TOWNSVILLE ROAD & PATHWAY DEMAND RATES

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Planning Report

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**ENGINEERING ASSETS & INFRASTRUCTURE PLANNING
TRATEGIC INFRASTRUCTURE PLANNING**

Quality Information

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Revision History

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EXECUTIVE SUMMARY

Townsville City Council's next Local Government Infrastructure Plan (LGIP) strategically plans transport infrastructure including roads and pathways. Critical to this are housing, employment and education unit demand rates for roads and pathways. These are reviewed herein from traffic volumes extracted from the 2021 calibrated version of the Townsville Aimsun Integrated Model (TAIM). The TAIM traffic volumes have been converted into traffic demands based on trip productions and trip attractions for each person in the Local Government Area (LGA) relative to 413 Growth Model Zones or (GMZs) distributed across the LGA.

The review finds that the representative demand for an average traditional house lot for road transport is 8.39 trip ends/lot, and for pathways is 0.35 trip ends/lot.

1.   INTRODUCTION >>

Unit rates of demand for roads and pathways are key elements in a Local Government Infrastructure Plan (LGIP) and when applied to projections of housing, employment, and education, enable the forecast of demand required for strategic infrastructure planning.

This report documents the derivation of road and pathway unit demand rates under consideration for the next LGIP (LGIP 2022), informed from the 2020-21 property database and traffic volumes extracted from the 2021 calibrated version of the Townsville Aimsun Integrated Model (TAIM)

2. DERIVATION OF THE DEMAND GENERATION RATES FOR LAND USES

Trip generation is essentially the functional relationship between land use described in the definitions of the Queensland Planning Provisions (QPP) and the service provided by the road infrastructure. Using this relationship, a trip generation rate or trip demand rate can be attributed to the following demographic parameters associated with each GMZ.

- Household Numbers in each zone
- Population number 0 to 17 years old in each zone
- Population number 18 to 64 years old in each zone
- Population over 65 years old in each zone
- Numbers of workers (White / Blue) resident in each zone.
- Primary school enrolments in each zone
- Secondary School enrolments in each zone
- Tertiary School enrolments in each zone
- Retail employee (White / Blue / Total) numbers in each zone
- Service employee (White / Blue / Total) numbers in each zone
- Professional employee (White / Blue / Total) numbers in each zone
- Industrial employee (White / Blue / Total) numbers in each zone
- Other employee (White / Blue / Total) numbers in each zone

The above demographic parameters apply specifically to residential land uses and relate to population, household numbers, workers, and populations of certain age groups.

Non-residential land uses have different trip generation rates applying to similar parameters as follows:

- School uses – primary, secondary, and tertiary.
- Retail use
- Service industry use
- Professional industry use.
- Industrial use
- Other employment use

Trip purposes are defined as follows: -

- HBW – Home-based work-related trips.
- HBE – Home based education related trips.
- HBEt – Home Based tertiary education trips.
- HBS – Home based shopping trips
- HBO – Home based "other" trips being trip from and to the home that do not fit into the previous categories.
- NHB – Non-Home-based trips originating & destinating at location not being home.
- CV – commercial vehicle trip which include MCV and HCV.

The purpose of splitting trip generation rates up into these specific parameters is to determine the amount of traffic generation from each land use of defined dimension i.e., number of trips per day. The TAIM traffic model uses a trip end as the unit where trip end (TE) can be either the TE-in or the T-out relative to a specific Origin and Destination on the network.

Table 1 - 2022 Overall - Traffic Demand Rates (trip ends/day)

Category	Units	Generator	Roads	Pathways	Realistic Path Demand
			(Trips ends/unit)	(Trips ends/unit)	(Trips ends/unit)
Students	enrolments (no.)	Pre & primary school	1.84	0.61	0.15
		Secondary school	0.77	0.25	0.06
		Tertiary education	1.12	0.11	0.03
Employment	employees (no.)	Retail	5.48	0.74	0.18
		Services	5.90	0.79	0.20
		Professional	5.03	0.68	0.17
		Industrial	7.54	1.01	0.25
		Other	5.03	0.68	0.17
		Average employment	**5.79**	**0.78**	**0.19**
Housing	dwellings (no.)	Single (rural)	8.02	1.34	0.34
		Single (rural res.)	8.02	1.34	0.34
		Single (urban)	8.02	1.34	0.34
		Units / Other	5.27	0.88	0.22
Population	persons (no.)	HH pop. 0 - 17	2.68	0.76	0.19
		HH pop. 18 - 64	3.63	0.53	0.13
		HH pop. 65 and over	2.34	0.29	0.07
		Average HH population	**2.41**	**2.41**	**0.00**
		Average Trips per res. lot	**8.39**	**1.40**	**0.35**

3. DERIVATION OF REALISTIC PATHWAY DEMAND RATES

In August 2021 a series of footpath counts using cameras were undertaken on the following streets.

- Mount Low Parkway
- North Shore Blvd
- Hooper Street
- Howitt Street
- Bayswater Road
- Mather Street
- Banfield Drive

Comparison of the August 2021 count data with the estimated demand data using the pink 'Pathways' column in table 1 indicated count data is in the range of 15% to 25% of the calculated demand data.

The major factor causing the very low count data is Townsville's very low public transport utilisation rate of between 1 and 1.5%. In major cities with a high PT utilisation rate of 15% like Brisbane pathways are extensively used by PT users walking to bus stops or train stations.

In Townsville because we have very low PT utilisation there is little or no demand on pathways for people walking to bus stops. Therefore, demand for pathways in Townsville is generated primarily by recreational users and not users of public transport, with commuters using the road system and cycling lanes.

To compensate for our very low PT utilisation rate the yellow column "Realistic Path Demand" has been added to the table 5 for the purposes of estimating pathway demand in Townsville.

4. URBAN, RURAL, MAGNETIC ISLAND AND KEY INFILL AREA DEMAND RATES

Traffic demands have been split relative to the City Plan definition of Urban, Rural, Magnetic Island or Key Infill Areas, these demands rates have been extracted from the 2021TAIM model using relative GMZ data as follows:

2022 Urban - Traffic Demand Rates (trip ends/day)			Roads	Pathways	Realistic Path Demand
Category	Units	Generator	(Trips ends/unit)	(Trips ends/unit)	(Trips ends/unit)
Students	enrolments (no.)	Pre & primary school	1.80	0.63	0.16
		Secondary school	0.75	0.26	0.07
		Tertiary education	0.95	0.10	0.02
Employment	employees (no.)	Retail	5.40	0.79	0.20
		Services	5.82	0.85	0.21
		Professional	4.96	0.72	0.18
		Industrial	7.44	1.09	0.27
		Other	4.96	0.72	0.18
		Average employment	**5.72**	**0.83**	**0.21**
Housing	dwellings (no.)	Single (rural)	7.97	1.43	0.36
		Single (rural res.)	7.97	1.43	0.36
		Single (urban)	7.97	1.43	0.36
		Units / Other	5.24	0.94	0.23
Population	persons (no.)	HH pop. 0 - 17	2.63	0.79	0.20
		HH pop. 18 - 64	3.41	0.53	0.13
		HH pop. 65 and over	2.33	0.30	0.07
		Average HH population	**2.51**	**2.51**	**0.63**
		Average Trips per res. lot	**8.34**	**1.49**	**0.37**

2022 Rural - Traffic Demand Rates (trip ends/day)			Roads	Pathways	Realistic Path Demand
Category	Units	Generator	(Trips ends/unit)	(Trips ends/unit)	(Trips ends/unit)
Students	enrolments (no.)	Pre & primary school	4.96	2.16	0.54
		Secondary school	2.07	0.90	0.22
		Tertiary education	0.00	0.00	0.00
Employment	employees (no.)	Retail	5.53	0.55	0.14
		Services	5.96	0.59	0.15
		Professional	5.08	0.51	0.13
		Industrial	7.62	0.76	0.19
		Other	5.08	0.51	0.13
		Average employment	**5.85**	**0.58**	**0.15**
Housing	dwellings (no.)	Single (rural)	5.84	0.73	0.18
		Single (rural res.)	5.84	0.73	0.18
		Single (urban)	5.84	0.73	0.18
		Units / Other	3.84	0.48	0.12
Population	persons (no.)	HH pop. 0 - 17	2.44	0.77	0.19
		HH pop. 18 - 64	3.23	0.31	0.08
		HH pop. 65 and over	2.41	0.24	0.06
		Average HH population	**1.92**	**1.92**	**0.48**
		Average Trips per res. lot	**6.11**	**0.77**	**0.19**

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2022 Magnetic Island - Traffic Demand Rates (trip ends/day)			Roads	Pathways	Realistic Path Demand
Category	Units	Generator	(Trips ends/unit)	(Trips ends/unit)	(Trips ends/unit)
Students	enrolments (no.)	Pre & primary school	2.31	0.74	0.18
		Secondary school	0.96	0.31	0.08
		Tertiary education	0.00	0.00	0.00
Employment	employees (no.)	Retail	5.55	0.56	0.14
		Services	5.98	0.60	0.15
		Professional	5.10	0.51	0.13
		Industrial	7.64	0.77	0.19
		Other	5.10	0.51	0.13
		Average employment	**5.87**	**0.59**	**0.15**
Housing	dwellings (no.)	Single (rural)	4.71	0.56	0.14
		Single (rural res.)	4.71	0.56	0.14
		Single (urban)	4.71	0.56	0.14
		Units / Other	3.10	0.37	0.09
Population	persons (no.)	HH pop. 0 - 17	3.16	0.83	0.21
		HH pop. 18 - 64	4.27	0.43	0.11
		HH pop. 65 and over	2.41	0.24	0.06
		Average HH population	**1.23**	**1.23**	**0.31**
		Average Trips per res. lot	**4.93**	**0.59**	**0.15**

2022 Key Infill Area - Traffic Demand Rates (trip ends/day)			Roads	Pathways	Realistic Path Demand
Category	Units	Generator	(Trips ends/unit)	(Trips ends/unit)	(Trips ends/unit)
Students	enrolments (no.)	Pre & primary school	1.64	0.28	0.07
		Secondary school	0.68	0.12	0.03
		Tertiary education	0.00	0.00	0.00
Employment	employees (no.)	Retail	5.74	0.56	0.14
		Services	6.18	0.60	0.15
		Professional	5.26	0.51	0.13
		Industrial	7.90	0.77	0.19
		Other	5.26	0.51	0.13
		Average employment	**6.07**	**0.59**	**0.15**
Housing	dwellings (no.)	Single (rural)	11.79	1.22	0.30
		Single (rural res.)	11.79	1.22	0.30
		Single (urban)	11.79	1.22	0.30
		Units / Other	7.75	0.80	0.20
Population	persons (no.)	HH pop. 0 - 17	3.30	0.56	0.14
		HH pop. 18 - 64	7.13	0.67	0.17
		HH pop. 65 and over	2.45	0.30	0.08
		Average HH population	**2.06**	**2.06**	**0.52**
		Average Trips per res. lot	**12.34**	**1.27**	**0.32**