Thrumster Business Park

Transport Impact Assessment

PREPARED FOR LOVE PROJECT MANAGEMENT | 13 AUGUST 2024 | 300304836

We design with community in mind



Revision

Revision	Date	Comment	Prepared By	Approved By
A	22 August 2023	Final	Connor Hoang, Jae Jeon & Helen Aberra	Bayzid Khan
B-Dr	19 July 2024	Draft – Updates to consider council comments.	Liz McCormack & Darren Cheng	Bayzid Khan
В	09 August 2024	Final	Liz McCormack & Darren Cheng	Bayzid Khan
С	13 August 2024	Final	Liz McCormack & Darren Cheng	Bayzid Khan

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Acknowledgment of Country

In the spirit of reconciliation, Stantec acknowledges the Traditional Custodians of country throughout Australia and their connections to land, sea and community. We pay our respect to their Elders past and present, and extend that respect to all Aboriginal and Torres Strait Islander peoples.

Limitations

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REF: \\AU2012-NTAP01_CIFS02\SHARED_PROJECTS\300304836\TECHNICAL\ADVICE\\RPT_240812_4836_THRUMSTER_BUSINESS_PARK_TIA_FINAL.DOCX

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1. Introduction

1.1 Background

It is understood that a development application was approved (DA 2014-114) for the 63-lot subdivision of land located at 314 John Oxley Drive, Thrumster for the purposes of industrial/ business park uses (herein referred to as the Thrumster Business Park).

A planning proposal was previously lodged with Port Macquarie-Hastings Council (PMHC) for the proposed rezoning of lots within the Thrumster Business Park from E4 General Industrial to MU1 Mixed Use zoning to provide 10,0000 square metres gross floor area (GFA) of commercial / industrial retail uses and 170 residential units. No changes to the broader Thrumster Business Park including site access or internal circulation were proposed.

Following submission, various comments were received by PHMC in relation to the planning proposal. As such, the planning proposal has now been amended to include the rezoning of 32 lots from E4 General Industrial to E3 Productivity Support with 17 of these lots to permit shop top housing and serviced apartments.

Stantec was commissioned by Love Project Management to undertake a transport impact assessment to support the planning proposal.

1.2 Purpose of this Report

The purpose of this report is to assess the anticipated transport implications of the proposed rezoning on the surrounding transport network as mandated by PMHC at the Pre-Lodgement Meeting (DD032.2022.00000001.001). This report also considers comments provided by PHMC in regard to the original planning proposal (DD032.2023.0000006.001). Specifically, this assessment includes consideration of the following:

- existing traffic and parking conditions surrounding the site
- suitability of the proposed parking in terms of supply (quantum) and layout
- service vehicle requirements
- pedestrian and bicycle requirements
- the traffic generating characteristics of the proposed development
- suitability of the proposed access arrangements for the site
- the transport impact of the development proposal on the surrounding road network.

1.3 References

In preparing this report, reference has been made to the following:

- an inspection of the site and its surrounds
- Port Macquarie Hastings Council Development Control Plan (DCP) 2013
- Port Macquarie Hastings Council Local Environmental Plan (LEP) 2011
- Australian/New Zealand Standard, Parking Facilities (AS 2890)
- other documents and data as referenced in this report.

1.4 Council Comments

As stated, following lodgement of the previous planning proposal various comments were received by PHMC detailed in the *Planning Proposal Submission PP-2023-2079 Thrumster Business Park*, dated 7 November 2023 (document reference DD032.2023.0000006.001). The relevant matters as they relate to traffic and transport have been reproduced in Table 1.



Table 1: Council comments

Council comment		Response or location in report where comment is addressed
Please see assumptions that for existing and future devel Oxley Hwy network under c	at are currently agreed between PMHC and TfNSW lopments along John Oxley Drive linking onto the urrent modelling project by TfNSW	5.1.2
Land use	Trips per - 100m2, dwelling or other.	
Commercial	1.6 (AM)/1.2 (PM) per 100 m ² GFA	
Industrial Residential	0.0063 (AM)/ 0.0066 (PM) per 100m ² GFA Assumed trips is: 0.45(AM&PM) Per dwelling, With- (Lot size x FSR = GFA) (High density (60m ² units) GFA/60m ² = Dwellings) (Medium density (100m ² units) GFA/100m ² = Dwellings) (Dwellings x 0.45 = Peak)	
	Low density - 0.75(AM /0.73(PM) per dwelling	
accommodation	0.39/unit (AM), 0.475/unit (PM)	
Light Industrial/ commercial (Small component residential) (most applicable MU1 rate)	0.70 (AM)/0.78 (PM) per 100m ² GFA	
Retail	3.0 (AM)/5.05 (PM) per 100 m ² GFA	
Estimated travel demand (n	umber of trips by mode)	5.1.4
Preliminary analysis of traffi high-level pre-deve potential impacts of potential services a potential need for active transport ree	c and transport impacts to understand: elopment and post-development scenarios on existing and future transport networks and infrastructure required to support the proposal type of traffic modelling quirements	2.5 and 5.1 5.1 3.3, 5.3 and 5.5 5.4 5.3
Proposed scope and metho assumptions (i.e. traffic gen containment, directional spl	dology for detailed analysis and proposed eration rates, public transport mode shifts, trip it, area growth rate, etc).	5.1
Further, TfNSW strategies of transport infrastructure requisition connections with current an services to reduce the reliar sustainable transport choice the Future Transport Strateg	3.3, 5.3, 5.4	
Rates of traffic generation s potential and variable peak	hould be confirmed against maximum land use hours of different land-uses.	The traffic generation presented in this report has been based on the permissible land uses and concept plan.
Highlight potential environm vehicles, considering MU1	nental impacts between local traffic and heavy / E4 with various permissible uses.	The updated proposal does not include any land to zoned as MU1.
Some minor Concerns have traffic and parking for reside heavy vehicle parking. This zone MU1 Mixed Use, such	e also been raised regarding the potential of local ents potentially conflicting with heavy vehicles and is further complicated by other permissible uses in as centre- based childcare facilities.	Refer to section 5.2
The TIA should assess cum broader transport network in Highway.	ulative impacts of proposed land uses on the ncluding John Oxley Drive and access to the Oxley	5.5



Council comment	Response or location in report where comment is addressed
Public transport assumptions related to site access and services should be considered a benefit over and above, not relied upon for base case.	5.4
Consult with public transport providers for route planning and provision	5.4
The TIA does not create a tangible baseline for impact comparison.	2.5, 2.6
The TIA doesn't even look at cumulative impacts to the broader network or what may impact itself in the vicinity.	5.5
No mitigation or action is proposed for any potential impacts (noting it concludes this PP will have NO impacts at all on transport).	
The TIA outlines that "John Oxley Drive serves as the main site access to the proposed development," - while it appears the land will be accessed via local roads, either Thrumster Street or the new local road for residential development at 344 John Oxley Dr, the assumption that this proposal is adjoining to John Oxley drive as a collector road is misleading.	3.2
The TIA outlines "the site with the nearest bus stop located on John Oxley Drive within a comfortable walking distance of the rezoned lots." An initial analysis identifies that the closest bus stop is approximately 1km from the subject site. This is generally not considered a comfortable walking distance. Recent studies and community consultation define walking distance as approximately 400m or a 5-minute walk)	5.4
The TIA outlines that the area is "well serviced by public transport" - assumptions regarding public transportation are considered flawed. Council would recommend further consultation with busways for routes and provision plans for after developments are built. A bus cannot stop currently in eastbound directions, meaning the 1 hr turnaround outlined is incorrect, and travel must be in a westerly direction, towards Sovereign Place or Wauchope.	5.4



2. Existing Conditions

2.1 Site Overview

The subject site is located off John Oxley Drive, Thrumster was previously Lot 2 DP 1245588 and resides outside the western fringe of Port Macquarie. The site has an area of approximately 21.25 and is accessed via a roundabout on John Oxley Drive. The site is currently split zoned consisting of E4 – General Industrial on a large portion of the lot and small sections of R1 – General Residential, C2 – Environmental Conservation and C3 – Environmental Management on the western portions of the lot.

The site is currently cleared and vacant of any structures, and a number of new roads have been completed as part of the approved Thrumster Business Park (63-lot subdivision as discussed in Section 1).

Thrumster has been identified by Council as a key urban release area accommodating up to 10,000 people and providing employment opportunities for the broader area and residential dwellings. The residential subdivision to the south fronting John Oxley Drive is currently being developed and provides access to the subject site.

The location of the subject site and its surrounding environs is shown in Figure 1, identified development precincts in Thrumster urban release area shown in Figure 2, and land zoning map shown in Figure 3.



Figure 1: Subject site and Its environs

Base Image Source: Metromap, 2024



Figure 2: Identified development areas in Thrumster



Base Image Source: Port Macquarie Hastings Council DCP 2013

Figure 3: Land use map



Base Image Source: Port Macquarie-Hastings LEP 2011

2.2 Transport Network

2.2.1 Road Hierarchy

Roads are classified according to the functions they perform. The main purpose of defining a road's functional class is to provide a basis for establishing the policies which guide the management of the road according to their intended service or qualities.

In terms of functional road classification, State roads are strategically important as they form the primary network used for the movement of people and goods between regions, and throughout the State. Transport for NSW (TfNSW) is responsible for funding, prioritising and carrying out works on State roads. State roads generally include roads classified as freeways, state highways, and main roads under the Roads Act 1993, and the regulation to manage the road system is stated in the Australian Road Rules.

TfNSW defines four levels in a typical functional road hierarchy, ranking from high mobility and low accessibility, to high accessibility and low mobility. These road classes are:

- Arterial Roads Controlled by TfNSW, typically no limit in flow and designed to carry vehicles long distance between regional centres.
- Sub-Arterial Roads Managed by either Council or TfNSW under a joint agreement. Typically, their operating capacity ranges between 10,000 and 20,000 vehicles per day, and their aim is to carry through traffic between specific areas in a sub region or provide connectivity from arterial road routes (regional links).
- Collector Roads Provide connectivity between local sites and the sub-arterial road network, and typically carry between 2,000 and 10,000 vehicles per day.
- Local Roads Provide direct access to properties and the collector road system and typically carry between 500 and 4,000 vehicles per day.

2.2.2 Adjoining Roads

John Oxley Drive

John Oxley Drive functions as a collector road, and in the vicinity of the site is aligned in an east-west direction. It is a key link between Port Macquarie and the Pacific Highway. In the vicinity of the site, John Oxley Drive is a two-way road configured with a single lane in each direction, set within an eight-metre-wide carriageway (approx.), however, the roadway varies along its lengths providing auxiliary/ channelised turning lanes and U-turn bays. John Oxley Drive serves



as the main site access to the proposed development and has a speed limit of 80 kilometres per hour within the vicinity of the site.

The kerbside parking on both sides of John Oxley Drive adjacent to the proposed site is not prohibited, however limited on-street parking opportunity is available due to narrow road shoulders.

Brush Cherry Boulevard is the road that provides access road from John Oxley Drive, into Thrumster Business Park. The intersection with John Oxley Drive is a recently completed roundabout and does not provide for any kerbside parking. A photo of this intersection is provided in Figure 4.

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Figure 4 Roundabout intersection of John Oxley Drive and Brush Cherry Boulevard

Oxley Highway

Oxley Highway is classified State Road and in the vicinity of the site is aligned in an east-west direction. It provides direct connection to the Pacific Highway via a grade-separated interchange and therefore is the main link between Port Macquarie and the Pacific Highway. It is a two-way road configured with two lanes in each direction and set within a 30-metre-wide separated carriageway.

Kerbside parking is not permitted on either side of the road and has a speed limit of 100 kilometres per hour in vicinity of the site.

Thrumster Street

Thrumster Street is classified as a Local Road and in the vicinity of the site it is aligned in a north-south direction. It is located west of the site and is one of the key connections to John Oxley Drive. It is a two-way road configured with unmarked single lanes in each direction, set within a 6.5-metre-wide carriageway (approx.). There are no formal kerbside parking spaces on either side of this road and there is no current speed limit posting within vicinity of the site.

The locations of adjoining roads relative to the site are shown in below in Figure 5.



Figure 5: Adjoining roads relative to the site



Base Image Source: Metromap, from March 2024 imagery

2.3 Public Transport

The 336 bus route runs along John Oxley Drive, which runs between Port Macquarie, Wauchope, and The Ruins Way with one service every hour on and off peak. The closest existing bus services to the subject site are at the intersection of John Oxley Drive and Chancellor Drive, and John Oxley Drive and Lindfield Park Road. The walking distance to these sites is approximately 2.5 kilometres and 2 kilometres respectively. It is to be noted that currently there is no demand for a bus service from the business park or the adjacent residential estate as the area is currently under development /construction stages.

A review of the public transport available in the vicinity of the site is shown indicatively in Figure 6.



Figure 6: Route 336 bus network map



25/Port%20Macquarie%20Network%20Map.pdf

However, there is newly constructed bus stop on Bush Cherry Boulevard approximately 400m from the site. This bus stop is shown in Figure 7 and its location is shown in Figure 8. It is noted that the residential estate adjoining to the south has recently been registered and as such, it is anticipated that adequate bus service and facilities will be provided in future when the area is fully developed.

Figure 7 Bus stop on Bush Cherry Drive



Figure 8 Location of bus stop on Bush Cherry Drive in context of site location



The draft Port Macquarie-Hastings Integrated Transport Plan identifies a target to increase the public transport usage within the LGA, and notes the opportunity to improve facilities, and expand services to entice more people to use public transport. In particular, the Plan identifies the opportunity to *'provide new growth areas with alternate transport options and public transport facilities.'*



As part of the Thrumster urban release area Council indicatively identified a future bus network map with a bus stop located along the eastern boundary of the site, as shown below in Figure 9



Figure 9 Thrumster urban release area future bus network

Base Image Source: Port Macquarie-Hastings DCP 2013

2.4 Walking and Cycling Infrastructure

The broader area within Port Macquarie has well established walking and cycling infrastructure including wide road shoulders on the Oxley Highway, facilitating cyclists. Thrumster Business Park consent included construction of a footpath along the western side of the estate, with Stage 1 of this walkway being completed as shown in Figure 10 and Figure 11.



Figure 10 Existing pedestrian paths and crossing location



Figure 11 Existing pedestrian paths



This connects with the footpaths throughout the residential estate to the south. These footpaths connect to an underpass of John Oxley Drive (Figure 12) which provides safe connection to the footpath network within the new residential estate on the southern side of the road. As these new estates are constructed, the 'missing links' in the walking and cycling infrastructure will be provided, and the network connections provided.



Figure 12 Existing underpass on John Oxley Drive



As part of the Thrumster urban release area Council indicatively identified a future cycling network for the area (shown in Figure 13).





Base Image Source: Port Macquarie-Hastings DCP 2013



2.5 Existing Travel Behaviour

Journey to Work (JTW) data has been sourced from the Australian Bureau of Statistics (ABS) 2016 census to provide an understanding of existing travel patterns within the vicinity of the site. It is noted, given effects of COVID-19 on travel behaviours, 2021 census data was not selected for this analysis.

Figure 14 details the catchment of ABS 2016 census data analysed, which corresponds to those that work within the relevant destination zone (DZN 111648349).



Figure 14: Analysed destination zone 111648349

Base image source: ABS Census

Table 2: Mode of travel to work (2016)

Mode of Travel	Percentage
Car (as driver)	87%
Car (as passenger)	6%
Walk	3%
Bus	1%
Bicycle	1%
Truck	1%
Motorbike	1%

Table 2 indicates that travel within the region is heavily reliant on private vehicle (car), accounting for 93 per cent of total trips. The remaining trips are comprised of active and public transport modes.

2.6 Existing Traffic Volumes

An assessment of the intersection on John Oxley Drive was undertake in 2021 by Streetwise Road Safety and Traffic Services. The assessment included traffic volumes on John Oxley Drive for both 2017, which were obtained from intersection counts, and 2021 and 2031, which were based on projected volumes obtained from discussions and information provided by Port Macquarie Hastings Council. The 2031 volumes were determined from a combination of background annual growth and the traffic generated by developments likely to be completed in the surrounding precinct.

The intersection assessment included SIDRA intersection modelling for the 2031 scenario in both the AM and PM peak hours. The model assumed the subject 32 lots (the site) of the proposed Thrumster Business Park as part of Stage 1 and showed that the proposed roundabout would perform satisfactorily in future year scenarios with the additional traffic generated by this site. The conclusion of the assessment was that a 2-lane roundabout was shown to operate satisfactorily, with Levels of Service B or better on all approaches in both peak hours.



3. Rezoning Proposal

3.1 Land Uses

The proposal includes rezoning of 32 lots within the broader 63-lot approved industrial subdivision known as the Thrumster Business Park from E4 General Industrial to E3 Productivity Support. Further, it is sought to permit shop top housing and serviced apartment uses on 17 of these lots (identified as Precinct A and Precinct B).

It is noted that commercial / industrial retail land uses are indicative at this stage with exact land uses subject to development applications for individual lots. The lots subject to the proposed rezoning, categorised into Precinct A and Precinct B, and the additional lots are summarised below.

- Precinct A:
 - o Commercial/ industrial retail : 5,100 square metres GFA
 - Residential: 80 units.
- Precinct B:
 - o Commercial/ industrial retail: 4,900 square metres GFA
 - Residential: 90 units.
- Additional lots:
 - o Commercial/ industrial retail: 7,000 square metres GFA

No changes to the broader Thrumster Business Park including zoning of remaining lots, site access arrangements or internal circulation are proposed.

The identified lots and precincts subject to rezoning within the Thrumster Business Park are shown in Figure 15, with indicative concept layouts for each precinct presented in Figure 16.

The change from zone E4 – General Industrial to zone E3 – Productivity Support, does not significantly alter the permissible land uses. Both the E3 and E4 zones prohibit retail premises, and therefore this remains unchanged. Industrial manufacturing businesses with associated retail outlets remain permissible in both zones, and the larger scale (bulky goods) type retailing will also remain permissible in both zones. Light industrial land uses, including artisan food and drink industry, high tech and creative industries, all remain permissible in both the current E4 zone and the proposed E3 zone. Support services and facilities for employees such as medical centres, indoor recreation facilities, and take away food premises are also permissible in both zones.

Heavy industrial land uses are not permissible in the E3 zone, and this includes land uses that generate high levels of heavy vehicle movements, such that freight transport facilities are currently permissible in the E4 zone, but the proposed rezoning to E3 will result in those land uses being prohibited across the 32 lots in the rezoning area. The E3 zone will also provide for a wider range of health and wellbeing facilities to support employees and future residents of the rezoned area. Office and business premises are an additional land use permissible in the E3 zone, but these uses generally do not generate heavy vehicle traffic, and this further supports a likely reduction in heavy vehicle movements to the estate.

The rezoning aims to provide for the change in demand for employment land operations, such that the rezoned area is an attractive and supportive environment for boutique manufacturers within an environment that provides for a high standard of support services and facilities. The limited differences in permissible land uses, and a focus on lighter, high-tech industries and incubator business opportunities, suggests minimal changes to the traffic generation arising from the proposed rezoning.



Figure 15: Precinct A and B within the broader Thrumster Business Park



Source: Love Project Management

Figure 16: Precinct A concept layout



Source: Love Project Management, August 2024

3.2 Access to Existing Road Network

Vehicular access to Thrumster Business Park is via the roundabout on John Oxley Drive. Future development in the surrounding area may include a local connection to Thrumster Street (as secondary access), which runs north-south and connects to John Oxley Drive.

3.3 Active Transport

The active transport provided by the proposed development is intended to align with Future Transport Strategy 2056, The Strategy states that transport options *"will give customers more choice in how they travel by better connecting the different travel modes, digitally and physically. Transport will support active transport options with improvements to our roads and pathways."*

Active transport plays an important role in the rezoning in promoting sustainable and healthy lifestyles. Footpaths form part of the approved and partially completed Thrumster Business Park estate. Footpaths ensure safe and convenient pedestrian access within the development to connect to the broader active transport network. These footpaths are between 1.2m and 2.5m wide and are shown in Figure 17. It is noted these footpaths that form the consent for the estate are currently under construction as discussed in Section 2.4.



Figure 17: Pedestrian footpaths within the Thrumster Business Park



4. Car Parking

4.1 Car Parking Requirements

The car parking requirements for different development types are set out in the Port Macquarie Hastings Council (PMHC) Development Control Plan (DCP) 2013. A review of the car parking requirement rates and the floor area schedule results in a statutory parking requirement for the proposed development as summarised in Table 3.

It is noted that given uncertainty regarding exact breakdown of land uses the following has been assumed:

- Gross leasable floor area (GLFA) assumed to be 75 per cent of GFA as recommended in Transport for NSW's (TfNSW) *Guide to Traffic Generating Development* (The Guide) 2002.
- Residential apartment mix to comprise 100 per cent two-bedroom units.
- Conservatively, the commercial/ industrial retail uses have been assessed based on commercial office parking rates.

Precinct	Land Uses	Description	Size	Car Parking Rate	Car Parking Requirement
	Commercial/ industrial retail	-	5,100 m² GFA	1 per 30m ² GLFA	128
A	Residential	2 bedroom	80 units	1 per unit	80
	Visitor			1 per 4 units	20
	Commercial/ industrial retail	- 4,900 m ² GFA		1 per 30m² GLFA	123
В	Residential	2 bedroom 90 units		1 per unit	90
	Visitor	-		1 per 4 units	23
Additional lots	Commercial/ industrial retail		7,000 m ² GFA 1 per 30m ² GLFA		175
	638				

Table 3: Statutory car parking requirements

Based on the proposed rezoning, collectively the precincts are required to provide 638 car parking spaces.

4.1.1 Accessible Car Parking Requirements

The PMHC DCP 2013 does not stipulate accessible parking requirements. As such reference has been made to the National Construction Code (formerly Building Code of Australia) which specifies one accessible space per 100 car parking space for Class 5 - commercial use. However, the National Construction Code does not specify any accessible parking requirements for residential units (Class 2). Generally, two in every 100 car park spaces is acceptable by the authority and hence is suggested for the proposed development.

Further assessments regarding the accessible parking requirements, including number and location, will be undertaken in detail when development applications are lodged for each lot.

4.2 Motorcycle and Bicycle Parking Requirements

The PMHC DCP 2013 requires that ' An application for a major commercial development must be accompanied by a Traffic Impact Study that makes adequate provision for public transport facilities and motorcycle and bicycle parking.'

The requirement for and assessed demand for motorcycle and bicycle parking will be assessed with future development applications for each lot within the Estate.

4.3 Car Parking Layout Review

4.3.1 Approved Car Parks

Lots 136, 137, and 138 DP 1304965 have been granted approval for car park development. This Development Application (DA) consent has been previously issued and is shown below in Figure 18. The car parks, which are adjacent to the lots designated for rezoning, will support the parking needs of future developments in these areas, ensuring



compliance with onsite parking requirements for forthcoming development applications. The adjacent road has been designed to facilitate efficient pedestrian movement and is not intended to accommodate heavy vehicle traffic in the southern section of Thrumster Business Park.



Figure 18: Car park 1, 2 and 3 in respective Lots 136, 137 and 138

Source: Cummings Group Pty Ltd, project no. CG2105-01, drawing no. 920, Rev: B, dated 8 September 2022.

Any parking for the development will be designed and developed in accordance with the relevant standards and guidelines, including PMHC DCP 2013 and Australian Standards. The parking will be designed to accommodate the largest design vehicles as required to access the development. Detailed review of the proposed car parking areas will be undertaken when development applications are prepared and lodged, with the consent authority assessment, including, but not limited to, the following items:

- bay and aisle width
- adjacent structures
- turnaround facilities
- circulation roads and ramps
- ramp grades
- height clearances
- internal queuing
- pick-up/set-down area
- parking for persons with disabilities
- motorcycle/motor scooter parking.



5. Traffic Impact Assessment

5.1 Traffic Generation

Appendix C of the *Proposed Roundabout John Oxley Drive, Thrumster Intersection Assessment Report* prepared by Streetwise Road Safety & Traffic Services on behalf of Land Dynamics Australia (Dated: September 2021) outlined estimated traffic generation for the 63-lot industrial subdivision.

The traffic generation in this section of the report looks at both the absolute trip generation based on the land use likely to arise from the current rezoning, and also the change in trips from the change to land uses permissible arising from the change in zoning from E4 to E3.

5.1.1 Traffic Generation – Current Zoning

Noting minor discrepancies in lot areas from those assessed as part of the Streetwise Road Safety & Traffic Services Traffic Assessment and those forming Precinct A, Precinct B, and the Additional lots the report adopted the following gross floor areas (assuming a 70 per cent developable floor area per lot):

- Precinct A:
 - Freight transport 1,924 square metres GFA
 - Warehouse/ distribution centre 1,957 square metres GFA
 - Factory 1,169 square metres GFA
 - Light Industrial 6,671 square metres GFA
- Precinct B:
 - Factory 3,463 square metres GFA
 - Light Industrial 5,322 square metres GFA.
- Additional lots:
 - Factory 7,816 square metres GFA
 - Light Industrial 13,364 square metres GFA

Streetwise Road Safety & Traffic Services adopted the following traffic generation rates:

- 0.5 vehicle trips per 100 square metres GFA in both the AM and PM peak hours for warehouse/ distribution centre uses, and
- one vehicle trip per 100 square metres GFA in both the AM and PM peak hours for all other industrial uses.

The areas forming Precinct A, Precinct B and the Additional lots have been assumed to be the area that forms Stage 1 of the 63-lot industrial subdivision.

On this basis, the estimated traffic generation for lots comprising Precinct A, Precinct B and the additional lots are summarised below:

- Precinct A: 108 vehicle trips during any peak hour.
- Precinct B: 96 vehicle trips during any peak hour.
- Additional lots: 149 vehicle trips during any peak hour

As such, the total traffic volume generated by Precinct A, Precinct B and the Additional lots under the currently permissible industrial uses equates to 353 vehicles during any peak hour.

5.1.2 Traffic Generation – Proposed Rezoning

Traffic generation rates for the proposed rezoning are based on the assumptions that are currently agreed upon between Port Macquarie Hastings Council and TfNSW for existing and future developments along John Oxley Drive linking on to the Oxley Highway.

The following have been considered when estimating the net increase of traffic volumes to be generated by the proposed rezoning compared to the approved volumes:

- A rate of 1.6 and 1.3 vehicular trips per 100 square metres GFA in the AM and PM peak hours respectively for commercial/ industrial retail uses
- A rate of 0.45 vehicular trips per dwelling in both the AM and PM peak hours respectively for medium density units.



The application of the relevant rates are outlined in Table 4.

Table 4.	Traffic	generation	estimates	(vehicular	trins)	1
	Trainc	generation	estimates	(veniculai	uipa	,

Use	Size	Traffic Generation Rate (vehicle trips / hour)		Traffic Generation Estimate (vehicle trips / hour)	
		AM	РМ	AM	PM
		Precinct A			
Commercial/ industrial retail	5,100m ² GFA	1.6 trips/ 100m ² GFA	1.3 trips/ 100m ² GFA	82	66
Residential	80 units	0.45 trips/ unit	0.45 trips/ unit	36	36
	Pro	posed Rezoning	Traffic Volumes	118	102
		Precinct B			
Commercial/ industrial retail	4,900m² GFA	1.6 trips/ 100m² GFA	1.3 trips/ 100m² GFA	78	64
Residential	90 units	0.45 trips/ unit	0.45 trips/ unit	41	41
	Pro	posed Rezoning	Traffic Volumes	119	105
		Additional lots			
Commercial/ industrial retail	7,000 m² GFA	1.6 trips/ 100m² GFA	1.3 trips/ 100m² GFA	112	91
	112	91			
	Cu	mulative Traffic V	olumes		
Total Volumes 349 298					

Table 4 indicates that based on the adopted traffic generation rates the permissible uses in the proposed rezoning would generate 349 and 298 vehicle trips during the AM and PM peak hour, respectively.

5.1.3 Net Traffic Generation

Considering the approved traffic volumes discussed in Section 5.1.1 and estimated traffic volumes as a result of the rezoning shown in Section 5.1.2, there is an estimated net decrease in traffic generation in both peak hours.

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I able	5: Net	cnange	in trip	generation	Trom	approved	uses

Land use scenario	Total trip generation AM	Total tip generation PM		
Approved industrial land uses	353	353		
Updated land use (this proposal)	349	298		
Net change	-5	-55		

Table 5 indicates that the proposed re-zoning results in a net decrease of 5 and 55 vehicles trips during the AM and PM peak hour, respectively as compared to the assessment undertaken by Streetwise.

5.1.4 Proposed Person Trips

Trip generation estimates for the proposal have been sourced from the Roads and Maritime Services Trip Generation Surveys – Medium Density Residential Dwellings (GTA 2013) and Technical Direction: Updated Traffic Surveys (TDT 2013/ 04a).

Commercial/ Industrial retail

TDT 2013/ 04a indicates an average weekday AM peak hour trip generation for warehouse sites surveyed in Sydney 1.41 vehicle trips per 100 square metre GFA. The PM peak hour rates are slightly higher at 1.57 vehicle trips per 100 square metre GFA.

Residential

Roads and Maritime Services Trip Generation Surveys (GTA 2013) indicates an average weekday AM peak hour trip generation for sites surveyed in Newcastle of 0.64 vehicle trips per unit. The PM peak hour rate is slightly higher at 0.88 vehicle trips per unit.

A summary of the person-based trips is shown below in below in Table 6.



Table 6: Tra	ffic generation	estimates	(person t	rips)

Use	Size	Traffic Gene (person-base	eration Rate d trips / hour)	Traffic Genera (person-base	ation Estimate d trips / hour)
		АМ	РМ	AM	РМ
		Precinct A			
Commercial/ industrial retail	5,100m ² GFA	1.41 trips/ 100m ² GFA	1.57 trips/ 100m ² GFA	72	81
Residential	80 units	0.64 trips/ unit	0.88 trips/ unit	52	71
			Total	124	152
		Precinct B			
Commercial/ industrial retail	4,900m ² GFA	1.41 trips/ 100m² GFA	70	77	
Residential	90 units	0.64 trips/ unit	0.88 trips/ unit	58	80
			Total	119	157
		Additional lo	vts		
Commercial/ industrial retail	Commercial/ industrial retail7,000 m² GFA1.41 trips/ 100m² GFA1.57 trips/ 100m² GFA			99	110
	99	110			
	351	419			

It is estimated that the rezoning would potentially generate 351 to 419 person trips during the AM and PM weekday peak hours.

5.1.5 Estimated Travel Demand

The existing ABS journey to work data (2016) has been used to understand the corresponding of trips by transport mode. The above analysis reflects the number of vehicle trips. Table 7 provides a high-level estimate of person trips by mode in each peak expected due to the proposed rezoning.

Table 7 Estimated pe	erson trips by mode
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Mode of Travel	Percentage ¹	Number of trips AM	Number of trips PM
Car (as driver or passenger)	93%	326	390
Walk	3%	11	13
Bus	1%	4	3
Bicycle	1%	4	3
Truck	1%	4	3
Motorbike	1%	4	3

[1] Source: ABS Census 2016

It is noted that there would be some level of trip containment due to the rezoning providing for shop top housing / serviced apartments within the estate, thus allowing essential and skilled workers to reside land uses within the development, and therefore a higher number of active travel trips could be expected.

5.1.6 Estimated Traffic Distribution

The following split between inbound and outbound vehicle trips has been adopted for the high-level assessment.

In the AM peak hour:

- 20 percent inbound and 80 percent outbound for residential trips
- 50 percent inbound and 50 percent outbound for commercial/ industrial retail trips



In the PM peak hour:

- 80 percent inbound and 20 percent outbound for residential trips
- 50 percent inbound and 50 percent outbound for commercial/ industrial retail trips

The ABS Census Journey to work data has been used to provide an estimate of the distribution. The following estimates for trip distribution have been adopted:

- 70 percent of vehicle trips are to/from the east
- 30 percent of vehicle trips are to/from the west.

It is noted that there are likely to be future developments to the west of the site. The impact of these developments on the trip distribution would be considered as part of future development assessments. The resultant turning movements at the site access and John Oxley Drive for the AM and PM peak hours are shown in Figure 19 and Figure 20 respectively.

Figure 19: AM turning movements at John Oxley Drive and site access due to the development



Figure 20: PM turning movements at John Oxley Drive and site access due to the development



5.2 Internal Road Layout

The proposed internal road layout has been designed to minimise conflict between the light and heavy vehicles accessing the different land uses within development. The road along the eastern boundary has been designed to carry heavy vehicle movements to the northern portion of Thrumster Business Park, where the land remains zoned E4 – General Industrial. The roads servicing the proposed E3 – Productivity Support zoning include traffic calming measures, such as changes in pavement surface treatment, to reflect the designed traffic environment

5.3 Active Transport

The proposed rezoning would not impact any pedestrian/ cyclist amenities approved as part of the broader industrial subdivision. The Stage 1 works have been completed, and the lots registered for all land within the rezoning footprint, except for the northern most lot in Precinct B. Connection to the broader active transport network for the Thrumster urban release area, as shown in Figure 17 is already partially in place.

5.4 Public Transport

The existing public bus services runs through John Oxley Drive in the vicinity of the site. The nearest bus stop that is currently served by a bus route is located on John Oxley Drive, a substantial walking distance from the proposed rezoning. Future services as part of the Thrumster urban release indicatively identified a future bus network map with a bus stop located along the eastern boundary of the site (as shown in Figure 9). A new bus stop is already in place on Brush Cherry Boulevard (Figure 7 and Figure 8) and bus services are anticipated to extend to this new bus stop when the Estate develops and demand for the service is created. In this regard, 'Busways' a public bus service provider operating in Thrumster area has been consulted to understand future bus routes and stops in the area, however 'Busways' is not aware of any future bus routes in the area. It is to be noted that any future bus route and bus stop



planning lies within the jurisdiction of TfNSW. It is anticipated that any future public bus services in the area will align the future bus network as shown in Figure 9.

The proposal may result in slightly varied travel patterns to/ from the site to facilitate commercial/ industrial retail and residential uses (i.e., children travelling to/ from school, residents travelling to/ from work, etc.) when compared to the approved industrial uses which could result in a minor increase to patronage to the local public transport facilities. Any such increase would be minimal and not anticipated to materially impact the operation of existing/ future public transport services due to the following reasons:

- The residential component comprises a portion of shop-top housing. Thus, these residents will likely work within the precinct reducing reliance on external public transport services.
- As part of the Thrumster urban release area Council has indicated new cycle paths (both off-road shared paths and on-road cycle paths), as shown in Figure 13, which will connect the precinct to the broader Port Macquarie cycle network. A portion of residents/ workers would be expected to utilise these active transport links.
- Consideration to an increase in public transport patronage would have been considered as part of planning for the broader Thrumster urban release area, and opportunities to increase frequency of existing bus services on John Oxley Drive (which currently are underutilised) could be investigated.

Taking the above factors into consideration, it is expected that no adverse impacts are anticipated to the existing public transport network.

5.5 Surrounding Road Network

The proposal is anticipated to slightly decrease the net traffic generation compared to the approved traffic volume considered in the *Proposed Roundabout John Oxley Drive, Thrumster Intersection Assessment Report*. Minor impact to the trip distribution and pattern is anticipated due to the proposed change in permissible land uses. The residential components of the proposed site would generate different trip patterns during peak hours (e.g., to travel to/from school, work and shopping etc.). However, the proposal would reduce the anticipated number of trips and thus a minor change in trip pattern would not materially have any impacts on surrounding network capacity. Additionally, the proposed rezoning is anticipated to see a reduction in heavy vehicle trips as compared to the currently approved lots due to the change from zone E4 – General Industrial to zone E3 – Productivity Support.

The proposed roundabout on John Oxley Drive at Thrumster is also anticipated to perform satisfactorily with sufficient capacity during peak hour with the previously approved traffic volume generated from the proposed site. With the new traffic volume generated from the proposed rezoning, the roundabout is anticipated to perform similarly or slightly worse. The intersection modelling previously undertaken estimated that the 2-lane roundabout would operate at a level of service B in 2031, which included 50 percent of the estimated Thrumster Business Park traffic.

It is noted that this analysis accounts for approximately half of the 63-lot industrial subdivision used in the assessment described above. This report has shown that the proposed rezoning would result in a small decrease in the net traffic as compared to the current zoning.

This assessment has assumed that the 100 percent of the vehicle traffic to and from the proposed development would be via the roundabout on John Oxley Drive. If there is an additional connection to the surrounding road network via Thrumster Street, this would lessen the impact on the existing roundabout.



6. Conclusion

The following conclusions are made based on the analysis and discussions presented within this report:

- The proposal involves rezoning of 32 lots within the Thrumster Business Park from E4 General Industrial to E3 zoning to provide 17,0000 square metres gross floor area (GFA) of commercial/ industrial retail uses and 170 residential units.
- The proposed development generates a statutory parking requirement of 638 car parking spaces, for the proposed uses.
- The parking area for the proposed development will be developed in accordance with the relevant standards and guidelines, including PMHC DCP 2013 and Australian Standards as part of the future DAs for individual lots.
- The site is expected to result in a net decrease of 5 and 55 vehicle trips during the AM and PM peak hour, respectively compared to the approved industrial uses for the lots, and therefore will have a minor impact on the performance of the surrounding road network.
- With regard to the active and public transport, pedestrian pathways have already been constructed and a bus stop has been constructed nearby that will be expected to serve a future bus route. The rezoning will not impact the surrounding active transport infrastructure or public transport services.

On the above basis the proposal can be approved from a traffic and transport perspective.







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