

ROAD AND WATER NOTE: BARCALDINE REGIONAL COUNCIL HAVE COMMITTED TO UPGRADING BOTH ROAD ACCESS AND WATER CONNECTION TO SITE

POWER NOTE: CURRENTLY ASSUMING ERGON WILL PROVIDE POWER TO EDGE OF SITE AT NO COST (STILL TO BE CONFIRMED)

BEEFWOOD ROAD



STAGE LEGEND	
	STAGE 1
	STAGE 2
	STAGE 3
	STAGE 4



DESCRIPTION +EXTENT NOTE:
REFER TO PART SITE PLANS AND GRANT DOCUMENTATION

BARCALDINE REGIONAL COUNCIL

DIGITALLY STAMPED

APPROVED PLAN

Change Application: Development Permit for Material Change of Use for Visitor Accommodation

Lot: Lot 6 on RY69, Lot 910 on RY190 and Lot 911 on RY190
Referred to in Council's Decision Notice for DA202021

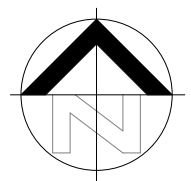
Approval Date: 21 July 2021
Application Number: DA202021

CONCEPT ONLY

1 OVERALL SITE PLAN
ST-003 1: 2000 @ A3

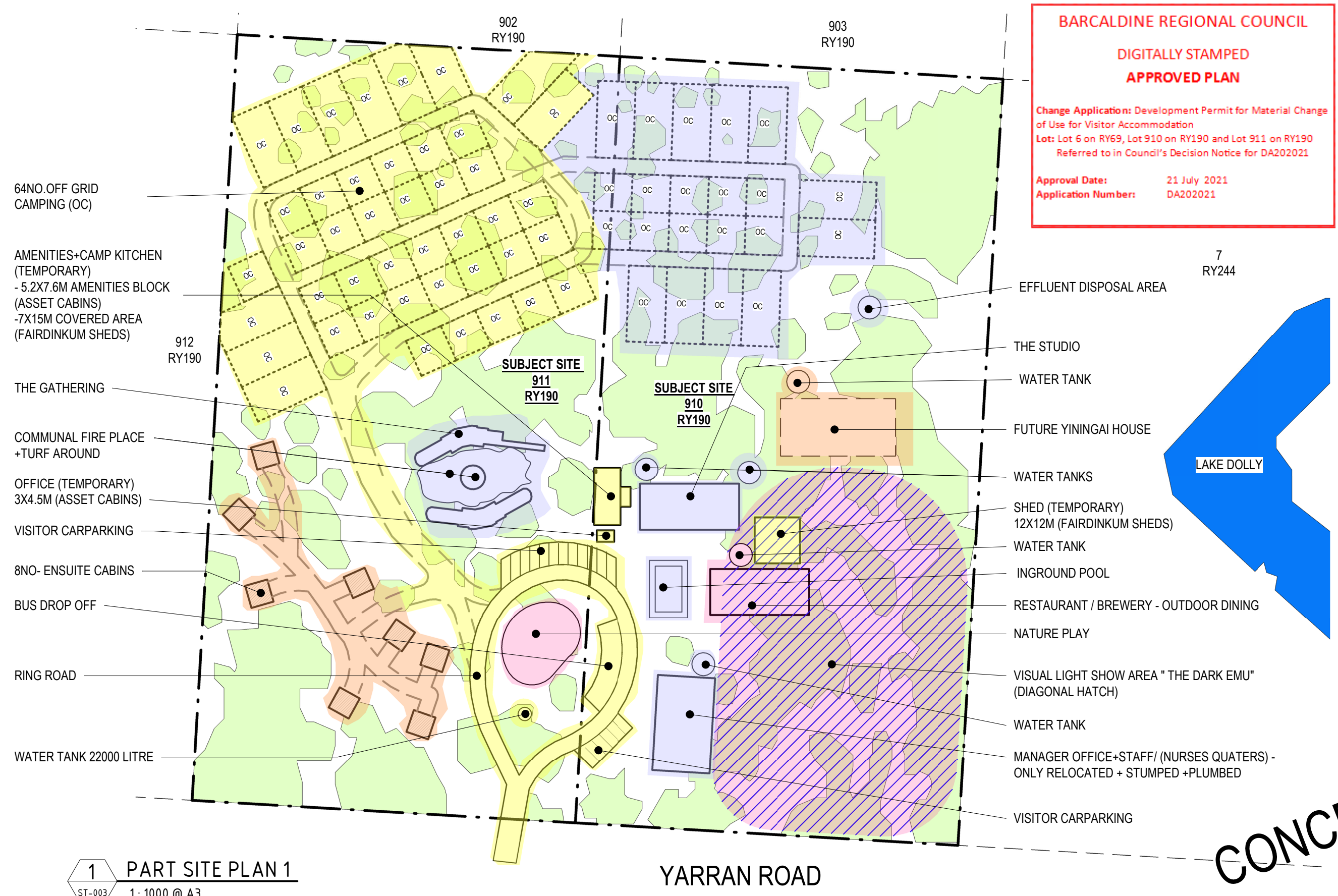
drawing title:
OVERALL SITE

drawing no: **SK-002** project no: **CO-052**



project: A3 DRAWING NOTED SCALES RELATE TO A3 DRAWINGS THE FRINGE CAMP		REVISIONS <table border="1" style="font-size: 8px;"> <thead> <tr> <th>REV</th> <th>DESCRIPTION</th> <th>DATE</th> </tr> </thead> <tbody> <tr><td>1</td><td>PRELIMINARY</td><td>03/09/2020</td></tr> <tr><td>2</td><td>PRELIMINARY</td><td>07/09/2020</td></tr> <tr><td>3</td><td>PRELIMINARY</td><td>07/09/2020</td></tr> <tr><td>5</td><td>PRELIMINARY</td><td>09/09/2020</td></tr> <tr><td>6</td><td>PRELIMINARY</td><td>11/09/2020</td></tr> </tbody> </table>	REV	DESCRIPTION	DATE	1	PRELIMINARY	03/09/2020	2	PRELIMINARY	07/09/2020	3	PRELIMINARY	07/09/2020	5	PRELIMINARY	09/09/2020	6	PRELIMINARY	11/09/2020	PRELIMINARY SKETCH PLANS: <small>If the drawings are labelled and issued 'preliminary', below, they are not suitable for Building Application, tender or construction purposes! The intent of preliminary sketch plans are only for presenting the concept for the specific project to the client as nominated in the title sheet.</small> COPYRIGHT & LIABILITY: <small>These drawings, concepts and designs are copyrighted and the property of DESIGNANDARCHITECTURE and not to be used for any other reason without the consent or permission of designandarchitecture PTY.LTD. (ACN 167 978 832)</small> <small>DESIGNANDARCHITECTURE accept no responsibility for the accuracy, completeness of electronically transferred documents.</small> <small>NEVER SCALE OF DRAWINGS, IF IN DOUBT, ASK!</small>	 abn: 80167978832 Pty.Ltd. 044 968 2924 design@designaa.com.au www.designaa.com.au reg no:4610	ISSUED FOR PRELIMINARY <table border="1" style="font-size: 8px;"> <tr> <td>scale</td> <td>As indicated</td> <td>rev</td> </tr> <tr> <td>date</td> <td>SEP 20</td> <td rowspan="2" style="font-size: 24px; text-align: center;">6</td> </tr> <tr> <td>drawn</td> <td>AUTHOR</td> </tr> </table>	scale	As indicated	rev	date	SEP 20	6	drawn	AUTHOR
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scale	As indicated	rev																													
date	SEP 20	6																													
drawn	AUTHOR																														
location: BARCALDINE- LOT NO. 911RY190+ 910RY190+6RY69 client: TRACKERS QLD																															

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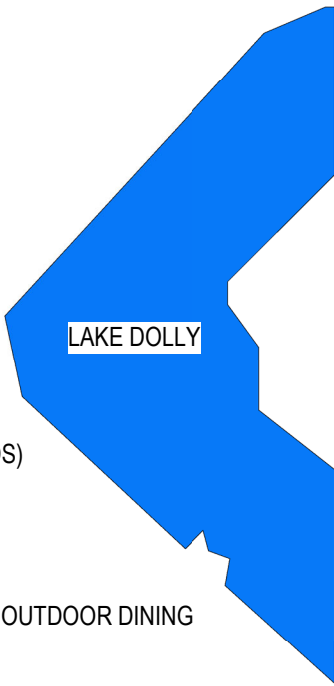


BARCALDINE REGIONAL COUNCIL
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STAGE LEGEND	
	STAGE 1
	STAGE 2
	STAGE 3
	STAGE 4



64NO.OFF GRID CAMPING (OC)

AMENITIES+CAMP KITCHEN (TEMPORARY)
 - 5.2X7.6M AMENITIES BLOCK (ASSET CABINS)
 - 7X15M COVERED AREA (FAIRDINKUM SHEDS)

912 RY190

THE GATHERING

COMMUNAL FIRE PLACE +TURF AROUND

OFFICE (TEMPORARY) 3X4.5M (ASSET CABINS)

VISITOR CARPARKING

8NO- ENSUITE CABINS

BUS DROP OFF

RING ROAD

WATER TANK 22000 LITRE

EFFLUENT DISPOSAL AREA

7 RY244

THE STUDIO

WATER TANK

FUTURE YININGAI HOUSE

WATER TANKS

SHED (TEMPORARY) 12X12M (FAIRDINKUM SHEDS)

WATER TANK

INGROUND POOL

RESTAURANT / BREWERY - OUTDOOR DINING

NATURE PLAY

VISUAL LIGHT SHOW AREA " THE DARK EMU" (DIAGONAL HATCH)

WATER TANK

MANAGER OFFICE+STAFF/ (NURSES QUATERS) - ONLY RELOCATED + STUMPED + PLUMBED

VISITOR CARPARKING

SUBJECT SITE
911 RY190

SUBJECT SITE
910 RY190

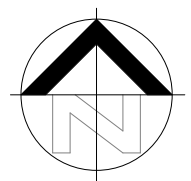
1 PART SITE PLAN 1
 ST-003 1: 1000 @ A3

YARRAN ROAD

CONCEPT ONLY

drawing title:
PART SITE PLAN 1

drawing no: **SK-003** project no: **CO-052**



project: A3 DRAWING NOTED SCALES RELATE TO A3 DRAWINGS	
THE FRINGE CAMP	
location: BARCALDINE- LOT NO. 911RY190+ 910RY190+6RY69	client: TRACKERS QLD

REV	DESCRIPTION	DATE
1	PRELIMINARY	03/09/2020
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drawn Author	

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STAGE LEGEND	
	STAGE 1
	STAGE 2
	STAGE 3
	STAGE 4

BARCALDINE REGIONAL COUNCIL
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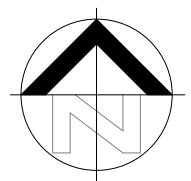
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1 PART SITE PLAN 2
 ST-003 1:1000 @ A3

drawing title:
PART SITE PLAN 2

drawing no: **SK-004** project no: **CO-052**



project: A3 DRAWING NOTED SCALES RELATE TO A3 DRAWINGS	
THE FRINGE CAMP	
location: BARCALDINE- LOT NO. 911RY190+ 910RY190+6RY69	client: TRACKERS QLD

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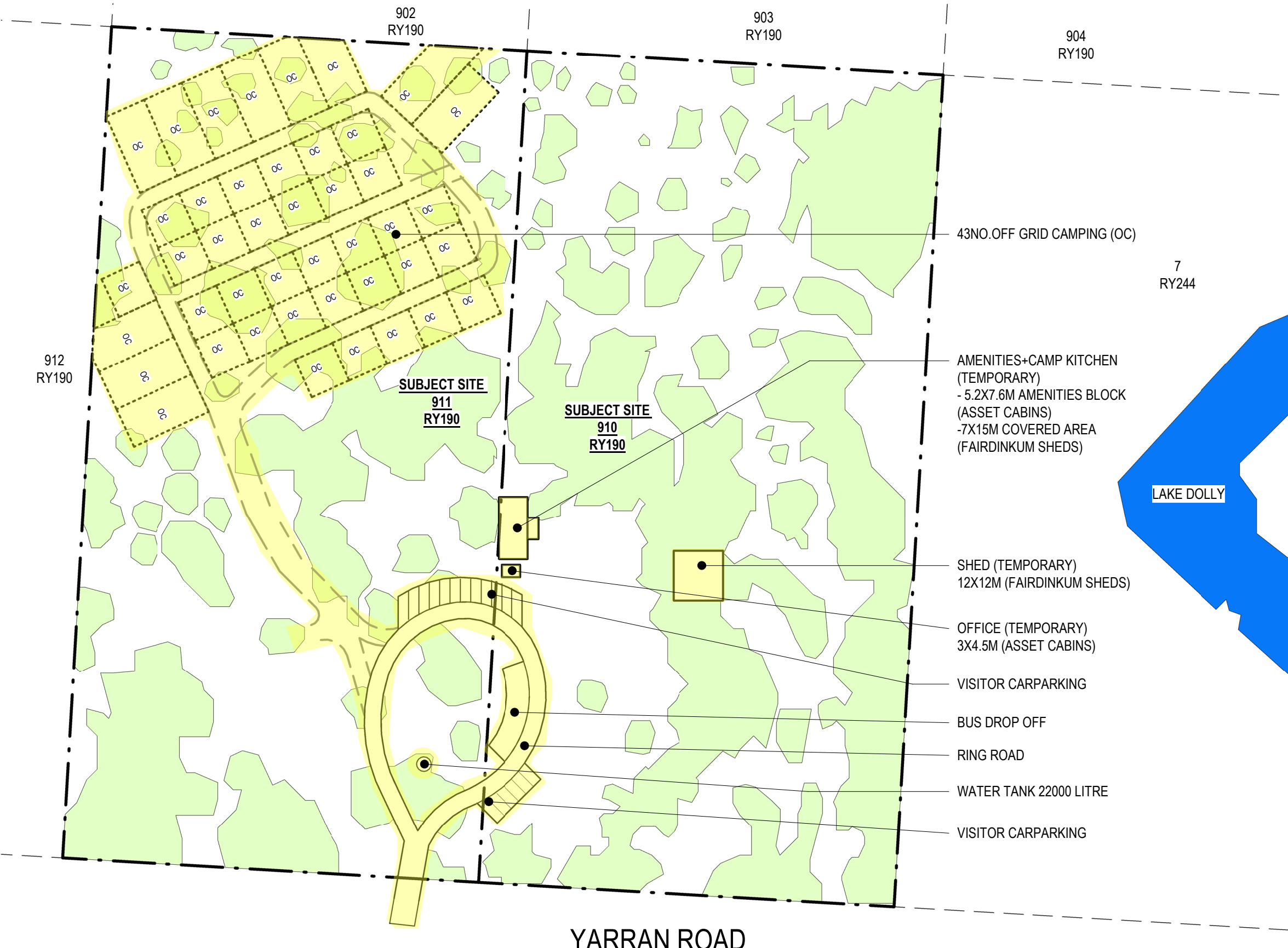
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drawn Author	

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LEGEND

STAGE 1

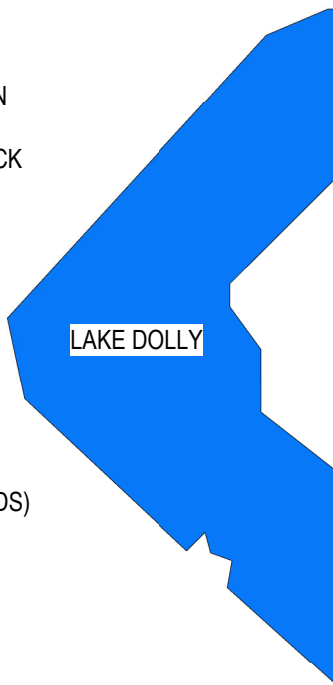
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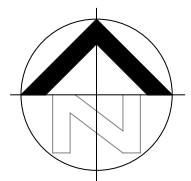
- 43NO.OFF GRID CAMPING (OC)
- 7 RY244
- AMENITIES+CAMP KITCHEN (TEMPORARY)
- 5.2X7.6M AMENITIES BLOCK (ASSET CABINS)
- 7X15M COVERED AREA (FAIRDINKUM SHEDS)
- SHED (TEMPORARY)
12X12M (FAIRDINKUM SHEDS)
- OFFICE (TEMPORARY)
3X4.5M (ASSET CABINS)
- VISITOR CARPARKING
- BUS DROP OFF
- RING ROAD
- WATER TANK 22000 LITRE
- VISITOR CARPARKING



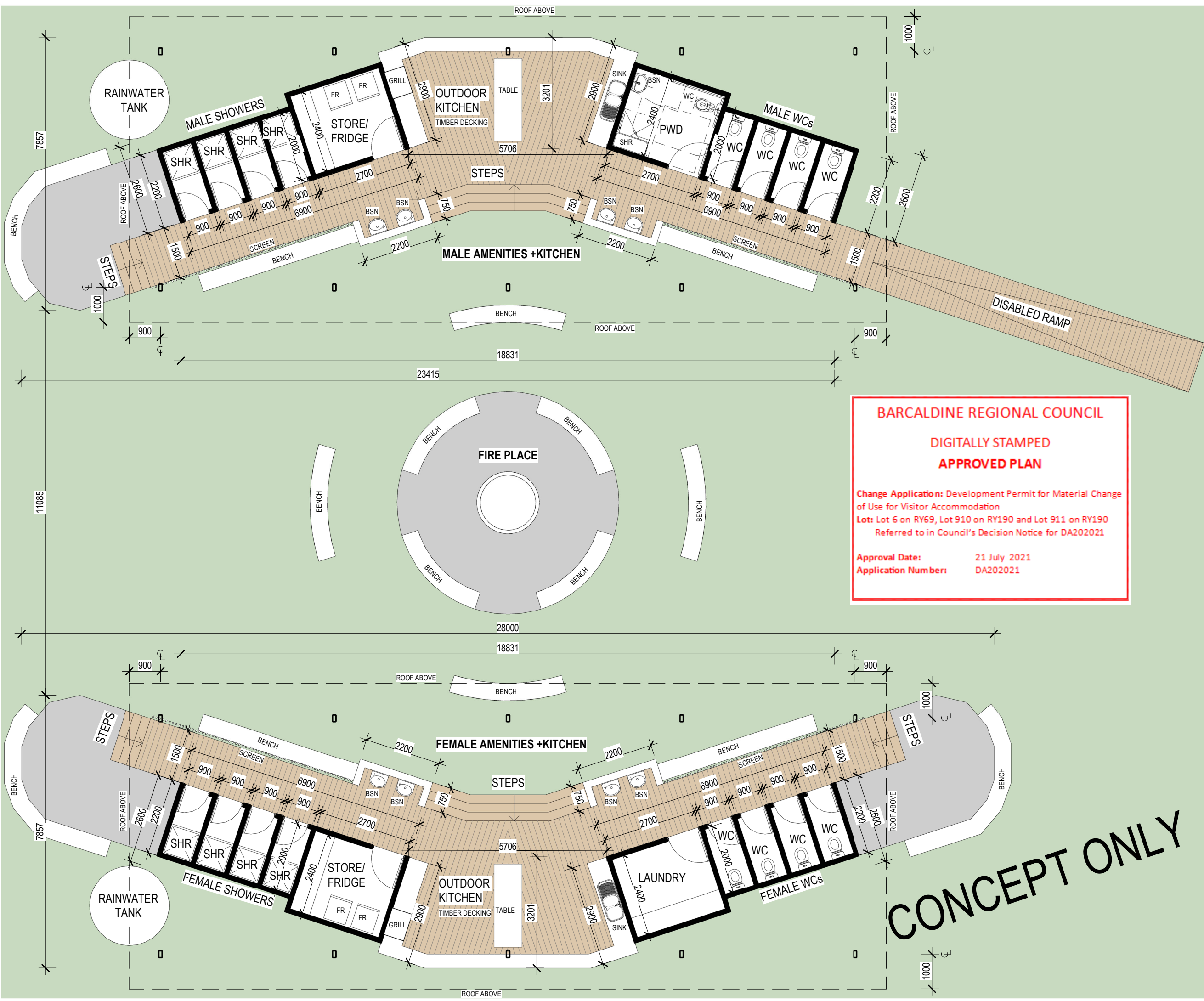
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drawing title:
STAGE 1 SITE PLAN

drawing no: **SK-005** project no: **CO-052**



project: A3 DRAWING NOTED SCALES RELATE TO A3 DRAWINGS THE FRINGE CAMP-STAGE 1		REV 6	REVISIONS DESCRIPTION PRELIMINARY	DATE 11/09/2020	PRELIMINARY SKETCH PLANS: If the drawings are labelled and issued 'preliminary', below, they are not suitable for Building Application, tender or construction purposes! The intent of preliminary sketch plans are only for presenting the concept for the specific project to the client as nominated in the title sheet. COPYRIGHT & LIABILITY: These drawings, concepts and designs are copyrighted and the property of DESIGNANDARCHITECTURE and not to be used for any other reason without the consent or permission of designandarchitecture PTY.LTD. (ACN 167 978 832) DESIGNANDARCHITECTURE accept no responsibility for the accuracy, completeness of electronically transferred documents. NEVER SCALE OF DRAWINGS, IF IN DOUBT, ASK!	 abn: 80167978832 Pty.Ltd. 044 968 2924 www.designaa.com.au	ISSUED FOR PRELIMINARY scale As indicated date SEP 20 drawn Author	rev 6
location: BARCALDINE- LOT NO. 911RY190+ 910RY190+6RY69	client: TRACKERS QLD							



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REV	DESCRIPTION	DATE
4	PRELIMINARY	08/09/2020
5	PRELIMINARY	09/09/2020
6	PRELIMINARY	11/09/2020

A3 DRAWING
 NOTED SCALES RELATE TO A3 DRAWINGS

project: **THE FRINGE CAMP - STAGE 2**
 drawing title: **THE GATHERING - CONCEPT PLAN**
 location: **BARCALDINE- LOT NO. 911 RY190+ 910RY190+6RY69**

project no: **CO-052**
 drawing no: **AK-001**

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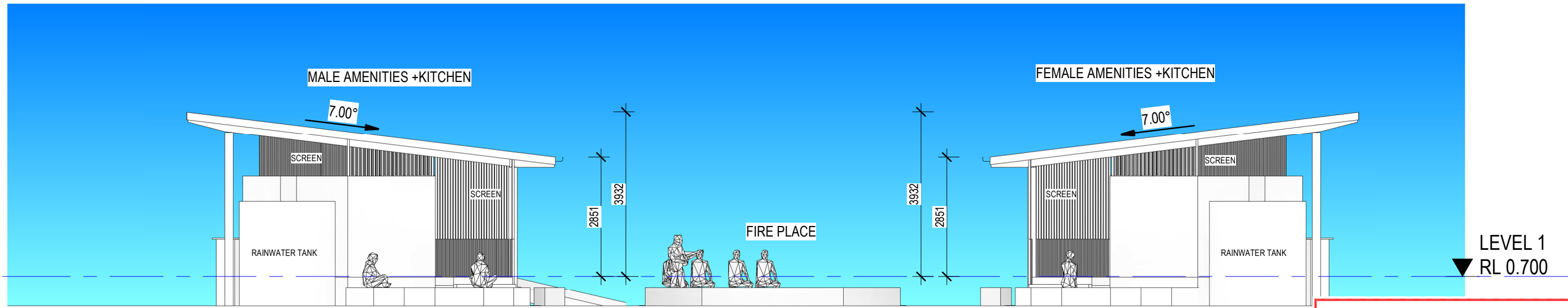
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 drawn **AUTHOR**

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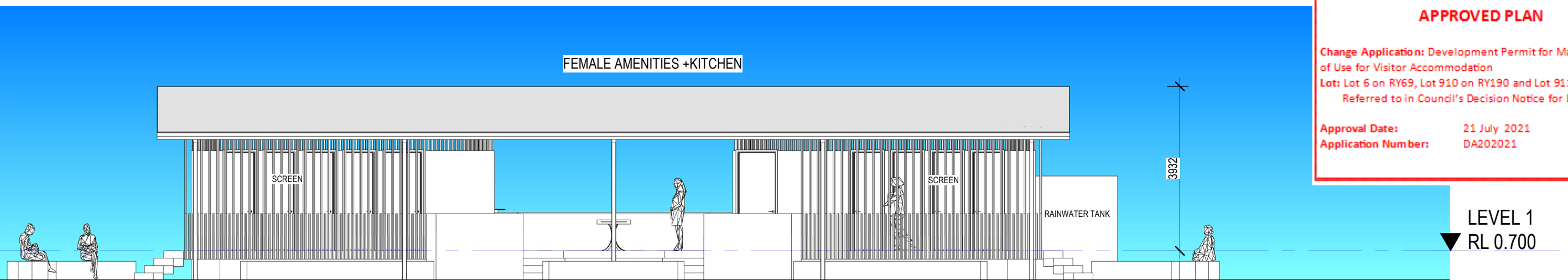


2 WEST ELEVATION
1 : 100 @ A3

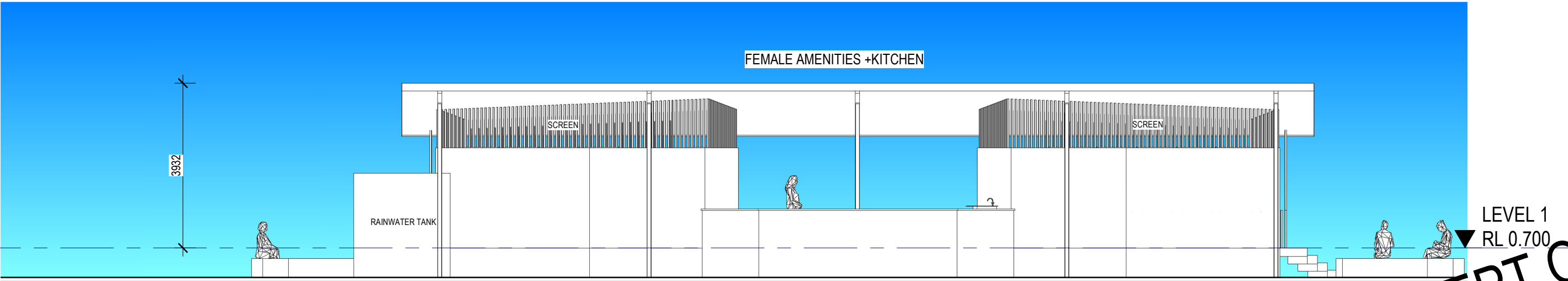
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3 NORTH ELEVATION
1 : 100 @ A3



1 SOUTH ELEVATION
1 : 100 @ A3

CONCEPT ONLY

drawing title:
THE GATHERING- CONCEPT ELEVATIONS

drawing no: **AK-002** project no: **CO-052**

project: A3 DRAWING NOTED SCALES RELATE TO A3 DRAWINGS	
THE FRINGE CAMP-STAGE 2	
location: BARCALDINE- LOT NO. 911RY190+ 910RY190+6RY69	client: TRACKERS QLD

REV	DESCRIPTION	DATE
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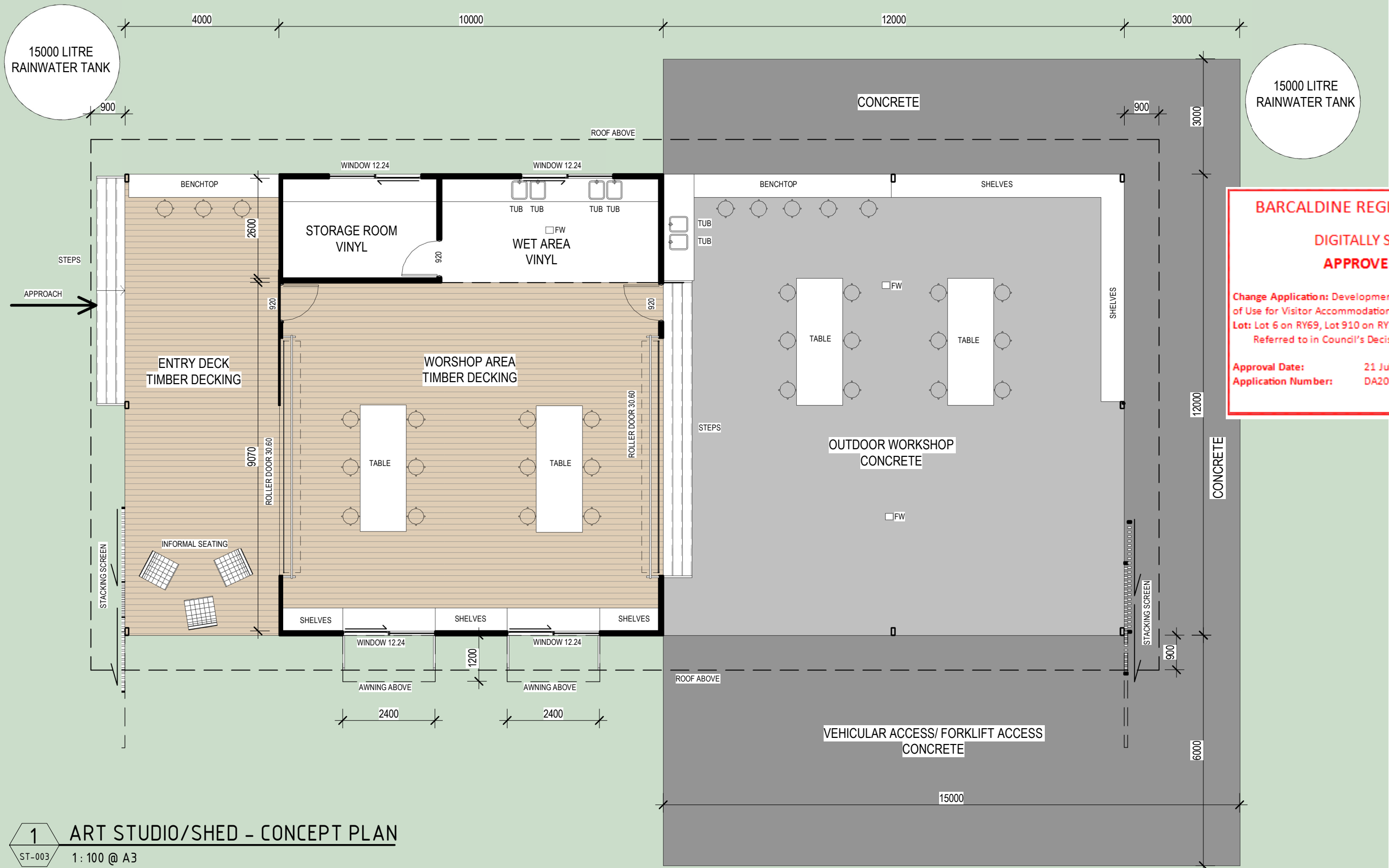
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drawn AUTHOR	



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1 ART STUDIO/SHED - CONCEPT PLAN
 ST-003 1: 100 @ A3

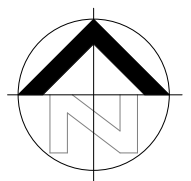
THE STUDIO NOTE:

- A/C TO ENCLOSED AREA
- EVAPORATIVE SYSTEM TO ENCLOSED AREA

CONCEPT ONLY

drawing title:
THE STUDIO- CONCEPT PLAN

drawing no: **ST-001** project no: **CO-052**



project: **A3 DRAWING** NOTED SCALES RELATE TO A3 DRAWINGS
THE FRINGE CAMP-STAGE 2

location: BARCALDINE- LOT NO. 911RY190+ 910RY190+6RY69

client: TRACKERS QLD

REV	DESCRIPTION	DATE
3	PRELIMINARY	07/09/2020
4	PRELIMINARY	08/09/2020
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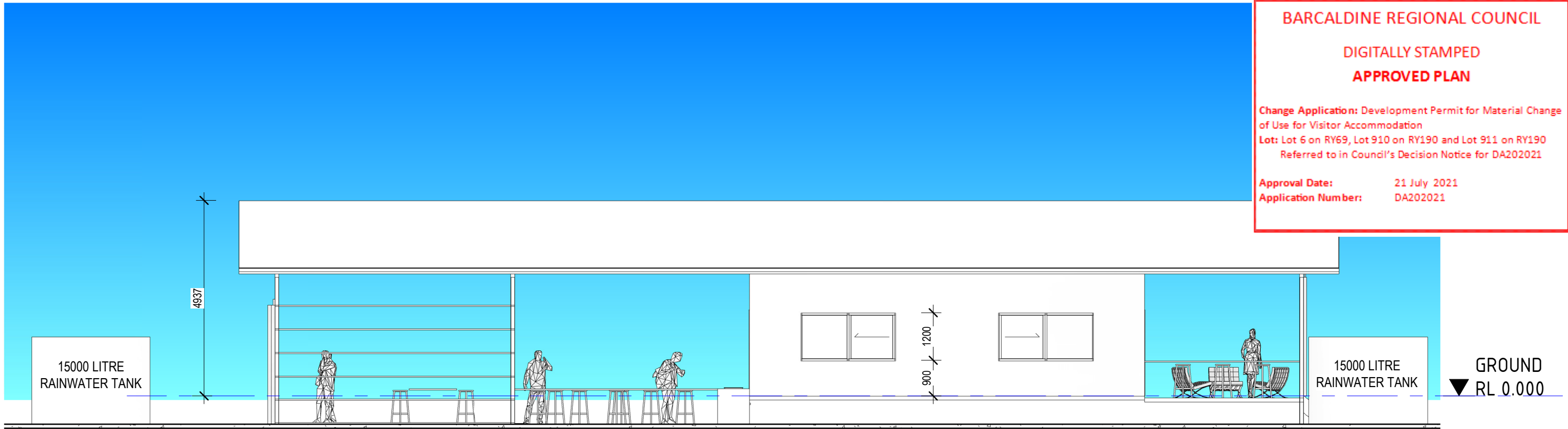
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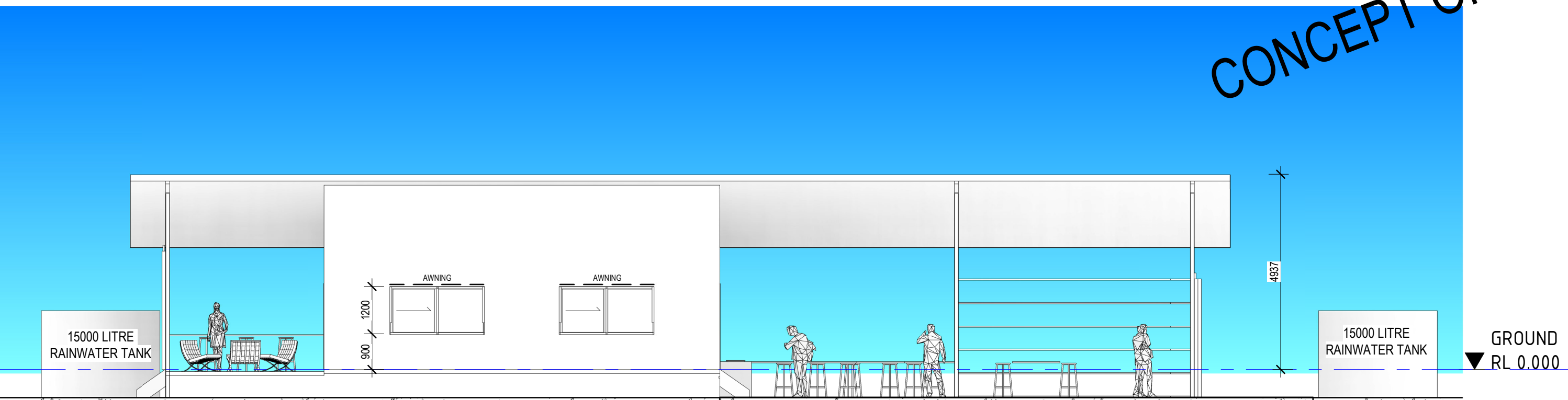
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1 NORTH ELEVATION
1: 100 @ A3

CONCEPT ONLY



2 SOUTH ELEVATION
1: 100 @ A3

drawing title:
THE STUDIO- CONCEPT ELEVATIONS

drawing no: **ST-003** project no: **CO-052**

project: A3 DRAWING NOTED SCALES RELATE TO A3 DRAWINGS THE FRINGE CAMP-STAGE 2	
location: BARCALDINE- LOT NO. 911RY190+ 910RY190+6RY69	client: TRACKERS QLD

REV	DESCRIPTION	DATE
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date SEP 20	Author

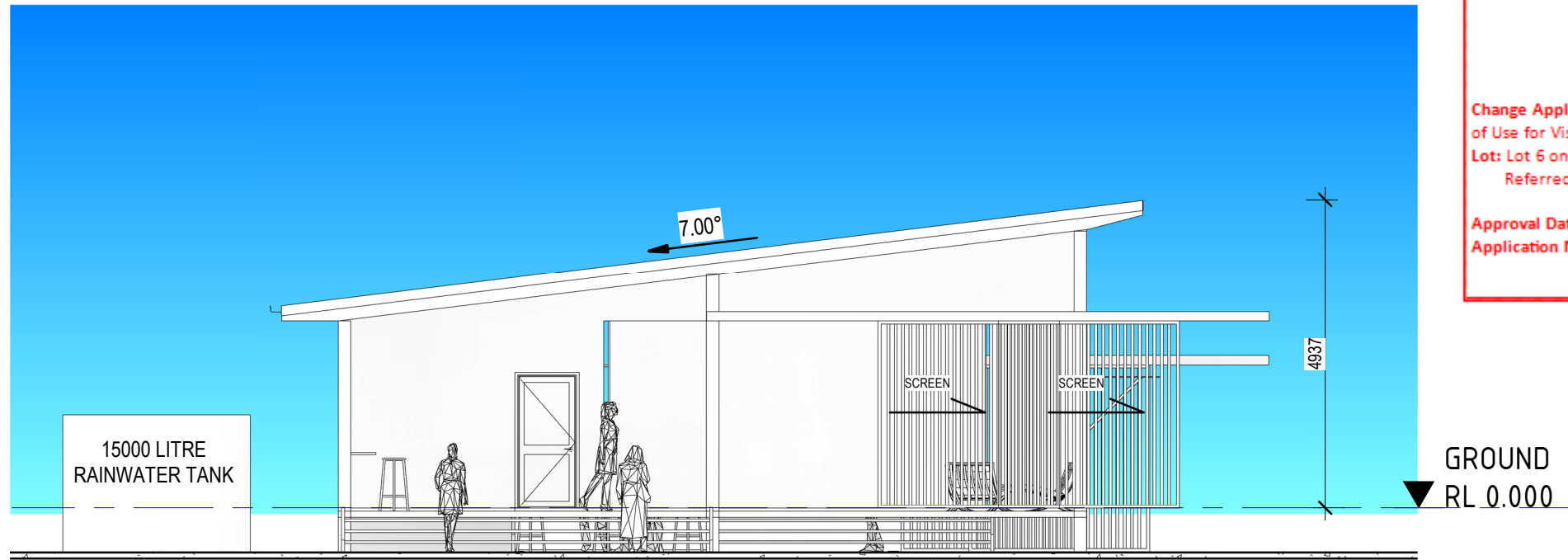
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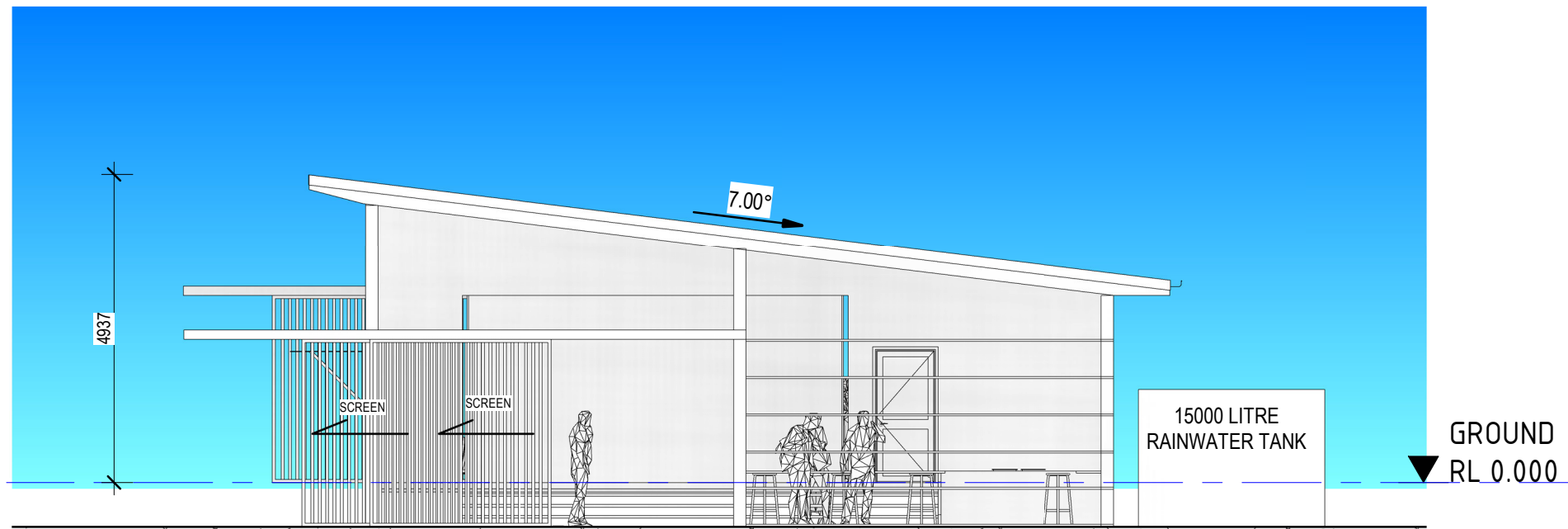
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1 WEST ELEVATION
 1: 100 @ A3



2 EAST ELEVATION
 1: 100 @ A3

CONCEPT ONLY

drawing title:
THE STUDIO- CONCEPT ELEVATIONS

drawing no: **ST-004** project no: **CO-052**

project: A3 DRAWING NOTED SCALES RELATE TO A3 DRAWINGS THE FRINGE CAMP-STAGE 2	
location: BARCALDINE- LOT NO. 911RY190+ 910RY190+6RY69	client: TRACKERS QLD

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date SEP 20	Author

Project #: 211019

Version: DA RFI V01

Date: April 2021

Traffic Engineering Report

Proposed Visitor Accommodation

42,44 & 53 Yarran Road, Barcaldine

Lot 6 on RY69, Lot 911 on RY19 & Lot 910 on RY910

For
Cheryl Thompson

BARCALDINE REGIONAL COUNCIL

DIGITALLY STAMPED

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**Proposed Development – Visitor Accommodation
64 Campsites and 20 Cabins
42,44 and 53 Yarran Road, Barcaldine
Lot 6 RY69, Lot 910 RY190 and Lot 911 RY19**

For Cheryl Thompson

Project	Date	Issue	Dianne Hayes RPEQ 7086
211019	April 2021	DA RFI – V 01	

Project No: 211019
April 2021

Status: DA - RFI Issue no: V01

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APPENDICES

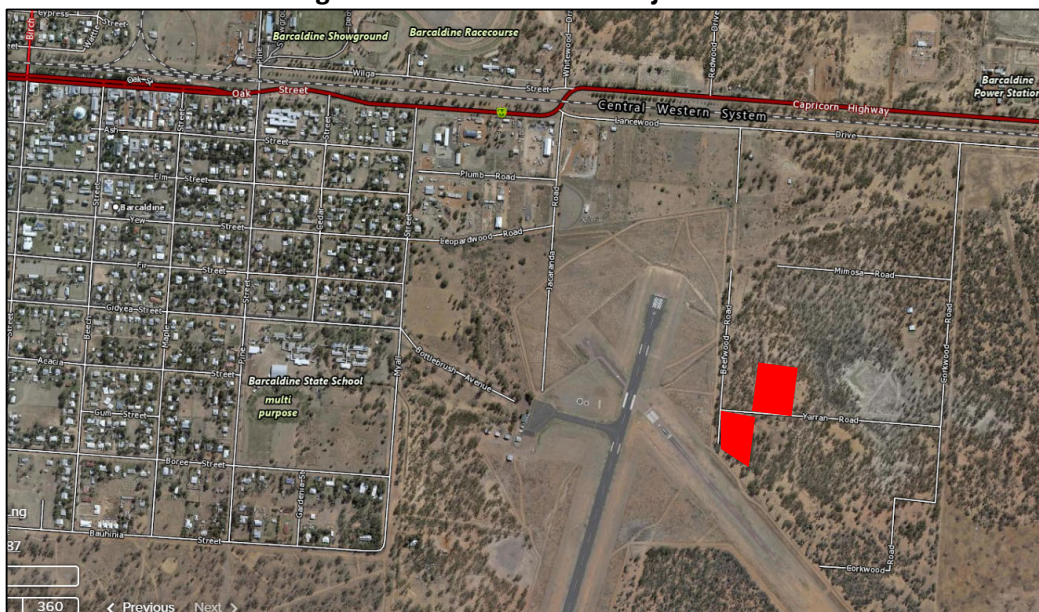
Appendix A – Proposed Development

1. INTRODUCTION

Hayes Traffic Engineering has been commissioned by Cheryl Thompson to provide traffic engineering advice for the proposed Visitor Accommodation Development site at Barcaldine. This report has been produced to assess the access arrangements into the site and the impact of additional vehicles on the external road network, namely Capricorn Highway with recommendations for proposed treatments (if any) to ensure the safe and efficient use of the road network.

The objective of this study is to provide adequate information to the Barcaldine Regional Council and the Department of Transport & Main Roads (DTMR) for a development application to be assessed in accordance with current requirements, and also to respond to items outlined in the Council and DTMR Information request dated 25th January and 8th January 2021 respectively.

Figure 1 – Aerial View of Subject Site



Source: Qld Globe

2. EXISTING CONDITIONS

In order to assess the impact of the proposal it is necessary to establish existing transport conditions within the surrounding area. Traffic survey data has been obtained to provide information for this study.

2.1 Road Network

The development site fronts Yarran Road and Beefwood Road in Barcaldine. The roads vary in width, but are generally 3m wide with gravel pavement and grassed shoulders as shown in Photographs 1.

Photograph 1 – Beefwood Road



Photograph 2 – Lancewood Road (view west from Beefwood Road)



Capricorn Highway is governed by the DTMR and has a posted 60km/h speed limit past the intersection with Myall Street. The intersection with Oak Street is closed and access from the main road into the site will be via Myall Street, Plumb Road, Jacaranda Road, Lancewood Road to Beefwood Road and Yarran Road. Photographs of the existing road conditions are shown in Photographs 3 and 4.

Photograph 3 – Jacaranda Road



Photograph 4 – Plumb Road



Photograph 5 – Myall Road



Photograph 6 – Capricorn Highway (just east of Lancewood Road – No Entry)



Photograph 7 – Capricorn Highway/Oak Street (at intersection with Myall Street)

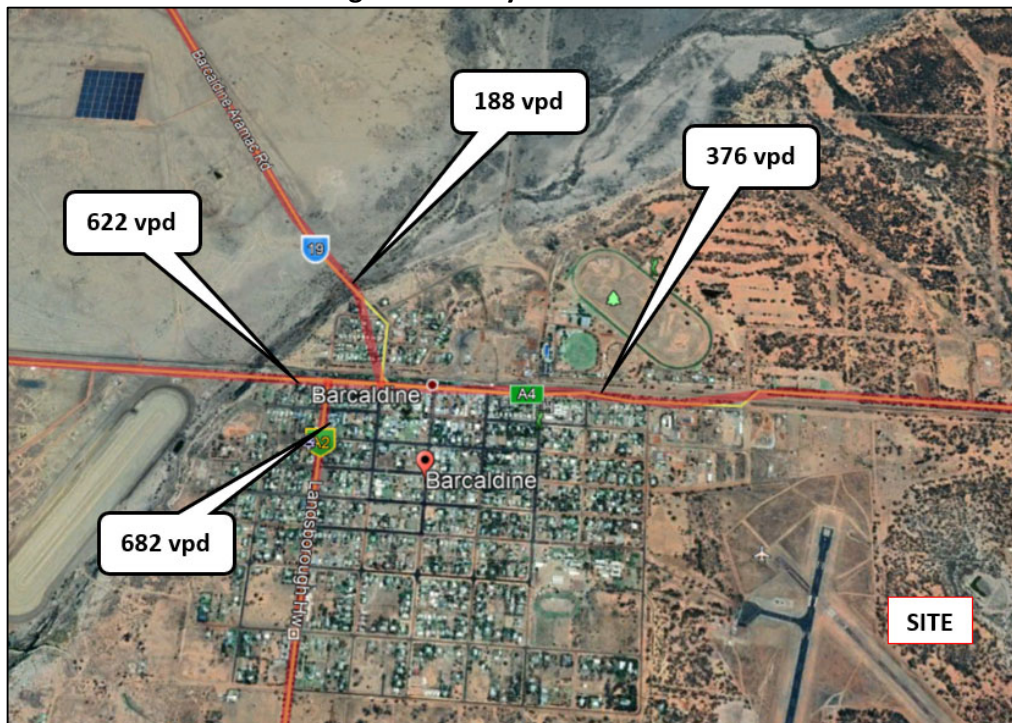


2.2 Traffic Flows

Information provided by the Department of Main Roads indicates the Annual Average Daily Traffic Volume (AADT) along the Capricorn Highway (from count site 70007 5.75km east of Barcaldine) in the vicinity of the site is 376 vehicles per day (vpd) with 28.85% heavy vehicles. Other daily traffic volumes for Barcaldine-Aramac Road are 188 vehicles per day and Landsborough Highway is 682 vehicles per day.

In regional areas the typical peak hour traffic flow is generally 15% of the daily traffic flow. Therefore, the peak hour traffic flows on Capricorn Highway in the vicinity of Myall Street is expected to be 56 vehicles per hour.

Figure 2 – Daily Traffic Volumes



Source: Google Earth + TMR Traffic Census 2019

2.3 Intersection Analysis

According to Austroads Guide to Traffic Management Part 3 Clause 6.1.1 – Traffic Studies and Analysis, “At unsignalised intersections with minor roads where there are relatively low volumes of cross and turning traffic, capacity considerations are usually not significant and capacity analysis is unnecessary”. Table 1 below shows the volumes where intersections operate adequately and capacity analysis is not required.

Table 1 - Roadway Capacity

Type of Road	Light cross & turning volumes Maximum design hour volumes Vehicles per hour (two way)		
	Two Lane major road	400	500
Cross road	250	200	100

Due to the low traffic volumes on the Oak Street / Capricorn Highway (approximately 56 vehicles per hour) and the low traffic volumes on Myall Street (<50 per hour), it is considered unnecessary to undertake intersection analysis as the intersection operates with uninterrupted flow conditions.

2.4 Crash History

Records indicate there have been no recorded crashes along the proposed local road route as shown in Figure 3. Crashes have been recorded on Capricorn Highway with only one crash recorded (2001) east of the existing level crossing on Capricorn Highway as shown in Figure 3.

Figure 3 – Recorded Crash Locations



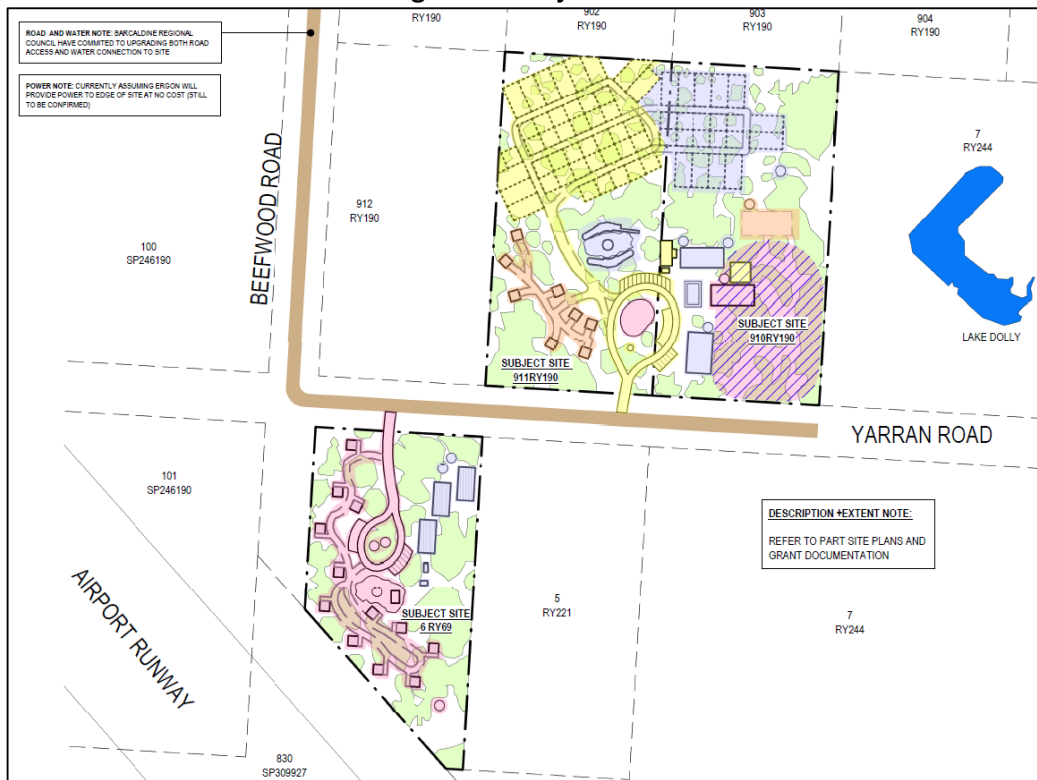
Source: Qld Globe

3. DEVELOPMENT PROPOSAL

The Development Proposal includes an application for a material change of use for 64 campsites and 20 cabins with a manager’s residence. The site is currently unoccupied and is described as Lot 6 on RY69, Lot 911 on RY19 and Lot 910 on RY190 at 42, 44 and 53 Yarran Road, Barcardine. Please refer to Appendix A for proposed plans of the development.

The proposal consists of four stages of development. Stage 1 will consist of 43 camp sites, Stage 2 includes an additional 21 sites, Stage 3 consists of 12 cabins and stage 4 a further 8 cabins. The timeframe for each stage is dependent on the economic conditions and tourism growth in the area.

Figure 4 –Subject Site



3.1 Access Arrangements

Vehicular access to the site will be provided from Yarran Road. A route map of the anticipated access to the site is shown in Figure 5.

Figure 5 – Route Map to Access the Site

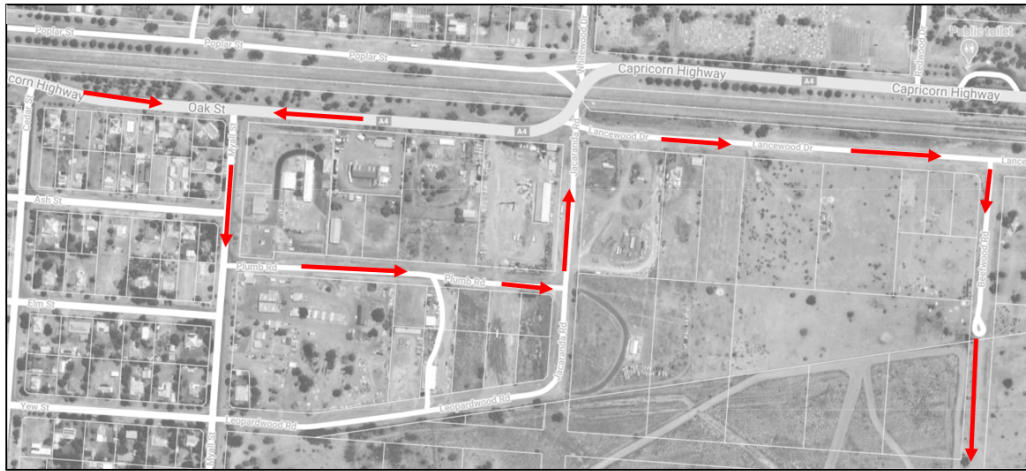
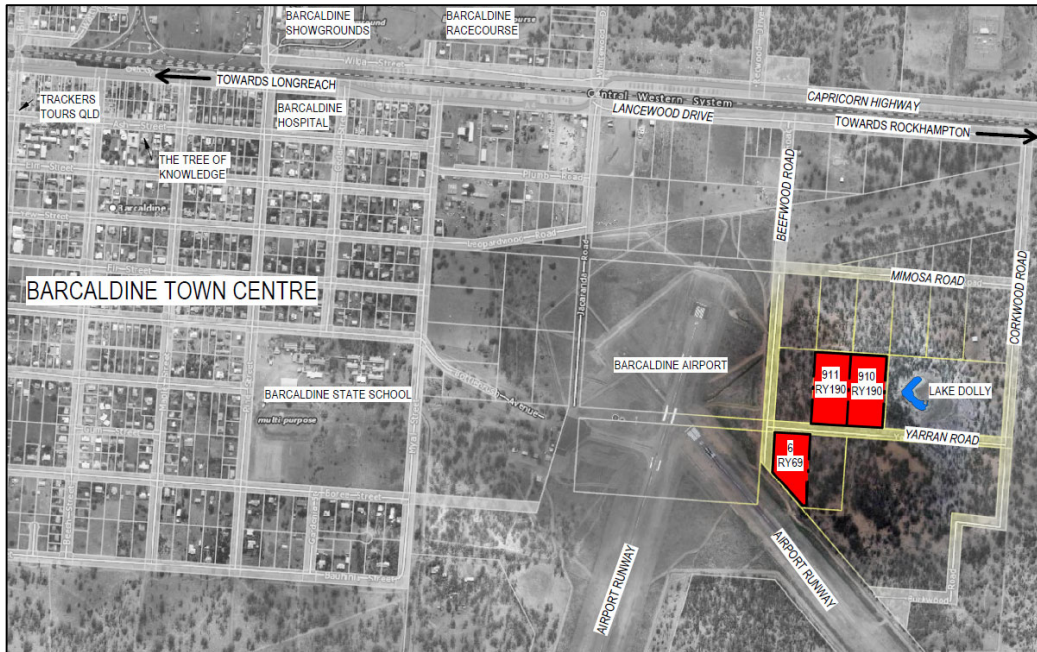


Figure 6 – Site Map



4. TRIP GENERATION AND DISTRIBUTION

In order to analyse the impact of the development on the existing transport infrastructure, it is necessary to assess the number of trips likely to be generated to and from the site and where they are likely to travel. A trip is defined as a one-way vehicular movement from 1 point to another excluding the return journey. Therefore a return trip to/from a land use is counted as two trips.

To determine an appropriate rate to forecast trip generation information has been sought from the Road Planning and Design Manual: Chapter 3 produced by the Department of Main Roads, Queensland Streets and the RTA Guide to Traffic Generating Developments.

4.1 Trip Generation

According to information provided in current guidelines the recommended traffic generation rate for short term accommodation is 0.4 trips per occupied site during the peak period and 3 daily trips per site.

Table 2 – Trip Generation Rates

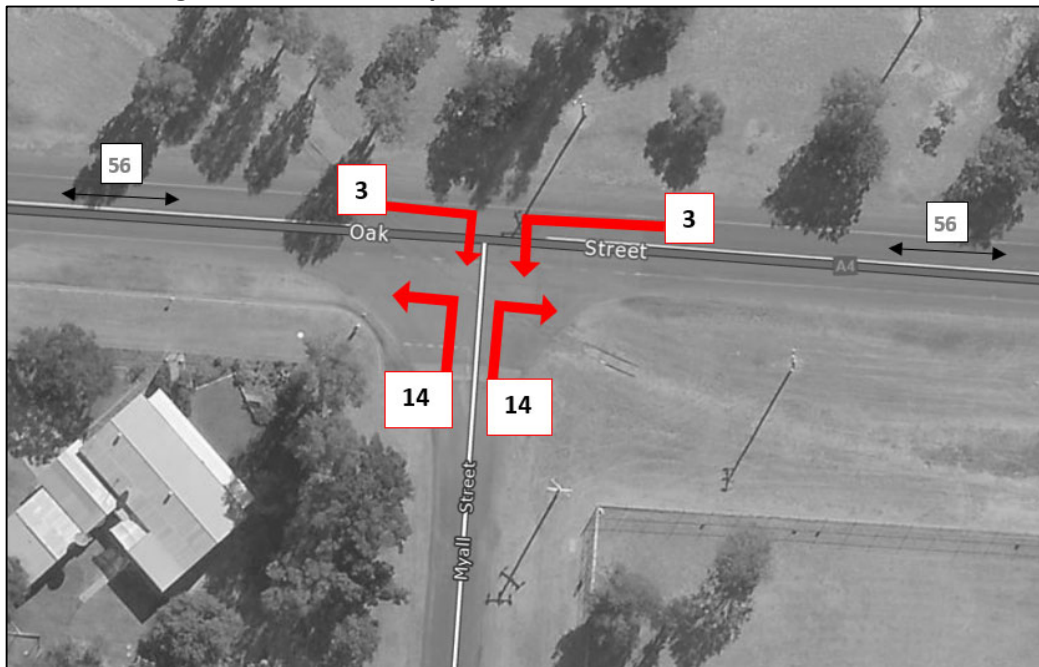
Stage	No of Sites/Cabins	Peak Hour Traffic	Daily Traffic
1	43	17.2	129
2	21	8.4	63
3	12	4.8	36
4	8	3.2	24
Total	64 sites and 20 cabins	33.6	252

Therefore, the site will generate up to 34 vehicles during the peak hour and 252 vehicles per day, assuming 100% occupancy.

4.2 Trip Distribution

Trip origin and destination for the proposed development has been assessed. The assignment of development generated traffic has been based on a manual assessment of the likely routes to/from the development site. Distribution of traffic flows are estimated to be 80% departures and 20% arrivals in the morning peak with the reverse in the afternoon peak. It is expected that 50% of trips will arrive and depart from the east and 50% to/from the west. A diagrammatic distribution of peak hour development generated trips at the intersection of Myall Street and Oak Street (Capricorn Highway) is shown in Figure 7.

Figure 7 –Peak Development Generated Traffic Distribution



5. TRAFFIC IMPACT

The assessment of the impact of the proposed development on the street network has been undertaken. Traffic volumes have been projected to 10 years past the completion of Stage 1 of development to 2032, assuming Stage 1 of the development is operational by 2022 and generating traffic. It is expected that the ultimate development (fully completed) could be operational by 2024. The impact has been analysed according to the procedures set out in Austroads – Guide to Traffic Management and Guide to Road Design.

5.1 Forecast Traffic Growth

The traffic volumes for 2022 and 2034 have been forecast from 2019 survey data. The traffic volumes have been declining since 2013, when the AADT was 435vpd. Therefore, given the fluctuations in growth a 0% growth rate has been applied to Capricorn Highway.

5.2 Traffic Impact of the Proposed Development

The impact of the proposed development on the surrounding street network has been assessed. The development generated traffic has been distributed to the road network and the operational performance has been analysed according to the procedures set out in Austroads – Guide to Road Design and Traffic Management.

5.4 Intersection Analysis (with development) Stage 1 - 2022

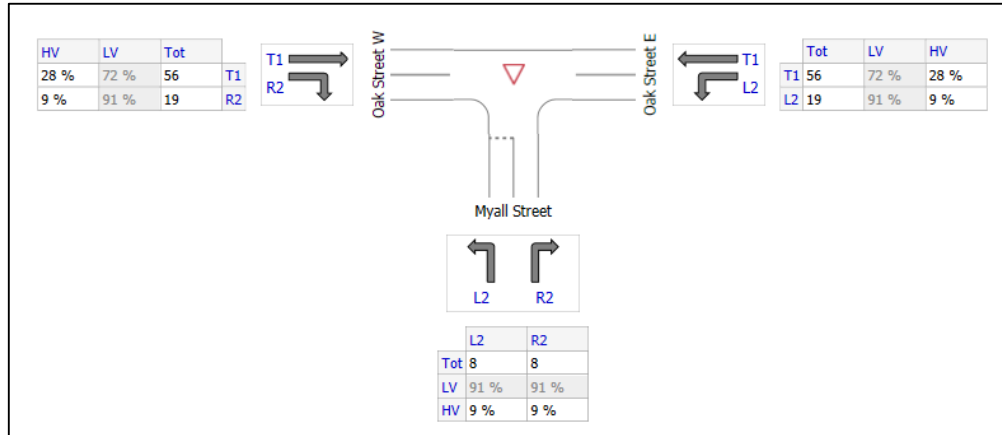
The intersection of Myall Street and Oak Street has been reviewed with the additional development generated traffic for Stage 1. Due to the low traffic volumes the intersection will continue to operate under uninterrupted flow conditions in 2022 and 2032 with the ultimate development traffic.

5.4 Intersection Analysis (with development) Complete - 2024

The intersection of Oak Street and Myall Street has been reviewed with the additional development generated traffic for the completed development. Whilst due to the low traffic volumes the intersection will continue to operate under uninterrupted flow conditions in 2024 with the ultimate development traffic a Sidra analysis has been undertaken to determine the queues and delays with the higher percentage of heavy vehicles and buses. A 28% heavy vehicle component has been included for the

through movements on the Oak Street as per existing traffic data and a 20% heavy vehicle component has been included for all traffic generated to/from Myall Street.

Figure 8 – Estimated Traffic Flows at Myall Street and Oak Street



Results for the operational performance of the intersection during the peak hour are shown in Table 3 below.

Table 3 – Sidra Intersection Performance 2024

Peak Period	Approach	LOS	Degree of Saturation	Delay (Seconds)	Queue (m)
AM	Myall Street	A	0.032	6.0	0.9
	Oak Street E	A	0.041	0.7	0
	Oak Street W	A	0.041	0.8	0.4
PM	Myall Street	A	0.014	6	0.4
	Oak Street E	A	0.047	1.4	0
	Oak Street W	A	0.048	1.6	1.0

Please note that summary of results shown below are for the overall approach, specific information for each movement is available in the electronic file.

The intersection operates with spare capacity and minimal delays. The degree of saturation for all movements at the intersection is below 0.80, which is the practical capacity for unsignalised. Should seasonal variations result in changes to the traffic distribution, capacity limits suggest the intersection will still operate adequately in the future with minimal queues and delays.

Results of intersection analysis indicate that the street network continues to operate under free flow conditions with spare capacity. The impact of development traffic on the operational performance of the external road network is insignificant.

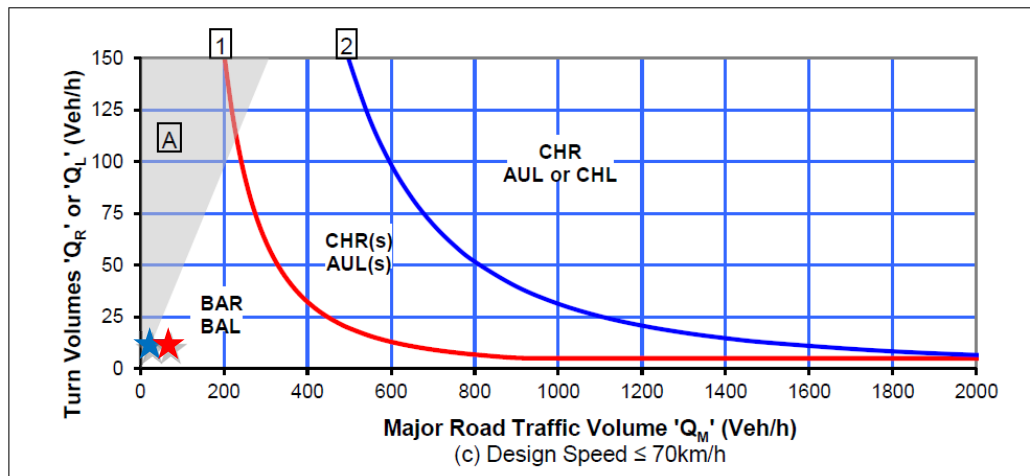
6. ROAD GEOMETRY

An assessment of the external and internal road geometry has been undertaken to determine the appropriate intersection treatments and road widths for the proposed development and intersections.

6.1 Intersection Geometry (with Development) 2034

An assessment of intersection geometry has been undertaken with reference to the requirements of the TMR. The intersection of Myall Street and Oak Street meets the warrants for a BAL and BAR type intersection.

Figure 9 – Intersection Turn Warrants



(Source: Austroads)

- ★ warrants for left turn treatments during the peak
- ★ warrants for right turn treatments during the peak

The requirements for a BAR and BAL treatment are outlined in Austroads Guide to Road Design. To allow safe passing on Oak Street for right turning movements into Myall Street, the minimum pavement width for a BAR treatment should be 6.5m from the centreline to the shoulder. Whilst preference is for the shoulder to be sealed, given the low traffic volumes and adequate sight visibility a gravel surface is deemed adequate. There should also be a minimum pavement width of 6m for the BAL treatment for a distance of approximately 10m on the Oak Street straight prior to turning left in Myall Street. As shown in photograph 8 and 9 it appears there is adequate width to comply with the turn warrant requirements. It is recommended that regular maintenance of the shoulder should be carried out to ensure the surface is safe and trafficable.

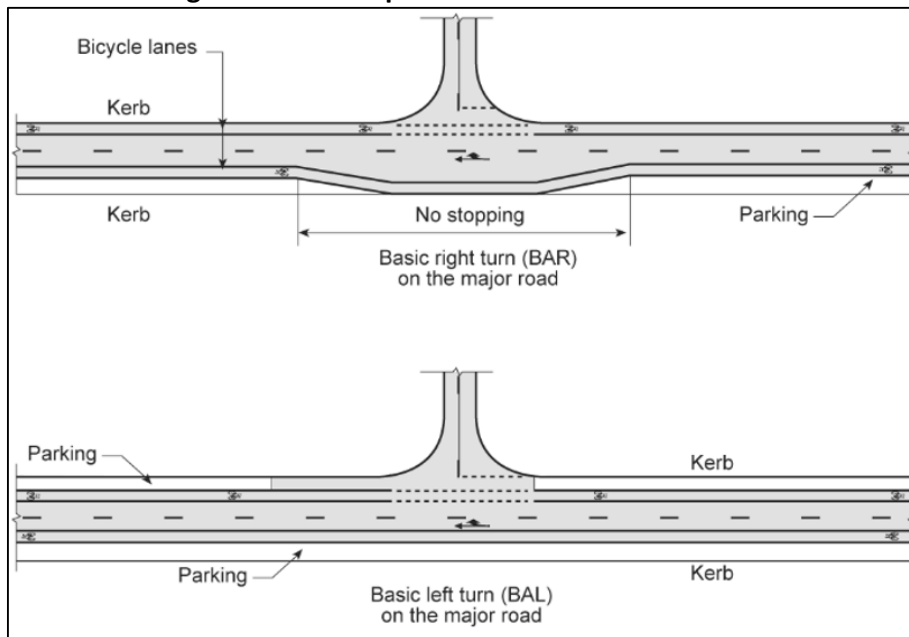
Photograph 8 – Oak Street (westbound at intersection with Myall Street)



Photograph 9 – Oak Street (eastbound at intersection with Myall Street)



Figure 10 – Concept of BAR and BAL Treatments



6.2 Intersection Sight Visibility

The sight visibility has been reviewed in accordance with Clause 3.4 of Austroads - *Guide to Road Design – Part 4A: Intersections*. Sight distance is measured along the carriageway from the approaching vehicle to the conflict point.

The posted speed limit on this section of road is 60km/h. The safe intersection sight distance (SISD) for an observation time of 3 seconds and reaction time of 2.0 seconds (Refer to Table 3.2 of Part 4 of Austroads Guide to Road Design) for 60km/h is 123m. The access intersection meets this requirement and achieves a sight distance of greater than 200m in each direction. Please refer to photographs 10 and 11 for visibility from the intersection.

Photograph 10 –Oak Street at Myall Street, Sight Visibility (View East)



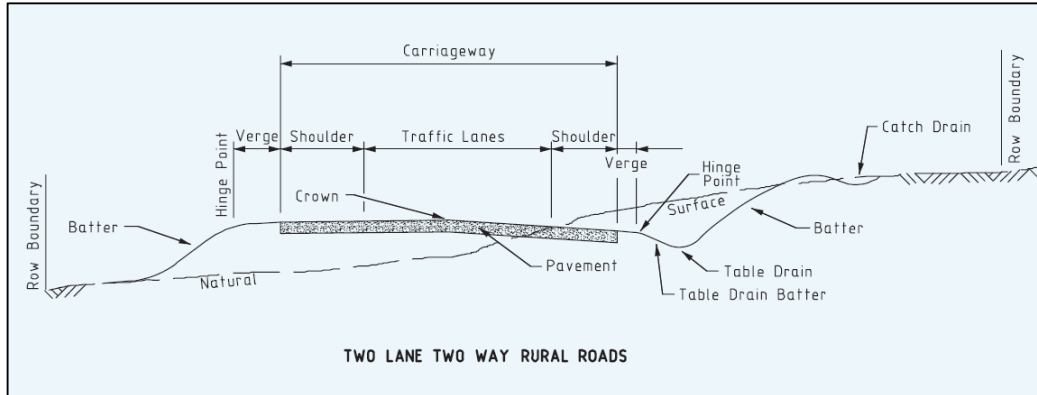
Photograph 11 –Oak Street and Myall Street, Sight Visibility (View West)



6.3 Local Road Network

A review of the local road network has been undertaken. Where traffic volumes are less than 150 vehicles per day and, particularly where terrain is open, single lane carriageways may be used. The traffic lane width adopted on such roads should be at least 3.5m. A width of less than 3.5m can result in excessive shoulder wear.

Figure 11 – Typical Cross Section



Source: Austroads Rural Road Design

A review of the current carriageway widths has been carried out. Site investigations indicate the terrain is flat and there is adequate shoulder width to provide for passing on Myall Street and Plumb Street. A summary of existing conditions is provided in Table 4.

Table 4 – Existing Local Road Conditions

Street	Existing Width	Estimated Existing Daily Traffic Flow
Myall Street	6m seal	150 vpd
Plumb Road	7m seal	50 vpd
Jacaranda Road	4m unsealed	20 vpd
Lancewood Drive	5m unsealed	10vpd
Beefwood Road	3m unsealed	0 vpd
Yarran Road	3m unsealed	0 vpd

The intersection of Jacaranda Road with Plumb Street is poorly delineated (refer to photograph 12). It is recommended that the formation of Jacaranda Road be upgraded to allow for 3.5m single traffic lane with 2m shoulders as an absolute minimum.

It is understood that the intersection of Lancewood Road and the Capricorn Highway (Oak Street) will be closed to traffic. There is currently a No Entry sign, however given the close location of the level crossing, the closure of this intersection by the local Council is supported.

Photograph 12 –Jacaranda Road



Lancewood Drive, Beefwood Road and Yarran Road should be upgraded to a minimum standard with a 3.5m unsealed traffic lane and suitable formed shoulders (1m minimum) to allow passing. Please refer to Table 5 for a summary of local road upgrades, to cater for development traffic.

Table 5 – Existing Local Road Conditions

Street	Existing Width	Recommendation
Myall Street	6m seal	Maintain
Plumb Road	7m seal	Maintain
Jacaranda Road	4m unsealed	Upgrade formation to improve legibility and shoulder
Lancewood Drive	5m unsealed	Upgrade to improve shoulder width
Beefwood Road	3m unsealed	Upgrade to a 3.5m unsealed traffic lane and 1m shoulders
Yarran Road	3m unsealed	Upgrade to a 3.5m unsealed traffic lane and 1m shoulders

6.4 Rail Level Crossing

There is a rail level crossing located on Capricorn Highway east of Jacaranda Road. As stated previously all development generated vehicles will access the site via Myall

Street intersection, as it is understood that the intersection of Lancewood Road, which is restricted to exit only movements, will be closed completely to traffic in the near future.

The existing railway crossing has a flashing signal assembly and appears to be compliant with MUTCD requirements, with signage generally in good condition. Given the existing low daily traffic volumes of 376 vehicles per day on the section of the Capricorn Highway, the impact of additional development traffic is deemed to be insignificant. Whilst the ultimate trip generation of 252 vehicles per day is estimated for the development, based on 100% occupancy, this is considered an upper limit and does not take into account drop-in and diverted drop-in trips from tourists already on the road network. With drop-in trips and seasonal peak variations, it is assumed that the average daily traffic volumes across the railway level crossing will be below 500 vehicles per day.

Photograph 13 –Railway Level Crossing



7. CONCLUSION

This report has assessed the impact of traffic generated by the proposed development site on the external road network. Consideration has been given to operational performance, intersection geometry and carriageway width.

An assessment was carried out of the trips likely to be generated by the proposed development and the estimated distribution of trips on the existing street network. The impact of the proposed development on the street network has been analysed using procedures set out in *Austroads* for assessing unsignalised intersections for a commencement year of 2022 for stage 1 and an ultimate year of 2024 for Stag completion. **Results of analysis indicate that the street network continues to operate adequately and under free flow conditions with spare capacity and minimal delays and queues. The impact of development traffic on the operational performance of the external road network is insignificant.**

A review of intersection geometry with the State-Controlled Road has been undertaken. **The intersection of Capricorn Highway (Oak Street) and Myall Street meet the requirement for a Basic Left Turn Lane (BAL) and Basic Right Turn Lane (BAR). Site investigations indicate that there is suitable shoulder width within the existing pavement to comply with this requirement.** The intersection of Myall Street and Oak Street has compliant safe intersection sight visibility and Give Way control, with suitable signage and line marking.

A review of the local road network has been carried out. It is understood the intersection of Lancewood Drive and Capricorn Highway will be closed to traffic. Upgrades are recommended to the carriageway widths of Jacaranda Road, Lancewood Road, Beefwood Road and Yarran Road as indicated in Table 5.

In conclusion, the proposed development will not adversely impact on the operational performance of the surrounding road network, however some minor upgrades to the local road network are required to mitigate the impacts of development traffic.

Appendix A

Proposed Development Concept Plans

THE FRINGE CAMP



GENERAL NOTE:

- THESE DRAWINGS ARE PART OF A GRANT APPLICATION AND SHOULD NOT BE USED FOR ANY OTHER REASON
- THESE DRAWINGS ARE APPROXIMATE AND HIGHLY CONCEPTUAL
- TRAFFIC/STORMWATER/OPERATIONAL WORKS: AS PER CIVIL ENGINEER DOCUMENTS AND DRAWINGS IF REQUIRED
- CURRENT LOCATIONS AND BOUNDARY LINE ARE APPROXIMATE, RELEVANT SURVEY TO BE CONDUCTED BEFORE ANY DOCUMENTATION OR CONSTRUCTION
- THESE DRAWINGS ARE CONCEPTUAL AND DO NOT REFLECT BUILDING APPROVAL, PLUMBING APPROVAL, QFRS APPROVAL OR DISABILITY REQUIREMENTS. CLIENT TO CONFIRM AND GET APPROVAL FROM RELEVANT AUTHORITIES
- IF THE SITE OR PROJECT ARE TRIGGERED OR LOCATED IN BUSHFIRE AREA, THEN THE BUILDINGS TO COMPLY WITH BUSHFIRE REQUIREMENTS OR AS PER COUNCIL REQUIREMENTS

CONCEPT ONLY

drawing title:
LOCATION PLAN

drawing no: **SK-001** project no: **CO-052**



project: A3 DRAWING NOTED SCALES RELATE TO A3 DRAWINGS	
THE FRINGE CAMP	
location: BARCALDINE- LOT NO. 911RY190+ 910RY190+6RY69	client: TRACKERS QLD

REV	DESCRIPTION	DATE
1	PRELIMINARY	03/09/2020
2	PRELIMINARY	07/09/2020
3	PRELIMINARY	07/09/2020
4	PRELIMINARY	09/09/2020
6	PRELIMINARY	11/09/2020

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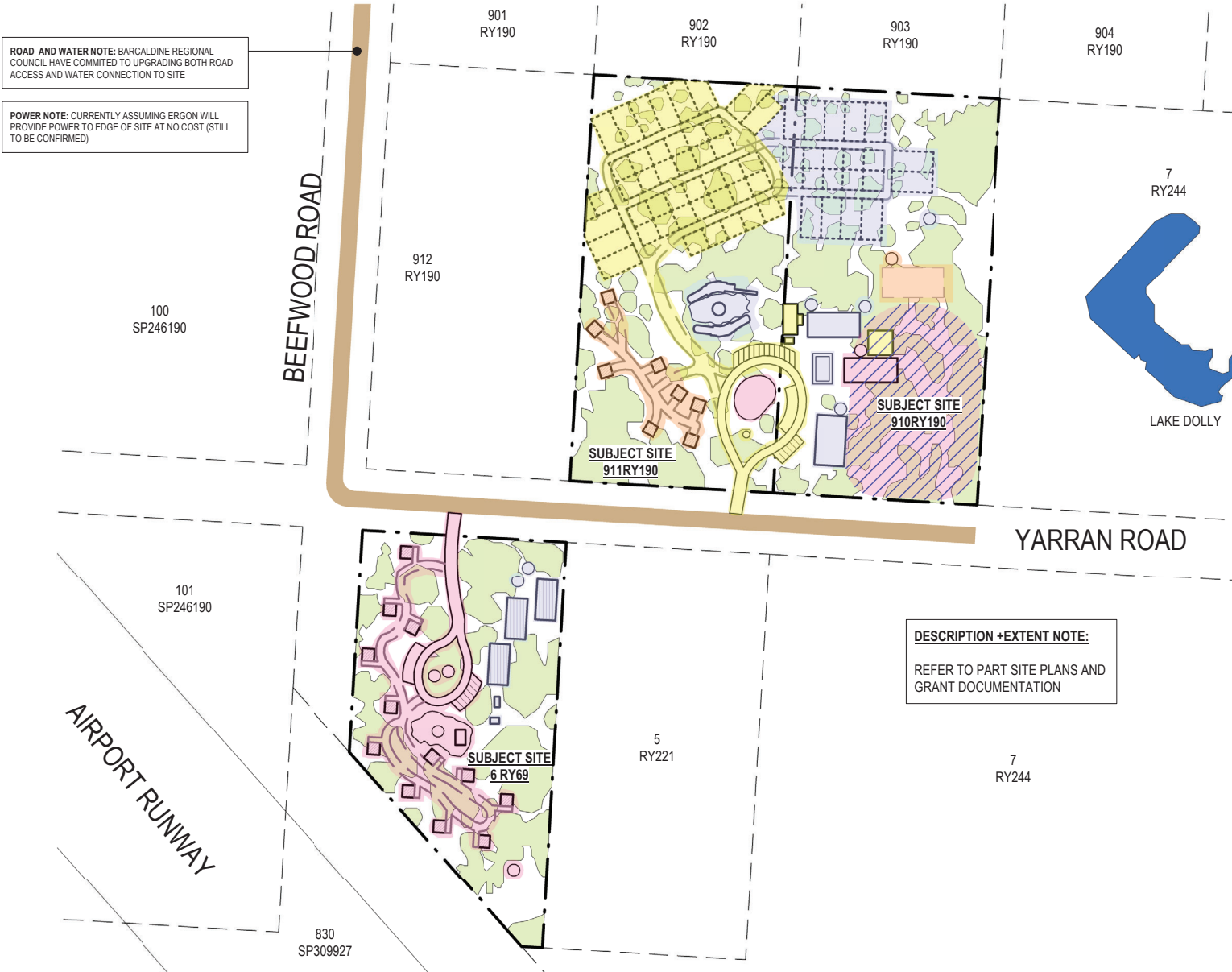
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design@designa.com.au
reg no:4610

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date SEP 20	drawn AUTHOR

ROAD AND WATER NOTE: BARCALDINE REGIONAL COUNCIL HAVE COMMITTED TO UPGRADING BOTH ROAD ACCESS AND WATER CONNECTION TO SITE

POWER NOTE: CURRENTLY ASSUMING ERGON WILL PROVIDE POWER TO EDGE OF SITE AT NO COST (STILL TO BE CONFIRMED)



STAGE LEGEND	
	STAGE 1
	STAGE 2
	STAGE 3
	STAGE 4

DESCRIPTION +EXTENT NOTE:
REFER TO PART SITE PLANS AND GRANT DOCUMENTATION

CONCEPT ONLY

1 OVERALL SITE PLAN
ST-003 1: 2000 @ A3

drawing title: **OVERALL SITE**

drawing no: **SK-002** project no: **CO-052**



project: A3 DRAWING NOTED SCALES RELATE TO A3 DRAWINGS	
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STAGE LEGEND	
	STAGE 1
	STAGE 2
	STAGE 3
	STAGE 4

1 PART SITE PLAN 1
ST-003 1: 1000 @ A3

YARRAN ROAD

CONCEPT ONLY

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PART SITE PLAN 1

drawing no: **SK-003** project no: **CO-052**



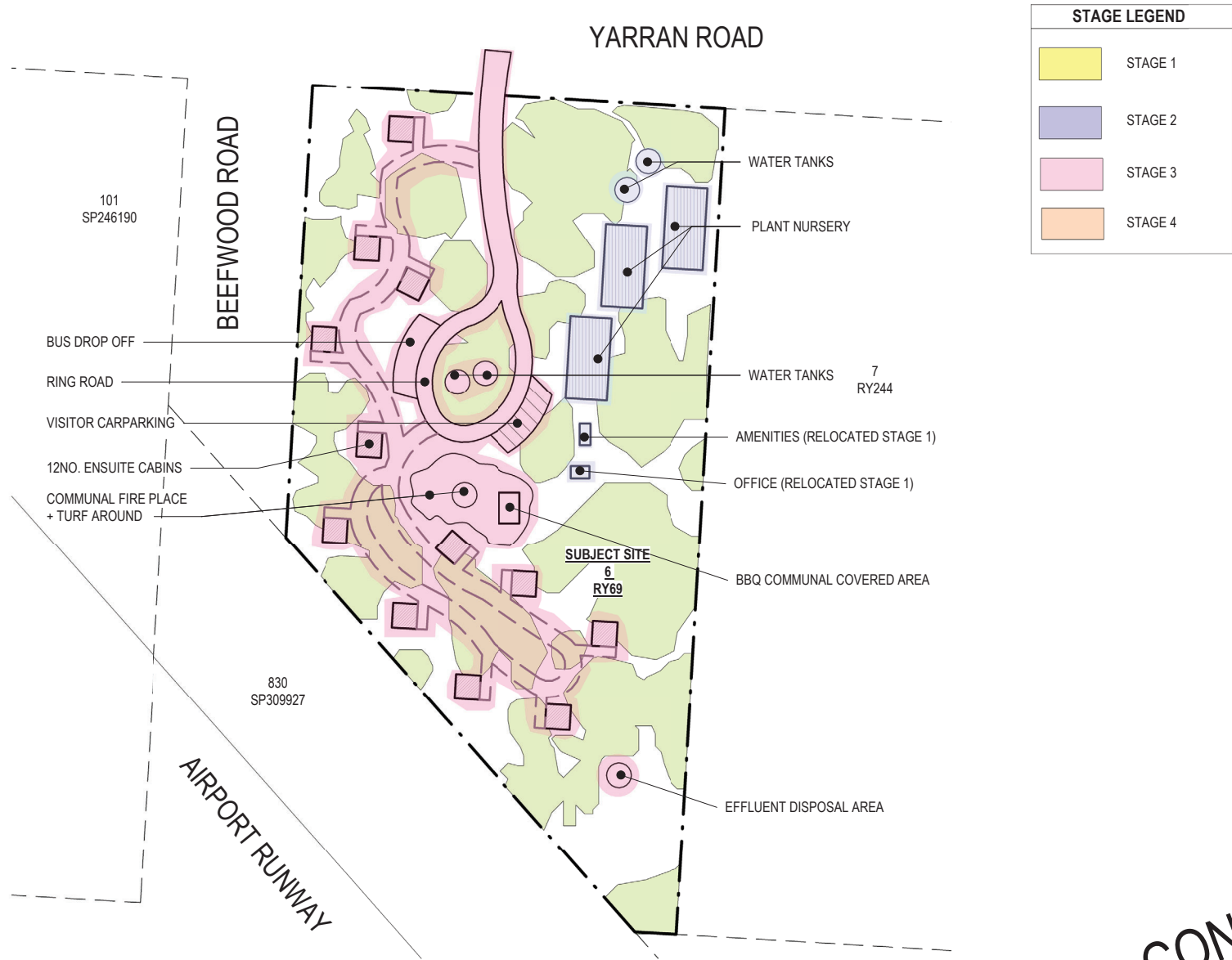
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location: BARCALDINE- LOT NO. 911RY190+ 910RY190+6RY69	client: TRACKERS QLD

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1 PART SITE PLAN 2
ST-003 1:1000 @ A3

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drawing no: SK-004 project no: CO-052



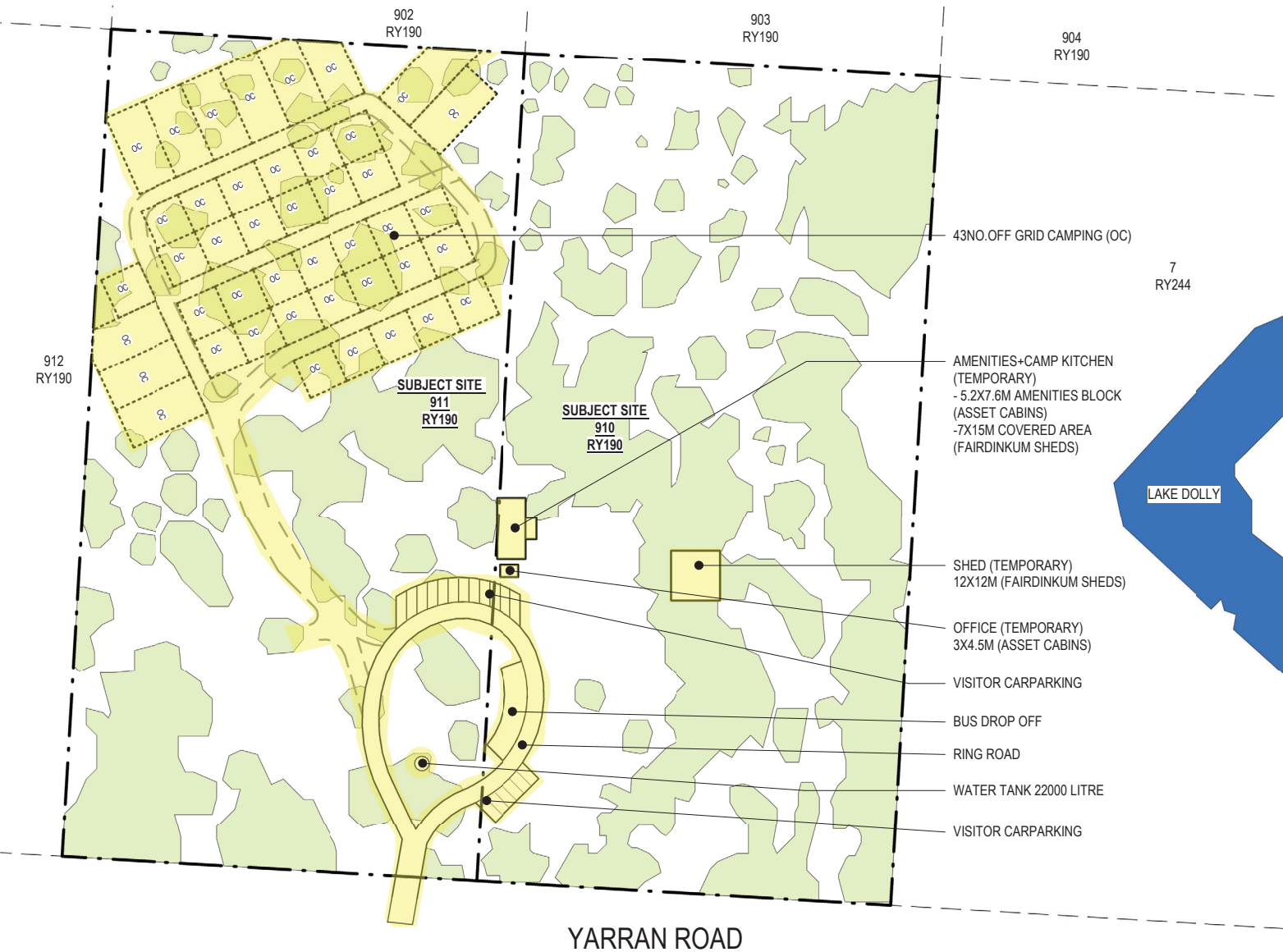
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location: BARCALDINE- LOT NO. 911RY190+ 910RY190+6RY69	client: TRACKERS QLD


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drawn: Author	



LEGEND	
	STAGE 1

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drawing title:
STAGE 1 SITE PLAN

drawing no: **SK-005** project no: **CO-052**



project: THE FRINGE CAMP-STAGE 1	
location: BARCALDINE- LOT NO. 911RY190+ 910RY190+6RY69	client: TRACKERS QLD

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BARCALDINE REGIONAL COUNCIL

DIGITALLY STAMPED

APPROVED PLAN

Change Application: Development Permit for Material Change of Use for Visitor Accommodation

Lot: Lot 6 on RY69, Lot 910 on RY190 and Lot 911 on RY190
Referred to in Council's Decision Notice for DA202021

Approval Date: 21 July 2021

Application Number: DA202021

Bushfire Hazard Assessment and Management Plan

42, 44 and 53 Yarran Road, Barcaldine

Prepared for The Fringe Camp @ the Dolly
c/o Brisbane Town Planning

Prepared by:

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Report Number: PR21133_BMP_Yarran Road, Barcaldine

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Document Records - Quality

TITLE	Bushfire Hazard Assessment and Management Plan for Yarran Road, Barcaldine
FILED AS	PR21133_BMP_Yarran Road, Barcaldine

Revision	Date	Prepared by (name/title)	Reviewed by (name/ title)	Approved by (name/title)
Version A	02/06/2021	Joseph Adair, Senior Ecologist	Kelly Matthews, Director	Client

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1. Introduction

1.1 Background

Green Tape Solutions was engaged by Cheryl Thompson of The Fringe Camp @ the Dolly to prepare a bushfire hazard assessment and management plan (BMP) located at 42, 44 and 53 Yarran Road, Barcaldine (formally described as Lot 6 on 2 on RY69, Lot 911 on RY190 and Lot 911 on RY190) (the 'site'). This report has been prepared for a development application for Material Change of Use of the site to construct visitor's accommodation consisting of 64 off grid campsites, 20 ensuited cabins, 1 managers residence and associated structures.

Careful consideration has been given to the site layout to ensure the development is spread throughout the site to give guests a sense of isolation and preserve the outback nature of the site. The proposed development layout is provided in **(Figure 2)**, which consists of campsites and proposed buildings. The village will be constructed over four stages.

1.2 Site Description

The site is located on three lots comprising a total area of approximately 56,590 m² (5.65 ha) within the Barcaldine Regional Council (BRC) local government area **(Figure 1)**. The site is bounded by Yarran Road to the south, Barcaldine Airport land to the west and vegetated lots to the west and north. A single dwelling is located about 250m east of the site on Corkwood Road.

The site is zoned as Industrial Use under the Barcaldine Shire Planning Scheme. The site is adjacent to the Barcaldine airport and is undeveloped and vacant of any buildings. Access to the proposed development is provided by Yarran Road which connects to Corkwood Road and then onto Lancewood Drive, which runs parallel to the Capricorn Highway and rail line. Beefwood Road (unconstructed) is west of the site. All roads are unsealed. Yarran Road is an unconstructed track leading to the site.

All lots have a mixture of remnant and regrowth sparse woodland with an understory consisting primarily of buffel grass. Lake Dolly (a significant cultural site to the Yiningai people) is situated to the east of Lot 910. Furthermore, the site is also of cultural significance. A more detailed description of the vegetation communities within and surrounding the site is provided in **Section 3.1.2**

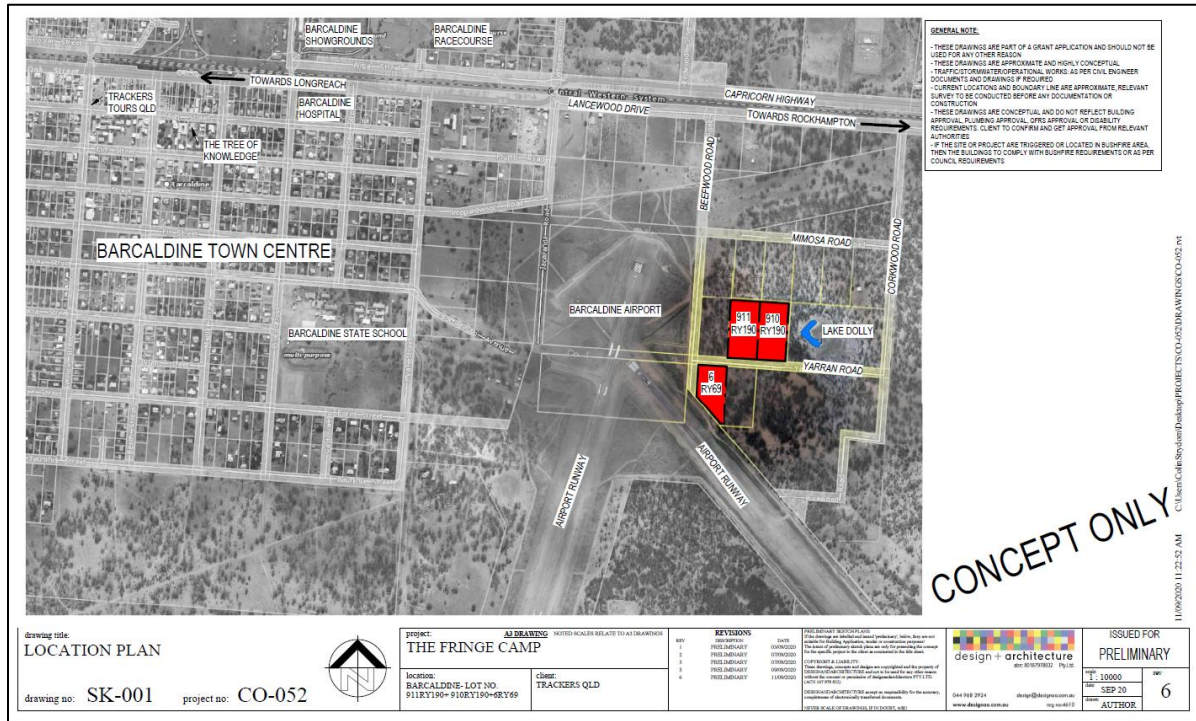


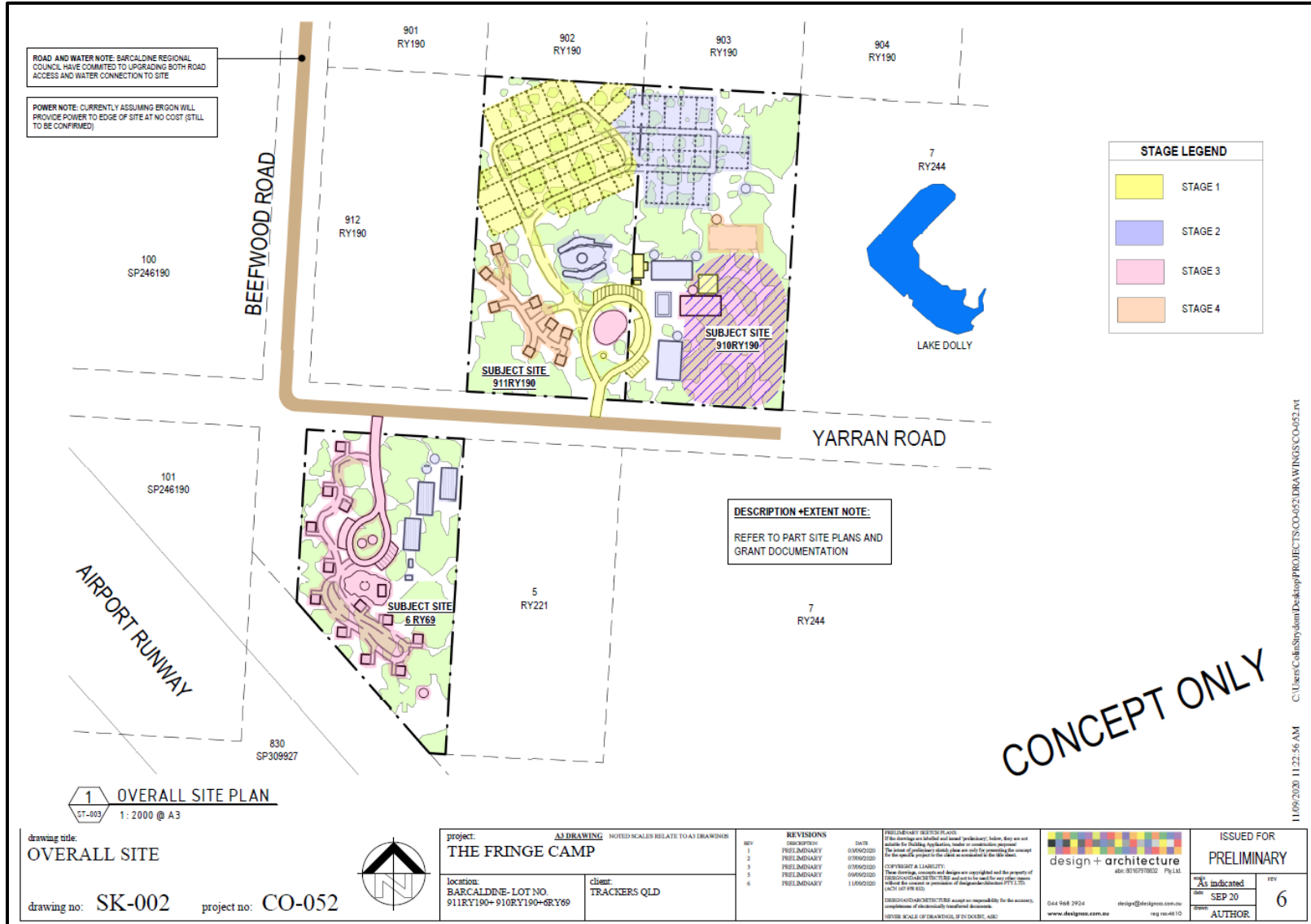
Figure 1: Site location (Source: Murray & Associates)

1.3 Scope of Work

The purpose of this BMP is to provide a site-specific assessment of bushfire hazard and to assess compliance of the proposed development with the outcomes sought by the Barcaldine Regional Council Information Request (DA212021) Item 2 Bushfire Hazard requiring Bushfire Hazard Assessment and Management Plan be prepared for the proposed development.

This BMP also provides a plan for bushfire risk management including building construction requirements, asset protection zones, fuel management, access requirements and emergency responses measures. Recommendations are consistent with legislative requirement and statutory requirements to reduce the risk to life and property.

Figure 2: Proposed development layout (Source Murray & Associates)



2. Bushfire Regulatory Framework

Given that bushfire hazard can cause harm to people and social wellbeing, damage to property and impacts to the economy and environment, the management of bushfire hazard in Queensland is considered an integral component of land use planning and development decisions.

There are three regulatory mechanisms/instruments applicable to the site that regulate development to avoid and mitigate potential impacts associated with bushfire hazard:

- State Planning Policy (SPP) and associated guidelines (DILGP, July 2017);
- Barcaldine Shire Council Planning Scheme 2016 (Version 2) (Barcaldine Regional Council, 2013); and
- Australian Standard AS3959:2018 – Construction of Buildings in Bushfire-prone Areas (Standards Australia, 2018).

2.1 State Planning Policy (SPP)

The SPP identifies the Queensland Government's policies about matters of state interest in land use planning and development (DILGP, July 2017). The SPP is a broad and comprehensive statutory planning instrument. It sits above regional plans, standard planning scheme provisions and local government planning schemes within the hierarchy of planning instruments outlined in the *Planning Act 2016*.

The SPP is supported by the following guidance material:

- The SPP state interest guidance material - Natural hazards, risk and resilience - Bushfire ('SPP guidance') (DSDMIP, 2019), which provides further context to the SPP and explains how the SPP policies can be applied, in particular for local government when making or amending local planning instruments. The SPP guidance is also intended to assist assessment managers and practitioners in applying the SPP assessment benchmarks when state interests have not been integrated into the local planning scheme (where applicable).
- The 'Bushfire Resilient Communities – Technical Reference Guide for the State Planning Policy State Interest - Natural Hazards, Risk and Resilience – Bushfire ('BRC technical document') (QFES, 2019), which provides technical guidance and policy positions of the Queensland Fire and Emergency Services (QFES). It includes procedures for undertaking a bushfire hazard assessment (BHA), calculating asset protection zones and preparing a Bushfire Management Plan.

The SPP assessment benchmarks outlined in Part E of the SPP and Section 4.0 of the SPP guidance apply to development to the extent that the development is assessable against a planning scheme and only to the extent that the planning scheme is inconsistent with the SPP.

The SPP is also supported by a state-wide map of bushfire prone areas (BPA) (also referred to as 'bushfire hazard area') that was developed based on the CSIRO modelling of potential fireline intensity using the methodology described by Leonard *et al.* (2014). An excerpt from the SPP Assessment Benchmark – BPA mapping published on the SPP Interactive Mapping System (IMS) is provided in

Figure 3. The site is mapped as containing areas of High and Medium Potential Bushfire Intensity and Potential Impact Buffer. The Potential Impact Buffer includes all land within 100 metres of any area with a potential fireline intensity greater than 4,000 kW/m (i.e. medium, high or very high bushfire hazard/potential bushfire intensity).

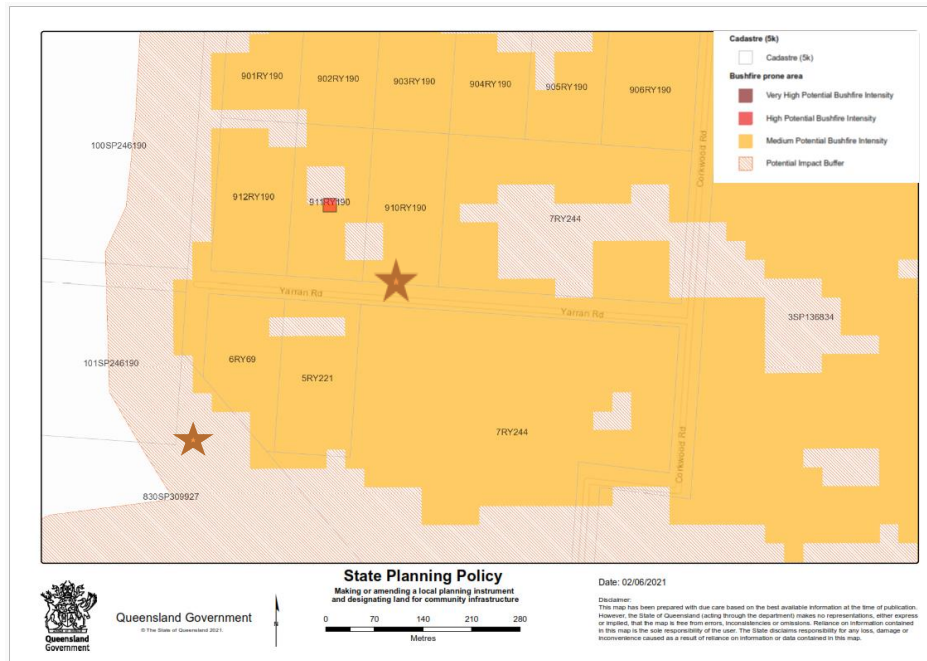


Figure 3: Excerpt from DSDMIP SPP IMS – Bushfire prone area (Source: DSDMIP SPP IMS)

2.2 Barcaldine Shire Council Planning Scheme (Version 2)

The site is located within the Barcaldine Regional Council local government area and is subject to the provisions of the Barcaldine Shire Planning Scheme. The Barcaldine Shire Planning Scheme 2006 (Version 2) does not specify bushfire assessment and management performance outcomes or acceptable solutions. In the absence of council advice in relation to acceptable methodologies, the site-specific bushfire assessment provided in this plan has been undertaken in accordance with the BRC Technical Document (Queensland Fire and Emergency Services (QFES), 2019).

2.3 AS3959:2018 Construction of Buildings in Bushfire Prone Areas

The Australian Standard *AS3959:2018 Construction of Buildings in Bushfire-Prone Areas* (Standards Australia, 2009) specifies the requirements for the construction of buildings in bushfire-prone areas in order to improve their resistance to bushfire attack. AS3959:2018 applies to those areas where a regulated map (i.e. a planning scheme overlay map) identifies an area as a bushfire prone area (or similar), requiring calculation of Bushfire Attack Level (BAL) in accordance with a methodology outlined in the standard.

AS3959:2018 thus prescribes the construction details for buildings depending on the calculated BAL. The detailed requirements relating to construction methods and materials are typically dealt with as part of building design and enabled via private certification in accordance with the Building Code of Australia.

3. Bushfire Hazard Assessment

A site-specific bushfire hazard assessment (BHA) for the site has been undertaken in accordance with the methodology outlined in the 'Bushfire Resilient Communities' (BRC) technical document (QFES, 2019). The methodology underpinning the BHA process consists of three stages:

1. An assessment to verify the reliability of existing BPA mapping over the site and land surrounding the site (the 'assessment area').
2. A hazard assessment involving field investigations to ground-truth the accuracy of the BPA mapping for the site, where required. The hazard assessment area must include the development area and all land within 150 metres of the development footprint.
3. Using the results of the site-specific assessment, the asset protection zone width needed to achieve the requisite radiant heat flux levels is calculated using the SPP Bushfire asset protection zone (APZ) width calculator or Method 2 of AS3959:2018.

Where the precision and/or accuracy of BPA mapping or map input datasets are insufficient (e.g. where there has been changes in land use and vegetation cover within the assessment area), the process enables applicants to create a local-scale BPA map based on the results of the site investigation and to apply modified input variables that reflect changes that have occurred over time. The BHA process adapts the method used to generate the state-wide BPA mapping, described in Leonard *et. al.* (2014).

3.1 Hazard Assessment

The following steps have been undertaken to assess spatial factors that contribute to potential bushfire intensity for the site and surrounding land:

- **Step 1: Identification of Fire weather severity**
Identification of all Forest Fire Danger Index (FFDI) values estimated at a 1:20 year (5%) Annual Exceedance Probability (AEP) using the Bushfire Hazard Area – Bushfire Prone Area – Inputs dataset from the Queensland Government data portal.
- **Step 2: Identification of Vegetation Hazard Classes**
Assessment of vegetation communities to identify the relevant vegetation hazard classes (VHCs) using a combination of remnant and pre-clearing regional ecosystem maps, high-resolution aerial imagery and a ground-truthed assessment of vegetation present within the site and within the required 150 m assessment area.
- **Step 3: Slope assessment**
Identification of site slope and effective slope, and determination of whether proposed buildings are upslope or downslope of hazardous vegetation using Bushfire Hazard Area – Bushfire Prone Area – Inputs dataset from the Queensland Government data portal and 1 m contour data.
- **Step 4: Remodelling of bushfire hazard and calculation of potential fireline intensity** -
Where a change to the distribution, extent and/or classification of VHCs within the assessment area is proposed, remodelling of bushfire hazard is undertaken to determine how the changes

to VHCs and associated fuel loads affect potential fireline intensity. Potential fireline intensity is to be calculated in accordance with the method outlined in Leonard *et. al.* (2014).

VHCs and associated potential fuel loads are in accordance with Leonard *et al.* (2017), as provided in the BRC technical document and SPP Bushfire APZ width calculator published by the Queensland Fire and Emergency Services (QFES).

Relevant spatial datasets published by the QFES were accessed via the Queensland Spatial Catalogue (QSpatial) and redi-PORTAL (PBSA, 2018).

3.1.1 Step 1 – Fire weather severity

The relevant Forest Fire Danger Index (FFDI) for the site was derived from the Fire Weather Severity (Forest Fire Danger Index) raster provided as part of the Bushfire Hazard Area – Bushfire Prone Area – Inputs dataset.

The FFDI for the site and surrounding land is 91.

3.1.2 Step 2 - Vegetation Hazard Classes and Potential Fuel Loads

3.1.2.1 Vegetation Hazard Classes

Different types of vegetation communities determine the rate at which dry fuel accumulates. Some vegetation communities protect fuel from drying out in all but extreme bushfire seasons and can then be susceptible to very destructive bushfires. Alternatively, vegetation communities may expose fuels to drying and therefore be frequently available for burning. Frequent bushfires can result in the development of bushfire-tolerant grassy woodlands or grasslands and less destructive bushfire behaviour.

The Queensland Spatial Catalogue (QSpatial) and redi-PORTAL (PBSA, 2018) does not show Vegetation Hazard Classes for the site. The site is mapped as being entirely Regional Ecosystem (RE) 10.5.12.

The site assessment determined that the site supports three (3) vegetation communities: Vegetation on Lot 6RY69 is predominately RE10.5.12 poplar box (*Eucalyptus populnea*) open woodland on sand plains which has a very sparse structure. Lots 910 and 911 on RY190 have a mix of RE10.5.12 and more commonly RE 10.3.14d river red gum (*Eucalyptus camaldulensis*) woodland with a sparse to very sparse canopy.

Vegetation Hazard Classes (VHCs) derived from these RE are shown in **Figure 4**. The following VHCs occur within the required 150 m assessment area:

- RE 10.5.12 – VHC - 17.2 Dry woodlands dominated by poplar box, silver-leaved ironbark or White's ironbark on sand or depositional plains;
- RE 10.3.14d – VHC 16.2 - Eucalyptus dominated woodland on drainage lines and alluvial plains; and
- Non-remnant vegetation – VHC 42.6 - Nil to very low vegetation cover

Vegetation community 1 – RE10.5.12 *Eucalyptus populnea* open woodland on sand plains.

This is remnant native vegetation associated with sand plains. It occurs primarily on Lot 6RY69 and has a grassy understory of buffel grass. Associated species included Reid River box (*Eucalyptus brownii*). The ground layer is predominately buffel grass. Weed species are few and not significant (**Plate 1**).

This community is mapped as Category B (remnant). The ground-truthed vegetation assessment determined that this vegetation meets the criteria for remnant status and is generally consistent with RE 10.5.12.

Vegetation community 2 – RE10.3.14d *Eucalyptus camaldulensis* woodland along channels and on floodplains.

This is remnant native vegetation associated with sand plains. It occurs primarily on Lots 900 and Lot 911 on RY190 with an understory of buffel grass. Associated species included rusty jacket (*Corymbia leichhardtii*). The ground layer is predominately buffel grass. Weed species are few and not significant (**Plates 2 and 3**).

This community is mapped as 10.5.12 Category B (remnant). However, the ground-truthed vegetation assessment determined that this vegetation meets the criteria for remnant status and is generally consistent with RE 10.3.14d within the lower areas of the site west of Lake Dolly. Fringing vegetation near Lake Dolly appear to be denser regrowth.

Vegetation community 3 – Cleared land.

This vegetation community occurs within the Barcaldine airport and east of Lake Dolly. A grassy layer occurs in some areas while the remaining areas are bare ground. (Figure 5). This vegetation community equates to VHC 42.6 - Nil to very low vegetation cover (**Plate 4**).

3.1.2.2 Potential Fuel Loads

Fuel loads have been allocated for each VHC to represent the long-unburnt condition that would be typically exhibited 10 years after fire. In accordance with the values provided in Figure 14 of the BRC technical document (QFES, 2019a), the potential fuel load values for ground-truthed VHCs within and surrounding the site are as provided in **Table 1**.

Table 1: Potential fuel loads for classified vegetation within 150 m assessment area.

VHC		Total potential surface fuel load (t/ha)	Total overall potential fuel load (t/ha)	Prone type ¹	
17.2	Dry woodlands dominated by poplar box, silver-leaved ironbark or White's ironbark on sand or depositional plains	9	9.6	1	Bushfire-prone – Forest or shrub fires
16.2	Eucalyptus dominated woodland on drainage lines and alluvial plains.	11.1	11.6	1	Bushfire-prone – Forest or shrub fires
42.6	Discontinuous low grass or tree cover	2.0	3	3	Non-bushfire prone – Grassland fire

¹ Prone type taken from the VHC_Data sheet of the SPP Bushfire APZ calculator.

As VHC 42.6 is classified as non-bushfire prone, this vegetation is not considered further in the assessment.



Plate 1: Poplar box woodland – VHC 17.2 with buffel grass understory.



Plate 2: River red gum woodland – VHC 16.2



Plate 3: Regrowth vegetation on Lot 911



Plate 4: Vegetation adjacent to airport

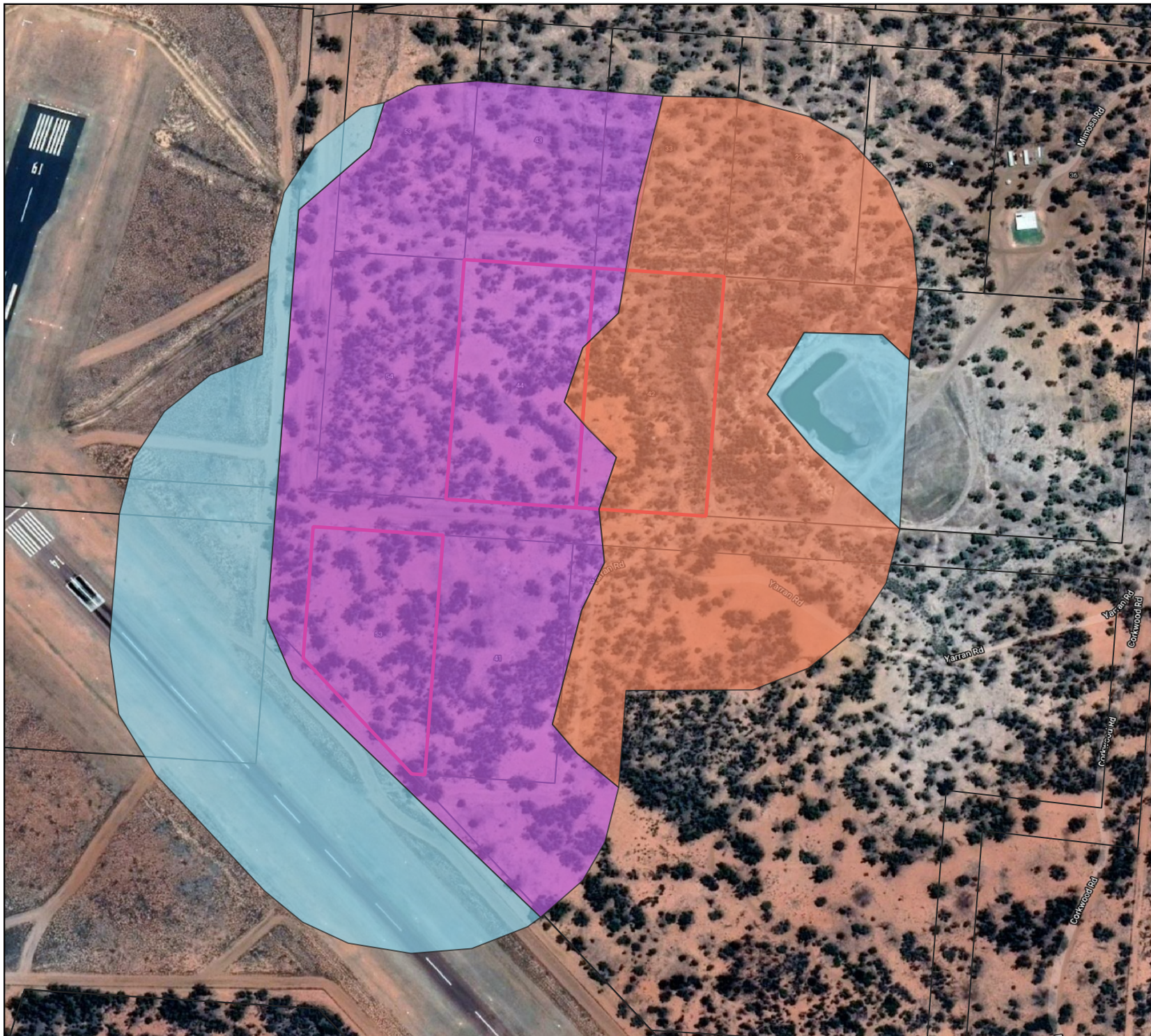


Figure 4: Ground Truthed VHC

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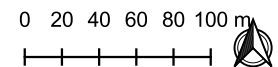
GT VHC

- VHC 16.2
- VHC 17.2
- VHC 42.6
- Cadastre

Notes:

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3.1.3 Step 3 - Site and Effective Slope

Two slope input parameters are required for the estimation of fire behaviour and separation. Site slope is the slope of the ground between the edge of the proposed development (or site boundary) and the edge of hazardous vegetation. Effective slope refers to the slope of the land beneath hazardous vegetation. Effective slope is the more important parameter as it has a direct influence on the potential rate of fire spread, fuel consumption and thus, potential fireline intensity. For each vegetation hazard class, the effective slope is determined by assessing the slope beneath classified vegetation (in degrees) which most influences bushfire behaviour and the relative position of land supporting hazardous vegetation in relation to the development i.e. upslope or downslope. Where there is more than one slope beneath classified vegetation, each slope should be individually assessed, and the worst-case scenario adopted.

Site slope was determined using LiDAR-derived 1 metre contour data published by the Department of Natural Resources, Mines and Energy. The site is generally flat with no discernible slope. The effective slope beneath all classified vegetation was determined to be 0 degrees (flat).

3.1.4 Remodelling of bushfire hazard and calculation of potential fireline intensity

The results of the potential fireline intensity calculation for bushfire-prone vegetation within the assessment area show that both fire prone vegetation communities have a potential bushfire hazard class of 'medium' which is consistent with the mapping for the site. All other vegetation within 150 m of the development site is not classified as bushfire-prone and therefore, calculation of radiant heat flux/bushfire attack level (BAL) is not applicable.

Section 5 outlines the requirements for management and mitigation of bushfire hazard for the bushfire-prone vegetation within the site.

3.2 Radiant Heat Exposure and Bushfire Attack Levels

The BRC technical document requires that radiant heat exposure/bushfire attack levels (BALs) are calculated using either the SPP Bushfire APZ calculator (QFES, 2019b), which is the preferred method or Method 2 of AS3959:2018. Where Method 2 is used, the following inputs are to be used:

- site-specific values for FFDI (Step 1)
- ground-truthed VHCs (Step 2) and their associated fuel loads (provided in Figure 14 of the BRC technical document); and
- site and effective slopes (Step 3).

Bushfire attack levels (BALs) are used to quantify the levels of attack (radiant heat exposures/flux) that built structures may experience during a fire event. The BAL is defined as 'a means of measuring the severity of a building's potential exposure to ember attack, radiant heat and direct flame contact, using increments of radiant heat expressed in kilowatts per metre squared, and the basis for establishing the requirements for construction to improve protection of building elements from attack by bushfire' (Standards Australia, 2018).

AS3959:2018 adopts six BAL categories, which are based on the level of radiant heat flux to which buildings may be exposed to during a bushfire event. This level of heat flux generally relates to the type of vegetation, effective slope and how far a building is from hazardous vegetation. BALs apply to buildings and any attached or adjacent structure within 6 m of the building.

The Flamesol Method 2 Minimum Distance calculator has been used to calculate the minimum separation distance required between the development and bushfire-prone vegetation for each BAL. These results are provided in **Appendix 1** and **Figure 5** and summarised in **Table 2**.

Table 2: Determination of Bushfire Attack Level (BAL) minimum separation distances for bushfire-prone vegetation.

Bushfire attack level (BAL) →	BAL-Flame zone (FZ)	BAL-40	BAL-29	BAL-19	BAL-12.5
Separation distances	0 - <6.3 m	6.3 - <8.5 m	8.5m - < 12.7 m	12.7 - <18.7 m	18.7 - < 100m

The Bushfire Resilient Communities Guideline specifies separation distances from hazardous vegetation classified as medium, high or very high potential bushfire intensity area by a distance that achieves a radiant heat flux level of 29 kW/m² or less at all development footprint plan boundaries. Based on **Table 2**, it is recommended that a separation distance that achieves BAL 29 or less be applied to achieve a radiant heat flux of 29kW/m². To achieve this outcome, any buildings must be sited at least 8.5m from any retained vegetation identified in **Figure 5**.

Figure 5 shows the indicative separation distances which would need to be applied.

Note that separation distances may be established through meeting the Asset Protection Zone management measures for the site by removing and managing surface fuels and maintaining separation between tree canopies.

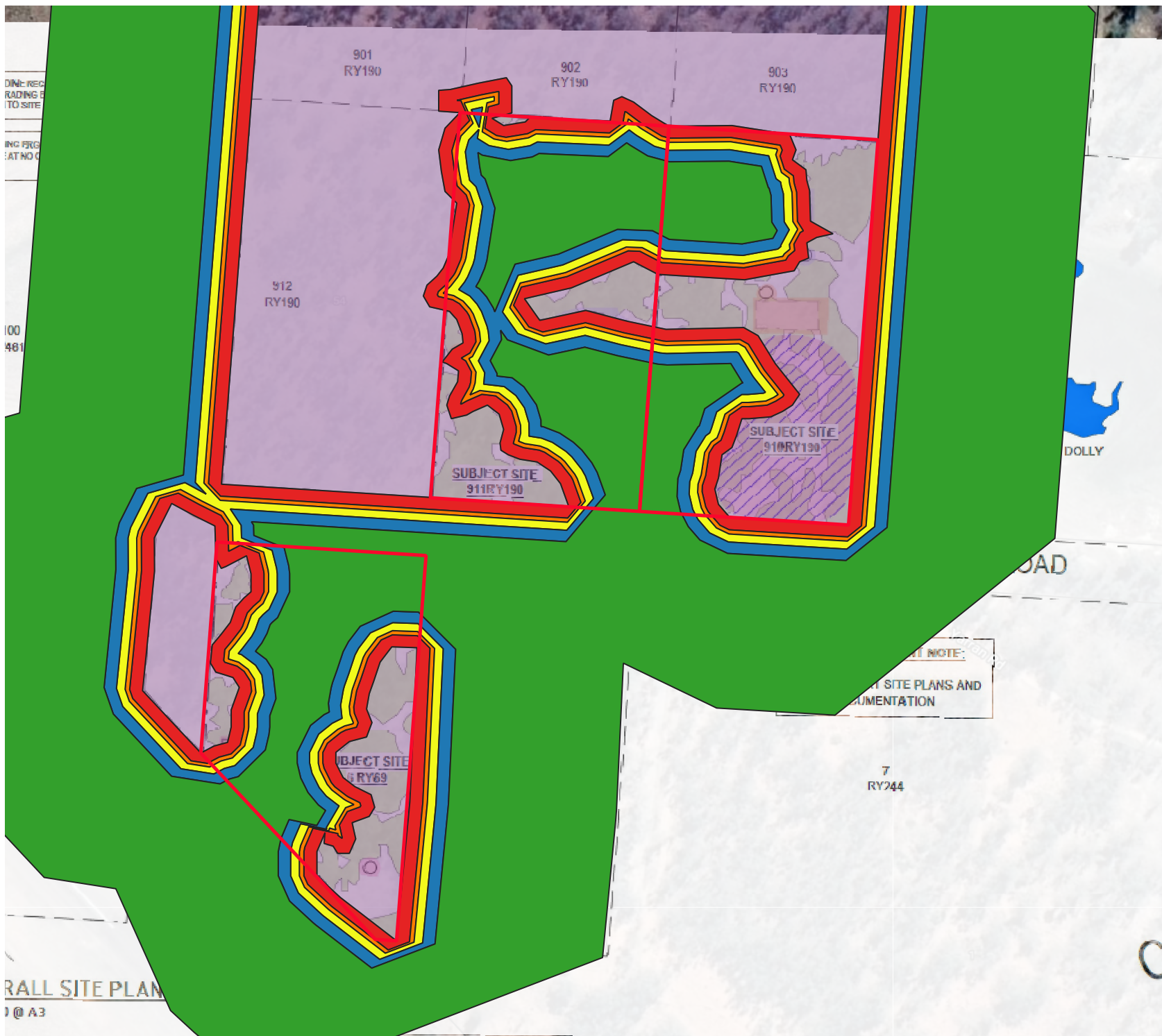


Figure 5: Bushfire Attack Levels

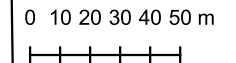
Project: PR21133_Yarran Road, Barcaldine.

- Site boundary
- Cadastre
- Bushfire Attack Level**
- BAL -Flame Zone
- BAL 40
- BAL 29
- BAL 19
- BAL 12.5



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4. Bushfire Management Plan

The SPP requires that where it is not possible to avoid a bushfire prone area, development mitigates bushfire risk to people and property to an acceptable or tolerable level. This can be achieved through development design and siting, hazard reduction practices and emergency mitigation measures for any buildings bordering potentially bushfire-susceptible vegetation. These practices and measures include fuel reduction and management, road infrastructure to provide safe access and egress, appropriate building design and construction standards, procedures for fighting bushfires and fire intensity reduction management measures.

4.1 Agencies / Persons Responsible

The responsible fire authority is the Queensland Fire and Emergency Services (QFES). It is the responsibility of the proponent to ensure that the relevant measures required by this plan are in place prior to inspection by the Council and the building certifier, and to ensure that the measures are in place prior to enacting the approval. Furthermore, it is the responsibility of the proponent to ensure that a copy of this report is always on hand at the site.

4.2 Owner / Occupier Responsibilities

It is the responsibility of the relevant lot owner to maintain each lot in accordance with the conditions outlined in this report. The owner / occupier responsibilities include:

- An Asset Protection Zone (APZ) is to be established and maintained between and bushfire-prone vegetation. The APZ is to be managed in accordance with the measures outlined in Section 4.4.
- All access routes are to remain clear of obstacles to enable effective emergency vehicle access and egress; and
- No burning is to be undertaken on-site without a Permit to Burn as issued by the local Fire Warden (and approval if required, in writing, from Council).
- The storage or handling of hazardous chemicals on the premises must not result in an unacceptable risk to people, property and the environment. Hazardous chemicals should not present a risk to or impose upon emergency services when responding to an emergency or evacuation.

4.3 Reporting and Auditing

This bushfire report is a controlled working document that is to be updated and revised to reflect adaptive management and constructive feedback. Some sections of the plan may be modified, new procedures may be implemented, and responsibilities altered, depending on feedback and application.

This bushfire report will only be modified with the agreement of QFES or Barcaldine Regional Council. This arrangement allows for changes to the plan scope, as determined through consultation and the acceptance of the proponent. That is, where further actions are deemed necessary or where actions can be reduced in scope.

4.4 Siting of Buildings

In accordance with the SPP 2019 (and associated guidance material) and the Barcaldine Shire Council Planning Scheme (version 2), the proposed design has considered the key principles when siting development. The relevant clauses that have been considered are:

- Utilising land that is predominantly cleared to minimise ecological impacts to native vegetation;
- Maximising where practicable building frontage setbacks from any hazardous vegetation; and
- Siting of buildings so that elements of the development that are least susceptible to fire are situated closest to the bushfire hazard (e.g., driveways, parking areas and protective landscape treatments).

4.5 Asset Protection Zones

The use of an APZ is the most effective defence against flame and radiant heat and to a lesser extent, ember attack. The APZ incorporates defendable space and allows for managing heat intensities at the building surface.

The landscaping plan shall incorporate the following measures aimed at minimising fuel within the APZ:

- The APZ is to be maintained as an area is free of flammable material to provide defendable space and for managing heat intensities at the building surface.
- Garden beds with flammable plants are not to be located under trees and should be no closer than 10 metres from an exposed window or door. Any planted trees should have lower limbs removed up to a height of 2 metres above the ground.
- Landscaping treatments within the APZ shall comprise only low threat vegetation, including lawn areas managed in a minimal fuel condition (i.e., ≤ 100 mm nominal height as specified in AS3959:2018) and species that are of low combustibility (i.e., species with high leaf moisture content, low volatile oil content, absence of shedding bark, low production of leaf litter etc.). Plants should also be arranged to minimise vertical and horizontal connectivity of plant material.
- Mulches within any landscaped areas are to be non-combustible.
- Regular site maintenance should be undertaken to remove fine fuels and debris, particularly prior to and during the fire season (i.e., late winter to early summer). This shall include regular vegetation management and maintenance where necessary and practicable (e.g., brush-cutting, weed removal etc.) and removal of debris and rubbish.
- Landscape trees should be spaced to avoid the foliage of mature trees overhanging roof lines and gutters.

4.6 Access Roads

Access to future development will be provided via Yarran Road which is constructed to a gravel standard. Vehicular access onto each of the lots occurs via Yarran Road. Yarran Road is accessed

via Beefwood Road, which is also constructed of gravel. This access shall provide safe and effective access and egress for emergency vehicles and occupants in the event of a bushfire.

4.7 Electricity Supply

The proposed development will have access to mains electricity supply. Where practicable, electrical transmission lines will be installed underground.

4.8 Water Supply

The site may have access to the reticulated water supply, however should this not be available a water supply in accordance with the Barcaldine Shire Council Planning Scheme will be provided in accordance with AS11.2 "Premises" are connected to an approved water allocation as provided by the relevant agency within the Industrial Zone 7.

4.9 Climate Change and Fire Weather – Projections for 2050

Climate change can act in two ways to affect fire behaviour. First, it is likely to exacerbate the fire-weather risk on any given day, leading to increased frequency or intensity of extreme and very extreme fire-weather days particularly within the fire season. Secondly, an increase in the accumulated fire risk over a year might represent a longer fire season and a reduction in the number of days suitable for prescribed burning.

It is recommended to review this document and associated bushfire procedures at the site over the coming decades in response to any potential increases of bushfire risk from climate change.

4.10 Emergency Response Procedures

An onsite fire management and evacuation strategy should be developed and available to implement in the event of an emergency. In the event of a pending fire emergency, assistance is to be obtained by contacting dialling 000.

Emergency access and egress will be via Yarran Road to Beefwood Road, or Goodwood Road onto Lancewood Drive. All roads shall be constructed to a minimum gravel all weather standard and comply with council's road width standards.

5. Assessment against the State Planning Policy – Bushfire State Interest

The site is mapped by the SPP Natural Hazards, Risk and Resilience – Bushfire State Interest. As the Barcaldine Regional Council does not have specific codes to address bushfire management the SPP applies. The State Interest assessment is provided in Error! Reference source not found..

Table 3: Assessment against Assessment Benchmarks for the SPP Natural Hazards, Risk and Resilience – Bushfire State Interest.

Assessment Benchmarks (AB) for the Natural hazards, risk and resilience - Bushfire State Interest		Compliance Assessment
Applicable development – A DA for a MCU, RoL or Operational Works within bushfire-prone area		
1	<p>Erosion prone areas within a coastal management district</p> <p>Development does not occur in an erosion prone area within a coastal management district unless the development cannot feasibly be located elsewhere and is:</p> <ul style="list-style-type: none"> (a) coastal-dependent development; or (b) temporary, readily relocatable or able to be abandoned development; or (c) essential community infrastructure; or (d) minor redevelopment of an existing permanent building or structure that cannot be relocated or abandoned. 	<p>Not applicable</p> <p>This assessment benchmark is not applicable to bushfire hazard considerations</p>
2	<p>Erosion prone areas within a coastal management district</p> <p>Development permitted in (1) above, mitigates the risks to people and property to an acceptable or tolerable level.</p>	<p>Not applicable</p> <p>This assessment benchmark is not applicable to bushfire hazard considerations</p>
3	<p>Bushfire, flood, landslide, storm tide inundation, and erosion prone areas outside the coastal management district</p> <p>Development other than that assessed against (1) above, avoids natural hazard areas, or where it is not possible to avoid the natural hazard area,</p>	<p>Complies with AB 3</p> <p>This bushfire hazard assessment and management plan (BHAMP) provides a site-specific bushfire hazard assessment that confirms the level of bushfire hazard for the development site. The proposed</p>

<p>Assessment Benchmarks (AB) for the Natural hazards, risk and resilience - Bushfire State Interest</p> <p>Applicable development – A DA for a MCU, RoL or Operational Works within bushfire-prone area</p>	<p>Compliance Assessment</p>
<p>development mitigates the risks to people and property to an acceptable or tolerable level.</p> <p>For development in a bushfire prone area involving vulnerable uses and community infrastructure for essential services as identified in Error! Reference source not found. of the SPP state interest guidance material ².</p> <p>1. Vulnerable uses are not established or intensified within the bushfire prone area unless:</p> <ol style="list-style-type: none"> a. there is an overriding need in the public interest for the new or expanded service the development provides, b. there are no other suitable alternative locations within the required service catchment, and c. site planning can appropriately mitigate the risk (for example, siting ovals for an educational establishment between the hazardous vegetation and structures). 	<p>development is located within the Medium Potential Bushfire Intensity area associated with bushfire-prone vegetation surrounding the site.</p> <p>The development is sited within the Industrial zone and the site layout considers vegetation which can be removed and retained to achieve separation distances.</p> <p>an existing residential area and siting to avoid development within the bushfire prone area (i.e., the Potential Impact Buffer) is not possible. However, the mitigation measures outlined in this BHAMP are sufficient to reduce the risk to a tolerable level (i.e., the level of risk is low enough to allow the exposure to the hazard to continue but high enough to require new treatments or actions to reduce this risk). These measures include:</p> <ul style="list-style-type: none"> • a minimum separation distance of 8.5m between the habitable buildings and bushfire prone vegetation; • establishment and ongoing management of an Asset Protection Zone (APZ) around the development; and • construction of the new buildings in accordance with the requirements for BAL-29 in AS3959:2018.

² Vulnerable uses are the following: childcare centre, community care centre, detention facility, educational establishment, hospital, nature-based tourism, relocatable home park, rooming accommodation, residential care facility, resort complex, retirement facility, tourist park.

Assessment Benchmarks (AB) for the Natural hazards, risk and resilience - Bushfire State Interest Applicable development – A DA for a MCU, RoL or Operational Works within bushfire-prone area		Compliance Assessment
		<p>To enhance bushfire mitigation measures the following actions will be undertaken:</p> <ul style="list-style-type: none"> • locates low fuel separation areas, such as roads, managed open spaces and large lots, to separate people from hazards, • design the development so that it does not hinder emergency service access and functions through active measures including: <ul style="list-style-type: none"> • ensuring sufficient access areas (e.g., via perimeter roads or fire trail and working areas) for firefighters and vehicles between assets and vegetation, • allowing for vegetation management and wildfire response to provide opportunities to establish control lines from which hazard reduction or backburning operations can occur, • allows safe access and egress routes, and • ensures water supply in both reticulated and non-reticulated areas.
<p>4</p>	<p>All natural hazard areas:</p> <p>Development supports, and does not hinder, disaster management response or recovery capacity or capabilities.</p> <p><i>Example of how a development may demonstrate compliance:</i></p>	<p>Complies with AB 4</p> <p>The development will have a suitable water supply and available pressure shall be in accordance with the standards specified by the relevant utilities provider to ensure supply and pressure is adequate for fire-fighting requirements.</p>

Assessment Benchmarks (AB) for the Natural hazards, risk and resilience - Bushfire State Interest		Compliance Assessment
Applicable development – A DA for a MCU, RoL or Operational Works within bushfire-prone area		
	To ensure emergency services can respond effectively, development is located within a reticulated water supply area or includes a dedicated static water supply that is available solely for fire-fighting purposes and can be accessed by fire-fighting vehicles.	In addition, the specified APZ shall provide defensible space and working area for fire-fighting.
5	<p>All natural hazard areas:</p> <p>Development directly, indirectly and cumulatively avoids an increase in the severity of the natural hazard and the potential for damage on the site or to other properties.</p>	<p>Complies with AB 5</p> <p>The development will not increase the severity or potential to damage to other property. The development layout sites elements that are least susceptible to fire between the premises and adjacent bushfire-prone vegetation. Landscaping treatments shall comprise only low threat vegetation (i.e., cultivated gardens and maintained lawn/turfed areas). No revegetation is required or proposed for any part of the site.</p> <p>Any fences installed shall be constructed of non-combustible or fire-retardant materials, with any installed gates to be freely accessed for fire-fighting purposes.</p>
6	<p>All natural hazard areas:</p> <p>Risks to public safety and the environment from the location of hazardous materials and the release of these materials as a result of a natural hazard are avoided.</p>	<p>Complies with AB 6</p> <p>The development is for a tourist park. No hazardous materials will be manufactured on site.</p> <p>Any hazardous chemicals on the premises will not be stored or handled in quantities that would exceed the threshold quantities specified by WorkSafe Queensland Storage and Handling Systems. These materials shall not present a risk to or impose upon emergency services when</p>

Assessment Benchmarks (AB) for the Natural hazards, risk and resilience - Bushfire State Interest Applicable development – A DA for a MCU, RoL or Operational Works within bushfire-prone area		Compliance Assessment
		<p>responding to an emergency or evacuation or present a risk to the environment as a result of release of these materials. Hazardous materials will not present an unacceptable risk to people, property and the environment.</p>
<p>7</p>	<p>All natural hazard areas:</p> <p>The natural processes and the protective function of landforms and vegetation that can mitigate risks associated with the natural hazard are maintained or enhanced.</p> <p>Where a requirement for an asset protection zone (or similar) exists:</p> <p>Landscaping treatments comprise only low threat vegetation, including grassland managed in a minimal fuel condition, maintained lawns, golf courses, maintained public reserves and parklands, vineyards, orchards, cultivated gardens, commercial nurseries, nature strips and windbreaks.</p> <p>OR</p> <p>Landscaping management maintains a potential available fuel load which is less than eight tonnes/hectare in aggregate, and fuel structure which is discontinuous.</p> <p>Note – The preparation of a landscape management plan undertaken in accordance with the methodology in the QFES Bushfire resilient</p>	<p>Complies with AB 7</p> <p>The development shall be sited within an asset protection zone (APZ) as described in Section 4.5.</p> <p>Landscaping treatments within this APZ shall comprise only low threat vegetation (i.e., cultivated gardens and maintained lawn/turfed areas). No revegetation is required or proposed for any part of the site.</p> <p>The APZ will be managed in accordance with the requirements outlined in Section 5 of this BMP. These management measures include landscape treatments and management to ensure low-combustibility and low fuel loads.</p>

Assessment Benchmarks (AB) for the Natural hazards, risk and resilience - Bushfire State Interest Applicable development – A DA for a MCU, RoL or Operational Works within bushfire-prone area		Compliance Assessment
	<p>communities document may assist in demonstrating compliance with this assessment benchmark.</p> <p>OR</p> <p>Development includes a bushfire management plan for the maintenance of any identified asset protection zone, including landscape design and ongoing vegetation management.</p>	

6. Conclusion

This report has been prepared to provide a site-specific bushfire hazard assessment and management plan for a proposed tourist park at 42, 44 and 53 Yarran Road, Barcaldine. The proposed use is determined as a vulnerable use under the State Planning Policy - Bushfire ('SPP guidance') (DSDMIP, 2019).

The results of the assessment show that vegetation on the site has a medium potential bushfire intensity. As the Barcaldine Shire Council Planning Scheme 2006 (Version 2) does not contain a Bushfire Overlay Code or other code for the management of bushfire the site-specific bushfire assessment provided in this plan has been undertaken in accordance with the BRC Technical Document (Queensland Fire and Emergency Services (QFES), 2019).

Where the hazardous vegetation is assessed to be medium or less there are no clear guidelines for separation distances in relation to vulnerable uses, therefore a separation distance that achieves BAL 29 or less is proposed.

All habitable buildings will need to be sited at least 8.5m from retained vegetation. Figure 5 illustrates the indicative separation distances which would need to be applied. All other vegetation within 150 m of the development site is not classified as bushfire-prone and therefore, calculation of radiant heat flux/bushfire attack level (BAL) is not applicable.

Bushfire management and mitigation measures to ensure safe premises have been outlined as part of a BMP for the site. These measures include the establishment and maintenance of an APZ. The development design provides for safe and efficient access and egress via an internal and external council roads, which allows for efficient access by fire-fighting and other emergency vehicles and safe and efficient egress for evacuation away from the most likely direction of bushfire attack.

The proposed development complies with State Planning Policy 2017 the requirements of the Barcaldine Regional Council Information Request (DA212021) Item 2.

7. References

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Appendix 1 Flamesol Method 2 Minimum Distance Calculations



Calculated June 2, 2021, 3:13 pm (MDC v.4.9)

Test

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	91	Rate of spread	1.21 km/h
Vegetation classification	Woodland	Flame length	9.27 m
Understorey fuel load	11.1 t/ha	Flame angle	53 °, 64 °, 72 °, 77 °, 79 ° & 84 °
Total fuel load	11.6 t/ha	Elevation of receiver	3.7 m, 4.16 m, 4.4 m, 4.51 m, 4.55 m & 4.6 m
Vegetation height	n/a	Fire intensity	7,264 kW/m
Effective slope	0 °	Transmissivity	0.883, 0.869, 0.848, 0.826, 0.8129999999999999 & 0.743
Site slope	0 °	Viewfactor	0.5939, 0.4363, 0.2924, 0.1983, 0.1611 & 0.0442
Flame width	100 m	Minimum distance to < 40 kW/m ²	7.7 m
Windspeed	n/a	Minimum distance to < 29 kW/m ²	10.5 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m ²	15.6 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m ²	22.7 m
		Minimum distance to < 10 kW/m ²	27.4 m

Rate of Spread - Mcarthur, 1973 & Noble et al., 1980

Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005



Calculated June 2, 2021, 3:15 pm (MDC v.4.9)

Test 2

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	91	Rate of spread	0.98 km/h
Vegetation classification	Woodland	Flame length	7.48 m
Understorey fuel load	9 t/ha	Flame angle	54 °, 64 °, 73 °, 78 °, 80 ° & 85 °
Total fuel load	9.1 t/ha	Elevation of receiver	3.02 m, 3.36 m, 3.57 m, 3.65 m, 3.68 m & 3.72 m
Vegetation height	n/a	Fire intensity	4,620 kW/m
Effective slope	0 °	Transmissivity	0.886, 0.875, 0.857, 0.836, 0.824 & 0.751
Site slope	0 °	Viewfactor	0.5842000000000001, 0.4343, 0.2906, 0.1954, 0.159 & 0.0436
Flame width	100 m	Minimum distance to < 40 kW/m ²	6.3 m
Windspeed	n/a	Minimum distance to < 29 kW/m ²	8.5 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m ²	12.7 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m ²	18.7 m
		Minimum distance to < 10 kW/m ²	22.8 m

Rate of Spread - Mcarthur, 1973 & Noble et al., 1980

Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005