Parking Scheme Review

Belongil Beach

80021089

Prepared for
Byron Shire Council

29 October 2021

Cardno

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1	22 June 2021	Draft 01	Shobhan Baranwal	Elizabeth Muscat Chris Slenders
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Table of Contents

Appendices

Tables

Figures

1 Introduction

1.1 Background and purpose

Cardno has been engaged by Byron Shire Council to undertake a review of the parking scheme, including provisions and performance, in the Belongil Beach area in Byron Bay, NSW.

The *Byron Bay Town Centre Masterplan* sets the vision and actions to enhance the town centre for people, outlining plans to shift car parking from the town centre to the periphery. This will result in demands radiating out of the CBD into fringe areas such as Belongil Beach. The purpose of this study is to investigate and understand the existing parking conditions to assist with identifying and developing recommendations to manage this as the Byron Bay Masterplan is implemented. Council is seeking to support the Masterplan through consideration of parking management controls such as paid parking or time limits.

Study objectives

The study objectives are to:

- Undertake an assessment of current on-street and off-street parking provisions in Belongil;
- Investigate and assess baseline parking conditions through:
  - Collecting parking survey data including utilisation and duration of stay;
  - Analysing parking survey data to establish the existing parking demand.
- Identify opportunities to achieve the Masterplan; and
- Develop an appropriate parking system to assist Council with managing parking demand across Byron Bay.

Transport objectives

The transport objectives of this project are to:

- Improve the efficiency of parking provisions;
- Promote the use of sustainable transport to reduce dependence on car use in the town centre; and
- Contribute to the management of parking demand across Byron Bay.

1.2 Scope and document overview

Key scope items included in the assessment are outlined in **Table 1-1**.

The recommendations are discussed immediately after the introduction. These provide the critical information and findings from the study.

The following sections and the Appendix Context Report document the work undertaken to develop the recommendations including background review, analytics, community input, options consideration and discussions.

Table 1-1 Key study tasks

Task	Purpose	Section
Recommendations	Identify recommendations for Council.	2
Existing transport provisions including site visit	Identify the existing transport network provisions. Observe and gather firsthand evidence of transport elements and travel behaviour: ▪ Active transport; ▪ Public transport; ▪ Road network; and ▪ Parking provisions.	2
Parking survey	Undertake parking surveys to assess parking demand and duration of stay.	4

Task	Purpose	Section
Issues and opportunities	Identify parking issues and opportunities for improvement.	5
Review background documentation	Understand local context and align recommendations of this study to overall vision, objectives and goals of the community of Bryon Shire Council.	Appendix (Context report)
Community inputs	Understand the needs and desires of the community	Appendix (Context report)
Discussion	Explore options to mitigate issues and realise opportunities.	Appendix (Context report)

1.3 Reference documents

The following documentation has been taken into consideration in the preparation of this assessment:

- Austroads Guide to Traffic Management Part 11: Parking (2020);
- AS2890 Parking Facilities;
- RTA Delineation Manual (2008);
- Austroads Guide to Pavement Technology (2009);
- Austroads Guide to Road Design Part 4: Intersections and Crossings (2021);
- Austroads Guide to Road Design Part 4B: Roundabouts (2021); and
- Austroads Guide to Traffic Management Part 8: Local Area Traffic Management (2016).

1.4 Study area

The focus of this study is the Belongil Beach area in Byron Bay, located approximately 900 to 1,800 metres west-northwest of the town centre. The study area, including all on-street and off-street parking locations included in the review, is shown in **Figure 1-1**.

Figure 1-1 Study area

2 Recommendations

Recommendations for the Belongil Beach study area are listed as short and longer term actions in **Table 2-1** and mapped in **Figure 2-1**, **Figure 2-2**, **Figure 2-3** and **Figure 2-4**. Their development has been informed by the issues identified in **Section 5** and the discussion in **Section 5 of Appendix A**. Details of the analysis are provided in the sections below.

Table 2-1 Recommendations

ID	Recommendation	Issue addressed
Short term		
REC-S-1	No Stopping signage	Parking within 10 metres of intersections.
REC-S-2	No Parking signage	Narrow carriageway width.
REC-S-3	Edgeline	Parking in the verge or on the footpath.
REC-S-4	Delineation linemarking (perpendicular)	Undesirable parking configurations.
REC-S-5	Marking dots (perpendicular)	
REC-S-6	Accessible parking spaces (2)	Lack of accessible parking.
REC-S-7	Motorcycle parking spaces (4)	Lack of designated motorcycle parking.
REC-S-8	Time limits	Uneven parking demand.
REC-S-9	Wheel stops	Vehicle overhang on footpath.
REC-S-10	Timber bollards	Lack of delineation and separation of parking area and open space.
REC-S-11	Geogrid pavement	Unsealed parking spaces.
REC-S-12	Mainintain vegetation	Vegetation reclaiming the road and reducing parking capacity.
REC-S-13	Footpath	Missing link in the active transport network.
REC-S-14	Shared path	No active transport connectivity to Byron Bay town centre.
REC-S-15	Raised pedestrian crossing	Lack of pedestrian crossing facility.
REC-S-16	Roundabout	Poor accessibility to eastbound on-street parking spaces.
REC-S-17	Kerb extensions	Lack of traffic calming devices.
REC-S-18	Destination signage	Lack of entry signage to define the area.
Long term		
REC-L-1	HPAA signage	High pedestrian volumes.
REC-L-2	Train station for the Byron Bay Solar Train	No public transport connectivity to Byron Bay town centre.

The following time limits have been recommended as shown in **Figure 2-1**:

- 2P in Zone H and Zone I;
- 4P in Zone J, Zone G and at Childe Street Car Park;
- 4P at the eastern end of Zone C;
- 4P at Border Street Car Park; and
- No time limit (all-day parking) everywhere else.

Figure 2-1 Recommendations – Parking (West)

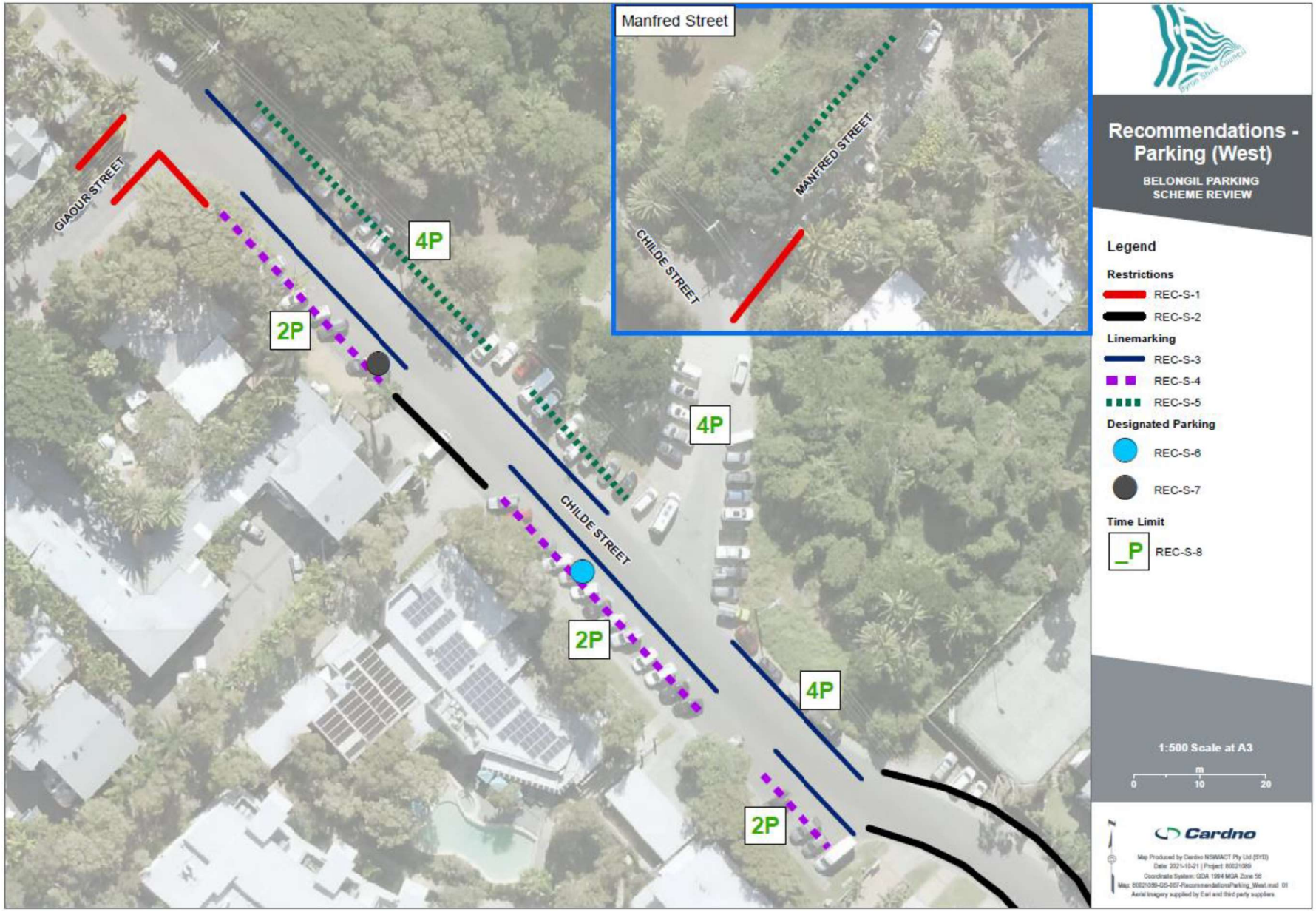


Figure 2-2 Recommendations – Parking (East)

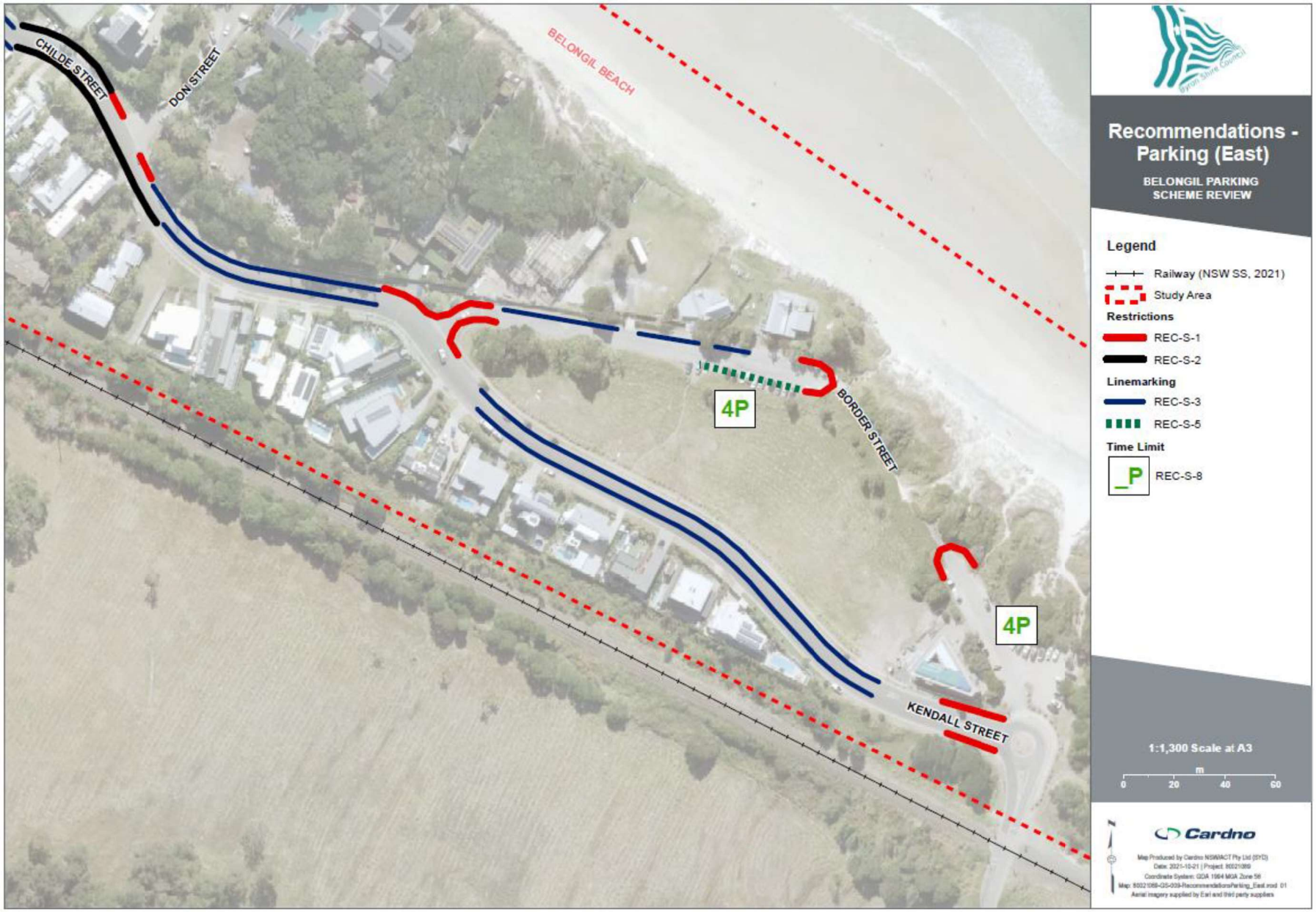


Figure 2-3 Recommendations – Supporting (West)

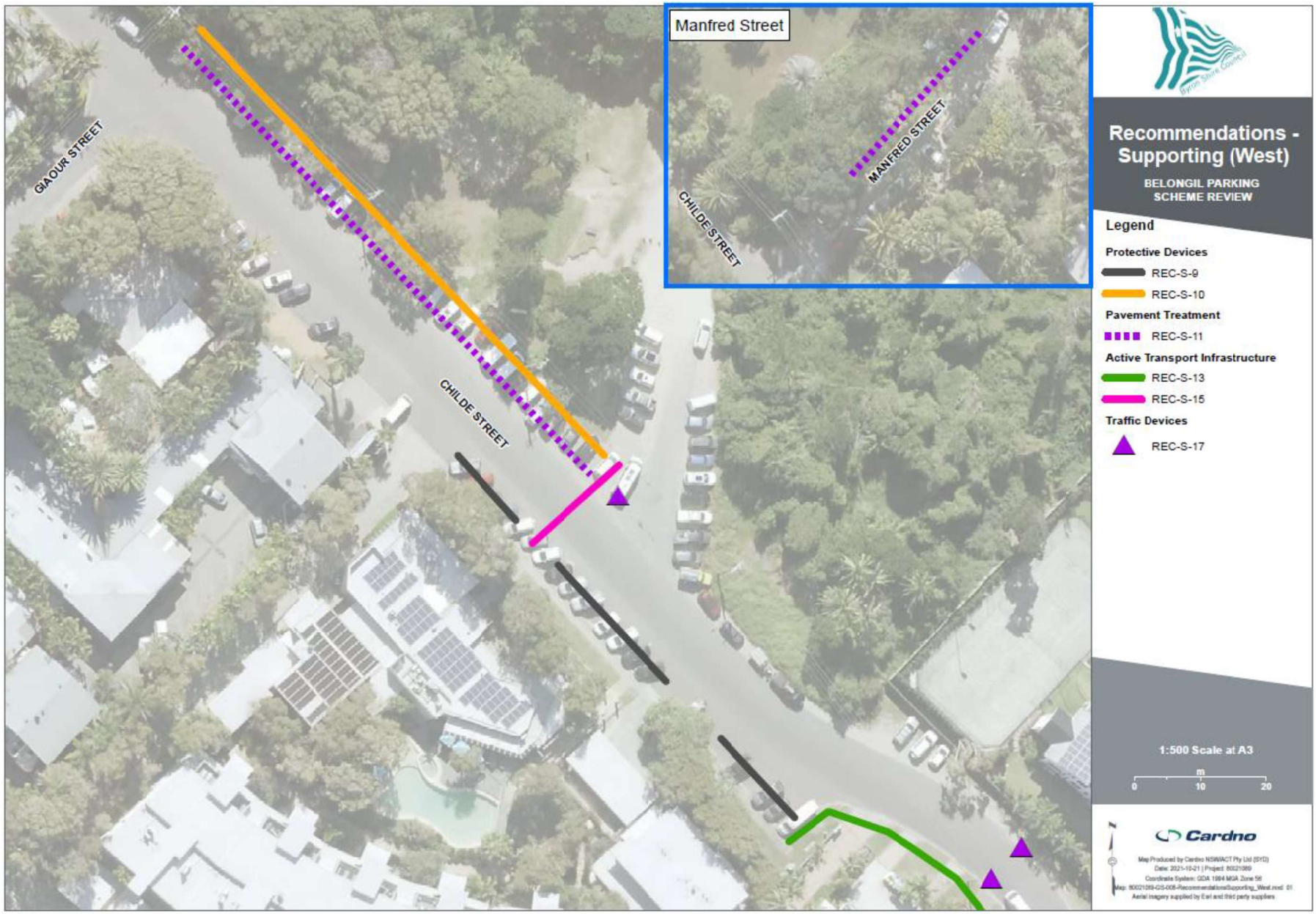


Figure 2-4 Recommendations – Supporting (East)

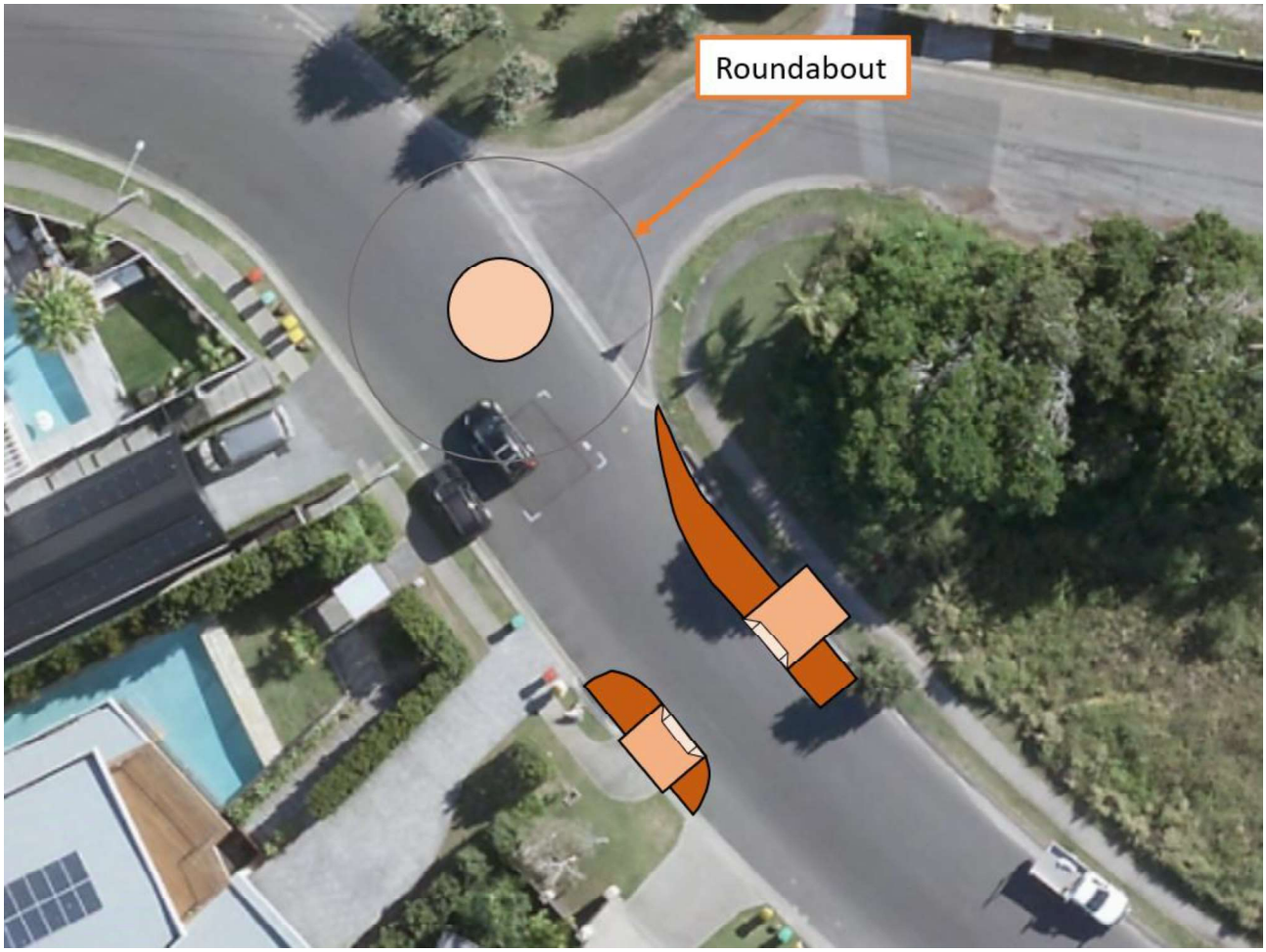
Recommendations have been made to:

- Spread parking demand more evenly throughout Belongil.
- Improve transport network safety through improved sight lines at intersections and traffic calming.
- Encourage higher turnover in high demand areas to support local businesses and provide opportunities for more people to access and enjoy the locality.
- Shift long term demand to less convenient parking locations.
- Provide pedestrian infrastructure to support the use of less convenient parking locations and to encourage more walking.
- Reduce the occurrence of illegal parking behaviours.

2.1 Pedestrian crossings

There is one pedestrian crossing facility provided in the study area. It consists of two kerb ramps. The provision of kerb extensions is recommended to reduce the crossing distance, improve sight distance and delineate and protect parallel parking areas. An example schematic plan of what this could look like is provided in **Figure 2-5**.

Figure 2-5 Roundabout and kerb buildouts at the intersection of Kendall Street and Border Street



A new pedestrian crossing has been recommended on Childe Street to facilitate pedestrian movements between Belongil Beach / Old Jetty Park and land uses to the south. This should be integrated with accessible car parking to reduce the loss of car parking spaces. Two location options have been provided in the form of example schematic plans in **Figure 2-6** and **Figure 2-7**. Option 2 incorporates converting Childe Street Car Park into an extension of Old Jetty Park and providing on-street car parking instead. This option utilises a vehicle access gate and bollards.

Figure 2-6 Childe Street pedestrian crossing – Option 1

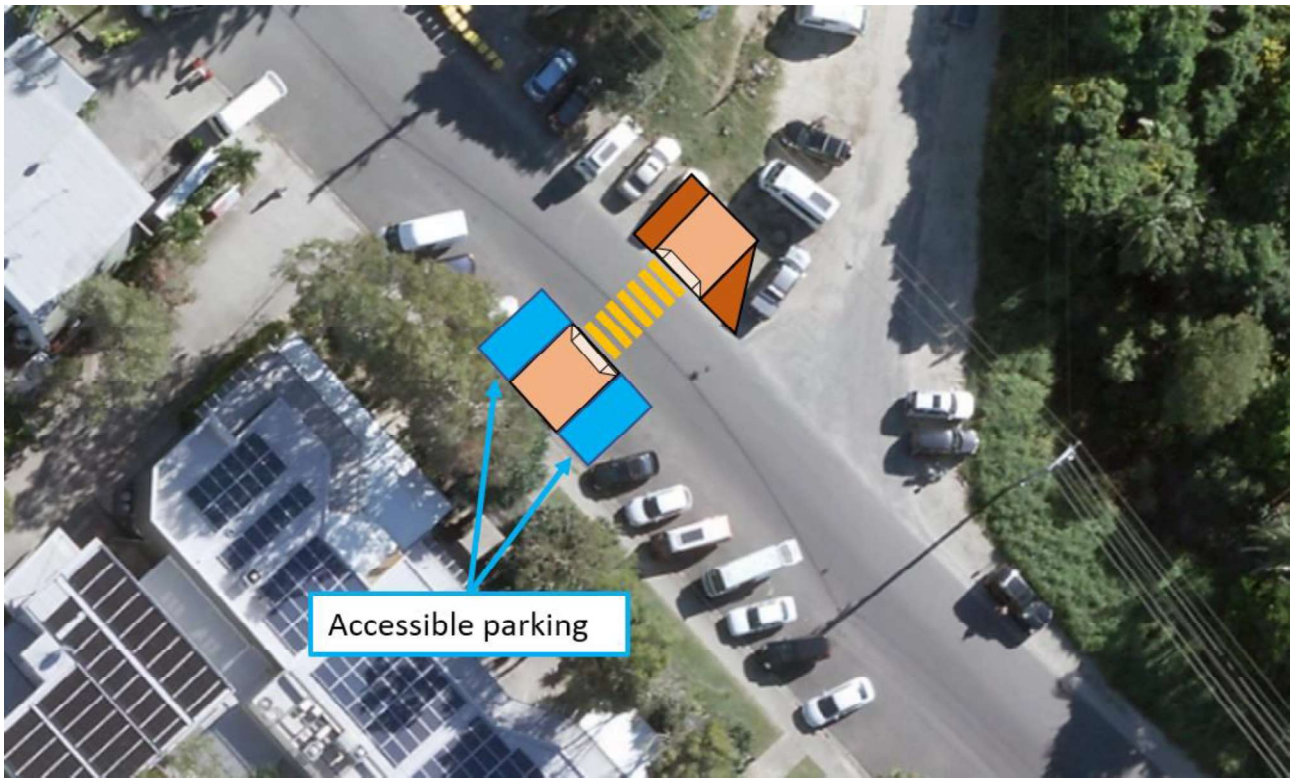
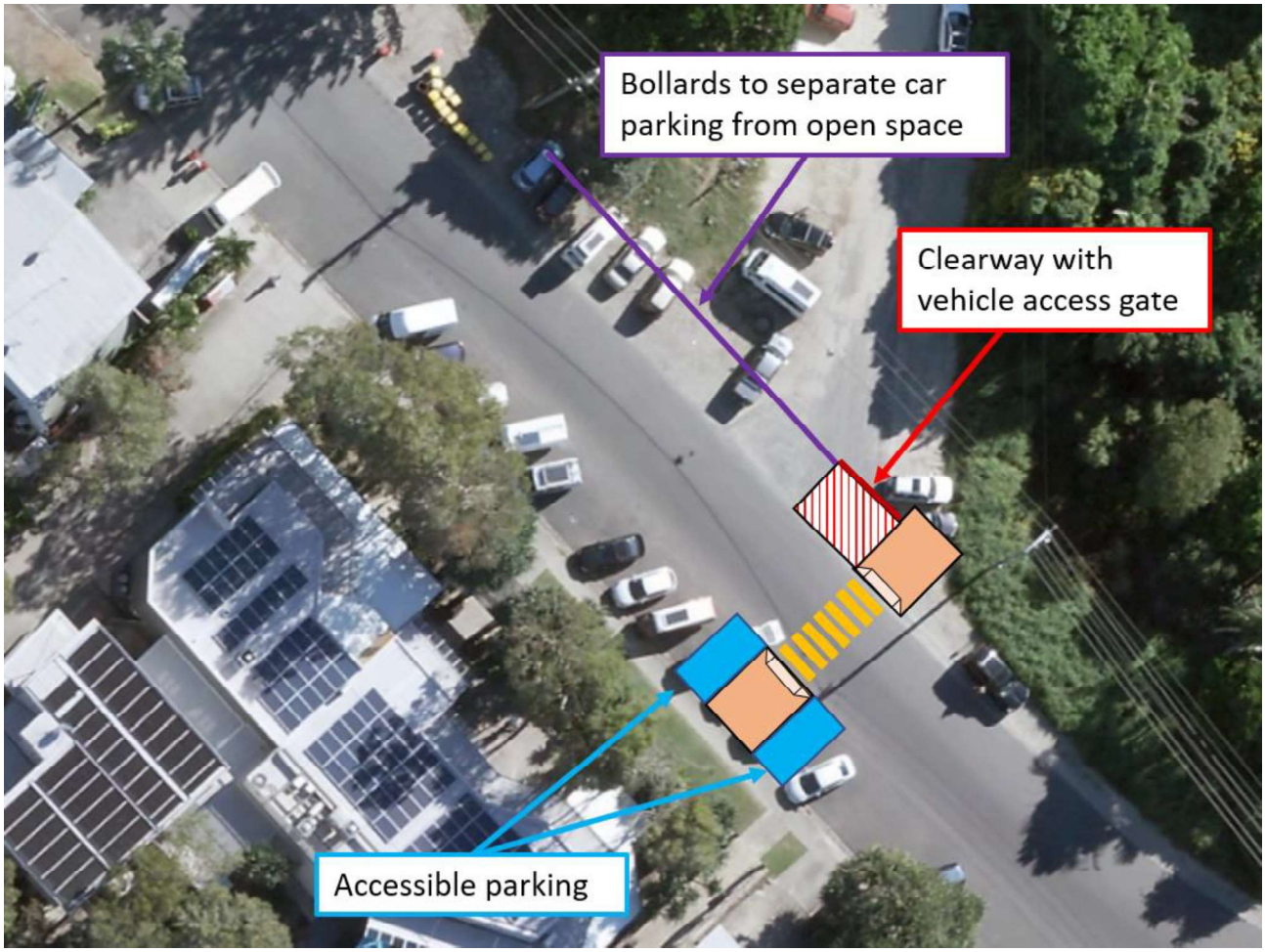


Figure 2-7 Childe Street pedestrian crossing – Option 2



The following sections and Appendix Context Report document the review, analysis, inputs and considerations that informed the development of the recommendations.

3 Transport provisions

The Belongil transport network generally accommodates multiple modes on or adjacent to the road network including pedestrians, cyclists, freight / delivery, private vehicles and parking. The area is enclosed as Childe Street is a no through road which narrows, making turning around difficult. A single vehicle access point is provided via Kendall Street. Kendall Street becomes Border Street and Childe Street as it continues west into the study area.

The following sections detail the condition of the transport networks and infrastructure provisions within and providing access to the study area.

3.1 Active transport

The active transport network in the Belongil Beach area is limited. Footpaths are provided on one side of the road along sections of Kendall Street, Border Street and Childe Street within the study area, although connectivity is not provided between Border Street and Childe Street. Pedestrians are generally accommodated in the verge and cyclists utilise the road carriageway.

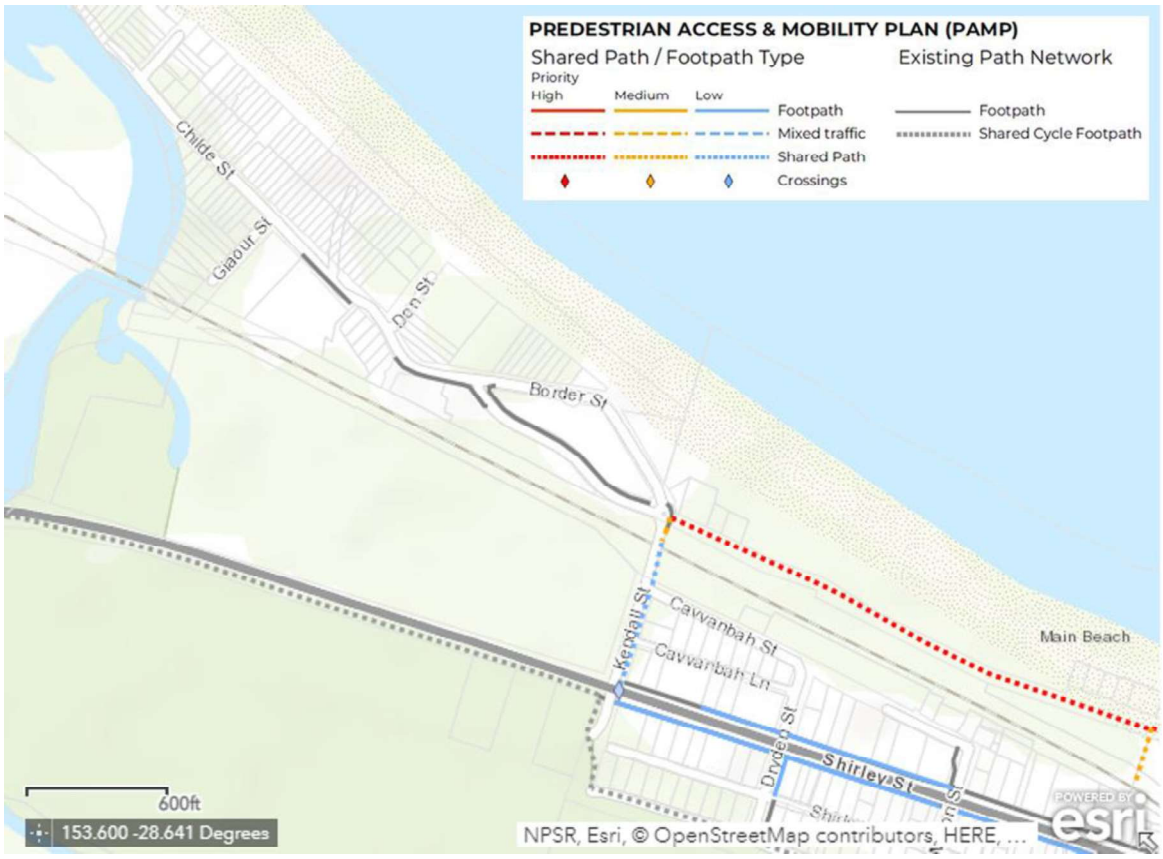
Council published a Pedestrian Access and Mobility Plan (PAMP) and Bike Plan for Byron Shire LGA in 2019. The walking network map from the PAMP is shown in **Figure 3-1**. Footpaths currently exist on both sides of Shirley Street, east of Kendall Street.

The cycling network map from the Bike Plan is shown in **Figure 3-2**. A shared path currently exists along the southern side of Ewingsdale Road, west of Kendall Street. The plans identify future active transport routes as shown in **Table 3-1**.

Table 3-1 Relevant planned active transport routes

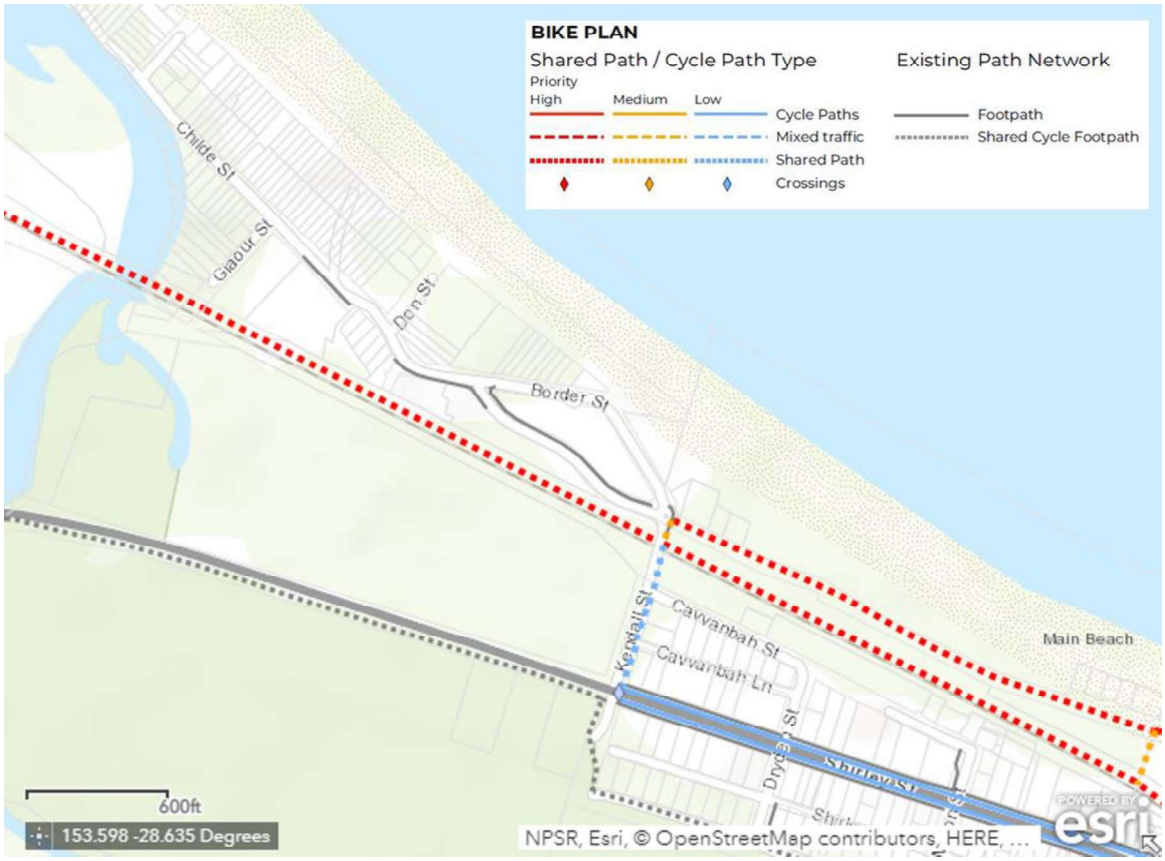
Route	Priority	Details/ connectivity
Foreshore shared path	High	880 metres of new shared path east from Kendall Street, along the beach foreshore. Would provide connectivity between Belongil and Main Beach via the car park at the northern end of Jonson Street.
Rail trail	High	Shared path along the rail corridor. This would provide connectivity between Byron Bay town centre and North Beach via Belongil.
Kendall Street north of railway	Medium	30 metres of shared path on the eastern side of Kendall Street from the rail corridor to the foreshore shared path.
Kendall Street south of railway	Low	175 metres of new shared path on the eastern side of Kendall Street between the rail corridor and Shirley Street. This will include a new crossing on the eastern leg of the Ewingsdale Road / Shirley Street and Kendall Street intersection.

Figure 3-1 Walking network



Source: Byron Shire PAMP, Byron Shire Council, 2019

Figure 3-2 Cycling network



Source: Byron Shire Bike Plan, Byron Shire Council, 2019

3.2 Public transport

The Belongil Beach area is currently not serviced by public transport. Buses operate in Byron Bay, although there are no routes that directly service or enter the study area.

Byron Bay Solar Train

The Byron Bay Solar Train utilises a three-kilometre section of the Murwillumbah railway line, providing services between North Beach station and Byron Beach station. It is located along the southern edge of the Belongil Beach study area. North Beach station services Elements of Byron Resort and land uses along Bayshore Drive. Byron Beach station services the town centre and Main Beach.

The not-for-profit passenger rail service is owned by Elements of Byron Resort and is operated by Byron Bay Railroad Company. The rail corridor is typically 40 metres in width and, along with rail infrastructure, remain the property of Transport for NSW. It includes a level crossing at Kendall Street and a railway bridge over Belongil Creek.

There is potential for:

- An additional railway platform site to service Belongil at the end of Giaour Street or near the Kendall Street roundabout; and
- A rail trail shared path along the corridor.

3.3 Road network

Roads are managed by an administrative framework of state, regional and local road categories. Classification is based on each road's connectivity and importance to the broader road network. State roads are managed and funded by Transport for NSW, and regional / local roads are managed and funded by councils. Roads that have a high freight task are generally assigned a state road classification. Regional roads perform an intermediate function and due to their network significance, Transport for NSW provides financial assistance to councils for the management of their regional roads.

All roads within the study area are classified as local roads and have an unposted speed limit of 50 kilometres per hour. Key roads within the Belongil study area are listed in **Table 3-2**.

Table 3-2 Belongil study area roads

Road name	Configuration
Kendall Street	One lane in each direction with no mid-block line markings. Unrestricted kerbside (parallel) parking available on both sides of the road.
Border Street	One lane in each direction with no line markings. Unrestricted kerbside (parallel and perpendicular) parking available on both sides of the road. Eastern end of the road is considered an off-street car park. The road pavement in the middle of Border Street has largely been reclaimed by vegetation as is signposted as a No Through Road from the Kendall Street roundabout and from the intersection with the western end of Kendall street.
Childe Street	One lane in each direction with no line markings. Unrestricted kerbside (parallel, perpendicular and angled) parking available on both sides of the road. Contains an off-street car park towards the beach.
Don Street	Narrow No Through Road with one lane providing two-way access with no line markings. Unrestricted kerbside (perpendicular and angled) parking available on both sides of the road (considered as an off-street car park).
Giaour Street	Narrow No Through Road with one lane in each direction with no line markings. Unrestricted kerbside (parallel) parking available on both sides of the road.
Manfred Street	Narrow No Through Road with one lane in each direction and no line markings. Unrestricted kerbside (perpendicular) parking available on the west side of the road and parallel parking available on the east side of the road.

3.4 Parking

The Belongil Beach study area provides over 300 publicly accessible car parking spaces in both on-street and off-street locations. Private parking provisions such as those for exclusive use of residents on residential properties are not considered for this assessment.

There are no publicly provided accessible car parking spaces or designated motorcycle parking spaces in the study area.

3.4.1 Restrictions

Public parking restrictions in the area are limited and drivers are allowed to park on the edge of the carriageway where no restrictions are marked, except for across driveways and within 10 metres on either side of an unsignalised intersection[1]. Parking is supported in the road shoulder where appropriate. Parking on the nature strip is illegal in NSW, however parking is allowed on road related areas that are specifically intended or constructed for the purpose of parking of vehicles[2].

No Parking (between 1:00am and 6:00am) restrictions are marked with signage in multiple locations near Belongil Beach to discourage overnight camping in vehicles. No Stopping signage is provided on the western side of Childe Street near the speed bump, preventing on-street parking as the road narrows approaching Manfred Street.

3.4.2 Configurations

Parking configuration in the area consists of a mix of parallel parking, perpendicular parking and front-to-kerb angled parking. No signage is provided to mandate parking configurations and motorists tend to park in configurations consistent with vehicles already parked. Angled parking and perpendicular parking is available where sufficient parking area is provided adjacent to the travel lane. No parking space delineation line marking is provided in the study area. This can reduce the car parking capacity as drivers tend to allow more space between adjacent vehicles than when spaces are line marked. The pavement in parking areas adjacent to the beach is generally covered in sand blown in by winds.

3.4.3 Study zones

The study area has been divided into 16 zones labelled from A to P to assist with data collection and analysis. Some zones have been further segmented to indicate defined parking spaces (due to driveways) and differing parking styles. ID codes have been assigned to each segment. Parking supply in the Belongil area is outlined in **Table 3-3**, with the zones displayed in **Figure 3-3**. Parking supply was determined through a desktop review of the study area and was confirmed during the on-site review of parking demand.

[1] https://roads-waterways.transport.nsw.gov.au/roads/safety-rules/parking/parking-rules.html
[2] https://roads-waterways.transport.nsw.gov.au/trafficinformation/downloads/ttd_2014-004.pdf

Figure 3-3 Parking areas

Table 3-3 Parking capacity and restrictions

Zone	Street	Segment	ID	Supply (spaces)	Observed configuration	Restrictions
On-street car parking areas						
A	Kendall	East 1	A1	10	Parallel	Unrestricted
		East 2	A2	1		
		East 3	A3	2		
		East 4	A4	2		
		West 1	A5	4		
		West 2	A6	1		
		West 3	A7	2		
		West 4	A8	2		
B	Kendall	-	B	28	Parallel	Unrestricted
C	Border	West	C1	8	Parallel	Unrestricted
		East	C2	15	Perpendicular	
D	Border	West	D1	8	Parallel	Unrestricted
		East	D2	6	Perpendicular	
E	Border/ Childe	-	E	17	Parallel	Unrestricted
F	Border	East	F1	10	Parallel	No Parking 1am – 6am
		West	F2	16	Perpendicular	
G	Childe	-	G	5	Perpendicular	No Parking 1am – 6am
H	Childe	East	H1	6	45-degree angle, front-to-kerb	Unrestricted
		Middle	H2	1		
		West	H3	14		
I	Childe	East	I1	1	45-degree angle, front-to-kerb	Unrestricted
		West	I2	12		
J	Childe	-	J	32	Perpendicular	No Parking 1am – 6am
K	Giaour	-	K	12	Parallel	Unrestricted
L	Giaour	-	L	10	Parallel	Unrestricted
M	Childe	-	M	7	Perpendicular and parallel	Unrestricted
N	Childe	-	N	9	Perpendicular and parallel	Unrestricted
O	Manfred	-	O	12	Perpendicular	No Parking 1am – 6am
P	Manfred	-	P	4	Parallel	Unrestricted
Sub-total				***257***		
Off-street car parking areas						
Border Street	Border	West	X1	12	Perpendicular	Unrestricted
		North	X2	13	Perpendicular and parallel	Unrestricted
		East	X3	7	Perpendicular	Unrestricted
Don Street	Don	West	Y1	3	45-degree angle, front-to-kerb	Unrestricted
		East	Y2	10	Perpendicular and parallel	No Parking 1am – 6am
Childe Street	Childe	West	Z1	10	Perpendicular	No Parking 1am – 6am
		East	Z2	13	Perpendicular	No Parking 1am – 6am
Sub-total				***68***		
Total public car parking				**325**		

4 Parking demand assessment

Parking surveys were undertaken to capture parking occupancy (utilisation) and duration of stay (DoS) data within the Belongil study area.

The parking surveys took place during the following times:

- Friday 21 May 2020, 8:00am – 4:00pm; and
- Saturday 22 May 2020, 8:00am – 4:00pm.

The times were selected in consultation with the project working group to capture peak parking demand for a typical weekday and weekend day at this time of the year. It is important to note that this time of year may not experience peak demand due to seasonal variations.

The study area experienced light rain on Friday afternoon and Saturday morning.

Esri Field Maps was utilised to record the quantity and registration number plates of vehicles parked in each segment every hour. Only the last three characters of number plates were recorded. Hourly surveys were conducted primarily within 30 minutes of the desired hour.

4.1 Observations

Parking demand was observed to be high on both survey days, especially near the beach. Many parking zones reached capacity on Saturday with some areas exceeding capacity due to informal and undesirable parking arrangements. Vehicles were observed to manoeuvre into small spaces, park close to other vehicles and park informally in areas where parking demand exceeded supply.

Zones A and B were primarily used for residential parking with some beachgoers parking in Zone A near the roundabout, shown in **Figure 4-1**. Some vehicles in Zone A parked halfway on the verge due to the mountable kerb, indicating motorists may have been unsure if on-street parking is permitted.

Zones C and D had parking demand concentrated in Segment C2 and Segment D2, at the eastern end of Border Street towards the beach. Vehicles were also parked in driveways in this location (**Figure 4-2**).

Figure 4-1 Beach parking demand in Segment A1

Figure 4-2 Parking in driveways in Segment D2

Zones E, F and G mainly experienced low parking demand. Zone G accommodated overflow demand from Childe Street car park and zones H and J. Parking in Zone F is shown in **Figure 4-3**.

Zones H, I and J were popular for parking and had a high turnover (**Figure 4-4**). These areas were close to capacity on both days and served surrounding trip generators including the beach and hospitality land uses.

Figure 4-3 Parking in Zone F

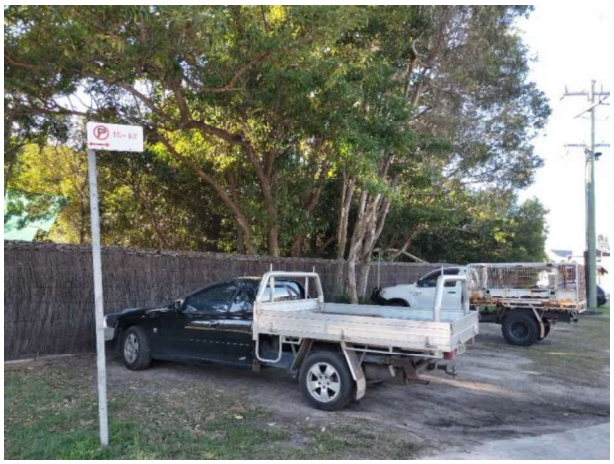


Figure 4-4 High demand in Zone J

Zones K and L supported restaurants and cafes in addition to residential parking for residents of Giaour Street. Parking on Giaour Street is shown in **Figure 4-5**.

Zones M and N were primarily used by the neighbouring land uses including residential properties and tourist accommodation. Parking in these zones primarily occurred in driveways (**Figure 4-6**) or grassed areas outside properties (**Figure 4-7**) as the road is too narrow to fully accommodate parking in the carriageway.

Zones O and P were highly utilised on both days as shown in **Figure 4-8**, and a popular parking location for surfers on Saturday morning. This area had the highest proportion of vehicles registered in Queensland.

Figure 4-5 Parking in zones K and L

Figure 4-6 Parking in driveways in Zone M

Figure 4-7 Parking in zones M and N

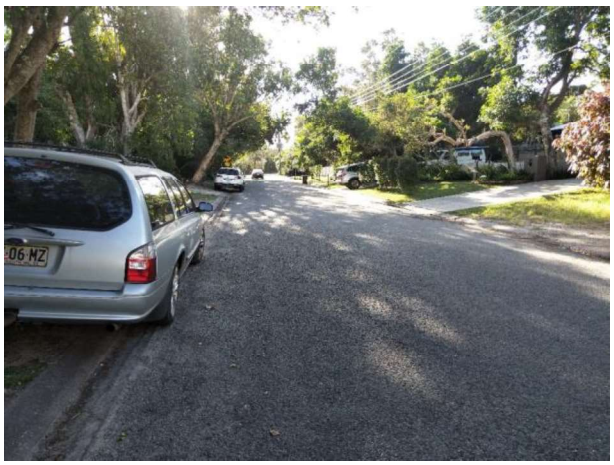


Figure 4-8 Parking in zones O and P

The off-street car parks were well utilised. Border Street and Childe Street (**Figure 4-11** and **Figure 4-12**) had high parking demand on both days. Some vehicles were parked at the Border Street car park for many hours although turnover was very high for the majority of spaces. The capacity of Childe Street car park was effectively reduced as drivers avoided parking on the sand at the northern end of the car park towards the beach.

Some vehicles were observed to be parked in the verge for convenience, even in places where on-street parking was available. Construction workers parked on the nature strip between zones F and D on Friday, as shown in **Figure 4-9**. This may be due to a lack of clear restrictions. In some cases, pedestrian access was blocked by informal parking, as seen outside *Wake Up! Byron Bay* where the hostel van was parked on the footpath (**Figure 4-10**).

Figure 4-9 Illegal parking on the nature strip between Zone F and Zone D

Figure 4-10 Van parked across the footpath in Segment I1 and blocking pedestrian access

On-street and off-street locations adjacent to the beach were utilised by a high proportion of vans as seen in **Figure 4-11** . Many beachgoers had their van doors or car boots open (**Figure 4-12**) for extended periods of time indicating day camping activities. These vehicles often remained parked for the majority of the day.

Figure 4-11 Childe Street off-street car park looking south

Figure 4-12 Childe Street off-street car park looking north

Informal parking signage was observed to be displayed in sections along Giaour Street. A traffic cone displaying “TREE LOADING” (**Figure 4-13**) was placed in the northern parking area of Zone K to reserve this area as an unofficial loading zone for *Treehouse on Belongil*. A sign was also seen displaying “RESIDENT PARKING ONLY” in Zone L (**Figure 4-14**).

Figure 4-13 Informal loading zone in Zone K

Figure 4-14 Informal parking restriction signage in Zone L

4.2 Occupancy

Hourly utilisation rates were calculated for each segment based on the capacity determined in **Section 3.4.3**. They survey findings are consistent with site observations, showing high utilisation of parking spaces adjacent to the beach and in the centre of the study area between Don Street and Giaour Street. Parking occupancy for the study area zones is shown in **Table 4-1** for Friday 21 May 2021 and **Table 4-2** for Saturday 22 May 2021.

Table 4-1 Parking occupancy by zone (Friday 21 May 2021)

Zone	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM
A	42%	33%	17%	21%	29%	29%	33%	25%	21%
B	4%	0%	0%	4%	0%	0%	4%	4%	0%
C	39%	48%	48%	26%	30%	26%	30%	26%	35%
D	29%	36%	43%	14%	14%	43%	43%	50%	50%
E	18%	18%	18%	35%	24%	35%	35%	18%	18%
F	23%	31%	27%	31%	27%	15%	27%	23%	19%
G	80%	60%	80%	20%	20%	20%	20%	40%	0%
H	81%	81%	81%	71%	67%	62%	48%	62%	48%
I	100%	77%	85%	85%	115%	108%	108%	100%	54%
J	81%	84%	75%	59%	63%	69%	50%	66%	53%
K	33%	25%	42%	42%	42%	42%	33%	42%	42%
L	50%	30%	40%	40%	50%	50%	50%	70%	70%
M	14%	29%	43%	43%	43%	57%	43%	57%	29%
N	0%	22%	22%	22%	11%	11%	11%	0%	11%
O	75%	67%	50%	33%	83%	75%	50%	58%	58%
P	50%	50%	25%	0%	0%	0%	0%	0%	0%
Border	56%	50%	75%	81%	81%	53%	56%	81%	88%
Don	77%	92%	92%	77%	69%	62%	54%	62%	92%
Childe	57%	52%	48%	26%	17%	30%	30%	52%	30%

Table 4-2 Parking occupancy by zone (Saturday 22 May 2021)

Zone	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM
A	25%	17%	21%	25%	17%	17%	21%	17%	17%
B	0%	0%	4%	7%	4%	4%	0%	0%	0%
C	52%	30%	30%	48%	26%	13%	13%	22%	22%
D	57%	57%	64%	29%	43%	57%	21%	29%	50%
E	29%	29%	24%	24%	24%	18%	18%	35%	24%
F	15%	8%	4%	8%	0%	0%	0%	0%	8%
G	20%	40%	120%	60%	20%	20%	100%	100%	60%
H	81%	76%	90%	76%	81%	90%	95%	76%	57%
I	123%	123%	108%	100%	100%	115%	123%	123%	77%
J	78%	100%	91%	81%	81%	103%	72%	66%	56%
K	67%	100%	75%	75%	75%	92%	100%	100%	75%
L	70%	70%	70%	60%	50%	50%	70%	90%	70%
M	43%	57%	43%	43%	29%	57%	71%	57%	43%
N	22%	22%	44%	44%	33%	100%	111%	100%	56%
O	100%	92%	92%	58%	58%	92%	92%	92%	33%
P	50%	25%	75%	50%	50%	0%	50%	75%	0%
Border	59%	91%	91%	103%	103%	91%	72%	59%	88%
Don	31%	23%	31%	54%	46%	15%	8%	38%	62%
Childe	52%	43%	61%	70%	57%	52%	43%	43%	48%

Parking occupancy data revealed the following findings:

- Zones A, E and F had low parking demand on both days.
- Zone B was severely underutilised.
- Zones C and D were highly utilised in the eastern segments and underutilised to the west.
- Zone G was highly utilised on Friday morning and reached capacity more than once on Saturday (on either side of noon). Demand here exceeded capacity at 10:00am on Saturday.
- Zone H was highly utilised on both days and was close to capacity on Saturday.
- Zone I was the most highly utilised parking zone. It repeatedly exceeded capacity on both days as cars parked too close to the intersection with Giaour Street.
- Zone J was highly utilised on both days and reached capacity on Saturday, exceeding capacity once.
- Zone K had low demand on Friday and was highly utilised on Saturday, reaching capacity.
- Zone L was highly utilised on Saturday.
- Zone M was moderately utilised on both days.
- Zone N was close to empty on Friday but well utilised on Saturday, reaching and exceeding capacity in the afternoon period.
- Zone O was well utilised on both days and demand was high in the morning and the afternoon. Parking was highly utilised on Saturday and reached capacity in the morning.
- Zone P was well utilised on Friday morning and highly utilised on Saturday.
- Border Street off-street car park was highly utilised on both days, exceeding capacity on Saturday.
- Don Street off-street car park was highly utilised on Friday and had low parking demand on Saturday.
- Childe Street off-street car park has low parking demand on Friday and was well utilised on Saturday.

4.2.1 Precincts

The zones have been aggregated into precincts for further analysis as shown in **Table 4-3** and mapped in **Figure 4-15**. Supply and demand curves for both days are shown for each precinct on the following pages.

Table 4-3 Parking precincts

ID	Precinct name	Zones included	Supply and demand figure
1	Kendall Street	A and B	**Figure 4-16**
2	Border Street East	C and D	**Figure 4-17**
3	Border Street West	E and F	**Figure 4-18**
4	Childe Street East	G, H, I and J	**Figure 4-19**
5	Giaour Street	K and L	**Figure 4-20**
6	Childe Street West	M and N	**Figure 4-21**
7	Manfred Street	O and P	**Figure 4-22**
8	Border Street Car Park	Border Street Car Park	**Figure 4-23**
9	Don Street Car Park	Don Street Car Park	**Figure 4-24**
10	Childe Street Car Park	Childe Street Car Park	**Figure 4-25**

The overall Friday and Saturday supply and demand curves for the Belongil Beach study area are shown in **Figure 4-26**.

Figure 4-15 Parking precincts

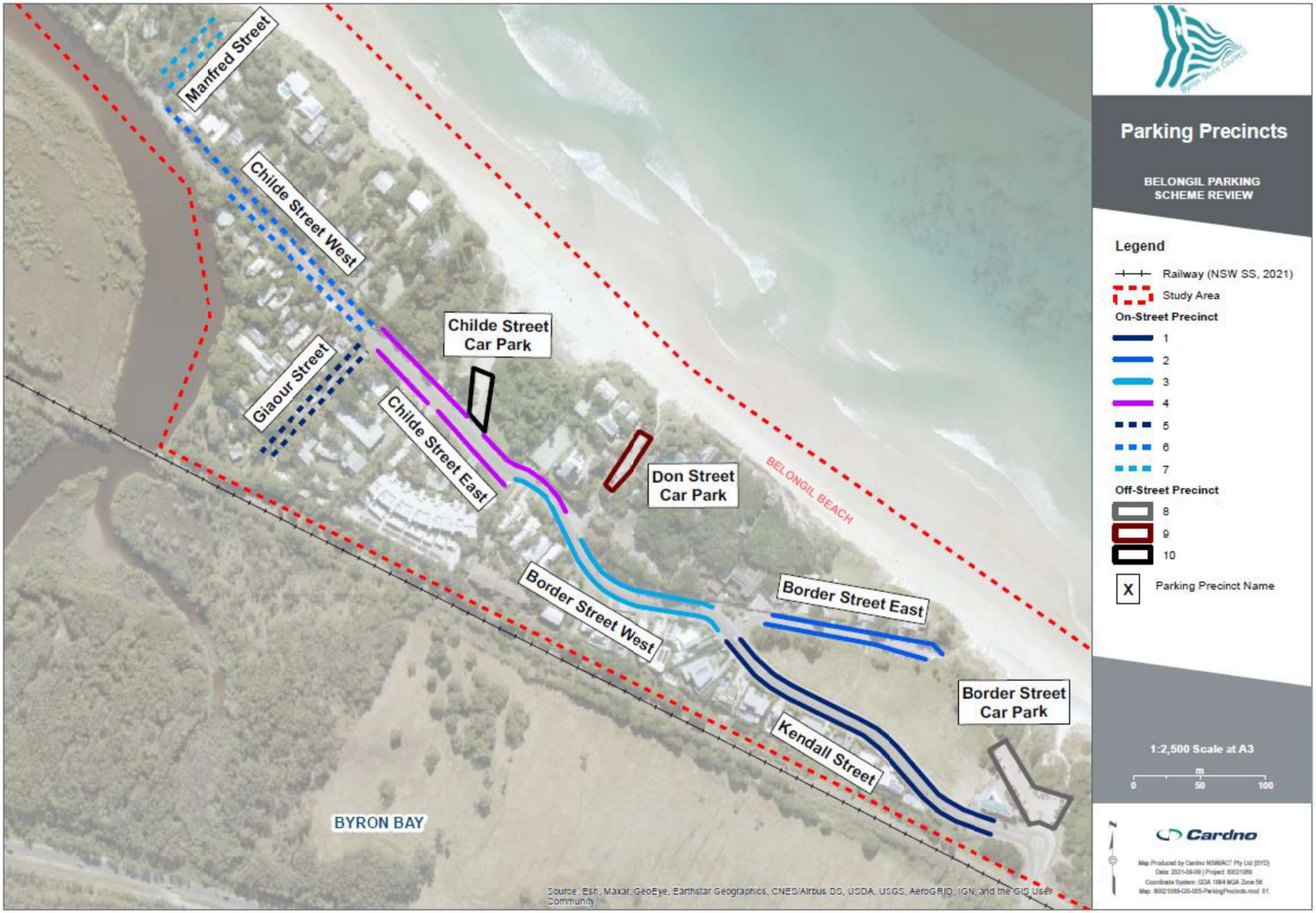


Figure 4-16 Kendall Street precinct utilisation

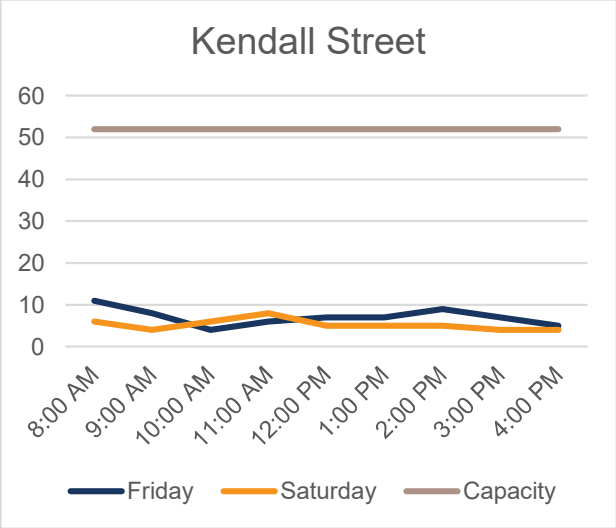


Figure 4-17 Border Street E (On-Street) precinct utilisation

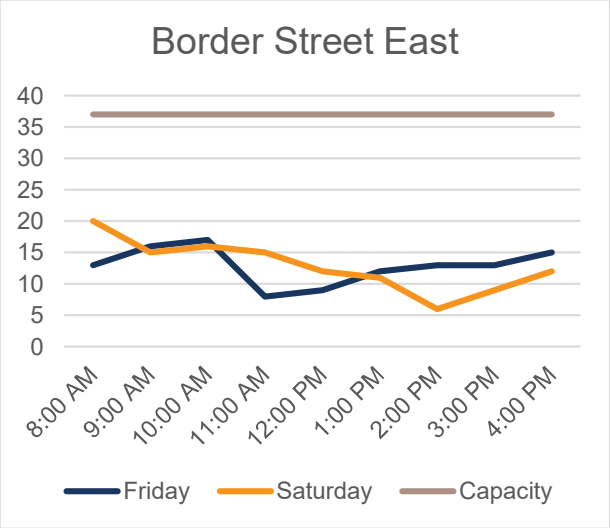


Figure 4-18 Border Street W (On-Street) precinct utilisation

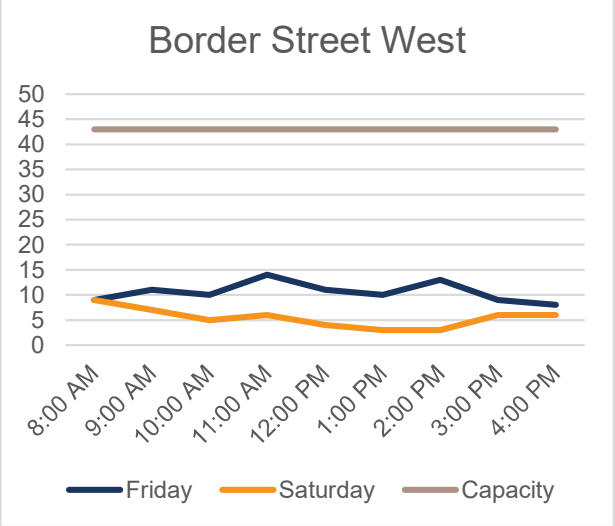


Figure 4-19 Childe Street E (On-Street) precinct utilisation

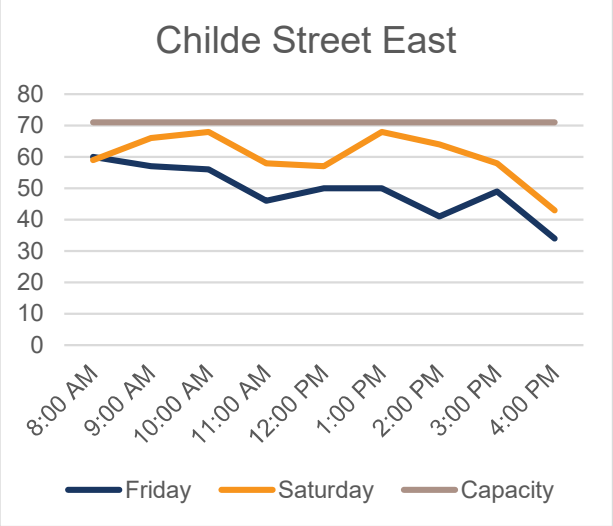


Figure 4-20 Giaour Street precinct utilisation

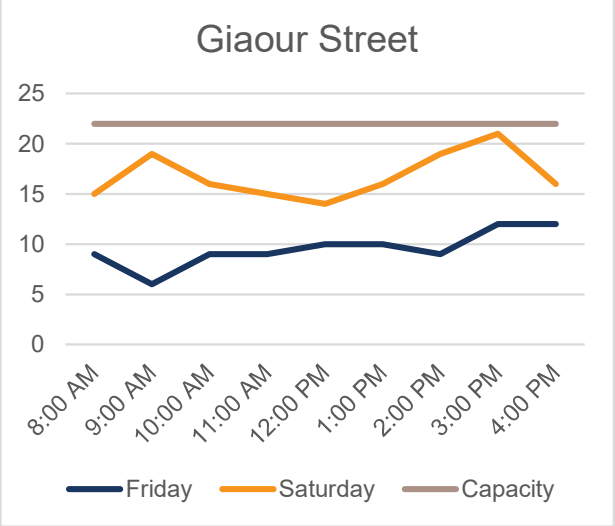


Figure 4-21 Childe Street W (On-Street) precinct utilisation

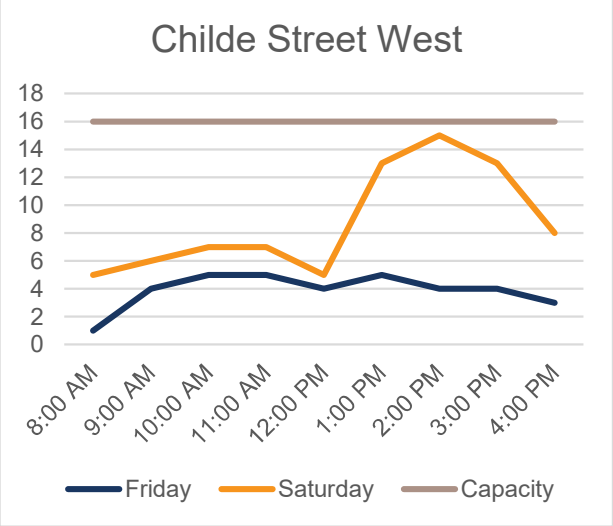


Figure 4-22 Manfred Street precinct utilisation

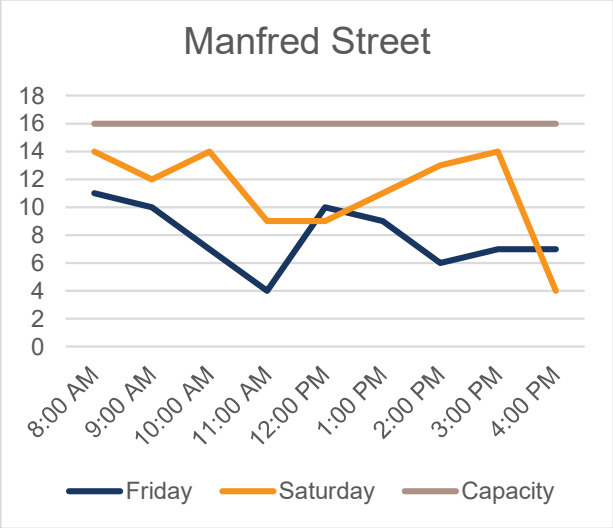


Figure 4-23 Border Street (Off-Street) precinct utilisation

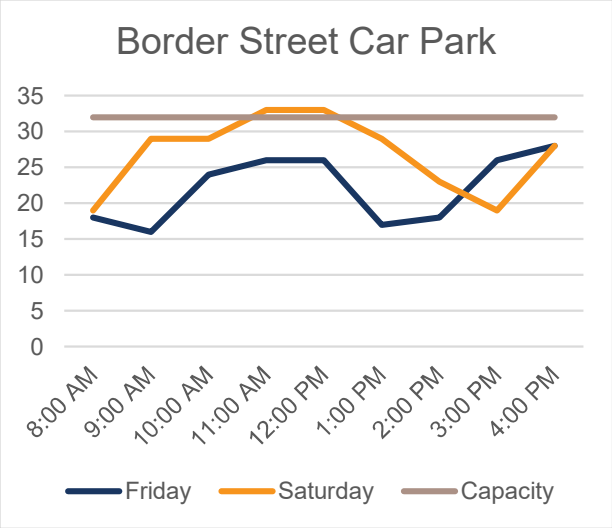


Figure 4-24 Don Street (Off-Street) precinct utilisation

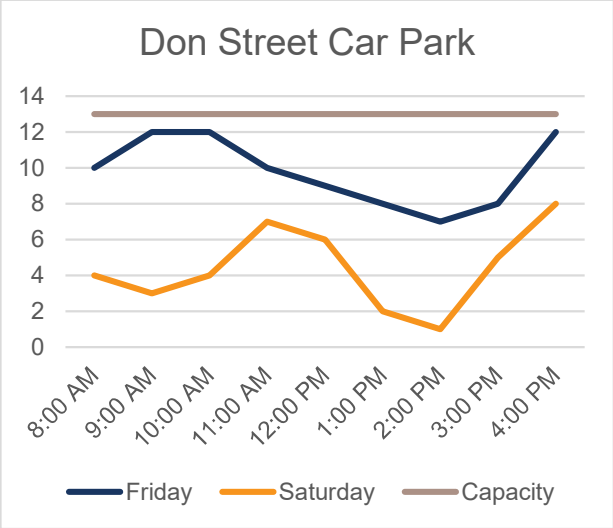


Figure 4-25 Childe Street (Off-Street) precinct utilisation

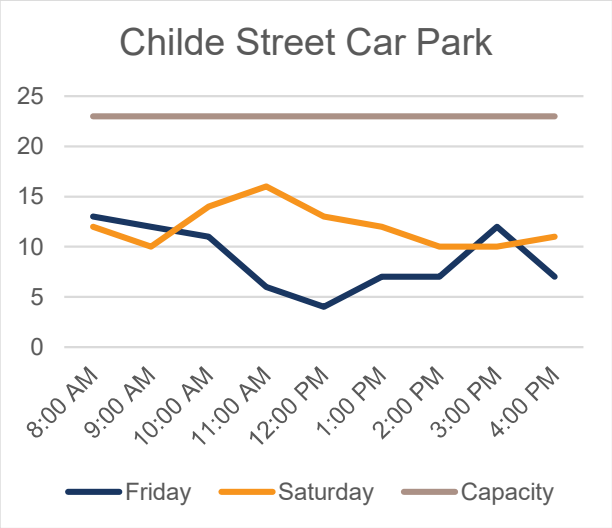
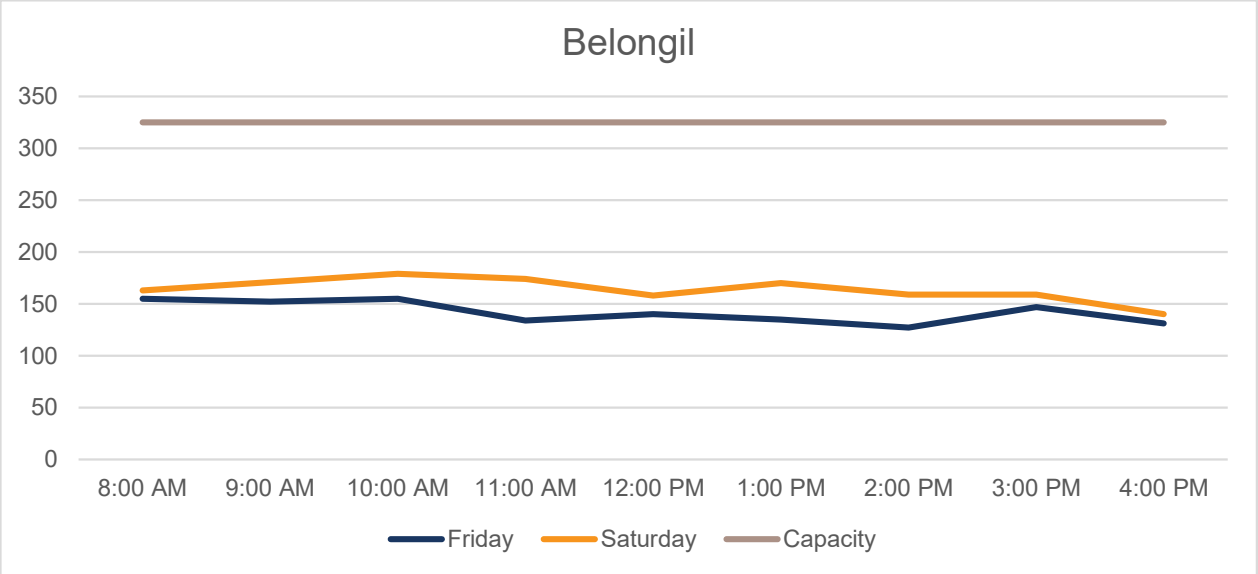


Figure 4-26 Belongil study area utilisation



On-street

Analysis of each precinct highlights that on-street parking utilisation was significantly low in the Kendall Street and Border Street West precincts. Parking demand was higher on Friday than Saturday in these areas and excess supply was available. Utilisation in Border Street East was also relatively low as parallel parking spaces near the intersection with Kendall Street were underutilised.

Childe Street East was well utilised on both surveyed days. Demand was higher on Saturday than on Friday. Giaour Street exhibited similar parking utilisation, although demand on Friday was significantly lower than on Saturday. Both precincts reached close to capacity on Saturday with two periods of high demand, either side of noon.

Childe Street West was underutilised on Friday and experienced greater demand on Saturday. Afternoon demand was high and demand in the precinct peaked at 2:00pm, almost reaching capacity.

Manfred Street exhibited parking demand consistent with that expected for a beach car park. Demand was high in the morning and from noon on Friday, indicating beachgoers may utilise this car park before work, during lunch breaks and after work. Utilisation was higher on Saturday, almost reaching capacity in the morning and afternoon. Demand reduced in the middle of the day on Saturday, indicating beachgoers may have left to get lunch.

Off-street

Border Street Car Park was highly utilised on both surveyed days. This aligns with expectations at is the first Car Park and is highly visible when entering the Belongil Beach area. Parking demand was high before noon and after 3:00pm on Friday. Demand was higher on Saturday and exceeded capacity at 11:00am and 12:00pm.

Don Street Car Park was well utilised on Friday. Demand was high in the morning, decreased in the middle of the day and increased again from 3:00pm. Saturday experienced significantly lower parking demand although it experienced utilisation peaks in the middle of the day and towards the end of the survey period. This may indicate that this carpark is primarily used for residential parking with some demand from beachgoers.

Chile Street Car Park experienced higher demand across Saturday then on Friday. Demand was high on Friday in the morning and in the afternoon, dipping significantly in the middle of the day. Saturday demand peaked at 11:00am. Utilisation on both days was around half of the available capacity. This may indicate that the northern end of the car park is not being utilised due to the amount of sand covering the parking area.

Overall

Parking spaces in the Belongil Beach study area were at around 50 per cent utilisation across the survey period. Demand was slightly higher on Saturday than Friday and was relatively stable across both days.

Significant excess capacity was available on both days, even though some parking areas exceeded capacity. This indicates that parking demand in the study area is uneven and concentrated in different areas at different times. There is an opportunity to spread demand across the Belongil Beach area to reduce stress on popular parking locations through the provision of formalised parking and supporting active transport to increase the desirability of parking areas.

4.3 Duration of stay

Duration of stay data was analysed to provide insight into the amount of time cars were parked in each space. The duration of stay proportions for parked vehicles in each study area zone are shown in **Figure 4-27** for Friday 21 May 2021 and in **Figure 4-29** for Saturday 22 May 2021. Overall duration of stay values and percentages for the study area are shown in **Figure 4-28** for Friday 21 May 2021 and **Figure 4-30** for Saturday 22 May 2021.

An additional parking zone, Zone Q, has been added to present the duration of stay data for illegal parking observed on the nature strip between Zone F and Zone D. Zone Q is the northern-western verge of Border Street at the intersection with Kendall Street, outside 10 Border Street, Byron Bay.

To help understand **Figure 4-27** below, approximately 36 per cent of vehicles parked in Zone A stayed for up to one hour, approximately 36 per cent stayed between one and two hours, approximately five per cent stayed between two and three hours and approximately 23 per cent stayed for four hours or more.

4.3.1 Friday 21 May 2021

Figure 4-27 Duration of stay by zone (Friday 21 May 2021)

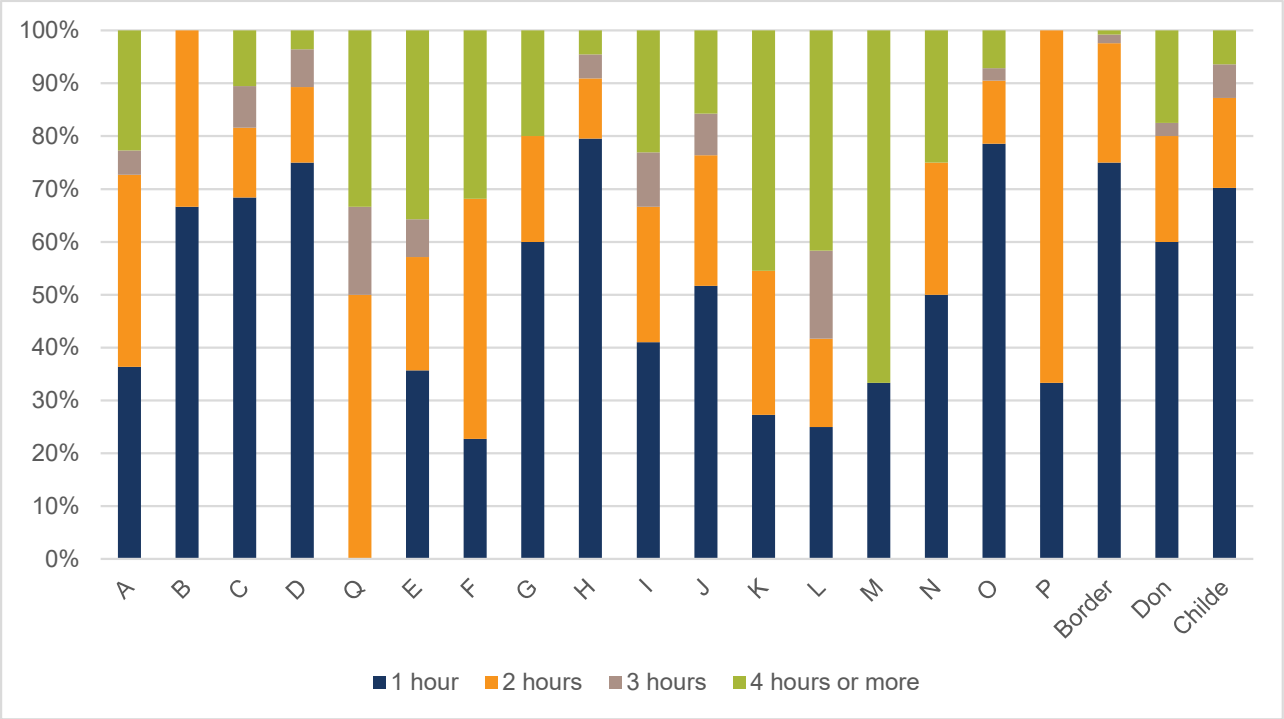
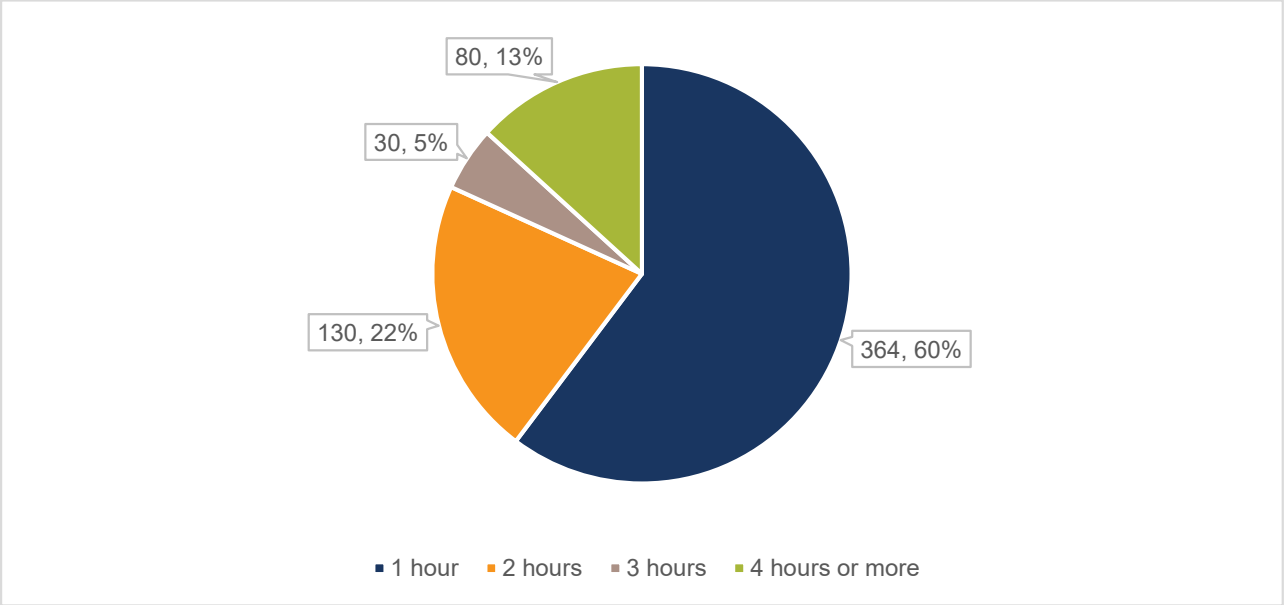


Figure 4-28 Duration of stay for the Belongil study area (Friday 21 May 2021)



Significant long-stay parking was exhibited in zones Q, E, F, K, L and M on Friday. Demand in Zone Q was observed to be primarily from construction workers from the construction site at 8 Border Street, Byron Bay. Long stay parking in zones E, F and M may indicate parking demand from residents. Similarly, zones K and L may indicate long-stay parking demand from residents and employees.

High proportions of one-hour parking demand was experience on Friday by zones B, C, D, G, H, J and O, as well as all three off-street car parks. The high turnover in these areas is as expected as they support parking demand generated by Belongil Beach and hospitality land uses.

A total of 604 parking stays were recorded during the surveyed Friday. Of those, 60 per cent of all parking demand was for one-hour parking. The least popular duration of stay was between three and four hours.

4.3.2 Saturday 22 May 2021

Figure 4-29 Duration of stay by zone (Saturday 22 May 2021)

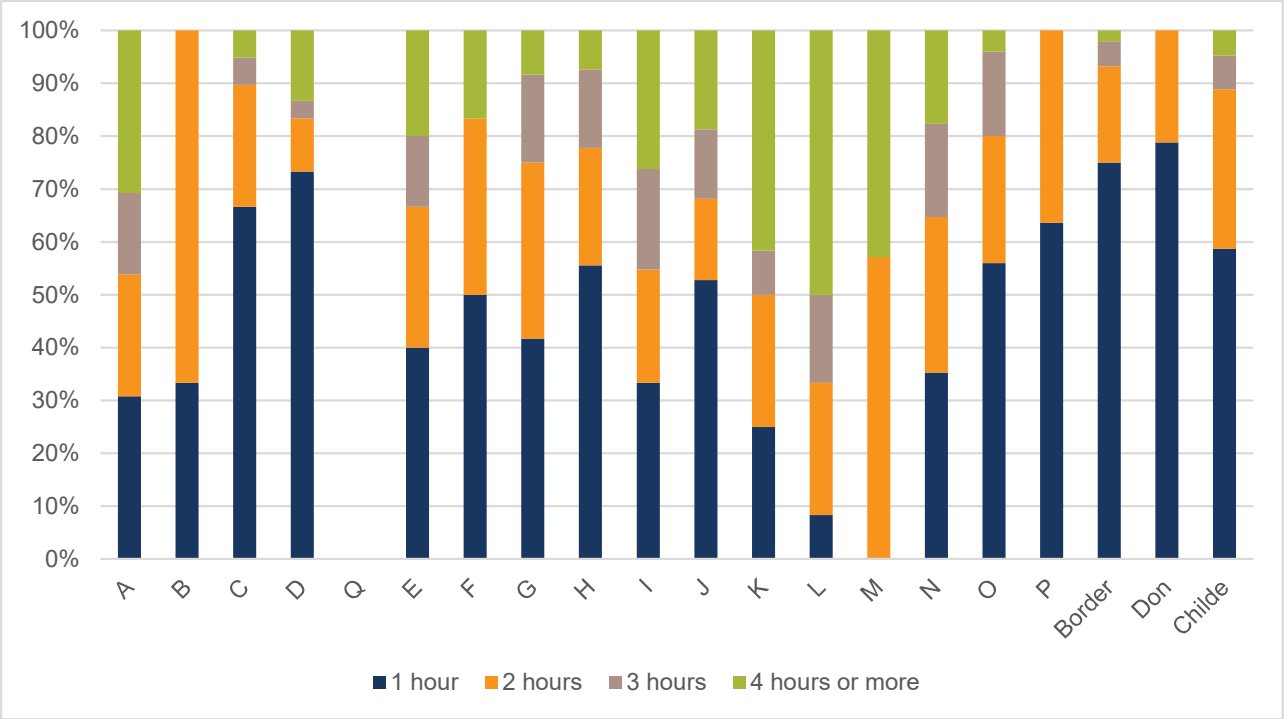
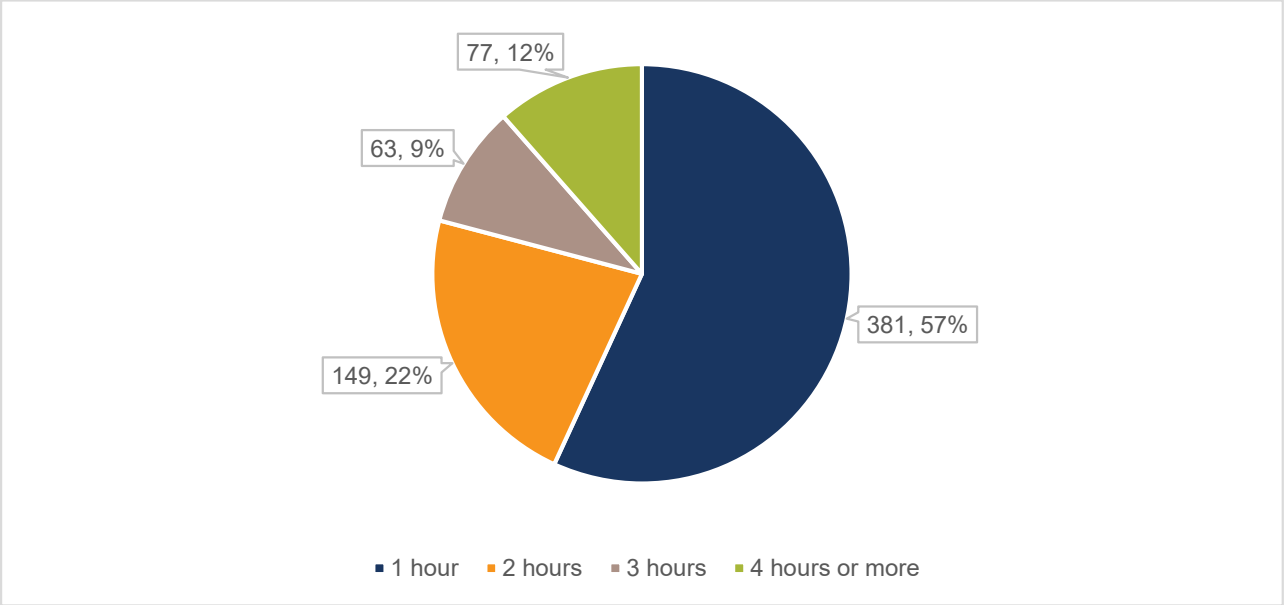


Figure 4-30 Duration of stay for the Belongil study area (Saturday 22 May 2021)



Long-stay parking demand was still high on Saturday in zones K, L and M. Zone Q had no demand, indicating the construction workers did not work on Saturday. Zones E and F had an increase in short-stay parking compared to Friday.

One-hour parking demand was high on Saturday in zones that exhibited high turnover on Friday apart from Zone B, where there was a high demand for two-hour parking.

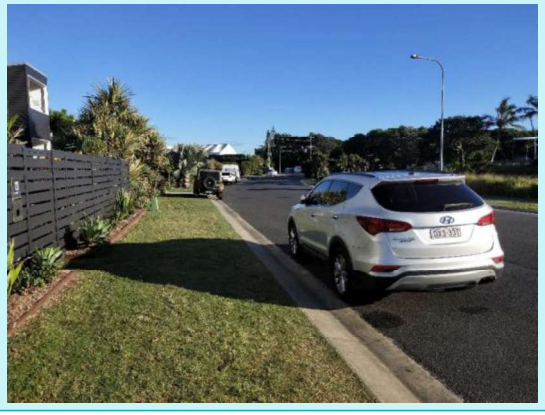
The data indicates that there is a high demand for short-stay parking at the three off-street car parks. The duration of stay of beach parking including at these areas and zones B, O and P is primarily less than three hours.

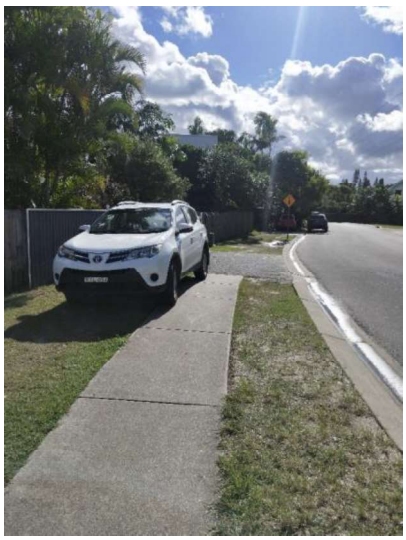
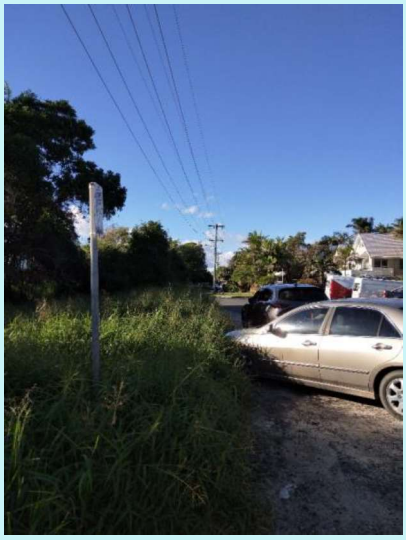
A total of 670 parking stays were recorded during the surveyed Saturday. Of those, 57 per cent of all parking demand was for one hour parking. The least popular duration of stay was between three and four hours. Two-hour parking demand remain unchanged between both days while three-hour parking demand was higher on the Saturday.

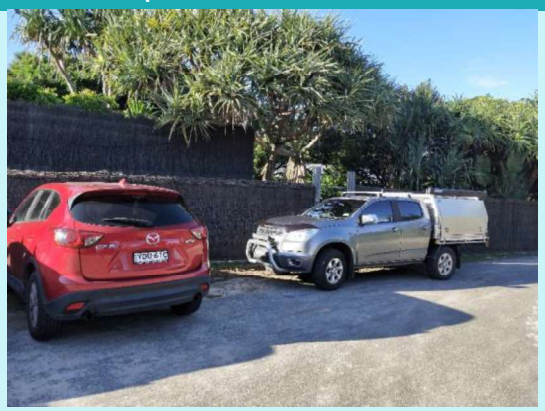
5 Issues and potential mitigation measures

A summary of issues and potential mitigation measures is shown in **Table 5-1** and mapped in **Figure 5-1**.

Table 5-1 Issues and opportunities

ID	Issue	Photo example	Potential mitigation
ISS-1	Illegal parking within 10 metres of intersection		▪ Formalised parking spaces ▪ No stopping signage ▪ Parking space delineation line marking
ISS-2	Illegal parking in the verge	  	▪ Non-mountable kerb ▪ Formalisation of parking spaces ▪ No Parking signage ▪ Yellow linemarking clearway restrictions ▪ Landscaping

ID	Issue	Photo example	Potential mitigation
ISS-3	Parking on the footpath when on-street parking is available		▪ Non-mountable kerb ▪ Formalisation of parking spaces ▪ Parking space delineation line marking
ISS-4	Incomplete pedestrian network makes some parking locations less desirable, encouraging uneven parking demand		▪ Provide active transport infrastructure to support the study area and connect parking areas to land uses
ISS-5	Lack of accessible parking spaces	N/A	▪ Provide accessible parking in an appropriate location
ISS-6	Mix of parking configurations		▪ Clear signage ▪ Formalisation of parking spaces ▪ Parking space delineation line marking

ID	Issue	Photo example	Potential mitigation
			
ISS-7	Parking demand exceeding capacity		▪ Introduce time limit restrictions on parking to distribute demand.
ISS-8	Parking spaces underutilised	N/A	▪ Introduce time limit restrictions on parking to distribute demand.
ISS-9	Damaged parking restriction signage		▪ Maintenance of assets
ISS-10	Informal parking due to unclear restrictions		▪ Formalise parking to provide clarity and reduce undesirable parking arrangements

ID	Issue	Photo example	Potential mitigation
ISS-11	Overnight camping affecting residents through undesirable behaviour such as noise, littering and dumping of waste	N/A	▪ Signage ▪ Increased enforcement of parking restrictions ▪ Car park gates
ISS-12	Encroachment of roadway by landscaping from private properties reducing available space for parking and manoeuvring	N/A	▪ Communicate property boundaries ▪ Reclaim the roadway ▪ Provide linemarking
ISS-13	Sand blown in from the beach, covering parking spaces		▪ Build walls to block sand blowing in (sandbreak / sand fence) subject to environmental assessment ▪ Regular maintenance
ISS-14	Verge reclaiming the road, reducing parking capacity		▪ Trim back vegetation to reveal the road underneath ▪ Regular maintenance
ISS-15	Overgrown vegetation growing into parking spaces		▪ Trim back vegetation to provide clearance for vehicle parking ▪ Regular maintenance

Figure 5-1 Summary of parking issues and general findings