TRAFFIC IMPACT ASSESSMENT

Hubble Traffic

August 2022

PROPOSED SUBDIVISON, LOT 2 RHEBAN ROAD, ORFORD

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1. Introduction

Neil Shephard & Associates has engaged Hubble Traffic Consulting to prepare an independent Traffic Impact Assessment, to consider the traffic impacts from the provision of a 90 Lot residential subdivision (development site) at Lot 2 Rheban Road, Orford.

This assessment has considered the amount of traffic this subdivision is likely to generate, and how additional traffic movements will enter and leave the site in an efficient manner, using two new junctions onto Rheban Road.

This report has been prepared to satisfy the requirements of Austroads, Guide to Traffic Management Part 12: Traffic Impacts of Developments 2019. This assessment has referred to the following information and resources:

- Tasmanian Planning Scheme (Glamorgan Spring Bay)
- Road Traffic Authority NSW (RTA) Guide to Traffic Generating Developments
- Australian Standards AS2890 parts 1, 2 and 6
- Austroads series of Traffic Management and Road Design
    - Part 4: Intersection and crossings, General
    - Part 4a: Unsignalised and Signalised Intersections
    - Part 12: Traffic Impacts of Development
- Department of State Growth crash database
- Department of State Growth traffic database
- LIST land information database
- Google Maps

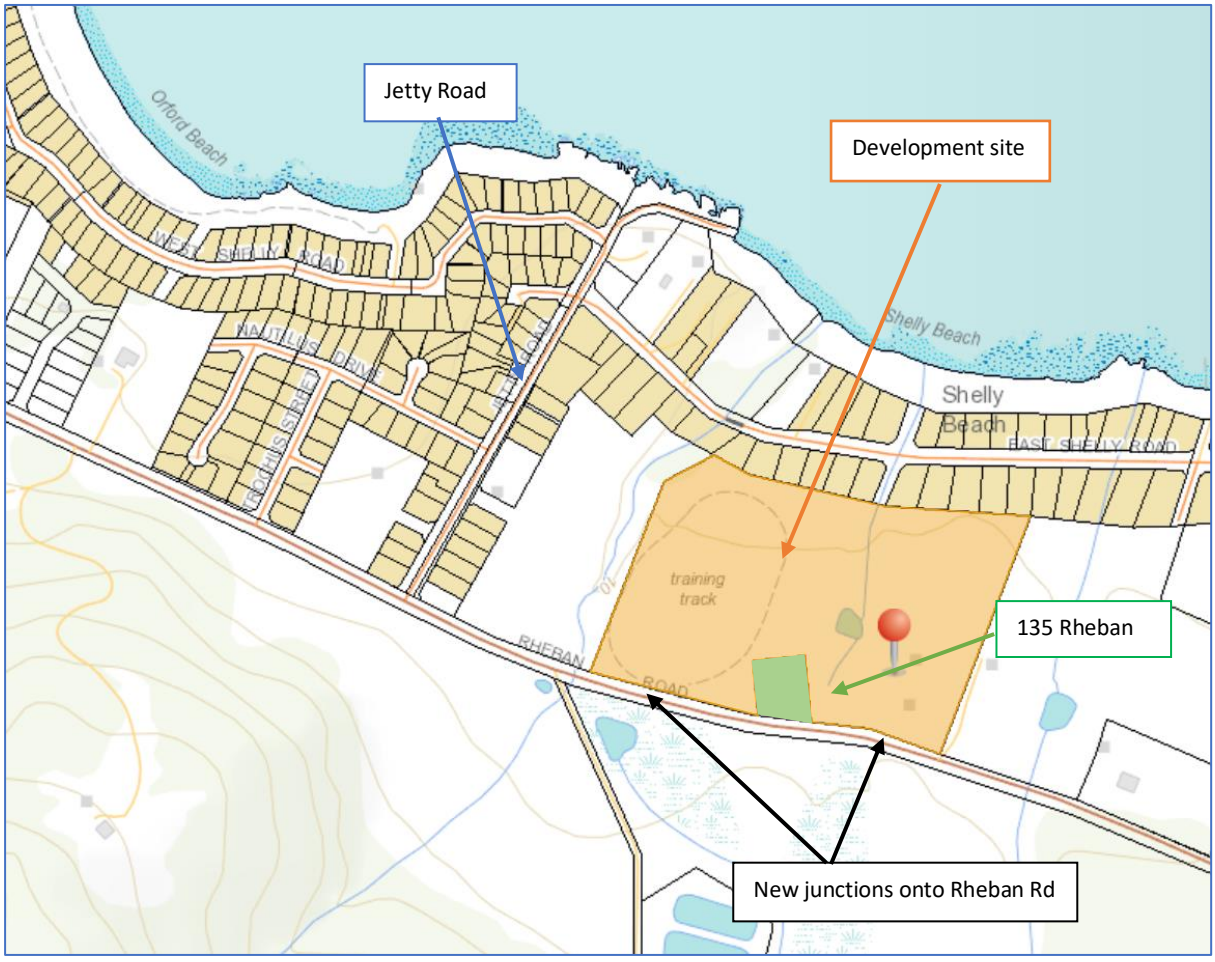
2. Site Description

The development site is located on the northern side of Rheban Road, south of Jetty Road, and the main centre of Orford.

The parcel of land is undeveloped and situated on moderately flat terrain, with a natural open watercourse flowing through the site, which will be retained. Due to the watercourse creating a separation of the subdivision, two new access junctions will be required onto Rheban Road.

An existing property at 135 Rheban Road, is privately owned with its own property access, and is not part of the subdivision.

Diagram 2.0 – Extract from LIST land information database of the development site



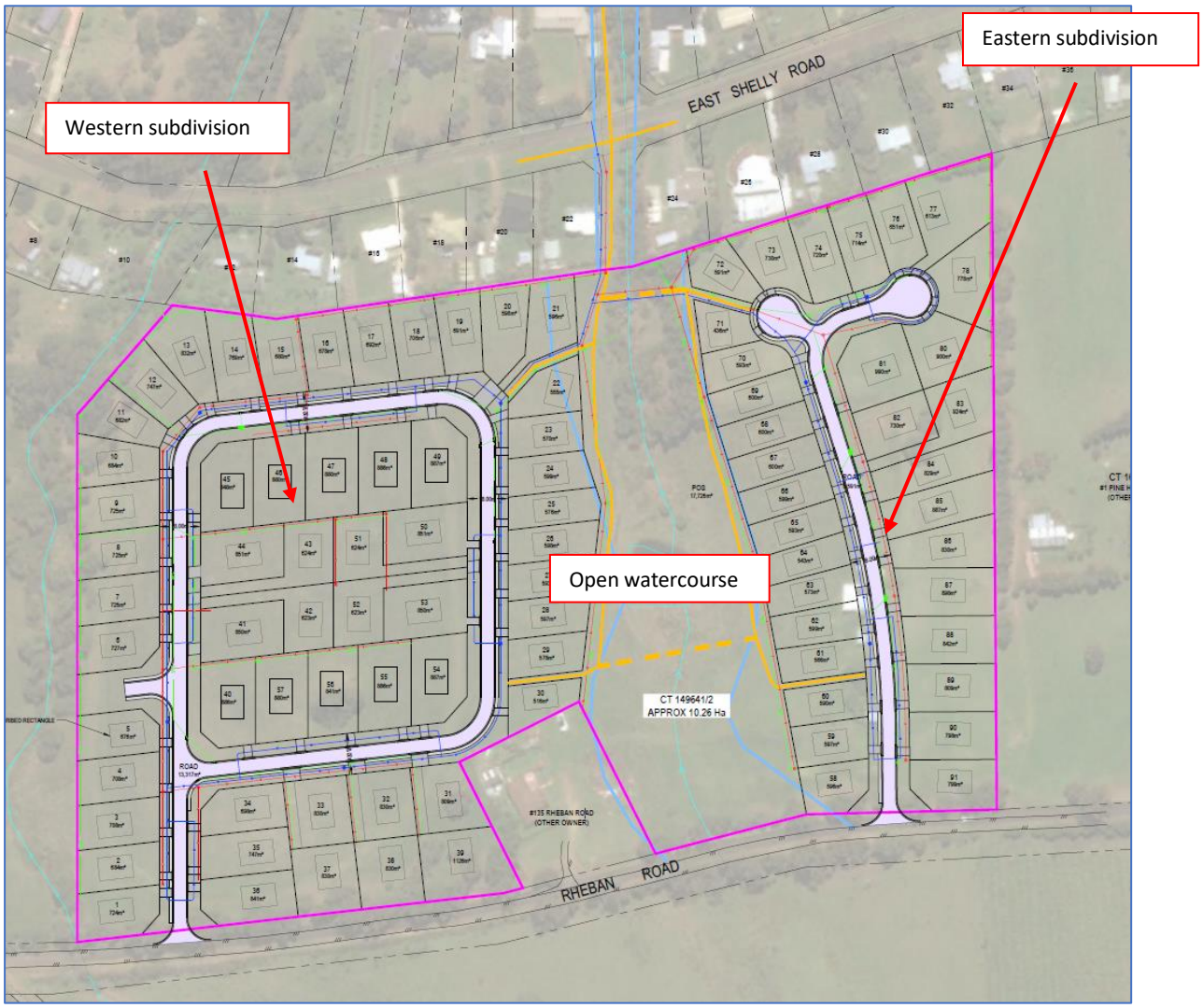
3. Development proposal

The development is for the provision of 90 residential lots, which will be divided into a 57 Lot western development and a 33 Lot eastern development, separated by the natural open watercourse that flows through the property. An access will be required for each development onto Rheban Road due to the watercourse.

The land is currently zoned as future urban, which indicates that this land is suitable for residential properties. The new lots will mostly range between 500 to 900 square metres, with one larger lot. It is expected the lots will contain a single dwelling, with no unit development.

Internal pathways will extend from each of the subdivisions which will provide a connection between the subdivisions.

Diagram 3.0 – Proposed layout of residential subdivisions



4. Trip generation by this development

A trip in this report is defined as a one-way vehicular movement from one point to another, excluding the return journey. Therefore, a return trip to and from a land use is counted as two trips.

To determine the number of trips likely to be generated by this development, it is acceptable practice to refer to the RTA Guide to Traffic Generating Developments (RTA Guide), section 3.3 residential housing, which indicates low density residential dwellings (RTA update 4a - August 2013) are likely to generate:

- Daily vehicle trips of 7.4 per dwelling
- Weekday morning trips of 0.71 per dwelling and
- Weekday evening trips of 0.78 per dwelling

As Orford is a holiday destination that is remote from Hobart and Launceston, the above generation rates are not likely to be representative, as there are fewer permanent residents.

With most residents not likely to commute to work on a daily basis, a lower generation rate would be expected of 4.5 daily trips per dwelling, generating 0.5 trips in the peak hours, which is a more representative trip rate. The peak traffic periods are likely to occur during the mid-morning and mid-afternoon periods, instead of the normal early morning and late afternoon commuter peak periods.

Table 4.0 – Predicted number of trips to be generated from the 90 lots

Subdivision	RTA Generation rate	Number of dwellings	Daily trips	Peak trips
Western subdivision	4.5 per day 0.5 per peak	57	257	29
Eastern subdivision		33	149	17
Total		**90**	**406**	**46**

From the above generation rates, it is estimated the new subdivision could generate 406 daily trips, with 46 of these trips occurring within any one-hour period.

5. Existing traffic Conditions

Orford is a small town on the east coast of Tasmania, accessed by the Tasman Highway (highway), which is part of the State Road Network. The highway provides connection to the nearest towns and Hobart, with the development site connecting to the highway via Charles Street, which turns into Rheban Road.

5.1 Rheban Road characteristics

From the highway, Charles Street, which is of an urban road standard, turns into Rheban Road at the Wielangta Road junction, where the road standard changes to rural.

Adjacent to the development site the road is bitumen sealed, with no line markings or street lighting. The road width averages 6.2 metres wide and is supported with narrow gravel shoulders, varying in width between 0.5 and 1.2 metres wide.

The road alignment is reasonably straight, with sweeping horizontal curves either side of the development site, and undulating terrain which creates some minor vertical road crests.

Along the development side there is a grass verge extending from the roadway to the property line, while on the opposite side there is a table drain beyond the gravel shoulder. Within the road verges there are trees scattered along the length of Rheban Road, along with wooden power poles.

Photograph 5.1A – Rheban Rd (view looking southeast towards Spring Beach)

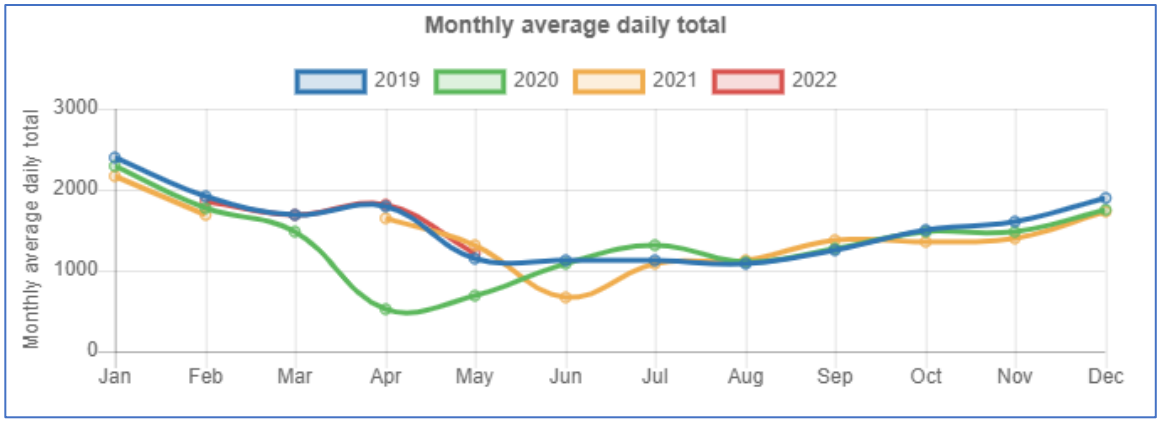
Photograph 5.1B - Rheban Road (view looking northwest towards Orford)

5.2 Traffic activity and seasonal flow adjustment

To evaluate the traffic impact of the development on the surrounding road network, it is necessary to understand the existing traffic flows along Rheban Road, Charles Street, and the Tasman Highway. Manual traffic surveys were undertaken in August 2022, but with Orford being a popular tourist destination, the recent surveys would not be representative of the peak season and would need to be adjusted.

The difference in traffic flow between August and the peak tourist season, can be calculated using the Department of State Growth's traffic database, which includes permanent traffic stations that collect data 365 days per year. The nearest permanent traffic station along the Tasman Highway to Orford, is located north of Triabunna. The graph below represents the average traffic flow between months, and the difference between August and the peak tourist months (December and January) is about 210 percent.

Graph 5.2 – Monthly traffic flow from the permanent traffic station north of Triabunna



All manual traffic surveys collected in August 2022 have been adjusted by 210 percent to represent the peak tourist period.

5.3 Manual traffic survey at the intersection of Tasman Highway and Charles Street

The Tasman Highway intersection with Charles Street is situated adjacent to the main hub of Orford, where there is the local supermarket, shops, and cafes. Vehicles from the development site travelling out of the area would need to use the intersection to access the highway, which is controlled by give way signs and traffic islands.

A manual traffic survey was conducted at the intersection of Tasman Highway, Charles Street, and the Esplanade, on 3rd of August between 8:00am and 9:00am. The collected traffic data has been adjusted by 210 percent to represent the peak tourist period.

Table 5.3 – Traffic survey for Tasman Highway intersection

Period	Tasman Highway						Charles Street		The Esplanade	
	North bound	Right into Charles	Right into Esplanade	South bound	Left into Esplanade	Left into Charles	Left out	Right out	Left out	Right out
8 to 9am	38	16	1	52	4	57	16	33	2	7
Adjusted Total	**80**	**34**	**2**	**109**	**8**	**120**	**34**	**69**	**4**	**15**

The Orford Primary School is located off Charles Street south of the Tasman Highway intersection. Traffic using this intersection peaked between 8:15 and 8:45am, with the school predicted to be the main contributor for the traffic increase. Seasonally adjusted, Charles Street generated 257 vehicle movements in the morning hour period 8:00am to 9:00am.

5.4 Traffic using Rheban Road pass the development site

A manual traffic survey was undertaken at the junction of Rheban Road and Jetty Street, collecting traffic on Rheban Road passing the development site, and traffic generated by the residential catchment of East and West Shelly Beach. The survey found a total of 55 traffic movements using the junction within the morning peak, which represents 111 vehicles when seasonally adjusted.

Based on the available traffic data it is predicted that the two-way traffic flow on Rheban Road pass the development site is likely to be 75 vehicles per hour (seasonally adjusted).

Table 5.4 – Traffic survey at junction of Rheban Road with Jetty Street

Time	Rheban Road				Jetty Street	
	Northbound	Southbound	Right into Jetty Street	Left into Jetty Street	Left Out	Right Out
7:30 to 7:45am	1	8	0	1	0	0
7:45 to 8:00am	3	4	1	1	0	4
8:00 to 8:15am	2	6	1	1	1	3
8:15 to 8:30am	3	6	1	1	1	4
Total	9	24	3	4	2	11
Seasonally adjusted Total	**19**	**50**	**6**	**8**	**4**	**23**

5.5 Speed Limit

Adjacent to the development site the speed limit on Rheban Road is posted at 80 km/h, then changes to 60 km/h east of Jetty Road where residential properties are located. A 60 km/h speed limit applies to Charles Street through to the highway, due to the urban environment.

6. Impact from traffic generated by this development

As determine by section 4 of this assessment, the development site has the potential to generate up to 406 additional traffic movements per weekday, with 46 of these trips likely to occur in the morning and afternoon periods.

It is common with residential properties, that 90 percent of the trips leave the area during the morning peak, with the opposite occurring in the evening. Based on the surrounding road network, all trips generated from the development site will travel along Rheban Road and Charles Street.

Table 6.0 – Additional trips generated by the development

Period	Trips generated from western development		Trips generated from eastern development		Total
	Leaving	Arriving	Leaving	Arriving	
Morning weekday	26	3	15	2	46
Afternoon weekday	3	26	2	15	46

6.1 Need for turning treatments on Rheban Road

With the location of the development site being south of Orford, the majority of the traffic movements arriving to the development site, will approach from a southerly direction and undertake a left-hand turn. The number of vehicles undertaking a right turn into the development site is predicted to be low, as Spring Beach is the only destination to the south.

As the development is likely to create minimal right turn movements from Rheban Road, an additional turning treatment on Rheban Road is not warranted.

6.2 Sight distance at the proposed new subdivision junctions

Both of the development sites will require the creation of a new junction onto Rheban Road, with all new junctions requiring adequate sight distance for vehicles to enter and leave in a safe and efficient manner.

The available sight distance at the two new junctions was measured on-site, based on the driver being 1.15 metres above the road surface, and an approaching vehicle being 1.2 metres high. Austroads Guide to Road Design part 4a, provides guidance on Safe Intersection Sight Distance (SISD) and with the posted speed limit along Rheban Road being 80 km/h, the minimum SISD is 181 metres, based on a driver reaction time of two seconds.

For the proposed eastern development junction, the available sight distance for a driver looking left exceeds 370 metres, while in the opposite direction a driver looking to the right will have 230 metres. In both directions the available sight distance exceeds the SISD for an 80 km/h speed environment, and available sight distance is shown in the following two photographs.

Photograph 6.2A – View looking left from the proposed eastern development access

Photograph 6.2B – View looking right from the proposed eastern development access

For the proposed western development junction, available sight distance in both directions distance in measured under 100 metres due to roadside vegetation and trees. This assessment has determined that removal of the trees and vegetation from the roadside verge, would provide drivers with adequate sight distance to meet the minimum SISD requirement of 181 metres.

The following two photographs shows the available sight distance in both directions.

Photograph 6.2C – View looking left from the proposed western development access

Photograph 6.2D – View looking right from the proposed western development access

6.3 Traffic efficiency at the new junctions

The simplest method to determine the traffic performance at a junction is to use SIDRA Intersection traffic modelling software, which uses gap acceptance theory to determine the average delay, queue lengths and degree of saturation, which are all measures of traffic congestion and level of service.

Level of Service (LOS) is a quantifiable assessment of the factors that contribute to the traffic performance, which includes traffic density, gaps in traffic streams, expected delays and queues. For junctions, there are six levels from A to F, with A providing the highest level for give-way controlled junctions, meaning motorists are not incurring delays, with ample gaps in the traffic stream for vehicles to turn freely and safely without disrupting other users.

The following table provides a reference to the level of service for the various traffic controls and is based on the RTA Guide.

Table 6.3 Level of service for intersections and junctions

Level of service	Average delay per vehicle (secs/vehicle)	Traffic Signals and Roundabouts	Give Way and Stop controls
A	<10	Good operation	Good operation
B	10 to <20	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	20 to <35	Satisfactory	Satisfactory, but crash study required
D	35 to <50	Operating near capacity, acceptable for State Roads	Near capacity and crash study required
E	50 to <70	At capacity for signals will cause excessive delays Roundabouts require other control mode	At capacity, requires other control modes
F	>70	Saturated flows – at signals consider additional lanes	

A traffic model has been developed within the modelling software to replicate the new junctions onto Rheban Road, with the seasonally adjusted hourly traffic flows entered. The modelling predicts the new junction will operate in the morning and evening periods at LOS A, which is the highest level, where motorists are not likely to incur any delay or queues. Motorists currently using Rheban Road are not expected to be adversely impacted by vehicles turning at the new junctions.

The modelling predicts traffic flows at the new junctions onto Rheban Road will use less than five percent of the junction's capacity, clearly demonstrating spare capacity at the junction to accommodate future growth along Rheban Road.

The result of the traffic modelling is available in appendix A.

6.4 Residential amenity impact

A new development in urban areas can be concerning to local residents, and it can be difficult to argue that a traffic increase is reasonable. The RTA Guide has considered this matter and provided an environmental performance standard, which can be used to evaluate the likely impact on residential amenity. Extract 6.4 is from the RTA Guide and relates to urban environments, providing maximum peak hour goals.

For urban collectors such as Charles Street and Rheban Road, the maximum environmental goal for two-way traffic flow is 500 vehicles per peak hour. From the recent traffic survey data, the impact to residential amenity is evaluated in table 6.4 below, predicting the two-way traffic flow (seasonally adjusted) on both Charles Street and Rheban Road will be no greater than 300 vehicles. Demonstrating the additional traffic generated by the development will not cause any adverse impact to amenity for existing properties.

Table 6.4 – Additional vehicle movements generated by the development

Road	Existing two-way traffic flow		Predicted two-way traffic flow	
	Peak Hour	Adjustment for tourist peak	Additional development per hour	Predicted two-way traffic flow
Rheban Road	36	75	46	121
Charles Street	122	257	46	303

Table 6.4 – Extract from the RTA Guide

Environmental capacity performance standards on residential streets

Road class	Road type	Maximum Speed (km/hr)	Maximum peak hour volume (veh/hr)
Local	Access way	25	100
	Street	40	200 environmental goal
			300 maximum
Collector	Street	50	300 environmental goal
			500 maximum

Note: Maximum speed relates to the appropriate design maximum speeds in new residential developments. In existing areas maximum speed relates to 85th percentile speed.

6.5 Lane capacity and level of service for users

In evaluating the impact of additional vehicle movements on Rheban Road users, it is important to understand the LOS motorists are currently receiving. The RTA Guide provides guidance for urban roads, based on peak hour directional traffic flows.

From the recent surveys (seasonally adjusted), maximum directional flow along Charles Street is predicted at 154 vehicles, with 50 vehicles along Rheban Road. Based on these directional flows, the RTA Guide indicates that both roads are operating at the highest LOS A.

An additional 46 peak hour traffic movements generated by this residential development is not expected to change the current LOS, as the new combined traffic flow is expected to be less than 200 vehicles per peak hour.

This demonstrates the development is not predicted to cause any adverse impact to the existing traffic flow on the surrounding local road network.

Diagram 6.5 – Extract from the RTA Guide

Table 4.4
Urban road peak hour flows per direction

Level of Service	One Lane (veh/hr)	Two Lanes (veh/hr)
A	200	900
B	380	1400
C	600	1800
D	900	2200
E	1400	2800

6.6 Traffic safety impact

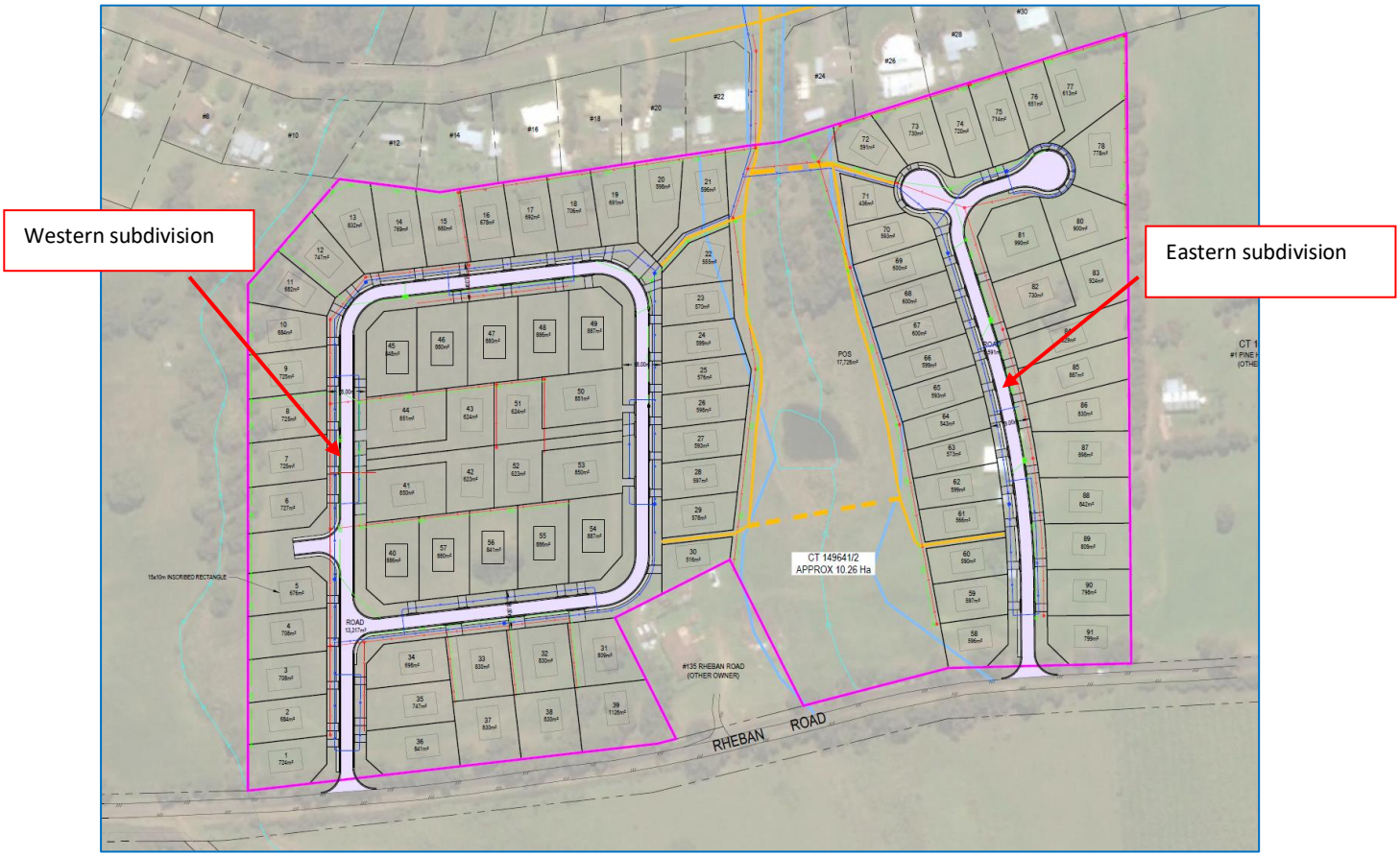
The Department keeps a database of reported road crashes. A check of this database found there were no reported crashes at this intersection in the last five years.

This suggests that drivers are not having any difficulty negotiating the road layout.

7. Subdivision layout and internal road arrangements

As discussed earlier, the open watercourse flowing through the property requires the subdivision to be divided into an eastern and western subdivision, with both requiring the creation of a new junction onto Rheban Road.

Diagram 7.0 – Proposed layout of the subdivision



7.1 Subdivisional road standard

Having consideration of similar roads recently constructed in the area, the new subdivision road in both developments, will have a minimum road width of 6.9 metres, within a 15-metre-wide road reserve, which will comply with the LGAT standard drawing for urban roads TSD-R06-V1.

The road surface will be bitumen, with concrete kerb and gutters, 1.4-metre-wide footpath along one-side, and street lighting to comply with the vehicle and pedestrian lighting standards.

7.2 Turning facilities

The western development will include a loop road, allowing all vehicles to enter and leave in a forward-driving manor without the need to provide turning facilities.

The eastern development will have two short cul-de-sacs at the end of the new subdivisional road. At the end of each cul-de-sac, an 18-metre diameter circular turning head will be provided, in accordance with LGAT standard drawing TSD-R07-V1, this will accommodate a standard waste collection vehicle, enabling vehicles to enter and leave the development in a forward-driving direction.

7.3 Turning radius at the new junctions

The two new junctions will be designed to accommodate the swept path of a heavy rigid vehicle, measuring 12.5 metres in length, to turn left into and right out of the development.

7.4 On-site parking provisions

Each property will have a single access and will have sufficient area to accommodate on-site parking facilities. While the new subdivisional road will have sufficient width to accommodate on-street visitor parking.

7.5 Active transport facilities

It is important for the new subdivision to be connected to existing facilities to allow residents to access the beach and other community facilities. The development will include formal pathways to connect between the two subdivisions, and a separate pathway through the designated waterway corridor to connect to East Shelly Road and in-turn to the beach.

7.6 Road gradients

The natural terrain of the development site is reasonably level with a slight northbound slope, this means the subdivisional roads will have minimal grades and comply with the relevant standards for road gradients.

7.7 Creation of two new junctions with Rheban Road

The two new junctions will intersect Rheban Road at ninety degrees and form a standard T-Junction, and under the Australian Road Rules, vehicles must give-way when travelling on the terminating leg of the junction. However, it would be appropriate, given the significance of Rheban Road, that a Give Way sign, supplemented by a holding line be provided at each junction.

Removal of trees within the road reserve on both sides of the western junction, will improve sight distance, and both junctions will have sufficient sight distance for motorists to enter and leave in a safe and efficient manner.

7.8 Future road connection

As part of the western subdivision, one lot will be reserved for a possible future connection to vacant land, located on the western boundary of the development site.

7.9 Waste collection and emergency service vehicles

The subdivisional roads will be designed to accommodate a 12.5 metre heavy rigid vehicle to enter and circulate. A standard waste collection vehicle and the largest fire brigade vehicle replicate a medium rigid vehicle (8.8 metres in length), with road design ensuring there will be sufficient road width and turning facilities to access all lots.

8. Planning scheme

8.1 C3.5.1 Traffic generation at a vehicle crossing, level crossing or new junction

This development will require the creation of two new junctions onto Rheban Road and needs to be assessed under the performance criteria P1, demonstrating the accesses can operate safely and efficiently.

Performance criteria	Assessment
Vehicular traffic to and from the site must minimise any adverse effects on the safety of a junction, vehicle crossing or level crossing or safety or efficiency of the road or rail network, having regard to:	
a) Any increase in the traffic caused by the use;	Due to the presence of an open water course flowing through the development site, two new junctions onto Rheban Road are required. This assessment predicts the total 90 lot subdivision could generate 406 daily trips, with the two junctions generating 46 trips in the peak hour periods.
b) The nature and frequency of the traffic generated by the use;	The development is for residential lots, with most vehicle movements generated to be less than 5.5 metres in length, which is associated with urban residential living. These types of vehicles are compatible with the existing vehicles using the surrounding local road network and are not expected to cause any adverse impact.
c) The nature of the road;	Rheban Road is a rural access road, functioning as a collector road carrying traffic between Orford and Spring Beach. The road standard has sufficient road width to accommodate two-way traffic flow. Rheban Road connects onto Charles Street, which in turn connects to the Tasman Highway. Within the surrounding area both Charles Street and Rheban Road are important distributing roads.
d) The speed limit and traffic flow of the road;	There is a posted 80 km/h speed limit that operates along Rheban Road where the development site is located. This assessment predicts during the peak tourist months both Rheban Road and Charles Street will have sufficient traffic capacity to absorb the additional traffic from the development, without causing a reduction in the level of service for users. Road users will continue to operate at the highest level of traffic performance, with the increase in traffic not predicted to cause any adverse residential amenity to the surrounding residential properties. Traffic modelling of the new junctions onto Rheban Road predicts the traffic movements will use less than five percent of the junction's traffic capacity, demonstrating no adverse impact, with spare traffic capacity for future traffic growth within the area. With removal of trees and vegetation within the road verge, adequate Safe Intersection Sight Distance will be provided for motorists using the two junctions, so they can enter and leave in a safe and efficient manner, without causing adverse impact to current road users.
e) Any alternative access;	No alternative road connection is available.

f) The need for the access or junction;	Urban infill in established towns is an excellent method to increase the supply of housing, while optimising the current infrastructure and community facilities.
g) Any traffic impact assessment; and	An independent traffic assessment has found there was no reason for this development not to proceed.
h) Any written advice received from the road authority.	Aware of none.

8.2 C2 Parking and Sustainable Transport Code

C2.5.1 Car parking numbers.	Each lot will be of sufficient size to enable off-street facilities to be provided within individual properties, and this meets the intent of the acceptable solution to prevent parking overflow. The subdivisional roads will be constructed to LGAT road standards, and suitable to accommodate visitor parking.
C2.5.2 Bicycle parking numbers.	Not applicable for residential subdivision.
C2.5.3 Motorcycle parking numbers.	Not applicable for residential subdivision.
C2.5.4 Loading bays.	While loading bays are not applicable for residential subdivision, the subdivisional road will have sufficient width to accommodate commercial vehicles, including waste collection and fire emergency vehicles.
C2.5.5 Number of car parking spaces within the General Residential Zone and Inner Residential Zone.	Not applicable.

9. Conclusion

The proposed new 90 lot subdivision at Lot 2 Rheban Road will provide a supply of urban residential building lots, compatible with the surrounding land-use, and the traffic generated from these new lots is expected to be residential in nature.

From a traffic engineering and road safety perspective, additional traffic generated from this development site is not expected to create any adverse safety, amenity, or traffic efficiency issues as:

- The predicted amount of traffic generated is considered to be minor and there is sufficient capacity within the current road network to absorb the extra traffic movements.
- The two new junctions with Rheban Road will have Safe Intersection Sight Distance, once the trees and vegetation are removed by the development, and this will ensure safe traffic movements between Rheban Road and the new subdivision.
- Traffic modelling predicts the junction will perform at the highest level of service for a give way control, and additional traffic movements operating along Rheban Road are not expected to create any adverse transport efficiency issues or reduce the level of service for current road users.

This Traffic Impact Assessment found no reason for this development not to proceed.

10. Appendix – Traffic Modelling of new junction

MOVEMENT SUMMARY

▽ **Site: 101 [Rheban Road and new junction Orford]**

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m
East: Rheban Rd (Spring Beach)								
5	T1	20	0.0	0.011	0.0	LOS A	0.0	0.0
6	R2	1	0.0	0.011	5.6	LOS A	0.0	0.0
Approach		21	0.0	0.011	0.3	NA	0.0	0.0
North: New subdivision								
7	L2	1	0.0	0.036	5.7	LOS A	0.1	0.8
9	R2	43	0.0	0.036	5.7	LOS A	0.1	0.8
Approach		44	0.0	0.036	5.7	LOS A	0.1	0.8
West: Rheban Rd (Orford)								
10	L2	5	0.0	0.030	5.5	LOS A	0.0	0.0
11	T1	53	0.0	0.030	0.0	LOS A	0.0	0.0
Approach		58	0.0	0.030	0.5	NA	0.0	0.0
All Vehicles		123	0.0	0.036	2.3	NA	0.1	0.8