TN4 - WELLINGTON TRANSPORT ANALYTICAL TOOLS – DATA ANALYSIS

PREPARED FOR GREATER WELLINGTON REGIONAL COUNCIL

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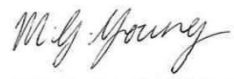
Marran Young		9/2/2021
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Greater Wellington Regional Council

TN4 - Wellington Transport Analytical Tools – Data analysis

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ADDENDUM

1. Introduction

This technical note is part of a series documenting the 2019-2021 update of components of the Wellington Regional Transportation Planning Analytical Tools ("Analytical Tools", "Tools"). The higher-level Analytical Tools are maintained and operated by Greater Wellington Regional Council (GWRC), who are the client for this project. This project is being primarily delivered by Stantec and Jacobs, supported by GWRC transport planners.

The Demand Model, the Wellington Transport Strategy Model (WTSM), is the relevant Tool referred to in this report.

1.1 Purpose of this Report

This report sets out the data collection and analysis for the traffic counts, vehicle travel time, and CBD cordon surveys. The purpose of this exercise is to obtain a set of 'clean' and consistent observed data for model calibration and validation inputs.

2. Definitions

2.1 Screenlines and Counts

2.1.1 Standard Screenlines

The 16 screenlines from the preceding 2013 WTSM revalidation ("2013 update") were adopted for the 2018 update, illustrated in Figure 2-1, Figure 2-2 and Table 2-1 at the end of this section.

Each screenline is also defined tidally as "inbound" or "outbound" from Wellington CBD to improve comprehension and retain consistency with the previous WTSM conventions.

2.1.2 Additional Counts

The counts sites from the 2013 WTSM update were also retained, including the sites not located on screenlines for model validation on a link-basis.

Additional count sites were added at:

- State Highway 1 Kapiti Expressway (count 57), Kapiti (K1) screenline. Count site added due to the Kapiti Expressway opening in February 2017.
- Glenmore Street (site 58), off screenline for validation of the Freight Model.

2.1.3 Final Dataset

The screenlines are listed in Table 2-1 below and illustrated in Figure 2-1 and Figure 2-2.

The full list of traffic count locations is provided in Appendix B at the end of this memo. This includes the site identifier, count direction, location, count's screenline, and tidal direction.

Table 2-1: Traffic Screenlines

Area	Screenline	Sub-Screenline	Description	No. of Links
Wellington City	W1		CBD	31
		W1A	South CBD	10
		W1B	North CBD	11
		W1C	West CBD	4
		W1D	East CBD	6
	W2		Miramar	4
	W3		Karori	4
	W4		Thorndon	6
	W5		Churton Park	4

Area	Screenline	Sub-Screenline	Description	No. of Links
	W6		Wellington South	10
Lower Hutt	L1		Ngauranga to Petone	2
	L2		Lower to Upper Hutt	4
	L3		Lower Hutt	8
	L4		Wainui Stokes	6
Upper Hutt	U1		Upper Hutt North	2
	U2		Upper Hutt South	4
Porirua	P1		Porirua North	4
	P2		SH58	2
	P3		Porirua South	4
Kapiti	K1		Kapiti	6

The "number of links" refers to the number of modelled roads crossing each screenline. Each direction is classified as a separate "link".

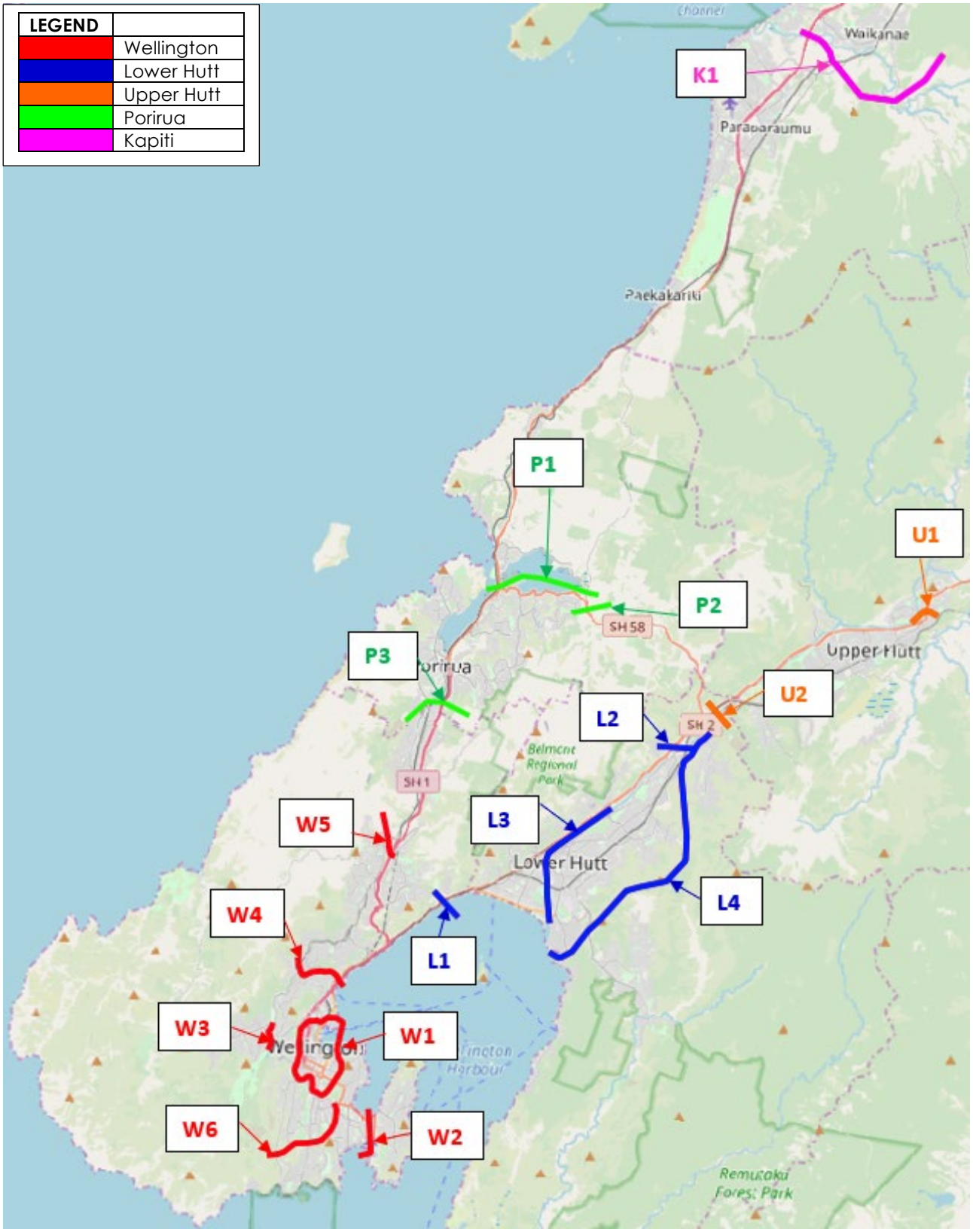

Figure 2-1: Traffic Screenlines

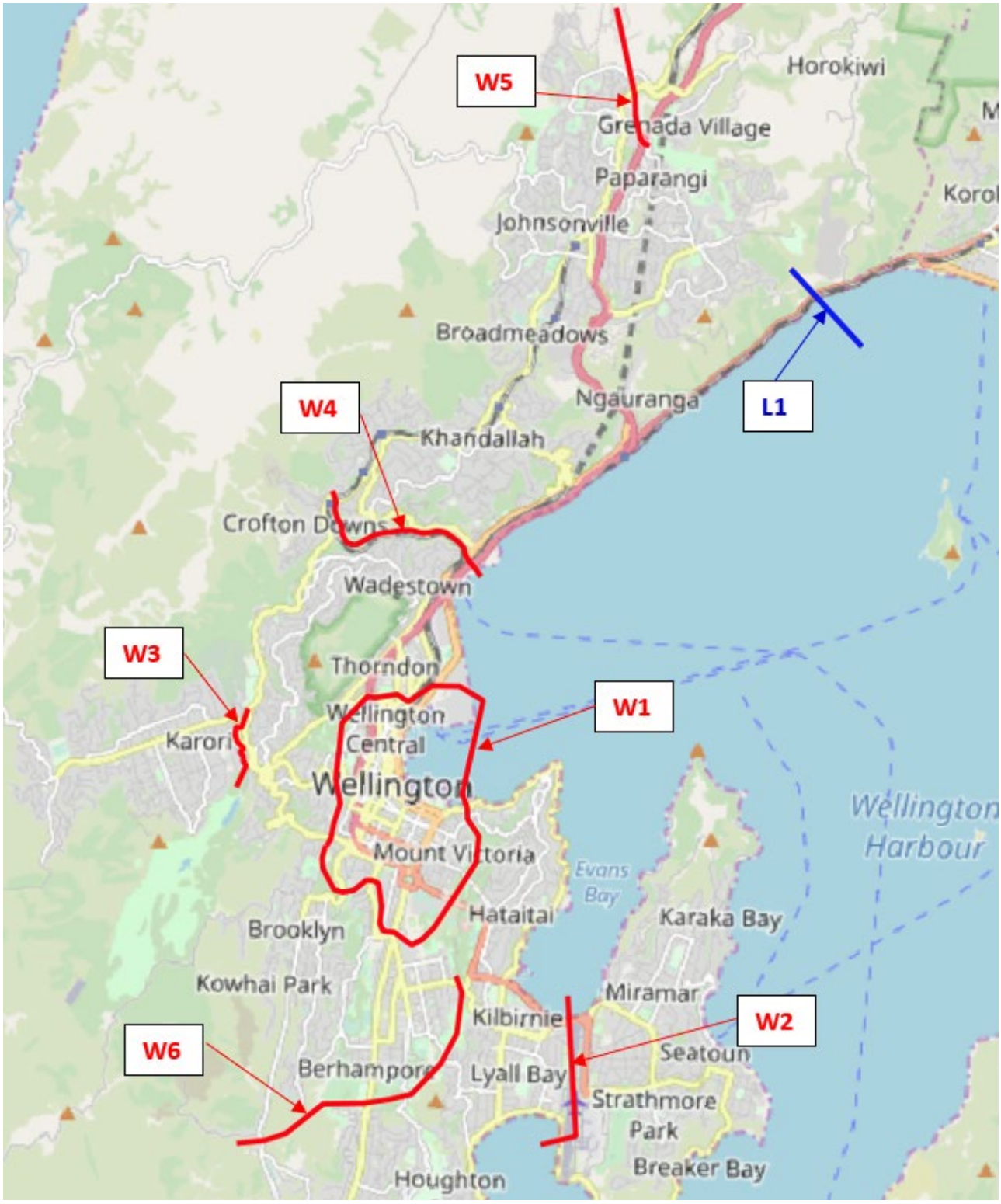

Figure 2-2: Traffic Screenlines - Wellington City

2.2 Weekday Average

Average weekday traffic counts were produced using data from Monday to Friday inclusive. Public and school holidays were excluded.

2.3 Vehicle Types

The counts obtained from Wellington City Council (WCC), Hutt City Council (HCC) and Porirua City Council (PCC) from surveys carried out by Team Traffic were classified using the New Zealand Transport Agency

(NZTA) 2011 Vehicle Classifications. Additional counts from HCC, were provided in their raw Metrocount format and were analysed with NZTA 2011 classifications.

The counts from Kapiti Coast District Council (KCDC) were provided as Metrocount outputs files using TNZ 1999 classifications. The TMS state highway network vehicle counts were split using the NZTA 2011 scheme. Details on NZTA 2011 and TNZ 1999 are included in Appendix A.

The model combines medium (MCV) and heavy vehicles (HCV1 and HCV2) together as "heavy" or "HCV" vehicles user class.

2.4 Model Time Periods

The observed traffic counts were tabulated on an hourly basis Monday to Sunday inclusive.

The current WTSM represents average weekday traffic conditions for the following time periods:

- AM Peak: 0700 to 0900
- Inter Peak: 1100 to 1300
- PM Peak: 1600 to 1800

Historically, traffic counts for these time periods have been used. However, as part of this project the modelled time period will be extended to three hours for the peak periods, and an additional Overnight period will be implemented (so that the four peak periods can be summed to 24 hours). The model period has been agreed with the client, and the detailed peak period analysis can be found in TN2 – Time Period Analysis. The new time periods are therefore as follows:

- AM Peak: 0600 to 0900
- Inter Peak: 0900 to 1500
- PM Peak: 1500 to 1800
- Overnight: 1800 to 0600

To enable this and to provide input into the analysis to identify the most suitable time periods to be modelled, data analysis processes were set up to allow easily modifying the time periods to be included and automatically extract the corresponding observed counts.

In addition, while WTSM historically represented an average annual weekday, it is intended for the updated version to 2018 to be representative of an average March weekday, as discussed in Section 4 of TN1 – Model Specification. The various traffic counts surveys were however carried out during different months and sometimes years and were therefore factored to March 2018. This process is described in Sections 3.4 and 3.5.

3. Traffic Counts

3.1 Overview

Traffic counts were sourced from:

- Local authorities (WCC, HCC, PCC, KCDC)
- NZTA

The same collection approach adopted during the 2013 update was used for this 2018 update with no additional counts commissioned. GWRC worked with the local authorities to ensure counts were collected at the required screenline locations as part of each authority's regular count programme. State Highway counts were collected using NZTA's Traffic Monitoring System (TMS) sites closest to the screenlines.

Where possible data from March 2018 was collected. However, due to the variety of data sources the collection dates range from March 2013 to November 2019. Therefore, in order to cover enough sites to ensure the quality of the model development, the data with collection date closest to March 2018 was used for each site, and factoring processes (i.e. growth factors and seasonal adjustment factors) were applied to bring up / down the data to March 2018 level.

3.2 Processing Non-State Highway Counts

All traffic counts were reviewed to check that:

- The recorded tidality/direction was correct and matched the 2013 directions for consistency;
- The volumes were logical compared to the 2013 counts; and
- The volumes were as expected and there were no data collection failures.

The main issues identified were the following:

- Tasman Street NB & SB (site 14) – The 2018 count is significantly larger than 2013 observed due to the temporary detour caused by the Pukeahu National War Memorial Park construction during the 2013 data collection. This increased 2018 count is considered appropriate and was adopted.
- Eastern Hutt Road South SB (site 26) – Tube failure southbound on Monday from 12:00 to 23:00 during the 2018 data collection. The Monday count was therefore discarded completely, and the remaining Tuesday to Friday count data was used to calculate the weekday average.
- Kennedy Good Bridge EB & WB (site 27) and Waione Street EB (site 30) – Tubes failed to count vehicle class and as a result only total counts were available during the 2018 data collection. These counts have been split using the 2013 update light and heavy splits. The process of this adjustment is detailed below in section 3.6. The adjusted classified data was used.
- Middleton Road NB (site 22) - The 2018 data collection showed the AM counts are 166% greater than 2013 observed. However, checking against 2011 shows that 2013 volumes were much lower, and 2018 is circa 30% higher than 2011. This count was therefore considered appropriate and was adopted.

3.3 Processing State Highway Counts

As mentioned in section 2.1, the most suitable NZTA count sites were determined based on their proximity to the screenlines. Additionally, NZTA uses two different types of counts with distinct uses and characteristics, to collect data on the State Highway network:

- **Dual loop (or Piezo count):** generally permanent counts and therefore useful to analyse trends and seasonal variations. They also classify vehicles; and
- **Single loop:** similar to dual loop but only measure total volumes and do not classify vehicles. They are the most widely used across the state highway network.

Where possible dual loop or piezo count sites were used as they provide detailed counts with light and heavy vehicle splits. Some single loop sites where used where dual loop or piezo counts were unavailable. The light and heavy vehicle proportions, for these sites, were obtained from surrounding sites on the network and applied to the single loop volumes.

Single loop sites include:

- The Terrace interchange (sites 5/5A) – Thorndon Overbridge proportions applied
- Mt Victoria Tunnel – Patterson St (site 8) – Cobham Drive proportions applied
- Churton Park – Grenada interchange (site 23) – Tawa College proportions applied
- Fergusson Drive – Sth of Akatarawa Rd (site 34) – Sth of Whakatiki proportions applied
- Manakau – Nth of Waitohu River Bridge (site 40) – Ohau proportions applied

Compared to the 2013 volumes, there are a couple of sites with significantly different volumes.

First, Cobham Drive NB (site 16-N) has ~46% to 49% lower volumes (2018 vs 2013) during the respective morning and afternoon peaks. However, based on analysis of the raw count data from 2017 to 2019, the observed March 2018 counts seem consistent across the three years, therefore the 2018 March counts were used.

Second, the Nth of Lindale (site 52) volumes are at least 50% lower than 2013 during the morning and afternoon peaks. This is due to the opening of the Kapiti Expressway and removal of state highway status on Main Road post 2017. The 2018 data is therefore considered appropriate and was used.

All sites were also checked for weekday day-to-day variation so that days with low volumes could be removed from the weekly averages. The following sites had days removed:

- Mt Bruce NB – Konini (site 41-N) – Tuesday removed
- Rimutaka Hills NB (site 46-N) – Wednesday removed
- Te Moana Interchange through N (site 57A-N) – Tuesday removed

3.4 Adjustments – Year

For the following sites' counts were collected for a year other than 2018:

- All WCC sites – 2019
- Eastern Hutt Road South (site 26) – 2013
- Kennedy Good Bridge (site 27) – 2015
- Melling Bridge (site 28) – 2015
- Ewen Bridge WB (site 29) – 2013
- Waione Street (site 30) – 2015 EB, 2014 WB
- Stokes Valley Road (site 31) – 2013
- Wainui Hill Road (site 32) – 2013
- Western Hutt Road (site 35) – 2019
- Linden – Tawa College (site 39) – 2019
- Mt Bruce – Konini (site 41) – 2019
- Paekakariki Hill Road (site 44) – 2019
- Elizabeth Street (site 53) – 2017
- High Street (site 56) – 2015

A factor to adjust the counts to 2018 was calculated and applied.

This factor was calculated from the Wellington TMS sites, where AADT was recorded from 2013 to 2019. A list of these sites and relevant data can be found in Appendix C.

The Table 3-1 Yearly Adjustment Factors are calculated by averaging all the individual sites growth factors, which is illustrated in Table 3-1.

Table 3-1: Yearly Adjustment Factors

Year	2013	2014	2015	2016	2017	2018	2019
Factor	1.110	1.098	1.077	1.046	1.025	1.000	0.998

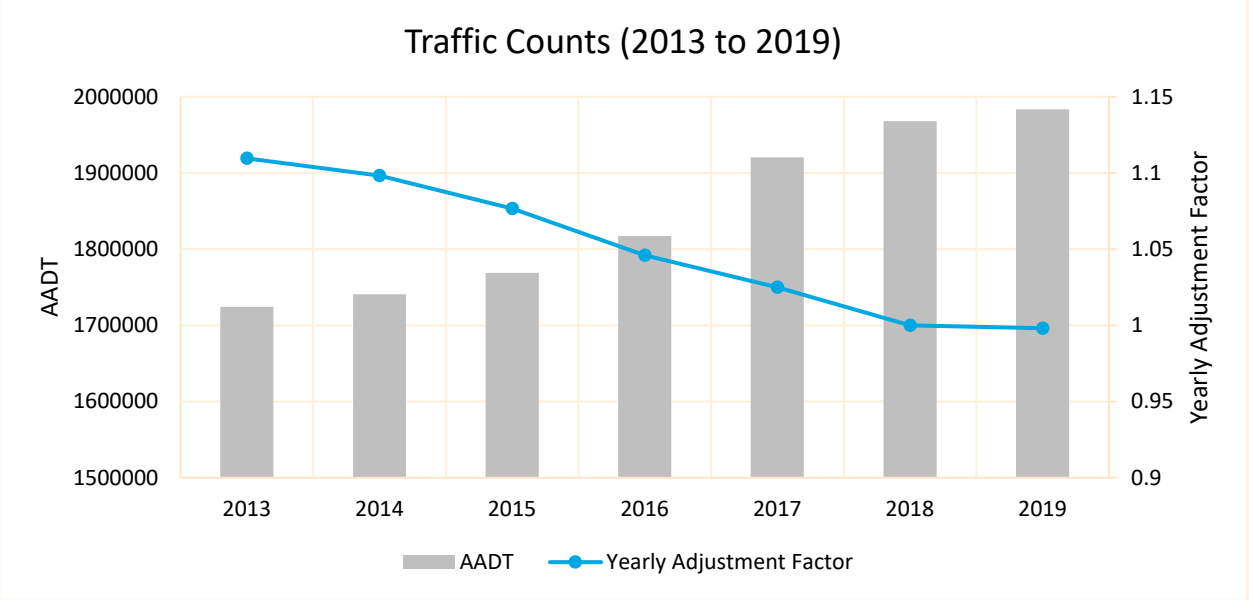

Figure 3-1: Yearly AADT and Adjustment Factors

3.5 Adjustments – Seasonality

It is intended for the 2018 version of WTSM to be representative of the month of March, in alignment with the Census data collection. Due to the non-commissioned nature of the traffic count collection, a few sites represented different months and had to be factored to March.

The following sites were not collected in March:

- Kennedy Good Bridge (site 27) – May
- Ewen Bridge EB (site 29) – April
- Waione Street (site 30) – May EB, September WB
- Wainui Hill Road (site 32) – August
- Marine Drive (site 33) - April
- Western Hutt Road (site 35) – October
- Paekakariki Hill Road (site 44) – May
- Elizabeth Street (site 53) – May
- High Street (site 56) – November

The factors were calculated from counts at the same Wellington TMS telemetry sites that were identified in the 2013 update, except for telemetry sites 3 and 4 which were replaced with Kelson due to lack of data.

An index was set such that for the month of March, the value was one. The index for other months was calculated relative to March based on the average daily traffic volume (both directions of travel combined), by site, and for light and heavy vehicles separately. This monthly / seasonal variation index is plotted below in Figure 3-2 and Figure 3-3 for light and heavy vehicles, respectively. The numeric information is also provided in Table 3-2 and Table 3-3.

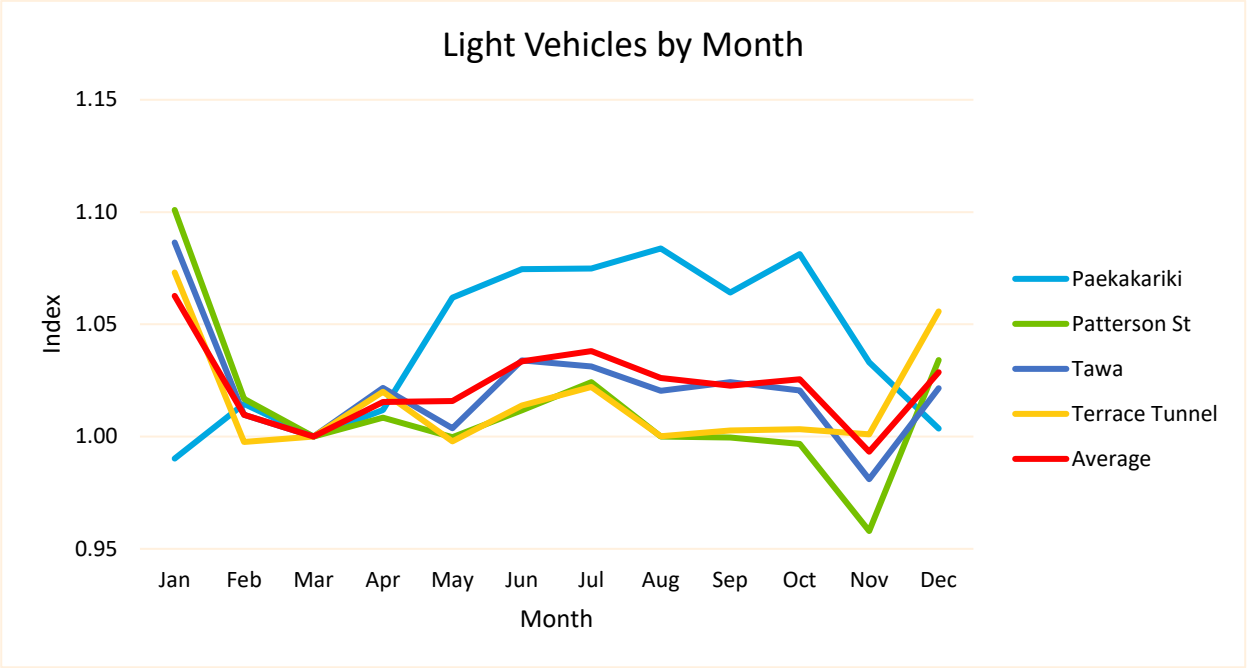

Figure 3-2: Monthly Variation for Light Vehicles

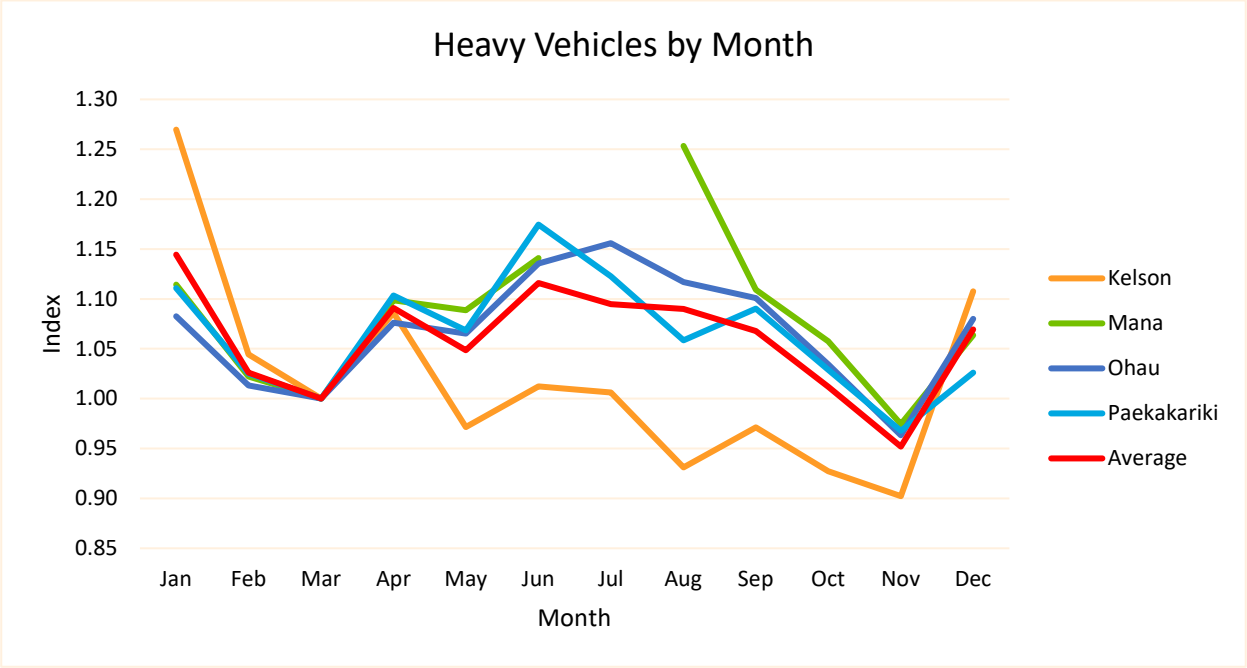

Figure 3-3: Monthly Variation for Heavy Vehicles

Note that for heavy vehicles at the Mana site, data was not available for the month of July (missing from graph).

Table 3-2: Seasonal Variation Index - Light Vehicles

LIGHT VEHICLES SEASONAL INDICES												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Paekakariki	0.99	1.01	1.00	1.01	1.06	1.07	1.07	1.08	1.06	1.08	1.03	1.00
Patterson St	1.10	1.02	1.00	1.01	1.00	1.01	1.02	1.00	1.00	1.00	0.96	1.03
Tawa	1.09	1.01	1.00	1.02	1.00	1.03	1.03	1.02	1.02	1.02	0.98	1.02
Terrace Tunnel	1.07	1.00	1.00	1.02	1.00	1.01	1.02	1.00	1.00	1.00	1.00	1.06
Average	1.06	1.01	1.00	1.02	1.02	1.03	1.04	1.03	1.02	1.03	0.99	1.03

Table 3-3: Seasonal Variation Index - Heavy Vehicles

HEAVY VEHICLES SEASONAL INDICES												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Kelson	1.27	1.04	1.00	1.09	0.97	1.01	1.01	0.93	0.97	0.93	0.90	1.11
Mana	1.11	1.02	1.00	1.10	1.09	1.14	-	1.25	1.11	1.06	0.97	1.06
Ohau	1.08	1.01	1.00	1.08	1.07	1.14	1.16	1.12	1.10	1.03	0.96	1.08
Paekakariki	1.11	1.03	1.00	1.10	1.07	1.17	1.12	1.06	1.09	1.03	0.97	1.03
Average	1.14	1.03	1.00	1.09	1.05	1.12	1.09	1.09	1.07	1.01	0.95	1.07

The index value averaged for each month across all sites was adopted. These average values were applied to the counts identified above to adjust the counts to represent March conditions.

Adjustments factors were checked against 2013 factors and found to be generally consistent.

3.6 Adjustments – Vehicle Classification

For the following sites, counts were not collected by vehicle classes:

- Kennedy Good Bridge (site 27)
- Waione Street EB (site 30)

Factors to split the counts into light and heavy were calculated and applied.

These factors were calculated from the 2013 vehicle classifications for each time period and applied to the updated counts. The site specific factors are provided in Table 3-4.

Table 3-4: Vehicle Class Factors – 2013 Site Specific

	KENNEDY GOOD BRIDGE EB		KENNEDY GOOD BRIDGE WB		WAIONE STREET EB	
	Light	Heavy	Light	Heavy	Light	Heavy
AM	0.952	0.048	0.939	0.061	0.900	0.100
IP	0.912	0.088	0.929	0.071	0.859	0.141
PM	0.956	0.044	0.975	0.025	0.909	0.091
Overnight	0.965	0.035	0.971	0.029	0.924	0.076
Day Counts	0.940	0.060	0.951	0.049	0.888	0.112

4. Travel Times

4.1 Travel Time Routes

Travel time routes analysed for the 2018 WTSM update vary slightly from the routes in the 2013 update, with two additional routes added. The following eight strategic routes, shown in Table 4-1, Figure 4-1 and Figure 4-2, will be used to compare the WTSM modelled travel times to observed.

Table 4-1: WTSM Travel Time Routes

Route	Direction	Description	via
1	N	Wellington Airport to North of Masterton	SH1 and SH2
1	S	North of Masterton to Wellington Airport	SH1 and SH2
2	N	Island Bay to Paekakariki	Waterfront
2	S	Paekakariki to Island Bay	Waterfront
3	N	Centreport to Seaview	Petone Esplanade
3	S	Seaview to Centreport	Petone Esplanade
4	N	Wellington Station to Newlands	Hutt Road
4	S	Newlands to Wellington Station	Hutt Road

Route	Direction	Description	via
5	E	Karori to Miramar	Waterfront and Evans Bay
5	W	Miramar to Karori	Waterfront and Evans Bay
6	E	Waterfront to Airport	Kilbirnie, Newtown and Adelaide Rd
6	W	Airport to Waterfront	Kilbirnie, Newtown and Adelaide Rd
7	E	Wellington Station to Seatoun	Taranaki St, Waterfront
7	W	Seatoun to Wellington Station	via Taranaki St, Waterfront
8	E	Paremata to Haywards	SH 58
8	W	Haywards to Paremata	SH 58

Figure 4-1: Travel Time Routes

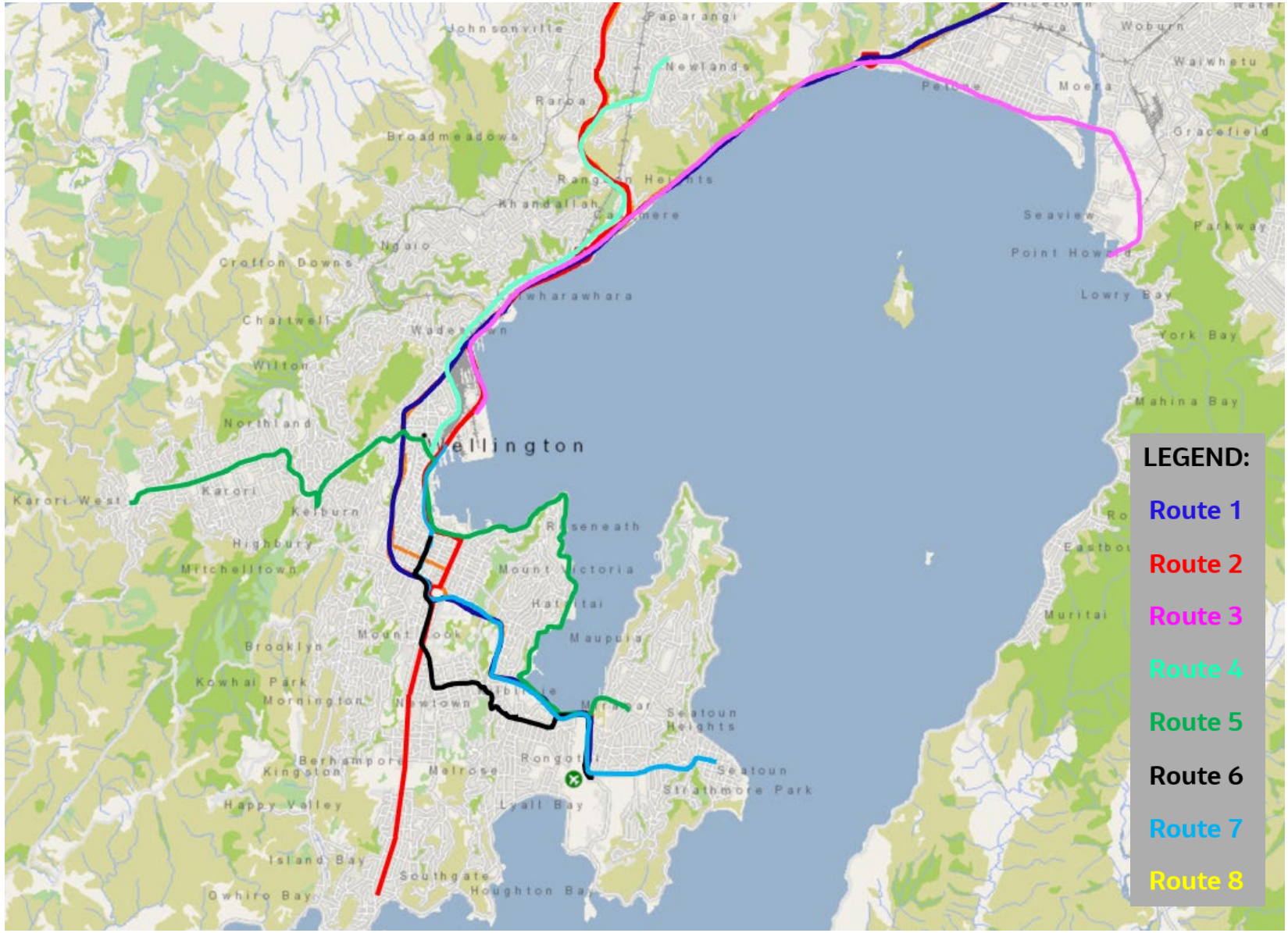

Figure 4-2: Travel Time Routes - Wellington

4.2 Observed Travel Times

Observed vehicle travel times were extracted from TomTom data for March 2018. Data was supplied by time period and weekday.

This data is of a different nature from floating car surveys that are traditionally used, including for earlier updates of WTSM, and some key characteristics must be kept in mind:

- The data does not represent a sample of trips with a defined start time for each route during a certain time period, but represents the sum of aggregate travel time means for each section of the route, and for the whole time period.
- Compared with traditional floating car surveys, minimum and maximum times are not reported in the TomTom data. Instead, 5th and 95th percentile travel times were used as an alternative for each WTSM route and model time period. However, these do not have the same definition in TomTom data as they represent travel times for a vehicle that would experiences the 5th (or 95th) percentile travel times along every single section of the route. This therefore leads to a wider range between 5th and 95th percentile compared with what would be observed if looking at the overall minimum and maximum time along the whole route. As an example, no vehicle will actually experience the reported 95th percentile travel times over the whole of the route. This will have implications that will need to be considered in the interpretation when using this data for validation purposes.

4.3 Processing

The supplied observed data was tabulated to produce weekday average travel times.

The average cumulative travel times were provided by TomTom with the travel time segments ranging from 3 to 1300 metres. The 5th and 95th percentile travel times were produced using the 95th and 5th percentile speeds along each segment. The range of section sizes created an issue when processing as the smaller segments often did not record speeds. To resolve this issue the average travel time was used for the null instances. This is not deemed to have any noticeable impact on the 5th and 95th percentile travel times due to these segments being very short compared with the overall length of travel time routes.

4.4 Validation Dataset

The average travel time and speed for each route (by direction) are provided in the following tables for each of the peak periods defined for the 2018 model, including the 5th and 95th percentile travel times.

Table 4-2: Observed AM Peak Travel Time by Route and Direction

AM PEAK 0600-0900 – OBSERVED					
Route	Distance (km)	Average (min)	Ave Speed (kph)	5th %ile (min)	95th %ile (min)
1N	107.5	112	58	81	169
1S	107.3	129	50	85	208
2N	47.8	54	54	37	90
2S	47.8	69	41	40	137
3N	15.3	18	51	13	28
3S	15.9	35	27	16	69
4N	9.0	15	37	9	29
4S	9.0	20	26	10	45
5E	15.7	32	29	10	20
5W	16.0	34	28	20	70
6E	7.4	18	24	9	44
6W	6.8	19	21	9	47
7E	9.7	20	29	11	46
7W	9.9	28	21	12	64
8E	14.1	14	62	11	18

AM PEAK 0600-0900 – OBSERVED					
Route	Distance (km)	Average (min)	Ave Speed (kph)	5th %ile (min)	95th %ile (min)
8W	14.1	16	54	11	24

Table 4-3: Observed Interpeak Travel Time by Route and Direction

INTERPEAK 0900-1500 – OBSERVED					
Route	Distance (km)	Average (min)	Ave Speed (kph)	5th %ile (min)	95th %ile (min)
1N	107.5	108	60	81	157
1S	107.3	113	57	82	171
2N	47.8	53	54	37	86
2S	47.8	54	53	37	92
3N	15.3	19	50	13	29
3S	15.9	19	49	13	33
4N	9.0	14	38	9	28
4S	9.0	14	39	9	26
5E	15.7	30	31	17	46
5W	16.0	31	31	20	59
6E	7.4	20	23	10	46
6W	6.8	19	21	9	45
7E	9.7	21	28	11	48
7W	9.9	22	27	12	51
8E	14.1	14	62	11	18
8W	14.1	14	62	11	19

Table 4-4: Observed PM Peak Travel Time by Route and Direction

PM PEAK 1500-1800 – OBSERVED					
Route	Distance (km)	Average (min)	Ave Speed (kph)	5th %ile (min)	95th %ile (min)
1N	107.5	124	52	83	211
1S	107.3	116	56	81	187
2N	47.8	72	40	40	153
2S	47.8	60	48	37	116
3N	15.3	24	38	14	47
3S	15.9	18	52	13	31
4N	9.0	15	35	9	33
4S	9.0	15	37	9	31
5E	15.7	32	30	19	60
5W	16.0	39	25	20	89
6E	7.4	23	20	10	60
6W	6.8	25	16	9	65
7E	9.7	25	24	12	60
7W	9.9	34	18	13	85
8E	14.1	13	63	11	17
8W	14.1	13	64	11	17

5. CBD Cordon Survey

In addition to vehicle counts, person trips into Wellington CBD are surveyed each year during the AM peak for a single day in March, and data from March 2017 to March 2019 were obtained. The mode of transport covered by these surveys included:

- Pedestrian trips
- Cycling trips
- Vehicle trips, and
- Public transport trips

A number of limitations apply to use of these surveys, namely:

- They only cover a single day, leading to some variability year to year
- Only inbound trips to the CBD are surveyed
- They cover the AM peak only, and for a different time period than the 2018 revised modelled AM peak

Nevertheless, they can provide a valuable indication of the number of person trips entering the CBD for each mode.

These surveys were undertaken at various locations, refer to Figure 5-1, aiming to cover all person trips and number of vehicles to form an inner-city cordon. Details on the types of survey undertaken are listed below.

- Pedestrian cordon surveys, at 28 sites on the CBD cordon, for the AM peak period (07:00 to 09:00)
- Cycle cordon surveys, at 28 sites on the CBD cordon, for the AM peak period (07:00 to 09:00)
- Vehicle occupancy surveys, at 21 sites on the CBD cordon, for the AM peak period (07:00 to 09:00), split into light vehicles, taxis, vans, and trucks
- Rail station surveys, at 5 sites outside Wellington Station, for the AM peak period (07:00 to 09:00), and
- Bus occupancy surveys, at 10 bus stops around the CBD for the AM peak period (07:00 to 09:00)

All surveys were carried out during a weekday in March.

The 2018 cordon survey data is presented in Table 5-1 to Table 5-3 below. For private vehicles and buses, both number of vehicles and persons counted are shown. The Airport Flyer is also reported separately from other buses.

Table 5-1: Vehicle Occupancy Cordon Survey 2018 AM (07:00-09:00)

LOCATION	LIGHT		TAXI		VAN	TRUCK
	#Vehicles	#People	#Vehicles	#People	#Vehicles	#Vehicles
Oriental Pde	1,188	1,536	257	554	64	47
Majoribanks St	491	643	10	13	18	15
Elizabeth St	187	233	2	4	10	7
Pirie St	147	174	4	7	26	12
Cambridge Tce	1,041	1,443	73	144	74	14
Buckle St	2,561	3,301	83	149	118	20
Tasman St	411	575	0	0	19	4
Taranaki St	597	785	25	45	8	42
Willis St	957	1,238	0	0	115	174
Cuba St	204	271	2	3	16	8
Kelburn Pde	1,304	1,789	37	61	64	18
Vivian St	2,195	2,687	26	39	239	294

LOCATION	LIGHT		TAXI		VAN	TRUCK
	#Vehicles	#People	#Vehicles	#People	#Vehicles	#Vehicles
Aro St	377	531	8	16	24	20
Bowen St	762	1,061	21	37	29	14
Hill Street	490	743	19	40	1	2
Hawkestone St	461	703	9	17	26	22
Murphy St	1,573	2,260	40	61	91	97
Hobson St	483	788	1	3	21	9
Thorndon Quay	1,157	1,736	16	28	130	50
Aotea Quay	1,624	2,240	16	32	169	173
The Terrace	3,194	4,224	17	28	161	28
Total	**21,404**	**28,961**	**666**	**1,281**	**1,423**	**1,070**

Table 5-2: Public Transport Cordon Survey 2018 AM (07:00-09:00)

LOCATION	PUBLIC BUSES		AIRPORT FLYER		TRAIN
	#Vehicles	# People	# Vehicles	#People	#People
Oriental Pde	13	412			
Majoribanks St	4	113			
Elizabeth St	53	2,234	11	175	
Cambridge Tce	54	1,997			
Taranaki St	26	840			
Willis St	21	805			
Kelburn Pde	25	450			
Bowen St	35	1,508			
Murphy St	28	748	4	71	
Thorndon Quay	63	2,632			
Wellington Station					19,981
Total	**322**	**11,739**	**15**	**246**	**19,981**

Table 5-3: Active Mode Cordon Survey 2018 AM (07:00-09:00)

Location	Cycle	Pedestrian
Oriental Pde	270	500
Majoribanks St	81	628
Elizabeth St	58	360
Pirie St	37	351
Cambridge Tce	190	263
Buckle St	32	304
Tasman St	165	470
Taranaki St	41	358
Willis St	62	429
Cuba St	8	402
Vivian St	31	305
Aro St	97	337
Bowen St	21	383
Hill Street	30	360
Hawkestone St	21	245

Location	Cycle	Pedestrian
Murphy St	86	1,163
Hobson St	18	427
Thorndon Quay	450	133
Aotea Quay	7	500
The Terrace	25	343
Victoria St	7	217
Abel Smith St	8	176
Ghuznee St	53	514
Dixon St	8	216
Everton Tce	6	166
Boulcott St	21	203
Aurora Tce	11	306
Bolton St	75	893
Total	**1,914**	**10,952**

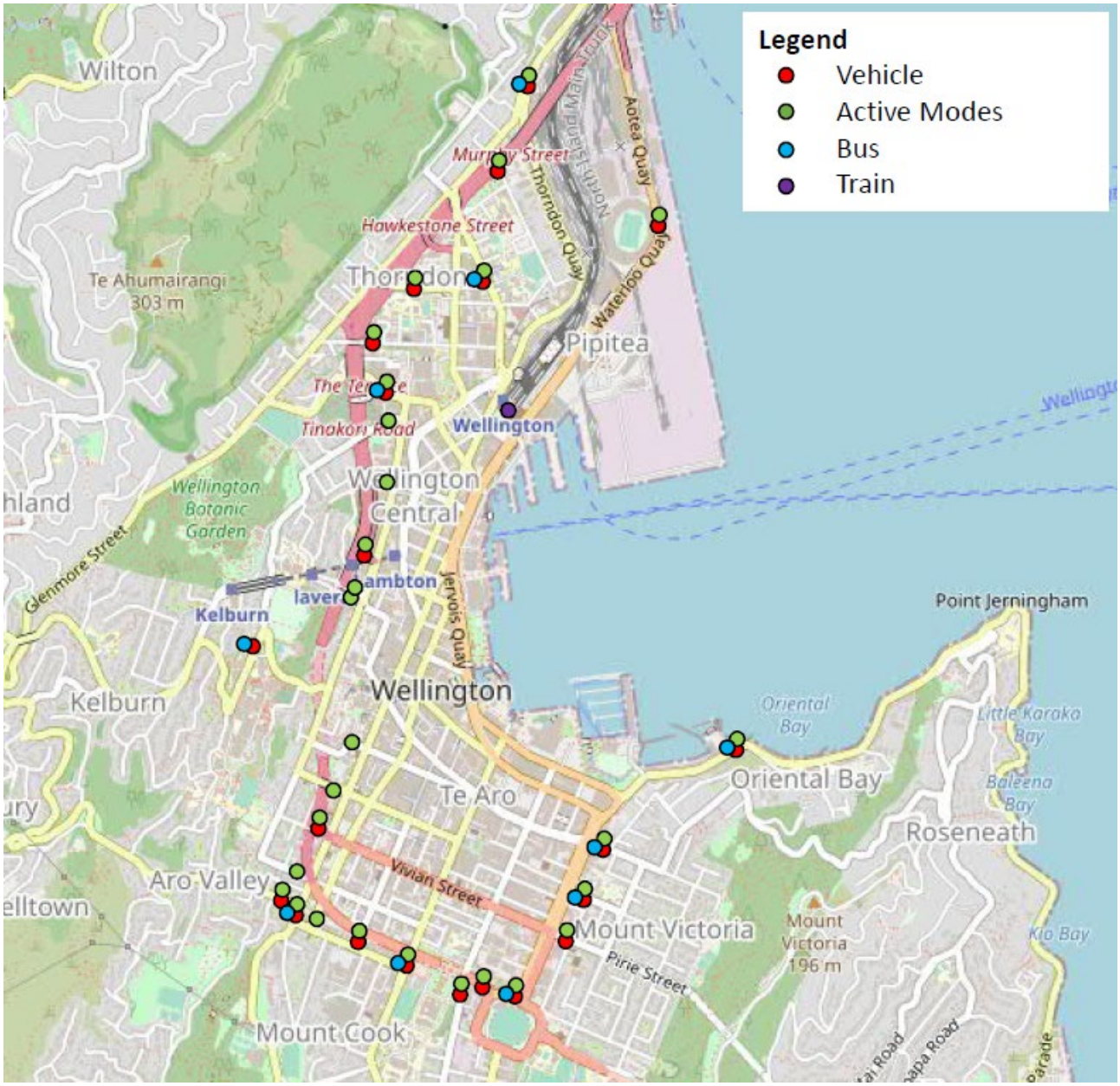

Figure 5-1: Cordon Survey Locations 2018

Appendices

Appendix A Vehicle Classification Schemes

A.1 TNZ 1999

Class	Axles	Axle Configuration	Aggregate	Model Equivalence
1	2	o-o (short)	1 (Car &LCV)	Light
2	3	o-o-o (short towing)		
	4	o-o-oo (short towing)		
3	2	o—o (long)	2 (MCV)	Heavy
4	3	o-oo	3 (HCV1)	Heavy
5	3	o-o—o		
6	4	oo—oo		
7	4	o—o-o—o		
		o-oo—oo		
8	5	o-oo—ooo	4 (HCV2)	Heavy
		o-oo-o—oo		
9	6	o-oo—ooo		
10	6	oo-oo-o—oo		
11	7	o-oo—oo—oo (B-train)		
		o—oo-oo—oo (T&T)		
		o-oo—oo-o—o (A-train)		
12	6-8	oo—oo-o—o		
		oo—oo-o—oo		
		oo—oo-oo—oo		
13	8-9	o-oo—ooo-oo (B-train)		
		o-oo-ooo-o—o (A-train)		
		o-oo-oo-o—oo (A-train)		
		o-oo—ooo-ooo (B-train)		

A.2 NZTA 2011

NZTA Axel Class	Vehicle Types in Class	Axles	Groups	Criteria	Maximum axle spacing < 10m			Length Range (WIM data)	NZTA EEM Class	Light or Heavy	NZTA Length Class	Austroads 1994 Class
					AS1- 2	AS2- 3	AS3- 4					
1	oo (very short 2 ax veh = motorbike)	2	1	2 ax, AS 1 criterion	>=0.5, <1.75	-	-	>1.5 - 2.5	(PC)	Light	VS	1
2	o-o (short 2 axle vehicle = car)	2	2	2 ax, AS 1 criterion	>=1.75, < 3.2	-	-	2.5-5.5 (4-6)	PC & LCV	Light	S	1
3	o-o--o (car towing 1 axle trailer)	3	3	3 ax, AS 1,2 criteria	>2.1, < 3.2	>2.1	-	7 -11	PC & LCV	Light	M	2
	o-o--oo (car towing tandem trailer)	4	3	4 ax, AS 1,3 criteria	>2.1, < 3.2	>2.1	<=1.0	8 -13			M	2
	o-o--o-o (car towing car)	4	4	4 ax, AS 1,2,3 criteria	>2.1, < 3.2	>2.1	>2.1	10 -15			M	2
4	o----o (truck or bus)	2	2	2ax AS 1criterion	> =3.2m			5 - 12	Bus & MCV		M	3
	o--o--o (truck towing light trailer)	3	3	3 ax, AS 1,2 criteria	>=3.2m	>2.1, <=6.8	-	8 -16			L	6
	o--o--oo (truck tow light 2 ax trailer)	4	3	4 ax, AS 1,3 criteria	>=3.2m	>2.1	<=1.0	9 -17			L	7
5	o--oo (truck or bus/coach)	3	2	3 axles, 2 groups	>=3.2m	<=2.1	-	7 -12	Bus & HCV1	Heavy	M	4
	o--oo (tractor without semi-trailer)	3	2	3 axles, 2 groups	>2.1, < 3.2	<=2.1	-	6 -8			M	4
	oo--o (twin steer truck)	3	2	3 axles, 2 groups	<=2.1	-	-	7 -12			M	4
	o--o-----o (artic e.g. bread truck)	3	3	3 ax, AS 1,2 criteria	>=3.2m	>6.8	-	11 -17			L	6
	o--oo---o (truck tow light 1 ax trailer)	4	3	4 ax, AS 1,2,3 criteria	>=3.2m	<=2.1	>2.1	10 -17			L	7
	oo--o---o (twin steer tow 1 ax trailer)	4	3	4 ax, AS 1,3 criteria	<=2.1	-	>2.1	10 -17			L	7
6	oo--oo (heavy truck)	4	2		<=2.1	-	>1.0, <=2.1	7 - 13	HCV1	Heavy	M	5
	o--ooo (heavy truck)	4	2	4,5 axles, 2 groups	>2.1	<=2.1	>1.0, <=2.1	7 -11			M	5
	oo--ooo (heavy truck)	5	2		-	-	-	8 -13			M	5
7	o--o--oo (artic A112)	4	3	4 ax, AS 1,2,3 criteria	>2.1	>2.1	>1.0, <=2.1	12 -18	HCV1	Heavy	L	7
	o--oo--o (artic A121)	4	3	4 ax, AS 1,2,3 criteria	>2.1,<3.2	<=2.1	>2.1	12 -18			L	7
	o--o--o--o (truck tow heavy trailer)	4	4	4 axles, 4 groups	>=3.2	>2.1	> 2.1	13 -17			VL	7
8	o--oo--oo (truck tow light trailer)	5	3		-	-	-	10-18	HCV2	Heavy	VL	8
	o--oo--oo (artic)	5	3	5 axles	-	-	-	12-17			L	8
	o--o-----ooo (artic)	5	3		-	-	-	12 -17			L	8
	o--oo--o--o (T+T)	5	4	3,4,5 groups	-	-	-	13 -18			VL	8
	o-o-o-o-o (mobile crane)	5	5		-	-	-	10 -13			L	8
9	o--oo--ooo (artic)	6	3			-	>2.2,<12.0	13 -18	HCV2	Heavy	L	9
	oo--oo--oo (artic)	6	3		-	-	-	13 -18			L	9
	o--ooo--ooo (artic)	7	3	6-8 axles	-	-	-	> 16			L	9
	o--oo--oooo (artic)	7	3	3 groups	-	-	-	> 17			L	9
	oo--oo--ooo (artic)	7	3		-	-	-				L	9
	oo--oo--oooo (artic)	8	3		-	-	-				L	9
	o--ooo--oooo (artic)	8	3		-	-	-				L	9
10	o--oo--o-oo (T+T)	6	4		-	-	-		HCV2	Heavy	VL	10
	oo--o--o-oo (T+T)	6	4		-	-	-				VL	10
	oo--oo--o--o (T+T)	6	4	6 axles	-	-	-				VL	10
	o--oo--o-o-o (T+T)	6	5	4,5 groups	-	-	-				VL	11
	o--o--oo--o-o (A train)	6	5		-	-	-				VL	11
	o--oo--o--o-o (A train)	6	5		-	-	-				VL	11
11	o--oo--oo-oo (T+T)	7	4		>2.2m	-	-		HCV2	Heavy	VL	10
	o--oo--oo--oo (B train)	7	4	7 axles, not twin steer	>2.2m	-	-				VL	10
	o--oo--oo--o-o (A train)	7	5	(AS 1 criterion)	>2.2m	-	-				VL	11
12	oo--oo--o-oo (T+T)	7	4		<=2.2m	-	-		HCV2	Heavy	VL	10
	oo--o--oo--oo (T+T)	7	4		<=2.2m						VL	10
	oo--oo--oo-oo (T+T)	8	4		<=2.2m	-	-				VL	10
	oo--oo--oo-ooo (T+T)	9	4	7-11 axles	<=2.2m	-	-				VL	10
	oo--oo--ooo-oo (T+T)	9	4	twin steer	<=2.2m	-	-				VL	10
	oo--oo--ooo-ooo (T+T)	10	4	(AS 1 criterion)	<=2.2m	-	-				VL	10
	oo--ooo--oo--ooo (T+T)	10	4		<=2.2m						VL	10
	oo--oo--ooo-oooo (T+T)	11	4		<=2.2m	-	-				VL	10
	various (twin steer A train)	7-11	5		<=2.2m	-	-				VL	11
13	o--oo--ooo-oo (B train)	8	4		>2.2m	-	-		HCV2	Heavy	VL	10
	o--oo--oo--ooo (B train)	8	4		>2.2m	-	-				VL	10
	o--oo--ooo-ooo (B train)	9	4		>2.2m	-	-				VL	10
	o--oo--ooo-oooo (B train)	10	4	8-11 axles	>2.2m	-	-				VL	10
	o--oo--oo--o-oo (A train)	8	5	not twin steer	>2.2m	-	-				VL	11
	o--oo--ooo--o-o (A train)	8	5	(AS 1 criterion)	>2.2m	-	-				VL	11
	o--oo--ooo--o-oo (A train)	8	5		>2.2m	-	-				VL	11
14		any	-	Everything else	-	-	-					

NZTA Length Class: VS= 0.5- 2.0m S=2.0- 5.5m M=5.5- 11m L=11- 17m VL>17m
Axles: Number of axles
Groups: Number of axle groups (an axle group is where axles are less then 2.1m apart.
AS1- 2: Distance between first and second axle
AS2- 3: Distance between second third axle
AS3- 4: Distance between third and fourth axle

Appendix B Traffic Count Locations

Count ID	Direction	Unique Site ID	Location	Screenline ID	Year	Month
1	N	1-N	Waterloo Quay	W1B-O	2019	March
1	S	1-S	Waterloo Quay	W1B-I	2019	March
2	N	2-N	Featherston St	W1B-O	2019	March
2	S	2-S	Featherston St	W1B-I	2019	March
3	N	3-N	Molesworth St	W1B-O	2019	March
4	E	4-E	Bowen St	W1B-I	2019	March
4	W	4-W	Bowen St	W1B-O	2019	March
5	N	5-N	The Terrace Interchange - Hawkestone Interchange mainline	W1B-O	2018	March
5	S	5-S	The Terrace Interchange - Hawkestone Interchange mainline	W1B-I	2018	March
5A	N	5A-N	The Terrace Interchange - Tinakori - NB Off Ramp	W1B-O	2018	March
5A	S	5A-S	The Terrace Interchange - Hawkestone Interchange - SB On Ramp	W1B-I	2018	March
6	N	6-N	Kelburn Pde	W1C-I	2019	March
6	S	6-S	Kelburn Pde	W1C-O	2019	March
7	E	7-E	Aro St	W1C-I	2019	March
7	W	7-W	Aro St	W1C-O	2019	March
8	N	8-N	Mt Vic Tunnel - Patterson St (Sth of Basin Reserve)	W1D-I	2018	March
8	S	8-S	Mt Vic Tunnel - Patterson St (Sth of Basin Reserve)	W1D-O	2018	March
9	N	9-N	Hawker St	W1D-O	2019	March
9	S	9-S	Hawker St	W1D-I	2019	March
10	E	10-E	Oriental Pde	W1D-O	2019	March
10	W	10-W	Oriental Pde	W1D-I	2019	March
11	N	11-N	Ohiro Rd	W1A-I	2019	March
11	S	11-S	Ohiro Rd	W1A-O	2019	March
12	N	12-N	Brooklyn Rd	W1A-I	2019	March
12	S	12-S	Brooklyn Rd	W1A-O	2019	March
13	N	13-N	Taranaki St	W1A-I	2019	March
13	S	13-S	Taranaki St	W1A-O	2019	March
14	N	14-N	Tasman St	W1A-I	2019	March
14	S	14-S	Tasman St	W1A-O	2019	March
15	N	15-N	Adelaide Rd Nth	W1A-I	2019	March
15	S	15-S	Adelaide Rd Nth	W1A-O	2019	March
16	N	16-N	Cobham Drive	W2-I	2018	March
16	S	16-S	Cobham Drive	W2-O	2018	March
17	N	17-N	Moa Point Rd	W2-I	2019	March
17	S	17-S	Moa Point Rd	W2-O	2019	March

Count ID	Direction	Unique Site ID	Location	Screenline ID	Year	Month
18	N	18-N	Chaytor St	W3-O	2019	March
18	S	18-S	Chaytor St	W3-I	2019	March
19	N	19-N	Birdwood St	W3-O	2019	March
19	S	19-S	Birdwood St	W3-I	2019	March
20	E	20-E	Hutt Rd	W4-O	2019	March
20	W	20-W	Hutt Rd	W4-I	2019	March
21	N	21-N	SH1 south of Ngauranga	W5-O	2018	March
21	S	21-S	SH1 south of Ngauranga	W4-I	2018	March
22	N	22-N	Middleton Rd	W5-O	2019	March
22	S	22-S	Middleton Rd	W5-I	2019	March
23	N	23-N	Churton Park - Grenada Interchange	W5-O	2018	March
23	S	23-S	Churton Park - Grenada Interchange	W5-I	2018	March
24	N	24-N	SH2 N of Nga	L1-O	2018	March
24	S	24-S	SH2 N of Nga	L1-I	2018	March
25	N	25-N	SH2 Sth of 58	L2-O	2018	March
25	S	25-S	SH2 Sth of 58	L2-I	2018	March
26	N	26-N	Eastern Hutt Rd South	L2-O	2013	March
26	S	26-S	Eastern Hutt Rd South	L2-I	2013	March
27	E	27-E	Kennedy Good Bridge	L3-O	2015	May
27	W	27-W	Kennedy Good Bridge	L3-I	2015	May
28	E	28-E	Melling Bridge	L3-O	2013	March
28	W	28-W	Melling Bridge	L3-I	2013	March
29	E	29-E	Ewen Bridge	L3-O	2018	April
29	W	29-W	Ewen Bridge	L3-I	2013	March
30	E	30-E	Waione St	L3-O	2015	May
30	W	30-W	Waione St	L3-I	2014	Sept
31	E	31-E	Stokes Valley Rd	L4-O	2013	March
31	W	31-W	Stokes Valley Rd	L4-I	2013	March
32	N	32-N	Wainui Hill Rd	L4-I	2013	August
32	S	32-S	Wainui Hill Rd	L4-O	2013	August
33	N	33-N	Marine Drive	L4-I	2018	April
33	S	33-S	Marine Drive	L4-O	2018	April
34	N	34-N	Fergusson Drive	U1-O	2018	March
34	S	34-S	Fergusson Drive	U1-I	2018	March
35	N	35-N	Western Hutt Road - Combined	U2-O	2019	Oct
35	S	35-S	Western Hutt Road - Combined	U2-I	2019	Oct
35A	N	35A-N	Western Hutt Road	U2-O	2019	Nov
35A	S	35A-S	Western Hutt Road	U2-I	2019	Nov
35B	N	35B-N	Western Hutt Road - NB On Ramp	U2-O	2019	Oct
35B	S	35B-S	Western Hutt Road - SB Off Ramp	U2-I	2019	Oct
36	N	36-N	Eastern Hutt Rd North	U2-O	2013	March

Count ID	Direction	Unique Site ID	Location	Screenline ID	Year	Month
36	S	36-S	Eastern Hutt Rd North	U2-I	2013	March
37	N	37-N	SH58	P2-I	2018	March
37	S	37-S	SH58	P2-O	2018	March
38	N	38-N	Main Road	P3-O	2019	March
38	S	38-S	Main Road	P3-I	2019	March
39	N	39-N	Linden - Tawa College	P3-O	2019	March
39	S	39-S	Linden - Tawa College	P3-I	2019	March
40	N	40-N	Manakau - Nth of Waitohu River Bridge		2018	March
40	S	40-S	Manakau - Nth of Waitohu River Bridge		2018	March
41	N	41-N	Mt Bruce		2019	March
41	S	41-S	Mt Bruce		2019	March
42	N	42-N	Waikowhai St	W4-O	2019	March
42	S	42-S	Waikowhai St	W4-I	2019	March
43	N	43-N	Mana Bridge - Paremata Bridge	P1-O	2018	March
43	S	43-S	Mana Bridge - Paremata Bridge	P1-I	2018	March
44	N	44-N	Paekakariki Hill Road	P1-O	2019	May
44	S	44-S	Paekakariki Hill Road	P1-I	2019	May
45	N	45-N	Nth of Pukerua Bay - PAEKAKARIKI - Telemetry Site 47		2018	March
45	S	45-S	Nth of Pukerua Bay - PAEKAKARIKI - Telemetry Site 47		2018	March
46	N	46-N	Rimutaka Hills		2018	March
46	S	46-S	Rimutaka Hills		2018	March
47	N	47-N	Crawford Rd	W6-I	2019	March
47	S	47-S	Crawford Rd	W6-O	2019	March
48	N	48-N	Manchester St	W6-I	2019	March
48	S	48-S	Manchester St	W6-O	2019	March
49	N	49-N	Mt Albert Rd	W6-I	2019	March
49	S	49-S	Mt Albert Rd	W6-O	2019	March
50	N	50-N	Adelaide Rd	W6-I	2019	March
50	S	50-S	Adelaide Rd	W6-O	2019	March
51	N	51-N	Happy Valley Rd	W6-I	2019	March
51	S	51-S	Happy Valley Rd	W6-O	2019	March
52	N	52-N	Kebble Drive - Nth of Lindale	K1-O	2018	March
52	S	52-S	Kebble Drive - Nth of Lindale	K1-I	2018	March
53	E	53-E	Elizabeth Street	K1-I	2017	May
53	W	53-W	Elizabeth Street	K1-O	2017	May
56	N	56-N	High St		2015	Nov
56	S	56-S	High St		2015	Nov
57	N	57-N	Kapiti Expressway	K1-O	2018	March
57	S	57-S	Kapiti Expressway	K1-I	2018	March
57A	N	57A-N	Te Moana Interchange	K1-O	2018	March

Count ID	Direction	Unique Site ID	Location	Screenline ID	Year	Month
57A	S	57A-S	Te Moana Interchange	K1-I	2018	March
57B	N	57B-N	Te Moana Interchange - NB Off Ramp	K1-O	2018	March
57B	S	57B-S	Te Moana Interchange - SB On Ramp	K1-I	2018	March
58	E	58-E	Glenmore St		2019	March
58	W	58-W	Glenmore St		2019	March

Appendix C Growth Factor Adjustment Data

C.1 AADT 2013 - 2019

Site Ref	Description	2013	2014	2015	2016	2017	2018	2019
ID:00200864	Sth of Readers Cutting	2968	3036	3193	3347	3372	3643	3804
ID:00200883	Sth of Second St (Masterton)	7352	7425	7735	8155	8627	8856	9026
ID:00200886	Sth of Intermediate St (Masterton)	13871	14095	14426	14892	15336	15850	16095
ID:00200895	CLAREVILLE - Telemetry Site 80 - Nth of Whites Line	10677	10871	11146	11811	12457	13216	13645
ID:00200899	Nth of Victoria St (Carterton)	12169	12136	12581	13020	13439	13847	13946
ID:00200906	Sth of Waiohine River Bridge	8946	9148	9555	9797	10209	10678	11001
ID:00200908	Nth of Wood St (Greytown)	8099	8097	8465	8867	8463	9763	9672
ID:00200917	Sth of Tauherenikau River Bridge	5778	5876	6185	6540	6803	7185	7250
ID:00200937	RIMUTAKA - Telemetry Site 01- Pukuratahi River Brg	5683	5724	6089	6338	6703	7120	7380
ID:00200948	Nth of Sunnyview Drive (Birchville)	12405	12583	11239	11320	11396	13178	14896
ID:00200949	Sth of Akaktarawa Rd	18098	18218	18726	19316	20631	20500	21049
ID:00200951	Sth of Totara Park	17628	17614	18171	18571	21015	19746	19295
ID:00200954	Sth of Whakatiki St	23966	24098	24231	24502	26730	27355	28009
ID:00210954	Sth of Whakatiki St - Southbound	11977	12059	11700	11748	13347	13577	13847
ID:00220954	Sth of Whakatiki St - Northbound	11957	12038	12389	12755	13383	13778	14162
ID:00200957	Sth of Craigs Flat	24253	25564	24052	25694	26626	27416	27984
ID:00210965	KELSON - Telemetry Site 99 - SB Lanes	17025	17039	17482	17766	18442	19284	19684
ID:00220965	KELSON - Telemetry Site 99 - NB Lanes	16440	16380	16832	17300	17877	18677	19085
ID:00200969	Nth of Block Rd	34506	34629	35458	36688	38101	39170	39476
ID:00210969	Nth of Block Rd - SB	15705	15775	16252	16853	17219	18115	18224
ID:00220969	Nth of Block Rd - NB	18790	18854	19206	19835	20427	20966	21252
ID:00210972	Dowse Interchange - SB Through Traffic	14142	14202	14601	14955	15371	15847	16094
ID:00220972	Dowse Interchange - NB Through Traffic	14107	14155	14514	14912	15306	15622	16018
ID:00230972	Dowse Interchange - SB ON Ramp	5173	5226	5360	5610	5793	5949	6140
ID:00240972	Dowse Interchange - NB OFF Ramp	4963	4958	5081	5233	5493	5791	5955
ID:00250972	Dowse Interchange - NB ON Ramp	3265	3275	3338	3562	3811	3879	3827
ID:00260972	Dowse Interchange - SB OFF Ramp	4300	4213	4213	4499	4975	5048	4987
ID:00210974	Nth of Petone Interchange - SB	20416	20796	21288	22001	22513	22882	23149
ID:00220974	Nth of Petone Interchange - NB	19164	19317	19831	20328	20842	21453	21694
ID:00230974	Petone - SB ON Ramp	13530	13401	13628	13887	14539	14652	14621

Site Ref	Description	2013	2014	2015	2016	2017	2018	2019
ID:00240974	Petone - NB OFF Ramp	14509	14407	14595	15033	15411	15542	15520
ID:00210978	Nth of Ngauranga Interchange - SB	33367	33596	33079	35225	35895	35105	35676
ID:00220978	Nth of Ngauranga Interchange - NB	33556	33628	34414	34009	35442	36282	36632
ID:00250978	Nth of Ngauranga Interchange - NB ON Ramp	12355	12277	12630	13277	13554	14021	14228
ID:00260978	Nth of Ngauranga Interchange - SB OFF Ramp	12086	12163	12518	11814	13795	13995	14284
ID:00210979	NGAURANGA SH2 - Telemetry Site 3 - SB	21304	21513	21269	22024	22610	23153	23072
ID:00220979	NGAURANGA SH2 - Telemetry Site 4 - NB	21069	21127	21244	21665	22293	22844	22379
ID:01K11011	Peka Peka Int Mainline Southbound	0	0	0	0	8796	8023	7885
ID:01K21011	Peka Peka Int Mainline Northbound	0	0	0	0	8204	7566	7594
ID:01K51011	Peka Peka Int Northbound On Ramp	0	0	0	0	2747	2965	2958
ID:01K61011	Peka Peka Int Southbound Off Ramp	0	0	0	0	2734	2718	2708
ID:01K11017	Te Moana Int Mainline Southbound	0	0	0	0	6967	6772	7136
ID:01K21017	Te Moana Int Mainline Northbound	0	0	0	0	6483	7008	6976
ID:01K31017	Te Moana Int Southbound On Ramp	0	0	0	0	3470	3721	3753
ID:01K41017	Te Moana Int Northbound Off Ramp	0	0	0	0	3662	3835	3873
ID:01K51017	Te Moana Int Northbound On Ramp	0	0	0	0	553	588	593
ID:01K61017	Te Moana Int Southbound Off Ramp	0	0	0	0	584	585	578
ID:01K11023	Kapiti Rd Int Mainline Southbound	0	0	0	0	5806	6312	6554
ID:01K21023	Kapiti Rd Int Mainline Northbound	0	0	0	0	5904	6203	6071
ID:01K31023	Kapiti Rd Int Southbound On Ramp	0	0	0	0	3006	3015	2908
ID:01K41023	Kapiti Rd Int Northbound Off Ramp	0	0	0	0	3192	2892	2813
ID:01K51023	Kapiti Rd Int Northbound On Ramp	0	0	0	0	4220	4599	4740
ID:01K61023	Kapiti Rd Int Southbound Off Ramp	0	0	0	0	4636	4890	4931
ID:01K11027	Poplar Ave Int Mainline Southbound	0	0	0	0	8747	9291	9002
ID:01K21027	Poplar Ave Int Mainline Northbound	0	0	0	0	9096	9135	8921
ID:01K31027	Poplar Ave Int Southbound On Ramp	0	0	0	0	4572	4542	4231

Site Ref	Description	2013	2014	2015	2016	2017	2018	2019
ID:01K41027	Poplar Ave Int Northbound Off Ramp	0	0	0	0	4221	4615	4408
ID:01N00998	Nth of Waitohu River Bridge	14152	14518	15206	16064	16852	16495	9479
ID:01N01001	Nth of Waerenga Rd (Otaki)	16055	16798	17202	17916	18555	19368	19316
ID:01N01011	Marycrest	17471	17900	18516	19688	20498	21399	21756
ID:01N01017	Nth of Elizabeth St (Waikanae)	20633	21103	22090	23051	11870	10098	10168
ID:01N01021	Nth of Lindale	22543	23031	23593	24178	10715	9560	9159
ID:01N01024	Nth of Ihakara St (Paraparaumu)	24611	24900	25527	26050	12172	10387	9208
ID:01N01036	PAEKAKARIKI - Telemetry Site 47 (Piezo Axle Classification)	23091	23455	23984	24338	25424	25504	26048
ID:01N01042	Nth of Wairaka Rd (Pukerua Bay)	23662	23984	24461	24854	26011	26214	26382
ID:01N01045	Taupo Swamp	24788	25285	25863	25854	26710	28194	26311
ID:01N41045	Taupo Swamp - NB Off Ramp	239	222	225	241	277	266	272
ID:01N01049	Mana Esplanade	30424	30269	30870	32423	26270	31216	32529
ID:01N01051	Sth of Papakowhai Footbridge (Divided) Both	38347	38671	39842	41108	41073	41774	43204
ID:01N11051	Sth of Papakowhai Footbridge - SB	19183	19370	19931	20616	21228	21362	21786
ID:01N21051	Sth of Papakowhai Footbridge - NB	19148	19301	19911	20492	19845	20412	21418
ID:01N11053	Porirua Nth Ramp Bridge - SB Through Traffic	16558	16768	17379	16242	18524	18655	18780
ID:01N51053	Porirua Nth Ramp Bridge - NB ON Ramp	9475	9531	9727	10040	10035	10340	10501
ID:01N61053	Porirua Nth Ramp Bridge - SB OFF Ramp	9872	9934	10077	10100	10592	10751	10917
ID:01N11054	Mungavin Interchange - SB Through Traffic	12275	12449	12814	13000	13565	13715	13744
ID:01N21054	Mungavin Interchange - NB Through Traffic	11869	12076	12028	11865	13225	13351	13411
ID:01N31054	Mungavin Interchange - SB ON Ramp	8706	8765	9025	9457	9643	9743	9936
ID:01N41054	Mungavin Interchange - NB OFF Ramp	9334	9435	9960	10072	10690	10861	11015
ID:01N51054	Mungavin Interchange - NB ON Ramp	4932	4940	5120	5319	5581	5707	5778
ID:01N61054	Mungavin Interchange - SB OFF Ramp	4402	4401	4570	4789	4986	5108	5190
ID:01N01058	Tawa College	42284	42833	44106	44061	46634	46929	47638
ID:01N11058	Tawa College - SB	21023	21255	21866	22482	22995	23164	23497
ID:01N21058	Tawa College - NB	21273	21578	22241	21579	23664	23838	24153
ID:01N11060	Tawa Interchange - SB Through Traffic	19251	19378	19897	20609	20945	21071	24381
ID:01N21060	Tawa Interchange - NB Through Traffic	19262	19361	20116	20959	21402	21602	21800
ID:01N31060	Tawa Interchange - SB On Ramp	6840	6938	6885	7035	7228	7431	7599

Site Ref	Description	2013	2014	2015	2016	2017	2018	2019
ID:01N41060	Tawa Interchange - NB Off Ramp	7249	7337	7407	7491	7720	7925	8071
ID:01N11062	Grenada Interchange - SB Through Traffic	24500	24730	25216	25798	26965	26885	28519
ID:01N21062	Grenada Interchange - NB Through Traffic	24979	25550	25950	26714	27362	27717	27963
ID:01N31062	Grenada Interchange - SB On Ramp	2378	2601	2788	2958	3173	3282	3438
ID:01N41062	Grenada Interchange - NB Off Ramp	2236	2436	2589	2729	2908	3035	3149
ID:01N01064	Nth of Helston Rd Overbridge - Both	43110	43860	45080	46115	47807	48240	48714
ID:01N11064	Nth of Helston Rd Overbridge - SB	21790	22142	22741	23343	24162	24394	24646
ID:01N21064	Nth of Helston Rd Overbridge - NB	21335	21718	22339	22772	23645	23846	24067
ID:01N31065	Johnsonville - SB On Ramp	9072	9087	9074	9432	9678	9811	9921
ID:01N11066	Newlands Interchange - SB Through Traffic	29174	29484	29900	30863	31462	33085	32426
ID:01N21066	Newlands Interchange - NB Through Traffic	29620	29799	30210	31460	31848	33469	33983
ID:01N31066	Newlands Interchange - SB On Ramp	5722	5746	5917	6040	6190	6303	6387
ID:01N41066	Newlands Interchange - NB Off Ramp	5444	5479	5681	5726	5993	6114	6223
ID:01N11068	NGAURANGA SH1 - Telemetry Site 3 - SB	21428	22579	22792	23230	23733	24046	24031
ID:01N21068	NGAURANGA SH1 - Telemetry Site 4 - NB	22037	22317	22065	22838	23612	24176	23999
ID:01N21070	Thorndon Overbridge - NB	32120	32345	32597	32675	24027	34303	34687
ID:01N61070	Aotea Quay - SB OFF Ramp	10184	10278	10849	10924	11172	11476	11301
ID:01N11071	Thorndon Overbridge - SB	27090	27339	27217	28104	27973	26932	26891
ID:01N51071	May St - NB On Ramp	4003	4064	4070	3626	3726	3773	3867
ID:01N61071	Murphy St - SB Off Ramp	5582	5602	5640	5521	5598	5610	4436
ID:01N11072	Hawkestone Interchange - SB Through Traffic	23528	23685	23480	24339	24864	25127	25222
ID:01N21072	Hawkestone Interchange - NB Through Traffic	24736	24946	25021	25850	26734	27967	27766
ID:01N31072	Hawkestone Interchange - SB On Ramp	4677	4732	4613	4663	4806	4725	4705
ID:01N51072	Tinakori - NB On Ramp	3501	3598	3672	3774	3856	4043	4136
ID:01N61072	Hawkestone Interchange - SB Off Ramp	3931	3955	3926	3987	4178	4442	4384
ID:01N41073	Tinakori - NB Off Ramp	7081	7044	7150	7226	7350	7260	7421
ID:01N61073	Terrace - SB Off Ramp	8072	8110	8258	8630	9053	9114	10872
ID:01N11074	Terrace Tunnel - SB	20108	20279	19861	20375	20714	20865	20925
ID:01N21074	Terrace Tunnel - NB	24252	24401	24598	25292	26210	26398	26571
ID:01N11075	Vivian St - between Taranaki St and Tory St	20147	20252	20106	20699	21499	21790	22017

Site Ref	Description	2013	2014	2015	2016	2017	2018	2019
ID:01N01076	Patterson St (Sth of Basin Reserve)	38998	38694	37849	39505	39765	40124	40540
ID:01N01077	Ruahine St (Sth of Goa St)	34246	34017	33154	33957	35381	35579	36012
ID:01N01078	Cobham Drive (Sth of Evans Bay Parade) - Both	35441	35025	35237	36458	35283	36465	36097
ID:01N01080	Calabar Rd (Sth of Caledonia St)	23116	22943	23510	24467	24860	25354	25596
ID:05300001	West of Donalds Bridge	2165	2173	2275	2493	2559	2658	2612
ID:05300006	Sth of No.1 Line	1453	1512	1581	1689	1821	1903	1939
ID:05300016	West of Princess St (Martinborough)	2669	2740	2814	3008	3179	3350	3280
ID:05800009	PAUATAHUNUI EAST - Telemetry Site 73	13745	13805	14254	15087	16021	16812	17211
ID:05800011	West of James Cook Drive	8991	9052	9616	10419	11186	11600	11947
ID:05800015	East of Paremata RAB	17113	17148	18021	19143	19616	20129	20565

C.2 Comparative Growth to 2018 Per Site

AVERAGE GROWTH FACTOR		2013	2014	2015	2016	2017	2018	2019
		1.110	1.098	1.077	1.046	1.025	1.000	0.998
Site Ref	Description							
ID:00200864	Sth of Readers Cutting	1.227	1.200	1.141	1.088	1.080	1.000	0.958
ID:00200883	Sth of Second St (Masterton)	1.205	1.193	1.145	1.086	1.027	1.000	0.981
ID:00200886	Sth of Intermediate St (Masterton)	1.143	1.125	1.099	1.064	1.034	1.000	0.985
ID:00200895	CLAREVILLE - Telemetry Site 80 - Nth of Whites Line	1.238	1.216	1.186	1.119	1.061	1.000	0.969
ID:00200899	Nth of Victoria St (Carterton)	1.138	1.141	1.101	1.064	1.030	1.000	0.993
ID:00200906	Sth of Waiohine River Bridge	1.194	1.167	1.118	1.090	1.046	1.000	0.971
ID:00200908	Nth of Wood St (Greytown)	1.205	1.206	1.153	1.101	1.154	1.000	1.009
ID:00200917	Sth of Tauherenikau River Bridge	1.244	1.223	1.162	1.099	1.056	1.000	0.991
ID:00200937	RIMUTAKA - Telemetry Site 01- Pukuratahi River Brg	1.253	1.244	1.169	1.123	1.062	1.000	0.965
ID:00200948	Nth of Sunnyview Drive (Birchville)	1.062	1.047	1.173	1.164	1.156	1.000	0.885
ID:00200949	Sth of Akaktarawa Rd	1.133	1.125	1.095	1.061	0.994	1.000	0.974
ID:00200951	Sth of Totara Park	1.120	1.121	1.087	1.063	0.940	1.000	1.023
ID:00200954	Sth of Whakatiki St	1.141	1.135	1.129	1.116	1.023	1.000	0.977
ID:00210954	Sth of Whakatiki St - Southbound	1.134	1.126	1.160	1.156	1.017	1.000	0.981
ID:00220954	Sth of Whakatiki St - Northbound	1.152	1.145	1.112	1.080	1.030	1.000	0.973
ID:00200957	Sth of Craigs Flat	1.130	1.072	1.140	1.067	1.030	1.000	0.980
ID:00210965	KELSON - Telemetry Site 99 - SB Lanes	1.133	1.132	1.103	1.085	1.046	1.000	0.980
ID:00220965	KELSON - Telemetry Site 99 - NB Lanes	1.136	1.140	1.110	1.080	1.045	1.000	0.979
ID:00200969	Nth of Block Rd	1.135	1.131	1.105	1.068	1.028	1.000	0.992
ID:00210969	Nth of Block Rd - SB	1.153	1.148	1.115	1.075	1.052	1.000	0.994
ID:00220969	Nth of Block Rd - NB	1.116	1.112	1.092	1.057	1.026	1.000	0.987
ID:00210972	Dowse Interchange - SB Through Traffic	1.121	1.116	1.085	1.060	1.031	1.000	0.985
ID:00220972	Dowse Interchange - NB Through Traffic	1.107	1.104	1.076	1.048	1.021	1.000	0.975
ID:00230972	Dowse Interchange - SB ON Ramp	1.150	1.138	1.110	1.060	1.027	1.000	0.969
ID:00240972	Dowse Interchange - NB OFF Ramp	1.167	1.168	1.140	1.107	1.054	1.000	0.972
ID:00250972	Dowse Interchange - NB ON Ramp	1.188	1.184	1.162	1.089	1.018	1.000	1.014
ID:00260972	Dowse Interchange - SB OFF Ramp	1.174	1.198	1.198	1.122	1.015	1.000	1.012
ID:00210974	Nth of Petone Interchange - SB	1.121	1.100	1.075	1.040	1.016	1.000	0.988
ID:00220974	Nth of Petone Interchange - NB	1.119	1.111	1.082	1.055	1.029	1.000	0.989
ID:00230974	Petone - SB ON Ramp	1.083	1.093	1.075	1.055	1.008	1.000	1.002
ID:00240974	Petone - NB OFF Ramp	1.071	1.079	1.065	1.034	1.009	1.000	1.001

AVERAGE GROWTH FACTOR		2013	2014	2015	2016	2017	2018	2019
		1.110	1.098	1.077	1.046	1.025	1.000	0.998
Site Ref	Description							
ID:00210978	Nth of Ngauranga Interchange - SB	1.052	1.045	1.061	0.997	0.978	1.000	0.984
ID:00220978	Nth of Ngauranga Interchange - NB	1.081	1.079	1.054	1.067	1.024	1.000	0.990
ID:00250978	Nth of Ngauranga Interchange - NB ON Ramp	1.135	1.142	1.110	1.056	1.034	1.000	0.985
ID:00260978	Nth of Ngauranga Interchange - SB OFF Ramp	1.158	1.151	1.118	1.185	1.014	1.000	0.980
ID:00210979	NGAURANGA SH2 - Telemetry Site 3 - SB	1.087	1.076	1.089	1.051	1.024	1.000	1.004
ID:00220979	NGAURANGA SH2 - Telemetry Site 4 - NB	1.084	1.081	1.075	1.054	1.025	1.000	1.021
ID:01K11011	Peka Peka Int Mainline Southbound					0.912	1.000	1.018
ID:01K21011	Peka Peka Int Mainline Northbound					0.922	1.000	0.996
ID:01K51011	Peka Peka Int Northbound On Ramp					1.079	1.000	1.002
ID:01K61011	Peka Peka Int Southbound Off Ramp					0.994	1.000	1.004
ID:01K11017	Te Moana Int Mainline Southbound					0.972	1.000	0.949
ID:01K21017	Te Moana Int Mainline Northbound					1.081	1.000	1.005
ID:01K31017	Te Moana Int Southbound On Ramp					1.072	1.000	0.991
ID:01K41017	Te Moana Int Northbound Off Ramp					1.047	1.000	0.990
ID:01K51017	Te Moana Int Northbound On Ramp					1.063	1.000	0.992
ID:01K61017	Te Moana Int Southbound Off Ramp					1.002	1.000	1.012
ID:01K11023	Kapiti Rd Int Mainline Southbound					1.087	1.000	0.963
ID:01K21023	Kapiti Rd Int Mainline Northbound					1.051	1.000	1.022
ID:01K31023	Kapiti Rd Int Southbound On Ramp					1.003	1.000	1.037
ID:01K41023	Kapiti Rd Int Northbound Off Ramp					0.906	1.000	1.028
ID:01K51023	Kapiti Rd Int Northbound On Ramp					1.090	1.000	0.970
ID:01K61023	Kapiti Rd Int Southbound Off Ramp					1.055	1.000	0.992
ID:01K11027	Poplar Ave Int Mainline Southbound					1.062	1.000	1.032
ID:01K21027	Poplar Ave Int Mainline Northbound					1.004	1.000	1.024

AVERAGE GROWTH FACTOR		2013	2014	2015	2016	2017	2018	2019
		1.110	1.098	1.077	1.046	1.025	1.000	0.998
Site Ref	Description							
ID:01K31027	Poplar Ave Int Southbound On Ramp					0.993	1.000	1.074
ID:01K41027	Poplar Ave Int Northbound Off Ramp					1.093	1.000	1.047
ID:01N00998	Nth of Waitohu River Bridge	1.166	1.136	1.085	1.027	0.979	1.000	1.740
ID:01N01001	Nth of Waerenga Rd (Otaki)	1.206	1.153	1.126	1.081	1.044	1.000	1.003
ID:01N01011	Marycrest	1.225	1.195	1.156	1.087	1.044	1.000	0.984
ID:01N01017	Nth of Elizabeth St (Waikanae)	0.489	0.479	0.457	0.438	0.851	1.000	0.993
ID:01N01021	Nth of Lindale	0.424	0.415	0.405	0.395	0.892	1.000	1.044
ID:01N01024	Nth of Ihakara St (Paraparaumu)	0.422	0.417	0.407	0.399	0.853	1.000	1.128
ID:01N01036	PAEKAKARIKI - Telemetry Site 47 (Piezo Axle Classification)	1.104	1.087	1.063	1.048	1.003	1.000	0.979
ID:01N01042	Nth of Wairaka Rd (Pukerua Bay)	1.108	1.093	1.072	1.055	1.008	1.000	0.994
ID:01N01045	Taupo Swamp	1.137	1.115	1.090	1.091	1.056	1.000	1.072
ID:01N41045	Taupo Swamp - NB Off Ramp	1.113	1.198	1.182	1.104	0.960	1.000	0.978
ID:01N01049	Mana Esplanade	1.026	1.031	1.011	0.963	1.188	1.000	0.960
ID:01N01051	Sth of Papakowhai Footbridge (Divided) Both	1.089	1.080	1.048	1.016	1.017	1.000	0.967
ID:01N11051	Sth of Papakowhai Footbridge - SB	1.114	1.103	1.072	1.036	1.006	1.000	0.981
ID:01N21051	Sth of Papakowhai Footbridge - NB	1.066	1.058	1.025	0.996	1.029	1.000	0.953
ID:01N11053	Porirua Nth Ramp Bridge - SB Through Traffic	1.127	1.113	1.073	1.149	1.007	1.000	0.993
ID:01N51053	Porirua Nth Ramp Bridge - NB ON Ramp	1.091	1.085	1.063	1.030	1.030	1.000	0.985
ID:01N61053	Porirua Nth Ramp Bridge - SB OFF Ramp	1.089	1.082	1.067	1.064	1.015	1.000	0.985
ID:01N11054	Mungavin Interchange - SB Through Traffic	1.117	1.102	1.070	1.055	1.011	1.000	0.998
ID:01N21054	Mungavin Interchange - NB Through Traffic	1.125	1.106	1.110	1.125	1.010	1.000	0.996
ID:01N31054	Mungavin Interchange - SB ON Ramp	1.119	1.112	1.080	1.030	1.010	1.000	0.981
ID:01N41054	Mungavin Interchange - NB OFF Ramp	1.164	1.151	1.090	1.078	1.016	1.000	0.986
ID:01N51054	Mungavin Interchange - NB ON Ramp	1.157	1.155	1.115	1.073	1.023	1.000	0.988
ID:01N61054	Mungavin Interchange - SB OFF Ramp	1.160	1.161	1.118	1.067	1.024	1.000	0.984
ID:01N01058	Tawa College	1.110	1.096	1.064	1.065	1.006	1.000	0.985
ID:01N11058	Tawa College - SB	1.102	1.090	1.059	1.030	1.007	1.000	0.986
ID:01N21058	Tawa College - NB	1.121	1.105	1.072	1.105	1.007	1.000	0.987
ID:01N11060	Tawa Interchange - SB Through Traffic	1.095	1.087	1.059	1.022	1.006	1.000	0.864

AVERAGE GROWTH FACTOR		2013	2014	2015	2016	2017	2018	2019
		1.110	1.098	1.077	1.046	1.025	1.000	0.998
Site Ref	Description							
ID:01N21060	Tawa Interchange - NB Through Traffic	1.121	1.116	1.074	1.031	1.009	1.000	0.991
ID:01N31060	Tawa Interchange - SB On Ramp	1.086	1.071	1.079	1.056	1.028	1.000	0.978
ID:01N41060	Tawa Interchange - NB Off Ramp	1.093	1.080	1.070	1.058	1.027	1.000	0.982
ID:01N11062	Grenada Interchange - SB Through Traffic	1.097	1.087	1.066	1.042	0.997	1.000	0.943
ID:01N21062	Grenada Interchange - NB Through Traffic	1.110	1.085	1.068	1.038	1.013	1.000	0.991
ID:01N31062	Grenada Interchange - SB On Ramp	1.380	1.262	1.177	1.110	1.034	1.000	0.955
ID:01N41062	Grenada Interchange - NB Off Ramp	1.357	1.246	1.172	1.112	1.044	1.000	0.964
ID:01N01064	Nth of Helston Rd Overbridge - Both	1.119	1.100	1.070	1.046	1.009	1.000	0.990
ID:01N11064	Nth of Helston Rd Overbridge - SB	1.120	1.102	1.073	1.045	1.010	1.000	0.990
ID:01N21064	Nth of Helston Rd Overbridge - NB	1.118	1.098	1.067	1.047	1.009	1.000	0.991
ID:01N31065	Johnsonville - SB On Ramp	1.081	1.080	1.081	1.040	1.014	1.000	0.989
ID:01N11066	Newlands Interchange - SB Through Traffic	1.134	1.122	1.107	1.072	1.052	1.000	1.020
ID:01N21066	Newlands Interchange - NB Through Traffic	1.130	1.123	1.108	1.064	1.051	1.000	0.985
ID:01N31066	Newlands Interchange - SB On Ramp	1.102	1.097	1.065	1.044	1.018	1.000	0.987
ID:01N41066	Newlands Interchange - NB Off Ramp	1.123	1.116	1.076	1.068	1.020	1.000	0.982
ID:01N11068	NGAURANGA SH1 - Telemetry Site 3 - SB	1.122	1.065	1.055	1.035	1.013	1.000	1.001
ID:01N21068	NGAURANGA SH1 - Telemetry Site 4 - NB	1.097	1.083	1.096	1.059	1.024	1.000	1.007
ID:01N21070	Thorndon Overbridge - NB	1.068	1.061	1.052	1.050	1.428	1.000	0.989
ID:01N61070	Aotea Quay - SB OFF Ramp	1.127	1.117	1.058	1.051	1.027	1.000	1.015
ID:01N11071	Thorndon Overbridge - SB	0.994	0.985	0.990	0.958	0.963	1.000	1.002
ID:01N51071	May St - NB On Ramp	0.943	0.928	0.927	1.041	1.013	1.000	0.976
ID:01N61071	Murphy St - SB Off Ramp	1.005	1.001	0.995	1.016	1.002	1.000	1.265
ID:01N11072	Hawkestone Interchange - SB Through Traffic	1.068	1.061	1.070	1.032	1.011	1.000	0.996
ID:01N21072	Hawkestone Interchange - NB Through Traffic	1.131	1.121	1.118	1.082	1.046	1.000	1.007
ID:01N31072	Hawkestone Interchange - SB On Ramp	1.010	0.999	1.024	1.013	0.983	1.000	1.004
ID:01N51072	Tinakori - NB On Ramp	1.155	1.124	1.101	1.071	1.048	1.000	0.978
ID:01N61072	Hawkestone Interchange - SB Off Ramp	1.130	1.123	1.131	1.114	1.063	1.000	1.013
ID:01N41073	Tinakori - NB Off Ramp	1.025	1.031	1.015	1.005	0.988	1.000	0.978

AVERAGE GROWTH FACTOR		2013	2014	2015	2016	2017	2018	2019
		1.110	1.098	1.077	1.046	1.025	1.000	0.998
Site Ref	Description							
ID:01N61073	Terrace - SB Off Ramp	1.129	1.124	1.104	1.056	1.007	1.000	0.838
ID:01N11074	Terrace Tunnel - SB	1.038	1.029	1.051	1.024	1.007	1.000	0.997
ID:01N21074	Terrace Tunnel - NB	1.088	1.082	1.073	1.044	1.007	1.000	0.993
ID:01N11075	Vivian St - between Taranaki St and Tory St	1.082	1.076	1.084	1.053	1.014	1.000	0.990
ID:01N01076	Patterson St (Sth of Basin Reserve)	1.029	1.037	1.060	1.016	1.009	1.000	0.990
ID:01N01077	Ruahine St (Sth of Goa St)	1.039	1.046	1.073	1.048	1.006	1.000	0.988
ID:01N01078	Cobham Drive (Sth of Evans Bay Parade) - Both	1.029	1.041	1.035	1.000	1.034	1.000	1.010
ID:01N01080	Calabar Rd (Sth of Caledonia St)	1.097	1.105	1.078	1.036	1.020	1.000	0.991
ID:05300001	West of Donalds Bridge	1.228	1.223	1.168	1.066	1.039	1.000	1.018
ID:05300006	Sth of No.1 Line	1.310	1.259	1.204	1.127	1.045	1.000	0.981
ID:05300016	West of Princess St (Martinborough)	1.255	1.223	1.190	1.114	1.054	1.000	1.021
ID:05800009	PAUATAHUNUI EAST - Telemetry Site 73	1.223	1.218	1.179	1.114	1.049	1.000	0.977
ID:05800011	West of James Cook Drive	1.290	1.281	1.206	1.113	1.037	1.000	0.971
ID:05800015	East of Paremata RAB	1.176	1.174	1.117	1.052	1.026	1.000	0.979

ADDENDUM

Stantec | JACOBS

Memo

To:	Greater Wellington Regional Council	From:	Marran Young Jacobs
File:	TN4 Additional Traffic Counts and Screenlines Addendum	Date:	December 8, 2020

INTRODUCTION

This memorandum is an addendum to TN4 – Wellington Transport Analytical Tools – Data Analysis (TN4) for the 2019-2021 Wellington Regional Transportation Planning Analytical Tools ("Analytical Tools", "Tools"). The addendum details the collection and processing of additional observed traffic counts for new screenlines. It is intended that this addendum is used in conjunction with TN4.

NEW SCREENLINES

Twelve screenlines were added for the 2018 update. Two screenlines formalised off-screenline traffic counts (traffic counts that were included in the data used for the 2011 and 2013 updates but not included in any screenline nor used in the validation), U3 Remutaka and P4 Pukerua Bay. The other ten screenlines required collation of additional traffic count data. The descriptions for all the screenlines, new and existing, were updated to better represent their locations. Some existing screenlines also had count sites added. All screenlines are listed in Table 1 and the new ones are shown in Figure 1 to Figure 5. This table is an update to Table 2-1 in TN4.

Table 1: Updated Traffic Screenlines

Area	Screenline	Description	No. of Links	Status
Wellington City	W1A	CBD South	10	Description changed
	W1B	CBD North	11	Description changed
	W1C	CBD West	4	Description changed
	W1D	CBD East	6	Description changed
	W2	Miramar Peninsula	4	Description changed
	W3	Karori	4	-
	W4	Kaiwharawhara	8	Links added and description changed
	W5	Churton Park	4	-
	W6	South Wellington	10	-
	W7	Tawa	6	New
	W8	North Wellington	6	New
	W9	Thorndon	11	New
	W10	CBD Lambton	13	New
	W11	CBD Te Aro North-South	12	New
	W12	CBD Te Aro East-West	9	New
Lower Hutt	L1	Lower Hutt South	2	Description changed
	L2	Lower Hutt North	4	Description changed
	L3	Lower Hutt Central	8	Description changed
	L4	Lower Hutt East	6	Description changed
Upper Hutt	U1	Upper Hutt North	2	-
	U2	Upper Hutt South	6	Links added
	U3	Remutaka	2	New
	U4	Upper Hutt Central	8	New

Area	Screenline	Description	No. of Links	Status
Porirua	P1	Porirua North	4	-
	P2	SH58	2	-
	P3	Porirua South	4	-
	P4	Pukerua Bay	2	New
Kāpiti	K1	Kāpiti North	8	Links added and description changed
	K2	Kāpiti South	2	New
Wairarapa	C1	Wairarapa South	4	New
	C2	Wairarapa North	2	New

ADDITIONAL SCREENLINE TRAFFIC COUNTS

OVERVIEW

Counts were needed for the new screenlines which have been established for the 2018 update. These additional counts were provided by TMS, WCC, and UHCC. Unless otherwise specified, the collation process and adjustment factors are the same as TN4. This section will focus on the new counts and any issues identified with the data.

NEW SITES

41 new sites were added in the Analytics Tools 2018 update to form the new and updated screenlines. These additional counts are listed in Table 2. Some of the TMS sites (35/35A, and 57/57A) are included in TN4, but the site numbers have been updated for clarity. Site 21A has also been added so the screenline is representative of Kaiwharawhara, before State Highway 2 splits from State Highway 1. The location of these counts are shown in Figure 1 to Figure 5.

Table 2: Additional Traffic Counts

Site	Location	Screenline	Source	Year	Month
21A	SH2 - Ngauranga	W4	TMS	2018	Mar
35	Western Hutt Road	U2	TMS	2019	Nov
35A	Western Hutt Road Ramps	U2	TMS	2019	Oct
57	Te Moana Interchange	K1	TMS	2018	Mar
57A	Te Moana Interchange Ramps	K1	TMS	2018	Mar
69	Martinborough	C1	TMS	2018	Mar
70	Greytown - Sth of Waiohine River	C1	TMS	2018	Mar
71	Clareville - Telemetry Site 80 / Masterton	C2	TMS	2018	Mar
72	Sth of MacKays Crossing - Paekakariki	K2	TMS	2018	Mar
73	River Road	U4	TMS	2018	Mar
74	Terrace Tunnel	W10	TMS	2018	Mar
75	Boulcott Street	W10	WCC	2019	May
76	Victoria Street North	W10	WCC	2019	May
77	Willis Street North	W10	WCC	2019	Jun
78	Jervois Quay	W10	WCC	2019	Mar
79	Willeston Street	W10	WCC	2015	Jun
80	Tory Street	W11	WCC	2019	Nov
81	Victoria Street South	W11	WCC	2019	Jul

Site	Location	Screenline	Source	Year	Month
82	Willis Street South	W11	WCC	2019	Jun
83	Cambridge Terrace	W11	WCC	2019	Aug
84	Kent Terrace	W11	WCC	2019	May
85	Vivian Street - SH1	W12	TMS	2018	Mar
86	Arthur Street - SH1	W12	TMS	2018	Mar
87	Courtenay Place	W12	WCC	2019	Mar
88	Frederick Street	W12	WCC	2015	Nov
89	Haining Street	W12	WCC	2015	Nov
90	Jessie Street	W12	WCC	2015	Nov
91	Wakefield Street	W12	WCC	2019	Mar
92	Cable Street	W12	WCC	2019	Nov
93	Tawa Interchange	W7	TMS	2018	Mar
93A	Tawa Interchange Ramps	W7	TMS	2018	Mar
94	Willowbank Road	W7	WCC	2020	Jun
95	Newlands Interchange	W8	TMS	2018	Mar
95A	Newlands Interchange Ramps	W8	TMS	2018	Mar
96	Burma Road	W8	WCC	2019	Sep
97	Thorndon Overbridge	W9	TMS	2018	Mar
97a	Murphy Street Off Ramp	W9	TMS	2018	Mar
98	Grant Rd	W9	WCC	2018	Nov
99	Tinakori Road	W9	WCC	2019	May
100	Thorndon Quay	W9	WCC	2019	Jun
101	Moturoa Street	W9	UHCC	2013	Jun
102	Shakespeare Ave	U4	UHCC	2018	Nov
103	Miro Street	U4	UHCC	2018	Nov
104	Fergusson Drive	U4	UHCC	2018	Nov
105	The Terrace North	W10	WCC	2019	May
106	The Terrace South	W11	WCC	2019	Apr
107	Taranaki St North	W11	WCC	2019	Feb

ADJUSTMENTS

Seasonality

Seasonality adjustments were made in accordance with the process set out in TN4 to ensure all counts were representative of March 2018.

Vehicle Classification

As mentioned in TN4, single loop TMS sites do not record vehicle classification. At sites where light and heavy vehicles splits are not available a nearby TMS sites light and heavy proportions were applied. The additional single loop sites are:

- Sth of MacKays Crossing – Paekakariki (site 72) – Paekakariki Telemetry proportions applied
- Terrace Tunnel (site 74) – Cobham Drive proportions applied
- Vivian Street – SH1 (site 85) – Cobham Drive proportions applied

- Arthur Street – SH1 (site 86) – Cobham Drive proportions applied
- Tawa Interchange (sites 93/93A) – Tawa College proportions applied
- Newlands Interchange (sites 95/95A) – Ngauranga SH1 proportions applied

There was also a similar issue with site 92 Cable Street where only the total count was available. When comparing the opposite direction, Wakefield Street (site 91), proportions to Taranaki Street, Jervois Quay and Cambridge Terrace, it was determined that Cambridge Terrace was most similar. Therefore, Kent Terrace proportions were applied to Cable Street.

Post Covid Counts

The site 94 Willowbank Road traffic counts were recorded in June 2020 after the Covid-19 lockdown. Therefore, a special factor was applied to convert from Covid 2020 counts to 2018 counts. This was done by using the June 2018 and June 2020 counts at the Tawa Interchange to develop a growth factor for Willowbank Road. Earlier counts from Willowbank Road were also considered, however these were from November 2016, during the week of the Kaikoura Earthquake. The decision was made to use the more recent 2020 counts as there was less fluctuation between the weekdays.

ADDITIONAL COUNTS FOR FREIGHT MODEL

For the development of the Freight model, eleven individual count sites were added using MobileRoad and turning count data. Due to the nature of the count data, every hour of every weekday was not collated. Instead overall light and heavy counts for the AM, IP, PM and overnight time periods were extracted. It is also worth noting that the count for site 59 – Port does not represent the exact Port access and exit. Instead, turning count data at the Waterloo Rd / Hinemoa St intersection for the AM, IP and PM periods was used. The overnight period was estimated using derived factors from nearby count sites.

These additional counts are listed in Table 3 with the location shown in Figure 1 to Figure 5.

Table 3: Additional Freight Model Counts

Site	Location	Source	Year	Month
32A	Wainui Hill Rd Ramps	MobileRoad	2019	Jul
59	Port	Turning Counts	2016	Mar
60	Whitehead Rd	MobileRoad	2017	Jul
61	Woodridge Dr	MobileRoad	2017	Jul
62	Mark Ave	MobileRoad	2017	Jul
63	Manor Drive	MobileRoad	2017	Jul
64	Grays Road	MobileRoad	2017	Nov
65	Reikonrangi Rd	MobileRoad	2020	Feb
66	Parkes Line Rd	MobileRoad	2019	May
67	Totara Park Road	MobileRoad	2018	Oct
68	Norana Rd	MobileRoad	2019	Sep

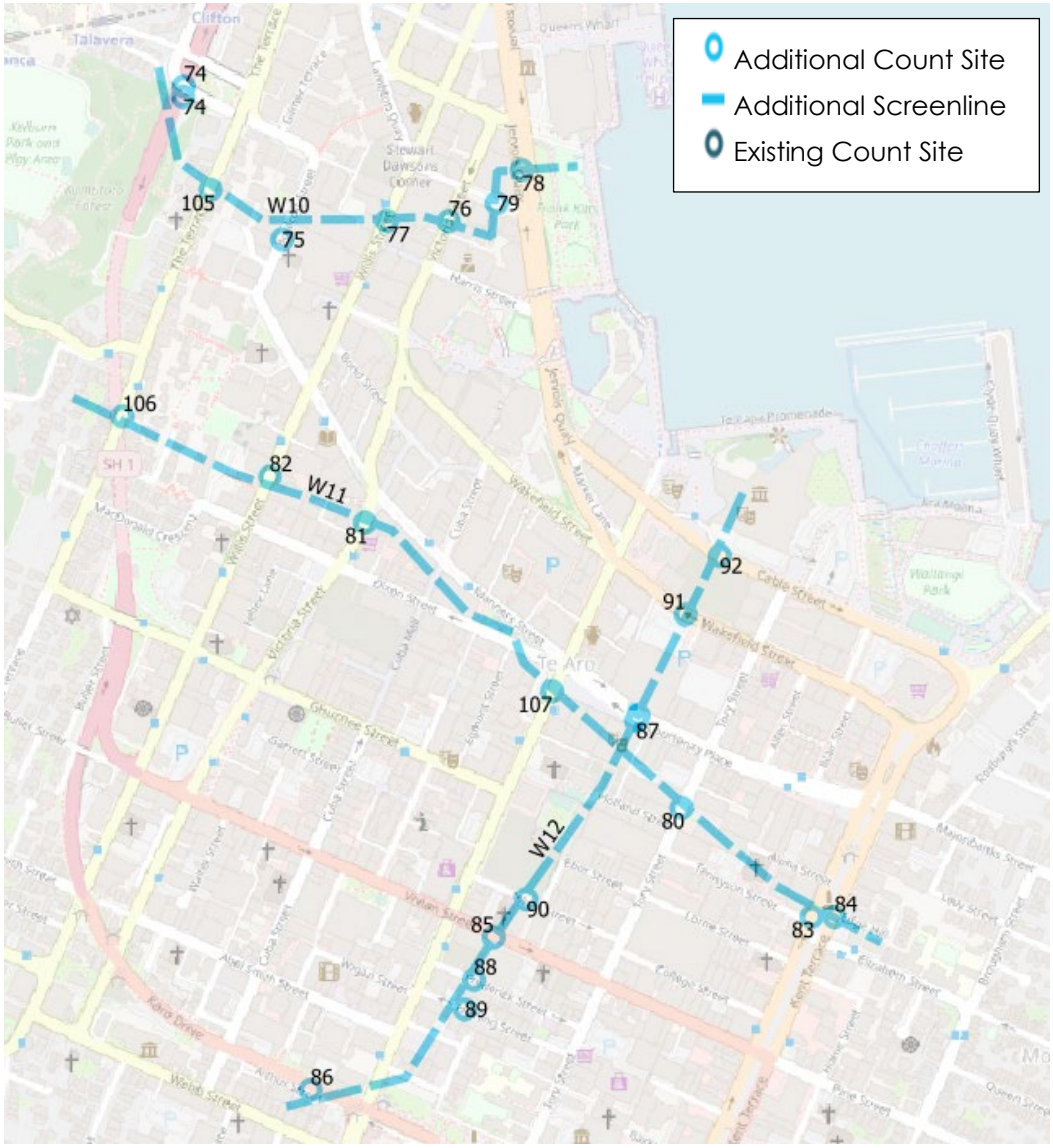

Figure 1: New Screenlines - Wellington CBD

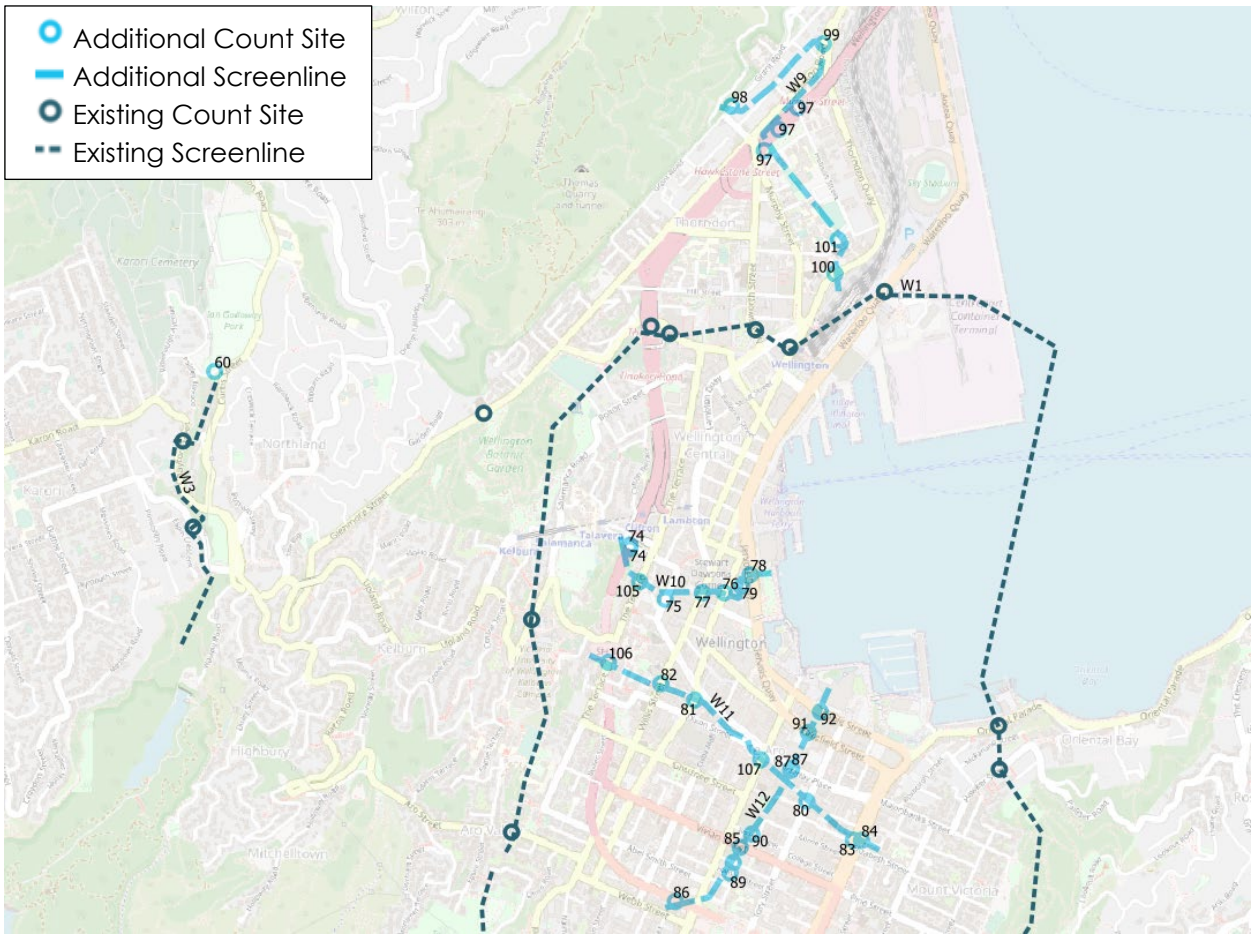

Figure 2: New Screenlines - Wellington Central

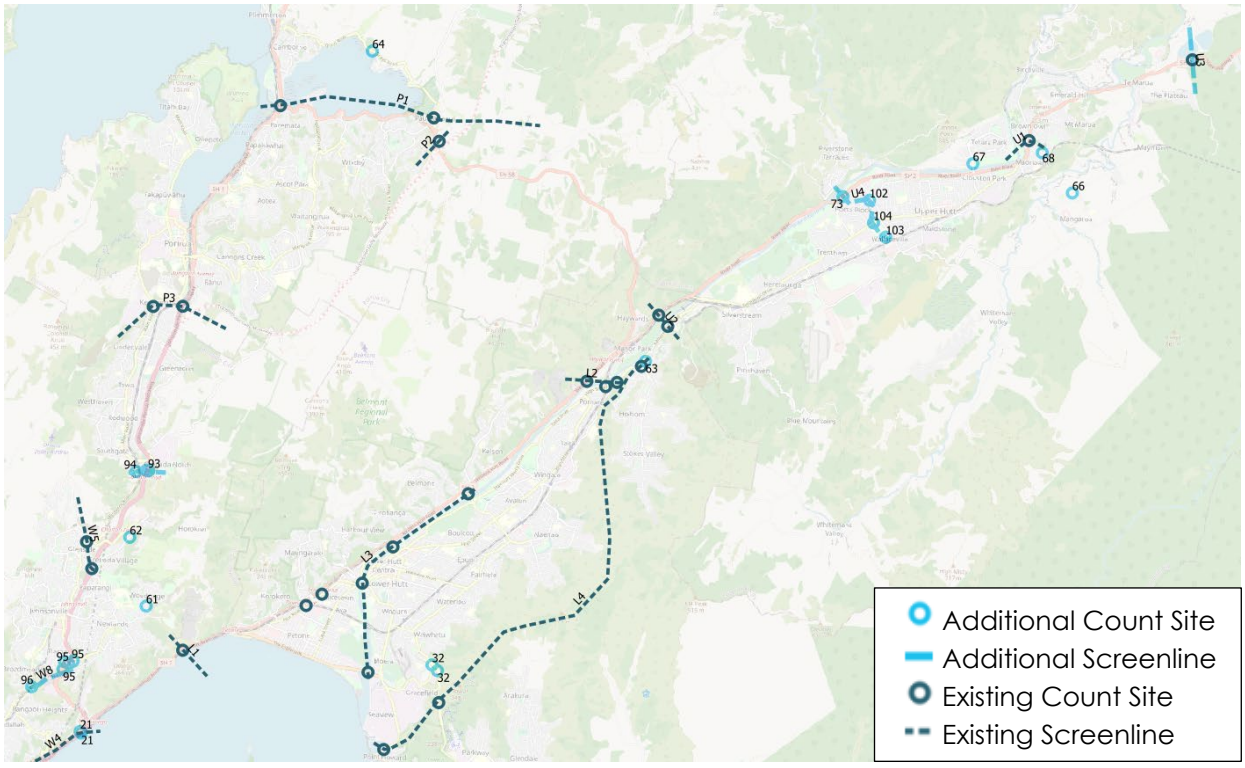

Figure 3: New Screenlines - North Wellington, Porirua, and Hutt Valley

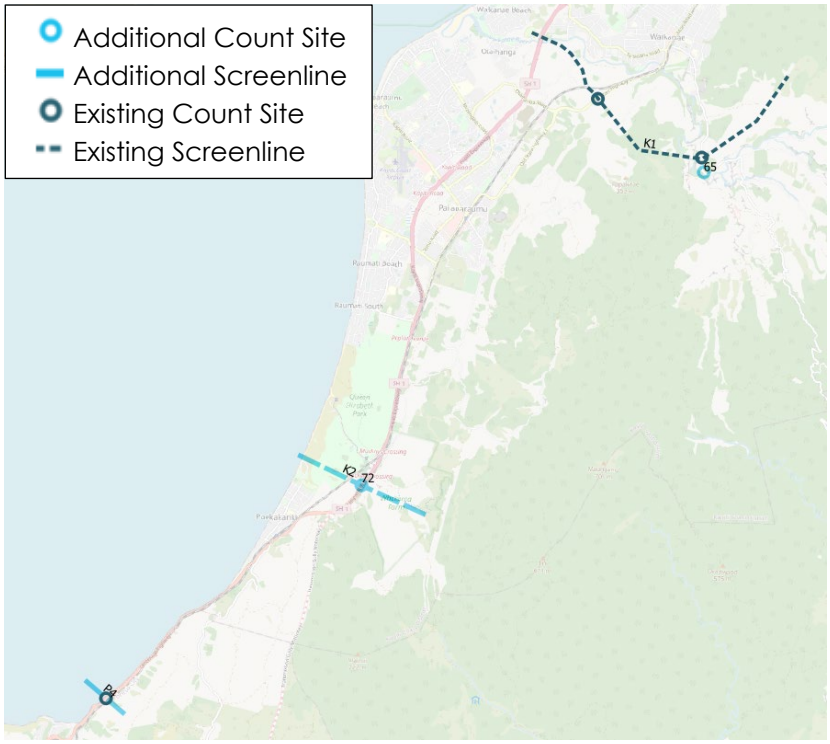

Figure 4: New Screenlines - Pukerua Bay and Kāpiti

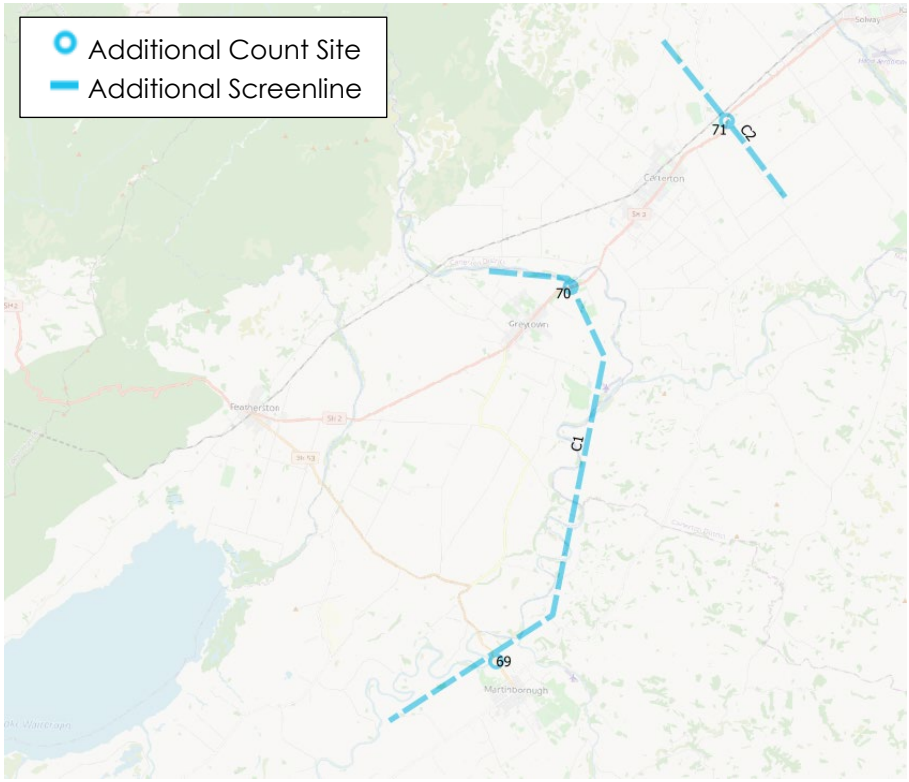

Figure 5: New Screenlines - Wairarapa

CLIENT AND PEER REVIEW COMMENTS ON TN4 ADDENDUM

Comment: The new screenlines improve coverage in the region and within the CBD which will be particularly important for WTAM. Due to the dense zone system in the CBD (relative to the rest of the model) and the fact that many zones straddle links, there might be challenges validating against some of the new CBD screenlines as due to issues of zone loading. This is probably a bridge to cross when we get to it.

Response: Agreed. Screenlines formed were the only possible based on available traffic counts. Validation will need to consider issues with zones loading either side of screenlines that will cross some zones.

Comment: Should W11 include Dixon Street?

Response: W11 is aligned to intersect north-south traffic whereas Dixon Street is east-west. We accept the screenline does cross Dixon Street, but this was required due to the availability of traffic counts.

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