



# **Waikato Regional Transport Model**

## Land Use Variables

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### **Technical Note No. 31**

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January 2017

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### Quality Assurance Statement

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## 1. Introduction

A significant component of the Waikato Regional Transportation Model (WRTM) is the land use data, which is used in the trip generation stage of the model. The trip generation model encompasses both the trip production model (trips from the home end) as well as the trip attraction model (trips from the non-home end).

In simple terms, trip generation calculates the number of trips made from each home (and the total of non-home based trips) while trip attraction determines where people go.

There are five broad types of land use data required as input to the WRTM, which are persons, households, vehicles, jobs and school places. Persons, households and vehicles are used in the trip generation model, while jobs and school places are the primary input to the trip attraction model.

All land use data should ideally be provided by model zone. The model zoning and the different types of land use are described below.

## 2. Model Zoning

The main source of base year land use data is Statistics New Zealand's 2013 Census. The smallest Census geographical unit is meshblock level, which vary in size from part of a city block to large areas of rural land. To enable use of the Census data in the model, model zones are generally formed from aggregations of Census meshblocks.

In the rural areas of the model, zones are generally consistent with Census area units. In the urban area referred to as Greater Hamilton, the model zones are geographically smaller and may be aggregations of meshblocks, whole meshblocks or parts of meshblocks such that each zone has approximately 400 combined households and jobs, with households and jobs split where practical.

The preferred form of the land use data input to the model is by model zone level. The model zones are shown in the figure uploaded to the project web site.

### 3. Persons, Households and Vehicles

The main input to the trip generation model is the number of households in each of 10 household categories. This information is calculated by the model for each forecast year. The household categories used in the WRTM are listed below.

- **Households With No Children:**
  - One adult working
  - One adult not working
  - Two adults both working
  - Two adults neither working
  - Two adults one working
  - Three or more adults
- **Household With Children:**
  - Two person family
  - Three person family
  - Four person family
  - Five or more person family

In terms of definitions, household uses the Census definition. An adult is defined as a person aged 19 years or above, so conversely, a child must be aged 18 years or below. The first 6 household categories include households where all occupants are aged 19 years or above (i.e. adults). Household categories 7 to 10 therefore include households with at least one child.

Total households by model zone are required.

Aside from the household data, other data associated with trip generation required for each forecast year includes:

- Total persons in the study area;
- Average number of persons per household for each model zone;
- Average number of employed persons per household for each model zone;
- Total number of vehicles in the study area, using the Census definition; and
- Average vehicles per household for each model zone.

The first three items are attained from Census data for input to the model.

The last two items will be produced by TDG. A trend analysis of historic vehicle numbers will be applied to estimate the forecast total vehicles for the study area. A saturation rate will also be imposed in terms of vehicles per thousand population to ensure the model forecasts are realistic, with an asymptotic upper limit on vehicle availability. These vehicles will then be distributed across the study area using existing patterns and changes in forecast household composition by area.

In terms of forecast data, Statistics New Zealand publish population projections for low, medium and high growth scenarios. These are available on-line by area unit for the years 2013, 2016, 2021, 2026 and 2031.

## 4. Jobs and School Places

Jobs and school places are the main input to the trip attraction model. These are required for all future years by model zone.

The main source of jobs in the base year (2013) is the 2013 Census conducted by Statistics New Zealand. These are available by industry type defined using the 2006 Australia and New Zealand Standard Industry Classification (ANZSIC06). The ANZSIC06 categories are listed below for reference although an aggregation of these categories is required for input to the model.

Categories	
Division A	Agriculture
Division B	Mining
Division C	Manufacturing
Division D	Electricity, gas, water and waste services
Division E	Construction
Division F	Wholesale trade
Division G	Retail trade
Division H	Accommodation
Division I	Transport, postal and warehousing
Division J	Information media and telecommunications
Division K	Financial and insurance services
Division L	Rental, hiring and real estate services
Division M	Professional, scientific and technical services
Division N	Administrative and support services
Division O	Public administration and safety
Division P	Education and training
Division Q	Health care and social assistance
Division R	Arts and recreation services
Division S	Other services

**Table 1: ANZSIC06 Industry Classification**



In the following table, the grouped jobs required for input to the model by model zone are listed with their definition in terms of ANZSIC06 category.

Model Input	Census Division	Census Division Description
Primary and Secondary Jobs	A	Agriculture, Forestry and Fishing
	B	Mining
	C	Manufacturing
	D	Electricity, Gas, Water and Waste Services
	E	Construction
Agriculture Jobs	A	Agriculture, Forestry and Fishing (required separately by WRTM as well as combined for Primary and Secondary Jobs)
Manufacturing Jobs	C	Manufacturing (required separately by WRTM as well as combined for Primary and Secondary Jobs)
Whole Trade Jobs	F	Wholesale Trade
Retail Trade	G	Retail Trade
Accommodation Jobs	H	Accommodation
Office Jobs	J	Information Media and Telecommunications
	K	Financial and Insurance Services
	L	Rental, Hiring and Real Estate Services
	M	Professional, Scientific and Technical Services
	N	Administrative and Support Services
	O	Public Administration and Safety
Community Jobs	Q	Health Care and Social Assistance
	R	Arts and Recreation Services
	S	Other Services
Total Jobs	All 19	Sum Across all 19 ANZSIC Categories

**Table 2: Model Job Categories Required by Zone**

**Please note:** Category I (Transport, Postal and Warehousing) and Category P (Education and Training) are not used directly in the modelling as they do not contribute to the Trip Attraction Model, see Technical Note 26.

Numbers of school places at primary/secondary and tertiary institutions is also required by model zone. The definition is shown in the following table, with the source for the base year data.

Model Input	Source
School Roll	Total number of combined primary, intermediate and secondary school places. Source for base year data was Ministry of Education July roll data.

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Tertiary Equivalent Full Time Students	Source for base year data was Ministry of Education by campus by provider
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**Table 3: Model School Places Required by Zone**