion of details with reference to *'Specific method of on-site reuse, contractor and recycling outlet and/or waste depot to be used'*.

Accordingly, it is respectfully requested that Council place an appropriately worded condition on the development consent notice requiring the submission of an updated Waste Management Plan to be submitted with the Construction Certificate that addresses both the operational and construction phases of the development.

The following construction phase information will also be required to be provided in the updated WMP lodged with the Construction Certificate despite some of these items being addressed within this submitted WMP:

- ❖ Size and location of waste storage area;
- ❖ Access for waste collection vehicles (collected from the property frontage);
- ❖ Type and number of storage bins likely to be required (1 small sized bulk storage waste bin);
- ❖ Signage required to facilitate correct use of storage facilities.

### 3. Ongoing Operation Phase

The below Section 3 provides information including a relevant table showing the total volume of waste expected to be generated by the development and the associated waste storage requirements.

#### 3.1 Proposed Development Summary

The proposal seeks to construct a mixed use development comprising of a Kool Kids Learning Centre (78 places), Industrial Retail Outlets (retail and takeaway food premises) and a managers residence. Separate application will be lodged for the internal fit-out and operational components for the various tenancies with the exception of the child care centre which has floor plans and operational details.

As demonstrated in the Statement of Environmental Effects and design plans accompanying the application, the proposed child care development provides for the creation of a child care centre which caters for a total of 78 children and is managed by 12 staff. The room structure proposed for the second Byron Arts & Industry Estate centre is outlined below.

- Babies: 6 weeks to 24 months.
- Toddlers: 15 months to 2 years.
- Junior Kindy: 2 to 3 years.
- 2 x Senior Kindy: 3 to 4 years.
- Pre-school: 4 to 6 years.

The owner operator currently owns and operates a number of child care centres at Casuarina, Gold Coast (Miami, Mermaid Waters, Southport, Ashmore, Pacific Pines, Clear Island Waters, Surfers Paradise) and a further centre at Helensvale Town Centre (Sir John Overall Drive). All the Kool Kids Early Learning Centres are licensed under the Education and Care Services National Law 2011 and the Education and Care Services National Regulations 2013.

It is proposed to create a waste storage area within development site adjacent to the internal driveway adjacent to Tenancy 4 (shown circled in red on **Plate 1**).

The area will be screened from view from the car park area as illustrated in the submitted design plans.



Plate 1 – Proposed Bin Storage Area

**3.2 TOTAL VOLUME OF WASTE EXPECTED (ESTIMATED)**

The below tables provides details as to the expected total volume of waste expected to be generated by the proposed development and the associated waste storage requirements for the child care centre (Table 1) and the mixed use (Table 2).

**Table 1 – Child Care Centre**

<b>Kool Kids Learning Centre</b>	
<b>Amount of Waste Generated (L per unit/day)</b>	<b>Waste</b>
Amount generated Total:(Approx) <b>10L/Day per 100m<sup>2</sup></b>	General 10L/Day per 100m <sup>2</sup> = 60.6 litres Recyclable Waste 10L/Day per 100m <sup>2</sup> = 60.6 litres  Total = 606L/ week
Any reduction due to compacting equipment	Nil
Frequency of collections	As required Likely 1 collection/week
Number and size of storage bins required/ utilised	Capacity exists for 6 x 240L bins
Floor area required for storage bins (m <sup>2</sup> )	Dedicated bin storage area provided on site. Refer Plate 1 within this WMP.

Floor area required for manoeuvrability (m <sup>2</sup> )	Waste storage/collection area is approx. 10m <sup>2</sup>
Height required for manoeuvrability (m <sup>2</sup> )	Waste bin satisfy the height requirements through a 2 metre clearance

**Table 2 – Mixed Use**

<b>Mixed Use</b>																
<b>Amount of Waste Generated (L per unit/day)</b>	<b>Waste</b>															
Amount generated Total:(Approx) <b>Cafe: 10.5L/Day per 100m<sup>2</sup></b> <b>Shop: 50L/Day per 100m<sup>2</sup></b> <b>Residence: 80L/unit/week</b>	Waste Generation <table border="1"> <thead> <tr> <th>Use</th> <th>Area</th> <th>Waste (L/day)</th> </tr> </thead> <tbody> <tr> <td>Café/Restaurant</td> <td>44m<sup>2</sup></td> <td>4.62</td> </tr> <tr> <td>Retail</td> <td>88m<sup>2</sup></td> <td>44</td> </tr> <tr> <td>Managers Residence</td> <td>56m<sup>2</sup></td> <td>11.5</td> </tr> <tr> <td></td> <td><b>TOTAL</b></td> <td><b>60</b></td> </tr> </tbody> </table>	Use	Area	Waste (L/day)	Café/Restaurant	44m <sup>2</sup>	4.62	Retail	88m <sup>2</sup>	44	Managers Residence	56m <sup>2</sup>	11.5		<b>TOTAL</b>	<b>60</b>
Use	Area	Waste (L/day)														
Café/Restaurant	44m <sup>2</sup>	4.62														
Retail	88m <sup>2</sup>	44														
Managers Residence	56m <sup>2</sup>	11.5														
	<b>TOTAL</b>	<b>60</b>														
Recyclable Material Generation Total:(Approx) <b>Cafe: 2.5L/Day per 1.5m<sup>2</sup></b> <b>Shop: 50L/Day per 100m<sup>2</sup></b> <b>Residence: 40L/unit/week</b>	Weekly Waste Output – 420L  Recyclable Material Generation <table border="1"> <thead> <tr> <th>Use</th> <th>Area</th> <th>Waste (L/day)</th> </tr> </thead> <tbody> <tr> <td>Café/Restaurant</td> <td>44m<sup>2</sup></td> <td>73.5</td> </tr> <tr> <td>Retail</td> <td>88m<sup>2</sup></td> <td>44</td> </tr> <tr> <td>Residence</td> <td>56m<sup>2</sup></td> <td>5.7</td> </tr> <tr> <td></td> <td><b>TOTAL</b></td> <td><b>123</b></td> </tr> </tbody> </table>	Use	Area	Waste (L/day)	Café/Restaurant	44m <sup>2</sup>	73.5	Retail	88m <sup>2</sup>	44	Residence	56m <sup>2</sup>	5.7		<b>TOTAL</b>	<b>123</b>
Use	Area	Waste (L/day)														
Café/Restaurant	44m <sup>2</sup>	73.5														
Retail	88m <sup>2</sup>	44														
Residence	56m <sup>2</sup>	5.7														
	<b>TOTAL</b>	<b>123</b>														
	Daily Waste Output – 183L  Total = 1,281L/ per week															
Any reduction due to compacting equipment	Nil															
Frequency of collections	As required Likely 1 collection/week															
Number and size of storage bins required/ utilised	Capacity exists for 2 x 1.5m <sup>3</sup> bins															
Floor area required for storage bins (m <sup>2</sup> )	Dedicated bin storage area provided on site. Refer Plate 1 within this WMP.															
Floor area required for manoeuvrability (m <sup>2</sup> )	Waste storage/collection area is approx. 10m <sup>2</sup>															
Height required for manoeuvrability (m <sup>2</sup> )	Waste bin satisfy the height requirements through a 2 metre clearance															

#### **3.3 CONSTRUCTION DETAILS (ALL TYPES OF DEVELOPMENT)**

Details concerning the measures (materials/lifecycle etc) for waste avoidance that have/will be incorporated into the design, material purchasing and construction techniques of the development will be provided to Council with the Construction Certificate.

As per Section 2 of this WMP, this part of the WMP may be completed and submitted with the Construction Certificate following approval of the Development Application. The WMP is dependent on the preparation of Construction Certificate drawings and the appointment of a contractor to carry out the construction works to enable inclusion of details within this section.

Accordingly, it is respectfully requested that Council place an appropriately worded condition on the development consent notice requiring the submission of an updated Waste Management Plan to be submitted with the Construction Certificate that addresses both the operational and construction phases of the development.

#### **3.4 Detail the arrangement that would be appropriate for the ongoing use of waste facilities as provided in the development. Identify each stage of waste transfer and loading into the collection vehicle, detailing the responsibility for and location and frequency of, transfer and collection**

Ongoing Waste Management will occur via the following Management Plan:

- a) Quantum of waste generated will be monitored by staff and commercial collection service adjusted as required.
- b) The waste storage area on site will be suitably located and clearly labelled. Location of bin storage area is identified above in **Plate 1**.
- c) With respect to general waste, staff will be responsible for:
  - the collection and storage of waste on site;
  - maintenance of the waste storage area in a clean and tidy manner.

### 4. Plans and Drawings

#### 4.1 Construction

The following construction phase plan information will be required to be provided in the updated WMP with the Construction Certificate despite some of this information being contained within this submitted WMP:

- ❖ Size and location of waste storage area;
- ❖ Access for waste collection vehicles (collected from the property frontage);
- ❖ Type and number of storage bins likely to be required (1 small sized bulk storage waste bin);
- ❖ Signage required to facilitate correct use of storage facilities.

#### 4.2 Ongoing Operation

The following ongoing operation information is provided in respect to the proposed development.

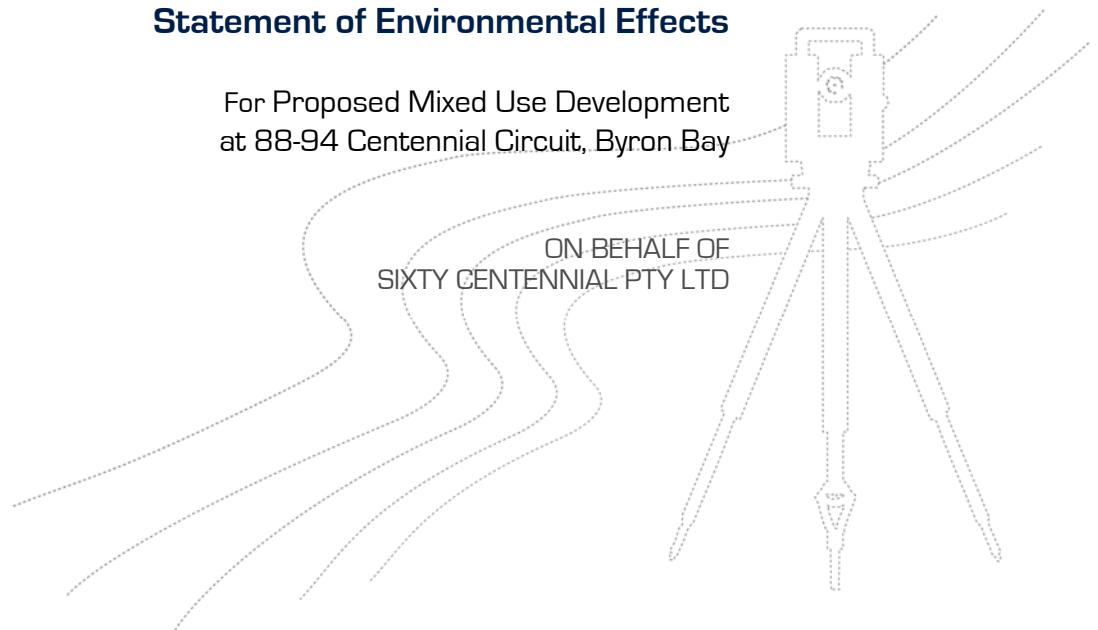
Component	Comment
<b>Space</b>	
Size and locations(s) of waste storage areas	The bin storage area designed to accommodate 6 x 240L & 2 x 1.5m <sup>3</sup> within the designated area as illustrated on the submitted Development Application design plans (Plan DA03) and <b>Plate 1</b> of this report.
Recycling bins placed next to waste bins	Bin storage area provided as shown.
Space provided for access to and the manoeuvring of bins/equipment	Bin storage collection will occur from the subject land as demonstrated within the TIA prepared by TTM in <b>Attachment 4</b> .
Any additional facilities	N/A.
<b>Access</b>	
Access route(s) to deposit waste in storage room/area	Typically waste storage/collection bins, will be placed within the property adjacent to the waste collection building for collection.  Pedestrian access routes will be from the proposed building directly to the identified waste storage area.
Access route(s) to collect waste from storage room/area	Typically the waste storage bin, will be placed at the frontage of the enclosure for collection.

	Pedestrian access routes will be from the proposed building directly to the identified waste storage area.
Bin carting grade	The grade of the land is considered to be flat.
Location of final collection point	Bins to be collected from the bin enclosure.
Clearance, geometric design and strength of internal access driveways and roads	Adequate clearance exists for waste collection.
Direction of traffic flow for internal access driveways and roads	Access will be achieved through the internal driveway with service vehicles manoeuvring through the site. Vehicles will enter and leave the site in a forward direction.
<b>Amenity</b>	
Aesthetic design of waste storage areas	As per design plans, the bin storage area will be adequately screened.
Signage – type and location	No specific signage proposed unless otherwise required by Council within the development consent conditions.
Construction details of storage rooms/areas (including floor, walls, doors, ceiling design, sewer connection, lighting, ventilation, security, wash down provisions etc)	The design plans submitted with the Development Application indicate design and construction material detail to Development Application standard. Further detailed designs in this regard will be submitted with the Construction Certificate.

## Statement of Environmental Effects

For Proposed Mixed Use Development  
at 88-94 Centennial Circuit, Byron Bay

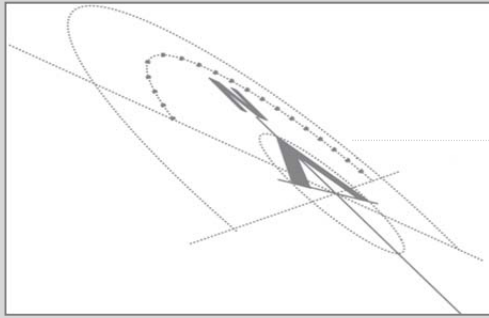
ON BEHALF OF  
SIXTY CENTENNIAL PTY LTD



Site: Lot 60 DP 835249

Our Ref: 16/296  
Date: January 2017





# Document Control Sheet

## Document Control Sheet

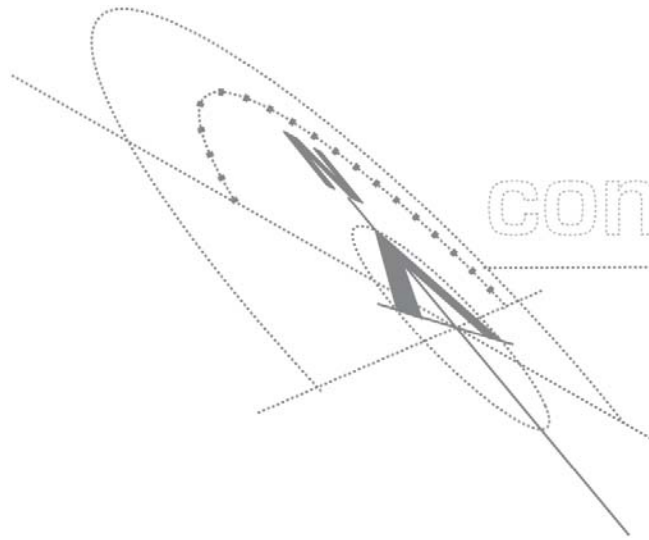
Document and Project Details				
Document Title:	Statement of Environmental Effects for proposed Mixed Use Development.			
Author:	Damian Chapelle			
Project Manager:	Damian Chapelle			
Date of Issue:	January 2017			
Job Reference:	16/296			
Project Outline:	This document presents a Statement of Environmental Effects for a proposed mixed use development comprising a childcare centre and industrial retail tenancies. The project also incorporates, on-site car parking, landscaping, civil works and signage.			
Document Distribution				
Date	Status	Distribution – Number of Copies		
		Client	Council	Other
23/01/2017	Draft	1	0	0
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Documentation Verification				
Checked by:	Bruce Coulson Damian Chapelle			

### **USAGE NOTE:**

The plans to this document were prepared for the exclusive use of Sixty Centennial Pty Ltd to accompany a Development Application to Byron Shire Council for approval for the development of land described herein and is not to be used for any other purpose or by any other person or corporation. Newton Denny Chapelle accepts no responsibility for any loss or damage suffered howsoever arising to any person or corporation who may use or rely on this document for a purpose other than that described above.

The maps, development plans and exhibits shown in this report are suitable only for the purposes of this report. No reliance should be placed on this information for any purpose other than for the purposes of this report. All dimensions, number, size and shape of lots/buildings as shown on plans in this document are subject to detailed engineering design plans and final survey and may vary subject to conditions of consent issued by Council.

The information contained in this report is based on independent research undertaken by Newton Denny Chapelle. To the best of our knowledge, it does not contain any false, misleading or incomplete information.



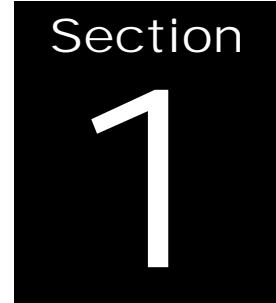
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## Attachments

- Attachment 1 - Proposed Design Plans  
*Harley Graham Architects & Local Office Architecture*
- Attachment 2 - Engineering Services Report  
*Newton Denny Chapelle*
- Attachment 3 - Environmental Noise Impact Assessment  
*CRG Acoustic*
- Attachment 4 - Traffic Impact Assessment  
*TTM*
- Attachment 5 - BCA Assessment  
*Techton Building Services*
- Attachment 6 - Waste Management Plan  
*Newton Denny Chapelle*

# Introduction



## 1.1 Purpose

This Statement of Environmental Effects is intended to accompany the Development Application prepared by Newton Denny Chapelle for and on behalf of the proponent of the proposed development, being Sixty Centennial Pty Ltd.

The subject property is located wholly within the Local Government Area of Byron Shire Council. The development site is known as Lot 60 DP 835249, Parish of Byron, being land situated at 88-94 Centennial Circuit, Byron Bay.

Development consent is sought for the development of a mixed-use project comprising a Kool Kids Learning Centre (78 places), industrial retail outlets with associated takeaway food and retail floor area and a managers residence. The project also encompasses the completion of civil works, car parking and landscaping.

The purpose of this report is to describe the site, its existing and proposed uses and to address all the issues relevant to the application's assessment and approval.



Plate 1: Aerial photo of the subject land and surrounds.

## 1.2 Property Details

Property Address:	88-96 Centennial Circuit, Byron Bay
Property Description:	Lot 60 DP 835249 Parish of Byron County of Rous
Total Site Area:	4,020m <sup>2</sup>
Property Zoning:	IN2 - Light Industrial
Proponent:	Sixty Centennial PTY LTD
Property Owner:	Sixty Centennial PTY LTD
Applicant:	Newton Denny Chapelle for and on behalf of the Proponent

Existing Land Use: Vacant

Local Authority: Byron Shire Council

Integrated Development Referrals: Nil

## 1.3 Structure of Report & Scope

**Section 2 – Land & its Context:** Describes the physical characteristics of the subject land and its planning context.

**Section 3 – Proposal:** Describes the proposed development for which this application is seeking planning consent and also describes the objectives of the proposed development.

**Section 4 – Statutory and Policy Planning Assessment:** Examines the consistency of the proposed development with the provisions of relevant planning policies, objectives, statutory instruments and legislation.

**Section 5 – Conclusion:** Provides a summary of the planning report and demonstrates the suitability of the development.

This report should be read in conjunction with the accompanying Byron Shire Council Development Application forms together with the plans, drawings and technical reports, which support the development as proposed.

## 1.4 Project Team & Technical Advice

Sixty Centennial Pty Ltd have assembled a team of consultants who have been involved with the design of the building and assessment of technical aspects of the proposal. This team includes the following:

Project Discipline	Consultants
Architectural Designs	Harley Graham Architects & Local Office Architecture
Environmental Noise Impact Assessment	CRG
Traffic Assessment	TTM Consulting
BCA Assessment	Techton
Stormwater Management	Newton Denny Chapelle
Town Planning	Newton Denny Chapelle
Surveying	Newton Denny Chapelle

## 1.5 Further Information

Should Council require any additional information, or wish to clarify any technical matter raised by this proposal or submissions made to same, Council is requested to consult with **Mr Damian Chapelle** on 6622 1011 or [dchapelle@newtondennychapelle.com.au](mailto:dchapelle@newtondennychapelle.com.au) prior to determination of this application.

# Land & its Context

# Section 2

## 2.1 Cadastral Description

The subject land is described in Real Property terms as Lot 60 in DP 835249. The land, the subject of the proposal, is detailed in a local context within **Plate 1** of this report. **Plate 2** of this report illustrates the deposited plan of the subject site.

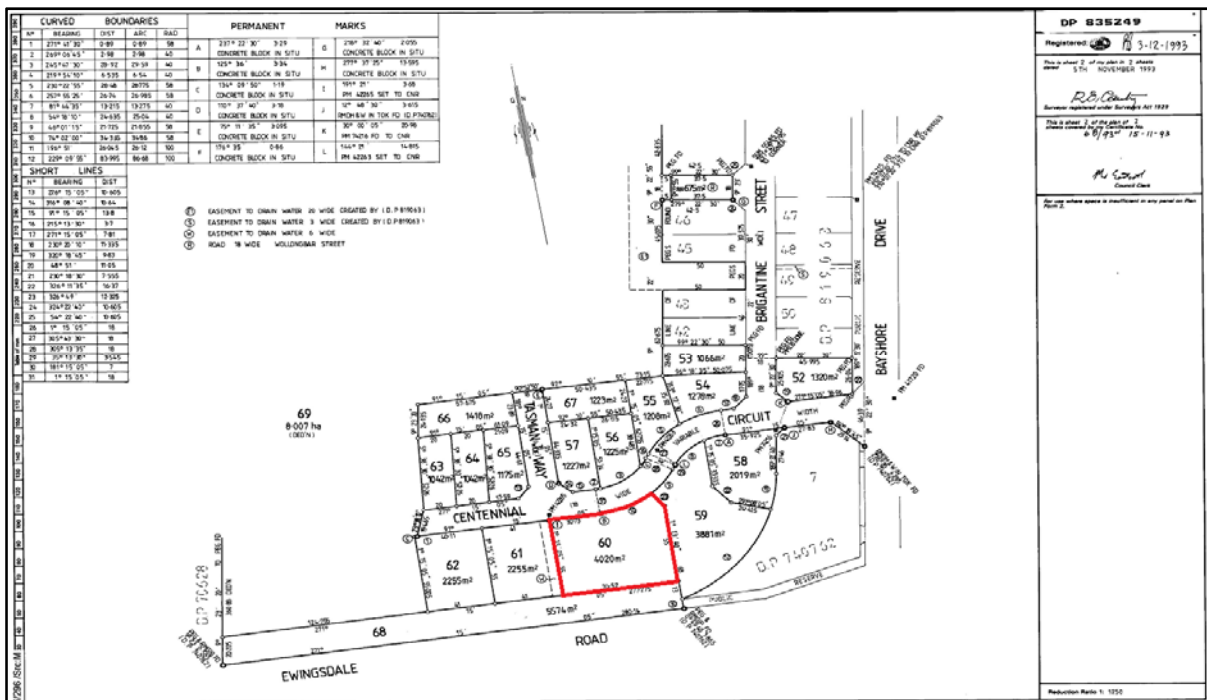


Plate 2: Deposited Plan 835249

## 2.2 Location

The site is located within the Byron Arts & Industry Estate accessed off Ewingsdale Road, approximately 3 kilometres west of the Byron Bay town centre. The site is generally flat with a slight downslope towards Ewingsdale Road. The site is clear with some street trees along the Centennial Circuit frontage.

The specific site details are provided in Table 1 and the site location is provided in **Table 2.1** below.

**Table 2.1: Property Dimensions**

Property Dimensions	North	South	East	West
Metres	65.59	70.52	71.37	55

The immediate surrounding area adjoining the subject land is described as follows:

- Northern Boundary – Is formed by Centennial Circuit.
- Eastern Boundary – Is currently formed by a vacant industrial lot (Lot 59 DP 835249). It is noted that there is currently a development application (10.2016.390.1) approved for the construction of a brewery.
- Southern Boundary – Is formed by a drainage reserve (Lot 68 DP 835249) adjacent to Ewingsdale Road. This reserve contains an existing drainage swale that drains east to west.
- Western Boundary – Is formed by an existing two storey industrial development (SP74049).

## 2.3 Site Analysis

Site inspection and searches of local and state government records indicate that key site characteristics include:

**Table 2.1: Site Analysis**

<b>Topography</b>	The subject land is gently sloping with a minor ridgeline running east to west across the site from the eastern boundary. This ridgeline divides the site into 3 catchments flowing to the north, south and west boundaries. The maximum slope across the site is less than 2%.
<b>Vegetation</b>	The site is located within an urbanised area which has undergone approved civil works resulting in the site being completely clear of any vegetation cover as illustrated in <b>Plate 1</b> within this report. Scattered street trees are located fronting Centennial Circuit.
<b>Service Availability</b>	Sewer: The site will be connected to the existing vacuum sewer network within the Arts & Industry Estate. The point of connection will be via the existing vacuum sewer pod stub line located within the site. The access lid to this pod will be upgraded to a trafficable lid as necessary.  Water: The site will be connected to the existing water reticulation network within Centennial Circuit.
<b>Site Improvements</b>	Lot 60 contains no structural improvements upon the land.
<b>Soil Profile</b>	The site is identified as containing Class 3 Acid Sulfate Soils, pursuant to mapping held by Byron Shire Council.

The subject land is deemed to be the preferred site for a proposed mixed use project, based on the following grounds:

- The results shown in specialist reports indicate the development of the site for a mixed use development may occur with suitable stormwater, landscape and acoustic management systems, resulting in a safe and sustainable environment;
- The proposal is unlikely to cause a significant impact on a matter of National Environmental Significance (as defined by the EPBC Act), and will not require referral to the Commonwealth Department of Environment and Heritage to determine Controlled Action status;
- The property may be serviced with essential infrastructure;
- The land contains habitats of little conservation significance; and
- The site slope is gentle and conducive to the completion of minor earthworks to permit the proposed building form.

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# Development Proposal

Section

3

## 3.1 Overview

The proposal seeks to construct a mixed-use development comprising of a Kool Kids Learning Centre (78 places), Industrial Retail Outlets (retail and takeaway food premises) and a managers residence with associated civil works, car parking and landscaping.

The development is illustrated in the design plans prepared by *Harley Graham Architects & Local Office Architecture*, which are contained within **Attachment 1** of this report.

### 3.1.1 Project Planning Objectives

The primary objective of this proposal is to erect a mixed-use development entailing two storey industrial retail outlet premises upon the eastern portion of the site and a child care centre on the western balance of the land.

For the purposes of project design criteria, the following site planning objectives have been incorporated into the development design:

- To ensure the development is respectful of its context and setting through the site layout and adopted frontage to Centennial Circuit.
- Maintain the visual integrity of the Byron Arts & Industry Estate streetscape.
- Ensure the implementation of contemporary water quality and soil management.
- Conform with Council's requirements for all vehicular access and parking requirements to meet the needs of the development.
- Review potential site planning hazards to ensure the development is not likely to present an unreasonable hazard.
- To satisfactorily provide for waste collection and management.

## 3.2 Proposed Built Form & Land Use

### 3.2.1 Built Form

The proposed built form comprises a contemporary building designed in two distinct precincts upon the land.

The eastern building comprises six (6) two storey industrial retail outlet tenancies. The tenancies are located either side of a centrally designed outdoor covered area. Accordingly, three (3) tenancies are located either side of the outdoor area.

A single room manager's residence is located on the first floor associated with Tenancy 3. The child care centre is proposed in the western portion of the site. The built form for the child care centre also comprises a two-storey form and setback commensurate to the industrial retail outlet tenancies.

The architecture of the proposed buildings proposes an articulated and visually interesting form with lightweight materials and varying external finishes and colours employed which will enhance the overall quality of built form in the locality.

In respect to the buildings compliance with the Building Code of Australia (BCA), reference should also be made to the BCA audit and access reports prepared by Tecton and contained within **Attachment 5** respectively.

The development will comprise of the following floor area budget outlined within **Table 3.1** below.

**Table 3.1** – Floor Area Budget

<b>Use</b>	<b>Area</b>
Industrial Retail Outlet	1,390m <sup>2</sup>
Retail	88m <sup>2</sup>
Take Away Food & Drink Premises	44m <sup>2</sup>
Managers Residence	56m <sup>2</sup>
Child Care Centre	679m <sup>2</sup>
<b>Total</b>	<b>2,177m<sup>2</sup></b>

### **3.2.2 Mixed Use**

The proposal is a mixed-use development. The term “mixed use development” is not a land use definition under the Byron Local Environmental Plan 2014. In statutory planning terms the proposal comprises child care centre, industrial retail outlet, light industry & take away food and drink premises.

Each tenancy comprises of storage and production areas on both floors, whilst a 22m<sup>2</sup> area is provided for retail or take away food sales for goods manufactured within each tenancy. Tenancy 3 is also afforded a manager’s residence located on the first floor and comprising an area of 56m<sup>2</sup>. The floor area allocated for each tenancy is outlined on Drawing O2 (Rev A) as provided within **Attachment 1**.

### **3.2.3 Child Care Centre**

The proposal provides for the creation of a child care facility which caters for a total of 78 children and is managed by 12 staff. The room structure proposed for Byron Bay is outlined below.

- Babies: 6 weeks to 24 months – 8 children in class;
- Toddlers: 15 months to 2 years – 15 children in class;
- Junior Kindy: 2 to 3 years – 15 children in class;
- Senior Kindy: 3 to 4 years – 20 children in class;
- Pre-school: 4 to 6 years – 20 children in class.

The proponent currently operates the existing childcare centre adjoining the subject land in addition to centres at Casuarina, Miami, Mermaid Waters, Southport, Ashmore, Pacific Pines, Clear Island Waters, Surfers Paradise and at the Helensvale Town Centre (Sir John Overall Drive).

Due to the existing waiting list generated by local families within the Byron Bay area, the demand for a childcare centre is evident for the proponent.

All the Kool Kids Early Learning Centres are licensed under the Education and Care Services National Law 2011 and the Education and Care Services National Regulations 2013.

The development proposal lodged for the Byron Bay site draws on the benefits of the other centres and as such the key qualities to be introduced include:

- To develop and maintain learning through play curriculum, while still supporting the Australian Children’s Educational and Care Quality Authority which supports, develops and extends the needs and interests of the children.
- To provide learning through play programs that supports the development of the ‘whole child’.
- To provide a physically safe and emotionally secure environment where children learn and have fun.
- To encourage children’s awareness and respect of diverse cultures while also bridging the gap between indigenous and non-indigenous and special needs.
- To encourage a rich and engaging environment where children’s voices are heard and acted upon.

### 3.3 Hours of Operation

Given the nature of the mixed-use development, there will be differing hours of operation as detailed below.

- **Childcare Centre:** Monday to Friday from 6.30am – 6.30pm
- **Industrial Retail and Takeaway Food:** Monday to Sunday from 7.30am – 6.30pm, with extended hours where necessary by the operator for holiday season periods, however not extending later than 10:00pm.

### 3.4 Earthworks

In respect to earthworks, the site will be shaped to maintain the existing crest running east to west across the site. To create a suitable building pad and to enable the connection of the stormwater system to existing Council infrastructure the site will be filled to achieve the finished levels shown on the Bulk Earthwork Plan as provided within Appendix A of the Engineering Services Report (contained within **Attachment 2**). Retaining structures will be required along the eastern, western and southern boundaries with a maximum height of 1.2m along the southern and western boundaries expected.

The works are expected to require 1,650m<sup>3</sup> of fill material to a maximum depth of 1.2m adjacent to the retaining structures.

### 3.5 Vehicular Access & Parking

A Traffic Impact Assessment (TIA) has been completed by TTM and is provided within **Attachment 4** of this report. The TIA has influenced the ultimate design of the development to ensure key considerations of access, parking and internal manoeuvring meet the demands of the future users of the development.

Vehicular access is proposed via a two-way driveway crossover from Centennial Circuit. All movements (i.e. left and right in) are permitted. The driveway will access the car park area which is embellished with 43 car spaces including the pick-up/drop-off bay and two (2) People with Disability (PWD) bays. The proposed development plans illustrate provision for eleven designated staff car parking spaces.

**Table 3.2 – Proposed Parking Budget**

Land Use	Council Requirement	Extent	Requirement	Provision
Child Care Centre -	1 space/4 children + 1 pick-up/drop-off bay	78 Children	20.5	
Industry	1/100m <sup>2</sup> GFA	1,390m <sup>2</sup>	13.9	
Food & Drink Premises	1 space per 20m <sup>2</sup> GFA	44m <sup>2</sup>	2.2	
Retail	1/20m <sup>2</sup> GFA	88m <sup>2</sup>	4.4	
Managers Residence	1 car space	1 bedroom	1	
<b>Total</b>			<b>42</b>	<b>43</b>

## 3.6 Utilities

### 3.6.1 Sewer Services

The site will be connected to the existing vacuum sewer network within the industrial estate. The point of connection will be via the existing vacuum sewer pod stub line located within the site. The access lid to this pod will be upgraded to a trafficable lid as necessary.

### 3.6.2 Potable Water Reticulation

The site will be connected to the existing water reticulation network within Centennial Circuit. Should the stub line provided to the site be missing or redundant a new feed from the water main on the northern side of Centennial Circuit will be installed to service the site.

### **3.6.3 Electricity and Communications**

The site has two existing connection points to the Telstra network located in the middle of the northern boundary. It is expected that the electrical feed for the site will come from the existing overhead supply network within Centennial Circuit via an underground pipe from the existing pole in front of the site. The works will require the relocation of the existing stay from this power pole outside of the site boundaries.

### **3.6.4 Stormwater**

Stormwater Attenuation – Stormwater attenuation for the 1 in 100-year event has been provided for the site. 112m<sup>3</sup> of attenuation storage will be provided as part of the development to ensure the pre-development storm flows from the site are not exceeded.

Stormwater Quality – MUSIC modelling has demonstrated that the proposed treatment train for the site (including a bioretention system and litter baskets) achieves the pollutant reduction targets.

## **3.7 Landscaping Treatment**

The implementation of soft and hard landscaping forms a component of the development. The following design principles have been adopted in the design strategy for the project.

- Incorporate the principles of Crime Prevention through Environmental Design (CPTED) ie. surveillance, access control, territorial reinforcement and space management;
- Provide design solutions which minimizes maintenance;
- Ensure that landscape elements remain unobstructed, clear and obvious entry points.

A detailed landscape plan is proposed to be prepared for lodgement with the Construction Certificate for the project should this application be approved by Council. The design principles will be applied to the landscaped areas located within the front setback for the full length of the car park, in addition to the area extending along the eastern boundary between the building and Centennial Circuit.

## 3.8 Signage

No signage is proposed under this application. A separate approval will be sought for a pole sign and individual tenancy signage.

## 3.9 Development Statistics

**Table 3.3** illustrates the development statistics of the proposed building, this data is subject to final approval.

**Table 3.3** – Development Statistics

Land Use Item	Development
Site Area	4,020m <sup>2</sup>
Gross Floor Area	2,177m <sup>2</sup>
Floor Space Ration	54%
Car Parking	43
Building Height	9.459m
Storeys (max)	2

# Environmental Assessment

## Section

# 4

Pursuant to Clause 2(4) of Part 1 of Schedule 1 of the Environmental Planning & Assessment Regulations 2000, this Development Application is accompanied by a Statement of Environmental Effects which addresses the following matters:

- The environmental impacts of the development;
- How the environmental impacts of the development have been identified;
- The steps to be taken to the environment or to lessen the expected harm to the environment.

Accordingly, Section 4 provides an environmental assessment of the proposal. The evaluation includes consideration of environmental impacts on both the natural and built environments, and social and economic impacts of the locality.

## 4.1 Likely Environmental Impacts

### Noise

An acoustic assessment has been completed for the project by CRG. The assessment report is provided within **Attachment 3** of this document. Through the completion of the acoustic assessment, CRG has outlined a number of recommendations which have been adopted for the project, being:

*Onsite and Offsite Industrial Activity Noise.* Upgraded wall and glazing treatments; and provision of air-conditioning or sealed mechanical ventilation to the entire childcare centre. It is noted that for south facing glazings at Activity Rooms 1 and 4 (i.e. facing Ewingsdale Road) higher Rw ratings are required to mitigate road traffic noise.

*Road Traffic Noise.* Acoustic building shell treatments to childcare activity rooms and caretaker's dwelling to show that compliance with the internal criterion can be achieved. Provision for air conditioning or sealed mechanical ventilation is also required to noise affected habitable rooms to allow occupants to close windows and doors

CRG have concluded the proposed development will generally be within acceptable levels of the adopted criterion, subject to the acoustic treatments recommended being integrated into the design, construction and operation of the development.

### **Lighting**

Light spillage associated with the proposal will be minimal and due to the extensive distance between the proposed development and the nearest sensitive land use will not result in loss of amenity for the surrounding locality. Notwithstanding this, ultimate lighting within the car park shall be designed to ensure no light spill outside the boundary.

### **Flora and Fauna**

The development is proposed to be located on a disturbed urbanised property and as such no vegetation is required to be removed for the built form.

### **Flooding**

The proposed development is within an existing industrial estate, having been initially approved by the Byron Shire Council. With reference to the Byron Shire Council Belongil Creek Flood Study 2009, Figure O16 illustrates that the site is free from inundation under the Probable Maximum Flood Levels for existing topography. As such, the development is not likely to be impacted upon by flooding.

### **Socio-Economic**

The development involves the construction of a child care centre and industrial retail outlets at Centennial Circuit, Byron Bay. The key objectives within the IN2 Light Industrial zoning include encouraging employment opportunities to support the viability of centres and to provide other land uses which meet the daily needs of workers of the area.

The development proposal will continue to provide socio–economic benefit to the regional economy by:

- Creating additional local jobs through the construction and operation of the proposed development;
- Providing additional child care services which improves the accessibility to this services for parents who work within the Arts & Industry Estate and wider Byron Bay locality; and
- Creating industrial retail facilities which promote the development of small business through the ability to consolidate production and sales.

## **4.2 Built Environmental Impacts**

### **Building Design**

The proposal has been designed to provide a design response to both Centennial Circuit and Ewingsdale Road, which is sympathetic to and respects the existing locality.

Key elements incorporated in the built form design include:

- Varying textures, surface treatments and architectural elements are employed, to provide relief in the northern and southern façades.
- A range of roof elements are incorporated into the design to break-up the roof plan.
- Landscaping along the northern boundary and east of the car parking access driveway.

- Provision of clear and direct access for customers from the car park to each of the entry points to the proposed tenancies & child care centre.
- Punctuating the customer entry points to the buildings through a cohesive mix of architectural treatments along the northern façade addressing the customer car park.

### ***Visual Amenity***

The building will be constructed from a variety of materials including fibrocement sheeting, glazing, hardwood battens, translucent sheeting and concrete panels to provide visual interest.

Landscaping the northern border of the car parking area will also enhance the visual presentation of the proposed development to Centennial Circuit for passing vehicles and pedestrians. Reference is also made to the landscape located within the drainage reserve (Lot 68 DP 835249) which sits between Ewingsdale Road and the subject land. The landscaping within the drainage reserve provides a level of visual screen to the development site.

### **Streetscape and Desired Future Character**

The nature and scale of the proposed development is consistent with relevant built form controls outlined in the Byron Development Control Plan and found within the surrounding Arts & Industrial Estate, including building height, GFA, setbacks and site cover.

The proposed development will represent an enhancement in the site's appearance through high quality design and the provision of supplementary landscaping.

In support of the site layout, the project design provides an increased setback to the Centennial Circuit which assists with the scale and bulk of the built form, improved surveillance to the car park area from the service area and ease of parking access for customers.

### **Access, Traffic Car parking and Servicing**

A Traffic Report has been prepared by TTM and is provided within **Attachment**

**3.** The key findings from the TTM traffic impact assessment include:

- the proposed development is expected to generate 73 trips in the AM peak hour and 76 trips in the PM peak hour;
- the SIDRA assessment for the intersection of Ewingsdale Road / Bayshore Drive shows that the 2016 background traffic scenario fails in terms of DOS, LOS, average delay and the 95th percentile queue on the Bayshore Drive approach. The failure of the intersection is an existing issue where the Byron Shire Council Section 94 Contributions Plan (2012) indicates that the intersection will be upgraded to a roundabout based on the scheduling of land release at the West Byron Development Area. The roundabout has been planned for taking into consideration surrounding developments; therefore, no additional modelling has been undertaken at this intersection. In addition, this development is only a minor traffic generator in comparison to the surrounding future development yields;
- the SIDRA assessment for the intersection of Bayshore Drive / Centennial Circuit / Grevillea Street shows that all 2016, 2018 and 2028 background and design traffic scenarios perform well in terms of DOS, LOS, average delay and the 95th percentile queue;
- the development has a car parking requirement of 42 car parking spaces including the pick-up/drop-off bay and two PWD bays. The proposed development plans illustrate provision for 43 car spaces, therefore complying with Council's car parking requirement;
- the car park layout geometrical design complies with AS2890.1 and Council's DCP;
- the proposed development has a bicycle parking requirement of four (4) bicycle spaces. The development plans provide four (4) visitor bicycle spaces and six (6) staff bicycle spaces which complies with Council's requirement;

- the proposed development provides provision for a HRV to ingress and egress the site in a forward gear. The first four (4) car space on both sides of the aisle are required to be vacant during servicing;

Based on the above key outcomes within the traffic impact assessment, TTM has concluded there are no significant traffic or transport impacts associated with the proposed development.

### **Stormwater**

Stormwater management for the development has been prepared by Newton Denny Chapelle as outlined within Section 5 of the Engineering Services Report found within **Attachment 2** of this document.

The stormwater generated by the development will be collected and treated prior to discharge from the site. The proposed stormwater system has been designed in accordance with the Byron Shire Council – Comprehensive Guidelines for Stormwater Management.

Stormwater attenuation has been provided to ensure that there is no increase in post development flows leaving the site for a range of events up to the 100 year ARI. This is in accordance with the requirements outlined in the Byron Shire Council – Comprehensive Guidelines for Stormwater Management and the NRLG Development and Design Manual.

#### *Stormwater Quality*

The stormwater generated by the development will be treated prior to discharge to achieve the pollutant reduction targets outlined in Table 4.1. The site has been split into 3 post development catchments:

- The front Carpark draining north
- The Child Care Centre draining south
- The Industrial area draining south

The treatment train for each catchment is summarised in **Table 4.1** below.

**Table 4.1: Summary of Proposed Treatment Train**

Catchment	Treatment Train
Front Carpark	Bioretention (100m <sup>2</sup> )
Industrial Area	Litter Basket
Child Care Centre	Litter Basket Rainwater Re-use (30kl)

It is important to note that the bioretention system for the front carpark has been oversized for the catchment area to compensate for other areas of the site. Rainwater re-use for the Child Care Centre has been modelled as 30% of the expected sewer demand of the centre.

#### *Stormwater Attenuation*

Stormwater generated by the development will be attenuated prior to discharge to ensure the post development flows do not exceed the pre-development flows generated by the site. The pre and post development catchments are shown on the Stormwater Catchment Plan attached in Appendix A. The pre-development site primarily drains into two catchments being north towards Centennial Circuit and south towards into the drainage swale beside Ewingsdale Road.

The post development site also drains into two primary catchments with the carpark area draining north to Centennial Circuit and the Industrial area and Child Care centre draining south to Ewingsdale Road.

The modelling completed by Newton Denny Chapelle demonstrates the proposed attenuation storage for the site is adequate to ensure that the post development stormwater discharges do not exceed the pre development case.

#### **Soil & Erosion Management**

During construction sediment and erosion control measures will be installed to ensure the loss of soil from the site is minimised. Refer to Appendix A – Erosion and Sediment Control Plan for the proposed site control measures. Temporary sediment and erosion control measures such as silt fencing are the responsibility of the Contractor and will be installed prior to construction.

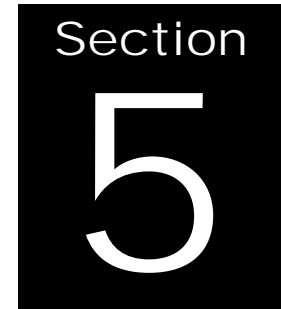
**Services**

All infrastructure services to the site will be provided by the proposed development by the time of Occupation Certificate. A condition to this effect would be accepted by the applicant.

**Waste Management**

An operational Waste Management Plan is provided within **Attachment 6** of this document. A construction Waste Management Plan will be prepared to accompany the Construction Certificate.

# Statutory & Policy Planning Assessment



## 5.1 Introduction

Section 5 documents the range of planning controls applicable in the subject case pursuant to Section 79C (1) (a) of the Act and tabulates the effect of these instruments in the circumstances of the development proposal described at Section 3. Section 5 also examines policy adopted by Council or other authority applicable in the subject matter which, whilst relevant, are not controls within the meaning of Section 79C (1) (a).

## 5.2 Byron Local Environmental Plan 2014 (BLEP)

### 5.2.1 Aims of the Plan

The particular aims of this Plan are as follows:

*(2) The particular aims of this Plan are as follows:*

*(a) to progressively respond to changes in the natural, social and economic environment in a way that is consistent with the following principles of ecologically sustainable development:*

*(i) the precautionary principle—this principle means that where there are threats of serious or irreversible damage to the community's ecological, social or economic systems, a lack of complete scientific evidence should not be used as a reason for postponing measures to prevent environmental degradation (In some circumstances this will mean actions will need to be taken to prevent damage even when it is not certain that damage will occur.),*

*(ii) the principle of intergenerational equity—this principle means that the present generation must ensure that the health, integrity, ecological diversity, and productivity of the environment is at least maintained or preferably enhanced for the benefit of future generations,*

*(iii) the principle of conserving biological diversity and ecological integrity—this principle aims to protect, restore and conserve the native biological diversity and enhance or repair ecological processes and systems,*

*(iv) the principle of improving the valuation and pricing of social and ecological resources—this principle means that users of goods and services should pay prices based on the full life cycle costs (including the use of natural resources at their replacement value, the ultimate disposal of any wastes and the repair of any consequent damage),*

*(v) the principle of eliminating or reducing to harmless levels any discharge into the air, water or land of substances or other effects arising from human activities that are likely to cause harm to the environment,*

*(b) to integrate local planning provisions with applicable regional and State planning controls and policies,*

*(c) to provide a framework for land use management in Byron,*

*(d) to promote and coordinate the orderly and economic use and development of land,*

*(e) to build and sustain community resilience by encouraging a diversity of housing choice and affordable housing in appropriate localities,*

*(f) to encourage development that contributes to a vibrant, socially-diverse community,*

*(g) to encourage development that contributes to a strong, growing and diversified economy,*

*(h) to ensure the timely provision and coordination of community services and facilities,*

*(i) to protect, manage and restore the natural environment and biodiversity of Byron,*

*(j) to protect the cultural heritage of Byron, including the conservation of built heritage and Aboriginal heritage,*

*(k) to provide for public involvement and participation in environmental planning and assessment,*

*(l) to minimise conflict between land uses within a zone and adjoining zones and*

**Comment:** The development of a mixed use development incorporating the proposed land uses will assist accessibility by workers and residents of Byron Bay to sought services inclusive of child care. The availability of the uses will also

strengthen the local economy through the construction and operational phases through employment and ongoing patronage of the proposed tenancies.

The proposed building has been designed to provide a high quality built form which will contribute positively to the built environment whilst fitting the allocated project budget.

Importantly, the development is proposed on land which is located in an urbanised area and as a result does not incorporate any significant impact upon the natural environment or biodiversity of the Byron locality.

The proposal is considered to be consistent with those objectives of the BLEP relevant to the project.

### 5.2.2 Zoning & Permissibility

**Zone:** The land is zoned IN2 – Light Industry pursuant to the provisions of the BLEP 2014. **Plate 3** illustrates provides an extract of the zoning map applicable to the site.

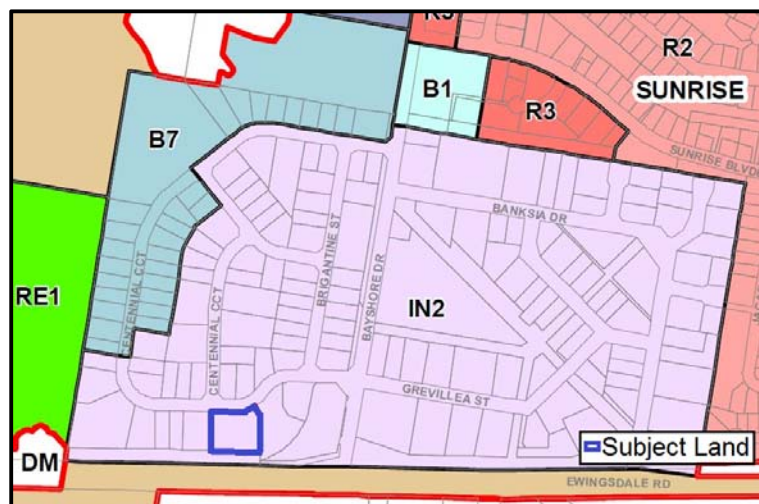


Plate 3 – Byron LEP Zoning Extract.

**Land Use Definition:** The project is defined as a mixed use development which includes the following land uses, “child care centre, industrial retail outlet, retail and food and drink premises” pursuant to the dictionary within the BLEP 2014.

An extract of this definition is provided below:

**mixed use development** means a building or place comprising 2 or more different land uses.

**child care centre** means a building or place used for the supervision and care of children that:

- (a) provides long day care, pre-school care, occasional child care or out-of-school-hours care, and
- (b) does not provide overnight accommodation for children other than those related to the owner or operator of the centre, but does not include:
- (c) a building or place used for home-based child care, or
- (d) an out-of-home care service provided by an agency or organisation accredited by the Children's Guardian, or
- (e) a baby-sitting, playgroup or child-minding service that is organised informally by the parents of the children concerned, or
- (f) a service provided for fewer than 5 children (disregarding any children who are related to the person providing the service) at the premises at which at least one of the children resides, being a service that is not advertised, or
- (g) a regular child-minding service that is provided in connection with a recreational or commercial facility (such as a gymnasium), by or on behalf of the person conducting the facility, to care for children while the children's parents are using the facility, or
- (h) a service that is concerned primarily with the provision of:
  - (i) lessons or coaching in, or providing for participation in, a cultural, recreational, religious or sporting activity, or
  - (ii) private tutoring, or
  - (j) a school, or
  - (k) a service provided at exempt premises (within the meaning of Chapter 12 of the Children and Young Persons (Care and Protection) Act 1998), such as hospitals, but only if the service is established, registered or licensed as part of the institution operating on those premises.

**Industrial retail outlet** means a building or place that:

- (a) is used in conjunction with an industry or rural industry, and
- (b) is situated on the land on which the industry or rural industry is located, and
- (c) is used for the display or sale (whether by retail or wholesale) of only those goods that have been manufactured on the land on which the industry or rural industry is located, but does not include a warehouse or distribution centre.

**food and drink premises** means premises that are used for the preparation and retail sale of food or drink (or both) for immediate consumption on or off the premises, and includes any of the following:

- (a) a restaurant or cafe,
- (b) take away food and drink premises,
- (c) a pub,
- (d) a small bar.

**Note.** Food and drink premises are a type of **retail premises**—see the definition of that term in this Dictionary.

**Permissibility:** The proposed land uses are all nominated as being permissible upon land zoned IN2 – Light Industrial under the BLEP 2014.

**Zone Objectives:** The zone objectives of the I2 – Light Industrial zone are outlined below:

- *To provide a wide range of light industrial, warehouse and related land uses.*
- *To encourage employment opportunities and to support the viability of centres.*
- *To minimise any adverse effect of industry on other land uses.*
- *To enable other land uses that provide facilities or services to meet the day to day needs of workers in the area.*
- *To support and protect industrial land for industrial uses.*
- *To provide for creative industrial uses such as artisan and cultural industries.*

**Comment:** The proposed development meets the strategic intent of the land through the delivery of key industrial and social land uses. Specific reference is made to the development of the child care centre and the demonstrated demand which exists for further placements within the Byron Bay locality. To this end, the development will assist those surrounding residents and employees within the Arts & Industry Estate with improved accessibility to child care.

Through the development of the land for industrial retail outlets, regard is made to the primary industrial floor area allocated to each tenancy. The design promotes the primary use for production purposes thereby ensuring the land provides for the intended light industrial use.

Given the above, the proposal is considered to be in accordance with the zone objectives of the IN2 Zone.

### 5.2.3 General Provisions

#### Clause 4.3 – Height of Buildings

The height of a building on the land is not to exceed the maximum height shown for the land on the Height of Buildings Map. An extract from the applicable Height of Buildings Map is provided in **Plate 4**. In this instance the maximum building height is prescribed as 9 metres.

For the purpose of compliance, the TLEP defines building height as follows:

*building height (or height of building) means the vertical distance between ground level (existing) and the highest point of the building, including plant and lift overruns, but excluding communication devices, antennae, satellite dishes, masts, flagpoles, chimneys, flues and the like.*

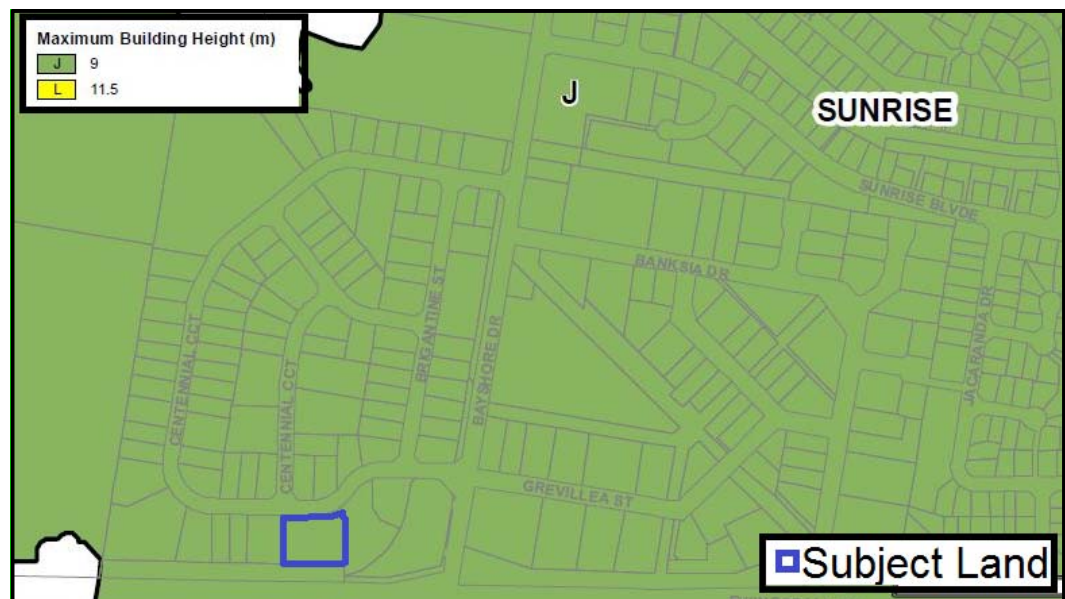


Plate 4 – Extract from Height of Buildings Map.

**Comment:** The proposed building presents a minor variation to the building height by 617mm. The variation is generated through the slope of the land towards the southern portion of the site adjacent to the drainage reserve. To this end, when the building is measured from the finished filled height commensurate to the adjoining land the maximum build height is below 9m, being 8.451m.

A variation pursuant to Clause 4.6 of the BLEP is proposed in this instance, based on the following grounds.

- The topography of the land is such that the site is required to be filled by some 1.2m thereby increasing the overall height of the building when measured from the existing natural surface to the highest part of the building.
- The increase in building height will not have any adverse impact upon either privacy and or solar access for any adjoining building. To this end, the existing and /or approved buildings on adjoining lands do not have any openings which will be impacted by the increase in building height
- The lowering of the roof is not seen as a desirable architectural response and therefore would have an adverse impact to the buildings articulation to Centennial Circuit & Ewingsdale Road.
- The increase in building height does not represent any greater development opportunities that would otherwise be obtained via a compliant building height.

#### **Clause 4.4 – Floor Space Ratio**

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 (see **Plate 5**). The *floor space ratio* of buildings on a site is the ratio of the gross floor area of all buildings within the site to the site area. In this instance the nominated FSR is 0.9.

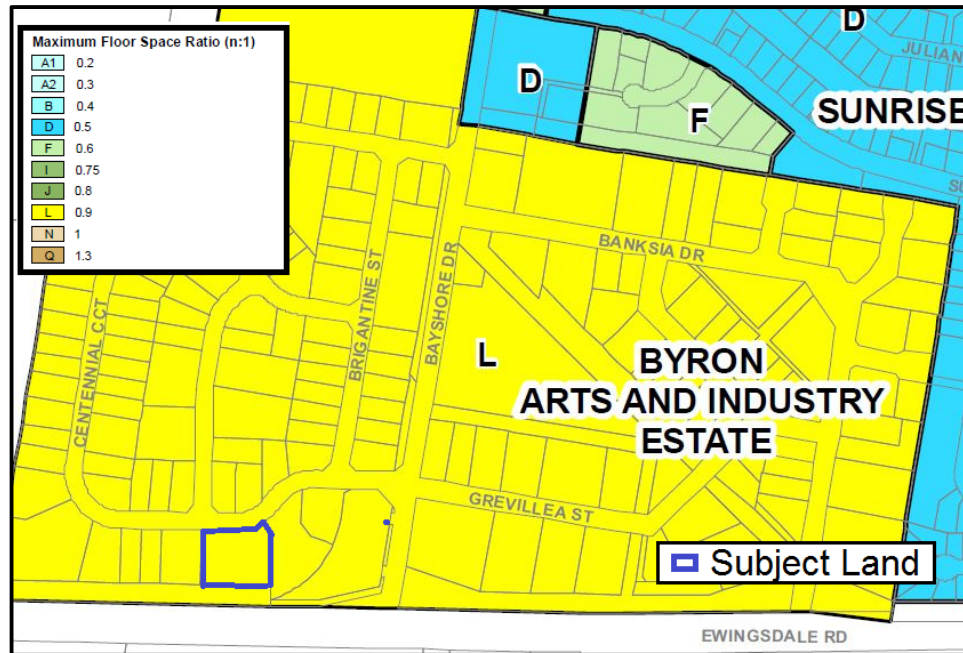


Plate 5 – Floor Space Ratio Map.

**Comment:** The proposed building has a Gross Floor Area of 2,177m<sup>2</sup>. Given the site area of 4,020m<sup>2</sup>, this equates to a Floor Space Ratio of 0.54:1.

#### Clause 5.4 - Controls Relating to Miscellaneous Permissible Uses

The clause outlines the controls for Industrial Retail Outlets:

*(4) If development for the purposes of an industrial retail outlet is permitted under this Plan, the retail floor area must not exceed:*

*(a) 40% of the gross floor area of the industry or rural industry located on the same land as the retail outlet, or*

*(b) 250 square metres, whichever is the lesser.*

**Comment:** The industrial retail outlet component of the development complies with the clause given the retail floor area of for the total development equates to only 132m<sup>2</sup> (including the café/take away food outlets) which is below both prescribed standards.

### **Clause 5.10 - Heritage Conservation**

The objectives of Clause 5.10 are:

- (a) to conserve the environmental heritage of Byron,*
- (b) to conserve the heritage significance of heritage items and heritage conservation areas, including associated fabric, settings and views, fabric,*
- (c) to conserve archaeological sites,*
- (d) to conserve Aboriginal objects and Aboriginal places of heritage significance.*

**Comment:** With reference to the Byron Shire Heritage Map - Sheet HER\_003CC, there are no conservation areas, general heritage items or archaeological items identified in the location of the site and surrounds.

The subject land is located within a modified urbanised environment. Notwithstanding this, in the event material are discovered during site works, and these items are believed to be Aboriginal sites or cultural found remains, the works are to immediately cease and the NSW Office of Environment & Heritage are to be contacted.

### **Clause 6.1 - Acid Sulphate Soils**

**Comment:** As outlined in Section 2.6, the site is mapped as containing Class 3 Acid Sulphate Soils (ASS) which in accordance with ASSMAC (1998) is defined as any "Works beyond 1 metre below natural ground surface and works by which the water table is likely to be lowered beyond 1 metre below the natural ground surface" require an assessment be carried out in relation to the proposed works.

The Acid Sulphate Soil Risk Map (Land & Water Conservation, 1995) for Byron was reviewed in the first instance to ascertain a preliminary view as to the potential of acid sulfate soils on the site. The depth to acid sulfate materials, if present, is between 1 and 3m below the ground surface. The mapped colour coding of the subject site location provided for a low probability.

It is considered to be conservative, that if the proposal requires the construction for services, footings or the alike, beyond 2m below the existing ground level at

the site, that an Acid Sulfate Soil Management Plan is required to be submitted to Council prior to the release of the Construction Certificate. However, if works are not proposed to be 2m below the existing ground level then contemporary practice of management of soil is to be undertaken at the site.

#### **Clause 7.2 – Earthworks**

**Comment:** The proposed development provides for the completion of earthworks ancillary to the development.

In respect to earthworks, the site will be shaped to maintain the existing crest running east to west across the site. To create suitable building pads and to enable the connection of the stormwater system to existing Council infrastructure the site will be filled to achieved the finished levels shown on the Bulk Earthwork Plan as provided within Appendix A of the Engineering Services Report (**Attachment 2**). Retaining structures will be required along the eastern, western and southern boundaries with a maximum height of 1.2m along the southern and western boundaries expected.

The works are expected to require 1,650m<sup>3</sup> of fill material to a maximum depth of 1.2m adjacent to the retaining structures.

#### **Clause 7.6 – Stormwater Management**

**Comment:** Specific reference should be made to the stormwater management plan contained within Section 5 of the Engineering Services Report found within **Attachment 2** of this document.

#### **Clause 7.10 – Essential Services**

**Comment:** Specific reference should be made to the Engineering Services Report provided within **Attachment 2** this document.

## 5.3 Byron Council Development Control Plan 2014

This DCP applies to all land zoned under the Byron Local Environmental Plan, 2014. Those provisions contained within the Byron Development Control Plan applicable to the proposed development are summarised below within **Table 5.1**.

**Table 5.1:** Byron Development Control Plan

Development Standards	Proposal
<b>Part A – Preliminary</b>	
Public Notification	Per Table A2 of section A14 of the DCP the proposed development does trigger Level 2 notification through the inclusion of the child care centre.
<b>Part B – Chapter B5 – Providing for Cycling</b>	
Development applications must demonstrate that all potential modes of transport have been addressed in assessing the requirements for transport and access to and from the proposed development. The assessment must address the potential for cycling as a means of transport to and from the site and the resultant need for the provision of facilities for cycling and cyclists at the site.	Reference is made to the Traffic Impact Assessment provided at <b>Attachment 4</b> .  The proposed development has a bicycle parking requirement of four (4) bicycle spaces. The development plans provide four (4) visitor bicycle spaces and six (6) staff bicycle spaces which complies with Council's requirement. All bicycle parking spaces have been designed in accordance with the dimensional requirements of AS2890.3: 2015 Bicycle Parking Facilities (i.e. 0.5m space width, 1.8m space length and 1.5m aisle width). In addition, end of trip facilities will be provided in the form of one (1) unisex shower and change room within the area labelled as staff rooms. Female and male toilets are provided as part of the development.
<b>Part B – Chapter B8 – Waste Minimisation &amp; Management</b>	
A Site Waste Minimisation and Management Plan (SWMMP) must be submitted with a development application for mixed use development.	Reference is to be made to the Site Waste Management plan provided within <b>Attachment 6</b> .
<b>Part B – B9 – Landscaping</b>	
<b>B9.3 - General Landscaping Principles</b>	The proposal will incorporate landscaping in the landscape area extending for the full frontage of the car park area & fronting Centennial Circuit. The landscaping palette will provide shade for staff and customers, and assist in providing a more temperate environment.

<p><b>B9.8.1 - Industrial Landscaping</b></p>	<p>This section requires effective landscaping to reduce the visual impacts of industrial developments. In response, the proposed development will incorporate landscaping to enhance the streetscape through the inclusion of a 2.5m wide garden bed and located between the footpath/grass verge and the proposed carpark.</p> <p>Existing street trees are to be retained where possible and additional shade trees will be planted in the garden bed area.</p>
<p><b>B9.9.1 - Landscaping of Car Parking and Open Storage</b></p>	<p>The prescriptive measures require shade trees to be provided at the rate of 1 tree to shade every 2 - 5 parking spaces and aim to provide adequate shade cover after five (5) years or less and be provided in garden beds of minimum width 2m.</p> <p>A minimum of 4 shade trees are required for the car park frontage to Centennial Circuit, with 21 car parks bordering the landscape area. Landscaping may take the form of Tuckeroo trees, however the final species will be illustrated on the landscape plans lodged with the Construction Certificate.</p> <p>Scope also exists for the placement of planters adjoining the outdoor covered area and the adjacent to the child care centre.</p>
<p><b>B11.2.2 Applying CPTED where Crime Risk Assessment is not required</b></p>	<p>This section requires the four CPTED principles be addressed to promote community safety and minimise the opportunity for crime.</p> <p><u>Surveillance</u></p> <p>The northern elevation provides a significant area of glazing on the building, in addition to public outdoor areas which provides an activation of the site with improved surveillance.</p> <p>The number and placement of windows on the northern façade of the building promotes natural surveillance onto the carpark and street for both employees and visitors to the site.</p> <p>Landscaping is proposed along the front boundary to Centennial Circuit. The landscaping will consist of shrubs, groundcovers and tall shade trees that will be designed to allow clear sightlines from the road and public footpath to the car parking areas and the open courtyard for the industrial retail outlets.</p> <p>These measures increase the feeling of safety and should also deter illegitimate users of the space, as the sight lines combined with the active areas permit ease of identification of anti-social behaviour.</p>

	<p><u>Access Control</u></p> <p>Access will be effectively controlled through the use of physical and symbolic barriers which are orientated to the car park and street frontage. A clear access/entry from the street will be provided to allow users to easily see in when entering the industrial retail outlet precinct in addition to the child care centre.</p> <p>Certain areas of the development are designed to restrict access through the use of fencing, with specific reference to the child care centre. A fence will be provided between the customer car park. This will ensure that the only areas accessible to the public are within areas of natural surveillance from Centennial Circuit.</p> <p><u>Territorial Reinforcement</u></p> <p>No gates or fencing are proposed for the northern boundary fronting Centennial Circuit. This ensures there is a clear acknowledgement of the area being accessible to the public associated with the use of the land.</p> <p>The design of the built form, however clearly delineates the areas which are private and thus not accessible to the general public. Reference is also made to the proposed use of security systems and lighting to clearly distinguish private components of the development.</p> <p><u>Space Management</u></p> <p>The space will be managed through regular maintenance to ensure areas are well-kept and clean. To this end, the following key measures will be adopted.</p> <p><u>Signage:</u></p> <ul style="list-style-type: none"> <li>• All signage is to comply with the requirements of AS 1428.1 (Disabled Access Code).</li> <li>• All signs will be strategically placed, well lit, large and legible with strong colours, and incorporate standard symbols.</li> </ul> <p><u>Lighting:</u></p> <ul style="list-style-type: none"> <li>• Lighting to external areas will have lighting levels in accordance with the respective parts of AS1158 (Public Lighting Code), AS4282 and Council requirements.</li> <li>• For all internal areas, the minimum lighting levels will satisfy the requirements of the respective part of AS1680.</li> </ul>
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	<ul style="list-style-type: none"><li>• Lighting will be controlled by time clock to ensure that appropriate lighting levels are in place at any time of day.</li></ul> <p>Maintenance</p> <ul style="list-style-type: none"><li>• Removing graffiti in a timely manner;</li><li>• Maintaining the public/communal spaces;</li><li>• Regular landscape maintenance;</li><li>• Repairing all broken common area infrastructure/furniture;</li><li>• Repairing all damaged, broken or decaying building elements; and</li><li>• Ensuring that bins are kept in locked enclosures.</li></ul>
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<b>Part D - Chapter D1 – Residential Accommodation in Urban, Village and Special Purpose Zones</b>	
<b>DI.11.1 Ancillary Dwellings in Zones IN1, IN2 and B7</b>	<p>This section of Chapter D1 addresses the consideration of amenity for future residents of ancillary dwelling located within industrial and business park localities.</p> <p>A manager's residence ancillary to the industrial retail activity is proposed to be located within the building on the first floor adjacent to Tenancy 3. This residence will be utilised to provide overnight supervision for the premises.</p> <p>The dwelling is to be located between Tenancy 3 and the child care centre thereby providing the greatest setback to the other industrial tenancies and the adjoining proposed brewery upon Lot 59 DP 835249. The internal design provides the furthest setback from the main industrial area and will therefore minimise any potential noise and odour impacts. The area below the residence will be used for storage/production, however as the unit is associated with Tenancy 3, the amenity impact will be appropriately managed.</p> <p>The proposed residence is consistent with the objectives as it is a small component of the overall development and the location and design will provide an acceptable level of amenity for the future resident. Obvious security benefits will also be obtained through the presence of a resident on-site.</p> <p>The total floor area of the proposed manager's residence is 56m<sup>2</sup>, which is below the prescribed maximum floor area of 60m<sup>2</sup>.</p>
<b>Part D – Chapter D5 – Industrial Development</b>	
<b>D5.2.1 Building Lines</b>	The building is setback established with a minimum depth of 19.2m from the northern boundary fronting Centennial Circuit, thereby in compliance with the primary 10m setback.
<b>D5.2.2.2 Building Criteria</b>	The northern elevation fronting Centennial Circuit incorporates a combination of materials including glass, fibrocement sheeting and hardwood. Tilt up concrete will be used on the western and eastern elevations which adjoin either existing or approved industrial developments.
<b>D5.2.3 Water and Sewer Services</b>	The development will be serviced by reticulated water and sewer services as outlined within the Engineering Services Report ( <b>Attachment 2</b> )

<p><b>D5.2.4 Energy Efficient Industrial Development</b></p>	<p>The building has been designed to take advantage of the northerly orientation through the level of glassing which supports the maximisation of solar energy to the building</p> <p>To complement the available solar access, the design of the open covered area for the industrial retail outlets provides for the area to utilise the prevailing northerly winds</p> <p>.</p> <p>A bicycle parking area is proposed directly north of Tenancy 4 and adjacent to the car park, thereby providing ease of access to cyclists.</p>
<p><b>D5.2.5 Water Sensitive Urban Design and Industrial Development</b></p>	<p>Stormwater Attenuation – Stormwater attenuation for the 1 in 100 year event has been provided for the site. 112m<sup>3</sup> of attenuation storage will be provided as part of the development to ensure the pre development storm flows from the site are not exceeded.</p> <p>Stormwater Quality – MUSIC modelling has demonstrated that the proposed treatment train for the site (including a bioretention system and litter baskets) achieves the pollutant reduction targets.</p> <p>Reference is to be made to the Stormwater Management Plan provided within <b>Attachment 2</b> of this document.</p>
<p><b>D5.2.6 Car Parking and Access</b></p>	<p>Car parking and access have been designed in accordance with the requirements of Chapter 4 of the DCP as demonstrated within Section 4.2 of the Traffic Impact Assessment contained within <b>Attachment 4</b> of this document.</p>
<p><b>D5.2.7 Landscaping and Screening</b></p>	<p>The proposed landscaping will complement the architectural form proposed for the subject land. The landscaping will therefore contribute to the provision of shade, thus controlling the microclimate, in accordance with Chapter B9 of the Byron DCP.</p>
<p><b>D5.2.8 Signage</b></p>	<p>A separate application will be lodged for signage upon consent being obtained for the development.</p>
<p><b>D5.2.9 Fencing</b></p>	<p>No fencing is proposed as part of this application.</p>
<p><b>D5.2.10 Outdoor Storage Areas</b></p>	<p>The bin enclosure and trade waste grease trap will be located within the loading area and as such through the enclosure of the bins, the waste will not be visible from public areas.</p>
<p><b>D5.2.11 Dwellings in Association with Industry</b></p>	<p>The proposed manager's residence complies with the requirements of Chapter D1, as addressed within this DCP compliance table.</p>

## 5.4 State Plans & Policies

### 5.4.1 State Environmental Planning Policy No. 55 - Remediation of Land

Clause 7 requires that a consent authority must not consent to the carrying out of any development on land unless it has considered whether the land is contaminated, based on a preliminary investigation of the land carried out in accordance with the Contaminated Land Planning Guidelines.

The Contaminated Land Planning Guidelines (Department of Urban Affairs and Planning, Environment Protection Authority, 1998) provide information relating to preliminary contamination investigations. In addition, Byron Shire Council has adopted a Management of Contaminated Land Policy (Policy No.5.61), which contains details of the information required to be submitted with applications for development.

The following key questions are completed to satisfy the preliminary site contamination investigation.

*1. Please specify all land uses to which the site has been put, including the current use.*

The site for the proposed development has been created through the development of the industrial estate.

*2. Is the proponent aware of uses to which properties adjoining the site have been put? If so, please specify.*

The land is therefore currently vacant of any structural improvements, although adjoined by existing industrial buildings to the west and a proposed brewery to the eastern side of the land. A service station is located further to the east of the subject land.

*3. Do any of the uses correlate with the potentially contaminated activity set out in table 1 in Schedule 1 of this policy?*

No land uses provided in response to Question 2 are listed within Schedule 1 directly adjoining the land.

*4. If the answer to 3 is yes - has there been any testing or assessment of the site and, if so, what were the results?*

Reference is however made to previous contaminated land assessment in 2009 by Ardill Payne & Partners (APP) (job 6833, February 2009) which was lodged with DA 2008/733. Importantly, the report also related to Lot 60 DP 835249, being the subject land in addition to Lot 59. The assessment determined that the site was levelled and filled during the 1990's. APP also noted that the neighbouring service station east of Lot 59 was approved in 1985 (DA 85/199) with subsequent approvals provided later for various additions to the site.

APP as part of their assessment reviewed historic aerial photographs from NSW Department of Lands which presented that the site was vacant, swamp land during the 1950s continuing through to the aerial photograph of 1987. APP identified from aerial photography of 2007 that the site had been stripped and filled as part of the Industrial Estate Subdivision works. Further to the review of historic photographs, APP completed sampling of both soil and groundwater from monitoring bores by Ardill Payne and Partners in 2009 presented that there were hydrocarbons present in the groundwater.

Further, no sampling is proposed as part of this application.

*5. Is the proponent aware of any contamination on the site?*

It is not expected the development will intersect the groundwater for the project construction works and therefore dewatering is not proposed as part of this application. Accordingly, no public health or environmental risk is present where the groundwater is not intersected by the development.

#### **5.4.2 State Environmental Planning Policy (Infrastructure) 2007**

The proposal gross floor area does not trigger a concurrence referral to the Roads and Maritime Service (RMS) under Clause 104 of the SEPP as '*traffic generating development*'.

### **5.4.3 Draft North Coast Regional Plan 2016**

The Draft North Coast Regional Plan (draft Plan) applies to 13 councils, inclusive of the Byron Shire. The draft Plan outlines a 20-year vision for the future, centred on a prosperous community, healthy environment and attractive lifestyle choices.

In the absence of specific development provisions under the Draft Plan for the subject land or for the form of development proposed, regard has been made to the draft goals contained within the Plan.

The Draft Plan identifies goals for the region including:

- A natural environment, Aboriginal and historic heritage that is protected and landscapes that are productive
- Offer housing choice in vibrant communities and liveable places
- Housing that meet the needs of changing communities
- A prosperous economy with services and infrastructure
- Improved transport connectivity and freight networks

The proposal is considered to be consistent with the above referenced goals as such the proposal is not antipathetic the Draft North Coast Regional Plan.

## **5.5 Planning Agreements**

No planning agreements have been entered into under Section 93F of the EP&A Act, 1979 (as amended), nor has a draft agreement been offered by the owner/applicant.

## **5.6 Any Matter Prescribed by the Regulations**

Where relevant the provisions of the Environmental Planning & Assessment Regulation 2000 (as amended) have been taken into consideration in the preparation of this Development Application.

## 5.7 S. 79C(i) Matters for Consideration

*(a) the provisions of:*

*(i) any environmental planning instrument,*

**Comment:** All relevant provisions of the Byron Local Environmental Plan 2014 have been addressed within Section 5.2 of this report.

*(ii) any draft environmental planning instrument that is or has been placed on public exhibition and details of which have been notified to the consent authority,*

**Comment:** No Draft LEP applies to the subject land or form of development proposed within this application.

*(iii) any development control plan,*

**Comment:** The provisions relevant to the Byron DCP have been addressed in Section 5.3 of this report.

*(iv) the regulations (to the extent that they prescribed matters for the purposes of this paragraph),*

**Comment:** The proposal is not subject to the provision of the NSW Coastal Policy.

*(b) the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality,*

Primary Matters	Proposal
Context & Setting	It is unlikely the land use and building configuration will compromise the relationship or continued use of adjoining lands. In this regard the proposed development is consistent with the design provisions of the Byron DCP.
Access, Transport & Traffic	Access, transport and parking issues are all addressed within the Traffic Impact Assessment contained within <b>Attachment 4</b> of this report.
Heritage	The subject land and associated built structures are not identified as items of heritage significance within Schedule 5 of the Byron LEP 2012.
Soils	No adverse impacts are envisaged in relation to soils by virtue of the proposed building works.  Reference should be made to Section 5.4.1 of this report which contains a preliminary assessment of the subject land against the Council's Contaminated Lands Policy.
Flora & Fauna	The proposed development is not likely to have a significant adverse effect on threatened species, populations and ecological communities or their habitats having regard to Section 5A of the Environmental Planning and Assessment Act 1979.
Noise	Potential noise impacts have been assessed in the preparation of the project design. The environmental noise impact assessment is contained within <b>Attachment 3</b> of this report.
Infrastructure Services	The ability to service the development and the proposed management of stormwater is outlined within the Engineering Services Report contained within <b>Attachment 2</b> of this document.

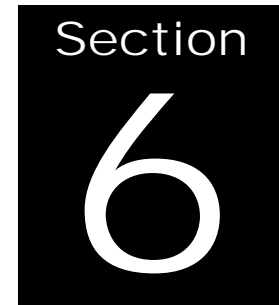
***(c) the suitability of the site for the development***

Primary Matters	Proposal
Does the proposal fit in the locality	It is submitted that the resulting building layout is not constrained by adjacent development reflected through the proposals consistency with the form of development (built form and land use) envisaged for the Arts & Industry Estate.  The subject land is strategically located so as to provide greater accessibility for residents of Byron Bay to child care services.
Site Attributes conducive to the development	It is not envisaged that the proposed development will be adversely affected by any natural hazard.  No adverse impacts are envisaged in relation to flora and fauna given that no vegetation is proposed to be removed as part of the subdivision proposal. Accordingly, the proposal is not likely to have a significant adverse effect on threatened species, populations and ecological communities or their habitats having regard to Section 5A of the Environmental Planning and Assessment Act 1979.

*(e) the public interest*

Primary Matters	Proposal
Federal, State, Local Government Interest & Community Interest	<p>This application considers and addresses the relevant State and Local Government plans and policies and is considered to be in the public interest.</p> <p>The provision of improved accessibility to child care for the Byron Bay area and surrounds provides increased social benefits to existing and future residents.</p>

# Conclusion



This Statement of Environmental Effects, when read in conjunction with the accompanying subdivision design plan, successfully addresses the issues relevant to Council's assessment of this application for the proposed development.

The grounds for this approval are summarised below:

- The mixed use proposal is generally in accordance with the Byron Local Environmental Plan 2014 and the Byron Development Control Plan 2014.
- The proposal shall provide improved accessibility to child care services facilities for works within the Arts & Industry Estate and the broader Byron Bay area.
- The development is ideally suited to the subject site given the desired land use of the immediate locality.
- The proposal demonstrates an appropriate and sympathetic design which is responsive to the site and compliance with Council's Development Control Plans.

In consideration of the issues and information provided, approval of the Development Application is warranted in the manner prepared, subject to the inspection of reasonable and relevant conditions.

*Dan Chapelle*

**DAMIAN CHAPELLE**

Town Planner BTP, CPP.

Date: January 2017

## **ATTACHMENT 1**

**Proposed Design Plans**  
***Harley Graham Architects &***  
***Local Office Architecture***

# DEVELOPMENT APPLICATION

## PROPOSED INDUSTRIAL SPACES + CHILD CARE

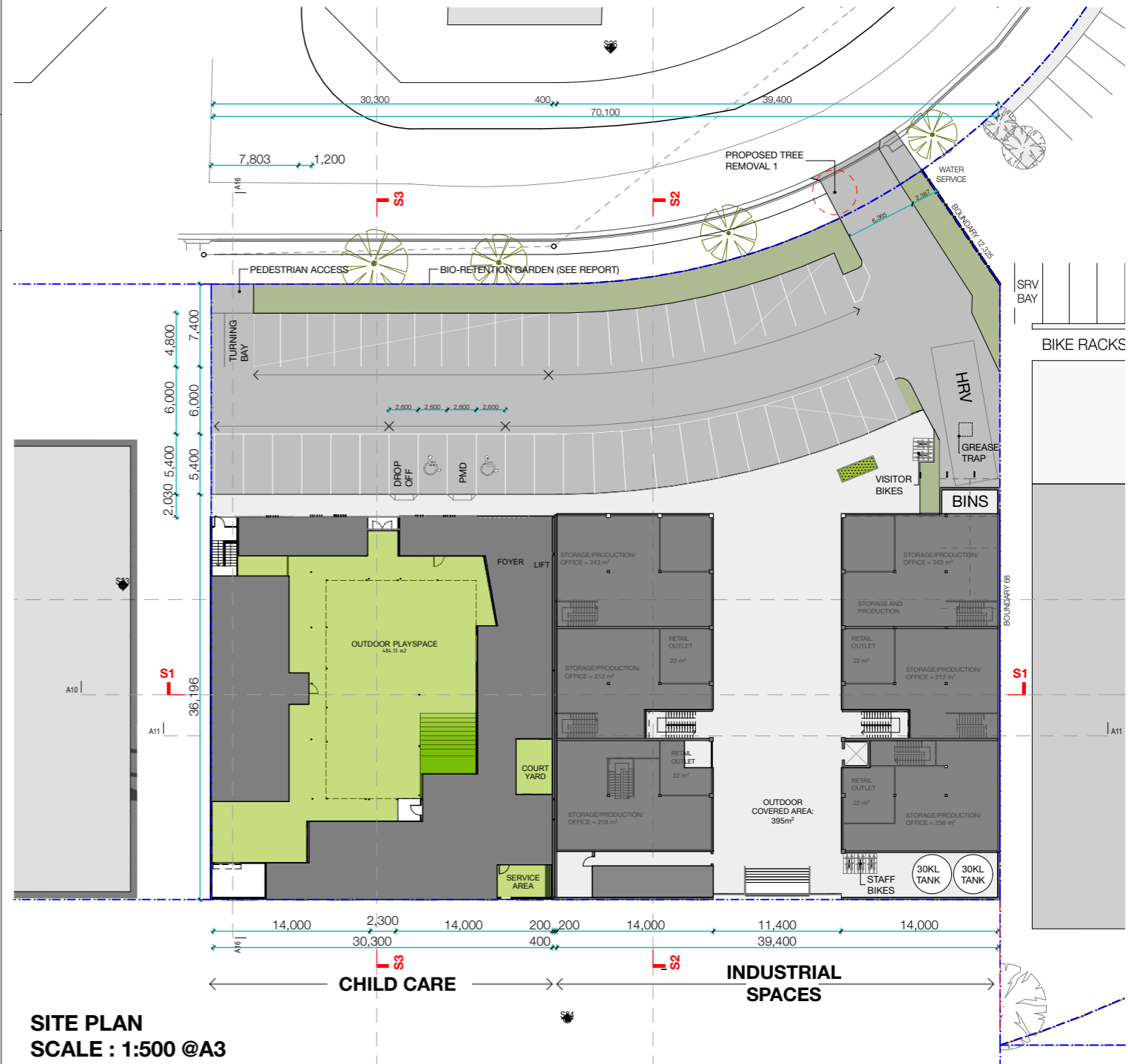
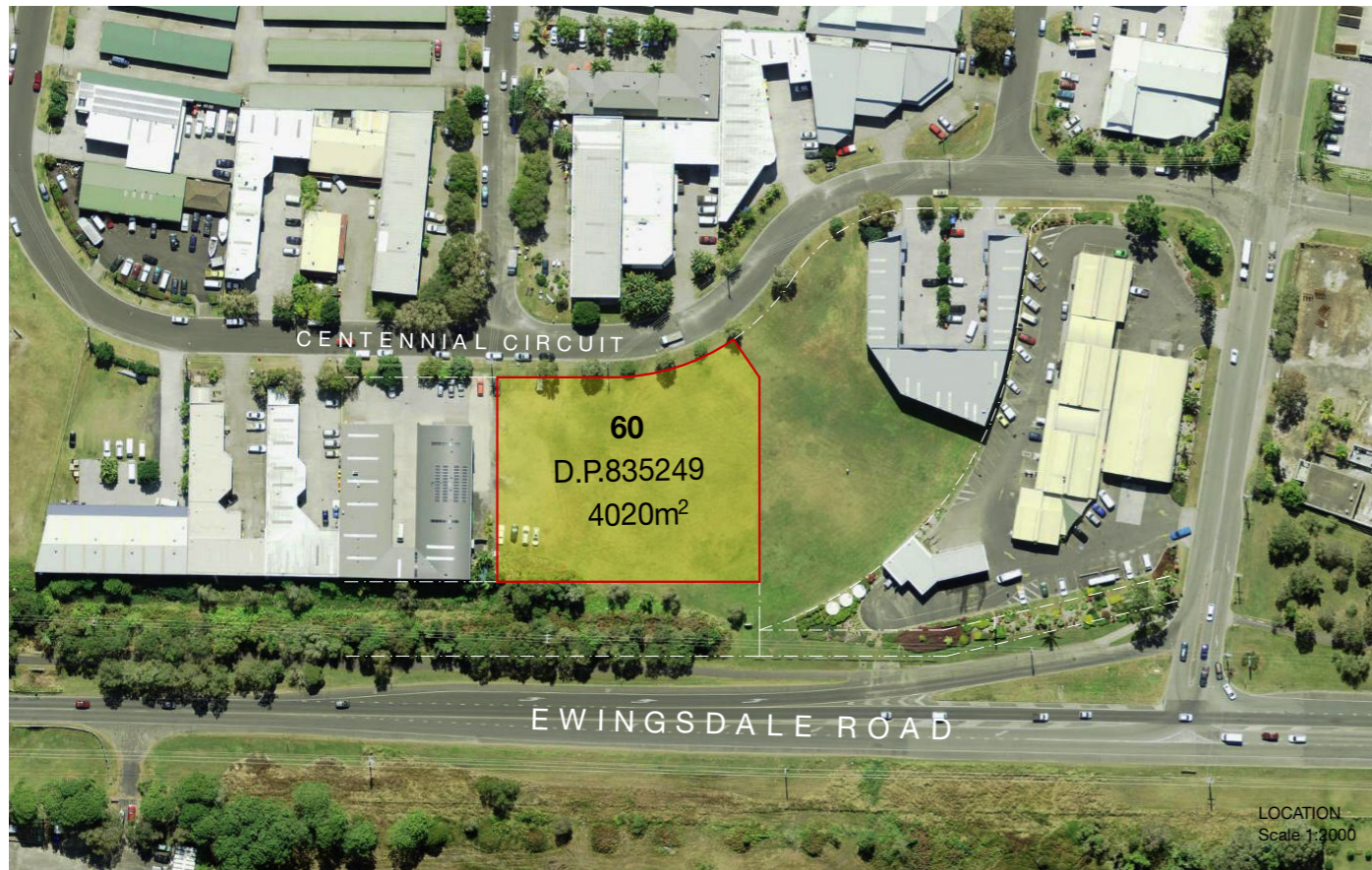
LOT 60 CENTENNIAL CIRCUIT  
BYRON BAY NSW 2481

### DRAWING SCHEDULE

ISSUE	No	NAME	SCALE
	01	DRAWING LIST / LOCATION / SITE PLAN	1:2000 / 1:500
	02	AREA AND USES	1:500
	03	LEVEL 00	1:200
	04	LEVEL 01	1:200
	05	PARKING AND ACCESS	1:200
	06	SECTIONS	1:200
	07	ELEVATIONS	1:200

### FLOOR SPACE RATIO AREAS

ZONE NAME	AREA	SITE AREA	FSR
INDUSTRIAL SPACES	1,562m <sup>2</sup>	4020m <sup>2</sup>	<b>38.8%</b>
CHILD CARE AREA	861m <sup>2</sup>	4020m <sup>2</sup>	<b>21.4%</b>
<b>TOTAL</b>	<b>2,423m<sup>2</sup></b>	<b>4020m<sup>2</sup></b>	<b>60.2%</b>



**SITE PLAN**  
SCALE : 1:500 @A3

### PLANNER

#### NDC - NEWTON DENNY CHAPELLE

Suite 1/31 Carrington Street, Lismore  
Post: PO Box 1138 Lismore NSW 2480  
T: 02 66221 011  
F: 02 6622 4088  
M: 0438 862 856  
e. dchappelle@newtondennychapelle.com.au



SCALE : 1:500 @A3

LEVEL 00

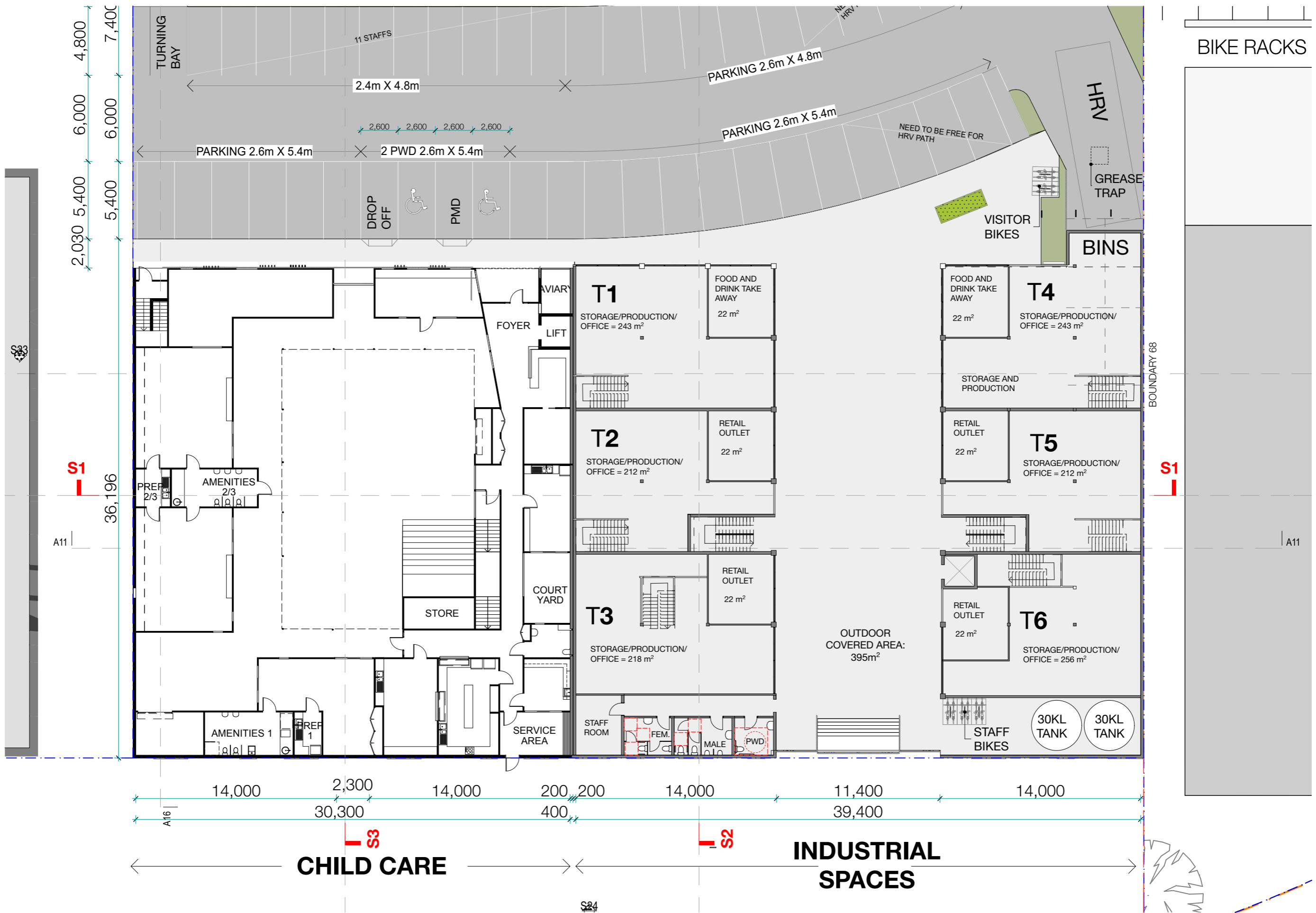


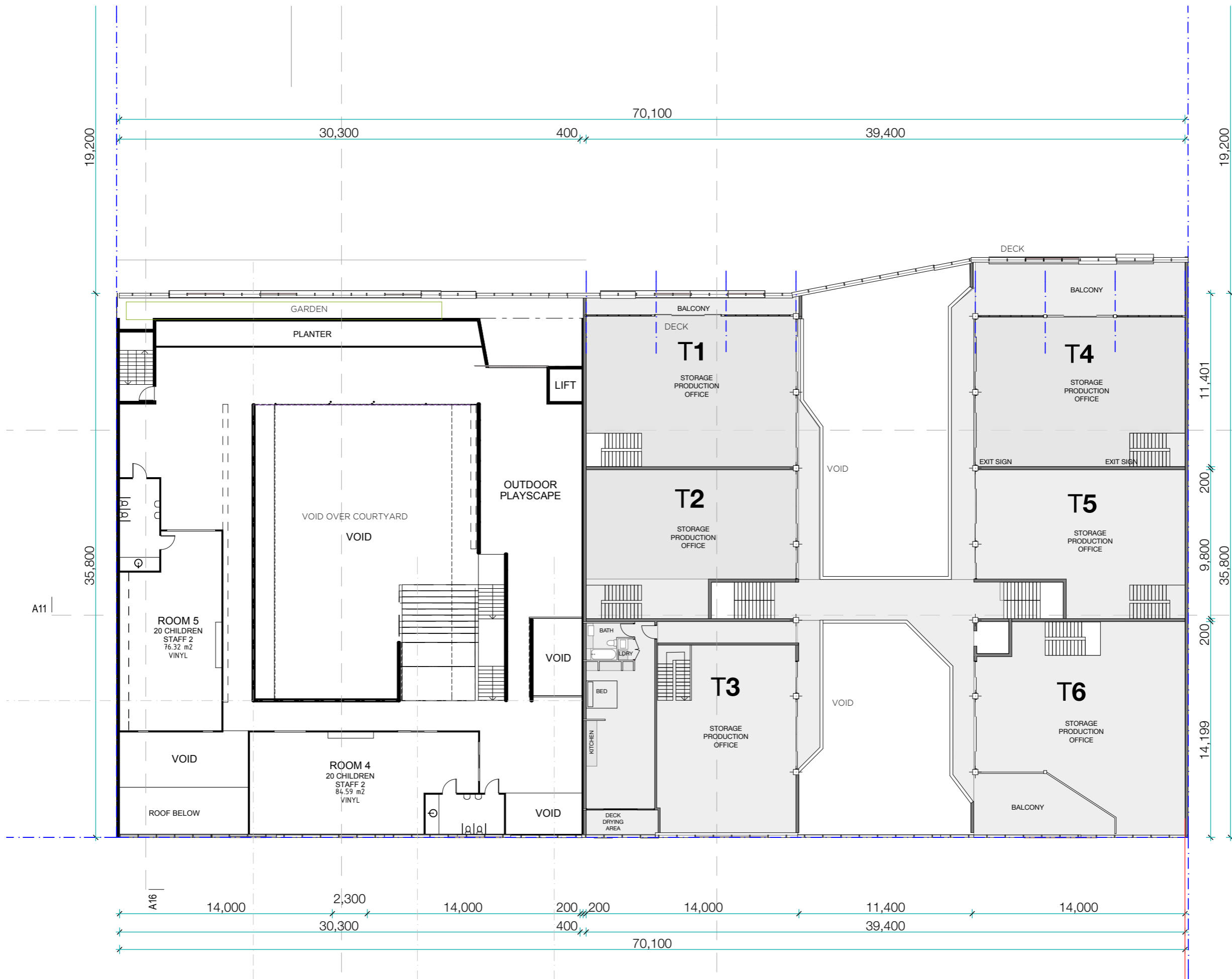
SCALE : 1:500 @A3

LEVEL 01

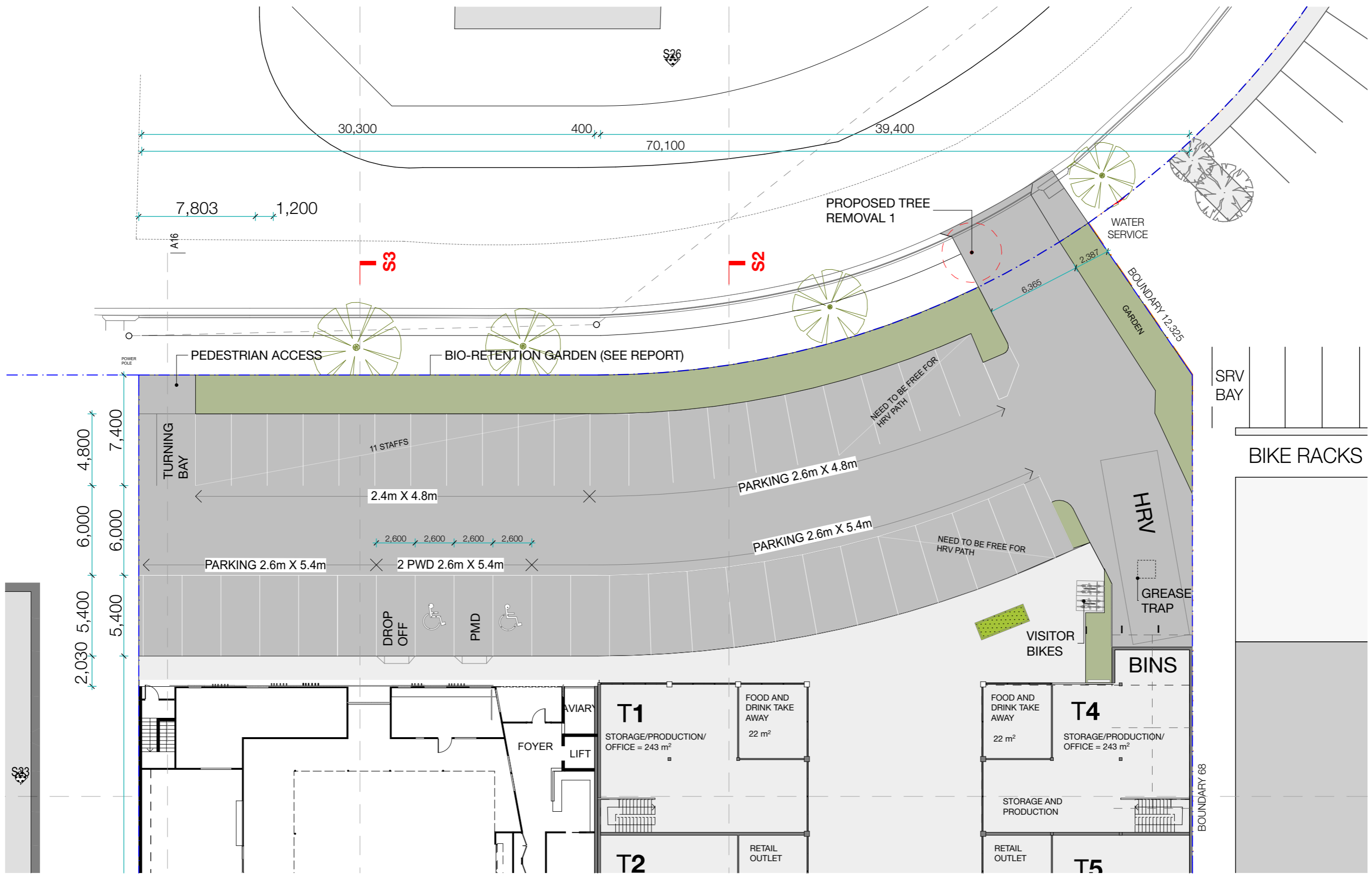
### INDUSTRIAL SPACES

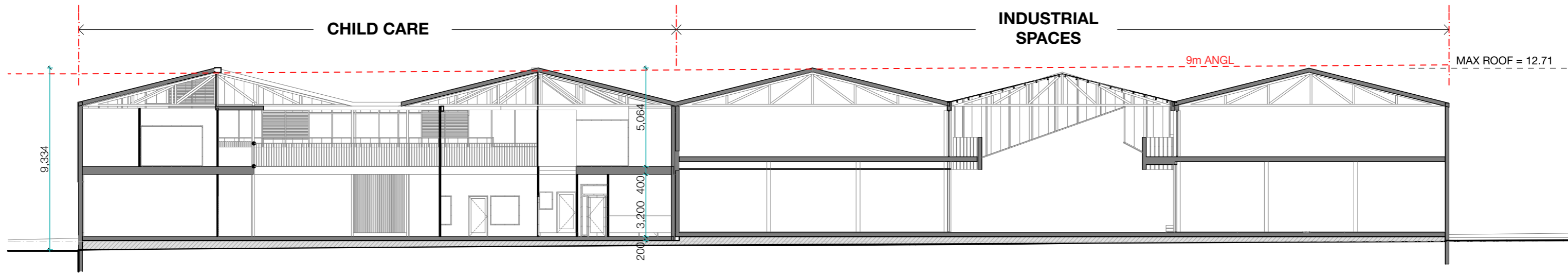
LEVEL 0	
INDUSTRIAL	680 m <sup>2</sup>
RETAIL	88 m <sup>2</sup>
TAKE AWAY	44 m <sup>2</sup>
WC	40 m <sup>2</sup>
LEVEL 1	
INDUSTRIAL	710 m <sup>2</sup>
MANAGER RESIDENCE	56 m <sup>2</sup>
DECK	140 m <sup>2</sup>
<b>TOTAL GFA</b>	<b>1,562 m<sup>2</sup></b>



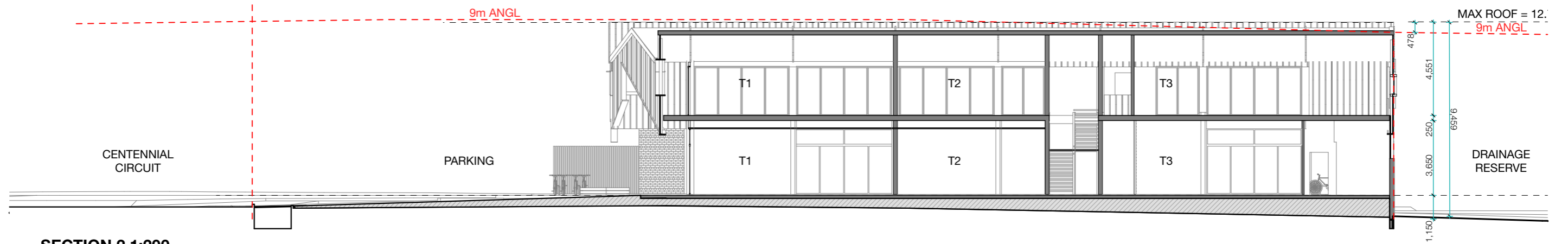


LEVEL 01  
Scale 1:250

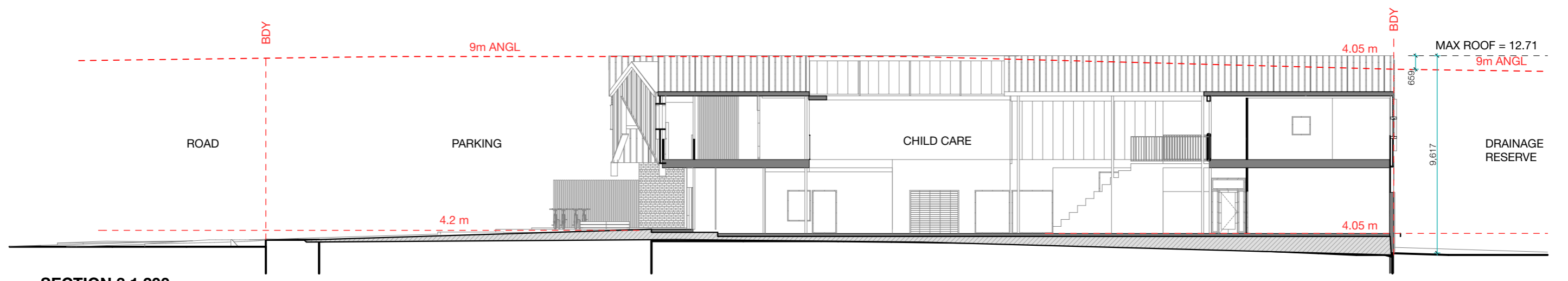




SECTION 1 1:200



SECTION 2 1:200



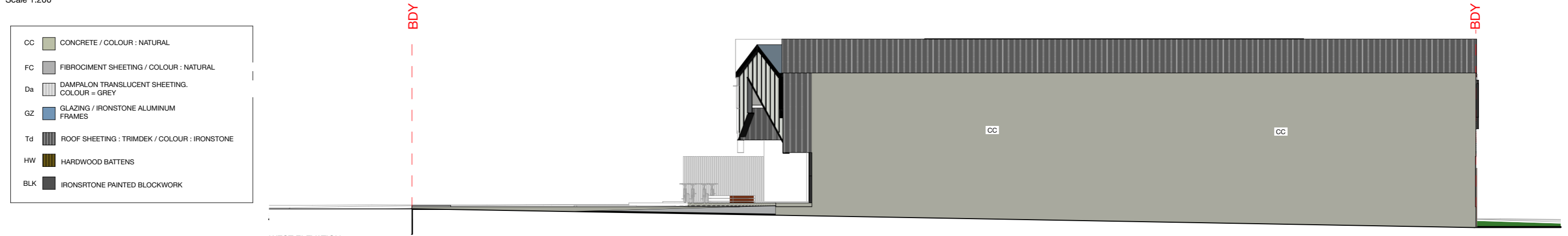
SECTION 3 1:200



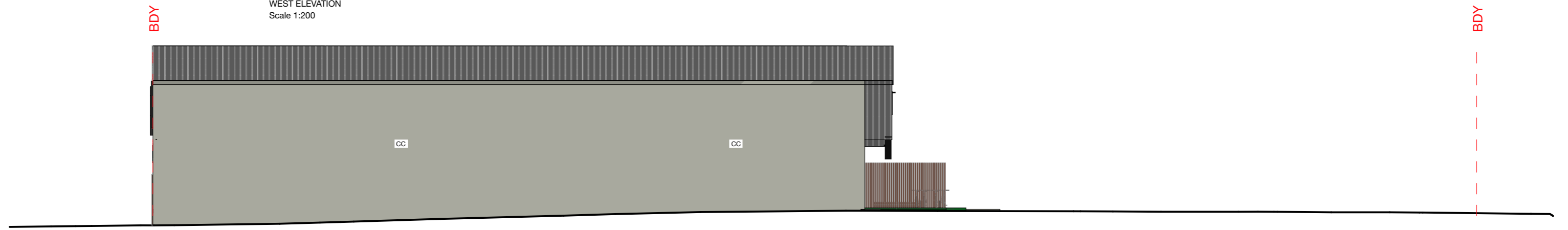
NORTH ELEVATION  
Scale 1:200



SOUTH ELEVATION  
Scale 1:200



WEST ELEVATION  
Scale 1:200



EAST ELEVATION  
Scale 1:200

CC	CONCRETE / COLOUR : NATURAL
FC	FIBROCIMENT SHEETING / COLOUR : NATURAL
Da	DAMPALON TRANSLUCENT SHEETING. COLOUR = GREY
GZ	GLAZING / IRONSTONE ALUMINUM FRAMES
Td	ROOF SHEETING : TRIMDEK / COLOUR : IRONSTONE
HW	HARDWOOD BATTENS
BLK	IRONSTONE PAINTED BLOCKWORK

**HGA** X **LOCAL OFFICE ARCHITECTURE**

LEVEL 1/ 144 JONSON STREET BYRON BAY | PO BOX 1285 NSW 2481  
F: 02 66809820 | T: 02 66809690 | E: office@harleygraham.com ABN: 85158246003 NSW 7892

All building works to be carried out in accordance with the Building Code of Australia (BCA) and to the satisfaction of the principle certifying authority.  
Builders/Contractors are to verify all dimensions prior to commencement of site work or off-site fabrication.  
Figured dimensions take precedence - do not scale.  
© Copyright HARLEY GRAHAM ARCHITECTS

ISSUE/REVISIONS	
A	DA SET
	21.12.16

CLIENT	DENWOL DEVELOPMENTS	ADDRESS	LOT 60 CENTENNIAL CIRCUIT BYRON BAY	APPROVED: HG	JOB NO: HGA048
JOB NAME	MIXED USED BUILDING + CHILD CARE	LOT + DP	LOT 60 SP 835249	SCALE	PAPER
DRAWING	ELEVATIONS			1:200	A3
				DA	07
					A



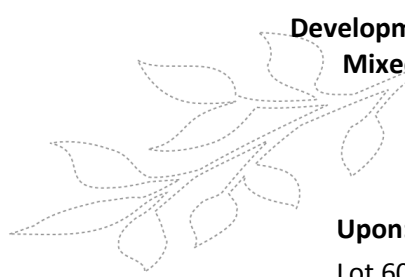
## **ATTACHMENT 2**

**Engineering Services Report**

***Newton Denny Chapelle***

# Engineering Services Report

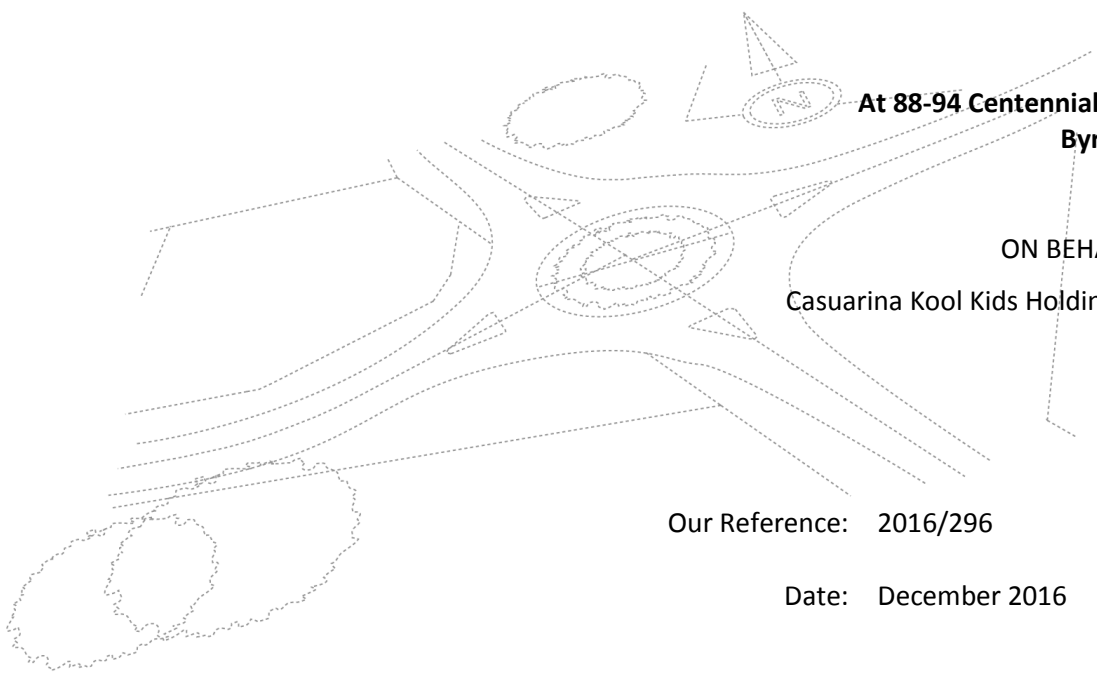
**Development Application for  
Mixed Use Development**



**Upon:**

Lot 60 DP 835249

**At 88-94 Centennial Circuit  
Byron Bay**



ON BEHALF OF:

Casuarina Kool Kids Holding Trust

Our Reference: 2016/296

Date: December 2016

  
**Newton Denny Chapelle**  
CONSULTING SURVEYORS & PLANNERS

Revision History				
REVISION #	DATE	DESCRIPTION	ORIGINATOR	APPROVED
A	01/02/2017	Issued for DA	CP	JN

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NSW 2480

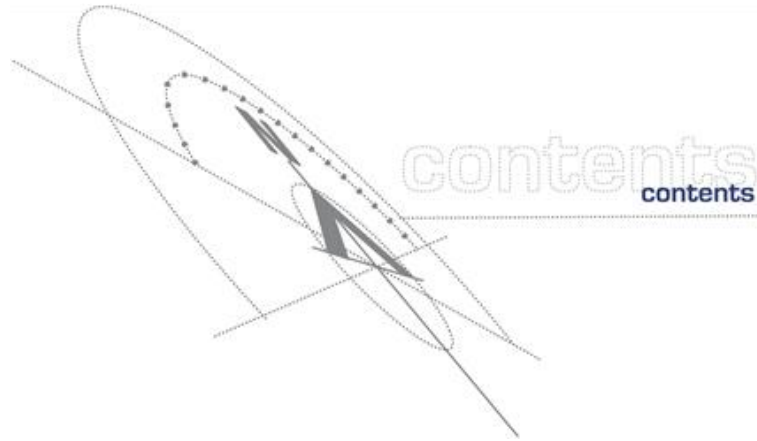
Telephone: (02) 6622 1011

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<http://www.newtondennychapelle.com.au>





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## Appendices

### Appendix A

#### Concept Engineering Plans:

Drawing Number:	Title:
DA-CIV-01	Bulk Earthworks Plan
DA-CIV-02	Bulk Earthworks Section – West to East
DA-CIV-03	Bulk Earthworks Section – North to South
DA-CIV-04	Bioretention Typical Section
DA-CIV-05	Engineering Services Plan
DA-CIV-06	Erosion & Sediment Control Plan
DA-CIV-07	Stormwater Catchment Plan

## Executive Summary

This Engineering Services Report is to accompany the Development Application seeking approval for a mixed use development comprising of industrial retail (inclusive of retail and takeaway food), managers residence and a childcare centre (78 children). The development is located within the Byron Arts and Industry Estate at 88-94 Centennial Circuit, Byron Bay (Lot 60 DP 835249). The site is approximately 4020m<sup>2</sup> in size.

This report details the engineering design elements required for the development to comply with the relevant approvals, polices, standards and regulations required for a residential development in the Byron Shire Council Local Government Area. The following components have been assessed:

- Bulk Earthworks – The site will be filled to a maximum depth of 1.2m with retaining walls to be provided on the boundaries.
- Stormwater Attenuation – Stormwater attenuation for the 1 in 100 year event has been provided for the site. 112m<sup>3</sup> of attenuation storage will be provided as part of the development to ensure the pre development storm flows from the site are not exceeded.
- Stormwater Quality – MUSIC modelling has demonstrated that the proposed treatment train for the site (including a bioretention system and litter baskets) achieves the pollutant reduction targets.
- Water Reticulation – The site will be connected to the existing water reticulation network within Centennial Circuit
- Sewer Reticulation – Sewer will be provided for the site via the existing vacuum sewer pod within the site.
- Electrical and Telecommunications – The site will be connected to the existing Telstra and Essential Energy infrastructure within Centennial Circuit. The existing power pole stay within the site will be relocated.
- Section 64 Contributions – Water and Sewer Contributions have been estimated at approximately \$415,900 in accordance with the Equivalent Tenement rates provided by Byron Shire Council.

## 1 Introduction

Newton Denny Chapelle has been engaged to prepare an Engineering Services Report to accompany the Development Application a mixed use development comprising of industrial retail (inclusive of retail and takeaway food), managers residence and a childcare centre, located at 88 – 94 Centennial Circuit (Lot 60 DP 835249) Byron Bay. The total development site is approximately 4020m<sup>2</sup>.



Figure 1-1 – Site Location (Source: nearmap)

## 2 Report Scope

This report focuses on providing sufficient concept engineering concepts/details to facilitate a thorough understanding of the proposed works. The works covered by this report include new infrastructure for stormwater (quality and attenuation), earthworks and servicing provisions for the proposed development.

It is recognised that a subsequent submission of detailed (construction certificate) engineering design plans and specifications are required to be made before final approval of the development is granted by Byron Shire Council. At this Stage any minor amendments of the design elements proposed will be addressed to meet any of the Council's requirements.

### 2.1 Reference Documents

The following documents have been referenced in the preparation of this report:

- Northern Rivers Local Government, *Development Design Manual*
- Byron Shire Council, *Comprehensive Guidelines for Stormwater Management*
- Byron Shire Council, *Development Control Plan 2014 – Chapter D5 – Industrial Development*
- Lismore City Council, *Development Control Plan – Water Sensitive Design*

## 3 Site Description

### 3.1 Existing Site Conditions

The site primarily consists of cleared land and forms part of the Byron Bay arts and industrial estate, refer Figure 3-1.



**Figure 3-1 - View looking South to North Across the Site**

The subject land is gently sloping with a minor ridgeline running east to west across the site from the eastern boundary. This ridgeline divides the site into 3 catchments flowing to the north, south and west boundaries. The maximum slope across the site is less than 2%. The areas surrounding the site can be summarised as:

- Northern Boundary – Is formed by Centennial Circuit.
- Eastern Boundary – Is currently formed by a vacant industrial lot. It is noted that there is currently a development application approved for the construction of a brewery on the site
- Southern Boundary – Is formed by a drainage reserve adjacent to Ewingsdale Road. This reserve contains an existing drainage swale that drains east to west.
- Western Boundary – Is formed by and existing industrial development.

### 3.2 Description of Proposed Development

The proposed development will consist of:

- 78 place child care centre (comprising 78 children and 12 staff)
- 1,390m<sup>2</sup> of Industrial floor area
- 88m<sup>2</sup> of retail area
- 44m<sup>2</sup> of take way shops
- 1 managers residence

The proposed development areas outlined above are split over two levels with access to the development from Centennial Circuit.

## 4 Bulk Earthworks

The site will be shaped to maintain the existing crest running east to west across the site. To create suitable building pads and to enable the connection of the stormwater system to existing Council infrastructure the site will be filled to achieved the finished levels shown on the Bulk Earthwork Plan (attached in Appendix A). Retaining structures will be required along the eastern, western and southern boundaries with a maximum height of 1.2m along the southern and western boundaries expected.

The works are expected to require 1,650m<sup>3</sup> of fill material to a maximum depth of 1.2m adjacent to the retaining structures.

## 5 Stormwater Management

The Stormwater generated by the development will be collected and treated prior to discharge from the site. The proposed stormwater system has been designed in accordance with the *Byron Shire Council – Comprehensive Guidelines for Stormwater Management*.

Stormwater attenuation has been provided to ensure that there is no increase in post development flows leaving the site for a range of events up to the 100 year ARI. This in in accordance with the requirements outlined in the *Byron Shire Council – Comprehensive Guidelines for Stormwater Management* and the *NRLG Development and Design Manual*.

In the absence of Byron Shire stormwater quality targets the targets outlined in the *Lismore Development Control Plan – Water Sensitive Design* (refer Figure 5-1) have been adopted for the development.

Stormwater Quality		
Total Suspended Solids	75% reduction in the mean annual load compared to baseline	Minimise the risk of water quality degradation in downstream waterways and thereby protect aquatic ecosystems
Total Phosphorus	65% reduction in the mean annual load compared to baseline	
Total Nitrogen	40% reduction in the mean annual load compared to baseline	
Gross Pollutants	90% reduction in the mean annual load compared to baseline	

Figure 5-1 - LCC Stormwater Quality Targets

### 5.1 Stormwater Quality

The stormwater generated by the development will be treated prior to discharge to achieve the pollutant reduction targets outlined in Figure 5-1. The site has been split into 3 post development catchments (also refer to the Stormwater Catchment Plan attached in Appendix A):

- The front Carpark draining north
- The Child Care Centre draining south
- The Industrial area draining south

The treatment train for each catchment is summarised in Table 5-1. Figure 5-1

**Table 5-1 - Summary of Proposed Treatment Train**

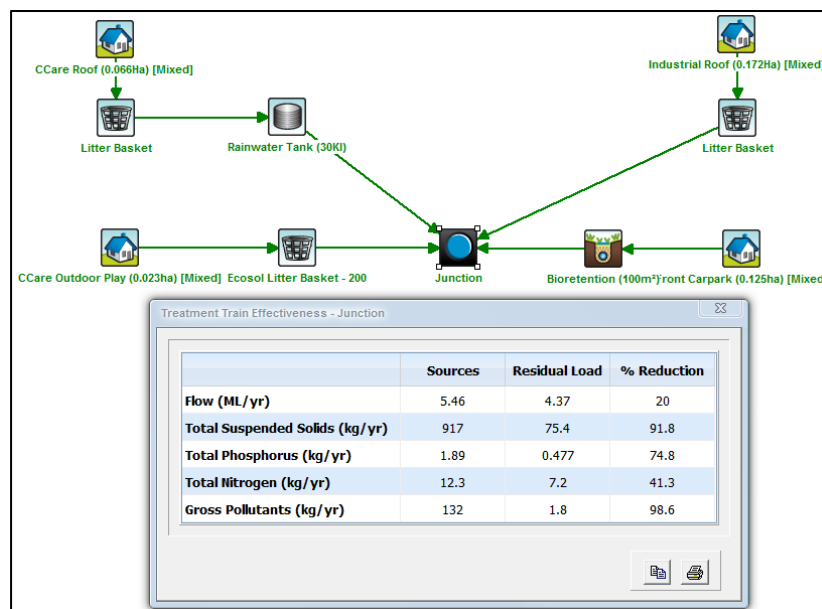
Catchment	Treatment Train
Front Carpark	Bioretention (100m <sup>2</sup> )
Industrial Area	Litter Basket
Child Care Centre	Litter Basket Rainwater Re-use (30kl)

It is important to note that the bioretention system for the front carpark has been oversized for the catchment area to compensate for other areas of the site. Rainwater re-use for the Child Care Centre has been modelled as 30% of the expected sewer demand of the centre. The sewer generation rate for the site has been based on the daily sewer ET of 590 l/day from *BSC Policy 13/005 – Water and Sewer Equivalent Tenements* (refer Table 5-2).

**Table 5-2 - Childcare Centre Rainwater Re-use**

Area	Sewer ET Unit rate	Unit of Measure	Qty	Total Daily Discharge to Sewer (l)	Re-use Percentage	Reuse amount (kl/day)
Childcare Centre	0.1	person	100	5900	30%	1.77

The MUSIC Model for the site presented in Figure 5-2 demonstrates that the proposed treatment train is able to achieve the pollutant reduction targets for the site.



**Figure 5-2 - MUSIC Model**

## 5.2 Stormwater Attenuation

Stormwater generated by the development will be attenuated prior to discharge to ensure the post development flows do not exceed the pre development flows generated by the site. The pre and post development catchments are shown on the Stormwater Catchment Plan attached in Appendix

A. The pre development site primarily drains into two catchments being north towards Centennial Circuit and south towards into the drainage swale beside Ewingsdale Road. The post development site also drains into two primary catchments with the carpark area draining north to Centennial Circuit and the Industrial area and Child Care centre draining south to Ewingsdale Road.

In accordance with Section 12 of the Northern Rivers Handbook of Stormwater Drainage Design the site has been modelled using the ILSAX method via the Drains software program. The 5, 20 and 100 year storm events have been checked to ensure the pre development flows are not exceeded.

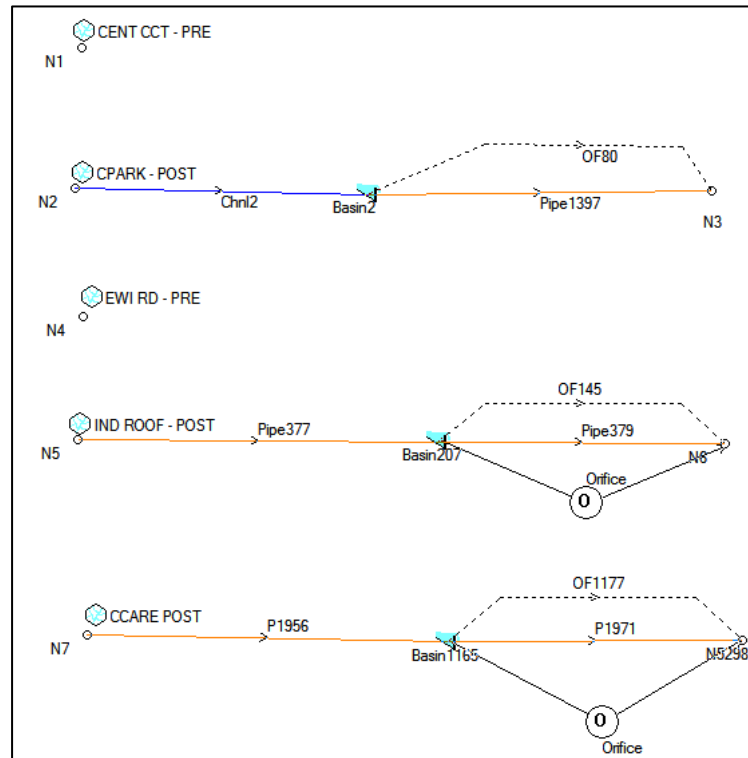


Figure 5-3 - Excerpt from Drains Model

Each catchment has been provided with attenuation storage as outlined in Table 5-3.

Table 5-3 - Attenuation Storage Volumes

Catchment	Attenuation Storage Required
Northern Catchment	24m <sup>3</sup>
Southern Catchment (Child Care)	28m <sup>3</sup>
Southern Catchment (Industrial)	60m <sup>3</sup>

The results from the Drains model are attached in Appendix B and are summarised below in Table 5-4.

Table 5-4 - Summary of Drains Results

	Pre Development (m <sup>3</sup> /s)			Post Development (m <sup>3</sup> /s)		
	5 yr	20 yr	100 yr	5 yr	20 yr	100 yr
Northern Catchment	0.051	0.069	0.087	0.040	0.043	0.077
Southern Catchment	0.067	0.091	0.115	0.067	0.086	0.101

As shown above the attenuation storage proposed for the site is adequate to ensure that the post development stormwater discharges do not exceed the pre development case.

## **6 Sewer Services**

The site will be connected to the existing vacuum sewer network within the greater industrial estate. The point of connection will be via the existing vacuum sewer pod stub line located within the site. The access lid to this pod will be upgraded to a trafficable lid as necessary.

## **7 Water Reticulation**

The site will be connected to the existing water reticulation network within Centennial Circuit. Should the stub line provided to the site be missing or redundant a new feed from the water main on the northern side of Centennial Circuit will be installed to service the site.

## **8 Electrical and Telecommunication Services**

The site has two existing connection points to the Telstra network located in the middle of the northern boundary. It is expected that the electrical feed for the site will come from the existing overhead supply network within Centennial Circuit via an underground pipe from the existing pole in front of the site. The works will require the relocation of the existing stay from this power pole outside of the site boundaries.

## **9 Sediment and Erosion Control Plan**

During construction sediment and erosion control measures will be installed to ensure the loss of soil from the site is minimised. Refer to Appendix A – Erosion and Sediment Control Plan for the proposed site control measures. Temporary sediment and erosion control measures such as silt fencing are the responsibility of the Contractor and will be installed prior to construction.

## **10 Section 64 Contributions**

The water and sewer contributions for the proposed development have been calculated based on the Equivalent Tenement (ET) rates outlined in the Byron Shire Council Policy 13/005 Water and Sewer Equivalent Tenements. The total water and sewer ET's expected for the site are outlined in Table 10-1.

**Table 10-1 - Water and Sewer Equivalent Tenements**

Type of Use	Water ET	Sewer ET	Unit of Measure	Quantity	Total Water ET's	Total Sewer ET's
Managers Residence	0.40	0.50	Dwelling	1	0.4	0.5
Child Care Centre	0.06	0.10	Person	100	6	10
Light Industrial (Mixed use)	0.003	0.003	m <sup>2</sup>	1390	4.17	4.17
Take Away / Fast Food	0.02	0.02	m <sup>2</sup>	44	0.88	0.88
Retail	0.003	0.003	m <sup>2</sup>	88	0.264	0.264
Public Amenities	0.40	0.63	per WC	7	2.8	4.41
Existing Site Entitlement	-1.00	-1.00		1	-1	-1
				<b>Totals:</b>	<b>13.514</b>	<b>19.224</b>

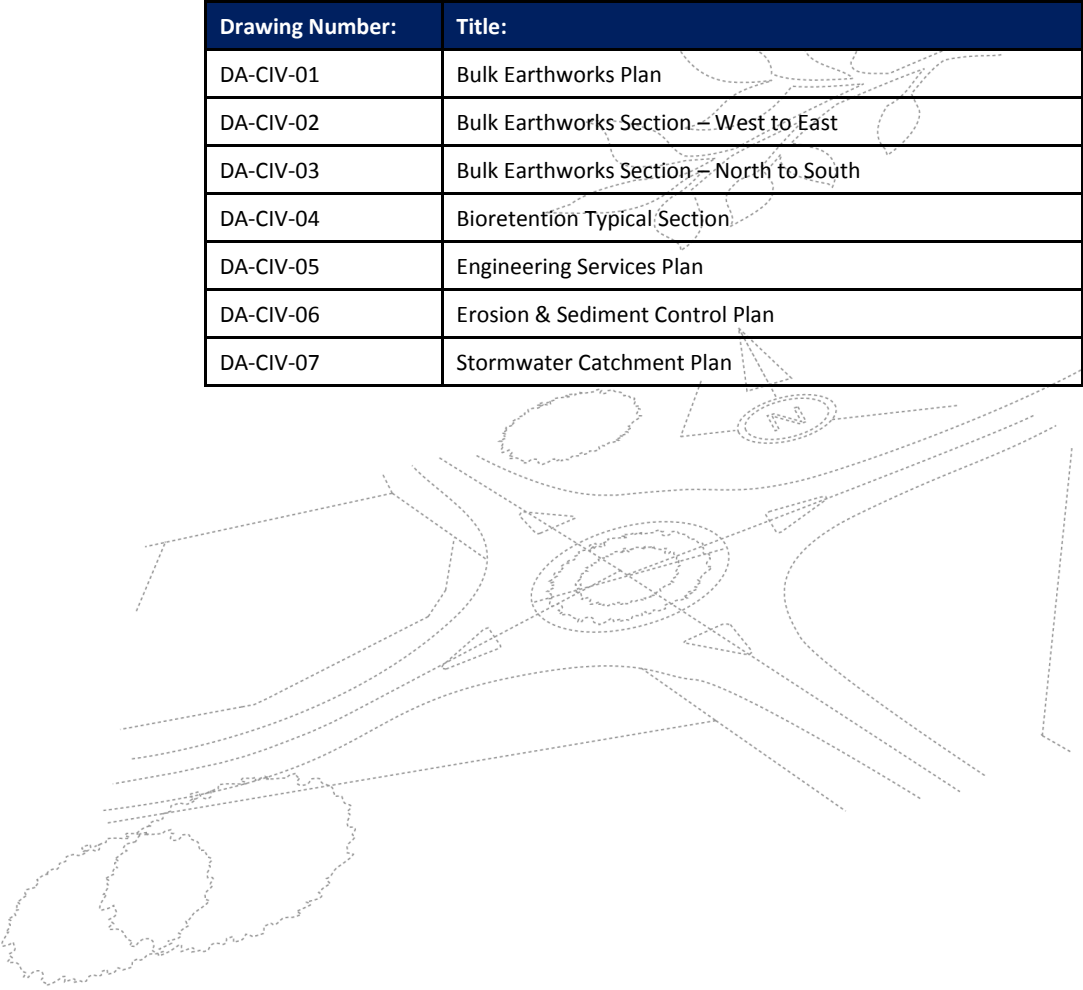
Based on the contribution rates in the Byron Shire Council, *Fees and Charges 2016-2017* the total Section 64 contributions for the site are outlined in Table 10-2.

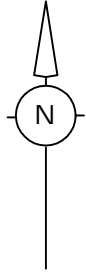
**Table 10-2 - Section 64 Contributions**

Contribution	Qty	Rate (2015/16)	Amount
Water - Byron Bay	13.514	\$ 3,575.00	\$ 48,312.55
Water - Rous	13.514	\$ 8,256.00	\$ 111,571.58
Sewer - Byron Bay	19.224	\$ 13,318.00	\$ 256,025.23
		<b>Total:</b>	<b>\$ 415,909.37</b>

# Appendix A Concept Engineering Plans

Drawing Number:	Title:
DA-CIV-01	Bulk Earthworks Plan
DA-CIV-02	Bulk Earthworks Section – West to East
DA-CIV-03	Bulk Earthworks Section – North to South
DA-CIV-04	Bioretention Typical Section
DA-CIV-05	Engineering Services Plan
DA-CIV-06	Erosion & Sediment Control Plan
DA-CIV-07	Stormwater Catchment Plan





CENTENNIAL

CIRCUIT

B  
DA-CIV03

MAXIMUM CUT 1m TO BASE  
OF BIORETENTION ZONE

NOTE : BIORETENTION AREA TO BE  
BACKFILLED WITH FILTER MEDIA

RETAINING WALL

SP 74049

WALL 0.45m HIGH

A  
DA-CIV02

Lot 59  
DP 835249

A  
DA-CIV02

SECTION A

SECTION B

TEMPORARY TRANSITION BATTER  
(FOR BULK EARTHWORKS PHASE)

LEGEND

- AREA OF SITE EXCAVATION
- AREA OF SITE FILL <1m
- AREA OF SITE FILL >1m
- 4.20 FINISHED SURFACE LEVEL
- 3.33 EXISTING SURFACE LEVEL

MAXIMUM FILL 1.2m

WALL 1.2m HIGH

RETAINING WALL

WALL 1.2m HIGH

RESERVE

WALL 0.9m HIGH

DRAINAGE

B  
DA-CIV03

Rev	Date	Amendment
A		
B		
C		
D		
E		
F		
G		
H		

Design:PS / CP  
 Survey:CANTY'S  
 Drawn:PS  
 Datum:AHD  
 Scale : 1:300@A3

**NDC**

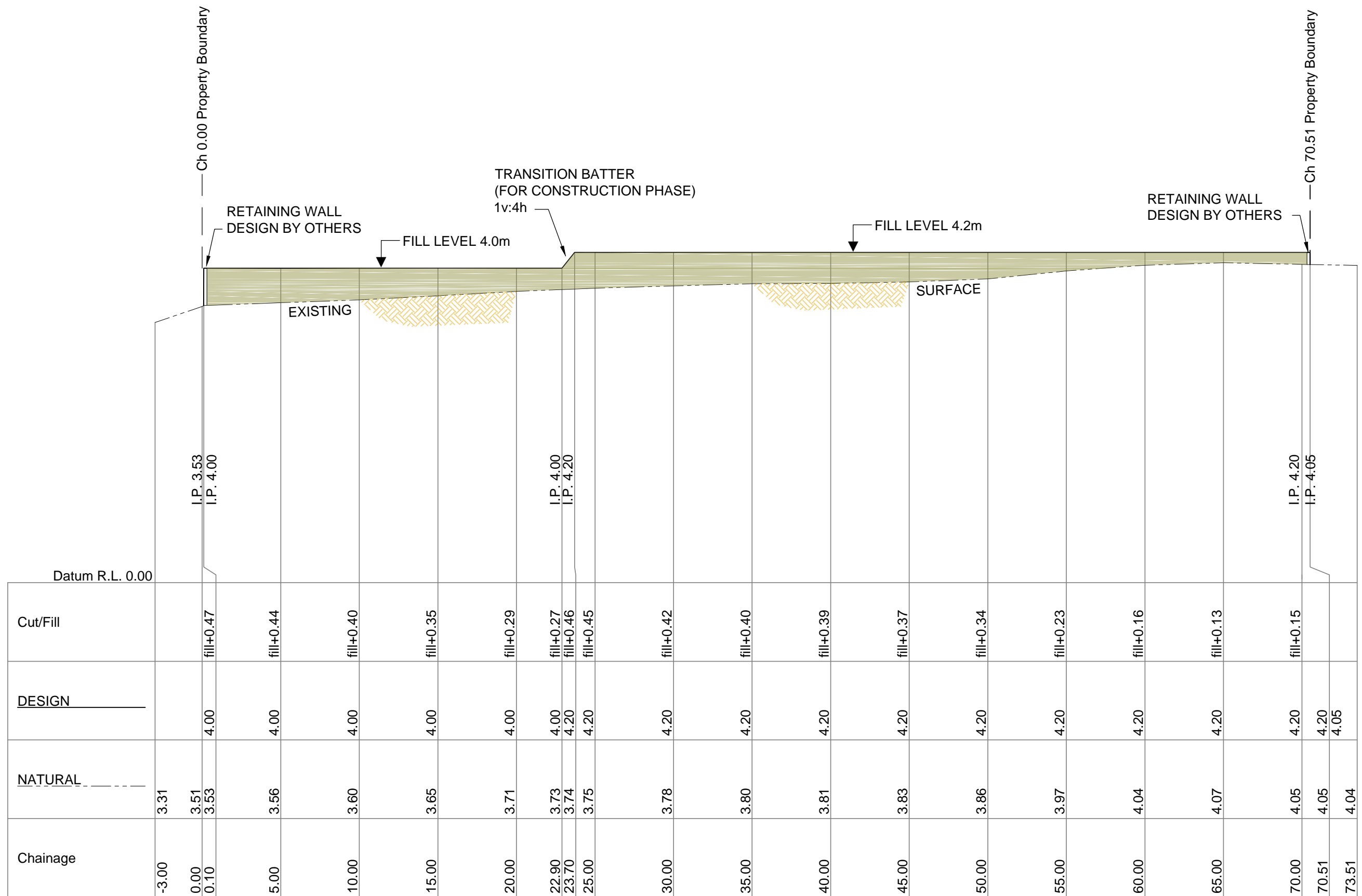
**Newton Denny Chapelle**  
 Surveyors Planners Engineers

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 Casino  
 100 Barker St. Casino 2470  
 T & F : 66 625000

Client:  
**MIXED USE BLD / CHILD CARE**  
**88-94 CENTENNIAL CIRCUIT**  
**BYRON BAY**

Project : Date: 18/01/2017  
**BULK EARTHWORKS PLAN**  
 Ref:16/296 DA-CIV 01



Scale Horizontal 1:250 Vertical 1:50

**SECTION A WEST TO EAST**

Rev	Date	Amendment
A		
B		
C		
D		
E		
F		
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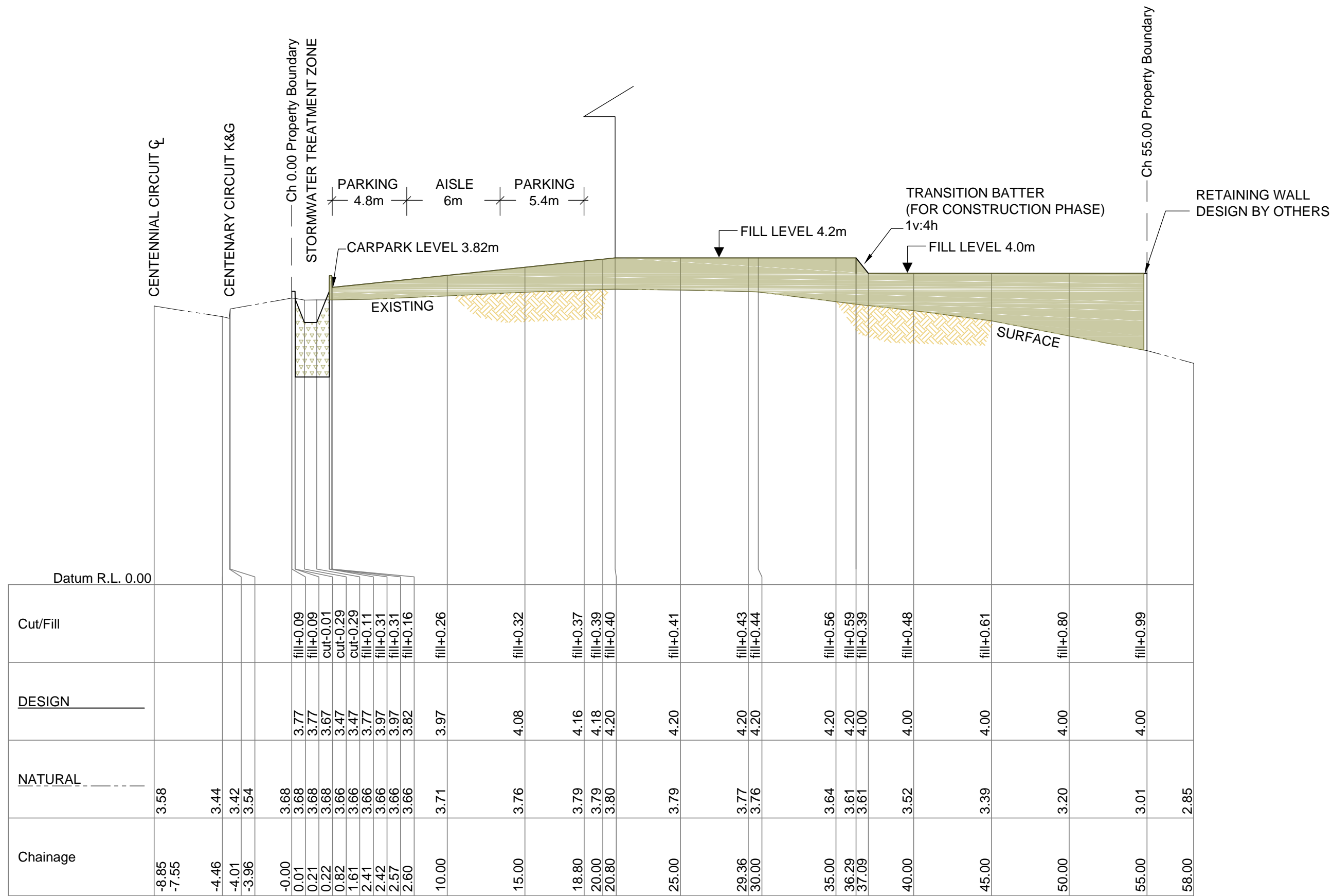
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 Casino  
 100 Barker St. Casino 2470  
 T & F : 66 625000

Client:  
**MIXED USE BLD / CHILD CARE**  
**88-94 CENTENNIAL CIRCUIT**  
**BYRON BAY**

Project : Date: 18/01/2017  
**BULK EARTHWORKS SECTION**  
**WEST TO EAST**  
 Ref:16/296 DA-CIV 02




Scale Horizontal 1:250 Vertical 1:50

	-8.85	-7.55	-4.46	-4.01	-3.96	-0.00	0.01	0.21	0.22	0.82	1.61	2.41	2.42	2.57	2.60	10.00	15.00	18.80	20.00	20.80	25.00	29.36	30.00	35.00	36.29	37.09	40.00	45.00	50.00	55.00	58.00
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DESIGN						3.77	3.77	3.67	3.47	3.47	3.77	3.97	3.97	3.82		3.97	4.08	4.16	4.18	4.20	4.20	4.20	4.20	4.20	4.20	4.00	4.00	4.00	4.00	4.00	
NATURAL	3.58		3.44	3.42	3.54	3.68	3.68	3.68	3.66	3.66	3.66	3.66	3.66	3.66	3.66	3.71	3.76	3.79	3.79	3.80	3.79	3.77	3.76	3.64	3.61	3.61	3.52	3.39	3.20	3.01	2.85
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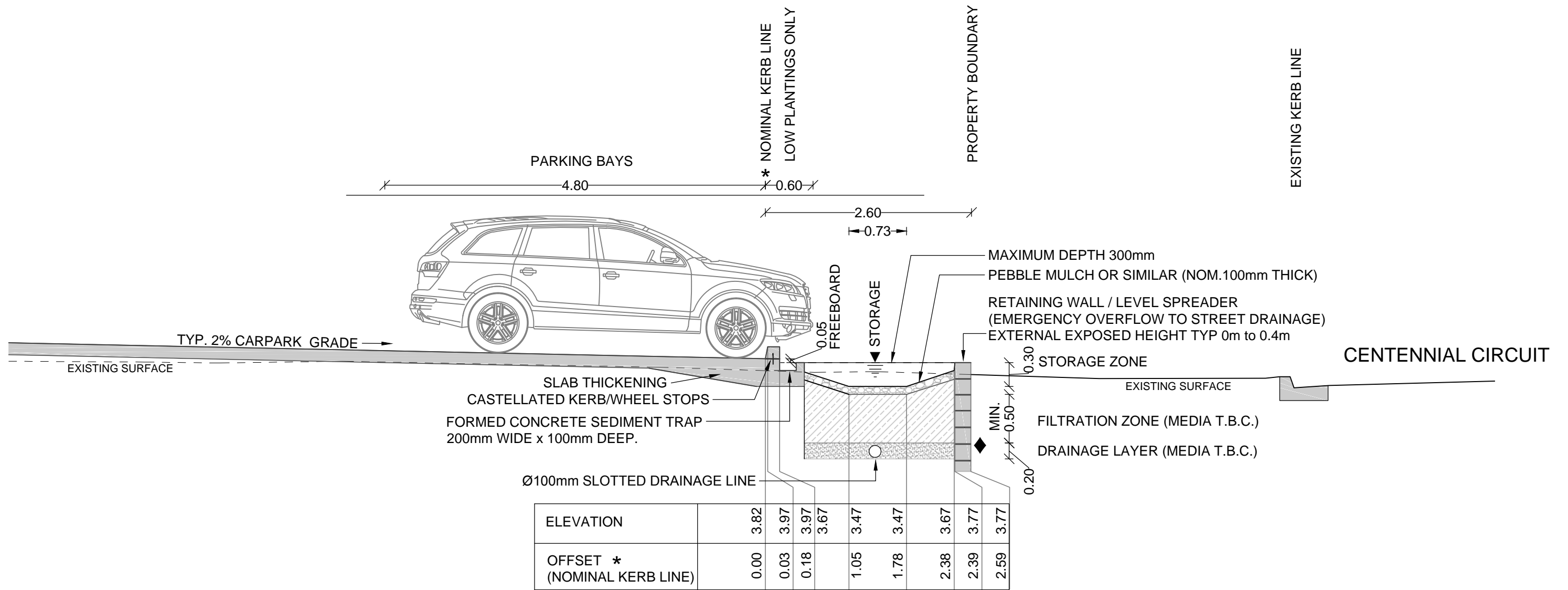
  
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 100 Barker St. Casino 2470  
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Client:  
**MIXED USE BLD / CHILD CARE**  
**88-94 CENTENNIAL CIRCUIT**  
**BYRON BAY**

Project : Date: 18/01/2017  
**BULK EARTHWORKS SECTION**  
**NORTH TO SOUTH**  
 Ref:16/296 DA-CIV 03

◆ DEPTH OF RETAINING WALL TO BE DETERMINED BY STRUCTURAL ENGINEER




TYPICAL SECTION THROUGH BIO RETENTION TREATMENT AREA

NOT FOR CONSTRUCTION

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 Survey:CANTY'S  
 Drawn:PS  
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 100 Barker St. Casino 2470  
 T & F : 66 625000

Client:  
**MIXED USE BLD / CHILD CARE**  
**88-94 CENTENNIAL CIRCUIT**  
**BYRON BAY**

Project :  
**BIORETENTION TYPICAL SECTION**  
 Ref:16/296  
 Date: 18/01/2017  
**DA-CIV 04**

STORMWATER CONNECTION TO EXISTING PIT  
NEW JUNCTION PIT REQUIRED TO AVOID  
CONFLICT WITH POWER POLE. Ø225 uPVC OUTLET

ELECTRICAL CONNECTION  
BY OTHERS

CONNECT TO EXISTING  
WATER SERVICE

CONSTRUCT NRLG COMPLIANT  
CONCRETE DRIVEWAY

CENTENNIAL

CIRCUIT

Ex. SW PIT

PEDESTRIAN ACCESS

O/H POWER LINE

Ex. TELSTRA PIT

CONNECT TO EXISTING  
VACUUM SEWER SERVICE

RELOCATE ELECTRICAL  
POLE STAY

SP 74049

Lot 59  
DP 835249

RETAINING WALL

RETAINING WALL

PROVIDE RAINWATER TANKS  
- 28ki ATTENUATION STORAGE  
- 30ki REUSE \*

PROVIDE RAINWATER TANKS  
- 60ki ATTENUATION \*

STORMWATER OVERFLOW OUTLET.  
Ø225 uPVC TO DRAINAGE RESERVE

STORMWATER OVERFLOW OUTLET.  
Ø225 uPVC TO DRAINAGE RESERVE



RETAINING WALL

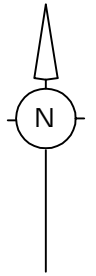
RETAINING WALL

DRAINAGE

RESERVE

LEGEND

-  BIORETENTION AREA
-  NEW EXTERNAL DRIVEWAY
- \* REFER TO ARCHITECTURAL PLANS FOR LOCATION AND TYPE OF TANK



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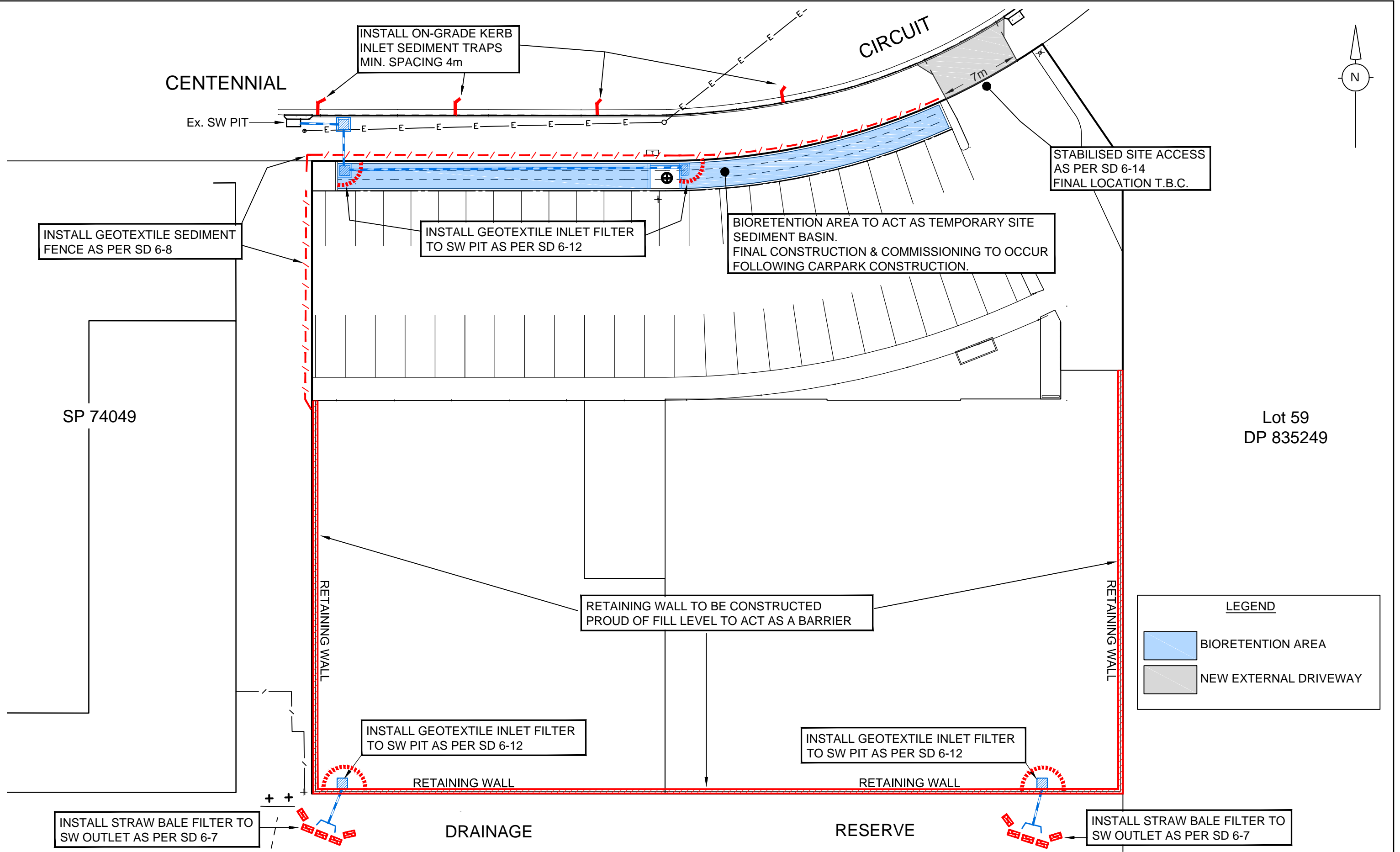
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T & F : 66 625000

Client:  
**MIXED USE BLD / CHILD CARE**  
**88-94 CENTENNIAL CIRCUIT**  
**BYRON BAY**

Project :  
**ENGINEERING SERVICES PLAN**  
Date: 18/01/2017  
Ref:16/296  
**DA-CIV 05**



INSTALL GEOTEXTILE SEDIMENT FENCE AS PER SD 6-8

INSTALL ON-GRADE KERB INLET SEDIMENT TRAPS MIN. SPACING 4m

INSTALL GEOTEXTILE INLET FILTER TO SW PIT AS PER SD 6-12

BIORETENTION AREA TO ACT AS TEMPORARY SITE SEDIMENT BASIN. FINAL CONSTRUCTION & COMMISSIONING TO OCCUR FOLLOWING CARPARK CONSTRUCTION.

STABILISED SITE ACCESS AS PER SD 6-14 FINAL LOCATION T.B.C.

RETAINING WALL TO BE CONSTRUCTED PROUD OF FILL LEVEL TO ACT AS A BARRIER

INSTALL GEOTEXTILE INLET FILTER TO SW PIT AS PER SD 6-12

INSTALL GEOTEXTILE INLET FILTER TO SW PIT AS PER SD 6-12

INSTALL STRAW BALE FILTER TO SW OUTLET AS PER SD 6-7

INSTALL STRAW BALE FILTER TO SW OUTLET AS PER SD 6-7

**LEGEND**

- BIORETENTION AREA
- NEW EXTERNAL DRIVEWAY

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Design:PS / CP  
 Survey:CANTY'S  
 Drawn:PS  
 Datum:AHD  
 Scale : 1:300@A3

**NDC**

**Newton Denny Chapelle**  
 Surveyors Planners Engineers

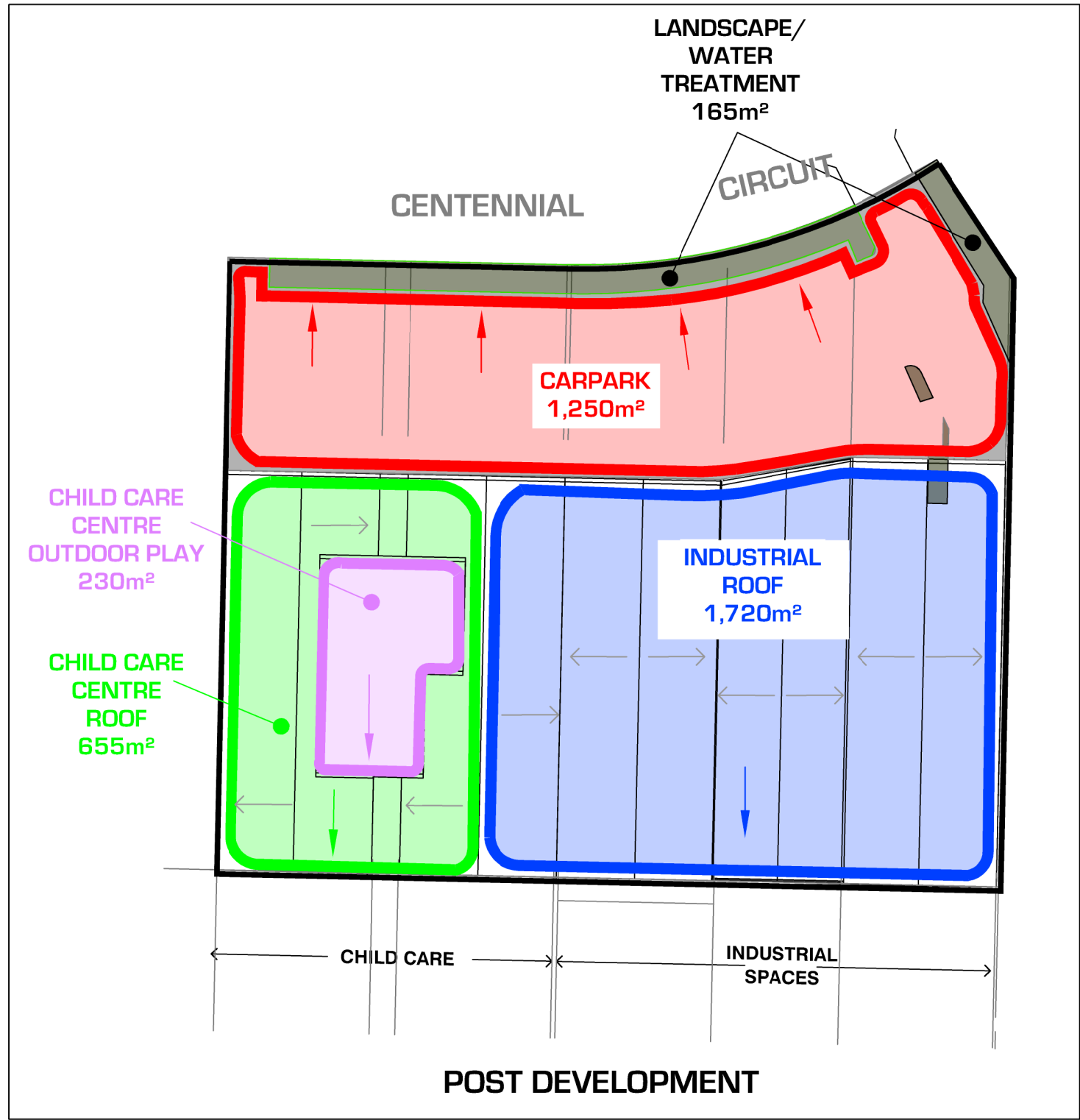
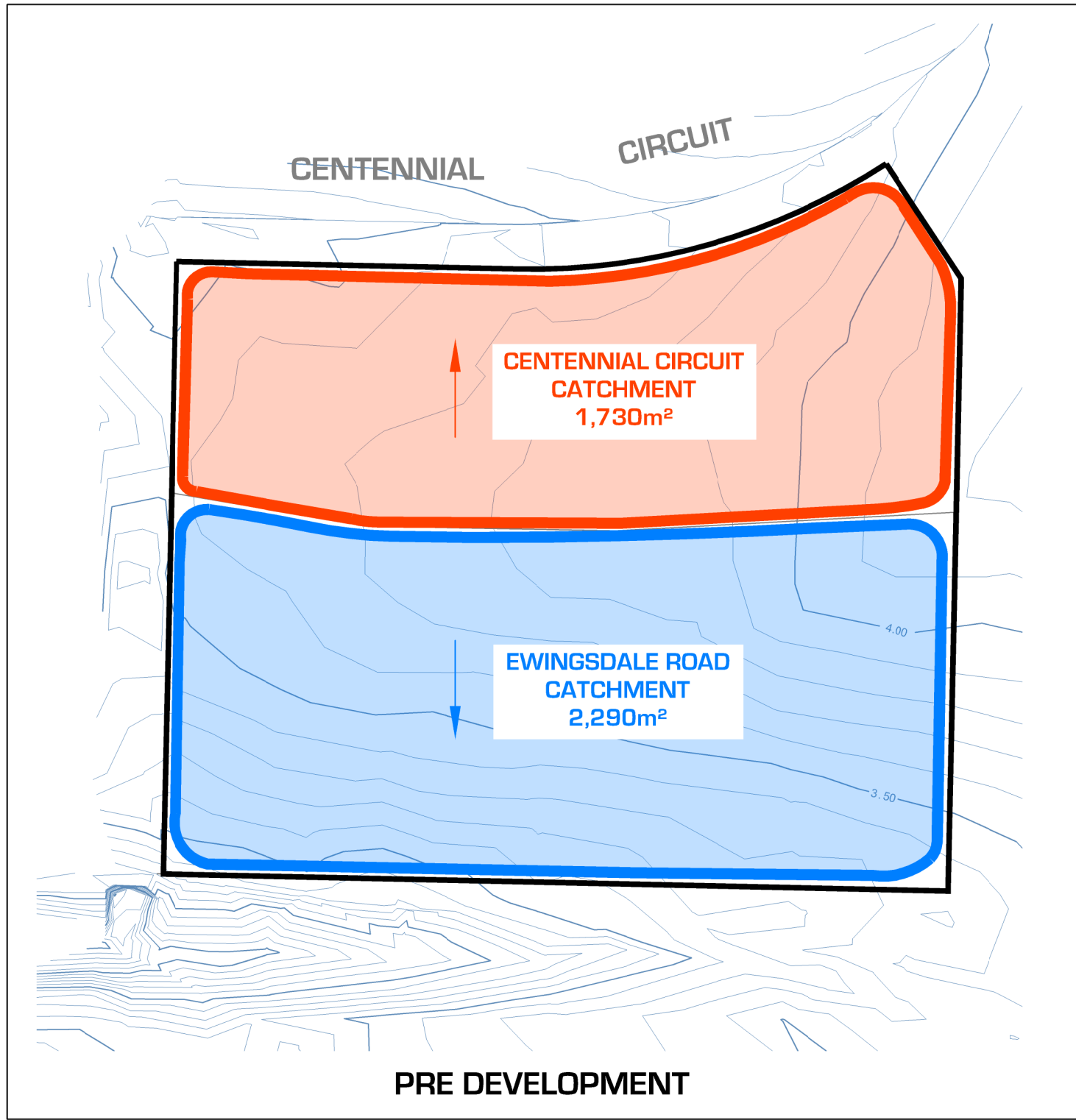
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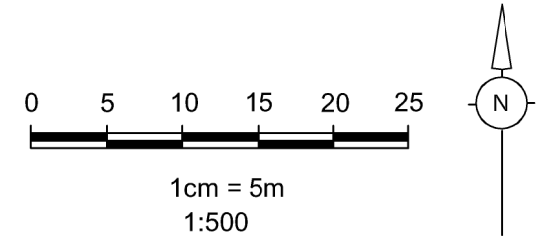
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**MIXED USE BLD / CHILD CARE**  
**88-94 CENTENNIAL CIRCUIT**  
**BYRON BAY**

Project :  
**EROSION & SEDIMENT CONTROL PLAN**

Date: 18/01/2017  
 Ref:16/296  
**DA-CIV 06**



**NOTE:**  
 This preliminary layout has been completed in accordance with the instructions provided by Casuarina Kook Kids Holding Trust. In this respect preliminary desktop data has been used to form this layout. The final layout is subject to the completion of a detailed survey & engineering plans. Accordingly, the conclusions reached within this report may be modified by the author upon the completion of the final design plans & site inspection. Newton Denny Chapelle accepts no responsibility for any loss or damage suffered, however so arising, to any person or corporation who may use or rely on this report.



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SOURCE PLAN: N/A  
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**NDC**  
**Newton Denny Chapelle**  
 Surveyors Planners Engineers  
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 LISMORE 31 Carrington St. Lismore 2480 PH: 6622 1011  
 CASINO 100 Barker St. Casino 2470 PH: 6662 5000  
 ABN: 36 220 045 469

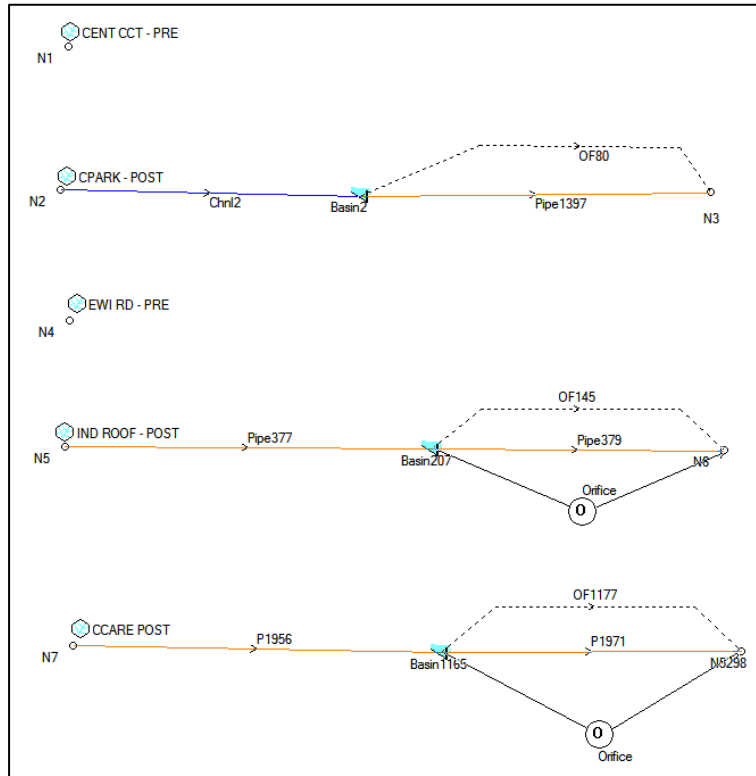
**DA-CIV-07**  
**STORMWATER CATCHMENT PLAN**  
 CLIENT: CASUARINA KOOL KIDS HOLDING TRUST  
 LOCATION: LOT 60 DP835249  
 88 - 94 CENTENNIAL CCT  
 BYRON BAY NSW  
 DATE: 10.01.16 REF: 16/296  
 SCALE: 1: 500 @ A3 DRAWN: bk

© NEWTON DENNY CHAPELLE

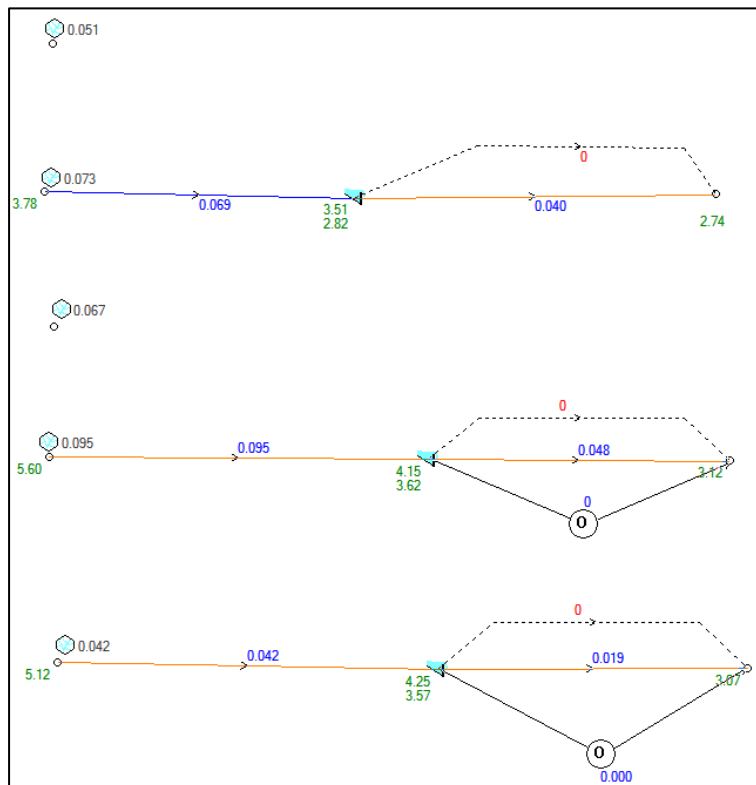
# Appendix B Drains Results



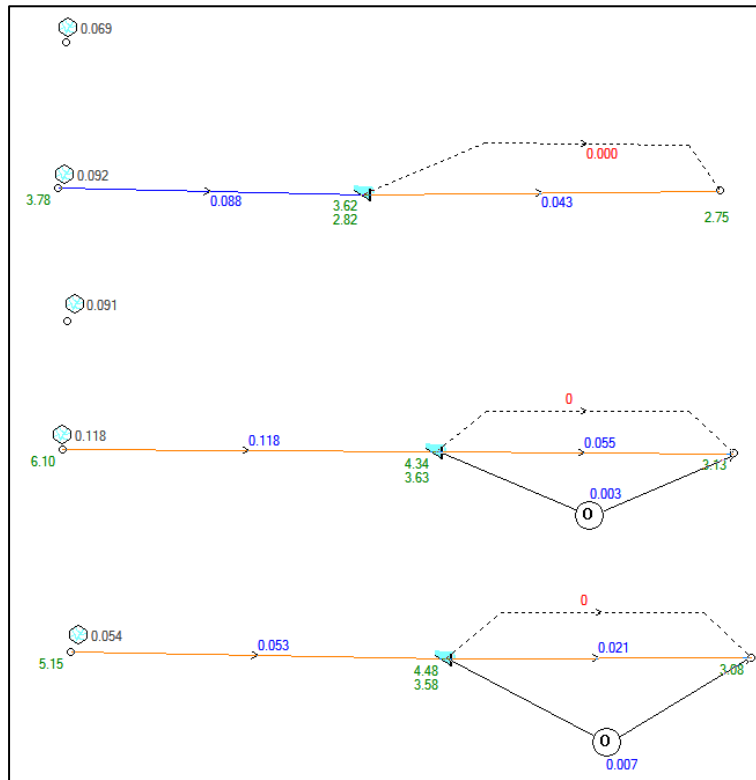
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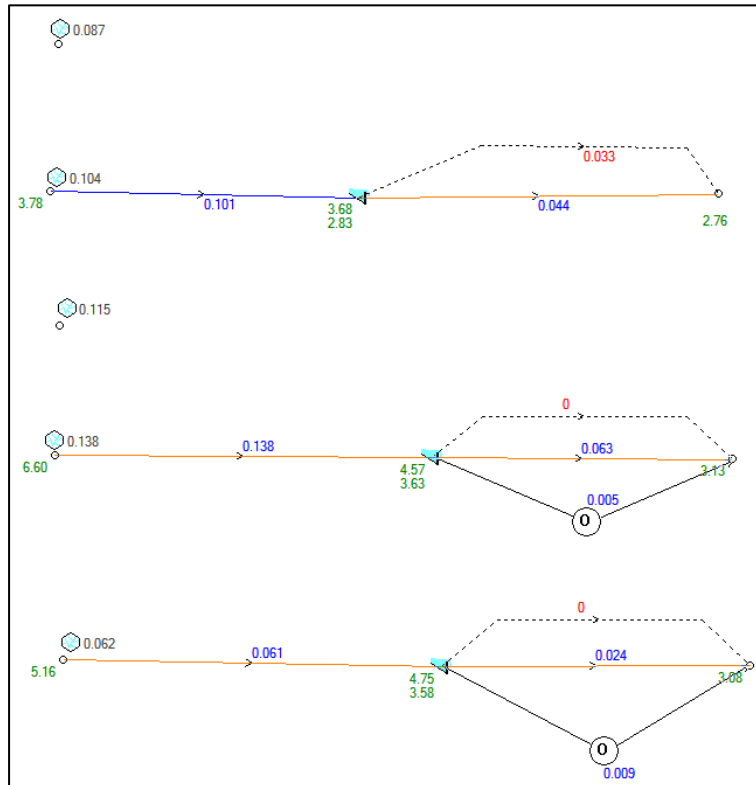
### 5 Year Results:



### 20 Year Results:



### 100 Year Results:





## **ATTACHMENT 3**

**Environmental Noise Impact Assessment**

***CRG Acoustic***

Proposed Childcare and Industrial Centre  
Centennial Circuit, Byron Bay  
(Lot 60 on DP835249)

## **ENVIRONMENTAL NOISE IMPACT REPORT**

Prepared for

Denwol Developments

**23 January 2017**

crgref: 16186 report

## 1.0 INTRODUCTION

This report is in response to a request from Denwol Developments for an environmental noise impact assessment of proposed childcare industrial centre and caretaker's apartment along Centennial Circuit in the Byron Bay Arts & Industry Estate. The report is intended to form part of a development application to Byron Shire Council in accordance with the Byron Local Environment Plan 2014. In undertaking the assessment, noise monitoring was conducted near the site and through modelling, predictions of road noise associated with traffic on Ewingsdale Road, and proposed onsite and existing offsite commercial / industrial noise impacting the noise sensitive components of the development. Based upon the predicted noise impact levels, recommendations regarding acoustic treatment have been provided.

## 2.0 DESCRIPTION OF THE DEVELOPMENT

The parcel of land is described as part of Lot 60 on DP835249 and is current undeveloped land within the Byron Bay Arts & Industrial Estate. The site is bounded by Centennial Circuit to the north, Ewingsdale Road to the south, vacant land to the immediate east, with a commercial building to the immediate west. The topography of the site and surrounding land is generally flat. It is noted that a large residential estate is proposed across Ewingsdale Road to the south, but this development will be screened by an acoustical barrier for control of road traffic noise, which will also serve to mitigate any noise from the subject site – for this reason, this development is not considered in this assessment. For site location refer to Appendix A.

The proposal is as follows:

- A two level childcare centre to cater for 78 children. The building is proposed to the western portion of the site. Outdoor play area at ground level is located in the centre of the building, to take advantage of acoustical screening to neighbouring commercial facilities;
- Car parking at the northern part of the site, with access via Centennial Circuit only;
- Two level industrial building to the eastern side of the site. The driveway and access to the 6 spaces will be in the centre of the industrial component, with ground level being for small retail or takeaway food space, with larger storage / production spaces, and storage / production / office at top floor level.

The childcare centre is likely to operate between 6:30am and 6pm Monday to Friday; with the industrial development likely to operate between 7am and 6pm, Monday to Saturday. For Development Plans refer to Appendix B.

Offsite and proposed onsite industrial activity noise impacts have the potential to impact upon proposed childcare centre (i.e. building façades, outdoor playspace and inside activity rooms) and has been assessed in accordance with the “*NSW Industrial Noise Policy*”.

Road traffic noise from Ewingsdale Road has been assessed in accordance with the “*NSW Road Noise Policy*”. We have not assessed noise from increased traffic on Ewingsdale Road as a result of the development, as the expected increase is not significant in the context of the existing volume of traffic on Ewingsdale Road.

### 3.0 AMBIENT NOISE SURVEY

#### 3.1 Instrumentation

The following equipment was used to record ambient noise levels in the locale:

- Rion NC 73 Calibrator; and
- Rion NL 21 Environmental Noise Logger.

All instrumentation used in this assessment hold current calibration certificate from a certified NATA calibration laboratory.

#### 3.2 Ambient Noise Monitoring Methodology and Results

A logger was located across Ewingsdale Road to the south-east of the site. The microphone was in a free-field location approximately 1.4m above ground and approximately 13m from the nearest lane of Ewingsdale Road. For logger location refer to Figure 8 of Appendix A.

The logger was set to record noise statistics in 15 minute blocks continually between Tuesday 23/08/2016 and Tuesday 30/08/2016. All measurements were conducted generally in accordance with Australian Standard AS 1055:1997 - *“Acoustics-Description and measurement of environmental noise”*. The operation of the sound level logging equipment was field calibrated before and after the measurement session with no significant drift from the reference signal recorded.

Daily weather observations were obtained from the Bureau of Meteorology’s website at the Byron Bay station. Weather conditions during the noise monitoring period were generally fine with the exception of rain periods on Wednesday 24/08/16 and Thursday 25/08/16, with a temperature range between approximately 10 and 24°C and relative humidity between approximately 40% and 80%.

From a series of observations on Tuesday 23/08/2016, Tuesday 30/08/2016, and Wednesday 18/01/2017, no significant noise from offsite and adjacent industrial premises was noted.

Table 1 presents the measured ambient noise levels at the unattended logger location. Graphical presentation of the measured noise levels is presented in Appendix C to this report. It is noted that data collected on Wednesday 24/08/16 and Thursday 25/08/16 have been excluded from the final Rating Background Level (RBL) calculations due to the occurrence of rain. The cleanest two days of road traffic noise results have been presented in Table 1.

Road Traffic Noise	Time Period	Measured Level dB(A)		
		26/08/2016	29/08/2016	Average
L <sub>10</sub> (18hr)	6am to Midnight	68	67	68
L <sub>eq</sub> (24hr)	6am to 6am	65	64	65
L <sub>eq</sub> (15hr)	7am to 10pm	66	66	66
L <sub>eq</sub> (9hr)	10pm to 7am	61	60	61
L <sub>eq</sub> (1hr) Daytime	7am to 10pm	68	68	68
L <sub>eq</sub> (1hr) Night-time	10pm to 7am	66	66	66

Background Noise	Measured L <sub>90</sub> dB(A)		
	Daytime (7am to 6pm)	Evening (6pm to 10pm)	Night (10pm to 7am)
Tuesday 23/08/16	-	47	-
Wednesday 24/08/16	61	62	44
Thursday 25/08/16	59	52	48
Friday 26/08/16	56	49	44
Saturday 27/08/16	55	49	43
Sunday 28/08/16	52	48	43
Monday 29/08/16	56	47	44
Tuesday 30/08/16	56	-	-
<b>RBL L<sub>90</sub></b>	<b>56</b>	<b>48</b>	<b>43</b>

**Table 1:** Measured ambient noise levels at the logger location.

## 4.0 NOISE ASSESSMENT CRITERION

### 4.1 Onsite and Offsite Industrial Activity Noise Criterion

Noise associated with industrial premises impacting the proposed childcare centre is regulated by the “NSW Industrial Noise Policy”. The Policy requires the following amenity noise levels are met:

Recommended $L_{Aeq}$ noise levels from industrial noise sources				
Type of Receiver	Indicative Noise Amenity Area	Time of Day	Recommended $L_{Aeq}$ Noise Level, dB(A) <i>(see Note 8 in Section 2.2.1)</i>	
<i>(see Notes in Section 2.2.1)</i>			Acceptable <i>(See Note 11)</i>	Recommended Maximum <i>(See Note 11)</i>
School classroom—internal	All	Noisiest 1-hour period when in use	35 <i>(See Note 10)</i>	40
Active recreation area (e.g. school playground, golf course)	All	When in use	55	60

**Table 2:** Amenity Criterion Prescribed in the “NSW Industrial Noise Policy”.

### 4.2 Road Traffic Noise Criterion

The New South Wales Environment, Climate Change and Water’s document “NSW Road Noise Policy” states the following in respect to childcare developments impacted by road traffic noise (i.e. from Ewingsdale Road):

Existing sensitive land use	Assessment criteria – dB(A)		Additional considerations
	Day (7 a.m.–10 p.m.)	Night (10 p.m.–7 a.m.)	
8. Childcare facilities	Sleeping rooms $L_{Aeq, (1 \text{ hour})}$ 35 (internal)  Indoor play areas $L_{Aeq, (1 \text{ hour})}$ 40 (internal)  Outdoor play areas $L_{Aeq, (1 \text{ hour})}$ 55 (external)	–	Multi-purpose spaces, e.g. shared indoor play/sleeping rooms should meet the lower of the respective criteria.  Measurements for sleeping rooms should be taken during designated sleeping times for the facility, or if these are not known, during the highest hourly traffic noise level during the opening hours of the facility.

**Table 3:** Road Noise Criterion Prescribed in the “NSW Road Noise Policy”.

It is noted that the caretaker’s dwelling should meet the noise goals outlined in the Infrastructure SEPP (Department of Planning NSW 2007) which are internal noise levels of 35 dB(A) for bedrooms during the night-time period and 40 dB(A) for other habitable rooms.

## 5.0 PREDICTED NOISE IMPACTS

### 5.1 Predicted Onsite and Offsite Industrial Activity Noise Emissions

All noise source levels used in the assessment have been collected from similar previous investigations – as no significant noise was noted during our site visits, all impacts have been based upon assumed worst case scenario noise source levels. All noise levels have been corrected for impulsiveness or tonality as per Australian Standard AS 1055:1997 – “Acoustics-Description and measurement of environmental noise”.

Short-term measured  $L_{Aeq}$  levels have been converted to  $L_{Aeq 15min}$  levels by estimating a worst case number of events / duration for which each activity occurs during any 15 minute period. For children’s outdoor play we have assumed that the activity will occur for a full 15 minute period.

For continuous noise sources (i.e. mechanical plant), a 15 minute duration has been adopted. It should be stressed that mechanical plant selection have yet to be undertaken, for this reason, we have applied noise levels from other similar developments.

The following activities and associated noise source levels are typical of industrial activities and have been assessed within this report:

Activity / Noise Source	Distance (m)	Measured $L_{eq}$ Adjusted dB(A)	Duration per 15 minutes	Noise Level, SPL $L_{eq 15 min}$ dB(A)
<b>Fluctuating Noise Source</b>				
Car door closures 80 events	1m	80** (0.052 secs)	4.2 secs	<b>57**</b>
Car bypass at 5km/hr 40 events	1m	66 (7 secs)	4.7 mins	<b>61</b>
Light industrial production	1m	85	15	<b>85**</b>
Goods delivery	1m	81**	7.5	<b>81**</b>
Waste collection	1m	97	2	<b>88</b>
<b>Continuous Noise Source</b>				
A/C unit x 6	1m	65	15	<b>65</b>
Toilet exhaust fan	1m	52	15	<b>52</b>

\* Denotes + 5 dB(A) correction due to tonality as per AS1055 – 1997 ; \*\* Denotes + 5 dB(A) correction due to impulsiveness as per AS1055 – 1997

**Table 4:** Typical noise source levels associated with industrial activities.

Based upon the location of the proposed onsite and offsite activities in relation to proposed childcare centre (i.e. at the nearest building façades), we predict the following noise impact levels as presented in Table 5.

The predicted levels assume that the recommended treatments detailed in Section 6.1 are incorporated into the development.

Noise source – Proposed Onsite Industrial Activity	Predicted Noise Impact, SPL $L_{eq}$ 15min dB(A)
	Inside Activity / Sleep Rooms Windows Closed
Car door closures in carpark	< 25
Car movement in carpark	< 25
Manufacturing activity	< 25
Goods unloading industrial driveway	< 25
Waste collection industrial driveway	25
A/C unit x 6 in industrial internal driveway	< 25
Toilet exhaust fan rooftop	< 25
Combined noise impact	28
<b>Noise Criterion</b>	<b>35 – 40</b>
<b>Centre of Ground Level Outdoor Playspace</b>	
Car door closures in carpark	26
Car movement in carpark	30
Manufacturing activity	35
Goods unloading industrial driveway	35
Waste collection industrial driveway	42
A/C unit x 6 in industrial internal driveway	< 25
Toilet exhaust fan rooftop	< 25
Combined noise impact	44
<b>Centre of Top Level Outdoor Playspace</b>	
Car door closures in carpark	33
Car movement in carpark	34
Manufacturing activity	35
Goods unloading industrial driveway	35
Waste collection industrial driveway	42
A/C unit x 6 in industrial internal driveway	< 25
Toilet exhaust fan rooftop	< 25
Combined noise impact	44
<b>Noise Criterion</b>	<b>55 – 60</b>
Noise source – Existing Offsite Industrial Activity	Predicted Noise Impact, SPL $L_{eq}$ 15min dB(A)
	Inside Activity / Sleep Rooms Windows Closed
Car door closures in carpark	< 25
Car movement in carpark	< 25
Manufacturing activity	29
Goods unloading industrial driveway	< 25
Waste collection industrial driveway	< 25
A/C unit east side of existing building	< 25
Toilet exhaust fan rooftop	< 25
Combined noise impact	30
<b>Noise Criterion</b>	<b>35 – 40</b>
<b>Centre of Ground Level Outdoor Playspace</b>	
Car door closures in carpark	< 25
Car movement in carpark	27
Manufacturing activity	30
Goods unloading industrial driveway	32
Waste collection industrial driveway	39
A/C unit east side of existing building	< 25
Toilet exhaust fan rooftop	< 25
Combined noise impact	40
<b>Centre of Top Level Outdoor Playspace</b>	
Car door closures in carpark	< 25
Car movement in carpark	30
Manufacturing activity	33
Goods unloading industrial driveway	32
Waste collection industrial driveway	39
A/C unit east side of existing building	< 25
Toilet exhaust fan rooftop	< 25
Combined noise impact	41
<b>Noise Criterion</b>	<b>55 – 60</b>

**Table 6:** Predicted onsite industrial activity noise impacts at the proposed childcare centre.

For point source calculations refer to Appendix C of this report.

## 5.2 Predicted Ewingsdale Road Traffic Noise Impacts

### 5.2.1 Road Traffic Volumes

Peak am & pm surveyed traffic data and ultimate year 2028 am & pm peak traffic volume predictions for Ewingsdale Road (inclusive of the proposed West Byron subdivision and surrounding future Western Precincts) were obtained from the Bitzios Report completed for the West Byron development. Daily traffic volumes have been estimated by multiplying the averaged of the am & pm peak traffic volumes by 10. Percentage of heavy vehicles were obtained from the TTM Acoustics report completed for the West Byron development (dated June 2010). The modelled traffic volumes for Ewingsdale Road are as follows:

<b>2016 Traffic Volume:</b>	AADT 24 hour:	16,260 vehicles, 4.3% heavy vehicles.
<b>2028 Traffic Volume:</b>	AADT 24 hour:	23,530 vehicles, 4.3% heavy vehicles.

### 5.2.2 Modelled Road Traffic Noise Levels – Existing Situation

Road traffic noise modelling was conducted using PEN3D, which is based upon the “CoRTN” (Control of Road Traffic Noise) method produced by the UK Department of Transport 1988. To verify the road traffic noise prediction model, the  $L_{Aeq\ 24hr}$  traffic noise level was calculated and compared to the measured noise level. For PEN3D point calculation sheets refer to the Appendix.

The predicted free-field  $L_{eq\ 24hr}$  existing noise level, approximately 13m from the nearest lane of Ewingsdale Road is 65.4 dB(A). Compared with the measured  $L_{eq\ 24hr}$  level of 64.5 dB(A), the model is within the allowable 2 dB(A) deviation from measured levels.

### 5.2.3 Modelled Road Traffic Noise Levels – Ultimate Situation

Based upon the traffic volumes presented in Section 5.2.1 of this report, the PEN3D model predicts the following façade corrected traffic noise levels as presented in Table 6 over the page.

The following parameters were used in the PEN3D model for the proposed development:

- 2.5 dB(A) façade correction for building façade predictions.
- 60 km/hr posted speed limit environment on Ewingsdale Road near childcare centre.
- 80 km/hr posted speed limit environment on Ewingsdale Road at the logger location.
- 3.2 dB(A) adjustment to the model to determine the  $L_{Aeq\ 24hr}$  from the  $L_{A10\ 18hr}$  based on the measured differences between the  $L_{Aeq\ 24hr}$  level as outlined in Table 1 of Section 3.3
- $L_{Aeq\ 15hr}$  and 9hr levels based on the measured differences between the  $L_{Aeq\ 24hr}$  level as outlined in Table 1 of Section 3.3.
- Ground level façade receiver heights of 1.5m above ground floor level.
- Level 1 façade receiver heights of 5.4m above ground floor level.

Receiver Location	Predicted Ultimate Road Traffic Noise: dB(A)	
	L <sub>10</sub> (24 hour)	L <sub>eq</sub> (1 hour)
<b>Building Façades (Façade Corrected)</b>		
Room 1 North / West	45	48
Room 1 South	63	66
Room 2 East / South	46	49
Room 2 West	55	58
Room 3 North / East	46	49
Room 3 West	51	54
Room 4 North / East / West	51	54
Room 4 South	65	68
Room 5 North / East / South	52	55
Room 5 West	59	62
Caretaker's	65	66 L <sub>eq</sub> 15hr / 61 L <sub>eq</sub> 9hr
<b>Outdoor Play Spaces (Free-field)</b>		
Ground Level Zen Space	44	47
Ground Level Main Area	45	48
Ground Level Southwest Area	44	47
Level 1 Northwest Area	49	52
Level 1 Northeast Area	49	52
Level 1 Southeast area	50	53

**Table 6:** Predicted road noise levels from Ewingsdale Road at the proposed development.

## 6.0 RECOMMENDED ACOUSTIC TREATMENTS

### 6.1 Recommended Acoustic Treatments to Control Onsite and Offsite Activity Noise

Based upon the adopted noise source levels, the following acoustic treatments and management principles are recommended to mitigate onsite activity noise emissions:

- Provision of air-conditioning or sealed mechanical ventilation to the entire childcare centre be provided.
- The full height of the party wall separating the industrial from the childcare centre be rated to a minimum  $R_w$  55.
- The western facing wall of the childcare centre be rated to a minimum  $R_w$  50.
- The top floor level of the roof / ceiling system of the childcare centre be rated to  $R_w$  45.
- All glazings be rated to a minimum  $R_w$  30.

### 6.2 Recommended Acoustic Treatments to Control Road Traffic Noise

To achieve the required indoor noise levels for road traffic noise, we recommend the building shell treatment  $R_w$  ratings as detailed in Table 7. Building shell treatment  $R_w$  ratings were determined by using the calculation methods detailed in Australian Standard AS3671 1989 “Road Traffic Noise Intrusion – Building Siting and Construction”. Calculations for building treatment determination are presented in Appendix C.

To allow occupants to close windows and doors and still have a supply of fresh air, provision for air conditioning or sealed mechanical ventilation is required to rooms affected by traffic noise (rooms listed in Table 7). The plant should not reduce the acoustic performance of the building shell.

Byron Bay Childcare Centre Space	Building Component	Rw
Activity Room 1	North / West Glazings	30*
	North / West Walls	26
	South Glazing	35
	South Wall	39
Activity Room 2	South / East Glazings	30*
	South / East Walls	26
	West Wall	50*
Activity Room 3	North / East Glazings	30*
	North / East Walls	25
	West Wall	50*
Activity Room 4	North / East Glazings	30*
	North / West / East Walls	33
	South Glazings	36
	South Wall	43
	Roof / Ceiling	45*
Activity Room 5	North / South / East Glazings	30*
	North / South / East Walls	34
	West Wall	50*
	Roof / Ceiling	45*
Caretaker's Dwelling	South Glazing	33
	South Wall	28
	Roof / Ceiling	37

\* Upgraded to include the  $R_w$  requirements of Section 6.1 of this report

**Table 7:** Recommended building shell treatments for road traffic noise intrusion.

## 7.0 DISCUSSION

### 7.1 Onsite and Offsite Industrial Activity Noise

Based upon the assumed noise source levels for existing offsite and proposed onsite industrial activities and the recommended acoustic treatments, predicted noise impacts at the proposed childcare activity rooms and outdoor playspaces are predicted to be within the relevant external noise criterion. The design is such that blank walls face the existing industrial premises to the west, and will be separated by an acoustically rated party wall to the proposed industrial. Further, only services and offices are located on the party wall shared with the proposed industrial to further mitigate impacts.

Based upon the assumed noise source levels for future onsite industrial activities and the recommended acoustic treatments, predicted noise impacts at the proposed childcare activity rooms and outdoor playspaces are predicted to be within the relevant external noise criterion.

To mitigate noise impacts at the childcare centre we have recommended upgraded wall and glazing treatments; and provision of air-conditioning or sealed mechanical ventilation to the entire childcare centre. It is noted that for south facing glazings at Activity Rooms 1 and 4 (i.e. facing Ewingsdale Road) higher  $R_w$  ratings are required to mitigate road traffic noise.

### 7.2 Road Traffic Noise

Based upon year ultimate volumes on Ewingsdale Road, we have recommended acoustic building shell treatments to childcare activity rooms and caretaker's dwelling to show that compliance with the internal criterion can be achieved. Provision for air conditioning or sealed mechanical ventilation is also required to noise affected habitable rooms to allow occupants to close windows and doors. The plant should not reduce the acoustic performance of the building shell.

Predicted road traffic noise impacts are predicted to be below the external noise criterion at all the outdoor play spaces due to the proposed building envelope.

## 8.0 CONCLUSIONS

This report is in response to a request from Denwol Developments for an environmental noise impact assessment of proposed childcare industrial centre and caretaker's apartment along Centennial Circuit in the Byron Bay Arts & Industry Estate.

Overall, the proposed development will generally be within acceptable levels of the adopted criterion, subject to the acoustic treatments recommended in Section 6 being integrated into the design, construction and operation of the development.

Report Prepared By:



**JAY CARTER BSc**  
Director

**APPENDIX A**

Subject Site and Logger Location

Figure No. 1: Subject Site Location (Google Maps).

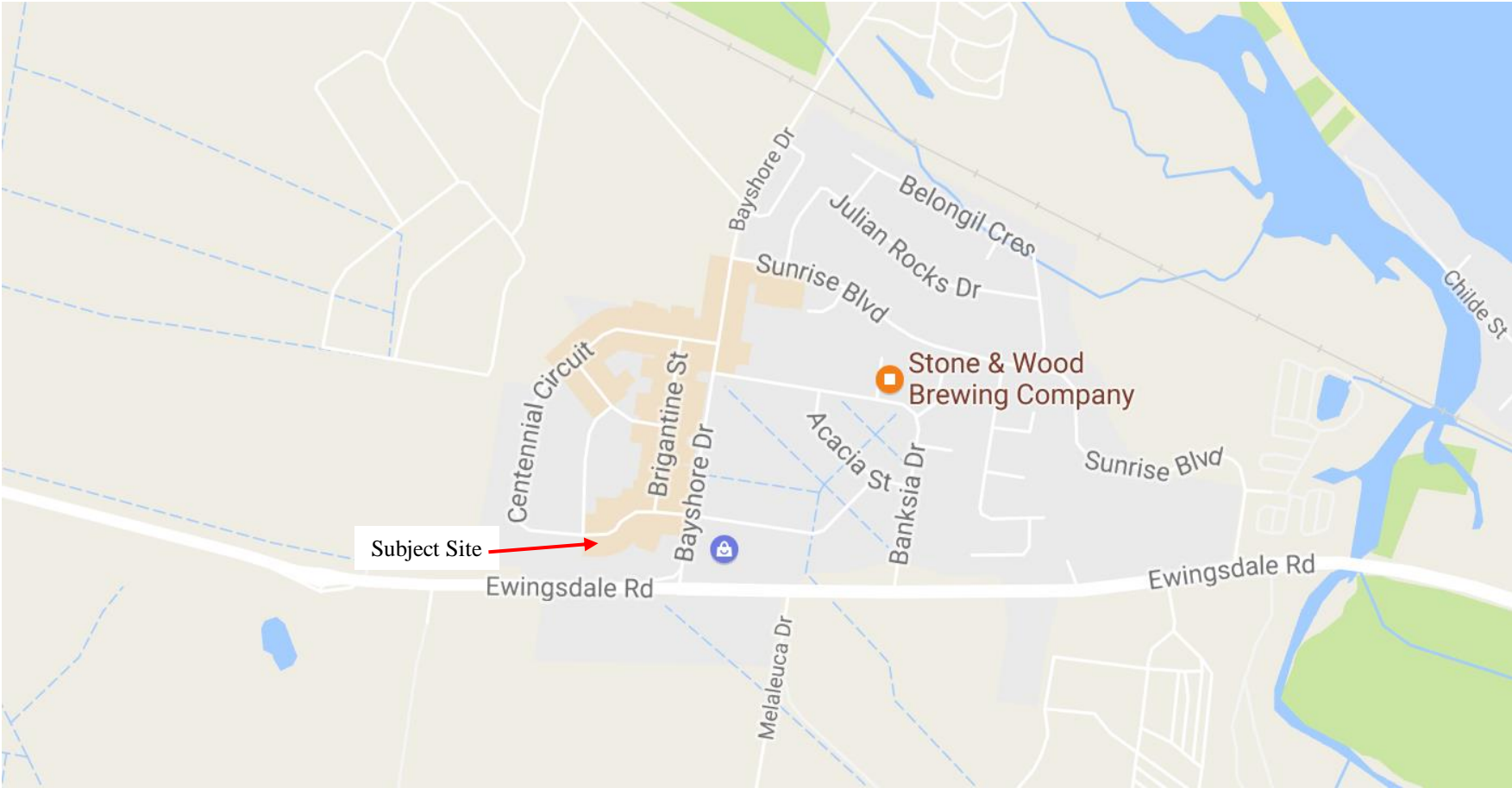


Figure No. 2: Subject Site, Logger Location and Surrounding Environs (NSW Six Maps).



Byron Bay, New South Wales  
August 2016 Daily Weather Observations



Date	Day	Temps		Rain	Evap	Sun	Max wind gust					9am					3pm				
		Min	Max				Dirn	Spd	Time	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn	Spd	MSLP
		°C	°C	mm	mm	hours	km/h	local	°C	%	heights	km/h	hPa	°C	%	heights	km/h	hPa			
1	Mo	14.3	21.6	0			N	28	18:14	15.6	54	SSW	17	1019.0	21.2	56	NE	17	1015.0		
2	Tu	14.4	22.0	0			NNE	41	12:42	19.8	79	N	13	1014.8	20.7	83	N	26	1010.1		
3	We	14.2	18.6	2.4			W	61	20:34	15.5	96	WSW	13	1008.9	16.1	89	W	17	1005.2		
4	Th	11.3	17.1	27.6			S	115	04:48	14.4	90	SW	50	1014.2	13.8	98	SW	35	1016.8		
5	Fr	9.9	16.9	29.6			SSW	65	13:26	11.8	100	SW	33	1025.1	15.3	89	SSW	41	1023.8		
6	Sa	11.6	16.9	3.6			SW	50	17:07	13.1	100	SW	24	1026.1	14.1	100	S	20	1024.7		
7	Su	11.7	17.7	6.8			S	41	14:07	14.0	94	SW	20	1026.2	17.2	81	SSE	24	1023.3		
8	Mo	11.9	17.8	0			SE	39	00:56	14.2	90	SW	17	1025.0	17.6	63	SSE	20	1022.3		
9	Tu	12.6	20.8	0			WSW	31	02:37	15.6	74	SW	15	1024.5	19.9	57	E	11	1021.7		
10	We	15.6	22.3	0			N	46	17:37	18.6	73	N	15	1022.4	20.6	64	NNE	24	1018.7		
11	Th	15.2	22.6	0			N	43	00:40	18.3	79	NNW	13	1020.3	20.7	73	N	9	1017.4		
12	Fr	13.1	18.7	1.4			SW	43	06:48	13.3	76	WSW	28	1022.3	18.5	74	SW	17	1020.5		
13	Sa	12.6	22.7	0.4			ESE	41	20:19	16.2	79	W	20	1023.4	20.8	33	SW	20	1019.7		
14	Su	12.6	18.6	0			WSW	39	03:19	15.2	63	SW	22	1026.5	18.3	53	S	31	1025.1		
15	Mo	12.0	20.1	0			ESE	50	17:43	15.8	86	SW	24	1030.2	18.8	64	SSE	28	1028.9		
16	Tu	14.2	20.4	0			ESE	37	01:13	16.7	67	SSW	11	1031.7	20.3	55	E	15	1028.3		
17	We	12.1	19.2	0			WSW	33	05:23	14.9	75	WSW	20	1027.8	18.6	73	SSE	20	1024.4		
18	Th	12.5	20.5	0			WSW	31	03:31	15.6	82	SW	19	1025.2	17.7	80	NE	24	1022.6		
19	Fr	14.5	22.5	1.4			NNE	46	18:41	18.9	71	NNW	6	1023.9	20.4	53	NE	22	1019.7		
20	Sa	17.3	22.4	0			N	46	12:30	19.7	79	N	30	1017.8	20.9	79	NNE	24	1014.5		
21	Su	11.2	18.2	2.2			SW	44	06:54	13.8	48	WSW	28	1020.6	17.2	62	S	20	1018.0		
22	Mo	13.8	21.5	0			N	52	21:07	18.1	78	E	7	1018.7	20.2	65	NNE	30	1014.4		
23	Tu	15.8	23.8	1.6			N	35	00:04	21.0	78	N	19	1013.9	21.3	81	NNE	17	1012.0		
24	We	14.7	17.1	50.6			S	70	10:55	16.1		SSW	35	1009.4	15.1		SW	22	1007.1		
25	Th	13.5	18.8	23.8			W	59	12:26	14.7	64	W	24	1010.1	18.5	39	W	28	1009.7		
26	Fr	10.9	16.8	0			W	43	02:31	13.9	57	WSW	20	1017.6	16.4	62	SE	22	1015.0		
27	Sa	10.2	18.1	0			SSW	57	14:01	13.9	55	SW	30	1019.8	17.0	63	SSW	43	1018.4		
28	Su	11.9	20.5	0.2			WSW	46	01:38	15.6	65	SW	26	1024.0	19.8	59	E	19	1021.2		
29	Mo	13.1	22.2	0			NE	31	20:10	16.2	75	SW	17	1026.4	21.2	60	E	9	1025.1		
30	Tu	16.2	23.0	0			NE	28	18:07	20.8	57	E	13	1029.5	21.1	50	NE	13	1027.0		
31	We	14.1	21.8	0			N	44	16:14	19.4	77	NNE	7	1026.8	20.2	72	N	28	1021.5		

Statistics for August 2016		Mean	13.2	20.0					16.2	75		20	1021.7	18.7	67		22	1019.1
Lowest	9.9	16.8							11.8	48	NNW	6	1008.9	13.8	33	#	9	1005.2
Highest	17.3	23.8	50.6			S	115		21.0	100	SW	50	1031.7	21.3	100	SSW	43	1028.9
Total			151.6															

Observations were drawn from Byron Bay (Cape Byron AWS) (station 058216) IDCJDW2022.201608 Prepared at 16:00 GMT on 2 Oct 2016  
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 Users of this product are deemed to have read the information and accepted the conditions described in the notes at <http://www.bom.gov.au/climate/dwo/IDCJDW000.pdf>

**APPENDIX B**

Development Plans

# DEVELOPMENT APPLICATION

## PROPOSED INDUSTRIAL SPACES + CHILD CARE

LOT 60 CENTENNIAL CIRCUIT  
BYRON BAY NSW 2481

### DRAWING SCHEDULE

ISSUE	No	NAME	SCALE
01	01	DRAWING LIST / LOCATION / SITE PLAN	1:2000 / 1:500
02	02	AREA AND USES	1:500
03	03	LEVEL 00	1:200
04	04	LEVEL 01	1:200
05	05	PARKING AND ACCESS	1:200
06	06	SECTIONS	1:200
07	07	ELEVATIONS	1:200

### FLOOR SPACE RATIO AREAS

ZONE NAME	AREA	SITE AREA	FSR
INDUSTRIAL SPACES	1,562m <sup>2</sup>	4020m <sup>2</sup>	<b>38.8%</b>
CHILD CARE AREA	861m <sup>2</sup>	4020m <sup>2</sup>	<b>21.4%</b>
<b>TOTAL</b>	<b>2,423m<sup>2</sup></b>	<b>4020m<sup>2</sup></b>	<b>60.2%</b>



**SITE PLAN**  
SCALE : 1:500 @A3

### PLANNER

**NDC - NEWTON DENNY CHAPELLE**  
Suite 1/31 Carrington Street, Lismore  
Post: PO Box 1138 Lismore NSW 2480  
T: 02 66221 011  
F: 02 6622 4088  
M: 0438 862 856  
e. dchapelle@newtondennychapelle.com.au



LEVEL 1/144 JONSON STREET BYRON BAY | PO BOX 1285 NSW 2481  
F: 02 66809820 | T: 02 66809890 | E: office@hargreaves.com.au | AEN: 85158246003 NSW 7892

All building works to be carried out in accordance with the Building Code of Australia (BCA) and to the satisfaction of the principle certifying authority.  
Builders/Contractors are to verify all dimensions prior to commencement of site work or off-site fabrication.  
Figured dimensions take precedence - do not scale.  
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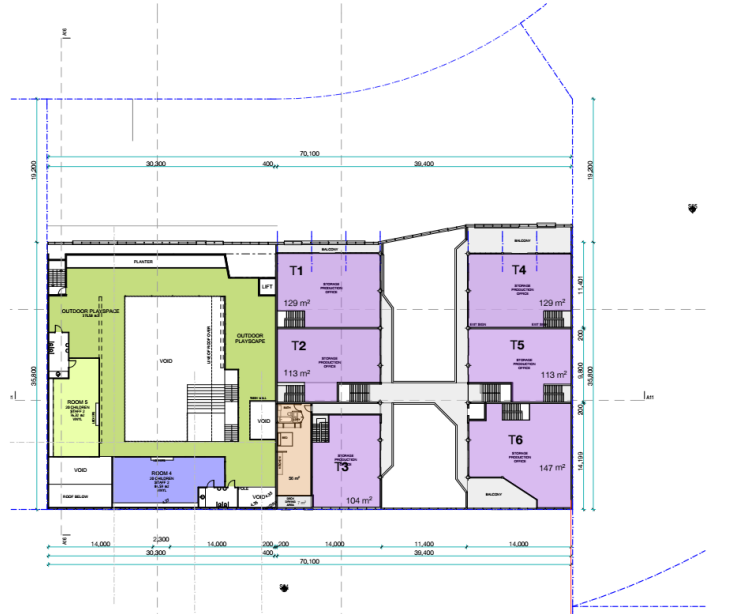
**ISSUE/REVISIONS**  
A DA SET 21.12.16

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				1:500	DA 01 A



SCALE : 1:500 @A3

LEVEL 00



SCALE : 1:500 @A3

LEVEL 01

### INDUSTRIAL SPACES

LEVEL 0	
INDUSTRIAL	680 m <sup>2</sup>
RETAIL	88 m <sup>2</sup>
TAKE AWAY	44 m <sup>2</sup>
WC	40 m <sup>2</sup>
LEVEL 1	
INDUSTRIAL	710 m <sup>2</sup>
MANAGER RESIDENCE	56 m <sup>2</sup>
DECK	140 m <sup>2</sup>
<b>TOTAL GFA</b>	<b>1,562 m<sup>2</sup></b>

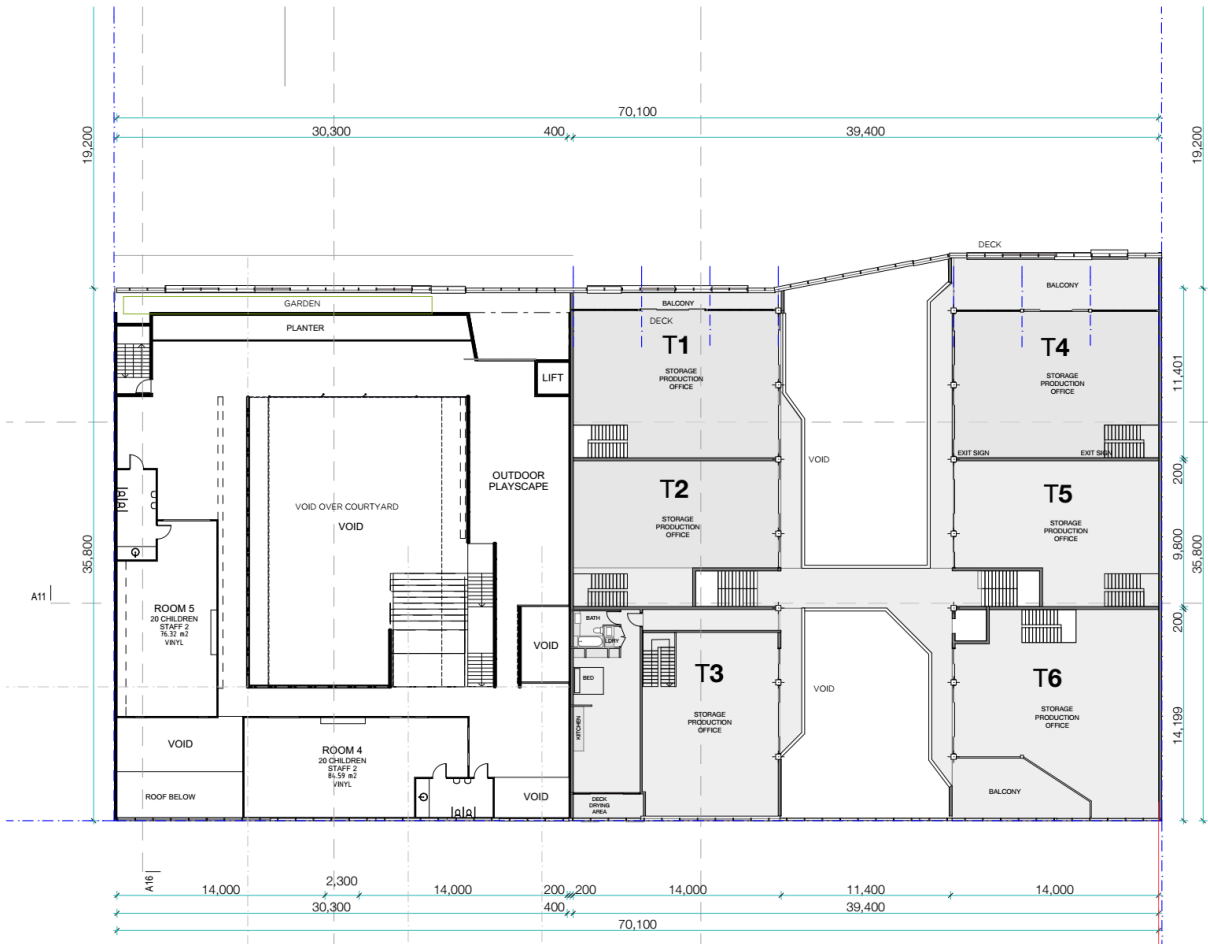
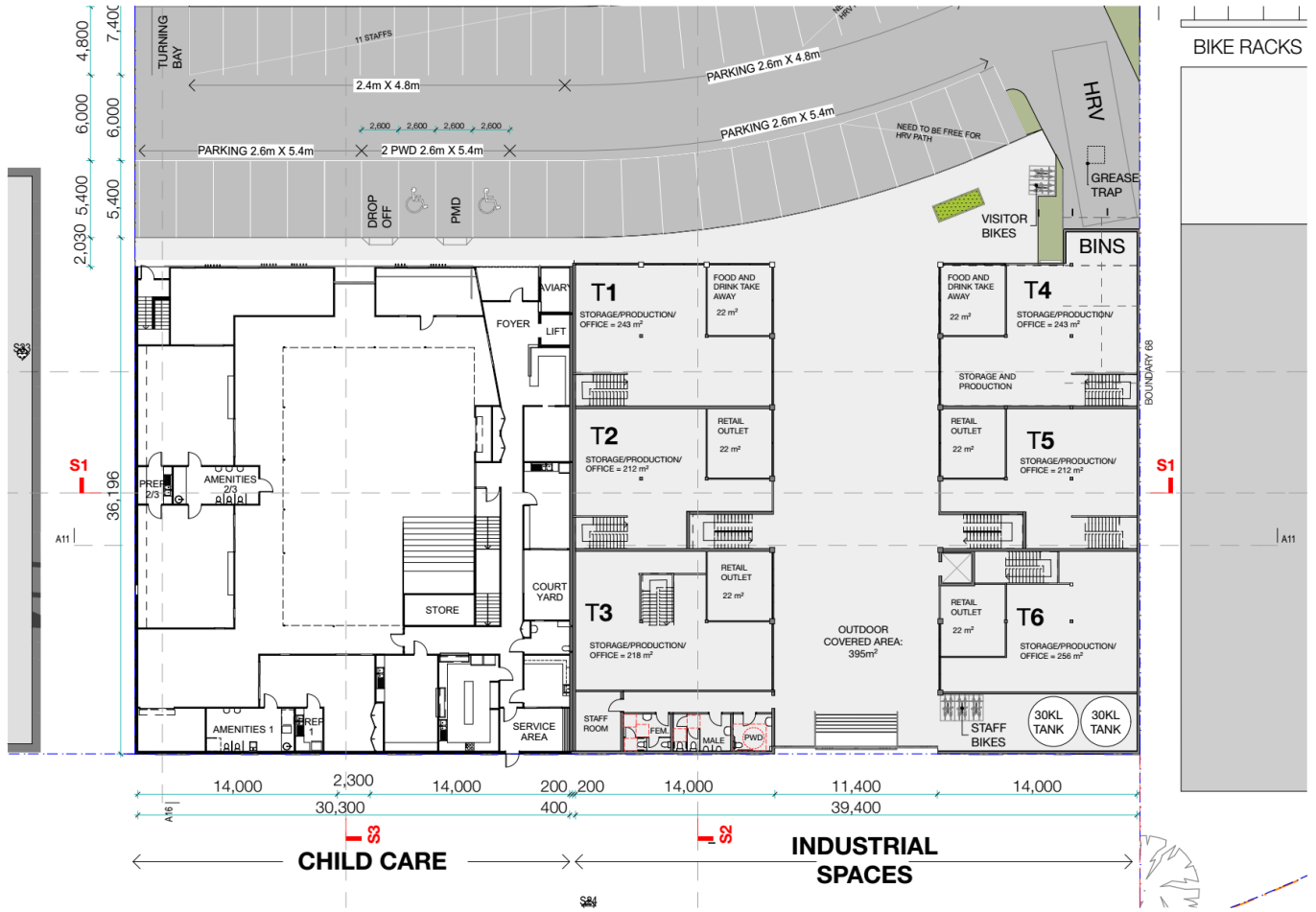


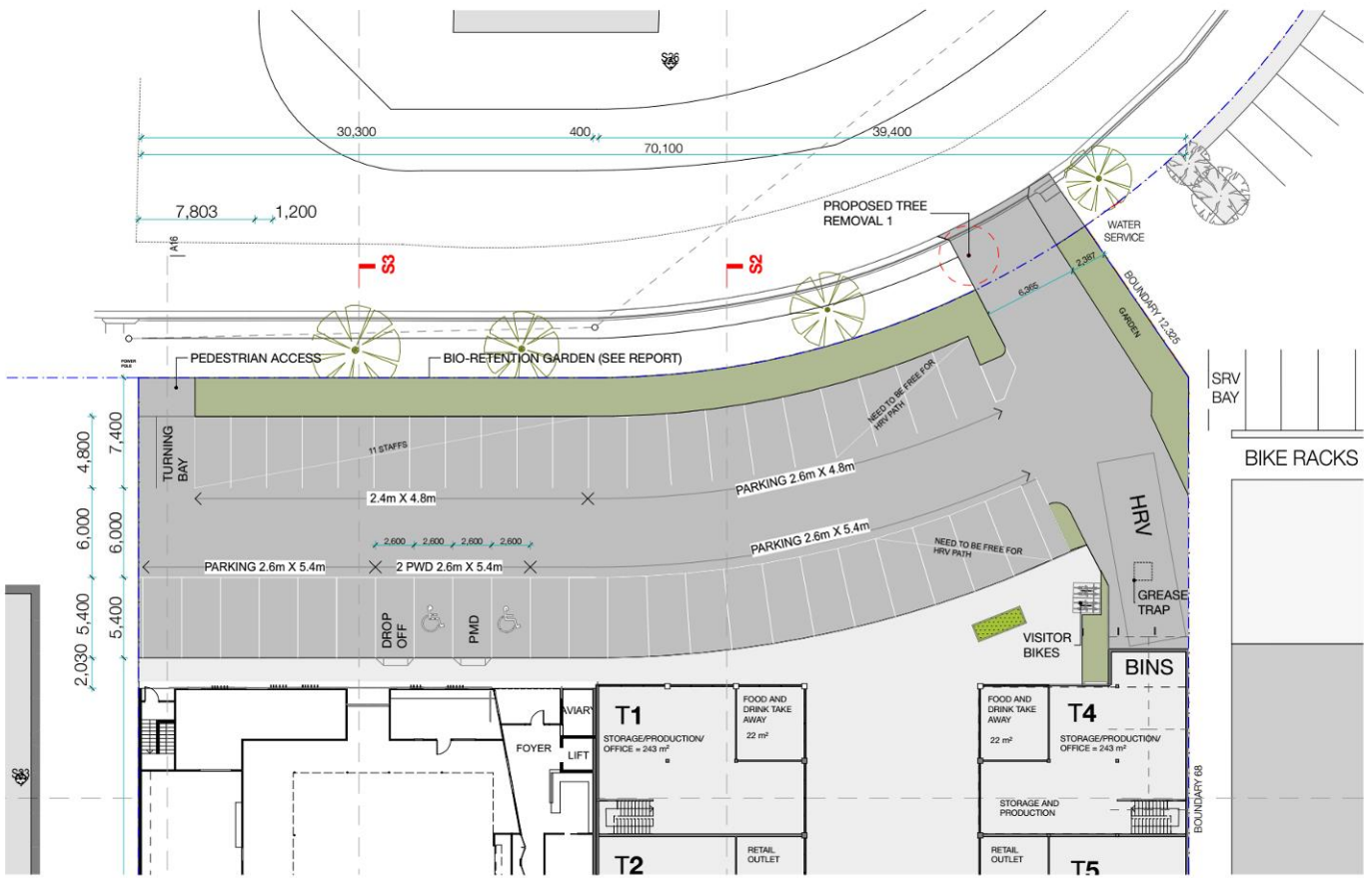
LEVEL 1/144 JONSON STREET BYRON BAY | PO BOX 1285 NSW 2481  
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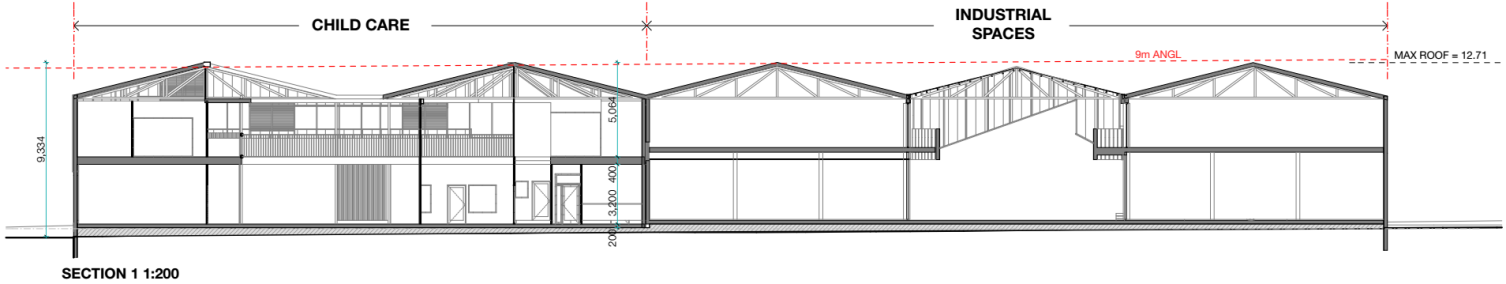




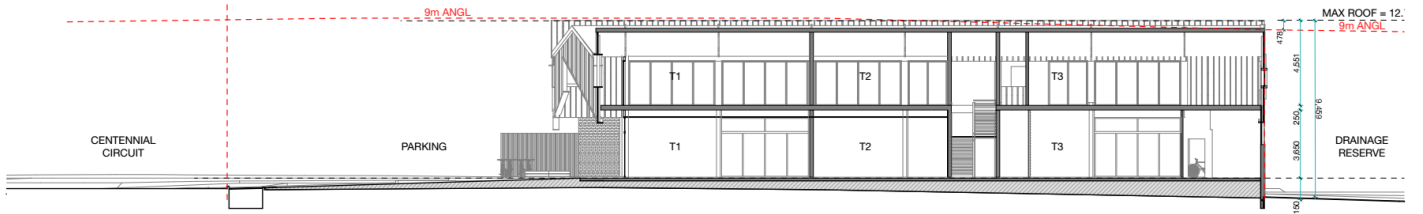
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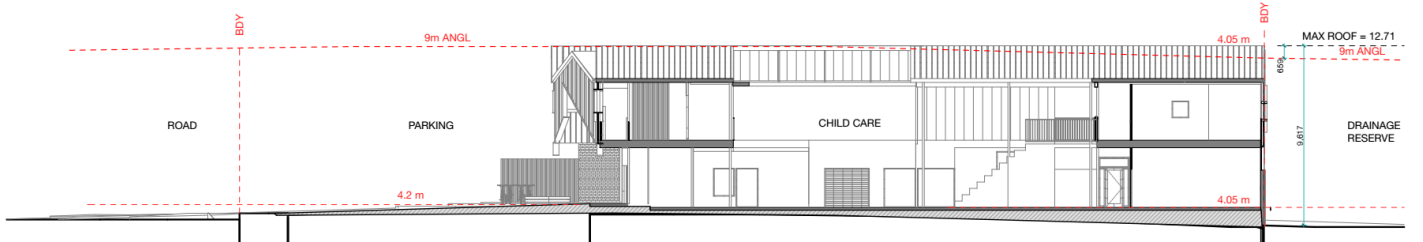
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DRAWING	PARKING AND ACCESS			1:200	A3 DA 05 A



SECTION 1 1:200



SECTION 2 1:200

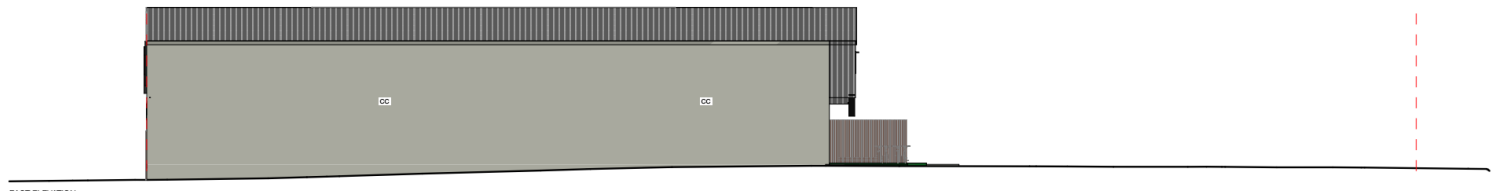
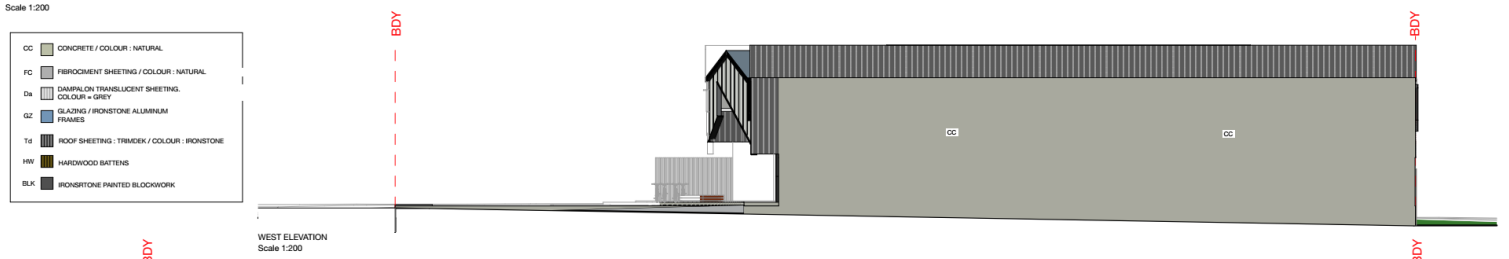
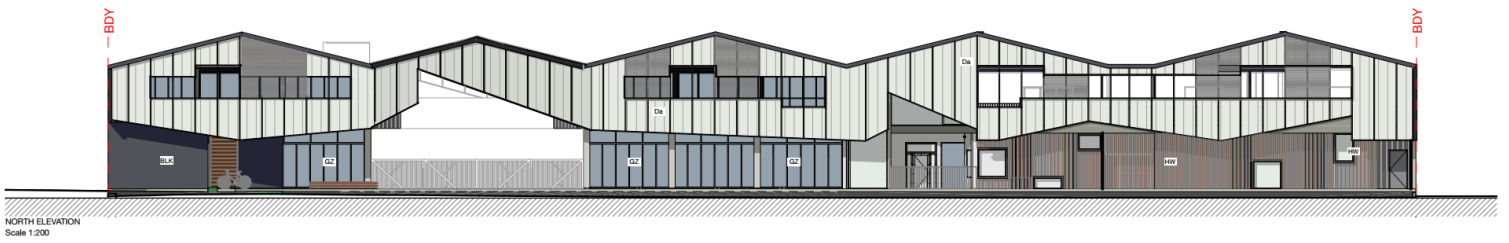


SECTION 3 1:200

All building works to be carried out in accordance with the Building Code of Australia (BCA) and to the satisfaction of the principle certifying authority.  
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ISSUE/REVISIONS  
 A DA SET 21.12.16

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JOB NAME	MIXED USED BUILDING + CHILD CARE	LOT + DP	LOT 60 SP 835249	SCALE	PAPER
DRAWING	SECTIONS			1:200	A3 DA 06 A



- CC CONCRETE / COLOUR : NATURAL
- FC FIBROCEMENT SHEETING / COLOUR : NATURAL
- Da DAMPALON TRANSLUCENT SHEETING, COLOUR = GREY
- GZ GLAZING / IRONSTONE ALUMINIUM FRAMES
- Td ROOF SHEETING - TRAPEZ / COLOUR : IRONSTONE
- HW HARDWOOD BATTENS
- BLK IRONSTONE PAINTED BLOCKWORK

LEVEL 1/ 144 JOHNSON STREET BYRON BAY | PO BOX 1285 NSW 2481  
 F: 02 66809600 | T: 02 66809600 | E: office@haleygraham.com AEN: BS156040000 NSW 7892

All building works to be carried out in accordance with the Building Code of Australia (BCA) and to the satisfaction of the principle certifying authority.  
 Builders/Contractors are to verify all dimensions prior to commencement of site work or off-site fabrication.  
 Figure dimensions take precedence - do not scale.  
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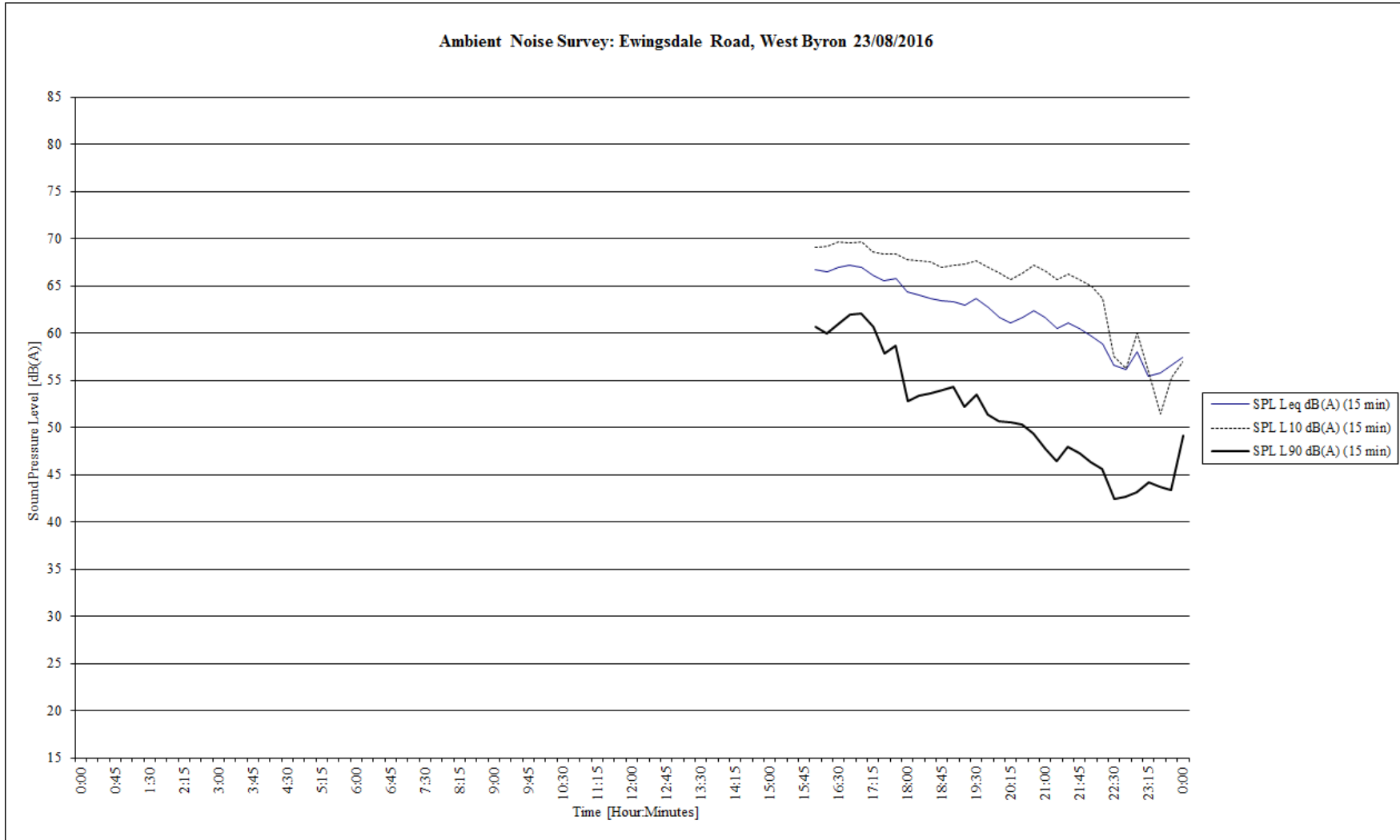
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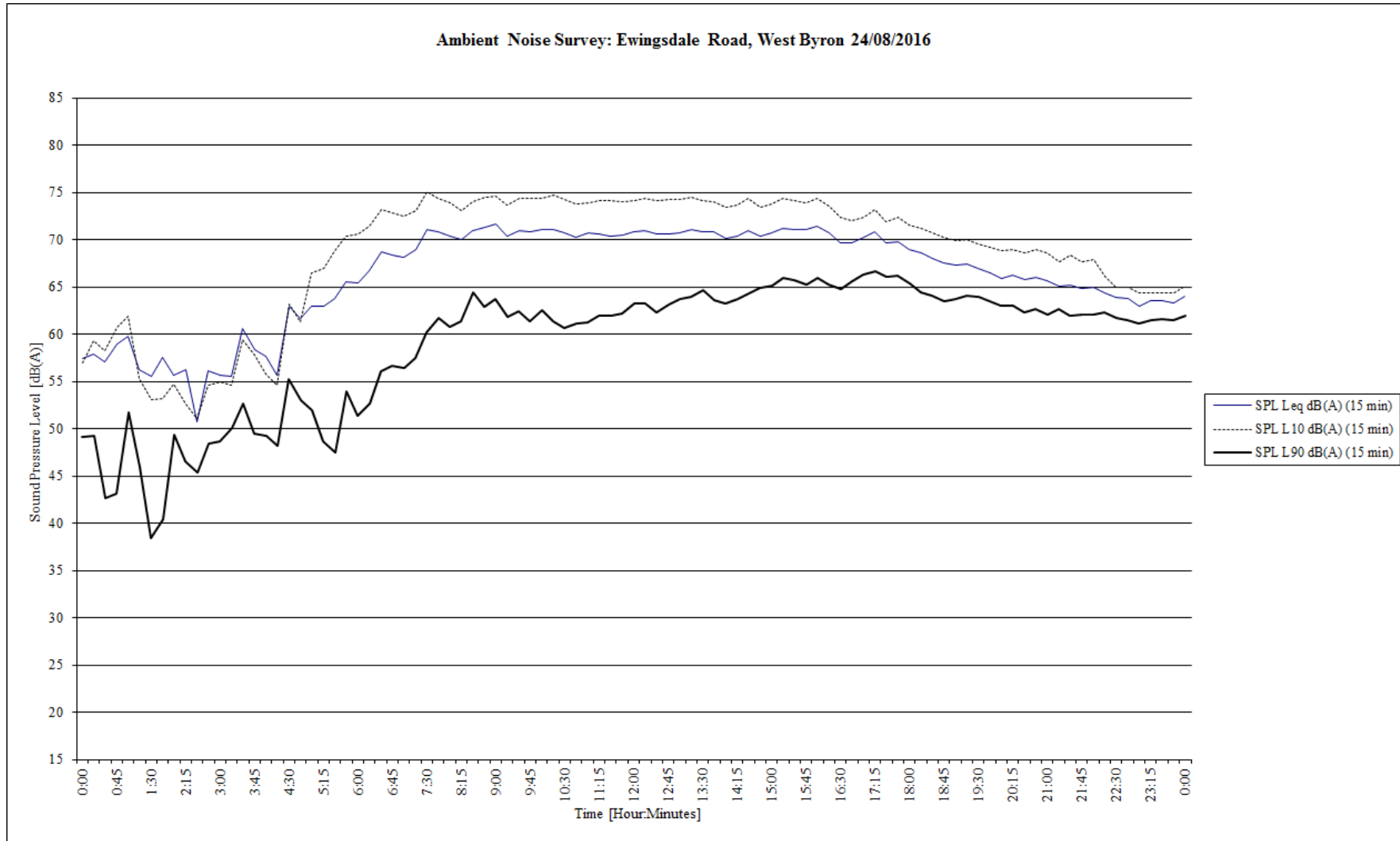
**APPENDIX C**

Measurement Results, Model Calculations / Predictions

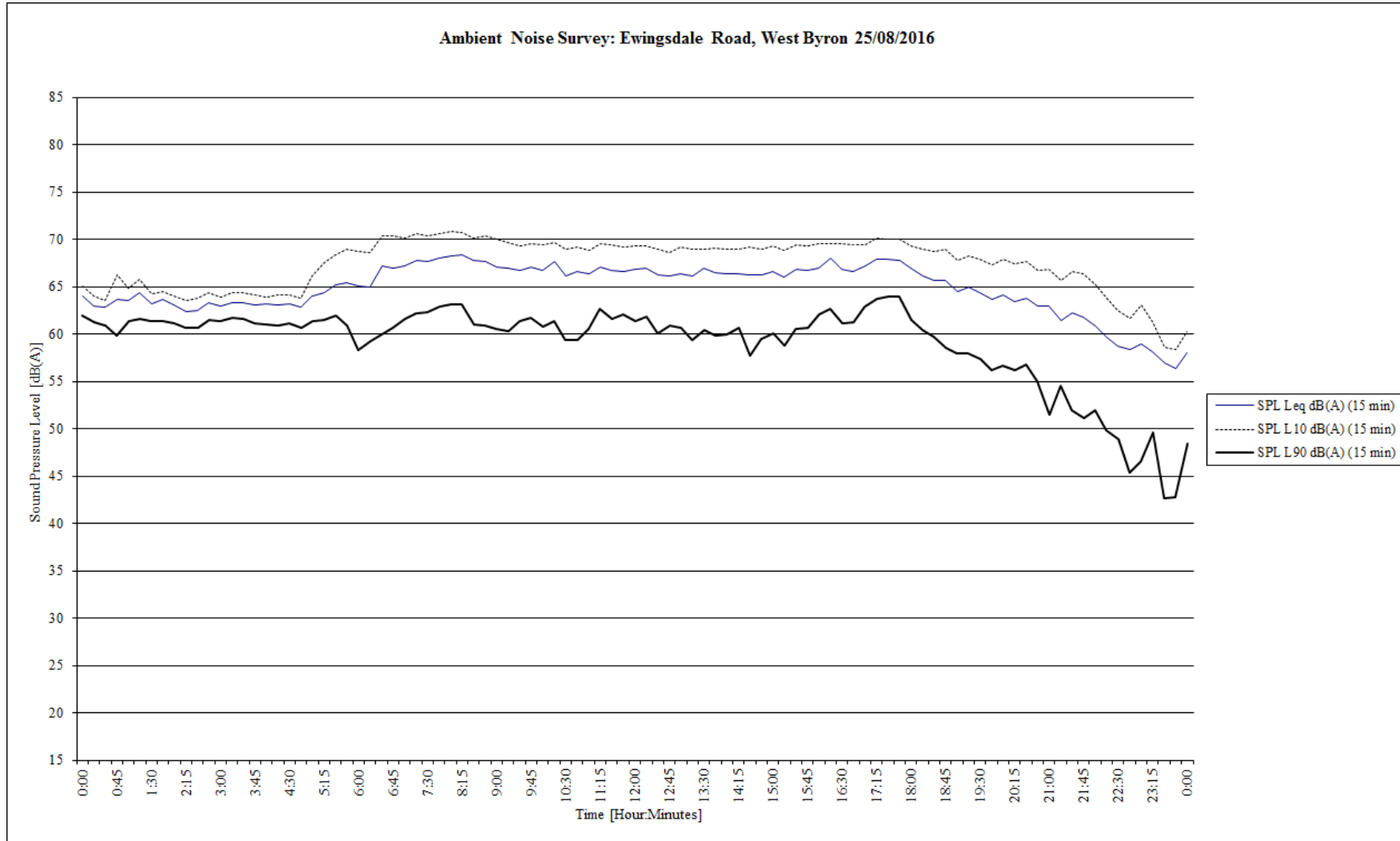
Ambient Noise Survey: Ewingsdale Road, West Byron 23/08/2016



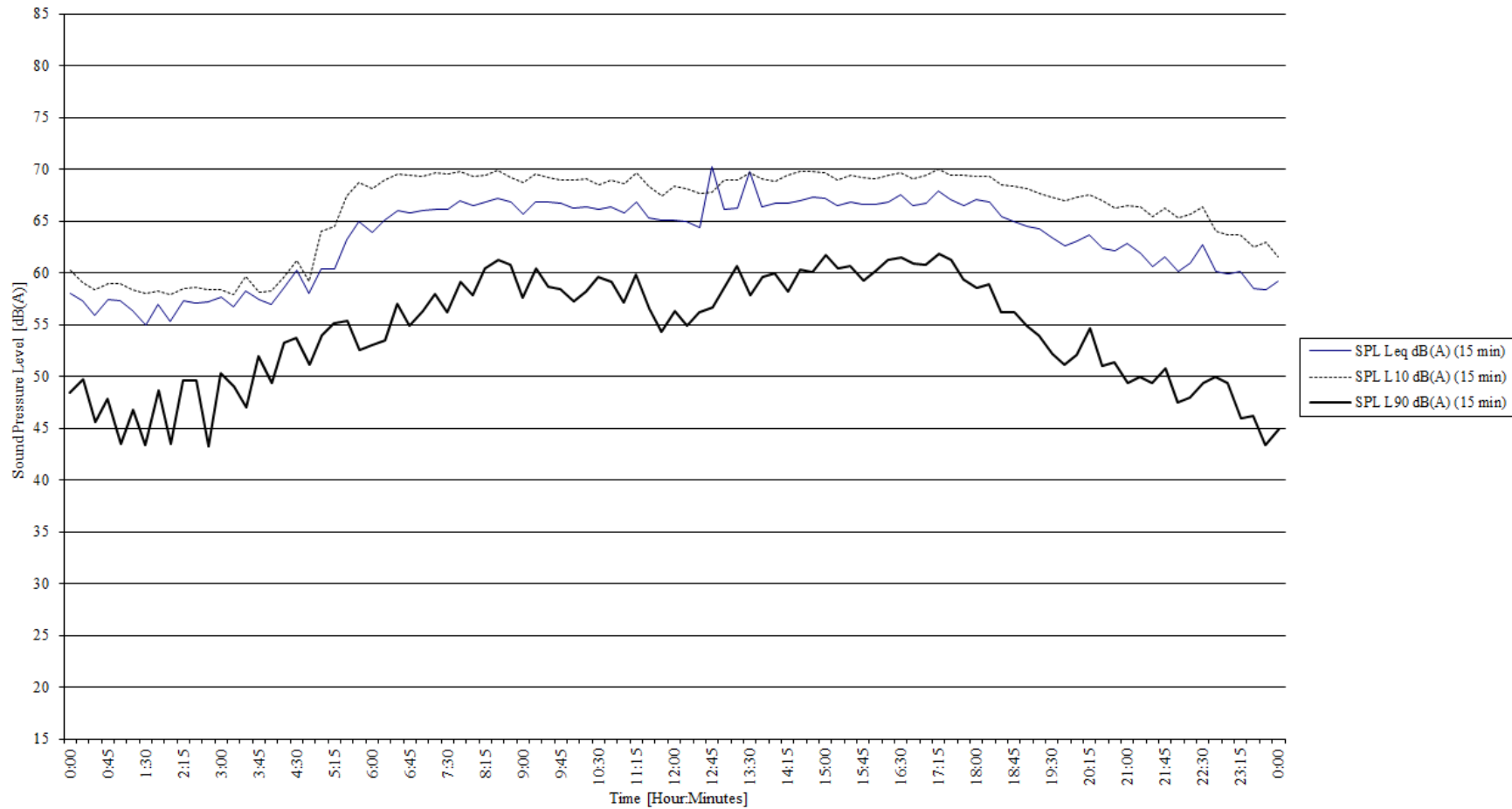
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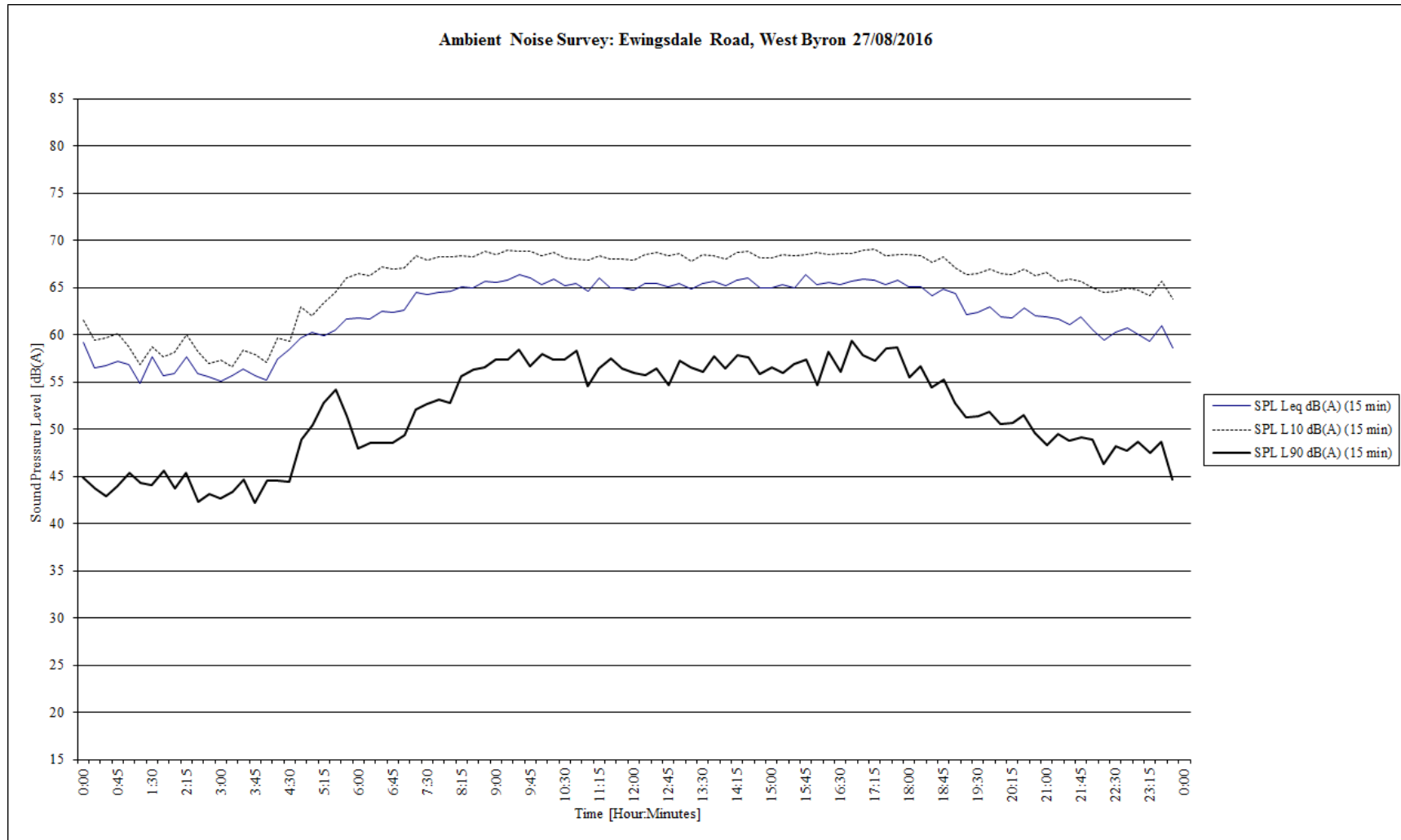


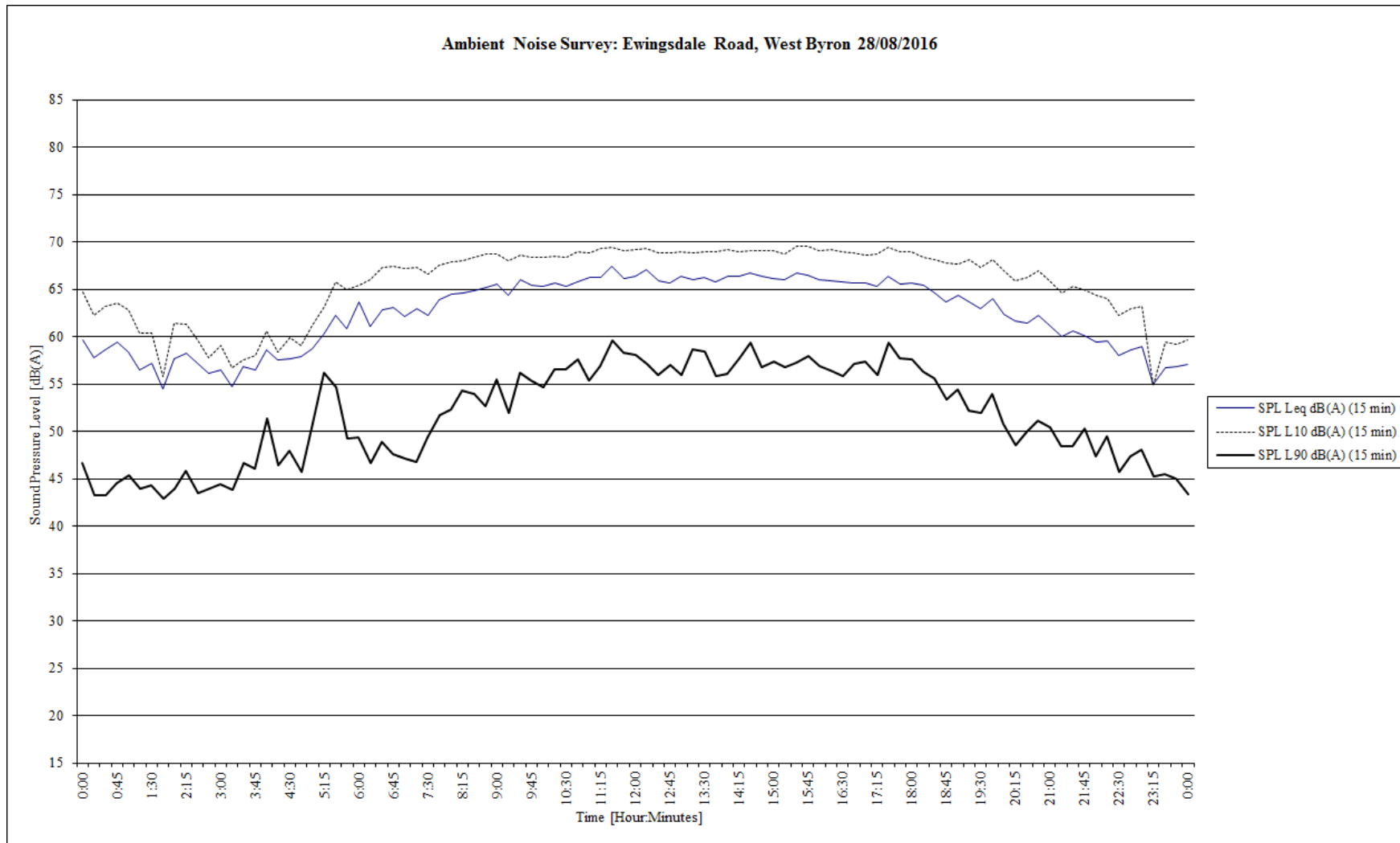
Ambient Noise Survey: Ewingsdale Road, West Byron 25/08/2016

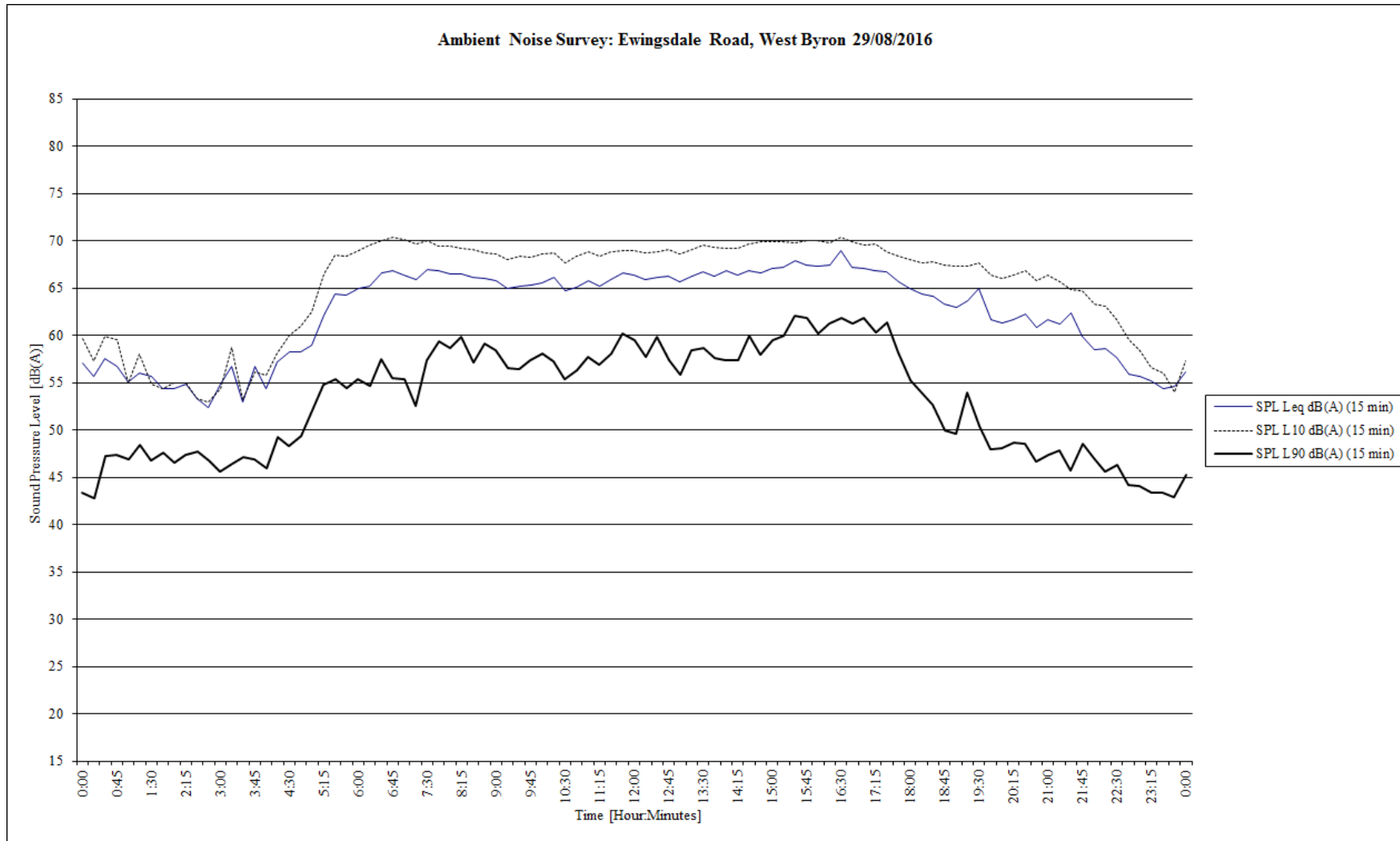


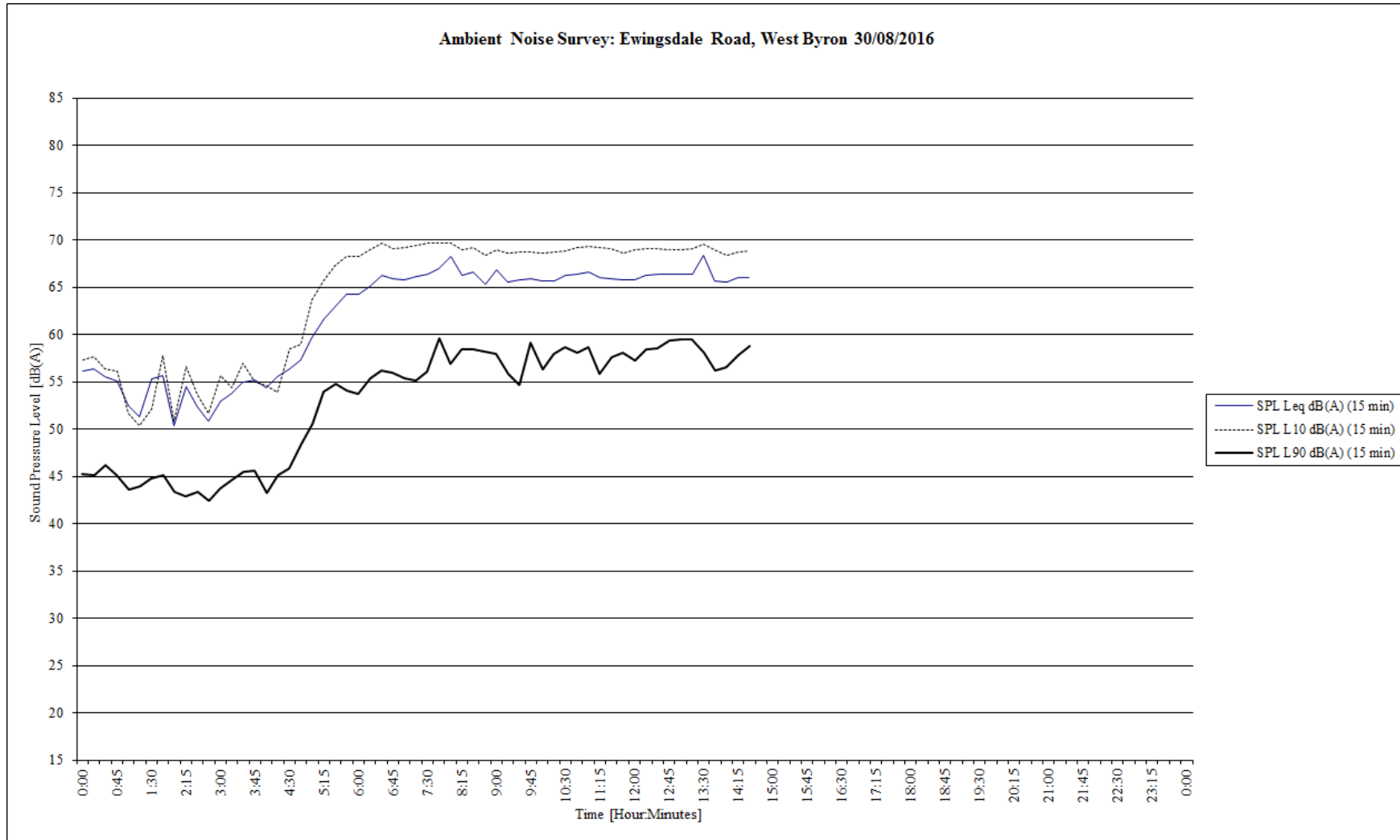
Ambient Noise Survey: Ewingsdale Road, West Byron 26/08/2016











ONSITE ACTIVITY NOISE IMPACTING THE FAÇADES OF:

Proposed Childcare Indoor	
Car door closures	57 dB(A) @ 1m
Distance source to receiver	11 m
Distance attenuation	-20.8 dB(A)
Building screening	0 dB(A)
Façade reflection	2.5 dB(A)
Impact inside closed windows	20.2 dB(A)
Car bypasses	61 dB(A) @ 1m
Distance source to receiver	15 m
Distance attenuation	-23.5 dB(A)
Building screening	0 dB(A)
Façade reflection	2.5 dB(A)
Impact inside closed windows	21.9 dB(A)
Manufacturing activity	85 dB(A) @ 1m
Distance source to receiver	10 m
Distance attenuation	-20.0 dB(A)
Inside to outside factory	-35 dB(A)
Façade reflection	2.5 dB(A)
Impact inside closed windows	14.5 dB(A)
Goods unloading on industrial driveway	81 dB(A) @ 1m
Distance source to receiver	24 m
Distance attenuation	-27.6 dB(A)
Building screening	-20 dB(A)
Façade reflection	2.5 dB(A)
Impact inside closed windows	17.9 dB(A)
Waste collection on industrial driveway	88 dB(A) @ 1m
Distance source to receiver	24 m
Distance attenuation	-27.6 dB(A)
Building screening	-20 dB(A)
Façade reflection	2.5 dB(A)
Impact inside closed windows	24.9 dB(A)
A/C unit x 6	65 dB(A) @ 1m
Distance source to receiver	24 m
Distance attenuation	-27.6 dB(A)
Building screening	-20 dB(A)
Façade reflection	2.5 dB(A)
Impact inside closed windows	1.9 dB(A)
Toilet exhaust	52 dB(A) @ 1m
Distance source to receiver	16 m
Distance attenuation	-24.1 dB(A)
Building screening	-10 dB(A)
Façade reflection	2.5 dB(A)
Impact inside closed windows	2.4 dB(A)
<b>Combined impact</b>	<b>28.2 dB(A)</b>

Proposed Childcare Ground level playspace	
Car door closures	57 dB(A) @ 1m
Distance source to receiver	17 m
Distance attenuation	-24.6 dB(A)
Building screening	-8 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	26.4 dB(A)
Car bypasses	61 dB(A) @ 1m
Distance source to receiver	24 m
Distance attenuation	-27.6 dB(A)
Building screening	-6 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	29.8 dB(A)
Manufacturing activity	85 dB(A) @ 1m
Distance source to receiver	13 m
Distance attenuation	-22.3 dB(A)
Building screening	-30 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	35.2 dB(A)
Goods unloading on industrial driveway	81 dB(A) @ 1m
Distance source to receiver	27 m
Distance attenuation	-28.6 dB(A)
Building screening	-20 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	34.9 dB(A)
Waste collection on industrial driveway	88 dB(A) @ 1m
Distance source to receiver	27 m
Distance attenuation	-28.6 dB(A)
Building screening	-20 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	41.9 dB(A)
A/C unit x 6	65 dB(A) @ 1m
Distance source to receiver	27 m
Distance attenuation	-28.6 dB(A)
Building screening	-20 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	18.9 dB(A)
Toilet exhaust	52 dB(A) @ 1m
Distance source to receiver	24 m
Distance attenuation	-27.6 dB(A)
Building screening	-15 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	11.9 dB(A)
<b>Combined impact</b>	<b>43.7 dB(A)</b>

Proposed Childcare Top floor level playspace	
Car door closures	57 dB(A) @ 1m
Distance source to receiver	10 m
Distance attenuation	-20.0 dB(A)
Building screening	-6 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	33.0 dB(A)
Car bypasses	61 dB(A) @ 1m
Distance source to receiver	15 m
Distance attenuation	-23.5 dB(A)
Building screening	-6 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	33.9 dB(A)
Manufacturing activity	85 dB(A) @ 1m
Distance source to receiver	13 m
Distance attenuation	-22.3 dB(A)
Building screening	-30 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	35.2 dB(A)
Goods unloading on industrial driveway	81 dB(A) @ 1m
Distance source to receiver	27 m
Distance attenuation	-28.6 dB(A)
Building screening	-20 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	34.9 dB(A)
Waste collection on industrial driveway	88 dB(A) @ 1m
Distance source to receiver	27 m
Distance attenuation	-28.6 dB(A)
Building screening	-20 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	41.9 dB(A)
A/C unit x 6	65 dB(A) @ 1m
Distance source to receiver	27 m
Distance attenuation	-28.6 dB(A)
Building screening	-20 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	18.9 dB(A)
Toilet exhaust	52 dB(A) @ 1m
Distance source to receiver	24 m
Distance attenuation	-27.6 dB(A)
Building screening	-8 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	18.9 dB(A)
<b>Combined impact</b>	<b>44.2 dB(A)</b>

OFFSITE ACTIVITY NOISE IMPACTING THE FAÇADES OF:

Proposed Childcare Indoor	
Car door closures	57 dB(A) @ 1m
Distance source to receiver	23 m
Distance attenuation	-27.2 dB(A)
Building screening	0 dB(A)
Façade reflection	2.5 dB(A)
Impact inside closed windows	13.8 dB(A)
Car bypasses	61 dB(A) @ 1m
Distance source to receiver	18 m
Distance attenuation	-23.1 dB(A)
Building screening	0 dB(A)
Façade reflection	2.5 dB(A)
Impact inside closed windows	20.3 dB(A)
Manufacturing activity	85 dB(A) @ 1m
Distance source to receiver	8 m
Distance attenuation	-18.1 dB(A)
Inside to outside factory open doors	-10 dB(A)
Façade reflection	2.5 dB(A)
Impact inside closed windows	29.4 dB(A)
Goods unloading on industrial driveway	81 dB(A) @ 1m
Distance source to receiver	22 m
Distance attenuation	-26.8 dB(A)
Building screening	-20 dB(A)
Façade reflection	2.5 dB(A)
Impact inside closed windows	6.7 dB(A)
Waste collection on industrial driveway	88 dB(A) @ 1m
Distance source to receiver	22 m
Distance attenuation	-26.8 dB(A)
Building screening	-20 dB(A)
Façade reflection	2.5 dB(A)
Impact inside closed windows	13.7 dB(A)
A/C unit x 2 east side of building	55 dB(A) @ 1m
Distance source to receiver	8 m
Distance attenuation	-18.1 dB(A)
Building screening	0 dB(A)
Façade reflection	2.5 dB(A)
Impact inside closed windows	9.4 dB(A)
Toilet exhaust	52 dB(A) @ 1m
Distance source to receiver	12 m
Distance attenuation	-21.6 dB(A)
Building screening	0 dB(A)
Façade reflection	2.5 dB(A)
Impact inside closed windows	2.9 dB(A)
<b>Combined impact</b>	<b>30.2 dB(A)</b>

Proposed Childcare Ground level playspace	
Car door closures	57 dB(A) @ 1m
Distance source to receiver	39 m
Distance attenuation	-31.8 dB(A)
Building screening	-8 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	19.2 dB(A)
Car bypasses	61 dB(A) @ 1m
Distance source to receiver	34 m
Distance attenuation	-30.6 dB(A)
Building screening	-6 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	26.8 dB(A)
Manufacturing activity	85 dB(A) @ 1m
Distance source to receiver	25 m
Distance attenuation	-28.0 dB(A)
Building screening	-30 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	29.5 dB(A)
Goods unloading on industrial driveway	81 dB(A) @ 1m
Distance source to receiver	39 m
Distance attenuation	-31.8 dB(A)
Building screening	-20 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	31.7 dB(A)
Waste collection on industrial driveway	88 dB(A) @ 1m
Distance source to receiver	39 m
Distance attenuation	-31.8 dB(A)
Building screening	-20 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	38.7 dB(A)
A/C unit x 2 east side of building	55 dB(A) @ 1m
Distance source to receiver	25 m
Distance attenuation	-28.0 dB(A)
Building screening	-20 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	9.5 dB(A)
Toilet exhaust	52 dB(A) @ 1m
Distance source to receiver	28 m
Distance attenuation	-28.9 dB(A)
Building screening	-15 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	10.6 dB(A)
<b>Combined impact</b>	<b>40.1 dB(A)</b>

ONSITE ACTIVITY NOISE IMPACTING THE FAÇADES OF:

Proposed Childcare Top floor level playspace	
Car door closures	57 dB(A) @ 1m
Distance source to receiver	27 m
Distance attenuation	-28.6 dB(A)
Building screening	-6 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	24.4 dB(A)
Car bypasses	61 dB(A) @ 1m
Distance source to receiver	23 m
Distance attenuation	-27.2 dB(A)
Building screening	-6 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	30.2 dB(A)
Manufacturing activity	85 dB(A) @ 1m
Distance source to receiver	16 m
Distance attenuation	-24.1 dB(A)
Building screening	-30 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	33.4 dB(A)
Goods unloading on industrial driveway	81 dB(A) @ 1m
Distance source to receiver	40 m
Distance attenuation	-32.0 dB(A)
Building screening	-20 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	31.5 dB(A)
Waste collection on industrial driveway	88 dB(A) @ 1m
Distance source to receiver	40 m
Distance attenuation	-32.0 dB(A)
Building screening	-20 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	38.5 dB(A)
A/C unit x 2 east side of building	55 dB(A) @ 1m
Distance source to receiver	16 m
Distance attenuation	-24.1 dB(A)
Building screening	-20 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	13.4 dB(A)
Toilet exhaust	52 dB(A) @ 1m
Distance source to receiver	16 m
Distance attenuation	-24.1 dB(A)
Building screening	-8 dB(A)
Façade reflection	2.5 dB(A)
Impact at façade	22.4 dB(A)
<b>Combined impact</b>	<b>40.8 dB(A)</b>

POINT CALCULATIONS

Pen3D2000 V 1.10.0

Project Code:16186a

Project Description:Noise assessment of Byron Childcare

File:G:\Users\Matty\CRGNAS\2016\16186 Childcare and Industrial Byron Bay COMM IND\16186a\_existing.PEN

Monday 23 Jan, 2017 at 09:28:58

CoRTN Calculations

All road segments included. Segmentation angle: 1degrees. Road elevations apply.

Receptor	X Posn (m)	Y Posn (m)	Height (m)	Leq(24hour) (dB(A))
monitor	557284.7	6831963.8	1.4	65.4 free-field

Project Description:Noise assessment of Byron Childcare

File:G:\Users\Matty\CRGNAS\2016\16186 Childcare and Industrial Byron Bay COMM IND\16186a\_ultimate.PEN

File Description:Data file covering ultimate

Monday 23 Jan, 2017 at 11:41:47

CoRTN Calculations

All road segments included. Segmentation angle: 1degrees. Road elevations apply.

Receptor	X Posn (m)	Y Posn (m)	Height (m)	Leq(24hour) (dB(A))
room1	556673.7	6832036.6	1.5	45.2
r1 ex	556680.2	6832030.4	1.5	62.6
room 2	556671.5	6832039.7	1.5	46.2
r2 ext	556664.6	6832041.2	1.5	55
room 3	556673.2	6832053.7	1.5	45.7
r3 ext	556664.9	6832055.6	1.5	50.6
room4	556689.8	6832036.5	5.4	51.4
r4 ext	556680.2	6832030.4	5.4	65.4
room5	556673.2	6832045.4	5.4	51.6
r5 ext	556664.6	6832041.2	5.4	58.5
caretaker's	556698.7	6832031.5	5.4	64.8
zen	556673.1	6832063.6	1.5	46.9
main	556680.9	6832049.5	1.5	47.1
sw	556669.7	6832037.4	1.5	46
nw	556673.9	6832056.7	5.4	51.8
ne	556693.4	6832053.8	5.4	51.8
se	556693.3	6832037	5.4	52.4


Proposed Job no.	Childcare Centre											
16186a												
<b>Rw Calculations to AS3671</b>												
Road Traffic Noise Space	Building Component	Impact dB(A)	Criteria dB(A)	TNR dB(A)	Element Area (m2)	Floor Area (m2)	Height (m)	RT60 (s)	C	TNA	Rw	
Activity Room 1	North / West Glazings	48.0	35	13.0	14.16	41.00	3.00	0.70	4	15.86	22	
Activity Room 1	North / West Walls	48.0	35	13.0	34.59	41.00	3.00	0.70	4	19.74	26	
Activity Room 1	South Glazing	66.0	35	31.0	5.04	41.00	3.00	0.70	4	29.38	35	
Activity Room 1	South Wall	66.0	35	31.0	12.51	41.00	3.00	0.70	4	33.33	39	
Activity Room 2	South / East Glazings	49.0	35	14.0	9.60	51.39	3.00	0.70	3	12.95	19	
Activity Room 2	South / East Walls	49.0	35	14.0	50.85	51.39	3.00	0.70	3	20.19	26	
Activity Room 2	West Wall	58.0	35	23.0	34.32	51.39	3.00	0.70	3	27.48	33	
Activity Room 3	North / East Glazings	49.0	35	14.0	9.39	51.82	3.00	0.70	3	12.81	19	
Activity Room 3	North / East Walls	49.0	35	14.0	41.31	51.82	3.00	0.70	3	19.25	25	
Activity Room 3	West Wall	54.0	35	19.0	33.93	51.82	3.00	0.70	3	23.39	29	
Activity Room 4	North / East Glazings	54.0	35	19.0	15.63	84.59	3.00	0.70	5	20.12	26	
Activity Room 4	North / West / East Walls	54.0	35	19.0	74.07	84.59	3.00	0.70	5	26.87	33	
Activity Room 4	South Glazings	68.0	35	33.0	6.00	84.59	3.00	0.70	5	29.96	36	
Activity Room 4	South Wall	68.0	35	33.0	29.40	84.59	3.00	0.70	5	36.86	43	
Activity Room 4	Roof / Ceiling	66.0	35	31.0	84.59	84.59	3.00	0.50	5	37.99	44	
Activity Room 5	North / South / East Glazings	55.0	35	20.0	11.04	76.32	3.00	0.70	4	19.09	25	
Activity Room 5	North / South / East Walls	55.0	35	20.0	83.73	76.32	3.00	0.70	4	27.88	34	
Activity Room 5	West Wall	62.0	35	27.0	31.80	76.32	3.00	0.70	4	30.68	37	
Activity Room 5	Roof / Ceiling	60.0	35	25.0	76.32	76.32	3.00	0.70	4	32.48	38	
Caretaker's dwelling	South Glazing	61.0	35	26.0	10.80	43.65	2.40	0.70	3	27.14	33	
Caretaker's dwelling	South Wall	61.0	35	26.0	3.30	43.65	2.40	0.70	3	21.99	28	
Caretaker's dwelling	Roof / Ceiling	59.0	35	24.0	43.65	43.65	2.40	0.70	3	31.20	37	



## **ATTACHMENT 4**

**Traffic Impact Assessment**

***TTM***



# THE HIVE – CENTENNIAL CIRCUIT BYRON BAY TRAFFIC IMPACT ASSESSMENT REPORT

FOR

SIXTY CENTENNIAL PTY LTD



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## 1. INTRODUCTION

Bitzios Consulting has been engaged by Sixty Centennial Pty Ltd to prepare a traffic impact assessment for a proposed mix-use development located at 88 – 94 Centennial Circuit, Byron Bay. The site currently exists as a vacant lot, with the site location shown in Figure 1.1.



Source: Google Earth – NSW Globe

Figure 1.1: Development Site location

### 1.1 PROPOSED DEVELOPMENT

The proposed development comprises of the following land uses:

- a two-story child care centre ('Kool Kids') with a total capacity of 78 enrolments;
- a 56m<sup>2</sup> manager's residence; and
- six (6) industrial tenancies ('The Hive');
- four (4) retail tenancies; and
- two (2) food and drink tenancies.

Access is proposed via a two-way driveway crossover from Centennial Circuit. All movements (i.e. left and right in) are permitted. Detailed development plans are provided in Appendix A.

### 1.2 SCOPE

The scope of this assessment includes:

- estimation of development's traffic generation and the distribution onto the external road network;
- summary of the site's traffic generation and any impacts on the surrounding road and intersections. This includes SIDRA modelling of the intersection of Centennial Circuit / Grevillea Street / Bayshore Drive and the intersection of Ewingsdale Road / Bayshore Drive for the expected year of opening and a 10-year design horizon for the AM and PM peak hours;
- assessment of site access location and form in accordance with Council's requirements;
- assessment of the development's car and bicycle parking requirements in accordance with Council's Development Control Plan (DCP) and Australian Standards (AS2890);
- assessment of the on-site parking layout for general traffic and service vehicle manoeuvring, including swept path checks using AutoTURN software;

- a review of on-site active transport amenity provisions; and
- assessment of public transport, pedestrian and cycling networks and connectivity within the vicinity of the site.

## 2. EXISTING CONDITIONS

### 2.1 ROAD NETWORK

The existing road network is summarised in Table 2.1.

Table 2.1: Surrounding Road Network Details

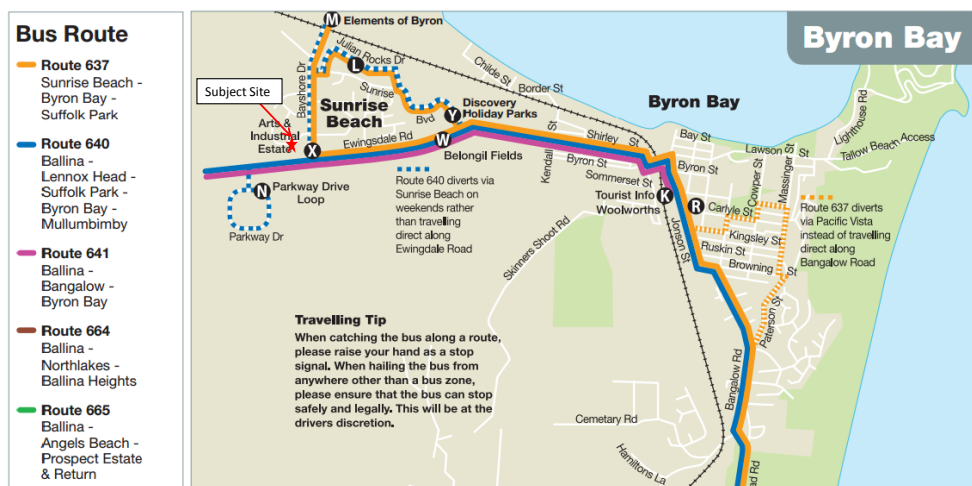
Road Name	No. of Lanes	Speed Limit	Divided	Jurisdiction	Hierarchy	Comments
Ewingsdale Road	2	80 km/h	No	Byron Shire Council	Arterial	Primary east-west arterial road connecting Byron Bay to the Pacific Highway.
Bayshore Drive	2	50 km/h	Yes (north to Grevillea Street)	Byron Shire Council	Local Collector	Links to Ewingsdale Road and is a no-through road. Services a number of residential and industrial land uses.
Centennial Circuit	2	50 km/h	No	Byron Shire Council	Local Access	Provides access to the development. Links from Ewingsdale Road and Bayshore Drive. Services a number of industrial land uses.

### 2.2 ALTERNATIVE TRANSPORT

#### 2.2.1 Public Transport

The development is reasonably well serviced by public transport (refer to Figure 2.1) with the closest bus stop (Stop X) located approximately 220m walking distance from the site. The Belongil Fields bus stop (Stop W) located approximately 1.3km walking distance, provides additional services to Ballina, Bangalow, Lennox Head and Mullumbimby.

A summary of bus routes that service the nearby stops are presented in Table 2.2.



Source: Blanch's Bus Company

Figure 2.1: Bus Route Map

Table 2.2: Bus Routes Servicing the Development

Route Number	Closest Bus Stop	Key Stops	Peak Service Interval
637	X	Sunrise Beach – Byron Bay – Suffolk Park	60 minutes
640	W	Ballina – Lennox Head – Suffolk park – Byron Bay - Mullumbimby	60 minutes
641	W	Ballina – Bangalow - Byron Bay	67 minutes

Additional bus stops are likely to be introduced near the Bayshore Drive / Ewingsdale Road intersection subject to the approval of a potential residential development on the southern side of Ewingsdale Road.

### 2.2.2 Active Transport

High quality shared pedestrian and bicycle footpaths are provided on surrounding streets including Bayshore Drive and Ewingsdale Road. Council Plans also indicate the potential construction of several pathways in the proximity of the development as shown in Figure 2.2.



Source: Byron Shire Council and the NSW Department of Lands

Figure 2.2: Active Transport Map

### 3. TRAFFIC ASSESSMENT

#### 3.1 OVERVIEW

This traffic assessment covers the following:

- identifying key surrounding roads and intersections;
- determining background traffic volumes from intersection count data;
- forecasting background traffic volumes using a compounding growth rate;
- estimating development traffic generation and distribution;
- determining design traffic volumes by combining forecast background traffic volumes and development trips for the anticipated year of opening and 10-year design horizon; and
- undertaking SIDRA intersection analysis for the key intersections.

The key intersections subject to the assessment are the intersection of Ewingsdale Road / Bayshore Drive and intersection of Bayshore Drive / Centennial Circuit / Grevillea Street.

#### 3.2 BACKGROUND TRAFFIC VOLUMES

##### 3.2.1 Intersection Count

Background traffic volumes for the intersection of Ewingsdale Road / Bayshore Drive and intersection of Bayshore Drive / Centennial Circuit / Grevillea Street were obtained from traffic counts undertaken by Traffic Data and Control (TDC) on Thursday 20<sup>th</sup> October 2016. The count data was recorded for both the AM and PM peak periods, where the network peak hour was identified as being from 8:00-9:00AM and 4:00-5:00PM respectively. The survey results for the AM and PM peak period traffic volumes are provided in Appendix B.

		Bayshore Drive							
AM Peak 8:00 - 9:00AM		24	14	L					
PM Peak 4:00 - 5:00PM		33	22	T	3	17	346	24	
		207	99	R	1	11	183	20	
Centennial Circuit		1	0	U	U	R	T	L	Grevillea Street
		L	T	R	U	U	0	0	
		274	283	86	13	L	20	20	
		151	237	85	37	T	15	18	
						R	28	64	
Development Site Location									
						404	261		
		268	434	L	180	164			
Ewingsdale Road		502	699	T	R	L			Ewingsdale Road
					R	230	214		
					T	462	690		

Figure 3.1: 2016 Background Traffic Volumes

#### 3.3 GROWTH RATE

The *West Byron Development Transport Study Report (March 2011)* prepared by Veitch Lister Consulting provides 2018 and 2028 Base Case Zenith Model Traffic Forecasts on Ewingsdale Road. The Zenith Model Scenario used to forecast the average weekday traffic volumes assumes that the following development and infrastructure projects are excluded:

- West Byron Development (all stages);
- Ewingsdale Road Four Lane Upgrade;

- Mini-Bypass (Butler Street to Jonson Street / Marvell Street); and
- Long-Bypass (Butler Street to Jonson Street / Browning Street).

The forecast growth rates summarised in Table 3.1 have been derived from 2018 and 2028 Daily Forecast Traffic Volumes for the key road links surrounding the subject site.

Table 3.1: Forecast Growth Rate Summary

Road Link	2018 Daily Forecast Volume	2028 Daily Forecast Volume	Forecast Growth Rate (compounded p.a)
Ewingsdale Road (West of Bayshore Drive)	18,820	20,340	0.77%
Ewingsdale Road (East of Bayshore Drive)	15,860	16,660	0.67%
Bayshore Drive	7,720	8,250	0.49%

A conservative compounding growth rate of 1% p.a. has been adopted for the estimation of forecast background traffic volumes on all roads assessed. Figure 3.2 and Figure 3.3 illustrate the forecast background traffic volumes for the expected year-of-opening (2018) with the 10-year design horizon (2028).

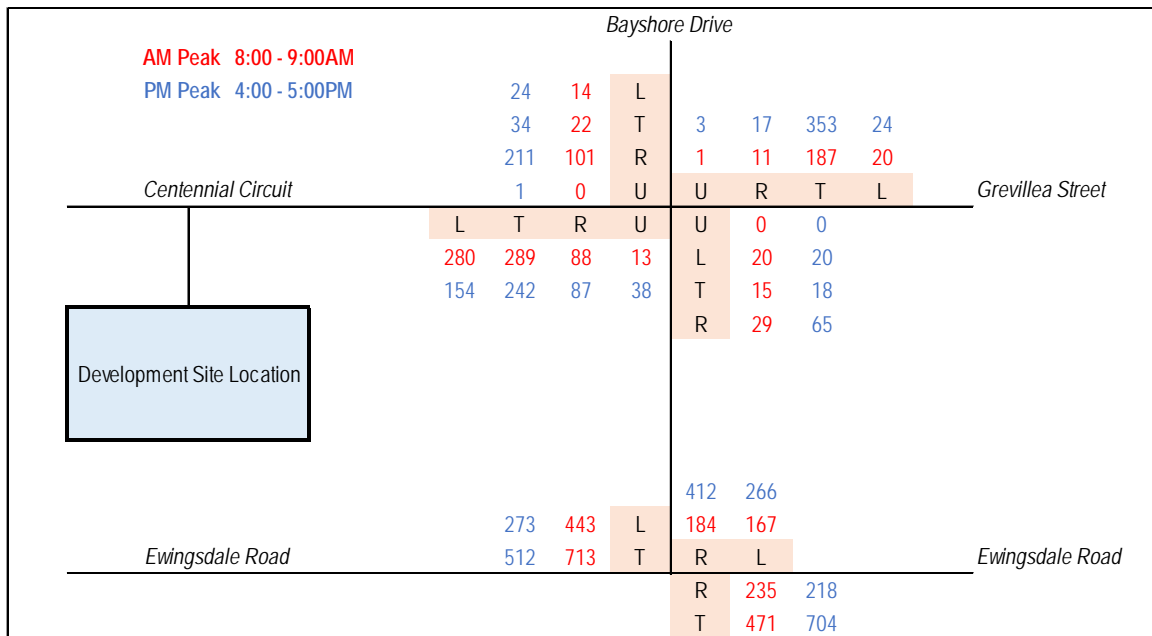


Figure 3.2: Forecast 2018 Background Traffic Volumes

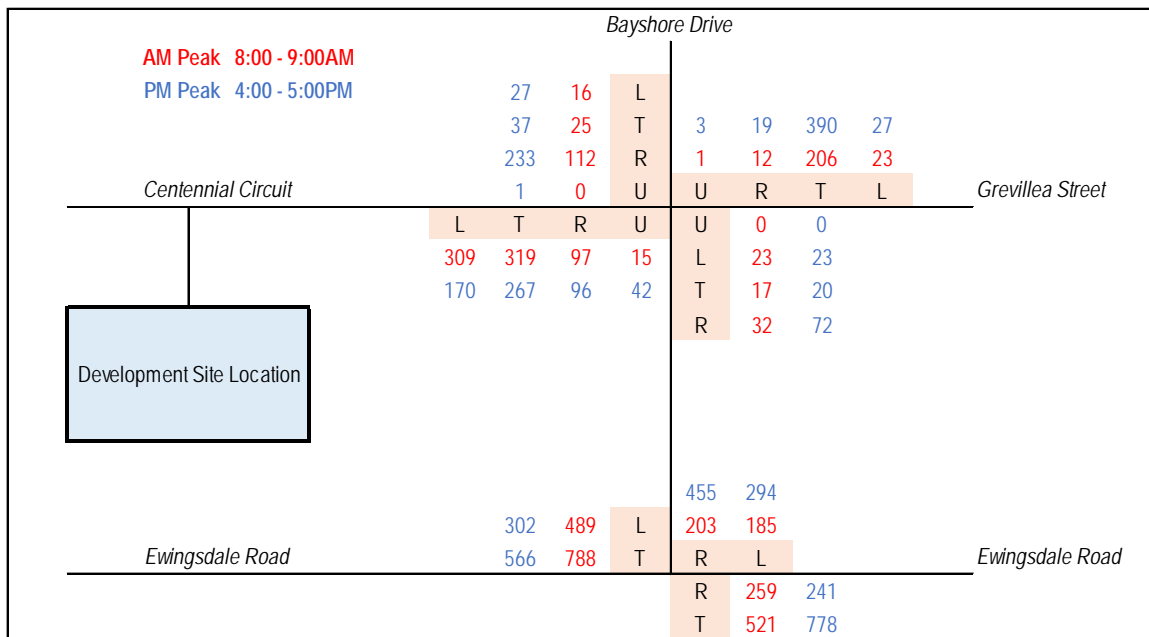


Figure 3.3: Forecast 2028 Background Traffic Volumes

### 3.4 DEVELOPMENT TRAFFIC GENERATION

Traffic generation rates for the proposed development were sourced from the *Roads and Maritime Services (Roads and Maritime) Guide to Traffic Generating Developments* (2002), and applied to each land use as follows:

- **Child Care Centre** – Roads and Maritime defined “Long Day Care”, specified AM and PM peak rates;
- **Industry** – Roads and Maritime defined “Factory”, specified PM peak rate. AM peak trips taken as 50% of PM peak trips;
- **Retail and Food and Drink Premises** – Roads and Maritime defined “Shopping Centre” (“A(SS) secondary retail”), specified PM peak rate. AM peak trips taken as 50% of PM peak trips; and
- it was assumed that the manager was working during peak hours and therefore the manager’s residence would not contribute to the peak hour trip generation.

The resultant AM and PM traffic generation is presented in Table 3.2 and Table 3.3.

Table 3.2: AM Development Traffic Generation

Land Use	Quantity	Rate	Trips (veh/hr)
Child Care Centre	78 Children Enrolled	0.8 trips per child enrolled	62.4
Industry	1390m <sup>2</sup> GFA	0.5 trips per 100m <sup>2</sup> GFA	7.0
Food and Drink	44m <sup>2</sup> GFA	2.8 trips per 100m <sup>2</sup> GFA	1.2
Retail	88m <sup>2</sup> GFA	2.8 trips per 100m <sup>2</sup> GFA	2.5
<b>Total AM Peak Trips</b>			<b>73</b>

Table 3.3: PM Development Traffic Generation

Land Use	Quantity	Rate	Trips (veh/hr)
Child Care Centre	78 Children Enrolled	0.7 trips per child enrolled	54.6
Industry	1390m <sup>2</sup> GFA	1 trips per 100m <sup>2</sup> GFA	13.9
Food and Drink	44m <sup>2</sup> GFA	5.6 trips per 100m <sup>2</sup> GFA	2.5
Retail	88m <sup>2</sup> GFA	5.6 trips per 100m <sup>2</sup> GFA	4.9
<b>Total PM Peak Trips</b>			<b>76</b>

The proposed development is expected to generate 73 vehicle trips in the AM peak hour and 76 trips in the PM peak hour. This is equivalent to approximately one (1) peak hour vehicle movement (ingress or egress) every 48 seconds.

The proposed developments IN/OUT trip splits are expected to be 50% / 50% for all land uses except for the industry components which are expected to have an 80% IN / 20% OUT split in the AM peak hour and vice versa in the PM peak hour based on the ITE Handbook. Table 3.4 details the expected total IN/OUT development trips.

**Table 3.4: AM and PM Development Traffic Splits**

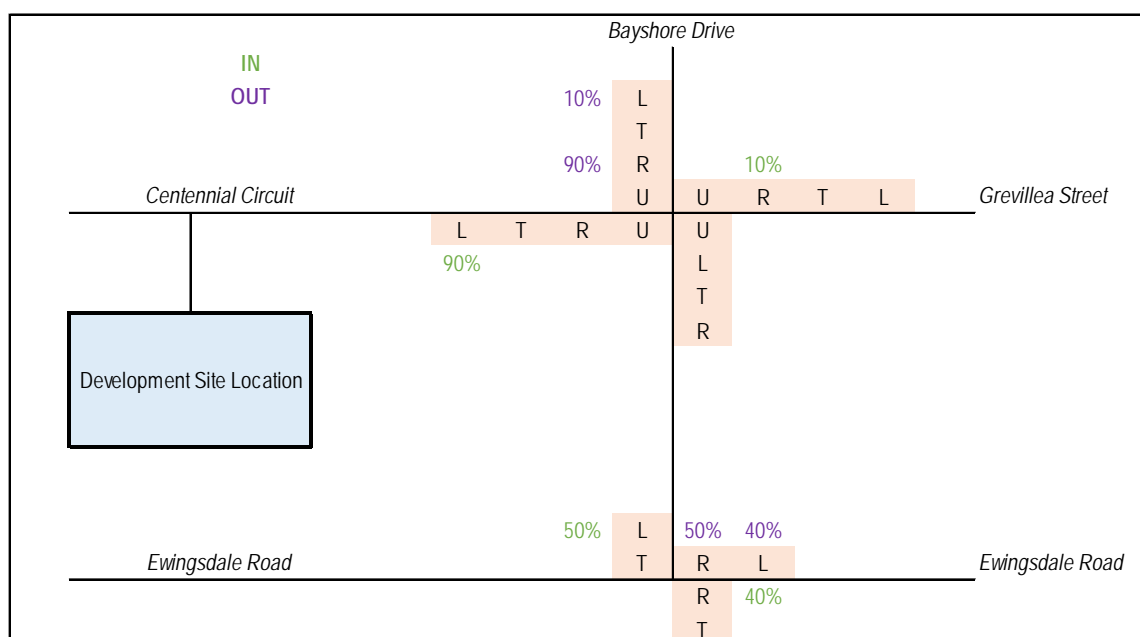
Land Use	AM		PM		AM		PM	
	IN%	OUT%	IN%	OUT%	IN	OUT	IN	OUT
Child Care Centre	50%	50%	50%	50%	31.2	31.2	27.3	27.3
Industry	80%	20%	20%	80%	5.6	1.4	2.8	11.1
Food and Drink	50%	50%	50%	50%	0.6	0.6	1.2	1.2
Retail	50%	50%	50%	50%	1.2	1.2	2.5	2.5
<b>Total Trips</b>					<b>39</b>	<b>34</b>	<b>34</b>	<b>42</b>

For the purpose of this assessment it has been assumed that the majority of traffic generated by the development will travel to and from Ewingsdale Road with a small percentage assumed to travel to and from the north (i.e. residential catchment). It should be noted that the intersection of Bayshore Drive / Ewingsdale Road is planned to be upgraded to a roundabout in the future to alleviate existing traffic congestion at this intersection and provide access to the future residential subdivision in the West Byron Development Area. The predicted intersection upgrade is likely to result in a reduction of vehicles choosing alternative routes to access Ewingsdale Road from Banksia Drive and Sunrise Boulevard.

The development’s directional traffic distribution percentage has been assumed as follows:

- trips to/from the development site are assumed as follows:
  - 10% to/from the north;
  - 40% to/from the east; and
  - 50% to/from the west.

The expected development AM and PM IN/OUT trip distributions at the key intersections are illustrated in Figure 3.4.



**Figure 3.4: Development Distribution**

The AM and PM development traffic volumes are illustrated in Figure 3.5.

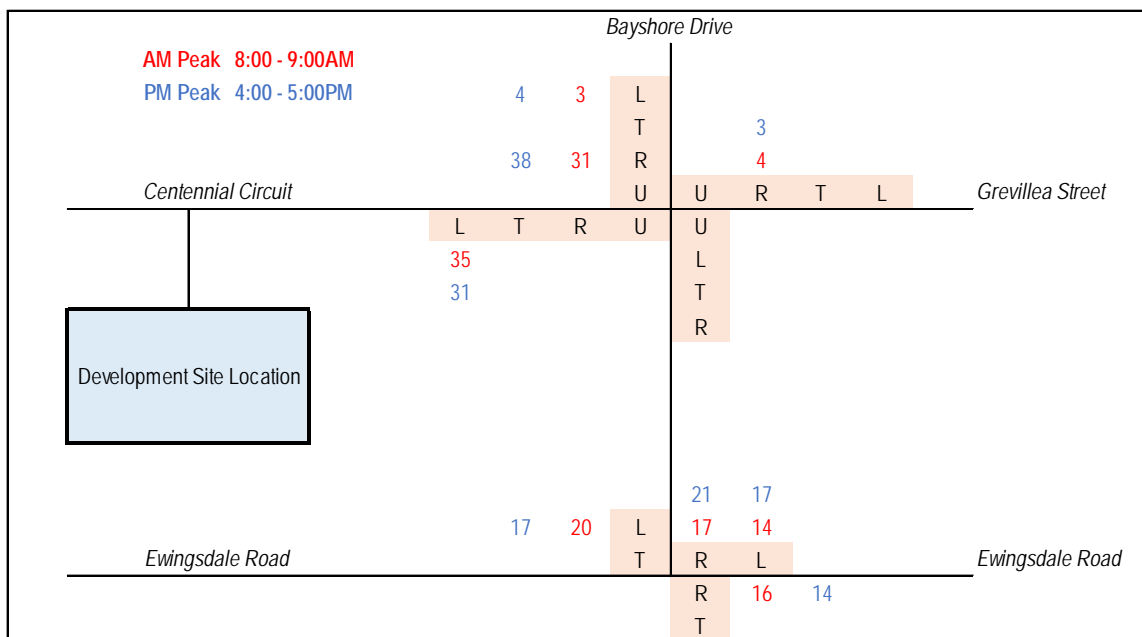


Figure 3.5: Development Traffic Volumes

### 3.5 DESIGN TRAFFIC VOLUMES

The traffic generated by the proposed development has been added to the background traffic volumes to determine design traffic volumes ('with development' scenario). The 2018 and 2028 design traffic volumes are shown in Figure 3.6 and Figure 3.7 respectively.

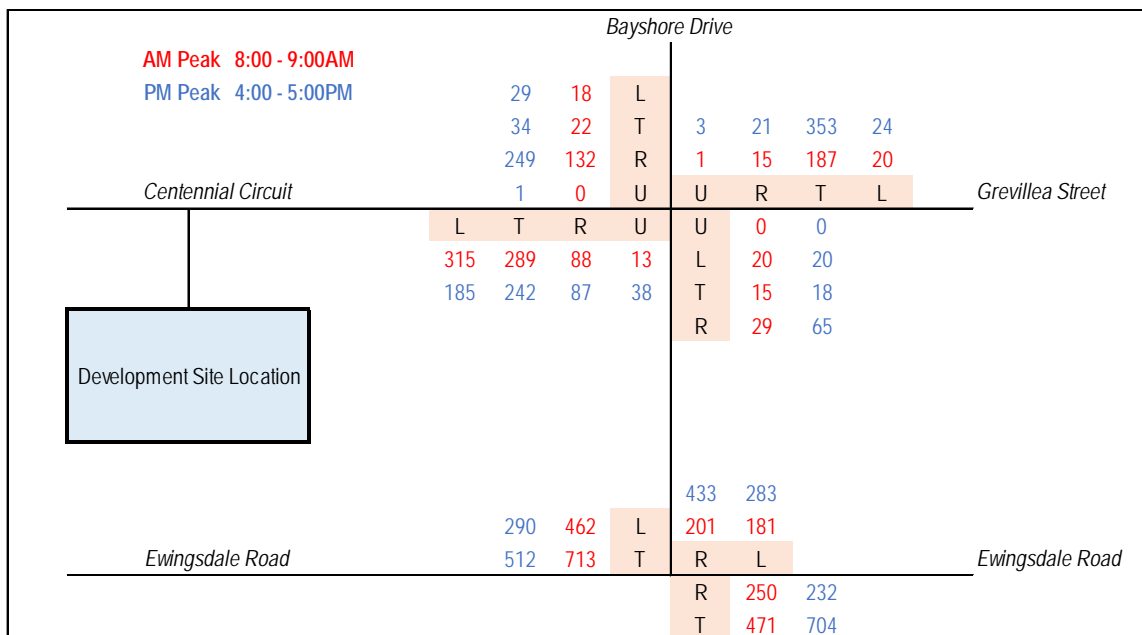


Figure 3.6: 2018 Design Traffic Volumes

		Bayshore Drive							
AM Peak 8:00 - 9:00AM		31	19	L					
PM Peak 4:00 - 5:00PM		37	25	T	3	23	390	27	
		271	142	R	1	16	206	23	
Centennial Circuit		1	0	U	U	R	T	L	Grevillea Street
		L	T	R	U	U	0	0	
		344	319	97	15	L	23	23	
		201	267	96	42	T	17	20	
						R	32	72	
						476	311		
		319	509	L	220	198			
Ewingsdale Road		566	788	T	R	L			Ewingsdale Road
					R	275	255		
					T	521	778		

Figure 3.7: 2028 Design Traffic Volumes

### 3.6 SIDRA ANALYSIS RESULTS

#### 3.6.1 Overview

The intersections of Ewingsdale Road / Bayshore Drive and Bayshore Drive / Centennial Circuit / Grevillea Street have been assessed in SIDRA 7.0 Plus intersection modelling software. The background and design traffic scenarios for the current year (2016), expected year of opening (2018) and 10-year design horizon (2028) have been analysed to determine the intersection's operational performance during the AM and PM peak hours.

#### 3.6.2 Intersection of Ewingsdale Road / Bayshore Drive

The SIDRA intersection layout of Ewingsdale Road / Bayshore Drive is illustrated in Figure 3.8. The intersection configuration is of a 'Seagull Arrangement', which will be assessed as a staged crossing in SIDRA.

The following points apply when assessing the staged crossing SIDRA results:

- the degree of saturation is the higher of the values for the two stages;
- the overall average delay is the sum of the average delay values for the two stages; and
- the level of service for the staged crossing could be assess using the average delay calculated as the sum of delays at the two stages of crossing.

The actual arrangement of the intersection is illustrated in Figure 3.9.

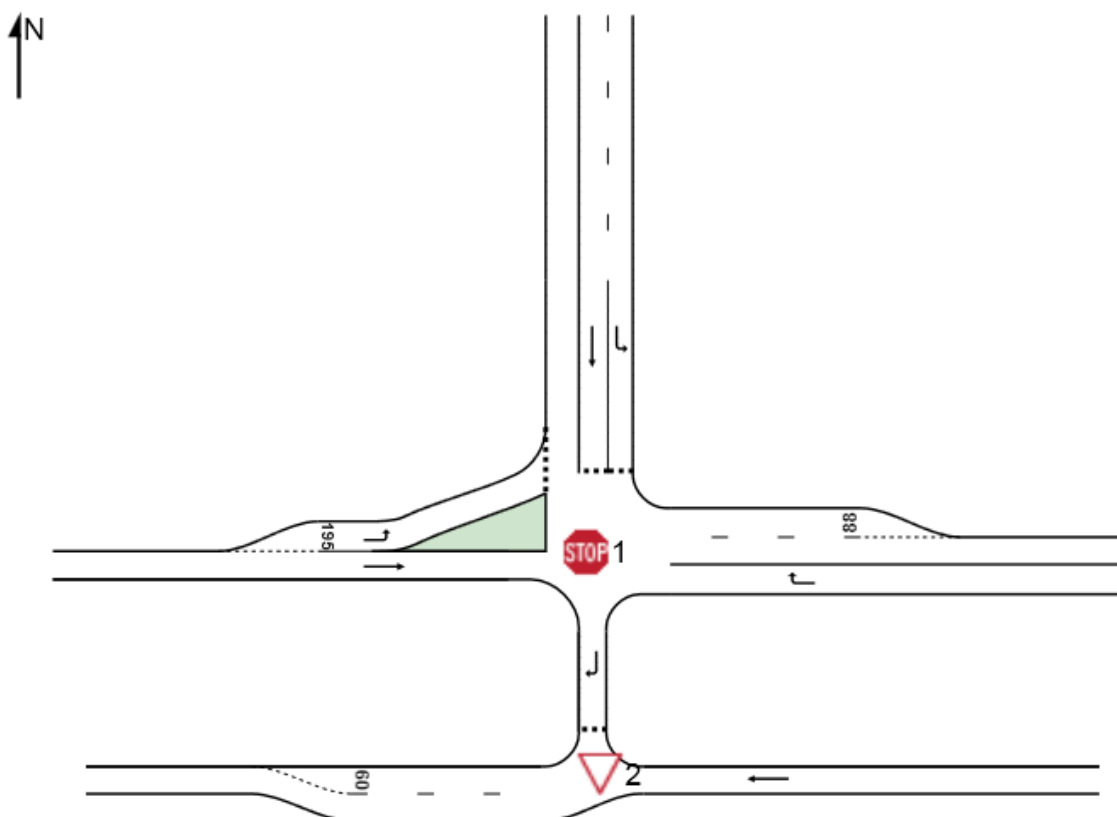


Figure 3.8: SIDRA Intersection Layout of Ewingsdale Road / Bayshore Drive



Figure 3.9: Actual Intersection Arrangement of Ewingsdale Road / Bayshore Drive

The SIDRA results for stage 1 2016 background traffic volumes are detailed in Table 3.5.

Table 3.5: 2016 SIDRA Results – Ewingsdale Rd / Bayshore Dr Intersection Stage 1

Approach	AM Peak					PM Peak				
	VOL	DOS	Average Delay (s)	LOS	95%ile Queue (m)	VOL	DOS	Average Delay (s)	LOS	95%ile Queue (m)
<b>2016 Background Results</b>										
Ewingsdale Rd (E)	242	0.34	11	N/A	12	242	0.244	8	N/A	8
Bayshore Dr (N)	362	1.01*	62*	E	97*	700	1.43*	258*	F	633*
Ewingsdale Rd (W)	1193	0.424	3	A	20	811	0.27	3	A	9

\*Note: Once DOS exceeds 1 the average delay and 95<sup>th</sup> percentile queue values become inaccurate

The SIDRA results for stage 2 2016 background traffic volumes are detailed in Table 3.6.

**Table 3.6: 2016 SIDRA Results – Ewingsdale Rd / Bayshore Dr Intersection Stage 2**

Approach	AM Peak					PM Peak				
	VOL	DOS	Average Delay (s)	LOS	95 <sup>th</sup> ile Queue (m)	VOL	DOS	Average Delay (s)	LOS	95 <sup>th</sup> ile Queue (m)
<b>2016 Background Results</b>										
Ewingsdale Rd (E)	486	0.26	0	N/A	0	726	0.382	0	N/A	0
Storage Area	189	0.23	2	A	5	425	0.446	5	A	11

The 2016 background traffic scenario for the intersection of Ewingsdale Road / Bayshore Drive fails in terms of Degree of Saturation (DOS), Level of Service (LOS), average delay and the 95<sup>th</sup> percentile queue on the Bayshore Drive approach. The SIDRA movement summaries for the intersection of Ewingsdale Road / Bayshore Drive are provided in Appendix C.

The failure of the intersection is an existing issue where the *Byron Shire Council Section 94 Contributions Plan* (2012) indicates that the intersection will be upgraded to a roundabout based on the scheduling of land release at the West Byron Development Area. The roundabout has been planned for taking into consideration surrounding developments; therefore, no additional modelling has been undertaken at this intersection. In addition, this development is only a minor traffic generator in comparison to the surrounding future development yields.

The applicant will provide development contributions (S94) to Council for this application. Council can decide whether they would like to use these contributions towards the roundabout upgrade, or any other enhancement, such as improvements to the cycling network in the area.

### 3.6.3 Intersection of Bayshore Drive / Centennial Circuit / Grevillea Street

The SIDRA intersection layout for the intersection of Bayshore Drive / Centennial Circuit / Grevillea Street is illustrated in Figure 3.10

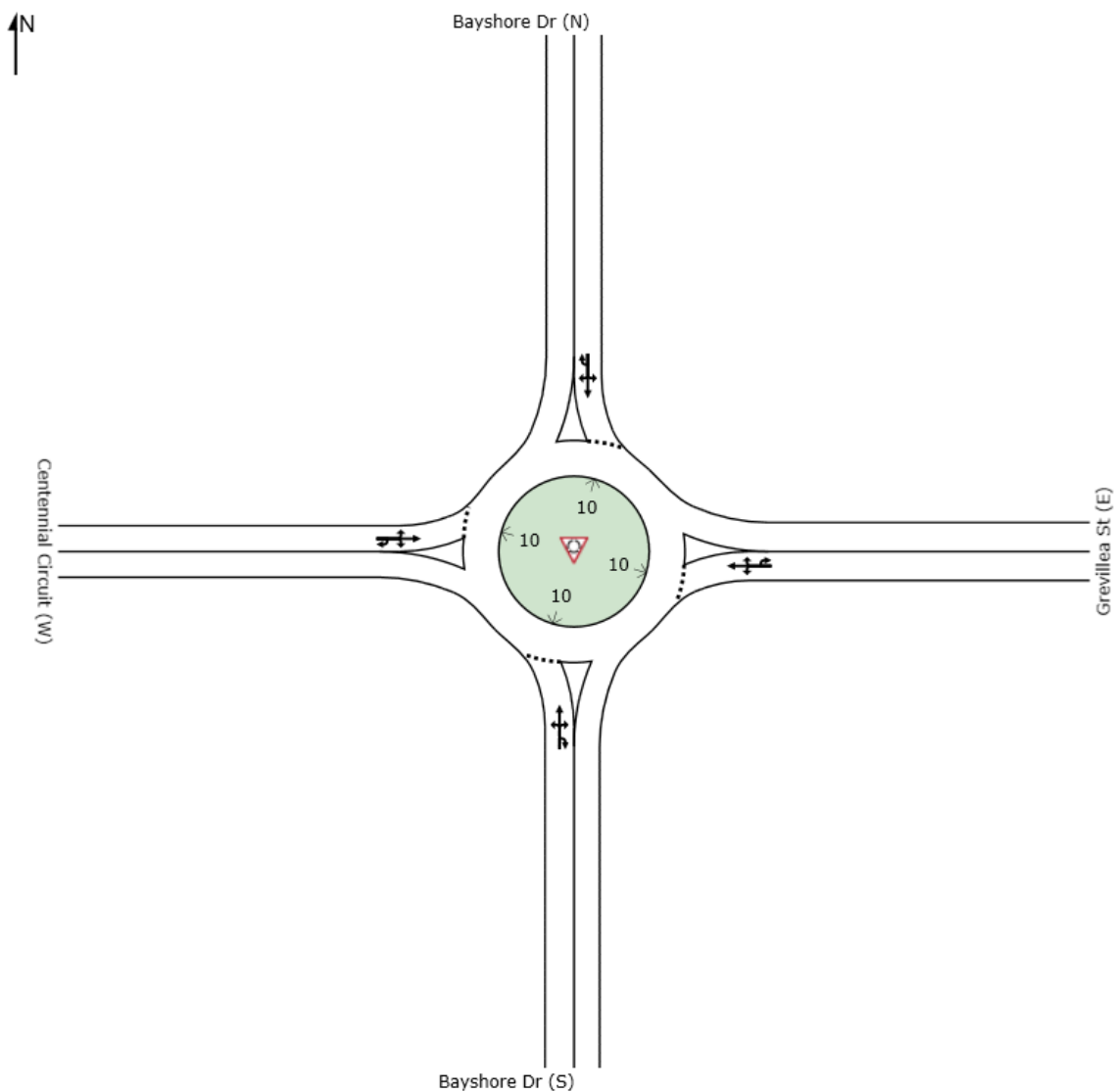


Figure 3.10: SIDRA Intersection Layout of Bayshore Dr / Centennial Circuit / Grevillea St

### 3.6.4 SIDRA Intersection Results

The SIDRA results for the 2016 background traffic volumes are detailed in Table 3.7.

Table 3.7: 2016 SIDRA Results – Bayshore Dr / Centennial Circuit / Grevillea St Intersection

Approach	AM Peak					PM Peak				
	VOL	DOS	Average Delay (s)	LOS	95%ile Queue (m)	VOL	DOS	Average Delay (s)	LOS	95%ile Queue (m)
<b>2016 Background Results</b>										
Bayshore Dr (S)	691	0.48	5	A	26	537	0.38	5	A	19
Grevillea St (E)	67	0.07	6	A	2	108	0.14	8	A	6
Bayshore Dr (N)	226	0.22	5	A	9	411	0.43	6	A	20
Centennial Circuit (W)	143	0.16	9	A	6	279	0.29	9	A	13
<b>Intersection</b>	<b>1127</b>	<b>0.48</b>	<b>5</b>	<b>A</b>	<b>26</b>	<b>1335</b>	<b>0.43</b>	<b>6</b>	<b>A</b>	<b>20</b>

The SIDRA results for the 2018 background and design traffic volumes are detailed in Table 3.8.

**Table 3.8: 2018 SIDRA Results – Bayshore Dr / Centennial Circuit / Grevillea St Intersection**

Approach	AM Peak					PM Peak				
	VOL	DOS	Average Delay (s)	LOS	95%ile Queue (m)	VOL	DOS	Average Delay (s)	LOS	95%ile Queue (m)
<b>2018 Background Results</b>										
Bayshore Dr (S)	705	0.49	5	A	27	548	0.39	5	A	19
Grevillea St (E)	68	0.07	6	A	2	109	0.14	8	A	6
Bayshore Dr (N)	231	0.22	5	A	9	418	0.44	6	A	21
Centennial Circuit (W)	145	0.16	9	A	7	284	0.30	9	A	13
<b>Intersection</b>	<b>1149</b>	<b>0.49</b>	<b>5</b>	<b>A</b>	<b>27</b>	<b>1360</b>	<b>0.44</b>	<b>7</b>	<b>A</b>	<b>21</b>
<b>2018 Design Results</b>										
Bayshore Dr (S)	742	0.51	5	A	30	581	0.42	5	A	21
Grevillea St (E)	68	0.07	7	A	3	109	0.15	8	A	6
Bayshore Dr (N)	235	0.23	5	A	10	422	0.46	7	A	23
Centennial Circuit (W)	182	0.20	9	A	8	331	0.35	9	A	16
<b>Intersection</b>	<b>1227</b>	<b>0.51</b>	<b>6</b>	<b>A</b>	<b>30</b>	<b>1443</b>	<b>0.46</b>	<b>7</b>	<b>A</b>	<b>23</b>

The SIDRA results for the 2028 background and design traffic volumes are detailed in Table 3.9.

**Table 3.9: 2028 SIDRA Results – Bayshore Dr / Centennial Circuit / Grevillea St Intersection**

Approach	AM Peak					PM Peak				
	VOL	DOS	Average Delay (s)	LOS	95%ile Queue (m)	VOL	DOS	Average Delay (s)	LOS	95%ile Queue (m)
<b>2028 Background Results</b>										
Bayshore Dr (S)	779	0.54	5	A	33	605	0.44	5	A	23
Grevillea St (E)	77	0.08	7	A	3	122	0.17	9	A	7
Bayshore Dr (N)	255	0.25	5	A	11	462	0.50	7	A	27
Centennial Circuit (W)	162	0.19	9	A	8	314	0.35	9	A	15
<b>Intersection</b>	<b>1273</b>	<b>0.54</b>	<b>5</b>	<b>A</b>	<b>33</b>	<b>1503</b>	<b>0.50</b>	<b>7</b>	<b>A</b>	<b>27</b>
<b>2028 Design Results</b>										
Bayshore Dr (S)	816	0.57	5	A	36	638	0.46	5	A	25
Grevillea St (E)	77	0.08	7	A	3	122	0.18	9	A	8
Bayshore Dr (N)	259	0.26	6	A	11	466	0.53	8	A	30
Centennial Circuit (W)	198	0.23	9	A	10	359	0.40	10	A	18
<b>Intersection</b>	<b>1349</b>	<b>0.57</b>	<b>6</b>	<b>A</b>	<b>36</b>	<b>1585</b>	<b>0.53</b>	<b>7</b>	<b>A</b>	<b>30</b>

In all 2016, 2018 and 2028 background and design traffic scenarios, the intersection of Bayshore Drive / Centennial Circuit / Grevillea Street performs well in terms of DOS, LOS, average delay and the 95<sup>th</sup> percentile queue. The addition of development traffic does not significantly impact the intersections performance; therefore, the intersection is not required to be upgraded. The SIDRA movement summaries for the intersection of Bayshore Drive / Centennial Circuit / Grevillea Street are provided in Appendix D.

It should be noted that the intersection of Bayshore Drive / Centennial Circuit / Grevillea Street currently experiences vehicle queues from the intersection of Ewingsdale Road / Bayshore Drive causing congestion. The above SIDRA results illustrate how the intersection performs by itself without impacts from adjacent intersections. The operations of the Ewingsdale Road / Bayshore Drive intersection is an existing issue which is expected to be resolved with the upgrade to a roundabout in the future.

## 4. PARKING AND ACCESS ASSESSMENT

### 4.1 CAR PARKING REQUIREMENTS

The car parking requirements for the development have been calculated in accordance with the Byron Shire Council DCP 2014. The car parking requirements are summarised in Table 4.1.

Table 4.1: Development Car Parking Requirements

Land Use	Quantity	Rate	Required
Child Care Centre	78 children enrolled	1 space per 4 children enrolled plus 1 pick-up/drop-off bay	20.5
Industry	1390m <sup>2</sup> GFA	1 space per 100m <sup>2</sup> GFA	13.9
Food and Drink Premises	44m <sup>2</sup> GFA	1 space per 20m <sup>2</sup> GFA	2.2
Retail	88m <sup>2</sup> GFA	1 space per 20m <sup>2</sup> GFA	4.4
Managers Residence	1 bedroom unit	-	1
<b>Total Car Parking Spaces</b>			<b>42</b>

The development has a car parking requirement of 42 car parking spaces including the pick-up/drop-off bay and two (2) People with Disability (PWD) bays. The proposed development plans illustrate provision for 43 car spaces, therefore complying with Council's car parking requirement.

### 4.2 CAR PARKING LAYOUT

The proposed development will provide User Class 3 and User Class 1A parking bay provisions designed in accordance with *Australian Standards AS2890.1:2004 Off-Street Parking*, *AS2890.2:2002 Off-Street Commercial Vehicle Facilities*, *AS2890.6:2009 Off Street Parking for people with Disabilities* and *Byron Shire Council DCP*. The car park layout geometrical design is summarised as follows:

- staff and visitor car parking bays have been provided in accordance with the relevant AS2890.1 User Class requirements (user Class 1A – 2.4m wide for staff, User Class 3 – 2.6m wide for visitors);
- the northern stretch of car parking bays are provided at 4.8m long with 0.6m of vehicle overhang in accordance with AS2890.1. The maximum kerb height will need to be 0.15m with any landscaping to be low lying;
- the southern stretch of car parking bays are provided at 5.4m long in accordance with AS2890.1;
- People with Disability (PWD) parking bays exceed AS2890.6 requirements with dimensions of 2.6m wide by 5.4m long with an adjacent shared area with the same dimensions;
- aisle widths are provided at 6m wide and therefore achieve the minimum requirement stipulated in AS2890.1 of 5.8m wide;
- the car parking design envelope for all car spaces are free of obstructions;
- a turnaround bay has been provided at the end of the parking aisle for visitors; and
- the car parking space at the end of the parking aisle will need to utilise the turnaround bay to reverse in to the end parking bay (i.e. reverse in only bay).

A swept path assessment was undertaken of all critical turning manoeuvres. The B99 and B85 swept path assessment provided in Appendix E illustrates no conflicts within the car parking area. Development plans outlining the geometry of the development car park are attached in Appendix A.

### 4.3 BICYCLE PARKING REQUIREMENTS

The bicycle parking requirements for the proposed development have been calculated in accordance with the Byron Shire Council DCP. The bicycle parking requirements are summarised in Table 4.2.

**Table 4.2: Development Bicycle Parking Requirements**

Land Use	Quantity	Rate	Required
Child Care Centre	78 children enrolled	0	0
Industry	1390m <sup>2</sup> GFA	0	0
Food and Drink Premises	44m <sup>2</sup> GFA	1 per 25m <sup>2</sup> GFA	1.76
Retail	88m <sup>2</sup> GFA	2 per 100m <sup>2</sup> GFA	1.76
Managers Residence	1 bedroom unit	-	0
<b>Total Bicycle Parking Spaces</b>			<b>4</b>

The proposed development has a bicycle parking requirement of four (4) bicycle spaces. The development plans provide four (4) visitor bicycle spaces and six (6) staff bicycle spaces which complies with Council's requirement. All bicycle parking spaces have been designed in accordance with the dimensional requirements of *AS2890.3: 2015 Bicycle Parking Facilities* (i.e. 0.5m space width, 1.8m space length and 1.5m aisle width). In addition, end of trip facilities will be provided in the form of one (1) unisex shower and change room within the area labelled as staff rooms. Female and male toilets are provided as part of the development.

## 5. ACCESS AND SERVICING ASSESSMENT

### 5.1 DRIVEWAY CROSSOVER

The proposed development has one (1) all movement crossover designed to allow the ingress and egress of a 12.5m Heavy Rigid Vehicle (HRV) and Council's Refuse Collection Vehicle (RCV). The driveway width is a minimum of 6m which is designed in accordance with AS2890.1 Category 2 crossover specifications.

A grade of 1:20 is required to be provided for the first 6m into the site from the property boundary in accordance with AS2890.1.

The development plans currently show no obstructions on the egress side of the driveway that would obstruct drivers line of sight to pedestrians. Sight triangles should be provided on the development plans in accordance with AS2890.1 at 2m across the property boundary and 2.5m into the property.

Swept path assessment for the access driveway has been provided in Appendix E.

### 5.2 SIGHT DISTANCE ASSESSMENT

The proposed access to the development site provides a minimum desirable gap acceptance sight distance equal to or greater than the minimum requirement of 69m in both directions in accordance with AS2890.1.

### 5.3 QUEUEING

In accordance with AS2890.1, the minimum queuing requirement for the proposed development is two (2) car lengths (i.e. 12m). The proposed development plans provide sufficient queuing space of approximately 13m; therefore, complying with AS2890.1.

### 5.4 SERVICING VEHICLES

Table 5.1 details the design service vehicle requirements for each land use as stipulated in the Byron Shire Council DCP.

**Table 5.1: Service Vehicle Requirements**

Land Use	Design Vehicle
Industry 200-799m <sup>2</sup> GFA	12.5m HRV
Retail Premises <199m <sup>2</sup> GFA	6.4m SRV
Business Premises <999m <sup>2</sup> GFA	6.4m SRV
Child Care Centre	VAN

The loading area illustrated on the development plans exceeds the requirements stipulated in AS2890.2 for a HRV (12.5m long by 3.5m wide). It is considered appropriate that all service vehicles that exceed the dimensions of a B99 vehicle can use the one (1) loading bay provided on site. The VAN service vehicle requirement for the child care centre can use the visitor car parking bays.

The largest design vehicle required for the proposed development is expected to be a 12.5m HRV. A swept path assessment (see Appendix E) demonstrates the ability for the HRV to ingress and egress the site in a forward direction. The HRV requires the first four (4) car parking spaces on both sides of the parking aisle on entry to the site during its ingress manoeuvring. It is recommended that the eight (8) car parking spaces are allocated to staff members and a site management plan implemented to manage HRV ingress and egress to the site.

The swept path of the HRV and RCV illustrates that the vehicles overhang the driveway when egressing the site; therefore, no obstructions are allowed adjacent to the driveway that would prevent the service and refuse vehicles from entering and exiting the site (i.e. fence, trees etc).

On the basis of the above, site servicing is expected to operate adequately.

## 5.5 REFUSE COLLECTION VEHICLE

Council's front end RCV will access the site, collect the refuse from the refuse collection area, and egress the site in a forward gear via Centennial Circuit. A swept path assessment provided in Appendix E has been undertaken illustrating the ingress and egress movements of the RCV.

On the basis of the above, the refuse collection arrangements are considered appropriate.

## 6. CONCLUSION

The key findings of the above traffic impact assessment report are summarised as follows:

- the proposed development is expected to generate 73 trips in the AM peak hour and 76 trips in the PM peak hour;
- the SIDRA assessment for the intersection of Ewingsdale Road / Bayshore Drive shows that the 2016 background traffic scenario fails in terms of DOS, LOS, average delay and the 95th percentile queue on the Bayshore Drive approach. The failure of the intersection is an existing issue where the Byron Shire Council Section 94 Contributions Plan (2012) indicates that the intersection will be upgraded to a roundabout based on the scheduling of land release at the West Byron Development Area. The roundabout has been planned for taking into consideration surrounding developments; therefore, no additional modelling has been undertaken at this intersection. In addition, this development is only a minor traffic generator in comparison to the surrounding future development yields;
- the SIDRA assessment for the intersection of Bayshore Drive / Centennial Circuit / Grevillea Street shows that all 2016, 2018 and 2028 background and design traffic scenarios perform well in terms of DOS, LOS, average delay and the 95th percentile queue;
- the development has a car parking requirement of 42 car parking spaces including the pick-up/drop-off bay and two PWD bays. The proposed development plans illustrate provision for 43 car spaces, therefore complying with Council's car parking requirement;
- the car park layout geometrical design complies with AS2890.1 and Council's DCP;
- the proposed development has a bicycle parking requirement of four (4) bicycle spaces. The development plans provide four (4) visitor bicycle spaces and six (6) staff bicycle spaces which complies with Council's requirement;
- the driveway crossover has been designed in accordance with AS2890.1 Category 2 crossover specifications (i.e. minimum width of 6m). A grade of 1:20 is required to be provided for the first 6m into the site from the property boundary in accordance with AS2890.1;
- the development plans currently show no obstructions on the egress side of the driveway that would obstruct drivers line of sight to pedestrians. Sight triangles should be provided on the development plans in accordance with AS2890.1 at 2m across the property boundary and 2.5m into the property.
- the proposed development complies with the minimum desirable gap acceptance sight distance of 69m;
- the proposed development complies with the minimum queueing requirement of two (2) vehicle lengths (i.e. 12m);
- the proposed development provides provision for a HRV to ingress and egress the site in a forward gear. The first four (4) car space on both sides of the aisle are required to be vacant during servicing;
- Council's front end RCV will access the site, collect the refuse from the refuse collection area, and egress the site in a forward gear via Centennial Circuit; and
- the public and active transport infrastructure surrounding the development site is considered to be adequate.

Based on the above assessment we conclude that there are no significant traffic or transport impacts associated with the proposed development that would preclude its approval and relevant conditioning by Council.

## APPENDIX A

### DEVELOPMENT PLANS



SCALE : 1:500 @A3

LEVEL 00

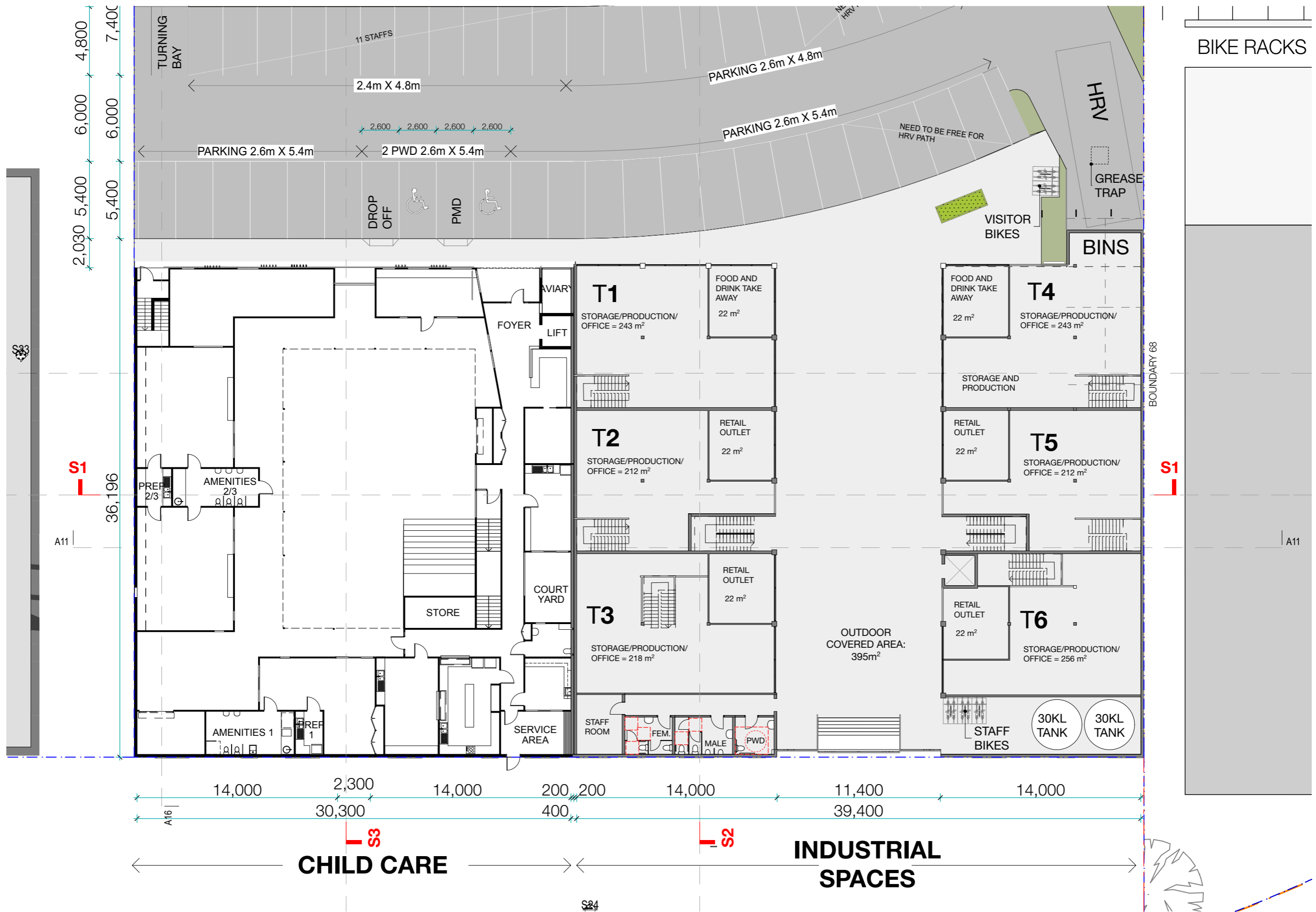


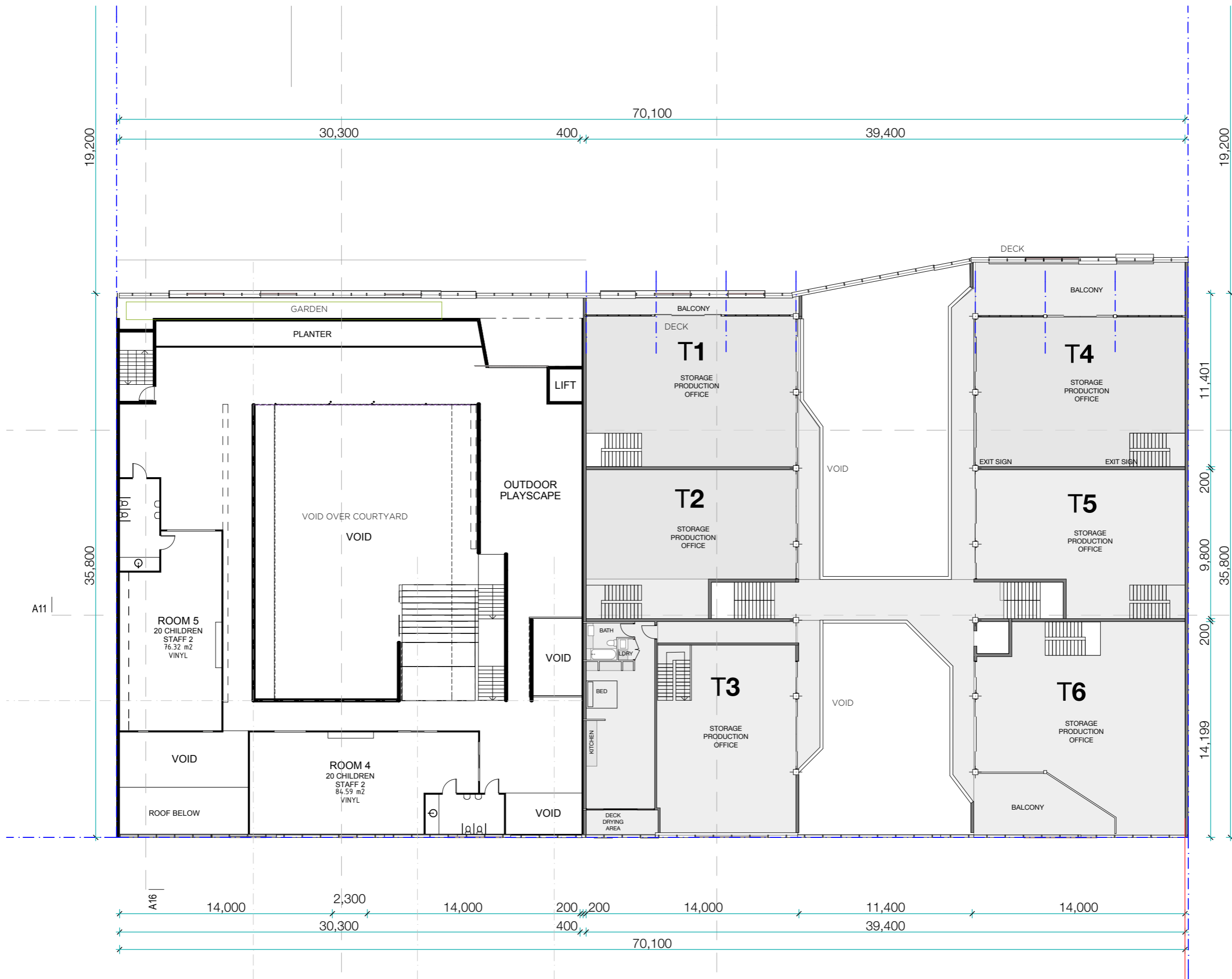
SCALE : 1:500 @A3

LEVEL 01

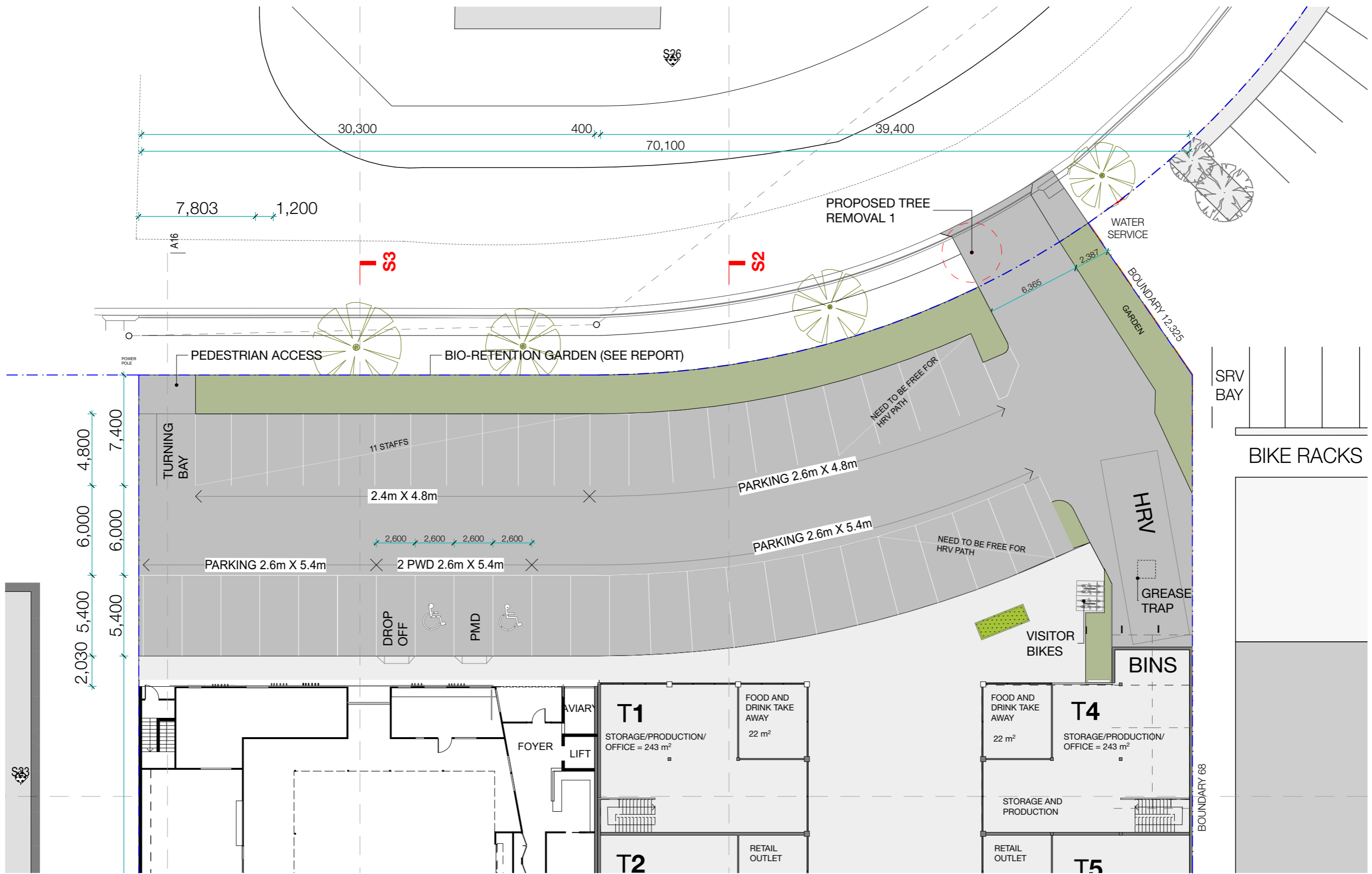
### INDUSTRIAL SPACES

LEVEL 0	
INDUSTRIAL	680 m <sup>2</sup>
RETAIL	88 m <sup>2</sup>
TAKE AWAY	44 m <sup>2</sup>
WC	40 m <sup>2</sup>
LEVEL 1	
INDUSTRIAL	710 m <sup>2</sup>
MANAGER RESIDENCE	56 m <sup>2</sup>
DECK	140 m <sup>2</sup>
<b>TOTAL GFA</b>	<b>1,562 m<sup>2</sup></b>





LEVEL 01  
Scale 1:250



## APPENDIX B

### TRAFFIC SURVEYS









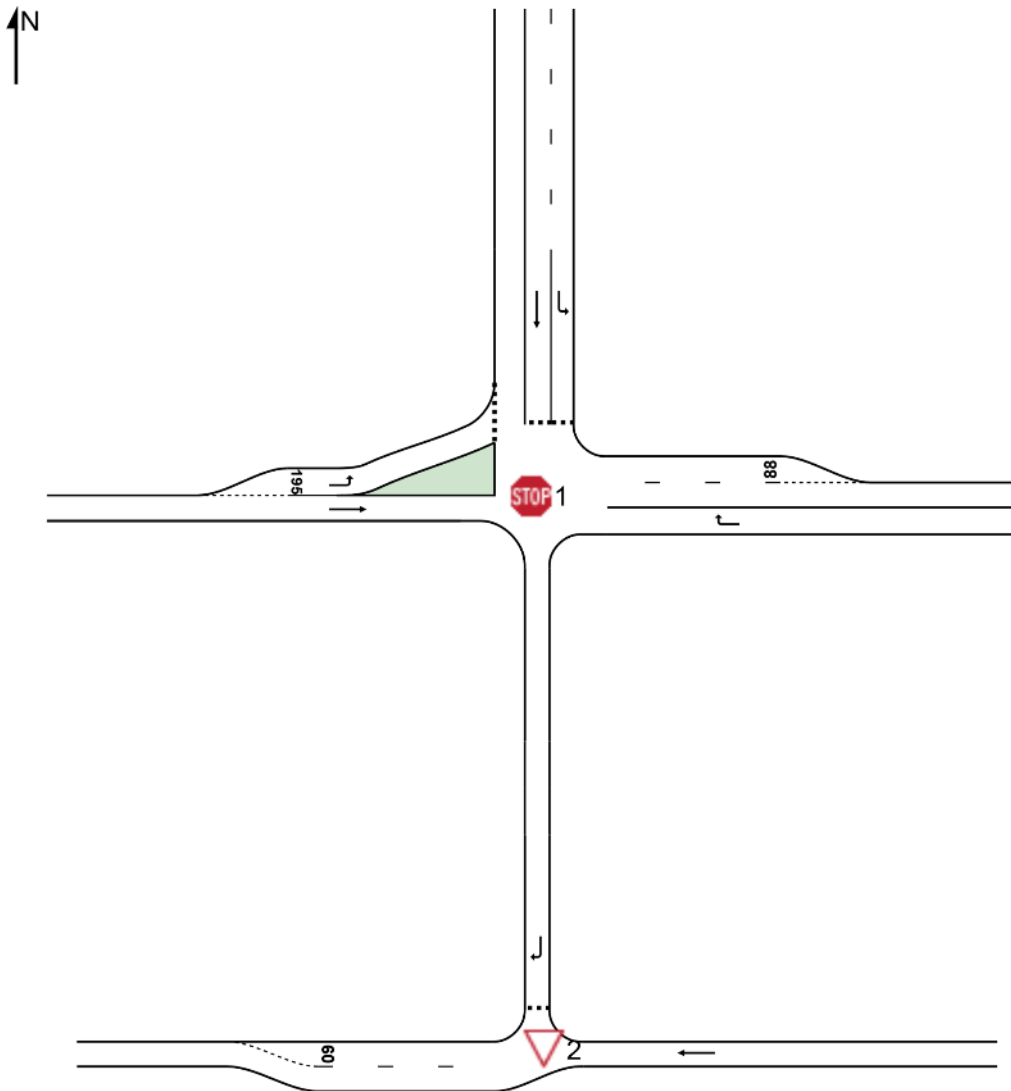
## APPENDIX C

### SIDRA RESULTS – EWINGSDALE ROAD / BAYSHORE

#### DRIVE INTERSECTION

# NETWORK LAYOUT

Network: N101 [2016 AM Base]



## SITES IN NETWORK

Site ID	Site Name
STOP1	2016 AM Base - Stage 1
Yield2	2016 AM Base - Stage 2

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Organisation: BITZIOS CONSULTING | Created: Monday, 9 January 2017 1:31:03 PM

Project: P:\P2841 Centennial Drive Byron Bay TIA\Technical Work\Models\P2841.001 Bayshore Dve & Ewingsdale Rd.sip7

# MOVEMENT SUMMARY

 Site: 1 [2016 AM Base - Stage 1]

 Network: N101 [2016 AM Base]

Intersection of Ewingsdale Rd / Bayshore Dr  
2016 AM Background Traffic  
Stop (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV %	Arrival Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h		veh/h		v/c	sec		veh	m		per veh	km/h
East: Ewingsdale Rd (E)													
12	R2	242	4.8	242	4.8	0.336	11.0	LOS A	1.7	12.1	0.68	0.92	30.1
Approach		242	4.8	242	4.8	0.336	11.0	NA	1.7	12.1	0.68	0.92	30.1
North: Bayshore Dr (N)													
1	L2	173	6.1	173	6.1	0.261	10.5	LOS A	1.1	7.8	0.65	0.88	29.6
2	T1	189	15.0	189	15.0	1.009	108.9	LOS F	12.2	96.8	1.00	1.95	3.8
Approach		362	10.8	362	10.8	1.009	62.0	LOS E	12.2	96.8	0.84	1.44	8.2
West: Ewingsdale Rd (W)													
4	L2	457	6.7	457	6.7	0.424	7.6	LOS A	2.6	19.5	0.47	0.67	48.6
5	T1	736	4.7	736	4.7	0.387	0.1	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		1193	5.5	1193	5.5	0.424	3.0	LOS A	2.6	19.5	0.18	0.26	54.9
All Vehicles		1797	6.4	1797	6.4	1.009	15.9	NA	12.2	96.8	0.38	0.58	37.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Network Model Accuracy Level (largest change in degree of saturation for any lane): 0.0 %

Number of Iterations: 3 (maximum specified: 10)

# MOVEMENT SUMMARY

Site: 2 [2016 AM Base - Stage 2]

Network: N101 [2016 AM Base]

Intersection of Ewingsdale Rd / Bayshore Dr  
2016 AM Background Traffic  
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
East: Ewingsdale Rd (E)													
11	T1	486	5.2	486	5.2	0.258	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		486	5.2	486	5.2	0.258	0.0	NA	0.0	0.0	0.00	0.00	59.9
North: Storage Area													
3	R2	189	15.0	188	15.0	0.225	2.4	LOS A	0.8	4.9	0.48	0.46	48.6
Approach		189	15.0	188 <sup>N1</sup>	15.0	0.225	2.4	LOS A	0.8	4.9	0.48	0.46	48.6
All Vehicles		676	7.9	674 <sup>N1</sup>	8.0	0.258	0.7	NA	0.8	4.9	0.13	0.13	57.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Network Model Accuracy Level (largest change in degree of saturation for any lane): 0.0 %

Number of Iterations: 3 (maximum specified: 10)

**N1** Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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Project: P:\P2841 Centennial Drive Byron Bay TIA\Technical Work\Models\P2841.001 Bayshore Dve & Ewingsdale Rd.sip7

# MOVEMENT SUMMARY

 Site: 1 [2016 PM Base - Stage 1]

 Network: N101 [2016 PM Base]

Intersection of Ewingsdale Rd / Bayshore Dr  
2016 PM Background Traffic  
Stop (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total	Flows HV %	Arrival Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
East: Ewingsdale Rd (E)													
12	R2	242	5.2	242	5.2	0.244	8.2	LOS A	1.1	8.1	0.58	0.77	33.7
Approach		242	5.2	242	5.2	0.244	8.2	NA	1.1	8.1	0.58	0.77	33.7
North: Bayshore Dr (N)													
1	L2	275	1.9	275	1.9	0.292	8.4	LOS A	1.3	9.4	0.56	0.81	32.3
2	T1	425	4.0	425	4.0	1.431	418.4	LOS F	87.5	633.2	1.00	6.28	1.0
Approach		700	3.2	700	3.2	1.431	257.5	LOS F	87.5	633.2	0.83	4.13	2.1
West: Ewingsdale Rd (W)													
4	L2	282	5.2	282	5.2	0.259	7.0	LOS A	1.2	8.7	0.41	0.62	49.0
5	T1	528	2.6	528	2.6	0.274	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		811	3.5	811	3.5	0.274	2.5	LOS A	1.2	8.7	0.14	0.22	55.5
All Vehicles		1753	3.6	1753	3.6	1.431	105.1	NA	87.5	633.2	0.48	1.85	10.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Network Model Accuracy Level (largest change in degree of saturation for any lane): 0.5 %

Number of Iterations: 6 (maximum specified: 10)

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Project: P:\P2841 Centennial Drive Byron Bay TIA\Technical Work\Models\P2841.001 Bayshore Dve & Ewingsdale Rd.sip7

# MOVEMENT SUMMARY

Site: 2 [2016 PM Base - Stage 2]

Network: N101 [2016 PM Base]

Intersection of Ewingsdale Rd / Bayshore Dr  
2016 PM Background Traffic

Giveaway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Flows Total	Flows HV %	Arrival Flows Total	Flows HV %	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Queue Distance	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		veh/h	%	veh/h	%	v/c	sec		veh	m			
East: Ewingsdale Rd (E)													
11	T1	726	3.8	726	3.8	0.382	0.1	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		726	3.8	726	3.8	0.382	0.1	NA	0.0	0.0	0.00	0.00	59.9
North: Storage Area													
3	R2	425	4.0	297	4.0	0.446	5.4	LOS A	2.0	11.4	0.67	0.86	45.7
Approach		425	4.0	297 <sup>N1</sup>	4.0	0.446	5.4	LOS A	2.0	11.4	0.67	0.86	45.7
All Vehicles		1152	3.8	1023 <sup>N1</sup>	4.3	0.446	1.6	NA	2.0	11.4	0.19	0.25	56.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Network Model Accuracy Level (largest change in degree of saturation for any lane): 0.5 %

Number of Iterations: 6 (maximum specified: 10)

<sup>N1</sup> Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

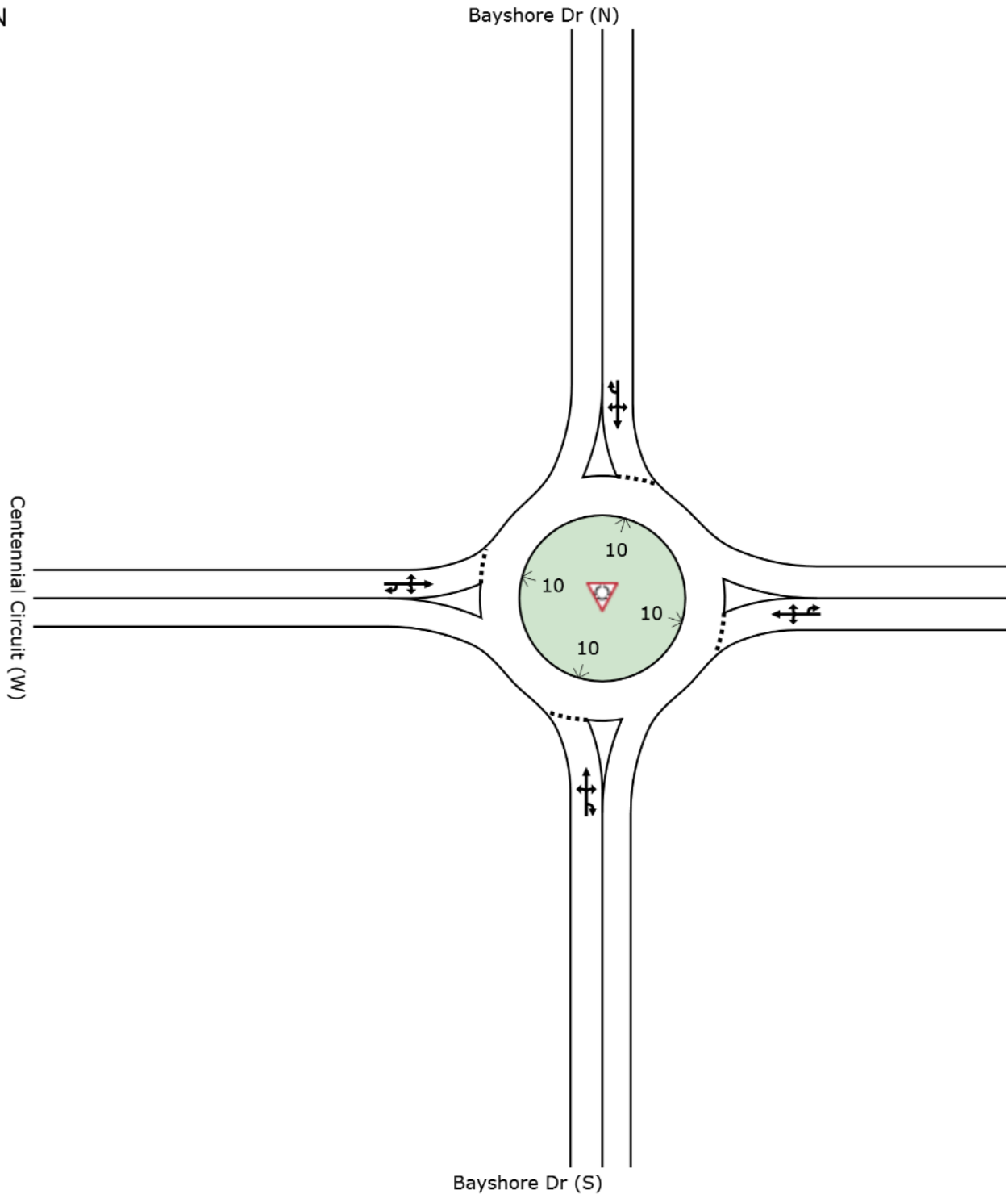
## APPENDIX D

### SIDRA RESULTS – BAYSHORE DRIVE / CENTENNIAL CIRCUIT / GREVILLEA STREET INTERSECTION

# SITE LAYOUT

 Site: [2016 AM Base]

Intersection of Bayshore Dr / Centennial Circuit / Grevillea St  
2016 AM Background Traffic  
Roundabout



# MOVEMENT SUMMARY

 Site: [2016 AM Base]

Intersection of Bayshore Dr / Centennial Circuit / Grevillea St  
2016 AM Background Traffic  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue	Prop. Queued	Effective Stop Rate	Average Speed	
		Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m	per veh	km/h	
South: Bayshore Dr (S)											
1	L2	288	1.5	0.478	3.9	LOS A	3.6	26.0	0.25	0.46	44.1
2	T1	298	8.8	0.478	3.9	LOS A	3.6	26.0	0.25	0.46	45.4
3	R2	91	7.0	0.478	7.4	LOS A	3.6	26.0	0.25	0.46	44.3
3u	U	14	0.0	0.478	8.9	LOS A	3.6	26.0	0.25	0.46	34.6
Approach		691	5.3	0.478	4.5	LOS A	3.6	26.0	0.25	0.46	44.6
East: Grevillea St (E)											
4	L2	29	7.1	0.068	5.2	LOS A	0.3	2.4	0.44	0.59	41.7
5	T1	16	6.7	0.068	5.1	LOS A	0.3	2.4	0.44	0.59	46.0
6	R2	21	10.0	0.068	8.6	LOS A	0.3	2.4	0.44	0.59	45.8
6u	U	1	0.0	0.068	10.0	LOS A	0.3	2.4	0.44	0.59	48.8
Approach		67	7.8	0.068	6.3	LOS A	0.3	2.4	0.44	0.59	44.6
North: Bayshore Dr (N)											
7	L2	21	0.0	0.219	4.8	LOS A	1.2	9.1	0.44	0.54	45.5
8	T1	193	13.7	0.219	5.0	LOS A	1.2	9.1	0.44	0.54	44.3
9	R2	12	0.0	0.219	8.2	LOS A	1.2	9.1	0.44	0.54	46.6
9u	U	1	0.0	0.219	9.8	LOS A	1.2	9.1	0.44	0.54	50.2
Approach		226	11.6	0.219	5.2	LOS A	1.2	9.1	0.44	0.54	44.7
West: Centennial Circuit (W)											
10	L2	15	7.1	0.160	6.2	LOS A	0.9	6.4	0.57	0.70	44.3
11	T1	23	4.5	0.160	6.1	LOS A	0.9	6.4	0.57	0.70	44.7
12	R2	104	7.1	0.160	9.7	LOS A	0.9	6.4	0.57	0.70	40.5
12u	U	1	0.0	0.160	11.1	LOS A	0.9	6.4	0.57	0.70	48.4
Approach		143	6.6	0.160	8.7	LOS A	0.9	6.4	0.57	0.70	41.9
All Vehicles		1127	6.9	0.478	5.3	LOS A	3.6	26.0	0.34	0.51	44.2

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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

 Site: [2016 PM Base]

Intersection of Bayshore Dr / Centennial Circuit / Grevillea St  
2016 PM Background Traffic  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue	Prop. Queued	Effective Stop Rate	Average Speed	
		Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m	per veh	km/h	
South: Bayshore Dr (S)											
1	L2	159	5.3	0.384	4.1	LOS A	2.6	18.8	0.25	0.48	43.8
2	T1	249	3.4	0.384	3.9	LOS A	2.6	18.8	0.25	0.48	45.2
3	R2	89	8.2	0.384	7.5	LOS A	2.6	18.8	0.25	0.48	44.0
3u	U	39	8.1	0.384	9.1	LOS A	2.6	18.8	0.25	0.48	33.9
Approach		537	5.1	0.384	4.9	LOS A	2.6	18.8	0.25	0.48	44.2
East: Grevillea St (E)											
4	L2	67	4.7	0.138	7.2	LOS A	0.8	5.5	0.66	0.72	40.5
5	T1	19	0.0	0.138	6.9	LOS A	0.8	5.5	0.66	0.72	45.3
6	R2	21	0.0	0.138	10.4	LOS A	0.8	5.5	0.66	0.72	45.1
6u	U	1	0.0	0.138	12.0	LOS A	0.8	5.5	0.66	0.72	47.8
Approach		108	2.9	0.138	7.8	LOS A	0.8	5.5	0.66	0.72	42.9
North: Bayshore Dr (N)											
7	L2	25	4.2	0.430	6.2	LOS A	2.8	20.4	0.64	0.68	44.8
8	T1	364	4.3	0.430	6.2	LOS A	2.8	20.4	0.64	0.68	43.8
9	R2	18	0.0	0.430	9.5	LOS A	2.8	20.4	0.64	0.68	46.0
9u	U	3	0.0	0.430	11.1	LOS A	2.8	20.4	0.64	0.68	49.5
Approach		411	4.1	0.430	6.3	LOS A	2.8	20.4	0.64	0.68	44.1
West: Centennial Circuit (W)											
10	L2	25	4.2	0.294	6.3	LOS A	1.8	12.5	0.60	0.73	44.3
11	T1	35	0.0	0.294	6.1	LOS A	1.8	12.5	0.60	0.73	44.6
12	R2	218	1.4	0.294	9.6	LOS A	1.8	12.5	0.60	0.73	40.5
12u	U	1	0.0	0.294	11.2	LOS A	1.8	12.5	0.60	0.73	48.3
Approach		279	1.5	0.294	8.9	LOS A	1.8	12.5	0.60	0.73	41.6
All Vehicles		1335	3.9	0.430	6.4	LOS A	2.8	20.4	0.48	0.61	43.4

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.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

 Site: [2018 AM Base]

Intersection of Bayshore Drive / Centennial Circuit  
2018 AM Background Traffic  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
		Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m		per veh	km/h
South: Bayshore Dr (S)											
1	L2	295	1.4	0.487	3.9	LOS A	3.7	26.9	0.25	0.46	44.1
2	T1	304	8.7	0.487	3.9	LOS A	3.7	26.9	0.25	0.46	45.4
3	R2	93	6.8	0.487	7.4	LOS A	3.7	26.9	0.25	0.46	44.3
3u	U	14	0.0	0.487	8.9	LOS A	3.7	26.9	0.25	0.46	34.6
Approach		705	5.2	0.487	4.5	LOS A	3.7	26.9	0.25	0.46	44.6
East: Grevillea St (E)											
4	L2	31	6.9	0.069	5.2	LOS A	0.3	2.4	0.45	0.59	41.7
5	T1	16	6.7	0.069	5.1	LOS A	0.3	2.4	0.45	0.59	46.0
6	R2	21	10.0	0.069	8.7	LOS A	0.3	2.4	0.45	0.59	45.8
6u	U	1	0.0	0.069	10.1	LOS A	0.3	2.4	0.45	0.59	48.8
Approach		68	7.7	0.069	6.3	LOS A	0.3	2.4	0.45	0.59	44.5
North: Bayshore Dr (N)											
7	L2	21	0.0	0.224	4.9	LOS A	1.2	9.3	0.44	0.54	45.5
8	T1	197	13.4	0.224	5.0	LOS A	1.2	9.3	0.44	0.54	44.3
9	R2	12	0.0	0.224	8.2	LOS A	1.2	9.3	0.44	0.54	46.6
9u	U	1	0.0	0.224	9.9	LOS A	1.2	9.3	0.44	0.54	50.2
Approach		231	11.4	0.224	5.2	LOS A	1.2	9.3	0.44	0.54	44.7
West: Centennial Circuit (W)											
10	L2	15	7.1	0.163	6.3	LOS A	0.9	6.6	0.57	0.70	44.3
11	T1	23	4.5	0.163	6.2	LOS A	0.9	6.6	0.57	0.70	44.7
12	R2	106	6.9	0.163	9.7	LOS A	0.9	6.6	0.57	0.70	40.5
12u	U	1	0.0	0.163	11.1	LOS A	0.9	6.6	0.57	0.70	48.4
Approach		145	6.5	0.163	8.8	LOS A	0.9	6.6	0.57	0.70	41.9
All Vehicles		1149	6.8	0.487	5.3	LOS A	3.7	26.9	0.34	0.52	44.2

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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

 Site: [2018 PM Base]

Intersection of Bayshore Dr / Centennial Circuit / Grevillea St  
2018 PM Background Traffic  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
		Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m		per veh	km/h
South: Bayshore Dr (S)											
1	L2	162	5.2	0.392	4.1	LOS A	2.7	19.4	0.25	0.48	43.8
2	T1	255	3.3	0.392	4.0	LOS A	2.7	19.4	0.25	0.48	45.2
3	R2	92	8.0	0.392	7.5	LOS A	2.7	19.4	0.25	0.48	44.0
3u	U	40	7.9	0.392	9.1	LOS A	2.7	19.4	0.25	0.48	33.8
Approach		548	5.0	0.392	5.0	LOS A	2.7	19.4	0.25	0.48	44.2
East: Grevillea St (E)											
4	L2	68	4.6	0.141	7.3	LOS A	0.8	5.6	0.67	0.73	40.5
5	T1	19	0.0	0.141	7.0	LOS A	0.8	5.6	0.67	0.73	45.2
6	R2	21	0.0	0.141	10.5	LOS A	0.8	5.6	0.67	0.73	45.1
6u	U	1	0.0	0.141	12.1	LOS A	0.8	5.6	0.67	0.73	47.7
Approach		109	2.9	0.141	7.9	LOS A	0.8	5.6	0.67	0.73	42.8
North: Bayshore Dr (N)											
7	L2	25	4.2	0.441	6.3	LOS A	2.9	21.1	0.65	0.69	44.8
8	T1	372	4.2	0.441	6.2	LOS A	2.9	21.1	0.65	0.69	43.7
9	R2	18	0.0	0.441	9.6	LOS A	2.9	21.1	0.65	0.69	46.0
9u	U	3	0.0	0.441	11.2	LOS A	2.9	21.1	0.65	0.69	49.5
Approach		418	4.0	0.441	6.4	LOS A	2.9	21.1	0.65	0.69	44.0
West: Centennial Circuit (W)											
10	L2	25	4.2	0.302	6.3	LOS A	1.8	12.9	0.61	0.73	44.2
11	T1	36	0.0	0.302	6.2	LOS A	1.8	12.9	0.61	0.73	44.6
12	R2	222	1.4	0.302	9.7	LOS A	1.8	12.9	0.61	0.73	40.4
12u	U	1	0.0	0.302	11.2	LOS A	1.8	12.9	0.61	0.73	48.2
Approach		284	1.5	0.302	8.9	LOS A	1.8	12.9	0.61	0.73	41.6
All Vehicles		1360	3.8	0.441	6.5	LOS A	2.9	21.1	0.48	0.62	43.4

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.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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# MOVEMENT SUMMARY

 Site: [2018 AM Design]

Intersection of Bayshore Dr / Centennial Circuit / Grevillea St  
2018 AM Design Traffic  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
		Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m		per veh	km/h
South: Bayshore Dr (S)											
1	L2	332	1.3	0.514	4.0	LOS A	4.0	29.5	0.27	0.46	44.1
2	T1	304	8.7	0.514	4.0	LOS A	4.0	29.5	0.27	0.46	45.3
3	R2	93	6.8	0.514	7.4	LOS A	4.0	29.5	0.27	0.46	44.3
3u	U	14	0.0	0.514	9.0	LOS A	4.0	29.5	0.27	0.46	34.5
Approach		742	5.0	0.514	4.5	LOS A	4.0	29.5	0.27	0.46	44.5
East: Grevillea St (E)											
4	L2	31	6.9	0.071	5.4	LOS A	0.3	2.5	0.47	0.60	41.6
5	T1	16	6.7	0.071	5.3	LOS A	0.3	2.5	0.47	0.60	46.0
6	R2	21	10.0	0.071	8.9	LOS A	0.3	2.5	0.47	0.60	45.7
6u	U	1	0.0	0.071	10.2	LOS A	0.3	2.5	0.47	0.60	48.7
Approach		68	7.7	0.071	6.5	LOS A	0.3	2.5	0.47	0.60	44.4
North: Bayshore Dr (N)											
7	L2	21	0.0	0.234	5.0	LOS A	1.3	9.9	0.48	0.57	45.3
8	T1	197	13.4	0.234	5.2	LOS A	1.3	9.9	0.48	0.57	44.1
9	R2	16	0.0	0.234	8.4	LOS A	1.3	9.9	0.48	0.57	46.5
9u	U	1	0.0	0.234	10.0	LOS A	1.3	9.9	0.48	0.57	50.0
Approach		235	11.2	0.234	5.4	LOS A	1.3	9.9	0.48	0.57	44.5
West: Centennial Circuit (W)											
10	L2	19	5.6	0.204	6.3	LOS A	1.1	8.4	0.59	0.72	44.2
11	T1	23	4.5	0.204	6.2	LOS A	1.1	8.4	0.59	0.72	44.6
12	R2	139	5.3	0.204	9.8	LOS A	1.1	8.4	0.59	0.72	40.4
12u	U	1	0.0	0.204	11.2	LOS A	1.1	8.4	0.59	0.72	48.2
Approach		182	5.2	0.204	9.0	LOS A	1.1	8.4	0.59	0.72	41.6
All Vehicles		1227	6.3	0.514	5.5	LOS A	4.0	29.5	0.37	0.53	44.0

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.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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# MOVEMENT SUMMARY

 Site: [2018 PM Design]

Intersection of Bayshore Dr / Centennial Circuit / Grevillea St  
2018 PM Design Traffic  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Bayshore Dr (S)											
1	L2	195	4.3	0.416	4.1	LOS A	2.9	21.1	0.27	0.49	43.8
2	T1	255	3.3	0.416	4.0	LOS A	2.9	21.1	0.27	0.49	45.2
3	R2	92	8.0	0.416	7.5	LOS A	2.9	21.1	0.27	0.49	44.0
3u	U	40	7.9	0.416	9.1	LOS A	2.9	21.1	0.27	0.49	33.8
Approach		581	4.7	0.416	4.9	LOS A	2.9	21.1	0.27	0.49	44.1
East: Grevillea St (E)											
4	L2	68	4.6	0.147	7.7	LOS A	0.8	6.0	0.69	0.75	40.1
5	T1	19	0.0	0.147	7.4	LOS A	0.8	6.0	0.69	0.75	45.0
6	R2	21	0.0	0.147	10.9	LOS A	0.8	6.0	0.69	0.75	44.8
6u	U	1	0.0	0.147	12.5	LOS A	0.8	6.0	0.69	0.75	47.4
Approach		109	2.9	0.147	8.3	LOS A	0.8	6.0	0.69	0.75	42.5
North: Bayshore Dr (N)											
7	L2	25	4.2	0.462	6.7	LOS A	3.2	22.9	0.69	0.73	44.6
8	T1	372	4.2	0.462	6.6	LOS A	3.2	22.9	0.69	0.73	43.5
9	R2	22	0.0	0.462	10.0	LOS A	3.2	22.9	0.69	0.73	45.8
9u	U	3	0.0	0.462	11.6	LOS A	3.2	22.9	0.69	0.73	49.3
Approach		422	4.0	0.462	6.9	LOS A	3.2	22.9	0.69	0.73	43.8
West: Centennial Circuit (W)											
10	L2	31	3.4	0.351	6.4	LOS A	2.2	15.6	0.63	0.74	44.1
11	T1	36	0.0	0.351	6.3	LOS A	2.2	15.6	0.63	0.74	44.5
12	R2	263	1.2	0.351	9.8	LOS A	2.2	15.6	0.63	0.74	40.3
12u	U	1	0.0	0.351	11.4	LOS A	2.2	15.6	0.63	0.74	48.1
Approach		331	1.3	0.351	9.1	LOS A	2.2	15.6	0.63	0.74	41.4
All Vehicles		1443	3.6	0.462	6.7	LOS A	3.2	22.9	0.51	0.64	43.2

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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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# MOVEMENT SUMMARY

 Site: [2028 AM Base ]

Intersection of Bayshore Dr / Centennial Circuit / Grevillea St  
2028 AM Background Traffic  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
		Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m		per veh	km/h
South: Bayshore Dr (S)											
1	L2	325	1.3	0.540	4.0	LOS A	4.5	32.5	0.29	0.47	44.0
2	T1	336	7.8	0.540	4.0	LOS A	4.5	32.5	0.29	0.47	45.3
3	R2	102	6.2	0.540	7.5	LOS A	4.5	32.5	0.29	0.47	44.2
3u	U	16	0.0	0.540	9.0	LOS A	4.5	32.5	0.29	0.47	34.3
Approach		779	4.7	0.540	4.6	LOS A	4.5	32.5	0.29	0.47	44.5
East: Grevillea St (E)											
4	L2	34	6.3	0.079	5.4	LOS A	0.4	2.8	0.47	0.61	41.6
5	T1	18	5.9	0.079	5.3	LOS A	0.4	2.8	0.47	0.61	45.9
6	R2	24	8.7	0.079	8.8	LOS A	0.4	2.8	0.47	0.61	45.7
6u	U	1	0.0	0.079	10.2	LOS A	0.4	2.8	0.47	0.61	48.7
Approach		77	6.8	0.079	6.5	LOS A	0.4	2.8	0.47	0.61	44.5
North: Bayshore Dr (N)											
7	L2	24	0.0	0.251	5.0	LOS A	1.4	10.6	0.48	0.56	45.4
8	T1	217	12.1	0.251	5.2	LOS A	1.4	10.6	0.48	0.56	44.2
9	R2	13	0.0	0.251	8.4	LOS A	1.4	10.6	0.48	0.56	46.5
9u	U	1	0.0	0.251	10.0	LOS A	1.4	10.6	0.48	0.56	50.1
Approach		255	10.3	0.251	5.4	LOS A	1.4	10.6	0.48	0.56	44.6
West: Centennial Circuit (W)											
10	L2	17	6.3	0.189	6.6	LOS A	1.1	7.8	0.61	0.73	44.1
11	T1	26	4.0	0.189	6.5	LOS A	1.1	7.8	0.61	0.73	44.5
12	R2	118	6.3	0.189	10.1	LOS A	1.1	7.8	0.61	0.73	40.2
12u	U	1	0.0	0.189	11.5	LOS A	1.1	7.8	0.61	0.73	48.2
Approach		162	5.8	0.189	9.1	LOS A	1.1	7.8	0.61	0.73	41.7
All Vehicles		1273	6.1	0.540	5.4	LOS A	4.5	32.5	0.38	0.53	44.1

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.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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# MOVEMENT SUMMARY

 Site: [2028 PM Base]

Intersection of Bayshore Dr / Centennial Circuit / Grevillea St  
2028 PM Background Traffic  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue	Prop. Queued	Effective Stop Rate	Average Speed	
		Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m	per veh	km/h	
South: Bayshore Dr (S)											
1	L2	179	4.7	0.435	4.1	LOS A	3.1	22.9	0.29	0.49	43.7
2	T1	281	3.0	0.435	4.0	LOS A	3.1	22.9	0.29	0.49	45.1
3	R2	101	7.3	0.435	7.6	LOS A	3.1	22.9	0.29	0.49	43.8
3u	U	44	7.1	0.435	9.2	LOS A	3.1	22.9	0.29	0.49	33.7
Approach		605	4.5	0.435	5.0	LOS A	3.1	22.9	0.29	0.49	44.0
East: Grevillea St (E)											
4	L2	76	4.2	0.169	7.9	LOS A	1.0	7.1	0.72	0.77	39.9
5	T1	21	0.0	0.169	7.7	LOS A	1.0	7.1	0.72	0.77	44.8
6	R2	24	0.0	0.169	11.1	LOS A	1.0	7.1	0.72	0.77	44.7
6u	U	1	0.0	0.169	12.7	LOS A	1.0	7.1	0.72	0.77	47.2
Approach		122	2.6	0.169	8.5	LOS A	1.0	7.1	0.72	0.77	42.3
North: Bayshore Dr (N)											
7	L2	28	3.7	0.504	7.1	LOS A	3.8	27.1	0.72	0.76	44.5
8	T1	411	3.8	0.504	7.1	LOS A	3.8	27.1	0.72	0.76	43.4
9	R2	20	0.0	0.504	10.4	LOS A	3.8	27.1	0.72	0.76	45.8
9u	U	3	0.0	0.504	12.0	LOS A	3.8	27.1	0.72	0.76	49.2
Approach		462	3.6	0.504	7.3	LOS A	3.8	27.1	0.72	0.76	43.7
West: Centennial Circuit (W)											
10	L2	28	3.7	0.346	6.7	LOS A	2.2	15.3	0.65	0.76	44.0
11	T1	39	0.0	0.346	6.6	LOS A	2.2	15.3	0.65	0.76	44.4
12	R2	245	1.3	0.346	10.1	LOS A	2.2	15.3	0.65	0.76	40.1
12u	U	1	0.0	0.346	11.7	LOS A	2.2	15.3	0.65	0.76	48.0
Approach		314	1.3	0.346	9.4	LOS A	2.2	15.3	0.65	0.76	41.3
All Vehicles		1503	3.4	0.504	6.9	LOS A	3.8	27.1	0.53	0.65	43.1

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.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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# MOVEMENT SUMMARY

 Site: [2028 AM Design]

Intersection of Bayshore Dr / Centennial Circuit / Grevillea St  
2028 AM Design Traffic  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
		Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m		per veh	km/h
South: Bayshore Dr (S)											
1	L2	362	1.2	0.568	4.1	LOS A	4.9	35.5	0.31	0.47	43.9
2	T1	336	7.8	0.568	4.0	LOS A	4.9	35.5	0.31	0.47	45.2
3	R2	102	6.2	0.568	7.5	LOS A	4.9	35.5	0.31	0.47	44.1
3u	U	16	0.0	0.568	9.0	LOS A	4.9	35.5	0.31	0.47	34.2
Approach		816	4.5	0.568	4.6	LOS A	4.9	35.5	0.31	0.47	44.4
East: Grevillea St (E)											
4	L2	34	6.3	0.082	5.6	LOS A	0.4	2.9	0.50	0.62	41.4
5	T1	18	5.9	0.082	5.5	LOS A	0.4	2.9	0.50	0.62	45.9
6	R2	24	8.7	0.082	9.0	LOS A	0.4	2.9	0.50	0.62	45.6
6u	U	1	0.0	0.082	10.4	LOS A	0.4	2.9	0.50	0.62	48.6
Approach		77	6.8	0.082	6.7	LOS A	0.4	2.9	0.50	0.62	44.4
North: Bayshore Dr (N)											
7	L2	24	0.0	0.263	5.2	LOS A	1.5	11.3	0.51	0.59	45.2
8	T1	217	12.1	0.263	5.4	LOS A	1.5	11.3	0.51	0.59	44.0
9	R2	17	0.0	0.263	8.6	LOS A	1.5	11.3	0.51	0.59	46.4
9u	U	1	0.0	0.263	10.2	LOS A	1.5	11.3	0.51	0.59	49.9
Approach		259	10.2	0.263	5.6	LOS A	1.5	11.3	0.51	0.59	44.4
West: Centennial Circuit (W)											
10	L2	20	5.3	0.230	6.7	LOS A	1.3	9.8	0.63	0.74	44.0
11	T1	26	4.0	0.230	6.6	LOS A	1.3	9.8	0.63	0.74	44.4
12	R2	151	4.9	0.230	10.1	LOS A	1.3	9.8	0.63	0.74	40.1
12u	U	1	0.0	0.230	11.6	LOS A	1.3	9.8	0.63	0.74	48.0
Approach		198	4.8	0.230	9.3	LOS A	1.3	9.8	0.63	0.74	41.4
All Vehicles		1349	5.8	0.568	5.6	LOS A	4.9	35.5	0.41	0.54	43.9

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.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: P:\P2841 Centennial Drive Byron Bay TIA\Technical Work\Models\P2841.001 Bayshore Dve & Centennial Circuit Rd.sip7

# MOVEMENT SUMMARY

 Site: [2028 PM Design]

Intersection of Bayshore Dr / Centennial Circuit / Grevillea St  
2028 PM Design Traffic  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
		Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m		per veh	km/h
South: Bayshore Dr (S)											
1	L2	212	4.0	0.460	4.1	LOS A	3.4	24.8	0.30	0.49	43.7
2	T1	281	3.0	0.460	4.0	LOS A	3.4	24.8	0.30	0.49	45.0
3	R2	101	7.3	0.460	7.6	LOS A	3.4	24.8	0.30	0.49	43.8
3u	U	44	7.1	0.460	9.2	LOS A	3.4	24.8	0.30	0.49	33.6
Approach		638	4.3	0.460	5.0	LOS A	3.4	24.8	0.30	0.49	44.0
East: Grevillea St (E)											
4	L2	76	4.2	0.177	8.4	LOS A	1.1	7.6	0.74	0.79	39.5
5	T1	21	0.0	0.177	8.1	LOS A	1.1	7.6	0.74	0.79	44.5
6	R2	24	0.0	0.177	11.6	LOS A	1.1	7.6	0.74	0.79	44.4
6u	U	1	0.0	0.177	13.2	LOS A	1.1	7.6	0.74	0.79	46.9
Approach		122	2.6	0.177	9.0	LOS A	1.1	7.6	0.74	0.79	42.0
North: Bayshore Dr (N)											
7	L2	28	3.7	0.529	7.9	LOS A	4.2	30.4	0.76	0.82	44.2
8	T1	411	3.8	0.529	7.8	LOS A	4.2	30.4	0.76	0.82	43.0
9	R2	24	0.0	0.529	11.1	LOS A	4.2	30.4	0.76	0.82	45.5
9u	U	3	0.0	0.529	12.8	LOS A	4.2	30.4	0.76	0.82	48.9
Approach		466	3.6	0.529	8.0	LOS A	4.2	30.4	0.76	0.82	43.3
West: Centennial Circuit (W)											
10	L2	33	3.2	0.396	6.9	LOS A	2.6	18.3	0.68	0.78	43.9
11	T1	39	0.0	0.396	6.7	LOS A	2.6	18.3	0.68	0.78	44.2
12	R2	286	1.1	0.396	10.2	LOS A	2.6	18.3	0.68	0.78	40.0
12u	U	1	0.0	0.396	11.8	LOS A	2.6	18.3	0.68	0.78	47.9
Approach		359	1.2	0.396	9.5	LOS A	2.6	18.3	0.68	0.78	41.1
All Vehicles		1585	3.3	0.529	7.2	LOS A	4.2	30.4	0.56	0.67	42.9

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.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

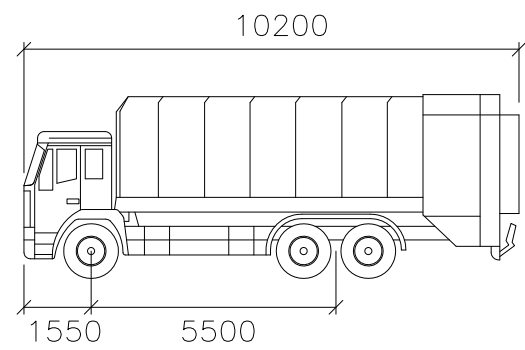
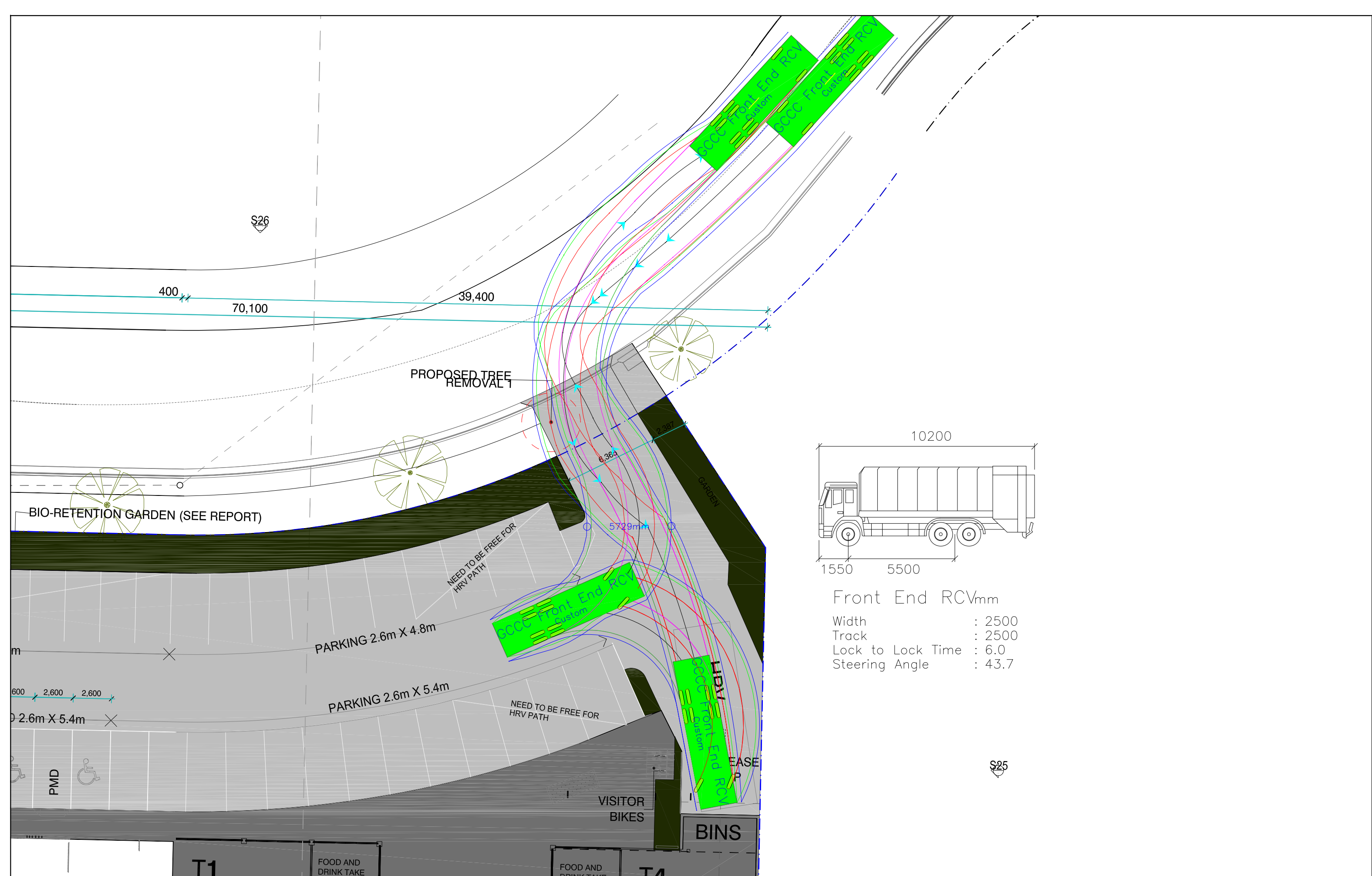
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

## APPENDIX E

### SWEPT PATH ASSESSMENT



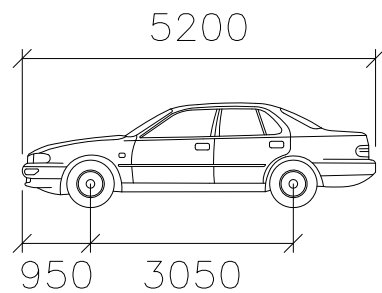


Front End RCVmm  
 Width : 2500  
 Track : 2500  
 Lock to Lock Time : 6.0  
 Steering Angle : 43.7

Date:	16/01/17
Project No:	P2841

Drawing Name:	RCV Swept Path Assessment
Project Name:	The Hive - Centennial Circuit Byron Bay TIA

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Sheet	Version
2	A



B99  
 Width : 1940 mm  
 Track : 1840 mm  
 Lock to Lock Time : 6.0  
 Steering Angle : 38.0

7,400  
 4,800  
 6,000  
 6,000  
 5,400  
 2,030

POWER POLE

PEDESTRIAN ACCESS

BIO-RETENTION GARDEN (S)

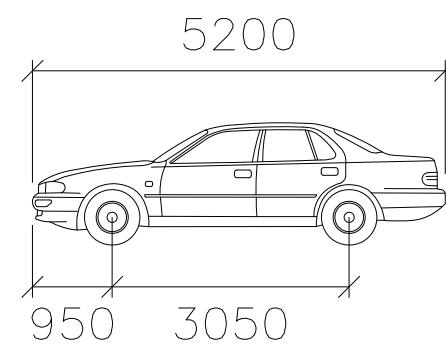
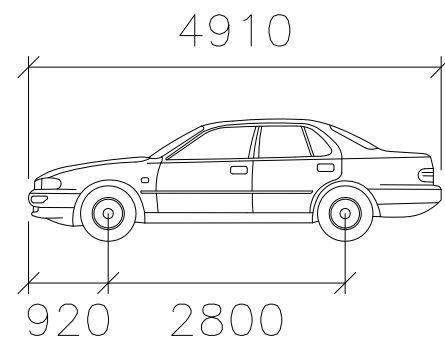
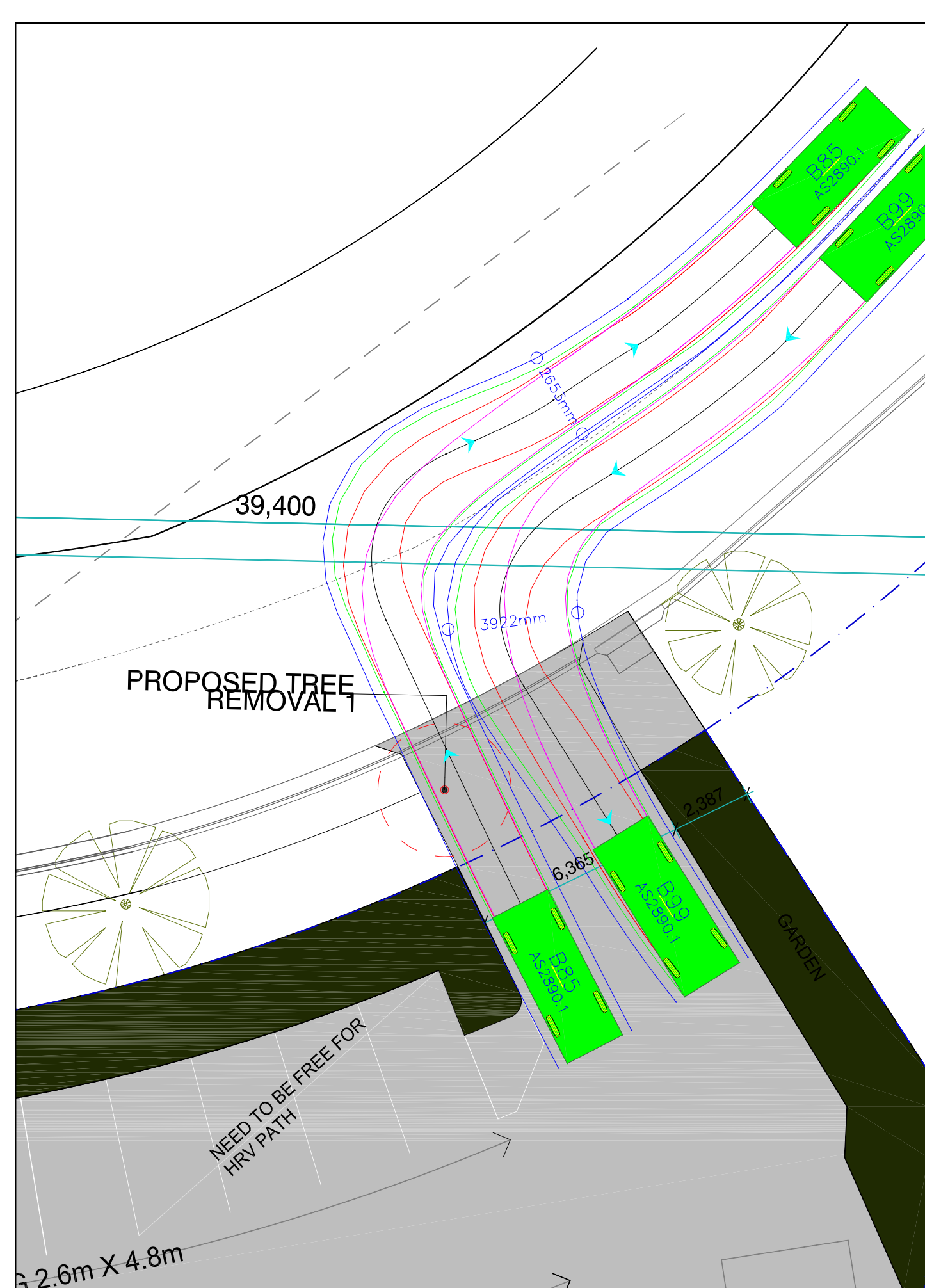


Date: 16/01/17  
 Project No: P2841

Drawing Name: Reverse Only Bay Swept Path Assessment  
 Project Name: The Hive - Centennial Circuit Byron Bay TIA

**BITZIOS**  
 consulting

Sheet	Version
3	A



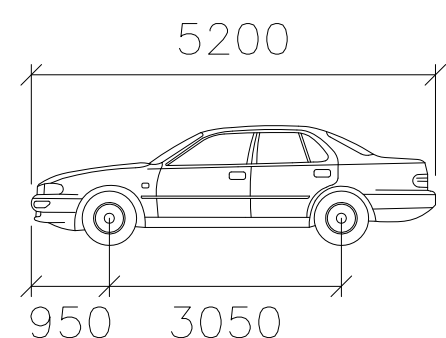
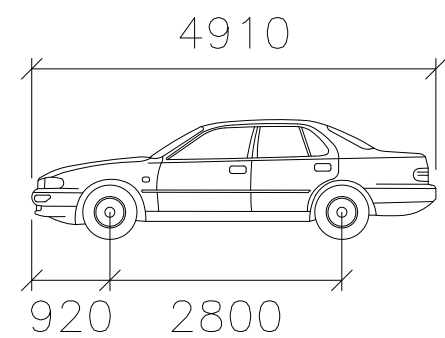
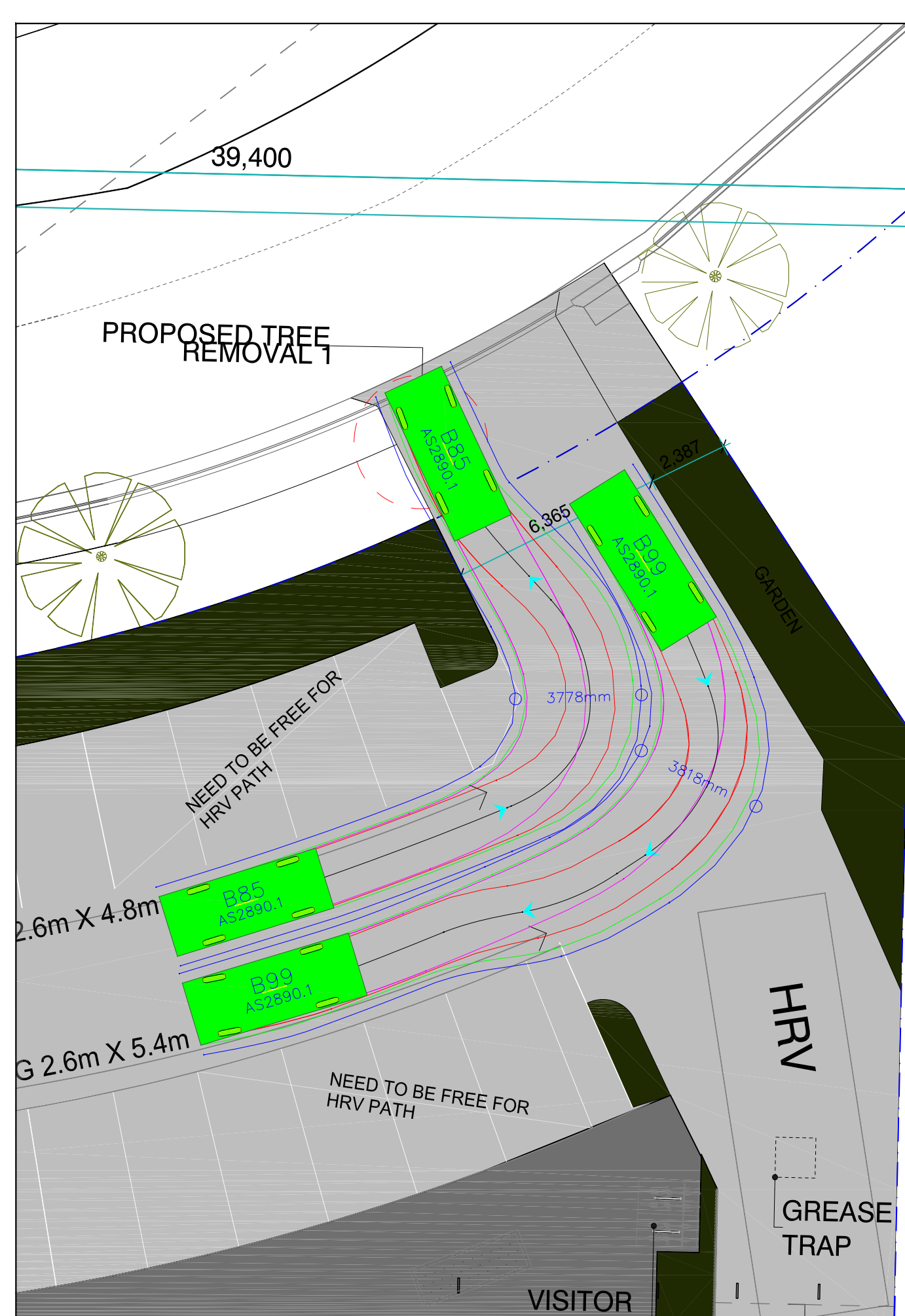
B85 mm  
 Width : 1870  
 Track : 1770  
 Lock to Lock Time : 6.0  
 Steering Angle : 38.5

B99 mm  
 Width : 1940  
 Track : 1840  
 Lock to Lock Time : 6.0  
 Steering Angle : 38.0

Date: 16/01/17  
 Project No: P2841

Drawing Name:  
 Project Name:

B99 and B85 Entry Swept Path Assessment  
 The Hive - Centennial Circuit Byron Bay TIA



B85  
 Width : 1870 mm  
 Track : 1770 mm  
 Lock to Lock Time : 6.0  
 Steering Angle : 38.5

B99  
 Width : 1940 mm  
 Track : 1840 mm  
 Lock to Lock Time : 6.0  
 Steering Angle : 38.0

Date:	16/01/17
Project No:	P2841

Drawing Name:	
Project Name:	

B99 and B85 Internal Swept Path Assessment

The Hive - Centennial Circuit Byron Bay TIA

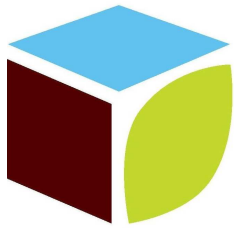
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-consulting

Sheet	Version
5	A



## **ATTACHMENT 5**

**BCA Assessment**  
*Tecton Building Services*



# Techoon

**BUILDING SERVICES**

## **BUILDING CODE OF AUSTRALIA ASSESSMENT**

**PROPERTY:**

**LOT 60, DP 835249  
88-94 CENTENNIAL CIRCUIT  
BYRON BAY NSW 2481**

**APPLICANT:**

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**PREPARED BY:**

**CRAIG NOWLAN**

**DATE:**

**12 JANUARY 2107**

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**Email: [info@techoon.com.au](mailto:info@techoon.com.au)  
[www.techoon.com.au](http://www.techoon.com.au)  
ABN 20 128 806 002**

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## REPORT REGISTER

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The following report register documents the development and issue of this report prepared by Tecton Building Services.

Ref	Issue No:	Comment:	Date:
	1	Report prepared for applicant	12 January 2017

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## AUTHORISATION

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Report	Issue No:	Name	Signature	Date:
Prepared by	1	Craig Nowlan		12 January 2017

### DISCLAIMER

This report has been prepared for the purposes and exclusive use of Bruce Coulson for use in the proposed development and is not to be used for any other purpose or by any other person or Corporation. Tecton Building Services Pty Ltd accepts no responsibility for any loss or damage suffered, howsoever, arising to any person or Corporation who may use or rely on this report in contravention of the terms of this clause.

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## 1.0 EXECUTIVE SUMMARY

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Techton Building Services has been requested by Newton Denny Chapelle to undertake an assessment of the proposed mixed use development located at Lot 60, DP 835249, 88-94 Centennial Circuit, Byron Bay and provide a written compliance report against the requirements of the Building Code of Australia (BCA) 2016.

The assessment has been requested to identify areas of non-compliance with the Building Code of Australia to enable the development of strategies to ensure that the premises complies with the relevant provisions of the BCA and Australian Standards.

The report has assessed the adequacy of proposed fire safety measures against current BCA 2016 requirements. The description of the services undertaken include:

- Site Inspection
- BCA Report

The inspection revealed a number of departures from the requirements of the BCA in respect of the provision of fire resistance levels and the provision of suitable egress pathways from the building.

This report does not include assessment of matters of a specialist nature. Limitations of this report include:

- Determination of structural adequacy in relation to fire resistance levels of building elements. If necessary an Independent assessment by a qualified structural engineer may be required for assessment of structural adequacy of fire resisting construction.
- Determination of compliance with the relevant Australian Standards in respect of fire safety measures including, fire hydrants, fire hose reels, emergency and exit lighting. Specialist Consultants shall be engaged to provide detailed designs to accompany the lodgement of a Construction Certificate.

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## 2.0 BRIEF

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Newton Denny Chapelle has requested that Techton Building Services undertake a BCA Assessment and provide a Report on the compliance status of the proposed development with the requirements of the application sections of the Building Code of Australia (BCA) with a view to upgrading to current standards where possible.

The proposal comprises a mixed use development including a Child Care Centre and Industrial Work Hub containing six (6) sole occupancy units.

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## 3.0 SITE

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The subject property is identified as Lot 60, DP 835249, No. 88-94 Centennial Circuit, Byron Bay.

The site is currently vacant land.

**Aerial Map**



Source: Six Maps

**Locality Map**



Source: Google Maps

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## 4.0 METHODOLOGY

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### PROCESS ADOPTED

The following method of assessment has been used in the preparation of this report;

- 1) Conduct a desktop review of the supplied documentation.
- 2) Determine the basic assessment data for the building.
- 3) Undertake site inspection of the facility.
- 4) Assess the existing design of the building against the current Deemed-to-Satisfy requirements of Sections C, D, E, F and J of the BCA having regard to the scope listed above. Establish the status of each clause into the following categories:
  - a) Clause is administrative information only (**Noted**).
  - b) Clause is applicable to the assessment (**Applies**).
  - c) Clause is not relevant to the building (**N/A**).
  - d) The building complies with the requirements of the clause (**Complies**).
  - e) Compliance with the requirements of the clause is unable to be determined from the site inspection or the documentation available. (**Not Determined**). A recommendation in the "Comments" column will indicate if further information or investigation is required or if the feature should be brought into conformity with the requirements of the BCA.
  - f) Spot checks and the visual inspection revealed no non-compliances (**No issues identified**) (Note that a full audit is not conducted in regard of certain 'generic' items as identified in the scope)
- 5) The building does not comply with the requirements of the clause (**Does Not Comply**).
- 6) Nominate the status of the design against each BCA requirement.
- 7) Details assessed for the purposes of this report are floor plans layouts prepared by Harley Graham and Associates and Local Office Architecture

### 1.1. BUILDING CHARACTERISTICS

The following assessment data has been drawn from the provisions of the BCA.

#### 1.1.1. Classification

The significant spaces in the design have been classified in accordance with the requirements of Clause A3.2 of the BCA and are summarised in the table below: -

The Hive – Child Care

Position	Space	Classification
Ground	Office, Childcare Rooms, Amenities, Staff Room and Play space	Class 9b
First	Childcare Rooms and Play Space	Class 9b

Industrial Spaces – 6 Tenancies/Caretaker's Flat

Position	Space	Classification
Ground	Storage/Production and Office Space	Class 8
	Takeaway Food Shop	Class 6
First	Storage/Production and Office Space	Class 8
	Caretaker's Residence	Class 4

**1.1.2. Number of storeys contained**

The design contains two storeys.

**1.1.3. Rise in storeys**

In accordance with the provisions of Clause C1.2 of the BCA the design has a rise in storey of 2.

**1.1.4. Type of Construction**

Clause C1.1 of the BCA requires the Child Care Centre component of the design to be of Type B construction whilst the Industrial tenancies are required to be Type C Construction subject to a fire wall separating the two separate uses in accordance with the requirements of Part C2.7.

## 5.0 BCA ASSESSMENT - CHILDCARE COMPONENT

The following section of the report presents a summary of the assessment of the existing building against the DTS provisions of Sections C, D, E, F and J of the BCA for the **Child Care component**. A separate assessment has been prepared for the industrial tenancies and is attached to this report.

### PART C - FIRE RESISTANCE

Clause	Description	Status	Comments
<b>Part C1</b>	<b>Fire Resistance &amp; Stability</b>		
C1.1	Type of construction required	<b>Applies</b>	Type B Construction
C1.2	Calculation of rise in storeys	<b>Applies</b>	Two
C1.3	Buildings of multiple classification	<b>Applies</b>	The development comprises a mixture of classifications including <ul style="list-style-type: none"> <li>▪ Child Care – Class 9b</li> <li>▪ Industrial Buildings – Class 8</li> <li>▪ Food Shops – Class 6</li> <li>▪ Caretaker's Flat – Class 4</li> </ul>
C1.4	Mixed types of construction	<b>Applies</b>	The building is to be separated into two uses by a fire wall in accordance with Part C2.7.
C1.5	Two storey Class 2 or 3 buildings	<b>N/A</b>	
C1.6	Class 4 parts of buildings	<b>N/A</b>	This section of the report deals with the Child Care component only. Refer to Section 6 of this assessment which deals with the Industrial component
C1.7	Open stands and indoor stadiums	<b>N/A</b>	
C1.8	Lightweight construction	<b>N/A</b>	
C1.9	-		
C1.10	Fire hazard properties	<b>Applies</b>	All floor and wall coverings to have the required fire hazard indices.
C1.11	Performance of external walls in fire	<b>Applies</b>	A Structural Engineer is to confirm if the walls have been designed to prevent outward collapse.
C1.12	Non-combustible materials	<b>N/A</b>	
C1.13	Fire protected timber: Concession	<b>N/A</b>	

Clause	Description	Status	Comments
Spec C1.1	Fire resisting construction	<b>Applies</b>	<p>The following Fire Resistance Levels are required for the relevant components:</p> <p>External Walls:            &lt; 1.5m to boundary – 120/120/120            1.5 – &lt; 3.0m - 120/90/60            3.0 - &lt; 9.0m - 120/30/30            9.0 - &lt; 18.0m - 120/30/-            18.0m or more - -/-/-</p> <p>Fire Walls: - 120/120/120</p> <p>Internal Walls:            Lift and stair shafts – 120/120/120            Non-loadbearing stair shafts - -/120/120</p> <p>Other loadbearing internal walls and columns- 120/-/-</p> <p>Floors – separating ground and first floor</p> <ul style="list-style-type: none"> <li>- A resistance to the incipient spread of fire for at least 60 minutes, or</li> <li>- Have an FRL of at least 30/30/30.</li> <li>- Have a fire protective covering</li> </ul>
Part C2	Compartmentation & Separation		
C2.1	Application of Part	<b>Applies</b>	Informative
C2.2	General floor area limitations	<b>Applies</b>	Complies
C2.3	Large isolated buildings	<b>N/A</b>	
C2.4	Requirements for open space and vehicular access	<b>N/A</b>	
C2.5	Class 9a and 9c buildings	<b>N/A</b>	
C2.6	Vertical separation of openings in external walls	<b>N/A</b>	
C2.7	Separation by fire walls	<b>Applies</b>	The walls separating the childcare centre and industrial component are to be designed to achieve an FRL of 240/240/240.
C2.8	Separation of classifications in the same storey	<b>N/A</b>	
C2.9	Separation of classifications in different storeys	<b>N/A</b>	
C2.10	Separation of lift shafts	<b>N/A</b>	
C2.11	Stairways and lifts in one shaft	<b>Applies</b>	Complies
C2.12	Separation of equipment	<b>N/A</b>	
C2.13	Electricity supply system	<b>Applies</b>	Unable to assess. Details of the location of the MSB are to be indicated on the plan.

Clause	Description	Status	Comments
C2.14	Public corridors in Class 2 & 3 buildings	N/A	
<b>Part C3</b>	<b>Protection of Openings</b>		
C3.1	Application of Part	<b>Applies</b>	
C3.2	Protection of openings in external walls	<b>Applies</b>	The following openings require protection: <ul style="list-style-type: none"> <li>▪ The door to the service area located in the south eastern corner of the building, and</li> <li>▪ The door opening affording access to the stair in the north west corner of the building</li> <li>▪ Windows to the "Zen" room if located less than 3.0m from the adjacent boundary</li> </ul>
C3.3	Separation of openings in different fire compartments	<b>Applies</b>	Complies. Openings are at 180° or greater – no protection required.
C3.4	Acceptable method of protection	<b>Applies</b>	Protection of openings to be undertaken in accordance with this clause.
C3.5	Doorways in fire walls	N/A	No doors in firewall.
C3.6	Sliding fire doors	N/A	
C3.7	Protection of doorways in horizontal exits	N/A	
C3.8	Openings in fire isolated exits	N/A	
C3.9	Service penetrations in fire isolated exits	N/A	
C3.10	Openings in fire isolated lift shafts	N/A	
NSW C3.11	Bounding construction: Class 2 & 3 and 4 buildings	N/A	
C3.12	Openings in floors for services	N/A	
C3.13	Openings in shafts	N/A	
C3.14	-		
C3.15	Openings for service installation	<b>Applies</b>	Service penetrations through the floor to have suitable protection to maintain FRL of floor/ceiling system.
C3.16	Construction Joints	<b>Applies</b>	Joints in tilt panels to achieve the required FRL.
C3.17	Columns protected with lightweight construction	N/A	

#### PART D - ACCESS AND EGRESS

Clause	Description	Status	Comments
<b>Part D1</b>	<b>Provision for Escape</b>		
D1.1	Application of Part	<b>Applies</b>	
NSW D1.2	Number of exits required	<b>Applies</b>	Complies
D1.3	When fire-isolated exits are required	N/A	
D1.4	Exit travel distances	<b>Applies</b>	Generally complies. Details of the location of access points to the outdoor playground area required to ensure adequate travel distances are provided.

<b>Clause</b>	<b>Description</b>	<b>Status</b>	<b>Comments</b>
D1.5	Distance between alternative exits	<b>Applies</b>	Complies
NSW D1.6	Dimensions of exits	<b>Applies</b>	In sufficient detail. Working drawing required to determine width of exits.
D1.7	Travel via fire-isolated exit	<b>N/A</b>	
D1.8	External stairways	<b>N/A</b>	
D1.9	Travel by non-fire-isolated stairways or ramps	<b>Applies</b>	Complies
NSW D1.10	Discharge from exits	<b>Applies</b>	Complies
D1.11	Horizontal exits	<b>N/A</b>	
D1.12	Non required stairways, ramps or escalators	<b>N/A</b>	
NSW D1.13	Number of persons accommodated	<b>Applies</b>	Ground floor area Library - 15 persons Office - 2 persons Staff - 2 persons Laundry - 2 persons Kitchen - 3 persons Lab - 3 persons Room 1 - 11 persons Room 2 - 13 persons Room 3 - 13 persons Zen - 12 persons First Floor Room 4 - 22 persons Room 5 - 20 persons <b>Total 118 persons</b>
D1.14	Measurement of distances	<b>Applies</b>	Informative clause
D1.15	Method of measurement	<b>Applies</b>	Informative clause
D1.16	Plant rooms and lift motor rooms; Concession	<b>Applies</b>	
D1.17	Access to lift pits	<b>N/A</b>	
<b>Part D2</b>	<b>Construction of Exits</b>		
NSW D2.1	Application of Part	<b>Applies</b>	
D2.2	Fire isolated stairs or ramps	<b>N/A</b>	
D2.3	Non-fire-isolated stairways and ramps	<b>N/A</b>	
D2.4	Separation of rising and descending stair flights	<b>N/A</b>	
D2.5	Open access ramps and balconies	<b>N/A</b>	
D2.6	Smoke lobbies	<b>N/A</b>	
D2.7	Installations in exits and paths of travel	<b>Applies</b>	Insufficient Detail – location of switchboard and electrical distribution boards to be nominated. All distribution boards located in paths of travel to exits are to be enclosed in a non-combustible cabinet with the enclosing door lined with a non-combustible lining and smoke seals fitted to the door opening.

<b>Clause</b>	<b>Description</b>	<b>Status</b>	<b>Comments</b>
D2.8	Enclosure of space under stairs and ramps	<b>Applies</b>	Insufficient detail – the space below the stair flights shall not be enclosed to form a cupboard unless: (i) the enclosing walls and ceilings have an FRL of not less than 60/60/60; and (ii) any access doorway to the enclosed space is fitted with a <a href="#">self-closing</a> –/60/30 fire door.
D2.9	Width of stairways	<b>N/A</b>	
D2.10	Pedestrian ramps	<b>N/A</b>	
D2.11	Fire-isolated passageways	<b>N/A</b>	
D2.12	Roof as open space	<b>N/A</b>	
NSW D2.13	Treads and risers	<b>Applies</b>	Insufficient details – working drawings to nominate tread and riser dimensions.
D2.14	Landings	<b>Applies</b>	Insufficient details – working drawings to detail landing dimensions
NSW D2.15	Thresholds	<b>Applies</b>	
NSW D2.16	Balustrades	<b>Applies</b>	Insufficient details – working drawings to detail balustrade dimensions
D2.17	Handrails	<b>Applies</b>	Insufficient details – working drawings to detail handrail dimensions. Note: Handrails are to be installed on both sides of the stair flights.
D2.18	Fixed platforms walkways, stairways, and ladders	<b>N/A</b>	
NSW D2.19	Doorways and doors	<b>Applies</b>	Complies
D2.20	Swinging doors	<b>Applies</b>	Does not comply Required exit doors are to swing in the direction of egress. All designated exit doors shall be capable of swinging in the direction of egress in the event of an emergency. The door at the base of the internal stairs shall swing in the direction of egress. The door to the corridor outside the Lab shall be dual action and capable of swinging in both directions.
NSW D2.21	Operation of latch	<b>Applies</b>	Insufficient detail – Architect to detail door furniture
D2.22	Re-entry fire-isolated exits	<b>N/A</b>	
D2.23	Signs on doors	<b>N/A</b>	
NSW D2.101	Doors in path of travel in a POPE	<b>N/A</b>	
D2.24	Protection of openable windows	<b>N/A</b>	
D2.25	Timber stairways: Concession	<b>N/A</b>	
<b>Part D3</b>	<b>Access for People with Disabilities</b>		
D3.1	General building access requirements	<b>Applies</b>	
D3.2	Access to buildings	<b>Applies</b>	Access required to and within all areas normally used by the occupants

Clause	Description	Status	Comments
D3.3	Parts of buildings to be accessible	<b>Applies</b>	<p>Access required to and within all areas normally used by the occupants:</p> <ul style="list-style-type: none"> <li>▪ All stairs to be provided with handrails on both sides.</li> <li>▪ Handrails to comply with Cl 12 of AS1428.1</li> <li>▪ Lifts to comply with Part E3.6 of the BCA</li> <li>▪ The floor surface proposed for the outdoor play space shall comply with the requirements of Part D3.3 of the BCA and Cl 7 of AS1428.1</li> </ul> <p>The following comments are made in respect of access to and within the building:</p> <ul style="list-style-type: none"> <li>▪ Corridor width to be a min. 1670mm to enable access to rooms.</li> <li>▪ Circulation space to accessible w.c does not comply from within the room. A min. 530mm is to be provided on the latch side.</li> </ul>
D3.4	Concessions	<b>Applies</b>	Disabled access not assessed for store room.
D3.5	Car parking	<b>Applies</b>	Complies – details of line marking and bollards to be provided on working drawings.
D3.6	Signage	<b>Applies</b>	To be provided
D3.7	Hearing augmentation	<b>Applies</b>	Hearing augmentation to be provided if an inbuilt amplification system is installed within the building.
D3.8	Tactile indicators	<b>Applies</b>	Tactile indicators to be provided to stairs in accordance with the Standard.
D3.9	Wheelchair seating spaces in Class 9b assembly building	<b>N/A</b>	
D3.10	Swimming Pools	<b>N/A</b>	
D3.11	Ramps	<b>N/A</b>	
D3.12	Glazing on an access way	<b>Applies</b>	Frameless glass or fully glazed doors are to be clearly marked or etched.

## PART E - SERVICES AND EQUIPMENT

Clause	Description	Status	Comments
<b>Part E1</b>	<b>Fire Fighting Equipment</b>		
E1.1	-		
E1.2	-		
E1.3	Fire hydrants	<b>Applies</b>	A fire hydrant system designed to provide coverage to the building in accordance with the requirements of the Standard is required. Details of the design of the system are to be prepared by a suitably qualified Hydraulic Engineer.
E1.4	Hose reels	<b>Applies</b>	A fire hose reel system is to be installed within the building so that all parts of the building are provided with coverage. Details of the design of the system are to be prepared by a suitably qualified Hydraulic Engineer.
E1.5	Sprinklers	<b>N/A</b>	
E1.6	Portable fire extinguishers	<b>Applies</b>	Portable fire extinguishers are to be installed throughout the building.
E1.7	-		

Clause	Description	Status	Comments
E1.8	Fire control centres	N/A	
E1.9	Fire precautions during construction	Applies	Builder to ensure appropriate fire safety measures are provided throughout the construction phase.
E1.10	Provision for special hazards	N/A	
<b>Part E2</b>	<b>Smoke Hazard Management</b>		
E2.1	Application of Part	Applies	
E2.2	General requirements	Applies	Details of the mechanical ventilation system are to be prepared by a suitably qualified Mechanical Engineer. Details of the system design are to be submitted with the Construction Certificate.
E2.3	Provisions for special hazards	N/A	
<b>Part E3</b>	<b>Lift Installations</b>		
E3.1	Lift installations	Applies	
E3.2	Stretcher facility in lifts	N/A	
E3.3	Warning against use of lifts in fire	Applies	Appropriate signage to be provided advising against the use of lifts in the event of fire.
E3.4	Emergency lifts	N/A	
E3.5	Landings	Applies	Complies
E3.6	Passenger lifts	Applies	Lift to include accessible features – Architect to detail
E3.7	Fire Services Control	N/A	
E3.8	Aged care buildings	N/A	
E3.9	Fire service recall operation switch	N/A	
E3.10	Lift car fire service drive control switch	N/A	
<b>Part E4</b>	<b>Emergency Lighting, Exit Signs and Warning Systems</b>		
E4.1	-		
E4.2	Emergency light requirements	Applies	A system of emergency lighting and exit signs are to be installed throughout the building in accordance with AS2293.1. The emergency lighting system is to be designed by a suitably qualified Electrical Engineer.
E4.3	Measurement of distance	Applies	
E4.4	Design & operate emergency light	Applies	
E4.5	Exit signs	Applies	A system of exit signs are to be provided to clearly identify required exits and paths of travel to required exits in accordance with AS2293.1. The emergency lighting system is to be designed by a suitably qualified Electrical Engineer.
E4.6	Direction signs	Applies	Directional exit signs are to be provided to clearly identify paths of travel to required exits in accordance with AS2293.1. The emergency lighting system is to be designed by a suitably qualified Electrical Engineer.

Clause	Description	Status	Comments
E4.7	Class 2, 3 & 4 buildings: Exemptions	N/A	
E4.8	Design and operation of exit signs	Applies	Informative Clause
E4.9	EWIS systems	N/A	

## PART F - HEALTH AND AMENITY

Clause	Description	Status	Comments
<b>Part F1</b>	<b>Damp and Weatherproofing</b>		
F1.1	Stormwater drainage	Applies	Details of stormwater drainage to be provided by Civil Engineer.
F1.2	-		
F1.3	-		
F1.4	External above ground membranes	Applies	
F1.5	Roof coverings	Applies	
F1.6	Sarking	N/A	
F1.7	Water-proofing of wet areas	Applies	Waterproofing to be undertaken in accordance with AS3740. Installation Certificate to be provided by installer on completion of work.
F1.8	-		
F1.9	Damp proofing	Applies	
F1.10	Damp proofing of floors on the ground	Applies	
F1.11	Provision of floor wastes	N/A	
F1.12	Sub-floor ventilation	N/A	
F1.13	Glazed assemblies	Applies	All glazing to comply with AS2047. Installation Certificate to be provided by supplier on completion.
<b>Part F2</b>	<b>Sanitary and Other Facilities</b>		
F2.1	Facilities in residential buildings	N/A	
F2.2	Calculation of number of occupants and fixtures	Applies	Refer to D1.13.
F2.3	Facilities in Class 3 to 9 buildings	Applies	The following facilities are to be provided: <ul style="list-style-type: none"> <li>▪ A separate hand washing sink is to be provided in the kitchen.</li> <li>▪ Access to the kitchen is to be restricted by a door or gate to prevent unsupervised access to the kitchen.</li> <li>▪ Provide a bath, shower or shower bath.</li> <li>▪ If the centre accommodates children younger than 3 years – laundry facilities, bench type baby bath adjacent to a nappy change bench.</li> <li>▪ Junior pans to be provided for children's amenities.</li> <li>▪ Washbasins to have a rim not exceeding 600mm</li> </ul>

<b>Clause</b>	<b>Description</b>	<b>Status</b>	<b>Comments</b>
F2.4	Facilities for people with disabilities	<b>Applies</b>	Insufficient details – details of the size of the accessible toilet to be provided with the working drawings. An additional accessible sanitary facility is to be provided on level 1 in accordance with Table F2.4(a). The shower required under F2.3 is to be accessible or alternatively an additional accessible shower is to be provided within a compliant accessible sanitary facility.
F2.5	Construction of sanitary compartments	<b>Applies</b>	Accessible facilities to be constructed in accordance with AS1428.1 – 2009.
F2.6	Interpretation: Urinals and washbasins	<b>Applies</b>	Informative clause.
NSW F2.7	Warm water installations	<b>N/A</b>	
F2.8	Waste Management	<b>N/A</b>	
<b>Part F3</b>	<b>Room Sizes</b>		
F3.1	Height of rooms	<b>Applies</b>	Complies.
<b>Part F.4</b>	<b>Light and Ventilation</b>		
F4.1	Provision of natural light	<b>Applies</b>	Natural lighting to be provided to all play rooms
F4.2	Methods and extent of natural light	<b>Applies</b>	Insufficient details – details of windows and openings to all playrooms to be provided.
F4.3	Natural light borrowed from adjoining room	<b>N/A</b>	
F4.4	Artificial lighting	<b>Applies</b>	
NSW F4.5	Ventilation of rooms	<b>Applies</b>	Mechanical ventilation complying with AS1668.2 to be provided to all office spaces and sanitary compartments. Details to be provided by a Mechanical Engineer.
F4.6	Natural ventilation	<b>Applies</b>	
F4.7	Ventilation borrowed from adjoining room	<b>N/A</b>	
F4.8	Restriction on position of water closets and urinals	<b>Applies</b>	Complies.
F4.9	Airlocks	<b>N/A</b>	
F4.10	-	<b>N/A</b>	
F4.11	Carparks	<b>N/A</b>	
F4.12	Kitchen local exhaust ventilation	<b>N/A</b>	
<b>Part F5</b>	<b>Sound Transmission and Insulation</b>		
F5.1	Application of part	<b>N/A</b>	
F5.2	Determination of airborne sound insulation ratings	<b>N/A</b>	
F5.3	Determination of impact sound insulation ratings	<b>N/A</b>	
F5.4	Sound insulation of floors between units	<b>N/A</b>	
F5.5	Sound insulation of walls between units	<b>N/A</b>	

Clause	Description	Status	Comments
F5.6	Walls between a bathroom, sanitary compartment, laundry or kitchen and a habitable room in adjoining unit.	N/A	
F5.6	Sound insulation rating of internal services	N/A	
F5.7	Sound insulation of pumps	N/A	

## PART J – ENERGY EFFICIENCY

Clause	Description	Status	Comments
<b>Part J1</b>	<b>Building Fabric</b>		
J1.1	Application of part	<b>Applies</b>	Section J Report to be provided.
J1.2	Thermal construction general	<b>Applies</b>	Section J Report to be provided.
J1.3	Roof and ceiling construction	<b>Applies</b>	Section J Report to be provided.
J1.4	Roof lights	<b>Applies</b>	
J1.5	Walls	<b>Applies</b>	Section J Report to be provided.
J1.6	Floors	<b>Applies</b>	Section J Report to be provided.
<b>Part J2</b>	<b>External glazing</b>		
J2.1	Application of Part	<b>Applies</b>	Section J Report to be provided.
J2.2	Applicable glazing provisions	<b>Applies</b>	Section J Report to be provided.
J2.3	Glazing – Method 1	N/A	
J2.4	Glazing – Method 2	N/A	
J2.5	Shading	N/A	
<b>Part J3</b>	<b>Building Sealing</b>		
J3.1	Application of Part	<b>Applies</b>	Section J Report to be provided.
J3.2	Chimneys and flues	N/A	
J3.3	Roof lights	N/A	
J3.4	External windows and doors	<b>Applies</b>	Section J Report to be provided.
J3.5	Exhaust fans	<b>Applies</b>	Section J Report to be provided.
J3.6	Construction of roofs, walls and floors	<b>Applies</b>	Section J Report to be provided.
J3.7	Evaporative coolers	N/A	
<b>Part J4</b>	Left blank	N/A	
<b>Part J5</b>	<b>Air-Conditioning and Ventilation Systems</b>		
J5.1	*****	-	
J5.2	Air-conditioning and ventilations systems	N/A	
J5.3	Time Switch	N/A	
J5.4	Heating and chilling systems	N/A	
J5.5	Miscellaneous exhaust systems	N/A	
<b>Part J6</b>	<b>Artificial Lighting and Power</b>		

<b>Clause</b>	<b>Description</b>	<b>Status</b>	<b>Comments</b>
J6.1	Application of Part	<b>Applies</b>	Section J Report to be provided.
J6.2	Interior artificial lighting	<b>Applies</b>	Section J Report to be provided.
J6.3	Control of interior and artificial lighting and power	<b>Applies</b>	Section J Report to be provided.
J6.4	Interior decorative and display lighting	<b>N/A</b>	
J6.5	Artificial lighting around the perimeter of a building	<b>N/A</b>	
J6.6	Boiling water and chilled water storage units	<b>N/A</b>	
<b>Part J7</b>	<b>Hot Water Supply</b>		
J7.1		-	
J7.2	Hot water supply	<b>Applies</b>	Section J Report to be provided.
J7.3	Swimming pool heating & pumping	<b>N/A</b>	
J7.4	Spa pool heating & pumping	<b>N/A</b>	
<b>Part J8</b>	<b>Access for Maintenance</b>		
J8.1	Application of Part	<b>Applies</b>	
J8.2	Access for maintenance	<b>Applies</b>	Section J Report to be provided.

## 6.0 BCA ASSESSMENT – INDUSTRIAL COMPLEX

The following section of the report presents a summary of the assessment of the existing building against the DTS provisions of Sections C, D, E, F and J of the BCA for the **Industrial Complex component**. A separate assessment has been prepared for the industrial tenancies and is attached to this report.

### PART C - FIRE RESISTANCE

Clause	Description	Status	Comments
<b>Part C1</b>	<b>Fire Resistance &amp; Stability</b>		
C1.1	Type of construction required	<b>Applies</b>	Type C Construction
C1.2	Calculation of rise in storeys	<b>Applies</b>	Two
C1.3	Buildings of multiple classification	<b>Applies</b>	The development comprises a mixture of classifications including <ul style="list-style-type: none"> <li>▪ Child Care – Class 9b</li> <li>▪ Industrial Buildings – Class 8</li> <li>▪ Food Shops – Class 6</li> <li>▪ Caretaker's Flat – Class 4</li> </ul>
C1.4	Mixed types of construction	<b>Applies</b>	The building is to be separated into two uses by a fire wall in accordance with Part C2.7.
C1.5	Two storey Class 2 or 3 buildings	<b>N/A</b>	
C1.6	Class 4 parts of buildings	<b>N/A</b>	This section of the report deals with the Industrial component only. Refer to Section 5 of this assessment which deals with the Child Care component
C1.7	Open stands and indoor stadiums	<b>N/A</b>	
C1.8	Lightweight construction	<b>N/A</b>	
C1.9	-		
C1.10	Fire hazard properties	<b>Applies</b>	All floor and wall coverings to have the required fire hazard indices.
C1.11	Performance of external walls in fire	<b>Applies</b>	A Structural Engineer is to confirm if the walls have been designed to prevent outward collapse.
C1.12	Non-combustible materials	<b>N/A</b>	
C1.13	Fire protected timber: Concession	<b>N/A</b>	
Spec C1.1	Fire resisting construction	<b>Applies</b>	The following Fire Resistance Levels are required for the relevant components: External Walls: < 1.5m to boundary – 90/90/90 1.5 – < 3.0m – 60/60/60  Fire Walls: – 120/120/120  Internal Walls: Bounding sole occupancy units

Clause	Description	Status	Comments
<b>Part C2</b>	<b>Compartmentation &amp; Separation</b>		
C2.1	Application of Part	<b>Applies</b>	Informative
C2.2	General floor area limitations	<b>Applies</b>	Complies
C2.3	Large isolated buildings	<b>N/A</b>	
C2.4	Requirements for open space and vehicular access	<b>N/A</b>	
C2.5	Class 9a and 9c buildings	<b>N/A</b>	
C2.6	Vertical separation of openings in external walls	<b>N/A</b>	
C2.7	Separation by fire walls	<b>Applies</b>	The walls separating the childcare centre and industrial component are to be designed to achieve an FRL of 240/240/240.
C2.8	Separation of classifications in the same storey	<b>Applies</b>	Walls separating the caretaker's residence from the industrial units shall have an FRL of 60/60/60 extending to the underside of the roof covering.
C2.9	Separation of classifications in different storeys	<b>N/A</b>	The floor separating the caretaker's residence from the industrial unit below shall: <ul style="list-style-type: none"> <li>▪ Be a floor/ceiling system incorporating a ceiling which has a resistance to the incipient spread of fire to the space above of not less than 60 minutes, or</li> <li>▪ Have an FRL of 30/30/30, or</li> <li>▪ Have a fire protective covering on the underside of the floor including beams.</li> </ul>
C2.10	Separation of lift shafts	<b>N/A</b>	
C2.11	Stairways and lifts in one shaft	<b>Applies</b>	Complies
C2.12	Separation of equipment	<b>N/A</b>	
C2.13	Electricity supply system	<b>Applies</b>	Unable to assess. Details of the location of the MSB are to be indicated on the plan.
C2.14	Public corridors in Class 2 & 3 buildings	<b>Applies</b>	Complies
<b>Part C3</b>	<b>Protection of Openings</b>		
C3.1	Application of Part	<b>Applies</b>	
C3.2	Protection of openings in external walls	<b>Applies</b>	Insufficient detail. Details of the openings in the southern wall are to be provided in order to determine compliance.
C3.3	Separation of openings in different fire compartments	<b>Applies</b>	Complies. Openings are at 180° or greater – no protection required.
C3.4	Acceptable method of protection	<b>Applies</b>	Protection of openings to be undertaken in accordance with this clause.
C3.5	Doorways in fire walls	<b>N/A</b>	No doors in firewall.
C3.6	Sliding fire doors	<b>N/A</b>	
C3.7	Protection of doorways in horizontal exits	<b>N/A</b>	
C3.8	Openings in fire isolated exits	<b>N/A</b>	

Clause	Description	Status	Comments
C3.9	Service penetrations in fire isolated exits	N/A	
C3.10	Openings in fire isolated lift shafts	N/A	
NSW C3.11	Bounding construction: Class 2 & 3 and 4 buildings	Applies	The entry door affording access to the caretaker's residence is to be protected by a 35mm self closing solid core door.
C3.12	Openings in floors for services	Applies	Service penetrations through the floor to have suitable protection to maintain FRL of floor/ceiling system.
C3.13	Openings in shafts	N/A	
C3.14	-		
C3.15	Openings for service installation	Applies	Service penetrations through the floor to have suitable protection to maintain FRL of floor/ceiling system.
C3.16	Construction Joints	Applies	Joints in tilt panels to achieve the required FRL.
C3.17	Columns protected with lightweight construction	N/A	

#### PART D - ACCESS AND EGRESS

Clause	Description	Status	Comments
<b>Part D1</b>	<b>Provision for Escape</b>		
D1.1	Application of Part	Applies	
NSW D1.2	Number of exits required	Applies	Complies
D1.3	When fire-isolated exits are required	N/A	
D1.4	Exit travel distances	Applies	Does not comply. The entry door to the caretaker's unit is to be located not greater than 6.0m from an exit or a point where travel in different directions is available. The travel distances from the ground floor staff room, amenities and bike storage exceed the required distances. It is recommended that an additional "fire exit" be located in the southern wall of the building to afford occupants an alternative means of egress in the event of fire.
D1.5	Distance between alternative exits	Applies	
NSW D1.6	Dimensions of exits	Applies	In sufficient detail. Working drawing required to determine width of exits.
D1.7	Travel via fire-isolated exit	N/A	
D1.8	External stairways	N/A	
D1.9	Travel by non-fire-isolated stairways or ramps	Applies	Does not comply. The entry door to the caretaker's flat and the point of egress to a road or open space shall not exceed 30m.
NSW D1.10	Discharge from exits	Applies	Complies
D1.11	Horizontal exits	N/A	
D1.12	Non required stairways, ramps or escalators	N/A	

Clause	Description	Status	Comments
NSW D1.13	Number of persons accommodated	<b>Applies</b>	Ground floor area T1 - 9 persons T1 – Food Shop - 8 persons T2 - 8 persons T2 – Retail - 8 persons T3 - 8 persons T3 - Retail - 8 persons T4 - 9 persons T4 – Food Shop - 8 persons T5 - 8 persons T5 - Retail - 8 persons T6 - 9 persons T6 - Retail - 8 persons <b>Total 99 persons</b>
D1.14	Measurement of distances	<b>Applies</b>	Informative clause
D1.15	Method of measurement	<b>Applies</b>	Informative clause
D1.16	Plant rooms and lift motor rooms; Concession	<b>Applies</b>	
D1.17	Access to lift pits	<b>N/A</b>	
<b>Part D2</b>	<b>Construction of Exits</b>		
NSW D2.1	Application of Part	<b>Applies</b>	
D2.2	Fire isolated stairs or ramps	<b>N/A</b>	
D2.3	Non-fire-isolated stairways and ramps	<b>N/A</b>	
D2.4	Separation of rising and descending stair flights	<b>N/A</b>	
D2.5	Open access ramps and balconies	<b>N/A</b>	
D2.6	Smoke lobbies	<b>N/A</b>	
D2.7	Installations in exits and paths of travel	<b>Applies</b>	Insufficient Detail – location of switchboard and electrical distribution boards to be nominated. All distribution boards located in paths of travel to exits are to be enclosed in a non-combustible cabinet with the enclosing door lined with a non-combustible lining and smoke seals fitted to the door opening.
D2.8	Enclosure of space under stairs and ramps	<b>Applies</b>	Insufficient detail – the space below the stair flights shall not be enclosed to form a cupboard unless: (i) the enclosing walls and ceilings have an FRL of not less than 60/60/60; and (ii) any access doorway to the enclosed space is fitted with a <a href="#">self-closing</a> –/60/30 fire door.
D2.9	Width of stairways	<b>N/A</b>	
D2.10	Pedestrian ramps	<b>N/A</b>	
D2.11	Fire-isolated passageways	<b>N/A</b>	
D2.12	Roof as open space	<b>N/A</b>	
NSW D2.13	Treads and risers	<b>Applies</b>	Insufficient details – working drawings to nominate tread and riser dimensions.
D2.14	Landings	<b>Applies</b>	Insufficient details – working drawings to detail landing dimensions

Clause	Description	Status	Comments
NSW D2.15	Thresholds	<b>Applies</b>	
NSW D2.16	Balustrades	<b>Applies</b>	Insufficient details – working drawings to detail balustrade dimensions
D2.17	Handrails	<b>Applies</b>	Insufficient details – working drawings to detail handrail dimensions. Note: Handrails are to be installed on both sides of the stair flights.
D2.18	Fixed platforms walkways, stairways, and ladders	<b>N/A</b>	
NSW D2.19	Doorways and doors	<b>Applies</b>	Complies
D2.20	Swinging doors	<b>Applies</b>	Complies
NSW D2.21	Operation of latch	<b>Applies</b>	Insufficient detail – Architect to detail door furniture
D2.22	Re-entry fire-isolated exits	<b>N/A</b>	
D2.23	Signs on doors	<b>N/A</b>	
NSW D2.101	Doors in path of travel in a POPE	<b>N/A</b>	
D2.24	Protection of openable windows	<b>N/A</b>	
D2.25	Timber stairways: Concession	<b>N/A</b>	
<b>Part D3</b>	<b>Access for People with Disabilities</b>		
D3.1	General building access requirements	<b>Applies</b>	
D3.2	Access to buildings	<b>Applies</b>	Access required to and within all areas normally used by the occupants
D3.3	Parts of buildings to be accessible	<b>Applies</b>	Access required to and within all areas normally used by the occupants: <ul style="list-style-type: none"> <li>▪ All stairs to be provided with handrails on both sides.</li> <li>▪ Handrails to comply with Cl 12 of AS1428.1</li> <li>▪ Lifts to comply with Part E3.6 of the BCA</li> </ul> The following comments are made in respect of access to and within the building: <ul style="list-style-type: none"> <li>▪ The layout of the accessible toilet shall be in accordance with the details confirmed via email to HG Architects dated 19/12/2016.</li> <li>▪ First floor balcony widths to comply with circulation requirements of AS1428.1.</li> </ul>
D3.4	Concessions	<b>Applies</b>	
D3.5	Car parking	<b>Applies</b>	Complies – details of line marking and bollards to be provided on working drawings.
D3.6	Signage	<b>Applies</b>	To be provided
D3.7	Hearing augmentation	<b>N/A</b>	
D3.8	Tactile indicators	<b>Applies</b>	Tactile indicators to be provided to stairs in accordance with the Standard.
D3.9	Wheelchair seating spaces in Class 9b assembly building	<b>N/A</b>	
D3.10	Swimming Pools	<b>N/A</b>	

Clause	Description	Status	Comments
D3.11	Ramps	N/A	
D3.12	Glazing on an access way	Applies	Frameless glass or fully glazed doors are to be clearly marked or etched.

## PART E - SERVICES AND EQUIPMENT

Clause	Description	Status	Comments
<b>Part E1</b>	<b>Fire Fighting Equipment</b>		
E1.1	-		
E1.2	-		
E1.3	Fire hydrants	Applies	A fire hydrant system designed to provide coverage to the building in accordance with the requirements of the Standard is required. Details of the design of the system are to be prepared by a suitably qualified Hydraulic Engineer.
E1.4	Hose reels	Applies	A fire hose reel system is to be installed within the building so that all parts of the building are provided with coverage. Details of the design of the system are to be prepared by a suitably qualified Hydraulic Engineer.
E1.5	Sprinklers	N/A	
E1.6	Portable fire extinguishers	Applies	Portable fire extinguishers are to be installed throughout the building.
E1.7	-		
E1.8	Fire control centres	N/A	
E1.9	Fire precautions during construction	Applies	Builder to ensure appropriate fire safety measures are provided throughout the construction phase.
E1.10	Provision for special hazards	N/A	
<b>Part E2</b>	<b>Smoke Hazard Management</b>		
E2.1	Application of Part	Applies	
E2.2	General requirements	Applies	Details of any mechanical ventilation system are to be prepared by a suitably qualified Mechanical Engineer. Details of the system design are to be submitted with the Construction Certificate.
E2.3	Provisions for special hazards	N/A	
<b>Part E3</b>	<b>Lift Installations</b>		
E3.1	Lift installations	Applies	
E3.2	Stretcher facility in lifts	N/A	
E3.3	Warning against use of lifts in fire	Applies	Appropriate signage to be provided advising against the use of lifts in the event of fire.
E3.4	Emergency lifts	N/A	
E3.5	Landings	Applies	Complies
E3.6	Passenger lifts	Applies	Lift to include accessible features – Architect to detail
E3.7	Fire Services Control	N/A	
E3.8	Aged care buildings	N/A	

Clause	Description	Status	Comments
E3.9	Fire service recall operation switch	N/A	
E3.10	Lift car fire service drive control switch	N/A	
<b>Part E4</b>	<b>Emergency Lighting, Exit Signs and Warning Systems</b>		
E4.1	-		
E4.2	Emergency light requirements	<b>Applies</b>	A system of emergency lighting and exit signs are to be installed throughout the building in accordance with AS2293.1. The emergency lighting system is to be designed by a suitably qualified Electrical Engineer.
E4.3	Measurement of distance	<b>Applies</b>	
E4.4	Design & operate emergency light	<b>Applies</b>	
E4.5	Exit signs	<b>Applies</b>	A system of exit signs are to be provided to clearly identify required exits and paths of travel to required exits in accordance with AS2293.1. The emergency lighting system is to be designed by a suitably qualified Electrical Engineer.
E4.6	Direction signs	<b>Applies</b>	Directional exit signs are to be provided to clearly identify paths of travel to required exits in accordance with AS2293.1. The emergency lighting system is to be designed by a suitably qualified Electrical Engineer.
E4.7	Class 2, 3 & 4 buildings: Exemptions	<b>Applies</b>	
E4.8	Design and operation of exit signs	<b>Applies</b>	Informative Clause
E4.9	EWIS systems	N/A	

#### PART F - HEALTH AND AMENITY

Clause	Description	Status	Comments
<b>Part F1</b>	<b>Damp and Weatherproofing</b>		
F1.1	Stormwater drainage	<b>Applies</b>	Details of stormwater drainage to be provided by Civil Engineer.
F1.2	-		
F1.3	-		
F1.4	External above ground membranes	<b>Applies</b>	
F1.5	Roof coverings	<b>Applies</b>	
F1.6	Sarking	N/A	
F1.7	Water-proofing of wet areas	<b>Applies</b>	Waterproofing to be undertaken in accordance with AS3740. Installation Certificate to be provided by installer on completion of work.
F1.8	-		
F1.9	Damp proofing	<b>Applies</b>	
F1.10	Damp proofing of floors on the ground	<b>Applies</b>	
F1.11	Provision of floor wastes	N/A	
F1.12	Sub-floor ventilation	N/A	

Clause	Description	Status	Comments
F1.13	Glazed assemblies	<b>Applies</b>	All glazing to comply with AS2047. Installation. Certificate to be provided by supplier on completion.
<b>Part F2</b>	<b>Sanitary and Other Facilities</b>		
F2.1	Facilities in residential buildings	<b>N/A</b>	
F2.2	Calculation of number of occupants and fixtures	<b>Applies</b>	Refer to D1.13.
F2.3	Facilities in Class 3 to 9 buildings	<b>Applies</b>	Based on the number of persons accommodated in accordance with Part D1.13 the following facilities are required to be provided <ul style="list-style-type: none"> <li>▪ 4 x female w.c + 3 x vanity basins.</li> <li>▪ 3 x male w.c + 2 x male urinal + 3 x vanity basins.</li> </ul> Note: The unisex accessible facility may be counted as one for each sex. Therefore based upon the above the following additional facilities are required: <ul style="list-style-type: none"> <li>▪ 1 x female w.c + 1 x vanity basin</li> <li>▪ 1 x male vanity basin</li> </ul>
F2.4	Facilities for people with disabilities	<b>Applies</b>	The layout of the accessible toilet shall be in accordance with the details confirmed via email to HG Architects dated 19/12/2016.
F2.5	Construction of sanitary compartments	<b>Applies</b>	Accessible facilities to be constructed in accordance with AS1428.1 – 2009.
F2.6	Interpretation: Urinals and washbasins	<b>Applies</b>	Informative clause.
NSW F2.7	Warm water installations	<b>N/A</b>	
F2.8	Waste Management	<b>N/A</b>	
<b>Part F3</b>	<b>Room Sizes</b>		
F3.1	Height of rooms	<b>Applies</b>	Complies.
<b>Part F.4</b>	<b>Light and Ventilation</b>		
F4.1	Provision of natural light	<b>N/A</b>	
F4.2	Methods and extent of natural light	<b>N/A</b>	
F4.3	Natural light borrowed from adjoining room	<b>N/A</b>	
F4.4	Artificial lighting	<b>Applies</b>	
NSW F4.5	Ventilation of rooms	<b>Applies</b>	Mechanical ventilation complying with AS1668.2 to be provided to all spaces and sanitary compartments. Details to be provided by a Mechanical Engineer.
F4.6	Natural ventilation	<b>Applies</b>	
F4.7	Ventilation borrowed from adjoining room	<b>N/A</b>	
F4.8	Restriction on position of water closets and urinals	<b>Applies</b>	Complies.
F4.9	Airlocks	<b>Applies</b>	Complies
F4.10	-	<b>N/A</b>	
F4.11	Carparks	<b>N/A</b>	
F4.12	Kitchen local exhaust ventilation	<b>N/A</b>	
<b>Part F5</b>	<b>Sound Transmission and Insulation</b>		

Clause	Description	Status	Comments
F5.1	Application of part	N/A	
F5.2	Determination of airborne sound insulation ratings	N/A	
F5.3	Determination of impact sound insulation ratings	N/A	
F5.4	Sound insulation of floors between units	N/A	
F5.5	Sound insulation of walls between units	N/A	
F5.6	Walls between a bathroom, sanitary compartment, laundry or kitchen and a habitable room in adjoining unit.	N/A	
F5.6	Sound insulation rating of internal services	N/A	
F5.7	Sound insulation of pumps	N/A	

#### PART J – ENERGY EFFICIENCY


Clause	Description	Status	Comments
<b>Part J1</b>	<b>Building Fabric</b>		
J1.1	Application of part	<b>Applies</b>	Section J Report to be provided.
J1.2	Thermal construction general	<b>Applies</b>	Section J Report to be provided.
J1.3	Roof and ceiling construction	<b>Applies</b>	Section J Report to be provided.
J1.4	Roof lights	<b>Applies</b>	
J1.5	Walls	<b>Applies</b>	Section J Report to be provided.
J1.6	Floors	<b>Applies</b>	Section J Report to be provided.
<b>Part J2</b>	<b>External glazing</b>		
J2.1	Application of Part	<b>Applies</b>	Section J Report to be provided.
J2.2	Applicable glazing provisions	<b>Applies</b>	Section J Report to be provided.
J2.3	Glazing – Method 1	N/A	
J2.4	Glazing – Method 2	N/A	
J2.5	Shading	N/A	
<b>Part J3</b>	<b>Building Sealing</b>		
J3.1	Application of Part	<b>Applies</b>	Section J Report to be provided.
J3.2	Chimneys and flues	N/A	
J3.3	Roof lights	N/A	
J3.4	External windows and doors	<b>Applies</b>	Section J Report to be provided.
J3.5	Exhaust fans	<b>Applies</b>	Section J Report to be provided.
J3.6	Construction of roofs, walls and floors	<b>Applies</b>	Section J Report to be provided.
J3.7	Evaporative coolers	N/A	
<b>Part J4</b>	Left blank	N/A	
<b>Part J5</b>	<b>Air-Conditioning and Ventilation Systems</b>		

<b>Clause</b>	<b>Description</b>	<b>Status</b>	<b>Comments</b>
J5.1	*****	-	
J5.2	Air-conditioning and ventilations systems	N/A	
J5.3	Time Switch	N/A	
J5.4	Heating and chilling systems	N/A	
J5.5	Miscellaneous exhaust systems	N/A	
<b>Part J6</b>	<b>Artificial Lighting and Power</b>		
J6.1	Application of Part	<b>Applies</b>	Section J Report to be provided.
J6.2	Interior artificial lighting	<b>Applies</b>	Section J Report to be provided.
J6.3	Control of interior and artificial lighting and power	<b>Applies</b>	Section J Report to be provided.
J6.4	Interior decorative and display lighting	N/A	
J6.5	Artificial lighting around the perimeter of a building	N/A	
J6.6	Boiling water and chilled water storage units	N/A	
<b>Part J7</b>	<b>Hot Water Supply</b>		
J7.1		-	
J7.2	Hot water supply	<b>Applies</b>	Section J Report to be provided.
J7.3	Swimming pool heating & pumping	N/A	
J7.4	Spa pool heating & pumping	N/A	
<b>Part J8</b>	<b>Access for Maintenance</b>		
J8.1	Application of Part	<b>Applies</b>	
J8.2	Access for maintenance	<b>Applies</b>	Section J Report to be provided.

## **ATTACHMENT 6**

**Waste Management Plan**  
*Newton Denny Chapelle*

## 1. Waste Management Plan (All Developments)

Applicant Details	
Application No.	TBA
Name	Newton Denny Chapelle
Address	PO Box 1138 Lismore NSW 2480
Phone Number(s)	(02) 6622 1011
Email	office@newtondennychapelle.com.au
Project Details	
Address of Development	Lot 60 DP 835249, Parish of Byron, being land situated at 88-94 Centennial Circuit, Byron Bay
Existing Buildings & Structures on Land	Lot 60 is currently vacant
Description of Development	Development consent is sought for the development of a mixed-use project comprising a Kool Kids Learning Centre (78 places), industrial retail outlets with associated takeaway food and retail floor area and a managers residence.
<p>This development achieves the waste objectives set out in the DCP. The details on this form are the provisions and intentions for minimising waste relating to this project. All records demonstrating lawful disposal of waste may be retained and kept readily accessible for inspection by regulatory authorities such as Council, DECC or WorkCover NSW.</p>	
Name	Damian Chapelle
Signature	
Date	24 January 2017
Name and telephone contact for principal person nominated for implementation of SWMMP (if different to above)	<p><b>Name:</b> Sixty Centennial Pty Ltd</p> <p><b>Telephone Contact:</b> Phone number to become available upon construction of the development and connection of telecommunication services.</p>

## 2. Construction Phase (All Types of Developments)

This part of the WMP providing details may be completed and submitted with the Construction Certificate associated with the Development Application. In this regard, following approval of the Development Application, the required Construction Certificate drawings can then be prepared to enable the inclusion of information within the WMP concerning the *reuse, recycling, and disposal* of materials during the construction phase of the development.

The WMP is also dependant on appointing a contractor to carry out the construction works to enable inclusion of details with reference to *'Specific method of on-site reuse, contractor and recycling outlet and/or waste depot to be used'*.

Accordingly, it is respectfully requested that Council place an appropriately worded condition on the development consent notice requiring the submission of an updated Waste Management Plan to be submitted with the Construction Certificate that addresses both the operational and construction phases of the development.

The following construction phase information will also be required to be provided in the updated WMP lodged with the Construction Certificate despite some of these items being addressed within this submitted WMP:

- ❖ Size and location of waste storage area;
- ❖ Access for waste collection vehicles (collected from the property frontage);
- ❖ Type and number of storage bins likely to be required (1 small sized bulk storage waste bin);
- ❖ Signage required to facilitate correct use of storage facilities.

### 3. Ongoing Operation Phase

The below Section 3 provides information including a relevant table showing the total volume of waste expected to be generated by the development and the associated waste storage requirements.

#### 3.1 Proposed Development Summary

The proposal seeks to construct a mixed use development comprising of a Kool Kids Learning Centre (78 places), Industrial Retail Outlets (retail and takeaway food premises) and a managers residence. Separate application will be lodged for the internal fit-out and operational components for the various tenancies with the exception of the child care centre which has floor plans and operational details.

As demonstrated in the Statement of Environmental Effects and design plans accompanying the application, the proposed child care development provides for the creation of a child care centre which caters for a total of 78 children and is managed by 12 staff. The room structure proposed for the second Byron Arts & Industry Estate centre is outlined below.

- Babies: 6 weeks to 24 months.
- Toddlers: 15 months to 2 years.
- Junior Kindy: 2 to 3 years.
- 2 x Senior Kindy: 3 to 4 years.
- Pre-school: 4 to 6 years.

The owner operator currently owns and operates a number of child care centres at Casuarina, Gold Coast (Miami, Mermaid Waters, Southport, Ashmore, Pacific Pines, Clear Island Waters, Surfers Paradise) and a further centre at Helensvale Town Centre (Sir John Overall Drive). All the Kool Kids Early Learning Centres are licensed under the Education and Care Services National Law 2011 and the Education and Care Services National Regulations 2013.

It is proposed to create a waste storage area within development site adjacent to the internal driveway adjacent to Tenancy 4 (shown circled in red on **Plate 1**).

The area will be screened from view from the car park area as illustrated in the submitted design plans.



Plate 1 – Proposed Bin Storage Area

**3.2 TOTAL VOLUME OF WASTE EXPECTED (ESTIMATED)**

The below tables provides details as to the expected total volume of waste expected to be generated by the proposed development and the associated waste storage requirements for the child care centre (Table 1) and the mixed use (Table 2).

**Table 1 – Child Care Centre**

<b>Kool Kids Learning Centre</b>	
<b>Amount of Waste Generated (L per unit/day)</b>	<b>Waste</b>
Amount generated Total:(Approx) <b>10L/Day per 100m<sup>2</sup></b>	General 10L/Day per 100m <sup>2</sup> = 60.6 litres Recyclable Waste 10L/Day per 100m <sup>2</sup> = 60.6 litres  Total = 606L/ week
Any reduction due to compacting equipment	Nil
Frequency of collections	As required Likely 1 collection/week
Number and size of storage bins required/ utilised	Capacity exists for 6 x 240L bins
Floor area required for storage bins (m <sup>2</sup> )	Dedicated bin storage area provided on site. Refer Plate 1 within this WMP.

Floor area required for manoeuvrability (m <sup>2</sup> )	Waste storage/collection area is approx. 10m <sup>2</sup>
Height required for manoeuvrability (m <sup>2</sup> )	Waste bin satisfy the height requirements through a 2 metre clearance

**Table 2 – Mixed Use**

<b>Mixed Use</b>																
<b>Amount of Waste Generated (L per unit/day)</b>	<b>Waste</b>															
Amount generated Total:(Approx) <b>Cafe: 10.5L/Day per 100m<sup>2</sup></b> <b>Shop: 50L/Day per 100m<sup>2</sup></b> <b>Residence: 80L/unit/week</b>	Waste Generation <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Use</th> <th>Area</th> <th>Waste (L/day)</th> </tr> </thead> <tbody> <tr> <td>Café/Restaurant</td> <td>44m<sup>2</sup></td> <td>4.62</td> </tr> <tr> <td>Retail</td> <td>88m<sup>2</sup></td> <td>44</td> </tr> <tr> <td>Managers Residence</td> <td>56m<sup>2</sup></td> <td>11.5</td> </tr> <tr> <td></td> <td><b>TOTAL</b></td> <td><b>60</b></td> </tr> </tbody> </table>	Use	Area	Waste (L/day)	Café/Restaurant	44m <sup>2</sup>	4.62	Retail	88m <sup>2</sup>	44	Managers Residence	56m <sup>2</sup>	11.5		<b>TOTAL</b>	<b>60</b>
Use	Area	Waste (L/day)														
Café/Restaurant	44m <sup>2</sup>	4.62														
Retail	88m <sup>2</sup>	44														
Managers Residence	56m <sup>2</sup>	11.5														
	<b>TOTAL</b>	<b>60</b>														
Recyclable Material Generation Total:(Approx) <b>Cafe: 2.5L/Day per 1.5m<sup>2</sup></b> <b>Shop: 50L/Day per 100m<sup>2</sup></b> <b>Residence: 40L/unit/week</b>	Weekly Waste Output – 420L  Recyclable Material Generation <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Use</th> <th>Area</th> <th>Waste (L/day)</th> </tr> </thead> <tbody> <tr> <td>Café/Restaurant</td> <td>44m<sup>2</sup></td> <td>73.5</td> </tr> <tr> <td>Retail</td> <td>88m<sup>2</sup></td> <td>44</td> </tr> <tr> <td>Residence</td> <td>56m<sup>2</sup></td> <td>5.7</td> </tr> <tr> <td></td> <td><b>TOTAL</b></td> <td><b>123</b></td> </tr> </tbody> </table>	Use	Area	Waste (L/day)	Café/Restaurant	44m <sup>2</sup>	73.5	Retail	88m <sup>2</sup>	44	Residence	56m <sup>2</sup>	5.7		<b>TOTAL</b>	<b>123</b>
Use	Area	Waste (L/day)														
Café/Restaurant	44m <sup>2</sup>	73.5														
Retail	88m <sup>2</sup>	44														
Residence	56m <sup>2</sup>	5.7														
	<b>TOTAL</b>	<b>123</b>														
	Daily Waste Output – 183L  Total = 1,281L/ per week															
Any reduction due to compacting equipment	Nil															
Frequency of collections	As required Likely 1 collection/week															
Number and size of storage bins required/ utilised	Capacity exists for 2 x 1.5m <sup>3</sup> bins															
Floor area required for storage bins (m <sup>2</sup> )	Dedicated bin storage area provided on site. Refer Plate 1 within this WMP.															
Floor area required for manoeuvrability (m <sup>2</sup> )	Waste storage/collection area is approx. 10m <sup>2</sup>															
Height required for manoeuvrability (m <sup>2</sup> )	Waste bin satisfy the height requirements through a 2 metre clearance															

#### **3.3 CONSTRUCTION DETAILS (ALL TYPES OF DEVELOPMENT)**

Details concerning the measures (materials/lifecycle etc) for waste avoidance that have/will be incorporated into the design, material purchasing and construction techniques of the development will be provided to Council with the Construction Certificate.

As per Section 2 of this WMP, this part of the WMP may be completed and submitted with the Construction Certificate following approval of the Development Application. The WMP is dependent on the preparation of Construction Certificate drawings and the appointment of a contractor to carry out the construction works to enable inclusion of details within this section.

Accordingly, it is respectfully requested that Council place an appropriately worded condition on the development consent notice requiring the submission of an updated Waste Management Plan to be submitted with the Construction Certificate that addresses both the operational and construction phases of the development.

#### **3.4 Detail the arrangement that would be appropriate for the ongoing use of waste facilities as provided in the development. Identify each stage of waste transfer and loading into the collection vehicle, detailing the responsibility for and location and frequency of, transfer and collection**

Ongoing Waste Management will occur via the following Management Plan:

- a) Quantum of waste generated will be monitored by staff and commercial collection service adjusted as required.
- b) The waste storage area on site will be suitably located and clearly labelled. Location of bin storage area is identified above in **Plate 1**.
- c) With respect to general waste, staff will be responsible for:
  - the collection and storage of waste on site;
  - maintenance of the waste storage area in a clean and tidy manner.

### 4. Plans and Drawings

#### 4.1 Construction

The following construction phase plan information will be required to be provided in the updated WMP with the Construction Certificate despite some of this information being contained within this submitted WMP:

- ❖ Size and location of waste storage area;
- ❖ Access for waste collection vehicles (collected from the property frontage);
- ❖ Type and number of storage bins likely to be required (1 small sized bulk storage waste bin);
- ❖ Signage required to facilitate correct use of storage facilities.

#### 4.2 Ongoing Operation

The following ongoing operation information is provided in respect to the proposed development.

Component	Comment
<b>Space</b>	
Size and locations(s) of waste storage areas	The bin storage area designed to accommodate 6 x 240L & 2 x 1.5m <sup>3</sup> within the designated area as illustrated on the submitted Development Application design plans (Plan DA03) and <b>Plate 1</b> of this report.
Recycling bins placed next to waste bins	Bin storage area provided as shown.
Space provided for access to and the manoeuvring of bins/equipment	Bin storage collection will occur from the subject land as demonstrated within the TIA prepared by TTM in <b>Attachment 4</b> .
Any additional facilities	N/A.
<b>Access</b>	
Access route(s) to deposit waste in storage room/area	Typically waste storage/collection bins, will be placed within the property adjacent to the waste collection building for collection.  Pedestrian access routes will be from the proposed building directly to the identified waste storage area.
Access route(s) to collect waste from storage room/area	Typically the waste storage bin, will be placed at the frontage of the enclosure for collection.

	Pedestrian access routes will be from the proposed building directly to the identified waste storage area.
Bin carting grade	The grade of the land is considered to be flat.
Location of final collection point	Bins to be collected from the bin enclosure.
Clearance, geometric design and strength of internal access driveways and roads	Adequate clearance exists for waste collection.
Direction of traffic flow for internal access driveways and roads	Access will be achieved through the internal driveway with service vehicles manoeuvring through the site. Vehicles will enter and leave the site in a forward direction.
<b>Amenity</b>	
Aesthetic design of waste storage areas	As per design plans, the bin storage area will be adequately screened.
Signage – type and location	No specific signage proposed unless otherwise required by Council within the development consent conditions.
Construction details of storage rooms/areas (including floor, walls, doors, ceiling design, sewer connection, lighting, ventilation, security, wash down provisions etc)	The design plans submitted with the Development Application indicate design and construction material detail to Development Application standard. Further detailed designs in this regard will be submitted with the Construction Certificate.

  
**Newton Denny Chapelle**  
SURVEYORS PLANNERS ENGINEERS

**E-MAILED**  
Date 16/3 By CW

Date: 14<sup>th</sup> March 2017  
Our Ref: 16/296

General Manager  
Byron Shire Council  
PO Box 219  
MULLUMBIMBY NSW 2482

**BYRON SHIRE COUNCIL**  
DOC NO: .....  
REC'D: 20 MAR 2017  
FILE NO: F1528106  
ASSIGNER: J. Viel

Pn: 188980

Dear Sir,

**Re: Development Application 111.2017.20.1**  
**Lot 60 DP 835249 No. 88-94 Centennial Circuit, Byron Bay**

Further to receipt of Council's letter dated 23 February 2017, please find additional information addressing the required information identified from Council's preliminary development application review.

1. Please find attached revised design plans (**Attachment 1**) and the associated BASIX Certificate (**Attachment 2**) for the proposed manager's residence.
2. Please find attached the landscape design plans prepared by Scenetics Landscape Planners and Consultants (**Attachment 3**).
3. Bitzios Consulting has reviewed the design of the loading bay. Their technical advice is also attached to this letter. In summary, Bitzios Consulting has identified based on the below mitigation measures, site servicing and refuse collection are expected to operate adequately (**Attachment 4**).
  - the implementation of the site management plan;
  - service vehicle and refuse collection operations are proposed to occur outside Child Care Centre AM and PM peak times;
  - Child Care Centre visitor parking (i.e. parents and children) are located away from the service vehicle manoeuvring area.

We trust this is the necessary information Council requires to satisfy the preliminary development application review. However, should you have any questions, please do not hesitate contacting Damian Chapelle of this office.

Yours sincerely,  
**NEWTON DENNY CHAPELLE**

*Daian Chapelle*

**DAMIAN CHAPELLE**  
Town Planner. BTP CPP.



## RFI ATTACHMENT 1

Revised Plans

*Harley Graham Architecture*

# DEVELOPMENT APPLICATION

## PROPOSED INDUSTRIAL SPACES + CHILD CARE

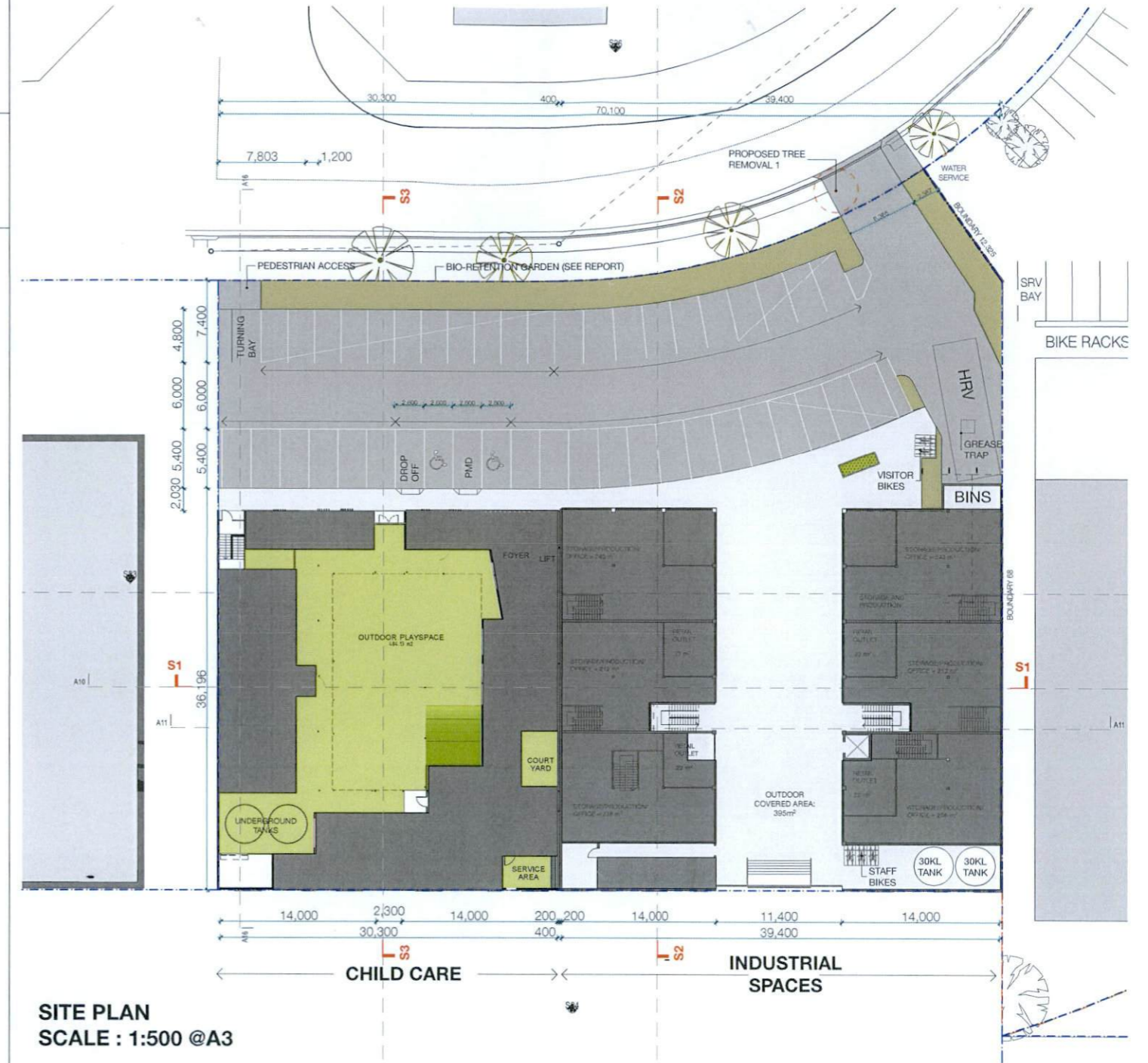
LOT 60 CENTENNIAL CIRCUIT  
BYRON BAY NSW 2481

### DRAWING SCHEDULE

ISSUE	No	NAME	SCALE
	01	DRAWING LIST / LOCATION / SITE PLAN	1:2000 / 1:500
	02	AREA AND USES	1:500
	03	LEVEL 00	1:200
	04	LEVEL 01	1:200
	05	PARKING AND ACCESS	1:200
	06	SECTIONS	1:200
	07	ELEVATIONS	1:200

### FLOOR SPACE RATIO AREAS

ZONE NAME	AREA	SITE AREA	FSR
INDUSTRIAL SPACES	1,562m <sup>2</sup>	4020m <sup>2</sup>	<b>38.8%</b>
CHILD CARE AREA	861m <sup>2</sup>	4020m <sup>2</sup>	<b>21.4%</b>
<b>TOTAL</b>	<b>2,423m<sup>2</sup></b>	<b>4020m<sup>2</sup></b>	<b>60.2%</b>



**SITE PLAN**  
SCALE : 1:500 @A3

### PLANNER

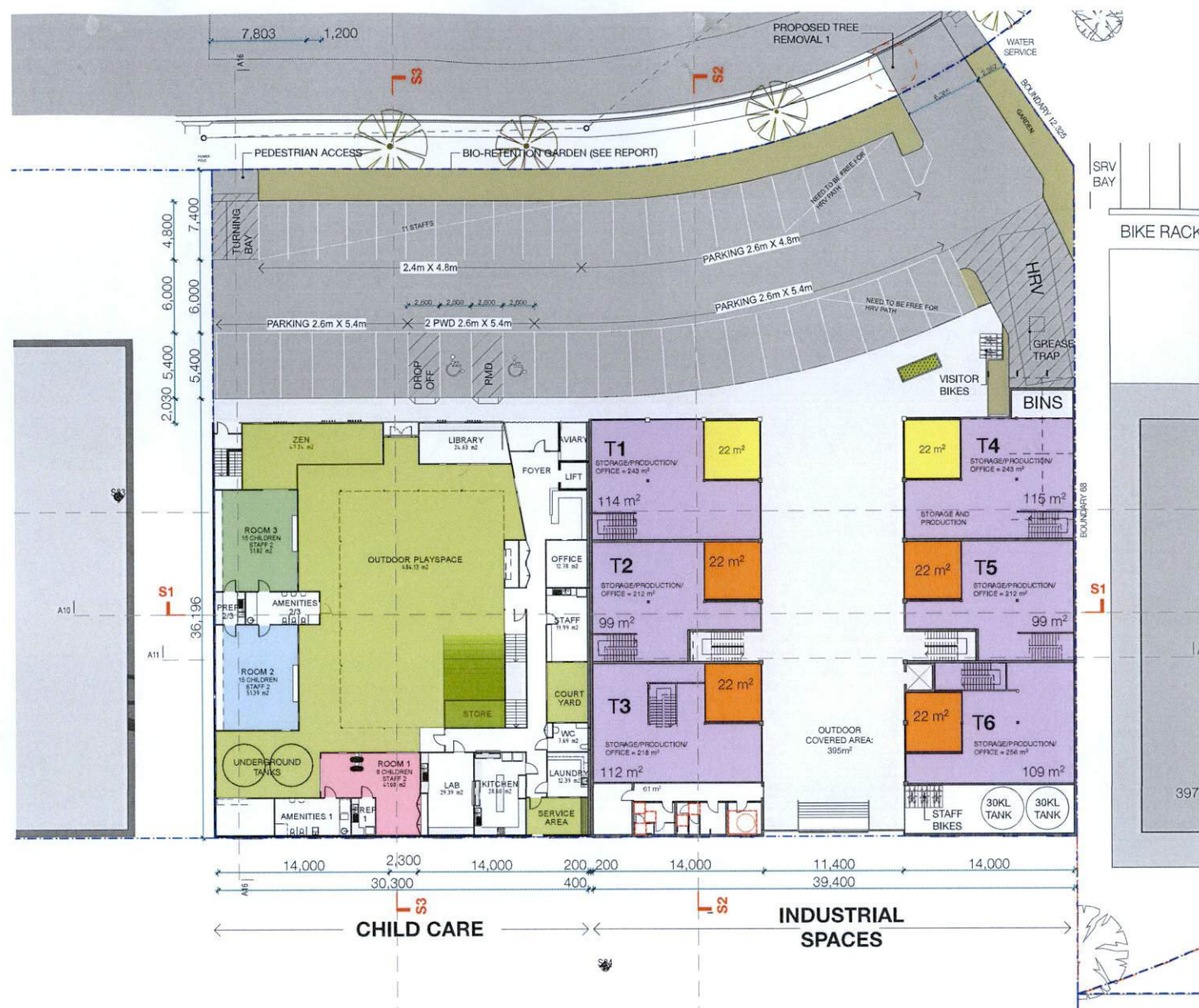
#### NDC - NEWTON DENNY CHAPELLE

Suite 1/31 Carrington Street, Lismore  
Post: PO Box 1138 Lismore NSW 2480  
T: 02 66221 011  
F: 02 6622 4088  
M: 0438 862 856  
e. dchappelle@newtondennychapelle.com.au

#### ISSUE/REVISIONS

B	DA	16.03.17
A	DA SET	24.01.17

CLIENT	DENWOL DEVELOPMENTS	ADDRESS	LOT 60 CENTENNIAL CIRCUIT BYRON BAY	APPROVED: HG	JOB NO: HGA048			
JOB NAME	MIXED USED BUILDING + CHILD CARE	LOT + DP	LOT 60 SP 835249	SCALE	PAPER	ISSUE	DWG NO	REV
DRAWING	<b>DRAWING LIST / LOCATION / SITE PLAN</b>			1:2000 1:500	A3	DA	01	B



SCALE : 1:500 @A3

LEVEL 00



SCALE : 1:500 @A3

LEVEL 01

**THERMAL PERFORMANCE SPECIFICATIONS:**  
 The following specifications take precedence over other plan notations for the construction of this building.  
 NOTE: In addition to BASIX commitments; building compliance is required to comply with the 'New South Wales Additions' in the current edition of the NCC, at the time of building. This includes New South Wales Parts 2.6 and 3.12. Specific mention is made of the following provisions:  
 - Building Fabric Thermal Insulation  
 - Building Sealing  
 - Building Services

**WINDOWS (total product specification – glass + frame)**  
 U-value 6.70 (or less than) & SHGC 0.70 (+/-5%)(Default – Plain glass in AL frame)

**EXTERNAL WALL (Medium colour)**  
 Concrete/Plasterboard lined – Reflective airgap required

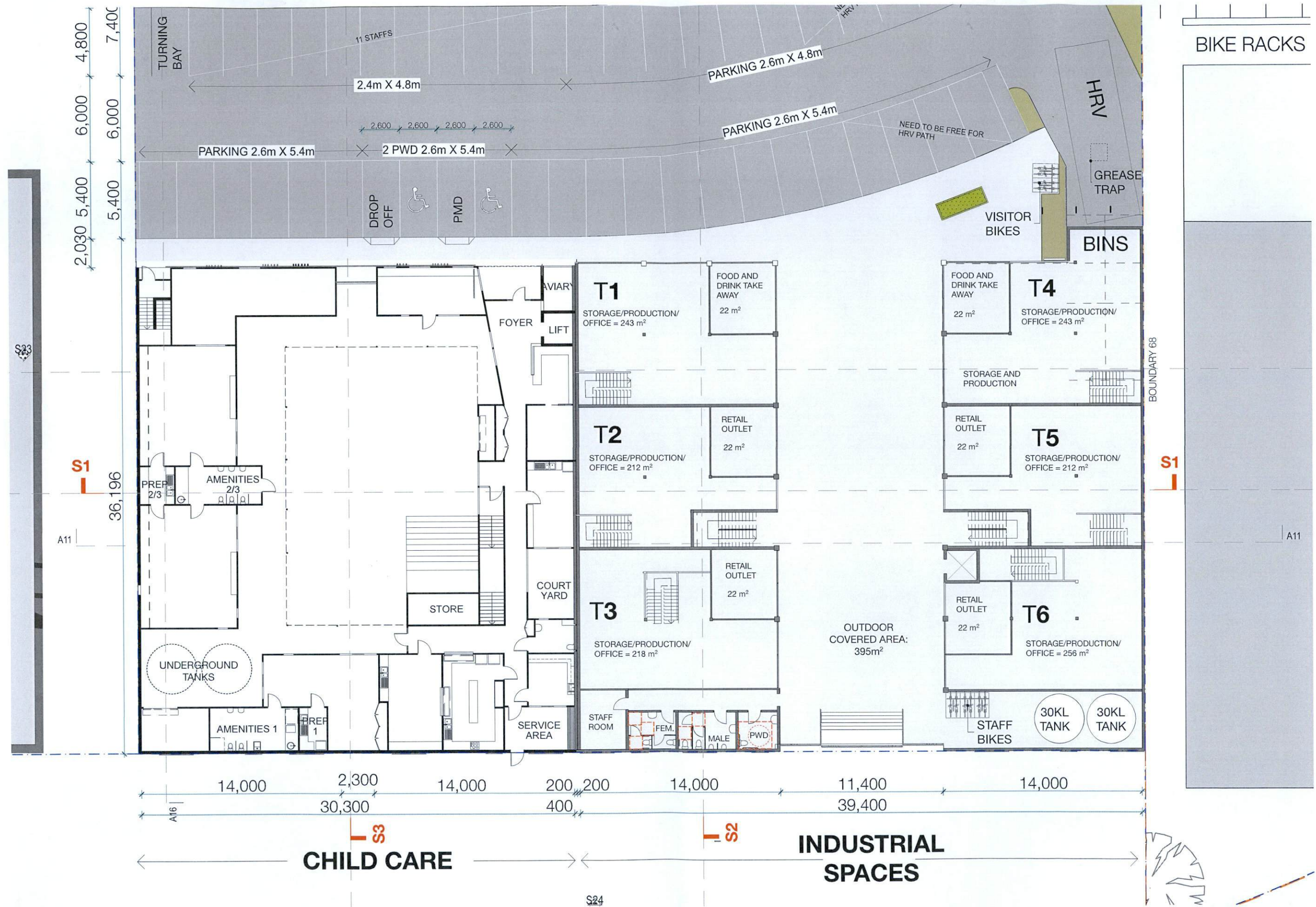
**INTERNAL WALL**  
 Cavity Panel – No Insulation  
 Partition walls – No thermal insulation where adjacent to other Conditioned space

**EXTERNAL FLOOR**  
 Suspended Concrete (Conditioned Space below) – No insulation

**CEILING SPACE with ROOF ABOVE**  
 Plasterboard – No insulation required

**ROOF (Medium colour) (Non-ventilated)**  
 Sheet Metal Roofing – 75mm Foil Blanket with Reflective airgap

INDUSTRIAL SPACES	
<b>LEVEL 0</b>	
INDUSTRIAL	680 m <sup>2</sup>
RETAIL	88 m <sup>2</sup>
TAKE AWAY	44 m <sup>2</sup>
WC	40 m <sup>2</sup>
<b>LEVEL 1</b>	
INDUSTRIAL	710 m <sup>2</sup>
MANAGER RESIDENCE	56 m <sup>2</sup>
DECK	140 m <sup>2</sup>
<b>TOTAL GFA</b>	<b>1,562 m<sup>2</sup></b>



All building works to be carried out in accordance with the Building Code of Australia (BCA) and to the satisfaction of the principle certifying authority.  
 Builders/Contractors are to verify all dimensions prior to commencement of site work or off-site fabrication.  
 Figured dimensions take precedence - do not scale.  
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ISSUE/REVISIONS	
B	DA
A	DA SET
	16.03.17
	24.01.17

CLIENT	DENWOL DEVELOPMENTS	ADDRESS	LOT 60 CENTENNIAL CIRCUIT BYRON BAY	APPROVED: HG	JOB NO: HGA048
JOB NAME	MIXED USED BUILDING + CHILD CARE	LOT + DP	LOT 60 SP 835249	SCALE	PAPER
DRAWING	LEVEL 00			1:200	A3
				ISSUE	DWG NO
				DA	03
					B

**BASIX REQUIREMENTS**

**THERMAL PERFORMANCE SPECIFICATIONS:**  
 The following specifications take precedence over other plan notations for the construction of this building.  
**NOTE:** In addition to BASIX commitments, building compliance is required to comply with the 'New South Wales Additions' in the current edition of the NCC, at the time of building. This includes New South Wales Parts 2.6 and 3.12. Specific mention is made of the following provisions:  
 - Building Fabric Thermal Insulation  
 - Building Sealing  
 - Building Services

**WINDOWS (total product specification – glass + frame)**  
 U-value 6.70 (or less than) & SHGC 0.70 (+/-5%)(Default – Plain glass in AL frame)

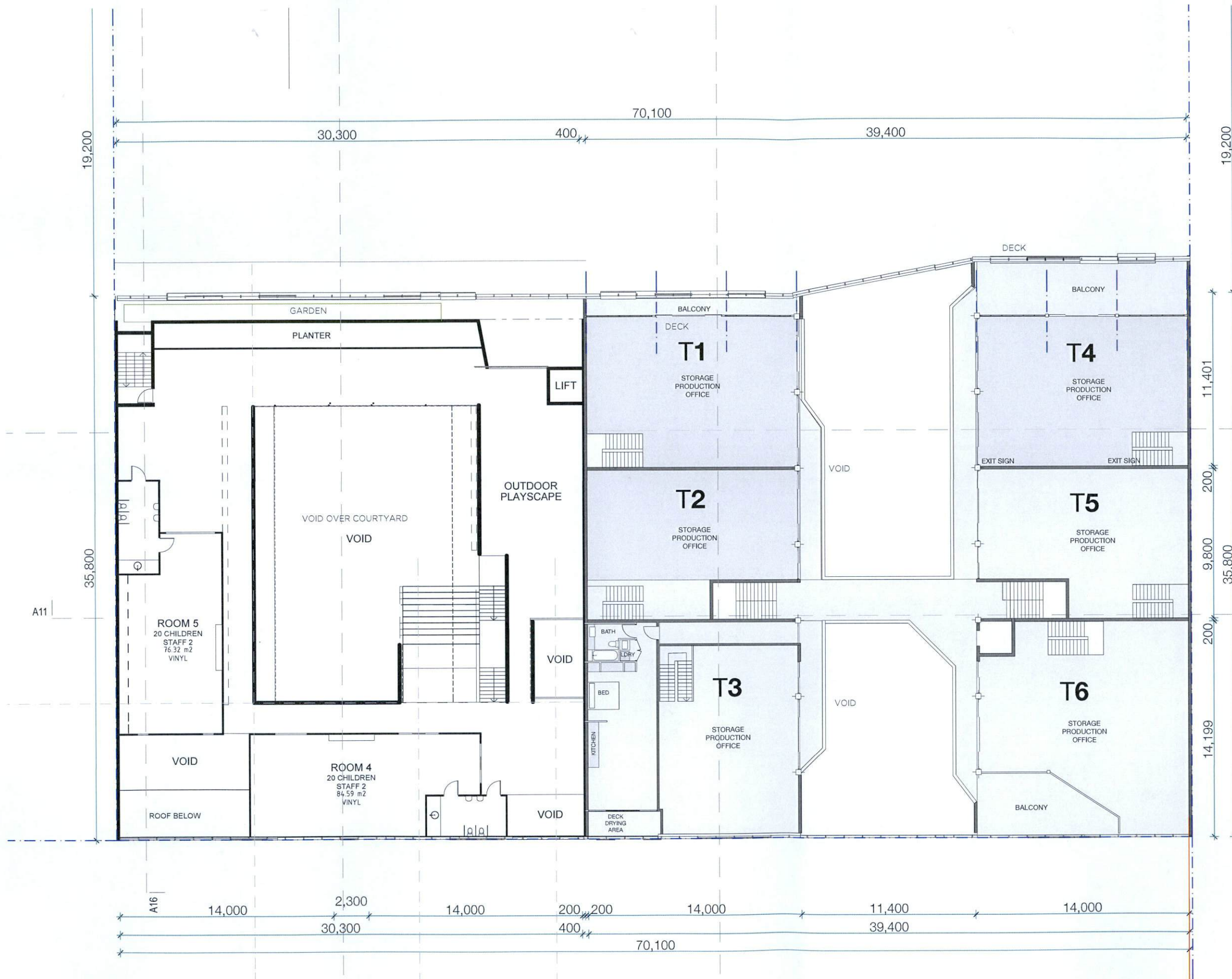
**EXTERNAL WALL (Medium colour)**  
 Concrete/Plasterboard lined – Reflective airgap required

**INTERNAL WALL**  
 Cavity Panel – No Insulation  
 Partition walls – No thermal insulation where adjacent to other Conditioned space

**EXTERNAL FLOOR**  
 Suspended Concrete (Conditioned Space below) – No insulation

**CEILING SPACE with ROOF ABOVE**  
 Plasterboard – No insulation required

**ROOF (Medium colour) (Non-ventilated)**  
 Sheet Metal Roofing – 75mm Foil Blanket with Reflective airgap



LEVEL 01  
 Scale 1:250

**HGA X LOCAL OFFICE ARCHITECTURE**

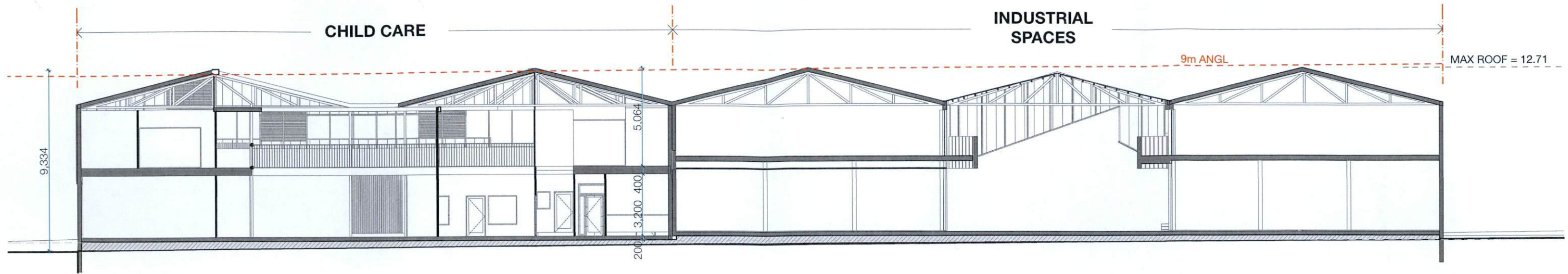
LEVEL 1/ 144 JONSON STREET BYRON BAY | PO BOX 1285 NSW 2481  
 F: 02 66809820 | T: 02 66809690 | E: office@harleygraham.com ABN: 85158246003 NSW 7892

All building works to be carried out in accordance with the Building Code of Australia (BCA) and to the satisfaction of the principle certifying authority.  
 Builders/Contractors are to verify all dimensions prior to commencement of site work or off-site fabrication.  
 Figured dimensions take precedence - do not scale.  
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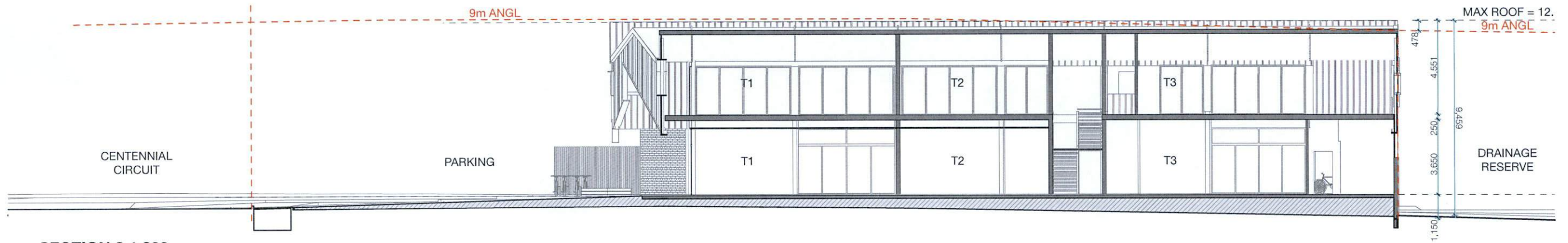
ISSUE/REVISIONS	
B DA	16.03.17
A DA SET	24.01.17

CLIENT	DENWOL DEVELOPMENTS	ADDRESS	LOT 60 CENTENNIAL CIRCUIT BYRON BAY	APPROVED: HG	JOB NO: HGA048
JOB NAME	MIXED USED BUILDING + CHILD CARE	LOT + DP	LOT 60 SP 835249	SCALE	PAPER
DRAWING	LEVEL 01			1:200,	A3 DA 04 B

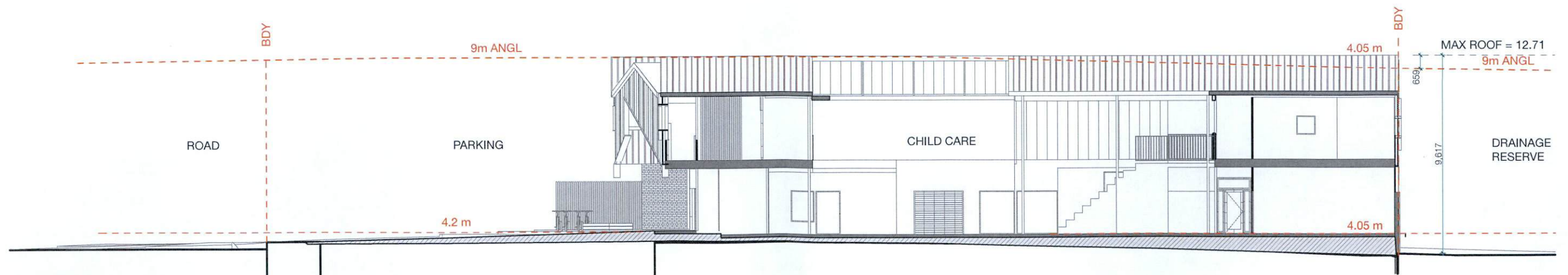




SECTION 1 1:200



SECTION 2 1:200



SECTION 3 1:200



NORTH ELEVATION  
Scale 1:200



SOUTH ELEVATION  
Scale 1:200



WEST ELEVATION  
Scale 1:200



EAST ELEVATION  
Scale 1:200

- CC CONCRETE / COLOUR : NATURAL
- FC FIBROCIMENT SHEETING / COLOUR : NATURAL
- Da DAMPALON TRANSLUCENT SHEETING, COLOUR = GREY
- GZ GLAZING / IRONSTONE ALUMINUM FRAMES
- Td ROOF SHEETING : TRIMDEK / COLOUR : IRONSTONE
- HW HARDWOOD BATTENS
- BLK IRONSTONE PAINTED BLOCKWORK

**HGA** X **LOCAL OFFICE ARCHITECTURE** 

LEVEL 1/ 144 JONSON STREET BYRON BAY | PO BOX 1285 NSW 2481  
F: 02 66809820 | T: 02 66809690 | E: office@harleygraham.com ABN: 85158246003 NSW 7892

All building works to be carried out in accordance with the Building Code of Australia (BCA) and to the satisfaction of the principle certifying authority.  
Builders/Contractors are to verify all dimensions prior to commencement of site work or off-site fabrication.  
Figured dimensions take precedence - do not scale.  
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ISSUE/REVISIONS	
B	DA
A	DA SET

16.03.17  
24.01.17

CLIENT	DENWOL DEVELOPMENTS	ADDRESS	LOT 60 CENTENNIAL CIRCUIT BYRON BAY	APPROVED: HG	JOB NO: HGA048
JOB NAME	MIXED USED BUILDING + CHILD CARE	LOT + DP	LOT 60 SP 835249	SCALE	PAPER
DRAWING	<b>ELEVATIONS</b>			1:200	A3
				DA	07
					B



Newton Denny Chapelle

SURVEYORS PLANNERS ENGINEERS

## RFI ATTACHMENT 2

BASIX Certification

# BASIX<sup>®</sup>Report

Building Sustainability Index [www.basix.nsw.gov.au](http://www.basix.nsw.gov.au)

Project summary		
Project name	6724	
Street address	88-94 Centennial Circuit Byron Bay 2481	
Local Government Area	Byron Shire Council	
Plan type and plan number	deposited 835249	
Lot no.	60	
Section no.	-	
No. of residential flat buildings	0	
No. of units in residential flat buildings	0	
No. of multi-dwelling houses	0	
No. of single dwelling houses	1	
Project score		
Water	40	Target 40
Thermal Comfort	Pass	Target Pass
Energy	41	Target 40

# Description of project

## Project address

Project name	6724
Street address	88-94 Centennial Circuit Byron Bay 2481
Local Government Area	Byron Shire Council
Plan type and plan number	deposited 835249
Lot no.	60
Section no.	-

## Project type

No. of residential flat buildings	0
No. of units in residential flat buildings	0
No. of multi-dwelling houses	0
No. of single dwelling houses	1

## Site details

Site area (m <sup>2</sup> )	4020
Roof area (m <sup>2</sup> )	1900
Non-residential floor area (m <sup>2</sup> )	2423.0
Residential car spaces	0
Non-residential car spaces	0

## Common area landscape

Common area lawn (m <sup>2</sup> )	0.0
Common area garden (m <sup>2</sup> )	0.0
Area of indigenous or low water use species (m <sup>2</sup> )	0.0

## Assessor details

Assessor number	20039
Certificate number	-
Climate zone	10

## Project score

Water	40	Target 40
Thermal Comfort	Pass	Target Pass
Energy	41	Target 40

## Description of project

The tables below describe the dwellings and common areas within the project

### Single dwelling houses

Dwelling no.	No. of bedrooms	Conditioned floor area (m <sup>2</sup> )	Unconditioned floor area (m <sup>2</sup> )	Area of garden & lawn (m <sup>2</sup> )	Indigenous species (min area m <sup>2</sup> )
Res	1	55.6	0.0	0.0	0.0

**No common areas specified.**

## Schedule of BASIX commitments

1. Commitments for multi-dwelling houses
2. Commitments for single dwelling houses
  - (a) Dwellings
    - (i) Water
    - (ii) Energy
    - (iii) Thermal Comfort
3. 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.

### 2. Commitments for single dwelling houses

#### (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: <ul style="list-style-type: none"> <li>(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</li> <li>(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.</li> </ul>		✓ ✓	✓ ✓
(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.	✓	✓	✓

Dwelling no.	Fixtures					Appliances		Individual pool				Individual spa		
	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	3 star (> 7.5 but <= 9 L/min)	4 star	5 star	5 star	no	-	-	-	-	-	-	-	-	-

Dwelling no.	Alternative water source							
	Alternative water supply systems	Size	Configuration	Landscape connection	Toilet connection (s)	Laundry connection	Pool top-up	Spa top-up
All dwellings	individual water tank (no. 1)	Tank size (min) 1300.0 litres	To collect run-off from at least: 300.0 square metres of roof area; 0.0 square metres of impervious area; 0.0 square metres of garden and lawn area; and 0.0 square metres of planter box area.	yes	yes	yes	no	no
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.		✓	✓

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(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.		✓	✓
(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".		✓	
(j) The applicant must install the photovoltaic system specified for the dwelling under the "Photovoltaic system" heading of the "Alternative energy" column of the table below, and connect the system to that dwelling's electrical system.	✓	✓	✓

Dwelling no.	Hot water	Bathroom ventilation system		Kitchen ventilation system		Laundry ventilation system	
	Hot water system	Each bathroom	Operation control	Each kitchen	Operation control	Each laundry	Operation control
All dwellings	electric heat pump - air sourced 26 to 30 RECs	individual fan, ducted to façade or roof	manual switch on/off	no mechanical ventilation (ie. natural)	-	individual fan, ducted to façade or roof	manual switch on/off

Dwelling no.	Cooling		Heating		Artificial lighting						Natural lighting	
	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
All dwellings	ceiling fans	-	-	-	1 (dedicated)	1 (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	yes (dedicated)	0	yes

Dwelling no.	Individual pool		Individual spa		Appliances & other efficiency measures							
	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	-	yes	-	-	-	yes	no

Alternative energy	
Dwelling no.	Photovoltaic system (min rated electrical output in peak kW)
All dwellings	-

(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:  (aa) Install insulation with an R-value of not less than 1.0 around the vertical edges of the perimeter of the slab; or  (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/m <sup>2</sup> /yr)	Area adjusted cooling load (in mJ/m <sup>2</sup> /yr)
All dwellings	32.7	34.8

Construction of floors and walls					
Dwelling no.	Concrete slab on ground(m <sup>2</sup> )	Suspended floor with open subfloor (m <sup>2</sup> )	Suspended floor with enclosed subfloor (m <sup>2</sup> )	Suspended floor above garage (m <sup>2</sup> )	Primarily rammed earth or mudbrick walls
All dwellings	-	-	55	-	No

### 3. 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	no common facility	no common facility	no common facility	no common laundry facility

(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.	✓	✓	✓

## 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).

**THERMAL PERFORMANCE SPECIFICATIONS:**

**The following specifications take precedence over other plan notations for the construction of this building.**

**NOTE:** In addition to BASIX commitments; building compliance is required to comply with the 'New South Wales Additions' in the current edition of the NCC, at the time of building.

This includes New South Wales Parts 2.6 and 3.12.

Specific mention is made of the following provisions:

- Building Fabric Thermal Insulation
- Building Sealing
- Building Services

**WINDOWS (total product specification – glass + frame)**

U-value 6.70 (or less than) & SHGC 0.70 (+/-5%)(Default – Plain glass in AL. frame)

**EXTERNAL WALL (Medium colour)**

Concrete/Plasterboard lined – Reflective airgap required

**INTERNAL WALL**

Cavity Panel – No Insulation

Partition walls – No thermal insulation where adjacent to other Conditioned space

**EXTERNAL FLOOR**

Suspended Concrete (Conditioned Space below) – No insulation

**CEILING SPACE with ROOF ABOVE**

Plasterboard – No insulation required

**ROOF (Medium colour) (Non-ventilated)**

Sheet Metal Roofing – 75mm Foil Blanket with Reflective airgap



## RFI ATTACHMENT 3

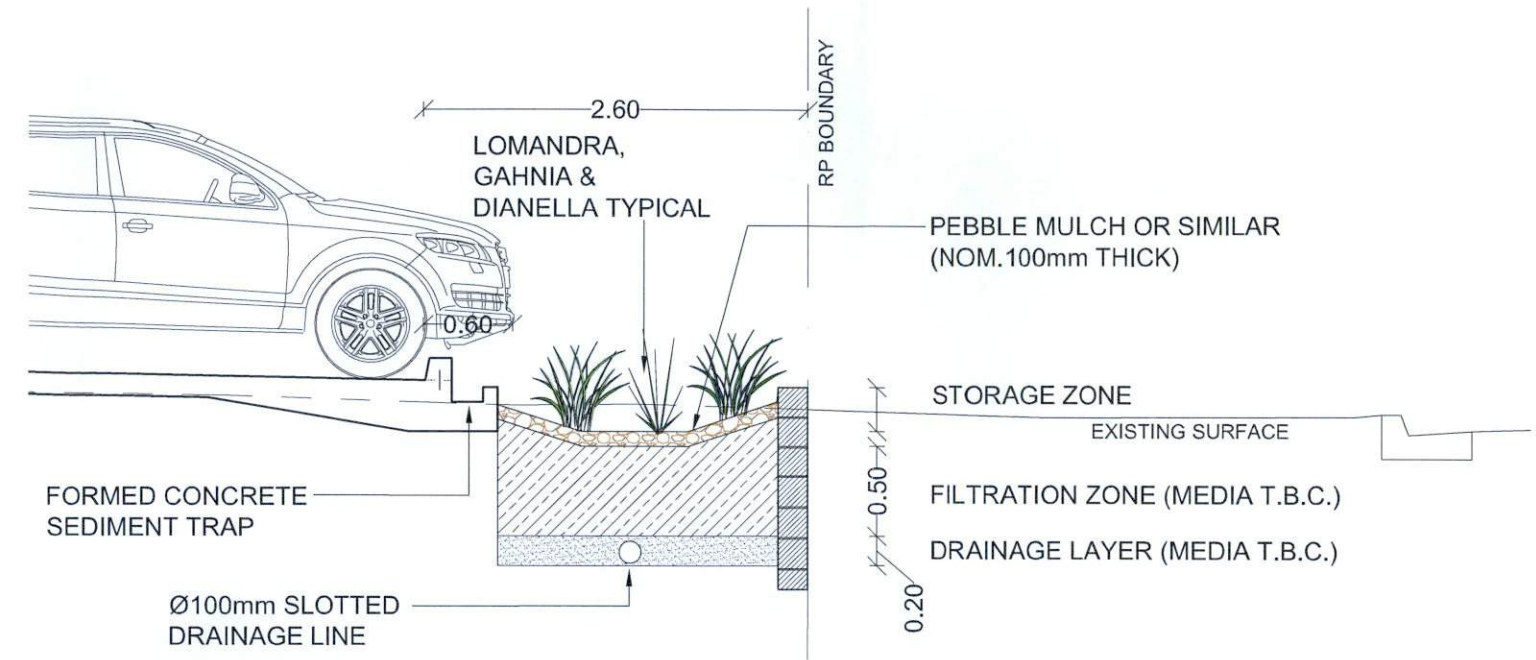
Landscape Plans

*Scenetics*





AERIAL SITE CONTEXT  
PLAN NTS.



TYPICAL BIORETENTION  
SECTION 1:50 A3

PROPOSED PLANT PALETTE

TREES

Cupaniopsis anacardioides Tuckeroo 45L

SHRUBS

Callistemon 'Dawson River' Bottlebrush 200mm  
 Callistemon 'Eureka' Bottlebrush 200mm  
 Dracaena marginata Dracaena 300mm  
 Nandina domestica Sacred Bamboo 300mm  
 Strelitzia reginae Bird of Paradise 200mm  
 Syzygium 'Bush Christmas' Dwarf lillypilly 200mm  
 Viburnum 'Emerald Lustre' Viburnum 200mm

GROUNDCOVERS

Dianella 'Little Jess' Flax Lilly 140mm  
 Liriope 'Evergreen Giant' Liriope 140mm  
 Myoporum boninense Myoporum 140mm  
 Hymenocallis littoralis Spider Lilly 140mm  
 Rhoeo spathacae Moses in a Cradle 140mm

BIORETENTION

Dianella caerulea Flax Lilly tube  
 Gahnia seiberiana Red Fruited Saw Sedge tube  
 Lomandra hystrix Mat rush tube



PLANT CHARACTER IMAGES



LANDSCAPE PLANNERS  
& CONSULTANTS  
 ABN 16 007 233 693  
 Mobile: 0448 463 510  
 Office: (07) 5539 1048  
 PO Box 5761 GCMC Qld 9726  
 email: john@scenetics.com.au

REVISION:  
 A Original Issue 07.03.2017

TITLE  
**STATEMENT OF  
 LANDSCAPE INTENT**

PROJECT  
**PROPOSED INDUSTRIAL  
 SPACES & CHILDCARE  
 LOT 60 CENTENNIAL CCT  
 BYRON BAY**

SCALE as shown	DATE MAR 2017	DESIGN TD	DRAWN TD
PROJECT No 17011855	DRAWING No SLI - 2	ISSUE A	

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# NatHERS Rated 4.2/10 STARS\*

\*www.nathers.gov.au



## BUILDING ENERGY EFFICIENCY CERTIFICATE

Denwol Developments  
ISSUED TO

88 - 94 Centennial Cct  
ADDRESS

Site Lot 60

Byron Bay

NSW

2481

1010909479  
CERTIFICATION NUMBER

16/03/2017  
DATE

10  
CLIMATE ZONE

BERSPPro - v4.3.0.1 (BERSPro)  
SOFTWARE

32.7 MJ/m<sup>2</sup> pa  
SIMULATED ENERGY CONSUMPTION - HEATING

34.8 MJ/m<sup>2</sup> pa  
SIMULATED ENERGY CONSUMPTION - COOLING

67.5 MJ/m<sup>2</sup> pa  
TOTAL SIMULATED ENERGY CONSUMPTION

55.6 m<sup>2</sup>  
FLOOR AREA - CONDITIONED

0.0 m<sup>2</sup>  
FLOOR AREA - UNCONDITIONED

55.6 m<sup>2</sup>  
FLOOR AREA - TOTAL

David Howard  
ASSESSOR NAME

20039  
ASSESSOR NUMBER

Partners Energy Management  
COMPANY

ASSESSOR SIGNATURE

Issued by a BUILDING THERMAL PERFORMANCE ASSESSOR accredited by the Australian Building Sustainability Association to provide NatHERS house energy ratings.



Newton Denny Chapelle

SURVEYORS PLANNERS ENGINEERS

## RFI ATTACHMENT 4

Traffic / Loading Bay Assessment

*Bitzios Consulting*

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Our Reference: P2841.001L

Your Reference:

13 March 2017

Sixty Centennial Pty Ltd  
PO Box 8315  
GCMC, QLD 9726

Attention: **Bruce Coulson**

Sent via email: dchapelle@newtondennychapelle.com.au

Dear Bruce

**RE: THE HIVE – CENTENNIAL CIRCUIT, BYRON BAY RFI**

**1.0 INTRODUCTION**

This letter has been prepared in response to Byron Shire Council's request for further information dated 23<sup>rd</sup> February 2017 for the proposed Child Care Centre and Industrial development located at 88 – 94 Centennial Circuit, Byron Bay. This letter specifically responds to item 3 of Council's information request.

**2.0 RESPONSE TO INFORMATION REQUEST**

**2.1. Item 3 – Loading Bay Manoeuvring**

The proposed Loading Bay and associated Manoeuvring Area is to be redesigned to be in accordance with AS2890.2 requirements. Particular attention is to be given to (but not limited to) Section 3.2 and the need to separate cars from service vehicles (especially given the presence of the child care centre and the need for a higher level of safety), accommodate required clearances and confine all service vehicle manoeuvring to the service area.

Table 2.1 details the service vehicle requirement stipulated in the Byron Shire Council DCP for the proposed development.

**Table 2.1: Council's Service Vehicle Requirement**

Land Use	Design Vehicle
Industry 200-799m <sup>2</sup> GFA	12.5m HRV
Retail Premises <199m <sup>2</sup> GFA	6.4m SRV
Business Premises <999m <sup>2</sup> GFA	6.4m SRV
Child Care Centre	VAN

Based on the GFA of the industrial components, the proposed development is required to provide loading facilities for a Heavy Rigid Vehicle (HRV). The current provision for the loading area (i.e. incorporates a 12.5m long by 3.5m wide loading bay) and manoeuvrability is considered to be acceptable based on the following:

- the HRV is expected to be infrequent and more likely to be a Medium Rigid Vehicle (MRV);
- the Child Care Centre parking and access to the building is located at the opposite end of the site, limiting any interactions between the Child Care Centre visitors (i.e. parents and children) and service vehicle manoeuvring. The service vehicle and refuse collection operations are proposed to occur outside the Child Care Centre AM and PM peak times;
- the section of the car parking aisle used for the refuse and service vehicle manoeuvring has designated staff bays to either side which will be managed accordingly if HRV servicing is required; and
- a site management plan will be implemented to manage the manoeuvring of the refuse and service vehicles in a safe environment.

The requirement to separate cars from service vehicles, accommodate required clearances and confine all service vehicle manoeuvring to the service area is with regards to *AS2890.2 Section 3.2.3 Regular Service – Major Road*. However, Centennial Circuit is a minor road and therefore the proposed servicing requirements are in accordance with those stipulated in *AS2890.2 Section 3.2.4 Regular Service – Minor Road* as follows:

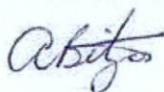
- manoeuvring on-street, if permitted by the relevant authority, shall be strictly limited to one reverse movement either onto or off the street, and furthermore, shall be subject to consideration of both safety and obstruction to other on-street traffic; and
- the swept path of the maximum size design vehicle using the facility may be allowed to occupy the entire width (less specified clearances) of a two-way access driveway when the vehicle is entering or leaving the minor road.

It is acknowledged that the safety levels are increased due to the presence of the Child Care Centre, therefore the following mitigation measures are considered to be sufficient to satisfy safety concerns:

- the implementation of the site management plan;
- service vehicle and refuse collection operations are proposed to occur outside Child Care Centre AM and PM peak times;
- Child Care Centre visitor parking (i.e. parents and children) are located away from the service vehicle manoeuvring area.

On the basis of the above, site servicing and refuse collection are expected to operate adequately.

Yours faithfully



**Adrian Bitzios**  
 Principal Traffic Engineer  
 BITZIOS CONSULTING